TERASAKI
Innovators in Protection Technology

Exclusive
Partner

NHP

TemBreak PRO

Ethernet/IP Module

Ethernet/IP Interface for TemCom *PRO* Communications Module and P Model Smart Energy Moulded Case Circuit Breaker

USER MANUAL

Version
1.0.0

Using this manual

Safety Precautions

Authorised Personnel Only
The product or system described in this documentation must be installed, operated and maintained by qualified personnel only. NHP or Terasaki accept no responsibility for the consequences of the use of this equipment by unqualified personnel.
A qualified person is one with the necessary skills and knowledge of the construction and operation of the installation of electrical equipment, and has been trained to identify and avoid risks.

Appropriate use of NHP / Terasaki products
NHP / Terasaki products are intended to be used only for the applications described in the catalog and technical documentation, which is dedicated to them.
If products and components from other manufacturers are used, they must be recommended or approved by NHP or Terasaki.
Appropriate use of NHP / Terasaki products during transport, storage, installation, assembly, commissioning, operation and maintenance is necessary to ensure safe operation and without any problems.
The permissible ambient conditions must be met. The information contained in the technical documentation must be observed.

Publication of responsibility
The contents of this document have been reviewed to ensure that the reliability of the information is correct at time of publication.
NHP or Terasaki are not responsible for printing or damage resulting from errors. NHP or Terasaki reserve the right to make corrections and changes needed in subsequent edition.

Warnings and notes
This documentation contains safety instructions that you must follow for your personal safety and to prevent damage to property.
Safety instructions, referring to your personal safety are reported in the literature by a safety alert symbol.

Safety warning symbols and the words below are classified according to the degree of risk.

WARNING: Indicates an imminently hazardous situation which, if it can not be avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if it can not be avoided, can result serious injury or death.

WARNING: Indicates a potentially hazardous situation which, if it can not be avoided, may cause minor or moderate injury.

Notice: Indicates a warning of property damage and can also indicate important operating and especially useful information on the product, that it should pay particular attention to efficient and safe operation.

Summary of Changes

This section highlights the details of changes made since the previous issue of this document.

The versioning convention used to track changes in this document follows the structure V**x.y.z** where:

x: Major revision, where extensive changes are made which is generally incompatible with the previous version. Such changes may include new products and/or features, or removal of information which is no longer relevant or applicable to the previous version

y: Minor revision, where changes made do not change the overall scope of the previous version, but may include additional information which complements or corrects the previous version, or provides additional clarity on an existing topic.

z: Patch version, where small changes are made to correct minor errors or adjust existing text, charts, figures and/or images, and which do not add or remove information from the previous version. Example changes may include spelling corrections, image re-sizing and adjustments, updated images, etc.

Version	Publication date	Changes	By
V 1.0.0	19-Apr-2021	Initial release	D.NAT

Table of Contents

Introduction

The TemBreak *PRO* Ethernet/IP Module (**EIPM**) is a specially configured Allen-Bradley Micro820 controller model 2080-LC20-20QWB, designed for use in conjunction with the NHP/Terasaki TemCom *PRO* Communications Module (**TPCM**) to enable Ethernet connectivity of NHP/Terasaki TemBreak *PRO* Smart Energy (**P_SE**) MCCB's via Ethernet/IP and Modbus-TCP communication protocols.

This user manual describes the EIPM features and instructions for use and provides information for commissioning and configuring.

Who Should Use This Manual

This manual aims to provide users, electricians, panel builders and maintenance personnel, with the technical information required for commissioning and operation of the EIPM.

Users of this document must have at minimum a basic understanding of the following:

- Modbus communication (RTU and TCP)
- Serial RS-485 wiring practices
- Ethernet communication
- Ethernet/IP and CIP messaging
- Electrical circuit protection

Additional Resources

The following documents contain additional information which should be read in conjunction with this document.

Resource	Description
NHP/Terasaki TemCom *PRO* Installation Instructions TemCom_PRO-IN-001-EN	Information on installing, mounting, and wiring the TemCom *PRO* Communications Module
NHP/Terasaki TemCom *PRO* User Manual TemCom_PRO-UM-001-EN	Reference guide for the TemCom *PRO* Communication Module including information for installation, wiring, commissioning, configuration, and troubleshooting.
NHP/Terasaki TemBreak *PRO* P_SE Installation Instructions P160_3_SE-IN-001-EN P160_4_SE-IN-001-EN P250_3_SE-IN-001-EN P250_4_SE-IN-001-EN P400_3_SE-IN-001-EN P400_4_SE-IN-001-EN P630_3_SE-IN-001-EN P630_4_SE-IN-001-EN	Information on installing, mounting, and wiring the TemBreak *PRO* Smart Energy MCCB.
NHP/Terasaki TemBreak *PRO* P_SE MCCB User Manual P_SE-UM-001-EN	Reference guide for the TemBreak *PRO* Smart Energy MCCB including information for installation, wiring, commissioning, configuration, and troubleshooting.
Allen-Bradley Micro820 User Manual 2080-UM005	Reference guide for the Allen-Bradley Micro820 controller including information for installation, wiring and troubleshooting.
Allen-Bradley Micro820 Installation Instructions 2080-IN009	Information on installing, mounting, and wiring the Micro820 controller.
Allen-Bradley Micro800 RS232/485 Isolated Serial Port Plug-in Module 2080-WD002	Information on installing, mounting, and wiring the 2080-SERIALISOL Isolated serial port plug-in module.

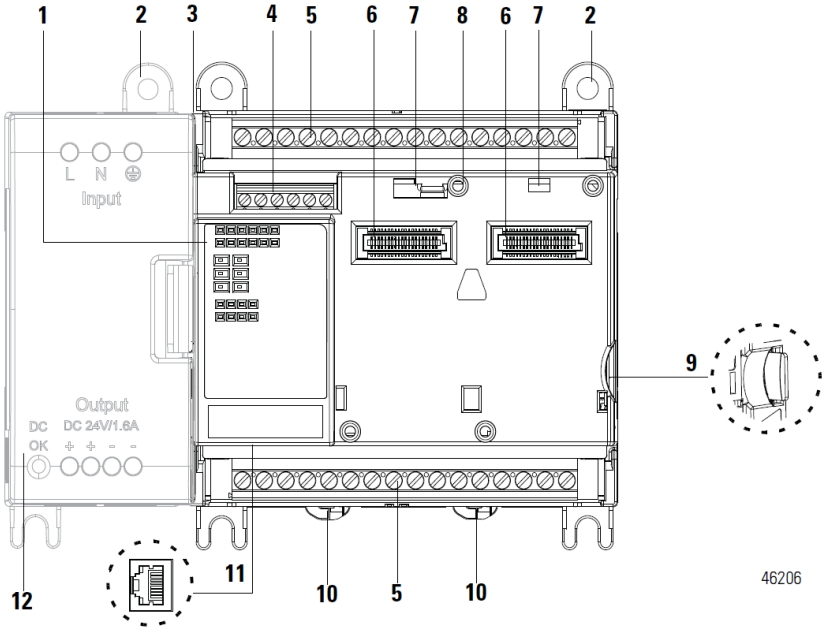
Introduction

Terminology and Abbreviations

Abbreviation	Description	Abbreviation	Description
ACP	Auxiliary Communications port: Plug for Smart auxiliary / alarm contact block	**MCCB**	Moulded Case Circuit Breaker
AL	Alarm: An auxiliary contact indicating trip status	**microSD**	Micro Secure Digital
ASCII	American Standard Code for Information Interchange	**MIP**	Maintenance Interface Port: Plug for temporary connection to OCR testing, servicing, and maintenance tools
AX or AUX	Auxiliary: Auxiliary contact indicating open / closed	**N**	Neutral
BE	Basic Electronic Trip Unit (dial type, **LSI** and **LSIG**)	**NP**	Neutral Protection
CCW	Connected Components Workbench software	**OAC**	Optional Alarm Contact: Connection connector optional alarm output contact
CIP [1] [2]	[1] Communication Interface Port: Plug for control power and data for use with the TPED and TPCM [2] Common Industrial Protocol	**OCR**	Over Current Relay
CRC	Cyclic Redundancy Check – error-detecting code used at the end of each Modbus message	**P or PTA**	Pre-trip Alarm
dec	Decimal (base-10) numbering system	**PDU**	Protocol Data Unit
DINT	Signed Double Integer datatype (4 bytes or 32 bits in length)	**PELV**	Protected Extra Low Voltage (earthed system)
EIPM	TemBreak *PRO* Ethernet/IP Module	**PTA**	Pre-Trip Alarm: is a programmable output contact to advise when a trip may be imminent.
FF	Fixed Thermal and Fixed Magnetic	**RTU**	Remote Terminal Unit
FM	Fixed Thermal and Adjustable Magnetic	**S or STD**	Short Time Protection
G or GF	Ground Fault Protection	**SE**	Smart Energy Trip Unit
hex	Hexadecimal (base-16) numbering system	**SELV**	Separated Extra Low Voltage
I or INST	Instantaneous Protection	**SN**	Solid Neutral
IEC	International Electrotechnical Commission	**SSID**	Service Set Identifier (name of the Wi-Fi wireless network)
IEEE	Institute of Electrical and Electronics Engineers	**STR**	String datatype
I_g	Ground Fault Protection Current	**TCP**	Transmission Control Protocol
I_i	Instantaneous Protection Current	**TF**	Adjustable Thermal and Fixed Magnetic
I_n	Rated Current	**THD**	Total Harmonic Distortion
I_N	Neutral Protection Current	**TM**	Adjustable Thermal Magnetic
INT	Signed Integer datatype (2 bytes or 16 bits in length)	**TPCM**	TemCom *PRO* Communication Module
IP	International Protection (Ingress Protection)	**TPED**	TemView *PRO* External Display
I_r	Long Time Protection Current	t_r	Long Time Delay or Long Time Time
I_{sd}	Short Time Protection Current	t_{sd}	Short Time Delay or Short Time Time
I_{tsp}	Thermal Self Protection Current	t_{tsp}	Thermal Self Protection Time
L or LTD	Long Time Protection	**UDINT**	Unsigned Integer (2 bytes or 16-bits in length)
LCD	Liquid Crystal Display (LCD)	**UINT**	Unsigned Integer (2 bytes or 16 bits in length)
LED	Light Emitting Diode	**ULINT**	Unsigned Long Integer datatype (8 bytes or 64 bits in length)
LINT	Signed Long Integer datatype (8 bytes or 64 bits in length)	**URLs**	Uniform Resource Locator (address of an Internet website)
LSI	Long Time, Short Time and Instantaneous Protection	**WORD**	2 bytes or 16-bits of data
LSIG	Long Time, Short Time, Instantaneous and Ground Fault Protection	**ZSI**	Zone Selective Interlocking (zone selectivity)

Micro820 Controller Overview

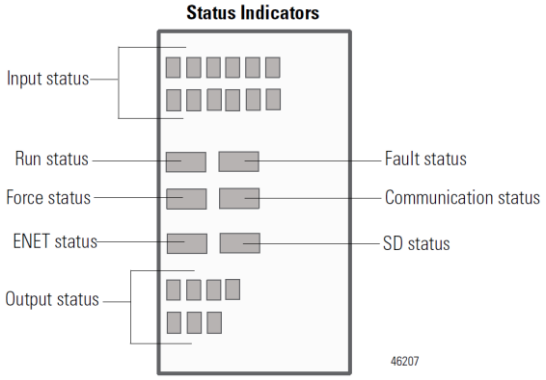
The Allen-Bradley Micro820 model 2080-LC20-20QWB is a 20-point configurable controller with embedded inputs and outputs. It supports an embedded non-isolated combination serial port for RS-232/485 serial communications, and a 10/100 Base-T Port for connection to an Ethernet network through any standard RJ-45 Ethernet cable. It can accommodate up to two plug-in modules for expanded I/O and capabilities; and is supplied via 24V dc power supply by the use of an external power supply or optional Micro800 power supply, 2080-PS120-240VAC.



Description		Description	
1	Status indicators	7	Plug-in latch
2	Optional power supply panel mounting latch hole	8	Plug-in screw hole
3	Optional power supply slot	9	microSD card slot
4	RS-232/485 non-isolated combo serial port	10	DIN rail mounting latch
5	Fixed terminal block	11	RJ-35 Ethernet connector port
6	40-pin high-speed plug-in connector	12	Optional power supply

Status Indicators

Controller status LED indicators are located at the leftmost side of the controller, next to the two plug-in slots.



Notice: Refer to the Allen-Bradley Micro820 User Manual 2080-UM005 and Installation Instructions 2080-IN009 for further important user information including, but not limited to, installation, safety and power considerations, wiring requirements and recommendations and technical specifications.

Micro820 Controller Overview

General and Environmental Specifications

Micro820 – 2080-LC20-20QWB

Attribute	Value
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20…65 °C
Temperature, surrounding air, max	65 °C
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40…85 °C
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% non-condensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 2 g @ 10…500 Hz
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 25 g
Shock, non-operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): DIN mount: 25 g PANEL mount: 45 g
Emissions	CISPR 11 Group 1, Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on signal ports ±1 kV @ 5 kHz on communication ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±1 kV line-line(DM) and ±2 kV line-earth(CM) on signal ports ±1 kV line-earth(CM) on communication ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Plug-in Module – 2080-SERIALISOL

Attribute	Value
Isolated voltage	500V ac
Temperature, operating	IEC60068-2-1 (Test Ad, Operating Cold), IEC60068-2-2, (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...65 °C
Temperature, surrounding air, max	65 °C
Temperature, non-operating	IEC60068-2-1 (Test Ad, Operating Cold), IEC60068-2-2, (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -40...85 °C

Installation

Mounting
Most applications require installation in an industrial enclosure to reduce the effects of electrical interference and environmental exposure. Locate the controller and associated communication and control wiring as far as possible from power lines, load lines, and other sources of electrical noise such as hard-contact switches, relays, and AC motor drives.

Spacing
Maintain spacing from objects such as enclosure walls, wireways and adjacent equipment. Allow 50.8 mm (2.0 in.) of space on all sides for adequate ventilation. If optional accessories/modules are attached such as the optional power supply, 2080-PS120-240VAC, make sure that there is 50.8 mm (2 in.) of space on all sides after attaching the optional parts.

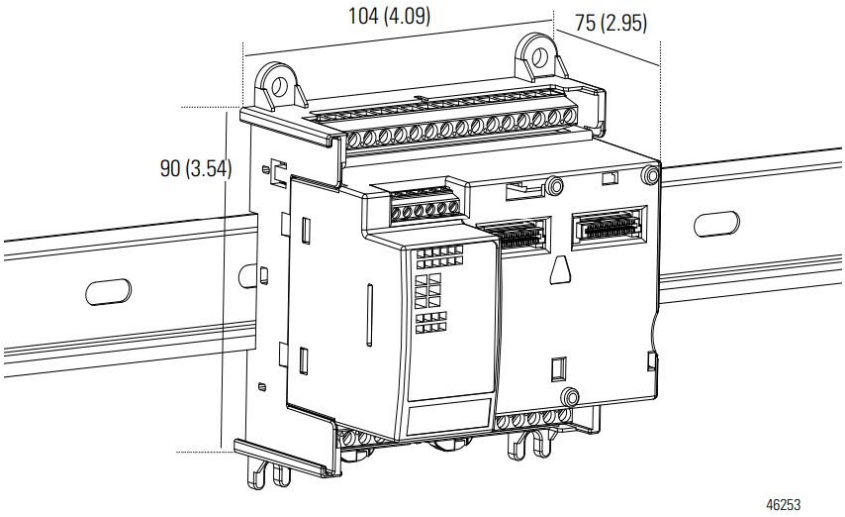
DIN Rail Mounting
The controller can be mounted using the following DIN rails: 35 x 7.5mm and 35 x 15mm (EN 50022 – 35x7.5 and EN 50022 – 35x15).

Notice: For environments with greater vibration and shock concerns, use the panel mounting method, instead of DIN rail mounting.

Before mounting the controller on a DIN rail, use a flat-blade screwdriver in the DIN rail latch and pry it downwards until it is in the unlatched position.

1. Hook the top of the DIN rail mounting area of the controller onto the DIN rail, and then press the bottom until the controller snaps onto the DIN rail.
2. Push the DIN rail latch back into the latched position.

To remove the controller from the DIN rail, pry the DIN rail latch downwards until it is in the unlatched position.



Mounting dimensions do not include mounting feet or DIN rail latches.
Measurements are in millimeters (inches)
.

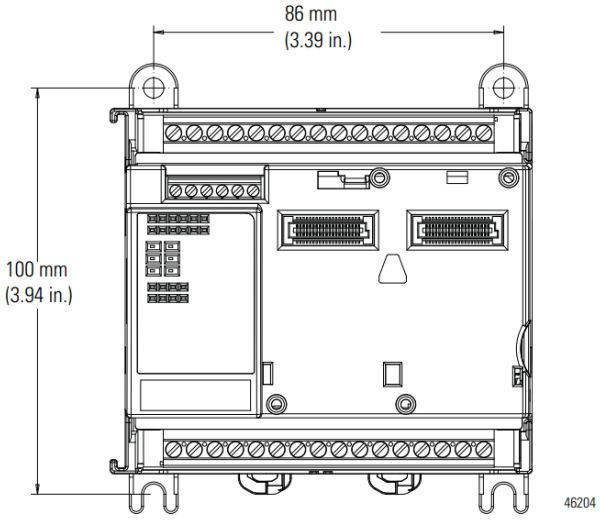
Installation

Panel Mounting

The preferred mounting method is to use four M4 (#8) screws per controller. Hole spacing tolerance is ±0.4mm (0.016 in.).

Follow these steps to install the controller using mounting screws.

1. Place the controller against the panel where it will be mounted. Make sure the controller is spaced appropriately.
2. Mark drilling holes through the mounting screw holes and mounting feet, then remove the controller.
3. Drill the holes at the marking, then replace the controller and mount it. Leave the protective debris strip in place until wiring of any other devices is finished.



Mounting dimensions do not include mounting feet or DIN rail latches.
Measurements are in millimeters (inches).

Installation

Plug-in Module

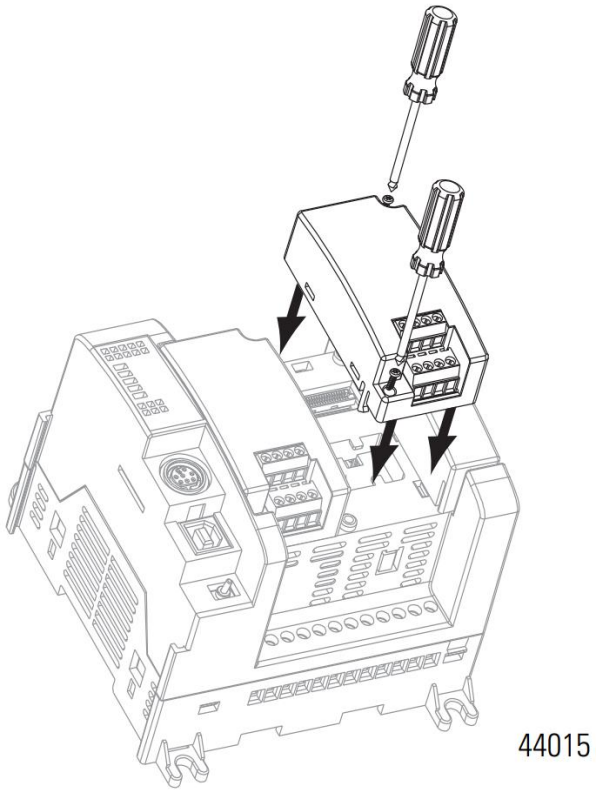
WARNING: Electrical arcing may occur if the plug-in module is removed or inserted while power is on. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is non-hazardous before proceeding.

Notice: Do not insert or remove the plug-in module while power is applied, otherwise, permanent damage to equipment may occur.

The EIPM is supplied with a 2080-SERIALISOL isolated RS-485 serial port for communication with the TPCM. This module is to be fixed to the expansion module slot on the front of the Mico820 controller.

You can choose to wire the plug-in module before inserting it onto the controller, or wire it once the module is secured in place.

Follow the instructions to insert and secure the plug-in module to the controller.



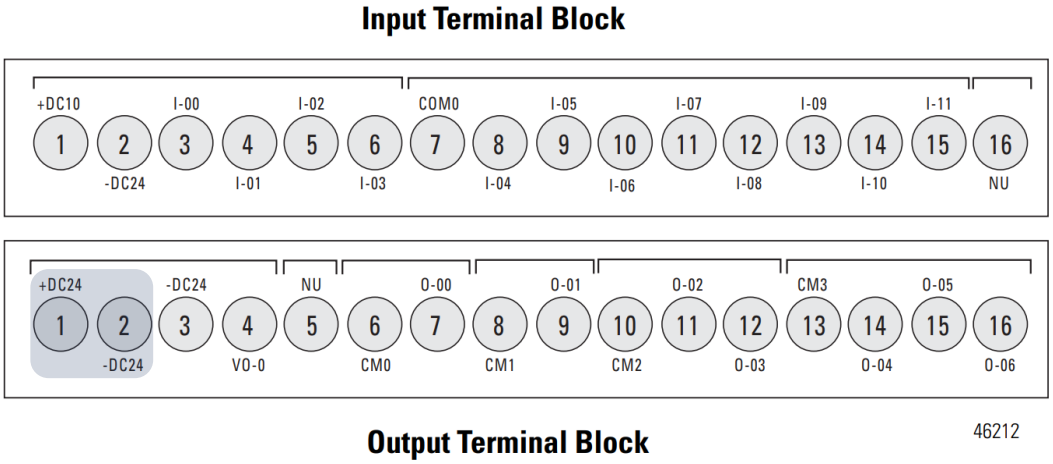
1. Remove the supplied plug-in module bay blanking cover from the right-most module bay (slot 2) on the controller.
2. Position the plug-in module with the terminal block facing the front of the controller as shown.
3. Snap the module into the exposed module bay.
4. Using a screwdriver, tighten the supplied 10…12 mm M3 self-tapping screw to 0.2 Nm torque.

Installation

Wiring

Power supply

The EIPM requires a continuous 24V dc power supply to operate. Power supply terminals are located on the bottom **Output Terminal Block**, terminals 1 and 2 (far left, as indicated by shaded area).



Terminal	Description
1	+DC24
2	-DC24

Power Supply specifications:

Attribute	Value			
Power Input	24V dc			
Power consumption	8.5 W (with plug-ins, max)			
Power dissipation	6 W			
Power supply voltage range	20.4 … 26.4V dc, Class 2, PELV or SELV			
Wire size	**For fixed terminal blocks:**			
		Min	**Max**	
	Solid	0.14 mm^2 (26 AWG)	2.5 mm^2 (14 AWG)	Rated @ 90 °C insulation max
	Stranded	0.14 mm^2 (26 AWG)	1.5 mm^2 (16 AWG)	
Wire type	Use copper conductors or shielded cables			
Insulation stripping length	7mm for removeable and fixed terminal blocks			
Terminal screw torque	0.5…0.6 Nm using a 0.6 x 3.5 mm flat-blade screwdriver.			

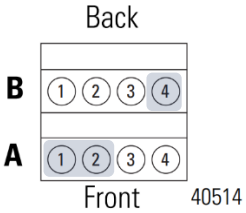
Installation

Wiring

Serial port

The EIPM utilizes the isolated RS-232/485 combo communications port on the supplied 2080-SERIALISOL expansion module. Only one port (RS-232 or RS-485) can work at any given time. Only RS-485 protocol is used with the EIPM. The baud rate of this port supports up to 38400 kpbs and is the default setting.

The isolated serial communication port uses an 8-pin 3.5mm terminal block with pin definition shown in the following table.



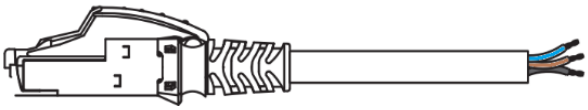
Terminal	Description		Terminal	Description	
A1	RS-485 Data +		B1	RS-232 DCD	**Not used**
A2	RS-232/485 GND		B2	RS-232 RXD	**Not used**
A3	RS-232 RTS	**Not used**	B3	RS-232 TXD	**Not used**
A4	RS-232 CTS	**Not used**	B4	RS-485 Data -	

Wiring from the serial communication port to the TPCM is done by modifying any standard Ethernet patch lead with 8P8C RJ-45 plugs. Alternatively, any suitable double-twisted pair serial line cable may be used by terminating one end with an RJ45 8P8C plug.

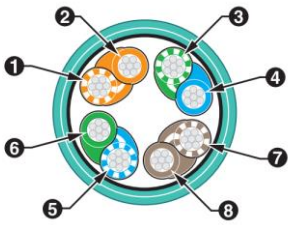
Notice: Serial port cables should not exceed 3m in length. Where longer cables are required a 120Ω terminating resistor shall be installed in parallel with the serial wiring between RS-485 terminals A1 and B4.

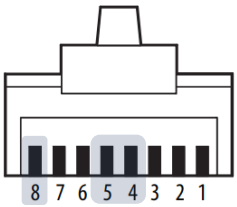
Notice: For installation in areas of high electromagnetic disturbance, a shielded Ethernet patch lead should be used. The shielding shall be grounded on one end of the cable only, and **shall not** be connected to the RS-232/485 GND terminal on the isolated serial port.

1. Cut one end of the ethernet cable and strip outer insulation and to expose twisted pair conductor colours (and shielding, where used).



2. Separate and strip insulation of the following conductors for wiring into the serial communication port.





RJ-45 Ethernet Patch Cable			Serial Communication Port	
Pin	Conductor		Terminal	Description
4	Blue		A1	RS-485 Data +
5	White/Blue		B4	RS-485 Data -
8	Brown		A2	RS-232/485 GND
Shield (Optional)			Functional Earth	

Attribute	Value			
Wire size		**Min**	**Max**	
	Solid	0.14 mm² (26 AWG)	1.5 mm² (16 AWG)	Rated @ 90 °C insulation max
	Stranded	0.14 mm² (26 AWG)	1.0 mm² (18 AWG)	
Terminal screw torque	0.22…0.25 Nm using a 2.5 mm flat-blade screwdriver.			

Configuration

Configure Ethernet Settings

By default, the EIPM is configured with a static IP address for ready connection to an Ethernet network

Default IP settings:
IP address – **192.168.100.246**
Subnet Mask – **255.255.255.0**

If the IP address is required to be changed, this can be done by editing the ConfigMeFirst.txt configuration file in the root directory as provided with the microSD card:

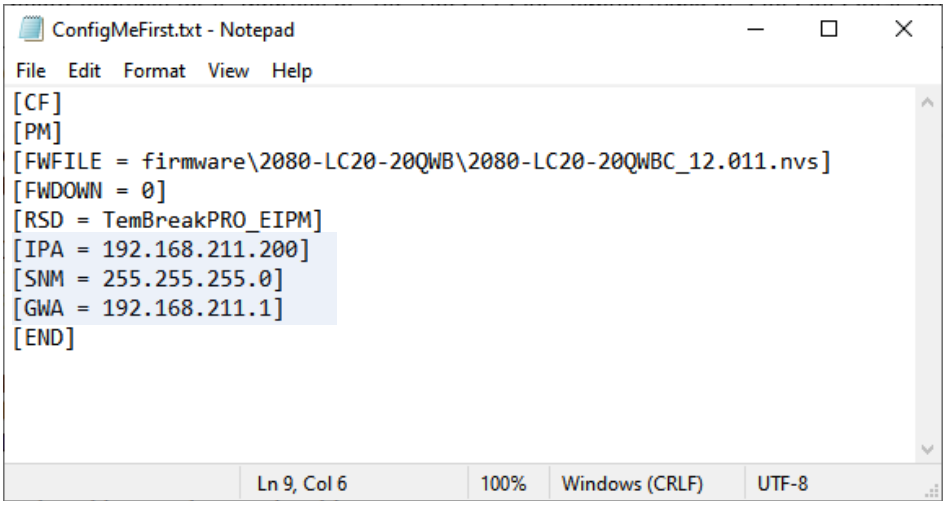
1. Open the **ConfigMeFirst.txt** configuration file using a preferred text editing software package (for example Notepad.exe).

2. Add three lines of text directly above the last line, **[END]**. Replace the 'xxx' in each line with the required octet.

```
[IPA = xxx.xxx.xxx.xxx]      # Ethernet IP address
[SNM = xxx.xxx.xxx.xxx]      # Ethernet Subnet mask
[GWA = xxx.xxx.xxx.xxx]      # Ethernet Gateway address
```

Notice: Do not make any other changes to the ConfigMeFirst.txt file other than those shown.

See below example for IP address of "192.168.211.200", subnet mask of "255.255.255.0" and gateway address of "192.168.211.1":

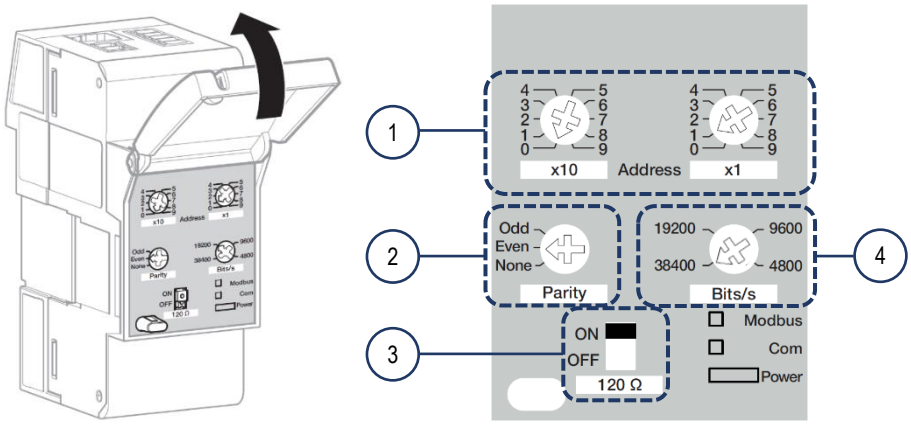


3. Save the **ConfigMeFirst.txt** configuration file and follow the Load program to controller steps above to push the changes to the controller.

Configuration

TPCM Configuration

Each TPCM used with the EIPM must be configured with the following parameters:



	Description	Configuration for EIPM
1	**Modbus device address / slave ID:** 1 to 99 by two rotary switches **x1** and **x10** Example: To set to address 21 – x10 dial set to 2 x1 dial set to 1 The address for each device on a single RS-485 network must be unique.	01* (x10 dial = 0) (x1 dial = 1)
2	**Parity setting:** None – Odd – Even The number of stop bits is automatically set according to the parity setting; the number of data bits is always set to 8-bits. All devices on a single RS-485 network must share the same Parity and Stop bit settings as the Master device.	Even (stop bit 1)
3	**Internal 120 Ω resistor:** ON – OFF Set to ON where the TPCM is the last device in an RS-485 daisy chain topology	ON*
4	**Baud rate setting:** 4800 – 9600 – 19200 – 38400 bps All devices on a single RS-485 network must share the same Baud rate as the master device.	38400 bps

Parity	Stop Bits	Data Bits
None	2	8
Even	1	8
Odd	1	8

* If only one TPCM is used, then its Address must be set to **1**, and 120Ω terminating resistor **ON**. If multiple TPCM are used in a daisy-chain arrangement, then the Addresses must be made unique per module (between 1 and 99), and the 120Ω terminating resistor set to **OFF**. Only the last module in the chain must have its 120Ω terminating resistor set to **ON**.

Notice: Refer to the TemCom *PRO* Communication Module User Manual for more information on installation, parameter settings and LED Status indicators.

Programming

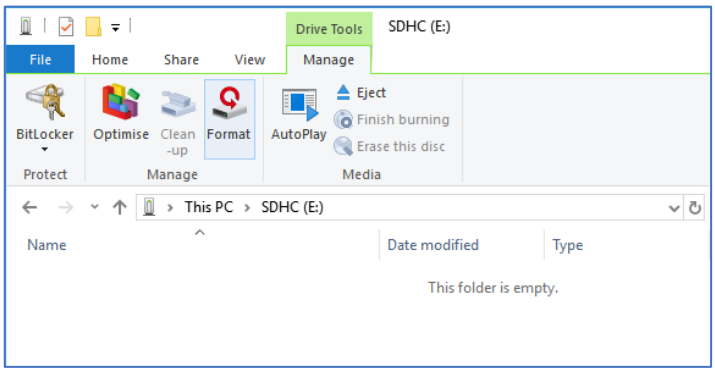
The EIPM software is provided as a downloadable package to be loaded onto a microSD card. A preloaded microSD card may be made available from NHP on request. With the software loaded to the microSD card, it can be loaded onto the Micro820 controller using the project restore function, without the use of additional programming software or hardware.

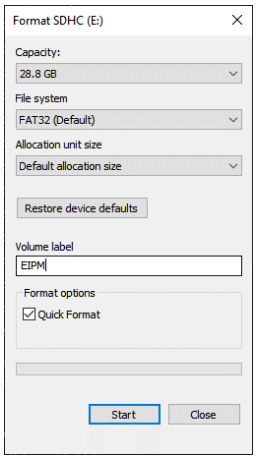
Non-preloaded microSD Card

Where a non-preloaded microSD card is used (customer or third-party provided), the EIPM software may be downloaded manually prior to programming the controller.

> **Notice**: The Micro820 controller only supports Class 6 and 10 SDSX and SDHC microSD cards with FAT32/16 formats, 32GB maximum size.
>
> The Micro820 controller does **not** support Class 4 microSD cards.

1. Insert supported microSD card into computer and open it in Windows File Explorer. Under the **Drive Tools > Manager** ribbon, click on **Format.**

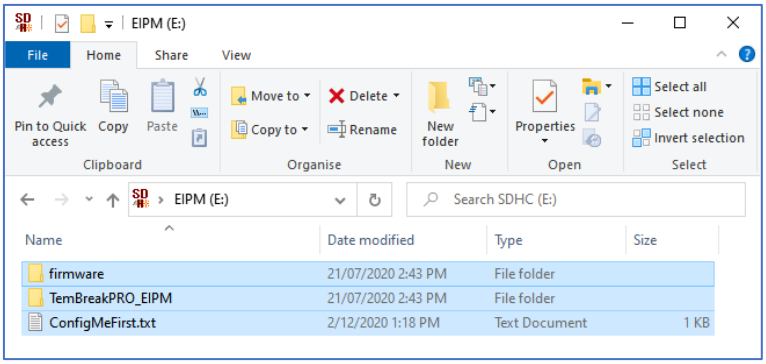




2. Select **FAT32** under the File system drop-down selection and click **Start**. When prompted, click **OK** once formatting is completed.

> **Notice**: Formatting the microSD card will delete all data currently stored. Ensure a separate backup of any critical files exists before formatting.

3. Download the EIPM microSD card project and extract all files and folders to the root folder of the microSD card directory.



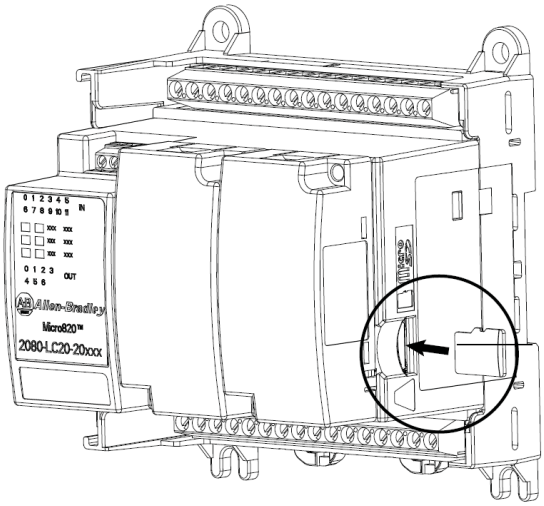
4. Continue to the Load program to controller section to load the EIPM software from the microSD card to the Micro820 controller.

Programming

Load program to controller

WARNING: Electrical arcing may occur if the microSD card is removed or inserted while power is on. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is non-hazardous before proceeding.

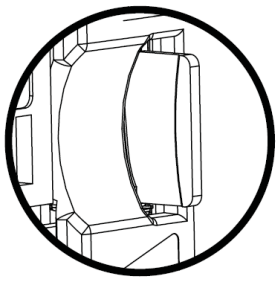
1. Insert the microSD card with the EIPM software loaded into the card slot on the Micro820 controller.
   The microSD card can only be inserted in one orientation only. The beveled corner should be at the bottom. If resistance is felt when inserting the microSD card, pull it out and change the orientation.



Insert the microSD card into the slot.

46218

2. Gently press the card until it clicks into place.



46219

3. Apply or cycle power to the controller and observe the **SD** Status LED indicator. Wait approximately 20 seconds until the SD Status LED indicator stops flashing and is solid Green and the **RUN** status LED indicator is flashing.
4. Remove power from the controller
5. Remove the microSD card from the slot by gently pressing in the card until it clicks back and releases itself from the slot.
6. Re-apply power to the controller. Wait approximately 12 seconds for the **RUN** status LED indicator to appear solid green, and the **COMM** Status indicator is flashing green to confirm successful loading of the software.

Data Access

The EIPM provides an array of datapoints which can be read from and written to via Ethernet/IP and Modbus-TCP over an Ethernet based network.

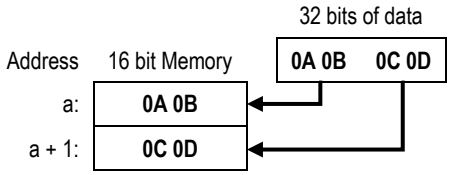
Access to the data over Ethernet/IP can be performed with explicit CIP Symbolic addressing for individual or groups of elements, or the entire data array by addressing the variable/tag name directly.

Access over Modbus-TCP is performed by reading and writing to designated holding registers.

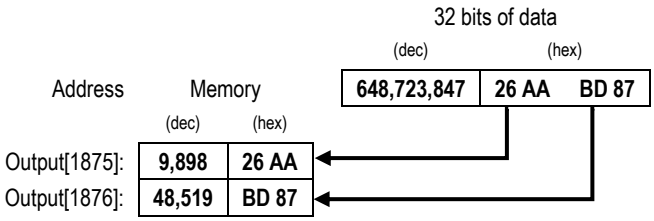
Notice: The address mapping for CIP Symbolic and Modbus-TCP datapoint elements is provided in ANNEX A – Read Only Address Map and ANNEX B – Writing Address Map of this document.

Data is stored and retrieved from the EIPM as one or multiple 16-bit WORDs stored in individual data points. Data which requires more than 16-bits may be split across several datapoints using Big-Endian byte order (MSB – most significant bit first); whereby the most-significant WORD of a multi-WORD object is stored at the lowest memory address of a storage location.

Example 1: a 32-bit integer (dec 168,496,141 = hex 0A 0B 0C 0D) is split across two 16-bit WORDs in memory.



Example 2: The User Time is read a 32-bit integer as seconds since 1/01/2000 (648,723,847 seconds) and is stored in two 16-bit elements in addresses 1875 and 1876. (Converting decimal to hexadecimal: dec 648,723,847 = hex 26 AA BD 87)



Data Access

Reading Data

CIP Symbolic Addressing

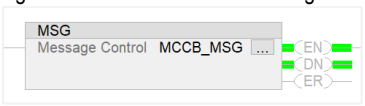
Read-Only data may be accessed by addressing the following global variable through CIP Symbolic addressing.
The address mapping for CIP Symbolic datapoint elements is provided in ANNEX A – Read Only Address Map section of this document.

Variable	Data Type	Dimensions	Accessibility
MCCB_Output	INT (Signed 16-bit integer value)	0…2499	Global

Logix MSG instructions can read this data type using the unconnected "CIP Data Table Read" message type.
Individual or groups of elements of the INT array are accessible by specifying the element number in the CIP message.

Example: Using a Logix CIP Data Table Read message to read only the Phase1 to Phase2 Voltage [U12] by directly addressing the two required **MCCB_Output** array elements: [250] and [251].

An MSG instruction is created in the Logix program and a MESSAGE control tag labelled **MCCB_MSG**.



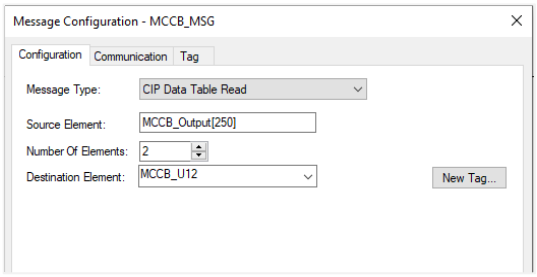
MCCB_MSG is configured as follows:

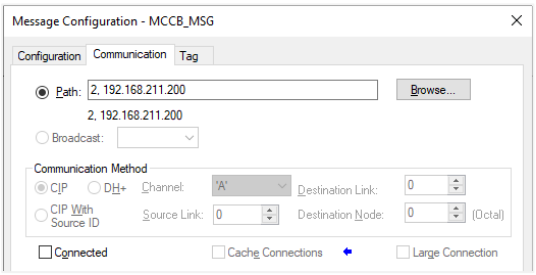
Configuration Tab

Message Type:	**CIP Data Table Read**	
Source Element:	**MCCB_Output[250]**	* This is the first element in our array which we want to read from.
Number of Elements:	**2**	* There are two elements we want to read, [250] and [251] inclusive.
Destination Element:	**MCCB_U12**	* This is an INT[2] array which has been created for the writing of the MSG data.

Communication Tab

Path	**2, 192.168.211.200**	* The embedded Ethernet comm port in the Logix controller, and the IP address of the EIPM.
Connected:	**Unchecked**	* Connected CIP Symbolic addressing is not supported between the Logix and Micro800 platforms using CIP Data Table Read/Write.





Data Access

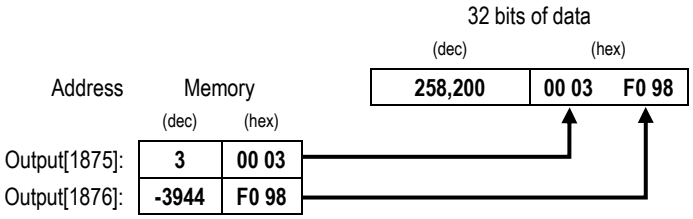
Reading Data

CIP Symbolic Addressing

The resultant data from the Read MSG is provided in the **MCCB_U12** tag elements as specified in the MSG instruction.

◢ MCCB_U12	{...}	{...}	Decimal	INT[2]
▷ MCCB_U12[0]	3		Decimal	INT
▷ MCCB_U12[1]	-3944		Decimal	INT

The data format is in Big-Endian byte order and can be combined per the reverse process, by converting the Signed 16-bit INT values from decimal to hexadecimal, concatenating the two hexadecimal values and converting the result back to decimal.



The resultant number of 258,200 is expressed in mV, and therefore the Phase1 to Phase2 voltage measurement of U12 is 258.2V.

Data Access

Reading Data

Modbus-TCP

Modbus holding register addresses are provided in this user manual in both raw hexadecimal format and in decimal holding register format (4xxxx) which is dec by 1 from the hexadecimal address (e.g. holding register address dec 40001 = hex 00 00).

Read-Only data may be accessed by addressing the EIPM holding registers using function code "**0x03 – Read Multiple Holding Registers**".

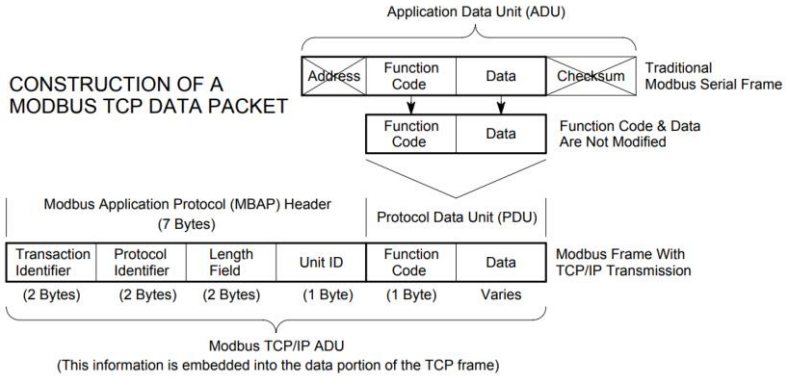
The Read-Only holding register addresses is provided in ANNEX A – Read Only Address Map and are identical to their CIP Symbolic counterpart in decimal format but may include an offset of 1 depending on the Modbus Master device.

Example relationship between CIP Symbolic and Modbus Holding register numbering in Hexadecimal, and in decimal:

Measurement	CIP Symbolic Variable Address	Modbus Holding Register Address (hex)	Modbus Holding Register Address (dec)
Phase1 to Phase2 Voltage [U12] (HIGH WORD)	MCCB_Output[**250**]	00 FA	40**251**
Phase1 to Phase2 Voltage [U12] (LOW WORD)	MCCB_Output[**251**]	00 FB	40**252**

Example: Using function code "0x03 – Read Multiple Holding Registers" to read the Phase1 to Phase2 Voltage [U12] by directly addressing the two required holding registers (dec): 40251 and 40252.

Below is an overview on the construction of a Modbus-TCP data packet, in this example we are only concerned with the Protocol Data Unit (PDU) of the data transaction.



Data Access

Reading Data

Modbus-TCP

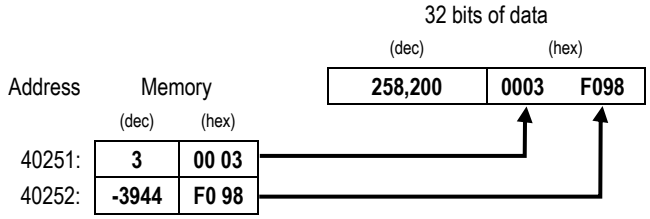
Data Request PDU:

Function Code (hex)	Data (hex)	
03	00 FA	00 02
Read Multiple Holding Registers command	First holding register to be read – 250_{dec} or 40251	2 registers to read

Data Response PDU:

Function Code (hex)	Data (hex)		
03	04	00 03	F0 98
Read Multiple Holding Registers command	4 bytes of data to follow	Data corresponding to the first register 40251	Data corresponding to the second register 40252

The data format is in Big-Endian byte order and can be combined per the reverse process, by converting the Signed 16-bit INT values from decimal to hexadecimal, concatenating the two hexadecimal values and converting the result back to decimal.



The resultant decimal number of 258200 is expressed in mV, and therefore the Phase1 to Phase2 voltage measurement of U12 is 258.2V.

Data Access

Writing Data

The EIPM may be used to remotely make changes and adjustments to TemBreak *PRO* Smart Energy MCCBs and associated devices, including changes to protection level and system settings, configuring custom alarms, reset of historical data and energizing digital outputs on the TPCM.

WARNING: Changes and adjustments to protection settings and levels (either local or remotely) should only be performed by qualified personnel. Failure to comply may result in malfunction or damage of protective equipment, serious injury or death.

Write Protection

Modifications made remotely over communications to the MCCB configuration settings may be dangerous for personnel near the circuit breaker or may cause damage to the equipment if the protection parameters are modified.

Therefore, remote data write commands are secured with two levels of protection:

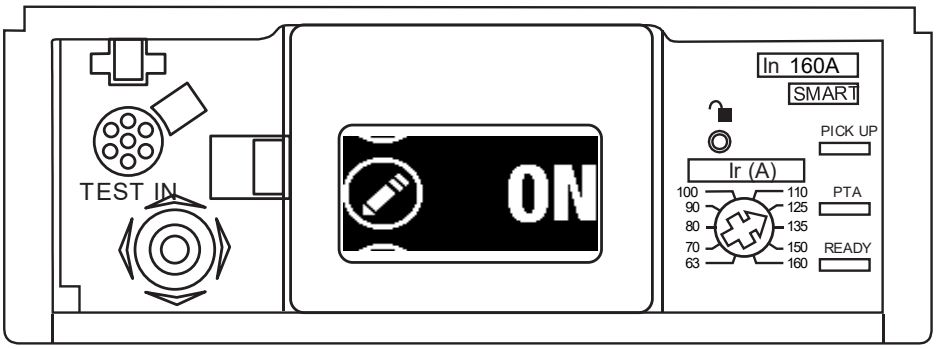
- Remote Write Authorization parameter at the MCCB for localized locking out of individual circuit breakers from remote writing access.
- Password Management with various security access levels for limiting accessibility of performing certain write commands.

Remote Write Authorization

To permit writing of data to the MCCB via remote devices (i.e. external to the MCCB, such as TPCM and TPED), the remote write authorization parameter must be enabled on the MCCB via the embedded LCD display menu.

This parameter is enabled via the Configuration menu of the embedded display by navigating to the Remote Write Authorization symbol as shown below and changing the value to “ON”.

Refer to the TemBreak *PRO* P_SE MCCB User Manual for further information on navigating the embedded display.



Remote Write Authorization	Default setting
ON – OFF ON – enabled, data write commands for remote devices permitted OFF – disabled, data write commands for remote devices prohibited.	ON

Data Access

Writing Data

CIP Symbolic Addressing

Data and output commands may be written by addressing the following global variable through CIP Symbolic addressing:

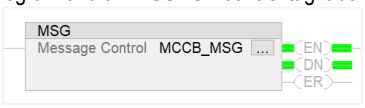
Variable	Data Type	Dimensions	Accessibility
MCCB_Input	INT (Signed 16-bit integer value)	0…33	Global

The structure of the MCCB_Input array and is provided in ANNEX B – Writing Address Map.

Logix MSG instructions can write to this data type using the unconnected "CIP Data Table Write" message type.
Individual or groups of elements of the INT array are written to by specifying the element number in the CIP message.

Example: Using a Logix CIP Data Table Write message to set a custom alarm setting by writing to the required **MCCB_Input** array elements including Password Level, Password Entry, Command ID, Writing Data, Write Enable and Slave ID.

An MSG instruction is created in the Logix program and a MESSAGE control tag labelled **MCCB_MSG**.



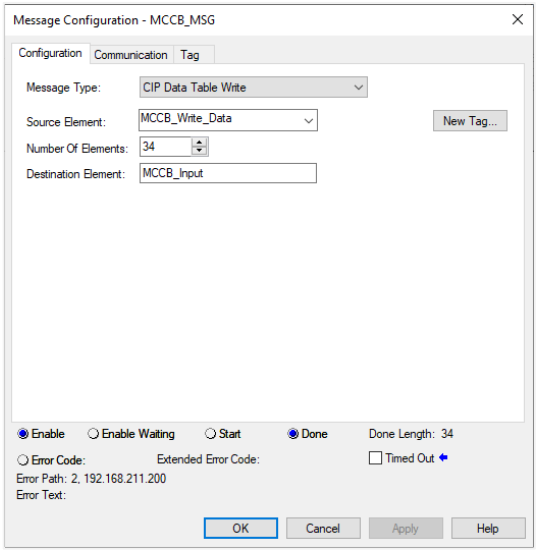
MCCB_MSG is configured as follows:

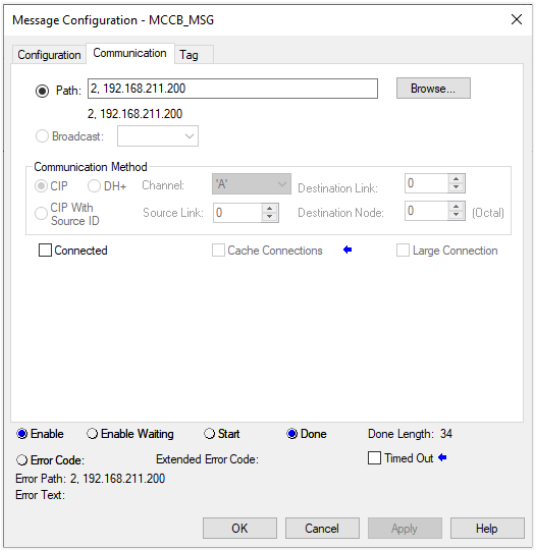
Configuration Tab

Message Type:	**CIP Data Table Write**	
Source Element:	**MCCB_Write_Data**	* An INT[34] array which has been created for writing the configuration data.
Number of Elements:	**34**	* We want to write to the entire array.
Destination Element:	**MCCB_Input**	* The remote array in the EIPM to write to.

Communication Tab

Path	**2, 192.168.211.200**	* The embedded Ethernet comm port in the Logix controller, and the IP address of the EIPM.
Connected:	**Unchecked**	* Connected CIP Symbolic addressing is not supported between the Logix and Micro800 platforms using CIP Data Table Read/Write.





Data Access

Writing Data

CIP Symbolic Addressing

Data from the **MCCB_Write_Data** array is written to the remote **MCCB_Output** array as specified in the MSG instruction.

Variable[element]	Value (dec)	Value (hex)	Comments
MCCB_Input[0]	0	0000	Digital Output settings. Not used in this example, left at 0.
MCCB_Input[1]	0	0000	
MCCB_Input[2]	0	0000	
MCCB_Input[3]	0	0000	
MCCB_Input[4]	0	0000	
MCCB_Input[5]	0	0000	
MCCB_Input[6]	1	0001	Password security level according to target configuration setting (0, 1, or 2) Set to '1' for the Custom Alarm configuration
MCCB_Input[7]	76	004C	Password corresponding to security level 1 for the Custom Alarm configuration. Decimal character numbers written for each individual character of the password, with 0 for all trailing characters. Password: 'Level1' **Array element (char) (dec) (hex)** MCCB_Input[7] 'L' 76 004C MCCB_Input[8] 'e' 101 0065 MCCB_Input[9] 'v' 118 0076 MCCB_Input[10] 'e' 101 0065 MCCB_Input[11] 'l' 108 006C MCCB_Input[12] '1' 49 0031
MCCB_Input[8]	101	0065	
MCCB_Input[9]	118	0076	
MCCB_Input[10]	101	0065	
MCCB_Input[11]	108	006C	
MCCB_Input[12]	49	0031	
MCCB_Input[13]	0	0000	
MCCB_Input[14]	0	0000	
MCCB_Input[15]	107	006B	Custom Alarm configuration Command ID is 107_{dec} ($006B_{hex}$)
MCCB_Input[16]	1	0001	Data to be written to the target configuration setting. Unused trailing characters must be filled with NULL (value of 0). Setting Custom Alarm 1 Under Instantaneous Voltage [U12] (alarm ID 35) Priority of 3 – High Pickup at 200V after 1 second delay Dropout at 230V after 1 second delay **Array element Description (dec) (hex)** MCCB_Input[16] Custom Alarm slot # 1 0001 MCCB_Input[17] Alarm ID 35 0023 MCCB_Input[18] Priority 3 0003 MCCB_Input[19] Pickup threshold (0.1x V) 2000 07D0 MCCB_Input[20] Pickup delay (seconds) 1 0001 MCCB_Input[21] Dropout threshold (0.1x V) 2300 08FC MCCB_Input[22] Dropout delay (second) 1 0001
MCCB_Input[17]	35	0023	
MCCB_Input[18]	3	0003	
MCCB_Input[19]	2000	07D0	
MCCB_Input[20]	1	0001	
MCCB_Input[21]	2300	08FC	
MCCB_Input[22]	1	0001	
MCCB_Input[23]	0	0000	
MCCB_Input[24]	0	0000	
MCCB_Input[25]	0	0000	
MCCB_Input[26]	0	0000	
MCCB_Input[27]	0	0000	
MCCB_Input[28]	0	0000	
MCCB_Input[29]	0	0000	
MCCB_Input[30]	0	0000	
MCCB_Input[31]	0	0000	
MCCB_Input[32]	1	0001	Toggle writing of the configuration data to the P_SE MCCB. Edge triggered on transition from 0 to 1. Leave activated until correct configuration is read from the P_SE MCCB and confirmed.
MCCB_Input[33]	1	0001	The Modbus RTU Slave ID address as set by the front dials of the target TPCM

WARNING: MCCB_Input[33] – Slave ID – must contain the target Slave ID address of the target TPCM before enabling the Data Writing MSG instruction. If left at 0 or a different value, reading and writing data to the EIPM may not perform correctly and provide incorrect values.

Data Access

Writing Data

CIP Symbolic Addressing

When the MSG instruction is sent, confirmation that the data has been successfully written is performed by reading the Custom Alarm 1 configuration settings. MCCB_Output[1885...1890] (6 elements) per the instructions provided in Reading Data – CIP Symbolic Addressing.

The data in these elements should reflect the data written to MCCB_Input[17…31]:

◢ MCCB_Custom_Alarm_1	{...}	{...}	Decimal	INT[6]
▷ MCCB_Custom_Alarm_1[0]	35		Decimal	INT
▷ MCCB_Custom_Alarm_1[1]	3		Decimal	INT
▷ MCCB_Custom_Alarm_1[2]	2000		Decimal	INT
▷ MCCB_Custom_Alarm_1[3]	1		Decimal	INT
▷ MCCB_Custom_Alarm_1[4]	2300		Decimal	INT
▷ MCCB_Custom_Alarm_1[5]	1		Decimal	INT

Once data is confirmed to have written successfully, the Configuration Write Enable element MCCB_Input[32] should be toggled back to 0 and written to the EIPM before the next data writing instruction.

Data Access

Writing Data

Modbus-TCP

Modbus holding register addresses are provided in this user manual in both raw hexadecimal format and in decimal holding register format (4xxxx) which is offset by 1 from the hexadecimal address (e.g. holding register address dec 40001 = hex 00 00).

Data and output commands may be written by writing the EIPM holding registers using either function code "**0x06 – Preset Single Register**" or "**0x10 – Preset Multiple Registers**".

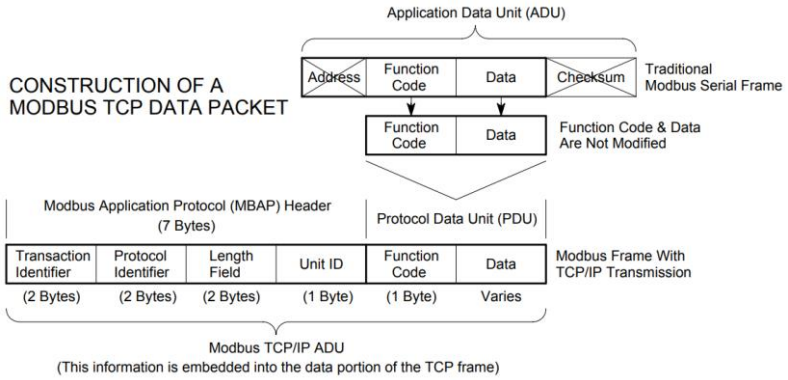
The structure of the writable Modbus-TCP holding registers is provided in ANNEX B – Writing Address Map and is identical to their CIP Symbolic counterpart, however the numbering of these registers is offset by dec 2500. This may also include a further offset of 1 depending on the Modbus Master device.

Example relationship between CIP Symbolic and Modbus Holding register numbering in Hexadecimal, and in decimal:

Description	CIP Symbolic Variable Address	Modbus Holding Register Address (hex)	Modbus Holding Register Address (dec
Digital Output 1 Mode	MCCB_Input[**0**]	09 C4	4**2501**
Digital Output 2 Mode	MCCB_Input[**1**]	09 C5	4**2502**

Example: Using function code "0x10 – Preset Multiple Registers" to set a custom alarm setting by writing to the required holding registers (dec): 42507 to 42534, which includes Password Level, Password Entry, Command ID, Writing Data, Write Enable and Slave ID.

Below is an overview on the construction of a Modbus-TCP data packet, in this example we are only concerned with the Protocol Data Unit (PDU) of the data transaction.



Data Access

Writing Data

Modbus TCP

Data Request PDU:

Protocol Data Unit (PDU)			Value (hex)	Comments
	Function Code (hex)		00 10	Preset Multiple Registers
	Data (hex)		09 CA	First holding register to be written – 2506_{dec} or register 42507
			00 1C	28 registers to write to
			38	56 bytes of data to follow
		42507	00 01	Password security level according to target configuration setting (0, 1, or 2) Set to '1' for the Custom Alarm configuration
		42508	00 4C	Password corresponding to security level 1 for the Custom Alarm configuration. Decimal character numbers written for each individual character of the password, with 0 for all trailing characters. Password: 'Level1' **(char) (dec) (hex)** 42508 'L' 76 004C 42509 'e' 101 0065 42510 'v' 118 0076 42511 'e' 101 0065 42512 'l' 108 006C 42513 '1' 49 0031
		42509	00 65	
		42510	00 76	
		42511	00 65	
		42512	00 6C	
		42513	00 31	
		42514	00 00	
		42515	00 00	
		42516	00 6B	Custom Alarm configuration Command ID is 107_{dec} ($006B_{hex}$)
		42517	00 01	Data to be written to the target configuration setting. Unused trailing characters must be filled with NULL (value of 0). Setting Custom Alarm 1 Under Instantaneous Voltage [U12] (alarm ID 35) Priority of 3 – High Pickup at 200V after 1 second delay Dropout at 230V after 1 second delay **Description (dec) (hex)** 42517 Custom Alarm slot # 1 0001 42518 Alarm ID 35 0023 42519 Priority 3 0003 42520 Pickup threshold (0.1x V) 2000 07D0 42521 Pickup delay (seconds) 1 0001 42522 Dropout threshold (0.1x V) 2300 08FC 42523 Dropout delay (second) 1 0001
		42518	00 23	
		42519	00 03	
		42520	07 D0	
		42521	00 01	
		42522	08 FC	
		42523	00 01	
		42524	00 00	
		42525	00 00	
		42526	00 00	
		42527	00 00	
		42528	00 00	
		42529	00 00	
		42530	00 00	
		42531	00 00	
		42532	00 00	
		42533	00 01	Toggle writing of the configuration data to the P_SE MCCB. Edge triggered on transition from 0 to 1. Left activated until correct configuration is read from the P_SE MCCB and confirmed.
		42534	00 01	The Modbus RTU Slave ID address as set by the front dials of the target TPCM

WARNING: Register 42534 (offset 1) – Slave ID – must contain the target Slave ID address of the target TPCM before sending the Modbus-TCP command. If left at 0 or a different value, reading and writing data to the EIPM may not perform correctly and provide or write incorrect values.

Data Access

Writing Data

Modbus TCP

Data Response PDU:

Function Code (hex)	Data (hex)	
10	09 CA	00 1C
Write Multiple Holding Registers command	First holding register to be written – 2506_{dec} or register 42507	28 registers have been written to

When the Modbus-TCP response is received, confirmation that the data has been successfully written is performed by reading the Custom Alarm 1 coniguration settings: holding regsters (dec) 41886…41891 per the instructions provided in Reading Data – Modbus-TCP.

The data in these elements should reflect the data written to registers (dec): 42507 to 42534.

Data Request PDU:

Function Code (hex)	Data (hex)	
03	07 5D	00 06
Read Multiple Holding Registers	First holding register to be read – 1885_{dec} or 41886	6 registers to read

Data Response PDU:

Function Code (hex)	Data (hex)						
03	0C	00 23	00 03	07 D0	00 01	08 FC	00 01
Read Multiple Holding Registers	12 bytes of data to follow	Alarm ID 35	Priority 3	Pickup threshold 2000	Pickup delay 1	Dropout threshold 2000	Dropout delay 1

Once data is confirmed to have written successfully, the Configuration Write Enable register (dec) 42533 should be toggled back to 0 and written to the EIPM before the next data writing instruction.

Data Access

Password Management

Changes to certain configuration settings are protected by varying security access levels. A password corresponding to the required security level must be input into the respective CIP Symbolic variable array element or Modbus-TCP holding register when writing data.

Security access levels and their default passwords are as follows:

Security Access Level	Classification	Default Password
0	Settings that do not cause damage even if the settings are incorrect. No password required.	N/A
1	Settings that can cause undesired operation or malfunction if settings are incorrect. Level 1 or Level 2 password required	“Level1”
2	Settings that can cause damage of protective equipment, serious injury or death if settings are incorrect. Level 2 password required.	“Level2”

Changing the Password

WARNING: Level 1 and Level 2 passwords should be changed during commissioning to prevent unauthorized modification to protected settings.

Password changes can be performed using the Writing Data function with Command ID: 2001 under both CIP Symbolic Addressing and Modbus-TCP.

The new password must be between 4 and 8 characters inclusive; and may consist of a combination of alphabetic and numerical characters (A-Z, a-z, 0-9, case-sensitive, no special symbols or characters).

- The Level 1 password can be modified with security access level 1 or 2.
- The Level 2 password can only be modified with security access level 2.

WARNING: If the Level 2 password is lost, it can only be reset or restored via authorised service and maintenance tools via the Maintenance Interface Port. Contact NHP for information on restoring lost passwords.

Data Access

Password Management

Example – CIP Symbolic Addressing

Changing the Level 1 password using Command ID: 2001 with Level 1 security access.

Default password: "Level1"
New password: "NHPas123"

Variable[element]	Value (dec)	Value (hex)	Comments
MCCB_Input[6]	1	0001	Password security level according to target command ID.
MCCB_Input[7]	76	004C	Enter the existing password for the corresponding password security level. Decimal character numbers written for each individual character of the password, with 0 for all trailing characters. Password: 'Level1' **(char) (dec) (hex)** MCCB_Input[7] 'L' 76 004C MCCB_Input[8] 'e' 101 0065 MCCB_Input[9] 'v' 118 0076 MCCB_Input[10] 'e' 101 0065 MCCB_Input[11] 'l' 108 006C MCCB_Input[12] '1' 49 0031
MCCB_Input[8]	101	0065	
MCCB_Input[9]	118	0076	
MCCB_Input[10]	101	0065	
MCCB_Input[11]	108	006C	
MCCB_Input[12]	49	0031	
MCCB_Input[13]	0	0000	
MCCB_Input[14]	0	0000	
MCCB_Input[15]	2001	07D1	Password change Command ID is 2001_{dec} ($07D1_{hex}$)
MCCB_Input[16]	51966	CAFE	Fixed code required for password changes only. This does not change.
MCCB_Input[17]	1	0001	Password Security Level of new password, In this case, 1.
MCCB_Input[18]	8	0008	Length of new password. In this case, 8 characters.
MCCB_Input[19]	20040	4E48	New password. Unused trailing characters must be filled with NULL (value 0). The new password data is entered as 2 characters per datapoint element by converting each character to their respective ASCII hex values and concatenating them into one hex number which is inserted to the datapoint element as a hex. Decimal may also be used but must be converted from the resultant hex number. New Password: "NHPas123" **Character ASCII Code (hex)** 'N' 4E 'H' 48 'P' 50 'a' 61 's' 73 '1' 31 '2' 32 '3' 33 Concatenate pairs of characters for entry to datapoint elements: **Character pair Concatenated Hex Dec equivalent** 'N' 'H' 4E48 20040 'P' 'a' 5061 20577 's' '1' 7331 29489 '2' '3' 3233 12851
MCCB_Input[20]	20577	5061	
MCCB_Input[21]	29489	7331	
MCCB_Input[22]	12851	3233	
MCCB_Input[23]	0	0000	
MCCB_Input[24]	0	0000	
MCCB_Input[25]	0	0000	
MCCB_Input[26]	0	0000	
MCCB_Input[27]	0	0000	
MCCB_Input[28]	0	0000	
MCCB_Input[29]	0	0000	
MCCB_Input[30]	0	0000	
MCCB_Input[31]	0	0000	
MCCB_Input[32]	1	0001	Toggle writing of the configuration data to the P_SE MCCB. Edge triggered on transition from 0 to 1. Left activated until correct configuration is read from the P_SE MCCB and confirmed.
MCCB_Input[33]	1	0001	The Modbus RTU Slave ID address as set by the front dials of the target TPCM

WARNING: MCCB_Input[33] – Slave ID – must contain the target Slave ID address of the target TPCM before enabling the Data Writing MSG instruction. If left at 0 or a different value, reading and writing data to the EIPM may not perform correctly and provide incorrect values.

Data Access

Password Management

Example – Modbus-TCP

Changing the Level 1 password using Command ID: 2001 with Level 1 security access.

Default password: "Level1"
New password: "NHPas123"

Data Request PDU:

Protocol Data Unit (PDU)				Value (hex)	Comments
	Function Code (hex)			00 10	Preset Multiple Registers
	Data (hex)			09 CA	First holding register to be written – 2506_{dec} or register 42507
				00 1C	28 registers to write to
				38	56 bytes of data to follow
		Registers (dec)	42507	00 01	Password security level according to target command ID.
			42508	00 4C	Enter the existing password for the corresponding password security level. Decimal character numbers written for each individual character of the password, with 0 for all trailing characters. Password: 'Level1' (char) (dec) (hex) 42508 'L' 76 004C 42509 'e' 101 0065 42510 'v' 118 0076 42511 'e' 101 0065 42512 'l' 108 006C 42513 '1' 49 0031
			42509	00 65	
			42510	00 76	
			42511	00 65	
			42512	00 6C	
			42513	00 31	
			42514	00 00	
			42515	00 00	
			42516	07 D1	Password change Command ID is 2001_{dec} ($07D1_{hex}$)
			42517	CA FE	Fixed code required for password changes only. This does not change.
			42518	00 01	Password Security Level of new password, In this case, 1.
			42519	00 08	Length of new password. In this case, 8 characters.
			42520	4E 48	New password. Unused trailing characters must be filled with NULL (value 0). The new password data is entered as 2 characters per datapoint element by converting each character to ASCII hex and concatenating them into one hex number which is inserted to the datapoint element as a hex. New Password: "NHPas123" Character ASCII Code (hex) 'N' 4E 'H' 48 'P' 50 'a' 61 's' 73 '1' 31 '2' 32 '3' 33 Concatenate pairs of characters for entry to datapoint elements: Character pair Concatenated Hex 'N' 'H' 4E 48 'P' 'a' 50 61 's' '1' 73 31 '2' '3' 32 33
			42521	50 61	
			42522	73 31	
			42523	32 33	
			42524	00 00	
			42525	00 00	
			42526	00 00	
			42527	00 00	
			42528	00 00	
			42529	00 00	
			42530	00 00	
			42531	00 00	
			42532	00 00	
			42533	00 01	Toggle writing of the configuration data to the P_SE MCCB. Edge triggered on transition from 0 to 1. Leave activated until correct configuration is read from the P_SE MCCB and confirmed.
			42534	00 01	The Modbus RTU Slave ID address as set by the front dials of the target TPCM

WARNING: Register 42534 (dec) – Slave ID – must contain the target Slave ID address of the target TPCM before sending the Modbus-TCP command. If left at 0 or a different value, reading and writing data to the EIPM may not perform correctly and provide incorrect values.

Data Response PDU:

Function Code (hex)	Data (hex)	
10	09 CA	00 1C
Write Multiple Holding Registers command	First holding register to be written – 2506_{dec} or register 42507	28 registers have been written to

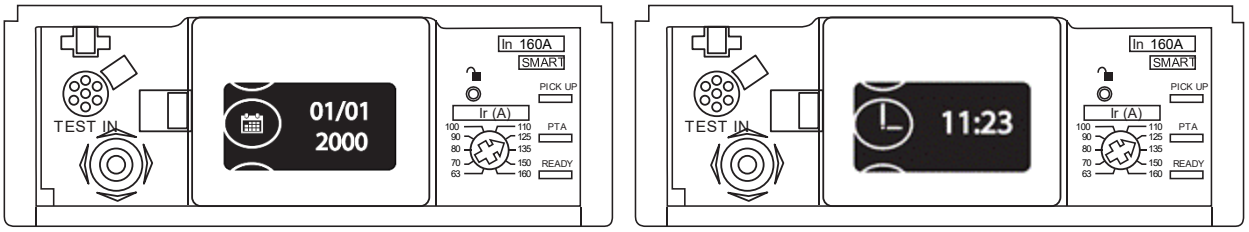
Date & Time

There are two types of Date & Time accessible from the OCR of the MCCB and which are used as timestamp of trips, alarms, and events, and which are affected by the presence of supply or control power to the OCR.

OCR Time: Non-resettable time which is the absolute operating time of the OCR seconds. OCR time increments whilst the OCR is in service and is stored in the OCR non-volatile memory. OCR time does not increment if power is removed from the OCR.

User Time: Resettable time which is configurable by the user locally via the MCCB embedded display, or remotely under Command ID: 1. This time is displayed on the MCCB embedded display. Unlike the OCR time, however, the User Time is stored in volatile memory, and is cleared back to 1st January 2000, 00:00:00 if power is removed from the OCR.

On the embedded display of the MCCB, the date and time is represented in the format DD/MM/YYYY (or YYYY/MM/DD depending on settings) and HH:MM (24H or AM/PM depending on settings).



Refer to the NHP/Terasaki TemBreak *PRO* P_SE MCCB User Manual for further information on accessing information via the embedded display and power requirements.

User Time is represented as the absolute number of seconds since 1st January 2000, 00:00:00 and is split across two datapoint elements in the form of a High WORD and Low WORD in Big-Endian byte order.

Example: "27th July 2020, 09:25:20" is represented as 649,157,142 seconds. The hexadecimal equivalent to this number is hex 26 B1 5A 16.

The hex number is then split across the two datapoints as follows:

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Value	
			hex	dec
41876	07 53	1875	26B1	9905
41877	07 54	1876	5A16	23062

Converting the value into traditional date & time format may be performed using any preferred algorithm, for example:

Year: 649157142 seconds divided by 31557600 sec/year = 20.57… years.
Remove the remainder and add to the year 2000 = **2020** with remainder of 180,05,142 seconds

Day: Previous remainder 18005142 seconds divided by 86400 sec/day = 208.39… days
Remove the remainder, this is the number of days where Day 0 is 1st January = **208** (or day **209** where Day 1 is 1st Jan) with remainder of 33,942 seconds.

Hour: Previous remainder 33942 seconds divided by 3600 sec/hour = 9.43… hours
Remove the remainder, this is the hour of the day = **9** with remainder of 1,542 seconds

Minute: Previous remainder 1542 seconds divided by 60 sec/min = 25.7 minutes
Remove the remainder, this is the minute of the hour = **25** with remainder of 42 seconds

Seconds: Previous remainder **42** seconds.

Year 2020, Day 209, 09:25:42

The day of year may be converted to day-of-the-month format using a conversion algorithm or look up table, as this varies dependent on the presence of leap years. Day 209 in the year 2020 is 27th July (where Day 1 is 1st January).

Troubleshooting

In the event of a problem when using the EIPM, this section provides advice on how to resolve issues.

	Problem	Possible cause	Remedial advice
1.	Read/Write Data is not refreshing or not returning correct values.	Incorrect or faulty wiring	Check Modbus RTU wiring. Refer to Wiring section. Check for and correct any: ▪ Loose connections ▪ Incorrect terminals / conductors / connector pins ▪ Segregation of communication and power wiring ▪ Correct seating of 2080-SERIALISOL module ▪ Long cable runs, use shielded cabling and terminating resistor
		Fault with TPCM	Confirm correct operation of TPCM Refer to TemCom *PRO* Communications Module User Manual troubleshooting section Check LED Status indicators • Modbus Flashing Amber • Com Flashing Amber • Power Solid Green If Modbus LED status is off or flashing Red, try: • Check for incorrect Slave ID address. • Confirm correct Modbus RTU dial settings. • Check for incorrect or faulty wiring
		Fault with Micro820 controller	Confirm correct operation of Micro820 controller. Refer to Allen-Bradley Micro820 User Manual 2080-UM005 troubleshooting section. Normal operation LED status indicators. ▪ RUN Solid Green ▪ FAULT Off ▪ FORCE Off ▪ COMM Flashing Green ▪ ENET Solid Green If RUN status is flashing, controller is in Program Mode and must be changed to Run mode. Try: ▪ Connect to controller using CCW and manually toggle to Run Mode. ▪ Ensure the EIPM program has been successfully loaded to the controller. Refer to Programming section. ▪ Cycle power to controller If FAULT status is Red (solid or flashing), controller is in Faulted state. Try: ▪ Connect to controller using CCW software and review fault code. ▪ Clear Faults using CCW software ▪ Check correct seating of 2080-SERIALISOL module ▪ Cycle power to controller. If FORCE status is amber, force conditions are active. Try: ▪ Connect to controller using CCW software and clear any forced variables. If COMM status is off, there is no Modbus RTU traffic transmitting. Try: ▪ Check for incorrect Slave ID address. ▪ Check correct seating of 2080-SERIALISOL module ▪ Cycle power to controller. If ENET status is off, there is no Ethernet connectivity. Check Ethernet wiring. If ENET status is flashing green, there is a problem with the IP address configuration. Try: ▪ Check IP Address is assigned. ▪ Check for duplicate IP Address on local network. ▪ Refer to Configure Ethernet Settings section.
		Incorrect Slave ID address	Confirm Modbus RTU Slave ID address settings match both EIPM and TPCM. MCCB_Input[33] / Register 42534 (dec) must contain the Slave ID address of the target TPCM. If left at 0 or a different value, reading and writing data to the EIPM may not perform correctly and provide incorrect values. Crosscheck for destructive writing commands to MCCB_Input[33] / Register 42534 (dec) from any external writing devices (e.g. PLC, SCADA, HMI)
		Incorrect settings on TPCM	Refer to TPCM Configuration section for correct settings.

Troubleshooting

2.	Read/Write Data is not refreshing or not returning correct values.	Incorrect Modbus-TCP Master connection or configuration.	Refer to Modbus-TCP Master device instructions. Try: ▪ Check IP Address and port settings to EIPM ▪ Check physical ethernet connectivity ▪ Confirm EIPM is visible on the local network (e.g. ping). ▪ Confirm correct Holding register addresses (hex or dec with and without offset), size, and datatype. ▪ Ensure function code 0x03 is used to read holding registers. ▪ Ensure function codes 0x06 or 0x10 (dec 16) are used for writing to holding registers. For reading, refer to Annex A – Read Only Address Map and Reading Data Modbus-TCP sections. For writing, refer to Annex B – Writing Address Map and Writing Data Modbus-TCP sections.
		Incorrect Ethernet/IP Scanner connection or configuration.	Refer to Ethernet/IP scanner device instructions regarding CIP Symbolic explicit messaging. Try: ▪ Check IP Address and port settings to EIPM ▪ Check physical ethernet connectivity ▪ Confirm EIPM is visible on the local network (e.g. ping). ▪ Confirm correct MCCB_Output or MCCB_Input array element address, size, and datatype. ▪ Ensure only unconnected explicit messaging is used. ▪ Confirm correct CIP message type for CIP Symbolic addressing (e.g. Logix CIP Data Table Read/Write message type) ▪ Ensure explicit message instructions are polled at suitable intervals by the Ethernet/IP scanner device program. (e.g. Logix MSG instruction cycled ON/OFF). For reading, refer to Annex A – Read Only Address Map and Reading Data CIP Symbolic Addressing sections. For writing, refer to Annex B – Writing Address Map and Writing Data CIP Symbolic Addressing sections.
3.	Writing data does not work / configuration settings are not updated.	Write authorization not enabled	Local write authorization must be enabled on the target MCCB to make local or remote changes to the configuration settings. Refer to Local Data Write Authorization section.
		Incorrect security access level	Configuration settings require the input of the correct security access level. Confirm the correct security access level for the target configuration setting. Refer to ANNEX F – Writing Command List section. Ensure the Security access level is entered into the required datapoint element or holding register before sending the write command. Refer to the Examples provided in Writing Data section. Security access level value must be entered into the following datapoints (depending on data write method): ▪ CIP Symbolic Addressing MCCB_Input[6] ▪ Modbus-TCP Holding register 42507 (dec)
		Incorrect Password	Ensure correct password is entered for the corresponding command security access level. Default password for Level 1 is “Level1” Default password for Level 2 is “Level2” Password entry must be performed one ASCII character per datapoint element between 4 and 8 characters inclusive and unused characters must be filled with zeros (NULL, 0x00 or 0): ▪ CIP Symbolic Addressing MCCB_Input[7…14] ▪ Modbus-TCP Holding registers 42508…42515 (dec) Refer to Password Management section.
		Invalid data	Data entered into Configuration Write Data array elements is not in the correct format for the target configuration setting. Unused datapoint elements must be filled with zeros (NULL, 0x00 or 0). ▪ CIP Symbolic Addressing MCCB_Input[16…31] ▪ Modbus-TCP Holding registers 42517…42532 (dec) Refer to ANNEX F – Writing Command List and Writing Data sections for correct data and examples.
		Write Enable bit not toggled	Configuration settings are only sent when the Write Enable bit transitions from 0 to 1. ▪ CIP Symbolic Addressing MCCB_Input[32] ▪ Modbus-TCP Holding registers 42533 (dec) If the bit is already 1, change to 0 and then back to 1. Confirm configuration has changed successfully by reading the corresponding datapoint(s), and toggle bit back to 0. Refer to Writing Data section for correct use and examples.
		Write authorization not enabled	Local write authorization must be enabled on the target MCCB to make local or remote changes to the configuration settings. Refer to Local Data Write Authorization section.

Troubleshooting

4.	Password change not registering	Incorrect security access level	Changing the Level 1 password requires either Level 1 or Level 2 access. Changing the Level 2 password requires Level 2 access only. Ensure the correct security access level is selected for changing the respective password. Refer to Changing the Password section.
		Incorrect new password entry	The method for data entry for the new password is different to the way in which the active password is entered for configuration changes. New password is entered as 2 ASCII characters per data element (2 bytes, or INT datatype). Example: the new password "PASS" is entered as 4 characters, 2 per data element: **Variable** **Char** **hex** **dec** MCCB_Input[16] "P" "A" 50 41 20545 MCCB_Input[17] "S" "S" 53 53 21331 Refer to Changing the Password section.
5.	Lost / forgotten password	N/A	If the Level 1 password is lost, it can be reset using Level 2 access. If the Level 2 password is lost, it cannot be reset. If the Level 2 password is lost, it can only be reset or restored via authorized service and maintenance tools via the Maintenance Interface Port. Contact NHP for information on restoring lost passwords. Refer to Changing the Password section.
6.	Program will not load to controller	microSD card not inserted properly	The microSD card can only be installed in one orientation only. The beveled corner should be at the bottom. If you feel resistance when inserting the microSD card, pull it out and change the orientation. Gently press the card until it clicks into place. Refer to Load program to controller section.
		Power not cycled with microSD card inserted	The microSD card with the EIPM program must be inserted into the Micro820 controller prior to applying power. It may be inserted whilst power is applied, but power must be cycled whilst the microSD card is inserted. With power applied, observe the SD Status LED indicator. Wait approximately 20 seconds until the SD Status LED indicator stops flashing and is solid Green and the RUN status LED indicator is flashing. Remove power from the controller and remove the microSD card from the slot. Refer to Load program to controller section.
		ConfigMeFirst.txt file is missing or corrupt	The ConfigMeFirst.txt contains a script which flashes the firmware to the Micro820 controller to version 12.011 and load the EIPM program. It may only be edited to configure Ethernet settings via the Configure Ethernet Settings procedure outside of CCW software. If the ConfigMeFirst.txt file is missing or has become corrupt, contact NHP to download the EIPM microSD card project and restore via the Programming procedure.
		microSD card is corrupt or incorrect format	The Micro820 controller only supports Class 6 and 10 SDSX and SDHC microSD cards with FAT32/16 formats, 32GB maximum size. The Micro820 controller does not support Class 4 microSD cards. Refer to the Programming section.
		Incorrect controller firmware	The EIPM software is compatible with Micro820 firmware version 12.011 and higher. If the Micro820 controller is of a lower firmware version, the Load program to controller procedure will flash upgrade the firmware to version 12.011. If the firmware upgrade is unsuccessful, firmware may be upgraded using ControlFLASH software. Refer to Allen-Bradley Micro820 User Manual 2080-UM005 for additional instruction on firmware upgrades.
		Incorrect controller model number	The EIPM software is compatible with Allen-Bradley Micro820 model number 2080-LC20-20QWB only. Alternative Micro820 models may be used with special modification to the EIPM software in CCW. Alternative models include: ▪ 2080-LC20-20AWB ▪ 2080-LC20-20AWBR ▪ 2080-LC20-20QWBR ▪ 2080-LC20-20QBB ▪ 2080-LC20-20QBBR Contact NHP for details on using alternative Micro820 controller models.

ANNEX A – Read Only Address Map

Device Identification
Communication module and OCR identification information

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Communication module Manufacturer name	-	-	40001	00 00	0	16	STR	"Terasaki Electric" = Hex 54 65 72 61 73 61 6B 69 20 45 6C 65 63 74 72 69 63 00...
Communication module Product code	-	-	40017	00 10	16	16	STR	"TPCM00D02WA" = Hex 54 50 43 4D 30 30 44 30 32 57 41 00... "TPCM00D02NA" = Hex 54 50 43 4D 30 30 44 30 32 4E 41 00...
Communication module Software version	-	-	40033	00 20	32	2	UINT	Example: "1.2.3" = Hex 01 02 03 00
Communication module Vendor URL	-	-	40035	00 22	34	16	STR	"http://www.terasaki.co.jp/" = Hex 68 74 74 70 3A 2F 2F 77 77 77 2E 74 65 72 61 73 61 6B 69 2E 63 6F 2E 6A 70 2F 00...
Communication module Product name	-	-	40051	00 32	50	16	STR	"Modbus RTU interface" = Hex 4D 6F 64 62 75 73 20 52 54 55 20 69 6E 74 65 72 66 61 63 65 00...
Communication module Model name	-	-	40067	00 42	66	16	STR	TPCM00D02WA: "Module with IO" = Hex 4D 6F 64 75 6C 65 20 77 69 74 68 20 49 4F 00...
Communication module User application name	-	-	40083	00 52	82	16	STR	"APL" = Hex 41 50 4C 00…
Communication module Hardware version	-	-	40099	00 62	98	2	UDINT	Example: "1.2.3" = Hex 01 02 03 00
Communication module Serial number	-	-	40101	00 64	100	16	STR	Example: "19H01001" = Hex 31 39 48 30 31 30 30 31 00...
Communication module Site code	-	-	40117	00 74	116	2	UINT	Example: "H" = Hex 00 00 00 48
Communication module Production Day	-	-	40119	00 76	118	1	UINT	Example: "1" = Hex 00 01 (Day-Of-Year)
Communication module Production Year	-	-	40120	00 77	119	1	UINT	Last two digits of the year, Example: "2019" = Hex 00 13
Reserved			40121	00 78	120	24		
MCCB Production site	-	-	40126	00 7D	125	1	STR	Example: "J" = Hex 00 4A
MCCB Serial number	-	-	40127	00 7E	126	2	UDINT	Example: "42123456" => 4123456 = Hex 00 3E EB 40 (The second digit from top of MCCB Serial Number is omitted.)
MCCB Production Day	-	-	40129	00 80	128	1	UINT	Example: "1" = Hex 00 01 (Day-Of-Year)
MCCB Production Year	-	-	40130	00 81	129	1	UINT	Last two digits of the year, Example: "2019" = Hex 00 13
MCCB Hardware version	-	-	40131	00 82	130	2	UDINT	Example: "1.2.3" = Hex 01 02 03 00
MCCB Software version	-	-	40133	00 84	132	2	UDINT	Example: "1.2.3" = Hex 01 02 03 00
MCCB Communication version	-	-	40135	00 86	134	2	UDINT	Example: "1.2.3" = Hex 01 02 03 00
MCCB Manufacturer code	-	-	40137	00 88	136	1	UINT	"Terasaki Electric" = Hex 00 01
MCCB Range code	-	-	40138	00 89	137	1	UINT	"TemBreak PRO" = Hex 00 01
MCCB Frame size	-	-	40139	00 8A	138	1	UINT	"P160" = Hex 00 00 "P250" = Hex 00 01 "P400 / P630" = Hex 00 03
MCCB Rated Current [In]	-	-	40140	00 8B	139	1	UINT	40A / 100A / 125A / 160A / 250A / 400A / 630A Example: "40A" = Hex 00 28
MCCB Number of Pole	-	-	40141	00 8C	140	1	UINT	"3 poles" = Hex 00 03, "4 poles" = Hex 00 04
MCCB OCR type	-	-	40142	00 8D	141	1	UINT	"SMART (TPOU)" = Hex 00 03
Reserved			40143	00 8E	142	95		

ANNEX A – Read Only Address Map

Measure

Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Phase to Phase Voltage between Phase1 and Phase2 [U12]	V	0.001	40251	00 FA	250	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Phase to Phase Voltage between Phase2 and Phase3 [U23]	V	0.001	40253	00 FC	252	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Phase to Phase Voltage between Phase3 and Phase1 [U31]	V	0.001	40255	00 FE	254	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Phase to Neutral Voltage between Phase1 and Neutral [V1N]	V	0.001	40257	01 00	256	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Phase to Neutral Voltage between Phase2 and Neutral [V2N]	V	0.001	40259	01 02	258	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Phase to Neutral Voltage between Phase3 and Neutral [V3N]	V	0.001	40261	01 04	260	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Max. Phase to Phase Voltage between U12, U23 & U31 [Umax]	V	0.001	40263	01 06	262	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Min. Phase to Phase Voltage between U12, U23 & U31 [Umin]	V	0.001	40265	01 08	264	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Max. Phase to Neutral Voltage between V1N, V2N & V3N [Vmax]	V	0.001	40267	01 0A	266	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Min. Phase to Neutral Voltage between V1N, V2N & V3N [Vmin]	V	0.001	40269	01 0C	268	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Calculated average Phase to Phase Voltage of U12, U23, U31 [Uavg]	V	0.001	40271	01 0E	270	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Calculated average Phase to Neutral Voltage of V1N, V2N, V3N [Vavg]	V	0.001	40273	01 10	272	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Unbalance Phase to Phase Voltage of U12 [U12 Unb]	%	0.1	40275	01 12	274	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase to Phase Voltage of U23 [U23 Unb]	%	0.1	40277	01 14	276	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase to Phase Voltage of U31 [U31 Unb]	%	0.1	40279	01 16	278	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase to Phase Voltage between U12, U23 and U31 [Umax Unb]	%	0.1	40281	01 18	280	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase to Neutral Voltage of V1N [V1 Unb]	%	0.1	40283	01 1A	282	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase to Neutral Voltage of V2N [V2 Unb]	%	0.1	40285	01 1C	284	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase to Neutral Voltage of V3N [V3 Unb]	%	0.1	40287	01 1E	286	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase to Neutral Voltage between V1N, V2N and V3N [Vmax Unb]	%	0.1	40289	01 20	288	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Phase Current of Phase1 [I1]	A	0.001	40291	01 22	290	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Phase Current of Phase2 [I2]	A	0.001	40293	01 24	292	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Phase Current of Phase3 [I3]	A	0.001	40295	01 26	294	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Phase Current of Neutral [IN]	A	0.001	40297	01 28	296	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Calculated Ground Current [Ig]	A	0.001	40299	01 2A	298	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Phase Current between I1, I2, I3 and IN [Imax]	A	0.001	40301	01 2C	300	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Phase Current between I1, I2 and I3 [Imin]	A	0.001	40303	01 2E	302	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Calculated average Phase Current of I1, I2, I3 [Iavg]	A	0.001	40305	01 30	304	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Unbalance Phase Current of I1 [I1 Unb]	%	0.1	40307	01 32	306	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase Current of I2 [I2 Unb]	%	0.1	40309	01 34	308	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase Current of I3 [I3 Unb]	%	0.1	40311	01 36	310	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Unbalance Phase Current of IN [IN Unb]	%	0.1	40313	01 38	312	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase Current between I1, I2, I3 and IN [Imax Unb]	%	0.1	40315	01 3A	314	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Active power of Phase1 [P1]	W	1	40317	01 3C	316	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Active power of Phase2 [P2]	W	1	40319	01 3E	318	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Active power of Phase3 [P3]	W	1	40321	01 40	320	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0

ANNEX A – Read Only Address Map

Measure

Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Total Active power [Ptot]	W	1	40323	01 42	322	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Reactive power of Phase1 [Q1]	var	1	40325	01 44	324	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Reactive power of Phase2 [Q2]	var	1	40327	01 46	326	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Reactive power of Phase3 [Q3]	var	1	40329	01 48	328	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Total Reactive power [Qtot]	var	1	40331	01 4A	330	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Apparent power of Phase1 [S1]	VA	1	40333	01 4C	332	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Apparent power of Phase2 [S2]	VA	1	40335	01 4E	334	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Apparent power of Phase3 [S3]	VA	1	40337	01 50	336	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Total Apparent power [Stot]	VA	1	40339	01 52	338	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Power factor of Phase1 [PF1]	-	0.0001	40341	01 54	340	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Power factor of Phase2 [PF2]	-	0.0001	40343	01 56	342	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Power factor of Phase3 [PF3]	-	0.0001	40345	01 58	344	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Total Power factor [PFtot]	-	0.0001	40347	01 5A	346	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Displacement Power factor of Phase1 [Cosφ1]	-	0.0001	40349	01 5C	348	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Displacement Power factor of Phase2 [Cosφ2]	-	0.0001	40351	01 5E	350	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Displacement Power factor of Phase3 [Cosφ3]	-	0.0001	40353	01 60	352	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Total Displacement Power factor [Cosφtot]	-	0.0001	40355	01 62	354	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Network Frequency [F]	Hz	0.001	40357	01 64	356	2	UDINT	Example: "50.000Hz" = Hex 00 00 C3 50
Reserved			40359	01 66	358	17		
THD of Phase to Phase Voltage U12 [THD U12]	%	0.1	40376	01 77	375	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase to Phase Voltage U23 [THD U23]	%	0.1	40378	01 79	377	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase to Phase Voltage U31 [THD U31]	%	0.1	40380	01 7B	379	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase to Neutral Voltage V1N [THD V1N]	%	0.1	40382	01 7D	381	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase to Neutral Voltage V2N [THD V2N]	%	0.1	40384	01 7F	383	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase to Neutral Voltage V3N [THD V3N]	%	0.1	40386	01 81	385	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase Current I1 [THD I1]	%	0.1	40388	01 83	387	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase Current I2 [THD I2]	%	0.1	40390	01 85	389	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
THD of Phase Current I3 [THD I3]	%	0.1	40392	01 87	391	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD between Phase Current I1, I2 and I3 [THD Imax]	%	0.1	40394	01 89	393	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. Phase to Phase Voltage of U12 since last reset	V	0.001	40396	01 8B	395	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Min. Phase to Phase Voltage of U12 since last reset	sec	1	40398	01 8D	397	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Phase to Phase Voltage of U12 since last reset	sec	1	40400	01 8F	399	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. Phase to Phase Voltage of U23 since last reset	V	0.001	40402	01 91	401	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Min. Phase to Phase Voltage of U23 since last reset	sec	1	40404	01 93	403	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Phase to Phase Voltage of U23 since last reset	sec	1	40406	01 95	405	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. Phase to Phase Voltage of U31 since last reset	V	0.001	40408	01 97	407	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40

ANNEX A – Read Only Address Map

Measure

Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Timestamp OCR (non-reset time) when Min. Phase to Phase Voltage of U31 since last reset	sec	1	40410	01 99	409	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Phase to Phase Voltage of U23 since last reset	sec	1	40412	01 9B	411	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. Phase to Neutral Voltage of V1N since last reset	V	0.001	40414	01 9D	413	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Min. Phase to Neutral Voltage of V1N since last reset	sec	1	40416	01 9F	415	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Phase to Neutral Voltage of V1N since last reset	sec	1	40418	01 A1	417	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. Phase to Neutral Voltage of V2N since last reset	V	0.001	40420	01 A3	419	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Min. Phase to Neutral Voltage of V2N since last reset	sec	1	40422	01 A5	421	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Phase to Neutral Voltage of V2N since last reset	sec	1	40424	01 A7	423	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. Phase to Neutral Voltage of V3N since last reset	V	0.001	40426	01 A9	425	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Min. Phase to Neutral Voltage of V3N since last reset	sec	1	40428	01 AB	427	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Phase to Neutral Voltage of V3N since last reset	sec	1	40430	01 AD	429	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. Calculated average Phase to Phase Voltage of U12, U23, U31 (Uavg) since last reset	V	0.001	40432	01 AF	431	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Min. Calculated average Phase to Neutral Voltage of V1N, V2N, V3N (Vavg) since last reset	V	0.001	40434	01 B1	433	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Min. Unbalance Phase to Phase Voltage of U12 since last reset	%	0.1	40436	01 B3	435	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Phase to Phase Voltage of U23 since last reset	%	0.1	40438	01 B5	437	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Phase to Phase Voltage of U31 since last reset	%	0.1	40440	01 B7	439	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. of [Max. Unbalance Phase to Phase Voltage between U12, U23 and U31] since last reset	%	0.1	40442	01 B9	441	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Unbalance Phase to Neutral Voltage of V1N since last reset	%	0.1	40444	01 BB	443	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Unbalance Phase to Neutral Voltage of V2N since last reset	%	0.1	40446	01 BD	445	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Unbalance Phase to Neutral Voltage of V3N since last reset	%	0.1	40448	01 BF	447	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. of [Max. Unbalance Phase to Neutral Voltage between V1N, V2N and V3N] since last reset	%	0.1	40450	01 C1	449	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Phase Current I1 since last reset	A	0.001	40452	01 C3	451	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Phase Current I2 since last reset	A	0.001	40454	01 C5	453	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Phase Current I3 since last reset	A	0.001	40456	01 C7	455	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Phase Current IN since last reset	A	0.001	40458	01 C9	457	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Calculated Ground Current Ig since last reset	A	0.001	40460	01 CB	459	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40

ANNEX A – Read Only Address Map

Measure

Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Min. of [Max. Phase Current between I1, I2, I3 and IN] since last reset	A	0.001	40462	01 CD	461	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. of [Min. Phase Current between I1, I2 and I3] since last reset	A	0.001	40464	01 CF	463	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Calculated average Phase Current of I1, I2, I3 (Iavg) since last reset	A	0.001	40466	01 D1	465	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Min. Unbalance Phase Current of I1 since last reset	%	0.1	40468	01 D3	467	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Phase Current of I2 since last reset	%	0.1	40470	01 D5	469	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Phase Current of I3 since last reset	%	0.1	40472	01 D7	471	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. Unbalance Phase Current of IN since last reset	%	0.1	40474	01 D9	473	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Min. of [Max. Unbalance Phase Current between I1, I2, I3 and IN] since last reset	%	0.1	40476	01 DB	475	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Reserved			40478	01 DD	477	23		
Min. Active power P1 since last reset	W	1	40501	01 F4	500	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Min. Active power P2 since last reset	W	1	40503	01 F6	502	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Min. Active power P3 since last reset	W	1	40505	01 F8	504	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Min. Total Active power Ptot since last reset	W	1	40507	01 FA	506	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Min. Reactive power Q1 since last reset	var	1	40509	01 FC	508	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Min. Reactive power Q2 since last reset	var	1	40511	01 FE	510	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Min. Reactive power Q3 since last reset	var	1	40513	02 00	512	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Min. Total Reactive power Qtot since last reset	var	1	40515	02 02	514	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Min. Apparent power S1 since last reset	VA	1	40517	02 04	516	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Min. Apparent power S2 since last reset	VA	1	40519	02 06	518	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Min. Apparent power S3 since last reset	VA	1	40521	02 08	520	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Min. Total Apparent power Stot since last reset	VA	1	40523	02 0A	522	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Min. Power factor of PF1 since last reset	-	0.0001	40525	02 0C	524	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Power factor of PF2 since last reset	-	0.0001	40527	02 0E	526	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Power factor of PF3 since last reset	-	0.0001	40529	02 10	528	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Total Power factor PFtot since last reset	-	0.0001	40531	02 12	530	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Displacement Power factor Cosφ1 since last reset	-	0.0001	40533	02 14	532	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Displacement Power factor Cosφ2 since last reset	-	0.0001	40535	02 16	534	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Displacement Power factor Cosφ3 since last reset	-	0.0001	40537	02 18	536	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Total Displacement Power factor Cosφtot since last reset	-	0.0001	40539	02 1A	538	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Min. Network Frequency F since last reset	Hz	0.001	40541	02 1C	540	2	UDINT	Example: "50.000Hz" = Hex 00 00 C3 50
Timestamp OCR (non-reset time) when Min. Network Frequency F since last reset	sec	1	40543	02 1E	542	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Min. Network Frequency F since last reset	sec	1	40545	02 20	544	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Min. THD of Phase to Phase Voltage U12 since last reset	%	0.1	40547	02 22	546	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase to Phase Voltage U23 since last reset	%	0.1	40549	02 24	548	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase to Phase Voltage U31 since last reset	%	0.1	40551	02 26	550	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase to Neutral Voltage V1N since last reset	%	0.1	40553	02 28	552	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B

ANNEX A – Read Only Address Map

Measure
Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Min. THD of Phase to Neutral Voltage V2N since last reset	%	0.1	40555	02 2A	554	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase to Neutral Voltage V3N since last reset	%	0.1	40557	02 2C	556	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase Current I1 since last reset	%	0.1	40559	02 2E	558	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase Current I2 since last reset	%	0.1	40561	02 30	560	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. THD of Phase Current I3 since last reset	%	0.1	40563	02 32	562	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Min. of [Max. THD between Phase Current I1, I2 and I3] since last reset	%	0.1	40565	02 34	564	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. Phase to Phase Voltage of U12 since last reset	V	0.001	40567	02 36	566	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase to Phase Voltage of U12 since last reset	sec	1	40569	02 38	568	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase to Phase Voltage of U12 since last reset	sec	1	40571	02 3A	570	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase to Phase Voltage of U23 since last reset	V	0.001	40573	02 3C	572	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase to Phase Voltage of U23 since last reset	sec	1	40575	02 3E	574	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase to Phase Voltage of U23 since last reset	sec	1	40577	02 40	576	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase to Phase Voltage of U31 since last reset	V	0.001	40579	02 42	578	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase to Phase Voltage of U31 since last reset	sec	1	40581	02 44	580	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase to Phase Voltage of U23 since last reset	sec	1	40583	02 46	582	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase to Neutral Voltage of V1N since last reset	V	0.001	40585	02 48	584	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase to Neutral Voltage of V1N since last reset	sec	1	40587	02 4A	586	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase to Neutral Voltage of V1N since last reset	sec	1	40589	02 4C	588	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase to Neutral Voltage of V2N since last reset	V	0.001	40591	02 4E	590	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase to Neutral Voltage of V2N since last reset	sec	1	40593	02 50	592	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase to Neutral Voltage of V2N since last reset	sec	1	40595	02 52	594	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase to Neutral Voltage of V3N since last reset	V	0.001	40597	02 54	596	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase to Neutral Voltage of V3N since last reset	sec	1	40599	02 56	598	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase to Neutral Voltage of V3N since last reset	sec	1	40601	02 58	600	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Reserved			40603	02 5A	602	23		
Max. Calculated average Phase to Phase Voltage of U12, U23, U31 (Uavg) since last reset	V	0.001	40626	02 71	625	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40
Max. Calculated average Phase to Neutral Voltage of V1N, V2N, V3N (Vavg) since last reset	V	0.001	40628	02 73	627	2	UDINT	Example: "123.456V" = Hex 00 01 E2 40

ANNEX A – Read Only Address Map

Measure

Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Max. Unbalance Phase to Phase Voltage of U12 since last reset	%	0.1	40630	02 75	629	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase to Phase Voltage of U23 since last reset	%	0.1	40632	02 77	631	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase to Phase Voltage of U31 since last reset	%	0.1	40634	02 79	633	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. of [Max. Phase to Phase Voltage between U12, U23 and U31] since last reset	%	0.1	40636	02 7B	635	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Unbalance Phase to Neutral Voltage of V1N since last reset	%	0.1	40638	02 7D	637	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Unbalance Phase to Neutral Voltage of V2N since last reset	%	0.1	40640	02 7F	639	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Unbalance Phase to Neutral Voltage of V3N since last reset	%	0.1	40642	02 81	641	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. of [Max. Unbalance Phase to Neutral Voltage between V1N, V2N and V3N] since last reset	%	0.1	40644	02 83	643	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Phase Current I1 since last reset	A	0.001	40646	02 85	645	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase Current I1 since last reset	sec	1	40648	02 87	647	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase Current I1 since last reset	sec	1	40650	02 89	649	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase Current I2 since last reset	A	0.001	40652	02 8B	651	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase Current I2 since last reset	sec	1	40654	02 8D	653	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase Current I2 since last reset	sec	1	40656	02 8F	655	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase Current I3 since last reset	A	0.001	40658	02 91	657	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase Current I3 since last reset	sec	1	40660	02 93	659	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase Current I3 since last reset	sec	1	40662	02 95	661	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Phase Current IN since last reset	A	0.001	40664	02 97	663	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Timestamp OCR (non-reset time) when Max. Phase Current IN since last reset	sec	1	40666	02 99	665	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Phase Current IN since last reset	sec	1	40668	02 9B	667	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Max. Calculated Ground Current Ig since last reset	A	0.001	40670	02 9D	669	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. of [Max. Phase Current between I1, I2, I3 and IN] since last reset	A	0.001	40672	02 9F	671	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. of [Min. Phase Current between I1, I2 and I3] since last reset	A	0.001	40674	02 A1	673	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Calculated average Phase Current of I1, I2, I3 (Iavg) since last reset	A	0.001	40676	02 A3	675	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Unbalance Phase Current of I1 since last reset	%	0.1	40678	02 A5	677	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase Current of I2 since last reset	%	0.1	40680	02 A7	679	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Unbalance Phase Current of I3 since last reset	%	0.1	40682	02 A9	681	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85

ANNEX A – Read Only Address Map

Measure
Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Max. Unbalance Phase Current of IN since last reset	%	0.1	40684	02 AB	683	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. of [Max. Unbalance Phase Current between I1, I2, I3 and IN] since last reset	%	0.1	40686	02 AD	685	2	DINT	Example: "12.3%" = Hex 00 00 00 7B, "-12.3%" = Hex FF FF FF 85
Max. Active power P1 since last reset	W	1	40688	02 AF	687	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Active power P2 since last reset	W	1	40690	02 B1	689	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Active power P3 since last reset	W	1	40692	02 B3	691	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Total Active power Ptot since last reset	W	1	40694	02 B5	693	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Reactive power Q1 since last reset	var	1	40696	02 B7	695	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Reactive power Q2 since last reset	var	1	40698	02 B9	697	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Reactive power Q3 since last reset	var	1	40700	02 BB	699	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Total Reactive power Qtot since last reset	var	1	40702	02 BD	701	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Apparent power S1 since last reset	VA	1	40704	02 BF	703	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Apparent power S2 since last reset	VA	1	40706	02 C1	705	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Apparent power S3 since last reset	VA	1	40708	02 C3	707	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Total Apparent power Stot since last reset	VA	1	40710	02 C5	709	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Power factor of PF1 since last reset	-	0.0001	40712	02 C7	711	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Power factor of PF2 since last reset	-	0.0001	40714	02 C9	713	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Power factor of PF3 since last reset	-	0.0001	40716	02 CB	715	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Total Power factor PFtot since last reset	-	0.0001	40718	02 CD	717	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Displacement Power factor Cosφ1 since last reset	-	0.0001	40720	02 CF	719	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Displacement Power factor Cosφ2 since last reset	-	0.0001	40722	02 D1	721	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Displacement Power factor Cosφ3 since last reset	-	0.0001	40724	02 D3	723	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Total Displacement Power factor Cosφtot since last reset	-	0.0001	40726	02 D5	725	2	DINT	Example: "0.1234" = Hex 00 00 04 D2, "-0.1234" = Hex FF FF FB 2E
Max. Network Frequency F since last reset	Hz	0.001	40728	02 D7	727	2	UDINT	Example: "50.000Hz" = Hex 00 00 C3 50
Timestamp OCR (non-reset time) when Max. Network Frequency F since last reset	sec	1	40730	02 D9	729	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Max. Network Frequency F since last reset	sec	1	40732	02 DB	731	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Reserved			40734	02 DD	733	17		
Max. THD of Phase to Phase Voltage U12 since last reset	%	0.1	40751	02 EE	750	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase to Phase Voltage U23 since last reset	%	0.1	40753	02 F0	752	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase to Phase Voltage U31 since last reset	%	0.1	40755	02 F2	754	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase to Neutral Voltage V1N since last reset	%	0.1	40757	02 F4	756	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase to Neutral Voltage V2N since last reset	%	0.1	40759	02 F6	758	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase to Neutral Voltage V3N since last reset	%	0.1	40761	02 F8	760	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase Current I1 since last reset	%	0.1	40763	02 FA	762	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase Current I2 since last reset	%	0.1	40765	02 FC	764	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. THD of Phase Current I3 since last reset	%	0.1	40767	02 FE	766	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B
Max. of [Max. THD between Phase Current I1, I2 and I3] since last reset	%	0.1	40769	03 00	768	2	UDINT	Example: "12.3%" = Hex 00 00 00 7B

ANNEX A – Read Only Address Map

Measure

Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Absolute Active Energy [Eaabs] (Eaabs = EaIn + EaOut) since last reset	Wh	1	40771	03 02	770	4	ULINT	Example: "1234567890123456Wh" = Hex 00 04 62 D5 3C 8A BA C0
Net Active Energy [Eanet] (Eanet = EaIn - EaOut) since last reset	Wh	1	40775	03 06	774	4	LINT	Example: "1234567890123456Wh" = Hex 00 04 62 D5 3C 8A BA C0, "-1234567890123456Wh" = Hex FF FB 9D 2A C3 75 45 40
Direct Active Energy [EaIn] since last reset	Wh	1	40779	03 0A	778	4	ULINT	Example: "1234567890123456Wh" = Hex 00 04 62 D5 3C 8A BA C0
Reverse Active Energy [EaOut] since last reset	Wh	1	40783	03 0E	782	4	ULINT	Example: "1234567890123456Wh" = Hex 00 04 62 D5 3C 8A BA C0
Direct Active Energy [EaIn] non-resettable	Wh	1	40787	03 12	786	4	ULINT	Example: "1234567890123456Wh" = Hex 00 04 62 D5 3C 8A BA C0
Reverse Active Energy [EaOut] non-resettable	Wh	1	40791	03 16	790	4	ULINT	Example: "1234567890123456Wh" = Hex 00 04 62 D5 3C 8A BA C0
Absolute Reactive Energy [Erabs] (Erabs = ErIn + ErOut) since last reset	VArh	1	40795	03 1A	794	4	ULINT	Example: "1234567890123456varh" = Hex 00 04 62 D5 3C 8A BA C0
Net Reactive Energy [Ernet] (Ernet = ErIn - ErOut) since last reset	VArh	1	40799	03 1E	798	4	LINT	Example: "1234567890123456varh" = Hex 00 04 62 D5 3C 8A BA C0, "-1234567890123456varh" = Hex FF FB 9D 2A C3 75 45 40
Direct Reactive Energy [ErIn] since last reset	VArh	1	40803	03 22	802	4	ULINT	Example: "1234567890123456varh" = Hex 00 04 62 D5 3C 8A BA C0
Reverse Reactive Energy [ErOut] since last reset	VArh	1	40807	03 26	806	4	ULINT	Example: "1234567890123456varh" = Hex 00 04 62 D5 3C 8A BA C0
Apparent Energy [Es] since last reset	VAh	1	40811	03 2A	810	4	ULINT	Example: "1234567890123456VAh" = Hex 00 04 62 D5 3C 8A BA C0
Demand Phase Current of Phase1 [I1 Dmd]	A	0.001	40815	03 2E	814	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Demand Phase Current of Phase2 [I2 Dmd]	A	0.001	40817	03 30	816	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Demand Phase Current of Phase3 [I3 Dmd]	A	0.001	40819	03 32	818	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Demand Phase Current of PhaseN [IN Dmd]	A	0.001	40821	03 34	820	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Demand Calculated average Phase Current of I1, I2, I3 [Iavg Dmd]	A	0.001	40823	03 36	822	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Demand Phase Current I1 Dmd since last reset	A	0.001	40825	03 38	824	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Demand Phase Current I2 Dmd since last reset	A	0.001	40827	03 3A	826	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Demand Phase Current I3 Dmd since last reset	A	0.001	40829	03 3C	828	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Demand Phase Current IN Dmd since last reset	A	0.001	40831	03 3E	830	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Max. Demand Calculated average Phase Current of I1, I2, I3 (Iavg Dmd) since last reset	A	0.001	40833	03 40	832	2	UDINT	Example: "123.456A" = Hex 00 01 E2 40
Reserved			40835	03 42	834	41		
Demand Active power of Phase1 [P1 Dmd]	W	1	40876	03 6B	875	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Demand Active power of Phase2 [P2 Dmd]	W	1	40878	03 6D	877	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Demand Active power of Phase3 [P3 Dmd]	W	1	40880	03 6F	879	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Demand Total Active power [Ptot Dmd]	W	1	40882	03 71	881	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Demand Active power P1 Dmd since last reset	W	1	40884	03 73	883	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Demand Active power P2 Dmd since last reset	W	1	40886	03 75	885	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Demand Active power P3 Dmd since last reset	W	1	40888	03 77	887	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Max. Demand Total Active power Ptot Dmd since last reset	W	1	40890	03 79	889	2	DINT	Example: "123456W" = Hex 00 01 E2 40, "-123456W" = Hex FF FE 1D C0
Demand Reactive power of Phase1 [Q1 Dmd]	var	1	40892	03 7B	891	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Demand Reactive power of Phase2 [Q2 Dmd]	var	1	40894	03 7D	893	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Demand Reactive power of Phase3 [Q3 Dmd]	var	1	40896	03 7F	895	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Demand Total Reactive power [Qtot Dmd]	var	1	40898	03 81	897	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Demand Reactive power Q1 Dmd since last reset	var	1	40900	03 83	899	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0

ANNEX A – Read Only Address Map

Measure
Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Max. Demand Reactive power Q2 Dmd since last reset	var	1	40902	03 85	901	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Demand Reactive power Q3 Dmd since last reset	var	1	40904	03 87	903	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Max. Demand Total Reactive power Qtot Dmd since last reset	var	1	40906	03 89	905	2	DINT	Example: "123456var" = Hex 00 01 E2 40, "-123456var" = Hex FF FE 1D C0
Demand Apparent power of Phase1 [S1 Dmd]	VA	1	40908	03 8B	907	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Demand Apparent power of Phase1 [S2 Dmd]	VA	1	40910	03 8D	909	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Demand Apparent power of Phase1 [S3 Dmd]	VA	1	40912	03 8F	911	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Demand Total Apparent power [Stot Dmd]	VA	1	40914	03 91	913	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Demand Apparent power S1 Dmd since last reset	VA	1	40916	03 93	915	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Demand Apparent power S2 Dmd since last reset	VA	1	40918	03 95	917	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Demand Apparent power S3 Dmd since last reset	VA	1	40920	03 97	919	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Max. Demand Total Apparent power Stot Dmd since last reset	VA	1	40922	03 99	921	2	UDINT	Example: "123456VA" = Hex 00 01 E2 40
Operating quadrant	-	1	40924	03 9B	923	1	UINT	"Q1" = Hex 00 01, "Q2" = Hex 00 02, "Q3" = Hex 00 03, "Q4" = Hex 00 04
Phase rotation (Phase sequence)	-	1	40925	03 9C	924	1	UINT	"1->2->3" = Hex 00 01, "1->3->2" = Hex 00 02
Timestamp OCR (non-reset time) when Reset concerning Current	sec	1	40926	03 9D	925	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Current	sec	1	40928	03 9F	927	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Voltage	sec	1	40930	03 A1	929	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Voltage	sec	1	40932	03 A3	931	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Power	sec	1	40934	03 A5	933	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Power	sec	1	40936	03 A7	935	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Power factor	sec	1	40938	03 A9	937	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Power factor	sec	1	40940	03 AB	939	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning THD	sec	1	40942	03 AD	941	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning THD	sec	1	40944	03 AF	943	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Network Frequency	sec	1	40946	03 B1	945	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Network Frequency	sec	1	40948	03 B3	947	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Energy	sec	1	40950	03 B5	949	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Energy	sec	1	40952	03 B7	951	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Demand Current	sec	1	40954	03 B9	953	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Demand Current	sec	1	40956	03 BB	955	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp OCR (non-reset time) when Reset concerning Demand Power	sec	1	40958	03 BD	957	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Timestamp user (settable by user) when Reset concerning Demand Power	sec	1	40960	03 BF	959	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E

ANNEX A – Read Only Address Map

Measure
Measurement data on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Reserved			40962	03 C1	961	434		

ANNEX A – Read Only Address Map

Indicator
Status and Maintenance indicators about OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
AX switch on Smart Aux status	-	-	41001	03 E8	1000	1	UINT	"AX contact is opened" = Hex 00 00, "AX contact is closed" = Hex 00 01
AL switch on Smart Aux status	-	-	41002	03 E9	1001	1	UINT	"AL contact is opened" = Hex 00 00, "AL contact is closed" = Hex 00 01
Absolute AX switch on Smart Aux counter (Non-reset counter)	-	1	41003	03 EA	1002	1	UINT	Example: "12345" = Hex 30 39
Absolute AL switch on Smart Aux counter (Non-reset counter)	-	1	41004	03 EB	1003	1	UINT	Example: "12345" = Hex 30 39
AX switch on Smart Aux counter (Reset counter)	-	1	41005	03 EC	1004	1	UINT	Example: "12345" = Hex 30 39
AL switch on Smart Aux counter (Reset counter)	-	1	41006	03 ED	1005	1	UINT	Example: "12345" = Hex 30 39
Date & Time synchronisation	-	1	41007	03 EE	1006	2	UINT	"Not synchronised" = Hex 00 00, "Synchronised" = Hex 00 01
Reserved			41009	03 F0	1008	1		
Measuring function availability status	-	-	41010	03 F1	1009	1	UINT	"Not available" = Hex 00 00, "Available" = Hex 00 01
Custom Alarms configuration status	-	-	41011	03 F2	1010	1	UINT	Custom Alarms configuration status bit 0 = Custom Alarm 1 bit 1 = Custom Alarm 2 bit 2 = Custom Alarm 3 bit 3 = Custom Alarm 4 bit 4 = Custom Alarm 5 bit 5 = Custom Alarm 6 bit 6 = Custom Alarm 7 bit 7 = Custom Alarm 8 bit 8 = Custom Alarm 9 bit 9 = Custom Alarm 10 bit 10 = Custom Alarm 11 bit 11 = Custom Alarm 12 bit 12-15 = Reserved Alarm is not configured = Value 0 Alarm is configured = Value 1 Example: "Custom Alarms 1 and 2 are configured" = Hex 00 03
Custom Alarms status	-	-	41012	03 F3	1011	1	UINT	Custom Alarms status bit 0 = Custom Alarm 1 bit 1 = Custom Alarm 2 bit 2 = Custom Alarm 3 bit 3 = Custom Alarm 4 bit 4 = Custom Alarm 5 bit 5 = Custom Alarm 6 bit 6 = Custom Alarm 7 bit 7 = Custom Alarm 8 bit 8 = Custom Alarm 9 bit 9 = Custom Alarm 10 bit 10 = Custom Alarm 11 bit 11 = Custom Alarm 12 bit 12-15 = Reserved Alarm is not activated = Value 0 Alarm is activated = Value 1 Example: "Custom Alarms 1 and 2 are activated" = Hex 00 03

ANNEX A – Read Only Address Map

Indicator
Status and Maintenance indicators about OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Reserved			41013	03 F4	1012	2		
Protection function availability status	-	-	41015	03 F6	1014	1	UINT	Protection function availability status bit 0 = Long time trip (LTD) bit 1 = Short time trip (STD) bit 2 = Instantaneous trip (INST) bit 3 = Ground fault trip (GF) bit 4-15 = Reserved Protection function is not available = Value 0 Protection function is available = Value 1 Example: "LTD&STD&INST&GF protection function are available" = Hex 00 0F
Trip Alarm status	-	-	41016	03 F7	1015	1	UINT	"Alarm is not activated" = Hex 00 00, "Alarm is activated" = Hex 00 01
Pre trip Alarm status	-	-	41017	03 F8	1016	1	UINT	"Alarm is not activated" = Hex 00 00, "Alarm is activated" = Hex 00 01
Pre trip Alarm OUT contact status	-	-	41018	03 F9	1017	1	UINT	"Contact is opened" = Hex 00 00, "Contact is closed" = Hex 00 01
Optional Alarm status	-	-	41019	03 FA	1018	1	UINT	"Alarm is not activated" = Hex 00 00, "Alarm is activated" = Hex 00 01
Optional Alarm OUT contact status	-	-	41020	03 FB	1019	1	UINT	"Contact is opened" = Hex 00 00, "Contact is closed" = Hex 00 01
OCR internal temperature	°C	1	41021	03 FC	1020	1	INT	Example: "40°C" = Hex 00 28
OCR internal temperature Alarm status	-	-	41022	03 FD	1021	1	UINT	"Alarm is not activated" = Hex 00 00, "Alarm is activated" = Hex 00 01
Reserved			41023	03 FE	1022	8		
Zone interlocking (STD) Input status	-	-	41031	04 06	1030	1	UINT	"No input from downstream breakers" = Hex 00 00, "Input from downstream breakers" = Hex 00 01
Zone interlocking (STD) Output status	-	-	41032	04 07	1031	1	UINT	"No output to upstream breaker" = Hex 00 00, "Output to upstream breaker" = Hex 00 01
Zone interlocking (GF) Input status	-	-	41033	04 08	1032	1	UINT	"No input from downstream breakers" = Hex 00 00, "Input from downstream breakers" = Hex 00 01
Zone interlocking (GF) Output status	-	-	41034	04 09	1033	1	UINT	"No output to upstream breaker" = Hex 00 00, "Output to upstream breaker" = Hex 00 01
Operating time counter	sec	1	41035	04 0A	1034	2	UDINT	Example: "1234567890sec" = Hex 49 96 02 D2
Reserved			41037	04 0C	1036	19		
OCR Error status			41056	04 1F	1055	1	UINT	Error status bit 0 = Trip coil disconnection bit 1 = Current sensor Phase 1 disconnection bit 2 = Current sensor Phase 2 disconnection bit 3 = Current sensor Phase 3 disconnection bit 4 = Current sensor Phase neutral disconnection bit 5-15 = Reserved Error is not detected = Value 0 Error is detected = Value 1 Example: "Trip coil disconnection" = Hex 00 01
Reserved			41057	04 20	1056	8		
Time before trip	sec	1	41065	04 28	1064	1	UINT	Example: "1234sec" = Hex 04 D2
LTD protection trip counter	-	1	41066	04 29	1065	1	UINT	Example: "123" = Hex 00 7B
STD protection trip counter	-	1	41067	04 2A	1066	1	UINT	Example: "123" = Hex 00 7B

ANNEX A – Read Only Address Map

Indicator
Status and Maintenance indicators about OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
INST protection trip counter	-	1	41068	04 2B	1067	1	UINT	Example: "123" = Hex 00 7B
GF protection trip counter	-	1	41069	04 2C	1068	1	UINT	Example: "123" = Hex 00 7B
Test trip counter	-	1	41070	04 2D	1069	1	UINT	Example: "123" = Hex 00 7B
Pre trip Alarm counter	INT	1	41071	04 2E	1070	1	UINT	Example: "123" = Hex 00 7B
Optional Alarm counter	INT	1	41072	04 2F	1071	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #1 counter	INT	1	41073	04 30	1072	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #2 counter	INT	1	41074	04 31	1073	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #3 counter	INT	1	41075	04 32	1074	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #4 counter	INT	1	41076	04 33	1075	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #5 counter	INT	1	41077	04 34	1076	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #6 counter	INT	1	41078	04 35	1077	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #7 counter	INT	1	41079	04 36	1078	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #8 counter	INT	1	41080	04 37	1079	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #9 counter	INT	1	41081	04 38	1080	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #10 counter	INT	1	41082	04 39	1081	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #11 counter	INT	1	41083	04 3A	1082	1	UINT	Example: "123" = Hex 00 7B
Custom Alarm #12 counter	INT	1	41084	04 3B	1083	1	UINT	Example: "123" = Hex 00 7B
Reserved			41085	04 3C	1084	1		
Ready to protect LED (Green) status	-	1	41086	04 3D	1085	1	UINT	"No power to operate" = Hex 00 00, "Ready to protect" = Hex 00 02
Ready to protect LED (Orange) status	-	1	41087	04 3E	1086	1	UINT	"Error is not detected" = Hex 00 00, "Error is detected" = Hex 00 01
Pre trip Alarm LED status	-	1	41088	04 3F	1087	1	UINT	"Alarm is not activated" = Hex 00 00, "Current is reached PTA threshold" = Hex 00 01, "Alarm is activated" = Hex 00 02
LTD pick up LED status	-	1	41089	04 40	1088	1	UINT	"No pick up" = Hex 00 00, "Current is over 105% Ir" = Hex 00 01, "Current is over 112.5% Ir" = Hex 00 02
Reserved			41090	04 41	1089	423		

ANNEX A – Read Only Address Map

History

Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
AX switch on Smart Aux status	-	-	41001	03 E8	1000	1	UINT	"AX contact is opened" = Hex 00 00, "AX contact is closed" = Hex 00 01
Custom Alarm event log #1 - Custom alarm ID	-	-	41126	04 65	1125	1	UINT	Example: "Over current demand I1 (ID number 106)" = Hex 00 6A, Refer to ANNEX C – Custom Alarms
Custom Alarm event log #1 - Timestamp OCR (non-reset time)	sec	1	41127	04 66	1126	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Custom Alarm event log #1 - Timestamp user (settable by user)	sec	1	41129	04 68	1128	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Custom Alarm event log #1 - Event category	-	-	41131	04 6A	1130	1	UINT	"Alarm cut off" = Hex 00 00, "Alarm rose up" = Hex 00 01
Custom Alarm event log #2 (6 following registers, same as Custom Alarm event log #1)	-	-	41132	04 6B	1131	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #3 (6 following registers, same as Custom Alarm event log #1)	-	-	41138	04 71	1137	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #4 (6 following registers, same as Custom Alarm event log #1)	-	-	41144	04 77	1143	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #5 (6 following registers, same as Custom Alarm event log #1)	-	-	41150	04 7D	1149	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #6 (6 following registers, same as Custom Alarm event log #1)	-	-	41156	04 83	1155	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #7 (6 following registers, same as Custom Alarm event log #1)	-	-	41162	04 89	1161	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #8 (6 following registers, same as Custom Alarm event log #1)	-	-	41168	04 8F	1167	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #9 (6 following registers, same as Custom Alarm event log #1)	-	-	41174	04 95	1173	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #10 (6 following registers, same as Custom Alarm event log #1)	-	-	41180	04 9B	1179	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #11 (6 following registers, same as Custom Alarm event log #1)	-	-	41186	04 A1	1185	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #12 (6 following registers, same as Custom Alarm event log #1)	-	-	41192	04 A7	1191	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #13 (6 following registers, same as Custom Alarm event log #1)	-	-	41198	04 AD	1197	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #14 (6 following registers, same as Custom Alarm event log #1)	-	-	41204	04 B3	1203	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #15 (6 following registers, same as Custom Alarm event log #1)	-	-	41210	04 B9	1209	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #16 (6 following registers, same as Custom Alarm event log #1)	-	-	41216	04 BF	1215	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #17 (6 following registers, same as Custom Alarm event log #1)	-	-	41222	04 C5	1221	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #18 (6 following registers, same as Custom Alarm event log #1)	-	-	41228	04 CB	1227	6	UINT	Refer to Custom Alarm event log #1

ANNEX A – Read Only Address Map

History

Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Custom Alarm event log #19 (6 following registers, same as Custom Alarm event log #1)	-	-	41234	04 D1	1233	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #20 (6 following registers, same as Custom Alarm event log #1)	-	-	41240	04 D7	1239	6	UINT	Refer to Custom Alarm event log #1
Reserved			41246	04 DD	1245	5		
Custom Alarm event log #21 (6 following registers, same as Custom Alarm event log #1)	-	-	41251	04 E2	1250	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #22 (6 following registers, same as Custom Alarm event log #1)	-	-	41257	04 E8	1256	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #23 (6 following registers, same as Custom Alarm event log #1)	-	-	41263	04 EE	1262	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #24 (6 following registers, same as Custom Alarm event log #1)	-	-	41269	04 F4	1268	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #25 (6 following registers, same as Custom Alarm event log #1)	-	-	41275	04 FA	1274	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #26 (6 following registers, same as Custom Alarm event log #1)	-	-	41281	05 00	1280	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #27 (6 following registers, same as Custom Alarm event log #1)	-	-	41287	05 06	1286	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #28 (6 following registers, same as Custom Alarm event log #1)	-	-	41293	05 0C	1292	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #29 (6 following registers, same as Custom Alarm event log #1)	-	-	41299	05 12	1298	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #30 (6 following registers, same as Custom Alarm event log #1)	-	-	41305	05 18	1304	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #31 (6 following registers, same as Custom Alarm event log #1)	-	-	41311	05 1E	1310	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #32 (6 following registers, same as Custom Alarm event log #1)	-	-	41317	05 24	1316	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #33 (6 following registers, same as Custom Alarm event log #1)	-	-	41323	05 2A	1322	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #34 (6 following registers, same as Custom Alarm event log #1)	-	-	41329	05 30	1328	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #35 (6 following registers, same as Custom Alarm event log #1)	-	-	41335	05 36	1334	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #36 (6 following registers, same as Custom Alarm event log #1)	-	-	41341	05 3C	1340	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #37 (6 following registers, same as Custom Alarm event log #1)	-	-	41347	05 42	1346	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #38 (6 following registers, same as Custom Alarm event log #1)	-	-	41353	05 48	1352	6	UINT	Refer to Custom Alarm event log #1

ANNEX A – Read Only Address Map

History

Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Custom Alarm event log #39 (6 following registers, same as Custom Alarm event log #1)	-	-	41359	05 4E	1358	6	UINT	Refer to Custom Alarm event log #1
Custom Alarm event log #40 (6 following registers, same as Custom Alarm event log #1)	-	-	41365	05 54	1364	6	UINT	Refer to Custom Alarm event log #1
Reserved			41371	05 5A	1370	5		
Trip event log #1 - Trip event ID	-	-	41376	05 5F	1375	1	UINT	Example: "INST Phase 1 (ID number 10)" = Hex 00 0A, Refer to ANNEX D – Trip events
Trip event log #1 - Timestamp OCR (non-reset time)	sec	1	41377	05 60	1376	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Trip event log #1 - Timestamp user (settable by user)	sec	1	41379	05 62	1378	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Trip event log #1 - Fault duration	sec	1	41381	05 64	1380	1	UINT	Example: "160s" = Hex 00 00 00 A0
Trip event log #1 - Fault current	A	1	41382	05 65	1381	1	UINT	Example: "20000A" = Hex 4E 20, RMS current in case of LTD, Peak current in other cases, Maximum value is limited 25-45xIn (depends on MCCB frame and In)
Trip event log #2 (7 following registers, same as Trip event log #1)	-	-	41383	05 66	1382	7	UINT	Refer to Trip event log #1
Trip event log #3 (7 following registers, same as Trip event log #1)	-	-	41390	05 6D	1389	7	UINT	Refer to Trip event log #1
Trip event log #4 (7 following registers, same as Trip event log #1)	-	-	41397	05 74	1396	7	UINT	Refer to Trip event log #1
Trip event log #5 (7 following registers, same as Trip event log #1)	-	-	41404	05 7B	1403	7	UINT	Refer to Trip event log #1
Trip event log #6 (7 following registers, same as Trip event log #1)	-	-	41411	05 82	1410	7	UINT	Refer to Trip event log #1
Trip event log #7 (7 following registers, same as Trip event log #1)	-	-	41418	05 89	1417	7	UINT	Refer to Trip event log #1
Trip event log #8 (7 following registers, same as Trip event log #1)	-	-	41425	05 90	1424	7	UINT	Refer to Trip event log #1
Trip event log #9 (7 following registers, same as Trip event log #1)	-	-	41432	05 97	1431	7	UINT	Refer to Trip event log #1
Trip event log #10 (7 following registers, same as Trip event log #1)	-	-	41439	05 9E	1438	7	UINT	Refer to Trip event log #1
Last Trip event log - Trip event ID	-	-	41446	05 A5	1445	1	UINT	Example: "INST Phase 1 (ID number 10)" = Hex 00 0A, Refer to ANNEX D – Trip events
Last Trip event log - Timestamp OCR (non-reset time)	sec	1	41447	05 A6	1446	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Last Trip event log - Timestamp user (settable by user)	sec	1	41449	05 A8	1448	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Last Trip event log - Fault duration	sec	1	41451	05 AA	1450	1	UINT	Example: "160s" = Hex 00 00 00 A0
Last Trip event log - Fault current	A	1	41452	05 AB	1451	1	UINT	Example: "20000A" = Hex 4E 20, RMS current in case of LTD, Peak current in other cases, Maximum value is limited 25-45xIn (depends on MCCB frame and In)
Ir setting log #1 - Previous Ir setting	A	1	41453	05 AC	1452	1	UINT	Example: "160A" = Hex 00 A0
Ir setting log #1 - Timestamp OCR (non-reset time)	sec	1	41454	05 AD	1453	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Ir setting log #1 - Timestamp user (settable by user)	sec	1	41456	05 AF	1455	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Ir setting log #2 (5 following registers, same as Ir setting log #1)	-	-	41458	05 B1	1457	5	UINT	Refer to Ir setting log #1
Ir setting log #3 (5 following registers, same as Ir setting log #1)	-	-	41463	05 B6	1462	5	UINT	Refer to Ir setting log #1
Ir setting log #4 (5 following registers, same as Ir setting log #1)	-	-	41468	05 BB	1467	5	UINT	Refer to Ir setting log #1
Ir setting log #5 (5 following registers, same as Ir setting log #1)	-	-	41473	05 C0	1472	5	UINT	Refer to Ir setting log #1
Reserved			41478	05 C5	1477	23		
tr setting log #1 - Previous tr setting	sec	0.25	41501	05 DC	1500	1	UINT	Example: "5s" = Hex 00 14
tr setting log #1 - Timestamp OCR (non-reset time)	sec	1	41502	05 DD	1501	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E

ANNEX A – Read Only Address Map

History
Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
tr setting log #1 - Timestamp user (settable by user)	sec	1	41504	05 DF	1503	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
tr setting log #2 (5 following registers, same as tr setting log #1)	-	-	41506	05 E1	1505	5	UINT	Refer to tr setting log #1
tr setting log #3 (5 following registers, same as tr setting log #1)	-	-	41511	05 E6	1510	5	UINT	Refer to tr setting log #1
tr setting log #4 (5 following registers, same as tr setting log #1)	-	-	41516	05 EB	1515	5	UINT	Refer to tr setting log #1
tr setting log #5 (5 following registers, same as tr setting log #1)	-	-	41521	05 F0	1520	5	UINT	Refer to tr setting log #1
STD setting [disable/enable] log #1 - Previous STD setting [disable/enable] status	-	-	41526	05 F5	1525	1	UINT	"Protection disable" = Hex 00 00, "Protection enable" = Hex 00 01
STD setting [disable/enable] log #1 - Timestamp OCR (non-reset time)	sec	1	41527	05 F6	1526	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
STD setting [disable/enable] log #1 - Timestamp user (settable by user)	sec	1	41529	05 F8	1528	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
STD setting [disable/enable] log #2 (5 following registers, same as STD setting [disable/enable] log #1)	-	-	41531	05 FA	1530	5	UINT	Refer to STD setting [disable/enable] log #1
STD setting [disable/enable] log #3 (5 following registers, same as STD setting [disable/enable] log #1)	-	-	41536	05 FF	1535	5	UINT	Refer to STD setting [disable/enable] log #1
STD setting [disable/enable] log #4 (5 following registers, same as STD setting [disable/enable] log #1)	-	-	41541	06 04	1540	5	UINT	Refer to STD setting [disable/enable] log #1
STD setting [disable/enable] log #5 (5 following registers, same as STD setting [disable/enable] log #1)	-	-	41546	06 09	1545	5	UINT	Refer to STD setting [disable/enable] log #1
Isd setting log #1 - Previous Isd setting	x Ir	0.5	41551	06 0E	1550	1	UINT	Example: "10xIr": Hex 00 14
Isd setting log #1 - Timestamp OCR (non-reset time)	sec	1	41552	06 0F	1551	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Isd setting log #1 - Timestamp user (settable by user)	sec	1	41554	06 11	1553	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Isd setting log #2 (5 following registers, same as Isd setting log #1)	-	-	41556	06 13	1555	5	UINT	Refer to Isd setting log #1
Isd setting log #3 (5 following registers, same as Isd setting log #1)	-	-	41561	06 18	1560	5	UINT	Refer to Isd setting log #1
Isd setting log #4 (5 following registers, same as Isd setting log #1)	-	-	41566	06 1D	1565	5	UINT	Refer to Isd setting log #1
Isd setting log #5 (5 following registers, same as Isd setting log #1)	-	-	41571	06 22	1570	5	UINT	Refer to Isd setting log #1
tsd setting log #1 - Previous tsd time delay	-	-	41576	06 27	1575	1	UINT	"50ms" = Hex 00 00, "100ms" = Hex 00 01, "200ms" = Hex 00 02, "300ms" = Hex 00 03, "400ms" = Hex 00 04
tsd setting log #1 - Timestamp OCR (non-reset time)	sec	1	41577	06 28	1576	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
tsd setting log #1 - Timestamp user (settable by user)	sec	1	41579	06 2A	1578	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
tsd setting log #2 (5 following registers, same as tsd setting log #1)	-	-	41581	06 2C	1580	5	UINT	Refer to tsd setting log #1
tsd setting log #3 (5 following registers, same as tsd setting log #1)	-	-	41586	06 31	1585	5	UINT	Refer to tsd setting log #1
tsd setting log #4 (5 following registers, same as tsd setting log #1)	-	-	41591	06 36	1590	5	UINT	Refer to tsd setting log #1
tsd setting log #5 (5 following registers, same as tsd setting log #1)	-	-	41596	06 3B	1595	5	UINT	Refer to tsd setting log #1

ANNEX A – Read Only Address Map

History
Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
I2t for STD setting log #1 - Previous I2t for STD setting	-	-	41601	06 40	1600	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
I2t for STD setting log #1 - Timestamp OCR (non-reset time)	sec	1	41602	06 41	1601	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
I2t for STD setting log #1 - Timestamp user (settable by user)	sec	1	41604	06 43	1603	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
I2t for STD setting log #2 (5 following registers, same as I2t for STD setting log #1)	-	-	41606	06 45	1605	5	UINT	Refer to I2t for STD setting log #1
I2t for STD setting log #3 (5 following registers, same as I2t for STD setting log #1)	-	-	41611	06 4A	1610	5	UINT	Refer to I2t for STD setting log #1
I2t for STD setting log #4 (5 following registers, same as I2t for STD setting log #1)	-	-	41616	06 4F	1615	5	UINT	Refer to I2t for STD setting log #1
I2t for STD setting log #5 (5 following registers, same as I2t for STD setting log #1)	-	-	41621	06 54	1620	5	UINT	Refer to I2t for STD setting log #1
Ii setting log #1 - Previous Ii setting	x In	0.5	41626	06 59	1625	1	UINT	Example: "15xIn": Hex 00 1E
Ii setting log #1 - Timestamp OCR (non-reset time)	sec	1	41627	06 5A	1626	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Ii setting log #1 - Timestamp user (settable by user)	sec	1	41629	06 5C	1628	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Ii setting log #2 (5 following registers, same as Ii setting log #1)	-	-	41631	06 5E	1630	5	UINT	Refer to Ii setting log #1
Ii setting log #3 (5 following registers, same as Ii setting log #1)	-	-	41636	06 63	1635	5	UINT	Refer to Ii setting log #1
Ii setting log #4 (5 following registers, same as Ii setting log #1)	-	-	41641	06 68	1640	5	UINT	Refer to Ii setting log #1
Ii setting log #5 (5 following registers, same as Ii setting log #1)	-	-	41646	06 6D	1645	5	UINT	Refer to Ii setting log #1
GF setting [disable/enable] log #1 - Previous GF setting [disable/enable] status	-	-	41651	06 72	1650	1	UINT	"Protection disable" = Hex 00 00, "Protection enable" = Hex 00 01
GF setting [disable/enable] log #1 - Timestamp OCR (non-reset time)	sec	1	41652	06 73	1651	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
GF setting [disable/enable] log #1 - Timestamp user (settable by user)	sec	1	41654	06 75	1653	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
GF setting [disable/enable] log #2 (5 following registers, same as GF setting [disable/enable] log #1)	-	-	41656	06 77	1655	5	UINT	Refer to GF setting [disable/enable] log #1
GF setting [disable/enable] log #3 (5 following registers, same as GF setting [disable/enable] log #1)	-	-	41661	06 7C	1660	5	UINT	Refer to GF setting [disable/enable] log #1
GF setting [disable/enable] log #4 (5 following registers, same as GF setting [disable/enable] log #1)	-	-	41666	06 81	1665	5	UINT	Refer to GF setting [disable/enable] log #1
GF setting [disable/enable] log #5 (5 following registers, same as GF setting [disable/enable] log #1)	-	-	41671	06 86	1670	5	UINT	Refer to GF setting [disable/enable] log #1
Ig setting log #1 - Previous Ig setting	x In	0.05	41676	06 8B	1675	1	UINT	Example: "0.20xIn": Hex 00 04
Ig setting log #1 - Timestamp OCR (non-reset time)	sec	1	41677	06 8C	1676	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Ig setting log #1 - Timestamp user (settable by user)	sec	1	41679	06 8E	1678	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Ig setting log #2 (5 following registers, same as Ig setting log #1)	-	-	41681	06 90	1680	5	UINT	Refer to Ig setting log #1
Ig setting log #3 (5 following registers, same as Ig setting log #1)	-	-	41686	06 95	1685	5	UINT	Refer to Ig setting log #1
Ig setting log #4 (5 following registers, same as Ig setting log #1)	-	-	41691	06 9A	1690	5	UINT	Refer to Ig setting log #1
Ig setting log #5 (5 following registers, same as Ig setting log #1)	-	-	41696	06 9F	1695	5	UINT	Refer to Ig setting log #1
tg setting log #1 - Previous tg time delay	-	-	41701	06 A4	1700	1	UINT	"50ms" = Hex 00 00, "100ms" = Hex 00 01, "200ms" = Hex 00 02, "300ms" = Hex 00 03, "400ms" = Hex 00 04, "500ms" = Hex 00 05
tg setting log #1 - Timestamp OCR (non-reset time)	sec	1	41702	06 A5	1701	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E

ANNEX A – Read Only Address Map

History

Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
tg setting log #1 - Timestamp user (settable by user)	sec	1	41704	06 A7	1703	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
tg setting log #2 (5 following registers, same as tg setting log #1)	-	-	41706	06 A9	1705	5	UINT	Refer to tg setting log #1
tg setting log #3 (5 following registers, same as tg setting log #1)	-	-	41711	06 AE	1710	5	UINT	Refer to tg setting log #1
tg setting log #4 (5 following registers, same as tg setting log #1)	-	-	41716	06 B3	1715	5	UINT	Refer to tg setting log #1
tg setting log #5 (5 following registers, same as tg setting log #1)	-	-	41721	06 B8	1720	5	UINT	Refer to tg setting log #1
I2t for GF setting log #1 - Previous I2t for GF setting	-	-	41726	06 BD	1725	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
I2t for GF setting log #1 - Timestamp OCR (non-reset time)	sec	1	41727	06 BE	1726	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
I2t for GF setting log #1 - Timestamp user (settable by user)	sec	1	41729	06 C0	1728	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
I2t for GF setting log #2 (5 following registers, same as I2t for GF setting log #1)	-	-	41731	06 C2	1730	5	UINT	Refer to I2t for GF setting log #1
I2t for GF setting log #3 (5 following registers, same as I2t for GF setting log #1)	-	-	41736	06 C7	1735	5	UINT	Refer to I2t for GF setting log #1
I2t for GF setting log #4 (5 following registers, same as I2t for GF setting log #1)	-	-	41741	06 CC	1740	5	UINT	Refer to I2t for GF setting log #1
I2t for GF setting log #5 (5 following registers, same as I2t for GF setting log #1)	-	-	41746	06 D1	1745	5	UINT	Refer to I2t for GF setting log #1
NP setting [disable/enable] log #1 - Previous NP setting [disable/enable] status	-	-	41751	06 D6	1750	1	UINT	"Protection disable" = Hex 00 00, "Protection enable" = Hex 00 01
NP setting [disable/enable] log #1 - Timestamp OCR (non-reset time)	sec	1	41752	06 D7	1751	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
NP setting [disable/enable] log #1 - Timestamp user (settable by user)	sec	1	41754	06 D9	1753	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
NP setting [disable/enable] log #2 (5 following registers, same as NP setting [disable/enable] log #1)	-	-	41756	06 DB	1755	5	UINT	Refer to NP setting [disable/enable] log #1
NP setting [disable/enable] log #3 (5 following registers, same as NP setting [disable/enable] log #1)	-	-	41761	06 E0	1760	5	UINT	Refer to NP setting [disable/enable] log #1
NP setting [disable/enable] log #4 (5 following registers, same as NP setting [disable/enable] log #1)	-	-	41766	06 E5	1765	5	UINT	Refer to NP setting [disable/enable] log #1
NP setting [disable/enable] log #5 (5 following registers, same as NP setting [disable/enable] log #1)	-	-	41771	06 EA	1770	5	UINT	Refer to NP setting [disable/enable] log #1
N Coefficient setting log #1 - Previous N Coefficient setting	-	-	41776	06 EF	1775	1	UINT	"50%xIr" = Hex 00 00, "100%xIr" = Hex 00 01
N Coefficient setting log #1 - Timestamp OCR (non-reset time)	sec	1	41777	06 F0	1776	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
N Coefficient setting log #1 - Timestamp user (settable by user)	sec	1	41779	06 F2	1778	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
N Coefficient setting log #2 (5 following registers, same as N Coefficient setting log #1)	-	-	41781	06 F4	1780	5	UINT	Refer to IN setting log #1
N Coefficient setting log #3 (5 following registers, same as N Coefficient setting log #1)	-	-	41786	06 F9	1785	5	UINT	Refer to IN setting log #1
N Coefficient setting log #4 (5 following registers, same as N Coefficient setting log #1)	-	-	41791	06 FE	1790	5	UINT	Refer to IN setting log #1
N Coefficient setting log #5 (5 following registers, same as N Coefficient setting log #1)	-	-	41796	07 03	1795	5	UINT	Refer to IN setting log #1

ANNEX A – Read Only Address Map

History

Custom Alarms and Trip events logs and Protection settings change logs on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Zone interlocking (STD) setting log #1 - Previous Zone interlocking (STD) setting status	-	-	41801	07 08	1800	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
Zone interlocking (STD) setting log #1 - Timestamp OCR (non-reset time)	sec	1	41802	07 09	1801	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Zone interlocking (STD) setting log #1 - Timestamp user (settable by user)	sec	1	41804	07 0B	1803	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Zone interlocking (STD) setting log #2 (5 following registers, same as Zone interlocking (STD) setting log #1)	-	-	41806	07 0D	1805	5	UINT	Refer to Zone interlocking (STD) setting log #1
Zone interlocking (STD) setting log #3 (5 following registers, same as Zone interlocking (STD) setting log #1)	-	-	41811	07 12	1810	5	UINT	Refer to Zone interlocking (STD) setting log #1
Zone interlocking (STD) setting log #4 (5 following registers, same as Zone interlocking (STD) setting log #1)	-	-	41816	07 17	1815	5	UINT	Refer to Zone interlocking (STD) setting log #1
Zone interlocking (STD) setting log #5 (5 following registers, same as Zone interlocking (STD) setting log #1)	-	-	41821	07 1C	1820	5	UINT	Refer to Zone interlocking (STD) setting log #1
Zone interlocking (GF) setting log #1 - Previous Zone interlocking (GF) setting status	-	-	41826	07 21	1825	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
Zone interlocking (GF) setting log #1 - Timestamp OCR (non-reset time)	sec	1	41827	07 22	1826	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Zone interlocking (GF) setting log #1 - Timestamp user (settable by user)	sec	1	41829	07 24	1828	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
Zone interlocking (GF) setting log #2 (5 following registers, same as Zone interlocking (GF) setting log #1)	-	-	41831	07 26	1830	5	UINT	Refer to Zone interlocking (GF) setting log #1
Zone interlocking (GF) setting log #3 (5 following registers, same as Zone interlocking (GF) setting log #1)	-	-	41836	07 2B	1835	5	UINT	Refer to Zone interlocking (GF) setting log #1
Zone interlocking (GF) setting log #4 (5 following registers, same as Zone interlocking (GF) setting log #1)	-	-	41841	07 30	1840	5	UINT	Refer to Zone interlocking (GF) setting log #1
Zone interlocking (GF) setting log #5 (5 following registers, same as Zone interlocking (GF) setting log #1)	-	-	41846	07 35	1845	5	UINT	Refer to Zone interlocking (GF) setting log #1
Reserved			41851	07 3A	1850	332		

ANNEX A – Read Only Address Map

Configuration

Measurements settings, Alarm settings and Protection settings on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
User time	sec	1	41876	07 53	1875	2	UDINT	Example: "12345678sec from 1st January 2000" = Hex 00 BC 61 4E
System phase sequence setting	-	-	41878	07 55	1877	1	UINT	"1->2->3" = Hex 00 00, "1->3->2" = Hex 00 01
System topology setting	-	-	41879	07 56	1878	1	UINT	"3Phase-3Wire system" = Hex 00 01,"3Phase-4Wire system" = Hex 00 02
Power flow direction setting	-	-	41880	07 57	1879	1	UINT	"Normal (ON side to OFF side)" = Hex 00 00, "Reverse (OFF side to ON side)" = Hex 00 01
Calculation formula for Reactive power and Apparent power setting	-	-	41881	07 58	1880	1	UINT	"Arithmetic" = Hex 00 00, "Vector" = Hex 00 01
Power factor sign convention setting	-	-	41882	07 59	1881	1	UINT	"IEEE" = Hex 00 00, "IEC" = Hex 00 01
Duration of Demand window setting	min	1	41883	07 5A	1882	1	UINT	Example: "30min" = Hex 00 1E
Demand window mode setting	-	-	41884	07 5B	1883	1	UINT	"Fix window" = Hex 00 00, "Sliding window" = Hex 00 01,"Bus synchronisation" = Hex 00 02
Reserved			41885	07 5C	1884	1		
Custom Alarm setting #1 - ID alarm	-	-	41886	07 5D	1885	1	UINT	Example: "Over current demand I1 (ID number 106)" = Hex 00 6A, Refer to ANNEX C – Custom Alarms
Custom Alarm setting #1 - Alarm priority	-	-	41887	07 5E	1886	1	UINT	No priority = Hex 00 00, "Low priority" = Hex 00 01, "Medium priority" = Hex 00 02, "High priority" = Hex 00 03
Custom Alarm setting #1 - Pick-up threshold	-	-	41888	07 5F	1887	1	UINT	Example: "160.0A" = Hex 06 40, Refer to ANNEX C – Custom Alarms
Custom Alarm setting #1 - Pick-up time delay	sec	1	41889	07 60	1888	1	UINT	Example: "1234sec" = Hex 04 D2
Custom Alarm setting #1 - Drop-out threshold	-	-	41890	07 61	1889	1	UINT	Example: "120.0A" = Hex 04 B0, Refer to ANNEX C – Custom Alarms
Custom Alarm setting #1 - Drop-out time delay	sec	1	41891	07 62	1890	1	UINT	Example: "1234sec" = Hex 04 D2
Custom Alarm setting #2 (6 following registers, same as Custom Alarm setting #1)	-	-	41892	07 63	1891	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #3 (6 following registers, same as Custom Alarm setting #1)	-	-	41898	07 69	1897	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #4 (6 following registers, same as Custom Alarm setting #1)	-	-	41904	07 6F	1903	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #5 (6 following registers, same as Custom Alarm setting #1)	-	-	41910	07 75	1909	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #6 (6 following registers, same as Custom Alarm setting #1)	-	-	41916	07 7B	1915	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #7 (6 following registers, same as Custom Alarm setting #1)	-	-	41922	07 81	1921	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #8 (6 following registers, same as Custom Alarm setting #1)	-	-	41928	07 87	1927	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #9 (6 following registers, same as Custom Alarm setting #1)	-	-	41934	07 8D	1933	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #10 (6 following registers, same as Custom Alarm setting #1)	-	-	41940	07 93	1939	6	UINT	Refer to Custom Alarm event setting #1
Custom Alarm setting #11 (6 following registers, same as Custom Alarm setting #1)	-	-	41946	07 99	1945	6	UINT	Refer to Custom Alarm event setting #1

ANNEX A – Read Only Address Map

Configuration

Measurements settings, Alarm settings and Protection settings on OCR

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
Custom Alarm setting #12 (6 following registers, same as Custom Alarm setting #1)	-	-	41952	07 9F	1951	6	UINT	Refer to Custom Alarm event setting #1
LTD trip log priority setting	-	-	41958	07 A5	1957	1	UINT	No priority = Hex 00 00, "Low priority" = Hex 00 01, "Medium priority" = Hex 00 02, "High priority" = Hex 00 03
STD trip log priority setting	-	-	41959	07 A6	1958	1	UINT	No priority = Hex 00 00, "Low priority" = Hex 00 01, "Medium priority" = Hex 00 02, "High priority" = Hex 00 03
INST trip log priority setting	-	-	41960	07 A7	1959	1	UINT	No priority = Hex 00 00, "Low priority" = Hex 00 01, "Medium priority" = Hex 00 02, "High priority" = Hex 00 03
GF trip log priority setting	-	-	41961	07 A8	1960	1	UINT	No priority = Hex 00 00, "Low priority" = Hex 00 01, "Medium priority" = Hex 00 02, "High priority" = Hex 00 03
Test trip log priority setting	-	-	41962	07 A9	1961	1	UINT	No priority = Hex 00 00, "Low priority" = Hex 00 01, "Medium priority" = Hex 00 02, "High priority" = Hex 00 03
Pre trip Alarm Pick-up threshold Ip setting	x Ir	0.01	41963	07 AA	1962	1	UINT	Example: "0.8xIr" = Hex 00 50
Pre trip Alarm Time delay tp setting	x tr	0.01	41964	07 AB	1963	1	UINT	Example: "0.5xtr" = Hex 00 32
Pre trip Alarm setting [disable/enable]	-	-	41965	07 AC	1964	1	UINT	"Alarm disable" = Hex 00 00, "Alarm enable" = Hex 00 01
Optional Alarm contact operation mode setting	-	-	41966	07 AD	1965	1	UINT	"Auto reset mode" = Hex 00 00, "Latching mode" = Hex 00 01
Optional Alarm setting Index setting	-	-	41967	07 AE	1966	1	UINT	Example: "High OCR internal temperature (ID number 1)" = Hex 00 01, Refer to ANNEX E – Optional Alarms
LTD Start mode setting	-	-	41968	07 AF	1967	1	UINT	"Cold start mode" = Hex 00 00, "Hot start mode" = Hex 00 01
LTD Pick-up threshold Ir setting	A	1	41969	07 B0	1968	1	UINT	Example: "160A" = Hex 00 A0
LTD Time delay tr setting	sec	0.25	41970	07 B1	1969	1	UINT	Example: "5s" = Hex 00 14
STD setting [disable/enable]	-	-	41971	07 B2	1970	1	UINT	"Protection disable" = Hex 00 00, "Protection enable" = Hex 00 01
STD Pick-up threshold Isd setting	x Ir	0.5	41972	07 B3	1971	1	UINT	Example: "10xIr": Hex 00 14
STD Time delay tsd setting	-	-	41973	07 B4	1972	1	UINT	"50ms" = Hex 00 00, "100ms" = Hex 00 01, "200ms" = Hex 00 02, "300ms" = Hex 00 03, "400ms" = Hex 00 04
I2t for STD setting	-	-	41974	07 B5	1973	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
Zone interlocking (ZSI) for STD setting	-	-	41975	07 B6	1974	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
INST setting [disable/enable]	-	-	41976	07 B7	1975	1	UINT	"Protection disable" = Hex 00 00, "Protection enable" = Hex 00 01
INST Pick-up threshold Ii setting	x In	0.5	41977	07 B8	1976	1	UINT	Example: "15xIn": Hex 00 1E
GF setting [disable/enable]	-	-	41978	07 B9	1977	1	UINT	"Protection disable" = Hex 00 00, "Protection enable (3P)" = Hex 00 01, "Protection enable (4P)" = Hex 00 02
GF Pick-up threshold Ig setting	x In	0.05	41979	07 BA	1978	1	UINT	Example: "0.20xIn": Hex 00 04
GF Time delay tg setting	-	-	41980	07 BB	1979	1	UINT	"50ms" = Hex 00 00, "100ms" = Hex 00 01, "200ms" = Hex 00 02, "300ms" = Hex 00 03, "400ms" = Hex 00 04, "500ms" = Hex 00 05
I2t for GF setting	-	-	41981	07 BC	1980	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
Zone interlocking (ZSI) for GF setting	-	-	41982	07 BD	1981	1	UINT	"Setting disable" = Hex 00 00, "Setting enable" = Hex 00 01
NP setting [disable/enable]	-	-	41983	07 BE	1982	1	UINT	"Protection disable" = Hex 00 00, "Protection enable" = Hex 00 01
N Coefficient setting	-	-	41984	07 BF	1983	1	UINT	"0.5xIr" = Hex 00 00, "1xIr" = Hex 00 01
External writing authorisation setting	-	-	41985	07 C0	1984	1	UINT	Access allowed = Hex 00 00, "Access not allowed" = Hex 00 01
Reserved			41986	07 C1	1985	1170		

ANNEX A – Read Only Address Map

Communication

Communication registers between TPCM and OCR
Registers for Digital input and output on TPCM with Embedded I/O

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Output[x]	Length (WORD)	Data Type	Further information
AX switch on Smart Aux status	-	-	41001	03 E8	1000	1	UINT	"AX contact is opened" = Hex 00 00, "AX contact is closed" = Hex 00 01
Communication status between Communication module and OCR	-	-	42001	07 D0	2000	1	UINT	"Not connected" = Hex 00 00, "Initializing" = Hex 00 01, "Operating normal but found some error" = Hex 00 02, "Operating without error" = Hex 00 03
Reserved			42002	07 D1	2001	7		
Number of Modbus communication error	-	-	42009	07 D8	2008	2	UDINT	Example: "1234" = Hex 00 00 04 D2
Number of Digital output contact 1 (count only on Pulse output mode)	-	-	42011	07 DA	2010	1	UINT	Example: "1234" = Hex 04 D2, Available only Module with IO model
Number of Digital output contact 1 (count only on Pulse output mode)	-	-	42012	07 DB	2011	1	UINT	Example: "1234" = Hex 04 D2, Available only Module with IO model
Operating duration counter of Communication module	hours	1	42013	07 DC	2012	2	UDINT	Example: "1234hours" = Hex 00 00 04 D2
Reserved			42015	07 DE	2014	15		
Modbus configuration of communication module - Address	-	-	42030	07 ED	2029	1	UINT	Example: "1" = Hex 00 01
Modbus configuration of communication module - Baud rate	-	-	42031	07 EE	2030	2	UDINT	Example: "19200bps" = Hex 00 00 4B 00
Modbus configuration of communication module - Stop bits	-	-	42033	07 F0	2032	1	UINT	"1 (Even or Odd parity)" = Hex 00 01, "2 (None parity)" = Hex 00 02
Modbus configuration of communication module - Parity	-	-	42034	07 F1	2033	1	UINT	"Odd" = Hex 00 00, "Even" = Hex 00 01, "None" = Hex 00 02
Reserved			42035	07 F2	2034	4		
Modbus configuration of communication module - Embedded termination resistor	-	-	42039	07 F6	2038	1	UINT	"Resistor not activated" = Hex 00 00, "Resistor activated" = Hex 00 01
Reserved			42040	07 F7	2039	86		
Digital input 1 status (24VDC voltage is needed)	-	-	42126	08 4D	2125	1	UINT	"Input not detected" = Hex 00 00, "Input detected" = Hex 00 01, Available only Module with IO model
Digital input 2 status (24VDC voltage is needed)	-	-	42127	08 4E	2126	1	UINT	"Input not detected" = Hex 00 00, "Input detected" = Hex 00 01, Available only Module with IO model
Reserved			42128	08 4F	2127	123		
Configuration of Digital output contact 1 mode	-	-	42251	08 CA	2250	1	UINT	"Continuous output mode" = Hex 00 00, "Pulse output mode" = Hex 00 01
Configuration of Digital output contact 2 mode	-	-	42252	08 CB	2251	1	UINT	"Continuous output mode" = Hex 00 00, "Pulse output mode" = Hex 00 01
Digital output contact 1 operation	-	-	42253	08 CC	2252	1	UINT	In case of Continuous output mode "Contact not activated" = Hex 00 00, "Contact activated continuously" = other than Hex 00 00 In case of Pulse output mode Example: "Contact activate 1234milliseconds" = Hex 04 D2
Digital output contact 2 operation	-	-	42254	08 CD	2253	1	UINT	In case of Continuous output mode "Contact not activated" = Hex 00 00, "Contact activated continuously" = other than Hex 00 00 In case of Pulse output mode Example: "Contact activate 1234milliseconds" = Hex 04 D2
Reserved			42255	08 CE	2254	433		

ANNEX B – Writing Address Map

Description	Unit	RES	Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Length (WORD)	Data Type	Further information
Configuration of Digital output contact 1 mode	-	-	42501	09 C4	0	1	INT	"Continuous output mode" = Hex 00 00, "Pulse output mode" = Hex 00 01
Configuration of Digital output contact 2 mode	-	-	42502	09 C5	1	1	INT	"Continuous output mode" = Hex 00 00, "Pulse output mode" = Hex 00 01
Digital output contact 1 operation	-	-	42503	09 C6	2	1	INT	In case of Continuous output mode "Contact not activated" = Hex 00 00, "Contact activated continuously" = other than Hex 00 00 In case of Pulse output mode Example: "Contact activate 1234milliseconds" = Hex 04 D2
Digital output contact 2 operation	-	-	42504	09 C7	3	1	INT	In case of Continuous output mode "Contact not activated" = Hex 00 00, "Contact activated continuously" = other than Hex 00 00 In case of Pulse output mode Example: "Contact activate 1234milliseconds" = Hex 04 D2
Digital output contact 1 write enable toggle	-	-	42505	09 C8	4	1	INT	Toggle writing of the digital output contact mode and operation to the TPCM with Embedded I/O. Edge triggered on transition from Hex 00 00 to Hex 00 01. Leave activated until correct contact activation is confirmed.
Digital output contact 2 write enable toggle	-	-	42506	09 C9	5	1	INT	Toggle writing of the digital output contact mode and operation to the TPCM with Embedded I/O. Edge triggered on transition from Hex 00 00 to Hex 00 01. Leave activated until correct contact activation is confirmed.
Password Level	-	-	42507	09 CA	6	1	INT	Password security level according to target configuration setting Level 0 = Hex 00 00 Level 1 = Hex 00 01 Level 2 = Hex 00 02
Password Entry	-	-	42508	09 CB	7	8	STR	Password corresponding to the security level according to the target configuration setting. Password ASCII characters entered separately per element/WORD. Unused trailing characters must be filled with NULL. Example: “Level1” = Hex 00 4C 00 65 00 76 00 65 00 6C 00 31 00 00 00 00
Command ID	-	-	42516	09 D3	15	1	INT	Command ID according to target configuration setting. Example: “Custom Alarm setting [command ID 107]” = Hex 00 6B Refer to ANNEX F – Writing Command List
Configuration write data	-	-	42517	09 D4	16	16	INT	Data to be written to the target configuration setting. Unused trailing characters must be filled with NULL. Refer to ANNEX F – Writing Command List
Configuration write enable toggle	-	-	42533	09 E4	32	1	INT	Toggle writing of the configuration data to the P_SE MCCB. Edge triggered on transition from Hex 00 00 to 00 01. Leave activated until correct configuration is read from the P_SE MCCB and confirmed.
Slave ID	-	-	42534	09 E5	33	1	INT	The Modbus RTU Slave ID address of the target TPCM Default Slave ID 1 = Hex 00 01

ANNEX C – Custom Alarms

ID	Name	Pick-up or Drop-out threshold value				Pick-up or Drop-out time delay value				Remark
		Format	Resolution	Min. value	Max. value	Format	Resolution	Min. value	Max. value	
0	No assignment	-	-	-	-	-	-	-	-	
1	Over Instantaneous Current [I1]	A	0.1	8	6300	sec	1	1	3000	
2	Over Instantaneous Current [I2]	A	0.1	8	6300	sec	1	1	3000	
3	Over Instantaneous Current [I3]	A	0.1	8	6300	sec	1	1	3000	
4	Over Instantaneous Current [IN]	A	0.1	8	6300	sec	1	1	3000	Only available for 3Phase-4Wire system
5	Over Instantaneous Current [Imax]	A	0.1	8	6300	sec	1	1	3000	
6	Under Instantaneous Current [I1]	A	0.1	8	6300	sec	1	1	3000	
7	Under Instantaneous Current [I2]	A	0.1	8	6300	sec	1	1	3000	
8	Under Instantaneous Current [I3]	A	0.1	8	6300	sec	1	1	3000	
9	Under Instantaneous Current [IN]	A	0.1	8	6300	sec	1	1	3000	Only available for 3Phase-4Wire system
10	Ground Current	x Ig	0.01	0.1	1	sec	1	1	3000	
11	Over Unbalance Current [I1]	x Iavg	0.1%	5%	60%	sec	1	1	3000	
12	Over Unbalance Current [I2]	x Iavg	0.1%	5%	60%	sec	1	1	3000	
13	Over Unbalance Current [I3]	x Iavg	0.1%	5%	60%	sec	1	1	3000	
14	Over Unbalance Current [Imax Unb]	x Iavg	0.1%	5%	60%	sec	1	1	3000	
15	Over Average Current [Iavg]	A	0.1	8	6300	sec	1	1	3000	
16	Under Average Current [Iavg]	A	0.1	8	6300	sec	1	1	3000	
17	Over Instantaneous Voltage [V1N]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
18	Over Instantaneous Voltage [V2N]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
19	Over Instantaneous Voltage [V3N]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
20	Over Instantaneous Voltage [Vmax]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
21	Under Instantaneous Voltage [V1N]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
22	Under Instantaneous Voltage [V2N]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
23	Under Instantaneous Voltage [V3N]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
24	Under Instantaneous Voltage [Vmin]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
25	Over Unbalance Voltage [V1N]	x Vavg	0.1%	2%	30%	sec	1	1	3000	Only available for 3Phase-4Wire system
26	Over Unbalance Voltage [V2N]	x Vavg	0.1%	2%	30%	sec	1	1	3000	Only available for 3Phase-4Wire system
27	Over Unbalance Voltage [V3N]	x Vavg	0.1%	2%	30%	sec	1	1	3000	Only available for 3Phase-4Wire system
28	Over Unbalance Voltage [Vmax Unb]	x Vavg	0.1%	2%	30%	sec	1	1	3000	Only available for 3Phase-4Wire system
29	Over Average Voltage [Vavg]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
30	Under Average Voltage [Vavg]	V	0.1	80	800	sec	1	1	3000	Only available for 3Phase-4Wire system
31	Over Instantaneous Voltage [U12]	V	0.1	80	800	sec	1	1	3000	
32	Over Instantaneous Voltage [U23]	V	0.1	80	800	sec	1	1	3000	
33	Over Instantaneous Voltage [U31]	V	0.1	80	800	sec	1	1	3000	
34	Over Instantaneous Voltage [Umax]	V	0.1	80	800	sec	1	1	3000	
35	Under Instantaneous Voltage [U12]	V	0.1	80	800	sec	1	1	3000	
36	Under Instantaneous Voltage [U23]	V	0.1	80	800	sec	1	1	3000	
37	Under Instantaneous Voltage [U31]	V	0.1	80	800	sec	1	1	3000	
38	Under Instantaneous Voltage [Umin]	V	0.1	80	800	sec	1	1	3000	
39	Over Unbalance Voltage [U12]	x Uavg	0.1%	2%	30%	sec	1	1	3000	
40	Over Unbalance Voltage [U23]	x Uavg	0.1%	2%	30%	sec	1	1	3000	
41	Over Unbalance Voltage [U31]	x Uavg	0.1%	2%	30%	sec	1	1	3000	

ANNEX C – Custom Alarms

ID	Name	Pick-up or Drop-out threshold value				Pick-up or Drop-out time delay value				Remark
		Format	Resolution	Min. value	Max. value	Format	Resolution	Min. value	Max. value	
42	Over Unbalance Voltage [Umax Unb]	x Uavg	0.1%	2%	30%	sec	1	1	3000	
43	Over Direct Active power [P1] (Positive component of P1)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
44	Over Direct Active power [P2] (Positive component of P2)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
45	Over Direct Active power [P3] (Positive component of P3)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
46	Over Direct Active power [Ptot] (Positive component of Ptot)	kW	0.1	1	3000	sec	1	1	3000	
47	Under Direct Active power [P1] (Positive component of P1)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
48	Under Direct Active power [P2] (Positive component of P2)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
49	Under Direct Active power [P3] (Positive component of P3)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
50	Under Direct Active power [Ptot] (Positive component of Ptot)	kW	0.1	1	3000	sec	1	1	3000	
51	Over Return Active power [P1] (Negative component of P1)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
52	Over Return Active power [P2] (Negative component of P2)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
53	Over Return Active power [P3] (Negative component of P3)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
54	Over Return Active power [Ptot] (Negative component of Ptot)	kW	0.1	1	3000	sec	1	1	3000	
55	Under Return Active power [P1] (Negative component of P1)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
56	Under Return Active power [P2] (Negative component of P2)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
57	Under Return Active power [P3] (Negative component of P3)	kW	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
58	Under Return Active power [Ptot] (Negative component of Ptot)	kW	0.1	1	3000	sec	1	1	3000	
59	Over Direct Reactive power [Q1] (Positive component of Q1)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
60	Over Direct Reactive power [Q2] (Positive component of Q2)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
61	Over Direct Reactive power [Q3] (Positive component of Q3)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
62	Over Direct Reactive power [Qtot] (Positive component of Qtot)	kVAr	0.1	1	3000	sec	1	1	3000	
63	Under Direct Reactive power [Q1] (Positive component of Q1)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
64	Under Direct Reactive power [Q2] (Positive component of Q2)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
65	Under Direct Reactive power [Q3] (Positive component of Q3)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
66	Under Direct Reactive power [Qtot] (Positive component of Qtot)	kVAr	0.1	1	3000	sec	1	1	3000	
67	Over Return Reactive power [Q1] (Negative component of Q1)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
68	Over Return Reactive power [Q2] (Negative component of Q2)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
69	Over Return Reactive power [Q3] (Negative component of Q3)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
70	Over Return Reactive power [Qtot] (Negative component of Qtot)	kVAr	0.1	1	3000	sec	1	1	3000	
71	Under Return Reactive power [Q1] (Negative component of Q1)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
72	Under Return Reactive power [Q2] (Negative component of Q2)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
73	Under Return Reactive power [Q3] (Negative component of Q3)	kVAr	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
74	Under Return Reactive power [Qtot] (Negative component of Qtot)	kVAr	0.1	1	3000	sec	1	1	3000	
75	Over Apparent power [S1]	kVA	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
76	Over Apparent power [S2]	kVA	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
77	Over Apparent power [S3]	kVA	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
78	Over Apparent power [Stot]	kVA	0.1	1	3000	sec	1	1	3000	
79	Under Apparent power [S1]	kVA	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
80	Under Apparent power [S2]	kVA	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
81	Under Apparent power [S3]	kVA	0.1	1	1000	sec	1	1	3000	Only available for 3Phase-4Wire system
82	Under Apparent power [Stot]	kVA	0.1	1	3000	sec	1	1	3000	
83	Lagging power factor [PF1] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
84	Lagging power factor [PF2] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system

ANNEX C – Custom Alarms

ID	Name	Pick-up or Drop-out threshold value				Pick-up or Drop-out time delay value				Remark
		Format	Resolution	Min. value	Max. value	Format	Resolution	Min. value	Max. value	
85	Lagging power factor [PF3] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
86	Lagging power factor [PFtot] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	
87	Leading displacement power factor [Cosφ1] (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
88	Leading displacement power factor [Cosφ2] (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
89	Leading displacement power factor [Cosφ3] (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
90	Leading displacement power factor [Cosφtot] (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	
91	Lagging displacement power factor [Cosφ1] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
92	Lagging displacement power factor [Cosφ2] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
93	Lagging displacement power factor [Cosφ3] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
94	Lagging displacement power factor [Cosφtot] (Negative in IEEE)	-	0.01	0	0.99	sec	1	1	3000	
95	Over THD Current [I1]	-	0.1%	0%	1000%	sec	1	1	3000	
96	Over THD Current [I2]	-	0.1%	0%	1000%	sec	1	1	3000	
97	Over THD Current [I3]	-	0.1%	0%	1000%	sec	1	1	3000	
98	Over THD Voltage [V1N]	-	0.1%	0%	1000%	sec	1	1	3000	Only available for 3Phase-4Wire system
99	Over THD Voltage [V2N]	-	0.1%	0%	1000%	sec	1	1	3000	Only available for 3Phase-4Wire system
100	Over THD Voltage [V3N]	-	0.1%	0%	1000%	sec	1	1	3000	Only available for 3Phase-4Wire system
101	Over THD Voltage [U12]	-	0.1%	0%	1000%	sec	1	1	3000	
102	Over THD Voltage [U23]	-	0.1%	0%	1000%	sec	1	1	3000	
103	Over THD Voltage [U31]	-	0.1%	0%	1000%	sec	1	1	3000	
104	Over frequency [F]	Hz	0.01	45	65	sec	1	1	3000	
105	Under frequency [F]	Hz	0.01	45	65	sec	1	1	3000	
106	Over Current demand [I1 Dmd]	A	0.1	8	6300	sec	1	1	3000	
107	Over Current demand [I2 Dmd]	A	0.1	8	6300	sec	1	1	3000	
108	Over Current demand [I3 Dmd]	A	0.1	8	6300	sec	1	1	3000	
109	Over Current demand [IN Dmd]	A	0.1	8	6300	sec	1	1	3000	Only available for 3Phase-4Wire system
110	Over Current demand [Iavg Dmd]	A	0.1	8	6300	sec	1	1	3000	
111	Under Current demand [I1 Dmd]	A	0.1	8	6300	sec	1	1	3000	
112	Under Current demand [I2 Dmd]	A	0.1	8	6300	sec	1	1	3000	
113	Under Current demand [I3 Dmd]	A	0.1	8	6300	sec	1	1	3000	
114	Under Current demand [IN Dmd]	A	0.1	8	6300	sec	1	1	3000	Only available for 3Phase-4Wire system
115	Under Current demand [Iavg Dmd]	A	0.1	8	6300	sec	1	1	3000	
116	Over Active power demand [Ptot Dmd]	kW	0.1	1	3000	sec	1	1	3000	
117	Under Active power demand [Ptot Dmd]	kW	0.1	1	3000	sec	1	1	3000	
118	Over Reactive power demand [Qtot Dmd]	kVAr	0.1	1	3000	sec	1	1	3000	
119	Under Reactive power demand [Qtot Dmd]	kVAr	0.1	1	3000	sec	1	1	3000	
120	Over apparent power demand [Stot Dmd]	kVA	0.1	1	3000	sec	1	1	3000	
121	Under apparent power demand [Stot Dmd]	kVA	0.1	1	3000	sec	1	1	3000	
122	Operating quadrant 1 (P>0, Q>0)	-	-	1	1	sec	1	1	3000	
123	Operating quadrant 2 (P<0, Q>0)	-	-	2	2	sec	1	1	3000	
124	Operating quadrant 3 (P<0, Q<0)	-	-	3	3	sec	1	1	3000	
125	Operating quadrant 4 (P>0, Q<0)	-	-	4	4	sec	1	1	3000	
126	Phase sequence 1->2->3	-	-	0	0	sec	1	1	3000	

ANNEX C – Custom Alarms

ID	Name	Pick-up or Drop-out threshold value				Pick-up or Drop-out time delay value				Remark
		Format	Resolution	Min. value	Max. value	Format	Resolution	Min. value	Max. value	
127	Phase sequence 1->3->2	-	-	1	1	sec	1	1	3000	
128	Operating quadrant 2 or 4 (Capacitive load)	-	-	0	0	sec	1	1	3000	
129	Operating quadrant 1 or 3 (Inductive load)	-	-	1	1	sec	1	1	3000	
130	Leading Power factor PF1 (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
131	Leading Power factor PF2 (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
132	Leading Power factor PF3 (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	Only available for 3Phase-4Wire system
133	Leading Power factor PFtot (Positive in IEEE)	-	0.01	0	0.99	sec	1	1	3000	

ANNEX D – Trip Events

ID	Name	Remark
0	No log	
1	LTD trip on Phase1	
2	LTD trip on Phase2	
3	LTD trip on Phase3	
4	LTD trip on Neutral phase	
5	STD trip on Phase1	
6	STD trip on Phase2	
7	STD trip on Phase3	
8	STD trip on Neutral phase	
9	GF trip	
10	INST trip on Phase1	
11	INST trip on Phase2	
12	INST trip on Phase3	
13	INST trip on Neutral phase	

ANNEX E – Optional Alarms

ID	Name	Remark
0	No log	
1	High OCR internal temperature	
2	Neutral monitoring wire disconnection (Overvoltage protection according to EN50550)	Only available for 3Phase-4Wire system
3	OCR self-test failure	
4	Reserved	
5	Pre trip Alarm	
6	Custom Alarm 1	
7	Custom Alarm 2	
8	Custom Alarm 3	
9	Custom Alarm 4	
10	Custom Alarm 5	
11	Custom Alarm 6	
12	Custom Alarm 7	
13	Custom Alarm 8	
14	Custom Alarm 9	
15	Custom Alarm 10	
16	Custom Alarm 11	
17	Custom Alarm 12	

ANNEX F – Writing Command List

Security Level 0
No password required.

[Command ID: 1] User time setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Date/time	Time from 1st January 2000 (31,557,600 seconds per year)	UDINT	0 (1st Jan 2000 00:00:00)	4294967295 (6th Feb 2156, 06:28:15)	1	sec

Refer to Date & Time
Example: "27th Jul 2020, 09:25:20 (649,157,142 sec)" = Hex 26 B1 5A 16

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	9905	26 B1
42518	09 D5	17	23062	5A 16

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 101] System phase sequence setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	System topology	"A-B-C" = Hex 00 00 "A-C-B" = Hex 00 01	DINT	0	1	1	-

Example: “A-B-C” = Hex 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00

[Command ID: 102] System topology setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	System topology	“3Phase-3Wire system" = Hex 00 01 "3Phase-4Wire system" = Hex 00 02	DINT	0	2	1	-

Example: “3-Phase-3Wire system” = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 103] Power flow direction setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Power flow direction	"Normal (ON side to OFF side)" = Hex 00 00 "Reverse (OFF side to ON side)" = Hex 00 01	DINT	0	1	1	-

Example: "Normal (ON side to OFF side)" = Hex 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 104] Calculation formula for Reactive and Apparent power setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Calculation formula	"Arithmetic" = Hex 00 00 "Vector" = Hex 00 01	DINT	0	1	1	-

Example: "Arithmetic" = Hex 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00

[Command ID: 105] Power factor sign convention setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Convention	"IEEE" = Hex 00 00 "IEC" = Hex 00 01	DINT	0	1	1	-

Example: "IEEE" = Hex 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00

[Command ID: 106] Demand setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Duration	Demand duration (minutes)	DINT	5	60	1	Min
1	Mode	"Fix window" = Hex 00 00 "Sliding window" = Hex 00 01 "Bus synchronisation" = Hex 00 02	DINT	0	2	1	-

Example: "60 min, Sliding window" = Hex 00 3C 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	60	00 3C
42518	09 D5	17	1	00 01

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 107] Custom Alarm setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Slot	Custom Alarm slot number	DINT	1	12	1	-
1	Alarm ID	Refer to ANNEX C - Custom Alarms	DINT	-	-	1	-
1	Alarm priority	"No priority" = Hex 00 00 "Low priority" = Hex 00 01 "Medium priority" = Hex 00 02 "High priority" = Hex 00 03	DINT	0	3	1	
1	Pick-up threshold	Refer to ANNEX C - Custom Alarms	DINT	-	-	-	-
1	Pick-up time delay		DINT	-	-	-	-
1	Drop-out threshold		DINT	-	-	-	-
1	Drop-out time delay		DINT	-	-	-	-

Example: "Custom alarm #7, 105 Under Frequency, high priority, pickup 45Hz 1s delay, dropout 55Hz 10s delay" = Hex 00 07 00 69 00 03 11 94 00 01 15 7C 00 0A

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	7	00 07
42518	09 D5	17	105	00 69
42519	09 D6	18	3	00 03
42520	09 D7	19	4500	11 94
42521	09 D8	20	1	00 01
42522	09 D9	21	5500	15 7C
42523	09 DA	22	10	00 0A

[Command ID: 108] LTD trip log priority setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Alarm priority	"No priority" = Hex 00 00 "Low priority" = Hex 00 01 "Medium priority" = Hex 00 02 "High priority" = Hex 00 03	DINT	0	3	1	

Example: "High priority" = Hex 00 03

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	3	00 03

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 109] STD trip log priority setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Alarm priority	"No priority" = Hex 00 00 "Low priority" = Hex 00 01 "Medium priority" = Hex 00 02 "High priority" = Hex 00 03	DINT	0	3	1	

Example: "High priority" = Hex 00 03

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	3	00 03

[Command ID: 110] INST trip log priority setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Alarm priority	"No priority" = Hex 00 00 "Low priority" = Hex 00 01 "Medium priority" = Hex 00 02 "High priority" = Hex 00 03	DINT	0	3	1	

Example: "High priority" = Hex 00 03

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	3	00 03

[Command ID: 111] GF trip log priority setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Alarm priority	"No priority" = Hex 00 00 "Low priority" = Hex 00 01 "Medium priority" = Hex 00 02 "High priority" = Hex 00 03	DINT	0	3	1	

Example: "High priority" = Hex 00 03

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	3	00 03

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 112] Test trip log priority setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Alarm priority	"No priority" = Hex 00 00 "Low priority" = Hex 00 01 "Medium priority" = Hex 00 02 "High priority" = Hex 00 03	DINT	0	3	1	

Example: "High priority" = Hex 00 03

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	3	00 03

[Command ID: 113] Pre trip Alarm Pick-up threshold I_p setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pick-up threshold	Multiple of Ir (increments of 5%)	DINT	0.60	0.95	0.01	x Ir

Example: "0.8x Ir" = Hex 00 50

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	80	00 50

[Command ID: 114] Pre trip Alarm Time-delay t_p setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pick-up time-delay	Multiple of tr (increments of 5%)	DINT	0.05	0.80	0.01	x tr

Example: "0.5x tr" = Hex 00 32

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	50	00 32

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 115] Pre trip Alarm setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pre-trip alarm status	"Alarm disable" = Hex 00 00 "Alarm enable" = Hex 00 01	DINT	0	1	1	-

Example: "Alarm enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 116] Optional Alarm contact operation mode setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Mode	"Auto reset mode" = Hex 00 00 "Latching mode" = Hex 00 01	DINT	0	1	1	-

Example: "Auto reset mode" = Hex 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00

[Command ID: 117] Optional Alarm assignment setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Alarm ID	Refer to ANNEX E – Optional Alarms	DINT	-	-	1	-

Example: "Optional Alarm #1 High OCR internal temperature" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 118] Reset Pre trip Alarm counter

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Pre trip Alarm counter"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 119] Reset Optional Alarm counter

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Optional Alarm counter"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 120] Reset Custom Alarm counter

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Custom Alarm counter"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 121] Reset AX and AL on Smart Aux counter

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset AX and AL on Smart Aux counter"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 122] Erase Logs of Trip events with No priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Trip events with No priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 123] Erase Logs of Trip events with Low priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Trip events with Low priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 124] Erase Logs of Trip events with Medium priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Trip events with Medium priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	0000

[Command ID: 125] Erase Logs of Trip events with High priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Trip events with High priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 126] Erase Logs of Trip events with All priorities

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Trip events with All priorities"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 127] Erase Logs of Alarm events with No priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Alarm events with No priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 128] Erase Logs of Alarm events with Low priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Alarm events with Low priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 129] Erase Logs of Alarm events with Medium priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Alarm events with Medium priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 130] Erase Logs of Alarm events with High priority

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Alarm events with High priority"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 131] Erase Logs of Alarm events with All priorities

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Erase Logs of Alarm events with All priorities"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	0000
42518	09 D5	17	0	0000

[Command ID: 132] Trigger signal of Bus synchronisation Demand mode

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Trigger signal of Bus synchronisation Demand mode"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 133] Reset Max. and Min. values of Current measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Current measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 134] Reset Max. and Min. values of Voltage measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Voltage measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 135] Reset Max. and Min. values of Power measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Power measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 136] Reset Max. and Min. values of Power factor measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Power factor measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 137] Reset Max. and Min. values of THD measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of THD measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 138] Reset Max. and Min. values of Frequency measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Frequency measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 1
Password Level 1 or 2 required.

[Command ID: 139] Reset partial Energy counters

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Energy measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 140] Reset Max. and Min. values of Demand Current measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Demand Current measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

[Command ID: 141] Reset Max. and Min. values of Demand Power measurement

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
2	Fixed value	Hex 00 00 00 00	DINT	-	-	-	-

Example: "Reset Max. and Min. values of Demand Power measurement"

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00
42518	09 D5	17	0	00 00

ANNEX F – Writing Command List

Security Level 2
Password Level 2 required.

[Command ID: 201] LTD Start mode setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Mode	"Cold start mode" = Hex 00 00 "Hot start mode" = Hex 00 01	DINT	0	1	1	-

Example: “Cold start mode” = Hex 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	0	00 00

[Command ID: 202] LTD Pick-up threshold I_r setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pick-up threshold	Ir in A (Min-Max values dependent on MCCB frame size and front-dial setting)	DINT	14	630	1	A

Example: “160A” = Hex 00 A0

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	160	00 A0

[Command ID: 203] LTD Time-delay t_r setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Time-delay	Select from: 0.5 / 1.5 / 2.5 / 5 / 7.5 / 9 / 10 / 12 / 14 / 16	DINT	0.5	16	0.25	sec

Example: "5 sec" = Hex 00 14

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	20	00 14

ANNEX F – Writing Command List

Security Level 2
Password Level 2 required.

[Command ID: 204] STD setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pre-trip alarm status	"Setting disable" = Hex 00 00 "Setting enable" = Hex 00 01	DINT	0	1	1	-

Example: "Setting enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 205] STD Pick-up threshold I_{sd} setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pick-up threshold	Multiple of Ir	DINT	1.5	10	0.5	x Ir

Example: "10x Ir" = Hex 00 14

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	20	00 14

[Command ID: 206] STD Time-delay t_{sd} setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Time-delay	Select from: 50 / 100 / 200 / 300 / 400	DINT	50	400	1	ms

Example: "100 ms" = Hex 00 64

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	100	00 64

ANNEX F – Writing Command List

Security Level 2
Password Level 2 required.

[Command ID: 207] I²t for STD setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pre-trip alarm status	"Setting disable" = Hex 00 00 "Setting enable" = Hex 00 01	DINT	0	1	1	-

Example: "Setting enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 208] Zone interlocking (ZSI) for STD setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pre-trip alarm status	"Setting disable" = Hex 00 00 "Setting enable" = Hex 00 01	DINT	0	1	1	-

Example: "Setting enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	

[Command ID: 209] INST Pick-up threshold I_i setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pick-up threshold	Multiple of In	DINT	3	15	0.5	x In

Example: "15x In" = Hex 00 1E

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	30	00 1E

ANNEX F – Writing Command List

Security Level 2
Password Level 2 required.

[Command ID: 210] GF Setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Status	"Setting disable" = Hex 00 00 "Setting enable (3P)" = Hex 00 01 "Setting enable (4P)" = Hex 00 02	DINT	0	2	1	-

Example: "Setting enable (3P)" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 211] GF Pick-up threshold I_g setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Pick-up threshold	Multiple of In	DINT	0.2	1	0.05	In

Example: "0.20x In" = Hex 00 04

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	4	00 04

[Command ID: 212] LTD Time-delay t_r setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Time-delay	Select from: 50 / 100 / 200 / 300 / 400 / 500	DINT	50	500	1	ms

Example: "200 ms" = Hex 00 C8

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	200	00 C8

ANNEX F – Writing Command List

Security Level 2
Password Level 2 required.

[Command ID: 213] I²t for GF setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Status	"Setting disable" = Hex 00 00 "Setting enable" = Hex 00 01	DINT	0	1	1	-

Example: "Setting enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 214] Zone interlocking (ZSI) for GF setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Status	"Setting disable" = Hex 00 00 "Setting enable" = Hex 00 01	DINT	0	1	1	-

Example: "Setting enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

[Command ID: 215] NP setting (disable/enable)

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Status	"Setting disable" = Hex 00 00 "Setting enable" = Hex 00 01	DINT	0	1	1	-

Example: "Setting enable" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

ANNEX F – Writing Command List

Security Level 2
Password Level 2 required.

[Command ID: 216] N Coefficient setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Status	"0.5x Ir" = Hex 00 00 "1x Ir" = Hex 00 01	DINT	0	1	1	-

Example: "1x Ir" = Hex 00 01

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	00 01

ANNEX F – Writing Command List

Security Level 1 or 2

Password Level 1 or 2 required depending on Command setting – See further information for respective Command for details.

[Command ID: 2001] Level1/Level2 Password setting

Length (WORD)	Description	Further information	Data Type	Min	Max	Res.	Unit
1	Fixed number	Fixed code required for password changes only = Hex CA FE	DINT	-	-	-	-
1	Level to set	"Level1" = Hex 00 01 "Level2" = Hex 00 02	DINT	1	2	1	-
1	Length of string	Select from: 4 / 5 / 6 / 7 / 8	DINT	4	8	1	Char.
4	Value of password	Any strings (8 characters in ASCII code, 2 char per WORD, Unused char must be filled with 0x00)	STR	-	-	-	-

Example: “New Level 2 password: NHPas2” = Hex CA FE 00 02 00 06 4E 48 50 61 73 32 00 00

Modbus-TCP Address (dec)	Modbus-TCP Address (hex)	CIP Symbolic Address MCCB_Input[x]	Value dec	Value hex
42517	09 D4	16	1	CA FE
42518	09 D5	17	2	00 02
42519	09 D6	18	6	00 06
42520	09 D7	19	20040	4E 48
42521	09 D8	20	20577	50 61
42522	09 D9	21	29490	73 32
42523	09 DA	22	0	00 00

TemBreak *PRO* Ethernet/IP Module User Manual

Version
1.0.0
Published
19th April 2021

NHP Electrical Engineering Products

AU 1300 NHP NHP
NZ 0800 NHP NHP

nhp.com.au
nhp-nz.com