

SIEMENS

SIMATIC

Process Control System PCS 7 V7.0

PCS 7 - Service Support and Diagnostics

Service Manual

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Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

WARNING

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Preface

Purpose of this Documentation

This documentation contains information to support you in the following:

- Performing steps to ensure the availability of a PCS 7 system
- Verifying requirements for effective diagnostics for your PCS 7 system
- Understanding the alarm concept of a PCS 7 system
- Responding appropriately to faults and preparing detailed information about the state of the PCS 7 system for service experts
- Selecting the correct diagnostic tool, enabling you to perform diagnostics on your PCS 7 system with the help provided

Disclaimer of liability

WARNING

Siemens assumes no liability for inappropriate use of the instructions provided in this documentation or any consequences that might result for the customer.

- Only trained service employees should be authorized to work on the process control system.
- Always observe the plant-specific rules and government regulations when making changes to your system.
- Observe the plant-specific boundary conditions and adjust the work accordingly.
- Always bear in mind that changes in a system can impact other sections of the system.

Target Audience of this Documentation

This documentation is intended for use by the following trained service personnel (Service Level 1):

- PCS 7 users
- SIMATIC S7 specialists

Required Knowledge

This documentation contains information about working with PCS 7 intended for **trained service personnel**. The following knowledge is required to understand the documentation:

- Basic knowledge of Microsoft Windows operating systems
- Knowledge of the functions and configurations of SIMATIC PCS 7 (Engineering System, PCS 7 Operator Station).
- Knowledge of the functions and configurations of SIMATIC S7 (S7-400, STEP 7)
- Knowledge of the functions and configurations of SIMATIC NET (network components and transmission media)

Important information about this documentation

This documentation is a guide for service support. It therefore does not claim to be complete. Due to our lack of knowledge of the particular circumstances in your plant, we **cannot guarantee** the following with this documentation:

- That you will be able to use this documentation to remedy problems yourself.
- That, if service is required (similar to what is presented), the procedure described will necessarily enable you to find the cause of the fault or to correct the fault.
- That detailed information about individual hardware or software components is complete.
- That detailed information about individual hardware or software errors is complete.
- That this documentation cannot provide the same expert knowledge as that provided by a service technician or a member of the hotline staff.
- That procedures carried out will not disturb the system.
- That the procedures described can be performed via remote access.

Validity of the Documentation

The documentation is valid for the software package *Process Control System; PCS 7 Toolset* as of V7.0.

Note

The PCS 7 Manual Collection DVD contains all PCS 7 software and hardware manuals. You can quickly find important information in this collection by using the navigation interface and the full-text search feature.

Changes Compared with the Previous Version

Below you will find an overview of the most important changes in the documentation over the previous version:

- Maintenance station for universal diagnostics/maintenance in PCS 7
You can find information about this in the section titled "Full diagnostics with the maintenance station (Page 85)".
- Diagnostics for PROFIBUS PA
You can find information on this in the section titled "Diagnostics for PROFIBUS PA (Page 95)".
- Diagnostic tools for the following operating systems:
 - Microsoft Windows XP Professional
 - Windows Server 2003
- Other diagnostic tools:
 - PC DiagMonitor (Page 111)
 - Simatic Shell (Page 117)
 - Microsoft Baseline Security Analyzer (MBSA) (Page 115)
 - BANY PROFIBUS (Page 133)

Conventions

In this documentation the designations of elements of the user interface are specified in the language of this documentation. If you have installed a multi-language package for the operating system, some of the designations will be displayed in the base language of the operating system after a language switch and will, therefore, differ from the designations used in the documentation.

PCS 7 Glossary

You can find a PCS 7 glossary defining the most important technical terms used in the documentation on the *SIMATIC PCS 7; Manual Collection* DVD or access one in the PCS 7 software via the SIMATIC Manager help menu (menu command **Help > Topics > "Glossary"** button).

Additional support

If this manual does not contain the answers to any questions you may have about how to use the products described, please contact your local Siemens representative.

You can locate your local representative at:

<http://www.siemens.com/automation/partner>

The guide that provides details of the technical documentation offered for the individual SIMATIC products and systems is available at:

<http://www.siemens.de/simatic-tech-doku-portal>

The online catalog and online ordering system are available at:

<http://mall.automation.siemens.com/>

Technical support

Technical support for all A&D products can be accessed

- via the online Support Request form at <http://www.siemens.de/automation/support-request>
- Phone: + 49 180 5050 222
- Fax: + 49 180 5050 223

For additional information about our technical support service, please go to

<http://www.siemens.de/automation/service>

Service & Support on the Internet

In addition to our documentation options, we also offer online expertise.

<http://www.siemens.com/automation/service&support>

Here you will be able to access:

- The newsletter, which will keep you constantly up-to-date with the latest information about our products
- The right documents via our Service & Support search facility
- A forum that provides users and specialists with an international platform for exchanging experiences
- Your local Automation & Drives representative
- Information about local service, repairs, spare parts The "Our service offer" section offers even more options.

Ensuring Availability

2.1 Introduction

Overview

This section presents measures for ensuring availability of a PCS 7 system.

You can find information on fault-tolerant systems in the *Process Control System PCS 7; Fault-Tolerant Process Control Systems* manual.

The information in this section enables you to perform the following tasks:

- Maintain the specified condition of a system.
Examples: adhere to maintenance intervals, replace batteries
- Optimize the system and prevent faults
Examples: perform firmware updates, eliminate known sources of errors
- Minimize downtime caused by faults
Examples: provide backups

Note to reader

Topics in this section are divided into topic areas. The following information is provided for each topic area:

What?	What is described?
When?	When can you perform this action?
How ?	You can find Information on the topic in the section entitled "...".

Content

Topic area	Information
Data backup	• WHAT?: Information on backing up and restoring data in a PCS 7 plant. Backups are necessary if you want to restore the state of a component or configuration (because a hard disk is damaged, for example). • WHEN?: You should perform a data backup if changes have been made in a PCS 7 plant. • HOW?: You can find information on creating data backups in the section "Options for data backup (Page 13)".
Hardware update	A SIMATIC station may switch to STOP mode if you change the hardware. • WHAT?: Information on how to perform a firmware update and the subsequent configuration steps required. • WHEN?: If you want to convert components to a current firmware version (because new functions are to be used or errors must be corrected, for example). • HOW?: You can find information about firmware updates in the section "Hardware updates (Page 36)".
Software update	A SIMATIC station may switch to STOP mode if you change the software. • WHAT?: Information on converting projects from older versions to a current version. There are two types of software updates: – Updates that utilize the new functions of a new version of PCS 7 – Updates that do not utilize the new functions of a new version of PCS 7 • WHEN?: – If you want to utilize new functions of a new version of PCS 7. – If you want your PCS 7 projects to always run with the latest software version. – If software corrections necessitate conversion. • HOW?: You can find information about software updates in the section "Software updates (Page 55)".

2.2 Data backup

2.2.1 Options for data backup

Introduction

You can back up project data in a variety of ways and for a variety of purposes, for example, project archiving, image file.

After system failure, you can use a backup to quickly restore the system to its original state.

Recommendations for increasing data security

- Always back up the data in the following cases:
 - After configuration changes
 - Before and after system component upgrades
 - Before and after configuration software upgrades
- Keep at least the three most recent versions of your PCS 7 project.
- Use different storage media for backing up the data.
Examples:
 - 2. Hard disk
 - ZIP disk
 - MOD
 - CD/DVD

This way, data can also be read from another storage medium in the event a device becomes defective.

- You can also back up data on hard disks of PCs in a network. Simultaneous hard disk failures on more than one PC are very unlikely.

Options for data backup

The sections below describe the options for backing up data:

Backing up ES project data

- Backing up parameter settings of the SIMATIC station (Page 15)
- Archiving a PCS 7 project (Page 17)
- Retrieving a PCS 7 project (Page 20)
- Archiving and retrieving a multiproject (Page 21)
- Archiving custom libraries (Page 23)
- Exporting operator and display texts (Page 24)
- Backing up custom functions and actions (Page 25)

Backing up OS project data

- Backing up OS configuration data (Page 26)

Backing up batch data

- Backing up configuration data (Page 27)
- Generating a backup (Page 28)
- Restoring data from a backup (Page 29)
- Archiving batches (Page 30)

Backing up SIMATIC Route Control data

- Backing up configuration data (Page 31)
- Backing up project data from SIMATIC Route Control (Page 32)
- Restoring data from a backup (Page 33)

Creating an image

- Backing up data by generating an image file (Page 34)

Note

Make sure that backups are stored in a protected location (in separate rooms, fireproof cabinets, etc.).

Make sure the backups are readable (particularly when reusable storage media such as floppy disks are used).

2.2.2 Backing up ES project data

2.2.2.1 How to back up parameter settings of the SIMATIC station

Introduction

You can change parameters (such as controller settings) online in the SIMATIC station using the PCS 7 OS and the engineering station.

Some situations make it necessary to back up the current data blocks, FBs or parameter settings from the SIMATIC station. This is the case, for example, when the configuration data have been restored from a data backup.

You can make use of the following backup options:

- Reading data blocks and FBs from the SIMATIC station
- Reading charts with current parameters from the SIMATIC station

NOTICE

These actions overwrite all settings in the configuration with the current values of the system. Make sure that the settings for start values, for example, are correctly maintained.

DANGER

If you read back the data from the SIMATIC Station, you must ensure that hazardous conditions cannot occur following a hot restart of the system or after configuration data are downloaded.

Reading back the data blocks and FBs from the SIMATIC station

1. Open the project in the SIMATIC Manager.
2. Select the menu command **View > Online**.
3. In the tree view, select the data blocks and FBs you want to read from the SIMATIC Station.
4. Select **Edit > Copy** from the menu.
5. Select the menu command **View > Offline**.
6. Select **Edit > Paste** from the menu.

Reading back charts with current parameters from the SIMATIC station

1. Double-click any CFC chart in SIMATIC Manager to start the CFC Editor.
2. Select the menu command **Chart > Read Back**.
3. In the "Read Back Chart" dialog box, make the following settings:
 - Source files: Program of the CPU
 - Scope: OCM-capable parameters

Recommendation: back up the project at this point. You can find information on this in the section "How to archive a project (Page 17)".

This data backup includes all current parameter settings of the SIMATIC station.

2.2.2.2 How to archive a project

Introduction

You can use various tools to archive project data.

In the following, the *PKZIP for Windows* program is used for archiving:

You can find the setup for *PKZIP for Windows* on the PCS 7 Toolset DVD.

PKZIP for Windows is automatically installed during the system setup from PCS 7.

You call *PKZIP for Windows* via the SIMATIC Manager.

Requirement

- A tool is installed for archiving project data (default: *PKZIP for Windows*).

Making settings in SIMATIC Manager

1. In SIMATIC Manager, select the menu command **Options > Settings**.
The "Settings" dialog box opens.
2. Select the "Archive" tab.
3. Select your "preferred archiving program" from the drop-down list box
(*PKZIP for Windows* is the default).
4. Select the following "options":
 - Check options
 - Check target directory on retrieval
5. Click "OK" to save your settings.

Making settings in the *PKZIP* software

If you use *PKZIP for Windows*, which is supplied on the PCS 7 Toolset DVD, the following settings need to be made:

1. In the Start menu, select the menu command **Start > Programs > PKZIP > PKZIP for Windows**.
PKZIP for Windows opens.
2. Select the menu command **Tools > Options**.
The "Options" dialog box opens.
3. Select the "Compress" tab.

4. Make the following settings:
 - In the "File Options" group:
Activate the check box for "Include subfolders (recurse)".
In the "Save folder name" drop-down list, set "Relative path".
In the "Update mode" drop-down list, set "Add & Update files".
 - In the "File Attribute" group:
Activate all check boxes.
 - In the "Folders" tab:
You can specify a default folder for your data backup here.
5. Click "OK" to apply your settings.

Archiving a project

1. In SIMATIC Manager, select the menu command **File > Archive**.
The "Archive" dialog box opens.
2. Select the "User Projects" tab.
3. Click "Browse" and select the project you want to archive from the list.
4. Click "OK" to save your settings.
The "**Archive - Select Archive**" dialog box opens.
5. Make the following settings for the archiving:
 - In the "Save to" drop-down list:
Select the drive and folder.
 - In the "File name" box:
Enter the name of the file in which the data are to be saved.
6. Click "Save" to apply your settings.
The "Archive – Options" dialog box opens.
7. If you want to archive the project on floppy disks, select the size of the diskette.
You can find additional information about this dialog box by pressing the "Help" button.
8. Click "OK".
The archiving process begins.

When the "Archive" dialog box closes, archiving is completed.

Recommendation

After compressing your project in the archive directory (S7 project), you should rename the project in such a way that you can determine the archiving date from the name.
Example: "yearmonthdayprojectname"; 021230name

Note

If you copy the project directly to the CD, all files and directories will be write-protected.
Before using the project again, you need to remove the "Write-protected" file attribute for all files and folders in the project.

Backing up configuration data

Also back up the following configuration data:

- GSD files (Siemens/STEP 7/S7Data/GSD) to another partition or to another drive
- C scripts of the standard functions

2.2.2.3 How to retrieve a project

Requirements

- The tool that was used to archive the project is installed (default: *PKZIP for Windows*).
- The settings required for the tool used for archiving the project are made (you can find additional information on this in the section "How to archive a project (Page 17)").

Note

You will find the setup for *PKZIP for Windows* on the PCS 7 Toolset DVD. *PKZIP for Windows* is automatically installed during the system setup from PCS 7.

Procedure

1. In SIMATIC Manager, select the menu command **File > Retrieve**.
The "Retrieve - Select Archive" dialog box opens.
2. Make the following settings for the archive file:
 - In the "Search in" list:
Enter the drive and folder where the project was archived.
 - In the "File name" box:
Enter the name of the file where the project is archived.
3. Click "Open" to save your settings.
The "Select Destination Directory" dialog box opens.
4. Select the destination directory/project directory in the selection list.
5. Click "OK" to apply your settings.

The retrieval is finished when the "Retrieving" dialog box closes.

2.2.2.4 How to archive and retrieve a multiproject

Introduction

You can store a multiproject in compressed form in an archive file in the same way as individual projects or libraries. This can be done on a hard disk or on transportable storage media (such as a ZIP disk).

If individual projects of a multiproject are stored on more than one PC in a network, you must use the following programs to archive the multiproject:

PKZIP for Windows (available on the PCS 7 Toolset DVD)

Recommendation:

Archive the multiproject on an engineering server.

Requirements for archiving a multiproject

- A tool is installed for archiving project data (default: *PKZIP for Windows*). *PKZIP for Windows* is automatically installed during the system setup from PCS 7.
- Archiving a multiproject is a cross-project function. Therefore, no other process can access any of the projects in the multiproject during archiving.

Archiving a multiproject

1. Select the multiproject in SIMATIC Manager.
2. Select the menu command **File > Archive**.
The "Archive" dialog box opens.
3. Select the "User Projects" tab.
4. Confirm the selected multiproject by clicking "OK" to save your entries.
5. Make the following settings for the archiving:
 - In the "Save to" drop-down list:
Select the drive and folder.
 - In the "File name" box:
Enter the name of the file in which the data are to be saved.
6. Click "Save" to apply your settings.
The "Archive – Options" dialog box opens.
7. If you want to archive the project on floppy disks, select the size of the diskette.
You can find additional information about this dialog box by pressing the "Help" button.
8. Click "OK".
The archiving process begins.

When the "Archive" dialog box closes, archiving is finished.

Retrieving a multiproject

1. In SIMATIC Manager, select the menu command **File > Retrieve**.
2. In the next dialog box, select the archived multiproject.
3. Click "Open" to save your entries.
The "Select Destination Directory" dialog box opens.
4. Select the destination directory where the archive is to be unzipped. Click "OK".
The multiproject is retrieved.
After the retrieval operation, the "Retrieve" dialog box opens.
5. Click "OK".
The following is displayed in the "Retrieve" dialog box.
 - The name of the retrieved project
 - A prompt for opening the project
6. Click "Yes" based on your wish to open the project or "No" to stop working.

Result

A subdirectory is automatically created in the destination directory you selected. The subdirectory contains the following:

- By default: the name of the multiproject
- Individually: a unique directory name derived from the name of the multiproject

The following are placed in the subdirectory:

- Multiproject
- Projects contained in the multiproject
- Libraries, including the master data library

Once a multiproject is retrieved, all project directories of the multiproject are located on the same level below this directory.

2.2.2.5 How to archive custom libraries

Introduction

If you have created a custom project library in PCS 7, we recommend that you archive it. Perform the steps below for each library to be backed up.

Procedure

1. In SIMATIC Manager, select the menu command **File > Archive**.
The "Archive" dialog box opens.
2. Open the "Libraries" tab.
3. Click "Browse" and select the library you want to archive from the list.
4. Click "OK" to save your settings.
The "Archive - Select Archive" dialog box opens.
5. Make the following settings for the archiving:
 - In the "Save to" drop-down list:
Select the drive and folder
 - In the "File name" box:
Enter the name of the file in which the data are to be saved.
6. Click "Save" to apply your settings.
The archiving process begins.

2.2.2.6 How to export operator and display texts

Introduction

To visualize the process on the operator station you use faceplates, which show the plant operator the measured values, operating limits, units, and operator texts of the blocks, for example.

If you have changed operator or display texts in your blocks, we recommend that you back up the operator and display texts.

Exporting operator and display texts

In SIMATIC Manager you can export information relating to parameters, signals and messages to a file (format: *.csv).

You can edit this file in standard MS Office applications (such as Excel and Access).

The same mechanisms that are used for converting to project-specific languages are used for the export.

Requirement

PCS 7 allows you to store all operator and display texts in every desired language. The only requirement is that the language is installed in your project:

- The languages available in SIMATIC Manager can be displayed via the menu command **Options > Language for Display Devices**.
- The number of languages offered is specified when Windows is installed (system characteristics).

Procedure

1. Open the project in the SIMATIC Manager.
2. In the component view, select the master data library (or, if not available, the project folder).
3. Select the menu command **Options > Manage Multilanguage Texts > Export**. The "Export User Texts" dialog box opens.
4. Make the following settings:
 - In the "Text Tables" group, set the storage location and the format for the export file (available formats: *.xls and *.csv).
 - In the "Language" group, set the source and target languages in accordance with your display language.
5. Click "OK".
6. If you have to manage several project-specific languages, repeat steps 3 to 5 for each language. Please note that you then have to set different export file names or target directories.

2.2.2.7 How to back up custom functions and actions

Introduction

PCS 7 enables you to create dynamic sequences in your OS project by creating custom functions and actions. These functions and actions are written in ANSI-C language.

You must back up any project functions, standard functions, local actions, and global actions that you have created or modified.

Project and standard functions

Project functions and standard functions have file names with the extension *.fct. By default, PCS 7 places these functions in the following folders:

- Project functions are placed in the "\library" folder of the OS project.
- Standard functions are placed in the "\aplib" folder in the installation directory of PCS 7.

Local and global actions

Local and global actions have file names with the extension *.pas. By default, PCS 7 places these actions in the following folders:

- Local actions are placed in the "\<Name of PC>\Pas" folder of the project directory.
- Global actions are placed in the "\Pas" folder of the OS project.

Additional information

- Online Help for *WinCC Information System*

2.2.3 Backing up OS project data

2.2.3.1 Backing up configuration data

Introduction

The configuration data of the PCS 7 operator station is automatically backed up when a multiproject is archived. A separate backup is not required.

Backing up OS configuration data

Configuration data for the PCS 7 operator station are saved by default in the following folder:
...\\Siemens\\WinCC\\WinCCProjects.

To back up data, compress the project paths in this folder and save them on a suitable medium (such as a CD).

Backing up OS PC data

The OS configuration data are located on the PCS 7 engineering station. You therefore back up OS server PCs or OS client PCs with an image. You can find information on this in the section "Backing Up Data by Generating an Image File (Page 34)".

2.2.4 Backing up batch data

2.2.4.1 Backing up configuration data

Options for data backup

SIMATIC BATCH offers several options for backing up and restoring project data.

Data	Menu command for backup operation	Menu command for restore operation
- Materials - Libraries - Basic recipes - Formula categories - Formulas - Orders - Rights and roles - User settings (1) - Project settings	Options > Backup You can find information on this in the section "How to generate a backup (Page 28)". (2)	Options > Restore You can find information on this in the section "How to restore data from a backup (Page 29)". (3)
Completed batches	Select batch(es), select Archive in the shortcut menu You can find information on this in the section "How to archive batches (Page 13)".	-

(1) "User settings" can only be backed up in a database copy.

(2) You back up in a database copy or an SBB file (compressed XML file).

(3) You restore the data from a database copy or from an SBB file (compressed XML file).

Additional information

- Manual *Process Control System PCS 7; SIMATIC BATCH*

2.2.4.2 How to generate a backup

Elements of the backup

You can back up all configured data with the **Backup** command. The backup includes the following elements:

- Materials
- Libraries
- Basic recipes
- Forms
- Rights and roles
- Project settings

Rule

NOTICE
The follow applies when a backup is running: Operator input cannot be executed on the BATCH client where a backup is being generated.

Procedure

1. Select the multiproject/project in the SIMATIC Manager.
2. Select the menu command **Options > SIMATIC BATCH**.
The "Batch Process Cell - ..." dialog box opens.
3. In BatchCC, select the menu command **Options > Backup**.
4. If there are non-archived batches in the project, you must acknowledge the message dialog for non-archived batches. In this case, click "OK".
The "Backup" dialog box opens.
5. Enter the name of the backup file in the "File Name" input box.
6. Click on the "Save" button.
The backup file is generated.

2.2.4.3 How to restore data from a backup

Introduction

You can restore the data from a backup file and update the Batch process cell in the SIMATIC BATCH Control Center (BatchCC).

Requirement

No Batch process cell is available in the BatchCC.

Reading a backup

1. Select the multiproject/project in the SIMATIC Manager.
2. Select the menu command **Options > SIMATIC BATCH**.
The "Batch Process Cell - ..." dialog box opens.
3. In BatchCC, select the menu command **Options > Restore**.
The "Restore" dialog box opens.
4. Select the backup file.
5. Click "Open".
The backup file is loaded.

Updating the Batch process cell

1. Select the Batch process cell in the tree view of BatchCC.
2. Select the menu command **Edit > Update Process Cell**.
The "Batch Process Cell - ..." dialog box opens.
3. Click "OK".
The "Update Process Cell" dialog box opens.
4. Compare the columns "Current process cell" und "New process cell" line-by-line.
Rearrange them if necessary.
You can find additional information about this in the manual *Process Control System PCS 7; SIMATIC BATCH*.
5. Click "OK".
The "Updating Process Cell" dialog box opens and closes automatically when the update is completed.

Result

In the BatchCC, the data from the backup file is entered into the Batch database and the process cell is made available again.

2.2.4.4 How to archive batches

Long-term archive

You archive batches in long-term archives in BatchCC. Long-term archives are used for long-term storage of batch data in accordance with the FDA.

Rules

- You can only archive completed batches.
- The archiving method and archiving path are set.
- Data from long-term archives cannot be used to restore defective batch data or batch structures.

Archiving Individual Batches

You archive a **single** completed batch as follows:

1. Select the batch to be archived in the tree view.
2. Open the shortcut menu (by right-clicking) and select the menu command **Archive**.

Archiving multiple batches

You archive **multiple** completed batches as follows:

1. Open a Batch overview list from the "Details" shortcut menu.
2. Select the batches to be archived.
3. Open the shortcut menu (by right-clicking) and select the menu command **Archive**.

2.2.5 Backing up SIMATIC Route Control data

2.2.5.1 Backing up configuration data

Options for data backup

SIMATIC Route Control provides the following options for backing up and restoring project data.

- You can back up the project data from SIMATIC Route Control with a PCS 7 project. You can find additional information on this in the section "How to archive a project (Page 17)".
- You can generate an image of the partition on which the project database is located.
- You can export/import partial routes from SIMATIC Route Control. You can find additional information on this in the section "How to back up project data from SIMATIC Route Control (Page 32)".

Additional information

- Manual *Process Control System PCS 7; SIMATIC Route Control*

2.2.5.2 How to back up project data from SIMATIC Route Control

Introduction

This section describes the separate backup of partial routes from SIMATIC Route Control to a file.

Note

You can back up the partial routes with the offline project data from SIMATIC Route Control. The interface blocks are part of the PCS 7 project and are backed up during the archiving of the PCS 7 project.

Preparing the database backups

Before performing a backup, you must always carry out the following steps in Route Control engineering:

- Check the database consistency via the menu command **Options > Check Consistency**.
- Compress the database via the menu command **Options > Compress Database**.

Creating a backup

1. Select the multiproject/project in the SIMATIC Manager.
2. Select the menu command **Options > SIMATIC Route Control**.
The "Route Control Engineering - ..." dialog box opens.
3. Select the menu command **Options > Export/Import CSV > CSV Export/Import Wizard**
The "Wizard: CSV file data exchange (Export/Import)" opens.
4. Check the path in the "Directory" input box.
5. In the "Direction" group, activate the check box "RC project engineering >> CSV file(s) (Export)".
6. Click "Continue".
7. Select all check boxes.
8. Click "Continue".
9. Click "Finish".
The files are exported.

Additional information

- Manual *Process Control System PCS 7; SIMATIC Route Control*

2.2.5.3 How to restore data from a backup

Introduction

You restore partial routes from SIMATIC Route Control from a backup file.

Importing a backup

1. Select the multiproject/project in the SIMATIC Manager.
2. Select the menu command **Options > SIMATIC Route Control**.
The "Route Control Engineering - ..." dialog box opens.
3. Select the menu command **Options > Export/Import CSV > CSV Export/Import Wizard**
The "Wizard: CSV file data exchange (Export/Import)" opens.
4. The dialog box "Wizard: CSV file data exchange (Export/Import)" opens.
5. Check the default path set in the "Directory" input box.
6. In the "Direction" group, activate the check box "CSV file(s) >> RC project engineering (Import)".
7. Click "Continue".
8. Select all check boxes.
9. Click "Continue".
10. Click "Finish".
The project engineering data are imported.

Additional information

- Manual *Process Control System PCS 7; SIMATIC Route Control*

2.2.6 Creating an image

2.2.6.1 Backing up data by generating an image file

Introduction

We recommend that you generate an image of the installation in order to back up partitions and hard disk data (following a reinstallation, for example).

Image file

An image file maps all of the data on the backed-up medium (hard disk, logical drives). It is used to back up data on partitions or hard disks. Many of the software packages that can be used to generate image files also offer data compression.

Boot partitions are included in the backup. This enables you to save all the PC settings including the Windows system settings.

All the data of a PC can be restored using an image file, usually in a short amount of time (e.g., 2 GB in approx. 15 minutes). In the event of a fault, you can restore the complete PC installation.

Rules

- You must use the **same hardware** to restore data.
- Note the following settings of the hard disk for the image file (you can find additional information on this in the section "Managing the operating system (Page 104)"):
 - Partition size
 - Formatting of partition or hard disk (e.g., NTFS, FAT32)
- Authorizations and license keys cannot be included in the backup.
- The image software must be suitable for the operating system in question.

Basic procedure

1. Move the authorizations and license keys to another medium (diskette, partition, etc.) before generating the image.
2. Follow the instructions of the manufacturer of the image software when creating an image.

Additional information

- Documentation relating to the image software used

2.2.7 Comparing project versions

2.2.7.1 Comparing project versions with VXC

Version Cross Manager (VXM)

The Version Cross Manager is a separate application you can order as an option. You use the Version Cross Manager to compare two user programs for download-relevant differences quickly and reliably. This allows you to detect whether changes have been made to the user program, and what those changes are.

Overview

Comparison of	Detailed Information	Called with	Additional information
Changes to different project versions in the user program	CFC charts SFC charts	Start > SIMATIC > STEP 7 > VCM - Compare Versions	Configuration manual <i>Process Control System PCS 7; Engineering System</i> Online help <i>Version Cross Manager</i>
User programs based on XML files (for synchronizing process-control project data with planning data, for example)	CFC charts SFC charts	Version Cross Manager - XML file generated with File > Export.... - Compare XML files using File > Compare With XML File....	Online help <i>Version Cross Manager</i>

2.3 Hardware update

2.3.1 Hardware updates

Introduction

In this section, a hardware update refers to changing the firmware in SIMATIC modules. Updating the firmware of a SIMATIC module is referred to as a "firmware update" in the following.

A firmware update includes the following:

- Function upgrades
- Operating system enhancements

Released modules

You can find the firmware versions for modules released of a particular PCS 7 version in the "PCS 7 - Released Modules" documentation that corresponds to the version in question.

Requirements for the firmware update

A firmware update for a SIMATIC module may be required if you wish to use new functions or correct errors.

Checking the latest product version or the firmware version of a module

You need to check the latest product version or the firmware version of a module in the following situations:

- When replacing a module (due to a defect, for example)
- When you wish to use new functions after you have change the configuration

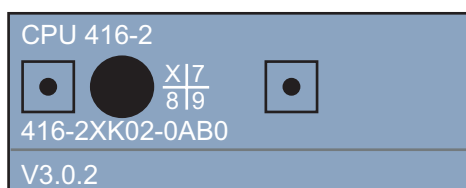
Compare the document *PCS 7 - Released Modules* for older PCS 7 versions to find out which PCS 7 version first included the feature.

Determining the product version or the firmware version

Update-capable modules:

- You can find the following identifiers on update-capable modules:
 - The product version is indicated by a cross (in the following example: product version 6).
 - The original version of a firmware is indicated with text (in the following example: V3.0.2).

Example:



- When a firmware update is delivered you obtain a label showing the current firmware version which you can paste over the displayed label. Once you have performed the firmware update, you should change the indicated firmware version of the module to match the that of the newly installed firmware version. This will ensure uniformity in the plant documentation.

Modules that cannot be updated:

- If only the manufacturer can perform changes to a module, only the product version is shown on the housing of the module (indicated by a cross; in the following example: product version 10).

Example:



Recommendation for performing firmware updates

Perform these firmware updates at regular intervals when an opportunity presents itself (such as during a scheduled plant shutdown).

Supply sources for the latest firmware version

The update file can be obtained from your Siemens representative or the Internet:

Internet address: www.ad.siemens.com/support ()

If you cannot access the Internet address, contact Technical Support.

Note

The update file may be supplied in an executable, self-extracting file (.exe). When you want to perform consecutive updates for different module types of module versions, you must unzip the update files in separate folders for the different CPUs as follows:

- Type of module
 - Product version
 - Firmware version
-

Overview

The sections below describe topics related to hardware updates:

- Adjustments after a hardware change (Page 39)
- Updating a SIMATIC S7 CPU (Page 40)
- Updating an interface module IM xxx (Page 43)
- Updating a CP xxx (Page 46)
- Working with GSD files (Page 54)

2.3.2 How to make adjustments after a hardware change

Basic procedure

A change to the hardware always requires a change to the software. You configure the changed hardware in HW Config. You then compile and download the changes to the CPU. You can then physically replace, remove or add the modified hardware.

Procedure

1. In HW Config, open the project (AS).
2. Drag the object (such as the CPU: Type, Firmware Version x.x) from the hardware catalog to the appropriate slot in the AS configuration table.
The following message appears: "Do you want to exchange component ... with component ...?"
3. After verification, click "Yes" to confirm.
4. Select the menu command **Station > Save/Compile**.
You can also perform the compiling during the subsequent work.

2.3.3 Updating the CPU

2.3.3.1 Updating a SIMATIC S7 CPU

Preparation

Compare the type and manufacture date of the modules you are using with the information in the document *PCS 7 Released Modules*.

If replacement of the CPU is required, contact your Siemens representative.

Firmware update for H CPUs

Note

In a fault-tolerant PCS 7 system, the H-CPU's must always have a uniform manufacture data and the same firmware version.

Both H CPU's must be in STOP mode for the firmware to be updated.

Update capability of CPs

You perform the firmware update using an S7 memory card. This is referred to simply as a "memory card" in the following.

Components	Updating CPU S7-400	Updating CPU S7-400H
PC with external EPROM burner or programming device for programming the memory card	X	X
2 MB S7 Memory Card - Order No. 6ES7 952-1KL00-0AA0	X	-
4 MB S7 Memory Card - Order No. 6ES7 952-1KM00-0AA0	X	X
STEP 7	X	X
Files for the firmware update (available on the Internet).	X	X

2.3.3.2 How to perform a firmware update for the CPU

Notes to the reader regarding the firmware update

The procedure for performing a firmware update is described below using the CPU 416-2 (6ES7 416-2XK02-0AB0) as an example.

Preparation

Compare the type and manufacture date of the modules you are using with the information in the document *PCS 7 Released Modules*.

If replacement of the CPU is required, contact your Siemens representative.

Requirements

The following is required for the update:

- STEP 7 V5.3 or higher is installed on the programming device or PC.
- The update file for the CPU update is available on the programming device / PC.

Loading the memory card for updating the CPU firmware

1. Clear the memory card by selecting the menu command **File > S7 Memory Card > Delete**.
2. In SIMATIC Manager, select the menu command **PLC > Update Operating System > Set Destination Directory**.
3. Set the destination directory.
4. Select the file CPU_HD.UPD.
5. Click "Open".
This starts the programming of the memory card (loading of the firmware).
When this is completed, the "Updating operating system" message dialog box reports that the firmware has been loaded to the memory card.
6. Click "OK".

Performing the CPU firmware update

NOTICE

With the next steps, all data on your CPU are deleted and cannot be recovered!
--

Do not cancel a download operation once it is started. If the download operation aborts, you can repeat it. If defects occur as a result of the abort, send the CPU in for repair.
--

1. Switch off the power supply (PS) of the rack where the CPU is inserted.
2. Insert the prepared memory card into the CPU.
3. Switch on the power supply for the module.
The firmware is transferred from the memory card to the internal CPU FLASH EPROM. During the transfer, all LEDs on the CPU (INTF, EXTF, FRCE, CRST, RUN, STOP) are lit.
After approximately 2 minutes, the slowly flashing STOP LED (=> general system reset) indicates the completion of the update for the CPU firmware.

NOTICE

Following the CPU update, an H-CPU starts a self test, which can last several minutes depending on the memory configuration.
--

4. Switch off the power supply of the rack.
5. Remove the memory card that was used for the CPU update and insert the memory card intended for CPU operation into the CPU, if one is provided.
6. Switch on the power supply for the module.
The CPU automatically performs a memory reset and is then ready for operation.

2.3.4 Updating an interface module

2.3.4.1 Updating an interface module (IM)

Introduction

The interface modules (IM)) are the interface to the PROFIBUS DP in PCS 7.

Preparation

- Compare the type and version of the interface modules you are using with the information in the document *PCS 7 Released Modules*.
- If replacement of the interface module is required, contact your Siemens representative.
- A firmware update is possible for some interface modules. You will find the procedure in the section "How to perform a firmware update of an IM (Page 44)" below.

Update capability of interface modules or couplers downstream from interface modules

You can update the firmware of the following components (interface modules or couplers downstream from interface modules):

Components	Order Number	As of firmware version
IM 153-2	6ES7 153-2Bx00-0XB0	
IM 152-1	6ES7 152-1AA00-0AB0	V2.02
Y Coupler	6ES7 197-1LB00-0XA0	
Y Link	6ES7 197-1LA01-0XA0	
DP/PA Link	6ES7 157-0AA82-0XA0	V4.x

Firmware update for SIMATIC stations with redundant interface modules

Note

You can perform a firmware update of the interface modules for SIMATIC 400H station with redundant interface modules during runtime.

2.3.4.2 How to perform a firmware update of an interface module (IM)

Introduction

This section describes how to update the firmware of the interface modules (IM) via Industrial Ethernet.

Requirements

The following is required to perform the update via Industrial Ethernet:

- STEP 7 V5.3 or higher is installed on the programming device or PC.
- The update file for the CPU update is available on the programming device / PC.
- The CP 443-1 is routing-capable (check in HW Config: Properties of the CP > brief description "Routing" is listed).
- The files containing the current (new) version of the firmware is available in the file system of your programming device or PC.
- The IM has been integrated in your PCS 7 project.

Procedure

1. Open SIMATIC Manager.
2. In the component view, select the SIMATIC station in which the IM is located.
3. Double-click the "Hardware" object in the detail window.
HW Config opens.
4. Select the IM whose firmware you want to update.
5. Select the menu command **PLC > Update Firmware**.
The "Update Firmware" dialog box opens.
6. Make the following settings:

Setting	Action
Location of the firmware file	1. In the "Firmware File" group, specify the folder where you placed the file for the firmware update. If you want to search, you can use "Browse" to open Explorer.
Activation of "new" firmware	1. Use the "Activate firmware after download" check box to specify when the "new" firmware is to be activated as follows: – Select the "Activate firmware after download" check box if you want the IM to automatically reset after successfully downloading the new firmware. The new firmware is active following the restart. – Clear the "Activate firmware after download" check box if you do not want the IM to reset after downloading the new firmware. The "new" firmware becomes active only after the power supply has been switched off.

1. Click "Execute". The firmware is updated.

Firmware update in a redundant system

After the firmware update of the active IM, the "RESET" automatically triggers the switchover of the two IMs.

You can now update the second IM in the redundant system. Each IM must be updated separately.

Updating the identifier

Note

After the firmware update of the IM has been successfully completed, update the identifier of the firmware version. You can find information on this in the section "Hardware Updates (Page 36)".

2.3.5 Updating a CP xxx

2.3.5.1 Updating a communication processor (CP)

Introduction

In PCS 7, communication modules (CPs) are used to connect a SIMATIC station to bus systems. By updating the firmware, you can enhance the CP properties without replacing the hardware.

Update capability of CPs

The specific properties of a module are retained when there is a firmware update. The CP type is not changed by a firmware update.

CP type	Update capability	Order number
CP 341	Can be updated in all versions	
CP 443-1	Can be updated in all versions	
CP 443-5 Extended	Can be updated in all versions	

Overview

The sections below describe procedures for updating firmware:

- CP 341 firmware update (Page 47)
- CP 443-1 firmware update (Page 49)
- CP 443-5 Extended firmware update (Page 52)

2.3.5.2 How to perform a firmware update of the CP 341

Introduction

This section describes how to update the firmware of the CP341.

Preparations

- Compare the type and version of the modules you are using with the information in the document *PCS 7 Released Modules*.
- If you need to replace the CP, contact your Siemens representative.

Requirements for the firmware update

- STEP 7 V5.3 or higher is installed on the programming device or PC.
- The update file for the CPU update is available on the programming device / PC.
- The software package "Configuration package for point to point communication" as of V5.0 is installed (supplied with the CP).
- The valid parameter assignment is stored in HW Config and has been downloaded to the CPU.

Procedure

1. Open SIMATIC Manager.
2. In the component view, select the SIMATIC station in which the CP 341 is located.
3. Double-click the "Hardware" object in the detail window.
HW Config opens.
4. Double-click on the CP whose firmware is to be updated.
The "Properties" dialog box of the CP opens.
5. Select the "General" tab.
6. Click "Parameters ...".
The dialog box for the configuration interface opens.
7. Select the menu command **Options > Firmware Update ...**
 - If the CP is available, the firmware version of the current module firmware is indicated (Vx.y.z).
 - If there is no firmware on the CP, a message to that effect is displayed. This can occur, for example, if the firmware update was aborted. The old firmware is deleted in this case. You must download a firmware.
8. In the "Firmware File" group, specify the folder where you placed the file for the firmware update. To search for this, open an Explorer window by clicking "Browse".
The version of the selected firmware is displayed under "Selected FW version".

9. Switch the CPU to STOP.
10. Click "Download Firmware" to start the download procedure to the CPU.
11. Click "Download Firmware" to confirm the download procedure.
If you click "Cancel", the download is aborted. The module will not be operational if this happens.
Restart the firmware download to make the module operational again.

Note

Before deleting the older firmware, the CP checks if the order number of the firmware to be downloaded is permitted.

Result

The new firmware is installed in the operating system memory of the CP. The progress of the installation is indicated by a progress bar and a percentage under "Done". Once the firmware update is complete, the module is ready for immediate operation.

2.3.5.3 How to perform a firmware update of the CP 443-1

Preparation

- Compare the type and version of the modules you are using with the information in the document *PCS 7 Released Modules*.
- If you need to replace the CP, contact your Siemens representative.

Requirements for the firmware update

- STEP 7 V5.3 or higher is installed on the programming device or PC.
- The update file for the CPU update is available on the programming device / PC.
- Ethernet card (CP 1613, 3COM network adapter, for example)

Determining the MAC address of the CP 443-1

When updating firmware, you must know the current MAC address of the CP 443-1.

1. Open SIMATIC Manager.
2. In the component view, select the CP 443-1 for which the firmware is to be updated from below the SIMATIC station.
3. Select the menu command **CPU > Diagnostics/Settings > Module Information**.
4. Click "Special Diagnostics".
The NCM S7 diagnostics tool opens.

Note

If the NCM S7 diagnostics do not start, the connection between the programming device/PC and the CP 443-1 is faulty. Correct the fault.

5. Note the MAC address setting of the CP 443-1 under "Industrial Ethernet."

Performing the firmware update

NOTICE

Note the following:

- A warning message appears before the download operation begins if an incorrect CP type has been inadvertently addressed. The firmware can nevertheless be downloaded to an incorrect CP type if the message is acknowledged.
- With the next steps, all data on your CP are deleted and cannot be recovered!
- Do not cancel a download operation once it is started. The CP may no longer be usable if you do this and you will have to send it in for repair.

1. Select the menu command **Start > SIMATIC > STEP 7 > NCM S7 Industrial Ethernet > Firmware Loader**.
The dialog box of the firmware loader opens.
2. Click "Continue".
3. In the "Step 1" dialog box, set the path for the update file
 - Click "Browse".
 - Use "Select file" to select the desired file ("`<drive>:\TEMP\Cp4435ba.fwl`", for example).
 - Click on the "Open" button.
4. Click "Continue".
5. In the "Step 2" dialog box, set the **MAC address**.
6. Click "Continue".
7. Check the following settings:
 - "Application access point"
 - "Interface parameter assignment used"
8. Make sure that the correct settings have been activated in the configuration console.

Note

The access point must be set to "S7ONLINE CP xxxx(ISO)".

9. Activate the firmware update by clicking "Download".
The operation takes approximately 1 minute.

Procedure when a download error occurs

If the download operation was terminated by an error, no LED is lit on the CP.

1. Switch the power supply of the rack off and on again.
2. Repeat the load operation.

If the CP responds to the download start, but the download operation does not finish properly, it could be that:

- The same address has been assigned more than once on the plant bus.
- The load on the plant bus is too high.

Note

If a CP does not respond to a load procedure via the configured MAC address, load the CP again via the imprinted address.

2.3.5.4 How to perform a firmware update of the CP 443-5 Extended

Preparation

- Compare the type and version of the modules you are using with the information in the document *PCS 7 Released Modules*.
- If you need to replace the CP, contact your Siemens representative.

Requirements for the firmware update

- STEP 7 V5.3 or higher is installed on the programming device or PC.
- The update file for the CPU update is available on the programming device / PC.
- MPI cable

Note

Ensure the following for the firmware update of the CP 443-5 Extended:

- If you want to connect devices that work with the DPV1 PROFIBUS standard to your PCS 7 system following the conversion, you have to replace the hardware (new CP type: 6GK7 443-5DX03-0XE0 with firmware version V5.1).
 - This hardware requires special device drivers.
You can find information on how to create these device drivers in the manual *Process Control System SIMATIC PCS 7; Programming Instructions, Creating Blocks for PCS 7*.
-

Preparing for the firmware update

1. Make sure that the update files required for the firmware update are available on the programming device or PC.
Files for the firmware update are available on the Internet. You can find information on this in the section "Hardware Updates".
2. Switch off the power supply (PS) of the rack where the CP is inserted.
3. Use an MPI cable to establish a direct connection between the MPI interface of your programming device or PC and the PROFIBUS interface of the CP.
4. Switch on the power supply of the rack and the programming device or PC.
5. Select the menu command **Start > Settings > Control Panel > Set PG/PC Interface**.
You use this to establish the access path to the CP 443-5 Extended.
Example: Make the following setting for the CP 5611 (FWL):
 - Select "FWL_LOAD" as the "Application access point" to the CP 443-5 Extended.
 - Select the MPI interface with the supplement "(FWL)" as the interface.
6. Click "OK".
7. Make sure there are no active applications on your programming device.
8. Restart the interface.

Performing the firmware update

NOTICE

Note the following:

- With the next steps, all data on your CP are deleted and cannot be recovered!
- Do not cancel a download operation once it is started. The CP may no longer be usable if you do this and you will have to send it in for repair.

1. Select the menu command **Start > SIMATIC > STEP 7 > NCM S7 > Firmware Loader**.
The dialog box of the firmware loader opens.
2. Click "Continue".
3. In the "Step 1" dialog box, set the path for the update file
 - Click the "Browse" button.
 - Use "Select file" to select the desired file ("**<drive>:\TEMP\Cp4435ex.fwl**", for example).
 - Click on the "Open" button.
4. Click "Next" to confirm the next three dialog boxes until you reach "Step 4: Perform Load Operation".
5. Read the information in the dialog box for "Step 4: Perform Load Operation".
In the table below you will find the download operation states that are displayed.

Where	Display	State
On the PG/PC in the Firmware Loader dialog box	The bar in the dialog box changes.	Download procedure is running.
On the PG/PC in the Firmware Loader dialog box	The message "Download completed successfully" is displayed.	Download procedure is complete.
CP 443-5 Extended	The CP RUN LED flashes.	Download procedure is running.
CP 443-5 Extended	The CP STOP LED is lit.	Download procedure is complete.

1. Switch off the power supply of the rack.
2. Click "Cancel" to close the dialog box.
3. Reestablish the original PROFIBUS connection.
4. Switch on the power supply for the module.
The CP performs a self-test and is then ready for operation.

Procedure when a download error occurs

If the download operation was terminated by an error, no LED is lit on the CP.

1. Switch the power supply of the rack off and on again.
2. Repeat the load operation.

2.3.6 Working with GSD files

2.3.6.1 Working with GSD files

Introduction

STEP 7 Version 5 carefully checks GSD files. Syntax errors or non-interpretable errors can occur with GSD files from an older project, however.

Improved help texts are provided for syntax errors and GSD problems starting with STEP 7 Version 5.1 SP2.

If the following measures are not successful, contact the device manufacturer and request a new GSD file. You can find solutions for some errors in this table:

Troubleshooting

When Error Occurs	Error message	Source of Error	Remedy
During insert operation	In the 'SIMATIC 400(1)' station, the transmission rate of '187.5 Kbps' is not supported by the 'MBK-P' station.	The entry '187.5_supp = 1' is not present.	1. Contact the device manufacturer.
Install a new GSD	The path/file name of the GSD file contains a syntax error. File cannot be interpreted.	Vendor_Name: the number of characters between the quotation marks must not exceed 32; special characters are not allowed.	1. Create a backup copy of the file and open it with a text editor (such as WordPad) 2. Check Vendor_Name. 3. Make corrections to the name, save the file and link it again.
Determine the names of the GSD files and the path: via the object properties of the DP slave	In the 'SIMATIC 400(1)' station, the transmission rate of '187.5 Kbps' is not supported by the 'MBK-P' station.	The decimal separator in the transmission rate must be a period and not a comma.	1. Create a copy of the file. 2. Open the original file with a text editor (such as WordPad). In transmission rate, change '187,5_supp = 1' to '187.5_supp = 1'. 3. Start HW Config by selecting the menu command Options > Update Catalog . Remarks: If the entry '187.5_supp = 1' is not present, the transmission rate is not supported. Contact the device manufacturer.

2.4 Software update

2.4.1 Software updates

Information

- You can find information on updates for the PCS 7 software in the *Process Control System PCS 7; Software Update* manuals.
- You can find information on updating redundant operator stations during running operation in the manual *PCS 7 Process Control System; Fault-Tolerant Process Control Systems*, section "Guide to Updating a Redundant OS During Running Operation". You can find a brief overview on this in this documentation in the section "Updating the PCS 7 OS in runtime (Page 56)".
- Information on installing hot fixes are included in the respective software package with the hot fix.

Note about software updates

Note

Note that you must use the appropriate hardware in order to take advantage of features in new software versions.

You can find information on the minimum requirements for PC stations in PCS 7 in the manual *PCS 7 Process Control System; PC Configuration and Authorization*.

2.5 Updating the PCS 7 OS in runtime

2.5.1 Updating the PCS 7 OS in runtime

Introduction

If you configure a PCS 7 OS with redundancy, you can update the PCS 7 OS in runtime, which allows you to adapt your existing PCS 7 process control system from an "older" version to a "newer" PCS 7 version).

Updating the PCS 7 OS involves the following tasks:

- Preparatory measures
- Installation of the "new" software
- Commissioning measures required to adapt you existing PCS 7 process control system

Updating the PCS 7 OS during running operation offers the following benefits:

- Operation of the PCS 7 system is not disrupted.
- The AS does not enter STOP mode.
- The automation process can still be operator controlled and monitored.

Guide to updating the PCS 7 OS in runtime

You can find a guide to updating a redundant OS during running operation in the documentation below.

Scenario	Information can be found in ...	Section ...
Updating the PCS 7 OS in runtime (updating the software, for example) Requirements: redundant OS	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	Guide to Updating the PCS 7 OS During Running Operation: • Phase 1: Updating the standby server • Phase 2: Updating OS clients that are interconnected to the standby server • Phase 3: Downloading connections, gateways and changes to the AS • Phase 4: Updating OS clients that are interconnected to the master server • Phase 5: Updating the master server

Checking the diagnostic requirements

3.1 Requirements for diagnostics

Requirements

Several requirements must be fulfilled to ensure that the status of a PCS 7 system can be diagnosed effectively. The most important requirements are:

- Diagnostics are enabled for the components.
- Diagnostic options were activated during configuration

Information on configuring the diagnostic options

The primary configurations can be found in the following documentation:

- Configuration manual *Process Control System PCS 7; Engineering System*
- Configuration manual *Process Control System PCS 7; Operator Station*

You can search for information in the index of these manuals by entering "Diagnostics ..." as a key word.

Checking PC components

- You check PC components using software tools of PCS 7 (such as a maintenance station or PC DiagMonitor) and the operating system.
- The following configuration actions assist you in diagnosing PC components:

Configured element	Reference
Lifebeat monitoring	Configuration manual <i>Process Control System PCS 7; Operator Station</i>
Diagnostic screen for PC diagnostics	Configuration manual <i>Process Control System PCS 7; Operator Station</i>
WinCC "System Info" channel	Online help for <i>WinCC Information System</i> , "Communication > System Info"
Diagnostics for systems with redundant OS PCs	Configuration manual <i>Process Control System PCS 7; Operator Station</i>

Checking module properties

1. Open the project in the SIMATIC Manager.
2. In the component view, select the SIMATIC station.
3. Double-click the "Hardware" object in the detail window.
HW Config opens.
4. Double-click the module you wish to check.
The properties dialog box for the selected module opens.
5. Browse the individual tabs for appropriate options.
Activate the diagnostic properties depending on the module type.
Available diagnostic options can be found in the following tabs:
 - Diagnostics"
 - Inputs"
 - Outputs"
 - Options"

SIMATIC modules with diagnostic properties

The following components are available in PCS 7 diagnostic-capable modules:

- S7-400
- S7 300 modules
- ET 200M
- ET 200S
- ET 200iSP
- DP slaves
- DP/AS-i link
- Diagnostic repeaters
- Network components (SCALANCE; OSM, ESM)

Additional information

- Configuration manual *Process Control System PCS 7; Operator Station*
- Online help *PC DiagMon*

Message concept of PCS 7

4.1 Servicing a system - message concept

Introduction

The message system and diagnostic options of PCS 7 help you to assess the system status. You can find information about the PCS 7 message concept in the following sections:

- PCS 7 message system (Page 61)
- Origin of a message (Page 62)
- Determining the source of a message (Page 63)
- Evaluating and understanding messages (Page 64)

Basic terms

Some basic terms used in the PCS 7 message concept are defined in the following:

Term	Definition
Events	Events cause a change in the data status to occur in the automation system. For example, an event can be the following: A bit is modified in an automation system by a change to a process value or by attaining a specified limit value. The configuration determines which events trigger a message.
Messages	Messages are triggered by events or by a message frame. PCS 7 has the following message types: • Operating messages • Process messages • Event messages • Process control messages and system messages
Error and fault	In PCS 7, the PCS 7 Operator Station operator control and monitoring system is also used to display errors and faults in the process. • Error: component (object) status that does not disturb the process (for example, defective display lamps). • Fault: component (object) status that interferes with the process (for example, a defective motor).

Additional information

You can find detailed information about the message system as follows:

- In the *WinCC Information System*:
Select the menu command **Start > SIMATIC > WinCC > WinCC Information System**, and look under "System Overview > How WinCC Works >
 - Message system of a PCS 7 OS
 - Archive system of a PCS 7 OS
 - Reports system of a PCS 7 OS
- In the configuration manual *PCS 7 Process Control System; Operator Station*, in the section "Settings for the alarm system"
- In the online help for *SIMATIC BATCH*, you will find the following information under "Batch Data Management":
 - Batch reports
 - Archiving batches
- In the *SIMATIC Route Control* online help, you will find the following information under "Operator Control and Monitoring":
 - Route log

4.2 PCS 7 message system

PCS 7 message system

PCS 7 acquires data on the status of your process and process control system using blocks assigned with appropriate parameters. You can influence the response to an event with a suitable program.

The most important message systems of PCS 7 are:

- WinCC operator control and monitoring system
- SIMATIC BATCH batch data management

Both message systems are available on the PCS 7 OS in process mode (runtime).

Configuration of messages in the message lists of PCS 7 OS

Every process message displayed on a PCS 7 OS always includes the following information:

- Date
- Time
- Origin
- Event
- Message Class

You can achieve the following when configuring messages:

- Specify the status used to report an event
- Use the "Alarm Logging" editor on the PCS 7 OS to modify the selection of message information to be displayed in WinCC

Message accuracy for signal transitions

Note

Be aware of the accuracy of the message system.

If events are recorded within one scan cycle, they can appear in the wrong order in the message list.

Remedy: You can find information about this in the function manual *Process Control System PCS 7; High-precision Time Stamping*.

Additional information

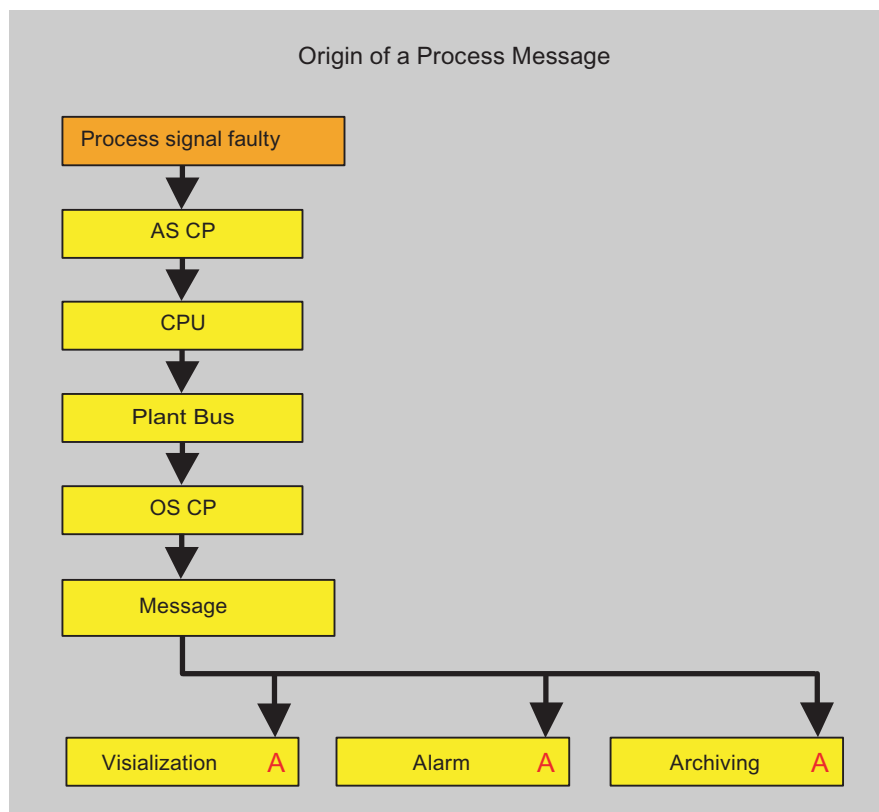
You can find detailed information on configuring messages in the following manuals:

- Configuration manual *Process Control System PCS 7; Engineering System*
- Configuration manual *PCS 7 Process Control System; Operator Station*

4.3 Origin of a message

Message path

Messages can originate in different locations in PCS 7 depending on the configuration. Each message is given a time stamp. The event which causes a time stamp to be assigned to a message depends on the place where the message has originated. Irrespective of where they originate, all messages are handled in the same way regarding how they are displayed and archived on the PCS 7 OS.



Additional information

You can find information on configuring messages in the following documentation:

- Configuration manual *Process Control System PCS 7; Engineering System*
- Configuration manual *Process Control System PCS 7; Operator Station*

You can find information on configuring messages with increased time stamp accuracy in the function manual *PCS 7 Process Control System; 10 ms Time Stamping*.

4.4 How to determine the source of a message

Procedure

1. Enable the message list by clicking "Activate/Deactivate Autoscroll" .
2. In the message list, select the message for which you need additional information.
3. Click "Open Infotext" .
4. Note the message number and use "Alarm Logging" to determine the source of the message.

4.5 Understanding messages

4.5.1 Introduction

Overview

You can find important information for understanding the PCS 7 message concept in the following sections:

- Message types in message lists and archives (Page 65)
- Target groups of messages (Page 66)
- Message lists in process mode (Page 66)
- Overflow of message buffer (Page 67)
- Message priorities (Page 68)
- Influencing messages (Page 69)

4.5.2 Message types in message lists and archives

Message types in message lists and archives

Messages are divided into the following classes:

Term	Definition
Operating messages	Operating messages are generated when an operator controls process variables, for example, changes the operating mode of a controller. • SIMATIC PCS 7 generates operating messages automatically if you use faceplates prepared from the libraries. • If you configure faceplates according to the programming guide <i>Process Control System PCS 7; Creating Blocks for PCS 7</i>, PCS 7-conforming operating messages are also available for your own blocks.
Process messages	Process messages signal process events that take place in the automated process, such as limit value violations and event messages. • Process messages are predefined for the blocks and therefore do not need to be configured. Message texts and message priority can be modified as needed in the object properties for the CFC blocks. These modifications can also be made centrally in the process object view or by means of import/export operations. • Operating messages are a subgroup of process messages. They signal process values that can be used to evaluate a process-related component, such as an operating hours counter.
Process control messages	Process control messages are generated when SIMATIC PCS 7 detects and signals errors in components within its own system. Such errors range from failure of a component to a wire break message for a connected I/O signal. Process control messages are generated by the driver blocks in PCS 7 and do not need to be configured.

System messages

System messages are messages that are triggered by self-diagnostics of a device. System messages are usually included in the process control messages or process messages (operating messages).

4.5.3 Target groups of messages

Target Groups

Message type	Target group: Process management	Target group: Operations management and recording	Target group: System and maintenance specialists
Operating messages	X	X	X
Process messages	X	X	X
Event messages	X	X	X
Process control messages		X	X
System messages			X

4.5.4 Message lists in process mode

Message lists

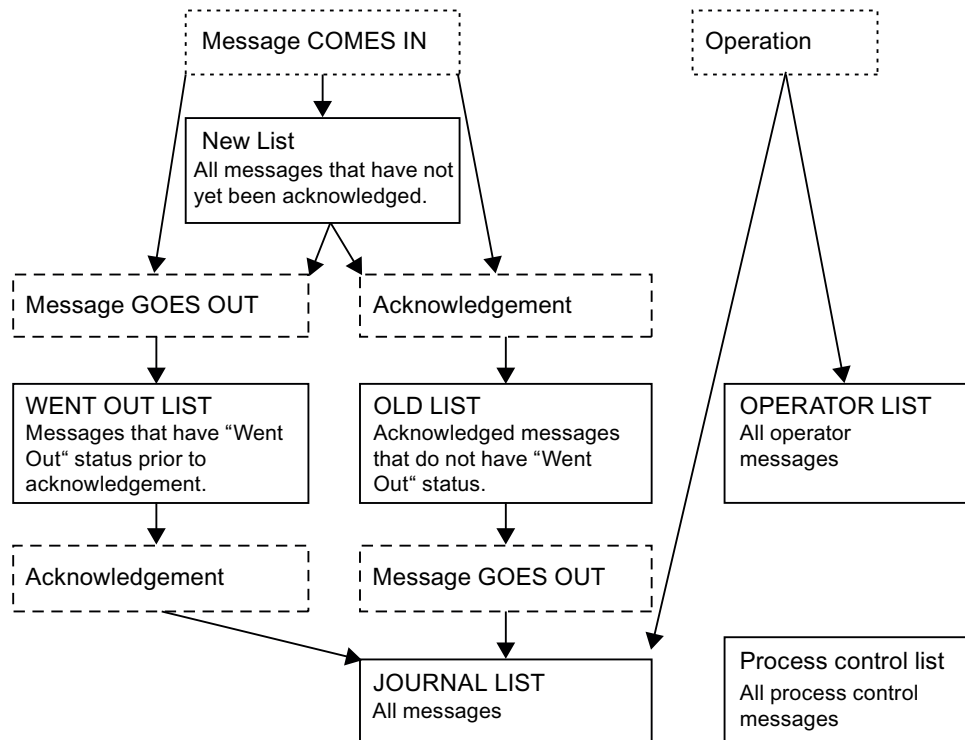
PCS 7 places incoming messages in message lists. You can locate a message in the various message lists according to the source of the event and the message status.

The following messages lists are available by default. You can modify these standard message lists or create additional message lists.

Default message lists

List	Content
Incoming alarm list	The incoming alarm list contains the unacknowledged messages.
Acknowledged alarm list	The outgoing alarm list contains the acknowledged messages and the messages queued in the process.
Outgoing alarm list	The outgoing alarm list contains the messages flagged as "Outgoing" (special message characteristic).
Operation list	The operation list contains operating messages. Example: the setpoint for a controller is set to 5 bar, motor was switched on.
Process alarm list	The process alarm list contains process control messages. Example: Rack failure
History list	The history list contains all messages (incoming, acknowledged and outgoing messages).

The following figure illustrates the path a message takes through the message lists.



4.5.5 Overflow of message buffer

Overflow of message buffer

Each component of the overall PCS 7 system can process only a limited number of messages. If more messages are generated in a component (for example, an AS) within a particular time frame than the component can process, some of these messages will be lost. If this occurs, the AS sets an overflow indicator and the following event will be signaled in the PCS 7 OS: "NRMS7 Messages Lost".

Note

If events that trigger messages change status in very quick succession, this can trigger a message surge. The overview of the plant status can no longer be sufficiently ensured.

Additional information

You can prevent a message surge by activating the "Messaging Triggered by Acknowledgment" function. You can find information on configuring in the configuration manual *Process Control System PCS 7; Engineering System*.

4.5.6 Message priorities

Changing message priorities

In PCS 7, a priority can be assigned to each message. 0 is the lowest priority and 16 the highest priority. When a signaling block is newly generated, its messages initially have the lowest priority (0).

You can change the message priority in a variety of ways:

- In the object properties for the block
- In the process object view
- Via an import operation

Rules

- Message priorities can only be specified if you defined the message number range as "Unique for Entire CPU".
- In PCS 7 OS, the unacknowledged message with the highest priority is always displayed in the message row above the overview. If multiple messages have the same priority, the most recent message is displayed here.
- You can filter the list according to priority.

Additional information

You can find information about configuring message priorities in the configuration manual *Process Control System PCS 7; Operator Station*.

4.5.7 Influencing messages

Options

PCS 7 offers the following options for influencing messages:

- Message suppression
 - You can suppress individual block messages with the CFC configuration.
 - In process mode, you can suppress individual messages directly in the faceplate using the "Suppress message" check box.
- Locking and releasing messages for blocks and OS areas
Locking (and releasing) messages for blocks and OS areas is used when the plant operator wants to lock all messages of an interrupt-capable block or OS area.
- Hiding and displaying messages
You hide individual messages to reduce the number of messages displayed in process mode. The messages are entered in a history list. The following variations are used to hide and display messages in PCS 7:
 - Manual hiding and showing of messages in process mode
 - Automatic hiding and displaying of messages in process mode

Additional information

- Configuration manual *Process Control System PCS 7; Operator Station*
- Configuration manual *Process Control System PCS 7; Engineering System*
- Manual *Process Control System PCS 7 OS Process Management*

Failure - What next?

5.1 Activities in the event of a fault

Basic procedure in the event of a fault

1. Evaluate the messages with regard to the following aspects:
 - Time
 - Sequence
 - Source
2. Determine the location and area of the fault.

Note

If the components you are using do not have diagnostics capability, only secondary faults are signaled.

- Use diagnostic tools to analyze the fault. You can achieve the following with the diagnostic tools:

You can find the cause of a fault.

or

You can verify the presumed cause of a fault.

- You can find the following information in the section "Diagnostics for PCS 7" for support:

The diagnostic tools available for PCS 7

Applications for the various diagnostic tools according to subsystem

Note

Make use of skilled experts if you cannot find a solution to your problem based on available information. You can find information on this in the "Preface (Page 7)" of this documentation.

3. Determine the actions to be taken.
In a running plant, check if a stop is necessary.

NOTICE
- The following actions should be carried out only under observance of applicable governmental and plant-specific regulations and only by qualified personnel: - Changes to the configuration - Replacement of and changes to components - Bear in mind that uncharacteristic situations can occur in the plant after activation. Make sure the activation of components and secondary systems is carefully directed.

Examples of causes

Fault	Possible causes	Initial diagnostics
CPU fault	- Fault due to internal error - Fault due to external error	CPU diagnostics
CP fault	- Fault due to internal error - Fault due to external error	Module Diagnostics > Special Diagnostics > NCM S7 Diagnostics CP... > > Information from: - Module" folder - Operating mode" folder - Diagnostic buffer" folder
I/O module fault	- Fault due to SIMATIC station component - Fault due to external influences (such as a short circuit on the module terminals)	Module diagnostics > Status information and, if available, diagnostic information
PC component fault	If the PC is running: - Fault due to events - Faulty connections	If the PC is defective: - Repair/replace - Restore data

5.2 Preparing for expert support

5.2.1 Information on cause of fault

Introduction

Topic area	Information
Supporting service experts	• WHAT?: Actions for making essential information available to experts for fault analysis. • WHEN?: If expert support is needed in the event of a fault, you facilitate the work of the experts by providing them essential information on the plant or the faulty components. • HOW?: You can find information on this in this section.

Overview

You support the work of service experts by providing them with information:

- Service experts need information about your plant and the faulty system in order to provide quick support.
You can find information on this below, in the section "Plant documentation (Page 74)".
- Service experts need information from the diagnostic buffer of the CPU in order to analyze the cause of a CPU fault.
You can find information on this below, in the section "How to read the CPU diagnostic buffer (Page 75)".
- A memory dump facilitates the analysis of the cause of the CPU fault.
You can find information on this below, in the section "CPU fault - preparing diagnostics (Page 76)".
- Backing up the diagnostics files facilitates the analysis of the cause of an OS fault.
You can find information on this below, in the section "How to back up the diagnostic data of the PCS 7 OS (Page 78)".
- You can create the conditions required for remote diagnostics via "remote access".
You can find information on this below, in the section "Remote diagnostics of a PCS 7 System (Page 80)".

5.2.2 Plant documentation

Maintaining system information

Information on the components of your system is among the most important information needed for successful repair.

You need this information in the following situations:

- When you are planning maintenance
- When you contact the hotline for assistance

Continual maintenance of this information shortens downtimes in case of a fault. Therefore, always keep up-to-date lists (in a database or in a table, for example) containing the following data:

- Plant
- Unit
- Location in plant
- Components
- Versions
 - Hardware
 - Firmware
 - Software

5.2.3 How to read the CPU diagnostic buffer

Formats for saving diagnostic data

You can make it easier for service engineers to perform initial diagnostics on a faulty CPU by saving and having ready the content of the diagnostic buffer in the following formats:

- HEX format
- TXT format

Procedure

1. Select the faulty CPU in the SIMATIC Manager.
2. Select the menu command **PLC > Diagnostics/Settings > Module Information**.
The "Module Information - Online" dialog box opens.
3. Select the "Stacks" tab and read out the following system memory:
 - Block stack (B stack)
 - If the CPU is in "STOP" mode: Interrupt stack (I stack)
4. Provide these data to the service engineers.

5.2.4 CPU fault - preparing diagnostics

Introduction

The following information is important for analyzing a CPU fault:

- Information on the relevant CPU
- Information or actions in the event of a fault

Rules



WARNING

- Only trained service employees should be authorized to work on the process control system.
- Always observe the plant-specific rules and government regulations when making changes to a system.
- Observe the plant-specific boundary conditions and adjust the work accordingly.
- Always bear in mind that changes in a system can impact other sections of the system.

Information on the Relevant CPU

The following information is needed when a CPU fault occurs:

- Order number
- Firmware version
- Hardware version

If you can access the CPU from the engineering station, you can query this information via the module information. You can find information on this in the section "Module Information (Page 127)".

Note

A constantly updated list of all module information facilitates troubleshooting in the event of a fault and reduces the time needed for correcting the fault.

Information in the event of a fault

The following information is needed if a fault occurs:

- Operations and actions/event history leading to the fault
- Status indicated by LED displays on the front of the CPU (such as RUN)

Only the RUN LED is lit

The SIMATIC station is functioning without errors.

RUN LED and additional red LED is lit

Faults have occurred in the SIMATIC station. Use the diagnostic tools for analysis. You can find additional information in the section "Diagnostics for the CPU (Page 92)".

STOP LED is lit

- If the **STOP LED is lit**, read out the diagnostic buffer. You can find information about this procedure in the section "How to read the CPU diagnostic buffer (Page 75)". Save the diagnostic buffer both as a HEX file and as a TXT file!
- These data can be analyzed by trained service engineers. They contain information about the cause, for example:
 - I/O error
 - Synchronization error with an H-CPU
- If the possibility exists that a hardware error in the I/O caused the CPU to switch to STOP mode, save the diagnostic buffer of the relevant module and the associated bus interface module (for example, CP 443-5).
- Generate a memory dump.

All LEDs are off or are flashing

You recognize the "CPU defective" status by the following LED displays on the front of the CPU:

- All LEDs are flashing.
- All LEDs are off, even though the power supply is switched on.

For additional support, contact your Siemens representative or Technical Support. Have the "information in the event of a fault" indicated above ready.

5.2.5 How to back up the diagnostic data of the PCS 7 OS

Basic procedure

We recommend that you back up the diagnostic files for analysis of the cause of the OS fault by experts.

1. Back up all diagnostic folders of WinCC
(default: drive:\Siemens\WinCC\Diagnostics).
2. Provide these data to the service engineers.

You can back up the data using the *PKZIP* software supplied on the PCS 7 Toolset DVD.

Setting up the PKZIP software

If you use the *PKZIP* software supplied on the PCS 7 Toolset DVD, the following settings need to be made.

1. In Windows Explorer, select the path "Program Files > Pkware > Pkzipw4".
2. Double-click the *PKZIP* compression program.
PKZIP for Windows opens.
3. Select the menu command **Tools > Options**.
The "Options" dialog box opens.
4. Select the "Compress" tab.
5. Make the following settings:
 - In the "File Options" group:
Activate the check box for "Include subfolders (recurse)".
In the "Save folder name" drop-down list, set "Relative path".
In the "Update mode" drop-down list, set "Add & Update files".
 - In the "File Attribute" group:
Activate all check boxes.
 - In the "Folders" tab:
You can specify a default folder for your data backup here.
6. Click "OK" to confirm your settings.

Backing up diagnostic data

1. Close WinCC.
2. In Windows Explorer, select the path "Program Files > Pkware > Pkzipw4".
3. Double-click the *PKZIP* compression program.
PKZIP for Windows opens.
4. Select the menu command **File > New**.
The "Save File As" dialog box opens.
5. Set the parameters as follows:
 - In the "Save in" group:
Enter the folder for the backup file.
 - In the "File Name" group:
Enter the name for the backup file (use unique names for backups such as "Plant_Date_BackupNo.").
6. Click "Save" to confirm your settings.
The "Add Files - (drive: folder for the backup file)" dialog box opens.
7. Set the parameters as follows:
 - In the "Drives:" group:
Enter the drive containing the diagnostic files.
 - In the "Directory:" group:
Specify the folder where the diagnostic files are located (default: ...\\Siemens\\WinCC\\Diagnostics).
 - Click "Add Directory".
Information regarding the drive and folder of the diagnostic files is entered in the "Files & Directories To Zip." group.
8. Click "OK" to confirm your settings.
You can watch the progress of the backup in the "Add Status" dialog box. The backup is finished when "Done" appears in the message box.
9. Click "Done".
All archived files are shown in the PKZIP dialog box.
10. Close PKZIP with the menu command **File > Exit**.

Note

Once the diagnostic files are backed up (not in diagnostic folder), you can delete the content of the diagnostic folder. In this way, you avoid keeping old information in the new diagnostic files.

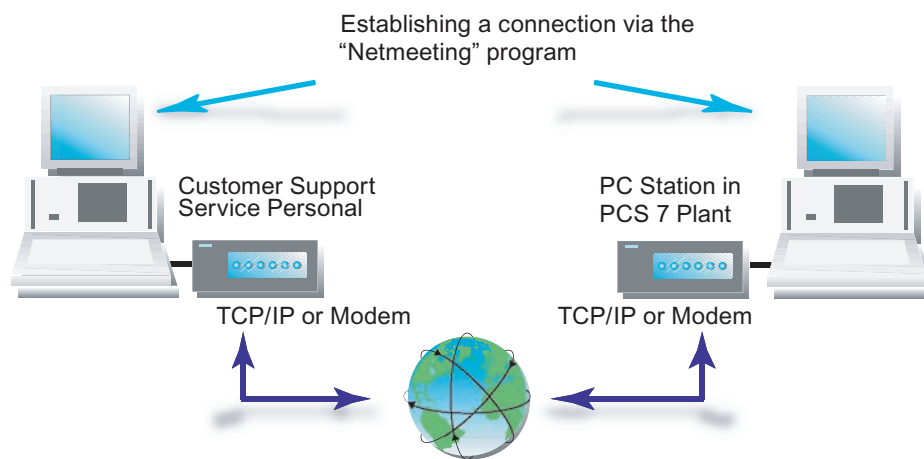
If the same error occurs the next time you start WinCC, make an additional backup to help the experts. Only a few messages will need to be analyzed in this backup.

5.2.6 Remote diagnostics of a PCS 7 system

Options for remote diagnostics and remote administration of a PCS 7 plant

We recommend you use the operating system features "NetMeeting" for remote diagnostics of PCS 7 plants and for administrative access on PC stations with Windows XP Professional and Windows Server 2003.

You can find additional information on this in the operating system's online help.



Transmission paths

The data can be transmitted along the following routes:

- Telephone line (modem)
- TCP/IP connection (system-internal network connection)

Security requirements

If you wish to perform remote diagnostics in a PCS 7 plant, you need to protect this plant against unauthorized access.

Several measures are required to realize a security concept. Optimal protection is only provided with all security measures as a whole.

You can find additional information in the documentation *Process Control System PCS 7; PCS 7 Security Concept*.

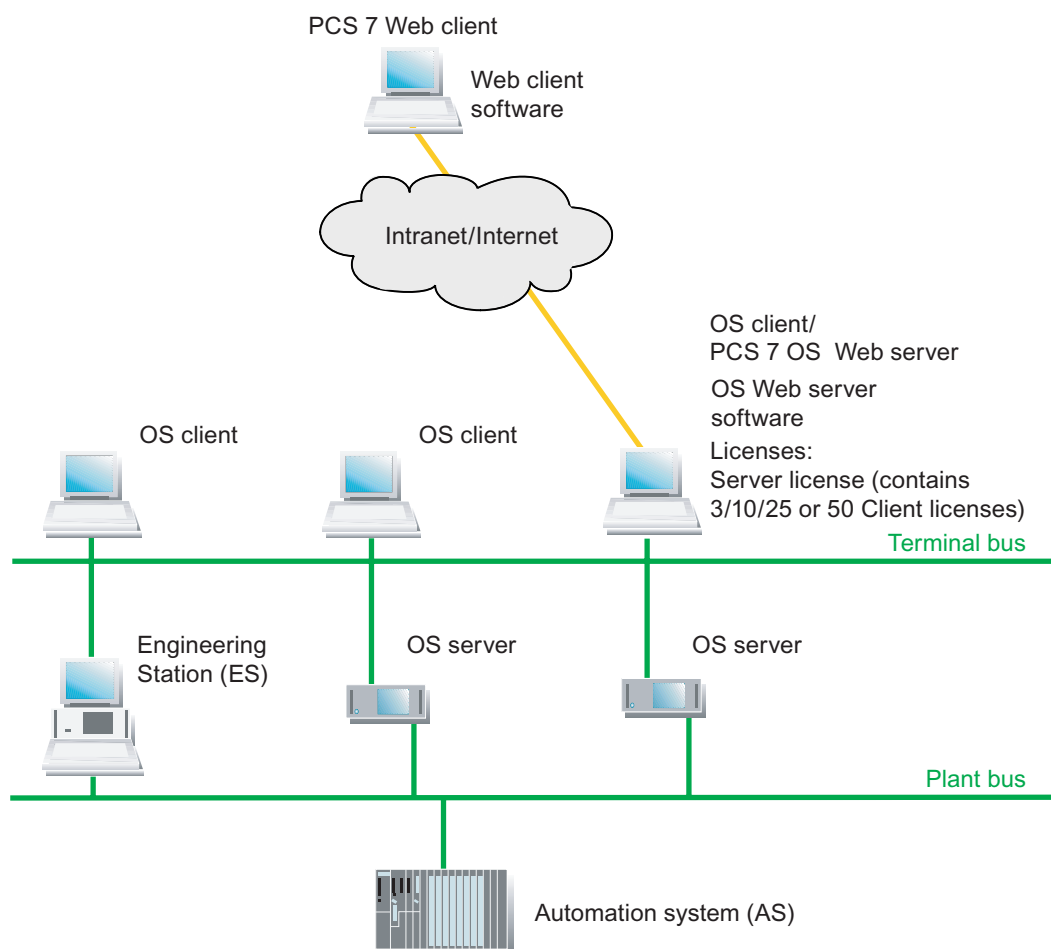
5.2.7 Interactive operator control and monitoring with the PCS 7 OS Web Option

Interactive operator control and monitoring of a PCS plant using the PCS 7 OS Web Option

Use the PCS 7 OS web option for the interactive operator control and monitoring of a PCS 7 system.

You can find additional information about this in the manual *Process Control System PCS 7; PCS 7 OS Web Option*.

The figure below shows how the PCS 7 OS web option (OS web server, web client) can be used in a PCS 7 system.



Transmission paths

The data can be transmitted along the following routes:

- Telephone line (modem)
- TCP/IP connection (system-internal network connection)
- Internet

Security requirements

If you use the PCS 7 OS Web Option in a PCS 7 plant, you must protect this plant against unauthorized access.

Several measures are required to realize a security concept. Optimal protection is only provided with all security measures as a whole.

You can find additional information on this in the documentation *Process Control System PCS 7; PCS 7 Security Concept*.

Diagnostics in PCS 7

6.1 Diagnostic capabilities in PCS 7 subsystems

Disclaimer of liability

** WARNING**

Siemens assumes no responsibility for inappropriate use of the instructions provided in this documentation or any consequences that might result for the customer.

** WARNING**

Note the following:

- Only trained service employees should be authorized to work on the process control system.
- Always observe the plant-specific rules and government regulations when making changes to your system.
- Observe the plant-specific boundary conditions and adjust the work accordingly.
- Always bear in mind that changes in a system can impact other sections of the system.

Introduction

The message system and diagnostic tools of PCS 7 help you to assess the status of your system. You can find information about the diagnostic tools in the following sections.

This description illustrates the capabilities of the diagnostic tools so that you can apply them to your individual requirements.

- You will also find information on the fields of application for diagnostic tools.
- You will learn how to call up a diagnostic tool.
- Since malfunctions can have a variety of causes and because procedures for using the diagnostic tools are already available in the online help, a detailed description is not provided here.

Assessing the status of your process control system

Topic	Questions Answered
Diagnostics in PCS 7	Who can perform particular types of diagnostics?
Diagnostic tools	• Which diagnostic procedures can be performed with a diagnostic tool? • How is the diagnostic tool activated? • Where can I find a description of the diagnostic tool or diagnostic capability?

Diagnostics

Diagnostics refers to all activities intended to:

- Ascertain the status of a system
- Find errors and faults as early as possible and identify their cause

Diagnostic Message

Diagnostic capabilities are used to analyze the system status and to determine the causes of faults.

Overview of diagnostic tools

You can find information on using diagnostic tools, grouped according to areas of application, in the following sections:

- Full Diagnostics Using the Maintenance Station (Page 85)
- Diagnostics for PC user settings (Page 87)
- Diagnostics for PC Components (Page 88)
- Diagnostics for Network Connections (Page 89)
- Diagnostics during Configuration (Page 91)
- Diagnostics for the CPU (Page 92)
- Diagnostics for Modules (Page 93)
- Diagnostics for PROFIBUS DP (Page 94)
- Diagnostics for PROFIBUS PA (Page 95)
- Diagnostics for the OS (Page 96)
- Diagnostics for the BATCH station (Page 97)
- Diagnostics for the Route Control station (Page 98)
- Diagnostics for the time of day (Page 99)

For many components, you will find displays on the front panel indicating the status of the component and any errors. Analyzing these displays enables you to obtain information without intervening in the system. The additional product manuals you will need for this analysis can be found in the section "Diagnostics for Hardware Displays (Page 100)".

6.2 Diagnostics with the maintenance station (asset management)

Introduction

With PCS 7 V6.1 and higher, a PCS 7 system can be fully diagnosed with the help of the maintenance station. The maintenance station is an operator station that is specially configured and assigned parameters for use in diagnostic and maintenance functions.

We particularly recommend the use of a maintenance station in medium and large PCS 7 systems.

Maintenance station

With the maintenance station, PCS 7 enables you to call up information on the states of all PCS 7 components on diagnostics screens which are hierarchically structured. As part of this process, the data of a component are analyzed using the available online functions of the associated tools. You can access ES data from the diagnostics screens (can be controlled via access protection mechanisms).

Screens for process-control diagnostics can be generated automatically for the entire PCS 7 system and made available on the maintenance station. The topmost level forms an overview screen for the entire system.

Diagnostics options

You will find information on the states of individual PCS 7 components with diagnostic capability on the maintenance station's special diagnostics screens.

Area	Diagnostics for ...
Automation systems	• CPU • SIMATIC PCS 7 BOX • Distributed I/O, such as ET 200M, ET 200S, ET 200iSP, input and output modules • Field devices (HART, PROFIBUS PA, ...) • Redundancy – Master/standby configuration – Status of redundant partners
PC stations	• Operator stations • BATCH stations • Route Control stations • Archive servers • SIMATIC PCS 7 BOX • Industrial PCs • Standard PCs (also web client via IP address) • Redundancy for PC stations from PCS 7 – Master/standby configuration – Status of redundant partners

Area	Diagnostics for ...
Ethernet components	• Switches, e.g.: – SCALANCE X – OSM – ESM • Network objects (via profile file) – Bridges – Router • Network components, which enable diagnostics using the "NIB II" profile (for example, printers and other SNMP-capable devices)
PROFIBUS components	• PROFIBUS DP – Interface modules (IM) – Couplers – Link modules – Diagnostic repeaters • PROFIBUS PA – Interfaces – Couplers

Additional information

- You will find a description of how to configure a maintenance station in the configuration manual *PCS 7 Process Control System; Operator Station*.
- You will find a description of how to use the maintenance station in process mode in the manual *PCS 7 Process Control System; PCS 7 OS Process Control*.
- You can find information on the configuration of a system with a PCS 7 OS web diagnostic server and PCS 7 web diagnostic client in the manual *PCS 7 Process Control System; PCS 7 OS Web Option*.

6.3 Diagnostics for PC user settings

Overview

Diagnostics for	Diagnostics tool	Called with
Defining users, setting access authorization to files and folders (users and user groups)	Windows User Management (Page 106)	Start > Settings > Control Panel > Administrative Tools > Computer Management > System Tools > Local Users and Groups
WinCC users	User administrator (Page 119)	Open WinCC Explorer by selecting the menu command Editors > User Administrator > Open
PCS 7 users (user roles and rights in PCS 7 applications)		Start > SIMATIC > SIMATIC Logon > Configure SIMATIC Logon
Shares	Shares for drives, folders and files (Page 105)	Start > Settings > Control Panel > Administrative Tools > Computer Management > System Tools > Shared Folders > Shares

6.4 Diagnostics for PC components

Overview

Diagnostics for	Diagnostics tool	Called with
Status of PC stations, redundancy	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
PC configuration	System information from windows (Page 103)	Call this with the menu command Start > Run... > enter " msinfo32 " in the command prompt.
Functions of drivers, logs, and services	Managing the operating system (Page 104) Event display	Start > Settings > Control Panel > Administrative Tools > Computer Management > System > Event Viewer Note: Only blue icons = "all correct"
Function of standard network modules	Set PC Station (Page 108)	Start > SIMATIC > SIMATIC NET > Settings > Set PC Station In the tree view, select PC Station > "Network Module" modules > Softnet IE . Click "Test".
Online verification of operating capability of redundant OS components	Redundancy state control (Page 121)	Picture must be configured and downloaded to the OS. Additional information is available in the configuration manual <i>Process Control System PCS 7; Operator Station</i>
Networks and network connections		You can find information on this in the section "Diagnostics for Network Connections (Page 89)".
Installed versions of the PCS 7 software	SIMATIC Manager (Page 124)	Start > SIMATIC > SIMATIC Manager Help > About > Click "Display"
Security settings and patches	MBSA (Page 115)	Call this with the menu command Start > Run... > enter " Mbscali.exe " in the command prompt.
Printers and print jobs	Printers and print jobs (Page 111)	Start > Settings > Printers and Faxes To obtain information about a print job, click on the printer executing the job.
PCS 7 bundle PCs	PC DiagMonitor (Page 111)	PC DiagnMonitor is started automatically on bundle PCs when the PC boots.

6.5 Diagnostics for network connections

Overview

Diagnostics for	Diagnostics tool	Called with
Connections with diagnostic capability	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
Network configuration	NetPro (Page 112)	Network > Check Consistency
Established connections to SIMATIC stations	NetPro (Page 112)	Select CPU: PLC > Activate Connection Status
Status of network cards on Industrial Ethernet	Network Connections" Windows Dialog Box" (Page 113)	Start > Settings > Network Connections
Connections to other stations; IP address, MAC address	Command line commands (Page 107)	Start > Programs > Command Prompt Open DOS window - enter 'ping IP address'
Determining MAC addresses and TCP/IP addresses	Command line commands (Page 107)	Start > Programs > Command Prompt Open DOS window: enter ipconfig -all .
Connection established to domain servers: DHCP, WINS, DNS	Command line commands (Page 107)	Start > Programs > Command Prompt Open DOS window: enter ipconfig -all .
PC station	Set PC Station (Page 108)	Start > SIMATIC > SIMATIC NET > Set PC Station
Status of network components, status of a WinCC application	Station Configuration Editor (Page 110)	Configuration with HW Config and loading of PC station required Call: In the Start menu via 
PC Ethernet modules	NCM S7 Industrial Ethernet (Page 113)	Start > SIMATIC > STEP 7 > NCM S7 Industrial Ethernet > Diagnostics
Status of configured channels and their connections to the SIMATIC station	WinCC Channel Diagnostics (Page 119)	Start > Simatic > WinCC > Tools > Channel Diagnostics > "Channels/Connections" tab
Connections to the OS: faulty or established	Lifebeat monitoring (Page 116)	Call picture (@CONFIG.PDL) in process mode. Picture must be configured and downloaded to the OS.
Status of process interface	Status of connections (Page 120)	In the WinCC Explorer: Options > Status of Connections
Client-server connections	Status of multi-user operation (Page 120)	In the WinCC Explorer: Options > Status of Multi-User Operation

Diagnostics for	Diagnostics tool	Called with
Determine stations Find IP address and MAC address Message frames Collisions	BANY (add-on product) (Page 133)	If you have installed BANYnet, call the program with the menu command Start menu > Programs > BANYnet.
PROFIBUS DP connections		You can find additional information in the section "Diagnostics for PROFIBUS DP (Page 94)".
PROFIBUS PA connections		You can find additional information in the section "Diagnostics for PROFIBUS PA (Page 95)".
Status of devices with SNMP capability (e.g., network switches)	PC DiagMonitor (Page 111)	Start > SIMATIC > PC DiagMonitor > Management Station

6.6 Diagnostics during configuration

Overview

Diagnostics for	Diagnostics tool	Note
Consistency of hardware configuration	HW Config (Page 126)	Menu command Station > Check Consistency
Consistency of PC station configuration	Station Configuration Editor (Page 110)	Click the following icon in the taskbar:  Analyze "Status" column table entry
Block consistency in a SIMATIC station	SIMATIC Manager (Page 124)	Select SIMATIC Station > S7 Program > Blocks Menu command Edit > Check Block Consistency
Chart consistency in a SIMATIC station	SIMATIC Manager (Page 124)	Select SIMATIC Station > S7 Program > Charts Menu command Edit > Check Consistency
Connection error	Module Information (Page 127)	Select the SIMATIC station in SIMATIC Manager or the CPU in HW Config.
Open signal interconnections in PCS 7 Operator Station	PCS 7 operator station (WinCC)	Convert pictures
Connection functions for a PC station	Set PC Station (Page 108)	Start > SIMATIC > SIMATIC NET > Settings > Set PC Station

6.7 Diagnostics for the CPU

Overview

Diagnostics for	Diagnostics tool	Called with
CPU module information, redundancy, connections	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
CPU	HW Config (Page 126)	Select CPU: Menu command Station > Online
CPU	Module Information (Page 127)	Select the SIMATIC station in SIMATIC Manager or Select the CPU in HW Config. Select the menu command PLC > Module Information
Module displays	Evaluating the Module Display (Page 100)	Notes on the manuals: Diagnostics for hardware displays (Page 100)
CPU fault - preparing diagnostics	Only to support experts	CPU fault - preparing diagnostics (Page 76)

6.8 Diagnostics for modules

Overview

Diagnostics for	Diagnostics tool	Called with
Diagnostics of all diagnostic-capable modules	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
Modules and CPs with diagnostics capability	HW Config (Page 126)	Station > Open Online
I/O modules and CPs with diagnostics capability	Module Information (Page 127)	Select the SIMATIC station in SIMATIC Manager or the CPU in HW Config. Select the menu command PLC > Module Information
Module displays	Evaluating the Module Display (Page 100)	Notes on the manuals: Diagnostics for Hardware Displays (Page 100)

6.9 Diagnostics for PROFIBUS DP

Overview

Diagnostics for	Diagnostics tool	Called with
Devices and connections with diagnostic capability	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
Status of stations	NCM S7 PROFIBUS (Page 114)	Start > SIMATIC > STEP 7 > NCM S7 PROFIBUS > Diagnostics
Internal PROFIBUS DP interface of the CPU	Module Information (Page 127)	Diagnostics via HW Config > Module Information
PROFIBUS DP error	PROFIBUS DP Diagnostics With Diagnostic Repeater (Page 129)	Diagnostics via HW Config > Module Information
Status of PROFIBUS nodes	NetPro (Page 112)	Start > SIMATIC > STEP 7 > NetPro Select the menu command View > With DP Slaves to display the DP slaves in the network view
Station failure Fault indication with detailed information about cause of error Name and comments from HW Config Order number, addresses, slot types	SYSTEM Process Control Diagnostics (add-on product) (Page 135)	Picture must be configured and downloaded to the OS. Additional information is available in the configuration manual <i>Process Control System PCS 7; Operator Station</i>
PROFIBUS error	Amprolyzer (add-on product) (Page 132)	If you have installed Amprolyzer, call the program with the menu command Start menu > Programs > Amprolyzer .

6.10 Diagnostics for PROFIBUS PA

Overview

Diagnostics for	Diagnostics tool	Called with
Devices and connections with diagnostic capability	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
Devices and connections on the PROFIBUS PA with diagnostic capability	SIMATIC PDM (Page 130)	SIMATIC Manager: View > Process Device Network View
Status of devices on the PROFIBUS PA with diagnostic capability	NCM S7 PROFIBUS (Page 114)	Start > SIMATIC > STEP 7 > NCM S7 PROFIBUS > Diagnostics
Station failure Fault indication with detailed information about cause of error Name and comments from HW Config Order number, addresses, slot types	SYSTEM Process Control Diagnostics (add-on product) (Page 135)	Picture must be configured and downloaded to the OS. Additional information is available in the configuration manual <i>Process Control System PCS 7; Operator Station</i>
PROFIBUS error	Amprolyzer (add-on product) (Page 132)	If you have installed Amprolyzer, call the program with the menu command Start menu > Programs > Amprolyzer .

6.11 Diagnostics for the OS

Overview

Diagnostics for	Diagnostics tool	Called with
Operating capability of all OS components and communication connections	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
WinCC projects and the assigned SIMATIC stations	Lifebeat monitoring (Page 116)	Call picture (@CONFIG.PDL) in process mode. Picture must be configured and downloaded to the OS.
Connections between OS components	Simatic Shell (Page 117)	Windows Explorer (workstation): Select PC station > "Simatic Shell" folder > in the shortcut menu Properties
Connection between WinCC and AS	Status of connections (Page 120)	In WinCC: Options > Status of Connections
Connection between OS server and OS client	Status of multi-user operation (Page 120)	In WinCC: Options > Status of Multi-User Operation
Status of channels and connections to the AS	WinCC Channel Diagnostics (Page 119)	Start > SIMATIC > WinCC > Tools > Channel Diagnostics
Operating capability of redundant OS components	Redundancy state control (Page 121)	Picture must be configured and downloaded to the OS. You can find information about this in the configuration manual <i>Process Control System PCS 7; Operator Station</i>
General system information of an OS server	WinCC "System Info" channel (Page 118)	Picture must be configured and downloaded to the OS. You can find information about this in the configuration manual <i>Process Control System PCS 7; Operator Station</i>
OS fault - preparing diagnostics	Only to support experts	You can find information on this in the section "OS fault - preparing diagnostics (Page 78)".
OS Web server status		Internet Explorer: <a href="http://<server_address>.status.html">http://<server_address>.status.html

6.12 Diagnostics for the BATCH Stations

Overview

Diagnostics for	Diagnostics tool	Called with
Operating capability of all BATCH components and communication connections	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System; PCS 7 OS Process Control</i> .
Status of the BATCH server	Status icons in the BATCH Server taskbar (Page 122)	Taskbar
Status of master	Status icons in the BATCH server taskbar (Page 122)	Taskbar
Status of the standby server (partner server)	Status icons in the BATCH server taskbar (Page 122)	Taskbar

6.13 Diagnostics for the Route Control stations

Overview

Diagnostics for	Diagnostics tool	Called with
Operating capability of all SIMATIC Route Control components and communication connections	Maintenance station (Page 85)	The maintenance station is an operator station that is specially configured for use in diagnostics. The maintenance station has to be configured. You can find additional information in the manual <i>PCS 7 Process Control System</i> ; <i>PCS 7 OS Process Control</i> .
Status of redundant servers	Status icons in the Route Control server taskbar (Page 123)	Taskbar
Established connections to SIMATIC stations	NetPro (Page 112)	NetPro: Online view > Select CPU: PLC > Activate Connection Status

6.14 Diagnostics for time of day

Overview

Diagnostics for	Diagnostics tool	Called with
AS-CPU time	SIMATIC Manager (Page 124)	Select CPU: PLC > Set Time of Day
AS-CPU time	Module Information (Page 127)	Station > Open Online Select CPU: PLC > Set Time of Day
PC time	Managing the operating system (Page 104)	Start > Settings > Control Panel > Date/Time. Do not change these settings.
Activated time services	Windows System Utilities	Start > Settings > Control Panel > Administrative Tools > Services Select "Windows Time": Action > Properties "General" tab > Startup type: ...
Synchronization status on the terminal bus	Set PG/PC Interface (Page 109)	Start > SIMATIC > SIMATIC Net > Set PG/PC Interface Select interface > Click "Diagnostics" > In the "Time" group
Configuration of time displayed in operator control and monitoring systems	WinCC Editor "Time Synchronization"	Open WinCC Explorer with the menu command Editors > Time Synchronization > Open

6.15 Diagnostics for hardware displays

Overview

Many components have displays indicating the component status and errors. Analyzing these displays enables you to obtain information without intervening in the system.

Components	You can find information about diagnostic options in the following manuals and sections:
Power supply module	Reference manual <i>SIMATIC; S7-400 Programmable Controller; Module Specifications</i> • Backup battery (optional) • Error messages by means of LED displays • Operator control and display elements
Central module for S7-400 CPU	Reference manual <i>SIMATIC; S7-400 Programmable Controller; CPU Data</i> • Monitoring functions of the CPU • Status and error displays • Operating mode switch
CP 441	Manual <i>SIMATIC; CP 441 Point-to-Point Communication - Installation and Parameter Assignment</i> • Diagnostics for CP 441
CP 443-1	Device manual <i>S7 CPs/Part B4; Description of CP 443-1</i> • Displays and operating mode switch
CP 443-5 Extended	Device manual <i>S7 CPs/Part B4; Description of CP 443-5 Extended</i> • Displays and operating mode switch
S7-300 I/O modules	Reference manual <i>SIMATIC; S7-300 Programmable Controller; Module Specifications</i> • Diagnostic data for the signal modules
S7-300 fail-safe signal modules	Manual <i>SIMATIC; Programmable Controller S7-300; Fail-safe Signal Modules</i> • Diagnostics of F-SM errors • Properties, front view, connection and block diagram
S7-300 ex I/O modules	Manual <i>SIMATIC; Programmable Controller S7-300, ET 200M s ex I/O modules</i> • Digital input module: Properties • Diagnostics for analog modules • Module view and block diagram
ET 200M	Manual <i>SIMATIC; ET 200M Distributed I/O; Commissioning and Diagnostics</i> • Diagnostics by means of LED display IM 153-1, IM 153-2 • Diagnostics with STEP 7

Components	You can find information about diagnostic options in the following manuals and sections:
ET 200iSP	Manual <i>SIMATIC</i> ; <i>ET 200iSP Distributed I/O; Commissioning and Diagnostics</i> • Status and error LEDs on IM 151-2 • Insertion and removal of modules • Line break of the NAMUR encoder on the digital input module • Diagnostics with STEP 7
ET 200S	Manual <i>SIMATIC</i> ; <i>ET 200S Distributed I/O; Commissioning and Diagnostics</i> • Diagnostics by means of LED displays • Diagnostic messages for electronic modules
DP/PA Coupler	Manual <i>SIMATIC</i> ; <i>Bus Adapters DP/PA Link and Y Link</i> Diagnostics by means of LED displays • LED displays of the IM 157 • LED displays of the DP/PA coupler • LED displays of the Y coupler
AFD (used with PROFIBUS PA)	Manual <i>SIMATIC</i> ; <i>SIMATIC NET; PROFIBUS PA</i> • Diagnostics by means of LED displays • Diagnostic messages for electronic modules
AFS (used with PROFIBUS PA)	Manual <i>SIMATIC</i> ; <i>SIMATIC NET; PROFIBUS PA</i> • Diagnostics by means of LED displays • Diagnostic messages for electronic modules
Y Link	Information under DP/PA Coupler
Diagnostic repeaters	Manual <i>SIMATIC</i> ; <i>Diagnostic Repeater for PROFIBUS DP</i> • LED diagnostics
Switch for Ethernet	Operating Instructions <i>SIMATIC NET</i> ; <i>Industrial Ethernet Switches SCALANCE X-400</i> • LED Commissioning manual <i>SIMATIC NET; Industrial Ethernet, SCALANCE X-100 and SCALANCE X-200 Product Line</i> • SCALANCE X<...> displays (SCALANCE X208 displays, for example) Manual <i>SIMATIC NET; Industrial Ethernet OSM/ESM</i> • Display and control elements

6.16 Diagnostic tools

6.16.1 Diagnostics tools of PCS 7

Disclaimer of liability



WARNING

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WARNING

Note the following:

- All work must be performed by trained service personnel.
- Always observe the plant-specific rules and government regulations when making changes to your system.
- Observe the plant-specific boundary conditions and adjust the work accordingly.
- Always bear in mind that changes in a system can impact other parts of the system.

6.16.2 Diagnostics for the PCs

6.16.2.1 System information from Windows

Calling

Call this by selecting the menu command **Start > Run >** enter "**msinfo32**" in the command prompt.

Overview

Topic	Detailed information	Called with	Additional information
PC configuration	Operating system Operating system version PC NAME Processor BIOS data Users currently logged on Time zone Size of the work memory Information on the swap file	System Overview	Online help of the operating system
Graphics settings	Type of graphics card Set resolution and frequency	System Overview > Components > Display	Online help of the operating system
Printer	Display of existing printers	System Overview > Components > Printer	Online help of the operating system
Drives	Recognized internal and external drives or storage media Partitioning of hard disks	System Overview > Components > Storage > Drives	Online help of the operating system

6.16.2.2 Managing the operating system

Calling

Call this tool by selecting the menu command **Start > Settings > Control Panel > Administrative Tools > Computer Management**.

Overview

Topic	Detailed information	Called with	Additional information
Event display	Icons indicate status (specialist knowledge required for analysis)	System Tools > Event Viewer	press "F1" key - blue icon only = "everything OK"
Removable memory	Recognized external drives or storage media	Data Memory > Removable Media	
Hard disks	Drive names, formats, size, segmentation, partitions, status	Data Memory > Storage Media Management	
Network adapters and PC cards	Network adapter type access levels, users, servers, network addresses (IP/MAC address)	System Tools > System Information > Components > Network > Adapter	
Network-wide analysis of connected PCs	Active users in network, Active PCs	System Tools > Shared Folders > Shares	
Management of users and user groups	• Creation and modification of local user accounts • Creation and modification of user profiles • Creation, addition and deletion of local groups	System Tools > Local Users and Groups	Online help of the operating system

6.16.2.3 Shares for drives, folders and files

Calling

Call this tool by selecting the menu command **Start > Settings > Control Panel > Administrative Tools > Computer Management > System**.

Overview

Topic	Detailed Information	Called with	Additional information
Drives and folders	Granting or changing of shares for drives and folders	In the tree view Select Shared Folders > Share	Select the folder, press "F1" key
Drives and folders	Granting or changing of shares for drives and folders	• Open Windows Explorer • In the tree view, select the drive/folder • Menu command: File > Properties > "Shares" tab	Online help of the operating system
Files	Granting or changing of shares for files	• Select the file in Windows Explorer • Menu command: File > Properties • Select the "Security" tab and make the required settings in the "Permissions" group.	Online help of the operating system

6.16.2.4 System tools - Local Users and Groups

Overview

Topic	Detailed information	Called with	Additional information
Managing users and groups in the operating system	• Creation and modification of local user accounts • Creation and modification of user profiles • Creation, addition and deletion of local groups	Start > Settings > Control Panel > Administrative Tools > Computer Management > System Tools > Local Users and Groups	Online help of the operating system
Application permissions	• Standard users, language and password changes • Selection of the computer from which the user data are to be obtained • Selection of the device via which component logon is to be checked • Setting a delay time for logging off from SIMATIC Logon	Start > SIMATIC > SIMATIC Logon > Configure SIMATIC Logon	Online help for <i>SIMATIC Logon</i>

6.16.2.5 Command line commands

Calling

Call this with the menu command **Start > Run... >** enter "cmd" in the command prompt.

You can find additional information on the Windows commands named here by searching the Microsoft "Help and Support Center": **Start > Help and Support**

Overview

Topic	Detailed Information	Called with	Additional information
Connections/ network adapter function	Verification of own network adapter	Enter "ping localhost" or "ping 127.0.0.0".	Help and Support Center
Connections/ network adapter function	Verification of a connection to another Ethernet node	Enter "ping - {PC-name}" or "ping - {IP-address}"	Help and Support Center
Connections/ network adapter function	Identification of own network adapter	Enter "ipconfig"	Help and Support Center
Connections/ network adapter function	Identification of network adapter of servers and network services	Enter "ipconfig -all"	Help and Support Center
Connections/ network adapter function	Active connections, computer I/Os, Ethernet statistics	Enter "netstat"	Help and Support Center

6.16.2.6 Set PC station

Calling

Call this with the menu command **Start > SIMATIC > SIMATIC NET > Settings > Set PC Station**

Overview

Topic	Detailed Information	Called with	Additional information
Configuration	Detected modules	SIMATIC NET Configuration > Modules folder	Online help for <i>Microsoft Management Console</i> ; see "Set PC station" topic
Diagnostic options	Available options vary for each module	SIMATIC NET Configuration > Modules > folder, select module. You can find additional information in the online help	Online help for <i>Microsoft Management Console</i> ; see "Set PC station" topic

6.16.2.7 Set PG/PC interface

Calling

Call this tool by selecting the menu command **Start > SIMATIC > SIMATIC NET > Set PG/PC Interface** or the menu command **Options > Set PG/PC Interface** in SIMATIC Manager.

Overview

Topic	Detailed Information	Called with	Additional information
Time synchronization	Synchronization status on the PC's terminal bus (requirement: CP 1613)	Select interface > Click "Diagnostics" > In the "Time" group	Online help for <i>Microsoft Management Console</i> ; see "Set PC Station" topic

6.16.2.8 Station Configuration Editor

Calling

Call this on the Windows task bar by clicking the icon: .

Requirement

The components in the configuration list must be entered in the same order as in the component image you created with HW Config. If the configuration deviates, it cannot be downloaded to the PC station. You can find additional information on this in the manual *PCS 7 Process Control System; PC Configuration and Authorizations*, in the section "Preparing the PC stations".

NOTICE

Making changes to the configuration list when the PC station is running causes the entire PC communication to be closed and restarted.

In this case, you will receive a corresponding warning message.

Overview

Topic	Detailed Information	Called with	Additional information
Hardware configuration and configuration of the PC station	The status display in the configuration list indicates the following: - Whether or not the created component matches the current hardware configuration - Whether or not the configuration matches a downloaded configuration	Components" tab	Online help Topic: "Status Symbols for Components"
Check module	Verification of accessibility of modules following configuration.	After completing the configuration, you can click "Ring" to check whether modules can be accessed.	Provided the module supports this function, a display on the module will indicate whether the module can be accessed.
PC station	Diagnostics for a PC station	Diagnostics" tab > Export Save file	Requires expert knowledge. Consult an expert if you encounter problems with the content of a log file

6.16.2.9 Printers and print jobs

Overview

Topic	Detailed information	Called with	Additional information
Printers and devices	Device failure Display of available printers	Start > Settings > Printers and Faxes • Problem devices • Printer	Online help via F1
Pending print jobs	Display of print jobs Deletion of print jobs	Start > Settings > Printers and Faxes Double-click the name of the printer.	Online help via F1

6.16.2.10 PC DiagMonitor

Overview

Topic	Detailed information	Called with	Additional information
Preparing the PC station	CPU temperature, fan speed, hard disks, operating hours BIOS data	Start > SIMATIC > PC DiagMonitor > PC DiagMonitor	Online help

6.16.3 Diagnostics in the network

6.16.3.1 NetPro

Calling

In SIMATIC Manager or HW Config, select the menu command **Options > Configure Network**.

Overview

Topic	Detailed information	Called with	Additional information
Consistency of configuration	Nodes that are not networked (exception: MPI nodes that are not networked) inconsistent connections in subnets with only one node	Network > Check Consistency	Online help for <i>STEP 7</i> "Checking the consistency of the network" topic
Connection status	Established connections to SIMATIC stations	Select CPU: PLC > Activate Connection Status	
Connection status	Established connections to PC stations	Select PC stations: PLC > Activate Connection Status	
Faults on PROFIBUS	Only when a diagnostic repeater is used	CPU > PROFIBUS > Display Network Topology	
Status of DP slaves	Display DP slaves in the network view	View > With DP Slaves	

6.16.3.2 NCM S7 Industrial Ethernet

Calling

Menu command **Start > SIMATIC > STEP 7 > NCM S7 Industrial Ethernet > Diagnostics**

Overview

Topic	Detailed information	Called with	Additional information
CP status	Dynamic information about the operating mode of the communication functions of CPs connected online	Diagnostics > Online > Open Connection	Online help for <i>STEP 7</i> , topic: "Hardware diagnostics" Manual <i>SIMATIC NET</i> ; <i>NCM S7 for Industrial Ethernet</i>
General CP diagnostics and statistics functions	Operating mode Scan event messages recorded in the Ethernet CP	Diagnostics > Online > Open Connection	
Diagnostics functions depending on CP type and operating mode	ISO transport connections ISO-on-TCP connections TCP connections UDP connections E-mail connections	Diagnostics > Online > Open Connection	

6.16.3.3 "Network Connections" Windows dialog box

Overview

Topic	Detailed information	Called with	Additional information
Status of network cards on Industrial Ethernet	Dynamic display of the status of physical and virtual network adapters	Start > Settings > Network Connections	Online help of the operating system

6.16.3.4 NCM S7 PROFIBUS

Calling

Menu command **Start > SIMATIC > STEP 7 > NCM S7 PROFIBUS > Diagnostics**

Overview

Topic	Detailed information	Called with	Additional information
General CP diagnostics and statistics functions	Operating mode Connected stations Station-related statistics functions Station overview	General" tab	- Online help for <i>NCM Diagnostics</i>, "General diagnostic functions" - Manual SIMATIC NET; NCM S7 for PROFIBUS
Mode-specific diagnostics	Dynamic information about the operating mode of the communication functions of CPs connected online		
FMS connections	DP master diagnostics Communication status of slaves and call of data for DP slave diagnostics DP slave diagnostics (non-passive slaves)		
PROFIBUS connections	DP master DP slave FDL connection FMS connection		
PROFIBUS connections	Faults and inconsistencies in FMS connections of the CP		

6.16.3.5 MBSA

Introduction

The Microsoft Baseline Security Analyzer (MBSA) is a tool for administrators that enables them to check a Windows network for security vulnerability.

Overview

Topic	Detailed information	Called with	Additional information
Security vulnerability	Configuration, passwords, utilities, creation of security reports, required updates	Mbscali.exe	MBSA description from Microsoft®

6.16.4 Operator station diagnostics

6.16.4.1 Lifebeat monitoring

Overview

Topic	Detailed information	Called with	Additional information
Monitoring of components of WinCC projects and their associated SIMATIC stations	Configured components are displayed graphically in a plant picture. Faulty components have a red line running through them in the graphic.	Configure lifebeat monitoring and call the picture in process mode	Online help for <i>WinCC Information System</i> , "Lifebeat Monitoring" Information about configuration in the configuration manual <i>Process Control System PCS 7; Operator Station</i>

6.16.4.2 Simatic Shell

Calling

1. Select "My Computer" in the tree view of Windows Explorer.
2. Select the "Simatic Shell" folder.
3. Select the menu command **Settings** from the shortcut menu.

Overview

Topic	Detailed information	Called with	Additional information
Network adapters	• Network adapters of the local computer • "IP" column current TCP/IP addresses and MAC addresses of the local network adapters	Network adapters" list	Online help of SIMATIC Shell
Multicast service life (TTL)	Maximum number of route jumps between subnets ("TTL" IP parameter)	Multicast service life (TTL)" input line	Online help of SIMATIC Shell
Multicast proxy	IP address of a computer in another subnet, which is to be used as a substitute for distributing Multicast packets	Multicast proxy" input line	Online help of SIMATIC Shell
Compatibility	Compatibility mode for communication between different versions of WinCC	Compatibility" check box	Online help of SIMATIC Shell
Computer status change	When the status of a computer changes, a message is sent to all station, for example: • When a computer has archived a project • When a computer shuts down • When a computer boots up, thus becoming part of a network/station group		Online Help for <i>WinCC Information System</i>

6.16.4.3 WinCC "System Info" channel

Introduction

The WinCC "System Info" channel is used to evaluate system information from server PCs.

This channel does not require hardware because it directly accesses the system information on the server PC on which it is installed.

Note

Only system information from a single server can be represented or evaluated on a client.

Overview

Topic	Detailed information	Called with	Additional information
Time information	Display of time of day, date and day of the week in process pictures	Display in configured picture	Online help for <i>WinCC Information System</i> , topic: "Communication > System Info"
CPU load	CPU load in a trend display	Display in configured picture	
Drive capacities - Storage space	• Display and monitoring of available drive capacities of different servers on a multi-client system • Monitoring of available drive capacity and message triggering	Display in configured picture	
Timers and counters	Using timers and counters (to count operating hours, for example)	Display in configured picture	
Event triggering	Triggering of events through evaluation of system information in scripts	Display in configured picture	

Configuration

Online help for *WinCC Information System*, "Communication > System Info > Channel Configuration > How to Configure the Channel System Info".

6.16.4.4 User Administrator

Calling

Call this tool by selecting the menu command **Start > SIMATIC > WinCC**

Overview

Topic	Detailed information	Called with	Additional information
For the OS Creating users Setting access permissions	Assignment and verification of access permissions for users of the PCS 7 Operator Station: - For process mode - For configuration system editors	In the tree view of WinCC Explorer, select: Editors > User Administrator > Open	Online help for <i>WinCC Information System</i> , see topics "User administrator functionality" and "Preventing unauthorized operation"

6.16.4.5 WinCC Channel Diagnostics

Calling

Select the menu command **Start > SIMATIC > WinCC > Tools > Channel Diagnostics**

Overview

Topic	Detailed information	Called with	Additional information
Connections	Overview of the status of the configured channels and their connections to the SIMATIC station, directly or by network connection through Internet Explorer	Channels/Connections" tab	Online Help for <i>WinCC Information System</i> , "How to Test the Channel and the Connection"
Trace mode	Trace mode can be activated in process mode (this affects runtimes)	Only to support experts	Online Help for <i>WinCC Information System</i> , "How to Configure the Trace Function of a Channel"

Additional information

Online help for *WinCC Information System*, "Channel Diagnostics Using Channel Diagnosis "

6.16.4.6 Status of multi-user operation

Calling

Diagnostics on the connection between OS server and an OS client

Only when WinCC is in process mode: in the menu of the WinCC Explorer.

Overview

Topic	Detailed information	Called with	Additional information
Connection status	Status - logical connections, current status of the server-client interface	Options > Status of Multi-User Operation	Online help for <i>WinCC Information System</i> , topic: "Options Status of multi-user operation"
Connection status on the server	Current status of connections in multi-user operation	"Process Data Server" tab	
Connection status on the client	Current status of the client on which the scan is started	"Process Data Clients" tab	

6.16.4.7 Status of connections

Calling

Diagnostics of the connection between WinCC and an automation system

Only when WinCC is in process mode: in the menu of the WinCC Explorer.

Overview

Topic	Detailed information	Called with	Additional information
Connection status	Status - logical connections, current status of the process interface	Options > Status of Connections	Online help for <i>WinCC Information System</i> , topic: "Checking the status of the connection"

6.16.4.8 Redundancy state control

Overview

For diagnostics in systems with redundant PCs, it is important to always have an overview of the redundancy status. The redundancy status represents the status of the individual master and standby computers. You use the redundancy status display for this.

Topic	Detailed information	Called with	Additional information
Redundant OS components Status	Master; standby Standalone Connection • Not initialized • Initialized • No connection • Fault	Create a picture the OS server in the WinCC project. Insert a control. Graphics Designer: Object palette > "Default" tab > in the "Smart Objects" tree > drag the control into the picture > in the "Insert Control" dialog box > Select "PCS 7 Redundancy State Control".	You can find information about configuration in the configuration manual Process Control System PCS 7; Operator Station

6.16.5 Diagnostics for the BATCH station

6.16.5.1 Status icons in the BATCH server taskbar

Overview

With SIMATIC BATCH, status icons in the BATCH server taskbar indicate the redundancy status.

Topic	Detailed information	Called with	Additional information
Status server	Status icons in the BATCH server taskbar	Double-click a status icon to display a field containing information about the server status.	You can find information about status icons in the online help.
Status of redundant servers	Status display of the server in process mode: - In the master server taskbar you will see the following symbols, highlighted in red:  - In the standby server taskbar you will see the following symbols: 	Double-click a status icon to display a field containing information about the server status.	You can find information on redundant BATCH servers in the manual <i>PCS 7 Process Control System; SIMATIC BATCH</i> .
Status of the data replication on the standby server	In the standby server taskbar you will see the following symbols: - Data replication running:  - Data replication completed: 	Double-click a status icon to display a field containing information about the server status.	You can find information on redundant BATCH servers in the manual <i>PCS 7 Process Control System; SIMATIC BATCH</i> .

6.16.6 Diagnostics for the Route Control station

6.16.6.1 Status icons in the Route Control server taskbar

Overview

With SIMATIC Route Control, status icons in the Route Control server taskbar indicate the redundancy status.

Topic	Detailed information	Called with	Additional information
Status of redundant servers	Status display of the server in process mode: - In the master server taskbar you will see the following symbol:  - In the standby server taskbar you will see the following symbol: 	Double-click a status icon to display a field containing information about the server status.	You can find information on redundant Route Control servers in the manual <i>PCS 7 Process Control System; Route Control</i> .

6.16.7 Diagnostics for the SIMATIC station

6.16.7.1 SIMATIC Manager

Calling

Call SIMATIC Manager by selecting the menu command **Start > Simatic > SIMATIC Manager**

Overview

Topic	Detailed information	Called with	Additional information
Diagnosing hardware	Quick view: icons indicate operating status or module status.	PLC > Diagnostics/Setting > Hardware Diagnostics Then, Module Information > Update: F5-key	Online help for <i>STEP 7</i> , topic: "Hardware diagnostics and troubleshooting" You can find information on this in the section "Module information (Page 127)". Additional information: Double-click on the icon
Module information	Use this menu command to read out information on the selected module.	Select CPU or CP: PLC > Module information	Online help for <i>STEP 7</i> , topic: "Hardware diagnostics and troubleshooting" You can find information on this in the section "Module information (Page 127)".
Operating mode	Displays the operating mode of the current module (RUN, STOP). This requires an online connection to the CPU.	Select CPU or CP: PLC > Module information	
Time	Checks/sets time of day	Select CPU: PLC > Diagnostics/Setting > Set Time of Day	Online help for <i>STEP 7</i> , topics "CPU Clocks with Time Zone Setting and Summer/Winter Time" and "Using the Clock Functions"
Faults on PROFIBUS	- Faulty bus segment - Distance of an error location from the diagnostics repeater	Select master system: PLC > Diagnose, Monitor/Modify PROFIBUS Node	Online help for <i>STEP 7</i> , topic "Topology display using diagnostics repeaters"

Topic	Detailed information	Called with	Additional information
All installed authorizations (Versions of installed components)	• Products (name, version, release) • Components (name, version, release) • Firmware updates • DLLs (STEP 7-DLLs, Windows DLLs)	Help > About > "Display" button	Online help for <i>STEP 7</i> , topic "Installed SIMATIC software"
PA devices and HART devices	Requirements: SIMATIC PDM is installed. • Icons provide information about the status of these devices	View > Process Device Plant View Select device. Select shortcut menu command Open Object .	Online Help for SIMATIC PDM > Configuring networks and process devices Icons: ...> Device icons in the process device plant view

6.16.7.2 HW Config

Calling

Select the menu command **Start > SIMATIC > SIMATIC Manager**.

In the tree view, click on "SIMATIC Station" and double-click "Hardware" in the selection list.

Overview

Topic	Detailed information	Called with	Additional information
Components accessible online	Icon indicates the operating mode of modules (= system diagnostics).	Station > Open Online	The <F5> key refreshes the display. Double-click the icon to obtain additional information.
Time	Check/Set	Station > Open Online Select CPU: PLC > Set Time of Day	Online help for <i>STEP 7</i> , topics "CPU-xxx clocks with time zone setting", "Daylight-saving/standard time" and "Using the clock functions"
Module Information	Use this menu command to read information on the selected module.	Select module: PLC > Module information	You can find information on this in the section "Module information (Page 127)".

Additional information is available in the online help for *STEP 7*.

- Diagnostic icons in the online view
- Information functions in the quick view
- Basic procedure for determining the cause of a STOP (CPU)
- Hardware diagnostics and troubleshooting
- Operating mode and operating mode transitions

6.16.7.3 Module information

Calling up quick information

1. Call up the quick information in SIMATIC Manager by selecting the menu command **Component View > View > Online**.
2. Select the SIMATIC station with the menu command **CPU > Diagnostics/Settings > Hardware Diagnostics**.

Additional diagnostics: select module and click "Module Information"

Calling up module diagnostics

1. Open HW Config.
2. Select the menu command **Station > Open Online**.
3. Select the module.
4. Select the menu command **PLC > Module Information**.

Diagnostics for the CPU

Extensive diagnostic checks are performed on a CPU.

Additional information:

Help on *STEP 7*, "Diagnostics, hardware diagnostics and troubleshooting"

Topic	Detailed information	Called with	Additional information
Module data	Data for identifying the selected module Examples: • Type • Order number • Firmware • Version • Status • Slot in the rack	General" tab	Comparison of configured and inserted modules
Events in the diagnostic buffer and detailed information about the selected event	Analysis of the cause of STOP of a CPU, overview of previous events on the selected module. Diagnostic data for the selected module	Diagnostic Buffer" tab	Check of events in the diagnostic buffer and detailed information about the selected event
DP slave diagnostics	Diagnostic data for the selected DP slave (in accordance with EN 50170)	"DP Slave Diagnostics" tab	To determine the cause of a DP slave error
Target system	Current time, operating hours and information about clock synchronization (synchronization intervals)	Time System" tab	

Topic	Detailed information	Called with	Additional information
Performance data	Operand areas and the available blocks of the selected (CPU/FM) module	Performance Data" tab For checking the user program to determine whether the CPU meets the appropriate requirements to execute a user program, for example, with regard to process image size	
Performance data	Display of all module types available in the functional scope of the selected module. List of OB, SFB and SFC that can be used in the module.	Used to check the standard blocks contained and called in the user program.	

Diagnostics for DP slaves

Topic	Detailed information	Called with	Additional information
Module data	Data for identifying the selected module Examples: • Type • Order number • Firmware • Version • Status • Slot in the rack	General" tab	Comparison of configured and inserted modules
DP slave diagnostics	Diagnostic data for the selected DP slave (in accordance with EN 50170)	"DP Slave Diagnostics" tab	To determine the cause of a DP slave error

6.16.7.4 PROFIBUS diagnostics with diagnostic repeater

Requirements

- The diagnostic repeater must be installed.
- The cable diagnostics must be prepared.

Calling

Select diagnose repeater in HW Config.

Select the menu command **PLC > Diagnostics/Setting > Module Information**

Additional information:

Help on *STEP 7*, topic "Diagnostics, hardware diagnostics and troubleshooting"

Overview

Topic	Detailed information	Called with	Additional information
Quick overview Error on bus segment	Icons indicate the status of the PROFIBUS master systems	Module Information" dialog box • Status • Icons in front of the tab names (DP1, DP2, DP3, PG)	Online help for <i>STEP 7</i> , topic: "Hardware diagnostics and troubleshooting" Comparison of configured and inserted modules
DP slave diagnostics	Diagnostic data for the selected DP slave (in accordance with EN 50170)	"DP Slave Diagnostics" tab	To determine the cause of DP slave errors
Location of error	Graphical representation of the error location		

6.16.7.5 SIMATIC PDM

Introduction

SIMATIC PDM is a software package used for configuring, assigning parameters to, commissioning, and maintaining devices (transducers, for example) and for setting network configurations and configuring PCs.

With SIMATIC PDM, you monitor devices with diagnostic capability which are located in a subnet on the PROFIBUS DP, downstream of a DP/PA link, for example.

Overview

Topic	Detailed information	Called with	Additional information
Connections to SIMATIC PDM	Connection configuration	In the SIMATIC Manager: Options > Set PG/PC Interface	Online help for <i>SIMATIC PDM</i> , topic "Configuring networks and process devices"
PDM device identification	Life List - determine accessible devices (HART and PROFIBUS PA profile V2/V3)	Start > SIMATIC > STEP 7 > SIMATIC PDM - Life List	Manual <i>SIMATIC</i> ; The <i>Process Device Manager</i> Online Help for <i>SIMATIC PDM</i> , Life List Take note of the "Scan subnets" option.
Quick information; display configuration	Icons provide an overview of the configuration and device status (then: see device status below)	In the SIMATIC Manager: View > Process Device Plant View	Online help for SIMATIC PDM, topic "Configuring networks and process devices" Icons: ...> Device icons in the process device plant view
Device information	- Type - DLL (type file) - Manufacturer - Versions	Open project in the Process Devices - Plant View> Select device > Edit > Object Properties Device" tab	Online Help for <i>SIMATIC PDM</i>
Device status	- Communication - Maintenance status - Process errors - Configuration errors - Overall status - Device-specific messages	Open project in the Process Devices - Plant View> Select device > Edit > Object Properties Device Status" tab	Online help for <i>SIMATIC PDM</i> , if manufacturer files are available in it

6.16.8 Additional diagnostic options

6.16.8.1 Additional diagnostic options for PCS 7

Disclaimer of liability

WARNING
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Siemens does not accept responsibility for inappropriate use of the procedures presented in this documentation or any consequences that might result thereof for the customer.
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WARNING
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Note the following:

- | |
|---|
| <ul style="list-style-type: none">• Only trained service employees should be authorized to work on the process control system.• Always observe the plant-specific rules and government regulations when making changes to your system.• Observe the plant-specific boundary conditions and adjust the work accordingly.• Always bear in mind that changes in a system can impact other sections of the system. |
|---|

Overview

The components and tools listed below are not part of PCS 7. You use them for advanced testing and diagnostics. Below you will find some of the diagnostics applications suitable for PCS 7:

- Ampolyzer (add-on product) (Page 132)
- BANY (add-on product) (Page 133)
- BT 200 bus test device (Page 134)
- SYSTEM Process Control Diagnostics (add-on product) (Page 135)

6.16.8.2 Amprolyzer (add-on product)

Introduction

Amprolyzer is a program that allows you to perform simple, thorough diagnostics for PROFIBUS.

Calling

If you have installed Amprolyzer, call the program with the menu command **Start menu > Programs > Amprolyzer**.

Overview

Topic	Detailed information	Called with	Additional information
System configuration	Comparison of specified and actual configuration, lifebeat monitoring	Addition of a new bus using the "Add Bus" button. Display of all bus information using the "Show Bus State" button.	Manual in PDF format
Message frame traffic	Interpretation, statistics, detection/triggering of frame errors and repeats	1. Without filters/triggers: As above 2. With filters/triggers: Record Complex" button Message frame traffic is recorded here, in addition to a display of all bus information.	Manual in PDF format
Bus recording	Parallel recording of multiple busses at the same time, special triggers, filters	As above	Manual in PDF format
Interface to data evaluation	Open interface using MS Excel	Recorded data are automatically exported and displayed in MS Excel. A recording can be sent as an Excel file, so that the recipient does not have to have this tool.	Manual in PDF format

6.16.8.3 BANY (add-on product)

Overview

BANY is a Windows-based tool used for documenting, diagnosing, recording, and analyzing your PCS 7 Ethernet and PCS 7 PROFIBUS networks.

The program packages below can be supplied separately or as a bundle:

- BANYnet
Diagnostic tool for Ethernet networks
- BANY PROFIBUS
Diagnostic tool for PROFIBUS networks

Requirements

- The PC to be used for analyzing the PROFIBUS using BANY PROFIBUS must be equipped with a PROFIBUS network adapter (CP 5512).
- If you wish to analyze the terminal bus and plant bus at the same time, the PC must be equipped with two Ethernet network adapters.

Calling

You call the analysis programs via the following menu commands:

- If you have installed BANYnet: **Start > Programs > BANYnet**.
- If you have installed BANY PROFIBUS: **Start > Programs > BANY PROFIBUS**.

BANYnet

The options for diagnosing Ethernet networks using BANYnet are shown in the table below:

Topic	Detailed information	Called with	Additional information
System configuration	Comparison of specified and actual configuration, graphical overview, lifebeat monitoring	In the Start window, select "Plant Manager"	Online help
Status of OSM/ESM	Display, parameter assignment, bus load measurement, SNMP server	In the Start window, select "System Diagnostics"	Online help
Message frame traffic	Interpretation (including PCS 7), statistics, batch analysis	In the Start window, select "Bus Analysis"	Online help
Bus recording	Parallel recording, special trigger, filter	Refer to menu in the "Bus Analysis" dialog box	Online help

BANY PROFIBUS

The options for diagnosing PROFIBUS networks using BANY PROFIBUS are shown in the table below:

Topic	Detailed information	Called with	Additional information
System configuration	Comparison of specified and actual configuration, graphical overview, master/slave monitoring, lifebeat monitoring Display, parameter assignment	In the Start window, select "Plant Manager"	Online help
Bus analysis, transmission rates of 9.6 Kbps to 12 Mbps	Bus load measurement, interpretation (including PCS 7), statistics, batch analysis, bus bottlenecks, available reserves, redundancy analysis	In the Start window, select "Bus Analysis"	Online help
Bus recording	Parallel recording, special trigger, filter The recording can be started and finished automatically with the help of triggers.	Refer to menu in the "Bus Analysis" dialog	Online help

6.16.8.4 BT 200 bus test device**Overview****Note**

The bus test device is not a software program – for this reason, the Call column is omitted.

Topic	Details	Information and Help
Bus line diagnostics	Tests for : • Line break • Monitor breaks • Line exchange A ↔ B • Short circuit • Number of terminating resistors inserted • Reflection points (for example, for line breaks)	Device description
Test of PROFIBUS interfaces	• RS 485 drivers • Internal voltage supply at 5V • RTS signal	Device description
Test of accessibility	... of stations	Device description
Protocol functions		Device description

6.16.8.5 SYSTEM Process Control Diagnostics (add-on product)

Introduction

Display of PROFIBUS diagnostic information on the operator station

Online help: *SYSTEM DIAGNOSTICS help*

Overview

Topic	Detailed information	Called with	Additional information
PROFIBUS DP – General	Station failure Display from HW Config	Picture in the OS	See "Configuration" below
PROFIBUS DP fault	Fault indication with detailed information about cause of error	Picture in the OS	See "Configuration" below
From HW Config Information	"Name and comments"	Picture in the OS	See "Configuration" below
Configuration information	Order number, addresses, slot types	Picture in the OS	See "Configuration" below

Configuration

The configuration is described in the online help *SYSTEM DIAGNOSTICS - Help* > section "PROFIBUS DP/PA DIAGNOSTICS".

Failure, replacement and return

7.1 Failure, replacement and return - guide to documentation

Guide to documentation

You can find information on component response and the procedure to be followed in the event of failure, exchange and return in the following documentation:

Scenario	Information can be found in ...	Section ...
I/O		
Failure and function fault on modules	Manual <i>Programmable Controller S7-400; CPU Data</i>	Monitoring functions of the CPU
Failure and function fault of SIMATIC ET 200M	Manual <i>SIMATIC Distributed I/O Device ET 200M</i>	Commissioning and diagnostics
Failure and function fault of SIMATIC ET 200iSP	Manual <i>SIMATIC Distributed I/O Device ET 200iSP</i>	Commissioning and diagnostics
Failure and function fault of SIMATIC ET 200S	Manual <i>SIMATIC Distributed I/O Device ET 200iSP</i>	Commissioning and diagnostics
Failure and function fault on <i>ex I/O modules</i>	Manual <i>Programmable Controller S7-300, ET 200M ex I/O modules</i>	- SIMATIC S7 ex digital modules - Diagnostics for analog modules
Failure and function fault of redundant I/O modules	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	- Failure of Redundant I/O Modules - How to Set the CPU in Respect of the Response of the I/O Modules in the Event of Channel Errors
Failure and function fault of components of distributed I/O components	Manual <i>Programmable Controller S7-400H; Fault-Tolerant Systems</i> :	- Failure and Replacement of a PROFIBUS DP Master - Failure and Replacement of a Redundant PROFIBUS DP Interface Module - Failure and Replacement of a Redundant PROFIBUS DP Slave - Failure and Replacement of Redundant PROFIBUS DP Lines
Failure of devices configured using PDM	Manual <i>SIMATIC; The Process Device Manager</i>	Device Replacement

Scenario	Information can be found in ...	Section ...
Automation systems		
Failure of a CPU in a redundant AS	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	Failure of the Master CPU
Failure of synchronization between the CPUs of a redundant AS	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	Failure of a Fiber-Optic Cable
Communication		
Failure and function fault of <i>SCALANCE X-400</i>	Operating Instructions <i>SIMATIC NET; Industrial Ethernet Switches SCALANCE X-400</i>	- Installation and Commissioning - Installation and Deinstallation - Displaying LEDs - Replacing the C-PLUG
Failure and function fault of <i>SCALANCE X-200</i>	Commissioning manual <i>SIMATIC NET; Industrial Ethernet, SCALANCE X-100 and SCALANCE X-200 Product Line</i>	- Installation and Maintenance - Configuration/Diagnostics via Remote Mechanisms - SCALANCE X2<...> Displays
Failure and function fault on the OSM	User manual <i>SIMATIC NET; Industrial Ethernet, OSM/ESM Network Management</i>	Notes on Troubleshooting
Disrupted network connections	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	- Failure, Failover and Restarting of Redundant OS Servers - Disrupted network connection to the OS partner server - Disrupted Network Connection Between the OS Client and the OS Server - Disrupted Network Connection Between the OS and AS
Fault on PROFIBUS DP	Manual <i>SIMATIC; Diagnostic Repeater for PROFIBUS DP</i>	- Mounting - Commissioning - Diagnostics
Operator control and monitoring stations		
Failure of a redundant OS server	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	Failure of a redundant OS server
Switchover response of OS clients in the event of an OS server failure	Configuration manual <i>PCS 7 Process Control System; Fault-Tolerant Process Control Systems</i>	Switchover response of OS clients in the event of an OS server failure
Failure of BATCH servers	Manual <i>Process Control System PCS 7; SIMATIC BATCH</i>	Failure of BATCH servers
Switchover response of BATCH clients in the event of a BATCH server failure	Manual <i>Process Control System PCS 7; SIMATIC BATCH</i>	Switchover response of BATCH clients in the event of a BATCH server failure

Scenario	Information can be found in ...	Section ...
Reaction of Route Control Servers to Failures	Manual <i>Process Control System PCS 7</i> ; <i>SIMATIC Route Control</i>	• Reaction of Route Control Servers to Failures
Switchover response of Route Control clients in the event of a Route Control server failure	Manual <i>Process Control System PCS 7</i> ; <i>SIMATIC Route Control</i>	• Switchover response of Route Control clients in the event of a Route Control server failure

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