Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors from 630 to 1600 A User Guide

Schneider Electric

06/2017







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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Important Information

NOTICE

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.

A DANGER

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

A WARNING

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

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.

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 and switch-disconnectors, in compliance with the IEC standards.

Validity Note

This document applies to Masterpact MTZ1 circuit breakers and switch-disconnectors.

Related Documents

Title of Documentation	Reference Number
Micrologic X Control Unit - User Guide	DOCA0102EN DOCA0102ES DOCA0102FR DOCA0102ZH
Masterpact MTZ - Modbus Communication Guide	DOCA0105EN DOCA0105ES DOCA0105FR DOCA0105ZH
Masterpact MTZ Circuit Breakers - Maintenance Guide	DOCA0099EN DOCA0099ES DOCA0099FR DOCA0099ZH
Masterpact MTZ Catalogue	LVPED216026EN LVPED216026FR
Enerlin'X IO - Input/Output Application Module for One Circuit Breaker - User Guide	DOCA0055EN DOCA0055ES DOCA0055FR DOCA0055ZH
Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide	DOCA0084EN DOCA0084FR DOCA0084ES DOCA0084ZH
Enerlin'X EIFE - Embedded Ethernet Interface for One Masterpact MTZ Drawout Circuit Breaker - User Guide	DOCA0106EN DOCA0106FR DOCA0106ES DOCA0106ZH
ULP System - User Guide	DOCA0093EN DOCA0093ES DOCA0093FR DOCA0093ZH

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Chapter 1 Masterpact MTZ1 Description

What Is in This Chapter?

This chapter contains the following topics:

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Masterpact MTZ1 Range

Description

The Masterpact MTZ1 range of circuit breakers and switch-disconnectors offers current ratings from 630 A to 1600 A, for AC power systems up to 690 Vac. The range is covered by one frame size.

Masterpact MTZ1 devices are available in the following power systems:

- 3-pole (3P)
- 4-pole (4P)

Devices are available in the following installation types:

- Fixed-mounted devices
- Drawout devices

Convention

In this guide, the term *Masterpact MTZ device* covers circuit breakers and switch-disconnectors.

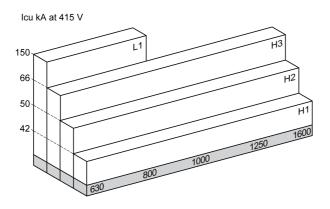
Circuit Breakers

The following performance levels (Icu at 415 Vac) are available:

- H1: standard short-circuit level (42 kA) with total discrimination
- H2: high short-circuit level (50 kA) with high discrimination (42 kA)
- H3: very high short-circuit level (66 kA) with very high discrimination (50 kA)
- L1: extremely high short-circuit level (150 kA) with strong current limitation and discrimination (10 kA)

NOTE: The values above correspond to a 415 Vac network, for higher voltage levels the values can be different. Refer to *Masterpact MTZ Catalogue*.

NOTE: The arc chutes on the Masterpact MTZ1 H3 are built-in and cannot be removed.



Circuit breakers are fitted with a Micrologic[™] X control unit.

For full information about available circuit breaker models, interrupting ratings, sensor ratings, and control units, refer to *Masterpact MTZ Catalogue*.

Switch-Disconnectors

The switch-disconnector functions in the HA performance level.

For information about available switch-disconnector models, refer to Masterpact MTZ Catalogue.

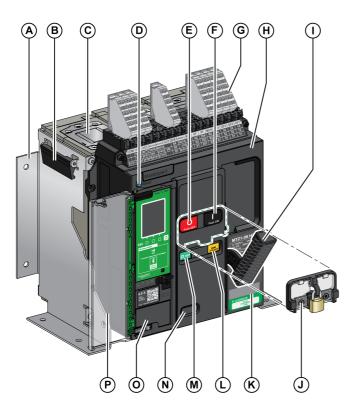
Neutral Position on 4P Devices

On 4P devices, the neutral is on the left side as standard. A right side neutral version is not available for circuit breakers. For switch-disconnectors, the user can change the neutral position to the right side. A labelling kit is provided with the switch-disconnector.

Fixed Device

Fixed Device Description

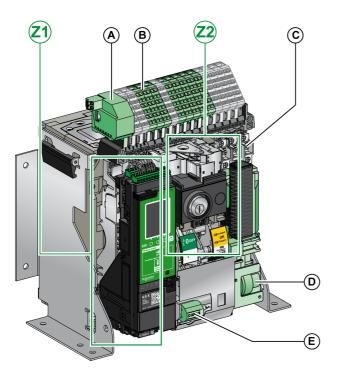
The following image shows the standard version of the fixed device (no optional accessories).



- A Mounting side plate
- B Carrying handle
- C Arc chute
- D Fault-trip reset button
- E Opening pushbutton
- F Closing pushbutton
- G Terminal blocks for standard accessories
- 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-contacts position indicator
- N Window to read the (optional) CDM mechanical operation counter
- O Control unit
- P Control unit transparent cover

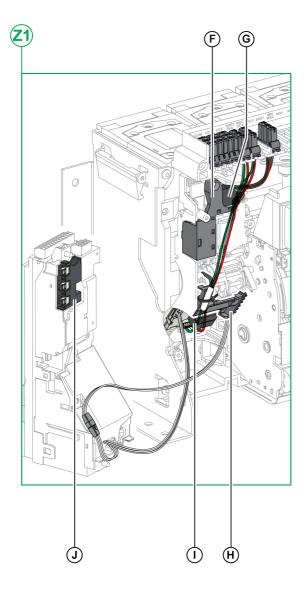
Fixed Device Accessories Description

The following image shows the accessories available for the fixed device.

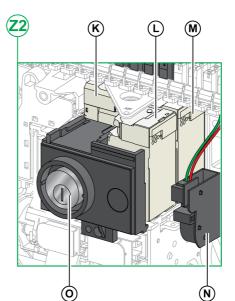


- A ULP port module
- **B** Terminal blocks for optional accessories
- C Four OF indication contacts (delivered as standard)
- D MCH gear motor
- E CDM mechanical operation counter
- Z1, Z2 See following images

The following images zoom in on the accessories for the fixed device:



- F Standard SDE1 fault-trip indication contact
- G Optional SDE2 fault-trip indication contact or RES electrical remote reset
- Microswitch Н
- M2C programmable contacts
- J Isolation module





MN undervoltage release or MX2 opening voltage release

Q

- K L XF closing voltage release
- М MX1 opening voltage release
- PF ready-to-close contact Ν

(P)

- ο VSPO OFF-position locking by keylocks (incompatible with BPFE pushbutton)
- VCPO OFF-position locking by padlocks Ρ
- Q BPFE electrical closing pushbutton

Fixed Device Terminal Block Description



The following table describes the assignment of the terminal blocks.

Marking	Description	Standard or optional
СОМ	Terminal block for the external power supply of the Micrologic X control unit or ULP port module	Standard Optional
UC1	Zone selective interlocking, rectangular sensor for earth-leakage protection, or MDGF module input	Standard
UC2	Neutral external sensor, rectangular sensor for earth-leakage protection, or MDGF module input	Standard
SDE2/RES	SDE2 additional fault-trip indication contact or RES electrical remote reset	Optional
M2C/UC4	M2C programmable contacts or external voltage connector	Optional
UC3	External voltage connector	 Standard on 3P devices Optional on 4P devices
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
МСН	MCH gear motor	Optional
OF1-OF4	4 OF indication contacts	Standard

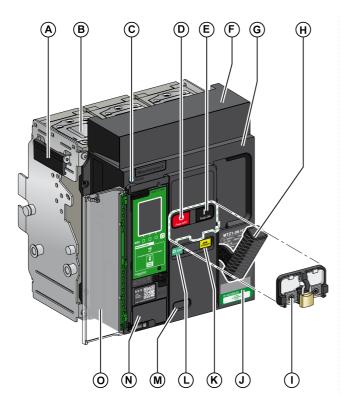
Drawout Device

Definition

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

Drawout Device Moving Part Description

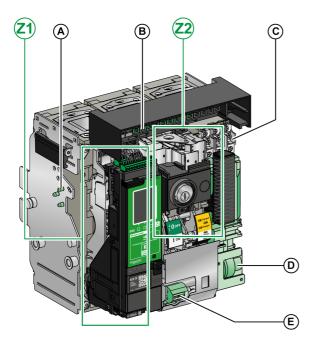
The following image shows the standard version of the moving part of a drawout device (no optional accessories).



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

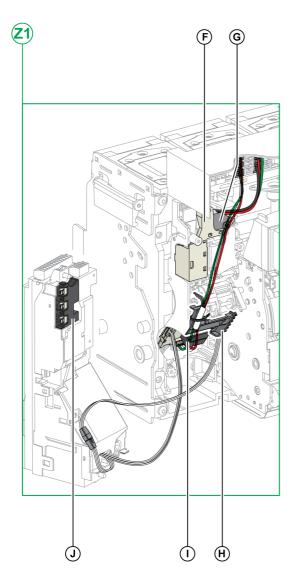
Drawout Device Accessories Description

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

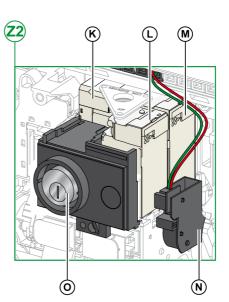


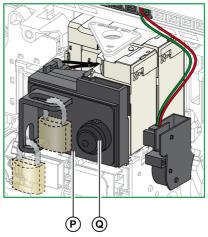
- A VDC mismatch protection
- B Disconnectable contact block
- C Four OF indication contacts (delivered as standard)
- D MCH gear motor
- E CDM mechanical operation counter
- Z1, Z2 See following images

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



- F Standard SDE1 fault-trip indication contact
- **G** Optional SDE2 fault-trip indication contact or RES electrical remote reset
- H Microswitch
- I M2C programmable contacts
- J Isolation module

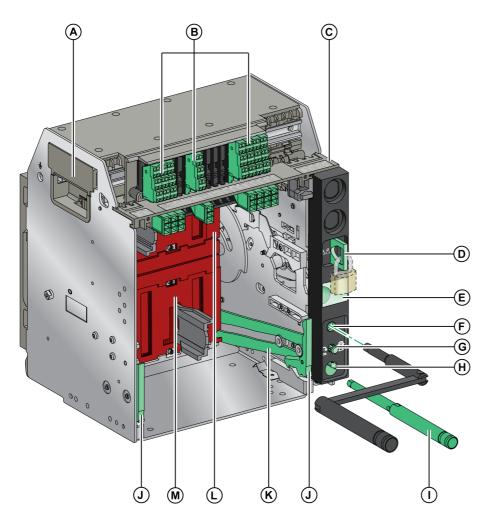




- K MN undervoltage release or MX2 opening voltage release
- L XF closing voltage release
- M MX1 opening voltage release
- **N** PF ready-to-close contact
- **O** VSPO OFF-position locking by keylocks (incompatible with BPFE pushbutton)
- P VCPO OFF-position locking by padlocks
- Q BPFE electrical closing pushbutton

Chassis Description

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

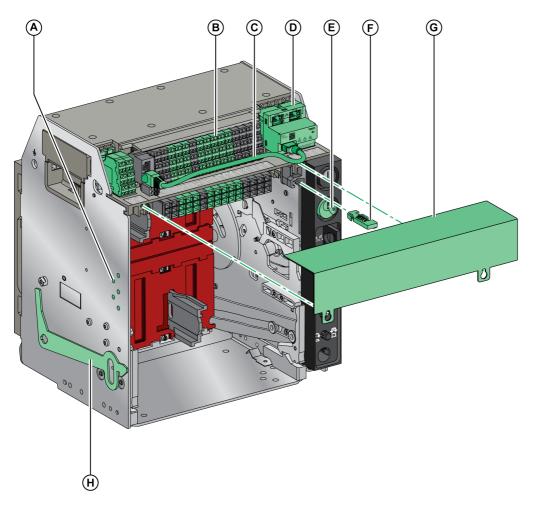


- Α Carrying grip
- в Terminal blocks for standard accessories
- С Terminal block identification plate
- Chassis locking by padlocks D
- Moving part position indicator Е
- F Racking handle socket
- G Position release button
- Racking handle storage space Racking handle н
- L
- Drawout grip J

- Extension rail κ
- L Top safety shutter
- M Bottom safety shutter

Chassis Accessories Description

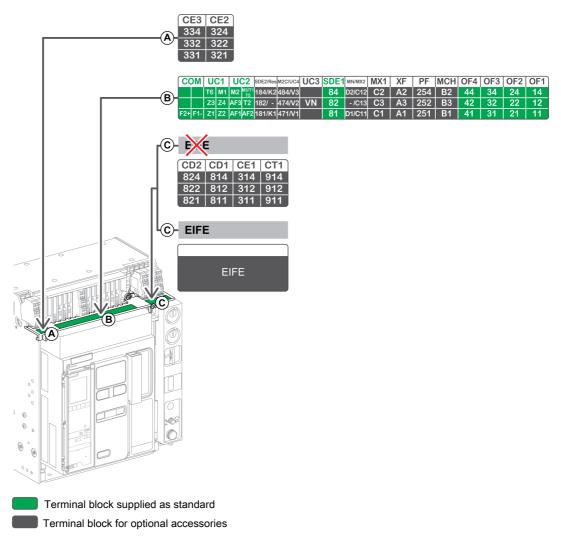
The following image shows the accessories available for the chassis.



- A VDC mismatch protection
- **B** Terminal blocks for optional accessories
- **C** Cord between ULP port module and EIFE interface
- D EIFE embedded Ethernet interface
- E VSPD chassis locking by keylocks

- **F** VPOC open-door racking interlock
- G CB auxiliary terminal shield
- H VPEC door interlock

Chassis Terminal Block Description



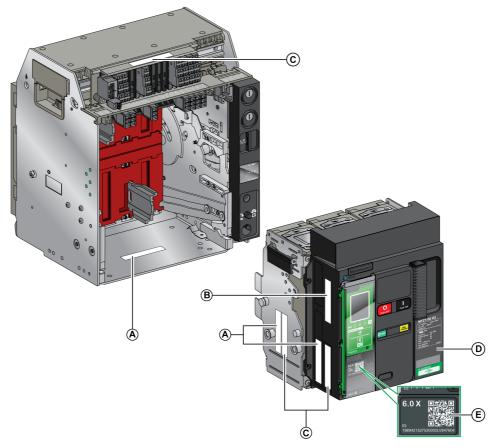
Block	Marking	Description	Standard or optional
А	CE2-CE3	2 CE connected position contacts	Optional
В	СОМ	Terminal block for the external power supply of the Micrologic X control unit or ULP port module	Standard Optional
	UC1	Zone selective interlocking, rectangular sensor for earth-leakage protection, or MDGF module input	Standard
	UC2	Neutral external sensor, rectangular sensor for earth-leakage protection, or MDGF module input	Standard
	SDE2/RES	SDE2 additional fault-trip indication contact or RES electrical remote reset	Optional
	M2C/UC4	M2C programmable contact or external voltage connector	Optional
	UC3	External voltage connector	 Standard on 3P devices Optional on 4P devices
	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
C (without	CD1-CD2	2 CD disconnected position contacts	
EIFE interface)	CE1	1 CE connected position contact	Optional
	CT1	1 CT test position contact	
C (with EIFE interface)	EIFE	EIFE embedded Ethernet interface	Optional

The following table describes the assignment of the terminal blocks.

Device Identification

Identification

- The Masterpact MTZ1 device can be identified in the following ways:
- Rating plate on device
- QR code on the Micrologic X control unit
- Identification labels on the device and on the chassis



- A Product identification label
- B Product checked label
- C Accessory voltages label
- D Rating plate
- E QR code

Product Identification Label



The product identification label shows the following information:

Legend	Description	Explanation
A	Product code	 The product code is a line of code representing the complete configuration of a Masterpact circuit breaker or switch-disconnector. The product code: Is automatically generated for each Masterpact device after completing the configuration by using the MyPact configuration tool. Appears on the invoice and on the delivery documents as well as on the Masterpact device and packaging labels. Can be entered in the MyPact configuration tool, which generates the complete configuration of the Masterpact device.
В	Schneider Electric internal identification numbers	-
С	Description of device	 The following characteristics are specified: Range Rating Performance level Number of poles Control unit type
D	Device serial number	 The device serial number is coded PPYYWWDXXXX, where: PP: plant code YY: year of manufacture WW: week of manufacture D: day of the week of manufacture (Monday = 1) XXXX: the production number of the device on the day. Ranges from 0001 to 9999. For example, PP162330064 is the sixty-fourth device manufactured at plant PP on Wednesday, June 8, 2016.

Product Checked Label

 D
 SN : PP162330064
 PP16245 15:50
 E

 Product checked
 Image: SN in the second sec

The product checked label shows the following information:

Legend	Description	Explanation
D	Device serial number	See explanation in preceding table.
E	Device test date code	 The device test date code is coded PPYYWWD HH:MM, where: PP: plant code YY: year of test WW: week of test D: day of the week of test (Monday = 1) HH:MM: the time of test in hours and minutes.

Accessory Voltages Label

Motormechanism MCH 200/240 VAC
Voltage release MX 24/30 VDC
Closing coil XF 48 VDC
Undervoltage release MN 100/130 VDC
Remote reset 200/240 VAC

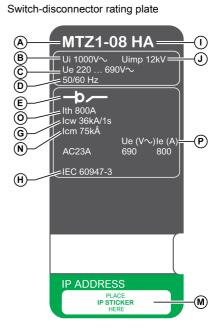
The accessory voltages label gives the voltage of the accessories which are installed in the device and which need to be connected to a power supply.

Rating Plate

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

Circuit breaker rating plate MTZ1-08 H2 (\mathbf{A}) Ui 1000V〜 Uin Ue 220 … 690V〜 **(B)** Uimp 12kV (\mathbf{J}) **(C**) =50/60 Hz ŏ × E) lcu (kA) = 50 42 42 Ue (V∼) (K) 220/415/440 690 =lcs = 100% lcu =lcw 42kA/1s F G IEC 60947-2 cat.B= **(L)** (H **IP ADDRESS** PLACE IP STICKER HERE (M)

- A Device size and rated current x 100 A
- **B** Ui: rated insulation voltage
- C Ue: rated operational voltage
- **D** Frequency
- E Type of device: circuit breaker or switch-disconnector, suitable for isolation
- F Ics: rated service short-circuit breaking capacity
- G Icw: rated short-time withstand current
- H Standards
- Performance level



- Uimp: rated impulse withstand voltage
- K Icu: rated ultimate short-circuit breaking capacity
- L Selectivity category as per IEC 60947-2
- M Place for sticker with IP address of the optional EIFE interface
- N Icm: rated short-circuit making capacity
- O Ith: conventional free air thermal current
- P le: rated operational current

QR Code

When the QR code on the front face of a Micrologic X control unit is flashed with a smartphone running a QR code reader and connected to the Internet, the Go2SE landing page is displayed *(see page 26)*. The landing page displays some information about the device and a list of menus.

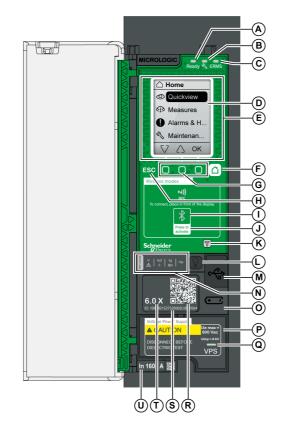
J

Micrologic X Control Unit: Description

Introduction

- The Micrologic X control unit includes:
- Micrologic X status LEDs
- A local Human Machine Interface comprising a graphic display with colored backlight, contextual buttons, and dedicated buttons
- · LEDs to monitor the Micrologic X status and the cause of trips and alarms

Control Unit Description



- A Ready LED
- B Service LED
- C ERMS LED (Reserved for future use)
- D Graphic display screen
- E NFC wireless communication zone
- F Home button
- **G** Three contextual buttons
- H Escape button ESC
- I Bluetooth LED
- J Bluetooth activation button
- **K** Test button for ground-fault and earth-leakage protection (Micrologic 6.0 X and 7.0 X)
- L Test/Reset button for trip cause LEDs and alarms
- M Mini USB port under rubber cover
- **N** Overload and trip cause LEDs
- O Cover for internal battery
- P VPS voltage power supply module (optional)
 Q VPS LED to indicate that the VPS module is supplying the control unit
- **R** QR code to product information
- S Control unit identification number
- T Control unit type
- U Sensor plug with the rated current of the circuit breaker

Micrologic X Status LEDs

LED	Description	
Ready	The Ready LED flashes when the standard protection functions of the control unit are operational.	
L'	 The service LED alerts the user to the overall health of the circuit breaker. Orange LED: medium-severity detected alarm that requires non-urgent action. Red LED: high-severity detected alarm that requires immediate action. 	
ERMS	The ERMS (Energy Reduction Maintenance Setting) LED is reserved for future use.	

Display Screen with Contextual Buttons and Dedicated Buttons

The local HMI screen and buttons are used to:

- Navigate the menu structure.
- · Display monitored values.
- Access and edit configuration settings.

NFC Communication Zone

The NFC communication zone is used to establish an NFC connection between a smartphone running the Masterpact MTZ Mobile App and the Micrologic X control unit. When the connection is established, the circuit breaker operating data is automatically uploaded to the smartphone.

Bluetooth Activation Button and LED

The Bluetooth activation button is used to establish a Bluetooth low energy connection between a smartphone running the Masterpact MTZ Mobile App and the Micrologic X control unit. When the connection is established, the circuit breaker can be monitored and controlled from the smartphone.

When the Bluetooth LED is blinking, it indicates that the Micrologic X control unit is in communication with a Bluetooth device.

Test Button

The test button is used to test the ground-fault protection for Micrologic 6.0 X and the earth-leakage protection for Micrologic 7.0 X.

Overload and Trip Cause LEDs

The indications of the four trip cause LEDs depend on the type of Micrologic X control unit.

LEDs	Description
Ir Isd Ig Op.	 Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: Overload pre-alarm, the load exceeds 90% and is lower than 105% of the Ir setting of the long-time protection.
Ir Isd Ig Op.	 Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: Overload alarm, the load exceeds 105% of the Ir setting of the long-time protection.
Isd Ig A Ii Ian Op.	• Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: Trip due to long-time protection.
Ir (Isd) Ig Op.	 Micrologic 2.0 X: Trip due to instantaneous protection. Micrologic 5.0 X, 6.0 X, 7.0 X: Trip due to short-time protection or instantaneous protection.
Ir Isd Ig Op.	 Micrologic 2.0 X, 5.0 X: Not used. Micrologic 6.0 X: Trip due to ground-fault protection. Micrologic 7.0 X: Trip due to earth-leakage protection.
Ir Isd Ig A Ii Ian	 Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: Trip due to other protection (optional protections).
	 Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: Micrologic control unit malfunction detected during self test.

NOTE: If the Micrologic X control unit is not powered, the trip cause LEDs go off after 4 hours. After this period, press the Test/Reset button to light them again.

Test/Reset Button

The Test/Reset button performs the following functions:

- Test of the trip cause LEDs and the service LED: press the Test/Reset button, the five LEDs light up for 1 second. If all the LEDs do not light and the Micrologic X control unit is not powered, replace the internal battery.
 - After a test, any active trip cause LED is lit again.
- Reset of the latched events: press and hold the Test/Reset button for 3 seconds to reset the latched events and switch off the trip cause LEDs and the service LED.

NOTE: When the Micrologic X control unit is not powered by an external 24 Vdc power supply or through a USB connection, the Micrologic X control unit can be restarted by pressing and holding the Test/Reset button for 15 seconds. **The standard protection functions remain active during the restart**.

Mini USB Port

Remove the rubber cover of the mini USB port to connect the following devices:

- A Mobile Power Pack to supply power to the Micrologic X control unit.
- A smartphone running the Masterpact MTZ Mobile App, through USB OTG connection.
- A PC running Ecoreach software.

NOTE: Micrologic X control unit cannot read a USB key even if a USB key is physically connected through an adaptor.

QR Code

When the QR code on the front face of a Micrologic X control unit is flashed with a smartphone running a QR code reader and connected to the Internet, the Go2SE landing page is displayed *(see page 26)*. The landing page displays some information about the device and a list of menus.

Control Unit Identification Number

The identification number is made up as follows:

- The serial number of the Micrologic X control unit in the format FFFFFYYWWDLXXXX
- The commercial reference of the control unit in the format LV8.

Use the identification number to register your Micrologic X control unit through the Schneider Electric customer care mobile application mySchneider.

Registering your Micrologic X control unit enables you to keep your records up to date and enables traceability.

Control Unit Type

This code indicates the type of Micrologic control unit:

- The number (for example, 6.0) defines the types of protection provided by the control unit.
- The letter (X) identifies the range of the control unit.

Internal Battery

The internal battery powers the trip cause LEDs and the main diagnostic functions in the absence of any other power supply.

VPS Voltage Power Supply Module

The VPS module provides an internal voltage supply to the Micrologic X control unit.

The VPS module is optional for Micrologic 2.0 X, 5.0 X, and 6.0 X. It is installed as standard on Micrologic 7.0 X.

Sensor Plug

The protection ranges depend on the rated current In, defined by the sensor plug present below the Micrologic X control unit.

Go2SE Landing Page

Presentation

When the QR code on the front face of a Micrologic X control unit is flashed 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 device and 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:

	Life Is	n Schneider	EN 📀				
A	- P	roduct: LV847603					
B	Control unit Micrologic 6.0 X S/N: 1953201509250001						
-	B	Characteristics	>				
	Q	Download Documents	>				
D	P	Download Customer Care App for Android	>				
	ð	Safe Repository	>				
	ð	Download Masterpact MTZ App	>				
	Ž	Purchase additional functions	>				

- A Commercial reference of Micrologic X control unit
- B Type of Micrologic X control unit
- **C** Serial number of Micrologic X control unit
- D Landing page menus. See the following menu descriptions for details.

Characteristics

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

Download Documents

Selecting this menu gives access to documentation, including the following documents:

- Micrologic X Control Unit User Guide
- Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors User Guide
- Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors User Guide

Download Customer Care App

Selecting this menu gives access to the Schneider Electric customer care mobile application **mySchneider** that can be downloaded on Android and iOS 9.0 or higher smartphones. The customer care application offers self-service instructions and easy access to expert support and information.

Safe Repository

Selecting this menu gives access to a web service allowing documentation linked to assets to be consulted, stored, and shared in a Schneider Electric environment. Access to the safe repository is restricted to authorized users.

Download Masterpact MTZ Mobile App

Selecting this menu gives access to the Masterpact MTZ Mobile App that can be downloaded and installed on Android and iOS 9.0 or higher smartphones.

Purchase Additional Functions

Selecting this menu gives direct access to the GoDigital marketplace webpage. Digital Modules are available for purchase in the marketplace.

Operating Conditions

Introduction

Masterpact MTZ devices 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 devices 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 device without the control unit.
- -25 °C to +85 °C for the control unit.

Extreme Atmospheric Conditions

Masterpact MTZ devices 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 devices can operate in the industrial environments defined by IEC 60947 (pollution degree up to 3).

It is advisable to check that devices 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/m² 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 devices must be installed inside switchboards with an IP rating equal to or greater than IP54.

Vibration

Masterpact MTZ devices 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).

Conditions	Reference
Vibrations, shocks, and shakes in operational conditions	3M4 IEC 60721-3-3 compliant

Altitude

Masterpact MTZ devices 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:

		Altitude			
		2,000 m	3,000 m	4,000 m	5,000 m
Impulse withstand voltage Uir	12	11	10	8	
Rated insulation voltage (Ui)	1,000	900	780	700	
Maximum rated operational voltage 50/60 Hz Ue (V)	Masterpact MTZ1 except H3	690	690	630	560
	Masterpact MTZ1 H3	440	440	440	440
Rated current (A) at 40 °C		1 x ln	0.99 x ln	0.96 x In	0.94 x ln

NOTE: Intermediate values can be obtained by interpolation.

Electromagnetic Disturbances

Masterpact MTZ devices have protection against:

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

Masterpact MTZ devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:

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

The devices have passed the above tests and therefore:

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

Chapter 2 Masterpact MTZ1 Normal Operation

What Is in This Chapter?

This chapter contains the following sections:

Section	Торіс			
2.1	Device Operating Actions	30		
2.2	Drawout Device Racking Actions	52		
2.3	Device Locking Actions	65		
2.4	Device Interlocking Actions	83		

Section 2.1 Device Operating Actions

What Is in This Section?

This section contains the following topics:

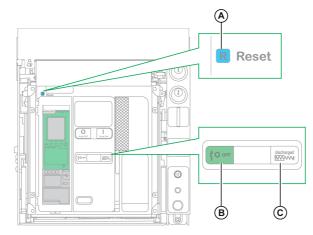
Торіс	Page
Operating the Device	31
Control Modes	35
Opening the Device	40
Closing the Device	42
Resetting the Device	45
Operating Accessories	46

Operating the Device

Device Status

The indicators on the front of the device show the following information:

- Reset button:
 - In: the device is closed or open voluntarily (not tripped)
 - Out: the device 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:
 - o Discharged (no energy to close the circuit breaker)
 - Charged not ready-to-close
 - O Charged ready-to-close



- A Reset button
- **B** Position indicator of main contacts
- C Closing spring and ready-to-close indicator

The combination of both indicators gives the device status:

Position indicator of main contacts	Closing spring and ready- to-close indicator	Device status description
[⊥] 0 огг	Discharged	Device is off (main contacts are open) and closing spring is discharged.
[⊥] 0огг	Charged OK	 Device is off (main contacts are open) and closing spring is charged. The device is not ready-to-close because at least one of the following conditions is true: The device has tripped and must be reset. The MX opening voltage release is energized. The MN undervoltage release is not energized. The device is mechanically locked in the open position by using padlock or keylock or by using interlocking cables.
[⊥] 0 огг	Charged	Device is off (main contacts are open) and closing spring is charged. The device is ready-to-close.
	Discharged	Device is on (main contacts are closed) and closing spring is discharged.
	Charged ƏK	Device is on (main contacts are closed) and closing spring is charged. The device is not ready-to-close because it is already closed.

Device Indication Contacts

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

Name	Contact number	Position of indicators and contacts				
Device status	-	ON	OFF	Tripped (by Micrologic X control unit)		
Position indicator of main contacts	_		[⊥] 0 оғғ	[⊥] О огг		
Main contact position	-	Closed	Open	Open		
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 devices 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 device closing spring completely before the XF closing voltage release is actuated.

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

Charging the Closing Spring

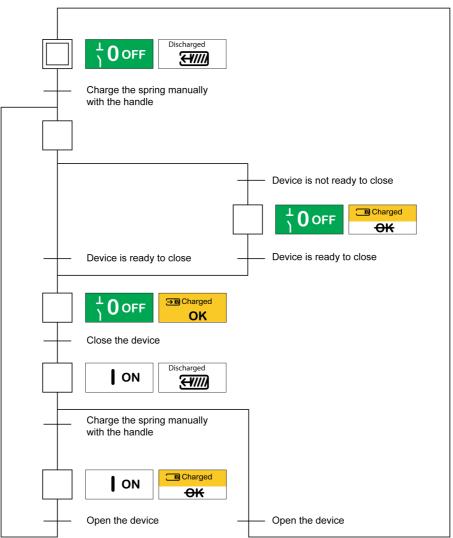
- The closing spring must be charged with sufficient energy to close the Masterpact MTZ:
- Manual charge: Charge the mechanism by pulling the spring charging handle down seven times.



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

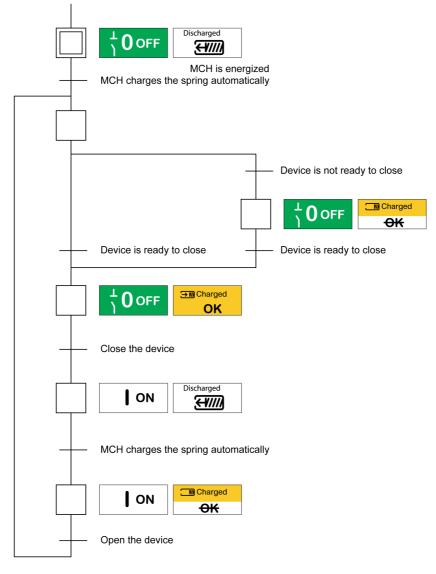
Manual Operation Cycle with the Spring Charging Handle

The following image shows an Open/Close/Open (OCO) cycle for manually charged devices 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 devices using an MCH gear motor:



Control Modes

Presentation

The control mode is a Micrologic X setting which defines the means to control the opening and closing functions of the circuit breaker.

Two control modes are available: Manual and Auto.

Manual mode only accepts orders made using one of the following:

- The mechanical buttons on the front of the circuit breaker.
- The external pushbutton connected to the MN/MX/XF voltage releases.
- The BPFE electrical closing pushbutton.

Auto mode has two settings: Local or Remote. All orders accepted in manual mode are accepted in auto mode, as well as orders from local or remote communication as follows:

- Auto Local: the operator needs to be close to the circuit breaker to establish communication and only
 orders sent from a local source through communication are accepted:
 - $\sigma\,$ Ecoreach software through USB connection
 - Masterpact MTZ Mobile App through Bluetooth or USB OTG connection with Masterpact Operation Assistant Digital Module
- Auto Remote: the operator does not need to be next to the circuit breaker to establish communication and orders are accepted only when sent from a remote source through the communication network.

NOTE: Ecoreach software connected through the communication network can be used to send control orders to the circuit breaker.

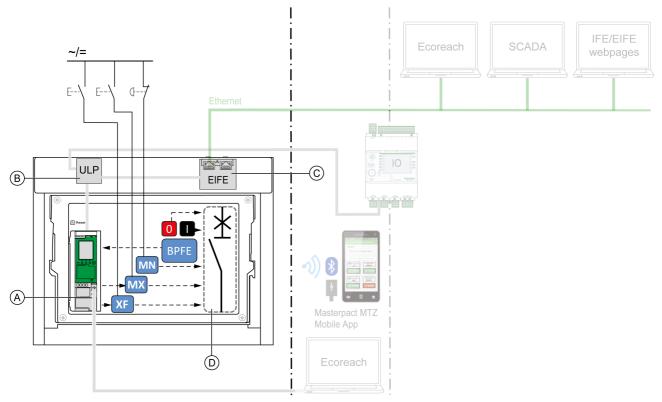
The control mode factory setting is Auto Remote.

Operation According to Control Mode Configured

The following table summarizes the opening and closing operations available, depending on the control mode configured:

Control mode	Type of order and delivery method								
	Mechanical	Electric	trical Thr		hrough communication				
	Pushbutton	BPFE	Point to point (voltage release)	IO module	Ecoreach software through USB	Masterpact MTZ Mobile App through Bluetooth or USB OTG + Masterpact Operation Assistant Digital Module	Communication network	IFE/EIFE Webpages	
Manual	1	1	1	-	-	-	-	-	
Auto: Local	1	1	1	√ ¹	1	1	-	-	
Auto: Remote	1	1	1	√ ¹	-	-	1	1	
1 According to	1 According to IO input mode setting								

Operation in Manual Mode

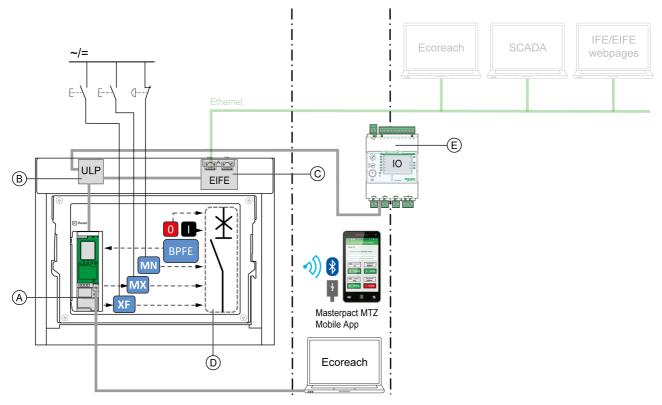


- A Micrologic X control unit
- B ULP port module
- **C** EIFE embedded Ethernet interface
- D Circuit breaker mechanism

Opening and closing operations available in Manual mode:

- 0: mechanical opening pushbutton
- 1: mechanical closing pushbutton
- BPFE: electrical closing pushbutton
- External pushbutton wired by customer, and connected to:
 - $\odot\,$ XF: standard or communicating and diagnostic closing voltage release
 - $\sigma\,$ MX: standard or communicating and diagnostic opening voltage release
 - $\sigma\,$ MN: standard or diagnostic undervoltage release

Operation in Auto: Local Mode

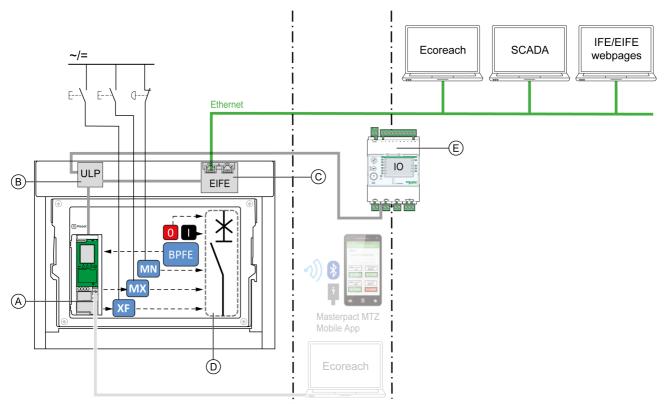


- A Micrologic X control unit
- B ULP port module
- C EIFE embedded Ethernet interface
- D Circuit breaker mechanism
- E IO input/output application module

Opening and closing operations available in Auto: Local mode:

- 0: mechanical opening pushbutton
- 1: mechanical closing pushbutton
- BPFE: electrical closing pushbutton
- External pushbutton wired by customer, and connected to:
 - O XF: communicating and diagnostic closing voltage release
 - O MX: communicating and diagnostic opening voltage release
 - $\sigma\,$ MN: standard or diagnostic undervoltage release
- IO: with the Breaker Operation predefined application of the IO module set to local control mode
- Ecoreach software: command sent through USB connection
- Masterpact MTZ Mobile App with Masterpact Operation Assistant Digital Module:
 Through Bluetooth low energy wireless communication
 - Through USB OTG connection

Operation in Auto: Remote Mode



- A Micrologic X control unit
- **B** ULP port module
- C EIFE embedded Ethernet interface
- D Circuit breaker mechanism
- E IO input/output application module

Opening and closing operations available in Auto: Remote mode:

- 0: mechanical opening pushbutton
- 1: mechanical closing pushbutton
- BPFE: electrical closing pushbutton
- External pushbutton wired by customer, and connected to:
 - XF: communicating and diagnostic closing voltage release
 - O MX: communicating and diagnostic opening voltage release
 - O MN: standard or diagnostic undervoltage release
- IO: with the Breaker Operation predefined application of the IO module set to remote control mode
- Communication: remote command through IFE, EIFE, or IFM interface.

Setting the Control Mode

The Auto or Manual mode can be set as follows:

- On the Micrologic X display screen, at Home → Configuration → Communication → Control Mode → Mode.
- With the Masterpact MTZ Mobile App through Bluetooth or USB OTG connection.

The Local or Remote mode can be set as follows:

- When the IO module is used with the Breaker Operation predefined application, the local or remote mode is defined only by the control mode selector switch wired on the digital input I1 of the IO module.
- When the IO module is not used with the Breaker Operation predefined application, the local or remote mode can be set as follows:
 - With Ecoreach software through USB connection
 - $\sigma\,$ With the Masterpact MTZ Mobile App through Bluetooth or USB OTG connection.

NOTE:

- The Local or Remote mode cannot be set on the Micrologic X display screen.
- When Auto mode is set, the control mode is Auto Local or Auto Remote, depending on the last setting.

Displaying the Control Mode

The control mode (Manual, Auto Local, or Auto Remote) is displayed as follows:

- On the Micrologic X display screen, at Home → Configuration → Communication → Control Mode → Mode
- With Ecoreach software through USB connection
- With the Masterpact MTZ Mobile App through Bluetooth or USB OTG connection.
- On the IFE/EIFE webpages
- By a remote controller using the communication network

Predefined Events

Changing the control mode settings generates the following events:

Event	History	Severity
Manual mode enabled	Operation	Low
Local mode enabled	Operation	Low

Opening the Device

Opening Conditions

- To open the device, the following conditions must be met:
- Device is closed (I).
- NOTE: An opening order always takes priority over a closing order.

Opening the Device

The following tables present the different ways to open the device in the different control modes available.

The device can be opened in the following ways in **all** control modes:

Opening type	Control mode	Accessories	Opening action
Mechanical	Manual, Auto: Local, or Auto: Remote	-	Press the opening pushbutton on the front of the device. This opening action is possible at any time.
Automatic	Manual, Auto: Local, or Auto: Remote	MN undervoltage release, with or without MN delay unit	The MN undervoltage release opens the device automatically in the case of voltage drop.
By external pushbutton	Manual, Auto: Local, or Auto: Remote	 External pushbutton wired by customer One of the following accessories: MX standard or communicating opening voltage release MN undervoltage release, with or without MN delay unit 	Press the external pushbutton which is connected to the MX opening voltage release or to the MN undervoltage release via the customer terminal block. When the MN undervoltage release is connected to the MN delay unit, the device opens with the corresponding time delay.

In addition, the device can be opened in the following ways when Auto control mode is configured.

\Lambda 🗛 DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not allow any person to work on the electrical network without physically validating the successful execution of the local or remote software actions for opening the circuit breaker or switching off the electrical circuit.

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

Opening type	Control mode	Accessories	Opening action
Through IO module	Auto: Local or Auto: Remote	 MX communicating opening voltage release ULP port IO module 	 Open the device by using the predefined application 2 Breaker Operation of the IO module. When the device is set to local control mode by the IO module, the command to open is issued from local pushbuttons wired on digital inputs. When the device is set to remote control mode by the IO module, the command to open is issued from remote PLC outputs wired on digital inputs. Refer to <i>Enerlin'X IO Input/Output Application Module for</i>
		•••	One Circuit Breaker - User Guide.
Through Ecoreach software	Auto: Local	 MX communicating opening voltage release 	Send a command to open the device from Ecoreach software running on a PC connected locally to the device through the mini USB port on the Micrologic X control unit. This opening action is password-protected. Refer to <i>Ecoreach Online Help</i> .
Through Masterpact MTZ Mobile App	Auto: Local	 MX communicating opening voltage release Masterpact Operation Assistant Digital Module 	Send a command to open the device from the Masterpact MTZ Mobile App with Masterpact Operation Assistant Digital Module, through Bluetooth wireless communication or USB OTG connection. The opening action is password-protected.
Through communication	Auto: Remote	 MX communicating opening voltage release ULP port 	Send a command to open the device through the communication network. This opening action is password-protected. Refer to <i>Masterpact MTZ - Modbus Communication Guide</i> .
		Communication interface	NOTE: Ecoreach software running on a PC connected to the device through the communication network can be used to send commands to open.
Through IFE/EIFE webpages	Auto: Remote	 MX communicating opening voltage release ULP port module Communication interface 	 Send a command to open the device from the IFE/EIFE control webpage. This opening action is password-protected. Refer to: Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide Enerlin'X EIFE Embedded Ethernet Interface for One Masterpact MTZ Drawout Circuit Breaker - User Guide

If the device does not open, refer to the troubleshooting chapter (see page 119).

Closing the Device

Closing Conditions

To close the device, the following conditions must be met:

- Device is open (O).
- Closing spring is charged.
- The device is ready to close, OK is displayed.

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

WARNING

HAZARD OF CLOSING ON ELECTRICAL FAULT

Do not close the circuit breaker again without first inspecting and, if necessary, repairing the downstream electrical equipment.

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

Closing the Device

The following tables present the different ways to close the device in the different control modes available. The device can be closed in the following ways in **all** control modes:

Closing type	Control mode	Accessories	Closing action	
Mechanical	Manual, Auto: Local, or Auto: Remote	-	Press the closing pushbutton on the front of the device. The closing action is possible when the closing conditions are met.	
Electrical with BPFE	Manual, Auto: Local, or Auto: Remote	 BPFE electrical closing pushbutton XF communicating closing voltage release 	Press the BPFE electrical closing pushbutton, mounted on the front cover. The closing action takes into account internal closing conditions of the device and the external conditions that are part of the control and monitoring system of the installation.	
External pushbutton	Manual, Auto: Local, or Auto: Remote	 External pushbutton wired by customer XF standard or communicating closing voltage release MCH gear motor 		on, which is connected to the XF igh the customer terminal block.

In addition, the device can be closed in the following ways when Auto control mode is configured.

A A DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not allow any person to work on the electrical network without physically validating the successful execution of the local or remote software actions for closing the circuit breaker or switching on the electrical circuit.

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

Closing type	Control mode	Accessories	Closing action
Through IO module	Auto: Local or Auto: Remote	 XF communicating closing voltage release MCH gear motor ULP port module IO module 	 Close the device by using the predefined application 2 Breaker Operation of the IO module: When the device is set to local control mode by the IO module, the command to close is issued from local pushbuttons wired on digital inputs. When the device is set to remote control mode by the IO module, the command to close is issued from remote PLC outputs wired on digital inputs. Refer to <i>Enerlin'X IO Input/Output Application Module for One Circuit Breaker - User Guide.</i>
Through Ecoreach software	Auto: Local	 XF communicating closing voltage release MCH gear motor 	Send a command to close to the device from Ecoreach software running on a PC connected locally to the device through the mini USB port on the Micrologic X control unit. The closing action is password-protected. Refer to <i>Ecoreach Online Help</i> .
Through Masterpact MTZ Mobile App	Auto: Local	 XF communicating closing voltage release MCH gear motor Masterpact Operation Assistant Digital Module 	Send a command to close to the device from the Masterpact MTZ Mobile App with Masterpact Operation Assistant Digital Module, through Bluetooth wireless communication or USB OTG connection. The closing action is password-protected.
Through communication	Auto: Remote	 XF communicating closing voltage release MCH gear motor ULP port module Communication interface 	Send a command to close to the device through the communication network. The closing action is password-protected. Refer to <i>Masterpact MTZ - Modbus Communication Guide.</i> NOTE: Ecoreach software running on a PC connected to the device through the communication network can be used to send commands to close.
Through IFE/EIFE webpages	Auto: Remote	 XF communicating closing voltage release MCH gear motor ULP port module Communication interface 	 Send a command to close to the device from the IFE/EIFE control webpage. The closing action is password-protected. Refer to: Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide Enerlin'X EIFE Embedded Ethernet Interface for One Masterpact MTZ Drawout Circuit Breaker - User Guide

If the device does not close, refer to the troubleshooting chapter (see page 119).

Inhibiting the Closing Function

The closing function can be inhibited by sending a command through:

- The communication network
- The IO module

WARNING

RESTRICTED CLOSING INHIBITION

Do not use the inhibit closing order to lock the device in open position.

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

The inhibit close order inhibits only the closing orders allowed in Auto control mode. The closing orders issued from the mechanical closing pushbutton or BPFE, or from the pushbutton directly connected to the XF voltage release are not inhibited.

Resetting the Device

Resetting Conditions

After a trip, the device must be reset before closing it. Resetting is possible in all control modes.

Resetting the Device

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

Type of resetting	Accessories	Resetting action	
Mechanical	_	Push in the fault-trip reset pushbutton on the front of the device. This resetting action is always possible. Pushing in the fault-trip reset pushbutton resets the SDE fault-trip indication contact, and allows the device to be closed.	
Automatic (RAR automatic reset)	 XF communicating or standard closing voltage release MCH gear motor 	After a trip, RAR automatic reset a without the fault-trip reset pushbutt closing voltage release is compuls The mechanical indicator and the remain in detected fault position. To reset the SDE fault-trip indicati indicator, push in the fault-trip rese	ton being pushed in. The use of XF sory with this option. SDE fault-trip indication contact on contact and the mechanical
By external pushbutton	 External pushbutton wired by customer RES electrical remote reset XF communicating or standard closing voltage release 	Press the external pushbutton whi electrical remote reset via the cust The use of XF closing voltage rele The RES electrical remote reset re contact and the mechanical indica closed. NOTE: The RES electrical remote SDE2 option.	tomer terminal block. ease is compulsory with this option. esets the SDE fault-trip indication ttor, and allows the device to be

Operating Accessories

The XF, MX, and MN Voltage Releases

The XF, MX, and MN voltage releases are optional accessories mounted inside the device. They can be of standard type or diagnostic and communicating type (standard or with diagnostic function for MN undervoltage release).

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

XF Closing Voltage Release (Standard or With Diagnostic and Communicating Function)

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.



For information on installation, consult the instruction sheets available on the Schneider Electric website:

- XF standard closing voltage release: <u>NVE40749</u>
- XF communicating closing voltage release: <u>NVE40766</u>

MX Opening Voltage Release (Standard or With Diagnostic and Communicating Function)

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 standard opening voltage release locks the circuit breaker in OFF position if the command is maintained.



For information on installation, consult the instruction sheets available on the Schneider Electric website:

- MX standard opening voltage release: <u>NVE40749</u>
- MX communicating opening voltage release: NVE40766

MN Undervoltage Release (Standard or With Diagnostic Function)

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.



For information on installation, consult the instruction sheets available on the Schneider Electric website:
MN standard undervoltage release: <u>NVE40749</u>

• MN undervoltage release with diagnostic function: <u>NVE40766</u>

Isolation Module for Communicating Voltage Releases

The internal isolation module for Micrologic X control units provides double isolation in compliance with IEC 60664-1 (up to 12 kV). It also provides isolation between the XF, MX, and MN types of voltage release.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE40748</u>

BPFE Electrical Closing Pushbutton

This is an optional accessory that is mounted on the front cover of the device.

The BPFE electrical closing pushbutton carries out electrical closing of the circuit breaker. It takes into account the internal closing conditions of the device and the external conditions that are part of the control and monitoring system of the installation. It connects to the XF standard or communicating closing voltage release.

If BPFE is being used, it is recommended to lock access to the closing pushbutton using the VBP accessory because the closing pushbutton does not take into account internal and external conditions.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE40771</u>

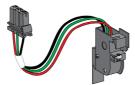
PF Ready-to-close Contact

This is an optional accessory that is mounted inside the device.

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.

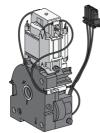


For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE35466</u>

MCH Gear Motor

This is an optional accessory that is mounted inside the device.

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



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE35514</u>

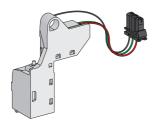
RES Electrical Remote Reset

This is an optional accessory that is mounted inside the device.

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 additional fault-trip indication contact SDE2 is not compatible with RES.



CDM Mechanical Operation Counter

This is an optional accessory that is mounted inside the device.

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 accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE35516</u>

ULP Port Module

The ULP port module is an optional accessory that is mounted with the terminal blocks of the device.

The ULP port module:

- Supplies the Micrologic X control unit.
- Integrates the ULP termination.
- Allows the connection to external ULP modules, like the IO module or the IFE Ethernet interface.

Fixed device:



Drawout device:



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

- ULP port module for fixed Masterpact MTZ1: <u>NVE40791</u>
- ULP port module for drawout Masterpact MTZ1: <u>NVE40796</u>

EIFE Embedded Ethernet Interface

This is an optional accessory that is mounted on the chassis of the drawout device.

The EIFE embedded Ethernet interface enables drawout Masterpact MTZ circuit breakers to be connected to an Ethernet network. It provides digital access to all the data delivered by the Micrologic X control unit. In addition, it monitors the position of the device in the chassis: connected, test, and disconnected.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE23550</u>

For information on accessory usage, refer to *Enerlin'X EIFE Embedded Ethernet Interface for One* Masterpact MTZ Drawout Circuit Breaker - User Guide.

IFE Ethernet Interface for One Circuit Breaker

The IFE Ethernet interface provides an Ethernet access to a single device. The device is connected to the IFE interface through the ULP port module and a prefabricated ULP cord.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>*HRB49218*</u>

For information on accessory usage, refer to *Enerlin'X IFE* - *Ethernet Interface for One Circuit Breaker* - *User Guide*.

IFE Ethernet Switchboard Server

The IFE Ethernet switchboard server provides an Ethernet access to one or several circuit breakers. It allows the following communication architectures:

- One single circuit breaker connected to the IFE server through the ULP port module.
- Up to 20 circuit breakers, including up to 12 Compact NSX through the IFM Modbus-SL interface for one circuit breaker stacked to the IFE server.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>*HRB49218*</u>

For information on accessory usage, refer to *Enerlin'X IFE* - *Ethernet Interface for One Circuit Breaker* - *User Guide*.

IFM Modbus-SL Interface for One Circuit Breaker

The IFM Modbus-SL interface provides an access to a Modbus serial line communication network to a single device. The device is connected to the IFM interface through the ULP port module and a prefabricated ULP cord.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>NVE85393</u>

IO Input/output Application Module for One Circuit Breaker

The IO input/output application module for one circuit breaker is one of the components of the ULP architecture.

The IO application module enhances control and monitoring functions, thanks to its built-in applications. Its resources are:

- Six digital inputs that are self-powered for either NO and NC dry contact or pulse counter.
- Three digital outputs that are bistable relay (5 A maximum).
- One analog input for Pt100 temperature sensor.



For information on accessory installation, consult the instruction sheet available on the Schneider Electric website: <u>*HRB49217*</u>

For information on accessory usage, refer to *Enerlin'X IO Input/Output Application Module for One Circuit Breaker - User Guide*.

Section 2.2 Drawout Device Racking Actions

What Is in This Section?

This section contains the following topics:

Торіс	Page
Drawout Masterpact MTZ1 Device Status	53
Disconnecting the Drawout Device	57
Connecting the Drawout Device	59
Removing the Drawout Device	61
Installing the Drawout Device in the Chassis	63

Drawout Masterpact MTZ1 Device Status

Drawout Device Handling Conditions

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

🗛 \Lambda DANGER

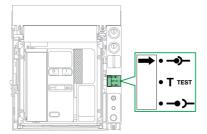
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

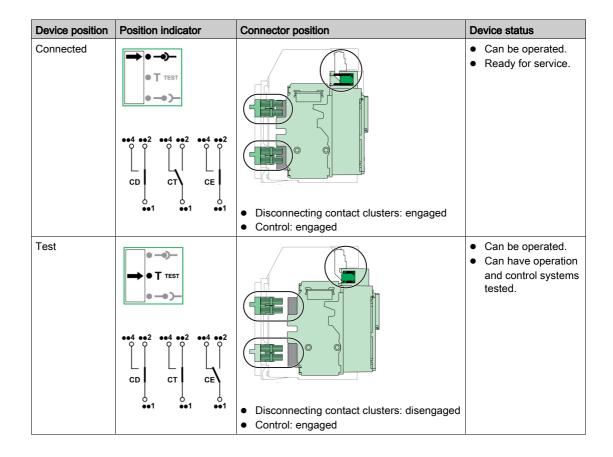
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462 or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.

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

Drawout Device Positions

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





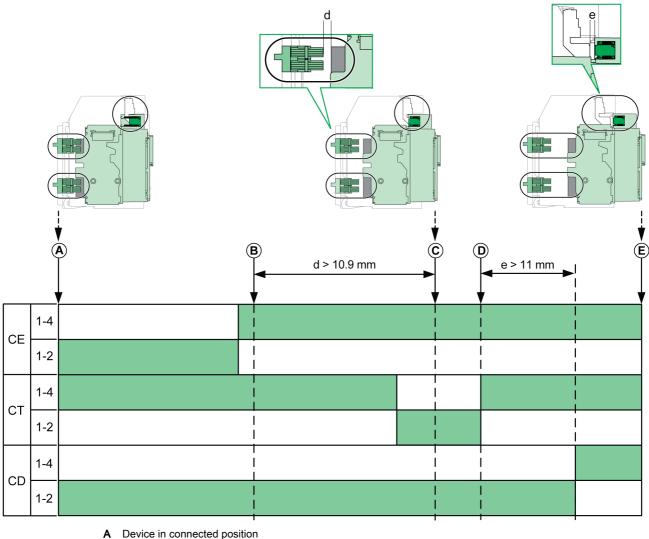
Device position	Position indicator	Connector position	Device status
Disconnected	•••4 •••2 •••4 •••2 •••4 •••2 •••4 •••2 CD CD CD CT CT CE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	 Disconnecting contact clusters: disengaged Control: disengaged 	 Can be operated. Can be removed from chassis.
Withdrawn		 Disconnecting contact clusters: disengaged Control: disengaged 	Removed from chassis.

Drawout Device Position Contacts

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

- CE: connected position.
- CT: test position.
- CD: disconnected position. The device is in the disconnected position when the minimum isolation distance between the device racking terminals and the chassis clusters is reached.

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



- в
- Separation of the main circuits
- Device in test position С D
- Separation of auxiliary circuits Device in disconnected position Е

Position contact is open.

Position contact is closed.

Drawout Device Position Contacts Without EIFE Ethernet Interface

Without EIFE Ethernet interface, optional position contacts can be added as follows:

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

Drawout Device Position Contacts With EIFE Ethernet Interface

With EIFE Ethernet interface, 2 optional CE connected position contacts can be added.

Chassis Management Function

- The chassis management function is used to:
- · Record and check the position of moving part of the drawout device in the chassis
- Provide information about preventive maintenance actions
- Notify the remote controller about the position of the drawout device

The chassis management function is performed by:

- The EIFE Ethernet interface, refer to *Enerlin'X EIFE Embedded Ethernet Interface for One Masterpact MTZ Drawout Circuit Breaker - User Guide.*
- The IO module, refer to Enerlin'X IO Input/Output Application Module for One Circuit Breaker User Guide.

Disconnecting the Drawout Device

Drawout Device Handling Conditions

Connection or disconnection of the drawout device 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.

\Lambda 🕼 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 Device from Connected to Test Position

Step	Action	
1	Press the opening pushbutton to open the device.	
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. Result : The device moves forward in the chassis.	Click!
6	When the test position is reached, the position release button pops out and the mechanism blocks the racking handle. Result: The device is in the test position.	

Racking-out the Device from Test to Disconnected Position

Step	Action	
1	Push in the position release button.	
2	Turn the racking handle counterclockwise. Result : The device moves forward in the chassis.	Click!
3	When the disconnected position is reached, the position release button pops out and the mechanism blocks the racking handle. Result: The device 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 Device

Drawout Device Handling Conditions

Connection or disconnection of the drawout device 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 Device 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.	
3	Push the position release button.	
4	Turn the racking handle clockwise. Result : The device moves back in the chassis.	Click
5	When the test position is reached, the position release button pops out and the mechanism blocks the racking handle. Result: The device is in the test position.	

Racking-in the Device from Test to Connected Position

Step	Action	
1	Push the position release button.	
2	Turn the racking handle clockwise. Result : The device 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. Result: The device is in the connected position.	
4	Remove the racking handle from the racking socket.	o o o
5	Put the racking handle back into its storage space.	

Removing the Drawout Device

Device Removal



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	Discharge the closing spring. With the device in the disconnected position <i>(see page 73)</i> , press the closing pushbutton. The breaker closes when the closing spring is charged.	
2	Press the opening pushbutton to open the device.	
3	Pull out the rails to the maximum by pulling on the drawout grips. The moving part of the drawout device stays in disconnected position in the chassis.	
4	Pull out the moving part of the drawout device to the maximum, by rolling it along the rails. Result : The device is supported on the rails, clear of the chassis and ready to be lifted.	

Lifting the Device

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

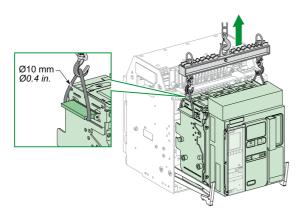
A DANGER

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 device from the chassis rails by using the carrying handles located on the sides of the device.



Device Weights

The following table shows the weights of the different devices available.

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

Installing the Drawout Device in the Chassis

Drawout Device Handling Conditions

Connection or disconnection of the drawout device 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.

\Lambda \Lambda 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 (see page 84) allows the installation of a drawout device only in a chassis with compatible characteristics.

Installing the Device

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.

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.

Step	Action
1	If the chassis is not installed yet in a switchboard or panelboard, secure 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 it is not in disconnected position, follow the steps on disconnecting the drawout device (see page 57).

Step	Action		
4	Pull out the drawout grips until the extension rails are fully extended.		
5	Install the device on the extension rails by using appropriate lifting equipment. Check that the four wheels on the sides of device are resting on the rails.	A Contraction of the second seco	
6 7	Detach the lifting equipment. Check that the device is in the open position.		
8	Using both hands, push in the device to the maximum in the chassis. Take care not to push the control unit. The rails stay extended.		
9	When the device is fully inserted into the chassis, lift and push in the rails to the maximum.		

Section 2.3 Device Locking Actions

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 device and chassis. For a complete listing of available locks, refer to *Masterpact MTZ Catalogue*.

What Is in This Section?

This section contains the following topics:

Торіс	Page
Locking the Pushbuttons	66
Locking the Device in Open Position with Padlocks	68
Locking the Device in Open Position with Keylocks	70
Chassis Locking in Disconnected Position	73
Chassis Locking in Any Position	77
Locking the Safety Shutters	82

Locking the Pushbuttons

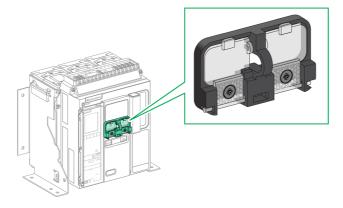
Description

The pushbutton locking cover is an optional accessory for the Masterpact MTZ1 device 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.

VBP Pushbutton Locking Accessory

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



For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: <u>NVE56769</u>.

Locking the Pushbuttons

Step	Action	
1	Close the transparent covers of the locking accessory. NOTE: 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 screw.	Padlock
		Lead seal
		Screws

Locking the Device in Open Position with Padlocks

Description

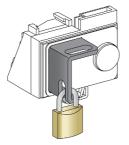
Optional padlocks can be used to lock the Masterpact MTZ1 in the open position. When locked the device cannot be closed either locally with the closing pushbutton or remotely.

To use padlocks to lock the device 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.

This accessory is not compatible with VSPO OFF-position keylocking accessory, the two accessories cannot be used at the same time.

VCPO OFF-Position Padlocking Accessory

The off-position padlocking accessory is an optional accessory that is mounted on the front face of the device.



For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: <u>NVE56770</u>.

Locking the Device 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.	All Contraction of the second
3	Insert the padlock in the tab and close the padlock. Release the opening pushbutton.	

Unlocking the Device

Step	Action	
1	Remove the padlock.	Reset
2	The tab of the OFF-position padlocking accessory retracts.	All Orum OTT Dush ON Dush ON Dush ON Dush ON Dush ON Dush ON Dush ON
3	Press the closing pushbutton to close the device.	

Locking the Device in Open Position with Keylocks

Description

Optional keylocks can be used:

- To lock one Masterpact MTZ1 in the open position. When locked the device cannot be closed either locally with the closing pushbutton or remotely.
- To interlock several Masterpact MTZ1 devices locked with the same key.

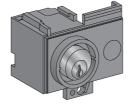
To use keylocks to lock the device in the open position, an optional OFF-position keylocking accessory is necessary.

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

This accessory is not compatible with the BPFE closing pushbutton.

VSPO OFF-Position Keylocking Accessory

The OFF-position keylocking accessory is an optional accessory that is mounted on the front of the device.



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: <u>NVE56770</u>.

Locking the Device in the Open Position

For devices equipped with two keylocks, locking with one key is sufficient to lock the device 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 device.	
3	Remove the key.	
4	Release the opening pushbutton	
5	Check that the device is locked in the open position and cannot be closed either locally with the closing pushbutton or remotely.	

Unlocking the Device

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

Step	Action	
1	Put the key in the keylock.	
2	Turn the key clockwise to unlock the device.	
3	The device can be closed by pressing the pushbutton. Result: 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.

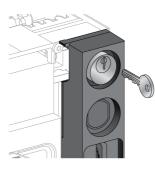
Chassis locking by padlock is always possible and does not require any accessory.

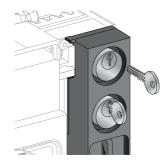


VSPD Chassis Locking by Keylock Accessory

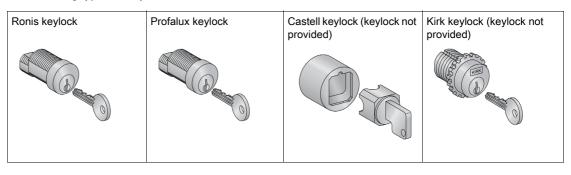
The chassis locking by keylock accessory can be fitted with either:

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





The following types of keylocks can be fitted:



For information on the accessory installation, consult the instruction sheet on the Schneider Electric website: <u>NVE56768</u>.

Chassis Locking with Padlocks

Step	Action	
1	Make sure that the chassis indicator is in the disconnected position.	
2	Pull out the padlocking tab.	
3	Insert the padlock(s) in the tab and close the padlock(s).	
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	Make sure that the chassis indicator is in the disconnected position.	
2	Turn the key counterclockwise to lock the chassis.	
3	Remove the key.	

Step	Action	
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.	
3	The key remains captive in the keylock.	
4	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.

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 *(see page 73)*.

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 these stages 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 (see page 79).	
3	Reinstalling the chassis front cover and the terminal block identification plate (see page 81).	

Removing the terminal block identification plate and the chassis front cover

Before starting the procedure, check that the device is in the disconnected position *(see page 57)* and remove the device from the chassis *(see page 61)*.

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.	PZ2 4 3 x2
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	Screw the lock into position with the two screws, by using a PZ2 screwdriver. Release the plastic cover to allow it to drop back into place	PZ2 8 x2 1.5±0.2 N•m 13±2 lb-in.

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.	1,5±0.2 N•m 13±2 lb-in. 2 x2 PZ2 PZ2
3	Slide the terminal block identification plate into place.	5
4	Screw the terminal block identification plate in with the two screws, by using a PZ2 screwdriver.	 A A

Locking the Safety Shutters

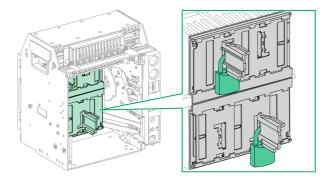
Description

A shutter lock locks the safety shutter in closed position so that a drawout Masterpact MTZ1 device 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.



Section 2.4 Device Interlocking Actions

About Interlocking Actions

An interlocking action is an automatic locking operation provided by interlocking accessories added to the Masterpact MTZ2/MTZ3 device or chassis.

A number of optional interlocking accessories are available for the Masterpact MTZ2/MTZ3 device and chassis. For a complete listing of available interlocks, refer to *Masterpact MTZ Catalogue*.

For detailed installation instructions on field-installable interlocks, refer to the installation instructions shipped with these accessories.

What Is in This Section?

This section contains the following topics:

Торіс	
Mismatch Protection	84
VPEC Door Interlock	86
VPOC Open-door Racking Interlock	
IPA Cable-type Door Interlock	
Mechanical Interlocking for Transfer Switches	

Mismatch Protection

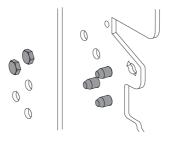
Description

Mismatch protection allows the installation of a Masterpact MTZ1 device only in a chassis with compatible characteristics.

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

Accessory

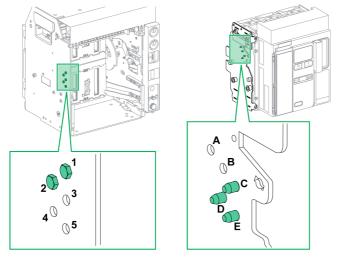
The use of mismatch protection is optional. One mismatch protection accessory is required for each device.



For information on the accessory installation, consult the instruction sheet available at Schneider Electric website: <u>NVE35465</u>.

Pin Location of Mismatch Protection

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



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

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

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

Recommended Pin Combinations

The following are the recommended pin combinations:

Pins on chassis	Pins on device	Pins on chassis	Pins on device
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

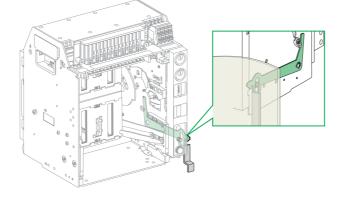
Description

With the door interlock:

- The equipment door is locked and cannot be opened when the drawout device is in connected or test position.
- The equipment door can be opened when the drawout device is in disconnected position.
- The equipment door can be closed with the drawout device 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 required for each chassis.



For information on the accessory installation, consult the instruction sheet available at Schneider Electric website: <u>NVE35519</u>.

Locking the Equipment Door

Step	Action	
1	Close the equipment door.	
2	Put the device into the test or connected position <i>(see page 59)</i> .	
3	Check that the equipment door is locked.	

Unlocking the Equipment Door

Step	Action	
1	Put the device into the disconnected position <i>(see page 57)</i> .	
2	Check that the equipment door is unlocked.	

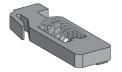
VPOC Open-door Racking Interlock

Description

With the racking interlock installed, a drawout Masterpact MTZ1 device 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 available at Schneider Electric website: <u>NVE35520</u>.

Activating the Racking Interlock

Step	Action	
1	Insert the racking interlock.	
2	Check that the racking handle cannot be inserted into the racking handle socket when the equipment door is open.	
3	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

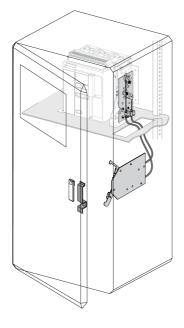
When the cable-type door interlock is installed, the door cannot be opened when the device is closed and the device cannot be closed when the door is open.

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

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 at Schneider Electric website: <u>NVE35521</u>.

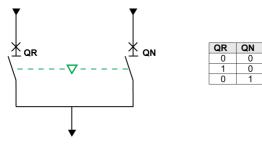
Mechanical Interlocking for Transfer Switches

Description

The mechanical interlocking for transfer switches between two Masterpact MTZ1 devices prevents the two interlocked devices from closing at the same time.

Mechanical Interlocking Between Two Devices

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



For information on the accessory installation, consult the instruction sheets available at Schneider Electric website:

- For Interlocking by cables: <u>NVE35522</u>
- For Interlocking by rods: <u>NVE35523</u>

IVE Electrical Interlocking Unit

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



Chapter 3 Masterpact MTZ Critical Cases

What Is in This Chapter?

This chapter contains the following topics:

Торіс	
Finding the Cause of a Trip or an Alarm in Critical Cases	94
Resetting the Circuit Breaker After a Trip Due to an Electrical Fault	
Resetting the Circuit Breaker After a Trip Due to a Malfunction Detected by the Micrologic X Self-tests	100
Diagnosing Alarms	101

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

Definitions

While operating the device, 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 X control unit has detected an alarm:
 - o For a high severity alarm, the service LED is red, indicating that urgent corrective action is required.
 o For a medium severity alarm, the service LED is orange, indicating that corrective action needs to be
- Notification of a Trip or Alarm
 - A trip or alarm event is signaled:

scheduled.

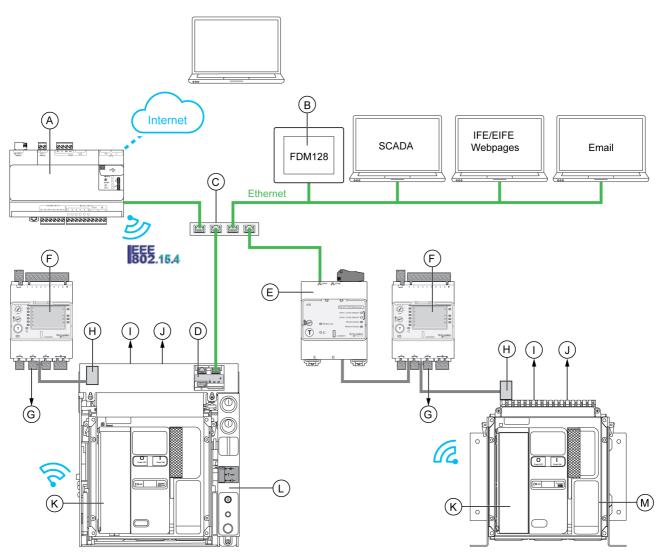
- On the Micrologic X control unit HMI, by the trip cause LEDs or the service LED. When the control unit is powered, a red or orange pop-up message is displayed on the screen.
- By the SDE fault-trip indication contact

Depending on the options installed, a trip or alarm can also be signaled:

- By an additional SDE2 fault-trip indication contact
- By the outputs of the M2C programmable contacts
- By the outputs of an IO application module
- By an email sent through IFE or EIFE Ethernet interface
- On a remote controller connected to the communication network (application customized by user)
- On the FDM128 display

Active alarms can also be consulted in the following ways:

- On a smartphone with Masterpact MTZ Mobile App connected to the Micrologic X control unit:
 Through Bluetooth
 - O Through USB OTG connection
- On Ecoreach software connected to the Micrologic X control unit:
 - Through USB connection
 - O Through IFE or EIFE Ethernet interface
 - O Through IFM Modbus-SL interface

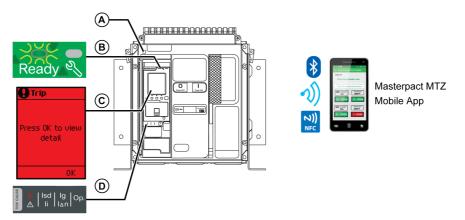


- A Com'X energy server
- **B** FDM128 Ethernet display for eight devices
- C Ethernet switch
- D EIFE embedded Ethernet interface for one Masterpact MTZ drawout circuit breaker
- E IFE Ethernet interface for one Masterpact MTZ circuit breaker
- **F** IO input/output application module for one circuit breaker
- G IO module outputs used for event notification
- H ULP port module
- I One or two SDE fault-trip indication contacts
- J Two optional M2C programmable contacts
- K Micrologic X control unit HMI
- L Drawout Masterpact MTZ circuit breaker
- M Fixed Masterpact MTZ circuit breaker

Identifying the Cause of a Trip or Alarm Using the Micrologic X Control Unit

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

- The indicators on the Micrologic X control unit HMI (see page 97).
 - The fault trip reset button on the circuit breaker (A)
 - O The Micrologic X health status LEDs (Ready and service LEDs) (B)
 - The Micrologic X display screen (C)
 - The trip cause LEDs (**D**)
- A smartphone with Masterpact MTZ Mobile App installed to get the tripping cause, the trip or alarm context, and the device ID:
 - O Through NFC
 - O Through Bluetooth
 - O Through USB OTG connection



- A Fault trip reset button
- B Health status LEDs
- C Micrologic X display screen
- **D** Trip cause LEDs

NOTE: The optional Power Restoration Assistant Digital Module provides assistance with restoring power after a trip.

Availability of Diagnostic Data After a Trip

The diagnostic data is available when the Micrologic X control unit is powered.

If the Micrologic X control unit is not permanently powered by an external 24 Vdc power source, connect the Micrologic X control unit to an external power supply, for example, the Mobile Power Pack, through the mini USB port to have access to the diagnostic data.

When the Micrologic X control unit is powered externally, the availability of diagnostic data depends on the Micrologic X health state:

- If the Micrologic X control unit is healthy, all diagnostic data is available.
- If there is a malfunction of the Micrologic X control unit, diagnostic data available depends on the type
 of malfunction.
- If the Micrologic X control unit is inoperative, no data is available.

The trip cause LEDs and the service LED are powered by the Micrologic X internal lithium battery and remain on for 4 hours when there is no other power to the control unit. To switch on the trip cause LEDs again after 4 hours, press the Test/Reset button.

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 fault-trip reset button has popped out.

Health status LEDs	Micrologic X display screen	Trip cause LEDs	Probable cause
Ready	Press OK to view detail	Isd Ig Op.	Electrical fault on the network <i>(see page 98)</i>
Ready LED flashing green. Service LED off.	OK	Ir (1sc) Ig Op.	
		Ir Isd Ig A Ii Isd Op.	
		Ir Isd Ig Op	
		One of the trip cause LEDs is on red.	
Ready Service LED on red.	Press OK to view detail OK	All LEDs are on.	Major Micrologic control unit malfunction detected during self-test <i>(see page 100)</i>

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

The circuit breaker has not tripped, but the Micrologic X control unit service LED is on.

Health status LEDs	Micrologic X display screen	Trip cause LEDs	Probable cause
Ready Service LED on red. Ready LED flashing green.	Press OK to view detail	Ir Isd Ig Op. ▲ Ii I I I I I I I An Op.	High severity alarm <i>(see page 102)</i>
Ready Service LED on red. Ready LED off.	UK	All LEDs are on.	
Ready S Ready LED flashing green. Service LED on orange.	Press OK to view detail	Ir Isd Ig Op. ▲ Ii IΔn Op. All LEDs are off.	Medium severity alarm <i>(see page 102)</i>

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

Reset Sequence

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.

Stage	Description
1	Identify the trip cause by using the Micrologic X control unit HMI.
2	Acknowledge the trip message on the Micrologic X control unit.
3	Clear the electrical fault on the network.
4	Inspect the circuit breaker and switchboard after a short circuit.
5	Reset the circuit breaker (see page 45).
6	When the circuit breaker is ready-to-close, re-close it (see page 42).

Identifying the Trip Cause

Trip cause LEDs	Description
Isd Ig ▲ Isd Ig I I I I I I I I OP.	• Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: trip due to the long-time protection.
	Micrologic 2.0 X: trip due to the short-time protection.
Ir (1sd) Ig Op.	 Micrologic 5.0 X, 6.0 X, 7.0 X: trip due to the short-time protection or instantaneous protection.
W	Micrologic 2.0 X, 5.0 X: not used.
Ir Isd (1g)	• Micrologic 6.0 X: trip due to the ground-fault protection.
	 Micrologic 7.0 X: trip due to the earth-leakage protection.
Ir Isd Ig A Ii IAn	 Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: trip due to other protection (optional protections).

NOTE: Diagnostic assistance can be obtained by using a smartphone running the Masterpact MTZ Mobile App.

Acknowledging a Trip Message on Micrologic X Control Unit

Step	Action
1	Press OK to view details of the trip cause on the display screen.
2	 Consult the two tripping context screens: Screen 1: Name and settings of the tripping protection. Date and time of the trip. Screen 2: Current values recorded before the trip.
3	Press OK to acknowledge the trip and return to the Home menu. NOTE: If the trip is not acknowledged within the event timeout, the pop-up is displayed again.
4	Press the Test/Reset button for 3 seconds to reset the latched events and switch off the trip cause LEDs and the service LED.

Clearing the Electrical Fault

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

A WARNING

HAZARD OF CLOSING ON ELECTRICAL FAULT

Do not close the circuit breaker again without first inspecting and, if necessary, repairing the downstream electrical equipment.

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

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

A A 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.
- Disconnect all power sources 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.

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

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 device casing.

Refer to *Masterpact MTZ Circuit Breakers - Maintenance Guide* and contact your field service representative.

Resetting the Circuit Breaker After a Trip Due to a Malfunction Detected by the Micrologic X Self-tests

Reset Sequence

The following table shows the sequence of actions to take after a trip due to a malfunction detected by the Micrologic X control unit. Further explanation of each action is given in the following paragraphs.

Stage	Description
1	Identify the tripping cause.
2	Acknowledge the trip message on the Micrologic X display screen.
3	Consult the list of malfunctions and perform the actions recommended to restart after the trip.
4	Reset the circuit breaker <i>(see page 45)</i> .
5	When the circuit breaker is ready to close, re-close it (see page 42).

Identifying the Trip Cause

Health status LEDs	Micrologic X display screen	Trip cause LEDs	Probable cause
Ready 🖏	Press OK to view detail	Ir Isd Ig Op	Major Micrologic control unit malfunction detected during self-test <i>(see page 100)</i>
Ready LED off. Service LED on red.	ОК	All LEDs are on.	

Acknowledging the Trip Message on Micrologic X Display Screen

Step	Action
1	 Press OK. The screen displays: A description of the malfunction. The date and time that the malfunction occurred.
2	Consult the list of possible detected malfunctions in the following table and perform the actions recommended.
3	Press OK to acknowledge the trip and return to the Home menu.
4	Press the Test/Reset button for 3 seconds to reset the latched events and switch off the trip cause LEDs and the service LED.

Recommended Actions After a Trip Due to a Micrologic X Malfunction

Trip message	Malfunction description	Recommended action
Internal failure trip	The circuit breaker tripped following a control unit microprocessor (Asic) malfunction	Call Schneider Electric field service for replacement of the control unit
CU self-test major malfunction ¹	The control unit self test detected a major malfunction in the control unit operation	Call Schneider Electric field service for replacement of the control unit
Internal current sensor disconnected	The control unit self test detected the disconnection of an internal sensor of the circuit breaker	Replace the circuit breaker
ENCT disconnected	The control unit self test detected the disconnection of the external neutral current sensor of the circuit breaker	Reconnect the external neutral current sensor (ENCT)
¹ Control unit major malfunction that can trip the device or not, depending on the type of malfunction detected.		

Diagnosing Alarms

Diagnosis Sequence

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

Stage	Description
1	Identify the alarm detected.
2	Acknowledge the alarm cause on the Micrologic X display screen.
3	Consult the list of alarms and perform the recommended actions.

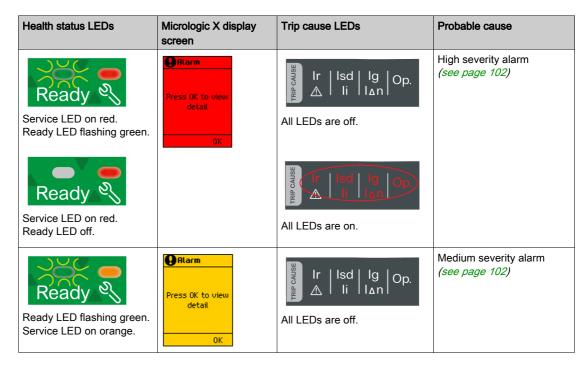
Identifying the Alarm Detected

The Micrologic X control unit indicates alarms with:

- The ready LED (flashing green or off)
- The service LED (red or orange)
- A pop-up alarm screen (red or orange)

Two levels of alarm are detected and indicated by the color of the service LED:

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



Acknowledging the Alarm on Micrologic X Display Screen

Step	Action
1	Press OK.The display screen displays:An alarm message.The date and time that the alarm occurred.
2	Consult the list of alarm messages in the following tables and perform the actions recommended.
3	Press OK to acknowledge the trip and return to the Home menu.
4	Press the Test/Reset button for 3 seconds to reset the latched events and switch off the service LED.

Recommended Action After Detection of High Severity Alarms

Alarm message	Alarm description	Recommended action
Contact wear > 100%. Replace CB	The contact wear indicator reached the threshold of 100%.	Replace the circuit breaker
Earth leakage (Vigi) sensor disconnected	The control unit self test detected the disconnection of an Earth leakage (Vigi) sensor of the circuit breaker.	Reconnect the Vigi sensor
CB has reached the max number of operations.	The circuit breaker reached the maximum number of operations.	Replace the circuit breaker
CU self-test major malfunction ¹	The control unit self test detected a major malfunction in the control unit operation.	Replace the control unit.
MCH has reached the max number of operations	The MCH gear motor reached the maximum number of operations.	Replace the MCH gear motor
Protection reset to default setting if rebooted!	If switched off, the control unit will be reset at next reboot to the default values of the protection settings, due to a control unit malfunction.	Replace the control unit
Error reading sensor plug	The control unit is unable to read the value of the sensor plug.	Check connection of the sensor plug. If it fails again replace the sensor plug or the control unit.
CU factory configuration error	An error occurred in the factory configuration of the control unit.	-
l∆n/lg test trip failed	The earth leakage (I∆n)/ground (Ig) test trip failed.	Restart the test. If it fails again, replace the control unit
¹ Major Micrologic malfunction that	t can trip the device or not, depending on the ty	pe of malfunction detected.

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

Recommended Action After Medium Severity Alarms

Alarm message	Alarm description	Recommended action
Contact wear > 60%. Check contacts	The contact wear indicator reached or is above the threshold of 60%.	Check contact wear
Contact wear > 95%. Plan replacement	The contact wear indicator reached or is above the threshold of 95%.	Plan replacement of the circuit breaker
Less than 20% CB operation remaining	The remaining number of operations of the circuit breaker is less than 20%.	Plan replacement of the circuit breaker
XF closing release malfunction	The control unit self test detected a malfunction of the XF closing voltage release.	Replace the XF closing voltage release
XF release no longer detected.	The control unit self test detected the unexpected absence of the XF closing voltage release.	Check the connection of the XF closing voltage release
MX1 opening release malfunction	The control unit self test detected a malfunction of the MX1 opening voltage release.	Replace the MX1 opening voltage release
MX1 release no longer detected.	The control unit self test detected the unexpected absence of the MX1 opening voltage release.	Check the connection of the MX1 opening voltage release
MX2/MN opening release malfunction	The control unit self test detected a malfunction of the MX2 opening voltage release or MN undervoltage release.	Replace the MX2/MN opening release
MX2/MN release no longer detected	The MN undervoltage release or MX2 opening voltage release cannot be detected by the control unit.	Check the connection of the MX2 opening voltage release or the MN undervoltage release
MCH charging operations above threshold	The number of operations of the gear motor (MCH) reached the alarm threshold.	Plan to replace the MCH gear motor
Replace battery	The lithium battery is under 3 V and needs to be replaced soon.	Replace the battery

Alarm message	Alarm description	Recommended action
Protection settings no longer accessible	The protection settings are no longer accessible by the control unit.	Replace the control unit
CU self test minor malfunction	The control unit self test detected a minor malfunction in the control unit.	Plan to replace the control unit
CU self test minor malfunction corrected	The control unit self test detected a minor malfunction in the control unit and corrected it.	-
Metering and other protection malfunction	The control unit self test detected a minor malfunction in the metering and other protection functions of the control unit.	Plan to replace the control unit
Display screen or wireless malfunction	The control unit self test detected a malfunction in the display screen or the wireless module.	Replace the display screen
NFC malfunction	The control unit self test detected a malfunction in the NFC memory.	Plan to replace the control unit
Bluetooth malfunction	The control unit self test detected a Bluetooth malfunction.	Replace the control unit
Address conflict between modules	The control unit self test detected the unexpected presence of IO2 module when IO1 is not present.	Check the supply of the IO1 module
Loss of IFE module	The control unit has lost communication with the IFE module.	Check supply of the IFE module or ULP connection
Loss of IO1 module	The control unit has lost communication with the IO1 module.	Check supply of the IO1 module or ULP connection
Loss of IO2 module	The control unit has lost communication with the IO2 module.	Check supply of the IO2 module or ULP connection
Protection changed by communication	The protection parameters are changed by communication.	-
Config. mismatch between IO and CU	There is an error of declaration between the IO module and the control unit.	With Ecoreach software, modify the module declaration
CU firmware upgrade failed	The firmware upgrade of the control unit failed.	Restart the upgrade procedure from the beginning
Firmware internal error	The control unit self test detected a firmware internal error.	Upgrade firmware version of the control unit with Ecoreach software
Critical hardware modules discrepancy	There is a major hardware discrepancy between the installed modules that prevent them from operating.	Replace module
Critical firmware modules discrepancy	There is a major software discrepancy between the installed ULP modules that prevent them from operating.	Upgrade the ULP modules with Ecoreach software
Non-critical hardware modules discrepancy	There is a minor hardware discrepancy between the installed modules that prevent them from operating correctly.	Plan the replacement of the module
Non-critical firmware modules discrepancy	There is a minor software discrepancy between the installed modules that prevent them from operating correctly.	Plan the upgrade of the modules with Ecoreach software
Firmware discrepancy within CU	The control unit self test detected a discrepancy between the firmware versions of control unit processors.	Upgrade the control unit with Ecoreach software
Ultimate self-protection trip (DIN/DINF) operate	The integrated instantaneous protection (DIN/DINF) operates: at least one of the phase or neutral currents is higher than DIN/DINF threshold (no time delay).	-
Ultimate self-protection (SELLIM) operate	The integrated instantaneous protection (SELLIM) operates: at least one of the phase or neutral currents is higher than SELLIM threshold (no time delay).	-

Alarm message	Alarm description	Recommended action
Ir prealarm (I > 90% Ir)	The long time protection prealarm started: at least one of the phase or neutral currents is higher than 90% Ir threshold. The circuit breaker is operating close to Ir threshold value.	-
Ir start (I > 105% Ir)	The long time protection started: at least one of the phase or neutral currents is higher than Ir threshold. The circuit breaker will trip at the end of time delay.	-
Ir operate	The long time protection operated: at least one of the phase or neutral currents is higher than Ir threshold and the time delay is elapsed.	-
Isd operate	The short time protection operated: at least one of the phase or neutral currents is higher than Isd threshold and the time delay is elapsed.	-
li operate	The instantaneous protection operated: at least one of the phase or neutral currents is higher than li threshold (no time delay).	-
lg operate	The ground fault protection operated: the ground fault current is higher than Ig threshold and the time delay tg is elapsed.	_
l∆n operate	The earth leakage $(I\Delta n)$ protection started: the earth leakage current is higher than $I\Delta n$ threshold and the time delay $t\Delta n$ is elapsed.	-

Chapter 4 Masterpact MTZ Commissioning

What Is in This Chapter?

This chapter contains the following topics:

Торіс	Page
Introduction	106
Inspection and Micrologic X Settings	108
Tests	110
Communication Tests	113
Final Checks and Reporting	114
Masterpact MTZ Test Form	115

Introduction

Overview

A A 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 deenergized.
- 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 chapter details the testing and commissioning procedure for Masterpact MTZ devices that must be done before the device 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 chapter.
- 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 chapter and the corresponding instruction notices.
- Wear personal protective equipment, recognize potential hazards, and take adequate safety precautions when performing the procedures outlined in this chapter and the corresponding instruction notices.

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

- The device is not connected to a power system or a control system.
- A drawout device is in the disconnected position.
- The device 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:

- Masterpact MTZ circuit breaker
- Micrologic X control unit
- Optional ULP modules:
 - O One IFE, EIFE, or IFM communication interface
 - $\odot\,$ One or two IO modules

The associated information, which must be read with this procedure, includes specific schematic diagrams, connections, and trip levels for the devices 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 updated Ecoreach software
- A USB to mini USB cable (LV850067SP) to connect the PC to the Micrologic X control unit

Test Form

A test form *(see page 115)* 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 chapter.

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

Inspection and Micrologic X Settings

Visual Inspection

Step	Action
1	Record the equipment identification, including substation name, switchboard name, Masterpact MTZ device type, Micrologic X model type and serial number, Micrologic X type, and protection settings.
2	Check that the device 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 device housing/enclosure.
5	Check that the ground terminals of the device 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 device 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 Ecoreach software, check that the firmware of the Micrologic X control unit and ULP modules in the intelligent modular unit (IMU) are up-to-date and compatible with each other. The ULP modules are EIFE, IFE, or IFM communication interfaces, and IO module.

Step	Action
1	Connect a PC running Ecoreach software by using a cable connected to the mini USB port on the front face of the Micrologic X control unit.
2	Establish a connection. Ecoreach software reads the parameters of the control unit.
3	 On Ecoreach, use the Overall System firmware status/compatibility matrix to display: The installed firmware version of the IMU devices (Micrologic X control unit and ULP modules). The latest firmware version of the devices that are available on the Schneider Electric System Updates Internet site. The recommended actions to get a compatible system. For more information, refer to <i>Ecoreach Online Help</i>.
4	Follow the recommended actions to get a compatible system.

Micrologic X Settings



RISK OF UNINTENDED OPERATION

- The device 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 X configuration and protection function settings are consistent with the results of this study.
- Micrologic X 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 Ecoreach software connected to the Micrologic X control unit.

Step	Action
1	Connect a PC running Ecoreach software by using a cable connected to the mini USB port on the front face of the Micrologic X control unit.
2	Establish a connection. Ecoreach 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 Ecoreach software: The protection settings must be defined according to the installation protection system study. Other settings must be defined according to the application.
4	Complete the project and device data.
5	Generate the project report with Ecoreach software, and save or print the project report as needed.

NOTE: The protection functions available depend on the type of Micrologic X control unit and its associated options.

Tests

Overview

The tests to do while commissioning an MTZ device are described in this section:

- Functional checks
- Check of MCH gear motor (if fitted)
- Check of M2C programmable contacts and IO module (if fitted)
- Check of electrical continuity
- Check of high-voltage insulation
- Check of Micrologic X Ready LED status
- Test of the tripping mechanism with Ecoreach software
- Test of the tripping mechanism with the test button (Micrologic 6.0 X or 7.0 X control units)

Only do the tests required, depending on the Masterpact MTZ type and the functions in use, and record the results on the test form *(see page 115)*. In the event of non-conformance, the result must be recorded and the Masterpact MTZ device must not be accepted into service.

Functional Checks

Follow this procedure to check the operation of the Masterpact MTZ device 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 device. Check the closing of the device in the different control modes and means designed for the application.
3	Open the device. Check the opening of the device in the different control modes and means designed for the application.

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 device 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 device closes and the mechanism is automatically charged.
6	Check electrical continuity between terminals B1 and B3.
7	Operate the device several times to check that the spring mechanism automatically recharges after every closing operation.

Check of M2C Programmable Contacts and IO Module (If Fitted)

Follow this procedure to check the operation of inputs and outputs, and record the results on the test form.

Step	Action
1	Connect a PC running Ecoreach software by using a cable to the mini USB port on the front face of the Micrologic X control unit.
2	Force the state of both inputs of the M2C programmable contacts and check that the operation is correct.
3	Force the state of the six digital inputs and three outputs of the one or two IO modules in the IMU to check the wiring to the circuit breaker. Check that the operation is correct.

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 device.
2	 Check electrical continuity, for each of the phases, between the upper and lower power terminals: For fixed device: on the power terminals For the drawout device: on the chassis power terminals, with the device in the connected position

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.

If included in the Micrologic X control unit, the voltage power supply (VPS) module connects and disconnects the control unit with the voltage connections in the circuit breaker.

Before conducting any high-voltage insulation tests, move the VPS module to the disconnected position and unplug any cables from the mini USB port on the front face of the Micrologic X control unit. For information on VPS disconnection, consult the instruction sheet <u>NVE40741</u> available at the Schneider Electric website.

DETERIORATION OF VPS MODULE

Disconnect the VPS module by pulling it out to the disconnected position before running a dielectric test on the equipment.

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

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

Step	Action
1	Disconnect the VPS module and unplug any cables from the mini USB port on the front face of the Micrologic X control unit.
2	Close the Masterpact MTZ device.
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 device 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 M Ω in each case. If this result is not obtained, contact your field service representative.

Check of Micrologic X Ready LED Status

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

Step	Action
1	Provide power to the Micrologic X control unit, for example, by connecting a PC or Mobile Power Pack to the mini USB port on the front face.
2	 Check that the Micrologic X Ready LED is flashing green. The Ready LED flashes green to indicate that: The sensors are correctly wired. The tripping mechanism is functioning correctly. The Micrologic X control unit is functioning correctly.
3	If the Ready LED is not flashing green, refer to chapter Critical Cases (see page 93).

Test of the Tripping Mechanism With Ecoreach Software

Follow this procedure to test the Masterpact MTZ tripping mechanism and record the results on the test form.

Step	Action
1	Close the circuit breaker.
2	Connect a PC running Ecoreach software by using a cable to the mini USB port on the front face of the Micrologic X control unit.
3	On Ecoreach software, select the circuit breaker and connect to it.
4	Force the circuit breaker to trip by clicking the Force Trip button on the Ecoreach 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 Isd/li LED is on.
8	Check that the SDE contacts have switched.
9	After the test, reset the circuit breaker.

Test of the Tripping Mechanism with the Test Button (Micrologic 6.0 X and 7.0 X Control Units)

Follow this procedure to test the Masterpact MTZ tripping mechanism when fitted with a Micrologic 6.0 X or 7.0 X control unit, and record the results on the test form.

Step	Action
1	Close the circuit breaker.
2	Use a thin screwdriver to briefly push in (<1 s) the test button on the control unit.
3	Check that the circuit breaker is open.
4	Check that the blue fault-trip reset button has popped out.
5	Check that the Ig/I∆n LED is on.
6	Check that the SDE contacts have switched.
7	After the test, reset the circuit breaker.

Communication Tests

Communication Network Test

Ecoreach software can be used to test the communication network between all the communicating devices of the project:

- Devices connected to the Ethernet network through an IFE or EIFE Ethernet interface.
- Devices connected to a Modbus serial line network through an IFM interface stacked to an IFE Ethernet server.
- Devices connected to a Modbus serial line network from an IFM interface.

Step	Action
1	Connect a PC running Ecoreach software by using an RJ45 cable to a communication network, on the IFE or EIFE Ethernet interface, or IFM interface, for example.
2	In Ecoreach software, at Create report → Communication test & report, select devices to be tested from the list of communicating devices defined in the project.
3	Click Run test. All selected devices are tested.
4	Results are displayed at the end of the test.
5	Generate the communication test report with Ecoreach software, and save or print the project report as needed.

Remote Control Tests

If the Masterpact MTZ device can be opened and closed remotely through the communication network, use the following tests to check for the correct operation of remote control:

Step	Action
1	Connect a PC running Ecoreach software by using an RJ45 cable to a communication network, on the IFE or EIFE Ethernet interface, or IFM interface, for example.
2	Check that the control mode is set to Auto: Remote.
3	In Ecoreach software, select the circuit breaker and connect to it.
4	Click the Device tab to access the Open and Close buttons.
5	Check that it is possible to open and close the Masterpact MTZ device remotely. These actions are password-protected.

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 devices, doors, and protective covers are in position.
2	Check that the device is off (open position) and the closing spring is charged.

Project Report Generated by Ecoreach Software

Ecoreach software generates a project report with a list of the devices for that project. For each device it provides the following information:

- The circuit breaker identification data
- The Micrologic X identification data, including the list of Digital Modules installed
- The list of accessories including internal accessories (for example, M2C programmable contacts), and external modules (for example, IO module)
- The protection settings for the Micrologic X control unit
- The alarm settings
- The IFE, EIFE, or IFM communication interface settings

Communication Test Report Generated by Ecoreach Software

Ecoreach software performs a communication test and generates a report of the test. For each device it provides the following information:

- The name and type of the device
- The type of communication
- The address of the device or gateway
- The status of the connection

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 (\checkmark) 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 chapter.

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

Workstation	Tests conducted on:	By:
		Signature:
Substation name	Comments:	
Substation number		
Switchboard name		
Voltage		

Masterpact MTZ device	
Manufacturer	Schneider Electric
Type of Masterpact MTZ device	
Serial number	
Hardware version	

Micrologic X control unit		
Micrologic X type	CT ratio	
Firmware version		

Preliminary Checks

Type of check	(✔)
Visual inspection satisfactory (for example, no visible signs of damage).	
Grounding satisfactory.	
Connection tightness checked.	
Firmware compatibility satisfactory.	
Micrologic X settings applied.	
Project report generated.	

Functional and Interlock Checks

Type of check	(✔)
Mechanism charges when spring charging handle is pulled.	
Masterpact MTZ device closes.	
Masterpact MTZ device opens.	
Mechanism charges automatically after closing when the device is fitted with an MCH gear motor.	
M2C programmable contacts function correctly.	
IO module functions correctly.	
Interlocking systems of the circuit breaker function correctly.	
Interlocking systems between two or three circuit breakers function correctly.	

Electrical Continuity Check

Masterpact MTZ device	Tested terminals		Electrical continuity
status	Incoming side	Outgoing side	
Closed	L1	L1	Ω
Closed	L2	L2	Ω
Closed	L3	L3	Ω

Masterpact MTZ Insulation Test

Masterpact MTZ device 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 L3 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 X Ready LED

Type of check	(•	
Micrologic X Ready LED flashes green.		

Test of the Tripping Mechanism for Micrologic X Control Units

Type of check	(✔)
With the circuit breaker closed, force the circuit breaker to trip using Ecoreach software.	
Check that the circuit breaker is open.	
Check that the blue fault-trip reset button has popped out.	
Check that the Isd/li LED is on.	
Check that the SDE contacts have switched.	

Test of the Tripping Mechanism for Micrologic 6.0 X and 7.0 X Control Units

Type of check	(✔)
With the circuit breaker closed, briefly press (<1 s) the test button on the front face of the control unit.	
Check that the circuit breaker is open.	
Check that the blue fault-trip reset button has popped out.	
Check that the Ig/I∆n LED is on.	
Check that the SDE contacts have switched.	

Communication Tests

Type of check	(✔)
Communication network tested.	
Communication test report generated.	
Remote opening and closing tested.	

Final Checks

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

Chapter 5 Masterpact MTZ Troubleshooting

Troubleshooting the Device

Presentation

The troubleshooting operations are described in the following tables. They are classified into the following events:

- Events related to a closing action
- Events related to an opening action
- Events related to the chassis
- Unexpected tripping

Troubleshooting with Assistance

Assistance for troubleshooting is provided by the Masterpact Operation Assistant Digital Module, which is available to be downloaded using the Masterpact MTZ Mobile App.

The Masterpact Operation Assistant Digital Module helps to close a circuit breaker after a trip or an opening.

The following features are available:

- Ready-to-close status
- Reset (if applicable)
- Spring charging (if applicable)
- Diagnostics on related reclosing information, for example, no power supply to MX opening voltage release, MN undervoltage release, or MCH gear motor

Refer to Micrologic X Control Unit - User Guide for more information about downloading Digital Modules.

Events Related to a Closing Action

Problem description	Probable causes	Solutions
Device cannot be closed locally or remotely.	Device is padlocked or keylocked in the open position.	Disable the locking function.
	Device is interlocked mechanically in a mechanical interlocking system.	 Check the position of the other device in the changeover system. Modify the situation to release the interlock.
	Device is not correctly connected.	Terminate racking in (connection) of the device.
	The fault-trip reset button has not been reset.	Clear the fault.Push the fault-trip reset button.
	Stored energy mechanism is not charged.	 Charge the mechanism manually. If the device is equipped with a MCH gear motor, check the supply of power to the motor. If the problem persists, replace the MCH gear motor.
	MX opening voltage release is permanently supplied.	As there is an opening order, determine the origin of the order. The order must be canceled before the device can be closed.
	MN undervoltage release is not supplied.	 As there is an opening order, determine the origin of the order. Check the voltage and the supply circuit (U > 0.85 Un).
		If the problem persists, replace the MN undervoltage release.
	XF closing voltage release is continuously supplied, but device is not ready-to-close (XF is not wired in series with PF ready-to- close contact).	 Remove the power supply to the XF closing voltage release. Only if the device is ready-to-close, send the closing order again via the XF closing voltage release.
Device cannot be closed remotely but can be closed locally using the closing pushbutton.	Closing order not executed by the XF closing voltage release.	Check the voltage and the supply circuit (0.85–1.1 Un). If the problem persists, replace the XF closing voltage release.
Device can be reset locally but not remotely.	Insufficient supply voltage for the MCH gear motor.	Check the voltage and the supply circuit (0.7–1.1 Un). If the problem persists, replace the MCH gear motor.

Events Related to an Opening Action

Problem description	Probable causes	Solutions
Device cannot be opened locally.	Operating mechanism malfunction or welded contacts.	Contact a Schneider Electric service center.
	Opening order is not executed by the MX opening voltage release.	Check the voltage and the supply circuit (0.7–1.1 Un). If the problem persists, replace the MX opening voltage release.
Device cannot be opened remotely, but can be opened locally.	Opening order is not executed by the MN undervoltage release.	Drop in voltage insufficient or residual voltage (> 0.35 Un) across the terminals of the MN undervoltage release. If the problem persists, replace the MN undervoltage release.

Events Related to the Chassis

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 has not been pressed and so the racking handle cannot be rotated.	Press the position release button.
Device cannot be removed from chassis.	Device is not in the disconnected position.	Turn the racking handle until the device is in the disconnected position and the position release button pops out.
	Rails are not completely out.	Pull the rails of the chassis out.
Device cannot be connected (racked in).	Chassis and device do not match (mismatch protection).	Check that the chassis corresponds with the device.
	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 has not been pressed and so the racking handle cannot be rotated.	Press the position release button.
	Device has not been sufficiently inserted in the chassis.	Insert the device completely so that it is engaged in the racking mechanism.
Device cannot be locked in the disconnected position.	Device is not in the right position.	Check the device position by verifying that the position release button is out.
	Racking handle is still in the chassis.	Remove the racking handle and store it.
Device cannot be locked in the connected, test, or disconnected position.	Locking in any position is not enabled.	Contact a Schneider Electric service center.
	Device is not in the right position.	Check the device position by verifying 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 device.	Rails are not completely in.	Push the rails all the way in.
The right-hand rail (chassis alone) or the device cannot be drawn out.	Racking handle is still in the chassis.	Remove the racking handle and store it.

Unexpected Tripping

Problem description	Probable causes	Solutions
Unexpected opening without activation of the fault-trip reset button.	MN undervoltage release supply voltage is too low.	Check the voltage and the supply circuit $(U > 0.85 Un)$.
	Load-shedding order sent to the MX opening voltage release by another device.	 Check the overall load on the distribution system. If necessary, modify the settings of devices in the installation.
	Unnecessary opening order from the MX opening voltage release.	Determine the origin of the order and cancel it.
Unexpected tripping with activation of the fault-trip reset button.	 An electrical fault is present, among: Overload Ground-fault Short-circuit detected by the control unit 	Refer to Masterpact MTZ critical cases <i>(see page 93)</i> .
Instantaneous tripping after each attempt to close the device with activation of the fault-trip reset button.	Thermal memory.	 Reset the thermal memory on screen. Refer to <i>Micrologic X Control Unit -</i> <i>User Guide.</i> Press the fault-trip reset button.
	Transient overcurrent when closing.	 Modify the distribution system or the control unit settings. Check the condition of the device before putting it back into service. Press the fault-trip reset button.
	Closing on a short-circuit.	Refer to Masterpact MTZ critical cases <i>(see page 93)</i> .
Nuisance tripping of the device with activation of the fault-trip reset button.	Fault-trip reset button is not pushed-in completely.	Push in the fault-trip reset button completely.

Maintenance of the Device

For information about the preventive maintenance program and maintenance procedures, refer to *Masterpact MTZ Circuit Breakers - Maintenance Guide*.

Chapter 6 Schneider Electric Green Premium™ Ecolabel

Schneider Electric Green Premium™ Ecolabel

Description

Green Premium by Schneider Electric is a label that allows you to develop and promote an environmental policy while preserving your business efficiency. This ecolabel is compliant with up-to-date environmental regulations.



Accessing Green Premium

Green Premium data on labeled products can be accessed online through any of the following ways:

- By navigating through the Schneider Electric website.
- By flashing the QR code displayed in the following image:



Checking Products Through the Schneider Electric Website

To check the environmental criteria of a product using a PC or smartphone, follow these steps:

Step	Action	
1	From <u>www.schneider-electric.com</u> , select Support → Additional Links → Green Premium Eco Label.	
2	Click Find Green Premium Products to open the search tool webpage.	
3	 Fill in the fields: Enter the commercial reference or product range of the product to search for. Optional: Enter the manufacturing date code of the product with format YYWW. By default, this field is filled with the date of the search. 	
4	To search for several products simultaneously, click the Add product button, and then fill in the fields.	
5	Click Check product(s) to generate a report of the environmental criteria available for the products with the entered commercial references.	

Environmental Criteria

The Green Premium ecolabel provides documentation on the following criteria about the environmental impact of the products:

- RoHs: European Union Restriction of Hazardous Substances (RoHS) directive.
- REACh: European Union Registration, Evaluation, Authorization, and Restriction of Chemicals regulation.
- PEP: Product Environmental Profile.
- EoLI: End of Life Instructions.

RoHs

Schneider Electric products are subject to RoHS requirements at a worldwide level, even for the many products that are not required to comply with the terms of the regulation. Compliance certificates are available for products that fulfill the criteria of this European initiative, which aims to eliminate hazardous substances.

REACh

Schneider Electric applies the strict REACh regulation on its products at a worldwide level, and discloses extensive information concerning the presence of SVHC (Substances of Very High Concern) in all of these products.

PEP

Schneider Electric publishes complete set of environmental data, including carbon footprint and energy consumption data for each of the life cycle phases on all of its products, in compliance with the ISO 14025 PEP ecopassport program. PEP is especially useful for monitoring, controlling, saving energy, and/or reducing carbon emissions.

EoLI

These instructions provide:

- Recyclability rates for Schneider Electric products.
- Guidance to mitigate personnel hazards during the dismantling of products and before recycling operations.
- Part identification for recycling or for selective treatment, to mitigate environmental hazards/incompatibility with standard recycling processes.



DOCA0100-00

Schneider Electric Industries SAS 35, rue Joseph Monier CS30323 F - 92506 Rueil Malmaison Cedex

http://www.schneider-electric.com

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.