Masterpact MTZ
Maintenance Procedures
Basic and Advanced Levels

09/2016

DOCA0103EN-00

www.schneider-electric.com

Schneider Electric

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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.

Table of Contents

Safety Information . . . 5
About the Book . . . 7
Chapter 1 Introduction . . . 9
Introduction . . . 10
Schneider Electric Green Premium™ Ecolabel . . . 12
Chapter 2 Maintenance Procedures - Basic Level . . . 15
Device NII_Z_1: Check the General Condition of the Device . . . 16
Mechanism NII_Z_1: Operate the Device Manually and Electrically . . . 22
Mechanism NII_Z_2: Charge the Device Electrically . . . 28
Mechanism NII_Z_3: Check the Complete Closing of Device Poles . . . 31
Mechanism NII_Z_4: Check the Number of Device Operating Cycles . . . 33
Breaking Unit NII_Z_1: Check Mounting of Arc Chutes and Filter Cleanliness . . . 35
Auxiliaries NII_Z_1: Check Auxiliary Wiring and Insulation . . . 37
Control Unit NII_Z_1: Check Device Tripping and Operation of SDE Fault-Trip Indication Contacts . . . 40
Control Unit NII_Z_2: Check Ground-Fault (Micrologic 6.0 X) or Earth-Leakage (Micrologic 7.0 X) Protection Function . . . 45
Device Locking NII_Z_1: Operate Device Keylocks . . . 48
Device Locking NII_Z_2: Operate Device Padlocks . . . 51
Chassis NII_Z_1: Check Device Racking Operation . . . 54
Chassis NII_Z_2: Check Operation of CD, CT, CE Position Contacts and EF Auxiliary Contacts . . . 61
Chassis NII_Z_3: Check Operation of Safety Shutters . . . 67
Chassis NII_Z_4: Check IBPO Racking Interlock Between Racking Handle and Opening Pushbutton (Masterpact MTZ2/MTZ3) . . . 70
Chassis Locking NII_Z_1: Operate Chassis Keylocking System . . . 72
Chassis Locking NII_Z_2: Operate Chassis Padlocking System . . . 75
Chapter 3 Maintenance Procedures - Advanced Level . . . 79
Mechanism NIII_Z_1: Check the MCH Gear Motor Charging Time at 0.85 Un . . . 80
Mechanism NIII_Z_2: Check the General Condition of the Mechanism . . . 82
Breaking Unit NIII_Z_1: Check the Condition of the Breaking Unit . . . 87
Auxiliaries NIII_Z_1: Check Operation of Indication Contacts (OF, PF) . . . 93
Auxiliaries NIII_Z_2: Check Closing Operation with XF Closing Voltage Release at 0.85 Un 97
Auxiliaries NIII_Z_3: Check Opening Operation with MX Opening Voltage Release at 0.7 Un 99
Auxiliaries NIII_Z_4: Check Closing and Opening Operations with MN Undervoltage Release 101
Auxiliaries NIII_Z_5: Check Time Delay of MNR Delayed Undervoltage Release . . . 104
Control Unit NIII_Z_1: Check Overcurrent Protection . . . 107
Chassis NIII_Z_1: Clean Chassis and Check Presence of Grease on Chassis . . . 110
Chassis NIII_Z_2: Check Disconnecting Contact Clusters . . . 114
Power Connections NIII_Z_1: Check Connection System . . . 116
Appendices . . . 121
Appendix A Masterpact MTZ1 Description . . . 123
Fixed Device . . . 124
Drawout Device . . . 127
Device Identification . . . 134
Appendix B Masterpact MTZ2/MTZ3 Description . . . 137
Fixed Device . . . 138
Drawout Device . . . 142
Device Identification . . . 149

Appendix C Micrologic X Control Unit Description 153
Micrologic X Control Unit: Description 154
Ecoreach Software 157
Masterpact MTZ Mobile App 158
Bluetooth Low Energy Communication 159
NFC Communication 162
Appendix D Masterpact MTZ Troubleshooting 165
Troubleshooting the Device 165

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.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

PLEASE NOTE

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

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

About the Book

At a Glance

Document Scope

The aim of this document is to provide qualified maintenance personnel with the technical information needed to perform Basic and Advanced levels of preventive maintenance on the following devices:

- Masterpact™ MTZ1 circuit breakers and switch-disconnectors
- Masterpact™ MTZ2/MTZ3 circuit breakers and switch-disconnectors

For general information on Schneider Electric maintenance policies and expertise and tools, contact your Schneider Electric representative.

Validity Note

This document applies to Masterpact MTZ1/MTZ2/MTZ3 circuit breakers with a Micrologic X™ control unit and switch-disconnectors.

Convention

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

Related Documents

Title of Documentation	Reference Number
Masterpact MTZ Catalogue	LVPED216026EN LVPED216026FR
Masterpact MTZ Circuit Breakers - Maintenance Guide	DOCA0099EN DOCA0099ES DOCA0099FR
Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide	DOCA0100EN DOCA0100ES DOCA0100FR
Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide	DOCA0101EN DOCA0101ES DOCA0101FR
Micrologic X Control Unit - User Guide	DOCA0102EN DOCA0102ES DOCA0102FR
Masterpact MTZ1 Fixed Circuit Breaker or Switch-Disconnector - Instruction Sheet	NVE35505
Masterpact MTZ1 Drawout Circuit Breaker or Switch-Disconnector - Instruction Sheet	NVE35506
Masterpact MTZ2/MTZ3 Fixed Circuit Breaker or Switch-Disconnector - Instruction Sheet	NVE35469
Masterpact MTZ2/MTZ3 Drawout Circuit Breaker or Switch-Disconnector - Instruction Sheet	NVE35470
Masterpact MTZ1 3P/4P Front Cover - Instruction Sheet	NVE56771
Masterpact MTZ2 3P/4P Front Cover - Instruction Sheet	NVE16117
Masterpact MTZ1/MTZ2/MTZ3 - Micrologic Transparent Cover - Instruction Sheet	NVE16151
Micrologic X Spare Battery - Instruction Sheet	NHA57283
Micrologic X Embedded Display - Instruction Sheet	NHA49910
Masterpact MTZ1 CDM Operation Counter - Instruction Sheet	NVE35516
Masterpact MTZ2/MTZ3 CDM Operation Counter - Instruction Sheet	NVE35485
Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet	NVE35463
Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet	NVE40749
Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet	NVE40766
Masterpact MTZ1 MCH Gear Motor - Instruction Sheet	NVE35514
Masterpact MTZ2/MTZ3 MCH Gear Motor - Instruction Sheet	NVE35483

Title of Documentation	Reference Number
Masterpact MTZ1 Arc Chute - Instruction Sheet	NVE35511
Masterpact MTZ2/MTZ3 Arc Chute - Instruction Sheet	NVE35479
Masterpact MTZ1 SDE2 Fault-Trip Indication Contact / RES Remote Reset - Instruction Sheet	NVE35524
Masterpact MTZ2/MTZ3 SDE2 Fault-Trip Indication Contact / RES Remote Reset - Instruction Sheet	NVE35503
Masterpact MTZ1 VCPO OFF-Position Locking and BPFE Support - Instruction Sheet	NVE56770
Masterpact MTZ2/MTZ3 VCPO OFF-Position Locking and BPFE Support - Instruction Sheet	NVE16146
Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet	NVE16135
Masterpact MTZ2/MTZ3 EF Combined Connected/Closed Contact - Instruction Sheet	NVE35482
Masterpact MTZ1 Safety Shutters - Instruction Sheet	NVE35509
Masterpact MTZ2/MTZ3 Safety Shutters - Instruction Sheet	NVE35476
Masterpact MTZ2/MTZ3 VIVC Front Face Shutter Position Indication and Locking - Instruction Sheet	NVE35478
Masterpact MTZ1 VSPD Disconnected Position Locking - Instruction Sheet	NVE56768
Masterpact MTZ2/MTZ3 VSPD Disconnected Position Locking - Instruction Sheet	NVE16142
Masterpact MTZ1 OF ON/OFF Indication Contacts - Instruction Sheet	NVE35513
Masterpact MTZ2/MTZ3 OF ON/OFF Indication Contacts - Instruction Sheet	NVE35481
Masterpact MTZ1/MTZ2/MTZ3 PF Ready-To-Close Contact - Instruction Sheet	NVE35466
Masterpact MTZ1 Connectors - Instruction Sheet	NVE35507
Masterpact MTZ2/MTZ3 Connectors - Instruction Sheet	NVE35472
Ecoreach Online Help	DOCA0069EN

You can download these technical publications and other technical information from our website at http://download.schneider-electric.com

Trademark Notice

Chapter 1
Introduction

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Introduction	10
Schneider Electric Green Premium™ Ecolabel	12

Introduction

Introduction

Preventive maintenance tasks on Masterpact MTZ circuit breakers and switch-disconnectors are to be carried out following the Schneider Electric maintenance program.

Preventive maintenance tasks can be categorized into three levels depending on complexity and maintenance interval:

- Basic level
- Advanced level
- Exclusive level

Refer to *Masterpact MTZ Circuit Breakers - Maintenance Guide* for the detailed Schneider Electric maintenance program.

Regular Preventive Maintenance

Maintenance recommendations for each product are intended to maintain the equipment or subassemblies in a satisfactory operational state for their useful service life.

The following table summarizes maintenance operations and intervals for the three preventive maintenance levels in normal environmental and operating conditions:

Maintenance interval	Maintenance operations	Performed by
1 year	Basic level tasks: visual inspection and functional testing, replacement of inoperative accessories.	• Qualified customer personnel with basic training • Schneider Electric certified partner • Schneider Electric field service representative
2 years	Advanced level tasks: Basic level tasks, plus operational servicing and subassembly tests.	• Qualified customer personnel with advanced training • Schneider Electric certified partner • Schneider Electric field service representative
5 years	Exclusive level tasks: Advanced level tasks, plus manufacturer diagnostics and part replacements by Schneider Electric Services.	Schneider Electric field service representative

Corrosive Environments

Devices may be used in places where sulfur dioxide (SO_2) or hydrogen sulphide (H_2S) are present. For example, steel works, paper mills, synthetic fibers, refineries, and sulphur chemical plants.

The corrosive chemicals can have an impact on the integrity of the device:

- Excessive temperature rise causes sulfurization (oxidation) of silver and results in destruction of contacts.
- Contact with SO_2 and H_2S blackens the solid-silver and the silver-plated contacts which increases contact resistance and temperature.

The maintenance intervals can be reduced in the case of corrosive or severe environments.

Instruction Sheets

When a corrective action in a maintenance procedure indicates referring to an instruction sheet, refer to the appropriate instruction sheet listed in the Reference documents depending on the product considered.

For example, referring to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet* means to use:

- *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* or
- *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet*.

Illustrations

The pictures and drawings in these maintenance procedures are for illustration only.

Appendixes

The following information is available in the appendix:

- Description of the Masterpact MTZ1 and Masterpact MTZ2/MTZ3 circuit breakers and switch-disconnectors.
- Description of the Micrologic X control unit and communication functions.
- Troubleshooting.

Convention

In these maintenance procedures, the term device covers circuit breakers and switch-disconnectors.

Tools

Performing the procedures of the maintenance program requires the following:

- A standard toolbox with electrical tools and equipment for an electrician.
- Specific tools, detailed in the maintenance procedures.

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 *http://www.schneider-electric.com/*, select **Support → Additional Links → Green Premium Eco Label**.
2	Click **Check your product** to open the search tool webpage.
3	Click **Launch now** to launch the search tool.
4	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.
5	To search for several products simultaneously, click the **Add product** button, and then fill in the fields.
6	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.

Chapter 2
Maintenance Procedures - Basic Level

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Device NII_Z_1: Check the General Condition of the Device	16
Mechanism NII_Z_1: Operate the Device Manually and Electrically	22
Mechanism NII_Z_2: Charge the Device Electrically	28
Mechanism NII_Z_3: Check the Complete Closing of Device Poles	31
Mechanism NII_Z_4: Check the Number of Device Operating Cycles	33
Breaking Unit NII_Z_1: Check Mounting of Arc Chutes and Filter Cleanliness	35
Auxiliaries NII_Z_1: Check Auxiliary Wiring and Insulation	37
Control Unit NII_Z_1: Check Device Tripping and Operation of SDE Fault-Trip Indication Contacts	40
Control Unit NII_Z_2: Check Ground-Fault (Micrologic 6.0 X) or Earth-Leakage (Micrologic 7.0 X) Protection Function	45
Device Locking NII_Z_1: Operate Device Keylocks	48
Device Locking NII_Z_2: Operate Device Padlocks	51
Chassis NII_Z_1: Check Device Racking Operation	54
Chassis NII_Z_2: Check Operation of CD, CT, CE Position Contacts and EF Auxiliary Contacts	61
Chassis NII_Z_3: Check Operation of Safety Shutters	67
Chassis NII_Z_4: Check IBPO Racking Interlock Between Racking Handle and Opening Pushbutton (Masterpact MTZ2/MTZ3)	70
Chassis Locking NII_Z_1: Operate Chassis Keylocking System	72
Chassis Locking NII_Z_2: Operate Chassis Padlocking System	75

Device NII_Z_1: Check the General Condition of the Device

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Visually check that there are no visible signs of aging or damage on the different parts of the device.
Goal	Verify the general condition of the device in operation or following long storage
Frequency	Annual
Special indications	–
Necessary tools	–
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 3P/4P Front Cover - Instruction Sheet* • *Masterpact MTZ2 3P/4P Front Cover - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 - Micrologic Transparent Cover - Instruction Sheet* • *Micrologic X Spare Battery - Instruction Sheet* • *Micrologic X Embedded Display - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Removed from chassis

Checking the Front Cover of the Device

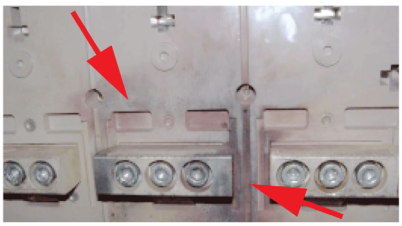
Step	Action	Corrective action
1	Check presence of all screws on the front cover: ● For Masterpact MTZ1: four screws. ● For Masterpact MTZ2/MTZ3: five screws.	If any screws are missing, replace the front cover (refer to *Masterpact MTZ 3P/4P Front Cover - Instruction Sheet*). Refer to the *Masterpact MTZ Catalogue* for spare parts.
2	Check that the front cover is not cracked, split open, or deformed.	If the front cover is damaged, replace it (refer to *Masterpact MTZ 3P/4P Front Cover - Instruction Sheet*). Refer to the *Masterpact MTZ Catalogue* for spare parts.
3	Check that the identification labels are present on the device and the chassis, including: ● Identification labels (bar code)  ● Rating plate 	To replace the rating plate, contact your field service representative.
4	If available, check the label indicating the date of the last maintenance operation.	

Checking the Micrologic X Control Unit

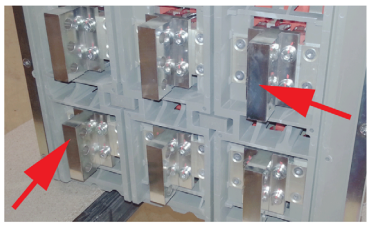
Step	Action	Corrective action
1	Check that the transparent cover is in place.	• If the transparent cover is not correctly mounted, remove it then mount it again (refer to *Masterpact MTZ1/MTZ2/MTZ3 - Micrologic Transparent Cover - Instruction Sheet*). • If the transparent cover is missing or damaged, replace it. Refer to the *Masterpact MTZ Catalogue* for spare parts.
2	To open the transparent cover, pull its upper right-hand side corner.  **NOTE:** The transparent cover must be opened to modify the protection settings locally or to access the mini USB port on the front of the Micrologic X control unit. At the end of each check when using the mini USB port: **1.** Remove the cable from the mini USB port. **2.** Close the transparent cover completely. The cover does not need to be opened when modifying the protection settings remotely.	
3	Briefly press (<1 s) the Test/Reset button and check that the four trip cause LEDs and the red Service LED are on. 	• If one LED does not light up, contact your field service representative. • If the four trip cause LEDs do not light up, replace the Micrologic X internal battery (refer to *Micrologic X Spare Battery - Instruction Sheet*). • Do the procedure again. If the problem persists, contact your field service representative.

Step	Action	Corrective action
4	Connect the Micrologic X control unit to a power supply. For example, connect the Mobile Power Pack external battery to the Micrologic USB port. 	
5	Check that the **Ready** LED is flashing. 	If the LED does not flash and no event message is displayed on the control unit, contact your field service representative to replace the Micrologic X control unit.
6	Press the Bluetooth button and check that the Bluetooth LED is on. 	If the LED does not light up, replace the Micrologic X display screen (refer to *Micrologic X Embedded Display - Instruction Sheet*).
7	Check the legibility of the data and settings displayed on the Micrologic X display screen.  **NOTE:** The interruption of display does not affect the protection functions. Settings and data can be viewed on other interfaces, for example, Ecoreach software.	If the display is not legible, replace the Micrologic X display screen (refer to *Micrologic X Embedded Display - Instruction Sheet*).

Checking the Case of the Device and Chassis for Drawout Device

Step	Action	Corrective action
1	Clean the device with a clean and dry cloth or a brush. **NOTE:** Do not use solvents. Avoid greased parts of the mechanisms, except for grease on electrical contacts. Do not use pressurized cleaning products or products containing solvents (trichloroethane or trichloroethylene) such as WD40. The use of an air hose is strictly forbidden, use a vacuum cleaner instead.	
2	Check for cracks and change in color.	If there are cracks or change in color, contact your field service representative.
3	Check for traces of black smoke (indicating tripping due to a short-circuit) around the arc chutes and on the sides.  **NOTE:** For a fixed device, remove the additional support brackets, if necessary.	If there are traces of black smoke, contact your field service representative.

Checking Connections

Step	Action	Corrective action
1	Visually check the device terminals for a change in color indicating abnormal temperature rise. ● For fixed devices: customer terminals ● For drawout devices: ❍ Customer terminals  ❍ Internal terminals  ❍ Disconnecting contact clusters 	If there is a change in color on device terminals and you are qualified, follow procedure Power Connections NIII_Z_1 *(see page 116)*. Otherwise, contact your field service representative.
2	Visually check the condition of cable insulation (for example, change in color, cracks, or cable shrinkage).	If the cables show signs of damage to insulation and you are qualified, follow procedure Power Connections NIII_Z_1 *(see page 116)*. Otherwise, contact your field service representative.

Checking Connections in Corrosive Environments

In the case of corrosive environments *(see page 10)*, contact your field service representative.

Mechanism NII_Z_1: Operate the Device Manually and Electrically

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

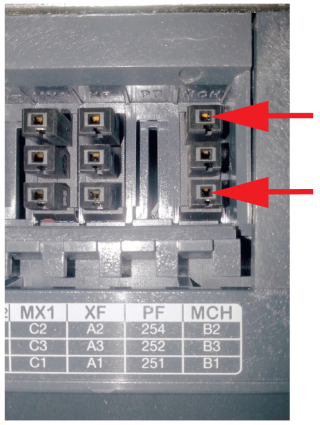
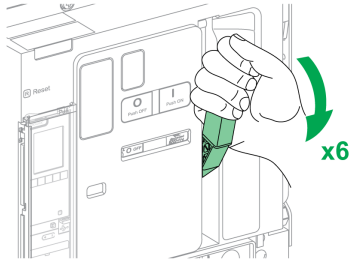
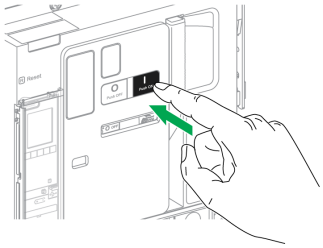
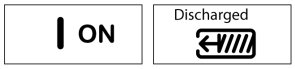
Procedure characteristics	Description
Action	Check the operation of: ● Charging mechanism using the spring charging handle. ● Device opening and closing mechanism by using: ❍ The pushbuttons. ❍ The XF/MX/MN voltage releases. ● The position indicators. ● The CDM operation counter, if present.
Goal	Verify that the device can be opened/closed manually and electrically.
Frequency	Annual
Special indications	Connect the XF/MX/MN voltage releases to the power supply.
Necessary tools	● Adjustable external power supply ● Voltmeter ● LV847074SP terminal block
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ1 CDM Operation Counter - Instruction Sheet* ● *Masterpact MTZ2/MTZ3 CDM Operation Counter - Instruction Sheet* ● *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* ● *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet* ● *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Disconnected

Checking Manual Opening/Closing of the Device

Step	Action	Corrective action
1	For fixed devices equipped with the MCH gear motor, disconnect the auxiliary circuit for the MCH gear motor (terminals B1 and B2). 	
2	Manually charge the mechanism by pulling the spring charging handle down six times. When the spring charging handle no longer resists, the mechanism is charged. 	
3	Press the closing pushbutton to close the device.  The device closes.	If the device does not close, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.
4	Check that the indicators show that the device is closed, and the mechanism is discharged. 	If the indicators show different information, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.

Step	Action	Corrective action
5	Check that the CDM operation counter increments. 	If the CDM operation counter does not increment, check it is correctly installed (refer to *Masterpact MTZ CDM Operation Counter - Instruction Sheet*). If the CDM operation counter is correctly installed, replace it.
6	Charge the mechanism again. Check that the indicators show that the device is closed, and the mechanism is charged and not ready-to-close. 	If the indicators show different information, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.
7	Press the opening pushbutton to open the device. The device opens.	If the device does not open, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.
8	Check that the indicators show that the device is open, and the mechanism is charged and ready-to-close. 	If the indicators show different information, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.

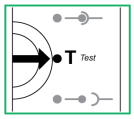
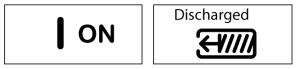
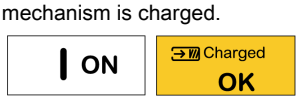
Checking Electrical Closing with the XF Closing Voltage Release

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK

When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Step	Action	Corrective action
1	● For fixed devices: Reconnect the auxiliary circuit for the MCH gear motor (terminals B1 and B2). ● For drawout devices: Rack-in the drawout device to the test position. 	
2	Press the external pushbutton to close the device. The device closes.	If the device does not close, it can be due to external conditions. Refer to troubleshooting in the appendix *(see page 165)*. If the external conditions are correct: ● For a fixed device: replace the XF closing voltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the XF contact itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block in the appropriate location on the device.  **3.** Connect the XF closing voltage release to the adjustable external power supply set to Un. ❍ If the device closes, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the device does not close, replace the XF closing voltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*) and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
3	Check that the indicators show that the device is closed and check the mechanism status: ● Without MCH gear motor, the mechanism is discharged.  ● With MCH gear motor, the mechanism is charged. 	If the indicators show different information, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.
4	Check that the CDM operation counter increments.	If the CDM operation counter does not increment, check it is correctly installed (refer to *Masterpact MTZ CDM Operation Counter - Instruction Sheet*). If the CDM operation counter is correctly installed, replace it.

Checking Electrical Opening with the MX Opening Voltage Release

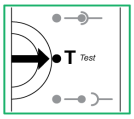
⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK

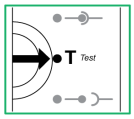
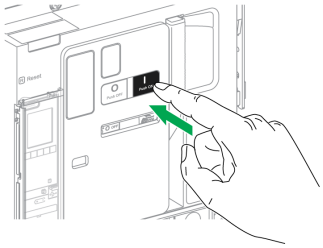
When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Execute the following procedure for MX1 then MX2, if connected.

Step	Action	Corrective action
1	For drawout devices, check that the device is in the test position. 	
2	Press the external pushbutton to open the device. The device opens.	If the device does not open, it can be due to external conditions. Refer to troubleshooting in the appendix *(see page 165)*. If the external conditions are correct: ● For a fixed device: replace the MX opening voltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the MX contact itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block in the appropriate location on the device.  **3.** Connect the MX opening voltage release to the adjustable external power supply set to Un. ❍ If the device opens, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the device does not open, replace the MX opening voltage release and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
3	Check that the indicators show that the device is open and check the mechanism status: ● Without MCH gear motor, the mechanism is discharged.  ● With MCH gear motor, the mechanism is charged. 	If the indicators show different information, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.

Checking Electrical Opening with the MN Undervoltage Release

Step	Action	Corrective action
1	For drawout devices, check that the device is in the test position. 	
2	● Without MCH gear motor: manually charge the mechanism by pulling the spring charging handle down six times. When the spring charging handle no longer resists, the mechanism is charged. ● With MCH gear motor: the mechanism is automatically charged.	
3	Press the closing pushbutton to close the device.  The device closes.	If the device does not close, check the MN undervoltage release wiring and power supply, and refer to troubleshooting in the appendix *(see page 165)*.
4	● For fixed devices: ❍ Remove the fixed auxiliary terminal block. ❍ Then, the device opens. ● For drawout devices: ❍ Rack-out the device to the disconnected position. ❍ Then, the device opens.	If the device does not open, replace the MN undervoltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
5	Check that the indicators show that the device is open and check the mechanism status: ● Without MCH gear motor, the mechanism is discharged.  ● With MCH gear motor, the mechanism is charged and not ready-to-close. 	If the indicators show different information, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.

Mechanism NII_Z_2: Charge the Device Electrically

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

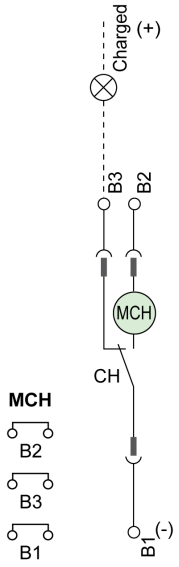
Procedure characteristics	Description
Action	● Check the operation of the MCH gear motor and its charging time. ● Check the operation of the CH contact of the MCH gear motor. ● Check the number of charging operations of MCH gear motor from a mobile device.
Goal	Verify that the device charges electrically.
Frequency	Annual
Special indications	Connect the MCH gear motor to the power supply.
Necessary tools	● Stopwatch ● Ohmmeter ● LV847074SP terminal block
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ Circuit Breakers - Maintenance Guide* ● *Masterpact MTZ1 MCH Gear Motor - Instruction Sheet* for operating limits ● *Masterpact MTZ2/MTZ3 MCH Gear Motor - Instruction Sheet* ● *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Test

MCH Gear Motor Wiring Diagram



MCH Gear Motor Charging Time Definition

The charging time is the time elapsed between the closing order and the moment when the mechanism is fully charged.

The charging time during the closing operation does not exceed 6 seconds.

Checking Operation of MCH Gear Motor and CH Contact

Step	Action	Corrective 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-B2, and electrical non-continuity between terminals B1-B3.	In case of electrical non-continuity between terminals B1-B2, or electrical continuity between terminals B1-B3: ● For a fixed device: replace the MCH gear motor (refer to *Masterpact MTZ MCH Gear Motor - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the MCH gear motor itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block at the appropriate location on the device.  **3.** Check the electrical continuity between terminals B1-B2 and non-continuity between terminals B1-B3 directly on the LV847074SP terminal block. ❍ If the check is correct, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the check is not correct, replace the MCH gear motor and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
4	Manually charge the mechanism.	

Step	Action	Corrective action
5	Reconnect the MCH gear motor power supply.	
6	Start the stopwatch while pressing the closing pushbutton.  The device closes and the mechanism is automatically charged.	If the device does not close, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.
7	Stop the stopwatch when the mechanism is totally charged.	
8	Check the mechanism charging time: it must not exceed 6 seconds.	If the charging time exceeds 6 seconds, do the procedure three more times from the beginning. If the charging time does not improve, follow the Advanced level maintenance procedure (Auxiliaries NIII_Z_1) to check the voltage supply of the MCH gear motor *(see page 93)*. If there is still no improvement, replace the MCH gear motor and measure the charging time again. If the problem persists, contact your field service representative.
9	Check electrical continuity between terminals B1-B3.	In case of electrical non-continuity between terminals B1-B3, see the corrective action concerning electrical continuity above.

Checking Number of Charging Operations of MCH Gear Motor From Masterpact MTZ Mobile App on a Smartphone

You can read the charging motor counter remotely from Masterpact MTZ Mobile App with Bluetooth connection.

Step	Action	Corrective action
1	Read the value on the mobile application. **NOTE:** If needed, refer to the presentation of the App *(see page 158)* and Bluetooth connection *(see page 159)*.	
2	Compare the value with the maximum number of charging operations indicated in *Masterpact MTZ Circuit Breakers - Maintenance Guide*.	• If the limit has been reached, replace the MCH gear motor (refer to *Masterpact MTZ MCH Gear Motor - Instruction Sheet*). • If the limit is close, preventively replace the MCH gear motor (refer to *Masterpact MTZ MCH Gear Motor - Instruction Sheet*).

Mechanism NII_Z_3: Check the Complete Closing of Device Poles

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

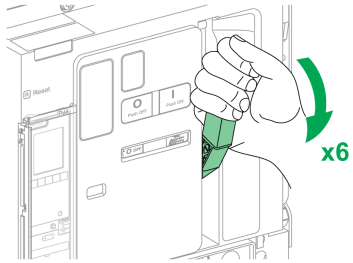
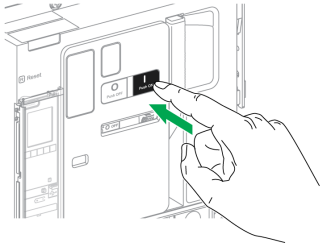
Procedure characteristics	Description
Action	Check that the mechanism charges and closes manually by using the spring charging handle.
Goal	Verify that the poles are mechanically locked after closing the device manually.
Frequency	Annual
Special indications	This check must be carried out manually. On fixed devices equipped with the MCH gear motor, disconnect the auxiliary circuit for the MCH gear motor (terminals B1 and B2).
Necessary tools	–
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Removed from chassis

Checking Device Pole Complete Closing

Step	Action	Corrective action
1	Manually charge the mechanism by pulling the spring charging handle down six times. When the spring charging handle no longer resists, the mechanism is charged. 	
2	Press the closing pushbutton to close the device.  The device closes.	If the device does not close, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.
3	Manually charge the mechanism again. The device must remain closed. The indicator shows  .	If the device opens (the indicator shows ), the poles are not locked. There is a risk of major malfunction, contact your field service representative.

Mechanism NII_Z_4: Check the Number of Device Operating Cycles

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

Procedure characteristics	Description
Action	Check the number of device operating cycles on the CDM mechanical operation counter, if present.
Goal	Verify that the maximum recommended number of operating cycles has not been exceeded.
Frequency	Annual
Special indications	–
Necessary tools	–
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Micrologic X Control Unit - User Guide* • *Masterpact MTZ1 CDM Operation Counter - Instruction Sheet* • *Masterpact MTZ2/MTZ3 CDM Operation Counter - Instruction Sheet* • *Masterpact MTZ Circuit Breakers - Maintenance Guide* for operating limits

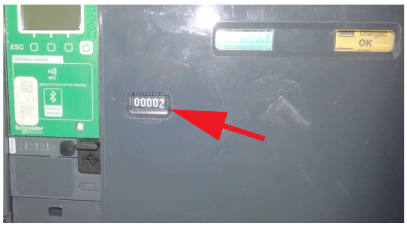
Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Test

Checking Operating Cycle with the Optional CDM Mechanical Operation Counter

The CDM mechanical operation counter increments each time the circuit breaker performs an open/close cycle.

Step	Action	Corrective action
1	Read the value on the CDM mechanical operation counter. 	
2	Compare the value with the maximum values indicated in *Masterpact MTZ Circuit Breakers - Maintenance Guide*.	• If the limit has been reached, contact your field service representative to replace the breaking unit. • If the limit is close, contact your field service representative to schedule the breaking unit replacement.

Breaking Unit NII_Z_1: Check Mounting of Arc Chutes and Filter Cleanliness

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

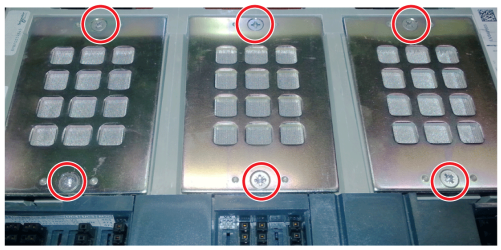
Procedure characteristics	Description
Action	• Check that the arc chutes are properly tightened. • Check that the filters are clean.
Goal	Verify the breaking performance of the device during a short-circuit.
Frequency	Annual
Special indications	This procedure is not applicable to the Masterpact MTZ1 H3 devices because arc chutes are not removable on Masterpact MTZ1 H3 devices.
Necessary tools	• Torque wrench • Vacuum cleaner
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 Arc Chute - Instruction Sheet* • *Masterpact MTZ2/MTZ3 Arc Chute - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Disconnected and Removed from chassis

Checking Mounting of Arc Chutes and Filter Cleanliness

Step	Action	Corrective action
1	Check presence of all screws on the arc chutes (except for Masterpact MTZ1 H3).  **NOTE:** The presence of all screws is mandatory to help to prevent the ionized gas from leaking through the edges of the arc chute.	If screws are damaged or missing, contact your field service representative.
2	Unscrew the screws on the arc chutes then tighten them to the recommended value using a torque wrench: • For Masterpact MTZ1 (except for Masterpact MTZ1 H3): 1.5 N•m • For Masterpact MTZ2/MTZ3: 7 N•m	If a screw cannot be tightened at the recommended value, contact your field service representative.
3	Use a vacuum cleaner to remove the dust deposited on the filters. **NOTE:** To avoid soiling the filters: • Do not blow air on the filter. • Do not use a cloth, particularly if there is dust and grease.	If the filters are still dirty (for example, greasy compound), replace the arc chutes (refer to *Masterpact MTZ Arc Chute - Instruction Sheet*). Refer to the *Masterpact MTZ Catalogue* for spare parts.

Auxiliaries NII_Z_1: Check Auxiliary Wiring and Insulation

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Visually check wiring and insulation of control and indication auxiliaries.
Goal	Verify electrical continuity of auxiliary circuits and contact robustness.
Frequency	Annual
Special indications	–
Necessary tools	Flat screwdriver, 3 mm
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Removed from chassis

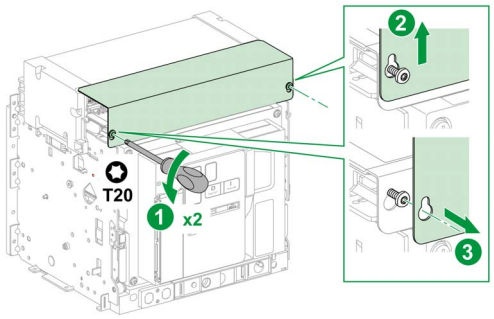
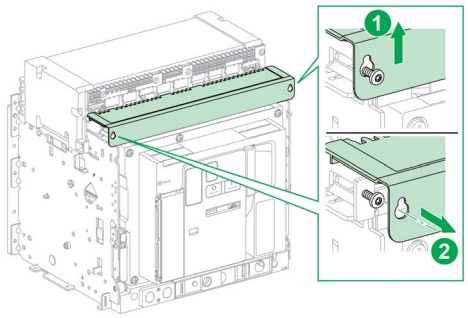
Checking Terminal Block and Connector Wiring

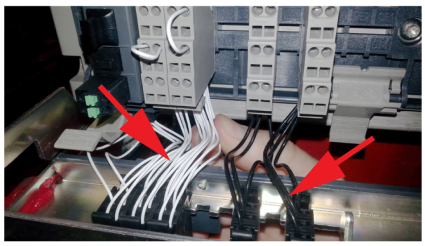
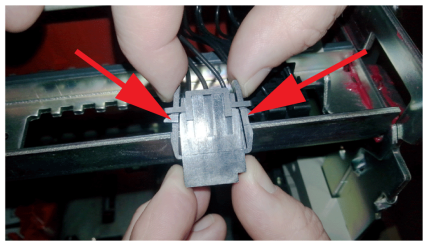
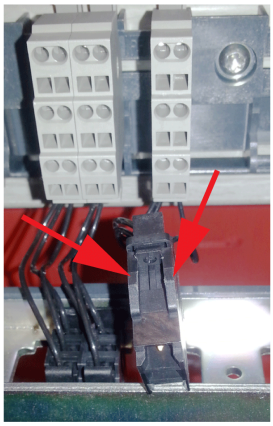
⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK

Use a properly rated voltage sensing device to confirm that the PTE voltage measurement input is de-energized (V1, V2, V3 on UC4 terminal block, VN on UC3 terminal block).

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

Step	Action	Corrective action
1	Remove the auxiliary terminal shield from a drawout device, if present. 	
2	Check that the conductors are connected securely in the terminals.	If the connection is loose, replace the terminal blocks (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*). Refer to the *Masterpact MTZ Catalogue* for spare parts.
3	Visually check the wire insulation.	If the wire insulation is cracked or damaged, replace the wires.
4	Check the terminal blocks for warping, damage, or change in color indicating abnormal temperature rise.	If there is a change in color, replace the terminal blocks (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*).
5	For a Masterpact MTZ2/MTZ3 drawout device, remove the auxiliary wiring cover. 	

Step	Action	Corrective action
6	Check the connection and wire insulation between the two parts of the terminal blocks.  	If the connection is loose or the wire insulation is cracked or damaged, replace the terminal blocks (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*).
7	Check the mounting of connectors on the auxiliary crossbar. 	• If a connector is damaged, replace the terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*). • If the crossbar is damaged, contact your field service representative.
8	Put the auxiliary wiring cover and terminal block shield back in place.	

Control Unit NII_Z_1: Check Device Tripping and Operation of SDE Fault-Trip Indication Contacts

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

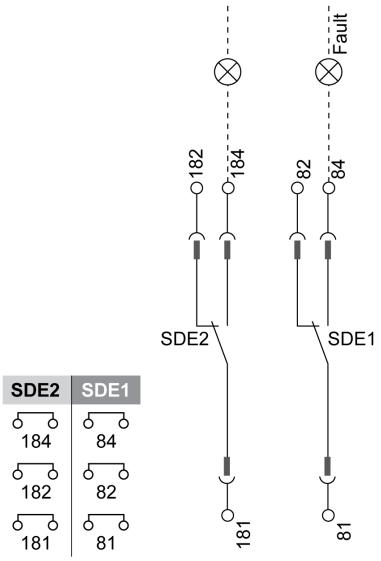
Procedure characteristics	Description
Action	● Check that the device trips. ● Check that the fault-trip indication contacts, SDE1 (standard) and SDE2 (optional), correctly operate. ● Check that the device resets.
Goal	Verify that the device operates fully (tripping mechanism, indication, and reset) when an electrical fault occurs.
Frequency	Annual
Special indications	–
Necessary tools	● A PC running Ecoreach software ● A USB cable (standard to mini USB port) ● LV847074SP terminal block
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Micrologic X Control Unit - User Guide* ● *Ecoreach Online Help* ● *Masterpact MTZ1 SDE2 Fault-Trip Indication Contact / RES Remote Reset - Instruction Sheet* ● *Masterpact MTZ2/MTZ3 SDE2 Fault-Trip Indication Contact / RES Remote Reset - Instruction Sheet* ● *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Closed	Discharged	–
Drawout	Closed	Discharged	Test

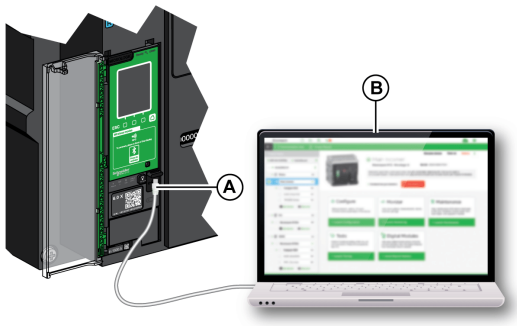
SDE Fault-Trip Indication Contact Wiring Diagram



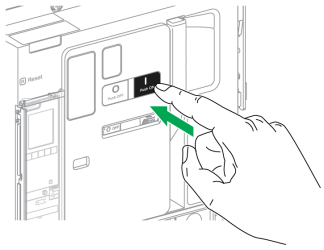
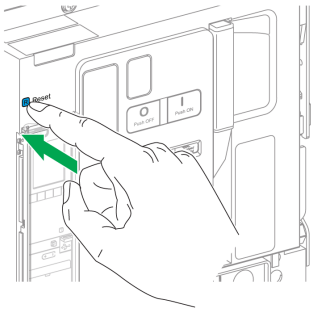
Checking the Micrologic X Trip Cause LEDs

Step	Action	Corrective action
1	Briefly press (<1 s) the Test/Reset button and check that the four trip cause LEDs and the red Service LED are on. 	● If one LED does not light up, contact your field service representative. ● If the four trip cause LEDs do not light up, refer to Step 3 when checking the Micrologic X control unit in Procedure Device NII_Z_1 *(see page 18)*.

Do a Trip Test

Step	Action	Corrective action
1	If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.	
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.  **A** Cable plug connected to the mini USB port of Micrologic X control unit **B** PC running Ecoreach software	
3	On Ecoreach software, select the device.	
4	Force the device to trip by clicking the **Force trip** button on the Ecoreach screen.	
5	Check that the device trips and that the blue fault-trip reset button on the front cover pops out.	• If the blue fault-trip reset button does not pop out, contact your field service representative. • If the device does not trip: 1. Check that the device is closed. 2. Check that the blue fault-trip reset button is pushed-in. Refer to troubleshooting in the appendix *(see page 165)*. 3. Do the procedure again. • If the problem persists, contact your field service representative.
6	Check that the LED Isd/Ii is on and that the screen display turns to red with the corresponding message.  	

Checking Operation of SDE Fault-Trip Indication Contact

Step	Action	Corrective action
1	With the device in tripped position, check electrical continuity between terminals: ● 81-84 on SDE1 contact. ● 181-184 on SDE2 contact, if installed.	In case of electrical non-continuity: ● For a fixed device: replace the SDE contact (refer to *Masterpact MTZ SDE2 Fault-Trip Indication Contact / RES Remote Reset - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the SDE contact itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block at the appropriate location on the device.  **3.** Check the electrical continuity directly on the LV847074SP terminal block: ❍ If the check is correct, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the check is still not correct, replace the SDE contact and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
2	Press the closing pushbutton.  The device must not close.	If the device closes, check with customer order form: ● With RAR automatic reset option ordered by customer: operation is normal. ● Without RAR automatic reset option ordered by customer: contact your field service representative.
3	Press the blue fault-trip reset button on the front cover to reset. 	If the blue fault-trip reset button does not reset, contact your field service representative.

Step	Action	Corrective action
4	Check electrical continuity between terminals: ● 81-82 on SDE1 contact. ● 181-182 on SDE2 contact, if installed.	In case of electrical non-continuity between terminals: ● For a fixed device: replace the SDE contact (refer to *Masterpact MTZ SDE2 Fault-Trip Indication Contact / RES Remote Reset - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the SDE contact itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block at the appropriate location on the device.  **3.** Check the electrical continuity directly on the LV847074SP terminal block: ❍ If the check is correct, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the check is still not correct, replace the SDE contact and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
5	Check that the log and the trip/test counter are recorded in control unit log by using display screen or Ecoreach software.	
6	Press and hold the Test/Reset button for 3 seconds to reset the trip cause LEDs.	

Control Unit NII_Z_2: Check Ground-Fault (Micrologic 6.0 X) or Earth-Leakage (Micrologic 7.0 X) Protection Function

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

This procedure is valid for circuit breakers equipped with a Micrologic 6.0 X or Micrologic 7.0 X control unit.

Procedure characteristics	Description
Action	Check that the device trips on ground-fault (Micrologic 6.0 X) or earth-leakage (Micrologic 7.0 X) by using the test button on the control unit.
Goal	Verify that the ground-fault or earth-leakage protection functions operate.
Frequency	Annual
Special indications	Connect the Micrologic X control unit to a power supply. For example, connect the Mobile Power Pack external battery to the Micrologic USB port.
Necessary tools	–
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Micrologic X Control Unit - User Guide*

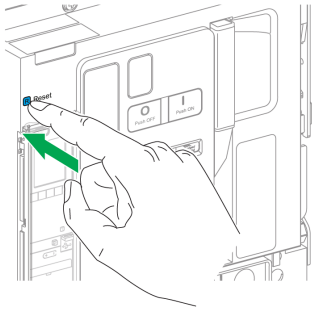
Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Closed	Discharged	–
Drawout	Closed	Discharged	Test

Checking Micrologic X Control Unit Trip Cause LED

Step	Action	Corrective action
1	If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.	
2	To open the transparent cover, pull its upper right-hand side corner. 	
3	Use a thin screwdriver to briefly push-in (<1 s) the test button, and then check that the Ig/IΔn LED is on and the screen display turns to red with the corresponding message. 	If the Ig/IΔn LED does not light up, contact your field service representative.
4	Check that the device trips and that the blue fault-trip reset button on the front cover pops out.	• If the blue fault-trip reset button does not pop out, contact your field service representative. • If the device does not trip: **1.** Check that the device is closed. **2.** Check that the blue fault-trip reset button is pushed-in. Refer to troubleshooting in the appendix *(see page 165)*. **3.** Do the procedure again. If the problem persists, contact your field service representative.
5	Press and hold the Test/Reset button for 3 seconds to reset the trip cause LEDs.	
6	Manually charge the mechanism by pulling the spring charging handle down six times. When the spring charging handle no longer resists, the mechanism is charged.	
7	If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.	
8	Press the closing pushbutton. The device must not close.	If the device closes, check with customer order form: • With RAR automatic reset option ordered by customer: operation is normal. • Without RAR automatic reset option ordered by customer: contact your field service representative.

Step	Action	Corrective action
9	Press the blue fault-trip reset button on the front cover to reset. 	If the blue fault-trip reset button does not reset, contact your field service representative.
10	Press the closing pushbutton. The device closes.	If the device does not close, refer to troubleshooting in the appendix *(see page 165)*. If the problem persists, contact your field service representative.

Device Locking NII_Z_1: Operate Device Keylocks

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Check the locking and unlocking of the device with keylocks.
Goal	Verify the operation of keylocks with the optional VSPO OFF-position locking accessory.
Frequency	Annual
Special indications	–
Necessary tools	–
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 VCPO OFF-Position Locking and BPFE Support - Instruction Sheet* • *Masterpact MTZ2/MTZ3 VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*

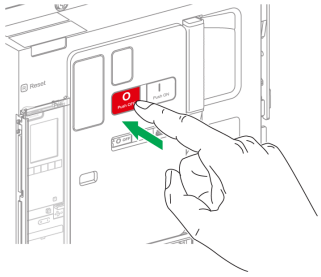
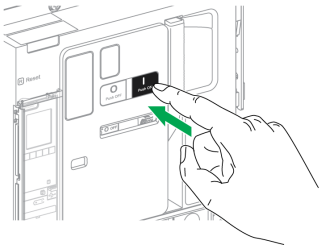
Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Closed	Discharged	–
Drawout	Open	Discharged	Removed from chassis

Checking Locking the Device in the Open Position

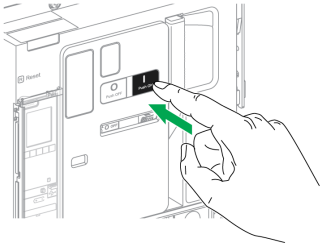
For devices with two keylocks, execute the following procedure for each keylock. Locking with one key is sufficient to lock the device in the open position.

Step	Action	Corrective action
1	With the key captive in the keylock, check that the device is not locked.	If the key is missing or broken, replace the keylock. Refer to the *Masterpact MTZ Catalogue* for spare parts.
2	Press the opening pushbutton to open the device. 	
3	• For Masterpact MTZ1: Press and hold down the opening pushbutton, and simultaneously turn the key counterclockwise. • For Masterpact MTZ2/MTZ3: Turn the key counterclockwise.	If the key does not turn, replace the keylock.
4	Remove the key and release the opening pushbutton. **NOTE:** For Masterpact MTZ1, the pushbutton remains pushed-in.	
5	Charge the mechanism to be able to give a closing order.	
6	If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.	
7	Press the closing pushbutton.  The device must not close.	• If the device closes, check that the lock support is correctly installed (refer to *Masterpact MTZ VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*). Then do the procedure again. • If the lock support is damaged, replace it. • If the keylock is corroded, replace it. If the problem persists, contact your field service representative.
8	If there is a second key, unlock the device and do the procedure with the second key.	

Checking Device Unlocking

Before starting this check, verify that the device is locked in the open position.

For devices with two keylocks, execute the following procedure for each keylock. Both keys must be inserted in the keylocks to unlock the device.

Step	Action	Corrective action
1	Put the key in the keylock.	
2	Turn the key clockwise and check that the key cannot be removed from the lock.	If the key does not turn or can be removed, replace the keylock. Refer to the *Masterpact MTZ Catalogue* for spare parts.
3	Press the closing pushbutton to close the device.  The device closes.	If the device does not close, check that the lock support is correctly installed (refer to *Masterpact MTZ VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*). Then do the procedure again. If the lock support is damaged, replace it. If the keylock is corroded, replace it. If the problem persists, contact your field service representative.
4	With the device closed, check that the key remains captive unless the opening pushbutton is pressed.	

Device Locking NII_Z_2: Operate Device Padlocks

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

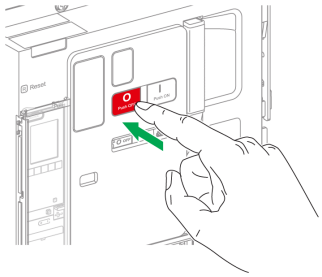
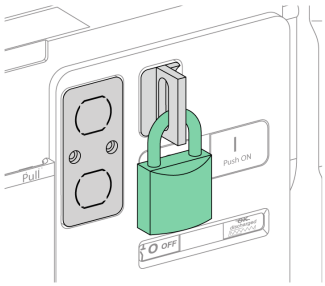
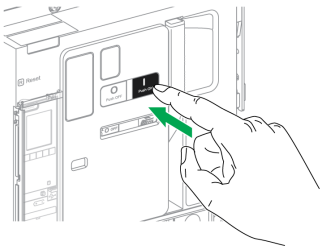
Procedure characteristics	Description
Action	Check the locking and unlocking of the device with padlocks.
Goal	Verify the operation of padlocks with the optional VCPO OFF-position locking accessory.
Frequency	Annual
Special indications	–
Necessary tools	Padlock with shackle diameter 5–8 mm
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 VCPO OFF-Position Locking and BPFE Support - Instruction Sheet* • *Masterpact MTZ2/MTZ3 VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

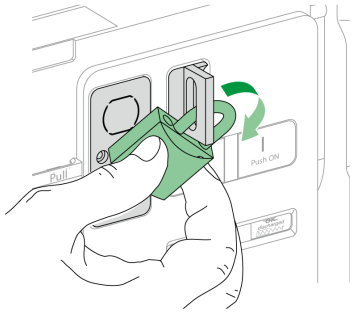
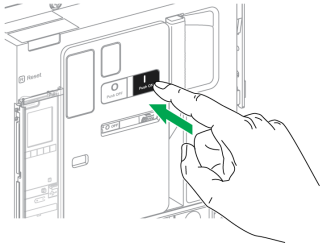
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Removed from chassis

Checking Locking the Device in the Open Position

Step	Action	Corrective action
1	Press the opening pushbutton to open the device. 	
2	Pull out the tab of the OFF-position locking accessory.	If the padlocking tab cannot be pulled out, check that the lock support is correctly installed (refer to *Masterpact MTZ VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*). Then do the procedure again. If the lock support is damaged, replace it. Refer to the *Masterpact MTZ Catalogue* for spare parts.
3	Install the padlock. 	
4	Charge the mechanism to be able to give a closing order.	
5	If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.	
6	Press the closing pushbutton.  The device must not close.	If the device closes, check that the lock support is correctly installed (refer to *Masterpact MTZ VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*). Then do the procedure again. If the lock support is damaged, replace it. If the problem persists, contact your field service representative.

Checking Device Unlocking

Before starting this check, verify that the device is padlocked in the open position.

Step	Action	Corrective action
1	Remove the padlock from the padlocking tab.  ● For Masterpact MTZ1: push in the tab. ● For Masterpact MTZ2/MTZ3: the tab retracts automatically.	If the tab does not retract fully, replace the lock support.
2	Press the closing pushbutton to close the device.  The device closes.	If the device does not close, check that the lock support is correctly installed (refer to *Masterpact MTZ VCPO OFF-Position Locking and BPFE Support - Instruction Sheet*). Then do the procedure again. If the lock support is damaged, replace it. If the problem persists, contact your field service representative.
3	With the device closed, check that the padlocking tab cannot be pulled out.	If the tab can be pulled out, replace the lock support.

Chassis NII_Z_1: Check Device Racking Operation

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	• Check the racking operations of the device. • Check the device pre-tripping. • Check the chassis position indicator.
Goal	Verify that the device operates correctly in its chassis.
Frequency	Annual
Special indications	Before the check, the device must be de-energized (no current flowing through the device and no voltage present on busbar).
Necessary tools	Racking handle
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

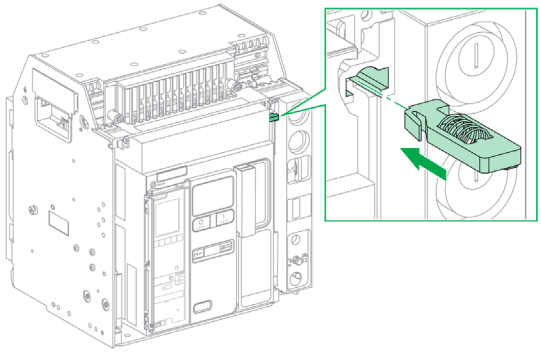
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Closed	Charged	Connected

Racking Handle Insertion Possibilities

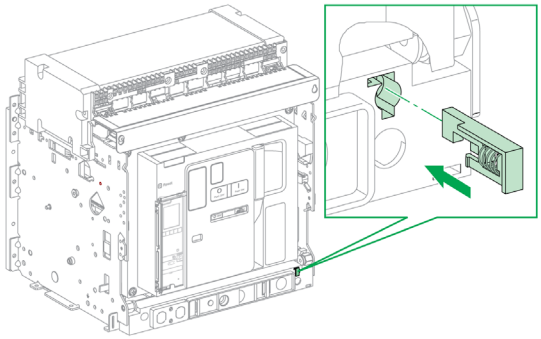
Before starting the check, verify that the racking handle can be inserted into its socket:

- The device is not locked with keylocks or padlocks.
- With VPOC racking interlock option installed, the switchboard door must be closed.

Masterpact MTZ1



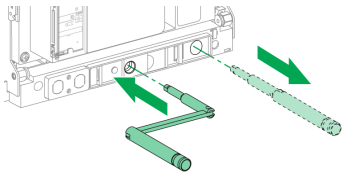
Masterpact MTZ2/MTZ3

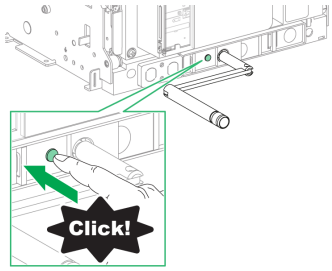
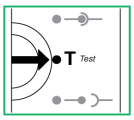
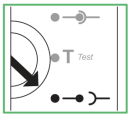


The following table shows the possible ways that the racking handle can be inserted.

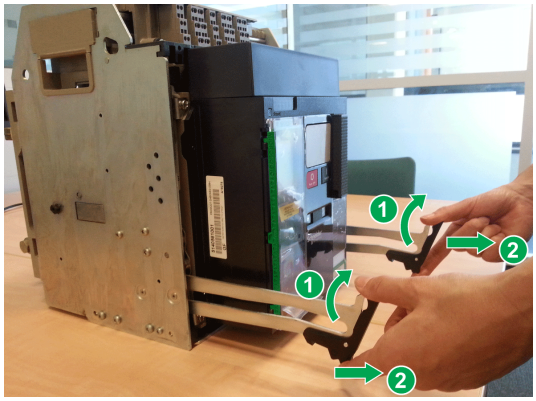
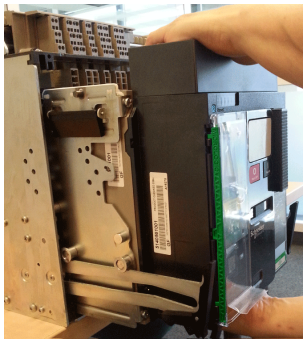
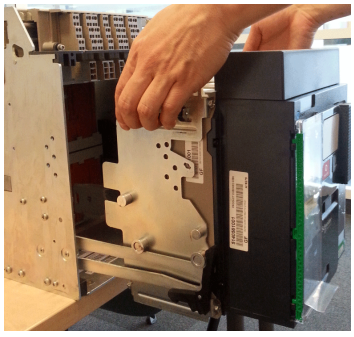
Switchboard door	VPOC option	Racking handle insertion
Closed	Absent	Possible
	Present	Possible
Open	Absent	Possible
	Present	Not possible(1)
(1) Press and hold the racking interlock to insert the racking handle into the racking handle socket.		

Racking-out the Device from Connected to Disconnected Position

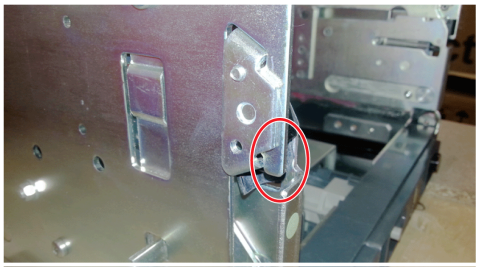
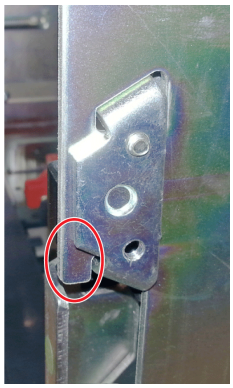
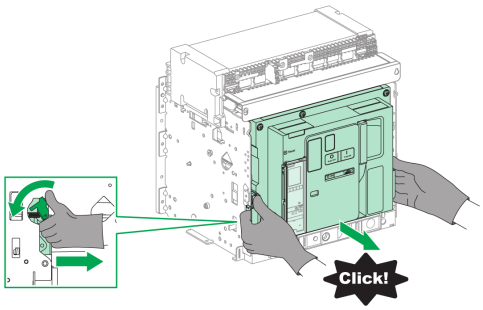
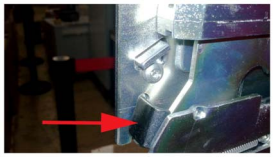
Step	Action	Corrective action
1	With the drawout device in the chassis, check that the indicators located on the front of the chassis show that the device is closed and in the connected position. 	If the position indicator is incorrect, contact your field service representative.
2	Remove the racking handle from its storage space, and then insert it into the racking handle socket.  **NOTE:** If the IBPO racking interlock between the racking handle and the opening pushbutton is installed (Masterpact MTZ2/MTZ3), press the opening pushbutton to allow insertion of the racking handle.	If the racking handle cannot be inserted into the racking handle socket, check the insertion possibilities above. If the problem persists, contact your field service representative.

Step	Action	Corrective action
3	Push in the position release button. 	
4	Turn the racking handle counterclockwise: ● Masterpact MTZ1: one turn. ● Masterpact MTZ2/MTZ3: three to four turns. **NOTE:** The racking handle cannot be turned if the position release button is not pushed in.	If the racking handle cannot be turned, contact your field service representative.
5	The device opens automatically. Check that the position indicator indicates that the device is in open position. 	If the device does not open or the position indicator is incorrect, contact your field service representative.
6	Continue turning the racking handle counterclockwise until the test position is reached. When the test position is reached, the mechanism blocks the racking handle and the position release button pops out.	If the mechanism is not blocked in the test position or the button does not pop out, contact your field service representative.
7	Check that the position indicator indicates the test position. 	If the indicator is incorrect, contact your field service representative.
8	Push in the position release button again.	
9	Turn the racking handle counterclockwise until the disconnected position is reached. **NOTE:** The racking handle cannot be turned if the position release button is not pushed in.	If the racking handle cannot be turned, contact your field service representative.
10	When the disconnected position is reached, the mechanism blocks the racking handle and the position release button pops out.	If the mechanism is not blocked in the disconnected position or the button does not pop out again, contact your field service representative
11	Check that the position indicator indicates the disconnected position. 	If the indicator is incorrect, contact your field service representative.
12	Remove the racking handle from the racking socket, and then put it back into its storage space.	
13	Open the door of the switchboard.	

Checking the Rails on Masterpact MTZ1 Chassis

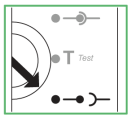
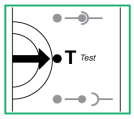
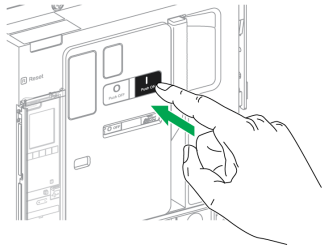
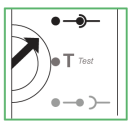
Step	Action	Corrective action
1	Pull out the rails to the maximum by pulling on the drawout grips.  **Result:** The device is supported on the rails, clear of the chassis and ready to be lifted.	
2	Check the general condition of the rail release tabs on both sides of the device. 	If the rail release tabs are damaged, contact your field service representative.
3	Grasp the device at the top and bottom and slide it out on the rails.  The device is now clear of the chassis.	If the device cannot slide on the rails: • Push it backwards then forwards again, and then check that the rails are fully pulled out. • Check that the top of the device is unobstructed. If the problem persists, contact your field service representative.
4	Use the carrying handles to remove the device from the rails. 	
5	To put the device back, push it into the chassis up to the stops. Push the rails until the rail release tabs lock.	

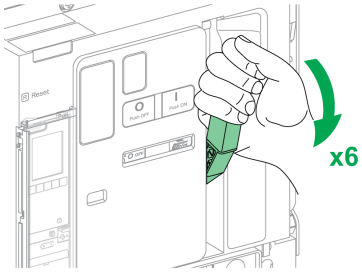
Checking the Rails on Masterpact MTZ2/MTZ3 Chassis

Step	Action	Corrective action
1	Check that the rack-out stops are in place.  	
2	Press and hold the rail release tabs towards the back and pull out the chassis by pulling on the drawout grips. 	
3	The device is now clear of the chassis.	
4	Check the general condition of the rail release tabs on both sides of the device.  	If the rail release tabs are damaged, contact your field service representative.
5	To put the device back, push it into the chassis. On reaching the rack-out stops, the rail release tabs automatically lock.	

Racking-in the Device from Disconnected to Connected Position

Before starting this check, verify that the device is open and the mechanism is charged.

Step	Action	Corrective action
1	Check that the position indicator located on the front of the chassis indicates the disconnected position. 	If the position indicator is incorrect, contact your field service representative.
2	Remove the racking handle from its storage space, and then insert it into the racking handle socket. **NOTE:** If the IBPO racking interlock between the racking handle and the opening pushbutton is installed (Masterpact MTZ2/MTZ3), press the opening pushbutton to allow insertion of the racking handle.	If the racking handle cannot be inserted into the racking handle socket, check the insertion possibilities above. If the problem persists, contact your field service representative.
3	Push in the position release button.	
4	Turn the racking handle clockwise until the test position is reached. **NOTE:** The racking handle cannot be turned if the position release button is not pushed in.	
5	When the test position is reached, the mechanism blocks the racking handle and the position release button pops out.	If the mechanism is not blocked in the test position or the button does not pop out, contact your field service representative.
6	Check that the position indicator indicates the test position. 	If the position indicator is incorrect, contact your field service representative.
7	Press the closing pushbutton to close the device.  The device closes.	If the device does not close, check that: ● MN undervoltage release is connected to a power supply. ● The device is charged. If the problem persists, contact your field service representative.
8	Push in the position release button again.	
9	Turn the racking handle clockwise: ● Masterpact MTZ1: one turn. ● Masterpact MTZ2/MTZ3: six to seven turns. **NOTE:** The racking handle cannot be turned if the position release button is not pushed in.	
10	The device opens automatically.	If the device does not open, contact your field service representative.
11	Continue turning the racking handle clockwise until the connected position is reached. When the connected position is reached, the mechanism blocks the racking handle and the position release button pops out.	If the mechanism is not blocked in the connected position or the button does not pop out, contact your field service representative.
12	Check that the position indicator indicates the connected position. 	If the position indicator is incorrect, contact your field service representative.

Step	Action	Corrective action
13	Remove the racking handle from the racking socket, and then put it back into its storage space.	
14	Charge the spring mechanism.  	
15	Close the device.	If the device does not close, check that: ● MN undervoltage release is connected to a power supply. ● The device is charged. If the problem persists, contact your field service representative.

Chassis NII_Z_2: Check Operation of CD, CT, CE Position Contacts and EF Auxiliary Contacts

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

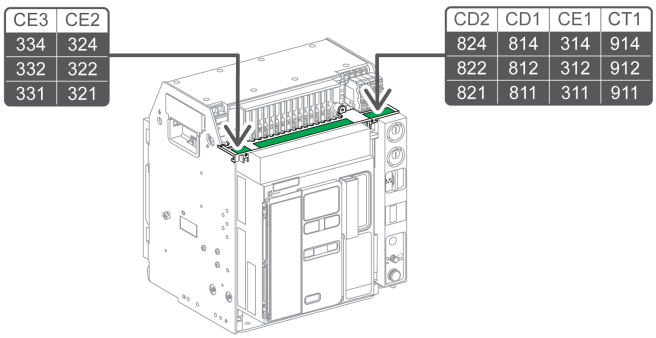
Procedure characteristics	Description
Action	Operate the chassis position contacts: ● CD disconnected position contact ● CT test position contact ● CE connected position contact ● EF combined connected/closed auxiliary contact (Masterpact MTZ2/MTZ3)
Goal	Verify consistency between actual position of the device in the chassis and the indications given by the position contacts.
Frequency	Annual
Special indications	● If the device positions in the chassis are indicated on the front panel of the switchboard, make sure that the auxiliary circuits are energized. ● If the device positions in the chassis are not indicated on the front panel of the switchboard, isolate the auxiliary circuits and use an ohmmeter or a tester to test them.
Necessary tools	Ohmmeter or tester
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet* ● *Masterpact MTZ2/MTZ3 EF Combined Connected/Closed Contact - Instruction Sheet*

Pre-Test Conditions

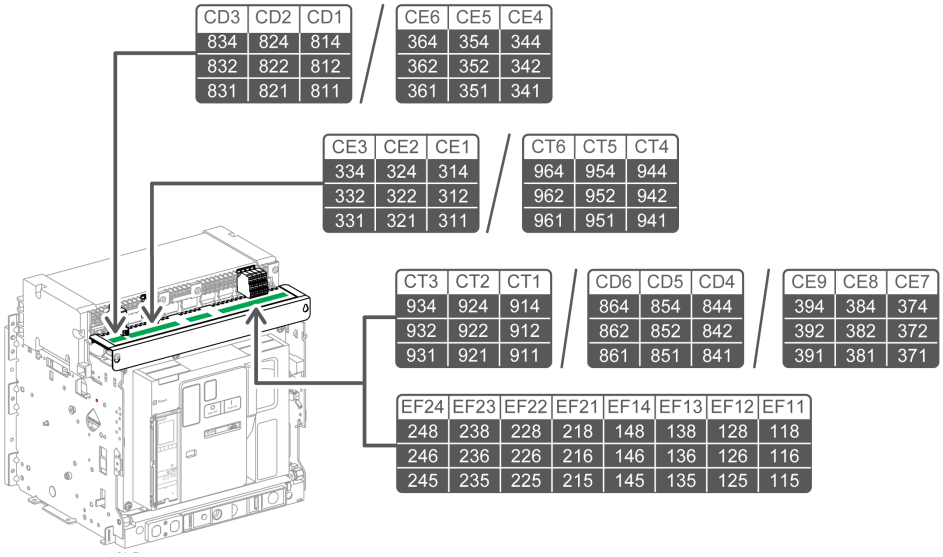
The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Discharged	Disconnected **NOTE:** It is advisable to check the positions with the device in the chassis to obtain the correct position of the actuators.

Location of Contacts in the Masterpact MTZ1 Devices

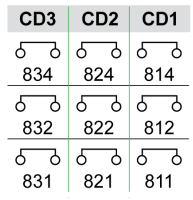
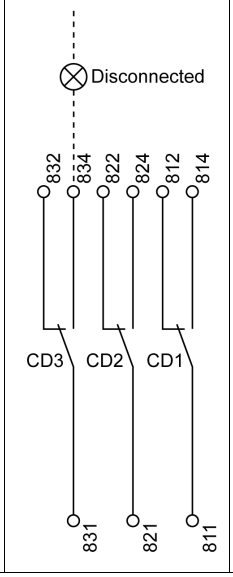
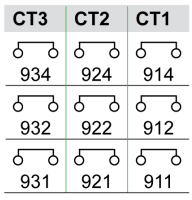
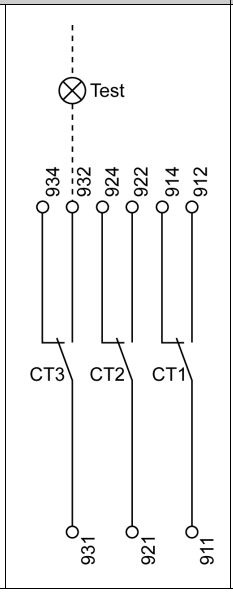
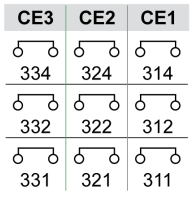
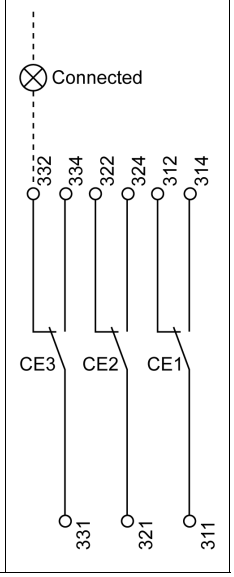


Location of Contacts in the Masterpact MTZ2/MTZ3 Devices



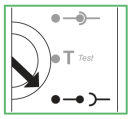
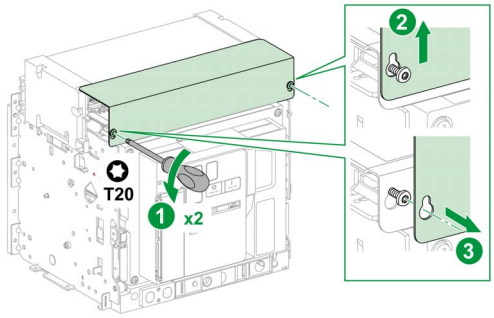
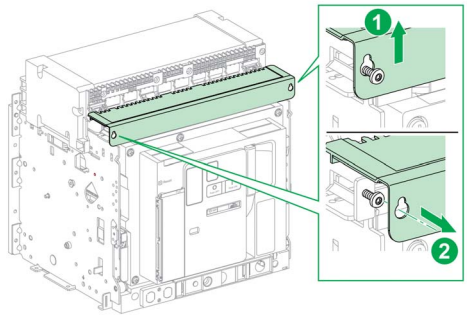
Wiring Diagrams of CD, CT, and CE Position Contacts

The following wiring diagrams show the case of a Masterpact MTZ2/MTZ3 chassis with three CD, three CT, and three CE contacts, that is, the standard configuration without EIFE embedded Ethernet interface. The checking operations are based on this configuration. The availability of the position contacts depends on the customer configuration.

CD position contacts		CT position contacts		CE position contacts	
					

Checking Position Contacts With Device in Disconnected Position

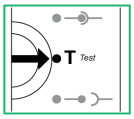
The CD position contacts indicate that the device is in the disconnected position.

Step	Action	Corrective action
1	Check that the device is in the disconnected position.  **NOTE:** If needed, refer to device racking operations as per procedure Chassis NII_Z_1 *(see page 54)*.	
2	Check that the signal is consistent with the device position by using the LED on the switchboard, if any.	If the LED on the switchboard does not operate, check the LED and the voltage power supply.
3	Remove the auxiliary terminal shield from a drawout device, if present. 	
4	For a Masterpact MTZ2/MTZ3 device, remove the auxiliary wiring cover. 	
5	Identify and disconnect all wires for the CD, CT, and CE position contacts, and EF auxiliary contacts, if present.	

Step	Action	Corrective action
6	For Masterpact MTZ1, use an ohmmeter or tester: ● To check electrical continuity between terminals: ❍ 811-814 on CD1 contact. ❍ 821-824 on CD2 contact. ● To check electrical non-continuity between terminals: ❍ 911-912 on CT1 contact. ❍ 311-314 on CE1 contact. ❍ 321-324 on CE2 contact. ❍ 331-334 on CE3 contact. For Masterpact MTZ2/MTZ3, use an ohmmeter or tester: ● To check electrical continuity between terminals: ❍ 811-814 on CD1 contact. ❍ 821-824 on CD2 contact. ❍ 831-834 on CD3 contact. ● To check electrical non-continuity between terminals: ❍ 911-912 on CT1 contact. ❍ 921-922 on CT2 contact. ❍ 931-932 on CT3 contact. ❍ 311-314 on CE1 contact. ❍ 321-324 on CE2 contact. ❍ 331-334 on CE3 contact.	If a contact does not operate: 1. Check the fixing of the CD contact actuator and manually operate it (refer to *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet*). 2. Check contact status again. 3. If the contact still does not operate, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet*). If the problem persists, contact your field service representative.
7	If the device has other CD contact blocks, check the corresponding contacts.	
8	Put the device in the test position.	

Checking Position Contacts With Device in Test Position

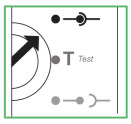
The CT position contacts indicate that the device is in the test position.

Step	Action	Corrective action
1	Check that the device is in the test position.  **NOTE:** If needed, refer to device racking operations as per procedure Chassis NII_Z_1 *(see page 54)*.	
2	Check that the signal is consistent with the device position by using the LED on the switchboard, if any.	If the LED on the switchboard does not operate, check the LED and the voltage power supply.
3	For Masterpact MTZ1, use an ohmmeter or tester: ● To check electrical continuity between terminals 911-912 on CT1 contact. ● To check electrical non-continuity between terminals: ❍ 811-814 on CD1 contact. ❍ 821-824 on CD2 contact. ❍ 311-314 on CE1 contact. ❍ 321-324 on CE2 contact. ❍ 331-334 on CE3 contact. For Masterpact MTZ2/MTZ3, use an ohmmeter or tester: ● To check electrical continuity between terminals: ❍ 911-912 on CT1 contact. ❍ 921-922 on CT2 contact. ❍ 931-932 on CT3 contact. ● To check electrical non-continuity between terminals: ❍ 811-814 on CD1 contact. ❍ 821-824 on CD2 contact. ❍ 831-834 on CD3 contact. ❍ 311-314 on CE1 contact. ❍ 321-324 on CE2 contact. ❍ 331-334 on CE3 contact.	If a contact does not operate: 1. Check the fixing of the CT contact actuator and manually operate it (refer to *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet*). 2. Check contact status again. 3. If the contact still does not operate, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet*). If the problem persists, contact your field service representative.

Step	Action	Corrective action
4	If the device has other CT contact blocks, check the corresponding contacts.	
5	Put the device in the connected position.	

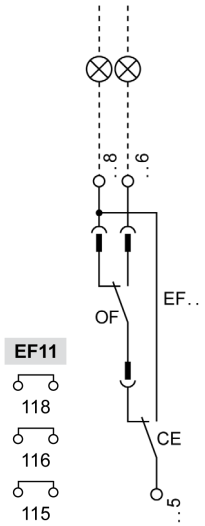
Checking Position Contacts With Device in Connected Position

The CE position contacts indicate that the device is in the connected position.

Step	Action	Corrective action
1	Check that the device is in the connected position.  **NOTE:** If needed, refer to device racking operations as per procedure Chassis NII_Z_1 *(see page 54)*.	
2	Check that the signal is consistent with the device position by using the LED on the switchboard, if any.	If the LED on the switchboard does not operate, check the LED and the voltage power supply.
3	For Masterpact MTZ1, use an ohmmeter or tester: ● To check electrical continuity between terminals: ❍ 311-312 on CE1 contact. ❍ 321-322 on CE2 contact. ❍ 331-332 on CE3 contact. ● To check electrical non-continuity between terminals: ❍ 811-814 on CD1 contact. ❍ 821-824 on CD2 contact. ❍ 911-912 on CT1 contact. For Masterpact MTZ2/MTZ3, use an ohmmeter or tester: ● To check electrical continuity between terminals: ❍ 311-312 on CE1 contact. ❍ 321-322 on CE2 contact. ❍ 331-332 on CE3 contact. ● To check electrical non-continuity between terminals: ❍ 811-814 on CD1 contact. ❍ 821-824 on CD2 contact. ❍ 831-834 on CD3 contact. ❍ 911-912 on CT1 contact. ❍ 921-922 on CT2 contact. ❍ 931-932 on CT3 contact.	If a contact does not operate: 1. Check the fixing of the CE contact actuator and manually operate it (refer to *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet*). 2. Check contact status again. 3. If the contact still does not operate, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Position Contacts (Connected / Disconnected / Test) - Instruction Sheet*). If the problem persists, contact your field service representative.
4	If the device has other CE contact blocks, check the corresponding contacts.	
5	Reconnect all the wires for the CD, CT, and CE position contacts.	
6	For Masterpact MTZ2/MTZ3 with optional EF auxiliary contacts, check operation of these contacts *(see page 66)*.	
7	Put the auxiliary wiring cover and terminal block shield back in place.	

Wiring Diagram of EF Auxiliary Contacts (Option on Masterpact MTZ2/MTZ3)

The availability of the EF auxiliary contacts depends on the device.



Checking Operation of EF Auxiliary Contacts (Masterpact MTZ2/MTZ3)

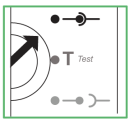
⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Check that the device and the chassis are de-energized on the upstream and downstream terminals.

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

This EF information combines the device connected (CE) contact and device closed (OF) contact to produce the circuit connected/closed signal.

Step	Action	Corrective action
1	Put the device in the connected position. 	
2	Close the device.	
3	Check that the signal is consistent with the device position by using the LED on the switchboard, if any.	If the LED on the switchboard does not operate, check the LED and the voltage power supply.
4	With the device in the connected position and with poles closed, use an ohmmeter or tester: ● To check electrical continuity between terminals 115-116. ● To check electrical non-continuity between terminals 115-118.	If a contact does not operate: **1.** Put the device in the test position. **2.** Check the fixing of the EF contact actuator and manually operate it (refer to *Masterpact MTZ2/MTZ3 EF Combined Connected/Closed Contact - Instruction Sheet*). **3.** Check contact status again. **4.** If the contact still does not operate, replace the EF contact (refer to *Masterpact MTZ2/MTZ3 EF Combined Connected/Closed Contact - Instruction Sheet* **5.** If there is still no improvement: • Check the operation of the OF indication contact as per procedure Auxiliaries NIII_Z_1 *(see page 93)*. • If necessary, replace the OF contact. If the problem persists, contact your field service representative.
5	Open the device.	
6	With the device in the connected position and with poles open, use an ohmmeter or tester: ● To check electrical continuity between terminals 115-118. ● To check electrical non-continuity between terminals 115-116.	
7	If the device has other EF auxiliary contact block, check them.	
8	Put the auxiliary wiring cover and terminal block shield back in place.	

Chassis NII_Z_3: Check Operation of Safety Shutters

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	• Check the opening and closing of the safety shutters manually. • Check the locking and unlocking of the safety shutters with the optional VIVC locking accessory (Masterpact MTZ2/MTZ3).
Goal	Verify that the safety shutters operate correctly and prevent access to the power circuit when the device is removed from the chassis.
Frequency	Annual
Special indications	–
Necessary tools	• Padlock with shackle diameter 5–8 mm • Racking handle
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 Safety Shutters - Instruction Sheet* • *Masterpact MTZ2/MTZ3 Safety Shutters - Instruction Sheet* • *Masterpact MTZ2/MTZ3 VIVC Front Face Shutter Position Indication and Locking - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Discharged	Removed from chassis

Checking Safety Shutter Operation by Rapid Action on the Opening Mechanism

Execute the following procedure for each safety shutter.

Step	Action	Corrective action
1	Press and hold the opening mechanism until the safety shutter opens completely. ● To open the upper safety shutter:  ● To open the lower safety shutter: 	
2	Quickly release the mechanism. The shutter must close completely.	If the shutter remains partially or completely open: ● Remove the shutter (refer to *Masterpact MTZ Safety Shutters - Instruction Sheet*). ● Remove the shutter actuator (Masterpact MTZ2/MTZ3). ● Clean the shutter actuator and safety shutter to remove any grease or dust. ● Reinstall the shutter actuator (Masterpact MTZ2/MTZ3). ● Reinstall the shutter. ● Do the procedure again. If the problem persists, replace: ● The safety shutter. ● The shutter actuator (Masterpact MTZ2/MTZ3). Refer to the *Masterpact MTZ Catalogue* for spare parts.

Checking Safety Shutter Operation by Slow Action on the Opening Mechanism

Execute the following procedure for each safety shutter.

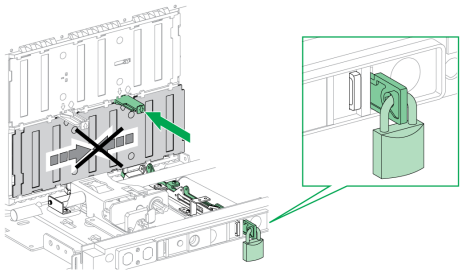
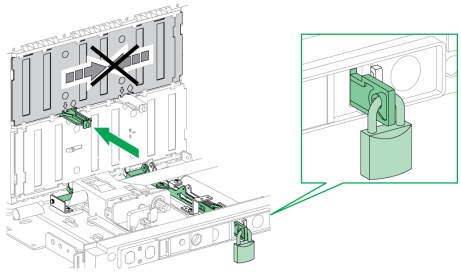
Step	Action	Corrective action
1	Press and hold the opening mechanism until the shutter opens completely.	
2	Slowly release pressure until the mechanism has returned to initial position. The shutter must close completely.	Follow the corrective action described above.

Checking Shutter Padlocking with the VIVC Locking Accessory (Masterpact MTZ2/MTZ3)

Before starting this check, verify that the VIVC front face shutter position indication and locking accessory is mounted.

The top or bottom safety shutters can be locked individually or together.

Safety shutter locking is only possible with the chassis in test or disconnected position.

Step	Action	Corrective action
1	Pull out the right-hand tab.	If the tab cannot be pulled out, check that the locking accessory is correctly installed (refer to *Masterpact MTZ2/MTZ3 VIVC Front Face Shutter Position Indication and Locking - Instruction Sheet*). If the locking accessory is damaged, replace it. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
2	Insert the padlock in this tab.	
3	Check that it is not possible to press the shutter actuator of the bottom safety shutter. The bottom safety shutter must remain closed. 	If the shutter actuator can be pressed and/or the safety shutter can be opened, remove and replace the shutter. If the problem persists, contact your field service representative.
4	Check that the racking handle cannot be inserted.	If the racking handle can be inserted, contact your field service representative
5	Remove the padlock.	
6	Pull out the left-hand tab.	
7	Insert the padlock in this tab.	
8	Check that it is not possible to press the shutter actuator of the top safety shutter. The top safety shutter must remain closed. 	If the shutter actuator can be pressed and/or the safety shutter can be opened, remove and replace the shutter. If the problem persists, contact your field service representative.
9	Check that the racking handle cannot be inserted.	If the racking handle can be inserted, contact your field service representative
10	Remove the padlock.	

Chassis NII_Z_4: Check IBPO Racking Interlock Between Racking Handle and Opening Pushbutton (Masterpact MTZ2/MTZ3)

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Check disconnection and connection of a drawout Masterpact MTZ2/MTZ3 device when the IBPO racking interlock is installed.
Goal	Verify that the IBPO racking interlock operates correctly and does not allow connection and disconnection of the device without additional action.
Frequency	Annual
Special indications	–
Necessary tools	Racking handle
Reference documents *(see page 7)*	*Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Charged	Connected

Checking Device Disconnection with IBPO Racking Interlock Accessory (Masterpact MTZ2/MTZ3)

Step	Action	Corrective action
1	Check that the equipment door is closed.	
2	Check that the racking handle cannot be inserted into the racking handle socket.	
3	Press and hold the opening pushbutton to allow insertion of the racking handle into the racking handle socket.	If the racking handle cannot be inserted into the racking handle socket: 1. Open the equipment door. 2. Check if the VPOC racking interlock option is present. 3. Remove the VPOC racking interlock, if necessary. If the problem persists, contact your field service representative.
4	Rack-out the device from connected to test position. When the test position is reached, the mechanism blocks the racking handle and the position release button pops out. **NOTE:** If needed, refer to device racking operations as per procedure Chassis NII_Z_1 *(see page 54)*.	
5	Remove the racking handle from the racking handle socket.	

Checking Device Connection with IBPO Racking Interlock Accessory (Masterpact MTZ2/MTZ3)

Step	Action	Corrective action
1	Check that the racking handle cannot be inserted into the racking handle socket.	
2	Press and hold the opening pushbutton to allow insertion of the racking handle into the racking handle socket.	
3	Rack-in the device from test to connected position. When the connected position is reached, the mechanism blocks the racking handle and the position release button pops out. **NOTE:** If needed, refer to device racking operations as per procedure Chassis NII_Z_1 *(see page 54)*.	
4	Remove the racking handle from the racking handle socket, and then put it back into its storage space.	
5	Reinstall the VPOC racking interlock if removed previously.	

Chassis Locking NII_Z_1: Operate Chassis Keylocking System

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Check the locking and unlocking of the chassis with keylocks in the disconnected position or in any position, according to the chassis locking configuration.
Goal	Verify the chassis keylocking system with the optional VSPD chassis locking accessory correctly operates.
Frequency	Annual
Special indications	–
Necessary tools	Racking handle
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 VSPD Disconnected Position Locking - Instruction Sheet* • *Masterpact MTZ2/MTZ3 VSPD Disconnected Position Locking - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Discharged	Disconnected or removed from chassis

Determining the Chassis Locking Configuration

The Masterpact MTZ drawout devices offer two chassis locking possibilities with keylocks:

- In the disconnected position.
- In any position (disconnected, test, or connected).

To determine the chassis locking possibility, move the device to the connected or test position:

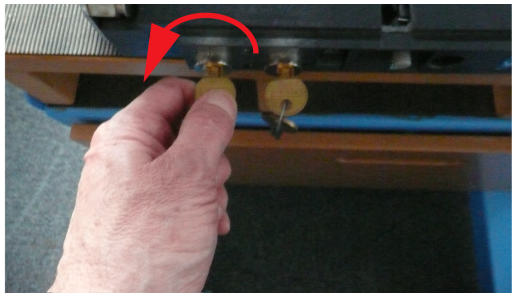
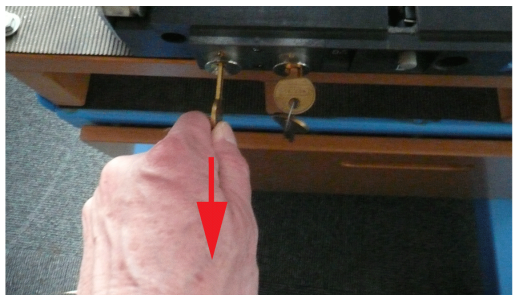
- If you cannot pull out the padlocking tab, the chassis can be locked in the disconnected position only. Execute the locking procedure then the unlocking procedure.
- If you can pull out the padlocking tab, the chassis can be locked in the disconnected, test, or connected position. The locking and unlocking procedures are the same as with chassis in the disconnected position. Execute these procedures in each position: connected, test, disconnected.

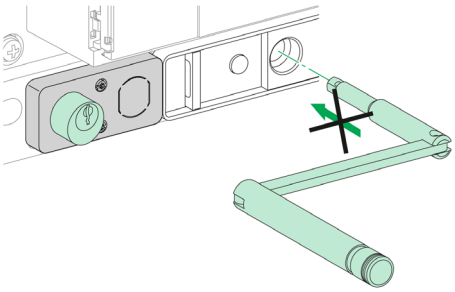
The following table shows the chassis locking configurations.

Chassis locking system	Device position in the chassis	Padlocking tab	Racking handle insertion with chassis locked
Chassis locking in the disconnected position	Connected	Cannot be pulled out	Possible
	Test	Cannot be pulled out	Possible
	Disconnected	Can be pulled out	Not possible
Chassis locking in any position	Connected	Can be pulled out	Not possible
	Test	Can be pulled out	Not possible
	Disconnected	Can be pulled out	Not possible

Checking Chassis Locking with Device in the Disconnected Position

For chassis with two keylocks, execute the following procedure for each keylock. Locking with one key is sufficient to lock racking operations.

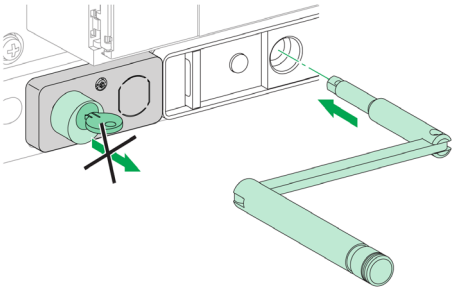
Step	Action	Corrective action
1	With the key captive in the keylock, check that the chassis is not locked.	If the key is missing or broken, replace the keylock. Refer to the *Masterpact MTZ Catalogue* for spare parts.
2	Verify that the racking handle is not inserted in the racking handle socket.	
3	Turn the key counterclockwise, and then remove it.  	If the key does not turn, replace the keylock.

Step	Action	Corrective action
4	Check that the racking handle cannot be inserted into the racking handle socket. 	If the racking handle can be inserted, check that the lock support is correctly installed (refer to *Masterpact MTZ VSPD Disconnected Position Locking - Instruction Sheet*). If the lock support is damaged, replace it. If the keylock is corroded, replace it. Then do the procedure again. If the problem persists, contact your field service representative.
5	Unlock the chassis and remove the key. Then do the procedure with the second key, if any.	

Checking Chassis Unlocking with Device in the Disconnected Position

Before starting this check, verify that the chassis is locked in the disconnected position.

For chassis with two keylocks, execute the following procedure for each keylock. Both keys must be inserted in the keylocks to unlock the chassis.

Step	Action	Corrective action
1	Put the key in the lock.	
2	Turn the key clockwise and check that the key remains captive.	If the key does not turn, replace the keylock. Refer to the *Masterpact MTZ Catalogue* for spare parts.
3	Check that the racking handle can be inserted into the racking handle socket so that racking operations can be carried out. 	If the racking handle cannot be inserted, check that the lock support is correctly installed (refer to *Masterpact MTZ VSPD Disconnected Position Locking - Instruction Sheet*). If the lock support is damaged, replace it. If the keylock is corroded, replace it. Then do the procedure again. If the problem persists, contact your field service representative.

Chassis Locking NII_Z_2: Operate Chassis Padlocking System

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Check the locking and unlocking of the chassis with padlocks in disconnected position or in any position, according to the chassis locking configuration.
Goal	Verify that the chassis padlocking system correctly operates.
Frequency	Annual
Special indications	–
Necessary tools	• Padlock with shackle diameter 5–8 mm • Racking handle
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Discharged	Disconnected or removed from chassis

Determining the Chassis Locking Configuration

The Masterpact MTZ drawout devices offer two chassis locking possibilities with padlocks:

- In disconnected position.
- In any position (disconnected, test, or connected).

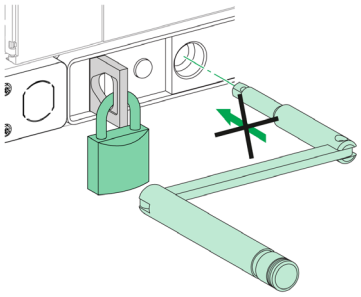
To determine the chassis locking possibility, move the device to the connected or test position:

- If you cannot pull out the padlocking tab, the chassis can be locked in disconnected position only. Execute the locking procedure then the unlocking procedure.
- If you can pull out the padlocking tab, the chassis can be locked in disconnected, test, or connected position. The locking and unlocking procedures are the same as with chassis in disconnected position. Execute these procedures in each position: connected, test, disconnected.

The following table shows the chassis locking configurations.

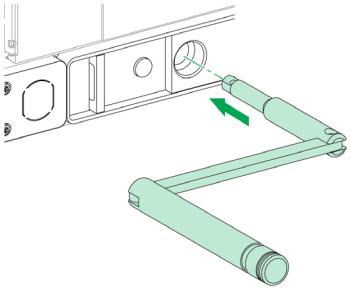
Chassis locking system	Device position in the chassis	Padlocking tab	Racking handle insertion with chassis locked
Chassis locking in disconnected position	Connected	Cannot be pulled out	Possible
	Test	Cannot be pulled out	Possible
	Disconnected	Can be pulled out	Not possible
Chassis locking in any position	Connected	Can be pulled out	Not possible
	Test	Can be pulled out	Not possible
	Disconnected	Can be pulled out	Not possible

Checking Chassis Padlocking With Device in Disconnected Position

Step	Action	Corrective action
1	Verify that the racking handle is not inserted in the racking handle socket.	
2	Pull out the padlocking tab.	If the padlocking tab cannot be pulled out, contact your field service representative.
3	Insert the padlock in this tab.	
4	Check that the racking handle cannot be inserted into the racking handle socket. 	If the racking handle can be inserted, contact your field service representative.

Checking Chassis Unlocking With Device in Disconnected Position

Before starting this check, verify that the chassis is locked in disconnected position.

Step	Action	Corrective action
1	Remove the padlock from the tab. ● With Masterpact MTZ1: push in the tab. ● With Masterpact MTZ2/MTZ3: the tab retracts automatically.	If the tab does not retract fully, contact your field service representative.
2	Check that the racking handle can be inserted into the racking handle socket so that racking operations can be carried out. 	If the racking handle cannot be inserted, contact your field service representative.

Chapter 3
Maintenance Procedures - Advanced Level

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Mechanism NIII_Z_1: Check the MCH Gear Motor Charging Time at 0.85 Un	80
Mechanism NIII_Z_2: Check the General Condition of the Mechanism	82
Breaking Unit NIII_Z_1: Check the Condition of the Breaking Unit	87
Auxiliaries NIII_Z_1: Check Operation of Indication Contacts (OF, PF)	93
Auxiliaries NIII_Z_2: Check Closing Operation with XF Closing Voltage Release at 0.85 Un	97
Auxiliaries NIII_Z_3: Check Opening Operation with MX Opening Voltage Release at 0.7 Un	99
Auxiliaries NIII_Z_4: Check Closing and Opening Operations with MN Undervoltage Release	101
Auxiliaries NIII_Z_5: Check Time Delay of MNR Delayed Undervoltage Release	104
Control Unit NIII_Z_1: Check Overcurrent Protection	107
Chassis NIII_Z_1: Clean Chassis and Check Presence of Grease on Chassis	110
Chassis NIII_Z_2: Check Disconnecting Contact Clusters	114
Power Connections NIII_Z_1: Check Connection System	116

Mechanism NIII_Z_1: Check the MCH Gear Motor Charging Time at 0.85 Un

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

Procedure characteristics	Description
Action	• Check the MCH gear motor charging time at 0.85 Un. • Check the continuity of electrical wiring for a drawout device.
Goal	Verify the correct operation of the MCH gear motor.
Frequency	Every 2 years
Special indications	Connect the MCH gear motor to a power supply.
Necessary tools	• Adjustable external power supply • Voltmeter • Stopwatch
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 MCH Gear Motor - Instruction Sheet* • *Masterpact MTZ2/MTZ3 MCH Gear Motor - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Test

MCH Gear Motor Charging Time Definition

The charging time is the time elapsed between the closing order and the moment when the mechanism is fully charged.

The charging time during closing operation and opening/closing operation does not exceed 6 seconds.

Checking the MCH Gear Motor Charging Time During Device Closing

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK

When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Before starting this check, it is advisable to verify that the device charges electrically as per procedure Mechanism NII_Z_2 *(see page 28)*.

Step	Action	Corrective action
1	Disconnect supply wires B1 and B2 (and B3 if connected) so that the MCH gear motor is not connected to a power supply.	
2	Connect terminals B1 and B2 to the adjustable external power supply.	
3	Set the voltage to 0.85 Un (minimum Un if the setting is for a range of voltages). The MCH gear motor charges the mechanism. The indicators show that the device is open and the mechanism is charged and ready-to-close. 	
4	Press the closing pushbutton and start the stopwatch. The device closes and the mechanism is automatically charged.	
5	Stop the stopwatch when the mechanism is charged and not ready-to-close. 	If the charging time exceeds 6 seconds: 1. Check that the MCH supply voltage remains at 0.85 Un while the MCH gear motor is charging the mechanism. 2. Do the procedure with another external source connected to terminals B1 and B2. 3. If the time is still too long, replace the MCH gear motor. If the problem persists, contact your field service representative to replace the breaking unit.

Checking the MCH Gear Motor Charging Time During Device Closing/Opening Sequence

Step	Action	Corrective action
1	Open the device.	
2	Press the closing pushbutton and immediately the opening pushbutton, and then start the stopwatch.	
3	Stop the stopwatch when the indicators show that the device is open and the mechanism is charged and ready-to-close. 	If the charging time exceeds 6 seconds: 1. Check that the MCH supply voltage remains at 0.85 Un while the MCH gear motor is charging the mechanism. 2. Do the procedure with another external source connected to terminals B1 and B2. 3. If the time is still too long, replace the MCH gear motor. If the problem persists, contact your field service representative to replace the breaking unit.

Reconnecting the MCH Gear Motor

Step	Action	Corrective action
1	Reconnect the supply wires (B1, B2, and B3 if present) as they were before executing the procedure.	
2	Open and close the device to check that the MCH gear motor operates properly.	

Mechanism NIII_Z_2: Check the General Condition of the Mechanism

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

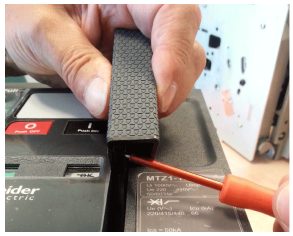
Procedure characteristics	Description
Action	Check the general condition of the mechanism: ● Positioning of XF/MX/MN voltage releases on the fixing plate. ● Positioning of springs in the groove on the axle. ● Condition of springs.
Goal	Verify that the mechanism correctly opens and closes the device.
Frequency	Every 2 years
Special indications	–
Necessary tools	Torx screwdriver
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* ● *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet* ● *Masterpact MTZ Circuit Breakers - Maintenance Guide*

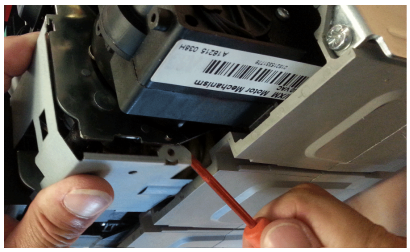
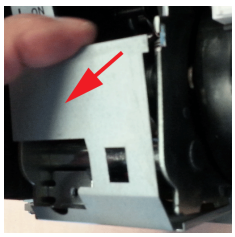
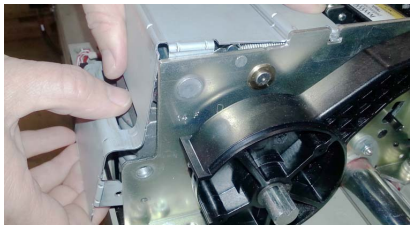
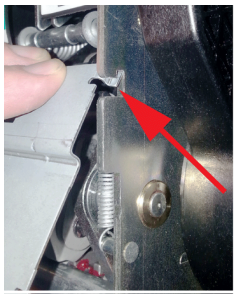
Pre-Test Conditions

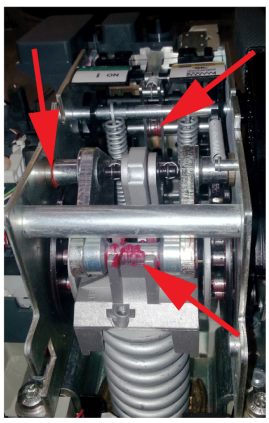
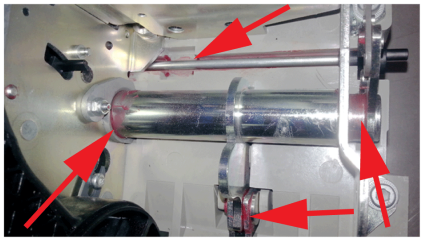
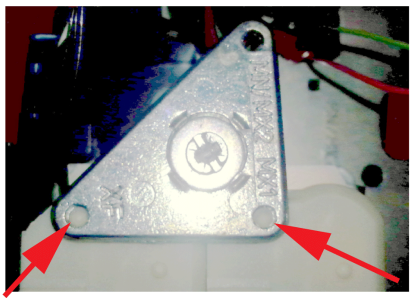
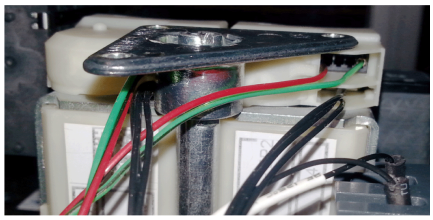
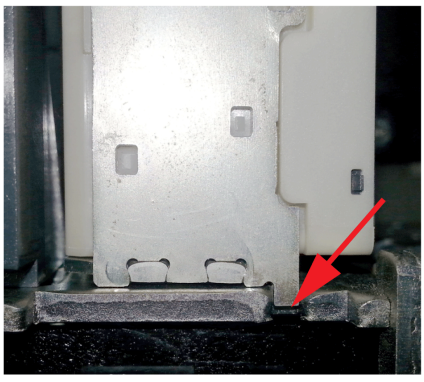
The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

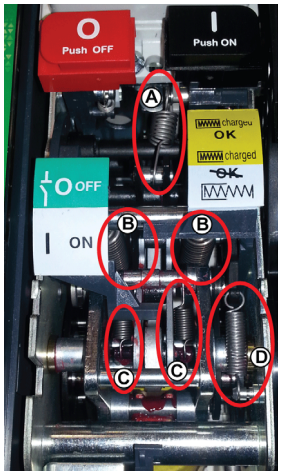
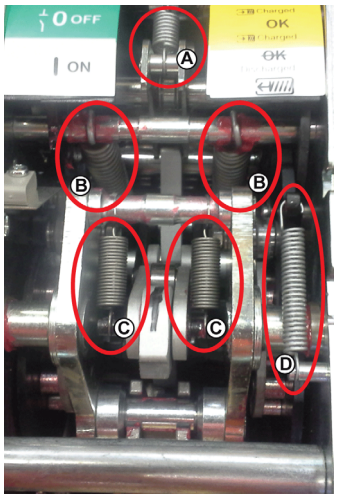
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Removed from chassis

Checking Mechanism

Step	Action	Corrective action
1	For Masterpact MTZ1: Remove the spring charging handle. **1.** Insert a thin screwdriver under the bottom left-hand corner of the spring charging handle.  **2.** Push the screwdriver to unclip the rubber cover of the spring charging handle.  **3.** Slide the rubber cover to the top and remove it from the spring charging handle. 	
2	Remove the front cover of the device.	

Step	Action	Corrective action
3	Remove the mechanism cover: ● For Masterpact MTZ1: using a thin screwdriver, release the tab on the left-hand side that holds the mechanism cover in place (do not break or bend the tab) and then free the right-hand side.   ● For Masterpact MTZ2/MTZ3: unscrew the screw that holds the mechanism cover in place then pull off the front cover.   	If the mechanism cover is damaged, contact your field service representative.

Step	Action	Corrective action
4	Check the general condition of the mechanism: ● Sufficient grease. ● No dust.  	If there is dust on the mechanism, or the consistency or color of the grease has changed, contact your field service representative.
5	Check that the XF/MX/MN voltage releases are correctly positioned on the fixing plate.   	If necessary, reposition the voltage releases (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*).

Step	Action	Corrective action
6	Check that the springs are present, in good condition, and correctly positioned in the groove on the axle. ● For Masterpact MTZ1:  **A** Opening latch **B** Pole opening springs **C** Connecting-rod springs **D** Closing latch ● For Masterpact MTZ2/MTZ3:  **A** Opening latch **B** Pole opening springs **C** Connecting-rod springs **D** Closing latch	If a spring is damaged or missing, contact your field service representative.
7	Manually charge the mechanism.	
8	Check that the springs are correctly positioned.	If a spring is not correctly positioned, carefully put it back into place. If the problem persists, contact your field service representative.
9	Close the device.	
10	Check that the springs are still correctly positioned.	If a spring is not correctly positioned, carefully put it back into place. If the problem persists, contact your field service representative.
11	Check the number of operating cycles at In and compare it with the maximum allowed for the connecting-rod springs as indicated in *Masterpact MTZ Circuit Breakers - Maintenance Guide*.	If the maximum number has been reached, contact your field service representative.
12	Put the mechanism cover back in place.	
13	Put the front cover back in place.	
14	For Masterpact MTZ1: Put the rubber cover back in place to the spring charging handle.	

Breaking Unit NIII_Z_1: Check the Condition of the Breaking Unit

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	Check the condition of the elements of the breaking unit: ● Separator plates and sides of arc chute assembly. ● Fixed and moving contact tips. ● Arcing contacts which protect the contact tips.
Goal	Verify that all subassemblies participating in arc extinction for rated and short-circuit currents correctly operate.
Frequency	Every 2 years
Special indications	This procedure is not applicable to the Masterpact MTZ1 H3 devices because arc chutes are not removable on Masterpact MTZ1 H3 devices.
Necessary tools	Torque wrench
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ1 Arc Chute - Instruction Sheet* ● *Masterpact MTZ2/MTZ3 Arc Chute - Instruction Sheet* ● *Masterpact MTZ Circuit Breakers - Maintenance Guide*

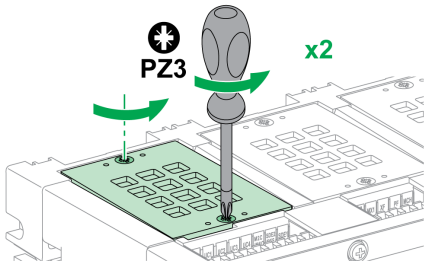
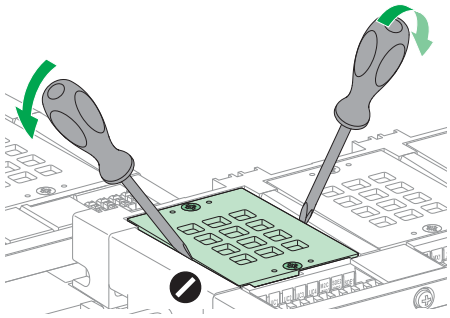
Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

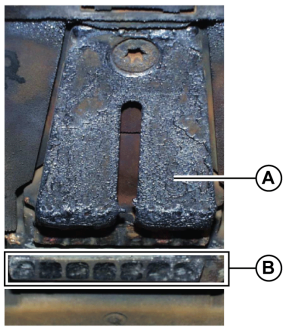
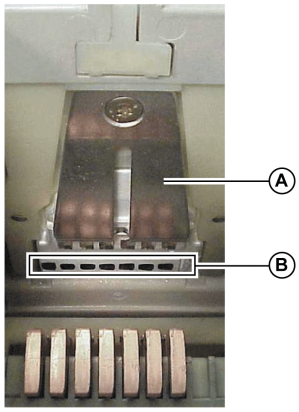
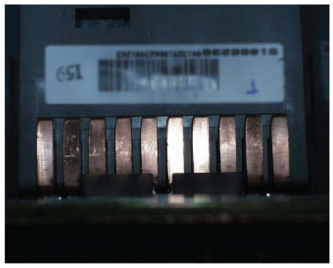
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Removed from chassis

Checking Separator Plates

Execute the following procedure for each arc chute and one arc chute at a time.

Step	Action	Corrective action
1	Remove the fixing screws on one arc chute.  **NOTE:** Do not remove the other arc chutes.	
2	Remove the arc chute.  **NOTE:** Do not turn the arc chute upside down when removing it so that the fixing screws do not fall in the arc chamber.	
3	Check the separator plates: the separator plates must not be corroded, they may be blackened but must not be significantly damaged. **Example:** Masterpact MTZ2 16 H1 with separator plates OK after 7,500 cycles at In. 	If damage is extensive, replace the arc chute (refer to *Masterpact MTZ Arc Chute - Instruction Sheet*). **Example:** Masterpact MTZ2 16 H1 with new separator plates. 
4	Compare the number of electrical operating cycles with the maximum values indicated in *Masterpact MTZ Circuit Breakers - Maintenance Guide*.	Depending on the number of electrical operating cycles and state of separator plates, replace the arc chute (refer to *Masterpact MTZ Arc Chute - Instruction Sheet*). Refer to the *Masterpact MTZ Catalogue* for spare parts.

Checking Surface of Arcing Contact and Fixed and Moving Contact Tips

Step	Action	Corrective action
1	With the arc chute removed, check the surface of the arcing contact and fixed contact tips. **Example:** Masterpact MTZ2 16 H1 with arcing contact and fixed contact tips OK after 7,500 operating cycles at In.  **A** Arcing contact **B** Fixed contact tips	If the arcing contact or fixed contact tips are extensively damaged, contact your field service representative to replace the breaking unit. **Example:** Masterpact MTZ2 16 H1 with new contact tips and arcing contact.  **A** Arcing contact **B** Fixed contact tips
2	Check the surface of the moving contact tips. **Example:** Masterpact MTZ1 with moving contact tips OK after 7,500 operating cycles at In. 	If the moving contact tips are extensively damaged, contact your field service representative to replace the breaking unit. **Example:** Masterpact MTZ2 16 H1 with new contact tips. 
3	Compare the number of operating cycles at In with the maximum values indicated in *Masterpact MTZ Circuit Breakers - Maintenance Guide*.	If the limit has been reached, contact your field service representative to replace the breaking unit. **Example:** For Masterpact MTZ2 16 H1, the breaking unit must be changed when 1,000 cycles are reached.

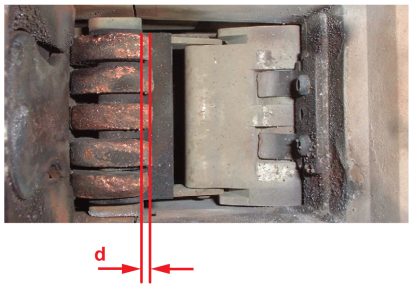
Checking Contact-Wear Indicator On Masterpact MTZ1

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The fixed device must be de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device and the auxiliary circuits are de-energized.

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

Step	Action	Corrective action
1	Close the device	
2	Check that the distance between the edge of the plastic and the arcing horn is at least 1 mm as shown below:  ● If 1 mm ≤ d < 3 mm, contact tips are OK. ● If d < 1 mm, contact tips are worn.	If d < 1 mm, the contact tips are worn. Contact your field service representative to replace the breaking unit.

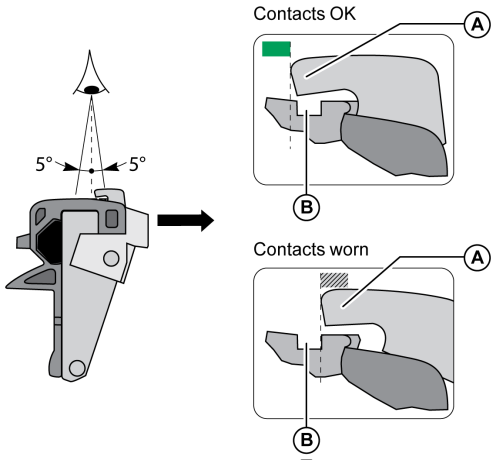
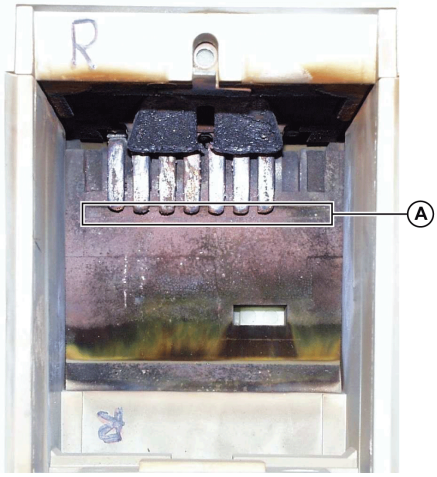
Checking Contact-Wear Indicator On Masterpact MTZ2/MTZ3

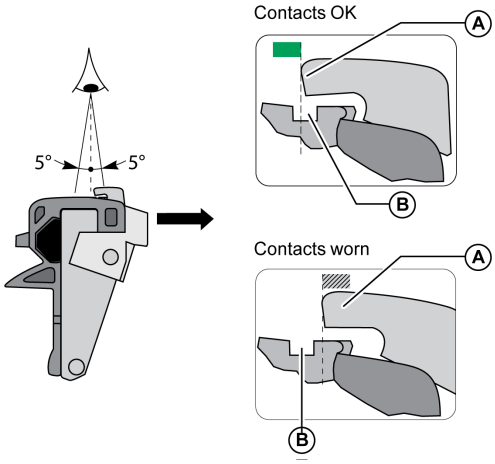
⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

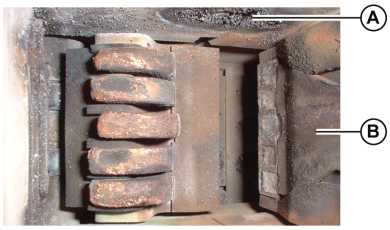
- The fixed device must be de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device and the auxiliary circuits are de-energized.

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

Step	Action	Corrective action
1	Close the device.	
2	Check that the channel is covered by the arcing horn for **Type A** devices: ● MTZ2 08–40 NA, HA, H1, H2, HA10 ● MTZ2 08–20 N1 ● MTZ2 20–40 H3  **A** Arcing horn **B** Channel **Example:** Contact-wear indicator on a Masterpact MTZ2 device OK after 7,500 operating cycles at In. 	If the channel is no longer covered, the contact tips are worn. Contact your field service representative to replace the breaking unit. **Example:** Original state of contact-wear indicator on a Masterpact MTZ2 device.  **A** Channel

Step	Action	Corrective action
3	Check that the channel is covered by the arcing horn for **Type B** devices: ● MTZ2 08-20 L1 ● MTZ3 40-63 H1, H2, HA  **A** Arcing horn **B** Channel	If the channel is no longer covered, the contact tips are worn. Contact your field service representative to replace the breaking unit. **Example:** Original state of contact-wear indicator on a Masterpact MTZ2 device.  **A** Channel

Checking Sides of Arc Chamber

Step	Action	Corrective action
1	Check the sides of the arc chamber. The sides of the arc chamber must not be cracked, they may be blackened but must show no traces of burns or holes.  **A** Traces of burns **B** Blackened parts	If the sides are burned or punctured, contact your field service representative to replace the breaking unit.
2	Put the arc chute back in place. **NOTE:** For Masterpact MTZ1: Make sure that the arrow on the top of the arc chute points towards the mechanism.	
3	Tighten the arc chute fixing screws to the recommended value using a torque wrench: ● For Masterpact MTZ1: 1.5 N•m ● For Masterpact MTZ2/MTZ3: 7 N•m	If a screw cannot be tightened at the recommended value, contact your field service representative.
4	Do the procedure from the beginning for another arc chute on the device.	

Auxiliaries NIII_Z_1: Check Operation of Indication Contacts (OF, PF)

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

Procedure characteristics	Description
Action	Check the operation of indication contacts OF and PF.
Goal	Verify electrical continuity of the installed contacts and contact robustness.
Frequency	Every 2 years
Special indications	–
Necessary tools	• Ohmmeter • LV847074SP terminal block
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 OF ON/OFF Indication Contacts - Instruction Sheet* • *Masterpact MTZ2/MTZ3 OF ON/OFF Indication Contacts - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 PF Ready-To-Close Contact - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*

Pre-Test Conditions

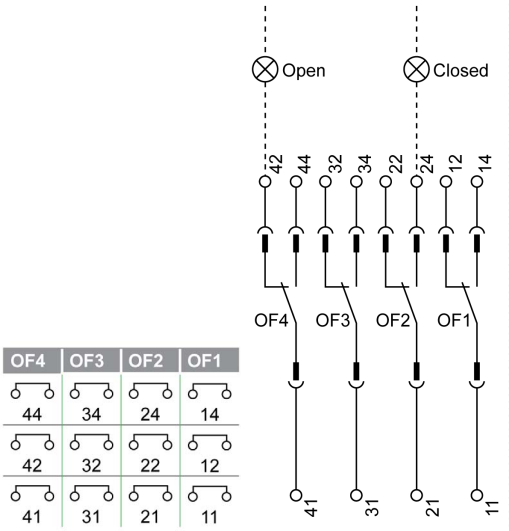
The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Discharged	–
Drawout	Open	Discharged	Test

OF Indication Contact Wiring Diagram

The number of OF indication contacts depends on the device type:

- A block of four OF indication contacts is supplied as standard on Masterpact MTZ1 and Masterpact MTZ2/MTZ3 devices.



OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

- Two additional blocks of four OF indication contacts (OF11–OF14, OF21–OF24) are optional on Masterpact MTZ2/MTZ3 devices.

OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11
244	234	224	214	144	134	124	114
242	232	222	212	142	132	122	112
241	231	221	211	141	131	121	111

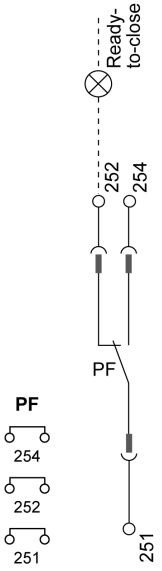
Checking Operation of OF Indication Contacts

Do this procedure for each OF indication contact of the device.

Step	Action	Corrective action
1	Check that the device is in the open position.	
2	Check electrical continuity between terminals: ● 41-42 ● 31-32 ● 21-22 ● 11-12	In case of electrical non-continuity between terminals: ● For a fixed device: replace the OF contact (refer to *Masterpact MTZ OF ON/OFF Indication Contacts - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the OF contact itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block at the appropriate location on the device.  **3.** Check the electrical continuity directly on the LV847074SP terminal block: ❍ If the check is correct, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the check is not correct, replace the OF contact and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.

Step	Action	Corrective action
3	Close the device.	
4	Check electrical continuity between terminals: ● 41-44 ● 31-34 ● 21-24 ● 11-14	In case of electrical non-continuity between terminals, see the corrective action concerning electrical continuity above.

PF Ready-To-Close Contact Wiring Diagram



Checking Operation of PF Ready-To-Close Contact

Step	Action	Corrective action
1	Close the device.	
2	Verify that the PF contact indicates that the device is not ready-to-close: ● Check electrical continuity between terminals 251-254. ● Check electrical non-continuity between terminals 251-252.	In case of electrical non-continuity between terminals 251-254, or electrical continuity between terminals 251-252: ● For a fixed device: replace the PF contact (refer to *Masterpact MTZ1/MTZ2/MTZ3 PF Ready-To-Close Contact - Instruction Sheet*) and do the procedure again. ● For a drawout device, malfunctions can be caused by the auxiliary terminal block or by the PF contact itself: **1.** Put the device in the withdrawn position. **2.** Insert an LV847074SP terminal block at the appropriate location on the device.  **3.** Check the electrical continuity and non-continuity directly on the LV847074SP terminal block: ❍ If the check is correct, replace the auxiliary terminal block (refer to *Masterpact MTZ1/MTZ2/MTZ3 Auxiliary Terminals - Instruction Sheet*) and do the procedure again with the device in the test position. ❍ If the check is not correct, replace the PF contact and do the procedure again with the device in the test position. Refer to the *Masterpact MTZ Catalogue* for spare parts. If the problem persists, contact your field service representative.
3	Open the device.	
4	Charge the mechanism.	

Step	Action	Corrective action
5	• Check that the device is not tripped. • Check that the device does not have a permanent opening order from an MN undervoltage release. • Check that the device does not have a permanent opening order from an MX opening voltage release. The device is ready-to-close.	• If the device is tripped, reset it by pushing in the blue fault-trip reset button. • If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release. • If the device is equipped with an MX opening voltage release, remove the power supply to the MX.
6	Verify that the PF contact indicates that the device is ready-to-close: • Check electrical continuity between terminals 251-252. • Check electrical non-continuity between terminals 251-254.	In case of electrical non-continuity between terminals 251-252, or electrical continuity between terminals 251-254, see the corrective action concerning electrical continuity above.

Auxiliaries NIII_Z_2: Check Closing Operation with XF Closing Voltage Release at 0.85 Un

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

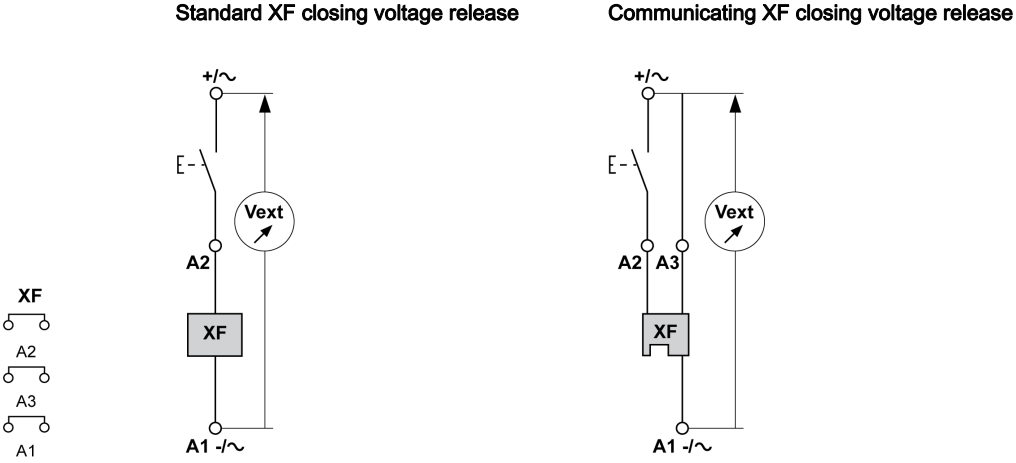
Procedure characteristics	Description
Action	Check closing the device with the XF closing voltage release at 0.85 Un.
Goal	Verify that the device closes electrically at Umin.
Frequency	Every 2 years
Special indications	Connect the XF closing voltage release to an external power supply.
Necessary tools	• Adjustable external power supply • Voltmeter • External pushbutton
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Charged	–
Drawout	Open	Charged	Removed from chassis

XF Closing Voltage Release Wiring Diagram



Closing Procedure with the XF Closing Voltage Release

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK

When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Before starting this check, it is advisable to execute a few electrical opening and closing cycles as per procedure Mechanism NII_Z_1 *(see page 22)*.

Step	Action	Corrective action
1	Disconnect supply wires on the customer terminal block.	
2	Connect the adjustable external power supply and external pushbutton according to the corresponding wiring diagram above.	
3	Set the external power supply voltage to 0.85 Un.	
4	Press the external pushbutton to close the device. The device closes.	If the device does not close: 1. Check that the power supply voltage is not lower than 0.85 Un and do the procedure again. 2. If the device still does not close, replace the XF closing voltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). If the problem persists, contact your field service representative.
5	Reconnect the customer terminal block according to the initial wiring.	
6	Check that the device electrically closes according to procedure Mechanism NII_Z_1 *(see page 22)*.	

Auxiliaries NIII_Z_3: Check Opening Operation with MX Opening Voltage Release at 0.7 Un

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

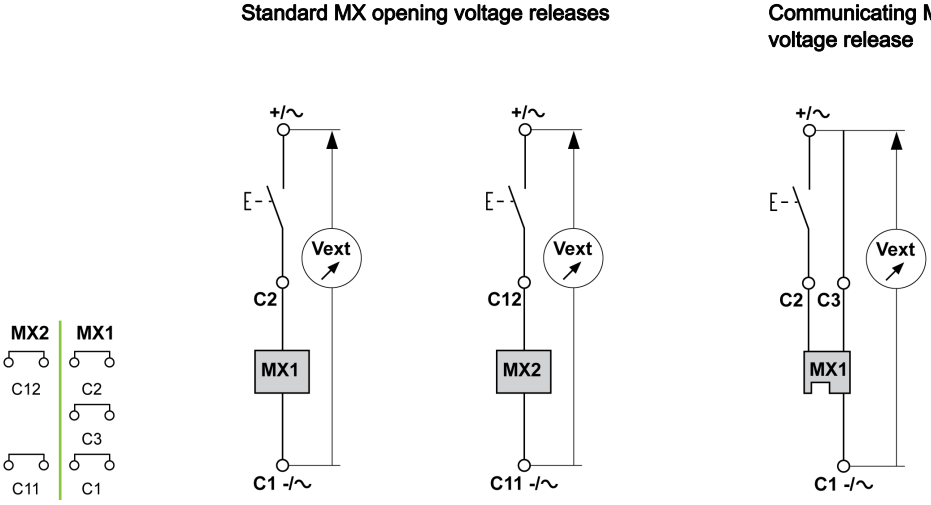
Procedure characteristics	Description
Action	Check opening the device with the MX opening voltage release at 0.7 Un.
Goal	Verify that the device opens electrically at Umin.
Frequency	Every 2 years
Special indications	Connect the MX opening voltage release to an external power supply.
Necessary tools	• Adjustable external power supply • Voltmeter • External pushbutton
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Closed	Charged or discharged	–
Drawout	Closed	Charged or discharged	Test

MX Opening Voltage Release Wiring Diagram



Opening Procedure with the MX Opening Voltage Release

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK

When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Before starting this check, it is advisable to execute a few electrical opening and closing cycles as per procedure Mechanism NII_Z_1 *(see page 22)*.

Step	Action	Corrective action
1	Disconnect supply wires on the customer terminal block.	
2	Connect the adjustable external power supply and external pushbutton according to the corresponding wiring diagram above.	
3	Set the external power supply voltage to 0.7 Un.	
4	Press the external pushbutton to open the device. The device opens.	If the device does not open: 1. Check that the power supply voltage is not below 0.7 Un and do the procedure again. 2. If the device still does not open, replace the MX opening voltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). If the problem persists, contact your field service representative.
5	Reconnect the customer terminal block according to the initial wiring.	
6	Check that the device electrically opens according to procedure Mechanism NII_Z_1 *(see page 22)*.	

Auxiliaries NIII_Z_4: Check Closing and Opening Operations with MN Undervoltage Release

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

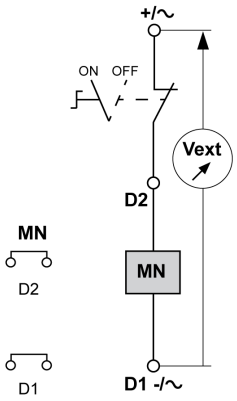
Procedure characteristics	Description
Action	• Check closing the device with the MN undervoltage release at Un. • Check opening the device with the MN undervoltage release below 0.7 Un. • Check closing the device with the MN undervoltage release above 0.35 Un.
Goal	Verify device operation when equipped with an MN undervoltage release operating.
Frequency	Every 2 years
Special indications	• Connect the MN undervoltage release to an external power supply. • With an MNR delayed undervoltage release, disconnect the MN delay unit.
Necessary tools	• Adjustable external power supply • Voltmeter • External switch
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

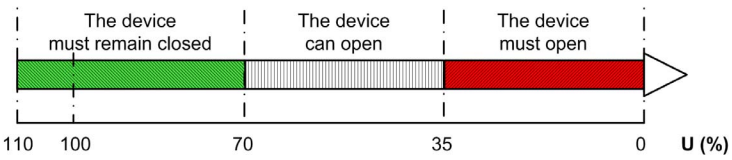
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Open	Charged	–
Drawout	Open	Charged	Test

MN Undervoltage Release Wiring Diagram

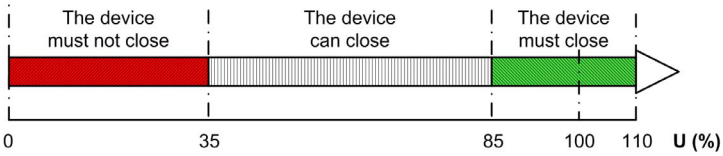


MN Undervoltage Release Operating Mode

Masterpact MTZ device status with an MN undervoltage release during voltage drop:



Masterpact MTZ device status with an MN undervoltage release during voltage increase:



Closing and Opening Procedures with the MN Undervoltage Release

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK

When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Before starting this check, it is advisable to execute a few electrical opening and closing cycles as per procedure Mechanism NII_Z_1 *(see page 22)*.

Step	Action	Corrective action
1	Disconnect supply wires on the customer terminal block.	
2	Connect the external switch and the adjustable external power supply according to the wiring diagram above.	
3	Set the external power supply voltage to Un.	
4	Close the external switch.	

Step	Action	Corrective action
5	Press the closing pushbutton. The device closes.	If the device does not close: **1.** Check that the power supply voltage is set to Un and do the procedure again. **2.** If the device still does not close, replace the MN undervoltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). If the problem persists, contact your field service representative.
6	Gradually decrease the voltage: ● The device can open at any voltage between 0.7 Un and 0.35 Un. ● The device must open at 0.35 Un. ● The device must remain open below 0.35 Un.	● If the device opens before the voltage reaches 0.7 Un, replace the MN undervoltage release. ● If the device does not open below 0.35 Un, replace the MN undervoltage release. ● If the device does not remain open below 0.35 Un, replace the MN undervoltage release. Refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet* to replace the MN undervoltage release. If the problem persists, contact your field service representative.
7	Set the voltage to a value lower than 0.35 Un.	
8	Charge the mechanism.	
9	Press the closing pushbutton. The device must not close.	If the device closes: **1.** Check that the power supply voltage is set to a value lower than 0.35 Un and do the procedure again. **2.** If the device still closes, replace the MN undervoltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). If the problem persists, contact your field service representative.
10	Gradually increase the voltage. While pressing the closing pushbutton: ● The device can close at any voltage between 0.35 Un and 0.85 Un. ● The device must close at 0.85 Un. ● The device must remain closed above 0.85 Un.	● If the device does not close at 0.85 Un, replace the MN undervoltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). ● If the device does not remain closed above 0.85 Un, replace the MN undervoltage release (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*). If the problem persists, contact your field service representative.
11	Reconnect the customer terminal block according to the initial wiring.	
12	Check that the device electrically closes and opens according to procedure Mechanism NII_Z_1 *(see page 22)*.	

Auxiliaries NIII_Z_5: Check Time Delay of MNR Delayed Undervoltage Release

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

Procedure characteristics	Description
Action	Check the time delay on the MN delay unit at 0.35 Un and 0.7 Un.
Goal	Verify that the MNR delayed undervoltage release is not activated before the end of the selected time delay.
Frequency	Every 2 years
Special indications	Connect the MNR delayed undervoltage release to an external power supply.
Necessary tools	• Adjustable external power supply • Voltmeter • Stopwatch
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Voltage Releases - Instruction Sheet* • *Masterpact MTZ1/MTZ2/MTZ3 MN-MX-XF Communicating Voltage Releases with Diagnostic Function - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

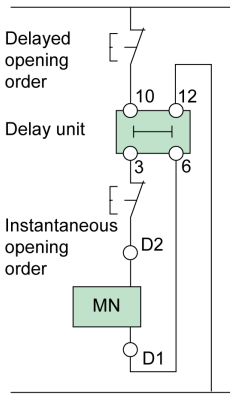
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Closed	Discharged	–
Drawout	Closed	Discharged	Test

Time Delay Definition

The time delay is the time elapsed between the opening order and the moment when the MNR delayed undervoltage release operates.

The time delay does not exceed the delay setting ±15%.

MNR Delayed Undervoltage Release Wiring Diagram



Checking the Time Delay of the MN Delay Unit During Device Opening

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK

When using the adjustable external power supply, take all suitable measures to protect against electric shock.

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

Before starting this check, it is advised to execute a few electrical opening and closing cycles as per procedure Mechanism NII_Z_1 *(see page 22)*.

Step	Action	Corrective action
1	Disconnect supply wires on the customer terminal block.	
2	Connect the adjustable external power supply according to the corresponding wiring diagram above. **NOTE:** If possible, the opening time should be measured using the main connections. If that is not possible, carry out the measurement on an OF contact.	
3	Set the external power supply voltage to 0.35 Un.	
4	To start the stopwatch, remove the power supply or issue a delayed opening order.	
5	The device opens when the time delay equals the delay setting on the MN delay unit. The stopwatch stops when the device opens.	
6	Check the time delay on the stopwatch: it must equal the delay setting ±15%.	If the time delay differs by more than ±15% from the delay unit setting, replace the MN delay unit (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*) and do the procedure again. If the problem persists, contact your field service representative.
7	Reconnect the external power supply to the MNR delayed undervoltage release, and then close the device.	
8	Set the external power supply voltage to 0.7 Un.	
9	To start the stopwatch, remove the power supply or issue a delayed opening order.	
10	The device opens when the time delay equals the delay setting on the MN delay unit. The stopwatch stops when the device opens.	

Step	Action	Corrective action
11	Check the time delay on the stopwatch: it must equal the delay setting ±15%.	If the time delay differs by more than ±15% from the delay unit setting, replace the MN delay unit (refer to *Masterpact MTZ MN-MX-XF Voltage Releases - Instruction Sheet*) and do the procedure again. If the problem persists, contact your field service representative.
12	Reconnect the customer terminal block according to the initial wiring.	
13	Check that the device electrically closes and opens according to procedure Mechanism NII_Z_1 *(see page 22)*.	

Control Unit NIII_Z_1: Check Overcurrent Protection

Safety Instructions

⚠ ⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

Procedure Definition

Procedure characteristics	Description
Action	● Check overcurrent protection (long-time, short-time, instantaneous) by using Ecoreach software installed on a PC. ● Check fault-trip LEDs. ● Save the test results to a personal computer.
Goal	Verify that the control unit operates when any electrical fault occurs.
Frequency	Every 2 years
Special indications	–
Necessary tools	● A PC running Ecoreach software ● A USB cable (standard to mini USB port)
Reference documents *(see page 7)*	● *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* ● *Micrologic X Control Unit - User Guide* ● *Ecoreach Online Help*

Pre-Test Conditions

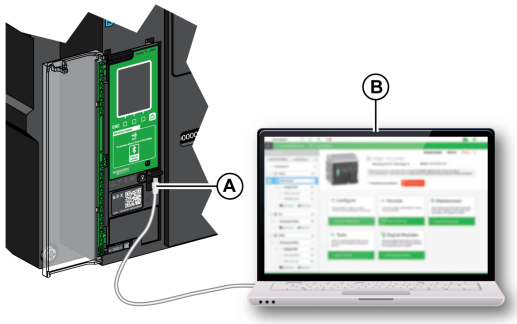
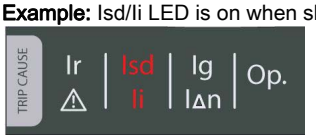
The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	Closed	Discharged	–
Drawout	Closed	Discharged	Test

Checking Overcurrent Protection and Fault-Trip LEDs

Do the procedure for each of the following types of overcurrent protection:

- Long-time Ir
- Short-time Isd
- Instantaneous Ii
- Ground-fault Ig (Micrologic 6.0 X),
- Earth-leakage fault IΔn (Micrologic 7.0 X)

Step	Action	Corrective action
1	If the device is equipped with an MN undervoltage release, either connect it to the power supply with its rated voltage or remove the MN undervoltage release.	
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.  **A** Cable plug connected to the mini USB port of Micrologic X control unit **B** PC running Ecoreach software	
3	On Ecoreach software, select the device.	
4	In the test menu, select automatic test. Choose the overcurrent protection to be tested.	
5	Check that the device is closed and the fault-trip LEDs are off.	
6	Launch the automatic test.	
7	Check that the device trips.	If the device does not trip: **1.** Check that the device is closed. **2.** Check that the blue fault-trip reset button is pushed-in. Refer to troubleshooting in the appendix *(see page 165)*. **3.** Do the procedure again. ● If the problem persists, contact your field service representative.
8	Check that the LED corresponding to the protection tested is on and the screen display turns to red with the corresponding message. **Example:** Isd/Ii LED is on when short-time protection is tested.  	
9	Check test result on Ecoreach: ● If the test result is **Pass**, reset the thermal memory then continue the next test. ● If the test result is **Fail**, reset the thermal memory then redo the test. If the problem persists, contact your field service representative.	
10	To restart the test for the other overcurrent protection: ● Press and hold the Test/Reset button for 3 seconds. ● Press the blue fault-trip reset button on the front cover.	
11	Close the device.	
12	Go to step 4 and do the procedure again to test another overcurrent protection.	

Saving the Test Results to a PC

Step	Action	Corrective action
1	After running the overcurrent protection tests, access the test results in Ecoreach software.	
2	Save the results on the PC and print them, if needed.	

Chassis NIII_Z_1: Clean Chassis and Check Presence of Grease on Chassis

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

Procedure characteristics	Description
Action	• Check cleanliness of internal parts of the chassis (no dust) and presence of grease. • If necessary, spread the grease uniformly across the mechanical parts of the chassis.
Goal	Verify the smooth mechanical racking-in and racking-out of the device.
Frequency	Every 2 years
Special indications	–
Necessary tools	• Vacuum cleaner • Small paintbrush
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Discharged	Removed from chassis

Checking Cleanliness and Greasing of Internal Parts of Chassis

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

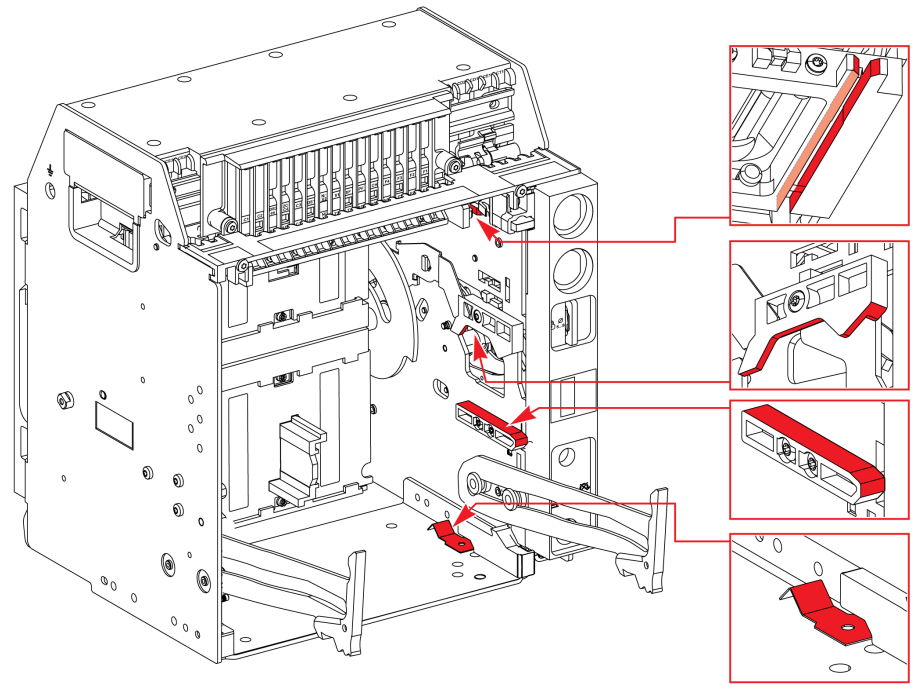
- The chassis must be de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the chassis and the auxiliary circuits are de-energized.

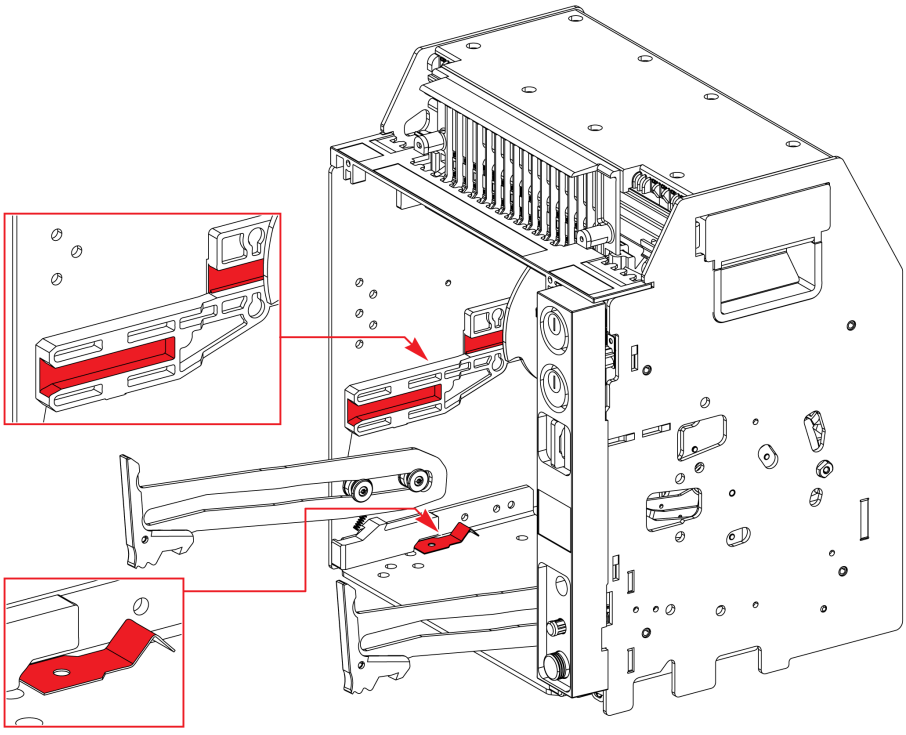
Failure to follow these instructions will result in death or serious injury.

Step	Action	Corrective action
1	Check cleanliness of the internal parts of the chassis.	In presence of dust, use a vacuum cleaner to remove it. **NOTE:** To avoid soiling the chassis: ● The use of an air hose is strictly forbidden, use a vacuum cleaner instead. ● Do not blow air inside the chassis.
2	Check the color and texture of grease. See parts indicated in the corresponding illustrations for Masterpact MTZ1 *(see page 112)* or Masterpact MTZ2/MTZ3 *(see page 113)*. **NOTE:** ● Dust mixed with grease can be abrasive and can lead to premature wear of mechanisms. ● Dust mixed with grease can increase mechanical friction and blocking moving parts.	If there is a change in grease (for example, grease is dirty or hardened on the mechanical parts of the chassis), contact your field service representative.
3	Check if the grease on the mechanical parts is applied uniformly on the whole zone concerned. See parts indicated in the corresponding illustrations for Masterpact MTZ1 *(see page 112)* or Masterpact MTZ2/MTZ3 *(see page 113)*. **NOTE:** ● Too much grease impacts negatively on the device operation. ● Absence of grease increases racking forces and leads to blocking moving parts.	● If there is excessive grease, spread the grease uniformly across the zone with a small paintbrush. ● If there is no grease, contact your field service representative.

Grease Points On Masterpact MTZ1 Chassis

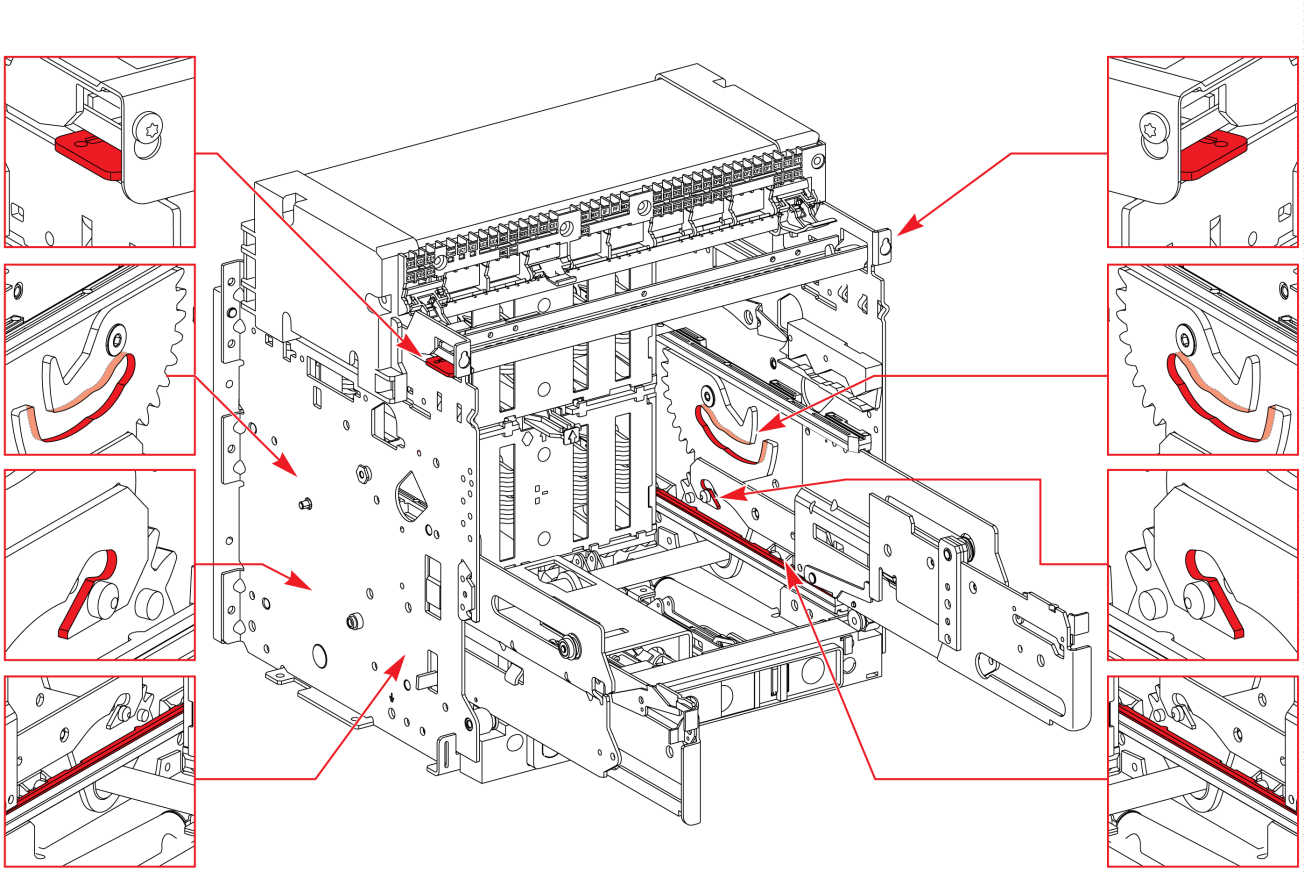
Check grease points on the right and left hand-side of the chassis as indicated on the zones identified in these illustrations.





Grease Points On Masterpact MTZ2/MTZ3 Chassis

Check grease points symmetrically on the right and left hand-side of the chassis as indicated on the zones identified in these illustrations.



Chassis NIII_Z_2: Check Disconnecting Contact Clusters

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

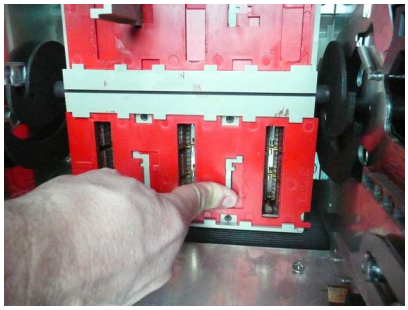
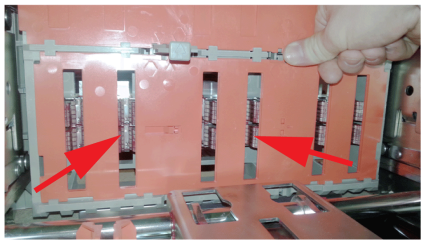
Procedure characteristics	Description
Action	Visually check the disconnecting contact clusters and cluster supports.
Goal	• Verify the smooth mechanical racking-in of the device. • Verify the smooth racking-out of the device (avoid pulling out the clusters during disconnection).
Frequency	Every 2 years
Special indications	–
Necessary tools	–
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	Open	Discharged	Removed from chassis

Checking Disconnecting Contact Clusters

Step	Action	Corrective action
1	If present, remove the VIVC locking accessory for safety shutters (Masterpact MTZ2/MTZ3).	
2	Without removing the safety shutters, visually check the disconnecting contact clusters. ● Masterpact MTZ1  ● Masterpact MTZ2/MTZ3 	
3	Check that no copper is present on the surface of the clusters.	If copper is visible, contact your field service representative.
4	Check if the disconnecting contact clusters are blackened.	If the disconnecting contact clusters are blackened, contact your field service representative.
5	Check the state of the grease on disconnecting contact clusters.	If there is no grease or there is a change in color or texture of grease, contact your field service representative.
6	Reinstall the optional VIVC locking accessory for safety shutters (Masterpact MTZ2/MTZ3).	

Maintaining Gold-Plated Assembly (Disconnecting Contact Clusters)

If the disconnecting contact clusters are gold-plated, no particular maintenance is required. Grease contacts and disconnecting contact clusters every 2 years.

Power Connections NIII_Z_1: Check Connection System

Safety Instructions

⚠⚠ 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 maintenance procedures, all operations (inspection, test, and preventive maintenance) must be carried out with the device, the chassis, and the auxiliary circuits de-energized.
- Check that the device and the chassis are de-energized on the upstream and downstream terminals.
- Always use a properly rated voltage sensing device to confirm that the device, the chassis, and the auxiliary circuits are de-energized.
- Install safety barriers and display a danger sign.
- During the tests, it is strictly forbidden for anyone to touch the device, the chassis, or the conductors while voltage is applied.
- Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, there are no tools or objects inside the equipment, all devices, doors, and protective covers are in position, and the device is off (open position).

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

⚠ 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.

Procedure Definition

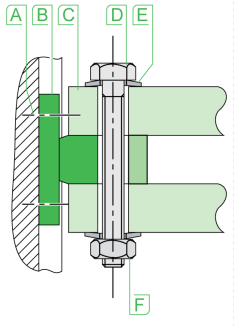
Procedure characteristics	Description
Action	• Check that the connection terminals and cables and/or busbars are correctly tightened. • Check presence and state of grease. • Check penetration of terminals in clusters in the case of a drawout device. • Clean contact surfaces.
Goal	Verify normal temperature rise on device and customer connections according to IEC standards.
Frequency	Following the visual inspection of connections as per procedure Device NII_Z_1 *(see page 20)* during which traces of overheating are identified.
Special indications	–
Necessary tools	• White abrasive pad (for example, Scotch-Brite) • Torque wrench • Small paintbrush • New bolts, nuts, and washers
Reference documents *(see page 7)*	• *Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ2/MTZ3 Circuit Breakers and Switch-Disconnectors - User Guide* • *Masterpact MTZ1 Connectors - Instruction Sheet* • *Masterpact MTZ2/MTZ3 Connectors - Instruction Sheet*

Pre-Test Conditions

The device must comply with the conditions specified below. Refer to the *Masterpact MTZ User Guides* to find instructions for operating the device.

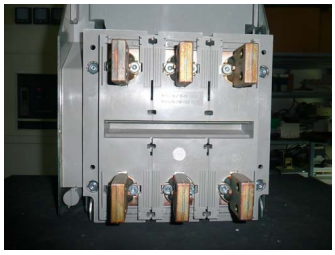
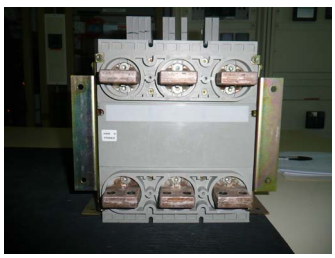
Device installation type	Position of poles	Mechanism	Device position in the chassis
Fixed	–	–	–
Drawout	–	–	Removed from chassis

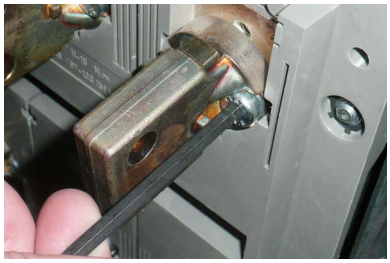
Example of Hardware Connection



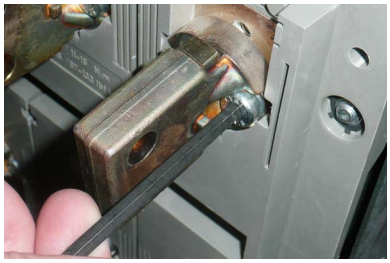
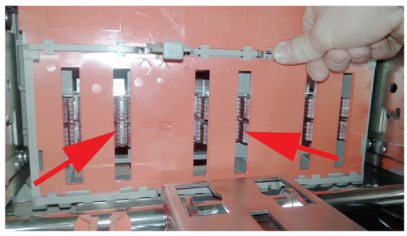
A Terminal screw factory-tightened to 13 N•m (Masterpact MTZ1) and 17 N•m (Masterpact MTZ2/MTZ3)
B Circuit breaker terminal
C Busbar
D Bolt
E Washer
F Nut

Fixed Device: Checking Mounting of Connection Terminals to Device and Cables And/Or Busbars to Connection Terminals

Step	Action	Corrective action
1	Disconnect busbars from all the connection terminals. Connection types: ● Mixed connection  ● Vertical rear connection  ● Horizontal rear connection 	Advise customer in case of damage to busbars noticed during disconnection.

Step	Action	Corrective action
2	Check the recommended torque value on the device: • For Masterpact MTZ1: 13 N•m  • For Masterpact MTZ2/MTZ3: 17 N•m	
3	Make sure that the screws are not overtightened: 1. Set the torque wrench to 1 N•m under the recommended value, and then tighten connection terminals to this value.  2. Set the torque wrench to the recommended value, and then tighten connection terminals to this value.	If a screw cannot be tightened to this value, contact your field service representative.
4	Clean the busbar contact surfaces and customer terminals by using a white abrasive pad.	If there is a major change in color, contact your field service representative.
5	Disconnect cables from all the connection terminals.	Advise customer in case of damage to cables noticed during disconnection.
6	Clean the contact surfaces of the cable lugs by using a white abrasive pad.	Advise customer in case of damage to the cable insulation (for example, cracks or cable shrinkage).
7	Reconnect the cables and/or busbars with a new set of bolts, nuts, and washers, and then tighten to the recommended torque. **NOTE:** Standard connection hardware is class 8.8 steel hardware with contact washers. For MTZ2 40, MTZ3 40, MTZ3 50, and MTZ3 63, it is recommended to use A80 stainless steel hardware.	

Drawout Device: Checking Mounting of Connection Terminals to Device and Cables And/Or Busbars to Connection Terminals

Step	Action	Corrective action
1	Check the recommended torque value on the device: ● For Masterpact MTZ1: 13 N•m ● For Masterpact MTZ2/MTZ3: 17 N•m	
2	Make sure that the screws are not overtightened: **1.** Set the torque wrench to 1 N•m under the recommended value, and then tighten connection terminals to this value.  **2.** Set the torque wrench to the recommended value, and then tighten connection terminals to this value.	If a screw cannot be tightened to this value, contact your field service representative.
3	Check the state of the grease on internal terminals on device.	● If there is excessive grease, spread the grease uniformly across the zone with a small paintbrush. ● If there is no grease or there is a change in color or texture of grease, contact your field service representative.
4	Check that the depth of the penetration of internal terminals in the clusters, indicated by the mark, is about 5 mm. 	If penetration depth is less that 5 mm, contact your field service representative.
5	Open manually the upper and lower safety shutters, and check presence of grease on the clusters. 	● If there is excessive grease, spread the grease uniformly across the zone with a small paintbrush. ● If there is no grease or there is a change in color or texture of grease, contact your field service representative.
6	Disconnect customer cables and/or busbars from all the connection terminals on the chassis.	Advise customer in case of damage to cables or busbars noticed during disconnection.
7	Make sure that the screws are not overtightened: Set the torque wrench to 1 N•m under the recommended value, and then tighten connection terminals to this value.	If a screw cannot be tightened to this value, contact your field service representative.
8	Without removing the customer terminals, tighten connection terminals to the recommended value: ● For Masterpact MTZ1: 13 N•m ● For Masterpact MTZ2/MTZ3: 17 N•m	If a screw cannot be tightened to this value, contact your field service representative.

Step	Action	Corrective action
9	Clean the busbar contact surfaces and customer terminals by using a white abrasive pad.	If there is a major change in color, contact your field service representative.
10	Clean the contact surfaces of the cable lugs by using a white abrasive pad.	
11	Reconnect the cables and/or busbars with a new set of bolts, nuts, and washers, and then tighten to the recommended torque. **NOTE:** Standard connection hardware is class 8.8 steel hardware with contact washers. For MTZ2 40, MTZ3 40, MTZ3 50, and MTZ3 63, it is recommended to use A80 stainless steel hardware.	

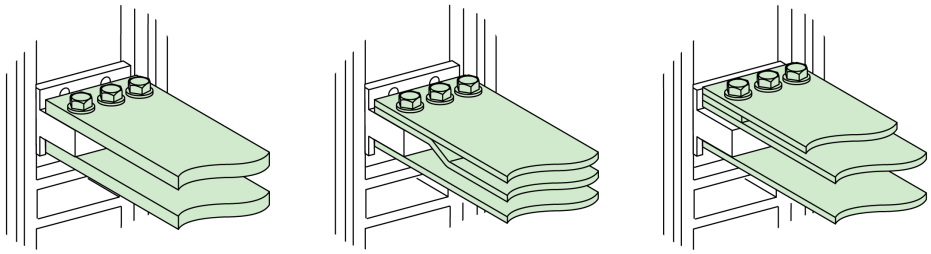
Terminal Mounting on Device and Recommended Tightening Torque

Refer to the following documentation:

- *Masterpact MTZ1 Connectors - Instruction Sheet*
- *Masterpact MTZ2/MTZ3 Connectors - Instruction Sheet*

Recommended Tightening Torque of Connecting Busbars

The following table shows the tightening torques to be used for connecting busbars (Cu ETP - French standard NFA 51-100) to the circuit breaker. These values are for use with copper busbars and steel nuts and bolts, class 8.8. The same torques can be used with AGS-T52 quality aluminum bars (French standard NFA 02-104 or American National Standard H-35-1).



Ø (mm) Nominal	Ø (mm) Drilling	Tightening torques (N•m) with grower or flat washers	Tightening torques (N•m) with contact or corrugated washers
10	11	37.5	50

Appendices

What Is in This Appendix?

The appendix contains the following chapters:

Chapter	Chapter Name	Page
A	Masterpact MTZ1 Description	123
B	Masterpact MTZ2/MTZ3 Description	137
C	Micrologic X Control Unit Description	153
D	Masterpact MTZ Troubleshooting	165

Appendix A
Masterpact MTZ1 Description

What Is in This Chapter?

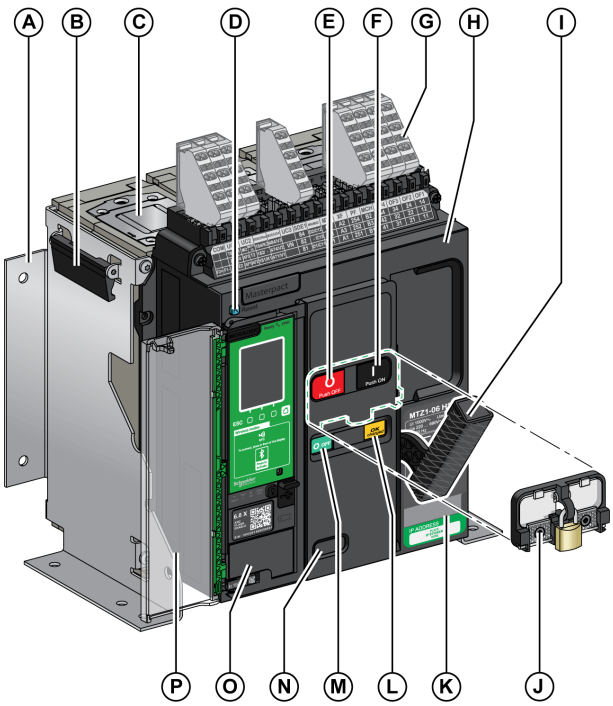
This chapter contains the following topics:

Topic	Page
Fixed Device	124
Drawout Device	127
Device Identification	134

Fixed Device

Fixed Device Description

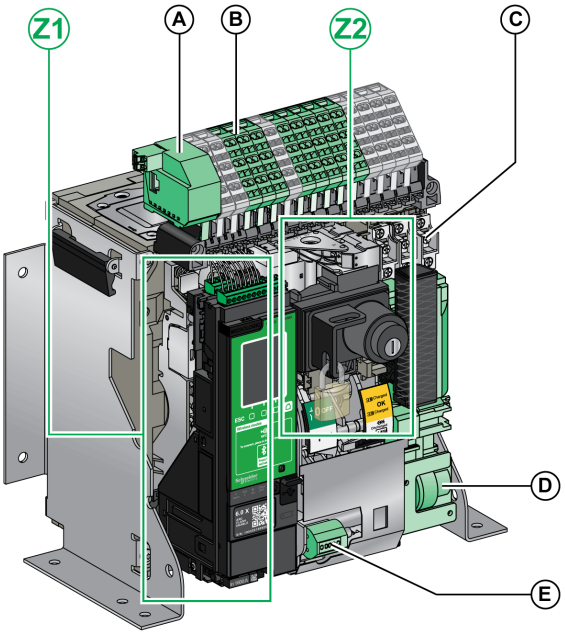
The following image shows the standard version of the fixed device (no optional accessories).



A Mounting side plate
B Carrying handles
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 Position indicator of main contacts
N Window to read the (optional) CDM mechanical operation counter
O Control unit
P Control unit transparent cover

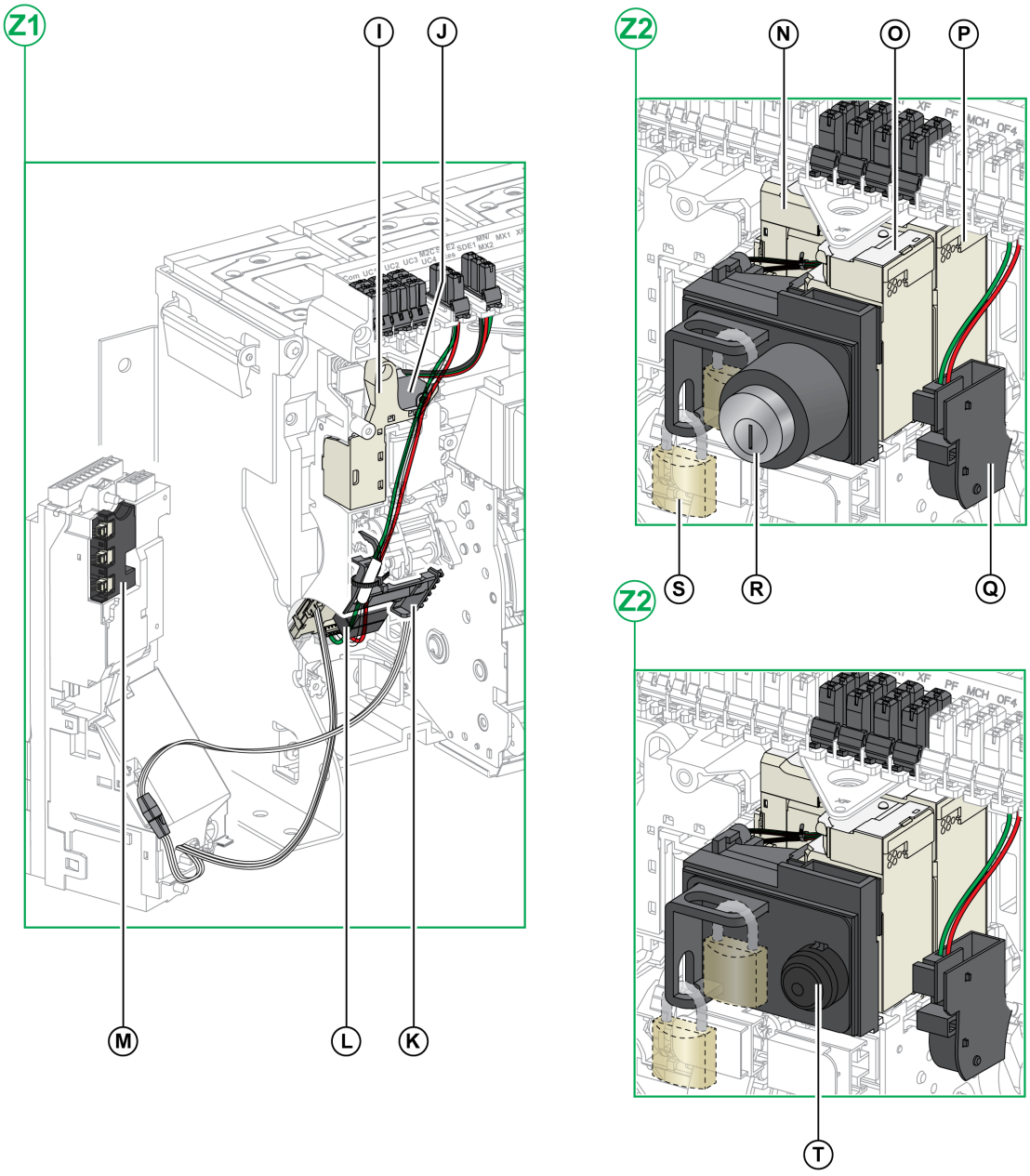
Fixed Device Accessories Description

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



A ULP port module
B Terminal blocks for optional accessories
C Standard block of four OF indication contacts
D MCH gear motor
E CDM mechanical operation counter
Z1, Z2 See following images

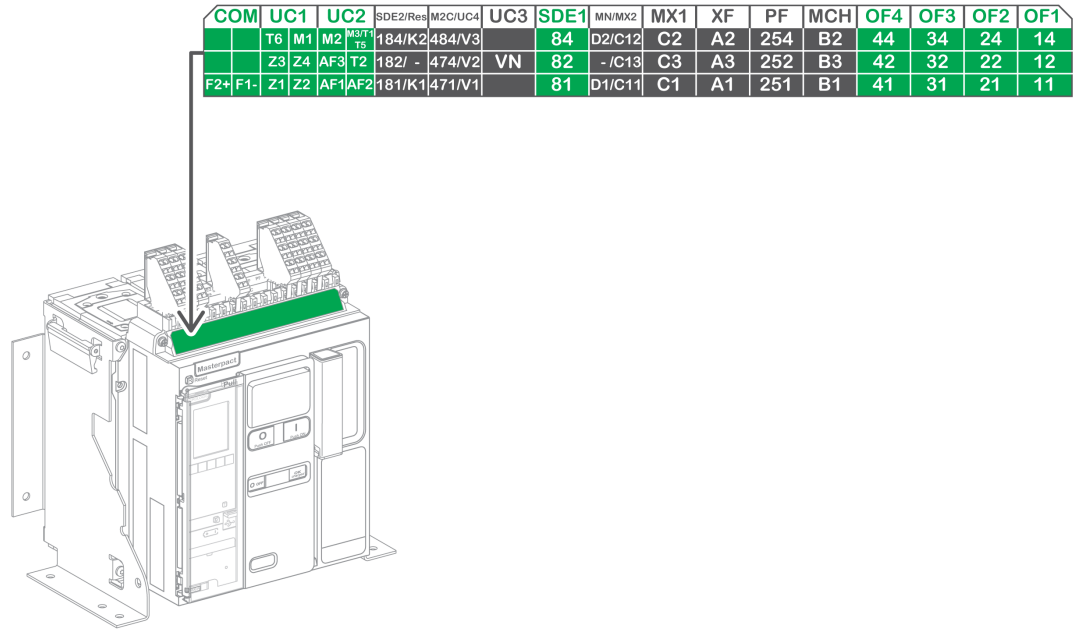
The following images zoom in on the accessories for the fixed device:



I Standard SDE1 fault-trip indication contact
J Optional SDE2 fault-trip indication contact or RES electrical remote reset
K Microswitch
L M2C programmable contacts
M Isolation module

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

Fixed Device Terminal Block Description



Terminal block supplied as standard

Optional terminal block

The following table describes the assignment of the terminal blocks.

Block	Marking	Description	Standard/Optional
A	COM	ULP port module or terminal block for the external power supply of the Micrologic X control unit	Optional
	UC1	Zone selective interlocking, rectangular sensor, or MDGF module input	Standard
	UC2	Neutral external sensors, rectangular sensor, or MDGF module input	Standard
	SDE2/RES	SDE2 fault-trip indication contact 2 or RES electrical remote reset	Optional
	M2C/UC4	M2C programmable contacts or external voltage connector	Optional
	UC3	Voltage connector	Optional
	SDE1	SDE1 fault-trip indication contact 1	Standard
B	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
C	OF1-OF4	4 OF indication contacts	Standard

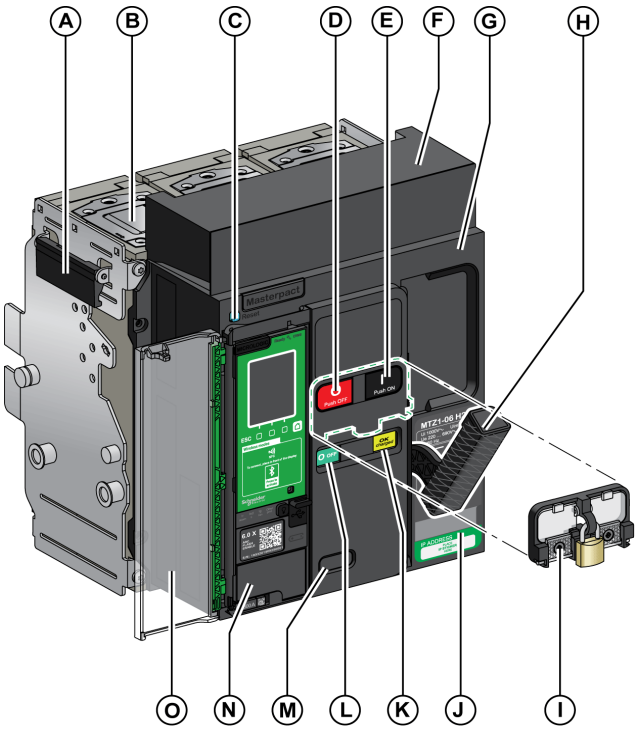
Drawout Device

Definition

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

Drawout Device Moving Part Description

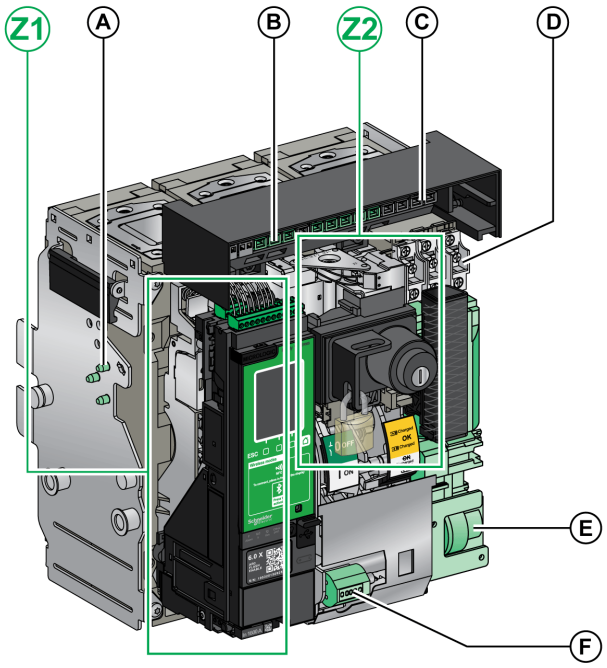
The following image shows the standard version of the moving part of a drawout device (no optional accessories).



A Carrying handles
B Arc chute
C Fault-trip reset button
D Opening pushbutton
E Closing pushbutton
F Terminal 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

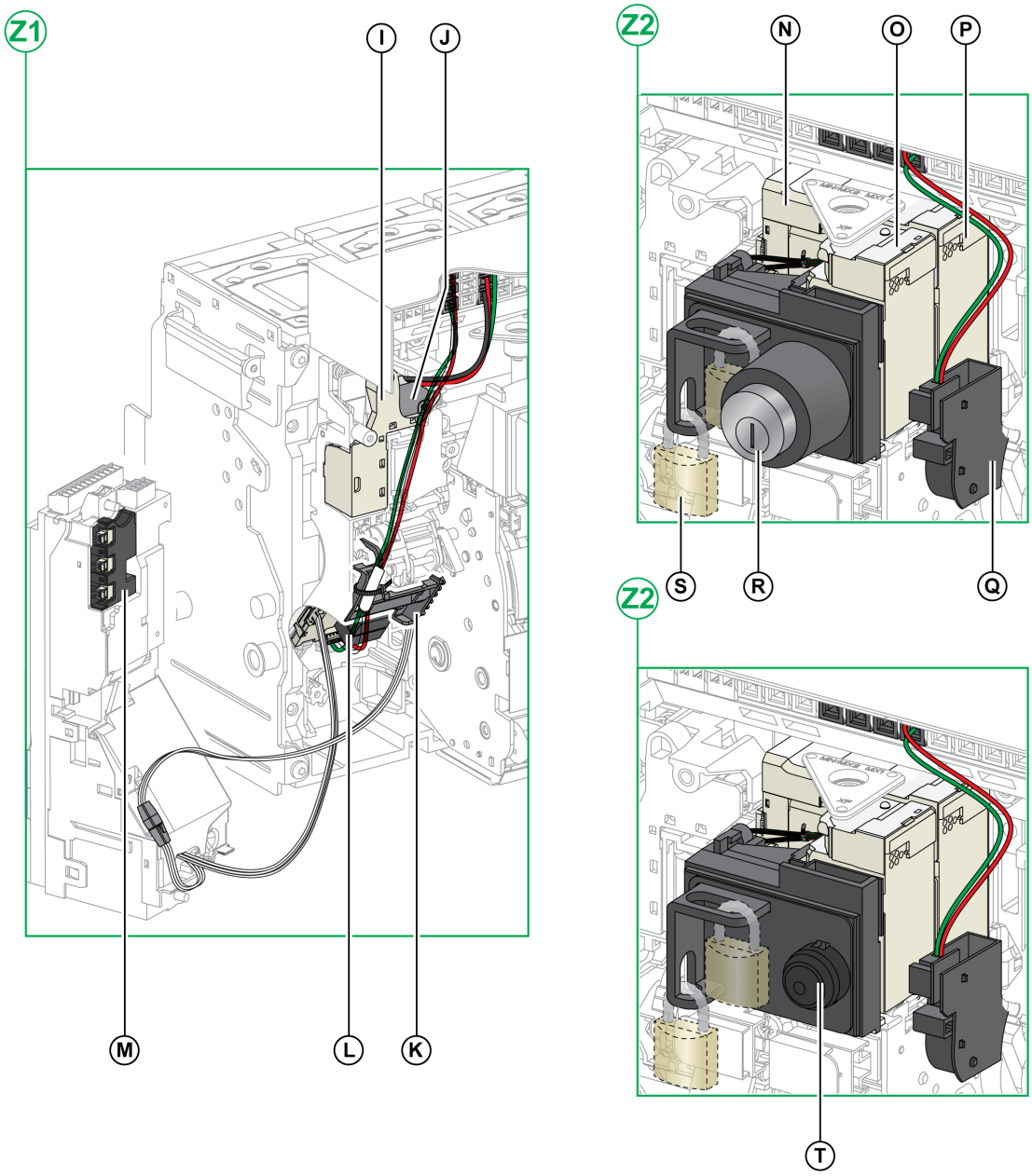
Drawout Device Accessories Description

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



A VDC mismatch protection
B Terminal block connectors for optional accessories
C Terminal block connectors for standard accessories
D Standard block of four OF indication contacts
E MCH gear motor
F 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.

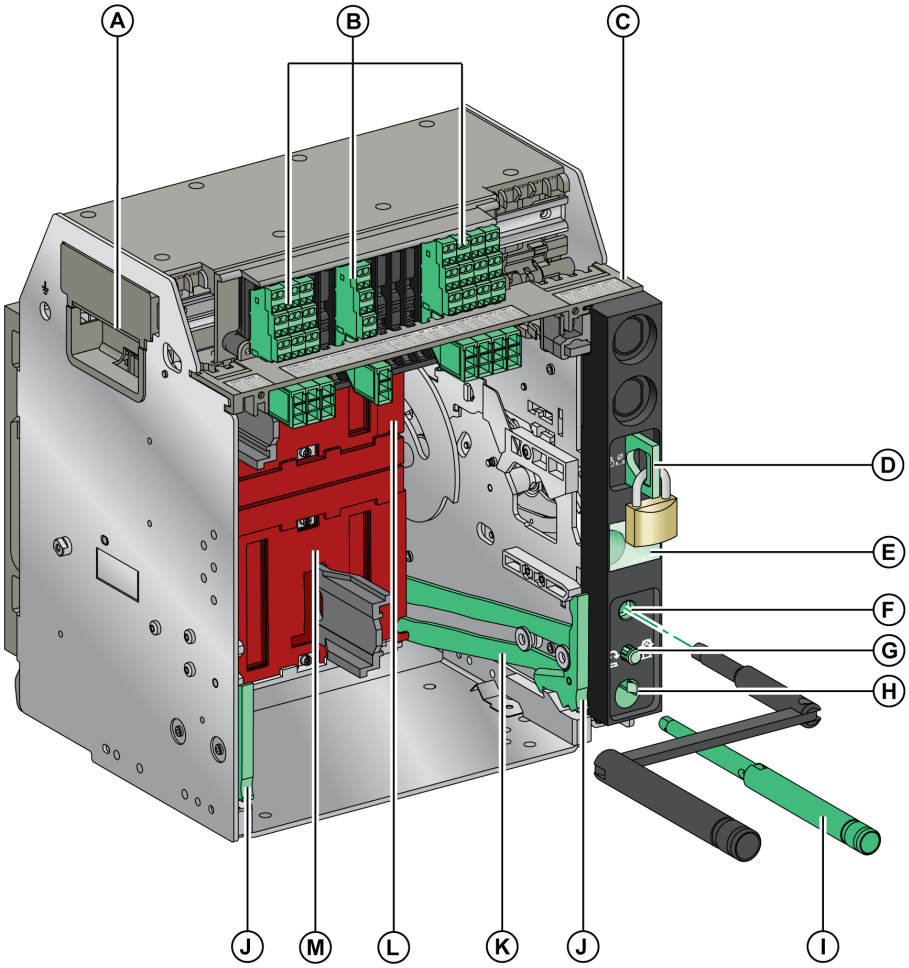


I Standard SDE1 fault-trip indication contact
J Optional SDE2 fault-trip indication contact or RES electrical remote reset
K Microswitch
L M2C programmable contacts
M Isolation module

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

Chassis Description

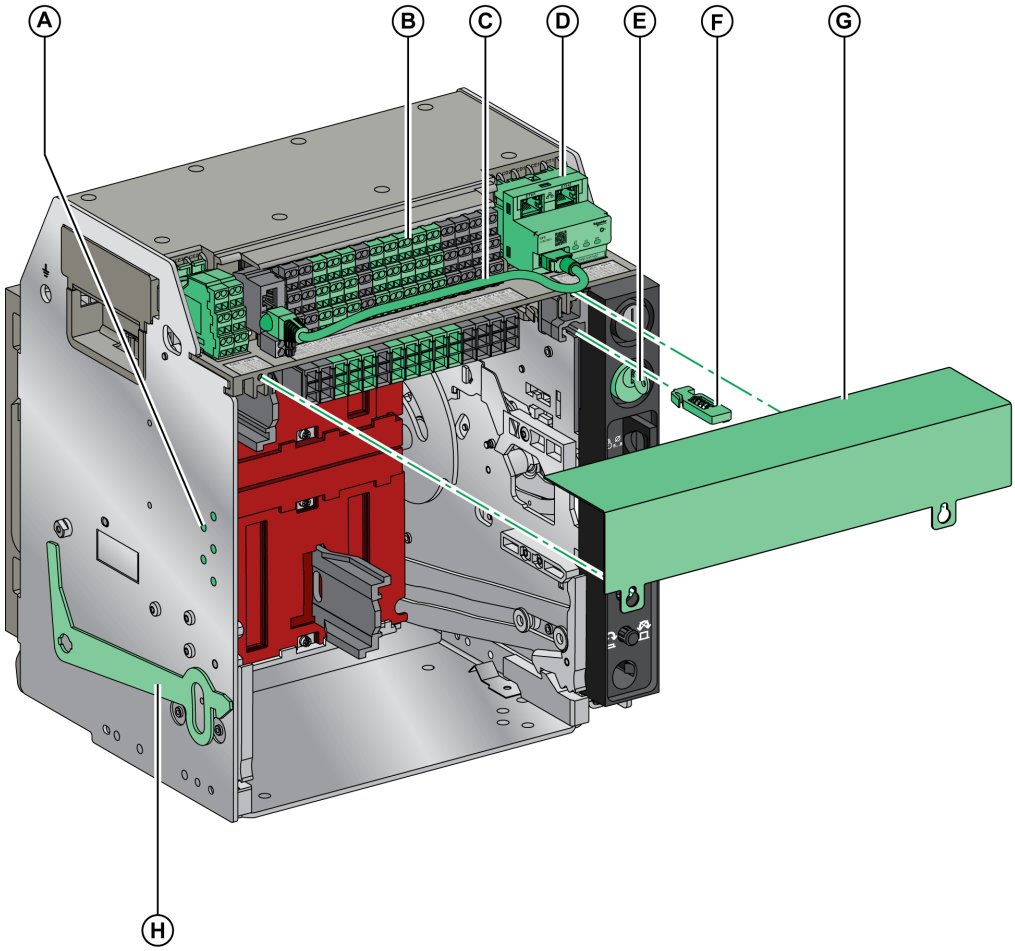
The following image shows the standard version of the chassis (no optional accessories).



A Carrying grip
B Terminal blocks for standard accessories
C Wiring terminal cover
D Chassis locking by padlocks
E Moving part position indicator
F Racking handle socket
G Position release button
H Racking handle storage space
I Racking handle
J Drawout grip
K Extension rail
L Top safety shutter
M Bottom safety shutter

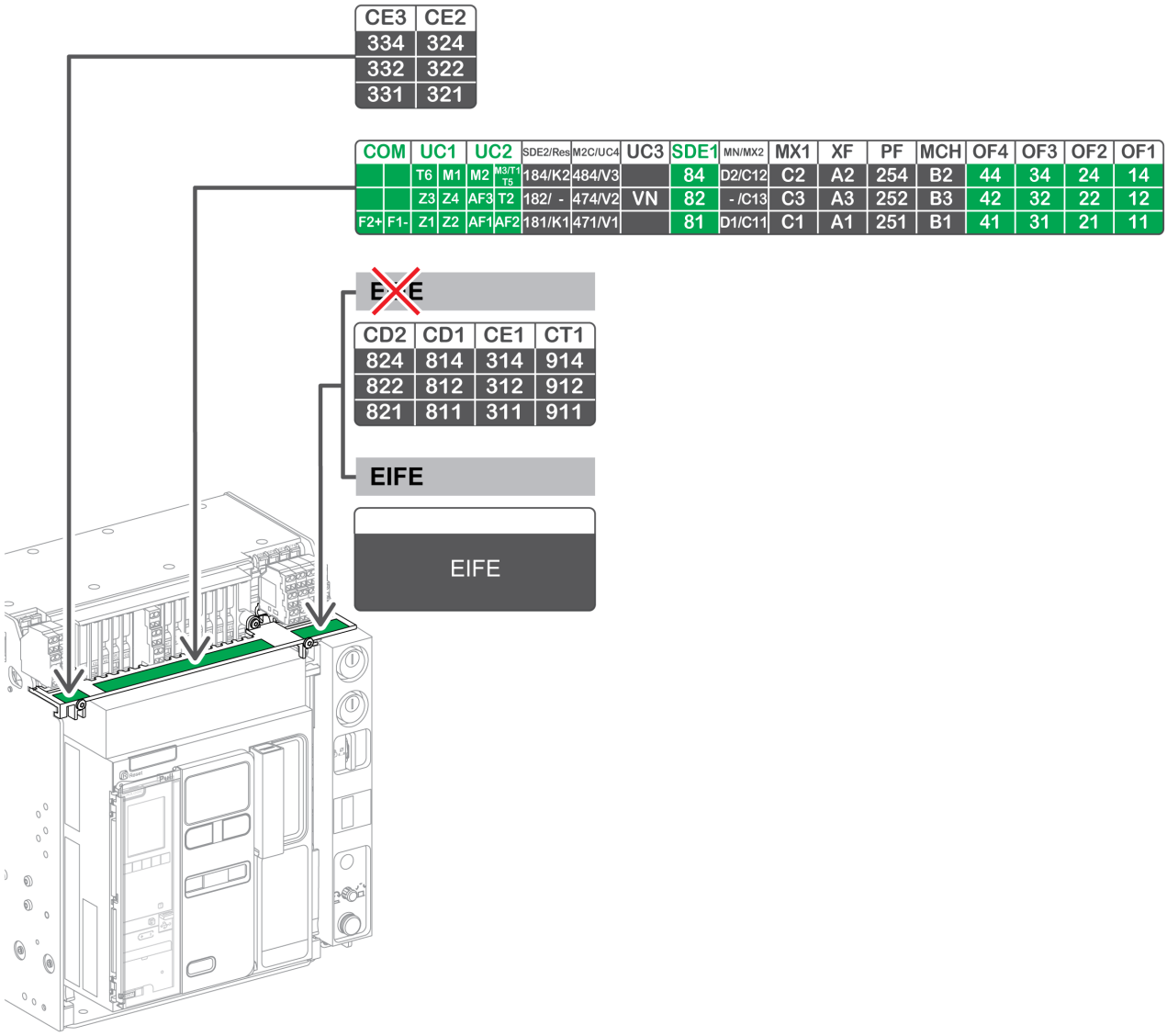
Chassis Accessories Description

The following image shows the accessories available for the chassis.



A VDC mismatch protection
B 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 racking interlock
G CB auxiliary terminal shield
H VPEC door interlock

Chassis Terminal Block Description



Terminal block supplied as standard

Optional terminal block

The following table describes the assignment of the terminal blocks.

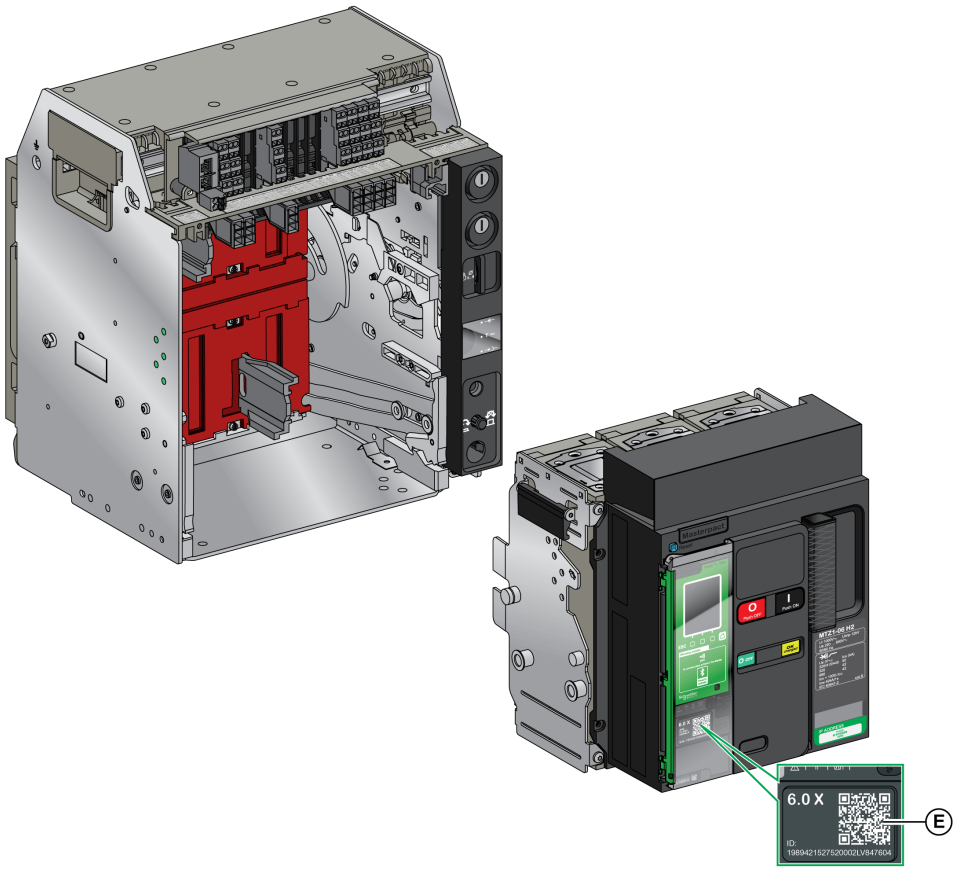
Block	Marking	Description	Standard or optional
A	CE2-CE3	2 CE connected position contacts	Optional
B	COM	ULP port module or terminal block for the external power supply of the Micrologic X control unit	Standard
	UC1	Zone selective interlocking, rectangular sensor, or MDGF module input	Standard
	UC2	Neutral external sensors, rectangular sensor, or MDGF module input	Standard
	SDE2/RES	SDE2 fault-trip indication contact 2 or RES electrical remote reset	Optional
	M2C/UC4	M2C programmable contact or External voltage connector	Optional
	UC3 (VN)	Voltage connector	Optional
	SDE1	SDE1 fault-trip indication contact 1	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 EIFE interface)	CT1 CD1-CD2 CE1	1 CT test position contact or 2 CD disconnected position contacts or 1 CE connected position contact	Optional
C (with EIFE interface)	EIFE	EIFE embedded Ethernet interface	Optional

Device Identification

Identification

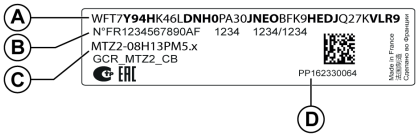
The Masterpact MTZ1 device can be identified in the following ways:

- Rating plate on device
- QR code on the Micrologic X control unit
- Identification labels on the device and 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:

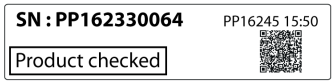
- The product code (**A**)
- Schneider Electric internal identification numbers (**B**)
- A short description of the device (**C**), specifying the following characteristics
  - Range
  - Rating
  - Performance level
  - Number of poles
  - Control unit type
- The device serial number (**D**)

The product code is a line of code representing the complete configuration of a Masterpact circuit breaker or switch-disconnector. It is automatically generated for each Masterpact device after completing the configuration by using the MyPact configuration tool.

The product code appears on the invoice and on the delivery documents as well as on the Masterpact device and packaging labels.

The product code can be entered in the MyPact configuration tool, which generates the complete configuration of the Masterpact device.

Product Checked Label



The device serial number (SN) is coded PPYYWWDXXXX, where:

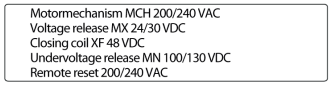
- PP: plant code
- YY: year of manufacture
- WW: week of manufacture
- D: day of the week of manufacture (Monday = 1)
- XXXX: the production number of the product on the day. Ranges from 0001 to 9999.

For example, PP162330064 is the sixty fourth device manufactured at plant PP on Wednesday, June 8, 2016.

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

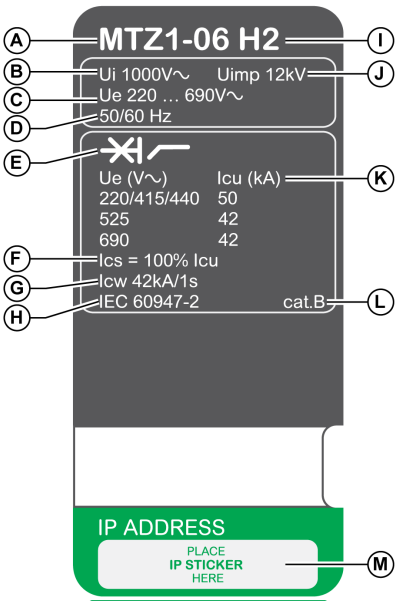


The accessory voltages label gives the voltage of the accessories which are installed in the device and which need to be connected to a power supply.

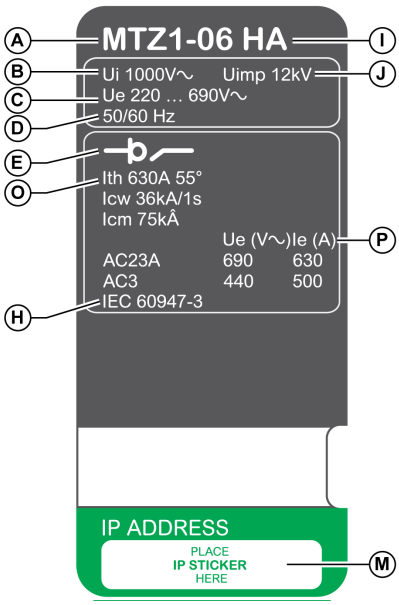
Rating Plate

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

Circuit breaker rating plate



Switch-disconnector rating plate



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
I Performance level
J **Uimp**: rated impulse withstand voltage
K **Icu**: rated ultimate short-circuit breaking capacity
L Selectivity category as per IEC 60947-2
M Place for sticker with IP address of the optional EIFE interface
O **Ith**: conventional free air thermal current
P **Ie**: 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. The landing page displays some information about the device and a list of menus.

Appendix B
Masterpact MTZ2/MTZ3 Description

What Is in This Chapter?

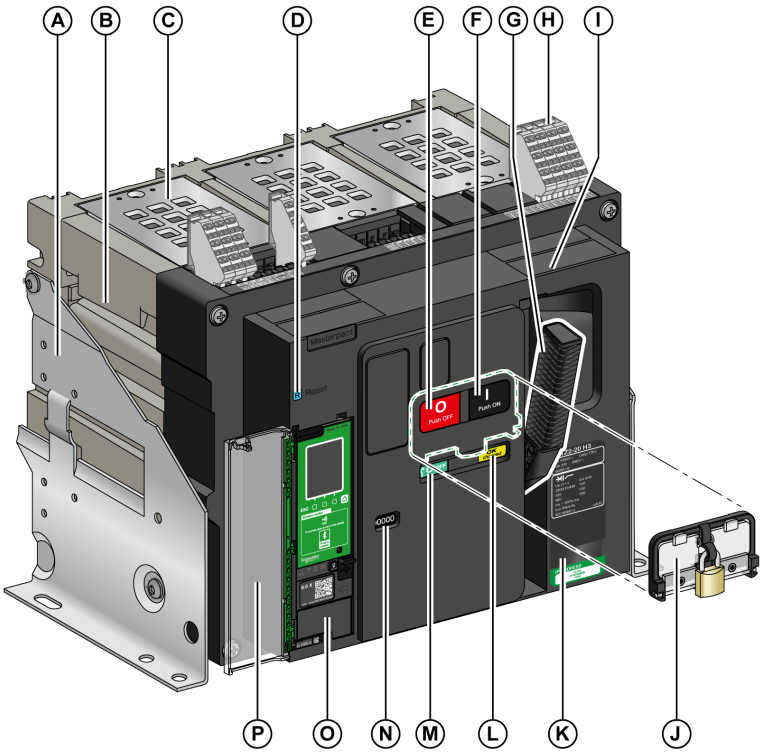
This chapter contains the following topics:

Topic	Page
Fixed Device	138
Drawout Device	142
Device Identification	149

Fixed Device

Fixed Device Description

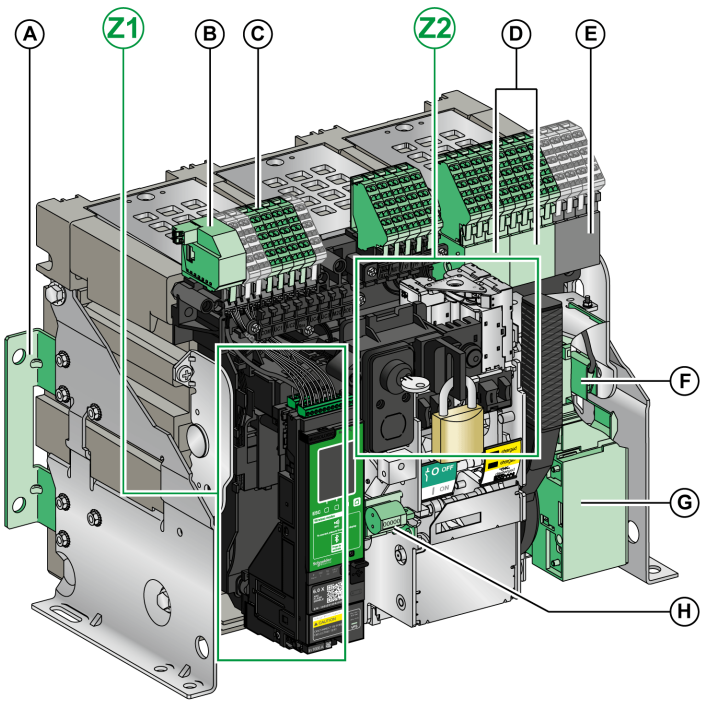
The following image shows the standard version of the fixed device (no optional accessories).



A Mounting side plate
B Carrying grip
C Arc chute
D Fault-trip reset button
E Opening pushbutton
F Closing pushbutton
G Spring charging handle
H Terminal blocks for standard accessories
I Front cover
J VBP pushbutton locking cover (optional)
K Rating plate
L Spring charged and ready-to-close indicator
M Position indicator of main contacts
N Window to read the (optional) CDM mechanical operation counter
O Control unit
P Control unit transparent cover

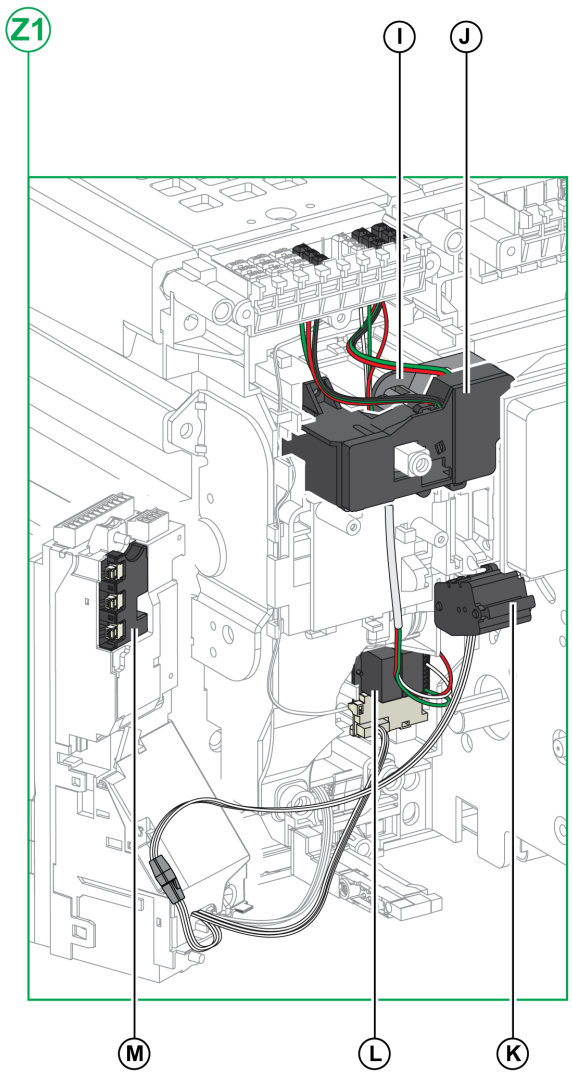
Fixed Device Accessories Description

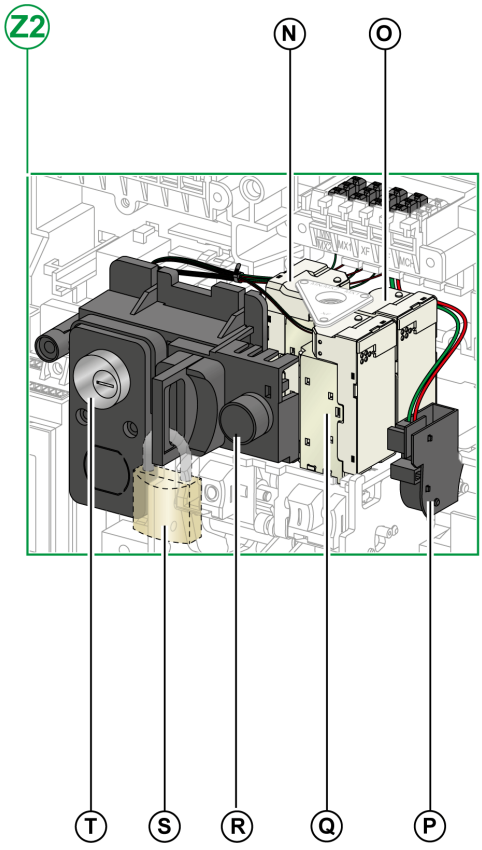
The following image shows the accessories available for the fixed device.



A Additional support brackets for mounting on a backplate
B ULP port module
C Terminal blocks for optional accessories
D Optional block of four OF indication contacts
E Standard block of four OF indication contacts
F KMT grounding kit
G MCH gear motor
H CDM mechanical operation counter
Z1, Z2 See following images

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

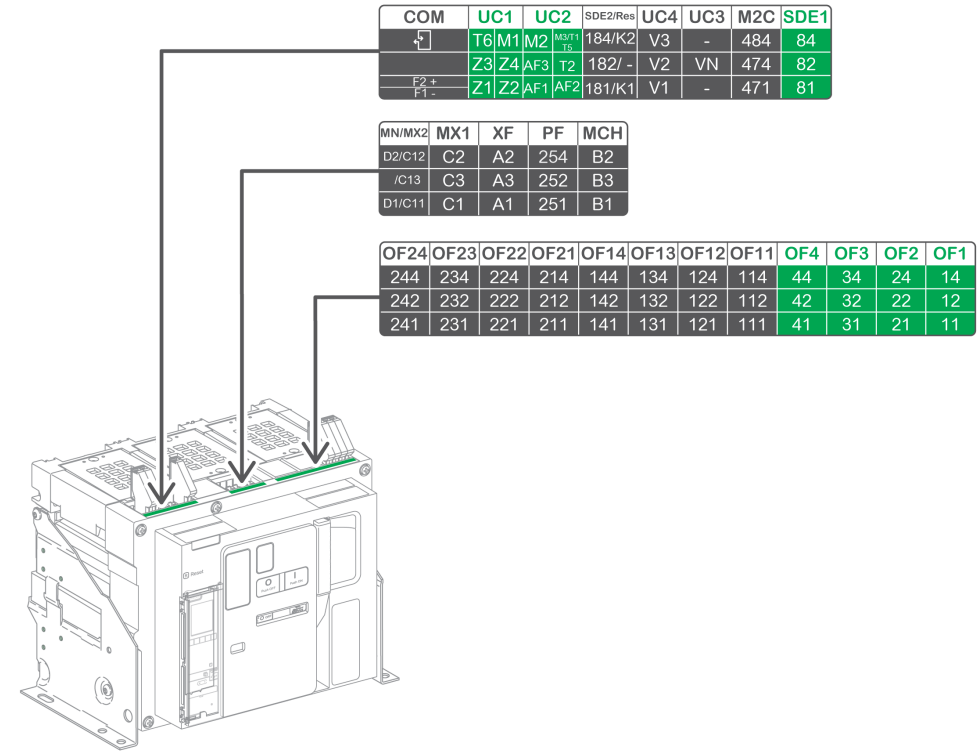




I Standard SDE1 fault-trip indication contact
J Optional SDE2 fault-trip indication contact or RES electrical remote reset
K Microswitch
L M2C programmable contacts
M Isolation module

N MN undervoltage release or MX2 opening voltage release
O MX1 opening voltage release
P PF ready-to-close contact
Q XF closing voltage release
R BPFE electrical closing pushbutton
S VCPO OFF-position locking by padlocks
T VSPO OFF-position locking by keylocks

Fixed Device Terminal Block Description



Terminal block supplied as standard

Optional terminal block

The following table describes the assignment of the terminal blocks.

Block	Marking	Description	Standard/Optional
A	COM	ULP port module or terminal block for the external power supply of the Micrologic X control unit	Optional
	UC1	Zone selective interlocking, rectangular sensor, or MDGF module input	Standard
	UC2	Neutral external sensors, rectangular sensor, or MDGF module input	Standard
	SDE2/RES	SDE2 fault-trip indication contact 2 or RES electrical remote reset	Optional
	UC4	External voltage connector	Optional
	UC3	Voltage connector	Optional
	M2C	M2C programmable contacts	Optional
	SDE1	SDE1 fault-trip indication contact 1	Standard
B	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
C	OF21–OF24	4 OF indication contacts	Optional
	OF11–OF14	4 OF indication contacts	Optional
	OF1–OF4	4 OF indication contacts	Standard

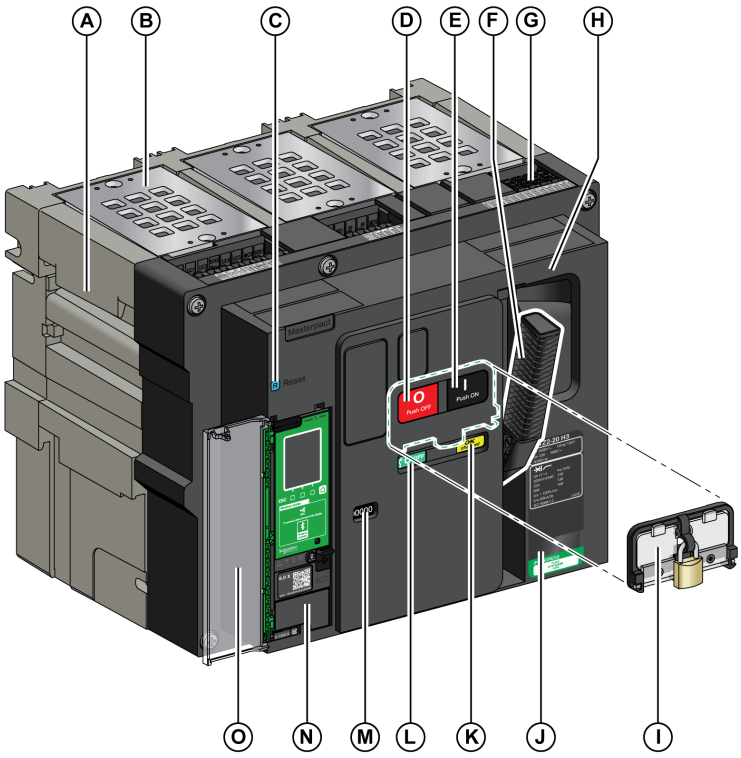
Drawout Device

Definition

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

Drawout Device Moving Part Description

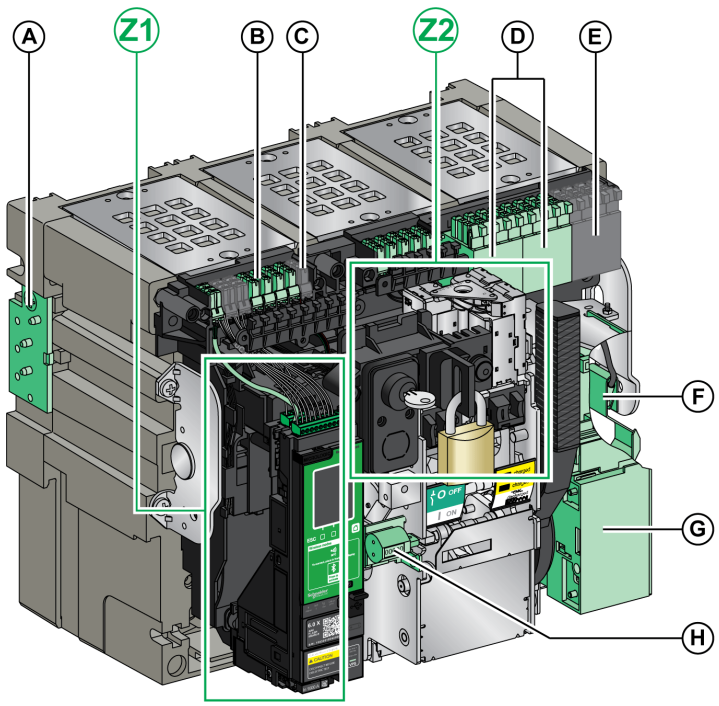
The following image shows the standard version of the moving part of a drawout device (no optional accessories).



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

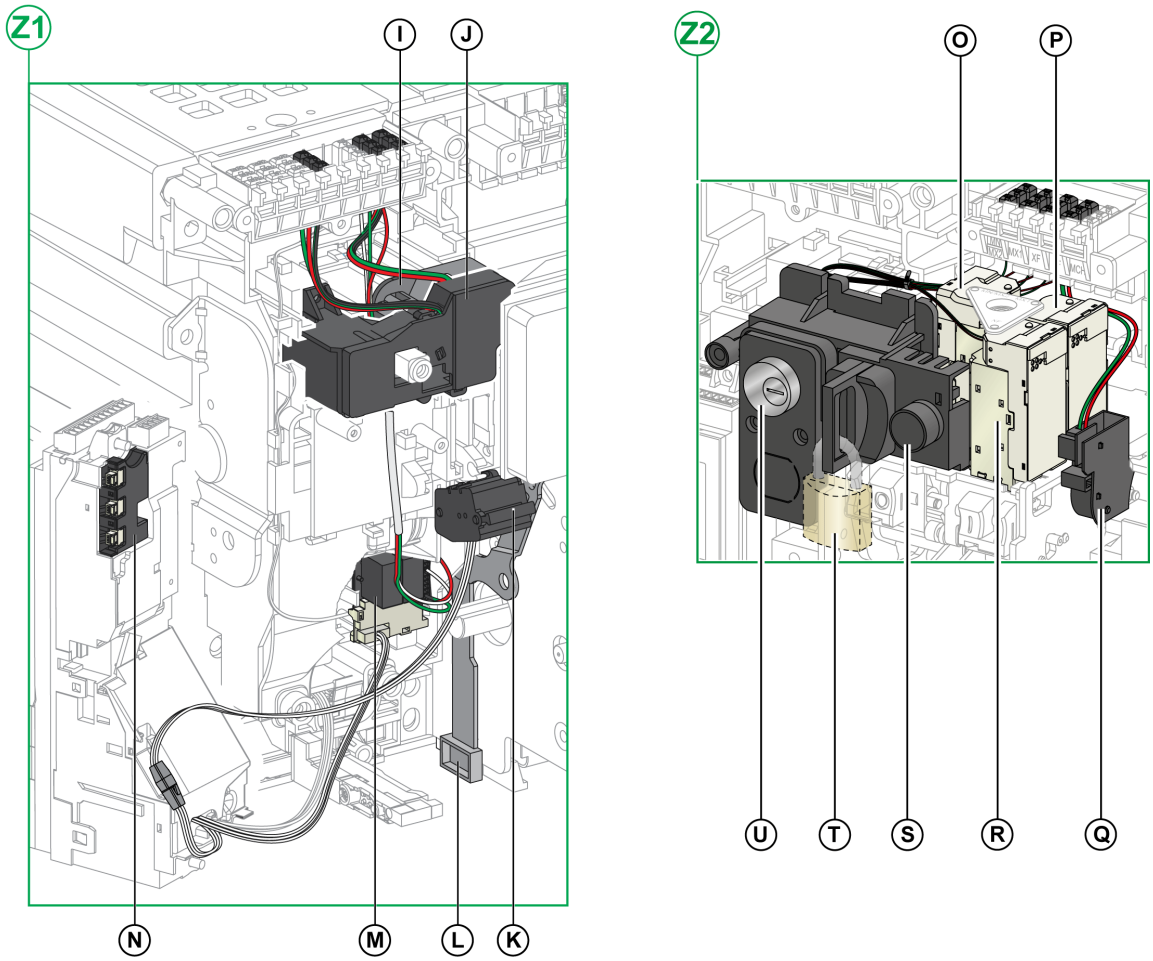
Drawout Device Accessories Description

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



A VDC mismatch protection
B Terminal block connectors for optional accessories
C Terminal block connectors for standard accessories
D Optional block of four OF indication contacts or EF combined connected/closed contacts
E Standard block of four OF indication contacts
F KMT grounding kit
G MCH gear motor
H CDM mechanical operation counter
Z1, Z2 See following images

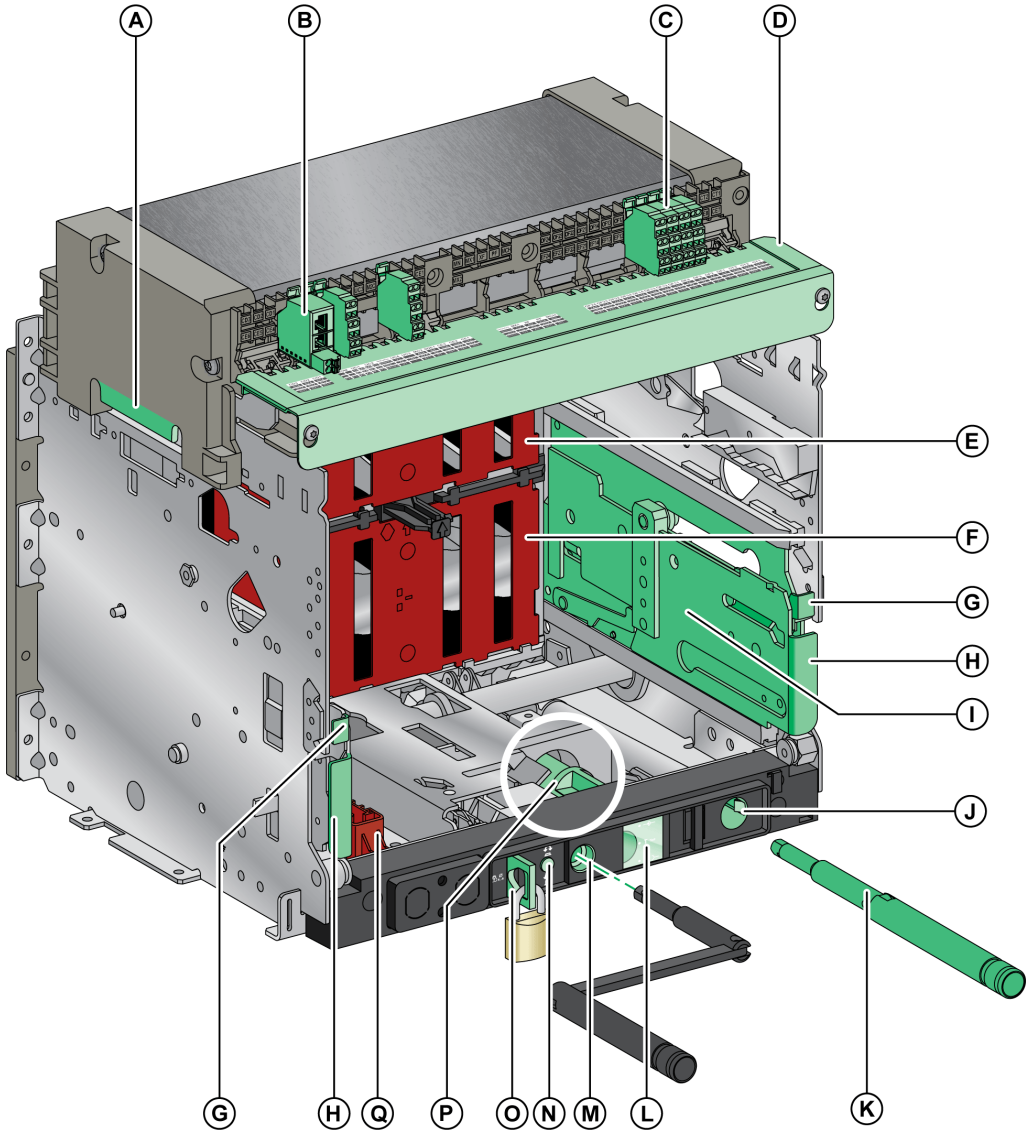
The following images zoom in on the accessories for the moving part of a drawout device.



I Standard SDE1 fault-trip indication contact
J Optional SDE2 fault-trip indication contact or RES electrical remote reset
K Microswitch
L IBPO interlock between racking handle and opening pushbutton
M M2C programmable contacts
N Isolation module
O MN undervoltage release or MX2 opening voltage release
P MX1 opening voltage release
Q PF ready-to-close contact
R XF closing voltage release
S BPFE electrical closing pushbutton
T VCPO OFF-position locking by padlocks
U VSPO OFF-position locking by keylocks

Chassis Description

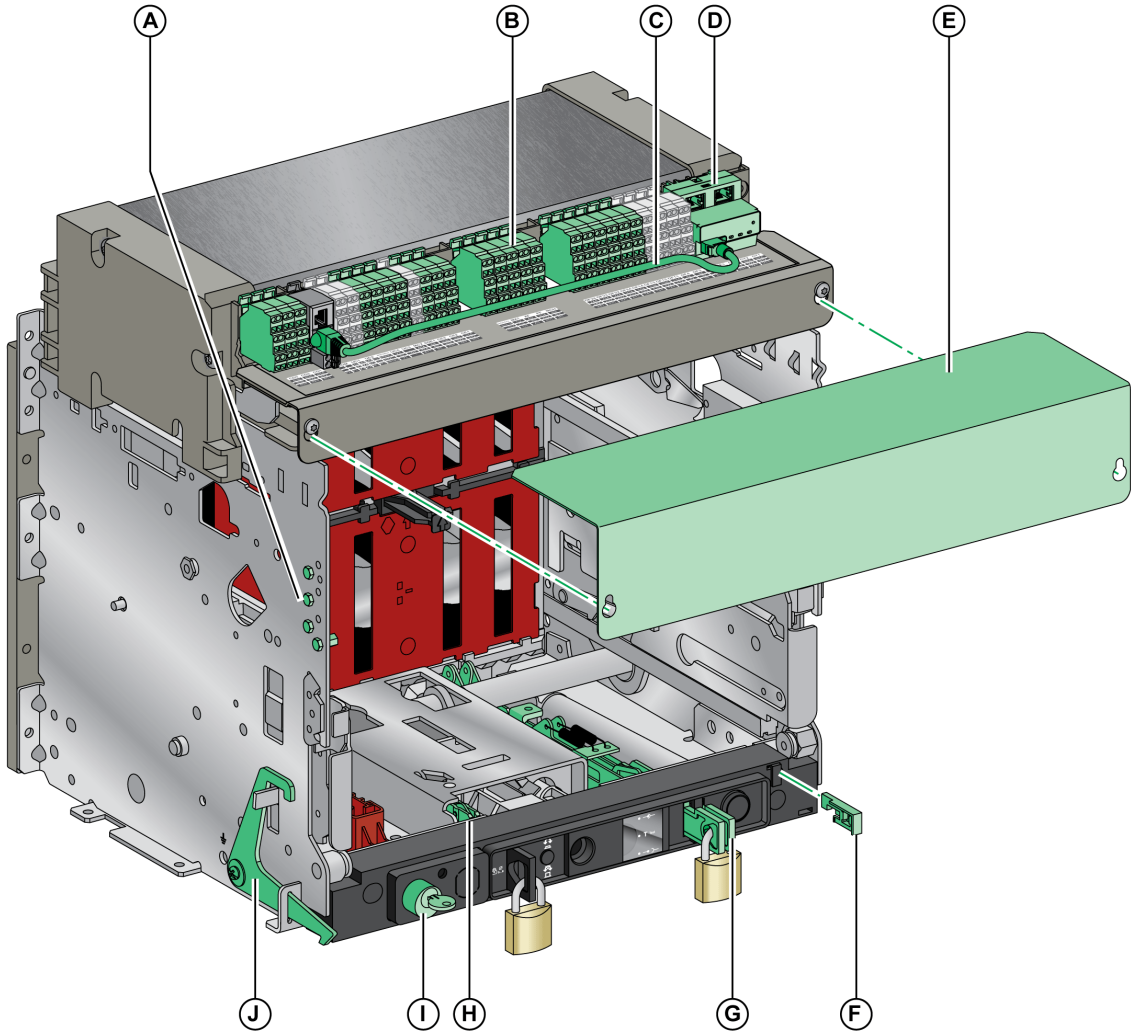
The following image shows the standard version of the chassis (no optional accessories).



A Carrying grip
B ULP port module
C Terminal blocks for standard accessories
D Wiring terminal cover
E Top safety shutter
F Bottom safety shutter
G Rail release tab
H Drawout grip
I Extension rail
J Racking handle storage space
K Racking handle
L Moving part position indicator
M Racking handle socket
N Position release button
O Chassis locking by padlocks
P Latch for switching chassis locking from disconnected position to any position (connected, test, disconnected)
Q Shutter locking block

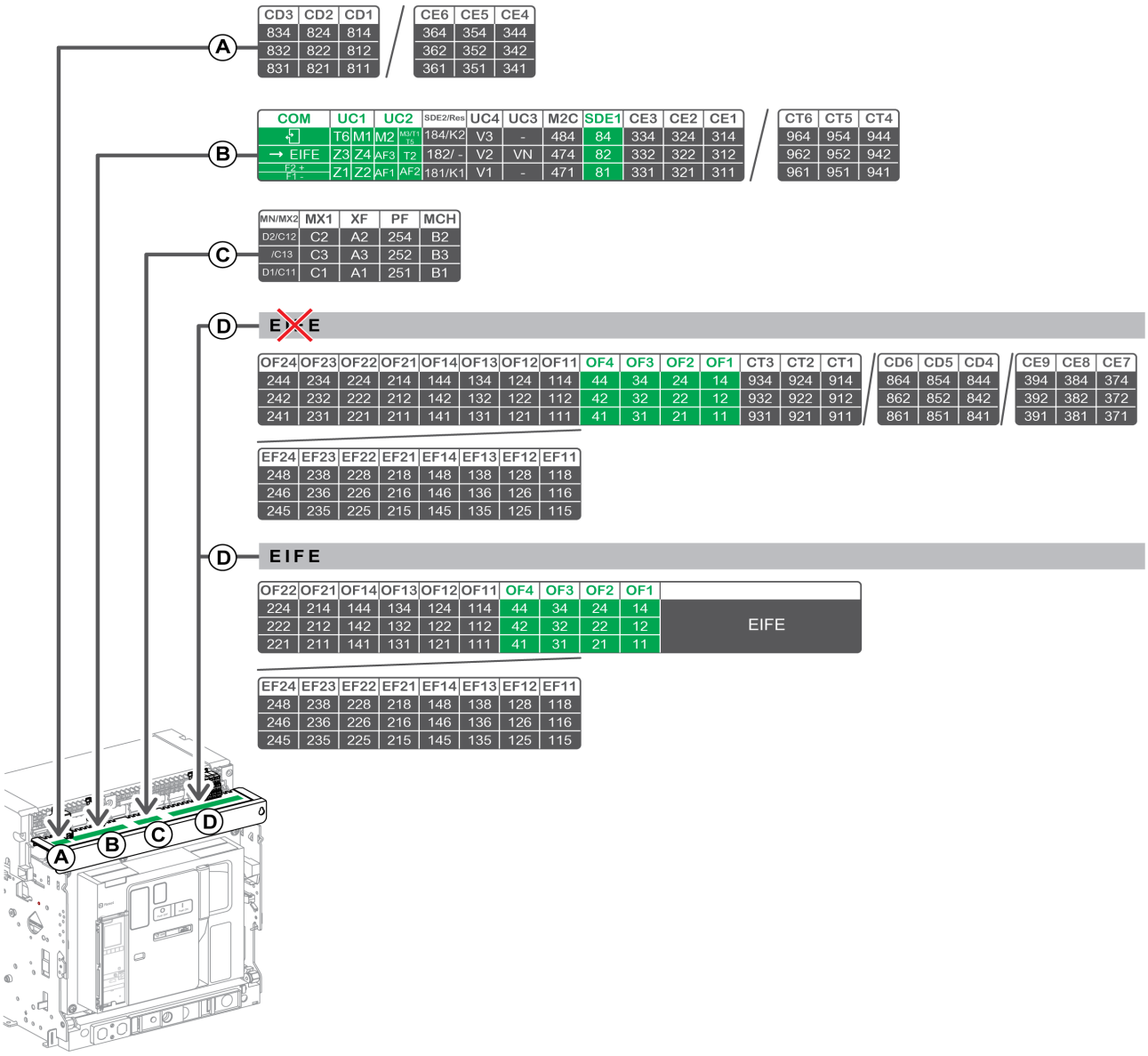
Chassis Accessories Description

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 CB auxiliary terminal shield
F VPOC racking interlock
G VIVC shutter position indication and locking
H IBPO interlock between racking handle and opening pushbutton
I VSPD chassis locking by keylocks
J VPEC door interlock

Chassis Terminal Block Description



Terminal block supplied as standard

Optional terminal block

The following table describes the assignment of the terminal blocks.

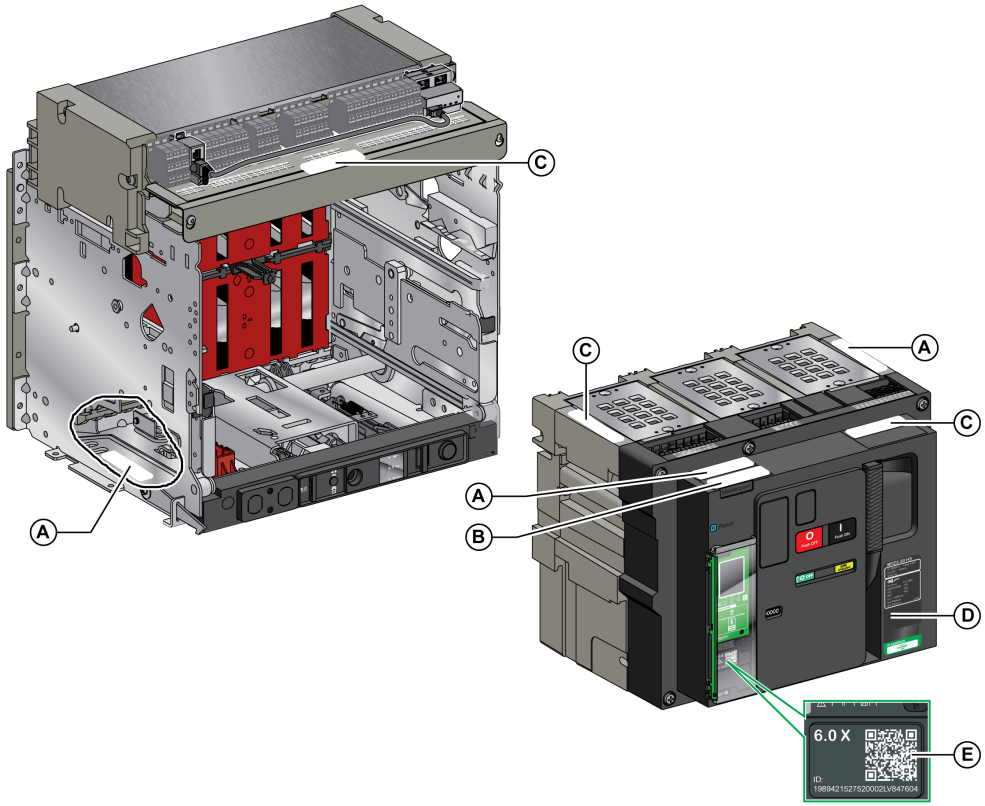
Block	Marking	Description	Standard or optional
A	CD1–CD3 CE4–CE6	3 CD disconnected position contacts or 3 CE connected position contacts	Optional
B	COM	ULP port module or terminal block for the external power supply of the Micrologic X control unit	Standard
	UC1	Zone selective interlocking, rectangular sensor, or MDGF module input	Standard
	UC2	Neutral external sensors, rectangular sensor, or MDGF module input	Standard
	SDE2/RES	SDE2 fault-trip indication contact 2 or RES electrical remote reset	Optional
	UC4 (V1, V2, V3)	External voltage connector	Optional
	UC3 (VN)	Voltage connector	Optional
	M2C	M2C programmable contact	Optional
	SDE1	SDE1 fault-trip indication contact 1	Standard
	CE1–CE3 CT4–CT6	3 CE connected position contacts or 3 CT test position contacts	Optional
C	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
D (without EIFE interface)	OF11–OF24 EF11–EF24	8 OF indication contacts or 8 EF combined connected/closed position auxiliary contacts	Optional
	OF1–OF4	4 OF indication contacts	Standard
	CT1–CT3 CD4–CD6 CE7–CE9	3 CT test position contacts or 3 CD disconnected position contacts or 3 CE connected position contacts	Optional
D (with EIFE interface)	OF11–OF22 EF11–EF24	6 OF indication contacts or 8 EF combined connected/closed position auxiliary contacts	Optional
	OF1–OF4	4 OF indication contacts	Standard
	EIFE	EIFE embedded Ethernet interface	Optional

Device Identification

Identification

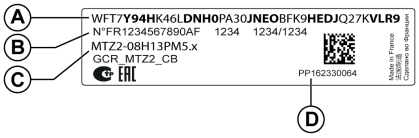
The Masterpact MTZ2/MTZ3 device can be identified in the following ways:

- Rating plate on device
- QR code on the Micrologic X control unit
- Identification labels on the device and 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:

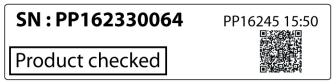
- The product code (**A**)
- Schneider Electric internal identification numbers (**B**)
- A short description of the device (**C**), specifying the following characteristics
  - Range
  - Rating
  - Performance level
  - Number of poles
  - Control unit type
- The device serial number (**D**)

The product code is a line of code representing the complete configuration of a Masterpact circuit breaker or switch-disconnector. It is automatically generated for each Masterpact device after completing the configuration by using the MyPact configuration tool.

The product code appears on the invoice and on the delivery documents as well as on the Masterpact device and packaging labels.

The product code can be entered in the MyPact configuration tool, which generates the complete configuration of the Masterpact device.

Product Checked Label



The device serial number (SN) is coded PPYYWWDXXXX, where:

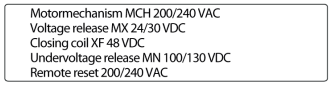
- PP: plant code
- YY: year of manufacture
- WW: week of manufacture
- D: day of the week of manufacture (Monday = 1)
- XXXX: the production number of the product on the day. Ranges from 0001 to 9999.

For example, PP162330064 is the sixty fourth device manufactured at plant PP on Wednesday, June 8, 2016.

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

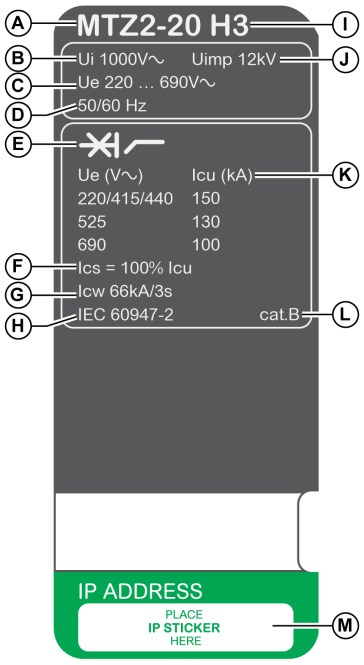


The accessory voltages label gives the voltage of the accessories which are installed in the device and which need to be connected to a power supply.

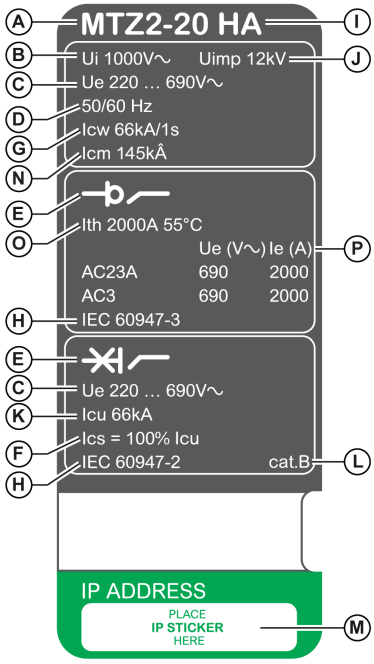
Rating Plate

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

Circuit breaker rating plate



Switch-disconnector rating plate



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
I Performance level
J **Uimp**: rated impulse withstand voltage
K **Icu**: rated ultimate short-circuit breaking capacity
L Selectivity category as per IEC 60947-2
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 **Ie**: 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. The landing page displays some information about the device and a list of menus.

Appendix C
Micrologic X Control Unit Description

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Micrologic X Control Unit: Description	154
Ecoreach Software	157
Masterpact MTZ Mobile App	158
Bluetooth Low Energy Communication	159
NFC Communication	162

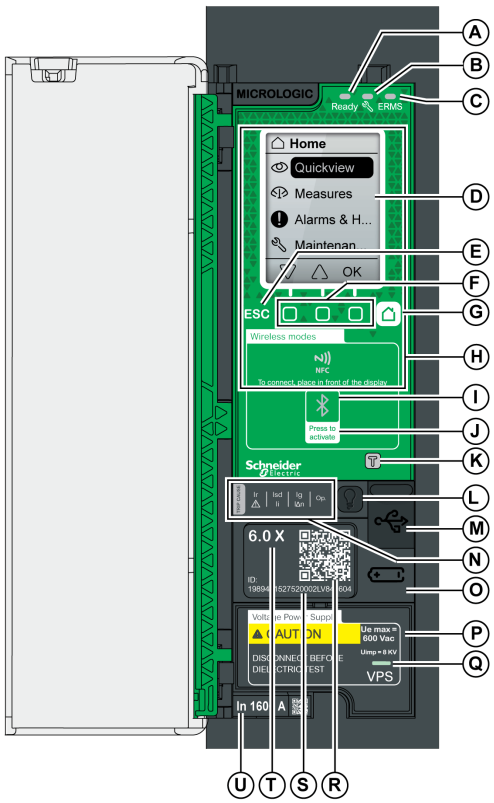
Micrologic X Control Unit: Description

Introduction

The Micrologic X control unit includes:

- Micrologic X status LEDs
- A local HMI comprising a graphic display with colored backlight, contextual buttons, and dedicated buttons
- LEDs to monitor circuit breaker operations as well as the source 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 Escape button **ESC**
F Three contextual buttons
G Home button
H NFC wireless communication zone
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 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 control unit is ready to provide standard protection.
	The service LED alerts the user to the overall health of the circuit breaker. There are three states: ● Unlit LED: the circuit breaker is in good working order. ● Orange LED: non-urgent alert message. ● Red LED: alert message that requires immediate action.
ERMS	The **ERMS** (Energy Reduction Maintenance Setting) LED is reserved for future use.

Local HMI 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 *(see page 162)* between a smartphone that has 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 *(see page 160)* between a smartphone that has 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 a Bluetooth device is in communication.

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
	• 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.
	• 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.
	• Micrologic 2.0 X, 5.0 X, 6.0 X, 7.0 X: Trip due to long-time protection.
	• 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.
	• 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.
	• 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 rebooted by pressing and holding the Test/Reset button for 15 seconds. The standard protection functions remain active during the reboot.

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 PC equipped with Ecoreach software.

NOTE: It is not possible to connect a USB key to the Micrologic X control unit.

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. 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 FFFFFFYYWWDXXXXX
- The commercial reference of the control unit in the format LV8•••••

Use the identification number to register your Micrologic X control unit.

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, 2.0) defines the types of protection provided by the control unit.
- The letter (X) identifies the range.

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 power supply 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 in the Micrologic X control unit.

Ecoreach Software

Overview

The Ecoreach software helps you to manage a project as part of testing, commissioning, and maintenance phases of the project life cycle. The innovative features in it provide simple ways to configure, test, and commission the smart electrical devices.

The Ecoreach software automatically discovers the smart devices and allows you to add the devices for an easy configuration. You can generate comprehensive reports as part of Factory Acceptance Test and Site Acceptance Test to replace your heavy manual work. Additionally, when the panels are under operation, any change of settings made can be easily identified and hence provides a system consistency during the operation and maintenance phase.

The Ecoreach software enables the configuration of the Masterpact MTZ devices with:

- Micrologic X control unit
- Communication interface modules: IFE interface and EIFE interface
- IO application modules
- M2C output module

For more information, refer to the *Ecoreach Online Help*.

The Ecoreach software is available at *www.schneider-electric.com*.

Key Features

The Ecoreach performs the following actions for the supported devices and modules:

- Create projects by device discovery
- Safe repository of projects in Ecoreach Cloud
- Upload settings to the device and download settings from the device
- Compare the settings between the project and the device
- Perform control actions in a secured way
- Generate and print the device settings report
- Perform a communication wiring test on the entire project and generate and print the test reports
- View the communication architecture between the devices in a graphical representation
- View the measurements, logs, and maintenance information
- Export Waveform capture
- View the status of device and IO module
- Check the system firmware compatibility status
- Upgrade to the latest device firmware
- Buy, install, or remove the digital modules

Masterpact MTZ Mobile App

Presentation

With the Masterpact MTZ Mobile App, a smartphone can be used as the primary interface for day-to-day and critical case maintenance. The application provides daily operation information that can be shared (for example by email). It also provides tutorials for restoring power and identifying the cause of trips. It also provides remote control operation of the circuit breaker.

Downloading the Application

The Masterpact MTZ Mobile App can be downloaded as follows:

- By flashing the QR code on the front face of the Micrologic X control unit to access to a landing page. Click the link to go to your application store from which the mobile application can be downloaded.
- From Google Play Store for Android smartphones.
- From App Store for iOS smartphones.

The Masterpact MTZ Mobile App is optimized for a 127 mm/5 in display screen.

Communicating with a Micrologic X Control Unit

Two means of communication are available to connect the Masterpact MTZ Mobile App to a Micrologic X control unit:

- Bluetooth:
  - Display data
  - Configure general and protection settings
- NFC (also available when control unit is not powered) (only available for Android smartphones):
  - Display selection of data

Using a Bluetooth Low Energy Connection

The Micrologic X control unit must be powered to establish a Bluetooth Low Energy connection.

Using Masterpact MTZ Mobile App with a Bluetooth connection gives access to and allows sharing of the following information types organized in four tabs:

- **Quick View**: gives an overview of current values per phase, the health state of the circuit breaker, and recent event history.
- **Metering**: displays values of current, rms voltages, network, and energy in real-time.
- **Protection Setting**: displays settings currently selected and allows modification of settings.
- **Status and Control**:
  - Displays status of the circuit breaker.
  - Allows opening and closing operations to be carried out when the Masterpact Operation Assistant Digital Module is installed.

For the details on how to connect, refer to Bluetooth connection procedure *(see page 160)*.

When Digital Modules are installed on the Micrologic X control unit, additional information is available.

Using an NFC Connection

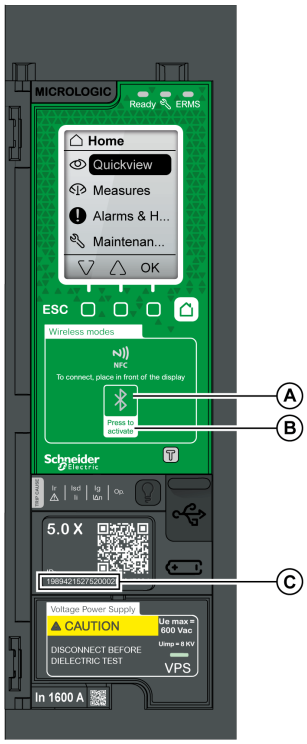
Connecting to Masterpact MTZ Mobile App with an NFC connection is always possible, even when the Micrologic X control unit is not powered. It gives access to the following information:

- Information about the Micrologic X control unit
- Last trip context: trip type; date and time of last trip; current values before trip
- Protection settings (display only)
- Access to Power Restoration Assistant or Masterpact Operation Assistant Digital Modules

For the details on how to connect, refer to NFC connection procedure *(see page 162)*.

Bluetooth Low Energy Communication

Description



Using Bluetooth low energy (BLE) communications, you can access the Micrologic X control unit from a smartphone running Masterpact MTZ Mobile App *(see page 158)*. This application offers a task-oriented interface with the control unit.
You can establish a Bluetooth connection with only one Micrologic X control unit at the same time. Only one smartphone at a time can connect to a control unit.
During the connection, the control unit is identified by the last digits of its serial number. The format of the identifier is **MTZ** *<ProtectionType> <EndOfSerialNumber>*, for example, MTZ 5 012345, where 5 indicates Micrologic 5.0 X control unit and 012345 are the last 6 digits of the serial number.
BLE communications are encrypted using Advanced Encryption Standard (AES) 128-bit encryption.

A Bluetooth LED
B Bluetooth activation button
C Serial number of Micrologic X control unit

Prerequisites for Using Bluetooth

The prerequisites for establishing a Bluetooth connection are:
- The Micrologic X control unit must be powered.
- Bluetooth communication must be enabled on the control unit.
- You must have a smartphone with Masterpact MTZ Mobile App installed.
- The smartphone must support Android 4.4 or iOS 9 or above, and be compatible with Bluetooth Low Energy.
- You must have access to the Micrologic X control unit, and be physically within an open field range of 10 meters (11 yards) for the duration of the connection.

Enabling and Disabling Bluetooth Communication

By default, Bluetooth communication is disabled.

Bluetooth communication can be enabled or disabled as follows:
- On the Micrologic X display screen, at **Home → Configuration → Communication → Bluetooth**, set **Bluetooth** to **ON** or **OFF**.
- With Ecoreach software, at **Home → Configuration → Communication → Bluetooth**, set **Bluetooth activation** to **ON** or **OFF**.

The Bluetooth communication status (enabled or disabled) can be displayed as follows:
- On the Micrologic X display screen, at **Home → Communication → Bluetooth**
- With Ecoreach software
- On a remote controller using the communication network

Predefined Events

Enabling Bluetooth communication generates the following event:

Event	History	Severity
Bluetooth communication enabled	Communication	Low

Setting the Bluetooth Disconnection Timer

When Bluetooth communication is activated using the activation pushbutton on the Micrologic X control unit, there is a timer on the connection with a smartphone that ends the communication after a period of idle time. By default, this automatic disconnection timer is set to 15 minutes.

The setting for the Bluetooth disconnection timer can be changed as follows:

- On the Micrologic X display screen, at **Home → Configuration → Communication → Bluetooth**, set **Bluetooth** to **ON**, and then set the **BLE timer (min)** value.
- With Ecoreach software, at **Home → Configuration → Communication → Bluetooth**, set **Bluetooth time out delay (min)** to the appropriate value.

You can set the value from 5 to 60 minutes (default = 15 minutes) in increments of 1.

Establishing a Bluetooth Connection

Follow the steps below to establish a Bluetooth connection from your smartphone to the Micrologic X control unit.

Step	Action
1	Start Masterpact MTZ Mobile App on your smartphone.
2	Select **Connect to device through Bluetooth**.
3	On the Micrologic X control unit, press the Bluetooth activation pushbutton. The Bluetooth LED lights up. If it does not, you must enable the Bluetooth communication feature first. On your smartphone, Masterpact MTZ Mobile App starts scanning and displays a list of Bluetooth devices in the neighborhood. Micrologic X control units are identified by their ID number.
4	Select the Micrologic X control unit to which you want to connect. A 6-digit pairing code is displayed on the Micrologic X display screen.
5	Enter the pairing code in Masterpact MTZ Mobile App within 30 seconds. ● If the pairing code is incorrect, or if more than 30 seconds have elapsed, Bluetooth communication is deactivated (the LED turns off), and you must start the connection procedure again at Step 3. ● If the connection is established, the Bluetooth LED starts blinking.
6	To end the connection, you can either: ● Press the Bluetooth pushbutton on the Micrologic X control unit. ● Disconnect from Masterpact MTZ Mobile App.

While your smartphone remains within the communication range (an open field range of 10 meters (11 yards) from the Micrologic X control unit), the Bluetooth connection remains active and the information displayed is refreshed.

NOTE: Each connection is unique, you cannot save the connection parameters for your next Bluetooth connection.

Bluetooth LED

The Bluetooth LED on the front face of the Micrologic X control unit can be:

- **ON**: A Bluetooth connection procedure is in progress.
- **OFF**: Bluetooth is not activated or disabled.
- **Blinking**: A Bluetooth connection is established and active.

NOTE: The Bluetooth LED does not indicate whether the Bluetooth communication feature is enabled or disabled in the Micrologic X control unit. When this feature is disabled, the LED does not light up when you press the Bluetooth activation button.

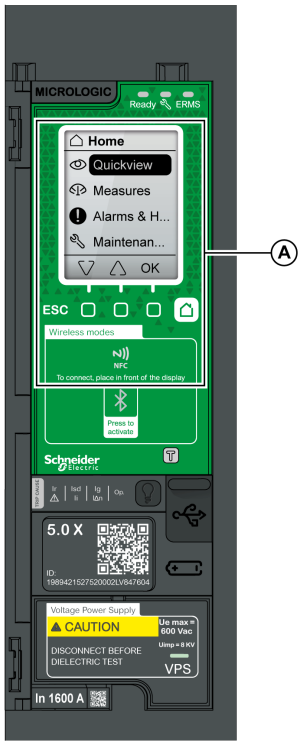
Troubleshooting Bluetooth Communication Issues

The following table lists the common problems you may meet when establishing a Bluetooth connection to the Micrologic X control unit.

Problem description	Probable causes	Solutions
The Bluetooth LED does not light up when you press the Bluetooth activation pushbutton on the Micrologic X control unit.	The Bluetooth function is not enabled in the Micrologic X control unit.	Enable Bluetooth communication in the Micrologic X control unit.
	The Micrologic X control unit is not powered.	Check the power supply of the Micrologic X control unit.
The Bluetooth connection was established but the signal is lost.	The smartphone has been moved out of range.	Place the smartphone within the range for Bluetooth and establish a new connection.
The Bluetooth LED is blinking on the control unit but you cannot see its ID number in the list of devices available.	A smartphone is already connected to the Micrologic X control unit.	Check whether another smartphone within range is also connected to the control unit.

NFC Communication

Description



A NFC wireless communication zone

Using Near Field Communication (NFC), you can access the Micrologic X control unit from a smartphone running Masterpact MTZ Mobile App *(see page 158)*. With NFC, you can access the control unit and download data to your smartphone, even when the control unit is not powered.
NFC communication is always enabled and cannot be disabled.
You can establish an NFC connection with only one Micrologic X control unit at the same time and only one smartphone at a time can connect to a control unit.
Micrologic X control units use a passive NFC tag, which does not have a power source. It draws power from the smartphone that reads it, and therefore does not emit any electromagnetic waves when NFC communication is not in use.

NOTE: NFC communication is only accessible from the Android version of the Masterpact MTZ Mobile App.

Prerequisites for Using NFC

The prerequisites for establishing an NFC connection are:

- You must have a smartphone with Masterpact MTZ Mobile App installed.
- The smartphone must support NFC.
- You must have physical access to the Micrologic X control unit. The smartphone must be held within 20 mm (0.8 in) of the display screen of the control unit.

Establishing an NFC Connection

Follow the steps below to establish an NFC connection from your smartphone to the Micrologic X control unit.

Step	Action
1	Start Masterpact MTZ Mobile App on your smartphone.
2	Select **Connect to device through NFC**.
3	Place your smartphone against the Micrologic X display screen at a maximum distance of 20 mm, in the wireless NFC communication zone. **NOTE:** The NFC antenna of the control unit is located around the Micrologic X display screen. The position of the NFC antenna on the smartphone depends on the model used. If communication is not established, check where the NFC antenna is located on your smartphone and repeat the procedure. A beep indicates that the communication is established. The Masterpact MTZ Mobile App then starts downloading data. Another beep indicates that the data download is complete. If the operation fails, a message is displayed on the smartphone. Start the procedure again. **NOTE:** You must not remove your smartphone from the Micrologic X display screen while the data download is in progress or the download will not be completed (you will lose the NFC connection).
4	Remove your smartphone from the Micrologic X display screen.

NFC data downloaded from the Micrologic X control unit is not automatically refreshed. To get updates, you must establish a new NFC connection. Be aware that each new set of data downloaded overwrites the previous data. You can use the Masterpact MTZ Mobile App to consult downloaded data.

Troubleshooting NFC Communication Issues

The following table lists the common problems you might meet when establishing an NFC connection to the Micrologic X control unit.

Problem description	Probable causes	Solutions
The NFC connection is not established. (No beep)	The smartphone is out of the NFC wireless communication zone.	Move your smartphone so that its antenna is in the NFC wireless communication zone and repeat the connection procedure.
	Your smartphone has a reinforced case which is blocking the signal.	Remove the case of your smartphone and repeat the connection procedure.
	Your smartphone does not have NFC capability.	–
The NFC connection was established but the signal is lost. (No second beep)	The smartphone was moved out of NFC wireless communication zone before the data transmission finished.	Move your smartphone into the NFC wireless communication zone and repeat the connection procedure. Keep the smartphone in the zone until you hear the second beep.
The data is not transmitted. The message ‘Memory fail. Please try again’ is displayed on the smartphone.		

Appendix D
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.
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 *Micrologic X Control Unit - User Guide*. • 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.
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*.

DOCA0103EN-00

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

www.schneider-electric.com

09/2016