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Identifying Masterpact

Rating plate

MASTERPACT
NT08 N
Circuit Breaker
Interruptor Automático
Disjoncteur

800 A FRAME/CAP.

Interrupting Rating / A nom. 1
50/60 Hz
UL 489/CSA C22.2 No.5.1 /
NEEMA ABI / NMX-J-268-ANCIE

240 V~  50 kA
480 V~  50 kA
600 V~  35 kA

Model Number
Type of Circuit Breaker
Rating
Interrupting Ratings
Before Working on Circuit Breaker

Disconnect power from circuit breaker

Disconnect power from circuit breaker

Turn off circuit breaker

Turn circuit breaker off

- If spring is charged, press “Push to close” button (A) to discharge spring, as indicated by window (B).
- Press “Push to open” button (C) to open contacts, as indicated by window (D).

Failure to follow these instructions will result in death, serious injury or equipment damage.
Components

A. Padlock provision
B. Key interlock
C. Racking interlock for open door
D. Terminal cover (optional)
E. Position indicating contact terminal block
F. On/Off contact terminal block
G. Auxiliary contact terminal block
H. Trip unit terminal block
I. Position indicating contact terminal block
J. Cradle rejection feature
K. Door interlock
L. Shutter

Drawout circuit breaker

- XF closing release
- MX/1 opening release
- MX/2 opening release or MN undervoltage release
- Terminals for control unit, fault indication contacts, control auxiliaries and auxiliary contacts
- SDE/1 "fault-trip" indication contact
- Carrying grip
- Side plate for drawout device
- SDE/2 "fault-trip" indication contact or Res electrical remote reset
- Control unit
- Arc chute
- 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
Fixed circuit breaker

- XF closing release
- MX/1 opening release
- MX/2 opening release or MN undervoltage release
- Terminals for control unit and fault indication contacts
- SDE/1 "fault-trip" indication contact
- Carrying grip
- Side plate for fixed device
- SDE/2 "fault-trip" indication contact or Res electrical remote reset
- Control unit
- Arc chute
- 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

Discovering Masterpact
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 seven times until you hear a "clack".

Automatic charging:
If the MCH gear motor is installed, the spring is automatically recharged after each closing.
Closing the circuit breaker

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.

Closing the circuit breaker
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.

Remotely
When connected to a remote control panel, the XF closing release can be used to 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

Delay unit
The circuit breaker signals a fault trip by:
- a mechanical indicator on the front
- one or two SDE “fault-trip” indication contacts SDE1, SDE2 (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 max. (0.2 to 0.3 in. max.), a 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.

Locking
Make swivel the covers. Insert the padlock shackle, lead seal or screws.

Padlock. Lead seal. Screws.
Combination of locking systems
To disable local and remote circuit-breaker closing, use as needed one to three padlocks or a keylock.

Install one to three padlocks maximum shackle diameter 5 to 8 mm max. (0.2 to 0.3 in. max.)

Locking
Open the circuit breaker.

Check
The closing control is inoperative.

Unlocking
Remove the padlock.
Locking the controls
Disabling closing or opening with keylocks

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.

Two types of keylocks are available

RONIS

PROFALUX
Discovering the circuit breaker positions

The circuit breaker comprises a safety function, which requires the confirmation of the manual order circuit breaker opening, to be able to insert the handle.

The indicator on the front shows the position of the circuit breaker in the cradle.

**DANGER**

**ELECTRIC SHOCK, EXPLOSION OR ARC FLASH HAZARD**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must be installed and serviced only by qualified electrical personnel.
- Failure to follow these instructions will result in death, serious injury or equipment damage.

**Drawout circuit breaker status**

**Drawout circuit breaker status**

This function can be carried out only if the opening button is pushed. Connection or disconnection of the drawout circuit breaker requires insertion of the racking handle. If interlocks, padlocks or an open door lock are in place, the racking handle cannot be inserted.

<table>
<thead>
<tr>
<th>Position indicator</th>
<th>Connector position</th>
<th>Connectors</th>
<th>Circuit breaker status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected</td>
<td>Engaged</td>
<td>Engaged</td>
<td>Can be operated. Ready for service.</td>
</tr>
<tr>
<td>Test</td>
<td>Disengaged</td>
<td>Engaged</td>
<td>Can be operated. Can have operation and control systems tested.</td>
</tr>
<tr>
<td>Disengaged</td>
<td>Disengaged</td>
<td>Disengaged</td>
<td>Can be operated. Can be removed from cradle.</td>
</tr>
<tr>
<td>Withdraw</td>
<td>Disengaged</td>
<td>Disengaged</td>
<td>Remove from cradle.</td>
</tr>
</tbody>
</table>

Clusters | Secondary (control)
Discovering the circuit breaker positions

As the circuit breaker position changes, the position contacts change states.

<table>
<thead>
<tr>
<th>Circuit Breaker Position</th>
<th>Disconnected Position</th>
<th>Auxiliary Contacts Isolated</th>
<th>Test Position</th>
<th>Primary Connectors Isolated</th>
<th>Connected Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disconnected Position</td>
<td>Open</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Position</td>
<td>Open</td>
<td>Closed</td>
<td>Open</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td></td>
<td>Open</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connected Position</td>
<td>Open</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

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

The circuit breaker comprises a safety function, which requires the confirmation of the manual order circuit breaker opening, to be able to insert the handle.
Using the Masterpact drawout cradle

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

Before mounting the circuit breaker, make sure it matches the cradle.

### 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).

Push the circuit breaker into the cradle, taking care not to push on the control unit.

If you cannot insert the circuit breaker in the cradle, check that the mismatch protection on the cradle corresponds to that on the circuit breaker.
These operations require that all cradle-locking functions be disabled (see pages 11, 12, 13).

The circuit breaker comprises a safety function, which requires the confirmation of the manual order circuit breaker opening, to be able to insert the handle.

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

The device is in "disconnected" position.

The device is in "test" position.

Remove the crank or continue to "connected" position.

The device is in "test" position.

The device is in "connected" position.

The device is in "connected" position.
To set up a mismatch-prevention combination for the circuit breaker and the cradle, see the mismatch-prevention installation manual.

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

The possible combinations are listed below.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>D</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>E</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>C</td>
<td>D</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>C</td>
<td>E</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>C</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>D</td>
<td>E</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>D</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>E</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Locking the switchboard door

The locking device is installed on the left or right-hand side of the cradle.
- 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 cradle
Using the Masterpact drawout cradle

Locking the circuit breaker in position

Combination of locking systems
To disable connection of the circuit breaker in "disconnected" position in the cradle, 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 max. (0.2 to 0.3 in. max.)

**Locking**
Circuit breaker in "disconnected" position.

1. Pull out the tab.

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

3. The crank cannot be inserted.

4. The crank can be inserted.

**Unlocking**
Remove the padlock(s).

1. Release the tab.

2. The crank can be inserted.

3. Remove the padlock(s).

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

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

Locking the circuit breaker in position

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

**Locking**
Circuit breaker in "disconnected" position.

1. Insert the key(s).
2. Turn the key(s).
3. Remove the key(s).

The crank cannot be inserted.

**Unlocking**
Insert the key(s).

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

Two types of keylocks are available

*RONIS*  *PROFALUX*

Padlocks and keylocks may be used together.
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.
**Shutter Lock**

The shutter lock (A) is used to prevent connection of the circuit breaker by locking the shutter in the closed position.

- Standard with shutter accessory.
- Padlockable.
- To lock:
  - attach a padlock (B) to the shutter lock (A) inside the cradle.

![Shutter Lock Diagram](image-url)
The different connections

Identifying the electrical auxiliaries

Install Connectors on a fixed device

- Standard connectors are shown in the table below.
- For information on non-standard connectors, contact the field office.
- For connector dimensions, see the catalogue.

Standard Connectors

<table>
<thead>
<tr>
<th>Rear-connected &quot;T&quot; Vertical (RCTV)</th>
<th>Rear-connected &quot;T&quot; Horizontal (RCTH)</th>
<th>Front-connected Flat (FCF)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="RCTV Connector" /></td>
<td><img src="image2.png" alt="RCTH Connector" /></td>
<td><img src="image3.png" alt="FCF Connector" /></td>
</tr>
</tbody>
</table>

Install Bussing

Bussing requirements by circuit breaker and connector are shown in the table below.

Note: the fitter is responsible for the bus wiring toward the connectors. The bus must be supported by the framework of the commutation equipment, without any weight on the connectors.

<table>
<thead>
<tr>
<th>Bus Size Required</th>
<th>Connectors</th>
<th>Bus Per Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rating</strong></td>
<td><strong>Connectors</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>800 A</td>
<td>RCTV</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>FCF</td>
<td>3</td>
</tr>
<tr>
<td>1200 A</td>
<td>RCTV</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>FCF</td>
<td>4</td>
</tr>
</tbody>
</table>
Install Connectors on a drawout device

- Standard connectors are shown in the table below.
- For information on non-standard connectors, contact the field office.
- For connector dimensions, see the catalogue.

**Standard Connectors**

<table>
<thead>
<tr>
<th>Circuit Breaker</th>
<th>Connectors</th>
<th>Bus Per Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 A</td>
<td>RCTV</td>
<td>1 6 x 76 mm (0.25 x 3 in.)</td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>2 6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
<tr>
<td></td>
<td>FCF</td>
<td>3 6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
<tr>
<td>1200 A</td>
<td>RCTV</td>
<td>1 6 x 76 mm (0.25 x 3 in.)</td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>3 6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
<tr>
<td></td>
<td>FCF</td>
<td>4 6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
</tbody>
</table>

Install Bussing

Bussing requirements by circuit breaker and connector are shown in the table below.

Note: the fitter is responsible for the bus wiring toward the connectors. The bus must be supported by the framework of the commutation equipment, without any weight on the connectors.

<table>
<thead>
<tr>
<th>Bus Size Required</th>
<th>Connectors</th>
<th>Bus Per Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Number</td>
<td>Size</td>
</tr>
<tr>
<td>800 A</td>
<td>1</td>
<td>6 x 76 mm (0.25 x 3 in.)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
<tr>
<td>1200 A</td>
<td>1</td>
<td>6 x 76 mm (0.25 x 3 in.)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6 x 38 mm (0.25 x 1.5 in.)</td>
</tr>
</tbody>
</table>
Identifying the electrical auxiliaries

Allocation of the connection terminals
Layout of terminal blocks

Terminal layout for push-in connector installation

<table>
<thead>
<tr>
<th>Function</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary contacts</td>
<td>OF (1)</td>
<td>Open/Closed circuit breaker or switch position contacts</td>
</tr>
<tr>
<td></td>
<td>OF1, OF2, OF3 and OF4 contacts are standard.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OF3</td>
<td>Disconnected position contacts</td>
</tr>
<tr>
<td></td>
<td>OF4</td>
<td>Connected position contacts</td>
</tr>
<tr>
<td></td>
<td>OF1</td>
<td>Test position contacts</td>
</tr>
<tr>
<td>Cradle contacts</td>
<td>CD</td>
<td>Disconnected position contacts</td>
</tr>
<tr>
<td></td>
<td>CE</td>
<td>Connected position contacts</td>
</tr>
<tr>
<td></td>
<td>CT</td>
<td>Test position contacts</td>
</tr>
<tr>
<td>Remote operation</td>
<td>SDE</td>
<td>Electrical fault alarm contact</td>
</tr>
<tr>
<td></td>
<td>RES</td>
<td>Remote reset</td>
</tr>
<tr>
<td></td>
<td>MN</td>
<td>Undervoltage trip device</td>
</tr>
<tr>
<td></td>
<td>MX (2)</td>
<td>Shunt trip</td>
</tr>
<tr>
<td></td>
<td>XF (2)</td>
<td>Shunt close</td>
</tr>
<tr>
<td></td>
<td>PF</td>
<td>Ready-to-close contact</td>
</tr>
<tr>
<td></td>
<td>MCH</td>
<td>Spring-charging motor</td>
</tr>
</tbody>
</table>

(1) OF1, OF2, OF3 and OF4 contacts are standard.
(2) When communicating MX1 or XF coils are used, terminal (C3 or A3) must be connected to line even if the communication module is not installed. The bypass circuit through terminal C2/A2 is only momentary duty for 0.5 sec. For continuous duty, use the communications command.

Trip unit type

<table>
<thead>
<tr>
<th>Basic</th>
<th>A</th>
<th>P</th>
<th>H</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Com: E1-E6</td>
<td>Communication</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC1: Z</td>
<td>Zone-selective Interlocking</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC1: M1</td>
<td>Modified differential ground fault (MDGF)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC2: T</td>
<td>External neutral</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC2: M</td>
<td>Modified differential ground fault (MDGF)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC3: F</td>
<td>24 Vdc external power supply</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC3: Vn</td>
<td>External neutral plug</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>UC4</td>
<td>External phase voltage sensing</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>M2C/M6C</td>
<td>Two programmable contacts (internal relay) or six programmable contacts (for connection to external M6C module)</td>
</tr>
</tbody>
</table>
Identification of the electrical auxiliaries

Allocation of the connection terminals

Terminal layout for push-in connector installation

<table>
<thead>
<tr>
<th>Function</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary contacts</td>
<td>OF (1)</td>
<td>Open/Closed circuit breaker or switch position contacts</td>
</tr>
<tr>
<td></td>
<td>CD</td>
<td>Disconnected position contacts</td>
</tr>
<tr>
<td></td>
<td>CE</td>
<td>Connected position contacts</td>
</tr>
<tr>
<td></td>
<td>CT</td>
<td>Test position contacts</td>
</tr>
<tr>
<td>Remote operation</td>
<td>SDE</td>
<td>Electrical fault alarm contact</td>
</tr>
<tr>
<td></td>
<td>RES</td>
<td>Remote reset</td>
</tr>
<tr>
<td></td>
<td>MN</td>
<td>Undervoltage trip device</td>
</tr>
<tr>
<td></td>
<td>MX (2)</td>
<td>Shunt trip</td>
</tr>
<tr>
<td></td>
<td>XF (2)</td>
<td>Shunt close</td>
</tr>
<tr>
<td></td>
<td>PF</td>
<td>Ready-to-close contact</td>
</tr>
<tr>
<td></td>
<td>MCH</td>
<td>Spring-charging motor</td>
</tr>
</tbody>
</table>

(1) OF1, OF2, OF3 and OF4 contacts are standard.
(2) When communicating MX1 or XF coils are used, terminal (C3 or A3) must be connected to line even if the communication module is not installed. The bypass circuit through terminal C2/A2 is only momentary duty for 0.5 sec.
For continuous duty, use the communications command.

Trip unit type

<table>
<thead>
<tr>
<th>Basic</th>
<th>A</th>
<th>P</th>
<th>H</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Com: E1-E6</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC1: Z</td>
<td>Zone-selective Interlocking Z1 = ZSI OUT signal, Z2 = ZSI OUT, Z3 = ZSI IN signal, Z4 = ZSI IN short time, Z5 = ZSI IN ground fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC1: M1</td>
<td>Modified differential ground fault (MDGF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC2: T</td>
<td>External neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC2: M</td>
<td>Modified differential ground fault (MDGF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC3: F</td>
<td>24 Vdc external power supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC3: Vn</td>
<td>External neutral plug</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UC4</td>
<td>External phase voltage sensing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M2C/M6C</td>
<td>Two programmable contacts (internal relay) or six programmable contacts (for connection to external M6C module)</td>
</tr>
</tbody>
</table>
Identifying the electrical auxiliaries

Electrical diagrams
Fixed and drawout devices

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

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
- UC4 / M2C: 2 programmable contacts (internal relay); ext. 24 V DC power supply required
- UC4 / M6C: 6 programmable contacts (external relay); ext. 24 V DC power supply required
- UC5: Micrologic

Remote operation

- SDE2: Fault-trip indication contact
- Res: Remote reset
- SDE1: Fault-trip indication contact (supplied as standard)
- MN: Undervoltage release
- MX2: Shunt release
- MX1: Shunt release (standard or communicating)
- XF: Closing release (standard or communicating)
- PF: "Ready to close" contact
- 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.

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

**Electrical diagrams**

### Indication contacts

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

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

### Cradle 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

Micrologic control units

Micrologic Trip Unit
Protective functions, measurement functions and communications are controlled by the Micrologic trip unit (A) installed in the circuit breaker. The trip unit is field replaceable for easy upgrading of functionality. For complete information on trip unit availability and capabilities, refer to the manual of trip unit which accompanies the circuit breaker.

For more in-depth information, see the control-unit user manual.

Micrologic control units

- Standard equipment, one per device
- Long-time rating plug and connectors not included,
  Micrologic 3.0 A
  Micrologic 5.0 A
  Micrologic 6.0 A
  Micrologic 5.0 P
  Micrologic 6.0 P
  Micrologic 5.0 H
  Micrologic 6.0 H
- Connectors for A, P, H:
  □ for fixed device
  □ for drawout device.

- Depending on the model, control units offer in addition:
  □ fault indications
  □ measurement of electrical parameters (current, voltage, power, etc.)
  □ harmonic analysis
  □ communication.
Micrologic Trip Unit Features
The table below describes the features available on the 3.0 A, 5.0 A and 6.0 A trip units with ammeters, the 5.0 P and 6.0 P power measurement trip units and the 5.0 H and 6.0 H harmonic measurement trip units.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Micrologic trip unit features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ammeter</td>
</tr>
<tr>
<td></td>
<td>3.0 A</td>
</tr>
<tr>
<td>LI</td>
<td></td>
</tr>
<tr>
<td>LSI</td>
<td></td>
</tr>
<tr>
<td>LSI/GF</td>
<td></td>
</tr>
<tr>
<td>Ground-fault alarm/no trip (1)</td>
<td></td>
</tr>
<tr>
<td>Ground-fault alarm and trip (1, 2)</td>
<td></td>
</tr>
<tr>
<td>Adjustable rating plugs</td>
<td></td>
</tr>
<tr>
<td>True RMS sensing</td>
<td></td>
</tr>
<tr>
<td>UL listed</td>
<td></td>
</tr>
<tr>
<td>Thermal imaging</td>
<td></td>
</tr>
<tr>
<td>Phase-loading bar graph</td>
<td></td>
</tr>
<tr>
<td>LED for long-time pick-up</td>
<td></td>
</tr>
<tr>
<td>LED for trip indication</td>
<td></td>
</tr>
<tr>
<td>Digital ammeter</td>
<td></td>
</tr>
<tr>
<td>Zone-selective interlocking</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>LCD dot matrix display</td>
<td></td>
</tr>
<tr>
<td>Advanced user interface</td>
<td></td>
</tr>
<tr>
<td>Protective relay functions</td>
<td></td>
</tr>
<tr>
<td>Neutral protection (1)</td>
<td></td>
</tr>
<tr>
<td>Contact wear indication</td>
<td></td>
</tr>
<tr>
<td>Incremental fine tuning of settings</td>
<td></td>
</tr>
<tr>
<td>Selectable long-time delay bands</td>
<td></td>
</tr>
<tr>
<td>Power measurement</td>
<td></td>
</tr>
<tr>
<td>Power quality measurements</td>
<td></td>
</tr>
<tr>
<td>Waveform capture</td>
<td></td>
</tr>
</tbody>
</table>

■ = Standard feature  □ = Available option
(1) Requires M2C or M6C programmable contact module.
(2) Requires neutral current transformer for 3-phase, 4-wire system.

Long-time rating plugs
■ Standard equipment: one per control unit
■ Setting options:
□ standard 0.4 to 1 x Ir setting
■ The plugs determine the setting range for the long-time protection.

M2C and M6C programmable contacts
■ Optional equipment, used with Micrologic P and H control units
■ Connectors not included, see below:
□ 2 M2C contacts
□ 2 M6C contacts
■ Connectors:
□ for fixed device
□ for drawout device.
■ 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:
□ 240 V AC: 5 A at cos ϕ = 0.7
□ 380 V AC: 3 A at cos ϕ = 0.7
□ 24 V DC: 1.8 A with L/R = 0
□ 48 V DC: 1.5 A with L/R = 0
□ 125 V DC: 0.4 A with L/R = 0
□ 250 V DC: 0.15 A with L/R = 0
■ M2C: 24 V DC ±5 % power from control unit
■ M6C: 24 V DC ±5 % external supply
■ Maximum consumption: 100 mA
ON/OFF indication contacts (OF)

- Standard equipment: 4 OF per device
  - standard
  - low level
- Connectors: 4 changeover contacts
  - for fixed device
  - for drawout device.
- OF contacts indicate the position of the main contacts
- They trip when the minimum isolation distance between the main contacts is reached.

<table>
<thead>
<tr>
<th>V AC</th>
<th>240/380</th>
<th>6 A (rms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>480</td>
<td>6 A (rms)</td>
</tr>
<tr>
<td></td>
<td>690</td>
<td>6 A (rms)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V DC</th>
<th>24/48</th>
<th>2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>0.3</td>
</tr>
</tbody>
</table>

- Breaking capacity at cos $\phi = 0.3$:
  - standard, minimum current 10 mA / 24 V
  - 5 A (rms)
  - 3 A (rms)
  - 3 A (rms)

"Fault-trip" indication contact (SDE/1)

- Standard equipment on circuit breakers, one SDE/1 contact per device
- Not available for switch-disconnector versions
- The contact provides a remote indication of device opening due to an electrical fault.

<table>
<thead>
<tr>
<th>V AC</th>
<th>240/380</th>
<th>5 A (rms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>480</td>
<td>5 A (rms)</td>
</tr>
<tr>
<td></td>
<td>690</td>
<td>3 A (rms)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V DC</th>
<th>24/48</th>
<th>3 A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125</td>
<td>0.3 A</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>0.15 A</td>
</tr>
</tbody>
</table>

- Changeover contact
- Breaking capacity at cos $\phi = 0.3$:
  - standard, minimum current 10 mA / 24 V
  - 5 A (rms)
  - 3 A (rms)
  - 3 A (rms)

Additional "fault-trip" indication contact (SDE/2)

- Optional equipment for circuit breakers, one additional SDE/2 contact per device
- Not available for switch-disconnector versions
- Not compatible with the Res option
- Connectors not included, see below:
  - standard
  - low level
- Connectors:
  - for fixed device
  - for drawout device.
- The contact remotely indicates device opening due to an electrical fault.

<table>
<thead>
<tr>
<th>V AC</th>
<th>240/380</th>
<th>5 A (rms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>480</td>
<td>5 A (rms)</td>
</tr>
<tr>
<td></td>
<td>690</td>
<td>3 A (rms)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V DC</th>
<th>24/48</th>
<th>3 A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125</td>
<td>0.3 A</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>0.15 A</td>
</tr>
</tbody>
</table>

- Changeover contact
- Breaking capacity at cos $\phi = 0.3$:
  - standard, minimum current 10 mA / 24 V
  - 5 A (rms)
  - 3 A (rms)
  - 3 A (rms)

### DANGER

**ELECTRIC SHOCK, EXPLOSION OR ARC FLASH HAZARD**

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- Failure to follow these instructions will result in death, serious injury or equipment damage.

---

**Indication contacts**

- Discovering Masterpact's accessories
- Indication contacts
  - ON/OFF indication contacts (OF)
    - Standard equipment: 4 OF per device
      - standard
      - low level
    - Connectors: 4 changeover contacts
      - for fixed device
      - for drawout device.
    - OF contacts indicate the position of the main contacts
    - They trip when the minimum isolation distance between the main contacts is reached.
  - Breaking capacity at cos $\phi = 0.3$:
    - standard, minimum current 10 mA / 24 V
    - 5 A (rms)
    - 3 A (rms)
    - 3 A (rms)

- "Fault-trip" indication contact (SDE/1)
  - Standard equipment on circuit breakers, one SDE/1 contact per device
  - Not available for switch-disconnector versions
  - The contact provides a remote indication of device opening due to an electrical fault.
  - Changeover contact
  - Breaking capacity at cos $\phi = 0.3$:
    - standard, minimum current 10 mA / 24 V
    - 5 A (rms)
    - 3 A (rms)
    - 3 A (rms)

- Additional "fault-trip" indication contact (SDE/2)
  - Optional equipment for circuit breakers, one additional SDE/2 contact per device
  - Not available for switch-disconnector versions
  - Not compatible with the Res option
  - Connectors not included, see below:
    - standard
    - low level
  - Connectors:
    - for fixed device
    - for drawout device.
  - The contact remotely indicates device opening due to an electrical fault.
**Indication contacts**

**Electrical reset after fault trip Res**
- Optional equipment: one Res per device
- Not compatible with the SDE/2 option
- Connectors not included, see below:
  - 110/130 V AC
  - 220/240 V AC
- Connectors:
  - for fixed device
  - for drawout device
- The contact remotely resets the device following tripping due to an electrical fault.

**"Springs charged" limit switch contact (CH)**
- Equipment 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:
  - 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
- Standard, minimum current 10 mA / 24 V
- Low level, minimum current 1 mA / 4 V

**"Ready to close" contact (PF)**
- Optional equipment: one PF contact per device
- Connectors not included, see below:
  - standard
  - low level
- Connectors:
  - for fixed device
  - for drawout 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 \( \cos \varphi = 0.3 \):
  - 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

**Changeover contacts**

<table>
<thead>
<tr>
<th>V AC</th>
<th>V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td>24/48</td>
</tr>
<tr>
<td>380</td>
<td>24/48</td>
</tr>
<tr>
<td>480</td>
<td>24/48</td>
</tr>
<tr>
<td>690</td>
<td>24/48</td>
</tr>
<tr>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>
Auxiliaries for remote operation

**Gear motor (MCH)**
- Optional equipment: one MCH gear motor per device
- Connectors not included, see below:
  - AC 50 / 60 Hz: 48/60
    - 100/130
    - 200/240
    - 277/415
    - 440/480
    - DC 24/30
    - 48/60
    - 100/125
    - 200/250
- Connectors:
  - for fixed device
  - for drawout device.
- The gear motor automatically charges the spring mechanism.
- Power supply:
  - V AC 50/60 Hz: 48/60 - 100/130 - 200/240 - 277 - 400/440 - 480
  - V DC: 24/30 - 48/60 - 100/125 - 200/250
- 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 35.

**Opening releases MX/1 and MX/2, closing release XF**
- Optional equipment, 1 or 2 MX releases per device, 1 XF per device
- The function (MX or XF) is determined by where the coil is installed
- Connectors not included, see below:
  - V AC 50/60 Hz, V DC:
    - standard version:
      - 12 DC
      - 24 AC/DC
      - 48 AC/DC
      - 120 AC/DC
      - 240 AC/DC
      - 277 AC
      - 380/480 AC
    - communicating version (with COM option):
      - 12 DC
      - 24/30 AC/DC
      - 48/60 AC/DC
      - 100/130 AC/DC
      - 200/250 AC/DC
      - 240/277 AC
      - 380/480 AC
- Connectors:
  - for fixed device
  - for drawout device.
- 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".
- Power supply:
  - V AC 50 / 60 Hz: 24/48 - 100/130 - 200/250 - 240/277 - 380/480
  - V DC: 12 - 24/30 - 48/60 - 100/130 - 200/250
- Operating threshold:
  - XF: 0.85 to 1.1 Un
  - MX: 0.7 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:
  - XF: 55 ms ± 10
  - MX: 50 ms ± 10.
Discovering Masterpact’s accessories

**Auxiliaries for remote operation**

### Instantaneous undervoltage releases (MN)
- **Optional equipment:**
  - 1 MN per device
- **Not compatible with the MX/2 opening release**
- **Connectors not included, see below**
  - V AC 50/60 Hz, V DC:
    - 24/30 AC/DC
    - 48/60 AC/DC
    - 100/130 AC/DC
    - 200/250 AC/DC
    - 380/480 AC
- **Connectors:**
  - for fixed device
  - for drawout device
- **The MN release instantaneously opens the circuit breaker when its supply voltage drops.**
- **Power supply:**
  - V AC 50/60 Hz: 24/48 - 100/130 - 200/250 - 240/277 - 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:**
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- **Circuit-breaker response time at Un:** 40 ms ± 10.

### Delay unit for MN releases
- **Optional equipment:**
  - 1 MN with delay unit per device
- **Delay-unit**
  - V AC 50/60 Hz, V DC:
    - non adjustable:
      - 100/130 AC/DC
      - 200/250 AC/DC
    - adjustable:
      - 48/60 AC/DC
      - 100/130 AC/DC
      - 200/250 AC/DC
      - 380/480 AC/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.**
- **Power supply V AC 50/60 Hz, V DC:**
  - non adjustable:
    - 100/130 - 200/250
  - adjustable:
    - 48/60 - 100/130 - 200/250 - 380/480
- **Operating threshold:**
  - opening: 0.35 to 0.7 Un
  - closing: 0.85 Un
- **Consumption:**
  - pick-up: 200 VA or W (80 ms)
  - hold: 4.5 VA or W
- **Circuit-breaker response time at Un:**
  - non adjustable:
    - 0.25 second
  - adjustable: 0.5 - 0.9 - 1.5 - 3 seconds.

### Electrical closing pushbutton (BPFE)
- **Optional equipment,**
  - 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/ft)

<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></td>
<td>(13 AWG)</td>
<td>(15 AWG)</td>
<td>(13 AWG)</td>
</tr>
<tr>
<td>MN</td>
<td>100 % source voltage</td>
<td>-</td>
<td>58/190</td>
</tr>
<tr>
<td></td>
<td>85 % source voltage</td>
<td>-</td>
<td>16/52</td>
</tr>
<tr>
<td>MX-XF</td>
<td>100 % source voltage</td>
<td>21/68</td>
<td>12/39</td>
</tr>
<tr>
<td></td>
<td>85 % source voltage</td>
<td>10/32</td>
<td>6/19</td>
</tr>
</tbody>
</table>

Note: the indicated length is that for each of the two supply wires.
Discovering Masterpact’s accessories

Device mechanical accessories

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

Escutcheon CDP
- Optional equipment, one CDP per device
  - for fixed device
  - for drawout device.
- The CDP increases the degree of protection to IP40 and IK07 (fixed and drawout devices).

Transparent cover CCP
- Optional equipment, one CCP per device equipped with a CDP (for drawout devices).
- Mounted with a CDP, the CCP increases the degree of protection to IP54 and IK10 (fixed and drawout devices).

Blanking plate OP
- Optional equipment, 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 equipment, 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 equipment, 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 equipment: one locking kit (without keylock) per device:
  - Profalux
  - Ronis.
- Optional equipment: one locking system per device.
- The kit inhibits local or remote closing of the device.

**Keylocks required for the device OFF position locking kit**
- One or two keylocks per locking kit:
  - Ronis:
    - 1 keylock
  - Profalux:
    - 1 keylock.
### Cradle accessories

#### Safety shutters
- Standard equipment
- Set of shutters for top and bottom drawout, front/rear connection:
  - 3 poles
  - 4 poles.
- Mounted on the cradle, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the "disconnected" or "test" positions.
- IP20 for cradle connections
- IP40 for the disconnecting contact cluster.

#### Circuit breaker locking in "disconnected" position
- Optional equipment, one locking system per device
- Keylocks not included:
  - Profalux
  - Ronis.
- Mounted on the cradle and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one or two keylocks.

#### 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 keylocks
  - Profalux:
    - 1 keylock
    - 1 keylock + one identical keylock
    - 2 different keylocks.

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

Cradle accessories

Door interlock
- Optional equipment: one door interlock per cradle.
- 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 cradle.

Racking interlock
- Optional equipment: one racking interlock per cradle.
- This device prevents insertion of the racking handle when the cubicle door is open.
- It is mounted on the right-hand side of the cradle.

Mismatch protection
- Standard equipment: one mismatch protection device per cradle.
- Mismatch protection offers twenty different combinations that the user may select to ensure that only a compatible circuit breaker is mounted on a given cradle.

Auxiliary terminal shield (CB)
- Optional equipment: one CB shield per cradle:
  - 3 poles
  - 4 poles.
- The shield prevents access to the terminal block of the electrical auxiliaries.

"Connected", "disconnected" and "test" position carriage switches (CE, CD, CT)
- Optional equipment: one to six carriage switches
- Standard configuration, 0 to 3 CE, 0 to 2 CD, 0 to 1 CT.
- Changeover contact
- Breaking capacity at $\cos \phi = 0.3$: standard, minimum current 10 mA / 24 V
- $\begin{array}{|c|c|} \hline V_{AC} & 240 & 8 \text{A (rms)} \\ 380 & 8 \text{A (rms)} \\ 480 & 8 \text{A (rms)} \\ 690 & 6 \text{A (rms)} \\ \hline V_{DC} & 24/48 & 2.5 \text{A} \\ & 125 & 0.8 \text{A} \\ & 250 & 0.3 \text{A} \\ \hline \end{array}$
- Low level, minimum current 1 mA / 4 V
- $\begin{array}{|c|c|} \hline V_{AC} & 24/48 & 5 \text{A (rms)} \\ & 240 & 5 \text{A (rms)} \\ & 380 & 5 \text{A (rms)} \\ \hline V_{DC} & 24/48 & 2.5 \text{A} \\ & 125 & 0.8 \text{A} \\ & 250 & 0.3 \text{A} \\ \hline \end{array}$
Inspecting and testing before use

Initial tests
Procedure

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

DANGER

ELECTRIC SHOCK, EXPLOSION OR ARC FLASH HAZARD

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death, serious injury or equipment damage.

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.
Inspecting and testing before use

What to do when the circuit breaker trips?

Note the fault
Faults are signalled locally and remotely by the indicators and auxiliary contacts installed on circuit breakers (depending on each configuration). See from page 34 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 tests must be directed and carried out by qualified personnel.

Inspect the circuit breaker following a short-circuit
- Check the arc chutes: see page 46
- Check the contacts: see page 46
- Check the tightness of connections: see the device installation manual
- Check the disconnecting-contact clusters: see page 46.

Reset the circuit breaker
The circuit breaker can be reset locally or remotely. See page 10 in this manual for information on how the circuit breaker can be reset.

⚠️ DANGER
ELECTRIC SHOCK, EXPLOSION OR ARC FLASH HAZARD
- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
Failure to follow these instructions will result in death, serious injury or equipment damage.
Before undertaking any maintenance work, de-energise the installation and fit locks or warnings in compliance with all applicable safety standards.

If the control unit has a maintenance indicator, there is no need to systematically check the contacts.

If the contacts are worn, have the concerned poles replaced by the Schneider Electric service centre.

**Arc chutes**
- Remove the fixing screws
- Check the arc chutes:
  - chamber intact
  - separators not corroded.

If necessary, replace the arc chutes.

- Refit the arc chutes and secure with a tightening torque of 1.5 Nm. (13 lb-in.)

**Wear of main contacts**
- Remove the arc chutes
- Visually check the contacts

If necessary, contact Schneider Electric After-sales support.

**Disconnecting-contact clusters**
- Grease the contacts using the grease recommended on page 48
- Check the contacts as follows:
  - open the circuit breaker
  - de-energise the busbars
  - disconnect the circuit breaker
  - remove the circuit breaker
  - check the contact fingers (no sign of copper should be visible).

Replace any worn clusters.
Maintaining Masterpact performance

Ordering replacement parts

Electrical accessories
The electrical accessories that may require replacement are the following:
- MCH gear motor
- MX opening release(s)
- XF closing release
- MN undervoltage release.

See pages 36 and 37 in the “Auxiliaries for remote operation” section for their characteristics and part numbers.

Arc chutes
- 1 arc chute:
  - type N
  - type L1.

One chute per pole.

Front
- 1 per 3- or 4-pole device.

Charging handle
- 1 handle.

1 per device

Crank
- 1 per device.

Support for MX / XF / MN releases
- 1 per device.

Disconnecting-contact clusters
- 1 cluster.

Grease for disconnecting-contact clusters
- 1 can.
## Troubleshooting and solutions

### Maintaining Masterpact performance

<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</td>
<td>- disable the locking function</td>
</tr>
<tr>
<td></td>
<td>- Circuit breaker interlocked mechanically in a source changeover system</td>
<td>- check the position of the other circuit breaker in the changeover system</td>
</tr>
<tr>
<td></td>
<td>- Circuit breaker not completely connected</td>
<td>- modify the situation to release the interlock</td>
</tr>
<tr>
<td></td>
<td>- The reset button signalling a fault trip has not been reset</td>
<td>- terminate racking in (connection) of the circuit breaker</td>
</tr>
<tr>
<td></td>
<td>- Stored energy mechanism not charged</td>
<td>- clear the fault</td>
</tr>
<tr>
<td></td>
<td>- MX opening shunt release permanently supplied with power</td>
<td>- charge the mechanism manually</td>
</tr>
<tr>
<td></td>
<td>- MN undervoltage release not supplied with power</td>
<td>- if it is equipped with a MCH gear motor, check the supply of power to the motor. If the problem persists, replace the gear motor (MCH)</td>
</tr>
<tr>
<td></td>
<td>- XF closing release continuously supplied with power, but circuit breaker not &quot;ready to close&quot; (XF not wired in series with PF contact)</td>
<td>- cut the supply of power to the XF closing release, then send the closing order again via the XF, but only if the circuit breaker is &quot;ready to close&quot;</td>
</tr>
<tr>
<td></td>
<td>- 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 these protection functions on the Micrologic P or H control unit</td>
</tr>
<tr>
<td>Circuit breaker cannot be closed remotely but can be opened locally using the closing pushbutton</td>
<td>- Closing order not executed by the XF closing release</td>
<td>- check the voltage and the supply circuit (0.85 - 1.1 Un). If the problem persists, replace the XF release</td>
</tr>
<tr>
<td>Unexpected tripping without activation of the reset button signalling a fault trip</td>
<td>- MN undervoltage release supply voltage too low</td>
<td>- check the voltage and the supply circuit (U &gt; 0.85 Un).</td>
</tr>
<tr>
<td></td>
<td>- Load-shedding order sent to the MX opening release by another device</td>
<td>- check the overall load on the distribution system</td>
</tr>
<tr>
<td></td>
<td>- Unnecessary opening order from the MX opening release</td>
<td>- if necessary, modify the settings of devices in the installation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- determine the origin of the order</td>
</tr>
<tr>
<td>Unexpected tripping with activation of the reset button signalling a fault trip</td>
<td>- A fault is present:</td>
<td>- determine and clear the causes of the fault</td>
</tr>
<tr>
<td></td>
<td>- overload</td>
<td>- check the condition of the circuit breaker before putting it back into service</td>
</tr>
<tr>
<td></td>
<td>- earth fault</td>
<td>- press the reset button</td>
</tr>
<tr>
<td></td>
<td>- short-circuit detected by the control unit</td>
<td>- modify the distribution system or the control-unit settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- check the condition of the circuit breaker before putting it back into service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- press the reset button</td>
</tr>
<tr>
<td>Instantaneous opening after each attempt to close the circuit breaker with activation of the reset button signalling a fault trip</td>
<td>- Thermal memory</td>
<td>- see the user manual of the control unit</td>
</tr>
<tr>
<td></td>
<td>- Transient overcurrent when closing</td>
<td>- press the reset button</td>
</tr>
<tr>
<td></td>
<td>- Closing on a short-circuit</td>
<td>- modify the distribution system or the control-unit settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- check the condition of the circuit breaker before putting it back into service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- press the reset button</td>
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## Troubleshooting and solutions

### Maintaining Masterpact performance

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<tr>
<th>Problem</th>
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</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 button signalling a fault trip</td>
<td>▪ Reset button not pushed-in completely</td>
<td>□ push the reset button in completely</td>
</tr>
<tr>
<td>Impossible to insert the crank in connected, test or disconnected position</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 turn the crank</td>
<td>▪ The reset button has not been pressed</td>
<td>□ press the reset button</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 cranck is still in the cradle</td>
<td>□ remove the cranck and store it</td>
</tr>
<tr>
<td>Circuit breaker cannot be locked in connected, test or disconnected position</td>
<td>▪ Check that locking in any position is enabled</td>
<td>□ contact a Schneider service centre</td>
</tr>
<tr>
<td></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>
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