Masterpact MTZ
Modbus Communication Guide

05/2019
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When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

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

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

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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 users, installers, and maintenance personnel with the technical information needed to operate the Modbus protocol on the following ranges of circuit breakers:

- Masterpact™ MTZ1 circuit breakers from 630 to 1600 A
- Masterpact™ MTZ2 circuit breakers from 800 to 4000 A
- Masterpact™ MTZ3 circuit breakers from 4000 to 6300 A

Validity Note

This document is valid for Masterpact MTZ1/MTZ2/MTZ3 circuit breakers with a Micrologic X control unit and connected:

- either to an RS-485 serial line Modbus network using an IFM Modbus-SL interface for one circuit breaker.
- or to an Ethernet network using:
  - an IFE Ethernet interface for one circuit breaker,
  - an IFE Ethernet switchboard server or,
  - an EIFE embedded Ethernet interface for one Masterpact MTZ drawout circuit breaker.

This document describes the registers and commands available for the IMU modules with the following firmware version:

<table>
<thead>
<tr>
<th>IMU module</th>
<th>Part number</th>
<th>Firmware version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micrologic X control unit</td>
<td>-</td>
<td>≥ V003.011.xxx</td>
</tr>
<tr>
<td>IO module</td>
<td>LV434063</td>
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</tr>
<tr>
<td>IFM interface</td>
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<tr>
<td>IFE Ethernet interface</td>
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</tr>
<tr>
<td></td>
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<td></td>
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<tr>
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<td>LV434002</td>
<td>≥ V003.009.010</td>
</tr>
<tr>
<td></td>
<td>LV434011</td>
<td></td>
</tr>
<tr>
<td>EIFE Ethernet interface</td>
<td>LV851001</td>
<td>≥ V003.009.010</td>
</tr>
</tbody>
</table>

You can update the firmware of the IMU modules by using the latest version of EcoStruxure Power Commission software.

Online Information

The information contained in this document 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.schneider-electric.com/docs](http://www.schneider-electric.com/docs).

The technical characteristics of the devices described in the present document also appear online. To access the information online:

<table>
<thead>
<tr>
<th>Step</th>
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<td>1</td>
<td>Go to the Schneider Electric home page <a href="http://www.schneider-electric.com">www.schneider-electric.com</a>.</td>
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<tr>
<td>2</td>
<td>In the Search box type the reference of a product or the name of a product range.  &lt;br&gt;● Do not include blank spaces in the reference or product range.  &lt;br&gt;● To get information on grouping similar modules, use asterisks (*).</td>
</tr>
<tr>
<td>3</td>
<td>If you entered a reference, go to the Product Datasheets search results and click on the reference that interests you.  &lt;br&gt;If you entered the name of a product range, go to the Product Ranges search results and click on the product range that interests you.</td>
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<td>4</td>
<td>If more than one reference appears in the Products search results, click on the reference that interests you.</td>
</tr>
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<td>5</td>
<td>Depending on the size of your screen, you may need to scroll down to see the datasheet.</td>
</tr>
<tr>
<td>6</td>
<td>To save or print a datasheet as a .pdf file, click Download XXX product datasheet.</td>
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</tbody>
</table>
The characteristics that are presented in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

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<td>Masterpact MTZ1 Circuit Breakers and Switch-Disconnectors - User Guide</td>
<td>DOCA0100EN</td>
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<td>Masterpact MTZ Micrologic X Control Unit User Guide</td>
<td>DOCA0102EN</td>
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<td>NVE85363</td>
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<td>Enerlin’X IFE - Ethernet Interface / Ethernet Server - Instruction Sheet</td>
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<td>DOCA0102ZH</td>
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<td>0614IB1701ZH</td>
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<tr>
<td>ULP (Universal Logic Plug) System for PowerPact and Masterpact Circuit Breakers - User Guide</td>
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<td>0602IB1504(ES)</td>
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# Chapter 1
Modbus Communication with Masterpact MTZ Circuit Breakers

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Section 1.1
Introduction

What Is in This Section?

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Description

Modbus Communication

The Modbus communication option enables Schneider Electric low voltage circuit breakers to be connected to a supervisor or to any other device with a master Modbus communication channel.

The Modbus communication option is available for the Masterpact MTZ circuit breakers with the Micrologic X control unit and the ULP port module.

The Masterpact MTZ circuit breakers can be connected:
- to an RS-485 serial line network with Modbus protocol using the IFM Modbus-SL interface for one circuit breaker with part number LV434000.
- to an Ethernet network with Modbus TCP/IP protocol using dedicated interfaces like:
  - the IFE Ethernet interface for one circuit breaker.
  - the IFE Ethernet switchboard server.
  - the EIFE embedded Ethernet interface for Masterpact MTZ drawout circuit breaker.

Access to Functions

The Modbus communication option provides access to many functions, including:
- read metering and diagnostic data
- read status conditions and remote operations
- transfer of time-stamped events
- display protection settings
- read the circuit breakers identification and configuration data
- remote control of the circuit breaker
- time-setting and synchronization

This list depends on the composition of the intelligent modular unit (type of circuit breaker, type of Micrologic control unit, IO application module, and so on) and the enabled functions.

Convention

The electrical phases described as phase 1, phase 2, phase 3 cover both IEC standard and UL standard, with the following equivalence:

<table>
<thead>
<tr>
<th>IEC Standard</th>
<th>UL Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Phase a</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Phase b</td>
</tr>
<tr>
<td>Phase 3</td>
<td>Phase c</td>
</tr>
</tbody>
</table>
Intelligent Modular Unit

Definition

A modular unit is a mechanical and electrical assembly containing one or more products to perform a function in a switchboard (incoming protection, motor command, and control).

The circuit breaker with its internal communicating components (Micrologic control unit or Micrologic trip unit) and external ULP modules (IO module) connected to one communication interface is called an intelligent modular unit (IMU).

An IMU is composed around a circuit breaker from the following ranges:

- Masterpact MTZ circuit breakers
- Masterpact NT/NW circuit breakers
- Compact NS 1600b-3200 circuit breakers
- Compact NS 630b-1600 circuit breakers
- PowerPact P- and R-frame circuit breakers
- Compact NSX circuit breakers
- PowerPact H-, J-, and L-frame circuit breakers

ULP Modules Per Circuit Breaker Range

The following table lists the compatible ULP modules for each range of circuit breakers.

<table>
<thead>
<tr>
<th>ULP Module</th>
<th>Part Number</th>
<th>Masterpact MTZ with ULP Port Module and Micrologic Control Unit</th>
<th>Masterpact NT/NW or Compact NS or PowerPact P- and R-Frame with BCM ULP Module and Micrologic Trip Unit</th>
<th>Compact NSX or PowerPact H-, J-, and L-Frame with BSCM Module and/or Micrologic Trip Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFE Ethernet interface for one circuit breaker</td>
<td>LV434001 LV434010</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IFE Ethernet switchboard server</td>
<td>LV434002 LV434011</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EIFE Embedded Ethernet interface for one Masterpact MTZ drawout circuit breaker</td>
<td>LV851001</td>
<td>✓</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Spare part kit EIFE for one Masterpact MTZ1 drawout circuit breaker</td>
<td>LV851100SP</td>
<td>✓</td>
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<td>–</td>
</tr>
<tr>
<td>Spare part kit EIFE for one Masterpact MTZ2/MTZ3 drawout circuit breaker</td>
<td>LV851200SP</td>
<td>✓</td>
<td>–</td>
<td>–</td>
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<tr>
<td>IFM Modbus-SL interface for one circuit breaker</td>
<td>TRV00210 STRV00210</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>IFM Modbus-SL interface for one circuit breaker</td>
<td>LV434000</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>FDM121 front display module for one circuit breaker</td>
<td>TRV00121 STRV00121</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>IO input/output application module for one circuit breaker</td>
<td>LV434063</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>USB maintenance interface</td>
<td>TRV00911 STRV00911</td>
<td>–</td>
<td>✓</td>
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</tbody>
</table>

For more information on the ULP System and its components, refer to the ULP System User Guides.
Communication Architecture

A FDM128 Ethernet display for eight devices
B FDM121 front display module for one circuit breaker
C IFE Ethernet interface for one circuit breaker
D IFE Ethernet switchboard server
E IFM Modbus-SL interface for one circuit breaker
F IO input/output application module for one circuit breaker
G Masterpact MTZ1 or MTZ2/MTZ3 drawout circuit breaker
H Masterpact MTZ1 or MTZ2/MTZ3 fixed circuit breaker
I Masterpact NT/NW circuit breaker
J Compact NS/PowerPact P- and R-frame circuit breaker
K Compact NSX/PowerPact H-, J-, and L-frame circuit breaker
L ULP port module
M EIFE Embedded Ethernet Interface for one Masterpact MTZ drawout circuit breaker
N ULP line termination
O RJ45 male/male ULP cord
P Circuit breaker BCM ULP cord
Q NSX cord

Remote Controller

A remote controller is a device that is able to communicate with an IMU using a communication interface, such as the IFE Ethernet interface. For example, FDM128 Ethernet display for eight devices, supervisor, PLC, BMS, SCADA system, and so on, are remote controllers.

For the description of Modbus registers and commands, refer to the Modbus Communication Guides.
EcoStruxure Power Commission Software

Overview

EcoStruxure™ Power Commission is the new name of Ecoreach software. EcoStruxure Power Commission 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.

EcoStruxure Power Commission 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 by a yellow highlighter. This indicates the difference between the project and device values, and hence provides a system consistency during the operation and maintenance phase.

EcoStruxure Power Commission software enables the configuration of the following circuit breakers, modules, and accessories:

<table>
<thead>
<tr>
<th>Circuit breaker ranges</th>
<th>Modules</th>
<th>Accessories</th>
</tr>
</thead>
</table>
| Masterpact MTZ circuit breakers | ● Micrologic X control unit  
● Communication interface modules: IFM interface, IFE interface, IFE server, and EIFE interface  
● ULP modules: IO module | M2C output module |
| Masterpact NT/NW circuit breakers  
Compact NS circuit breakers  
PowerPact P- and R-frame circuit breakers | ● Micrologic trip units  
● Communication interface modules: BCM module, CCM module, BCM ULP module, IFM interface, IFE interface, IFE server  
● ULP modules: IO module, FDM121 display(1) | M2C and M6C output modules |
| Compact NSX circuit breakers  
PowerPact H-, J- and L-frame circuit breakers | ● Micrologic trip units  
● Communication interface modules: BSCM module, IFM interface, IFE interface, IFE server  
● ULP modules: IO module, FDM121 display(1) | SDTAM and SDx output modules |

(1) For FDM121 display, only the firmware and language download are supported.

For more information, refer to the EcoStruxure Power Commission Online Help.

EcoStruxure Power Commission software is available at www.schneider-electric.com

Key Features

EcoStruxure Power Commission software performs the following actions for the supported devices and modules:
- Create projects by device discovery
- Save the project in the EcoStruxure Power Commission cloud for reference
- 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 test report
- View the communication architecture between the devices in a graphical representation
- View the measurements, logs, and maintenance information
- Export Waveform Capture on Trip Event (WFC)
- View the status of device and IO module
- View the alarm details
- Buy, install, remove, or retrieve the Digital Modules
- Check the system firmware compatibility status
- Update to the latest device firmware
- Perform force trip and automatic trip curve tests
Section 1.2
IFM Interface Presentation

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>20</td>
</tr>
<tr>
<td>Hardware Description</td>
<td>21</td>
</tr>
<tr>
<td>Schematics with Masterpact MTZ Circuit Breakers</td>
<td>24</td>
</tr>
<tr>
<td>Configuration</td>
<td>26</td>
</tr>
<tr>
<td>Communication Test</td>
<td>27</td>
</tr>
</tbody>
</table>
Introduction

Overview

The IFM Modbus-SL interface for one circuit breaker enables an intelligent modular unit (IMU) with a Compact, PowerPact or Masterpact circuit breaker, to be connected to a two-wire Modbus-SL RS-485 serial line Modbus network. Each circuit breaker has its own IFM interface and a corresponding Modbus address.

Types of IFM Interface

The part number of the IFM interface is LV434000. The IFM interface part number LV434000 completely replaces the IFM interface with part number TRV00210 or STRV00210.

NOTE:

- The IFM interface data for the IFM interface with part number LV434000 is the same as for the IFM interface with part number TRV00210 or STRV00210.
- The IFM interfaces with part number TRV00210 or STRV00210 are not compatible with Masterpact MTZ circuit breakers.

IFM Interface Features

The main features of IFM interface are:

- Single Modbus serial line interface provided in
  - RJ45 connector interface
  - Stacking connection interface
- HMI rotary dials for address settings and padlock option
- Pushbutton for test functionality
Hardware Description

General Description

A 24 Vdc power supply terminal block
B Modbus address rotary switches
C Modbus traffic status LED
D Modbus locking pad
E ULP status LED
F Test button
G Mechanical lock
H QR code to product information
I RJ45 Modbus-SL port
J Stacking accessory connection (TRV00217, optional)
K 2 RJ45 ULP ports

For information on installation, consult the instruction sheet available on Schneider Electric website: NVE85393.

Mounting

The IFM interface is a DIN rail mounting device. The stacking accessory enables the interconnection of several IFM interfaces without additional wiring.

24 Vdc Power Supply

The IFM interface must always be supplied with 24 Vdc:

- IFM interfaces stacked to an IFE server are supplied by the IFE server and it is not necessary to supply them separately.
- If IFM interfaces are stacked without IFE server, only one of the IFM interfaces must be supplied with 24 Vdc.
- A single IFM interface must be supplied with 24 Vdc.

It is recommended to use an UL listed/UL recognized limited voltage/limited current or a class 2 power supply with a 24 Vdc, 3 A maximum.

NOTE: For 24 Vdc power supply connection, use copper conductors only.
Modbus Address Rotary Switches

The IFM interface bears the Modbus address of the IMU to which it is connected. See the ULP System User Guide for more information regarding the IMU.

Define the Modbus address using the two address rotary switches on the front panel of the IFM interface.

The address range is 1 to 99. Do not use the address 0, because it is reserved for broadcasting commands.

The IFM interface is initially configured with address 99.

Example of the configuration of the address rotary switches for address 21:

![Address Configuration Diagram]

Modbus Traffic Status LED

The Modbus traffic status LED provides information about the traffic transmitted or received by the IMU over the Modbus network.

- When the Modbus address rotary switches are on value 0, the yellow LED is steady ON.
- When the Modbus address rotary switches are on value anywhere from 1 to 99, the yellow LED is ON during the transmission and reception of messages, OFF otherwise.

Modbus Locking Pad

The Modbus locking pad on the front panel of the IFM interface enables or disables remote control commands to be sent over the Modbus network to the IFM interface itself, and to the other modules of the IMU.

- If the arrow points to the open padlock (factory setting), remote control commands are enabled.
- If the arrow points to the closed padlock, remote control commands are disabled.

The only remote control commands that are enabled even if the arrow points to the closed padlock are the Set Absolute Time and Get Current Time commands (see page 225).

NOTE: For IFM interface slaves connected to an IFE Ethernet switchboard server, the locking pad of the IFE interface does not disable the remote control commands in IFM interface.

Test Button

The test button tests the connection between all the ULP modules connected to the IFM interface.

Pressing the test button launches the connection test for 15 seconds.

During the test, all the ULP modules keep working normally.

ULP Status LED

The yellow ULP status LED describes the mode of the ULP module.

<table>
<thead>
<tr>
<th>ULP status LED</th>
<th>Mode</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>![ULP Status LED Diagram]</td>
<td>Nominal</td>
<td>None</td>
</tr>
<tr>
<td>![ULP Status LED Diagram]</td>
<td>Conflict</td>
<td>Remove extra ULP module</td>
</tr>
<tr>
<td>![ULP Status LED Diagram]</td>
<td>Degraded</td>
<td>Replace IFM at the next maintenance operation</td>
</tr>
<tr>
<td>ULP status LED</td>
<td>Mode</td>
<td>Action</td>
</tr>
<tr>
<td>----------------</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>Test</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Non-critical firmware discrepancy</td>
<td>Use EcoStruxure Power Commission software to check the firmware and hardware compatibility and follow the recommended actions.</td>
</tr>
<tr>
<td></td>
<td>Non-critical hardware discrepancy</td>
<td>Install missing features</td>
</tr>
<tr>
<td></td>
<td>Configuration discrepancy</td>
<td>Use EcoStruxure Power Commission software to check the firmware and hardware compatibility and follow the recommended actions.</td>
</tr>
<tr>
<td></td>
<td>Critical hardware discrepancy</td>
<td>Replace IFM.</td>
</tr>
<tr>
<td></td>
<td>Stop</td>
<td>Check power supply</td>
</tr>
</tbody>
</table>
Schematics with Masterpact MTZ Circuit Breakers

Description

The IFM interface is connected to the Masterpact MTZ circuit breaker through its ULP port module. For more information, refer to the ULP System User Guides (see page 10).

ULP Connection

---

**NOTICE**

HAZARD OF EQUIPMENT DAMAGE

- Never connect a Modbus-SL device to an RJ45 ULP port.
- The RJ45 ULP ports of IFM interface are for ULP modules only.
- Any other use can damage the IFM interface or the device connected to the IFM interface.
- To check if an ULP module is compatible with the RJ45 ULP ports of IFM interface, refer to the ULP System User Guide.

Failure to follow these instructions can result in equipment damage.

---

All the connection configurations require the RJ45 male/male ULP cord.

When the second RJ45 ULP port is not used, it must be closed with an ULP line termination.

---

A  RJ45 male/male ULP cord

B  ULP line termination
Connection of the IFM Interface to a Masterpact MTZ Circuit Breaker

Connect the IFM interface to the ULP port module on a Masterpact MTZ circuit breaker by using the ULP cord.

A  IFM Modbus-SL interface for one circuit breaker
B  ULP line termination
C  RJ45 male/male ULP cord
D  ULP port module
E  Masterpact MTZ fixed circuit breaker
Configuration

General Description

Two configurations of the IFM interface are available:
- Automatic configuration (Auto-Speed sensing ON, factory setting): when connected to the Modbus network, the IFM interface automatically detects the network parameters.
- Personalized configuration (Auto-Speed sensing OFF): the user can personalize the network parameters using the EcoStruxure Power Commission software (see page 18).

Automatic Configuration

The Modbus slave address is defined by the two address rotary switches on the front panel of the IFM interface. When connected to the Modbus serial line network, the IFM interface automatically detects the network speed and parity. The Auto-Speed sensing algorithm tests the available Baud rates and parities and automatically detects the Modbus communication network parameters. The Modbus master must send at least 25 frames on the Modbus network in order to allow the Auto-Speed sensing algorithm to work.

The transmission format is binary with one start bit, eight data bits, one stop bit in case of even or odd parity, and two stop bits in case of no parity.

If the Auto-Speed sensing algorithm does not detect the network parameters, it is recommended to follow this procedure:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set up the IFM interface to Modbus address 1 (see page 22).</td>
</tr>
<tr>
<td>2</td>
<td>Send a Read Multiple Register request (function code 0x03) to slave 1, at any address and for any number of registers.</td>
</tr>
<tr>
<td>3</td>
<td>Send this request at least 25 times.</td>
</tr>
</tbody>
</table>

NOTE: If the network speed or parity is changed after the IFM interface has automatically detected these settings, the IFM interface must be restarted (power off/power on) in order to detect the new network parameters.

Personalized Configuration

The Modbus slave address is defined by the two address rotary switches on the front panel of the IFM interface.

Disable the Auto-Speed sensing option and set the following Modbus communication network parameters with the EcoStruxure Power Commission software (see page 18):
- Baud rate: 4800, 9600, 19200, and 38400 Baud.
- parity: even, odd, and none (it is possible to select one stop bit or two stop bits in case of no parity).

NOTE: It is not possible to change the Modbus address or the status of the locking pad with the EcoStruxure Power Commission software.
Communication Test

Introduction

The use of the EcoStruxure Power Commission software (see page 18) is recommended to test the serial line communication on the various circuit breakers.

If the laptop or PC installed with the EcoStruxure Power Commission software and connected on the Modbus network is able to read data from the IMU, the communication is established. Refer to the EcoStruxure Power Commission Online Help.
Section 1.3
IFE Interface

What Is in This Section?
This section contains the following topics:

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<thead>
<tr>
<th>Topic</th>
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<td>Hardware Description</td>
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</tr>
<tr>
<td>Schematics with Masterpact MTZ Circuit Breakers</td>
<td>34</td>
</tr>
</tbody>
</table>
Introduction

Overview

The IFE interface enables an intelligent modular unit (IMU) with a Compact, PowerPact, or Masterpact circuit breaker to be connected to an Ethernet network. Each circuit breaker has its own IFE interface and a corresponding IP address.

Types of IFE Interface

There are two types of the IFE interface:

- IFE Ethernet interface for one circuit breaker, with part number LV434001
  This type of IFE interface is an Ethernet interface for Compact, PowerPact, and Masterpact circuit breakers.
  \[\text{NOTE: The IFE interface with part number LV434001 completely replaces the IFE interface with part number LV434010. The LV434001 comes with the real time clock (RTC) feature and allows ULP connections up to 20 m (65.6 ft) with the Masterpact MTZ circuit breakers (LV434010 had a theoretical limitation of 5 m (16.4 ft) over the life of the IFE interface).}\]

- IFE Ethernet switchboard server, with part number LV434002
  This type of IFE interface is an Ethernet interface for Compact, PowerPact, and Masterpact circuit breakers and a server for Modbus-SL (serial line) connected devices.
  \[\text{NOTE: The IFE server with part number LV434002 completely replaces the IFE server with part number LV434011. The LV434002 comes with the real time clock (RTC) feature and allows ULP connections up to 20 m (65.6 ft) with the Masterpact MTZ circuit breakers (LV434011 had a theoretical limitation of 5 m (16.4 ft) over the life of the IFE interface).}\]

IFE Interface Features

The main features of IFE interface are:

- Dual Ethernet port for simple daisy chain connection
- Device profile web service for discovery of the IFE interface on the local area network (LAN)
- ULP compliant for location of the IFE interface in the switchboard
- Ethernet interface for Compact, PowerPact, and Masterpact circuit breakers
- Server for Modbus-SL connected devices (only for the IFE server with the part number LV434002)
- Embedded setup webpages
- Embedded monitoring webpages
- Embedded control webpages
- Built-in email alarm notification for circuit breaker connected to IFE interface.

\[\text{NOTE: The built-in switch of IFE interface does not support the ring topology as it does not have the feature of the loop back protection.}\]
Hardware Description

Description

A  Ethernet 1 and Ethernet 2 RJ45 communication ports
B  24 Vdc power supply terminal block
C  QR code to product information
D  Ethernet communication LEDs
E  Module status LED
F  Network status LED
G  Sealable transparent cover
H  Reset button
I  ULP status LED
J  Test button (accessible even with closed cover)
K  Locking pad
L  Modbus traffic status LED (IFE server only)
M  Device name label
N  Two RJ45 ULP ports
O  Grounding connection

For information on installation, consult the instruction sheet available on the Schneider Electric website: QGH13473.

Mounting

The IFE interface mounts on a DIN rail. The stacking accessory enables the connection of several IFM interfaces to an IFE server without additional wiring.

NOTE: The stacking feature is available only for the IFE server with the part number LV434002.
24 Vdc Power Supply

The IFE interface must always be supplied with 24 Vdc. The power to the IFM interfaces stacked to an IFE server are supplied by the IFE server and it is not necessary to supply power to them separately.

It is recommended to use an UL listed and recognized limited voltage/limited current or a class 2 power supply with a 24 Vdc, 3 A maximum.

**NOTE:** For 24 Vdc power supply connection, use copper conductors only.

---

**Ethernet Communication LEDs**

The Ethernet communication dual color LEDs, indicate the status of the Ethernet ports ETH1 and ETH2.

<table>
<thead>
<tr>
<th>LED Indication</th>
<th>Status Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>No power</td>
<td>None</td>
</tr>
<tr>
<td>Steady yellow</td>
<td>10 Mbps, link established, and no activity</td>
<td>None</td>
</tr>
<tr>
<td>Blinking yellow</td>
<td>10 Mbps, ongoing activity</td>
<td>None</td>
</tr>
<tr>
<td>Steady green</td>
<td>100 Mbps, link established, and no activity</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green</td>
<td>100 Mbps, ongoing activity</td>
<td>None</td>
</tr>
</tbody>
</table>

**Module Status LED**

The module status dual color LED, indicates the IFE interface status.

<table>
<thead>
<tr>
<th>LED Indication</th>
<th>Status Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>No power</td>
<td>None</td>
</tr>
<tr>
<td>Steady green</td>
<td>IFE interface operational</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green (250 ms ON, 250 ms OFF)</td>
<td>Hidden control webpage available</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green (500 ms ON, 500 ms OFF)</td>
<td>IFE interface firmware corrupted</td>
<td>Contact your local Schneider Electric service team for support.</td>
</tr>
<tr>
<td>Blinking red (500 ms ON, 500 ms OFF)</td>
<td>IFE interface in degraded mode</td>
<td>Replace ULP module at the next maintenance operation.</td>
</tr>
<tr>
<td>Steady red</td>
<td>IFE interface out of service</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green/red (1 s green, 1 s red)</td>
<td>Firmware update in progress</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green/red (250 ms green, 250 ms red)</td>
<td>Self-test in progress</td>
<td>None</td>
</tr>
</tbody>
</table>

**Network Status LED**

The network status dual color LED, indicates the Ethernet network status.

<table>
<thead>
<tr>
<th>LED Indication</th>
<th>Status Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>No power or no IP address</td>
<td>None</td>
</tr>
</tbody>
</table>
Modbus Communication with Masterpact MTZ Circuit Breakers

### Modbus Serial Line Traffic LED

The Modbus serial line traffic yellow LED, indicates that the traffic is being transmitted or received over the Modbus serial line network through the IFE server.

The LED is ON during the transmission and reception of the messages. The LED is OFF otherwise.

**NOTE:** The LED is OFF on the IFE interface (part number LV434001).

### Modbus Address

The IFE interface accepts the Modbus address of the IMU to which it is connected.

The Modbus address is 255 and cannot be changed.

### Locking Pad

The locking pad on the front panel of the IFE interface enables or disables the ability to send the remote control commands over the Ethernet network to the IFE interface, and to the other modules of the IMU.

- If the arrow points to the open padlock (factory setting), remote control commands are enabled.
- If the arrow points to the closed padlock, remote control commands are disabled.

The only remote control command that is enabled even if the arrow points to the closed padlock, is the set absolute time command.

### Test Button

The test button has two functions, according to the duration of the button pressed.

<table>
<thead>
<tr>
<th>Time Range</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–5 s</td>
<td>Tests the connection between all the ULP modules for 15 s.</td>
</tr>
<tr>
<td>10–15 s</td>
<td>Activates the hidden configuration mode.</td>
</tr>
</tbody>
</table>

**NOTE:** The hidden configuration is not activated if the button is pressed for more than 15 s.

### Reset Button

When the reset button is pressed for 1–5 s, it forces the IP acquisition mode to the factory default setting (DHCP).

### ULP Status LED

The yellow ULP status LED describes the mode of the ULP module.

<table>
<thead>
<tr>
<th>ULP LED</th>
<th>Mode</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>![1 s]</td>
<td>Nominal</td>
<td>None</td>
</tr>
<tr>
<td>![Conflict]</td>
<td>Conflict</td>
<td>Remove extra ULP module</td>
</tr>
<tr>
<td>![1.5 s]</td>
<td>Degraded</td>
<td>Replace ULP module at the next maintenance operation</td>
</tr>
<tr>
<td>![Test]</td>
<td>Test</td>
<td>None</td>
</tr>
</tbody>
</table>
## Modbus Communication with Masterpact MTZ Circuit Breakers

<table>
<thead>
<tr>
<th>ULP LED</th>
<th>Mode</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Non-critical firmware discrepancy</td>
<td>Use EcoStruxure Power Commission software to check the firmware and hardware compatibility and follow the recommended actions</td>
</tr>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Non-critical hardware discrepancy</td>
<td>Install missing features</td>
</tr>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Configuration discrepancy</td>
<td>Install missing features</td>
</tr>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Critical firmware discrepancy</td>
<td>Use EcoStruxure Power Commission software to check the firmware and hardware compatibility and follow the recommended actions</td>
</tr>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Critical hardware discrepancy</td>
<td>Replace ULP module</td>
</tr>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Stop</td>
<td>Replace ULP module</td>
</tr>
<tr>
<td><img src="image.png" alt="LED Diagram" /></td>
<td>Power OFF</td>
<td>Check power supply</td>
</tr>
</tbody>
</table>
Schematics with Masterpact MTZ Circuit Breakers

Description

The IFE interface is connected to the Masterpact MTZ circuit breaker through its ULP port module. For more information, refer to the ULP System User Guides (see page 10).

ULP Connection

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAZARD OF EQUIPMENT DAMAGE</td>
</tr>
<tr>
<td>• Never connect an Ethernet device to a RJ45 ULP port.</td>
</tr>
<tr>
<td>• The RJ45 ULP ports of IFE interface are for ULP modules only.</td>
</tr>
<tr>
<td>• Any other use can damage the IFE interface or the device connected to the IFE interface.</td>
</tr>
<tr>
<td>• To check if a ULP module is compatible with the RJ45 ULP ports of IFE interface, refer to the ULP System User Guides.</td>
</tr>
<tr>
<td>Failure to follow these instructions can result in equipment damage.</td>
</tr>
</tbody>
</table>

All the connection configurations require the RJ45 male/male ULP cord. When the second RJ45 ULP port is not used, it must be closed with an ULP line termination.

A  RJ45 male/male ULP cord  
B  ULP line termination

Connection of the IFE Interface to a Masterpact MTZ Circuit Breaker

Connect the IFE interface to the ULP port module on a Masterpact MTZ circuit breaker by using the ULP cord.
A  IFE Ethernet interface for one circuit breaker
B  ULP line termination
C  RJ45 male/male ULP cord
D  ULP port module
E  Masterpact MTZ fixed circuit breaker
Section 1.4
EIFE Ethernet Interface for Drawout Circuit Breaker

What Is in This Section?
This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>37</td>
</tr>
<tr>
<td>Hardware Description</td>
<td>38</td>
</tr>
</tbody>
</table>
Introduction

Overview

The EIFE embedded Ethernet interface for one Masterpact™ MTZ drawout circuit breaker (or EIFE interface) enables one Masterpact MTZ drawout circuit breaker to be connected to an Ethernet network. It provides digital access to all the data delivered by the Micrologic™ X control unit of the Masterpact MTZ circuit breaker. It provides information about the intelligent modular unit (IMU) system. In addition, it monitors the three positions of the circuit breaker when inserted in its cradle:

- Cradle connected
- Cradle disconnected
- Cradle test position

EIFE Interface Features

The main features of EIFE interface are:

- Dual 10/100 Mbps Ethernet port for simple daisy chain connection
- Device profile web service for discovery of the EIFE interface on the local area network (LAN)
- Ethernet interface for Masterpact MTZ drawout circuit breakers
- Embedded setup webpages
- Embedded monitoring webpages
- Embedded control webpages
- Cradle status management (CE, CD, and CT)
- Built-in email alarm notification
- Network time management (SNTP)
Hardware Description

Description

A Two RJ45 Ethernet ports
  A1 OFF: 10 Mbps
  Steady green: 100 Mbps
  A2 Steady green: link
  Blinking green: activity
B IP reset button
C Device identification label
D Module status LED
E Network status LED
F ULP status LED
G USB mode ULP port
H QR code to product information
I DIN clip
J Grounding connection
K CT limit switch
L CE limit switch
M CD limit switch
N MAC ID

For information on installation, consult the instruction sheet available on Schneider Electric website: NVE23550.

Mounting

The EIFE interface is embedded in the cradle of the Masterpact MTZ circuit breaker.

24 Vdc Power Supply

The EIFE interface is powered by the ULP port module.

For more information, refer to ULP System User Guides.

It is recommended to use an UL listed and recognized limited voltage/limited current or a class 2 power supply with a 24 Vdc, 3 A maximum.

NOTE: For 24 Vdc power supply connection, use copper conductors only.
Modbus Communication with Masterpact MTZ Circuit Breakers

**Ethernet Connection**

---

**Module Status LED**

The module status dual color LED, indicates the EIFE interface status.

<table>
<thead>
<tr>
<th>LED Indication</th>
<th>Status Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>No power</td>
<td>None</td>
</tr>
<tr>
<td>Steady green</td>
<td>EIFE interface operational</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green (250 ms ON, 250 ms OFF)</td>
<td>Hidden control webpage available</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green (500 ms ON, 500 ms OFF)</td>
<td>EIFE interface firmware corrupted</td>
<td>Contact your local Schneider Electric service team for support.</td>
</tr>
<tr>
<td>Blinking red (500 ms ON, 500 ms OFF)</td>
<td>EIFE interface in degraded mode</td>
<td>Replace ULP module at the next maintenance operation.</td>
</tr>
<tr>
<td>Steady red</td>
<td>EIFE interface out of service</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green/red (1 s green, 1 s red)</td>
<td>Firmware update in progress</td>
<td>None</td>
</tr>
<tr>
<td>Blinking green/red (250 ms green, 250 ms red)</td>
<td>Self-test in progress</td>
<td>None</td>
</tr>
</tbody>
</table>

**Network Status LED**

The network status dual color LED, indicates the Ethernet network status.

<table>
<thead>
<tr>
<th>LED Indication</th>
<th>Status Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>No power or no IP address</td>
</tr>
<tr>
<td>Steady green</td>
<td>Valid IP address</td>
</tr>
<tr>
<td>Steady red</td>
<td>Duplicated IP address</td>
</tr>
<tr>
<td>Blinking green/red (250 ms green, 250 ms red)</td>
<td>Self-test in progress</td>
</tr>
<tr>
<td>Steady amber</td>
<td>Error detected in IP configuration</td>
</tr>
</tbody>
</table>

**ULP Status LED**

The yellow ULP status LED describes the mode of the ULP module.

<table>
<thead>
<tr>
<th>ULP LED</th>
<th>Mode</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>![1 s green, 1 s red]</td>
<td>Nominal</td>
<td>None</td>
</tr>
<tr>
<td>![2 s green, 2 s red]</td>
<td>Conflict</td>
<td>Remove extra ULP module</td>
</tr>
<tr>
<td>![1.5 s green, 1.5 s red]</td>
<td>Degraded</td>
<td>Replace EIFE interface at the next maintenance operation</td>
</tr>
</tbody>
</table>

---
Modbus Address

The EIFE interface accepts the Modbus address of the IMU to which it is connected.
The Modbus address is 255 and cannot be changed.

Intrusive Command Mode

The EIFE intrusive command mode can be configured with EcoStruxure Power Commission software. This software can enable or disable the ability to send the remote control commands over the Ethernet network to the EIFE interface, and to the other modules of the connected IMU.

- If the intrusive command mode is Locked, the remote control commands are disabled.
- If the intrusive command mode is Unlocked (factory setting), the remote control commands are enabled.

**NOTE:** Whatever is the intrusive command mode, the only remote control command that is always enabled is the **Set Absolute Time** command.

Reset Button

When the reset button is pressed for 1–5 seconds, it forces the IP acquisition mode to the factory default setting (DHCP).

Cradle Position Contacts

To identify the cradle position of the circuit breaker, the EIFE interface has three limit switches.

<table>
<thead>
<tr>
<th>Limit Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>Cradle connected position contact</td>
</tr>
<tr>
<td>CD</td>
<td>Cradle disconnected position contact</td>
</tr>
<tr>
<td>CT</td>
<td>Cradle test position contact</td>
</tr>
</tbody>
</table>
Chapter 2
Modbus Protocol with Masterpact MTZ Circuit Breakers

What Is in This Chapter?

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</tbody>
</table>
Modbus Master-Slave Principle

Overview

The Modbus protocol exchanges information using a request-reply mechanism between a master (client) and a slave (server). The master-slave principle is a model for a communication protocol in which one device (the master) controls one or more other devices (the slaves). In a standard Modbus network, there is 1 master and up to 31 slaves.

A detailed description of the Modbus protocol is available at [www.modbus.org](http://www.modbus.org).

Characteristics of the Master-Slave Principle

The master-slave principle is characterized as follows:
- Only 1 master is connected to the network at the same time.
- Only the master can initiate communication and send requests to the slaves.
- The master can address each slave individually using its specific address or all slaves simultaneously using address 0.
- The slaves can only send replies to the master.
- The slaves cannot initiate communication, neither to the master nor to other slaves.

Master-Slave Communication Modes

The Modbus protocol can exchange information using 2 communication modes:
- unicast mode
- broadcast mode

Unicast Mode

In unicast mode, the master addresses a slave using the specific address of the slave. The slave processes the request then replies to the master.
Broadcast Mode

The master can also address all slaves using address 0. This type of exchange is called broadcasting. The slaves do not reply to broadcasting messages.

Response Time

The response time $T_r$ is the time needed by a slave to respond to a request sent by the master:

Values with the Modbus protocol:
- Typical value $< 10$ ms for 90% of the exchanges
- Maximum value is around 700 ms, so it is recommended to implement a 1 second time out after sending a Modbus request.

Data Exchange

The Modbus protocol uses 2 types of data:
- Single bit
- Register (16 bits)

Masterpact MTZ circuit breakers support registers only.

Each register has a register number. Each type of data (bit or register) has a 16-bit address.

The messages exchanged with the Modbus protocol contain the address of the data to be processed.

Registers and Addresses

The address of register number $n$ is $n-1$. The tables detailed in the following parts of this document provide both register numbers (in decimal format) and corresponding addresses (in hexadecimal format). For example, the address of register number 12000 is 0x2EDF (11999).

Frames

All the frames exchanged with the Modbus protocol have a maximum size of 256 bytes and are composed of 4 fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Definition</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slave number</td>
<td>1 byte</td>
<td>Destination of the request</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 0: Broadcasting (all slaves concerned)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 1–247: Unique destination</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 248–255: Reserved</td>
</tr>
<tr>
<td>2</td>
<td>Function codes</td>
<td>1 byte</td>
<td>Refer to function codes description (see page 45)</td>
</tr>
<tr>
<td>Field</td>
<td>Definition</td>
<td>Size</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
<td>-----------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Data</td>
<td>n registers</td>
<td>Request or reply data</td>
</tr>
<tr>
<td>4</td>
<td>CRC error checking</td>
<td>2 bytes</td>
<td>CRC16 (to check the content of the entire transmission message)</td>
</tr>
</tbody>
</table>
Modbus Functions

General Description
The Modbus protocol offers a number of functions that are used to read or write data over the Modbus network. The Modbus protocol also offers diagnostic and network-management functions. Only the Modbus functions handled by the circuit breaker are described here.

Read Functions
The following read functions are available:

<table>
<thead>
<tr>
<th>Function Code</th>
<th>Subfunction Code</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (0x03)</td>
<td>–</td>
<td>Read holding registers</td>
<td>Read n output or internal registers</td>
</tr>
<tr>
<td>4 (0x04)</td>
<td>–</td>
<td>Read input registers</td>
<td>Read n input registers</td>
</tr>
<tr>
<td>43 (0x2B)</td>
<td>14 (0x0E)</td>
<td>Read device identification</td>
<td>Read the identification data of the slave</td>
</tr>
<tr>
<td>43 (0x2B)</td>
<td>15 (0x0F)</td>
<td>Get date and time</td>
<td>Read the date and time of the slave</td>
</tr>
</tbody>
</table>

Read Register Example
The following table shows how to read the RMS current on phase 1 (I1) in registers 21037 and 21038. The address of register 21037 is 21037 - 1 = 21036 = 0x522C. The Modbus address of the Modbus slave is 47 = 0x2F.

<table>
<thead>
<tr>
<th>Master Request</th>
<th>Slave Reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name</td>
<td>Example</td>
</tr>
<tr>
<td>Modbus slave address</td>
<td>0x2F</td>
</tr>
<tr>
<td>Function code</td>
<td>0x03</td>
</tr>
<tr>
<td>Address of the register to read (MSB)</td>
<td>0x52</td>
</tr>
<tr>
<td>Address of the register to read (LSB)</td>
<td>0x2C</td>
</tr>
<tr>
<td>Number of registers (MSB)</td>
<td>0x00</td>
</tr>
<tr>
<td>Number of registers (LSB)</td>
<td>0x02</td>
</tr>
<tr>
<td>CRC (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (LSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The content of registers 21037 and 21038 in FLOAT32 is 0x440AC000. Therefore, the RMS current on phase 1 (I1) is 555.00 A.

Get Date and Time Example
The following table shows how to get the date and time of a Modbus slave. The Modbus address of the Modbus slave is 47 = 0x2F.

<table>
<thead>
<tr>
<th>Master Request</th>
<th>Slave Reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name</td>
<td>Example</td>
</tr>
<tr>
<td>Modbus slave address</td>
<td>0x2F</td>
</tr>
<tr>
<td>Function code</td>
<td>0x2B</td>
</tr>
<tr>
<td>Subfunction code</td>
<td>0x0F</td>
</tr>
<tr>
<td>Reserved</td>
<td>0x00</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Set Date and Time Example
The following table shows how to set date and time of a Modbus slave. The Modbus address of the Modbus slave is 47 = 0x2F, the new date is October 2, 2014, and the new time is 2:32:03.500 p.m.

NOTE: Use the broadcast mode (with Modbus slave address = 0) to set the date and time of all Modbus slaves.
The normal response is an echo of the request, returned after the date-time has been updated in the remote device. If the date-time structure content is not consistent with a true date-time (that is, an invalid date-time), the value returned in the Date-Time field is set to 0 by the device.

In case of 24 Vdc power loss, the date and time of the Modbus slaves without battery is not refreshed anymore. It is therefore mandatory to set date and time for all Modbus slaves after recovering the 24 Vdc power supply.

Furthermore, due to the clock drift of each Modbus slave, it is mandatory to set date and time for all Modbus slaves periodically. Recommended period is at least every 15 minutes.

### Scattered Holding Register Read Function

The scattered holding register read function is available:

<table>
<thead>
<tr>
<th>Function Code</th>
<th>Subfunction Code</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 (0x64)</td>
<td>4 (0x04)</td>
<td>Read scattered holding register</td>
<td>Read n non-contiguous registers</td>
</tr>
</tbody>
</table>

The maximum value for n is 100.

The scattered holding register read function enables the user to:
- avoid reading a large block of contiguous registers when only few registers are needed
- avoid multiple use of functions 3 and 4 in order to read non-contiguous registers

### Scattered Holding Register Read Example

The following table shows how to read the addresses of the register 664 (address 0x0297) and register 666 (address 0x0299) of a Modbus slave. The Modbus address of the Modbus slave is 47 = 0x2F.

<table>
<thead>
<tr>
<th>Master Request</th>
<th>Slave Reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name</td>
<td>Example</td>
</tr>
<tr>
<td>Modbus slave address</td>
<td>0x2F</td>
</tr>
<tr>
<td>Function code</td>
<td>0x64</td>
</tr>
<tr>
<td>Data length in bytes</td>
<td>0x06</td>
</tr>
<tr>
<td>Subfunction code</td>
<td>0x04</td>
</tr>
<tr>
<td>Transmission number(1)</td>
<td>0XX</td>
</tr>
<tr>
<td>Address of first register to read (MSB)</td>
<td>0x02</td>
</tr>
<tr>
<td>Address of first register to read (LSB)</td>
<td>0x97</td>
</tr>
<tr>
<td>Address of second register to read (MSB)</td>
<td>0x02</td>
</tr>
<tr>
<td>Address of second register to read (LSB)</td>
<td>0x99</td>
</tr>
<tr>
<td>CRC (MSB)</td>
<td>0XX</td>
</tr>
<tr>
<td>CRC (LSB)</td>
<td>0XX</td>
</tr>
</tbody>
</table>

(1) The master gives the transmission number in the request. The slave returns the same number in the reply.
Write Functions

The following write functions are available:

<table>
<thead>
<tr>
<th>Function Code</th>
<th>Subfunction Code</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 (0x06)</td>
<td>–</td>
<td>Preset single register</td>
<td>Write 1 register</td>
</tr>
<tr>
<td>16 (0x10)</td>
<td>–</td>
<td>Preset multiple registers</td>
<td>Write n registers</td>
</tr>
<tr>
<td>43 (0x2B)</td>
<td>16 (0x10)</td>
<td>Set date and time</td>
<td>Write the date and time of the slave</td>
</tr>
</tbody>
</table>

Diagnostic Functions

The following diagnostic functions are available:

<table>
<thead>
<tr>
<th>Function Code</th>
<th>Subfunction Code</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>08 (0x08)</td>
<td>10 (0x000A)</td>
<td>Clear counters and diagnostic register</td>
<td>Reset all diagnostic counters</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>11 (0x000B)</td>
<td>Return bus message counter</td>
<td>Read the counter of correct bus messages managed by the slave</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>12 (0x000C)</td>
<td>Return bus communication error counter</td>
<td>Read the counter of incorrect bus messages managed by the slave</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>13 (0x000D)</td>
<td>Return bus exception error counter</td>
<td>Read the counter of exception responses managed by the slave</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>14 (0x000E)</td>
<td>Return slave message counter</td>
<td>Read the counter of messages sent to the slave</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>15 (0x000F)</td>
<td>Return slave no response counter</td>
<td>Read the counter of broadcast messages</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>16 (0x0010)</td>
<td>Return slave negative acknowledge counter</td>
<td>Read the counter of messages sent to the slave but not answered because of the Negative Acknowledge exception code 07</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>17 (0x0011)</td>
<td>Return slave busy counter</td>
<td>Read the counter of messages sent to the slave but not answered because of the Slave Device Busy exception code 06</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>18 (0x0012)</td>
<td>Return bus overrun counter</td>
<td>Read the counter of incorrect bus messages due to overrun errors</td>
</tr>
<tr>
<td>11 (0x0B)</td>
<td>–</td>
<td>Get communication event counter</td>
<td>Read Modbus event counter</td>
</tr>
</tbody>
</table>

Diagnostic Counters

Modbus uses diagnostic counters to enable performance and error management. The counters are accessible using the Modbus diagnostic functions (function codes 8 and 11). The Modbus diagnostic counters and the Modbus event counter are described in the following table:

<table>
<thead>
<tr>
<th>Counter Number</th>
<th>Counter Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bus message counter</td>
<td>Counter of correct bus messages managed by the slave</td>
</tr>
<tr>
<td>2</td>
<td>Bus communication error counter</td>
<td>Counter of incorrect bus messages managed by the slave</td>
</tr>
<tr>
<td>3</td>
<td>Slave exception error counter</td>
<td>Counter of exception responses managed by the slave and incorrect broadcast messages</td>
</tr>
<tr>
<td>4</td>
<td>Slave message counter</td>
<td>Counter of messages sent to the slave</td>
</tr>
<tr>
<td>5</td>
<td>Slave no response counter</td>
<td>Counter of broadcast messages</td>
</tr>
<tr>
<td>6</td>
<td>Slave negative acknowledge counter</td>
<td>Counter of messages sent to the slave but not answered because of the Negative Acknowledge exception code 07</td>
</tr>
<tr>
<td>7</td>
<td>Slave busy count</td>
<td>Counter of messages sent to the slave but not answered because of the Slave Device Busy exception code 06</td>
</tr>
<tr>
<td>8</td>
<td>Bus character overrun counter</td>
<td>Counter of incorrect bus messages due to overrun errors</td>
</tr>
<tr>
<td>9</td>
<td>Comm. event counter</td>
<td>Modbus event counter (this counter is read with function code 11)</td>
</tr>
</tbody>
</table>

Counters Reset

The diagnostic counters are reset to 0 when:
- the maximum value 65535 is reached
- they are reset by a Modbus command (function code 8, sub-function code 10)
- the power supply is lost
- the communication parameters are modified.
Modbus Exception Codes

Exception Responses
Exception responses from either the master (client) or a slave (server) can result from data processing errors. One of the following events can occur after a request from the master (client):

- If the slave (server) receives the request without a communication error and can handle the request correctly, it will return a normal response.
- If the slave (server) does not receive the request due to a communication error, it will not return any response. The master program will eventually process a timeout condition for the request.
- If the slave (server) receives the request but detects a communication error, it will not return a response. The master program will eventually process a timeout condition for the request.
- If the slave (server) receives the request without a communication error, but cannot handle it correctly (for example, the request is to read a register that does not exist), the slave will return an exception response to inform the master of the nature of the error.

Exception Frame
The slave (server) sends an exception frame to the master (client) to report an exception response. An exception frame is composed of 4 fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Definition</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slave number</td>
<td>1 byte</td>
<td>Destination of the request</td>
</tr>
<tr>
<td>2</td>
<td>Exception function code</td>
<td>1 byte</td>
<td>Request function code + 128 (0x80)</td>
</tr>
<tr>
<td>3</td>
<td>Exception code</td>
<td>n bytes</td>
<td>See next paragraph</td>
</tr>
<tr>
<td>4</td>
<td>CRC error checking</td>
<td>2 bytes</td>
<td>CRC16 (to check the content of the entire transmission messages)</td>
</tr>
</tbody>
</table>

Exception Codes
The exception response frame has two fields that differentiate it from a normal response frame:

- The exception function code of the exception response is equal to the function code of the original request plus 128 (0x80).
- The exception code depends on the communication error that the slave (server) encounters.

The following table describes the exception codes handled by the circuit breaker:

<table>
<thead>
<tr>
<th>Exception Code</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 (0x01)</td>
<td>Illegal function</td>
<td>The function code received in the request is not an authorized action for the slave. The slave may be in the wrong state to process a specific request.</td>
</tr>
<tr>
<td>02 (0x02)</td>
<td>Illegal data address</td>
<td>The data address received by the slave is not an authorized address for the slave.</td>
</tr>
<tr>
<td>03 (0x03)</td>
<td>Illegal data value</td>
<td>The value in the request data field is not an authorized value for the slave.</td>
</tr>
<tr>
<td>04 (0x04)</td>
<td>Slave device failure</td>
<td>The slave fails to perform a requested action because of an unrecoverable error.</td>
</tr>
<tr>
<td>05 (0x05)</td>
<td>Acknowledge</td>
<td>The slave accepts the request but needs a long time to process it.</td>
</tr>
<tr>
<td>06 (0x06)</td>
<td>Slave device busy</td>
<td>The slave is busy processing another command. The master must send the request once the slave is available.</td>
</tr>
<tr>
<td>07 (0x07)</td>
<td>Negative acknowledgment</td>
<td>The slave cannot perform the programming request sent by the master.</td>
</tr>
<tr>
<td>08 (0x08)</td>
<td>Memory parity error</td>
<td>The slave detects a parity error in the memory when attempting to read extended memory.</td>
</tr>
<tr>
<td>10 (0x0a)</td>
<td>Gateway path unavailable</td>
<td>The gateway is overloaded or not correctly configured.</td>
</tr>
<tr>
<td>11 (0x0b)</td>
<td>Gateway target device failed to respond</td>
<td>The slave is not present on the network.</td>
</tr>
</tbody>
</table>

Illegal Data Address
The guide describes the registers available for each IMU module with the latest firmware version. When a register described in the guide is not implemented in an IMU module that has an old firmware version, an exception response is returned with the exception code 02 (0x02), illegal data address.

You can update the firmware of the IMU modules by using the EcoStruxure Power Commission software.
Write Protection

General Description

⚠️ WARNING

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP
Protection setting adjustments must be done by qualified electrical personnel.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Remote modifications of Modbus registers can either be dangerous to personnel near the circuit breaker or can cause equipment damage if the protection settings are altered. Therefore, remote control commands are protected by password or by configuration (see page 51).

Software Protection

To prevent an inadvertent change to the Micrologic configuration, remote modifications of the Modbus registers are protected by both of the following:
- a robust data structure and a set of dedicated Modbus registers
- a user profile password scheme

This combination is called the command interface. Failure to conform to these results in an error code and the operation is not performed. The hardware protection has always precedence over the software protection.
Password Management

General Description
Remote access to data on Micrologic control units and the ULP modules of the IMU is protected by password. Remote access includes:
- The communication network
- EcoStruxure Power Commission software
- EcoStruxure Power Device App
- FDM128 display
- IFE/IFE webpages

Four user profiles are defined for remote access. Each IMU has a different password for each user profile. The password for each IMU should be changed from the default password. The default password for each user profile is as follows:

<table>
<thead>
<tr>
<th>User profile</th>
<th>Default password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>0000=0x30303030</td>
</tr>
<tr>
<td>Services</td>
<td>1111=0x31313131</td>
</tr>
<tr>
<td>Engineer</td>
<td>2222=0x32323232</td>
</tr>
<tr>
<td>Operator</td>
<td>3333=0x33333333</td>
</tr>
</tbody>
</table>

The Administrator password is required to write the settings to the Micrologic control unit and the ULP modules of the IMU using the EcoStruxure Power Commission software (see page 18).

Changing a Password
A password can be changed with the EcoStruxure Power Commission software (see page 18). Entering the current password for a given user profile is required to change the password of this user profile. Entering the Administrator password enables you to change the password of any user profile.

A password is composed of exactly 4 ASCII characters. It is case-sensitive and the allowed characters are:
- Digits from 0 to 9
- Letters from a to z
- Letters from A to Z

Passwords of the IMU
The Micrologic control unit and the ULP modules of the IMU must be protected by the same passwords for each user profile.

When using EcoStruxure Power Commission software to modify a password, the password gets modified in the Micrologic control unit and the ULP modules of the IMU.

It is compulsory to assign the current IMU passwords to the new module in the IMU, in case of:
- addition of a new ULP module in the IMU.
- replacement of the Micrologic control unit or one of the ULP module of the IMU.

Use EcoStruxure Power Commission software to modify the passwords of the new module to the current IMU passwords.

Example: Addition of an IO module in an IMU with a Micrologic control unit and an IFE interface.
- The IMU has user-defined passwords for each user profile.
- The IO module has the default passwords for each user profile.

Use EcoStruxure Power Commission software to replace the default passwords of the IO module by the user-defined passwords of the IMU for each user profile.

Password Reset
In case that the Administrator password of the (IMU) is lost or forgotten, the password can be reset to the default password with EcoStruxure Power Commission software (see page 18) and the support of the Schneider Electric Customer Care Center.
Command Interface

General Description

The command interface is used to:

- send remote commands
- send remote control commands

Remote commands are non-intrusive commands. They are not password-protected and always enabled.

Remote control commands are intrusive commands and can either be dangerous to personnel near the circuit breaker or can cause equipment damage if the protection settings are altered. Therefore, remote control commands are:

- protected by password where a password is required in the command
- protected by configuration:
  - with the IFM interface, the remote control commands are enabled when the locking pad on the IFM interface is in the open position.
  - with the IFE interface, the remote control commands are enabled when the locking pad on the IFE interface is in the open position.
  - with the EIFE interface, the remote control commands are enabled when the intrusive command mode is unlocked by EIFE configuration using the EcoStruxure Power Commission software (see page 18).

Each command has a specific code. For example, command code 904 defines the command to open the circuit breaker.

Executing a Command

Follow these steps to execute a command:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Load a buffer.</td>
</tr>
<tr>
<td>2</td>
<td>Write this buffer with a write request (Modbus function 16) starting at register 8000.</td>
</tr>
<tr>
<td>3</td>
<td>Read the command status register 8021, and wait while its content shows that the command is still in progress (0x0003).</td>
</tr>
<tr>
<td>4</td>
<td>Read the command code register 8020:</td>
</tr>
<tr>
<td></td>
<td>- If content of register 8020 is the command code entered in register 8000 at step 2, go to next step.</td>
</tr>
<tr>
<td></td>
<td>- If content of register 8020 is different from the command code entered in register 8000 at step 2, restart at step 1.</td>
</tr>
<tr>
<td>5</td>
<td>Read the error code in the LSB of register 8021:</td>
</tr>
<tr>
<td></td>
<td>- If LSB ≠ 0, then the command failed. Check the error code to understand the cause (see next paragraph). For example, if register 8021 returns 4609 (0x1201), then the error code is 1, which means that the password is not correct (insufficient user rights).</td>
</tr>
<tr>
<td></td>
<td>- If LSB = 0, then the command is executed with no errors.</td>
</tr>
</tbody>
</table>

NOTE: The Modbus application will wait for the complete execution of one command before sending its next command. In case of no response, the Modbus application can resend the command. In this case, the first command will be aborted automatically.
**Command Diagram**

The following diagram shows the steps to follow in order to execute a command:

1. **Step 1**
   - Load buffer

2. **Step 2**
   - Write buffer (starting at register 8000)

3. **Step 3**
   - Read command status register 8021
     - Register 8021 = 31
       - Yes
         - Read command code register 8020
           - No
             - Register 8020 = Command code entered in register 8000 at step 27
               - Yes
                 - Command executed with no errors
                   - Depending on the command:
                     * Check the number of bytes returned (register 8022)
                     * Check the data buffer (registers 8023..8149)
               - No
                 - Command failed
                   - Command status register 8021:
                     * MSE = address of the module that generates the error
                     * LSB = error identifier

**Command Data Structure**

The command data structure is defined as a set of values written in registers 8000 to 8149.

The 3 main areas are:
- Input parameters: registers 8000 to 8015
  - The command-specific parameters are in registers 8006 to 8015.
- Command status: register 8021
- Returned values: registers 8022 to 8149

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>Command code</td>
<td>Writing at this register triggers the command using the parameters in the following registers.</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>Parameter length</td>
<td>Number of bytes used for the parameters including this one (from 10 to 30). This value is provided for each command.</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>Destination</td>
<td>A constant value provided for each command. Factory setting: 0x0000</td>
</tr>
</tbody>
</table>
Command Status

When the command is successful, the command status is 0.
When the command is in progress, the command status is 3.

When the command generates an error, the command status register contains:
- LSB: the error code
- MSB: the address of the module that generates the error

Module Returning the Command Result

The following table lists the addresses of the modules:

<table>
<thead>
<tr>
<th>Module Address</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (0x01)</td>
<td>UTA maintenance module</td>
</tr>
<tr>
<td>2 (0x02)</td>
<td>FDM121 ULP display for one circuit breaker</td>
</tr>
<tr>
<td>3 (0x03)</td>
<td>IFM Modbus-SL interface for one circuit breaker</td>
</tr>
<tr>
<td>17 (0x11)</td>
<td>BSCM circuit breaker status control module for Compact NSX</td>
</tr>
<tr>
<td>18 (0x12)</td>
<td>BCM ULP circuit breaker communication module for Masterpact NT/NW and Compact NS</td>
</tr>
<tr>
<td>20 (0x14)</td>
<td>Micrologic trip unit of Compact NSX</td>
</tr>
<tr>
<td>21 (0x15)</td>
<td>Micrologic control unit of Masterpact MTZ</td>
</tr>
<tr>
<td>32 (0x20)</td>
<td>IO input/output application module 1 for one circuit breaker</td>
</tr>
<tr>
<td>33 (0x21)</td>
<td>IO input/output application module 2 for one circuit breaker</td>
</tr>
<tr>
<td>34 (0x22)</td>
<td>IFE Ethernet interface for one circuit breaker</td>
</tr>
<tr>
<td></td>
<td>IFE Ethernet switchboard server</td>
</tr>
<tr>
<td></td>
<td>EIFE embedded Ethernet interface for one Masterpact MTZ circuit breaker</td>
</tr>
</tbody>
</table>

NOTE: The Micrologic trip units of Masterpact NT/NW and Compact NS circuit breakers do not have an IMU module address.

Result of the Command

The following table lists the codes corresponding to the result of the command.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (0x00)</td>
<td>Successful command</td>
</tr>
<tr>
<td>1 (0x01)</td>
<td>Insufficient user rights (incorrect password)</td>
</tr>
<tr>
<td>2 (0x02)</td>
<td>Access violation (IFM locking pad is locked <em>(see page 22)</em> or, IFE locking pad is locked <em>(see page 32)</em> or intrusive command mode is locked).</td>
</tr>
<tr>
<td>3 (0x03)</td>
<td>Unable to perform a read access</td>
</tr>
</tbody>
</table>
The guide describes the commands available for each IMU module with the latest firmware version. When a command described in the guide is not implemented in an IMU module that has an old firmware version, the command status is returned with the error code 19 (0x13), command is not supported.

You can update the firmware of the IMU modules by using the EcoStruxure Power Commission software.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (0x04)</td>
<td>Unable to perform a write access</td>
</tr>
<tr>
<td>5 (0x05)</td>
<td>Unable to execute service (IFM locking pad locked)</td>
</tr>
<tr>
<td>6 (0x06)</td>
<td>Not enough memory</td>
</tr>
<tr>
<td>7 (0x07)</td>
<td>Allocated memory is too small</td>
</tr>
<tr>
<td>8 (0x08)</td>
<td>Resource is not available</td>
</tr>
<tr>
<td>9 (0x09)</td>
<td>Resource does not exist</td>
</tr>
<tr>
<td>10 (0x0A)</td>
<td>Resource already exists</td>
</tr>
<tr>
<td>11 (0x0B)</td>
<td>Resource is out of order</td>
</tr>
<tr>
<td>12 (0x0C)</td>
<td>Access out of available memory</td>
</tr>
<tr>
<td>13 (0x0D)</td>
<td>String is too long</td>
</tr>
<tr>
<td>14 (0x0E)</td>
<td>Buffer is too small</td>
</tr>
<tr>
<td>15 (0x0F)</td>
<td>Buffer is too big</td>
</tr>
<tr>
<td>16 (0x10)</td>
<td>Input argument is out of range</td>
</tr>
<tr>
<td>17 (0x11)</td>
<td>Requested security level is not supported</td>
</tr>
<tr>
<td>18 (0x12)</td>
<td>Requested component is not supported</td>
</tr>
<tr>
<td>19 (0x13)</td>
<td>Command is not supported</td>
</tr>
<tr>
<td>20 (0x14)</td>
<td>Input argument has an unsupported value</td>
</tr>
<tr>
<td>21 (0x15)</td>
<td>Internal error during command</td>
</tr>
<tr>
<td>22 (0x16)</td>
<td>Timeout during command</td>
</tr>
<tr>
<td>23 (0x17)</td>
<td>Checksum error during command</td>
</tr>
<tr>
<td>24 (0x18)</td>
<td>Unsupported destination</td>
</tr>
<tr>
<td>151 (0x97)</td>
<td>Circuit breaker tripped, reset before commands</td>
</tr>
<tr>
<td>152 (0x98)</td>
<td>Circuit breaker already closed</td>
</tr>
<tr>
<td>153 (0x99)</td>
<td>Circuit breaker already open</td>
</tr>
<tr>
<td>154 (0x9A)</td>
<td>Circuit breaker already reset</td>
</tr>
<tr>
<td>155 (0x9B)</td>
<td>Actuator in manual mode</td>
</tr>
<tr>
<td>156 (0x9C)</td>
<td>Actuator not present</td>
</tr>
<tr>
<td>157 (0x9D)</td>
<td>Bad ASIC configuration</td>
</tr>
<tr>
<td>158 (0x9E)</td>
<td>Previous command in progress</td>
</tr>
<tr>
<td>159 (0x9F)</td>
<td>Reset command forbidden</td>
</tr>
<tr>
<td>160 (0xA0)</td>
<td>inhibit mode on</td>
</tr>
<tr>
<td>169 (0xA9)</td>
<td>Already in asked state</td>
</tr>
<tr>
<td>170 (0xAA)</td>
<td>Unable to preset counters</td>
</tr>
<tr>
<td>171 (0xAB)</td>
<td>Output command rejected, already assigned</td>
</tr>
<tr>
<td>172 (0xAC)</td>
<td>Emitter not allowed to perform the command</td>
</tr>
<tr>
<td>173 (0xAD)</td>
<td>Mode not relevant with requested command</td>
</tr>
<tr>
<td>174 (0xAE)</td>
<td>Session key is invalid</td>
</tr>
<tr>
<td>175 (0xAF)</td>
<td>Out of session scope</td>
</tr>
<tr>
<td>176 (0xB0)</td>
<td>Session is already opened</td>
</tr>
<tr>
<td>177 (0xB1)</td>
<td>No session is open</td>
</tr>
<tr>
<td>178 (0xB2)</td>
<td>No valid setting was submitted</td>
</tr>
<tr>
<td>180 (0xB4)</td>
<td>Wireless component not started</td>
</tr>
<tr>
<td>190 (0xBE)</td>
<td>Read and get an invalid value</td>
</tr>
<tr>
<td>191 (0xBF)</td>
<td>License is not installed</td>
</tr>
</tbody>
</table>
Command Examples

Open Circuit Breaker

The following table details the steps to perform in the master remote device to send a remote control command to open the circuit breaker. The command itself has no parameters.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1    | Load a buffer of 20 registers, word0 to word19.  
|      | - Load into word0 the value 904, the code corresponding to the open circuit breaker command.  
|      | - Load into word1 the value 10, the length of the input parameters. The command itself has no parameters, 10 is the length of the fixed part.  
|      | - Load into word2 the value 5377 (0x1501), the destination. This value is a constant for the command. It is provided in the command description.  
|      | - Load into word3 the value 1.  
|      | - Load into word4 and word5 the 4 ASCII bytes for the Administrator or Operator password. Assuming this password is 'ABcd', load 16706 (0x4142) into word #4 and 25444 (0x6364) into word #5.  
|      | - Load into word6 to word16 the value 0.  
|      | - Load into word17 the value 8019, a command setup constant.  
|      | - Load into word18 the value 8020, a command setup constant.  
|      | - Load into word19 the value 8021, a command setup constant.  
| 2    | Write this buffer with a write request (Modbus function 16) of 20 registers, starting at register 8000.  
| 3    | Read the command status register 8021, and wait while its content shows that the command is still in progress (0x0003).  
| 4    | Read the command code register 8020:  
|      | - If content of register 8020 is the command code entered in register 8000 at step 2, go to next step.  
|      | - If content of register 8020 is different from the command code entered in register 8000 at step 2, restart at step 1.  
| 5    | Read the error code in the LSB of register 8021:  
|      | - If LSB ≠ 0, then the command failed. Check the error code to understand the cause (see next paragraph). For example, if register 8021 returns 4609 (0x1201), then the error code is 1, which means that the password is not correct (insufficient user rights).  
|      | - If LSB = 0, then the command was executed with no errors.  

Reset Energy Measurements

The following table details the steps to perform to send a command to reset the energy measurements (see page 153). The command itself has one parameter.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1    | Load a buffer of 20 registers, word0 to word19.  
|      | - Load into word0 the value 46728, the code corresponding to the reset minimum/maximum command.  
|      | - Load into word1 the value 12, the length of the input parameters. The command itself has one parameter, add 2 bytes to 10 which is the length of the fixed part.  
|      | - Load into word2 the value 5377 (0x1501), the destination. This value is a constant for the command. It is provided in the command description.  
|      | - Load into word3 the value 1.  
|      | - Load into word4 and word5 the 4 ASCII bytes for the Administrator or Operator password. Assuming this password is ‘Pw57’, load 20599 (0x5077) into word #4 and 13623 (0x3537) into word #5.  
|      | - Load into word6 the value 512 (bit 9 set to one). This value requires all the energy measurements to be reset.  
|      | - Load into word7 to word16 the value 0.  
|      | - Load into word17 the value 8019, a command setup constant.  
|      | - Load into word18 the value 8020, a command setup constant.  
|      | - Load into word19 the value 8021, a command setup constant.  
| 2    | Write this buffer with a write request (Modbus function 16) of 20 registers, starting at register 8000.  
| 3    | Read the command status register 8021, and wait while its content shows that the command is still in progress (0x0003).  
| 4    | Read the command code register 8020:  
|      | - If content of register 8020 is the command code entered in register 8000 at step 2, go to next step.  
|      | - If content of register 8020 is different from the command code entered in register 8000 at step 2, restart at step 1.  
| 5    | Read the error code in the LSB of register 8021:  
|      | - If LSB ≠ 0, then the command failed. Check the error code to understand the cause (see next paragraph). For example, if register 8021 returns 4609 (0x1201), then the error code is 1, which means that the password is not correct (insufficient user rights).  
|      | - If LSB = 0, then the command was executed with no errors.  

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**Read Date and Time**

The following table details the steps to perform to send a command to read the date and time (see page 162). The command itself has no parameters. The date and time are returned in a buffer.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1    | Load a buffer of 20 registers, word0 to word19.  
    |   ● Load into word0 the value 768, the code corresponding to the read date/time command.  
    |   ● Load into word1 the value 10, the length of the input parameters. The command itself has no parameters, the length is the length of the fixed part which is 10.  
    |   ● Load into word2 the value 5377 (0x1501), the destination. This value is a constant for the command. It is provided in the command description.  
    |   ● Load into word3 the value 0.  
    |   ● Load into word4 and word5 the value 0x0000 (no password required).  
    |   ● Load into word6 to word16 the value 0.  
    |   ● Load into word17 the value 8019, a command setup constant.  
    |   ● Load into word18 the value 8020, a command setup constant.  
    |   ● Load into word19 the value 8021, a command setup constant. |
| 2    | Write this buffer with a write request (Modbus function 16) of 20 registers, starting at register 8000. |
| 3    | Read the command status register 8021, and wait while its content shows that the command is still in progress (0x0003). |
| 4    | Read the command code register 8020:  
    |   ● If content of register 8020 is the command code entered in register 8000 at step 2, go to next step.  
    |   ● If content of register 8020 is different from the command code entered in register 8000 at step 2, restart at step 1. |
| 5    | Read the error code in the LSB of register 8021:  
    |   ● If LSB ≠ 0, then the command failed. Check the error code to understand the cause (see next paragraph). For example, if register 8021 returns 783 (0x030F), then the error code is 15 (0x0F), which means that the input argument is out of range (too many parameters).  
    |   ● If LSB = 0, then the command was executed with no errors. |
| 6    | If there were no errors, read the data buffer length in register 8022. Its value must be 8 for this command. |
| 7    | In the data buffer:  
    |   ● register 8023 holds the month in the MSB, the day in the LSB.  
    |   ● register 8024 holds the year offset in the MSB (add 2000 to get the year) and the hour in the LSB.  
    |   ● register 8025 holds the minutes in the MSB, the seconds in the LSB.  
    |   ● register 8026 holds the milliseconds. |
Date Management

Introduction
Each module of the IMU uses its date to time-stamp events and history registers.
The date of the IMU modules is updated in two steps:
1. External synchronization: The Modbus master synchronizes the IFM, IFE, or EIFE communication interface.
2. Internal synchronization: The communication interface broadcasts the date and time to the Micrologic X control unit and the other ULP modules connected in the IMU.

External Synchronization
There are several ways to externally synchronize the IFM, IFE, or EIFE communication interface:

- Manually:
  - With the EcoStruxure Power Commission software (see page 18)
  - With IFE or EIFE webpage

- Automatically:
  - With the Modbus master using:
    - either the Modbus function set date and time: function code 43-16 (see page 47).
    - or, the interface command set absolute time through the IFM, IFE, or EIFE interface.
  - With IFE or EIFE configured as SNTP mode.

The communication interface is considered as externally synchronized if the last synchronization has occurred within the last 2 hours.

Internal Synchronization
When the IFM, IFE or EIFE communication interface receives the date and time, it will broadcast the date and time to all the ULP modules connected in the IMU.
Modbus Registers Tables

General Description

The following chapters describe the Modbus registers of the Micrologic control unit and the Modbus registers of the modules connected to it. These registers provide information that can be read, such as electrical measures, and monitoring information. The command interface enables modification of these registers in a controlled way.

The presentation rules of the Modbus registers are as follows:

- For each module, the registers are grouped in tables of logically related information, according to the module they relate to:
  - Micrologic control unit (see page 98)
  - IO module (see page 186)
  - IFM Modbus-SL interface (see page 220)
  - IFE or EIFE Ethernet interface (see page 230)

- For some modules, the files are described separately.

- For each module, the commands are described separately:
  - Micrologic control unit (see page 143)
  - IO module (see page 209)
  - IFM Modbus-SL interface (see page 224)
  - IFE or EIFE Ethernet interface (see page 237)

To find a register, use the ordered list of the registers with a cross reference to the page where these registers are described.

Table Format

Register tables have the following columns:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>

- **Address**: a 16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
- **Register**: a 16-bit register number in decimal (register = address + 1).
- **RW**: register read-write status
  - R: the register can be read by using Modbus functions
  - W: the register can be written by using Modbus functions
  - RW: the register can be read and written by using Modbus functions
  - RC: the register can be read by using the command interface
  - WC: the register can be written by using the command interface
- **Unit**: the unit the information is expressed in.
- **Type**: the encoding data type (see data type description below).
- **Range**: the permitted values for this variable, usually a subset of what the format allows.
- **Description**: provides information about the register and restrictions that apply.

Data Types

<table>
<thead>
<tr>
<th>Data Types</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT16U</td>
<td>16-bit unsigned integer</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>INT16</td>
<td>16-bit signed integer</td>
<td>-32768 to +32767</td>
</tr>
<tr>
<td>INT32U</td>
<td>32-bit unsigned integer</td>
<td>0 to 4 294 967 295</td>
</tr>
<tr>
<td>INT32</td>
<td>32-bit signed integer</td>
<td>-2 147 483 648 to +2 147 483 647</td>
</tr>
<tr>
<td>INT64U</td>
<td>64-bit unsigned integer</td>
<td>0 to 18 446 744 073 709 600 000</td>
</tr>
<tr>
<td>INT64</td>
<td>64-bit signed integer</td>
<td>-9 223 372 036 854 775 808 to +9 223 372 036 854 775 807</td>
</tr>
<tr>
<td>FLOAT32</td>
<td>32-bit signed integer with a floating point</td>
<td>$2^{-126}$ (1.0) to $2^{127}$ (2 - $2^{23}$)</td>
</tr>
<tr>
<td>OCTET STRING</td>
<td>Text string</td>
<td>1 byte per character</td>
</tr>
<tr>
<td>XDATE</td>
<td>Date and time of ULP modules</td>
<td>–</td>
</tr>
<tr>
<td>DATETIME</td>
<td>Date and time in the IEC 60870-5 format</td>
<td>–</td>
</tr>
</tbody>
</table>
Big-Endian Format

INT32 and INT32U, INT64 and INT64U variables are stored in big-endian format: the most significant register is transmitted first, the least significant register is transmitted at last place.

Example

The total active energy is an INT64 variable coded in registers 32096 to 32099.

If

- register 32096 = 0
- register 32097 = 0
- register 32098 = 70 (0x0046)
- register 32099 = 2105 (0x0839)

then the total active energy is equal to 4 589 625 Wh = 0x248 + 0x232 + 70x216 + 2105x20

Data Type: FLOAT32

Data type FLOAT32 is represented in the single precision IEEE 754 (IEEE standard for floating-point arithmetic). A value \( N \) is calculated as indicated below:

\[
N = (-1)^S \times 2^{E-127} \times (1 + M)
\]

Example:

- 0 = 0 00000000 000000000000000000000000
- -1.5 = 1 01111111 100000000000000000000000

with:

- \( S = 1 \)
- \( E = 01111111 = 127 \)
- \( M = 100000000000000000000000 = 1 \times 2^{-1} + 0 \times 2^{-2} + ... + 0 \times 2^{-23} = 0.5 \)
- \( N = (-1) \times 2^{0} \times (1+0.5) = -1.5 \)

Data Type: XDATE

XDATE is a data type used to code date and time defined by the ULP modules.

<table>
<thead>
<tr>
<th>Register</th>
<th>Type</th>
<th>Bit</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INT16U</td>
<td>0–7</td>
<td>0x01–0x1F</td>
<td>Day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8–15</td>
<td>0x01–0x0C</td>
<td>Month</td>
</tr>
<tr>
<td>2</td>
<td>INT16U</td>
<td>0–7</td>
<td>0x00–0x17</td>
<td>Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8–15</td>
<td>0x50–0xC7</td>
<td>Year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0x50 (80) to 0x63 (99) correspond to years 1980 to 1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0x64 (100) to 0xC7 (199) correspond to years 2000 to 2099</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For example, 0x70 (112) corresponds to year 2012.</td>
</tr>
<tr>
<td>3</td>
<td>INT16U</td>
<td>0–7</td>
<td>0x00–0x3B</td>
<td>Seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8–15</td>
<td>0x00–0x3B</td>
<td>Minutes</td>
</tr>
<tr>
<td>4</td>
<td>INT16U</td>
<td>0–15</td>
<td>0x0000–0x03E7</td>
<td>Complement in milliseconds</td>
</tr>
</tbody>
</table>
Data Type: DATETIME

DATETIME is a data type used to code date and time defined by the IEC 60870-5 standard.

<table>
<thead>
<tr>
<th>Register</th>
<th>Type</th>
<th>Bit</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INT16U</td>
<td>0–6</td>
<td>0x00–0x7F</td>
<td>Year: 0x00 (00) to 0x7F (127) correspond to years 2000 to 2127</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For example, 0x0D (13) corresponds to year 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7–15</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>INT16U</td>
<td>0–4</td>
<td>0x01–0x1F</td>
<td>Day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5–7</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8–11</td>
<td>0x00–0x0C</td>
<td>Month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12–15</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>INT16U</td>
<td>0–5</td>
<td>0x00–0x3B</td>
<td>Minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6–7</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8–12</td>
<td>0x00–0x17</td>
<td>Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13–15</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>INT16U</td>
<td>0–15</td>
<td>0x0000–0xEA5F</td>
<td>Milliseconds</td>
</tr>
</tbody>
</table>

Quality of DATETIME Timestamps

The quality of timestamps coded with the DATETIME data type can be indicated in the register following the 4 registers of the timestamp. In this case, the timestamp quality is coded as follows:

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–11</td>
<td>Reserved</td>
</tr>
<tr>
<td>12</td>
<td>Externally synchronized:</td>
</tr>
<tr>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>13</td>
<td>Synchronized:</td>
</tr>
<tr>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>14</td>
<td>Date and time is set:</td>
</tr>
<tr>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>15</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Quality of Bits in Registers

The quality of each bit of a register coded as INT16U data type as an enumeration of bits can be indicated in the register preceding the register.

Example:
The quality of each bit of the register 32001, circuit breaker status, is given in the preceding register, 32000. The quality of the data corresponding to the bit 0 of register 32001, OF status indication contact, is given in the bit 0 of register 32000:
- bit 0 of register 32000 = quality of OF status indication
- bit 0 of register 32001 = OF status indication contact

<table>
<thead>
<tr>
<th>If</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>If bit 0 of register 32000 = 1 AND bit 0 of register 32001 = 0</td>
<td>The OF contact indicates that the device is open</td>
</tr>
<tr>
<td>If bit 0 of register 32000 = 1 AND bit 0 of register 32001 = 1</td>
<td>The OF contact indicates that the device is closed</td>
</tr>
<tr>
<td>If bit 0 of register 32000 = 0</td>
<td>The OF contact indication is invalid</td>
</tr>
</tbody>
</table>

Notes

- The type column tells how many registers to read to get the variable. For instance INT16U requires reading one register, whereas INT32 requires reading 2 registers.
- Some variables must be read as a block of multiple registers, like the energy measurements. Reading the block partially results in an error.
- Reading from an undocumented register results in a Modbus exception (see page 48).
- Numerical values are given in decimal. When it is useful to have the corresponding value in hexadecimal, it is shown as a C language type constant: 0xdddd. For example, the decimal value 123 is represented in hexadecimal as 0x007B.
- For measures that depend on the presence of a neutral as identified by register 3314, reading the value returns 32768 (0x8000) if not applicable. For each table where it occurs, it is explained in a footnote.
- Out of order and not applicable values depend on the data type.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Out of Order and Not Applicable Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT16U</td>
<td>65535 (0xFFFF)</td>
</tr>
<tr>
<td>INT16</td>
<td>-32768 (0x8000)</td>
</tr>
<tr>
<td>INT32U</td>
<td>4294967295 (0xFFFFFFFF)</td>
</tr>
<tr>
<td>INT32</td>
<td>0x80000000</td>
</tr>
<tr>
<td>INT64U</td>
<td>0xFFFFFFFFFFFFFFFF</td>
</tr>
<tr>
<td>INT64</td>
<td>0x8000000000000000</td>
</tr>
<tr>
<td>FLOAT32</td>
<td>0xFFC00000</td>
</tr>
</tbody>
</table>
Chapter 3
Dataset

What Is in This Chapter?

This chapter contains the following sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Standard Dataset</td>
<td>64</td>
</tr>
<tr>
<td>3.2</td>
<td>Legacy Dataset</td>
<td>82</td>
</tr>
</tbody>
</table>
Section 3.1
Standard Dataset

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Dataset</td>
<td>65</td>
</tr>
<tr>
<td>Modbus Registers</td>
<td>66</td>
</tr>
<tr>
<td>Readout Examples</td>
<td>68</td>
</tr>
<tr>
<td>Standard Dataset Common Registers</td>
<td>70</td>
</tr>
</tbody>
</table>
Standard Dataset

Description

The standard dataset is a global entity that collects the most useful information of each IMU module in one convenient table.

The benefit is that in one location there is up-to-date information with three read requests. Each module moves the data on a regular basis so that the structure is refreshed with current values.

The standard dataset can be used with:

- the IFE Ethernet interface for one circuit breaker
- the IFE Ethernet switchboard server
- the EIFE embedded Ethernet interface for Masterpact MTZ drawout circuit breaker
- the IFM Modbus-SL interface for one circuit breaker with part number LV434000

The standard dataset is defined in the 32000 to 32341 register range.
**Modbus Registers**

**Table of Standard Dataset Common Registers**

The main information needed for remote supervision of a CompactNSX, Compact NS, Masterpact NT/NW or Masterpact MTZ circuit breaker is contained in the table of common registers starting at register 32000. One Modbus read request is limited to 125 registers maximum. Three Modbus read requests are necessary to read the entire table.

It contains the following information:
- Circuit breaker status
- Tripping causes
- Real-time values of main measurements: current, voltage, power, and energy

The content of this table of registers is detailed in Standard Dataset Common Registers (see page 70). Use of these common registers is highly recommended to optimize response times and simplify the use of data.

**Measurement Update Period**

The update period for the common registers of the standard dataset is:

- One second for the following measurements:
  - Voltage
  - Current
  - Active, reactive, apparent, and distortion power
  - Reactive power with harmonics
  - Power factor and fundamental power factor
  - Frequency

- Five seconds for the following measurements:
  - Energy
  - Minimum and maximum real-time measurement values
  - Total harmonic distortion (THD)

**Table Format**

Register tables have the following columns:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
</table>

- **Address**: a 16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
- **Register**: a 16-bit register number in decimal (register = address + 1).
- **RW**: register read-write status
  - R: the register can be read by using Modbus functions
  - W: the register can be written by using Modbus functions
  - RW: the register can be read and written by using Modbus functions
  - RC: the register can be read by using the command interface
  - WC: the register can be written by using the command interface
- **Unit**: the unit the information is expressed in.
- **Type**: the encoding data type (see data type description below).
- **Range**: the permitted values for this variable, usually a subset of what the format allows.
- **A/E**: types of Compact NSX Micrologic trip unit for which the register is available.
  - Type A (Ammeter): current measurements
  - Type E (Energy): current, voltage, power, and energy measurements
- **A/E/P/H**: types of Masterpact NT/NW and Compact NS Micrologic trip unit for which the register is available.
  - Type A (Ammeter): current measurements
  - Type E (Energy): current, voltage, power, and energy measurements
  - Type P (Power): current, voltage, power, energy measurements, and advanced protection
  - Type H (Harmonics): current, voltage, power, energy, energy quality measurements, and advanced protection
- **X**: register available in the Micrologic X control unit for Masterpact MTZ circuit breakers.
- **Description**: provides information about the register and restrictions that apply.
Data Types

<table>
<thead>
<tr>
<th>Data Types</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT16U</td>
<td>16-bit unsigned integer</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>INT64</td>
<td>64-bit signed integer</td>
<td>-9,223,372,036,854,775,808 to +9,223,372,036,854,775,807</td>
</tr>
<tr>
<td>INT64U</td>
<td>64-bit unsigned integer</td>
<td>0 to 18,446,744,073,709,600,000</td>
</tr>
<tr>
<td>FLOAT32</td>
<td>32-bit signed integer with a floating point</td>
<td>$2^{-126} (1.0)$ to $2^{127} (2 - 2^{-23})$</td>
</tr>
</tbody>
</table>

Data Type: FLOAT32

Data type FLOAT32 is represented in the single precision IEEE 754 (IEEE standard for floating-point arithmetic). A value $N$ is calculated as indicated below:

$$N = (-1)^S \times 2^{E-127} \times (1 + M)$$

Example:

- $0 = 0 \ 00000000 \ 0000000000000000000000000000000000$
- $-1.5 = 1 \ 01111111 \ 1000000000000000000000000000000000$

with:

- $S = 0$ 0 = positive
- $E = 01111111 = 127$
- $M = 1000000000000000000000000000000000 = 1 \times 2^{-1} + 0 \times 2^{-2} + \ldots + 0 \times 2^{-23} = 0.5$
- $N = (-1)^1 \times 2^{0} \times (1+0.5) = -1.5$

Quality of Bits in Registers

The quality of each bit of a register coded as INT16U data type as an enumeration of bits can be indicated in the register preceding the register.

Example:

The quality of each bit of the register 32001, circuit breaker status, is given in the preceding register, 32000.

The quality of the data corresponding to the bit 0 of register 32001, OF status indication contact, is given in the bit 0 of register 32000:

- bit 0 of register 32000 = quality of OF status indication
- bit 0 of register 32001 = OF status indication contact

<table>
<thead>
<tr>
<th>If</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>If bit 0 of register 32000 = 1 AND bit 0 of register 32001 = 0</td>
<td>The OF contact indicates that the device is open</td>
</tr>
<tr>
<td>If bit 0 of register 32000 = 1 AND bit 0 of register 32001 = 1</td>
<td>The OF contact indicates that the device is closed</td>
</tr>
<tr>
<td>If bit 0 of register 32000 = 0</td>
<td>The OF contact indication is invalid</td>
</tr>
</tbody>
</table>
Readout Examples

Readout Example of a Modbus Register

The table below shows how to read the RMS current on phase 1 (I1) in registers 32028 and 32029 (coded in FLOAT32).

- The address of register 32028 equals 32028 - 1 = 32027 = 0x7D1B.
- The Modbus address of the Modbus slave is 255 = 0xFF.

<table>
<thead>
<tr>
<th>Request from the Master</th>
<th>Response from the Slave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name</td>
<td>Example</td>
</tr>
<tr>
<td>Modbus slave address</td>
<td>0xFF</td>
</tr>
<tr>
<td>Function code</td>
<td>0x03</td>
</tr>
<tr>
<td>Address of first register to be read (MSB)</td>
<td>0x7D</td>
</tr>
<tr>
<td>Address of first register to be read (LSB)</td>
<td>0x1B</td>
</tr>
<tr>
<td>Number of registers (MSB)</td>
<td>0x00</td>
</tr>
<tr>
<td>Number of registers (LSB)</td>
<td>0x02</td>
</tr>
<tr>
<td>CRC (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (LSB)</td>
<td>0xXX</td>
</tr>
</tbody>
</table>

The converted value of the FLOAT32 registers 32028 and 32029 is 555.

The RMS current on phase 1 (I1) is thus 555 A.

Readout Example of the Table of Standard Dataset Common Registers

Since there are more than 125 registers in the standard dataset, at least three Modbus read requests are needed to read the entire table.

Request to read registers 32000 to 32123:
- The address of register 32000 is 0x7CFF.
- The length is 124 registers = 0x7C.
- The number of bytes is 124 x 2 = 248 bytes = 0xF8.
- The Modbus address of the slave is 255 = 0xFF.

Request to read registers 32124 to 32241:
- The address of register 32124 is 0x7D7B.
- The length is 118 registers = 0x76.
- The number of bytes is 118 x 2 = 236 bytes = 0xEC.
- The Modbus address of the slave is 255 = 0xFF.

Request to read registers 32340 to 32435:
- The address of register 32340 is 0x7E53.
- The length is 96 registers = 0x60.
- The number of bytes is 2 x 96 = 192 bytes = 0xC0.
- The Modbus address of the slave is 255 = 0xFF.

<table>
<thead>
<tr>
<th>Request from the Master</th>
<th>Response from the Slave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name</td>
<td>Example</td>
</tr>
<tr>
<td>Modbus slave address</td>
<td>0xFF</td>
</tr>
<tr>
<td>Function code</td>
<td>0x03</td>
</tr>
<tr>
<td>Address of the first register to be read (MSB)</td>
<td>0x7C</td>
</tr>
<tr>
<td>Address of the first register to be read (LSB)</td>
<td>0x0F</td>
</tr>
<tr>
<td>Number of registers (MSB)</td>
<td>0x00</td>
</tr>
<tr>
<td>Number of registers (LSB)</td>
<td>0x7C</td>
</tr>
<tr>
<td>CRC (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (LSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Request from the Master</td>
<td>Response from the Slave</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Field Name</td>
<td>Example</td>
</tr>
<tr>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
# Standard Dataset Common Registers

## Circuit Breaker Status Register

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7CFF  | 32000    | R  | –      | INT16U| –     | A/E  | A/E/P/H | X | –   | Quality of each bit of register 32001 (see page 67):  
|         |          |    |        |      |       |      |         |    |     | • 0 = Invalid  
|         |          |    |        |      |       |      |         |    |     | • 1 = Valid   |
| 0x7D00  | 32001    | R  | –      | INT16U| –     | A/E  | A/E/P/H | X | 0   | OF status indication contact  
|         |          |    |        |      |       |      |         |    |     | • 0 = The circuit breaker is open.  
|         |          |    |        |      |       |      |         |    |     | • 1 = The circuit breaker is closed.  
|         |          |    |        |      |       |      |         |    | 1   | SD trip indication contact  
|         |          |    |        |      |       |      |         |    |     | • 0 = Circuit breaker is not tripped.  
|         |          |    |        |      |       |      |         |    |     | • 1 = Circuit breaker is tripped due to electrical fault, shunt trip, or push-to-trip.  
|         |          |    |        |      |       |      |         |    | 2   | SDE fault trip indication contact  
|         |          |    |        |      |       |      |         |    |     | • 0 = Circuit breaker is not tripped on electrical fault.  
|         |          |    |        |      |       |      |         |    |     | • 1 = Circuit breaker is tripped due to electrical fault (including ground-fault test and earth-leakage test).  
|         |          |    |        |      |       |      |         |    | 3   | CH spring charged contact (only with Masterpact)  
|         |          |    |        |      |       |      |         |    |     | • 0 = Spring discharged  
|         |          |    |        |      |       |      |         |    |     | • 1 = Spring charged  
|         |          |    |        |      |       |      |         |    | 4   | Reserved  
|         |          |    |        |      |       |      |         |    | 5   | PF ready to close contact (only with Masterpact)  
|         |          |    |        |      |       |      |         |    |     | • 0 = Not ready to close  
|         |          |    |        |      |       |      |         |    |     | • 1 = Ready to close  
|         |          |    |        |      |       |      |         |    | 6–14| Reserved  
|         |          |    |        |      |       |      |         |    | 15  | Data availability  
|         |          |    |        |      |       |      |         |    |     | If this bit is set at 1, all other bits of the register are not significant. |

## IO Status Registers

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7D01  | 32002    | R  | –    | INT16U| –     | A/E | A/E/P/H | X | –   | Quality of each bit of register 32003:  
|         |          |    |      |      |       |      |         |    |     | • 0 = Invalid  
<p>|         |          |    |      |      |       |      |         |    |     | • 1 = Valid   |</p>
<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
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<td>IO1 module and M2C status</td>
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<td>A/E/P/H</td>
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<td>–</td>
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<td>X</td>
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<td>● 0 = Off</td>
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<td>X</td>
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<td>● 1 = On</td>
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<td>–</td>
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<td>X</td>
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<td>If this bit is set at 1, all other bits of the</td>
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<td></td>
<td>–</td>
<td>● 0 = Invalid</td>
</tr>
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<td></td>
<td>–</td>
<td>● 1 = Valid</td>
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</table>
Tripping Cause

The tripping cause register provides information about the cause of the trip for the standard protection functions. When a tripping cause bit is at 1 in the tripping cause register, it indicates that a trip has occurred and has not been reset.

- For Micrologic A/E trip units for Compact NSX circuit breakers, the tripping cause bit is reset by pressing the key OK (keypad of the Micrologic A/E trip unit) twice (validation and confirmation).
- For Micrologic A/E/P/H trip units for Masterpact NT/NW and Compact NS circuit breakers, the tripping cause bit is reset as soon as the circuit breaker is closed again.
- For Micrologic X control units for Masterpact MTZ circuit breakers, the tripping cause bit is reset by pressing the test/reset button (located beside the trip cause LEDs on the Micrologic X control unit). Press and hold the button for 3 to 15 seconds to reset all the trip causes.
Overrun of the Protection Setpoints

The alarm setpoint registers provide information about overrun of the standard and advanced protection setpoints. A bit is at 1 once a setpoint overrun has occurred, even if the time delay has not expired.

### Table 1: Description of Setpoint Overrun

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
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<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
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<td>Tripping cause for the standard protection functions</td>
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<td>A/E</td>
<td>A/E/P/H</td>
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<td>E</td>
<td>A/P/H</td>
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<td>Earth-leakage protection IΔn</td>
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<td>A/E/P/H</td>
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<td>Integrated instantaneous protection (SELLIM and DIN/DINF)</td>
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<td>A/E</td>
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<td>6</td>
<td>Internal failure (STOP)</td>
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<td>P/H</td>
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<td>Other protections</td>
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<tr>
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<td>A/E/P/H</td>
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<td>7</td>
<td>Internal failure (temperature)</td>
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<td>P/H</td>
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<td>8</td>
<td>Other protection (see register 32009)</td>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
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<th>Bit</th>
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<td>Load shedding based on power</td>
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<td>P/H</td>
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Alarms

The alarm register provides information about the pre-alarms and the user-defined alarms. A bit is set to 1 once an alarm is active.

<table>
<thead>
<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
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<td>Overrun of the standard protection setpoints</td>
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<td>A/E</td>
<td>P/H</td>
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<td>0</td>
<td>Long-time protection pick-up</td>
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(1) Value available on Micrologic 7.0 X control unit only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.
(2) Value available on Micrologic 2.0 X, 3.0 X, 5.0 X, and 6.0 X control units only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.
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<th>Range</th>
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(1) Value available on Micrologic 7.0 X control unit only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.

(2) Value available on Micrologic 2.0 X, 3.0 X, 5.0 X, and 6.0 X control units only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.

### Current

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(1) Value available when system type register returns 30 or 41.
(2) Value available with Micrologic 7.0 X.
(3) Value reset with the reset minimum/maximum command.
Maximum Current Values

Maximum current values can be reset with the reset minimum/maximum command.

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<td>This is the highest (i.e. maximum) maximum current value since this measurement was last reset. The measurement looks at all 3 currents, MaxI1, MaxI2, MaxI3 and MaxIN and keeps track of the highest value of any of them over time.</td>
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<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.

Voltage

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D37–0x7D38</td>
<td>32056–32057</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>RMS phase-to-phase voltage V12</td>
</tr>
<tr>
<td>0x7D39–0x7D3A</td>
<td>32058–32059</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>RMS phase-to-phase voltage V23</td>
</tr>
<tr>
<td>0x7D3B–0x7D3C</td>
<td>32060–32061</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>RMS phase-to-phase voltage V31</td>
</tr>
<tr>
<td>0x7D3D–0x7D3E</td>
<td>32062–32063</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>RMS phase-to-neutral voltage V1N(1)</td>
</tr>
<tr>
<td>0x7D3F–0x7D40</td>
<td>32064–32065</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>RMS phase-to-neutral voltage V2N(1)</td>
</tr>
<tr>
<td>0x7D41–0x7D42</td>
<td>32066–32067</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>RMS phase-to-neutral voltage V3N(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

Frequency

When the Micrologic trip unit cannot calculate the frequency, it returns Not applicable = 0xFFC00000.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D43–0x7D44</td>
<td>32068–32069</td>
<td>R</td>
<td>Hz</td>
<td>FLOAT32</td>
<td>40.0–70.0</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Frequency</td>
</tr>
<tr>
<td>0x7D45–0x7D46</td>
<td>32070–32071</td>
<td>R</td>
<td>Hz</td>
<td>FLOAT32</td>
<td>40.0–70.0</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum frequency (1)</td>
</tr>
</tbody>
</table>

(1) This value can be reset with the reset minimum/maximum command.

Power

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D47–0x7D48</td>
<td>32072–32073</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Active power on phase 1(1) (2)</td>
</tr>
<tr>
<td>0x7D49–0x7D4A</td>
<td>32074–32075</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Active power on phase 2(1) (2)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.
(2) The sign for the active and reactive power depends on the configuration of:
- register 3316 for Compact NSX, Compact NS and Masterpact NT/NW circuit breakers.
- register 8405 for Masterpact MTZ circuit breakers.
Energy

Energy is stored in big-endian format: the most significant register is transmitted first.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D4B–</td>
<td>0x7D4C</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Active power on phase 3 (1) (2)</td>
</tr>
<tr>
<td>0x7D4D–</td>
<td>0x7D4E</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total active power (2)</td>
</tr>
<tr>
<td>0x7D4F–</td>
<td>0x7D50</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Reactive power on phase 1 (1) (2)</td>
</tr>
<tr>
<td>0x7D51–</td>
<td>0x7D52</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Reactive power on phase 2 (1) (2)</td>
</tr>
<tr>
<td>0x7D53–</td>
<td>0x7D54</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Reactive power on phase 3 (1) (2)</td>
</tr>
<tr>
<td>0x7D55–</td>
<td>0x7D56</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>-16000000–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total reactive power (2)</td>
</tr>
<tr>
<td>0x7D57–</td>
<td>0x7D58</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Apparent power on phase 1 (1)</td>
</tr>
<tr>
<td>0x7D59–</td>
<td>0x7D5A</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Apparent power on phase 2 (1)</td>
</tr>
<tr>
<td>0x7D5B–</td>
<td>0x7D5C</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Apparent power on phase 3 (1)</td>
</tr>
<tr>
<td>0x7D5D–</td>
<td>0x7D5E</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total apparent power</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.
(2) The sign for the active and reactive power depends on the configuration of:
   - register 3316 for Compact NSX, Compact NS and Masterpact NT/NW circuit breakers.
   - register 8405 for Masterpact MTZ circuit breakers.

Average Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D63–</td>
<td>0x7D64</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Average of 3-phase RMS currents</td>
</tr>
<tr>
<td>0x7D65–</td>
<td>0x7D66</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Average of 3 RMS phase-to-phase voltages: (V12+V23+V31)/3</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.
### Maximum Power Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D87–</td>
<td>0x7D88</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Average of 3 RMS phase-to-neutral voltages: (V1N+V2N+V3N)/3(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

### Maximum Average Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D88–</td>
<td>0x7D8A</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Maximum total active power</td>
</tr>
<tr>
<td>0x7D8B–</td>
<td>0x7D8C</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Maximum total reactive power</td>
</tr>
<tr>
<td>0x7D8D–</td>
<td>0x7D8E</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Maximum total apparent power</td>
</tr>
</tbody>
</table>

### Ground and Earth-Leakage Current

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D95–</td>
<td>0x7D96</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Ground-fault current</td>
</tr>
<tr>
<td>0x7D97–</td>
<td>0x7D98</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>–</td>
<td>X</td>
<td>Earth-leakage current(1)</td>
</tr>
<tr>
<td>0x7D99–</td>
<td>0x7D9A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Value available with Micrologic 7.

### Current Demand Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D9B–</td>
<td>0x7D9C</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Current demand value on phase 1: I1 Dmd</td>
</tr>
<tr>
<td>0x7D9D–</td>
<td>0x7D9E</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Current demand value on phase 2: I2 Dmd</td>
</tr>
<tr>
<td>0x7D9F–</td>
<td>0x7DA0</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Current demand value on phase 3: I3 Dmd</td>
</tr>
<tr>
<td>0x7DA1–</td>
<td>0x7DA2</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Current demand value on the neutral: IN Dmd(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.

### Power Demand Values

When the window is a fixed type, this value is updated at the end of the window. For the sliding type, the value is updated every 15 seconds.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DA3–</td>
<td>0x7DA4</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Total active power demand: P Dmd</td>
</tr>
<tr>
<td>0x7DA5–</td>
<td>0x7DA6</td>
<td>R</td>
<td>VAR</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Total reactive power demand: Q Dmd</td>
</tr>
</tbody>
</table>
### Current Peak Demand Values

Current peak demand values can be reset with the reset minimum/maximum command.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DA7–</td>
<td>0x7DA8</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Total apparent power demand: S Dmd</td>
</tr>
</tbody>
</table>

### Power Peak Demand Values

Power peak demand values are updated every 15 seconds. Power peak demand values can be reset with the reset minimum/maximum command.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DA9–</td>
<td>0x7DAA</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Current peak demand value on phase 1: I1 dmd max</td>
</tr>
<tr>
<td>0x7DAB–</td>
<td>0x7DAC</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Current peak demand value on phase 2: I2 dmd max</td>
</tr>
<tr>
<td>0x7DAD–</td>
<td>0x7DAE</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Current peak demand value on phase 3: I3 dmd max</td>
</tr>
<tr>
<td>0x7DAF–</td>
<td>0x7DB0</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Current peak demand value on the neutral: IN dmd max(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.

### Maximum Ground and Earth-Leakage Current Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DB7–</td>
<td>0x7DB8</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>X</td>
<td>Maximum ground-fault current</td>
</tr>
<tr>
<td>0x7DB9–</td>
<td>0x7DBA</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>–</td>
<td>X</td>
<td>Maximum earth-leakage current(1)</td>
</tr>
<tr>
<td>0x7DBB–</td>
<td>0x7DC0</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Value available with Micrologic 7.

### Maximum Voltage Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DC1–</td>
<td>0x7DC2</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-phase voltage V12</td>
</tr>
<tr>
<td>0x7DC3–</td>
<td>0x7DC4</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-phase voltage V23</td>
</tr>
<tr>
<td>0x7DC5–</td>
<td>0x7DC6</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-phase voltage V31</td>
</tr>
<tr>
<td>0x7DC7–</td>
<td>0x7DC8</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-neutral voltage V1N(1)</td>
</tr>
<tr>
<td>0x7DC9–</td>
<td>0x7DCA</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-neutral voltage V2N(1)</td>
</tr>
<tr>
<td>0x7DCC</td>
<td>0x7DCC</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-neutral voltage V3N(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.
### Power Factor

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DCD–0x7DCE</td>
<td>32206–32207</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Power factor on phase 1(1)</td>
</tr>
<tr>
<td>0x7DCF–0x7DD0</td>
<td>32208–32209</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Power factor on phase 2(1)</td>
</tr>
<tr>
<td>0x7DD1–0x7DD2</td>
<td>32210–32211</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Power factor on phase 3(1)</td>
</tr>
<tr>
<td>0x7DD3–0x7DD4</td>
<td>32212–32213</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total power factor</td>
</tr>
<tr>
<td>0x7DD5–0x7DD6</td>
<td>32214–32215</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Fundamental power factor on phase 1 (cosϕ1)(1)(2)</td>
</tr>
<tr>
<td>0x7DD7–0x7DD8</td>
<td>32216–32217</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Fundamental power factor on phase 2 (cosϕ2)(1)(2)</td>
</tr>
<tr>
<td>0x7DD9–0x7DDA</td>
<td>32218–32219</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Fundamental power factor on phase 3 (cosϕ3)(1)(2)</td>
</tr>
<tr>
<td>0x7DDB–0x7DDC</td>
<td>32220–32221</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total fundamental power factor(2)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.
(2) The sign for the fundamental power factor (cosϕ) depends on the configuration:
- register 3318 for Compact NSX, Compact NS and Masterpact NT/NW circuit breakers.
- register 8404 for Masterpact MTZ circuit breakers.

### Total Harmonic Distortion (THD)

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DDD–0x7DDE</td>
<td>32222–32223</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of phase-to-phase voltage V12 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DDF–0x7DD0</td>
<td>32224–32225</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of phase-to-phase voltage V23 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DE1–0x7DE2</td>
<td>32226–32227</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of phase-to-phase voltage V31 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DE3–0x7DE4</td>
<td>32228–32229</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of phase-to-neutral voltage V1N compared to the fundamental (1)</td>
</tr>
<tr>
<td>0x7DE5–0x7DE6</td>
<td>32230–32231</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of phase-to-neutral voltage V2N compared to the fundamental (1)</td>
</tr>
<tr>
<td>0x7DE7–0x7DE8</td>
<td>32232–32233</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of phase-to-neutral voltage V3N compared to the fundamental (1)</td>
</tr>
<tr>
<td>0x7DE9–0x7DEA</td>
<td>32234–32235</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of current on phase 1 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DEB–0x7DEC</td>
<td>32236–32237</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of current on phase 2 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DED–0x7DEE</td>
<td>32238–32239</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Total harmonic distortion (THD) of current on phase 3 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DEF–0x7DF0</td>
<td>32240–32241</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>0–2</td>
<td>E</td>
<td>H</td>
<td>X</td>
<td>Average of 3-phase current Total harmonic distortions (THD) compared to the fundamental</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

### Maximum Power Factor

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DF1–0x7DF2</td>
<td>32242–32243</td>
<td>R</td>
<td></td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Maximum total power factor</td>
</tr>
<tr>
<td>0x7DF3–0x7E52</td>
<td>32244–32339</td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
### Inhibit Close Order

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7E53  | 32340    | R  | –     | INT16U | –     | A/E | A/E/P/H | X | –   | Quality of each bit of register 32341:  
|         |          |    |       |        |       |     |         |   |     | ● 0 = Invalid  
|         |          |    |       |        |       |     |         |   |     | ● 1 = Valid                                                                 |
| 0x7E54  | 32341    | R  | –     | INT16U | –     | A/E | A/E/P/H | X | –   | Inhibit close order status  
|         |          |    |       |        |       |     |         |   |     | 0 Close breaker inhibited by IO module  
|         |          |    |       |        |       |     |         |   |     | ● 0 = Disable  
|         |          |    |       |        |       |     |         |   |     | ● 1 = Enable                                                                 |
|         |          |    |       |        |       |     |         |   |     | 1 Close breaker inhibited by communication  
|         |          |    |       |        |       |     |         |   |     | ● 0 = Disable  
|         |          |    |       |        |       |     |         |   |     | ● 1 = Enable                                                                 |
|         |          |    |       |        |       |     |         |   | 2–15| Reserved                                                                    |
Section 3.2
Legacy Dataset

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legacy Dataset</td>
<td>83</td>
</tr>
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<td>Modbus Registers</td>
<td>84</td>
</tr>
<tr>
<td>Readout Examples</td>
<td>86</td>
</tr>
<tr>
<td>Legacy Dataset Common Registers</td>
<td>87</td>
</tr>
</tbody>
</table>
Legacy Dataset

Description

The legacy dataset is a global entity that collects the most useful information of each IMU module in one convenient table.

The benefit is that in one location there is up-to-date information with two read requests. Each module moves the data on a regular basis so that the structure is refreshed with current values.

The legacy dataset is defined in the 12000 to 12165 register range.

**NOTE:** The legacy dataset is compatible with previous versions of the Micrologic trip unit for Compact NSX, PowerPact H-, J-, and L-frame, Compact NS, PowerPact P-, and R-frame, or Masterpact NT/NW circuit breaker. For this reason, data read directly in the Modbus registers is organized in a different way than in the standard dataset.

Data Availability

The legacy dataset is available when the Modbus legacy dataset Digital Module is purchased and installed on a Micrologic X control unit.

The Modbus legacy dataset Digital Module is compatible with Micrologic X control units with firmware version greater than or equal to version V002.000.xxx.

The Modbus legacy dataset is available on a remote controller using the communication network through the following communication interfaces:

- IFE Ethernet interface
- EIFE Ethernet interface
- IFE server
- IFM Modbus-SL interface

The following table shows the part numbers and firmware versions necessary to access the Modbus legacy dataset through communication interfaces:

<table>
<thead>
<tr>
<th>Communication Interface</th>
<th>Part number</th>
<th>Minimum firmware version required</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFE Ethernet interface</td>
<td>LV434010</td>
<td>V003.007.024</td>
</tr>
<tr>
<td></td>
<td>LV434001</td>
<td></td>
</tr>
<tr>
<td>IFE server</td>
<td>LV434011</td>
<td>V003.007.024</td>
</tr>
<tr>
<td></td>
<td>LV434002</td>
<td></td>
</tr>
<tr>
<td>EIFE Ethernet interface</td>
<td>LV851001</td>
<td>V003.007.024</td>
</tr>
<tr>
<td>IFM Modbus-SL interface</td>
<td>LV434000</td>
<td>V003.001.006</td>
</tr>
</tbody>
</table>
Modbus Registers

Table of Legacy Dataset Common Registers

The main information needed for remote supervision of a Compact NSX, Compact NS, Masterpact NT/NW, or Masterpact MTZ circuit breaker is contained in the table of common registers starting at register 12000.

This compact table of 114 registers can be read with a single Modbus request.

It contains the following information:
- Circuit breaker status
- Tripping causes
- Real-time values of main measurements: current, voltage, power, energy, total harmonic distortion

The content of this table of registers is detailed in Legacy Dataset Common Registers (see page 87).

Use of these common registers is highly recommended to optimize response times and simplify the use of data.

Measurement Update Period

The update period for the common registers of the legacy dataset is:
- One second for the following measurements:
  - Voltage and voltage unbalance
  - Current and current unbalance
  - Active, reactive, apparent, and distortion power
  - Reactive power with harmonics
  - Power factor and fundamental power factor
  - Frequency
- Five seconds for the following measurements:
  - Energy
  - Minimum and maximum real-time measurement values
  - Total harmonic distortion (THD)

Table Format

Register tables have the following columns:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
</table>
- **Address**: a 16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
- **Register**: a 16-bit register number in decimal (register = address + 1).
- **RW**: register read-write status
  - R: the register can be read by using Modbus functions
  - W: the register can be written by using Modbus functions
  - RW: the register can be read and written by using Modbus functions
  - RC: the register can be read by using the command interface
  - WC: the register can be written by using the command interface
- **Unit**: the unit the information is expressed in.
- **Type**: the encoding data type (see data type description below).
- **Range**: the permitted values for this variable, usually a subset of what the format allows.
- **A/E**: types of Compact NSX Micrologic trip unit for which the register is available.
  - Type A (Ammeter): current measurements
  - Type E (Energy): current, voltage, power, and energy measurements
- **A/E/P/H**: types of Masterpact NT/NW and Compact NS Micrologic trip unit for which the register is available.
  - Type A (Ammeter): current measurements
  - Type E (Energy): current, voltage, power, and energy measurements
  - Type P (Power): current, voltage, power, energy measurements, and advanced protection
  - Type H (Harmonics): current, voltage, power, energy, energy quality measurements, and advanced protection
- **X**: register available in the Micrologic X control unit for Masterpact MTZ circuit breakers when the Modbus legacy dataset Digital Module is purchased and installed on the Micrologic X control unit.
- **Description**: provides information about the register and restrictions that apply.

## Data Types

<table>
<thead>
<tr>
<th>Data Types</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT16U</td>
<td>16-bit unsigned integer</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>INT16</td>
<td>16-bit signed integer</td>
<td>-32768 to +32767</td>
</tr>
<tr>
<td>INT32U</td>
<td>32-bit unsigned integer</td>
<td>0 to 4 294 967 295</td>
</tr>
<tr>
<td>INT32</td>
<td>32-bit signed integer</td>
<td>-2 147 483 648 to +2 147 483 647</td>
</tr>
</tbody>
</table>
Readout Examples

Readout Example of a Modbus Register

The table below shows how to read the rms current on phase 1 (I1) in register 12016.
- The address of register 12016 equals 12016 - 1 = 12015 = 0x2EEF.
- The Modbus address of the Modbus slave is 47 = 0x2F.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Example</th>
<th>Field Name</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus slave address</td>
<td>0x2F</td>
<td>Modbus slave address</td>
<td>0x2F</td>
</tr>
<tr>
<td>Function code</td>
<td>0x03</td>
<td>Function code</td>
<td>0x03</td>
</tr>
<tr>
<td>Address of register to be read (MSB)</td>
<td>0x2E</td>
<td>Data length in bytes</td>
<td>0x02</td>
</tr>
<tr>
<td>Address of register to be read (LSB)</td>
<td>0xEF</td>
<td>Register value (MSB)</td>
<td>0x02</td>
</tr>
<tr>
<td>Number of registers (MSB)</td>
<td>0x00</td>
<td>Register value (LSB)</td>
<td>0x2B</td>
</tr>
<tr>
<td>Number of registers (LSB)</td>
<td>0x01</td>
<td>CRC (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (MSB)</td>
<td>0xXX</td>
<td>CRC (LSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (LSB)</td>
<td>0xXX</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

The content of register 12016 (address 0x2EEF) is 0x022B = 555.
The rms current on phase 1 (I1) is thus 555 A.

Readout Example of the Table of Legacy Dataset Common Registers

The table below shows how to read the table of legacy dataset common registers. This table starts at register 12000 and consists of 113 registers.
- The address of register 12000 = 0x2EDF.
- The table length is 113 registers = 0x71.
- The number of bytes is 113x2 = 226 bytes = 0xE2.
- The Modbus address of the slave is 47 = 0x2F.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Example</th>
<th>Field Name</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus slave address</td>
<td>0x2F</td>
<td>Modbus slave address</td>
<td>0x2F</td>
</tr>
<tr>
<td>Function code</td>
<td>0x03</td>
<td>Function code</td>
<td>0x03</td>
</tr>
<tr>
<td>Address of the first register to be read (MSB)</td>
<td>0x2E</td>
<td>Data length in bytes</td>
<td>0x02</td>
</tr>
<tr>
<td>Address of the first register to be read (LSB)</td>
<td>0xDF</td>
<td>Value of register 12000 (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>Number of registers (MSB)</td>
<td>0x00</td>
<td>Value of register 12000 (LSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>Number of registers (LSB)</td>
<td>0x71</td>
<td>Value of register 12001 (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>Number of registers (LSB)</td>
<td>0x70</td>
<td>Value of register 12001 (LSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (MSB)</td>
<td>0xXX</td>
<td>Value of register 12011 (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>CRC (LSB)</td>
<td>0xXX</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>Value of register 12112 (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>Value of register 12112 (LSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>CRC (MSB)</td>
<td>0xXX</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>CRC (LSB)</td>
<td>0xXX</td>
</tr>
</tbody>
</table>
### Legacy Dataset Common Registers

**Circuit Breaker Status Register**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2EDF</td>
<td>12000</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>–</td>
<td>Validity of each bit in the circuit breaker status register.</td>
</tr>
<tr>
<td>0x2EE0</td>
<td>12001</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>0</td>
<td>OF status indication contact 0 = The circuit breaker is open. 1 = The circuit breaker is closed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>SD trip indication contact 0 = Circuit breaker is not tripped. 1 = Circuit breaker is tripped due to electrical default or shunt trip or push-to-trip. Bit always equal to 0 for Masterpact NT/NW and Compact NS circuit breakers with motor mechanism.</td>
</tr>
<tr>
<td></td>
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<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>2</td>
<td>SDE fault trip indication contact 0 = Circuit breaker is not tripped on electrical default. 1 = Circuit breaker is tripped due to electrical default (including ground-fault test and earth-leakage test).</td>
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<tr>
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<td>–</td>
<td>A/E/P/H</td>
<td>X</td>
<td>3</td>
<td>CH spring charged contact (only with Masterpact) 0 = Spring discharged 1 = Spring charged Bit always equal to 0 for Compact NS circuit breaker.</td>
</tr>
<tr>
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<td>Reserved</td>
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<td></td>
<td>–</td>
<td>A/E/P/H</td>
<td>X</td>
<td>5</td>
<td>PF ready to close contact (only with Masterpact) 0 = Not ready to close 1 = Ready to close Bit always equal to 0 for Compact NS circuit breaker.</td>
</tr>
<tr>
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<td>–</td>
<td>A/E/P/H</td>
<td>X</td>
<td>6</td>
<td>Distinction between Compact NS and Masterpact NT/NW 0 = Compact NS 1 = Masterpact NT/NW</td>
</tr>
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<td>–</td>
<td>–</td>
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<td>7-14</td>
<td>Reserved</td>
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<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>X</td>
<td>15</td>
<td>Data availability If this bit is set at 1, all other bits of the register are not significant.</td>
</tr>
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</table>
## IO Status Registers

<table>
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<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
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<tbody>
<tr>
<td>0x2EE1</td>
<td>12002</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>–</td>
<td>Status IO 1</td>
</tr>
</tbody>
</table>
| 0       |          |    |      |       |       |     |         | 0 | Input 1 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 1       |          |    |      |       |       |     |         | 1 | Input 2 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 2       |          |    |      |       |       |     |         | 2 | Input 3 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 3       |          |    |      |       |       |     |         | 3 | Input 4 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 4       |          |    |      |       |       |     |         | 4 | Input 5 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 5       |          |    |      |       |       |     |         | 5 | Input 6 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 6       |          |    |      |       |       |     |         | 6 | Output 1 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 7       |          |    |      |       |       |     |         | 7 | Output 2 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 8       |          |    |      |       |       |     |         | 8 | Output 3 status  
|         |          |    |      |       |       |     |         |   | ● 0 = Off  
|         |          |    |      |       |       |     |         |   | ● 1 = On  |
| 9–14    |          |    |      |       |       |     |         |   | Reserved  |
| 15      |          |    |      |       |       |     |         |   | Data availability  
|         |          |    |      |       |       |     |         |   | If this bit is set at 1, all other bits of the register are not significant.  |
Tripping Cause

The tripping cause register provides information about the cause of the trip for the standard protection functions. When a tripping cause bit is at 1 in the tripping cause register, it indicates that a trip has occurred and has not been reset.

- For Micrologic A/E trip units for Compact NSX circuit breakers, the tripping cause bit is reset by pressing the OK key (keypad of the Micrologic A/E trip unit) twice (validation and confirmation).
- For Micrologic A/E/P/H trip units for Masterpact NT/NW and Compact NS circuit breakers, the tripping cause bit is reset as soon as the circuit breaker is closed again.
- For Micrologic X control units for Masterpact MTZ circuit breakers, the tripping cause bit is reset by pressing the test/reset button (located beside the trip cause LEDs on the Micrologic X control unit). Press and hold the button for 3 to 15 seconds to reset all the trip causes.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
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<td>0x2EE2</td>
<td>12003</td>
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<td>INT16U</td>
<td>–</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>–</td>
<td>Status IO 2</td>
</tr>
</tbody>
</table>
|         |          |    |      |       |      |     |         |   | 0   | Input 1 status  
|         |          |    |      |       |      |     |         |   | 1   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 1   | Input 2 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 2   | Input 3 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 3   | Input 4 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 4   | Input 5 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 5   | Input 6 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 6   | Output 1 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 7   | Output 2 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 8   | Output 3 status  
|         |          |    |      |       |      |     |         |   | 0   | 0 = Off  
|         |          |    |      |       |      |     |         |   |     | 1 = On  
|         |          |    |      |       |      |     |         |   | 9–14| Reserved  
|         |          |    |      |       |      |     |         |   |     |                
|         |          |    |      |       |      |     |         |   | 15  | Data availability  
|         |          |    |      |       |      |     |         |   |     | If this bit is set at 1, all other bits of the register are not significant.  

0x2EE3 12004 R – INT16U – A/E A/E/P/H X – Tripping cause for the standard protection functions
0x2EE3 12004 R – INT16U – A/E A/E/P/H X 0 Long-time protection Ir
0x2EE3 12004 R – INT16U – A/E A/E/P/H X 1 Short-time protection Isd
0x2EE3 12004 R – INT16U – A/E A/E/P/H X 1 Short-time protection Isd or Instantaneous protection Ii
0x2EE3 12004 R – INT16U – A/E A/E/P/H X 2 Instantaneous protection Ii
0x2EE3 12004 R – INT16U – A/E A/E/P/H X 3 Ground-fault protection Ig
0x2EE3 12004 R – INT16U – A/E A/E/P/H X 4 Earth-leakage protection IΔn
Overrun of the Protection Setpoints

The alarm setpoint registers provide information about overrun of the standard and advanced protection setpoints. A bit is at 1 once a setpoint overrun has occurred, even if the time delay has not expired.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0x2EE4</td>
<td>12005</td>
<td>R</td>
<td>INT16U</td>
<td>INT16U</td>
<td>–</td>
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<td>P/H</td>
<td>X</td>
<td>5</td>
<td>Integrated instantaneous protection (SELLIM and DIN/DINF)</td>
</tr>
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<td></td>
<td></td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>6</td>
<td>Internal failure (STOP)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td>–</td>
<td>A/E</td>
<td>–</td>
<td>1</td>
<td>Other protections or integrated instantaneous protection</td>
</tr>
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<td></td>
<td>–</td>
<td>P/H</td>
<td>–</td>
<td>7</td>
<td>Internal failure (temperature)</td>
</tr>
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<td></td>
<td>–</td>
<td>A/E/P/H</td>
<td>–</td>
<td>8</td>
<td>Internal failure (overvoltage)</td>
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<td>–</td>
<td>P/H</td>
<td>X</td>
<td>9</td>
<td>Other protection (see register 12005)</td>
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<td></td>
<td>E</td>
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<td>–</td>
<td>10</td>
<td>Instantaneous with earth-leakage protection on the trip unit.</td>
</tr>
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<td>E</td>
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<td>–</td>
<td>11</td>
<td>Unbalance motor protection</td>
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<td>E</td>
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<td>–</td>
<td>12</td>
<td>Jam motor protection</td>
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<td>E</td>
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<td>–</td>
<td>13</td>
<td>Underload motor protection</td>
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<td>E</td>
<td>–</td>
<td>–</td>
<td>14</td>
<td>Long-start motor protection</td>
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<td>A/E</td>
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<td>–</td>
<td>15</td>
<td>Reflex tripping protection</td>
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<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>0</td>
<td>If this bit is at 1, bits 0 to 14 are not valid.</td>
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<td>Overrun of the standard protection setpoints</td>
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<td>P/H</td>
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<td>Long-time protection pick-up</td>
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<td>1–14</td>
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<td>A/E</td>
<td>P/H</td>
<td>–</td>
<td>15</td>
<td>If this bit is at 1, bits 0 to 14 are not valid.</td>
</tr>
</tbody>
</table>
Alarms

The alarm register provides information about the pre-alarms and the user-defined alarms. A bit is set to 1 once an alarm is active.

<table>
<thead>
<tr>
<th>Address</th>
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<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Bit</th>
<th>Description</th>
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<td>0x2EE8</td>
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<td>–</td>
<td>Overrun of the advanced protection setpoints</td>
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<td>Current unbalance</td>
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<td>Maximum current on phase 1</td>
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<td>Maximum current on phase 2</td>
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<td>Maximum current on phase 3</td>
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<td>Maximum current on the neutral</td>
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<td>Minimum voltage</td>
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<td>Maximum voltage</td>
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<td>P/H</td>
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<td>Voltage unbalance</td>
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<td>Reverse power</td>
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<td>Minimum frequency</td>
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<td>P/H</td>
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<td>Maximum frequency</td>
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<td>Phase rotation</td>
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<td>P/H</td>
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<td>Load shedding based on the current</td>
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<td>P/H</td>
<td>14</td>
<td>–</td>
<td>Load shedding based on the power</td>
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<td>P/H</td>
<td>15</td>
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<td>If this bit is at 1, bits 0 to 14 are not valid.</td>
</tr>
<tr>
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<td>12010</td>
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<td>INT16U</td>
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<td>Continuation of the previous register</td>
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<td>Ground-fault alarm</td>
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<td></td>
<td>–</td>
<td>15</td>
<td>–</td>
<td>If this bit is at 1, bits 0 to 14 are not valid.</td>
</tr>
</tbody>
</table>

(1) Value available on Micrologic 7.0 X control unit only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.
(2) Value available on Micrologic 2.0 X, 3.0 X, 5.0 X, and 6.0 X control units only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.
### Current

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2EEB</td>
<td>12012</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>A/E</td>
<td>–</td>
<td>–</td>
<td>Register of user-defined alarms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>0</td>
<td>User-defined alarm 201</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>1</td>
<td>User-defined alarm 202</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td>A/E</td>
<td>–</td>
<td>2</td>
<td>User-defined alarm 203</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>3</td>
<td>User-defined alarm 204</td>
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<td>A/E</td>
<td>–</td>
<td>4</td>
<td>User-defined alarm 205</td>
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<td></td>
<td>A/E</td>
<td>–</td>
<td>5</td>
<td>User-defined alarm 206</td>
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<td></td>
<td>A/E</td>
<td>–</td>
<td>7</td>
<td>User-defined alarm 208</td>
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<td></td>
<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>8</td>
<td>User-defined alarm 209</td>
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<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>9</td>
<td>User-defined alarm 210</td>
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<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>10–14</td>
<td>Reserved</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A/E</td>
<td>–</td>
<td>15</td>
<td>If this bit is at 1, bits 0 to 14 are not valid.</td>
</tr>
<tr>
<td>0x2EED–</td>
<td>12013–</td>
<td></td>
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<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>0x2EEE</td>
<td>12015</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Value available on Micrologic 7.0 X control unit only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.
(2) Value available on Micrologic 2.0 X, 3.0 X, 5.0 X, and 6.0 X control units only when the Digital Module ANSI 51N/51G Ground-fault alarm is installed.

### Maximum Current Values

Maximum current values can be reset with the reset minimum/maximum command.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2EF6</td>
<td>12023</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>Maximum RMS current on phase 1: I1</td>
</tr>
</tbody>
</table>

(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral current transformer (ENCT).
(2) This value is only available:
  - For Masterpact MTZ Micrologic 6.0 X control units, expressed as %Ig pick-up
  - For Masterpact NT/NW and Compact NS Micrologic 6.0 trip units, expressed as %Ig pick-up
  - For Compact NSX Micrologic 6.2 and 6.3 trip units, expressed as %Ig pick-up
(3) This value is only available:
  - For Masterpact MTZ Micrologic 7.0 X control units, expressed as %IΔn pick-up
  - For Masterpact NT/NW and Compact NS Micrologic 7.0 trip units, expressed as %IΔn pick-up
  - For Compact NSX Micrologic 7.2 and 7.3 trip units, expressed as %IΔn pick-up
### Dataset

#### Voltage

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2EF7</td>
<td>12024</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>Maximum RMS current on phase 2: I2</td>
</tr>
<tr>
<td>0x2EF8</td>
<td>12025</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>Maximum RMS current on phase 3: I3</td>
</tr>
<tr>
<td>0x2EF9</td>
<td>12026</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>Maximum RMS current on the neutral: IN (1)</td>
</tr>
<tr>
<td>0x2EFA</td>
<td>12027</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>Maximum RMS current out of the 4 previous registers</td>
</tr>
<tr>
<td>0x2EFB</td>
<td>12028</td>
<td>R</td>
<td>%lg</td>
<td>INT16U</td>
<td>0–32767</td>
<td>A/E</td>
<td>A/E/P/H</td>
<td>X</td>
<td>Maximum ground-fault current Ig (2)</td>
</tr>
<tr>
<td>0x2EFC</td>
<td>12029</td>
<td>R</td>
<td>%lΔn</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>A/P/H</td>
<td>X</td>
<td>Maximum earth-leakage current (3)</td>
</tr>
</tbody>
</table>

(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral current transformer (ENCT).
(2) This value is only available:
- For Masterpact MTZ Micrologic 6.0 X control units, expressed as %lg pick-up
- For Masterpact NT/NW and Compact NS Micrologic 6.0 trip units, expressed as %lg pick-up
- For Compact NSX Micrologic 6.2 and 6.3 trip units, expressed as %lg pick-up
(3) This value is only available:
- For Masterpact MTZ Micrologic 7.0 X control units, expressed as %lΔn pick-up
- For Masterpact NT/NW and Compact NS Micrologic 7.0 trip units, expressed as %lΔn pick-up
- For Compact NSX Micrologic 7.2 and 7.3 trip units, expressed as %lΔn pick-up

#### Frequency

When the Micrologic trip unit cannot calculate the frequency, it returns Not applicable = 32768 (0x8000).

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F03</td>
<td>12036</td>
<td>R</td>
<td>0.1 Hz</td>
<td>INT16U</td>
<td>400–600</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Frequency</td>
</tr>
<tr>
<td>0x2F04</td>
<td>12037</td>
<td>R</td>
<td>0.1 Hz</td>
<td>INT16U</td>
<td>400–600</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum frequency (1)</td>
</tr>
</tbody>
</table>

(1) This value can be reset with the reset minimum/maximum command.

#### Power

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F05</td>
<td>12038</td>
<td>R</td>
<td>0.1 kW</td>
<td>INT16</td>
<td>-32767~+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Active power on phase 1: P1 (1) (2)</td>
</tr>
<tr>
<td>0x2F06</td>
<td>12039</td>
<td>R</td>
<td>0.1 kW</td>
<td>INT16</td>
<td>-32767~+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Active power on phase 2: P2 (1) (2)</td>
</tr>
<tr>
<td>0x2F07</td>
<td>12040</td>
<td>R</td>
<td>0.1 kW</td>
<td>INT16</td>
<td>-32767~+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Active power on phase 3: P3 (1) (2)</td>
</tr>
<tr>
<td>0x2F08</td>
<td>12041</td>
<td>R</td>
<td>0.1 kW</td>
<td>INT16</td>
<td>-32767~+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total active power: Ptot (2)</td>
</tr>
<tr>
<td>0x2F09</td>
<td>12042</td>
<td>R</td>
<td>0.1 kVAR</td>
<td>INT16</td>
<td>-32767~+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Reactive power on phase 1: Q1 (1) (2)</td>
</tr>
<tr>
<td>0x2F0A</td>
<td>12043</td>
<td>R</td>
<td>0.1 kVAR</td>
<td>INT16</td>
<td>-32767~+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Reactive power on phase 2: Q2 (1) (2)</td>
</tr>
</tbody>
</table>

(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral current transformer (ENCT).
(2) The sign for the active and reactive power depends on the configuration of register 3316.
Energy

Energy is stored in big-endian format: the most significant register is transmitted first, the least significant second.

### Address

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F0B</td>
<td>12044</td>
<td>R</td>
<td>0.1 kVAR</td>
<td>INT16</td>
<td>-32767–+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Reactive power on phase 3: Q₃ (¹) (²)</td>
</tr>
<tr>
<td>0x2F0C</td>
<td>12045</td>
<td>R</td>
<td>0.1 kVAR</td>
<td>INT16</td>
<td>-32767–+32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total reactive power: Qₜ₀tą𝑡 (²)</td>
</tr>
<tr>
<td>0x2F0D</td>
<td>12046</td>
<td>R</td>
<td>0.1 kVA</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Apparent power on phase 1: S₁ (¹)</td>
</tr>
<tr>
<td>0x2F0E</td>
<td>12047</td>
<td>R</td>
<td>0.1 kVA</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Apparent power on phase 2: S₂ (¹)</td>
</tr>
<tr>
<td>0x2F0F</td>
<td>12048</td>
<td>R</td>
<td>0.1 kVA</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Apparent power on phase 3: S₃ (¹)</td>
</tr>
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<td>0x2F10</td>
<td>12049</td>
<td>R</td>
<td>0.1 kVA</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total apparent power: S₀ᵗ</td>
</tr>
</tbody>
</table>

(¹) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral current transformer (ENCT).
(²) The sign for the active and reactive power depends on the configuration of register 3316.

---

### Current Demand Values

When the window is fixed type, this value is updated at the end of the window. For the sliding type, the value is updated every 15 seconds.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F0F</td>
<td>12080</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Current demand value on phase 1: I₁ Dmd</td>
</tr>
<tr>
<td>0x2F0E</td>
<td>12081</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Current demand value on phase 2: I₂ Dmd</td>
</tr>
<tr>
<td>0x2F0D</td>
<td>12082</td>
<td>R</td>
<td>A</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Current demand value on phase 3: I₃ Dmd</td>
</tr>
<tr>
<td>(¹) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral current transformer (ENCT).</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Power Demand Values

When the window is fixed type, this value is updated at the end of the window. For the sliding type, the value is updated every 15 seconds.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F33</td>
<td>12084</td>
<td>R</td>
<td>0.1 kW</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>E/P/H</td>
<td>X</td>
<td>Total active power demand: P Dmd</td>
</tr>
<tr>
<td>0x2F34</td>
<td>12085</td>
<td>R</td>
<td>0.1 kVAR</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Total reactive power demand: Q Dmd</td>
</tr>
</tbody>
</table>
### Maximum Voltage Values

Maximum voltage values can be reset with the reset minimum/maximum command. Register = 0 if the voltage < 25 V.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F35</td>
<td>12086</td>
<td>R</td>
<td>0.1 kVA</td>
<td>INT16U</td>
<td>0–32767</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Total apparent power demand: S Dmd</td>
</tr>
<tr>
<td>0x2F36- 0x2F38</td>
<td>12087–12089</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral voltage transformer (ENVT).

### Power Factor

The sign for the fundamental power factor (cos\(\phi\)) depends on the Micrologic trip unit configuration.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>A/E</th>
<th>A/E/P/H</th>
<th>X</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2F39</td>
<td>12090</td>
<td>R</td>
<td>V</td>
<td>INT16U</td>
<td>0–1200</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-phase voltage V12</td>
</tr>
<tr>
<td>0x2F3A</td>
<td>12091</td>
<td>R</td>
<td>V</td>
<td>INT16U</td>
<td>0–1200</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-phase voltage V23</td>
</tr>
<tr>
<td>0x2F3B</td>
<td>12092</td>
<td>R</td>
<td>V</td>
<td>INT16U</td>
<td>0–1200</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-phase voltage V31</td>
</tr>
<tr>
<td>0x2F3C</td>
<td>12093</td>
<td>R</td>
<td>V</td>
<td>INT16U</td>
<td>0–1200</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-neutral voltage V1N (1)</td>
</tr>
<tr>
<td>0x2F3D</td>
<td>12094</td>
<td>R</td>
<td>V</td>
<td>INT16U</td>
<td>0–1200</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-neutral voltage V2N (1)</td>
</tr>
<tr>
<td>0x2F3E</td>
<td>12095</td>
<td>R</td>
<td>V</td>
<td>INT16U</td>
<td>0–1200</td>
<td>E</td>
<td>P/H</td>
<td>X</td>
<td>Maximum RMS phase-to-neutral voltage V3N (1)</td>
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(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral voltage transformer (ENVT).

### Total Harmonic Distortion (THD)

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<th>Range</th>
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<th>Description</th>
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<td>0.1 %</td>
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<td>E</td>
<td>H</td>
<td>X</td>
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<td>Total harmonic distortion of V2N compared to the fundamental (1)</td>
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(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral voltage transformer (ENVT).
### Counters

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<td>A/E/P/H</td>
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<td>0x2F80</td>
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<td>A/E/P/H</td>
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### Miscellaneous

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(1) This value cannot be accessed for motor applications and in cases of three-pole circuit breakers without external neutral voltage transformer (ENVT).
Chapter 4
Micrologic Control Unit Data for Masterpact MTZ Circuit Breakers

Micrologic X User Guide
For more information about the Micrologic X functions, refer to Masterpact MTZ Micrologic X Control Unit User Guide (see page 10).

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<td>Micrologic Control Unit Commands</td>
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<td>Micrologic Control Unit Protection Commands with Session</td>
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Section 4.1
Micrologic Control Unit Registers

What is in This Section?
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<td>Demand Values of Real-Time Measurements</td>
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<td>Maintenance and Diagnostic Data</td>
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<td>Protection Settings</td>
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## Tripping Data

### Tripping Cause

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### Protection Data

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<td>IΔn alarm</td>
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<td>4–7</td>
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<td>9</td>
<td>ERMS engaged for more than 24 hours</td>
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<td>• 0 = A curve active</td>
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<td>• 1 = B curve active</td>
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<td>13</td>
<td>Optional protections inhibited by IO</td>
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<td>14</td>
<td>ESM (ERMS switch module) self diagnostic alarm</td>
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<td>15</td>
<td>Communication lost with ESM (ERMS switch module)</td>
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## Last Trip Event

<table>
<thead>
<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
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<tbody>
<tr>
<td>0x0227</td>
<td>552</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
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<td>Last trip event code:</td>
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<td>○ 25600 (0x6400) = Ir trip event</td>
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<td>○ 25601 (0x6401) = Isd trip event</td>
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<td></td>
<td>○ 25602 (0x6402) = Ii trip event</td>
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<td>○ 25603 (0x6403) = Ig trip event</td>
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<td>○ 25604 (0x6404) = Ivigi trip event</td>
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<td>○ 25606 (0x6406) = Ultimate self protection trip event (SELLIM)</td>
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<td>○ 25607 (0x6407) = Internal failure event</td>
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<td>○ 25616 (0x6410) = Undervoltage on one phase trip</td>
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<td>○ 25617 (0x6411) = Overvoltage on one phase trip event</td>
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<td>○ 25620 (0x641A) = Reverse power trip event</td>
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<td>○ 25621 (0x6415) = Underfrequency trip event</td>
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<td>○ 25622 (0x6416) = Overfrequency trip event</td>
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<td>○ 25629 (0x641D) = Ultimate self protection trip event (DIN/DINF)</td>
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<td>○ 25630 (0x641E) = Ground fault and earth-leakage test trip event</td>
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<td>○ 25642 (0x642A) = Undervoltage on all 3 phases trip</td>
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<td>○ 25643 (0x642B) = Overvoltage on all 3 phases trip event</td>
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<td>○ 25649 (0x6431) = Optional protection trip event</td>
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<tr>
<td>0x0228– 0x022B</td>
<td>553-556</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of last trip event</td>
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<tr>
<td>0x022C</td>
<td>557</td>
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<td>–</td>
<td>INT16U</td>
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<td>–</td>
<td>Timestamp quality of last trip event</td>
</tr>
<tr>
<td>0x022D</td>
<td>558</td>
<td>–</td>
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<td>Reserved</td>
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<td>0x022E</td>
<td>559</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
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<td>Quality of each bit of registers 560 (see page 60):</td>
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<tr>
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<td>○ 0 = Invalid</td>
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<td>○ 1 = Valid</td>
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<td>0x022F</td>
<td>560</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
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<td>–</td>
<td>Last trip event origin electrical fault:</td>
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<td>○ 0 = Inactive</td>
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<td>○ 1 = Active</td>
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<td>0 Fault on phase 1</td>
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<td>1 Fault on phase 2</td>
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<td>2 Fault on phase 3</td>
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<td>3 Fault on neutral</td>
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<td>4–15 Reserved</td>
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## ZSI Status Before Last Trip

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
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<tbody>
<tr>
<td>0x0231</td>
<td>562</td>
<td>R</td>
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<td>INT16U</td>
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<td>Quality of each bit of register 563:</td>
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<td>○ 0 = Invalid</td>
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<td></td>
<td>○ 1 = Valid</td>
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<tr>
<td>0x0232</td>
<td>563</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0</td>
<td>ZSI in status before last trip:</td>
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<td>○ 0 = Not energized</td>
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<td></td>
<td></td>
<td>○ 1 = Energized</td>
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<td>1</td>
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<td>○ 0 = Not energized</td>
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<td></td>
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<td>○ 1 = Energized</td>
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<td>2–15</td>
<td>Reserved</td>
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</table>
Setting Group of the Last Trip

If a standard protection is responsible of the last trip, the settings of the standard protection responsible of the last trip are recorded in the following registers:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x0233  | 564      | R  | –    | INT16U| 1–128 | Setting group of the last trip:  
- 1 = Setting group A  
- 2 = Setting group B  
- 3 = Setting group ERMS  
- 128 = Fallback settings  
- 255 = N/A |

Settings of Protection Responsible of the Last Trip

If a standard protection is responsible of the last trip, the settings of the standard protection responsible of the last trip are recorded in the following registers:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0234–0x0235</td>
<td>565–566</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Generic standard protection last parameter 1</td>
</tr>
<tr>
<td>0x0236–0x0237</td>
<td>567–568</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Generic standard protection last parameter 2</td>
</tr>
<tr>
<td>0x0238–0x0239</td>
<td>569–570</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Generic standard protection last parameter 3</td>
</tr>
<tr>
<td>0x023A–0x023B</td>
<td>571–572</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Generic standard protection last parameter 4</td>
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<td>0x023C</td>
<td>573</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Generic standard protection last parameter 5</td>
</tr>
<tr>
<td>0x023D</td>
<td>574</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Generic standard protection last parameter 6</td>
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</table>

The following table defines the parameters corresponding to the 6 generic standard protection last parameters according to the protection responsible of the last trip, indicated by register 552.

<table>
<thead>
<tr>
<th>Protection responsible of the last trip</th>
<th>Registers</th>
<th>552 Last trip event code</th>
<th>565-566 Generic protection last parameter 1</th>
<th>567-568 Generic protection last parameter 2</th>
<th>569-570 Generic protection last parameter 3</th>
<th>571-572 Generic protection last parameter 4</th>
<th>573 Generic protection last parameter 5</th>
<th>574 Generic protection last parameter 6</th>
</tr>
</thead>
</table>
| Overload protection (Long time)        | 25600     | (0x6400)                 | Long time over current protection threshold | –                                        | Long time over current protection time delay | –                                        | Long time over current protection curve:  
- 1 = I^2t On |
|                                        |           |                          |                                           |                                          |                                          |                                          |                                          |                                          |
| Short circuit protection (Short time)  | 25601     | (0x6401)                 | Short time over current protection threshold | –                                        | Short time over current protection time delay | –                                        | Short time over current protection curve:  
- 0 = I^2t Off  
- 1 = I^2t On |
|                                        |           |                          |                                           |                                          |                                          |                                          |                                          |                                          |
| Instantaneous protection               | 25602     | (0x6402)                 | Instantaneous over current protection threshold | –                                        | –                                        | –                                        | Instantaneous over current protection time delay mode:  
- 0 = Standard  
- 1 = Fast |
|                                        |           |                          |                                           |                                          |                                          |                                          |                                          |                                          |
| Ground fault protection                | 25603     | (0x6403)                 | Ground fault protection threshold         | –                                        | Ground fault protection time delay        | –                                        | Ground fault protection curve:  
- 0 = I^2t Off  
- 1 = I^2t On |
|                                        |           |                          |                                           |                                          |                                          |                                          |                                          |                                          |
NOTE: If an optional protection is responsible of the last trip, use the EcoStruxure Power Commission software or the EcoStruxure Power Device App to get the settings of the optional protection responsible of the last trip.

### Interrupted Current

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x023E–0x023F</td>
<td>575–576</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Last interrupted current on phase 1 (peak)</td>
</tr>
<tr>
<td>0x0240–0x0241</td>
<td>577–578</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Last interrupted current on phase 2 (peak)</td>
</tr>
<tr>
<td>0x0242–0x0243</td>
<td>579–580</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Last interrupted current on phase 3 (peak)</td>
</tr>
<tr>
<td>0x0244–0x0245</td>
<td>581–582</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Last interrupted current on neutral (peak)</td>
</tr>
<tr>
<td>0x0246–0x0247</td>
<td>583–584</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Last interrupted ground current (peak)</td>
</tr>
<tr>
<td>0x0248–0x0249</td>
<td>585–586</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Last interrupted earth leakage current (peak)</td>
</tr>
</tbody>
</table>

### Measurement Before Last Trip

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x024A–0x024B</td>
<td>587–588</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current of phase 1 before last trip</td>
</tr>
<tr>
<td>0x024C–0x024D</td>
<td>589–590</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
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<td>RMS current of phase 2 before last trip</td>
</tr>
<tr>
<td>0x024E–0x024F</td>
<td>591–592</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current of phase 3 before last trip</td>
</tr>
<tr>
<td>0x0250–0x0251</td>
<td>593–594</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current of neutral before last trip</td>
</tr>
<tr>
<td>0x0252–0x0253</td>
<td>595–596</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current of ground fault before last trip</td>
</tr>
<tr>
<td>0x0254–0x0255</td>
<td>597–598</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current earth leakage before last trip</td>
</tr>
<tr>
<td>0x0256–0x0257</td>
<td>599–600</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
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<td>RMS phase-to-phase voltage V12 before last trip</td>
</tr>
</tbody>
</table>
### Micrologic Control Unit Data for Masterpact MTZ Circuit Breakers

<table>
<thead>
<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0258–0x0259</td>
<td>601–602</td>
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<td>V</td>
<td>FLOAT32</td>
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<td>RMS phase-to-phase voltage V23 before last trip</td>
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<td>0x025A–0x025B</td>
<td>603–604</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS phase-to-phase voltage V31 before last trip</td>
</tr>
<tr>
<td>0x025C–0x025D</td>
<td>605–606</td>
<td>R</td>
<td>Hz</td>
<td>FLOAT32</td>
<td>–</td>
<td>Frequency before last trip</td>
</tr>
<tr>
<td>0x025E–0x025F</td>
<td>607–608</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Voltage unbalance V12 before last trip</td>
</tr>
<tr>
<td>0x0260–0x0261</td>
<td>609–610</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Voltage unbalance V23 before last trip</td>
</tr>
<tr>
<td>0x0262–0x0263</td>
<td>611–612</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Voltage unbalance V31 before last trip</td>
</tr>
<tr>
<td>0x0264–0x0265</td>
<td>613–614</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current unbalance 1 before last trip</td>
</tr>
<tr>
<td>0x0266–0x0267</td>
<td>615–616</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current unbalance 2 before last trip</td>
</tr>
<tr>
<td>0x0268–0x0269</td>
<td>617–618</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current unbalance 3 before last trip</td>
</tr>
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</table>
### Circuit Breaker Data

#### Circuit Breaker Status Register

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7CFF   | 32000    | R  | –    | INT16U | –     | –   | Quality of each bit of register 32001 (see page 60):  
  - 0 = Invalid  
  - 1 = Valid                                                                                                                                   |
| 0x7D00   | 32001    | R  | –    | INT16U | –     | –   | Circuit breaker status register  
  0 OF status indication contact  
  - 0 = The circuit breaker is open.  
  - 1 = The circuit breaker is closed.  
  1 SD trip indication contact  
  - 0 = Circuit breaker is not tripped.  
  - 1 = Circuit breaker is tripped due to electrical fault, shunt trip, or push-to-trip.  
  Bit always equal to 0 for Masterpact and Compact NS circuit breakers with motor mechanism.  
  2 SDE fault trip indication contact  
  - 0 = Circuit breaker is not tripped on electrical fault.  
  - 1 = Circuit breaker is tripped due to electrical fault (including ground-fault test and earth-leakage test).  
  3 CH spring charged contact (only with Masterpact)  
  - 0 = Spring discharged  
  - 1 = Spring charged  
  Bit always equal to 0 for Masterpact and Compact NS circuit breakers with motor mechanism.  
  4 Reserved  
  5 PF ready to close contact (only with Masterpact)  
  - 0 = Not ready to close  
  - 1 = Ready to close  
  Bit always equal to 0 for Masterpact and Compact NS circuit breakers with motor mechanism.  
  6–15 Reserved |

#### Inhibit Close Order

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7E53   | 32340    | R  | –    | INT16U | –     | –   | Quality of each bit of register 32341:  
  - 0 = Invalid  
  - 1 = Valid                                                                                     |
| 0x7E54   | 32341    | R  | –    | INT16U | –     | –   | Inhibit close order status  
  0 Close breaker inhibited by IO module  
  - 0 = Disable  
  - 1 = Enable                                                                                      |
|          |          |    |      |       |       | 1  | Close breaker inhibited by communication  
  - 0 = Disable  
  - 1 = Enable                                                                                     |
|          |          |    |      |       |       | 2–15 | Reserved                                                                        |

#### Opening/Closing Release Data

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7E64–  | 32357–   | R  | –    | INT16U | –     | –   | Quality of each bit of registers 32382-32383:  
  - 0 = Invalid  
  - 1 = Valid                                                                                     |
| 0x7E65   | 32358    |    |      |       |       |     |                                                                             |
| 0x7E66–  | 32359–   | R  | –    | INT16U | –     | –   | Quality of each bit of registers 32384-32396 (see page 137).                |
| 0x7E65   | 32371    |    |      |       |       |     |                                                                             |
### Last Event Data

<table>
<thead>
<tr>
<th>Address</th>
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<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0x7E73–0x7E76</td>
<td>32372–32375</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Tripping cause (see page 99)</td>
</tr>
<tr>
<td>0x7E77–0x7E7C</td>
<td>32376–32381</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Protection data (see page 99)</td>
</tr>
<tr>
<td>0x7E7D</td>
<td>32382</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
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<td>1</td>
<td>Circuit breaker opened</td>
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<td>2</td>
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<td>Opening order sent to MX</td>
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<td>7</td>
<td>Circuit breaker did not open or close</td>
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<td>Local mode enabled</td>
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<td>10</td>
<td>Closing inhibited by communication</td>
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<td>11</td>
<td>Closing inhibited through IO module</td>
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<td>13</td>
<td>Alarm reset</td>
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<td>14</td>
<td>M2C output 1 is forced</td>
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<td>M2C output 2 is forced</td>
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<td>0x7E7E</td>
<td>32383</td>
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<td>–</td>
<td>INT16U</td>
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<td>0</td>
<td>Reserved</td>
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<td>1</td>
<td>Allow control by digital input is disabled</td>
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<td>2–7</td>
<td>Reserved</td>
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<td>XF voltage release operation counter above alarm threshold</td>
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<td>9</td>
<td>XF voltage release reached the maximum number of operations</td>
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<td>MX2 voltage release operation counter above alarm threshold</td>
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<td>11</td>
<td>MX2 voltage release reached the maximum number of operations</td>
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<td>12</td>
<td>MX1 voltage release operation counter above alarm threshold</td>
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<td>13</td>
<td>MX1 voltage release reached the maximum number of operations</td>
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<td>14</td>
<td>MN undervoltage release operation counter above alarm threshold</td>
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<td>15</td>
<td>MN undervoltage release reached the maximum number of operations</td>
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### Remote Control Settings

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0298</td>
<td>665</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>–</td>
<td>Remote protection setting enable:</td>
</tr>
<tr>
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<td>• 0 = Disable</td>
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<td>• 1 = Enable</td>
</tr>
<tr>
<td>0x0299</td>
<td>666</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
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<td>–</td>
<td>Protection lock enable:</td>
</tr>
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<td>• 0 = Disable</td>
</tr>
<tr>
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<td>• 1 = Enable</td>
</tr>
<tr>
<td>0x029A</td>
<td>667</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 668:</td>
</tr>
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<td>• 0 = Invalid</td>
</tr>
<tr>
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<td></td>
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<td>• 1 = Valid</td>
</tr>
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</table>
### Alarm Status

<table>
<thead>
<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x029B</td>
<td>668</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0–4</td>
<td>Reserved</td>
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<td>5</td>
<td>Auto mode:</td>
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<td>● 0 = Remote</td>
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<td>● 1 = Local</td>
</tr>
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<td>6–15</td>
<td>Reserved</td>
</tr>
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<td>0x029C</td>
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<td>INT16U</td>
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<td>● 0 = Invalid</td>
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<td>● 1 = Valid</td>
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<td>0x029D</td>
<td>670</td>
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<td>INT16U</td>
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<td>● 0 = Manual</td>
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<td>● 1 = Auto</td>
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<td>0x029E–</td>
<td>671–672</td>
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<td>2–15</td>
<td>Reserved</td>
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<td>0x029F</td>
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### Table

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<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
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<tbody>
<tr>
<td>0x02A0</td>
<td>673</td>
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<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Counter of active low-level alarms</td>
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<tr>
<td>0x02A1</td>
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<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Counter of active medium-level alarms</td>
</tr>
<tr>
<td>0x02A2</td>
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<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Counter of active high-level alarms</td>
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</table>
Circuit Breaker Characteristics

System Settings

<table>
<thead>
<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
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<th>Range</th>
<th>Description</th>
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<tbody>
<tr>
<td>0x1FD8–0x1FD9</td>
<td>8153–8154</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>208–1000</td>
<td>Rated voltage</td>
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<td>0x1FDA–0x1FDB</td>
<td>8155–8156</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>100–8000</td>
<td>Rated current</td>
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<td>0x1FDC</td>
<td>8157</td>
<td>–</td>
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<td>Reserved</td>
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<td>0x1FDD</td>
<td>8158</td>
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<td>–</td>
<td>INT16U</td>
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<td>8159–8161</td>
<td>–</td>
<td>–</td>
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<td>Reserved</td>
</tr>
<tr>
<td>0x1FE1</td>
<td>8162</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Number of poles:</td>
</tr>
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<td>• 0 = 3 poles</td>
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<td></td>
<td>• 1 = 4 poles</td>
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<td>0x1FE2</td>
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<td>–</td>
<td>INT16U</td>
<td>30–41</td>
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<td>• 30 = 4CT 3VT</td>
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<td>• 31 = 3CT 3VT</td>
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<td>• 40 = 3CT 4VT</td>
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<td>• 41 = 4CT 4VT</td>
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<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>1000–1250</td>
<td>VT primary voltage</td>
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<td>0x1FE5–0x1FE6</td>
<td>8166–8167</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>100–690</td>
<td>VT secondary voltage</td>
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<td>0x1FE7–0x1FEA</td>
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<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Current date/time of the source.</td>
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System type detailed description:

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<th>If...</th>
<th>Then...</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>the system is 3-pole circuit breaker with external neutral current</td>
<td>system type = 30</td>
<td>• Measurements of the phase-to-phase voltages are available.</td>
</tr>
<tr>
<td>transformer and without external neutral voltage tap</td>
<td></td>
<td>• Measurements of the phase-to-neutral voltages are not available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measurement of the neutral current is available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 wattmeters method is not possible.</td>
</tr>
<tr>
<td>the system is 3-pole circuit breaker without external neutral current</td>
<td>system type = 31</td>
<td>• Measurements of the phase-to-phase voltages are available.</td>
</tr>
<tr>
<td>transformer and without external neutral voltage tap</td>
<td></td>
<td>• Measurements of the phase-to-neutral voltages are not available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measurement of the neutral current is not available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 wattmeters method is not possible.</td>
</tr>
<tr>
<td>the system is 3-pole circuit breaker without external neutral current</td>
<td>system type = 40</td>
<td>• Measurements of the phase-to-phase voltages are available.</td>
</tr>
<tr>
<td>transformer and with external neutral voltage tap</td>
<td></td>
<td>• Measurements of the phase-to-neutral voltages are available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measurement of the neutral current is not available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 wattmeters method is possible.</td>
</tr>
<tr>
<td>the system is 3-pole circuit breaker with external neutral current</td>
<td>system type = 41</td>
<td>• Measurements of the phase-to-phase voltages are available.</td>
</tr>
<tr>
<td>transformer and external neutral voltage tap, or if the system is</td>
<td></td>
<td>• Measurements of the phase-to-neutral voltages are available.</td>
</tr>
<tr>
<td>4-pole circuit breaker</td>
<td></td>
<td>• Measurement of the neutral current is available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 wattmeters method is possible.</td>
</tr>
</tbody>
</table>

Hardware Revision

The hardware revision is an ASCII string using the format XXX.YYY.ZZZ with:

• XXX = major version (000–127)
• YYY = minor version (000–255)
• ZZZ = revision number (000–255)

The NULL character ends the revision number.
### Protection Type

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x204E</td>
<td>8271</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Protection type:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 12848 = LSo (Long time and Short time (without timeout) overcurrent protections)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• 13104 = LI (Long time and Instantaneous overcurrent protections)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• 13616 = LSI (Long time, Short time and Instantaneous overcurrent protections)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 13872 = LSIG (Long time, Short time, Instantaneous overcurrent and ground fault protections)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 14128 = LSIV (Long time, Short time, Instantaneous overcurrent and earth leakage protections)</td>
</tr>
</tbody>
</table>

### Application Type

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x204F</td>
<td>8272</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Application type:</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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<td>• 1 = Distribution</td>
</tr>
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</table>

### Circuit Breaker Standard

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2072</td>
<td>8307</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–3</td>
<td>Standard or market targeted by the device:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = UL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = IEC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 2 = ANSI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 3 = IEC/GB</td>
</tr>
</tbody>
</table>

### Firmware Revision

The firmware revision is an ASCII string using the format XXX.YYY.ZZZ with:
- XXX = major version (000–127)
- YYY = minor version (000–255)
- ZZZ = revision number (000–255)

The NULL character ends the revision number.

### Measurement Settings

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x20C9</td>
<td>8394</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Current demand calculation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Thermal image sliding</td>
</tr>
<tr>
<td>0x20CA–0x20CB</td>
<td>8395–8396</td>
<td>R-WC</td>
<td>min</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current demand calculation interval time</td>
</tr>
<tr>
<td>0x20CC</td>
<td>8397</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x20CD</td>
<td>8398</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Power demand calculation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Time interval sliding</td>
</tr>
<tr>
<td>0x20CE–0x20CF</td>
<td>8399–8400</td>
<td>R-WC</td>
<td>min</td>
<td>FLOAT32</td>
<td>–</td>
<td>Power demand calculation interval time</td>
</tr>
<tr>
<td>0x20D0</td>
<td>8401</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x20D1</td>
<td>8402</td>
<td>R-WC</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>External neutral voltage sensor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Not available</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• 1 = Available</td>
</tr>
<tr>
<td>0x20D2</td>
<td>8403</td>
<td>R-WC</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>External neutral current sensor:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Available</td>
</tr>
<tr>
<td>0x20D3</td>
<td>8404</td>
<td>R-WC</td>
<td>–</td>
<td>INT16U</td>
<td>0, 2</td>
<td>Power factor sign convention:</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = IEC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 2 = IEEE</td>
</tr>
</tbody>
</table>
### Device Identification

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x20D4   | 8405     | R-WC| –    | INT16U| 0–1   | Power sign:  
  - 0 = Direct  
  - 1 = Inverted                                                             |
| 0x20D5   | 8406     | –  | –    | –     | –     | Reserved                                                                    |
| 0x20D6   | 8407     | R-WC| –    | INT16U| 0–1   | Energy accumulation mode:  
  - 0 = Absolute  
  - 1 = Signed                                                               |
| 0x20D7   | 8408     | R  | –    | INT16U| 0–1   | Power calculation method:  
  - 0 = Vectorial  
  - 1 = Arithmetic                                                            |

### Address Identification

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x20D9   | 8410     | R  | –    | INT16U| –     | Internal identifier of the product:  
  - 17120 = Micrologic X                                                       |
| 0x20DA–0x20E3 | 8411–8420 | R | –    | OCTET STRING | – | Vendor name: ‘Schneider Electric’                                           |
| 0x20E4–0x2123 | 8421–8484 | R | –    | OCTET STRING | – | Vendor URL                                                                  |
| 0x2124–0x212D | 8485–8492 | R | –    | OCTET STRING | – | Product range: ‘Micrologic’                                                |
| 0x212C–0x2132 | 8493–8500 | R | –    | OCTET STRING | – | Product model                                                               |
| 0x2134–0x213B | 8501–8508 | R | –    | OCTET STRING | – | Product code                                                                |
| 0x213C–0x2148 | 8509–8521 | R | –    | OCTET STRING | – | Serial number of the Micrologic X control unit                             |
| 0x2149–0x2168 | 8522–8553 | R-WC| –    | OCTET STRING | – | User application name                                                       |
| 0x2169–0x2178 | 8554–8569 | R | –    | OCTET STRING | – | Main capability of device                                                  |
| 0x2179   | 8570     | –  | –    | –     | –     | Reserved                                                                    |
| 0x217A–0x2181 | 8571–8578 | R | –    | OCTET STRING | – | Product range: ‘Masterpact MTZ’                                             |
| 0x2182–0x2189 | 8579–8586 | – | –    | –     | –     | Reserved                                                                    |
| 0x218A–0x218D | 8587–8590 | R | –    | OCTET STRING | – | Performance level:  
  - ’N1’: standard short-circuit level (42 kA)  
  - ’H1’: high short-circuit level (66 kA)  
  - ’H2’: very high short-circuit level (100 kA)  
  - ’H3’: extremely high short-circuit level (150 kA)  
  - ’L1’: extremely high short-circuit level (150 kA) with strong current limitation and significant discrimination (30 kA)  |
| 0x218E–0x219A | 8591–8603 | R | –    | OCTET STRING | – | Serial number of the Masterpact MTZ circuit breaker                        |
| 0x219B–0x21AA | 8604–8619 | R | –    | OCTET STRING | – | Device family: ‘Circuit breaker’                                           |
Real-Time Measurements

General Description

The real-time measurements are refreshed every second. Real-time measurements include:

- RMS (Root Mean Square) voltage and voltage unbalance
- RMS (Root Mean Square) current and current unbalance
- Active, reactive, and apparent power
- Power factor and fundamental power factor
- Frequency
- Total harmonic distortion (THD) of voltage and current compared to the fundamental
- Total harmonic distortion (thd) of voltage and current compared to the RMS value

Voltage

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D37–0x7D38</td>
<td>32056–32057</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>RMS phase-to-phase voltage V12</td>
</tr>
<tr>
<td>0x7D39–0x7D3A</td>
<td>32058–32059</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>RMS phase-to-phase voltage V23</td>
</tr>
<tr>
<td>0x7D3B–0x7D3C</td>
<td>32060–32061</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>RMS phase-to-phase voltage V31</td>
</tr>
<tr>
<td>0x7D3D–0x7D3E</td>
<td>32062–32063</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>RMS phase-to-neutral voltage V1N(1)</td>
</tr>
<tr>
<td>0x7D3F–0x7D40</td>
<td>32064–32065</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>RMS phase-to-neutral voltage V2N(1)</td>
</tr>
<tr>
<td>0x7D41–0x7D42</td>
<td>32066–32067</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>RMS phase-to-neutral voltage V3N(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

Average Voltage

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x5214–0x5215</td>
<td>21013–21014</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>41.6–2250</td>
<td>Average of 3 RMS phase-to-phase voltages: (V12 + V23 + V31)/ 3</td>
</tr>
<tr>
<td>0x5216–0x5217</td>
<td>21015–21016</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>24–1500</td>
<td>Average of 3 RMS phase-to-neutral voltages: (V1N + V2N + V3N)/ 3(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

Voltage Unbalance

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x5220–0x5221</td>
<td>21025–21026</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Phase-to-phase V12 voltage unbalance with respect to the average of 3 phase-to-phase RMS voltages</td>
</tr>
<tr>
<td>0x5222–0x5223</td>
<td>21027–21028</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Phase-to-phase V23 voltage unbalance with respect to the average of 3 phase-to-phase RMS voltages</td>
</tr>
<tr>
<td>0x5224–0x5225</td>
<td>21029–21030</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Phase-to-phase V31 voltage unbalance with respect to the average of 3 phase-to-phase RMS voltages</td>
</tr>
<tr>
<td>0x5226–0x5227</td>
<td>21031–21032</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Phase-to-neutral V1N voltage unbalance with respect to the average of 3 phase-to-neutral RMS voltages(1)</td>
</tr>
<tr>
<td>0x5228–0x5229</td>
<td>21033–21034</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Phase-to-neutral V2N voltage unbalance with respect to the average of 3 phase-to-neutral RMS voltages(1)</td>
</tr>
<tr>
<td>0x522A–0x522B</td>
<td>21035–21036</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Phase-to-neutral V3N voltage unbalance with respect to the average of 3 phase-to-neutral RMS voltages(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

Current

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D1B–0x7D1C</td>
<td>32028–32029</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current on phase 1</td>
</tr>
<tr>
<td>0x7D1D–0x7D1E</td>
<td>32030–32031</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current on phase 2</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.
(2) Value available with Micrologic 7.0 X.
### Current Unbalance

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D1F–0x7D20</td>
<td>32032–32033</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current on phase 3</td>
</tr>
<tr>
<td>0x7D21–0x7D22</td>
<td>32034–32035</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>RMS current of neutral(1)</td>
</tr>
<tr>
<td>0x7D23–0x7D24</td>
<td>32036–32037</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Maximum of RMS current of phases 1, 2, 3, N (Most loaded phase)</td>
</tr>
<tr>
<td>0x7D25–0x7D26</td>
<td>32038–32039</td>
<td>R</td>
<td>-</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current ratio on ground (Ig setting ratio)</td>
</tr>
<tr>
<td>0x7D27–0x7D28</td>
<td>32040–32041</td>
<td>R</td>
<td>-</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current ratio on earth-leakage (IΔn setting ratio)(2)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.
(2) Value available with Micrologic 7.0 X.

### Address

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D95–0x7D96</td>
<td>32150–32151</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Ground-fault current</td>
</tr>
<tr>
<td>0x7D97–0x7D98</td>
<td>32152–32153</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Earth-leakage current(1)</td>
</tr>
</tbody>
</table>

(1) Value available with Micrologic 7.0 X.

### Current Unbalance

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x5336–0x5337</td>
<td>21301-21302</td>
<td>R</td>
<td>-</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current ratio on phase 1 (Ir setting ratio)</td>
</tr>
<tr>
<td>0x5338–0x5339</td>
<td>21303-21304</td>
<td>R</td>
<td>-</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current ratio on phase 2 (Ir setting ratio)</td>
</tr>
<tr>
<td>0x533A–0x533B</td>
<td>21305-21306</td>
<td>R</td>
<td>-</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current ratio on phase 3 (Ir setting ratio)</td>
</tr>
<tr>
<td>0x533C–0x534D</td>
<td>21307-21308</td>
<td>R</td>
<td>-</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current ratio on neutral (Ir setting ratio x Type of neutral protection: 0.5, 1, 1.6, OFF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>If type of neutral protection is OFF, then the value returned is 0.</td>
</tr>
</tbody>
</table>

### Average Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D83–0x7D84</td>
<td>32132–32133</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase RMS currents</td>
</tr>
<tr>
<td>0x7D85–0x7D86</td>
<td>32134–32135</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 RMS phase-to-phase voltages: (V12+V23+V31)/3</td>
</tr>
<tr>
<td>0x7D87–0x7D88</td>
<td>32136–32137</td>
<td>R</td>
<td>V</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 RMS phase-to-neutral voltages: (V1N+V2N+V3N)/3(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

### Frequency

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D43–0x7D44</td>
<td>32068–32069</td>
<td>R</td>
<td>Hz</td>
<td>FLOAT32</td>
<td>–</td>
<td>Frequency</td>
</tr>
</tbody>
</table>
Active Power

The flow sign of the active power depends on the configuration of register 8405 (see page 109):

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D47–0x7D48</td>
<td>32072–32073</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>Active power on phase 1&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D49–0x7D4A</td>
<td>32074–32075</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>Active power on phase 2&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D4B–0x7D4C</td>
<td>32076–32077</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>Active power on phase 3&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D4D–0x7D4E</td>
<td>32078–32079</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total active power</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Value available when system type register returns 40 or 41.

Reactive Power

The flow sign of the reactive power depends on the configuration of register 8405 (see page 109):

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D4F–0x7D50</td>
<td>32080–32081</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>–</td>
<td>Reactive power on phase 1&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D51–0x7D52</td>
<td>32082–32083</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>–</td>
<td>Reactive power on phase 2&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D53–0x7D54</td>
<td>32084–32085</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>–</td>
<td>Reactive power on phase 3&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D55–0x7D56</td>
<td>32086–32087</td>
<td>R</td>
<td>VAr</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total reactive power</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Value available when system type register returns 40 or 41.

Apparent Power

The sign of the apparent power depends on the configuration of register 8404 (see page 109):

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7D57–0x7D58</td>
<td>32088–32089</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>–</td>
<td>Apparent power on phase 1&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D59–0x7D5A</td>
<td>32090–32091</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>Apparent power on phase 2&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D5B–0x7D5C</td>
<td>32092–32093</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>Apparent power on phase 3&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7D5D–0x7D5E</td>
<td>32094–32095</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>0–16000000</td>
<td>Total apparent power</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Value available when system type register returns 40 or 41.

Power Factor

The sign of the power factor depends on the configuration of register 8404 (see page 109):

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DDC–0x7DCE</td>
<td>32206–32207</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Power factor on phase 1&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7DCF–0x7DD0</td>
<td>32208–32209</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Power factor on phase 2&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7DD1–0x7DD2</td>
<td>32210–32211</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Power factor on phase 3&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7DD3–0x7DD4</td>
<td>32212–32213</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total power factor</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Value available when system type register returns 40 or 41.

Fundamental Power Factor (cos ϕ)

The sign of the fundamental power factor (cos ϕ) depends on the configuration of register 8404 (see page 109):

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DD5–0x7DD6</td>
<td>32214–32215</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Fundamental power factor on phase 1 (cos ϕ1)&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7DD7–0x7DD8</td>
<td>32216–32217</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Fundamental power factor on phase 2 (cos ϕ2)&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7DD9–0x7DDA</td>
<td>32218–32219</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Fundamental power factor on phase 3 (cos ϕ3)&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>0x7DDB–0x7DDC</td>
<td>32220–32221</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total fundamental power factor</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Value available when system type register returns 40 or 41.
### Total Harmonic Distortion (THD) of Voltage Compared to the Fundamental

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DDD–0x7DE</td>
<td>32222–32223</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (THD) of phase-to-phase voltage V12 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DF–0x7DE0</td>
<td>32224–32225</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (THD) of phase-to-phase voltage V23 in compared to the fundamental</td>
</tr>
<tr>
<td>0x7DE1–0x7DE2</td>
<td>32226–32227</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (THD) of phase-to-phase voltage V31 in compared to the fundamental</td>
</tr>
<tr>
<td>0x7DE3–0x7DE4</td>
<td>32228–32229</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (THD) of phase-to-neutral voltage V1N in compared to the fundamental</td>
</tr>
<tr>
<td>0x7DE5–0x7DE6</td>
<td>32230–32231</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (THD) of phase-to-neutral voltage V2N in compared to the fundamental</td>
</tr>
<tr>
<td>0x7DE7–0x7DE8</td>
<td>32232–32233</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (THD) of phase-to-neutral voltage V3N in compared to the fundamental</td>
</tr>
<tr>
<td>0x528C–0x528D</td>
<td>21133–21134</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase-to-phase voltage Total Harmonic Distortions (THD) compared to the fundamental average</td>
</tr>
<tr>
<td>0x528E–0x528F</td>
<td>21135–21136</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase-to-neutral voltage Total Harmonic Distortions (THD) compared to the fundamental</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

### Total Harmonic Distortion (thd) of Voltage Compared to RMS Voltage

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x5290–0x5291</td>
<td>21137–21138</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of phase-phase voltage V12 compared to the RMS voltage</td>
</tr>
<tr>
<td>0x5292–0x5293</td>
<td>21139–21140</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of phase-phase voltage V23 compared to the RMS voltage</td>
</tr>
<tr>
<td>0x5294–0x5295</td>
<td>21141–21142</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of phase-phase voltage V31 compared to the RMS voltage</td>
</tr>
<tr>
<td>0x5296–0x5297</td>
<td>21143–21144</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of phase-neutral voltage V1N compared to the RMS voltage</td>
</tr>
<tr>
<td>0x5298–0x5299</td>
<td>21145–21146</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of phase-neutral voltage V2N compared to the RMS voltage</td>
</tr>
<tr>
<td>0x529A–0x529B</td>
<td>21147–21148</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of phase-neutral voltage V3N compared to the RMS voltage</td>
</tr>
<tr>
<td>0x529C–0x529D</td>
<td>21149–21150</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase-to-phase voltage total harmonic distortions (thd) compared to the RMS voltage</td>
</tr>
<tr>
<td>0x529E–0x529F</td>
<td>21151–21152</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase-to-neutral voltage total harmonic distortions (thd) compared to the RMS voltage</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 40 or 41.

### Total Harmonic Distortion (THD) of Current Compared to the Fundamental

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7DE9–0x7DEA</td>
<td>32234–32235</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total Harmonic Distortion (THD) of current on phase 1 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DEB–0x7DEC</td>
<td>32236–32237</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total Harmonic Distortion (THD) of current on phase 2 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DED–0x7DEE</td>
<td>32238–32239</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total Harmonic Distortion (THD) of current on phase 3 compared to the fundamental</td>
</tr>
<tr>
<td>0x7DEF–0x7DF0</td>
<td>32240–32241</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase current Total Harmonic Distortions (THD) compared to the fundamental</td>
</tr>
</tbody>
</table>
**Total Harmonic Distortion (thd) of Current Compared to RMS Current**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x52AA–0x52AB</td>
<td>21163–21164</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of current on phase 1 compared to the RMS current</td>
</tr>
<tr>
<td>0x52AC–0x52AD</td>
<td>21165–21166</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of current on phase 2 compared to the RMS current</td>
</tr>
<tr>
<td>0x52AE–0x52AF</td>
<td>21167–21168</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of current on phase 3 compared to the RMS current</td>
</tr>
<tr>
<td>0x52B0–0x52B1</td>
<td>21169–21170</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total harmonic distortion (thd) of current on neutral compared to the RMS current(1)</td>
</tr>
<tr>
<td>0x52B2–0x52B3</td>
<td>21171–21172</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Average of 3 phase current total harmonic distortions (thd) compared to the RMS current</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.

**Miscellaneous**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x52C6</td>
<td>21191</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Phase rotation sequence:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = 123</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = 132</td>
</tr>
<tr>
<td>0x52C7</td>
<td>21192</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1–4</td>
<td>Total power factor quadrant:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Quadrant I</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = Quadrant II</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = Quadrant III</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 4 = Quadrant IV</td>
</tr>
<tr>
<td>0x52C8</td>
<td>21193</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Lead or Lag:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Capacitive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Inductive</td>
</tr>
<tr>
<td>0x52C9–0x52CB</td>
<td>21194–21196</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x52CC–0x52CD</td>
<td>21197–21198</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Deviation (%) of 3 RMS phase-to-phase voltages</td>
</tr>
</tbody>
</table>
Harmonic Values

General Description

The Individual Harmonics Analysis Digital Module provides real-time monitoring of individual harmonics of voltages and currents up to rank 40. If harmonic pollution reaches unacceptable levels, it helps you to select appropriate corrective action.

Total harmonic distortions THD(I), THD(V), THD-R(I), and THD-R(V) are calculated as standard by the Micrologic X control unit (see page 114).

Individual harmonics are calculated by the Micrologic X control unit according to the measurement methods specified in IEC 61000-4-30 (Testing and measurement techniques - Power quality measurement methods). The calculation of individual harmonics is performed every 200 milliseconds. The Micrologic X control unit provides the aggregated values of individual harmonics calculated on a time period of 3 seconds.

Data Availability

Individual harmonics analysis is available when the Individual Harmonics Analysis Digital Module is purchased and installed on a Micrologic X control unit.

The Individual Harmonics Analysis Digital Module is compatible with Micrologic X control units with firmware version greater than or equal to version V002.000.xxx.

The Individual harmonics analysis is not available with IFM interface.

Odd Voltage Harmonics

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## Even Voltage Harmonics

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</table>
Minimum and Maximum Values of Real-Time Measurements

General Description

Read the maximum and minimum values of real-time measurements with associated date and time in the following registers.

Maximum and minimum values of real-time measurements can be reset with the reset minimum/maximum command (see page 153).

Table: Timestamp of Reset Actions

<table>
<thead>
<tr>
<th>Address</th>
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<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
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<td>–</td>
<td>Timestamp of reset of minimum and maximum THD and thd</td>
</tr>
<tr>
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<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of reset of minimum and maximum RMS current</td>
</tr>
<tr>
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<td>Timestamp of reset of minimum and maximum RMS voltage</td>
</tr>
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<td>DATETIME</td>
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<td>Timestamp of reset of minimum and maximum power</td>
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<td>DATETIME</td>
<td>–</td>
<td>Timestamp of reset of minimum and maximum power factor and cos Φ</td>
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Table: Maximum Current

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<th>Range</th>
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<td>DATETIME</td>
<td>–</td>
<td>Timestamp of maximum RMS current on phase 1</td>
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<td>This is the highest (i.e. maximum) current value since this measurement was last reset. The measurement looks at all 4 currents, Max I1, Max I2, Max I3, and Max IN and keeps track of the highest value of any of them over time</td>
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<td>This is the date/time of the highest (i.e. maximum) current value since this measurement was last reset. The measurement looks at all 4 currents, Max I 1, Max I 2, Max I 3, and Max I n.</td>
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### Maximum Voltage

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### Minimum Voltage

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### Micrologic Control Unit Data for Masterpact MTZ Circuit Breakers

#### Maximum Power

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<td>35811–35812</td>
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<td>Maximum total fundamental power factor (cos φ)</td>
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### Minimum Power Factor

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<tr>
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<tr>
<td>0x8BBE–0xBBF</td>
<td>35823–35824</td>
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<td>Minimum power factor on phase 1</td>
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<tr>
<td>0xBFD–0xBF3</td>
<td>35825–35828</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of minimum power factor on phase 1</td>
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<tr>
<td>0xBFD–0xBF5</td>
<td>35829–35830</td>
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<td>Minimum power factor on phase 2</td>
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<td>–</td>
<td>Timestamp of minimum power factor on phase 2</td>
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<tr>
<td>0xBF8–0xBF9</td>
<td>35835–35836</td>
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## Maximum THD and THD

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<td>0x8C14–0x8C17</td>
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<tr>
<td>0x8C18–0x8C19</td>
<td>35865–35866</td>
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### Minimum THD and THD

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<tr>
<td>0x8C26–0x8C29</td>
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<td>DATETIME</td>
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<td>35885–35888</td>
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<td>Timestamp of maximum of average of 3 phase-to-neutral voltage Total Harmonic Distortions (THD) compared to the fundamental</td>
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<tr>
<td>0x8C30–0x8C31</td>
<td>35889–35890</td>
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<td>Maximum of average of 3 phase-to-phase voltage total harmonic distortions (thd) compared to the RMS voltage</td>
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<tr>
<td>0x8C32–0x8C35</td>
<td>35891–35894</td>
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<td>Timestamp of maximum of average of 3 phase-to-phase voltage total harmonic distortions (thd) compared to the RMS voltage</td>
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<td>Maximum of average of 3 phase-to-neutral voltage total harmonic distortions (thd) compared to the RMS voltage</td>
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<tr>
<td>0x8C38–0x8C3B</td>
<td>35897–35900</td>
<td>R –</td>
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<td>35901–35902</td>
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<tr>
<td>0x8C3E–0x8C41</td>
<td>35903–35906</td>
<td>R –</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of maximum Total Harmonic Distortion (THD) of current on neutral compared to the fundamental</td>
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</tr>
<tr>
<td>0x8C42–0x8C43</td>
<td>35907–35908</td>
<td>R –</td>
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<td>0x8C44–0x8C47</td>
<td>35909–35912</td>
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<td>DATETIME</td>
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<td>Timestamp of maximum of average of 3 phase current Total Harmonic Distortions (THD) compared to the fundamental</td>
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<tr>
<td>0x8C48–0x8C49</td>
<td>35913–35914</td>
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<td>–</td>
<td>Maximum total harmonic distortion (thd) of current on neutral compared to the RMS current</td>
<td></td>
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<tr>
<td>0x8C4A–0x8C4D</td>
<td>35915–35918</td>
<td>R –</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of maximum total harmonic distortion (thd) of current on neutral compared to the RMS current</td>
<td></td>
</tr>
<tr>
<td>0x8C4E–0x8C4F</td>
<td>35919–35920</td>
<td>R –</td>
<td>FLOAT32</td>
<td>–</td>
<td>Maximum of average of 3 phase current total harmonic distortions (thd) compared to the RMS current</td>
<td></td>
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<tr>
<td>0x8C50–0x8C53</td>
<td>35921–35924</td>
<td>R –</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of maximum of average of 3 phase current total harmonic distortions (thd) compared to the RMS current</td>
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### Micrologic Control Unit Data for Masterpact MTZ Circuit Breakers

#### Maximum Frequency

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
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<tbody>
<tr>
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<td>35949–35950</td>
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<td>FLOAT32</td>
<td>–</td>
<td>Minimum of average of 3 phase-to-neutral voltage total harmonic distortions (compared to the RMS voltage) since last reset</td>
</tr>
<tr>
<td>0x8C6E–0x8C71</td>
<td>35951–35954</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of minimum of average of 3 phase-to-neutral voltage total harmonic distortions (thd) compared to the RMS voltage</td>
</tr>
<tr>
<td>0x8C72–0x8C73</td>
<td>35955–35956</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Minimum Total Harmonic Distortion (THD) of current on neutral compared to the fundamental</td>
</tr>
<tr>
<td>0x8C74–0x8C77</td>
<td>35957–35960</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of minimum Total Harmonic Distortion (THD) of current on neutral compared to the fundamental</td>
</tr>
<tr>
<td>0x8C78–0x8C79</td>
<td>35961–35962</td>
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<td>FLOAT32</td>
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<td>Minimum of average of 3 phase current Total Harmonic Distortions (THD) compared to the fundamental</td>
</tr>
<tr>
<td>0x8C7A–0x8C7D</td>
<td>35963–35966</td>
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<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of minimum of average of 3 phase current Total Harmonic Distortions (THD) compared to the fundamental</td>
</tr>
<tr>
<td>0x8C7E–0x8C7F</td>
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<td>FLOAT32</td>
<td>–</td>
<td>Minimum total harmonic distortion (thd) of current on neutral compared to the RMS current</td>
</tr>
<tr>
<td>0x8C80–0x8C83</td>
<td>35969–35972</td>
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<td>DATETIME</td>
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<td>Timestamp of minimum total harmonic distortion (thd) of current on neutral compared to the RMS current</td>
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<tr>
<td>0x8C84–0x8C85</td>
<td>35973–35974</td>
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</tr>
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<td>0x8C86–0x8C89</td>
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<td>DATETIME</td>
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<td>Timestamp of minimum of average of 3 phase current total harmonic distortion (thd) compared to the RMS current</td>
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#### Minimum Frequency

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
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<th>Type</th>
<th>Range</th>
<th>Description</th>
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</tr>
<tr>
<td>0x8C92–0x8C95</td>
<td>35987–35990</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of maximum frequency</td>
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<tr>
<td>0x8C96–0x8C97</td>
<td>35991–35992</td>
<td>R</td>
<td>Hz</td>
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<td>–</td>
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</tr>
<tr>
<td>0x8C98–0x8C9B</td>
<td>35993–35996</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
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Demand Values of Real-Time Measurements

Current Demand Values

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<th>Address</th>
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<th>Type</th>
<th>Range</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0x7D98–0x7D9C</td>
<td>32156–32157</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current demand value on phase 1: I1 Dmd</td>
</tr>
<tr>
<td>0x7D9D–0x7D9E</td>
<td>32158–32159</td>
<td>R</td>
<td>A</td>
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<td>–</td>
<td>Current demand value on phase 2: I2 Dmd</td>
</tr>
<tr>
<td>0x7D9F–0x7DA0</td>
<td>32160–32161</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current demand value on phase 3: I3 Dmd</td>
</tr>
<tr>
<td>0x7DA1–0x7DA2</td>
<td>32162–32163</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Current demand value on the neutral: IN Dmd(1)</td>
</tr>
</tbody>
</table>

(1) Value available when system type register returns 30 or 41.

Power Demand Values

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
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<th>Unit</th>
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<th>Range</th>
<th>Description</th>
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<tr>
<td>0x7DA5–0x7DA6</td>
<td>32166–32167</td>
<td>R</td>
<td>VAR</td>
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<td>Total reactive power demand: Q Dmd</td>
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<tr>
<td>0x7DA7–0x7DA8</td>
<td>32168–32169</td>
<td>R</td>
<td>VA</td>
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<td>Total apparent power demand: S Dmd</td>
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</table>

Current Peak Demand Values

Current peak demand values can be reset with the reset minimum/maximum command.

<table>
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<th>Type</th>
<th>Range</th>
<th>Description</th>
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<tr>
<td>0x7DAB–0x7DAC</td>
<td>32172–32173</td>
<td>R</td>
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<tr>
<td>0x7DAD–0x7DAE</td>
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<td>Current peak demand value on the neutral: IN dmd max(1)</td>
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<td>–</td>
<td>Average peak current demand</td>
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</tbody>
</table>

(1) Value available when system type register returns 30 or 41.

Power Peak Demand Values

Power peak demand values can be reset with the reset minimum/maximum command.

<table>
<thead>
<tr>
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<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
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<tbody>
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</tr>
<tr>
<td>0x7DB3–0x7DB4</td>
<td>32180–32181</td>
<td>R</td>
<td>VAR</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total reactive power peak demand: Q dmd max</td>
</tr>
<tr>
<td>0x7DB5–0x7DB6</td>
<td>32182–32183</td>
<td>R</td>
<td>VA</td>
<td>FLOAT32</td>
<td>–</td>
<td>Total apparent power peak demand: S dmd max</td>
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</tbody>
</table>

Timestamp of Peak Demand Values and Reset of Peak Demand Values

<table>
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<tr>
<th>Address</th>
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<th>Unit</th>
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<th>Range</th>
<th>Description</th>
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<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak current demand on neutral</td>
</tr>
<tr>
<td>0x8944–0x8947</td>
<td>35141–35144</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of average peak current demand</td>
</tr>
<tr>
<td>0x8948–0x894B</td>
<td>35145–35148</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last reset of peak demand current</td>
</tr>
<tr>
<td>0x894C–0x894F</td>
<td>35149–35152</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last reset of peak demand power</td>
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<tr>
<td>0x8950–0x8953</td>
<td>35153–35156</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak demand current on phase 1</td>
</tr>
<tr>
<td>0x8954–0x8957</td>
<td>35157–35160</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak demand current on phase 2</td>
</tr>
<tr>
<td>0x8958–0x895B</td>
<td>35161–35164</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak demand current on phase 3</td>
</tr>
<tr>
<td>0x895C–0x895F</td>
<td>35165–35168</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak demand active power</td>
</tr>
<tr>
<td>0x8960–0x8963</td>
<td>35169–35172</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak demand reactive power</td>
</tr>
<tr>
<td>0x8964–0x8967</td>
<td>35173–35176</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of peak demand apparent power</td>
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</table>
Energy Measurements

Active, Reactive, and Apparent Energy

<table>
<thead>
<tr>
<th>Address</th>
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<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
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<tbody>
<tr>
<td>0x7D5F–0x7D62</td>
<td>32096–32099</td>
<td>R</td>
<td>Wh</td>
<td>INT64</td>
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<td>Total active energy</td>
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<tr>
<td>0x7D63–0x7D66</td>
<td>32100–32103</td>
<td>R</td>
<td>VARh</td>
<td>INT64</td>
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<tr>
<td>0x7D67–0x7D6A</td>
<td>32104–32107</td>
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<tr>
<td>0x7D6B–0x7D6E</td>
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<td>Wh</td>
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<td>0x7D6F–0x7D72</td>
<td>32112–32115</td>
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<td>0x7D73–0x7D76</td>
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<td>VARh</td>
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<td>0x7D7B–0x7D7E</td>
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<td>0x560C–0x5617</td>
<td>22029–22040</td>
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<td>0x5618–0x561B</td>
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<td>VAh</td>
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<td>0x561C–0x561F</td>
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<td>0x5624–0x5627</td>
<td>22053–22056</td>
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Timestamp of Reset Actions

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<th>Description</th>
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<tr>
<td>0x8968–0x896B</td>
<td>35177–35180</td>
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Energy per Phase

Energy per phase is available when the Energy per Phase Digital Module is purchased and installed on a Micrologic X control unit.

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<thead>
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<th>Description</th>
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<tbody>
<tr>
<td>0xAD70–0xAD73</td>
<td>44401–44404</td>
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<td>INT64</td>
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<td>Active energy delivered on phase 1 (into the load, counted positively)</td>
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<td>44405–44408</td>
<td>R</td>
<td>Wh</td>
<td>INT64</td>
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<td>44409–44412</td>
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<td>0xAD7C–0xAD7F</td>
<td>44413–44416</td>
<td>R</td>
<td>Wh</td>
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<td>0xAD80–0xAD83</td>
<td>44417–44420</td>
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<td>Active energy delivered on phase 2 (into the load, counted positively)</td>
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<td>Unit</td>
<td>Type</td>
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<td>Description</td>
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<td>0xAD84–0xAD87</td>
<td>44421–44424</td>
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<td>Wh</td>
<td>INT64</td>
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<td>0xAD88–0xAD8B</td>
<td>44425–44428</td>
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<td>Wh</td>
<td>INT64</td>
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<td>0xAD8C–0xAD8F</td>
<td>44429–44432</td>
<td>R</td>
<td>Wh</td>
<td>INT64</td>
<td>–</td>
<td>Total active energy received on phase 2 (not resettable)</td>
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<td>0xAD90–0xAD93</td>
<td>44433–44436</td>
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<td>Wh</td>
<td>INT64</td>
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<td>0xAD94–0xAD97</td>
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<td>Wh</td>
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<td>Total active energy delivered on phase 3 (not resettable)</td>
</tr>
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<td>0xAD98–0xAD9B</td>
<td>44441–44444</td>
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<td>Wh</td>
<td>INT64</td>
<td>–</td>
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<tr>
<td>0xAD9C–0xAD9F</td>
<td>44445–44448</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
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</tr>
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<td>0xADAC–0xADAF</td>
<td>44457–44460</td>
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<td>VAh</td>
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<td>Total reactive energy delivered on phase 1 (not resettable)</td>
</tr>
<tr>
<td>0xADB0–0xADB3</td>
<td>44465–44468</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
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<tr>
<td>0xADB4–0xADB7</td>
<td>44469–44472</td>
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<td>VAh</td>
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</tr>
<tr>
<td>0xADB8–0xADBB</td>
<td>44473–44476</td>
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<td>VAh</td>
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<td>Total reactive energy delivered on phase 2 (not resettable)</td>
</tr>
<tr>
<td>0xADBC–0xADBF</td>
<td>44477–44480</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Total reactive energy received on phase 2 (not resettable)</td>
</tr>
<tr>
<td>0xADC0–0xADC3</td>
<td>44481–44484</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Reactive energy delivered on phase 3 (into the load, counted positively)</td>
</tr>
<tr>
<td>0xADC4–0xADC7</td>
<td>44485–44488</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Reactive energy received on phase 3 (out of the load, counted negatively)</td>
</tr>
<tr>
<td>0xADC8–0xADCB</td>
<td>44489–44492</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Total reactive energy delivered on phase 3 (not resettable)</td>
</tr>
<tr>
<td>0xADCC–0xADCF</td>
<td>44493–44496</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Total reactive energy received on phase 3 (not resettable)</td>
</tr>
<tr>
<td>0xADD0–0xADD3</td>
<td>44497–44500</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Apparent energy on phase 1</td>
</tr>
<tr>
<td>0xADD4–0xADD7</td>
<td>44501–44504</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Cumulative apparent energy on phase 1 (not resettable)</td>
</tr>
<tr>
<td>0xADD8–0xADDB</td>
<td>44505–44508</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Apparent energy on phase 2</td>
</tr>
<tr>
<td>0xADDC–0xADDF</td>
<td>44509–44512</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
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<td>Cumulative apparent energy on phase 2 (not resettable)</td>
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<tr>
<td>0xADE0–0xADE3</td>
<td>44513–44516</td>
<td>R</td>
<td>VAh</td>
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<td>Apparent energy on phase 3</td>
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<tr>
<td>0xADE4–0xADE7</td>
<td>44517–44520</td>
<td>R</td>
<td>VAh</td>
<td>INT64</td>
<td>–</td>
<td>Cumulative apparent energy on phase 3 (not resettable)</td>
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</table>
## Maintenance and Diagnostic Data

### Contact Wear

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x5DC0–0x5DC1 | 24001–24002 | R  | –    | FLOAT32  | –     | Rate of contact wear:  
  - 0 = the contacts are new  
  - 1 = the contacts are worn, the circuit breaker must be changed |

### Load profile

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x5DCD–0x5DCE</td>
<td>24014–24015</td>
<td>R</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Cumulated duration when current was lower than 49% of rated current In</td>
</tr>
<tr>
<td>0x5DCF–0x5DD0</td>
<td>24016–24017</td>
<td>R</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Cumulated duration when current was between 50% and 79% of rated current In</td>
</tr>
<tr>
<td>0x5DD1–0x5DD2</td>
<td>24018–24019</td>
<td>R</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Cumulated duration when current was between 80% and 89% of rated current In</td>
</tr>
<tr>
<td>0x5DD3–0x5DD4</td>
<td>24020–24021</td>
<td>R</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Cumulated duration when current was higher than 90% of rated current In</td>
</tr>
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### Maintenance Data

<table>
<thead>
<tr>
<th>Address</th>
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<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x7E66–0x7E72 | 32359–32371 | R  | –    | INT16U   | –     | –   | Quality of each bit of registers 32384-32396:  
  - 0 = Invalid  
  - 1 = Valid |
<p>| 0x7E73–0x7E76 | 32372–32375 | R  | –    | INT16U   | –     | –   | Tripping cause (see page 99) |
| 0x7E77–0x7E7C | 32376–32381 | R  | –    | INT16U   | –     | –   | Protection data (see page 99) |
| 0x7E7D–0x7E7E | 32382–32383 | R  | –    | INT16U   | –     | –   | Opening/Closing release data (see page 105) |
| 0x7E7F      | 32384    | R  | –    | INT16U   | –     | 0   | Protection settings changed by display enabled |
|             |          |     |      |           |       | 1   | Protection settings changed by display |
|             |          |     |      |           |       | 2   | Protection settings changed by Bluetooth/USB/IFE |
|             |          |     |      |           |       | 3   | Communication lost with EIFE/IFE module |
|             |          |     |      |           |       | 4   | Communication lost with IO1 module |
|             |          |     |      |           |       | 5   | Communication lost with IO2 module |
|             |          |     |      |           |       | 6   | Configuration mismatch between IO and control unit: dual settings or inhibit close order |
|             |          |     |      |           |       | 7   | Communication lost with IFM module |
|             |          |     |      |           |       | 8–9 | Reserved |
|             |          |     |      |           |       | 10  | Configuration mismatch between IO and control unit: optional protection inhibit |
|             |          |     |      |           |       | 11  | Configuration mismatch between IO and control unit: local/remote mode |
|             |          |     |      |           |       | 12–15 | Reserved |</p>
<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
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<td>0x7E80</td>
<td>32385</td>
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<td>Control unit firmware update mode</td>
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<td>Digital module license expires in 20 days</td>
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<td>Digital module license expires in 10 days</td>
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<td>Control unit firmware update unsuccessful</td>
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<td>Digital module license uninstalled</td>
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<td>15</td>
<td>Remote protection settings change enabled</td>
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<tr>
<td>0x7E81</td>
<td>32386</td>
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<td>INT16U</td>
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<td>0</td>
<td>Connection on USB port</td>
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<td>4–5</td>
<td>Reserved</td>
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<td>Schedule basic maintenance within one month</td>
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<td></td>
<td></td>
<td></td>
<td>● 2 = Medium severity alarm detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = High severity alarm detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Reserved</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x8981–0x8982</td>
<td>35202–35203</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Breaker remaining service life ratio:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = End of typical service life of the breaker</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = New breaker</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x8983–0x8984</td>
<td>35204–35205</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Total number of operations (opening operation counter)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x8985–0x8986</td>
<td>35206–35207</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Number of total trips in operation</td>
</tr>
</tbody>
</table>
**Micrologic Control Unit Data for Masterpact MTZ Circuit Breakers**

### Protection Settings

#### Active Long Time Over Current Protection Settings

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xAFDE</td>
<td>45023</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Long time over current protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = On (tripping)</td>
</tr>
<tr>
<td>0xAFDF</td>
<td>45024</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Long time over current protection curve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Inverse time ($I^2t = ON$)</td>
</tr>
<tr>
<td>0xAFE0-</td>
<td>45025</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Long time over current protection threshold</td>
</tr>
<tr>
<td>0xAFE1</td>
<td>45026</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0xAFE2-</td>
<td>45027</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>–</td>
<td>Long time over current protection time delay</td>
</tr>
<tr>
<td>0xAFE3</td>
<td>45028</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Active Short Time Over Current Protection Settings

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xAFE8</td>
<td>45033</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Short time over current protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = On (tripping)</td>
</tr>
<tr>
<td>0xAFE9</td>
<td>45034</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Short time over current protection curve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Definite time ($I^2t = OFF$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Inverse time ($I^2t = ON$)</td>
</tr>
<tr>
<td>0xAFEA-</td>
<td>45035</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Short time over current protection threshold coefficient</td>
</tr>
<tr>
<td>0xAFEB</td>
<td>45036</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0xAFEC-</td>
<td>45037</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>–</td>
<td>Short time over current protection time delay</td>
</tr>
<tr>
<td>0xAFED</td>
<td>45038</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Active Instantaneous Protection Settings

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xAFE2</td>
<td>45043</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Instantaneous over current protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = On (tripping)</td>
</tr>
<tr>
<td>0xAFE3</td>
<td>45044</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Instantaneous over current protection time delay mode:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Fast</td>
</tr>
<tr>
<td>0xAFE4–</td>
<td>45045</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Instantaneous over current protection threshold coefficient</td>
</tr>
<tr>
<td>0xAFE5</td>
<td>45046</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Active Ground Fault Protection Settings

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xAFFA</td>
<td>45051</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Ground fault protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = On (tripping)</td>
</tr>
<tr>
<td>0xAFFB</td>
<td>45052</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Ground fault protection curve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Definite time ($I^2t = OFF$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Inverse time ($I^2t = ON$)</td>
</tr>
<tr>
<td>0xAFFC–</td>
<td>45053</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Ground fault protection threshold</td>
</tr>
<tr>
<td>0xAFFD</td>
<td>45054</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0xAFFE–</td>
<td>45055</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>–</td>
<td>Ground fault protection time delay</td>
</tr>
<tr>
<td>0xAFFF</td>
<td>45056</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Active Earth Leakage Protection Settings

---

**DOCA0105EN-05 05/2019 141**
<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xB004</td>
<td>45061</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Earth leakage protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = On</td>
</tr>
<tr>
<td>0xB005</td>
<td>45062</td>
<td>R</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0xB006–</td>
<td>45063–</td>
<td>R</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Earth leakage protection threshold</td>
</tr>
<tr>
<td>0xB007</td>
<td>0xB009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0xB008–</td>
<td>45065–</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>0.06, 0.15, 0.23, 0.35, 0.80</td>
<td>Earth leakage protection time delay</td>
</tr>
<tr>
<td>0xB009</td>
<td>0xB09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 4.2
Micrologic Control Unit Commands

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Micrologic Control Unit Commands and Error Codes</td>
<td>144</td>
</tr>
<tr>
<td>Protection Get Commands without Session</td>
<td>145</td>
</tr>
<tr>
<td>Protection Set Commands without Session</td>
<td>150</td>
</tr>
<tr>
<td>Measurement Set and Reset Commands</td>
<td>153</td>
</tr>
<tr>
<td>Diagnostic Get Commands</td>
<td>154</td>
</tr>
<tr>
<td>Measurement Settings Set Commands</td>
<td>159</td>
</tr>
<tr>
<td>Circuit Breaker Operation Set Commands</td>
<td>161</td>
</tr>
<tr>
<td>Micrologic X Get and Reset Commands</td>
<td>162</td>
</tr>
</tbody>
</table>
List of Micrologic Control Unit Commands and Error Codes

List of Commands

The Micrologic control unit commands are performed by the command interface (see page 51). They are grouped by their functions and types:

- Protection get commands (see page 145)
- Protection set commands (see page 150)
- Measurement set and reset commands (see page 153)
- Diagnostic get commands (see page 154)
- Measurement settings set or reset commands (see page 159)
- Circuit breaker operation set commands (see page 161)
- Micrologic X get and reset commands (see page 162)

In the Micrologic control unit registers:

- RC indicates the registers that can be read by a get command
- WC indicates the registers that can be written by a set and reset command

Error Codes

Error codes generated by Micrologic control units are the generic error codes (see page 53).
Protection Get Commands without Session

List of Commands
The following table lists the protection get commands without session, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
</table>
| Get neutral protection settings  
(see page 145) | 51589 | No password required |
| Get ZSI configuration parameters  
(see page 146) | 49025 | No password required |
| Get dual settings control configuration  
(see page 146) | 49536 | No password required |
| Get active setting group  
(see page 147) | 49537 | No password required |
| Get ground fault alarm settings  
(see page 147) | 51590 | No password required |
| Get earth leakage alarm settings  
(see page 148) | 51591 | No password required |

Get Neutral Protection Settings
To get the neutral protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51589</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
</tbody>
</table>
| 0x1F43–  
0x1F44 | 8004–8005 | –    | OCTET    | 0     | Password of the command = 0 (no password required) |
| 0x1F45–  
0x1F46 | 8006–8007 | –    | INT32U   | 0xFFFFFFFF | Key for the protection get command without session |

The neutral protection settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51589</td>
<td>Last command code</td>
</tr>
</tbody>
</table>
| 0x1F54  | 8021     | –    | INT16U   | –     | MSB: Neutral protection mode  
|         |          |       |          |       | ● 0 = Off  
|         |          |       |          |       | ● 1 = On  
|         |          |       |          |       | LSB: Neutral protection function supported  
|         |          |       |          |       | ● 0 = Not supported  
|         |          |       |          |       | ● 1 = Supported |
| 0x1F55  | 8022     | –    | INT16U   | 32    | Number of bytes returned |
| 0x1F56–  
0x1F57 | 8023–8024 | –    | INT32U   | 0xFFFFFFFF | Key for the protection get command without session |
| 0x1F58  | 8025     | –    | INT16U   | –     | MSB: Neutral protection type  
|         |          |       |          |       | ● 0 = OFF  
|         |          |       |          |       | ● 1 = 0.5  
|         |          |       |          |       | ● 2 = 1.0  
|         |          |       |          |       | ● 3 = Oversized |
| 0x1F59–  
0x1F5C | 8026–8029 | –    | DATETIME | –     | Timestamp of last change of neutral protection mode |
| 0x1F5D  | 8030     | –    | INT16U   | –     | Timestamp quality of last change of neutral protection mode |
| 0x1F5E–  
0x1F61 | 8031–8034 | –    | DATETIME | –     | Timestamp of last change of any parameter of the neutral protection function |
| 0x1F62  | 8035     | –    | INT16U   | –     | Timestamp quality of last change of any parameter of the neutral protection function |
| 0x1F63  | 8036     | –    | INT16U   | 0–3   | MSB: 0  
|         |          |       |          |       | LSB: Neutral protection type  
|         |          |       |          |       | ● 0 = OFF  
|         |          |       |          |       | ● 1 = 0.5  
|         |          |       |          |       | ● 2 = 1.0  
|         |          |       |          |       | ● 3 = Oversized |
| 0x1F64–  
0x1F65 | 8037–8038 | A    | FLOAT32  | –     | Long time over current protection threshold |
Get ZSI Configuration Parameter

To get the ZSI configuration parameter settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49025</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The ZSI configuration parameter settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49025</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>24</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56</td>
<td>8023</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: ZSI configuration mode:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = On (tripping)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: ZSI configuration function supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Not supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Supported</td>
</tr>
<tr>
<td>0x1F57–0x1F5A</td>
<td>8024–8027</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last change of ZSI configuration mode</td>
</tr>
<tr>
<td>0x1F5B</td>
<td>8028</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Timestamp quality of last change of ZSI configuration mode.</td>
</tr>
<tr>
<td>0x1F5C–0x1F5F</td>
<td>8029–8032</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last change of any parameter of the ZSI configuration</td>
</tr>
<tr>
<td>0x1F60</td>
<td>8033</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Timestamp quality of last change of any parameter of the ZSI configuration</td>
</tr>
<tr>
<td>0x1F61</td>
<td>8034</td>
<td>–</td>
<td>INT16U</td>
<td>0-2</td>
<td>ZSI protection selection:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Short time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Ground/Earth leakage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = All</td>
</tr>
</tbody>
</table>

Get Dual Settings Control Configuration

To get the dual settings control configuration, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49536</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The dual settings control configuration are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49536</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>6</td>
<td>Number of bytes returned</td>
</tr>
</tbody>
</table>
### Get Active Setting Group

To get the active setting group, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49537</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The active setting group is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49537</td>
<td>Last command code</td>
</tr>
</tbody>
</table>
| 0x1F54      | 8021     | –    | INT16U | –     | Command status:  
  - 0 = Successful command  
  - Other value = command with error (see page 53)                                                                                      |
| 0x1F55      | 8022     | –    | INT16U | 12    | Number of bytes returned                                                                                                                     |
| 0x1F56      | 8023     | –    | INT16U | –     | MSB: Active setting group validation  
  - 0 = Invalid, the selection of the active setting group is in progress  
  - 1 = Valid  
  LSB: Active setting group  
  - 1 = Setting group A  
  - 2 = Setting group B                                                                                                                    |
| 0x1F57–0x1F5A | 8024–8027 | – | DATETIME | – | Timestamp of last active setting group change                                                                                              |
| 0x1F5B      | 8028     | –    | INT16U | –     | Timestamp quality of last active setting group change                                                                                       |

### Get Ground Fault Alarm Settings

To set the ground fault alarm, use the set ground fault alarm settings command (see page 152).

To get the ground fault alarm settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51590</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0xFFFFFF</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
The ground fault alarm settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F52</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51590</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F53</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>34</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F55–</td>
<td>8023–8024</td>
<td>–</td>
<td>–</td>
<td>0xFFFFFFFF</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

0x1F57

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F58–</td>
<td>8026–8035</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F62–</td>
<td>8036–8037</td>
<td>A</td>
<td>FLOAT32</td>
<td>120–1200</td>
<td>Ig alarm pickup value</td>
</tr>
<tr>
<td>0x1F63–</td>
<td>8038–8039</td>
<td>s</td>
<td>FLOAT32</td>
<td>1–10</td>
<td>Ig alarm time delay</td>
</tr>
</tbody>
</table>

Get Earth Leakage Alarm Settings

To set the earth leakage alarm, use the set earth leakage alarm settings command (see page 151).

To get the earth leakage alarm settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51591</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td></td>
<td></td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–8007</td>
<td>–</td>
<td>–</td>
<td>0xFFFFFFFF</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F46</td>
<td></td>
<td></td>
<td></td>
<td>FF</td>
<td></td>
</tr>
</tbody>
</table>

The earth leakage alarm settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51591</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>34</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–</td>
<td>8023–8024</td>
<td>–</td>
<td>–</td>
<td>0xFFFFFFFF</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F58</td>
<td>8025</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Earth leakage alarm mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = On</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Earth leakage alarm function supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Not supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Supported</td>
</tr>
<tr>
<td>0x1F59–</td>
<td>8026–8035</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F63–</td>
<td>8036–8037</td>
<td>A</td>
<td>FLOAT32</td>
<td>0.5-22</td>
<td>Earth leakage alarm threshold</td>
</tr>
<tr>
<td>Address</td>
<td>Register</td>
<td>Unit</td>
<td>Type</td>
<td>Range</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>0xF65–0xF66</td>
<td>8038–8039</td>
<td>s</td>
<td>FLOAT32</td>
<td>1-10</td>
<td>Earth leakage alarm time delay</td>
</tr>
</tbody>
</table>
Protection Set Commands without Session

List of Commands
The following table lists the protection set commands without session, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set external neutral current transformer settings</td>
<td>45704</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set external neutral voltage sensor settings</td>
<td>46472</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set ZSI configuration parameters</td>
<td>49033</td>
<td>Administrator</td>
</tr>
<tr>
<td>Select active curve</td>
<td>49545</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Set earth leakage alarm settings</td>
<td>51592</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set ground fault alarm settings</td>
<td>51599</td>
<td>Administrator</td>
</tr>
</tbody>
</table>

Set External Neutral Current Transformer Settings
To set the external neutral current transformer settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>45704</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>–</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>External neutral current transformer:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Available</td>
</tr>
</tbody>
</table>

Set External Neutral Voltage Sensor Settings
To set the external neutral voltage sensor settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>46472</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>–</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>External neutral voltage sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Available</td>
</tr>
</tbody>
</table>

Set ZSI Configuration Parameter
To get the ZSI configuration parameters, use the get ZSI configuration parameters command (see page 156).
To set the ZSI configuration parameter settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49033</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
</tbody>
</table>
### Select Active Curve

To get the active setting group, use the get active setting group command (see page 147).

To set the active setting group, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F–</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49545</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td></td>
<td>STRING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Active setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Setting curve A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = Setting curve B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Dual setting operating behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Local</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = IO module (1 wire)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = IO module (2 wires)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = Remote</td>
</tr>
</tbody>
</table>

**NOTE:** After selecting the active setting group, use the get active setting group command (see page 147) to get the confirmation that the set command has been executed successfully.

### Set Earth Leakage Alarm Settings

To get the earth leakage alarm settings, use the get earth leakage alarm settings command (see page 148).

To set the earth leakage alarm settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51592</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>24</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td></td>
<td>STRING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0xFFFFFFFF FF</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Earth leakage alarm mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Off (alarm disabled)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = On (alarm enabled)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: 0</td>
</tr>
<tr>
<td>0x1F48–</td>
<td>8009–8010</td>
<td>A</td>
<td>FLOAT32</td>
<td>0.5–22.0 (step 0.1)</td>
<td>Earth leakage alarm threshold</td>
</tr>
</tbody>
</table>
Set Ground Fault Alarm Settings

To get the ground fault alarm settings, use the get ground fault alarm settings command (see page 147).

To set the ground fault alarm settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F–0x1F4B</td>
<td>8011–8012</td>
<td>s</td>
<td>FLOAT32</td>
<td>1-10</td>
<td>Earth leakage alarm time delay</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>24</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0xFFFFFF</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
| 0x1F47       | 8008     | –    | INT16U  | –       | MSB: Ground fault alarm mode
  ● 0 = Off (alarm disabled)
  ● 1 = On (alarm enabled)
  LSB: 0 |
| 0x1F48–0x1F49| 8009–8010| A    | FLOAT32 | 120–1200 | Ground fault alarm threshold          |
| 0x1F4A–0x1F4B| 8011–8012| s    | FLOAT32 | 1-10    | Ground fault alarm time delay          |
Measurement Set and Reset Commands

List of Commands

The following table lists the measurement set and reset commands, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset minimum/maximum values and energies (see page 153)</td>
<td>46728</td>
<td>Administrator or Operator</td>
</tr>
</tbody>
</table>

Reset Minimum/Maximum Values and Energies

To reset minimum/maximum values and energy, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>46728</td>
<td>–</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>–</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>–</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>–</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>–</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0</td>
<td>Reset min-max current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Reset min-max voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Reset min-max power</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Reset min-max power factor and ( \cos \phi )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Reset min-max THD (% fund)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>Reset peak current demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>Reset peak power demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>Reset min-max frequency</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>Reset all energies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10–15</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
Diagnostic Get Commands

List of Commands

The following table lists the diagnostic get commands, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get coil information (see page 154)</td>
<td>49793</td>
<td>No password required</td>
</tr>
<tr>
<td>Get health state (see page 155)</td>
<td>49794</td>
<td>No password required</td>
</tr>
<tr>
<td>Get trip counters in operation (see page 156)</td>
<td>49795</td>
<td>No password required</td>
</tr>
<tr>
<td>Get trip counters in test mode (see page 156)</td>
<td>49796</td>
<td>No password required</td>
</tr>
<tr>
<td>Get trip counters in manual test mode (see page 157)</td>
<td>49797</td>
<td>No password required</td>
</tr>
<tr>
<td>Get motor charging operation information (see page 157)</td>
<td>49798</td>
<td>No password required</td>
</tr>
<tr>
<td>Get breaker durability (see page 158)</td>
<td>51328</td>
<td>No password required</td>
</tr>
<tr>
<td>Get operating times (see page 158)</td>
<td>51329</td>
<td>No password required</td>
</tr>
</tbody>
</table>

Get Coil Information

To get the coil information, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49793</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>11</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Requested coil identification:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 16 = MX1 opening voltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 17 = XF closing voltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 18 = MN opening undervoltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 19 = MX2 opening voltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: 0 (not used)</td>
</tr>
</tbody>
</table>

The coil information is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49793</td>
<td>–</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>4</td>
<td>–</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56</td>
<td>8023</td>
<td>–</td>
<td>INT16U</td>
<td>1–3</td>
<td>–</td>
<td>MSB: Responded coil identification:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 16 = MX1 opening voltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 17 = XF closing voltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 18 = MN opening undervoltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 19 = MX2 opening voltage release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: 0 (not used)</td>
</tr>
</tbody>
</table>
Get Health State

To get the health state, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49794</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
<td></td>
</tr>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>–</td>
<td>0xFFFFFFFF</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

The health state is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49794</td>
<td>Last command code</td>
</tr>
</tbody>
</table>
**Micrologic Control Unit Data for Masterpact MTZ Circuit Breakers**

### Get Trip Counters in Operation

To get the trip counters in operation, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49795</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command (0x1501)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>53</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
<td></td>
</tr>
</tbody>
</table>

The trip counters in operation is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49796</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>6</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–0x1F57</td>
<td>8023–8024</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F58</td>
<td>8025</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Overall system health state</td>
</tr>
</tbody>
</table>

### Get Trip Counters in Test Mode

To get the trip counters in test mode, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49796</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command (0x1501)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
<td></td>
</tr>
</tbody>
</table>

The trip counters in test mode is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49796</td>
<td>Last command code</td>
</tr>
</tbody>
</table>
### Get Trip Counters in Manual Test Mode

To get the trip counters in manual test mode, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49797</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The trip counters in manual test mode are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49797</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–0x1F57</td>
<td>8023–8024</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Number of total trips in test mode</td>
</tr>
<tr>
<td>0x1F58–0x1F5B</td>
<td>8025–8028</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Date/Time of last trip in test mode</td>
</tr>
</tbody>
</table>

### Get Motor Charging Operation Information

To get the motor charging operation information, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>49798</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The motor charging operation information is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>49798</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>8</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–0x1F57</td>
<td>8023–8024</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Motor charging operation counter</td>
</tr>
<tr>
<td>0x1F58–0x1F59</td>
<td>8025–8026</td>
<td>s</td>
<td>FLOAT32</td>
<td>–</td>
<td>Motor last charging time after closing</td>
</tr>
</tbody>
</table>
Get Breaker Durability

To get the breaker durability information, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51328</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The breaker durability information is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51328</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>28</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–0x1F57</td>
<td>8023–8024</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Total number of operations (opening operation counter)</td>
</tr>
<tr>
<td>0x1F58–0x1F59</td>
<td>8025–8026</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Number of operation with load &gt; 0.4 In</td>
</tr>
<tr>
<td>0x1F5A–0x1F5B</td>
<td>8027–8028</td>
<td>–</td>
<td>FLOAT32</td>
<td>0-1</td>
<td>Breaker remaining service life ratio:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = End of typical service life of the breaker</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Breaker is new</td>
</tr>
<tr>
<td>0x1F5C–0x1F63</td>
<td>8029–8036</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Get Operating Times

To get the operating time information, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51329</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The operating time information is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51329</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>8</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–0x1F57</td>
<td>8023–8024</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Time of use</td>
</tr>
<tr>
<td>0x1F58–0x1F59</td>
<td>8025–8026</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Operating time with load</td>
</tr>
</tbody>
</table>
Measurement Settings Set Commands

List of Commands

The following table lists the measurement settings set commands, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set power flow sign configuration (see page 159)</td>
<td>47240</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set power factor sign convention (see page 159)</td>
<td>47241</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set energy accumulation mode (see page 159)</td>
<td>47242</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set current demand configuration (see page 160)</td>
<td>47243</td>
<td>Administrator</td>
</tr>
<tr>
<td>Set power demand configuration (see page 160)</td>
<td>47244</td>
<td>Administrator</td>
</tr>
</tbody>
</table>

Set Power Flow Sign Configuration

To set the power flow sign configuration, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>47240</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0xF44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Power sign</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Direct or P+ = the active power flows from upstream (top) to downstream (bottom) (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Inverted or P– = the active power flows from downstream (bottom) to upstream (top)</td>
</tr>
</tbody>
</table>

Set Power Factor Sign Convention

To set the power factor sign convention, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>47241</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0xF44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0, 2</td>
<td>Power factor sign convention</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = IEC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = IEEE (factory setting)</td>
</tr>
</tbody>
</table>

Set Energy Accumulation Mode

To set the energy accumulation mode, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>47242</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
</tbody>
</table>
Set Current Demand Configuration

To set the current demand configuration, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
</tbody>
</table>
| 0x1F45 | 8006 | – | INT16U | 0–1 | Energy accumulation mode:  
  ● 0 = Absolute (factory setting)  
  ● 1 = Signed |

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x1F45 | 8006 | – | INT16U | 0–1 | Energy accumulation mode:  
  ● 0 = Absolute (factory setting)  
  ● 1 = Signed |

Set Power Demand Configuration

To set the power demand configuration, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>47243</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>min</td>
<td>INT16U</td>
<td>1–60</td>
<td>Current demand calculation interval time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>47244</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
</tbody>
</table>
| 0x1F45 | 8006 | – | INT16U | 0 | Power demand calculation method:  
  ● 0 = sliding window |
| 0x1F46 | 8007 | min | INT16U | 1–60 | Power demand calculation interval time |
Circuit Breaker Operation Set Commands

List of Commands

The following table lists the circuit breaker operation set commands, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open circuit breaker</td>
<td>904</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Close circuit breaker</td>
<td>905</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Set close breaker inhibition</td>
<td>910</td>
<td>Administrator or Operator</td>
</tr>
</tbody>
</table>

Open Circuit Breaker

To open the circuit breaker, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>904</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
</tbody>
</table>

NOTE: After use of the open circuit breaker command, check that the circuit breaker is open in register 32001 (see page 70).

Close Circuit Breaker

To close the circuit breaker, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>905</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
</tbody>
</table>

NOTE: After use of the close circuit breaker command, check that the circuit breaker is closed in register 32001 (see page 70).

Set Close Breaker Inhibition

To enable or inhibit the close circuit breaker command, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>910</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>13</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Close breaker inhibited by communication:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Enable close order</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Inhibit close order</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Origin of the command:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = close breaker enable/inhibit command from remote controller using the communication network</td>
</tr>
</tbody>
</table>
Micrologic X Get and Reset Commands

List of Commands

The following table lists the Micrologic X get and reset commands, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get date time (see page 162)</td>
<td>768</td>
<td>No password required</td>
</tr>
<tr>
<td>Reset events (see page 162)</td>
<td>50056</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Get events (see page 162)</td>
<td>50560</td>
<td>No password required</td>
</tr>
<tr>
<td>Get list of all the applications (see page 165)</td>
<td>50816</td>
<td>No password required</td>
</tr>
<tr>
<td>Get application details (see page 165)</td>
<td>50817</td>
<td>No password required</td>
</tr>
</tbody>
</table>

Get Date Time

To get the date and time of the Micrologic X control unit, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>--</td>
<td>INT16U</td>
<td>768</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>--</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>--</td>
<td>INT16U</td>
<td>5376 (0x1500)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>--</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>

The date and time of the Micrologic X control unit is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>--</td>
<td>INT16U</td>
<td>768</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>--</td>
<td>INT16U</td>
<td>--</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>--</td>
<td>INT16U</td>
<td>8</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56–0x1F59</td>
<td>8023–8026</td>
<td>XDATE</td>
<td>--</td>
<td></td>
<td>Current date/time of the source</td>
</tr>
</tbody>
</table>

Reset Events

To reset events, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>--</td>
<td>INT16U</td>
<td>50056</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>--</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>--</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>--</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>0</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
</tbody>
</table>

Get Events

The command allows to get 10 events maximum, logged in one or several event logs. To get more than 10 events, several commands are necessary with the last event sequence number from the previous command.

**NOTE:** Maintain a delay of 1 second between two get events commands.

There are three methods to get events:

- get the 10 last events
- get all events logged after a date
- get all events from an event sequence number

The event sequence number is an event identifier defined by the Micrologic X control unit, and available among the event characteristics.

To monitor the occurrence of the new event, refer to register 655-656  *(see page 106).*
To get events, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>50560</td>
<td>–</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>27</td>
<td>–</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>–</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>–</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>–</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Requested event log book</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 Trip</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Diagnostic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 Metering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 Configuration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7–15 Reserved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>0–2</td>
<td>–</td>
<td>Requested get event method:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Last events</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Events after a date</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = Events from a sequence number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F47–0x1F4A</td>
<td>8008–8011</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Requested event date time (for method 1 only)</td>
</tr>
<tr>
<td>0x1F4B–0x1F4C</td>
<td>8012–8013</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>Requested event sequence number (for method 2 only)</td>
</tr>
<tr>
<td>0x1F4D</td>
<td>8014</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
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<td>Requested event severity</td>
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<td></td>
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<td></td>
<td>0–7 Reserved</td>
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<td></td>
<td>8 Low</td>
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<tr>
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<td></td>
<td>9 Medium</td>
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<td></td>
<td>10 High</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15 Reserved</td>
<td></td>
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</table>

Events are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>50560</td>
<td>–</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56</td>
<td>8023</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Responded event log book</td>
</tr>
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<td>0 Trip</td>
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<td>1 Protection</td>
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<td>2 Diagnostic</td>
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<td>3 Metering</td>
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<td>4 Configuration</td>
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<td>5 Operation</td>
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<td>6 Communication</td>
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<td>INT16U</td>
<td>0–2</td>
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<td>Responded get event method:</td>
</tr>
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<td>● 0 = Last events</td>
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<td>● 1 = Events after a date</td>
<td></td>
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<td>● 2 = Events from a sequence number</td>
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</tr>
<tr>
<td>Address</td>
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<td>Unit</td>
<td>Type</td>
<td>Range</td>
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<td>Description</td>
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<td>-------------</td>
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<td>-------------</td>
<td>-----</td>
<td>----------------------------------------------------------------------------</td>
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<td>0x1F5E</td>
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<td>Responded event severity</td>
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<td>0–7</td>
<td>0–7</td>
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<td>9</td>
<td>Medium</td>
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<td>11–15</td>
<td>11–15</td>
<td>Reserved</td>
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<tr>
<td>0x1F5F</td>
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<td>–</td>
<td>INT16U</td>
<td>0–10</td>
<td>0–10</td>
<td>MSB: Number of events returned</td>
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<td>0–1</td>
<td>0–1</td>
<td>LSB: Remaining events</td>
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<td>• 0 = No more events to get</td>
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<td>• 1 = More events to get</td>
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<td>INT16U</td>
<td>1013–25630</td>
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<td>First event code <em>(see page 249)</em></td>
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<td>DATETIME</td>
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<td>–</td>
<td>Timestamp quality of the first event</td>
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<td>MSB: First event status</td>
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<td>LSB: Reserved</td>
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<td>Trip</td>
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<td>Metering</td>
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<td>Configuration</td>
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<td>5</td>
<td>Operation</td>
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<td>6</td>
<td>6</td>
<td>Communication</td>
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<td>7–15</td>
<td>7–15</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F6A</td>
<td>8043</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>First event severity</td>
</tr>
<tr>
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<td>0–7</td>
<td>0–7</td>
<td>Reserved</td>
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<td>Low</td>
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<td>9</td>
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<td>Medium</td>
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<td>10</td>
<td>10</td>
<td>High</td>
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<td>11–15</td>
<td>11–15</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F6B–0x1F75</td>
<td>8044–8054</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 2 (same as event 1)</td>
</tr>
<tr>
<td>0x1F76–0x1F80</td>
<td>8055–8065</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 3 (same as event 1)</td>
</tr>
<tr>
<td>0x1F81–0x1F8B</td>
<td>8066–8076</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 4 (same as event 1)</td>
</tr>
<tr>
<td>0x1F8C–0x1F96</td>
<td>8077–8087</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 5 (same as event 1)</td>
</tr>
<tr>
<td>0x1F97–0x1FA1</td>
<td>8088–8098</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 6 (same as event 1)</td>
</tr>
<tr>
<td>0x1FA2–0x1FAC</td>
<td>8099–8109</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 7 (same as event 1)</td>
</tr>
<tr>
<td>0x1FAD–0x1FB7</td>
<td>8110–8120</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 8 (same as event 1)</td>
</tr>
<tr>
<td>0x1FB8–0x1FC2</td>
<td>8121–8131</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 9 (same as event 1)</td>
</tr>
<tr>
<td>0x1FC3–0x1FCD</td>
<td>8132–8142</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 10 (same as event 1)</td>
</tr>
</tbody>
</table>
### Get List of all the Applications

To get the list of applications of the Micrologic X control unit, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>50816</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>All applications</td>
</tr>
</tbody>
</table>

The list of applications of the Micrologic X control unit is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>50816</td>
<td>Last command code</td>
</tr>
</tbody>
</table>
| 0x1F54   | 8021     | –    | INT16U | –     | Command status:  
  0 = Successful command  
  Other value = command with error (see page 53) |
| 0x1F55   | 8022     | –    | INT16U | –     | Number of bytes returned                                |
| 0x1F56   | 8023     | –    | INT16U | 0     | All applications                                       |
| 0x1F57   | 8024     | –    | INT16U | 0–4   | Number of apps returned                                |
| 0x1F58   | 8025     | –    | INT16U | 1–11  | First application firmware identifier entry:  
  1 = WFC trip oriented  
  2 = Energy per phase  
  3 = Harmonic ranks  
  4 = Assistance to power restoration  
  5 = Assistance to recloser  
  6 = 27/59 voltage based protection  
  7 = 32P reverse power protection  
  8 = Ground-fault/Earth-leakage alarm  
  9 = ERMS protection  
  10 = Legacy dataset  
  11 = Frequency based protection |
| 0x1F59   | 8026     | –    | INT16U | 1–10  | Second application firmware identifier entry           |
| 0x1F5A   | 8027     | –    | INT16U | 1–10  | Third application firmware identifier entry             |
| 0x1F5B   | 8028     | –    | INT16U | 1–10  | Fourth application firmware identifier entry            |

### Get Application Details

To get the application details of the Micrologic X control unit, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>50817</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>12</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
</tbody>
</table>
The application details of the Micrologic X control unit is returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>1–11</td>
<td>Requested apps entry:</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>● 1 = WFC trip oriented</td>
</tr>
<tr>
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<td></td>
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<td>● 2 = Energy per phase</td>
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<td></td>
<td>● 3 = Harmonic ranks</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>● 4 = Assistance to power restoration</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>● 5 = Assistance to recloser</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td>● 6 = 27/59 voltage based protection</td>
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<td>● 7 = 32P reverse power protection</td>
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<td></td>
<td></td>
<td>● 8 = Ground-fault/Earth-leakage alarm</td>
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<td>● 9 = ERMS protection</td>
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<td>● 10 = Legacy dataset</td>
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<td></td>
<td>● 11 = Frequency based protection</td>
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</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>50817</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>124</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56</td>
<td>8023</td>
<td>–</td>
<td>INT16U</td>
<td>1–11</td>
<td>Responded apps entry:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = WFC trip oriented</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = Energy per phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = Harmonic ranks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 4 = Assistance to power restoration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 5 = Assistance to recloser</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 6 = 27/59 voltage based protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 7 = 32P reverse power protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 8 = Ground-fault/Earth-leakage alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 9 = ERMS protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 10 = Legacy dataset</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 11 = Frequency based protection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F57–0x1F5E</td>
<td>8024–8031</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Apps product code (commercial reference)</td>
</tr>
<tr>
<td>0x1F5F–0x1F66</td>
<td>8032–8071</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Application model name</td>
</tr>
<tr>
<td>0x1F67–0x1F6C</td>
<td>8072–8077</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Application firmware revision</td>
</tr>
<tr>
<td>0x1F6D</td>
<td>8078</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F6E</td>
<td>8079</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Application license type</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = No license installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Temporary license installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = Permanent license installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Application activation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = On</td>
</tr>
<tr>
<td>0x1F6F</td>
<td>8080</td>
<td>Days</td>
<td>INT16U</td>
<td>0–65534</td>
<td>Application license remaining days (only for temporary license installed)</td>
</tr>
<tr>
<td>0x1F90–0x1F93</td>
<td>8081–8084</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
Section 4.3
Micrologic Control Unit Protection Commands with Session

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Commands with Session</td>
<td>168</td>
</tr>
<tr>
<td>List of Micrologic Control Unit Protection Commands with Session and Error Codes</td>
<td>170</td>
</tr>
<tr>
<td>Session Management Commands</td>
<td>171</td>
</tr>
<tr>
<td>Protection Submit Commands</td>
<td>173</td>
</tr>
<tr>
<td>Protection Get Commands with Session</td>
<td>177</td>
</tr>
</tbody>
</table>
Description of Commands with Session

Presentation

The procedure for setting a protection setting conforms to UL489SE standard. It is safeguarded by an exclusive editing session and by a two-step procedure for submitting and applying setting changes.

The exclusive editing session means that only one interface at a time can access and set protection settings. Access from other interfaces is blocked when an editing session is open.

During the editing session there is no impact on the active protection provided by the Micrologic X control unit until the new settings are applied. If the new settings are canceled, or the editing session times out before the new settings are applied, the active settings are maintained.

Enabling and Disabling Access to Protection Settings

You can enable or disable access to the protection settings by using the Micrologic X display screen at Home → Configuration → General → Lock protection.

From the Lock protection screen of the Micrologic X control unit, you can allow changes to the protection settings from the following interfaces:

- Keypad: Micrologic X display screen keypad itself
- External access: EcoStruxure Power Commission software, EcoStruxure Power Device app, and communication network

For each interface:

- Set as Allowed (factory setting) to enable changes to be made.
- Set as Not Allowed to disable changes.

Editing Session for Selecting and Changing Protection Settings

An editing session has the following characteristics:

- Only one editing session at a time can be open. Access to protection settings from other interfaces is blocked when you open an editing session.
- There is a five-minute timeout for submitting and for applying new settings. The session times out as follows:
  - Five minutes after the session opens, if you do not submit the new settings
  - Five minutes after submitting the new settings, if you do not apply the new settings
- After applying new settings, get the apply setting status to check that the new protection settings are applied. Once apply is completed, close the session.
- When setting protection using the communication network, several protection functions of the same setting group can be set in one editing session, with a submit step after changing each function and one apply step to apply all the new settings. Active settings are maintained until the apply step is executed.
- The earth-leakage protection and the neutral protection can be set with the other protections of setting group A or setting group B.
- The protection settings activated when the ERMS function is engaged cannot be set by using the communication network. The ERMS settings can be set only as follows:
  - with EcoStruxure Power Commission software through a USB connection (password-protected)
  - with the EcoStruxure Power Device app (password-protected)

Two-Step Procedure for Submitting and Applying Protection Settings

The procedure for changing protection settings requires you to submit and apply the new settings in two consecutive steps:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Submit new settings</td>
</tr>
<tr>
<td>2</td>
<td>Apply new settings</td>
</tr>
</tbody>
</table>

Protection Setting Procedure with Session

To set protection settings by using the communication network, external access to protection settings must be allowed by using the Micrologic X display screen (see page 168).

The following example shows how to set the long-time overcurrent protection setting group A:
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open the editing session with the open setup session command <em>(see page 171)</em>. <strong>Result:</strong> The session key for the editing session is returned to the command registers. The returned session key must be used in all commands during the session.</td>
</tr>
<tr>
<td>2</td>
<td>Submit the new protection settings with the submit long time over current protection settings command <em>(see page 173)</em>. The requested session key for the command must be the session key returned by the open setup session command.</td>
</tr>
<tr>
<td>3</td>
<td>Use the Get long time over current protection settings command <em>(see page 177)</em> to read the submitted settings. The requested session key for the command must be the session key returned by the open setup session command.</td>
</tr>
</tbody>
</table>
| 4    | Check that the protection settings submitted at step 2 and the protection settings got at step 3 are identical:  
  - If the settings are identical, go to step 5  
  - If the settings are not identical, go to step 7 and start the setting procedure again |
| 5    | Apply submitted protection settings with the apply settings command *(see page 171)*. The requested session key for the command must be the session key returned by the open setup session command. |
| 6    | Use the Get apply setting status *(see page 171)* to check that the new protection settings are applied. **NOTE:** If the settings of other protection functions must be changed or if the settings of protection functions of another setting group must be changed, restart the setting procedure at step 2 for each protection function. |
| 7    | Close the editing session with the close setup session command *(see page 172)*. The requested session key for the command must be the session key returned by the open setup session command. |
List of Micrologic Control Unit Protection Commands with Session and Error Codes

List of Commands

The Micrologic control unit protection commands with session are performed by the command interface (see page 51). They are grouped by their functions and types:
- Session management commands (see page 171)
- Protection submit commands (see page 173)
- Protection get commands with session (see page 177)

In the Micrologic control unit registers:
- RC indicates the registers that can be read by a get command
- WC indicates the registers that can be written by a set and reset command

Error Codes

Error codes generated by Micrologic control units are the generic error codes (see page 53).
Session Management Commands

List of Commands

The following table lists the commands necessary to manage the editing session of the setting protection function in accordance with UL489SE standard, their corresponding command codes and user profiles.

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open setup session</td>
<td>1930</td>
<td>Administrator</td>
</tr>
<tr>
<td>Apply settings</td>
<td>1932</td>
<td>Administrator</td>
</tr>
<tr>
<td>Get apply setting status</td>
<td>1924</td>
<td>No password required</td>
</tr>
<tr>
<td>Close setup session</td>
<td>1933</td>
<td>Administrator</td>
</tr>
</tbody>
</table>

Open Setup Session

To open setup session, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1930</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
</tbody>
</table>

The session key for the editing session is returned to the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>1930</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Other value = Command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>4</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F42–0x1F43</td>
<td>8023–8024</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Session key for the command</td>
</tr>
</tbody>
</table>

Apply Settings

To apply settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1932</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>Destination of the command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0x1501)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Requested session key for the command</td>
</tr>
</tbody>
</table>

Get Apply Setting Status

To get apply setting status, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1924</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
</tbody>
</table>
The apply setting status is returned to the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43−0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45−0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Requested session key for the command</td>
</tr>
</tbody>
</table>

**Close Setup Session**

To close setup session, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1933</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43−0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45−0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Requested session key for the command</td>
</tr>
</tbody>
</table>
Protection Submit Commands

List of Commands

The following table lists the protection submit commands, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit long time over current protection settings (see page 173)</td>
<td>51593</td>
<td>Administrator</td>
</tr>
<tr>
<td>Submit short time over current protection settings (see page 173)</td>
<td>51594</td>
<td>Administrator</td>
</tr>
<tr>
<td>Submit instantaneous protection settings (see page 174)</td>
<td>51595</td>
<td>Administrator</td>
</tr>
<tr>
<td>Submit ground fault protection settings (see page 175)</td>
<td>51596</td>
<td>Administrator</td>
</tr>
<tr>
<td>Submit earth leakage protection settings (see page 176)</td>
<td>51597</td>
<td>Administrator</td>
</tr>
<tr>
<td>Submit neutral protection settings (see page 176)</td>
<td>51598</td>
<td>Administrator</td>
</tr>
</tbody>
</table>

Submit Long Time Over Current Protection Settings

To get the long time over current protection settings, use the get long time over current protection setting command (see page 177).

**WARNING**

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP

Protection setting adjustments must be done only by qualified electrical personnel.

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

To submit the long time over current protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51593</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>26</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004-8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006-8007</td>
<td>INT32U</td>
<td>0-4294967294</td>
<td>Requested session key for the command</td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = Setting group B</td>
</tr>
<tr>
<td>0x1F48</td>
<td>8009</td>
<td>–</td>
<td>–</td>
<td>0xFFF0</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F49–0x1F4A</td>
<td>8010–8011</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Long time over current protection threshold setting group A or B (step 0.1 A)</td>
</tr>
<tr>
<td>0x1F4B–0x1F4C</td>
<td>8012–8013</td>
<td>s</td>
<td>FLOAT32</td>
<td>0.5-24.0 (step 0.5)</td>
<td>Long time over current protection time delay setting group A or B</td>
</tr>
</tbody>
</table>

Submit Short Time Over Current Protection Settings

To get the short time over current protection settings, use the get short time over current protection settings command (see page 178).

**WARNING**

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP

Protection setting adjustments must be done only by qualified electrical personnel.

Failure to follow these instructions can result in death, serious injury, or equipment damage.
To submit the short time over current protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51594</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>26</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004-8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006-8007</td>
<td>–</td>
<td>INT32U</td>
<td>0-4294967294</td>
<td>Requested session key for the command</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td>0x1F48</td>
<td>8009</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Short time over current protection curve setting group A or B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Definite time (I^2t = Off)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Inverse time (I^2t = On)</td>
</tr>
<tr>
<td>0x1F49–0x1F4A</td>
<td>8010–8011</td>
<td>–</td>
<td>FLOAT32</td>
<td>1.5–10.0 (step 0.1)</td>
<td>Short time over current protection threshold coefficient setting group A or B</td>
</tr>
<tr>
<td>0x1F4B–0x1F4C</td>
<td>8012–8013</td>
<td>s</td>
<td>FLOAT32</td>
<td>0–0.4 (step0.1)</td>
<td>Short time over current protection time delay setting group A or B</td>
</tr>
</tbody>
</table>

Submit Instantaneous Protection Settings

To get the instantaneous protection, use the get instantaneous protection settings command (see page 179).

⚠️ WARNING

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP

Protection setting adjustments must be done only by qualified electrical personnel.

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

To submit the instantaneous protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51595</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>22</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004-8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006-8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Requested session key for the command</td>
</tr>
</tbody>
</table>

(1) Ii setting range:
- for Micrologic 5.0 X, 6.0 X and 7.0 X: 2.0 to 15.0 (step 0.1)
- for Micrologic 3.0 X: 2.0 to 12.0 (step 0.1)
Submit Ground Fault Protection Settings

To get the ground fault protection settings, use the get ground fault protection settings command (see page 180).

⚠️ WARNING

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP

Protection setting adjustments must be done only by qualified electrical personnel.

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

To submit the ground fault protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51596</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>26</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377</td>
<td>(0x1501) Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
<td></td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Requested session key for the command</td>
</tr>
</tbody>
</table>
| 0x1F47  | 8008     | –    | INT16U | –     | MSB: Ground fault protection mode (1)  
0 = Off (protection disabled)  
1 = On (protection enabled)  
LSB: Requested setting group  
1 = Setting group A  
2 = Setting group B |
| 0x1F48  | 8009     | –    | INT16U | –     | MSB: 0  
LSB: Short time over current protection curve setting group A or B  
0 = Definite time (I2t = Off)  
1 = Inverse time (I2t = On) |
| 0x1F49–0x1F4A | 8010–8011 | A | FLOAT32 | – | Ground fault protection threshold setting group A or B (step 10 A) |
| 0x1F4B–0x1F4C | 8012–8013 | s | FLOAT32 | 0–0.4 (step 0.1) | Ground fault protection time delay setting group A or B |

(1) On Micrologic 6.0 X for UL standard, the ground fault protection mode is always On. In case of setting the ground fault protection mode to Off, the result of the command will be 0x10, Input argument is out of range.
Submit Earth Leakage Protection Settings

To get the earth leakage protection settings, use the get earth leakage protection settings command (see page 181).

⚠️ WARNING

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP

Protection setting adjustments must be done only by qualified electrical personnel.

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

To submit the earth leakage protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51597</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>24</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–429496729 4</td>
<td>Requested session key for the command</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>–</td>
<td>0xFFFF</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F48-0x1F49</td>
<td>8009–8010</td>
<td>A</td>
<td>FLOAT32</td>
<td>0.5–30.0 (step 0.1)</td>
<td>Earth leakage protection threshold</td>
</tr>
<tr>
<td>0x1F4A-0x1F4B</td>
<td>8011–8012</td>
<td>s</td>
<td>FLOAT32</td>
<td>0.06, 0.15, 0.23, 0.35, 0.80</td>
<td>Earth leakage protection time delay</td>
</tr>
</tbody>
</table>

Submit Neutral Protection Settings

To get the neutral protection settings, use the get neutral protection settings command (see page 182).

⚠️ WARNING

HAZARD OF NUISANCE TRIPPING OR FAILURE TO TRIP

Protection setting adjustments must be done only by qualified electrical personnel.

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

To submit the neutral protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51598</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>16</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator user profile password</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Requested session key for the command</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>0–3</td>
<td>Neutral protection type:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = Oversized</td>
</tr>
</tbody>
</table>
Protection Get Commands with Session

List of Commands

The following table lists the protection get commands with session, their corresponding command codes, and user profiles:

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get long time over current protection settings (see page 177)</td>
<td>51584</td>
<td>No password required</td>
</tr>
<tr>
<td>Get short time over current protection settings (see page 178)</td>
<td>51585</td>
<td>No password required</td>
</tr>
<tr>
<td>Get instantaneous protection settings (see page 179)</td>
<td>51586</td>
<td>No password required</td>
</tr>
<tr>
<td>Get ground fault protection settings (see page 180)</td>
<td>51587</td>
<td>No password required</td>
</tr>
<tr>
<td>Get earth leakage protection settings (see page 181)</td>
<td>51588</td>
<td>No password required</td>
</tr>
<tr>
<td>Get neutral protection settings (see page 182)</td>
<td>51589</td>
<td>No password required</td>
</tr>
</tbody>
</table>

Get Long Time Over Current Protection Settings

To get the long time over current protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51584</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>16</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Current setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
</tbody>
</table>

The long time over current protection settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51584</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>56</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56-0x1F57</td>
<td>8023–8024</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
<td></td>
</tr>
<tr>
<td>0x1F58</td>
<td>8025</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Current setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Responded setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>128 = Fallback setting</td>
</tr>
<tr>
<td>0x1F59</td>
<td>8026</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Long time over current protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = On (tripping)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Long time over current protection supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Supported</td>
</tr>
</tbody>
</table>
Get Short Time Over Current Protection Settings

To get the short time over current protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51585</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>16</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>OCTET</td>
<td>STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Current setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
</tbody>
</table>

The short time over current protection settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51585</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>56</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56-0x1F57</td>
<td>8023–8024</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
</tr>
<tr>
<td>0x1F58</td>
<td>8025</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Current setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Responded setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>128 = Fallback setting</td>
</tr>
</tbody>
</table>
Get Instantaneous Protection Settings

To get the instantaneous protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51586</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>16</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
<td></td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The instantaneous protection settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51586</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>44</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56-0x1F57</td>
<td>8023–8024</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
<td></td>
</tr>
</tbody>
</table>
Get Ground Fault Protection Settings

To get the ground fault protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F58</td>
<td>8025</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Requested setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Current setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Responded setting group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Setting group A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Setting group B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Setting group ERMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>128 = Fallback setting</td>
</tr>
<tr>
<td>0x1F59</td>
<td>8026</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Instantaneous over current protection mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = On (tripping)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Instantaneous over current protection function</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Supported</td>
</tr>
<tr>
<td>0x1F5A-0x1F5D</td>
<td>8027-8030</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last change of instantaneous over current protection mode</td>
</tr>
<tr>
<td>0x1F5E</td>
<td>8031</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Timestamp quality of last change of instantaneous over current protection mode</td>
</tr>
<tr>
<td>0x1F5E-0x1F62</td>
<td>8032-8035</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last change of any parameter of the instantaneous over current protection mode</td>
</tr>
<tr>
<td>0x1F63</td>
<td>8036</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Timestamp quality of last change of any parameter of the instantaneous over current protection function</td>
</tr>
<tr>
<td>0x1F64-0x1F65</td>
<td>8037-8038</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Instantaneous over current protection threshold coefficient high limit</td>
</tr>
<tr>
<td>0x1F66-0x1F67</td>
<td>8039-8040</td>
<td>–</td>
<td>FLOAT32</td>
<td>–</td>
<td>Instantaneous over current protection threshold coefficient</td>
</tr>
<tr>
<td>0x1F68</td>
<td>8041</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Instantaneous over current protection time delay mode:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Fast</td>
</tr>
<tr>
<td>0x1F69-0x1F6B</td>
<td>8042-8044</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

The ground fault protection settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51587</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>56</td>
<td>Number of bytes returned</td>
</tr>
</tbody>
</table>
To get the earth leakage protection settings, set the command registers in the following way:

- **Address**: 0x1F56-0x1F57
- **Register**: 8023–8024
- **Unit**: INT32U
- **Type**: 0–4294967294
- **Range**: Key for the protection get command with session

- **Address**: 0x1F58
- **Register**: 8025
- **Unit**: INT16U
- **Type**: MSB: Requested setting group
- **Range**: 0 = Current setting group
- **Type**: 1 = Setting group A
- **Range**: 2 = Setting group B
- **Type**: 3 = Setting group ERMS
- **Range**: LSB: Responded setting group
- **Range**: 0 = Not supported
- **Type**: 1 = Supported

- **Address**: 0x1F59
- **Register**: 8026
- **Unit**: INT16U
- **Type**: MSB: Ground fault protection mode
- **Range**: 0 = Off
- **Type**: 1 = On (tripping)
- **Range**: LSB: Ground fault protection function supported
- **Range**: 0 = Not supported
- **Type**: 1 = Supported

- **Address**: 0x1F5A-0x1F5D
- **Register**: 8027–8030
- **Unit**: DATETIME
- **Type**: Timestamp of last change of ground fault protection mode

- **Address**: 0x1F5E
- **Register**: 8031
- **Unit**: INT16U
- **Type**: Timestamp quality of last change of ground fault protection mode

- **Address**: 0x1F5F-0x1F62
- **Register**: 8032–8035
- **Unit**: DATETIME
- **Type**: Timestamp of last change of any parameter of the ground fault protection function

- **Address**: 0x1F63
- **Register**: 8036
- **Unit**: INT16U
- **Type**: Timestamp quality of last change of any parameter of the ground fault protection function

- **Address**: 0x1F64-0x1F65
- **Register**: 8037–8038
- **Unit**: FLOAT32
- **Type**: Ground fault protection threshold coefficient high limit

- **Address**: 0x1F66-0x1F67
- **Register**: 8039–8040
- **Unit**: FLOAT32
- **Type**: Ground fault protection time delay high limit

- **Address**: 0x1F68
- **Register**: 8041
- **Unit**: INT16U
- **Type**: MSB: 0
- **Range**: LSB: Ground fault protection curve
- **Range**: 0 = Definite time (I²t = OFF)
- **Type**: 1 = Inverse time (I²t = ON)

- **Address**: 0x1F69-0x1F6A
- **Register**: 8042–8043
- **Unit**: FLOAT32
- **Type**: Ground fault protection threshold

- **Address**: 0x1F6B-0x1F6C
- **Register**: 8044–8045
- **Unit**: FLOAT32
- **Type**: Ground fault protection time delay

- **Address**: 0x1F6D-0x1F71
- **Register**: 8046–8050
- **Unit**: –
- **Type**: –
- **Range**: Reserved

### Get Earth Leakage Protection Settings

To get the earth leakage protection settings, set the command registers in the following way:

- **Address**: 0x1F3F
- **Register**: 8000
- **Unit**: INT16U
- **Type**: 51588
- **Range**: Requested command code

- **Address**: 0x1F40
- **Register**: 8001
- **Unit**: INT16U
- **Type**: 16
- **Range**: Number of parameters of the command

- **Address**: 0x1F41
- **Register**: 8002
- **Unit**: INT16U
- **Type**: 5377 (0x1501)
- **Range**: Destination of the command

- **Address**: 0x1F42
- **Register**: 8003
- **Unit**: INT16U
- **Type**: 0
- **Range**: Security type of the command

- **Address**: 0x1F43-0x1F44
- **Register**: 8004–8005
- **Unit**: OCTET STRING
- **Type**: 0
- **Range**: Password of the command = 0 (no password required)

- **Address**: 0x1F45-0x1F46
- **Register**: 8006–8007
- **Unit**: INT32U
- **Type**: 0–4294967294
- **Range**: Key for the protection get command with session

- **Address**: 0x1F47
- **Register**: 8008
- **Unit**: –
- **Type**: 0xFFFF
- **Range**: Reserved

The earth leakage protection settings are returned to command registers in the following way:

- **Address**: 0x1F53
- **Register**: 8020
- **Unit**: INT16U
- **Type**: 51588
- **Range**: Last command code

- **Address**: 0x1F54
- **Register**: 8021
- **Unit**: INT16U
- **Type**: –
- **Range**: Command status:
  - 0 = Successful command
  - Other value = command with error (see page 53)

- **Address**: 0x1F55
- **Register**: 8022
- **Unit**: INT16U
- **Type**: 52
- **Range**: Number of bytes returned
Get Neutral Protection Settings

To get the neutral protection settings, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>51589</td>
<td>Requested command code</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>14</td>
<td>Number of parameters of the command</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>5377 (0x1501)</td>
<td>Destination of the command</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45-0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
</tr>
</tbody>
</table>

The neutral protection settings are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>51589</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Command status: &lt;br&gt; 0 = Successful command&lt;br&gt; Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>32</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56-0x1F57</td>
<td>8023–8024</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>Key for the protection get command with session</td>
</tr>
<tr>
<td>0x1F58</td>
<td>8025</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Neutral protection mode&lt;br&gt; 0 = Off&lt;br&gt; 1 = On&lt;br&gt; LSB: Neutral protection function supported&lt;br&gt; 0 = Not supported&lt;br&gt; 1 = Supported</td>
</tr>
<tr>
<td>0x1F59-0x1F5C</td>
<td>8026–8029</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last change of neutral protection mode</td>
</tr>
<tr>
<td>0x1F5D</td>
<td>8030</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Timestamp quality of last change of neutral protection mode</td>
</tr>
<tr>
<td>0x1F5E-0x1F61</td>
<td>8031–8034</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of last change of any parameter of the neutral protection function</td>
</tr>
<tr>
<td>Address</td>
<td>Register</td>
<td>Unit</td>
<td>Type</td>
<td>Range</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>0x1F62</td>
<td>8035</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Timestamp quality of last change of any parameter of the neutral protection function</td>
</tr>
<tr>
<td>0x1F63</td>
<td>8036</td>
<td>–</td>
<td>INT16U</td>
<td>0–3</td>
<td>MSB: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Neutral protection type</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = Oversized</td>
</tr>
<tr>
<td>0x1F64-0x1F65</td>
<td>8037–8038</td>
<td>A</td>
<td>FLOAT32</td>
<td>–</td>
<td>Long time over current protection threshold</td>
</tr>
</tbody>
</table>
Chapter 5
IO Module Data for Masterpact MTZ Circuit Breakers

IO Module User Guides

For more information about the IO module functions, refer to Enerlin'X IO - Input/Output Application Module for One Circuit Breaker (see page 10).

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<td>203</td>
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<td>IO Module Commands</td>
<td>209</td>
</tr>
</tbody>
</table>
Section 5.1
IO Module Registers

Introduction
This section describes the IO module registers.

- Registers 13824 to 15719 are held by the IO 1.
- Registers 16824 to 18719 are held by the IO 2:
  - The registers of the parameters of IO 2 are equal to the registers of the parameters of IO 1 plus 3000.
    - **Example:**
      - Register 14599 holds the digital input status register of the IO 1.
      - Register 17599 holds the digital input status register of the IO 2.
  - The order of the registers is the same as that of the IO 1.
  - The characteristics (access type, size, range, and unit) are the same as those of the registers of IO 1.
  - Registers 15360 to 16109 containing the predefined application are specific to the IO 1 because they hold the predefined applications.

What Is in This Section?
This section contains the following topics:

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<th>Topic</th>
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<td>Hardware Setting</td>
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<td>Digital Input and Output Status</td>
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<tr>
<td>IO Module Identification</td>
<td>195</td>
</tr>
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<td>Alarm Status</td>
<td>197</td>
</tr>
<tr>
<td>Applications</td>
<td>200</td>
</tr>
</tbody>
</table>
Analog Inputs

Analogue Input Register Mapping

The following table describes the analogue inputs and corresponding registers and addresses of the IO module.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Analog Input Addresses</th>
<th>Analog Input Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>0x35FF–0x3668</td>
<td>13824–13929</td>
</tr>
<tr>
<td>IO 2</td>
<td>0x41B7–0x4220</td>
<td>16824–16929</td>
</tr>
</tbody>
</table>

Analogue Input Registers of IO 1

The order and the description of the analogue input registers of IO 2 are the same as those of IO 1.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x35FF–0x3600</td>
<td>13824–13825</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x3601–0x3602</td>
<td>13826–13827</td>
<td>R</td>
<td>°C</td>
<td>FLOAT32</td>
<td>-50–250</td>
<td>Analog input sensor Pt100 temperature value (updated once every 1 s)</td>
</tr>
</tbody>
</table>
| 0x3603 | 13828 | R | – | INT16U | 0–1 | Data quality of the analog input  
  0 = Valid  
  1 = Invalid |
| 0x3604 | 13829 | – | – | – | – | Reserved |
| 0x3605–0x3608 | 13830–13833 | R | – | DATETIME | – | Timestamp of the last change of +/- 1 °C of the analog data value |
| 0x3609–0x360C | 13834–13837 | – | – | – | – | Reserved |
| 0x360D–0x360E | 13838–13839 | R | °C | FLOAT32 | -50–250 | Analog input Pt100 maximum value |
| 0x3610 | 13840–13841 | R | °C | FLOAT32 | -50–250 | Analog input Pt100 minimum value |
| 0x3611–0x3614 | 13842–13845 | R | – | DATETIME | – | Timestamp of minimum value of analog input value recorded |
| 0x3615–0x3618 | 13846–13849 | R | – | DATETIME | – | Timestamp of maximum value of analog input value recorded |
| 0x3619–0x361C | 13850–13853 | R | – | DATETIME | – | Timestamp of last reset of min/max values of analog input value recorded |
| 0x361D–0x361E | 13854–13855 | R | – | INT32U | 0–65534 | Switchboard temperature threshold 1 counter  
  This counter increments every time threshold 1 is exceeded. |
| 0x361F–0x3620 | 13856–13857 | R | – | INT32U | 0–65534 | Switchboard temperature threshold 2 counter  
  This counter increments every time threshold 2 is exceeded. |
| 0x3621–0x3622 | 13858–13859 | R | – | INT32U | 0–65534 | Switchboard temperature threshold 3 counter  
  This counter increments every time threshold 3 is exceeded. |
| 0x3623–0x363A | 13860–13883 | R | – | OCTET STRING | – | Analog input identification coded over 45 ASCII characters \(^{(1)}\) |
| 0x363B | 13884 | R | – | INT16U | 0–2 | Analog input type \(^{(1)}\)  
  0 = Analog input is not valid (factory setting)  
  1 = Not applicable  
  2 = Pt100 |
| 0x363C | 13885 | – | – | – | – | Reserved |
| 0x363D–0x363E | 13886–13887 | R | °C | FLOAT32 | -50–250 | Switchboard temperature threshold 1 pick-up value (Pt100) \(^{(1)}\)  
  Factory setting = 50 °C |
| 0x363F–0x3640 | 13888–13889 | R | s | FLOAT32 | 1–3600 | Switchboard temperature threshold 1 pick-up time delay (Pt100) \(^{(1)}\)  
  Factory setting = 10 s |
| 0x3641–0x3642 | 13890–13891 | R | °C | FLOAT32 | -50–250 | Switchboard temperature threshold 1 drop-out value (Pt100) \(^{(1)}\)  
  Factory setting = 45 °C |

\(^{(1)}\) Value set using the EcoStruxure Power Commission software.
<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3643–0x3644</td>
<td>13892–13893</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>1–3600</td>
<td>Switchboard temperature threshold 1 drop-out time delay (Pt100)(1) Factory setting = 10 s</td>
</tr>
<tr>
<td>0x3645–0x3646</td>
<td>13894–13895</td>
<td>R</td>
<td>°C</td>
<td>FLOAT32</td>
<td>-50–250</td>
<td>Switchboard temperature threshold 2 pick-up value (Pt100)(1) Factory setting = 60 °C</td>
</tr>
<tr>
<td>0x3647–0x3648</td>
<td>13896–13897</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>1–3600</td>
<td>Switchboard temperature threshold 2 pick-up time delay (Pt100)(1) Factory setting = 10 s</td>
</tr>
<tr>
<td>0x3649–0x364A</td>
<td>13898–13899</td>
<td>R</td>
<td>°C</td>
<td>FLOAT32</td>
<td>-50–250</td>
<td>Switchboard temperature threshold 2 drop-out value (Pt100)(1) Factory setting = 55 °C</td>
</tr>
<tr>
<td>0x364B–0x364C</td>
<td>13900–13901</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>1–3600</td>
<td>Switchboard temperature threshold 2 drop-out time delay (Pt100)(1) Factory setting = 10 s</td>
</tr>
<tr>
<td>0x364D–0x364E</td>
<td>13902–13903</td>
<td>R</td>
<td>°C</td>
<td>FLOAT32</td>
<td>-50–250</td>
<td>Switchboard temperature threshold 3 pick-up value (Pt100)(1) Factory setting = 70 °C</td>
</tr>
<tr>
<td>0x364F–0x3650</td>
<td>13904–13905</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>1–3600</td>
<td>Switchboard temperature threshold 3 pick-up time delay (Pt100)(1) Factory setting = 10 s</td>
</tr>
<tr>
<td>0x3651–0x3652</td>
<td>13906–13907</td>
<td>R</td>
<td>°C</td>
<td>FLOAT32</td>
<td>-50–250</td>
<td>Switchboard temperature threshold 3 drop-out value (Pt100)(1) Factory setting = 65 °C</td>
</tr>
<tr>
<td>0x3653–0x3654</td>
<td>13908–13909</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>1–3600</td>
<td>Switchboard temperature threshold 3 drop-out time delay (Pt100)(1) Factory setting = 10 s</td>
</tr>
<tr>
<td>0x3655–0x3656</td>
<td>13910–13911</td>
<td>R</td>
<td>Ω</td>
<td>FLOAT32</td>
<td>200–650</td>
<td>Motor temperature sensor fault threshold</td>
</tr>
<tr>
<td>0x3657–0x3668</td>
<td>13912–13929</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Value set using the EcoStruxure Power Commission software.
Digital Inputs

Digital Input Register Mapping

Each digital input description is made up of 80 registers. The order and the description of the digital inputs 2, 3, 4, 5, and 6 are the same as those of digital input 1.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Digital Input Number</th>
<th>Digital Input Addresses</th>
<th>Digital Input Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>I1</td>
<td>0x3669–0x36B8</td>
<td>13930–14009</td>
</tr>
<tr>
<td></td>
<td>I2</td>
<td>0x36B9–0x3708</td>
<td>14010–14089</td>
</tr>
<tr>
<td></td>
<td>I3</td>
<td>0x3709–0x3758</td>
<td>14090–14169</td>
</tr>
<tr>
<td></td>
<td>I4</td>
<td>0x3759–0x37A8</td>
<td>14170–14249</td>
</tr>
<tr>
<td></td>
<td>I5</td>
<td>0x37A9–0x37F8</td>
<td>14250–14329</td>
</tr>
<tr>
<td></td>
<td>I6</td>
<td>0x37F9–0x3848</td>
<td>14330–14409</td>
</tr>
<tr>
<td>IO 2</td>
<td>I1</td>
<td>0x4221–0x4270</td>
<td>16930–17009</td>
</tr>
<tr>
<td></td>
<td>I2</td>
<td>0x4271–0x42C0</td>
<td>17010–17089</td>
</tr>
<tr>
<td></td>
<td>I3</td>
<td>0x42C1–0x4310</td>
<td>17090–17169</td>
</tr>
<tr>
<td></td>
<td>I4</td>
<td>0x4311–0x4360</td>
<td>17170–17249</td>
</tr>
<tr>
<td></td>
<td>I5</td>
<td>0x4361–0x43B0</td>
<td>17250–17329</td>
</tr>
<tr>
<td></td>
<td>I6</td>
<td>0x43B1–0x4400</td>
<td>17330–17409</td>
</tr>
</tbody>
</table>

Digital Input 1 Registers of IO 1

The order and the description of the digital input 1 registers of IO 2 are the same as those of IO 1:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3669</td>
<td>13930</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 13931:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Valid</td>
</tr>
<tr>
<td>0x366A</td>
<td>13931</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0</td>
<td>Digital input status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = On</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Digital input forced status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>● 0 = Unforced</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Forced</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2–15 Reserved</td>
<td></td>
</tr>
<tr>
<td>0x366B–0x366E</td>
<td>13932–13935</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp for the last input transition:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Last rising edge if input is configured as NO (normally open contact)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● Last falling edge if input is configured as NC (normally closed contact)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Valid if input signal type is a normal digital input (not valid for pulse digital input).</td>
</tr>
<tr>
<td>0x366F–0x3670</td>
<td>13936–13937</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x3671–0x3672</td>
<td>13938–13939</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>–</td>
<td>Input counter value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This counter increments for each rising edge of the input</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Valid if input signal type is normal digital input.</td>
</tr>
<tr>
<td>0x3673–0x3676</td>
<td>13940–13943</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp for the last input change counter preset/reset</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Valid if input signal type is normal digital input.</td>
</tr>
</tbody>
</table>

(1) Value set by using the EcoStruxure Power Commission software.
(2) Examples:
● If each incoming pulse represents 125 kWh, and since consumption data must be expressed in watt-hours, the consumption pulse weight is 125,000.
● If each incoming pulse represents 1 US gallon, and since consumption data must be expressed in cubic meters, the consumption pulse weight is 0.003785.
<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3677–0x3678</td>
<td>13944–13945</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967294</td>
<td>–</td>
<td>Number of pulses received Valid if input signal type is pulse digital input.</td>
</tr>
<tr>
<td>0x3679–0x367C</td>
<td>13946–13949</td>
<td>R</td>
<td>–</td>
<td>INT64</td>
<td>–</td>
<td>–</td>
<td>Resettable value of consumption Value = pulse weight x number of pulses received Valid if input signal type is pulse digital input.</td>
</tr>
<tr>
<td>0x367D–0x3680</td>
<td>13950–13953</td>
<td>R</td>
<td>–</td>
<td>INT64</td>
<td>–</td>
<td>–</td>
<td>Accumulated non-resettable value of consumption Valid if input signal type is pulse digital input.</td>
</tr>
<tr>
<td>0x3681–0x3684</td>
<td>13954–13957</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of last resettable consumption value reset Valid if input signal type is pulse digital input.</td>
</tr>
<tr>
<td>0x3685–0x3686</td>
<td>13958–13959</td>
<td>R</td>
<td>W</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>Power calculation Valid if • Input signal type is pulse digital input • the pulse input is from Energy pulse counter</td>
</tr>
<tr>
<td>0x3687–0x368E</td>
<td>13960–13983</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>–</td>
<td>Digital input identification coded over 45 ASCII characters(1)</td>
</tr>
<tr>
<td>0x368F–0x36A0</td>
<td>13984–13985</td>
<td>R</td>
<td>s</td>
<td>FLOAT32</td>
<td>0.003–1</td>
<td>–</td>
<td>Digital input 1 filter time</td>
</tr>
<tr>
<td>0x36A1</td>
<td>13986</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>–</td>
<td>Input contact type(1) • 0 = NO (normally open contact, factory setting) • 1 = NC (normally close contact)</td>
</tr>
<tr>
<td>0x36A2</td>
<td>13987</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>–</td>
<td>Input signal type(1) • 0 = normal digital input (factory setting) • 1 = pulse digital input</td>
</tr>
<tr>
<td>0x36A3</td>
<td>13988</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>–</td>
<td>Pulse polarity(1) • 0 = low to high (factory setting) • 1 = high to low Valid if input signal type is pulse digital input.</td>
</tr>
<tr>
<td>0x36A4</td>
<td>13989</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1–4</td>
<td>–</td>
<td>Pulse unit(1) • 1 = Wh (Watt-hour, factory setting) • 2 = VARh (Reactive Volt-Ampere hour) • 3 = VAh (Volt-Ampere hour) • 4 = m³ (cubic meters) Valid if input signal type is pulse digital input.</td>
</tr>
<tr>
<td>0x36A5–0x36A6</td>
<td>13990–13991</td>
<td>R</td>
<td>–</td>
<td>FLOAT32</td>
<td>1–16777215</td>
<td>–</td>
<td>Pulse weight(1) (2) Valid if input signal type is pulse digital input. Factory setting = 1.0</td>
</tr>
<tr>
<td>0x36A7–0x36A8</td>
<td>13992–13993</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>1–4294967294</td>
<td>–</td>
<td>Input counter threshold value(1) Valid if input signal type is normal digital input. Factory setting = 5000</td>
</tr>
<tr>
<td>0x36A9–0x36B8</td>
<td>13994–14009</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Value set by using the EcoStruxure Power Commission software.  
(2) Examples:  
- If each incoming pulse represents 125 kWh, and since consumption data must be expressed in watt-hours, the consumption pulse weight is 125,000.  
- If each incoming pulse represents 1 US gallon, and since consumption data must be expressed in cubic meters, the consumption pulse weight is 0.003785.
Digital Outputs

Digital Output Register Mapping

Each digital output description is made up of 60 registers. The order and the description of the digital outputs 2 and 3 are the same as those of digital output 1.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Digital Output Number</th>
<th>Digital Output Addresses</th>
<th>Digital Output Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>O1</td>
<td>0x3849–0x3884</td>
<td>14410–14469</td>
</tr>
<tr>
<td></td>
<td>O2</td>
<td>0x3885–0x38C0</td>
<td>14470–14529</td>
</tr>
<tr>
<td></td>
<td>O3</td>
<td>0x38C1–0x38FC</td>
<td>14530–14589</td>
</tr>
<tr>
<td>IO 2</td>
<td>O1</td>
<td>0x4401–0x443C</td>
<td>17410–17469</td>
</tr>
<tr>
<td></td>
<td>O2</td>
<td>0x443D–0x4478</td>
<td>17470–17529</td>
</tr>
<tr>
<td></td>
<td>O3</td>
<td>0x4479–0x44B4</td>
<td>17530–17589</td>
</tr>
</tbody>
</table>

Digital Output 1 Registers of IO 1

The order and the description of the digital output 1 registers of IO 2 are the same as those of IO 1:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3849</td>
<td>14410</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 14411:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>0x384A</td>
<td>14411</td>
<td>R-WC</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0</td>
<td>Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Digital output status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>• 0 = OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Digital output forced status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3–15</td>
<td>• 0 = Unforced</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Forced</td>
</tr>
<tr>
<td>0x384B–0x384E</td>
<td>14412–14415</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp for the last output transition:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Last rising edge if output is configured as NO (normally open contact)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Last falling edge if output is configured as NC (normally closed contact)</td>
</tr>
<tr>
<td>0x384F–0x3850</td>
<td>14416–14417</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x3851–0x3852</td>
<td>14418–14419</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>1–4294967294</td>
<td>–</td>
<td>Output counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This counter increments for each rising edge of the output.</td>
</tr>
<tr>
<td>0x3853–0x3856</td>
<td>14420–14423</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of the last reset for the output counter</td>
</tr>
<tr>
<td>0x3857–0x386E</td>
<td>14424–14447</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>–</td>
<td>Digital output identification coded over 45 ASCII characters</td>
</tr>
<tr>
<td>0x386F</td>
<td>14448</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–2</td>
<td>–</td>
<td>Output operating mode(1):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Non-latching (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Latched</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 2 = Time delayed non-latching</td>
</tr>
<tr>
<td>0x3870</td>
<td>14449</td>
<td>R</td>
<td>s</td>
<td>INT16U</td>
<td>0–65534</td>
<td>–</td>
<td>On time for time delayed non-latching mode value(1):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The time for the output to remain energized when the output is in time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>delayed non-latching mode (Factory setting = 0)</td>
</tr>
<tr>
<td>0x3871</td>
<td>14450</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>–</td>
<td>Output contact type(1):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = NO (normally open, factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = NC (normally close)</td>
</tr>
</tbody>
</table>

(1) Value set using the EcoStruxure Power Commission software.
(2) Simple commands are enabled by factory setting. The simple commands can be disabled by using the command Enable/Disable commands.
<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3872</td>
<td>14451</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–2</td>
<td>–</td>
<td>Indicates On/Off state of the discrete output when any fall back condition occurs(^{(1)}): * 0 = OFF (factory setting) * 1 = ON * 2 = Freeze</td>
</tr>
<tr>
<td>0x3873–0x3874</td>
<td>14452–14453</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>1–4294967294</td>
<td>–</td>
<td>Output counter threshold value(^{(1)}) * Factory setting = 5000</td>
</tr>
<tr>
<td>0x3875</td>
<td>14454</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–2</td>
<td>–</td>
<td>Simple command for output(^{(1)}): * 0 = No command * 1 = OFF * 2 = ON * Valid if simple commands are enabled.</td>
</tr>
<tr>
<td>0x3876–0x3884</td>
<td>14455–14469</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

\(^{(1)}\) Value set using the EcoStruxure Power Commission software.  
\(^{(2)}\) Simple commands are enabled by factory setting. The simple commands can be disabled by using the command Enable/Disable commands.
Hardware Setting

Addresses and Registers List

The following table describes the hardware settings addresses, and registers regarding the IO module.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Addresses</th>
<th>Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>0x38FD–0x3902</td>
<td>14590–14595</td>
</tr>
<tr>
<td>IO 2</td>
<td>0x44B5–0x44BA</td>
<td>17590–17595</td>
</tr>
</tbody>
</table>

Hardware Setting Registers for IO 1

The order and the description of the hardware setting registers for IO 2 are the same as those of IO 1.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x38FD  | 14590    | R  | –    | INT16U| 1–9   | Application rotary switch current position:  
  ● 2 = position 2  
  ● 3 = position 3  
  ● 4 = position 4  
  ● 5 = position 5  
  ● 6 = position 6  
  ● 7 = position 7  
  ● 8 = position 8  
  ● 9 = position 9 |
| 0x38FE  | 14591    | R  | –    | INT16U| 0–1   | Remote setup padlock position:  
  ● 0 = Unlock  
  ● 1 = Lock  |
| 0x38FF  | 14592    | R  | –    | INT16U| 0–1   | Dip switch1 position:  
  ● 0 = IO 1  
  ● 1 = IO 2  |
| 0x3900  | 14593    | –  | –    | –     | –     | Reserved |
| 0x3901  | 14594    | R  | –    | INT16U| 1–9   | Last validated application set by the test button located on the front of the IO module:  
  ● 1 = position 1  
  ● 2 = position 2  
  ● 3 = position 3  
  ● 4 = position 4  
  ● 5 = position 5  
  ● 6 = position 6  
  ● 7 = position 7  
  ● 8 = position 8  
  ● 9 = position 9 |
| 0x3902  | 14595    | R  | –    | INT16U| 1–9   | Last validated application set by the EcoStruxure Power Commission software:  
  ● 1 = position 1  
  ● 2 = position 2  
  ● 3 = position 3  
  ● 4 = position 4  
  ● 5 = position 5  
  ● 6 = position 6  
  ● 7 = position 7  
  ● 8 = position 8  
  ● 9 = position 9 |
| 0x3903– | 14596–   | –  | –    | –     | –     | Reserved  |
| 0x3904  | 14597    |     |       |       |       |             |
# Digital Input and Output Status

## Addresses and Registers List

The following table describes the digital inputs and outputs status addresses, and registers regarding the IO module.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Addresses</th>
<th>Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>0x3905–0x3908</td>
<td>14598–14601</td>
</tr>
<tr>
<td>IO 2</td>
<td>0x44BD–0x44C0</td>
<td>17598–17601</td>
</tr>
</tbody>
</table>

## Digital Input and Output Status Registers for IO 1

The order and the description of the digital input and output status registers for IO 2 are the same as those of IO 1.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x3905   | 14598    | R  | –    | INT16U | –     | –   | Quality of each bit of register 14599:  
|          |          |    |      |       |       | 0 = Invalid  
|          |          |    |      |       |       | 1 = Valid   |
| 0x3906   | 14599    | R  | –    | INT16U | –     | –   | Digital input status register:  
|          |          |    |      |       |       | Input status = 0 when input is OFF  
|          |          |    |      |       |       | Input status = 1 when input is ON   |
|          |          |    |      |       |       | 0  | I1 status   |
|          |          |    |      |       |       | 1  | I2 status   |
|          |          |    |      |       |       | 2  | I3 status   |
|          |          |    |      |       |       | 3  | I4 status   |
|          |          |    |      |       |       | 4  | I5 status   |
|          |          |    |      |       |       | 5  | I6 status   |
|          |          |    |      |       |       | 6–15 | Reserved |
| 0x3907   | 14600    | R  | –    | INT16U | –     | –   | Quality of each bit of register 14601:  
|          |          |    |      |       |       | 0 = Invalid  
|          |          |    |      |       |       | 1 = Valid   |
| 0x3908   | 14601    | R–WC | – | INT16U | – | – | Digital output status register:  
|          |          |    |      |       |       | Output status = 0 when output is OFF  
|          |          |    |      |       |       | Output status = 1 when output is ON   |
|          |          |    |      |       |       | 0  | O1 status   |
|          |          |    |      |       |       | 1  | O2 status   |
|          |          |    |      |       |       | 2  | O3 status   |
|          |          |    |      |       |       | 3–15 | Reserved |
IO Module Identification

Introduction

The order and the description of the IO module identification registers for IO 2 are the same as those of IO 1.

Addresses and Registers List

The following table describes the identification addresses, and registers regarding the IO module.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Addresses</th>
<th>Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>0x392F–0x3982</td>
<td>14640–14723</td>
</tr>
<tr>
<td>IO 2</td>
<td>0x44E7–0x453A</td>
<td>17640–17723</td>
</tr>
</tbody>
</table>

**IO Hardware Revision**

The hardware revision is an ASCII string using the format XXX.YYY.ZZZ with:
- XXX = major version (000–127)
- YYY = minor version (000–255)
- ZZZ = revision number (000–255)

The NULL character ends the revision number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3961–0x3966</td>
<td>14690–14695</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Hardware revision</td>
</tr>
</tbody>
</table>

**IO Module Firmware Revision**

The firmware revision is an ASCII string using the format XXX.YYY.ZZZ with:
- XXX = major version (000–127)
- YYY = minor version (000–255)
- ZZZ = revision number (000–255)

The NULL character ends the revision number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3967–0x396C</td>
<td>14696–14701</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Firmware revision</td>
</tr>
</tbody>
</table>

**Current Date and Time**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x396D–0x3970</td>
<td>14702–14705</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Current date and time of the IO module in DATETIME format, set by using the EcoStruxure Power Commission software.</td>
</tr>
</tbody>
</table>

**Serial Number**

The IO module serial number is composed of a maximum of 11 alphanumeric characters with the following format: PYYWWDnnnn.
- PP = plant code
- YY = year of fabrication (05–99)
- WW = week of fabrication (01–53)
- D = day of fabrication (1–7)
- nnnn = production number of the device on the day (0001–9999)

A read request of 6 registers is necessary to read the IO module serial number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3971–0x397A</td>
<td>14706–14715</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Serial number</td>
</tr>
<tr>
<td>0x3971</td>
<td>14706</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘05’–‘99’</td>
<td>‘PP’</td>
</tr>
<tr>
<td>0x3972</td>
<td>14707</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘01’–‘53’</td>
<td>‘YY’</td>
</tr>
<tr>
<td>0x3973</td>
<td>14708</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘10’–‘79’</td>
<td>‘WW’</td>
</tr>
<tr>
<td>0x3974</td>
<td>14709</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘Dn’</td>
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</tr>
</tbody>
</table>
### Manufacturing Date and Time

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x397B–0x397E</td>
<td>14716–14719</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Manufacturing date and time</td>
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</table>

### Product Identification

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0x392F</td>
<td>14640</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>15150</td>
<td>Product identification = 15150 for the IO module</td>
</tr>
<tr>
<td>0x3930</td>
<td>14641</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x397F–0x3982</td>
<td>14720–14723</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product code = ‘LV434063’</td>
</tr>
<tr>
<td>0x3D1C–0x3D3B</td>
<td>15645–15676</td>
<td>R–WC</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>User application name</td>
</tr>
<tr>
<td>0x3D3C–0x3D45</td>
<td>15677–15686</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Vendor name = ‘Schneider Electric’</td>
</tr>
<tr>
<td>0x3D46–0x3D4D</td>
<td>15687–15694</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product range: ‘Enerlinx’</td>
</tr>
<tr>
<td>0x3D4E–0x3D5D</td>
<td>15695–15710</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Device family: ‘IO device’</td>
</tr>
<tr>
<td>0x3D5E–0x3D65</td>
<td>15711–15718</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product model</td>
</tr>
</tbody>
</table>
## Alarm Status

### Addresses and Registers List

The following table describes the alarm status addresses, and registers regarding the IO module.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Addresses</th>
<th>Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>0x3989–0x39A6</td>
<td>14730–14759</td>
</tr>
<tr>
<td>IO 2</td>
<td>0x4541–0x455E</td>
<td>17730–17759</td>
</tr>
</tbody>
</table>

### Generic Alarm Status for IO 1

The order and the description of the generic alarm status registers for IO 2 are the same as those of IO 1.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x3989    | 14730    | R  | –    | INT16U | –     | –   | Quality of each bit of register 14731:  
|           |          |    |      |       |       |     | • 0 = Invalid  
|           |          |    |      |       |       |     | • 1 = Valid                                                                  |
| 0x398A    | 14731    | R  | –    | INT16U | –     | –   | IO module history format register  
|           |          |    |      |       |       |     | 0 ULP format  
|           |          |    |      |       |       |     | 1 TI086 format  
|           |          |    |      |       |       |     | 2–15 Reserved                                                                |
| 0x398B    | 14732    | R  | –    | INT16U | –     | –   | Quality of each bit of register 14733:  
|           |          |    |      |       |       |     | • 0 = Invalid  
|           |          |    |      |       |       |     | • 1 = Valid                                                                  |
| 0x398C    | 14733    | R  | –    | INT16U | –     | –   | IO module command type  
|           |          |    |      |       |       |     | Factory setting = 3, both write command mechanisms are enabled.  
|           |          |    |      |       |       |     | 0 1 = Complex commands  
|           |          |    |      |       |       |     | 1 1 = Simple commands  
|           |          |    |      |       |       |     | Simple commands can be disabled by sending a command  
|           |          |    |      |       |       |     | 2–15 Reserved                                                                |
| 0x398D–0x3992 | 14734–14739 | – | – | – | – | – | Reserved |
| 0x3993    | 14740    | R  | –    | INT16U | –     | –   | Quality of each bit of register 14741:  
|           |          |    |      |       |       |     | • 0 = Invalid  
|           |          |    |      |       |       |     | • 1 = Valid                                                                  |
| 0x3994    | 14741    | R  | –    | INT16U | –     | –   | IO module generic alarm 1 status register.  
|           |          |    |      |       |       |     | 0 IO module in STOP mode: IO module is not working and must be replaced.  
|           |          |    |      |       |       |     | 1 IO module in ERROR mode: IO module is working in degraded mode.  
|           |          |    |      |       |       |     | 2 Threshold overrun on I1 counter  
|           |          |    |      |       |       |     | 3 Threshold overrun on I2 counter  
|           |          |    |      |       |       |     | 4 Threshold overrun on I3 counter  
|           |          |    |      |       |       |     | 5 Threshold overrun on I4 counter  
|           |          |    |      |       |       |     | 6 Threshold overrun on I5 counter  
|           |          |    |      |       |       |     | 7 Threshold overrun on I6 counter  
|           |          |    |      |       |       |     | 8 Threshold overrun on O1 counter  
|           |          |    |      |       |       |     | 9 Threshold overrun on O2 counter  
|           |          |    |      |       |       |     | 10 Threshold overrun on O3 counter  
|           |          |    |      |       |       |     | 11 Switchboard temperature threshold 1 overrun  
|           |          |    |      |       |       |     | 12 Switchboard temperature threshold 2 overrun  
|           |          |    |      |       |       |     | 13 Switchboard temperature threshold 3 overrun  
|           |          |    |      |       |       |     | 14–15 Reserved                                                                |
| 0x3995    | 14742    | R  | –    | INT16U | –     | –   | Quality of each bit of register 14743:  
|           |          |    |      |       |       |     | • 0 = Invalid  
|           |          |    |      |       |       |     | • 1 = Valid                                                                  |
### Cradle and Drawer Management Alarms for IO 1

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3997</td>
<td>14744</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 14745:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>0x3998</td>
<td>14745</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Cradle management alarms register</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0  Cradle position discrepancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1  Remove device from cradle and put it back</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2  Cradle has reached its maximum number of operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3  Remaining service life of cradle is below alarm threshold</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4  New Micrologic control unit has been detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5–7 Reserved</td>
</tr>
<tr>
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<td>8  Drawer position discrepancy</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>9–15 Reserved</td>
</tr>
</tbody>
</table>

### Motor Alarms for IO 1

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3999</td>
<td>14746</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 14747:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>0x399A</td>
<td>14747</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>IO motor alarms</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>0–15 Reserved</td>
</tr>
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</table>

### Miscellaneous Application Alarms for IO 1

<table>
<thead>
<tr>
<th>Address</th>
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<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x399B</td>
<td>14748</td>
<td>R</td>
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<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 14749:</td>
</tr>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>0x399C</td>
<td>14749</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Other application alarms register</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0  Auxiliary contact of load contactor 1 is not closed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1  Auxiliary contact of load contactor 1 is not opened.</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2  Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3  Dual settings 2-wire input discrepancy</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>4–15 Reserved</td>
</tr>
<tr>
<td>0x399D</td>
<td>14750</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 14751:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>Address</td>
<td>Register</td>
<td>RW</td>
<td>Unit</td>
<td>Type</td>
<td>Range</td>
<td>Bit</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
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<td>------</td>
<td>----------</td>
<td>-------</td>
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<tr>
<td>0x399E</td>
<td>14751</td>
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<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Predefined input alarms register</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>0 Earth-leakage trip signal contact (SDV)</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Control voltage presence contact</td>
</tr>
<tr>
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<td></td>
<td>2 Surge protection status contact</td>
</tr>
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<td></td>
<td>3 Surge failure contact</td>
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<tr>
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<td></td>
<td></td>
<td>4 Switch-disconnector ON/OFF indication contact (OF)</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>5 Fuse blown indication contact</td>
</tr>
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<td></td>
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<td></td>
<td>6 Emergency stop</td>
</tr>
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<td></td>
<td>7 Switchboard temperature contact</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>8 Switchboard ventilation contact</td>
</tr>
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<td></td>
<td>9 Switchboard door contact</td>
</tr>
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<td></td>
<td>10–15 Reserved</td>
</tr>
<tr>
<td>0x399F</td>
<td>14752</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 14753:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Valid</td>
</tr>
<tr>
<td>0x39A0</td>
<td>14753</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>IO module discrepancy alarms register</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 Critical hardware discrepancy</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Critical firmware discrepancy</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Non-critical hardware discrepancy</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>3 Non-critical firmware discrepancy</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4–15 Reserved</td>
</tr>
<tr>
<td>0x39A1–</td>
<td>14754–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x39A6</td>
<td>14759</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Applications

IO Application Status

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3927</td>
<td>14632</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0</td>
<td>Cradle application enabled or disabled:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = Disabled</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = Enabled</td>
</tr>
<tr>
<td>0x3928</td>
<td>14633</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
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<td>Quality of each bit of register 14632:</td>
</tr>
<tr>
<td></td>
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<td>- 0 = Invalid</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = Valid</td>
</tr>
</tbody>
</table>

Cradle Management

The table describes the registers related to the cradle management application performed by IO 1 (predefined or user defined application).

The registers 18300–18329 are related to the cradle management application performed by IO 2 (predefined or user defined application).

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3BC3</td>
<td>15300</td>
<td>R-RC</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td></td>
<td>Quality of each bit of register 15301:</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>- 0 = Invalid</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = Valid</td>
</tr>
<tr>
<td>0x3BC4</td>
<td>15301</td>
<td>R-RC</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td></td>
<td>Cradle status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0–7 Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 8 = Device in disconnected position (CD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 9 = Device in connected position (CE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 10 = Device in the test position (CT)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15 Reserved</td>
</tr>
<tr>
<td>0x3BC5–0x3BC6</td>
<td>15302–15303</td>
<td>R-RC-WC</td>
<td>–</td>
<td>INT32U</td>
<td>0–65534</td>
<td>–</td>
<td>Cradle connected position counter This counter increments for each rising edge of the cradle connected position</td>
</tr>
<tr>
<td>0x3BC7–0x3BC8</td>
<td>15304–15305</td>
<td>R-RC-WC</td>
<td>–</td>
<td>INT32U</td>
<td>0–65534</td>
<td>–</td>
<td>Cradle disconnected position counter This counter increments for each rising edge of the cradle disconnected position</td>
</tr>
<tr>
<td>0x3BC9–0x3BCA</td>
<td>15306–15307</td>
<td>R-RC-WC</td>
<td>–</td>
<td>INT32U</td>
<td>0–65534</td>
<td>–</td>
<td>Cradle test position counter This counter increments for each rising edge of the cradle test position</td>
</tr>
<tr>
<td>0x3BCB–0x3BCE</td>
<td>15308–15311</td>
<td>R-RC</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of the last change for the cradle connected position</td>
<td></td>
</tr>
<tr>
<td>0x3BCF–0x3BD2</td>
<td>15312–15315</td>
<td>R-RC</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of the last change for the cradle disconnected position</td>
<td></td>
</tr>
<tr>
<td>0x3BD3–0x3BD6</td>
<td>15316–15319</td>
<td>R-RC</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Timestamp of the last change for the cradle test position</td>
<td></td>
</tr>
<tr>
<td>0x3BD7–0x3BD8</td>
<td>15320–15321</td>
<td>R-WC</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Operating time since last grease maintenance</td>
<td></td>
</tr>
<tr>
<td>0x3BD9–0x3BDA</td>
<td>15322–15323</td>
<td>R-WC</td>
<td>s</td>
<td>INT32U</td>
<td>–</td>
<td>Operating time since last move connected position</td>
<td></td>
</tr>
<tr>
<td>0x3BD8</td>
<td>15324</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–65534</td>
<td>–</td>
<td>Cradle contact regrease counter</td>
</tr>
<tr>
<td>0x3BDC–0x3BE0</td>
<td>15325–15329</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
<td></td>
</tr>
</tbody>
</table>

Drawer Management

The table describes the registers related to the Drawer management user-defined application performed by IO 1.

The registers 18330–18359 are related to the Drawer management user-defined application performed by IO 2.
Light Control

The table describes the registers related to the Light control predefined application performed by IO 1. The registers 18400–18409 are related to the Light control predefined application performed by IO 2.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3BE1</td>
<td>15330</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Quality of each bit of register 15331: 0 = Invalid 1 = Valid</td>
</tr>
<tr>
<td>0x3BE2</td>
<td>15331</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Drawer status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0–7</td>
<td></td>
<td>8 Drawer in disconnected position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 Drawer in connected position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 Drawer in the test position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>0x3BE3–0x3BE4</td>
<td>15332–15333</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>Drawer connected position counter. This counter increments for each rising edge of the drawer connected position.</td>
</tr>
<tr>
<td>0x3BE5–0x3BE6</td>
<td>15334–15335</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>Drawer disconnected position counter. This counter increments for each rising edge of the drawer disconnected position.</td>
</tr>
<tr>
<td>0x3BE7–0x3BE8</td>
<td>15336–15337</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>Drawer test position counter. This counter increments for each rising edge of the drawer test position.</td>
</tr>
<tr>
<td>0x3BE9–0x3BEC</td>
<td>15338–15341</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of the last change for the drawer connected position.</td>
</tr>
<tr>
<td>0x3BED–0x3BF0</td>
<td>15342–15345</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of the last change for the drawer disconnected position.</td>
</tr>
<tr>
<td>0x3BF1–0x3BF4</td>
<td>15346–15349</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of the last change for the drawer test position.</td>
</tr>
<tr>
<td>0x3BF5–0x3BFE</td>
<td>15350–15359</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Load Control

The table describes the registers related to the Load control predefined application performed by IO 1. The registers 18410–18419 are related to the Load control predefined application performed by IO 2.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3C27</td>
<td>15400</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Quality of register 15401: 0 = Invalid 1 = Valid (application is configured and running)</td>
</tr>
<tr>
<td>0x3C28</td>
<td>15401</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Light status: 0 = Reset/OFF 1 = Set/ON</td>
</tr>
<tr>
<td>0x3C29–0x3C2A</td>
<td>15402–15403</td>
<td>R</td>
<td>s</td>
<td>INT32U</td>
<td>0–54000</td>
<td>Remaining time in ON or OFF state (depending of the light status)</td>
</tr>
<tr>
<td>0x3C2B–</td>
<td>15404</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–2</td>
<td>Light simple command(1): 0 = No command 1 = Light OFF 2 = Light ON</td>
</tr>
<tr>
<td>0x3C2C–0x3C30</td>
<td>15405–15409</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

(1) Simple commands are enabled by factory setting. The simple commands can be disabled by using the command Enable/Disable simple commands.
## IO Module Data for Masterpact MTZ Circuit Breakers

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x3C31   | 15410    | R  | –    | INT16U| 0–1   | Quality of register 15411:  
  - 0 = Invalid  
  - 1 = Valid (application is configured and running) |
| 0x3C32   | 15411    | R  | –    | INT16U| 0–1   | Load status:  
  - 0 = Reset/OFF  
  - 1 = Set/ON |
| 0x3C33–0x3C34 | 15412–15413 | R | s    | INT32U| 0–54000 | Remaining time in ON or OFF state (depending of the load status) |
| 0x3C35   | 15414    | R  | –    | INT16U| 0–2   | Load simple command(1):  
  - 0 = No command  
  - 1 = Load OFF  
  - 2 = Load ON |
| 0x3C36–0x3EEC | 15415–16109 | – | –    | –     | –     | Reserved |

(1) Simple commands are enabled by factory setting. The simple commands can be disabled by using the command Enable/Disable simple commands.
Section 5.2
IO Module Events

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event History</td>
<td>204</td>
</tr>
<tr>
<td>IO Module Events and Alarms</td>
<td>205</td>
</tr>
</tbody>
</table>
### Event History

#### General Description

The event history registers describe the last 100 encountered events. The event history format corresponds to a series of 100 records. Each record is composed of 5 registers describing one event.

A read request of 5x(n) registers is necessary to read the last n event records, where 5 is the number of registers for each event record.

For example, a read request of 5x3 = 15 registers is necessary to read the last 3 event records of the event history:

- The first five registers describe the first event record (most recent event).
- The next five registers describe the second event record.
- The last five registers describe the third event record.

There are two event histories, 1 per IO module.

<table>
<thead>
<tr>
<th>IO Module</th>
<th>Address</th>
<th>Register</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 1</td>
<td>0x39A7–0x39AB</td>
<td>14760–14764</td>
<td>Event record 1 (most recent event record)</td>
</tr>
<tr>
<td></td>
<td>0x39AC–0x39B0</td>
<td>14765–14769</td>
<td>Event record 2</td>
</tr>
<tr>
<td></td>
<td>0x39A7+5x(n-1)–0x39AB+5x(n-1)</td>
<td>14760+5x(n-1)–14764+5x(n-1)</td>
<td>Event record n</td>
</tr>
<tr>
<td></td>
<td>0x3B96–0x3B9A</td>
<td>15255–15259</td>
<td>Event record 100</td>
</tr>
<tr>
<td>IO 2</td>
<td>0x455F–0x4563</td>
<td>17760–17764</td>
<td>Event record 1 (most recent event record)</td>
</tr>
<tr>
<td></td>
<td>0x4564–0x4568</td>
<td>17765–17769</td>
<td>Event record 2</td>
</tr>
<tr>
<td></td>
<td>0x455F+5x(n-1)–0x4563+5x(n-1)</td>
<td>17760+5x(n-1)–17764+5x(n-1)</td>
<td>Event record n</td>
</tr>
<tr>
<td></td>
<td>0x474E–0x4752</td>
<td>18255–18259</td>
<td>Event record 100</td>
</tr>
</tbody>
</table>

**NOTE:** The event history of IO modules connected to a Masterpact MTZ circuit breaker can be read also by using the Get all events command *(see page 212)*.

#### Event Record

A block request of five registers is necessary to read an event record. The order and the description of the event record registers of IO 2 are the same as those of IO 1:

<table>
<thead>
<tr>
<th>Event Record 1 (Most Recent Event Record)</th>
<th>Address</th>
<th>RW</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x39A7</td>
<td>14760</td>
<td>R</td>
<td>INT16U</td>
<td>Event code of IO 1 and IO 2 <em>(see page 205)</em></td>
</tr>
<tr>
<td>0x39AB–0x39AA</td>
<td>14761–14763</td>
<td>R</td>
<td>ULP DATE</td>
<td>Date and time of the event</td>
</tr>
<tr>
<td>0x39AB</td>
<td>14764</td>
<td>R</td>
<td>INT16U</td>
<td>Event type</td>
</tr>
</tbody>
</table>

#### Alarm Definition

Alarms are specific events that need to be reset.

The reset mode of an alarm can be:

- **automatic:** the alarm is reset automatically when the alarm is no more active.
- **manual:** the alarm is reset manually with the Test/Reset pushbutton located on the front face of the IO module and when the alarm is no more active.
- **remote:** the alarm is reset remotely with the Reset command sent via the communication and when the alarm is no more active.

Each alarm has a priority level that manages the alarm display on the FDM121 display:

- **no priority = N/A (not affected)**
- **low priority = 1. No alarm display on the FDM121 display**
- **medium priority = 2. The FDM121 display LED is steady ON.**
- **high priority = 3. The FDM121 display LED blinks and a pop-up screen informs that the alarm has occurred.**
### IO Module Events and Alarms

#### IO 1 Events and Alarms

<table>
<thead>
<tr>
<th>Code</th>
<th>Application</th>
<th>Description</th>
<th>Type</th>
<th>Priority</th>
<th>Reset Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1537 (0x0601)</td>
<td>General</td>
<td>IO1 Watchdog reset</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1538 (0x0602)</td>
<td>General</td>
<td>IO1 reset to factory setting</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1539 (0x0603)</td>
<td>General</td>
<td>IO1 failure (STOP mode)</td>
<td>Alarm</td>
<td>High</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1540 (0x0604)</td>
<td>General</td>
<td>IO1 failure (ERROR mode)</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1541 (0x0605)</td>
<td>General</td>
<td>IO1 functional rotary switch position change</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1542 (0x0606)</td>
<td>General</td>
<td>IO1 setting locking pad rotary switch position change</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1543 (0x0607)</td>
<td>General</td>
<td>IO1 source address dip switch position change</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1552 (0x0610)</td>
<td>General</td>
<td>IO1 O1 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1553 (0x0611)</td>
<td>General</td>
<td>IO1 O2 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1554 (0x0612)</td>
<td>General</td>
<td>IO1 O3 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1555 (0x0613)</td>
<td>General</td>
<td>IO1 I1 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1556 (0x0614)</td>
<td>General</td>
<td>IO1 I2 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1557 (0x0615)</td>
<td>General</td>
<td>IO1 I3 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1558 (0x0616)</td>
<td>General</td>
<td>IO1 I4 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1559 (0x0617)</td>
<td>General</td>
<td>IO1 I5 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1560 (0x0618)</td>
<td>General</td>
<td>IO1 I6 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1561 (0x0619)</td>
<td>General</td>
<td>IO1 threshold overrun on I1 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1562 (0x061A)</td>
<td>General</td>
<td>IO1 threshold overrun on I2 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1563 (0x061B)</td>
<td>General</td>
<td>IO1 threshold overrun on I3 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1564 (0x061C)</td>
<td>General</td>
<td>IO1 threshold overrun on I4 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1565 (0x061D)</td>
<td>General</td>
<td>IO1 threshold overrun on I5 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1566 (0x061E)</td>
<td>General</td>
<td>IO1 threshold overrun on I6 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1567 (0x061F)</td>
<td>General</td>
<td>IO1 threshold overrun on O1 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1568 (0x0620)</td>
<td>General</td>
<td>IO1 threshold overrun on O2 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1569 (0x0621)</td>
<td>General</td>
<td>IO1 threshold overrun on O3 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1570 (0x0622)</td>
<td>General</td>
<td>IO1 I1 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1571 (0x0623)</td>
<td>General</td>
<td>IO1 I2 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1572 (0x0624)</td>
<td>General</td>
<td>IO1 I3 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1573 (0x0625)</td>
<td>General</td>
<td>IO1 I4 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1574 (0x0626)</td>
<td>General</td>
<td>IO1 I5 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1575 (0x0627)</td>
<td>General</td>
<td>IO1 I6 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1576 (0x0628)</td>
<td>General</td>
<td>IO1 O1 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1577 (0x0629)</td>
<td>General</td>
<td>IO1 O2 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1578 (0x062A)</td>
<td>General</td>
<td>IO1 O3 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1579 (0x062B)</td>
<td>General User-defined input acquisition</td>
<td>IO1 user-defined input 1</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1580 (0x062C)</td>
<td>General User-defined input acquisition</td>
<td>IO1 user-defined input 2</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1581 (0x062D)</td>
<td>General User-defined input acquisition</td>
<td>IO1 user-defined input 3</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1582 (0x062E)</td>
<td>General User-defined input acquisition</td>
<td>IO1 user-defined input 4</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1583 (0x062F)</td>
<td>General User-defined input acquisition</td>
<td>IO1 user-defined input 5</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1584 (0x0630)</td>
<td>General User-defined input acquisition</td>
<td>IO1 user-defined input 6</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
</tbody>
</table>
### IO 2 Events and Alarms

<table>
<thead>
<tr>
<th>Code</th>
<th>Application</th>
<th>Description</th>
<th>Type</th>
<th>Priority</th>
<th>Reset Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1793 (0x0701)</td>
<td>General</td>
<td>IO2 watchdog reset</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1794 (0x0702)</td>
<td>General</td>
<td>IO2 reset to factory settings</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1795 (0x0703)</td>
<td>General</td>
<td>IO2 module failure (STOP mode)</td>
<td>Alarm</td>
<td>High</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1796 (0x0704)</td>
<td>General</td>
<td>IO2 module failure (ERROR mode)</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1797 (0x0705)</td>
<td>General</td>
<td>IO2 functional rotary switch position change</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1798 (0x0706)</td>
<td>General</td>
<td>IO2 setting locking pad rotary switch position change</td>
<td>Event</td>
<td>Medium</td>
<td>–</td>
</tr>
<tr>
<td>1799 (0x0707)</td>
<td>General</td>
<td>IO2 source address dip switch position change</td>
<td>Event</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1808 (0x0710)</td>
<td>General</td>
<td>IO2 O1 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1809 (0x0711)</td>
<td>General</td>
<td>IO2 O2 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1810 (0x0712)</td>
<td>General</td>
<td>IO2 O3 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1811 (0x0713)</td>
<td>General</td>
<td>IO2 I1 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1812 (0x0714)</td>
<td>General</td>
<td>IO2 I2 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1813 (0x0715)</td>
<td>General</td>
<td>IO2 I3 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1814 (0x0716)</td>
<td>General</td>
<td>IO2 I4 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1815 (0x0717)</td>
<td>General</td>
<td>IO2 I5 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1816 (0x0718)</td>
<td>General</td>
<td>IO2 I6 rising edge (OFF/ON change)</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1817 (0x0719)</td>
<td>General</td>
<td>IO2 threshold overrun on I1 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1818 (0x071A)</td>
<td>General</td>
<td>IO2 threshold overrun on I2 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1819 (0x071B)</td>
<td>General</td>
<td>IO2 threshold overrun on I3 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1820 (0x071C)</td>
<td>General</td>
<td>IO2 threshold overrun on I4 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1821 (0x071D)</td>
<td>General</td>
<td>IO2 threshold overrun on I5 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1822 (0x071E)</td>
<td>General</td>
<td>IO2 threshold overrun on I6 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1823 (0x071F)</td>
<td>General</td>
<td>IO2 threshold overrun on O1 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1824 (0x0720)</td>
<td>General</td>
<td>IO2 threshold overrun on O2 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1825 (0x0721)</td>
<td>General</td>
<td>IO2 threshold overrun on O3 counter</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1826 (0x0722)</td>
<td>General</td>
<td>IO2 I1 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1827 (0x0723)</td>
<td>General</td>
<td>IO2 I2 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1828 (0x0724)</td>
<td>General</td>
<td>IO2 I3 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1829 (0x0725)</td>
<td>General</td>
<td>IO2 I4 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1830 (0x0726)</td>
<td>General</td>
<td>IO2 I5 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1831 (0x0727)</td>
<td>General</td>
<td>IO2 I6 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1832 (0x0728)</td>
<td>General</td>
<td>IO2 O1 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1833 (0x0729)</td>
<td>General</td>
<td>IO2 O2 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1834 (0x072A)</td>
<td>General</td>
<td>IO2 O3 unforced/forced change</td>
<td>Event</td>
<td>Low</td>
<td>–</td>
</tr>
<tr>
<td>1835 (0x072B)</td>
<td>User-defined input acquisition</td>
<td>IO2 user-defined input 1</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>1836 (0x072C)</td>
<td>User-defined input acquisition</td>
<td>IO2 user-defined input 2</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
</tbody>
</table>

**NOTE:** The alarm exit priority is fixed in IO module firmware. The value is Low, when available.
**NOTE:** The alarm exit priority is fixed in IO firmware. The value is Low, when available.

### IO 1 and IO 2 Events and Alarms

<table>
<thead>
<tr>
<th>Code</th>
<th>Application</th>
<th>Description</th>
<th>Type</th>
<th>Priority</th>
<th>Reset Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>2304</td>
<td>Cradle management</td>
<td>Cradle position discrepancy</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2305</td>
<td>Cradle management</td>
<td>Cradle connected contact change</td>
<td>Alarm</td>
<td>Low</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2306</td>
<td>Cradle management</td>
<td>Cradle disconnected contact change</td>
<td>Alarm</td>
<td>Low</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2307</td>
<td>Cradle management</td>
<td>Cradle test contact change</td>
<td>Alarm</td>
<td>Low</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2308</td>
<td>Cradle management</td>
<td>Remove device from cradle and put it back</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2309</td>
<td>Cradle management</td>
<td>Cradle has reached its maximum number of operations</td>
<td>Alarm</td>
<td>High</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2309</td>
<td>Cradle management</td>
<td>Remaining service life of cradle is below alarm threshold</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2311</td>
<td>Cradle management</td>
<td>New Micrologic control unit has been detected.</td>
<td>Alarm</td>
<td>High</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2432</td>
<td>Drawer management</td>
<td>Drawer position discrepancy</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2560</td>
<td>Load control</td>
<td>Auxiliary contact of the load contactor 1 is not closed</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2561</td>
<td>Load control</td>
<td>Auxiliary contact of the load contactor 1 is not opened</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2816</td>
<td>Predefined input acquisition</td>
<td>Earth leakage trip signal contact (SDV)</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2817</td>
<td>Predefined input acquisition</td>
<td>Control voltage presence contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2818</td>
<td>Predefined input acquisition</td>
<td>Surge protection status contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2819</td>
<td>Predefined input acquisition</td>
<td>Surge failure contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2820</td>
<td>Predefined input acquisition</td>
<td>Switch-disconnector ON/OFF indication contact (OF)</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2821</td>
<td>Predefined input acquisition</td>
<td>Fuse blown indication contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2822</td>
<td>Predefined input acquisition</td>
<td>Emergency stop</td>
<td>Alarm</td>
<td>High</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2823</td>
<td>Cooling system</td>
<td>Switchboard temperature contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2824</td>
<td>Cooling system</td>
<td>Switchboard ventilation contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>2825</td>
<td>Cooling system</td>
<td>Switchboard door contact</td>
<td>Alarm</td>
<td>Medium</td>
<td>Manual or Remote</td>
</tr>
<tr>
<td>3328</td>
<td>General</td>
<td>Critical hardware modules discrepancy</td>
<td>Alarm</td>
<td>High</td>
<td>Auto</td>
</tr>
<tr>
<td>3329</td>
<td>General</td>
<td>Critical firmware modules discrepancy</td>
<td>Alarm</td>
<td>High</td>
<td>Auto</td>
</tr>
<tr>
<td>Code</td>
<td>Application</td>
<td>Description</td>
<td>Type</td>
<td>Priority</td>
<td>Reset Mode</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>--------------------------------------</td>
<td>--------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td>3330 (0x0D02)</td>
<td>General</td>
<td>Non-critical hardware modules discrepancy</td>
<td>Alarm</td>
<td>Medium</td>
<td>Auto</td>
</tr>
<tr>
<td>3331 (0x0D03)</td>
<td>General</td>
<td>Non-critical firmware modules discrepancy</td>
<td>Alarm</td>
<td>Medium</td>
<td>Auto</td>
</tr>
<tr>
<td>3333 (0x0D05)</td>
<td>Dual Settings</td>
<td>Dual settings 2-wire input discrepancy</td>
<td>Alarm</td>
<td>High</td>
<td>Auto</td>
</tr>
</tbody>
</table>
Section 5.3
IO Module Commands

What Is in This Section?

This section contains the following topics:

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<th>Topic</th>
<th>Page</th>
</tr>
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<td>List of IO Module Commands</td>
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</tr>
<tr>
<td>Generic Commands</td>
<td>211</td>
</tr>
<tr>
<td>Application Commands</td>
<td>215</td>
</tr>
</tbody>
</table>
List of IO Module Commands

There are two types of command:
- generic commands which work independently of the application selected.
- application commands which are dedicated to an application. A command is only valid if the related application is configured.

The following table lists the available IO module commands, their corresponding application, command codes and user profiles. Follow the command execution procedures accordingly (see page 51).

<table>
<thead>
<tr>
<th>Application</th>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
<td>Change output state (see page 211)</td>
<td>1672</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Generic</td>
<td>Reset IO module alarms (see page 211)</td>
<td>41099</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Generic</td>
<td>Enable/Disable simple commands (see page 211)</td>
<td>41100</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Generic</td>
<td>Acknowledge latched output (see page 211)</td>
<td>41102</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Generic</td>
<td>Reset analog input minimum/maximum values (see page 212)</td>
<td>42890</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Generic</td>
<td>Get all events (see page 212)</td>
<td>50560</td>
<td>No password</td>
</tr>
<tr>
<td>Cradle and drawer management</td>
<td>Preset cradle/drawer counters (see page 215)</td>
<td>41352</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Cradle and drawer management</td>
<td>Preset cradle/drawer regrease timers (see page 215)</td>
<td>41353</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Light control</td>
<td>Light control (see page 215)</td>
<td>42120</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Load control</td>
<td>Load control (see page 216)</td>
<td>42376</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Pulse counter management</td>
<td>Preset input pulse counter (see page 216)</td>
<td>42888</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Preset switchboard temperature threshold counter (see page 217)</td>
<td>42889</td>
<td>Administrator or Operator</td>
</tr>
</tbody>
</table>

IO Module Error Codes

The error codes generated by the IO module are the generic error codes (see page 53).
Generic Commands

Change Output State

To change the output state, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1672</td>
<td>Command code = 1672</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>13</td>
<td>Number of parameters (bytes) = 13</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>1–3</td>
<td>Output number</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = output 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = output 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = output 3</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Value to set:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0x0000 = Change output state to 0 (OFF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0x0100 = Change output state to 1 (ON)</td>
</tr>
</tbody>
</table>

Reset IO Module Alarm

The alarms can be read from the alarm status register (see page 197).

To reset IO module alarms, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>41099</td>
<td>Command code = 41099</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters (bytes) = 10</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Enable/Disable Simple Commands

To enable or disable the simple commands, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>41100</td>
<td>Command code = 41100</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>11</td>
<td>Number of parameters (bytes) = 11</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB: Enable or disable:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = Disable simple command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Enable simple command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: 0 (not used)</td>
</tr>
</tbody>
</table>

Acknowledge Latched Output

To acknowledge the latched output, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>41102</td>
<td>Command code = 41102</td>
</tr>
</tbody>
</table>
Reset Analog Input Minimum/Maximum Values

The analog input maximum and minimum values can be read from the analog input registers (see page 187).

To reset the minimum/maximum analog input values, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>11</td>
<td>Number of parameters (bytes) = 11</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-</td>
<td>8004-</td>
<td></td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td></td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0x01 = Digital output relay 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0x02 = Digital output relay 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0x03 = Digital output relay 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0xFF = Unlatch all digital output</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: 0 (not used)</td>
</tr>
</tbody>
</table>

Get All Events

The command allows to get 10 events maximum. To get more than 10 events, several commands are necessary.

There are two methods to get events:
• get the 10 last events
• get all events from an event sequence number

The event sequence number is an event identifier defined by the IO module, and available among the event characteristics.

To get events, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>42890</td>
<td>–</td>
<td>Command code = 42890</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>–</td>
<td>Number of parameters (bytes) = 10</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 1: 8193 (0x2001)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 2: 8449 (0x2101)</td>
<td></td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>–</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-</td>
<td>8004-</td>
<td></td>
<td>OCTET</td>
<td>–</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td></td>
<td>STRING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>0, 2</td>
<td>–</td>
<td>Requested get event method:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Last events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 2 = Events from a sequence number</td>
</tr>
<tr>
<td>0x1F47-0x1F4A</td>
<td>8008-8011</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F48-0x1F4C</td>
<td>8012-8013</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>Requested event sequence number (for method 2 only)</td>
<td></td>
</tr>
</tbody>
</table>
## Events are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Other value = command with error (see page 53)</td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56</td>
<td>8023</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F57</td>
<td>8024</td>
<td>–</td>
<td>INT16U</td>
<td>0, 2</td>
<td>–</td>
<td>Responded get event method:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = Last events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 2 = Events from a sequence number</td>
</tr>
<tr>
<td>0x1F5E</td>
<td>8031</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Responded event severity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0–7 Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15 Reserved</td>
</tr>
<tr>
<td>0x1F5F</td>
<td>8032</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>MSB: Number of events returned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Remaining events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0 = No more events to get</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = More events to get</td>
</tr>
<tr>
<td>0x1F60</td>
<td>8033</td>
<td>–</td>
<td>INT16U</td>
<td>1013-25630</td>
<td>–</td>
<td>First event code (see page 205)</td>
</tr>
<tr>
<td>0x1F61–0x1F64</td>
<td>8034–8037</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of the first event</td>
<td></td>
</tr>
<tr>
<td>0x1F65</td>
<td>8038</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Timestamp quality of the first event</td>
</tr>
<tr>
<td>0x1F66–0x1F67</td>
<td>8039–8040</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>First event sequence number</td>
<td></td>
</tr>
<tr>
<td>0x1F68</td>
<td>8041</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>MSB: First event status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = Occurrence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 2 = Completion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 3 = Pulse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB: Reserved</td>
</tr>
<tr>
<td>0x1F69</td>
<td>8042</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F6A</td>
<td>8043</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>First event severity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0–7 Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15 Reserved</td>
</tr>
<tr>
<td>0x1F6B–0x1F75</td>
<td>8044–8054</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 2 (same as event 1)</td>
<td></td>
</tr>
<tr>
<td>0x1F76–0x1F80</td>
<td>8055–8065</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 3 (same as event 1)</td>
<td></td>
</tr>
<tr>
<td>0x1F81–0x1F8B</td>
<td>8066–8076</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 4 (same as event 1)</td>
<td></td>
</tr>
</tbody>
</table>
### Address Range

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F8C–0x1F96</td>
<td>8077–8087</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 5 (same as event 1)</td>
</tr>
<tr>
<td>0x1F97–0x1FA1</td>
<td>8088–8098</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 6 (same as event 1)</td>
</tr>
<tr>
<td>0x1FA2–0x1FAC</td>
<td>8099–8109</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 7 (same as event 1)</td>
</tr>
<tr>
<td>0x1FAD–0x1FB7</td>
<td>8110–8120</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 8 (same as event 1)</td>
</tr>
<tr>
<td>0x1FB8–0x1FC2</td>
<td>8121–8131</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 9 (same as event 1)</td>
</tr>
<tr>
<td>0x1FC3–0x1FCD</td>
<td>8132–8142</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Characteristics of event 10 (same as event 1)</td>
</tr>
</tbody>
</table>
Application Commands

Preset Cradle/Drawer Counters

The cradle/drawer counter values can be read from the cradle management registers (see page 200).

To preset the cradle or drawer counters, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>41352</td>
<td>Command code = 41352</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>16</td>
<td>Number of parameters (bytes) = 16</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>0–65535</td>
<td>Connected counter reset/preset:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–65534 = preset value of the connected counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 65535 (0xFFFF) = do not preset the connected counter</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>0–65535</td>
<td>Disconnected counter reset/preset:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–65534 = preset value of the disconnected counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 65535 (0xFFFF) = do not preset the disconnected counter</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>0–65535</td>
<td>Test counter reset/preset:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–65534 = preset value of the test counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 65535 (0xFFFF) = do not preset the test counter</td>
</tr>
</tbody>
</table>

Preset Regrease Timers

To preset regrease timers, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>41353</td>
<td>Command code = 41353</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>18</td>
<td>Number of parameters (bytes) = 18</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F45–0x1F46</td>
<td>8006–8007</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Operating time since last grease maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–157766400 = preset value of regrease timer counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 4294967295 (0xFFFFFFFF) = No preset</td>
</tr>
<tr>
<td>0x1F47–0x1F48</td>
<td>8008–8009</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>Operating time since last move in rack in position (delay from last disconnection)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–28944000 = preset value of remove timer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 4294967295 (0xFFFFFFFF) = No preset</td>
</tr>
</tbody>
</table>

Light Control

The light command status can be read from the light control registers (see page 201).

To control the light, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>42120</td>
<td>–</td>
<td>Command code = 42120</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>13</td>
<td>–</td>
<td>Number of parameters (bytes) = 13</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Destination = IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>–</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–0x1F44</td>
<td>8004–8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
<td></td>
</tr>
</tbody>
</table>
Load Control

The load command status can be read from the load control registers (see page 201).

To control the load, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Command code = 42376</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>13</td>
<td>–</td>
<td>Number of parameters (bytes) = 13</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Destination = IO 1: 8193 (0x2001)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>–</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td>–</td>
<td>MSB: State</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>0</td>
<td>0 = Load OFF&lt;br&gt;1 = Load ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0 = without time delay&lt;br&gt;1 = with time delay</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>LSB = Timer (MSB)&lt;br&gt;1–54000 seconds (if bit 1 in set state) Any value 0-0xffff (if bit 1 in reset state)</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>MSB = Timer (LSB)&lt;br&gt;1 to 54000 seconds (if bit 1 is in set state) Any value 0-0xffff (if bit 1 is in reset state) LSB = 0 (not used)</td>
</tr>
</tbody>
</table>

Preset Input Pulse Counters

To preset pulse counters, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>42888</td>
<td>Command code = 42888</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>34</td>
<td>Number of parameters (bytes) = 34</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Destination =&lt;br&gt;● IO 1: 8193 (0x2001)&lt;br&gt;● IO 2: 8449 (0x2101)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td>I1 pulse counter reset/preset:&lt;br&gt;0–4294967294 = preset value of the I1 pulse counter&lt;br&gt;4294967295 (0xffffffff) = do not preset the I1 pulse counter</td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–</td>
<td>–</td>
<td>INT32U</td>
<td>0–4294967295</td>
<td>I2 pulse counter reset/preset:&lt;br&gt;0–4294967294 = preset value of the I2 pulse counter&lt;br&gt;4294967295 (0xffffffff) = do not preset the I2 pulse counter</td>
</tr>
</tbody>
</table>
To preset switchboard temperature threshold counters, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x1F3F–0x1F4A | 8010–8011 | – | INT32U | 0–4294967295 | I3 pulse counter reset/preset:  
  ● 0–4294967294 = preset value of the I3 pulse counter  
  ● 4294967295 (0xFFFFFFFF) = do not preset the I3 pulse counter |
| 0x1F4B–0x1F4C | 8012–8013 | – | INT32U | 0–4294967295 | I4 pulse counter reset/preset:  
  ● 0–4294967294 = preset value of the I4 pulse counter  
  ● 4294967295 (0xFFFFFFFF) = do not preset the I4 pulse counter |
| 0x1F4D–0x1F4E | 8014–8015 | – | INT32U | 0–4294967295 | I5 pulse counter reset/preset:  
  ● 0–4294967294 = preset value of the I5 pulse counter  
  ● 4294967295 (0xFFFFFFFF) = do not preset the I5 pulse counter |
| 0x1F55–0x1F56 | 8022–8023 | – | INT32U | 0–4294967295 | I6 pulse counter reset/preset:  
  ● 0–4294967294 = preset value of the I6 pulse counter  
  ● 4294967295 (0xFFFFFFFF) = do not preset the I6 pulse counter |
# Chapter 6
IFM Interface Data for Masterpact MTZ Circuit Breakers

What is in This Chapter?

This chapter contains the following sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>IFM Interface Registers</td>
<td>220</td>
</tr>
<tr>
<td>6.2</td>
<td>IFM Interface Commands</td>
<td>224</td>
</tr>
</tbody>
</table>
Section 6.1
IFM Interface Registers

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFM Interface Identification</td>
<td>221</td>
</tr>
<tr>
<td>Modbus Network Parameters</td>
<td>223</td>
</tr>
</tbody>
</table>
# IFM Interface Data for Masterpact MTZ Circuit Breakers

## IFM Interface Identification

### IFM Interface Firmware Revision

The IFM interface firmware revision starts at register 11776 and has a maximum length of eight registers. The firmware revision is an ASCII string using the format XXX.YYY.ZZZ with:

- XXX = major version (000–127)
- YYY = minor version (000–255)
- ZZZ = revision number (000–255)

The NULL character ends the revision number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2DFF–0x2E06</td>
<td>11776–11783</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Firmware revision</td>
</tr>
</tbody>
</table>

### Serial Number for IFM Interface TRV00210 or STRV00210

The serial number of IFM interface TRV00210 or STRV00210 is composed of a maximum of 11 alphanumeric characters with the following format: PPYYWWDnnnn.

- PP = plant code
- YY = year of fabrication (05–99)
- WW = week of fabrication (01–53)
- D = day of fabrication (1–7)
- nnnn = production number of the device on the day (0001–9999)

A read request of six registers is necessary to read the IFM interface serial number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E07</td>
<td>11784</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>PP</td>
</tr>
<tr>
<td>0x2E08</td>
<td>11785</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'05'–'99'</td>
<td>'YY'</td>
</tr>
<tr>
<td>0x2E09</td>
<td>11786</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'01'–'53'</td>
<td>'WW'</td>
</tr>
<tr>
<td>0x2E0A</td>
<td>11787</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>D: '1'–'7' n: '0'–'9'</td>
<td>'Dn'</td>
</tr>
<tr>
<td>0x2E0B</td>
<td>11788</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'00'–'99'</td>
<td>'nn'</td>
</tr>
<tr>
<td>0x2E0C</td>
<td>11789</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'0'–'9'</td>
<td>'n' (the NULL character ends the serial number)</td>
</tr>
</tbody>
</table>

### Serial Number for IFM Interface LV434000

The serial number of IFM interface LV434000 is composed of a maximum of 17 alphanumeric characters with the following format: PPPPPPPYYWWDLnnnn0.

- PPPPPP = plant code (example: BATAM plant code is 0000HL)
- YY = year of fabrication (05–99)
- WW = week of fabrication (01–53)
- D = day of fabrication (1–7)
- L = line or machine number (0-9 or a-z)
- nnnn = production number of the device on the day (0001–9999)

A read request of ten registers is necessary to read the IFM interface serial number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E5C–0x2E5E</td>
<td>11869-11871</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>PPPPPP</td>
</tr>
<tr>
<td>0x2E5F</td>
<td>11872</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'05'–'99'</td>
<td>'YY'</td>
</tr>
<tr>
<td>0x2E60</td>
<td>11873</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'01'–'53'</td>
<td>'WW'</td>
</tr>
<tr>
<td>0x2E61</td>
<td>11874</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>D: '1'–'7' L: '0'–'9' or 'a'–'z'</td>
<td>'DL'</td>
</tr>
<tr>
<td>0x2E62</td>
<td>11875</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'00'–'99'</td>
<td>'nn'</td>
</tr>
<tr>
<td>0x2E63</td>
<td>11876</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'00'–'99'</td>
<td>'nn'</td>
</tr>
<tr>
<td>0x2E64–0x2E65</td>
<td>11877-11878</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>'0'</td>
<td>'0' (the NULL character ends the serial number)</td>
</tr>
</tbody>
</table>
Product Identification

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E7C</td>
<td>11901</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Product identification = 15146 for the IFM interface</td>
</tr>
</tbody>
</table>

Read Device Identification

The Read Device Identification function is used to access in a standardized manner the information required to identify a device clearly. The description is made up of a set of objects (ASCII character strings).

A complete description of the Read Device Identification function is available at [www.modbus.org](http://www.modbus.org).

The coding for the identification of the IFM interface is the following:

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor name</td>
<td>OCTET STRING</td>
<td>‘Schneider Electric’ (18 characters)</td>
</tr>
<tr>
<td>Product code</td>
<td>OCTET STRING</td>
<td>‘LV434000’ or ‘TRV00210’ or ‘STRV00210’</td>
</tr>
<tr>
<td>Firmware revision</td>
<td>OCTET STRING</td>
<td>‘XXX.YYY.ZZZ’ from IFM interface revision 002.002.000</td>
</tr>
<tr>
<td>Vendor URL</td>
<td>OCTET STRING</td>
<td>‘<a href="https://www.schneider-electric.com%E2%80%99">https://www.schneider-electric.com’</a> (33 characters)</td>
</tr>
<tr>
<td>Product name</td>
<td>OCTET STRING</td>
<td>‘ULP/Modbus-SL communication interface module’</td>
</tr>
</tbody>
</table>

(1) Product code returns ‘TRV00210-L’ when IFM interface TRV00210 is loaded with IFM legacy firmware. For more information, refer to Masterpact Modbus Legacy User Guide.

IMU Identification

Identification of the IMU can be set by using the EcoStruxure Power Commission software (see page 18). When not programmed, the IMU identification registers return 0 (0x0000).

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2801– 0x2820</td>
<td>10242– 10273</td>
<td>R-WC</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>User application name Maximum length is 64 characters.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E2F– 0x2E38</td>
<td>11824– 11833</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Vendor name = ‘Schneider Electric’</td>
</tr>
<tr>
<td>0x2E39– 0x2E42</td>
<td>11834– 11843</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product Code = ‘LV434000’ or ‘TRV00210’ or ‘STRV00210’</td>
</tr>
<tr>
<td>0x2E43– 0x2E44</td>
<td>11844– 11845</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
## Modbus Network Parameters

### Modbus Locking Pad Position

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E72</td>
<td>11891</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1–3</td>
<td>Modbus locking pad position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = Modbus locking pad is on the locked position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 3 = Modbus locking pad is on the open position</td>
</tr>
</tbody>
</table>

### Auto-Speed Sensing State

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x306E</td>
<td>12399</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–1</td>
<td>Auto-Speed sensing state</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = Auto-Speed sensing is disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = Auto-Speed sensing is enabled (factory setting)</td>
</tr>
</tbody>
</table>

### IFM Interface Modbus Address

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x306F</td>
<td>12400</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1–99</td>
<td>IFM interface Modbus address</td>
</tr>
</tbody>
</table>

### Modbus Parity

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3070</td>
<td>12401</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1–3</td>
<td>Modbus parity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = no parity (none)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 2 = even parity (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 3 = odd parity</td>
</tr>
</tbody>
</table>

### Modbus Baud Rate

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3071</td>
<td>12402</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>5–8</td>
<td>Modbus Baud rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 5 = 4800 Baud</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 6 = 9600 Baud</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 7 = 19200 Baud (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 8 = 38400 Baud</td>
</tr>
</tbody>
</table>

### Number of Stop Bits

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3072</td>
<td>12403</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–5</td>
<td>Number of stop bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = no change</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = standard Modbus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 2 = 1/2 stop bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 3 = 1 stop bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 4 = 1 and 1/2 stop bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 5 = 2 stop bits</td>
</tr>
</tbody>
</table>
Section 6.2
IFM Interface Commands

What Is in This Section?
This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of IFM Interface Commands</td>
<td>225</td>
</tr>
<tr>
<td>IFM Interface Commands</td>
<td>226</td>
</tr>
</tbody>
</table>
List of IFM Interface Commands

List of Commands

The following table lists the IFM interface commands, their corresponding command codes and user profiles. Follow the command execution procedures accordingly (see page 51).

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get current time (see page 226)</td>
<td>768</td>
<td>No password required</td>
</tr>
<tr>
<td>Set absolute time (see page 226)</td>
<td>769</td>
<td>No password required</td>
</tr>
<tr>
<td>Write user application name (see page 226)</td>
<td>1032</td>
<td>No password required</td>
</tr>
</tbody>
</table>

Error Codes

Error codes generated by the IFM interface are the generic error codes (see page 53).
IFM Interface Data for Masterpact MTZ Circuit Breakers

IFM Interface Commands

Get Current Time

The get current time command is not hardware protected. When the arrow of the Modbus locking pad (located on the front panel of the IFM interface) points to the closed padlock, the get current time command is still enabled.

To get the current time for all modules, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>768</td>
<td>Command code = 768</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters (bytes) = 10</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>768</td>
<td>Destination = 768 (0x0300)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following registers contain the time data:
- Register 8023 holds the month in the MSB, the day in the LSB.
- Register 8024 holds the year offset in the MSB (add 2000 to get the year) and the hour in the LSB.
- Register 8025 holds the minutes in the MSB, the seconds in the LSB.
- Register 8026 holds the milliseconds.

Set Absolute Time

The set absolute time command is not hardware protected. When the arrow of the Modbus locking pad (located on the front panel of the IFM interface) points to the closed padlock, the set absolute time command is still enabled.

To set the absolute time for all the IMU modules, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>769</td>
<td>Command code = 769</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>18</td>
<td>Number of parameters (bytes) = 18</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>768</td>
<td>Destination = 768 (0x0300)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB = month (1–12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB = day in the month (1–31)</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB = year (0–99, 0 meaning year 2000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB = hour (0–23)</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MSB = minute (0–59)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LSB = second (0–59)</td>
</tr>
<tr>
<td>0x1F48</td>
<td>8009</td>
<td>ms</td>
<td>INT16U</td>
<td>0–999</td>
<td>Milliseconds (0–999)</td>
</tr>
</tbody>
</table>

In case of 24 Vdc power loss, date and time counter is reset and will restart at January 1 2000. It is therefore mandatory to set absolute time for all the IMU modules after recovering the 24 Vdc power supply.

Furthermore, due to the clock drift of each IMU module, it is mandatory to set absolute time for all the IMU modules periodically. Recommended period is at least every 15 minutes.

Write User Application Name

The user application name can be read from registers 10242 to 10273  (see page 222).

To write the user application name, set the command registers the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1032</td>
<td>Command code = 1032</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Number of parameters (bytes) = depends on the length of the user application name (up to 46 characters)</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Destination = 0 (0x0000)</td>
</tr>
<tr>
<td>Address</td>
<td>Register</td>
<td>Unit</td>
<td>Type</td>
<td>Range</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>17039366 = User application name (load 0x0104 into register 8006, 0x0081 into 8007)</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>–</td>
<td>INT16U</td>
<td>2048</td>
<td>2048</td>
</tr>
<tr>
<td>0x1F48</td>
<td>8009</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>MSB = First character of the user application name</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STRING</td>
<td></td>
<td>LSB = Second character of the user application name</td>
</tr>
<tr>
<td>0x1F49–</td>
<td>8010–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Depends on the length of the user application name and ends by the</td>
</tr>
<tr>
<td>0x1F5F</td>
<td>8038</td>
<td>–</td>
<td>STRING</td>
<td></td>
<td>NULL character 0x00</td>
</tr>
</tbody>
</table>
Chapter 7
IFE/EIFE Interface Data for Masterpact MTZ Circuit Breakers

IFE/EIFE Interface User Guides

For more information about IFE/EIFE functions, refer to the relevant document:

- Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide  (see page 10)
- Enerlin'X EIFE - Embedded Ethernet Interface for One Masterpact MTZ Drawout Circuit Breaker - User Guide  (see page 10)
- Enerlin'X IFE - Ethernet Switchboard Server - User Guide  (see page 10)

What Is in This Chapter?

This chapter contains the following sections:

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<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>IFE/EIFE Interface Registers</td>
<td>230</td>
</tr>
<tr>
<td>7.2</td>
<td>IFE/EIFE Interface Commands</td>
<td>237</td>
</tr>
</tbody>
</table>
Section 7.1
IFE/IFE Interface Registers

What Is in This Section?
This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFE/IFE Interface Identification and Status Registers</td>
<td>231</td>
</tr>
<tr>
<td>EIFE Interface Specific Registers</td>
<td>235</td>
</tr>
<tr>
<td>IP Network Parameters</td>
<td>236</td>
</tr>
</tbody>
</table>
IFE/EIFE Interface Identification and Status Registers

IFE/EIFE Interface Firmware Revision

The IFE/EIFE interface firmware revision starts at register 11776 and has a maximum length of eight registers.

The firmware revision is an ASCII string using the format XXX.YYY.ZZZ with:
- XXX = major version (000–127)
- YYY = minor version (000–255)
- ZZZ = revision number (000–255)

The NULL character ends the revision number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2DDF–0x2DEE</td>
<td>11744–11759</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Device family</td>
</tr>
<tr>
<td>0x2DEF–0x2DF6</td>
<td>11760–11767</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product range</td>
</tr>
<tr>
<td>0x2DF7–0x2DFE</td>
<td>11768–11775</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product model</td>
</tr>
<tr>
<td>0x2DFF–0x2E04</td>
<td>11776–11781</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Firmware revision</td>
</tr>
</tbody>
</table>

IFE/EIFE Interface Hardware Revision

The IFE/EIFE interface hardware revision starts at register 11784 and has a maximum length of eight registers.

The hardware revision is an ASCII string using the format XXX.YYY.ZZZ with:
- XXX = major version (000–127)
- YYY = minor version (000–255)
- ZZZ = revision number (000–255)

The NULL character ends the revision number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E07–0x2E9C</td>
<td>11784–11789</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Hardware revision</td>
</tr>
</tbody>
</table>

IMU Identification

Identification of the IMU can be set by using the EcoStruxure Power Commission software. When not programmed, the IMU identification registers return 0 (0x0000).

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2801–0x2820</td>
<td>10242–10273</td>
<td>R-WC</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>User application name</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Device name used for acquiring the IP address using DHCP and also the friendly name on DPWS device discovery.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Example: 'IFE-0A129F'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum length is 64 characters.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E2F–0x2E38</td>
<td>11824–11833</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Vendor name = 'Schneider Electric'</td>
</tr>
<tr>
<td>0x2E39–0x2E42</td>
<td>11834–11843</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>Product code:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 'LV434001' or 'LV434010' = IFE-Ethernet com Modbus TCP/IP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 'LV434002' or 'LV434011' = IFE-Ethernet com Modbus TCP/IP master</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 'LV851001' = EIFE Embedded Ethernet interface</td>
</tr>
<tr>
<td>0x2E43–0x2E44</td>
<td>11844–11845</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
**Locking Pad Position**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E72</td>
<td>11891</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1,3</td>
<td>Locking pad position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1 = locking pad is in the locked position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 3 = locking pad is in the unlocked position</td>
</tr>
</tbody>
</table>

**Current Date and Time**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E73–</td>
<td>0x2E76</td>
<td>R–WC</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Current date and time in DATETIME format</td>
</tr>
<tr>
<td>0x2E77–</td>
<td>0x2E78</td>
<td>R</td>
<td>Seconds</td>
<td>INT32U</td>
<td>0x00–0xFFFFF</td>
<td>Number of seconds counted since last start</td>
</tr>
</tbody>
</table>

**Product Identification**

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E7C</td>
<td>11901</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>17100–17101</td>
<td>Product identification:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 17100 for IFE Ethernet interface for one circuit breaker (‘LV434001’ or ‘LV434010’)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 17101 for IFE Ethernet switchboard server (‘LV434002’ or ‘LV434011’)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 17107 for EIFE embedded Ethernet interface (‘LV851001’)</td>
</tr>
</tbody>
</table>

**Read Device Identification**

The Read Device Identification function is used to access in a standardized manner the information required to identify a device clearly. The description is made up of a set of objects (ASCII character strings).

A complete description of the Read Device Identification function is available at [www.modbus.org](http://www.modbus.org).

The coding for the identification of the IFE/EIFE interface is the following:

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor name</td>
<td>OCTET STRING</td>
<td>‘Schneider Electric’ (18 characters)</td>
</tr>
<tr>
<td>Product code</td>
<td>OCTET STRING</td>
<td>• ‘LV434001’ or ‘LV434010’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ‘LV434002’ or ‘LV434011’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ‘LV851001’ (EIFE)</td>
</tr>
<tr>
<td>Firmware revision</td>
<td>OCTET STRING</td>
<td>‘XXX.YYY.ZZZ’</td>
</tr>
<tr>
<td>Vendor URL</td>
<td>OCTET STRING</td>
<td>‘www.schneider-electric.com’ (26 characters)</td>
</tr>
<tr>
<td>Product name</td>
<td>OCTET STRING</td>
<td>• For IFE Ethernet interface for one circuit breaker (LV434001 or LV434010):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ‘Ethernet interface for LV breakers’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For IFE Ethernet switchboard server (LV434002 or LV434011):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ‘Ethernet interface for LV breakers + gateway’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For EIFE Ethernet interface (LV851001):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ‘Embedded Ethernet interface for LV breakers’</td>
</tr>
<tr>
<td>Family</td>
<td>OCTET STRING</td>
<td>‘Gateway and server’</td>
</tr>
<tr>
<td>Range</td>
<td>OCTET STRING</td>
<td>‘Enerlin’X’</td>
</tr>
<tr>
<td>Model</td>
<td>OCTET STRING</td>
<td>‘IFE Ethernet interface’, ‘IFE/Gateway’, or ‘EIFE Ethernet interface’</td>
</tr>
<tr>
<td>Product ID</td>
<td>INT16U</td>
<td>Product ID of the core of IMU:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 17100 = IFE without gateway</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 17101 = IFE with gateway</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 17107 = EIFE</td>
</tr>
</tbody>
</table>
### Mac Address of the IFE/EIFE Server

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E7D– 0x2E7F</td>
<td>11902– 11904</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>MAC address of the IFE/EIFE interface coded over 3 registers (6 bytes) in hexadecimal.</td>
</tr>
</tbody>
</table>

**Example:** The MAC address 00:80:F4:02:12:34 (or 00-80-F4-02-12-34) is coded in hexadecimal as follows: 0080F4021234 (0x00 0x80 0xF4 0x02 0x12 0x34).

### Manufacturing Date and Time

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2E89– 0x2E8C</td>
<td>11914– 11917</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Manufacturing date and time</td>
</tr>
</tbody>
</table>

### IFE Interface Serial Number

The IFE interface serial number is composed of a maximum of 11 alphanumeric characters with the following format: PPYYWWDDnnnn.

- **PP** = plant code
- **YY** = year of fabrication (05–99)
- **WW** = week of fabrication (01–53)
- **D** = day of fabrication (1–7)
- **nnnn** = production number of the device on the day (0001–9999)

A read request of 6 registers is necessary to read the IFE interface serial number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x02E91</td>
<td>11922</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>‘PP’</td>
</tr>
<tr>
<td>0x02E92</td>
<td>11923</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘05’–’99’</td>
<td>‘YY’</td>
</tr>
<tr>
<td>0x02E93</td>
<td>11924</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘01’–’53’</td>
<td>‘WW’</td>
</tr>
<tr>
<td>0x02E94</td>
<td>11925</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>D: ‘1’–’7’  n: ‘0’–’9’</td>
<td>‘Dn’</td>
</tr>
<tr>
<td>0x02E95</td>
<td>11926</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘00’–’99’</td>
<td>‘hn’</td>
</tr>
<tr>
<td>0x02E96</td>
<td>11927</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘0’–’9’</td>
<td>’n’ (the NULL character ends the serial number)</td>
</tr>
</tbody>
</table>

### EIFE Interface Serial Number

The EIFE interface serial number is composed of a maximum of 16 alphanumeric characters with the following format: PPPPPPPYYWWDLnnnn.

- **PPPPPP** = plant code
- **YY** = year of fabrication (05–99)
- **WW** = week of fabrication (01–53)
- **D** = day of fabrication (1–7)
- **L** = Line or machine number (0–9 or a–z)
- **nnnn** = production number of the device on the day (0001–9999)

A read request of 8 registers is necessary to read the EIFE interface serial number.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x02E91– 0x02E93</td>
<td>11922– 11924</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>‘PPPPPP’</td>
</tr>
<tr>
<td>0x02E94</td>
<td>11925</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘05’–’99’</td>
<td>‘YY’</td>
</tr>
<tr>
<td>0x02E95</td>
<td>11926</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘01’–’53’</td>
<td>‘WW’</td>
</tr>
<tr>
<td>0x02E96</td>
<td>11927</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>D: ‘1’–’7’  L: ‘0’–’9’ or ‘a’–’z’</td>
<td>‘DL’</td>
</tr>
</tbody>
</table>
IFE/EIFE Interface Data for Masterpact MTZ Circuit Breakers

Modbus Parameters of the IFE Server

These parameters are valid for the IFE switchboard server only.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x02E97– 0x02E98</td>
<td>11928–11929</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>‘0000’–’9999’</td>
<td>‘nnnn’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x306F</td>
<td>12400</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Modbus address of IFE server (always 255)</td>
</tr>
<tr>
<td>0x3070</td>
<td>12401</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1–3</td>
<td>Modbus parity:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = no parity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = even parity (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = odd parity</td>
</tr>
<tr>
<td>0x3071</td>
<td>12402</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>5–8</td>
<td>Modbus Baud rate:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 5 = 4800 Baud</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 6 = 9600 Baud</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 7 = 19,200 Baud (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 8 = 38,400 Baud</td>
</tr>
<tr>
<td>0x3072</td>
<td>12403</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>1,3,5</td>
<td>Number of stop bits:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = Auto (factory setting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 3 = 1 stop bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 5 = 2 stop bits</td>
</tr>
</tbody>
</table>

Time Synchronization

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3098– 0x30B7</td>
<td>12441–12472</td>
<td>R</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>The type of source use for time synchronization:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● ‘Auto–SNTP’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● ‘Manual–Modbus’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● ‘Manual–ULP’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● ‘Manual–Webpage’</td>
</tr>
<tr>
<td>0x30B8– 0x30BB</td>
<td>12473–12476</td>
<td>R</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>Date and time of last time synchronization</td>
</tr>
<tr>
<td>0x30BC– 0x30BD</td>
<td>12477–12478</td>
<td>R s</td>
<td>FLOAT32</td>
<td>–</td>
<td>–</td>
<td>Time since last time synchronization</td>
</tr>
<tr>
<td>0x30BE</td>
<td>12479</td>
<td>R</td>
<td>–</td>
<td>INT16U</td>
<td>0–2</td>
<td>Status of automatic time synchronization:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 0 = SNTP disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 1 = SNTP failed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 2 = SNTP succeeded</td>
</tr>
<tr>
<td>0x30BF</td>
<td>12480</td>
<td>R</td>
<td>–</td>
<td>INT16</td>
<td>–</td>
<td>SNTP fails count</td>
</tr>
</tbody>
</table>
### IFE Interface Specific Registers

#### Cradle Alarms

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x3997   | 14744    | R  | –    | INT16U| –     | –   | Quality of each bit of register 14745:  
|          |          |    |      |       |       |     | • 0 = Invalid  
|          |          |    |      |       |       |     | • 1 = Valid  
| 0x3998   | 14745    | R  | –    | INT16U| –     | –   | Cradle management alarms register  
|          |          |    |      |       |       |     | 0 Cradle position discrepancy  
|          |          |    |      |       |       |     | 1 Remove device from cradle and put it back  
|          |          |    |      |       |       |     | 2 Cradle has reached its maximum number of operations  
|          |          |    |      |       |       |     | 3 Remaining service life of cradle is below alarm threshold  
|          |          |    |      |       |       |     | 4 New Micrologic control unit has been detected  
|          |          |    |      |       |       |     | 5–15 Reserved |

#### Cradle Management

The table describes the registers related to the Cradle management function performed by EIFE embedded Ethernet interface.

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x3BC3   | 15300    | R-RC | –    | INT16U| –     | –   | Quality of each bit of register 15301:  
|          |          |    |      |       |       |     | • 0 = Invalid  
|          |          |    |      |       |       |     | • 1 = Valid  
| 0x3BC4   | 15301    | R-RC | –    | INT16U| –     | –   | Cradle status  
|          |          |    |      |       |       |     | 0–7 Reserved  
|          |          |    |      |       |       |     | 8 Device in disconnected position (CD)  
|          |          |    |      |       |       |     | 9 Device in connected position (CE)  
|          |          |    |      |       |       |     | 10 Device in the test position (CT)  
|          |          |    |      |       |       |     | 11–15 Reserved  
| 0x3BC5–  | 15302–   | R-RC-WC | –    | INT32U| 0–65534| –   | Cradle connected position counter  
| 0x3BC6   | 15303    |    |      |       |       |     | This counter increments for each rising edge of the cradle connected position  
| 0x3BC7–  | 15304–   | R-RC-WC | –    | INT32U| 0–65534| –   | Cradle disconnected position counter  
| 0x3BC8   | 15305    |    |      |       |       |     | This counter increments for each rising edge of the cradle disconnected position  
| 0x3BC9–  | 15306–   | R-RC-WC | –    | INT32U| 0–65534| –   | Cradle test position counter  
| 0x3BCA   | 15307    |    |      |       |       |     | This counter increments for each rising edge of the cradle test position  
| 0x3BCB–  | 15308–   | R-RC | –    | DATETIME| –     | –   | Timestamp of the last change for the cradle connected position  
| 0x3BCE   | 15311    |    |      |       |       |     |  
| 0x3BCF–  | 15312–   | R-RC | –    | DATETIME| –     | –   | Timestamp of the last change for the cradle disconnected position  
| 0x3BD2   | 15315    |    |      |       |       |     |  
| 0x3BD3–  | 15316–   | R-RC | –    | DATETIME| –     | –   | Timestamp of the last change for the cradle test position  
| 0x3BD6   | 15319    |    |      |       |       |     |  
| 0x3BD7–  | 15320–   | R-WC | –    | INT32U| –     | –   | Operating time since last grease maintenance  
| 0x3BD8   | 15321    |    |      |       |       |     |  
| 0x3BD9–  | 15322–   | R-WC | –    | INT32U| –     | –   | Operating time since last move connected position  
| 0x3BDA   | 15323    |    |      |       |       |     |  
| 0x3DB    | 15324    | R   | –    | INT16U| 0-65534| –   | Cradle contact regrease counter  
| 0x3DCE–  | 15325–   | –    | –    | –     | –     | –   | Reserved  
| 0x3BEO   | 15329    |    |      |       |       |     |  

**DOCA0105EN-05 05/2019**
IP Network Parameters

### Network Parameters

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x27FF–</td>
<td>0x2800</td>
<td>R</td>
<td>–</td>
<td>INT32</td>
<td>0–1</td>
<td>Network configuration mode:</td>
</tr>
<tr>
<td></td>
<td>0x27FF–0x2800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = IPv4 only</td>
</tr>
<tr>
<td></td>
<td>0x27FF–0x2800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = IPv4 and IPv6</td>
</tr>
</tbody>
</table>

### IPv4 Parameters

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2823–</td>
<td>0x2824</td>
<td>R-WC</td>
<td>–</td>
<td>INT32U</td>
<td>0–2</td>
<td>IPv4 address acquisition mode, set by using the EcoStruxure Power Commission software:</td>
</tr>
<tr>
<td></td>
<td>0x2823–0x2824</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = Static</td>
</tr>
<tr>
<td></td>
<td>0x2823–0x2824</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = BootP</td>
</tr>
<tr>
<td></td>
<td>0x2823–0x2824</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 2 = DHCP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2825–</td>
<td>0x2826</td>
<td>R</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>IPv4 address acquisition status:</td>
</tr>
<tr>
<td></td>
<td>0x2825–0x2826</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 0 = IP acquisition successful</td>
</tr>
<tr>
<td></td>
<td>0x2825–0x2826</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 1 = IP acquisition in progress</td>
</tr>
<tr>
<td></td>
<td>0x2825–0x2826</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 2 = Acquired IP address is duplicated</td>
</tr>
<tr>
<td></td>
<td>0x2825–0x2826</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- 3 = Error in IP acquisition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2827–</td>
<td>0x2828</td>
<td>R-WC</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>IPv4 address of IFE/EIFE interface</td>
</tr>
<tr>
<td></td>
<td>0x2827–0x2828</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Example: 169.254.1.1</td>
</tr>
<tr>
<td></td>
<td>0x2827–0x2828</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Register 10280 = 0xA9FE</td>
</tr>
<tr>
<td></td>
<td>0x2827–0x2828</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Register 10281 = 0x0101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x2829–</td>
<td>0x282A</td>
<td>R-WC</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>IPv4 subnet mask</td>
</tr>
<tr>
<td></td>
<td>0x2829–0x282A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Example: 255.255.0.0</td>
</tr>
<tr>
<td></td>
<td>0x2829–0x282A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Register 10282 = 0xFFFF</td>
</tr>
<tr>
<td></td>
<td>0x2829–0x282A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Register 10283 = 0x0000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x282B–</td>
<td>0x282C</td>
<td>R-WC</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>IPv4 default gateway address</td>
</tr>
<tr>
<td></td>
<td>0x282B–0x282C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Example: 169.154.1.1</td>
</tr>
<tr>
<td></td>
<td>0x282B–0x282C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Register 10284 = 0xA9FE</td>
</tr>
<tr>
<td></td>
<td>0x282B–0x282C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Register 10285 = 0x0101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Register Range</th>
<th>RW</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x282D–</td>
<td>0x2846</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x282D–</td>
<td>0x2846</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 7.2
IFE/EIFE Interface Commands

What Is in This Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of IFE/EIFE Interface Commands</td>
<td>238</td>
</tr>
<tr>
<td>IFE/EIFE Interface Generic Commands</td>
<td>239</td>
</tr>
<tr>
<td>EIFE Interface Specific Commands</td>
<td>241</td>
</tr>
</tbody>
</table>
List of IFE/EIFE Interface Commands

List of Commands for IFE/EIFE Interfaces
The following table lists the IFE/EIFE interface commands, their corresponding command codes and user profiles. Follow the command execution procedures accordingly (see page 51).

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get current time (see page 239)</td>
<td>768</td>
<td>No password required</td>
</tr>
<tr>
<td>Set absolute time (see page 239)</td>
<td>769</td>
<td>No password required</td>
</tr>
<tr>
<td>Write user application name (see page 239)</td>
<td>1032</td>
<td>No password required</td>
</tr>
</tbody>
</table>

List of Specific Commands for EIFE Interface
The following table lists the EIFE interface commands, their corresponding command codes and user profiles. Follow the command execution procedures accordingly.

<table>
<thead>
<tr>
<th>Command</th>
<th>Command code</th>
<th>User profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset EIFE alarms (see page 241)</td>
<td>41099</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Preset cradle/drawer counters (see page 241)</td>
<td>41352</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Preset regrease timers (see page 241)</td>
<td>41353</td>
<td>Administrator or Operator</td>
</tr>
<tr>
<td>Get all events (see page 241)</td>
<td>50560</td>
<td>No password required</td>
</tr>
</tbody>
</table>

Error Codes
Error codes generated by the IFE/EIFE interface are the generic error codes (see page 53).
IFE/EIFE Interface Data for Masterpact MTZ Circuit Breakers

IFE/EIFE Interface Generic Commands

Get Current Time
The get current time command is not hardware protected. The get current time command is still enabled when the locking pad located on the front panel on the IFE/EIFE interface is in locked position.

To get the current time for all modules, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>768</td>
<td>Command code = 768</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>10</td>
<td>Number of parameters (bytes) = 10</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>8704</td>
<td>Destination = 8704 (0x2200)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following registers contain the time data:
- Register 8023 holds the month in the MSB, the day in the LSB.
- Register 8024 holds the year offset in the MSB (add 2000 to get the year) and the hour in the LSB.
- Register 8025 holds the minutes in the MSB, the seconds in the LSB.
- Register 8026 holds the milliseconds.

Set Absolute Time
The set absolute time command is still enabled when the locking pad located on the front panel on the IFE/EIFE interface is in locked position.

To set the absolute time for all the IMU modules, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>769</td>
<td>Command code = 769</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>18</td>
<td>Number of parameters (bytes) = 18</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>8704</td>
<td>Destination = 8704 (0x2200)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>0</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8006–</td>
<td>–</td>
<td>XDATE</td>
<td>–</td>
<td>Current date/time</td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Date and time counter is reset and will restart at January 1, 2000 when the internal battery of the Micrologic X control unit is removed, if the control unit has no other power supply.

NOTE: If the IFE/EIFE interface is not configured in SNTP mode it is mandatory to set absolute time for all the IMU modules periodically, due to the clock drift of each IMU module. Recommended period is at least every 15 minutes.

Write User Application Name
The user application name can be read from registers 10242 to 10273 (see page 231).

To write the user application name, set the command registers the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>1032</td>
<td>Command code = 1032</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>Number of parameters (bytes) = depends on the length of the user application name (up to 46 characters)</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>Destination = 0 (0x0000)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>1</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>–</td>
<td>OCTET</td>
<td>–</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F44</td>
<td>8005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>17039366 = User application name (load 0x0104 into register 8006, 0x0081 into 8007)</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td></td>
<td>INT16U</td>
<td>2048</td>
<td>2048</td>
</tr>
</tbody>
</table>
### IFE/EIFE Interface Data for Masterpact MTZ Circuit Breakers

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x1F48  | 8009     | –    | OCTET STRING | –     | ● MSB = First character of the user application name  
                          ● LSB = Second character of the user application name |
| 0x1F49–0x1F5F | 8010–8038 | –    | OCTET STRING | –     | Depends on the length of the user application name and ends by the NULL character 0x00 |
### EIFE Interface Specific Commands

#### Reset EIFE Alarms

To reset EIFE interface alarms, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>INT16U</td>
<td>41099</td>
<td></td>
<td>Command code = 41099</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>INT16U</td>
<td>10</td>
<td></td>
<td>Number of parameters (bytes) = 10</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>INT16U</td>
<td>8705</td>
<td>(0x2201)</td>
<td>Destination = 8705 (0x2201)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>INT16U</td>
<td>1</td>
<td></td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>OCTET</td>
<td>STRING</td>
<td></td>
<td>Password of the command: Administrator or Operator user profile password</td>
</tr>
</tbody>
</table>

#### Preset Cradle/Drawer Counters

To preset the cradle or drawer counters, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>INT16U</td>
<td>41352</td>
<td></td>
<td>Command code = 41352</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>INT16U</td>
<td>16</td>
<td></td>
<td>Number of parameters (bytes) = 16</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>INT16U</td>
<td>8705</td>
<td>(0x2201)</td>
<td>Destination = 8705 (0x2201)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>INT16U</td>
<td>1</td>
<td></td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>OCTET</td>
<td>STRING</td>
<td></td>
<td>Connected counter reset/preset:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–65534 = preset value of the connected counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 65535 (0xFFFF) = do not preset the connected counter</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>INT16U</td>
<td>0–65535</td>
<td></td>
<td>Disconnected counter reset/preset:</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>INT16U</td>
<td>0–65535</td>
<td></td>
<td>• 0–65534 = preset value of the disconnected counter</td>
</tr>
<tr>
<td>0x1F47</td>
<td>8008</td>
<td>INT16U</td>
<td>0–65535</td>
<td></td>
<td>• 65535 (0xFFFF) = do not preset the disconnected counter</td>
</tr>
</tbody>
</table>

#### Preset Regrease Timers

To preset regrease timers, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>INT16U</td>
<td>41353</td>
<td></td>
<td>Command code = 41353</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>INT16U</td>
<td>18</td>
<td></td>
<td>Number of parameters (bytes) = 18</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>INT16U</td>
<td>8705</td>
<td>(0x2201)</td>
<td>Destination = 8705 (0x2201)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>INT16U</td>
<td>1</td>
<td></td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43–</td>
<td>8004–</td>
<td>OCTET</td>
<td>STRING</td>
<td></td>
<td>Operating time since last grease maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–157766400 = preset value of regrease timer counter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 4294967295 (0xFFFFFFFF) = No preset</td>
</tr>
<tr>
<td>0x1F45–</td>
<td>8006–</td>
<td>INT16U</td>
<td>–</td>
<td></td>
<td>Operating time since last move in rack in position (delay from last</td>
</tr>
<tr>
<td></td>
<td>8007</td>
<td></td>
<td></td>
<td></td>
<td>disconnection)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 0–28944000 = preset value of remove timer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 4294967295 (0xFFFFFFFF) = No preset</td>
</tr>
</tbody>
</table>

#### Get All Events

The command allows to get 10 events maximum. To get more than 10 events, several commands are necessary.

There are two methods to get events:

- get the 10 last events
- get all events from an event sequence number
The event sequence number is an event identifier defined by the EIFE interface, and available among the event characteristics.

To get events, set the command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F3F</td>
<td>8000</td>
<td>–</td>
<td>INT16U</td>
<td>50560</td>
<td>–</td>
<td>Command code = 50560</td>
</tr>
<tr>
<td>0x1F40</td>
<td>8001</td>
<td>–</td>
<td>INT16U</td>
<td>27</td>
<td>–</td>
<td>Number of parameters (bytes) = 27</td>
</tr>
<tr>
<td>0x1F41</td>
<td>8002</td>
<td>–</td>
<td>INT16U</td>
<td>8705</td>
<td>(0x2201)</td>
<td>Destination = 8705 (0x2201)</td>
</tr>
<tr>
<td>0x1F42</td>
<td>8003</td>
<td>–</td>
<td>INT16U</td>
<td>0</td>
<td>–</td>
<td>Security type of the command</td>
</tr>
<tr>
<td>0x1F43-0x1F44</td>
<td>8004-8005</td>
<td>–</td>
<td>OCTET STRING</td>
<td>–</td>
<td>–</td>
<td>Password of the command = 0 (no password required)</td>
</tr>
<tr>
<td>0x1F45</td>
<td>8006</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F46</td>
<td>8007</td>
<td>–</td>
<td>INT16U</td>
<td>0, 2</td>
<td>–</td>
<td>Requested get event method:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 0 = 10 last events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 2 = Events from a sequence number</td>
</tr>
<tr>
<td>0x1F47-0x1F4A</td>
<td>8008-8011</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F4B-0x1F4C</td>
<td>8012-8013</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>Requested event sequence number (for method 2 only)</td>
</tr>
<tr>
<td>0x1F4D</td>
<td>8014</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Requested event severity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0–7 Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15 Reserved</td>
</tr>
</tbody>
</table>

Events are returned to command registers in the following way:

<table>
<thead>
<tr>
<th>Address</th>
<th>Register</th>
<th>Unit</th>
<th>Type</th>
<th>Range</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1F53</td>
<td>8020</td>
<td>–</td>
<td>INT16U</td>
<td>50560</td>
<td>–</td>
<td>Last command code</td>
</tr>
<tr>
<td>0x1F54</td>
<td>8021</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Command status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 0 = Successful command</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– Other value = command with error <em>(see page 53)</em></td>
</tr>
<tr>
<td>0x1F55</td>
<td>8022</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Number of bytes returned</td>
</tr>
<tr>
<td>0x1F56</td>
<td>8023</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Reserved</td>
</tr>
<tr>
<td>0x1F57</td>
<td>8024</td>
<td>–</td>
<td>INT16U</td>
<td>0, 2</td>
<td>–</td>
<td>Responded event requested method:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 0 = 10 last events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 2 = Events from a sequence number</td>
</tr>
<tr>
<td>0x1F5E</td>
<td>8031</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Responded event severity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0–7 Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11–15 Reserved</td>
</tr>
<tr>
<td>0x1F5F</td>
<td>8032</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>MSB: Number of events returned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– LSB: Remaining events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 0 = No more events to get</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>– 1 = More events to get</td>
</tr>
<tr>
<td>0x1F60</td>
<td>8033</td>
<td>–</td>
<td>INT16U</td>
<td>1013-25630</td>
<td>–</td>
<td>First event code <em>(see page 243)</em></td>
</tr>
<tr>
<td>0x1F61-0x1F64</td>
<td>8034-8037</td>
<td>–</td>
<td>DATETIME</td>
<td>–</td>
<td>–</td>
<td>Timestamp of the first event</td>
</tr>
<tr>
<td>0x1F65</td>
<td>8038</td>
<td>–</td>
<td>INT16U</td>
<td>–</td>
<td>–</td>
<td>Timestamp quality of the first event</td>
</tr>
<tr>
<td>0x1F66-0x1F67</td>
<td>8039-8040</td>
<td>–</td>
<td>INT32U</td>
<td>–</td>
<td>–</td>
<td>First event sequence number</td>
</tr>
</tbody>
</table>
### IFE/EIFE Interface Data for Masterpact MTZ Circuit Breakers

#### EIFE Interface Events

<table>
<thead>
<tr>
<th>Event Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2304 (0x0900)</td>
<td>Cradle position discrepancy</td>
</tr>
<tr>
<td>2305 (0x0901)</td>
<td>Cradle connected contact change</td>
</tr>
<tr>
<td>2306 (0x0902)</td>
<td>Cradle disconnected contact change</td>
</tr>
<tr>
<td>2307 (0x0903)</td>
<td>Cradle test contact change</td>
</tr>
<tr>
<td>2308 (0x0904)</td>
<td>Remove device from cradle and put it back</td>
</tr>
<tr>
<td>2309 (0x0905)</td>
<td>Cradle has reached its maximum number of operations</td>
</tr>
<tr>
<td>2310 (0x0906)</td>
<td>Remaining service life of cradle is below alarm threshold</td>
</tr>
<tr>
<td>2311 (0x0907)</td>
<td>New Micrologic control unit has been detected</td>
</tr>
</tbody>
</table>
Appendix A
Micrologic X Events

What Is in This Chapter?
This chapter contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event History</td>
<td>248</td>
</tr>
<tr>
<td>Event List</td>
<td>249</td>
</tr>
</tbody>
</table>
Event History

Overview

All events are logged in one of the histories of the Micrologic X control unit:
- Trip
- Protection
- Diagnostic
- Metering
- Configuration
- Operation
- Communication

All severities of events are logged, including low-severity events.

Events logged in histories are displayed as follows:
- On the Micrologic X display screen
- With EcoStruxure Power Commission software
- With the EcoStruxure Power Device app

The event histories can be downloaded using the communication network.

The following information is logged in a history for each event:
- Event ID: event code
- Event type: Entry/Exit or Pulse
- Time stamp: date and time of occurrence and completion
- Context data (only for certain events)

Maximum Number of Events in Each History

Each history has a predefined maximum size. When a history is full, each new event overwrites the oldest event in the relevant history.

<table>
<thead>
<tr>
<th>Event history</th>
<th>Maximum number of events stored in history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip</td>
<td>50</td>
</tr>
<tr>
<td>Protection</td>
<td>100</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>300</td>
</tr>
<tr>
<td>Metering</td>
<td>300</td>
</tr>
<tr>
<td>Configuration</td>
<td>100</td>
</tr>
<tr>
<td>Operation</td>
<td>300</td>
</tr>
<tr>
<td>Communication</td>
<td>100</td>
</tr>
</tbody>
</table>

Displaying Event History on Micrologic X Display Screen

For more information about how events are displayed on Micrologic X display screen, refer to Alarm and History menu.

Displaying Event History on EcoStruxure Power Commission Software

All events logged in histories can be consulted using EcoStruxure Power Commission software. The events can be exported as an Excel file.

Events in histories are displayed in chronological order, starting with the most recent event.

Displaying Event History on EcoStruxure Power Device App

All events logged in histories are displayed on the EcoStruxure Power Device app.

Events in histories are displayed in chronological order, starting with the most recent event.

Events can be sorted by date and time, or by sequence number, and filtered by using the following criteria:
- Type
- Severity
- History

Clicking on a specific event in the list displays a list of all occurrences of the same event, in chronological order.
Event List

Event Characteristics

The events are listed according to the history in which they are logged (see page 248).

Each event is defined by the following characteristics:

- Code: event code
- User message
- History (see page 248)
- Type: not customizable
  - Entry/Exit: occurrence/completion event.
  - Pulse: instantaneous event.
- Latched:
  - Yes: the event is latched and the user must reset the event status.
  - No: the event is unlatched.

NOTE: The latch mode of events marked (1) in the following tables can be customized with EcoStruxure Power Commission software.

- Activity:
  - Enabled
  - Disabled

NOTE: The activity of events marked (1) in the following tables can be customized with EcoStruxure Power Commission software.

- Severity:
  - High severity events.
  - Medium severity events.
  - Low severity events.

- Service LED:
  - Yes: the service LED is lit in either orange or red, depending on the severity of the event.
    Maintenance action is required
  - No: the service LED is not lit. No maintenance action is required.

Trip Events

<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latched</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x6400 (25600)</td>
<td>Ir trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6401 (25601)</td>
<td>Isd trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6402 (25602)</td>
<td>li trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6403 (25603)</td>
<td>Ig trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6404 (25604)</td>
<td>IΔn trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6406 (25606)</td>
<td>Ultimate self-protection trip (SELLIM)</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6407 (25607)</td>
<td>Self diagnostic trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x641D (25629)</td>
<td>Ultimate self-protection trip (DIN/DINF)</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x641E (25630)</td>
<td>IΔn/Ig test trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6414 (25620)</td>
<td>Reverse power trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x6410 (25616)</td>
<td>Undervoltage on 1 phase trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>0x642A (25642)</td>
<td>Undervoltage on all 3 phases trip</td>
<td>Trip</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
</tr>
</tbody>
</table>
### Protection Events

<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latched</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x631D</td>
<td>Ultimate self-protection (DIN/DINF) operate</td>
<td>Protection</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
<td>0x6306</td>
<td>Ultimate self-protection (SELLIM) operate</td>
<td>Protection</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
<td>0x0F11</td>
<td>Thermal memory reset order</td>
<td>Protection</td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>0x03F5</td>
<td>Ir prealarm (I &gt; 90% Ir)</td>
<td>Protection</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
<td>0x6200</td>
<td>Ir start (I &gt; 105% Ir)</td>
<td>Protection</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
<td>0x6300</td>
<td>Ir operate</td>
<td>Protection</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
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<td>0x6211</td>
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<td>0x622B</td>
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<td>Protection</td>
<td>Entry/Exit</td>
<td>No</td>
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(1) Customizable with EcoStruxure Power Commission software
### Diagnostic Events

<table>
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<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latch</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1120 (4384)</td>
<td>Communication lost with IO#1 module</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Medium</td>
<td>No</td>
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<td>0x1121 (4385)</td>
<td>Communication lost with IO#2 module</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Medium</td>
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<tr>
<td>0x1122 (4386)</td>
<td>Communication lost with EIFE or IFE module</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Medium</td>
<td>No</td>
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<tr>
<td>0x1123 (4387)</td>
<td>Communication lost with IFM module</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>Yes</td>
<td>Enabled&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Medium</td>
<td>No</td>
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<tr>
<td>0x1302 (4866)</td>
<td>Control unit in test mode</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
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<tr>
<td>0x1303 (4867)</td>
<td>Injection test in progress</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
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<td>0x1304 (4868)</td>
<td>Test aborted by user</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
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<td>0x142C (5164)</td>
<td>Ig protection configured in OFF mode</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
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<td>0x1400 (5120)</td>
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<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
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<sup>(1)</sup> Customizable with EcoStruxure Power Commission software
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<th>Code</th>
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<th>History</th>
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<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
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<td>0x1404(5124)</td>
<td>Control unit self test major malfunction 2</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
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<td>Diagnostic</td>
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<td>0x1406(5126)</td>
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<td>0x1402(5122)</td>
<td>Internal current sensor disconnected</td>
<td>Diagnostic</td>
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<td>No</td>
<td>Enabled</td>
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<td>0x1403(5123)</td>
<td>External neutral current sensor disconnected</td>
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<td>Earth leakage (Vigi) sensor disconnected</td>
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<td>Enabled</td>
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<td>0x1430(5168)</td>
<td>Protection settings reset to factory values</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
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<td>0x142F(5167)</td>
<td>Last modification of protection settings has not been completely applied</td>
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<td>0x140F(5135)</td>
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<td>Enabled</td>
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<td>0x1474(5236)</td>
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<td>0x1475(5237)</td>
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<td>0x140A(5130)</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
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<th>Latch</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
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<td>Entry/Exit</td>
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<td>Entry/Exit</td>
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<td>Replace battery</td>
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<td>Entry/Exit</td>
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<td>Battery not detected</td>
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<td>0x1436</td>
<td>Control Unit alarm reset</td>
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<td>Pulse</td>
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<td>Self diagnostic test - firmware</td>
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<td>Entry/Exit</td>
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<td>Unable to read sensor plug</td>
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<td>Entry/Exit</td>
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<td>Critical hardware modules discrepancy</td>
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<td>Non critical hardware modules discrepancy</td>
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<td>0x0DD9</td>
<td>Firmware discrepancy within control unit</td>
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<td>Entry/Exit</td>
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<td>0x1413</td>
<td>( I_{\Delta n} ) test - no trip ( I_{\Delta n} ) ( I_g )</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
<td>High</td>
<td>No</td>
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<td>0x142A</td>
<td>( I_{\Delta n} ) test button pressed ( I_{\Delta n} ) ( I_g )</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
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<td>0x1305</td>
<td>ZSI test in progress</td>
<td>Diagnostic</td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
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<td>No</td>
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<td>0x1440</td>
<td>Contact wear is above 60%. Check contacts</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
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<td>0x1441</td>
<td>Contact wear os above 95%. Plan for replacement</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
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<td>Enabled(1)</td>
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<td>0x1442</td>
<td>Contacts 100% worn out. CB needs to be replaced</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
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<td>Remaining service life of circuit breaker is below alarm threshold</td>
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<td>Invalid self test - MX1 voltage release</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
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<td>MX1 voltage release not detected</td>
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<td>MCH charging operations above threshold</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
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</table>

(1) Customizable with EcoStruxure Power Commission software
### Micrologic X Events

<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latch</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1463 (5219)</td>
<td>XF voltage release not detected</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Disabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1464 (5220)</td>
<td>Invalid self test - MN undervoltage release</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1465 (5221)</td>
<td>MN undervoltage release not detected</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Disabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1466 (5222)</td>
<td>Voltage loss on MN undervoltage release</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Disabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1467 (5223)</td>
<td>Communication loss on MN undervoltage release</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Disabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1468 (5224)</td>
<td>Invalid self test - MX2 voltage release</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1469 (5225)</td>
<td>MX2 voltage release not detected</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Disabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1306 (4870)</td>
<td>Presence of external 24V power supply</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>0x1438 (5176)</td>
<td>Main voltage loss and CB is closed</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
<td>0x1445 (5189)</td>
<td>Remaining service life of Micrologic is below alarm threshold</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1446 (5190)</td>
<td>Micrologic control unit has reached the max service life</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1452 (5202)</td>
<td>MX1 voltage release operation counter is above alarm threshold</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1453 (5203)</td>
<td>MX1 voltage release has reached the max number of operations</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1454 (5204)</td>
<td>XF voltage release operation counter is above alarm threshold</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1455 (5205)</td>
<td>XF voltage release has reached the max number of operations</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1456 (5206)</td>
<td>MN undervoltage release operation counter is above alarm threshold</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1457 (5207)</td>
<td>MN undervoltage release has reached the max number of operations</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1458 (5208)</td>
<td>MX2 voltage release operation counter is above alarm threshold</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1459 (5209)</td>
<td>MX2 voltage release has reached the max number of operations</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1480 (5248)</td>
<td>Schedule basic maintenance within one month</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Disabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1481 (5249)</td>
<td>Schedule standard maintenance within one month</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>0x1482 (5250)</td>
<td>Schedule manufacturer maintenance within three months</td>
<td>Diagnostic</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled(1)</td>
<td>Medium</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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### Metering Events

<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latch</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0F12 (3858)</td>
<td>Reset Min/Max currents</td>
<td>Metering</td>
<td>Pulse</td>
<td>No(1)</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>0x0F13 (3859)</td>
<td>Reset Min/Max voltages</td>
<td>Metering</td>
<td>Pulse</td>
<td>No(1)</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>0x0F14 (3860)</td>
<td>Reset Min/Max power</td>
<td>Metering</td>
<td>Pulse</td>
<td>No(1)</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>0x0F15 (3861)</td>
<td>Reset Min/Max frequency</td>
<td>Metering</td>
<td>Pulse</td>
<td>No(1)</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
</tbody>
</table>

(1) Customizable with EcoStruxure Power Commission software
### Operation Events

<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latch</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0C02</td>
<td>ERMS engaged for more than 24 hours</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1000</td>
<td>Circuit breaker opened</td>
<td>Operation Pulse No Enabled(1) Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1001</td>
<td>Circuit breaker closed</td>
<td>Operation Pulse No Enabled(1) Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0411</td>
<td>Closing order sent to XF</td>
<td>Operation Pulse No Enabled(1) Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0410</td>
<td>Opening order sent to MX</td>
<td>Operation Pulse No Enabled(1) Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0002</td>
<td>Manual mode enabled</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0004</td>
<td>Local mode enabled</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x111F</td>
<td>Allow control by digital input is disabled</td>
<td>Operation Pulse No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x00A</td>
<td>Closing inhibited by communication</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x009</td>
<td>Closing inhibited through IO module</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1307</td>
<td>Alarm reset</td>
<td>Operation Pulse No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x130B</td>
<td>M2C output 1 is forced</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x130C</td>
<td>M2C output 2 is forced</td>
<td>Operation Entry/Exit No Enabled Low No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Configuration Events

<table>
<thead>
<tr>
<th>Code</th>
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<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0D06</td>
<td>Config error IO/ CU: dual settings or inhibit close</td>
<td>Configuration</td>
<td>Entry/Exit No Enabled Medium No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0D0C</td>
<td>Config error IO/ CU: optional protection inhibit</td>
<td>Configuration</td>
<td>Entry/Exit No Enabled Medium No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0D0D</td>
<td>Config, error IO and CU - Local/Remote mode</td>
<td>Configuration</td>
<td>Entry/Exit No Enabled Medium No</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

(1) Customizable with EcoStruxure Power Commission software
## Micrologic X Events

### Communication Events

<table>
<thead>
<tr>
<th>Code</th>
<th>User message</th>
<th>History</th>
<th>Type</th>
<th>Latch</th>
<th>Activity</th>
<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1128</td>
<td>Control unit firmware update mode</td>
<td>Configuration</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(4395)</td>
<td>Control unit firmware update</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x112C</td>
<td>Control unit firmware update</td>
<td></td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
<td>Medium</td>
<td>No</td>
</tr>
<tr>
<td>(4396)</td>
<td>unsuccessful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1107</td>
<td>Date and time set</td>
<td></td>
<td>Pulse</td>
<td>No&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(4359)</td>
<td>Date and time set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1130</td>
<td>Digital Module license installed</td>
<td></td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(4400)</td>
<td>Digital Module license installed</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>0x1131</td>
<td>Digital Module license uninstalled</td>
<td></td>
<td>Pulse</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(4401)</td>
<td>Digital Module license uninstalled</td>
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</tr>
</tbody>
</table>

<sup>(1)</sup> Customizable with EcoStruxure Power Commission software

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### Communication Events

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<tr>
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<th>Severity</th>
<th>Service LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1301</td>
<td>Connection on USB port</td>
<td>Communication</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(4865)</td>
<td>Connection on USB port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1429</td>
<td>Bluetooth communication enabled</td>
<td>Communication</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(5161)</td>
<td>Bluetooth communication enabled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x1427</td>
<td>Connection on Bluetooth port</td>
<td>Communication</td>
<td>Entry/Exit</td>
<td>No</td>
<td>Enabled</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>(5159)</td>
<td>Connection on Bluetooth port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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