

Low voltage

Masterpact NT and NW

LV power circuit breakers
and switch-disconnectors

Catalogue
2011



Masterpact NT and NW

The standard for power circuit breakers around the world.

Over the years, other major manufacturers have tried to keep up by developing products incorporating Masterpact's most innovative features, including the breaking principle, modular design and the use of composite materials.

In addition to the traditional features of power circuit breakers (withdrawability, discrimination and low maintenance), Masterpact NT and NW ranges offer built-in communications and metering functions, all in optimised frame sizes.

Masterpact NT and NW incorporate the latest technology to enhance both performance and safety. Easy to install, with user-friendly, intuitive operation and environment-friendly design, Masterpact NT and NW are, quite simply, circuit breakers of their time.



Covering all your applications

Masterpact meets the needs of all types of LV electrical distribution networks.



Building

- > Hotels
- > Hospitals
- > Offices
- > Retail



Data Centres and Networks



Industry

- > Mining and minerals
- > Automotive
- > Food and beverage
- > Chemical industry



Energy and Infrastructures

- > Airports
- > Oil and gas
- > Water
- > Electrical energy
- > Marine

An answer to specific applications

- > 1000 V for mining applications
- > Direct current networks
- > Corrosion protection
- > Switch-disconnectors and earthing switches
- > Automatic transfer switching equipment (ATSE) for emergency power systems
- > High electrical endurance applications: Masterpact NT H2 is a high performance device offering high breaking capacity (Icu: 50 kA/480 V) and a high level of discrimination, all in a small volume.

Whenever high short circuit is involved

Masterpact UR is a low voltage ultra rapid opening circuit breaker. Its fault detection rate and its reaction speed mean that it will stop a short circuit from developing. As a result, this is the key component in very high power installations equipped with a number of power sources connected in parallel.

Masterpact UR truly comes into its own when short circuit currents can reach very high levels and when continuity of service is a must: **offshore installations, cement plants, petrochemical industry.** It is also especially suited to electrical installations on board merchant.



All standards

Masterpact is compliant with international standards IEC 60947-1 and 2, IEC 68230 for type 2 tropicalisation, UL489, ANSI, UL1066, CCC and GOST.

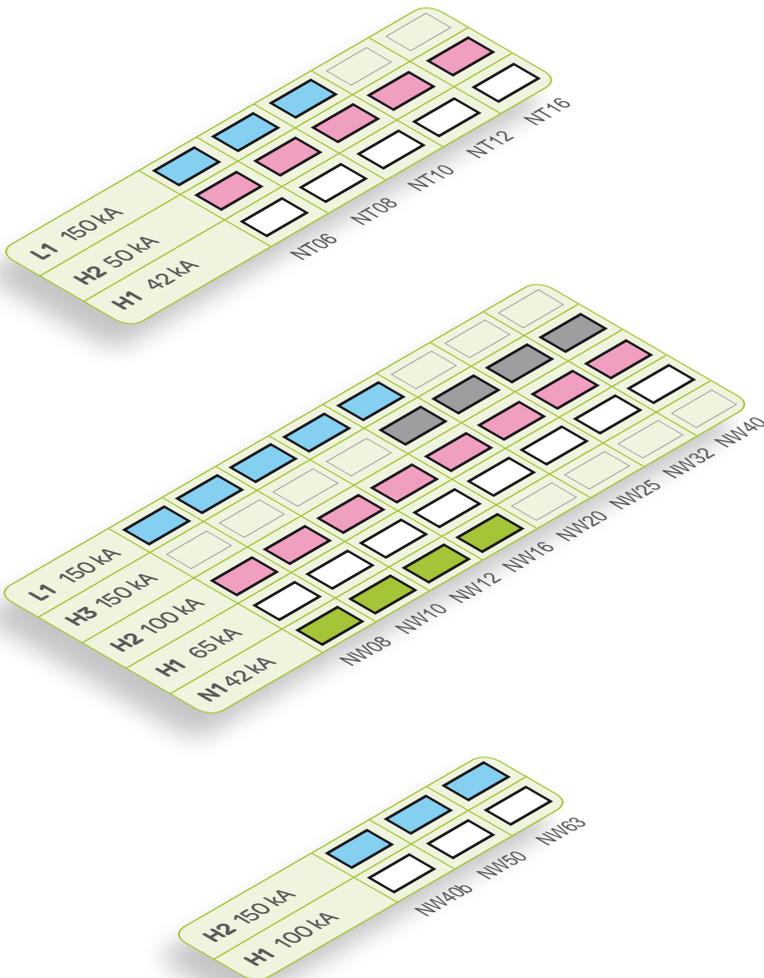
Two families and three frame sizes

The range of power circuit breakers includes two families:

- > Masterpact NT, the world's smallest true power circuit breaker, with ratings from 630 to 1600 A
- > Masterpact NW, in two frame sizes, one from 800 to 4000 A and the other from 4000 A to 6300 A

5 performance levels

- > N1 - for standard applications with low short-circuit levels.
- > H1 - for industrial sites with high short-circuit levels or installations with two parallel-connected transformers.
- > H2 - high-performance for heavy industry where very high short-circuits can occur.
- > H3 - for incoming devices supplying critical applications requiring both high performance and a high level of discrimination.
- > L1 - for high current-limiting capability and a discrimination level (37 kA) as yet unequalled by any other circuit breaker of its type; intended for the protection of cable-type feeders or to raise the performance level of a switchboard when the transformer power rating is increased.



3 sizes:



Masterpact NT 630 to 1600 A



Masterpact NW 800 to 4000 A



Masterpact NW 4000 to 6300 A

Optimised volumes and ease of installation

Aiming at standardising electrical switchboards at a time when installations are increasingly complex, Masterpact provides an unequalled simplicity, both concerning choice and installation.

The smallest circuit breaker in the world

Masterpact NT innovates by offering all the performance of a power circuit breaker in an extremely small volume. The 70 mm pole pitch means a three-pole draw out circuit breaker can be installed in a switchboard section 400 mm wide and 400 mm deep.

Maximum security

The arc chutes absorb the energy released during breaking, thus limiting the stresses exerted on the installation. They filter and cool the gases produced, reducing effects perceptible from the outside.

Optimised volumes

Up to 4000 A, Masterpact NW circuit breakers are all the same size, the same as the old M08 to 32 range. From 4000 A to 6300 A, there is just one size.

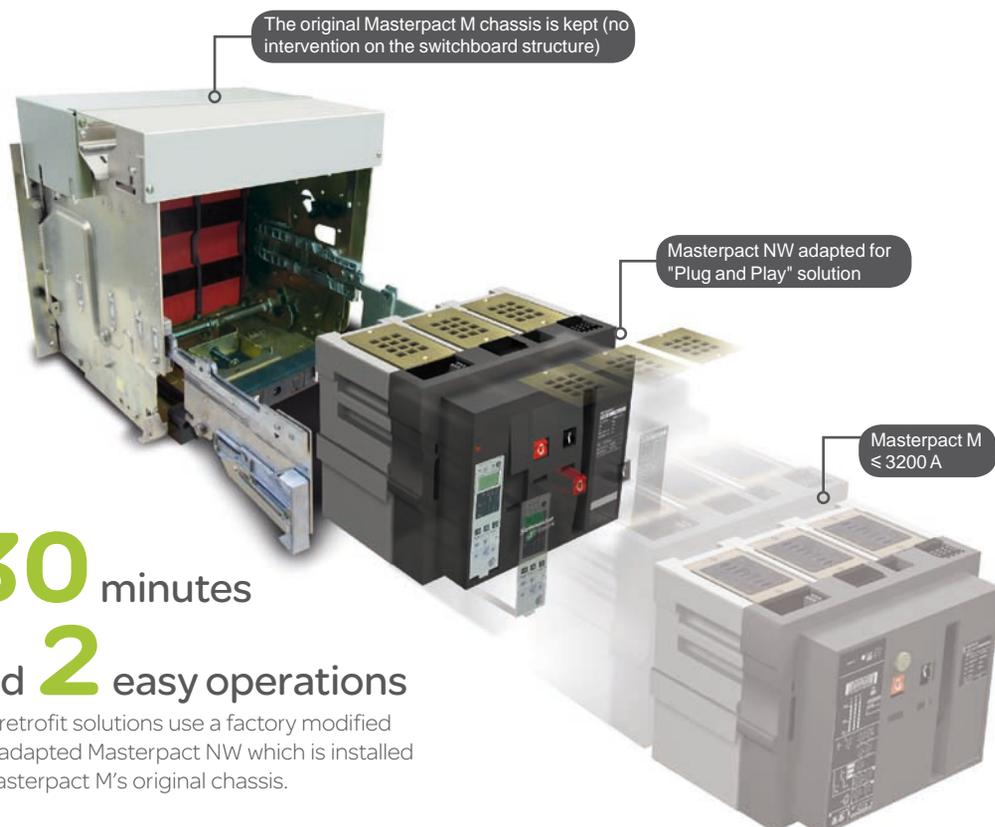
More than

60

patents are used to design Masterpact

Retrofit solutions

- > Special connections terminals are available to replace a fixed or a drawout Masterpact M08 to 32 with a Masterpact NW, without modifying the busbars or the door cut-out.
- > "Plug and Play" retrofit solution : this solution enables retrofitting of Masterpact M units with considerably reducing on-site intervention time and getting the performance of last generation device.



30 minutes
and **2** easy operations

The retrofit solutions use a factory modified and adapted Masterpact NW which is installed in Masterpact M's original chassis.

Standardisation of the switchboard

With optimised sizes, the Masterpact NT and NW ranges simplify the design of switchboards and standardise the installation of devices:

- > a single connection layout for Masterpact NT
- > three connection layouts for Masterpact NW:
 - one from 800 to 3200 A
 - one for 4000 A
 - one up to 6300 A
- > horizontal or vertical rear connections can be modified on-site by turning the connectors 90° or they can even be replaced by front connection terminals
- > identical connection terminals for the fixed or draw-out version for each rating (Masterpact NW)
- > front connection requires little space because the connectors not increase the depth of the device.



Practical installation solutions

The Masterpact NW range further improves the installation solutions that have built the success of its predecessors:

- > incoming connection to top or bottom terminals
- > no safety clearance required
- > connection:
 - horizontal or vertical rear connection
 - front connection with minimum extra space
 - mixed front and rear connections
- > 115 mm pole pitch on all versions
- > no derating up to 55 °C and 4000 A.



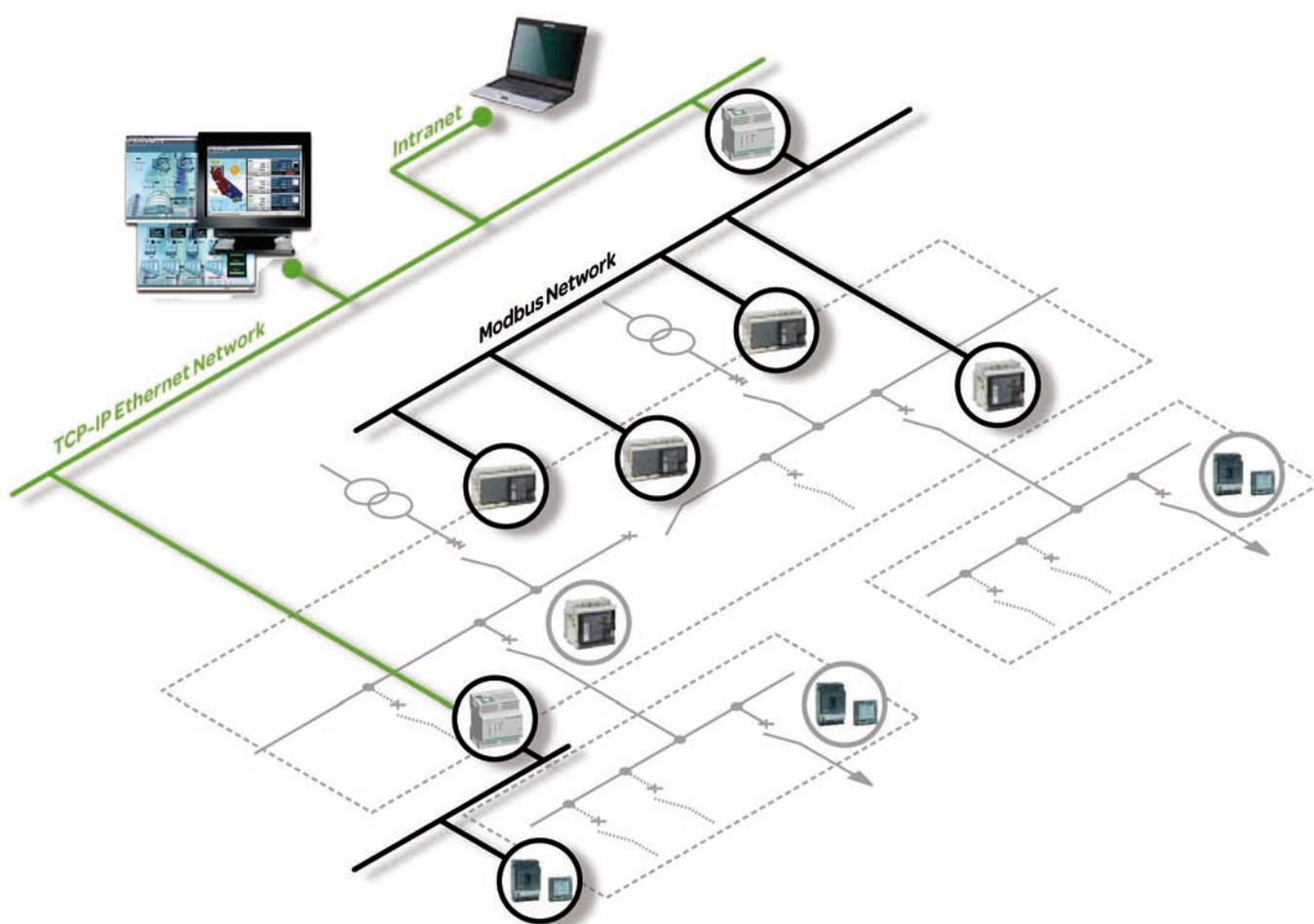
Compliance with environmental requirements

The materials used for Masterpact are not potentially dangerous to the environment and are marked to facilitate sorting for recycling.

Production facilities are non-polluting in compliance with the ISO 14001 standard.

Monitoring and protecting your low voltage network

Masterpact can be integrated in a general supervision system to optimise your electrical installation.



Intuitive use

Micrologic control units are equipped with a digital LCD display used in conjunction with simple navigation buttons. Users can directly access parameters and settings. Navigation between screens is intuitive and the immediate display of values greatly simplifies settings. Text is displayed in the desired language.

Ensuring safety at any time

All Masterpact circuit breakers are equipped with a Micrologic electronic control unit that offers all types of current and advanced protection, measurement and communication. Protection functions are separated from the measurement functions and are managed by an ASIC electronic component. This independence guarantees immunity from conducted or radiated disturbances and ensures the highest degree of reliability.

Maximising continuity of service

Because a LV power supply interruption is unacceptable especially in critical power applications, an automatic system is required for LV transfer switching. For your peace of mind, Masterpact enables automatic control and management of power sources in your low voltage distribution network guaranteeing the hi-reliability of your installation.

Optimising the management of your electrical installation

When equipped with a Micrologic type E, P or H, Masterpact can be integrated in a general supervision system to optimise installation operation and maintenance. Alarms may be programmed for remote indications. Used with PowerLogic ION Enterprise software, you can exploit the electrical data (current, voltage, frequency, power, and power quality) to optimise continuity of service and energy management:

- > reduce energy and operations costs
- > improve power quality, reliability and uptime
- > optimise equipment use.



PowerLogic ION Enterprise

PowerLogic ION Enterprise software is a complete power management solution for your facility or plant operations. It can be connected to Masterpact through Ethernet/Modbus protocol.

EGX300 gateway-server or iRIO RTU

The EGX300 web-enabled gateway-server or the iRIO RTU (remote terminal unit) can both 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.



Measurement functions are controlled by an additional microprocessor.

Protection functions are electronically managed independently of measurement functions.

An ASIC (Application-Specific Integrated Circuit) is common to all trip units, which boosts immunity to conducted or radiated interference and increases reliability.



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This overview describes all the functions offered by Masterpact NT and NW devices. The two product families have identical functions implemented using the same or different components depending on the case.



Circuit breakers and switch-disconnectors page A-4

- Ratings:
 - Masterpact NT 630 to 1600 A
 - Masterpact NW 800 to 6300 A.
- Circuit breakers type N1, H1, H2, H3, L1.
- Switch-disconnectors type NA, HA, HF.
- 3 or 4 poles.
- Fixed or drawout versions.
- Option with neutral on the right.
- Protection derating.

Micrologic control units page A-10

- Ammeter A and Energy E**
- 2.0 basic protection
 - 5.0 selective protection
 - 6.0 selective + earth-fault protection
 - 7.0 ⁽¹⁾ selective + earth-leakage protection

- Power meter P**
- 5.0 selective protection
 - 6.0 selective + earth-fault protection
 - 7.0 selective + earth-leakage protection

- Harmonic meter H**
- 5.0 selective protection
 - 6.0 selective + earth-fault protection
 - 7.0 selective + earth-leakage protection
 - External sensor for earth-fault protection.
 - Rectangular sensor for earth-leakage protection.
 - Setting options (long-time rating plug):
 - low setting 0.4 to 0.8 x I_r
 - high setting 0.8 to 1 x I_r
 - without long-time protection.
 - External power-supply module.
 - Battery module.
- (1) Only for ammeter A.*

Power Meter page A-22

Masterpact equipped with Micrologic 2 / 5 / 6 trip units offer type A (ammeter) or E (energy) metering functions as well as communication. Using Micrologic sensors and intelligence, Masterpact provides access to measurements of all the main electrical parameters on the built-in screen, on a dedicated FDM121 display unit or via the communication system.

Operating assistance page A-24

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

Switchboard display unit page A-25

The main measurements can be read on the built-in screen of Micrologic 5 / 6 trip units. They can also be displayed on the FDM121 switchboard display unit along with pop-up windows signalling the main alarms.

Portable data acquisition page A-30

- Masterpact and GetnSet.

Communication page A-32

- COM option in Masterpact.
- Masterpact in a communication network.

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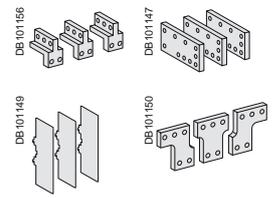
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Connections

page A-39

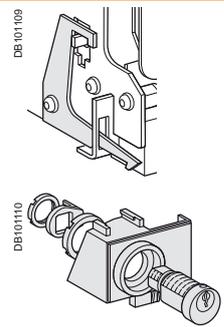
- Rear connection (horizontal or vertical).
- Front connection.
- Mixed connections.
- Optional accessories:
 - bare-cable connectors and connector shields
 - terminal shields
 - vertical-connection adapters
 - cable-lug adapters
 - interphase barriers
 - spreaders
 - disconnectable front-connection adapter
 - safety shutters, shutter locking blocks, shutter position indication and locking.



Locking

page A-43

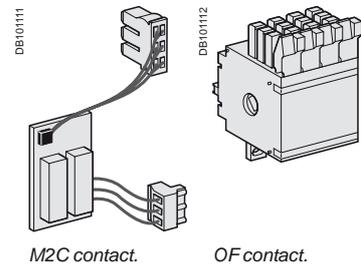
- Pushbutton locking by padlockable transparent cover.
- OFF-position locking by padlock or keylock.
- Chassis locking in disconnected position by keylock.
- Chassis locking in connected, disconnected and test positions.
- Door interlock (inhibits door opening with breaker in connected position).
- Racking interlock (inhibits racking with door open).
- Racking interlock between crank and OFF pushbutton.
- Automatic spring discharge before breaker removal.
- Mismatch protection.



Indication contacts

page A-45

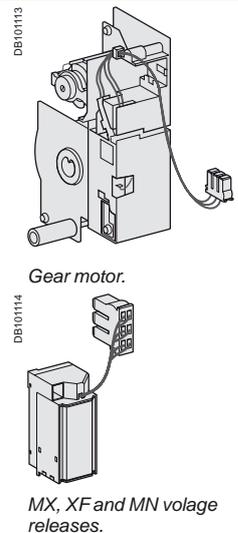
- Standard or low-level contacts:
 - ON/OFF indication (OF)
 - "fault trip" indication (SDE)
 - carriage switches for connected (CE) disconnected (CD) and test (CT) positions.
- Programmable contacts:
 - 2 contacts (M2C)
 - 6 contacts (M6C).



Remote operation

page A-47

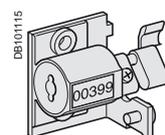
- Remote ON/OFF:
 - gear motor
 - XF closing or MX opening voltage releases
 - PF ready-to-close contact
 options: RAR automatic or RES electrical remote reset
 - BPFE electrical closing pushbutton.
- Remote tripping function:
 - MN voltage release
 - standard
 - adjustable or non-adjustable delay
 -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



Accessories

page A-51

- Auxiliary terminal shield.
- Operation counter.
- Escutcheon.
- Transparent cover for escutcheon.
- Escutcheon blanking plate.



schneider-electric.com

This international site allows you to access all the Schneider Electric products in just 2 clicks via comprehensive range data-sheets, with direct links to:

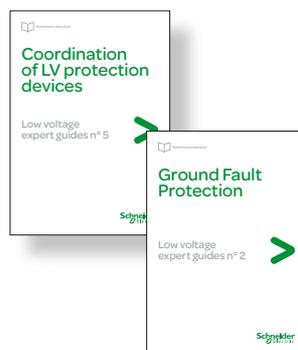
- complete library: technical documents, catalogs, FAQs, brochures...
- selection guides from the e-catalog.
- product discovery sites and their Flash animations.

You will also find illustrated overviews, news to which you can subscribe, the list of country contacts...



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.



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This chapter describes all the functions offered by Masterpact NT and NW devices. The two product families have identical functions implemented using the same or different components depending on the case.

PB100762-60A



Circuit breakers and switch-disconnectors page A-4

- ratings:
 - Masterpact NT 630 to 1600 A
 - Masterpact NW 800 to 6300 A
- circuit breakers type N1, H1, H2, H3, L1
- switch-disconnectors type NA, HA, HF
- 3 or 4 poles
- fixed or drawout versions
- option with neutral on the right
- protection derating.

Micrologic control units page A-10

Ammeter A and Energy E

- 2.0 basic protection
- 5.0 selective protection
- 6.0 selective + earth-fault protection
- 7.0 (*) selective + earth-leakage protection

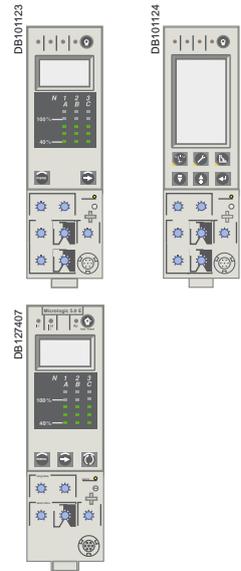
Power meter P

- 5.0 selective protection
- 6.0 selective + earth-fault protection
- 7.0 selective + earth-leakage protection

Harmonic meter H

- 5.0 selective protection
- 6.0 selective + earth-fault protection
- 7.0 selective + earth-leakage protection
- external sensor for earth-fault protection
- rectangular sensor for earth-leakage protection
- setting options (long-time rating plug):
 - low setting 0.4 to 0.8 x I_r
 - high setting 0.8 to 1 x I_r
 - without long-time protection
- external power-supply module
- battery module.

(*) Only for ammeter A.



Portable data acquisition page A-30

- Masterpact and GetnSet

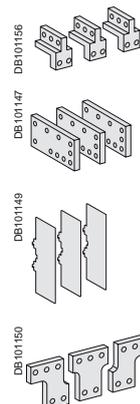


Communication page A-32

- COM option in Masterpact
- Masterpact in a communication network.

Connections page A-39

- rear connection (horizontal or vertical)
- front connection
- mixed connections
- optional accessories
 - bare-cable connectors and connector shields
 - terminal shields
 - vertical-connection adapters
 - cable-lug adapters
 - interphase barriers
 - spreaders
 - disconnectable front-connection adapter
 - safety shutters, shutter locking blocks, shutter position indication and locking.



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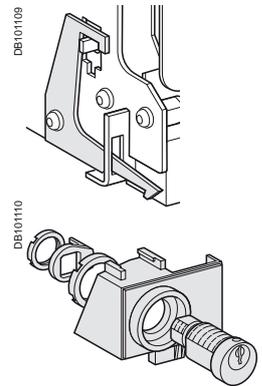
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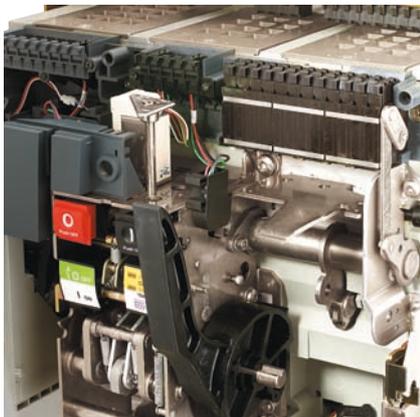
Locking

page A-43

- pushbutton locking by padlockable transparent cover
- OFF-position locking by padlock or keylock
- chassis locking in disconnected position by keylock
- chassis locking 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.



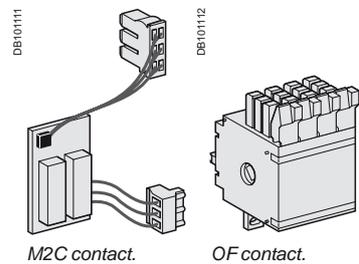
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Indication contacts

page A-45

- standard or low-level contacts:
 - ON/OFF indication (OF)
 - "fault trip" indication (SDE)
 - carriage switches for connected (CE) disconnected (CD) and test (CT) positions
- programmable contacts:
 - 2 contacts (M2C)
 - 6 contacts (M6C).



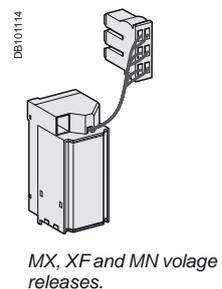
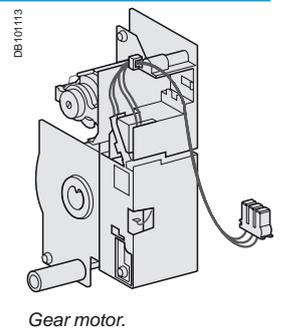
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Remote operation

page A-47

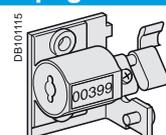
- remote ON/OFF:
 - gear motor
 - XF closing or MX opening voltage releases
 - PF ready-to-close contact
- options: RAR automatic or RES electrical remote reset
- BPFE electrical closing pushbutton
- remote tripping function:
 - MN voltage release
- standard
- adjustable or non-adjustable delay
- or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



Accessories

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



Circuit breakers and switch-disconnectors

NT06 to NT16 and NW08 to NW63

NT and NW selection criteria

| | Masterpact NT | | | Masterpact NW | |
|---------------------------------|---|---|---|---|---|
| | Standard applications | | | Standard applications | |
| | NT06, NT08, NT10, NT12, NT16 H1 | H2 | NT06, NT08, NT10 L1 | NW08...NW16 N1 | NW08...NW40 H1 |
| Type of application | Standard applications with low short-circuit currents | Applications with medium-level short-circuit currents | Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings | Standard applications with low short-circuit currents | Circuit breaker for industrial sites with high short-circuit currents |
| Icu/Ics at 440 V | 42 kA | 50 kA | 130 kA | 42 kA | 65 kA |
| Icu/Ics at 1000 V | - | - | - | - | - |
| Icu/Ics at 500 V DC L/R < 15 ms | - | - | - | - | - |
| Position of neutral | Left | Left | Left | Left | Left or right |
| Fixed | F | F | F | F | F |
| Drawout | D | D | D | D | D |
| Switch-disconnector version | Yes | No | No | Yes | Yes |
| Front connection | Yes | Yes | Yes | Yes | Yes up to 3200 A |
| Rear connection | Yes | Yes | Yes | Yes | Yes |
| Type of Micrologic control unit | A, E, P, H | A, E, P, H | A, E, P, H | A, E, P, H | A, E, P, H |

Masterpact NT06 to NT16 installation characteristics

| Circuit breaker | | NT06, NT08, NT10 | | | NT12, NT16 | |
|----------------------------------|-------|------------------|-------|----|------------|----|
| Type | | H1 | H2 | L1 | H1 | H2 |
| Connection | | | | | | |
| Drawout | FC | ■ | ■ | ■ | ■ | ■ |
| | RC | ■ | ■ | ■ | ■ | ■ |
| Fixed | FC | ■ | ■ | ■ | ■ | ■ |
| | RC | ■ | ■ | ■ | ■ | ■ |
| Dimensions (mm) H x W x D | | | | | | |
| Drawout | 3P | 322 x 288 x 277 | | | | |
| | 4P | 322 x 358 x 277 | | | | |
| Fixed | 3P | 301 x 276 x 196 | | | | |
| | 4P | 301 x 346 x 196 | | | | |
| Weight (kg) (approximate) | | | | | | |
| Drawout | 3P/4P | 30/39 | | | | |
| | Fixed | 3P/4P | 14/18 | | | |

Masterpact NW08 to NW63 installation characteristics

| Circuit breaker | | NW08, NW10, NW12, NW16 | | | | | NW20 | | | | |
|----------------------------------|-------|------------------------|-------|----|----|-----|------|----|----|----|-----|
| Type | | N1 | H1 | H2 | L1 | H10 | H1 | H2 | H3 | L1 | H10 |
| Connection | | | | | | | | | | | |
| Drawout | FC | ■ | ■ | ■ | ■ | - | ■ | ■ | ■ | ■ | - |
| | RC | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Fixed | FC | ■ | ■ | ■ | - | - | ■ | ■ | - | - | - |
| | RC | ■ | ■ | ■ | - | - | ■ | ■ | - | - | - |
| Dimensions (mm) H x W x D | | | | | | | | | | | |
| Drawout | 3P | 439 x 441 x 395 | | | | | | | | | |
| | 4P | 439 x 556 x 395 | | | | | | | | | |
| Fixed | 3P | 352 x 422 x 297 | | | | | | | | | |
| | 4P | 352 x 537 x 297 | | | | | | | | | |
| Weight (kg) (approximate) | | | | | | | | | | | |
| Drawout | 3P/4P | 90/120 | | | | | | | | | |
| | Fixed | 3P/4P | 60/80 | | | | | | | | |

(1) Except 4000

| | | | Special applications | | | | |
|--|--|---|---|---|------------------|---------------|-----------------------|
| H2 | H3 | L1 | NW H10 | NW H2 with corrosion protection | NW10...NW40 N DC | H DC | NW earthing switch |
| High-performance circuit breaker for heavy industry with high short-circuit currents | Incoming device with very high performance for critical applications | Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings | 1000 V systems, e.g. mines and wind power | Environments with high sulphur contents | DC system | DC system | Installation earthing |
| 100 kA | 150 kA | 150 kA | - | 100 kA | - | - | - |
| - | - | - | 50 kA | - | - | - | - |
| - | - | - | - | - | 35 kA | 85 kA | - |
| Left or right | Left | Left | Left | Left or right | - | - | - |
| F | - | - | - | - | F | F | - |
| D | D | D | D | D | D | D | D |
| Yes | Yes | No | Yes | Yes | Yes | Yes | Yes |
| Yes up to 3200 A | Yes up to 3200 A | Yes up to 3200 A | No | Yes up to 3200 A | No | No | Yes up to 3200 A |
| Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| A, E, P, H | A, E, P, H | A, E, P, H | A, E, consult us for P and H | A, E, P, H | DC Micrologic | DC Micrologic | - |

| NW25, NW32, NW40 | | | | NW40b, NW50, NW63 | |
|------------------|------------------|------------------|-----|-------------------|----|
| H1 | H2 | H3 | H10 | H1 | H2 |
| ■ ⁽¹⁾ | ■ ⁽¹⁾ | ■ ⁽¹⁾ | - | - | - |
| ■ | ■ | ■ | ■ | ■ | ■ |
| ■ ⁽¹⁾ | ■ ⁽¹⁾ | - | - | - | - |
| ■ | ■ | - | - | ■ | ■ |
| | | | | 479 x 786 x 395 | |
| | | | | 479 x 1016 x 395 | |
| | | | | 352 x 767 x 297 | |
| | | | | 352 x 997 x 297 | |
| | | | | 225/300 | |
| | | | | 120/160 | |

Circuit breakers and switch-disconnectors

NT06 to NT16

PE100365A49



Common characteristics

| | | |
|---|-------------|------|
| Number of poles | | 3/4 |
| Rated insulation voltage (V) | Ui | 1000 |
| Impulse withstand voltage (kV) | Uimp | 12 |
| Rated operational voltage (V AC 50/60 Hz) | Ue | 690 |
| Suitability for isolation | IEC 60947-2 | |
| Degree of pollution | IEC 60664-1 | 3 |

Basic switchgear

Circuit-breaker as per IEC 60947-2

| | | |
|--|------------|--------------------------------------|
| Rated current (A) | In | at 40 °C/50 °C ⁽¹⁾ |
| Rating of 4th pole (A) | | |
| Sensor ratings (A) | | |
| Type of circuit breaker | | |
| Ultimate breaking capacity (kA rms) V AC 50/60 Hz | Icu | 220/415 V 440 V 525 V 690 V |
| Rated service breaking capacity (kA rms) | Ics | % Icu |
| Utilisation category | | |
| Rated short-time withstand current (kA rms) V AC 50/60 Hz | Icw | 0.5 s 1 s 3 s |
| Integrated instantaneous protection (kA peak ±10 %) | | |
| Rated making capacity (kA peak) V AC 50/60 Hz | Icm | 220/415 V 440 V 525 V 690 V |
| Break time (ms) between tripping order and arc extinction | | |
| Closing time (ms) | | |

Circuit-breaker as per NEMA AB1

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

Switch-disconnector as per IEC 60947-3 and Annex A

| | | |
|---|------------|-----------------------------|
| Type of switch-disconnector | | |
| Rated making capacity (kA peak) AC23A/AC3 category V AC 50/60 Hz | Icm | 220 V 440 V 525/690 V |
| Rated short-time withstand current (kA rms) AC23A/AC3 category V AC 50/60 Hz | Icw | 0.5 s 1 s 3 s |
| Ultimate breaking capacity Icu (kA rms) with an external protection relay Maximum time delay: 350 ms | | 690 V |

Mechanical and electrical durability as per IEC 60947-2/3 at In/Ie

| | | | |
|---|------------|---------------------|---|
| Service life | Mechanical | without maintenance | |
| C/O cycles x 1000 | | | |
| Type of circuit breaker | | | |
| Rated current | | | In (A) |
| C/O cycles x 1000 | Electrical | without maintenance | 440 V ⁽⁴⁾ 690 V |
| IEC 60947-2 | | | |
| Type of circuit breaker or switch-disconnector | | | |
| Rated operational current | | | Ie (A) AC23A |
| C/O cycles x 1000 | Electrical | without maintenance | 440 V ⁽⁴⁾ 690V |
| IEC 60947-3 | | | |
| Type of circuit breaker or switch-disconnector | | | |
| Rated operational current | | | Ie (A) AC3 ⁽⁵⁾ |
| Motor power | | | 380/415 V (kW) 440 V (kW) |
| C/O cycles x 1000 | Electrical | without maintenance | 440 V ⁽⁴⁾ 690 V |
| IEC 60947-3 Annex M/IEC 60947-4-1 | | | |

⁽¹⁾ 50 °C: rear vertical connected. Refer to temperature derating tables for other connection types.

⁽²⁾ See the current-limiting curves in the "additional characteristics" section.

⁽³⁾ SELLIM system.

⁽⁴⁾ Available for 480 V NEMA.

⁽⁵⁾ Suitable for motor control (direct-on-line starting).

Sensor selection

| | | | | | | | |
|-------------------------------------|--------------------|------------|------------|------------|-------------|-------------|-------------|
| Sensor rating (A) | 250 ⁽¹⁾ | 400 | 630 | 800 | 1000 | 1250 | 1600 |
| I _r threshold setting(A) | 100 to 250 | 160 to 400 | 250 to 630 | 320 to 800 | 400 to 1000 | 500 to 1250 | 640 to 1600 |

(1) For circuit-breaker NT02, please consult us.

| NT06 | | | NT08 | | | NT10 | | | NT12 | | NT16 | |
|-----------------|-----------|------------------------------------|------------|-----------|-----------|-------------|-----------|-----------|-------------|-----------|-------------|-------------|
| 630 | | | 800 | | | 1000 | | | 1250 | | 1600 | |
| 630 | | | 800 | | | 1000 | | | 1250 | | 1600 | |
| 400 to 630 | | | 400 to 800 | | | 400 to 1000 | | | 630 to 1250 | | 800 to 1600 | |
| H1 | H2 | L1 ⁽²⁾ | | | | | | | H1 | H2 | | |
| 42 | 50 | 150 | | | | | | | 42 | 50 | | |
| 42 | 50 | 130 | | | | | | | 42 | 50 | | |
| 42 | 42 | 100 | | | | | | | 42 | 42 | | |
| 42 | 42 | 25 | | | | | | | 42 | 42 | | |
| 100 % | | | | | | | | | 100 % | | | |
| B | B | A | | | | | | | B | B | | |
| 42 | 36 | 10 | | | | | | | 42 | 36 | | |
| 42 | 36 | - | | | | | | | 42 | 36 | | |
| 24 | 20 | - | | | | | | | 24 | 20 | | |
| - | 90 | 10 x I _n ⁽³⁾ | | | | | | | - | 90 | | |
| 88 | 105 | 330 | | | | | | | 88 | 105 | | |
| 88 | 105 | 286 | | | | | | | 88 | 105 | | |
| 88 | 88 | 220 | | | | | | | 88 | 88 | | |
| 88 | 88 | 52 | | | | | | | 88 | 88 | | |
| 25 | 25 | 9 | | | | | | | 25 | 25 | | |
| < 50 | | | | | | | | | < 50 | | | |
| 42 50 150 | | | | | | | | | 42 50 | | | |
| 42 50 100 | | | | | | | | | 42 50 | | | |
| 42 42 25 | | | | | | | | | 42 42 | | | |
| HA | | | | | | | | | HA | | | |
| 75 | | | | | | | | | 75 | | | |
| 75 | | | | | | | | | 75 | | | |
| 75 | | | | | | | | | 75 | | | |
| 36 | | | | | | | | | 36 | | | |
| 36 | | | | | | | | | 36 | | | |
| 20 | | | | | | | | | 20 | | | |
| 36 | | | | | | | | | 36 | | | |
| 12.5 | | | | | | | | | | | | |
| H1 | H2 | L1 | H1 | H2 | L1 | H1 | H2 | L1 | H1 | H2 | H1 | H2 |
| 630 | | | 800 | | | 1000 | | | 1250 | | | |
| 6 | 6 | 3 | 6 | 6 | 3 | 6 | 6 | 3 | 6 | 6 | 3 | 3 |
| 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 1 | 1 |
| H1/H2/HA | | | | | | | | | | | | |
| 630 | | | 800 | | | 1000 | | | 1250 | | | 1600 |
| 6 | | | 6 | | | 6 | | | 6 | | | 3 |
| 3 | | | 3 | | | 3 | | | 3 | | | 1 |
| H1/H2/HA | | | | | | | | | | | | |
| 500 | | | 630 | | | 800 | | | 1000 | | | 1000 |
| ≤ 250 | | | 250 to 335 | | | 335 to 450 | | | 450 to 560 | | | 450 to 560 |
| ≤ 300 | | | 300 to 400 | | | 400 to 500 | | | 500 to 630 | | | 500 to 630 |
| 6 | | | | | | | | | | | | |
| - | | | | | | | | | | | | |

Circuit breakers and switch-disconnectors

NW08 to NW63

PB106383A35



PB106382A65



Common characteristics

| | | |
|---|-------------|-------------------------------------|
| Number of poles | | 3/4 |
| Rated insulation voltage (V) | Ui | 1000/1250 |
| Impulse withstand voltage (kV) | Uimp | 12 |
| Rated operational voltage (V AC 50/60 Hz) | Ue | 690/1150 |
| Suitability for isolation | | IEC 60947-2 |
| Degree of pollution | | IEC 60664-1 4 (1000 V) / 3 (1250 V) |

Basic circuit-breaker

Circuit-breaker as per IEC 60947-2

| | | |
|------------------------|--|---------------------------------|
| Rated current (A) | | at 40 °C / 50 °C ⁽¹⁾ |
| Rating of 4th pole (A) | | |
| Sensor ratings (A) | | |

Type of circuit breaker

| | | |
|--|------------|---|
| Ultimate breaking capacity (kA rms) V AC 50/60 Hz | Icu | 220/415/440 V 525 V 690 V 1150 V |
| Rated service breaking capacity (kA rms) | Ics | % Icu |
| Utilisation category | | |
| Rated short-time withstand current (kA rms) V AC 50/60 Hz | Icw | 1 s 3 s |
| Integrated instantaneous protection (kA peak ±10 %) | | |
| Rated making capacity (kA peak) V AC 50/60 Hz | Icm | 220/415/440 V 525 V 690 V 1150 V |

Break time (ms) between tripping order and arc extinction

Closing time (ms)

Circuit-breaker as per NEMA AB1

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

Unprotected circuit-breaker

Tripping by shunt trip as per IEC 60947-2

Type of circuit breaker

| | | |
|---|------------|-------------|
| Ultimate breaking capacity (kA rms) V AC 50/60 Hz | Icu | 220...690 V |
| Rated service breaking capacity (kA rms) | Ics | % Icu |
| Rated short-time withstand current (kA rms) | Icw | 1 s 3 s |

Overload and short-circuit protection

External protection relay: short-circuit protection, maximum delay: 350 ms ⁽⁴⁾

| | | |
|---|------------|-------------|
| Rated making capacity (kA peak) V AC 50/60 Hz | Icm | 220...690 V |
|---|------------|-------------|

Switch-disconnector as per IEC 60947-3 and Annex A

Type of switch-disconnector

| | | |
|--|------------|-----------------------|
| Rated making capacity (kA peak) AC23A/AC3 category V AC 50/60 Hz | Icm | 220...690 V 1150 V |
| Rated short-time withstand current (kA rms) AC23A/AC3 category V AC 50/60 Hz | Icw | 1 s 3 s |

Earthing switch

| | | |
|--------------------------------------|------------|------------|
| Latching capacity (kA peak) | | 135 |
| Rating short time withstand (kA rms) | Icw | 1 s 3 s |

Mechanical and electrical durability as per IEC 60947-2/3 at In/Ie

| | | | |
|-------------------|------------|---------------------|--|
| Service life | Mechanical | with maintenance | |
| C/O cycles x 1000 | | without maintenance | |

Type of circuit breaker

| | | | |
|----------------------|------------|---------------------|----------------------|
| Rated current | | In (A) | |
| C/O cycles x 1000 | Electrical | without maintenance | 440 V ⁽⁵⁾ |
| IEC 60947-2 | | | 690 V 1150 V |

Type of circuit breaker or switch-disconnector

| | | | |
|----------------------------------|------------|---------------------|----------------------|
| Rated operational current | | Ie (A) | AC23A |
| C/O cycles x 1000 | Electrical | without maintenance | 440 V ⁽⁵⁾ |
| IEC 60947-3 | | | 690 V |

Type of circuit breaker or switch-disconnector

| | | | |
|-----------------------------------|------------|---------------------|---|
| Rated operational current | | Ie (A) | AC3 ⁽⁶⁾ |
| Motor power | | | 380/415 V (kW) 440 V ⁽⁶⁾ (kW) 690 V (kW) |
| C/O cycles x 1000 | Electrical | without maintenance | 440/690 V ⁽⁵⁾ |
| IEC 60947-3 Annex M/IEC 60947-4-1 | | | |

(1) 50 °C: rear vertical connected. Refer to temperature derating tables for other connection types.

(2) See the current-limiting curves in the "additional characteristics" section.

(3) Equipped with a trip unit with a making current of 90 kA peak.

(4) External protection must comply with permissible thermal constraints of the circuit breaker (please consult us). No fault-trip indication by the SDE or the reset button.

(5) Available for 480 V NEMA.

(6) Suitable for motor control (direct-on-line starting).

(7) The use of NW08 to NW20 H1 in IT systems is limited to 500 V network voltage.

Sensor selection

| | | | | | | | | | | | | | |
|-------------------------|--------------------|------------|------------|------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Sensor rating (A) | 250 ⁽¹⁾ | 400 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 5000 | 6300 |
| Ir threshold setting(A) | 100 to 250 | 160 to 400 | 250 to 630 | 320 to 800 | 400 to 1000 | 500 to 1250 | 630 to 1600 | 800 to 2000 | 1000 to 2500 | 1250 to 3200 | 1600 to 4000 | 2000 to 5000 | 2500 to 6300 |

(1) For circuit-breaker NW02, please consult us.

| NW08 | NW10 | NW12 | NW16 | | NW20 | | | | | NW25 | NW32 | NW40 | | NW40b | NW50 | NW63 |
|------------|-------------------|-------------|-------------------|-----|-------------------|-----|-----|-------------------|-----|--------------|--------------|--------------|-----|--------------|--------------|--------------|
| 800 | 1000 | 1250 | 1600 | | 2000 | | | | | 2500 | 3200 | 4000 | | 4000 | 5000 | 6300 |
| 800 | 1000 | 1250 | 1600 | | 2000 | | | | | 2500 | 3200 | 4000 | | 4000 | 5000 | 6300 |
| 400 to 800 | 400 to 1000 | 630 to 1250 | 800 to 1600 | | 1000 to 2000 | | | | | 1250 to 2500 | 1600 to 3200 | 2000 to 4000 | | 2000 to 4000 | 2500 to 5000 | 3200 to 6300 |
| N1 | H1 ⁽⁷⁾ | H2 | L1 ⁽²⁾ | H10 | H1 ⁽⁷⁾ | H2 | H3 | L1 ⁽²⁾ | H10 | H1 | H2 | H3 | H10 | H1 | H2 | |
| 42 | 65 | 100 | 150 | - | 65 | 100 | 150 | 150 | - | 65 | 100 | 150 | - | 100 | 150 | |
| 42 | 65 | 85 | 130 | - | 65 | 85 | 130 | 130 | - | 65 | 85 | 130 | - | 100 | 130 | |
| 42 | 65 | 85 | 100 | - | 65 | 85 | 100 | 100 | - | 65 | 85 | 100 | - | 100 | 100 | |
| - | - | - | - | 50 | - | - | - | - | 50 | - | - | - | 50 | - | - | |
| 100 % | | | | | 100 % | | | | | 100 % | | | | 100 % | | |
| B | | | | | B | | | | | B | | | | B | | |
| 42 | 65 | 85 | 30 | 50 | 65 | 85 | 65 | 30 | 50 | 65 | 85 | 65 | 50 | 100 | 100 | |
| 22 | 36 | 50 | 30 | 50 | 36 | 75 | 65 | 30 | 50 | 65 | 75 | 65 | 50 | 100 | 100 | |
| - | - | 190 | 80 | - | - | 190 | 150 | 80 | - | - | 190 | 150 | - | - | 270 | |
| 88 | 143 | 220 | 330 | - | 143 | 220 | 330 | 330 | - | 143 | 220 | 330 | - | 220 | 330 | |
| 88 | 143 | 187 | 286 | - | 143 | 187 | 286 | 286 | - | 143 | 187 | 286 | - | 220 | 286 | |
| 88 | 143 | 187 | 220 | - | 143 | 187 | 220 | 220 | - | 143 | 187 | 220 | - | 220 | 220 | |
| - | - | - | - | 105 | - | - | - | - | 105 | - | - | - | 105 | - | - | |
| 25 | 25 | 25 | 10 | 25 | 25 | 25 | 25 | 10 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | |
| < 70 | | | | | < 70 | | | | | < 70 | | | | < 80 | | |

| | | | | | | | | | | | | | | | |
|----|----|-----|-----|---|----|-----|-----|-----|---|----|-----|-----|---|-----|-----|
| 42 | 65 | 100 | 150 | - | 65 | 100 | 150 | 150 | - | 65 | 100 | 150 | - | 100 | 150 |
| 42 | 65 | 85 | 100 | - | 65 | 85 | 100 | 100 | - | 65 | 85 | 100 | - | 100 | 100 |

| | HA | HF ⁽³⁾ | | HA | HF ⁽³⁾ | | HA | HF ⁽³⁾ | | HA |
|--|-------|-------------------|--|-------|-------------------|--|-------|-------------------|--|-------|
| | 50 | 85 | | 50 | 85 | | 55 | 85 | | 85 |
| | 100 % | | | 100 % | | | 100 % | | | 100 % |
| | 50 | 85 | | 50 | 85 | | 55 | 85 | | 85 |
| | 36 | 50 | | 36 | 75 | | 55 | 75 | | 85 |
| | - | - | | - | - | | - | - | | - |
| | 105 | 187 | | 105 | 187 | | 121 | 187 | | 187 |

| NW08/NW10/NW12/NW16 | | | | NW20 | | | | | NW25/NW32/NW40 | | | NW40b/NW50/NW63 | |
|---------------------|-----|-----|------|------|-----|------|-----|-----|----------------|-----|--|-----------------|--|
| NA | HA | HF | HA10 | HA | HF | HA10 | HA | HF | HA10 | HA | | | |
| 88 | 105 | 187 | - | 105 | 187 | - | 121 | 187 | - | 187 | | | |
| - | - | - | 105 | - | - | 105 | - | - | 105 | - | | | |
| 42 | 50 | 85 | 50 | 50 | 85 | 50 | 55 | 85 | 50 | 85 | | | |
| - | 36 | 50 | 50 | 36 | 75 | 50 | 55 | 75 | 50 | 85 | | | |

60 Hz
50 Hz

| 25 | | | | | | 20 | | | | | | 10 | | |
|--------------------|-------------|--------------|--------------|--|----------------|-------|--------------|----|-----|----------------|------|-----|-----------------|-----|
| 12.5 | | | | | | 10 | | | | | | 5 | | |
| N1/H1/H2 | L1 | H10 | | | | H1/H2 | H3 | L1 | H10 | H1/H2 | H3 | H10 | H1 | H2 |
| 800/1000/1250/1600 | | | | | 2000 | | | | | 2500/3200/4000 | | | 4000b/5000/6300 | |
| 10 | 3 | - | | | | 8 | 2 | 3 | - | 5 | 1.25 | - | 1.5 | 1.5 |
| 10 | 3 | - | | | | 6 | 2 | 3 | - | 2.5 | 1.25 | - | 1.5 | 1.5 |
| - | - | 0.5 | | | | - | - | - | 0.5 | - | - | 0.5 | - | - |
| H1/H2/NA/HA/HF | | | | | H1/H2/H3/HA/HF | | | | | H1/H2/H3/HA/HF | | | H1/H2/HA | |
| 800/1000/1250/1600 | | | | | 2000 | | | | | 2500/3200/4000 | | | 4000b/5000/6300 | |
| 10 | | | | | 8 | | | | | 5 | | | 1.5 | |
| 10 | | | | | 6 | | | | | 2.5 | | | 1.5 | |
| H1/H2/NA/HA/HF | | | | | H1/H2/H3/HA/HF | | | | | | | | | |
| 800 | 1000 | 1250 | 1600 | | | | 2000 | | | | | | | |
| 335 to 450 | 450 to 560 | 560 to 670 | 670 to 900 | | | | 900 to 1150 | | | | | | | |
| 400 to 500 | 500 to 630 | 500 to 800 | 800 to 1000 | | | | 1000 to 1300 | | | | | | | |
| ≤ 800 | 800 to 1000 | 1000 to 1250 | 1250 to 1600 | | | | 1600 to 2000 | | | | | | | |

6

All Masterpact circuit breakers are equipped with a Micrologic control unit that can be changed on site. Control units are designed to protect Power circuits and loads. Alarms may be programmed for remote indications. Measurements of current, voltage, frequency, power and power quality optimise continuity of service and energy management.

Dependability

Integration of protection functions in an ASIC electronic component used in all Micrologic control units guarantees a high degree of reliability and immunity to conducted or radiated disturbances.

On Micrologic A, E, P and H control units, advanced functions are managed by an independent microprocessor.

Accessories

Certain functions require the addition of Micrologic control unit accessories, described on [page A-27](#).

The rules governing the various possible combinations can be found in the documentation accessible via the Products and services menu of the www.schneider-electric.com web site.

Micrologic name codes

2.0 E
X Y Z

X: type of protection

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

Y: control-unit generation

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

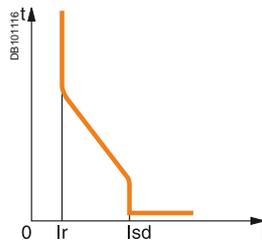
Z: type of measurement

- A for "ammeter"
- E for "energy"
- P for "power meter"
- H for "harmonic meter".



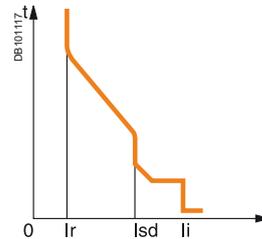
Current protection

Micrologic 2: basic protection



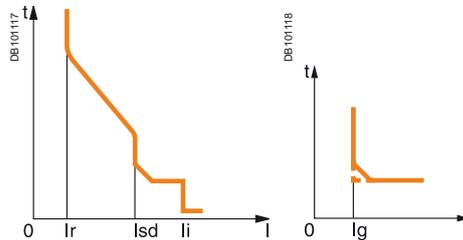
Protection:
long time
+ instantaneous

Micrologic 5: selective protection



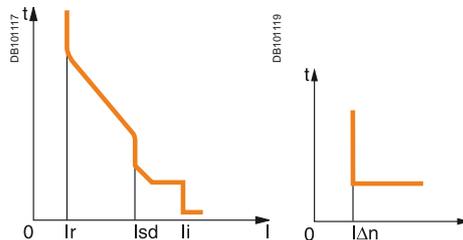
Protection:
long time
+ short time
+ instantaneous

Micrologic 6: selective + earth-fault protection



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

Micrologic 7: selective + earth-leakage protection



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

Measurements and programmable protection

A: ammeter

- $I_1, I_2, I_3, N, I_{\text{earth-fault}}, I_{\text{earth-leakage}}$ and maximeter for these measurements
- fault indications
- settings in amperes and in seconds.

E: Energy

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

P: A + power meter + programmable protection

- measurements of V, A, W, VAR, VA, Wh, VARh, VAh, Hz, $V_{\text{peak}}, A_{\text{peak}}$, power factor and maximeters and minimeters
- IDMTL long-time protection, minimum and maximum voltage and frequency, voltage and current imbalance, phase sequence, reverse power
- load shedding and reconnection depending on power or current
- measurements of interrupted currents, differentiated fault indications, maintenance indications, event histories and time-stamping, etc.

H: P + harmonics

- power quality: fundamentals, distortion, amplitude and phase of harmonics up to the 31st order
- waveform capture after fault, alarm or on request
- enhanced alarm programming: thresholds and actions.

2.0 A



2.0 E



5.0 A



5.0 E



5.0 P



5.0 H



6.0 A



6.0 E



6.0 P



6.0 H



7.0 A



7.0 P



7.0 H



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

"Ammeter" measurements

Micrologic A control units measure the true (rms) value of currents. They provide continuous current measurements from 0.2 to 1.2 I_n and are accurate to within 1.5 % (including the sensors). A digital LCD screen continuously displays the most heavily loaded phase (I_{max}) or displays the $I_1, I_2, I_3, I_N, I_g, I_{\Delta n}$, stored-current (maximeter) and setting values by successively pressing the navigation button. The optional external power supply makes it possible to display currents $< 20\%$ I_n . Below 0.1 I_n , measurements are not significant. Between 0.1 and 0.2 I_n , accuracy changes linearly from 4 % to 1.5 %.

Communication option

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

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

Protection

Protection thresholds and delays are set using the adjustment dials.

Overload protection

True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.
Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection

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

Earth-fault protection

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

Residual earth-leakage protection (Vigi).

Operation without an external power supply.
 Δ Protected against nuisance tripping.
 \sim DC-component withstand class A up to 10 A.

Neutral protection

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

Zone selective interlocking (ZSI)

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

Overload alarm

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

Fault indications

LEDs indicate the type of fault:

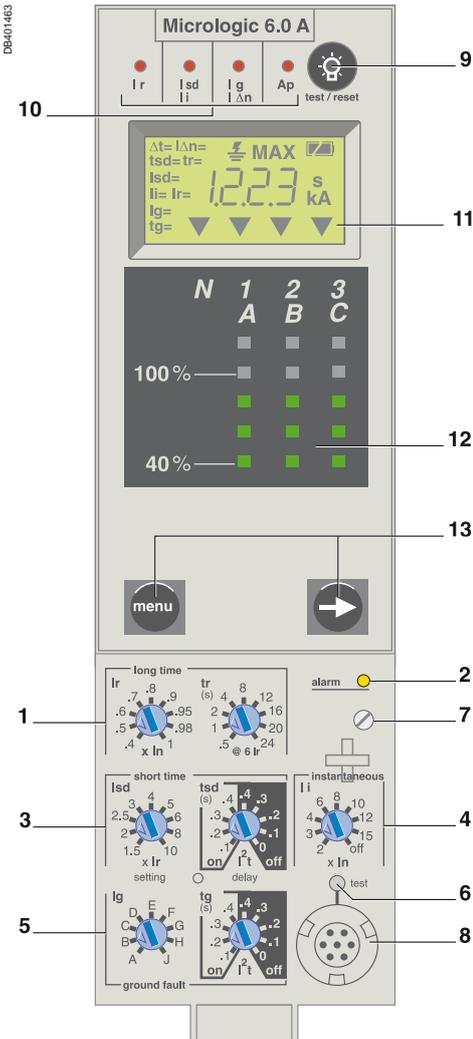
- overload (long-time protection I_r)
- short-circuit (short-time I_{sd} or instantaneous I_i protection)
- earth fault or earth leakage (I_g or $I_{\Delta n}$)
- internal fault (A_p).

Battery power

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

Test

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

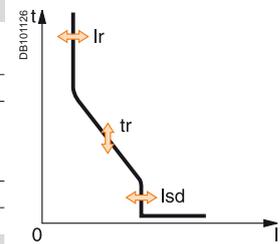


- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1, 125 I_r
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 earth-leakage or earth-fault pick-up and tripping delay
- 6 earth-leakage or earth-fault test button
- 7 long-time rating plug screw
- 8 test connector
- 9 lamp test, reset and battery test
- 10 indication of tripping cause
- 11 digital display
- 12 three-phase bargraph and ammeter
- 13 navigation buttons

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

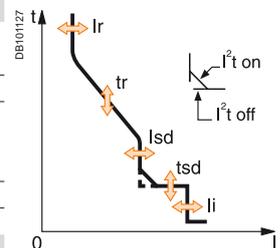
Protection Micrologic 2.0 A

| Long time | | | | | | | | | | | | | |
|-------------------------------------|---|---|--------------------|------|------|-----|-----|------|------|------|------|--|--|
| Current setting (A) | | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.95 | 0.98 | 1 | | | |
| Tripping between 1.05 and 1.20 x Ir | | Other ranges or disable by changing long-time rating plug | | | | | | | | | | | |
| Time setting | tr (s) | 0.5 | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | | |
| Time delay (s) | Accuracy: 0 to -30 % | 1.5 x Ir | 12.5 | 25 | 50 | 100 | 200 | 300 | 400 | 500 | 600 | | |
| | Accuracy: 0 to -20 % | 6 x Ir | 0.7 ⁽¹⁾ | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | |
| | Accuracy: 0 to -20 % | 7.2 x Ir | 0.7 ⁽²⁾ | 0.69 | 1.38 | 2.7 | 5.5 | 8.3 | 11 | 13.8 | 16.6 | | |
| Thermal memory | | 20 minutes before and after tripping | | | | | | | | | | | |
| (1) 0 to -40 % - (2) 0 to -60 % | | | | | | | | | | | | | |
| Instantaneous | | | | | | | | | | | | | |
| Pick-up (A) | I_{sd} = I_r x ... | 1.5 | 2 | 2.5 | 3 | 4 | 5 | 6 | 8 | 10 | | | |
| Accuracy: ±10 % | | | | | | | | | | | | | |
| Time delay | | Max resettable time: 20 ms Max break time: 80 ms | | | | | | | | | | | |

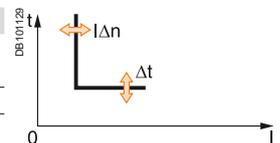
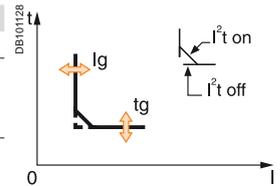


Protection Micrologic 5.0 / 6.0 / 7.0 A

| Long time | | Micrologic 5.0 / 6.0 / 7.0 A | | | | | | | | | | | |
|--|---|---|--------------------|------|------|-----|-----|------|------|------|------|--|--|
| Current setting (A) | I_r = I_n x ... | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.95 | 0.98 | 1 | | | |
| Tripping between 1.05 and 1.20 x Ir | | Other ranges or disable by changing long-time rating plug | | | | | | | | | | | |
| Time setting | tr (s) | 0.5 | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | | |
| Time delay (s) | Accuracy: 0 to -30 % | 1.5 x Ir | 12.5 | 25 | 50 | 100 | 200 | 300 | 400 | 500 | 600 | | |
| | Accuracy: 0 to -20 % | 6 x Ir | 0.7 ⁽¹⁾ | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | |
| | Accuracy: 0 to -20 % | 7.2 x Ir | 0.7 ⁽²⁾ | 0.69 | 1.38 | 2.7 | 5.5 | 8.3 | 11 | 13.8 | 16.6 | | |
| Thermal memory | | 20 minutes before and after tripping | | | | | | | | | | | |
| (1) 0 to -40 % - (2) 0 to -60 % | | | | | | | | | | | | | |
| Short time | | | | | | | | | | | | | |
| Pick-up (A) | I_{sd} = I_r x ... | 1.5 | 2 | 2.5 | 3 | 4 | 5 | 6 | 8 | 10 | | | |
| Accuracy: ±10 % | | | | | | | | | | | | | |
| Time setting tsd (s) | Settings | I ² t Off | 0 | 0.1 | 0.2 | 0.3 | 0.4 | | | | | | |
| | | I ² t On | - | 0.1 | 0.2 | 0.3 | 0.4 | | | | | | |
| Time delay (ms) at 10 x Ir (I ² t Off or I ² t On) | tsd (max resettable time) | 20 | 80 | 140 | 230 | 350 | | | | | | | |
| | tsd (max break time) | 80 | 140 | 200 | 320 | 500 | | | | | | | |
| Instantaneous | | | | | | | | | | | | | |
| Pick-up (A) | I_{li} = I_n x ... | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 | off | | | |
| Accuracy: ±10 % | | | | | | | | | | | | | |
| Time delay | | Max resettable time: 20 ms Max break time: 50 ms | | | | | | | | | | | |



| Earth fault | | Micrologic 6.0 A | | | | | | | | | | |
|---|--|----------------------|-----|-----|-----|------|-----|------|------|------|--|--|
| Pick-up (A) | I_g = I_n x ... | A | B | C | D | E | F | G | H | J | | |
| Accuracy: ±10 % | I _n ≤ 400 A | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | | |
| | 400 A < I _n < 1250 A | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | | |
| | I _n ≥ 1250 A | 500 | 640 | 720 | 800 | 880 | 960 | 1040 | 1120 | 1200 | | |
| Time setting tg (s) | Settings | I ² t Off | 0 | 0.1 | 0.2 | 0.3 | 0.4 | | | | | |
| | | I ² t On | - | 0.1 | 0.2 | 0.3 | 0.4 | | | | | |
| Time delay (ms) at I _n or 1200 A (I ² t Off or I ² t On) | tg (max resettable time) | 20 | 80 | 140 | 230 | 350 | | | | | | |
| | tg (max break time) | 80 | 140 | 200 | 320 | 500 | | | | | | |
| Residual earth leakage (Vigi) | | Micrologic 7.0 A | | | | | | | | | | |
| Sensitivity (A) | I_{Δn} | 0.5 | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 | | |
| Accuracy: 0 to -20 % | | | | | | | | | | | | |
| Time delay Δt (ms) | Settings | 60 | 140 | 230 | 350 | 800 | | | | | | |
| | Δt (max resettable time) | 60 | 140 | 230 | 350 | 800 | | | | | | |
| | Δt (max break time) | 140 | 200 | 320 | 500 | 1000 | | | | | | |

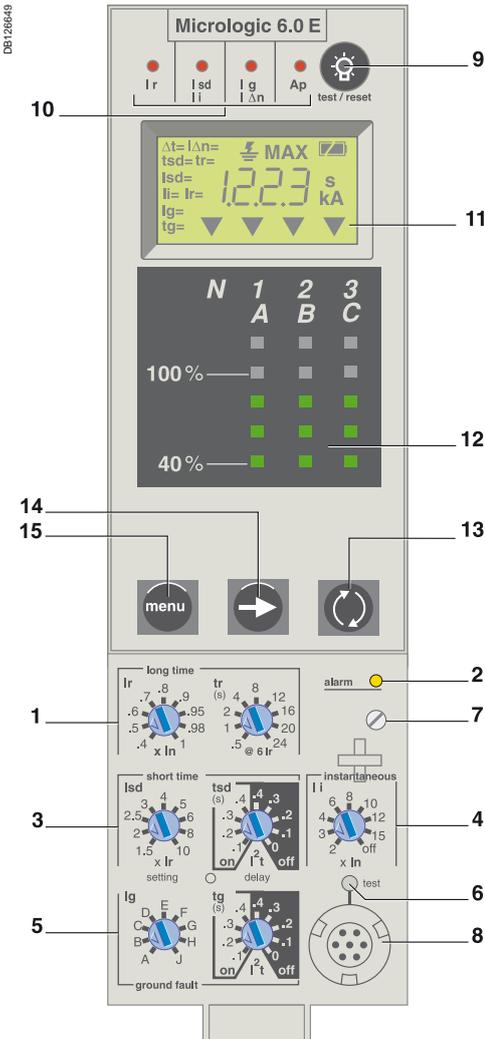


Ammeter Micrologic 2.0 / 5.0 / 6.0 / 7.0 A

| Type of measurements | | Range | Accuracy |
|------------------------|---|--|----------|
| Instantaneous currents | I ₁ , I ₂ , I ₃ , I _N | 0.2 x I _n to 1.2 x I _n | ± 1.5 % |
| | I _g (6.0 A) | 0.2 x I _n to I _n | ± 10 % |
| | I _{Δn} (7.0 A) | 0 to 30 A | ± 1.5 % |
| Current maximeters of | I ₁ , I ₂ , I ₃ , I _N | 0.2 x I _n to 1.2 x I _n | ± 1.5 % |

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

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



- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1, 125 Ir
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 earth-leakage or earth-fault pick-up and tripping delay
- 6 earth-leakage or earth-fault test button
- 7 long-time rating plug screw
- 8 test connector
- 9 lamp test, reset and battery test
- 10 indication of tripping cause
- 11 digital display
- 12 three-phase bargraph and ammeter
- 13 navigation button "quick View" (only with Micrologic E)
- 14 navigation button to view menu contents
- 15 navigation button to change menu

"Energy meter" measurements

In addition to the ammeter measurements of Micrologic A

Micrologic E control units measure and display:

- current demand
- voltages: phase to phase, phase to neutral, average⁽¹⁾ and unbalanced⁽¹⁾
- instantaneous power: P, Q, S
- power factor: PF
- power demand: P demand
- energy: Ep, Eq⁽¹⁾, Es⁽¹⁾.

Accuracy of active energy Ep is 2 % (including the sensors). The range of measurement is the same as current with Micrologic A, depending of an external power supply module (24 V DC).

Communication option

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

- settings
- all "ammeter" and "energy" measurements
- enable connection to FDM121
- tripping causes
- maximeter / minimeter readings.

Protection

Protection thresholds and delays are set using the adjustment dials.

Overload protection

True rms long-time protection.

Thermal memory: thermal image before and after tripping.

Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug. Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection

Short-time (rms) and instantaneous protection.

Selection of I²t type (ON or OFF) for short-time delay.

Earth-fault protection

Source ground return earth fault protection.

Selection of I²t type (ON or OFF) for delay.

Neutral protection

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

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

Zone selective interlocking (ZSI)

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

Overload alarm

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

M2C programmable contacts

The M2C (two contacts) programmable contacts may be used to signal events (Ir, Isd, Alarm Ir, Alarm Ig, Ig). They can be programmed using the keypad on the Micrologic E control unit or remotely using the COM option (BCM ULP).

Fault indications

LEDs indicate the type of fault:

- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault (Ig)
- internal fault (Ap).

Trip history

The trip history displays the list of the last 10 trips. For each trip, the following indications are recorded and displayed:

- the tripping cause: Ir, Isd, Ii or Auto-protection (Ap) trips
- the date and time of the trip (requires communication option).

Battery power

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

Test

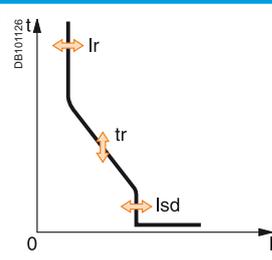
A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 E control units, the operation of earth-fault or earth-leakage protection can be checked by pressing the test button located above the test connector.

(1) Display on FDM121 only.

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

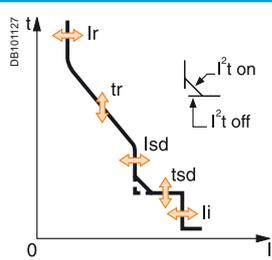
Protection Micrologic 2.0 E

| Long time | | Micrologic 2.0 E | | | | | | | | | | | |
|-------------------------------------|--|---|--------------------|------|------|-----|-----|------|------|------|------|--|--|
| Current setting (A) | | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.95 | 0.98 | 1 | | | |
| Tripping between 1.05 and 1.20 x Ir | | Other ranges or disable by changing long-time rating plug | | | | | | | | | | | |
| Time setting | tr (s) | 0.5 | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | | |
| Time delay (s) | Accuracy: 0 to -30 % | 1.5 x Ir | 12.5 | 25 | 50 | 100 | 200 | 300 | 400 | 500 | 600 | | |
| | Accuracy: 0 to -20 % | 6 x Ir | 0.7 ⁽¹⁾ | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | |
| | Accuracy: 0 to -20 % | 7.2 x Ir | 0.7 ⁽²⁾ | 0.69 | 1.38 | 2.7 | 5.5 | 8.3 | 11 | 13.8 | 16.6 | | |
| Thermal memory | | 20 minutes before and after tripping | | | | | | | | | | | |
| (1) 0 to -40 % - (2) 0 to -60 % | | | | | | | | | | | | | |
| Instantaneous | | | | | | | | | | | | | |
| Pick-up (A) | I _{sd} = I _r x ... | 1.5 | 2 | 2.5 | 3 | 4 | 5 | 6 | 8 | 10 | | | |
| Accuracy: ±10 % | | | | | | | | | | | | | |
| Time delay | | Max resettable time: 20 ms Max break time: 80 ms | | | | | | | | | | | |

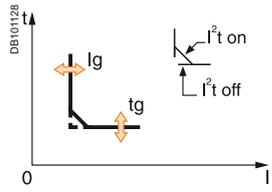


Protection Micrologic 5.0 / 6.0 E

| Long time | | Micrologic 5.0 / 6.0 E | | | | | | | | | | | |
|--|--|---|--------------------|------|------|-----|-----|------|------|------|------|--|--|
| Current setting (A) | I _r = I _n x ... | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.95 | 0.98 | 1 | | | |
| Tripping between 1.05 and 1.20 x Ir | | Other ranges or disable by changing long-time rating plug | | | | | | | | | | | |
| Time setting | tr (s) | 0.5 | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | | |
| Time delay (s) | Accuracy: 0 to -30 % | 1.5 x Ir | 12.5 | 25 | 50 | 100 | 200 | 300 | 400 | 500 | 600 | | |
| | Accuracy: 0 to -20 % | 6 x Ir | 0.7 ⁽¹⁾ | 1 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | | |
| | Accuracy: 0 to -20 % | 7.2 x Ir | 0.7 ⁽²⁾ | 0.69 | 1.38 | 2.7 | 5.5 | 8.3 | 11 | 13.8 | 16.6 | | |
| Thermal memory | | 20 minutes before and after tripping | | | | | | | | | | | |
| (1) 0 to -40 % - (2) 0 to -60 % | | | | | | | | | | | | | |
| Short time | | | | | | | | | | | | | |
| Pick-up (A) | I _{sd} = I _r x ... | 1.5 | 2 | 2.5 | 3 | 4 | 5 | 6 | 8 | 10 | | | |
| Accuracy: ±10 % | | | | | | | | | | | | | |
| Time setting tsd (s) | Settings | I ² t Off | 0 | 0.1 | 0.2 | 0.3 | 0.4 | | | | | | |
| | | I ² t On | - | 0.1 | 0.2 | 0.3 | 0.4 | | | | | | |
| Time delay (ms) at 10 x Ir (I ² t Off or I ² t On) | tsd (max resettable time) | 20 | 80 | 140 | 230 | 350 | | | | | | | |
| | tsd (max break time) | 80 | 140 | 200 | 320 | 500 | | | | | | | |
| Instantaneous | | | | | | | | | | | | | |
| Pick-up (A) | I _{li} = I _n x ... | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 | off | | | |
| Accuracy: ±10 % | | | | | | | | | | | | | |
| Time delay | | Max resettable time: 20 ms Max break time: 50 ms | | | | | | | | | | | |



| Earth fault | | Micrologic 6.0 E | | | | | | | | | | |
|---|--|----------------------|-----|-----|-----|-----|-----|------|------|------|--|--|
| Pick-up (A) | I _{lg} = I _n x ... | A | B | C | D | E | F | G | H | J | | |
| Accuracy: ±10 % | I _n ≤ 400 A | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | | |
| | 400 A < I _n < 1250 A | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | | |
| | I _n ≥ 1250 A | 500 | 640 | 720 | 800 | 880 | 960 | 1040 | 1120 | 1200 | | |
| Time setting tg (s) | Settings | I ² t Off | 0 | 0.1 | 0.2 | 0.3 | 0.4 | | | | | |
| | | I ² t On | - | 0.1 | 0.2 | 0.3 | 0.4 | | | | | |
| Time delay (ms) at I _n or 1200 A (I ² t Off or I ² t On) | tg (max resettable time) | 20 | 80 | 140 | 230 | 350 | | | | | | |
| | tg (max break time) | 80 | 140 | 200 | 320 | 500 | | | | | | |



Energy Micrologic 2.0 / 5.0 / 6.0 E

| Type of measurements | | Range | Accuracy |
|---|------------------------------|---|----------|
| Instantaneous currents | I1, I2, I3, I _N | 0.2 x I _n to 1.2 x I _n | ± 1.5 % |
| | I _g (6.0 E) | 0.05 x I _n to I _n | ± 10 % |
| Current maximeters of | I1, I2, I3, I _N | 0.2 x I _n to 1.2 x I _n | ± 1.5 % |
| Demand currents of I1, I2, I3, I _g | | 0.2 x I _n to 1.2 x I _n | ± 1.5 % |
| Voltages | V12, V23, V31, V1N, V2N, V3N | 100 to 690 V | ± 0.5 % |
| Active power | P | 30 to 2000 kW | ± 2 % |
| Power factor | PF | 0 to 1 | ± 2 % |
| Demand power | P demand | 30 to 2000 kW | ± 2 % |
| Active energy | Ep | -10 ¹⁰ GWh to 10 ¹⁰ GWh | ± 2 % |

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

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

Protection.....



Protection settings

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

Fine adjustment

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

IDMTL (Inverse Definite Minimum Time lag) setting

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

Neutral protection

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

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

Programmable alarms and other protection

Depending on the thresholds and time delays set using the keypad or remotely using the COM option (BCM ULP), the Micrologic P control unit monitors currents and voltage, power, frequency and the phase sequence. Each threshold overrun is signalled remotely via the COM option (BCM ULP). Each threshold overrun may be combined with tripping (protection) or an indication carried out by an optional M2C or M6C programmable contact (alarm), or both (protection and alarm).

Load shedding and reconnection

Load shedding and reconnection parameters may be set according to the power or the current flowing through the circuit breaker. Load shedding is carried out by a supervisor via the COM option (BCM ULP) or by an M2C or M6C programmable contact.

M2C / M6C programmable contacts

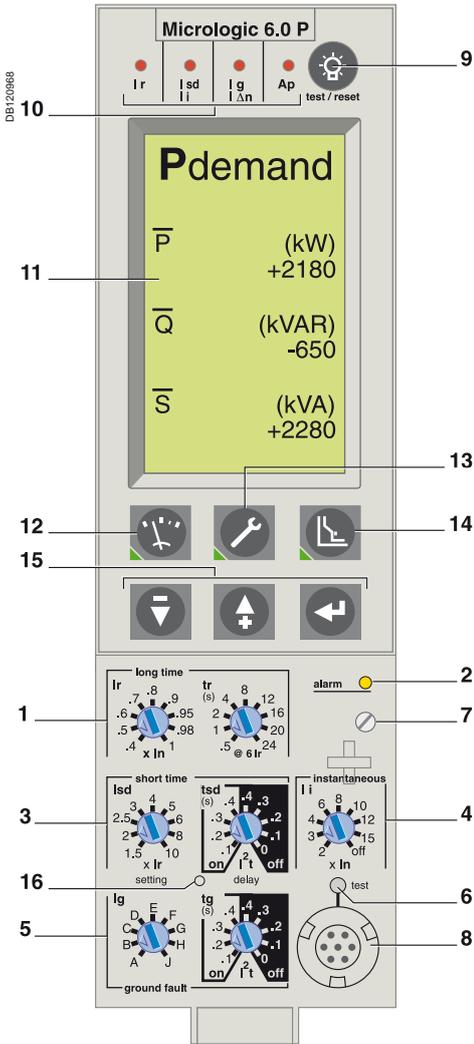
The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option (BCM ULP).

Communication option (COM)

The communication option may be used to:

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

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

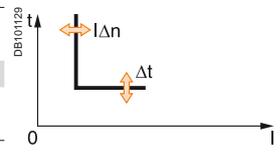
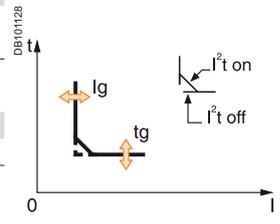
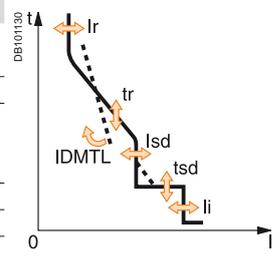


- 1 Long-time current setting and tripping delay.
- 2 Overload signal (LED).
- 3 Short-time pick-up and tripping delay.
- 4 Instantaneous pick-up.
- 5 Earth-leakage or earth-fault pick-up and tripping delay.
- 6 Earth-leakage or earth-fault test button.
- 7 Long-time rating plug screw.
- 8 Test connector.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

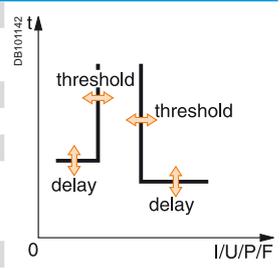
Note: Micrologic P control units come with a non-transparent lead-seal cover as standard.



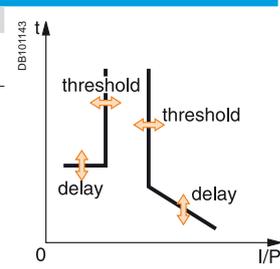
| Protection | | Micrologic 5.0 / 6.0 / 7.0 P | | | | | | | | | |
|--|----------------------------------|---|---|------|------|--------|------|------|------|------|------|
| Long time (rms) | | Micrologic 5.0 / 6.0 / 7.0 P | | | | | | | | | |
| Current setting (A) | $I_r = I_n \times \dots$ | 0.4 | 0.5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



| Alarms and other protection | | Micrologic 5.0 / 6.0 / 7.0 P | |
|--------------------------------|--|---|--------------|
| Current | | Threshold | Delay |
| Current unbalance | Iunbalance | 0.05 to 0.6 leverage | 1 to 40 s |
| Max. demand current | I_{max demand} : I1, I2, I3, I _N | 0.2 I _n to I _n | 15 to 1500 s |
| Earth fault alarm | | | |
| | I_{\neq} | 10 to 100 % I _n ⁽³⁾ | 1 to 10 s |
| Voltage | | | |
| Voltage unbalance | Uunbalance | 2 to 30 % x U _{average} | 1 to 40 s |
| Minimum voltage | U_{min} | 100 to U _{max} between phases | 1.2 to 10 s |
| Maximum voltage ⁽⁴⁾ | U_{max} | U _{min} to 1200 between phases | 1.2 to 10 s |
| Power | | | |
| Reverse power | rP | 5 to 500 kW | 0.2 to 20 s |
| Frequency | | | |
| Minimum frequency | F_{min} | 45 to F _{max} | 1.2 to 5 s |
| Maximum frequency | F_{max} | F _{min} to 440 Hz | 1.2 to 5 s |
| Phase sequence | | | |
| Sequence (alarm) | $\Delta\emptyset$ | $\emptyset 1/2/3$ or $\emptyset 1/3/2$ | 0.3 s |

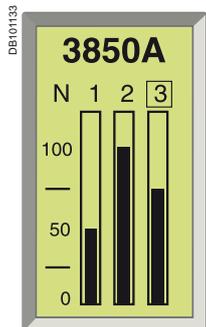


| Load shedding and reconnection | | Micrologic 5.0 / 6.0 / 7.0 P | |
|--------------------------------|----------|------------------------------------|--------------------|
| Measured value | | Threshold | Delay |
| Current | I | 0.5 to 1 I _r per phases | 20 % tr to 80 % tr |
| Power | P | 200 kW to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

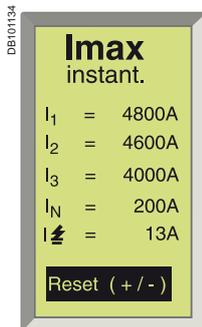


⁽³⁾ $I_n \leq 400$ A 30 %
 400 A < I_n < 1250 A 20 %
 $I_n \geq 1250$ A 10 %
⁽⁴⁾ For 690 V applications, a step-down transformer must be used if the voltage exceeds the nominal value of 690 V by more than 10 %.

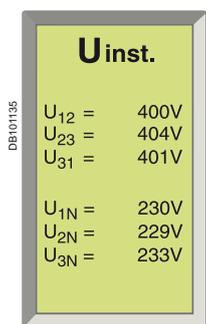
Note: all current-based protection functions require no auxiliary source.
 Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.



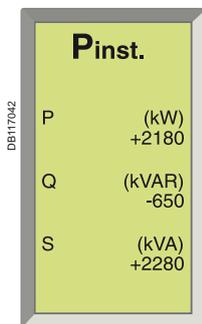
Default display.



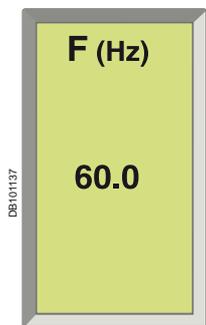
Display of a maximum current



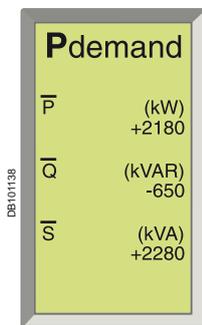
Display of a voltage.



Display of a power.



Display of a frequency.



Display of a demand power.



ion software.

Measurements

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

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

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

Instantaneous values

The value displayed on the screen is refreshed every second.

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

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

Demand metering

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

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

Minimeters and maximeters

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

Time-stamping

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

Reset

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

Additional measurements accessible with the COM option (BCM ULP)

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

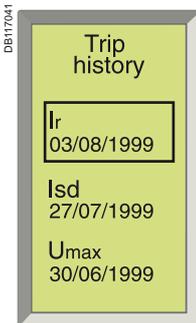
- $I_{peak} / \sqrt{2}$, $(I_1 + I_2 + I_3) / 3$, I unbalance
- load level in % I_r
- total power factor.

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

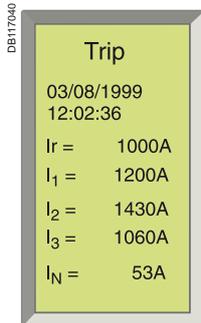
Additional info

Accuracy of measurements (including sensors):

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



Display of a tripping history.



Display after tripping.

Histories and maintenance indicators

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

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

All the other events are recorded in a third history file which is only accessible through the communication network.

- Event log history (only accessible through the communication network)
 - modifications to settings and parameters
 - counter resets
 - system faults:
 - fallback position
 - thermal self-protection
 - loss of time
 - overrun of wear indicators
 - test-kit connections
 - etc.

Note:

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

Maintenance indicators with COM option (BCM ULP)

A number of maintenance indicators may be called up on the screen to better plan for device maintenance:

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

Additional maintenance indicators are also available through the COM network, and can be used as an aid in troubleshooting:

- highest current measured
- number of test-kit connections
- number of trips in operating mode and in test mode.

Additional technical characteristics

Safety

Measurement functions are independent of the protection functions.

The high-accuracy measurement module operates independently of the protection module.

Simplicity and multi-language

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc. Micrologic is also multi-language, including the following languages: English, Spanish, Portuguese, Russian, Chinese, French, German...

Intelligent measurement

Measurement-calculation mode:

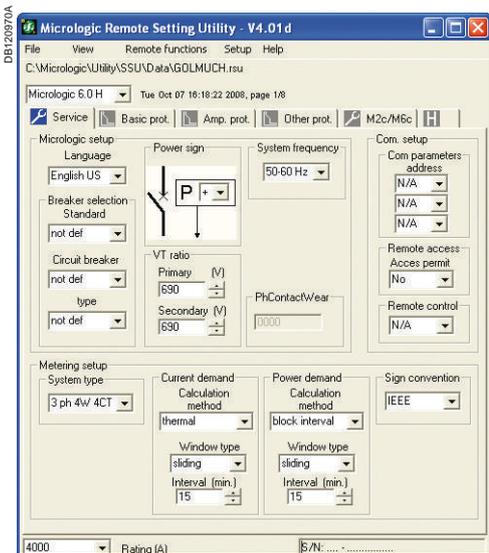
- energies are calculated on the basis of the instantaneous power values, in two manners:
 - the traditional mode where only positive (consumed) energies are considered
 - the signed mode where the positive (consumed) and negative (supplied) energies are considered separately
- measurement functions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

Always powered

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

Stored information

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



RSU configuration screen for a Micrologic.

Micrologic H control units include all the functions offered by Micrologic P. Integrating significantly enhanced calculation and memory functions, the Micrologic H control unit offers in-depth analysis of power quality and detailed event diagnostics. It is intended for operation with a supervisor.

In addition to the Micrologic P functions, the Micrologic H control unit offers:

- in-depth analysis of power quality including calculation of harmonics and the fundamentals
- diagnostics aid and event analysis through waveform capture
- enhanced alarm programming to analyse and track down a disturbance on the AC power system.

Measurements

The Micrologic H control unit offers all the measurements carried out by Micrologic P, with in addition:

- phase by phase measurements of:
 - power, energy
 - power factors
- calculation of:
 - current and voltage total harmonic distortion (THD)
 - current, voltage and power fundamentals
 - current and voltage harmonics up to the 31st order.

Instantaneous values displayed on the screen

Currents

| | | | | | |
|-----------|---|---------|---|-----------|---|
| I rms | A | 1 | 2 | 3 | N |
| | A | E-fault | | E-leakage | |
| I max rms | A | 1 | 2 | 3 | N |
| | A | E-fault | | E-leakage | |

Voltages

| | | | | |
|---------------|---|-----------------------|----|----|
| U rms | V | 12 | 23 | 31 |
| V rms | V | 1N | 2N | 3N |
| U average rms | V | (U12 + U23 + U31) / 3 | | |
| U unbalance | % | | | |

Power, energy

| | | | | | |
|----------------------------------|---------------|----------------------------|---|---|---|
| P active, Q reactive, S apparent | W, Var, VA | Totals | 1 | 2 | 3 |
| E active, E reactive, E apparent | Wh, VARh, VAh | Totals consumed - supplied | | | |
| | | Totals consumed | | | |
| | | Totals supplied | | | |
| Power factor | PF | Total | 1 | 2 | 3 |

Frequencies

| | | | | | |
|---|----|--|--|--|--|
| F | Hz | | | | |
|---|----|--|--|--|--|

Power-quality indicators

| | | | | | | | |
|--------------------|-----------|-----|---|---|---|----|----|
| Total fundamentals | | U | I | P | Q | S | |
| THD | % | U I | | | | | |
| U and I harmonics | Amplitude | 3 | 5 | 7 | 9 | 11 | 13 |

Harmonics 3, 5, 7, 9, 11 and 13, monitored by electrical utilities, are displayed on the screen.

Demand measurements

Similar to the Micrologic P control unit, the demand values are calculated over a fixed or sliding time window that may be set from 5 to 60 minutes.

Currents

| | | | | | |
|--------------|---|---------|---|-----------|---|
| I demand | A | 1 | 2 | 3 | N |
| | A | E-fault | | E-leakage | |
| I max demand | A | 1 | 2 | 3 | N |
| | A | E-fault | | E-leakage | |

Power

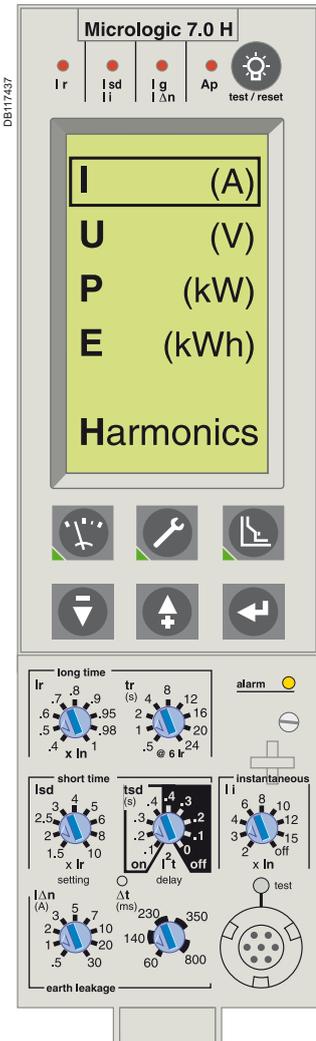
| | | | | | |
|--------------------|------------|--------|--|--|--|
| P, Q, S demand | W, Var, VA | Totals | | | |
| P, Q, S max demand | W, Var, VA | Totals | | | |

Maximeters

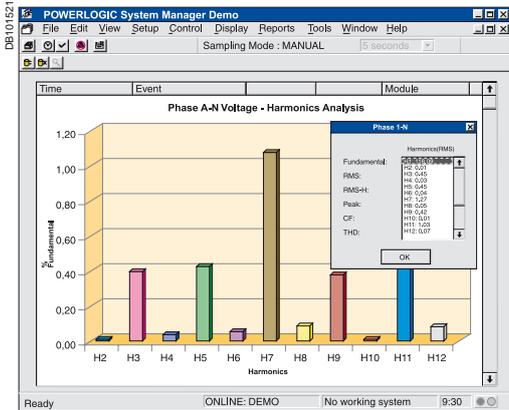
Only the current maximeters may be displayed on the screen.

Histories and maintenance indicators

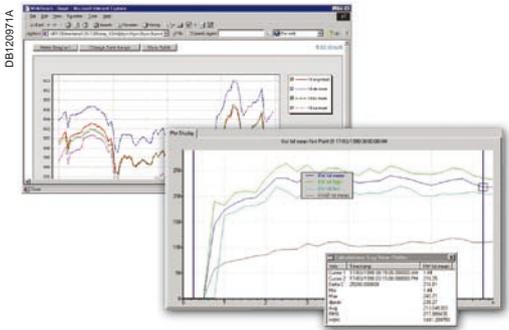
These functions are identical to those of the Micrologic P.



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



Display of harmonics up to 21th order.



| Label | N° | Stat | Pu. val | Unit | Pu. dly | Do. val | Unit | Do. dly | Log |
|-------------------------|----|------|---------|------|---------|---------|------|---------|-----|
| Over Current Phase A | 1 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Current Phase B | 2 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Current Phase C | 3 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Neutral Current | 4 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Ground Current | 5 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Under Current Phase A | 6 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Under Current Phase B | 7 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Under Current Phase C | 8 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Current Unbalan... | 9 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Current Unbalan... | 10 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Current Unbalan... | 11 | Off | N/A | A | N/A | N/A | A | N/A | Off |
| Over Voltage Phase A | 12 | Off | N/A | V | N/A | N/A | V | N/A | Off |
| Over Voltage Phase B | 13 | Off | N/A | V | N/A | N/A | V | N/A | Off |
| Over Voltage Phase C | 14 | Off | N/A | V | N/A | N/A | V | N/A | Off |
| Under Voltage Phase A | 15 | Off | N/A | V | N/A | N/A | V | N/A | Off |
| Under Voltage Phase B | 16 | Off | N/A | V | N/A | N/A | V | N/A | Off |
| Under Voltage Phase C | 17 | Off | N/A | V | N/A | N/A | V | N/A | Off |
| Over Voltage Unbalan... | 18 | Off | N/A | % | N/A | % | N/A | % | Off |
| Over Voltage Unbalan... | 19 | Off | N/A | % | N/A | % | N/A | % | Off |
| Over Voltage Unbalan... | 20 | Off | N/A | % | N/A | % | N/A | % | Off |
| Over kVA 3-ph Total | 21 | Off | N/A | k... | N/A | k... | N/A | k... | Off |
| Over kW Into the Loa... | 22 | Off | N/A | kW | N/A | kW | N/A | kW | Off |
| Over kW Out of the l... | 23 | Off | N/A | kW | N/A | kW | N/A | kW | Off |

Log.

With the communication option

Additional measurements, maximeters and minimeters

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

- $I_{peak} / \sqrt{2} (I_1 + I_2 + I_3) / 3, I_{unbalance}$
 - load level in % Ir
 - power factor (total and per phase)
 - voltage and current THD
 - K factors of currents and average K factor
 - crest factors of currents and voltages
 - all the fundamentals per phase
 - fundamental current and voltage phase displacement
 - distortion power and distortion factor phase by phase
 - amplitude and displacement of current and voltage harmonics 3 to 31.
- The maximeters and minimeters are available only via the COM option (BCM ULP) for use with a supervisor.

Waveform capture

The Micrologic H control unit stores the last 4 cycles of each instantaneous current or voltage measurement. On request or automatically on programmed events, the control unit stores the waveforms. The waveforms may be displayed in the form of oscillograms by a supervisor via the COM option (BCM ULP). Definition is 64 points per cycle.

Pre-defined analogue alarms (1 to 53)

Each alarm can be compared to user-set high and low thresholds. Overrun of a threshold generates an alarm. An alarm or combinations of alarms can be linked to programmable action such as selective recording of measurements in a log, waveform capture, etc.

Event log and maintenance registers

The Micrologic H offers the same event log and maintenance register functions as the Micrologic P. In addition, it produces a log of the minimums and maximums for each "real-time" value.

Additional technical characteristics

Safety

Measurement functions are independent of the protection functions.

The high-accuracy measurement module operates independently of the protection module.

Simplicity and multi-language

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc. Micrologic is also multi-language, including the following languages: English, Spanish, Portuguese, Russian, Chinese, French, German;;;

Intelligent measurement

Measurement-calculation mode:

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

Always powered

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

Stored information

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

Power Meter functions

Micrologic A/E/P/H control unit with COM option (BCM ULP)

In addition to protection functions, Micrologic A/E/P/H control units offer all the functions of Power Meter products as well as operating-assistance for the circuit breaker.

Micrologic A/E/P/H measurement functions are made possible by Micrologic intelligence and the accuracy of the sensors. They are handled by a microprocessor that operates independent of protection functions.

Display



FDM121 display unit

The FDM121 switchboard display unit can be connected to a Micrologic COM option (BCM ULP) using a breaker ULP cord to display all measurements on a screen. The result is a veritable 96 x 96 mm Power Meter.

In addition to the information displayed on the Micrologic LCD, the FDM121 screen shows demand, power quality and maximeter/minimeter values along with histories and maintenance indicators.

The FMD121 display unit requires a 24 V DC power supply. The COM option (BCM ULP) unit is supplied by the same power supply via the breaker ULP cord connecting it to the FDM121.

Measurements



Instantaneous rms measurements

The Micrologic continuously display the RMS value of the highest current of the three phases and neutral (Imax). The navigation buttons can be used to scroll through the main measurements.

In the event of a fault trip, the trip cause is displayed.

The Micrologic A measures phase, neutral, ground fault currents.

The Micrologic E offers voltage, power, Power Factor, measurements in addition to the measurements provided by Micrologic A.

The Micrologic P/H offer frequency, cos.φ in addition to the measurements provided by Micrologic E.

Maximeters / minimeters

Every instantaneous measurement provided by Micrologic A or E can be associated with a maximeter/minimeter. The maximeters for the highest current of the 3 phases and neutral, the demand current and power can be reset via the FDM121 display unit or the communication system.

Energy metering

The Micrologic E/P/H also measures the energy consumed since the last reset of the meter. The active energy meter can be reset via Micrologic keypad or the FDM121 display unit or the communication system.

Demand and maximum demand values

Micrologic E/P/H also calculates demand current and power values. These calculations can be made using a block or sliding interval that can be set from 5 to 60 minutes in steps of 1 minute. The window can be synchronised with a signal sent via the communication system. Whatever the calculation method, the calculated values can be recovered on a PC via Modbus communication.

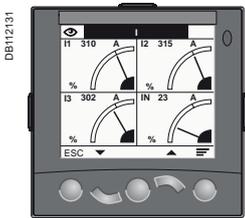
Ordinary spreadsheet software can be used to provide trend curves and forecasts based on this data. They will provide a basis for load shedding and reconnection operations used to adjust consumption to the subscribed power.

Power quality

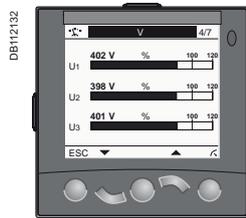
Micrologic H calculates power quality indicators taking into account the presence of harmonics up to the 15th order, including the total harmonic distortion (THD) of current and voltage.



FDM121 display: navigation.



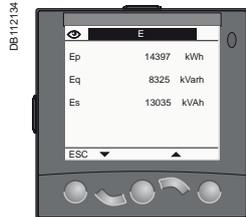
Current.



Voltage.

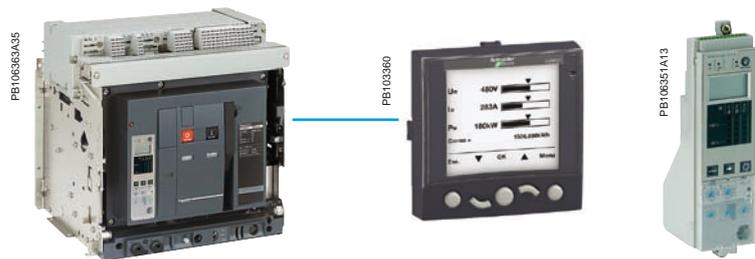


Power.



Consumption.

Examples of measurement screens on the FDM121 display unit.



| Micrologic A/E/P/H integrated Power Meter functions | | | | Type | | Display | |
|---|--|--|-----|------------------|------------------|----------------|----------------|
| | | | | A/E | P/H | Micrologic LCD | FDM121 display |
| Display of protection settings | | | | | | | |
| Pick-ups (A) and delays | All settings can be displayed | Ir, tr, lsd, tsd, li, lg, tg | A/E | P/H | ■ | - | - |
| Measurements | | | | | | | |
| Instantaneous rms measurements | | | | | | | |
| Currents (A) | Phases and neutral | I1, I2, I3, IN | A/E | P/H | ■ | ■ | ■ |
| | Average of phases | $I_{avg} = (I1 + I2 + I3) / 3$ | A/E | P/H | - | - | ■ |
| | Highest current of the 3 phases and neutral | Imax of I1, I2, I3, IN | A/E | P/H | ■ | ■ | ■ |
| | Ground fault (Micrologic 6) | % Ig (pick-up setting) | A/E | P/H | ■ | ■ | ■ |
| | Current unbalance between phases | % Iavg | -/E | P/H | - | - | ■ |
| Voltages (V) | Phase-to-phase | V12, V23, V31 | -/E | P/H | ■ | ■ | ■ |
| | Phase-to-neutral | V1N, V2N, V3N | -/E | P/H | ■ | ■ | ■ |
| | Average of phase-to-phase voltages | $V_{avg} = (V12 + V23 + V31) / 3$ | -/E | P/H | - | - | ■ |
| | Average of phase-to-neutral voltages | $V_{avg} = (V1N + V2N + V3N) / 3$ | -/E | P/H | - | - | ■ |
| | Ph-Ph and Ph-N voltage unbalance | % Vavg and % Vavg | -/E | P/H | - | - | ■ |
| | Phase sequence | 1-2-3, 1-3-2 | -/- | P/H | ■ | ■ | ■ |
| Frequency (Hz) | Power system | f | -/- | P/H | ■ | ■ | ■ |
| Power | Active (kW) | P, total | -/E | P/H | ■ | ■ | ■ |
| | | P, per phase | -/E | P/H | ■ ⁽²⁾ | ■ | ■ |
| | Reactive (kVAR) | Q, total | -/E | P/H | ■ | ■ | ■ |
| | | Q, per phase | -/- | P/H | ■ ⁽²⁾ | ■ | ■ |
| | Apparent (kVA) | S, total | -/E | P/H | ■ | ■ | ■ |
| | | S, per phase | -/- | P/H | ■ ⁽²⁾ | ■ | ■ |
| | Power Factor | PF, total | -/E | P/H | ■ | ■ | ■ |
| | | PF, per phase | -/- | P/H | ■ ⁽²⁾ | ■ | ■ |
| Cos.φ | Cos.φ, total | -/- | P/H | ■ ⁽²⁾ | ■ | ■ | |
| | Cos.φ, per phase | -/- | P/H | ■ ⁽²⁾ | ■ | ■ | |
| Maximeters / minimeters | | | | | | | |
| | Associated with instantaneous rms measurements | Reset via FDM121 display unit and Micrologic keypad | A/E | P/H | ■ | ■ | ■ |
| Energy metering | | | | | | | |
| Energy | Active (kW), reactive (kVARh), apparent (kVAh) | Total since last reset | -/E | P/H | ■ | ■ | ■ |
| Demand and maximum demand values | | | | | | | |
| Demand current (A) | Phases and neutral | Present value on the selected window | -/E | P/H | ■ | ■ | ■ |
| | | Maximum demand since last reset | -/E | P/H | ■ ⁽²⁾ | ■ | ■ |
| Demand power | Active (kWh), reactive (kVAR), apparent (kVA) | Present value on the selected window | -/E | P/H | ■ | ■ | ■ |
| | | Maximum demand since last reset | -/E | P/H | ■ ⁽²⁾ | ■ | ■ |
| Calculation window | Sliding, fixed or com-synchronised | Adjustable from 5 to 60 minutes in 1 minute steps ⁽¹⁾ | -/E | P/H | - | - | - |
| Power quality | | | | | | | |
| Total harmonic distortion (%) | Of voltage with respect to rms value | THDU, THDV of the Ph-Ph and Ph-N voltage | -/- | H | ■ | ■ | ■ |
| | Of current with respect to rms value | THDI of the phase current | -/- | H | ■ | ■ | ■ |

(1) Available via the communication system only.
(2) Available for Micrologic P/H only.

Additional technical characteristics

Measurement accuracy

Accuracies are those of the entire measurement system, including the sensors:

- current: class 1 as per IEC 61557-12
- voltage: 0.5 %
- power and energy: Class 2 as per IEC 61557-12
- frequency: 0.1 %.

Histories



- trip indications in clear text in a number of user-selectable languages
- time-stamping: date and time of trip.

Maintenance indicators



Micrologic control unit have indicators for, among others, the number of operating cycles, contact wear P/H, load profile and operating times (operating hours counter) of the Masterpact circuit breaker.

It is possible to assign an alarm to the operating cycle counter to plan maintenance. The various indicators can be used together with the trip histories to analyse the level of stresses the device has been subjected to.

Management of installed devices

Each circuit breaker equipped with a COM option (BCM ULP) can be identified via the communication system:

- serial number
- firmware version
- hardware version
- device name assigned by the user.

This information together with the previously described indications provides a clear view of the installed devices.

| Micrologic A/E/P/H operating assistance functions | | | Type | | Display | |
|---|--------------------------------|--|-------|-------|----------------|----------------|
| | | | A/E | P/H | Micrologic LCD | FDM121 display |
| Operating assistance | | | | | | |
| Trip history | | | | | | |
| Trips | Cause of tripping | Ir, lsd, li, Ig, lΔn | - / E | P / H | ■ | ■ |
| Maintenance indicators | | | | | | |
| Counter | Mechanical cycles | Assignable to an alarm | A / E | P / H | - | ■ |
| | Electrical cycles | Assignable to an alarm | A / E | P / H | - | ■ |
| | Hours | Total operating time (hours) ⁽¹⁾ | A / E | P / H | - | - |
| Indicator | Contact wear | % | - / - | P / H | - | ■ |
| Load profile | Hours at different load levels | % of hours in four current ranges: 0-49 % In, 50-79 % In, 80-89 % In and ≥ 90 % In | A / E | P / H | - | ■ |

(1) Also available via the communication system.

Additional technical characteristics

Contact wear

Each time Masterpact opens, the Micrologic P/H trip unit measures the interrupted current and increments the contact-wear indicator as a function of the interrupted current, according to test results stored in memory. Breaking under normal load conditions results in a very slight increment. The indicator value may be read on the FDM121 display. It provides an estimation of contact wear calculated on the basis of the cumulative forces affecting the circuit breaker. When the indicator reaches 100 %, it is advised to inspect the circuit breaker to ensure the availability of the protected equipment.

Circuit breaker load profile

Micrologic A/E/P/H calculates the load profile of the circuit breaker protecting a load circuit. The profile indicates the percentage of the total operating time at four current levels (% of breaker In):

- 0 to 49 % In
- 50 to 79 % In
- 80 to 89 % In
- ≥ 90 % In.

This information can be used to optimise use of the protected equipment or to plan ahead for extensions.

Switchboard-display functions

Micrologic A/E/P/H control unit with COM option (BCM ULP)

Micrologic measurement capabilities come into full play with the FDM121 switchboard display. It connects to COM option (BCM ULP) via a breaker ULP cord and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.

FDM121 switchboard display

The FDM121 switchboard display unit can be connected to a Micrologic COM option (BCM ULP). It uses the sensors and processing capacity of the Micrologic control unit. It is easy to use and requires no special software or settings. It is immediately operational when connected to the COM option (BCM ULP) by a breaker ULP cord. The FDM121 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and trips

The FDM121 is intended to display Micrologic A/E/P/H measurements, trips and operating information. It cannot be used to modify the protection settings. Measurements may be easily accessed via a menu.

Trips are automatically displayed.

- A pop-up window displays the time-stamped description of the trip and the orange LED flashes

Status indications

When the circuit breaker is equipped with the COM option (BCM ULP) (including its set of sensors) the FDM121 display can also be used to view circuit breaker status conditions:

- O/F: ON/OFF
- SDE: Fault-trip indication (overload, short-circuit, ground fault).
- PF: ready to close
- CH: charged (spring loaded).

Remote control

When the circuit breaker is equipped with the COM option (BCM ULP) (including its kit for connection to XF and MX1 communication voltage releases), the FDM121 display can also be used to control (open/close) the circuit breaker. Two operating mode are available.

- local mode : open/close commands are enabled from FDM121 while disabled from communication network
- remote mode : open/close commands are disabled from FDM121 while enabled from communication network.

Main characteristics

- 96 x 96 x 30 mm screen requiring 10 mm behind the door (or 20 mm when the 24 volt power supply connector is used).
- White backlighting.
- Wide viewing angle: vertical $\pm 60^\circ$, horizontal $\pm 30^\circ$.
- High resolution: excellent reading of graphic symbols.
- Alarm LED: flashing orange for alarm pick-up, steady orange after operator reset if alarm condition persists.
- Operating temperature range -10°C to $+55^\circ\text{C}$.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V -20 % (19.2 V) to 24 V +10 % (26.4 V). When the FDM121 is connected to the communication network, the 24 V DC can be supplied by the communication system wiring system (see paragraph "Connection").
- Consumption 40 mA.

Mounting

The FDM121 is easily installed in a switchboard.

- Standard door cut-out 92 x 92 mm.
- Attached using clips.

To avoid a cut-out in the door, an accessory is available for surface mounting by drilling only two 22 mm diameter holes.

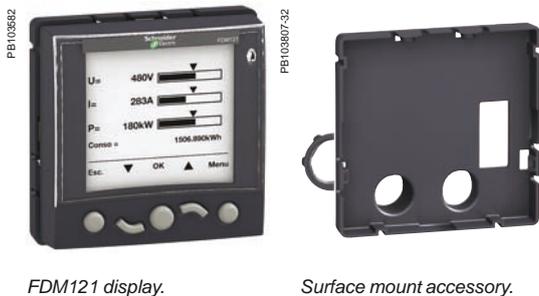
The FDM121 degree of protection is IP54 in front. IP54 is maintained after switchboard mounting by using the supplied gasket during installation.

Connection

The FDM121 is equipped with:

- a 24 V DC terminal block:
 - plug-in type with 2 wire inputs per point for easy daisy-chaining
 - power supply range of 24 V DC -20 % (19.2 V) to 24 V DC +10 % (26.4 V).
- A 24 V DC type auxiliary power supply must be connected to a single point on the ULP system. The FDM121 display unit has a 2-point screw connector on the rear panel of the module for this purpose. The ULP module to which the auxiliary power supply is connected distributes the supply via the ULP cable to all the ULP modules connected to the system and therefore also to Micrologic.
- two RJ45 jacks.

The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord. Connection to one of the RJ45 connectors on the FDM121 automatically establishes communication between the Micrologic and the FDM121 and supplies power to the Micrologic measurement functions. When the second connector is not used, it must be fitted with a line terminator.



FDM121 display.

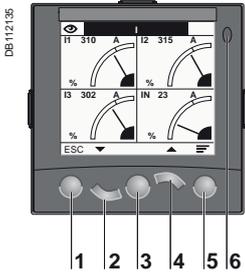
Surface mount accessory.



Connection with FDM121 display unit.

Switchboard-display functions

Micrologic A/E/P/H control unit with COM option (BCM ULP)



- 1 Escape
- 2 Down
- 3 OK
- 4 Up
- 5 Context
- 6 Alarm LED

Navigation

Five buttons are used for intuitive and fast navigation. The "Context" button may be used to select the type of display (digital, bargraph, analogue). The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens

Main menu

When powered up, the FDM121 screen automatically displays the ON/OFF status of the device.

- Quick view
- Alarms
- Metering
- Services.
- Control

When not in use, the screen is not backlit. Backlighting can be activated by pressing one of the buttons. It goes off after 3 minutes.

Fast access to essential information

■ "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

Access to detailed information

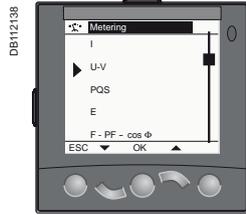
■ "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.

■ Alarms displays the trip history.

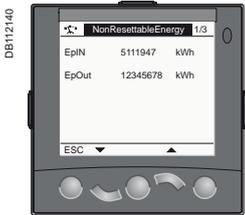
■ Services provides access to the operation counters, energy and maximeter reset function, maintenance indicators, identification of modules connected to the internal bus and FDM121 internal settings (language, contrast, etc.)



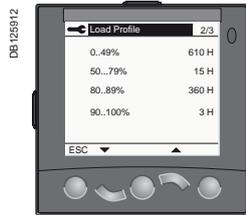
Product identification.



Metering: sub-menu.

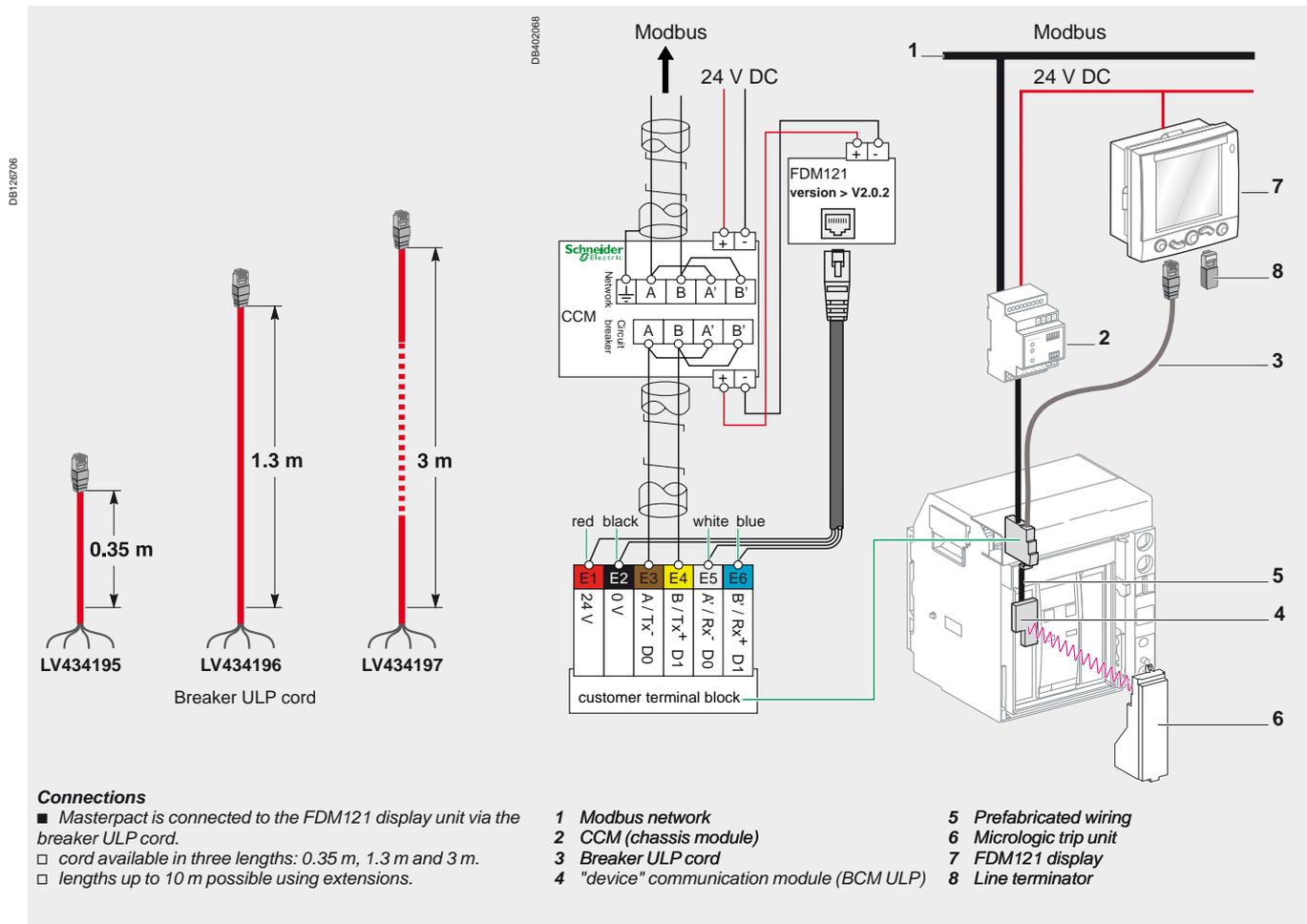


Metering: meter.



Services.

Communication components and FDM121 connections



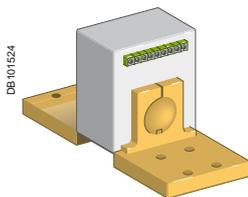
Connections

- Masterpact is connected to the FDM121 display unit via the breaker ULP cord.
- cord available in three lengths: 0.35 m, 1.3 m and 3 m.
- lengths up to 10 m possible using extensions.

- 1 Modbus network
- 2 CCM (chassis module)
- 3 Breaker ULP cord
- 4 "device" communication module (BCM ULP)
- 5 Prefabricated wiring
- 6 Micrologic trip unit
- 7 FDM121 display
- 8 Line terminator

Micrologic control units

Accessories and test equipment



External sensor (CT).



Rectangular sensor.



External sensor for source ground return protection.



Long time rating plug.



External 24 V DC power supply module.

External sensors

External sensor for earth-fault and neutral protection

The sensors, used with the 3P circuit breakers, are installed on the neutral conductor for:

- neutral protection (with Micrologic P and H)
- residual type earth-fault protection (with Micrologic A, E, P and H).

The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:

- NT06 to NT16: TC 400/1600
- NW08 to NW20: TC 400/2000
- NW25 to NW40: TC 1000/4000
- NW40b to NW63: TC 4000/6300.

For oversized neutral protection the sensor rating must be compatible with the measurement range: 1.6 x I_N (available up to NW 40 and NT 16).

Rectangular sensor for earth-leakage protection

The sensor is installed around the busbars (phases + neutral) to detect the zero-phase sequence current required for the earth-leakage protection. Rectangular sensors are available in two sizes.

Inside dimensions (mm)

- 280 x 115 up to 1600 A for Masterpact NT and NW
- 470 x 160 up to 3200 A for Masterpact NW.

External sensor for source ground return protection

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

Voltage measurement inputs

Voltage measurement inputs are required for power measurements (Micrologic P or H) and for earth-leakage protection (Micrologic 7...).

As standard, the control unit is supplied by internal voltage measurement inputs placed downstream of the pole for voltages between 220 and 690 V AC. On request, it is possible to replace the internal voltage measurement inputs by an external voltage input (PTE option) which enables the control unit to draw power directly from the distribution system upstream of the circuit breaker. An 3 m cable with ferrite comes with this PTE option.

Long-time rating plug

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

The time delay settings indicated on the plugs are for an overload of 6 I_r (for further details, see the characteristics on [page A-15](#) and [page A-17](#)).

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

Setting ranges

| | | | | | | | | | | |
|---------------------|---|------|------|------|------|------|------|------|------|-----|
| Standard | I _r = I _n x... | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.95 | 0.98 | 1 |
| Low-setting option | I _r = I _n x... | 0.4 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.8 |
| High-setting option | I _r = I _n x... | 0.80 | 0.82 | 0.85 | 0.88 | 0.90 | 0.92 | 0.95 | 0.98 | 1 |
| Off plug | No long-time protection (I _r = I _n for I _{sd} setting) | | | | | | | | | |

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

External 24 V DC power-supply module

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

This module powers both the control unit (100 mA) and the M2C and M6C programmable contacts (100 mA).

If the COM communication option is used, the communication bus requires 24 V DC power supply. With the Micrologic A/E control unit, this module makes it possible to display currents of less than 20 % of I_n.

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

Characteristics

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



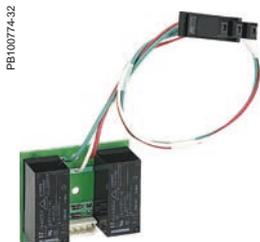
Battery module

Battery module

The battery module maintains display operation and communication with the supervisor if the power supply to the Micrologic control unit is interrupted. It is installed in series between the Micrologic control unit and the AD module.

Characteristics

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



M2C.



M6C.

M2C, M6C programmable contacts

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

| Micrologic Characteristics | Type E M2C | Types P, H M2C/M6C |
|------------------------------------|-------------|--------------------|
| Minimum load | 100 mA/24 V | 100 mA/24 V |
| Breaking capacity (A) p.f.: 0.7 | V AC 240 | 5 |
| | 380 | 3 |
| | V DC 24 | 1.8 |
| | 48 | 1.5 |
| | 125 | 0.4 |
| 250 | 0.15 | 0.15 |

M2C: 24 V DC power supplied by control unit (consumption 100 mA).

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



Lead-seal cover.

Spare parts

Lead-seal covers

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

When the cover is closed:

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

Characteristics

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

Spare battery

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

A test button on the front of the control unit is used to check the battery condition.

The battery may be replaced on site when discharged.



Portable test kit.

Test equipment

Hand-held test kit

The hand-held mini test kit may be used to:

- check operation of the control unit and the tripping and pole-opening system by sending a signal simulating a short-circuit
- supply power to the control units for settings via the keypad when the circuit-breaker is open (Micrologic P and H control units).

Power source: standard LR6-AA battery.

Full function test kit

The test kit can be used alone or with a supporting personal computer.

The test kit without PC may be used to check:

- the mechanical operation of the circuit breaker
- the electrical continuity of the connection between the circuit breaker and the control unit
- operation of the control unit:
 - display of settings
 - automatic and manual tests on protection functions
 - test on the zone-selective interlocking (ZSI) function
 - inhibition of the earth-fault protection
 - inhibition of the thermal memory.

The test kit with PC offers in addition:

- the test report (software available on request).

GetnSet is a portable data acquisition and storage accessory that connects directly to the Micrologic control units of Masterpact circuit breakers to read important electrical installation operating data and Masterpact protection settings. This information is stored in the GetnSet internal memory and can be transferred to a PC via USB or Bluetooth for monitoring and analysis.

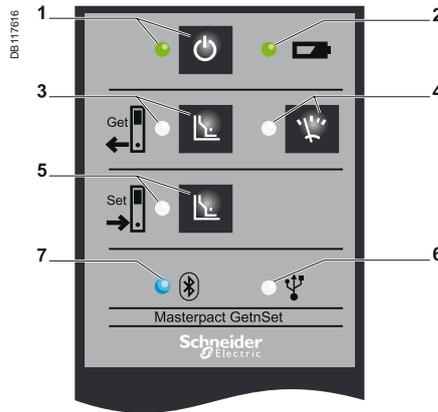
Overview of Masterpact GetnSet functions

GetnSet⁽¹⁾ is a portable data acquisition and storage device that works like a USB drive, letting users manually transfer data to and from a Masterpact circuit breaker or PC.

GetnSet can download operating data from Masterpact and download or upload settings.

Downloadable operating data include measurements, the last 3 trip history records and contact wear status.

Accessible settings include protection thresholds, external relay assignment modes and pre-defined alarm configurations if applicable.



- 1 On/Off
- 2 batterie indicator
- 3 Download settings
- 4 Download operating parameters
- 5 Upload settings
- 6 USB indicator
- 7 Bluetooth indicator

| Micrologic Identification | | Lighting breaker | Main feeder |
|-----------------------------|----------------------------|----------------------------|-------------------------------|
| Circuit Breaker Name | | | |
| Serial Number | 00000011 | 12245678 | 12245678 |
| Date | 7/18/12 | 3/8/12 | 3/8/12 |
| Profile Name | RCB9651_01.dgl | 12245678_01.dgl | 12245678_01.dgl |
| Full Path of .dgl File | Settings\CB965123\Breakage | Settings\CB965123\Breakage | Settings\CB965123\Breakage |
| Energy | | | |
| ActiveEnergy (kWh) | 150 | 60 | 60 |
| ReactiveEnergy (kVArh) | 95 | 34 | 34 |
| ActiveEnergy (kVAh) | 54 | 48 | 48 |
| ActiveEnergy (kVAh) | 36 | 100 | 100 |
| ReactiveEnergy (kVArh) | 60 | 25 | 25 |
| ReactiveEnergy (kVArh) | 24 | 76 | 76 |
| ApparentEnergy (kVAh) | 184 | 151 | 151 |
| TRIP Record | | | |
| 1st Last Trip | | | |
| Date | Date: 02/22/2007 | Time: 11:00:40.940 | Time: 02/22/2007 11:00:40.940 |
| Case Alarm Number | 5000 | | 5000 |
| Warning (A) | 1.00 | | 1.00 |
| Phase A Opening Current (A) | 1100 | | 1100 |
| Phase B Opening Current (A) | 0 | | 0 |
| Phase C Opening Current (A) | 0 | | 0 |
| Phase W Opening Current (A) | 0 | | 0 |
| Contact Wear Indicator | 0 | | 0 |
| 2nd Last Trip | | | |
| Date | Date: 02/22/2007 | Time: 11:00:40.940 | Time: 02/22/2007 11:00:40.940 |
| Case Alarm Number | 5000 | | 5000 |
| Warning (A) | 1.00 | | 1.00 |
| Phase A Opening Current (A) | 1100 | | 1100 |
| Phase B Opening Current (A) | 0 | | 0 |
| Phase C Opening Current (A) | 0 | | 0 |
| Phase W Opening Current (A) | 0 | | 0 |
| Contact Wear Indicator | 0 | | 0 |

Operating data functions

Electrical installation information such as energy measurements and contact wear status is increasingly important to help reduce operating expenses and increase the availability of electrical power. Such data is often available from devices within the installation, but needs to be gathered and aggregated to allow analysis and determine effective improvement actions.

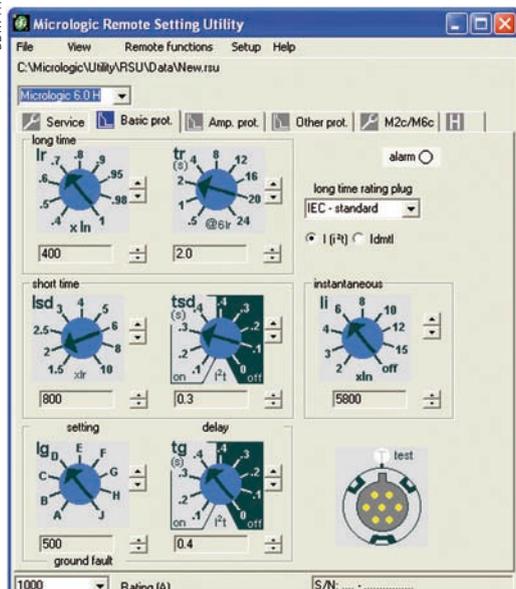
With GetnSet, this operating data can be easily read and stored as .dgl files in the internal memory. It can then be transferred to a PC via a USB or Bluetooth link and imported in an Excel spreadsheet.

The provided Excel spreadsheet can be used to display the operating data from several breakers in order to:

- analyse changes in parameters such as energy, power factor and contact wear
- compare the values of parameters between circuit breakers
- create graphics and reports using standard Excel tools

GetnSet data accessible in the Excel spreadsheet

| Type of data | Micrologic | | |
|--|------------|---|---|
| Current | A/E | P | H |
| Energy, voltages, frequency, power, power factor | E | P | H |
| Power quality: fundamental, harmonics | - | - | H |
| Trip history | E | P | H |
| Contact wear | - | P | H |



Protection setting functions

GetnSet can also be used to back up circuit breaker settings and restore them on the same device or, under certain conditions, copy them to any Masterpact circuit breaker equipped with the same type of Micrologic control unit. This concerns only advanced settings, as other parameters must be set manually using the dials on the Micrologic control unit.

- When commissioning the installation, safeguard the configuration parameters of your electrical distribution system by creating a back-up of circuit breaker settings so that they can be restored at any time.

- The settings read by GetnSet can be transferred to a PC and are compatible with RSU software (Remote Setting Utility). Protection configurations can also be created on a PC using this software, copied to GetnSet's internal memory and uploaded to a Masterpact circuit breaker with a compatible Micrologic trip unit and dial settings.

Operating procedure

The procedure includes several steps.

- Plug GetnSet into the receptacle on the front of the Micrologic control unit of a Masterpact circuit breaker.
- On the keypad, select the type of data (operating data or settings) and the transfer direction (download or upload). This operation can be done as many times as required for the entire set of Masterpact circuit breakers.
- Downloaded data is transferred to the GetnSet internal memory and a file is created for each Masterpact device (either an .rsu file for settings or a .dgl file for operating data).
- Data can be transferred between GetnSet and a PC via a USB or Bluetooth connection.
- Operating data can be imported in an Excel spreadsheet and protection settings can be read with RSU (remote setting utility) software.

Features

- Battery-powered to power a Micrologic control unit even if the breaker has been opened or tripped. This battery provides power for an average of 1 hour of use, enough for more than 100 download operations.
- Can be used on Masterpact circuit breakers equipped or not equipped with a Modbus "device" communication module.
- Portable, standalone accessory eliminating the need for a PC to connect to a Masterpact circuit breaker.
- No driver or software required for GetnSet connection to a PC.
- Can be used with many circuit breakers, one after the other.
- Embedded memory sized to hold data from more than 5000 circuit breakers.
- Supplied with its battery, a cable for connection to Micrologic trip units, a USB cable for connection to a PC and a battery charger.

Compatibility

- Micrologic control units A, E, P, H
- PC with USB port or Bluetooth link and Excel software

Technical characteristics

| | |
|---------------------------|------------------------------|
| Charger power supply | 100 – 240 V; ~1A; 50 – 60 Hz |
| Charger power consumption | Max 100 W |
| Battery | 3.3 V DC; 9mAh; Li-Ion |
| Operating temperature | -20 to +60 °C |
| GetnSet dimensions | 95 x 60 x 35 mm |

All the Masterpact devices can be fitted with the communication function thanks to the COM option. Masterpact uses the Modbus communications protocol for full compatibility with the supervision management systems. An external gateway is available for communication on other networks: Eco COM is limited to the transmission of metering data. It is not used to communicate status and controls.

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.

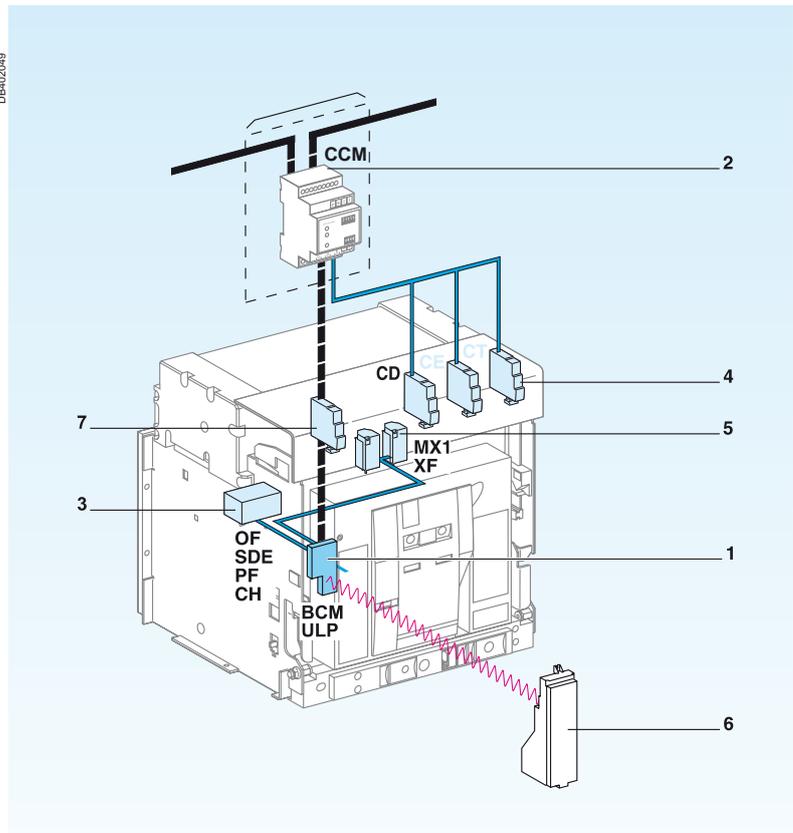
The remote-tripping function (MX2 or MN) are independent of the communication option. They are not equipped for connection to the “device” communication module.



Modbus BCM ULP “device” communication module.



Modbus CCM “chassis” communication module.



- 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.

Overview of functions

PB104804



A: Micrologic with ammeter
 E: Micrologic "Energy"
 P: Micrologic "Power"
 H: Micrologic "Harmonics"

Note: see the description of the Micrologic control units for further details on protection and alarms, measurements, waveform capture, histories, logs and maintenance indicators.

Four functional levels

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

| | Switch-disconnectors | Circuit breaker | | | |
|--|----------------------|-----------------|---|---|---|
| Status indications | | | | | |
| ON/OFF (O/F) | ■ | A | E | P | H |
| Spring charged CH | ■ | A | E | P | H |
| Ready to close | ■ | A | E | P | H |
| Fault-trip SDE | ■ | A | E | P | H |
| Connected / disconnected / test position CE/CD/CT (CCM only) | ■ | A | E | P | H |
| Controls | | | | | |
| MX1 open | ■ | A | E | P | H |
| XF close | ■ | A | E | P | H |
| Measurements | | | | | |
| Instantaneous measurement information | ■ | A | E | P | H |
| Averaged measurement information | ■ | | E | P | H |
| Maximeter / minimeter | ■ | A | E | P | H |
| Energy metering | ■ | | E | P | H |
| Demand for current and power | ■ | | E | P | H |
| Power quality | ■ | | | | H |
| Operating assistance | | | | | |
| Protection and alarm settings | | | | P | H |
| Histories | | | E | P | H |
| Time stamped event tables | | | | P | H |
| Maintenance indicators | | A | E | P | H |

Communication Modbus bus

The Modbus RS 485 (RTU protocol) system is an open bus on which communicating Modbus devices (Compact NS with Modbus COM, Power Meter PM700, PM800, Sepam, Vigilohm, Compact NSX, 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 keypad on the Micrologic A, E, P, H. For a switch-disconnector, it is necessary to use the RSU (Remote Setting Utility) Micrologic utility.

Modbus addresses

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

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, 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.

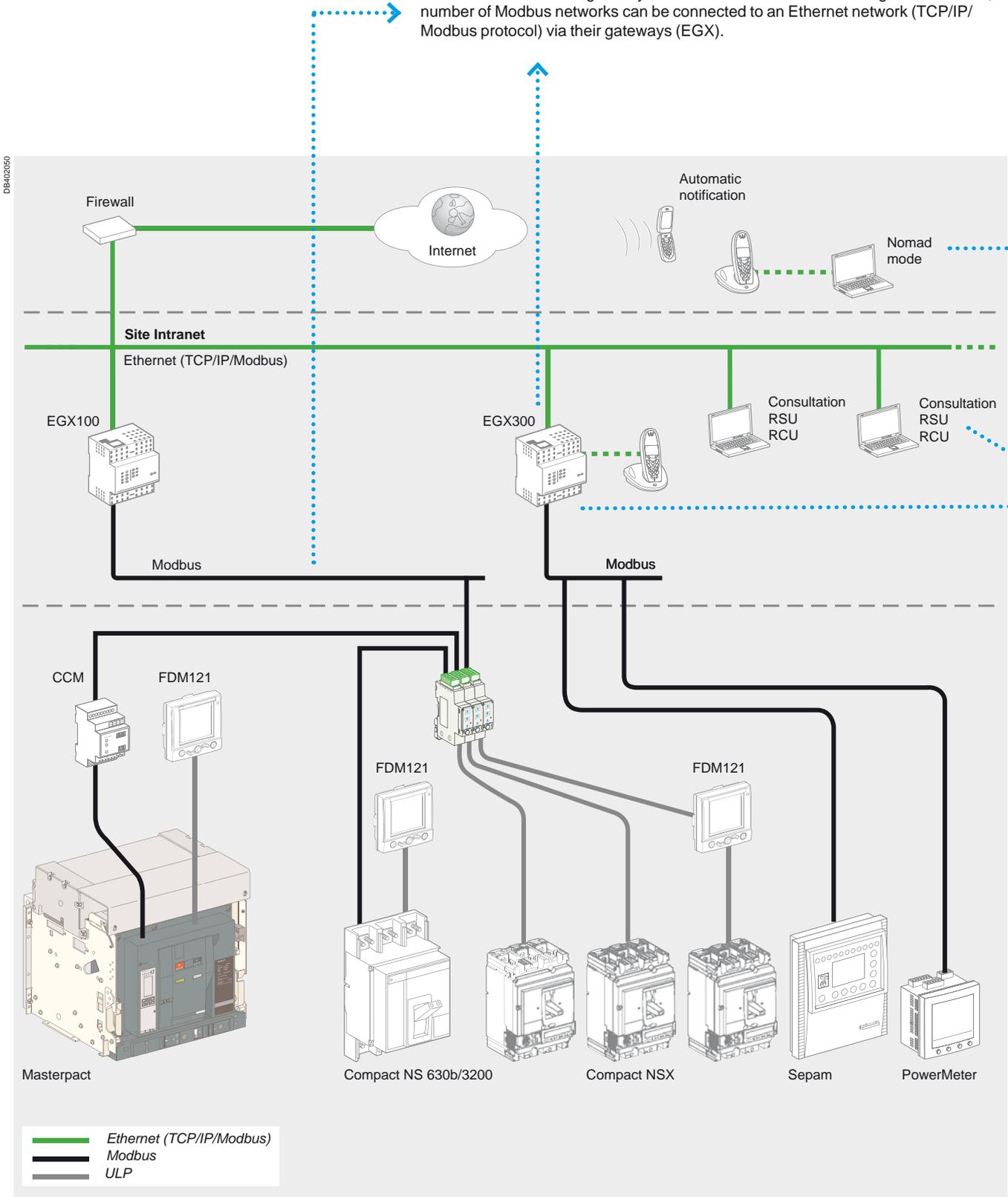
Bus power source

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

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

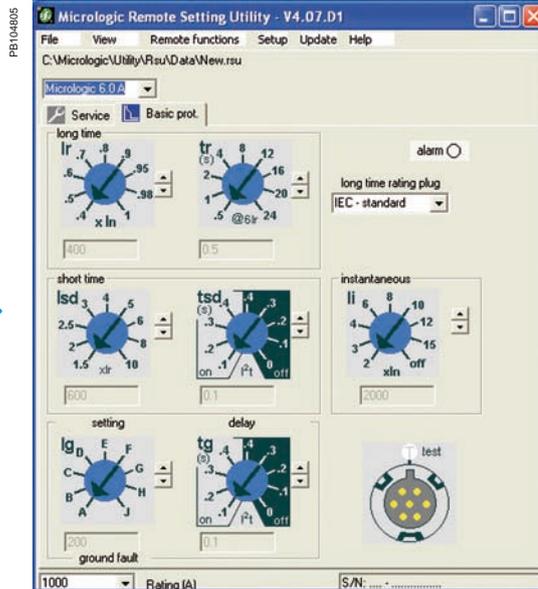
Modbus

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, Compact NSX, 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) via their gateways (EGX).

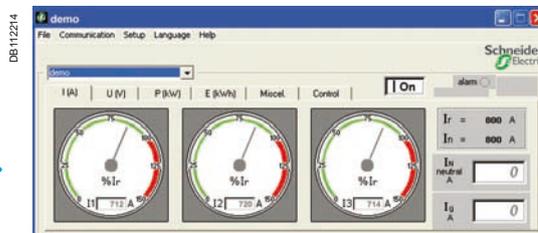


Micrologic utilities

- Two utilities, RSU and RCU, presented on the next page, are available to assist in starting up a communicating installation. Intended for Masterpact, the software can be downloaded from the Schneider Electric internet site.
- The "Live update" function enables immediate updating to obtain the most recent upgrades. These easy-to-use utilities include starting assistance and on-line help. They are compatible with Microsoft Windows 2000, XP and Windows 7.



RSU configuration screen for a Micrologic.

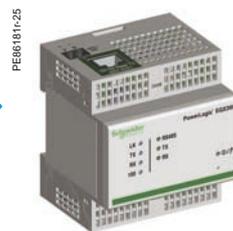


RCU mini-supervision screen for current measurements.

Gateway

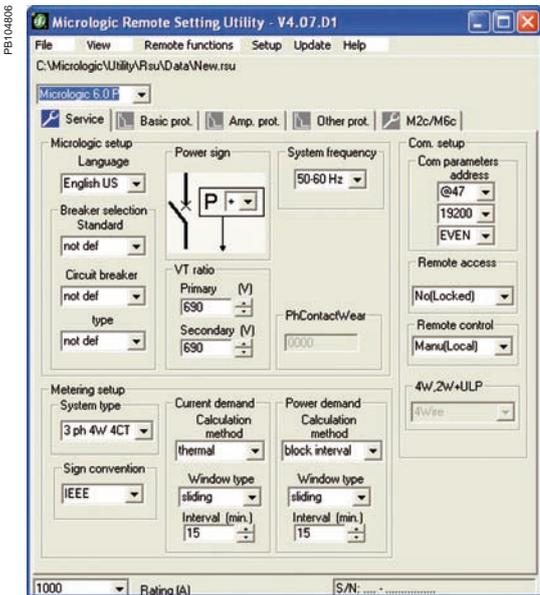
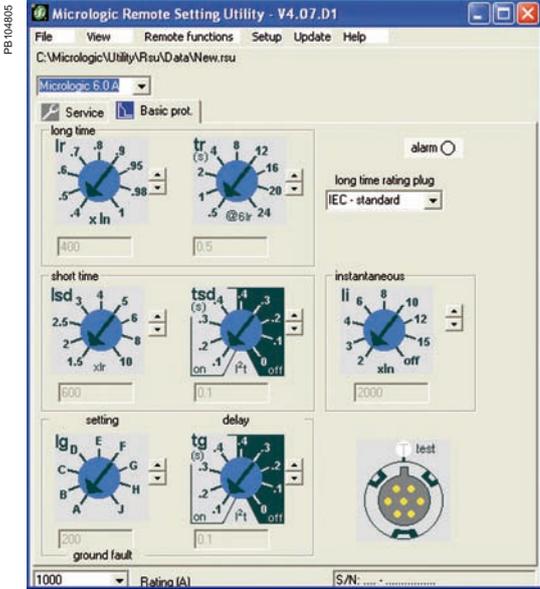
The gateway has two functions:

- 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 EGX300 and EGX100.

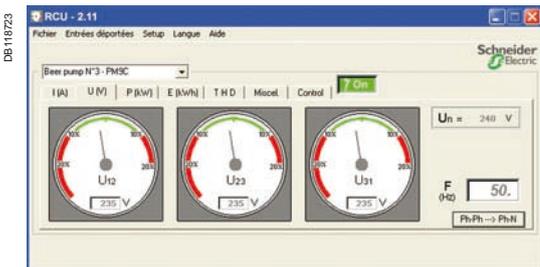


EGX300.

Two utilities, RSU and 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.



RSU: Micrologic Remote Setting Utility.



RCU: Remote Control Utility for communication tests.

RSU (Remote Setting Utility)

This utility is used to set the protection functions and alarms for each Masterpact and Compact NSX device. After connection to the network and entry of the circuit-breaker Modbus address, the software automatically detects the type of trip unit installed. There are two possible operating modes.

Off-line with the software disconnected from the communication network

For each selected circuit breaker, the user can do the following.

Determine the protection settings

The settings are carried out on a screen that shows the front of the trip unit. The Micrologic setting dials, keypad and screen are simulated for easy use of all Micrologic setting functions.

Save and duplicate the protection settings

Each configuration created can be saved for subsequent device programming. It can also be duplicated and used as the basis for programming another circuit breaker.

On-line with the software connected to the network

Similarly, for each selected circuit breaker, the user can do the following.

Display the current settings

The software displays the trip unit and provides access to all settings.

View the corresponding protection curves

A graphic curve module in the software displays the protection curve corresponding to the settings. It is possible to lay a second curve over the first for discrimination studies.

Modify settings in a secure manner

- There are different levels of security:
 - password: by default, it is the same for all devices, but can be differentiated for each device
 - locking of the Modbus interface module which must be unlocked before the corresponding device can be set remotely
 - maximum settings limited by the positions of the two dials on the trip unit. These dials, set by the user, determine the maximum settings that can be made via the communication system.

Settings are modified by:

- either direct, on-line setting of the protection settings on the screen
 - or by loading the settings prepared in off-line mode. This is possible only if the positions of the dials allow the new settings.
- All manual settings made subsequently on the device have priority.

Program alarms

- Up to 12 alarms can be linked to measurements or events.
 - two alarms are predefined and activated automatically:
 - Micrologic 5: overload (Ir)
 - Micrologic 6: overload (Ir) and ground fault (Ig)
 - thresholds, priorities and time delays can be set for 10 other alarms. They may be selected from a list of 91 alarms

Set the outputs of the SDx relays

This is required when the user wants to change the standard configuration and assign different signals to the 2 outputs of the SDx relay.

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, Advantys OTB and Power Meter devices. It offers a number of functions.

Mini supervisor

- Display of I, U, f, P, E and THD measurements for each device, via navigation.
- 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.

Supervision software

Schneider Electric electrical installation supervision, management and expert system software integrates Masterpact, Compact and Compact NSX identification modules.

Types of software

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

- switchboard supervision
- electrical installation supervision
- power system management: electrical engineering expert systems
- 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

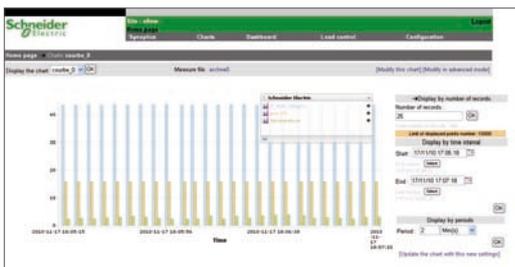
The iRIO RTU (remote terminal unit) can be used as Ethernet coupler for the PowerLogic System devices and for any other communicating devices operating under Modbus RS485 protocol. Data is viewable via a standard web browser.

PE88181125



EGX300

PB104859



iRIO RTU

PB104807_68



ION-E

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.

ION-E offer detailed analysis of electrical events, long-duration data logging and extensive, economical report-building capabilities (e.g. consumption monitoring and tariff management).

A wide variety of screens can be displayed in real time, including more than 50 tables, analogue meters, bargraphs, alarms logs with links to display waveforms and predefined reports on energy quality and service costs.

Other software

Masterpact, Compact and Compact NSX devices can forward their measurement and 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.

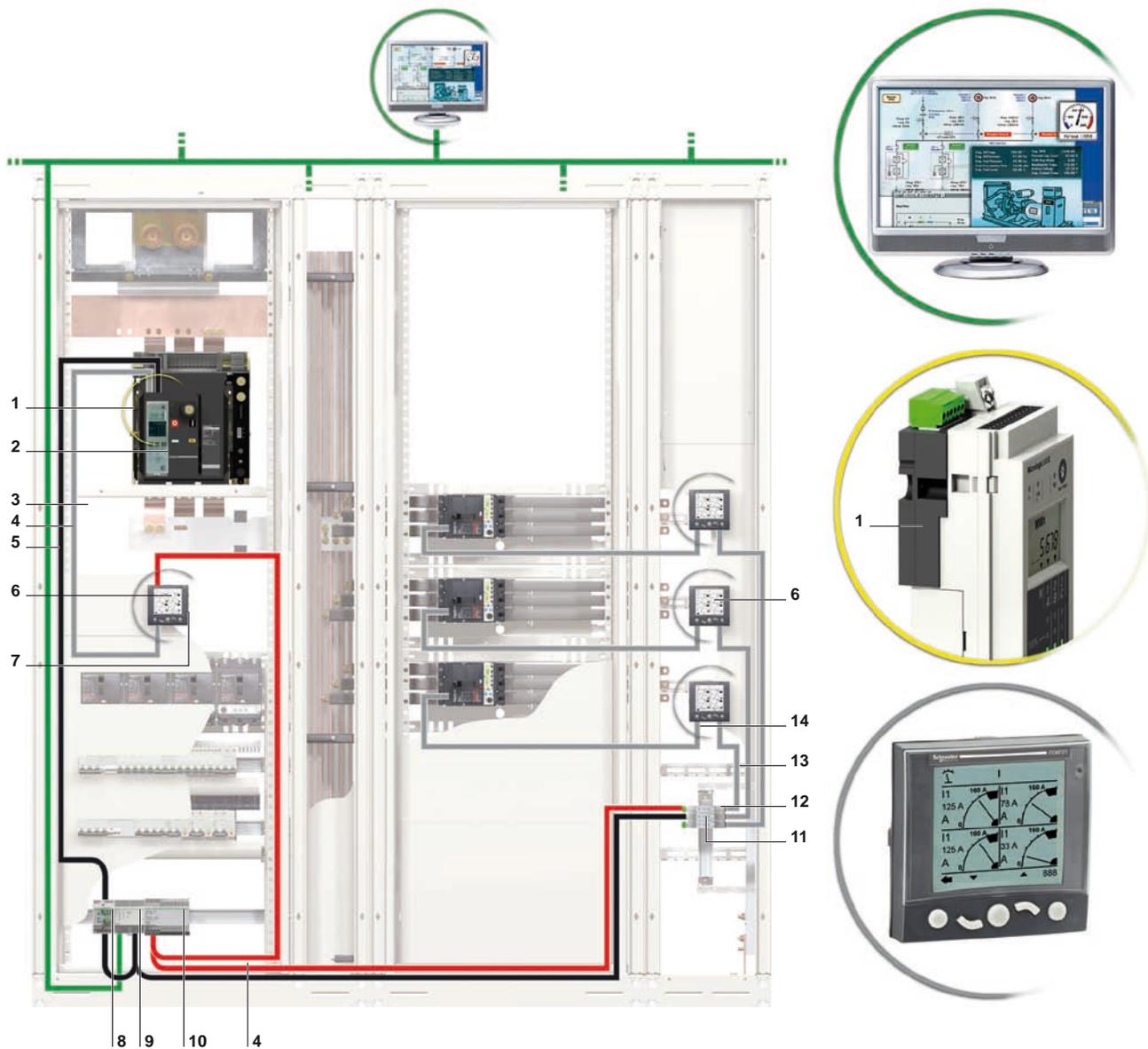
Please consult us.

Wiring system UPP

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

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

PB106E72-176



- 1 BCM ULP: Breaker Communication Module with ULP port
- 2 Micrologic control unit
- 3 Breaker ULP cord

| | |
|--------|----------|
| 0.35 m | LV434195 |
| 1.3 m | LV434196 |
| 3 m | LV434197 |
- 4 Modbus cable
- 5 Ethernet cable
- 6 FDM121: Front Display Module TRV00121
- 7 ULP line terminators TRV00880
- 8 CCM: Chassis Communication Module 33852
- 9 EGX100: Ethernet gateway
- 10 External 24 V DC power supply module
- 11 Modbus interface TRV00210
- 12 Stacking accessorie TRV00217

- 13 ULP cable

| | |
|-------|----------|
| 0.3 m | TRV00803 |
| 0.6 m | TRV00806 |
| 1 m | TRV00810 |
| 2 m | TRV00820 |
| 3 m | TRV00830 |
| 5 m | TRV00850 |

- 14 NSX cord

| | |
|--------|----------|
| 0.35 m | LV434200 |
| 1.3 m | LV434201 |
| 3 m | LV434202 |

Connections

Overview of solutions

Three types of connection are available:

- vertical or horizontal rear connection
- front connection
- mixed connection.

The solutions presented are similar in principle for all Masterpact NT and NW fixed and drawout devices.

Rear connection

Horizontal



Vertical



Simply turn a horizontal rear connector 90° to make it a vertical connector. For the 6300 A circuit breaker, only vertical connection is available.

Front connection



Front connection is available for NW fixed and drawout versions up to 3200 A.

Mixed connection



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

| Type of accessory | Masterpact NT06 to NT16 | | | | Masterpact NW08 to NW63 | | | |
|---|-------------------------|-----------------|-----------------------------|-----------------|-------------------------|-----------------|-----------------------------|-----------------|
| | Fixed Front connection | Rear connection | Drawout Front connection | Rear connection | Fixed Front connection | Rear connection | Drawout Front connection | Rear connection |
| Vertical connection adapters | DB101156 | | DB101156 | | | | | |
| Cable lug adapters | DB101147 | | DB101147 | | | | | |
| Interphase barriers | DB101148 (1) | | DB101149 (1) | | DB101149 (2) | | DB101149 (2) | |
| Spreaders | DB101150 | | DB101150 | | | | | |
| Disconnectable front-connection adapter | | | | | DB101151 | | | |
| Safety shutters with padlocking | | | DB101152 <i>standard</i> | | | | DB101153 <i>standard</i> | |
| Shutter position indication and locking | | | | | | | DB101154 | |
| Arc chute screen | DB101155 (3) | DB101155 | | | | | | |

(1) Mandatory for voltages > 500 V, not compatible with spreaders.

(2) Except for an NW40 equipped for horizontal rear connection, and for fixed NW40b-NW63.

(3) Mandatory for fixed NT front-connection versions with vertical-connection adapters oriented towards the front.

Masterpact M replacement kit

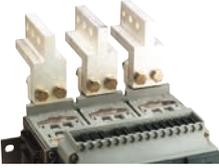
A set of connection parts is available to allow replacement of a Masterpact M08 to M32 circuit breaker by a Masterpact NW without modifying the busbars (please consult us).

Mounting on a switchboard backplate using special brackets

Masterpact NT and NW fixed front-connected circuit breakers can be installed on a backplate without any additional accessories.

Masterpact NW circuit breakers require a set of special brackets.

PB104360A30



Vertical-connection adapters (option)

Mounted on front-connected devices or chassis, the adapters facilitate connection to a set of vertical busbars.

PB104381A30



Cable-lug adapters (option)

Cable-lug adapters are used in conjunction with vertical-connection adapters. They can be used to connect a number of cables fitted with lugs. To ensure adequate mechanical strength, the connectors must be secured together via spacers (catalogue number 07251).

PB104350A30



Interphase barriers (option)

These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not. For Masterpact NT/NW devices, they are installed vertically between rear connection terminals. They are mandatory for NT devices at voltages > 500 V. They are not compatible with spreaders.

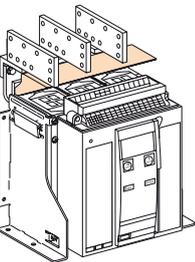
PB104382A30



Spreaders (option)

Mounted on the front or rear connectors, spreaders are used to increase the distance between bars in certain installation configurations.

DB117039



Arc chute screen (option)

For fixed Masterpact NT front-connection versions and with vertical-connection adapters oriented towards the front, an arc chute screen must be installed to respect safety clearances.

The arc chute screen is delivered in standard on the NT and NW drawout version.

PB104383A350



Disconnectable front-connection adapter (option)

Mounted on a fixed front-connected device, the adapter simplifies replacement of a fixed device by enabling fast disconnection from the front.

PE104384A50



Safety shutters (VO standard)

Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP 20). When the device is removed from its chassis, no live parts are accessible.

The shutter-locking system is made up of a moving block that can be padlocked (padlock not supplied). The block:

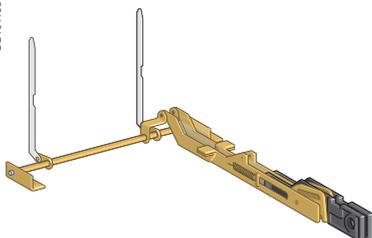
- prevents connection of the device
- locks the shutters in the closed position.

For Masterpact NW08 to NW63

A support at the back of the chassis is used to store the blocks when they are not used:

- 2 blocks for NW08 to NW40
- 4 blocks for NW40b to NW63.

DB101158



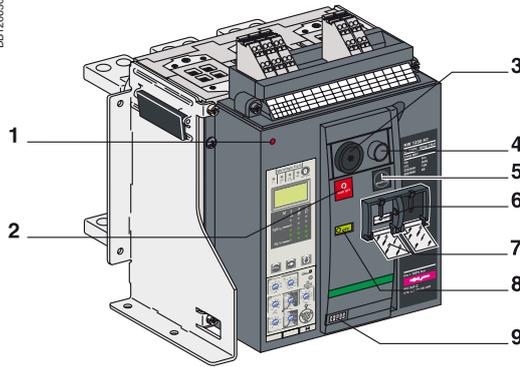
Shutter position indication and locking on front face (VIVC, NW only)

This option located on the chassis front plate indicates that the shutters are closed. It is possible to independently or separately padlock the two shutters using one to three padlocks (not supplied).

Locking

On the device

DB126650



- 1 Reset button for mechanical trip indication.
- 2 OFF pushbutton.
- 3 OFF position lock.
- 4 Electrical closing pushbutton.
- 5 ON pushbutton.
- 6 Springs charged indication.
- 7 Pushbutton locking.
- 8 Contact position indication.
- 9 Operation counter.

PB100811-32



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.

PB100810-32



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), shackle diameter: 5 to 8 mm
- 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).

PB100812-32



OFF position locking using a padlock.

Accessory-compatibility

For Masterpact NT: 3 padlocks or 1 keylock

For Masterpact NW: 3 padlocks and/or 2 keylocks

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.

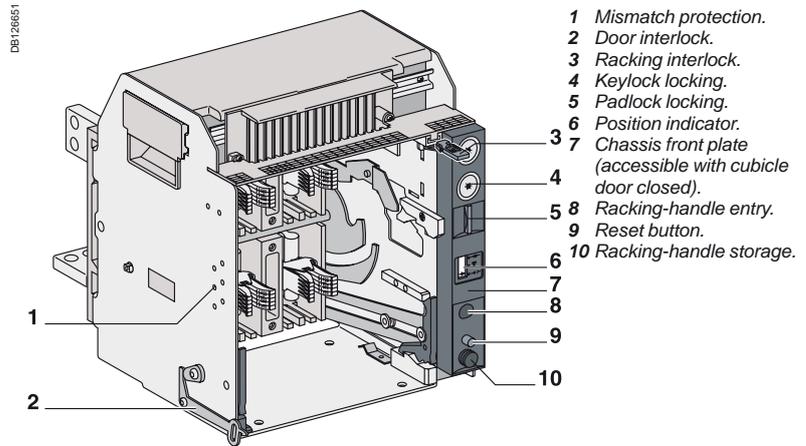
For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.

With this interlock installed, the source changeover function cannot be implemented.

PB104365A40



OFF position locking using a keylock.



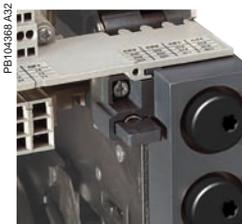
"Disconnected" position locking by padlocks.



"Disconnected" position locking by keylocks.



Door interlock.



Racking interlock.



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 device + one (or two) identical keylocks supplied separately for interlocking with another device.

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

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

The "connected", "disconnected" and "test" positions are shown by an indicator and are mechanically indexed. The 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. If the breaker is put in the "connected" position with the door open, the door may be closed without having to disconnect the circuit breaker.

Racking interlock VPOC

This device prevents insertion of the 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 only)

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.

Automatic spring discharge before breaker removal DAE (for NW only)

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.

Indication contacts

Indication contacts are available:

- in the standard version for relay applications
- in a low-level version for control of PLCs and electronic circuits.

M2C and M6C contacts may be programmed via the Micrologic E, P and H control units.

ON/OFF indication contacts OF

Two types of contacts indicate the ON or OFF position of the circuit breaker:

- micro switch type changeover contacts for Masterpact NT
- rotary type changeover contacts directly driven by the mechanism for Masterpact NW. These contacts trip when the minimum isolation distance between the main circuit-breaker contacts is reached.

| OF | | NT | NW |
|---|-----------|---------------------------|-------|
| Supplied as standard | | 4 | 4 |
| Maximum number | | 4 | 12 |
| 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 | 0.5 |
| | | 250 | 0.3 |
| | Low-level | Minimum load: 2 mA/15 V | |
| | V AC | 24/48 | 5 |
| | | 240 | 5 |
| | | 380 | 5 |
| | V DC | 24/48 | 5/2.5 |
| | | 125 | 0.5 |
| | | 250 | 0.3 |

(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 | | NT/NW |
|---|-----------|---------------------------|
| 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 |
| | | 480 |
| | | 690 |
| | V DC | 24/48 |
| | | 125 |
| | | 250 |
| | Low-level | Minimum load: 2 mA/15 V |
| | V AC | 24/48 |
| | | 240 |
| | | 380 |
| | V DC | 24/48 |
| | | 125 |
| | | 250 |

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, it is mounted in place of the connector of an additional OF contact.

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

PB100806-32



PB100807-20



ON/OFF indication contacts (OF) (rotary type).

ON/OFF indication contacts (OF) (micro switch type).

PB100820-32



Additional “fault-trip” indication contacts (SDE).

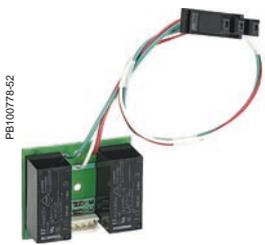
PB100816-32



Combined contacts.



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



M2C programmable contacts: circuit-breaker internal relay with two contacts.



M6C programmable contacts: circuit-breaker external relay with six independent changeover contacts controlled from the circuit breaker via a three-wire connection. (maximum length is 10 meters).

"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.

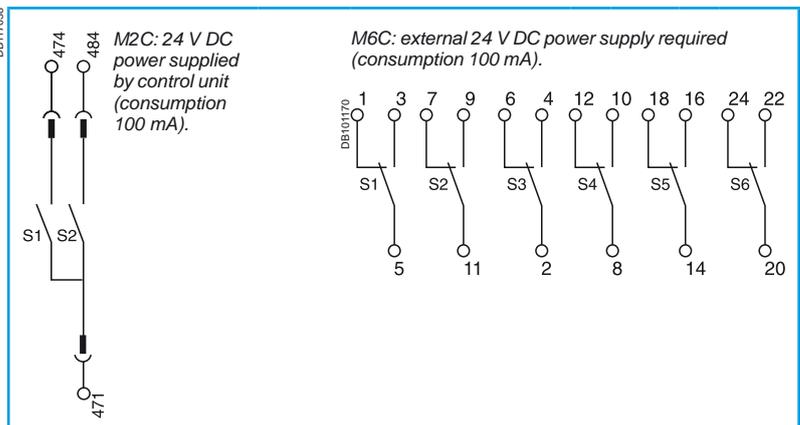
| Contacts | | NT | | | NW | | | |
|---|------------------------------------|---------------------------|-------|-----|----------|-----|-----|-----|
| | | CE/CD/CT | | | CE/CD/CT | | | |
| Maximum number | Standard with additional actuators | 3 | 2 | 1 | 3 | 3 | 3 | |
| | | 9 | 0 | 0 | 6 | 3 | 0 | |
| | | 6 | 3 | 0 | 6 | 0 | 3 | |
| | | 6 | 0 | 3 | 6 | 0 | 3 | |
| Breaking capacity (A) p.f.: 0.3 AC12/DC12 | Standard | Minimum load: 100 mA/24 V | | | | | | |
| | | V AC | 240 | 8 | 8 | 8 | 8 | 8 |
| | | | 380 | 8 | 8 | 8 | 8 | 8 |
| | | | 480 | 8 | 8 | 8 | 8 | 8 |
| | | | 690 | 6 | 6 | 6 | 6 | 6 |
| | | V DC | 24/48 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | 125 | | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | |
| | Low-level | Minimum load: 2 mA/15 V | | | | | | |
| | | V AC | 24/48 | 5 | 5 | 5 | 5 | 5 |
| | | | 240 | 5 | 5 | 5 | 5 | 5 |
| | | | 380 | 5 | 5 | 5 | 5 | 5 |
| | | V DC | 24/48 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 125 | | | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | |
| 250 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | | |

M2C / M6C programmable contacts

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

The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option (BCM ULP).

| Micrologic Characteristics | | Type E | | Types P, H | |
|------------------------------------|------|-------------|------|-------------|------|
| | | M2C | | M2C/M6C | |
| Minimum load | | 100 mA/24 V | | 100 mA/24 V | |
| Breaking capacity (A) p.f.: 0.7 | V AC | 240 | 5 | 5 | 5 |
| | | 380 | 3 | 3 | 3 |
| | V DC | 24 | 1.8 | 1.8 | 1.8 |
| | | 48 | 1.5 | 1.5 | 1.5 |
| | | 125 | 0.4 | 0.4 | 0.4 |
| | | 250 | 0.15 | 0.15 | 0.15 |



Remote operation

Remote ON / OFF

Two solutions are available for remote operation of Masterpact devices:

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



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 the type of fault, e.g. overload, short-time fault, earth fault, earth leakage, short-circuit, etc.).

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 standard MX or XF releases for applications such as source-changeover systems.

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.

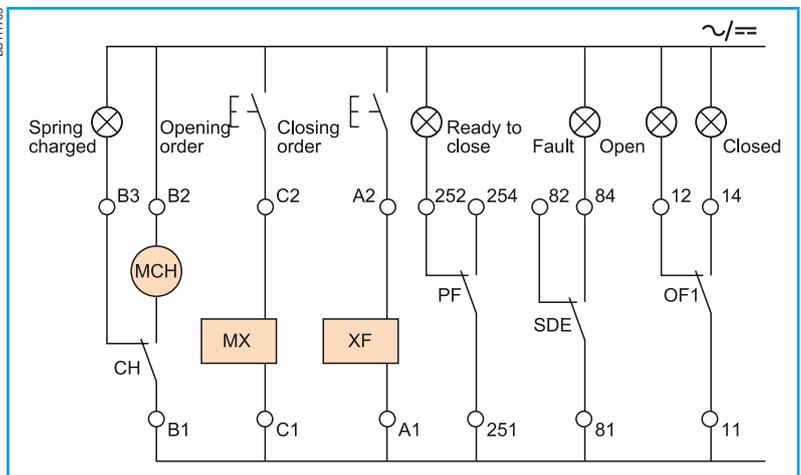
Optionally, other functions may be added:

- a "ready to close" contact PF
- an electrical closing pushbutton BPF
- remote RES following a fault.

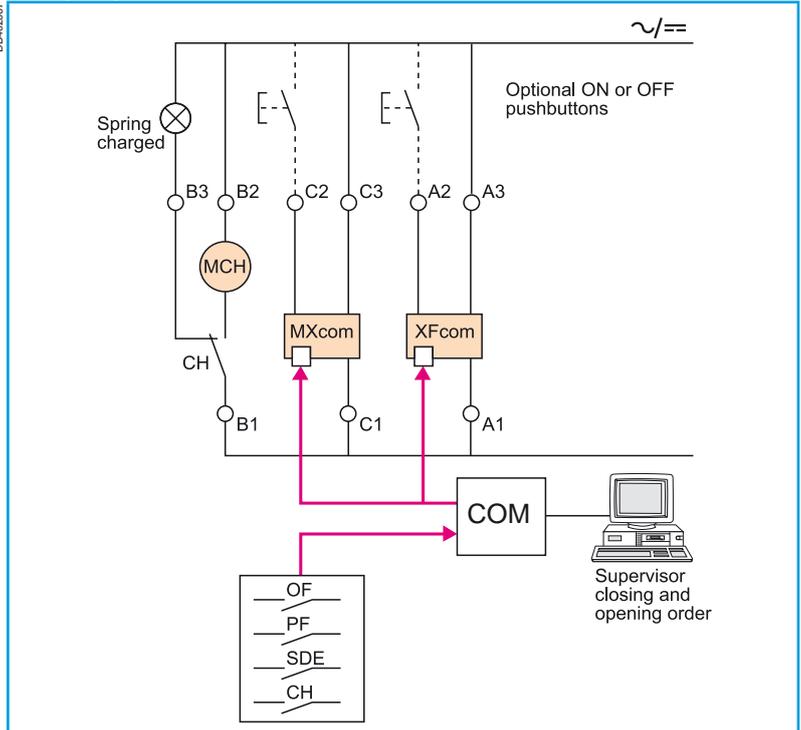
A remote-operation function is generally combined with:

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

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



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





Electric motor MCH for Masterpact NT.



Electric motor MCH for Masterpact NW.

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 3 s for Masterpact NT | |
| | maximum 4 s for Masterpact NW | |
| 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.

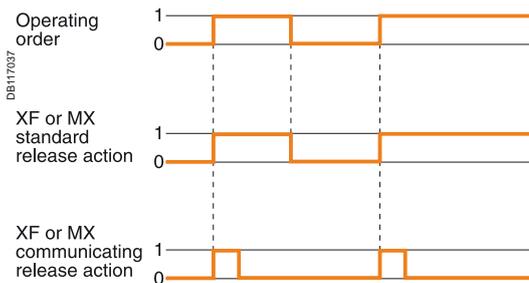
Opening release MX

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 (see diagram).

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) | Hold: 4.5 | Hold: 4.5 |
| | Pick-up: 200 (200 ms) | Pick-up: 200 (200 ms) |
| Circuit-breaker response time at Un | 55 ms ±10 (Masterpact NT) | 50 ms ±10 |
| | 70 ms ±10 (NW ≤ 4000 A) | |
| | 80 ms ±10 (NW > 4000 A) | |



XF and MX voltage releases.



"Ready to close" contacts PF.

"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

| | NT/NW | | |
|-----------------------|-----------|---------------------------|------|
| Maximum number | 1 | | |
| Breaking capacity (A) | Standard | Minimum load: 100 mA/24 V | |
| | p.f.: 0.3 | | |
| AC12/DC12 | V AC | 240/380 | 5 |
| | | 480 | 5 |
| | | 690 | 3 |
| | V DC | 24/48 | 3 |
| | | 125 | 0.3 |
| | | 250 | 0.15 |
| Low-level | V AC | 24/48 | 3 |
| | | 240 | 3 |
| | | 380 | 3 |
| | V DC | 24/48 | 3 |
| | | 125 | 0.3 |
| | | 250 | 0.15 |

PB100798-56



Electrical closing pushbutton BPFE.

Electrical closing pushbutton BPFE

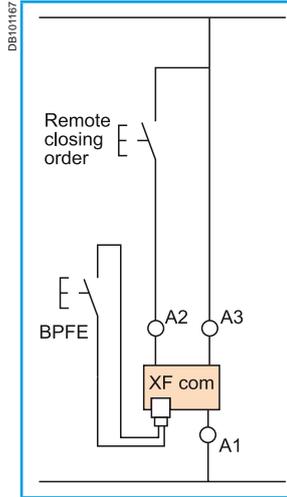
Located on the front panel, this pushbutton carries out electrical closing of the circuit breaker. It is generally associated with the transparent cover that protects access to the closing pushbutton.

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 com) in place of the COM module.

The COM module is incompatible with this option.

Different types of voltage exist and the XF electromagnet is compulsory if the BPFE option is selected.



Remote reset after fault trip

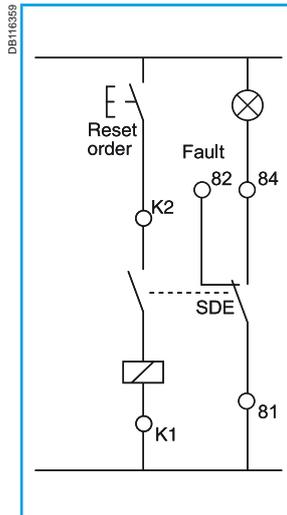
Electrical reset after fault trip RES

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.

The additional "Fault Trip" indication contact SDE2 is not compatible with RES.

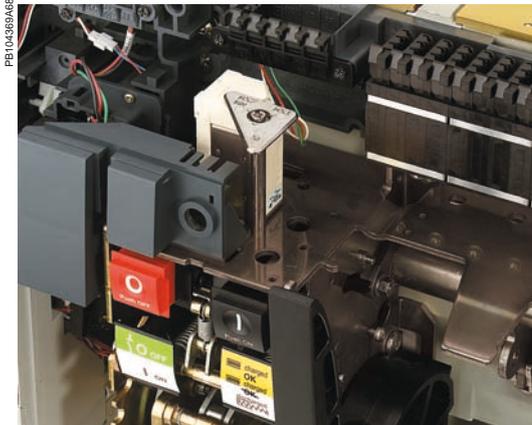


Automatic reset after fault trip RAR

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



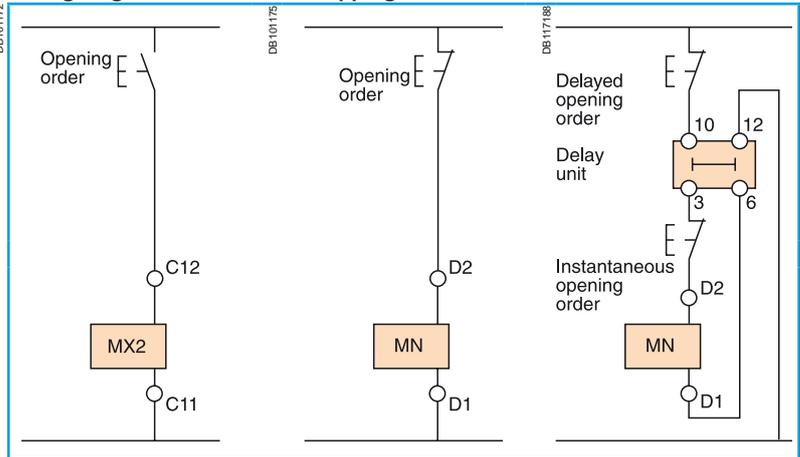
MX or MN voltage release.

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



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 50/60Hz | 24 - 48 - 100/130 - 200/250 - 277 - 380/480 |
| | V DC | 12 - 24/30 - 48/60 - 100/130 - 200/250 |
| Operating threshold | 0.7 to 1.1 Un | |
| Permanent locking function | 0.85 to 1.1 Un | |
| Consumption (VA or W) | Pick-up: 200 (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 | 24/30 - 48/60 - 100/130 - 200/250 |
| Operating threshold | Opening | 0.35 to 0.7 Un |
| | Closing | 0.85 Un |
| Consumption (VA or W) | Pick-up: 200 (200 ms) | Hold: 4.5 |
| MN consumption with delay unit (VA or W) | Pick-up: 200 (200 ms) | Hold: 4.5 |
| Circuit-breaker response time at Un | 40 ms ±5 for NT | |
| | 90 ms ±5 for NW | |

MN delay units

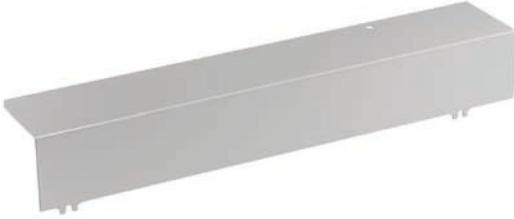
To eliminate circuit-breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

Characteristics

| | | |
|-------------------------------------|-----------------------|-------------------------------------|
| Power supply | Non-adjustable | 100/130 - 200/250 |
| | Adjustable | 48/60 - 100/130 - 200/250 - 380/480 |
| Operating threshold | Opening | 0.35 to 0.7 Un |
| | Closing | 0.85 Un |
| Delay unit consumption | Pick-up: 200 (200 ms) | Hold: 4.5 |
| Circuit-breaker response time at Un | Non-adjustable | 0.25 s |
| | Adjustable | 0.5 s - 0.9 s - 1.5 s - 3 s |

Accessories

PB104740



Auxiliary terminal shield CB

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

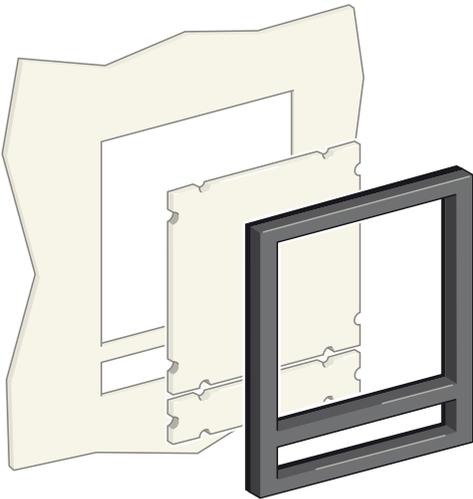
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Operation counter CDM

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. This option is compulsory for all the source-changeover systems.

DB101173



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 IP54, IK10. It adapts to drawout devices.

Escutcheon CDP with blanking plate.

PE100776-42



Transparent cover CCP for escutcheon.

PB100845A



Manual source-changeover system

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

A manual source-changeover system is made up of two or three mechanically interlocked manually-operated circuit breakers or switch-disconnectors. The interlocks prevent any paralleling, even transient, of the two sources.

Remote-operated source-changeover system

This is the most commonly employed system for devices with high ratings (above 400 A). No human intervention is required. Transfer from the normal to the replacement source is controlled electrically.

A remote-controlled source-changeover system is made up of two or three circuit breakers or switch-disconnectors linked by an electrical interlocking system that may have different configurations. In addition, a mechanical interlocking system protects against electrical malfunctions or incorrect manual operations.

Automatic source-changeover systems

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

- transfer to a replacement source according to external requirements
- management of power sources
- regulation
- emergency source replacement, etc.

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

Communication option

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

The eco COM option is perfectly suited to these equipments.

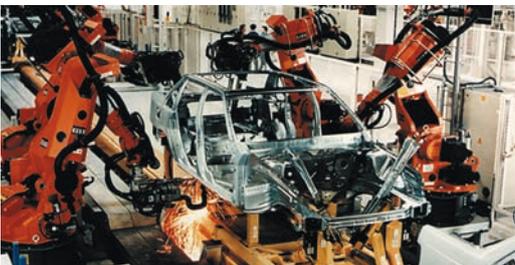
PB100844A



Commercial and service sector:

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

PB100847A



Industry:

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

PB100846A



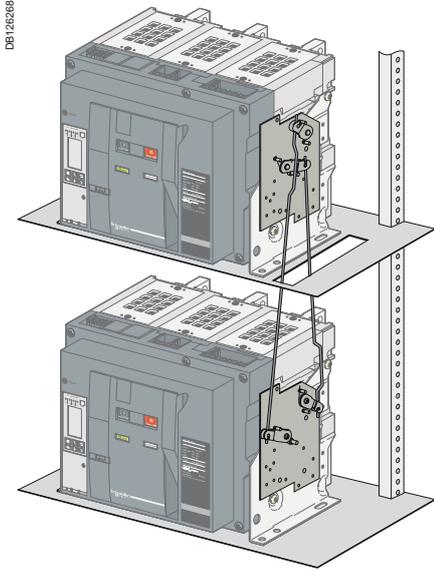
PB100847A



Infrastructures:

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

Mechanical interlocking



Interlocking of two Masterpact NT or NW circuit breakers using connecting rods.

Interlocking of two Compact NS630b to 1600 or two Masterpact NT and NW devices using connecting rods

The two devices must be mounted one above the other (either 2 fixed or 2 withdrawable/drawout devices).

Combinations are possible between Compact NS630b to NS1600 devices and between Masterpact NT and Masterpact NW devices.

Installation

This function requires:

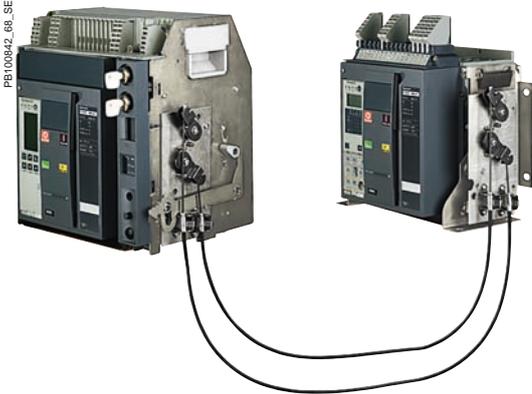
- an adaptation fixture on the right side of each circuit breaker or switch-disconnector
- a set of connecting rods with no-slip adjustments.

The adaptation fixtures, connecting rods and circuit breakers or switch-disconnectors are supplied separately, ready for assembly by the customer.

The maximum vertical distance between the fixing planes is 900 mm.

Possible combinations of "Normal" and "Replacement" source circuit breakers

| "Normal" N | "Replacement" R | | | |
|-------------------------|------------------|--------------|--------------|---------------|
| | NS630b to NS1600 | NT06 to NT16 | NW08 to NW40 | NW40b to NW63 |
| NS630b to NS1600 | | | | |
| Ratings 250... 1600 A | ■ | | | |
| NT06 to NT16 | | | | |
| Ratings 250... 1600 A | | ■ | ■ | ■ |
| NW08 to NW40 | | | | |
| Ratings 320... 4000 A | | ■ | ■ | ■ |
| NW40b to NW63 | | | | |
| Ratings 4000... 6300 A | | ■ | ■ | ■ |



Interlocking of two Masterpact circuit breakers using cable.

Interlocking of two Masterpact NT/NW or up to three Masterpact NW devices using cables

For cable interlocking, the circuit breakers may be mounted one above the other or side-by-side.

The interlocked devices may be fixed or drawout, three-pole or four-pole, and have different ratings and sizes.

Interlocking between two devices (Masterpact NT and NW)

This function requires:

- an adaptation fixture on the right side of each device
- a set of cables with no-slip adjustments
- the use of a mechanical operation counter CDM is compulsory.

The maximum distance between the fixing planes (vertical or horizontal) is 2000 mm.

Interlocking between three devices (Masterpact NW only)

This function requires:

- a specific adaptation fixture for each type of interlocking, installed on the right side of each device
- two or three sets of cables with no-slip adjustments
- the use of a mechanical operation counter CDM is compulsory.

The maximum distance between the fixing planes (vertical or horizontal) is 1000 mm.

Installation

The adaptation fixtures, sets of cables and circuit breakers or switch-disconnectors are supplied separately, ready for assembly by the customer.

Installation conditions for cable interlocking systems:

- cable length: 2.5 m
- radius of curvature: 100 mm
- maximum number of curves: 3.

Possible combinations of “Normal” and “Replacement” source circuit breakers

| “Normal N” | “Replacement” R | | |
|------------------------|-----------------|--------------|---------------|
| | NT06 to NT16 | NW08 to NW40 | NW40b to NW63 |
| NT06 to NT16 | | | |
| Ratings 250... 1600 A | ■ | ■ | ■ |
| NW08 to NW40 | | | |
| Ratings 320... 4000 A | ■ | ■ | ■ |
| NW40b to NW63 | | | |
| Ratings 4000... 6300 A | ■ | ■ | ■ |

All combinations of two Masterpact NT and Masterpact NW devices are possible, whatever the rating or size of the devices.

Possible combinations of three device

| | NT06 to NT16 | NW08 to NW40 | NW40b to NW63 |
|------------------------|--------------|--------------|---------------|
| NT06 to NT16 | | | |
| Ratings 250... 1600 A | | | |
| NW08 to NW40 | | | |
| Ratings 320... 4000 A | | ■ | ■ |
| NW40b to NW63 | | | |
| Ratings 4000... 6300 A | | ■ | ■ |

Only Masterpact NW may be used for three-device combinations.

Types of mechanical interlocking and combinations

See catalogue “Source changeover systems”, réf. LVPED208007EN.

Electrical interlocking

Electrical interlocking is used with the mechanical interlocking system.

An automatic controller may be added to take into account information from the distribution system.

Moreover, the relays controlling the "normal" and "replacement" circuit breakers must be mechanically and/or electrically interlocked to prevent them from giving simultaneous closing commands.

Electrical interlocking is carried out by an electrical control device.

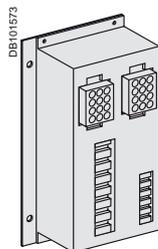
For Masterpact, this function can be implemented in one of two ways:

- using the IVE unit
- by an electrician in accordance with the chapter "electrical diagrams" of the catalogue "source-changeover systems".

Characteristics of the IVE unit

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

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



IVE unit.

Necessary equipment

For Masterpact NT and NW, each circuit breaker must be equipped with:

- a remote-operation system made up of:
 - MCH gear motor
 - MX or MN opening release
 - XF closing release
 - PF "ready to close" contact
 - CDM mechanical operation counter
- an available OF contact
- one to three CE connected-position contacts (carriage switches) on drawout circuit

Compact NS, Masterpact NT and NW

| Types of mechanical interlocking | Possible combinations | Typical electrical diagrams | Diagram no. | | | | | | | | | | | | | | | | | | | | | |
|---|---|-----------------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 2 devices | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>QN</th> <th>QR</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> </tr> </tbody> </table> | QN | QR | 0 | 0 | 1 | 0 | 0 | 1 | Masterpact NT and NW: <ul style="list-style-type: none"> ■ electrical interlocking with lockout after fault: <ul style="list-style-type: none"> <input type="checkbox"/> permanent replacement source (without IVE) 51201139 <input type="checkbox"/> with EPO by MX (without IVE) 51201140 <input type="checkbox"/> with EPO by MN (without IVE) 51201141 <input type="checkbox"/> permanent replacement source (with IVE) 51201142 <input type="checkbox"/> with EPO by MX (with IVE) 51201143 <input type="checkbox"/> with EPO by MN (with IVE) 51201144 ■ automatic control without lockout after fault: <ul style="list-style-type: none"> <input type="checkbox"/> permanent replacement source (without IVE) 51156226 <input type="checkbox"/> engine generator set (without IVE) 51156227 ■ automatic control with lockout after fault: <ul style="list-style-type: none"> <input type="checkbox"/> permanent replacement source (with IVE) 51156904 <input type="checkbox"/> engine generator set (with IVE) 51156905 ■ BA/UA controller (with IVE) 51156903 | | | | | | | | | | | | | | |
| QN | QR | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| Masterpact NW only | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 devices: 2 "Normal" sources and 1 "Replacement" source | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>QN1</th> <th>QN2</th> <th>QR</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table> | QN1 | QN2 | QR | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | <ul style="list-style-type: none"> ■ electrical interlocking: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault 51156906 <input type="checkbox"/> with lockout after fault 51156907 | | | | | | | | | | |
| QN1 | QN2 | QR | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 3 devices: 2 "Normal" sources and 1 "Replacement" source with source selection | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>QN1</th> <th>QN2</th> <th>QR</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> </tbody> </table> | QN1 | QN2 | QR | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | <ul style="list-style-type: none"> ■ automatic control with engine generator set: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault (with MN) 51156908 <input type="checkbox"/> with lockout after fault (with MN) 51156909 | | | | |
| QN1 | QN2 | QR | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 3 devices: 3 sources, only one device | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>QS1</th> <th>QS2</th> <th>QS3</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table> | QS1 | QS2 | QS3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | <ul style="list-style-type: none"> ■ electrical interlocking: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault 51156910 <input type="checkbox"/> with lockout after fault 51156911 | | | | | | | |
| QS1 | QS2 | QS3 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 3 devices: 2 sources + 1 coupling | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>QS1</th> <th>QC</th> <th>QS2</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table> <p>(1) possible by forcing operation</p> | QS1 | QC | QS2 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | <ul style="list-style-type: none"> ■ electrical interlocking: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault 51156912 <input type="checkbox"/> with lockout after fault 51156913 ■ automatic control with lockout after fault 51156914 | |
| QS1 | QC | QS2 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | |

"Lockout after fault" option. This option makes it necessary to manually reset the device following fault tripping.

Masterpact NW with corrosion protection 800-4000 A

PF106363A50



Masterpact NW circuit breakers with corrosion protection are designed for use in industrial environments with high concentrations of sulphur compounds. Examples include paper mills, oil refineries, steel works and water treatment plants, all of which produce large quantities of sulphur dioxide (SO₂) or hydrogen sulphate (H₂S). Under such conditions, silver-plated parts rapidly turn black due to the formation of silver sulphate (AgS) on the surface, an insulating material that can lead to abnormal temperature rise in electrical contacts. This phenomenon can have serious consequences on all equipment installed inside a switchboard.

Circuit breakers used in such environments generally require frequent maintenance and therefore a large number of replacement devices on the site. Furthermore, problems are often encountered even with intensive maintenance.

Masterpact NW circuit breakers with corrosion protection receive special surface treatment on all parts exposed to corrosion and critical with respect to electrical continuity. In this way, the availability of electrical power and operating safety are ensured without special maintenance for the following environmental condition classes as defined by standard IEC 721-3-3:

- 3C3 for H₂S (concentrations from 2.1 to 7.1 x 10⁻⁶)
- 3C4 for SO₂ (concentrations from 4.8 to 14.8 x 10⁻⁶).

The Masterpact NW range of power circuit breakers with corrosion protection offers the following features:

- rated current from 800 A to 4000 A
- 3 and 4-pole models
- drawout circuit breaker
- operational voltage up to 690 V AC
- Ics breaking capacity of 100 kA at 220/415 V AC
- reverse feed possible
- stored-energy mechanism for instantaneous closing (source coupling).
- 3 types of RMS electronic protection
- adjustable long-time settings from 0.4 to 1 In, with fine adjustment via local keypad or remote supervisor
- electronic functions dedicated to energy management and power-quality analysis.

The Masterpact NW range complies with the main standards and certifications:

- IEC 60947-1 and 60947-2
- IEC 68230 (damp heat) and IEC 68252 severity level 2 (salt mist)
- IEC 60068-2-42 and IEC 60068-2-43 for corrosive environments:
 - SO₂ : tested to IEC 60068-2-42 in a 3C4 environment as defined by IEC 60721-3-3
 - H₂S: tested to IEC 60068-2-43 in a 3C3 environment as defined IEC 60721-3-3.

A complete range of electrical accessories and auxiliaries:

- motor mechanism (MCH)
- undervoltage release (MN, MNR)
- shunt trip unit (MX)
- closing release (XF)
- auxiliary contacts (OF)
- low-level indication contacts (SDE, PF, CD, CT, CE and EF)
- electrical closing button (BPFE)
- locking by padlocks and/or keylocks.
- source-changeover systems for 2 or 3 devices

Maximum safety

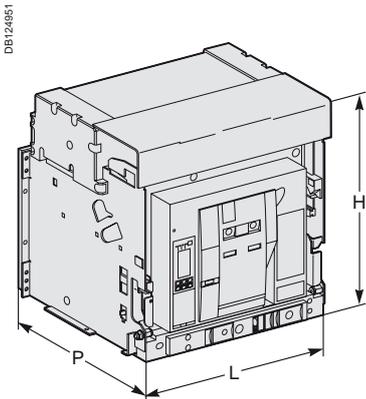
The Masterpact NW range with corrosion protection offers the same safety features as the standard version:

- positive contact indication
- high impulse withstand voltage (12 kV)
- suitable for isolation in compliance with IEC 60947-2, as indicated by the disconnector symbol on the front face: 
- Front face insulation class 2, allowing class 2 installations with breaker control from outside.

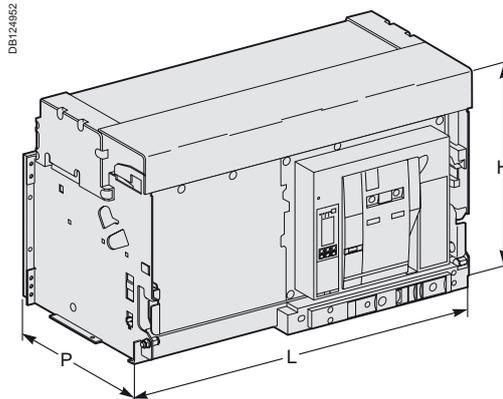
Characteristics according to IEC 60 947-2

| | | | | NW08H2 | NW10H2 | NW12H2 | NW16H2 | NW20H2 | NW25H2 | NW32H2 | NW40bH2 |
|----------------------------------|---------------------------------|-----------------------|------------|------------------------------------|--------|--------|--------|--------|--------|--------|---------|
| Number of poles | | | | 3, 4 | | | | | | | |
| Rated insulation voltage | | Ui (V) | | 1000 | | | | | | | |
| Rated operational voltage | | Ue (V) | | 690 | | | | | | | |
| Closing time (ms) | | | | < 50 | | | | | | | |
| Rated current | In (A) | Vertical connection | 40 °C | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 |
| | | | 45 °C | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 |
| | | | 50 °C | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 |
| | | | 55 °C | 800 | 1000 | 1250 | 1550 | 1900 | 2500 | 3150 | 4000 |
| | | | 60 °C | 800 | 1000 | 1250 | 1500 | 1800 | 2500 | 3000 | 4000 |
| | | Horizontal connection | 40 °C | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | - | 4000 |
| | | | 45 °C | 800 | 1000 | 1250 | 1550 | 1900 | 2500 | - | 4000 |
| | | | 50 °C | 800 | 1000 | 1250 | 1500 | 1800 | 2500 | - | 4000 |
| | | | 55 °C | 800 | 1000 | 1250 | 1450 | 1700 | 2400 | - | 4000 |
| | | | 60 °C | 800 | 1000 | 1250 | 1400 | 1600 | 2300 | - | 3900 |
| 4 th pole rating | | | | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 |
| Rated ultimate breaking capacity | Icu (kA rms) CA 50/60 Hz | 220/440 V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | 690 V | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
| Rated service breaking capacity | | Ics = Icu x... | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % |
| Break time (ms) | | | Total maxi | 25 to 30 with no intentional delay | | | | | | | |

Dimensions and connection



Masterpact NW08 to NW32 with corrosion protection.



Masterpact NW40b with corrosion protection.

| Drawout device | L (mm) | | H (mm) | P (mm) |
|----------------|--------|------|--------|--------|
| | 3P | 4P | | |
| 800 to 3200 A | 441 | 556 | 439 | 395 |
| 4000 A | 786 | 1016 | 479 | 395 |

Connections

- Power circuits:
 - vertical rear connections as standard
 - possibility of conversion to horizontal rear connections on-site by rotating the connectors, except for NW32, available with vertical rear connections only.
- Auxiliaries connected to terminal block on circuit breaker front face.

The Masterpact Earthing Switch can be racked into any compatible Masterpact NW chassis in place of a Masterpact circuit breaker. It is used to interconnect and earth the phase and neutral conductors of an electrical installation to ensure the safety of personnel during servicing. It can be locked in earthed position.



Main characteristics

| | |
|------------------------------------|---|
| Rated insulation voltage | 1000 V |
| Rated operational voltage | 690 V |
| Rated current | 800 to 4000 A |
| Latching capacity | 135 kA peak |
| Rated short-time withstand current | 60 kA/1s 50 kA/3s |
| Compatibility | Compatible with drawout NW08 to NW40 circuit breakers, types N1/H1/NA/HA, 3-pole and 4-pole rear connected versions |
| Remote indication | 12 ON/OFF indication contacts that can be used according to the chassis auxiliary wiring |

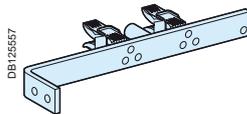
The Earthing Switch is compatible with Masterpact NW08 to NW40 type N1, H1, NA and HA circuit breakers in both 3-pole and 4-pole versions. It has two parts:

- a chassis earthing kit for installation on the Masterpact NW chassis. Two different versions are available for 3-pole and 4-pole chassis.
- the Earthing Switch itself, which is a specific Masterpact NW device that can be racked into any chassis equipped with an earthing kit, in place of the circuit breaker. Two versions are available (3-pole and 4-pole).

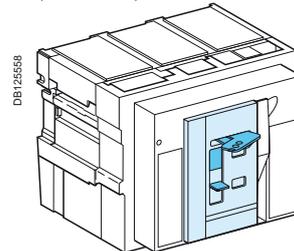
An earthing kit must be installed on the chassis of each circuit breaker protecting a circuit that may require earthing while work is being carried out. However, a single earthing switch is often sufficient for an entire installation if only one circuit is to be serviced at any given time.

The standard Earthing Switch comes with the short-circuit bar installed across the bottom (downstream) connections for earthing of the upstream portion of the circuit. The user can easily move the short-circuit bar to the top connections if the downstream portion of the circuit needs to be earthed.

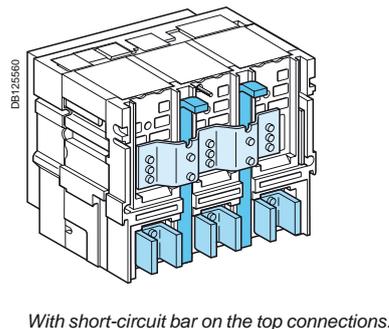
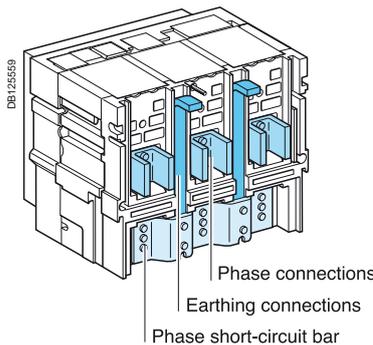
Earthing kit (for chassis)



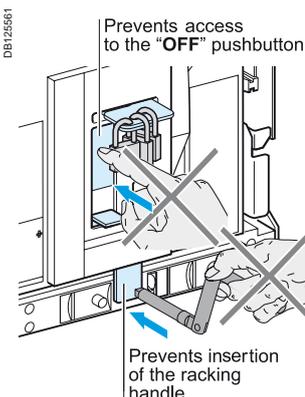
Earthing switch (front view)



Earthing switch (rear view)



With short-circuit bar on the bottom connections.



Locking in earthed position by 3 padlocks

The standard Earthing Switch can be locked in earthed position by one to three padlocks as long as the following conditions are satisfied:

- the Earthing Switch must be in "connected" position in a chassis equipped with an earthing kit
 - the Earthing Switch must be in "ON" position.
- Under these conditions, the installation is earthed.

When the Earthing Switch is locked in earthed position:

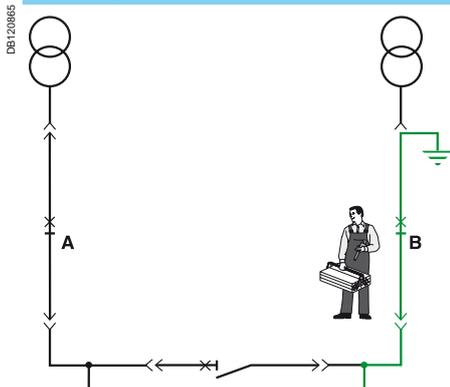
- it cannot be moved to "disconnected" position (a shutter prevents insertion of the racking handle)
- it cannot be turned "OFF" (a shutter prevents access to the "OFF" pushbutton).

Typical applications

The earthing switch is used to protect maintenance personnel working on an installation against the risk of accidental connection of a parallel source or energisation by reverse power. Protection is provided by earthing the part of the installation that is to be worked on.

Application n°1

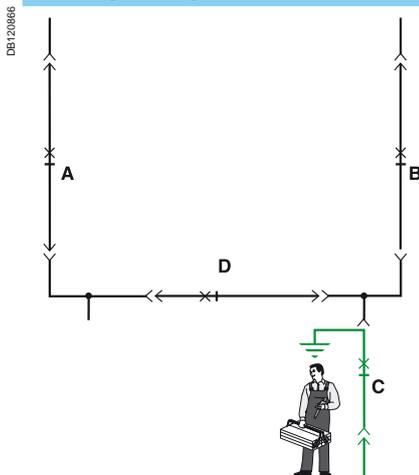
Earthing of one section of a coupled busbar arrangement



When working on section **B**, the bus coupler is normally open. To protect personnel in the event of accidental closing of this device, an earthing switch with the upstream terminals earthed is installed in place of the circuit breaker at **B**. In this way section **B** will remain at earth potential under all circumstances and the personnel can work in complete safety.

Application n°2

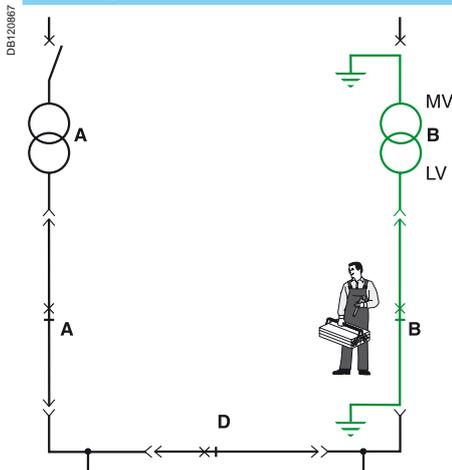
Earthing an outgoer



When working on outgoer **C**, installation of an earthing switch with the upstream terminals earthed (in place of the circuit breaker at **C**) ensures complete safety even if all the other devices on the installation are closed.

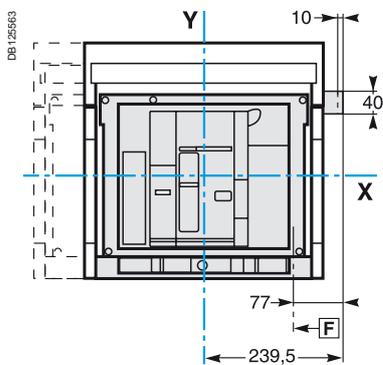
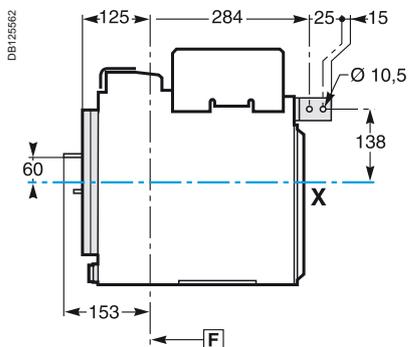
Application n°3

Earthing of an MV/LV transformer



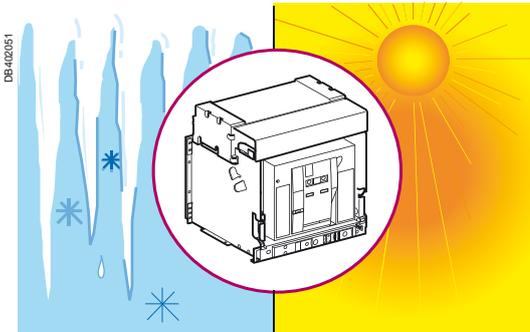
When working on an MV/LV transformer, upstream earthing is carried out by means of the usual medium voltage and high voltage procedures. Installation of an earthing switch with the downstream terminals earthed (in place of the circuit breaker at **B**) maintains the part of the installation between the upstream MV circuit breaker and the downstream LV circuit breaker at earth potential. In this way, the personnel can work in complete safety even if the rest of the installation is energised.

Dimensions and connection



| | |
|--|------|
| <i>Presentation</i> | 2 |
| <i>Functions and characteristics</i> | A-1 |
| Operating conditions | B-2 |
| Installation in switchboard | B-4 |
| Door interlock catch | B-6 |
| Control wiring | B-7 |
| Power connection | B-8 |
| Recommended busbars drilling | |
| Masterpact NT06 to NT16 | B-10 |
| Masterpact NW08 to NW63 | B-11 |
| Busbar sizing | B-12 |
| Temperature derating | |
| Power dissipation and input / output resistance | B-14 |
| Derating in switchboards | B-15 |
| Substitution kit | |
| Fixed / drawout devices 800 to 3200 A | B-22 |
| <i>Dimensions and connection</i> | C-1 |
| <i>Electrical diagrams</i> | D-1 |
| <i>Additional characteristics</i> | E-1 |
| <i>Catalogue numbers and order form</i> | F-1 |

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.



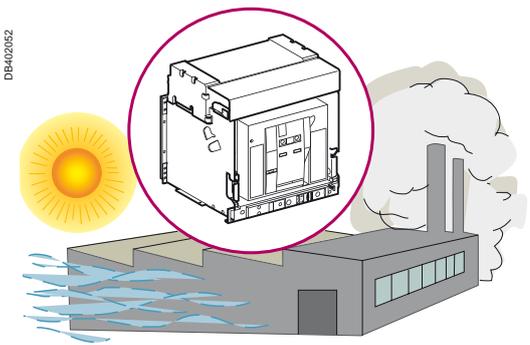
Ambient temperature

Masterpact devices can operate under the following temperature conditions:

- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5 °C to $+70\text{ °C}$
- circuit-breaker closing is guaranteed down to -35 °C .

Storage conditions are as follows:

- -40 to $+85\text{ °C}$ for a Masterpact device without its control unit
- -25 °C to $+85\text{ °C}$ for the control unit.



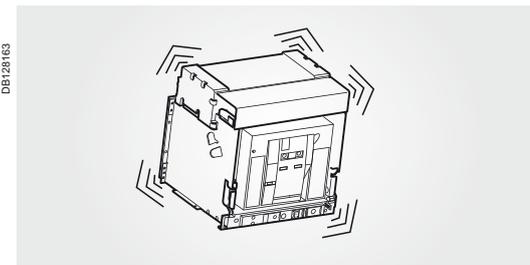
Extreme atmospheric conditions

Masterpact 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 $+85\text{ °C}$
- IEC 60068-2-30: damp heat (temperature $+55\text{ °C}$, relative humidity 95 %)
- IEC 60068-2-52 level 2: salt mist.

Masterpact 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.



Vibrations

Masterpact devices have successfully passed testing in compliance with IEC 60068-2-6 for the following vibration levels:

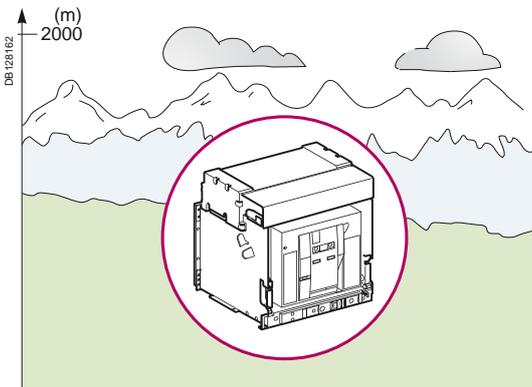
- 2 to 13.2 Hz: amplitude $\pm 1\text{ mm}$
- 13.2 to 100 Hz: constant acceleration 0.7 g.

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 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 circuit breaker
- emergency generators
- high vibration marine applications such as thrusters, anchor positioning systems, etc.

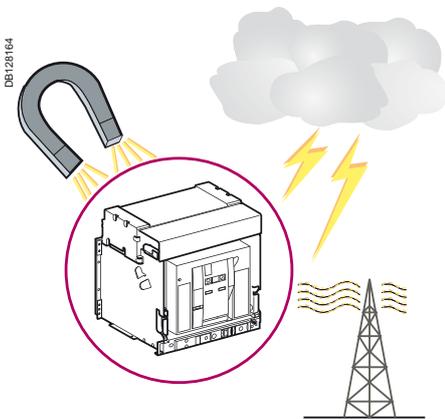


Altitude

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 U_{imp} (kV) | 12 | 11 | 10 | 8 |
| Rated insulation voltage (U_i) | 1000 | 900 | 780 | 700 |
| Maximum rated operational voltage 50/60 Hz U_e (V) | NT, NW except H10 | 690 | 630 | 560 |
| | NW H10 | 1000 | 890 | 795 |
| Rated current 40 °C | $1 \times I_n$ | $0.99 \times I_n$ | $0.96 \times I_n$ | $0.94 \times I_n$ |

Intermediate values may be obtained by interpolation.



Electromagnetic disturbances

Masterpact 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:

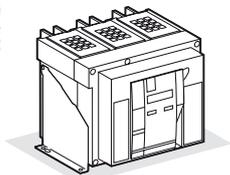
- IEC 60947-2, appendix F
- IEC 60947-2, appendix B (trip units with earth-leakage function).

The above tests guarantee that:

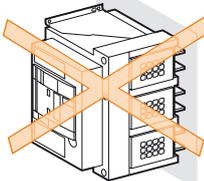
- no nuisance tripping occurs
- tripping times are respected.

Possible positions

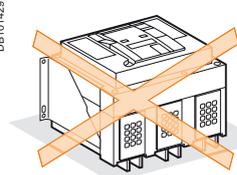
DB101427



DB101428

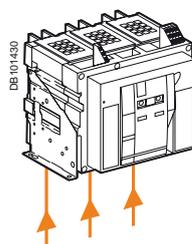


DB101429



Power supply

Masterpact devices can be supplied either from the top or from the bottom without reduction in performance, in order to facilitate connection when installed in a switchboard.



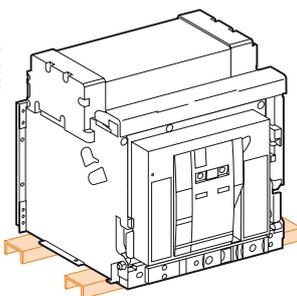
Mounting the circuit-breaker

It is important to distribute the weight of the device uniformly 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.

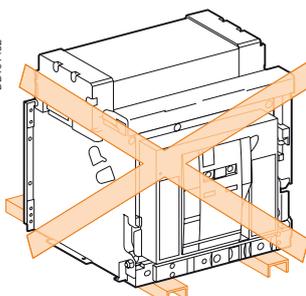
Masterpact devices can also be mounted on a vertical plane using the special brackets.

DB101431

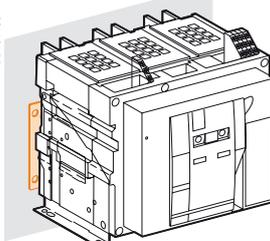


Mounting on rails.

DB101432



DB101433

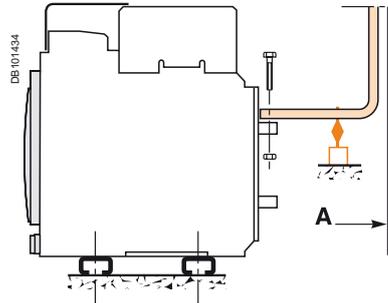


Mounting with vertical brackets.

Partitions

Sufficient openings must be provided in partitions to ensure good air circulation around the circuit breaker; Any partition between upstream and downstream connections of the device must be made of non-magnetic material.

For high currents, of 2500 A and upwards, the metal supports or barriers in the immediate vicinity of a conductor must be made of non-magnetic material **A**. Metal barriers through which a conductor passes must not form a magnetic loop.

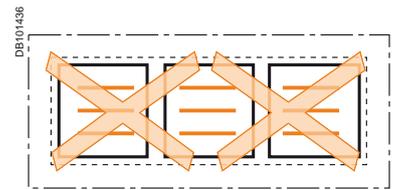
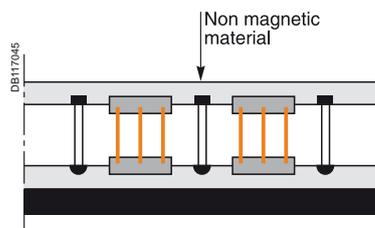


A : non magnetic material.



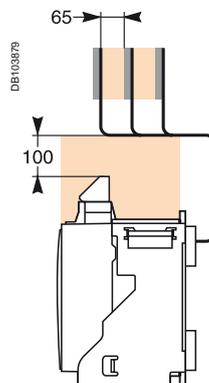
Busbars (NT, NW)

The mechanical connection must exclude the possibility of formation of a magnetic loop around a conductor.



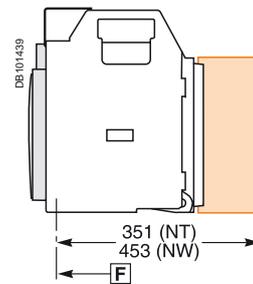
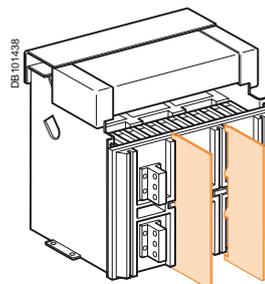
Busbars (NT)

For live busbars installed immediately above the circuit breaker (respecting the 100 mm safety clearance), the distance between bars must be 65 mm minimum. In a 1000 V system, the bars must be insulated.



Interphase barrier

If the insulation distance between phases is not sufficient (≤ 14 mm), it is advised to install phase barriers (taking into account the safety clearances). Mandatory for a Masterpact NT > 500 V.

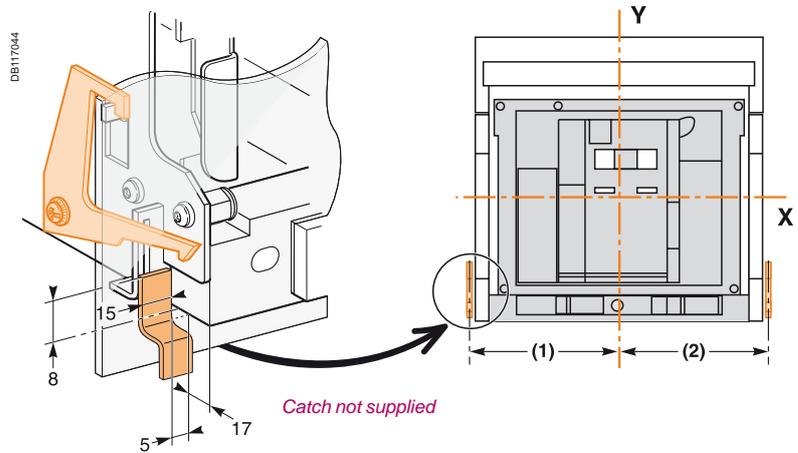


Door interlock VPEC

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

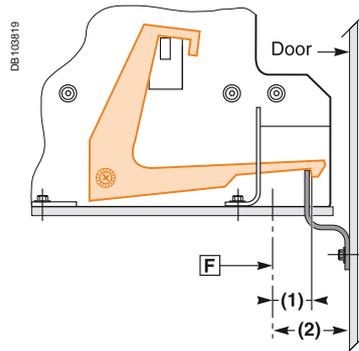
Dimensions (mm)

| Type | (1) | (2) |
|---------------|-----|-----|
| NT08-16 (3P) | 135 | 168 |
| NT08-16 (4P) | 205 | 168 |
| NW08-40 (3P) | 215 | 215 |
| NW08-40 (4P) | 330 | 215 |
| NW40b-63 (3P) | 660 | 215 |
| NW40b-63 (4P) | 775 | 215 |



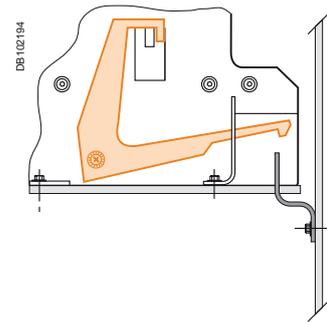
Breaker in “connected” or “test” position

Door cannot be opened



Breaker in “disconnected” position

Door can be opened



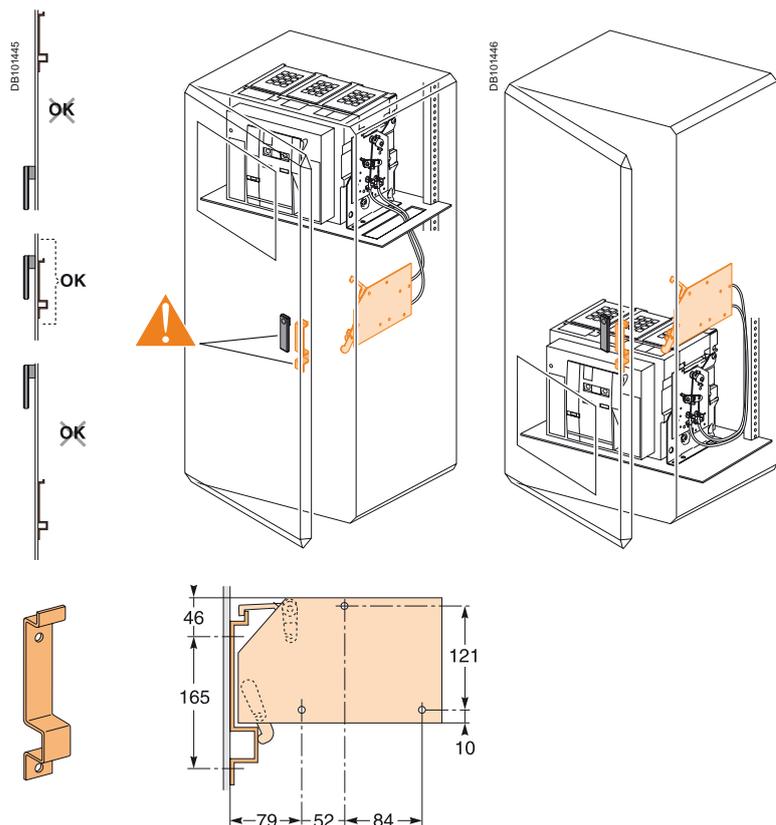
Dimensions (mm)

| Type | (1) | (2) |
|------|-----|-----|
| NT | 5 | 23 |
| NW | 83 | 103 |

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.



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

F : datum.

Control wiring

Wiring of voltage releases

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

Recommended maximum cable lengths (meter).

| | | 12 V | | 24 V | | 48 V | |
|-------|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | 2,5 mm ² | 1,5 mm ² | 2,5 mm ² | 1,5 mm ² | 2,5 mm ² | 1,5 mm ² |
| MN | U source 100 % | – | – | 58 | 35 | 280 | 165 |
| | U source 85 % | – | – | 16 | 10 | 75 | 45 |
| MX-XF | U source 100 % | 21 | 12 | 115 | 70 | 550 | 330 |
| | U source 85 % | 10 | 6 | 75 | 44 | 350 | 210 |

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

24 V DC power-supply module

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

- do not connect the positive terminal (F2+) to earth
- the negative terminal (F1-) can be connected to earth, except in IT systems
- a number of Micrologic control units and M6C modules can be connected to the same 24 V DC power supply (the consumption of a Micrologic control unit or an M6C module is approximately 100 mA)
- do not connect any devices other than a Micrologic control unit or an M6C module **if voltage > 480 V AC or in an environment with a high level of electromagnetic disturbance**
- the maximum length for each conductor is ten metres. For greater distances, it is advised to twist the supply wires together
- the 24 V DC supply wires must cross the power cables perpendicularly. If this is difficult, it is advised to twist the supply wires together
- the technical characteristics of the external 24 V DC power-supply module for Micrologic control units are indicated on [page A-27](#).

Communication bus

- do not connect the positive terminal (E1) to earth
- the negative terminal (E2) can be connected to earth
- a number of “device” or “chassis” communication modules can be connected to the same 24 V DC power supply (the consumption of each module is approximately 30 mA).

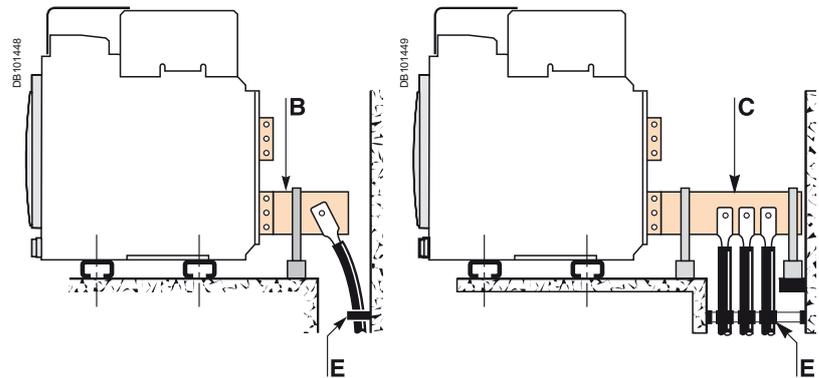
Note: wiring of ZSI: it is recommended to use twisted shielded cable. The shield must be connected to earth at both ends.

Cables 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:

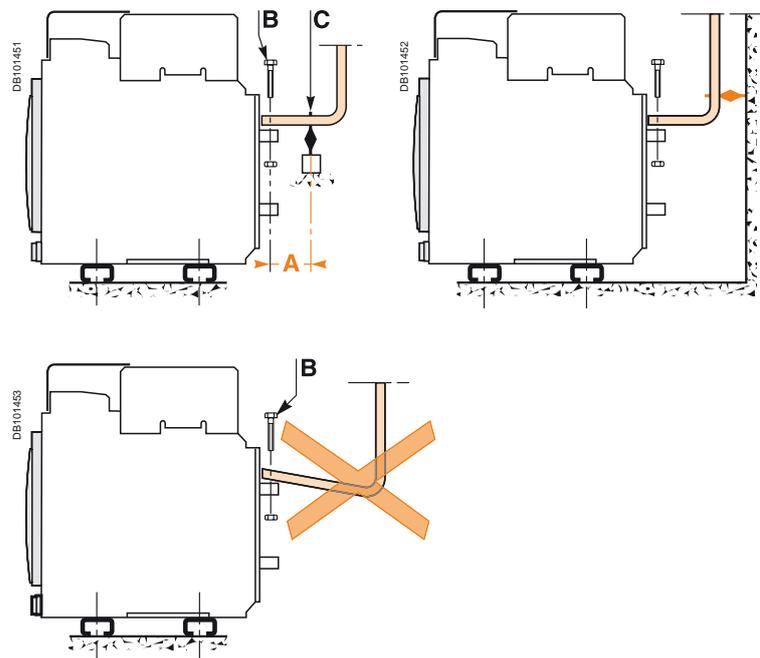
- extend the circuit breaker terminals using short bars designed and installed according to the recommendations for bar-type power connections:
 - for a single cable, use solution **B** opposite
 - for multiple cables, use solution **C** opposite
- in all cases, follow the general rules for connections to busbars:
 - position the cable lugs before inserting the bolts
 - the cables should firmly secured to the framework **E**.



Busbars 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).

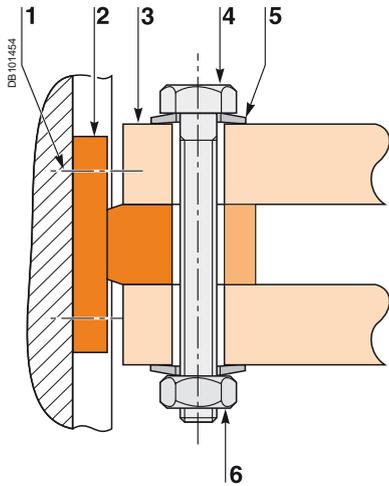


Electrodynamic stresses

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 | 150 |
|-----------------|-----|-----|-----|-----|-----|-----|
| Distance A (mm) | 350 | 300 | 250 | 150 | 150 | 150 |



- 1 Terminal screw factory-tightened to 16 Nm (NW), 13 Nm (NT).
- 2 Breaker terminal.
- 3 Busbar.
- 4 Bolt.
- 5 Washer.
- 6 Nut.

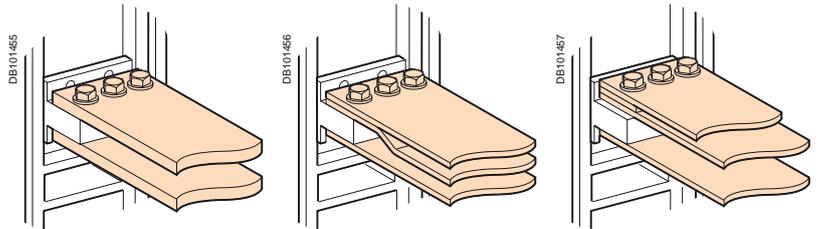
Clamping

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).

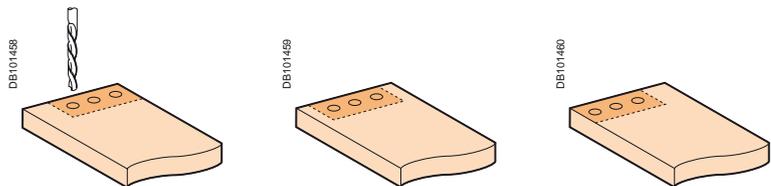
Examples



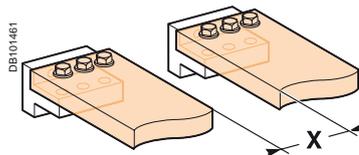
| Tightening torques | | | |
|--------------------|--------------------|--|---|
| Ø (mm) Nominal | Ø (mm) Drilling | Tightening torques (Nm) with grower or flat washers | Tightening torques (Nm) with contact or corrugatec washers |
| 10 | 11 | 37.5 | 50 |

Busbar drilling

Examples



Isolation distance

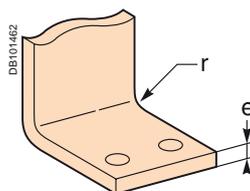


Dimensions (mm)

| Ui | X min |
|--------|-------|
| 600 V | 8 mm |
| 1000 V | 14 mm |

Busbar bending

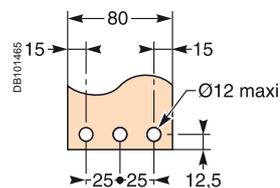
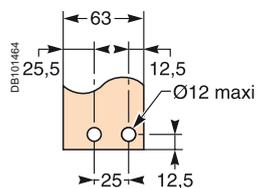
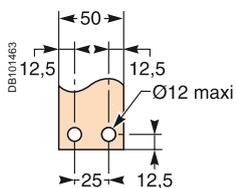
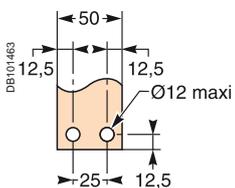
When bending busbars maintain the radius indicated below (a smaller radius would cause cracks).



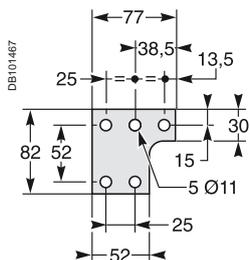
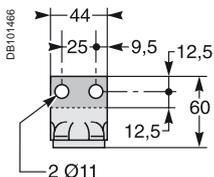
Dimensions (mm)

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

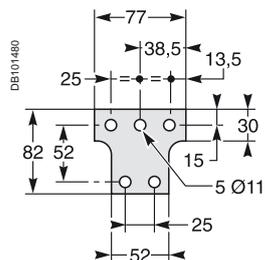
Rear connection



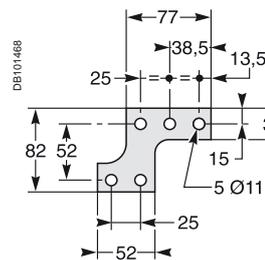
Middle left or middle right spreader for 4P



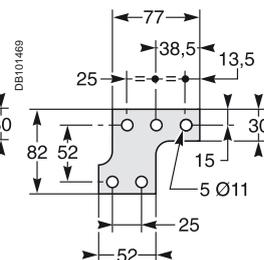
Middle spreader for 3P



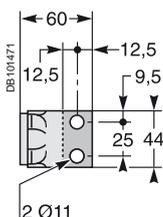
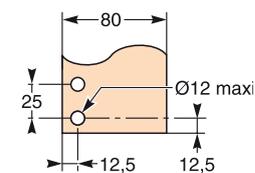
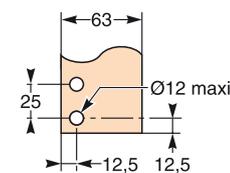
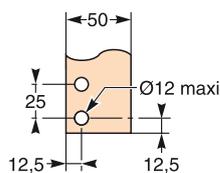
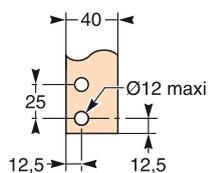
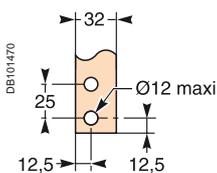
Left or right spreader for 4P



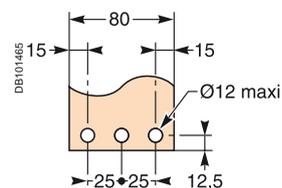
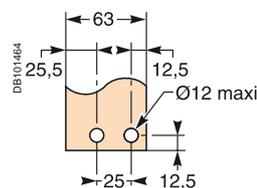
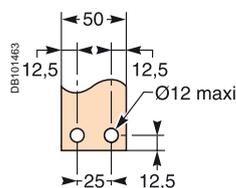
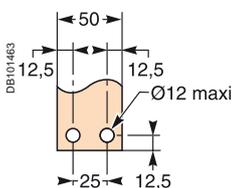
Left or right spreader for 3P



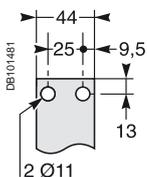
Vertical rear connection



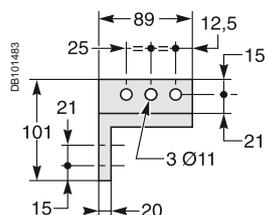
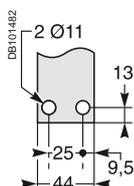
Front connection



Top connection



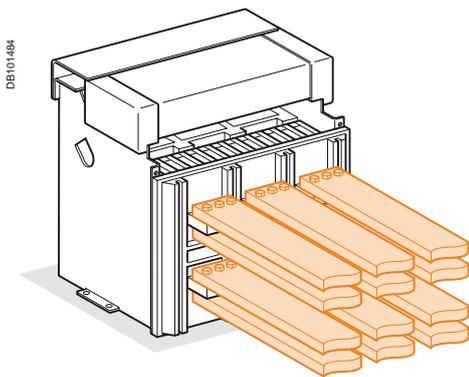
Bottom connection



Basis of tables:

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

Front or rear horizontal connection



| Masterpact | Maximum service current | T_i : 40 °C | | T_i : 50 °C | | T_i : 60 °C | |
|--------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|
| | | No. of 5 mm thick bars | No. of 10 mm thick bars | No. of 5 mm thick bars | No. of 10 mm thick bars | No. of 5 mm thick bars | No. of 10 mm thick bars |
| NT06 | 400 | 2b.30 x 5 | 1b.30 x 10 | 2b.30 x 5 | 1b.30 x 10 | 2b.30 x 5 | 1b.30 x 10 |
| NT06 | 630 | 2b.40 x 5 | 1b.40 x 10 | 2b.40 x 5 | 1b.40 x 10 | 2b.40 x 5 | 1b.40 x 10 |
| NT08 ou NW08 | 800 | 2b.50 x 5 | 1b.50 x 10 | 2b.50 x 5 | 1b.50 x 10 | 2b.50 x 5 | 1b.63 x 10 |
| NT10 ou NW10 | 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 |
| NT12 ou NW12 | 1250 | 3b.50 x 5 | 2b.40 x 10 | 3b.50 x 5 | 2b.50 x 10 | 3b.63 x 5 | 2b.50 x 10 |
| | | 2b.80 x 5 | 2b.40 x 10 | 2b.80 x 5 | | | |
| NT16 ou NW16 | 1400 | 3b.63 x 5 | 2b.40 x 10 | 3b.63 x 5 | 2b.50 x 10 | 3b.80 x 5 | 2b.63 x 10 |
| NT16 ou NW16 | 1600 | 3b.80 x 5 | 2b.63 x 10 | 3b.80 x 5 | 2b.63 x 10 | 3b.80 x 5 | 3b.50 x 10 |
| | | NW20 | 1800 | 3b.80 x 5 | 2b.63 x 10 | 3b.80 x 5 | 2b.63 x 10 |
| NW20 | 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 |
| NW25 | 2200 | 4b.100 x 5 | 2b.80 x 10 | 4b.100 x 5 | 2b.80 x 10 | 4b.100 x 5 | 2b.100 x 10 |
| NW25 | 2500 | 4b.100 x 5 | 2b.100 x 10 | 4b.100 x 5 | 2b.100 x 10 | 4b.100 x 5 | 3b.80 x 10 |
| NW32 | 2800 | 4b.100 x 5 | 3b.80 x 10 | 4b.100 x 5 | 3b.80 x 10 | 5b.100 x 5 | 3b.100 x 10 |
| NW32 | 3000 | 5b.100 x 5 | 3b.80 x 10 | 6b.100 x 5 | 3b.100 x 10 | 8b.100 x 5 | 4b.80 x 10 |
| NW32 | 3200 | 6b.100 x 5 | 3b.100 x 10 | 8b.100 x 5 | 3b.100 x 10 | | 4b.100 x 10 |
| NW40 | 3800 | | 4b.100 x 10 | | 5b.100 x 10 | | 5b.100 x 10 |
| NW40 | 4000 | | 5b.100 x 10 | | 5b.100 x 10 | | 6b.100 x 10 |
| NW50 | 4500 | | 6b.100 x 10 | | 6b.100 x 10 | | 7b.100 x 10 |
| NW50 | 5000 | | 7b.100 x 10 | | 7b.100 x 10 | | |

With Masterpact NT, it is recommended to use 50 mm wideness bars (see "Recommended busbars drilling").

Example

Conditions:

- drawout version
- horizontal busbars
- T_i : 50 °C
- service current: 1800 A.

Solution:

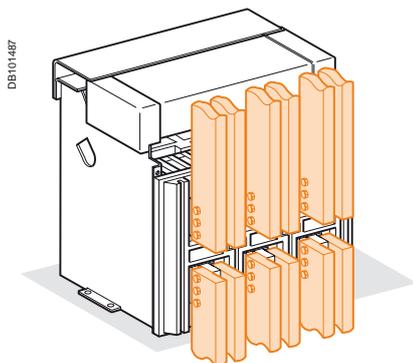
For $T_i = 50$ °C, use an NW20 which can be connected with three 80 x 5 mm bars or two 63 x 10 mm bars.

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.

Basis of tables:

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

Rear vertical connection



| Masterpact | Maximum service current | $T_i : 40\text{ °C}$ | | $T_i : 50\text{ °C}$ | | $T_i : 60\text{ °C}$ | |
|--------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|
| | | No. of 5 mm thick bars | No. of 10 mm thick bars | No. of 5 mm thick bars | No. of 10 mm thick bars | No. of 5 mm thick bars | No. of 10 mm thick bars |
| NT06 | 400 | 2b.30 x 5 | 1b.30 x 10 | 2b.30 x 5 | 1b.30 x 10 | 2b.30 x 5 | 1b.30 x 10 |
| NT06 | 630 | 2b.40 x 5 | 1b.40 x 10 | 2b.40 x 5 | 1b.40 x 10 | 2b.40 x 5 | 1b.40 x 10 |
| NT08 ou NW08 | 800 | 2b.50 x 5 | 1b.50 x 10 | 2b.50 x 5 | 1b.50 x 10 | 2b.50 x 5 | 1b.50 x 10 |
| NT10 ou NW10 | 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 |
| NT12 ou NW12 | 1250 | 2b.63 x 5 | 1b.63 x 10 | 3b.50 x 5 | 2b.40 x 10 | 3b.50 x 5 | 2b.40 x 10 |
| NT16 ou NW16 | 1400 | 2b.80 x 5 | 1b.80 x 10 | 2b.80 x 5 | 2b.50 x 10 | 3b.63 x 5 | 2b.50 x 10 |
| NT16 ou NW16 | 1600 | 3b.63 x 5 | 2b.50 x 10 | 3b.63 x 5 | 2b.50 x 10 | 3b.80 x 5 | 2b.63 x 10 |
| NW20 | 1800 | 2b.100 x 5 | 1b.80 x 10 | 2b.100 x 5 | 2b.50 x 10 | 3b.80 x 5 | 2b.63 x 10 |
| NW20 | 2000 | 3b.100 x 5 | 2b.63 x 10 | 3b.100 x 5 | 2b.63 x 10 | 3b.100 x 5 | 2b.80 x 10 |
| NW25 | 2200 | 3b.100 x 5 | 2b.63 x 10 | 3b.100 x 5 | 2b.63 x 10 | 3b.100 x 5 | 2b.80 x 10 |
| NW25 | 2500 | 4b.100 x 5 | 2b.80 x 10 | 4b.100 x 5 | 2b.80 x 10 | 4b.100 x 5 | 3b.80 x 10 |
| NW32 | 2800 | 4b.100 x 5 | 2b.100 x 10 | 4b.100 x 5 | 2b.100 x 10 | 4b.100 x 5 | 3b.80 x 10 |
| NW32 | 3000 | 5b.100 x 5 | 3b.80 x 10 | 6b.100 x 5 | 3b.100 x 10 | 5b.100 x 5 | 4b.80 x 10 |
| NW32 | 3200 | 6b.100 x 5 | 3b.100 x 10 | 6b.100 x 5 | 3b.100 x 10 | | 4b.100 x 10 |
| NW40 | 3800 | | 4b.100 x 10 | | 4b.100 x 10 | | 4b.100 x 10 |
| NW40 | 4000 | | 4b.100 x 10 | | 4b.100 x 10 | | 4b.100 x 10 |
| NW50 | 4500 | | 5b.100 x 10 | | 5b.100 x 10 | | 6b.100 x 10 |
| NW50 | 5000 | | 5b.100 x 10 | | 6b.100 x 10 | | 7b.100 x 10 |
| NW63 | 5700 | | 7b.100 x 10 | | 7b.100 x 10 | | 8b.100 x 10 |
| NW63 | 6300 | | 8b.100 x 10 | | 8b.100 x 10 | | |

Example

Conditions:

- drawout version
- vertical connections
- T_i : 40 °C
- service current: 1100 A.

Solution :

For $T_i = 40\text{ °C}$ use an NT12 or NW12 which can be connected with two 63 x 5 mm bars or with one 63 x 10 mm bar.

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 T_i around the circuit breaker and the busbars.

Circuit breakers with mixed connections have the same derating as horizontally connected breakers.

For T_i greater than 60 °C, consult us.

T_i : temperature around the circuit breaker and its connection.

| Version | Drawout | | | | | | | | | | Fixed | | | | | | | | | | |
|---------------|--------------------------|------|------|------|----|---------------|----|------|------|------|--------------------------|------|----|------|------|---------------|------|----|----|----|----|
| | Front or rear horizontal | | | | | Rear vertical | | | | | Front or rear horizontal | | | | | Rear vertical | | | | | |
| | Temp. | 40 | 45 | 50 | 55 | 60 | 40 | 45 | 50 | 55 | 60 | 40 | 45 | 50 | 55 | 60 | 40 | 45 | 50 | 55 | 60 |
| NT06 H1/H2/L1 | 630 | | | | | 630 | | | | | 630 | | | | | 630 | | | | | |
| NT08 H1/H2/L1 | 800 | | | | | 800 | | | | | 800 | | | | | 800 | | | | | |
| NT10 H1/H2/L1 | 1000 | | | | | 1000 | | | | | 1000 | | | | | 1000 | | | | | |
| NT12 H1/H2 | 1250 | | | | | 1250 | | | | | 1250 | | | | | 1250 | | | | | |
| NT16 H1/H2 | 1600 | 1520 | 1480 | 1430 | | 1600 | | 1560 | 1510 | | | 1600 | | | 1550 | | 1600 | | | | |
| NW08 N/H/L | 800 | | | | | 800 | | | | | 800 | | | | | 800 | | | | | |
| NW10 N/H/L | 1000 | | | | | 1000 | | | | | 1000 | | | | | 1000 | | | | | |
| NW12 N/H/L | 1250 | | | | | 1250 | | | | | 1250 | | | | | 1250 | | | | | |
| NW16 N/H/L | 1600 | | | | | 1600 | | | | | 1600 | | | | | 1600 | | | | | |
| NW20 H1/H2/H3 | 2000 | | 1980 | 1890 | | 2000 | | | | 1920 | | 2000 | | | 1920 | | 2000 | | | | |
| NW20 L1 | 2000 | 1900 | 1850 | 1800 | | 2000 | | | | | - | - | - | - | - | - | - | - | - | - | - |
| NW25 H1/H2/H3 | 2500 | | | | | 2500 | | | | | 2500 | | | | | 2500 | | | | | |
| NW32 H1/H2/H3 | 3200 | 3100 | 3000 | 2900 | | 3200 | | | | | 3200 | | | | | 3200 | | | | | |
| NW40 H1/H2/H3 | 4000 | 3900 | 3750 | 3650 | | 4000 | | | 3850 | | 4000 | | | 3900 | 3800 | 4000 | | | | | |
| NW40b H1/H2 | 4000 | | | | | 4000 | | | | | 4000 | | | | | 4000 | | | | | |
| NW50 H1/H2 | 5000 | | | | | 5000 | | | | | 5000 | | | | | 5000 | | | | | |
| NW63 H1/H2 | - | - | - | - | - | 6300 | | | | 6200 | | - | - | - | - | - | 6300 | | | | |

Power dissipation and input / output resistance

Total power dissipation is the value measured at I_N , 50/60 Hz, for a 3 pole or 4 pole breaker (values above the power $P = 3RI^2$).

The resistance between input / output is the value measured per pole (cold state).

| Version | Drawout | | Fixed | |
|---------------|---------------------------|---|---------------------------|---|
| | Power dissipation (Watts) | Input/output resistance (μohm) | Power dissipation (Watts) | Input/output resistance (μohm) |
| NT06 H1/H2/L1 | 55/115 (H1/L1) | 38/72 | 30/45 | 26/39 |
| NT08 H1/H2/L1 | 90/140 (H1/L1) | 38/72 | 50/80 | 26/39 |
| NT10 H1/H2/L1 | 150/230 (H1/L1) | 38/72 | 80/110 | 26/39 |
| NT12 H1/H2 | 250 | 36 | 130 | 26 |
| NT16 H1/H2 | 460 | 36 | 220 | 26 |
| NW08 N1 | 137 | 42 | 62 | 19 |
| NW08 H/L | 100 | 30 | 42 | 13 |
| NW10 N1 | 220 | 42 | 100 | 19 |
| NW10 H/L | 150 | 30 | 70 | 13 |
| NW12 N1 | 330 | 42 | 150 | 19 |
| NW12 H/L | 230 | 27 | 100 | 13 |
| NW16 N1 | 480 | 37 | 220 | 19 |
| NW16 H/L | 390 | 27 | 170 | 13 |
| NW20 H/L | 470 | 27 | 250 | 13 |
| NW25 H1/H2/H3 | 600 | 19 | 260 | 8 |
| NW32 H1/H2/H3 | 670 | 13 | 420 | 8 |
| NW40 H1/H2/H3 | 900 | 11 | 650 | 8 |
| NW40b H1/H2 | 550 | 7 | 390 | 5 |
| NW50 H1/H2 | 950 | 7 | 660 | 5 |
| NW63 H1/H2 | 1200 | 7 | 1050 | 5 |

Derating in switchboards

Factors affecting switchboard design

The temperature around the circuit breaker and its connections:

This is used to define the type of circuit breaker to be used and its connection arrangement.

Vents at the top and bottom of the cubicles:

Vents considerably reduce the temperature inside the switchboard, but must be designed so as to respect the degree of protection provided by the enclosure. For weatherproof heavy-duty cubicles, a forced ventilation system may be required.

The heat dissipated by the devices installed in the switchboard:

This is the heat dissipated by the circuit breakers under normal conditions (service current).

The size of the enclosure:

This determines the volume for cooling calculations.

Switchboard installation mode:

Free-standing, against a wall, etc.

Horizontal partitions:

Partitions can obstruct air circulation within the enclosure.

Basis of tables

- switchboard dimensions
- number of circuit-breakers installed
- type of breaker connections
- drawout versions
- ambient temperature outside of the switchboard: T_a (IEC 60439-1).

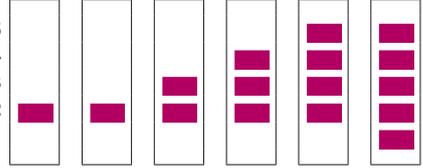
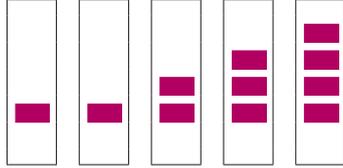
Masterpact NT06-16 H1/H2/L1 (switchboard 2000 x 400 x 400) - area of outlet vents: 150 cm²

| Type | NT06 H1/H2/L1 | | NT08 H1/H2/L1 | | NT10 H1/H2/L1 | | NT12 H1/H2 | | NT16 H1/H2 | | |
|---|----------------------|-----|---------------|-----|---------------|-----------|--------------------------|------|--------------------------|------|------|
| Switchboard composition | | | | | | | | | | | |
| Connection type | ≡ | | ≡ | | ≡ | | ≡ | | ≡ | | |
| Busbar dimensions (mm) | 2b. 40 x 5 | | 2b. 50 x 5 | | 3b. 63 x 5 | | 3b. 63 x 5 3b. 50 x 5 | | 3b. 80 x 5 3b. 63 x 5 | | |
| Ventilated switchboard (→ IP31) | | | | | H1/L1 H1/L1 | | | | | | |
| <p>(1) Area of outlet vents: 150 cm². (2) Area of inlet vents: 150 cm².</p> | $T_a = 35\text{ °C}$ | | | | | | | | | | |
| | 4 | | | | | | | | | | |
| | 3 | 630 | 630 | 800 | 800 | 1000/1000 | 1000/1000 | 1250 | 1250 | 1400 | 1520 |
| | 2 | | | | | | | | | | |
| | 1 | | | | | | | | | | |
| | <hr/> | | | | | | | | | | |
| | $T_a = 45\text{ °C}$ | | | | | | | | | | |
| | 4 | | | | | | | | | | |
| | 3 | 630 | 630 | 800 | 800 | 1000/950 | 1000/1000 | 1250 | 1250 | 1330 | 1440 |
| 2 | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| <hr/> | | | | | | | | | | | |
| $T_a = 55\text{ °C}$ | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 3 | 630 | 630 | 800 | 800 | 1000/890 | 1000/960 | 1200 | 1250 | 1250 | 1340 | |
| 2 | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| <hr/> | | | | | | | | | | | |
| Non ventilated switchboard (→ IP54) | | | | | | | | | | | |
| | $T_a = 35\text{ °C}$ | | | | | | | | | | |
| | 4 | | | | | | | | | | |
| | 3 | 630 | 630 | 800 | 800 | 1000/960 | 1000/1000 | 1250 | 1250 | 1330 | 1400 |
| | 2 | | | | | | | | | | |
| | 1 | | | | | | | | | | |
| | <hr/> | | | | | | | | | | |
| | $T_a = 45\text{ °C}$ | | | | | | | | | | |
| | 4 | | | | | | | | | | |
| | 3 | 630 | 630 | 800 | 800 | 1000/910 | 1000/980 | 1220 | 1250 | 1260 | 1330 |
| 2 | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| <hr/> | | | | | | | | | | | |
| $T_a = 55\text{ °C}$ | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 3 | 630 | 630 | 800 | 800 | 1000/860 | 1000/930 | 1150 | 1230 | 1200 | 1260 | |
| 2 | | | | | | | | | | | |
| 1 | | | | | | | | | | | |

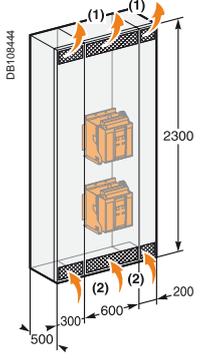
Note: the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.

The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

Masterpact NT06-08 H1/H2/L1 (switchboard 2300 x 1100 x 500) - area of outlet vents: 300 cm²

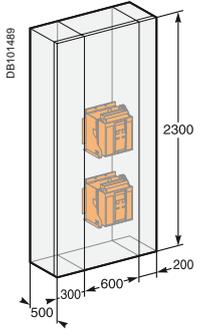
| Type | NT06 H1/H2/L1 | | | | | | NT08 H1/H2/L1 | | | | |
|-------------------------|---|--|--|--|--|--|---|--|--|--|--|
| Switchboard composition |  | | | | | |  | | | | |
| Connection type |  | | | | | |  | | | | |
| Busbar dimensions (mm) | 2b. 40 x 5 | | | | | | 2b. 50 x 5 | | | | |

| Ventilated switchboard (→ IP31) | | NT06 | | | | | | NT08 | | | | | | |
|---------------------------------|---|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| $T_a = 35\text{ °C}$ | 5 | | | | 630 | 630 | | | | | | 800 | | |
| | 4 | | | | 630 | 630 | 630 | | | | | 800 | 800 | |
| | 3 | | | | 630 | 630 | 630 | 630 | | | | 800 | 800 | 800 |
| | 2 | 630 | 630 | 630 | 630 | 630 | 630 | 800 | 800 | 800 | 800 | 800 | | |
| | 1 | | | | | | 630 | | | | | | | |
| | 1 | | | | | | 630 | | | | | | | |
| $T_a = 45\text{ °C}$ | 5 | | | | 630 | 630 | | | | | | 800 | | |
| | 4 | | | | 630 | 630 | 630 | | | | | 800 | 800 | |
| | 3 | | | | 630 | 630 | 630 | 630 | | | | 800 | 800 | 800 |
| | 2 | 630 | 630 | 630 | 630 | 630 | 630 | 800 | 800 | 800 | 800 | 800 | | |
| | 1 | | | | | | 630 | | | | | | | |
| | 1 | | | | | | 630 | | | | | | | |
| $T_a = 55\text{ °C}$ | 5 | | | | 630 | 630 | | | | | | 800 | | |
| | 4 | | | | 630 | 630 | 630 | | | | | 800 | 800 | |
| | 3 | | | | 630 | 630 | 630 | 630 | | | | 800 | 800 | 800 |
| | 2 | 630 | 630 | 630 | 630 | 630 | 630 | 800 | 800 | 800 | 800 | 800 | | |
| | 1 | | | | | | 630 | | | | | | | |
| | 1 | | | | | | 630 | | | | | | | |



(1) Area of outlet vents: 300 cm².
(2) Area of inlet vents: 300 cm².

| Non ventilated switchboard (→ IP54) | | NT06 | | | | | | NT08 | | | | | | |
|-------------------------------------|---|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| $T_a = 35\text{ °C}$ | 5 | | | | 630 | 630 | | | | | | 800 | | |
| | 4 | | | | 630 | 630 | 630 | | | | | 800 | 800 | |
| | 3 | | | | 630 | 630 | 630 | 630 | | | | 800 | 800 | 800 |
| | 2 | 630 | 630 | 630 | 630 | 630 | 630 | 800 | 800 | 800 | 800 | 800 | | |
| | 1 | | | | | | 630 | | | | | | | |
| | 1 | | | | | | 630 | | | | | | | |
| $T_a = 45\text{ °C}$ | 5 | | | | 630 | 630 | | | | | | 800 | | |
| | 4 | | | | 630 | 630 | 630 | | | | | 800 | 800 | |
| | 3 | | | | 630 | 630 | 630 | 630 | | | | 800 | 800 | 800 |
| | 2 | 630 | 630 | 630 | 630 | 630 | 630 | 800 | 800 | 800 | 800 | 800 | | |
| | 1 | | | | | | 630 | | | | | | | |
| | 1 | | | | | | 630 | | | | | | | |
| $T_a = 55\text{ °C}$ | 5 | | | | 630 | 630 | | | | | | 800 | | |
| | 4 | | | | 630 | 630 | 630 | | | | | 800 | 800 | |
| | 3 | | | | 630 | 630 | 630 | 630 | | | | 800 | 800 | 800 |
| | 2 | 630 | 630 | 630 | 630 | 630 | 630 | 800 | 800 | 800 | 800 | 800 | | |
| | 1 | | | | | | 630 | | | | | | | |
| | 1 | | | | | | 630 | | | | | | | |



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.

The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

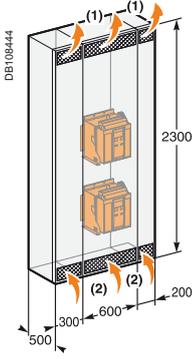
Masterpact NT10-16 H1/H2/L1 (switchboard 2300 x 1100 x 500) - area of outlet vents: 300 cm²

| Type | NT10 H1/H2/L1 | | | | NT12 H1/H2 | | | | NT16 H1/H2 | | | |
|-------------------------|---------------|--|--|--|------------|--|--|--|------------|--|--|--|
| Switchboard composition | | | | | | | | | | | | |

| | | | | | | | | | | | |
|-----------------|--|--|--|--|--|--|--|--|--|--|--|
| Connection type | | | | | | | | | | | |
|-----------------|--|--|--|--|--|--|--|--|--|--|--|

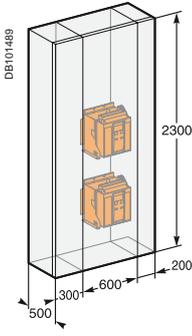
| | | | | | | | | | | | |
|------------------------|------------|--|--|--|------------|--|--|--|------------|--|--|
| Busbar dimensions (mm) | 3b. 63 x 5 | | | | 3b. 63 x 5 | | | | 3b. 80 x 5 | | |
| | 2b. 63 x 5 | | | | 3b. 50 x 5 | | | | 3b. 63 x 5 | | |

| Ventilated switchboard (→ IP31) | 5 H1/L1 | H1/L1 | H1/L1 | H1/L1 | | | | | | | | |
|---------------------------------|---------|-----------|-----------|-----------|-----------|------|------|------|------|------|------|------|
| $T_a = 35\text{ °C}$ | 4 | | | 1000/1000 | | | | 1250 | | | | |
| | 3 | | | 1000/1000 | 1000/1000 | | | 1250 | 1250 | | 1500 | |
| | 2 | 1000/1000 | 1000/1000 | 1000/1000 | 1000/1000 | 1250 | 1250 | 1250 | 1250 | 1460 | 1600 | 1550 |
| | 1 | | | | | | | | | | | |
| $T_a = 45\text{ °C}$ | 4 | | | 1000/1000 | | | | 1250 | | | | |
| | 3 | | | 1000/1000 | 1000/1000 | | | 1250 | 1250 | | 1420 | |
| | 2 | 1000/960 | 1000/1000 | 1000/1000 | 1000/1000 | 1250 | 1250 | 1250 | 1250 | 1400 | 1500 | 1480 |
| | 1 | | | | | | | | | | | |
| $T_a = 55\text{ °C}$ | 4 | | | 1000/920 | | | | 1250 | | | | |
| | 3 | | | 1000/950 | 1000/930 | | | 1250 | 1250 | | 1330 | |
| | 2 | 1000/900 | 1000/1000 | 1000/970 | 1000/950 | 1250 | 1250 | 1250 | 1250 | 1300 | 1400 | 1370 |
| | 1 | | | | | | | | | | | |



(1) Area of outlet vents: 300 cm².
 (2) Area of inlet vents: 300 cm².

| Non ventilated switchboard (→ IP54) | 5 | | | | | | | | | | |
|-------------------------------------|---|-----------|-----------|-----------|----------|------|------|------|------|------|------|
| $T_a = 35\text{ °C}$ | 4 | | | 1000/950 | | | | 1250 | | | |
| | 3 | | | 1000/1000 | 1000/960 | | | 1250 | 1250 | | 1370 |
| | 2 | 1000/1000 | 1000/1000 | 1000/1000 | 1000/970 | 1250 | 1250 | 1250 | 1250 | 1400 | 1500 |
| $T_a = 45\text{ °C}$ | 4 | | | 1000/900 | | | | 1180 | | | |
| | 3 | | | 1000/950 | 1000/910 | | | 1250 | 1190 | | 1300 |
| | 2 | 1000/950 | 1000/1000 | 1000/960 | 1000/930 | 1250 | 1250 | 1250 | 1220 | 1350 | 1430 |
| $T_a = 55\text{ °C}$ | 4 | | | 1000/850 | | | | 1120 | | | |
| | 3 | | | 1000/900 | 1000/860 | | | 1200 | 1130 | | 1210 |
| | 2 | 1000/880 | 1000/970 | 1000/910 | 1000/870 | 1210 | 1250 | 1210 | 1150 | 1250 | 1350 |



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.
 The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

Masterpact NW08-10 N/H/L (switchboard 2300 x 800 x 900) - area of outlet vents: 350 cm²

| Type | NW08 N/H/L | | | | | NW10 N/H/L | | | |
|-------------------------|------------|--|--|--|--|--------------------------|--|--|--|
| Switchboard composition | | | | | | | | | |
| Connection type | | | | | | | | | |
| Busbar dimensions (mm) | 2b. 50 x 5 | | | | | 3b. 63 x 5 2b. 63 x 5 | | | |

| Ventilated switchboard (→ IP31) | | NW08 N/H/L | | | | | NW10 N/H/L | | | |
|---------------------------------|----------------------|------------|-----|-----|-----|-----|------------|------|------|------|
| | $T_a = 35\text{ °C}$ | 4 | 800 | | | | | | | |
| | | 3 | 800 | | | 800 | | | | 1000 |
| | | 2 | 800 | | 800 | 800 | | | 1000 | 1000 |
| | | 1 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 | 1000 |
| $T_a = 45\text{ °C}$ | | 4 | 800 | | | | | | | |
| | | 3 | 800 | | | 800 | | | | 1000 |
| | | 2 | 800 | | 800 | 800 | | | 1000 | 1000 |
| | | 1 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 | 1000 |
| $T_a = 55\text{ °C}$ | | 4 | 800 | | | | | | | |
| | | 3 | 800 | | | 800 | | | | 1000 |
| | | 2 | 800 | | 800 | 800 | | | 1000 | 1000 |
| | | 1 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 | 1000 |

(1) Area of outlet vents: 350 cm².
(2) Area of inlet vents: 350 cm².

| Non ventilated switchboard (→ IP54) | | NW08 N/H/L | | | | | NW10 N/H/L | | | |
|-------------------------------------|----------------------|------------|-----|-----|-----|-----|------------|------|------|------|
| | $T_a = 35\text{ °C}$ | 4 | 800 | | | | | | | |
| | | 3 | 800 | | | 800 | | | | 1000 |
| | | 2 | 800 | | 800 | 800 | | | 1000 | 1000 |
| | | 1 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 | 1000 |
| $T_a = 45\text{ °C}$ | | 4 | 800 | | | | | | | |
| | | 3 | 800 | | | 800 | | | | 1000 |
| | | 2 | 800 | | 800 | 800 | | | 1000 | 1000 |
| | | 1 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 | 1000 |
| $T_a = 55\text{ °C}$ | | 4 | 800 | | | | | | | |
| | | 3 | 800 | | | 800 | | | | 1000 |
| | | 2 | 800 | | 800 | 800 | | | 1000 | 1000 |
| | | 1 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 | 1000 |

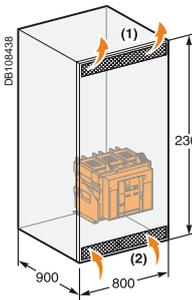
Note: the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.

The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

Masterpact NW12-16 N/H/L (switchboard 2300 x 800 x 900) - area of outlet vents: 350 cm²

| Type | NW12 N1 | NW12 H/L | NW16 N1 | NW16 H/L |
|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Switchboard composition | | | | |
| Connection type | | | | |
| Busbar dimensions (mm) | 3b. 63 x 5 3b. 50 x 5 | 3b. 63 x 5 3b. 50 x 5 | 3b. 80 x 5 3b. 63 x 5 | 3b. 80 x 5 3b. 63 x 5 |

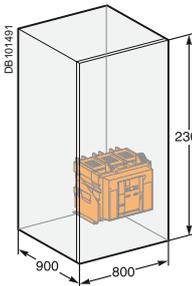
Ventilated switchboard (→ IP31)



| | | | | | | | | | | | | | | |
|----------------------|---|-----------|------|------|------|-----------|------|------|------|-----------|------|------|------|------|
| $T_a = 35\text{ °C}$ | 4 | | | | | | | | | | | | | |
| | 3 | 1250 | | | | 1250 | | | | | | | | |
| | 2 | 1250 1250 | | | | 1250 1250 | | | | 1600 1600 | | | | |
| | 1 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1550 | 1600 | 1600 | 1600 | 1600 |
| $T_a = 45\text{ °C}$ | 4 | | | | | | | | | | | | | |
| | 3 | 1250 | | | | 1250 | | | | | | | | |
| | 2 | 1250 1250 | | | | 1250 1250 | | | | 1500 1600 | | | | |
| | 1 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1470 | 1600 | 1600 | 1600 | 1600 |
| $T_a = 55\text{ °C}$ | 4 | | | | | | | | | | | | | |
| | 3 | 1250 | | | | 1250 | | | | | | | | |
| | 2 | 1250 1250 | | | | 1250 1250 | | | | 1380 1470 | | | | |
| | 1 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1380 | 1500 | 1500 | 1520 | 1600 |

- (1) Area of outlet vents: 350 cm².
- (2) Area of inlet vents: 350 cm².

Non ventilated switchboard (→ IP54)



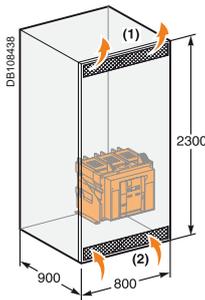
| | | | | | | | | | | | | | | |
|----------------------|---|-----------|------|------|------|-----------|------|------|------|-----------|------|------|------|------|
| $T_a = 35\text{ °C}$ | 4 | | | | | | | | | | | | | |
| | 3 | 1240 | | | | 1250 | | | | | | | | |
| | 2 | 1250 1250 | | | | 1250 1250 | | | | 1425 1600 | | | | |
| | 1 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1440 | 1550 | 1550 | 1600 | 1600 |
| $T_a = 45\text{ °C}$ | 4 | | | | | | | | | | | | | |
| | 3 | 1170 | | | | 1250 | | | | | | | | |
| | 2 | 1210 1210 | | | | 1250 1250 | | | | 1360 1500 | | | | |
| | 1 | 1200 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1360 | 1470 | 1470 | 1500 | 1600 |
| $T_a = 55\text{ °C}$ | 4 | | | | | | | | | | | | | |
| | 3 | 1100 | | | | 1250 | | | | | | | | |
| | 2 | 1140 1170 | | | | 1250 1250 | | | | 1280 1400 | | | | |
| | 1 | 1130 | 1200 | 1200 | 1200 | 1250 | 1250 | 1250 | 1250 | 1280 | 1380 | 1380 | 1400 | 1520 |

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.
The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

Masterpact NW20-40 N/H/L (switchboard 2300 x 800 x 900) - area of outlet vents: 350 cm²

| Type | NW20 H1/H2/H3 | NW20 L1 | NW25 H1/2/3 | NW32 H1/2/3 | NW40 H1/2/3 |
|-------------------------|---------------|-------------|-------------|--------------|--------------|
| Switchboard composition | | | | | |
| Connection type | | | | | |
| Busbar dimensions (mm) | 3b. 100 x 5 | 3b. 100 x 5 | 4b. 100 x 5 | 3b. 100 x 10 | 4b. 100 x 10 |

Ventilated switchboard (→ IP31)

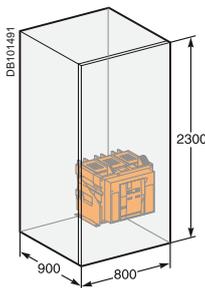


| | | | | | | | | | | | | | |
|----------------------|---|------|------|------|------|------|------|------|------|------|------|------|------|
| $T_a = 35\text{ °C}$ | 4 | | | | | | | | | | | | |
| | 3 | | 2000 | | | | | 1830 | | | | | |
| | 2 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2375 | 2500 | 3040 | 3200 | 3320 | 3700 |
| | 1 | | | | | | | | | | | | |
| $T_a = 45\text{ °C}$ | 4 | | | | | | | | | | | | |
| | 3 | | 2000 | | | | | 1750 | | | | | |
| | 2 | 2000 | 2000 | 2000 | 1810 | 1960 | 1920 | 2250 | 2380 | 2880 | 3100 | 3160 | 3500 |
| | 1 | | | | | | | | | | | | |
| $T_a = 55\text{ °C}$ | 4 | | | | | | | | | | | | |
| | 3 | | 2000 | | | | | 1640 | | | | | |
| | 2 | 2000 | 2000 | 2000 | 1700 | 1850 | 1800 | 2100 | 2250 | 2690 | 2900 | 2960 | 3280 |
| | 1 | | | | | | | | | | | | |

(1) Area of outlet vents: 350 cm².

(2) Area of inlet vents: 350 cm².

Non ventilated switchboard (→ IP54)



| | | | | | | | | | | | | | |
|----------------------|---|------|------|------|------|------|------|------|------|------|------|------|------|
| $T_a = 35\text{ °C}$ | 4 | | | | | | | | | | | | |
| | 3 | | 2000 | | | | | 1750 | | | | | |
| | 2 | 2000 | 2000 | 2000 | 1800 | 1900 | 1890 | 2125 | 2275 | 2650 | 2850 | 3040 | 3320 |
| | 1 | | | | | | | | | | | | |
| $T_a = 45\text{ °C}$ | 4 | | | | | | | | | | | | |
| | 3 | | 1900 | | | | | 1660 | | | | | |
| | 2 | 1900 | 1960 | 1960 | 1680 | 1810 | 1800 | 2000 | 2150 | 2550 | 2700 | 2880 | 3120 |
| | 1 | | | | | | | | | | | | |
| $T_a = 55\text{ °C}$ | 4 | | | | | | | | | | | | |
| | 3 | | 1780 | | | | | 1550 | | | | | |
| | 2 | 1800 | 1920 | 1920 | 1590 | 1700 | 1700 | 1900 | 2020 | 2370 | 2530 | 2720 | 2960 |
| | 1 | | | | | | | | | | | | |

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.

The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

Masterpact NW40b-63 H1/H2 (switchboard 2300 x 1400 x 1500) - area of outlet vents: 500 cm²

| Type | NW40b H1/H2 | NW50 H1/H2 | NW63 H1/H2 |
|--|----------------------------|----------------------------|-----------------------|
| Switchboard composition | | | |
| Connection type | | | |
| Busbar dimensions (mm) | 5b. 100 x 10 | 7b. 100 x 10 | 8b. 100 x 10 |
| Ventilated switchboard (→ IP31) | | | |
| $T_a = 35\text{ °C}$ | 4 3 2 4000 4000 1 | 4 3 2 4700 5000 1 | 4 3 2 5850 1 |
| $T_a = 45\text{ °C}$ | 4 3 2 4000 4000 1 | 4 3 2 4450 4850 1 | 4 3 2 5670 1 |
| $T_a = 55\text{ °C}$ | 4 3 2 4000 4000 1 | 4 3 2 4200 4600 1 | 4 3 2 5350 1 |
| Non ventilated switchboard (→ IP54) | | | |
| $T_a = 35\text{ °C}$ | 4 3 2 4000 4000 1 | 4 3 2 4350 4650 1 | 4 3 2 5290 1 |
| $T_a = 45\text{ °C}$ | 4 3 2 4000 4000 1 | 4 3 2 4100 4400 1 | 4 3 2 5040 1 |
| $T_a = 55\text{ °C}$ | 4 3 2 3840 3840 1 | 4 3 2 3850 4150 1 | 4 3 2 4730 1 |

(1) Area of outlet vents: 500 cm².
 (2) Area of inlet vents: 500 cm².

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.
 The values indicated for the cross-sectional area of the vents should be considered as general indications only given that the thermal performance of a switchboard with natural ventilation depends on many parameters, e.g. shape, porosity and location of vents and air flow within the switchboard.

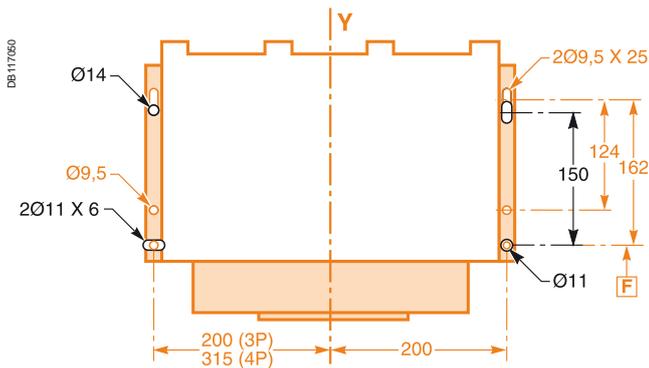
It is possible to replace a **Masterpact (M08 to M32)** with a new **Masterpact (NW08 to NW32)** with the same power rating.

Substitution is possible for the following types of circuit breakers:

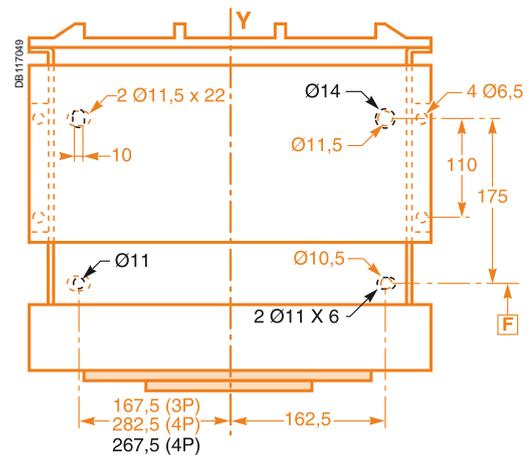
- N1, H1, H2 for both fixed and drawout versions
- L1 for drawout versions up to 2000 A.

Mounting diagram

Fixed version



Drawout version

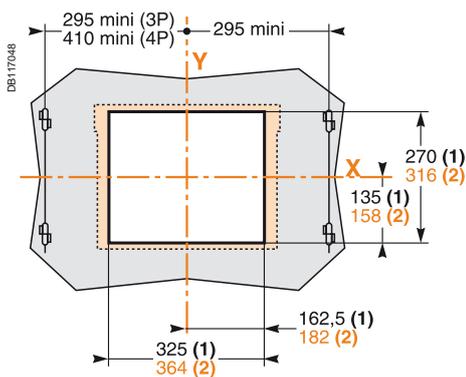


— : Masterpact NW
— : Masterpact M

Fixing points are identical for Masterpact (M08 to M32) and Masterpact (NW08 to NW32), except for the four-pole chassis.

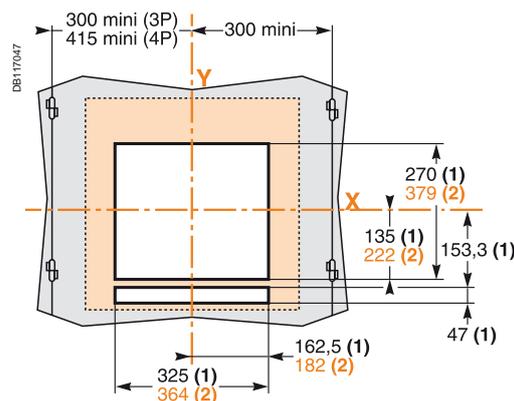
Door cut-out

Fixed version



- without an escutcheon, the cut-out is identical (270 x 325 mm)
- with the former escutcheon, the cut-out is identical (270 x 325 mm)
- with the new escutcheon, the cut-out is different.

Drawout version



Power connection

Select a set of retrofit connectors to replace the standard connectors and avoid any modifications to the busbars (see the retrofit section in "orders and quotations").

Note:

(1) Without escutcheon.

(2) With escutcheon.

References X and Y represent the symmetry planes for three-pole devices.

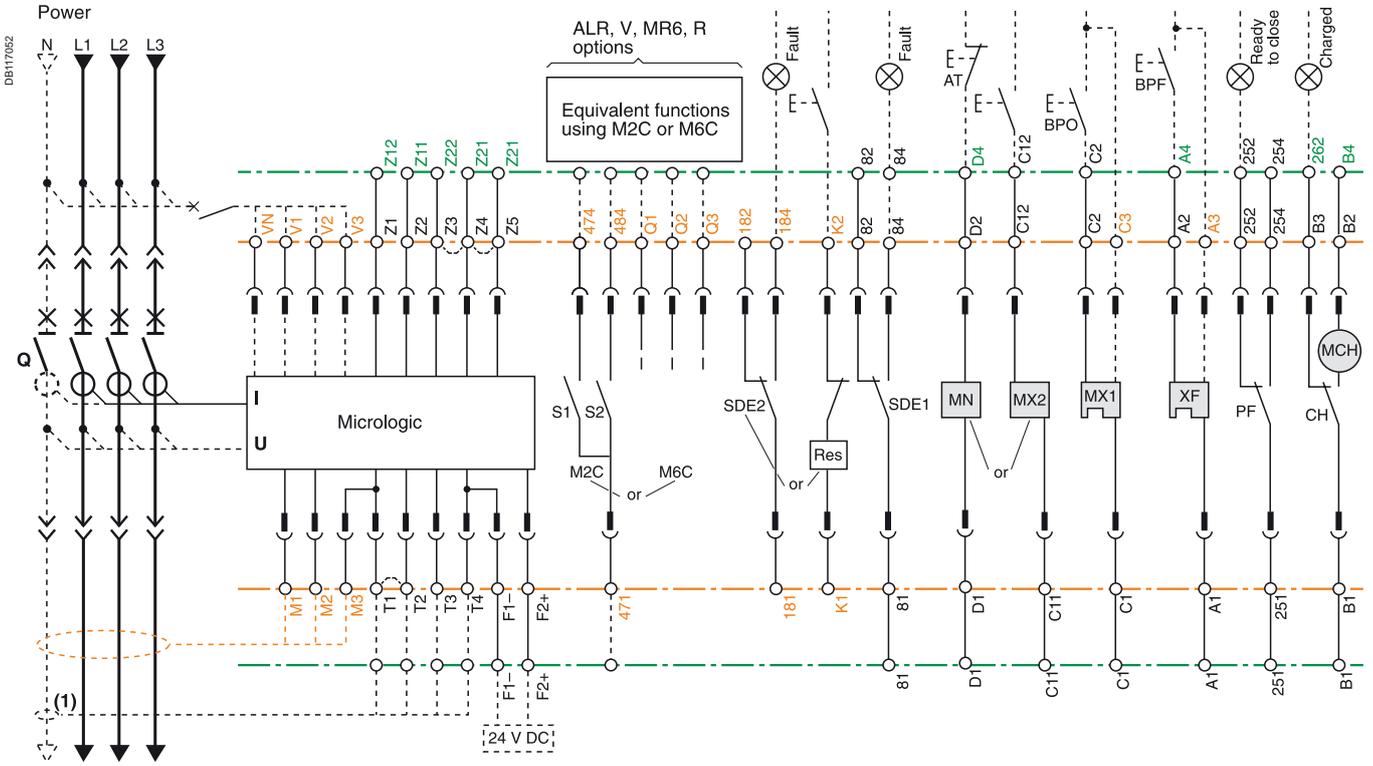
Electrical diagrams

Correspondences between Masterpact NW and Masterpact M terminal blocks.

Power

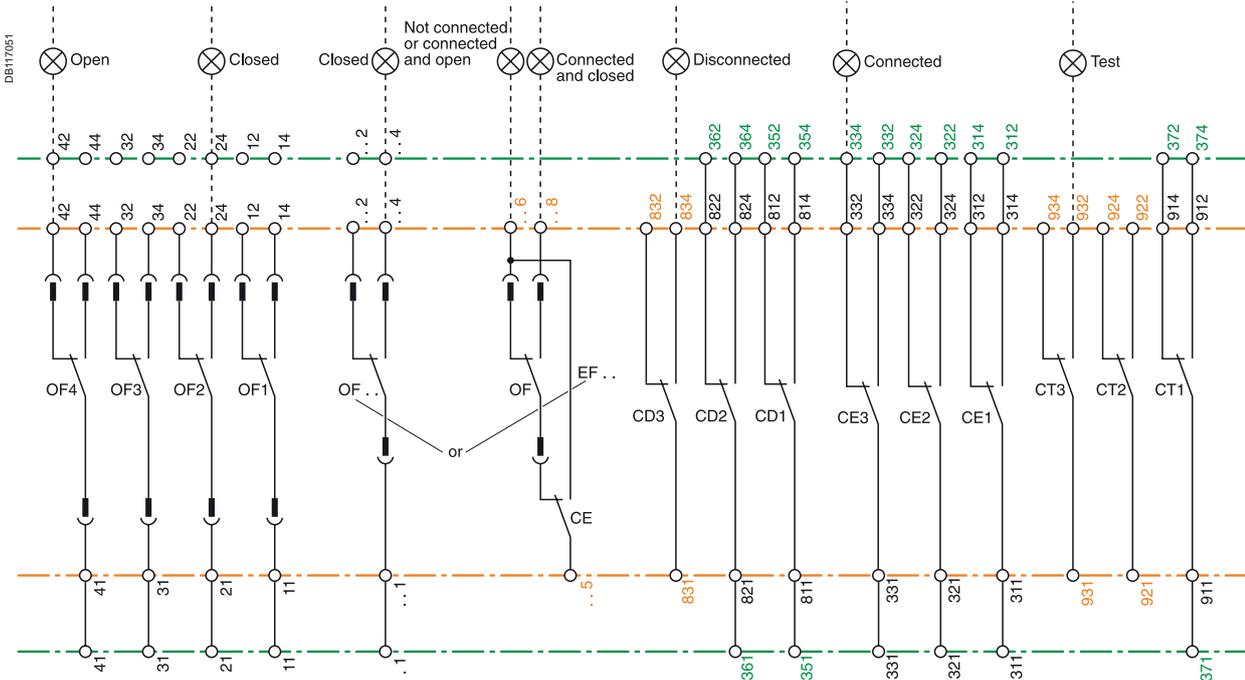
Control unit

Remote operation



Indication contacts

Chassis contacts



Identical to Masterpact M.

Different than Masterpact M.

New or additional functions.

(1) The current transformer for the external neutral must be replaced.

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CAD software and tools

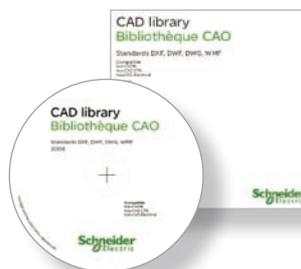
This international site allows you to access all the Schneider Electric products in just 2 clicks via comprehensive range data-sheets, with direct links to:

- complete library: technical documents, catalogs, FAQs, brochures...
- selection guides from the e-catalog.
- product discovery sites and their Flash animations.

You will also find illustrated overviews, news to which you can subscribe, the list of country contacts...

The CAD software and tools enhance productivity and safety. They help you create your installations by simplifying product choice through easy browsing in the Schneider Electric offers.

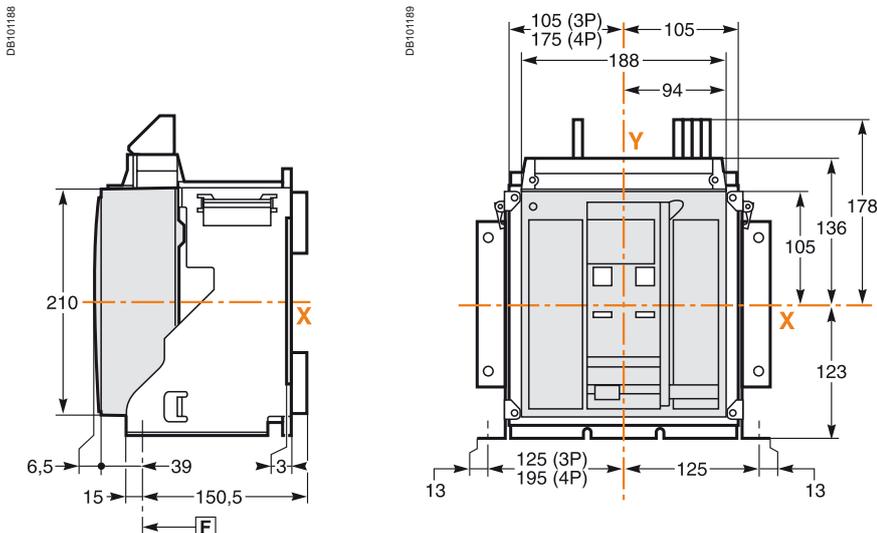
Last but not least, they optimise use of our products while also complying with standards and proper procedures.



| | |
|---|------|
| <i>Presentation</i> | 2 |
| <i>Functions and characteristics</i> | A-1 |
| <i>Installation recommendations</i> | B-1 |
| NT06 to NT16 circuit breakers | |
| Fixed 3/4-poles device | C-2 |
| Drawout 3/4-poles device | C-6 |
| NW08 to NW32 circuit breakers | |
| Fixed 3/4-poles device | C-10 |
| Drawout 3/4-poles device | C-12 |
| NW40 circuit breakers | |
| Fixed 3/4-poles device | C-14 |
| Drawout 3/4-poles device | C-16 |
| NW40b to NW63 circuit breakers | |
| Fixed 3/4-poles device | C-18 |
| Drawout 3/4-poles device | C-20 |
| NT/NW accessories | C-22 |
| NT/NW external modules | C-24 |
| <i>Electrical diagrams</i> | D-1 |
| <i>Additional characteristics</i> | E-1 |
| <i>Catalogue numbers and order form</i> | F-1 |

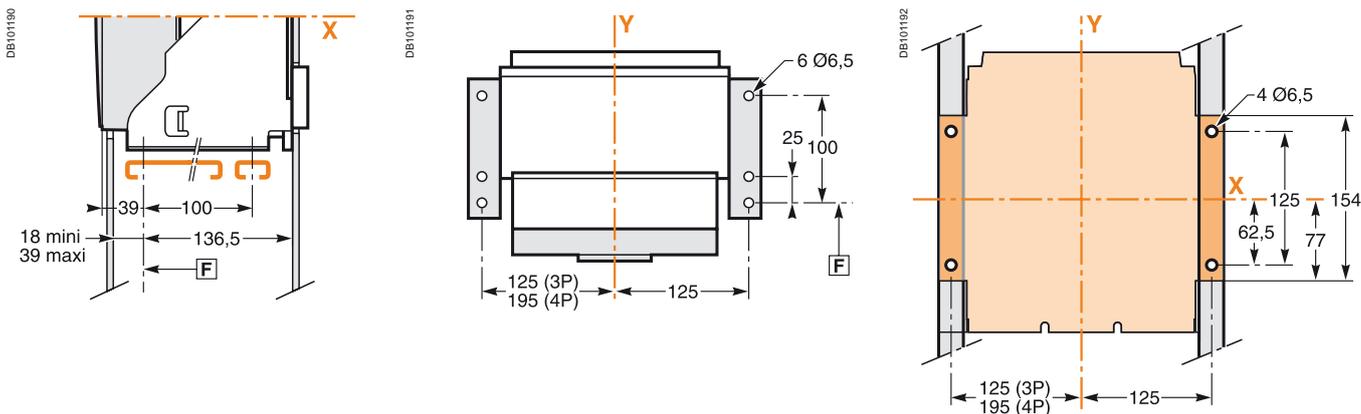


Dimensions



Bottom mounting (on base plate or rails)

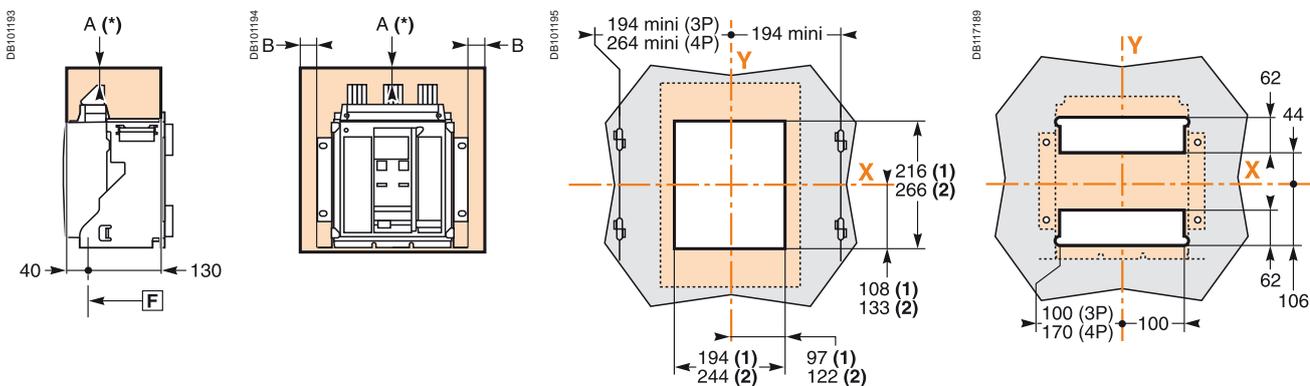
Rear mounting detail (on upright or backplate)



Safety clearances

Door cutout

Rear panel cutout



For voltages < 690 V

| | Parts Insulated | Metal | Energised |
|---|-----------------|-------|-----------|
| A | 0 | 0 | 100 |
| B | 0 | 0 | 60 |

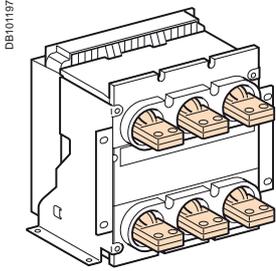
F: datum.

(1) Without escutcheon.
(2) With escutcheon.

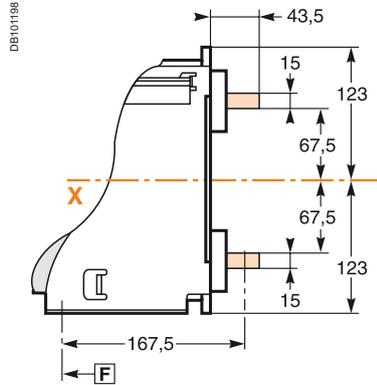
Note: X and Y are the symmetry planes for a 3-pole device.
A(*) An overhead clearance of 50 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

Connections

Horizontal rear connection

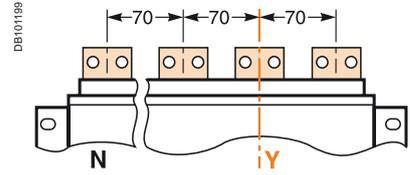


DB101197

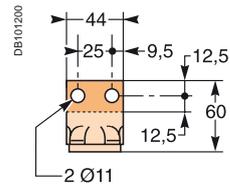


DB101198

Detail

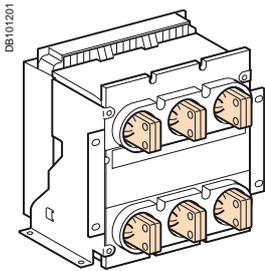


DB101199

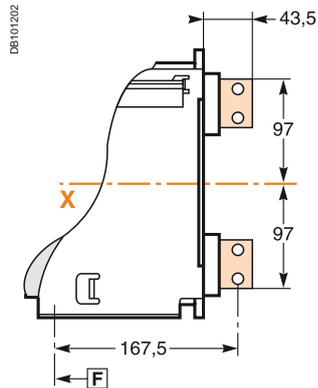


DB101200

Vertical rear connection

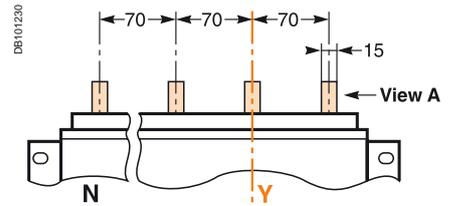


DB101201

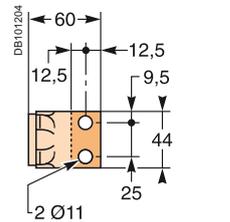


DB101202

Detail



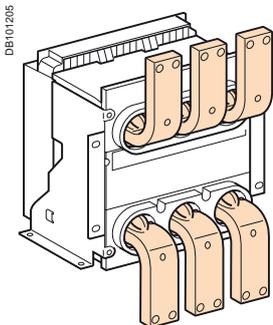
DB101230



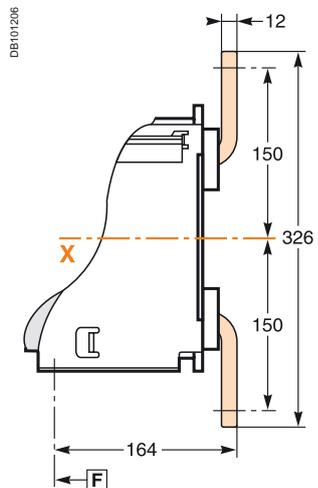
DB101204

View A detail.

Front connection

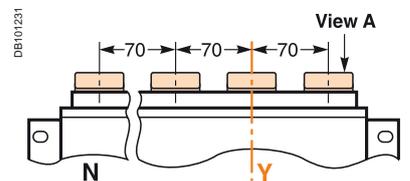


DB101205



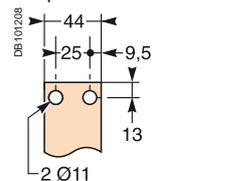
DB101206

Detail



DB101231

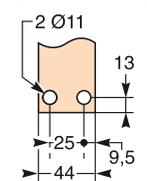
Top connection



DB101208

View A detail.

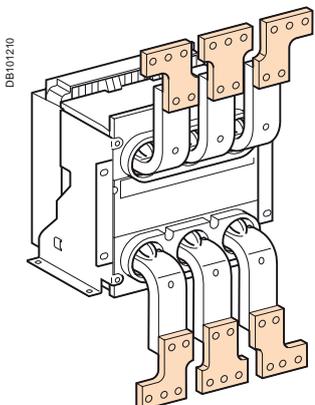
Bottom connection



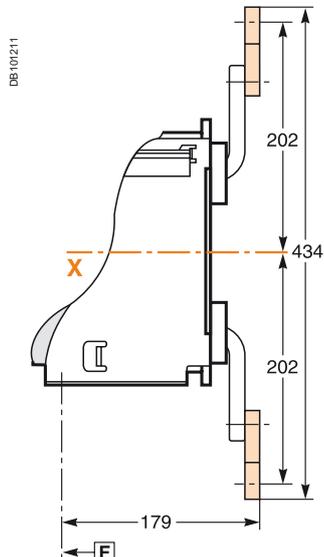
Note: recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

Connections

Front connection with spreaders

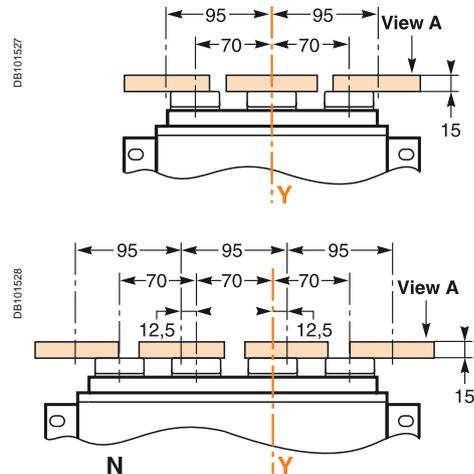


DB101210



DB101211

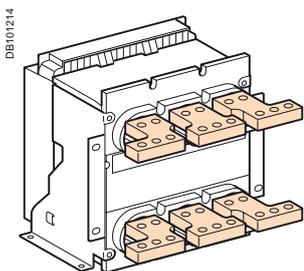
Detail



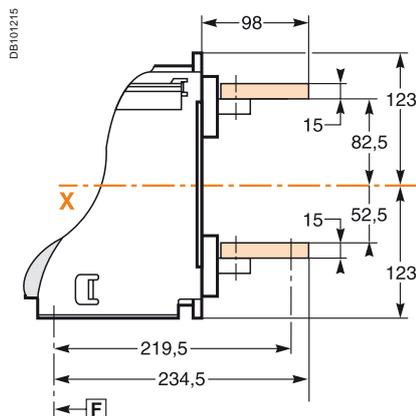
DB101527

DB101528

Rear connection with spreaders

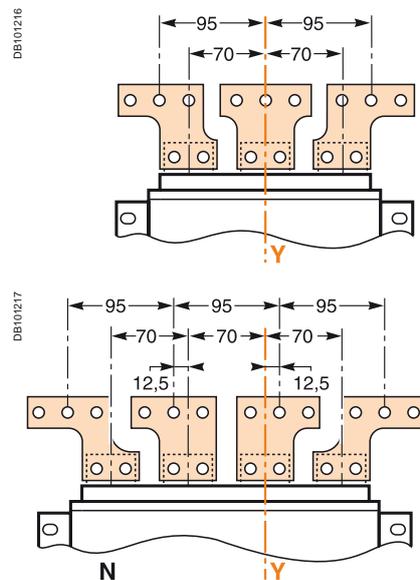


DB101214



DB101215

Detail

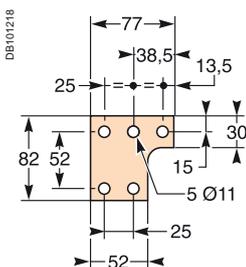


DB101216

DB101217

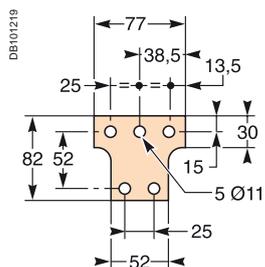
Spreader detail

Middle left or middle right spreader for 4P.



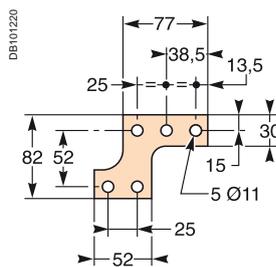
DB101218

Middle spreader for 3P.



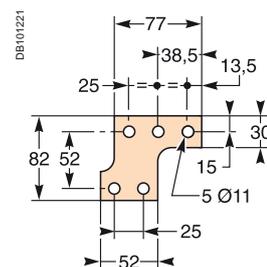
DB101219

Left or right spreader for 4P.



DB101220

Left or right spreader for 3P.



DB101221

View A detail.

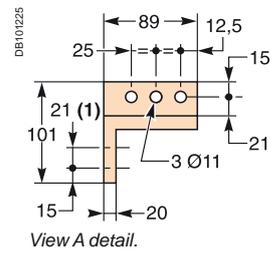
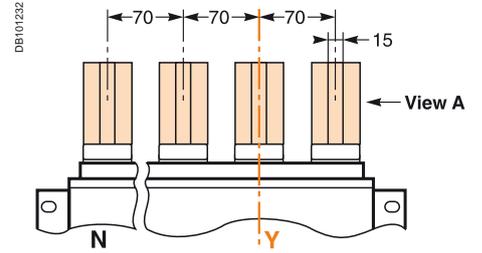
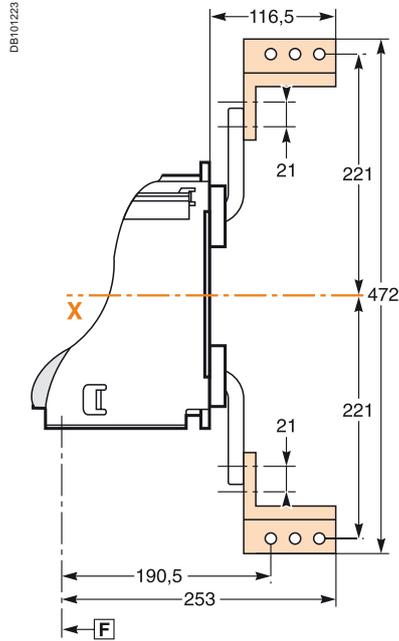
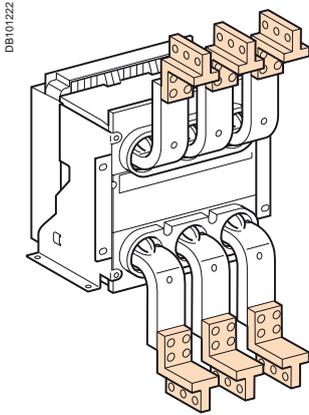
F : datum.

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

Connections

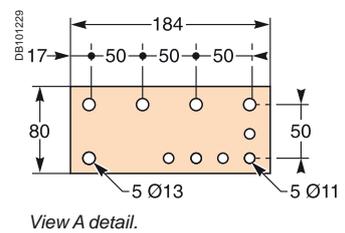
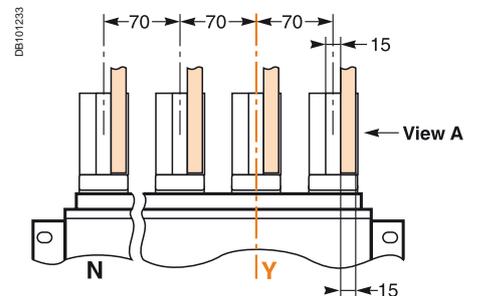
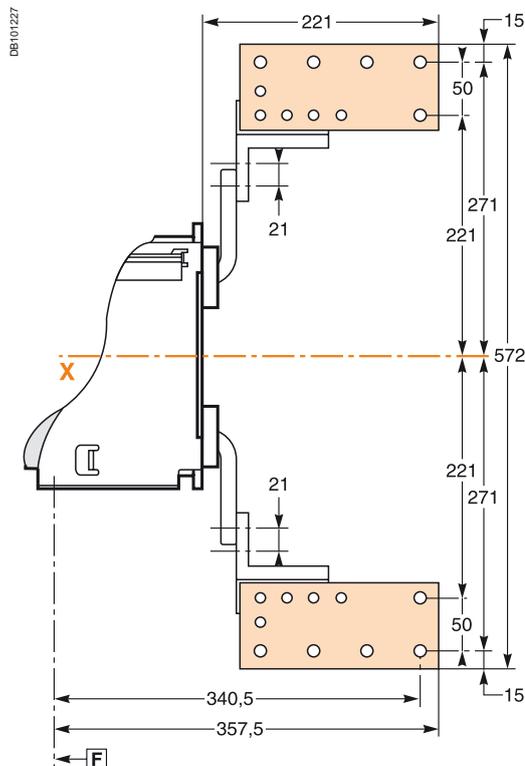
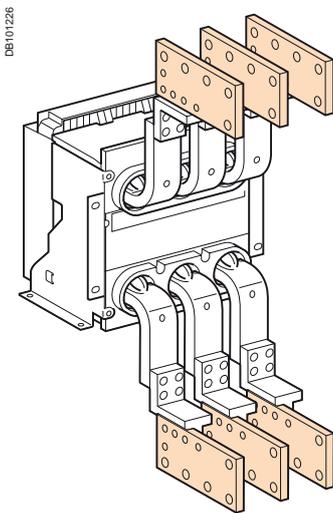
Front connection via vertical connection adapters

Detail



Front connection via vertical connection adapters fitted with cable-lug adapters

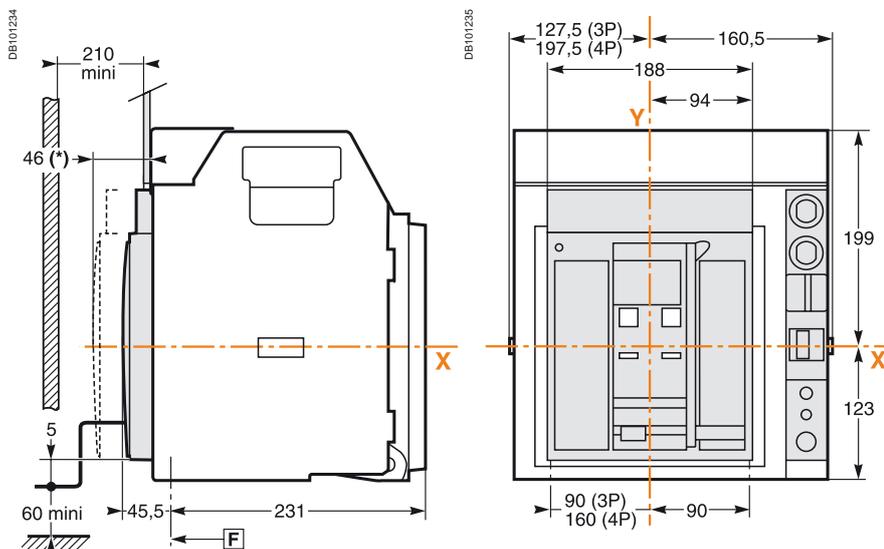
Detail



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

(1) 2 connection possibilities on vertical connection adapters (21 mm between centres).

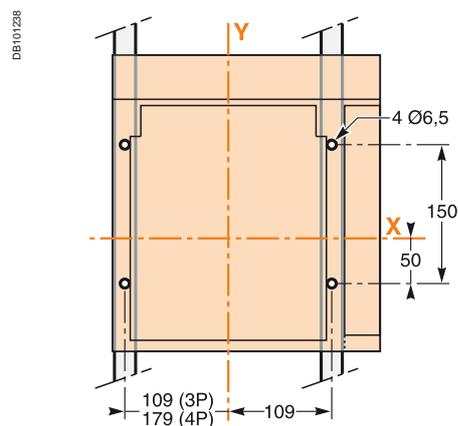
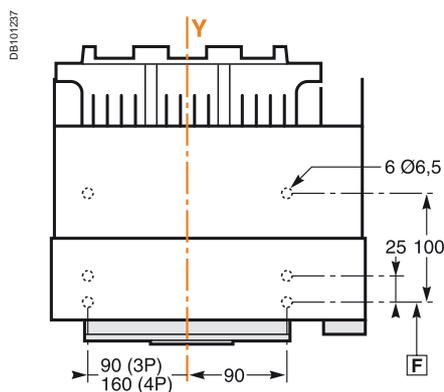
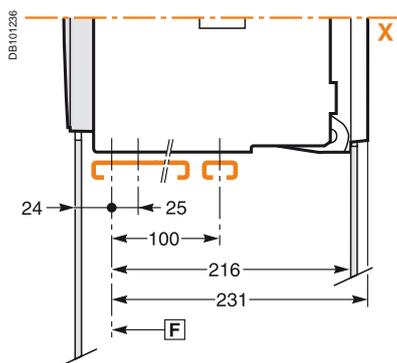
Dimensions



(*): Disconnected position.

Bottom mounting (on base plate or rails)

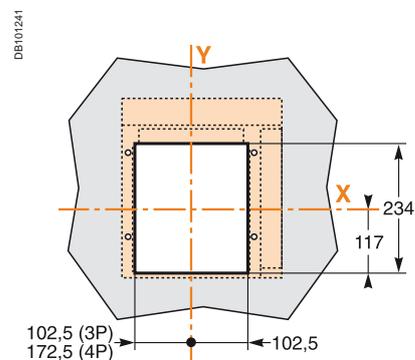
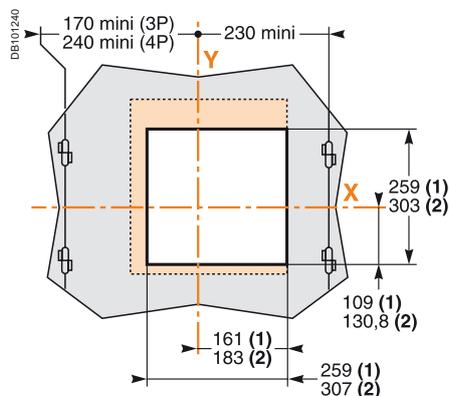
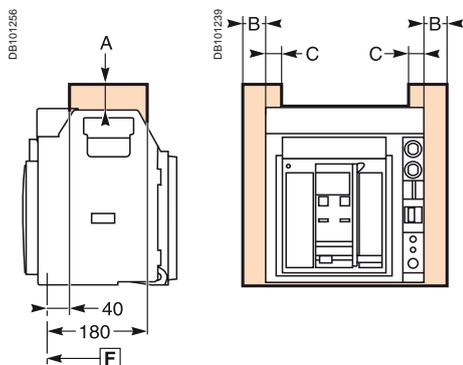
Rear mounting detail (on upright or backplate)



Safety clearances

Door cutout

Rear panel cutout



For voltages ≤ 690 V

| | Parts | | |
|---|-----------|-------|-----------|
| | Insulated | Metal | Energised |
| A | 0 | 0 | 30 |
| B | 10 | 10 | 60 |
| C | 0 | 0 | 30 |

F : datum.

(1) Without escutcheon.

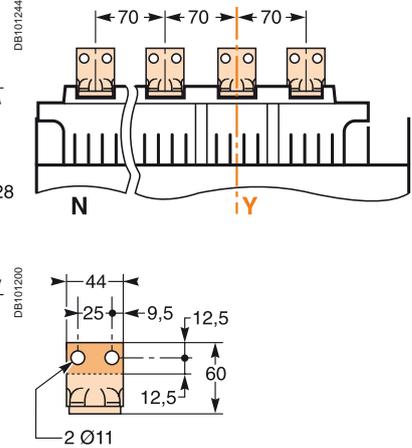
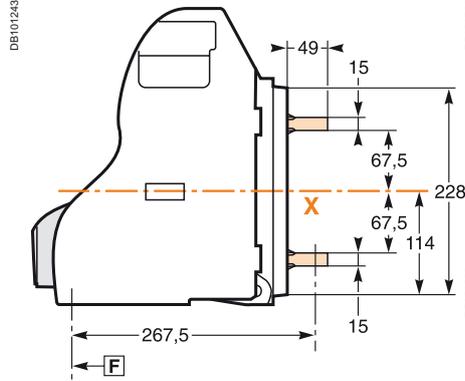
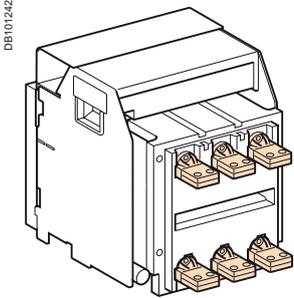
(2) With escutcheon.

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

Connections

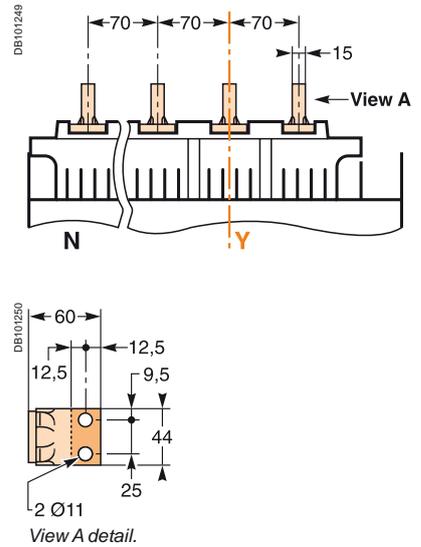
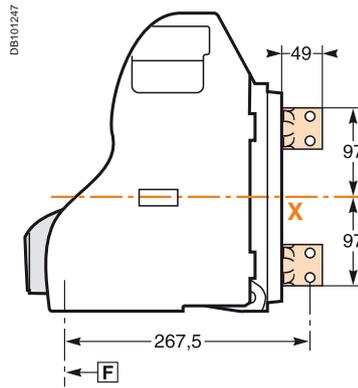
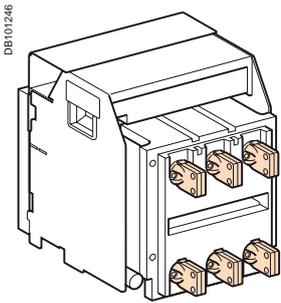
Horizontal rear connection

Detail



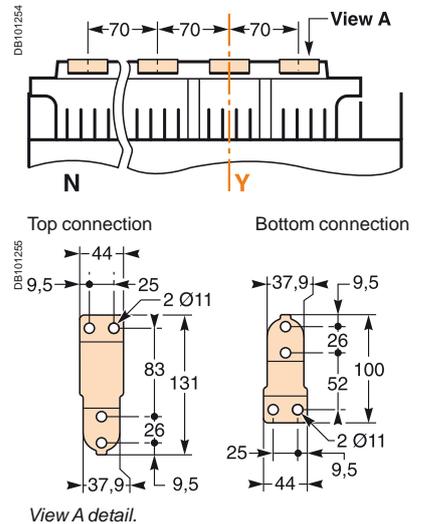
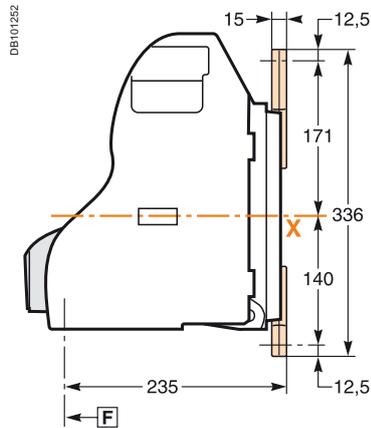
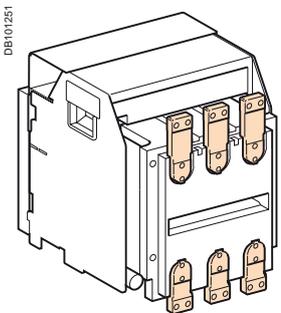
Vertical rear connection

Detail



Front connection

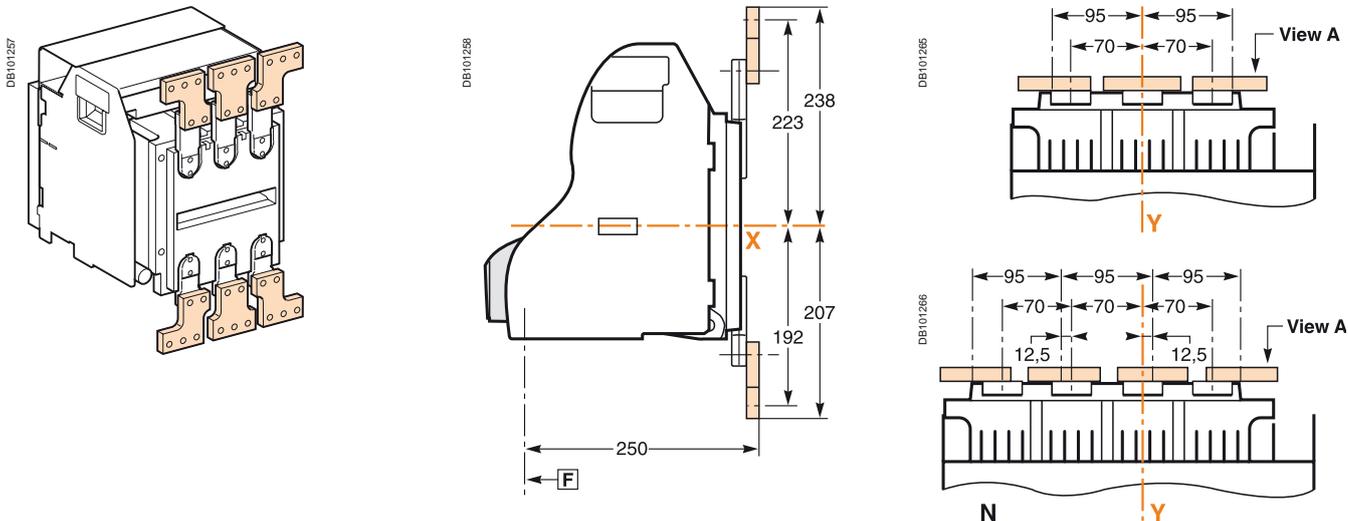
Detail



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

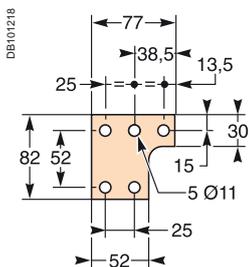
Connections

Front connection with spreaders



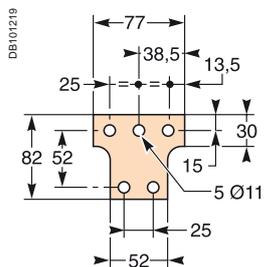
Spreader detail

Middle left or middle right spreader for 4P.

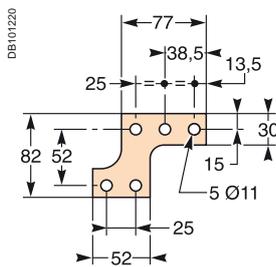


View A detail.

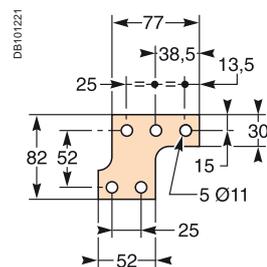
Middle spreader for 3P.



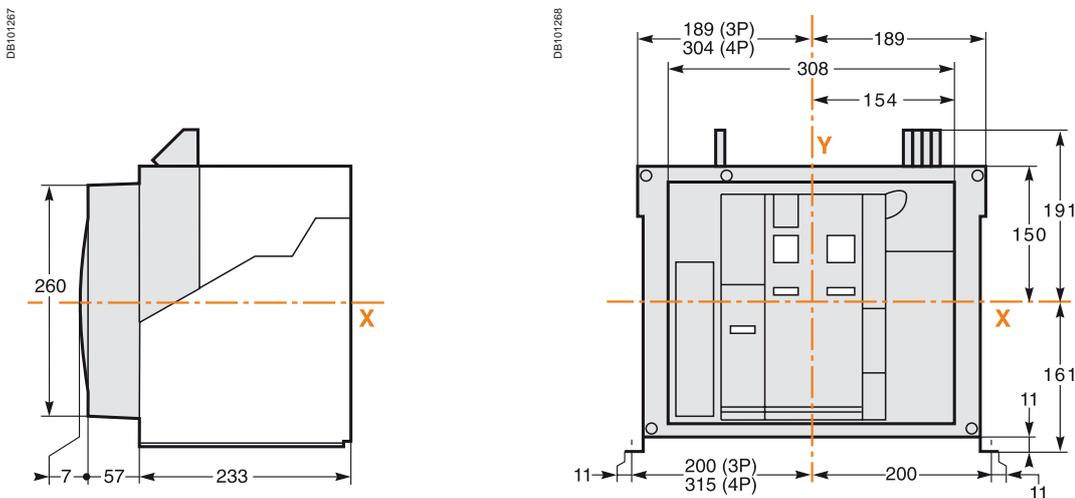
Left or right spreader for 4P.



Left or right spreader for 3P.

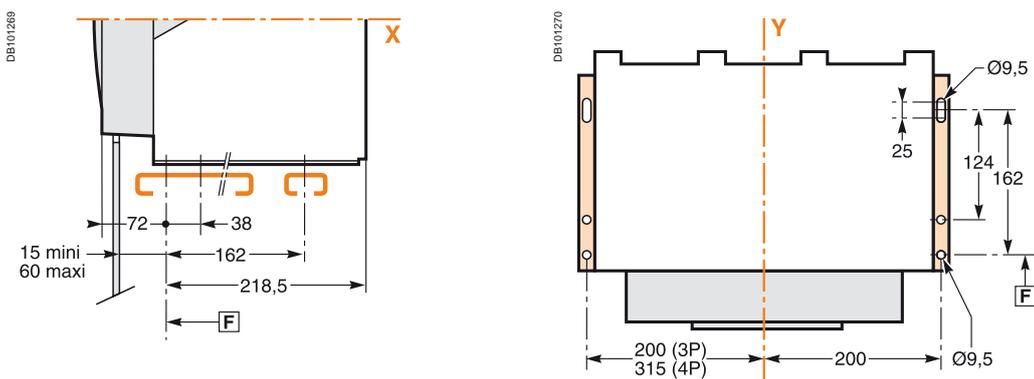


Dimensions

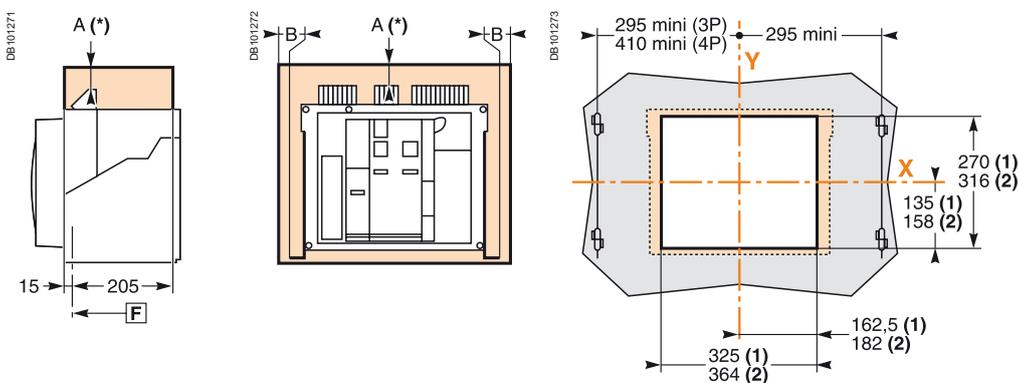


Mounting on base plate or rails

Mounting detail



Safety clearances



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

F : datum.

(1) Without escutcheon.

(2) With escutcheon.

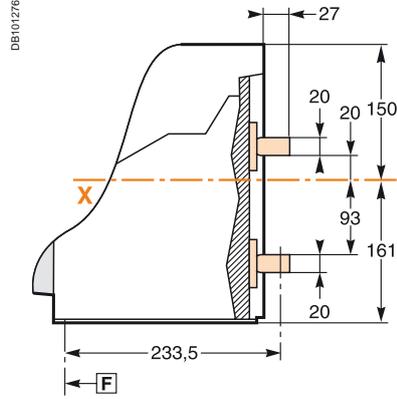
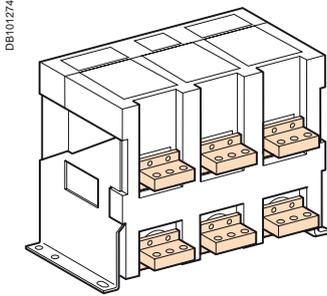
Note: X and Y are the symmetry planes for a 3-pole device.

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

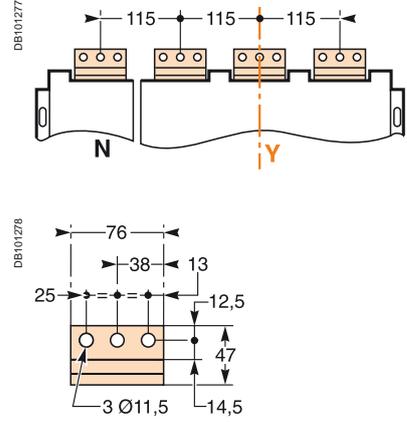
An overhead clearance of 20 mm is required to remove the terminal block.

Connections

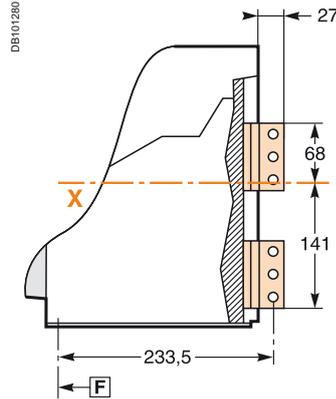
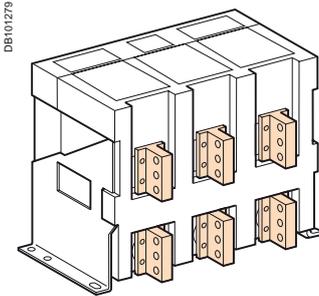
Horizontal rear connection



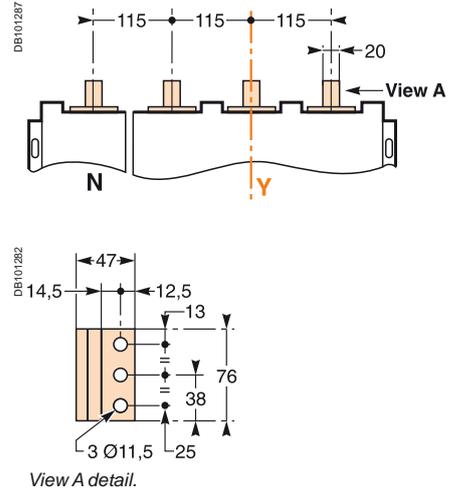
Detail



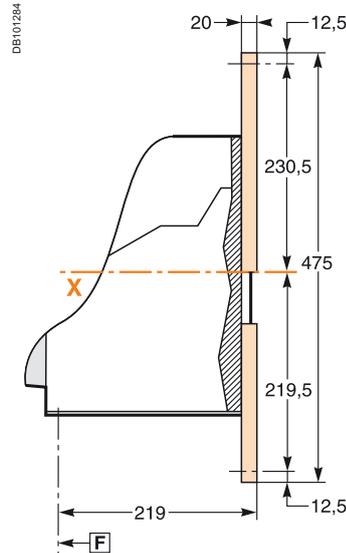
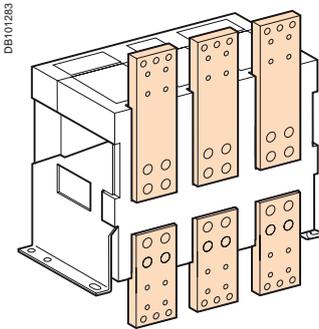
Vertical rear connection



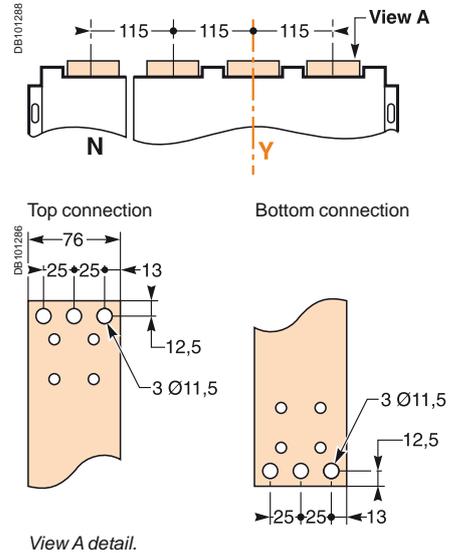
Detail



Front connection

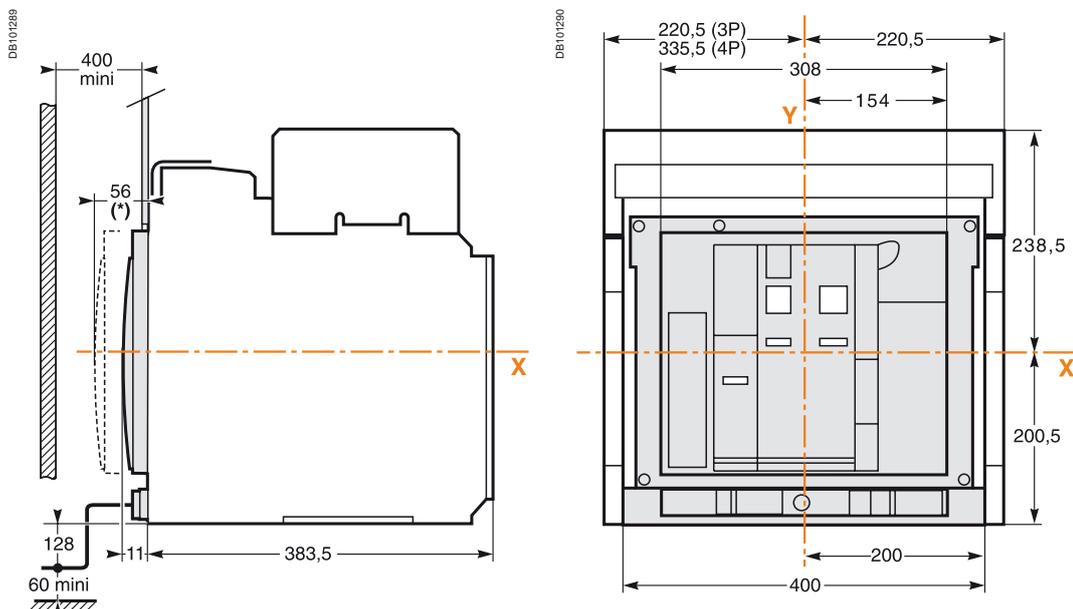


Detail



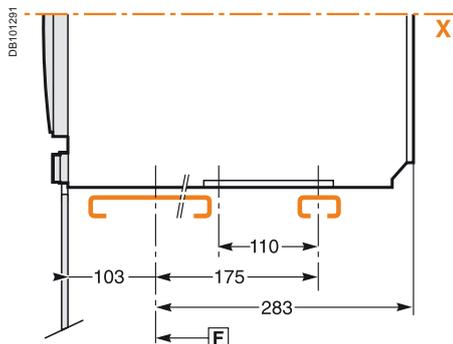
Note: recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

Dimensions

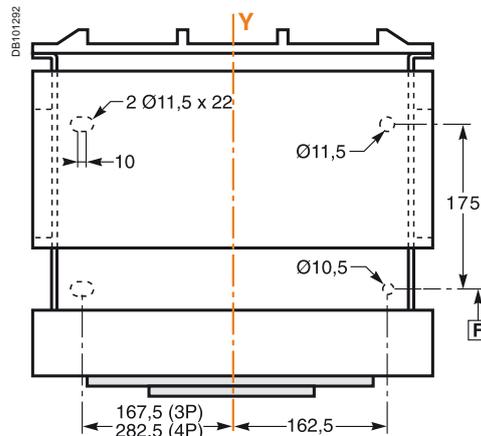


(*) Disconnected position.

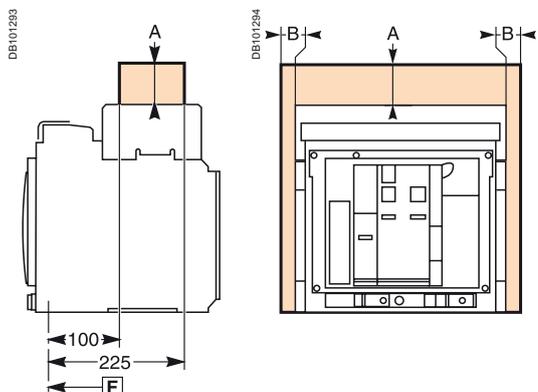
Mounting on base plate or rails



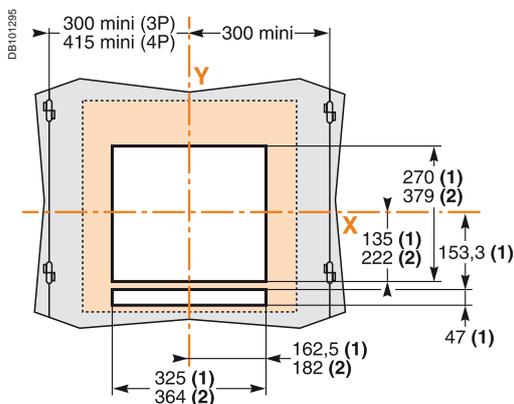
Mounting detail



Safety clearances



Door cutout



| | Insulated parts | Metal parts | Energised parts |
|---|-----------------|-------------|-----------------|
| A | 0 | 0 | 0 |
| B | 0 | 0 | 60 |

F : datum.

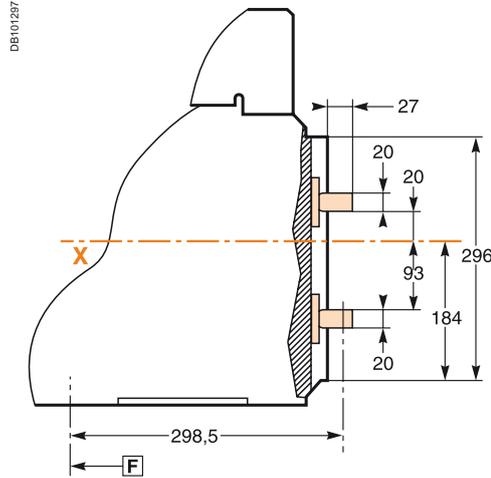
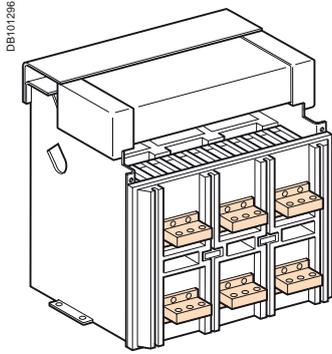
(1) Without escutcheon.

(2) With escutcheon.

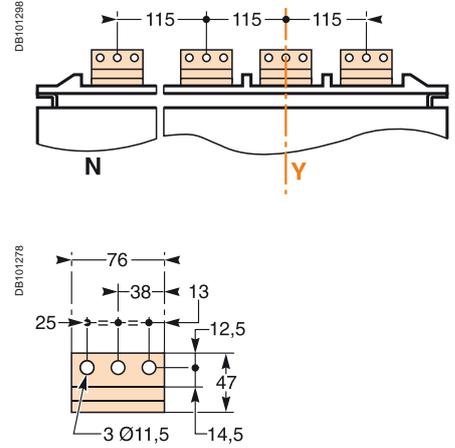
Note: X and Y are the symmetry planes for a 3-pole device.

Connections

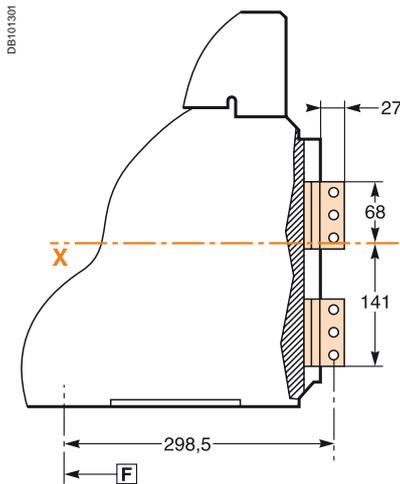
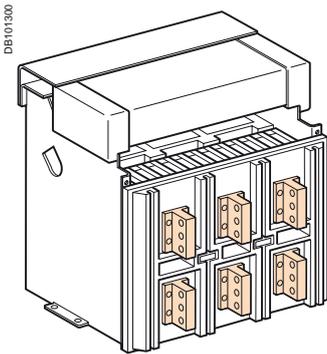
Horizontal rear connection



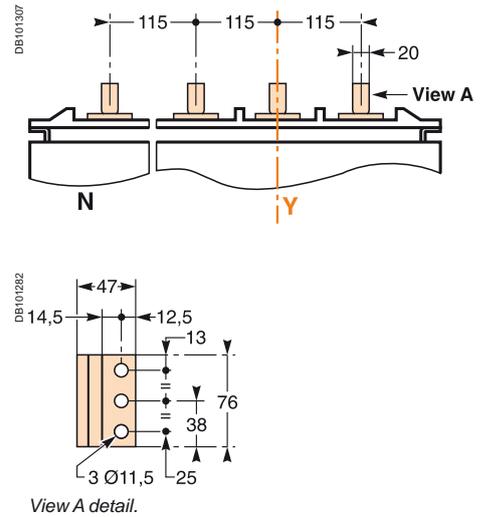
Detail



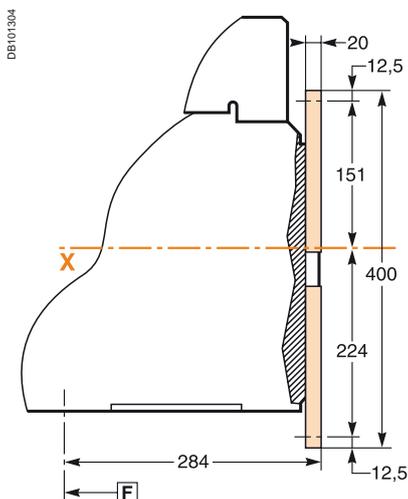
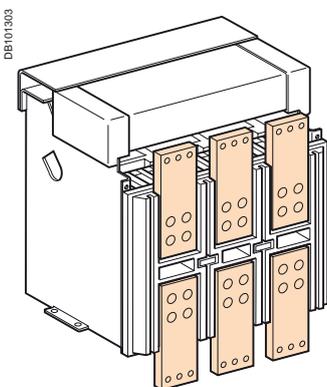
Vertical rear connection



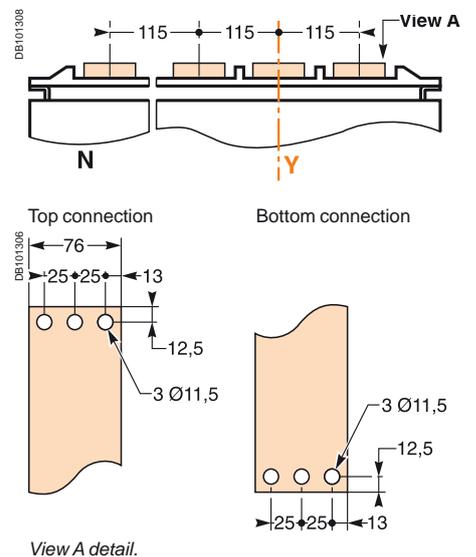
Detail



Front connection

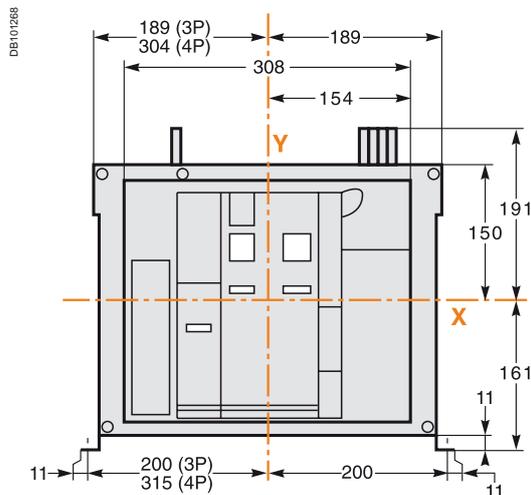
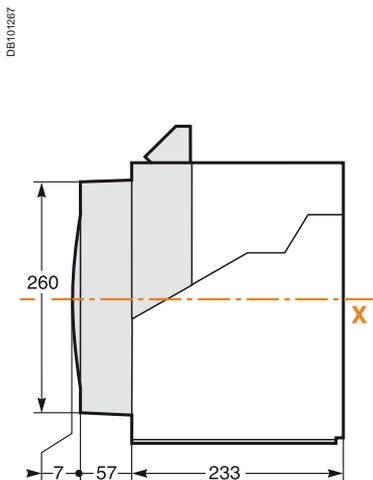


Detail

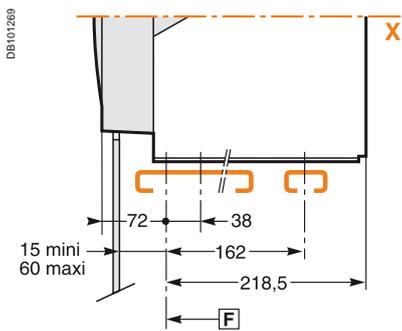


Note: recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

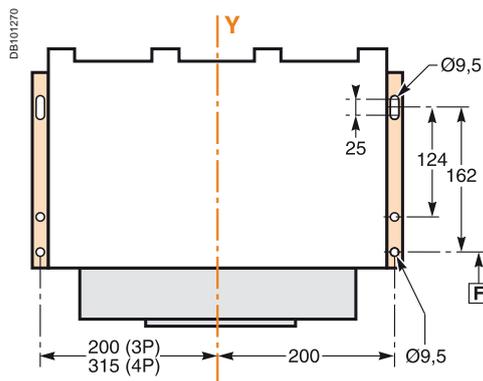
Dimensions



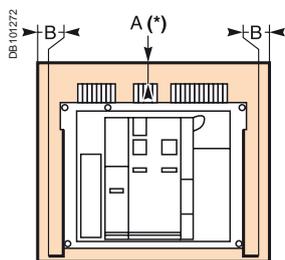
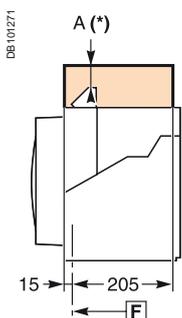
Mounting on base plate or rails



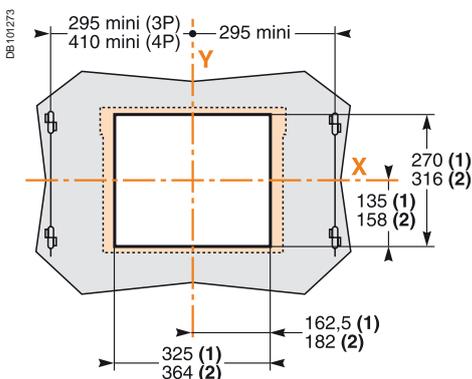
Mounting detail



Safety clearances



Door cutout



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

F : datum.

(1) Without escutcheon.

(2) With escutcheon.

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

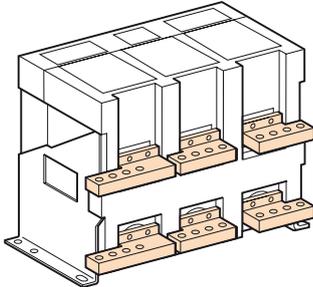
A(*) An overhead clearance of 110 mm is required to remove the arc chutes.

An overhead clearance of 20 mm is required to remove the terminal block.

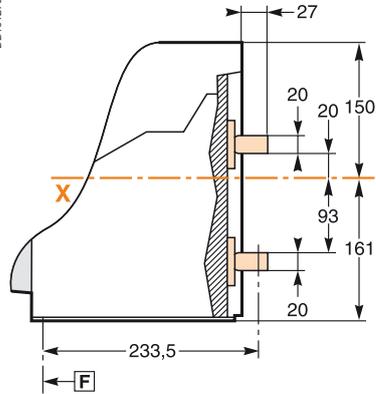
Connections

Horizontal rear connection

DB101309

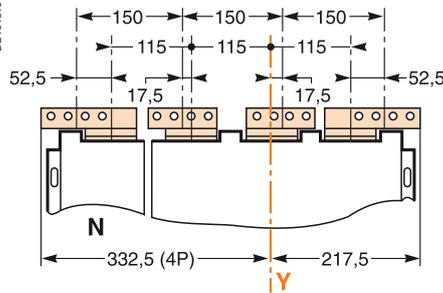


DB101276

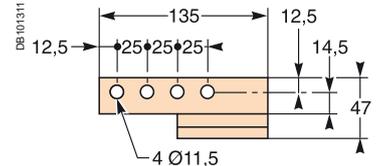


Detail

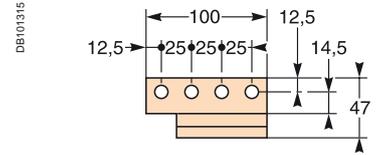
DB101310



DB101311

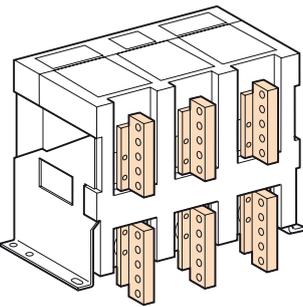


DB101315

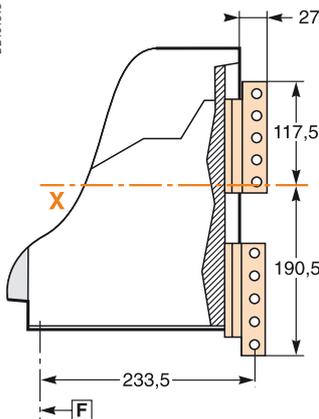


Vertical rear connection

DB101312

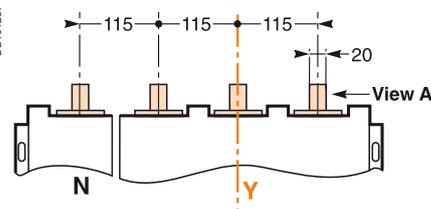


DB101313

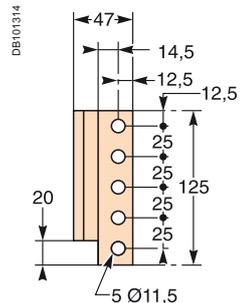


Detail

DB101287

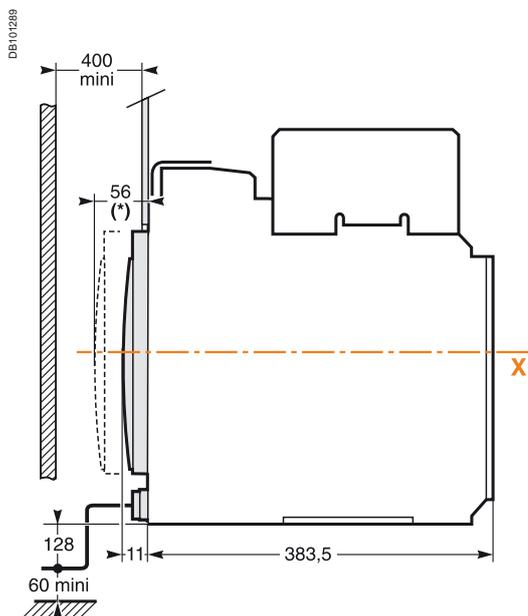


DB101314

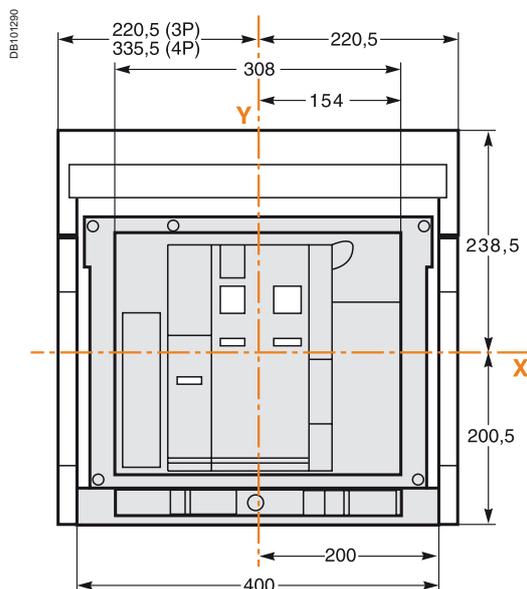


Note: recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

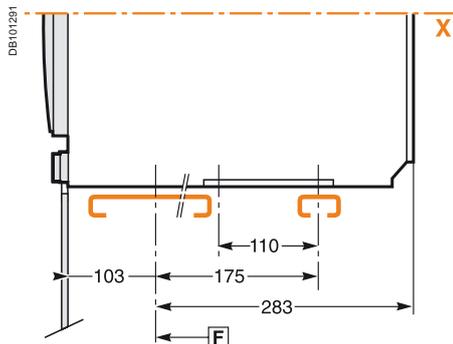
Dimensions



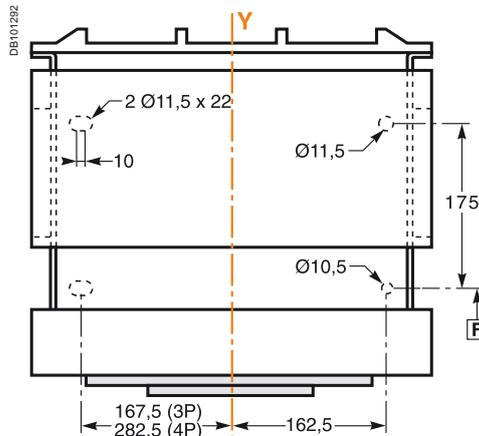
(*) Disconnected position.



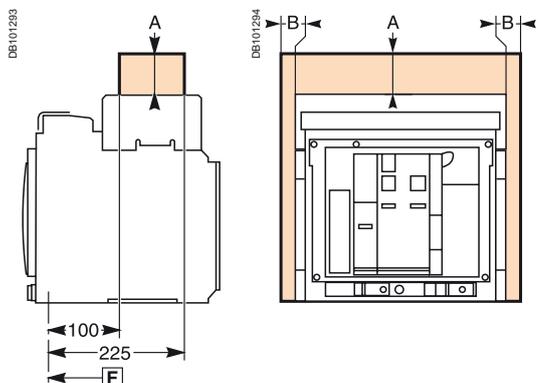
Mounting on base plate or rails



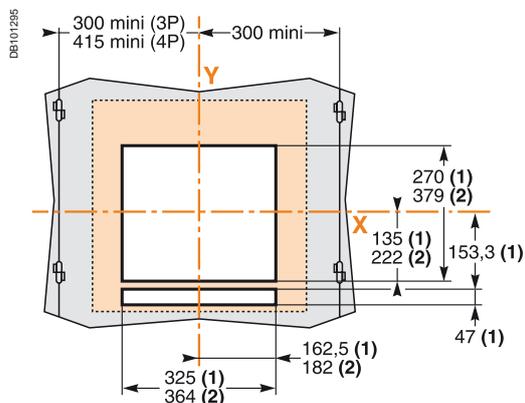
Mounting detail



Safety clearances



Door cutout



| | Insulated parts | Metal parts | Energised parts |
|---|-----------------|-------------|-----------------|
| A | 0 | 0 | 0 |
| B | 0 | 0 | 60 |

F : datum.

(1) Without escutcheon.

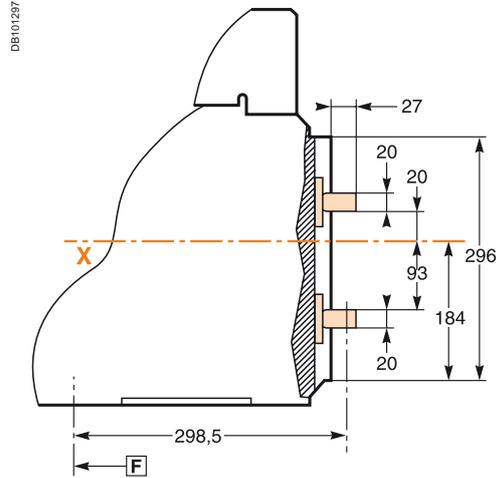
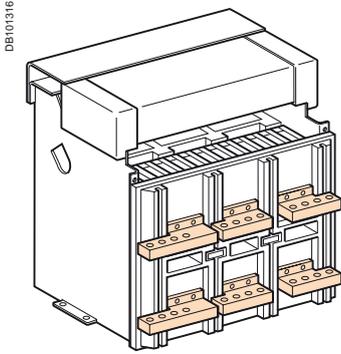
(2) With escutcheon.

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

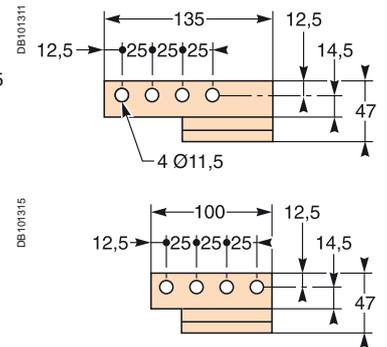
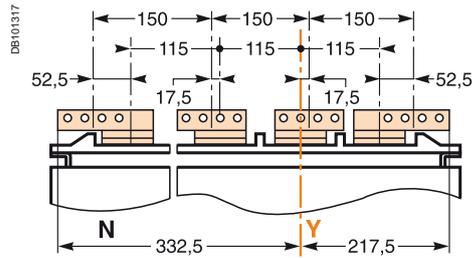
The safety clearances take into account the space required to remove the arc chutes.

Connections

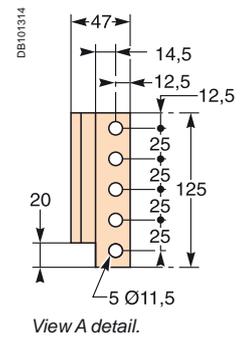
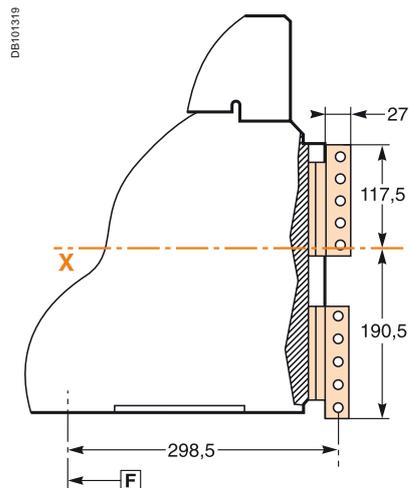
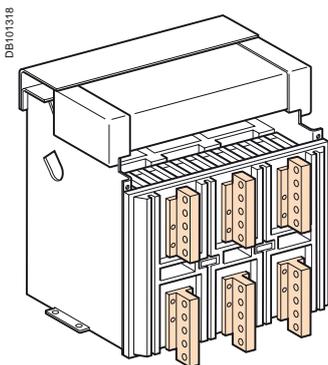
Horizontal rear connection



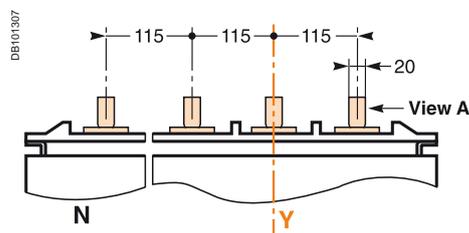
Detail



Vertical rear connection



Detail

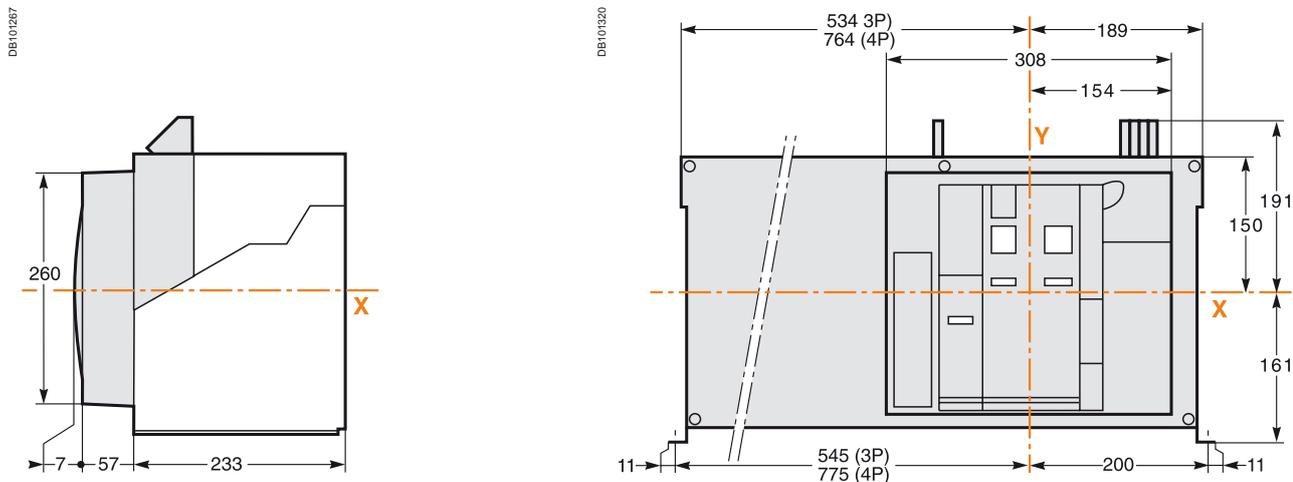


Note: recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

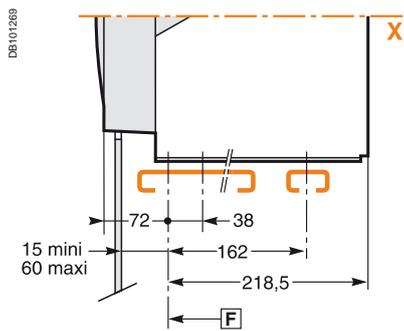
NW40b to NW63 circuit breakers

Fixed 3/4-poles device

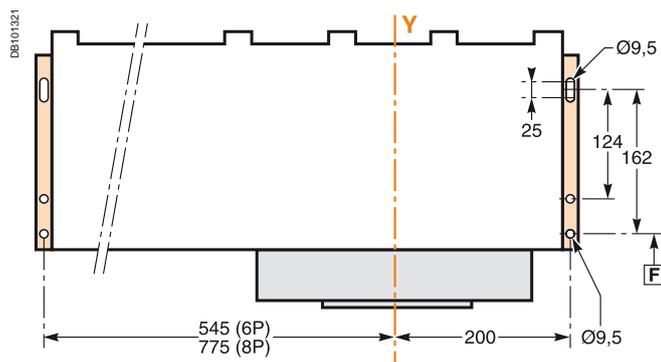
Dimensions



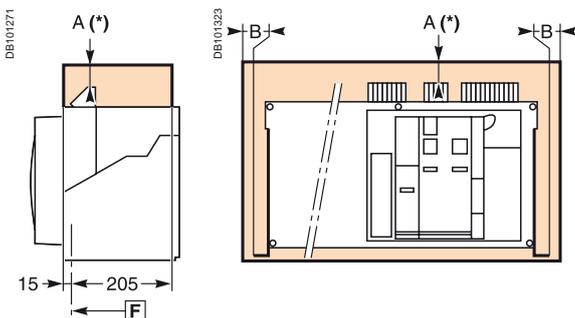
Mounting on base plate or rails



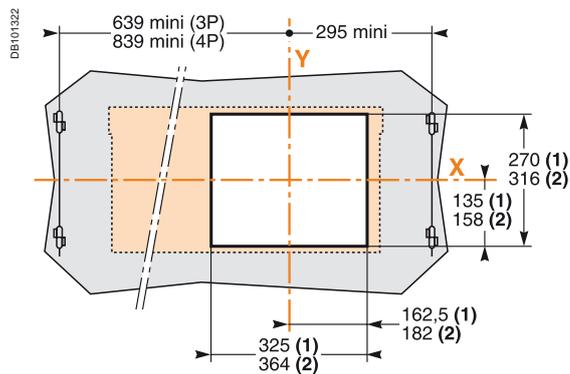
Mounting detail



Safety clearances



Door cutout



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

F : datum.

(1) Without escutcheon.

(2) With escutcheon.

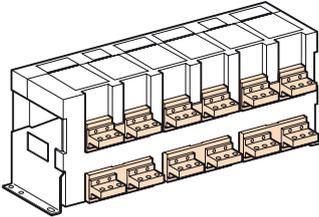
Note: X and Y are the symmetry planes for a 3-pole device.

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.

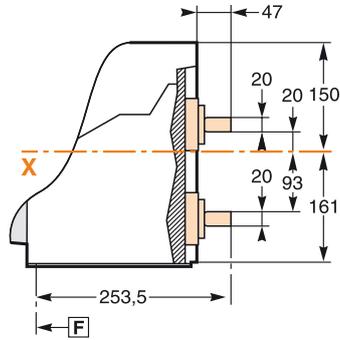
Connections

Horizontal rear connection (NW40b - NW50)

DB101332

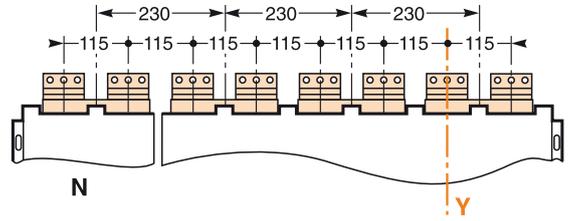


DB101324

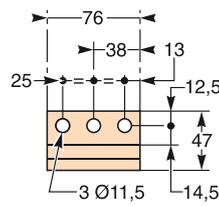


Detail

DB101325

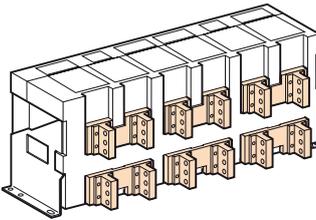


DB101278

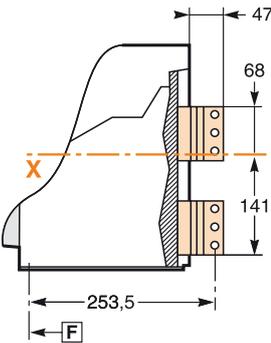


Vertical rear connection (NW40b - NW50)

DB101327

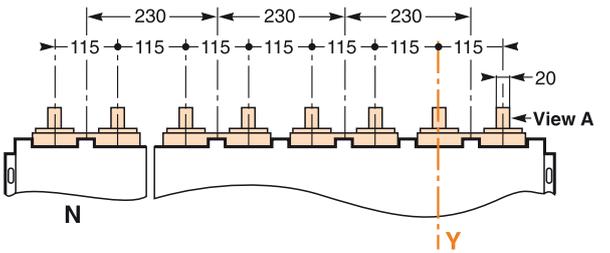


DB101328

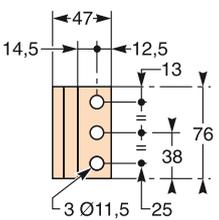


Detail

DB101333



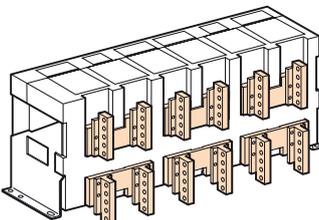
DB101282



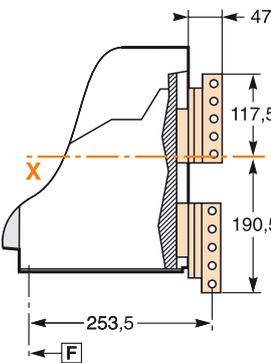
View A detail.

Vertical rear connection (NW63)

DB101330

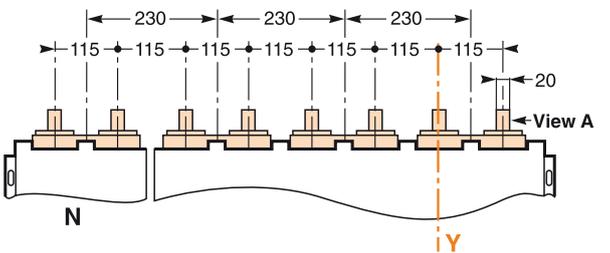


DB101331

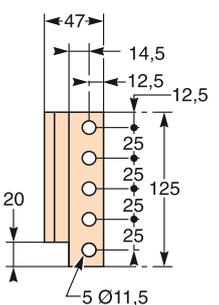


Detail

DB101333



DB101314



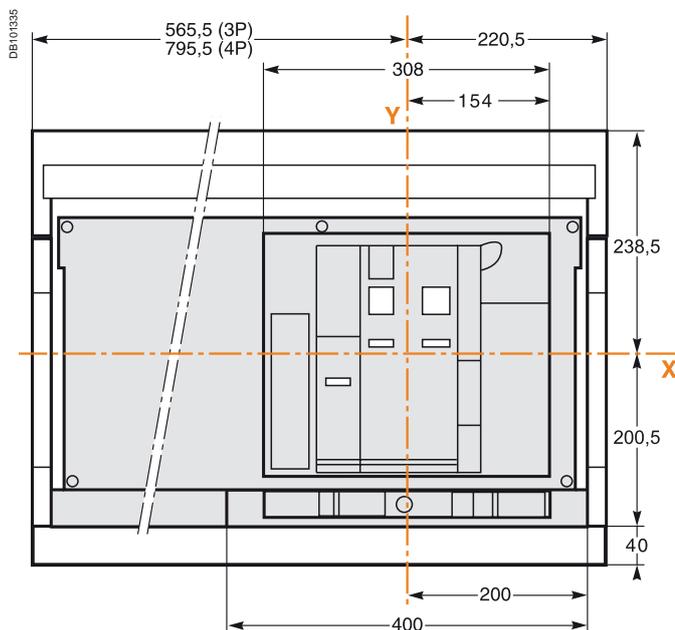
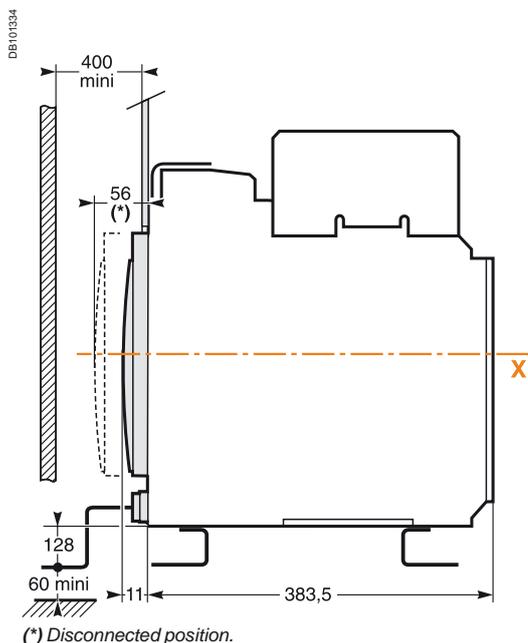
View A detail.

Note: recommended connection screws: **M10** s/s class A4 80.
Tightening torque: **50 Nm** with contact washer.

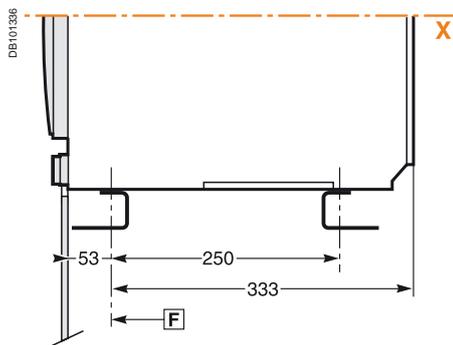
NW40b to NW63 circuit breakers

Drawout 3/4-poles device

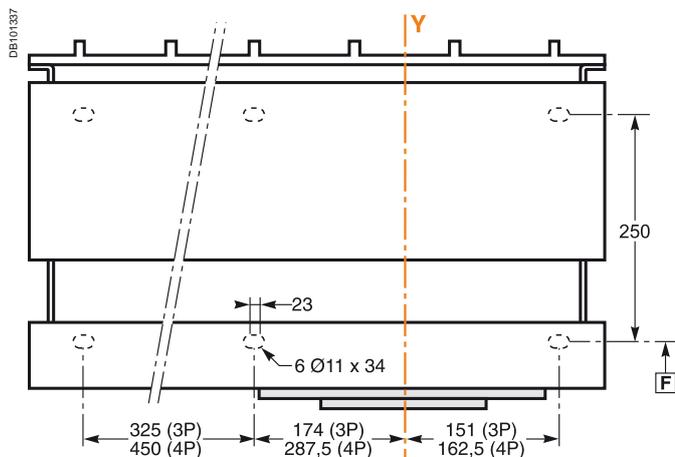
Dimensions



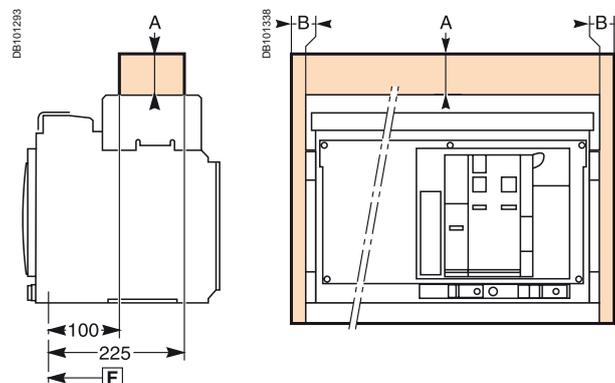
Mounting on base plate or rails



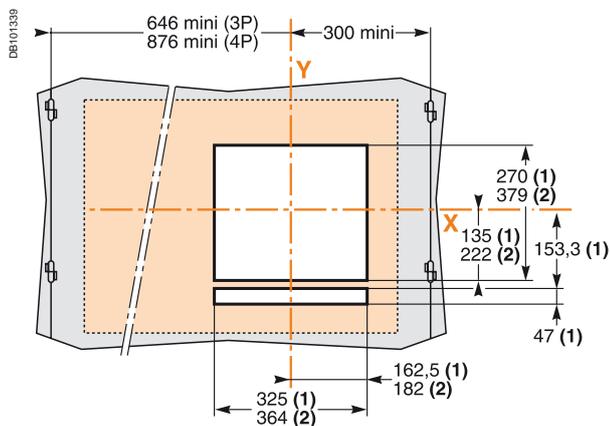
Mounting detail



Safety clearances



Door cutout



| | Insulated parts | Metal parts | Energised parts |
|---|-----------------|-------------|-----------------|
| A | 0 | 0 | 0 |
| B | 0 | 0 | 60 |

(1) Without escutcheon.

(2) With escutcheon.

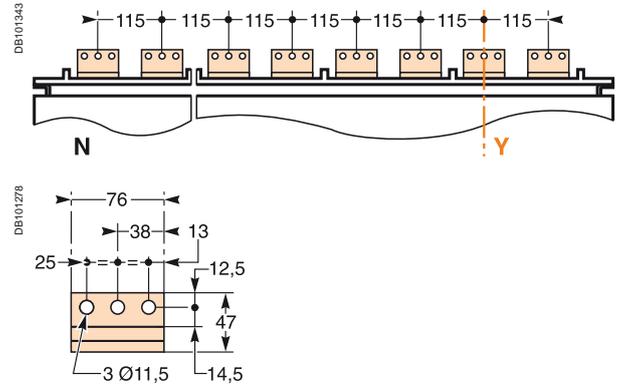
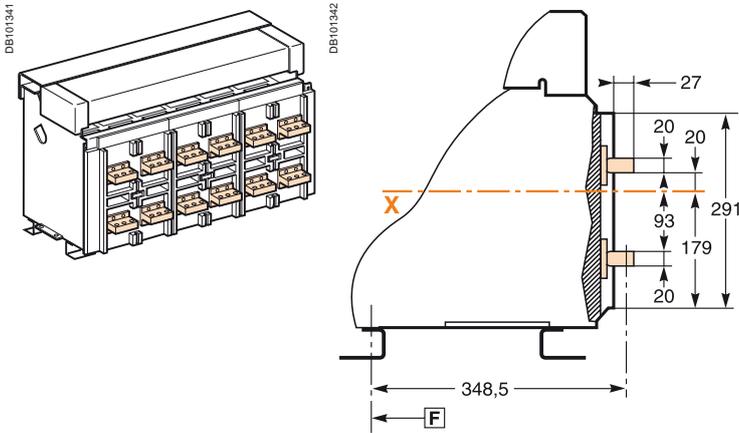
Note: X and Y are the symmetry planes for a 3-pole device.

F : datum.

Connections

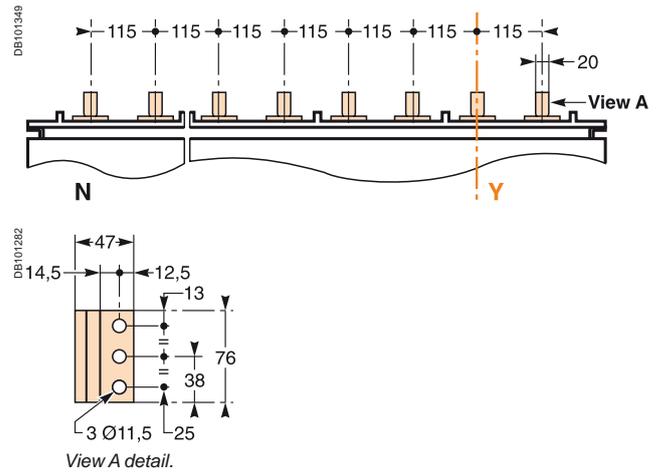
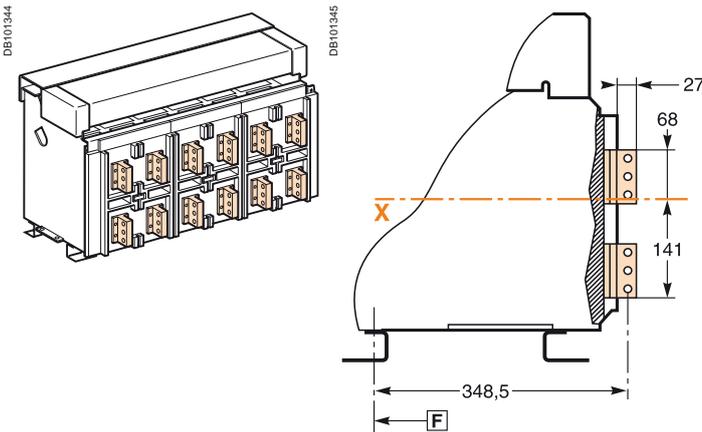
Horizontal rear connection (NW40b - NW50)

Detail



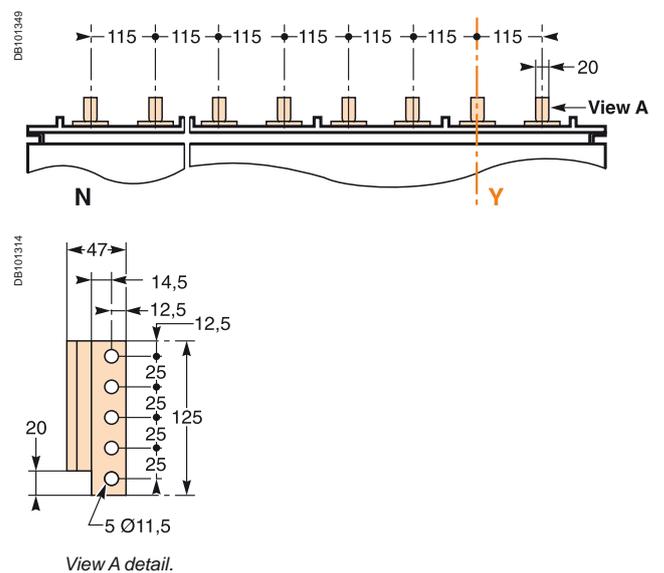
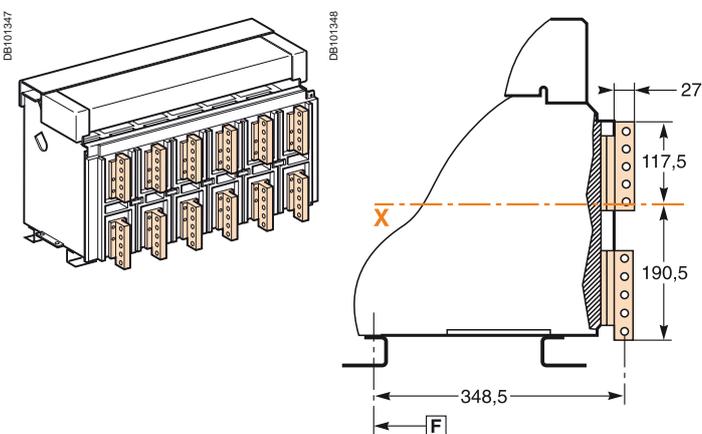
Vertical rear connection (NW40b - NW50)

Detail



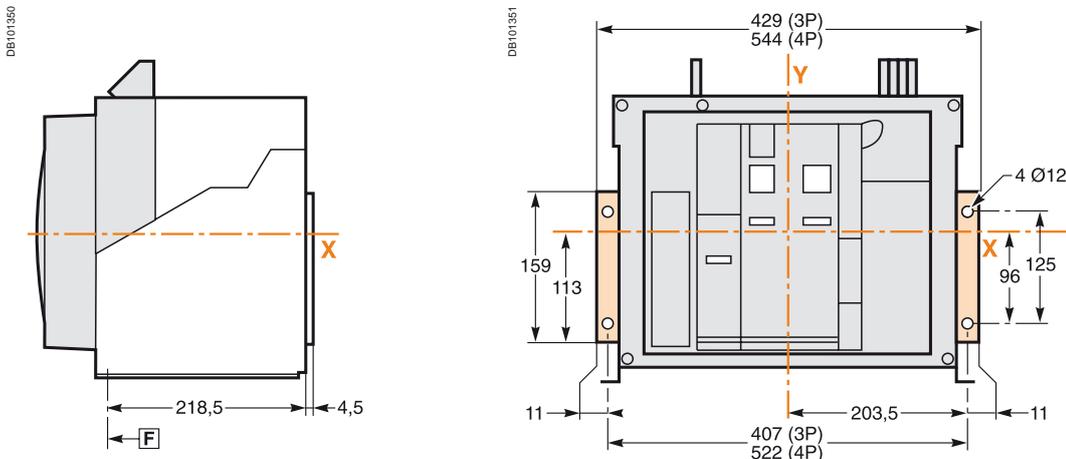
Vertical rear connection (NW63)

Detail



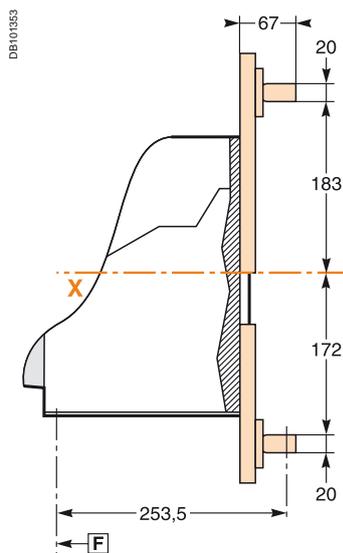
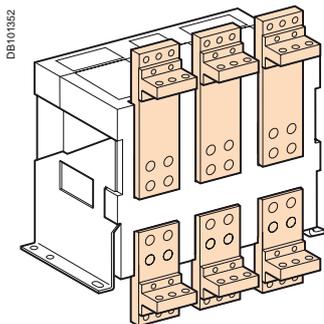
Note: recommended connection screws: **M10** s/s class A4 80.
Tightening torque: **50 Nm** with contact washer.

Mounting on backplate with special brackets (Masterpact NW08 to 32 fixed)

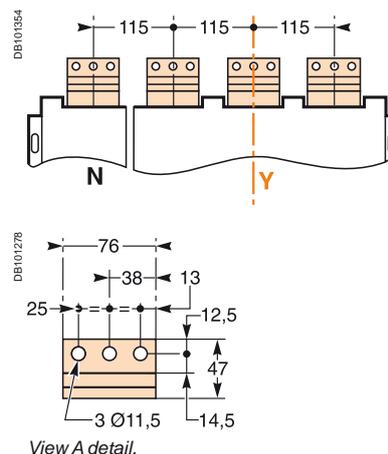


Disconnectable front-connection adapter (Masterpact NW08 to 32 fixed)

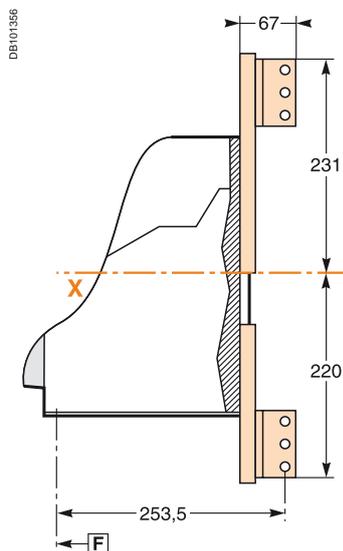
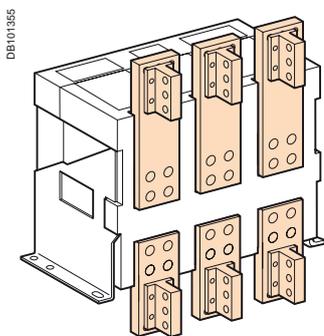
Horizontal rear connection



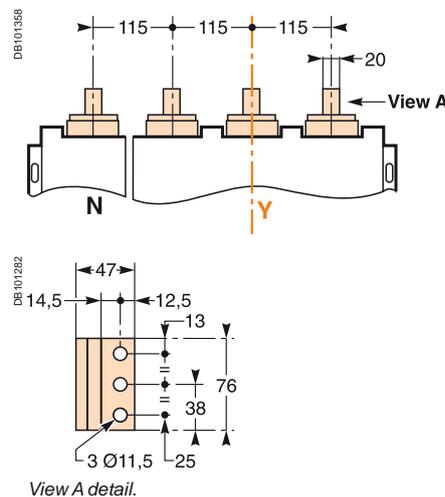
Detail



Vertical rear connection



Detail



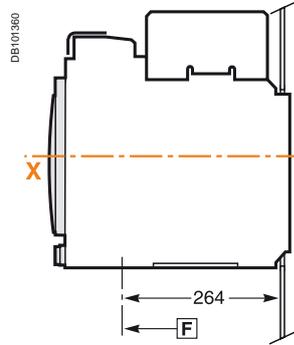
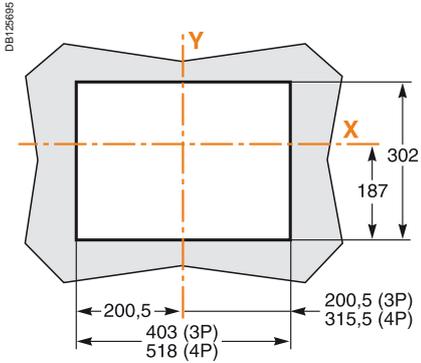
Note: recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

F : datum.

Rear panel cutout (drawout devices)

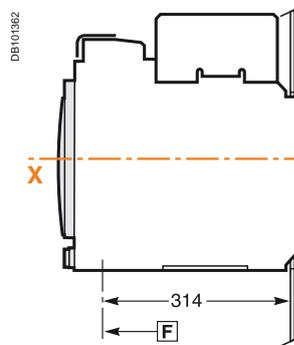
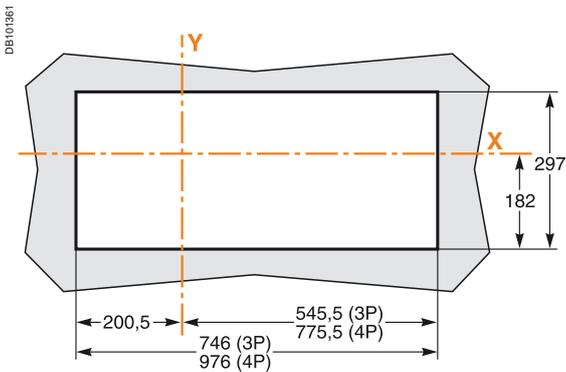
NW08 to NW40

Rear view



NW40b to NW63

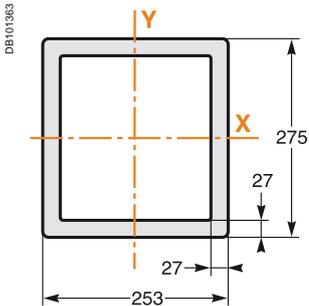
Rear view



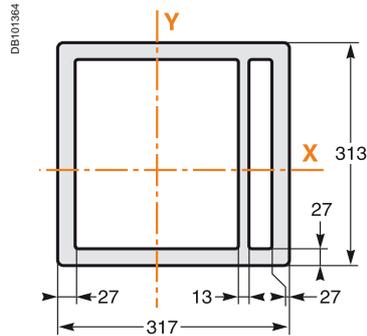
Escutcheon

Masterpact NT

Fixed device

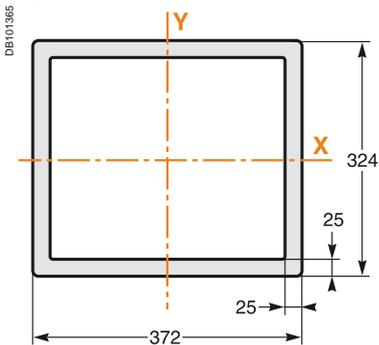


Drawout device

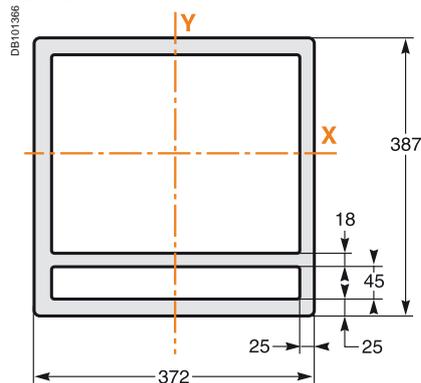


Masterpact NW

Fixed device

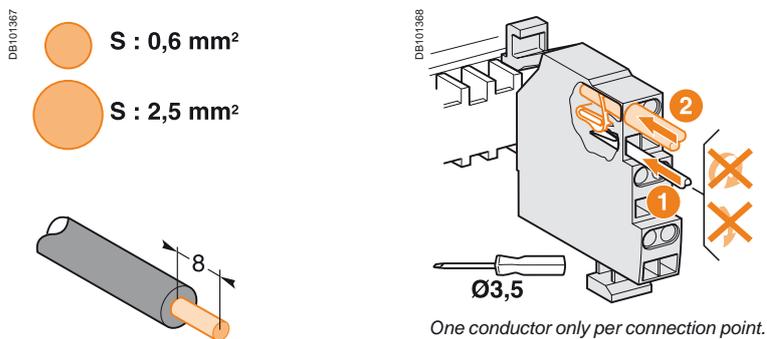


Drawout device

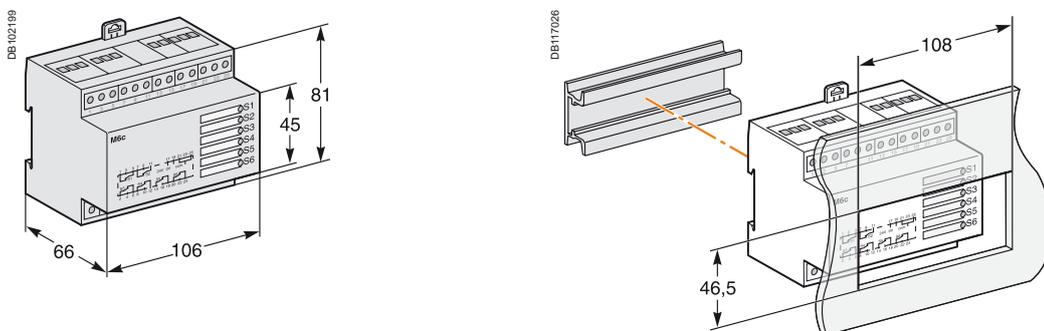


F : datum.

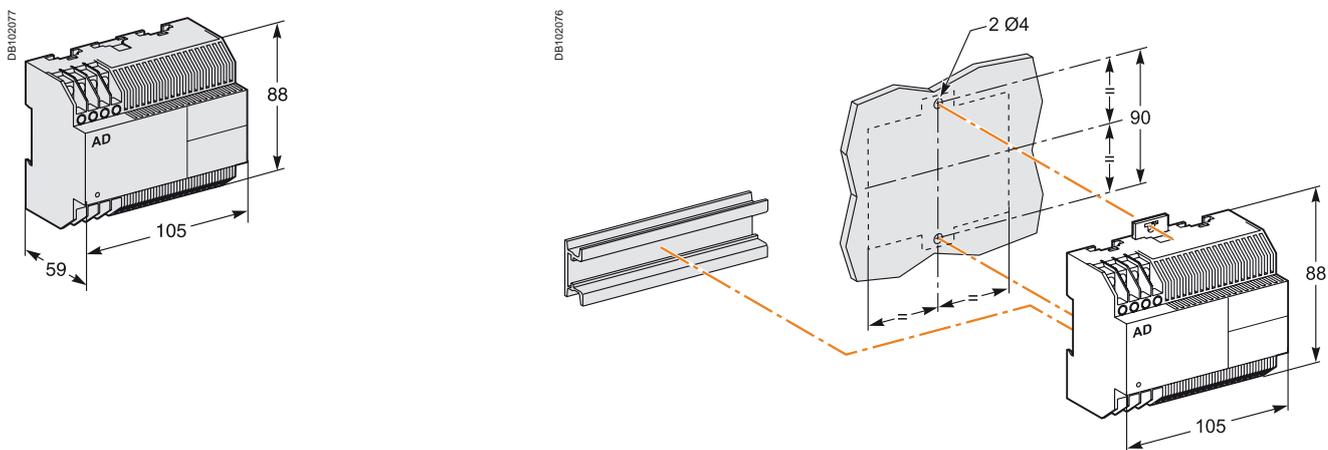
Connection of auxiliary wiring to terminal block



M6C relay module

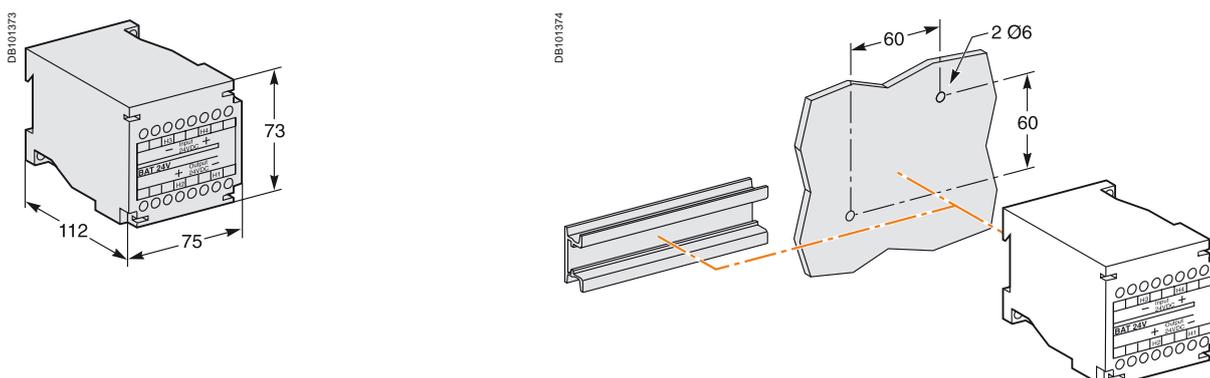


External power supply module (AD)

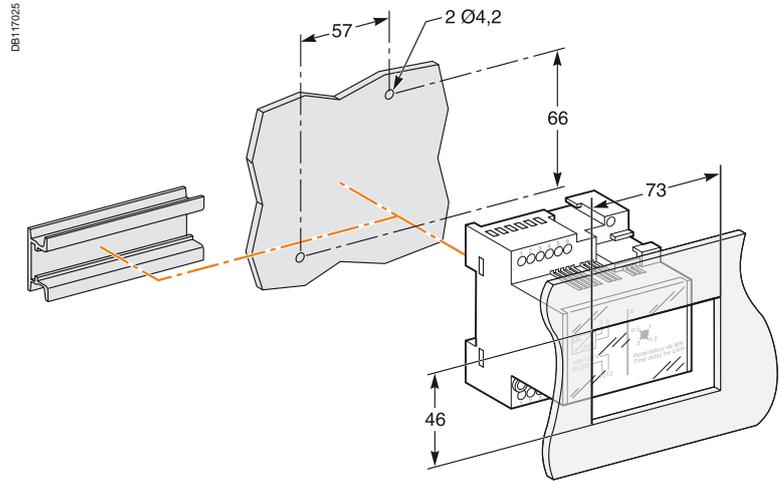
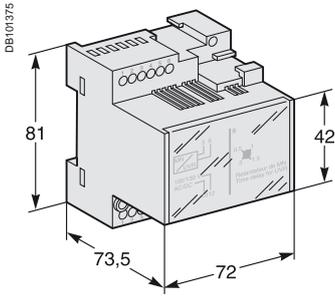


Battery module (BAT)

Mounting

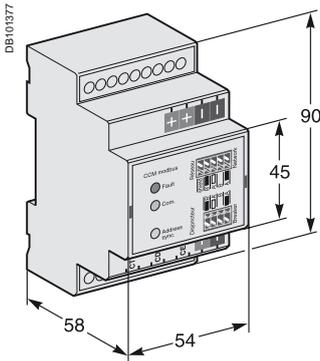


Delay unit for MN release



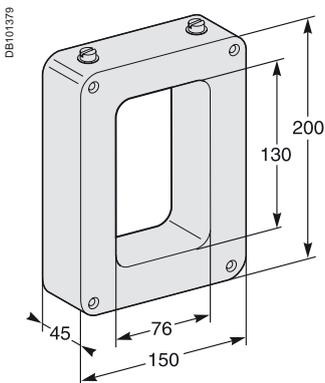
“Chassis” communication module

ModBUS

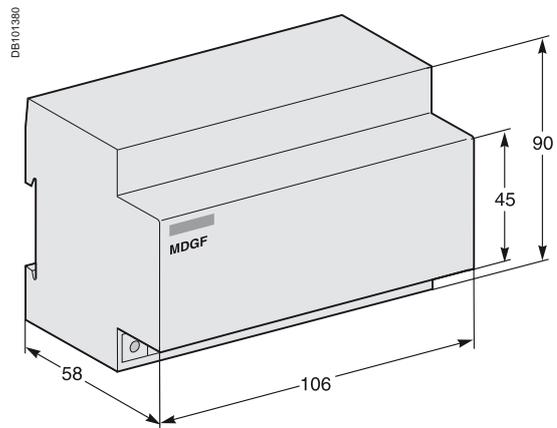


External sensor for source ground return (SGR) protection

Sensor



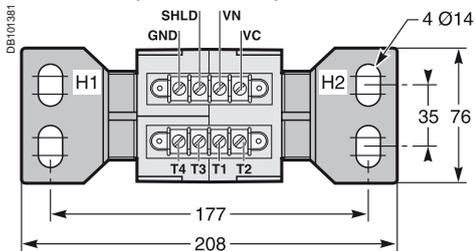
“MGDF summer” module



External sensor for external neutral

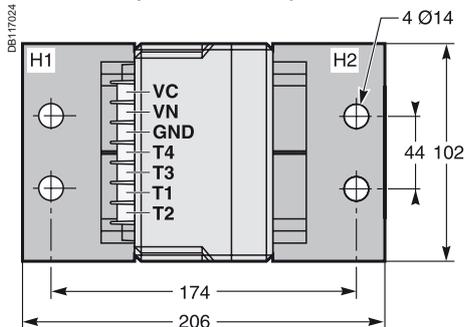
Dimensions

400/1600 A (NT06 to NT16)



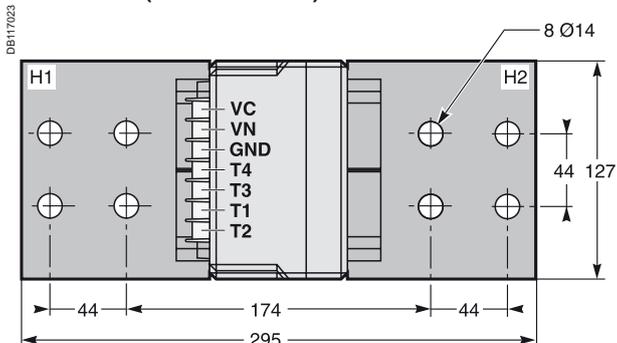
High: 137 mm.

400/2000 A (NW08 to NW20)



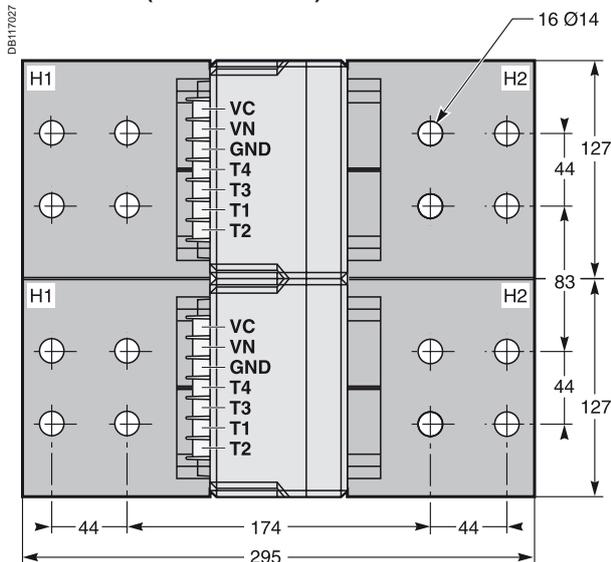
High: 162 mm.

1000/4000 A (NW025 to NW40)



High: 162 mm.

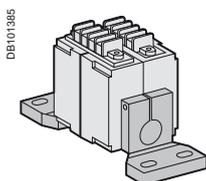
4000/6300 A (NW40b to NW63)



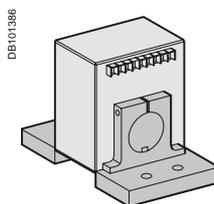
High: 168 mm.

Installation

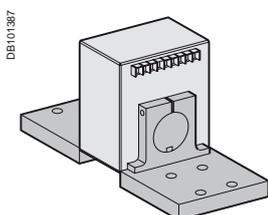
400/1600 A (NT06 to NT16)



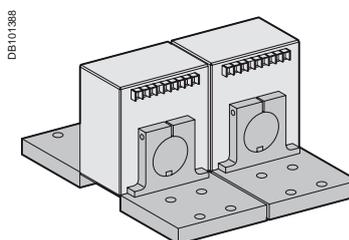
400/2000 A (NW08 to NW20)



1000/4000 A (NW025 to NW40)

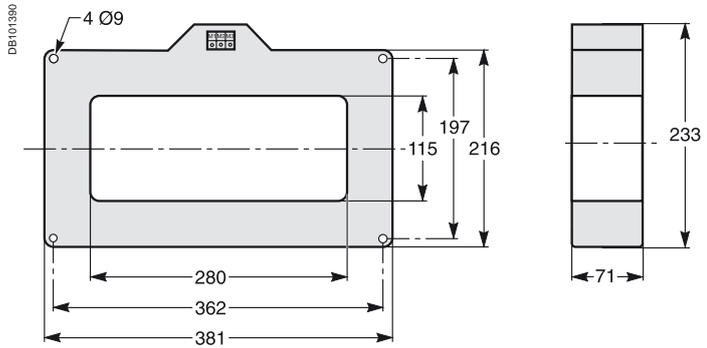
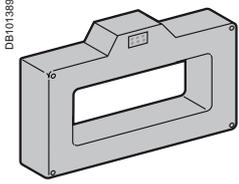


4000/6300 A (NW40b to NW63)

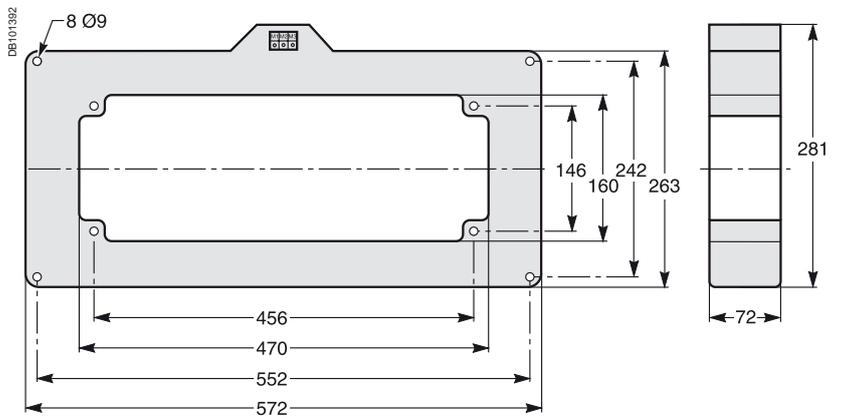
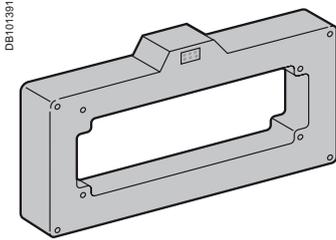


Rectangular sensor for earth leakage protection (Vigi)

280 x 115 mm window



470 x 160 mm window

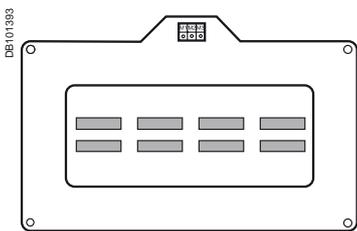


| Busbars | I ≤ 1600 A | I ≤ 3200 |
|-------------|------------|-----------|
| Window (mm) | 280 x 115 | 470 x 160 |
| Weight (kg) | 14 | 18 |

Busbars path

280 x 115 window

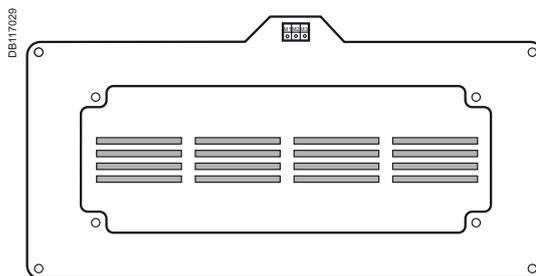
Busbars spaced 70 mm centre-to-centre



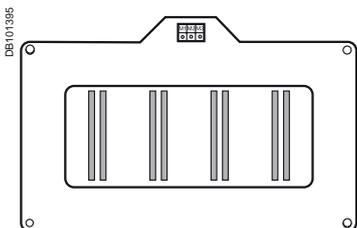
2 bars 50 x 10.

470 x 160 window

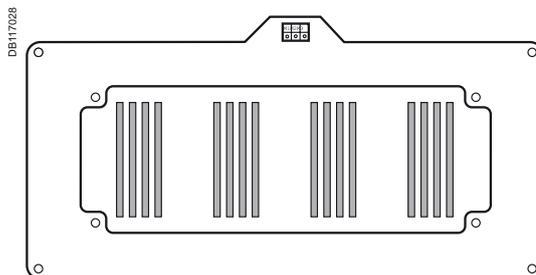
Busbars spaced 115 mm centre-to-centre



4 bars 100 x 5.



2 bars 100 x 5.



4 bars 125 x 5.

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This international site allows you to access all the Schneider Electric products in just 2 clicks via comprehensive range data-sheets, with direct links to:

- complete library: technical documents, catalogs, FAQs, brochures...
- selection guides from the e-catalog.
- product discovery sites and their Flash animations.

You will also find illustrated overviews, news to which you can subscribe, the list of country contacts...



Training

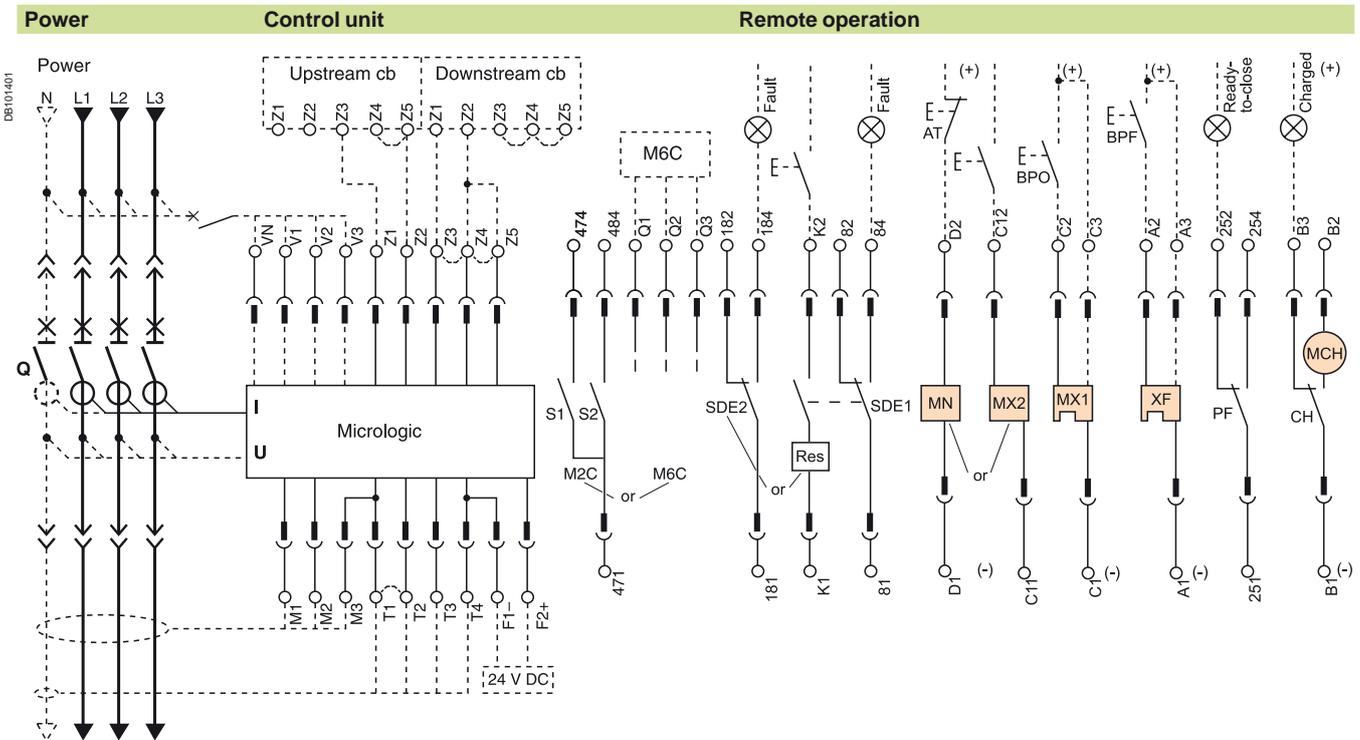
Training allows you to acquire the Schneider Electric expertise (installation design, work with power on, etc.) for increased efficiency and a guarantee of improved customer service.

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.



| | |
|--|-------------|
| <i>Presentation</i> | 2 |
| <i>Functions and characteristics</i> | A-1 |
| <i>Installation recommendations</i> | B-1 |
| <i>Dimensions and connection</i> | C-1 |
| Masterpact NT06 to NT16 | D-2 |
| Fixed and drawout devices | D-2 |
| Masterpact NW08 to NW63 | D-4 |
| Fixed and drawout devices | D-4 |
| Earth-fault and earth-leakage protection | |
| Neutral protection - Zone selective interlocking | D-6 |
| Masterpact NT and NW | D-8 |
| Communication | D-8 |
| Fixed, electrically operated Masterpact NT and NW | D-10 |
| Wiring of the COM option (with BCM ULP) | D-10 |
| Withdrawable Masterpact NT and NW | D-11 |
| Wiring of the COM option (with CCM) | D-11 |
| Masterpact NT and NW | D-12 |
| 24 V DC external power supply AD module | D-12 |
| <i>Additional characteristics</i> | E-1 |
| <i>Catalogue numbers and order form</i> | F-1 |

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



| Terminal block marking | Control unit | | | | | | | | | | |
|------------------------|--------------|------|------|------|------|------|-------|-----------------|---------|--------|--|
| | Com | UC1 | | | UC2 | | UC3 | UC4 / M2C / M6C | | | |
| | ○ E5 | ○ E6 | ○ Z5 | ○ M1 | ○ M2 | ○ M3 | ○ F2+ | ○ V3 | ○ / 484 | ○ / Q3 | |
| | ○ E3 | ○ E4 | ○ Z3 | ○ Z4 | ○ T3 | ○ T4 | ○ VN | ○ V2 | ○ / 474 | ○ / Q2 | |
| | ○ E1 | ○ E2 | ○ Z1 | ○ Z2 | ○ T1 | ○ T2 | ○ F1- | ○ V1 | ○ / 471 | ○ / Q1 | |

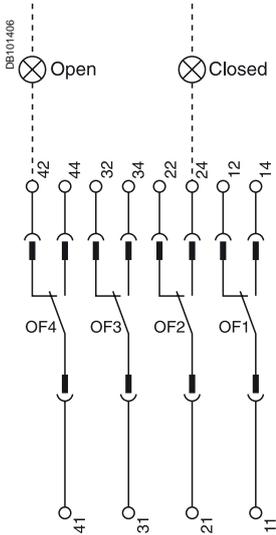
| Remote operation | | | | | | | | | |
|------------------|------|----------|---------|------|------|-------|------|--|--|
| SDE2 / Res | SDE1 | MN / MX2 | | MX1 | XF | PF | MCH | | |
| ○ 184 / K2 | ○ 84 | ○ D2 | ○ / C12 | ○ C2 | ○ A2 | ○ 254 | ○ B2 | | |
| ○ 182 | ○ 82 | | | ○ C3 | ○ A3 | ○ 252 | ○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

| A | E | P | H | Control unit |
|---|---|---|---|--|
| ■ | ■ | ■ | ■ | Com : E1-E6 communication |
| ■ | ■ | ■ | ■ | UC1 : Z1-Z5 zone selective interlocking Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7) |
| ■ | ■ | ■ | ■ | UC2 : T1, T2, T3, T4 = external neutral M2, M3 = Vigi module input (Micrologic 7) |
| ■ | ■ | ■ | ■ | UC3 : F2+, F1- external 24 V DC power supply VN external voltage connector (must be connected to the neutral with a 3P circuit breaker) |
| | | | ■ | UC4 : External Voltage Connector (PTE option) or M2C : 2 programmable contacts (external relay) ext. 24 V DC power supply required. or M6C : 6 programmable contacts to be connected to the external module M6C ext. 24 V DC power supply required. |

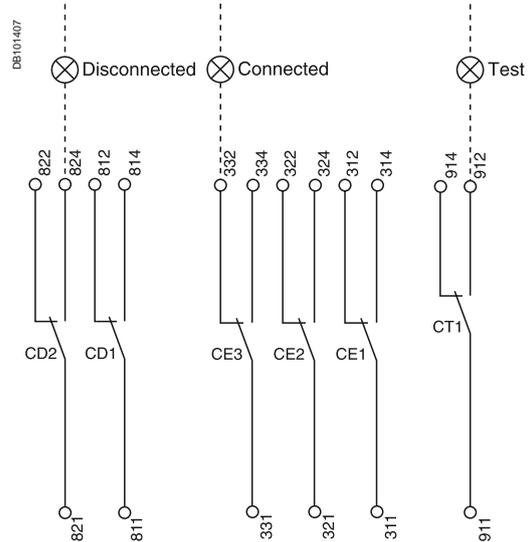
| Remote operation | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|
| SDE2 : fault-trip indication contact or Res : remote reset | | | | | | | | | |
| SDE1 : fault-trip indication contact (supplied as standard) | | | | | | | | | |
| MN : undervoltage release or MX2 : shunt release | | | | | | | | | |
| MX1 : shunt release (standard or communicating) | | | | | | | | | |
| XF : closing release (standard or communicating) | | | | | | | | | |
| PF : ready-to-close contact | | | | | | | | | |
| MCH : electric motor | | | | | | | | | |
| <i>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.</i> | | | | | | | | | |

A : digital ammeter.
E : energy.
P : A + power meter + additional protection.
H : P + harmonics.

Indication contacts



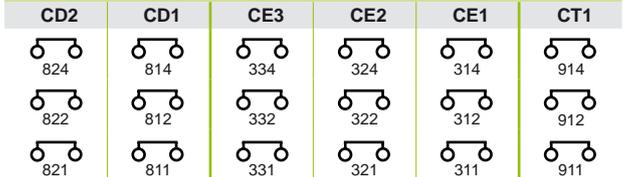
Chassis contacts



Indication contacts



Chassis contacts



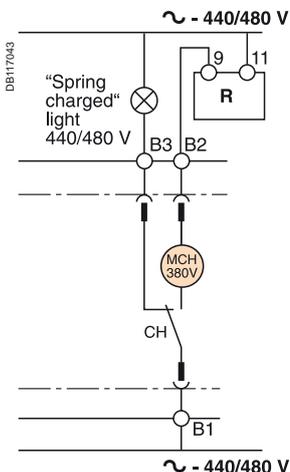
Indication contacts

OF4 / OF3 / OF2 / OF1 : ON/OFF indication contacts.

(*) Spring charging motor 440/480 V AC
(380 V motor + additional resistor).

Chassis contacts

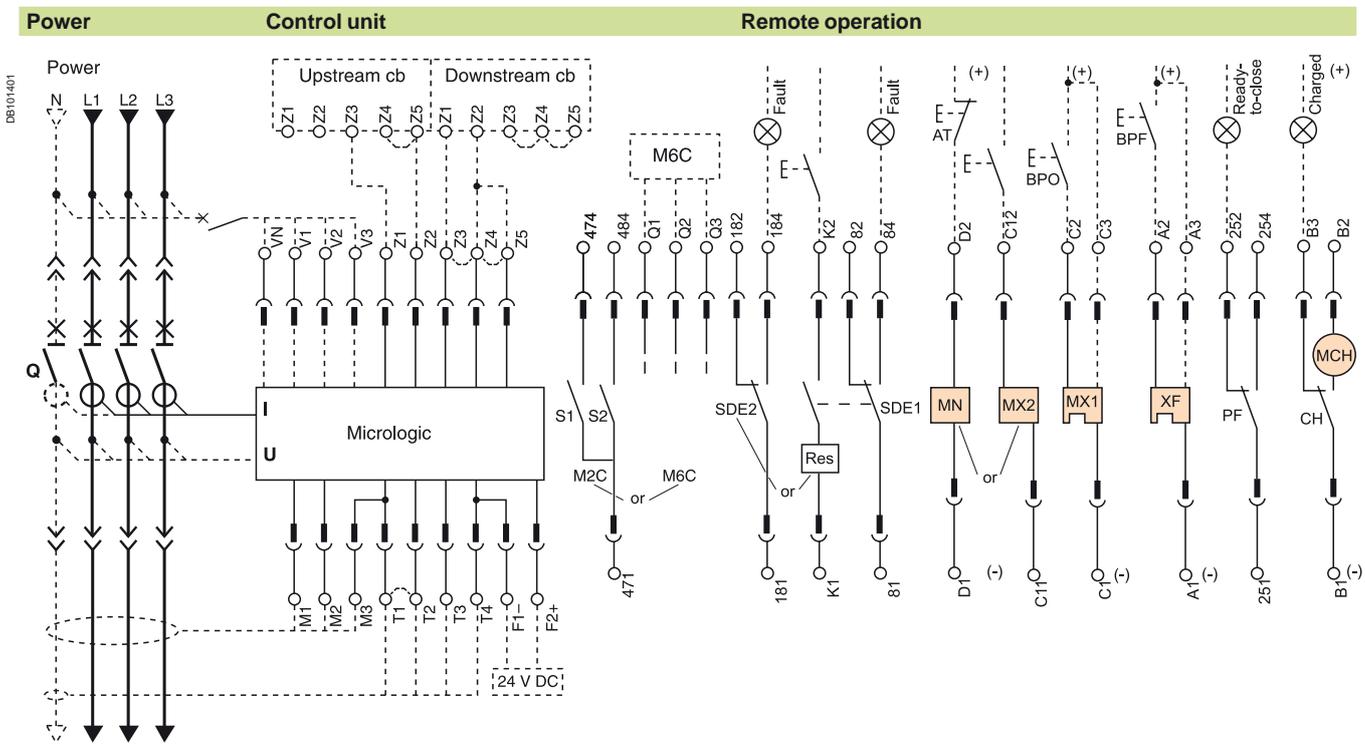
CD2 : disconnected position contacts CE3 : connected position contacts CT1 : test position contacts



Key:

- drawout device only.
- SDE1, OF1, OF2, OF3, OF4 supplied as standard.
- interconnected connections (only one wire per connection point).

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



| Terminal block marking | Control unit | | | | | | | | | | |
|------------------------|--------------|------|------|------|------|-----------|-------|------|-------|-----|------|
| | Com | UC1 | UC2 | UC3 | UC4 | M2C / M6C | | | | | |
| | O5 | O6 | O Z5 | O M1 | O M2 | O M3 | O F2+ | O V3 | O 484 | O / | O Q3 |
| | O E3 | O E4 | O Z3 | O Z4 | O T3 | O T4 | O VN | O V2 | O 474 | O / | O Q2 |
| | O E1 | O E2 | O Z1 | O Z2 | O T1 | O T2 | O F1- | O V1 | O 471 | O / | O Q1 |

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

| A | E | P | H | Control unit |
|---|---|---|---|---|
| ■ | ■ | ■ | ■ | Com : E1-E6 communication |
| ■ | ■ | ■ | ■ | UC1 : Z1-Z5 zone selective interlocking Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7) |
| ■ | ■ | ■ | ■ | UC2 : T1, T2, T3, T4 = external neutral M2, M3 = Vigi module input (Micrologic 7) |
| ■ | ■ | ■ | ■ | UC3 : F2+, F1- external 24 V DC power supply VN external voltage connector (must be connected to the neutral with a 3P circuit breaker) |
| ■ | ■ | ■ | ■ | UC4 : External Voltage Connector (PTE option) |
| ■ | ■ | ■ | ■ | M2C : 2 programmable contacts (internal relay) ext. 24 V DC power supply required or M6C : 6 programmable contacts (to be connected to the external module M6C) ext. 24 V DC power supply required |

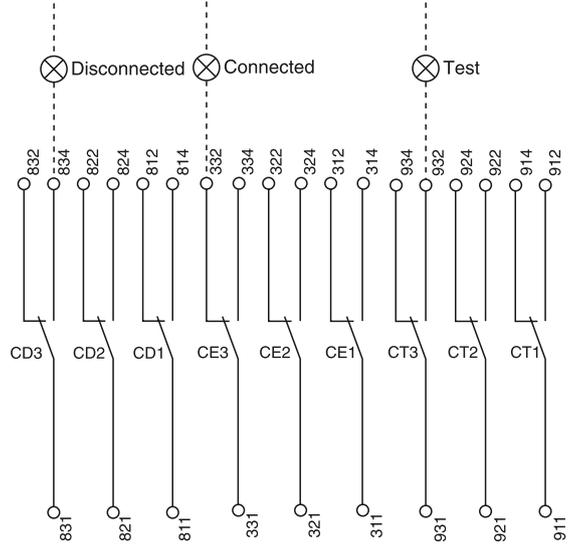
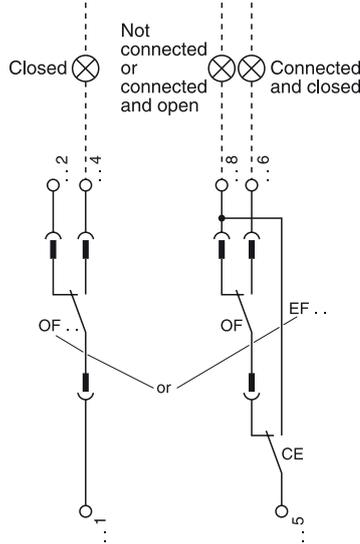
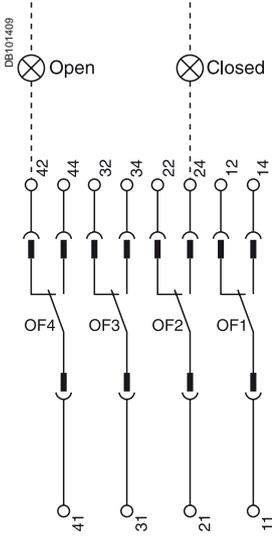
| Remote operation | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|
| SDE2 : fault-trip indication contact or Res : remote reset | | | | | | | | | | | |
| SDE1 : fault-trip indication contact (supplied as standard) | | | | | | | | | | | |
| MN : undervoltage release or MX2 : shunt release | | | | | | | | | | | |
| 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.

A : digital ammeter. P : A + power meter + additional protection.
E : energy. H : P + harmonics.

Indication contacts

Chassis contacts



Indication contacts

| OF4 | OF3 | OF2 | OF1 | OF24 | OF23 | OF22 | OF21 | OF14 | OF13 | OF12 | OF11 |
|-----------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | | | | | | | | |
| 44 | 34 | 24 | 14 | 244 | 234 | 224 | 214 | 144 | 134 | 124 | 114 |
| | | | | | | | | | | | |
| 42 | 32 | 22 | 12 | 242 | 232 | 222 | 212 | 142 | 132 | 122 | 112 |
| | | | | | | | | | | | |
| 41 | 31 | 21 | 11 | 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 | | | | | | or | | |
| CE6 | CE5 | CE4 | | | | CE9 | CE8 | CE7 |
| | | | | | | | | |
| 364 | 354 | 344 | | | | 394 | 384 | 374 |
| | | | | | | | | |
| 362 | 352 | 342 | | | | 392 | 382 | 372 |
| | | | | | | | | |
| 361 | 351 | 341 | | | | 391 | 381 | 371 |

Indication contacts

| | | | |
|--------------|----------------------------|---------------------|--|
| OF4 : | ON/OFF indication contacts | OF24 or EF24 | Combined "connected-deconnected" indication contacts |
| OF3 | | OF23 or EF23 | |
| OF2 | | OF22 or EF22 | |
| OF1 | | OF21 or EF21 | |
| | | OF14 or EF14 | |
| | | OF13 or EF13 | |
| | | OF12 or EF12 | |
| | | OF11 or EF11 | |

Chassis contacts

| | | | | | |
|------------|--------------------------------|------------|-----------------------------|------------|--------------------------------|
| CD3 | disconnected position contacts | CE3 | connected position contacts | CT3 | test position contacts |
| CD2 | | CE2 | | CT2 | |
| CD1 | | CE1 | | CT1 | |
| or | | | | | |
| CE6 | connected position contacts | CE9 | connected position contacts | CE8 | position contacts |
| CE5 | | CE7 | | CE7 | |
| CE4 | | | | CD6 | disconnected position contacts |
| | | | | CD5 | |
| | | | | CD4 | |

Key:

drawout device only.

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

interconnected connections (only one wire per connection point).

Masterpact NT and NW

Earth-fault and earth-leakage protection

Neutral protection

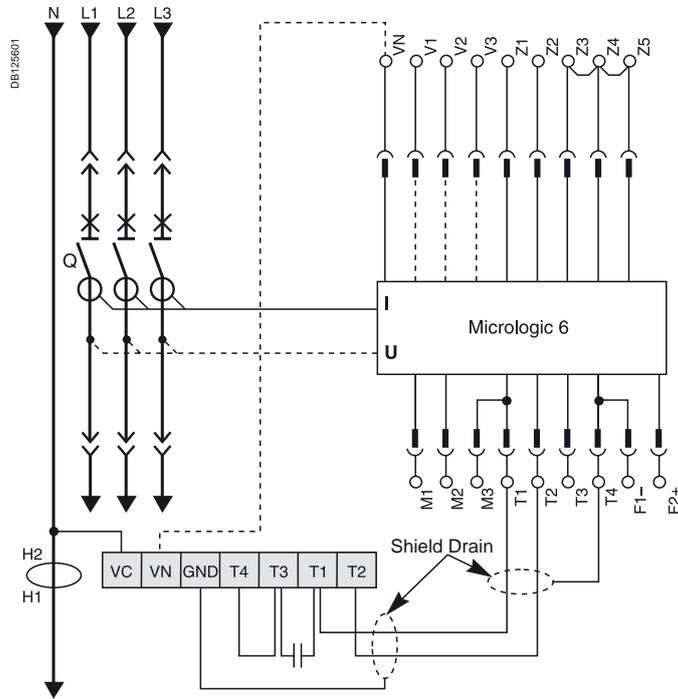
Zone selective interlocking

External sensor (CT) for residual earth-fault protection

Connection of current-transformer secondary circuit for external neutral

Masterpact equipped with a Micrologic 6 A/E/P/H:

- shielded cable with 2 twisted pairs
 - T1 twisted with T2
 - maximum length 4 meters
 - cable cross-sectional area 0.4 to 1.5 mm²
 - recommended cable: Belden 9552 or equivalent.
- For proper wiring of neutral CT, refer to instruction Bulletin 48041-082-03 shipped with it.
- Do not remove Micrologic factory-installed jumper between T1 and T2 unless neutral CT is connected.
- Do not remove factory-installed jumper between T1 and T2 unless neutral CT is connected.
- If supply is via the top, follow the schematics.
- If supply is via the bottom, control wiring is identical; for the power wiring, H1 is connected to the source side, H2 to the load side.
- For four-pole versions, for residual earth-fault protection, the current transformer for the external neutral is not necessary.
- Connection for signal VN is required only for power measurements (3 Ø, 4 wires, 4CTs).

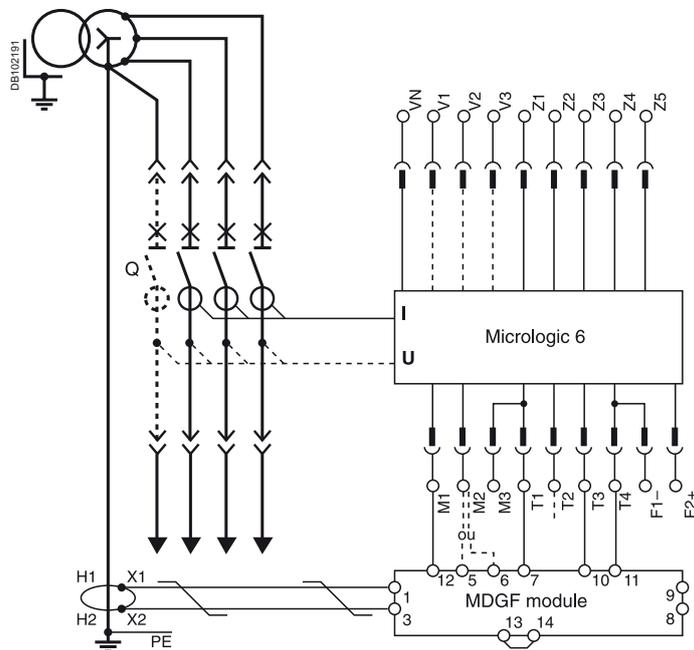


External transformer for source ground return (SGR) earth-fault protection

Connection of the secondary circuit

Masterpact equipped with a Micrologic 6 A/E/P/H:

- unshielded cable with 1 twisted pair
- maximum length 150 meters
- cable cross-sectional area 0.4 to 1.5 mm²
- terminals 5 and 6 may not be used at the same time
- use terminal 5 for NW08 to 40
- use terminal 6 for NW40b to 63
- recommended cable: Belden 9409 or equivalent.



Masterpact NT and NW

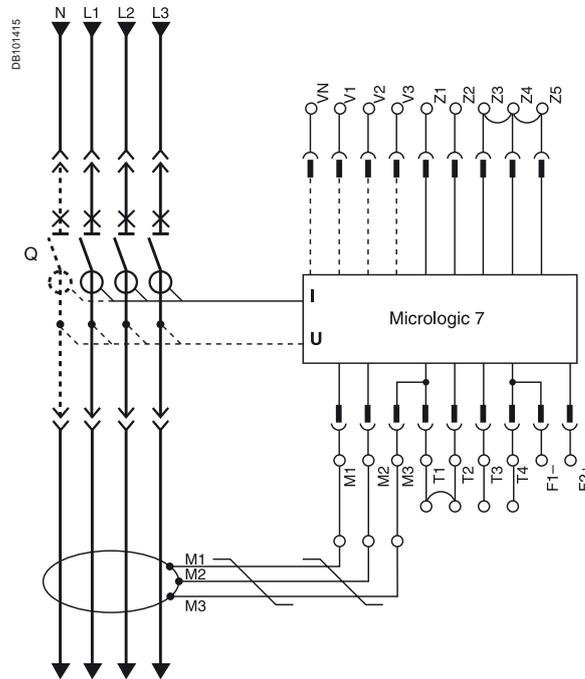
Earth-fault and earth-leakage protection

Neutral protection

Zone selective interlocking

Earth-leakage protection

Connection of the rectangular-sensor secondary circuit
Use the cable shipped with the rectangular sensor.



Neutral protection

- Three pole circuit breaker:
 - neutral protection is impossible with Micrologic A, E
 - Masterpact equipped with Micrologic P or H
 - the current transformer for external neutral is necessary (the wiring diagram is identical to the one used for the residual earth-fault protection)
- Four pole circuit breaker:
 - Masterpact equipped with Micrologic A, E, P or H
 - the current transformer for external neutral is not necessary.

Zone selective interlocking

Zone-selective interlocking is used to reduce the electrodynamic forces exerted on the installation by shortening the time required to clear faults, while maintaining time discrimination between the various devices.

A pilot wire interconnects a number of circuit breakers equipped with Micrologic A/E/P/H control units, as illustrated in the diagram above.

The control unit detecting a fault sends a signal upstream and checks for a signal arriving from downstream. If there is a signal from downstream, the circuit breaker remains closed for the full duration of its tripping delay. If there is no signal from downstream, the circuit breaker opens immediately, regardless of the tripping-delay setting.

Fault 1.

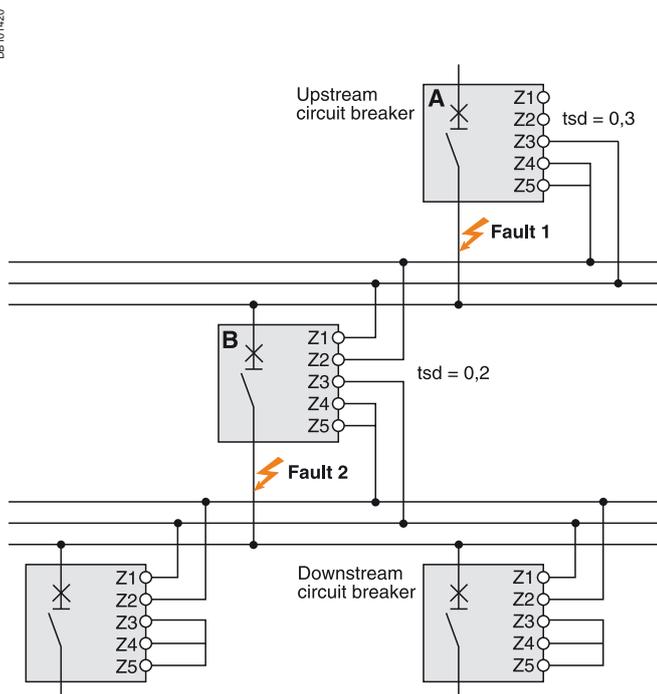
Only circuit breaker A detects the fault. Because it receives no signal from downstream, it opens immediately, regardless of its tripping delay set to 0.3.

Fault 2.

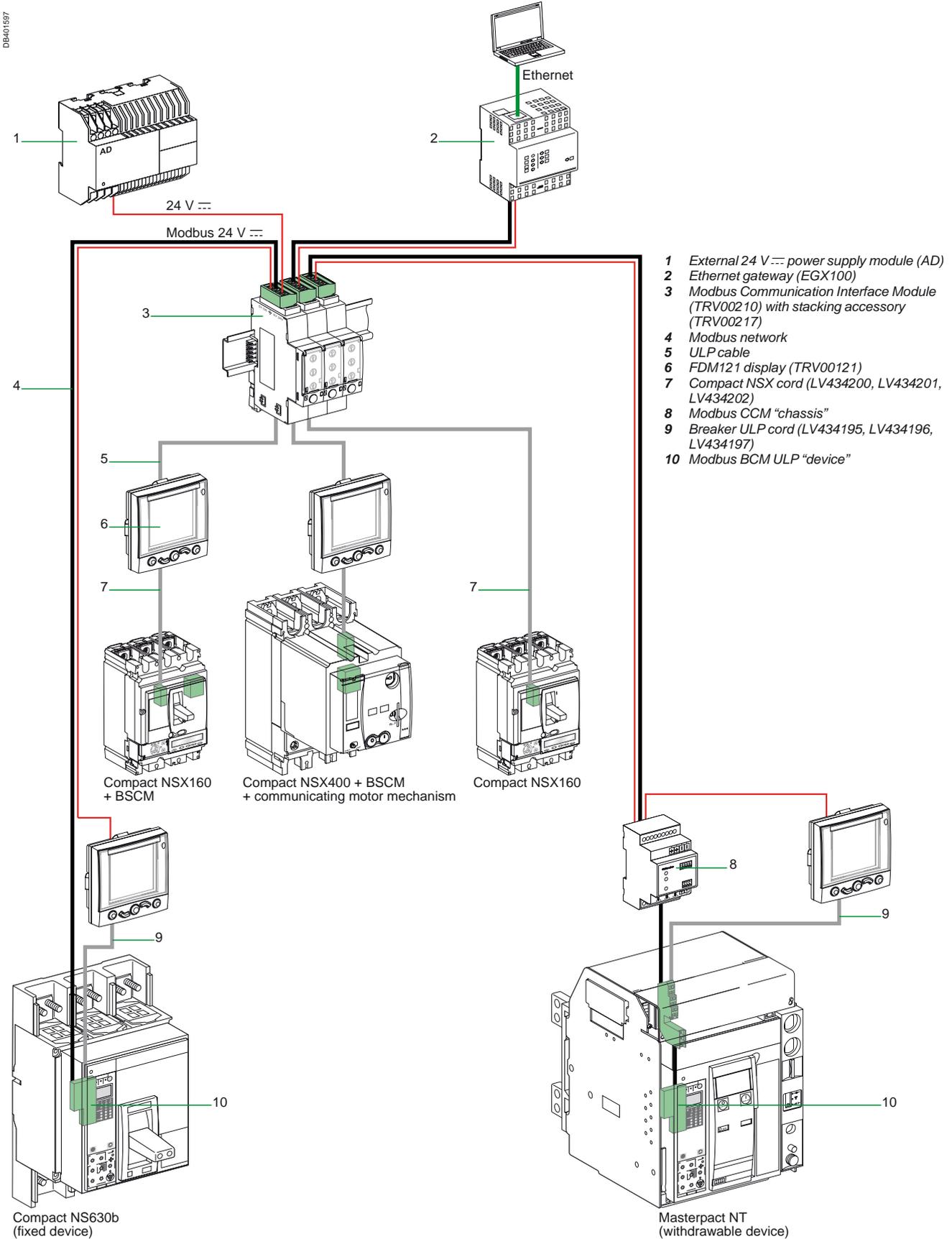
Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from B and remains closed for the full duration of its tripping delay set to 0.3. Circuit breaker B does not receive a signal from downstream and opens immediately, in spite of its tripping delay set to 0.2.

Wiring

- Maximum impedance: 2.7 Ω / 300 m.
- Capacity of connectors: 0.4 to 2.5 mm².
- Wires: single or multicore.
- Maximum length: 3000 m.
- Limits to device interconnection:
 - the common ZSI - OUT (Z1) and the output ZSI - OUT (Z2) can be connected to a maximum of 10 upstream device
 - a maximum of 100 downstream devices may be connected to the common ZSI - IN (Z3) and to an input ZSI - IN CR (Z4) or GF (Z5).

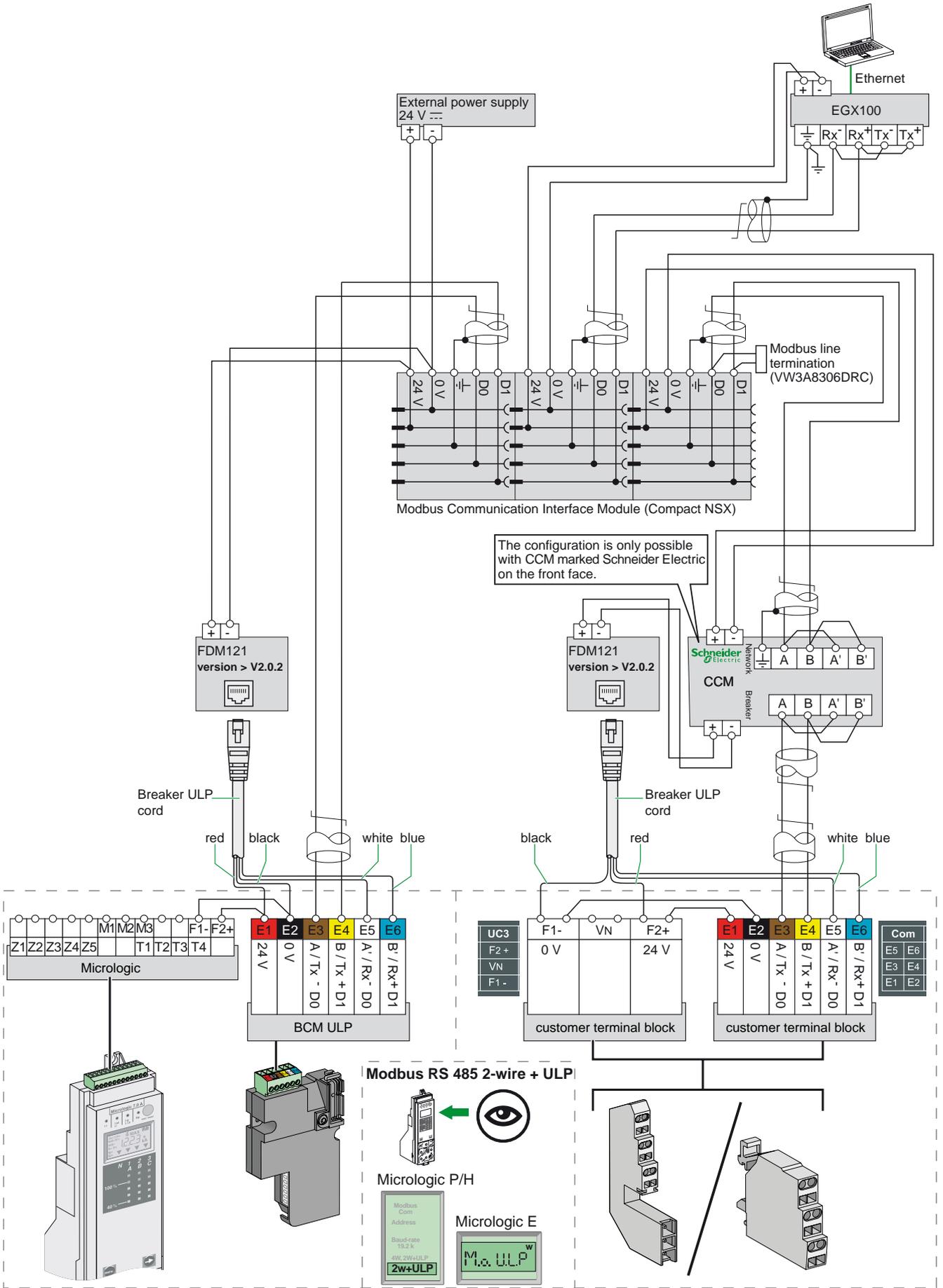


Connection of circuit breakers to the Modbus communication network



Masterpact NT and NW Communication

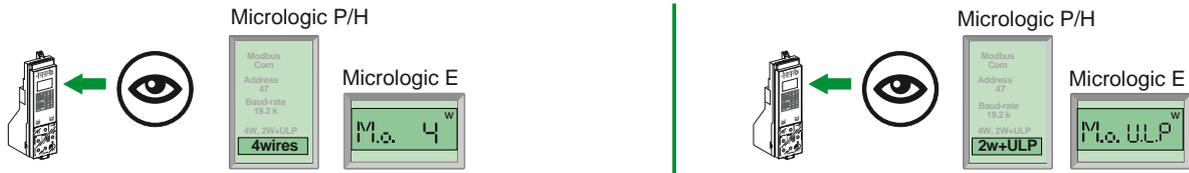
DB402146



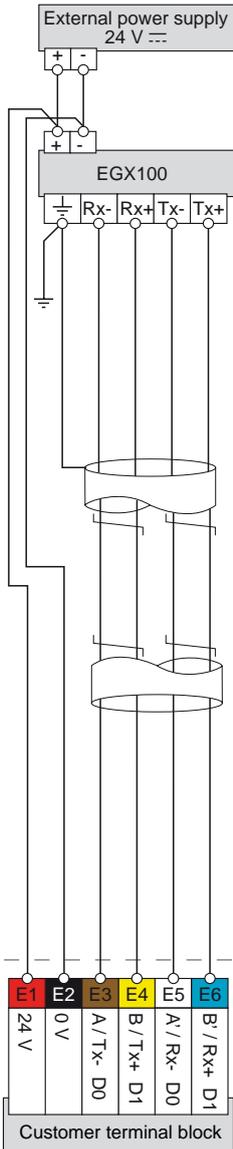
Fixed, electrically operated Masterpact NT and NW

Wiring of the COM option (with BCM ULP)

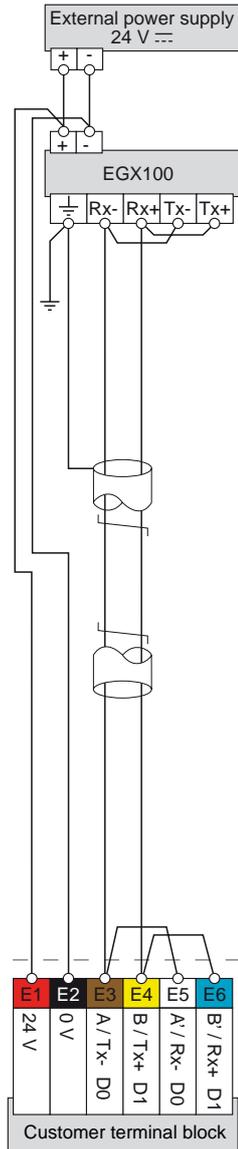
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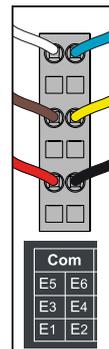
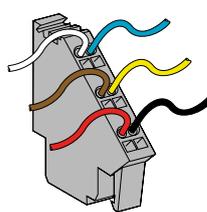
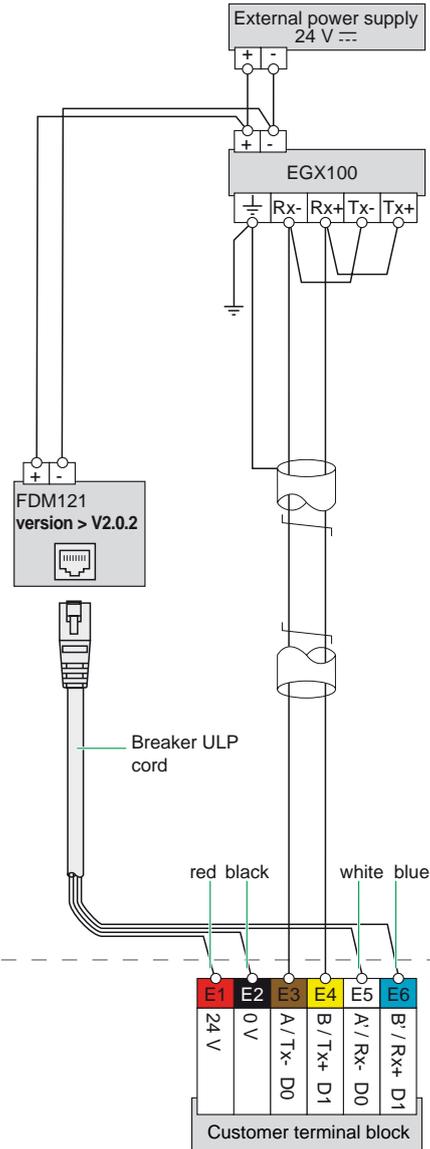
A Modbus RS 485 4-wire without ULP module



A Modbus RS 485 2-wire without ULP module



B Modbus RS 485 2-wire + ULP with ULP module



Withdrawable Masterpact NT and NW

Wiring of the COM option (with CCM)

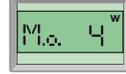
DB40281



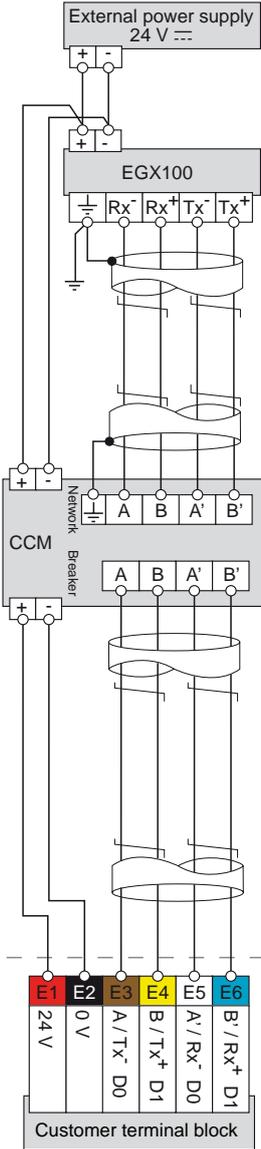
Micrologic P/H



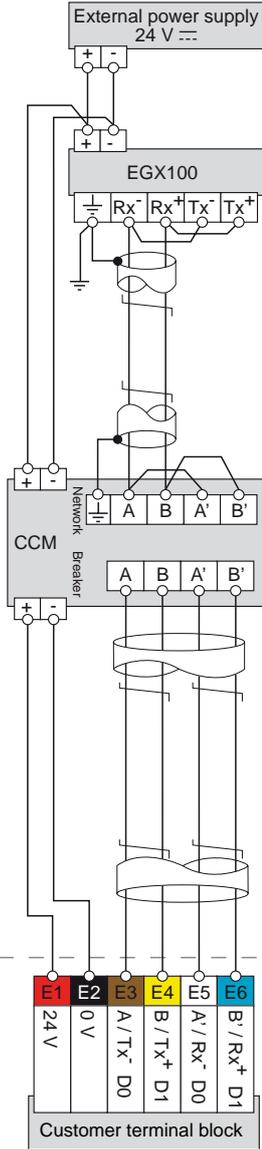
Micrologic E



A Modbus RS 485 4-wire without ULP module



A Modbus RS 485 2-wire without ULP module



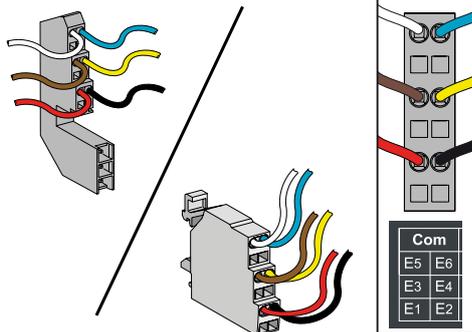
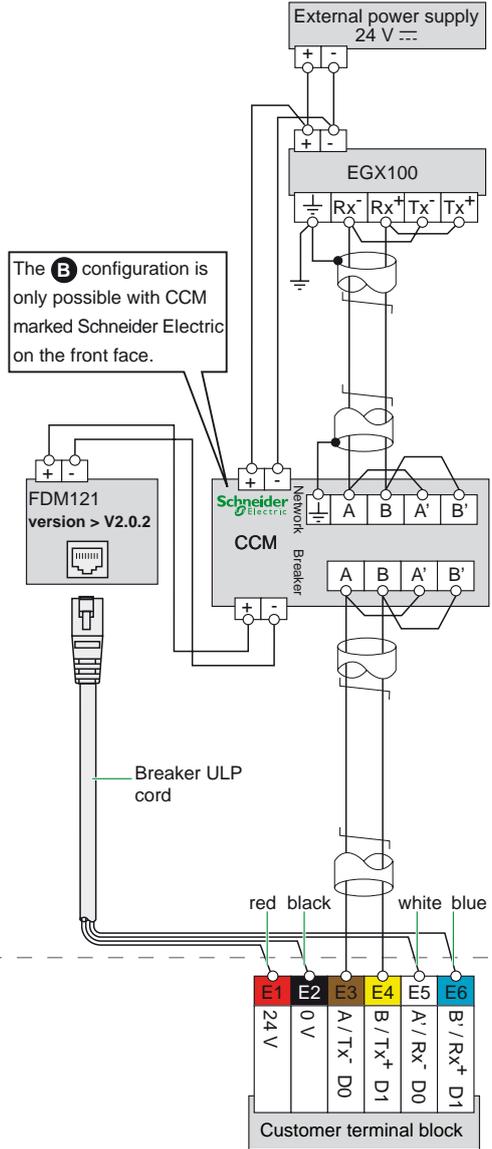
Micrologic P/H



Micrologic E

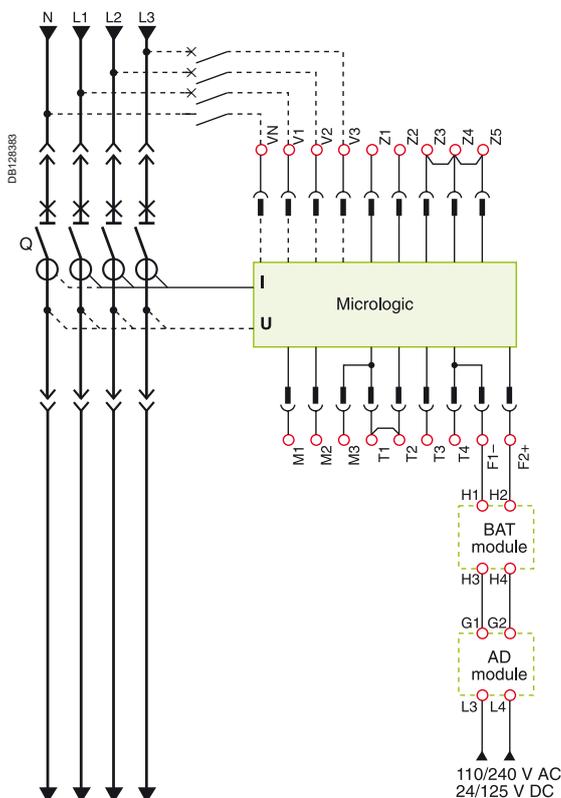


B Modbus RS 485 2-wire + ULP with ULP module



Masterpact NT and NW

24 V DC external power supply AD module



- The 24 V DC external power-supply (AD module) for the Micrologic control unit (F1- F2+) is not required for basic protections LSIG.
- The 24 V DC external power-supply (AD module) for the BCM ULP communication module (E1-E2) is required.
- The 24 V DC external power-supply (AD module) for the FDM121 front display module (0V +24) is required.
- The 24 V DC external power-supply (AD module) for the programmable contact M2C/M6C is required.
- The same 24 V DC external power-supply (AD module) can be connected to Micrologic control unit, BCM ULP and FDM121, M2C/M6C.
- With Micrologic A/E, it is recommended to connect 24 V DC external power-supply (AD module) to the Micrologic control unit (F1- F2+) in order to keep available the display and the energy metering, even if Current < 20 % I_n.

Note: In case of using the 24 V DC external power supply (AD module), maximum cable length between 24 V DC (G1, G2) and the control unit (F1-, F2+) must not exceed 10 meters.

The BAT battery module, mounted in series upstream of the AD module, ensures an uninterrupted supply of power if the AD module power supply fails.

The internal voltage taps are connected to the bottom side of the circuit breaker.

With Micrologic P/H, external voltage taps are possible using the PTE option.

With this option, the internal voltage taps are disconnected and the voltage taps are connected to terminals VN, V1, V2, V3.

The PTE option is required for voltages less than 220 V and greater than 690 V (in which case a voltage transformer is compulsory). For three-pole devices, the system is supplied with terminal VN connected only to the control unit (Micrologic P).

When the PTE option is implemented, the voltage measurement input must be protected against short-circuits. Installed as close as possible to the busbars, this protection function is ensured by a P25M circuit breaker (1 A rating) with an auxiliary contact (cat. no. 21104 and 21117).

This voltage measurement input is reserved exclusively for the control unit and must not ever be used to supply other circuits outside the switchboard.

Connection

The maximum length for each conductor supplying power to the trip unit or M6C module is 10 m.

Do not ground F2+, F1-, or power supply output:

- the positive terminal (F2+) on the trip unit must not be connected to earth ground
- the negative terminal (F1-) on the trip unit must not be connected to earth ground
- the output terminals (- and +) of the 24 V DC power supply must not be grounded.

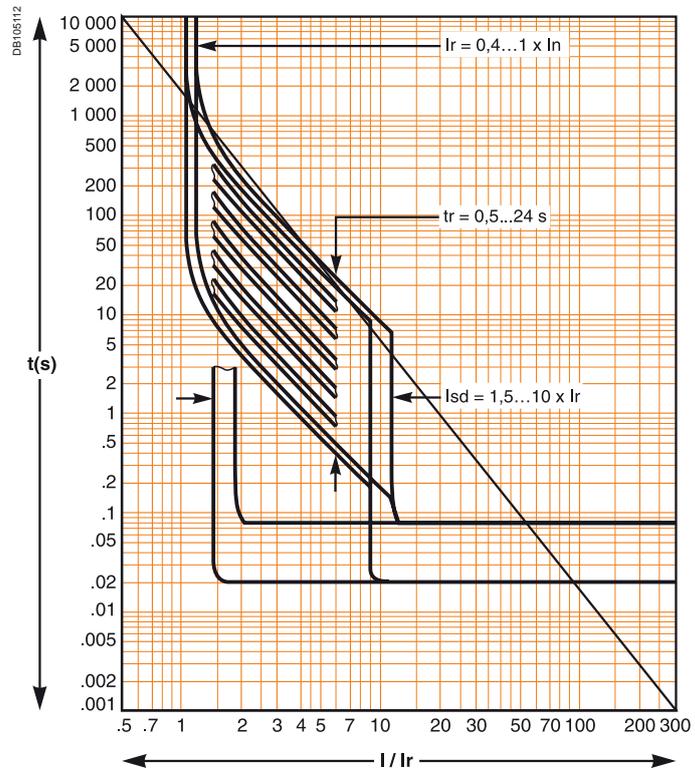
Reduce electromagnetic interference:

- the input and output wires of the 24 V DC power supply must be physically separated as much as possible
- if the 24 V DC power supply wires cross power cables, they must cross perpendicularly. If this is not physically possible, the power supply conductors must be twisted together
- Power supply conductors must be cut to length. Do not loop excess conductor.

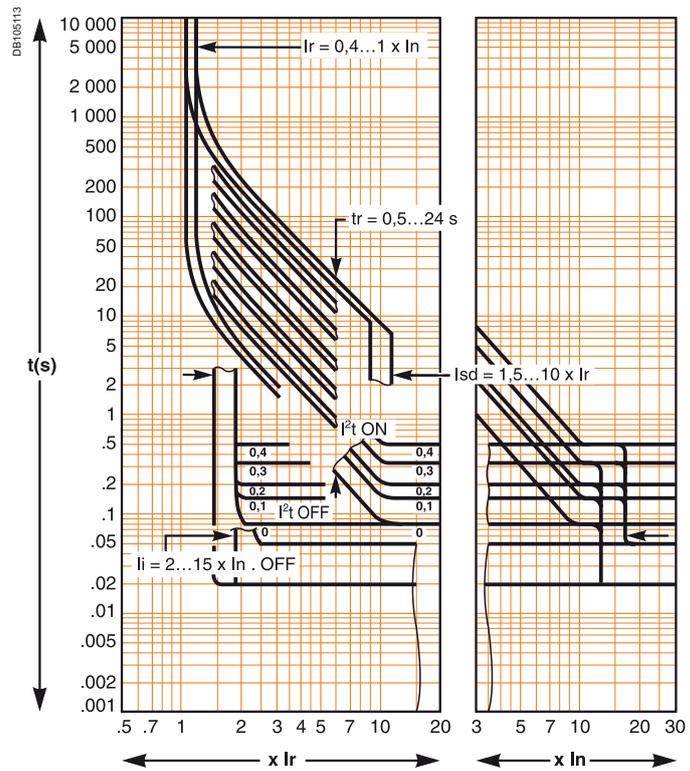
| | |
|---|-----|
| <i>Presentation</i> | 2 |
| <i>Functions and characteristics</i> | A-1 |
| <i>Installation recommendations</i> | B-1 |
| <i>Dimensions and connection</i> | C-1 |
| <i>Electrical diagrams</i> | D-1 |
| Tripping curves | E-2 |
| <hr/> | |
| Limitation curves | |
| Current limiting | E-4 |
| Energy limiting | E-5 |
| <i>Catalogue numbers and order form</i> | F-1 |

Tripping curves

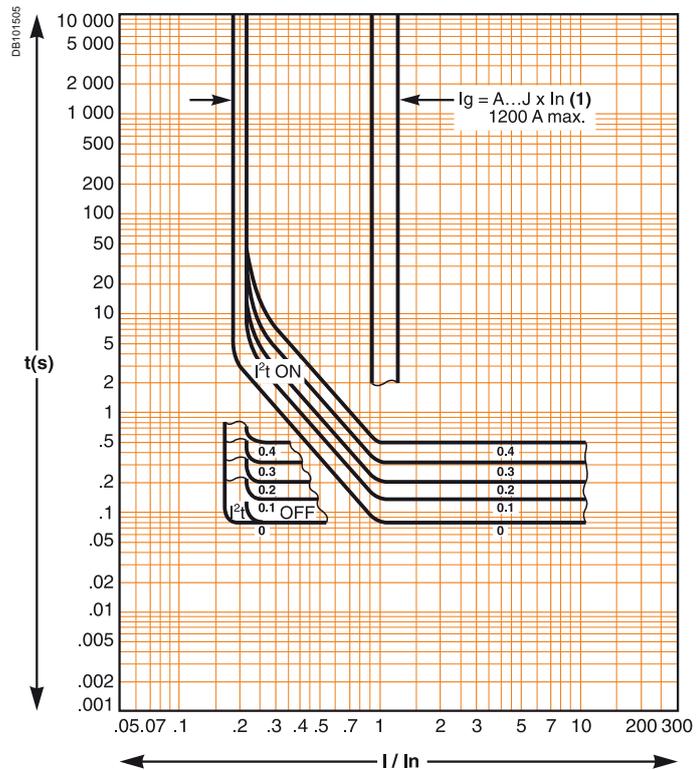
Micrologic 2.0



Micrologic 5.0, 6.0, 7.0



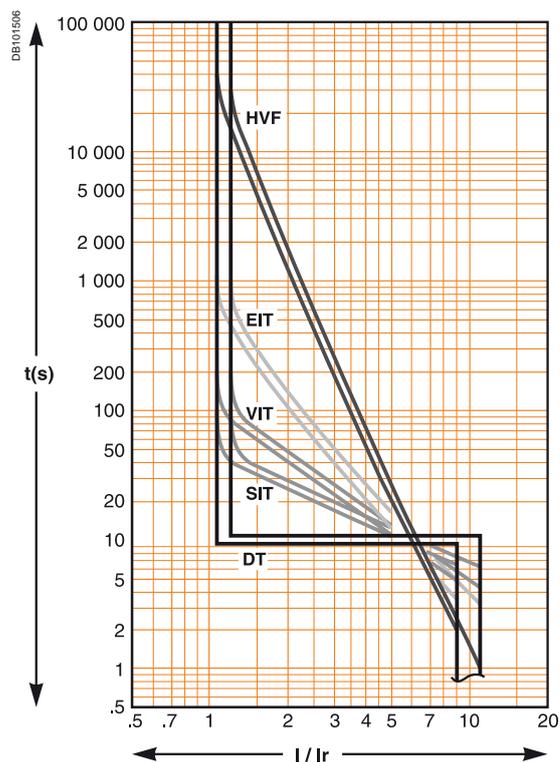
Earth fault protection (Micrologic 6.0)



(1)

| $I_g = I_n \times \dots$ | A | B | C | D | E | F | G | H | I |
|--|-----|-----|-----|-----|-----|-----|------|------|------|
| $I_g < 400 \text{ A}$ | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
| $400 \text{ A} \leq I_g \leq 1200 \text{ A}$ | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
| $I_g > 1200 \text{ A}$ | 500 | 640 | 720 | 800 | 880 | 960 | 1040 | 1120 | 1200 |

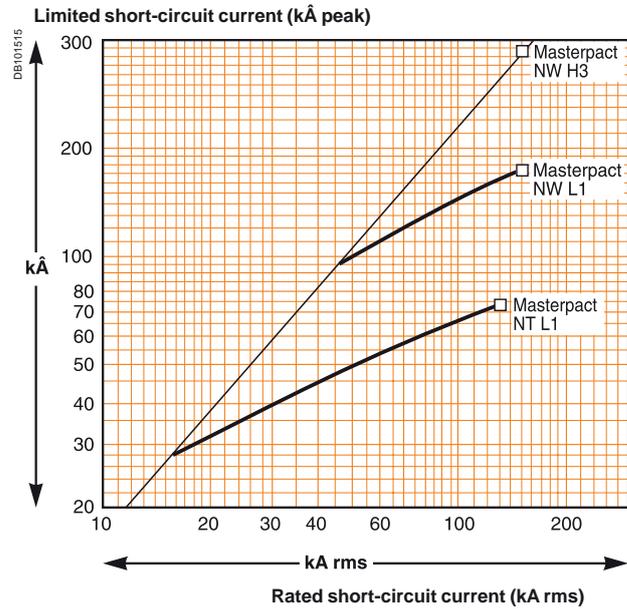
IDMTL curve (Micrologic P and H)



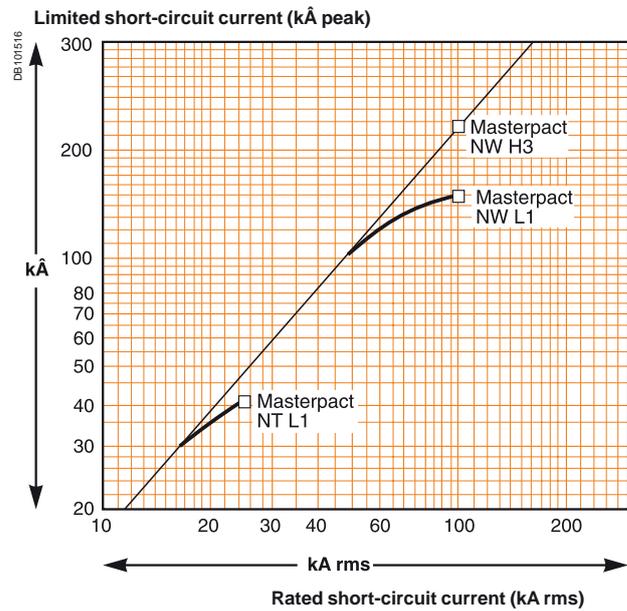
Limitation curves

Current limiting

Voltage 380/415/440 V AC

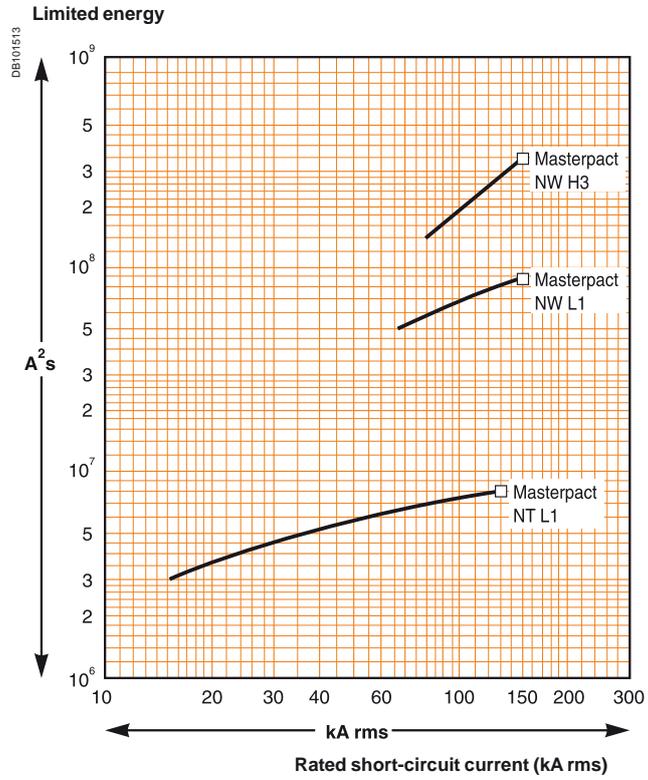


Voltage 660/690 V AC

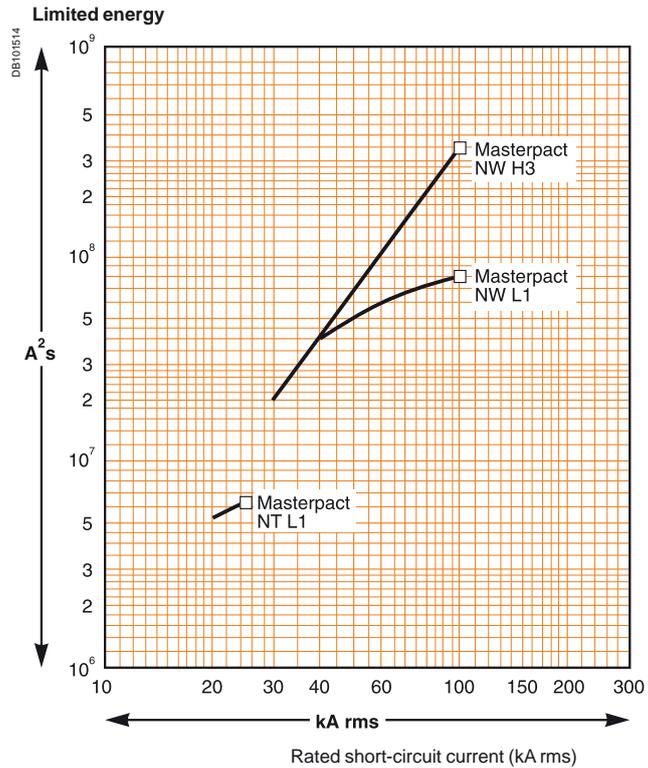


Energy limiting

Voltage 380/415/440 V AC



Voltage 660/690 V AC



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The electrical installation guide

According to IEC 60364

This guide, part of the Schneider Electric offer, is the essential tool to "guide" you any time in your business:

- design office, consultant
- contractor, panelbuilder
- teacher, trainer.

Comprehensive and concrete information on:

- all the new technical solutions
- all the components
- of an installation from a global point of view
- all the IEC standards modifications
- all the fundamental electrotechnical knowledge
- all the design stages, from medium to low voltage.



Catalogue numbers and order form

| | |
|---|-------------|
| <i>Presentation</i> | 2 |
| <i>Functions and characteristics</i> | A-1 |
| <i>Dimensions and connection</i> | C-1 |
| <i>Installation recommendations</i> | B-1 |
| <i>Electrical diagrams</i> | D-1 |
| <i>Additional characteristics</i> | E-1 |
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| Masterpact NT | F-4 |
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| Clusters | F-18 |
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| Indication contacts | F-21 |
| Instructions | F-22 |
| Portable data acquisition Monitoring and control converter | F-23 |
| Masterpact NT and NW | F-24 |

Retrofit solutions (*)

Connections for fixed devices

To replace a Masterpact M with a Masterpact NW, order a retrofit device (without connections) and select a set of connectors corresponding to the replaced device.

The Masterpact NW is installed in exactly the same place as the old Masterpact M device, without any modifications required on the switchboard.

Horizontal rear connection

| Device to be replaced | | Connection to be ordered | | | |
|-------------------------------|-----|--------------------------|-----|-------|--|
| Masterpact M08 to M12 | | | | | |
| Type N1/NI | | | | | |
| | | 3P | | 4P | |
| Top | 3 x | 48951 | 4 x | 48951 | |
| Bottom | 3 x | 48964 | 4 x | 48964 | |
| Type H1/H2/HI/HF | | | | | |
| Top | 3 x | 48954 | 4 x | 48954 | |
| Bottom | 3 x | 48965 | 4 x | 48965 | |
| Masterpact M16 | | | | | |
| Type N1/NI/H1/H2/HI/HF | | | | | |
| Top | 3 x | 48954 | 4 x | 48954 | |
| Bottom | 3 x | 48965 | 4 x | 48965 | |
| Masterpact M20 and M25 | | | | | |
| Type N1/NI/H1/H2/HI/HF | | | | | |
| Top | 3 x | 48957 | 4 x | 48957 | |
| Bottom | 3 x | 48958 | 4 x | 48958 | |
| Masterpact M32 | | | | | |
| Type H1/H2/HI/HF | | | | | |
| Top | 1 x | 48962 | 1 x | 48960 | |
| Bottom | 1 x | 48961 | 1 x | 48960 | |

(*) Please contact U2R (Retrofit Replacement Unit).

Connections for drawout devices

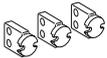
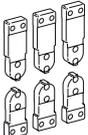
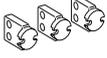
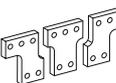
To replace a Masterpact M with a Masterpact NW, order a retrofit device (without connections) and select a set of connectors corresponding to the replaced device.

The Masterpact NW is installed in exactly the same place as the old Masterpact M device, without any modifications required on the switchboard.

| Vertical rear connection | | | | |
|-------------------------------|-----|--------------------------|-----|-------|
| Device to be replaced | | Connection to be ordered | | |
| Masterpact M08 to M12 | | | | |
| Type N1/NI | | | | |
| | | 3P | | 4P |
| Top | 3 x | 48966 | 4 x | 48966 |
| Bottom | 3 x | 48966 | 4 x | 48966 |
| Type H1/H2/HI/HF/L1 | | | | |
| Top | 3 x | 48969 | 4 x | 48969 |
| Bottom | 3 x | 48969 | 4 x | 48969 |
| Masterpact M16 | | | | |
| Type N1/NI/H1/H2/HI/HF/L1 | | | | |
| Top | 3 x | 48969 | 4 x | 48969 |
| Bottom | 3 x | 48969 | 4 x | 48969 |
| Masterpact M20 and M25 | | | | |
| Type N1/NI/H1/H2/HI/HF | | | | |
| Top | 3 x | 48970 | 4 x | 48970 |
| Bottom | 3 x | 48970 | 4 x | 48970 |
| Masterpact M32 | | | | |
| Type H1/H2/HI/HF/M20/L1 | | | | |
| Top | 1 x | 48974 | 1 x | 48978 |
| Bottom | 1 x | 48974 | 1 x | 48978 |

| Horizontal rear connection | | | | |
|--|-----|--------------------------|-----|-------|
| Device to be replaced | | Connection to be ordered | | |
| Masterpact M08 to M12 | | | | |
| Type N1/NI | | | | |
| | | 3P | | 4P |
| Top | 3 x | 48951 | 4 x | 48951 |
| Bottom | 3 x | 48964 | 4 x | 48964 |
| Type H1/H2/HI/HF/L1 | | | | |
| Top | 3 x | 48954 | 4 x | 48954 |
| Bottom | 3 x | 48965 | 4 x | 48965 |
| Masterpact M16 | | | | |
| Type N1/NI/H1/H2/HI/HF/L1 | | | | |
| Top | 3 x | 48954 | 4 x | 48954 |
| Bottom | 3 x | 48965 | 4 x | 48965 |
| Masterpact M20 and M25 | | | | |
| Type N1/NI/H1/H2/HI/HF | | | | |
| Top | 3 x | 48957 | 4 x | 48957 |
| Bottom | 3 x | 48958 | 4 x | 48958 |
| Masterpact M32 neutral on left-hand side | | | | |
| Type H1/H2/HI/HF/M20/L1 | | | | |
| Top | 1 x | 48973 | 1 x | 48976 |
| Bottom | 1 x | 48973 | 1 x | 48977 |
| Masterpact M32 neutral on right-hand side | | | | |
| Type H1/H2/HI/HF/M20/L1 | | | | |
| Top | 1 x | 48973 | 1 x | 48977 |
| Bottom | 1 x | 48973 | 1 x | 48976 |

(*) Please contact U2R (Retrofit Replacement Unit).

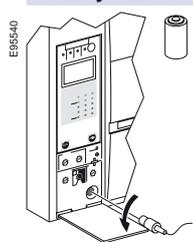
| Connection | | 3P | 4P |
|---|--|--|---------------|
| Fixed circuit breakers | | | |
| Front connection / Replacement kit (3 or 4 parts) | | | |
| E46534  | Top or bottom | 250/630-1600 A | 47069 47070 |
| | Installation manual | | 47102 |
| Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts) | | | |
| E46429  | E46430  | 250/630-1600 A | 33584 33585 |
| | | Vert. mounting. Horiz. mounting. Installation manual | 47102 |
| Drawout circuit breakers | | | |
| Front connection / Replacement kit (6 or 8 parts) | | | |
| E46440  | Top and bottom | 250/630-1600 A | 33588 33589 |
| | Installation manual | | 47102 |
| Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts) | | | |
| E46429  | E46430  | 250/630-1600 A | 33586 33587 |
| | | Vert. mounting. Horiz. mounting. Installation manual | 47102 |
| Connection accessories | | 3P | 4P |
| Vertical connection adapters 250/630-1600 A / Replacement kit (3 or 4 parts) | | | |
| E46426  | For fixed and drawout front-connected circuit breakers | | 33642 33643 |
| | Installation manual | | 47102 |
| Cable lug adapters 250/630-1600 A / Replacement kit (3 or 4 parts) | | | |
| E46427  | For fixed and drawout front-connected circuit breakers | | 33644 33645 |
| | Installation manual | | 47102 |
| Spreaders / Replacement kit 250/630-1600 A (3 or 4 parts) | | | |
| E46431  | For fixed and drawout front and rear-connected circuit breakers | | 33622 33623 |
| | Installation manual | | 47102 |
| Interphase barriers / Replacement kit (3 or 4 parts) | | | |
| E79151  | For fixed and drawout front and rear-connected circuit breakers | | 33648 33648 |
| | For drawout rear-connected circuit breakers | | 33768 33768 |
| | Installation manual | | 47102 |
| Arc chute screen (1 part) | | | |
| E74437  | For fixed front-connected circuit breakers | | 47335 47336 |
| | Installation manual | | 47102 |

Replacement parts for Micrologic control units

Long-time rating plug (limits setting range for higher accuracy) / 1 part

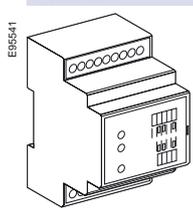
| | | | |
|---|------------------------------|-----------------|-------|
|  | Standard | 0.4 at 1 x Ir | 33542 |
| | Low-setting option | 0.4 at 0.8 x Ir | 33543 |
| | High-setting option | 0.8 at 1 x Ir | 33544 |
| | Without long-time protection | off | 33545 |

Battery + cover

| | | | |
|---|------------------|------------------------|-------|
|  | Battery (1 part) | | 33593 |
| | Cover (1 part) | For Micrologic A, E | 33592 |
| | | For Micrologic P and H | 47067 |

Communication option

Chassis

| | | | |
|--|-----------------------------------|--|-------|
|  | Modbus COM | | 64915 |
| | 6 wires terminal drawout (1 part) | | 33099 |
| | 6 wires terminal fixed (1 part) | | 47075 |
| | Installation manual | | 33088 |

External sensors

External sensor for earth-fault protection (TCE) / 1 part

| | | | |
|---|---------------|------------|-------|
|  | Sensor rating | 400/1600 A | 33576 |
|---|---------------|------------|-------|

Source ground return (SGR) earth-fault protection / 1 part

| | | | |
|---|-----------------------|--|-------|
|  | External sensor (SGR) | | 33579 |
| | MDGF summing module | | 48891 |

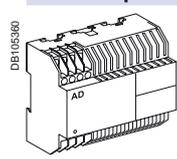
Rectangular sensor for earth-leakage protection + Vigi cable / 1 part

| | | | |
|---|-----------------|--|-------|
|  | 280 mm x 115 mm | | 33573 |
|---|-----------------|--|-------|

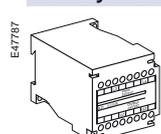
Vigi cable or external voltage cable / 1 part

| | | |
|---|--|-------|
| Vigi cable or external voltage cable (1 part) | | 47090 |
|---|--|-------|

External power supply module (AD) / 1 part

| | | | |
|---|--------------|--|-------|
|  | 24-30 V DC | | 54440 |
| | 48-60 V DC | | 54441 |
| | 100-125 V DC | | 54442 |
| | 110-130 V AC | | 54443 |
| | 200-240 V AC | | 54444 |
| | 380-415 V AC | | 54445 |

Battery module (BAT) / 1 part

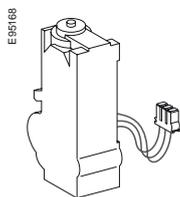
| | | | |
|---|-----------|---------|-------|
|  | 1 battery | 24 V DC | 54446 |
|---|-----------|---------|-------|

Test equipments / 1 part

| | | | |
|---|--|--|-------|
|  | Hand held test kit (HHTK) | | 33594 |
| | Full function test kit (FFTK) | | 33595 |
| | Test report edition come from FFTK | | 34559 |
| | FFTK test cable 2 pin for STR trip unit | | 34560 |
| | FFTK test cable 7 pin for Micrologic trip unit | | 33590 |

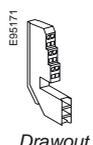
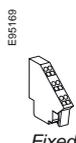
Remote operation

Gear motor



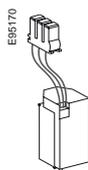
MCH (1 part)

| | | |
|-------------------------|-----------------------------|-------|
| AC 50/60 Hz | 48 V | 33186 |
| | 100/130 V | 33176 |
| | 200/240 V | 33177 |
| | 277/415 V | 33179 |
| | 440/480 V | 33179 |
| | + resistor | 33193 |
| DC | 24/30 V | 33185 |
| | 48/60 V | 33186 |
| | 100/125 V | 33187 |
| | 200/250 V | 33188 |
| Terminal block (1 part) | For fixed circuit breaker | 47074 |
| | For drawout circuit breaker | 33098 |



Installation manual | 47103

Closing and opening release (XF or MX)



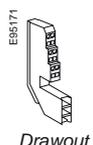
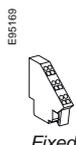
Standard coil (1 part)

| | | |
|-------------|---------------------|-------|
| AC 50/60 Hz | 12 V DC | 33658 |
| | 24/30 V DC, 24 V AC | 33659 |
| DC | 48/60 V DC, 48 V AC | 33660 |
| | 100/130 V AC/DC | 33661 |
| | 200/250 V AC/DC | 33662 |
| | 277 V AC | 33663 |
| | 380/480 V AC | 33664 |

Communicating coil (1 part)

| | | |
|-------------|---------------------|-------|
| AC 50/60 Hz | 12 V DC | 33032 |
| | 24/30 V DC, 24 V AC | 33033 |
| DC | 48/60 V DC, 48 V AC | 33034 |
| | 100/130 V AC/DC | 33035 |
| | 200/250 V AC/DC | 33036 |
| | 277 V AC | 33037 |
| | 380/480 V AC | 33038 |

| | | |
|-------------------------|-----------------------------|-------|
| Terminal block (1 part) | For fixed circuit breaker | 47074 |
| | For drawout circuit breaker | 33098 |



Installation manual | 47103

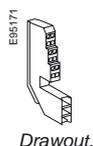
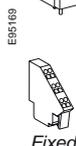
Undervoltage release MN



Undervoltage release (1 part)

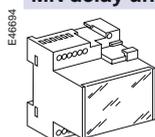
| | | |
|-------------|---------------------|-------|
| AC 50/60 Hz | 24/30 V DC, 24 V AC | 33668 |
| | 48/60 V DC, 48 V AC | 33669 |
| DC | 100/130 V AC/DC | 33670 |
| | 200/250 V AC/DC | 33671 |
| | 380/480 V AC | 33673 |

| | | |
|-------------------------|-----------------------------|-------|
| Terminal block (1 part) | For fixed circuit breaker | 47074 |
| | For drawout circuit breaker | 33098 |



Installation manual | 47103

MN delay unit



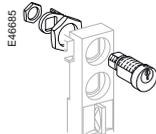
MN delay unit (1 part)

| | | R (non-adjustable) | Rr (adjustable) |
|-------------|-----------------|--------------------|-----------------|
| AC 50/60 Hz | 48/60 V AC/DC | | 33680 |
| | 100/130 V AC/DC | 33684 | 33681 |
| DC | 200/250 V AC/DC | 33685 | 33682 |
| | 380/480 V AC/DC | | 33683 |

Installation manual | 47103

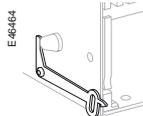
Chassis locking

"Disconnected" position locking / 1 part



| By padlocks | | |
|--|--|----------|
| | VCPO | Standard |
| By Profalux keylocks | | |
| Profalux | 1 lock with 1 key + adaptation kit | 64909 |
| | 2 locks 1 key + adaptation kit | 64910 |
| | 2 locks 2 different keys + adaptation kit | 64911 |
| 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 | 64912 |
| | 2 locks 1 key + adaptation kit | 64913 |
| | 2 locks 2 different keys + adaptation kit | 64914 |
| 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 | 33769 |
| | adaptation kit Ronis | 33770 |
| | adaptation kit Castell | 33771 |
| | adaptation kit Kirk | 33772 |
| Installation manual | | 47104 |

Door interlock / 1 part



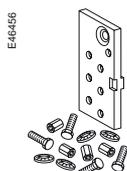
| | |
|--|-------|
| Right and left-hand side of chassis (VPECD or VPECG) | 33172 |
| Installation manual | |
| | 47104 |

Racking interlock / 1 part



| | |
|--------------------------|-------|
| Racking interlock (VPOC) | 33788 |
| Installation manual | |
| | 47104 |

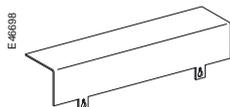
Breaker mismatch protection / 1 part



| | |
|-----------------------------------|-------|
| Breaker mismatch protection (VDC) | 33767 |
| Installation manual | |
| | 47104 |

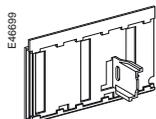
Chassis accessories

Auxiliary terminal shield (CB) / 1 part



| | | |
|---------------------|-------|-------|
| Terminal shield | 3P | 33763 |
| | 4P | 33764 |
| Installation manual | | |
| | 47104 | |

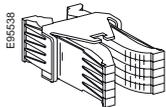
Safety shutters + locking / 1 part



| | | |
|----------------------|-------|-------|
| Safety shutters (VO) | 3P | 33765 |
| | 4P | 33766 |
| Installation manual | | |
| | 47104 | |

Note: the locking of safety shutters is integrated.

Clusters



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

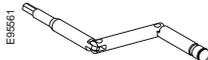
64906

Table : number of clusters required for the different chassis models

| Chassis rating (A) | Masterpact NT | |
|--------------------|---------------|----|
| | 3P | 4P |
| 250 | 12 | 18 |
| 630 | 12 | 18 |
| 800 | 12 | 18 |
| 1000 | 12 | 18 |
| 1250 | 12 | 18 |
| 1600 | 18 | 24 |

Note: the minimum order is 6 parts.

Racking handle / 1 part

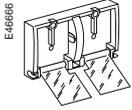


Racking handle

47098

Circuit breaker locking

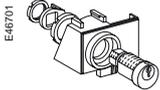
Pushbutton locking device / 1 part



| | |
|-------------|-------|
| By padlocks | 33897 |
|-------------|-------|

| | |
|---------------------|-------|
| Installation manual | 47103 |
|---------------------|-------|

OFF position locking / 1 part



| | |
|-----------------------------------|-------|
| By padlocks + BPFE support | 47514 |
|-----------------------------------|-------|

| | |
|--|--|
| By Profalux keylocks + BPFE support | |
|--|--|

| | | |
|----------|------------------------------------|-------|
| Profalux | 1 lock with 1 key + adaptation kit | 64918 |
|----------|------------------------------------|-------|

| | | |
|--|--------------------------------|-------|
| | 2 locks 1 key + adaptation kit | 64919 |
|--|--------------------------------|-------|

| | |
|--|--|
| 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 + BPFE support | |
|---|--|

| | | |
|-------|------------------------------------|-------|
| Ronis | 1 lock with 1 key + adaptation kit | 64920 |
|-------|------------------------------------|-------|

| | | |
|--|--------------------------------|-------|
| | 2 locks 1 key + adaptation kit | 64921 |
|--|--------------------------------|-------|

| | |
|---|--|
| 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 | 47515 |
|-----------------------------------|-------------------------|-------|

| | | |
|--|----------------------|-------|
| | adaptation kit Ronis | 47516 |
|--|----------------------|-------|

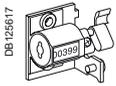
| | | |
|--|---------------------|-------|
| | adaptation kit Kirk | 47517 |
|--|---------------------|-------|

| | | |
|--|------------------------|-------|
| | adaptation kit Castell | 47518 |
|--|------------------------|-------|

| | |
|---------------------|-------|
| Installation manual | 47103 |
|---------------------|-------|

Other circuit breaker accessories

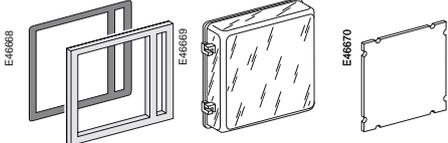
Mechanical operation counter / 1 part



| | |
|-----------------------|-------|
| Operation counter CDM | 33895 |
|-----------------------|-------|

| | |
|---------------------|-------|
| Installation manual | 47103 |
|---------------------|-------|

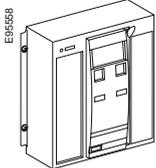
Escutcheon and accessories / 1 part



| | Fixed | Drawout |
|---------------------------|-------|---------|
| Escutcheon | 33718 | 33857 |
| Transparent cover (IP54) | | 33859 |
| Escutcheon blanking plate | | 33858 |

| | | | | |
|------------|--|--|---------------------|-------|
| Escutcheon | | | Installation manual | 47103 |
|------------|--|--|---------------------|-------|

Front cover (3P / 4P) / 1 part



| | |
|-------------|-------|
| Front cover | 47094 |
|-------------|-------|

| | |
|---------------------|-------|
| Installation manual | 47103 |
|---------------------|-------|

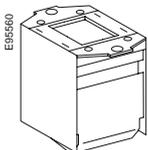
Spring charging handle / 1 part



| | |
|------------------------|-------|
| Spring charging handle | 47092 |
|------------------------|-------|

| | |
|---------------------|-------|
| Installation manual | 47103 |
|---------------------|-------|

Arc chute for Masterpact NT / 1 part

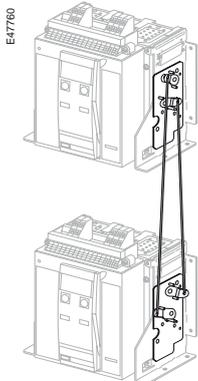


| | 3P | 4P |
|------------|-----------|-----------|
| Type H1/H2 | 3 x 47095 | 4 x 47095 |
| Type L1 | 3 x 47096 | 4 x 47096 |

| | |
|---------------------|-------|
| Installation manual | 47103 |
|---------------------|-------|

Mechanical interlocking for source changeover

Interlocking using connecting rods



Complete assembly with 2 adaptation fixtures + rods

2 Masterpact NT fixed devices

33912

2 Masterpact NT drawout devices

33913

Note: the installation manual is enclosed.

Interlocking using cables⁽¹⁾

Choose 2 adaptation fixtures (1 for each breaker) + 1 set of cables

1 adaptation fixture for Masterpact NT fixed devices

33200

1 adaptation fixture for Masterpact NT drawout devices

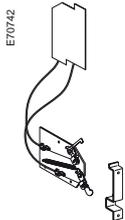
33201

1 set of 2 cables

33209

⁽¹⁾ Can be used with any combination of NT or NW, fixed or drawout devices.

Cable-type door interlock



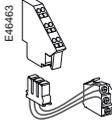
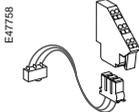
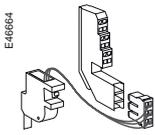
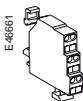
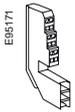
1 complete assembly for Masterpact NT fixed devices

33920

1 complete assembly for Masterpact NT drawout devices

33921

Note: the installation manual is enclosed.

| Indication contacts | | |
|---|--|---|
| ON/OFF indication contacts (OF) / 1 part | | |
|  | Changeover contacts (6 A - 240 V) | 47076 |
| | 1 low-level OF to replace 1 standard OF (4 max.) | 47077 |
| | Wiring | For fixed circuit breaker 47074 For drawout circuit breaker 33098 |
| | Installation manual | 47103 |
| | “Fault trip” indication contacts (SDE) / 1 part | |
|  | 1 additional SDE (5 A - 240 V) | 47078 |
| | 1 additional low-level SDE | 47079 |
| | Wiring | For fixed circuit breaker 47074 For drawout circuit breaker 33098 |
| | Installation manual | 47103 |
| | “Ready to close” contact (1 max.) / 1 part | |
|  | 1 changeover contact (5 A - 240 V) | PF |
| | 1 low-level changeover contact | 47080 |
| | Wiring | For fixed circuit breaker 47081 For drawout circuit breaker 47074 33098 |
| | Installation manual | 47103 |
| | Electrical closing pushbutton / 1 part | |
|  | 1 pushbutton | BPFE 64917 |
| | Installation manual | 47103 |
| | Carriage switches (connected / disconnected / test position) / 1 part | |
|  | Changeover contacts (6 A - 240 V) | |
| | 1 connected position contact (3 max.) | 33170 |
| | 1 test position contact (1 max.) | 33170 |
| | 1 disconnected position contact (2 max.) | 33170 |
| | And/or low-level changeover contacts | |
| | 1 connected position contact (3 max.) | 33171 |
| | 1 test position contact (1 max.) | 33171 |
| 1 disconnected position contact (2 max.) | 33171 | |
| Auxiliary terminals for chassis alone | | |
|  | 3 wire terminal (1 part), terminal block (1 part) | 33098 |
| | Jumpers (10 parts) | 47900 |
| | Installation manual | 47104 |

| Instructions | | |
|--|-----------------|-------|
| Chassis accessories | | 47104 |
| Circuit breaker accessories | | 47103 |
| Fixed and drawout circuit breaker | | 47102 |
| Micrologic user manual | 20/50 (French) | 33076 |
| | 20/50 (English) | 33077 |
| | 2A/7A (French) | 33079 |
| | 2A/7A (English) | 33080 |
| | 2E/6E (French) | 33079 |
| | 2E/6E (English) | 33080 |
| | 5P/7P (French) | 33082 |
| | 5P/7P (English) | 33083 |
| | 5H/7H (French) | 33085 |
| | 5H/7H (English) | 33086 |
| NT user manual | French | 47106 |
| | English | 47107 |
| Modbus communication notice for manual | | 33088 |

Portable data acquisition

Masterpact GetnSet (*)

| | |
|---|-------|
| Masterpact GetnSet product with battery and accessories | 48789 |
| Spare battery for Masterpact GetnSet product | 48790 |
| Spare cable for Masterpact GetnSet product | 48791 |

Monitoring and control

ULP display module (1)



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

ULP wiring accessories



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



| | |
|----------------------------|-----------------|
| 10 Modbus line terminators | VW3A8306DRC (2) |
|----------------------------|-----------------|



| | |
|---------------------------------|----------|
| 5 RJ45 connectors female/female | TRV00870 |
|---------------------------------|----------|



| | |
|-------------------------|----------|
| 10 ULP line terminators | TRV00880 |
|-------------------------|----------|



| | |
|----------------------------------|----------|
| 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

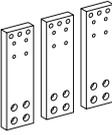
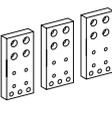
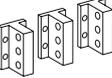
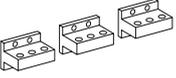
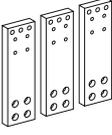
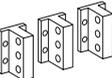
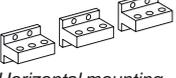
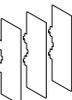
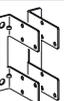
| | |
|----------------|---------------------|
| RS485/Ethernet | EGX100MG/EGX300 (*) |
|----------------|---------------------|

(1) For measurement display with Micrologic A, E, P and H.

(2) See Telemecanique catalogue.

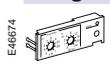
(*) Consult us.

Connection

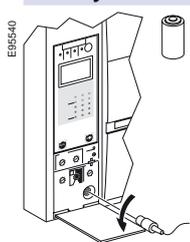
| | | | 3P | 4P |
|--|--|-------------------------|----------|----------|
| Fixed circuit breakers | | | | |
| Front connection / Replacement kit (3 or 4 parts) | | | | |
|   | 800-1600 A | Top | 47990 | 47991 |
| | 2000/3200 A | Top | 47992 | 47993 |
| | | | | |
|   | 800-1600 A | Bottom | 47932 | 47933 |
| | 2000/3200 A | Bottom | 47942 | 47943 |
| Installation manual | | | 47950 | |
| Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts) | | | | |
|   | 800-2000 A | Vertical | 47964 | 47965 |
| | | Horizontal | 47964 | 47965 |
|   | 2500/3200 A | Vertical | 47966 | 47967 |
| | | Horizontal | 47966 | 47967 |
| Vertical mounting | | 4000 A | 47968 | 47969 |
| Horizontal mounting | | 4000b/5000 A | 2x 47966 | 2x 47967 |
| | | | 2x 47966 | 2x 47967 |
| | | 6300 A | 2x 47968 | 2x 47969 |
| Installation manual | | | 47950 | |
| Drawout circuit breakers | | | | |
| Front connection / Replacement kit (3 or 4 parts) | | | | |
|   | 800-1600 A | Top or bottom | 47960 | 47961 |
| | 2000/3200 A | Top or bottom | 47962 | 47963 |
| Installation manual | | | 47950 | |
| Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts) | | | | |
|   | 800-2000 A types N1/H1/H2 | Vertical | 47964 | 47965 |
| | | Horizontal | 47964 | 47965 |
|   | 2500/3200 A types H1/H2 | Vertical | 47966 | 47967 |
| | | Horizontal | 47966 | 47967 |
| Vertical mounting | | 2000/3200 A types H3/L1 | 47966 | 47967 |
| Horizontal mounting | | 4000 A | 47968 | 47969 |
| | | | 47970 | 47971 |
| | | 4000b/5000 A | 2x 47966 | 2x 47967 |
| | | | 2x 47966 | 2x 47967 |
| | | 6300 A | 2x 47968 | 2x 47969 |
| Installation manual | | | 47950 | |
| Connection accessories | | | | |
| Disconnectable front-connection adapter for fixed circuit breaker (3 or 4 parts) | | | | |
|   | 1600 A | | 48464 | 48466 |
| | 2000/3200 A | | 48465 | 48467 |
| Installation manual | | | 47950 | |
| Interphase barriers / Replacement kit (3 parts) | | | | |
|   | For fixed rear-connected circuit breaker | | 48599 | 48599 |
| | For drawout rear-connected circuit breaker | | 48600 | 48600 |
| Installation manual | | | 47950 | |
| Additional support brackets for mounting on a backplate | | | | |
|   | For fixed rear-connected circuit breaker (2 parts) | | | 47829 |

Replacement parts for Micrologic control units

Long-time rating plug (limits setting range for higher accuracy) / 1 part

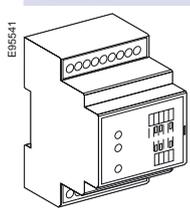
| | | | |
|---|------------------------------|-----------------|-------|
|  | Standard | 0.4 at 1 x Ir | 33542 |
| | Low-setting option | 0.4 at 0.8 x Ir | 33543 |
| | High-setting option | 0.8 at 1 x Ir | 33544 |
| | Without long-time protection | off | 33545 |

Battery + cover

| | | | |
|---|------------------|------------------------|-------|
|  | Battery (1 part) | | 33593 |
| | Cover (1 part) | For Micrologic A, E | 33592 |
| | | For Micrologic P and H | 47067 |

Communication option

Chassis

| | | | |
|--|-----------------------------------|--|-------|
|  | Modbus COM | | 64915 |
| | 6 wires terminal drawout (1 part) | | 47850 |
| | 6 wires terminal fixed (1 part) | | 47075 |
| | Installation manual | | 33088 |

External sensors

External sensor for earth-fault protection (TCE) / 1 part

| | | | |
|---|---------------|-------------|-------|
|  | Sensor rating | 400/2000 A | 34035 |
| | | 1000/4000 A | 34036 |
| | | 4000/6300 A | 48182 |

Source ground return (SGR) earth-fault protection / 1 part

| | | | |
|---|-----------------------|--|-------|
|  | External sensor (SGR) | | 33579 |
| | MDGF summing module | | 48891 |

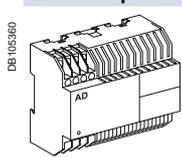
Rectangular sensor for earth-leakage protection + Vigi cable / 1 part (up to 3200 A)

| | | | |
|---|-----------------|--|-------|
|  | 280 mm x 115 mm | | 33573 |
| | 470 mm x 160 mm | | 33574 |

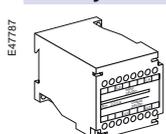
Vigi cable or external voltage cable / 1 part

| | | |
|--------------------------------------|--|-------|
| Vigi cable or external voltage cable | | 47090 |
|--------------------------------------|--|-------|

External power supply module (AD) / 1 part

| | | | |
|---|--------------|--|-------|
|  | 24-30 V DC | | 54440 |
| | 48-60 V DC | | 54441 |
| | 100-125 V DC | | 54442 |
| | 110-130 V AC | | 54443 |
| | 200-240 V AC | | 54444 |
| | 380-415 V AC | | 54445 |

Battery module (BAT) / 1 part

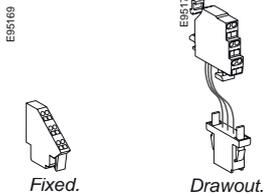
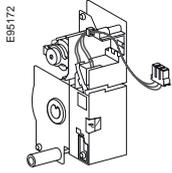
| | | | |
|---|-----------|---------|-------|
|  | 1 battery | 24 V DC | 54446 |
|---|-----------|---------|-------|

Test equipments / 1 part

| | | | |
|---|--|--|-------|
|  | Hand held test kit (HHTK) | | 33594 |
| | Full function test kit (FFTK) | | 33595 |
| | Test report edition come from FFTK | | 34559 |
| | FFTK test cable 2 pin for STR trip unit | | 34560 |
| | FFTK test cable 7 pin for Micrologic trip unit | | 33590 |

Remote operation

Gear motor

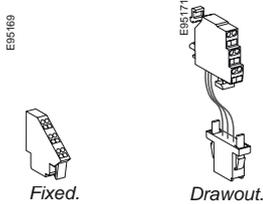
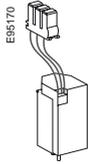


MCH (1 part)

| | | |
|-------------------------|-----------------------------|-------|
| AC 50/60 Hz | 48 V | 47889 |
| | 100/130 V | 47893 |
| | 200/240 V | 47894 |
| | 250/277 V | 47895 |
| | 380/415 V | 47896 |
| | 440/480 V | 47897 |
| DC | 24/30 V | 47888 |
| | 48/60 V | 47889 |
| | 100/125 V | 47890 |
| | 200/250 V | 47891 |
| Terminal block (1 part) | For fixed circuit breaker | 47074 |
| | For drawout circuit breaker | 47849 |

| | |
|---------------------|-------|
| Installation manual | 47951 |
|---------------------|-------|

Closing and opening release (XF or MX)



Standard coil (1 part)

| | | |
|-------------|---------------------|-------|
| AC 50/60 Hz | 12 V DC | 33658 |
| | 24/30 V DC, 24 V AC | 33659 |
| | 48/60 V DC, 48 V AC | 33660 |
| | 100/130 V AC/DC | 33661 |
| | 200/250 V AC/DC | 33662 |
| | 277 V AC | 33663 |
| DC | 380/480 V AC | 33664 |

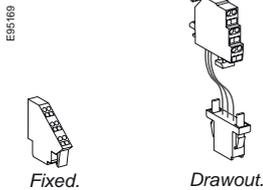
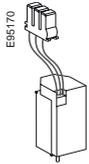
Communicating coil (1 part)

| | | |
|-------------|---------------------|-------|
| AC 50/60 Hz | 12 V DC | 33032 |
| | 24/30 V DC, 24 V AC | 33033 |
| | 48/60 V DC, 48 V AC | 33034 |
| | 100/130 V AC/DC | 33035 |
| | 200/250 V AC/DC | 33036 |
| | 277 V AC | 33037 |
| DC | 380/480 V AC | 33038 |

| | | |
|-------------------------|-----------------------------|-------|
| Terminal block (1 part) | For fixed circuit breaker | 47074 |
| | For drawout circuit breaker | 47849 |

| | |
|---------------------|-------|
| Installation manual | 47951 |
|---------------------|-------|

Undervoltage release MN



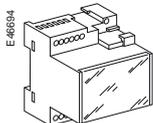
Undervoltage release (1 part)

| | | |
|-------------|---------------------|-------|
| AC 50/60 Hz | 24/30 V DC, 24 V AC | 33668 |
| | 48/60 V DC, 48 V AC | 33669 |
| | 100/130 V AC/DC | 33670 |
| | 200/250 V AC/DC | 33671 |
| DC | 380/480 V AC | 33673 |

| | | |
|-------------------------|-----------------------------|-------|
| Terminal block (1 part) | For fixed circuit breaker | 47074 |
| | For drawout circuit breaker | 47849 |

| | |
|---------------------|-------|
| Installation manual | 47951 |
|---------------------|-------|

MN delay unit



MN delay unit (1 part)

| | | | | |
|-------------|-----------------|--------------------|-----------------|-------|
| AC 50/60 Hz | 48/60 V AC/DC | R (non-adjustable) | Rr (adjustable) | |
| | | | 33680 | |
| | DC | 100/130 V AC/DC | 33684 | 33681 |
| | | 200/250 V AC/DC | 33685 | 33682 |
| DC | 380/480 V AC/DC | | 33683 | |

| | |
|---------------------|-------|
| Installation manual | 47951 |
|---------------------|-------|

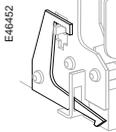
Chassis locking

"Disconnected" position locking / 1 part



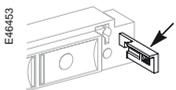
| By padlocks | | |
|--|--|----------|
| | VCPO | Standard |
| By Profalux keylocks | | |
| Profalux | 1 lock with 1 key + adaptation kit | 64934 |
| | 2 locks 1 keys + adaptation kit | 64935 |
| | 2 locks 2 different keys + adaptation kit | 64936 |
| 1 keylock Profalux (without adaptation kit): | | |
| | 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 keys + 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



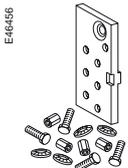
| | | |
|--|--|-------|
| | Right and left-hand side of chassis (VPECD or VPECG) | 47914 |
| | Installation manual | 47952 |

Racking interlock



| | | |
|--|---------------------|-------|
| | 5 parts | 64940 |
| | Installation manual | 47952 |

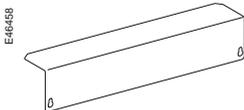
Breaker mismatch protection / 1 part



| | | |
|--|-----------------------------------|-------|
| | Breaker mismatch protection (VDC) | 33767 |
| | Installation manual | 47952 |

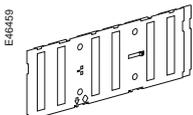
Chassis accessories

Auxiliary terminal shield (CB) / 1 part



| | | | |
|--|---------------------|----|-------|
| | 800/4000 A | 3P | 64942 |
| | | 4P | 48596 |
| | 4000b/6300 A | 3P | 48597 |
| | | 4P | 48598 |
| | Installation manual | | 47952 |

Safety shutters + locking block / 1 part



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

Shutter locking block (for replacement) / 1 part



| | | |
|--|------------------------|-------|
| | 2 parts for 800/4000 A | 48591 |
| | Installation manual | 47952 |

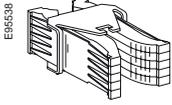
Earthing kit for chassis

Types for N1/H1/NA/HA

| | | |
|--|-------|-------|
| | 3P | 4P |
| | 48433 | 48434 |

Note: the installation manual is enclosed.

Clusters



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

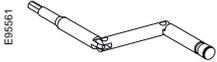
64906

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

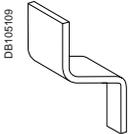


Racking handle

47944

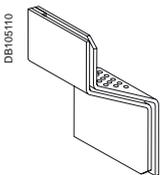
DC rear connection

Serial connection kit



For NW10/20 DC

48642

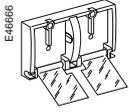


For NW40 DC

48643

Circuit breaker locking

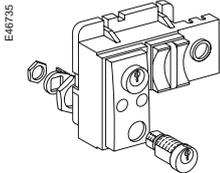
Pushbutton locking device / 1 part



By padlocks 48536

Installation manual 47951

OFF position locking / 1 part



By padlocks 48539

By Profalux keylocks

| | | |
|----------|---|-------|
| Profalux | 1 lock with 1 key + adaptation kit | 64928 |
| | 2 locks 1 keys + 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 keys + 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 |

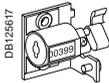
Adaptation kit (without keylock):

| | | |
|--|---------------------------------|-------|
| | adaptation kit Profalux / Ronis | 64925 |
| | adaptation kit Kirk | 64927 |
| | adaptation kit Castell | 64926 |

Installation manual 47951

Other circuit breaker accessories

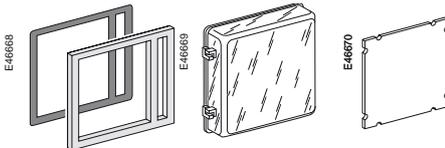
Mechanical operation counter / 1 part



Operation counter CDM 48535

Installation manual 47951

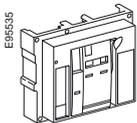
Escutcheon and accessories / 1 part



| | | |
|---------------------------|-------|---------|
| Escutcheon | Fixed | Drawout |
| Transparent cover (IP 54) | 48601 | 48603 |
| Escutcheon blanking plate | 48605 | 48605 |

Installation manual 47951

Front cover (3P / 4P) / 1 part



Front cover 47939

Installation manual 47951

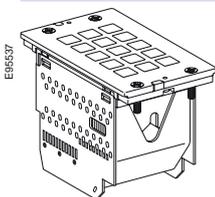
Spring charging handle / 1 part



Spring charging handle 47940

Installation manual 47951

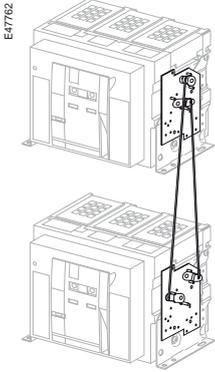
Arc chute for Masterpact NW / 1 part



| | 3P | 4P |
|----------------------------|-----------|-----------|
| Type N1 | 3 x 47935 | 4 x 47935 |
| Type H1/H2 (NW08 to NW40) | 3 x 47935 | 4 x 47935 |
| Type H1/H2 (NW40b to NW63) | 6 x 47936 | 8 x 47936 |
| Type H3 | 3 x 47936 | 4 x 47936 |
| Type L1 | 3 x 47937 | 4 x 47937 |
| Type NW DC | 3 x 47934 | 4 x 47934 |
| Installation manual | | 47951 |

Mechanical interlocking for source changeover

Interlocking of 2 devices using connecting rods



Complete assembly with 2 adaptation fixtures + rods

2 Masterpact NW fixed devices

48612

2 Masterpact NW drawout devices

48612

Can be used with 1 NW fixed + 1 NW drawout.

Note: the installation manual is enclosed.

Interlocking of 2 devices using cables ⁽¹⁾

Choose 2 adaptation sets (1 for each device + 1 set of cables)

1 adaptation fixture for Masterpact NW fixed devices

47926

1 adaptation fixture for Masterpact NW drawout devices

47926

1 set of 2 cables

33209

⁽¹⁾ Can be used with any combination of NT or NW, fixed or drawout devices.

Interlocking of 3 devices using cables

Choose 3 adaptation (including 3 adaptation fixtures + cables)

3 sources, only 1 device closed, fixed or drawout devices

48610

2 sources + 1 coupling, fixed or drawout devices

48609

2 normal + 1 replacement source, fixed or drawout devices

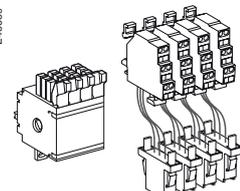
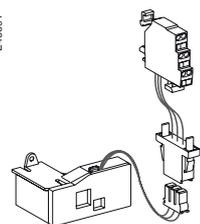
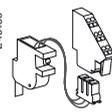
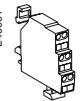
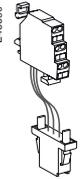
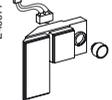
48608

Cable-type door interlock

1 complete assembly for Masterpact NW fixed or drawout device

48614

Note: the installation manual is enclosed.

| 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 | | | |
|  | 1 changeover contact (5 A - 240 V) | PF | |
| | 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 actuators 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 | | | |
|  | 1 pushbutton | BPFE | |
| | | 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 | |

| Instructions | | |
|--|-----------------|-------|
| Chassis accessories | | 47952 |
| Circuit breaker accessories | | 47951 |
| Fixed and drawout circuit breaker | | 47950 |
| User manual | NW AC (French) | 47954 |
| | NW AC (English) | 47955 |
| | NW DC (French) | 64923 |
| | NW DC (English) | 64924 |
| Micrologic user manual | 20/50 (French) | 33076 |
| | 20/50 (English) | 33077 |
| | 2A/7A (French) | 33079 |
| | 2A/7A (English) | 33080 |
| | 2E/6E (French) | 33079 |
| | 2E/6E (English) | 33080 |
| | 5P/7P (French) | 33082 |
| | 5P/7P (English) | 33083 |
| | 5H/7H (French) | 33085 |
| | 5H/7H (English) | 33086 |
| Modbus communication notice for manual | | 33088 |

Portable data acquisition

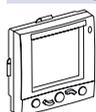
Masterpact GetnSet (*)

| | |
|---|-------|
| Masterpact GetnSet product with battery and accessories | 48789 |
| Spare battery for Masterpact GetnSet product | 48790 |
| Spare cable for Masterpact GetnSet product | 48791 |

Monitoring and control

ULP display module (1)

DB111440



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

ULP wiring accessories

DB111442



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

DB111443



| | |
|----------------------------|-----------------|
| 10 Modbus line terminators | VW3A8306DRC (2) |
|----------------------------|-----------------|

DB115623



| | |
|---------------------------------|----------|
| 5 RJ45 connectors female/female | TRV00870 |
|---------------------------------|----------|

DB111444



| | |
|-------------------------|----------|
| 10 ULP line terminators | TRV00880 |
|-------------------------|----------|

DB111445



| | |
|----------------------------------|----------|
| 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) For measurement display with Micrologic A, E, P and H.

(2) See Telemecanique catalogue.

(*) Consult us.

To indicate your choice, check the applicable square boxes
 and enter the appropriate information in the rectangles

| Circuit breaker or switch-disconnector | | Qty |
|--|--|----------------------|
| Masterpact type | NT <input type="checkbox"/> NW <input type="checkbox"/> | <input type="text"/> |
| Rating | A <input type="checkbox"/> | <input type="text"/> |
| Sensor rating | A <input type="checkbox"/> | <input type="text"/> |
| Circuit breaker | N1, H1, H2, H3, L1 <input type="checkbox"/> | <input type="text"/> |
| Special circuit breaker | H2 anticorrosion, H10 (NW) <input type="checkbox"/> | <input type="text"/> |
| Special circuit breaker | NW25/32 H1T, NT16 H2T <input type="checkbox"/> | <input type="text"/> |
| Switch-disconnector | NA, HA, HF, ES, HA10 (NW) <input type="checkbox"/> | <input type="text"/> |
| Number of poles | 3 or 4 <input type="checkbox"/> | <input type="text"/> |
| Brand | Schneider Electric <input type="checkbox"/> SD <input type="checkbox"/> | <input type="text"/> |
| Option: neutral on right side (NW) | <input type="checkbox"/> | <input type="text"/> |
| Type of equipment | Fixed <input type="checkbox"/> Drawout with chassis <input type="checkbox"/> Drawout without chassis (moving part only) <input type="checkbox"/> Chassis alone <input type="checkbox"/> | <input type="text"/> |

| Micrologic control unit | | | | |
|----------------------------|---|------------------------------|------------------------------|------------------------------|
| A - ammeter | 2.0 <input type="checkbox"/> | 5.0 <input type="checkbox"/> | 6.0 <input type="checkbox"/> | 7.0 <input type="checkbox"/> |
| E - energy | 2.0 <input type="checkbox"/> | 5.0 <input type="checkbox"/> | 6.0 <input type="checkbox"/> | <input type="checkbox"/> |
| P - power meter | <input type="checkbox"/> | 5.0 <input type="checkbox"/> | 6.0 <input type="checkbox"/> | 7.0 <input type="checkbox"/> |
| H - harmonic meter | <input type="checkbox"/> | 5.0 <input type="checkbox"/> | 6.0 <input type="checkbox"/> | 7.0 <input type="checkbox"/> |
| LR - long-time rating plug | Standard 0.4 to 1 Ir <input type="checkbox"/> Low setting 0.4 to 0.8 Ir <input type="checkbox"/> High setting 0.8 to 1 Ir <input type="checkbox"/> LR OFF <input type="checkbox"/> | | | |

| | | |
|---|--|----------------------|
| AD - external power-supply module | V <input type="checkbox"/> | <input type="text"/> |
| BAT - battery module | <input type="checkbox"/> | <input type="text"/> |
| TCE - external sensor (CT) for neutral and residual earth-fault protection | <input type="checkbox"/> | <input type="text"/> |
| TCE - external sensor (CT) for over sized neutral (3P - Micrologic P / H) and residual earth-fault protection | <input type="checkbox"/> | <input type="text"/> |
| TCW - external sensor for SGR protection | <input type="checkbox"/> | <input type="text"/> |
| Rectangular sensor for earth-leakage protection | NT (280 x 115 mm) <input type="checkbox"/> NW (470 x 160 mm) <input type="checkbox"/> | <input type="text"/> |
| PTE - external voltage connector | <input type="checkbox"/> | <input type="text"/> |

| Communication | | | |
|---|---------------------------------|---------------------------------|--------------------------------------|
| COM module | ModBus <input type="checkbox"/> | Device <input type="checkbox"/> | Chassis <input type="checkbox"/> |
| Eco COM module | ModBus <input type="checkbox"/> | Device <input type="checkbox"/> | Chassis (*) <input type="checkbox"/> |
| (*) for drawout devices, please order 1 Modbus chassis COM module | | | |

| Connection | | |
|---|--|---------------------------------|
| Horizontal | Top <input type="checkbox"/> | Bottom <input type="checkbox"/> |
| Vertical | Top <input type="checkbox"/> | Bottom <input type="checkbox"/> |
| Front | Top <input type="checkbox"/> | Bottom <input type="checkbox"/> |
| Vertical-connection adapters | NT - FC fixed, draw. <input type="checkbox"/> | |
| Cable-lug adapters | NT - FC fixed, draw. <input type="checkbox"/> | |
| Arc chute screen | NT - FC fixed <input type="checkbox"/> | |
| Interphase barriers | NT, NW fixed, drawout <input type="checkbox"/> | |
| Spreaders | NT fixed, drawout <input type="checkbox"/> | |
| Disconnectable front connection adapter | NW fixed <input type="checkbox"/> | |
| Lugs for 240° or 300° cables | NT fixed, drawout <input type="checkbox"/> | |

Micrologic control unit functions:
 2.0 : basic protection (long time + inst.)
 5.0 : selective protection (long time + short time + inst.)
 6.0 : selective + earth-fault protection (long time + short time + inst. + earth-fault)
 7.0 : selective + earth-leakage protection (long time + short time + inst. + earth-leakage)

| Indication contacts | | | |
|--|--|----------------------|--------------------------|
| OF - ON/OFF indication contacts | | | |
| Standard | 4 OF 6 A-240 V AC (10 A-240 V AC and low-level for NW) | <input type="text"/> | <input type="text"/> |
| Alternate | 1 OF low-level for NT | Max. 4 | qty <input type="text"/> |
| Additional | 1 block of 4 OF for NW | Max. 2 | qty <input type="text"/> |
| EF - combined "connected/closed" contacts | | | |
| | 1 EF 6 A-240 V AC for NW | Max. 8 | qty <input type="text"/> |
| | 1 EF low-level for NW | Max. 8 | qty <input type="text"/> |

| | | | |
|---|--------------------------|--------------------------|--|
| SDE - "fault-trip" indication contact | | | |
| Standard | 1 SDE 6 A-240 V AC | <input type="text"/> | <input type="text"/> |
| Additional | 1 SDE 6 A-240 V AC | <input type="checkbox"/> | 1 SDE low level <input type="checkbox"/> |
| Programmable contacts | | | |
| | 2 M2C contacts | <input type="checkbox"/> | 6 M6C contacts <input type="checkbox"/> |
| Carriage switches | Low level | <input type="checkbox"/> | 6 A-240 V AC <input type="checkbox"/> |
| CE - "connected" position | Max. 3 for NW/NT | <input type="checkbox"/> | qty <input type="text"/> |
| CD - "disconnected" position | Max. 3 for NW - 2 for NT | <input type="checkbox"/> | qty <input type="text"/> |
| CT - "test" position | Max. 3 for NW - 1 for NT | <input type="checkbox"/> | qty <input type="text"/> |
| AC - NW actuator for 6 CE - 3 CD - 0 CT additional carriage switches | | | |
| | | <input type="checkbox"/> | qty <input type="text"/> |

| Remote operation | | | |
|--------------------------------------|---------------------------------------|---|----------------------|
| Remote ON/OFF | | | |
| MCH - gear motor | <input type="checkbox"/> | V | <input type="text"/> |
| XF - closing voltage release | <input type="checkbox"/> | V | <input type="text"/> |
| MX - opening voltage release | <input type="checkbox"/> | V | <input type="text"/> |
| PF - "ready to close" contact | Low level <input type="checkbox"/> | | <input type="text"/> |
| | 6 A-240 V AC <input type="checkbox"/> | | <input type="text"/> |
| BPFE - electrical closing pushbutton | <input type="checkbox"/> | V | <input type="text"/> |
| RES - electrical reset option | <input type="checkbox"/> | V | <input type="text"/> |
| RAR - automatic reset option | <input type="checkbox"/> | | <input type="text"/> |
| Remote tripping | | | |
| MN - undervoltage release | <input type="checkbox"/> | V | <input type="text"/> |
| R - delay unit (non-adjustable) | <input type="checkbox"/> | | <input type="text"/> |
| Rr - adjustable delay unit | <input type="checkbox"/> | | <input type="text"/> |
| 2 nd MX - shunt release | <input type="checkbox"/> | V | <input type="text"/> |

| Locking | | | |
|--|--|-----------------------------------|--------------------------------|
| VBP - ON/OFF pushbutton locking (by transparent cover + padlocks) | | | |
| <input type="checkbox"/> | | | |
| OFF position locking: | | | |
| VCPO - by padlocks | <input type="checkbox"/> | | <input type="text"/> |
| VSPO - by keylocks | Keylock kit (w/o keylock) <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | 1 keylock <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | 2 identical keylocks, 1 key <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | 2 keylocks, different keys (NW) <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |

| | | | |
|--|---|-----------------------------------|----------------------------------|
| Chassis locking in "disconnected" position: | | | |
| VSPP - by keylocks | Keylock kit (w/o keylock) <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | | Kirk <input type="checkbox"/> | Castell <input type="checkbox"/> |
| | 1 keylock <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | 2 identical keylocks, 1 key <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | 2 keylocks, different keys <input type="checkbox"/> | Profalux <input type="checkbox"/> | Ronis <input type="checkbox"/> |
| | Optional connected/disconnected/test position lock <input type="checkbox"/> | | |

| | |
|--|---|
| VPEC - door interlock | On right-hand side chassis <input type="checkbox"/> On left-hand side chassis <input type="checkbox"/> |
| VPOC - racking interlock | <input type="checkbox"/> |
| IPA - cable-type door interlock | <input type="checkbox"/> |
| VDC - mismatch protection | <input type="checkbox"/> |
| VIVC - shutter position indication and locking for NW | <input type="checkbox"/> |
| IBPO - racking interlock between crank and OFF pushbutton for NW | <input type="checkbox"/> |
| DAE - automatic spring discharge before breaker removal for NW | <input type="checkbox"/> |

| Accessories | | | |
|---|--|--|---|
| VO - safety shutters on chassis for NT and NW | <input type="checkbox"/> | | X |
| CDM - mechanical operation counter NT, NW | <input type="checkbox"/> | | |
| CB - auxiliary terminal shield for chassis NT, NW | <input type="checkbox"/> | | |
| CC - arc chute cover for fixed NT | <input type="checkbox"/> | | |
| CDP - escutcheon NT, NW | <input type="checkbox"/> | | |
| CP - transparent cover for escutcheon NT, NW | <input type="checkbox"/> | | |
| OP - blanking plate for escutcheon NT, NW | <input type="checkbox"/> | | |
| Brackets for mounting | NW fixed <input type="checkbox"/> | On backplates <input type="checkbox"/> | |
| Test kits | Mini test kit <input type="checkbox"/> | Portable test kit <input type="checkbox"/> | |

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