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<th>circuit breaker or switch-disconnector</th>
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<tr>
<td>Rated operational voltage</td>
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<td>Rated insulation level</td>
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<tr>
<td>Rated short-time withstand current</td>
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<tr>
<td>Rated current (x 100 A)</td>
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<td>Performance level</td>
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<td>Suitability for isolation</td>
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<td>Impulse withstand voltage</td>
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<td>50/60Hz</td>
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<td>UNE AS NEMA</td>
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</table>
Masterpact circuit breakers are available in drawout and fixed versions. The drawout version is mounted on a chassis and the fixed version is installed using fixing brackets.

**Drawout version**

**Fixed version**
Discovering Masterpact

Components

Drawout circuit breaker / switch-disconnector (moving part)

- XF closing release
- MX1 opening release
- MX2 opening release or MN undervoltage release
- Terminals for control unit, fault indication contacts, control auxiliaries and auxiliary contacts
- SDE1 "fault-trip" indication contact
- Carrying grip
- Side plate for drawout device
- SDE2 "fault-trip" indication contact or Res electrical remote reset
- Control unit

- OF "ON/OFF" indication contacts
- PF "ready to close" contact
- Operating-mechanism charging handle
- MCH gear motor for electrical charging of the operating mechanism
- Keylock for locking in open position
- BPF E electrical closing pushbutton
- BPF E electrical closing pushbutton
- Closing pushbutton
- Opening pushbutton
- Operation counter

- Padlock for locking in open position

Discovering Masterpact Components
Fixed circuit breaker / switch-disconnector

- MX1 opening release
- MX2 opening release or MN under voltage release
- Terminals for control unit and fault indication contacts
- SDE1 "fault-trip" indication contact
- MX2 opening release or MN under voltage release
- SDE2 "fault-trip" indication contact or Res electrical remote reset
- Control auxiliary terminals
- Auxiliary contact terminals
- OF "ON/OFF" indication contacts
-PF "ready to close" contact
- Operating-mechanism charging handle
- MCH gear motor for electrical charging of the operating mechanism
- Keylock for locking in open position
- BPFE electrical closing pushbutton
- BPFE electrical closing pushbutton
- Padlock for locking in open position
- Closing pushbutton
- Opening pushbutton
- Operation counter
- Carrying grip
- Control unit
- XF closing release
- Arc chute
- Side plate for fixed device
- Auxiliary contact terminals
- Rating plate
- Locking by padlock, lead-seal cover or screws for pushbuttons
- Trip indication button used to reset before closing
- Indicator for position of the main contacts
- "Springs charged" and "Ready to close" indicator

Discovering Masterpact Components
Understanding the controls and indications

- Circuit breaker open and discharged
- Circuit breaker closed and discharged
- Circuit breaker open, charged and not "ready to close"
- Circuit breaker closed and charged
- Circuit breaker open, charged and "ready to close"
The charge status is indicated as follows.

The springs in the circuit breaker operating mechanism must be charged to store the energy required to close the main contacts. The springs may be charged manually using the charging handle or automatically by the optional MCH gear motor.

Manual charging.
Pull the handle down six times until you hear a "clack".

Automatic charging.
If the MCH gear motor is installed, the spring is automatically recharged after each closing.
Closing conditions
Closing (i.e. turning the circuit ON) is possible only if the circuit breaker is "ready to close".
The prerequisites are the following:
- device open (OFF)
- springs charged
- no opening order present.

The circuit breaker will not close unless it is "ready to close" when the order is given. An opening order always takes priority over a closing order.

Locally (mechanical)
Press the mechanical ON pushbutton.

Locally (electrical)
Press the electrical closing pushbutton. By adding an XF closing release, the circuit breaker can be closed locally. 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.

Remotely
By adding an XF closing release, the circuit breaker can be closed remotely. When connected to a remote control panel, the XF closing release can close the circuit breaker remotely.

Anti-pumping function
The purpose of the mechanical anti-pumping function is to ensure that a circuit breaker receiving simultaneous opening and closing orders does not open and close indefinitely.
If there is a continuous closing order, after opening the circuit breaker remains open until the closing order is discontinued. A new closing order is required to close the circuit breaker. A new order is not required if the closing release is wired in series with the PF "ready to close" contact.
Opening the circuit breaker

Locally
Press the OFF pushbutton.

Remotely
Use one of the following solutions:
- one or two MX opening releases (MX1 and MX2)
- one MN undervoltage release
- one MN undervoltage release with a delay unit.

When connected to a remote control panel, these releases can be used to open the circuit breaker remotely.

**MX1, MX2, MN**

**MN delay unit**
Using Masterpact

Resetting after a fault trip

The circuit breaker signals a fault trip by:
- a mechanical indicator on the front
- one or two SDE "fault-trip" indication contacts (SDE2 is optional).

Locally
If the circuit breaker is not equipped with the automatic reset option, reset it manually.

Remotely
Use the Res electrical remote reset option (not compatible with an SDE2).
Locking the controls
Disabling circuit-breaker local closing and opening

Pushbutton locking using a padlock (shackle diameter 5 to 8 mm), a lead seal or screws.

**Locking**
Close the covers.
Insert the padlock shackle, lead seal or screws.

**Unlocking**
Remove the padlock, lead seal or screws.
Lift the covers and swing them down.
The pushbuttons are no longer locked.
Combination of locking systems
To disable local and remote circuit-breaker closing, use as needed 1 to 3 padlocks or a keylock.

Install one to three padlocks
(maximum shackle diameter 5 to 8 mm)

Locking
Open the circuit breaker. Pull out the tab. Insert the padlock shackle.

Check
The closing control is inoperative.

Unlocking
Remove the padlock.
Locking the controls with a keylock

Locking
Open the circuit breaker. Turn the key. Remove the key.

Check
The closing control is inoperative.

Unlocking
Insert the key. Turn the key. The key cannot be removed.

Four types of keylocks can be installed

- RONIS
- PROFALUX
- CASTELL
- KIRK

Note:
Castell and Kirk keylocks are not provided by Schneider Electric, only the adaptation kit is available.
Using the Masterpact
drawout chassis

Identifying the circuit breaker positions

The indicator on the front signals the position of the circuit breaker in the chassis.

- "connected" position

- "test" position

- "disconnected" position
These operations require that all chassis-locking functions be disabled (see page 22).

**Prerequisites**
To connect and disconnect Masterpact, the crank must be used. The locking systems, padlocks and the racking interlock all inhibit use of the crank.

**Withdrawing the circuit breaker from the "connected" to "test" position, then to "disconnected" position**

The circuit breaker is in "connected" position. Push the pop-up button before starting to turn the crank.

The circuit breaker is in "test" position.

Remove the crank or continue to "disconnected" position. Push the pop-up button before continuing to turn the crank.

The circuit breaker is in "disconnected" position.

⚠️ STOP
Using the Masterpact drawout chassis

For complete information on Masterpact handling and mounting, see the installation manual(s).

Before mounting the circuit breaker, make sure it matches the chassis in terms of rated current and performance level.

Racking

Removing the rails
Press the release tabs and pull the rails out.

Press the release tabs to push the rails in.

Inserting Masterpact
Position the circuit breaker on the rails. Check that it rests on all four supports.

Open the circuit breaker (in any case, it opens automatically during connection).

If you cannot insert the circuit breaker in the chassis, check that the mismatch protection on the chassis corresponds to that on the circuit breaker.

Push the circuit breaker into the chassis, taking care not to push on the control unit.
Racking the circuit breaker from the "disconnected" to "test" position, then to "connected" position

The device is in "disconnected" position. Push the pop-up button before continuing to turn the crank.

The device is in "test" position. Push the pop-up button before continuing to turn the crank.

The device is in "test" position. Remove the crank or continue to "connected" position.

The device is in "connected" position.
Using the Masterpact drawout chassis

Matching a Masterpact circuit breaker with its chassis

To set up a mismatch-prevention combination for the circuit breaker and the chassis, see the mismatch-prevention installation manual.

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

The possible combinations are listed below.

<table>
<thead>
<tr>
<th>Combination</th>
<th>Identification</th>
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<tbody>
<tr>
<td>A B C</td>
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<td>1 2 4</td>
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<td></td>
<td>1 2 3</td>
</tr>
</tbody>
</table>
Locking the switchboard door

The locking option is installed on the left or right-hand side of the chassis.
- When the circuit breaker is in "connected" or "test" position, the latch is lowered and the door is locked
- When the circuit breaker is in "disconnected" position, the latch is raised and the door is unlocked.

Disabling door opening
Close the door.
Put the Masterpact in "test" or "connected" position.
The door is locked.

Enabling door opening
Put the Masterpact in "disconnected" position.
The door is unlocked.
Using the Masterpact drawout chassis

Locking the circuit breaker in position

Padlocks and keylocks may be used together.

Combination of locking systems
With the circuit breaker in the "disconnected" position, for forbidding its connection in the chassis, use as needed:
- one to three padlocks
- one or two keylocks
- a combination of the two locking systems.

Disabling connection when the circuit breaker is in "disconnected" position, using one to three padlocks (maximum shackle diameter 5 to 8 mm)

Locking
Circuit breaker in "disconnected" position.

1. Pull out the tab.

2. The crank cannot be inserted.

3. Insert the shackle (max. diameter 5 to 8 mm) of the padlock(s).

Unlocking
Remove the padlock(s).

1. Release the tab.

2. The crank can be inserted.

If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position only.
Unlocking

Four types of keylocks are available

- **RONIS**
- **PROFALUX**
- **CASTELL**
- **KIRK**

**Note:**
Castell and Kirk keylocks are not provided by Schneider Electric, only the adaptation kit is available.

Disabling connection when the circuit breaker is in "disconnected" position, using one or two keylocks.

**Locking**

1. Circuit breaker in "disconnected" position.
2. Turn the key(s).
3. Remove the key(s).
4. The crank cannot be inserted.

**Unlocking**

1. Insert the key(s).
2. Turn the key(s).
3. The crank can be inserted.

Padlocks and keylocks may be used together.
Using the Masterpact
drawout chassis

Locking the circuit breaker
in position

Locking the circuit breaker when the door is open

When the door is open, the crank cannot
be inserted.

When the door is closed, the crank
can be inserted.
Using the Masterpact drawout chassis

Locking the safety shutters
Padlocking inside the chassis

Four locking possibilities: using one or two padlocks (maximum shackle diameter 5 to 8 mm) for each shutter

- Top and bottom shutters not locked.
- Top shutter not locked. Bottom shutter locked.
- Top shutter locked. Bottom shutter not locked.
- Top and bottom shutters locked.
Identifying the electrical auxiliaries

Identification of the connection terminals
Layout of terminal blocks
Identifying the electrical auxiliaries

Operation

The ON/OFF indication contacts signal the status of the device main contacts.

Circuit breaker

The carriage switches indicate the "connected", "test" and "disconnected" positions.

Chassis

For information on the separation distance of the main circuits in the "test" and "disconnected" positions, see page 16.

Chassis

For information on the separation distance of the main circuits in the "test" and "disconnected" positions, see page 16.
Identifying the electrical auxiliaries

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

### Power

- **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
  - **UC4**: V1, V2, V3 optional external voltage connector
  - **M2C**: 2 programmable contacts (internal relay);
    - ext. 24 V DC power supply required
    - or
  - **M6C**: 6 programmable contacts (external relay);
    - 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
- **MF**: “Ready to close” contact
- **MX1**: Shunt release (standard or communicating)
- **XF**: Closing release (standard or communicating)
- **MCH**: Gear motor (*)

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

### Symbols

- **A**: Digital ammeter
- **E**: A + energy
- **P**: E+ power meter + programmable protection
- **H**: P + harmonics
Identifying the electrical auxiliaries

Electrical diagrams
Fixed and drawout devices

**Indication contacts**

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

* (*) 440/480 V AC gear motor for charging
  (380 V motor + additional resistor)

**Chassis contacts**

* CD2-CD1: Disconnected-position
  CE3-CE2-CE1: Connected-position
  CT1: Test-position contacts

---

**Key:**
- Drawout device only
- SDE1, OF1, OF2, OF3, OF4 supplied as standard
- Interconnected connections
  (only one wire per connection point)
Discovering Masterpact’s accessories

For the spare parts list, see the Masterpact NT/NW catalogue. For more in-depth information, see the control-unit user manual.

Micrologic control units

- All Masterpact circuit breakers are equipped with a Micrologic control unit. Control units are designed to protect power circuits and loads. Alarms may be programmed for remote indications.
  - Micrologic 2.0 A
  - Micrologic 5.0 A
  - Micrologic 6.0 A
  - Micrologic 7.0 A
  - Micrologic 2.0 E
  - Micrologic 5.0 E
  - Micrologic 6.0 E
  - Micrologic 5.0 P
  - Micrologic 6.0 P
  - Micrologic 7.0 P
  - Micrologic 5.0 H
  - Micrologic 6.0 H
  - Micrologic 7.0 H

Depending on the model, control units offer in addition:
- fault indications
- measurement of electrical parameters (current, voltage, power, etc.)
- harmonic analysis
- communication.

Long-time rating plugs

- Standard accessory, one per control unit
  - standard 0.4 to 1 x Ir setting
  - low 0.4 to 0.8 x Ir setting
  - high 0.8 to 1 x Ir setting
  - off (no long-time protection).
- The plugs determine the setting range for the long-time protection.

M2C and M6C programmable contacts

- Optional accessory, used with Micrologic P and H control units
  - M2C: 2 programmable contacts
  - M6C: 6 programmable contacts
- Contacts can be programmed using the keypad on the control unit or via the COM option
  - They indicate:
    - the type of fault
    - instantaneous or delayed threshold overruns.
- M2C: 2 contacts (5 A - 240 V)
- M6C: 6 contacts (5 A - 240 V).
- Permissible load on each of the M6C relay outputs at cos ϕ = 0.7
  - 240 V AC: 5 A
  - 380 V AC: 3 A
  - 24 V DC: 1.8 A
  - 48 V DC: 1.5 A
  - 125 V DC: 0.4 A
  - 250 V DC: 0.15 A
- M2C: 24 V DC ± 5 % power from control unit
- M6C: 24 V DC ± 5 % external supply
- Maximum consumption: 100 mA.
Indication contacts

ON/OFF indication contacts (OF)
- Standard accessory, 4 OF per device
- OF contacts indicate the position of the main contacts
- They switch when the minimum isolation distance between the main contacts is reached.
- 4 changeover contacts
- Breaking capacity at \( \cos \phi = 0.3 \) (AC12/DC12 as per IEC 60947-5-1)
- Standard, minimum current 10 mA / 24 V
- V AC: 240/380 6 A (rms)
- 480 6 A (rms)
- 690 6 A (rms)
- V DC: 24/48 2.5 A
- 125 0.5 A
- 250 0.3 A
- Low level, minimum current 1 mA / 4 V
- V AC: 24/48 5 A (rms)
- 240 5 A (rms)
- 380 5 A (rms)
- V DC: 24/48 5 / 2.5 A
- 125 0.5 A
- 250 0.3 A

"Fault-trip" indication contact (SDE1)
- Standard accessory on circuit breakers, one SDE1 contact per device
- Not available for switch-disconnector versions.
- Changeover contact
- Breaking capacity at \( \cos \phi = 0.3 \) (AC12/DC12 as per IEC 60947-5-1)
- Standard, minimum current 10 mA / 24 V
- V AC: 240/380 5 A (rms)
- 480 5 A (rms)
- 690 3 A (rms)
- V DC: 24/48 3 A
- 125 0.3 A
- 250 0.15 A
- Low level, minimum current 1 mA / 4 V
- V AC: 24/48 3 A (rms)
- 240 3 A (rms)
- 380 3 A (rms)
- V DC: 24/48 3 A
- 125 0.3 A
- 250 0.15 A

Additional "fault-trip" indication contact (SDE2)
- Optional accessory for circuit breakers, one additional SDE2 contact per device
- Not available for switch-disconnector versions
- Not compatible with the Res option
- The contact remotely indicates device tripping due to an electrical fault.
- Changeover contact
- Breaking capacity at \( \cos \phi = 0.3 \) (AC12/DC12 as per IEC 60947-5-1)
- Standard, minimum current 10 mA / 24 V
- V AC: 240/380 5 A (rms)
- 480 5 A (rms)
- 690 3 A (rms)
- V DC: 24/48 3 A
- 125 0.3 A
- 250 0.15 A
- Low level, minimum current 1 mA / 4 V
- V AC: 24/48 3 A (rms)
- 240 3 A (rms)
- 380 3 A (rms)
- V DC: 24/48 3 A
- 125 0.3 A
- 250 0.15 A
**Indication contacts**

**Electrical reset after fault trip (Res)**
- Optional accessory, one Res per device
- Not compatible with the SDE2 option
- Power supply:
  - 110/130 V AC
  - 220/240 V AC
- The Res option allows the remote resetting of the device following tripping due to an electrical fault.

**"Springs charged" limit switch contact (CH)**
- Contact included with MCH gear motor, one CH contact per device.
- The contact indicates the "charged" status of the operating mechanism (springs charged).
- Changeover contact
- Breaking capacity 50/60 Hz for AC power (AC12 / DC12 as per IEC 60947-5-1):
  - V AC
    - 240: 10 A (rms)
    - 380: 6 A (rms)
    - 480: 6 A (rms)
    - 690: 3 A (rms)
  - V DC
    - 24/48: 3 A
    - 125: 0.5 A
    - 250: 0.25 A

**"Ready to close" contact (PF)**
- One optional PF contact per device
- The contact indicates that the device may be closed because all the following are valid:
  - circuit breaker is open
  - spring mechanism is charged
  - a maintained closing order is not present
  - a maintained opening order is not present.
- Changeover contact
- Breaking capacity at cos $\varphi = 0.3$ (AC12 / DC12 as per IEC 60947-5-1)
  - standard, minimum current 10 mA / 24 V
    - V AC
      - 240/380: 5 A (rms)
      - 480: 5 A (rms)
      - 690: 3 A (rms)
    - V DC
      - 24/48: 3 A
      - 125: 0.3 A
      - 250: 0.15 A
  - low level, minimum current 1 mA / 4 V
    - V AC
      - 24/48: 3 A (rms)
      - 240: 3 A (rms)
      - 380: 3 A (rms)
    - V DC
      - 24/48: 3 A
      - 125: 0.3 A
      - 250: 0.15 A
Discovering Masterpact’s accessories

Auxiliaries for remote operation

Gear motor (MCH)
- Optional accessory, one MCH gear motor per device
- Power supply:
  - V AC 50/60 Hz:
    - 48/60 V AC
    - 100/130 V AC
    - 200/240 V AC
    - 277 V AC
    - 380/415 V AC
    - 400/440 V AC
    - 480 V AC
  - V DC:
    - 24/30 V DC
    - 48/60 V DC
    - 100/125 V DC
    - 200/250 V DC
- The gear motor automatically charges the spring mechanism.
- Operating threshold: 0.85 to 1.1 Un
- Consumption: 180 VA or W
- Inrush current: 2 to 3 In for 0.1 second
- Charging time: 3 seconds max.
- Operating rate: maximum 3 cycles per minute
- CH contact: see page 32.

Opening releases MX1 and MX2, closing release XF
- Optional accessory, 1 or 2 MX releases per device, 1 XF per device
- The function (MX or XF) is determined by where the coil is installed
- Power supply:
  - V AC 50/60 Hz:
    - 24 V AC
    - 48 V AC
    - 100/130 VAC
    - 200/250 V AC
    - 277 V AC
    - 380/480 V AC
  - V DC:
    - 12 V DC
    - 24/30 V DC
    - 48/60 V DC
    - 100/130 V DC
    - 200/250 V DC
- The MX release instantaneously opens the circuit breaker when energised
- The XF release instantaneously closes the circuit breaker when energised, if the device is "ready to close".
- Operating threshold:
  - MX: 0.7 to 1.1 Un
  - XF: 0.85 to 1.1 Un
- Consumption:
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- Circuit-breaker response time at Un:
  - MX: 50 ms ± 10
  - XF: 55 ms ± 10.
Discovering Masterpact’s accessories

Auxiliaries for remote operation

Instantaneous undervoltage releases (MN)
- Optional accessory, 1 MN per device
- Not compatible with the MX2 opening release
- Power supply:
  - V AC 50/60 Hz:
    - 24 V AC
    - 48 V AC
    - 100 / 130 V AC
    - 200 / 250 V AC
    - 380 / 480 V AC
  - V DC:
    - 24 / 30 V DC
    - 48 / 60 V DC
    - 100 / 130 V DC
    - 200 / 250 V DC
- The MN release instantaneously opens the circuit breaker when its supply voltage drops.
- Device response time: 90 ms ±5
- Operating threshold:
  - opening: 0.35 to 0.7 x Un
  - closing: 0.85 x Un
- Consumption:
  - pick-up (80 ms): 200 VA
  - hold: 4.5 VA.

Delay unit for MN releases
- Optional accessory, 1 MNR with delay unit per device.
- Delay-unit (must be ordered in addition to the MN):
  - 48/60 V AC 50/60 Hz / DC
  - 100/130 V AC 50/60 Hz / DC
  - 200/250 V AC 50/60 Hz / DC
  - 380/480 V AC 50/60 Hz / DC.
- The unit delays operation of the MN release to eliminate circuit-breaker nuisance tripping during short voltage dips.
- The unit is wired in series with the MN and must be installed outside the circuit breaker.
- Device response time: 0.5, 1, 1.5, 3 seconds
- Operating threshold:
  - opening: 0.35 to 0.7 x Un
  - closing: 0.85 x Un
- Consumption:
  - pick-up (80 ms): 200 VA
  - hold: 4.5 VA.

Electrical closing pushbutton (BPFE)
- Optional accessory, 1 BPFE per device
- Located on the padlock or keylock locking system, this pushbutton carries out electrical closing of the circuit breaker via the XF release, taking into account all the safety functions that are part of the control/monitoring system of the installation.
- It connects to the input of the COM option.
Wiring of control auxiliaries

Under pick-up conditions, the level of consumption is approximately 150 to 200 VA. Consequently, for low supply voltages (12, 24, 48 V), cables must not exceed a maximum length determined by the supply voltage and the cross-section of the cables.

### Indicative values for maximum cable lengths (in meters)

<table>
<thead>
<tr>
<th></th>
<th>12 V</th>
<th>24 V</th>
<th>48 V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.5 mm²</td>
<td>1.5 mm²</td>
<td>2.5 mm²</td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>source voltage —</td>
<td>58</td>
<td>36</td>
<td>280</td>
</tr>
<tr>
<td>85 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>source voltage —</td>
<td>16</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td>MX-XF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>source voltage 21</td>
<td>12</td>
<td>115</td>
<td>70</td>
</tr>
<tr>
<td>85 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>source voltage 10</td>
<td>6</td>
<td>75</td>
<td>44</td>
</tr>
</tbody>
</table>

**Note:** The indicated length is that for each of the two supply wires.
Device mechanical accessories

Discovering Masterpact’s accessories

Operation counter (CDM)
- Optional accessory, one CDM per device
- The operation counter sums the number of operating cycles.

Escutcheon (CDP)
- Optional accessory, one CDP per device
  - for fixed device
  - for drawout device.
- The CDP increases the degree of protection to IP 40 and IK 07 (fixed and drawout devices).

Transparent cover (CCP)
- Optional accessory, one CCP per device equipped with a CDP
- Mounted with a CDP, the CCP increases the degree of protection to IP 54 and IK 10 (fixed and drawout devices).

Blanking plate (OP)
- Optional accessory, one OP per device
- 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.
Discovering Masterpact’s accessories

Device mechanical accessories

Transparent cover for pushbutton locking using a padlock, lead seal or screws
- Optional accessory, one locking cover per device
- The transparent cover blocks access (together or separately) to the pushbuttons used to open and close the device
- Locking requires a padlock, a lead seal or two screws.

Device locking in the OFF position using a padlock
- Optional accessory, one locking system per device
- The unit inhibits local or remote closing of the device
- Up to three padlocks may be used for locking.

Device OFF position locking kit for keylocks
- Optional accessory: one locking kit (without keylock) per device
- Locks not included:
  - for Profalux keylocks
  - for Ronis keylocks
  - for Castell keylocks
  - for Kirk keylocks.
- The kit inhibits local or remote closing of the device
- Mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in “disconnected” position using one or two keylocks.

Keylocks required for the device OFF position locking kit:
- One keylock per device, Ronis or Profalux type.
- Adaptation kits alone are available for Castell and Kirk keylocks.
Chassis accessories

Discovering Masterpact’s accessories

**Safety shutters**
- Standard accessories, provided on every chassis.
  - The safety shutters automatically block the access to the disconnecting contact cluster when the device is in the "disconnected" or "test" positions.
- IP 20 for chassis connections
- IP 40 for the disconnecting contact cluster.

**Chassis breaker locking in "disconnected" position**
- Optional accessory, one locking system per device
  - for Profalux or Ronis keylocks
  - for Castell keylocks
  - for Kirk keylocks.
  - Mounted on the chassis and accessible with the door closed, this system locks the chassis in "disconnected" position using one or two keylocks.

**Top shutter closed**

**Bottom shutter closed**

If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position alone.

**Keylocks required with the "disconnected" position locking system**
- One or two keylocks per locking system
  - Ronis:
    - 1 keylock
    - 1 keylock + one identical keylock
    - 2 different key locks
  - Profalux:
    - 1 keylock
    - 1 keylock + one identical keylock
    - 2 different key locks.
  - Adaptation kits alone are available for Kirk and Castell keylocks.
Discovering Masterpact’s accessories

Chassis accessories

**Door interlock**
- **Optional accessory, one door interlock per chassis**
- This device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position.
- It may be mounted on the left or right-hand side of the chassis.

**Racking interlock**
- **Optional accessory, one racking interlock per chassis**
- This device prevents insertion of the racking handle when the cubicle door is open.
- It is mounted on the right-hand side of the chassis.

**Mismatch protection**
- **Optional accessory, one mismatch protection device per chassis**
- Mismatch protection offers twenty different combinations that the user may select to ensure that only a compatible circuit breaker is mounted on a given chassis.

**Auxiliary terminal shield (CB)**
- **Optional accessory, one CB shield per chassis**
- The shield prevents access to the terminal block of the electrical auxiliaries.

"Connected", "disconnected" and "test" position carriage switches (CE, CD, CT)
- **Optional accessories, one to six carriage switches**
- Standard configuration, 0 to 3 CE, 0 to 2 CD, 0 to 1 CT
- The carriage switches indicate the three positions:
  - CE: connected position
  - CD: disconnected position (when the minimum isolation distance between the main contacts and the auxiliary contacts is reached)
  - CT: test position.
- Changeover contact
- Breaking capacity at \( \cos \phi = 0.3 \) (AC12 / DC12 as per IEC 60947-5-1)
  - Standard, minimum current 10 mA / 24 V
<table>
<thead>
<tr>
<th>Voltage</th>
<th>Breaking Capacity</th>
<th>Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>V AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>8 A (rms)</td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>8 A (rms)</td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>8 A (rms)</td>
<td></td>
</tr>
<tr>
<td>690</td>
<td>6 A (rms)</td>
<td></td>
</tr>
<tr>
<td>V DC</td>
<td>2.5 A</td>
<td></td>
</tr>
<tr>
<td>24/48</td>
<td>0.8 A</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>0.8 A</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>0.3 A</td>
<td></td>
</tr>
</tbody>
</table>
  - Low level, minimum current 1 mA / 4 V
<table>
<thead>
<tr>
<th>Voltage</th>
<th>Breaking Capacity</th>
<th>Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>V AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/48</td>
<td>5 A (rms)</td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>5 A (rms)</td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>5 A (rms)</td>
<td></td>
</tr>
<tr>
<td>V DC</td>
<td>2.5 A</td>
<td></td>
</tr>
<tr>
<td>24/48</td>
<td>0.8 A</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>0.8 A</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>0.3 A</td>
<td></td>
</tr>
</tbody>
</table>
Inspecting and testing
before use

These operations must be carried out in particular before using a Masterpact device for the first time.

Initial tests
Procedure

A general check of the circuit breaker takes only a few minutes and avoids any risk of mistakes due to errors or negligence.

A general check must be carried out:

- prior to initial use
- following an extended period during which the circuit breaker is not used.

A check must be carried out with the entire switchboard de-energised.

In switchboards with compartments, only those compartments that may be accessed by the operators must be de-energised.

Electrical tests

Insulation and dielectric-withstand tests must be carried out immediately after delivery of the switchboard. These tests are precisely defined by international standards and must be directed and carried out by a qualified expert.

Prior to running the tests, it is absolutely necessary to:

- disconnect all the electrical auxiliaries of the circuit breaker (MCH, MX, XF, MN, Res electrical remote reset)
- remove the long-time rating plug on the 7.0 A, 5.0 P, 6.0 P, 7.0 P, 5.0 H, 6.0 H, 7.0 H control units. Removal of the rating plug disconnects the voltage measurement input.

Switchboard inspection

Check that the circuit breakers are installed in a clean environment, free of any installation scrap or items (tools, electrical wires, broken parts or shreds, metal objects, etc.).

Conformity with the installation diagram

Check that the devices conform with the installation diagram:

- breaking capacities indicated on the rating plates
- identification of the control unit (type, rating)
- presence of any optional functions (remote ON/OFF with motor mechanism, auxiliaries, measurement and indication modules, etc.)
- protection settings (long time, short time, instantaneous, earth fault)
- identification of the protected circuit marked on the front of each circuit breaker.

Condition of connections and auxiliaries

Check device mounting in the switchboard and the tightness of power connections. Check that all auxiliaries and accessories are correctly installed:

- electrical auxiliaries
- terminal blocks
- connections of auxiliary circuits.

Operation

Check the mechanical operation of the circuit breakers:

- opening of contacts
- closing of contacts.

Check on the control unit

Check the control unit of each circuit breaker using the respective user manuals.
Note the fault
Faults are signalled locally and remotely by the indicators and auxiliary contacts installed on circuit breakers (depending on each configuration). See page 12 in this manual and the user manual of the control unit for information on the fault indications available with your circuit breaker.

Identify the cause of tripping
A circuit must never be reclosed (locally or remotely) before the cause of the fault has been identified and cleared. A fault may have a number of causes:
- depending on the type of control unit, fault diagnostics are available. See the user manual for the control unit.
- depending on the type of fault and the criticality of the loads, a number of precautionary measures must be taken, in particular the insulation and dielectric tests on a part of or the entire installation. These checks and test must be directed and carried out by qualified personnel.

Inspect the circuit breaker following a short-circuit
- Check the arc chutes (see page 43)
- Check the contacts (see page 43)
- Check the tightness of connections (see the device installation manual)
- Check the disconnecting-contact clusters (see page 43).

Reset the circuit breaker
The circuit breaker can be reset locally or remotely. See page 12 in this manual for information on how the circuit breaker can be reset.
Maintaining Masterpact performance

Recommended maintenance program

Keep your Masterpact NT/NW features year after year by performing requested maintenance.

To ensure that your protective device retains the operating and safety characteristics specified in the catalogs for the whole of its service life, Schneider Electric recommends that routine inspections and periodic maintenance should be carried out by qualified personnel in accordance with the instructions in the Masterpact maintenance guide.

The Maintenance Guide LVPED508016EN can be downloaded from the www.schneider-electric.com website and provides detailed information on:

- the types of maintenance required, depending on the criticality of the protected circuit
- the risks involved if the component ceases to operate correctly
- what is understood by the terms normal, improved and severe environment and operating conditions
- the periodic preventive maintenance operations that should be carried out under normal environment and operating conditions as well as the level of competence required for the operations
- the environment and operating conditions that accelerate device ageing.

The level II and III procedures mentioned in the Maintenance Guide can be downloaded from the www.schneider-electric.com website. They are compiled in a document with reference HRB16483.
## Troubleshooting and solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker cannot be closed locally or remotely</td>
<td>- Circuit breaker padlocked or keylocked in the &quot;open&quot; position  &lt;br&gt; - Circuit breaker interlocked mechanically in a source changeover system  &lt;br&gt; - Circuit breaker not completely connected  &lt;br&gt; - The reset button signalling a fault trip has not been reset  &lt;br&gt; - Stored energy mechanism not charged  &lt;br&gt; - MX opening shunt release permanently supplied with power  &lt;br&gt; - MN undervoltage release not supplied with power  &lt;br&gt; - XF closing release continuously supplied with power, but circuit breaker not &quot;ready to close&quot; (XF not wired in series with PF contact)  &lt;br&gt; - Permanent trip order in the presence of a Micrologic P or H control unit with minimum voltage and minimum frequency protection in Trip mode and the control unit powered</td>
<td>- disable the locking function  &lt;br&gt; - check the position of the other circuit breaker in the changeover system  &lt;br&gt; - modify the situation to release the interlock  &lt;br&gt; - terminate racking in (connection) of the circuit breaker  &lt;br&gt; - clear the fault  &lt;br&gt; - push the reset button on the front of the circuit breaker  &lt;br&gt; - charge the mechanism manually  &lt;br&gt; - if it is equipped with an MCH gear motor, check the supply of power to the motor. If the problem persists, replace the gear motor (MCH)  &lt;br&gt; - there is an opening order. Determine the origin of the order. The order must be cancelled before the circuit breaker can be closed  &lt;br&gt; - there is an opening order. Determine the origin of the order.  &lt;br&gt; - check the voltage and the supply circuit (U &gt; 0.85 Un). If the problem persists, replace the release  &lt;br&gt; - check the voltage and the supply circuit (0.85 - 1.1 Un). If the problem persists, replace the XF release  &lt;br&gt; - check the voltage and the supply circuit (U &gt; 0.85 Un)  &lt;br&gt; - check the overall load on the distribution system  &lt;br&gt; - if necessary, modify the settings of devices in the installation  &lt;br&gt; - determine the origin of the order  &lt;br&gt; - there is an opening order. Determine the origin of the order.  &lt;br&gt; - check the voltage and the supply circuit (U &gt; 0.85 Un)  &lt;br&gt; - check the voltage and the supply circuit (0.85 - 1.1 Un). If the problem persists, replace the XF release</td>
</tr>
</tbody>
</table>

| Circuit breaker cannot be closed remotely but can be opened locally using the closing pushbutton | - Closing order not executed by the XF closing release  <br> - MN undervoltage release supply voltage too low  <br> - Load-shedding order sent to the MX opening release by another device  <br> - Unnecessary opening order from the MX opening release | - check the voltage and the supply circuit (0.85 - 1.1 Un). If the problem persists, replace the XF release  |

| Unexpected tripping without activation of the reset button signalling a fault trip | - MN undervoltage release supply voltage too low  <br> - Load-shedding order sent to the MX opening release by another device  <br> - Unnecessary opening order from the MX opening release | - check the voltage and the supply circuit (U > 0.85 Un)  <br> - check the overall load on the distribution system  <br> - if necessary, modify the settings of devices in the installation  <br> - determine the origin of the order  |

| Unexpected tripping with activation of the reset button signalling a fault trip | - A fault is present:  <br> - overload  <br> - earth fault  <br> - short-circuit detected by the control unit | - determine and clear the causes of the fault  <br> - check the condition of the circuit breaker before putting it back into service  |

<p>| Instantaneous opening after each attempt to close the circuit breaker with activation of the reset button signalling a fault trip | - Thermal memory  &lt;br&gt; - Transient overcurrent when closing  &lt;br&gt; - Closing on a short-circuit | - see the user manual of the control unit  &lt;br&gt; - press the reset button  &lt;br&gt; - modify the distribution system or the control-unit settings  &lt;br&gt; - check the condition of the circuit breaker before putting it back into service  &lt;br&gt; - press the reset button  &lt;br&gt; - clear the fault  &lt;br&gt; - check the condition of the circuit breaker before putting it back into service  &lt;br&gt; - press the reset button |</p>
<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker cannot be opened remotely, but can be opened locally</td>
<td>■ Opening order not executed by the MX opening release</td>
<td>□ check the voltage and the supply circuit (0.7 - 1.1 Un). If the problem persists, replace the MX release</td>
</tr>
<tr>
<td></td>
<td>■ Opening order not executed by the MN undervoltage release</td>
<td>□ drop in voltage insufficient or residual voltage (&gt; 0.35 Un) across the terminals of the undervoltage release. If the problem persists, replace the MN release.</td>
</tr>
<tr>
<td>Circuit breaker cannot be opened locally</td>
<td>■ Operating mechanism malfunction or welded contacts</td>
<td>□ contact a Schneider service centre</td>
</tr>
<tr>
<td>Circuit breaker cannot be reset locally but not remotely</td>
<td>■ Insufficient supply voltage for the MCH gear motor</td>
<td>□ check the voltage and the supply circuit (0.7 - 1.1 Un). If the problem persists, replace the MCH release</td>
</tr>
<tr>
<td>Nuisance tripping of the circuit breaker with activation of the reset</td>
<td>■ Reset button not pushed-in completely</td>
<td>□ push the reset button in completely</td>
</tr>
<tr>
<td>button signalling a fault trip</td>
<td>■ A padlock or keylock is present on the chassis or a door interlock is present</td>
<td>□ disable the locking function</td>
</tr>
<tr>
<td>Impossible to insert the crank in connected, test or disconnected</td>
<td>■ The reset button has not been pressed</td>
<td>□ press the reset button</td>
</tr>
<tr>
<td>position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit breaker cannot be removed from chassis</td>
<td>■ Circuit breaker not in disconnected position</td>
<td>□ turn the crank until the circuit breaker is in disconnected position and the reset button out</td>
</tr>
<tr>
<td></td>
<td>■ The rails are not completely out</td>
<td>□ pull the rails all the way out</td>
</tr>
<tr>
<td>Circuit breaker cannot be connected (racked in)</td>
<td>■ Cradle/circuit breaker mismatch protection</td>
<td>□ check that the cradle corresponds with the circuit breaker</td>
</tr>
<tr>
<td></td>
<td>■ The safety shutters are locked</td>
<td>□ remove the lock(s)</td>
</tr>
<tr>
<td></td>
<td>■ The disconnecting-contact clusters are incorrectly positioned</td>
<td>□ reposition the clusters</td>
</tr>
<tr>
<td></td>
<td>■ Cradle locked in disconnected position</td>
<td>□ disable the cradle locking function</td>
</tr>
<tr>
<td></td>
<td>■ The reset button has not been pressed, preventing rotation of the crank</td>
<td>□ press the reset button</td>
</tr>
<tr>
<td></td>
<td>■ The circuit breaker has not been sufficiently inserted in the cradle</td>
<td>□ insert the circuit breaker completely so that it is engaged in the racking mechanism</td>
</tr>
<tr>
<td>Circuit breaker cannot be locked in disconnected position</td>
<td>■ The circuit breaker is not in the right position</td>
<td>□ check the circuit breaker position by making sure the reset button is out</td>
</tr>
<tr>
<td></td>
<td>■ The crank is still in the cradle</td>
<td>□ remove the crank and store it</td>
</tr>
<tr>
<td>Circuit breaker cannot be locked in connected, test or disconnected</td>
<td>■ Check that locking in any position is enabled</td>
<td>□ contact a Schneider Electric service centre</td>
</tr>
<tr>
<td>position</td>
<td>■ The circuit breaker is not in the right position</td>
<td>□ check the circuit breaker position by making sure the reset button is out</td>
</tr>
<tr>
<td></td>
<td>■ The crank is still in the cradle</td>
<td>□ remove the crank and store it</td>
</tr>
</tbody>
</table>
Checking Masterpact operating conditions

Environmental conditions

**Ambient temperature**
Masterpact NT devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -25 °C to +70 °C
- circuit-breaker mechanical closing by pushbutton is guaranteed down to -35 °C
- Masterpact NW (without the control unit) can be stored in an ambient temperature of -40 °C to +85 °C
- the control unit can be stored in an ambient temperature of -25 °C to +85 °C.

**Extreme atmospheric conditions**
Masterpact NT devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 60068-2-1: dry cold at -40 °C
- IEC 60068-2-2: dry heat at +85 °C
- IEC 60068-2-30: damp heat (temperature +55 °C, relative humidity 95 %)
- IEC 60068-2-52 level 2: salt mist.

Masterpact NT 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 NT devices resist electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 60068-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd’s, etc.):
- 2 to 13.2 Hz: amplitude ±1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

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

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**

Masterpact NT devices are designed for operation at altitudes under 2000 metres. At altitudes higher than 2000 metres, the modifications in the ambient air (electrical resistance, cooling capacity) lower the following characteristics.

<table>
<thead>
<tr>
<th>Altitude (m)</th>
<th>2000</th>
<th>3000</th>
<th>4000</th>
<th>5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric withstand voltage (V)</td>
<td>3500</td>
<td>3150</td>
<td>2500</td>
<td>2100</td>
</tr>
<tr>
<td>Rated insulation level (V)</td>
<td>1000</td>
<td>900</td>
<td>700</td>
<td>600</td>
</tr>
<tr>
<td>Rated operational voltage (V)</td>
<td>690</td>
<td>590</td>
<td>520</td>
<td>460</td>
</tr>
<tr>
<td>Rated current (A) at 40 °C</td>
<td>1 x In</td>
<td>0.99 x In</td>
<td>0.96 x In</td>
<td>0.94 x In</td>
</tr>
</tbody>
</table>

**Electromagnetic disturbances**

Masterpact NT devices are protected against:
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbance 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 NT 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.

**Cleaning**

- Non-metallic parts: never use solvent, soap or any other cleaning product. Clean with a dry cloth only
- Metal parts: clean with a dry cloth whenever possible. If solvent, soap or any other cleaning product must be used, make sure that it does not come into contact with non-metallic parts.