PacT Series

Master**PacT** MTZ with MicroLogic X Control Units – **IEC** 61850 Communication

User Guide

PacT Series offers world-class circuit breakers and switches.

DOCA0162EN-02 07/2024





Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this document are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owner.

This document and its content are protected under applicable copyright laws and provided for informative use only. No part of this document may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the document or its content, except for a non-exclusive and personal license to consult it on an "as is" basis.

Schneider Electric reserves the right to make changes or updates with respect to or in the content of this document or the format thereof, at any time without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this document, as well as any non-intended use or misuse of the content thereof.

As part of a group of responsible, inclusive companies, we are updating our communications that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

Table of Contents

Safety Information	5
Cybersecurity Safety Notice	6
About the Book	7
IEC 61850 Standard Description	10
IEC 61850 Standard Overview	11
Introduction	12
MasterPacT MTZ IED Definition	12
IEC 61850 Terminology	13
CET850 Configuration Software	14
Overview	15
Graphical SCL Editor	16
Device Configuration	16
Add an IED	17
IED Identification	17
Address	17
Remove an IED	18
Connect Device in IEC 61850	18
Enable CID.exi File for File Transfer	19
IEC 61850 Files	20
ICD Files	21
	21
IEC 61850 Implementation	22
	23
File Transfer Protocol or File Transfer Protocol Secure	23
	24
	25
GGIO Logical Nodes	25
	20
IEC 61850 Protocol Configuration	27
MasterPacI MIZ IED Configuration	28
Introduction	29
	29
MasterPaci Milz CID File Generation (Offline Configuration)	29
CID.exi File Transfer to IFE of EIFE Interface with Firmware Version	24
CID exi Files Transfer to IEE or FIEE Interface with Firmware Version	
V004.006.000 and Later (On Site Configuration)	30
CID exi Files Transfer to IEE Server with Firmware Version	
V005 001 000 and Later (On-Site Configuration)	34
Configurable Features of IEC 61850 Standard	37
Preconfigured Datasets	
Reports Configuration	39
Reporting Triggers Configuration	41
Deadband Value Configuration	42
Circuit Breaker Control Configuration	43
лүрүнчил л	44

Abstract Communication Services Interface Conformance	
Statement	45
ACSI Basic Conformance Statement	46
ACSI Models Conformance Statement	46
ACSI Service Conformance Statement	47
Model Implementation Conformance Statement	49
Supported Models	50
Logical Node	50
Profile Implementation Conformance Statement	68
Protocol Implementation Extra Information for Testing	71
TISSUES Implementation Conformance Statement	78
Conformance Statements (Edition 2.0)	80

Safety Information

Important Information

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



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



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

DANGER

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

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

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

NOTICE

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

Please Note

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

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

Cybersecurity Safety Notice

AWARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

- Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.
- Disable unused ports/services and default accounts to help minimize pathways for malicious attackers.
- Place networked devices behind multiple layers of cyber defenses (such as firewalls, network segmentation, and network intrusion detection and protection).
- Use cybersecurity best practices (for example, least privilege, separation of duties) to help prevent unauthorized exposure, loss, modification of data and logs, or interruption of services.

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

About the Book

Document Scope

The objective of this document is to provide users, installers, and maintenance personnel with the technical information required to operate the IEC 61850 communication standard on the following ranges of circuit breakers:

- MasterPacT[™] MTZ1 circuit breakers from 630 to 1600 A with MicroLogic X control unit
- MasterPacT™ MTZ2 circuit breakers from 800 to 4000 A with MicroLogic X control unit
- MasterPacT[™] MTZ3 circuit breakers from 4000 to 6300 A with MicroLogic X control unit

Validity Note

This document is valid for:

- MasterPacT MTZ1/MTZ2/MTZ3 circuit breakers.
- MicroLogic[™] X control unit with IEC 61850 for MasterPacT MTZ Digital Module installed
- · Connected to Ethernet network using:
 - An IFE Ethernet interface for one circuit breaker
 - An EIFE embedded Ethernet interface for one MasterPacT MTZ drawout circuit breaker
 - An IFE Ethernet switchboard server, with the MasterPacT MTZ circuit breaker connected to an ULP port of the IFE server.

NOTE: IEC 61850 is not applicable for serial devices.

This document is valid for the devices with a firmware version equal to or greater than the minimum firmware version required:

IMU module	Part number	Firmware version
MicroLogic X control unit	-	≥ V004.000.000
IO module	LV434063	≥ V003.004.005
IFE Ethernet interface	LV434001	≥ V004.001.000
EIFE Ethernet interface	LV851001	≥ V004.001.000
IFE Ethernet server	LV434002	≥ V005.001.000

Use the latest version of EcoStruxure Power Commission (EPC) software to update the device with the latest firmware version available.

Online Information

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

The technical characteristics of the devices described in this guide also appear online. To access the information online, go to the Schneider Electric Country website at www.se.com.

Related Documents for IEC Devices

Title of documentation	Reference number
CET850 IEC 61850 Configuration Software - User's Manual	SEPED306025EN
MasterPacT MTZ MicroLogic X Control Unit - User Guide	DOCA0102EN DOCA0102ES DOCA0102FR DOCA0102ZH
ULP (Universal Logic Plug) System for ComPacT and MasterPacT Circuit Breakers - User Guide	DOCA0093EN DOCA0093ES DOCA0093FR DOCA0093ZH
Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide	DOCA0142EN DOCA0142ES DOCA0142FR DOCA0142ZH
Enerlin'X EIFE - Embedded Ethernet Interface for One MasterPacT MTZ Drawout Circuit Breaker - User Guide	DOCA0106EN DOCA0106ES DOCA0106FR DOCA0106ZH
Enerlin'X - IFE Ethernet Switchboard Server - User Guide	DOCA0084EN DOCA0084ES DOCA0084FR DOCA0084ZH
Enerlin'X IO - Input/Output Application Module for One Circuit Breaker - User Guide	DOCA0055EN DOCA0055ES DOCA0055FR DOCA0055ZH

You can download these technical publications and other technical information from our website at https://www.se.com/en/download.

Related Documents for UL Devices

Title of documentation	Reference number
CET850 IEC 61850 Configuration Software - User's Manual	SEPED306025EN
MasterPacT MTZ MicroLogic X Control Unit - User Guide	DOCA0102EN DOCA0102ES DOCA0102FR DOCA0102ZH
ULP (Universal Logic Plug) System for PowerPacT and MasterPacT Circuit Breakers - User Guide	0602IB1503EN 0602IB1503ES 0602IB1503FR 0602IB1503ZH
Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide	DOCA0142EN DOCA0142ES DOCA0142FR DOCA0142ZH
Enerlin'X EIFE - Embedded Ethernet Interface for One MasterPacT MTZ Drawout Circuit Breaker - User Guide	DOCA0106EN DOCA0106ES DOCA0106FR

Title of documentation	Reference number
	DOCA0106ZH
Enerlin'X - IFE Ethernet Switchboard Server - User Guide	DOCA0084EN
	DOCA0084ES
	DOCA0084FR
	DOCA0084ZH
Enerlin'X IO - Input/Output Application Module for One Circuit Breaker - User Guide	0613IB1317ES
	0613IB1317EN
	0613IB1317FR
	0613IB1317ZH

You can download these technical publications and other technical information from our website at https://www.se.com/en/download.

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

Trademark Notice

All trademarks are owned by Schneider Electric Industries SAS or its affiliated companies.

IEC 61850 Standard Description

What's in This Part

IEC 61850 Standard Overview	11
CET850 Configuration Software	
IEC 61850 Files	20
IEC 61850 Implementation	
Device Information	24

IEC 61850 Standard Overview

What's in This Chapter

Introduction	
MasterPacT MTZ IED Definition	12
IEC 61850 Terminology	13

Introduction

PacT Series Master Range

Future-proof your installation with Schneider Electric's low-voltage and mediumvoltage PacT Series. Built on legendary Schneider Electric innovation, the PacT Series comprises world-class circuit breakers, switches, residual current devices and fuses, for all standard and specific applications. Experience robust performance with PacT Series within the EcoStruxure-ready switchgear, from 16 to 6300 A in low-voltage and up to 40.5 kV in medium-voltage.

Overview

IEC 61850 is a standard for communication networks and systems in substations. Based on Ethernet protocol, it is a standardized method of communication developed to support integrated systems, composed of multi-vendor, selfdescribing Intelligent Electronic Devices (IEDs) that are networked together to perform real-time protection, control, measurement, and monitoring functions.



MasterPacT MTZ MasterPacT MTZ

MasterPacT MTZ IED Definition

The MasterPacT MTZ IED is composed of:

- One MasterPacT MTZ1, MTZ2, or MTZ3 circuit breaker
- One MicroLogic X control unit with IEC 61850 for MasterPacT MTZ Digital Module installed
- One IFE Ethernet interface, EIFE Ethernet interface, or IFE Ethernet switchboard server, with the MasterPacT MTZ circuit breaker connected to an ULP port of the IFE server.
- Optional digital inputs and outputs: one or two IO modules, or one M2C programmable contacts

A MasterPacT MTZ IED can be connected to an IEC 61850 Ethernet network according to Edition 2.0 of the following IEC standards:

- IEC 61850-6 standard
- IEC 61850-7-1 to 7-4 standards
- IEC 61850-8-1 standard

The MasterPacT MTZ IED communication conforms to IEC 61850 standard and Manufacturing Message Specification (MMS) protocol.

IEC 61850 Terminology

The following table defines some of the terms used in IEC 61850 standard. Refer to IEC 61850 standard for the complete list of terms.

Term	Definition
ACSI	Abstract Communications Service Interface is an interface to define how to model and organize the data of an IED independently from the communication stack.
CID	Configured IED Description is a ICD file that has been configured for a specific IED using IEC 61850 configuration tool. Refer to IEC 61850 Files, page 20.
Client	An IEC 61850 system terminal that receives data, reports, and controls MasterPacT MTZ circuit breaker, and may provide real-time data or event viewing, or similar functions. Only the client can initiate the requests.
Dataset	A predefined or user-selected set of data that can be reported via IEC 61850.
FTP	File Transfer Protocol is a method of transferring computer files over Ethernet. NOTE: FTP is used to transfer files to IFE/EIFE interface with firmware version ≤ V004.005.000.
FTPS	File Transfer Protocol Secure is a variant of FTP that adds a layer of security on the data in transit through a Secure Socket Layer (SSL) or Transport Layer Security (TLS) protocol connection. FTPS enables encrypted communication and secure connection between a remote user and the IFE interface, EIFE interface, or IFE server. NOTE: • FTPS is used to transfer files to IFE/EIFE interface with firmware version ≥ V004.006.000. • FTPS is used to transfer files to IFE server with firmware version ≥ V005.001.000.
ICD	IED Capability Description is a file supplied by the vendor of the IED. Refer to IEC 61850 Files, page 20.
IED	Intelligent Electronic Device is a device with a microprocessor controller.
IID	Instantiated IED Description is a file that describes the project-specific configuration of a single IED in a system. It is used as an exchange file between the CET850 configuration tool and other IEC 61850 system configuration tools to exchange the configuration data for a single IED instantiated specifically for a project.
Logical device	The set of typical substation functions of the IED (such as protection, metering, measurement, and alerting) which are referred to as logical nodes.
Logical node	Logical node is one typical substation function of the IED. For example the MMTR logical node, which contains energy information. Refer to Device Information, page 24.
MMS	Manufacturing messaging specification is a standard that defines messaging systems to exchange real time data between networked devices. MMS is used for communication between an IED and a supervision system.
Physical device	The physical device Ethernet access point of the IED. In the context of IEC 61850, this is the same as an IED. The physical device contains one or more logical devices.
SCD	Substation Configuration Description is an integration of the CID files for a particular substation. Refer to IEC 61850 Files, page 20.
SCL	Substation Configuration Language is the XML-based language used to create the IEC 61850 description files. There are four types of SCL files required to define an IEC 61850 substation (ICD, CID, SCD, and SSD).
Self-description	The capability of the IED to provide the IEC 61850 system with information on the function and data of the device.
Server	The IEC 61850 IED that sends reports to clients and responds to commands. The server can only respond to requests. However, the server can not initiate any request.

CET850 Configuration Software

What's in This Chapter

Overview	15
Graphical SCL Editor	16
Device Configuration	16

Overview

CET850 software is a Schneider Electric IEC 61850 configuration software. This software must be used to create, display, modify, or optimize the IEC 61850 configuration of MasterPacT MTZ IEDs.



- 1. Create an IEC 61850 configuration using an ICD, IID, or CID file as an input.
- 2. Edit an existing CID, SCD, IID, or user-customized ICD file to modify its contents by:
 - Displaying the configuration.
 - Modifying communication parameter values.
 - For MasterPacT MTZ IED, all the report control blocks and datasets are preconfigured.

NOTE: Modifying these parameter values are not recommended.

- 3. Generate a CID file for storing the configuration, which can then be imported to the MasterPacT MTZ IED using CET850 configuration software.
- 4. Generate SCD file for storing the configuration which can then be imported to any IEC 61850 configuration tools.
- 5. Generate an IID file for storing the specific configuration of an instantiated IED which can then be used by other IEC 61850 system configuration tools.
- 6. Load the CID file in the IFE interface, EIFE interface, or IFE server.
 - For IFE or EIFE interface with firmware version ≤ V004.005.000, the CET850 configuration software can be used to transfer the files. Refer to the file transfer procedure, page 31.
 - For IFE or EIFE interface with firmware version ≥ V004.006.000, use a FTPS client, such as FileZilla or WinSCP to transfer the files. Refer to the file transfer procedure, page 32.
 - For IFE server with firmware version ≥ V005.001.000, use a FTPS client, such as FileZilla or WinSCP to transfer the files. Refer to the file transfer procedure, page 34.

For more information, refer to CET850 IEC 61850 Configuration Software - User's Manual, page 8.

Graphical SCL Editor

The CET850 configuration software is a graphical tool that enables to browse an SCL file using a tree view that displays the content of the file in a hierarchical format.

📓 My Substation.scd - CET850 - IEC61850	DEdition 2	_ • •
<u>File Edit View Add FTP Tools H</u> e	lp	
j 🗋 🚅 🖬 X 🖻 🛍 🞼		Schneider Ottectric
B- CL File	Properties	
B- 🖹 Header	SCL	
Pa History	xmins	http://www.iec.ch/61850/2003/SCL
B-& Communication	revision	В
E-88 goose	xmIns:xsd	http://www.w3.org/2001/XMLSchema
GSE Receive	version	2007
H-LD Relay	xmInsxsi	http://www.w3.org/2001/XMLSchema-instance
B-■ P5U20		
GSE Receive	SCL file SCL means Substr by IEC 61850-8 sta	ation Configuration description Language (SCL). This is the XML-based language defined andard to describe the configuration of electrical substations and related IEDs.
SCL File	,	NUM //

Tree View

The following main sections are displayed in the tree view:

- Header and History
 - This section identifies the SCL configuration file and its version.
- Communication

This section contains the definition of all sub-networks defined in the IEC 61850 system, with the list of the connected IEDs. Both client/server and peer-to-peer communication access points are displayed.

List of IEDs

This section contains the definition of all IEDs defined in the IEC 61850 system, such as:

- Logical Devices (LD)
- Logical Nodes (LN)
- Datasets (DS)
- Report Control Blocks (RCB)

Property View

When an item is selected in the tree view, the property view displays the details of the selected item. You can activate editing operations from the toolbar and contextual menu. There are also specific dialog interfaces to guide you.

Device Configuration

Adding and removing a device in an IEC 61850 system consists of making the change in the associated SCD file.

Add an IED

The CET850 configuration software enables the addition of an IED to an IEC 61850 system using its ICD description file, or the addition of a device already defined by a CID file. A specific dialog interface requests a name for the IED and then its description. The description is provided from an ICD file, a CID file, or an IID file.

The following procedure describes the steps to add an IED to the IEC 61850 system:

Step	Action
1	Create a new SCL file for substation system (for example, My Substation.SCD).
2	From the tree view, select the SCL root element.
3	In the menu bar or in the contextual menu, click Add > IED.
4	Set the IED Identification and Address parameters (optional) according to the descriptions given in the section below.
5	Click OK to validate the operation.

IED Identification

You must add identification details to the IED before adding it to an IEC 61850 system.

- ICD/CID file: Select IEC 61850 description of the IED to add by an ICD or a CID.
 - **NOTE:** You can select a device from the library or select any other device with the ICD file.
- **IED name**: Assign a name to the IED. The name of the IED is unique in the IEC 61850 system.

A valid IED name must comply with the below naming convention rules:

- Can begin with a letter
- Must contain only alphanumeric and underscore characters.
- Must not exceed a maximum length of 64 characters.
- **IED description**: This is a free ASCII string where you can write comments about the device.

Address

Address parameters are set to connect the IED to the communication network. Connecting the IED can be done at this stage or later using the **Add > Connected Access Point menu**.

D 🚅 🖬 🐰	医肠网				Schreider
8 - <mark>3 SCL file</mark> 유- 한 Hess 유- 중 Com 유 문 PSE2 유- 물 PSU	Add Edit Show Errors Download All CID Download CID To Print. Print Preview	Properties To Devices Device	History IED Connected Acce Dataset. Report Control Blod GOOSE Control Blod GOOSE Control I GSE Element	Add IED ED identification ICD / QD File Name Dascription Address Subnet IP Address Subnet IP Address	
		SCL file SCL means Substation Cr standard to describe the	enfiguration description Lang- configuration of electrical sul		Details Cit: Cancel Help

Remove an IED

An IED can be removed from an SCD file. This function is available when an IED is selected in the tree view. After confirming that the IED is to be deleted, the tree view and the content of the SCD file are updated.

Connect Device in IEC 61850

An IED uses an Access Point (AP) to communicate. This AP is connected to a subnetwork. The CET850 configuration software provides the following functions to manage the communication architecture of an IEC 61850 system:

- Add or remove a Subnet to the system.
- · Add or remove an Access Point on a Subnet.

The following figure shows the subnet configuration settings:

Untitled1.scd* - CET850 (Version : 4.6.0) - IEC61850 Edition 2					
File Edit View Add FTP Tools Help					
🗅 😅 🖬 % ங 💼 🧳					
⊡ SCL File	Properties				
🖶 🗎 Header	ConnectedAP				
History	apName	AP1			
Communication	iedName	IFE			
	Address				
	- IP	169.254.0.10			
	- IP-SUBNET	255.255.0.0			
	- IP-GATEWAY	0.0.0.0			
	- OSI-PSEL	0000001			
LN CSWI1	- OSI-SSEL	0001			
LN GGIO1	- OSI-TSEL	0001			
LN GGIO2	OSI-AP-Title	1,3,9999,33			
LN GGIO3	OSI-AE-Qualifier	1			
LN Ext_GGIO1					
LN A51L_PTOC1					
LN A51S PTOC1					

Enable CID.exi File for File Transfer

The IFE interface, EIFE interface, or IFE server accepts CID file with **CID.exi** format only. Before transferring the **CID.exi** file to IFE interface, EIFE interface, or IFE server, it is mandatory to enable the **CID.exi** file.

To enable the **CID.exi** file, in the CET850 configuration software, in **Tools > Properties > Preferences**, select **Use EXI compression format for CID file** from the **File Export** option.

I CET850 (Version : 3.6.1) - IEC61850 File Edit View Add FTP Tools) Edition 2 Help	
	Properties	
	Preferences CET950 Options IEC61850 Standard Don't display welcome message Display Preferences ED full display mode DataType Template section Substation section Process bus elements	File Export Use EXI compression format for CID file Cute CID file after EXI file creation Editing Control Editing Control Cute confirmation required Reason of GOOSE invalidity (default values for P5 device) No valid frame exailable Last Associated quality invalid OR questionable Last Associated quality exit is set and Reley Mod I=*on*
	File validation and backup Image: Schema Validation Image: Validation at file saving Image: Files library path ICD Library C:\Program Files (x86)\Schneid SCL Schema	Periodical backup Period 10 mn der Electric\SFTCommon\EC61850\Edition_2\/CD\ der Electric\SFTCommon\EC61850\Edition_2\/SD - v2B 201401 22\SCL OK Cancel Help

IEC 61850 Files

What's in This Chapter

ICD Files	21
CID Files	21

ICD Files

The ICD file is a template supplied by Schneider Electric. It defines the capabilities of the IEDs, such as MasterPacT MTZ IED. ICD files are available within the CET850 configuration software and can also be downloaded by clicking here.

The ICD file is loaded into the CET850 configuration software, and the parameters are edited as required with the specific information to the instance of that IED. The CET850 configuration software can build the CID file. Once the parameters are edited, the CID file is then loaded into the IED through FTP protocol.

The IEDs with the same feature set use the same ICD file. However, each IED requires its own unique CID file. To create a CID file, begin with the correct ICD file and then configure the ICD file using CET850 configuration software.

CID Files

The CID files are created from the ICD file using the CET850 configuration software. The CID file contains information specific to MasterPacT MTZ IED, such as deadband values, datasets, and reports. The CET850 configuration software may include Ethernet communication information in the CID file. However, this information is not used. The communication information for IEC 61850 communication standard is taken from the MasterPacT MTZ IED configuration.

The CID files can be created offline without the MasterPacT MTZ IED. A valid CID file must have an **.exi** file to fit within the allocated directory space.

NOTICE

UNINTENDED DEVICE OPERATION

Do not manually alter the CID files created with CET850 configuration software. The CID files contain a security mechanism that is verified by the IFE interface, EIFE interface, or IFE server.

Failure to follow these instructions can result in loss of communication.

The CID file must also be compatible with the IEC 61850 conformance statements of the MasterPacT MTZ IED. Refer to Appendix A, page 44. If the CID file is corrupted or invalid, the ULP LED on the IFE interface, EIFE interface, or IFE server will flash five times to indicate discrepancy in the configuration.

NOTE: The CID file controls the operation of MasterPacT MTZ IED as an IEC 61850 server. If the MasterPacT MTZ IED does not have a valid CID file loaded, the MasterPacT MTZ IED will not perform any IEC 61850 functions.

IEC 61850 Implementation

What's in This Chapter

TCP/IP Client Connections	23
File Transfer Protocol or File Transfer Protocol Secure	23

TCP/IP Client Connections

The IEC 61850 communication standard is available through the Ethernet port of the IFE interface, EIFE interface, or IFE server, with the MasterPacT MTZ circuit breaker connected to an ULP port of the IFE server. A maximum of four IEC 61850 clients can be connected for each MasterPacT MTZ IED.

File Transfer Protocol or File Transfer Protocol Secure

For IFE or EIFE interface with firmware version \leq V004.005.000, use the FTP protocol and CET850 configuration software to transfer the **CID.exi** files.

For IFE, or EIFE interface with firmware version \geq V004.006.000, use a FTPS client, such as FileZilla or WinSCP to transfer the **CID.exi** files.

For IFE server with firmware version \geq V005.001.000, use a FTPS client, such as FileZilla or WinSCP to transfer the **CID.exi** files.

The transfer of **CID.exi** files through FTP or FTPS is password-protected by Role Based Access Control (RBAC) feature in IFE interface, EIFE interface, and IFE server. Only users with Engineer or Installer roles can transfer the **CID.exi** files.

For more information on user roles, refer to the following user guides in Related Documents, page 8:

- Enerlin'X IFE Ethernet Interface for One Circuit Breaker User Guide
- Enerlin'X EIFE Embedded Ethernet Interface for One MasterPacT MTZ Drawout Circuit Breaker - User Guide
- Enerlin'X IFE Ethernet Switchboard Server- User Guide
- CET850 IEC 61850 Configuration Software User's Manual

When a valid **CID.exi** file has been transferred to the IFE interface, EIFE interface, or IFE server and if the IEC 61850 for MasterPacT MTZ Digital Module is installed in the MicroLogic X control unit. The MasterPacT MTZ IED functions as a server and provides information to the IEC 61850 client substation systems.

The IEC 61850 folders on the IFE interface, EIFE interface, and IFE server are factory-configured and cannot be modified. The file or folder structure of the FTP or FTPS files on the IFE or EIFE interface, and IFE server cannot be changed.

Device Information

What's in This Chapter

Supported Logical Nodes	25
GĠlO Logical Nodes	25
Features	

Supported Logical Nodes

The following table lists the logical nodes supported in the MasterPacT MTZ implementation of IEC 61850 communication standard:

Logical Node	Description
CSWI	Switch controller. Used to control circuit breakers.
GGIO	Generic process IO module, page 25.
	For more information about inputs and outputs of the IO module, refer to <i>Enerlin'X IO</i> - <i>Input/Output Application Module for One Circuit Breaker</i> - User Guide, page 8.
LLN0	Logical node zero. Contains the data related to the associated Intelligent Electronic Device (IED).
LPHD	Physical device. Contains information related to the physical device.
MHAI	Harmonics. Consists of harmonic values such as THD.
MMTR	Metering. Consists of the integrated values (energy), primarily for billing purposes.
MMXU	Measurements. Contains per-phase and total current, voltage and power flow for operational purposes.
PTOC	Time overcurrent protection
PIOC	Instantaneous over current protection
PTOV	Over voltage protection
PTUV	Under voltage protection
PDOP	Reverse power protection
PTRC	Protection trip conditioning
XCBR	Circuit breaker. Indicates the status of the circuit breaker.
PTUF	Under frequency protection
PTOF	Over frequency protection

For more information on the logical nodes, refer to Appendix A, page 44.

GGIO Logical Nodes

The GGIO logical nodes supported in the MasterPacT MTZ implementation of IEC 61850 communication standard are:

- GGIO1 IO module1
 For more information, refer to Enerlin'X IO Input/Output Application Module
 for One Circuit Breaker User Guide, page 8.
- GGIO2 IO module2 For more information, refer to Enerlin'X IO - Input/Output Application Module for One Circuit Breaker - User Guide, page 8.
- GGIO3 M2C programmable contacts For more information, refer to MasterPacT MTZ MicroLogic X Control Unit User Guide, page 8.
- Ext_GGIO1 External Inputs and Outputs (Chassis Position Status).

For more information on chassis status, refer to the following user guides:

- Enerlin'X IFE Ethernet Interface for One Circuit Breaker User Guide, page 8
- Enerlin'X IO Input/Output Application Module for One Circuit Breaker -User Guide, page 8

Features

The following table lists the configurable features in the MasterPacT MTZ implementation of IEC 61850 communication standard:

Feature	Description	
Datasets	A Dataset (DS) is a collection of data values from any logical node. A maximum of six datasets are preconfigured in .ICD file.	
Report Control Blocks	Report Control Blocks (RCBs) are associated with a specific dataset. When the report is enabled and the trigger conditions are met, the report is sent to a specific client. The RCBs are preconfigured.	
	For more information, refer to Reports Configuration, page 39.	
Trigger options The trigger options are specified in the RCB options in the CID file, which includes:		
	Quality change	
	Data change (using deadband values)	
	Data update	
	Integrity period	
	General interrogation	
	For more information, refer to Reporting Triggers Configuration, page 41.	

IEC 61850 Protocol Configuration

What's in This Part

MasterPacT MTZ IED Configuration	
Configurable Features of IEC 61850 Standard	

MasterPacT MTZ IED Configuration

What's in This Chapter

Introduction	29
Prerequisites	29
MasterPacT MTZ CID File Generation (Offline Configuration)	29
CID.exi File Transfer to IFE or EIFE Interface with Firmware Version up to	
V004.005.000 (On-Site Configuration)	31
CID.exi Files Transfer to IFE or EIFE Interface with Firmware Version	
V004.006.000 and Later (On-Site Configuration)	32
CID.exi Files Transfer to IFE Server with Firmware Version V005.001.000	
and Later (On-Site Configuration)	34

Introduction

The configuration of MasterPacT MTZ IED includes two operations:

 MasterPacT MTZ CID.exi file generation (offline configuration) using the CET850 configuration software.

The **CID.exi** file can be configured and created offline without any connection to the IFE interface, EIFE interface, or IFE server.

CID.exi file transfer to IFE interface, EIFE interface, or IFE server (on-site configuration)

After the **CID.exi** file is transferred, it is validated by the IFE interface, EIFE interface, or IFE server.

- The CID file is transferred to the IFE or EIFE interface with firmware version ≤ V004.005.000 via the FTP protocol using the CET850 configuration software. Refer to the file transfer procedure, page 31.
- The CID file is transferred to the IFE or EIFE interface with firmware version ≥ V004.006.000 via the FTPS protocol using the FTPS client, such as FileZilla or WinSCP Refer to the file transfer procedure, page 32.
- The CID file is transferred to the IFE server with firmware version ≥ V005.001.000 via the FTPS protocol using the FTPS client, such as FileZilla or WinSCP. Refer to the file transfer procedure, page 34.

Prerequisites

The prerequisites for configuring MasterPacT MTZ IED in IEC 61850 communication standard are:

 Configure all the non-IEC 61850 settings of the MasterPacT MTZ IED and IFE interface, EIFE interface, IFE server (including communication and hardware inputs and outputs) separately from the IEC 61850 configuration process.

For more information, refer to the following user guides:

- MasterPacT MTZ MicroLogic X Control Unit User Guide, page 8
- Enerlin'X IFE Ethernet Interface for One Circuit Breaker User Guide, page 8
- Enerlin'X EIFE Embedded Ethernet Interface for One MasterPacT MTZ Drawout Circuit Breaker - User Guide, page 8
- Enerlin'X IFE Ethernet Switchboard Server User Guide, page 8
- Install the CET850 configuration software in order to create the CID file.

MasterPacT MTZ CID File Generation (Offline Configuration)

NOTICE

INCOMPATIBLE ICD OR CID FILES

Use only CET850 configuration software to edit ICD or CID files for the MasterPacT MTZ IED.

Failure to follow these instructions can result in configuration discrepancy or communication loss.

For instructions on how to use the CET850 configuration software, refer to the CET850 IEC 61850 Configuration Software - User's Manual, page 8.

Step	Action
1	Access the ICD file using the CET850 configuration software.
2	 Enter the file properties to configure MasterPacT MTZ IED. The properties that must be configured in the CID file includes: IED name IP settings (IP Address and Subnet Mask) Deadband values For more information, refer to Deadband Value Configuration, page 42. NOTE: Enter the revision notes and change track information in the header properties.
3	 Review the preconfigured datasets and report control blocks. Refer to Preconfigured Datasets, page 38 for details on the datasets. Refer to Reports Configuration, page 39 for details on the report control blocks.
4	Configure the descriptions (d field) for any logical node leafs if required.
5	Build the CID file.

The following figure shows how to access the ICD file using the CET850 configuration software:

Substation 1.scd* - CET850 - IEC61850 Edition 2 File Edit View Add FTP Tools Help		- 8 ×
D S I X B B Ø		Schneider
B B Header SCL		
History xmlns	http://www.iec.ch/61950/2002/5/1	
revision	B Add IED ×	
xminsosd	http://www.w3.o	
version	Add a device ×	
xminsxsi	r Select a device	
	Device from library Panily Panily Varsion	
	Fainty Model Version Eastery FKP30 Mathef@actMTZ1020 Version Identified action Version Version	
	C Other device	
	OK Cancel	
	OK. Cancel Hep	
SCL file SCL means Substatio	Configuration descriptions (any page (EQL)) This is the NDL Assert language dollaries (\$2511) ESE4 allowed to describe the configuration of electrical substantions and related EDL.	÷
A Readu	Log	CAD NUM

The following figure shows the file properties to be configured in the CID file for MasterPacT MTZ IED:

Substation 1.scd* - CET850 - IEC61850 Edition	in 2			×
File Edit View Add FTP Tools Help				
				Schreid
B 🗠 SCL File	Properties			
B Header SC	CL			
History 2	xmlns	http://www.iec.ch	/61950/2002/5/1	
	revision	В	Add IED	*
1	xmlns:xsd	http://www.w3.o		
	version	2007	-IED identification -	
1	xmlns:xsi http	http://www.w3.o	ICD / CID File	MTZ/SE_MasterPacT_MTZ-F01_E2V01.icd
			Name	MasterPacT_MTZ
		_	Description	MasterPacT MTZ- Low Voltage Air Circuit Breaker
			Address	
			Subnet	SUBNET
			IP Address	169 . 254 . 0 . 10
			Subnet mask	265 . 255 . 0 . 0
			Gateway address	0 . 0 . 0 . 0
				Details
				OK Cannel Help
SC SC	1. file 1. means Substation	Configuration description Lan	puage (SCL). This is the XML-b	ased language defined by EC 51500.4 standard to describe the configuration of electrical substantions and related EDs.
				Log

CID.exi File Transfer to IFE or EIFE Interface with Firmware Version up to V004.005.000 (On-Site Configuration)

The **CID.exi** file is transferred to IFE or EIFE interface with firmware version \leq V004.005.000 via the FTP protocol using the CET850 configuration software. The on-site configuration requires Ethernet connection to the IFE or EIFE interface.

NOTE:

- At a single time, only one **CID.exi** file can be loaded onto the IEC 61850 folder in IFE or EIFE interface.
- If the IFE or EIFE interface is reset to the factory setting, the CID.exi file in the IFE or EIFE interface is erased. The IFE or EIFE interface must be retransferred and the CID.exi file has to be retransferred into the IFE or EIFE interface.

The following procedure describes how to transfer IEC 61850 **CID.exi** file to the IFE or EIFE interface:

Step	Action					
1	Run the CET850 configuration software.					
2	Enter the IP address of IFE or EIFE interface to get connected to the IFE or EIFE interface through FTP.					
	NOTE: The previous CID.exi file can be archived as part of historical information of the IED.					
3	Enter the login credentials for FTP. On successful credential verification, the CID.ex files will be transferred to IFE or EIFE interface.					
	NOTE: The transfer of CID.exi files through FTP is password-protected by Role Based Access Control feature in IFE or EIFE interface. Only users with Engineer or Installer roles can transfer the CID.exi files.					
4	The IFE or EIFE interface validates the CID.exi file.					
	NOTE: If the CID.exi file is invalid, the IEC 61850 features of the MasterPacT MTZ IED does not function and the ULP LED will flash for five times to indicate discrepancy in configuration.					
5	On successful validation of CID.exi file, it is recommended to disable the FTP settings in the IFE or EIFE webpage.					
	NOTE: Only users with Administrator role can change the FTP settings.					
	For more information, refer to the following user guides:					
	Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide, page 8					
	 Enerlin'X EIFE - Embedded Ethernet Interface for One MasterPacT MTZ Drawout Circuit Breaker - User Guide, page 8 					

The following figure shows the FTP credentials required for MasterPacT MTZ IED:

SSA.scd - CET850 (Version : 4.6.0) - IEC61850 Edition 2					
File Edit View Add FTP Tools Help					
D G 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日					
B-CL File Properties					
🗄 🖷 🛅 Header	ConnectedAP				
E Communication	desc				
	apName	AP1			
MasterPacT_MTZ	iedName	MasterPacT_MTZ			
	Address				
	- IP	192.168.0.103 255.255.255.0			
	- IP-SUBNET				
	- IP-GATEWAY	0.0.0.0			
LN GGIO1	FTP Credentials	×			
LN GGIO2	Connection Credentials				
LN GGIO3	Please provide credentials for MasterPacT MTZ				
LN Ext_GGIO1		Use default credentials			
LN A51L_PTOC1	Use default credentials				
LN A51S_PTOC1					
LN A51G_PTOC1	Username	Username			
LN ASTG_PTOC2	Password	Password Password			
IN AS2_FUORT	Skip	OK Cancel			
LN A81_PTOF1					
LN A27_PTUV1					

CID.exi Files Transfer to IFE or EIFE Interface with Firmware Version V004.006.000 and Later (On-Site Configuration)

The **CID.exi** file is transferred to IFE or EIFE interface with firmware version ≥ V004.006.000 using any FTPS client software, such as FileZilla or WinSCP. The on-site configuration requires Ethernet connection to the IFE or EIFE interface.

NOTE:

- At a single time, only one **CID.exi** file can be loaded onto the IEC 61850 folder in IFE or EIFE interface.
- If the IFE or EIFE interface is reset to the factory setting, the CID.exi file in the IFE or EIFE interface is erased. The IFE or EIFE interface must be retransferred and the CID.exi file has to be retransferred into the IFE or EIFE interface.

The following procedure describes how to transfer IEC 61850 **CID.exi** file to the IFE or EIFE interface using FileZilla software:

Step	Action
1	Run the CET850 configuration software.
2	Build the CID.exi file in the CET850 configuration software. For more information, refer to CET850 IEC 61850 Configuration Software - User's Manual, page 8.

Step	Action							
	8788							
	File Edit View Add FTP Tools	IEC61850 Edition 2 Help						
	8- 🔄 SCL File 8- 🕒 Header	Properties IED						
	8-6 Communication 8-6 IFE1	desc configVersion	MasterPacT_MTZ- Low Volta 1.0	ige Air Circuit Break	er			
		name	Schneider Electric					
		type * Services	IED	Save As				×
				Save in	CID Name	^		Type
				Quick access		No items match y	our search.	
				Desktop				
				Libraries				
				This PC				
				۲				
				Peetwork	<			>
					File name: Save as type:	FE1.cid.exi EXI Files (*.cid.exi)	•	Save
		Intelligent Electronic Dev Manufacturer: Schneide ED type: ED	ice (ED) r Electric			EXI Files (* cid ex) CID Files (* cid)		
	Current task Va	lidate IED Inputs				Log		
	H 🏠 Task history 0 H 🗞 Messages 0	7/02/2024 11:55:09 07/02/2024 11:43:19	601: Device "IFE1" not suppor 0.090: Application started	ted. Ignored for vali	dation.			
3	Run the FTPS cli	ent softv	vare.					
4	Enter the IP addr	ess of IF	E or EIFE int	erface in	the Hos	t field to get c	onnected to	the
	NOTE: The	previous	CID.exi file (can be ar	chived a	as part of histo	rical inform	ation of
	the IED.	•	-			•		
5	Enter the login cr successful crede interface.	edential ntial veri	s for FTPS in fication, the (the User CID.exi fi	name a les will b	nd Password e transferred t	fields. On o IFE or Ell	FE
	NOTE: The transfer of CID.exi files through FTPS is password-protected by Role Based Access Control feature in IFE or EIFE interface. Only users with Engineer or Installer roles can transfer the CID.exi files.							
6	Enter the port of	the serve	er into the Po	rt field (9	90 for F	TPS).		
7	Click Quickconn	ect to es	stablish the co	ommunic	ation wi	th the IFE or E	IFE interfac	æ.
	ftps://SecurityAdmin@10.179.247.20 - FileZilla File Edit View Transfer Server Bookmarks Helj	o Debug						- a ×
	Host %://10.179247.20 Usemame: SecurityAdmin	〒 点 9 め Rassword: ••••••	Port: Quickconnect *					
	13:17:21 Status: Connection established, init 13:17:22 Status: Ventying certificate 13:17:25 Status: TLS connection established 13:17:25 Status: Samer does not support no 13:17:25 Status: Samer does not support no	ializing TLS waiting for welcome mess n-ASCII characters.	sge					Ŷ
	18/17/25 Status Retroyed directory listing, 18/17/25 Status Retroyed directory listing, 18/17/25 Status Directory listing of "/" succe	estul						*
	- IID IID IID IID IID	anachich		A B-	? fw ? logging			
	SchweiderTools Software Update							
	Filenome Filesize Filetype	Last modified 3/9/2022 12:25		Fieran	ne Filesize	Filetype Last modified	Permissi. Owner/Gr	
	IFE1.cid.exi 8.6 KB EX0 File IFE1.ftp 36.8 FTP File	2/14/2022 3:24 3/9/2022 10:45		1 fw	ing	File folder 1/1/1980 5:30:00 PM File folder 1/1/1980 5:30:00 PM		
	3 files. Total size: 64.5 KB Server/Local file Direc Remote file	Size Priori	ty Status	2 direct	ories			
	Queued files Failed transfers Successful resolution							
	and a second second second second fraction						<mark>∩</mark> ©© 0₀	tue: empty 🛛 🗢 🗢
8	Select the CID.ex	ki file on	the local site	to transf	ər.			
Э	Select the folder transferred.	in the rei	mote site (/i	w/exi) to	which t	ne CID.exi file	IS TO DE	
10	Drag and drop th	e selecte	ed CID.exi file	e to the re	emote si	te folder.		

Step	Action
	【2 http://canipkening/th/32/27-14/2018 ロ × ite: Lat Uries Inseet Seere Bootmans Hep Dobug 証 ・ 別 *** 二 数 形 ① ★* 3 形 点 の 合
	Stat cu/UU1932/2020 guarance ScottlyAdrin Associat Port Quickconnect * 1317.25 Statue Looped in thermony directly strates. A A A A
	121/20 Maile Unedity bit of the control 121/20 State Diversity of the control 121/20 State Diversity of the Xecond A 121/20 State Diversity of the Xecond A 121/21 State Diversity of the Xecond A
	Local like (Program Dural Schwider Recht (SEC155) SCL), CD, V Immits like /// het with the schwider Recht (SEC155) SCL), CD, V
	KET KGMS Stado
	Bonelardos Bonelardos Bonelardos V
	Find Starts CTISS Crudy_ 30/202125. Finds Starts CTISS Crudy_ 30/202125. Finds Starts CTISS Crudy_ 30/202125. Finds Starts CTISS Crudy_ 30/202126. Finds Starts CTISS Crudy_ 30/202126.
	Selected 1 Mic. Total date 88 43 English Control (Second Contr
	Sever0ccal file Direc. Remote file Size (Honly Satus
	Convert files (Failed traceles: Successful traceles
11	The IFE or EIFE interface validates the CID.exi file and then the file gets transferred to
	remote site folder.
	NOTE: If the CID.exi file is invalid, the IEC 61850 features of the MasterPacT MTZ IED does not function and the ULP LED will flash for five times to indicate
	discrepancy in configuration.
	2 the first first first first block - □ × Re first first first first first block - □ ×
	Ister strain 17/17/24/28) Igename Security/drain Reagont Paragont Paragont<
	13144 Statu: Loged in 13144 Statu: File statement and and the statement and the s
	Tk144 Steak Directory listing of Thinket" accordal Lead aller Chrosomabas/Sonotal Board Deer Steam (Stational Structure) Remate site (Andreal Board Deer Steam (Stational Structure) Remate site (Andreal
	In the second sec
	Extender forte Scholar Update Fisce Filtigze Last modified
	. .
	Selected 1 file. Total size 86 48 11 File. Total size 86 48
	Smerifacatile Direc, Renderlie Size Promy Status
	Covered film [Field transfers ()]
12	On successful transfer of CID.exi file, it is recommended to disable the FTPS settings in the IFE or EIFE webpage.
	NOTE: Only users with Administrator role can change the FTPS settings.
	For more information, refer to the following user guides:
	Enerlin'X IFE - Ethernet Interface for One Circuit Breaker - User Guide, page 8
	 Enerlin'X EIFE - Embedded Ethernet Interface for One MasterPacT MTZ Drawout Circuit Breaker - User Guide, page 8

CID.exi Files Transfer to IFE Server with Firmware Version V005.001.000 and Later (On-Site Configuration)

The **CID.exi** file is transferred to IFE server with firmware version \geq V005.001.000 using any FTPS client software, such as FileZilla or WinSCP. The on-site configuration requires Ethernet connection to the IFE server.

NOTE:

- At a single time, only one **CID.exi** file can be loaded onto the IEC 61850 folder in IFE server.
- If the IFE server is reset to the factory setting, the CID.exi file in the IFE server is erased. The IFE server must be retransferred and the CID.exi file has to be retransferred into the IFE server.

The following procedure describes how to transfer IEC 61850 **CID.exi** file to the IFE server using FileZilla software:

Step	Action									
1	Run the CET85	Run the CET850 configuration software.								
2	Build the CID.exi file in the CET850 configuration software. For more information, refer to CET850 IEC 61850 Configuration Software - User's Manual, page 8.									
	is stassed - CETESO (Version : 4.6.0) - IEC61550 Edition 2 File Edit: View Add FTP Tools Help									
	D @ D X % % R // B @ SSL File Properties									
	8-10 Header 8-6 Communication	IED desc	MasterPacT_MTZ- Lo	ow Voltage Air Circuit Breaker						
		manufacturer name englight type × Services	Schneider Electric							
			full IED	Save As X						
				Saveir: CO · · · · · · · · · · · · · · · · · ·						
				Name Date modified Type Ouck access No items match your search.						
				Network						
				File name: FE1 cid exi 💌 Save						
		Intelligent Electronic De Manufacturer: Schneid	rvice (ED) fer Electric	Save as type: EX Files (* cid ex) Cancel Co Files (* cid) CO Files (* cid)						
		ED type: ED		Log						
	Current task Task history Kessages	07/02/2024 11:43:1	9.601: Device "IFE1" not 19.090: Application starte	t supported. Ignored for validation. ed						
3	Run the FTPS of	client soft	ware.							
4	Enter the IP address of IFE server in the Host field to get connected to the IFE server through FTPS. NOTE: The previous CID.exi file can be archived as part of historical information of									
5	Enter the login credentials for ETPS in the Username and Password fields. On									
	successful credential verification, the CID.exi files will be transferred to IFE server.									
	NOTE: The transfer of CID.exi files through FTPS is password-protected by Role Based Access Control feature in IFE server. Only users with Engineer or Installer roles can transfer the CID.exi files.									
6	Enter the port o	f the serv	er into the	Port field (990 for FTPS).						
7	Click Quickcon	inect to e	stablish the	e communication with the IFE server.						
	If typ://SecurityAcm/04/1924/19.4/02/in - 0 × Tip: Edit: Vew Stander Security S									
	131721 State Connection relationship instanting Bref Quintozzenia +									
	10:03 Tester 15 Or wellow 117:23 Lines forwer down to specify the set of the specific speci									
	Local site: C\ProgramData\Schneider Electric\/E	C61850\SCL\CID\								
	HICON SI Studio			P Kogóng						
	Filenome Filesize Filetype	Last modified		Fierame Filesze Filetype Last modified PermissL. Owner/Gr.						
	IFE1.cid 55.8 KB CETBSD Cor IFE1.cid.exi 8.6 KB E01 File IFE1.tig 36 B FTP File	ntig. 3/9/2022 12:25 2/14/2022 3:24 3/9/2022 10:45		• •						
	3 film, Total size, 65.5% 2 Server(Local file Direct., Remote File Size, Priority Status									
	Cussed Res Failed travelers Successful travelers									
8	Select the CID (exi file on	the local s	site to transfer						
9	Select the folde	r in the re	mote site ((/fw/exi) to which the CID.exi file is to be						
10	Drag and drag f	ho coloct		i filo to the remete site folder						
10	Drag and drop t	ine select	eu viv.exi							

Step	Action
	Papel/methydemidgle151754726-F46288 - 0 × If the left fires loader birty blog blog If the left fires loader birty blog blog blog blog If the left fires loader birty blog blog blog blog blog blog blog blog
11	The IFE server validates the CID.exi file and then the file gets transferred to remote site folder. NOTE: If the CID.exi file is invalid, the IEC 61850 features of the MasterPacT MTZ IED does not function and the ULP LED will flash for five times to indicate discrepancy in configuration.
	121 121 </td
	Falseer Falseer
12	On successful transfer of CID.exi file, it is recommended to disable the FTPS settings in the IFE webpage. NOTE: Only users with Administrator role can change the FTPS settings.
	For more information, refer to Enerlin'X IFE - Ethernet Switchboard Server - User Guide, page 8.
Configurable Features of IEC 61850 Standard

What's in This Chapter

Preconfigured Datasets	
Reports Configuration	
Reporting Triggers Configuration	
Deadband Value Configuration	
Circuit Breaker Control Configuration	
5	

The datasets are preconfigured. The configurable IEC 61850 features of the MasterPacT MTZ IED are:

- Report control blocks
- Reporting triggers
- Deadband value
- Circuit breaker control

To set up client connections and enable reports, refer to the CET850 IEC 61850 Configuration Software - User's Manual, page 8.

Preconfigured Datasets

For MasterPacT MTZ IED, six datasets are preconfigured with predefined data values.

NOTICE

COMMUNICATION LOSS

Do not modify the data values of each preconfigured dataset. If the data values are modified, the resulting CID file will not function on the MasterPacT MTZ IED.

Failure to follow these instructions can result in communication loss.

The CET850 configuration software can be used to view datasets in the CID file.

The ICD file for the MasterPacT MTZ IED is preconfigured with six datasets:

Datasets	Description
Health status	Contains the health information of all logical nodes
Breaker status	Contains XCBR, Ext_GGIO1, and CSWI logical nodes
Protections	Contains PTOC, PTOV, PTUV, PTOF, PTUF, PDOP, PTRC, and PIOC logical nodes
Measurements	Contains MMXU and MHAI logical nodes
Energy	Contains MMTR logical node
GGIO	Contains GGIO logical node

The following figure shows the details of preconfigured datasets:

sfsa.scd* - CET850 (Version : 4.6.0) - IEC61850 Edition 2									
File Edit View Add FTP Tools Help	р								
🗅 😅 🛃 🐇 🛍 💼 🗳									
B-	^	Properti	es						
🗉 🗎 Header		DataSet							
🖲 🖧 Communication		desc							
B MasterPacT_MTZ		name	StatXCBR						
DS StatEpergy									
DS StatMeas									
DS StatProtection									
DS StatHealth									
DS StatIO									
-RC URCB_StatXCBR		DataSet	Details						
RC URCB_StatProtection		Logical N	ode Reference	DO Name	DA Name	FC			
RC URCB_StatHealth		LD0/CS	WI1	Pos		ST			
		LD0/CS	WI1	Loc		ST			
RC URCB_StatEnergy		LD0/XC	BR1	Pos		ST			

Reports Configuration

The CET850 configuration software can be used to view unbuffered reports. Each client connection can enable this report when it is available. This report is sent to the clients who have enabled this report.

This report must be located in LLN0 as it contains data from other logical nodes within that logical device.

NOTE: It is recommended not to modify these data as all the reports are preconfigured.

When unbuffered reports are enabled, the reports are transmitted. If the client is not connected or if there is a communication issue, the report is lost.

NOTICE

LOSS OF DATA

Do not create, modify, or delete preconfigured reports.

Failure to follow these instructions can result in loss of communication or data reports.

The MasterPacT MTZ configuration file is limited to 24 unbuffered reports. This corresponds to a maximum of four client connections with six unbuffered reports for each connection.

NOTE:

- If the maximum number of reports or client connections exceeds the limit, the IFE interface, EIFE interface, or IFE server will reject the reports for new clients.
- The minimum refreshment rate of IEC 61850 data is 1 s. The associated MasterPacT MTZ IED data is updated more frequently.

The ICD file for the MasterPacT MTZ IED is preconfigured with six unbuffered reports:

Report	Description
Health status	Reports data from the health status dataset
Breaker status	Reports data from the breaker status dataset

Report	Description
Protections	Reports data from the protections dataset
Measurements	Reports data from the measurements dataset
Energy	Reports data from the energy dataset
GGIO	Reports data from the GGIO dataset

Reporting Triggers Configuration

The reporting triggers allows the MasterPacT MTZ IED to generate and send reports automatically to clients, when certain conditions are met. They are configured using the CET850 configuration software.

NOTE: It is recommended to set to the default configuration.

The following figure shows the report control block configuration settings:

View Add FTP Tools Help			Modify Report Control Block	×	
关 軸 昭 均			Depart Capital Plack identification		
DS StatXCBR	Properties		Mamo		
DS StatEnergy	ReportControl		LIPCE StatyCEP		
DS StatMeas	intgPd	0	Intel_statesh		
-P\$ StatProtection	indexed	true	Description		
- PS StatHealth	bufTime	500	1		
DS StatIO	buffered	fals	Dataset		
-RC URCB_StatXCBR	name	URC	StatyORD		
-RC URCB_StatProtection	datSet	Stat	joi abiobiti		
— RC URCB_StatHealth	rptID	URC	кероптіа	Conf Rev	
RC URCB_StatMeas	confRev	1	URCB_StatXCBR	1	
-RC URCB_StatEnergy	 TrgOps 				
RC URCB_StatIO	period	true	Report Control Block parameters		
	acha	true	Putter time (me)		
	dupd	fals	Durier une (ma)	Buffered	
LN GGIO1	ai	true	500		
LN GGIO2	dcha	true	Integrity period (me)	Number (01-99)	
LN GGIO3	© OptFields			✓ Indexed 04	
LN Ext_GGIO1	dataRef	true	0		
IN A51L_PTOC1	- bufOvfl	fals			
-IN A51S_PTOC1	seaNum	true	-Trigger conditions	Report content	
IN A51G_PTOC1	configRef	true	Name Value	Name Value	
-IN A51G_PTOC2	dataSet	true	dchg true	seqNum true	
IN A67_PTOC1	reasonCode	true	qchg true	timeStamp true	
IN A32_PDOP1	timeStamp	true	oupd taise	reasonCode true	
A81_PTUF1	antedD	fale	gi true	dataRef true	
A81_PTOF1	- PotEnabled	TUIS		configRef true	
IN A27_PTUV1	Rptenabled				
IN A27_PTUV2	max	4			
A59_PTOV1		-			
LN A59_PTOV2	Report Control Block	_			
A50_PIOC1	 OptFields: specifies the cont 	ent of the		OK Cancel Help	

The list of reporting triggers are:

Reporting triggers	Description	Value/Comments
Supported trigger	Integrity	Supported
conditions	Data change	Supported
	Data update	Supported (can be set, however there is no process data to report for this condition.)
	Quality change	Supported
	General interrogation	Supported
Supported optional	Sequence Number	Supported
neius	Report time-stamp	Supported
	Reason for inclusion	Supported
	Dataset name	Supported
	Data reference	Supported
	Conf-rev	Supported
	Segmentation	Not Supported
	Sending of segmented reports	Supported
	Second change of analogue or digital value during buffer time	Report is sent immediately
	Online changeable RCB members	RptID, OptFlds, BufTm, TrgOpts, IntgPd, and RptEna
	URCB management	The auto-indexation of the URCB with the use of the RptEnabledmax="n" attribute is supported. Indexed URCBs are visible from all clients

For the complete list of reporting triggers, refer to Abstract Communication Services Interface Conformance Statement, page 45.

Deadband Value Configuration

In IEC 61850 communication standard, certain parameters have an instantaneous values which begins with *inst* and a deadband value. The instantaneous value is updated every second. The deadband value is set to the new instantaneous value when the difference between the new instantaneous value, and the deadband value exceeds the deadband value configured for that parameter.

The CET850 configuration software is used to configure the deadband value of a data point in the CID file. In IEC 61850-7-3, the deadband values are expressed as percentage, whereas in MasterPacT MTZ IED devices, the deadband values are expressed as integer values. These values are usually in different units than the dead banded value. This value is stored in the *db* parameter associated with that data point. For example, a value with units of Amperes may have a deadband value with units of Milliamperes. These values are usually in different units than the dead banded value.

Example:

Configure the power report for client connection to be triggered (sent) when phase A current changes by 5 A or more from one reading to the next. The phase A current is in units of 1 A and the deadband parameter (db) is in units of 0.1 A.

The CET850 configuration software can be used to build a CID file that includes the following settings:

- 1. Set the db parameter of phase A (MMXU > A > phsA) to 50 which specifies a deadband range of 5 A 50 x 0.1 A = 5 A.
- 2. Set the **dchg** option to **True** to get the reports for client connection.

NOTE: Reports are only sent if this option is enabled by the client.

Refer to the figure below to understand the deadband operation:



- - - Deadband Magnitude Phase A current

Initially, the phase A current has an instantaneous magnitude and a deadbanded magnitude of 5 A. The deadband quantity set through the CET850 configuration software is 5 A.

Marker position	Instantaneous magnitude of Phase A current	Operation analysis
1	12A	 The difference between the instantaneous magnitude and deadbanded magnitude is greater than 5 A (the deadband range).
		The dchg trigger is set, which sends report on data change to the client.
		The deadbanded magnitude is set to the instantaneous magnitude (12 A).
2	4A	 The difference between the instantaneous magnitude and deadbanded magnitude is greater than 5 A (the deadband range).
		The dchg trigger is set, which sends report on data dhange to the client.
		 The deadbanded magnitude is set to the instantaneous magnitude (4 A).
3	3A	 The difference between the instantaneous magnitude and deadbanded magnitude is less than 5 A (the deadband range).
		2. The dchg trigger is not set, no reports are sent to the client.
		3. The deadbanded magnitude remains at its existing value (4 A).

NOTE: Deadband setting range: 1-100. If the db value is configured to a value greater than 100, then it will be considered as 0.

The following figure shows the configuration of deadband values for measurements data:

dit View Add FTP Tools Help							
■ X == 10 #2	Descrite						
- DS StatIO	A Propertie	do : MM	VUI				
NC URCB_StatXCBR	Logical Ivot	ue . mm	1				
RC URCB_StatProtection	inst		1				
CORCE_StatHealth	< prenx						
CRCB_Statmeas	Logical N	lode De	tails				
CIRCE_StatEnergy	Name	Value	Description	C Flac		Type	
- CRCb_Statio	MMYUI				MMX	II SE MMYII ffa222/da07a28afaa582fa2a5552114aa5087068	
IN CSWI1	- TotW				MV	SE_MW.e6f5h/h3h3d1de1ad07e89e32fdrf7180e1f8f70	
IN GGIO1	1 000			MY deb		SE_Analogue)(aluga 19090/s959c/25119cb/2552142/469bbd/27ddd9/s9d	
	anag			MX ach	9	Ouslity	
LIN GGIO2	4			www.	9	Timestame	
-IN Evt. GGIO1	i unite			*/A		SE Linit (71x5204x25b00ff2570210x11x4677debx4dx02	
UN AS1L PTOC1	db	1	unit 0.1kW	-rc		INT2011	
-IN A51S PTOC1	d		UNIC O. INVV	DC		VirString 255	
-IN AS1G PTOC1	TotVA			~	MM	SE MU offEh4h2h2d1da1ad07o90o22fddf7190o1f9F70	
A51G PTOC2	TotVAr				MM	SE_MV_e6f5b4b3b3d1da1ad07e99e32fdcf7190a1f0f70	
LN A67 PTOC1	TotPE				MM	SE_MV_e6f5b4b2b2d1da1ad07e89e32fdcf7180e1f8f70	
LN A32 PDOP1	2 IOPP				MIN	SE_MV_e0ISD40SD5010818007e05e521007100e110170	
A81_PTUF1	C HZ				MOVE	SE_MV_e01504050501041400766565210(171606116170	
-IN A81_PTOF1	- A				DEL	SE_WTE_70a5b0b4d0cb21a1194550055b4C9772224etda0	
-IN A27_PTUV1	E PPV				140/C	SE_DEL_1554802005e01407590830421e002c0080640745	
LN A27_PTUV2	- W				MOVE	SE_W1E_0091270eC560d01392C001394C01000IC3D04910	
-IN A59_PTOV1	S PP				WIE	SE_WIE_609127/bec5e0801352c081354c01b001C5b04916	
IN A59_PTOV2	T VA				WVE	SE_WTE_003127.bet5e6ad1502cda1554c0fbd0fc5bb4016	
-IN A50_PIOC1	a Rah				ENIC	SE_YTE_0031270605607-04102-066Lb3646L62-22700-244	
LN PTRC1	- ben				ENG	3E_ENG_35247.000037.03012303300020400330337.3982.14	
-IN MMXU1	Cicwith				ENG	30_0140_1/00466039600003001451/3100300101/010005D5[06	
MMTR1							
W MHAI1	Logical Node MMX The MMXU LN prov	U. Measurem rides 3-phase	ent (3 phases) is measurements.				
	 Depending on its ty 	ype, Separa e	ray implement up to 3 ins	dances of Mi	DOU LN.		

Circuit Breaker Control Configuration

The MasterPacT MTZ IED supports the following control features:

- Direct control with normal security
- Select Before Operate (SBO) with normal security
- Select Before Operate (SBO) with enhanced security (default setting)
 NOTE: For circuit breaker operation, the MasterPacT MTZ IED should be Auto: Remote mode to allow control over IEC 61850 communication standard.

To change the control modes use the system engineering tools (for example, PASIC-GEA).

For more information on control model, refer to Control Model, page 74.

Appendix A

What's in This Part

Abstract Communication Services Interface Conformance Statement	45
Model Implementation Conformance Statement	49
Profile Implementation Conformance Statement	68
Protocol Implementation Extra Information for Testing	71
TISSUES Implementation Conformance Statement	78
Conformance Statements (Edition 2.0)	80

Abstract Communication Services Interface Conformance Statement

What's in This Chapter

ACSI Basic Conformance Statement	
ACSI Models Conformance Statement	
ACSI Service Conformance Statement	47

The Abstract Communication Services Interface (ACSI) conformance statement is defined by IEC 61850-7-2, and provides the following specifications:

- A basic information model.
- Information exchange service models.

The supported features are indicated with an X.

ACSI Basic Conformance Statement

ACSI basic conform	ance statement		Client/ Subscriber	Server/ Publisher	Value/Comments
Client-server roles	B11	Server side (of two-party application-association)	-	x	-
	B12	Client side (of two-party application-association)	-	-	-
SCSMs supported	B21	SCSM: IEC 61850-8-1 used	-	х	-
	B22	SCSM: IEC 61850-9-1 used	-	-	Deprecated
	B23	SCSM: IEC 61850-9-2 used	-	-	-
	B24	SCSM: other	-	-	-
Generic substation	B31	Publisher side	-	-	-
event model (GSE)	B32	Subscriber side	-	-	-

ACSI Models Conformance Statement

ACSI models conformance statement			Client/ Subscriber	Server/Publisher	Value/Comments
If Server side (B11)	M1	Logical device	-	х	-
supported	M2	Logical node	-	х	-
	M3	Data	-	х	-
	M4	Dataset	-	х	-
	M5	Substitution	-	-	-
	M6	Setting group control	-	-	-
Reporting	M7	Buffered report control	-	-	-
	M7-1	sequence number	-	-	-
	M7-2	report-time-stamp	-	-	-
	M7-3	reason-for-ENClusion	-	-	-
	M7-4	data-set-name	-	-	-
	M7-5	data-reference	-	-	-
	M7-6	buffer-overflow	-	-	-
	M7-7	entryID	-	-	-
	M7-8	BufTm	-	-	-
	M7-9	IntgPd	-	-	-
	M7-10	GI	-	-	-
	M8	Unbuffered report control	-	х	-
	M8-1	sequence-number	-	х	-
	M8-2	report-time-stamp	-	х	-
	M8-3	reason-for-inclusion	-	Х	-

ACSI models conformance statement			Client/ Subscriber	Server/Publisher	Value/Comments
	M8-4	data-set-name	-	х	-
	M8-5	data-reference	-	х	-
	M8-6	BufTm	-	х	-
	M8-7	IntgPd	-	х	-
	M8-8	GI	-	х	-
	M8-9	Confrevision	-	х	-
Logging	M9	Log control	-	-	-
	M9-1	IntgPd	-	-	-
	M10	Log	-	-	-
Control	M11	Control	-	х	-
If SVC (B41/42) is	M14	Multicast SVC	-	-	-
supported	M15	Unicast SVC	-	-	-
Other	M16	Time	-	X	-
	M17	File Transfer	-	-	-

ACSI Service Conformance Statement

ACSI service conformance statement			Client/ Subscriber	Server/ Publisher	Value/Comments		
Server (Clause 6)	S1	ServerDirectory	-	х	-		
Application	S2	Associate	-	х	-		
7)	S3	Abort	-	-	-		
	S4	Release	-	х	-		
Logical device (Clause 8)	S5	LogicalDeviceDirectory	-	x	-		
Logical node	S6	LogicalNodeDirectory	-	х	-		
(Clause 9)	S7	GetAllDataValues	-	х	-		
Data (Clause 10)	S8	GetDataValues	-	х	-		
	S9	SetDataValues	-	-	-		
	S10	GetDataDirectory	-	х	-		
	S11	GetDataDefinition	-	х	-		
Dataset (Clause 11)	S12	GetDataSetValues	-	х	-		
	S13	SetDataSetValues	-	-	-		
	S14	CreateDataSet	-	-	-		
	S15	DeleteDataSet	-	-	-		
	S16	GetDataSetDirectory	-	х	-		
Substitution (Clause 12)	S17	SetDataValues	-	-	-		
Setting group control	S18	SelectActiveSG	-	-	-		
(Clause 13)	S19	SelectEditSG	-	-	-		
	S20	SetSGValues	-	-	-		
	S21	ConfirmEditSGValues	-	-	-		
	S22	GetSGValues	-	-	-		
	S23	SetSGCBValues	-	-	-		
Reporting (Clause 14)							

ACSI service conformance statement			Client/ Subscriber	Server/ Publisher	Value/Comments
Buffered report	S24	Report	-	-	-
(BRCB)	S24-1	data-change (dchg)	-	-	-
	S24-2	qchg-change (qchg)	-	-	-
	S24-3	data-update (dupd)	-	-	-
	S25	GetBRCBValues	-	-	-
	S26	SetBRCBValues	-	-	-
Unbuffered report	S27	Report	-	x	-
control block (URCB)	S27-1	data-change (dchg)	-	x	-
	S27-2	qchg-change (qchg)	-	x	-
	S27-3	data-update (dupd)	-	x	Supported (However, there is no process data to report for this condition)
	S28	GetURCBValues	-	х	-
	S29	SetURCBValues	-	х	-
Logging (Clause 14)					
Log control block	S30	GetLCBValues	-	-	-
	S31	SetLCBValues	-	-	-
Log	S32	QueryLogByTime	-	-	-
	S33	QueryLogAfter	-	-	-
	S34	GetLogStatusValues	-	-	-
Transmission of samp	led value model (SVC	C) (Clause 16)			
Multicast SVC	S45	SendMSVMessage	-	-	-
	S46	GetMSVCBValues	-	-	-
	S47	SetMSVCBValues	-	-	-
Unicast SVC	S48	SendUSVMessage	-	-	-
	S49	GetUSVCBValues	-	-	-
	S50	SetUSVCBValues	-	-	-
Control (Clause 17)	S51	Select	-	x	-
	S52	SelectWithValue	-	х	-
	S53	Cancel	-	х	-
	S54	Operate	-	х	-
	S55	Command-termination	-	х	-
	S56	TimeActivated-operate	-	-	-
File transfer	S57	GetFile	-	-	-
(Clause 20)	S58	SetFile	-	-	-
	S59	DeleteFile	-	-	-
	S60	GetFileAttributeValues	-	-	-
Time (Clause 18)	T1	Time resolution of internal clock	-	X	3 (Time Synchronization Protocol)
	T2	Time accuracy of internal clock	-	x	T1
	Т3	Supported Timestamp resolution	-	x	0

Model Implementation Conformance Statement

What's in This Chapter

Supported Models	50
Logical Node	50

Introduction

The Model Implementation Conformance Statement (MICS) is defined by IEC 61850-7-3 and IEC 61850-7-4, and provides the following specifications:

- · Logical nodes, used to model substation devices and functions.
- Common data classes and common data attribute classes used in the logical nodes.

The data requirements are rated as follows:

- M: Mandatory
- O: Optional
- C: Conditional
- E: Extension
- X: Supported

Supported Models

The supported models are IFE interface, EIFE interface, and IFE server, with the MasterPacT MTZ circuit breaker connected to an ULP port of the IFE server.

Logical Node

System Logical Nodes (L Group)

Physical Device Information (LPHD) Class

Attribute name	Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName	Object name	LPHD	М	х
PhyNam	DPL	Physical device name plate	Μ	х
PhyHealth	ENS	Physical device health	М	х
Proxy	SPS	Indicates if this LN is a proxy	Μ	х

Logical Node Zero (LLN0) Class

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	LLN0	М	х
Common logical node	Mod	ENC	Mode	Μ	х
mormation	Beh	ENS	Behaviour	Μ	Х
	Health	ENS	Health	М	х
	NamPlt	LPL	Name plate	М	х
	LocKey	SPS	Local operation for complete LD	0	х
	Loc	SPS	Local control behaviour	0	х

Metering and Measurement Logical Nodes (M Group)

Harmonics (MHAI) Class

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	MHAI1	М	х
Common logical node information	Beh	ENS	Behaviour	М	x
Measured or	Hz	MV	Basic frequency	С	х
calculated values	ThdA	WYE	Current total harmonic or interharmonic distortion	0	X
	ThdPPV	DEL	Phase to phase voltage total harmonic or interharmonic	0	x

Metering (MMTR) Class

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50	
LNName		Object name	MMTR1	М	х	
Common logical node information	Beh	ENS	Behaviour	М	х	
Measured or	TotVAh ⁽¹⁾	BCR	Net apparent energy	0	х	
calculated values	TotWh ⁽¹⁾	BCR	Net real energy	0	х	
	TotVarh ⁽¹⁾	BCR	Net reactive energy	0	х	
(1) Values accumulated since last reset.						

Measurement (MMXU) Class

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	MMXU1	М	х
Common logical node information	Beh	ENS	Behaviour	М	x
Measured or	TotW	MV	Total real power	0	х
	TotVAr	MV	Total reactive power	0	х
	TotVA	MV	Total apparent power	0	х
	TotPF	MV	Average power factor	0	х
	Hz	MV	Power system frequency	0	x
	PPV	DEL	Phase to phase voltages, ENCluding angles	0	X
	А	WYE	Phase currents	0	х
	W	WYE	Phase active power	0	х
	VAr	WYE	Phase reactive power	0	х
	VA	WYE	Phase apparent power	0	х
	PF	WYE	Phase to ground power factor	0	x
	ClcMth ⁽¹⁾	ENG	Calculation method ⁽¹⁾	С	
(1) The calculation meth	od is unspecified and cann	ot be changed.			

Generic Reference Logical Nodes (G Group)

Generic Process I/O (GGIO1 – IO Module1)

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	GGIO1	М	х
Common logical node	Mod	ENC	Mode	М	Х
Information	Beh	ENS	Behaviour	М	х
Functional attributes	SPCS01	SPC	Single point controllable status output	0	X
	SPCS02	SPC	Single point controllable status output	0	X
	SPCS03	SPC	Single point controllable status output	0	X
	Ind1	SPS	General indication (binary input)	0	X
	Ind2	SPS	General indication (binary input)	0	X
	Ind3	SPS	General indication (binary input)	0	X
	Ind4	SPS	General indication (binary input)	0	X
	Ind5	SPS	General indication (binary input)	0	X
	Ind6	SPS	General indication (binary input)	0	x
	AnIn1	MV	Analog input	0	x

Generic Process I/O (GGIO2 – IO Module2)

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	GGIO2	М	х
Common logical node	Mod	ENC	Mode	М	х
Information	Beh	ENS	Behaviour	М	х
Functional attributes	SPCS01	SPC	Single point controllable status output	0	x
	SPCS02	SPC	Single point controllable status output	0	x
	SPCS03	SPC	Single point controllable status output	0	х
	Ind1	SPS	General indication (binary input)	0	x
	Ind2	SPS	General indication (binary input)	0	x
	Ind3	SPS	General indication (binary input)	0	х
	Ind4	SPS	General indication (binary input)	0	х
	Ind5	SPS	General indication (binary input)	0	х
	Ind6	SPS	General indication (binary input)	0	x
	AnIn1	MV	Analog input	0	x

Generic Process I/O (GGIO3 – M2C Programmable Contact)

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	GGIO3	М	х
Common logical node	Mod	ENC	Mode	М	х
Information	Beh	ENS	Behaviour	М	х
Functional attributes	SPCS01	SPC	Single point controllable status output	0	x
	SPCS02	SPC	Single point controllable status output	0	x

Generic Process I/O (Ext_GGIO1 - External Inputs and Outputs (Chassis Position Status))

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50		
LNName		Object name	Ext_GGIO1	М	х		
Common logical node	Beh	ENS	Behaviour	М	х		
Information	Mod	ENC	Mode	С	х		
	ChassisPos ⁽¹⁾	ENS	Chassis Status Input	0	х		
(1) For more details on the extended data object, refer ENUM Type Extensions, page 62 table.							

Supervisory Control Logical Node (C Group)

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	CSWI1	М	х
Common logical node information	Beh	ENS	Behaviour	М	Х
Functional attributes	Pos	DPC	Double point control label status output	Μ	х
	Loc	SPS	Single point status	0	х

Switchgear Logical Node (X Group)

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	XCBR1	М	х
Common logical node information	Beh	ENS	Behaviour	М	x
Functional attributes	Pos	DPC	Double point control label status output	Μ	x
	Loc	SPS	Single point status	0	х
	OpCnt	INS	Operation counter	М	х
	RTC ⁽¹⁾	SPS	Single point status/ Ready to close	E	x
	BlkOpn	SPC	Single point controllable status output	Μ	x
	BlkCls	SPC	Single point controllable status output	М	x
(1) Extended data objec	t.				

Protection Function Logical Node (P Group)

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A51L_PTOC1/Long time overcurrent protection	Μ	х
Common logical node information	Beh	ENS	Behaviour	М	х
Functional attributes	Ор	ACT	Operate/Protection activation information	Μ	Х
	Str	ACD	Start/Direction protection activation information	Μ	x

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A51S_PTOC1/Short time overcurrent protection	М	x
Common logical node information	Beh	ENS	Behaviour	М	х
Functional attributes	Ор	ACT	Operate/Protection activation information	М	х
	Str	ACD	Start/Direction protection activation information	Μ	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A51G_PTOC1/Ground fault protection	Μ	x
Common logical node information	Beh	ENS	Behaviour	Μ	x
Functional attributes	Ор	ACT	Operate/Protection activation information	М	x
	Str	ACD	Start/Direction protection activation information	М	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A51G_PTOC2/Earth leakage protection	М	x
Common logical node information	Beh	ENS	Behaviour	М	x
Functional attributes	Ор	ACT	Operate/Protection activation information	М	x
	Str	ACD	Start/Direction protection activation information	М	x

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A67_PTOC1/Directional time overCurrent protection	М	x
Common logical node information	Beh	ENS	Behaviour	М	х
Functional attributes	Ор	ACT	Operate/Protection activation information	М	х
	Str	ACD	Start/Direction protection activation information	М	x

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A50_PIOC1/ Instantaneous protection	Μ	x
Common logical node information	Beh	ENS	Behaviour	Μ	х
Functional attributes	Ор	ACT	Operate/Protection activation information	Μ	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A32_PDOP1/Directional Overpower Protection	Μ	x
Common logical node information	Beh	ENS	Behaviour	М	x
Functional attributes	Ор	ACT	Operate/Protection Activation Information	М	x
	Str	ACD	Start/Direction Protection Activation Information	М	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A81_PTUF1/ Underfrequency protection	М	x
Common logical node information	Beh	ENS	Behaviour	М	х
Functional attributes	Ор	ACT	Operate/Protection activation information	М	х
	Str	ACD	Start/Direction protection activation information	Μ	x

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A81_PTOF1/ Overfrequency protection	Μ	х
Common logical node information	Beh	ENS	Behaviour	М	Х
Functional attributes	Ор	ACT	Operate/Protection activation information	М	Х
	Str	ACD	Start/Direction protection activation information	М	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A27_PTUV1/ Undervoltage-1 Protection	М	x
Common logical node information	Beh	ENS	Behaviour	М	х
Functional attributes	Ор	ACT	Operate/Protection activation information	0	х
	Str	ACD	Start/Direction protection activation information	М	Х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A27_PTUV2/ Undervoltage-2 protection	М	x
Common logical node information	Beh	ENS	Behaviour	М	х

MasterPacT MTZ with MicroLogic X Control Units – IEC 61850 Communication

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
Functional attributes	Ор	ACT	Operate/Protection activation information	0	Х
	Str	ACD	Start/Direction protection activation information	Μ	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A59_PTOV1/Overvoltage- 1 Protection	Μ	х
Common logical node information	Beh	ENS	Behaviour	Μ	х
Functional attributes	Ор	ACT	Operate/Protection activation information	0	х
	Str	ACD	Start/Direction protection activation information	Μ	х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	A59_PTOV2/Overvoltage- 2 protection	Μ	x
Common logical node information	Beh	ENS	Behaviour	М	х
Functional attributes	Ор	ACT	Operate/Protection activation information	0	х
	Str	ACD	Start/Direction protection activation information	М	Х

Attribute name		Attribute type	Description/Value	M/O/C/E	See Supported Models, page 50
LNName		Object name	PTRC1–Protection Trip Conditioning	М	x
Common logical node information	Beh	ENS	Behaviour	М	x
Functional attributes	Ор	ACT	Operate/Protection activation information	С	x
	Tr	ACT	Protection trip conditioning for PTRC	С	x

Common Data Attributes Classes

The following tables list the fields found in each common data attribute class. The field descriptions are as follows:

- M: Mandatory fields
- O: Optional fields
- C: Conditional fields

Timestamp

Attribute name	Attribute type	Value/Rrange	M/O/C	Comments
SecondsSinceEpoch	INT32	(0MAX)	М	-
FractionOfSecond	INT24U	Default: 0	М	Default
TimeQuality	TimeQuality	See TimeQuality table below	М	Default

TimeQuality

Attribute name	Attribute type	Value/Range	M/O/C	Comments
LeapSecondsKnown	Boolean	Default: false	М	Supported
ClockFailure	Boolean	Default: false	М	Default
ClockNotSynchronized	Boolean	Default: false	М	Supported
TimeAccuracy	Coded Enum	1ms-T1	М	Default

Quality

Attribute name	Attribute type	Value/Range	M/O/C	Comments
validity	Packed list	Good/Invalid/Questionable	М	Supported
	Coded enum			
detailQual	Packed list	-	М	Supported
- overflow	Boolean	Default: False	М	Default: False
- outOfRange	Boolean	True/False	М	Default: False
- badReference	Boolean	True/False	М	Default: False
- oscillatory	Boolean	True/False	М	Default: False
- failure	Boolean	True/False	М	Default: False
- oldData	Boolean	True/False	М	Default: False
- inconsistent	Boolean	True/False	М	Default: False
- inaccurate	Boolean	True/False	М	Default: False
source	Coded enum	Process/Substituted	М	Default: Process
		Default: False		
test	Boolean	True/false	М	Default: False
operatorBlocked	Boolean	True/false	М	Default: False

Vector

Attribute name	Attribute type	Value/Range	M/O/C	Comments
mag	AnalogValue	Analog value	М	-

Operate Configuration

Attribute name	Attribute type	Value/Range	M/O/C	Comments
ctlVal	Boolean	-	М	-
origin	Originator	-	М	-
ctlNum	INT8U	-	М	-
Т	Timestamp	-	0	-
Test	Boolean	-	0	-
Check	Check	-	0	-

Operate Configuration 2

Attribute name	Attribute type	Value/Range	M/O/C	Comments
ctlVal	INT32	-	М	-
origin	Originator	-	М	-
ctlNum	INT8U	-	М	-
Т	Timestamp	-	0	-
Test	Boolean	-	0	-
Check	Check	-	0	-

Analog Value

Attribute name	Attribute type	Value/Range	M/O/C	Comments
f	Float32	Floating point value	С	-

Originator

Attribute name	Attribute type	Value/Range	M/O/C	Comments
orCat	ENUM	Refer to IEC 61850-7-3 standard	М	-
orldent	Octet String64		Μ	-

Unit

Attribute name	Attribute type	Value/Range	M/O/C	Comments
SIUnit	Enum	Refer to IEC 61850-7-3 standard	М	-
multiplier	Enum	Refer to IEC 61850-7-3 standard	0	Default :1

Sub-Data Attributes

CtlModel Value

Attribute name	Supported/Not Supported
status-only	Supported
direct-with-normal-security	Supported
sbo-with-normal-security	Supported
direct-with-enhanced-security	Not Supported
sbo-with-enhanced-security	Supported

Common Data Classes

The following tables list the fields found in each common data attribute class. The field descriptions are as follows:

- M: Mandatory fields
- O: Optional fields
- C: Conditional fields

Single Point Status (SPS)

Attribute name	Attribute type	FC	M/O/C	Comments
stVal	Boolean	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-
d	Visible string 255	DC	0	-

Integer Status (INS)

Attribute name	Attribute type	FC	M/O/C	Comments
stVal	INT32	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-

Enumerated Status (ENS)

Attribute name	Attribute type	FC	M/O/C	Comments
stVal	Enumerated	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-

Binary Counter Reading (BCR)

Attribute name	Attribute type	FC	M/O/C	Comments
actVal	Int64	ST	Μ	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-
units	Unit	CF	0	-
pulsQty	Float32	CF	Μ	Default:1

Measured Value (MV)

Attribute name	Attribute type	FC	M/O/C	Comments
mag	AnalogVal	MX	М	-
q	Quality	MX	М	-
t	Timestamp	MX	М	-
units	Unit	CF	0	Read only
db	Int32U	CF	0	Supported range 1 to 100 (Integer) If the db value is configured to a value > 100, then it will be considered as 0.
d	Visible string 255	DC	0	-

Complex Measured Value (CMV)

Attribute name	Attribute type	FC	M/O/C	Comments
cVal	Vector	MX	М	-
q	Quality	MX	М	-
t	Timestamp	MX	М	-
units	Unit	CF	0	-
db	Int32U	CF	0	-

WYE (WYE)

Attribute name	Attribute type	FC	M/O/C	Comments
phsA	CMV	-	С	-
phsB	CMV	-	С	-
phsC	CMV	-	С	-
neut	CMV	-	С	-
net	CMV	-	С	-

Delta (DEL)

Attribute name	Attribute type	FC	M/O/C	Comments
phsAB	CMV	-	С	-
phsBC	CMV	-	С	-
phsCA	CMV	-	С	-

Controllable Single Point (SPC)

Attribute name	Attribute type	FC	M/O/C	Comments
stVal	Boolean	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-
Oper	Operate	СО	М	-
ctlVal	Boolean	СО	М	-
ctlModel	CtlModel	CF	М	Default: Direct with normal security
cancel	Boolean	СО	М	-

Controllable Enumerated Status (ENC)

Attribute name	Attribute type	FC	M/O/C	Comments
stVal	Int8	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-
ctlModel	CtlModels	CF	М	Default: Read only

Logical Node Name Plate (LPL)

Attribute name	Attribute type	FC	M/O/C	Comments
vendor	Visible string 255	DC	М	-
serNum	Visible string 255	DC	0	-

Logical Node Name Plate (LPL) (Continued)

Attribute name	Attribute type	FC	M/O/C	Comments
model	Visible string 255	DC	0	-
location	Visible string 255	DC	С	-

Directional Protection Activation Information (ACD)

Attribute name	Attribute type	FC	M/O/C	Comments
general	Boolean	ST	Μ	-
dirGeneral	Enumerated (Int8)	ST	Μ	-
q	Quality	ST	Μ	-
t	Timestamp	ST	Μ	-

Protection Activation Information (ACT)

Attribute name	Attribute type	FC	M/O/C	Comments
general	Boolean	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-

Logical Node Name Plate (LPL)

Attribute name	Attribute type	FC	M/O/C	Comments
vendor	Visible string 255	DC	Μ	-
swRev	Visible string 255	DC	Μ	-
configRev	Visible string 255	DC	С	-
ldNs	Visible string 255	EX	С	-

Device Name Plate (DPL)

Attribute name	Attribute type	FC	M/O/C	Comments
vendor	Visible string 255	DC	Μ	-
swRev	Visible string 255	DC	0	-
model	Visible string 255	DC	0	-
location	Visible string 255	EX	0	-

Double Point Status Contact (DPC)

Attribute name	Attribute type	FC	M/O/C	Comments
stVal	Coded Enum	ST	М	-
q	Quality	ST	М	-
t	Timestamp	ST	М	-
Oper	Operate	со	М	-
ctlVal	Boolean	со	М	-
ctlModel	CtlModel	CF	Μ	-
cancel	Boolean	СО	М	-
sboClass	sboclassess	CF	С	-
Timeout	Int32U	CF	Μ	Default: 120000
orgin	orginator	ST	С	-
ctlNum	Int8U	ST	С	-

Logical Nodes Per Device Type

Logical node	IFE interface	EIFE interface	IFE server with firmware version ≥ V005.001.000
LLN0	х	х	Х
LPHD1	Х	Х	Х
CSWI1	Х	Х	Х
GGIO1	х	х	Х
GGIO2	Х	Х	Х
GGIO3	Х	х	Х
Ext_GGIO1	х	х	х
A51L_PTOC1	х	х	x
A51S_PTOC1	х	х	х
A51G_PTOC1	х	х	х
A51G_PTOC2	х	х	х
A67_PTOC1	Х	Х	х
A32_PDOP1	х	х	х
A81_PTUF1	х	х	х
A81_PTOF1	х	х	х
A27_PTUV1	х	х	х
A27_PTUV2	х	х	х
A59_PTOV1	х	х	х
A59_PTOV2	х	х	х
A50_PIOC1	х	х	х
PTRC1	х	х	х
MMXU1	Х	х	Х
MMTR1	х	х	х
MHAI1	х	x	х
XCBR1	х	х	х

ENUM Type Extensions

Enumerated Type: New ENUM Description: For Ext_GGIO1, ChassisPos data object

Value	Description	Remarks
0	Position Discrepancy	-
1	Connected	-
2	Test	-
3	Disconnected	-

Enumerated Types

The following subsections specify the enumerations that are associated with some common data class attributes. The definition of the enumerations are according to IEC 61850-7-3 and IEC 61850-7-4 unless otherwise stated.

Enumerated Type: AddCause Description: Cause of the rejected command

Value	Description	Remarks
0	Unknown	-
1	Not-supported	-
2	Blocked-by-switching-hierarchy	-
3	Select-failed	-
4	Invalid-position	-
5	Position-reached	-
6	Parameter-change-in-execution	-
7	Step-limit	-
8	Blocked-by-Mode	-
9	Blocked-by-process	-
10	Blocked-by-interlocking	-
11	Blocked-by-synchrocheck	-
12	Command-already-in-execution	-
13	Blocked-by-health	-
14	1-of-n-control	-
15	Abortion-by-cancel	-
16	Time-limit-over	-
17	Abortion-by-trip	-
18	Object-not-selected	-
19	Object-already-selected	-
20	No-access-authority	-
21	Ended-with-overshoot	-
22	Abortion-due-to-deviation	-
23	Abortion-by-communication-loss	-
24	Blocked-by-command	-
25	None	-
26	Inconsistent-parameters	-
27	Locked-by-other-client	-

Enumerated Type: BehKind Description : Behaviour

Value	Description	Remarks	
1	on	-	
2	blocked	Not Supported	
3	test	Not Supported	
4	test/blocked	Not Supported	
5	off	-	

Enumerated Type: CtlModelKind Description : Control Model

Value	Description	Remarks
0	status-only	-
1	direct-with-normal-security	-
2	sbo-with-normal-security	-
3	direct-with-enhanced-security	Not Supported
4	sbo-with-enhanced-security	-

Enumerated Type: FaultDirectionKind Description: Direction

Value	Description	Remarks
0	unknown	-
1	forward	-
2	backward	-
3	both	-

Enumerated Type: HealthKind Description : Health

Value	Description	Remarks
1	Ok	-
2	Warning	-
3	Alarm	-

Enumerated Type: ModKind Description: Mode

Value	Description	Remarks	
1	on	-	
2	blocked	Not Supported	
3	test	Not Supported	
4	test/blocked	Not Supported	
5	off	-	

Enumerated Type: MultiplierKind Description : Exponents of the multiplier value in base 10

Value	Description	Remarks
-24	У	-
-21	Z	-
-18	а	-
-15	f	-
-12	р	-
-9	n	-
-6	μ	-
-3	m	-
-2	с	-
-1	d	-
0	-	-
1	da	-
2	h	-
3	k	-
6	Μ	-
9	G	-
12	Т	-
15	Р	-
18	E	-
21	Z	-
24	Υ	-

Enumerated Type: OriginatorCategoryKind Description : Ed2 IEC61850-7-2 defined

Value	Description	Remarks
0	not-supported	-
1	bay-control	-
2	station-control	-
3	remote-control	-
4	automatic-bay	-
5	automatic-station	-
6	automatic-remote	-
7	maintenance	-
8	process	Control commands with OrCat as process will be rejected.

Enumerated Type: SIUnitKind Description: SI Units derived from ISO/IEC 1000

Value	Description	Remarks
-16	years	-
-15	months	-
-14	weeks	-
-13	V/s	-
-12	mins	-

Enumerated Type: SIUnitKindDescription: SI Units derived from ISO/IEC 1000 (Continued)

Value	Description	Remarks
-11	hours	-
-10	days	-
-9	°F	-
-8	ratio	-
-7	miles	-
-6	inches	-
-5	feet	-
-4	df/dt	-
-2	%	-
-1	pu	-
1	-	-
2	m	-
3	kg	-
4	s	-
5	А	-
6	к	-
7	mol	-
8	cd	-
9	deg	-
10	rad	-
11	sr	-
21	Gy	-
22	Bq	-
23	°C	-
24	Sv	-
25	F	-
26	С	-
27	S	-
28	Н	-
29	V	-
30	ohm	-
31	J	-
32	Ν	-
33	Hz	-
34	lx	-
35	Lm	-
36	Wb	-
37	Т	-
38	W	-
39	Ра	-
41	m ²	-
42	m ³	-
43	m/s	-
44	m/s ²	-

Enumerated Type: SIUnitKindDescription: SI Units derived from ISO/IEC 1000 (Continued)

Value	Description	Remarks	
45	m³/s	-	
46	m/m ³	-	
47	Μ	-	
48	kg/m ³	-	
49	m²/s	-	
50	W/m K	-	
51	J/K	-	
52	ppm	-	
53	1/s	-	
54	rad/s	-	
55	W/m ²	-	
56	J/m ²	-	
57	S/m	-	
58	K/s	-	
59	Pa/s	-	
60	J/kg K	-	
61	VA	-	
62	Watts	-	
63	VAr	-	
64	phi	-	
65	cos(phi)	-	
66	Vs	-	
67	V ²	-	
68	As	-	
69	A ²	-	
70	A ² t	-	
71	VAh	-	
72	Wh	-	
73	VArh	-	
74	V/Hz	-	
75	Hz/s	-	
76	char	-	
77	char/s	-	
78	kgm²	-	
79	dB	-	
80	J/Wh	-	
81	W/s	-	
82	l/s	-	
83	dBm	-	

Profile Implementation Conformance Statement

Introduction

The Profile Implementation Conformance Statement (PICS) is defined by IEC 61850-8-1, and provides the following specifications:

- Mapping of the objects and services of the ACSI to MMS.
- Mapping of time-critical information exchanges to ISO/IEC 8802-3.

The data requirements are rated as follows:

- M: Mandatory
- O: Optional
- C: Conditional
- I: Out of scope
- X: Supported

Profile Conformance

A-Profile Support

Profile	Description	Client	Server	Comments
A1	Client/server	-	х	-
A2	GOOSE/GSE Management	-	-	-
A3	GSSE	-	-	-
A4	Time sync	Х	-	-

T-Profile Support

Profile	Description	Client	Server	Comments
T1	TCP/IP profile	-	х	-
T2	OSI T profile	-	х	-
Т3	GOOSE/GSE T profile	-	-	-
T4	GSSE T profile	-	-	-
Т5	Time sync T profile	-	-	-

MMS Conformance

MMS service supported CBB (server)	M/O/C/I	Supported
status	М	Х
getNameList	С	Х
identify	М	Х
rename	0	-
read	С	X
write	С	X
getVariableAccessAttributes	С	Х
defineNamedVariable	0	X
defineScatteredAccess	1	-
getScatteredAccessAttributes	1	-
deleteVariableAccess	0	-

MMS Conformance (Continued)

MMS service supported CBB (server)	M/O/C/I	Supported
defineNamedVariableList	0	-
getNamedVariableListAttributes	С	Х
defineNamedType	I	-
getNamedTypeAttributes	1	-
deleteNamedType	1	-
input	I	-
output	I	-
takeControl	I	-
relinquishControl	1	-
defineSemaphore	1	-
deleteSemaphore	I	-
reportPoolSemaphoreStatus	1	-
reportSemaphoreStatus	1	-
initiateDownloadSequence	I	-
downloadSegment	I	-
terminateDownloadSequence	I	-
initiateUploadSequence	I	-
uploadSegment	1	-
terminateUploadSequence	I	-
requestDomainDownload	I	-
requestDomainUpload	I	-
loadDomainContent	I	-
storeDomainContent	1	-
deleteDomain	1	-
getDomainAttributes	С	Х
createProgramInvocation	I	-
deleteProgramInvocation	I	-
start	1	-
stop	1	-
resume	1	-
reset	1	-
kill	1	-
getProgramInvocationAttributes	1	-
obtainFile	1	-
defineEventCondition	1	-
deleteEventContition	1	-
getEventConditionAttributes	1	-
reportEventConditionStatus	1	-
alterEventConditionMonitoring	1	-
triggerEvent	1	-
defineEventAction	1	-
deleteEventAction	1	-

MMS Conformance (Continued)

MMS service supported CBB (server)	M/O/C/I	Supported
alterEventEnrollment	1	-
reportEventEnrollmentStatus	1	-
getEventEnrollmentAttributes	1	-
acknowledgeEventNotification	1	-
getAlarmSummary	1	-
getAlarmEnrollmentSummary	1	-
readJournal	С	-
writeJournal	1	-
intializeJournal	С	-
reportJournalStatus	1	-
createJournal	I	-
deleteJournal		-
fileOpen	С	-
fileRead	С	-
fileClose	С	-
fileRename	I	-
fileDelete	С	-
fileDirectory	С	-
unsolicitedStatus		-
informationReport	С	Х
eventNotification	1	-
attachToEventCondition		-
attachToSemaphore	1	-
conclude	Μ	X
cancel	М	Х
getDataExchangeAttributes	С	-
exchangeData	С	-
defineAccessControlList	С	-
getAccessControlListAttributes	С	-
reportAccessConrolledObjects	С	-
deleteAccessControlList	С	-
alterAccessControl	С	-
reconfigureProgramInvocation	С	-

SCL Conformance

SCL conformance		M/O/C	Supported
SCL.1	SCL file available for implementation (offline)	М	х
SCL.2	SCL file available from implementation (online)	0	-
SCL.3	SCL implementation reconfiguration supported online	0	-

Protocol Implementation Extra Information for Testing

Introduction

The Protocol Implementation Extra Information for Testing (PIXIT) of the IEC 61850 interface in MasterPacT MTZ IED is applicable with IFE or EIFE interface with firmware version \geq V004.001.000 and IFE server with firmware version \geq V005.001.000.

The PIXIT forms the basis for a conformance test together with the PICS and the MICS according to IEC 61850-10. The PIXIT entries contains information which is not available in the PICS, MICS, TICS documents, or SCL file.

The following tables below specifies the PIXIT for applicable ACSI service model as structured in IEC 61850-10.

ACSI Service Models

Documentation

ID	Edition	Description	Value/Clarification
Do1	2	How to expose the required firmware version(s) when not present in the data model?	LD0/LLN0/NamPlt/swRev [DC]

Association Model

ID	Edition	Description	Value/Clarification
As1	1	Maximum number of clients that can set-up an association simultaneously	4
As2	1,2	TCP_KEEPALIVE value	20 s The recommended range is 120 s
As3	1,2	Lost connection detection time	3 retries * 20 s = 60 s
As4	-	Authentication is not supported yet	Yes
As5	1,2	What association parameters are necessary for successful association?	 Transport selector - Yes Session selector - Yes Presentation selector - Yes AP Title - Yes AE Qualifier - Yes
As6	1,2	If association parameters are necessary for association, describe the correct values	 Transport selector - 0001 Session selector - 0001 Presentation selector - 00000001 AP Title - 1,3,9999,33 AE Qualifier - 1
As7	1,2	What is the maximum and minimum MMS PDU size?	Maximum size - 20480 Bytes Minimum size - 1024 Bytes
As8	1,2	What is the maximum start up time after a power supply interrupt?	MasterPacT MTZ IED start-up time including server function is at average 60 s
As9	1,2	Does this device function only as test equipment? (test equipment need not have a non-volatile configuration; but it cannot be part of the substation automation system)	No

Server Model

ID	Edition	Description	Value/Clarification
Sr1	1, 2	Which analogue value (MX) quality bits are supported (can be set by server)?	 Validity: Yes - Good Yes - Invalid No - Reserved Yes - Questionable No - Overflow No - Overflow No - Out of Range No - Bad Reference No - Bad Reference No - Oscillatory No - Failure No - Old Data No - Inconsistent No - Inaccurate Source: Yes - Process No - Substituted No - Test No - Operator Blocked
Sr2	1, 2	Which status value (ST) quality bits are supported (can be set by server)?	 Validity: Yes - Good Yes - Invalid No - Reserved No - Questionable No - Bad Reference No - Bad Reference No - Oscillatory No - Failure No - Old Data No - Inconsistent No - Inaccurate Source: Yes - Process No - Substituted No - Test No - Operator Blocked
Sr3	-	What is the maximum number of data object references in one GetDataValues request?	Deprecated
Sr4	-	What is the maximum number of data object references in one SetDataValues request?	Deprecated
Sr5	1 6:2009 clause 9 5	Which Mode values are supported? ⁽¹⁾ 6 states that, if only a subrance of the enumeration value	On - Yes [On-] Blocked - No Test - No Test/Blocked - No Off - Yes e set is supported, this shall be indicated within an
ICD file by an enumeration type, where the unsupported values are missing.			
Dataset Model

ID	Edition	Description	Value/Clarification
Ds1	1	What is the maximum number of data elements in one dataset (compare ICD setting)?	Maximum attributes = 100
Ds2	1	How many persistent datasets can be created by one or more clients (this number includes predefined datasets)?	Not supported
Ds3	1	How many non-persistent datasets can be created by one or more clients?	Not supported

Reporting Model

ID	Edition	Description	Value/Clarification
Rp1	1	Supported trigger conditions (compare PICS)	Integrity - Yes
			Data change - Yes
			Quality change - Yes
			Data update - Yes ⁽¹⁾
			General interrogation - Yes
Rp2	1	The supported optional fields are	Sequence-number - Yes
			Report-time-stamp - Yes
			Reason-for-inclusion - Yes
			Data-set-name - Yes
			Data-reference - Yes
			Buffer-overflow - No
			EntryID - No
			Conf-rev - Yes
			Segmentation - No
Rp3	1, 2	Can the server send segmented reports? (when not supported it is allowed to refuse an association with a smaller than minimum PDU size)	No
Rp4	1, 2	Mechanism on second internal data change notification of the same analogue data value within buffer period (Compare IEC 61850-7-2 \$17.2.2.9)	Send report immediately
Rp5	1	Multi-client URCB approach (compare IEC 61850-7- 2:2003 \$14.2.1)	Each URCB is visible to one client only
Rp6	-	What is the format of EntryID?	Not applicable
Rp7	1, 2	What is the buffer size for each BRCB or how many reports can be buffered?	Not applicable
Rp8	-	Preconfigured RCB attributes that are dynamic, Compare SCL report settings	
Rp9	1	May the reported dataset contain:	
		- structured data objects?	Yes
		- data attributes?	Yes
Rp10	1, 2	What is the scan cycle for binary events?	300ms
		Is this fixed, configurable?	Fixed
Rp11	1	Does the device support to pre-assign a RCB to a specific client in the SCL?	No
Rp12	2	After restart of the server, is the value of ConfRev restored from the original configuration or retained	Retained prior to restart
		prior to restart?	Default: 1

Reporting Model (Continued)

ID	Edition	Description	Value/Clarification	
Rp13	1,2	Does the server accept any client to configure or enable a BRCB with ResvTms =-1?	Not applicable	
		What fields are used to do the identification?	AP-Title YN (Not Applicable)	
			AE-Qualifier Y/N (Not Applicable)	
			<other field=""> Y/N (Not Applicable)</other>	
Rp14	1,2	When BRCB.ResvTms is exposed? what is the default value for BRCB.ResvTms if client does not write (must be > 0)	Not applicable	
		OR	Millionendo en Niet en disebie	
		When BRCB.ResvTms is not exposed, what is the internal reservation time (must be ≥ 0)	NOTE: Both cannot be Not applicable	
(1) Supported, but not updated by the process.				

Control Model

ID	Edition	Description	Value/Clarification
Ct1	1	What control models are supported?	DOns: Yes
		(compare ICD file enums for Ed2)	SBOns: Yes
			DOes: No
			SBOes: Yes
Ct2	1, 2	Is the control model fixed, configurable and/or dynamic?	Fixed for SPC and configurable for DPC (Breaker-Manual in SCL)
Ct3	-	Is TimeActivatedOperate supported? (compare PICS or SCL)	Not applicable
Ct4	-	Is operate-many supported? (compare sboClass)	Deprecated see sboClass in datamodel (ICD) (Not applicable)
Ct5	1	Will the DUT activate the control output when the test attribute is set in the SelectWithValue and/or Operate request (when N test procedure Ctl2 is applicable)?	Not applicable
Ct6	-	What are the conditions for the time (T) attribute in the SelectWithValue and/or Operate request?	Deprecated
Ct7	-	Is pulse configuration supported (compare pulseConfig)?	Deprecated
Ct8	1	What is the behaviour of the DUT when the check conditions are set?	Synchrocheck - No
			Interlock-check - No
			DUT ignores the check value and the command is executed as usual.
		changeable?	Fixed
Ct9	1,2	Which additional cause diagnosis are supported?	Yes - Unknown
			Yes - Not-supported
			Yes - Blocked-by-switching-hierarchy
			Yes - Select-failed
			No - Invalid-position
			Yes - Position-reached
			No - Step-limit
			Yes - Blocked-by-Mode
			No - Blocked-by-process
			No - Blocked-by-interlocking

Control Model (Continued)

ID	Edition	Description	Value/Clarification
			No - Blocked-by-synchrocheck
			Yes - Command-already-in-execution
			Yes - Blocked-by-health
			No - 1-of-n-control
			No - Abortion-by-cancel
			No - Time-limit-over
			Yes - Abortion-by-trip
			Yes - Object-not-selected
			Edition 1 specific values:
			No Parameter-change-in-execution (PCIE Edition1 semantics)
			Edition 2 specific values:
			Yes - Object-already-selected
			Yes - No- access - authority
			No - Ended-with-overshoot
			No - Abortion-due-to-deviation
			No - Abortion-by-communication-loss
			Yes - Blocked-by-command
			No - None
			Yes - Inconsistent-parameters
			Yes - Locked-by-other-client
			No - Parameter-change-in-execution (PCIE Edition2 semantics)
Ct10	1,2	How to force a test-not-ok respond with SelectWithValue request?	Not applicable
Ct11	1,2	How to force a test-not-ok respond with Select request?	Not Applicable
Ct12	1,2	How to force a test-not-ok respond with Operate	DOns: Put the device in Local Mode
		request?	SBOns: idem
			DOes: Not applicable
			SBOes: idem
Ct13	1,2	Which origin categories are supported or accepted?	Yes - Bay-control
			Yes - Station-control
			Yes - Remote-control
			Yes - Automatic-bay
			Yes - Automatic-station
			Yes - Automatic-remote
			Yes - Maintenance
			Yes - Process
Ct14	1,2	What happens if the orCat value is not supported or invalid?	DOns: Control command is rejected
			SBOns: Control command is rejected
			DOes: Not applicable
			SBOes: Control command is rejected

Control Model (Continued)

ID	Edition	Description	Value/Clarification
Ct15	1,2	Does the IED accept a SelectWithValue or operate	DOns: Yes
		value?	SBOns: Yes (Addcause PosRch)
			DOes: Not applicable
			SBOes: Yes (Addcause PosRch)
		Is this behaviour configurable	
			Configurable: No
Ct16	1,2	Does the IED accept a select or operate on the same	DOns: Yes (default Y)
		time?	SBOns: No (default N)
			DOes: Not applicable (default Y)
			SBOes: No (default Y)
Ct17	1	Does the IED accept a Select/SelectWithValue from	SBOns: Yes
		the same client when the control object is already selected (Tissue #334)?	SBOes: No
Ct18	1,2	Is for SBOes the internal validation performed during the SelectWithValue and/or Operate step?	Yes
Ct19	-	Can a control operation be blocked by Mod=Off or [On-] Blocked (Compare PIXIT-Sr5]?	Deprecated
Ct20	1,2	Does the IED support local or remote operation?	Yes
Ct21	1,2	Does the IED send an Information report with	SBOns: Yes
		LastApplError as part of the Operate response- for control with normal security?	DOns: Yes
Ct22	2	How to force a parameter-change-in-execution?	SBOns: Not Applicable
			SBOes: Not Applicable
Ct23	1,2	How many SBOns or SBOes control objects can be selected at the same time?	SBOns: multiple (with more IFE or EIFE interface)
			SBOes: multiple (with more IFE server)
Ct24	1,2	Can a controllable object be forced to keep its old state for example, Internal Controllable Objects may not be accessible to force this, whereas a switch like circuit breaker outside the DLT can?	Yes
Ct25	12	When CDC=DPC is supported is it possible to have	No
0120	1,2	DPC (Controllable Double Point) go to the intermediate state (00)?	
Ct26	1,2	Name a control point (if any) with a finite operate	DOes: Not applicable
		timeout and specify the timeout (in milliseconds)	SBOes: LD0/CSWI.Pos (120000 ms)
Ct27	2	Does the IED support control objects with external signals?	DOns: Yes
			SBOns: Yes
			DOes: Not applicable
			SBOes: Yes
Ct28	-	-	Deprecated, kept as placeholder

Time Synchronization Model

ID	Edition	Description	Value/Clarification
Tm1,	1	What time quality bits are supported (may be set by the IED)?	Yes -LeapSecondsKnown Default: False
			Yes -ClockNotSynchronized
Tm2	1, 2	Describe the behaviour when all time server(s) cease to respond?	Set - ClockNotSynchronized after lost detection time

Time Synchronization Model (Continued)

ID	Edition	Description	Value/Clarification
		What is the time server lost detection time?	Maximum. 60 s
Tm3	1,2	How long does it take to take over the new time from time server?	Depends upon the time difference between internal and time server
			Maximum. 60 s from last sync
Tm4	1,2	When is the time quality bit Clock Failure set	Never set or set when Tested byor cannot be tested
Tm5	1	When is the time quality bit Clock not Synchronized set?	When connection to all time servers are lost
Tm6	-	Is the timestamp of a binary event adjusted to the configured scan cycle?	Deprecated
Tm7	1	Does the device support time zone and daylight saving?	Yes
Tm8	1,2	Which attributes of the NTP response packet are	Y/N - Leap indicator not equal to 3
		Validated :	Y/N - Mode is equal to SERVER
			Y/N - OriginateTimestamp is equal to value sent by the NTP client as Transmit Timestamp
			Y/N - RX/TX timestamp fields are checked for reasonableness
			Y/N - NTP version 3 and/or 4
			Y/N - other (describe)
Tm9	n9 1,2 Do the COMTRADE files have local time or UTC time?		Not applicable
		Is this configurable?	Not applicable

TISSUES Implementation Conformance Statement

Introduction

The TISSUES Implementation Conformance Statement (TICS) is required by UCA IUG QAP to perform conformance test.

The supported features are indicated as follows:

- Y: Implemented
- Na: Not applicable

Mandatory Interoperability (Intop) Issues

Implemented Intop TISSUES

Part	TISSUE	Description	Implemented
8-1	116	GetNameList with empty response?	Y
	165	Improper error response for GetDataSetValues	Y
	183	GetNameList error handling	Y
7-4	None		
7-3	28	Definition of APC	Na
	54	Point def xVal, not cVal	Na
	55	Ineut = Ires?	Na
	60	Services missing in tables	Na
	63	mag in CDC CMV	Y
	65	Deadband calculation of a vector and trigger option	Na
	219	operTm in ACT	Na
	270	WYE and DEL RMS values	Na
7-2	30	Control parameter T	Y
	31	Туро	Na
	32	Typo in syntax	Na
	35	Typo syntax control time	Na
	36	Syntax parameter Dset-Ref missing	Na
	37	Syntax GOOSE "T" type	Na
	39	Add DstAddr to GoCB	Na
	40	GOOSE Message AppID to GoID	Na
	41	GsCb ApplE to GolD	Na
	42	SV timestamp: EntryTime to TimeStamp	Na
	43	Control T semantic	Na
	44	AddCause - Object not sel	Na
	45	Missing AddCauses (neg range)	Na
	46	Synchro check cancel	Na
	47	"." in LD name?	Y
	49	BRCB TimeOfEntry (part of # 453)	Na

Part	TISSUE	Description	Implemented
	50	LLName start with number?	Y
	51	ARRAY [0num] missing	Y
	52	Ambiguity GOOSE SqNum	Na
	53	Add DstAddr to GsCB, SV	Na
	151	Name constraint for control blocks	Y
	166	DataRef attribute in Log	Na
	185	Logging - Integrity period	Na
	189	SV format	Na
	190	BRCB: EntryID and TimeOfEntry (part of #453)	Na
	191	BRCB: Integrity and buffering reports (part of #453)	Na
	234	New type CtxInt (Enumerated values are mapped to 8 bit integer)	Na
	275	Confusing statement on GI usage (part of #453)	Y
	278	EntryID not valid for a server (part of #453)	Y
6	1	Syntax	Na
	5	ExtensionAttributeNameEnum is restricted	Na
	8	SIUnit enumeration for W	Υ
	10	Base type for bitstring usage	Y
	17	DAI/SDI elements syntax	Na
	169	Ordering of Enumerated values differs from 7-3	Y

Implemented Intop TISSUES (Continued)

Optional Interoperability (Intop) Issues

Implemented Intop TISSUES

Part	TISSUE	Description	Implemented
8-1	235	Extension of name length	Y
	246	Control negative response (SBOns) with LastApplError	Na
	545	Skip file directories with no files	Na
7-2	333	Enabling of an incomplete GoCB	Na
	453	Combination of all reporting and logging issues	Na
6	245	Attribute RptId in SCL	Y
	529	Replace sev - Unknown by unknown	Na

Conformance Statements (Edition 2.0)

This appendix describes the conformity with IEC 61850 edition 2.0 communication standard. It does not describe the standard itself, only the details of the IEC 61850 implementation of the standard in MasterPacT MTZ IED in terms of services, modeling, exceptions, extensions, and adaptations are described.

The conformance is described in the following statements:

- Abstract Communication Services Interface (ACSI) conformance statement: Describes the abstract communication services interface (which services are implemented). These services are mapped to Specific Communication Services Model (SCSM) described in the Protocol Implementation Conformance Statement (PICS).
- Model Implementation Conformance Statement (MICS): Describes how the information model is implemented.
- Protocol Implementation Conformance Statement (PICS): Describes how the IEC 61850 standard is implemented.
- Protocol Implementation eXtra Information for Testing (PIXIT): Describes additional implementation-specific information not contained within the previous standard statements.
- TISSUES Implementation Conformance Statement (TICS): Describes technical issues that have been incorporated into our implementation of the IEC 61850 standard.

Schneider Electric 35 rue Joseph Monier 92500 Rueil Malmaison France

+ 33 (0) 1 41 29 70 00

www.se.com

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

© 2024 - Schneider Electric. All rights reserved.

DOCA0162EN-02