

# PacT Series

## MasterPacT MTZ1 IEC Circuit Breakers From 630 to 1600 A With MicroLogic Active Control Unit

### User Guide

PacT Series offers world-class breakers and switches.

DOCA0284EN-02  
11/2024



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# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

### **NOTICE**

**NOTICE** is used to address practices not related to physical injury.

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

## Safety Notice

### **WARNING**

#### **HAZARD OF ELECTRIC SHOCK**

Do not use MasterPacT MTZ circuit breakers with MicroLogic Active control units:

- On power systems with IT grounding system with voltage above 600 Vac.
- On power systems with other grounding system with voltage above 690 Vac.

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

### **CAUTION**

#### **HAZARD OF BURNS**

Apply appropriate personal protective equipment (PPE) when the MasterPacT MTZ circuit breaker ambient temperature is above 50 °C (122 °F).

**Failure to follow these instructions can result in injury or equipment damage.**

## Cybersecurity Safety Notice

### **WARNING**

#### **POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY**

- Change default PIN codes and passwords at first use to help prevent unauthorized access to device settings, controls, and information.
- Disable unused ports/services and default accounts to help minimize pathways for malicious attackers.
- Place networked devices behind multiple layers of cyber defenses (such as firewalls, network segmentation, and network intrusion detection and protection).
- Use cybersecurity best practices (for example, least privilege, separation of duties) to help prevent unauthorized exposure, loss, modification of data and logs, or interruption of services.

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

# About the Book

## Document Scope

The aim of this guide is to provide users, installers, and maintenance personnel with technical information needed to operate MasterPacT™ MTZ1 circuit breakers with MicroLogic™ Active control units in compliance with IEC standards.

## Validity Note

This guide applies to MasterPacT MTZ1 circuit breakers with MicroLogic Active control units with firmware version 002.001.001 or greater.

## Online Information

The information contained in this guide is likely to be updated at any time. Schneider Electric strongly recommends that you have the most recent and up-to-date version available on [www.se.com/ww/en/download](http://www.se.com/ww/en/download).

The technical characteristics of the devices described in this guide also appear online. To access the information online, go to the Schneider Electric home page at [www.se.com](http://www.se.com).

## Related Documents

Title of documentation	Reference number
<i>MasterPacT MTZ - MicroLogic Active Control Unit - User Guide</i>	DOCA0265EN
<i>MasterPacT MTZ IEC Circuit Breakers with MicroLogic Active Control Unit - Maintenance Guide</i>	DOCA0305EN
<i>MasterPacT MTZ Catalog</i>	LVPED225010EN
<i>MasterPacT MTZ1 - Fixed IEC Circuit Breaker with MicroLogic Active Control Unit - Instruction Sheet</i>	PKR4242702
<i>MasterPacT MTZ1 - Drawout IEC Circuit Breaker with MicroLogic Active Control Unit - Instruction Sheet</i>	PKR4242802
<i>MasterPacT, ComPacT, PowerPacT - Cybersecurity Guide</i>	DOCA0122EN DOCA0122ES DOCA0122FR DOCA0122ZH
<i>EcoStruxure Panel Server - User Guide</i>	DOCA0172EN DOCA0172ES DOCA0172FR DOCA0172DE DOCA0172IT DOCA0172PT

You can download these technical publications and other technical information from our website at [www.se.com/ww/en/download/](http://www.se.com/ww/en/download/).

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# MasterPacT MTZ1 with MicroLogic Active Description

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## PacT Series Master Range

Future-proof your installation with Schneider Electric's low-voltage and medium-voltage PacT Series. Built on legendary Schneider Electric innovation, the PacT Series comprises world-class circuit breakers, switches, residual current devices and fuses, for all standard and specific applications. Experience robust performance with PacT Series within the EcoStruxure-ready switchgear, from 16 to 6300 A in low-voltage and up to 40.5 kV in medium-voltage.



## MasterPacT MTZ1 Range

The MasterPacT MTZ1 range of circuit breakers is made of:

- Circuit breakers with MicroLogic X control unit, described in DOCA0100•• *MasterPacT MTZ1 - IEC Switch-Disconnectors and Circuit Breakers with MicroLogic X Control Unit - User Guide*, page 7.
- Circuit breakers with MicroLogic Active control unit described in this guide.

## MasterPacT MTZ1 Circuit Breakers with MicroLogic Active Control Unit

The range of MasterPacT MTZ1 circuit breakers with MicroLogic Active control unit offers current ratings from 630 A to 1,600 A for AC power systems up to 690 Vac.

**NOTE:** For AC power systems with IT grounding system, the voltage is limited to 600 Vac.

MasterPacT MTZ1 circuit breakers with MicroLogic Active control unit are available:

- In one frame size.
- In the following power systems:
  - 3-pole (3P)
  - 4-pole (4P)
- In the following installation types:
  - Fixed-mounted circuit breakers
  - Drawout circuit breakers

## Circuit Breakers

MasterPacT MTZ1 circuit breakers with MicroLogic Active control unit are available with the following performance levels:

- H1: standard short-circuit level (42 kA) with total selectivity
- H2: high short-circuit level (50 kA) with high selectivity (42 kA)

**NOTE:** The values above correspond to a 415 Vac network, for higher voltage levels the values can be different. Refer to LVPED225010EN *MasterPacT MTZ Catalog* in **Related Documents** at the beginning of this guide.

For full information about available circuit breaker models, interrupting ratings, sensor ratings, and control units, refer to LVPED225010EN *MasterPacT MTZ Catalog*, page 7.

Circuit breakers are fitted with a MicroLogic Active control unit.

For full information about MicroLogic Active control unit, refer to DOCA0265•• *MasterPacT MTZ - MicroLogic Active Control Unit - User Guide*, page 7.

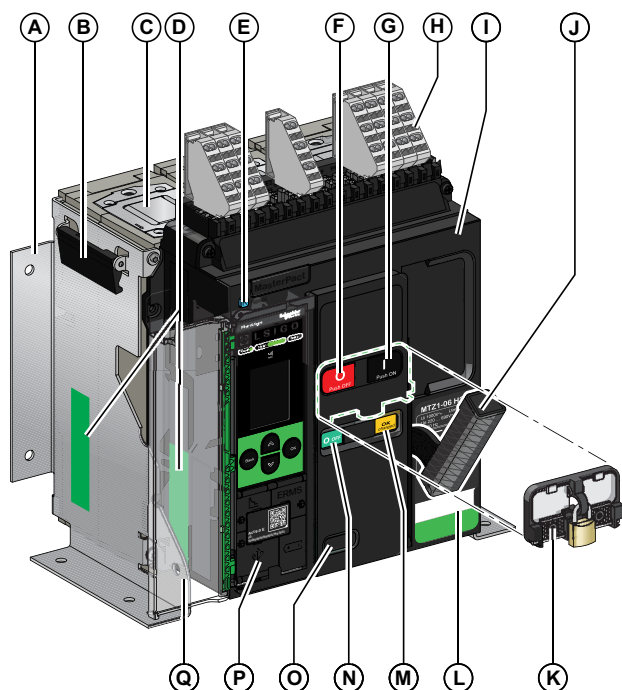
## Neutral Position on 4P Circuit Breakers

On 4P circuit breakers, the neutral is on the left side as standard. A right side neutral version is not available for circuit breakers.

# Fixed Circuit Breaker

## Fixed Circuit Breaker Description

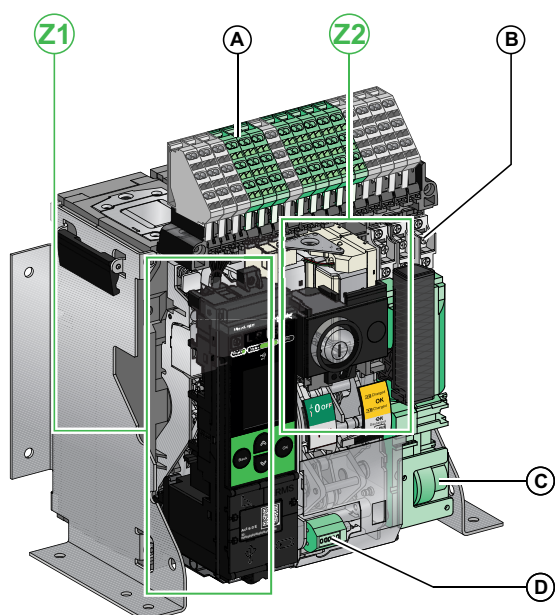
The following image shows the standard version of the fixed circuit breaker (no optional accessories).



- A** Mounting side plate
- B** Carrying grip
- C** Arc chute
- D** Product identification label, with manufacturing date
- E** Blue fault-trip reset button
- F** Opening pushbutton
- G** Closing pushbutton
- H** Terminal blocks for standard accessories
- I** Front cover
- J** Spring charging handle
- K** VBP pushbutton locking cover (optional)
- L** Rating plate
- M** Spring charged and ready-to-close indicator
- N** Main-contact position indicator
- O** Window to read the (optional) CDM mechanical operation counter
- P** Control unit
- Q** Control unit transparent cover

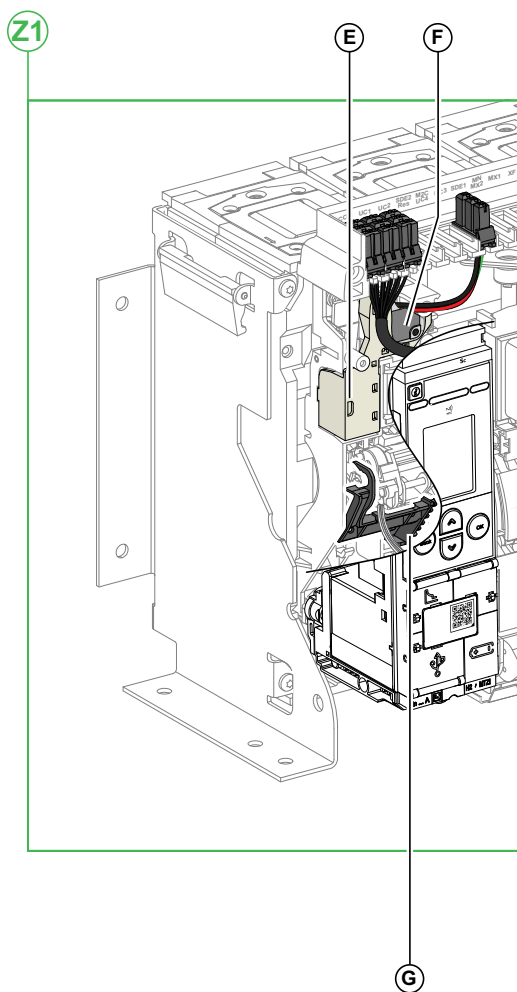
## Fixed Circuit Breaker Accessories Description

The following image shows the accessories available for the fixed circuit breaker.



- A** Terminal blocks for optional accessories
- B** Four OF indication contacts (delivered as standard)
- C** MCH gear motor
- D** CDM mechanical operation counter
- Z1, Z2** See following images

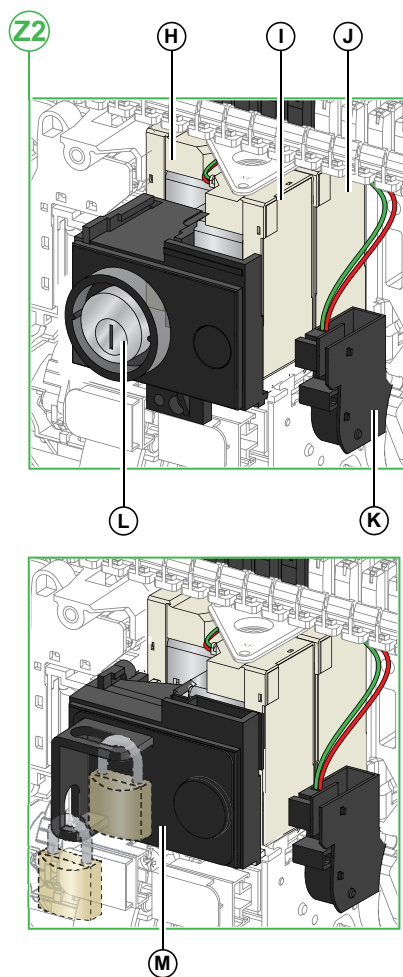
The following images zoom in on the accessories for the fixed circuit breaker:



**E** Standard SDE1 fault-trip indication contact

**F** Optional SDE2 fault-trip indication contact or RES electrical remote reset

**G** Microswitch



**H** MN undervoltage release or MX2 opening voltage release

**I** XF closing voltage release

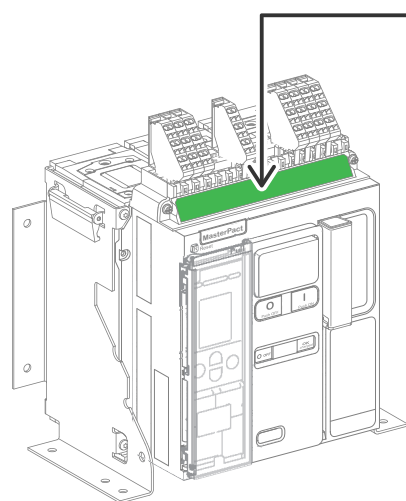
**J** MX1 opening voltage release

**K** PF ready-to-close contact

**L** VSPO OFF-position locking by keylocks

**M** VCPO OFF-position locking by padlocks

## Fixed Circuit Breaker Terminal Block Description



COM	UC1	UC2	SDE2/Res	M2C/UC4/ESM	UC3	SDE1	MN/MX2	MX1	XF	PF	MCH	OF4	OF3	OF2	OF1
T6	M1	M2	M3/T1	184/K2	484/V3	84	D2/C12	C2	A2	254	B2	44	34	24	14
Z3	Z4	AF3	T2	182/-	474/V2	VN	-/C13	C3	A3	252	B3	42	32	22	12
F2+	F1-	Z1	Z2	AF1	AF2	181/K1	471/V1		81	D1/C11	C1	A1	251	B1	41

- Terminal block supplied as standard on the circuit breaker
- Terminal block for optional accessories on the circuit breaker

## Assignment of Terminal Blocks

### **⚡ ⚠ DANGER**

#### **HAZARD OF ELECTROCUTION FOR VOLTAGES ABOVE 480 VAC**

If a voltage greater than 480 Vac is connected to a terminal, it is forbidden to connect adjacent terminals to a 24 Vdc SELV (Safety Extra Low Voltage) power supply in order to observe the insulation distances. For example, if you connect a 690 Vac supply to the UC4 terminal block, you must not connect a 24 Vdc SELV supply to the SDE2 terminal block.

**Failure to follow these instructions will result in death or serious injury.**

The following table describes the assignment and the availability of the terminal blocks for fixed circuit breakers:

- Standard terminal blocks and the associated accessories are delivered with the circuit breaker.
- Optional terminal blocks are delivered with the circuit breaker only if the associated optional accessories are installed in the circuit breaker.

Marking	Description	Availability
COM	Terminal block for the external power supply of the MicroLogic Active control unit	Standard
UC1	Zone selective interlocking (ZSI) or MDGF module input	Standard
UC2	Neutral external sensor or MDGF module input	Standard
SDE2/RES	SDE2: additional fault-trip indication contact or RES: electrical remote reset	Optional
M2C/UC4/ESM	M2C: not applicable, or UC4: external voltage connector	Optional

Marking	Description	Availability
	or ESM: not applicable	
UC3	External voltage connector	Standard on 3P circuit breakers Optional on 4P circuit breakers
SDE1	SDE1 fault-trip indication contact	Standard
MN/MX2	MN undervoltage release or MX2 opening voltage release	Optional
MX1	MX1 opening voltage release	Optional
XF	XF closing voltage release	Optional
PF	PF ready-to-close contact	Optional
MCH	MCH gear motor	Optional
OF1-OF4	4 OF indication contacts	Standard

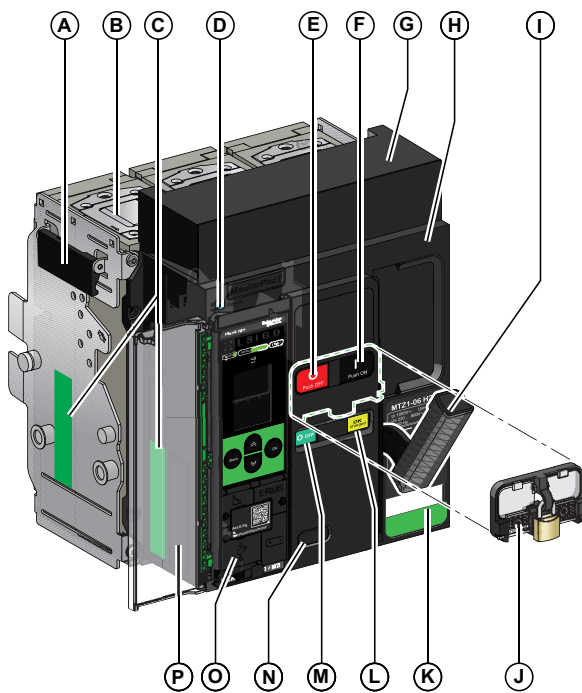
# Drawout Circuit Breaker

## Definition

A drawout circuit breaker is composed of the moving part (also called the circuit breaker) and the fixed part (or chassis).

## Drawout Circuit Breaker Moving Part Description

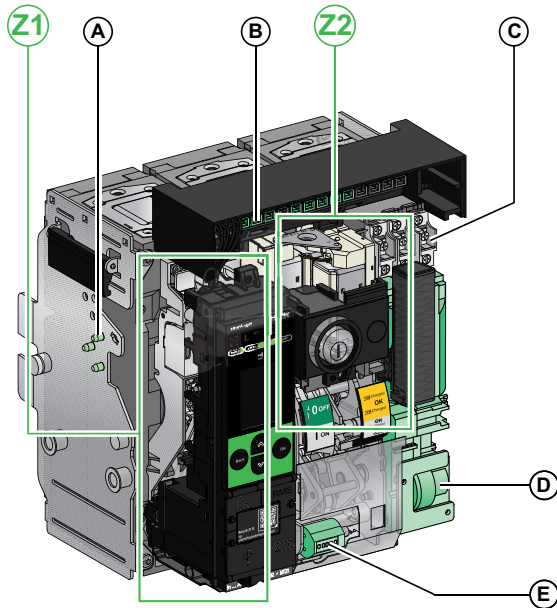
The following image shows the standard version of the moving part of a drawout circuit breaker (no optional accessories).



- A** Carrying grip
- B** Arc chute
- C** Product identification label, with manufacturing date
- D** Blue fault-trip reset button
- E** Opening pushbutton
- F** Closing pushbutton
- G** Disconnectable contact block cover
- H** Front cover
- I** Spring charging handle
- J** VBP pushbutton locking cover (optional)
- K** Rating plate
- L** Spring charged and ready-to-close indicator
- M** Main-contact position indicator
- N** Window to consult the (optional) CDM mechanical operation counter
- O** Control unit
- P** Control unit transparent cover

## Drawout Circuit Breaker Accessories Description

The following image shows the accessories available for the moving part of a drawout circuit breaker.



**A** VDC mismatch protection

**B** Disconnectable contact block

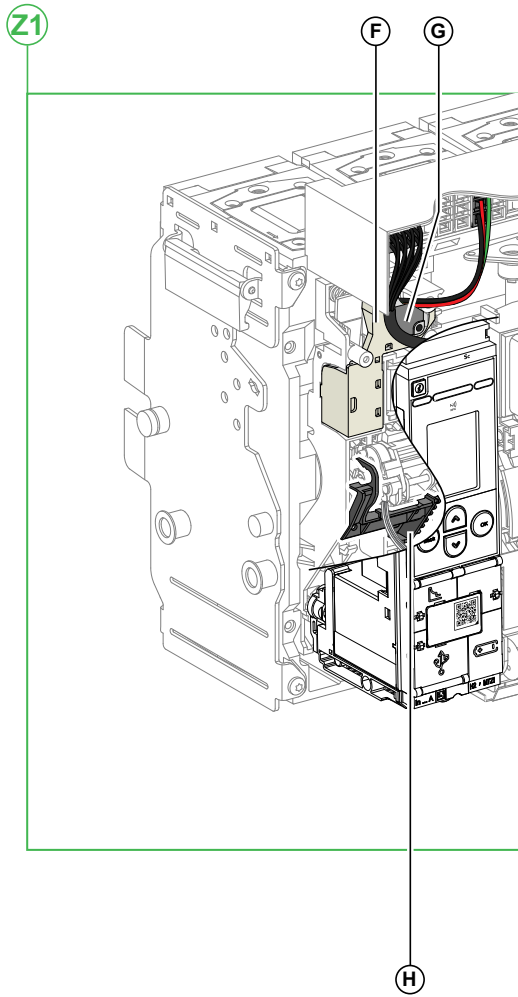
**C** Four OF indication contacts (delivered as standard)

**D** MCH gear motor

**E** CDM mechanical operation counter

**Z1, Z2** See following images

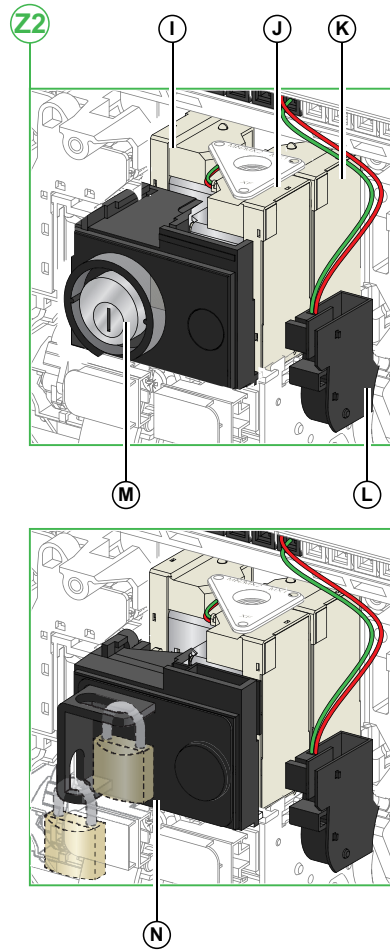
The following images zoom in on the accessories for the moving part of a drawout circuit breaker.



**F** Standard SDE1 fault-trip indication contact

**G** Optional SDE2 fault-trip indication contact or RES electrical remote reset

**H** Microswitch



**I** MN undervoltage release or MX2 opening voltage release

**J** XF closing voltage release

**K** MX1 opening voltage release

**L** PF ready-to-close contact

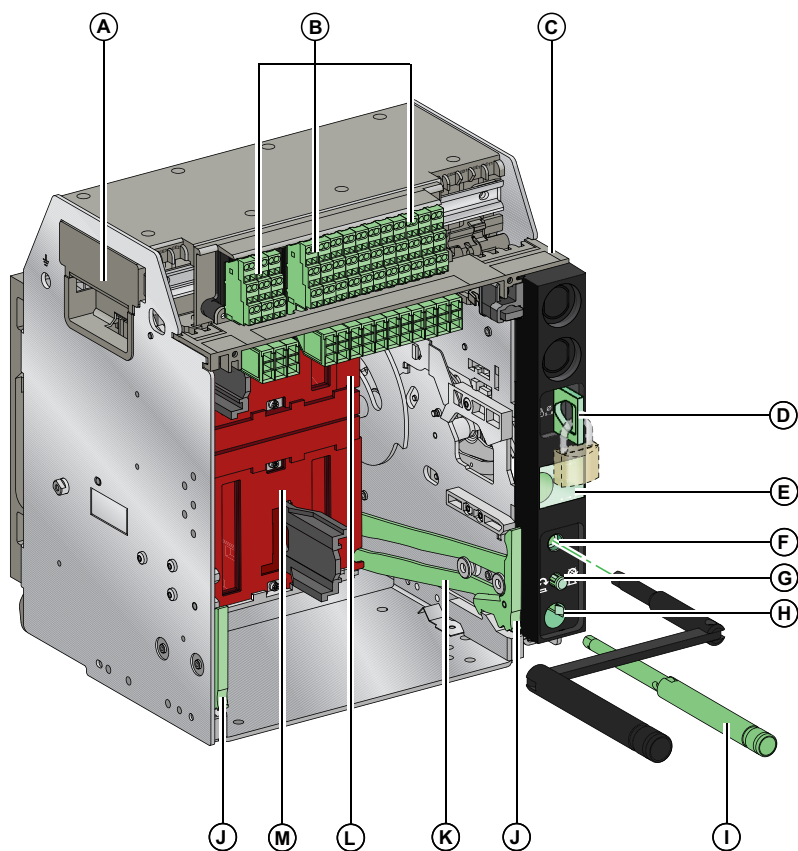
**M** VSPO OFF-position locking by keylocks

**N** VCPO OFF-position locking by padlocks



## Chassis Description

The following image shows the standard version of the chassis (no optional accessories).



**A** Carrying grip

**B** Terminal blocks for standard accessories

**C** Terminal block identification plate

**D** Chassis locking by padlocks

**E** Moving part position indicator

**F** Racking handle socket

**G** Position release button

**H** Racking handle storage space

**I** Racking handle

**J** Drawout grip

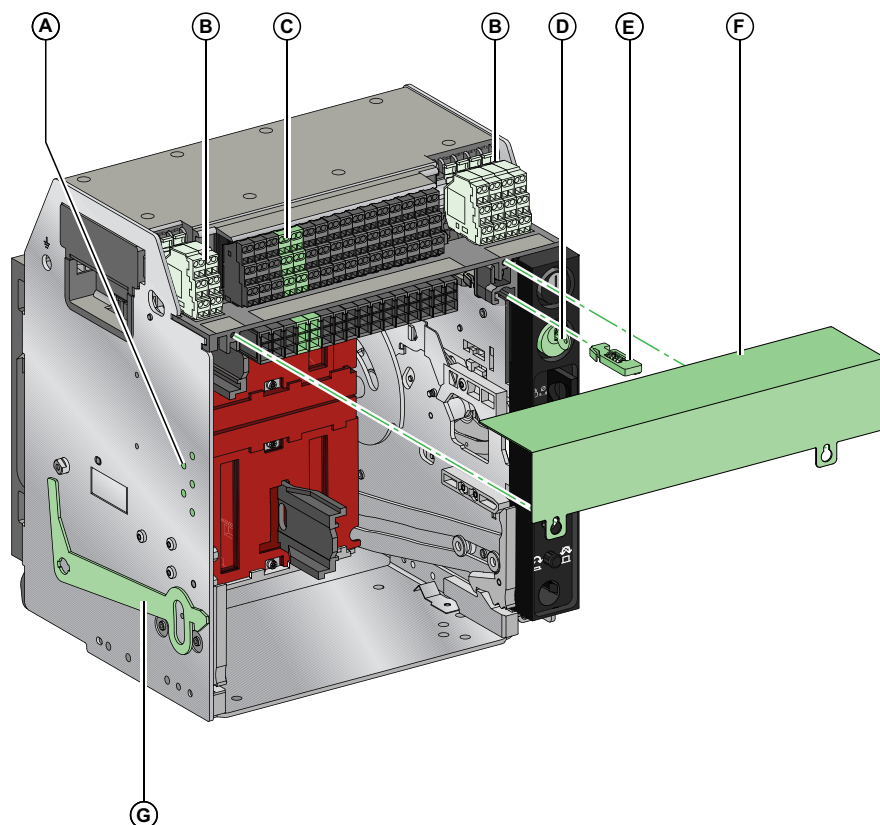
**K** Extension rail

**L** Top safety shutter

**M** Bottom safety shutter

## Chassis Accessories Description

The following image shows the accessories available for the chassis.



**A** VDC mismatch protection

**B** Drawout device position contacts

**C** Terminal blocks for optional accessories

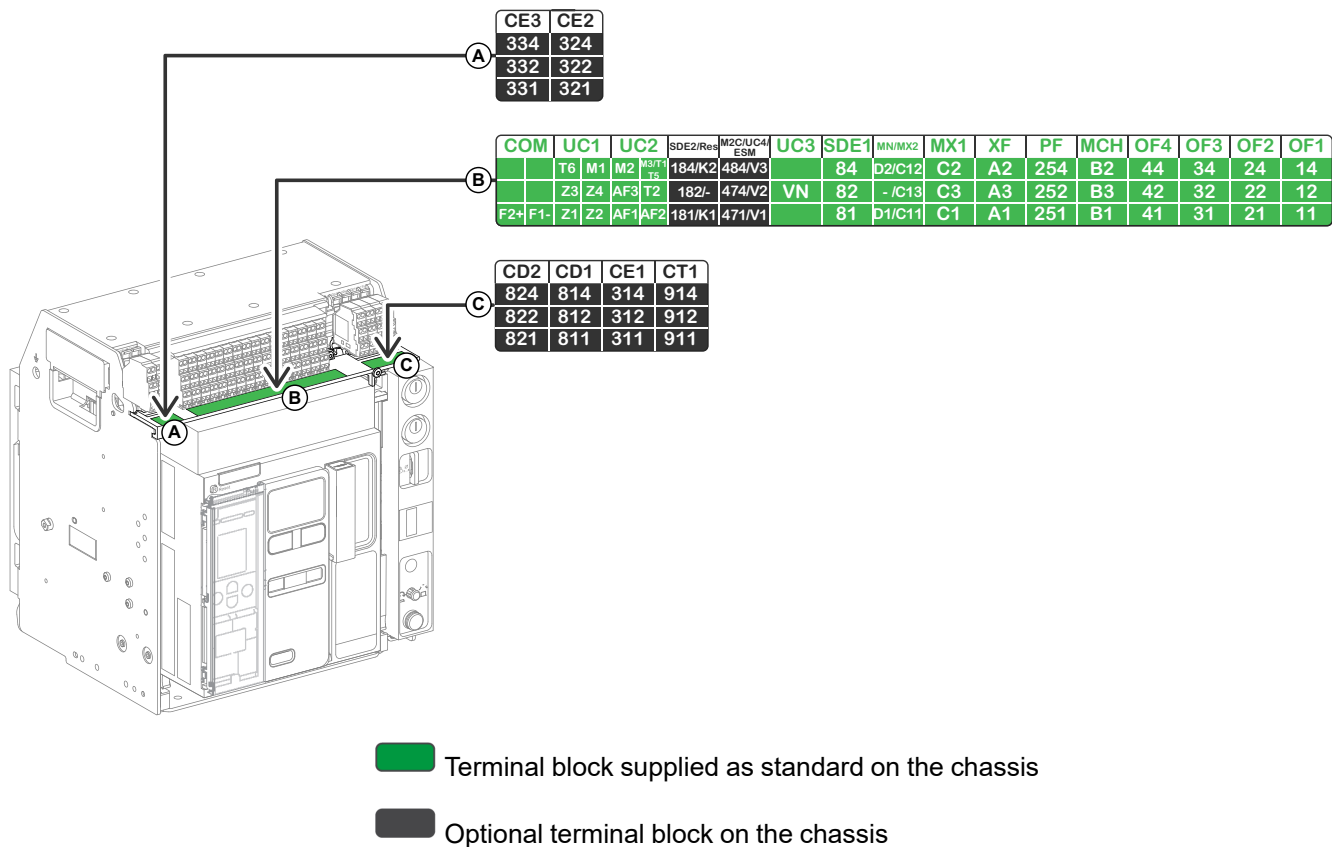
**D** VSPD chassis locking by keylocks

**E** VPOC open-door racking interlock

**F** Circuit breaker auxiliary terminal shield

**G** VPEC door interlock

## Chassis Terminal Block Description



## Assignment of Chassis Terminal Blocks

### **DANGER**

#### **HAZARD OF ELECTROCUTION FOR VOLTAGES ABOVE 480 VAC**

If a voltage greater than 480 Vac is connected to a terminal, it is forbidden to connect adjacent terminals to a 24 Vdc SELV (Safety Extra Low Voltage) power supply in order to observe the insulation distances. For example, if you connect a 690 Vac supply to the UC4 terminal block, you must not connect a 24 Vdc SELV supply to the SDE2 terminal block.

**Failure to follow these instructions will result in death or serious injury.**

The following table describes the assignment and the availability of the terminal blocks for drawout circuit breakers:

- Standard terminal blocks are delivered on the chassis, even if the associated accessories are not installed in the circuit breaker.
- Optional terminal blocks are delivered on the chassis only if the associated optional accessories are installed in the circuit breaker.

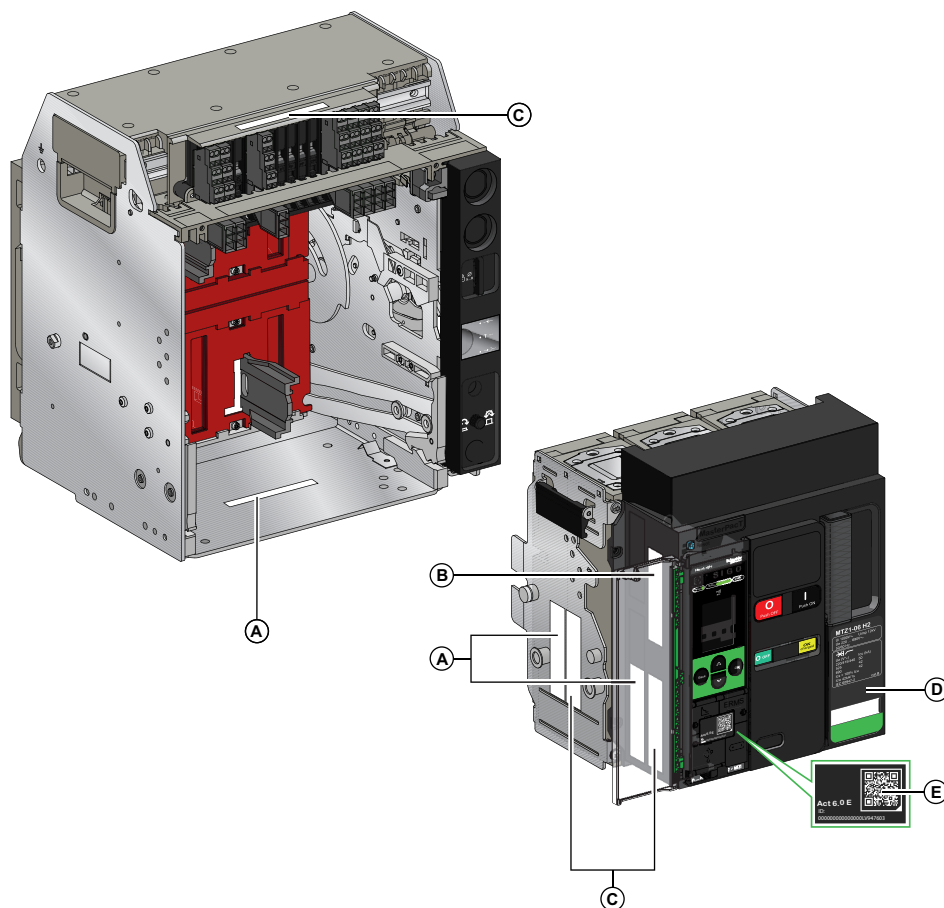
Block	Marking	Description	Availability
A	CE2-CE3	2 CE connected position contacts	Optional
B	COM	Terminal block for the external power supply of the MicroLogic Active control unit	Standard
	UC1	Zone selective interlocking (ZSI) or MDGF module input	Standard
	UC2	Neutral external sensor or MDGF module input	Standard
	SDE2/RES	SDE2: additional fault-trip indication contact or RES: electrical remote reset	Optional
	M2C/UC4/ESM	M2C: not applicable, or UC4: external voltage connector, or ESM: not applicable	Optional
	UC3	External voltage connector	Standard on 3P circuit breakers Optional on 4P circuit breakers
	SDE1	SDE1 fault-trip indication contact	Standard
	MN/MX2	MN undervoltage release or MX2 opening voltage release	Standard
	MX1	MX1 opening voltage release	Standard
	XF	XF closing voltage release	Standard
	PF	PF ready-to-close contact	Standard
	MCH	MCH gear motor	Standard
	OF1-OF4	4 OF indication contacts	Standard
C	CD1-CD2	2 CD disconnected position contacts	Optional
	CE1	1 CE connected position contact	
	CT1	1 CT test position contact	

# Circuit Breaker Identification

## Identification

The MasterPacT MTZ1 circuit breaker can be identified in the following ways:

- Rating plate on circuit breaker
- QR code located on the front face of the control unit of the circuit breaker
- Identification labels on the circuit breaker and on the chassis



**A** Product identification label

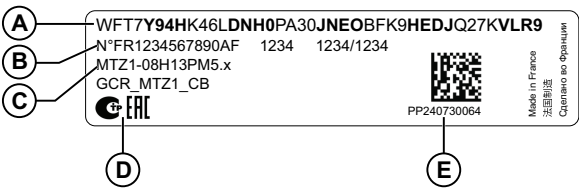
**B** Product checked label

**C** Accessory voltages label

**D** Rating plate

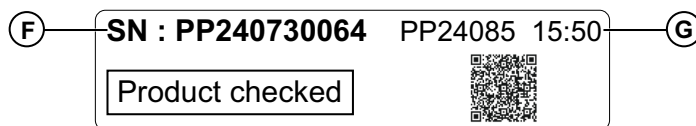
**E** QR code to access product information

Product Identification Label



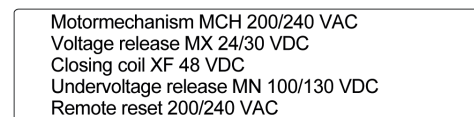
Legend	Description	Explanation
A	Product code	<p>The product code is a line of code representing the complete configuration of a MasterPacT circuit breaker. It is automatically generated for each MasterPacT circuit breaker after completing the configuration by using the Product Selector configuration tool.</p> <p>The product code appears on the invoice and on the delivery documents as well as on the MasterPacT circuit breaker and packaging labels.</p> <p>The product code can be entered in the Product Selector configuration tool, which generates the complete configuration of the MasterPacT circuit breaker.</p>
B	Schneider Electric internal identification numbers	–
C	Description of circuit breaker	<p>The description of the circuit breaker, specifies the following characteristics:</p> <ul style="list-style-type: none"><li>• Range</li><li>• Rating</li><li>• Performance level</li><li>• Number of poles</li><li>• Control unit type</li></ul>
D	Certification logos	The logos of the mandatory certifications of the circuit breaker.
E	Circuit breaker serial number	<p>The circuit breaker serial number is coded PPYYWWDNNNN, where:</p> <ul style="list-style-type: none"><li>• PP: Plant code</li><li>• YY: Year of manufacture</li><li>• WW: Week of manufacture</li><li>• D: Day of the week of manufacture (Monday = 1)</li><li>• NNNN: The production number of the circuit breaker on the day. Ranges from 0001 to 9999.</li></ul> <p>For example, PP240730064 is the sixty-fourth circuit breaker manufactured at plant PP on Wednesday, February 14, 2024.</p>

## Product Checked Label



Legend	Description	Explanation
F	Circuit breaker serial number	See explanation in preceding table.
G	Circuit breaker test date code	<p>The circuit breaker test date code is coded PPYYWWD HH:MM, where:</p> <ul style="list-style-type: none"> <li>• PP: Plant code</li> <li>• YY: Year of test</li> <li>• WW: Week of test</li> <li>• D: Day of the week of test (Monday = 1)</li> <li>• HH:MM: The time of test in hours and minutes</li> </ul>

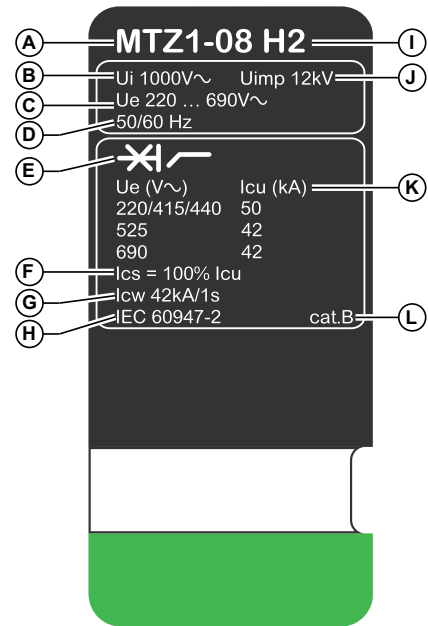
## Accessory Voltages Label



The accessory voltages label gives the voltage of the accessories which are installed in the circuit breaker and which need to be connected to a power supply.

# Rating Plate

The rating plate with the circuit breaker information is located on the front cover of the circuit breaker.



- A** Circuit breaker size and rated current x 100 A

**B** **Ui**: rated insulation voltage

**C** **Ue**: rated operational voltage

**D** Frequency

**E** Type of circuit breaker, suitable for insulation

**F** **Ics**: rated service short-circuit breaking capacity
- G** **Icw**: rated short-time withstand current

**H** Standards

**I** Performance level

**J** **Uimp**: rated impulse withstand voltage

**K** **Icu**: rated ultimate short-circuit breaking capacity

**L** Selectivity category as per IEC 60947-2

# QR Code

When the QR code on the front face of a MasterPacT MTZ circuit breaker is scanned with a smartphone running a QR code reader and connected to the Internet, the Go2SE landing page is displayed, page 27.

The landing page displays:

- Information about the MicroLogic Active control unit, including traceability information.
- IEEE 802.15.4 ID and installation code for MicroLogic Active AP/EP control unit.
- A list of menus.



# Go2SE Landing Page

## Presentation

When the QR code on the front face of a MasterPacT MTZ circuit breaker is scanned with a smartphone running a QR code reader and connected to the Internet, the Go2SE landing page is displayed.

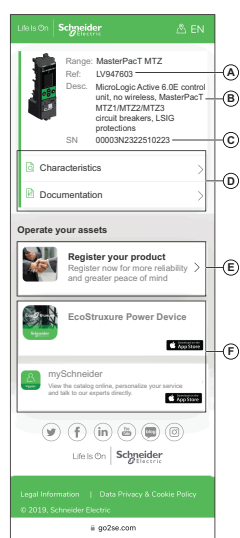
The landing page displays:

- Information about the MicroLogic Active control unit, including traceability information.
- IEEE 802.15.4 ID and installation code for MicroLogic Active AP/EP control unit.
- A list of menus.

## Landing Page Description

The landing page is accessible from Android and iOS smartphones. It displays the same list of menus with slight differences in presentation.

The following example shows the landing page displayed on an Android smartphone:



- A. Commercial reference of MicroLogic Active control unit
- B. Type of MicroLogic Active control unit
- C. Serial number of the MicroLogic Active control unit
- D. Landing page menus. See the following menu descriptions for details.
- E. Link to Schneider Electric Product Registrations to register your product
- F. Downloadable applications

## Serial Number

The serial number provides traceability by encoding the manufacturing date and location of the MicroLogic Active control unit.

## IEEE 802.15.4 ID and Installation Code

Click on **More details** to get the IEEE 802.15.4 ID and installation code. If using selective pairing, the IEEE 802.15.4 ID is required to pair a MicroLogic Active AP/EP control unit with a Panel Server.

The IEEE 802.15.4 ID (IEEE address) is a hexadecimal number with 16 characters, for example 8C6FB9FFFEF7A574.

The installation code is a hexadecimal number with 36 characters, for example 1F4A547964BC254A1F4A547964BC254ABC12.

## Characteristics

Selecting this menu gives access to a product datasheet with detailed information about the MicroLogic Active control unit.

## Documentation

Selecting this menu gives access to MasterPacT MTZ and MicroLogic Active technical publications, including:

- Certificates
- Declaration of conformity
- How to videos
- Instruction sheets
- User guides

## mySchneider App

Selecting this application gives access to the Schneider Electric customer care mobile application **mySchneider** app that can be downloaded on Android and iOS smartphones. For smartphone compatibility, check on your application store. The customer care application offers self-service instructions and easy access to expert support and information.

# Operating Conditions

## Introduction

MasterPacT MTZ circuit breakers are designed and tested for operation in industrial atmospheres. It is recommended that equipment is cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.

## Ambient Temperature

MasterPacT MTZ circuit breakers can operate under the following temperature conditions:

- Electrical and mechanical characteristics specified for an ambient temperature of -25 °C to +70 °C.
- Circuit-breaker closing specified down to -35 °C by manual operation with closing pushbutton.

Storage conditions are as follows:

- -40 °C to +85 °C for the circuit breaker without the control unit.
- -25 °C to +85 °C for the control unit.

## Extreme Atmospheric Conditions

MasterPacT MTZ circuit breakers have successfully passed tests for extreme atmospheric conditions, defined by the following standards:

Standard	Title
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

## Industrial Environments

MasterPacT MTZ circuit breakers can operate in the industrial environments defined by IEC 60947 (pollution degree up to 3).

It is advisable to check that circuit breakers are installed in suitably cooled switchboards without excessive dust.

Conditions	Standard
Corrosive industrial atmospheres	Category 3C3 compliant with IEC 60721-3-3
Sea salts 0.8 to 8 mg/m <sup>2</sup> day average over the year	Compliant with IEC 60721-2-5
Mechanically active substances	Category 3S3 compliant with IEC 60721-3-3

Beyond these conditions, MasterPacT MTZ circuit breakers must be installed inside switchboards with an IP rating equal to or greater than IP54.

## Vibration

MasterPacT MTZ circuit breakers have successfully passed tests for the following vibration levels, in compliance with IEC 60068-2-6 and IEC 60068-2-27:

- 2 Hz to 13.2 Hz: amplitude +/- 1 mm.
- 13.2 Hz to 100 Hz: constant acceleration of 0.7 g.

Vibration testing to these levels is required by merchant marine inspection organizations (for example, Veritas, Lloyd's).

MasterPacT MTZ circuit breakers have also been successfully tested according to:

- Annex Q - IEC 60947-1: Special tests – damp heat, salt mist, vibration and shock
- IEC 60947-1 - Category D: Environment subject to temperature, humidity and vibration

## Altitude

MasterPacT MTZ circuit breakers are designed and tested to operate at altitudes below 2,000 m.

At altitudes above 2,000 m, the characteristics of the ambient air (electrical resistance, cooling capacity) lower product characteristics as follows:

Characteristics	Altitude			
	2,000 m	3,000 m	4,000 m	5,000 m
Impulse withstand voltage $U_{imp}$ (kV)	12	11	10	8
Rated insulation voltage ( $U_i$ ) (V)	1,000	900	780	700
Maximum rated operational voltage 50/60 Hz $U_e$ (V)	690	690	630	560
Rated current (A) at 40 °C	1 x $I_n$	0.99 x $I_n$	0.96 x $I_n$	0.94 x $I_n$

**NOTE:** Intermediate values can be obtained by interpolation.

## Electromagnetic Disturbances

MasterPacT MTZ circuit breakers have protection against:

- Overvoltages caused by circuit breakers that generate electromagnetic disturbance.
- Overvoltages caused by atmospheric disturbance or by a distribution-system outage (for example, a lighting system failure).
- Circuit breakers emitting radio waves (for example, radio transmitters, walkie-talkies, or radar).
- Electrostatic discharge produced by users.

MasterPacT MTZ circuit breakers have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:

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

The circuit breakers have passed the above tests and therefore:

- No nuisance tripping occurs.
- Tripping times are respected.

# MasterPacT MTZ1 Normal Operation

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Circuit Breaker Interlocking Actions ..... 77

# Circuit Breaker Operating Actions

## What's in This Chapter

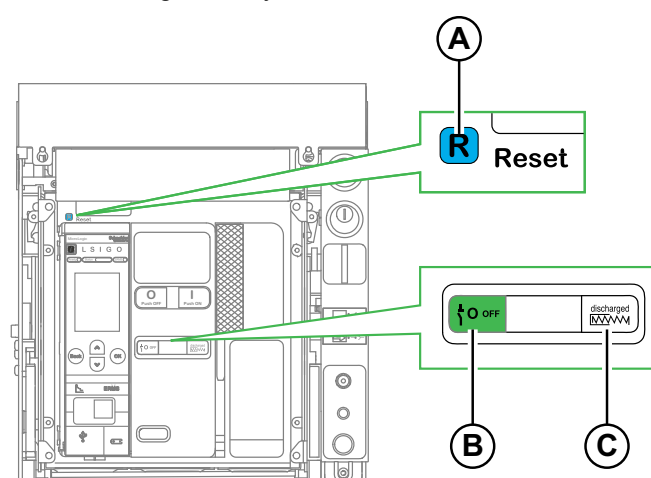
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# Operating the Circuit Breaker

## Circuit Breaker Status

The indicators on the front of the circuit breaker show the following information:

- Blue fault-trip reset button:
  - In: the circuit breaker is closed or open voluntarily (not tripped)
  - Out: the circuit breaker has tripped
- Position indicator of main contacts: ON or OFF.
- Closing spring and ready-to-close indicator. The state can be one of the following:
  - Discharged (no energy to close the circuit breaker)
  - Charged not ready-to-close
  - Charged ready-to-close







**A** Blue fault-trip reset button

**B** Position indicator of main contacts

**C** Closing spring and ready-to-close indicator




The combination of both indicators gives the circuit breaker status:

Position indicator of main contacts	Closing spring and ready-to-close indicator	Circuit breaker status description
		Circuit breaker is off (main contacts are open) and closing spring is discharged.
		Circuit breaker is off (main contacts are open) and closing spring is charged. The circuit breaker is not ready-to-close because at least one of the following conditions is true: <ul style="list-style-type: none"> <li>• The circuit breaker has tripped and must be reset.</li> <li>• The MX opening voltage release is energized.</li> <li>• The MN undervoltage release is not energized.</li> <li>• The circuit breaker is mechanically locked in the open position by using padlock or keylock or by using an interlocking system.</li> </ul>
		Circuit breaker is off (main contacts are open) and closing spring is charged.  The circuit breaker is ready-to-close.

Position indicator of main contacts	Closing spring and ready-to-close indicator	Circuit breaker status description
		Circuit breaker is on (main contacts are closed) and closing spring is discharged.
		Circuit breaker is on (main contacts are closed) and closing spring is charged.  The circuit breaker is not ready-to-close because it is already closed.

## Circuit Breaker Indication Contacts

The position of the circuit breaker main contacts is indicated by OF indication contacts.

Name	Contact number	Position of indicators and contacts		
Circuit breaker status	–	ON	OFF	Tripped (by MicroLogic Active control unit)
Position indicator of main contacts	–			
Main contact position	–	Closed	Open	Open
Blue fault-trip reset button position	–	IN	IN	OUT
OF indication contact position	1–2	Open	Closed	Closed
	1–4	Closed	Open	Open
SDE indication contact position	1–2	Closed	Closed	Open
	1–4	Open	Open	Closed

## Anti-Pumping Function

MasterPacT MTZ circuit breakers provide a mechanical anti-pumping function. In the event of simultaneous maintained opening and closing orders, the standard mechanism blocks the main contacts in the open position. After a trip due to an electrical fault or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the circuit breaker. This prevents a cycle of closing and opening.

When remote operation features are used, allow at least four seconds for the MCH gear motor to charge the circuit breaker closing spring completely before the XF closing voltage release is actuated.

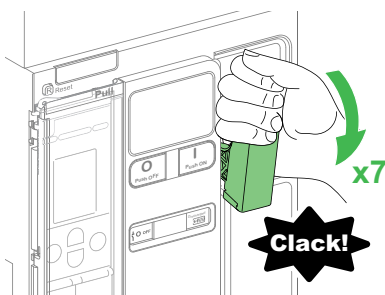
To prevent the circuit breaker from closing prematurely, the PF ready-to-close contact can be series connected with the XF closing voltage release.



## Charging the Closing Spring

The closing spring must be charged with sufficient energy to close the MasterPacT MTZ circuit breaker:

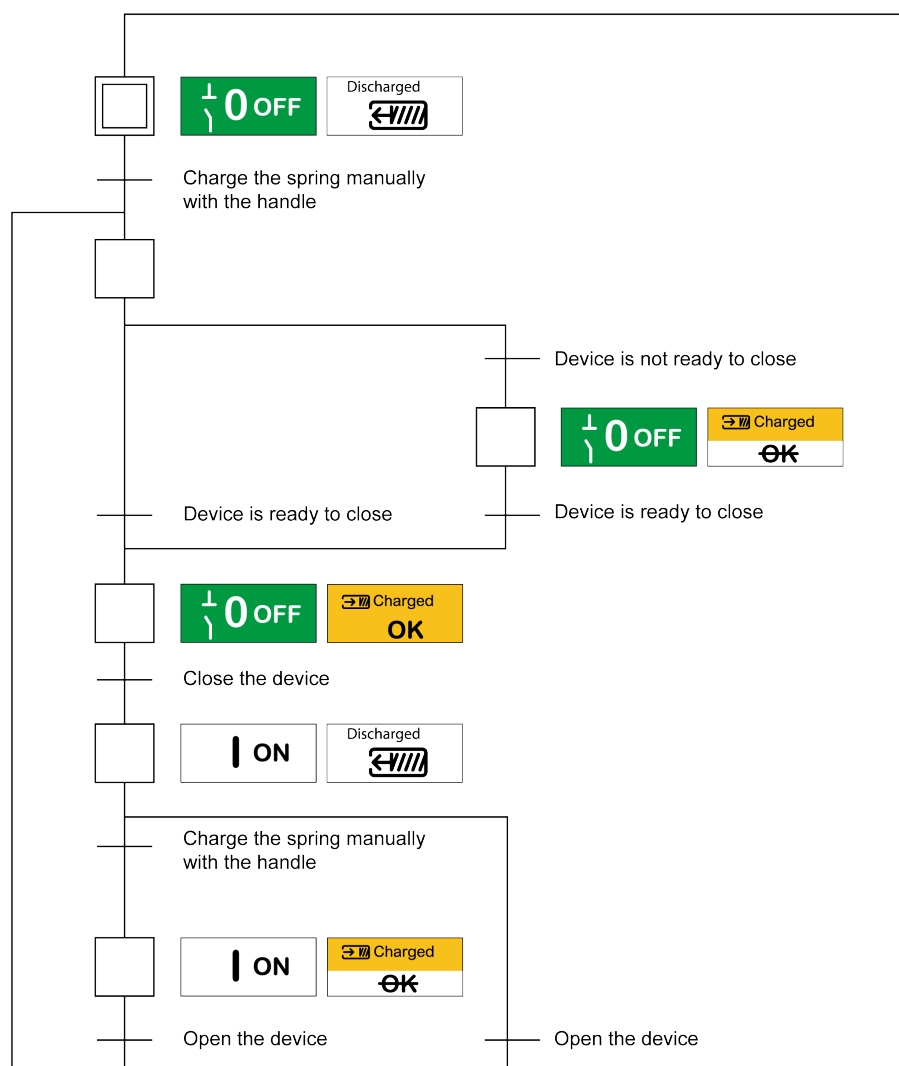
- Manual charge: Charge the mechanism by pulling the spring charging handle down seven times.



- Automatic charge: If the optional MCH gear motor is installed, the spring is automatically charged after closing.

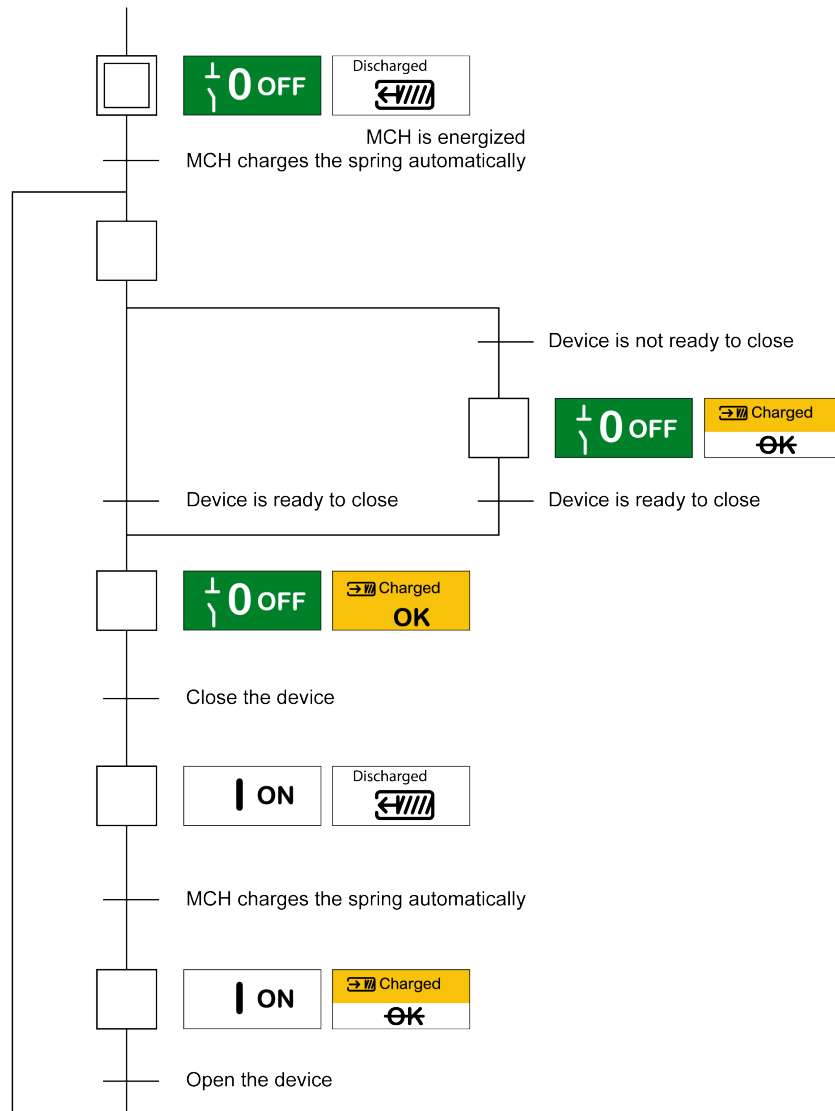
## Manual Operation Cycle with the Spring Charging Handle

The following image shows an Open/Close/Open (OCO) cycle for manually charged circuit breakers without MCH gear motor:



## Electrical Operation Cycle with an MCH Gear Motor

The following image shows an Open/Close/Open (OCO) cycle for electrically charged circuit breakers using an MCH gear motor:



# Opening the Circuit Breaker

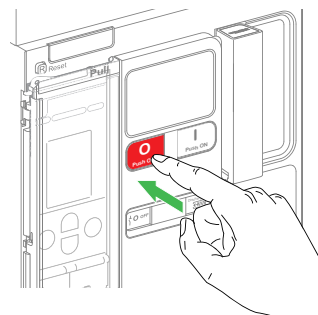
## Opening Conditions

To open the circuit breaker, the circuit breaker must be closed (I).

**NOTE:** An opening order always takes priority over a closing order.

## Opening the Circuit Breaker

The following table presents the different ways to open the circuit breaker.

Opening type	Accessories	Opening action	
Mechanical	—	Press the opening pushbutton on the front of the circuit breaker.  This opening action is possible at any time.	
Automatic	MN undervoltage release, with or without MN delay unit	The MN undervoltage release opens the circuit breaker automatically in the case of voltage drop.	
By external pushbutton	<ul style="list-style-type: none"> <li>External pushbutton wired by customer</li> <li>One of the following accessories: <ul style="list-style-type: none"> <li>MX opening voltage release</li> <li>MN undervoltage release, with or without MN delay unit</li> </ul> </li> </ul>	<p>Press the external pushbutton which is connected to the MX opening voltage release or to the MN undervoltage release via the customer terminal block.</p> <p>When the MN undervoltage release is connected to the MN delay unit, the circuit breaker opens with the corresponding time delay.</p>	


# Closing the Circuit Breaker

## Closing Conditions

To close the circuit breaker, the following conditions must be met:

- Circuit breaker is open (**O**).
- Closing spring is charged.
- The circuit breaker is ready to close, **OK** is displayed.

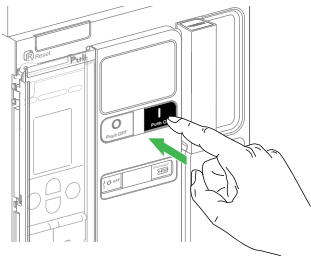
**NOTE:** An opening order always takes priority over a closing order. The circuit breaker cannot be closed while an opening order is being received. If **OK** is crossed-out on the ready-to-close indicator, an order to open is being received (either electrically or mechanically) and must be ended before **OK** can be displayed.

 **DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**  
  
Do not re-close the device on an electrical fault. First inspect and, if necessary, repair the downstream equipment.  
  
**Failure to follow these instructions will result in death or serious injury.**

## Closing the Circuit Breaker

The following table presents the different ways to close the circuit breaker.

Closing type	Accessories	Closing action	
Mechanical	—	Press the closing pushbutton on the front of the circuit breaker.  The closing action is possible when the closing conditions are met.	
External pushbutton	<ul style="list-style-type: none"><li>• External pushbutton wired by customer</li><li>• XF closing voltage release</li><li>• MCH gear motor</li></ul>	Press the external pushbutton, which is connected to the XF closing voltage release through the customer terminal block.	

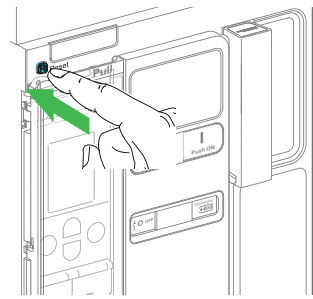
# Resetting the Circuit Breaker

## Resetting Conditions

After a trip, the circuit breaker must be reset before closing it.

## Resetting the Circuit Breaker

The circuit breaker can be reset in different ways, according to the circuit breaker configuration and its accessories:

Type of resetting	Accessories	Resetting action	
Mechanical with the blue fault-trip reset button	—	Push in the blue fault-trip reset button on the front of the circuit breaker. This resetting action is always possible. Pushing in the blue fault-trip reset button resets the SDE fault-trip indication contact, and allows the circuit breaker to be closed.	
Automatic (RAR automatic reset option)	<ul style="list-style-type: none"> <li>• XF closing voltage release</li> <li>• MCH gear motor</li> </ul>	<p>After a trip, RAR automatic reset allows the circuit breaker to be closed without the blue fault-trip reset button being pushed in. The use of XF closing voltage release is compulsory with this option.</p> <p>The mechanical indicator and the SDE fault-trip indication contact remain in detected fault position.</p> <p>To reset the SDE fault-trip indication contact and the mechanical indicator, push in the blue fault-trip reset button.</p>	
Electrical with external pushbutton	<ul style="list-style-type: none"> <li>• External pushbutton wired by customer</li> <li>• RES electrical remote reset</li> <li>• XF closing voltage release</li> <li>• MCH gear motor</li> </ul>	<p>Press the external pushbutton which is connected to the RES electrical remote reset via the customer terminal block.</p> <p>The use of XF closing voltage release is compulsory with this option.</p> <p>The RES electrical remote reset resets the SDE fault-trip indication contact and the mechanical indicator, and allows the circuit breaker to be closed.</p> <p><b>NOTE:</b> The RES electrical remote reset is not compatible with the SDE2 option.</p>	

# Engaging/Disengaging the ERMS Function

## Presentation

The ERMS function is used to reduce protection settings so that the circuit breaker trips as soon as possible when an electrical fault occurs. Minimizing the time between the electrical fault and circuit breaker trip helps to reduce the risk of injury when qualified electrical personnel are near energized equipment.

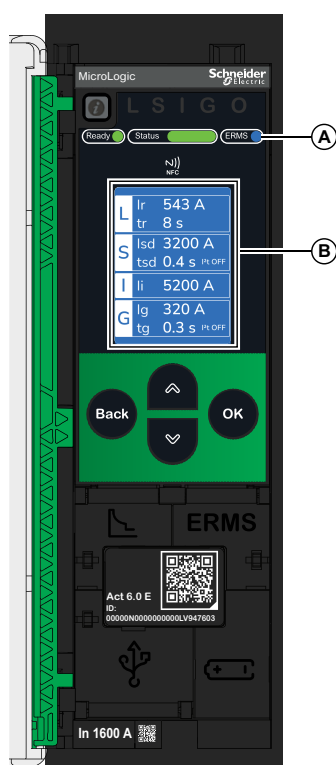
When the ERMS function is engaged, the ERMS protection settings replace the standard protection settings.

## Availability

The ERMS function is available on MicroLogic Active 2.0, 5.0 and 6.0 control units for IEC standard.

## Operating Principle

The ERMS function can be engaged or disengaged by using the **ERMS** button.



While the ERMS function is engaged:

- The ERMS LED (A) is lit in blue.
- The LSIG home screen (B) is blue.
- The Quick View screens are blue.
- All other screens are not blue.

For more information about the ERMS function, and how to engage and disengage the ERMS function, refer to DOCA0265•• *MasterPacT MTZ - MicroLogic Active Control Unit - User Guide*, page 7.

## Operating Accessories

### XF, MX, and MN Voltage Releases

XF, MX, and MN voltage releases are optional accessories mounted inside the circuit breaker.

These voltage releases are designed to receive either pulse-type or maintained voltage operating orders.

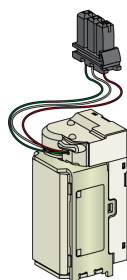
Reinforced voltage releases sustain overvoltage on coil control at 15% of control nominal voltage. They are used for electrical networks with a high overvoltage level.

For information on installation of reinforced voltage releases, consult instruction sheet NVE40749 on the Schneider Electric website.

For information on installation of standard voltage releases, consult instruction sheet 51201007AA on the Schneider Electric website.

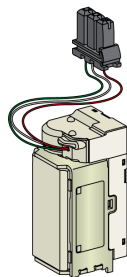
### XF Closing Voltage Release

The XF closing voltage release closes the circuit breaker instantaneously when powered if the spring mechanism is charged. The minimum duration of the pulse operating order must be 200 ms.



### MX Opening Voltage Release

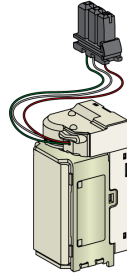
The MX opening voltage release opens the circuit breaker instantaneously when powered. The minimum duration of the pulse operating order must be 200 ms. The MX opening voltage release locks the circuit breaker in the OFF position if the command is maintained.



### MN Undervoltage Release

The MN undervoltage release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35% and 70% of its rated voltage. If there is no supply to the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on

the main contacts. Circuit breaker closing is enabled again when the supply voltage of the release returns to 85% of its rated value.



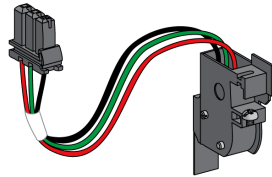
## PF Ready-to-close Contact

This is an optional accessory that is mounted inside the circuit breaker.

The PF ready-to-close contact delivers remotely, the indication delivered locally by the ready-to-close indicator.

It consists of a changeover contact indicating remotely that the circuit breaker is ready to close, that is:

- The circuit breaker is in the open position.
- The spring mechanism is charged.
- There is no maintained opening order.

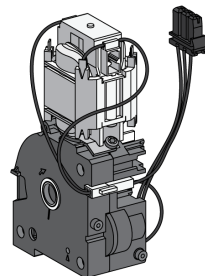


For information on installation, consult instruction sheet NVE35466 on the Schneider Electric website.

## MCH Gear Motor

This is an optional accessory that is mounted inside the circuit breaker.

The MCH gear motor automatically charges the spring mechanism when the circuit breaker is closed, allowing instantaneous closing of the circuit breaker following opening.



For information on installation, consult instruction sheet NVE35514 sheet on the Schneider Electric website.

## RES Electrical Remote Reset

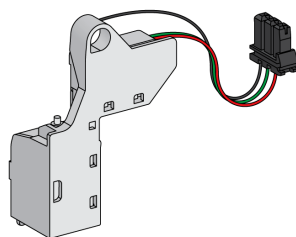
This is an optional accessory that is mounted inside the circuit breaker.



Following tripping, this function resets the SDE fault-trip indication contact and the mechanical indicator, and enables circuit breaker closing.

The use of an XF closing release is compulsory with this option.

The RES electrical remote reset is not compatible with the SDE2 additional fault-trip indication contact because they are installed in the same physical location.

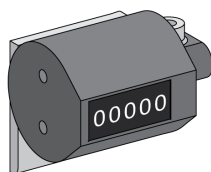


## CDM Mechanical Operation Counter

This is an optional accessory that is mounted inside the circuit breaker.

The CDM mechanical operation counter counts the number of operating cycles and is visible on the front panel. It is compatible with manual and electrical control functions.

This option is compulsory for all source-changeover systems.



For information on installation, consult instruction sheet NVE35516 on the Schneider Electric website.

# Drawout Circuit Breaker Racking Actions

## What's in This Chapter

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Installing the Drawout Circuit Breaker in the Chassis .....	55

# Drawout MasterPacT MTZ1 Circuit Breaker Status

## Drawout Circuit Breaker Handling Conditions

Connection or disconnection of the drawout circuit breaker requires insertion of the racking handle. When interlocks, padlocks, or an open door lock are in place, the racking handle cannot be inserted.

**⚠️ DANGER**

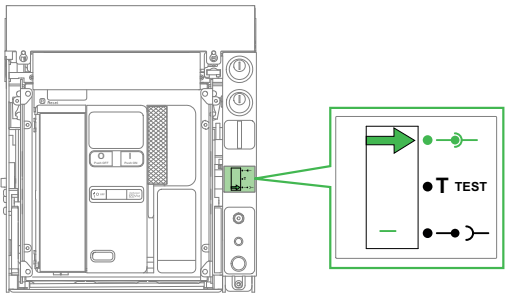
**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462 or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.

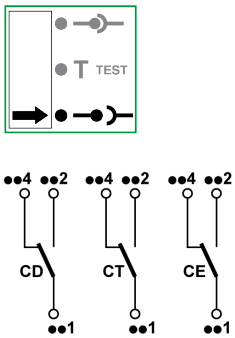
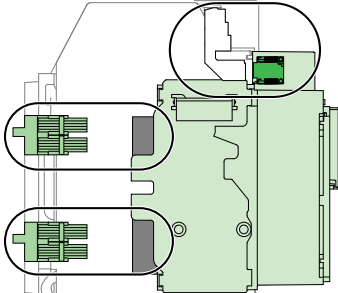
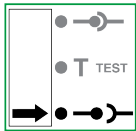
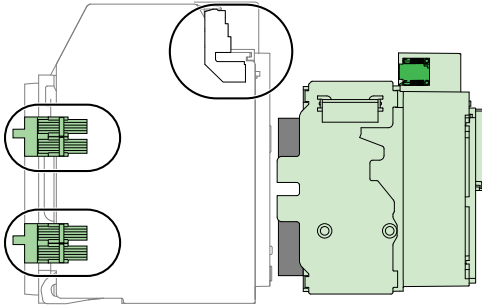
**Failure to follow these instructions will result in death or serious injury.**

## Drawout Circuit Breaker Positions

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



Circuit breaker position	Position indicator and position contact state	Connector position	Circuit breaker status
Connected	 	<ul style="list-style-type: none"> <li>• Disconnecting contact clusters: engaged</li> <li>• Control: engaged</li> </ul>	<ul style="list-style-type: none"> <li>• Can be operated.</li> <li>• Ready for service.</li> </ul>
Test	 		<ul style="list-style-type: none"> <li>• Can be operated.</li> <li>• Can have operation and control systems tested.</li> </ul>

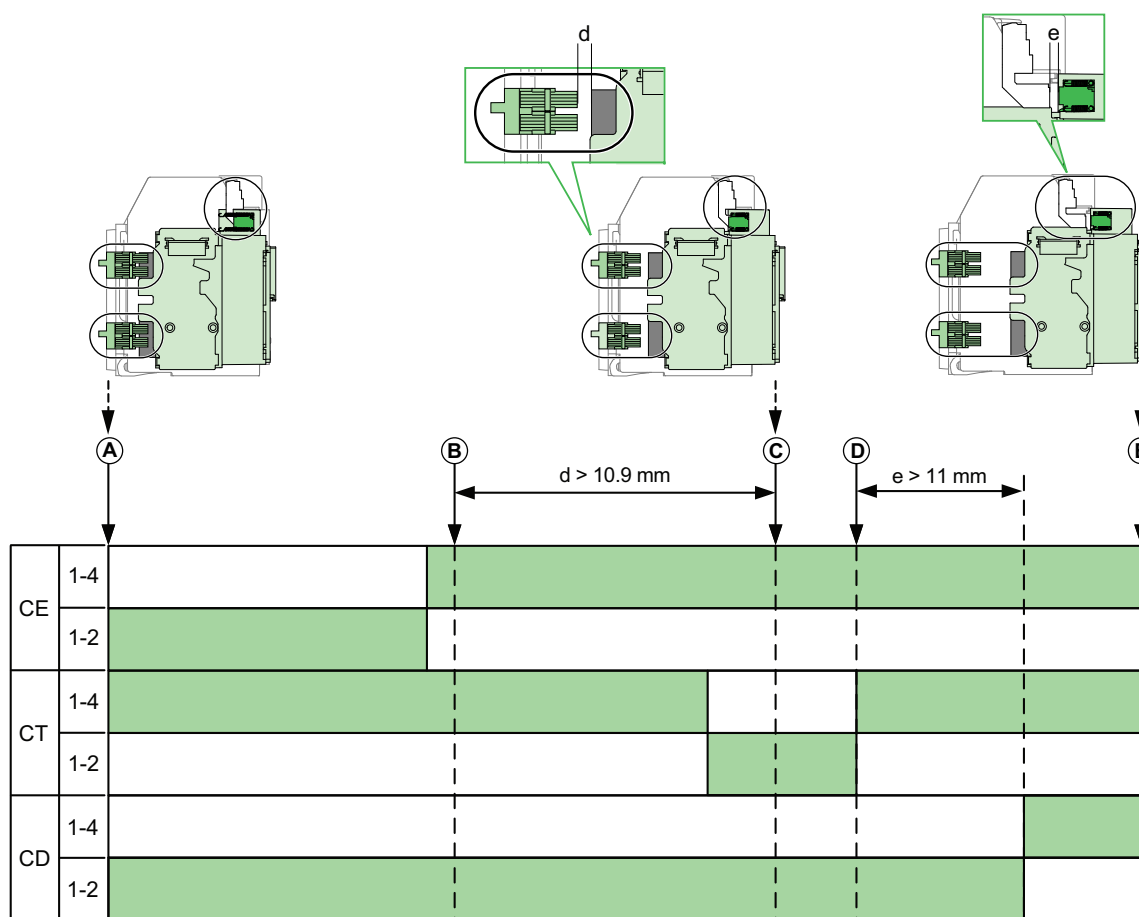
Circuit breaker position	Position indicator and position contact state	Connector position	Circuit breaker status
		<ul style="list-style-type: none"><li>Disconnecting contact clusters: disengaged - the minimum distance between the circuit breaker racking terminals and the chassis clusters is reached.</li><li>Control: engaged</li></ul>	
Disconnected		 <ul style="list-style-type: none"><li>Disconnecting contact clusters: disengaged</li><li>Control: disengaged</li></ul>	<ul style="list-style-type: none"><li>Can be operated.</li><li>Can be removed from chassis.</li></ul>
Withdrawn		 <ul style="list-style-type: none"><li>Disconnecting contact clusters: disengaged</li><li>Control: disengaged</li></ul>	Removed from chassis.

## Drawout Circuit Breaker Position Contacts

The position of the circuit breaker in the chassis is indicated remotely by the following position contacts:

- CE: connected position
- CT: test position
- CD: disconnected position

The state of the position contacts changes according to the circuit breaker position during racking-in and racking-out operations, as shown in the diagram below.



**A** Circuit breaker in connected position


**B** Separation of the main circuits

**C** Circuit breaker in test position

**D** Separation of auxiliary circuits

**E** Circuit breaker in disconnected position

 Position contact is open.

 Position contact is closed.

## Optional Position Contacts

Optional position contacts can be added as follows:

- 2 CD disconnected position contacts
- 3 CE connected position contacts
- 1 CT test position contact

# Disconnecting the Drawout Circuit Breaker

## Drawout Circuit Breaker Handling Conditions

Connection or disconnection of the drawout circuit breaker requires insertion of the racking handle. When chassis locking by keylocks, padlocks, or an open door lock are in place, the racking handle cannot be inserted.

**⚠ ⚠ DANGER**

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

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462 or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.

**Failure to follow these instructions will result in death or serious injury.**

**NOTICE**

**HAZARD OF EQUIPMENT DAMAGE**

- Use the provided racking handle to rack the device into or out of chassis.
- Do not use power tools for racking.
- Do not turn the handle after position release button has popped out.

**Failure to follow these instructions can result in equipment damage.**

## Racking-out the Circuit Breaker from Connected to Test Position

Step	Action	
1	Press the opening pushbutton to open the circuit breaker.	
2	Remove the racking handle from its storage space.	
3	Insert the racking handle into the racking handle socket.	
4	Push in the position release button.	
5	Turn the racking handle counterclockwise. <b>Result:</b> The circuit breaker moves forward in the chassis.	
6	When the test position is reached, the position release button pops out and the mechanism blocks the racking handle. <b>Result:</b> The circuit breaker is in the test position.	

## Racking-out the Circuit Breaker from Test to Disconnected Position

Step	Action	
1	Push in the position release button.	
2	Turn the racking handle counterclockwise.  <b>Result:</b> The circuit breaker moves forward in the chassis.	
3	When the disconnected position is reached, the position release button pops out and the mechanism blocks the racking handle.  <b>Result:</b> The circuit breaker is in the disconnected position.	
4	Remove the racking handle from the racking socket.	
5	Put the racking handle back into its storage space.	



## Connecting the Drawout Circuit Breaker

### Drawout Circuit Breaker Handling Conditions

Connection or disconnection of the drawout circuit breaker requires insertion of the racking handle. When chassis locking by keylocks, padlocks, or an open door lock are in place, the racking handle cannot be inserted.

#### **⚠ ⚠ DANGER**

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

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462 or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.

**Failure to follow these instructions will result in death or serious injury.**

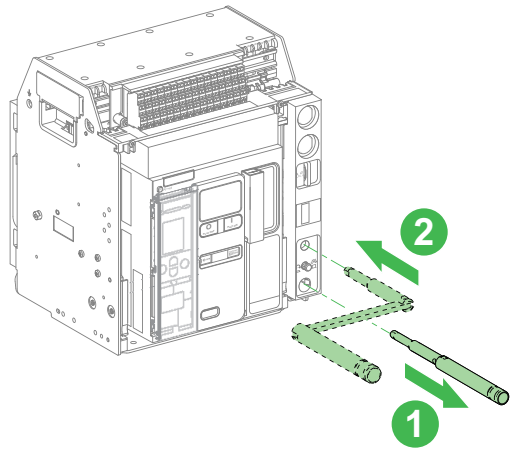
#### **NOTICE**

##### **HAZARD OF EQUIPMENT DAMAGE**

- Use the provided racking handle to rack the device into or out of chassis.
- Do not use power tools for racking.
- Do not turn the handle after position release button has popped out.

**Failure to follow these instructions can result in equipment damage.**

### Racking-in the Circuit Breaker from Disconnected to Test Position

Step	Action	
1	Remove the racking handle from its storage space.	
2	Insert the racking handle into the racking handle socket.	

Step	Action	
3	Push the position release button.	
4	Turn the racking handle clockwise.  <b>Result:</b> The circuit breaker moves back in the chassis.	
5	When the test position is reached, the position release button pops out and the mechanism blocks the racking handle.  <b>Result:</b> The circuit breaker is in the test position.	

## Racking-in the Circuit Breaker from Test to Connected Position

Step	Action	
1	Push the position release button.	
2	Turn the racking handle clockwise.  <b>Result:</b> The circuit breaker moves back in the chassis.	
3	When the connected position is reached, the position release button pops out and the mechanism blocks the racking handle.  <b>Result:</b> The circuit breaker is in the connected position.	
4	Remove the racking handle from the racking socket.	
5	Put the racking handle back into its storage space.	

# Removing the Drawout Circuit Breaker

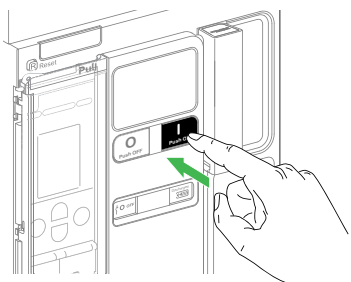
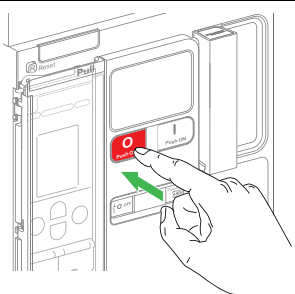
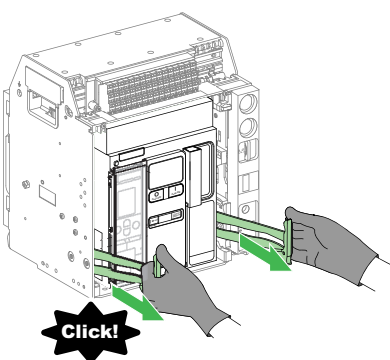
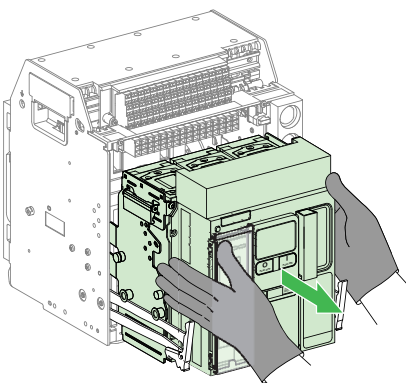
## Circuit Breaker Removal

### NOTICE

#### HAZARD OF EQUIPMENT DAMAGE

The chassis must be securely fastened when installing or removing the device.

**Failure to follow these instructions can result in equipment damage.**

Step	Action	
1	With the circuit breaker in the disconnected position, page 49, discharge the closing spring by pressing the closing pushbutton.  If the closing spring is charged, the circuit breaker closes.	
2	Press the opening pushbutton to open the circuit breaker.	
3	Pull out the rails to the maximum by pulling on the drawout grips. The moving part of the drawout circuit breaker stays in disconnected position in the chassis.	
4	Pull out the moving part of the drawout circuit breaker to the maximum, by rolling it along the rails.  <b>Result:</b> The circuit breaker is supported on the rails, clear of the chassis and ready to be lifted.	

## Lifting the Circuit Breaker

Both the circuit breaker and chassis have a carrying grip for lifting. To lift the circuit breaker, use an overhead lifting device attached to the carrying grip, following the directions given in this section.

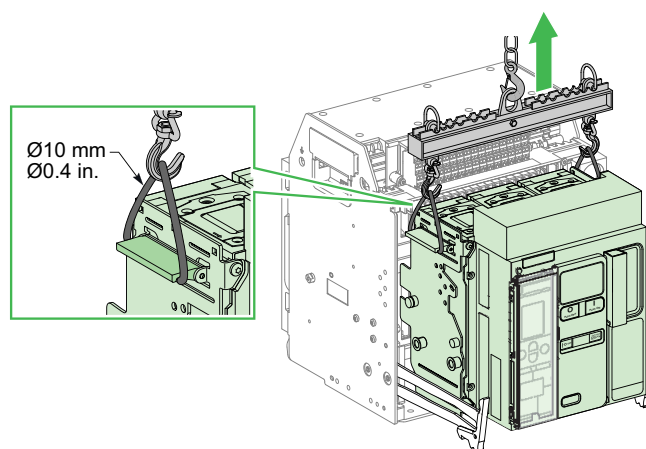
### **⚠ DANGER**

#### **HAZARD OF DEVICE FALLING**

- Be sure that lifting equipment has lifting capacity for the device being lifted.
- Follow manufacturer's instructions for use of lifting equipment.
- Wear hard hat, safety shoes, and heavy gloves.

**Failure to follow these instructions will result in death or serious injury.**

Lift the circuit breaker from the chassis rails by using the carrying grip located on the sides of the circuit breaker.



## Circuit Breaker Weights

The following table shows the weights of the different circuit breakers available.

Number of poles	Circuit breaker	MTZ1
3P	Moving part (Drawout)	14 kg
	Chassis	16 kg
	Fixed circuit breaker	14 kg
4P	Moving part (Drawout)	18 kg
	Chassis	21 kg
	Fixed circuit breaker	18 kg

# Installing the Drawout Circuit Breaker in the Chassis

## Drawout Circuit Breaker Handling Conditions

Connection or disconnection of the drawout circuit breaker requires insertion of the racking handle. When chassis locking by keylocks, padlocks, or an open door lock is in place, the racking handle cannot be inserted.

### **⚠ ⚠ DANGER**

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

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462 or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.

**Failure to follow these instructions will result in death or serious injury.**

### ***NOTICE***

#### **HAZARD OF EQUIPMENT DAMAGE**

- Use the provided racking handle to rack the device into or out of chassis.
- Do not use power tools for racking.
- Do not turn the handle after position release button has popped out.

**Failure to follow these instructions can result in equipment damage.**

## Optional Mismatch Protection

Mismatch protection, page 78 allows the installation of a drawout circuit breaker only in a chassis with compatible characteristics.

Installing the Circuit Breaker

**⚠ DANGER**

**HAZARD OF DEVICE FALLING**

- Be sure that lifting equipment has lifting capacity for the device being lifted.
- Follow manufacturer's instructions for use of lifting equipment.
- Wear hard hat, safety shoes, and heavy gloves.

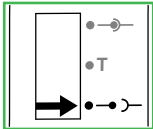
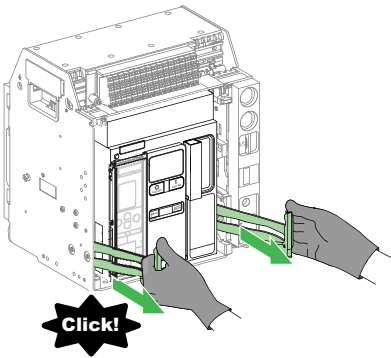
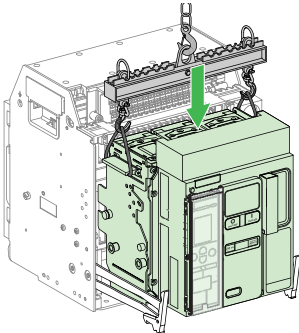
**Failure to follow these instructions will result in death or serious injury.**

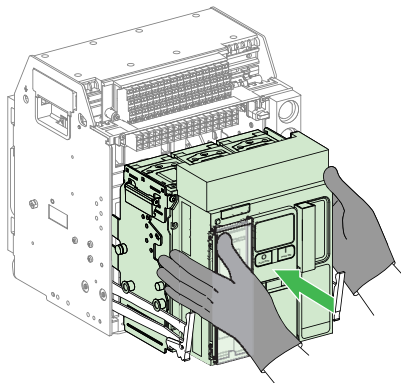
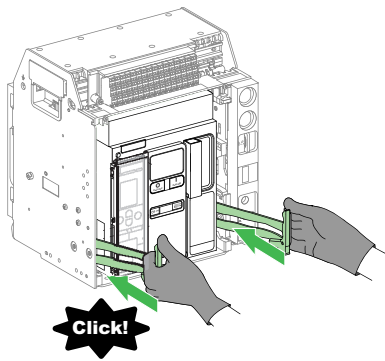
**NOTICE**

**HAZARD OF EQUIPMENT DAMAGE**

- Chassis must be securely fastened when installing or removing the device.
- Before mounting the device, make sure that it matches the chassis.

**Failure to follow these instructions can result in equipment damage.**

Step	Action	
1	If the chassis is not installed yet in a switchboard or panelboard, securely fasten the chassis on a pallet.	
2	Remove the racking handle from its storage space.	
3	Check that the chassis indicator is in the disconnected position:  If the chassis indicator is not in the disconnected position, follow the steps on disconnecting the drawout circuit breaker, page 49.	
4	Pull out the drawout grips until the extension rails are fully extended.	
5	Install the circuit breaker on the extension rails by using appropriate lifting equipment.  Check that the four wheels on the sides of circuit breaker are resting on the rails.	
6	Detach the lifting equipment.	
7	Check that the circuit breaker is in the open position.	

Step	Action	
8	Using both hands, push in the circuit breaker to the maximum in the chassis. Take care not to push the control unit. The rails stay extended.	 A technical illustration showing a circuit breaker being pushed into a metal chassis. Two hands are shown on the sides of the breaker, with green arrows pointing inward to indicate the direction of movement. The breaker is partially inserted, and the internal rails are visible and extended.
9	When the circuit breaker is fully inserted into the chassis, lift and push in the rails to the maximum.	 A technical illustration showing the final step of racking the circuit breaker. The breaker is now fully seated in the chassis. Two hands are shown at the bottom, with green arrows pointing upwards and outwards to indicate the rails being pushed in. A black starburst graphic with the word "Click!" is positioned near the bottom left hand, indicating the completion of the action.

# Circuit Breaker Locking Actions

## What’s in This Chapter

Locking the Pushbuttons .....	59
Locking the Circuit Breaker in Open Position with Padlocks .....	61
Locking the Circuit Breaker in Open Position with Keylocks .....	63
Chassis Locking in Disconnected Position .....	66
Chassis Locking in Any Position .....	71
Locking the Safety Shutters .....	76

## About Locking Actions

A locking action is a manual locking operation made by the user. A number of optional locking accessories are available for the MasterPacT MTZ1 circuit breaker and chassis. For a complete listing of available locks, refer to LVPED225010EN *MasterPacT MTZ Catalog* in **Related Documents** at the beginning of this guide.



# Locking the Pushbuttons

## Description

The pushbutton locking cover is an optional accessory for the MasterPacT MTZ1 circuit breaker that forbids access to the closing and opening pushbuttons:

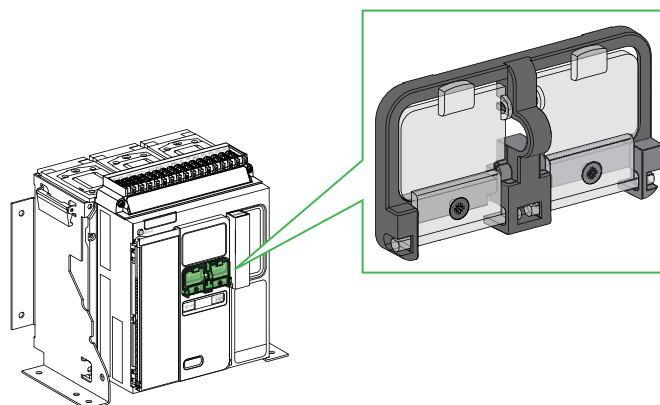
- Together or separately.
- By using a padlock (shackle diameter 5–8 mm).
- By using a lead seal.
- By using screws.

**IMPORTANT:** The use of the pushbutton locking cover is mandatory to padlock the closing pushbutton when a MasterPacT MTZ1 circuit breaker is used as a transfer switch.

For more information, refer to [Mechanical Interlocking for Transfer Switches](#), page 86.

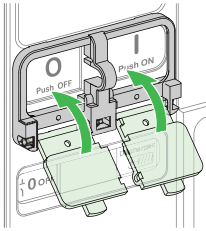
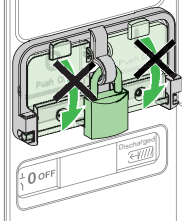
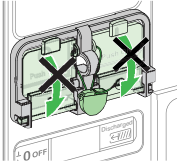
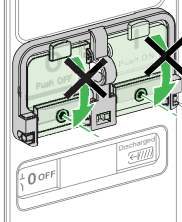
## VBP Pushbutton Locking Accessory

The pushbutton locking accessory is an optional transparent cover, mounted on the front cover of the circuit breaker, which covers the closing and opening pushbuttons.



For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [NVE56769](#).

# Locking the Pushbuttons

Step	Action	
1	Close the transparent covers of the locking accessory. <b>NOTE:</b> One or both transparent covers of the locking accessory can be closed and locked.	
2	Lock the transparent covers in place by using a padlock, lead seal, or screws.	<div><p>Padlock</p></div> <div><p>Lead seal</p></div> <div><p>Screws</p></div>

# Locking the Circuit Breaker in Open Position with Padlocks

## Description

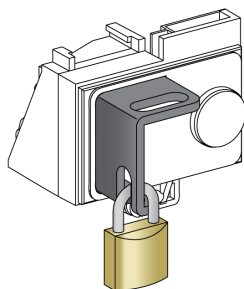
Optional padlocks can be used to lock the MasterPacT MTZ1 circuit breaker in the open position. When locked the circuit breaker cannot be closed, either locally with the closing pushbutton, or remotely.

To use padlocks to lock the circuit breaker in the open position, an optional OFF-position locking accessory is necessary. This accessory allows the use of up to three padlocks with shackle diameter 5–8 mm.

**NOTE:** This accessory is not compatible with VSPO OFF-position keylock accessory. The two accessories cannot be used at the same time.

## VCPO OFF-Position Locking Accessory

The off-position locking accessory is an optional accessory that is mounted on the front face of the circuit breaker.

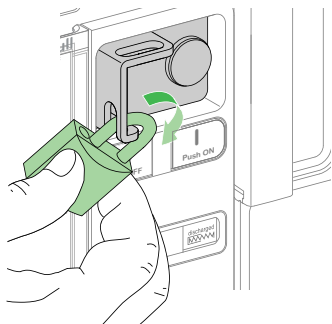
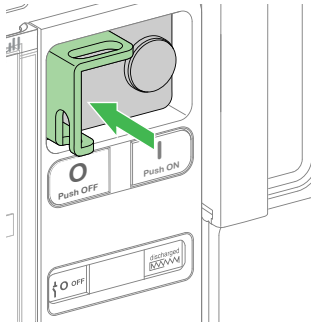
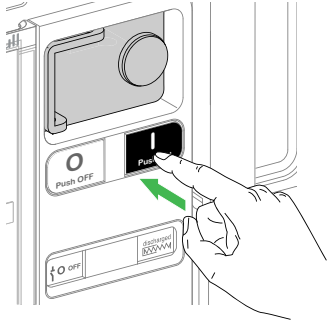


For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [NVE56770](http://NVE56770).

## Locking the Circuit Breaker in the Open Position

Step	Action	
1	Press and hold down the opening pushbutton.	
2	With the opening button pressed, pull out the tab of the off-position padlocking accessory.	
3	Insert the padlock in the tab and close the padlock. Release the opening pushbutton.	

# Unlocking the Circuit Breaker

Step	Action	
1	Remove the padlock.	
2	Push back the tab of the OFF-position locking accessory before operating the circuit breaker	
3	Press the closing pushbutton to close the circuit breaker.	

# Locking the Circuit Breaker in Open Position with Keylocks

## Description

Optional keylocks can be used:

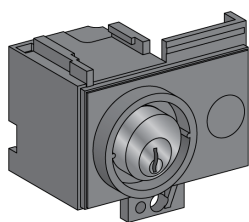
- To lock one MasterPacT MTZ1 circuit breaker in the open position. When locked the circuit breaker cannot be closed, either locally with the closing pushbutton, or remotely.
- To interlock several MasterPacT MTZ1 circuit breakers locked with the same key.

To use keylocks to lock the circuit breaker in the open position, an optional OFF-position locking accessory is necessary.

**NOTE:** This accessory is not compatible with the VCPO OFF-position padlocking accessory. The two accessories cannot be used at the same time.

## VSPO OFF-Position Locking Accessory

The OFF-position locking accessory is an optional accessory that is mounted on the front of the circuit breaker.



The OFF-position keylocking accessory can be fitted with either:

- One keylock.
- Two keylocks with identical keys or different keys.

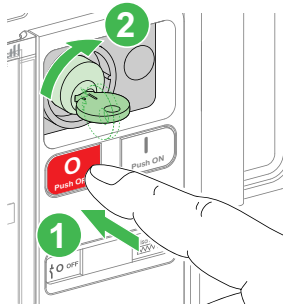
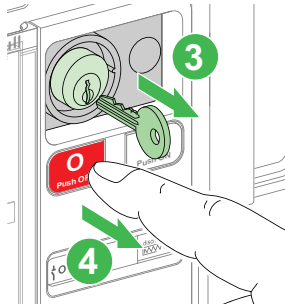
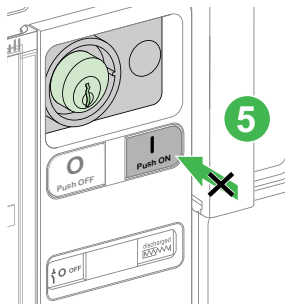
The following types of keylocks can be fitted:

Ronis keylock	Profalux keylock	Castell keylock (keylock not provided)	Kirk keylock (keylock not provided)

For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [NVE56770](https://www.schneider-electric.com/resources/technical-documents/NVE56770).

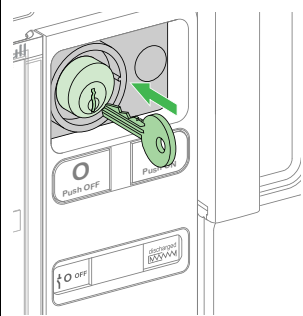
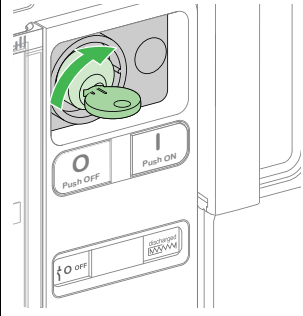
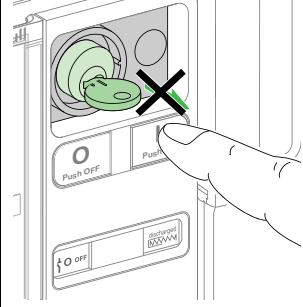
## Locking the Circuit Breaker in the Open Position

For circuit breakers equipped with two keylocks, locking with one key is sufficient to lock the circuit breaker in the open position.

Step	Action	
1	Press and hold the opening pushbutton.	
2	With the opening pushbutton pressed, turn the key clockwise to lock the circuit breaker.	
3	Remove the key.	
4	Release the opening pushbutton.	
5	Check that the circuit breaker is locked in the open position and cannot be closed, either locally with the closing pushbutton, or remotely.	

## Unlocking the Circuit Breaker

For circuit breakers equipped with two keylocks, both keys must be inserted in the keylocks to unlock the circuit breaker.

Step	Action	
1	Put the key in the keylock.	
2	Turn the key clockwise to unlock the circuit breaker.	
3	Press the closing pushbutton to close the circuit breaker. <b>NOTE:</b> The key remains captive in the keylock.	

## Chassis Locking in Disconnected Position

### Description

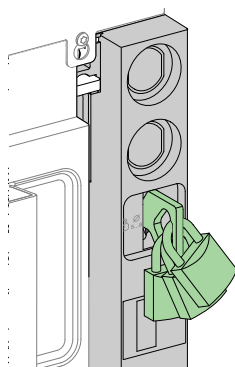
The chassis can be locked in the disconnected position. When the chassis is locked in the disconnected position, the racking handle cannot be inserted.

The chassis can be locked in the disconnected position:

- By up to three padlocks with shackle diameter 5–8 mm.
- By optional keylocks.

Keylocks can be used in addition to padlocks.

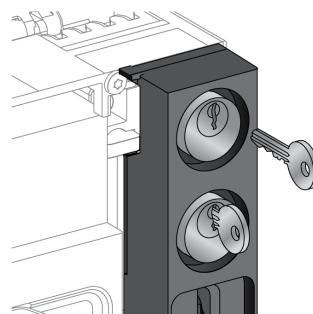
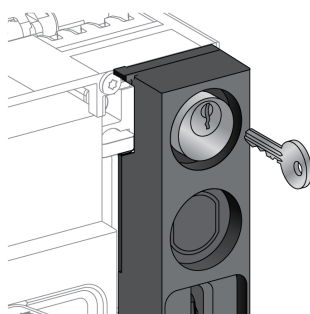
Chassis locking by padlock is always possible and does not require any accessory.



### VSPD Chassis Locking by Keylock Accessory

The chassis locking by keylock accessory can be fitted with either:

- One keylock.
- Two keylocks with identical keys or different keys.



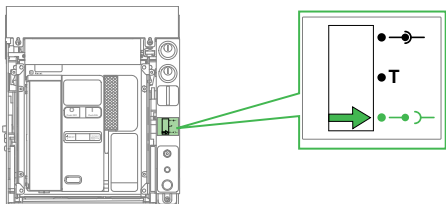
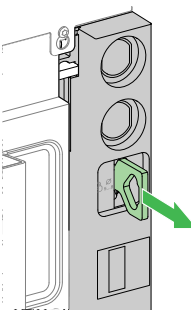
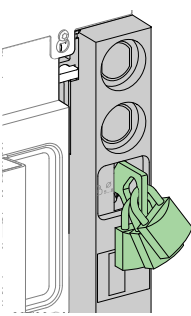
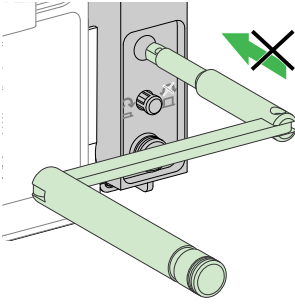
The following types of keylocks can be fitted:

Ronis keylock	Profalux keylock	Castell keylock (keylock not provided)	Kirk keylock (keylock not provided)

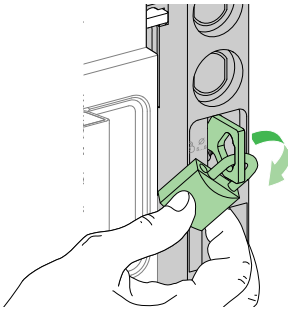
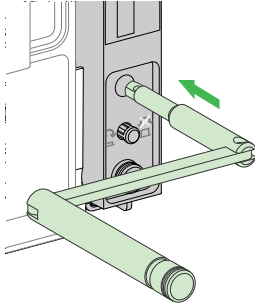
For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [NVE56768](http://NVE56768).



## Chassis Locking with Padlocks

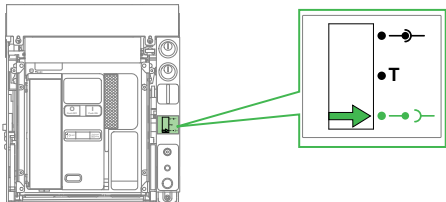
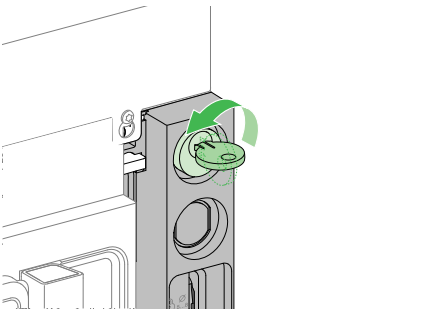
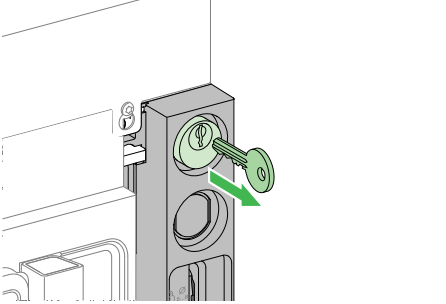
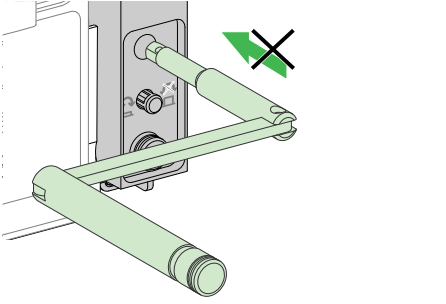
Step	Action	
1	Check that the chassis indicator is in the disconnected position.	
2	Pull out the padlocking tab.	
3	Insert the padlocks in the tab and close the padlocks.	
4	Check that the racking handle cannot be inserted into the racking handle socket.	

## Chassis Unlocking with Padlocks

Step	Action	
1	Remove the padlocks.  The tab retracts.	
2	Check that the racking handle can be inserted into the racking handle socket.	

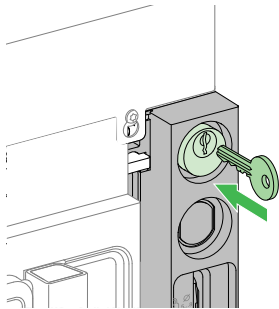
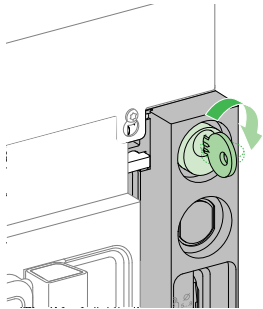
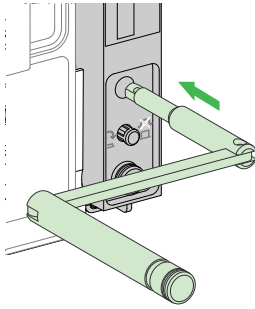
## Chassis Locking with Keylocks

For chassis equipped with two keylocks, locking with one key is sufficient to lock the chassis in the disconnected position.

Step	Action	
1	Check that the chassis indicator is in the disconnected position.	
2	Turn the key counterclockwise to lock the chassis.	
3	Remove the key.	
4	Check that the racking handle cannot be inserted into the racking handle socket.	

## Chassis Unlocking with Keylocks

For chassis equipped with two keylocks, both keys must be inserted in the keylocks to unlock the chassis.

Step	Action	
1	Put the key in the lock.	
2	Turn the key clockwise to unlock the chassis. <b>NOTE:</b> The key remains captive in the keylock.	
3	Check that the racking handle can be inserted into the racking handle socket.	

## Chassis Locking in Any Position

### Description

The chassis can be locked in any position (connected, test, or disconnected position).

This locking function requires a mechanical adaptation of the chassis, explained in the following procedure.

When the chassis is locked, the racking handle cannot be inserted in the racking handle socket.

The chassis can be locked in any position:

- By up to three padlocks with shackle diameter 5-8 mm as standard.
- By one or two optional keylocks.

Keylocks can be used in addition to padlocks.

### VSPD Chassis Locking by Keylock Accessory

The chassis locking by keylock accessory and the locking and unlocking procedures are the same as for the chassis locking in disconnected position., page 66

### Adapting the Chassis

#### DANGER

##### HAZARD OF DEVICE FALLING

- Be sure that lifting equipment has lifting capacity for the device being lifted.
- Follow manufacturer's instructions for use of lifting equipment.
- Wear hard hat, safety shoes, and heavy gloves.

**Failure to follow these instructions will result in death or serious injury.**

#### NOTICE

##### HAZARD OF EQUIPMENT DAMAGE

The chassis must be securely fastened when installing or removing the device.

**Failure to follow these instructions can result in equipment damage.**

Follow this procedure to adapt the chassis locking mechanism so that the chassis can be locked in any position.

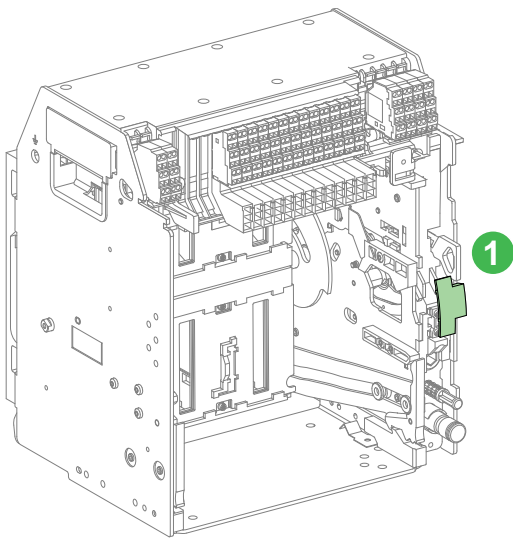
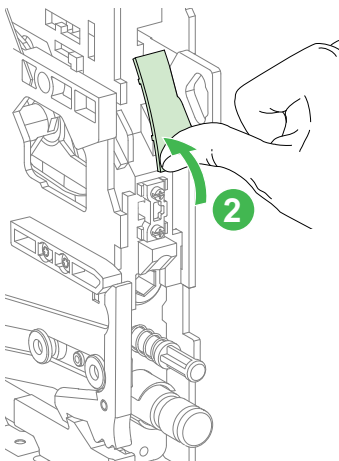
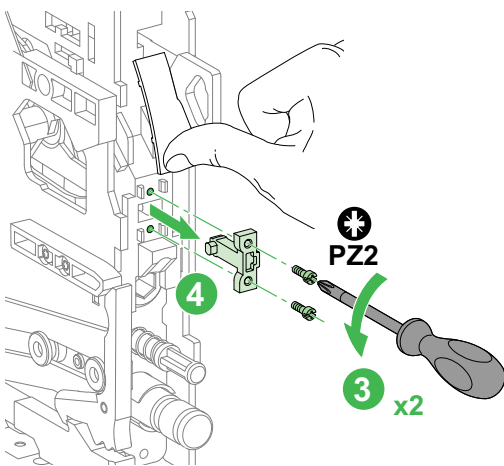
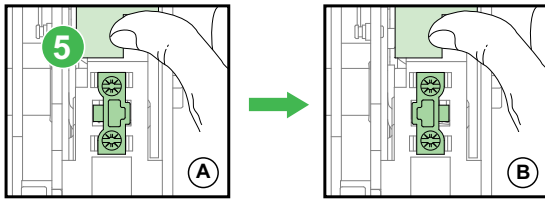
Stage	Description
1	Removing the terminal block identification plate and the chassis front cover. (Refer to the following procedure)
2	Changing the position of the lock, page 73.
3	Reinstalling the chassis front cover and the terminal block identification plate, page 75.

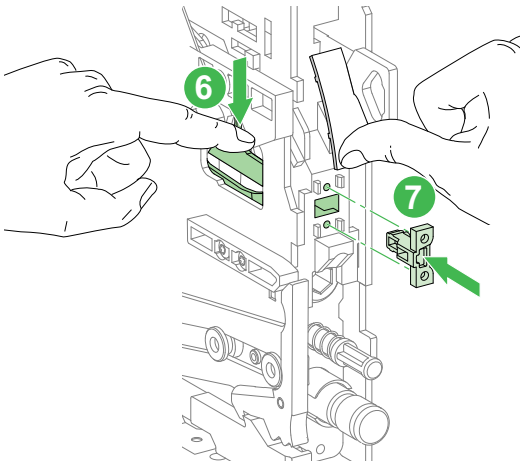
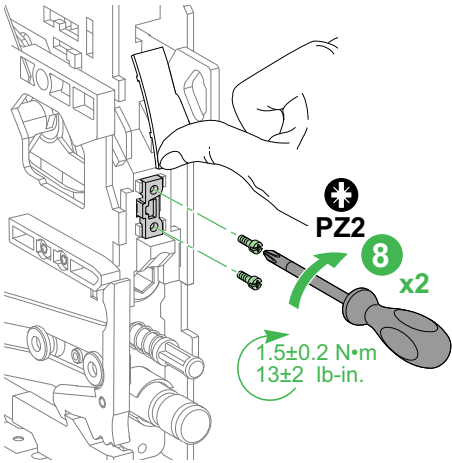
# Removing the Terminal Block Identification Plate and the Chassis Front Cover

Before starting the procedure, check that the circuit breaker is in the disconnected position, page 49 and remove the circuit breaker from the chassis.

Step	Action	
1	Remove the two screws holding the terminal block identification plate in place, by using a PZ2 screwdriver.	
2	Carefully pull out the terminal block identification plate.	
3	Remove the two screws holding the chassis front cover in place, by using a PZ2 screwdriver.	
4	Pull off the chassis front cover.	

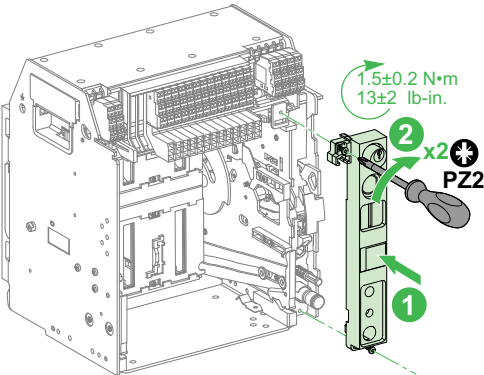
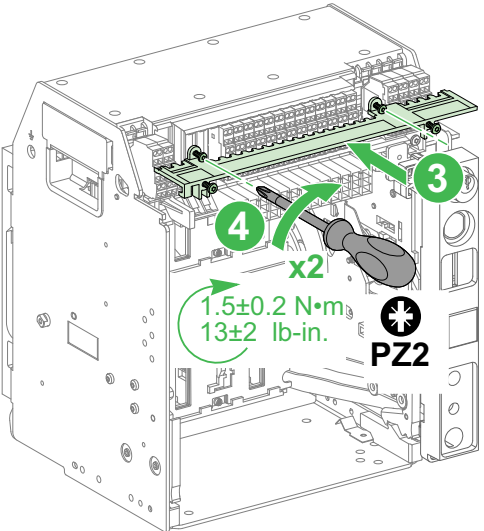
## Changing the Position of the Lock

Step	Action	
1	Identify the position of the plastic cover of the lock.	
2	Lift the plastic cover of the lock and hold it up.	
3	Remove the two screws holding the lock in place, by using a PZ2 screwdriver.	
4	Remove the lock.	
5	Rotate the lock through 180° to change from locking in disconnected position (A) to locking in any position (B).	

Step	Action	
6	Use your finger to press down the tab behind the lock slot.	
7	Insert the lock, making sure that the notch is on the left side.	
8	<p>Screw the lock into position with the two screws, by using a PZ2 screwdriver.</p> <p>Release the plastic cover to allow it to drop back into place</p>	



## Reinstalling the Chassis Front Cover and the Terminal Block Identification Plate

Step	Action	
1	Reinstall the chassis front cover.	
2	Screw the front cover into position with the two screws, by using a PZ2 screwdriver.	
3	Slide the terminal block identification plate into place.	
4	Screw the terminal block identification plate in with the two screws, by using a PZ2 screwdriver.	

## Locking the Safety Shutters

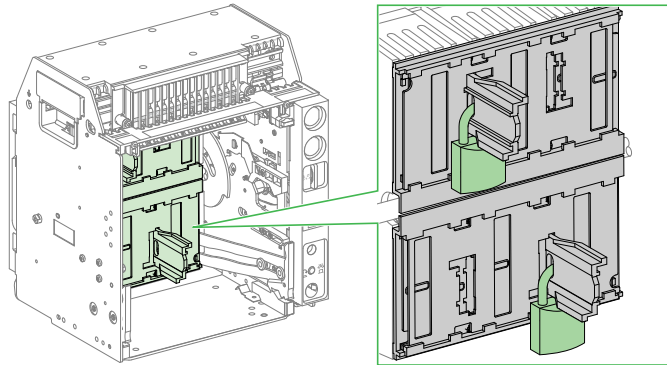
### Description

A shutter lock locks the safety shutter in closed position so that a drawout MasterPacT MTZ1 circuit breaker cannot be connected in its chassis.

The top and bottom safety shutters can be locked independently.

### Locking the Safety Shutters

Place two padlocks on the top and bottom shutter locking guides to lock the shutters.



For more information, refer to the instruction sheet: [NVE35509](#).

# Circuit Breaker Interlocking Actions

## What's in This Chapter

Mismatch Protection .....	78
VPEC Door Interlock .....	80
VPOC Open-door Racking Interlock .....	83
IPA Cable-type Door Interlock .....	85
Mechanical Interlocking for Transfer Switches .....	86

## About Interlocking Actions

An interlocking action is an automatic locking operation provided by interlocking accessories added to the MasterPacT MTZ1 circuit breaker or chassis.

A number of optional interlocking accessories are available for the MasterPacT MTZ1 circuit breaker and chassis. For a complete listing of available interlocks, refer to LVPED225010EN *MasterPacT MTZ Catalog* in **Related Documents** at the beginning of this guide.

## Mismatch Protection

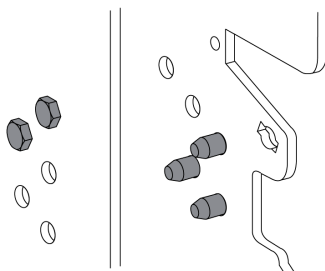
### Description

Mismatch protection allows the installation of a MasterPacT MTZ1 circuit breaker only in a chassis with compatible characteristics.

Mismatch protection offers 35 different combinations that can be selected so that a circuit breaker can only be mounted on a chassis with the matching combination.

### Accessory

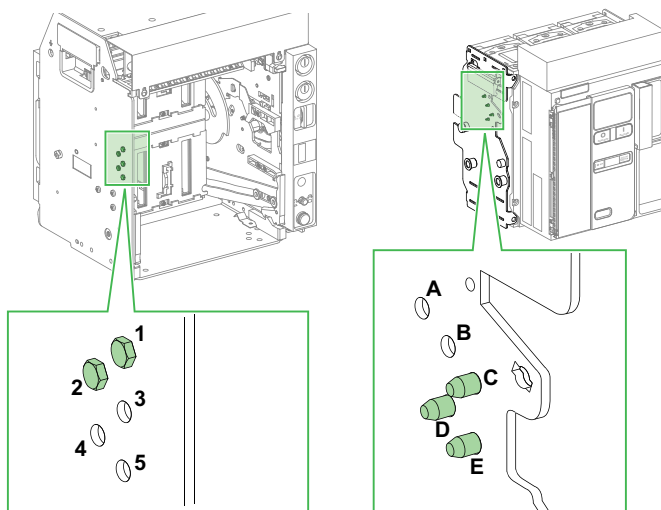
The use of mismatch protection is optional. One mismatch protection accessory is required for each circuit breaker.



For information on the accessory installation, consult the instruction sheet available at Schneider Electric website: [NVE35465](https://www.schneider-electric.com/resources/technical-documents/NVE35465).

### Pin Location of Mismatch Protection

The following illustration shows the pin location on the chassis and circuit breaker, respectively.



The pin combination selected on the chassis must correspond to the pin combination selected on the circuit breaker (see following table). For example, the combination 12 on the chassis corresponds to the combination CDE on the circuit breaker.

Pins on the chassis are labeled 1, 2, 3, 4, 5.

Pins on the circuit breaker are labeled A, B, C, D, E.

## Recommended Pin Combinations

The following are the recommended pin combinations:

Pins on chassis	Pins on circuit breaker	Pins on chassis	Pins on circuit breaker
45	ABC	15	BCD
35	ABD	14	BCE
34	ABE	145	BC
345	AB	13	BDE
25	ACD	135	BD
24	ACE	134	BE
245	AC	12	CDE
23	ADE	125	CD
235	AD	124	CE
234	AE	123	DE

# VPEC Door Interlock

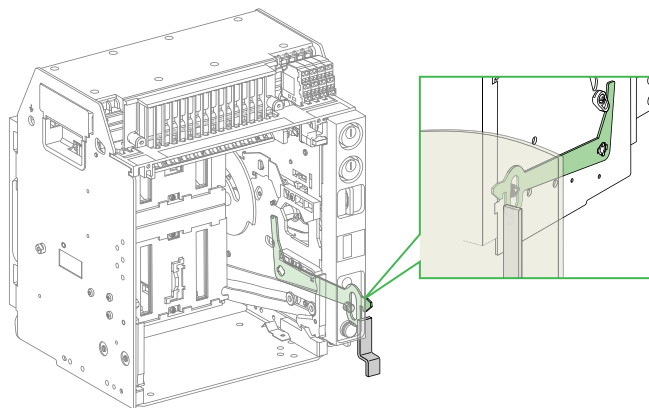
## Description

With the door interlock:

- The equipment door is locked and cannot be opened when the drawout circuit breaker is in connected or test position.
- The equipment door can be opened when the drawout circuit breaker is in disconnected position.
- The equipment door can be closed with the drawout circuit breaker in any position.

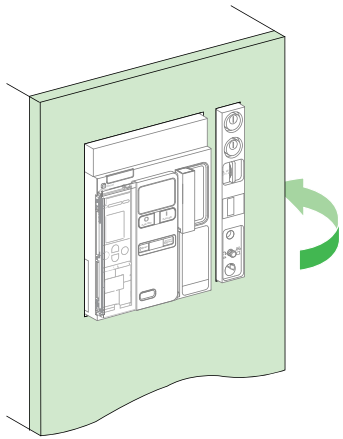
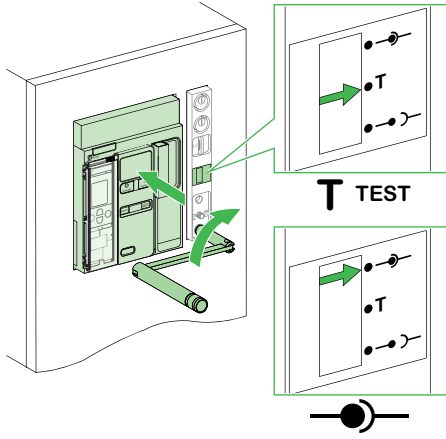
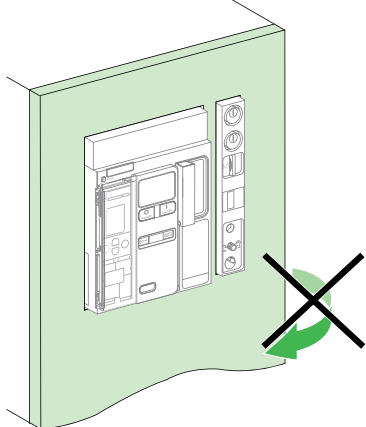
## Accessory

The VPEC door interlock accessory is an optional accessory that is mounted on the left side or on the right side of the chassis. One door interlock is necessary for each chassis.

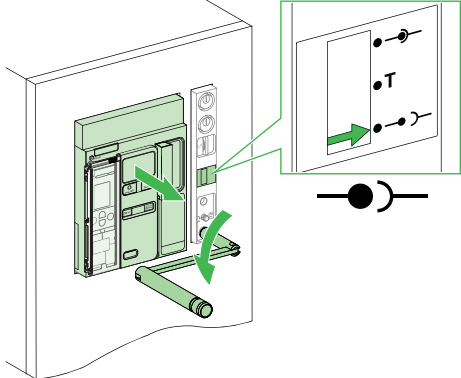
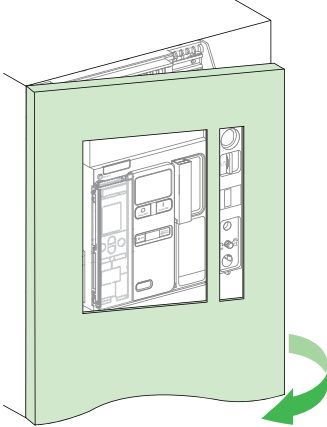


For information on the accessory installation, consult the instruction sheet available at Schneider Electric website: [NVE35519](#).

## Locking the Equipment Door

Step	Action	
1	Close the equipment door.	
2	Put the circuit breaker into the test or connected position, page 51.	
3	Check that the equipment door is locked.	

# Unlocking the Equipment Door

Step	Action	
1	Put the circuit breaker into the disconnected position, page 49.	
2	Check that the equipment door is unlocked.	



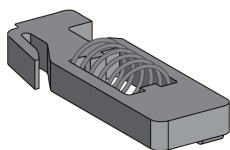
# VPOC Open-door Racking Interlock

## Description

With the racking interlock installed, a drawout MasterPacT MTZ1 circuit breaker cannot be racked in or out when the equipment door is open because the racking handle cannot be inserted.

## Accessory

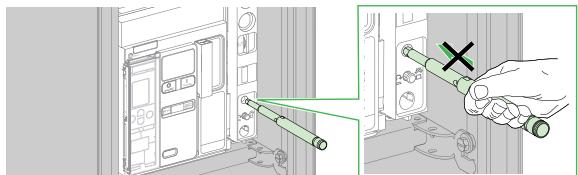
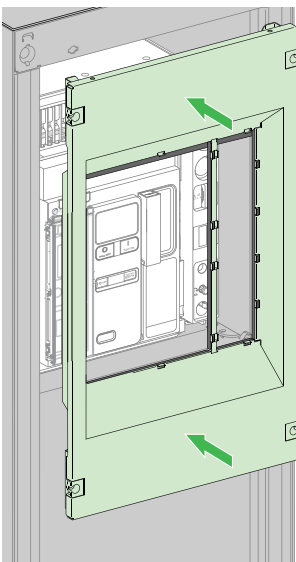
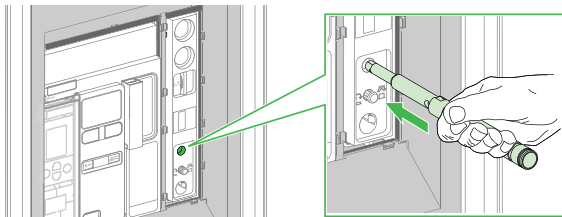
The optional VPOC racking interlock can be installed on the right side of the chassis.



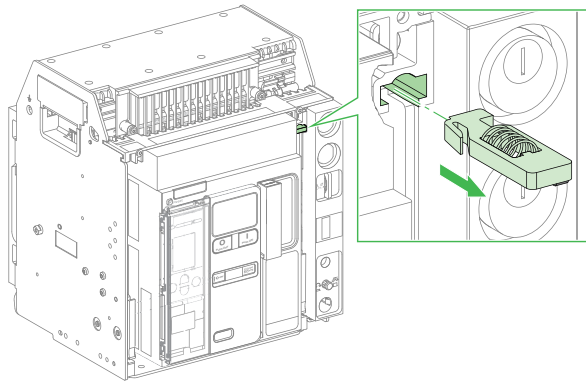
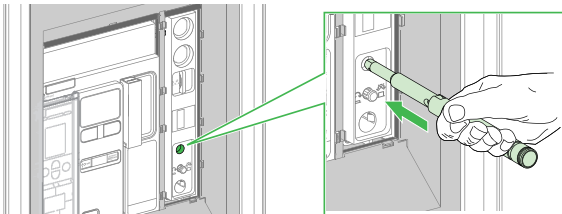
For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [NVE35520](http://NVE35520).

## Activating the Racking Interlock

Step	Action	
1	Remove the door.	
2	Insert the racking interlock.	

Step	Action	
3	Check that the racking handle cannot be inserted into the racking handle socket when the equipment door is open.	
4	Replace the door.	
5	Check that the racking handle can be inserted into the racking handle socket when the equipment door is closed.	

## Deactivating the Racking Interlock

Step	Action	
1	Pull out the racking interlock.	
2	Check that the racking handle can be inserted into the racking handle socket when the equipment door is open or closed.	

## IPA Cable-type Door Interlock

### Description

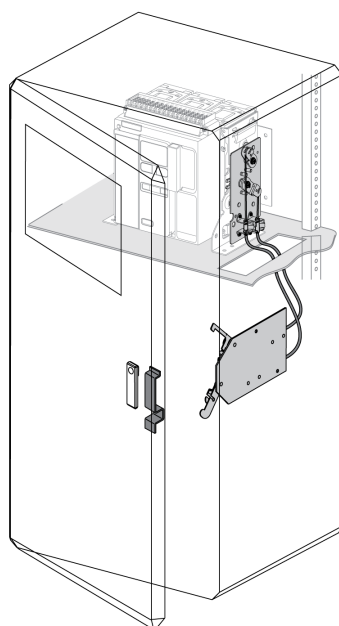
When the cable-type door interlock is installed, the door cannot be opened when the circuit breaker is closed and the circuit breaker cannot be closed when the door is open.

The cable-type door interlock comprises a plate, a lock, and a cable. It is mounted on the right-hand side of the circuit breaker.

When the interlock is installed, the mechanical interlock for transfer switches cannot be implemented.

### Accessory

The IPA cable-type door interlock is an optional accessory.



For information on the accessory installation, consult the instruction sheet available on the Schneider Electric website: [NVE35521](#).

# Mechanical Interlocking for Transfer Switches

## Description

The mechanical interlocking for transfer switches between two MasterPacT MTZ1 circuit breakers prevents the two interlocked circuit breakers from closing at the same time.

## VBP Pushbutton Locking Accessory

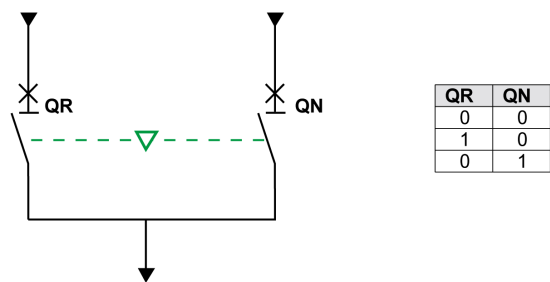
The VBP pushbutton locking accessory provides redundancy in addition to the mechanical interlocking system.

The use of the pushbutton locking cover is mandatory on each interlocked MasterPacT MTZ circuit breaker. The closing pushbuttons of the interlocked circuit breakers must be locked by padlocks sharing one key to help avoid simultaneous closing orders of interlocked circuit breakers.

For more information about the pushbutton locking cover, refer to VBP Pushbutton Locking Accessory, page 59.

## Mechanical Interlocking Between Two Circuit Breakers

Two circuit breakers can be mechanically interlocked by cables or by rods so that both circuit breakers cannot be closed at the same time.

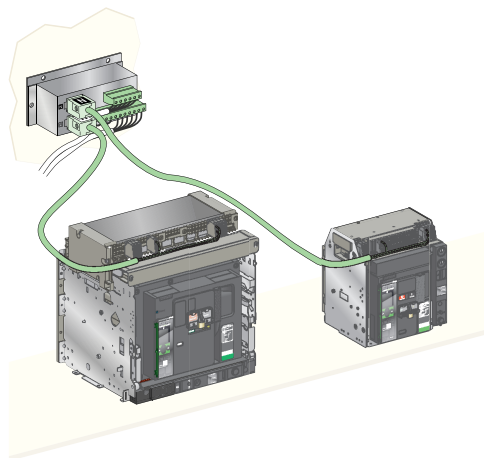


For information on the accessory installation, consult the instruction sheet on the Schneider Electric website:

- For Interlocking by cables: NVE35522
- For Interlocking by rods: NVE35523

## IVE Electrical Interlocking Unit

Electrical interlocking between MasterPacT MTZ circuit breakers can be done using the IVE electrical interlocking unit or by using dedicated wiring. The IVE unit is suitable for two circuit breakers only. For three circuit breakers, dedicated wiring is required to perform the electrical interlocking.



For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: [51201201AA](#)

# MasterPacT MTZ Critical Cases

## What’s in This Part

Finding the Cause of a Trip or an Alarm in Critical Cases.....	89
Resetting the Circuit Breaker After a Trip Due to an Electrical Fault.....	94
Resetting the Circuit Breaker After a Trip Due to an Incident Detected by MicroLogic Active Self-tests .....	97
Diagnosing Alarms .....	99

# Finding the Cause of a Trip or an Alarm in Critical Cases

## Definitions

While operating the circuit breaker, the user may face two critical cases:

- The circuit breaker has tripped automatically, interrupting the power supply.
- The circuit breaker has not tripped, but the MicroLogic Active control unit has detected an alarm:
  - For a high severity alarm, the status bar is red, indicating that urgent corrective action is required.
  - For a medium severity alarm, the status bar is orange, indicating that corrective action needs to be scheduled.

## Notification of a Trip or Alarm

A trip or alarm event is signaled:

- On the MicroLogic Active control unit HMI, by the trip cause LEDs or the status bar. When the control unit is powered, a red or orange pop-up message is displayed on the screen.
- By the SDE fault-trip indication contact

Depending on the options installed, a trip or alarm can also be signaled by an additional SDE2 fault-trip indication contact

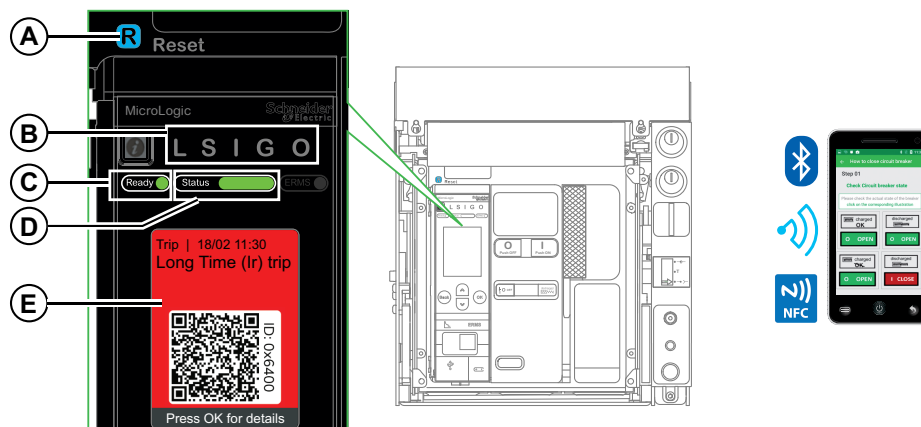
Active alarms can also be consulted in the following ways:

- On a smartphone with EcoStruxure Power Device app connected to the MicroLogic Active control unit through USB OTG connection.
- On EcoStruxure Power Commission software connected to the MicroLogic Active control unit through USB connection.
- On Panel Server webpages and on remote controllers connected to Panel Server, through IEEE 802.15.4 wireless communication (MicroLogic Active AP/EP control unit only).

## Identifying the Cause of a Trip or Alarm Using the MicroLogic Active Control Unit

In critical situations, the cause of a trip or an alarm can be identified locally by using one of the following:

- The blue fault-trip reset button on the circuit breaker. When the blue fault-trip reset button is popped out, the trip has occurred.
- The indicators on the MicroLogic Active control unit, page 92.
- A smartphone with EcoStruxure Power Device app installed to get the trip cause, the trip or alarm context, and the circuit breaker ID:
  - Through NFC
  - Through USB OTG connection



- A** Blue fault-trip reset button
- B** Trip cause LEDs
- C** Ready LED
- D** Status bar
- E** MicroLogic Active display screen

## Availability of Diagnostic Data After a Trip

Diagnostic data is available when the MicroLogic Active control unit is powered.

If the MicroLogic Active control unit power supply is interrupted, use a Mobile Power Pack to enable access to diagnostic data. Connect the Mobile Power Pack to the MicroLogic Active control unit USB-C port.

When the MicroLogic Active control unit is powered externally, the availability of diagnostic data depends on the MicroLogic Active state:


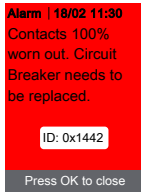
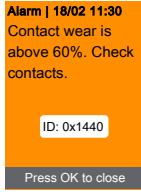
- If the MicroLogic Active control unit is operative, all diagnostic data is available.
- If the MicroLogic Active control unit is inoperative, no data is directly available. However, some data can be extracted using the NFC function with the EcoStruxure Power Device app.

The trip cause LEDs are powered by the MicroLogic Active internal battery and remain on for 2 hours when there is no other power to the control unit. To switch on the trip cause LEDs again after 2 hours, press the **i** button.



## Trip and Alarm Display Screen Examples

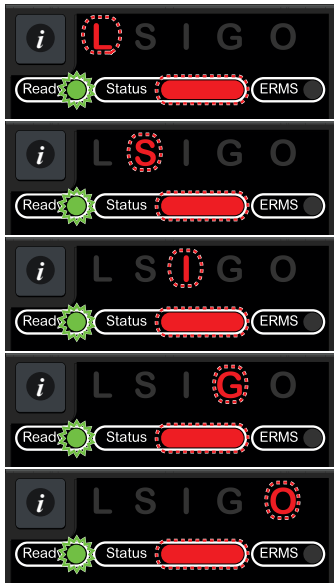
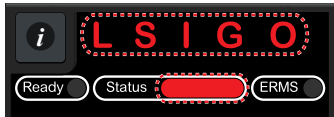
Three types of pop-up message are displayed, depending on the severity of the event.

Message type	Description	Example
Trip	Trip message is displayed on a red screen.	
High severity alarm	Alarm message is displayed on a red screen.	
Medium severity alarm	Alarm message is displayed on an orange screen.	

## Using the Display Screen and LEDs to Find the Cause of a Trip

The circuit breaker has tripped automatically, interrupting the power supply, and the blue fault-trip reset button has popped out.

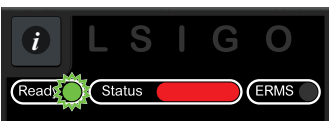
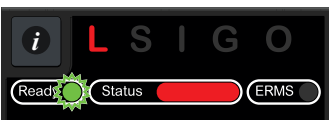
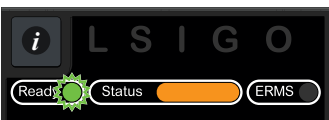
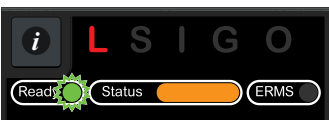
The related trip cause LEDs blink in red.

Description	Display screen	Status and Trip cause LED display	Status and Trip cause LED description
Electrical fault on the network, page 94	Trip message is displayed on a red screen.		<p>Ready LED: green flashing</p> <p>Status bar: red blinking</p> <p>ERMS LED: off</p> <p>Related trip cause LED: red blinking</p>
Major MicroLogic Active control unit incident detected during self-test, page 97	Trip message is displayed on a red screen.		<p>Ready LED: off</p> <p>Status bar: red blinking</p> <p>ERMS LED: off</p> <p>All trip cause LEDs: red blinking</p>

## Using the Display Screen and LEDs to Find the Cause of an Alarm

The circuit breaker has not tripped, but the MicroLogic Active status bar is on.

The L trip cause LED may be red.

Description	Display screen	Status and Trip cause LED display	Status and Trip cause LED description
High severity alarm, page 100	Alarm message is displayed on a red screen.		Ready LED: green flashing Status bar: red on ERMS LED: off All trip cause LEDs off
Overload alarm: phase current > 105% I <sub>r</sub>	Alarm message is displayed on a red screen.		Ready LED: green flashing Status bar: red on ERMS LED: off L trip cause LED: on
Medium severity alarm, page 101	Alarm message is displayed on an orange screen.		Ready LED: green flashing Status bar: orange on ERMS LED: off All trip cause LEDs off
Overload pre-alarm: 90% I <sub>r</sub> < Current < 105% I <sub>r</sub>	Alarm message is displayed on an orange screen.		Ready LED: green flashing Status bar: orange on ERMS LED: off L trip cause LED: red on

# Resetting the Circuit Breaker After a Trip Due to an Electrical Fault

## Reset Sequence


### **DANGER**


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

Do not re-close the device on an electrical fault. First inspect and, if necessary, repair the downstream equipment.

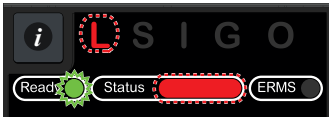

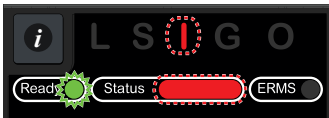

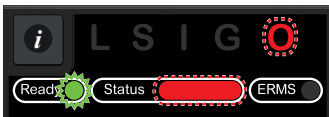
**Failure to follow these instructions will result in death or serious injury.**

The table shows the sequence of actions to follow after a trip due to an electrical fault. Further explanation of each action is given in the following paragraphs.

Step	Action
1	Identify the trip cause on the pop-up trip message and trip cause LEDs.
2	Press <b>OK</b> to: <ul style="list-style-type: none"><li>Acknowledge and close the pop-up trip message.</li><li>Open the trip context screen.</li></ul> <b>NOTE:</b> If the pop-up trip message is not acknowledged within the event timeout, the pop-up is displayed again.
3	Consult the trip context screen for: <ul style="list-style-type: none"><li>Name and settings of the tripping protection, date and time of the trip.</li><li>Current values recorded before the trip.</li></ul>
4	Press <b>OK</b> to close the trip context screen.
5	Clear the electrical fault on the network.
6	Inspect the circuit breaker and switchboard after a short circuit.
7	Reset the circuit breaker, page 39.
8	Press the  button for 3 seconds to: <ul style="list-style-type: none"><li>Reset the latched events.</li><li>Switch off the trip cause LEDs and revert the <b>Status</b> bar to green.</li><li>Return to the tree navigation menu.</li></ul>
9	When the circuit breaker is ready-to-close, re-close it, page 38.

**NOTE:** You can bypass steps 3, 4 and 8, by pressing the  button instead of **OK** in step 2.

## Identifying the Trip Cause

Description	Display screen	Status and Trip cause LED display	Status and Trip cause LED description
<ul style="list-style-type: none"> <li>MicroLogic Active 2.0, 5.0, 6.0: trip due to the long-time protection.</li> </ul>	Trip message is displayed on a red screen.		Ready LED: green flashing Status bar: red blinking ERMS LED: off L trip cause LED: red blinking.
<ul style="list-style-type: none"> <li>MicroLogic Active 5.0, 6.0: trip due to the short-time protection.</li> </ul>	Trip message is displayed on a red screen.		Ready LED: green flashing Status bar: red blinking ERMS LED: off S trip cause LED: red blinking.
<ul style="list-style-type: none"> <li>MicroLogic Active 2.0, 5.0, 6.0: trip due to the instantaneous protection.</li> </ul>	Trip message is displayed on a red screen.		Ready LED: green flashing Status bar: red blinking ERMS LED: off I trip cause LED: red blinking.
<ul style="list-style-type: none"> <li>MicroLogic Active 2.0, 5.0: not used.</li> <li>MicroLogic Active 6.0: trip due to the ground-fault protection.</li> </ul>	Trip message is displayed on a red screen.		Ready LED: green flashing Status bar: red blinking ERMS LED: off G trip cause LED: red blinking.
<ul style="list-style-type: none"> <li>MicroLogic Active 2.0, 5.0, 6.0: trip due to other events.</li> </ul> <p><b>NOTE:</b> This feature will be available in future releases.</p>	Trip message is displayed on a red screen.		Ready LED: green flashing Status bar: red blinking ERMS LED: off O trip cause LED: red blinking.

## Clearing the Electrical Fault

### **DANGER**

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

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462 or local equivalent.
- This equipment must be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before performing maintenance inspections. Assume that all circuits are live until they are de-energized, tested, grounded, and tagged. Consider all sources of power, including the possibility of backfeeding and control power.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.
- Beware of potential hazards and carefully inspect the work area for tools and objects that may have been left inside the equipment.

**Failure to follow these instructions will result in death or serious injury.**

### **DANGER**

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

Do not re-close the device on an electrical fault. First inspect and, if necessary, repair the downstream equipment.

**Failure to follow these instructions will result in death or serious injury.**

The feed must be isolated before inspecting the electrical equipment downstream of the protection.

The fact that a circuit breaker has tripped does not remedy the cause of the electrical fault detected on the downstream electrical equipment.

## Inspecting the Circuit Breaker and Switchboard After a Trip on Short Circuit


After a trip on short circuit due to short-time or instantaneous protection, the circuit breaker and switchboard must be inspected for smoke deposits or cracks in the circuit breaker casing.


Refer to DOCA0305• *MasterPacT MTZ IEC Circuit Breakers with MicroLogic Active Control Unit - Maintenance Guide*, page 7, and contact your Schneider Electric Services representative.

# Resetting the Circuit Breaker After a Trip Due to an Incident Detected by MicroLogic Active Self-tests


## Reset Sequence

The following table shows the sequence of actions to take after a trip due to an incident detected by the MicroLogic Active control unit. Further explanation of each action is given in the following paragraphs.

Step	Action
1	Identify the trip cause on the pop-up trip message and trip cause LED.
2	Consult the list of possible detected incidents, page 98 and perform the actions recommended.
3	Press <b>OK</b> to acknowledge and close the pop-up trip message.
4	Reset the circuit breaker, page 39.
5	Press the  button for 3 seconds to: <ul style="list-style-type: none"><li>Reset the latched events.</li><li>Switch off the trip cause LEDs and revert the <b>Status</b> bar to green.</li><li>Return to the tree navigation menu.</li></ul>
6	When the circuit breaker is ready to close, re-close it, page 38.

**NOTE:** You can combine steps 3 and 5 by pressing the  button instead of **OK** in step 3.

## Identifying the Trip Cause

Description	Display screen	Status and Trip cause LED display	Status and Trip cause LED description
Major MicroLogic Active control unit incident detected during self-test., page 98	Trip message is displayed on a red screen.		Ready LED: off Status bar: red blinking ERMS LED: off All trip cause LEDs: red blinking

## Recommended Actions

The following table indicates what action to perform according to the trip message after a trip due to an incident detected by MicroLogic Active self-tests.

For more information about event messages, refer to DOCA0265•• *MasterPacT MTZ - MicroLogic Active Control Unit - User Guide*, page 7.

Code	Trip message	Description	Recommended action
0x6405	<b>Control unit over temperature trip.</b>	The temperature of the control unit is above the maximum temperature threshold.	Decrease ambient temperature near the circuit breaker.
0x6406	<b>Ultimate self-protection (SELLIM) trip</b>	The circuit breaker tripped due to SELLIM protection.	Reset the circuit breaker.
0x6407	<b>Self diagnostic trip. Replace control unit</b>	The circuit breaker tripped following a control unit internal event.	Replace the MicroLogic Active control unit. Contact Schneider Electric support.
0x640A	<b>ENCT disconnected trip.</b>	The control unit self-test detected the disconnection of the external neutral current sensor of the circuit breaker.	Check internal/external wiring of External Neutral Current Sensor (ENCT)
0x641D	<b>Ultimate self-protection (DIN/DINF) trip</b>	The circuit breaker tripped due to DIN/DINF protection.	Reset the circuit breaker.
0x6433	<b>Current sensor loss. Replace circuit breaker.</b>	The control unit self test detected the disconnection of an internal sensor of the circuit breaker.	Replace the circuit breaker. Contact Schneider Electric support.


Contact your Schneider Electric Services representative for more information about who can carry out the recommended actions.



# Diagnosing Alarms

## Diagnosis Sequence

The following table shows the sequence of actions to take after an alarm is detected by the MicroLogic Active control unit. Further explanation of each action is given in the following paragraphs.

Step	Action
1	Identify the alarm detected.
2	Consult the list of alarm messages in the following tables and perform the actions recommended.
3	Press <b>OK</b> to acknowledge the alarm.
4	Press the  button for 3 seconds to reset the latched events, switch off the trip cause LEDs and revert the status bar to green.

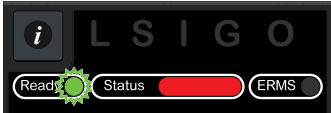
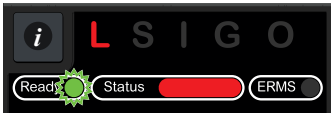
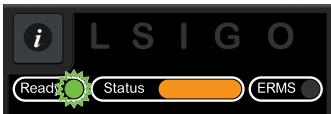
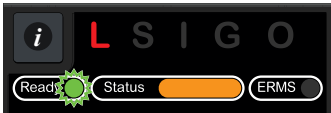
## Identifying the Alarm Detected

The MicroLogic Active control unit indicates alarms with:

- The **Ready** LED (flashing green or off)
- The **Status** bar (red or orange)
- The L trip cause LEDs (red or orange)
- A pop-up alarm screen (red or orange)

Two levels of alarm are detected and indicated by the color of the status bar:

- Red for high-severity detected alarms.
- Orange for medium-severity detected alarms.

Description	Display screen	Status and Trip cause LED display	Status and Trip cause LED description
High severity alarm, page 100	Alarm message is displayed on a red screen.		Ready LED: green flashing Status bar: red on ERMS LED: off All trip cause LEDs off
Overload alarm: phase current > 105% I <sub>r</sub>	Alarm message is displayed on a red screen.		Ready LED: green flashing Status bar: red on ERMS LED: off L trip cause LED: on
Medium severity alarm, page 101	Alarm message is displayed on an orange screen.		Ready LED: green flashing Status bar: orange on ERMS LED: off All trip cause LEDs off
Overload pre-alarm: 90% I <sub>r</sub> < Current < 105% I <sub>r</sub>	Alarm message is displayed on an orange screen.		Ready LED: green flashing Status bar: orange on ERMS LED: off L trip cause LED: red on

## Recommended Action After Detection of High Severity Alarms

The following table indicates what action to perform according to the alarm message.

For more information about event messages, refer to DOCA0265•• *MasterPacT MTZ - MicroLogic Active Control Unit - User Guide*, page 7.

Code	Alarm message	Alarm description	Recommended action
0x1400	<b>Self-test 1. Replace control unit.</b>	The control unit self test detected a major internal event in the control unit operation.	Replace the MicroLogic Active control unit. Contact Schneider Electric support.
0x1402	<b>Current sensor loss. Replace circuit breaker.</b>	The control unit self test detected the disconnection of an internal sensor of the circuit breaker.	Replace the circuit breaker. Contact Schneider Electric support.
0x1403	<b>ENCT disconnected</b>	The control unit self-test detected the disconnection of the external neutral current sensor of the circuit breaker.	Check internal/external wiring of External Neutral Current Sensor (ENCT)
0x1404	<b>Control unit over temperature</b>	The temperature of the control unit is above the maximum temperature threshold.	Decrease ambient temperature near the circuit breaker. If the problem persists, replace the MicroLogic Active control unit.
0x1405	<b>Self-test 3. Replace control unit.</b>	The control unit self test detected a major internal event in the control unit operation.	Replace the MicroLogic Active control unit. Contact Schneider Electric support.
0x1406	<b>Self-test 4. Replace control unit.</b>	The control unit self test detected a major internal event in the control unit operation.	Replace the MicroLogic Active control unit. Contact Schneider Electric support.
0x1409	<b>Unable to read sensor plug</b>	The control unit is unable to read the value of the sensor plug.	Check connection of the sensor plug and performer plugs. If the connection is good but the event recurs, replace the sensor plug or the MicroLogic Active control unit.
0x1413	<b>Ig test - no trip</b>	The ground Ig did not trip.	Restart the test. If the event recurs, contact your Schneider Electric Services representative.
0x1416	<b>Mitop disconnected. Call Schneider Electric support</b>	The circuit breaker Mitop is disconnected.	Contact Schneider Electric support before restarting
0x1430	<b>Protection settings reset to factory values.</b>	If the control unit is switched off due to an internal event, protection settings are reset to default protection settings at the next reboot.	Update the MicroLogic Active control unit firmware with EcoStruxure Power Commission software. Otherwise, plan to replace the MicroLogic Active control unit.
0x1442	<b>Contact wear &gt; 100%. Replace circuit breaker</b>	The contact wear indicator reached the threshold of 100%.	Replace the circuit breaker.
0x150F	<b>Iron CT loss. Replace circuit breaker.</b>	The control unit self test detected an event in all internal current power supply sensors of the circuit breaker.	Replace the circuit breaker.
0x1518	<b>Self-test 6. Replace control unit.</b>	The control unit self test detected a major internal event in the control unit operation.	Replace the MicroLogic Active control unit. Contact Schneider Electric support.
0x6200	<b>Ir start (<math>I &gt; 105\% I_r</math>)</b>	The long time protection prealarm started: at least one of the phase or neutral currents is above the 105% $I_r$ threshold. The circuit breaker is operating close to $I_r$ threshold.	Check the load.



For more information about the maximum number of operations for individual parts, refer to DOCA0305•• *MasterPacT MTZ IEC Circuit Breakers with MicroLogic Active Control Unit - Maintenance Guide*, page 7.

Contact your Schneider Electric Services representative for more information about who can carry out the recommended actions.

## Recommended Action After Medium Severity Alarms

The following table indicates what action to perform according to the alarm message.

For more information about event messages, refer to DOCA0265•• *MasterPacT MTZ - MicroLogic Active Control Unit - User Guide*, page 7.

Code	Alarm message	Alarm description	Recommended action
0x03F5	<b>Ir pre-alarm (I &gt; 90% Ir)</b>	The long time protection prealarm started: at least one of the phase or neutral currents is above the 90% Ir threshold. The circuit breaker is operating close to Ir threshold.	Check the load.
0x0D09	<b>Firmware discrepancy within control unit</b>	The control unit self-test detected a discrepancy between the firmware versions of control unit processors.	Check the firmware version of the MicroLogic Active control unit with EcoStruxure Power Commission software. If not latest, update the firmware of the MicroLogic Active control unit.
0x0D0A	<b>Invalid CU factory config. 1</b>	Invalid control unit factory configuration.	Plan to replace the MicroLogic Active control unit.
0x140F	<b>Protection settings not accessible 1.</b>	The control unit cannot access the protection settings.	Plan to replace the MicroLogic Active control unit.
0x142F	<b>Last protection settings have not been applied.</b>	The control unit did not apply the last modification.	Apply again the protection settings.
0x1440	<b>Contact wear &gt; 60%. Check contacts.</b>	The contact wear indicator reached or is above the threshold of 60%.	Inspect visually the arc chute and main contacts at the next scheduled maintenance.
0x1441	<b>Contact wear &gt; 95%. Plan circuit breaker replacement.</b>	The contact wear indicator reached or is above the threshold of 95%.	Plan to replace the circuit breaker.
0x1473	<b>Internal access loss. Reboot control unit</b>	Internal access. Reset control unit	Internal access loss. Reboot control unit by simultaneously pressing the 5 buttons  , <b>OK</b> , <b>Back</b> , <b>Up</b> , <b>Down</b> .
0x1474	<b>Protection settings not accessible 2.</b>	The control unit cannot access the protection settings.	Reboot control unit by simultaneously pressing the 5 buttons  , <b>OK</b> , <b>Back</b> , <b>Up</b> , <b>Down</b> .
0x1482	<b>Sched. Manufact. maintenance within 3 months</b>	A manufacturer maintenance program should be performed within three months.	Plan to schedule the manufacturer preventive maintenance program within three months. To plan, edit report and track maintenance intervention, you may use EcoStruxure Facility Expert app.

# MasterPacT MTZ Commissioning

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# Introduction to Commissioning

## Overview

### **⚠️ DANGER**

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

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS, or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Unless specified otherwise in the commissioning procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

**Failure to follow these instructions will result in death or serious injury.**

This part details the testing and commissioning procedure which must be performed on the MasterPacT MTZ circuit breaker with MicroLogic Active control unit, before the circuit breaker can be accepted as fit for service and connected to a power supply.

The commissioning procedure must be done by an authorized commissioning engineer with appropriate training and experience:

- Only qualified electrical personnel with training and experience on low voltage circuits must perform the work described in this part.

Personnel must understand the hazards involved in working with or near low-voltage equipment. Such work must be performed only after reading the complete set of instructions.

- Some inspections or procedures require that certain parts of the electrical system remain energized at hazardous voltage during the procedure. Observe all safety messages (Danger, Warning, Caution) throughout this part and the corresponding instruction notices.
- Wear personal protective equipment, recognize potential hazards, and take adequate safety precautions when performing the procedures outlined in this part and the corresponding instruction notices.

The commissioning procedure assumes that the following conditions are met at the start of the procedure:

- The circuit breaker is not connected to a power system or a control system.
- A drawout circuit breaker is in the disconnected position.
- The circuit breaker is not connected to a communication network.

The results of all observations, tests, adjustments, together with any relevant comments must be recorded on the appropriate form, if applicable.

Wherever possible, testing must be done without disconnecting or disturbing existing wiring.

## Scope

The commissioning procedure applies to the MasterPacT MTZ intelligent modular unit (IMU), made up of a MasterPacT MTZ circuit breaker with its MicroLogic Active control unit.

The associated information, which must be read with this procedure, includes specific schematic diagrams, connections, and trip levels for the circuit breakers covered by this document.

## Equipment

The following equipment is required to do the tests detailed in the commissioning procedure:

- Insulation resistance tester
- Multimeter
- A PC equipped with the latest version of EcoStruxure Power Commission software
- A USB-A to USB-C cable to connect the PC to the MicroLogic Active control unit:
  - Supplier: RS PRO
  - Cable reference: 182-8848

## Test Form

A test form, page 114 is proposed to guide you through the commissioning procedure and to record the results of the commissioning tests. Each test is described in detail in the Commissioning part.

Only do the tests required, depending on the MasterPacT MTZ type and the functions in use.

# Inspection and MicroLogic Active Settings

## Visual Inspection

Step	Action
1	Record the equipment identification, including substation name, switchboard name, MasterPacT MTZ circuit breaker type, MicroLogic Active model type and serial number, MicroLogic Active type, and protection settings.
2	Check that the circuit breaker is undamaged, correctly mounted, and securely fastened in the switchboard.
3	Check the 3-phase clearance at terminal blocks.
4	Check that there is no debris remaining at the back of the circuit breaker housing/ enclosure.
5	Check that the ground terminals of the circuit breaker are securely connected with the correct grounding cables.
6	Check that all external surfaces are undamaged.
7	Rectify any non-conformities, if possible. All equipment non-conformities must be referred to asset management.

## Condition of Connections and Auxiliaries

Check circuit breaker mounting in the switchboard and the tightness of all connections (main connection and auxiliary wiring).

Check that all auxiliaries and accessories are correctly installed:

- Electrical auxiliaries
- Terminal blocks
- Connections of auxiliary circuits

## Check Firmware Compatibility

By using the latest version of EcoStruxure Power Commission software, check that the firmware of the MicroLogic Active control unit is up-to-date.

Step	Action
1	Connect a PC running EcoStruxure Power Commission software by using a cable connected to the USB-C port on the front face of the MicroLogic Active control unit.
2	Establish a connection. EcoStruxure Power Commission software reads the parameters of the control unit.
3	On EcoStruxure Power Commission, use the Overall System firmware status/ compatibility matrix to display: <ul style="list-style-type: none"> <li>• The installed firmware version of the MicroLogic Active control unit.</li> <li>• The latest firmware version of the MicroLogic Active control unit that are available on the Schneider Electric System Updates Internet site.</li> <li>• The recommended actions to get a compatible system.</li> </ul> For more information, refer to <i>EcoStruxure Power Commission Online Help</i> .
4	Follow the recommended actions to get a compatible system.

## MicroLogic Active Settings

### ***NOTICE***

#### **HAZARD OF UNINTENDED OPERATION**

- The circuit breaker must only be configured and set by qualified personnel, using the results of the installation protection system study.
- During commissioning of the installation and following any modification, check that the MicroLogic Active configuration and protection function settings are consistent with the results of this study.
- MicroLogic Active protection functions are set by default to the minimum value, except for the long time protection function which is set to the maximum value, by default.

**Failure to follow these instructions can result in equipment damage.**

Check the settings with EcoStruxure Power Commission software connected to the MicroLogic Active control unit.

Step	Action
1	Connect a PC running EcoStruxure Power Commission software by using a cable connected to the USB-C port on the front face of the MicroLogic Active control unit.
2	Establish a connection. EcoStruxure Power Commission software reads the parameters of the control unit.
3	Check that the settings read in the control unit match the requirements of the application. If necessary, correct the settings with EcoStruxure Power Commission software: <ul style="list-style-type: none"><li>• The protection settings must be defined according to the installation protection system study.</li><li>• Other settings must be defined according to the application.</li></ul>
4	Check that the date and time are set. If necessary, set them by using the MicroLogic Active HMI.
5	Complete the project and circuit breaker data.
6	Generate the project report with EcoStruxure Power Commission software, and save or print the project report as needed.

**NOTE:** The protection functions available depend on the type of MicroLogic Active control unit.



# IEEE 802.15.4 Wireless Communication Commissioning

## Pairing MicroLogic Active AP/EP Control Unit With Panel Server

The prerequisites to pairing a MicroLogic Active AP/EP control unit with a Panel Server are:

- The control unit must be a MicroLogic Active AP/EP control unit.
- The Panel Server must be turned on.
- The MicroLogic Active AP/EP control unit and Panel Server must be in close proximity.

It is recommended to perform the commissioning of IEEE 802.15.4 wireless devices in a place secure from rogue radio transmitters, such as an administrator room. For more information, refer to DOCA0122•• *MasterPacT, ComPacT, PowerPacT - Cybersecurity Guide* in **Related Documents** at the beginning of this guide.

Follow the procedure below to pair a MicroLogic Active AP/EP control unit with a Panel Server:

Step	Action
1	Turn on the Panel Server.
2	Follow the discovery procedure described in <i>EcoStruxure Panel Server - User Guide</i> in <b>Related Documents</b> , at the beginning of this guide.
3	When prompted to do so, connect the MicroLogic Active AP/EP control unit to a IEEE 802.15.4 network.  Do this by selecting <b>Connect</b> on the MicroLogic Active display screen, from the tree navigation menu, at <b>Configuration &gt; Communication &gt; IEEE 802.15.4 &gt; Status</b> .
4	At the end of the discovery procedure, the MasterPacT MTZ circuit breaker with MicroLogic Active AP/EP control unit appears in the list of discovered devices on Panel Server webpages.

**NOTE:** It is recommended that the MicroLogic Active AP/EP control unit is powered by an external 24 Vdc power supply, to avoid communication loss if the load falls below 20% of the rated current  $I_n$ .

## IEEE 802.15.4 Wireless Communication Test

After discovery of the MasterPacT MTZ circuit breaker with MicroLogic Active AP/EP control unit, you can check IEEE 802.15.4 wireless communication and microswitch installation.

Step	Action
1	Select the <b>Monitoring &amp; Control</b> menu on Panel Server webpages.
2	Select the MasterPacT MTZ circuit breaker with MicroLogic Active AP/EP control unit to test, from the list of paired devices.
3	Check the circuit breaker status.
4	If the circuit breaker status (open or closed), displayed on Panel Server webpages does not match the actual status of the circuit breaker, contact your Schneider Electric Services representative.

# Tests

## Overview

The tests to do while commissioning a MasterPacT MTZ circuit breaker are described in this section:

- Functional checks
- Check of MCH gear motor (if fitted)
- Check of electrical continuity
- Check of high-voltage insulation
- Check of MicroLogic Active internal battery
- Check of MicroLogic Active **Ready** LED status
- Test of the tripping mechanism with EcoStruxure Power Commission software
- Test of the tripping mechanism on the MicroLogic Active 6.0 display screen
- Automatic trip curve test with EcoStruxure Power Commission software

Only do the tests required, depending on the MasterPacT MTZ type and the functions in use, and record the results on the [test form](#), page 114. In the event of non-conformance, the result must be recorded and the MasterPacT MTZ circuit breaker must not be accepted into service.

## Functional Checks

Follow this procedure to check the operation of the MasterPacT MTZ circuit breaker and record the results on the test form.

Step	Action
1	Manually charge the mechanism by pulling the spring charging handle down.
2	Close the circuit breaker. Check the closing of the circuit breaker in each of the different means designed for the application.
3	Open the circuit breaker. Check the opening of the circuit breaker in each of the different means designed for the application.

If the circuit breaker does not close or does not open, refer to *Troubleshooting*, page 118.

## Check of MCH Gear Motor (if Fitted)

Follow this procedure to check the operation of the MCH gear motor and record the results on the test form.

Step	Action
1	Remove the MCH gear motor power supply.
2	Do an opening/closing/opening cycle to discharge the mechanism.
3	With the circuit breaker in the open position and the mechanism discharged, check electrical continuity between terminals B1 and B2, and electrical non-continuity between terminals B1 and B3.
4	Manually charge the mechanism.
5	Reconnect the MCH gear motor power supply. The circuit breaker closes and the mechanism is automatically charged.

Step	Action
6	Check electrical continuity between terminals B1 and B3.
7	Operate the circuit breaker several times to check that the spring mechanism automatically recharges after every closing operation.

## Check of Electrical Continuity

Follow this procedure to check electrical continuity using a multimeter or continuity checker and record the results on the test form.

Step	Action
1	Close the circuit breaker.
2	Check electrical continuity, for each of the phases, between the upper and lower power terminals: <ul style="list-style-type: none"> <li>For fixed circuit breaker: on the power terminals</li> <li>For the drawout circuit breaker: on the chassis power terminals, with the circuit breaker in the connected position</li> </ul>

## Check of High-Voltage Insulation

Dielectric tests (high potential and insulation resistance tests) are used to check the insulation between phases, and insulation between each phase and ground. The equipment used to conduct these tests creates a high potential voltage (thousands of volts) to check dielectric or insulation integrity.


Before conducting any high-voltage insulation tests, unplug any cables from the USB-C port on the front face of the MicroLogic Active control unit.

Follow this procedure to check insulation resistance and record the results on the test form.

Step	Action
1	Unplug any cables from the USB-C port on the front face of the MicroLogic Active control unit.
2	Close the MasterPacT MTZ circuit breaker.
3	Measure the insulation resistance using a 500 Vdc insulation resistance tester between one of the phases and the other two phases grounded. Repeat for each phase.
4	Open the MasterPacT MTZ circuit breaker by pressing the opening pushbutton.
5	Measure the insulation resistance using a 500 Vdc insulation resistance tester between one of the phases and ground, with all other phases grounded. Repeat for each phase.
6	Check that the insulation resistance is above 5 MΩ in each case. If this result is not obtained, contact your Schneider Electric Services representative.

## Check of MicroLogic Active Internal Battery

Follow this procedure to check the functioning of the MicroLogic Active internal battery.

Step	Action
1	Press and hold the  button for less than 3 seconds to test the internal battery.
2	<p>Check that the trip cause LEDs switch off for one second, and then switch on.</p> <p>If the trip cause LEDs:</p> <ul style="list-style-type: none"> <li>Blink sequentially: the battery is near the end of its life. Replace the battery. For information about internal battery replacement and installation, consult the instruction sheet on the Schneider Electric website: PKR4244002 <i>MicroLogic Active - Spare Battery - Instruction Sheet</i>.</li> <li>Do not light: check that the battery strip has been removed. If it has, replace the battery.</li> </ul> <p>If the battery strip has not been removed, remove it as indicated in the circuit breaker instruction sheet. Refer to <i>Related Documents</i>, page 7.</p>

## Check of MicroLogic Active Ready LED Status

Follow this procedure to check the functioning of the MicroLogic Active control unit and record the results on the test form.

Step	Action
1	Provide power to the MicroLogic Active control unit, for example, by connecting a PC or Mobile Power Pack to the USB-C port on the front face.
2	<p>Check that the MicroLogic Active <b>Ready</b> LED is flashing green.</p> <p>The <b>Ready</b> LED flashes green to indicate that:</p> <ul style="list-style-type: none"> <li>The sensors are correctly wired.</li> <li>The tripping mechanism is functioning correctly.</li> <li>The MicroLogic Active control unit is functioning correctly.</li> </ul>
3	If the <b>Ready</b> LED is not flashing green, refer to <i>Critical Cases</i> , page 88.

## Test of the Tripping Mechanism With EcoStruxure Power Commission Software


Follow this procedure to test the tripping mechanism of the circuit breaker and record the results on the test form.

Step	Action
1	Close the circuit breaker.
2	Connect a PC running EcoStruxure Power Commission software by using a cable to the USB-C port on the front face of the MicroLogic Active control unit.
3	On EcoStruxure Power Commission software, select the circuit breaker and connect to it.
4	Force the circuit breaker to trip by clicking the <b>Force Trip</b> button on the EcoStruxure Power Commission screen. This action is password-protected.
5	Check that the circuit breaker is open.
6	Check that the blue fault-trip reset button has popped out.
7	Check that the I trip cause LED is blinking red.

Step	Action
8	Check that the SDE contacts have switched.
9	After the test, reset the circuit breaker.

## Test of the Tripping Mechanism on the MicroLogic Active 6.0 Display Screen

Follow this procedure to test the tripping mechanism of the circuit breaker when fitted with a MicroLogic Active 6.0 control unit, and record the results on the test form.

Step	Action
1	Close the circuit breaker.
2	Select <b>Maintenance &gt; Ground Protection Test</b> on the MicroLogic Active display screen.
3	Enter the pin code.
4	Press <b>OK</b> to confirm that you want to start the ground-fault protection test and trip the circuit breaker.
5	Check that the <b>G</b> trip cause LED is blinking, and the <b>Ig test trip</b> pop-up trip message is displayed.
6	Check that the circuit breaker is open.
7	Check that the blue fault-trip reset button has popped out.
8	Check that the SDE contacts have switched.
9	Press <b>OK</b> to close the pop-up trip message.
10	Press and hold the  button for more than 3 seconds to reset the trip cause LEDs.
11	Manually charge the mechanism by pulling the spring charging handle down six times. When the spring charging handle no longer resists, the mechanism is charged.
12	If the circuit breaker is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.
13	Press the closing pushbutton. The circuit breaker must not close.
14	After the test, reset the circuit breaker by pressing the blue reset button.
15	Press the closing pushbutton. The circuit breaker closes.

## Automatic Trip Curve Test With EcoStruxure Power Commission Software

Follow this procedure to run the automatic trip curve test and record the results on the test form.

Step	Action
1	Close the circuit breaker.
2	If the circuit breaker is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.
3	Connect a PC running EcoStruxure Power Commission software by using a cable to the USB-C port on the front face of the MicroLogic Active control unit.
4	On EcoStruxure Power Commission software, select the circuit breaker and connect to it.
5	In the <b>Device Check up</b> section, click the <b>Device</b> tab.

Step	Action
6	Select the <b>Automatic Trip Test</b> section.
7	Select <b>Preconfigured test point</b> .
8	Select the overcurrent protection to be tested.
9	Click <b>Run Test</b> .
10	Check that the circuit breaker trips.
11	Check that the blue fault-trip reset button has popped out
12	Check that the related trip cause LED is blinking red.
13	Check the SDE contacts have switched.
14	After the test, reset the circuit breaker.

# Final Checks and Reporting

## Final Checks

After completing the commissioning tests, check the following:

Step	Action
1	Check that connections are made with the correct tightening torque, that there are no tools or objects inside the equipment, and that all circuit breakers, doors, and protective covers are in position.
2	Check that the circuit breaker is off (open position) and the closing spring is charged.

## Project Report Generated by EcoStruxure Power Commission Software

EcoStruxure Power Commission software generates a project report with a list of the circuit breakers for that project. For each MasterPacT MTZ circuit breaker it provides the following information:

- The circuit breaker identification data
- The MicroLogic Active identification data
- The list of accessories including internal accessories (for example, programmable contacts), and external modules (for example, IO module)
- The protection settings for the MicroLogic Active control unit
- The alarm settings

# MasterPacT MTZ Test Form

## How to Use the Test Form

Print this test form to record the results of the commissioning tests.

Check the box (✓) when the test has been made and is conclusive.

This test form, the project report, and the communication test report should be left on-site in a plastic wallet and in an easily accessible, safe place.

Each test is described in detail in the Commissioning part.

Only do the tests required, depending on the MasterPacT MTZ type and the functions in use.

When all the tests have been satisfactorily completed, sign and date the test form.

## Identification

<b>Workstation</b>		<b>Tests conducted on:</b>	<b>By:</b>
			<b>Signature:</b>
Substation name		<b>Comments:</b>	
Substation number			
Switchboard name			
Voltage			
<b>MasterPacT MTZ circuit breaker</b>			
Manufacturer		Schneider Electric	
Type of MasterPacT MTZ circuit breaker			
Serial number			
Hardware version			
<b>MicroLogic Active control unit</b>			
MicroLogic Active type		CT ratio	
Firmware version			

## Preliminary Checks

<b>Type of check</b>	<b>(✓)</b>
Visual inspection satisfactory (for example, no visible signs of damage).	
Grounding satisfactory.	
Connection tightness checked.	
Firmware compatibility satisfactory.	



Type of check	(✓)
MicroLogic Active settings applied.	
Project report generated.	

## Functional and Interlock Checks

Type of check	(✓)
Mechanism charges when spring charging handle is pulled.	
MasterPacT MTZ circuit breaker closes.	
MasterPacT MTZ circuit breaker opens.	
Interlocking systems of the circuit breaker function correctly.	
Interlocking systems between two or three circuit breakers function correctly.	

## Electrical Continuity Check

MasterPacT MTZ circuit breaker status	Tested terminals		Electrical continuity
	Incoming side	Outgoing side	
Closed	L1	L1	Ω
Closed	L2	L2	Ω
Closed	L3	L3	Ω

## MasterPacT MTZ Insulation Test

MasterPacT MTZ circuit breaker status	Terminals under test	Voltage	Insulation resistance
Closed	L1, with L2 and L3 grounded	500 Vdc	MΩ
Closed	L2, with L1 and L3 grounded	500 Vdc	MΩ
Closed	L3, with L1 and L2 grounded	500 Vdc	MΩ
Open	L1, with L1, L2, L3 grounded on the other side	500 Vdc	MΩ
Open	L2, with L1, L2, L3 grounded on the other side	500 Vdc	MΩ
Open	L3, with L1, L2, L3 grounded on the other side	500 Vdc	MΩ

## Check of MicroLogic Active Ready LED

Type of check	(✓)
MicroLogic Active <b>Ready</b> LED flashes green.	

## Test of the Tripping Mechanism for MicroLogic Active Control Units

Type of check	(✓)
With the circuit breaker closed, force the circuit breaker to trip using EcoStruxure Power Commission software.	
Check that the circuit breaker is open.	
Check that the blue fault-trip reset button has popped out.	
Check that the I trip cause LED is blinking red.	
Check that the SDE contacts have switched.	

## Test of the Tripping Mechanism for MicroLogic Active 6.0 Control Units

Type of check	(✓)
With the circuit breaker closed, force the circuit breaker to trip by using the MicroLogic Active display screen.	
Check that the circuit breaker is open.	
Check that the blue fault-trip reset button has popped out.	
Check that the G trip cause LED is blinking red.	
Check that the SDE contacts have switched.	

## Automatic Trip Curve Test

Type of check	(✓)
Check that the circuit breaker trips.	
Check that the blue fault-trip reset button has popped out.	
Check that the related trip cause LED is blinking red.	
Check that the SDE contacts have switched.	

## Final Checks

Type of check	(✓)
All doors and protected covers are in position.	
The circuit breaker is off (open position) and the closing spring is charged.	

# MasterPacT MTZ Troubleshooting

## What's in This Part

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# Introduction to Troubleshooting

## Presentation

This part contains information for troubleshooting problems in a working system. It assumes that the system is correctly installed and that all the commissioning tests have been completed successfully. The troubleshooting operations are described under the following headings:

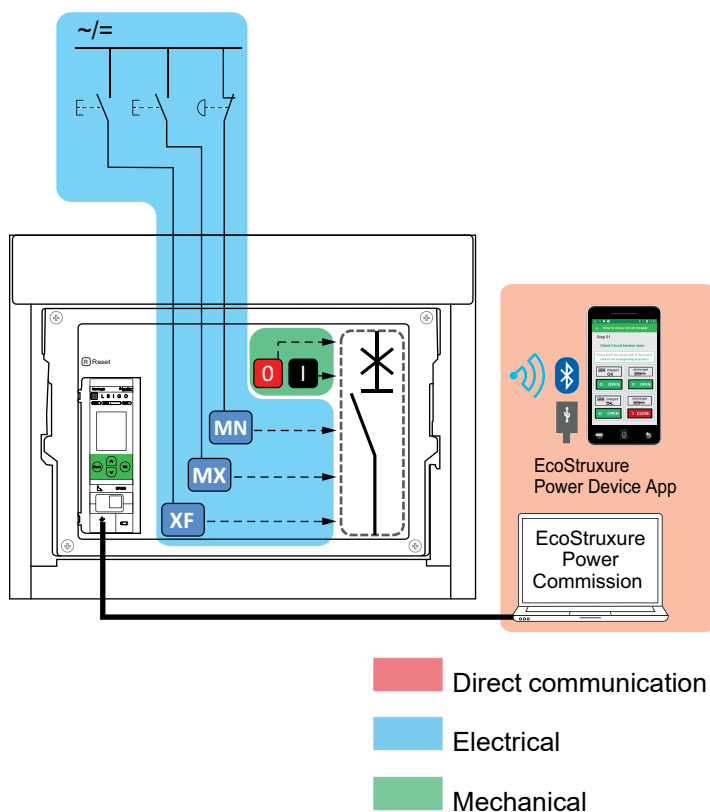
- Chassis operation
- Unexpected tripping
- Mechanical control operations
- Electrical control operations

## Layer Model

When troubleshooting the device, it is useful to consider a layer model. There are three layers:

- Direct connection
- Electrical
- Mechanical

The following diagram shows the layers in the device:



If the troubleshooting actions for a layer are not successful, go to the next layer until you reach the Mechanical layer. If you cannot solve the problem after troubleshooting the Mechanical layer, contact your Schneider Electric Services representative.

## Maintenance of the Device

Schneider Electric recommends a preventive maintenance program to ensure that devices retain the operating and technical characteristics specified in the catalogs during their service life. Maintenance must be carried out by trained and qualified personnel.

For information about the preventive maintenance program and maintenance procedures, refer to DOCA0305• *MasterPacT MTZ IEC Circuit Breakers with MicroLogic Active Control Unit - Maintenance Guide* in **Related Documents** at the beginning of this guide.

# Troubleshooting: Chassis Operation

## Definition

Chassis operation includes the following:

- Racking in and racking out the drawout circuit breaker
- Locking and unlocking the chassis

## Troubleshooting

Problem description	Probable causes	Solutions
Impossible to insert the racking handle in connected, test, or disconnected position.	A padlock or keylock is present on the chassis or a door interlock is present.	Disable the locking function.
Impossible to turn the racking handle.	The position release button is not pushed in and so the racking handle cannot be rotated.	Push the position release button.
Circuit breaker cannot be removed from chassis.	Circuit breaker is not in the disconnected position.	Turn the racking handle until the circuit breaker is in the disconnected position and the position release button pops out.
	Rails are not completely extended.	Pull out the rails of the chassis.
Circuit breaker cannot be connected (racked in).	Chassis and circuit breaker do not match (mismatch protection).	Check that the chassis corresponds with the circuit breaker.
	Safety shutters are locked.	Remove the locks.
	Disconnecting contact clusters are incorrectly positioned.	Reposition the disconnecting contact clusters.
	Chassis is locked in the disconnected position.	Disable the chassis locking function.
	The position release button is not pushed in and so the racking handle cannot be rotated.	Push the position release button.
	Circuit breaker has not been sufficiently inserted in the chassis.	Insert the circuit breaker completely so that it is engaged in the racking mechanism.
Circuit breaker cannot be locked in the disconnected position.	Circuit breaker is not in the correct position.	Check the circuit breaker position by checking that the position release button is popped out.
	Racking handle is still in the chassis.	Remove the racking handle and store it.
Circuit breaker cannot be locked in the connected, test, or disconnected position.	Locking in any position is not enabled.	Adapt the chassis locking mechanism so that the chassis can be locked in any position.
	Circuit breaker is not in the correct position.	Check the circuit breaker position by checking that the position release button is out.
	Racking handle is still in the chassis.	Remove the racking handle and store it.
The racking handle cannot be inserted to connect or disconnected the circuit breaker.	Rails are not completely in.	Push the rails all the way in.
The right-hand rail (chassis alone) or the circuit breaker cannot be drawn out.	Racking handle is still in the chassis.	Remove the racking handle and store it.

# Troubleshooting: Unexpected Tripping

## Definition

Unexpected tripping is tripping that is not caused by a protection function during normal operation or by tests.

## Troubleshooting



Problem description	Symptom	Probable causes	Solutions
Circuit breaker opened without any over-current electrical fault.	The blue fault-trip reset button is not popped out and no trip cause LED is lit.	Drop in voltage to below the threshold detected by MN undervoltage release.	Check the voltage and the MN supply circuit ( $V > 0.85 U_n$ ).
		An order (for example load-shedding) sent to the MX opening voltage release by another circuit breaker.	Check the parameters of the circuit breaker that sent the order.
		Unnecessary opening order from the MX opening voltage release.	Determine the origin of the order and cancel it.
Circuit breaker trips in a shorter time than expected after attempt to close the circuit breaker.	The blue fault-trip reset button is popped out and the L trip cause LED is blinking red.	Thermal memory is still active and current on the line is above the $I_r$ threshold.	Check whether there is still an overload on the line. If necessary, make a correction. For details of thermal memory, refer to DOCA0265• <i>MasterPacT MTZ - MicroLogic Active Control Unit - User Guide</i> in <b>Related Documents</b> at the beginning of this guide.
	The blue fault-trip reset button is popped out, the I trip cause LED is lit, and the ERMS LED is lit.	ERMS is active so circuit breaker opens at lower protection settings.	The ERMS function applies reduced protection settings for use during maintenance. Check whether maintenance is in progress. If ERMS is no longer necessary, disengage it to revert to normal protection settings.
Immediate tripping after an attempt to close the circuit breaker.	The blue fault-trip reset button is popped out and the L trip cause LED is blinking red.	Transient overcurrent when closing.	<ul style="list-style-type: none"> <li>Modify the distribution system or the control unit settings.</li> <li>Check the condition of the circuit breaker before putting it back into service.</li> </ul>
Immediate tripping after an attempt to close the circuit breaker with activation of the blue fault-trip reset button.	—	Closing on a short-circuit.	Refer to MasterPacT MTZ critical cases.
Nuisance tripping of the circuit breaker with activation of the blue fault-trip reset button.	—	Blue fault-trip reset button is not pushed-in completely.	Push in the blue fault-trip reset button completely.
	—	Transient overcurrent detected on the line and fast instantaneous trip setting is active in EcoStruxure Power Commission software.	Intended behavior. If necessary, adjust the settings in EcoStruxure Power Commission software.

# Troubleshooting: Mechanical Control Operations

## Definition

Mechanical control operations are operations that are made using the opening or closing pushbuttons.

## Circuit Breaker Cannot be Closed by Using the Mechanical Closing Pushbutton

Symptom	Probable causes	Solutions
The blue fault-trip reset button is popped out.	The blue fault-trip reset button has not been reset.	<ul style="list-style-type: none"> <li>Clear the fault.</li> <li>Push the blue fault-trip reset button.</li> </ul>
—	Circuit breaker is padlocked or keylocked in the open position.	Unlock the circuit breaker.
—	Circuit breaker is interlocked mechanically in a mechanical interlocking system.	<ul style="list-style-type: none"> <li>Check the position of the other circuit breaker in the changeover system.</li> <li>Modify the situation to release the interlock.</li> </ul>
<p>The closing spring and ready-to-close indicator shows that the mechanism is discharged.</p> 	Stored energy mechanism is not charged.	<ul style="list-style-type: none"> <li>Charge the mechanism manually.</li> <li>If the circuit breaker is equipped with an MCH gear motor, check the supply of power to the motor. If the problem persists, replace the MCH gear motor.</li> </ul>
<p>The closing spring and ready-to-close indicator shows that the mechanism is charged but the circuit breaker is not ready to close.</p> 	MX opening voltage release is permanently powered.	As there is an opening order, determine the origin of the order. The order must be canceled before the circuit breaker can be closed.
	MN undervoltage release is not powered due to an opening order.	As there is an opening order, determine the origin of the order. The order must be canceled before the circuit breaker can be closed.
	MN undervoltage release is not powered due to insufficient voltage power supply.	<p>Check the voltage and the MN supply circuit (<math>V &gt; 0.85 U_n</math>).</p> <p>If the problem persists, replace the MN undervoltage release.</p>
Recurring undervoltage trip.	The measured voltage remains at 0 V.	<p>Set the undervoltage behavior parameter, <math>V_{min}</math> behavior, to <b>Force to Off when CB is open</b>. For more information, refer to DOCA0265•• <i>MasterPacT MTZ - MicroLogic Active Control Unit - User Guide</i> in <b>Related Documents</b> at the beginning of this guide.</p>
The position release button on the chassis of the drawout circuit breaker is pushed in.	Circuit breaker is not correctly connected.	<p>Terminate racking in (connection) of the circuit breaker, making sure that it is fully inserted in the chassis, to the connected position. Check that the position release button is popped out.</p>



## Circuit Breaker Cannot be Opened by Using the Mechanical Opening Pushbutton


Probable causes	Solutions
Operating mechanism incident or welded contacts.	Contact your Schneider Electric Services representative.

# Troubleshooting: Electrical Control Operations

## Definition

Electrical control operations are operations that are made by an electrical order through a voltage release or by an external pushbutton that is directly connected to a voltage release.

## Circuit Breaker Cannot be Closed by Using an External Pushbutton/Electrical Order

Symptom	Probable causes	Solutions
–	Circuit breaker is padlocked or keylocked in the open position.	Unlock the circuit breaker.
–	Electrical closing order not executed by the XF closing voltage release due to insufficient voltage power supply.	Check the voltage and the XF supply circuit (0.85–1.1 Un).  If the problem persists, replace the XF closing voltage release.
The closing spring and ready-to-close indicator shows that the mechanism is charged but the circuit breaker is not ready to close.  	MX opening voltage release is permanently powered.	As there is an opening order, determine the origin of the order. The order must be canceled before the circuit breaker can be closed.
	MN undervoltage release is not powered due to an opening order.	As there is an opening order, determine the origin of the order. The order must be canceled before the circuit breaker can be closed.
	MN undervoltage release is not powered due to insufficient voltage power supply.	Check the voltage and the MN supply circuit ( $V > 0.85 U_n$ ).  If the problem persists, replace the MN undervoltage release.
–	XF closing voltage release is continuously supplied, but circuit breaker was not ready-to-close when the closing order was sent (XF closing voltage release is not wired in series with PF ready-to-close contact).	<ul style="list-style-type: none"> <li>Remove the power supply to the XF closing voltage release.</li> <li>Only if the circuit breaker is ready-to-close, send the closing order again via the XF closing voltage release.</li> </ul>

## Circuit Breaker Cannot be Opened by Using an External Pushbutton/Electrical Order

Probable causes	Solutions
Opening order is not executed by the MN undervoltage release.	Drop in voltage insufficient or residual voltage ( $V > 0.35 U_n$ ) across the terminals of the MN undervoltage release.  If the problem persists, replace the MN undervoltage release.
Opening order is not executed by the MX opening voltage release.	Check the voltage and the MX supply circuit (0.7–1.1 Un).  If the problem persists, replace the MX opening voltage release.

## Circuit Breaker Cannot be Reset by Using RES Electrical Remote Reset

Symptom	Probable causes	Solutions
The blue fault-trip reset button is popped out.	Insufficient supply voltage for the RES electrical remote reset.	Check the voltage and the RES supply circuit (0.7–1.1 Un).  If the problem persists, replace the RES electrical remote reset.

## Additional Checks

If the troubleshooting actions described above do not work, refer to the troubleshooting information for [Mechanical Control Operations](#), page 122.





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