

# Pact Series

## IDMT Ground-Fault Digital Module for MicroLogic X Control Unit

### User Guide

Pact Series offers world-class breakers and switches.

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# Safety Information

## Important Information

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



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



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

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

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

### **NOTICE**

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

## Please Note

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

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

# About the Book

## Document Scope

The aim of this guide is to provide users, installers, and maintenance personnel with the technical information needed to operate the factory-installed Inverse Definite Minimum Time (IDMT) Ground-fault Digital Module. It includes information about:

- The **Advanced** protection menu available on the MicroLogic X display screen to set IDMT ground-fault protection
- IDMT ground-fault protection

All information concerning the MicroLogic X control unit can be found in DOCA0102EN *MasterPact MTZ – MicroLogic X Control Unit – User Guide*.

This guide applies to the following MicroLogic X and MicroLogic Xi control units.

Standard	Control units	Commercial reference
IEC	MicroLogic 2.0 X	LV847600
	MicroLogic 5.0 X	LV847602
	MicroLogic 2.0 Xi	LV857600
	MicroLogic 5.0 Xi	LV857602
UL	MicroLogic 3.0 X	LV848815
	MicroLogic 5.0 X	LV847609
	MicroLogic 3.0 Xi	LV857610
	MicroLogic 5.0 Xi	LV857609
<b>NOTE:</b> The commercial reference is printed on the front face of the MicroLogic X and Xi control unit. It also identifies the standard, IEC or UL.		

**NOTE:** A MicroLogic Xi control unit is a MicroLogic X control unit without Bluetooth® Low Energy communication.

All the information related to the MicroLogic X control units presented in this guide applies to MicroLogic Xi control units except information about Bluetooth Low Energy communication.

The specific features of the MicroLogic Xi control units are described in the appendix of DOCA0102EN *MasterPact MTZ – MicroLogic X Control Unit – User Guide*.

## Validity Note

This guide applies to MicroLogic X and Xi control units with firmware version 005.103.000 or greater, and with IDMT Ground-fault Digital Module factory-installed.

For a MicroLogic X control unit with a lower firmware version, refer to DOCA0144EN *MasterPact MTZ - MicroLogic X Control Unit - Firmware Release Note* for a description of the new features and bugs fixed in subsequent firmware versions.

## Online Information

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

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

## Related Documents

Title of documentation	Reference number
<i>MasterPact MTZ – MicroLogic X Control Unit – User Guide</i>	DOCA0102EN
<i>MasterPact MTZ - MicroLogic X Control Unit - Firmware Release Note</i>	DOCA0144EN
<i>MicroLogic Trip Units and Control Units - Firmware History</i>	DOCA0155EN

# Protection Menu

## Description

The **Protection** menu contains the following submenus:

Level 1	Level 2	Level 3	Function description
Home	Protection	I long time	Long-time overcurrent protection, L or ANSI 49RMS/51
		I short time <sup>(1)</sup>	Short-time overcurrent protection, S or ANSI 50TD/51
		I instantaneous	Instantaneous overcurrent protection, I or ANSI 50
		I neutral	Neutral protection
		Dual settings	Dual settings
		Advanced	IDMT ground-fault protection
(1) Applies to MicroLogic 5.0 X for IEC and UL standards			

Only the **Advanced** submenu is described in this guide. For the description of other submenus, refer to [DOCA0102EN MasterPact MTZ – MicroLogic X Control Unit – User Guide](#)

## Active Settings

Active settings used by the protection functions are displayed in the Quick View.

The settings in the **Protection** menu are the settings defined by the user. They may differ from the settings used by the protection functions when **Fallback settings mode** is active.

For more information, refer to [DOCA0102EN MasterPact MTZ – MicroLogic X Control Unit – User Guide](#)

## Advanced

The **Advanced** menu presents the following data and settings:

Level 3	Level 4	Level 5	Parameter name
Advanced	IDMT GF	Protection	Enable IDMT ground-fault protection function: <ul style="list-style-type: none"> <li><b>OFF</b>: the following menus are not displayed and the ground-fault protection is not active.</li> <li><b>ON</b>: the following menus are displayed.</li> </ul>
		Action	IDMT ground-fault protection action: <ul style="list-style-type: none"> <li><b>Trip</b></li> <li><b>Alarm</b></li> </ul>
		Inhibit	Enable inhibit by IO module: <ul style="list-style-type: none"> <li><b>OFF</b></li> <li><b>ON</b></li> </ul>
		Curve	I4t, for display only.
		Ig (A)	Ig ground-fault protection threshold expressed in Amps.
		IgMax (A)	Maximum Ig ground-fault protection threshold expressed in Amps.
		tg (s)	tg ground-fault protection time delay.



# IDMT Ground-Fault Protection (G or ANSI 50N-TD/51N)

## Presentation

IDMT ground-fault protection provides protection against phase-to-ground fault, which is more sensitive than protection based on phase current only. It is generally used in TN-S systems but could also be used in other earthing systems.

IDMT ground-fault protection is based on the summation of the phases and neutral current.

The IDMT ground-fault protection Digital Module provides ground-fault protection based on a High Voltage Fuse (HVF) tripping curve ( $I^4t$ ), providing the ability to be selectively coordinated with fuses.

## Availability

IDMT ground-fault protection is available when the IDMT Ground-fault Digital Module is factory-installed on the MicroLogic control unit.

IDMT ground-fault protection requires an external 24 Vdc power supply.

IDMT ground-fault protection is compatible with:

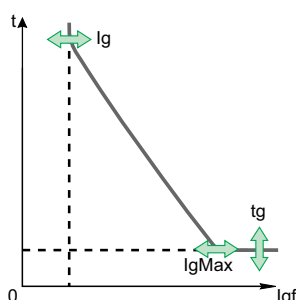
- 3-pole and 4-pole circuit breakers. For details of possible configurations, refer to the table below.
- MicroLogic 2.0 X and 5.0 X control units for IEC standard
- MicroLogic 3.0 X and 5.0 X control units for UL standard
- MicroLogic X control units with firmware version greater than or equal to 005.103.000. Earlier firmware versions need to be updated. For more information about firmware updates, refer to [DOCA0144EN MasterPact MTZ - MicroLogic X Control Unit - Firmware Release Note](#)

An External Neutral Current Transformer (ENCT) can be used for measurement of the current on neutral. For information about the installation of ENCT, consult the instruction sheet on the Schneider Electric website: [NHA14388](#).

## Operating Principle

The ground-fault current  $I_{gf}$  is calculated by summation of the instantaneous phases and neutral current according to the circuit breaker configuration, as shown in the following table. As a result, it does not need an additional sensor to measure the ground current.

Circuit breaker configuration	$I_{gf}$ ground-fault current
3P	$I_{gf} = I_1 + I_2 + I_3$
4P	$I_{gf} = I_1 + I_2 + I_3 + I_N$
3P + ENCT	$I_{gf} = I_1 + I_2 + I_3 + I_N$ (ENCT)



The IDMT ground-fault protection threshold  $I_g$  sets the level of ground-fault current at which the circuit breaker detects a ground fault that can lead to a trip, based on a High Voltage Fuse (HVF) tripping curve ( $I^4t$ ).

The time delay  $t_g$  sets the minimum length of time during which the circuit breaker carries a ground-fault within the IDMT ground-fault protection threshold  $I_g$  range.

The IDMT ground-fault protection threshold  $I_{gMax}$  sets the level of ground-fault current at which the circuit breaker trips with the time delay  $t_g$  as a constant time protection.

IDMT ground-fault protection is based on the true RMS current of phases and neutral.

In order to trip on an intermittent electrical fault, the control unit accumulates the intermittent currents in the ground-fault tripping range that do not last long enough to trigger a trip. In this case the tripping time is progressively reset at each intermittent electrical fault and may lead to shorter tripping times than those set.

## Setting the Protection

IDMT ground-fault protection can be enabled or disabled.

The IDMT ground-fault protection settings are:

- IDMT mode: enables (ON) or disables (OFF) IDMT ground-fault protection
- IDMT action: trip or alarm
- IDMT inhibit: enables (ON) the protection to be inhibited by IO module
- Ig: IDMT ground-fault protection threshold
- IgMax: for ground-fault current Igf above IgMax, tripping time is tg
- tg: IDMT ground-fault protection minimum time delay

They can be set on the MicroLogic X display screen, at **Home > Protection > Advanced > IDMT GF**.

The dual settings function does not apply to the IDMT ground-fault protection. When the dual settings function is enabled, IDMT ground-fault settings are the same whether set A or set B settings are activated.

## Protection Settings

Settings for MicroLogic X IEC standard

Setting	Unit	Range	Step	Factory setting	Accuracy
IDMT mode	–	ON/OFF	–	OFF	–
IDMT action	–	Alarm/Trip	–	Alarm	–
IDMT inhibit	–	ON/OFF	–	OFF	–
Ig	A	0.2–1 x In	1 A	1 x In	+/- 10%
IgMax	A	Ig–5 x In	1 A	2 x In	+/- 10%
tg	s	0–0.8	0.05	0.4	-

**NOTE:** If IgMax = Ig, protection is constant time.

**NOTE:** The setting tg = 0 is sensitive. One measurement above Ig will generate a trip.

## Settings for MicroLogic X UL standard

Setting	Unit	Range	Step	Factory setting	Accuracy
IDMT mode	–	ON/OFF	–	OFF	–
IDMT action	–	Alarm/Trip	–	Alarm	–
IDMT inhibit	–	ON/OFF	–	OFF	–
Ig for In < 1200 A	A	0.2–1 x In	1 A	1 x In	+/- 10%
Ig for In ≥ 1200 A	A	500–1200 A	1 A	1200 A	+/- 10%
IgMax for In < 1200 A	A	Ig–5 x In	1 A	2 x In	+/- 10%
IgMax for In ≥ 1200 A	A	Ig–5 x In	1 A	3000 A	+/- 10%
tg	s	0–0.8	0.05	0.4	-

**NOTE:** If IgMax = Ig, protection is constant time.

**NOTE:** The setting tg = 0 is sensitive. One measurement above Ig will generate a trip.

**NOTE:** If the choice of protection settings results in a tripping curve which does not respect the NEC norm, a popup screen is generated on the MicroLogic X display screen. Select **OK** to acknowledge the popup message.

## Zone Selective Interlocking (ZSI)

ZSI does not apply to the IDMT ground-fault protection.

## Predefined Events

The function generates the following predefined events:

Code	Event	History	Type	Latched	Activity	Severity	Service LED
0x6432 (25650)	IDMTG Ig trip	Trip	Pulse	Yes	Enabled	High	No
0x6232 (25138)	IDMTG Ig start	Protection	Entry/Exit	No	Enabled	Low	No
0x6332 (25394)	IDMTG Ig operate	Protection	Entry/Exit	No	Enabled	Medium	No

Predefined events cannot be modified by the user. For general information about events, refer to the Event Management section of *DOCA0102EN MasterPact MTZ – MicroLogic X Control Unit – User Guide*.

Protection events are generated as follows:

- The start event is generated when the protection picks up.
- The operate event is generated when the protection time delay elapses.
- The trip event is generated when the circuit breaker tripping voltage release (MITOP) activates.

The trip event is not generated when:

- The protection is set in alarm mode
- The protection is inhibited

## Recommended Actions

Code	Event	Recommended actions
0x6432 (25650)	IDMTG Ig trip	Reset the device or use the Power restoration assistant within the EcoStruxure Power Device app.

## Resetting a Trip Event

For information about resetting the circuit breaker after a trip due to an electrical fault, refer to the relevant document:

- [DOCA0100EN MasterPact MTZ1 - Circuit Breakers and Switch-Disconnectors - User Guide](#)
- [DOCA0101EN MasterPact MTZ2/MTZ3 - Circuit Breakers and Switch-Disconnectors - User Guide](#)



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