

Electrical network protection

CET850

IEC 61850 configuration software

User's manual
11/2017



Safety instructions

Safety symbols and messages

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 bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



ANSI symbol.



IEC symbol.

Risk of electric shock

The addition of either 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.



Safety alert

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.

Safety messages

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

Important notes

Restricted liability

Electrical equipment should be serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this manual. This document is not intended as an instruction manual for untrained persons.

Device operation

The user is responsible for checking that the rated characteristics of the device are suitable for its application. The user is responsible for reading and following the device's operating and installation instructions before attempting to commission or maintain it. Failure to follow these instructions can affect device operation and constitute a hazard for people and property.

Protective grounding

The user is responsible for compliance with all the existing international and national electrical codes concerning protective grounding of any device.

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CET850 is an advanced tool for configuring IEC 61850 communication. This manual presents how the IEC 61850 protocol is implemented in Schneider Electric devices, and explains how to use the CET850. For more information about the IEC 61850 protocol, please refer to the Sepam IEC 61850 communication user's manual (reference SEPED306024EN).

General

IEC 61850 is a standard for communication networks and systems in automated electric substations.

The following devices can be connected to an IEC 61850 station bus:

- G3200 Modbus-to-IEC 61850 servers
- PowerLogic ION Series 7000/8000 power meters
- Sepam series 20/40/60/80 protection relays

Sepam units can be connected to an IEC 61850 station bus with one of the following communication interfaces:

- the ECI850 Sepam server, for Sepam series 20, Sepam series 40, Sepam series 60, and Sepam series 80
- the ACE850 communication interface, for Sepam series 40, Sepam series 60, and Sepam series 80 only

Sepam units with ECI850 and ACE850 are compliant with:

- IEC 61850-6
- IEC 61850-7-1
- IEC 61850-7-2
- IEC 61850-7-3
- IEC 61850-7-4
- IEC 61850-8-1

Application and benefits

Based on the Ethernet protocol, the IEC 61850 communication standard ensures:

- high communication speeds and versatile communication architecture
- interoperability between manufacturers

ECI850 Sepam server

The ECI850 Sepam server provides a high-performance, cost-effective, and versatile solution for connecting Sepam units to an IEC 61850-compliant system.

The ECI850 Sepam server provides:

- compatibility with the whole Sepam range (series 20, 40, 60, and 80) to fit your needs perfectly
- ability to upgrade existing Sepam units to ensure the durability of your assets
- ability to connect up to 1 Sepam series 80 units to 1 ECI850, 2 Sepam series 60 units to 1 ECI850, or 3 Sepam series 40 units to 1 ECI850, or 5 Sepam series 20 units to 1 ECI850, ensuring a cost-effective solution
- IEC 61850 logical nodes and configurable data sets to fit the needs of your Scada system
- high-performance because the ECI850 is not a generic gateway but a data server dedicated to Sepam

ACE850 communication interface

The Sepam series 40, Sepam series 60, and Sepam series 80 fitted with the ACE850 communication interface provide a built-in solution for demanding IEC 61850 applications including:

- IEC 61850 logical nodes and configurable data sets to fit the needs of your Scada system
- peer-to-peer communication capabilities on Sepam series 60 and Sepam series 80 with GOOSE messages to enhance your protection and control system without additional wiring

G3200 Modbus-to-IEC 61850 server

The G3200 Modbus-to-IEC 61850 server enables the majority of Modbus communicating devices to be connected to an IEC 61850 station bus and benefit from advanced features such as efficient time management, meaningful and optimized data retrieval, and simultaneous support of devices over Modbus TCP.

The G3200 offers the following benefits:

- highly-accurate time-stamped data and associated time synchronization with the source,
- facilitated retrieval of meaningful information,
- enhanced security control model,
- optimized network bandwidth usage,
- easy integration into IEC 61850 systems,
- simultaneous support of Modbus TCP and IEC 61850, with the ability to connect legacy Modbus TCP-based tools in parallel with IEC 61850 communication.

Easy integration into IEC 61850 systems

The configuration files loaded in to the G3200 and corresponding Modbus devices are IEC 61850 compliant and so are easily manageable by any IEC 61850 system configuration tool.

Simultaneous support of Modbus TCP and IEC 61850

The G3200 not only provides the communication benefits offered by the IEC 61850 protocol, but also ensures inter-operability of these devices in a Modbus TCP system.

Implementation

Configuration tools

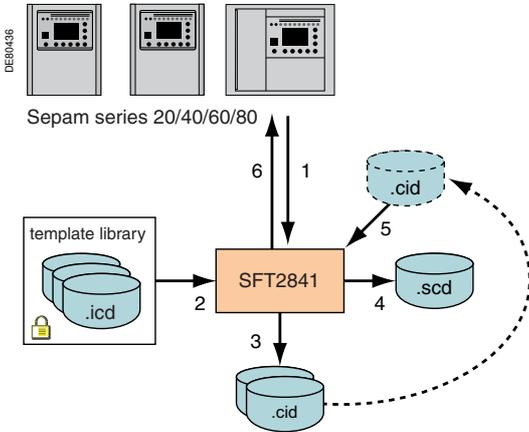
The Sepam IEC 61850 solution can be configured with either of the following software tools:

- The SFT2841 setting and operating software ensures straightforward configuration and builds standard IEC 61850 configuration files.
- The CET850 configuration tools adapt the communication profile of the devices to the precise needs of the system. The CET850 software tool is explained in this manual.
- The ION Meter setup tool configures the meter's communications.

Configuration files

The IEC 61850 configuration process uses and generates the following types of Substation Configuration Language (SCL) files:

SCL file	Explanation
ICD IED (Intelligent Electronic Device) Capability Description	An ICD file exists for each type of Sepam device. An ICD file describes the functions and communication data available in a Sepam. ICD files are provided in a library with SFT2841 and CET850 configuration tools, and are used as device models in the configuration process.
IID Instantiated IED Description	The IID file 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.
CID Configured IED Description	For every configured Sepam or ECI850 device there is a CID file. It describes the operating IEC 61850 configuration of the device. A CID file is created when a device is configured with the configuration tools. The CID file is then loaded into the device to configure it. A CID file for an ECI850 contains configuration information for all the Sepam devices to which it is connected.
SCD Substation Configuration Description	An IEC 61850 Substation Automation System has an SCD file. An SCD file contains configuration data for the IEC 61850 system and the communication configuration settings for all related IEC 61850 devices.



SCL files with SFT2841.

SFT2841 for standard Sepam IEC 61850 configuration

The Sepam setting and operating software, SFT2841, is used to produce a standard IEC 61850 configuration. The standard configuration enables the use of all the communication data of a Sepam without modification, as described in the ICD files.

The SFT2841 is used to:

- 1 Get the information from Sepam and ECI850 connected to the IEC 61850 network. This can be done manually by keying the Sepam description (name, type, address) or automatically by the SFT2841 polling the network to find connected devices.
- 2 Extract ICD files from the library to build a configuration based on the Sepam description.
- 3 Build a CID file as a result of the configuration for each Sepam or ECI850 connected to the IEC 61850 network. For an ECI850, it contains the configuration of all the Sepam connected to the ECI850.
- 4 Generate an SCD file for use by other IEC 61850 configuration tools. It contains the configuration of all Sepam and ECI850 connected to the IEC 61850 network.
- 5 Import a CID file into SFT2841 to modify it: for example to add or remove a Sepam in the IEC 61850 network topology.
- 6 Download a CID file into Sepam or ECI850 with SFT2841.

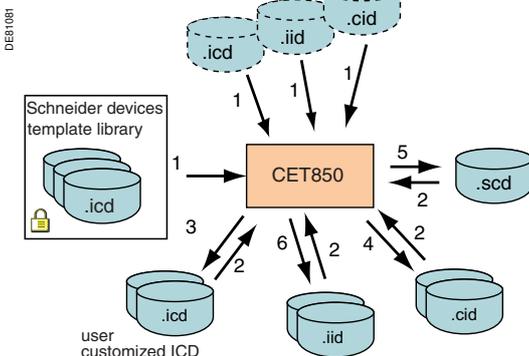
CET850 for advanced IEC 61850 configuration

IEC 61850 configuration software CET850 is used to create, display, modify, or optimize an IEC 61850 configuration.

The CET850 can be used to:

- 1 Create an IEC 61850 configuration using an ICD, or an IID, or a CID file as an input.
- 2 Edit an existing CID, SCD, IID, or user-customized ICD file to modify its contents by:
 - adding or removing a device
 - displaying the configuration
 - modifying communication parameter values
 - optimizing configuration by creating or modifying Datasets and Report Control Blocks
 - configuring or optimizing the GOOSE communication by creating or modifying the GOOSE messages production and subscription.
- 3 Generate a user-customized ICD file using a device IED template from the factory ICD library.
- 4 Generate a CID file for storing the configuration of one device which can then be downloaded to the device or ECI850 Sepam server using SFT2841 or by FTP with standard Internet browser software or G3200 generic server.
- 5 Generate an SCD file for storing the configuration of an IEC 61850 system which can then be used by other IEC 61850 configuration tools.
- 6 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.

Note: The CID or SCD file can come from the SFT2841. ICD Factory library templates for Schneider Electric devices can not be modified.



SCL files with CET850.

Introduction

On installation, the user is requested to register the software. A license number is needed in order to register.
If it is not registered, the software is installed in demonstration mode, for a trial period of 30 days.

Demonstration mode

In demonstration mode, all the software functions are available without restriction. The user is requested to register each time the software is run. At the end of the trial period of 30 days, it is no longer possible to run the software and it must be registered.

Registration methods

To register a running version of the software:

1. Click **Help > About CET850** in the menu bar.
2. Select the **License Agreement** tab.
3. Click the **Register Product** button.
4. Click **OK** on the message that warns about the expired evaluation period.
5. Click **Yes** to begin the Registration Wizard.

During registration, a wizard offers the user the following registration methods:

- requesting a license number
- transferring license rights
- entering a license number (code obtained by fax or E-mail)

Requesting a license number

The user can request a license number, as follows:

- using the Internet from the PC it is installed on
- using the Internet from another PC
- by telephone using the number given by the installation wizard
- by E-mail, using the address given by the installation wizard
- by fax, sent to the number given by the installation wizard

Transferring license rights

The rights for an existing license can be transferred using:

- a USB key
- another connected computer

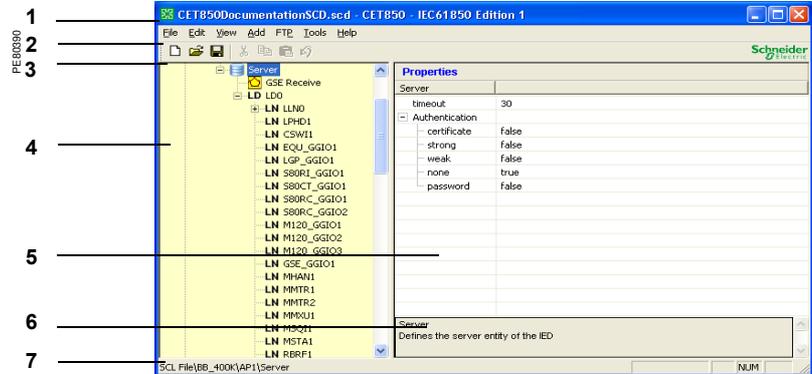
It is possible for the license rights to be transferred to another user from a different company.

Software version and licence agreement

To display the current version and the licence agreement of the running CET850 software, click **Help > About** in the menu bar.

The main window of CET850 enables the user to browse an SCL file using a tree view that displays the content of the file.

The main window contains the following parts:



1. Title bar
2. Menu bar
3. Toolbar
4. Tree view
5. Property view
6. Help area
7. Status bar

Title bar, menu bar, and toolbar

- The title bar displays the name of the open file and the IEC 61850 edition used to edit the file.

A star appears next to the file name when the file has been modified and not yet saved.

- The menu bar gives access to all functions of CET850.
- The toolbar gives access to main functions. Depending on use, some functions may be disabled and will appear in gray.

Display and editing area

The display and editing area is divided into 2 parts: on the left, the tree view with a yellow background, and on the right, the property view with white background.

Tree view

The tree view initially shows the highest level sections of the SCL file:

- Header and History
- Substation
- Communication
- IED sections
- Data Type template

These sections can then be expanded to obtain more details.

Only the sections present in the SCL file are shown. Furthermore, some sections may be hidden, depending on the display options set in the User Preferences.

Property view

The property view displays detailed information about the element selected from the tree view.

Editing

To edit an element, choose the **Edit** option from the menu bar. The user can also select an element and then choose an **Edit** option from the contextual menu. There are dialog boxes to guide the user when editing element information.

Help area

The help area is located at the bottom of the property view and above the status bar. It gives additional information about the element selected from the tree view or in the property view.

Status bar

The status bar is located at the bottom of the window. It gives information pertaining to the context or operation in progress.

An IEC 61850 system is represented as a hierarchical tree, which is constructed from the information defined in an SCL file. This tree is composed of different elements of different levels.

Click the  symbol in front of an element to expand it and see its sublevel or click the  symbol to hide its sublevel. Click any element of the tree to select it and to display the corresponding attributes in the property view.

There are 3 possible colors to display an element in the tree view:

- Black means that the element properties can be modified.
- Gray means that the element properties cannot be modified.
- Red means that the element has an error status.

Header

The Header section contains a History subsection. CET850 provides a specific function that allows the user to add an entry in the History subsection in order to track the modifications made to the file. Tracking is not done automatically by the software and must be handled by the user. See "Editing History", page 19.

Substation

The Substation section describes the functional structure of the electrical substation, identifies the primary devices and their electrical connections, and defines the system functionality by attaching Logical Nodes to primary equipment. This section deals with the system configuration only; it is optional in an SCD file and not relevant to a CID file.

By default, this section is hidden in the tree view. To display this section, set the relevant option in the CET850 User preferences. The section is displayed in gray because it is not editable with CET850.

Communication

The Communication section contains the definition of all subnetworks 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.

CET850 provides specific functions to:

- add or delete a subnetwork
- add or remove an IED on a subnetwork
- set or modify the communication parameters

IED sections

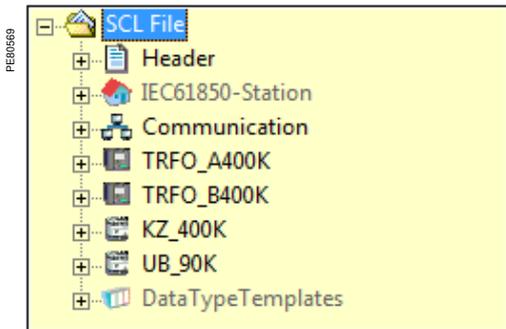
The IED sections contain the definition of all IEDs defined in the IEC 61850 system. Each IED is displayed with all its contents:

- Logical Devices (LD)
- Logical Nodes (LN)
- Datasets (DS)
- Report Control Blocks (RCB)
- Log Control Blocks (LCB)
- GOOSE Control Blocks (GCB)
- GOOSE Receive

Data Type templates

The Data Type template section provides a detailed description of the data types used by the IEDs defined in the configuration: Logical Node types, Data Object types, Data Attribute types, Enumeration types.

This section is intended for IEC 61850 experts and is hidden by default. To display this section, set the relevant option in the CET850 User preferences. The section is displayed in gray because it is not editable.



Main SCL file sections.

The content of the property view varies depending on the element selected from the tree view. There are 5 types of view:

- Standard property view
- History view
- Communication view
- Logical Node view
- GOOSE Receive view.

Standard property view

The standard property view is the most common. It is displayed whenever the user selects any element except Communication, Subnet or Logical Node.

The attributes of the selected element are displayed in a 2-column table. The first column contains the attribute's name and the second column contains the attribute's value.

To modify an attribute, right-click the attribute line and select **Modify** in the contextual menu.

PEB0393

Properties	
IED	
desc	IEC61850 server for Sepam devices
type	ECI850 Sepam server
name	UB_90K
manufacturer	Merlin Gerin
configVersion	1.0
+ Services	

Standard property view.

History view

The History view is displayed when the user selects the History element in the Header section. This table lists the history of the modifications done in the SCL file. Each History entry is displayed in a row. The associated attributes are displayed in columns.

To modify an attribute, right-click the History entry line and select **Modify** in the contextual menu.

PEB0392

Version	Revision	When	Who	What	Why
V1	0	2007-05-03	SFT850Config	Draft:1	
V1	1	2007-06-28	JMR	Draft 2: Added Goose CB for 2 TRFO IEDs	
V1	2	2007-07-02	JMR	Draft 3: Added Substation section (for test purpose)	

History view.

Communication view

The Communication view is displayed when a Communication or a Subnet element is selected.

The communication property view is divided into 2 parts:

- The upper part gives an overview of the **Client-Server communication**. All subnetworks are displayed with the connected IEDs and their communication parameters.
- The lower part gives an overview of the **GOOSE communication**. All subnetworks are displayed with the list of the IEDs that produce GOOSE messages. The multicast network addresses used to transmit GOOSE messages are displayed. To modify an attribute, right-click the attribute line and select **Modify** in the contextual menu. It is also possible to modify main attributes directly in the view.

PEB0799

Client Server Communication				
Name	IP address	Subnet mask	Gateway	
- CET850DefaultSubnet				
- TRFO_A400K	10.196.132.162	255.255.255.0	127.0.0.1	
- TRFO_B400K	10.196.132.163	255.255.255.0	127.0.0.1	

GOOSE Communication					
Subnet/IED/ID	GOOSE Control Block	Description	Dataset	Goose ID	MAC address
- CET850DefaultSubnet					
- TRFO_A400K	gcbBasicGse	Predefined GOOSE ControlBlock	BasicGseDr	CBatahuGse	01-0C-CD-01-00-00
- LDO					
- TRFO_B400K	gcbBasicGse	Predefined GOOSE ControlBlock	BasicGseDr	CBatahuGse	01-0C-CD-01-00-00
- LDO					

Communication view.

Logical Node view

The Logical Node view is displayed when the user selects a Logical Node element from the tree view.

The Logical Node view is divided into 2 parts.

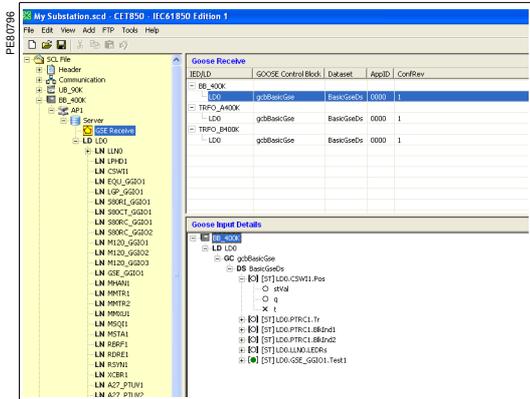
- The upper part is the same as the standard property view and gives the description of the Logical Node attributes.
- The lower part displays all the Data Objects (DOs) and Data Attributes (DAs) that are instantiated in the Logical Node. Each DO or DA is displayed in a row. The associated attributes are displayed in columns. Some attributes are editable: they are displayed in a colored cell. To modify the value of an editable attribute, click the colored cell and change the value.

PEB0395

Properties	
Logical Node: LLNO	
desc	General
InClass	LLNO
inst	
InType	LLNO_Sepam4080

Logical Node Details						
Name	Value	Description	FC	Flags	CDC	Type
LLNO		General			LLNO	LLNO_Sepam4080
+ Mod					INC	Mod_Sepam204080
+ Beh					INS	Beh_Sepam204080
+ Health					INS	Health_Sepam204080
+ NamPit					LPL	LplLLNO_Sepam204080
+ Loc					SPS	Sps_Sepam204080
+ LEDRs			transient		SPC	Spc_Sepam204080
+ CTFIt					SPS	SpsEx_Sepam204080
+ VTFIt					SPS	SpsEx_Sepam204080

Logical Node view.



GOOSE Receive view.

GOOSE Receive view

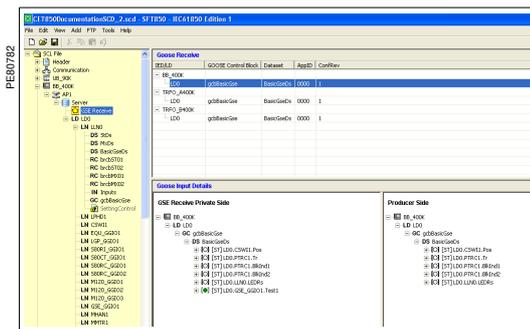
The GOOSE Receive view is displayed when the user selects the GOOSE Receive section of an IED from the tree view.

The GOOSE Receive property view is divided into 2 parts:

- The upper part gives the list of all GOOSE messages that are consumed by the IED (GOOSE input messages) with their description.
- The lower part gives a detailed view of the structure of the Dataset attached to the GOOSE message selected in the upper part.

Each Data Attribute (DA) contained in the dataset is displayed with a specific mark that indicates if it has been selected for subscription or not.

Mark	Meaning
	The Data Attribute (DA) is free and can be selected for subscription.
	The DA is selected for subscription.
	The structure contains at least 1 DA which is free and which can be selected for subscription.
	The structure contains at least 1 DA which is selected for subscription.
	The DA is not valid for subscription.
	The structure does not contain any DA valid for subscription.



GOOSE Receive Input Details view.

- The lower part can be divided into 2 when the structure of the Dataset attached to the GOOSE message in the Producer Side is different from the Receiver Side.
- The lower part is split into 2 when the structure of the Dataset in the Producer Side is different from the structure of the Dataset in the Private GOOSE Receive.

- The first column displays the content of the Private GOOSE Receive.
- The second column displays the content of the Dataset in the Producer Side.

CET850 provides 2 types of help:

- on-demand help
- automatic help

On-demand help

On-demand help is contextual help that applies to the elements displayed in the tree view and the property view, and to some dialog boxes for specific operations. It is activated by the F1 key (or by the **Help** menu), and by the **Help** button in dialog boxes.

This help text is based on the following PDF documents:

- CET850 User's manual (this manual)
- IEC 61850 Communication User's manual for Sepam
- IEC 61850 Modbus and ION Technology User guide

The help topics are displayed using the Acrobat Reader application, which is automatically launched by CET850.

The relevant page of the relevant PDF document is displayed depending on the element selected by the user from the tree view or the property view, and depending on the operation implemented within the dialog box.

Note: Adobe Acrobat Reader must be installed on the user's PC to display PDF documents.

Automatic help

When available, help topics are displayed automatically in the Help area at the bottom of the property view. They provide details about the selected element, regarding the IEC 61850 standard and its implementation by Schneider Electric devices.

Functions can be accessed through the:

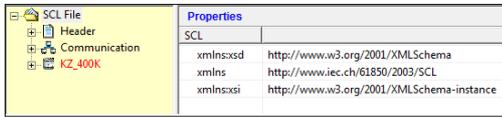
- menu bar
- toolbar
- contextual menu accessed by right-clicking an element in the tree view or the property view

The table below gives the different functions available for each menu in the Menu bar.

Menu	Function	Description	Toolbar icon	See
File				
	New	Create a new SCL file.		-
	Open	Open an existing SCL file. The file may be an SCD, a CID, an ICD, or an IID file.		-
	Close	Close the open SCL file.	-	-
	Save	Save the open SCL file.		-
	Save as	Save the open SCL file under chosen name and location.	-	-
	Validate	Check the XML syntax and the global consistency of the open file.	-	page 13
	Build all CID files	Generate all the CID files of the current SCL file.	-	page 13
	Build CID file	Generate the CID file of the selected IED.	-	page 13
	Export all IID files	Export all the IID files of the current SCL file.	-	page 14
	Export IID file	Export the IID file of the selected IED.	-	page 14
	Import all CID files	Import all CID files to the SCL file.	-	page 15
	Import CID file	Import an individual CID file to the SCL file.	-	page 15
	Find duplicates	Find duplicate IEDs in the SCL file.	-	-
	Export to SFT2841	Export a package to the SFT2841 containing a NET file and all the CID files defined in the NET file.	-	page 16
	Print	Print a report of the SCL file or a report of the selected element.	-	page 16
	Print preview	Display a preview of the report to be printed.	-	-
	Print options	Set filter options for the print report.	-	page 16
	Exit	Exit from CET850 tool	-	-
Edit				
	Undo	Undo last editing action.		-
	Cut	Cut the selected item and put it in the clipboard.		-
	Copy	Copy the selected item in the clipboard.		-
	Paste	Paste an item from the clipboard.		-
	Delete	Delete the selected item.	-	-
	Find	Find a character string in the tree structure or in the XML code.	-	-
View				
	Toolbar	Display or hide the toolbar.	-	-
	Status bar	Display or hide the status bar.	-	-
	Show Errors	Display the syntax error line number(s) of the current SCL file.	-	page 13
	Property view	Display the property view.	-	page 8
	XML source	Display the XML view.	-	page 47
Add				
	History	Add a History entry to track file modifications.	-	page 19
	IED	Add an IED into the current SCL file.	-	page 20
	Logical Devices	Add a Logical Device inside an IED.	-	page 23
	Connected Access Point	Add a Connected Access Point onto a subnetwork.	-	page 25
	Dataset	Add a Dataset into a Logical Node.	-	page 27
	Report Control Block	Add a Report Control Block into a Logical Node.	-	page 31
	Log Control Block	Add a log control block in a Logical Node.	-	page 34
	GOOSE Control Block	Add a GOOSE Control Block into a Logical Node.	-	page 37
	GSE Element	Configure an incoming GOOSE message	-	page 40
FTP				
	Download All CID To Devices	Download several CID files to a device.	-	page 45
	Download CID To Device	Download an individual CID file to a device.	-	page 45
	Upload CID from Device	Upload CID files from a device.	-	page 46

Menu	Function	Description	Toolbar icon	See
Tools				
	Preferences	Set CET850 display and running options.	-	page 47
	Languages	Select the language of the user interface.	-	-
Help				
	Help Topics	Display contextual help about selected element or open window.	-	page 10
	About CET850	Give various information about the CET850 software (version identification and license agreement).	-	page 5

Only the main functions of the File menu are explained here. Other functions are standard ones and do not require specific descriptions.



Syntax error displayed in red color.

Validate

The Validate function includes 3 kinds of verification:

- verification of the structure and content of the SCL file
- verification of the structure against the IEC 61850 schema
- verification of the consistency of the GOOSE communication

Verification of the structure and content of the SCL file

The Substation Configuration Language is based on XML.

The structure and content of all SCL files are fully specified by the IEC 61850 standard using an XML Schema (XSD files).

CET850 is delivered with the set of XSD files defined by the IEC 61850 standard and checks the validity of SCL files against the IEC 61850 XML Schema.

CET850 uses the Xerces parser to check the validity of the SCL files.

Verification of the consistency of the GOOSE communication

The dataset sent via GOOSE messages must meet a specific size constraint.

The data sent by a producer IED must be consistent with the data expected and subscribed by the consumer IED.

CET850 checks the size and the consistency of the data exchanged via GOOSE messages.

Validating an SCL file at saving time

The Validate function can be automatically activated when the user saves an SCL file.

Automatic validation is enabled or disabled using a specific option in the CET850 User Preferences.

Validating an SCL file during editing

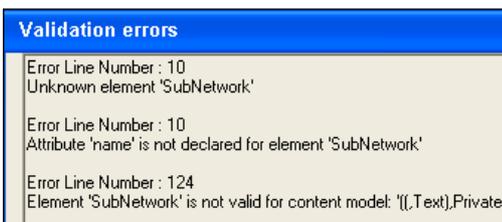
The Validate function can be explicitly triggered when an SCL file is open.

In the menu bar or in the contextual menu, click **File > Validate**.

- If the SCL file is valid, the message **Validation is successful** is displayed.
- If the SCL file is not valid, the **Validation Errors** window opens.

See "Error display" on the following section.

The Validate function can be activated both when the Property view is displayed and when the XML source is displayed.



Syntax error pop-up window.

Error display

As a result of an explicit Validate action, the **Validation Errors** window lists all the errors detected in the SCL file. For each error, a message is displayed indicating the reason for the error and its location in the XML source file.

Erroneous elements in the tree view are displayed in red. In the XML source, erroneous lines are displayed in red.

To obtain details about an erroneous element displayed in the tree view, select this element and click **Show errors** in the contextual menu

Build CID files

To configure an IED for IEC 61850 communication, the user needs to build a CID file and load it into the IED.

When an SCD file is open, CET850 can build the CID file for a specific IED or all the CID files for all the connected IEDs defined in the SCD file.

Building the CID file of a specific IED

This function is available when the user has selected from the tree view an IED that is connected to a subnet.

Procedure

1. From the tree view, select an IED that is connected to a subnet.
2. In the menu bar, click **File > Build CID File**. A dialog box opens.
3. In the dialog box, enter the location and the name of the output CID file. By default, the name of the CID file is based on the name of the IED.
4. Click **OK** to validate the operation.

The CID file is created in the directory specified in step 3.

Building CID files for all IEDs in the SCD file

This function is available when the SCD file includes at least one IED that is connected to a subnet.

Procedure

1. In the menu bar, click **File > Build All CID Files**.
 2. In the dialog box, enter the location of the output CID files.
 3. Click **OK** to validate the operation.
- The CID files of all IEDs are created in the directory specified in step 2.
The name of the CID files is based on the name of the IEDs.

Integrity check

To be sure that the CID file has not been modified or corrupted before being loaded into the target device, an integrity key is generated by CET850. This key is stored in a private section at the beginning of the SCL file.

When editing a CID file, the integrity key is automatically rebuilt by CET850 when saving and closing the file.

Export IID files

IID files are used to exchange the configuration of IEDs between the CET850 configuration tool and other IEC 61850 configuration tools.
Exporting IID files allows the user to generate the configuration file of IEDs done with CET850 in order to integrate them to a system configuration done using other IEC 61850 configuration tools. When an SCD file is open, CET850 can export the IID file for a specific IED or all the IID files for all the connected IEDs defined in the SCD file.

Exporting the IID file of a specific IED

This function is available when the user has selected from the tree view an IED that is connected to a subnet.

Procedure

1. From the tree view, select an IED that is connected to a subnet.
 2. In the menu bar, click **File > Export IID File**. A dialog box opens.
 3. In the dialog box, enter the location and the name of the output IID file.
The default name of the IID file is based on the name of the IED.
 4. Click **OK** to validate the operation.
- The IID file is created in the directory specified in step 3.

Exporting IID files for all IEDs in the SCD file

This function is available when the SCD file includes at least one IED that is connected to a subnet.

Procedure

1. In the menu bar, click **File > Export All IID Files**.
 2. In the dialog box, enter the location of the output IID files.
 3. Click **OK** to validate the operation.
- The IID files of all IEDs are created in the directory specified in step 2.
The default name of the IID files is based on the name of the IEDs.

Importing IID files

CET850 can import to a system configuration the IID files generated by other IEC 61850 configuration tools. The import operation is done using the Add IED function. See "Adding an IED" on page 20.

Import all CID files

Importing all CID files to the SCL file

This function is available when at least one SCD file is open.

Procedure

1. In the menu bar, click **File > Import all CID Files**. A dialog box opens.
2. In the dialog box, enter the location of the input CID files.
3. Click **OK** to validate the operation.

All the CID files contained in the selected folder are imported.

This function imports the communication parameters defined in the CID file.

Import CID file

Importing a CID file to the SCL file

This function is available when at least one SCD file is open.

Procedure

1. In the menu bar, click **File > Import CID File**. A dialog box opens.
2. In the dialog box, enter the location of the input CID file.
3. Click **OK** to validate the operation. The CID file is imported.

Export to SFT2841

SFT2841 is the setting tool for Sepam devices. It gives access to Sepam devices via Ethernet TCP/IP and may be used to identify the Sepam connected to the network and to load the associated CID files.

For that purpose, SFT2841 uses a configuration file named NET file which contains the IP address of each Sepam, the reference to its CID file, and the identification of the originating ICD file from the Sepam ICD library.

When an SCD file is open, CET850 can export the NET file and the CID files for all the connected IEDs defined in the SCD file.

Exporting to SFT2841

This function is available when the SCD file contains at least one connected IED.

Procedure

1. In the menu bar, click **File > Export To SFT2841**. A dialog box opens.
2. In the dialog box, enter the location and the name of the output NET file. The default name of the NET file is the same as the name of the SCD.
3. Click **OK** to validate the operation.

The NET file is created in the directory specified in step 2.

The CID sub-directory is created inside the output directory specified in step 2: it contains all the CID files for the IED declared in the NET file.

Print

Print options

Print options allow the user to select the list of elements to be printed in the report. The following elements can be selected:

- History
- Communication
- Subnet
- IED
- LD
- Dataset
- Report Control Block
- GOOSE Control Block
- GOOSE Receive

Print SCL file

Print SCL file sends a report of the SCL file to the printer. The content of the report depends on the options set by the user using the menu **File > Print options**.

To print an SCL file:

The Print function is available when an SCL file is opened.

1. In the menu bar, click **File > Print SCL file**.
2. Click **OK** to validate the operation.

A general report is printed out.

Print Element

Print Element sends a report of a selected element in the tree to the printer. Reports on the following sections or elements can be printed separately:

- History
- Communication
- Subnet
- IED
- LD
- Dataset
- Report Control Block
- GOOSE Control Block
- GOOSE Receive

Procedure

The Print Element function is available when an SCL file is open.

1. From the tree view, select an element from the list above
2. In the menu bar, click **File > Print Element**.
3. Click **OK** to validate the operation.

A report of the selected element is printed.

When printing a report on an IED, the content of the report depends on the options set by the user using the menu **File > Print options**.

Editing an SCL file consists in:

- adding or removing elements from the tree view
 - modifying element attributes in the property view
- In both cases, the SCL file is updated when it is saved.

Adding elements

The table below gives for an element of the tree, the next level elements that can be added by the user.

Selected element	Icon	Elements that can be added	Icon
SCL (SCL file level)		IED	
		Connected Access Point	
History		History entry	
Communication		Connected Access Point	
Subnet		Connected Access Point	
Connected Access Point		GSE Element	
IED (Sepam Server)		Logical Device	
Logical Node	LN	DataSet	
		RCB (reports)	
		Log Control Block	
		GOOSE Control Block (GCB) (LN0 only)	

Procedure

1. From the tree view, select the element where you want to add the new element.
2. In the menu bar or in the contextual menu, click **Add** then click the element to be added.
3. Refer to specific procedures in this manual for further instructions.

Removing elements

Any element that can be added can also be removed from the tree view.

Procedure

1. From the tree view, select the element you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key.
3. If the Delete Confirmation Required option is checked in **Tools > Preference**, click **Yes** in the confirmation dialog box to delete the selected element. The selected element is deleted from the tree view.

Moving or copying elements

Copy/paste or cut/paste functions are enabled depending on the context and the type of element selected from the tree view.

Procedure

1. Select the element to be cut or copied.
2. In the menu bar or in the contextual menu, click **Edit > Cut or Copy**.
3. From the tree view, select the location where the item should be pasted.
4. In the menu bar or in the contextual menu, click **Edit > Paste**.

The element is either moved or copied from its location.

Note: Copy/Paste and Cut/Paste operations may lead to SCL errors due to duplicate references or missing references. These errors will be detected by CET850 and must be corrected by the user to obtain a consistent SCL file.

The order of some elements displayed in the tree view can be changed in a section. (For instance, the order of the Connected Access Points can be modified inside the subnet section).

Use drag-and-drop or cut/paste methods to move an element in a section.

Modifying attributes

Some elements are editable and their attributes may be modified. There are 3 possible ways to edit an element, depending on its type:

- From the tree view, select the element and right-click **Edit > Modify** in the contextual menu.
- From the tree view, select the element and double-click it.
- In the property view, click **Edit > Modify** in the contextual menu.

In addition, specific attributes of DataObjects (DOs) and DataAttributes (DAs) displayed in the LN details view are editable. They are displayed in a colored cell. To modify their values, click the colored cell. For instance, the user can set or modify the description of a DO, or modify the value of the deadband of a measurement (DA "db").

The history allows tracking of the SCL file modifications during the configuration process. Each time the file is modified, the user should add a History entry with comments.

Adding a History entry

Procedure

1. Double-click the **Header** section to expand it.
2. Click the **History** element to select it.
Then the history content is displayed in the property view.
3. In the menu bar or in the contextual menu, click **Add > History**. A pop-up window opens, displaying a table with all attributes to fill.
4. Click the **Attribute Value** column fields to fill them with comments. The 3 first attributes (Version, Revision and When) are compulsory.
5. Click **OK** to validate the operation.
A new entry is added in the history table displayed in the property view.

Modifying a History entry

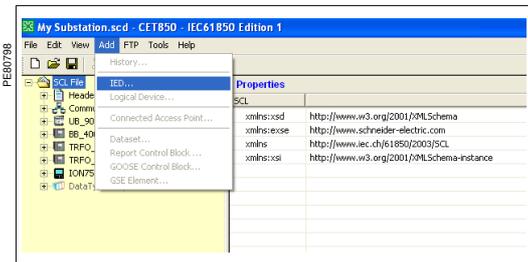
Procedure

1. Double-click the **Header** section to expand it.
2. Click the **History** element to select it.
3. In the property view, select the History entry you want to edit and click **Modify** in the contextual menu. A pop-up window opens, displaying all attributes with their current values.
4. Click the **Attribute Value** column fields to modify them.
5. Click **OK** to validate the modification.
The selected entry is updated accordingly in the history table.

Removing a History entry

Procedure

1. Double-click the **Header** section to expand it.
2. Click the **History** element to select it.
3. In the property view, select the History entry you want to delete and click **Delete** in the contextual menu.



Adding an IED.

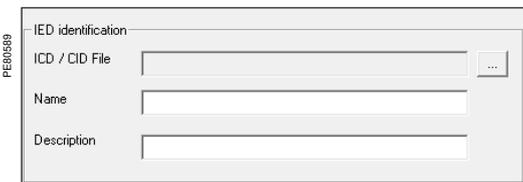
Adding an IED

CET850 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 either a CID file or an IID file.

For Schneider Electric devices, the ICD files are available in a library included in the CET850 software package. The ICD library is automatically installed during the installation of CET850.

Procedure

1. From the tree view, select the **SCL** root element.
 2. In the menu bar or in the contextual menu, click **Add > IED**.
 3. Set the IED Identification and optionally the Address parameters according to following descriptions.
 4. Click **OK** to validate the operation.
- A new IED element is added to the tree view.



Identification settings.

IED Identification

ICD/CID file

The IEC 61850 description of the IED to add is given by an ICD, a CID, or an IID file. To select the description file, click: (...).

■ ICD file selection

Choose the **Device From Library** option to select an ICD file from the internal library. CET850 software is delivered with a library of ICD files for all types of Sepam devices and all Sepam applications. This library also includes the ICD file for the ECI850. To browse inside the ICD library, use the access keys Family, Model, and Version.

Choose the **Other Device** option to select an ICD file outside the ICD library.

■ CID file selection

Choose the **Other Device** option to select a CID file or an ICD file outside the standard ICD library.

■ IID file selection

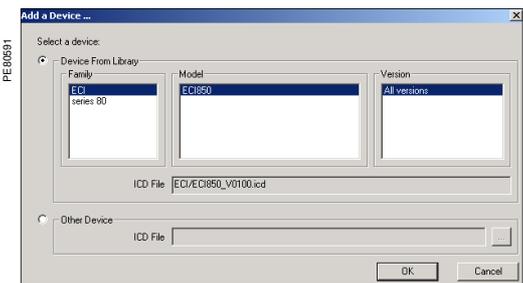
Choose the **Other Device** option to select an IID file outside the standard ICD library.

IED name

Assign a name to the IED. The name of the IED must be unique in the IEC 61850 system. Its length is restricted to a maximum of 64 characters, and consists of alphanumeric and underscore (_) characters, beginning with a letter.

IED description

This is a free ASCII string where the user can write comments about the device.



Description or configuration file selection.

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.

See "Adding a Connected Access Point", page 25.

■ Subnet:

To select the subnet you want to connect the IED to, click: (...).

To select an existing subnet or create a new one, enter the following parameters:

■ IP Address: address of the IED

■ IP Subnet: subnet mask

■ IP Gateway: address of the subnet gateway

If the user chooses an existing subnet, IP Subnet and IP Gateway are automatically supplied.

Note: If subnet parameters are not yet known, they can be entered later. See "Adding a Connected Access Point", page 25. The IED icon will then be displayed in the tree view with a blue right-upper corner, to show that the IED is not connected to any subnet.



Network settings.

Modifying an IED

Procedure

1. From the tree view, select, the IED you want to modify.
2. From the property view, select an attribute and click **Modify** in the contextual menu.
A dialog box opens, displaying a table with the attributes and their values.
3. Click the **Attribute Value** column fields to modify them.
4. Click **OK** to validate the modification.
The IED parameters are updated.

Removing an IED

Procedure

1. From the tree view, select the IED you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key.
The IED and the relevant Connected Access Point are removed from the SCL file.
The undo function can be used to go back to the previous state.

Introduction

CET850 is able to manage ECI850 Sepam servers and G3200 generic servers. ECI850 allows only Sepam devices to be connected. G3200 generic servers are used for all other Schneider Electric and pre-defined Modbus devices.

The pre-defined Modbus devices allowed with CET850 are:

- PowerLogic Circuit Monitor Series 4000
- Micrologic A/P/H for Masterpact and Compact NS
- PowerLogic Power Meter 710
- PowerLogic Power Meter 850
- Easergy T200
- Sepam 2000

According to the IEC 61850 standard, Sepam devices that are connected to the ECI850 Sepam server via Modbus subnet are seen as Logical Devices inside the ECI850 IED. Sepam devices can be connected to the ECI850 Sepam server in one of the following ways:

- 1 Sepam series 80 unit, or
- 2 Sepam series 60 unit, or
- 3 Sepam series 40 units, or
- 5 Sepam series 20 units.

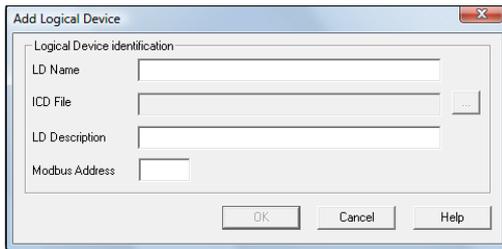
The CET850 software is used to add or remove Sepam Logical Device inside an ECI850 IED.

Adding a Logical Device

When an ECI850 Sepam server is selected from the tree view, CET850 allows the addition of slave Sepam devices as Logical Devices of the ECI850 IED.

Procedure

1. From the tree view, select an IED element whose type is **ECI850 Sepam server**. Such an IED is displayed with the icon .
 2. In the menu bar or in the contextual menu, click **Add > Logical Device**.
 3. Set the fields of the **Add Logical Device** window according to the rules described in the Logical Device identification section.
 4. Click **OK** to validate the operation.
- A new Logical Device element is added to the tree view inside the ECI850 Sepam server.



Logical Device settings.

Logical Device identification

- **LD name**
Assign a name to the Logical Device. The Logical Device name must be unique for the ECI850 Sepam server. This is a string of up to 64 alphanumeric and underscore (_) characters, starting with a letter.
- **ICD file**
Select the ICD file that provides the IEC 61850 description of the device either from the ICD library or from a specific location.
CET850 software is delivered with a library of ICD files for all types of Sepam devices and all Sepam applications. To browse inside the ICD library, use the access keys: Family, Model, and Version.
- **LD description**
This is a free ASCII string where the user can write comments about the device.
- **Modbus address**
Assign a Modbus address from 1 to 247 to the device.
This address is used by the ECI850 to access the device as a slave device using the Modbus subnetwork. It must be unique for the ECI850 Sepam server.

Modifying a Logical Device

Procedure

1. From the tree view, select the Logical Device to be modified.
 2. In the property view, select an attribute and click **Modify** in the contextual menu. A dialog box opens, displaying a table with the attributes and their values.
 4. Click the **Attribute Value** column fields to modify them.
 5. Click **OK** to validate the modification.
- The LD parameters are updated.

Removing a Logical Device from an ECI850 Sepam server

Procedure

1. From the tree view, select the Logical Device you want to remove.
 2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key.
- The Logical device is removed from its ECI850 Sepam server.

Note: The ECI850 Sepam server has at least one LD (LD0) which describes the ECI850 device itself. Removing the LD0 is not allowed.

According to the IEC 61850 standard, devices that are connected to the G3200 Modbus-to-IEC 61850 server via Modbus subnet are seen as Logical Devices inside the G3200 IED. These devices can be connected to the G3200 generic server in one of the following ways:

- 1 PowerLogic Circuit Monitor Series 4000 unit, or
- 2 Micrologic A for Masterpact and Compact NS units, or
- 1 Micrologic P/H for Masterpact and Compact NS unit, or
- 2 PowerLogic Power Meter 710 units, or
- 1 PowerLogic Power Meter 850 unit, or
- 3 Easergy T200 units.

The CET850 software is used to add or remove a pre-defined Logical Device inside a G3200 IED.

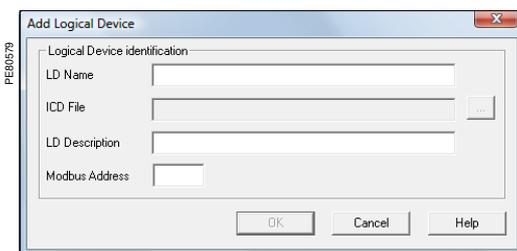
Note: G3200 does not support edition 2 and can not be selected in CET850 edition 2.

Adding a Logical Device

When a G3200 generic server is selected from the tree view, CET850 allows the addition of slave devices as Logical Devices of the G3200 IED.

Procedure

1. From the tree view, select an IED element whose type is **G3200 Generic server**. Such an IED is displayed with the icon: .
 2. In the menu bar or in the contextual menu, click **Add > Logical Device**.
 3. Set the fields of the **Add Logical Device** window according to the rules described in the Logical Device identification section.
 4. Click **OK** to validate the operation.
- A new Logical Device element is added to the tree view inside the G3200 generic server.



Logical Device settings.

Logical Device identification

■ LD name

Assign a name to the Logical Device. The Logical Device name must be unique for the G3200 generic server. This is a string of up to 64 alphanumeric and underscore (_) characters, starting with a letter.

■ ICD file

Select the ICD file that provides the IEC 61850 description of the device either from the ICD library or from a specific location.

CET850 software is delivered with a library of ICD files for all types of pre-defined applications. To browse inside the ICD library, use the access keys: Family, Model, and Version.

■ LD description

This is a free ASCII string where the user can write comments about the device.

■ Modbus address

Assign a Modbus address from 1 to 247 to the device.

This address is used by the G3200 to access the device as a slave device using the Modbus subnetwork. It must be unique for the G3200 generic server.

Modifying a Logical Device

Procedure

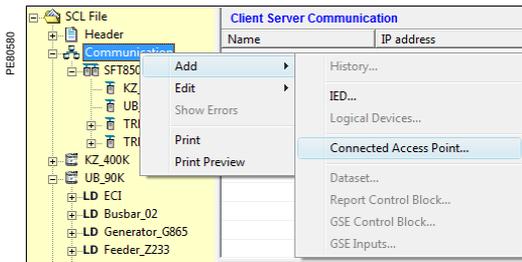
1. From the tree view, select the Logical Device to be modified.
 2. In the property view, select an attribute and click **Modify** in the contextual menu. A dialog box opens, displaying a table with the attributes and their values.
 4. Click the **Attribute Value** column fields to modify them.
 5. Click **OK** to validate the modification.
- The LD parameters are updated.

Removing a Logical Device from a G3200 generic server

Procedure

1. From the tree view, select the Logical Device you want to remove.
 2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key.
- The Logical Device is removed from its G3200 generic server.

Note: The G3200 generic server has at least one LD (LD0) which describes the G3200 device itself. Removing the LD0 is not allowed.



Adding a Connected Access Point.

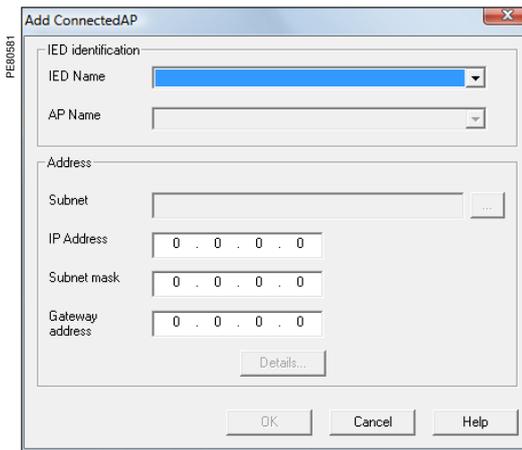
The connection of an IED to the communication network is done using an Access Point (AP).
 An IED can have one or several APs. Sepam devices and the ECI850 Sepam server have only one Access Point.
 According to the IEC 61850 standard, connecting an IED consists in adding a Connected Access Point (ConnectedAP) to a subnet. Using CET850, this operation can be done when adding the IED (see "Adding an IED", page 20), or at a later stage, using the **Add > Connected Access Point** action in the menu.

Adding a Connected Access Point

Procedure

1. From the tree view, select either the SCL root element, or the Communication section, or a Subnet element.
2. In the menu bar or in the contextual menu, click **Add > Connected Access Point**.
3. Set the IED identification and Address parameters according to the following descriptions.
4. Click **OK** to validate the operation.

A Connected Access Point (Connected AP) is added in the Communication section, on an existing subnet or a newly created one.



Connected Access Point settings.

IED identification

- **IED Name**
Select the IED you want to connect. Only IEDs having a free Access Point (not yet connected) are listed.
- **AP Name**
Select the Access Point of the IED you want to use for the connection.

Address

- **Subnet:** name of the subnetwork (must be unique in the SCL configuration)
To select the subnet you want to connect the IED to, click:



The user can select an existing subnet or create a new one.

Enter the following parameters:

- **IP Address:** address of the IED
- **IP Subnet:** subnet mask
- **IP Gateway:** address of the subnet gateway

If the user chooses an existing subnet, the IP Subnet and IP Gateway are automatically supplied.

Modifying a Connected Access Point

Procedure

1. From the tree view, select a Connected AP.
2. From the property view, select an attribute and click **Modify** in the contextual menu. A dialog box opens, displaying a table with the attribute and their values.
3. Click the **Attribute Value** column fields to modify them.
4. Click **OK** to validate the operation.

The Connected AP parameters are updated consequently.

Removing a Connected Access Point

Procedure

1. From the tree view, select the Connected AP you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key.

The Connected AP and the elements defined under the Connected AP are removed from the SCL configuration.

If the subnet does not contain any more Connected AP, it is automatically removed from the SCL configuration.

The undo function can be used to go back to the previous state.

Adding a Subnet

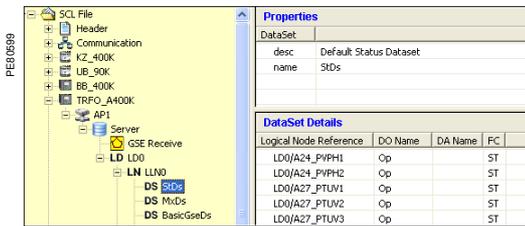
A subnetwork can be created when adding a Connected AP or an IED, and setting the address parameters. See "Address", page 25.

Removing a Subnet

Procedure

1. Select in the Communication section of the tree view, the subnetwork you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key.

The subnetwork is removed from the tree view. If there is no more subnet element in the communication section, the communication section is automatically removed from the SCL configuration file.



Dataset in a Logical Node.

A Dataset is a collection of Data Attributes (DAs) grouped together to increase communication efficiency. In particular, Datasets are used for reports and GOOSE messages.

Any LN instance can contain one or more Datasets depending on the capabilities of the IED.

By default, each Sepam provides 3 Datasets pre-defined in the ICD file:

- StDs: this Dataset includes all status indications provided by all the Protection (or related to protection) Logical Nodes present in Sepam, the Switchgear LN, the Sensor and Monitoring LN, and the Physical Device itself.
- MxDs: this Dataset includes all measurements values provided by all the Measurement Logical Nodes (MMXU) present in Sepam.
- BasicGseDs: this Dataset includes the main indications used for basic GOOSE exchange.

By default, each ION Meter provides 6 Datasets pre-defined in the ICD file:

- STATUS: this Dataset includes all device operational status.
- MMXU: this Dataset includes all default measurements.
- MMTR: this Dataset includes all default metering.
- GGIO: this Dataset includes all default hardware input/output data.
- PQ: this Dataset includes all default power quality data.
- CUSTOMIO: this Dataset includes all default custom GGIO data.

Note: ION Meter does not support edition 2 and can not be selected in CET850 edition 2.

These default Datasets can be modified by the user and new Datasets can be added, depending on the capabilities of the IED.

The capabilities of an IED regarding the configuration of Datasets are defined in the Services element by the ConfDataSet element.

Displaying the IED capabilities

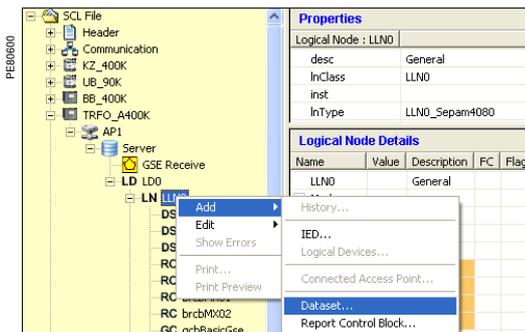
Procedure

1. From the tree view, select the IED.
2. In the property view, expand the Services element.
3. Expand the ConfDataSet element to display the capabilities attributes:
 - modify: an existing Dataset can be modified if modify = true.
 - max: this value defines the maximum number of Datasets that can be created inside this IED.

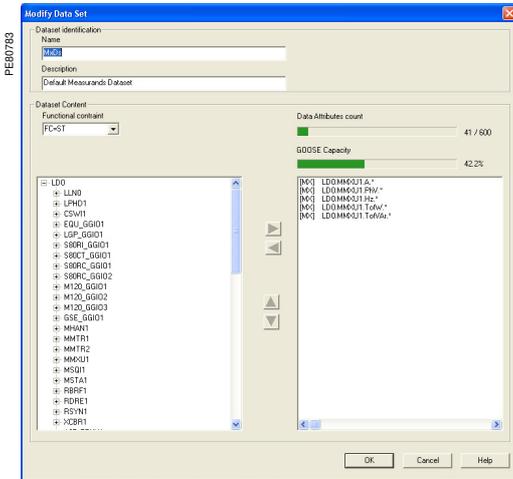
Adding a Dataset

Procedure

1. From the tree view, select a Logical Node of an IED.
2. In the menu bar or in the contextual menu, click **Add > Dataset**. A dialog box opens enabling the user to set the Dataset attributes and its content.
3. Enter a Dataset name and enter a description text.
4. Create the Dataset content according to the following description.



Adding a Dataset.



Dataset Content

The Dataset Content frame in the dialog window allows the user to select the data that will be put in the Dataset.

This frame displays 2 lists:

- a left-hand list
- a right-hand list

Left-hand list

The left-hand list displays all the data that can be placed in the Dataset. It contains the Data Objects and Data Attributes of all the Logical Nodes present in the IED. The list is displayed as a tree view and can be expanded or collapsed by clicking on the +/- symbols. The highest level displayed is the Logical Device (LD) level. The user can expand the tree view up to the Data Attribute (DA) level (last level or leaf level). Each DA is displayed with its Functional Constraint (FC) preceding its name.

Right-hand list

The right-hand list gives the content of the Dataset. Each line specifies an element of the Dataset.

An element may be an FCDA or an FCD:

- FCDA (Functional Constrained Data Attribute)

An FCDA identifies a single Data Attribute. This DA is identified by the name of the LD, the name of the LN, the name of the DO and the name of the DA. The Functional Constraint is displayed in the first column.

- FCD (Functional Constrained Data)

An FCD identifies a data structure that contains all the DAs of a DataObject, with a given FC. The FCD is identified by the name of the LD, the name of the LN, and the name of the DO. The attributes are implicitly identified and a star is displayed instead at the attribute level. The Functional Constraint is displayed in the first column.

Selecting the data to be put into the Dataset

A filter, based on a specific FC is available to restrict the DAs displayed in the left-hand list.

- By default there is no filter (filter set to All FC).

In this case, all DAs are displayed in the list. The user can add only a fully constrained DA, by selecting it at the leaf level of the tree. The entry created in the Dataset is a single attribute and is called an FCDA (Functional Constrained Data Attribute)

- If the user sets a specific FC as filter, then the list is restricted according to this FC. In this case the user can add an FCDA by selecting a DA at the leaf level of the tree (as in the previous case), but the user can also select a DataObject at DO level. When selecting a DataObject, the entry created in the Dataset is called an FCD (Functional Constrained Data). The associated element that will be reported in the Dataset is a data structure that includes all the attributes with the required FC.

Ordering the data in the Dataset

The order of the Dataset elements inside a Dataset is very important because it determines its decoding by an IEC 61850 Client when it gets the Dataset.

When adding an element to a Dataset, it is added at the last position. The user can modify the order of the Dataset elements by selecting an element and moving it up or down using the **Up** and **Down** arrow buttons.

Functional Constrained Data Attributes count

The count of Functional Constrained Data Attributes (FCDA) that can be contained in the Dataset is checked against the memory capacity of the device. The maximum limit is given in the ICD file by the **max Attributes** value defined in the Services element by the ConfDataSet element.

During the definition of a Dataset, the amount of size used and available is given by a bar-graph. The bar-graph is displayed in green up to the **max Attributes** defined and in red above this value.

CET850 does not allow the creation of new Datasets with a Data Attribute count that exceeds the maximum limit defined.

GOOSE capacity bar-graph

A Dataset can be attached to a Report Control Block or a GOOSE Control Block. It can only be attached to a GOOSE message if its size is compatible with the size of an Ethernet frame.

During the definition of a Dataset, the amount of size used and available is given by a bar-graph and percentage. The bar-graph is displayed in green up to 100% of the allowed capacity and in red above 100%.

Creating the Dataset content

Procedure

1. Use the combo box filter to optionally assign a filter to the FC.
2. In the left-hand list, select the FCDAs or FCDs you want to add to the Dataset.
3. Click on the **right arrow button** to add the selected data to the right-hand list. A new element is created at the end of the Dataset.
4. Repeat this operation to select all the data (FCDAs or FCDs) to be added to the Dataset.
5. If necessary, re-arrange the order of the elements inside of the Dataset using the **Up** and **Down** arrow buttons.
6. If necessary, to remove an element from the Dataset, select it in the right-hand list and click the **left arrow button**.
7. Click **OK** to validate the Dataset.

After the **Add Dataset** operation is completed, the changes to the Dataset are reflected in the current SCL file and the CET850 display is updated: a newly created Dataset is displayed in the tree view. The content of the Dataset is updated in the property view.

Modifying a Dataset

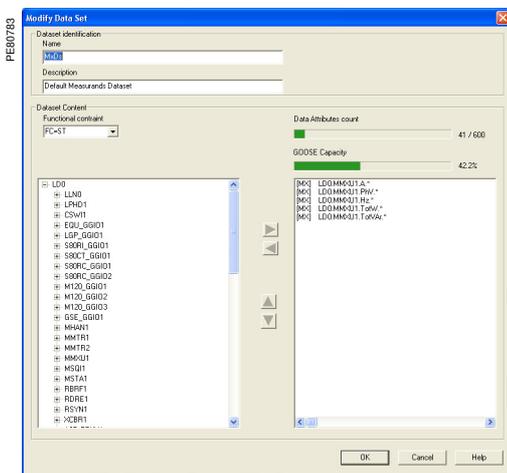
Procedure

1. From the tree view, select a Dataset and click **Edit > Modify** in the contextual menu.
- The Dataset edition window opens.
2. To modify the Dataset content, see "Dataset Content", page 28.

Copying or Moving a Dataset

Once a Dataset has been created it can be moved or copied to another Logical Node of an other Logical Device, if needed, using the copy/cut and paste or drag-and-drop methods.

Note: A dataset can be linked to Control blocks (Report Control Blocks, GOOSE Control Blocks). Control blocks must reside in the same logical node as the Dataset they refer to. Be sure to move or remove the control blocks together with their referenced datasets.



Dataset Content.

Removing a Dataset

Procedure

1. From the tree view, select the Dataset you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key. The Dataset is removed from its Logical Node. The undo function can be used to go back to the previous state.

Note 1: A dataset can be linked to Control blocks (Report Control Blocks, GOOSE Control Blocks). Control blocks must reside in the same logical node as the Dataset they reference. Be sure to move or remove the control blocks together with their referenced datasets.

Note 2: CET850 does not allow the removal of a Dataset which is used by RCBs.

Note 3: The removal of Datasets used in GOOSE Control Blocks will result in inconsistencies.

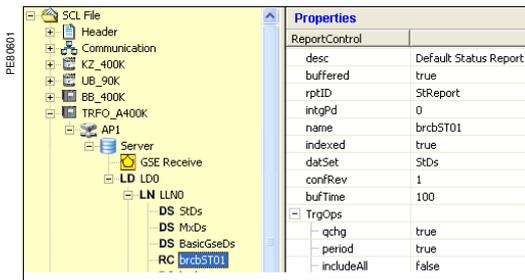
Adjusting the dead band of measurements

Sepam produces many measurements that are accessible via the IEC 61850 communication interface as Measured Values (MV) and Complex measured values (CMV).

To optimize the network bandwidth, it is possible to create a Dataset of measurements and to send it on data changes only, rather than periodically. Sepam and CET850 use the dead band parameter (db) defined by the IEC 61850 Standard for the MV and CMV to control the conditions for generating reports. CET850 allows the user to set the dead band of each value for MV and CMV data produced by Sepam. If the data is associated with a Dataset and an RCB with the Data change trigger option (dchg), a report will be generated only when the value of the data exceeds the dead band. If the data change is less than the dead band, no report will be generated.

Procedure

1. From the tree view, select a Logical Node.
2. In the LN details part of the LN view, expand the LN.
3. Select the required measurement.
4. Click the colored cell of the dead band attribute and change the value.



Report Control Block in a Logical Node.

A Report Control Block (RCB) defines the way a Dataset is transmitted to a client. An RCB can be created inside any Logical Node. Sepam provides both buffered and unbuffered RCBs.

A buffered RCB (BRCB) is dedicated to at a maximum of one client at a time. If the same report is to be used by more than one client, several reports of this type have to be instantiated in the IED. The instances of a BRCB are identified using a numerical index and are called commonly indexed BRCB.

An unbuffered RCB (URCB) may be used by several client.

By default, each Sepam provides 2 pre-defined buffered RCBs in the LLN0, each RCB defined with 2 instances. These RCBs are defined in each Sepam ICD file:

- brcbST01 and brcbST02 are the 2 BRCB associated with the StDs Dataset for reporting status indications.
- brcbMX01 and brcbMX02 are the 2 BRCB associated with the MxDs Dataset for reporting measurements.

By default, each ION Meter provides 6 pre-defined RCBs in the LLN0, each RCB defined with 4 instances. These RCBs are defined in each ION Meter ICD file:

- uncbSTATUS associated with the STATUS Dataset for reporting status indications.
- uncbMMXU associated with the MMXU Dataset for reporting default measurements.
- uncbMMTR associated with the MMTR Dataset for reporting default metering.
- uncbPQ associated with the PQ Dataset for reporting power quality data.
- uncbCUSTOMIO associated with the CUSTOMIO Dataset for reporting custom GGIO data.
- brcbGGIO associated with the GGIO Dataset for reporting default hardware input/output data.

These default RCBs can be modified by the user and new RCBs can be added, depending on the capabilities of the IED.

The capabilities of an IED to configure RCBs are defined in the Services element by the ConfReportControl element.

Displaying the IED capabilities

Procedure

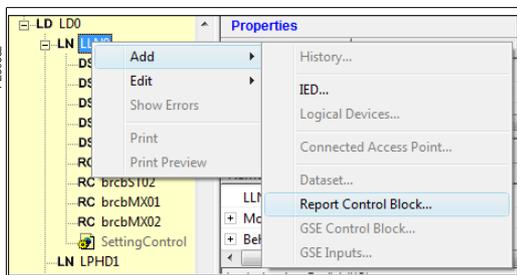
1. From the tree view, select the IED.
2. In the property view, expand the Services element.
3. Expand the ConfReportControl element to display the capabilities attributes:
 - max: this value defines the maximum number of instantiable Report Control Blocks. If this is equal to the number of preconfigured instances, then no new instances can be created.
 - bufMode (unbuffered, buffered, both): this attribute specifies the buffer mode supported by the device.
 - bufConf (boolean): TRUE means the buffered attribute of preconfigured RCBs can be changed via SCL configuration.

Adding a Report Control Block (RCB)

Procedure

To add an RCB in a Logical Node, there must be at least one Dataset in this Logical Node.

1. From the tree view, select a Logical Node of an IED.
2. In the menu bar or in the contextual menu, click **Add > Report Control Block**. A dialog box opens that displays settings for the RCB attributes.
3. Set the RCB identification attributes and parameters according to the descriptions below.
4. Click **OK** to validate the operation.



Adding a Report Control Block.

When the operation is complete, the changes to the RCB are reflected in the current SCL file and the CET850 display is updated: a newly created RCB is displayed in the tree view and the settings of the RCB are updated in the property view.

PEB00933

RCB identification settings.

PEB0784

RCB parameters settings.

PEB0785

Name	Value
dchg	true
qchg	true
dupd	false
period	true

RCB trigger settings.

PEB0786

Name	Value
seqNum	true
timeStamp	true
dataSet	true
reasonCode	true
dataRef	false
configRef	true

RCB content settings.

Report Control Block identification

- RCB name: name of the RCB (must be unique in the Logical Node). It contains only alphanumeric characters.
- RCB Description
- Dataset: select in the list box the name of the Dataset to be associated with the RCB.
- Report ID: Identification of the RCB. This parameter is optional. If it is empty, the full name of the RCB will be used at reporting time instead of the Report ID.
- Conf Rev: revision number of the Dataset. It indicates to the client any modifications inside the RCB, or the Dataset attached to the RCB.

Report Control Block parameters

- The Report Control Block parameters attributes define how to build the report.
- Buffer time: delay between the first trigger event and the creation of the report.
 - Integrity period: time to periodically create the report, even without triggering. The value 0 disables the creation of the periodic report.
 - Buffered: when this option is checked, the report content is memorized in buffers.
 - Index: when this option is checked, the reports are automatically indexed. This option is enabled only if the Buffered option has been checked.
 - Number 01-99: number of indexed buffers to be created by the device. This field is available only if the Index option has been checked.

Report trigger conditions

- These attributes define the conditions to trigger the report. To set an attribute, click the corresponding Attribute Value and select true or false in the combo box.
- dchg: report triggers on data change (see "Adjusting the dead band of measurements", page 30).
 - qchg: report triggers on quality change.
 - dupd: report triggers on data update.
 - period: report triggers periodically according to the Integrity period defined above.

Report content

These attributes define the content of the report. Setting one of the attributes to true means that the corresponding data will be included in the report. To set or reset an attribute, click the corresponding Attribute Value and select true or false in the combo box.

Attribute	Explanation
seqNum	A sequence number may be assigned to a report when it is sent by the server. This number is incremented each time a report is sent. If the seqNum option is set to TRUE, the sequence number will be included in the report. Otherwise, it is omitted.
timeStamp	The report time stamp specifies the time when the report was created. If this option is set to TRUE, the report time stamp shall be included in the report. Otherwise, it is omitted.
dataSet	If this option is set to TRUE, the reference of the Dataset shall be included in the report. Otherwise, it is omitted.
reasonCode (Reason for inclusion)	If this option is set to TRUE, the data in the report shall be reported with the reason for their inclusions (depending on the Trigger option, the reason may be: data-change, quality-change, integrity, general-interrogation). Otherwise, the data are reported without reason code.
dataRef	If this option is set to TRUE, the data in the report are reported with their FCDA reference. Otherwise, the references of the data are omitted.
configRef	If this option is set to TRUE, the configuration revision number of the RCB shall be included in the report. Otherwise, it is omitted.

Modifying an RCB

Modifying the RCB content or the trigger conditions

1. From the tree view, select an RCB and click **Edit > Modify** in the contextual menu. The RCB settings window opens.
 2. To modify the RCB content or the trigger conditions, see "Report content", page 32 and "Report trigger conditions", page 32.
- The undo function can be used to go back to the previous state.

Modifying the RCB type (Buffered/Unbuffered)

1. From the tree view, select an RCB and click **Edit > Modify** in the contextual menu. The RCB settings window opens.
2. To modify the RCB type, see "Report Control Block parameters", page 32.
 - If the RCB type is "Unbuffered", check the Buffered option.
 - If the RCB type is "Buffered", uncheck the Buffered option.
 - If the RCB type is indexed, check the Indexed option and select the number of indexed reports.
 - If the RCB type is not indexed, uncheck the Indexed option.

Copying or moving an RCB

Once an RCB has been created it can be moved or copied to another Logical Node of a different Logical Device if needed, using the copy/cut and paste or drag-and-drop methods.

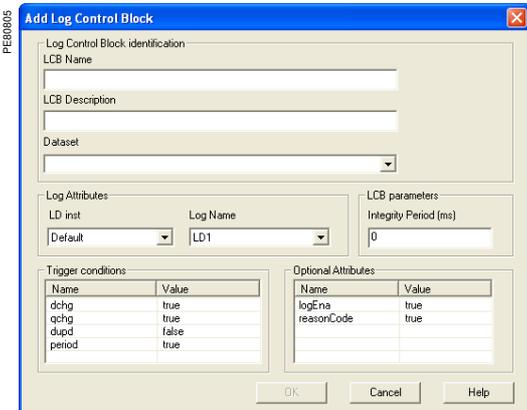
The undo function can be used to go back to the previous state.

Note: Report Control blocks are linked to Datasets which must reside in the same Logical Node. When copying or moving an RCB, be sure to keep valid the reference to the Dataset.

Removing an RCB

Procedure

1. From the tree view, select the RCB you want to remove.
 2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key. The RCB is removed from its Logical Node.
- The undo function can be used to go back to the previous state.



Add Log Control Block in a Logical Node.

A Log Control Block (LCB) defines which data values and when these data values are to be stored in the log.

ACE850

For edition 1, ACE850 allows only 1 Log file (in Logical Device LD0) and only 1 LCBs. For edition 2, ACE850 allows only 1 Log file (in Logical node LLN0 and Logical Device LD0) and only 1 LCBs.

Logging is disabled by default in the ICD file. It must be enabled either dynamically or at configuration time. Integrity period logging is not supported; write operations to the corresponding field of the LCB are possible but the value is ignored.

Log data is stored in non-volatile memory. Two 128 kBytes memory blocks are used; when both are full, the block containing the oldest data is erased. The minimum Log depth is the 128 kBytes and the maximum one is 256 kBytes, which corresponds to approximately between 1000 and 2000 single point status changes.

To ensure that a valid TimeOfEntry is assigned to Log entries, logging is automatically disabled if the Sntp synchronization is disabled or not successful, whatever the value of LogEna.

ECI850

Logging is not supported by ECI850. If Log or LogControl elements are found in the CID file, they are ignored. This may occur as ICD files are common for ACE850 and ECI850 and contain defaults elements.

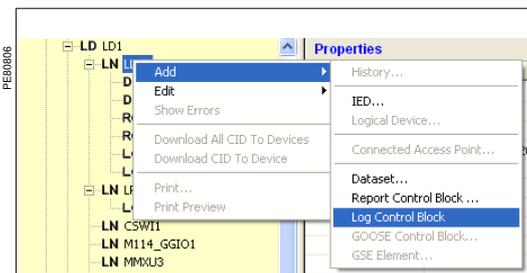
LCB can be added by the user depending on the capabilities of the IED and can be modified by the user.

Adding a Log Control Block (LCB)

Procedure

1. From the tree view, select a Logical Node of an IED.
2. In the menu bar or in the contextual menu, click **Add > Log Control Block**. A dialog box opens and displays settings for the LCB attributes.
3. Set the LCB identification attributes and parameters according to the descriptions below.
4. Click **OK** to validate the operation.

When the operation is complete, the changes to the LCB are reflected in the current SCL file and the CET850 display is updated. The newly created LCB is displayed in the tree view and the settings of the LCB are updated in the property view.



Adding a Log Control Block.

PEB0807

Log Control Block identification

LCB Name

LCB Description

Dataset

LCB identification settings.

Log Control Block identification

- LCB Name: name of the LCB (must be unique in the Logical Node). It contains only alphanumeric characters.
- LCB Description: free ASCII description.
- Dataset: select in the list the data set whose values are to be logged.

The LCB has several attributes and parameters that control the logging process.

PEB0808

Log Attributes

LD inst Log Name

Default LD1

Log attributes settings.

Log attributes

Log attributes indicate in which log, the entries are to be stored.

- LD inst: the name of the logical device where the log resides. If missing, the it's the same LD in which the LCB is places.
- Log Name: the name of the log. The log element exist and cannot be added nor modified.

In edition 1, LD inst and Log Name are set with default values and cannot be modified.

In edition 2, LD inst and Log Name are chosen in list box.

PEB0809

LCB parameters

Integrity Period (ms)

0

LCB parameters settings.

LCB parameters

- Integrity Period: time to periodically create the log in ms.

PEB0810

Trigger conditions

Name	Value
dchg	true
qchg	true
dupd	false
period	true

LCB trigger settings.

Trigger conditions

Trigger conditions contain the reasons which cause the control block to store an entry into the log.

The reasons for storing a log entry into the log may be:

- dchg: report triggers on data change.
- qchg: report triggers on quality change.
- dupd: report triggers on data update.
- period: report triggers periodically according to the integrity period defined above. To set an attribute, click the corresponding attribute value and select true or false in the combo box.

PEB0811

Optional Attributes

Name	Value
logEna	true
reasonCode	true

LCB optional attributes settings.

Optional attributes

- logEna: select true to enable the logging process, false to disable it.
- reasonCode: select true to store the reason code for the event trigger into the log.

Modifying a LCB

Procedure

1. From the tree view, select a LCB and click **Edit > Modify** in the contextual menu. The LCB settings window is opened.
 2. To modify the LCB content, see Log Control Block information and "LCB parameters", page 35.
- The undo function can be used to go back to the previous state.

Copying or moving a LCB

Once an LCB is created, it can be moved or copied to another Logical Device if needed, using the copy/cut and paste or drag-and drop methods.

The undo function can be used to go back to the previous state.

Note: Log Control blocks are linked to Datasets which must reside in the same Logical device. When copying or moving an LCB, make sure to keep valid reference to the Dataset.

Removing a LCB

Procedure

1. From the tree view, select the LCB you want to remove.
 2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key. The LCB is removed from its Logical Node.
- The undo function can be used to go back to the previous state.

The GOOSE message service is an efficient real-time communication service for peer-to-peer exchanges between IEDs.

A GOOSE Control Block defines the way a Dataset is transmitted in a GOOSE message.

A GCB can be created inside the LNO only. The capabilities of an IED regarding the configuration of GCBs are defined in the Services element by the GOOSE element. For Sepam devices, only Sepam series 60 and Sepam series 80 IEDs implement the GOOSE communication service.

By default, each Sepam series 60 or Sepam series 80 IED provides 1 GCB defined in the LLN0. This GCB is pre-defined in each Sepam series 60 or Sepam series 80 ICD file. This GCB is named gcbBasicGse and is associated with the BasicGseDs Dataset.

This default GCB can be modified by the user and new GCBs can be added, depending on the capabilities of the IED.

Displaying the IED capabilities

Procedure

1. From the tree view, select the IED.
2. In the property view, expand the Services element.
3. Expand the GOOSE element to display the capabilities attributes:
 - max: this value defines the maximum number of GOOSE Control Blocks that can be created. If the max value is equal to the number of preconfigured GCB, no new GCB can be created.

Adding a GOOSE Control Block (GCB)

To add a GCB in the LNO, there must be at least one Dataset GOOSE compatible in this Logical Node.

A Dataset is compatible when:

- The number of FCDA defined is less or equal to the maximum allowed.
- The size of the dataset is compatible with the Ethernet frame size.

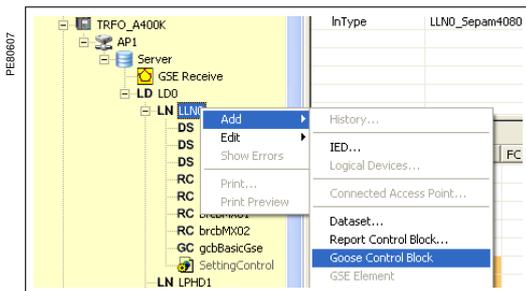
Procedure

1. From the tree view, select the LNO of an IED.
2. In the menu bar or in the contextual menu, click **Add > GOOSE Control Block**. The GOOSE Control Block Details dialog box opens which is used to set the GCB attributes.
3. Set the GCB attributes according to the information given in the GOOSE Control Block Details section below.
4. Click **OK** to validate the operation.

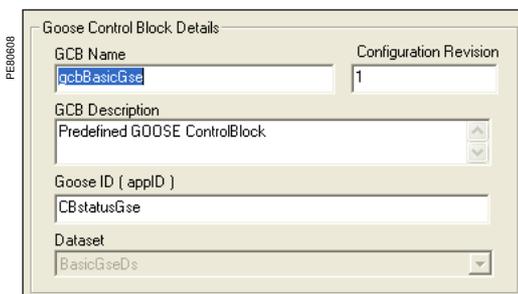
When the operation is complete, the changes to the GCB are reflected in the current SCL file and the CET850 display is updated: a newly created GCB is displayed in the tree view and the settings of the GCB are updated in the property view.

GOOSE Control Block Details

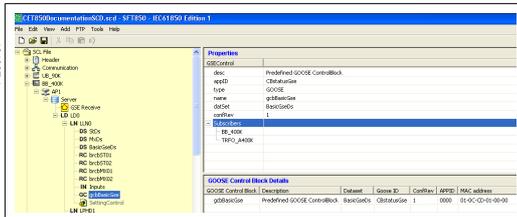
- GCB name: name of the GCB. The name must be unique in the Logical Node. Only alphanumeric characters are allowed.
- GCB description: description of the GCB (optional, may be empty).
- Dataset: name of the Dataset attached to the GCB. It is selected from the list of the compatible datasets given in a list box.
- GOOSE ID: Identification of the GCB. A system-wide unique identification of the application to which the GOOSE message belongs (mandatory, cannot be empty).
- Configuration revision: Revision number of the Dataset. It indicates to the client any modifications inside the GCB (mandatory, cannot be empty), or inside the associated Dataset.



Adding a GOOSE Control Block.



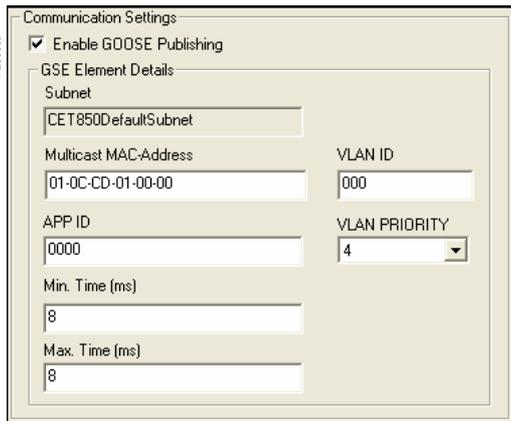
GOOSE Control Block Details.



GOOSE Control Block Properties.

GOOSE Control Block Properties

- Subscribers: list of consumer IED names of the GCB.



GOOSE Control Block communication settings.

Communication settings

These attributes are used to transmit the GOOSE.

Enable GOOSE Publishing

This option is available only if the IED is connected to the communication network. To connect the IED, see See "Adding a Connected Access Point" on page 25. Checking/unchecking this option allows to enable/disable the publishing of the GOOSE message on the communication network.

When the publishing is enabled, a GSE element is automatically created at the same time in the ConnectedAP section inside the communication section. When the publishing is disabled, the GSE element is automatically deleted.

It is also possible to enable/disable the publishing of a GOOSE at the Connected Access Point level, inside the Communication section. See "Editing GSE Elements" on page 40.

GSE Element Details

- MAC-Address: multicast MAC address of the GOOSE, default '01 0C CD 01 00 00'
- APPID: application identifier. 4 hexadecimal digits from '0000' to '3FFF', default '0000'.
- VLAN-PRIORITY: Virtual LAN priority. From '0' to '7', default '4'.
- VLAN-ID: Virtual LAN identifier. 3 hexadecimal digits, default '000'.
- MinTime: Minimum time for GOOSE message reiteration. Range from 4 ms to 30 000 ms, default 8 ms.
- MaxTime: Maximum time for GOOSE message reiteration. Range from 4 ms to 30000 ms (30 s), default 2050 ms.

Modifying a GOOSE Control Block

Procedure

1. From the tree view, select a GCB and click **Edit > Modify** in the contextual menu. The GCB settings window opens.
2. To modify the GCB content, See “GOOSE Control Block Details” on page 37. The undo function can be used to go back to the previous state.

Copying or moving a GOOSE Control Block

When a GCB has been created, it can be moved or copied to the LN0 of another Logical Device if needed, using the copy/cut and paste or drag-and-drop methods.

The undo function can be used to go back to the previous state.

Note: GOOSE Control blocks are linked to Datasets which must reside in the same Logical Node. When copying or moving a GCB, be sure to keep valid the reference to the Dataset.

Removing a GCB

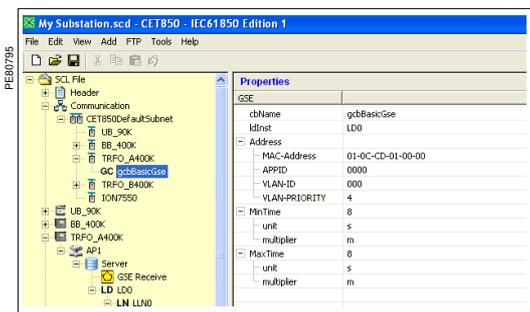
Procedure

1. From the tree view, select, the GCB you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the **DEL** key.

The GCB is removed from its Logical Node.

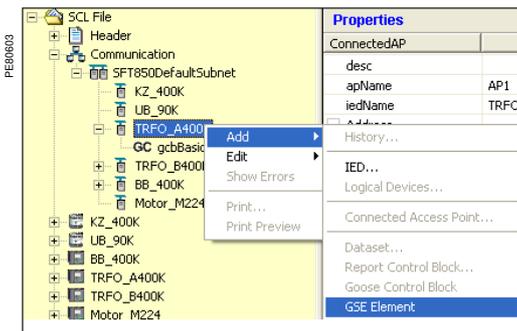
The undo function can be used to go back to the previous state.

Note: If the GCB is linked to a GSE element at the Connected Access Point level in the Communication section, the GSE element is automatically deleted when removing the GCB.



GSE element in a ConnectedAp.

The GSE element contains the settings used for publishing of a GOOSE message on the communication network by an IED. It is defined at the IED Connected Access Point level, inside the Communication section.



Adding a GSE element.

Adding a GSE element

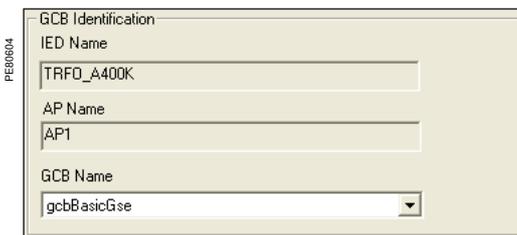
To add a GSE element to the Connected AP element of an IED, there must be at least one GOOSE Control Block in this IED to publish.

Procedure

To create a GSE element:

1. From the tree view in the Communication section, select a ConnectedAP of an IED.
2. In the menu bar or in the contextual menu, click **Add > GSE Element**. A dialog box opens that allows setting the GSE element attributes.
3. Set the GSE element attributes according to the GCB Identification and GOOSE Publishing Details sections below.
4. Click **OK** to validate the operation.

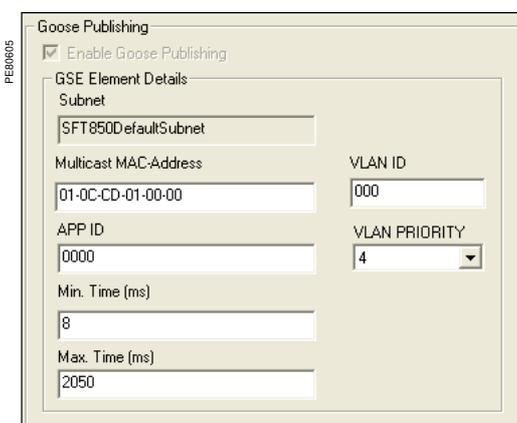
Once the operation is complete, the changes to the GSE element are reflected in the current SCL file and the CET850 display is updated: a newly created GSE element is displayed in the tree view and the settings of the GSE element are updated in the property view.



GCB identification settings.

GCB identification

- IED name: name of the IED. This field is grayed and cannot be changed.
- AP name: name of the Connected AP. This field is grayed and cannot be changed.
- GCB name: list of available GCBs in the selected IED.



GOOSE publishing settings.

GOOSE publishing

Enable GOOSE Publishing option

Adding a GSE element is equivalent to enable the publishing of a GOOSE message. By default this option is checked and cannot be changed.

GSE Element Details

- MAC-Address: multicast MAC address of the GOOSE, default '01 0C CD 01 00 00'
- APPID: application identifier. 4 hexadecimal digits from '0000' to '3FFF', default '0000'.
- VLAN-PRIORITY: Virtual LAN priority. From '0' to '7', default '4'.
- VLAN-ID: Virtual LAN identifier. 3 hexadecimal digits, default '000'.
- MinTime: Minimum time for GOOSE message reiteration. Range from 4 ms to 50 ms, default 8 ms.
- MaxTime: Maximum time for GOOSE message reiteration. Range from 100 ms to 30000 ms (30 s), default 2000 ms (2 s).

Modifying a GSE element

Procedure

1. From the tree view, select an GCB and click **Edit > Modify** in the contextual menu. The GSE element settings window opens.
2. To edit the GSE element details, see "GSE Element Details", page 40. The undo function can be used to go back to the previous state.

Removing a GSE element

Removing a GSE element is equivalent to disable the publishing of a GOOSE message.

There are 2 possible ways to remove a GSE element:

- directly by deleting the GSE element from the tree view (see procedure 1 below),
- indirectly by editing the associated GOOSE Control Block and disabling the GOOSE publishing (see procedure 2 below).

Procedure 1

1. From the tree view, select the GSE Element you want to remove.
2. In the menu bar or in the contextual menu, click **Edit > Delete** or press the DEL key. The GSE Element is removed from its ConnectedAP. The undo function can be used to go back to the previous state.

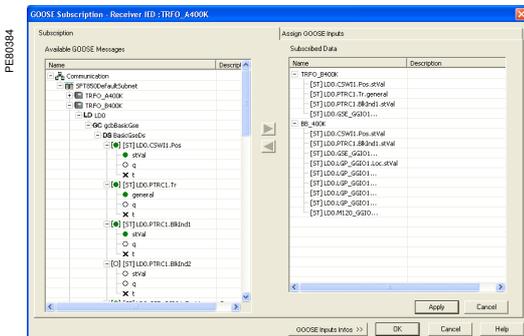
Procedure 2

1. From the tree view, select the GOOSE Control Block associated with the GSE Element you want to remove.
 2. In the menu bar or in the contextual menu, click **Edit > Modify**.
 3. Uncheck the Enable GOOSE Publishing option.
 4. Click OK to validate the modification.
- The GSE Element is removed from its ConnectedAP in the Communication section. The undo function can be used to go back to the previous state.

Modifying the GOOSE Receive

Procedure

1. From the tree view, double-click GOOSE Receive of the consumer IED or click **Edit > Modify** in the contextual menu. A dialog box, organized in 2 tabs, opens. The dialog box enables the user to select GOOSE Messages to subscribe to data from these messages, and then to assign the subscribed data to Sepam GOOSE inputs.
2. In the **Subscription** tab:
 - 2.1 Select the GOOSE messages that will be received by the IED (these messages are selected from all the GOOSE messages produced on the network).
 - 2.2 Select the Data Attributes (DA) which might be useful for the consumer IED.
3. In the **Assign GOOSE Inputs** tab, using the list of all subscribed DA, assign each FCDA to a Sepam GOOSE input. A user name and user description can also be assigned to each Sepam GOOSE input.



GOOSE subscription dialog box.

Subscription tab

The subscription tab is divided into 2 parts:

- The left part gives the list of all GOOSE messages that are produced by the IEDs present in the SCL file, including their associated datasets.
- The right part gives the list of the Data Attributes (DAs) selected for subscription from the datasets published as GOOSE messages.

All the DAs defined in the dataset are displayed, but only DAs with a Functional Constraint [ST] can be selected. Inside the [ST] group, only the DA of type BOOLEAN, Dbpos, or Quality can be selected. A specific mark is added to indicate if a DA can be selected or if it is already selected.

Mark	Meaning
<input type="radio"/>	The DA is free and can be selected for subscription.
<input checked="" type="radio"/>	The DA is selected for subscription. It cannot be selected again.
[<input type="radio"/>]	The structure contains at least 1 DA which is free and which can be selected for subscription.
[<input checked="" type="radio"/>]	The structure contains at least 1 DA which is selected for subscription.
✗	The DA is not valid for subscription.
[✗]	The structure does not contain any valid DA for subscription.

It is possible to select for subscription a GOOSE message produced by the IED itself. The same data attribute can be selected for subscription only once. GOOSE messages with incompatible dataset cannot be selected and are displayed in the list in grey color.

Procedure

Subscribe

1. Select the valid DA in the left part and click on the right button arrow .

The DA is added to the right list for subscription.

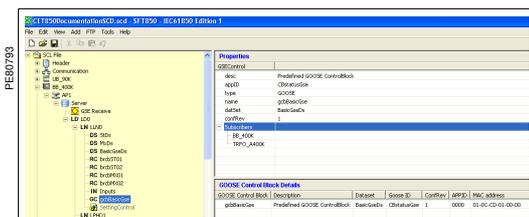
Unsubscribe

2. Select the DA in the right part and click on the left button arrow .

The DA is removed from the right list for subscription.

To validate the subscriptions and go to the **Assign GOOSE Inputs** tab, select the button **Apply**.

When the GOOSE message subscription is complete, the list of subscriber IED names is updated in the GCB Properties view for each GCB subscriber. To obtain the list of subscribers for a given GCB, select the GCB. The Properties view is refreshed with the section Subscribers that contains the IED subscribers.



GOOSE Receive Subscribers section view.

GOOSE Input Details

The GOOSE Input Details section is updated with all the GOOSE messages subscribed in the GOOSE Receive dialog box.

- The lower part is split into 2 when the structure of the Dataset in the Producer Side is different from the structure of the Dataset in the Private GOOSE Receive.
- The first column displays the content of the Private GOOSE Receive.
- The second column displays the content of the Dataset in the Producer Side.

Assign GOOSE Inputs tab

The **Assign GOOSE Inputs** tab is used to assign the subscribed DAs to the Sepam GOOSE inputs. This tab is available only if some GOOSE data has been previously subscribed.

The **Assign GOOSE Inputs** tab displays a table.

Table rows

The table rows lists all the DAs previously selected for subscription, with their full name and their associated description.

Two specific attributes by dataset are added for assignment:

- QR: quality reception
At run time, the QR attribute is set to 1 to inform that the GOOSE message was not received in the expected time.
- QD: dataset consistency
At run time, the QD attribute is set to 1 to inform that the structure of the received GOOSE message is different from the structure defined at subscription time.

Table columns

The table gives in column the list of the Sepam GOOSE inputs to which the DAs can be assigned/de-assigned by selecting the appropriate cells in the table. Sepam provides 31 GOOSE inputs named G401 to G416 and G501 to G515. Several DAs can be assigned to the same Sepam GOOSE input. In this case, Sepam applies a wired-OR logic operation to these DAs.

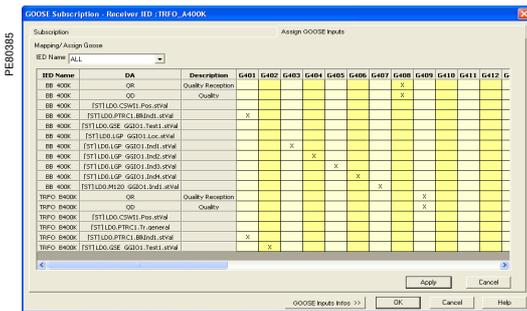
Procedure to assign/de-assign a DA

1. To assign/de-assign a DA to/from a Sepam GOOSE input, click on the cell associated with the DA (in row) and with the GOOSE input (in column). When the DA is assigned to the GOOSE input, a cross is displayed inside the cell. When the DA is de-assigned from the GOOSE input, the cross disappears.
2. To validate the assignment matrix, click on the **Apply** button.

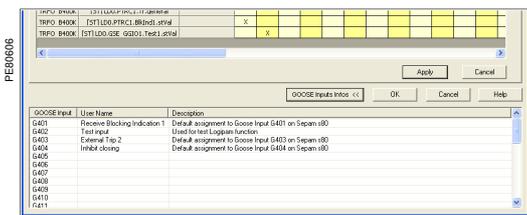
Procedure to edit GOOSE Inputs Infos

The lower part of the main dialog box can be extended to edit details about the Sepam GOOSE inputs. This part of the dialog allows the user to assign a name and a description to each Sepam GOOSE input.

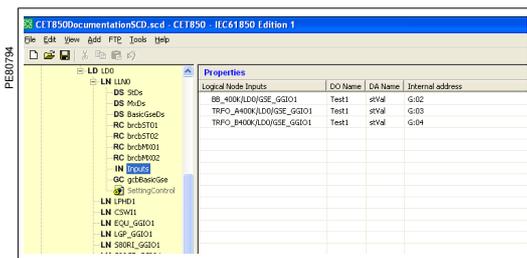
1. To display the GOOSE Inputs details, click the **GOOSE Inputs Infos >>** button.
2. A table is displayed that lists all of the GOOSE inputs with 2 text fields for the user name and description. The user can edit these 2 fields for each GOOSE input.



Assign GOOSE Inputs tab.



GOOSE Inputs infos.

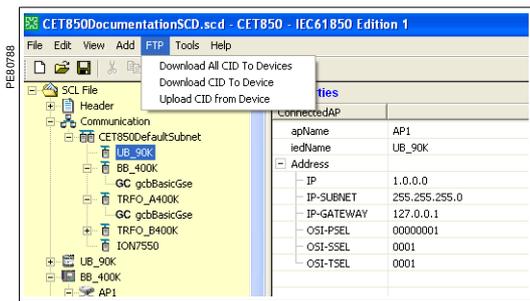


Logical Node Inputs Properties view.

Logical Node Inputs

The Logical Nodes Inputs section is updated with all the GOOSE messages subscribed in the GOOSE Receive dialog box.

The list of all GOOSE messages subscribed is displayed in the Properties view.



FTP menu.

The FTP function is used to download or upload CID files to/from a device. With the CET850, the user can download an individual CID file or several CID files as a group.

Downloading all CID files

Procedure

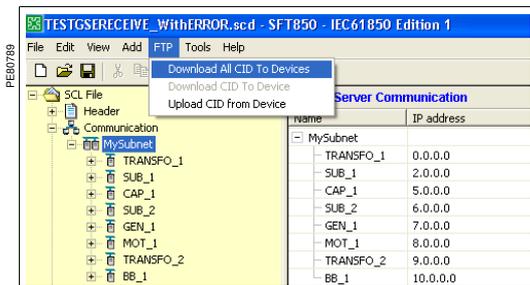
To download all CID files:

1. From the tree view, select the **Communication** element.
2. From the tree view, select the subnet element.
3. In the menu bar, right-click and select the **Download All CID To Devices**.

A dialog box opens, displaying the CID files available for download.

4. In the dialog box, select the files to download by checking the associated box. To download all files, check the **Select All** box.
5. Click **Download** to validate the operation.

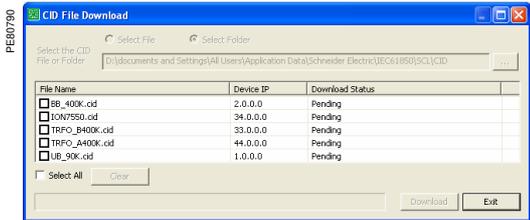
The dialog box remains open until all the CID files are downloaded.



Downloading all CID files.

If a download operation is unsuccessful, the line is red.

To close the dialog box, click the **Exit** button.



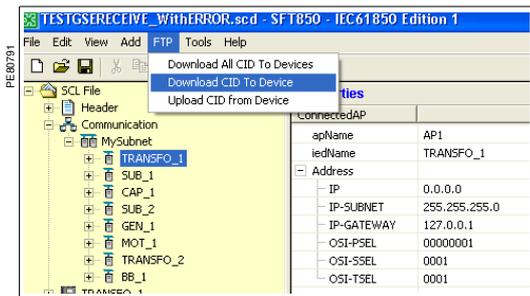
Selecting CID files to download.

Downloading a CID file

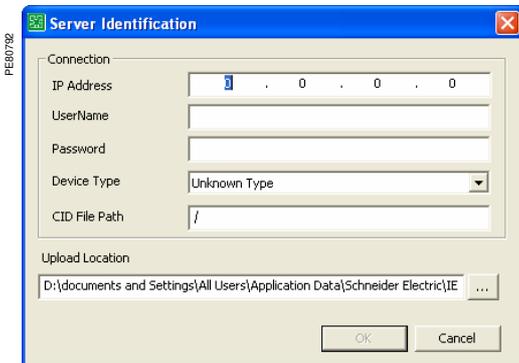
Procedure

To download a CID file:

1. From the **Communication** tree view, select the connected Access Point associated with the IED.
2. In the menu bar, right-click and select the **Download CID To Device**.
3. Click **Download** to validate the operation.



Downloading a CID file.



Uploading a CID file.

Uploading a CID file

Procedure

To upload a CID file:

1. In the menu bar, right-click and select the **Upload CID from Device**.

A dialog box opens, displaying the server identification and device credentials fields to complete.

2. In the dialog box, complete the fields as follows:

■ **UserName:** enter the default username specific to the device type:

Sepam series 20, Sepam series 40, Sepam series 60, and Sepam series 80: Admin

G3200: Administrator

ION Series 7000/8000: 0

ECi850 Sepam server: Administrator

■ **Password:** enter the default username specific to the device type:

Sepam series 20, Sepam series 40, Sepam series 60, and Sepam series 80: ACE850

G3200: G3200

ION Series 7000/8000: 0

ECi850 Sepam server: ECi850

ECi850 Sepam server: ECi850

■ **Device Type:** select the device type from the combo list.

■ **CID File Path:** the default location is automatically selected by the CET850. This location is the same as the default location used for building CID files.

■ **Upload Location:** enter the path of the desired location on the hard drive.

Note: The default device credentials are kept in the Windows registry. During a download operation, the CET850 checks for the registry settings and attempts to authenticate the settings if present. If the registry settings are missing, the CET850 uses the hardcoded default values.

3. Click **OK** to validate the operation.

■ If the device credentials entered are invalid, a box opens prompting the user for valid credentials.

■ If the CID file selected is at the correct location and the device credentials entered are valid, the CET850 displays a message indicating that the CID file download is in progress.

■ If the CID file selected or the device credentials entered are invalid, the CET850 displays a message indicating that the CID file download is unsuccessful.

■ If the selected IED already exists in the default location of the CID file, the CET850 displays a message prompting the user to use the existing IED or to rebuild the CID file.

The download starts as soon as the CID file is built.

```

1 <?xml version="1.0" encoding="UTF-8" standa
2 <SCL xmlns="http://www.iec.ch/61850/2003/SCI
3 <Private type="Schneider-Electric-SFT-Edit
4 <Private type="Schneider-Electric-SFT-Vers
5 <Header id="SCD file" nameStructure="IEDNa
6 <History>
7 <Hitem revision="0" version="V1" what=
8 </History>
9 </Header>
10 <Communication>
11 <SubNetwork name="SPT850DefaultSubnet">
12 <ConnectedAP apName="AP1" iedName="KZ_
13 <Address>
14 <P type="IP" xsi:type="tP_IP">10.1
15 <P type="IP-SUBNET" xsi:type="tP_I
16 <P type="IP-GATEWAY" xsi:type="tP_

```

XML source view.

XML source editing

Expert users can directly edit the XML code of the SCL file. By default, this function is disabled. It can be enabled by checking the **Enable XML source editing** option in the menu **Tools > Preferences**.

To display XML code:

In the menu bar, click **View > XML source**.

The whole file is displayed even if some parts are hidden in the tree view.

To go back to normal display mode, click **View > Property View**.

NOTICE

RISK OF SCL FILE CORRUPTION

XML source editing must be used with extreme care. Inappropriate modifications may corrupt the SCL file.

Failure to follow these instructions can result in equipment damage.

Backup and file recovery

When an SCL file is opened for editing, a backup of the file is done with the same name as the SCL file but with BAK extension. In case of errors in the file, it is possible to go back to the previous state before the last save command.

By default, the current SCL file is saved every 5 minutes.

This function is controlled in the menu **Tools > Preferences**.

User preferences

The Preferences window allows the user to customize CET850.

Procedure

1. In the Menu bar, click **Tools > Preferences** to display Preferences window.
2. Check options or set fields to enable desired features in CET850.

Option/Field	Default	Explanation
IEC 61850 standard	1	Specifies the IEC 61850 edition to be used in the CET850. This list box displays all the available IEC 61850 editions supported by CET850.
Display welcome message	No	Display/hide the Welcome message to select the IEC61850 Edition at the application launch.
IED full display mode	No	Display/hide intermediate SCL levels with little or no added value/interest
Display DataType Templates section	No	Display/hide DataType Templates section
Display Substation section	No	Display/hide Substation section
Display Process Bus elements	No	Display/hide SMV elements in the Communication section
Delete confirmation required	Yes	Deletion needs confirmation
Enable XML source editing	No	Enable XML source editing
Enable periodical backup	Yes	Make periodical backup of open file
Period for automatic backup	5 mn	Period for current SCL file backup
Automatic validation at file opening	Yes	Check XML syntax at file opening
Automatic validation at file saving	No	Check XML syntax at file saving
ICD library path	C:\Program Files\ Schneider\SFTCommon\ IEC61850\Edition1\ICD	Path for the standard ICD library
SCL schema	C:\Program Files\ Schneider\SFTCommon\ IEC61850\Edition1\XSD	Path for IEC 61850 SCL XML schema

Abbreviation	Meaning
AP	Access Point
APPID or AppID	Application Identification
BRCB	Buffered Report Control Block
BDA	Basic DATA Attribute, i.e. not structured
CB	Control Block
CDC	Common Data Class
CID	Configured IED Description
DA	Data Attribute
DAI	Instantiated Data Attribute
DAType	Type of Data Attribute
DO	Data Object
DOI	Instantiated Data Object
DOType	Type of a Data Object
FC	Functional Constraint
FCD	Functional Constrained Data
FCDA	Functional Constrained Data Attribute
GCB	GOOSE Control Block
GOOSE	Generic Object-Oriented Substation Event
GSE	Generic Substation Event
GSSE	Generic Substation Status Event
Hitem	History Item
ID	Identifier
IED	Intelligent Electronic Device
ICD	IED Configuration Description
IP	Internet Protocol
LD	Logical Device
IdInst	Instance identification of a Logical Device
LAN	Local Area Network
LCB	Log Control Block
LN	Logical Node
LNType	Type of a LN
InInst	Instance number of a Logical Node
MAC	Medium Access Control
MSV	Multicast Sampled Value
MsvID	ID for MSV (Multicast Sampled Value)
RCB	Report Control Block
SCD	Substation Configuration Description
SCL	Substation Configuration Description Language
SDI	Instantiated Sub DATA
SDO	Sub DATA within a DOType, referencing another DOType
SG	Setting Group
SV	Sampled Values
TCP	Transmission Control Protocol
URCB	Unbuffered Report Control Block
V-LAN	Virtual Local Area Network
XML	Extensible Markup Language

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