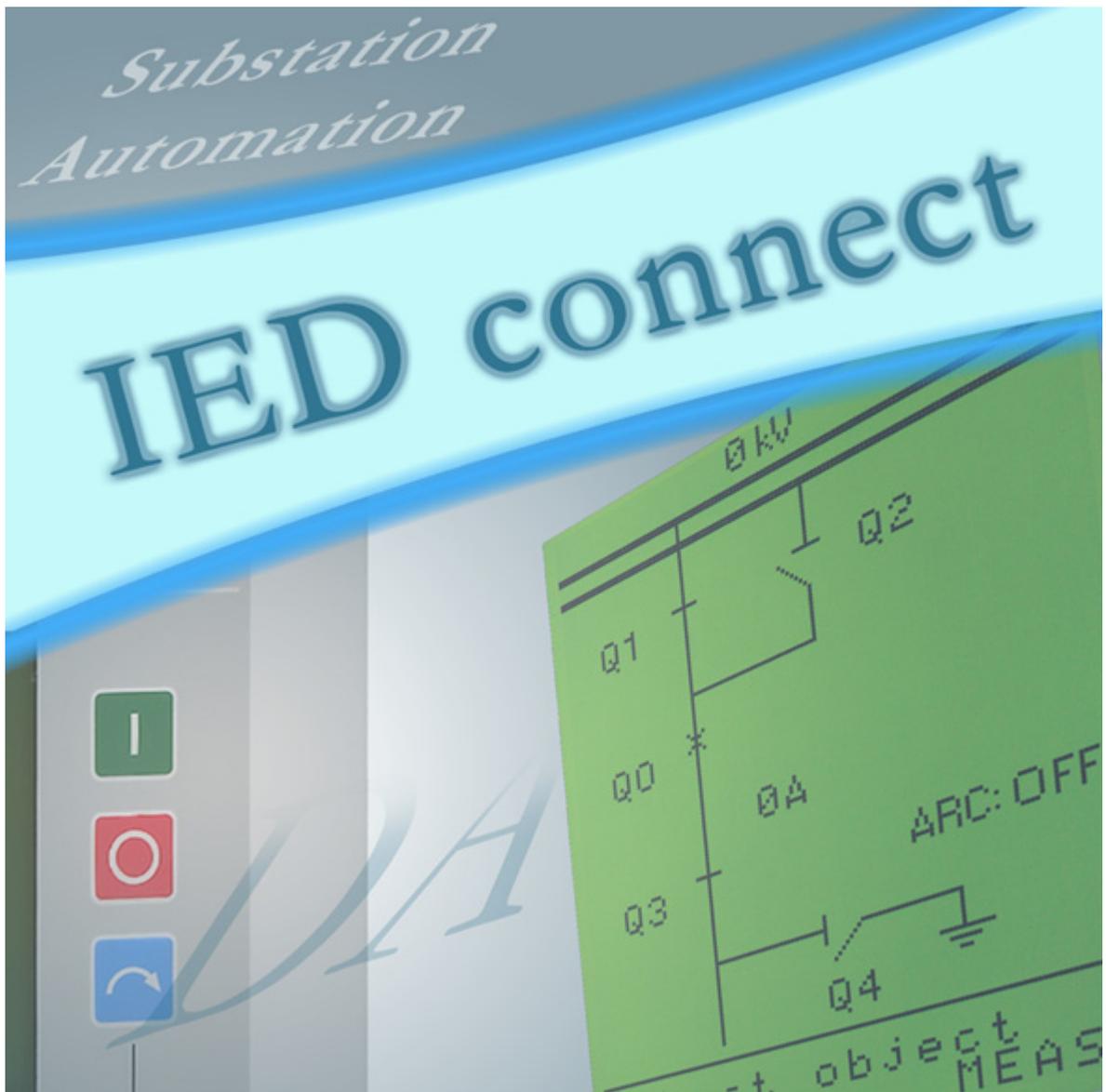


# Connectivity Packages

User's Guide - ANSI Version





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## 1. Introduction

A connectivity package is a collection of software and information related to a specific protection and control terminal, an IED (Intelligent Electronic Device). Connectivity packages enable system products and tools to connect and interact with an IED.

This manual introduces the installation and uninstallation of connectivity packages, the content and usage of connectivity packages and the logical node naming principles as well as the main functions of Connectivity Package Manager. Connectivity Package Manager is a tool that helps the user to define the right connectivity package versions for different system products and tools.

For more information on handling connectivity packages in different system products and tools, see Section 1.2. Related documents.

### 1.1. Intended audience

This manual is intended for operators, supervisors and administrators to support normal use of the product.

### 1.2. Related documents

Name of the document	Document ID
Connectivity Packages, Online Help	
MicroSCADA Pro IEC 61850 Master Protocol (OPC) *1.1 User's Guide	1MRS755321
Protection and Control IED Manager PCM 600, Online Help	
Protection and Control IED Manager PCM 600 Installation and Commissioning Manual	1MRS755552
SPA-ZC 400 Ethernet Adapter Installation and Commissioning Manual	1MRS755347
SPA-ZC 402 Ethernet Adapter Installation and Commissioning Manual	1MRS755380
COM 600 Station Automation Series COM 600 3.0 User's Guide	1MRS756125

### 1.3. Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a dialog, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the CTRL key. Although the Enter and Shift keys are not labeled they are written in capital letters, e.g. press ENTER.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).

- Press ALT E C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
- The following convention is used for menu operations: **Menu Name > Menu Item > Cascaded Menu Item**. For example: select **File > Open > New Project**.
- The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if you enter a value out of range, the following message is displayed:

**Example:**

Entered value is not valid.

You may be told to enter the string MIF349 in a field. The string is shown as follows in the procedure:

**Example:**

MIF349

- Variables are shown using lowercase letters: sequence name

**1.4.****Document revisions**

Version	Date	History
A	30.11.2006	Document created. Based on the IEC version F.

## 2. Supported IEDs

**Table 2-1 System products, protocols and tools supporting connectivity concept**

	REF 610 connectivity package	REM 610 connectivity package	REU 610 connectivity package
<b>Communication Engineering Tool for COM 610 Ver. 2.1 or later</b>			
IEC 61850	2.0 or later	2.0 or later	-
SPA	2.0 or later	2.0 or later	-
<b>Communication Engineering Tool for COM 6xx Ver. 3.0 or later</b>			
IEC 61850	2.0 or later	2.0 or later	2.0 or later
SPA	2.0 or later	2.0 or later	2.0 or later
SLD Editor	-	-	-
<b>Communication Engineering Tool for SPA-ZC 40x Ver. 1.1.0 (or later) with SPA-ZC 40x</b>			
IEC 61850	2.0 or later	2.0 or later	-
<b>Communication Engineering Tool for SPA-ZC 40x Ver. 2.0 (or later) with SPA-ZC 40x</b>			
IEC 61850	2.0 or later	2.0 or later	2.0 or later
<b>MicroSCADA Pro SYS 600 Ver. 9.0 or later</b>			
Communication Engineering Tool for IEC 61850	2.0 or later	2.0 or later	2.0 or later
SCL Importer	2.0 or later	2.0 or later	2.0 or later
<b>COM 500 Ver. 4.1 or later</b>			
Communication Engineering Tool for IEC 61850	2.0 or later	2.0 or later	2.0 or later
SCL Importer	2.0 or later	2.0 or later	2.0 or later
<b>Protection and Control IED Manager PCM 600 Ver. 1.5</b>			
IEC 61850	2.0 or later	2.0 or later	2.0 or later
SPA	2.0 or later	2.0 or later	2.0 or later
Parameter Setting	2.0 or later	2.0 or later	2.0 or later
Disturbance Handling	2.0 or later	2.0 or later	2.0 or later
Event Viewer	-	-	-
Signal Monitoring	2.0 or later	2.0 or later	2.0 or later
Signal Matrix	-	-	-

**Table 2-2 Supported medium voltage IED revisions in connectivity packages**

	REU 610					
REU 610 Connectivity Package			C			
Ver. 2.0			x			
	REF 610					
REF 610 Connectivity Package			C			
Ver. 2.0			x			
	REM 610					
REM 610 Connectivity Package			C			
Ver. 2.0			x			



The necessary connectivity packages can be downloaded from the ABB web site <http://www.abb.com/substationautomation>.

## 3. Installation and uninstallation

This chapter describes the installation and uninstallation of the connectivity packages.

### 3.1. Installing connectivity packages



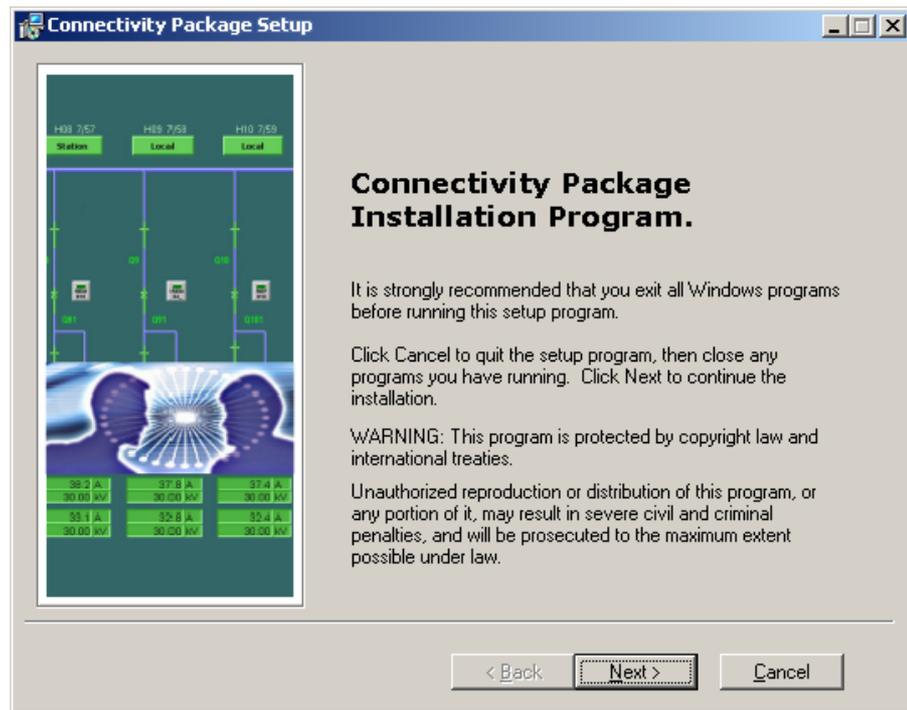
One connectivity package requires at least 55 MB of hard disk space, although the installation package size is about 30 MB.

Connectivity packages can be installed in the same environments as the system products and tools that use the connectivity packages. For more information about the system product and tool manuals, refer to Section 1.2. Related documents.

To install a connectivity package:

1. Locate the connectivity package installation program (.msi) on the computer, or download it via Internet.
2. Double-click the relevant IED connectivity package installation program to start the installation. The installation wizard extracts the installation files on your local computer.
3. After the connectivity package installation program starts, click **Next** to proceed, see Fig. 3.1.-1.

With the **Back** button, you can return to the previous dialog, and with the **Cancel** button, exit the installation wizard. This applies to all the dialogs in the installation wizard.



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Fig. 3.1.-1 Installing connectivity packages

4. Follow the instructions of the installation wizard to complete the installation.



To use the ANSI functionality of a connectivity package, you need to install an IED specific ANSI add-on package after you have successfully installed the connectivity package.

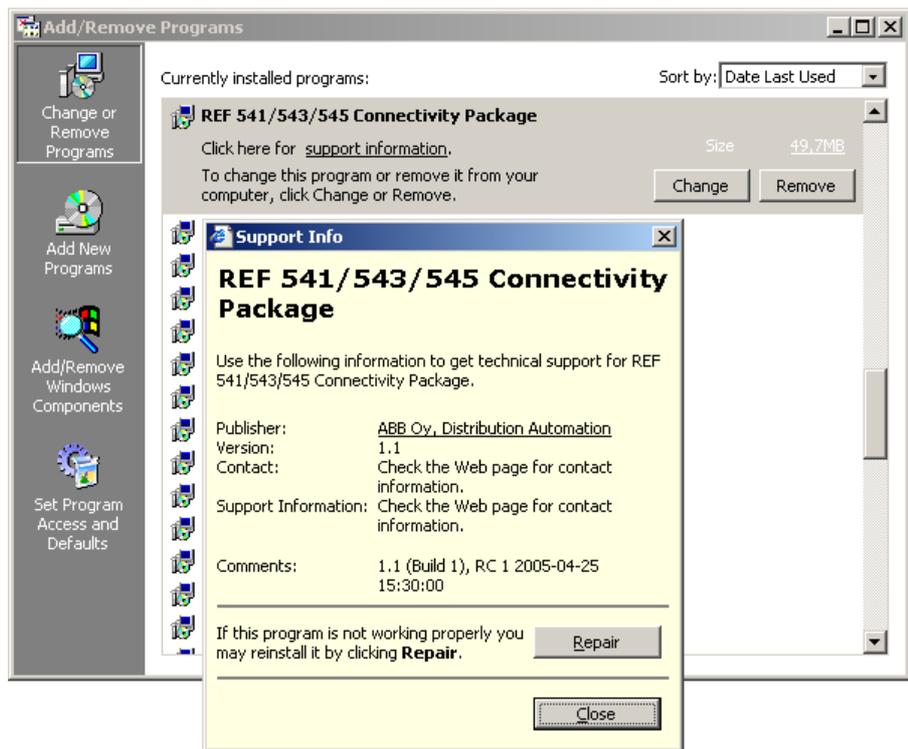
### 3.2.

#### Uninstalling connectivity packages

To uninstall the connectivity packages:

1. Double-click the Add/Remove Programs icon from the Windows Control Panel. An Add/Remove Programs dialog is displayed.
2. Select the relevant connectivity package and click **Remove**, see Fig. 3.2.-1.

You can check that you are uninstalling the right connectivity package by clicking the support information link. A Support Info dialog is displayed to identify the correct connectivity package version.



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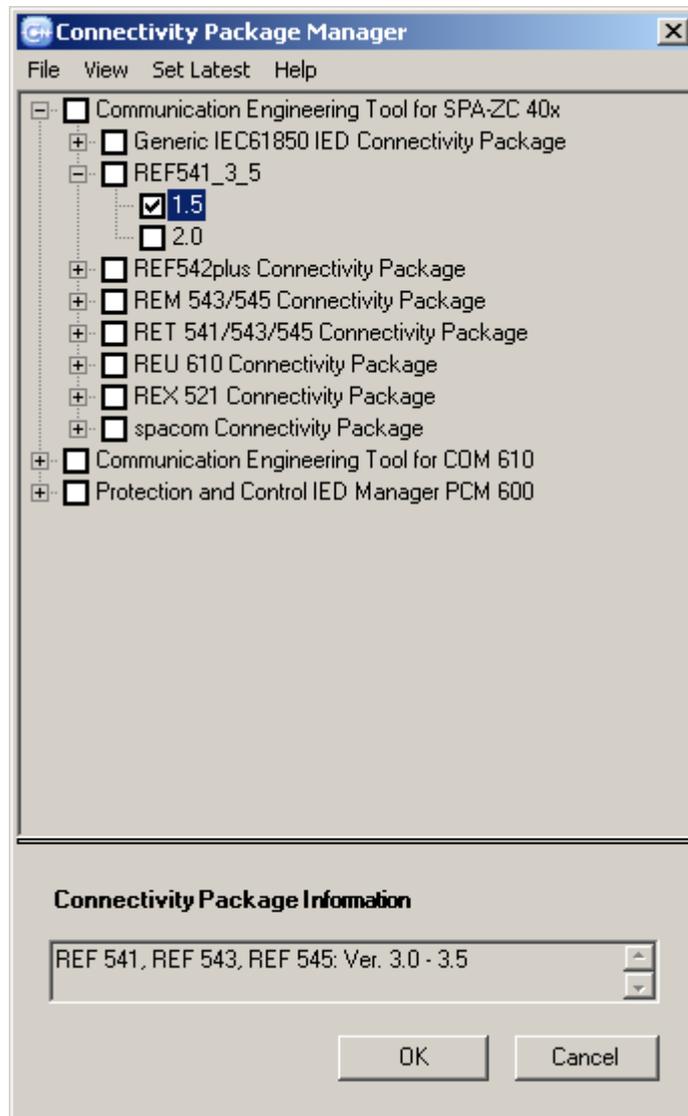
Fig. 3.2.-1 Example of Add/Remove Programs dialog



## 4. Connectivity Package Manager

Connectivity Package Manager helps you to select the right connectivity package versions for different system products and tools. Connectivity Package Manager is included in products supporting the connectivity concept. For more information on the supported system products and tools, refer to Section 1.2. Related documents and Section 2. Supported IEDs.

A Connectivity Package Manager window shows the installed system products and tools as well as the installed connectivity package versions in a tree structure, see Fig. 4.-1. The object tree shows all the information on the connectivity packages and the IED configuration tools that are installed on the computer. You can define which version of the connectivity package is used with a specific system product and tool by selecting the corresponding check box.



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Fig. 4.-1 Connectivity Package Manager

## 4.1. Starting Connectivity Package Manager

You can start Connectivity Package Manager from the shortcut icon on your computer's desktop, see Fig. 4.1.-1.



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Fig. 4.1.-1 Connectivity Package Manager icon

You can exit the program by selecting **File > Exit**.

## 4.2. Using Connectivity Package Manager

This section describes the main functions of Connectivity Package Manager.

### 4.2.1. Selecting connectivity package versions

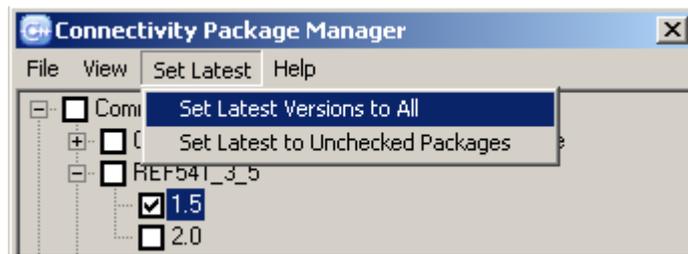
When Connectivity Package Manager is started, it shows all the system products and tools supporting connectivity concept, as well as the connectivity packages installed on your computer. You can expand and collapse Connectivity Package Manager's tree structure to see which connectivity package versions are currently used in different system products and tools.

You can browse through the object tree with the mouse or the keyboard's arrow keys. You can expand and collapse the nodes by clicking the  and  icons or by pressing the left and right arrow keys. You can also use the commands on the **View** menu to expand and collapse the nodes.

If the check box beside the version name is selected, the particular version of the connectivity package is used in the application or tool. If you clear all the versions of one connectivity package, the application or tool no longer uses that connectivity package the next time you start it. This will save some processing time during the application or tool startup.

If you have already installed some connectivity packages, Connectivity Package Manager detects them and checks if they can be used with the new IEDs. If the installed connectivity packages have a wrong version extension, Connectivity Package Manager prevents them from being defined for the new IEDs.

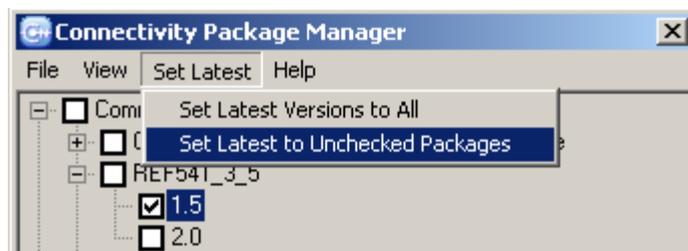
To select the latest versions of all the installed connectivity packages, select **Set Latest > Set Latest Versions to All**. The program goes through all the installed connectivity packages shown in the object tree and selects the most recent versions, see Fig. 4.2.1.-1



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Fig. 4.2.1.-1 Setting latest versions to all nodes

To select the latest version of only those connectivity packages that do not have any version selected, select **Set Latest > Set Latest to Unchecked Packages**. This command leaves the already selected connectivity package versions as they are, see Fig. 4.2.1.-2.



A060284

Fig. 4.2.1.-2 Setting latest versions to unactive packages

If the connectivity package version has information about supported IEDs, this information is shown in the text box under Supported IEDs, see Fig. 4.2.1.-3. With this information, you can confirm the right version of the connectivity package.



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Fig. 4.2.1.-3 Example of specific IED's supported versions

## 4.2.2.

### Adding connectivity packages

Connectivity packages can be installed on the local computer with Connectivity Package Manager as well. You can install connectivity packages from any location you have access to.

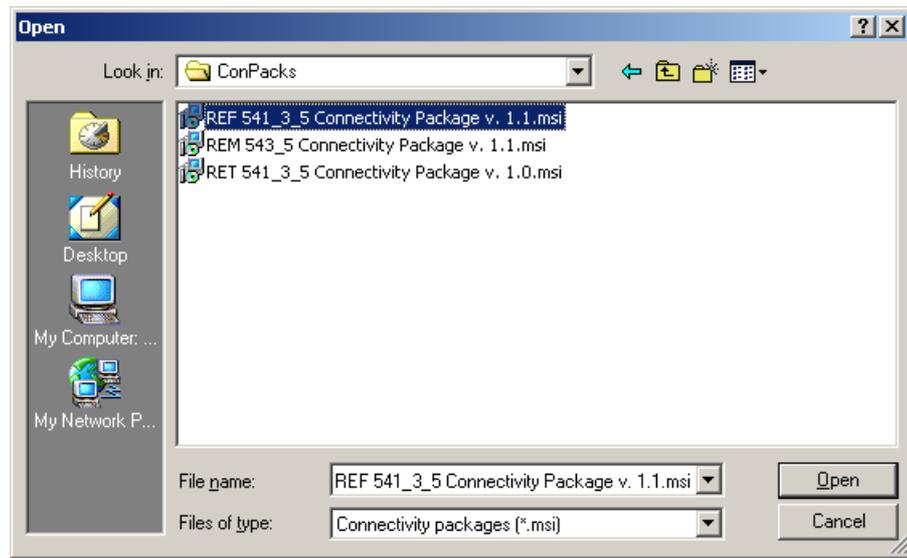
To add a new connectivity package:

1. Select **File > Add new package**. The Open dialog is displayed.



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Fig. 4.2.2.-1 Adding a new connectivity package



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Fig. 4.2.2.-2 Example of adding a connectivity package

2. Select the relevant connectivity package installer file (.msi).
3. Click **Open**.

The installation program starts to install the selected connectivity package on your local computer. For more information about installing connectivity packages, refer to Section 3. Installation and uninstallation.

---

## 5. **Content and usage of connectivity packages**

For all the products supporting the connectivity concept, the connectivity packages contain:

- Description of IED functions and capabilities in SCL (Substation Configuration description Language) format. The functions of an IED are mapped from the SPA and LON protocols to IEC 61850 protocol. The description texts in these files can be translated into other languages as well.
- Object types for device integration. These object types define the properties for a device-related object, for example the protocols that are supported by an IED.
- IED specific visual elements, for example object icons, graphical symbols and pictures in various places.
- Connectivity package related documentation
- IED specific documentation
- Other data and components needed by products using connectivity packages

The following sections describe the usage of the connectivity packages in different products. For more information on how to use connectivity packages in system products and tools, refer to documentation related to each product.

### **Control and Monitoring Unit COM 605, Communication Gateway COM 610 and Station Computer COM 615**

You can use connectivity packages with Communication Engineering Tool for COM 600 to configure COM 600 Station Automation Series' products to communicate and interact with SPA and LON devices. With the help of connectivity packages you can also configure systems that have COM 605, COM 610 or COM 615 using IEC 61850 protocol and SPA-ZC 40x to communicate and interact with SPA devices.

Additionally connectivity packages contain IED specific information for single line diagram, parameter setting and disturbance recording uploading. With this information you can easily configure COM 605 or COM 615 so that they have the IED specific information and functionality available in the web based HMI.

### **Ethernet Adapter SPA-ZC 40x**

You can use the connectivity packages to configure SPA-ZC 40x with CET for SPA-ZC 40x.

### **MicroSCADA Pro SYS 600 and COM 500**

In MicroSCADA Pro SYS 600 \*9.0 or later and COM 500 \*4.1 or later, you can use the connectivity packages to configure the IEC 61850 OPC server. This is usually done by importing the export file that is generated when SPA-ZC 40x is configured. In MicroSCADA Pro SYS 600 \*9.1 or later and COM 500 \*4.2 or later, the same export file can also be used to build up the process database.

**Protection and Control IED Manager PCM 600**

You can use the connectivity packages to create configuration structure in PCM 600. In addition to other products supporting connectivity concept, the connectivity packages for PCM 600 contain:

- Description of IED internal parameters and their properties (for example data format, unit, setting range, visibility, access rights, and so on). The description texts can be translated into other languages as well.
- Software components that adapt the IED-specific interfaces to the standard interfaces of system products and tools, for example IED-specific dispatchers for tools. This means that there is protocol-specific adaptation for the Parameter Setting and Disturbance Handling tool components, for example disturbance uploading according to COMTRADE.

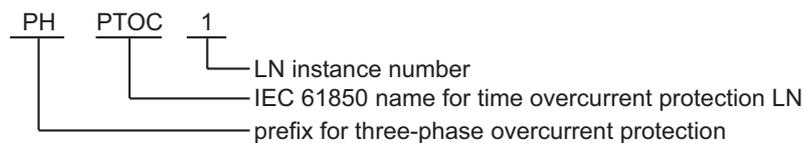
## 6. Logical node naming

The connectivity packages contain the descriptions for logical nodes and function blocks of IEDs. When an IED configuration (SCL file or CAP project file) is imported, a structure containing definitions of logical nodes is constructed.

When the IED configuration is imported, for example, to Communication Engineering Tool (CET), you can see the logical devices (LD) and logical nodes (LN). An IED object can include many logical devices, and a logical device can include many logical nodes.

The logical node names are composed of three different parts: LN prefix, LN class and LN instance number. The LN prefix is an ABB specific string with less than five characters (see the table below). The LN class is the name of the logical node class defined in the IEC 61850-7-4 specification, refer to the Section 1.2. Related documents. The LN instance number is the ID number of the logical node.

The Fig. 6.-1 shows an example of designation code for the logical nodes in connectivity packages. In the following example, the logical node name is PH PTOC 1.



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Fig. 6.-1 Logical node naming in connectivity packages

### 6.1. Logical node mapping for REU 610, REF 610 and REM 610

Table 6.1.-1 LN mapping for REU 610

Function	Logical Node Prefix	Logical Node Class	Logical Node Instance	Description
<b>Protection</b>				
59P-1	DO	PTOV	1	Overvoltage protection, low-set stage
59P-2	DO	PTOV	2	Overvoltage protection, high-set stage
47	DO	PTOV	2	Negative phase-sequence overvoltage protection
27P-1	DU	PTUV	1	Undervoltage protection, low-set stage
27P-2	DU	PTUV	2	Undervoltage protection, high-set stage
27D	DU	PTUV	2	Positive phase-sequence undervoltage protection
59N-1	ZS	PTOV	3	Residual overvoltage protection, low-set stage
59N-2	ZS	PTOV	4	Residual overvoltage protection, high-set stage
CBFAIL		RBRF	1	Circuit-breaker failure protection

**Table 6.1.-1 LN mapping for REU 610 (Continued)**

Function	Logical Node Prefix	Logical Node Class	Logical Node Instance	Description
<b>Measurements</b>				
U <sub>12</sub>	U	MMXU	1	Measured phase-to-phase voltage U <sub>12</sub>
U <sub>23</sub>	U	MMXU	1	Measured phase-to-phase voltage U <sub>23</sub>
U <sub>31</sub>	U	MMXU	1	Measured phase-to-phase voltage U <sub>31</sub>
U <sub>0</sub>	U	MMXU	1	Measured residual voltage U <sub>0</sub>
U <sub>1s</sub>		MSQI	1	Positive phase-sequence voltage
U <sub>2s</sub>		MSQI	1	Negative phase-sequence voltage
DR		RDRE	1	Disturbance recorder function

**Table 6.1.-2 LN mapping for REF 610**

Function	Logical Node Prefix	Logical Node Class	Logical Node Instance	Description
<b>Protection</b>				
51P	PH	PTOC	1	Three-phase non-directional overcurrent protection, low-set stage
50P-1	PH	PTOC	2	Three-phase non-directional overcurrent protection, high-set stage
50P-2	PH	PIOC	1	Three-phase non-directional overcurrent protection, instantaneous stage
46	CUB	PTOC	5	Phase discontinuity protection
49	CAB	PTTR	1	Three-phase thermal overload protection for cables
51N	EF	PTOC	3	Non-directional ground-fault protection, low-set stage
50N	EF	PTOC	4	Non-directional ground-fault protection, high-set stage
ARC		SARC	1	ARC protection
CBFAIL		RBRF	1	Circuit-breaker failure protection
79		RREC	1	Automatic reclosing
<b>Measurements</b>				
I <sub>a</sub>	I	MMXU	1	Current measured on phase I <sub>a</sub>
I <sub>b</sub>	I	MMXU	1	Current measured on phase I <sub>b</sub>
I <sub>c</sub>	I	MMXU	1	Current measured on phase I <sub>c</sub>
DR		RDRE	1	Disturbance recorder function

**Table 6.1.-3 LN mapping for REM 610**

Function	Logical Node Prefix	Logical Node Class	Logical Node Instance	Description
<b>Protection</b>				
49	TOL	PTTR	1	Thermal overload protection
I <sub>s</sub> 2 x t <sub>s</sub> or I <sub>s</sub>	S	PMSS	1	Start-up supervision
50P	SC	PTOC	1	Short-circuit protection
37	UI	PTUC	1	Undercurrent protection
51N	EF	PTOC	2	Ground-fault protection

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**Table 6.1.-3 LN mapping for REM 610 (Continued)**

Function	Logical Node Prefix	Logical Node Class	Logical Node Instance	Description
46	CUB	PTOC	3	Unbalance protection
46R	PRV	PPAM	1	Phase reversal protection
$\Sigma t_s$	CS	PMRI	1	Cumulative start-up time counter
CBFAIL	CB	RBRF	1	Circuit-breaker failure protection
49/38-1	T	PTTR	2	Temperature protection
49/38-2	T	PTTR	2	Temperature protection
<b>Measurements</b>				
$I_a$	I	MMXU	1	Current measured on phase $I_a$
$I_b$	I	MMXU	1	Current measured on phase $I_b$
$I_c$	I	MMXU	1	Current measured on phase $I_c$
$I_0$	I	MMXU	1	Measured ground-fault current
DR		RDRE	1	Disturbance recorder function



## 7. Abbreviations

Abbreviation	Description
CAP	Computer Aided Programming system (a tool used to configure, maintain and operate the protection and control IEDs)
CET	Communication Engineering Tool
COMTRADE	Common Format for Transient Data Exchange
HMI	Human-machine interface
ID	Identifier; identification
IEC	International Electrotechnical Commission
IED	Intelligent electronic device
LD	Logical device
LN	Logical node
LON	Local operating network
OPC	OLE (Object linking and embedding) for process control
SCL	Substation configuration description language (defined by IEC 61850)
SLD	Single-line diagram
SPA	Data communication protocol developed by ABB



## 8. Terminology

Term	Description
Communication Engineering Tool	Also known as CET. Software for configuring and monitoring communication gateways or communication front ends.
connectivity concept	The connectivity concept separates the IED specific information from system products and tools. Applications and tools supporting the connectivity concept can be updated easily with the latest versions of the IED-specific information.
connectivity package	Connectivity package is a collection of software and information related to a specific protection and control terminal (IED), providing system products and tools to connect and interact with the IED.
IEC 61850	A communication protocol based on the IEC 61850 standard series and a standard for substation modeling.
Intelligent Electronic Device	Also known as IED. Devices containing advanced logics such as meters, protection and control relays and trip units.
system products and tools	A system product is a product that administers one of the supported tools, for example, different CETs or PCM 600. A tool is one of the supported tools, for example, SCL Importer or Event Viewer.











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