
Protection and Control IED Manager PCM600

Cyber Security Deployment Guideline





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Section 1 Introduction

1.1 This manual

The cyber security deployment guideline describes the process for handling cyber security when engineering and monitoring protection and control IEDs. The cyber security deployment guideline provides information on how to secure the engineering environment on which the IED is installed. The guideline can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service. See also all IED-related cyber security deployment guidelines.

1.2 Intended audience

This guideline is intended for the system engineering, commissioning, operation and maintenance personnel handling cybersecurity during the product lifecycle.

The personnel is expected to have general knowledge about topics related to cybersecurity.

- Protection and control IEDs, gateways and workstations
- Networking, including Ethernet and TCP/IP with its concept of ports and services
- Security policies
- Firewalls
- Antivirus protection
- Application whitelisting
- Secure remote communication

1.3 Product documentation

1.3.1 Product documentation set

The cyber security deployment guideline describes the process for handling cyber security when engineering and monitoring protection and control IEDs. The cyber security deployment guideline provides information on how to secure the engineering environment on which the IED is installed. The guideline can be used as a technical reference during the engineering phase, installation and

commissioning phase, and during normal service. See also all IED-related cyber security deployment guidelines.

The getting started guide provides basic instructions on how to use PCM600. The manual provides instructions for typical use cases in operation and field, as well as for use cases in engineering and commissioning. The purpose of the manual is to describe the PCM600 tool functionality, and it can be seen as a complementary manual to the application-related instructions, such as the relay-specific operation or engineering manuals.

The online help contains instructions on how to use the software.

1.3.2 Document revision history

Document revision/date	Product version	History
A/2015-11-20	2.7	First release
B/2016-09-29	2.8	Content updated to correspond to the product version
C/2018-04-18	2.9	Content updated to correspond to the product version
D/2020-01-22	2.10	Content updated to correspond to the product version
E/2021-11-17	2.11	Content updated to correspond to the product version
F/2022-11-30	2.12	Content updated to correspond to the product version

1.3.3 Related documentation

Product series- and product-specific manuals can be downloaded from the ABB Web site abb.com/mediumvoltage.

1.3.4 Symbols and conventions

1.3.4.1 Symbols



The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.



The information icon alerts the reader of important facts and conditions.



The tip icon indicates advice on, for example, how to design your project or how to use a certain function.

Operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to information or property loss. Therefore, comply fully with all notices.

1.3.4.2

Document conventions

A particular convention may not be used in this manual.

- Abbreviations and acronyms are spelled out in the glossary. The glossary also contains definitions of important terms.
- Menu paths are presented in bold.
Select **Main menu/Settings**.
- Menu, tab, button, list and box names as well as window or dialog box titles are presented in bold.
On the **File** menu, click **New Project**.
Right-click the **MainApp** tab and select **Copy** from the shortcut menu.
Click **OK** to start the comparing.
- Shortcut keys are presented in uppercase letters.
A page can also be added pressing the shortcut keys CTRL+SHIFT+P.
- Command prompt commands are shown in Courier font.
Type `ping <devices_IP_address>/t` and wait for at least one minute to see if there are any communication breaks.
- Parameter names are shown in italics.
The function can be enabled and disabled with the *Operation* setting.

Section 2 Security in substation and distribution automation systems

2.1 General security in distribution automation

Technological advancements and breakthroughs have caused a significant evolution in the electric power grid. As a result, the emerging “smart grid” and “Internet of Things” are quickly becoming a reality. At the heart of these intelligent advancements are specialized IT systems – various control and automation solutions such as distribution automation systems. To provide end users with comprehensive real-time information, enabling higher reliability and greater control, automation systems have become ever more interconnected. To combat the increased risks associated with these interconnections, ABB offers a wide range of cyber security products and solutions for automation systems and critical infrastructure.

The new generation of automation systems uses open standards such as IEC 60870-5-104, DNP3 and IEC 61850 and commercial technologies, in particular Ethernet and TCP/IP based communication protocols. They also enable connectivity to external networks, such as office intranet systems and the Internet. These changes in technology, including the adoption of open IT standards, have brought huge benefits from an operational perspective, but they have also introduced cyber security concerns previously known only to office or enterprise IT systems.

To counter cyber security risks, open IT standards are equipped with cyber security mechanisms. These mechanisms, developed in a large number of enterprise environments, are proven technologies. They enable the design, development and continual improvement of cyber security solutions also for control systems, including distribution automation applications.

ABB understands the importance of cyber security and its role in advancing the security of distribution networks. A customer investing in new ABB technologies can rely on system solutions where reliability and security have the highest priority.

Reporting of vulnerability or cyber security issues related to any ABB product can be done via cybersecurity@ch.abb.com.

2.2 Reference documents

Information security in critical infrastructure like electrical distribution and transmission networks has been in high focus for both vendors and utilities. This together with developing technology, for example, appliance of Ethernet and IP based communication networks in substations, power plants and network control centers creates a need of specifying systems with cyber security.

ABB is involved in the standardization and definition of several cyber standards, the most applicable and referred ones are ISO 2700x, IEC 62443, IEEE P1686 and IEC 62351. Besides standardization efforts there are also several governments initiated requirements and practices like NERC CIP and BDEW. ABB fully understands the importance of cyber security for substation automation systems and is committed to support users in efforts to achieve or maintain compliance to these.

See also all IED-related cyber security deployment guidelines.

Section 3 Secure system setup

3.1 Basic system hardening rules

Today's distribution automation systems are basically specialized IT systems. Therefore, several rules of hardening an automation system apply to these systems, too. Protection and control IEDs are from the automation system perspective on the lowest level and closest to the actual primary process. It is important to apply defense-in-depth information assurance concept where each layer in the system is capable of protecting the automation system and therefore protection and control IEDs are also part of this concept. The following should be taken into consideration when planning the system protection.

- Recognizing and familiarizing all parts of the system and the system's communication links
- Removing all unnecessary communication links in the system
- Rating the security level of remaining connections and improving with applicable methods
- Hardening the system by removing or deactivating all unused processes, communication ports and services
- Checking that the whole system has backups available from all applicable parts
- Collecting and storing backups of the system components and keeping those up-to-date
- Removing all unnecessary user accounts
- Defining password policies
- Changing default passwords and using strong passwords
- Checking that the link from substation to upper level system uses strong encryption and authentication
- Segregating public network (untrusted) from automation networks (trusted)
- Segmenting traffic and networks
- Using firewalls and demilitarized zones
- Assessing the system periodically
- Using malware protection in workstations and keeping those up-to-date
- Using principle of least privilege

It is important to utilize the defence-in-depth concept when designing automation system security. It is not recommended to connect a device directly to the Internet without adequate additional security components. The different layers and interfaces in the system should use security controls. Robust security means, besides product features, enabling and using the available features and also enforcing their use by company policies. Adequate training is also needed for the personnel accessing and using the system.

3.2 TCP/IP based protocols and used IP ports

PCM600 does not require specific ports to be open. However, Update Manager requires allowing outbound connections to port 80 (http protocol).

To set up an IP firewall, see the IED-specific cyber security deployment guidelines for the ports that are used to communicate and to configure the IEDs. All closed ports can be opened in the configuration. Ports that are open by default are used for configuring or monitoring the protection IED.

3.3 Secure communication

Some of the protection IEDs support encrypted communication according to the principles of IEC 62351 in secured communication for WHMI and file transfer protocol. If the *Secure Communication* parameter is activated in the IED, protocols require TLS protocol based encryption method support from the clients. In case of file transfer, the client must use FTPS. PCM600 supports FTPS and is able to download and upload configuration files in encrypted format from IED.

3.4 Validation of application libraries

PCM600 includes a functionality for validating application binary files. In other words, PCM600 validates its own application files and the activated connectivity package application files. By default this functionality is not enabled for providing backward compatibility for the old released connectivity packages.

Table 1: Available security levels

Security level	Description
Low	Application files are not validated by PCM600. Use this option when it is certain that both PCM600 and connectivity packages are loaded from a trusted secure location.
Medium	Application files are validated by PCM600. Exceptions can be added to load an activated connectivity package that failed the application file validation. Use this option when it is certain that the connectivity packages are loaded from a trusted secure location.
High	Application files are validated by PCM600. Activated connectivity packages that fail the application file validation are blocked from PCM600.



The recommended security level is “High”.

3.5

IED certificates

When PCM600 connects securely to an IED, the IED security certificate is shown. The user can select to trust that IED forever or for the current PCM600 session.

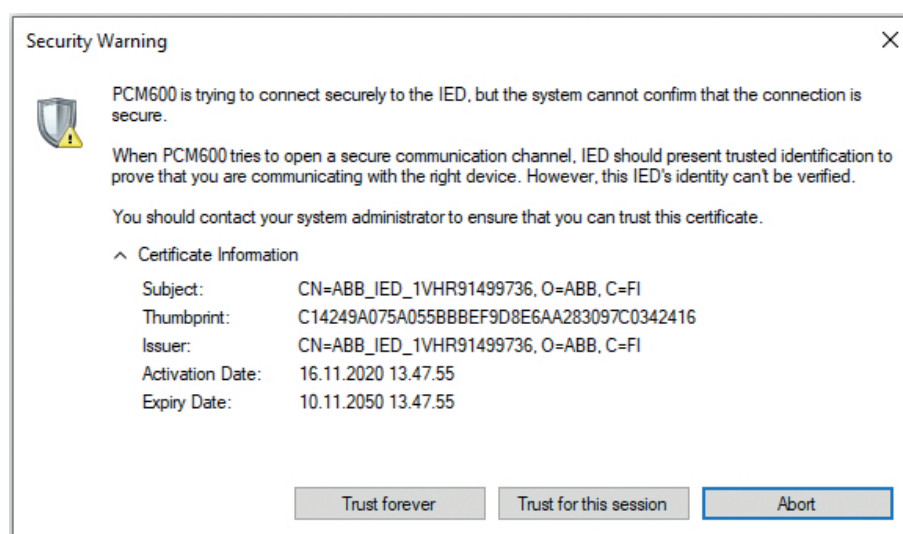


Figure 1: Security warning

These certificates are added to Windows Certificate Storage and can be viewed using the certmgr.msc management snippet in Windows.

In Certificate Manager, all IED certificates are stored under PCM Permanent Trust and PCM Session Trust. PCM Session Trust is cleared when PCM600 is closed. Permanently trusted IED certificates can be manually removed by deleting them from PCM Permanent Trust.

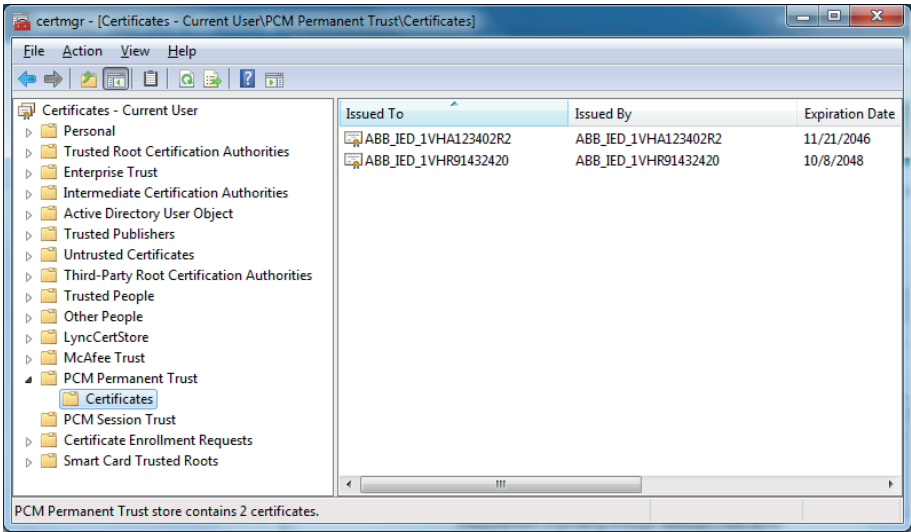


Figure 2: *PCM Permanent Trust certificates*



All IED certificates are trusted in the current user scope. Every PCM600 user must trust IED certificates individually.

Section 4 PCM600 user management

4.1 PCM600 user authentication

This section describes the user authentication for PCM600. For IED user authentication, see the IED-specific cyber security deployment guidelines.

PCM600 supports working with authenticated and anonymous users. No authentication method is enabled by default.

It is not recommended to use PCM600 without authentication.

When PCM600 is started for the first time, a PCM600 administrator account has to be created and named. The password is not set by default. It is recommended to change the password immediately for the created administrator account.



It is not recommended to use the administrator accounts by default. It is recommended to create limited user accounts that have privileges only for performing the necessary tasks related to the user role.

4.1.1 Configuring login banner

In some countries, a legal statement banner should be displayed when accessing a device. Login banner configuration is enabled only if the logged in PCM600 user has function and rights set to User Management - Administration allowed.

1. On the menu bar, click **Tools** and select **Options**.
2. Click **Security Settings** and select the **Login Banner Settings** tab.
3. Select the **Show login banner** check box.

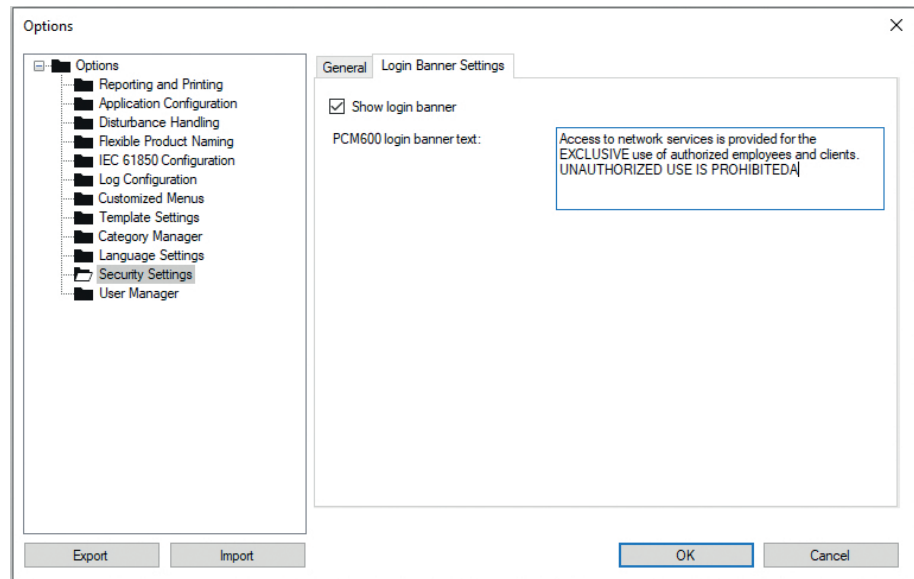


Figure 3: Configuring the login banner



PCM600 authentication must be enabled to show and configure the login banner functionality.

4.2 Activating user authentication

The system engineer can enable or disable the user authentication. When the user authentication is disabled, all the users get full rights to operate. The login function also works according to this function. For more information on the login functions, see the getting started guide.

1. On the menu bar, click **Tools** and select **Options**.
2. Click **Security Settings** and select the **General** tab.
3. Under **Authentication**, select the appropriate option.
 - **Disabled** means that user authentication is disabled.
 - **PCM** authentication uses the user name and password specified on the User Manager page of PCM600 options window. The default password for PCM600 user account is empty.
 - **Windows** authentication compares the account name of the current Windows user to the Windows account names specified for users in PCM600 User Manager. If **Windows** authentication is enabled and the current Windows user account has not been linked to any PCM600 user account, the user name and password must be entered to log in to PCM600.



When entering Windows account names in PCM600 User Manager, the account name must contain both a domain and a user name. The account names are entered in the Windows Account field, for example, mydomain\john.

Multiple account names can be specified in the Windows Account field for a single PCM600 user, but they must be separated with semicolon, for example, mydomain\john;anotherdomain\john.

The recommended authentication method is the Windows authentication. This also enables indirect password recovery. Windows user passwords can be recovered on Windows if forgotten.



If the Administrator password has not been set before, it must be set when activating user authentication.

4.3 User categories

4.3.1 Creating user categories

The user management is based on the users and the user categories. The users have a user account for PCM600. Each user account is mapped to one user category, which defines the permission to access certain functions. There are three default user categories.

- System Engineer acts as an administrator for the system and has full rights to perform any function and can define the user accounts.
- Operator can perform certain simple tasks and has read-only access to certain functionality of PCM600.
- Application Engineer can access most of the functions and has read and write access to the IED engineering functionality.

Check the actual settings of the user categories from **Tools/Options/Category Manager** in PCM600.

The members of the System Engineer user category can create new user categories. The name of the user category must be unique.

1. On the menu bar, click **Tools** and select **Options** to start the user management.
2. Select the **Category Manager** folder.
3. Click **Add New Category** to open the **Add New Category** dialog.

4. Type the name for the new user category.
5. Specify the rights to perform different functions under the **Functions And Rights** field.
6. Select **OK** to save the definition.

4.3.2 Deleting user categories

A user with the System Engineer rights can delete the user categories. The System Engineer category cannot be deleted. If there are members in the deleted category, a confirmation for removing the category appears. If the category is removed, the user accounts remain, but they are no longer mapped to any user category. The category changes are saved to the system configuration data.

1. On the menu bar, click **Tools** and select **Options** to start the user management.
2. Select the **Category Manager** folder.
3. Select the right user category from the drop-down list.
4. Click **Delete Category** to remove the user category.
5. Click **Yes** to confirm the delete operation.

4.3.3 Modifying existing user categories

System Engineer can change the access rights of an existing user category. The access rights of the System Engineer user category cannot be changed. The System Engineer user category has always full privileges.

1. On the menu bar, click **Tools** and select **Options** to start the user management.
2. Select **Category Manager** folder.
3. Select the right user category from the **User Category** drop-down list to activate the **Functions And Rights** field.
4. Change the user rights by selecting one of the user levels in the drop-down menu of the function.

The Functions And Rights field is divided into different sections for you to specify the user rights by a specific tool component or function.

4.4 User management

This chapter describes the user management for PCM600. For IED user management, see the IED-specific cyber security deployment guidelines.

4.4.1 Creating users

Create a new user to PCM600 and define the user information.

- User name (mandatory)
- Real name of the user
- User category



The Windows account can be used to log in automatically. Multiple Windows account names can be used for a single PCM600 account. The Windows account names are separated by a semicolon (;). These Windows account names are only used for login, if the administrator has enabled the Windows authentication.

1. On the menu bar, click **Tools** and select **Options** to start the user management.
2. Select the **User Manager** folder.
The default **Real Name** is System Administrator and makes it easier to find the user.
3. Click **Add New User** in the **User Profile** field.
The **Add New User** dialog is displayed.
4. Type **User Name** and select **User Category** from the drop-down list.
The user name must be at least three characters long.
5. Click **OK** to confirm.
The new user is created.

The new user name has to be a member of a user category to have permission to PCM600 functions.

4.4.2 Deleting users

1. On the menu bar, click **Tools** and select **Options** to start the user management.
2. Select **User Manager** folder.
3. Select the right user name from the **User Name** drop-down list.
4. Click **Delete User** under the User Profile field.

Only users with System Engineer rights can delete a user.



The System Engineer account cannot be deleted.

4.4.3

Changing password

1. On the menu bar, click **Tools** and select **Options** to start the user management.
2. Select **User Manager** folder.
3. Click **Set Password** under User Preferences to open **Set Password** dialog.
4. Type the old password.
5. Type the new password.
The password must meet certain requirements.
 - Cannot be empty
 - Starts and ends with an alphabetic character
 - Contains at least one special character ~!@#\$%^*_-=~\(){}[]:<>.,?/
 - Is at least eight characters long
 - Contains at least one number 0-9
 - Contains at least one uppercase character
 - Contains at least one lowercase character
6. Retype the new password for confirmation and click **OK**.

When changing the authentication password, the validity of password is checked and a new password is saved to the database.

Section 5 PCM600 Scheduler setup

To use the Scheduler service on PCM600, the logon account for the service must be the same as the intended Windows account for running PCM600. The service logon account can be configured in Services.msc. Search for appropriate ABBPCMSchedulerService version depending on your PCM600 version and change the service logon account on the Log On tab.



If authentication is enabled for the IED, use the Scheduler tool in PCM600 using the same Windows account as the account defined as logon account for the Scheduler service.



If ABBPCMSchedulerService fails to start for the standard user, ensure that the user has the "Log on as a service" user rights defined using the Local Security Policy tool.

To use PCM600 Scheduler with IEDs with security certificates, the PCM600 option Always trust IED security certificates in Security Settings must be enabled. This setting should be enabled only in a secure environment where the communication between PCM600 and the IED is secure.

Section 6 Configuration of computer settings for PCM600

6.1 General security actions

In general, the Windows operating system can be protected from the malicious attacks with the latest service packs and security updates, firewalls, security policies, application whitelisting, and virus scanners. In computers where PCM600 is installed, programs and services that are not used can be uninstalled or disabled to reduce the attack surface.

This section gives an overview of different ways to secure the operating systems on which PCM600 is installed.



If PCM600 is run on virtual computer, these recommendations still apply.

6.2 Operating systems

Table 2: *Supported operating systems for PCM600 installation*

Edition	Operating system
Desktop	Windows 10 64 bit Windows 11 64 bit
Server	Windows Server 2016 64 bit Windows Server 2019 64 bit

Only 64-bit OS is supported.

See the operating system related documentation and best practices to further reduce the attack surface in the operating system.

6.3 BIOS settings

Passwords must be enabled and remote wake up/wake on LAN disabled manually.

6.4 Windows updates and patch management

There are nine update classifications defined by Microsoft. These include, for example, critical updates, drivers, security updates and service packs. The compatibility of PCM600 with the latest Microsoft security updates and service packs is tested and verified monthly by ABB. The report does not cover computers from which PCM600 is accessed remotely. In general, it is recommended to install all the Windows updates.

Windows Update vs. Microsoft Update

Windows Update receives updates only for the Windows operating system. Microsoft Update must be used for other installed Microsoft products. The updates must be configured manually.



After PCM600 installation, it is recommended to update the system to the latest ABB verified patch level of all installed ABB software products. For other vendors' software products, see the respective documentation.

6.5 Virus scanner

PCM600 does not create specific requirements for anti-virus software. It is recommended to use organization specific de facto anti-virus software, which has to be configured manually.

6.6 Malware protection

PCM600 does not create specific requirements for malware protection software. It is recommended to use organization specific de facto malware protection software, which has to be configured manually.

6.7 Firewall, ports and services

PCM600 does not have specific firewall requirements. PCM600 is a client system from the communication point of view. However, sometimes when reading disturbance records using FTPS, for example, communication fails after some amount of successful communication. This is caused by the Windows Firewall's Stateful Package Inspection feature. The feature can be disabled by running the following PowerShell command with administrator privileges:

Set-NetFirewallSetting -EnableStatefulFtp false -PolicyStore PersistentStore

When PCM600 is used in a distributed setup, see [Chapter 6.8](#) for actions needed on the SQL Server computer.

The firewall has to be configured manually.

6.8 Distributed installation of PCM600

In PCM600 2.10 and later, SQL Server and PCM600 can be installed on different computers. The server computer contains SQL Server and a shared location where PCM600 stores internal files. The client PC contains PCM600, Update Manager and connectivity packages. PCM600 installer can perform client or server installation. For installation instructions, see PCM600 Installation Guide.

When using the distributed setup, each user using PCM600 must have access to SQL Server. This is done by adding the user to the PCMSERVER2014 Users user group. The user group is automatically created after installing PCM600 on the server computer.

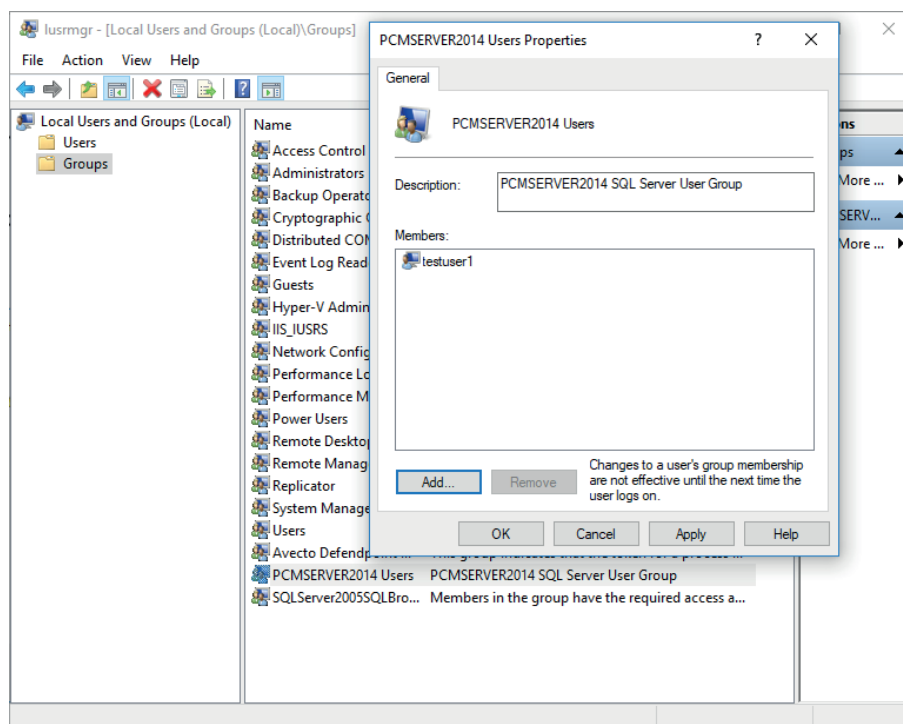


Figure 4: PCMSERVER2014 Users group

If no domain account is used, an account with the same name and password must exist on both the client and the server machine.

The server machine must share the directory defined by the %PCMDATADIRABB % system environment variable and the PCMSERVER2014 Users user group must be given full privileges to that directory. If the name “PCMDDataBasesABB” is given to the share, the client automatically has the correct path in PCMDATADIRABB system environment variable after the client installation.

If the server machine has firewall, it needs to allow communication to two ports.

Table 3: *Ports for SQL Browser service and SQL Server*

Port	Description
1434/UDP	SQL Browser service
1435/TCP by default	SQL Server



If multiple PCM600 versions of Distributed PCM600 Servers are installed, unique available ports must be assigned for both SQL Browser service and SQL Server. The first installed Distributed PCM600 Server installation gets the default ports. If this is noticed after the installation, the ports can be changed and the repair action on PCM600 installer can be run for both server and client side.

The server uses the SQL Browser service to tell the client which port the server is listening to. The SQL Server port can be changed using SQL Server Configuration Manager.

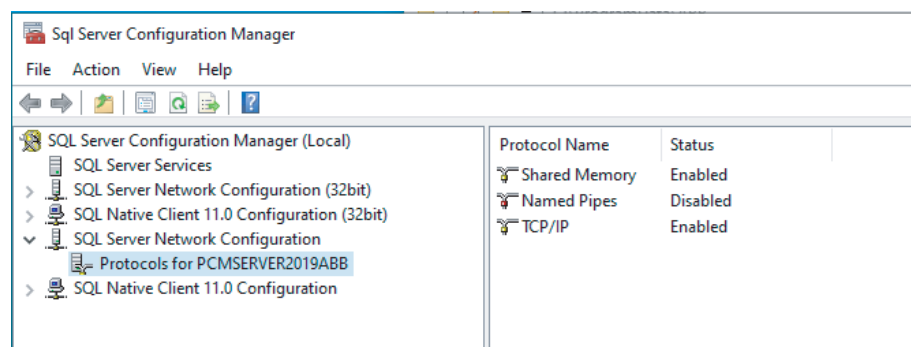


Figure 5: *SQL Server Configuration Manager*

6.8.1

Installing PCM600 on client computer

1. Install PCM600 with option **Install only PCM600**.
2. Ensure that all users using PCM600 have a user account (either a domain account or a standard user with the same name and password) on both client and server machines.

The PCMDATADIRABB system environment variable is automatically set to point to the shared folder of the server (PCMDDataBasesABB, by default). If the server share name is not PCMDDataBasesABB, the PCMDATADIRABB system environment variable must be set to point to the correct path. The UNC path must be used (for example, \\server\share).

6.8.2 Installing PCM600 on SQL Server computer

1. Install PCM600 with option **Install only SQL Server**.
2. Ensure that all users using PCM600 have a user account (either a domain account or a standard user with the same name and password) on both client and server machines.
3. Using lusrmgr.msc, add all PCM600 users to the **PCMSERVER2014 Users** group.
4. Share the **PCMDDataBasesABB** folder (with full control) with all PCM600 users.
5. Configure the SQL Server Browser service to start up automatically and start it if it is not running.
6. Ensure that the firewall allows communication with SQL Server Browser (port UDP 1434).
7. Configure the port for SQL Server.
 - 7.1. Open **Sql Server Configuration Manager** (using SQLServerManager15.msc).
 - 7.2. Enable TCP/IP for PCMSERVER2019ABB.

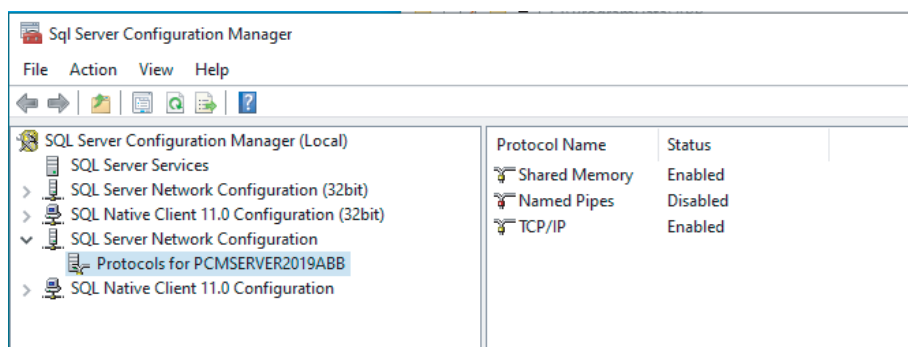


Figure 6: Enabling TCP/IP for PCMSERVER2019ABB in Sql Server Configuration Manager

- 7.3. Right-click **TCP/IP** and select **Properties**.
- 7.4. On the **IP Addresses** tab, scroll down to the **IPAll** section, leave **TCP Dynamic Ports** empty and specify a port number (for example, 1435) in the **TCP Port** field.

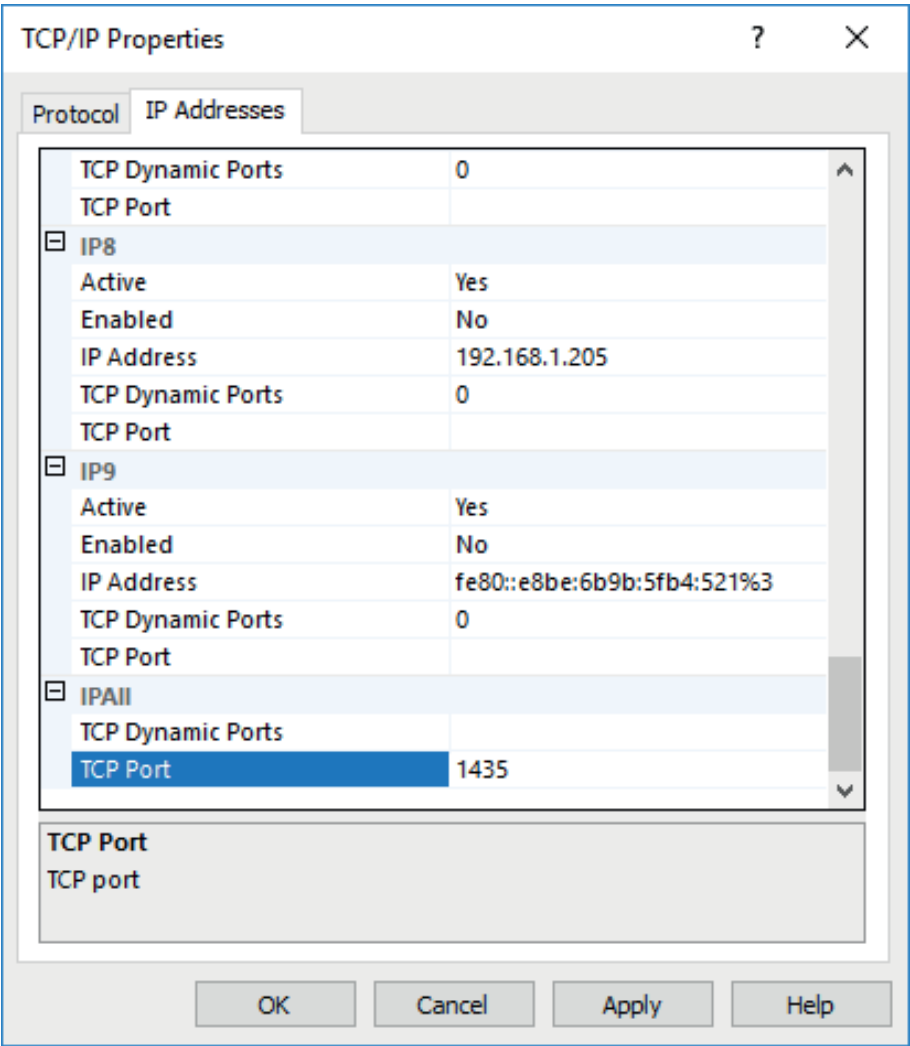


Figure 7: Defining a port number for SQL Server



If Distributed PCM600 installation is created using IP addresses and not with computer names, locate the IP Address for your SQL Server and set *Enabled* to "Yes".

- 7.5. Allow inbound TCP communication to the selected port in the Windows firewall for SQL Server. The executable file is usually C : \Program Files\Microsoft SQL Server \MSSQL15.PCMSEVER2019ABB\MSSQL\Binn \sqlservr.exe.

6.9 Disabling of devices

It is recommended to disable any unused devices in the system, such as USB ports, CD/DVD drives, communication ports, or floppy disc controllers. Devices are disabled manually in devmgmt.msc (Device Manager).

Disabling of autorun functionality

If it is not possible to disable a device, disable the autorun functionality of the device. The autorun functionality is disabled to prevent the automatic start of the malicious code contained in a removable device. For more information, search how to disable the Autorun functionality in Windows..

6.10 Secure boot

PCM600 does not create specific requirements for secure boot. Secure boot should be implemented with organization specific de facto procedures, if needed. Secure boot has to be configured manually.

6.11 Isolation techniques

PCM600 has two dedicated functionalities that are connected to the Internet, that is, Update Manager and ABB Lifecycle Service Tool. These functionalities are run as separated processes from actual PCM600. It is recommended that there is more than one network interface and a dedicated network interface is connected to the Internet. This has to be configured manually.

6.12 User Account Control

User Account Control (UAC) is a security feature in Windows 7, Windows Server 2008 R2 and the later versions. UAC is recommended to be enabled in PCM600 and in computers that are used to access PCM600.

Table 4: *Actions if the program requires privilege elevation*

User role	Action
Administrators	A dialog is shown for selecting Continue or Cancel . In Windows Server edition, Prompt for consent is used for non-Windows binaries.
Standard users	A message box is shown stating that a program has been blocked. This setting was introduced in Windows 7, Server 2008 R2 and the later versions.

A shield in the program icon indicates that it requires administrative privileges to run. This is automatically detected by the operating system, if for example, Run as administrator flag is set in the file properties, or if the program has previously asked for administrative privileges.



It is not recommended to use administrator accounts by default. It is recommended to create limited user accounts that have privileges only to perform the necessary tasks related to the user role.

6.13 Intrusion detection system

An intrusion detection system (IDS) is a device or software application that monitors the network or system activities for malicious activities or policy violations and produces reports to the management station. It is recommended that organization specific IDS; to be configured manually, is deployed on the computer running PCM600.

6.14 Enabling of SQL Server 2019 for PCM600

PCM600 requires access to the PCMSERVER2019ABB instance of SQL Server. The PCM user is added to PCMSERVER2014 Users Group in Windows to provide access.

During installation, the user logged in is automatically added to PCMSERVER2014 Users Group. If additional users are required, they have to be added to PCMSERVER2014 Users Group. This can be done by using `lusrmgr.msc` – Local Users and Groups (Local). The local Users and Groups function provides a possibility to add both local and network user accounts to PCMSERVER2014 Users Group.



If the operating system and PCM600 installation is cloned to a different computer, the following message appears: “Access Denied. Current Windows user (“computer name/username”) has no privileges to access the SQL Server databases used by PCM600.” as only users from the original operating system and PCM600 installation image are authorized to access the cloned SQL Server.

Using administrator rights, run the following commands in command prompt to fix the issue. Replace the `SOURCE_COMPUTER_NAME` with the name of the computer used originally to create the image.

```
net stop MSSQL$PCMSERVER2019ABB
net start MSSQL$PCMSERVER2019ABB /m
osql -E -S%computername%\PCMSERVER2019ABB -Q "drop login
[SOURCE_COMPUTER_NAME\PCMSERVER2014 Users]"
osql -E -S%computername%\PCMSERVER2019ABB -Q "drop user
[SOURCE_COMPUTER_NAME\PCMSERVER2014 Users]"
osql -E -S%computername%\PCMSERVER2019ABB -Q "create login [%computername%
\PCMSERVER2014 Users] from windows"
osql -E -S%computername%\PCMSERVER2019ABB -Q "alter server role sysadmin add
member[%computername%\PCMSERVER2014 Users]"
osql -E -S%computername%\PCMSERVER2019ABB -Q "create user [%computername%
\PCMSERVER2014 Users] FOR LOGIN [%computername%\PCMSERVER2014 Users]"
net stop MSSQL$PCMSERVER2019ABB
net start MSSQL$PCMSERVER2019ABB
```

Section 7 Project backups and restoring

Backups can be created by either backing up the computer running PCM600 or by using the functionality in PCM600 that exports the project configuration to a single file.

Configuration can be backed up by storing the Backup Project from PCM600 to a location that is regularly backed up. It is important to take and manage the project backups of the engineered substations. This enables proper configuration management for the users.

7.1 Creating a backup of a project

1. On the **File** menu, click **Open** and select **Manage Project** to open the project management.
2. Click **Backup Projects** functionality.
3. Select the projects from the list of available projects.
4. Click **Backup Selected**.
5. Browse the target location and click **OK**.

Creating a project backup enables transferring project data between the based systems via different media, for instance in CD-ROM. The source and target computers do not have to be connected to the same network so the data can be transferred between two stand-alone computers.

All project related data is compressed and saved to one file, which is named and located according to the definitions.

7.2 Restoring a project

Importing a project backup enables transferring project data between the based systems via different media, for instance in CD-ROM. The source and target computers do not have to be connected to the same network so the data can be transferred between two stand-alone computers.

1. On the **File** menu, click **Open** and select **Manage Project** to open the project management.
2. Right-click **Projects on my computer**, and click **Import** to open the **Import project** dialog box.
3. Browse the location and type the name for the imported file.

A new project is created containing all the data from the imported file.

Section 8 Standard compliance statement

Cyber security issues have been the subject of standardization initiatives by ISA, IEEE, or IEC for some time. ABB plays an active role in all these organizations, helping to define and implement cyber security standards for power and industrial control systems.

Some of the cyber security standards which are most important for substation automation, such as IEC 62351 and IEC 62443 (former ISA S99), are still under active development. ABB participates in the development by delegating subject matter experts to the committee working on the respective standard. Since these standards are still under development, ABB strongly recommends to use existing common security measures available in the market, for example, VPN for secure Ethernet communication.

Table 5: *Overview of cyber security standards*

Standard	Main focus	Status
NERC CIP	NERC CIP cyber security regulation for North American power utilities	Released, ongoing ¹⁾
IEC 62351	Data and communications security	Partly released, ongoing
IEEE 1686	IEEE standard for substation intelligent electronic devices (IEDs) cyber security capabilities	Finalized

1) Ongoing: major changes will affect the final solution

ABB has identified cyber security as a key requirement and has developed a large number of product features to support the international cyber security standards such as NERC CIP, IEEE 1686, as well as local activities like the German BDEW white paper.

Section 9 Glossary

BDEW	Bundesverband der Energie- und Wasserwirtschaft
Connectivity package	A collection of software and information related to a specific protection and control IED, providing system products and tools to connect and interact with the IED
DNP3	A distributed network protocol originally developed by Westronic. The DNP3 Users Group has the ownership of the protocol and assumes responsibility for its evolution.
Ethernet	A standard for connecting a family of frame-based computer networking technologies into a LAN
FTP	File transfer protocol
FTPS	FTP Secure
IDS	Intrusion detection system
IEC	International Electrotechnical Commission
IEC 60870-5-104	Network access for IEC 60870-5-101
IEC 61850	International standard for substation communication and modeling
IED	Intelligent electronic device
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IEEE 1686	Standard for Substation Intelligent Electronic Devices' (IEDs') Cyber Security Capabilities
IP	Internet protocol
ISO	International Standard Organization
LAN	Local area network
NERC CIP	North American Electric Reliability Corporation - Critical Infrastructure Protection
OS	Operating system
PCM600	Protection and Control IED Manager
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport layer security
UAC	User account control

VPN	Virtual Private Network
WHMI	Web human-machine interface

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