# User manual for circuit breakers

## COMPACT NS630b to 1600 A

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Discovering Compact

Rating plate

- Rated current (x 100 A)
- Performance level
- Suitability for isolation
- Type of device: circuit breaker or switch-disconnector
- Ui - rated insulation level
- Uimp - impulse withstand voltage
- Icu - ultimate breaking capacity
- Ue - rated operational voltage
- Ics - rated service breaking capacity
- Icw - rated short-time withstand current
- Standards

**Compact**

<table>
<thead>
<tr>
<th>NS630b</th>
<th>NS690b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ui</td>
<td>750 V</td>
</tr>
<tr>
<td>Uimp</td>
<td>8 kV</td>
</tr>
<tr>
<td>Ue</td>
<td>220/240 V ~ 50</td>
</tr>
<tr>
<td>(V)</td>
<td>380/415 V ~ 50</td>
</tr>
<tr>
<td>440</td>
<td>~ 30</td>
</tr>
<tr>
<td>500/525</td>
<td>~ 40</td>
</tr>
<tr>
<td>660/690</td>
<td>~ 30</td>
</tr>
<tr>
<td>Ics = 75% Icu</td>
<td></td>
</tr>
<tr>
<td>Icw 25kA / 0.5s cat B</td>
<td></td>
</tr>
</tbody>
</table>

**Standards**

- IEC 60947-2
- UTE VDE NEMA

---

**Type of device:**
- circuit breaker or switch-disconnector

**Suitability for isolation:**

**Performance level:**

**Ui - rated insulation level:**

**Uimp - impulse withstand voltage:**

**Icu - ultimate breaking capacity:**

**Ue - rated operational voltage:**

**Ics - rated service breaking capacity:**

**Icw - rated short-time withstand current:**

---

**Compact NS Schneider Electric**
Manually operated
Compact with a toggle

Components

Control unit

Spring-charging handle and ON/OFF toggle

Control auxiliary terminals

“Push to trip” button

Device for padlocking the toggle in all positions

Rating plate

Device rating

Padlocking device for the toggle in the OFF position

MX opening voltage release or MN undervoltage release

OF1 ON/OFF indication contact

OF2 ON/OFF indication contact

OF3 ON/OFF indication contact

SD trip-indication contact

SDE fault-trip indication contact

Device rating

OF1 ON/OFF indication contact

OF2 ON/OFF indication contact

OF3 ON/OFF indication contact

SD trip-indication contact

SDE fault-trip indication contact

MX opening voltage release or MN undervoltage release
Opening, closing, reset

Local opening and closing

- OFF: breaker open, ON: breaker closed.

Remote opening

Use either:
- an MX opening release
- an MN undervoltage release
- a delayed MN undervoltage release.

When connected to the control panel, these releases may be used to remotely open the device.

Resetting the device following a trip

- the device trips.
- reset the device, then close it again.
Testing the device

Manually operated Compact with a toggle

1. close the device.
2. press the "Press to trip" button.
3. push the toggle down to reset the device, then back up close it again.
4. ON

reset
Locking the toggle in the OFF position using one to three padlocks (shackle diameter 5 to 8 mm)

Locking the toggle in the ON or OFF position using one to three padlocks (shackle diameter 5 to 8 mm)
Manually operated
Compact with a rotary handle

Components

- CAF early-make contact
- CAO early-break contact
- OF1 ON/OFF indication contact
- OF2 ON/OFF indication contact
- OF3 ON/OFF indication contact
- SD trip-indication contact
- MX opening voltage release or MN undervoltage release
- SDE fault-trip indication contact
- Control unit
- Extended rotary handle
- Door lock
- Padlocking device
- "Push to trip" button
- Rating plate
- Keylocks
- Direct rotary handle
Opening, closing, reset

Local opening and closing
- OFF: breaker open, ON: breaker closed.

Remote opening
Use either:
- an MX opening release
- an MN undervoltage release
- a delayed MN undervoltage release.

When connected to the control panel, these releases may be used to remotely open the device.

Resetting the device following a trip
- the device trips.

- reset the device, then close it again.
Testing the device

- close the device.

- press the "Press to trip" button.

- turn the handle to reset the device, then back to close it again.
Locking the rotary handle

Locking the direct or extended rotary handle in all positions using one to three padlocks (shackle diameter 5 to 8 mm)

- in the standard configuration, the device may be locked in the OFF position.

- remove the ring as indicated below to enable locking in both the ON and OFF positions.

- lock the handle.

- the controls are locked.

**Note:**
the rotary handle can be equipped for locking by both padlocks and keylocks.
Manually operated
Compact with a rotary handle

Locking the rotary handle

Locking the direct rotary handle in all positions using a keylock

1. Lock.

2. The controls are locked.

3. Unlock.

Two types of keylocks are available

RONIS
PROFALUX
Door locking when the device is in the ON position, using the extended rotary handle

- in the standard configuration, the door cannot be opened when the rotary handle is set to the ON position.

- it is possible, however, to defeat the door lock.

- the door-lock function may be permanently disabled by removing the lock.
Remote operated Compact Components

Fixed device

- MX opening voltage release or MN undervoltage release
- SDE fault-trip indication contact
- SD trip-indication contact
- OF ON/OFF indication contacts
- Charging handle for the closing order
- Control auxiliary terminals
- Motor mechanism
- Locking in the OFF position using a padlock
- Locking in the OFF position using a keylock and a padlock
- ON button
- OFF button
- Operation counter

Front

- Trip indication button used to reset before closing
- Rating plate
- Locking by padlock, lead-seal cover or screws for pushbuttons
- Indicator for position of the main contacts
- Closing spring status indicator

Control unit
Local opening and closing

Device open (OFF), discharged

Device closed (ON), discharged

Device open (OFF), charged

Device closed (ON), charged
Remote operated Compact

Opening, closing, reset

Remote opening

Use either:
- an MX opening release
- an MN undervoltage release
- a delayed MN undervoltage release
- a motor mechanism.

When connected to the control panel, these releases may be used to remotely open the device.

MX, MN

Delay unit

Remote close

Motor mechanism

Opening, closing, reset
Manually recharge the device following a trip

- the device trips.

- reset the device, then recharge it.
Remote operated Compact

**Locking the controls**
Disabling local or remote closing

---

**Locking the device using one to three padlocks**
(shackle diameter 5 to 8 mm)

- lock.
- Open the device.
- Pull out the tab.
- Install the padlock(s).

- the controls are locked.

- unlock.
- push in the tab.

---

**Note.**

Padlocks and keylocks may be used together.
Padlocks and keylocks may be used together. Locking using padlocks is identical to the system on the previous page.

Locking the device using a keylock and/or one to three padlocks (shackle diameter 5 to 8 mm)

- keylocking.
  - Open the device.
  - Turn the key.
  - Remove the key.

- the controls are locked.

- unlock.
  - Insert the key.
  - Turn the key.
  - Push in the tab.

Two types of keylocks are available

- RONIS
- PROFALUX
Compact chassis

Components

- Carriage switch terminals
- ON/OFF indication contact terminals
- Control auxiliary terminals
- Arc-chute cover
- Terminals for control-unit and fault-trip indication contacts
- Carriage switch terminals
- Auxiliary terminal shield
- Racking interlock
- Locking by keylocks
- Locking by padlocks
- "Connected", "test" or "disconnected" position indicator
- Crank socket
- Position release button
- Crank storage
- Crank
- Disconnecting-contact cluster
- Withdraw grip
- Shutter locking blocks
- Safety shutters
- Side plate for withdrawable device
- Manually operated device with a toggle
- Manually operated device with a rotary handle
- Electrically operated device
- Mismatch protection
- Door interlock
- Carrying grip
- Withdraw grip
- Crank socket
- Position release button
- Crank storage
- Crank
- Arc-chute cover
- Side plate for withdrawable device
To set up a mismatch-prevention combination for the device and the chassis, see the mismatch-prevention installation manual.

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

The possible combinations are listed below.

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<td>B</td>
<td>C</td>
<td>4 5</td>
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<tr>
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<td>B</td>
<td>D</td>
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<td>D</td>
<td>E</td>
<td>1 2 3</td>
<td></td>
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Compact chassis

Racking

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

Before mounting Compact NS, make sure it matches the chassis.

Removing the rails

Press the release tabs and pull the rails out.

To put the rails back in, press the release tabs and push the rails in.

Inserting the device

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

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

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

Push the device into the chassis, taking care not to push on the control unit.
Racking

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

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

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

1. The device is in "disconnected" position.
2. The device is in "test" position.
3. The device is in "test" position.
4. The circuit breaker is in "test" position. Remove the crank or continue to "connected" position.
5. The device is in "connected" position.
6. The circuit breaker is in "disconnected" position.

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

1. The circuit breaker is in "connected" position.
2. The circuit breaker is in "test" position.
3. The device is in "test" position.
4. The circuit breaker is in "test" position. Remove the crank or continue to "disconnected" position.
5. The device is in "disconnected" position.
6. The circuit breaker is in "disconnected" position.

Note.
These operations require that all chassis-locking functions be disabled (see page 24).
Combination of locking systems.
It is possible to lock the device on the chassis in the "disconnected" position using:
- one to three padlocks
- one or two keylocks
- a combination of both.

**Locking**

Use padlocks with a maximum shackle diameter of 5 to 8 millimetres.

Device in "disconnected" position.  
Pull out the tab.

1. Insert the shackle (max. diameter 5 to 8 mm) of the padlock(s).
2. The crank cannot be inserted.

**Unlocking**

Remove the padlock(s).  
Release the tab.

1. The crank can be inserted.
2. Release the tab.

**Note.**
Padlocks and keylocks may be used together.  
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.
Using one or two keylocks

**Locking**

- Device in "disconnected" position.
  - Turn the key(s).
- Turn the key(s).
- The crank cannot be inserted.
- Remove the key(s).
- The crank cannot be inserted.

**Unlocking**

- Insert the key(s).
- Turn the key(s).
- The crank can be inserted.
- Turn the key(s).
- The crank can be inserted.

**Three types of keylocks are available.**

- RONIS
- PROFALUX
- CASTELL
The locking device is installed on the left or right-hand side of the chassis.
- when the device is in "connected" or "test" position, the latch is lowered and the door is locked.
- when the device is in "disconnected" position, the latch is raised and the door is unlocked.

Disabling door opening

Close the door. Turn the crank until the device is in "test" or "connected" position. The door is locked.

Enabling door opening

Turn the crank until the device is in "disconnected" position. The door is unlocked.
Locking the device 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.
Locking the safety shutters

Four locking possibilities inside the chassis 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.
Electrical auxiliaries

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

### Power

- **Control unit**

### Remote operation

- **Control unit**

- **Remote operation**

<table>
<thead>
<tr>
<th>A</th>
<th>P</th>
<th>H</th>
<th>Control unit</th>
<th>Remote operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Com: E1-E6 communication</td>
<td>SDE: Fault-trip indication contact (supplied as standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>UC1: Z1-Z5 zone selective interlocking; Z1 = ZSI = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (ground fault) M1 = Vigi module input (Micrologic 7)</td>
<td>SD: Trip-indication contact (supplied as standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>UC2: T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)</td>
<td>MN: Undervoltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>UC3: F2+, F1- external 24 V DC power supply VN external voltage connector</td>
<td>or MX: Shunt release (standard or communicating)</td>
</tr>
</tbody>
</table>

**A:** Digital ammeter  
**P:** A + power meter + programmable protection  
**H:** P + harmonics
**Indication contacts**

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

**Key:**
- Withdrawable device only
- SDE1, OF1, OF2, OF3, OF4 supplied as standard
- Interconnected connections (only one wire per connection point)

**Chassis contacts**

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

---

**Diagram:**

- Indication contacts diagram showing connections for various contacts like CAF1, CAF2, SDE, SD, CAO1, CAO2, OF3, OF2, OF1.
- Chassis contacts diagram showing connections for CD2, CD1, CE3, CE2, CE1, CT1.
**Electrical auxiliaries**

**Operation**

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

<table>
<thead>
<tr>
<th>Device</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>completely open</td>
<td>closed</td>
</tr>
<tr>
<td>open</td>
<td>open</td>
</tr>
</tbody>
</table>

OF: ON/OFF (closed/open) indication changeover contacts

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

<table>
<thead>
<tr>
<th>Chassis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>completely connected</td>
<td>separation of the main circuits</td>
</tr>
<tr>
<td>open</td>
<td>separation of the auxiliary circuits</td>
</tr>
<tr>
<td>closed</td>
<td></td>
</tr>
<tr>
<td>open</td>
<td></td>
</tr>
<tr>
<td>closed</td>
<td></td>
</tr>
<tr>
<td>closed</td>
<td></td>
</tr>
</tbody>
</table>

CE: connected-position carriage switch contact

CT: test-position carriage switch contact

CD: disconnected-position carriage switch contact
**Device indication contacts**

<table>
<thead>
<tr>
<th>designation</th>
<th>type</th>
<th>standard, minimum current 100 mA</th>
<th>24 V low level, minimum current 2 mA</th>
<th>15 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>OF ON/OFF contact</td>
<td>3 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)</td>
<td>V AC 240/380 6 A (rms)</td>
<td>V AC 24/48 5 A (rms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 A (rms)</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 A (rms)</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24/48 2.5 A</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 A (rms)</td>
<td>250</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>0.3 A</td>
<td>0.3 A</td>
<td></td>
</tr>
<tr>
<td>SD fault indication</td>
<td>1 changeover contact breaking capacity (AC 12 / DC 12 as per 947-5-1)</td>
<td>V AC 240/380 6 A (rms)</td>
<td>V AC 24/48 5 A (rms)</td>
<td></td>
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<td></td>
<td></td>
<td>6 A (rms)</td>
<td>240</td>
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<td></td>
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<td>6 A (rms)</td>
<td>380</td>
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<td></td>
<td></td>
<td>24/48 2.5 A</td>
<td>125</td>
<td></td>
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<td></td>
<td></td>
<td>5 A (rms)</td>
<td>250</td>
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<td></td>
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<td>0.3 A</td>
<td>0.3 A</td>
<td></td>
</tr>
<tr>
<td>SDE fault-trip indication for device with motor mechanism</td>
<td>1 changeover contact breaking capacity (AC 12 / DC 12 as per 947-5-1)</td>
<td>V AC 240/380 6 A (rms)</td>
<td>V AC 24/48 5 A (rms)</td>
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<td></td>
<td></td>
<td>6 A (rms)</td>
<td>240</td>
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<td>6 A (rms)</td>
<td>380</td>
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<td>24/48 2.5 A</td>
<td>125</td>
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<td>5 A (rms)</td>
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<td></td>
<td></td>
<td>0.3 A</td>
<td>0.3 A</td>
<td></td>
</tr>
<tr>
<td>CAO early-break switch for device with rotary handle</td>
<td>2 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)</td>
<td>V AC 240/380 6 A (rms)</td>
<td>V AC 24/48 5 A (rms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 A (rms)</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 A (rms)</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24/48 2.5 A</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 A (rms)</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3 A</td>
<td>0.3 A</td>
<td></td>
</tr>
<tr>
<td>CAF early-make switch for device with rotary handle</td>
<td>2 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)</td>
<td>V AC 240/380 6 A (rms)</td>
<td>V AC 24/48 5 A (rms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 A (rms)</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 A (rms)</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24/48 2.5 A</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 A (rms)</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3 A</td>
<td>0.3 A</td>
<td></td>
</tr>
</tbody>
</table>

**Device control auxiliaries**

<table>
<thead>
<tr>
<th>designation</th>
<th>power supply</th>
<th>threshold</th>
<th>consumption</th>
<th>response time</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX opening release</td>
<td>V AC: 50/60 Hz: 24/48 - 100/130 - 200/250 - 277 - 380/480</td>
<td>0.7 to 1.1 Un</td>
<td>pick-up: 200 VA or W (80 ms)</td>
<td>device at Un: 50 ms ± 10</td>
</tr>
<tr>
<td></td>
<td>V DC: 12 - 24/30 - 48/60 - 100/130 - 200/250</td>
<td></td>
<td>hold: 4.5 VA or W</td>
<td></td>
</tr>
<tr>
<td>MN undervoltage release</td>
<td>V AC: 50/60 Hz: 24/48 - 100/130 - 200/250 - 380/480</td>
<td>open: 0.35 to 0.7 Un close: 0.85 Un</td>
<td>pick-up: 200 VA or W (80 ms)</td>
<td>device at Un: 40 ms ± 10</td>
</tr>
<tr>
<td></td>
<td>V DC: 24/30 - 48/60 - 100/130 - 200/250</td>
<td></td>
<td>hold: 4.5 VA or W</td>
<td></td>
</tr>
<tr>
<td>Delay unit for undervoltage release</td>
<td>V AC: 50/60 Hz</td>
<td>open: 0.35 to 0.7 Un close: 0.85 Un</td>
<td>200 VA</td>
<td>device at Un: not adjustable: 0.25 s adjustable: 0.5 - 0.9 - 1.5 - 3 s</td>
</tr>
<tr>
<td></td>
<td>V DC not adjustable: 100/130 - 200/250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V DC adjustable: 48/60 - 100/130 - 200/250 - 380/480</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Motor mechanism**

<table>
<thead>
<tr>
<th>designation</th>
<th>power supply</th>
<th>threshold</th>
<th>consumption and motor overcurrent</th>
<th>recharge time and operating rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor mechanism</td>
<td>V AC: 50/60 Hz: 48/60 - 100/130 - 200/240 - 277 - 400/440 - 460</td>
<td>0.85 to 1.1 Un</td>
<td>consumption: 180 VA or W overcurrent: 2 to 3 In for 0.1 s</td>
<td>3 seconds max. 3 cycles per minute</td>
</tr>
<tr>
<td></td>
<td>V DC: 24/30 - 48/60 - 100/125 - 200/250</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>designation</th>
<th>type</th>
<th>standard, minimum current 100 mA</th>
<th>24 V low level, minimum current 2 mA</th>
<th>15 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE, CT, CD</td>
<td>3 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)</td>
<td>V AC 240 8 A (rms)</td>
<td>V AC 24/48 5 A (rms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 A (rms)</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 A (rms)</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24/48 2.5 A</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 A (rms)</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.8 A</td>
<td>0.8 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>V DC 24/48 2.5 A</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>250</td>
<td>0.3 A</td>
<td></td>
</tr>
</tbody>
</table>
Electrical auxiliaries

Electrical characteristics of contacts and control auxiliaries

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>58</td>
<td>36</td>
<td>280</td>
</tr>
<tr>
<td>100% source voltage</td>
<td>—</td>
<td>—</td>
<td>58</td>
</tr>
<tr>
<td>85% source voltage</td>
<td>—</td>
<td>—</td>
<td>16</td>
</tr>
<tr>
<td>MX-XF</td>
<td>21</td>
<td>12</td>
<td>115</td>
</tr>
<tr>
<td>100% source voltage</td>
<td>21</td>
<td>12</td>
<td>115</td>
</tr>
<tr>
<td>85% source voltage</td>
<td>10</td>
<td>6</td>
<td>75</td>
</tr>
</tbody>
</table>

Note. The indicated length is that for each of the two supply wires.
Start-up operations
Procedure

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

A general check of the device 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 device 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 device (MCH, MX, MN)
- remove the long-time rating plug on the 7.0 A control units.
Removal of the rating plug disconnects the voltage measurement input.

Switchboard inspection
Check that the devices 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 (motor mechanism)
- protection settings (long time, short time, instantaneous, ground fault)
- identification of the protected circuit marked on the front of each device.

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 devices:
- opening of contacts
- closing of contacts.

Check on the control unit
Check the control unit of each circuit breaker using the respective user manuals.
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 devices (depending on each configuration). See page 32 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.
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 tightness of connections (see the device installation manual)
- check the disconnecting-contact clusters.

Reset the circuit breaker

The circuit breaker can be reset locally or remotely. See pages 5, 9 and 15 in this manual for information on how the device can be reset.
Compact operating conditions

Ambient temperature

Compact devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5°C to +70°C
- circuit-breaker closing is guaranteed down to -35°C
- Compact (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

Compact devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 68-2-1: dry cold at -55°C
- IEC 68-2-2: dry heat at +85°C
- IEC 68-2-30: damp heat (temperature +55°C, relative humidity 95%)
- IEC 68-2-52 level 2: salt mist.

Compact devices can operate in the industrial environments defined by standard IEC 947 (pollution degree up to 3).

It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.

Vibrations

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

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

Compact 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.

Compact devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:
- IEC 947-2, appendix F
- IEC 947-2, 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.