SIEMENS

SIMATIC HMI

SIMATIC powerrate for WinCC

Programming and Operating Manual

Printout of the Online Help

05/2012

A5E03939210-02

Legal information

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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.

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

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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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A5E03939210-02
℗ 05/2012 Technical data subject to change

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1.1 SIMATIC powerrate

Introduction

SIMATIC powerrate provides transparency for energy consumption – from the infeed up to the consumer. Energy data are continuously recorded, archived and processed further by SIMATIC powerrate. Exact knowledge of the consumption profile allows efficient energy purchase as well as identification of potential savings, and thus helps you to effectively reduce your energy costs. Through monitoring of the supply limit agreed in a contract you are able to fully utilize your limit without unnecessarily high supply prices or penalties becoming due.

Advantages at a glance:

- Streamlined process design and optimization of energy efficiency by identifying energy-intensive processes and devices and comparing consumption profiles and costs
- Reduced operating costs through increased transparency of the energy flow
- Intensification of awareness of energy costs through assignment of costs/cause and batches
- Adherence to contractually stipulated power limits and avoidance of the associated higher energy purchasing charges and penalties.
- Safety of application through tested system components.

SIMATIC powerrate for PCS 7 and for WinCC SCADA

SIMATIC powerrate can be used in a PCS 7 or WinCC SCADA environment.

The following basic differences apply:

	PCS 7	WinCC SCADA integrated in STEP 7 1)
Hardware	S7-400 WinAC RTX 2010	S7-300 S7-400 WinAC RTX 2010
Programming of the PLC (programs normally used)	CFC, SCL, SFC	LAD, FBD, STL 2)
Messaging procedure	Chronological messaging	Chronological messaging 3)
OS functionality	Advanced Process Control (APC) and Basic Process Control (BPC) are integrated	Basic Process Control (BPC) is included as a WinCC option After corresponding configuration, a WinCC project can also run on computers without BPC.
Compile OS	Automatic creation of: - PLC connection - Tags in WinCC - Block icons in the corresponding process picture (optional) - Picture tree (optional)	Automatic creation of 4): - PLC connection - Tags in WinCC - Messages

1) SCADA: Supervisory Control And Data Acquisition

2) The CFC, SFC and SCL editors offered as an option in STEP 7 are not required for SIMATIC powerrate for WinCC.

3) Chronological messaging is only possible in integrated projects.

4) OS compilation is only possible in integrated projects.

1.2 Functional overview of SIMATIC powerrate

Introduction

SIMATIC powerrate is an option used to visualize and manage energy measurement and distribution.

Depending on the installation, you can use SIMATIC powerrate in a PCS 7 project or WinCC project. The required versions can be found in the Release Notes in the section "Installation".

The SIMATIC powerrate V4.0 SP1 software package can be used as of WinCC V7.0 SP3 with and without Basic Process Control. This document refers to the variant WinCC native without Basic Process Control although the installation of Basic Process Control is a prerequisite. Basic Process Control is used for the configuration of Alarm Logging.
The picture structure of Basic Process Control is not used in this case.

Functions of SIMATIC powerrate

The configuration of some functions depends on whether powerrate is used in a PCS 7 project or a WinCC SCADA project.

Energy measurement

- Energy measurement (power, operating and energy values) independent of the hardware used
- Faceplate for displaying energy values (when used in PCS 7: based on the Faceplate Designer)
- Assignment of energy values to batches
- Using standard mechanisms for archiving measured values
- Export of the acquired energy and batch data to MS Excel
- Allocation of energy data to cost centers and evaluation in the form of predefined reports

Power distribution

- Basic functionality for operation & monitoring of general switches and PAC3200 / PAC4200

Load management

- Load management for up to 100 loads
- Faceplate for configuration and operation & monitoring of load management
- Communication blocks for data exchange between several PLCs

SIMATIC powerrate wizard

The powerrate wizard (PRE_Config.exe) carries out the following configuration steps in SIMATIC powerrate V4.0 and higher:

- Reading the configuration to WinCC and STEP 7
- Creation of the internal tags pre_inf of the raw data tags and C actions in WinCC
- Creation of the Tag Logging archive and the archive tags
- Creation of the ini file for archiving with S7-300
- Creation of the user archives for batch-related energy measurement and load management

Block library

The library contains blocks for the following tasks:

Task [1)]	**Blocks for S7-400** [2)]	**Blocks for S7-300** [2)] **(Only used in WinCC SCADA systems)**
Time synchronization	PRE_SYNC	PR3_SYNC
Data buffering	PRE_FIFO_IO PRE_FIFO_DATA	PR3_FIFO_IO PR3_FIFO_DATA
Archiving measured values and transferring/sending archive data	PRE_AR_SND PRE_AR_DATA	PR3_AR_SND_B PR3_AR_SND PR3_AR_DATA_B PR3_AR_DATA
Acquisition and processing of measured values (energy)	PRE_SUM PRE_CALC PRE_PE_RD PRE_BIN_ACQ PRE_INT_ACQ	PR3_SUM PR3_CALC PR3_PE_RD PR3_BIN_ACQ PR3_INT_ACQ
Batch-related energy measurement	PRE_SUMC	PR3_SUMC
Status of energy distribution: • Block for general switch with integration via DI / DO • Block for basic functionality of the PAC3200 / PAC4200	PRE_SWTCH PRE_PAC	PR3_SWTCH PR3_PAC
Load management for up to 100 loads	PRE_LMGM	PR3_LMGM
Load management for up to 75 / 50 / 25 / 10 loads	PRE_LMGM_75 PRE_LMGM_50 PRE_LMGM_25 PRE_LMGM_10	PR3_LMGM_75 PR3_LMGM_50 PR3_LMGM_25 PR3_LMGM_10
Send / receive blocks for AS-to-AS communication or for AS-4xxH <> AS-400 communication	PRE_AS_SEND PRE_AS_RECV PRE_SND_H PRE_RCV_H	PRE_GET PR3_GET
Communication with WinCC user archives: Read and write of archive data	PRE_UA_S PRE_UA_R	PR3_UA_S PR3_UA_R

Task [1]	Blocks for S7-400 [2]	Blocks for S7-300 [2] (Only used in WinCC SCADA systems)
Activate the system blocks BSEND and BRCV	PRE_BS PRE_BR	
Measured value transfer via PROFIenergy between I device and IO controller	PRE_PE_IDEV	PR3_PE_IDEV

1) The blocks support German and English. Documentation on the blocks is available in the chapter "Description of blocks (Page 211)" and the online help.

2) The blocks with the prefix PRE are intended for use in S7-400 and WinAC RTX 2010. The blocks with the prefix PR3 are intended for use in S7-300. There is no functional difference between the blocks for S7-400 and S7-300.

Faceplates and configuration examples

With the powerrate library, SIMATIC powerrate also provides:

- Example programs in STL
- User objects and operating blocks for operating and monitoring energy measurement data, load management, switches, and PAC3200 / PAC4200 energy measurement devices on the OS

STL example projects

The library contains configuration examples in STL for using the blocks:

- S7-300: OB32, OB34 and OB35
- S7-400: OB32, OB35 and OB38
- OB100

Faceplates for PCS 7 process pictures

The following blocks can be integrated in PCS 7 projects via supplied faceplates:

- PRE_SUM
- PRE_LMGM
- PRE_SWTCH
- PRE_PAC

Faceplates for WinCC process pictures

The following blocks can be integrated in WinCC SCADA projects via supplied faceplates:

- PRE_SUM / PR3_SUM
- PRE_LMGM / PR3_LMGM
- PRE_SWTCH / PR3_SWTCH
- PRE_PAC / PR3_PAC

SIMATIC powerrate reports

Functions available in powerrate reports:

- Writing archive data from WinCC process value archives to MS Excel reports
- Writing archive data from WinCC user archives to MS Excel reports
- Further processing of archive data
- Output of archive data in the form of MS Excel reports
- Analysis of costs and consumption for different cost centers
- Cyclic creation of automatic reports

SIMATIC powerrate documentation

The SIMATIC powerrate documentation consists of the following files:

- Release Notes

  The SIMATIC powerrate Release Notes contain important information for installation and use of the software. The information in this document takes precedence over statements made in other documents.

  The chapter "What's New?" contains information about the new functions in the respective SIMATIC powerrate versions.

- SIMATIC powerrate for WinCC

  The documentation is supplied as a PDF file.

  The configuration guide shows in the form of "Getting Started" documentation an example of how to integrate powerrate in a STEP 7 project and from this create your WinCC process pictures for operating and monitoring your plant.

  The block description contains detailed information on the blocks of the supplied powerrate library.

- SIMATIC powerrate for PCS 7

  The documentation is supplied as a PDF file.

  The configuration guide shows how to integrate powerrate in a PCS 7 project and from this create your PCS 7 process pictures for operating and monitoring your plant.

  The block description contains detailed information on the blocks of the supplied powerrate library.

- Direct Help for call in the STEP 7 block editor

  When processing the powerrate blocks, you can open the block description using the Direct Help function.

Configuration 2

2.1 Configuration basics

Introduction

To use SIMATIC powerrate for operation and monitoring, carry out the following steps:

1. Create a project in SIMATIC Manager:
   - Creating a STEP 7 project (Page 22)
   - Configuring hardware (Page 25)
   - Configuring a PC station (Page 29)
   - Defining a time zone and configuring time synchronization (Page 34)
   - Configuring connections (Page 40)

   You can also use and adapt an existing project.
2. Copy and load templates from the powerrate library:
   - Copying a block library (Page 46)
   - Downloading configuration to PLC and PC station (Page 50)
3. Creation and configuration of WinCC projects:

   Create the tags and messages via AS-OS Engineering in WinCC.
   The WinCC project must be integrated in STEP 7.
   - Compile OS (Page 54)
   - Running the OS project editor (Page 59)
   - Running the powerrate wizard (Page 66)
   - Integrating icons in the process pictures (Page 73)

4. Connecting block icons and S7 blocks

   The blocks are interconnected in the WinCC process picture via the Dynamic Wizard. The procedure is described as an example for the PRE_SUM / PR3_SUM block and applies accordingly to the other faceplates.

   You also create the appropriate AS programs. The most important information for this step is summarized in the relevant sections.

   – Configuring energy measurement with PRE_SUM / PR3_SUM (Page 84)

   – Configuring the switch PRE_SWTCH / PR3_SWTCH (Page 115)

   – Configuring measured value display with PRE_PAC / PR3_PAC for PAC3200/PAC4200 (Page 123)

   – Configuring batch-based energy measurement with PRE_SUM / PR3_SUM (Page 131)

   – Configuring load management with PRE_LMGM / PR3_LMGM (Page 141)

5. Creating reports with powerrate Reports

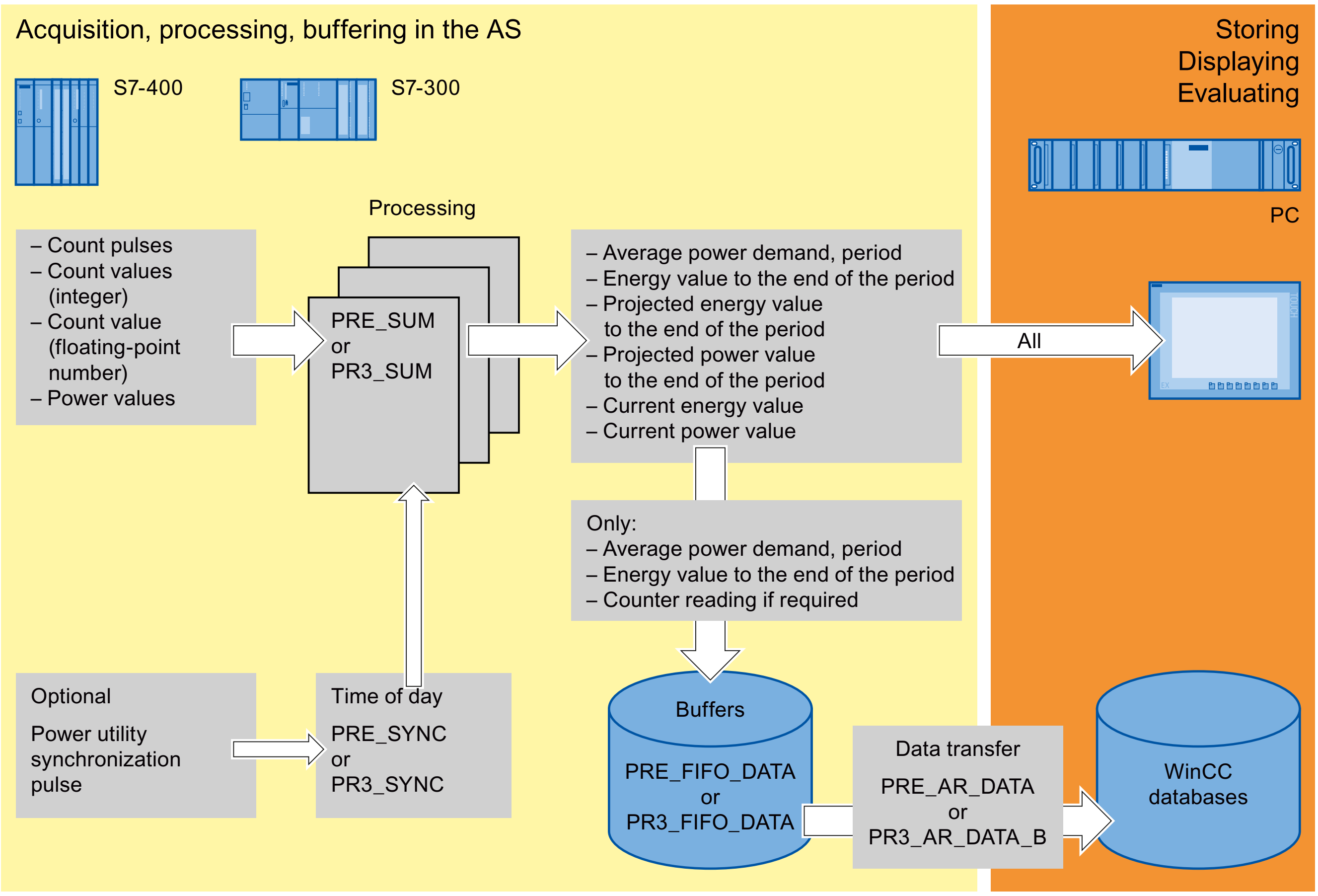
   You save reports as templates for exporting data to MS Excel files and for future evaluation. You create the reports manually or automatically at scheduled times.

   – Configuring report generation with powerrate Reports (Page 159)

Functionality of powerrate

The diagram illustrates the tasks of the powerrate function blocks.

The blocks with the prefix PRE are intended for use in S7-400 and WinAC RTX 2010. The blocks with the prefix PR3 are intended for use in S7-300. In terms of function, there is no difference between the blocks for S7-400 and S7-300. The blocks for S7-400 include alarm blocks, which are not executable in S7-300.



PRE_SUM / PR3_SUM

The function block PRE_SUM / PR3_SUM is used to acquire and process energy values. The block forms the interface to the OS. Various acquisition types of the energy value are supported. They are selected with the help of the "INP_SEL" input parameter:

- INP_SEL= 0 ' count pulse
- INP_SEL= 1 ' integer count value
- INP_SEL= 2 ' analog count value
- INP_SEL= 3 ' energy value calculated using arithmetic function

  (Calculation algorithms can be found in the description of the blocks:
  Function - PRE_CALC / PR3_CALC (Page 250))

The current value, trend and average value is calculated for each period for power and energy values for each PRE_SUM / PR3_SUM function block.

PRE_SYNC / PR3_SYNC

The PRE_SYNC / PR3_SYNC function block is used as a clock for time synchronization for the function blocks for energy measurement PRE_SUM / PR3_SUM and for other powerrate function blocks. The SYNC_OUT clock can be triggered by an external synchronization signal (EXT_SYNC) or the internal CPU time.

PRE_FIFO_DATA / PR3_FIFO_DATA

The PRE_FIFO_DATA / PR3_FIFO_DATA function block serves as a buffer for the measured values to be archived which are returned by the PRE_SUM / PR3_SUM function block. The measured values are sent to WinCC via the PRE_AR_SND / PR3_AR_SND function block.

PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

The PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA function block contains the data interface for the archive data to be sent. PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA calls the PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND function block which sends the archive data to WinCC.

Note

For performance reasons, it is best to use the PR3_AR_DATA_B block. In an existing user program, replace the call of the PR3_AR_DATA block with the call of the PR3_AR_DATA_B block.

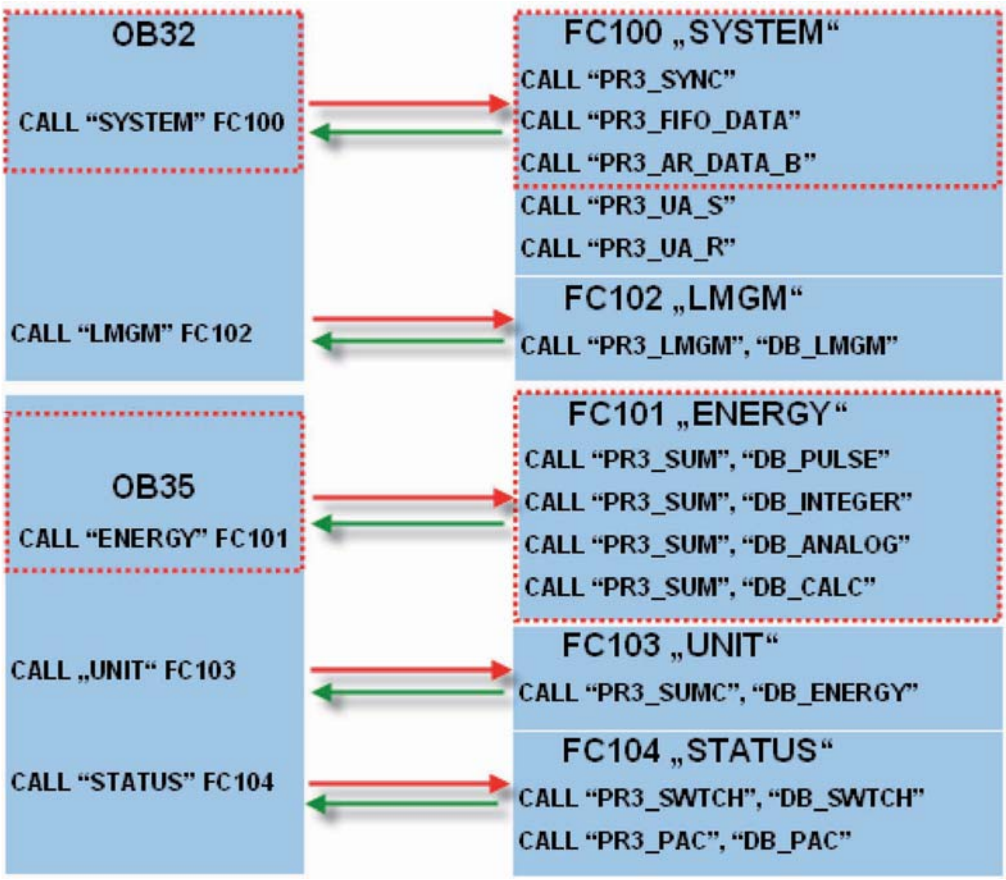
Configuration example

The powerrate library contains standard blocks and configuration examples in STL in the program folders for S7-400 and S7-300.

These configuration examples can be used as a template. They have a similar structure for S7-300 and S7-400:

- S7-300: OB32, OB34 and OB35 organization blocks
- S7-400: OB32, OB35 and OB38 organization blocks
- Organization block OB100 for the startup characteristics
- Called functions

The following diagram shows the structure of an configuration example for S7-300:



See also

Configuring a WinCC project without Basic Process Control (Page 61)

Important inputs and IDs (Page 215)

2.2 Creating a STEP 7 project

2.2.1 Creating a STEP 7 project

Introduction

This section provides information on STEP 7 and describes how you can create a project in the SIMATIC Manager. The project is the basis for the configuration of a user interface in WinCC. In this project, you create and edit all the objects you require for operating and monitoring processes.

This description contains the procedure for an S7-300. The basic procedure is identical for the use of an S7-400. Deviations for the use of an S7-400 are mentioned in the individual steps.

Requirements

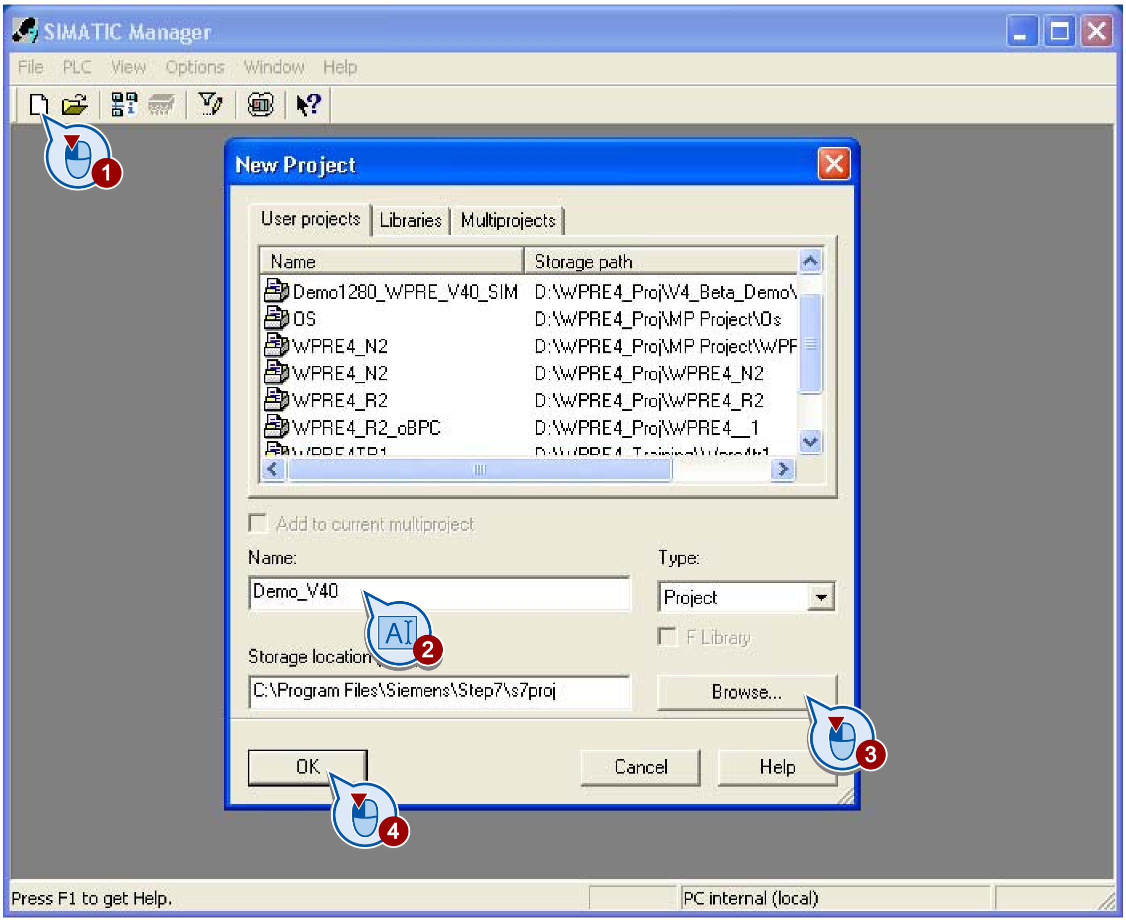
- SIMATIC Manager is installed.
- WinCC is installed.
- The following WinCC components are installed:
  - AS-OS Engineering
  - Basic Process Control
  - User Archives (for load management and batch-based energy measurement)

Procedure

1. Open the SIMATIC Manager in the Windows Start menu via "SIMATIC > SIMATIC Manager" or by double-clicking the Desktop.

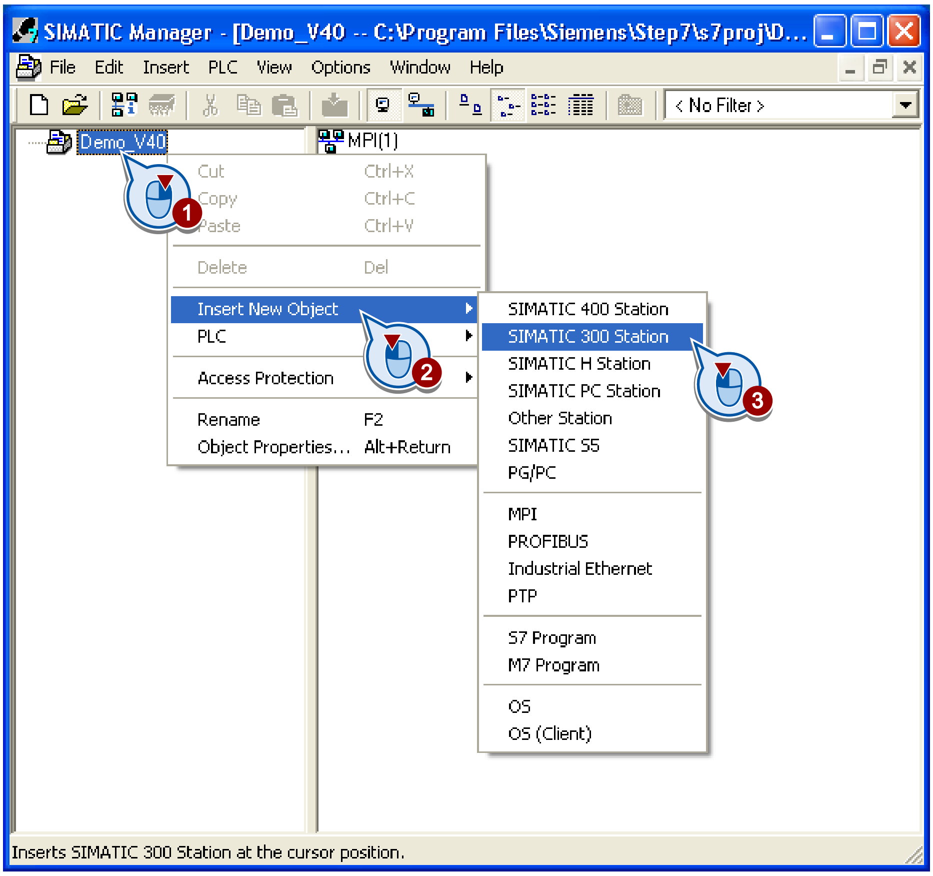
2. Create a new project.

   Assign a project name and the storage path.



3. Insert a "SIMATIC 300" station.

   If you are working with the S7-400 PLC, insert a "SIMATIC 400 station".



Result

You have created a STEP 7 project.

2.2.2 Configuring the hardware in the STEP 7 project

Introduction

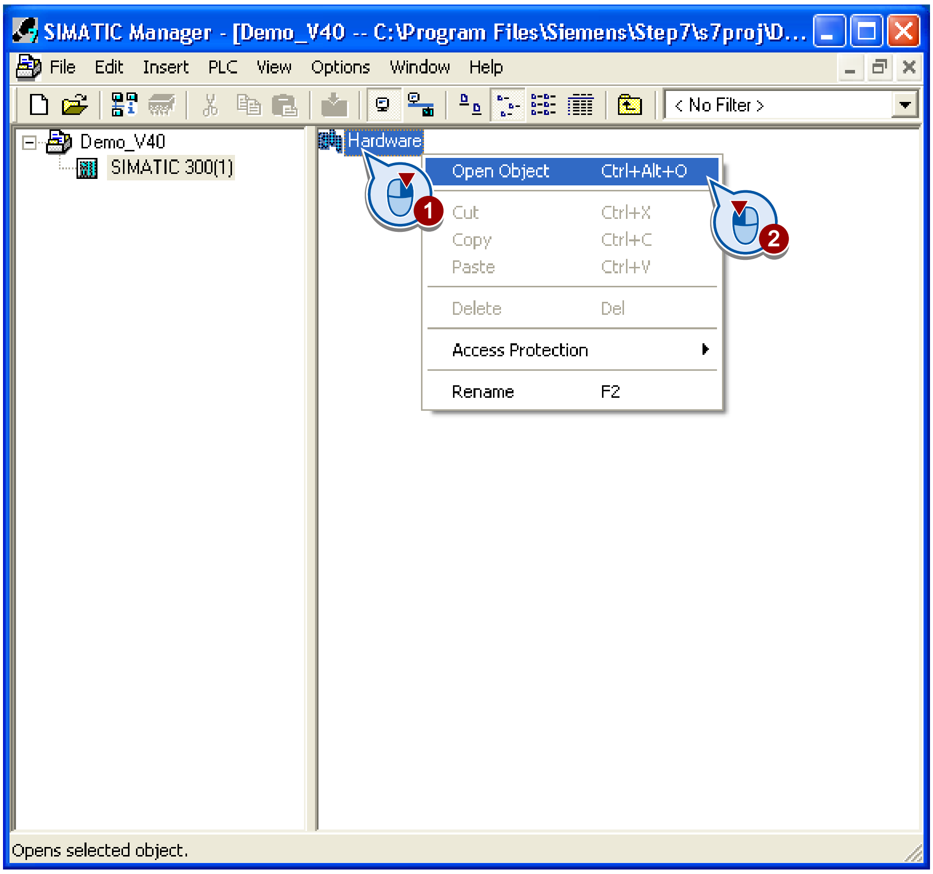
You will configure the hardware and the connections in the STEP 7 project.

Requirements

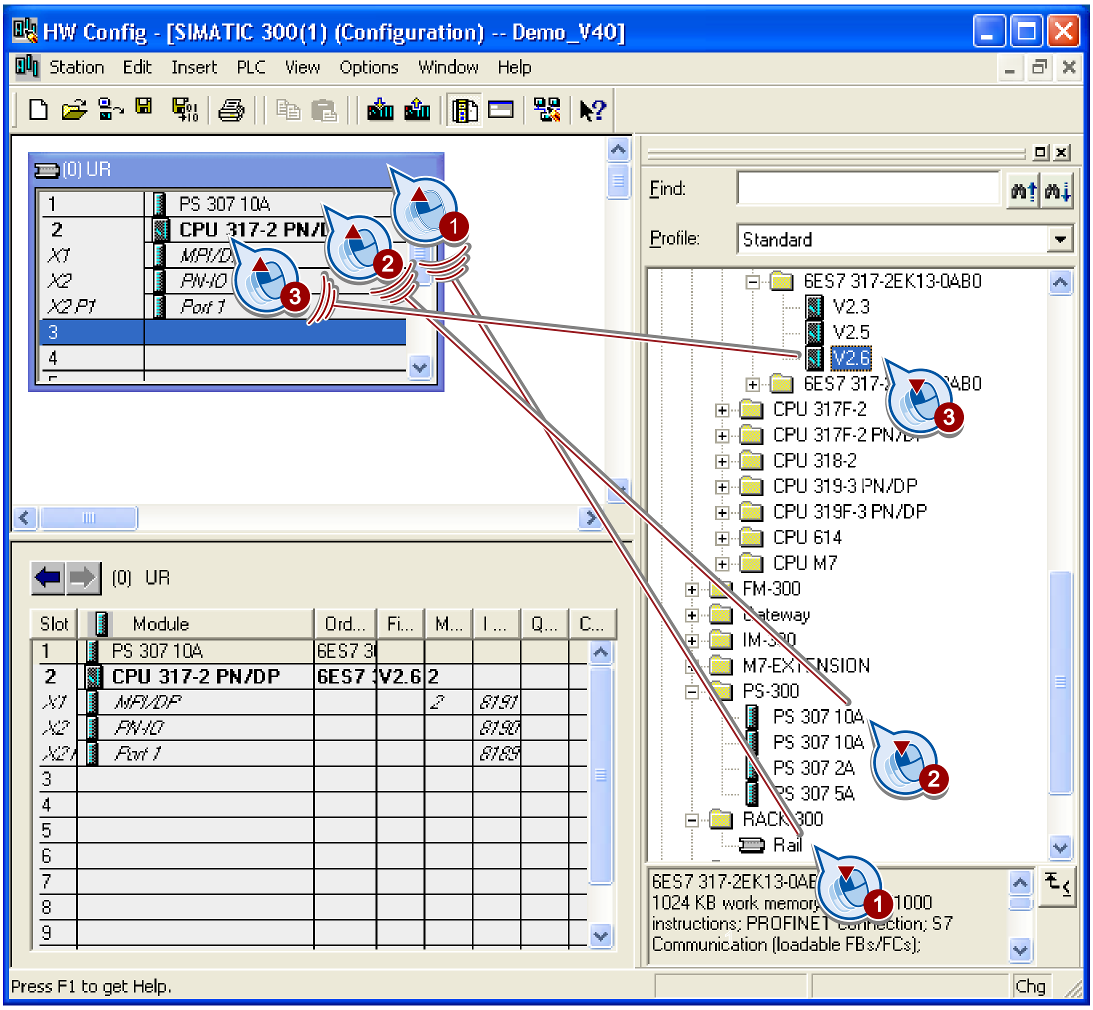
- A STEP 7 project is created.
- A SIMATIC 300 station or SIMATIC 400 station is created in the project.

Procedure

1. Open the hardware configuration.

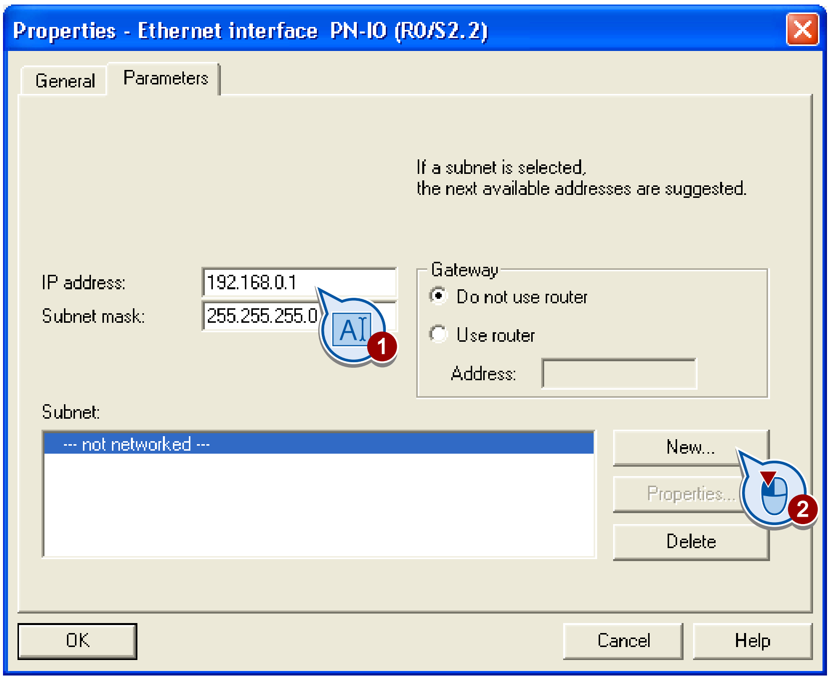


2. Insert the rack, the power supply module and the CPU.



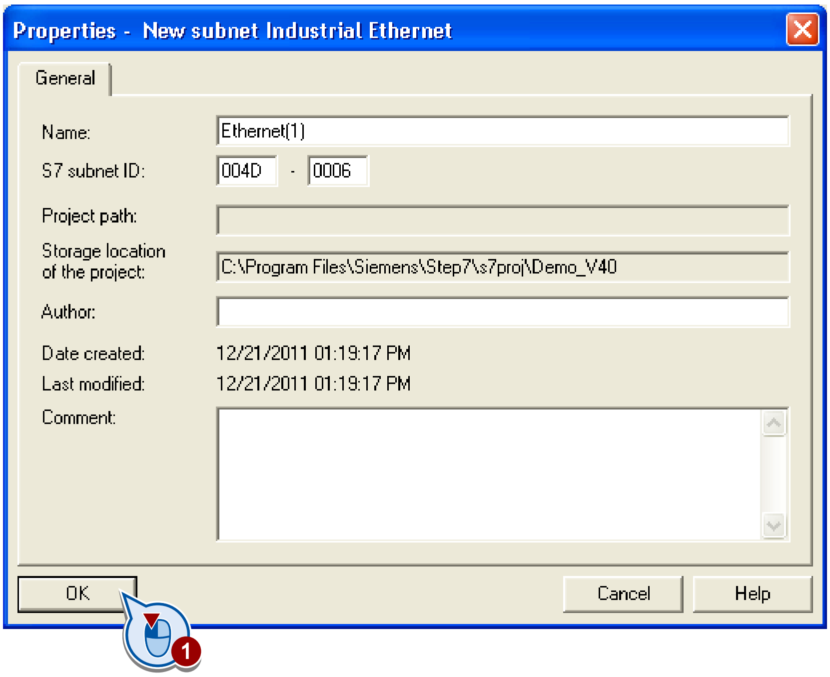
3. Define an IP address , for example, 192.168.219.10 for the "PN-IO" interface.

   Ensure that the CPU and the PC station belong to the same subnet.



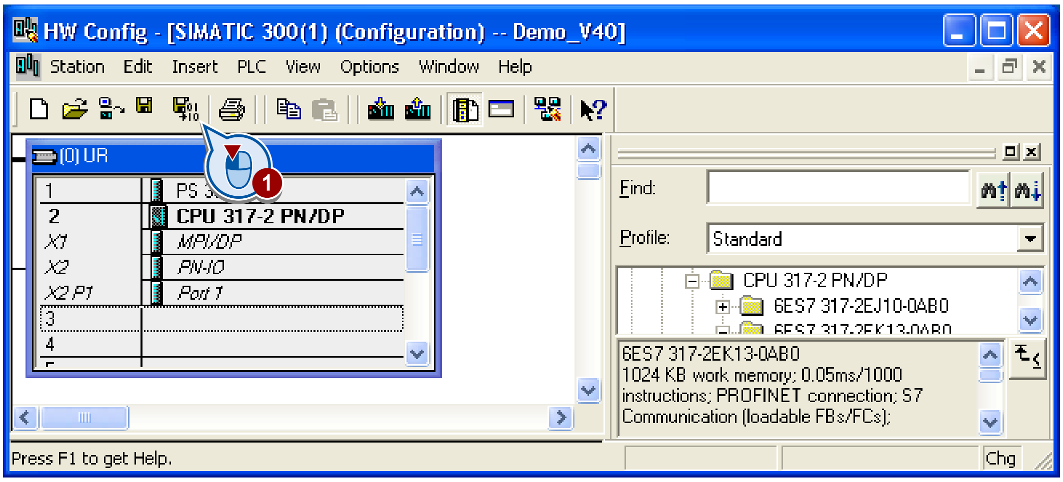
4. Create the network, for example, "Ethernet (1)".

   Connect the interface to this network.



5. Save and compile the hardware configuration.

   If required, confirm that unique message numbers are assigned CPU-wide.



2.2.3 Configuring the PC station in the STEP 7 project

Introduction

You will create a PC station and configure the connections in the STEP 7 project.

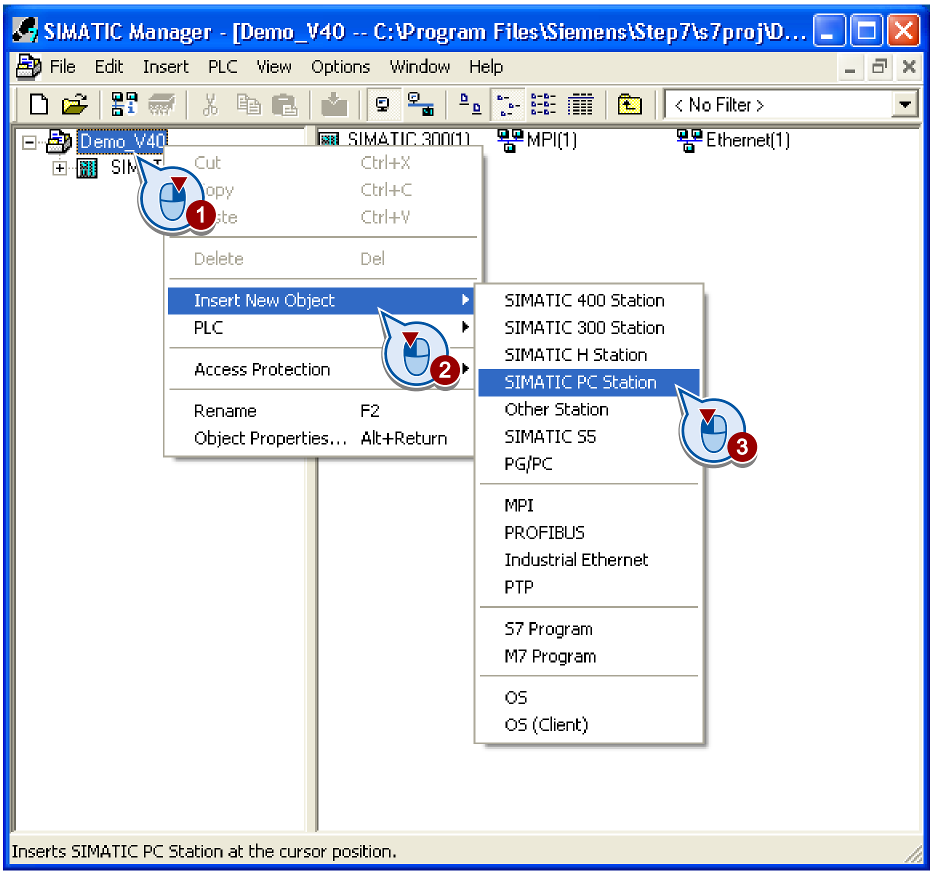
You use the PC station to configure the WinCC project for operating and monitoring.

Requirements

- A STEP 7 project is created.
- A SIMATIC 300 station or SIMATIC 400 station is created and configured in the project.

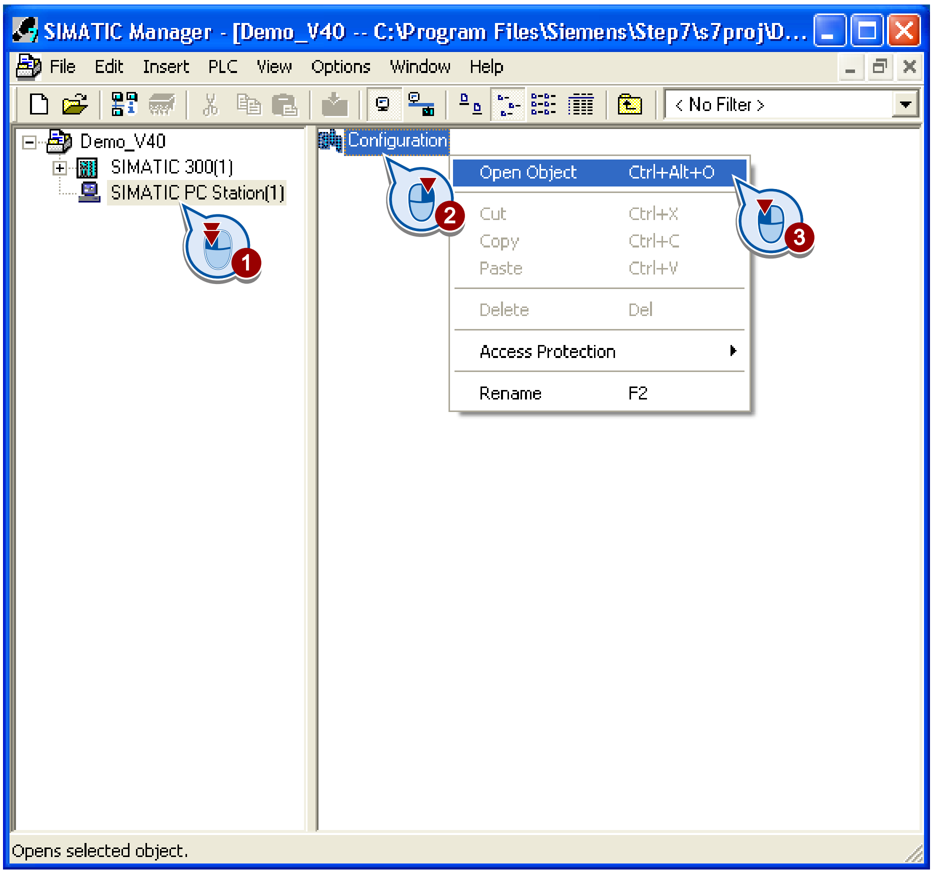
Procedure

1. Insert the PC station.

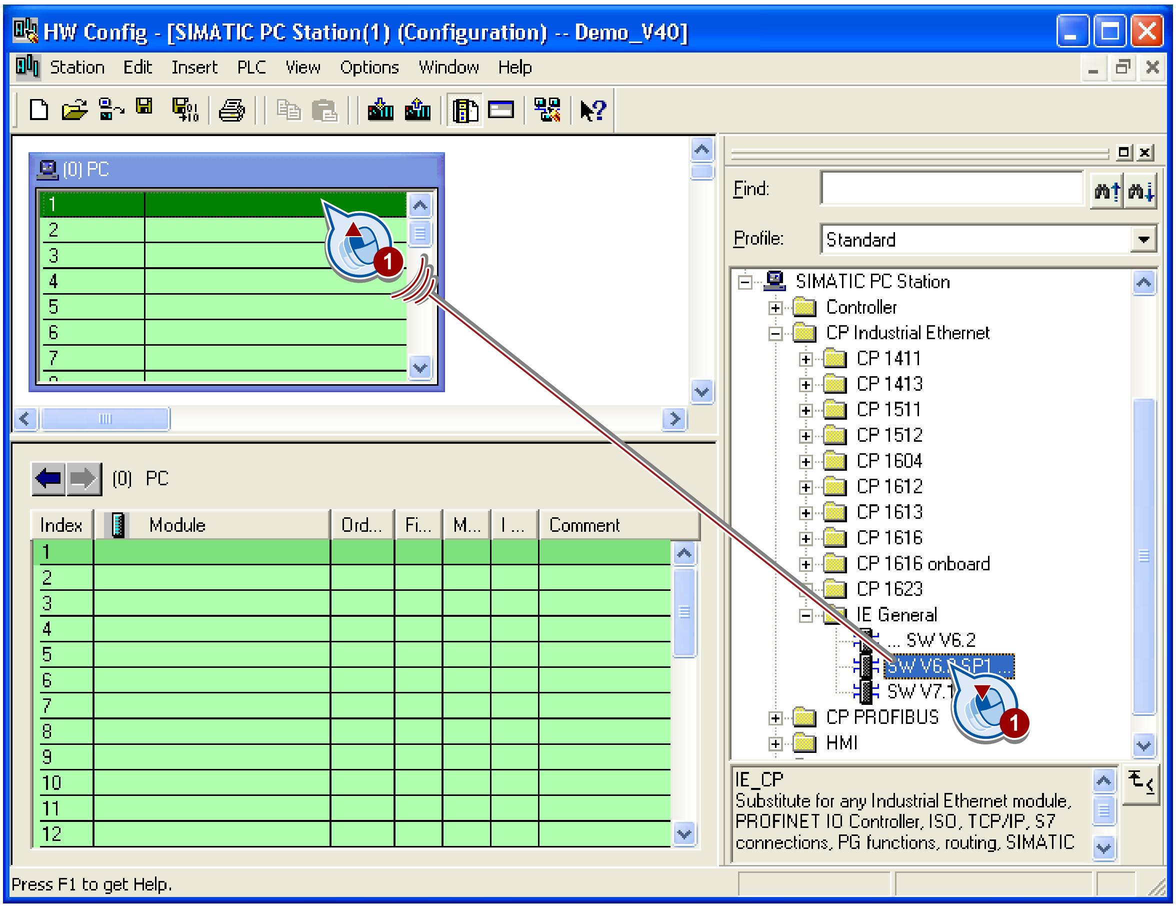


2. Change the default name of the PC station to the name of your PC, for example, "HMI".

   Open the hardware configuration.

3. Insert the network adapter, e.g. "IE General".

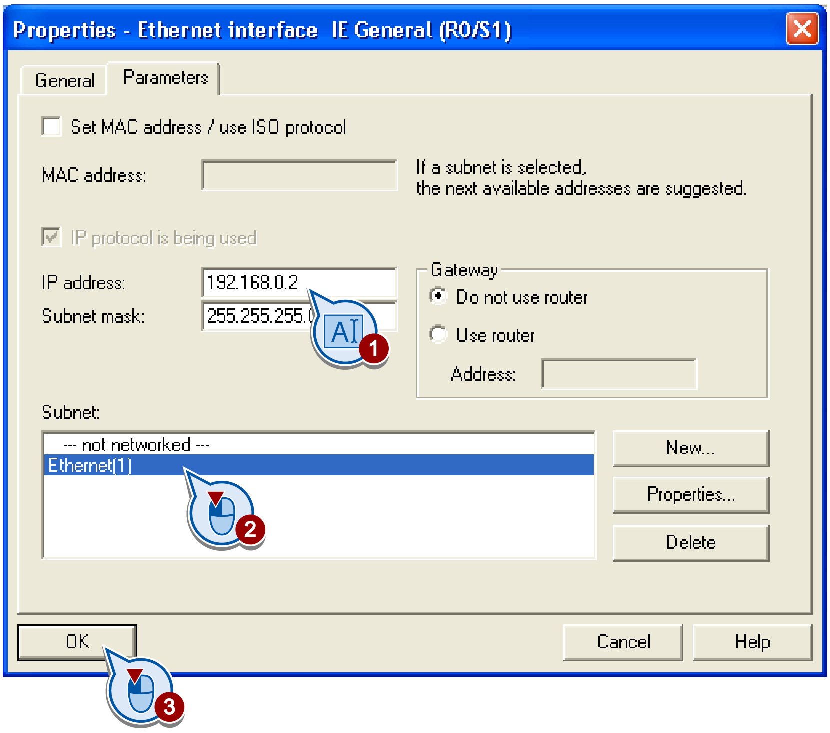


4. Check the IP address of your PC and assign it to the network adapter.

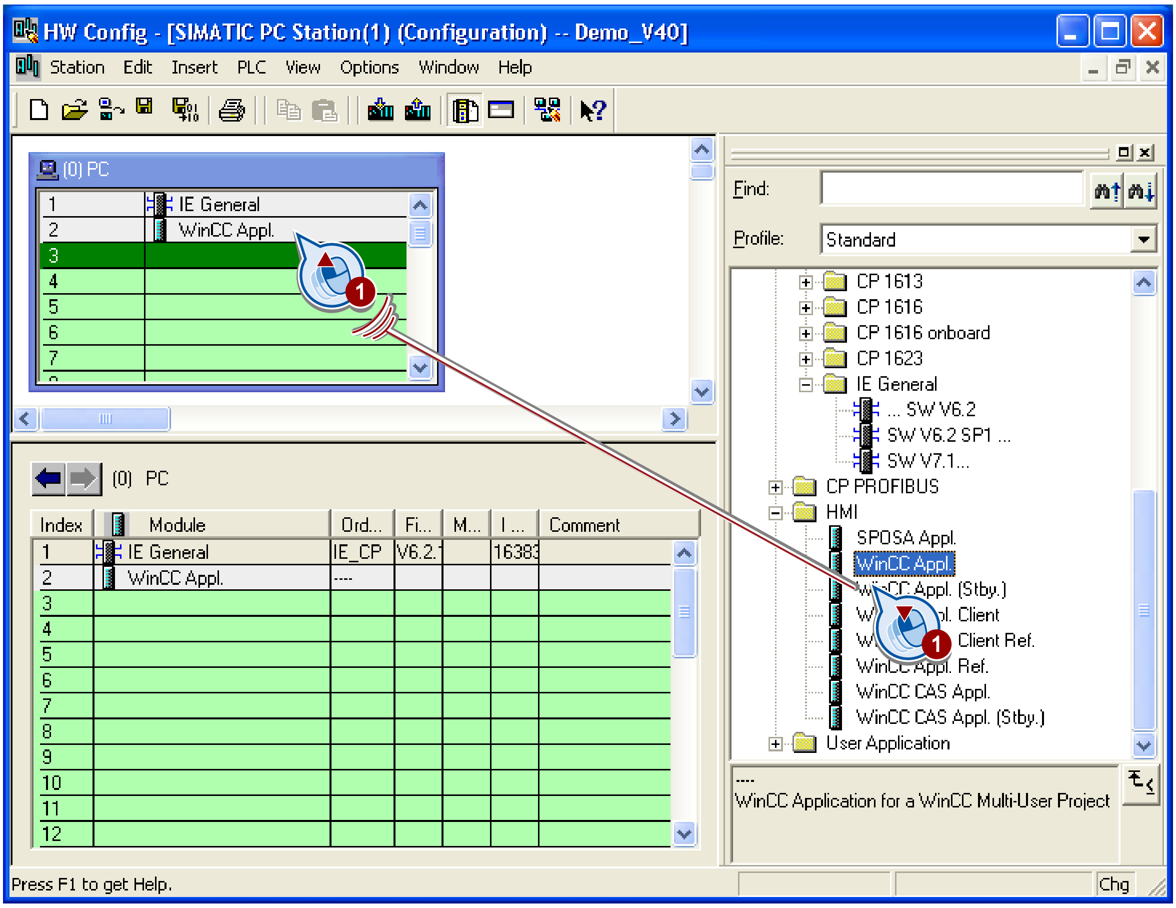
   Ensure that the CPU and the PC station belong to the same subnet.

   To display the IP address of your PC, start the DOS editor via the Windows Start menu command "Run > cmd" and enter "ipconfig".

   Connect the interface to the network.



5. Insert "WinCC Appl.".



6. Save and compile the hardware configuration.

2.2.4 Defining a time zone and configuring time synchronization

Introduction

To ensure that the date and time are displayed and saved correctly, time synchronization must be configured in your system. Synchronize the time of the CPU and WinCC servers to ensure times are properly archived and calculated in the system.

Set the coordinated universal time UTC as the time basis in your project ("Universal Time Coordinated"). The time in the controller is then calculated from UTC + the time difference to local time.

If you do not use time synchronization in your system, the following error may occur:

- The time in the controller is more recent than the time on the server.

Inconsistencies can occur in the Tag Logging if the clock is not set correctly,
in particular with an S7-300. The communication error "DB_ARCHIVE" will be reported.

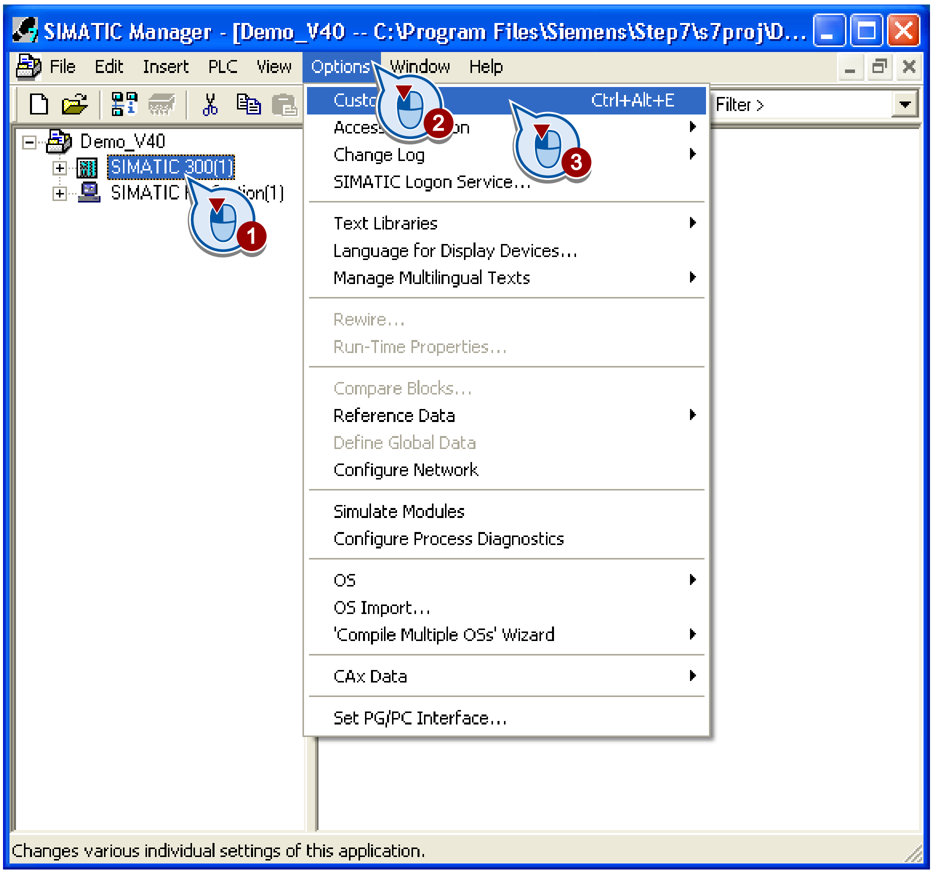
For additional information on time synchronization refer to the documentation for your controller in the documentation of WinCC and PCS 7.

Requirements

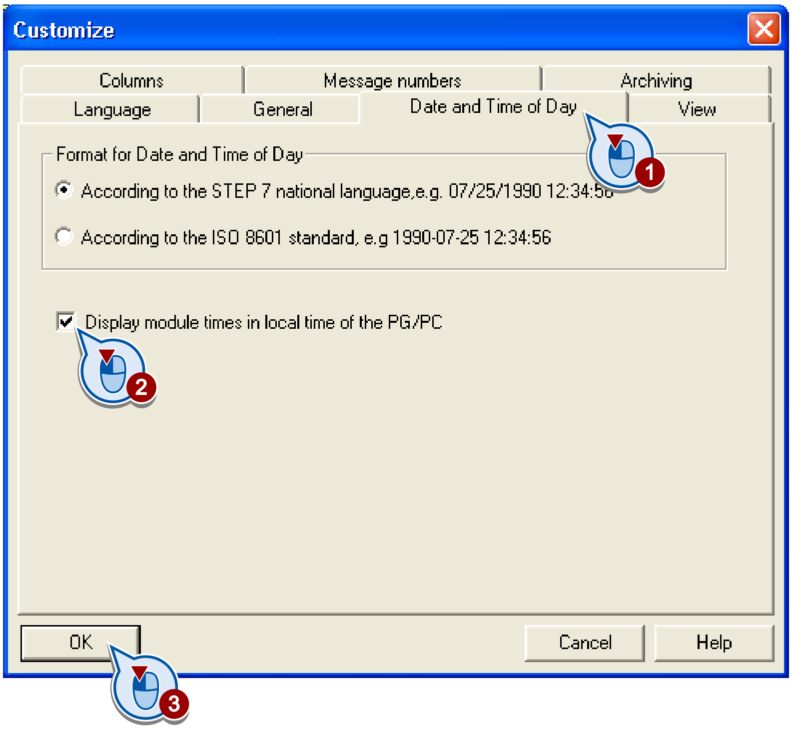
- The S7-300 or the S7-400 is linked to the configuring PC.

Procedure

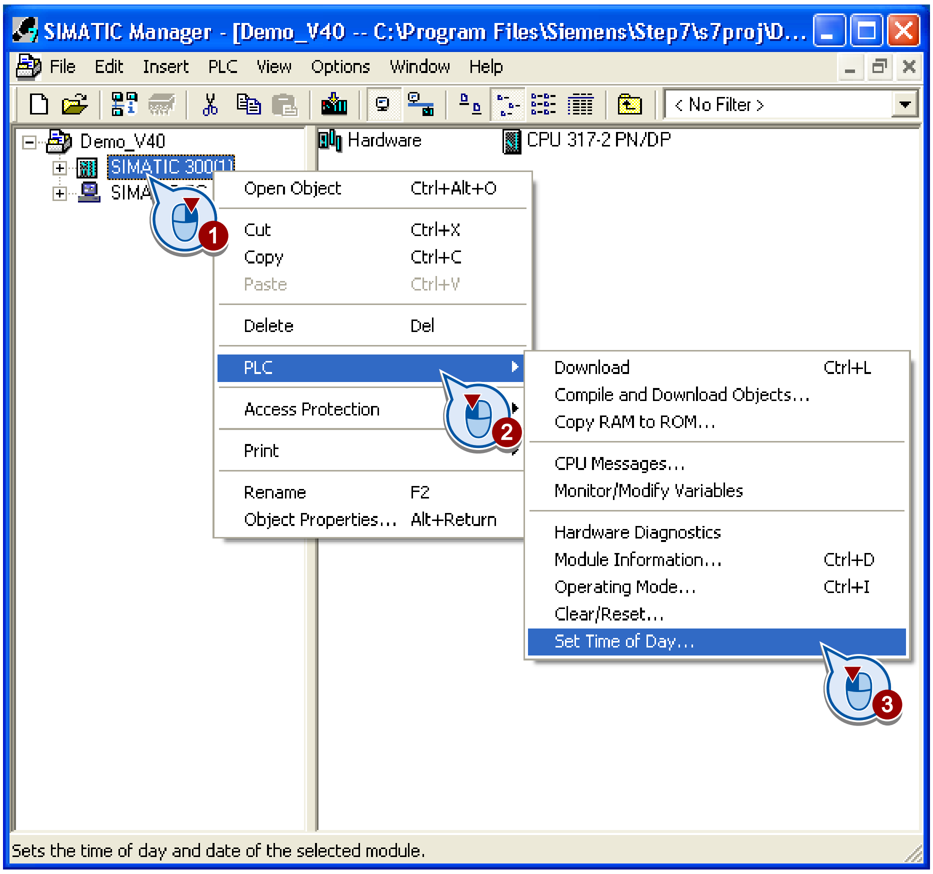
1. Open the settings of the CPU in the SIMATIC Manager.


SIMATIC Manager - [Demo_V40 -- C:\Program Files\Siemens\Step7\s7proj\D...
File Edit Insert PLC View Options Window Help
Demo_V40
SIMATIC 300(1)
Ctrl+Alt+E
Change Log
SIMATIC Logon Service...
Text Libraries
Language for Display Devices...
Manage Multilingual Texts
Rewire...
Run-Time Properties...
Compare Blocks...
Reference Data
Define Global Data
Configure Network
Simulate Modules
Configure Process Diagnostics
OS
OS Import...
'Compile Multiple OSs' Wizard
CAx Data
Set PG/PC Interface...
Changes various individual settings of this application.
1
2
3

2. Activate the setting "Display module times in local time of PG/PC".



3. Set the time of the CPU in the SIMATIC Manager to UTC.



4. Specify the local time and activate "Take from PG/PC as UTC".
5. Set time synchronization. Information about this can be found in the respective documentation of your PLC.

2.2.5 Setting the display language

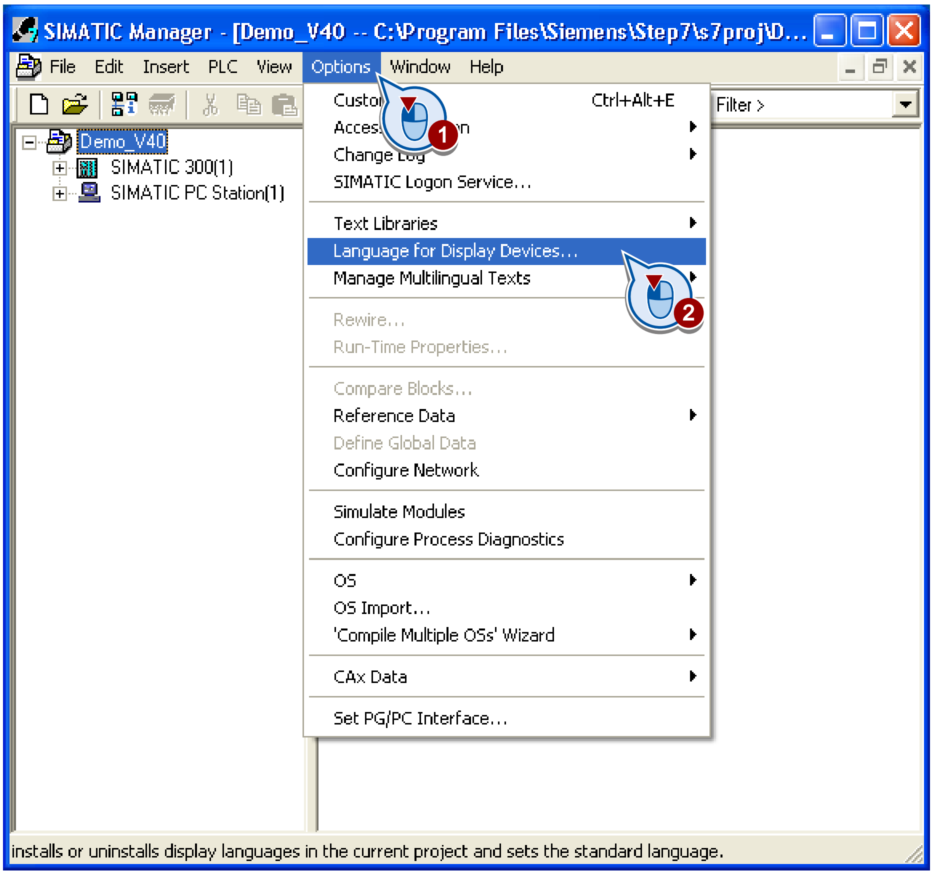
Introduction

If you want to display several languages in Runtime, you have to add these languages in the SIMATIC Manager.

The default language in the SIMATIC Manager is English. powerrate messages are configured in German and English. To avoid problems when compiling the AS-OS, ensure that "English (United States)" and "German (Germany)" are installed.

Procedure

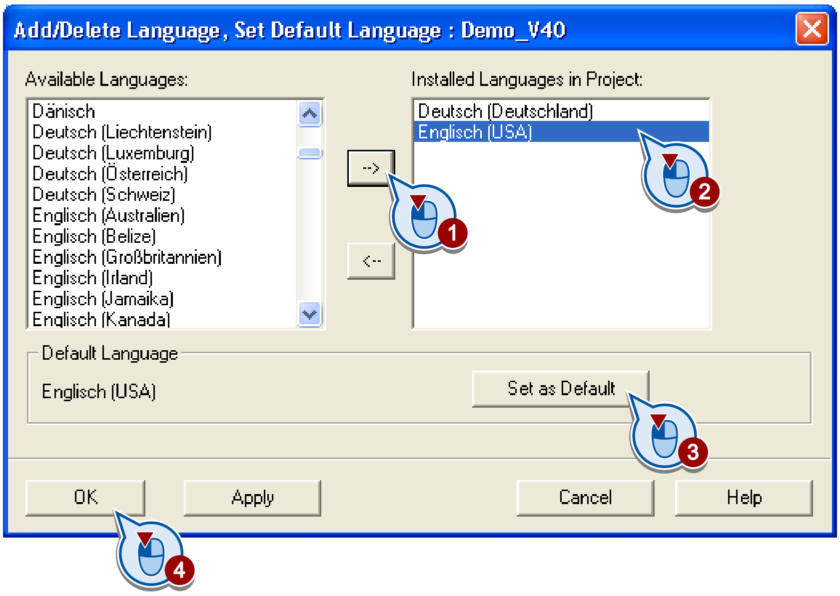
1. Open the "Add / Delete Language, Set Default Language..." dialog.



2. Check whether the languages "English (United States) and "German (Germany) are entered in the "Installed languages in project" area.

   If necessary, move a missing language to the "Installed languages in project" area.

   Select "English (United States)" as the default language.



3. If required, install additional languages with which you would like to display user texts.

2.2.6 Configuring connections

Introduction

Create an S7 connection for the WinCC application.

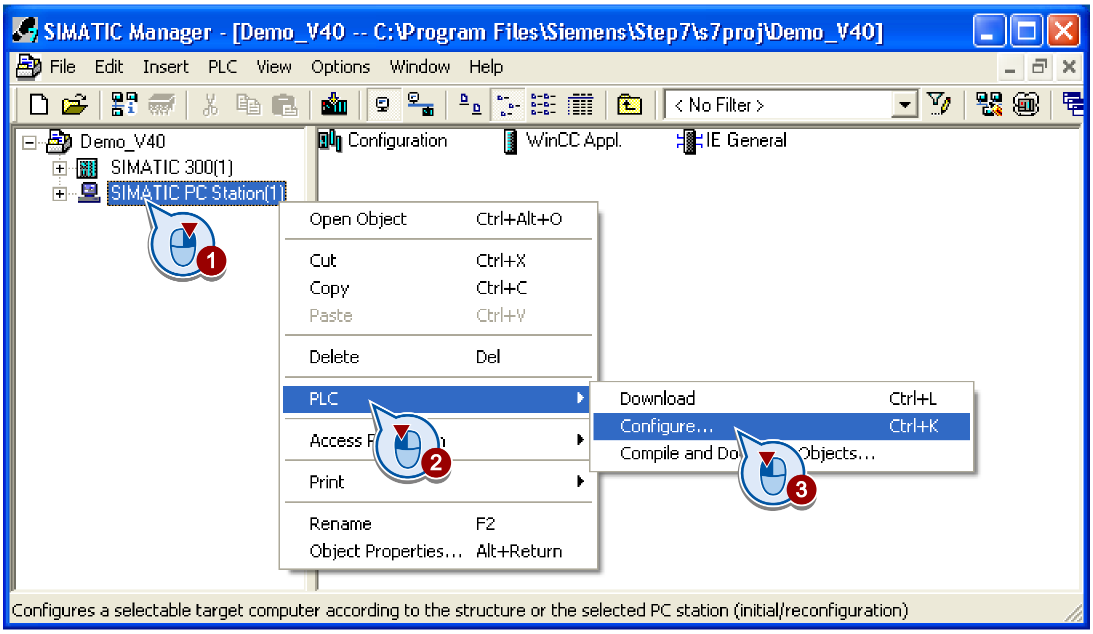
Communication with the WinCC user archives is implemented via BSEND / BRCV. To do this, configure a connection in NETPRO for each WinCC server. The same connection must be used as when compiling the OS.

Requirements

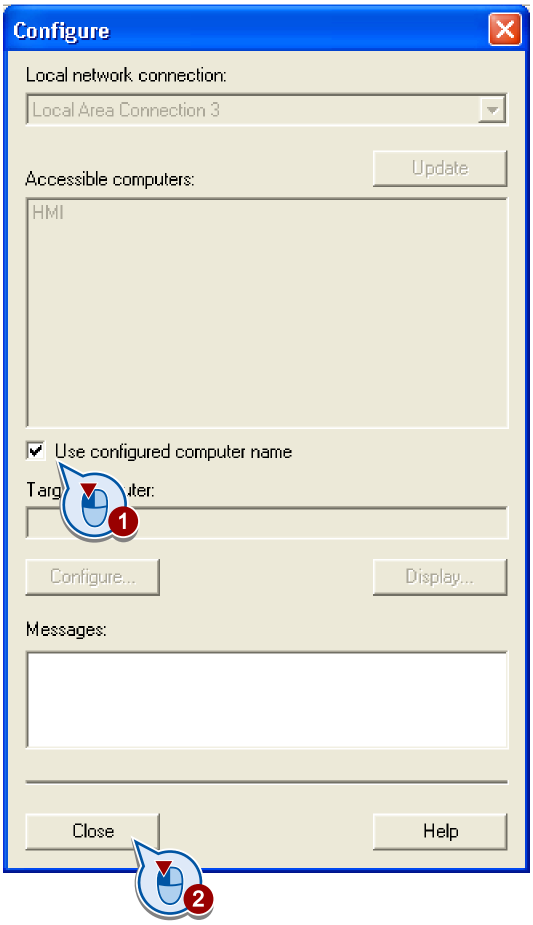
- You have configured the hardware in the STEP 7 project.

Procedure

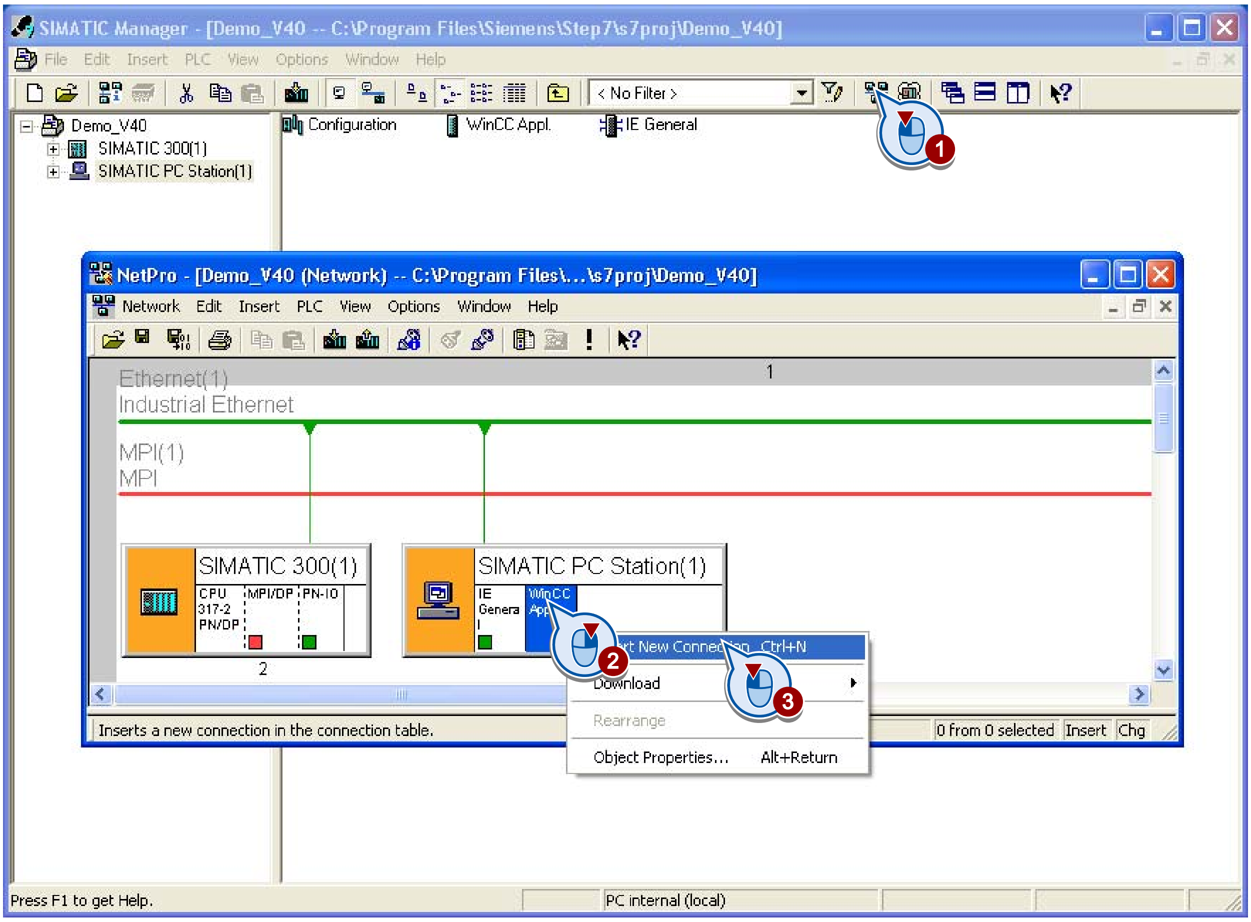
1. Start the configuration of the PC station.



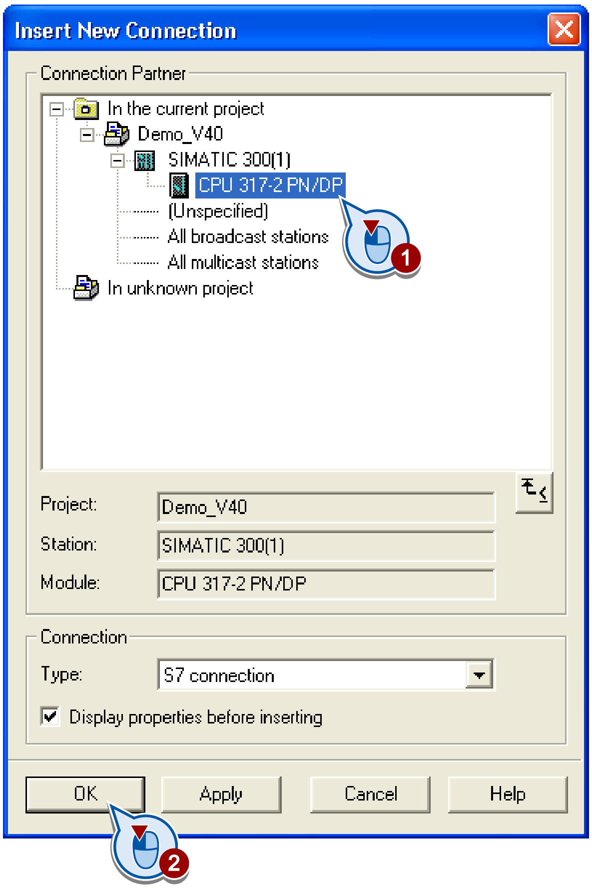
2. Select the "use configured computer name" setting.



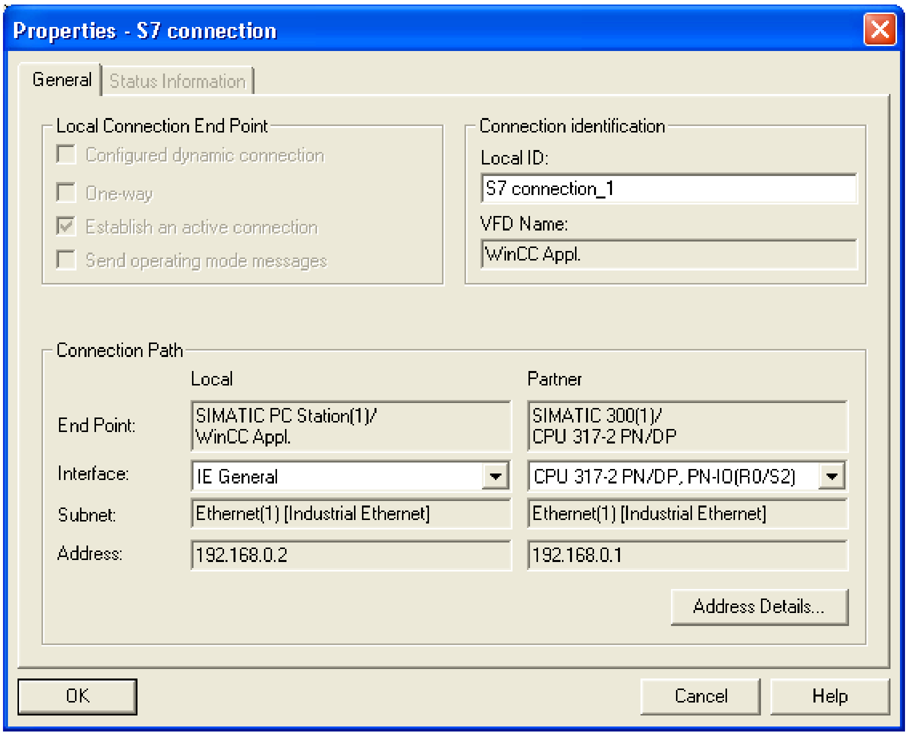
3. Start the "Netpro" editor and select "Insert new connection" in the shortcut menu of the WinCC application.



4. Create the S7 connection.

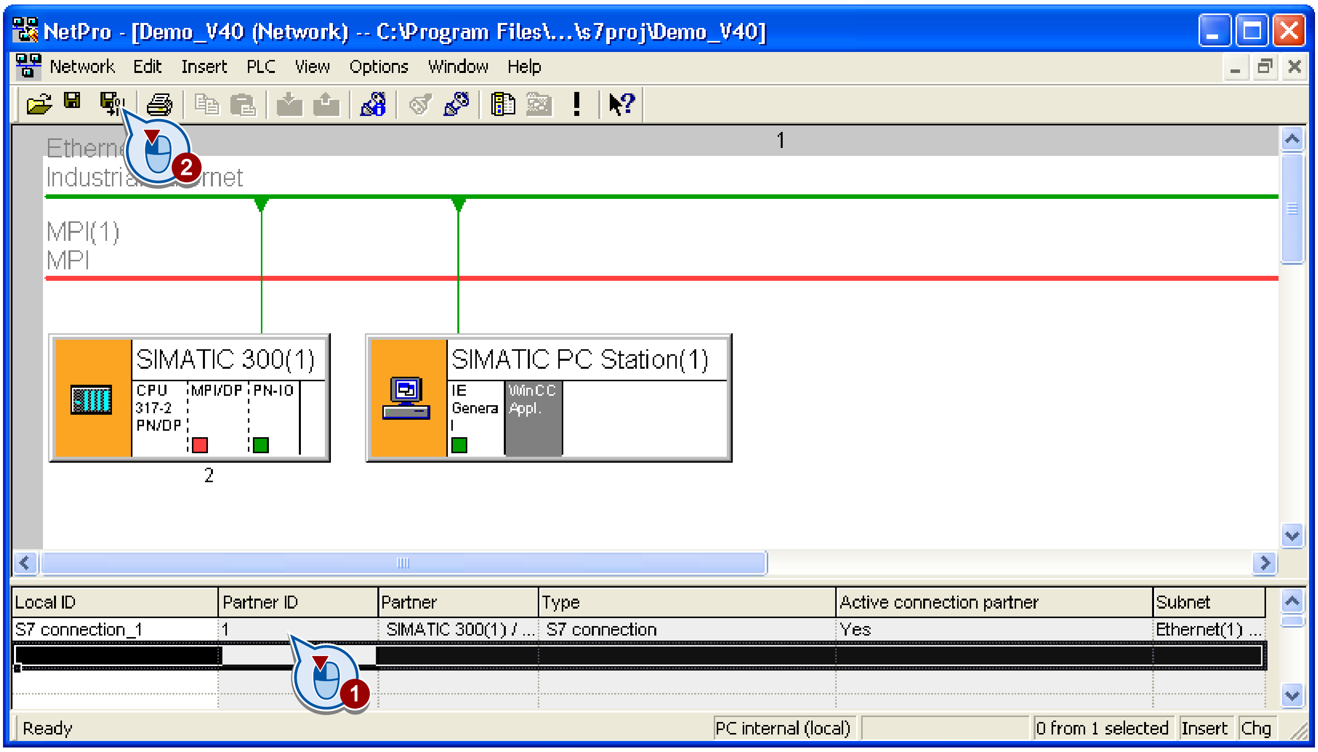


5. Check the settings of the S7 connection in the "Properties - S7 connection" dialog in the "Connection Path" area.



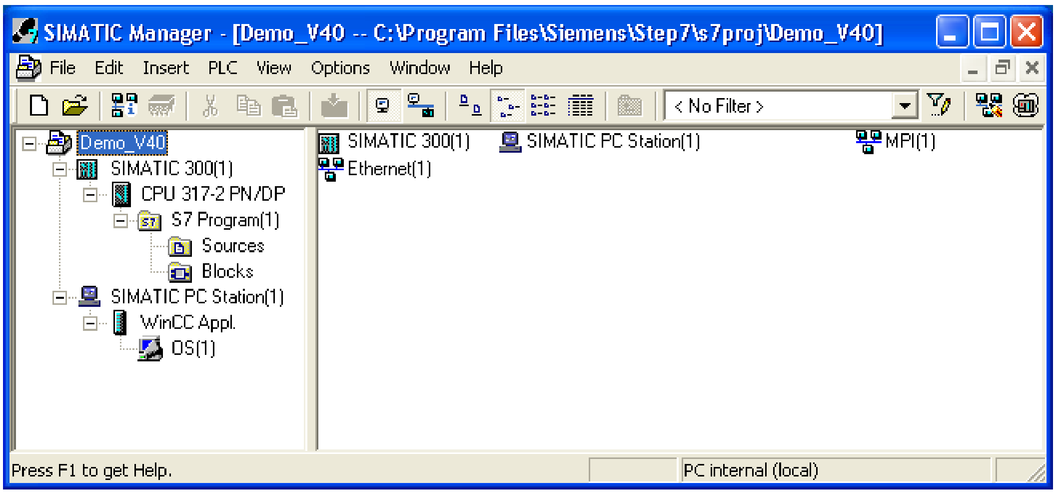
6. To complete configuration, click the "Save and Compile" icon in the toolbar and select "Compile and check everything".

   Make a note of the partner ID of the connection. The ID is required to configure communication with the user archives. It is written to the inputs ID_1 or ID_2 of the archive manager blocks PRE_UA_S / PR3_UA_S and PRE_UA_R / PR3_UA_R.



Result

You have created the "DEMO_V4" STEP 7 project.



2.3 Load powerrate blocks

2.3.1 Copying blocks from the powerrate library

Introduction

The SIMATIC powerrate library is installed in the same path as the STEP 7 basic software. The path suggested by default is C:\<Program Files >\Siemens\Step7\S7libs\powerrate.

The library contains a program folder for both the S7-300 and S7-400.

The folder contains the standard blocks and an example program that you can use as a template. The example programs for S7-300 and S7-400 have the same structure.

Copying the blocks into an existing project

If you are working with an already existing STEP 7 project, only copy the required blocks from the powerrate library. They are primarily the function blocks "PRE_..." or "PR3_..." as well as the functions "PRx_CALC" and "PRx_FIFO_IO".

Using the CEMAT library

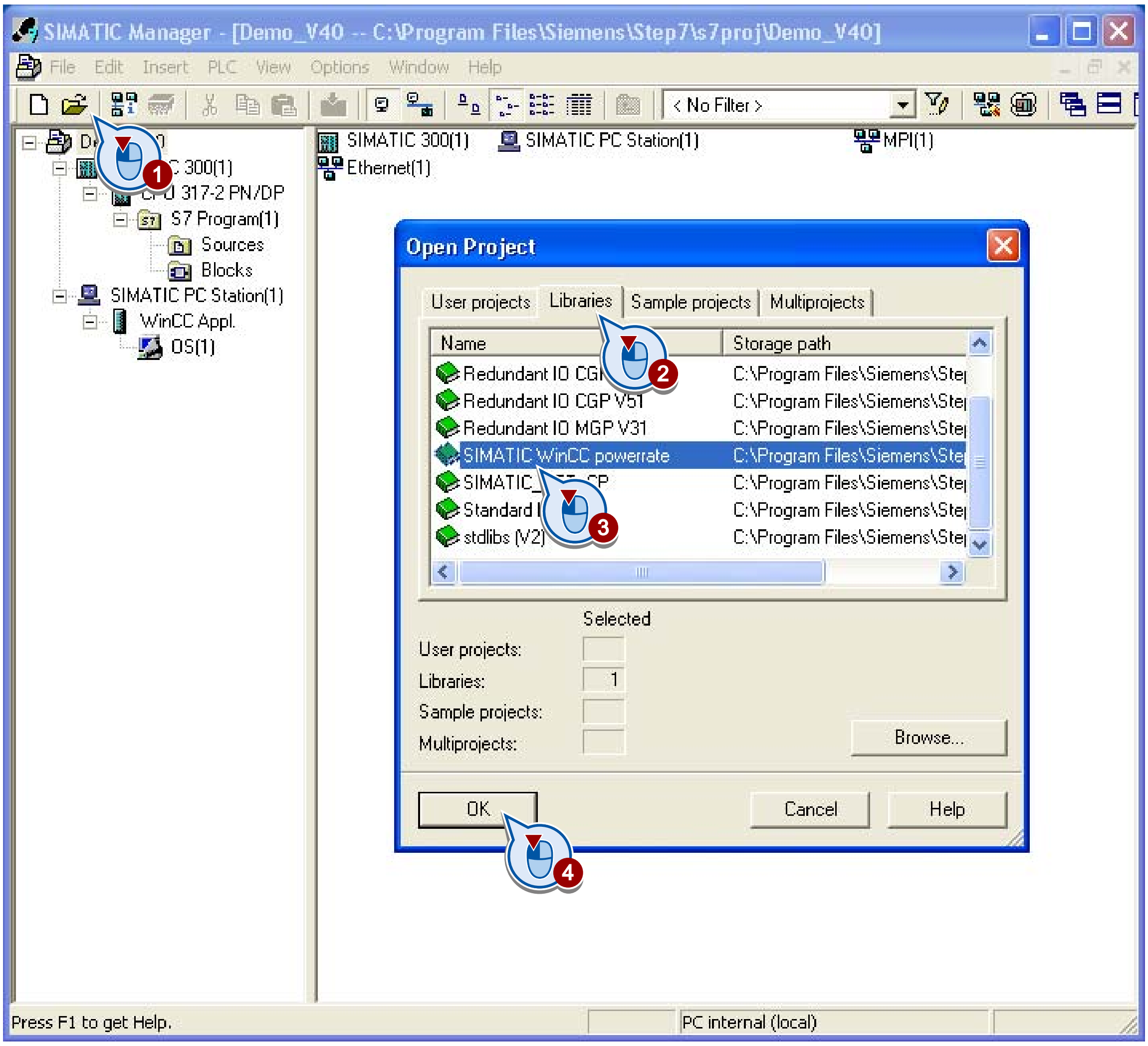
If you use the CEMAT library, you need to rename the "FC1061" and "FC1062" functions. These numbers are also used by the powerrate library and otherwise will be overwritten. You can find information on changing block names and rewiring under "Changing block numbers (Page 220)".

Note

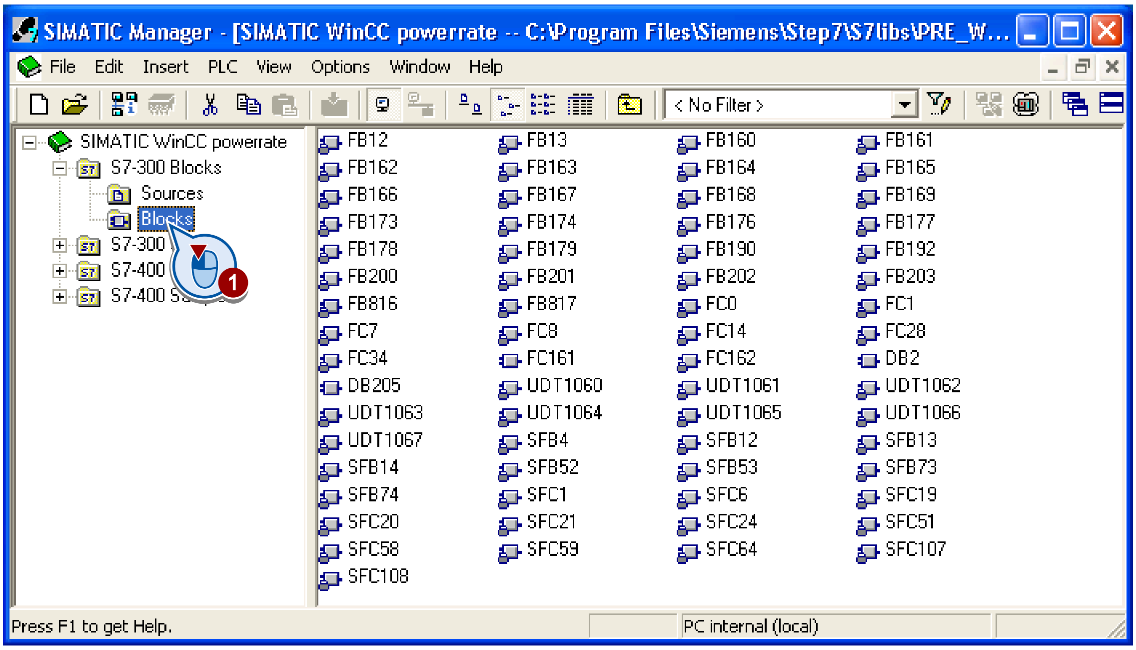
The CEMAT library is not included in the powerrate block library.

Procedure

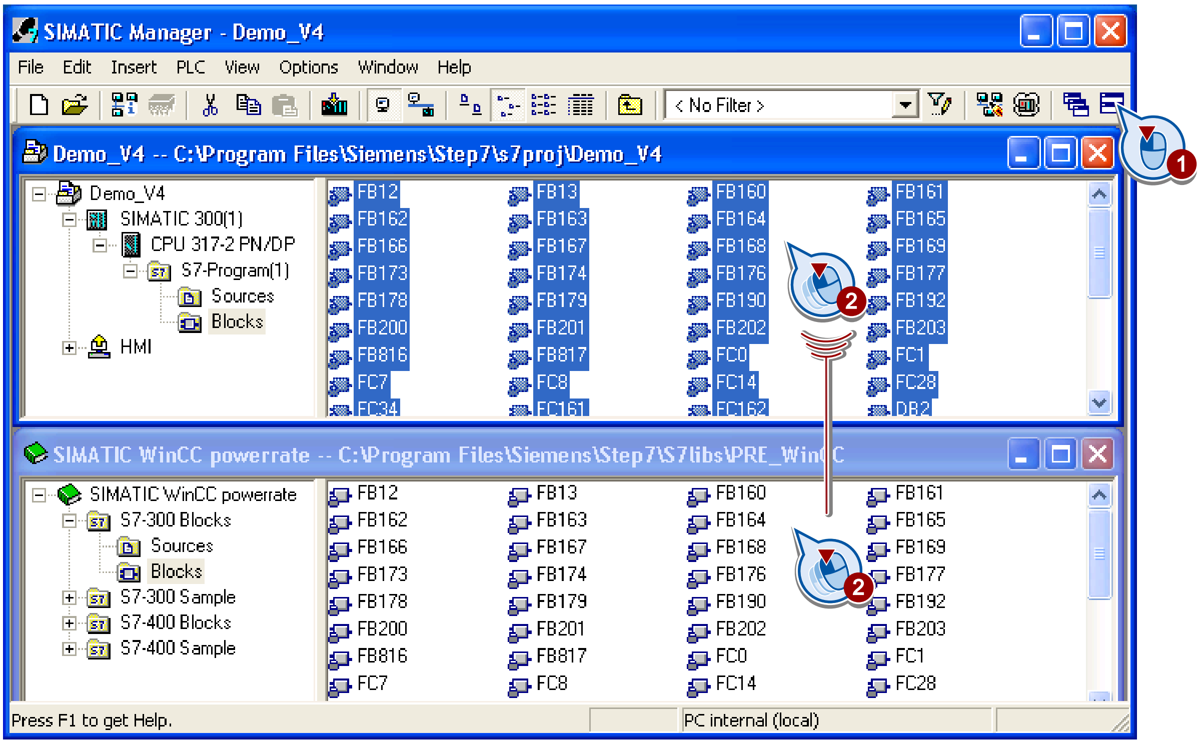
1. Open the powerrate block library.


SIMATIC Manager - [Demo_V40 -- C:\Program Files\Siemens\Step7\s7proj\Demo_V40]
File Edit Insert PLC View Options Window Help
< No Filter >
CPU 317-2 PN/DP
S7 Program(1)
Sources
Blocks
SIMATIC PC Station(1)
WinCC Appl.
OS(1)
SIMATIC 300(1)
SIMATIC PC Station(1)
MPI(1)
Ethernet(1)
Open Project
User projects
Libraries
Sample projects
Multiprojects
Name
Storage path
Redundant IO CGP V51
Redundant IO MGP V31
SIMATIC WinCC powerrate
stdlibs (V2)
C:\Program Files\Siemens\Ste
Selected
User projects:
Libraries:
1
Sample projects:
Multiprojects:
Browse...
OK
Cancel
Help
Press F1 to get Help.
PC internal (local)
1
2
3
4

2. Select the block directory.

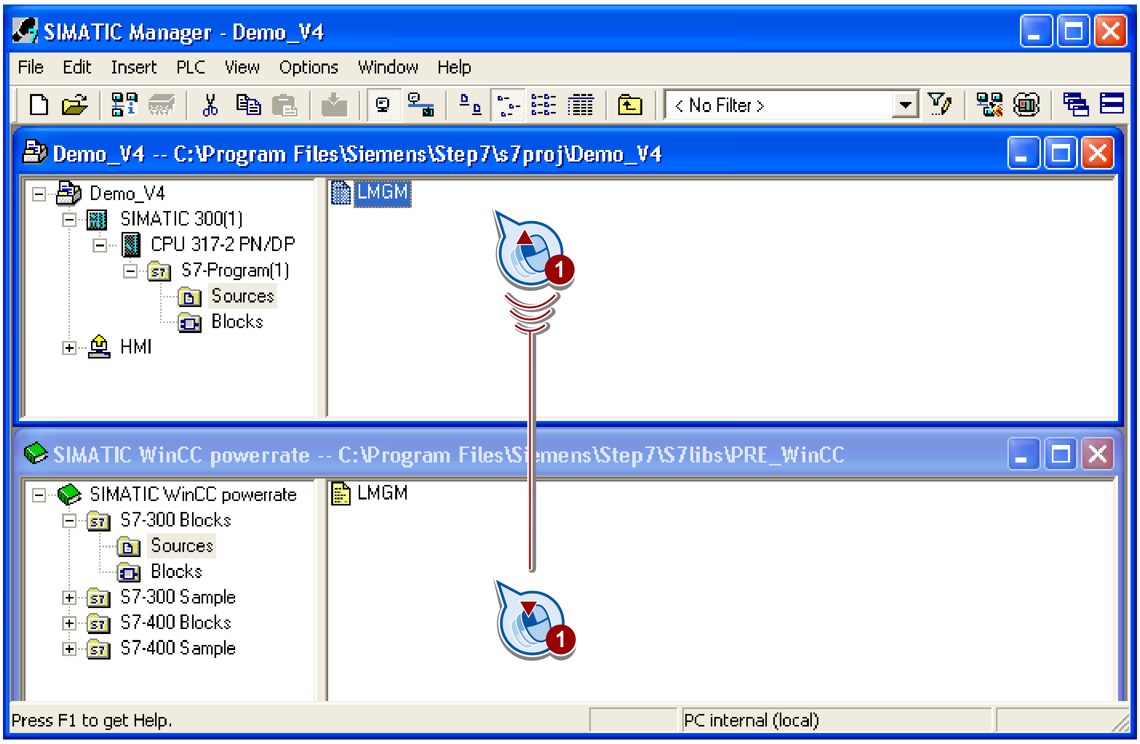


3. Copy all the blocks for S7-300 or S7-400 from the powerrate library into your project.



4. A message is displayed, informing you that the source has to be recompiled. Confirm the message with "Yes".
5. Copy the "LMGM" STL source from the SIMATIC powerrate library into your project.

   The "LMGM" function is required for configuring load management.



6. Close the SIMATIC WinCC powerrate library.
7. Check the parameter assignment of the blocks.

   For additional information on this topic, refer to Important inputs and IDs (Page 215).
8. Adapt the "ID_1" to the connection ID from NetPro for the archive manager PRE_UA_S / PR3_UA_S andPRE_UA_R / PR3_UA_R blocks.

See also

Configuration basics (Page 17)

Important inputs and IDs (Page 215)

Downloading blocks to the controller and PC station (Page 50)

2.3.2 Downloading blocks to the controller and PC station

Introduction

After configuration, download the S7 program to the PLC.

Then download the configuration to the PC station.

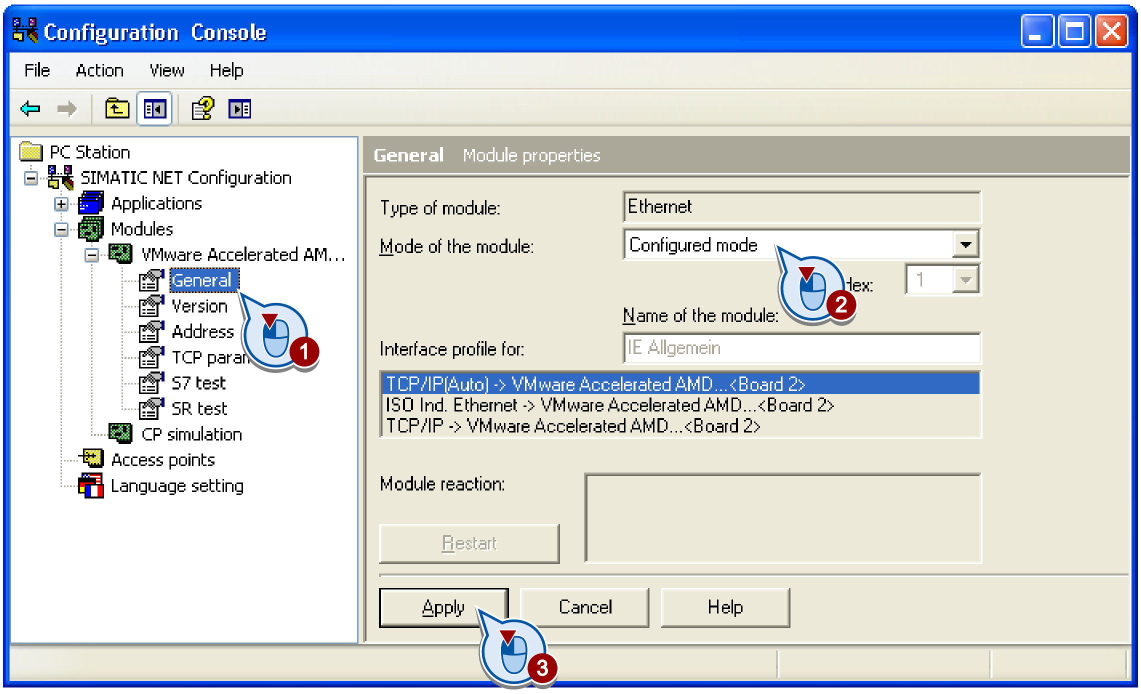
Requirements

- The name of the PC station is the same as the computer name of your PC.

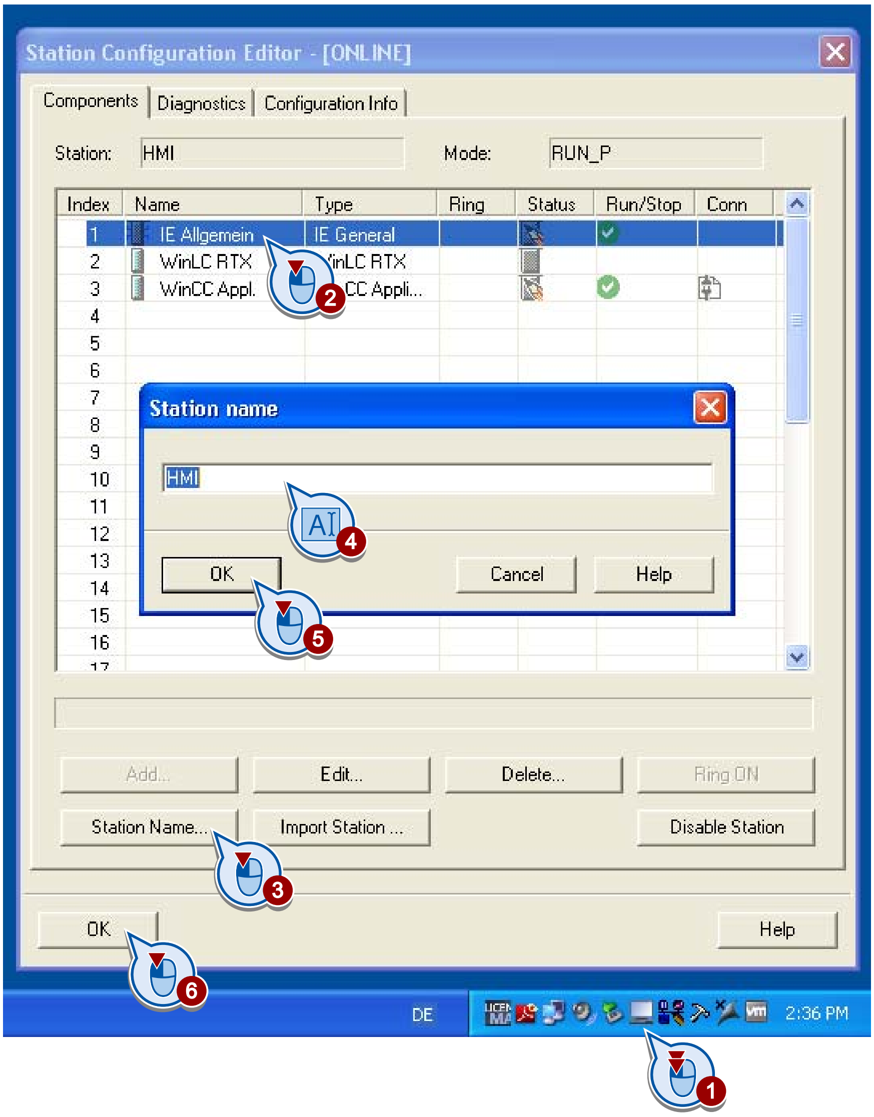
  To display the computer name, open the system properties, for example, using the key combination <Windows-Logo+Pause>.
- The S7-300 or the S7-400 is linked to the configuring PC.

Procedure

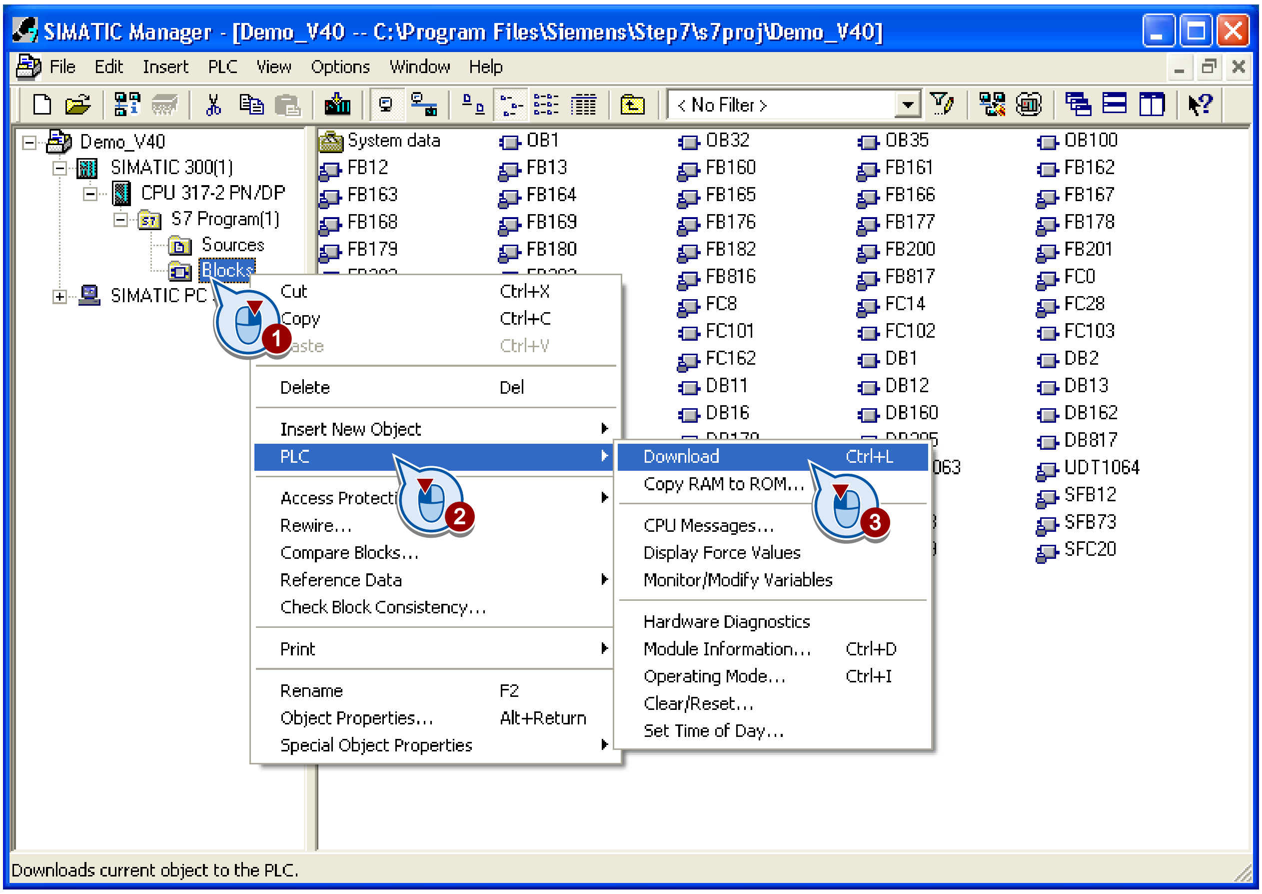
1. To assign parameters to the network adapter, open the SIMATIC NET configuration console "Set PC station".
2. Select your network adapter under "Modules" and select the operating mode "Configured mode" mode under "General".



3. Open the Component Configurator to check the station name of the PC station.

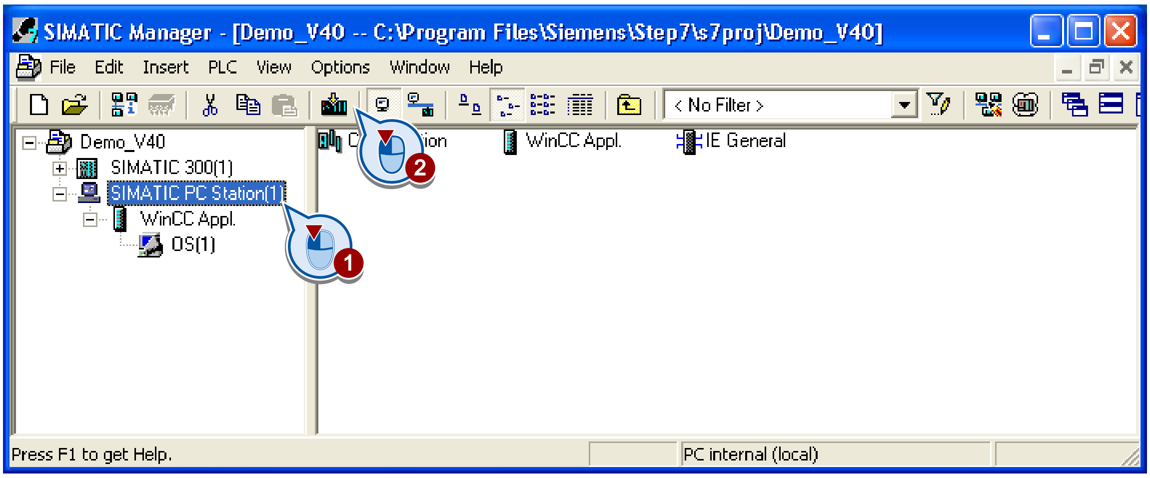


4. Download the S7 program to the PLC.



5. In the status bar of the SIMATIC Manager, check whether your PG/PC interface is set to "PC internal (local)".

   Download the configuration to the PC station.



See also

Copying blocks from the powerrate library (Page 46)

Changing block numbers (Page 220)

2.4 Creation and configuration of WinCC projects

2.4.1 Compiling the OS

Introduction

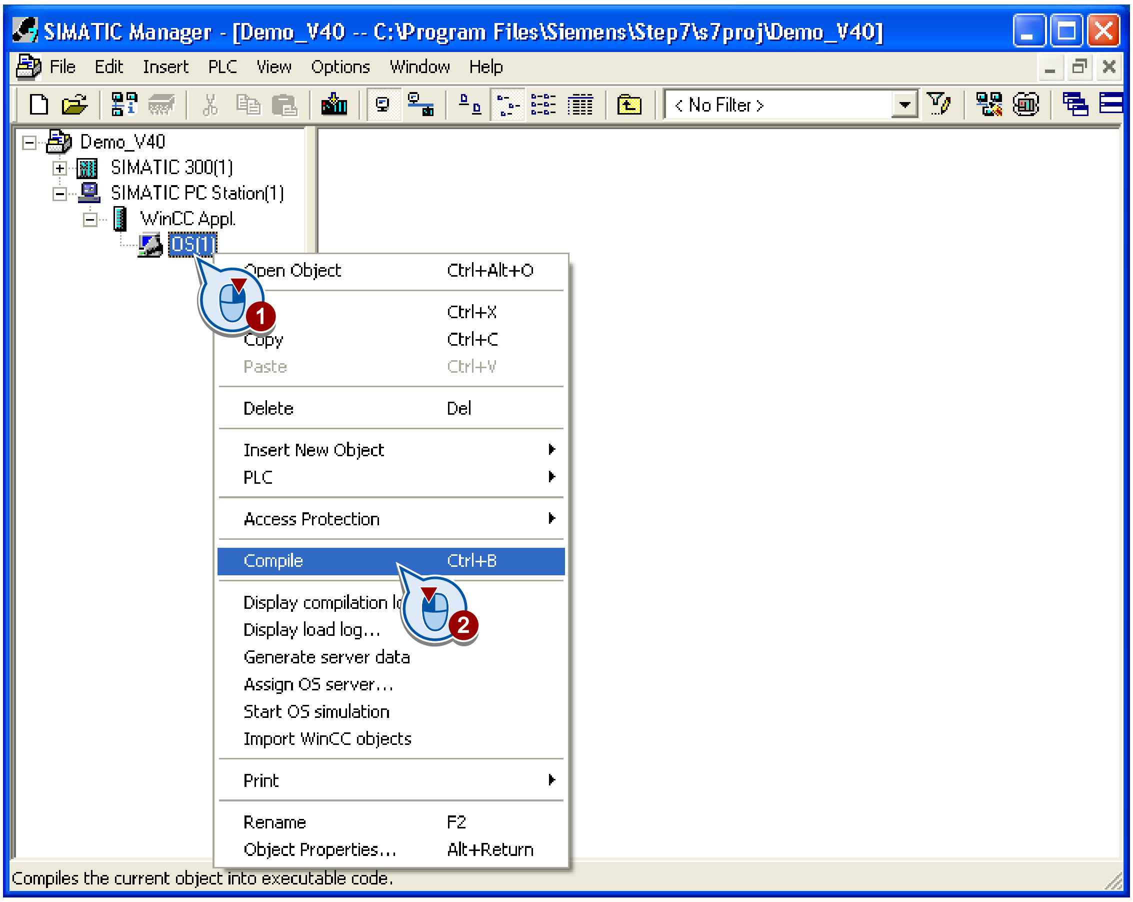
The compilation wizard is used to transfer the data for all the selected operator stations to a WinCC project.

During compilation of the OS, you transfer the required data to the WinCC project:

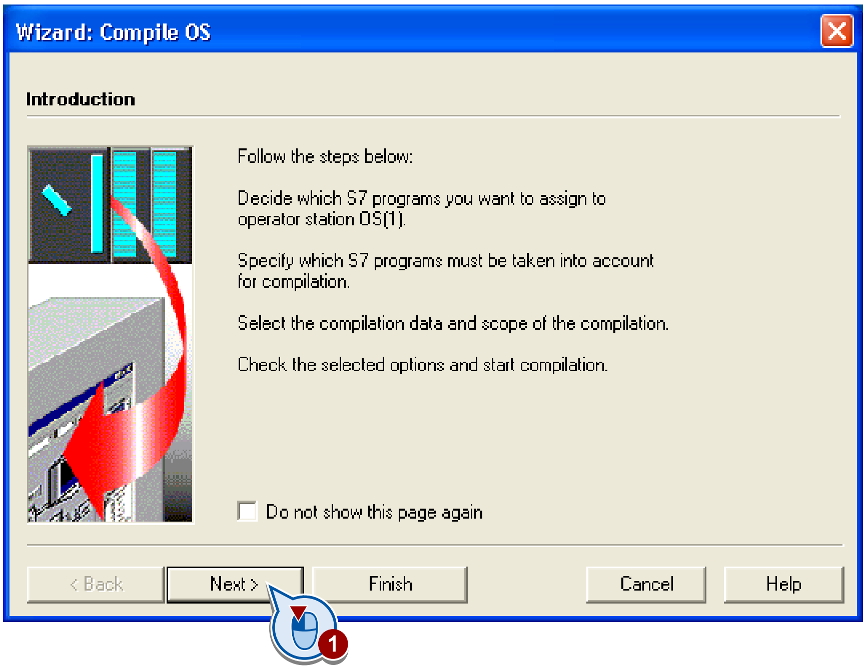
- External tags are created.
- Messages are created. Message class and message type are not yet valid, however.
- Template process pictures are copied. The WinCC process pictures are created in the WinCC Explorer with the OS Project Editor.

Procedure

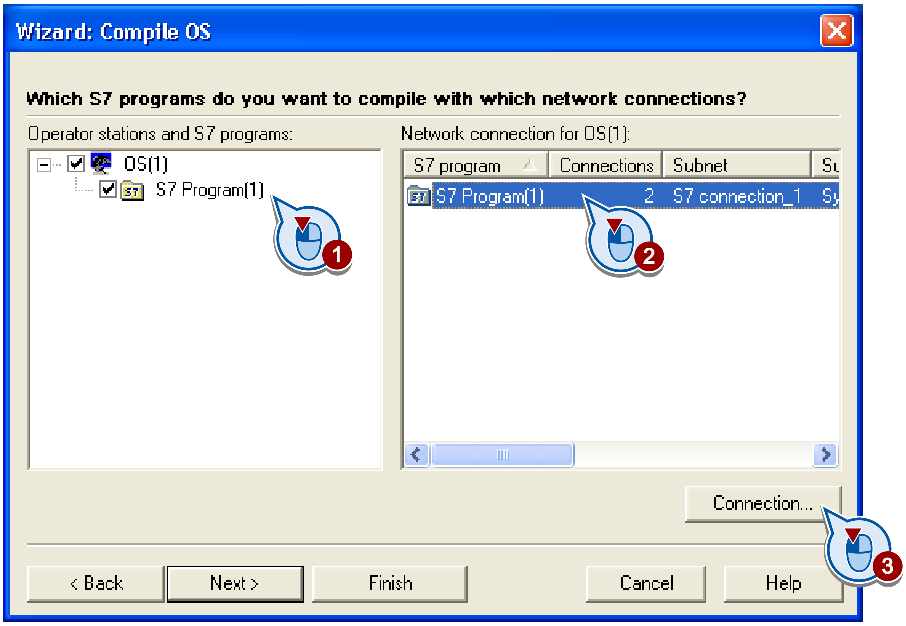
1. Open the "Compile OS" wizard.



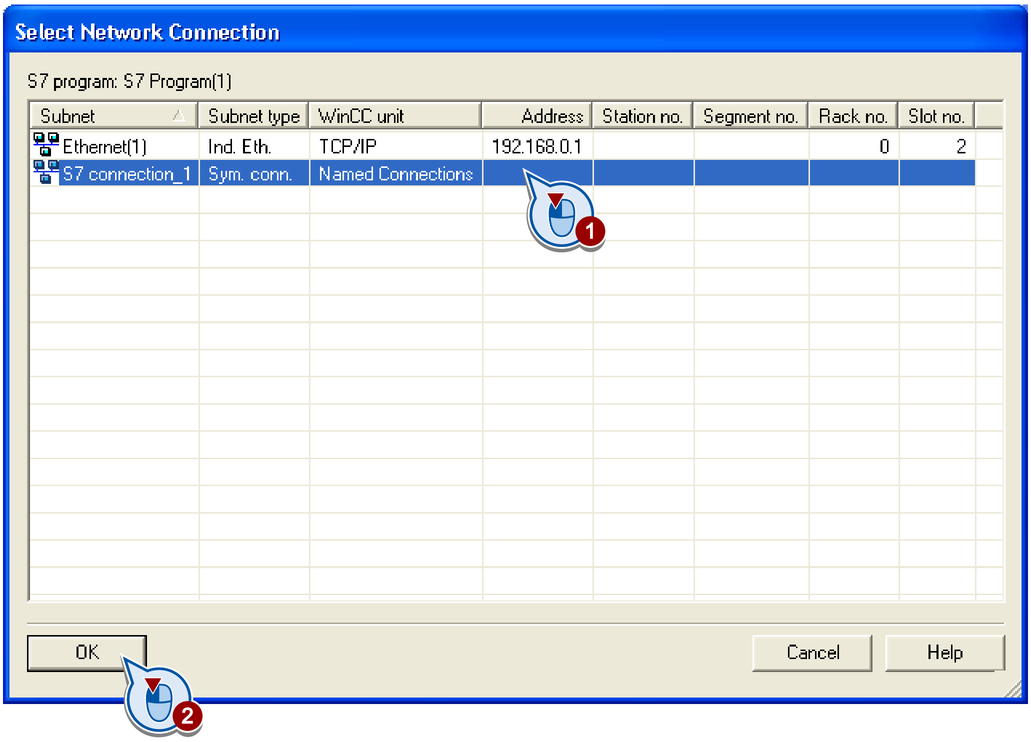
2. Confirm with "Next".



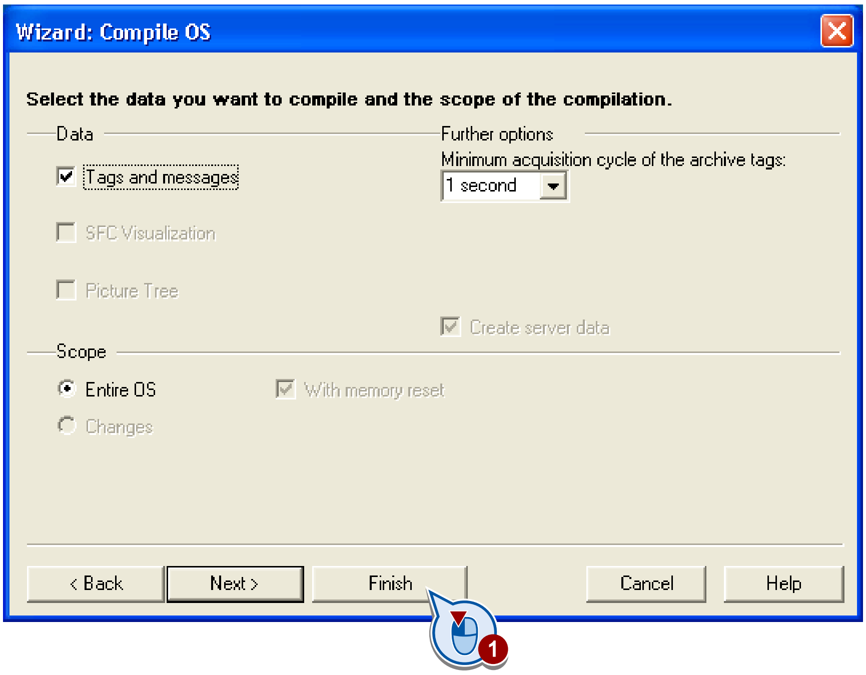
3. Select the network connection and open the "Select network connection" dialog".



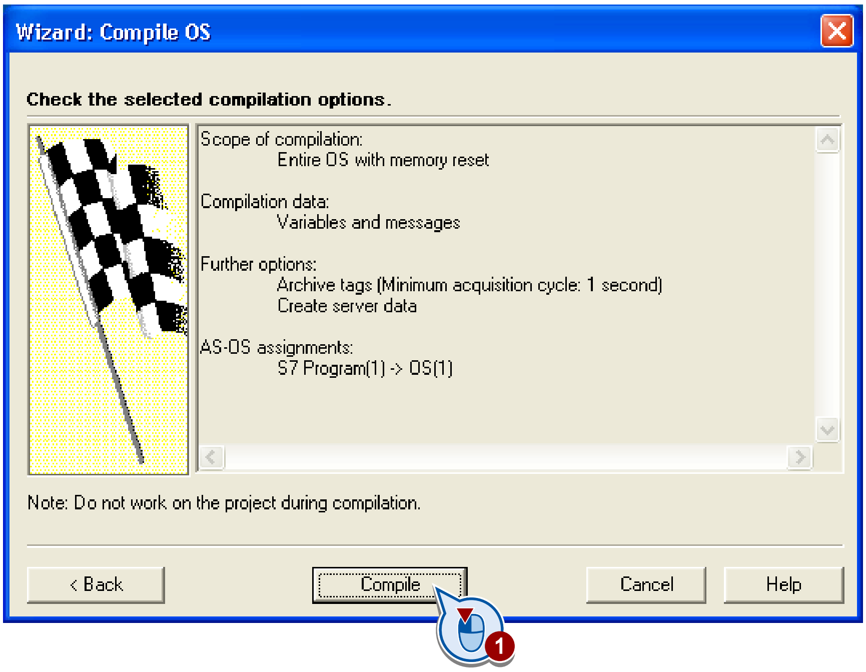
4. Select the S7 connection.



5. Confirm with "Next" and select the scope of compilation.

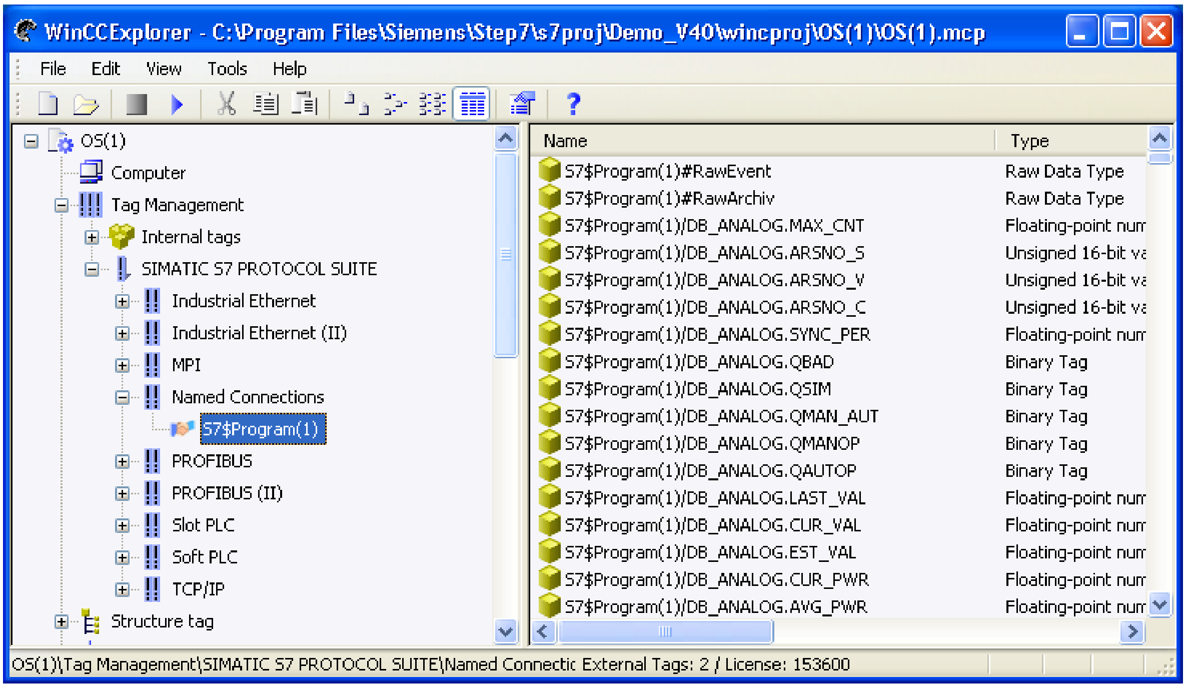


6. Start compilation.



Result

You have created a process communication channel and transferred all the relevant tags to WinCC.



2.4.2 Running the OS Project Editor

Introduction

When running the OS Project Editor, create the process pictures and specify typical settings for the WinCC project.

When working in an integrated environment, the OS Project Editor must be run at least once. The message classes and message types are adapted.

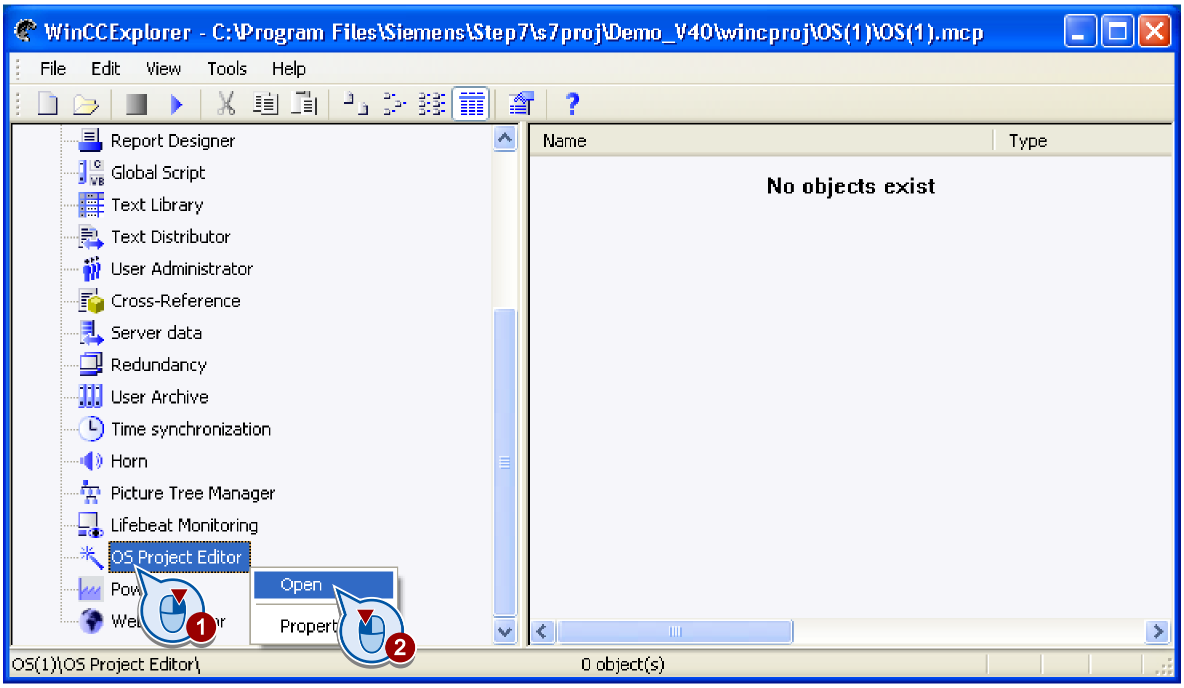
Use on a computer without Basic Process Control

If you want to use the project on a computer without Basic Process Control, you have to run the OS Project Editor once on the WinCC server.

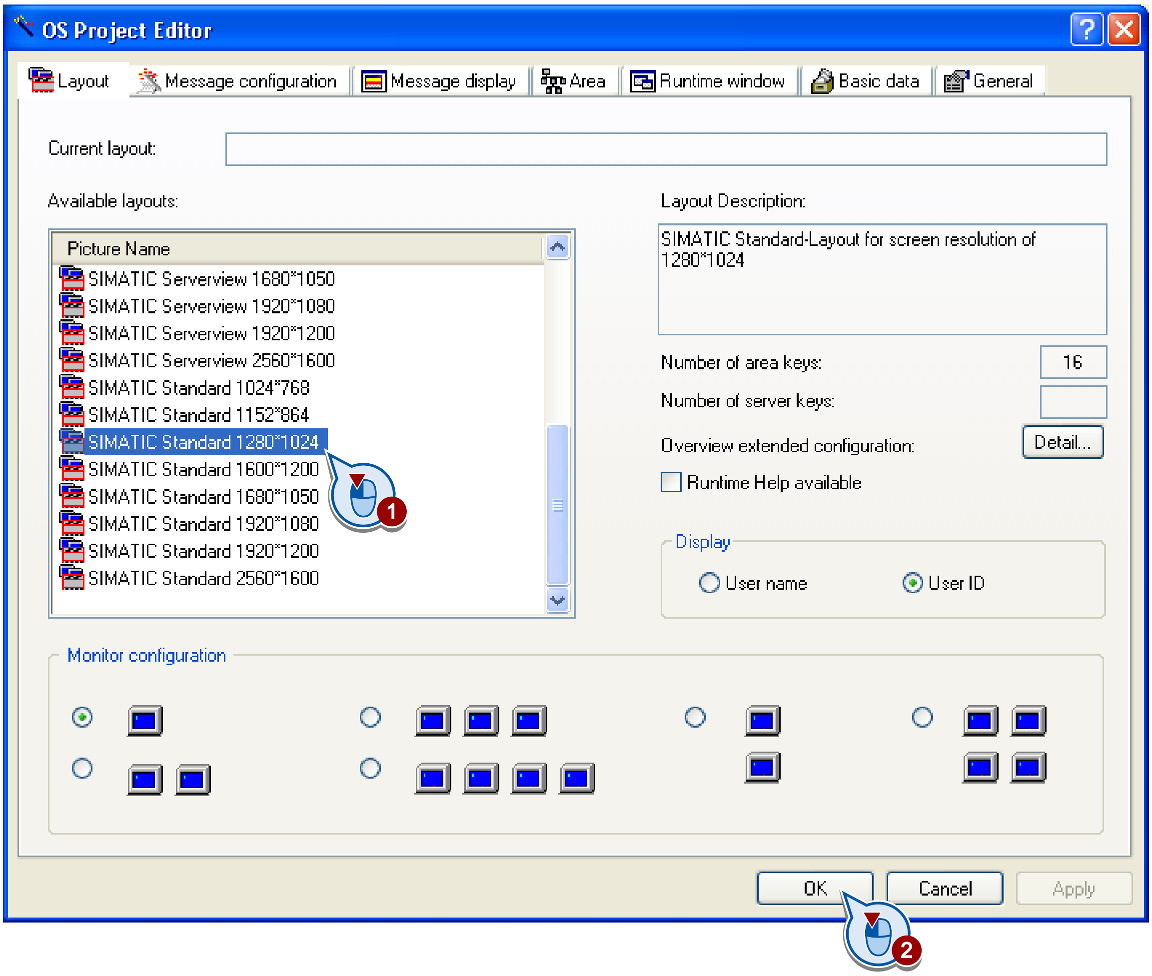
Procedure

1. Start the WinCC Explorer and open the STEP 7 project.

   To start the WinCC project in the SIMATIC Manager, select the "Open object" command from the shortcut menu of the OS.
2. Open the OS Project Editor.



3. Select the required layout and start the OS Project Editor.



2.4.3 Configuring a WinCC project without Basic Process Control

Introduction

You can also use SIMATIC powerrate on a computer on which Basic Process Control is not used.

However, you make the basic settings for the message system on a computer with the OS Project Editor, which is included as a component in Basic Process Control.

NOTICE
Checking the settings in the OS project editor
If the settings are not set correctly by running the OS Project Editor, a WinCC project is reconfigured into a project with Basic Process Control.
Always let the OS Project Editor run with the setting "Only message configuration".

Client/server systems and distributed systems

To ensure that all components run in Runtime, Basic Process Control must be installed on the clients and servers in the system. If you use powerrate in a client/server system, you have to configure the operator authorizations on the WinCC client.

Alarm logging

The following requirements apply to configuration:

The OS Project Editor has to run once to make the following configurations:

- In Alarm Logging, user text blocks are created according to Basic Process Control.
- User text blocks are configured in the messages.
- Alarm classes are created according to Basic Process Control.
- Operator input messages are created (according to structure for operator input messages in Basic Process Control).

Operator authorizations

The Operator authorizations must be created according to the configuration with Basic Process Control. Among those required are operator authorizations "5: Process controlling" and "6: Higher process controlling".

Block icons

Using faceplate types

You use a different template process picture in a WinCC project without Basic Process Control. The process picture contains no user objects, only WinCC faceplate types.

WinCC OnlineTrendControl

Configure the "ReturnPath" property for the configuration of the WinCC OnlineTrendControl.

For additional information see the description of the process screen "@PCS7_Trend.pdl" under "Faceplates in WinCC process pictures (Page 74)".

WinCC Gauge Control as icon template

Because you cannot use ActiveX controls in faceplate types, the template picture contains the WinCC Gauge Control as an example. This control is shown as an example of how to configure a pointer instrument.

Faceplates

Copy the picture windows "PRE_TOP01" and "PRE_TOP02" from the template picture into each process picture. The C script for opening the faceplate is not protected, which means you can adapt the name of the picture window in the script as required.

Differences to faceplates with Basic Process Control:

- You can only open one faceplate at a time with the associated loop display with the supplied C script. This C script is not protected, which means the user can change the function.
- Operator authorizations are not checked for each area. The appropriate authorization must be issued to the process picture to realize the areas.

Procedure for single-user systems and WinCC server

1. Open the OS Project Editor in the WinCC Explorer.
2. In the "General" tab, select the "Only message configuration" option.
3. Start the OS Project Editor with "OK".

   The settings of the message system are configured.
4. Copy the files in the "..\WinCC\powerrate\faceplates" folder to the "GraCS" folder in your WinCC project.

   You only use these pictures and templates if you are configuring without Basic Process Control.
5. Open the process pictures in which powerrate faceplates are to be called.
6. Copy the picture windows "PRE_TOP01" and "PRE_TOP02" from the template picture "@Template_pre.pdl" .
7. Copy the required icons from the template picture "@Template_pre.pdl".
8. Configure the inserted icons using the Dynamic Wizard "Link a prototype to a structure".
9. Run the powerrate Wizard.

Configuring operator authorizations on WinCC clients

1. Open the User Administrator in WinCC Explorer on the WinCC client.
2. Assign users the required authorizations.

Result

The WinCC project is configured so that it can run without the process picture structure of Basic Process Control.

Next, call the powerrate Wizard to create the required tags and archives.

2.4.4 The powerrate wizard

Introduction

As of SIMATIC powerrate V4.0, the powerrate Wizard carries out the following configurations for the WinCC project:

- Configuration of process value archive
- Configuration of user archives for load management
- Configuration of user archives for batch-related energy measurement
- Creating and configuring raw data tags and internal tags
- Creation and configuration of C scripts

You start the powerrate Wizard on the WinCC server to read the configuration of the powerrate components from WinCC and STEP 7. The wizard then generates the objects required in WinCC from this configuration data.

Created objects

The powerrate Wizard creates the following objects that you had to manually create or copy prior to SIMATIC powerrate V4.0.

Some objects can only be used for the PLC S7-400 or S7-300. Objects with the names "PRE_" for S7-400 and "PR3_" for S7-300 are created accordingly.

Raw data tags:

- tagname/DB_ARCHIVE/rawdata
- tagname/DB_RCV/DATA
- tagname/DB_SEND/DATA

Internal tag:

- Text tag, 8-bit character set "pre_inf"

C scripts:

- Global Script actions:
  - pre_Reports.pas
  - PRE_AR_SND.pas / PR3_AR_SND_B.pas / PR3_AR_SND.pas
  - PRE_UA_R.pas / PR3_UA_R.pas
  - PRE_UA_S.pas / PR3_UA_S.pas
- Global Script Standard Function:
  - PR3_SetDiff_UTC_Localtime.pas
    (only required for S7-300)

Process value archive

- pre

  The process-controlled archive tags are also created with the process value archive:
  - tagname.S
  - tagname.V
  - tagname.C

Process tags

- tagname/DB_ANALOG.S
- tagname/DB_ANALOG.V
- tagname/DB_ANALOG.C
- tagname/DB_CALC.S
- tagname/DB_CALC.V
- tagname/DB_INTEGER.S
- tagname/DB_INTEGER.V
- tagname/DB_INTEGER.C
- tagname/DB_PULSE.S
- tagname/DB_PULSE.V

User archives

Depending on the interface language, the user archives are created in German or English when the powerrate Wizard is run.

- PRE_LMGM_CONFIG_1 / PR3_LMGM_CONFIG_1
- PRE_LMGM_LIM_1 / PR3_LMGM_LIM_1
- PRE_LMGM_PRIO_1 / PR3_LMGM_PRIO_1
- PRE_SUMC_1

See also

Diagnostics of the powerrate wizard (Page 71)

2.4.5 Run powerrate wizard

Introduction

You use the powerrate Wizard to create the necessary archives, tags, and C scripts in your WinCC project. Note the following in this regard:

- Illegal characters in tag names / block names
- Units for energy and power in user archives for load management
- Import of default priority list for user archives for load management
- Duplicate C actions and display of C actions
- Language switching of the WinCC user interface language

NOTICE
Preventing inconsistencies
Changes to the data created and configured by the powerrate Wizard may result in inconsistencies in data management. This may affect the functioning of the powerrate Wizard.
Avoid making changes to the components created by the powerrate Wizard.

Permitted characters in tag names / block names

Do not use special characters in tag names and block names.
Only use the following characters and numbers:

- a ... z
- 0 ... 9
- "_" or "-" for separators

"@" is reserved for system tags.

User archives for load management

Units for energy and power

The user archives contain the unit for the energy or power to be monitored in the columns for energy and power parameters. By default, "kWh" or "kW" is entered in these columns.

If you use different units, change the text in the columns accordingly.

Importing a default priority list

Using a default priority list for load management in the user archives may result in an error due to performance reasons. Import is then not possible.

In this case, you can carry out import manually. The files for the import of the priority list are located in the WinCC installation directory "...\WinCC\powerrate\config".

ANSI C actions (Global Script)

Refreshing a display

After the wizard has run, the display of the C actions may not be refreshed.

To refresh the display and display all the C actions in the project, close the WinCC Explorer.

Duplicate C actions

If you are using powerrate in an already existing project, there may be some duplicate C actions after the first execution of the wizard. The wizard assigns fixed names to the C actions, which may differ from the names selected by the user.

Delete the original C actions in the Global Script C Editor to ensure that only the C actions created by the wizard exist.

If you have changed the trigger times in the existing C actions, apply the changes to the newly created C actions.

Language Change

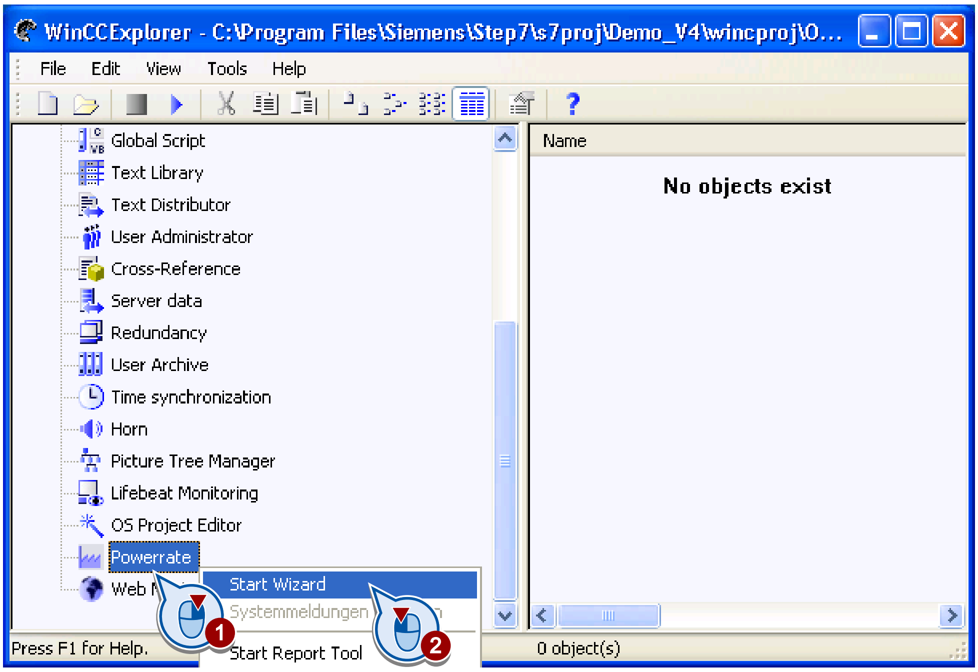
If you change the WinCC user interface language, the original language continues to be displayed in the Wizard. In order to switch from German to English, for example, close the WinCC Explorer and start it again.

Requirements

- "Compile OS" was executed.
- The OS project editor has been run.
- All WinCC editors and STEP 7 editors are closed.
- The WinCC project is deactivated in Runtime.
- The data in STEP 7 and WinCC are consistent.

Procedure

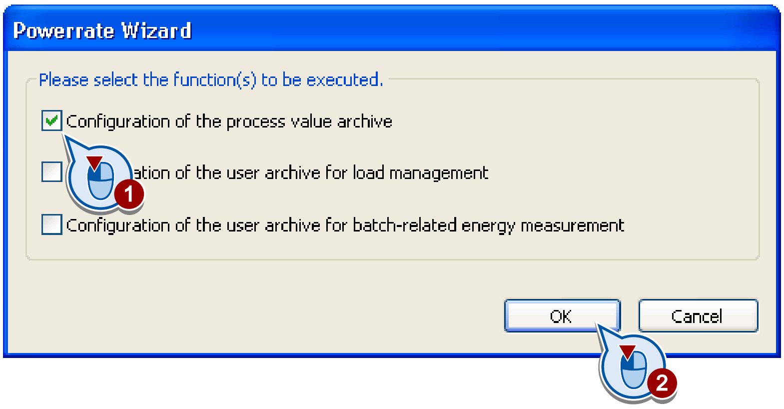
1. After installation of powerrate, the WinCC Explorer contains the entry "Powerrate". Select the "Start" command in the "Powerrate" shortcut menu.



2. Select the required actions:
   - Configuration of process value archive
   - Configuration of user archives for load management
   - Configuration of user archives for batch-related energy measurement.

   You can select one or more options.

   The "Configure process value archive" option must be run for every new configuration.
3. Confirm your selection with "OK".



The powerrate Wizard runs and automatically configures all the required powerrate components in the WinCC project.

Note

For performance reasons, use the PR3_AR_DATA_B block to send archive data whenever possible.

Result

The data required for SIMATIC powerrate is created in the WinCC project.

You can configure the process pictures, process value archives and user archives.

The powerrate wizard reports any errors after execution. For information on this topic, refer to "Diagnostics of the powerrate wizard (Page 71)".

See also

Applying changes in the STEP 7 project with the powerrate wizard (Page 69)

2.4.6 Applying changes in the STEP 7 project with the powerrate wizard

Introduction

If changes are made to the STEP 7 configuration, you have to restart the wizard.

The powerrate Wizard then updates the configuration data of the WinCC project.

Proceed step-by-step when you apply the changes in STEP 7. If you change the name of the S7 program or project name, start powerrate Wizard as the first step. Change the configuration in your project or in the blocks as the second step.

CAUTION
Data loss when changing tags and IDs Changing tags or IDs in the STEP 7 project may result in data loss when you run the powerrate Wizard. The existing archive tags and archives are deleted and created again if changes are made to the following blocks or inputs: • PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA: Input AR_EVID • PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND: Input AR_EVID • PRE_SUM / PR3_SUM: Inputs ARSNO_C / ARSNO_S / ARSNO_V • PRE_LMGM / PR3_LMGM: Input ARCH_ID • PRE_SUMC / PR3_SUMC: Input ARCH_ID **Solution** Back up your archive data before starting the powerrate wizard.

Requirements

- All WinCC editors and STEP 7 editors are closed.
- The WinCC project is deactivated in Runtime.

- The data in STEP 7 and WinCC are consistent.

  The following data may not be changed after creation by the powerrate Wizard:

  – C actions

  – Raw data tags for the archive data link
- The S7 program name, project name and the parameters of the AS blocks cannot all be changed at one time.

Applying changes to the STEP 7 project

Start the powerrate Wizard in the "powerrate" shortcut menu in WinCC Explorer.
Select the archives which you want to update.

The powerrate Wizard runs and carries out a change generation in WinCC.
Only the changed components are changed, added or deleted in the WinCC project.

The powerrate Wizard reports any errors after execution. For information on this topic, refer to "Diagnostics of the powerrate wizard (Page 71)".

Note

Reaction to non-transferable changes

If the change to a component cannot be applied in the WinCC project, the component is deleted in the WinCC project and created again.

Creating configuration data again

When the powerrate Wizard is running, it creates a configuration file in the path of the WinCC project:

- ..\powerrate\config\PRE_Config.xml

Which objects were created and configured is documented in this file.

If you want to create one of these objects again, delete the XML file and run the powerrate Wizard again. This may be possible in the following cases, for example:

- A component created by the powerrate Wizard has been deleted.
- A C script created by the powerrate Wizard was subsequently changed and no longer runs.
- A raw data tag created by the powerrate Wizard was subsequently changed and can no longer be used.

Creating PRE_Config.xml

You can create all powerrate configuration data again:

1. Rename the PRE_Config.xml file as a backup file.
2. Delete the components created by the powerrate wizard which were subsequently changed.
3. Start powerrate Wizard. Activate the required options.

The configuration data and the file PRE_Config.xml are created again.
The archives are also created again.

If necessary, check the diagnostics file.

See also

Run powerrate wizard (Page 66)

2.4.7 Diagnostics of the powerrate wizard

Introduction

The powerrate Wizard reports any errors after execution. These error messages are stored in a log file in the diagnostics folder of the WinCC installation directory:

- ..\WinCC\diagnose\PRE_Config_YYYYMMDD.log

The table lists the error messages, their meaning and appropriate solutions.

To correct problems, it may be necessary to edit the configuration file "PRE_Config.xml" of the powerrate Wizard. Instructions can be found under "Applying changes in the STEP 7 project with the powerrate wizard (Page 69)".

Log file messages

Message	Meaning	Action
No message when you run the Wizard for changes in the STEP 7 project. The changes in the STEP 7 project could not be applied.	The changes could not be applied. Maybe the changes were not detected due to changes in configuration data in the WinCC project.	Check whether the block tags are created in WinCC.
Error, User archive 'PR3_LMGM_PRIO_1' could not be queried: Error 1004, hr=0xC0048004	The default values were not written to the user archive. Possible cause is reduced performance when writing.	Import the files manually. They are located in the WinCC installation path "...\WinCC\powerrate\config".
Error, Data not completed for inst type <block>; inst name <instance data block>	The instance data block is not fully configured.	Edit the specified instance data block or the call of the specified block and restart the powerrate Wizard.
Error, Error in APConnect: E1= 0x00000003 ; E2= 0x00000000 ; There is no connection to the script control. Possibly no connection setup took place. (bRet), File:.\WinCCConnection.cpp, Line:2693	No connection to WinCC project.	Open the WinCC project.
Error,Instance <Block> of type <type> with ARCH ID ist not unique	There are multiple instances of the ARCH_ID input for the block type or block group, for example, for the LMGM blocks.	Check and correct the ARCH_ID of the block groups used for all controllers in the project.
Error, No tag logging process variables for <Data block> could be created. No assigned <type> variable found	No tags were created WinCC.	In the SIMATIC Manager, check if the "Operating and monitoring" object property is enabled for the block.
Error,SubNo<Subnumber> was already used for variable<tag name>	Duplicate subnumbers ARSNO_S, ARSNO_C or ARSNO_V have been created.	Check and change the subnumbers. The subnumbers must be unique within a PLC.

See also

The powerrate wizard (Page 63)

Run powerrate wizard (Page 66)

2.4.8 Creating process screens

Introduction

After the OS Project Editor is run, all the faceplates which you require for your WinCC project are located in the project path in the folder "GraCS".

The block icons of powerrate are located in the process picture "@Template_pre.pdl". You can copy the required block icons from the template picture and use them in your process pictures.

Creating process pictures

For the configuration of powerrate, copy the required block icons from the template to a process picture of your WinCC project. You configure the faceplates with the Dynamic Wizard.

You can use the pictures created with the OS Project Editor or you can create your own process pictures.

Open the Graphics Designer editor in the WinCC Explorer. Create a new process picture, or open an existing one.

Additional information regarding the creation and editing of process pictures can be found in the WinCC Information System under "Working with WinCC > Creating process pictures".

Configuring faceplates for Runtime

To display the values of a block in Runtime, carry out the following steps:

1. Copy the corresponding faceplate from the template file to a WinCC process picture.
2. You connect the faceplate to a structure tag using the Dynamic Wizard.
3. Check whether the correct connection ID from NetPro is specified in the associated block as the input "ID_1".

This procedure is identical for all powerrate faceplates.

A sample configuration is shown in the following section using the example of the PR3_SUM block. See Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)

Set the object property "Operating and monitoring"

For the tags and messages to be created in WinCC, the "Operating and monitoring" object property must be activated for the instance data block of the HMI block. This property has already been set in the provided example.

If you want to set the object property manually or call new block instances, proceed as follows:

1. In the SIMATIC Manager, select the entry "Special object properties > Operating and monitoring..." from the shortcut menu of the instance data block.
2. Activate the option "Operating and monitoring" and confirm with "Save".

2.4.9 Faceplates in WinCC process pictures

Introduction

SIMATIC powerrate provides functional and tested faceplates as examples for the configuration. You can customize these faceplates to meet the needs of your project. You configure the faceplates with the Graphics Designer. If required, you can add additional user objects.

The Block description (Page 211) section shows you the faceplates and provides the information you need to customize the faceplates, for example, the interfaces of blocks and the control and display functions.

User rights for faceplates

User groups are created in each WinCC project and assigned specific user rights. You need appropriate authorizations to work with faceplates. To configure a faceplate, the user must be a member of the "SIMATIC HMI" user group. The rights of the "SIMATIC HMI Viewer" user group are sufficient for read access. For more information, refer to the WinCC installation notes under "Defining access authorization in operating systems".

Symbols

There is an icon for the following faceplates:

- Energy measurement blocks PRE_SUM / PR3_SUM
- Load management blocks PRE_LMGM / PR3_LMGM, PRE_LMGM_x / PR3_LMGM_x
- Switch blocks PRE_SWTCH / PR3_SWTCH
- Blocks for PAC devices PRE_PAC / PR3_PAC.

Group display / loop display

The group display is opened using the icon. A group display and a loop display with all required pictures is available for each of the following blocks:

- Energy measurement blocks PRE_SUM / PR3_SUM
- Switch blocks PRE_SWTCH / PR3_SWTCH
- Blocks for PAC devices PRE_PAC / PR3_PAC.

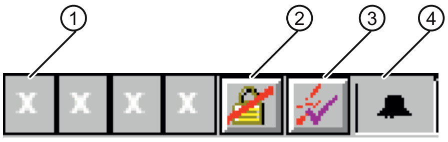
For additional information, refer to the WinCC online help, keyword "loop display".

Process picture"@Overview.pdl"

The picture is a component of the following basic pictures:

- @PG_PRE_xxx_OVERVIEW.PDL
- @PG_PR3_xxx_OVERVIEW.PDL
- @PL_PRE_xxx_OVERVIEW.PDL
- @PL_PR3_xxx_OVERVIEW.PDL

The picture contains the following buttons:



(1) Group display
(2) Message lock (MSG_LOCK)
(3) Message acknowledgment
(4) Message suppression (QMSG_SUP)

Process picture"@PCS7_Trend.pdl"

You can connect a faceplate to a trend.

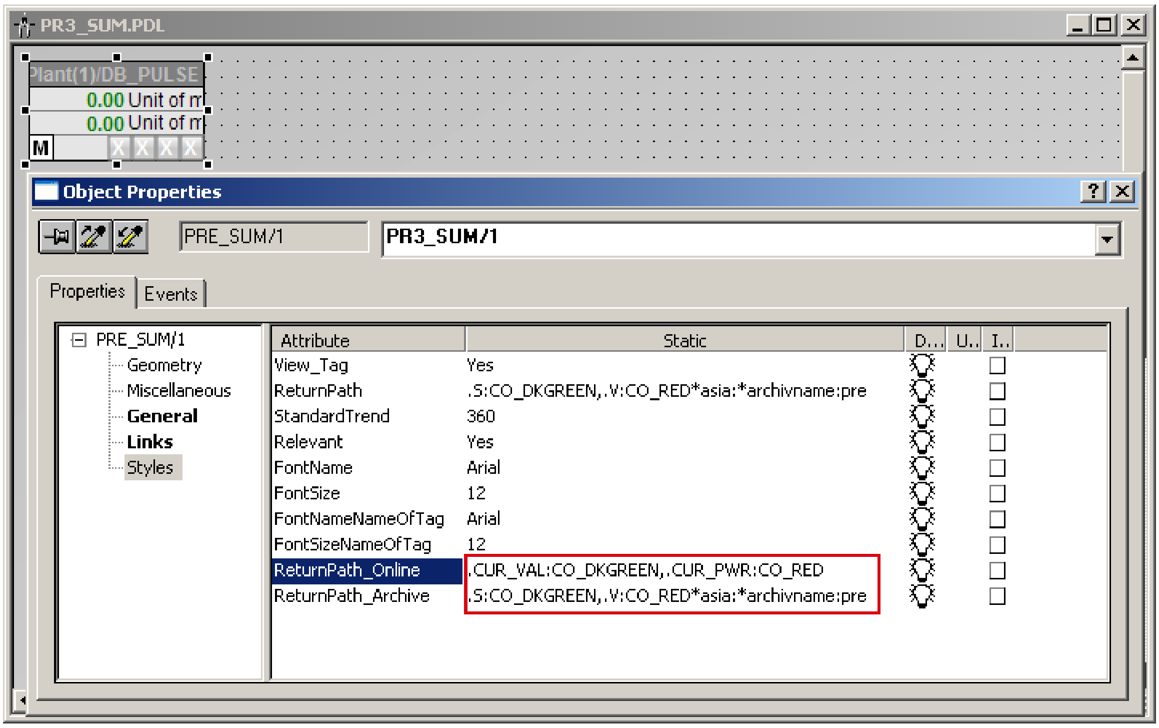
Using the WinCC OnlineTrendControl you can create additional trends for other types of display, for example, a comparison of a trend value over several time ranges.

To do this, configure the "ReturnPath" and "StandardTrend" properties at the icon.

	Parameters	Explanation
• StandardTrend	2	Online values with 5 min time axis
	> 2	Archive values with time axis of the value entered (in min)
• ReturnPath	.S	Structural element name starting with a full stop
	:	Separators
	CO_GREEN	Color for trend
		Add color to the structural element name for other trends (e.g. .S:CO_GREEN,.V:CO_RED)
	*asia	Skip the server prefix in the archive tag name
	:	Separators
	*archivname:pre	Archive name of pre-archive

Trend connection for the faceplate PRE_SUM / PR3_SUM

A dynamic selection is made for the PRE_SUM / PR3_SUM faceplate to determine whether the online values or archive tags are to be accessed. Configure each of the ReturnPath_Online properties for the online values or for the ReturnPath_Archive archive tags.



See also

Icons in WinCC process pictures (Page 77)

2.4.10 Icons in WinCC process pictures

Introduction

The diagrams of the block icons are schematic diagrams.

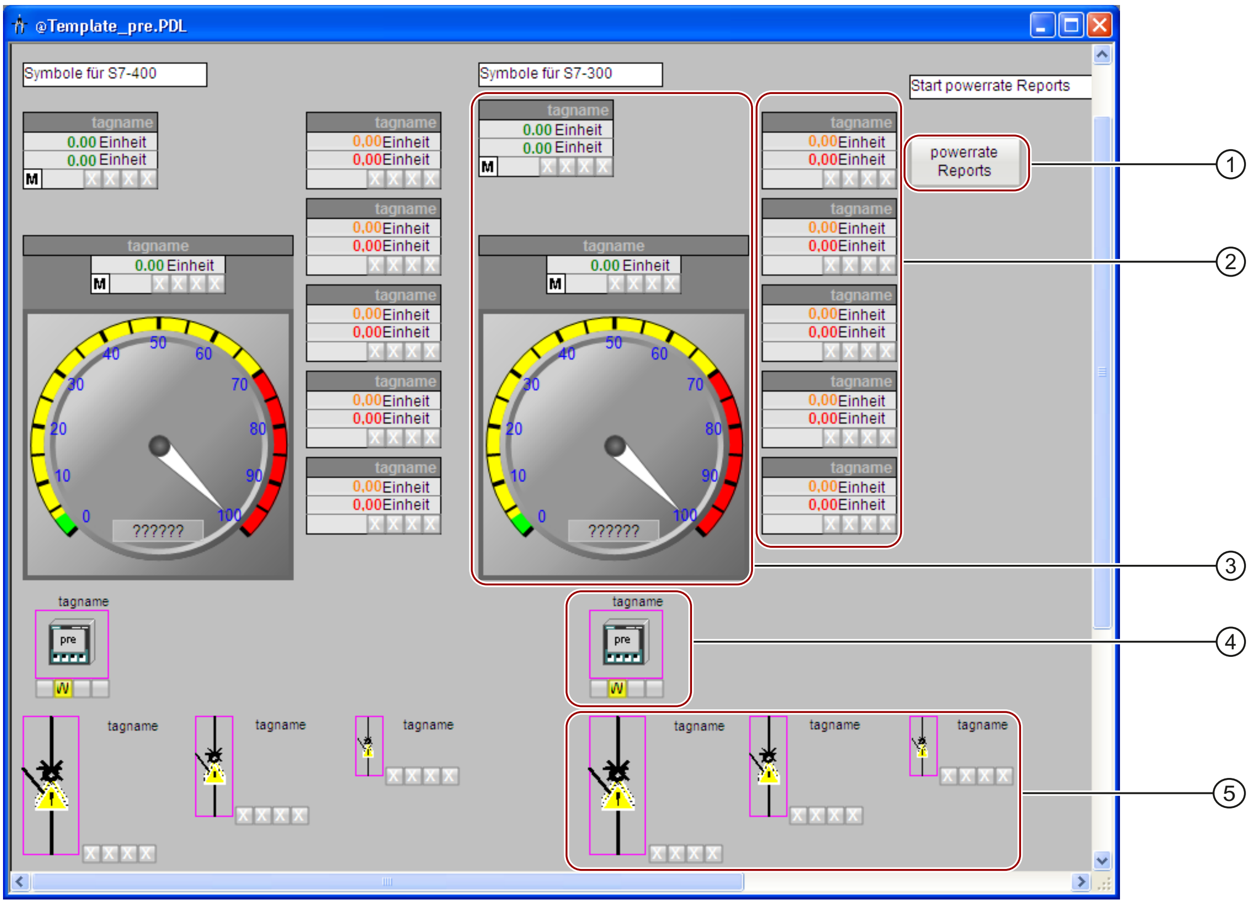
Templates @Template_PRE.pdl

The block icons are contained in the template picture @Template_PRE.pdl.

To be able to use the "Update block icons" function in the Graphics Designer, you have to copy the block icons of the @Template_PRE.pdl file into @Template.pdl.

There are different faceplates for S7-300 and S7-400. The S7-400 faceplates are used for WinAC RTX 2010.

Ensure that you copy the correct faceplate.



①	powerrate Reports	Button for opening the "powerrate Reports" editor
②	PRE_LMGM / PR3_LMGM	Visualization for load management
③	PRE_SUM / PR3_SUM	Visualization for acquisition of measured energy values
④	PRE_PAC / PR3_PAC	Visualization for the power monitoring devices, PAC3200 and PAC4200
⑤	PRE_SWTCH / PR3_SWTCH	Visualization for the general switches

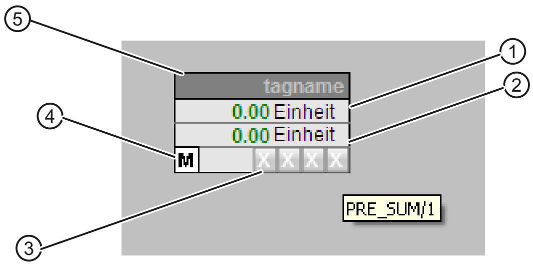
Different variants of block icons

There may be several variants of block icons for one measuring point. These variants are distinguished by the "type" attribute: The value of this attribute describes the variant. For example, if you look at a variant of the block icon for a measuring point for energy measurement, you will find the value "@PRE_SUM/2". You use the part of the value displayed after the "/" to control which variant of the block icon is used.

Connection to the measuring point

There is one icon for the various blocks that is linked to the associated measuring point using the Dynamic Wizard "Connect faceplate with measuring point" in the WinCC Graphics Designer.

The icons contain the following visible information:



① Current value, dependent on block type
② Current value, dependent on block type
③ Group display (EventState)
④ Manual/automatic mode (QMAN_AUT)
⑤ Tag name

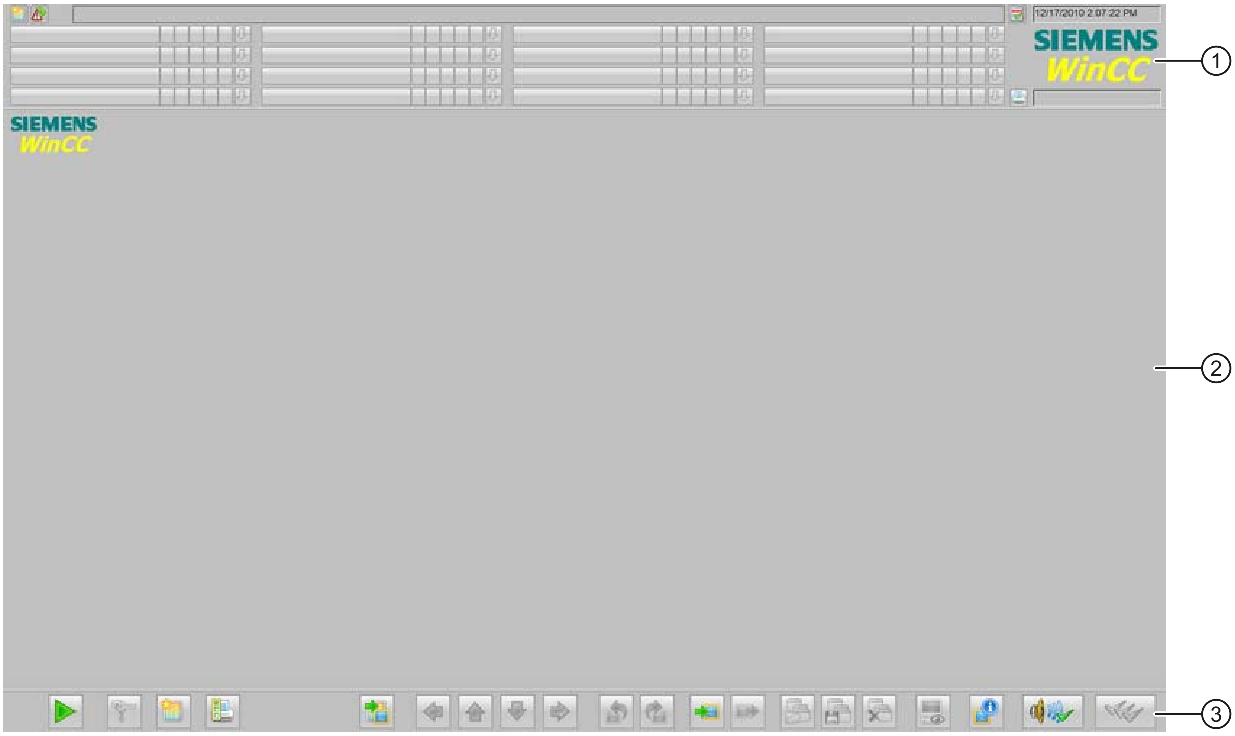
See also

Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)

2.4.11 Changing picture layout with Basic Process Control

Introduction

When you create process pictures with Basic Process Control, a special picture layout is created by default with the overview area, work area and a button area.



(1) Overview area
(2) Work area
(3) Button area

Changing the process picture layout

Proceed as follows to change the picture layout:

1. Make a backup copy of the configuration file.

   The configuration file named "<Layout name>.cfg" is located in the directory "..\WinCC\Options\<Layout name>. The layout name corresponds to the name of the layout selected in the OS Project Editor.
2. Open the configuration file.
3. Edit the graphic data or coordinates of the overview area, work area and button area and save the configuration file.
4. Run the OS Project Editor. This causes the modified layout to be accepted.

You can find additional information in the WinCC Information System under "Options for Process Control > Graphic Object Update Wizard > Structure of the configuration file".

Example of an unedited configuration file

```
[Coordinates]
MonitorWidth=1280
MonitorHeight=1024

OverviewFieldLeft=0
OverviewFieldTop=0
OverviewFieldRight=1280
OverviewFieldBottom=148
OverviewFrameWidth=4

WorkFieldLeft=0
WorkFieldTop=148
WorkFieldRight=1280
WorkFieldBottom=973
WorkFieldFrameWidth=4

ButtonFieldLeft=0
ButtonFieldTop=973
ButtonFieldRight=1280
ButtonFieldBottom=1024
ButtonFieldFrameWidth=4
```

(1) Overview area

(2) Work area

(3) Button area

Example of an edited configuration file

The button and overview areas are hidden in this configuration file.

```
[Coordinates]
MonitorWidth=1280
MonitorHeight=1024

OverviewFieldLeft=0
OverviewFieldTop=0
OverviewFieldRight=0
OverviewFieldBottom=
OverviewFrameWidth=4

WorkFieldLeft=0
WorkFieldTop=0
WorkFieldRight=1280
WorkFieldBottom=1024
WorkFieldFrameWidth=4

ButtonFieldLeft=0
ButtonFieldTop=0
ButtonFieldRight=0
ButtonFieldBottom=0
ButtonFieldFrameWidth=4
```

(1) Overview area

(2) Work area

(3) Button area

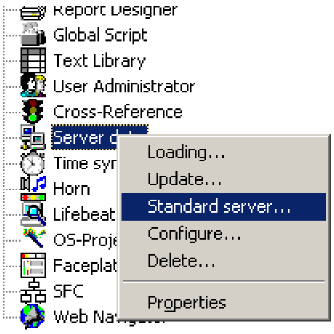
2.4.12 Use in a redundant system

Setting the standard server for an S7-400

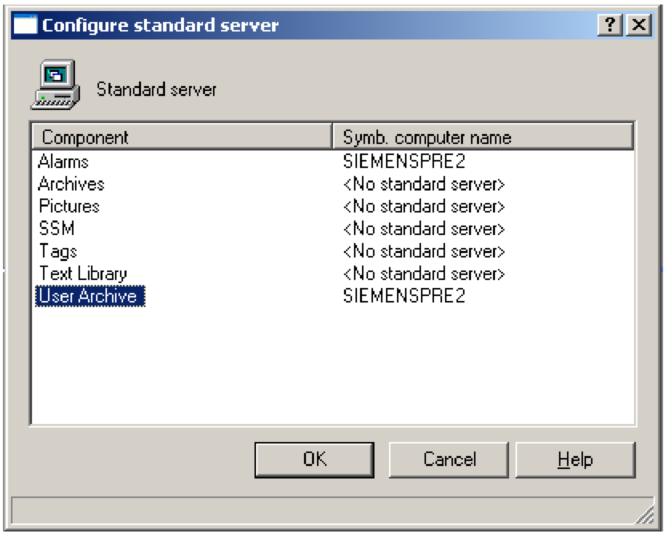
If you use SIMATIC powerrate in a redundant system, you must configure the standard server for the user archives.

Proceed as follows:

1. Select the command "Standard server" in the "Serverdata" shortcut menu of the WinCC Explorer.

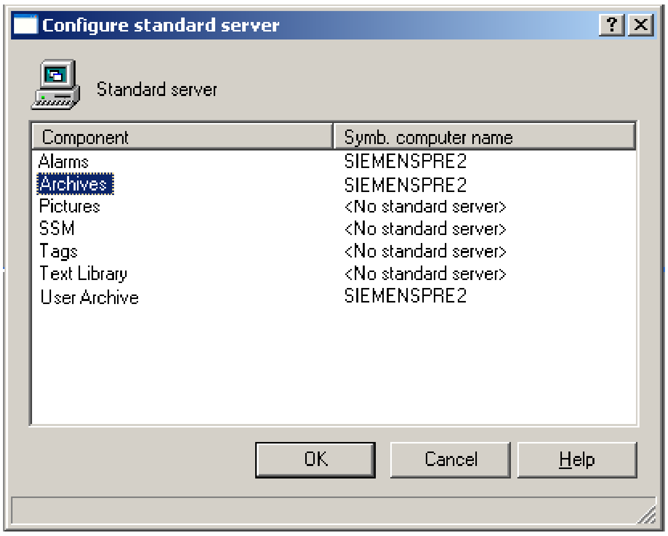


2. Set the standard server for the "User Archive" component.



Setting the standard server for an S7-300

If you are using an S7-300 and are using the block PR3_AR_DATA to send data, you must configure the standard server for the user archives and for the archives:



Note

For performance reasons, use the PR3_AR_DATA_B block to send archive data whenever possible.

If you use the PR3_AR_DATA_B block, you have to configure the standard server only for the user archive.

For additional information, refer to "Setting the standard server for a S7-400".

Deactivate redundancy

The "Redundancy" tag group is created in a redundant WinCC project.

If you disable redundancy in WinCC, you have to delete the "Redundancy" tag group from the internal tags.

2.4.13 Use with the WinCC/WebNavigator option

Introduction

You can also use SIMATIC powerrate with the WinCC/WebNavigator option.

Requirements

- You kept to the following sequence during installation:

  1. WebNavigator Server

  2. SIMATIC powerrate

  If you install SIMATIC powerrate on a Web server, the required plug-ins for the Web client are also installed.

Adapting WinCC projects

You need to adapt the WinCC projects to use the WinCC/WebNavigator option:

1. Select the "Web settings" command in the shortcut menu of the "Web Navigator" component in the WinCC Explorer.
2. In the "Compatibility" tab, select the "Picture name and path" option.
3. Install the powerrate Web plug-in on the Web client.

Result

You can access the icons and faceplates of SIMATIC powerrate via a Web client.

2.5 Configuring measurement points with PRE_SUM / PR3_SUM

2.5.1 The PRE_SUM / PR3_SUM block

Introduction

The PR3_SUM / PRE_SUM block is used to configure the measurement and processing of the energy values. The block is the interface to the operator station (OS).

The procedure using PR3_SUM is described in this section. The description also applies to PRE_SUM when an S7-400 is used.

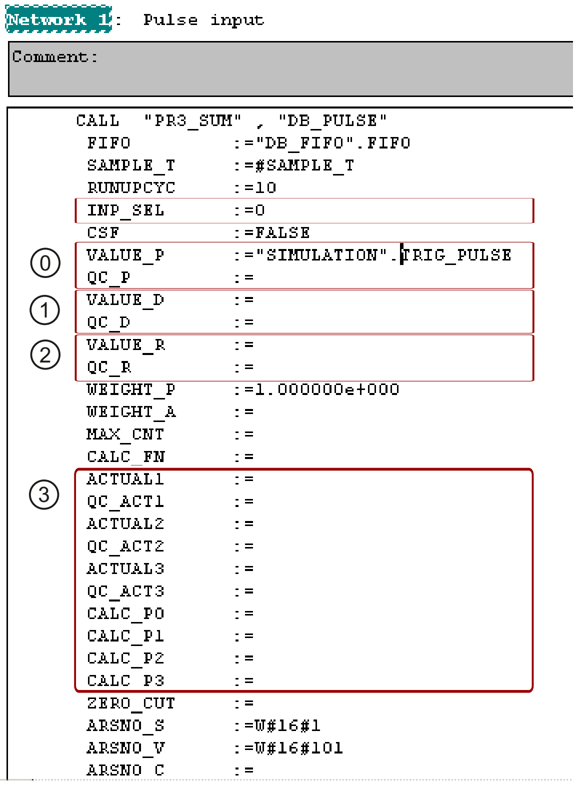
Note

As of SIMATIC powerrate V4.0 SP1, the blocks PR3_BIN_ACQ / PR3_BIN_ACQ and PR3_INT_ACQ / PR3_INT_ACQ are available to acquire pulses and counter values.
You set these blocks upstream of the PR3_SUM / PRE_SUM block.

It is best to use this variant to acquire pulses and counter values.

Important inputs

Use the INP_SEL input to specify the format of the energy value to be measured for the PR3_SUM / PRE_SUM block. The input values are either pulse or counter value in the acquisition for additional calculations. A 15-minute average power demand and the energy consumed, for example, are displayed at the outputs.



```
Network 1: Pulse input
Comment:

      CALL  "PR3_SUM" , "DB_PULSE"
       FIFO          :="DB_FIFO".FIFO
       SAMPLE_T      :=#SAMPLE_T
       RUNUPCYC      :=10
       INP_SEL       :=0
       CSF           :=FALSE
 (0)   VALUE_P       :="SIMULATION".TRIG_PULSE
       QC_P          :=
 (1)   VALUE_D       :=
       QC_D          :=
 (2)   VALUE_R       :=
       QC_R          :=
       WEIGHT_P      :=1.000000e+000
       WEIGHT_A      :=
       MAX_CNT       :=
       CALC_FN       :=
 (3)   ACTUAL1       :=
       QC_ACT1       :=
       ACTUAL2       :=
       QC_ACT2       :=
       ACTUAL3       :=
       QC_ACT3       :=
       CALC_P0       :=
       CALC_P1       :=
       CALC_P2       :=
       CALC_P3       :=
       ZERO_CUT      :=
       ARSNO_S       :=W#16#1
       ARSNO_V       :=W#16#101
       ARSNO_C       :=
```

0 = Count pulse

1 = Integer counter

2 = Floating-point counter

3 = Calculation

An energy value is measured with the values 0, 1 and 2 at the INP_SEL input.

Power is measured with the value 3 at the INP_SEL input.

Important outputs

```
   QMANOP       :=
   QAUTOP       :=
①  LAST_VAL     :=
   QC_LAST_VAL  :=
②  CUR_VAL      :=
   QC_CUR_VAL   :=
③  EST_VAL      :=
   QC_EST_VAL   :=
④  CUR_PWR      :=
   QC_CUR_PWR   :=
⑤  AVG_PWR      :=
   QC_AVG_PWR   :=
⑥  EST_PWR      :=
   QC_EST_PWR   :=
   QMSG_ERR     :=
```

1 = Total energy value of the preceding time period

2 = Cumulative energy value of the current time period

3 = Projected accumulated energy value of the current time period

4 = Current power value

5 = Average power demand of the preceding time period

6 = Projected average power demand of the current time period

SYNC_PER input of the PR3_SYNC block

You configure the time interval for the synchronization period using the SYNC_PER inputs.

The time interval is set at the REQ_PER input in the PR3_SYNC block.

```
Network 1: synchronization period
Comment:

      CALL  "PR3_SYNC" , "DB_SYNC_15MIN"
       SAMPLE_T:=#SAMPLE_T
       RUNUPCYC:=10
       EXT_EN  :=FALSE
       EXT_SYNC:=FALSE
       REQ_PER :=9.000000e+002
       REQ_T   :=1.000000e+000
       QPARAMF :=
       SYNC_OUT:=
       SYNC_PER:=
       SYNC_TS :=
       CUR_TS  :=
```

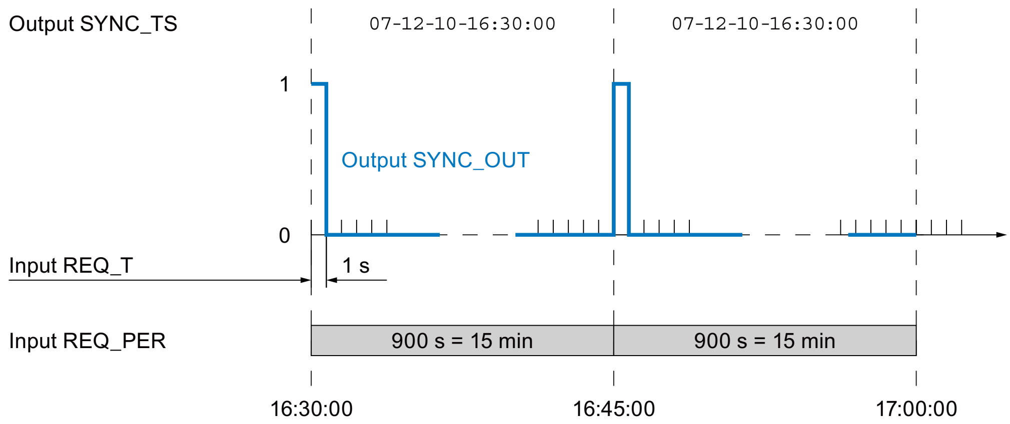
The SYNC_PER output of PR3_SYNC is connected to the SYNC_PER input of PR3_SUM.

```
Network 1:  Pulse input
Comment:

      CALL  "PR3_SUM" , "DB_PULSE"
       FIFO         :="DB_FIFO".FIFO
       SAMPLE_T     :=#SAMPLE_T
       RUNUPCYC     :=10
       INP_SEL      :=0
       CSF          :=FALSE
       VALUE_P      :="SIMULATION".TRIG_Pulse
       QC_P         :=
       VALUE_D      :=
       QC_D         :=
       VALUE_R      :=
       QC_R         :=
       WEIGHT_P     :=1.000000e+000
       WEIGHT_A     :=
       MAX_CNT      :=
       CALC_FN      :=
       ACTUAL1      :=
       QC_ACT1      :=
       ACTUAL2      :=
       QC_ACT2      :=
       ACTUAL3      :=
       QC_ACT3      :=
       CALC_P0      :=
       CALC_P1      :=
       CALC_P2      :=
       CALC_P3      :=
       ZERO_CUT     :=
       ARSNO_S      :=W#16#1
       ARSNO_V      :=W#16#101
       ARSNO_C      :=
       PER_T        :=
       SYNC_PER     :="DB_SYNC_15MIN".SYNC_PER
       SYNC_P       :="DB_SYNC_15MIN".SYNC_OUT
       SYNC_TS      :="DB_SYNC_15MIN".SYNC_TS
       MANOP_EN     :=TRUE
       AUTOP_EN     :=TRUE
       AUTMAN_EN    :=TRUE
```

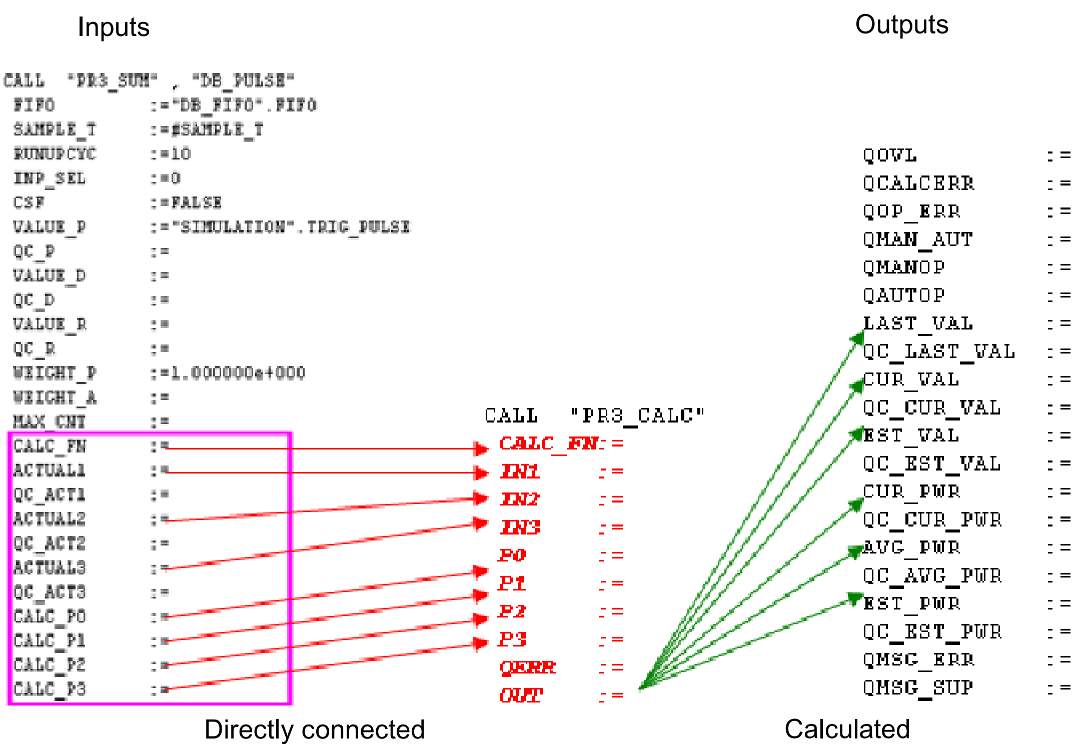
Time interval (synchronization period)

The average power demand and energy consumed during a period are displayed at the outputs, for example, in 15-minute intervals in accordance with the time interval. For additional information on configuring the time interval, refer to "Function - PRE_SYNC / PR3_SYNC (Page 394)".



PRE blocks with calculation function

The PR3_CALC block is called internally by the PR3_SUM block.
The following figure shows the connection between PR3_SUM and PR3_CALC:



Calculation algorithm

The PR3_CALC function contains the calculation algorithms which are used when forming measured values for the PR3_SUM function block.

The PR3_CALC function is available in the library as a source. You can extend PR3_CALC to include additional calculations. The interface of the function must not be changed.

For additional information, refer to "Function - PRE_CALC / PR3_CALC (Page 250)".

See also

Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)

The PRE_SUM / PR3_SUM block with interconnection from PRE_BIN_ACQ / PR3_BIN_ACQ block (Page 90)

The PRE_SUM / PR3_SUM block with interconnection from the PRE_INT_ACQ / PR3_INT_ACQ block (Page 93)

2.5.2 The PRE_SUM / PR3_SUM block with interconnection from PRE_BIN_ACQ / PR3_BIN_ACQ block

Introduction

The PRE_BIN_ACQ block is used to configure the acquisition of pulsed energy values.

Important inputs of the PRE_BIN_ACQ / PRE_BIN_ACQ block

Use the INP_SEL input to specify the format of the energy value to be measured, such as pulse or edge, for the PRE_BIN_ACQ block.

```
Netzwerk 1: Pulse acquisition
Kommentar:

      CALL  "PRE_BIN_ACQ" , "DB_PULSE_ACQ"
       CONSUMER_STATUS:=
       VALUE          :=E0.2
       QC             :=
       INP_SEL        :=
       CSF            :=
       UNIT           :=1
       INPUT_PER_UNIT :=1
       PER_T          :=1.000000e+000
       ZERO_CUT       :=
       SAMPLE_T       :=#SAMPLE_T
       QPARAMF        :=
       QBAD           :=
       QSIM           :=
       CUR_VAL_D      :=
       QC_CUR_VAL_D   :=
       MAX_VAL_D      :=
       CUR_VAL_R      :=
       QC_CUR_VAL_R   :=
       MAX_VAL_R      :=
       CUR_PWR        :=
       QC_CUR_PWR     :=
       RESET          :=
```

Acquisition period

Unlike the PRE_SUM block, the PRE_BIN_ACQ block has an acquisition period that adjusts itself to the signal input.

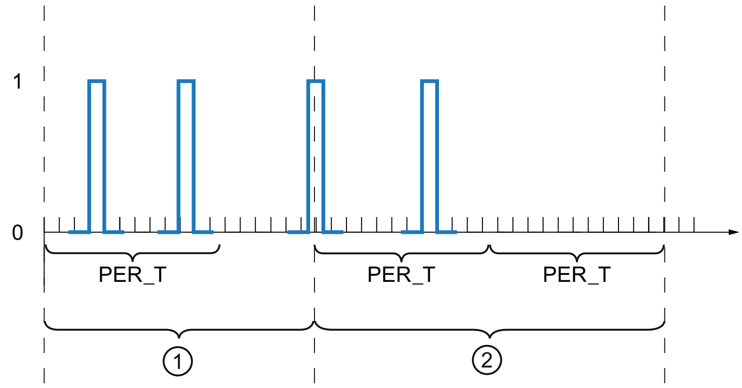
The PER_T parameter is used to define the minimum acquisition period. The number of incoming pulses or edges is counted during this period.

To calculate the current power, the block waits until the next pulse arrives or the time interval PER_T * ZERO_CUT has expired.

If the consumer is switched off (CONSUMER_STATUS = FALSE), the time interval is shortened.

The following occurs at this point of time:

- The acquisition period is closed.
- The current power is calculated (average power throughout the acquisition period).
- A new acquisition period starts.



① The minimum acquisition period PER_T has expired. A new pulse arrives before the expiry of the time interval PER_T * ZERO_CUT. The power is calculated. The new acquisition period starts after this.

② The maximum time interval PER_T * ZERO_CUT has expired. Since no new pulse has arrived, the counter state from the minimum acquisition period is used.

Interconnection of the PRE_SUM block

The PRE_SUM block is interconnected as follows:

```
Netzwerk 1: Pulse input

Kommentar:

      CALL  "PRE_SUM" , "DB_PULSE"
       FIFO         :="DB_FIFO1".FIFO
       SAMPLE_T     :=#SAMPLE_T
       RUNUPCYC     :=10
       INP_SEL      :=2
       CSF          :=
       VALUE_P      :=
       QC_P         :=
       VALUE_D      :=
       QC_D         :=
       VALUE_R      :="DB_PULSE_ACQ".CUR_VAL_R
       QC_R         :="DB_PULSE_ACQ".QC_CUR_VAL_R
       WEIGHT_P     :=
       WEIGHT_A     :=1.000000e+000
       MAX_CNT      :="DB_PULSE_ACQ".MAX_VAL_R
       CALC_FN      :=
       ACTUAL1      :=
       QC_ACT1      :=
       ACTUAL2      :=
       QC_ACT2      :=
       ACTUAL3      :=
       QC_ACT3      :=
       CALC_P0      :="DB_PULSE_ACQ".CUR_PWR
       CALC_P1      :=
       CALC_P2      :=
       CALC_P3      :=
       ZERO_CUT     :=
       ARSNO_S      :=W#16#1
       ARSNO_V      :=W#16#101
       ARSNO_C      :=
       PER_T        :=1.000000e+001
```

The PER_T parameter from the PRE_SUM block should be equal to or greater than the PER_T parameter from the PRE_BIN_ACQ block.

See also

PRE_BIN_ACQ / PR3_BIN_ACQ: Acquisition of measured energy values (Page 241)

2.5.3 The PRE_SUM / PR3_SUM block with interconnection from the PRE_INT_ACQ / PR3_INT_ACQ block

Introduction

The PRE_INT_ACQ block is used to configure the acquisition of integer energy values.

Important inputs of the PRE_INTO_ACQ block

Use the UNIT input to specify the unit of the input integer counter for the PRE_INT_ACQ block.

```
Netzwerk 2 : Integer acquisition
Kommentar:

      CALL  "PRE_INT_ACQ" , "DB_INT_ACQ"
       CONSUMER_STATUS:=
       VALUE_D        :=ED4
       QC_D           :=
       CSF            :=
       UNIT           :=L#1
       PER_T          :=1.000000e+000
       ZERO_CUT       :=
       SAMPLE_T       :=#SAMPLE_T
       QPARAMF        :=
       QBAD           :=
       QSIM           :=
       CUR_VAL_D      :=
       QC_CUR_VAL_D   :=
       MAX_VAL_D      :=
       CUR_VAL_R      :=
       QC_CUR_VAL_R   :=
       MAX_VAL_R      :=
       CUR_PWR        :=
       QC_CUR_PWR     :=
       RESET          :=
```

The input integer value is converted to kWh, kvarh or m3 at the output.

Acquisition period

Unlike the PRE_SUM block, the PRE_INT_ACQ block has an acquisition period that adjusts itself to the signal input.

The PER_T parameter is the minimum acquisition period. The difference between the start counter state and the end counter state is calculated during this period.

To calculate the current power, the block waits until there is a new counter state or one of the following termination conditions occurs:

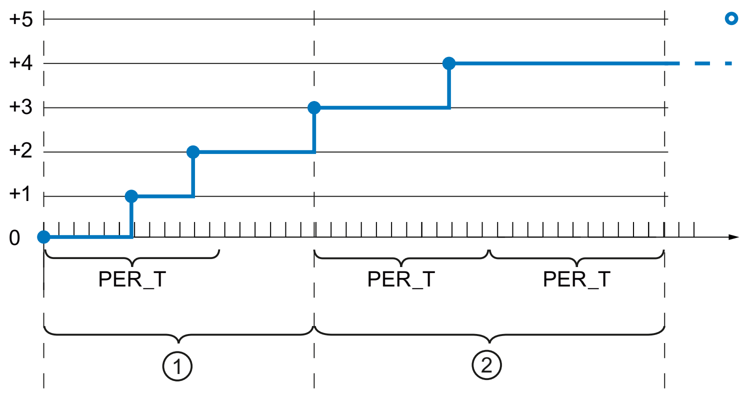
- The maximum time interval PER_T * ZERO_CUT has expired.
- The consumer is switched off. In this case, the CONSUMER_STATUS parameter is set to FALSE .

If one of the two termination conditions occurs, the time interval is shortened.

The following occurs at this point of time:

- The acquisition period is closed.
- The current power (average power throughout the acquisition period) is calculated.
- A new acquisition period starts.

The following figure shows the acquisition in schematic form.
The ZERO_CUT parameter has the value "2":



① The minimum acquisition period PER_T has expired. A new counter state occurs before the expiry of the time interval PER_T * ZERO_CUT. The power is calculated. The new acquisition period starts after this.

② The maximum time interval PER_T * ZERO_CUT has expired. Since no new counter state has arrived, the counter state from the minimum acquisition period is used.

Interconnection of PRE_SUM / PR3_SUM block

The PRE_SUM block is interconnected as follows:

```
Netzwerk 2 :  Integer counter

Kommentar:

      CALL  "PRE_SUM" , "DB_INTEGER"
       FIFO         :="DB_FIFO2".FIFO
       SAMPLE_T     :=#SAMPLE_T
       RUNUPCYC     :=10
       INP_SEL      :=1
       CSF          :=
       VALUE_P      :=
       QC_P         :=
       VALUE_D      :="DB_INT_ACQ".CUR_VAL_D
       QC_D         :="DB_INT_ACQ".QC_D
       VALUE_R      :=
       QC_R         :=
       WEIGHT_P     :=
       WEIGHT_A     :=1.000000e+000
       MAX_CNT      :="DB_INT_ACQ".MAX_VAL_R
       CALC_FN      :=
       ACTUAL1      :=
       QC_ACT1      :=
       ACTUAL2      :=
       QC_ACT2      :=
       ACTUAL3      :=
       QC_ACT3      :=
       CALC_P0      :="DB_INT_ACQ".CUR_PWR
       CALC_P1      :=
       CALC_P2      :=
       CALC_P3      :=
       ZERO_CUT     :=
       ARSNO_S      :=W#16#2
       ARSNO_V      :=W#16#102
       ARSNO_C      :=W#16#202
       PER_T        :=1.000000e+001
```

The PER_T parameter from PRE_SUM block should be equal to or greater than the PER_T parameter from the PRE_INT_ACQ block.

See also

PRE_INT_ACQ / PR3_INT_ACQ: Acquisition of measured energy values (Page 245)

2.5.4 Creating an AS program for energy measurement

Introduction

You need to create a suitable AS program to transfer values. Note the following information in this regard.

Structure of the SYSTEM function

The "SYSTEM" function contains the call of the higher-level blocks which are responsible for time synchronization, data buffering and archiving.

Calling the PRE_SYNC / PR3_SYNC block

Configuring the call of PRE_SYNC / PR3_SYNC for the various synchronization times:

- Synchronization type (internal/external)
- Time interval (synchronization period)
- Synchronization pulse duration

```
Network 1: Synchronization period
Comment:

      CALL  "PRE_SYNC" , "DB_SYNC_15MIN"
       SAMPLE_T:=#SAMPLE_T
       RUNUPCYC:=10
       EXT_EN  :=FALSE
       EXT_SYNC:=FALSE
       REQ_PER :=9.000000e+002
       REQ_T   :=1.000000e+000
       QPARAMF :=
       SYNC_OUT:=
       SYNC_PER:=
       SYNC_TS :=
       CUR_TS  :=
```

Call of the PRE_FIFO_DATA / PR3_FIFO_DATA block for the FIFO buffer

Configure the call of PRE_FIFO_DATA / PR3_FIFO_DATA for the FIFO buffer.

```
Network 2: FIFO
Comment:

      CALL  "PRE_FIFO_DATA" , "DB_FIFO"
       FIFO    :=
       ITEM_LEN:=
       ITEM_NO :=
```

Calling the PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA block

Configure the call of PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA for the communication with WinCC process value archive:

- FIFOInput: Allocation to the FIFO output of the PRE_FIFO_DATA / PR3_FIFO_DATA block
- Configuration of the monitoring time for the send operation SEND_T:

  The monitoring time must be at least as long as the necessary start-up time of WinCC Runtime.

NOTICE
Cancellation of archiving in case of a faulty configuration The values in the PRE_FIFO_DATA / PR3_FIFO_DATA block are no longer processed if the configuration for a value is incorrect. Archiving can be cancelled, for example, when an archive is incorrectly configured or missing. Before you start the project in WinCC Runtime, ensure that all required archive data are configured.

```
Network 3 :   ARCHIVE

Comment:

      CALL  "PRE_AR_DATA" , "DB_ARCHIVE"    FB1063 / DB3        -- Archive data / A
       FIFO     :="DB_FIFO".FIFO            DB2.DBW0            --   Number of FIF(
       RUNUPCYC:=10
       SAMPLE_T:=#SAMPLE_T
       SEND_T   :=3.000000e+001
       AR_EVID  :=DW#16#1
       MSG_EVID:=DW#16#2
       QPARAMF  :=
       QERR     :=
       QMSG_ERR:=
       QMSG_SUP:=
       MSG_STAT:=
       MSG_ACK  :=
       AR_STAT  :=
       ACK_TEL  :=
```

Installation of PRE_SUM / PR3_SUM block for measurement point

Configure the call of the PRE_SUM / PR3_SUM block for the measurement point:

- Connection with measured value
- Parameter transfer for time synchronization from the PRE_SYNC / PR3_SYNC block
- Transfer of the number of the FIFO DB from the PRE_FIFO_DATA / PR3_FIFO_DATA block
- Configuration of signal type/calculation parameter
- Parameter assignment for subnumbers of archive tags

The "ENERGY" function is created for energy measurement.
An example call is implemented for each signal type.

```
Network 2:   Integer counter

Comment:

      CALL  "PRE_SUM" , "DB_INTEGER"                          FB1061 / DB11
       FIFO          :="DB_FIFO".FIFO                          DB2.DBW0
       SAMPLE_T      :=#SAMPLE_T
       RUNUPCYC      :=10
       INP_SEL       :=1
       CSF           :=
       VALUE_P       :=
       QC_P          :=
       VALUE_D       :=ED4                  // Integer input value
       QC_D          :=
       VALUE_R       :=
       QC_R          :=
       WEIGHT_P      :=
       WEIGHT_A      :=1.000000e+000
       MAX_CNT       :=6.553600e+004
       CALC_FN       :=
       ACTUAL1       :=
       QC_ACT1       :=
       ACTUAL2       :=
       QC_ACT2       :=
       ACTUAL3       :=
       QC_ACT3       :=
       CALC_P0       :=
       CALC_P1       :=
       CALC_P2       :=
       CALC_P3       :=
       ZERO_CUT      :=
       ARSNO_S       :=W#16#2
       ARSNO_V       :=W#16#102
       ARSNO_C       :=W#16#202
       PER_T         :=1.000000e+001
       SYNC_PER      :="DB_SYNC_15MIN".SYNC_PER                DB1.DBD18
       SYNC_P        :="DB_SYNC_15MIN".SYNC_OUT                DB1.DBX16.1
       SYNC_TS       :="DB_SYNC_15MIN".SYNC_TS                 P#DB1.DBX22.0
       MANOP_EN      :=TRUE
       AUTOP_EN      :=TRUE
       AUTMAN_EN     :=TRUE
       MSG_EVID      :=DW#16#4
       QPARAMF       :=
```

Special considerations when using a S7-300 with the PR3_AR_DATA block

Note the following when configuring an S7-300:

Archive numberAR_EVID

The archive id has to be unique throughout the project.

Note

For performance reasons, use the PR3_AR_DATA_B block to send archive data whenever possible.

See also

PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA: Data interface for sending the archive data (Page 221)

2.5.5 Configuring the faceplate for PRE_SUM / PR3_SUM

Introduction

You use the PRE_SUM / PR3_SUM block to measure energy and display the values on the OS.

Configuring blocks for Runtime

For each configured PRE_SUM / PR3_SUM block, create a "PRE_SUM/1" or "PR3_SUM/1" faceplate in WinCC and connect it to the corresponding structure tag.

To display the values of a block icon in Runtime, copy the appropriate faceplate icon from the template file to a WinCC process picture. You connect the faceplate to a structure tag using the Dynamic Wizard.

This procedure is identical for all powerrate faceplates. For this reason, a sample configuration is shown using the example of the PR3_SUM block.

Block interconnection

The block supports the following counter types:

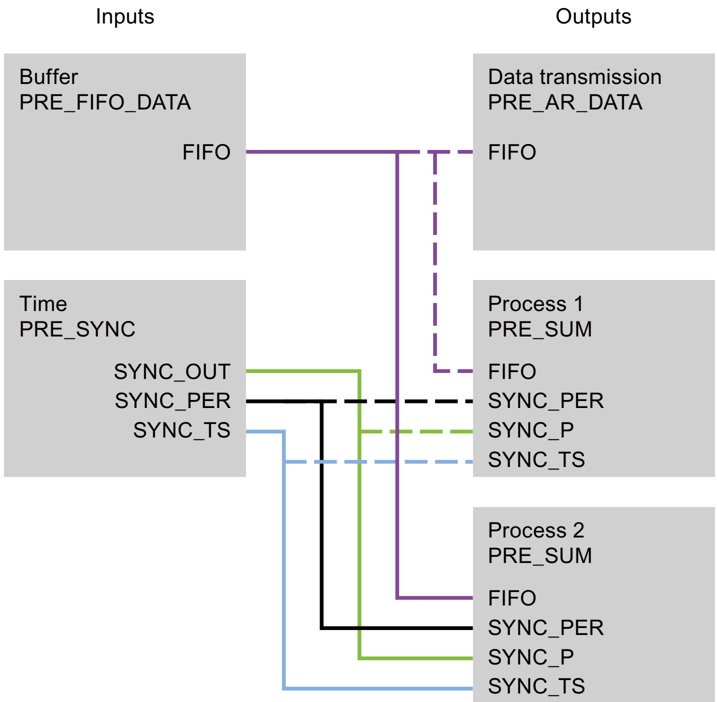
- Counter pulse
- Integer counter
- Floating-point counter
- Calculation

The average power demand and energy consumed during a period are displayed at the outputs, for example, in 15-minute intervals in accordance with the synchronization interval. For additional information on configuring the synchronization interval, refer to

Function - PRE_SYNC / PR3_SYNC (Page 394).

For additional information about PR3_SUM , refer to the block description Function - PRE_SUM / PR3_SUM (Page 356).

The following figure show the basic interconnection of the system blocks with multiple PRE_SUM blocks:



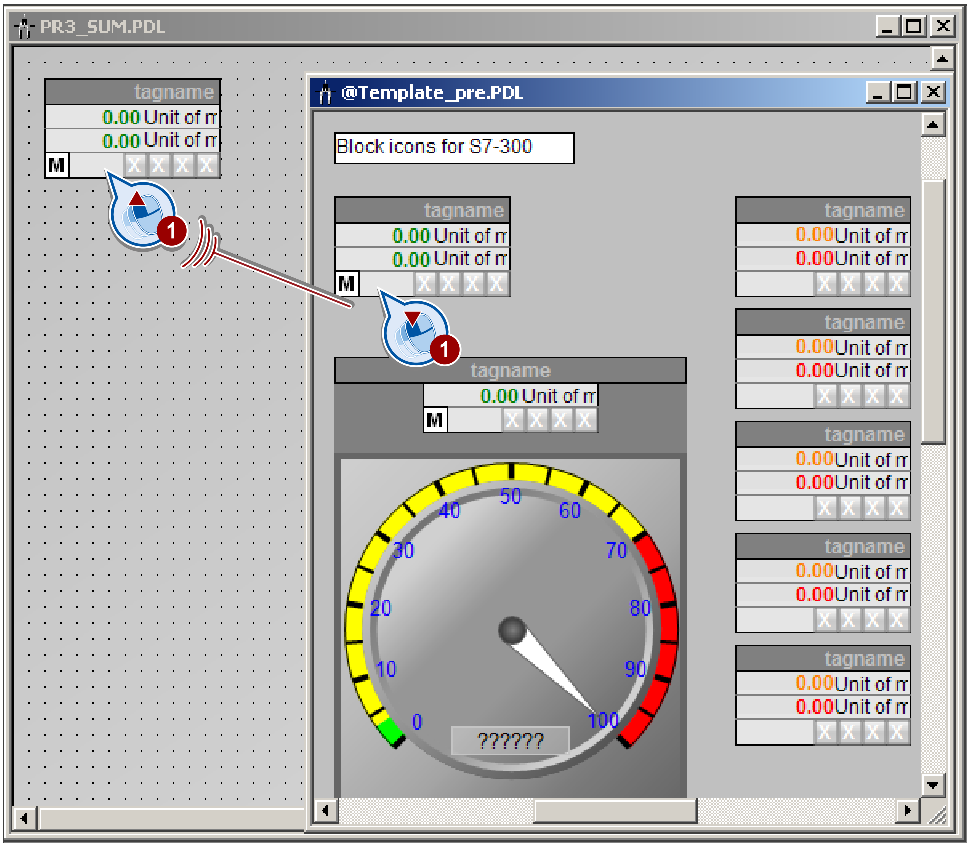
You can find additional information on the interconnection of inputs and outputs in the section "The PRE_SUM / PR3_SUM block (Page 84)".

Requirements

- "Compile OS" was executed.
- The OS project editor has been run.
- The powerrate wizard has been run.
- You have opened a process picture in the WinCC Graphics Designer in which the block icon is to be displayed.
  See also Creating process screens (Page 73)

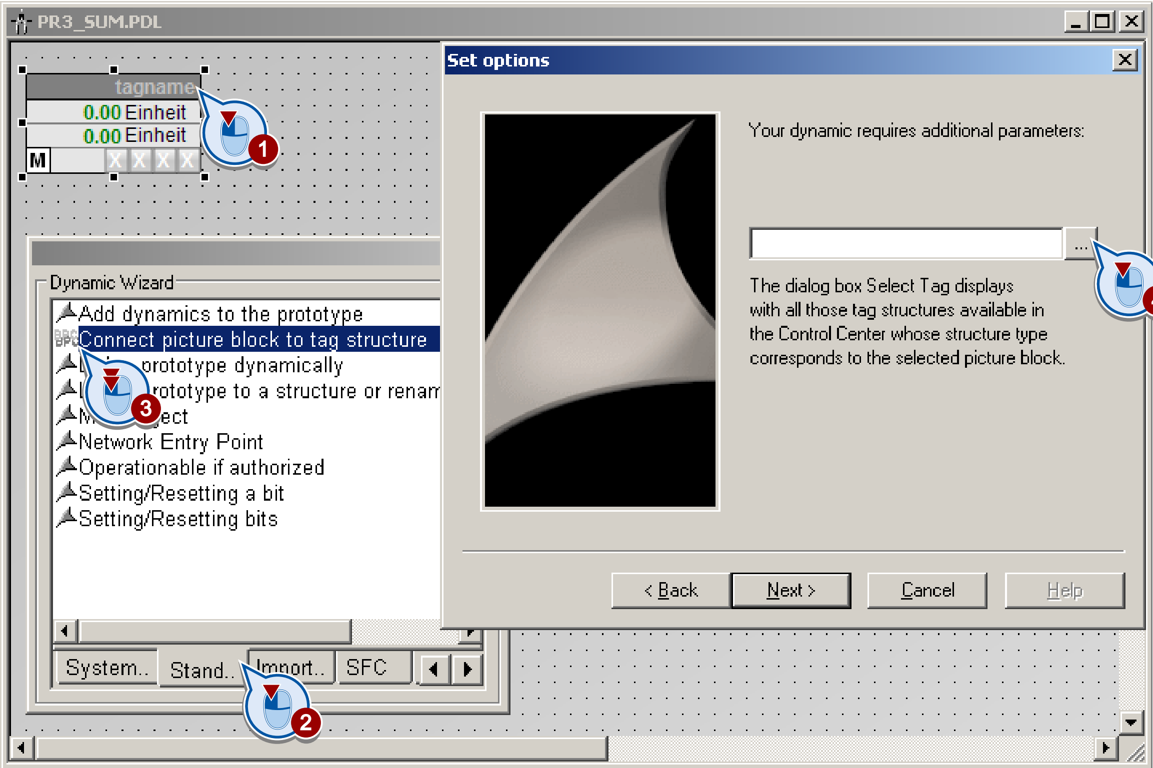
Procedure

1. Copy the "PR3_SUM/1" block icon into your process picture from the "@Template_pre.PDL" template process picture.

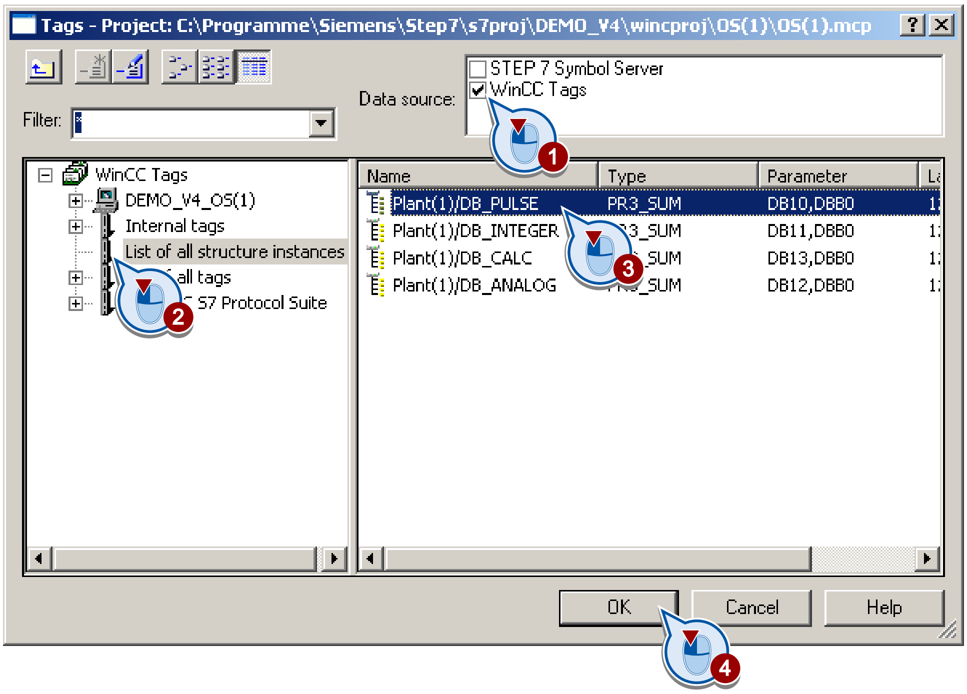


2. Select the block icon and start the "Interconnect faceplate with measurement point" Dynamic Wizard.

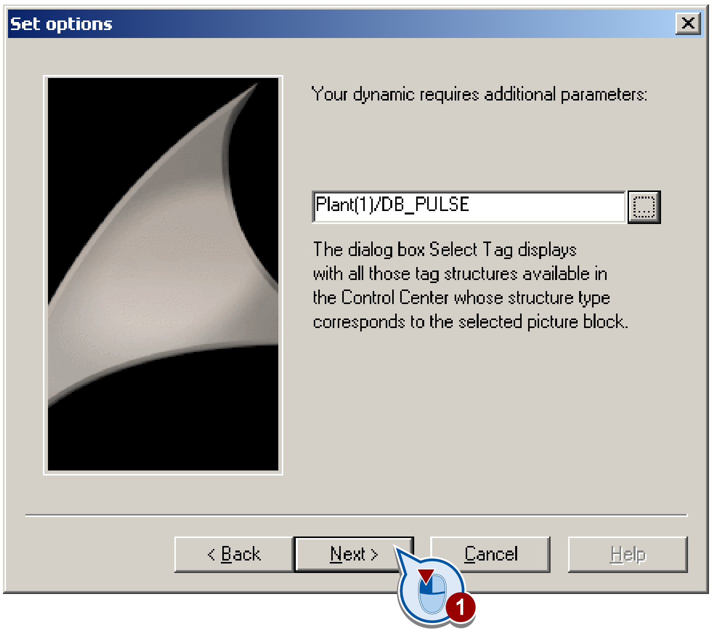
   In the "Set options" window, open WinCC Tag Management.



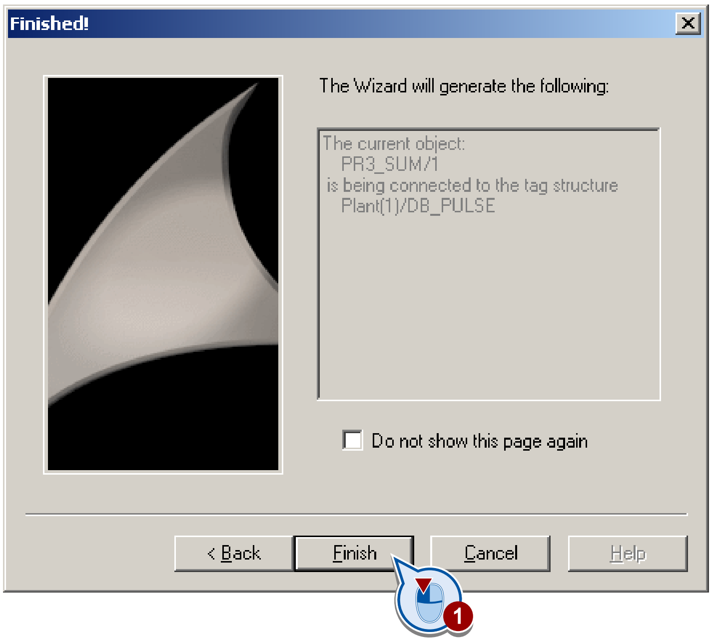
3. Select the "<tagname>/DB_PULSE" structure tag.



4. Confirm with "Next".



5. End the Dynamic Wizard.



6. Repeat steps 1 to 5.

   Connect the copied "PR3_SUM" block icons with the following structure tags:

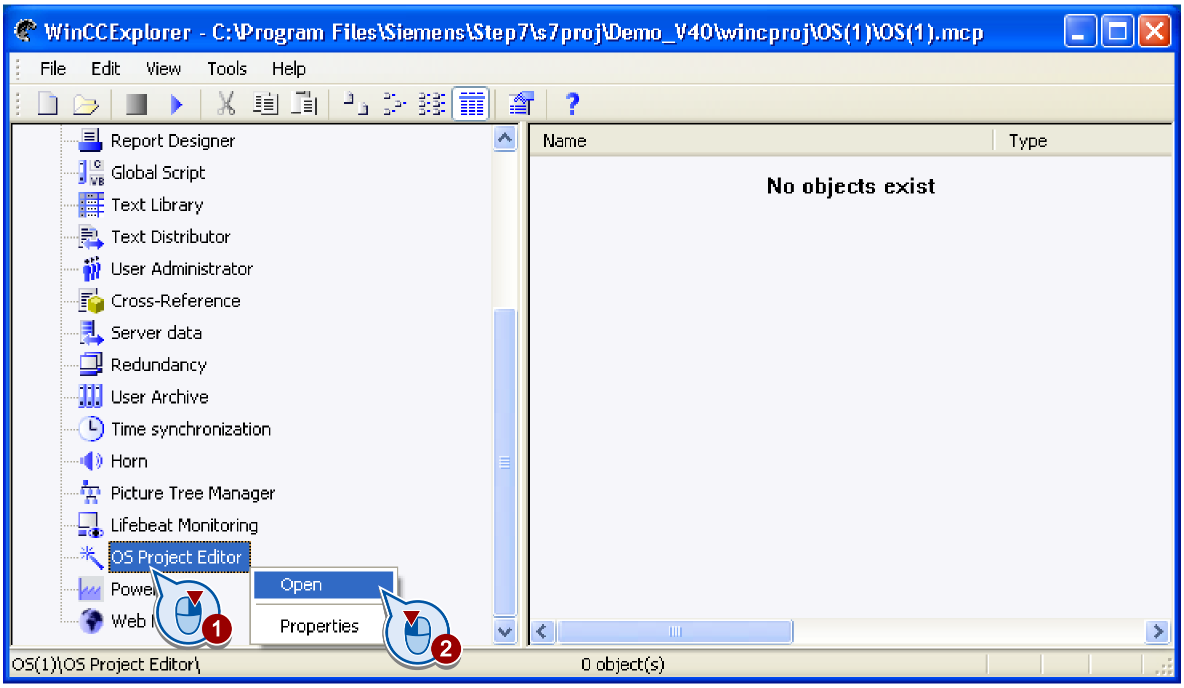
   – <tagname>/DB_INTEGER
   – <tagname>/DB_ANALOG
   – <tagname>/DB_CALC

   "[kWh]" is entered as the default unit of the structure tags.

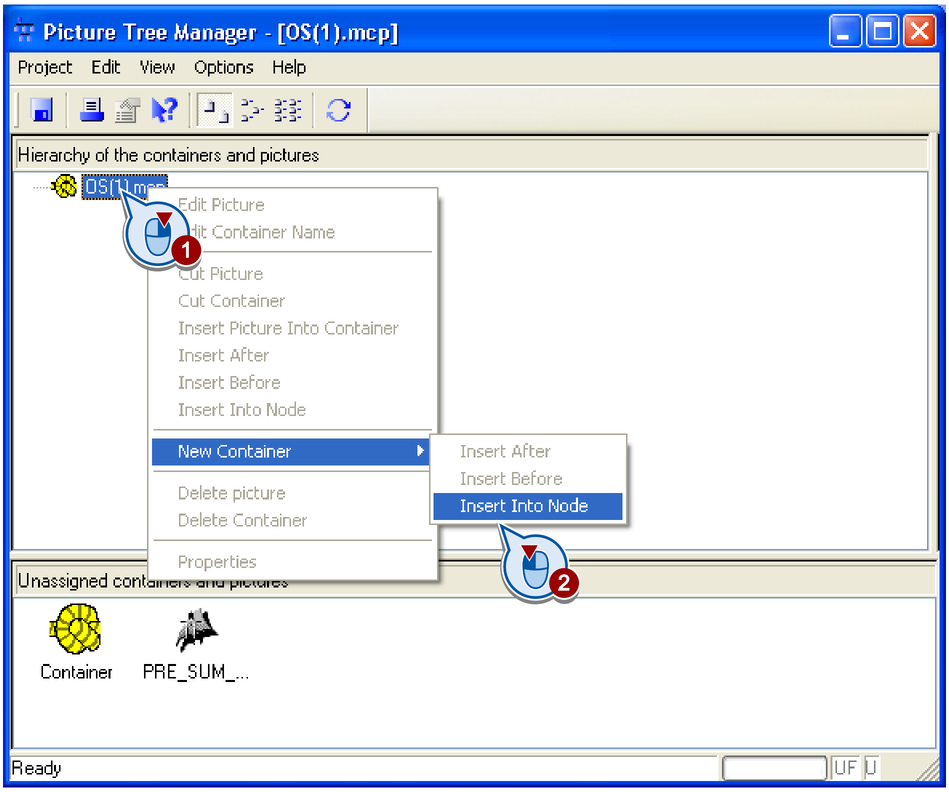
   To change the units, start the Tag Logging editor. Open the "pre" archive from the shortcut menu of the tag properties. Change the comment.

   The changed unit is displayed in the reports and the table views.
   The change does not affect the "standard" view of the faceplate.

7. Save the process picture.
8. Open the "Picture Tree Manager" editor.



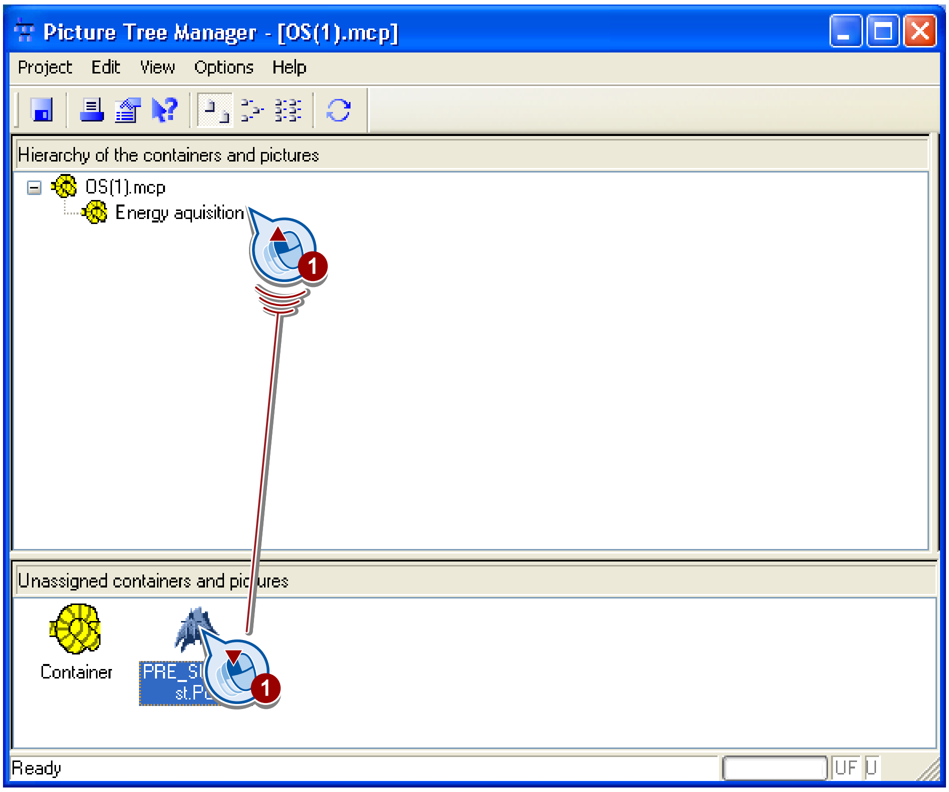
9. Insert a new container in the node.



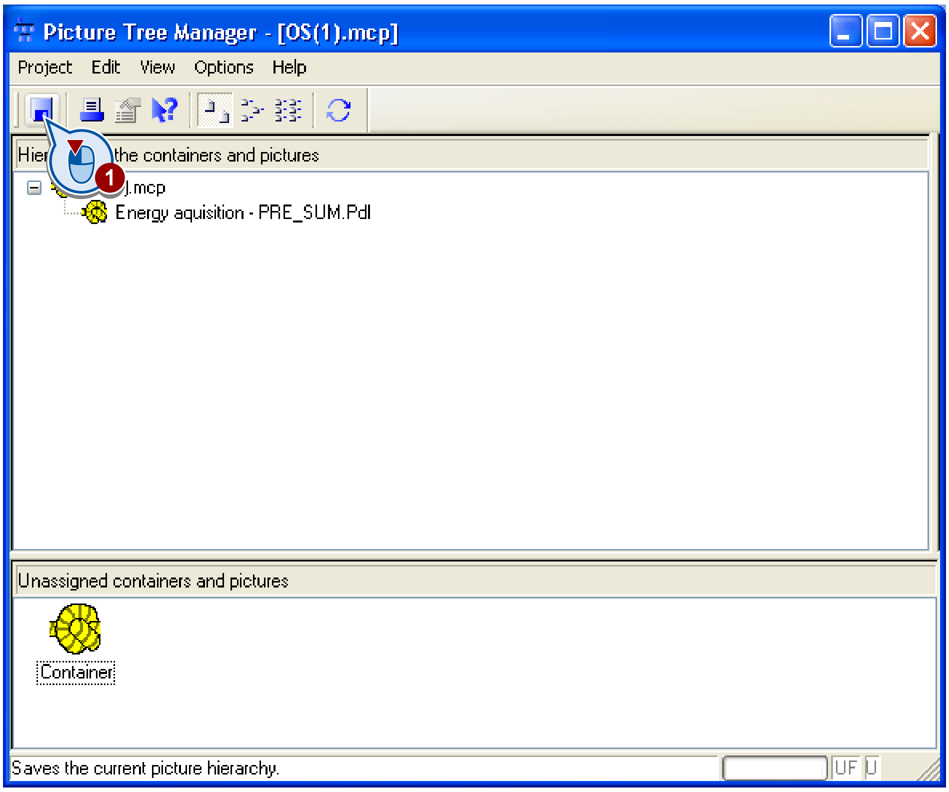
10. Rename the container accordingly.

    The container name is displayed on the area buttons in runtime.

11.Insert the created process picture behind the container with drag-and-drop.

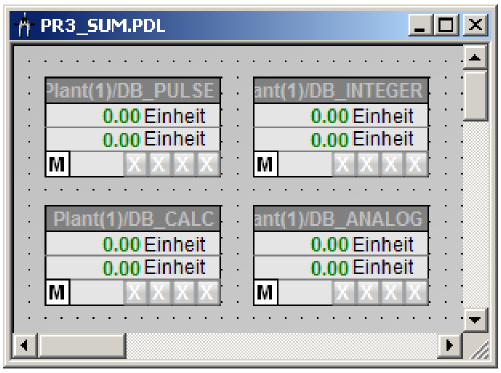


12.Save the hierarchy.



Result

The faceplates are linked to the structure tags.
The process picture can be displayed in runtime.



See also

Function - PRE_SYNC / PR3_SYNC (Page 394)

Function - PRE_SUM / PR3_SUM (Page 356)

Configuring faceplate for PRE_SWTCH / PR3_SWTCH (Page 117)

2.5.6 Operating the PRE_SUM / PR3_SUM faceplate in Runtime

Introduction

When you activate the WinCC project in Runtime, the faceplates are displayed with the corresponding values.

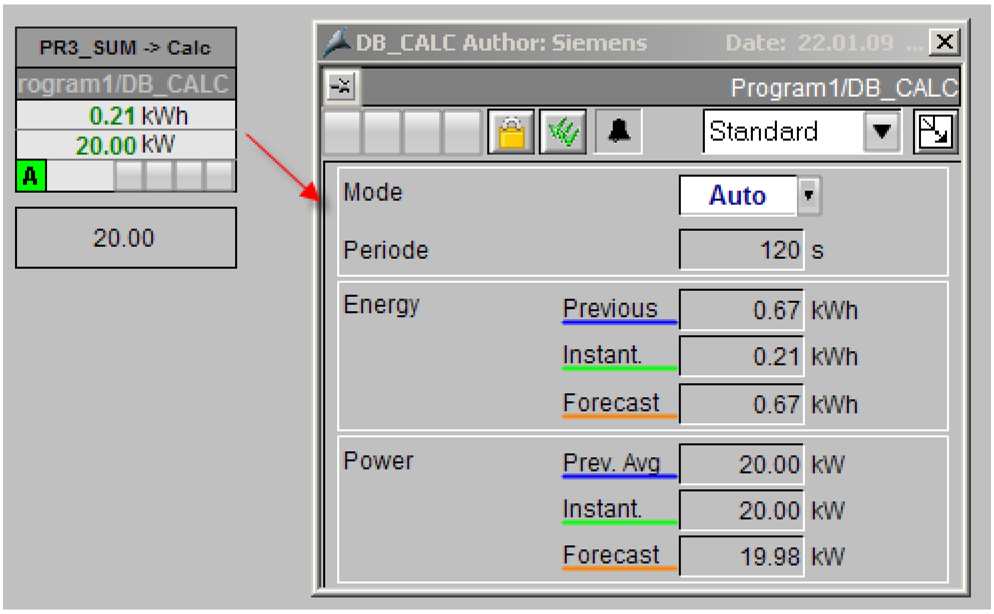
In the description of the PRE_SUM / PR3_SUM (Page 356) block you will find a detailed description of the icons (Page 373) and the faceplate (Page 373).

Requirements

- The S7-300 or the S7-400 is linked to the configuring PC.

Opening a faceplate

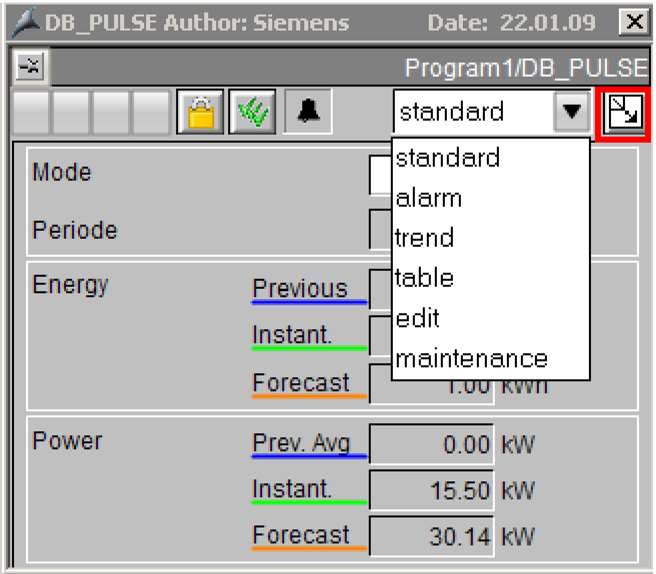
The associated faceplate is opened by clicking the block icon.

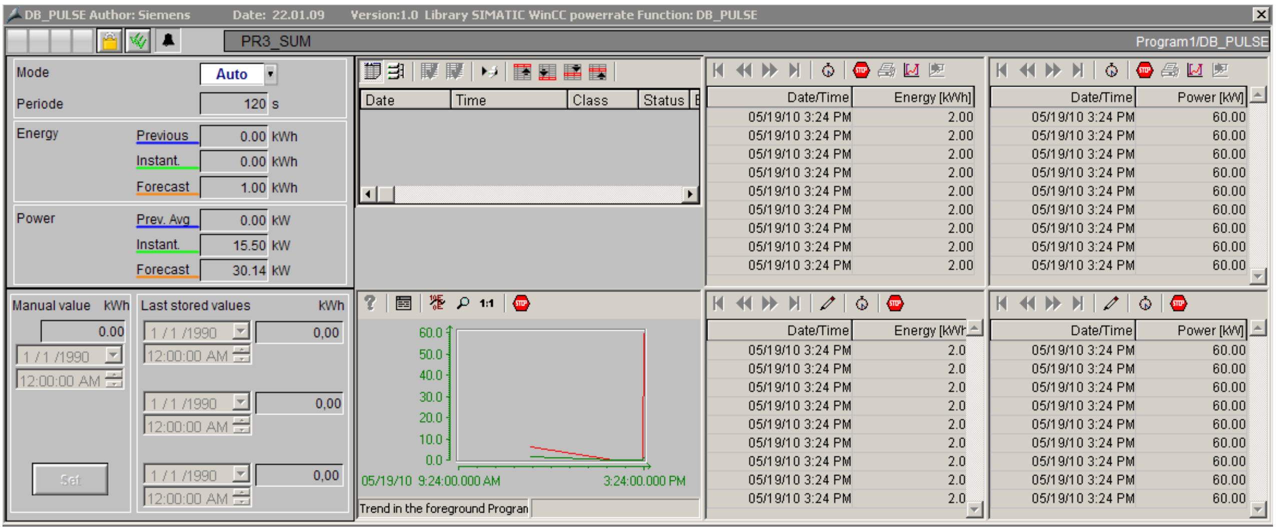


Views

You can select the various views using the drop-down menu.

You can open the loop display by selecting the corresponding icon.





2.5.7 Configuring additional units for energy measurement

Support for additional units of energy measurement

You can also use the PRE_SUM / PR3_SUM and PRE_LMGM_x / PR3_LMGM_x blocks for energy measurement of additional units.

If you are working with CFC, you can change the units directly at the block parameters.

Without CFC, you configure additional units in the SIMATIC Manager. The exact procedure is described in the section PRE_SUM / PR3_SUM. For PRE_LMGM_x / PR3_LMGM_x, you follow the same procedure but change other parameters.

Adapting parameters

To configure an additional unit, for measuring gas or water, for example, change the "S7_unit" attribute for the following parameters in the declaration section of the blocks:

Block	Type	Parameter	Example
PRE_SUM / PR3_SUM	O	CUR_VAL	m^3
		LAST_VAL	m^3
		EST_VAL	m^3
		CUR_PWR	m^3/h
		AVG_PWR	m^3/h
		EST_PWR	m^3/h
	IO [1)]	V_MAN	m^3
		V_MAN_L1	m^3
		V_MAN_L2	m^3
		V_MAN_L3	m^3
PRE_LMGM_x / PR3_LMGM_x	I	CUR_VAL	m^3
		CUR_PWR	m^3/h

1) Used for manually entered measured values.

Procedure PRE_SUM / PR3_SUM

1. Copy the PRE_SUM (S7-400) or PR3_SUM (S7-300) block under a free FB number and a new icon,for example PRE_SUM2 with the block number FB191.

   The name of the block icon must begin with PRE_SUM or PR3_SUM , for example PRE_SUM2 or PR3_SUM_Water. Do not use names which begin with PRE_SUMC or PR3_SUMC.
2. Open the block.

   An error message appears reporting that a block cannot be rewired.
   You can ignore this message.
3. Search for the affected OUT parameters, IN parameters and INOUT parameters in the declaration section and adapt the attributes.

   To do this, change the value of the "S7_unit" attribute to the desired unit for each tag via the shortcut menu "Object Properties > Attributes".

   Save the block.
4. Call the block, for example in the ENERGY (FC101) function via a new instance data block, for example DB191. Interconnect the parameters in accordance with the calls of the copied block.

   Assign a symbolic name to the instance data block, for example. DB_WATER.

   In the shortcut menu of the instance data block, ensure that the "Operating and monitoring" property is activated.
5. Load the blocks into the PLC and compile the OS.
6. Copy the icons of the PRE_SUM / PR3_SUM block for the @Template_pre.pdl icons in the template picture.

   For the newly created icons in the Properties window, replace each property containing PPRE_SUM or PR3_SUM with the new symbolic block name (for example, PRE_SUM2).

   In particular, change the object name and object properties "type" and "Servername".
7. Copy all faceplate files of the block.

   Replace PRE_SUM or PR3_SUM in the name with the new symbolic name of the block, for example, PRE_SUM2.

   The following files are part of the faceplate:

   – @PG_PRE_SUM.pdl / @PG_PR3_SUM.pdl
   – @PG_PRE_SUM_EDIT.pdl / @PG_PR3_SUM_EDIT.pdl
   – @PG_PRE_SUM_MAINTENANCE.pdl / @PG_PR3_SUM_MAINTENANCE.pdl
   – @PG_PRE_SUM_OVERVIEW.pdl / @PG_PR3_SUM_OVERVIEW.pdl
   – @PG_PRE_SUM_STANDARD.pdl / @PG_PR3_SUM_STANDARD.pdl
   – @PG_PRE_SUM_TABLE.pdl / @PG_PR3_SUM_TABLE.pdl
   – @PG_PRE_SUM_VIEWLIST.pdl / @PG_PR3_SUM_VIEWLIST.pdl
   – @PL_PRE_SUM.pdl / @PL_PR3_SUM.pdl

8. Open the newly created pictures @PG_<block name>.pdl and @PL_<block name>.pdl.

   Select all picture objects using the menu command "Edit > Select All".
9. In the menu "Edit > Rewire > Texts", replace all PRE_SUM / PR3_SUM standard texts with the new block name, for example, PRE_SUM2.

Procedure PRE_LMGM_x / PR3_LMGM_x

With the same procedure, you can use additional units for the PRE_LMGM_x / PR3_LMGM_x blocks. You only change the IN parameters CUR_VAL and CUR_PWR.

2.5.8 Adding more process tags

Introduction

If you expand your plant and require an additional measuring device, you can use an existing block parameterization. In this case you must perform the following steps:

- Create a new instance data block.
- Adapt the parameters.
- Run the "Compile OS" wizard.
- Copy the faceplate and run the dynamic wizard "Connect faceplate with process tag".

Requirement

- New measuring device is installed in the plant and wired.
- New measuring device is inserted in the hardware configuration.
- STEP 7 is open.

Configuring a process tag

To configure the measured value acquisition for the new process tag, follow these steps:

1. Copy the network together with the required process tag and insert the network at the end of the user program.

2. Change the name of the instance data block, from "DB_CALC" to "DB_CALCNEW", for example.

   The code of the new network is colored red because the new instance data block is not yet recognized.

```
CALL  "PRE_SUM" , "DB_CALCNEW"
 FIFO        :="DB_FIFO".FIFO
 SAMPLE_T    :=#SAMPLE_T
 RUNUPCYC    :=10
 INP_SEL     :=3
 CSF         :=FALSE
 VALUE_P     :=
 QC_P        :=
 VALUE_D     :=
 QC_D        :=
```

3. Open the symbol table and insert the new instance data block. Use a free number for the data block and insert the function block of the old network, for example, DB 20 and FB 1061.

9		CYC_INT5	OB 35	OB 35	Cyclic Interrupt 5
10		DB_ANALOG	DB 12	FB 1061	Analog counter - Instance DB of PRE_SUM
11		DB_ARCHIVE	DB 1063	FB 1063	Archive DB - Instance DB of PRE_AR_DATA
12		DB_CALC	DB 13	FB 1061	Calculation - Instance DB of PRE_SUM
13		DB_CALCNEW	DB 20	FB 1061	
14		DB_ENERGY	DB 14	FB 1077	Charge related energy acquisition - Instance
15		DB_FIFO	DB 1062	FB 1062	FIFO DB - Instance DB of PRE_FIFO_DATA

4. Save and close the symbol table.

   The data block is created.

5. Configure the automatic data transfer to WinCC for the newly created data block:

   – Select "Special object properties > Operating and monitoring" from the shortcut menu of the data block.

   – Select the "Operating and monitoring" option.

   – Click "Save" and return to the user program.

   The network code is now displayed correctly.

```
CALL  "PRE_SUM" , "DB_CALCNEW"
 FIFO        :="DB_FIFO".FIFO
 SAMPLE_T    :=#SAMPLE_T
 RUNUPCYC    :=10
 INP_SEL     :=3
 CSF         :=FALSE
 VALUE_P     :=
 QC_P        :=
 VALUE_D     :=
 QC_D        :=
 VALUE_R     :=
```

6. Set the following parameters:
   - `ACTUAL1 :=` <Address of the measuring device>, e.g., `ACTUAL1 := ED20`
   - `ARSNO_S :=` <Archive ID>, e.g., `ARSNO_S := W#16#5`
   - `ARSNO_V :=` <Archive ID>, e.g., `ARSNO_V := W#16#105`

```
MAX_CNT       :=
CALC_EN       :=0
ACTUAL1       :=ED20                  // Input value 1
QC_ACT1       :=
ACTUAL2       :=
QC_ACT2       :=
ACTUAL3       :=
QC_ACT3       :=
CALC_P0       :=
CALC_P1       :=1.000000e+000
CALC_P2       :=
CALC_P3       :=
ZERO_CUT      :=
ARSNO_S       :=W#16#5
ARSNO_V       :=W#16#105
ARSNO_C       :=
PER_T         :=1.000000e+001
SYNC_PER      :="DB_SYNC_15MIN".SYNC_PER
SYNC_P        :="DB_SYNC_15MIN".SYNC_OUT
SYNC_TS       :="DB_SYNC_15MIN".SYNC_TS
```

7. Download the user program to the PLC.
8. Run the "Compile OS" wizard.

Copy the faceplate and connect with the process tag.

To copy the existing faceplate and connect to the process tag, follow these steps:

1. Open the configured OS in STEP 7.
2. Open the process picture that contains the faceplate of the old process tag.
   Copy the corresponding faceplate.
3. Select the copied faceplate and open the dynamic wizard "Connect faceplate with process tag". Use the structure type of the new data block, e.g., DB_CALCNEW, as parameter.
4. Save the process picture and close the Graphics Designer.
5. Open the Powerrate wizard in WinCC Explorer.
6. Select the "Configuration of the process value archive" option in the Powerrate wizard.

Result

The new process tag is configured. The new faceplate is linked with the structure tag in WinCC. The acquired measured values are archived in tag logging.

See also

Compiling the OS (Page 54)

Run powerrate wizard (Page 66)

Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)

2.6 Configuring switches with PRE_SWTCH / PR3_SWTCH

2.6.1 Relationship between the block icon and S7 block PRE_SWTCH / PR3_SWTCH

Introduction

The PRE_SWTCH / PR3_SWTCH function block is used to display and operate a switch via digital inputs and outputs.

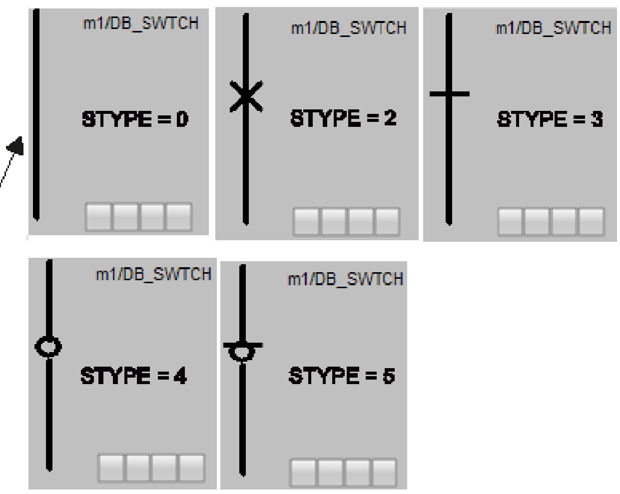
Switch types

You can modify the type of switch with the STYPE input parameter. The default value is 0. The following switch types are possible depending on the value:

- 0 = General switch
- 2 = Circuit-breaker
- 3 = Disconnector
- 4 = Mechanical switch
- 5 = Switch-disconnector

```
Network 1: Status switch
Comment:

      CALL  "PR3_SWTCH" , "DB_SWTCH"
       SAMPLE_T :=#SAMPLE_T
       RUNUPCYC :=10
       CSF      :=
       L_RESET  :=
       MONITOR  :=TRUE
       EN_TRIP  :=TRUE
       EN_UNPLUG:=TRUE
       MT_TYPE  :=
       OFF      :="SIMULATION".SWITCH1_OFF
       QC_OFF   :=
       ON       :="SIMULATION".SWITCH1_ON
       QC_ON    :=
       OFFOP_EN :="SIMULATION".SWITCH1_OFFOP_EN
       ON_OP_EN :="SIMULATION".SWITCH1_QON
       QC_OFF_I :=
       QC_ON_I  :=
       TRIP     :="SIMULATION".SWITCH1_TRIP
       QC_TRIP  :=
       UNPLUG   :="SIMULATION".SWITCH1_UNPLUG
       QC_UNPLUG:=
       TIME_MON :=1.000000e+001
       STYPE    :="SIMULATION".SWITCH1_STYPE
```



Status of the switch

The input parameters ON, OFF, TRIP and UNPLUG are used to generate the switch state.

If there is a "FALSE" state for EN_TRIP or EN_UNPLUG, the TRIP and UNPLUG input parameters are not evaluated.

The following switch states are formed dependent on the inputs and displayed in the faceplate and icon:

State 1)	Output 2) QSTATUS	Input ON	Input OFF	Input TRIP	Input UNPLUG
On	Bit 0	TRUE	FALSE	FALSE	FALSE
Off	Bit 1	FALSE	TRUE	FALSE	FALSE
Tripped	Bit 2	X	X	TRUE	FALSE
Unplugged	Bit 3	X	X	X	TRUE

1) Cells marked with X are irrelevant in this state and are not evaluated. States not in the table are considered undefined.

Activation

The following factors determine if you can switch from the faceplate (QON_OP, QOFFOP):

- State of the switch
- Input parameters for the operator control enables (ON_OP_EN, OFFOP_EN)

The QON and QOFF output signals are set according to the operation. After reaching the requested state or after the monitoring time expires, the signals are reset.

Monitoring

The faceplate monitors the duration of a switching action. The monitoring time is set with TIME_MON. If the requested switch state is not reached within the monitoring time, the QMON_ERR output parameter is set. The block enters an error state.

If the configured monitoring time is not equal to 0, the QERR output is set when the time expires.

QMON_ERR is reset if RESET or L_RESET is set.

This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.
The issued command is revoked.

2.6.2 Configuring faceplate for PRE_SWTCH / PR3_SWTCH

Introduction

You set the required inputs on the S7 block with a switch set in the WinCC process picture.

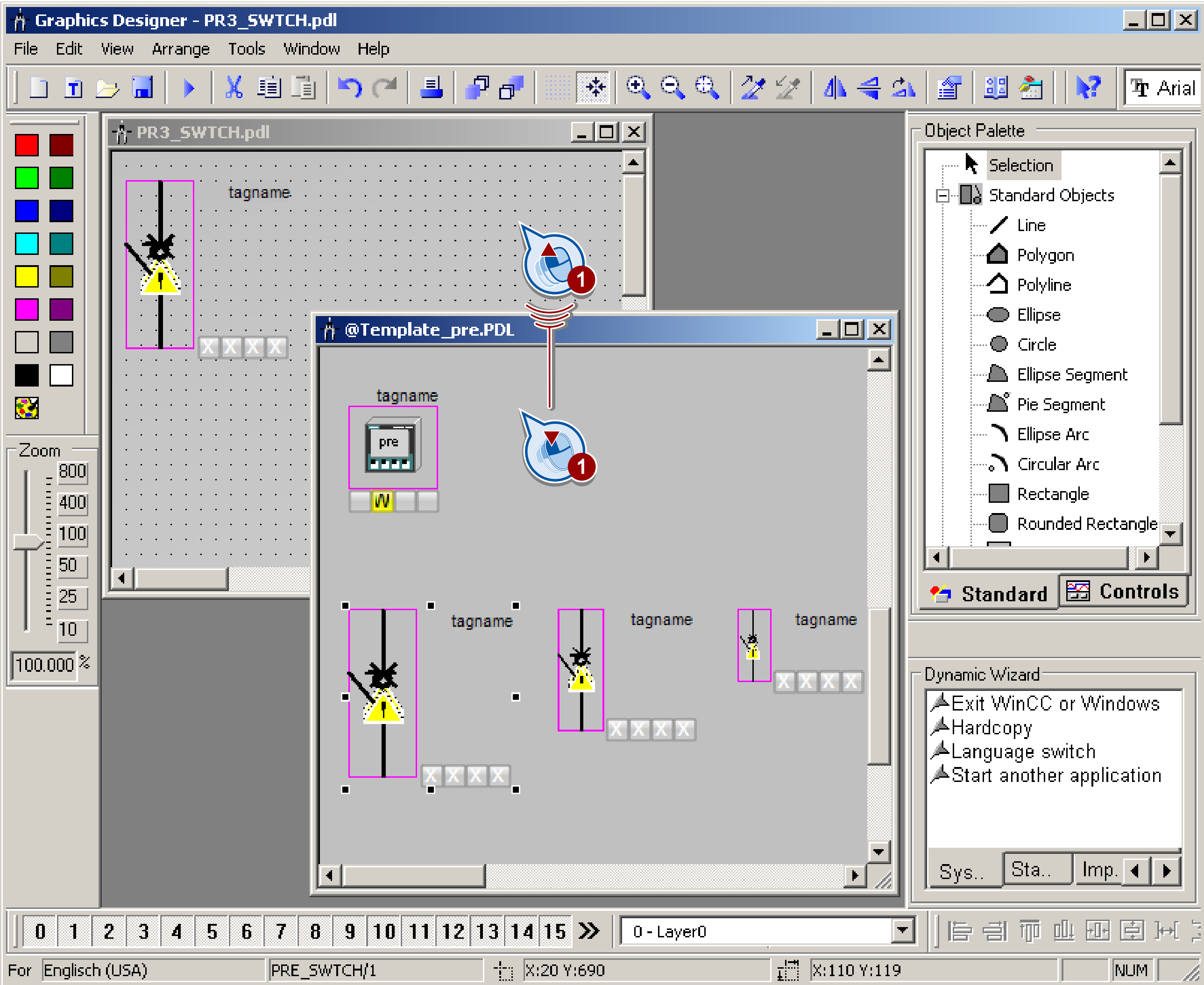
To configure the faceplate for PRE_SWTCH / PR3_SWTCH, use the same procedure as the one used for the faceplate for PRE_SUM / PR3_SUM. For additional information, refer to "Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)".

Requirements

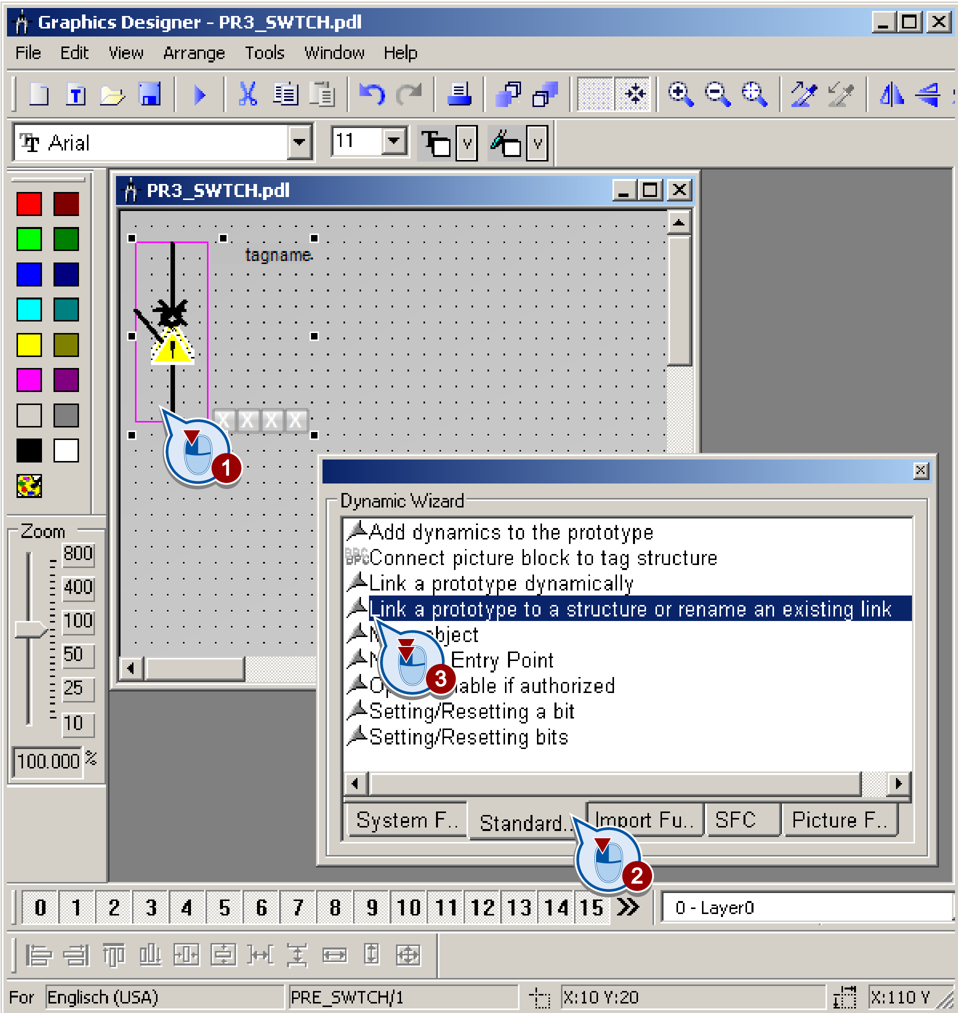
- "Compile OS" was executed.
- The OS project editor has been run.
- You have opened a process picture in the WinCC Graphics Designer in which the block icon is to be displayed.

Procedure

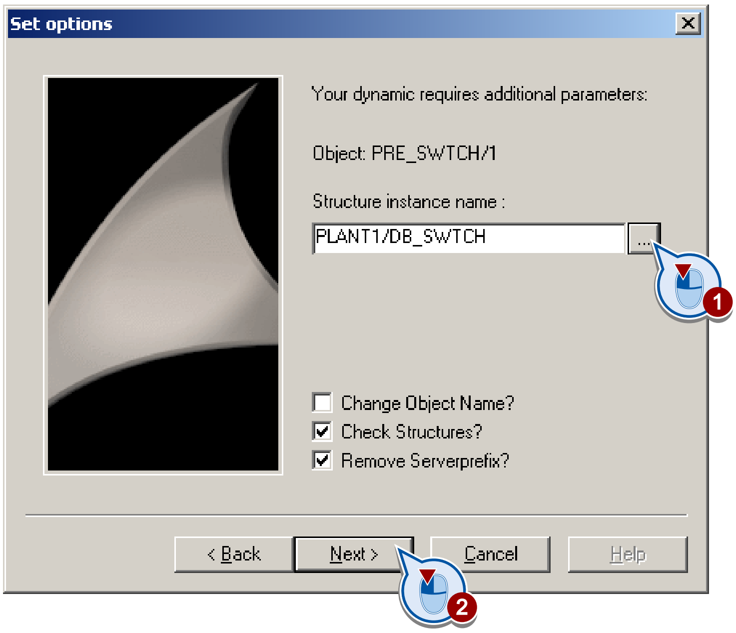
1. Copy the "PR3-SWTCH/1" block icon into your process picture from the "@Template_pre.PDL" template process picture.



2. Select the block icon and start the "Link a prototype to a structure or rename an existing link" Dynamic Wizard.



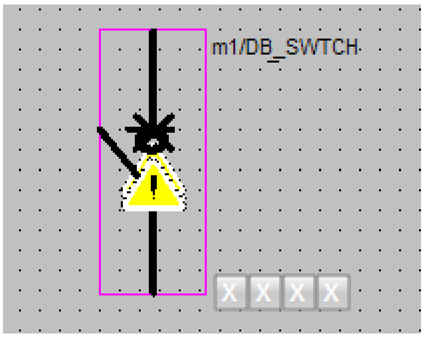
3. Link the faceplate with the "<tagname>/DB_SWTCH" structure tag.



4. Save the process picture.
5. In the "Picture Tree Manager" editor, insert a new container for the created process picture.

Result

The faceplate is linked to the structure tag "<tagname>/DB_SWTCH".
The process picture can be displayed in runtime.



2.6.3 Operating the PRE_SWTCH / PR3_SWTCH faceplate in Runtime

Introduction

When you activate the WinCC project in Runtime, the faceplates are displayed with the corresponding values.

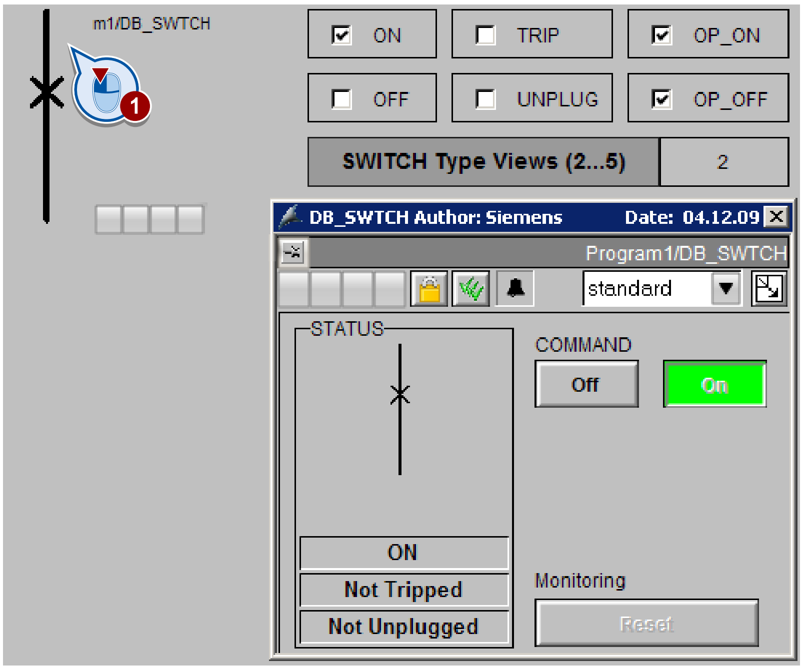
In the description of the PRE_SWTCH / PR3_SWTCH (Page 387) block you will find a detailed description of the icons (Page 392) and the faceplate (Page 393).

Requirements

- The S7-300 or the S7-400 is linked to the configuring PC.

Opening a faceplate

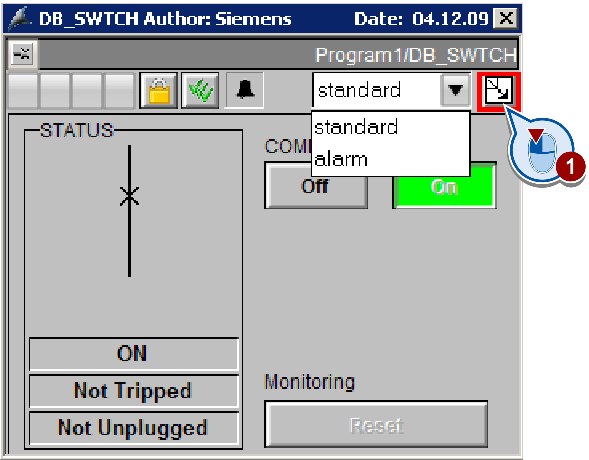
You open the faceplate by clicking the block icon in the process picture in WinCC Runtime.

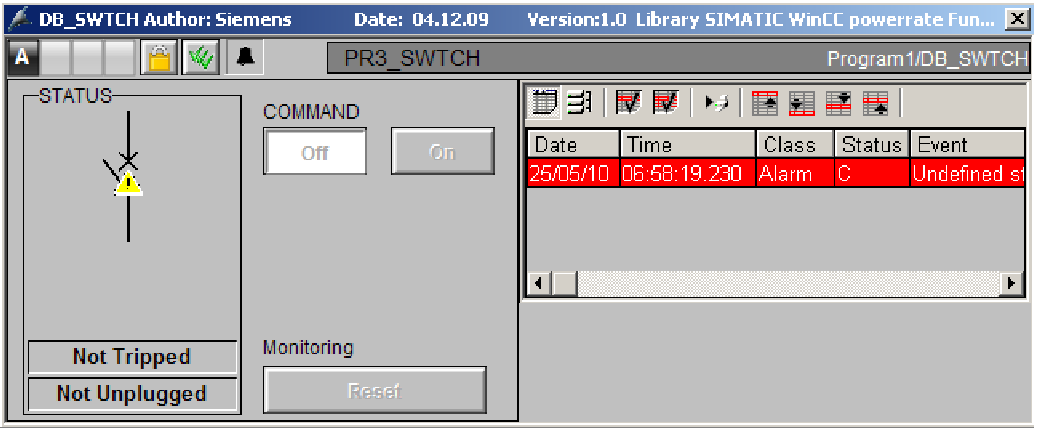


Views

You can select the various views using the drop-down menu.

You can open the loop display by selecting the corresponding icon.





2.7 Configuration of PAC3200/PAC4200 with PRE_PAC / PR3_PAC

2.7.1 Relationship between the block icon and S7 block PRE_PAC / PR3_PAC

Introduction

The PRE_PAC / PR3_PAC function block is used when the 7KM PAC3200 and 7KM PAC4200 measuring devices are employed:

- Display of select measured values
- Reporting status information

To process the values of the measuring devices in powerrate, you have to configure the measuring device in your STEP 7 project. To do this, open the PLC in HW Config, insert the field device and configure the device.

SIMATIC PCS 7 block library PAC3200

To connect the measuring devices to a SIMATIC PCS 7 process control system or a SIMATIC WinCC SCADA system, use the block libraries of PAC3200. CDs containing these libraries are included in the SIMATIC powerrate scope of delivery.

The block libraries contain a diagnostics block, a PCS 7 block for recording measured values as well as user objects and operating blocks for operating and monitoring measured value data on the OS.

Measured value display

For the measured value display, select the data of the base type 1 and 2 in HW Config. Configure each of the basic data types you wish to display by assigning parameters to PAC.

If you use the BASADR1 and BASADR2 parameters, these parameters must always be assigned the logical basic address of the basic types 1 and 2.

Use the TYPE_x parameter to define the measurement type.

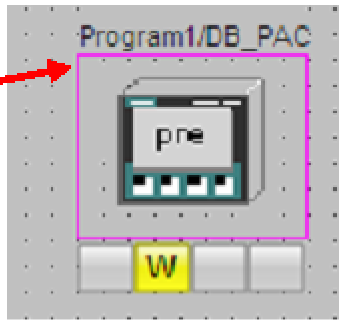
Measurement type TYPE_x	Basic type	Meaning	Unit of measurement
1	1	Current L1	A
2	1	Current L2	A
3	1	Current L3	A
4	1	Total active power	W
5	2	Voltage PH-PH L1-L2	V
6	2	Voltage PH-PH L2-L3	V
7	2	Voltage PH-PH L3-L1	V
8	2	Total power factor	-

The active energy is read out and displayed dependent on the EN_ACENER parameter.

```
Network 2: Status PAC3200 / PAC4200

Comment:

      CALL  "PR3_PAC" , "DB_PAC"
       RUNUPCYC   :=10
       BASADR1    :=256
       BASADR2    :=276
       CSF        :=
       EN_ACENER  :=TRUE
       TYPE_1     :=1
       TYPE_2     :=2
       TYPE_3     :=3
       UNITVOLT   :=
       UNITACPOW  :=
       UNITACENER :=
       MSGEVID1   :=DW#16#60000040
       MSGEVID2   :=DW#16#60000041
       MSGEVID3   :=DW#16#60000042
       MSGEVID4   :=DW#16#60000043
       MSGEVID5   :=DW#16#60000044
       CMP_ID     :=DW#16#10
       QBAD       :=
       QPARAMF    :=
       QE_VOLTOVER:=
       QE_CUROVER :=
       QE_PULSOVER:=
       STATDIAG   :=
```



Status information

The status information is output to the STATDIAG parameter. The bits relevant for the messages are also output to binary output parameters.

Assignment of the status double word STATDIAG:

Byte	Bit	Binary status information	Block parameters
0	0	No synchronization pulse	-
0	1	Local configuration enabled	-
0	2	Voltage too high	QE_VOLTOVER
0	3	Current too high	QE_CUROVER
0	4 ... 7	Reserved	-
1	0	Reserved	-
1	1	Maximum pulse rate exceeded	QE_PULSOVER
1	2 ... 7	Reserved	-
2	0	Relevant parameter changes	-
2	1	High and low limit violations	-
2	2	Maximum pulse rate exceeded	QE_PULSOVER
2	3	Restart of the device	-
2	4	Reset of the energy meter by the user	-
2	5 ... 7	Reserved	-
3	0 ... 7	Reserved	-

2.7.2 Configuring the faceplate for PRE_PAC / PR3_PAC

Introduction

If you work with the PAC3200 or PAC4200 measuring instruments, you can display the measured values and status information with the PRE_PAC / PR3_PAC faceplate.

To do this, the measuring instrument must be configured for the PLC in the hardware configuration.

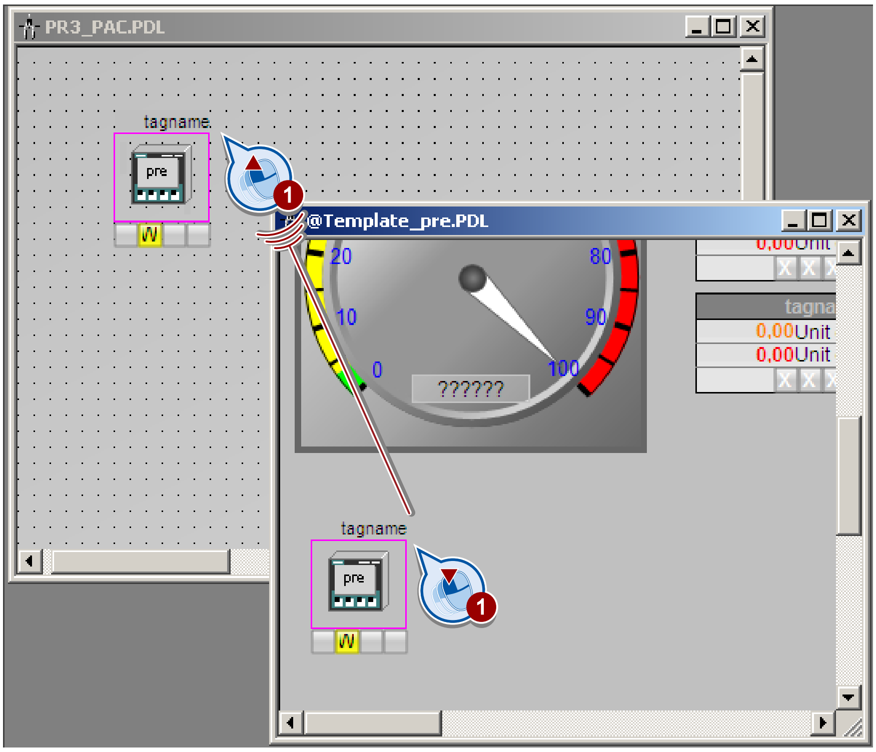
When you configure the faceplate for PRE_PAC / PR3_PAC, follow the procedure you use for the faceplate of PRE_SUM / PR3_SUM. For additional information, please refer to "Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)".

Requirements

- "Compile OS" was executed.
- The OS project editor has been run.
- You have opened a process picture in the WinCC Graphics Designer in which the block icon is to be displayed.

Procedure

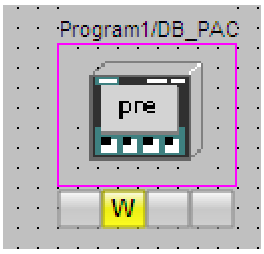
1. Copy the "PRE_PAC/1" or "PR3_PAC/1" block icon into your process picture from the template process picture "@Template_pre.PDL".



2. Select the block icon and start the "Link a prototype to a structure or rename an existing link" Dynamic Wizard.
3. Link the faceplate to the "<tagname>/DB_PAC" structure tag.
4. Save the process picture.
5. In the "Picture Tree Manager" editor, insert a new container for the created process picture.

Result

The faceplate is connected to the "<tagname>/DB_PAC" structure tag.
The process picture can be displayed in runtime.



2.7.3 Operating the PRE_PAC / PR3_PAC faceplate in runtime

Introduction

When you activate the WinCC project in Runtime, the faceplates are displayed with the corresponding values.

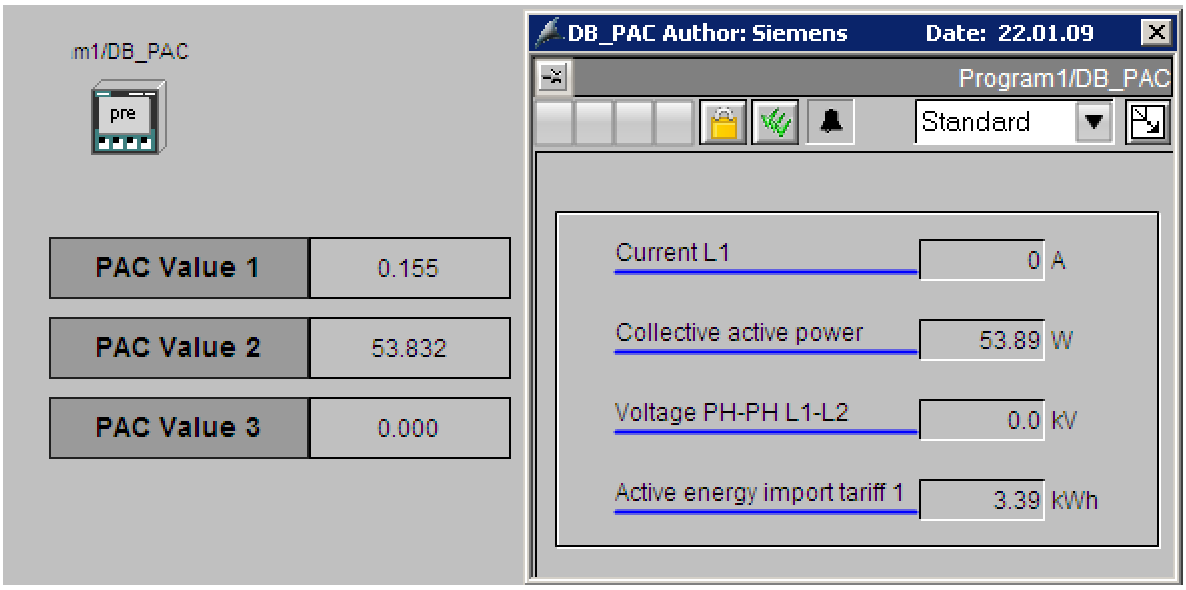
The description of the PRE_PAC / PR3_PAC (Page 327) faceplate provides you with a detailed description of the icons (Page 333) and the faceplate (Page 333).

Requirements

- The S7-300 or the S7-400 is linked to the configuring PC.

Opening a faceplate

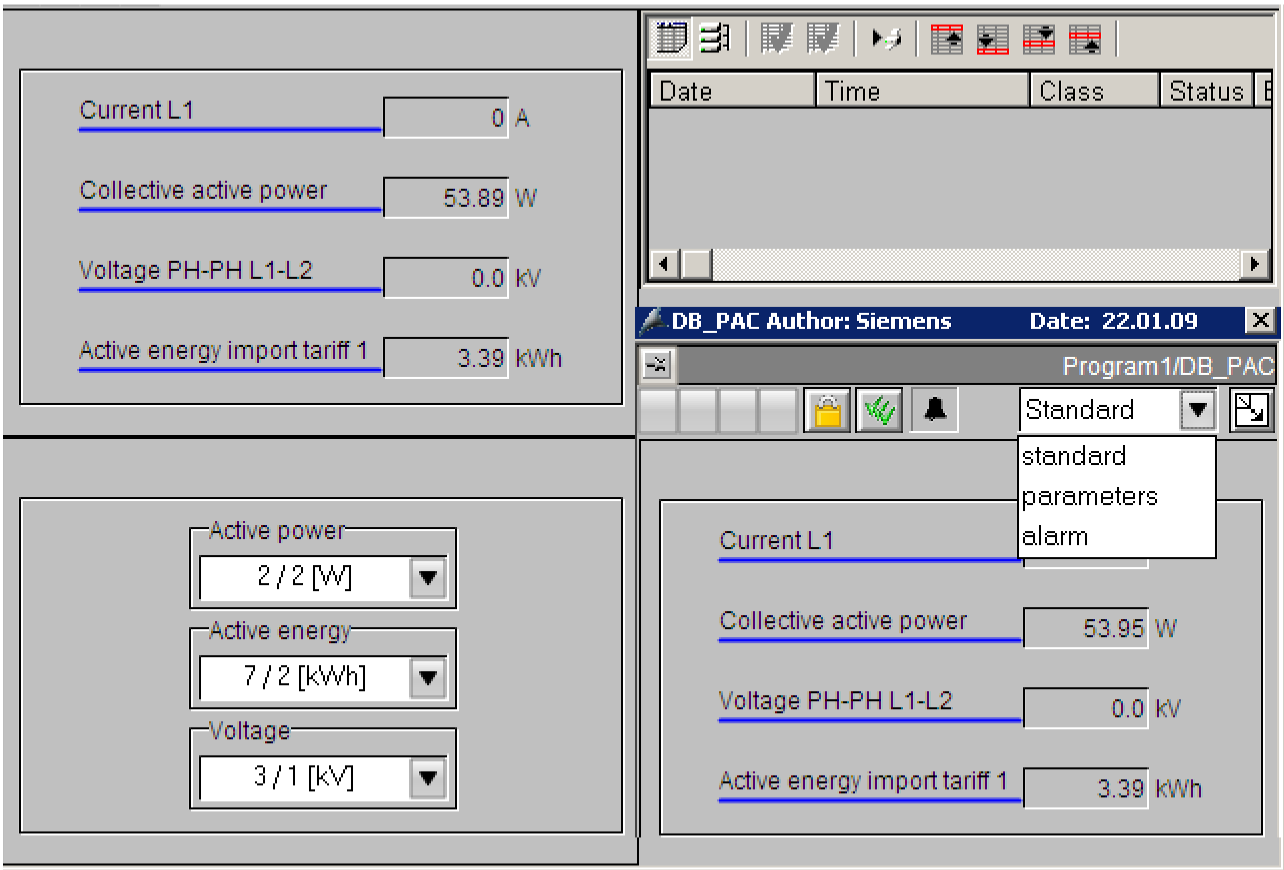
You open the faceplate by clicking the block icon in the process picture in WinCC Runtime.



Views

You can select the various views using the drop-down menu.

You can open the loop display by selecting the corresponding icon.



See also

Description of icons and faceplates (Page 333)

2.8 Parameters for communication with user archives

Introduction

You need to create a suitable AS program to transfer values. Note the following information in this regard.

Structure of the SYSTEM function

The ""SYSTEM"" function contains the call of the PRE_UA_S / PR3_UA_S block (archive manager for writing), and the call of the PRE_UA_R / PR3_UA_R block (archive manager for reading).

Communication with WinCC in the write direction

The block PRE_UA_S / PR3_UA_S is used by the PRE_SUMC / PR3_SUMC and PRE_LMGM / PR3_LMGM blocks to write to the WinCC archive.

Configure the call of PRE_UA_S / PR3_UA_S block for the communication with WinCC in the write direction:

- Configure the connection IDs ID_1 / ID_2 with the local ID of the connection created in NETPRO (see "Configuring connections (Page 40)").

  ID_2 only needs to be configured when redundant WinCC servers are used.
- Configure a unique request ID R_ID for identifying the communication job

```
Network 4 :  Send to User Archive

Comment:

      CALL  "PRE_UA_S" , "DB_SEND"       FB1078 / DB20      -- Archive manager for
       RUNUPCYC  :=10
       ID_1      :=W#16#1
       ID_2      :=
       R_ID      :=DW#16#1
       REQ001_ST:="DB_ENERGY".QREQ_ST     P#DB14.DBX608.0    -- Request data
       REQ002_ST:="DB_LMGM".QREQ_S_ST     P#DB4.DBX8098.0    -- Archive data send
       REQ003_ST:=
       REQ004_ST:=
       REQ005_ST:=
       REQ006_ST:=
       REQ007_ST:=
       REQ008_ST:=
       REQ009_ST:=
       REQ010_ST:=
```

Communication with WinCC in the read direction

The block PRE_UA_R / PR3_UA_R is used by the PRE_LMGM / PR3_LMGM block to read from the WinCC archives.

Configure the call of PRE_UA_R / PR3_UA_R block for the communication with WinCC in the read direction:

- Configure the connection IDs ID_1 / ID_2 with the local ID of the connection created in NETPRO.

  ID_2 only needs to be configured when redundant WinCC servers are used.
- Configure a unique request ID R_ID for identifying the communication job

```
Network 5 :  Receive from User Archive
Comment:

      CALL  "PRE_UA_R" , "DB_RCV"       FB1079 / DB21      -- Archive manager for
       RUNUPCYC  :=10
       ID_1      :=W#16#1
       ID_2      :=
       R_ID      :=DW#16#2
       REQ001_ST:="DB_LMGM".QREQ_R_ST    P#DB4.DBX8122.0    -- Archive data receiv
       REQ002_ST:=
       REQ003_ST:=
       REQ004_ST:=
       REQ005_ST:=
       REQ006_ST:=
       REQ007_ST:=
       REQ008_ST:=
       REQ009_ST:=
       REQ010_ST:=
       REQ011_ST:=
       REQ012_ST:=
```

2.9 Configuring batch-based energy measurement with PRE_SUMC / PR3_SUMC

2.9.1 The PRE_SUMC / PR3_SUMC block

Introduction

The PRE_SUMC / PR3_SUMC block measures the total energy consumption of a batch. It performs the following tasks:

- Collects the data for batch-related energy measurement
- Assembles the data for archiving
- Forwards the data to the user archive

A maximum of five types of energy are totaled, each from a maximum of ten consumers. The PRE_SUM / PR3_SUM block supplies the work values of the individual consumers.

Recording of energy consumption is started and stopped with an input signal. The block calculates and saves the start time. The default end time is 10/01/1990. After completing the measurement, the end time is updated.

The energy consumption measured in this period is archived in the WinCC user archives. The local time is saved as the time stamp. The archive manager block PRE_UA_S / PR3_UA_S is used for archiving.

For more information on the structure of the user archives and the blocks, refer to "Function - PRE_SUMC / PR3_SUMC (Page 380)".

The following tables briefly explain the most important inputs and outputs of the block and of PRE_UA_S / PR3_UA_S.

PRE_SUMC / PR3_SUMC block parameter

Open PRE_SUMC / PR3_SUMC with an instance data block.

```
Network 1: Charge related energy acquisiton
Comment:

    CALL  "PR3_SUMC" , "DB_ENERGY"          FB177 / DB14
     ID       :=1
     RUNUPCYC:=10
     SAMPLE_T:=#SAMPLE_T
     CUR_TS   :="DB_SYNC_15MIN".CUR_TS       P#DB160.DBX30.0
     DIFF_LOC:="DB_SYNC_15MIN".DIFF_LOC     DB160.DBD38
     ACTIVE   :="SIMULATION".ACTIVE          DB100.DBX44.0
     ARCH_ID  :=1
     UNIT     :="SIMULATION".UNIT            P#DB100.DBX18.0
     BA_ID    :="SIMULATION".BA_ID           DB100.DBD80
     BA_NA    :="SIMULATION".BA_NA           P#DB100.DBX46.0
     REC_NA   :="SIMULATION".REC_NA          P#DB100.DBX84.0
     MAX_VAL  :=3
     VALUNIT1:="SIMULATION".VALUNIT1         P#DB100.DBX288.0
     TYPE1    :="SIMULATION".TYPE1           P#DB100.DBX118.0
     VALUNIT2:="SIMULATION".VALUNIT2         P#DB100.DBX298.0
     TYPE2    :="SIMULATION".TYPE2           P#DB100.DBX152.0
     VALUNIT3:="SIMULATION".VALUNIT3         P#DB100.DBX308.0
     TYPE3    :="SIMULATION".TYPE3           P#DB100.DBX186.0
     VALUNIT4:=
     TYPE4    :=
     VALUNIT5:=
     TYPE5    :=
     VAL1_1   :="DB_PULSE".CUR_VAL           DB10.DBD138
     VAL1_2   :="DB_INTEGER".CUR_VAL         DB11.DBD138
     VAL1_3   :="DB_ANALOG".CUR_VAL          DB12.DBD138
     VAL1_4   :="DB_CALC".CUR_VAL            DB13.DBD138

     COUNT    :=1
     TIME_MON:=6.000000e+001
     SND_ST   :="DB_SEND".QSND_ST              P#DB178.DBX796.0
     MSGEVID1:=DW#16#6000002B
     MSGEVID2:=DW#16#6000002C
     MSGEVID3:=DW#16#6000002D
     MSGEVID4:=DW#16#6000002E
     CMP_ID   :=DW#16#E
```

Important inputs

Input	Meaning
ID	Block ID, unique number for this block
CUR_TS	CUR_TS output of the PRE_SYNC / PR3_SYNC block
DIFF_LOC	DIFF_LOC output of the PRE_SYNC / PR3_SYNC block
ACTIVE	Batches active, start/stop measurement: 1 = Measurement running, 0 = Measurement completed Trigger to send data to the user archives
ARCH_ID	Number of the user archive, for example "PRE_SUMC_<ARCH_ID>" for PRE_SUMC_1
UNIT	Plant name (text, maximum 24 characters)
BA_ID / REC_NA / BA_NA	Used to identify the individual measurements or batch. Active values are also stored in the user archive. BA_ID: Batch ID (DWORD) REC_NA: Recipe name (text, maximum 32 characters) BA_NA: Batch name (text, maximum 32 characters), can be used as a sorting criterion in powerrate reports.
MAX_VAL	Maximum number of energy types (values: 1 to 5) Example: Electric power and gas consumption is to be measured. Inputs VAL_1_1 to VAL1_10 and VAL2_1 to VAL2_20 are connected for this purpose. This means MAX_VAL equals 2.
VALUNITx	Unit of energy type x [1)], e.g. kWh or m³
TYPEx	Energy type x [1)], e.g. electrical
VALx_y	Current work value of the energy type x [1)] of load y [2)] Connect the VALx_y inputs to the outputs of the PRE_SUM / PR3_SUM blocks Up to 10 measured values of energy can be added for each energy type. The energy values must have the same synchronization period (for example, 15 minutes) within an energy type (for example, VAL1_1 to VAL1_3). VAL_2_1 to VAL2_10 can have a different period, for example, 60 minutes.
SND_ST	QSND_ST output of the PRE_UA_S / PR3_UA_S block

1) "x" stands for the possible values 1 to 5.

2) "y" stands for the possible values 1 to 10.

Important outputs

Output	Meaning
QREQ_ST	REQx_ST input of the PRE_UA_S / PR3_UA_S block
CUR_VALx	Current total energy value of the corresponding energy type 1)
LASTVALx	Last archived total energy value of the corresponding energy type 1)

1) "x" stands for the possible values 1 to 5.

PRE_UA_S / PR3_UA_S block parameter

The PRE_UA_S / PR3_UA_S block writes the measured values to the WinCC user archives. When load management is used, detail information on limit violations and configuration data is written to the user archives with this block.

Enter the partner ID of the S7 connection at the ID_1 parameter of the block.
The parameter at the R_ID input is needed for creating the raw data tags in WinCC.
(Configuring connections (Page 40))

Connect the REQ001_ST input to the QREQ_ST output of the PRE_SUMC / PR3_SUMC block.

```
Network 4: Send to User Archive
Comment:

      CALL  "PR3_UA_S" , "DB_SEND"       FB178 / DB178      -- Archive manager for
       RUNUPCYC :=10
       ID_1     :=W#16#1
       ID_2     :=
       R_ID     :=DW#16#1
       REQ001_ST:="DB_ENERGY".QREQ_ST    P#DB14.DBX628.0    -- Request data
       REQ002_ST:="DB_LMGM".QREQ_S_ST    P#DB4.DBX1306.0    -- Archive data send
       REQ003_ST:=
       REQ004_ST:=
       REQ005_ST:=
       REQ006_ST:=
```

Important inputs

Input	Meaning
ID_1	Partner ID of the S7 connection
ID_2	Only required for redundant connections
R_ID	A connection to the user archives is needed for the BSEND/BRCV raw data tag.

For additional information on the block, refer to "Function - PRE_UA_S / PR3_UA_S (Page 404)".

See also

PRE_SYNC / PR3_SYNC: Time synchronization (Page 394)

2.9.2 Creating an AS program for batch-related energy measurement

Introduction

You need to create a suitable AS program to transfer values. Configure the block for batch-related energy measurement. Then, download the configuration to the controller and run "Compile OS".

Note the following information in this regard.

Structure of the UNIT function

The "UNIT" function contains the call of the block PRE_SUMC / PR3_SUMC.

```
Network 1: Charge related energy acquisiton

Comment:

      CALL  "PRE_SUMC" , "DB_ENERGY"       FB1077 / DB14       -- Charge related er
       ID       :=1
       RUNUPCYC:=10
       SAMPLE_T:=#SAMPLE_T
       CUR_TS   :="DB_SYNC_15MIN".CUR_TS   P#DB1.DBX30.0       -- Current time star
       ACTIVE   :=
       ARCH_ID  :=1
       UNIT     :=
       BA_ID    :=
       BA_NA    :=
       REC_NA   :=
       MAX_VAL  :=1
       VALUNIT1:=
       TYPE1    :=
       VALUNIT2:=
       TYPE2    :=
       VALUNIT3:=
       TYPE3    :=
       VALUNIT4:=
       TYPE4    :=
       VALUNIT5:=
       TYPE5    :=
       VAL1_1   :="DB_PULSE".CUR_VAL       DB10.DBD114         -- Current accumulat
       VAL1_2   :="DB_INTEGER".CUR_VAL     DB11.DBD114         -- Current accumulat
       VAL1_3   :="DB_ANALOG".CUR_VAL      DB12.DBD114         -- Current accumulat
       VAL1_4   :="DB_CALC".CUR_VAL        DB13.DBD114         -- Current accumulat


       VAL5_8   :=
       VAL5_9   :=
       VAL5_10  :=
       COUNT    :=1
       TIME_MON:=6.000000e+001
       SND_ST   :="DB_SEND".QSND_ST     P#DB20.DBX3088.0    -- Archive data
       MSG_EVID:=DW#16#C
       QPARAMF  :=
       QERR     :=
       QMON_ERR:=
       QOVL     :=
```

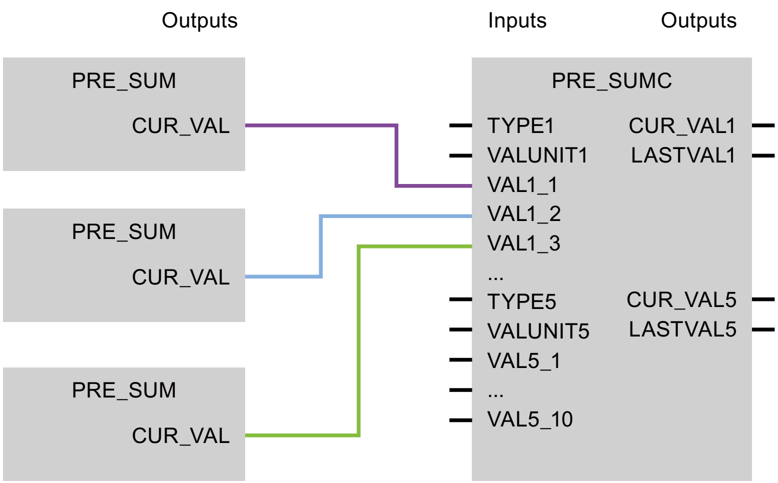
Special considerations when using an S7-300

- Connect the DIFF_LOC input to the DIFF_LOC output of the PR3_SYNC block.

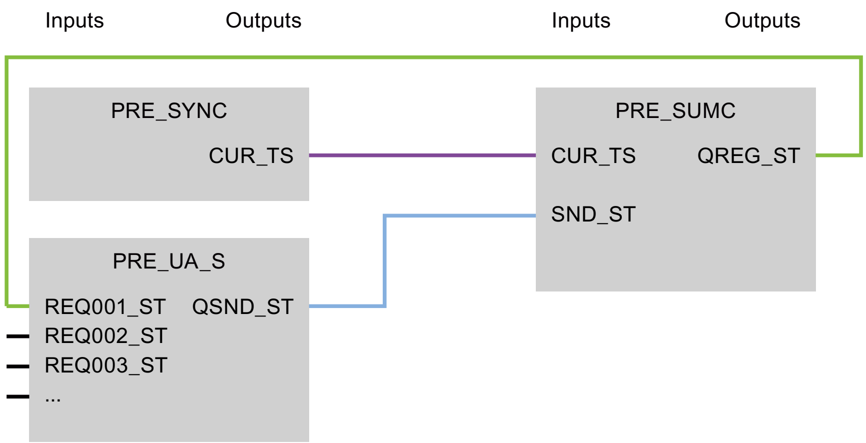
Basic interconnection of the PRE_SUMC block

The graphics apply equally to PR3_SUMC and the correspondingly connected blocks for S7-300.

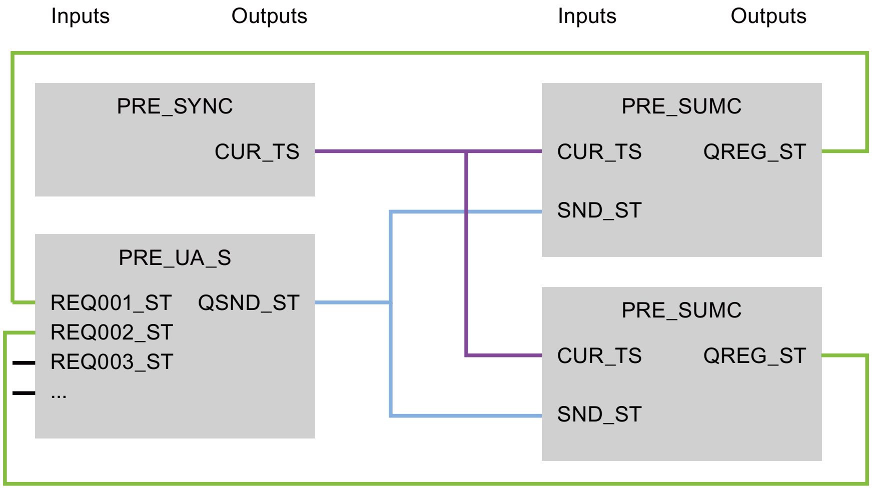
Interconnection with PRE_SUM block



Interconnection with PRE_UA_S and PRE_SYNC blocks



Interconnection of two PRE_SUMC blocks to PRE_UA_S and PRE_SYNC



2.9.3 Creating a WinCC UserArchiveControl for PRE_SUMC / PR3_SUMC

Introduction

The total energy consumption of a batch is stored in WinCC user archives.

Configure an WinCC UserArchiveControl in your process picture to display the values during runtime.

Requirement

- powerrate Wizard has been run with the "Configuration of user archives for batch-related energy measurement" option.

  The wizard has created and configured the following objects in this case:

  – Raw data tag tagname/DB_RCV/DATA

  – Raw data tag tagname/DB_SEND/DATA

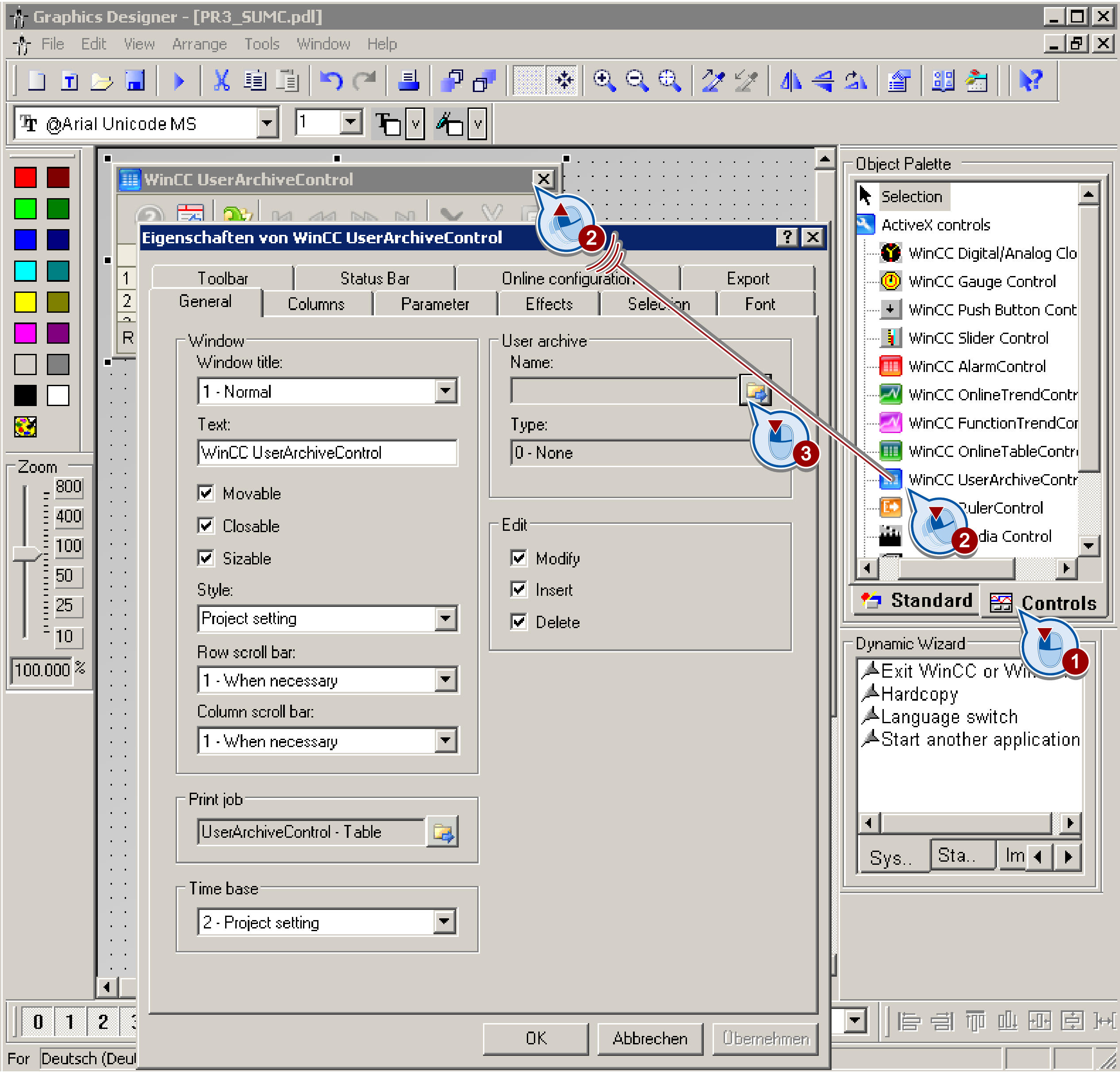
  – C action PRE_UA_S.pas

  – C function PR3_SetDiff_UTC_Localtime.pas

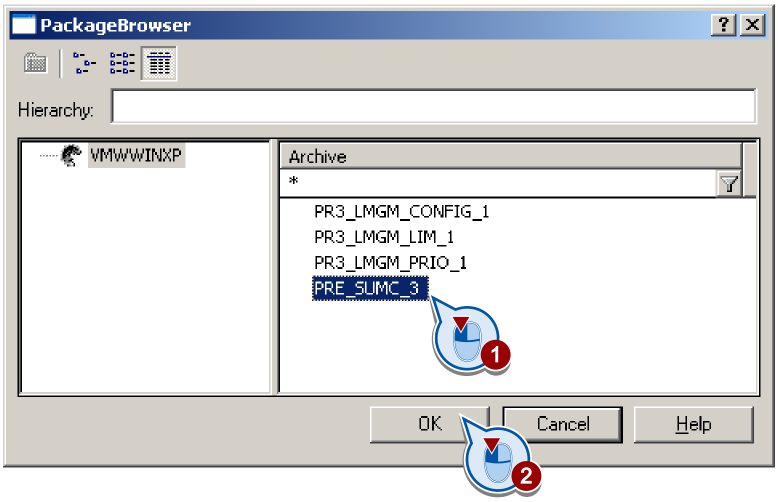
  – User archive PRE_SUMC_1

Procedure

1. Insert a WinCC ActiveX control "WinCC UserArchiveControl" into the process picture. The configuration dialog opens.


Graphics Designer - [PR3_SUMC.pdl]
File Edit View Arrange Tools Window Help
WinCC UserArchiveControl
Eigenschaften von WinCC UserArchiveControl
Toolbar
Status Bar
Online configuration
Export
General
Columns
Parameter
Effects
Selection
Font
Window
Window title:
1 - Normal
Text:
WinCC UserArchiveControl
Movable
Closable
Sizable
Style:
Project setting
Row scroll bar:
1 - When necessary
Column scroll bar:
1 - When necessary
Print job
UserArchiveControl - Table
Time base
2 - Project setting
User archive
Name:
Type:
0 - None
Edit
Modify
Insert
Delete
OK
Abbrechen
Übernehmen
Object Palette
Selection
ActiveX controls
WinCC Digital/Analog Clo
WinCC Gauge Control
WinCC Push Button Cont
WinCC Slider Control
WinCC AlarmControl
WinCC OnlineTrendContr
WinCC FunctionTrendCor
WinCC OnlineTableContr
WinCC UserArchiveContr
Standard
Controls
Dynamic Wizard
Hardcopy
Language switch
Start another application
Zoom
1
2
3

2. Connect the "PRE_SUMC_1" user archive in the "General" tab.



3. Close the dialog and save the picture.

Result

WinCC UserArchiveControl is connected to the user archive.

Configure WinCC UserArchiveControl. You can find additional information in WinCC Information System under "Options > User Archive > WinCC UserArchiveControl".

See also

Function - PRE_SUMC / PR3_SUMC (Page 380)

2.10 Configuration of load management with PRE_LMGM / PR3_LMGM

2.10.1 Load management with SIMATIC powerrate

Basics of load management

In the context of energy management, load management means monitoring the power limits for each time interval. This time interval is specified by the power utility, for example, it is usually 15 minutes for electricity and one hour for gas.

SIMATIC powerrate provides the following monitoring and control functions:

- Calculation of the differential power based on the actual consumption
- Monitoring the reference limit
- Warning for limit violation
- Disabling and enabling consumers to avoid limit violations based on the priorities assigned by the user

General information about the configuration

The configuration data of load management are stored in the WinCC user archives.

Therefore in Runtime you will require a WinCC UserArchives license.

You configure load management in the faceplate in WinCC Runtime. If you change and save the parameters of the individual views, the data is loaded in the controller and written to the WinCC user archives. For additional information, refer to "Description of icons and faceplates (Page 307)".

Read the notes under "General information on configuration - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 264)".

2.10.2 The PRE_LMGM / PR3_LMGM block

Introduction

SIMATIC powerrate includes the basic configuration for load management with the PRE_LMGM / PR3_LMGM block and the LMGM function.

The consumption values are assigned to individual consumers and compared with the setpoints. During peak loads, low-priority consumers are stopped and started again when the consumption drops accordingly. The starting conditions can be set for this process.

You configure these specification in the faceplates of WinCC. You specify the basic interconnection for value measurement and processing in the block.

Blocks with varying capacities are provided depending on the number of consumers:

- PRE_LMGM_10 / PR3_LMGM_10 up to 10 consumers
- PRE_LMGM_25 / PR3_LMGM_25 up to 25 consumers
- PRE_LMGM_50 / PR3_LMGM_50 up to 50 consumers
- PRE_LMGM_75 / PR3_LMGM_75 up to 75 consumers
- PRE_LMGM / PR3_LMGM up to 100 consumers

For additional information on the block, refer to "PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x: Load management (Page 261)".

Important inputs

```
L      3
T      "DB_LMGM".MAX_LOAD


CALL  "PR3_LMGM_10" , "DB_LMGM"
 ID            :=2
 ARCH_ID       :=1
 CFG_MAX       :=
 SYNC_P        :="DB_SYNC_15MIN".SYNC_OUT
 SYNC_PER      :="DB_SYNC_15MIN".SYNC_PER
 CUR_TS        :="DB_SYNC_15MIN".CUR_TS
 LAST_VAL      :="DB_INFEED".LAST_VAL
 QC_LAST_VAL   :="DB_INFEED".QC_LAST_VAL
 CUR_VAL       :="DB_INFEED".CUR_VAL
 QC_CUR_VAL    :="DB_INFEED".QC_CUR_VAL
 EST_VAL       :="DB_INFEED".EST_VAL
 QC_EST_VAL    :="DB_INFEED".QC_EST_VAL
 CUR_PWR       :="DB_INFEED".CUR_PWR
 QC_CUR_PWR    :="DB_INFEED".QC_CUR_PWR
 AVG_PWR       :="DB_INFEED".AVG_PWR
 QC_AVG_PWR    :="DB_INFEED".QC_AVG_PWR
 EST_PWR       :="DB_INFEED".EST_PWR
 QC_EST_PWR    :="DB_INFEED".QC_EST_PWR
 SND_ST        :="DB_SEND".QSND_ST
 RCV_ST        :="DB_RCV".QRCV_ST
```

Input	Meaning
MAX_LOAD	Maximum number of consumers
ID	Batch ID, unique number for this block
ARCH_ID	Number of the user archive, for example "PRE_LMGM_CONFIG_<ARCH_ID>" for PRE_LMGM_CONFIG_1
SYNC_P / SYNC_PER / CUR_TS	Synchronization pulse, time interval, time stamps in the block call Connect these inputs to the outputs of the PRE_SYNC / PR3_SYNC block.
SND_ST / RCV_ST	Acknowledgment from the send request / receive request of the archive manager Connect these inputs to the outputs of the PRE_UA_S / PR3_UA_S and PRE_UA_R / PR3_UA_R blocks.
Inputs marked with red	The inputs represent the preprocessed input values. Connect the inputs to the outputs of the PRE_SUM / PR3_SUM block.

Configuration of consumers

The maximum number of consumers is specified by the block used. The block PRE_LMGM_10 / PR3_LMGM_10 can manage up to 10 consumers, for example. The MAX_LOAD input sets the maximum number of inputs by which consumers are connected.

Configure the appropriate settings for each consumer. In the following description, "x" always stands for the number of the configured consumer.

MODEx

The type of consumer is set with the MODEx input:

- 1: The current actual power of the consumer is evaluated. The rated power is evaluated at power-on.
- 2: As long as the consumer is switched on, the rated power is continually evaluated.
- 3: Only the rated power of the consumer is known. The state of the consumer is read from the QONx output.

Additional inputs are set depending on the type of consumer:

- The Px input contains the current consumer power (actual power).
- The rated power is specified at the CAPx input. The rated power always serves as the basis for performing a calculation during connection.
- The ONx input indicates the control state of the consumer.
- The QC_Px and QC_Onx inputs contain a quality code for the Px and ONx inputs. This code indicates, for example, if the power measurement provides a valid value.

Timers

The following timers are configured for every consumer:

- MIN_ONx = Minimum on-time

  How long the consumer must remain enabled following its release before it can be locked again.
- MIN_OFFx = Minimum off-time

  The minimum amount of time the consumer must be shed before it can be released again.
- MAX_OFFx = Maximum off-time

  Maximum amount of time the consumer can be shed before it can be released again. The value "0" means that there is no maximum off-time.

Enables

The EN_SHEDx input indicates whether a consumer can be removed from the load management.

The MAN_ENx input indicates whether manual mode is released or locked.

The MANx input indicates if manual mode is enabled.

Priority list

The priority of the consumer is configured as a number from 1 to 255 at the PRIOx input.

- Priority "1" means that the consumer is switched off first.
- Priority "0" means that the consumer does not participate in load management or that no consumer is present.

Rolling loads

The ROLLx input indicates whether this is a rolling consumer within the priority group. Rolling consumers all have the same priority and are switched off successively. The order is determined by the ROLLx parameter.

Example: A large hall has six ventilation fans. In order to switch off each fan once in turn, they are configured as rolling consumers with the same priority.

Rates

You can use the block to specify the operating limit or power limit for each of the three rates:

- On-peak tariff
- Off-peak tariff
- Sunday rate / holiday rate

The BEG_HT and BEG_NT inputs contain the start of the on-peak tariff and off-peak tariff.

PRE_SUM / PR3_SUM block

The PRE_SUM / PR3_SUM block is used to measure the following values:

- Total energy consumption (CUR_VAL) / total power supply (CUR_PWR)
- Calculation of trends up to end of period (EST_VAL / EST_PWR)
- Average energy values / power values at the end of the time interval

The block parameters must be connected in accordance with PRE_LMGM / PR3_LMGM.

PRE_SYNC / PR3_SYNC block

The three inputs of the LMGM blocks must be connected to the three outputs of the PRE_SYNC block.

PRE_UA_S / PR3_UA_S and PRE_UA_R / PR3_UA_R blocks

The blocks write the parameters from the S7-CPU to the WinCC user archives and read the values.

For additional information, refer to "Configuration of consumers - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 265)".

See also

PRE_SYNC / PR3_SYNC: Time synchronization (Page 394)

Function - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 262)

2.10.3 Creating an AS program for load management

Introduction

You need to create a suitable AS program to transfer values. Note the following information in this regard.

Structure of the LMGM function

The powerrate library contains the "LMGM" function. This feature contains the functionality for load management.

Because the interface of the PRE_LMGM / PR3_LMGM block is too large for representation and editing in the incremental STL editor, the STL source for the ""LMGM"" function is provided and can be edited by the user. Copy this source with the blocks from the powerrate library into your STEP 7 program.

Installing the PRE_LMGM / PR3_LMGM block

Configure the block for load management. Then, download the configuration to the controller and run "Compile OS".

- Configure the link to power and energy values of the PRE_SUM / PR3_SUM block for the supply power
- Transfer the parameters for time synchronization from the PRE_SYNC / PR3_SYNC block.
- Connect the consumers to the state (ONx) and power (Px), if these are present.
- Connect release signal for the consumers (QONx) to the switching logic of the consumer.
- Connect the SND_ST input structure to the QSND_ST output structure of the PRE_UA_S / PR3_UA_S block.
- Connect the QREQ_S_ST output structure to the REQx_ST input structure of the PRE_UA_S / PR3_UA_S block.
- Connect the RCV_ST input structure to the QRCV_ST output structure of the PRE_UA_R / PR3_UA_R block.
- Connect the QREQ_R_ST output structure to the REQx_ST input structure of the PRE_UA_R / PR3_UA_R block.
- Configure unique ID for identification of the block.
- Configure unique ARCH_ID.

  The ARCH_ID determines the number of the WinCC user archive in which the data of the block instance is stored. Each block instance must be assigned a unique ARCH_ID.

Special considerations when using an S7-300

- Connect the DIFF_LOC input to the DIFF_LOC output of the PR3_SYNC block.

Example of S7-400

In the example, the PRE_SUM block is used to measure the supply power which has the DB_PULSE instance data block in the example.

```
FUNCTION "LMGM" : VOID
TITLE =  Call of load management function block
//Author: Siemens              Date:  15.08.07       Version:1.0
//
//Library SIMATIC WinCC powerrate
//Function: Call of load management function block
//KNOW_HOW_PROTECT
AUTHOR : Siemens
FAMILY : pre
NAME : LMGM
VERSION : 1.0


VAR_INPUT
  SAMPLE_T : REAL ;
END_VAR

VAR_TEMP
  i_ret_val: INT;
END_VAR

BEGIN
NETWORK
TITLE = Load management

// Set max. number of loads
      L     10;
      T     DB_LMGM.MAX_LOAD;

      CALL "PRE_LMGM" , DB_LMGM (
           ID                         := 1,
           ARCH_ID                    := 1,
           SYNC_P                     := "DB_SYNC_15MIN".SYNC_OUT,
           SYNC_PER                   := "DB_SYNC_15MIN".SYNC_PER,
           CUR_TS                     := "DB_SYNC_15MIN".CUR_TS,
           LAST_VAL                   := "DB_PULSE".LAST_VAL,
           QC_LAST_VAL                := "DB_PULSE".QC_LAST_VAL,
           CUR_VAL                    := "DB_PULSE".CUR_VAL,
           QC_CUR_VAL                 := "DB_PULSE".QC_CUR_VAL,
           EST_VAL                    := "DB_PULSE".EST_VAL,
           QC_EST_VAL                 := "DB_PULSE".QC_EST_VAL,
           CUR_PWR                    := "DB_PULSE".CUR_PWR,
           QC_CUR_PWR                 := "DB_PULSE".QC_CUR_PWR,
           AVG_PWR                    := "DB_PULSE".AVG_PWR,
           QC_AVG_PWR                 := "DB_PULSE".QC_AVG_PWR,
           EST_PWR                    := "DB_PULSE".EST_PWR,
           QC_EST_PWR                 := "DB_PULSE".QC_EST_PWR,
           SND_ST                     := "DB_SEND".QSND_ST,
           RCV_ST                     := "DB_RCV".QRCV_ST,
           SAMPLE_T                   := #SAMPLE_T,
           P01                        := ED512,
           ON02                       := E1.0,
           QON01                      := A1.0,
           QON02                      := A1.1);

END_FUNCTION
```

2.10.4 User archives for load management

Introduction

SIMATIC powerrate provides configuration files for the user archives required by load management.

The user archives are copied and preconfigured by running powerrate Wizard with the "Configure user archives for load management" option.

The German or English archives are copied to the WinCC project depending on the interface language of powerrate Wizard.

User archives for load management

Three user archives each are created for S7-300 or S7-400:

- List of previous configurations:

  PRE_LMGM_CONFIG_LIST1 / PR3_LMGM_CONFIG_1
- Priority list:

  PRE_LMGM_PRIO_1 / PR3_LMGM_CONFIG_1
- Limit violations:

  PRE_LMGM_LIM_1 / PR3_LMGM_LIM_1

The "1" in the name corresponds to the archive ID from the ARCH_ID parameter at the PRE_LMGM / PR3_LMGM block. You can change this number.

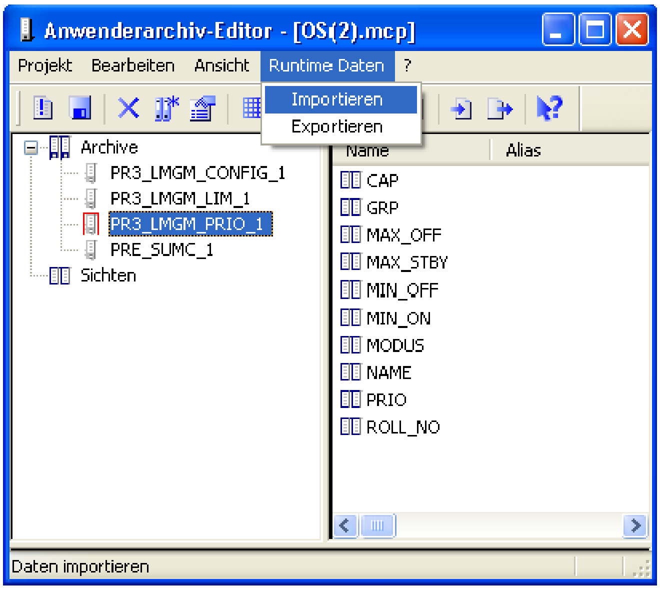
Importing runtime data for assignment of priority list

A file with default mapping is imported for the PRE_LMGM_PRIO_1 / PR3_LMGM_PRIO_1 archive:

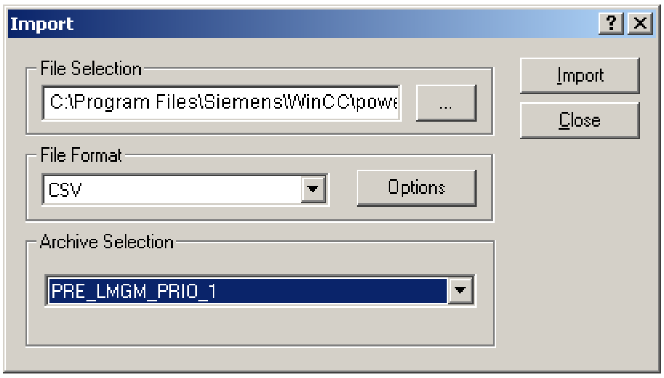
- German: PRx_LMGM_PRIO_Deutsch.csv
- English: PRx_LMGM_PRIO_English.csv

You can edit this file and import it again with Excel:

1. Open the "User Archive" editor and select the menu command "Runtime Data > Import".



2. Select the file and the "PRx_LMGM_PRIO_1" archive in the "Import" dialog.



3. Click "Import" to confirm.

2.10.5 Configuring the faceplate for PRE_LMGM / PR3_LMGM

Introduction

Blocks with varying capacities are provided depending on the number of consumers.
The template process picture contains a corresponding block icon for each of these blocks, for example:

- Block icon "PRE_LMGM_10/1" or "PR3_LMGM_10/1" for the block PRE_LMGM_10 / PR3_LMGM_10 for up to 10 consumers
- Block icon "PRE_LMGM/1" or "PR3_LMGM/1" for the block PRE_LMGM / PR3_LMGM for up to 100 consumers

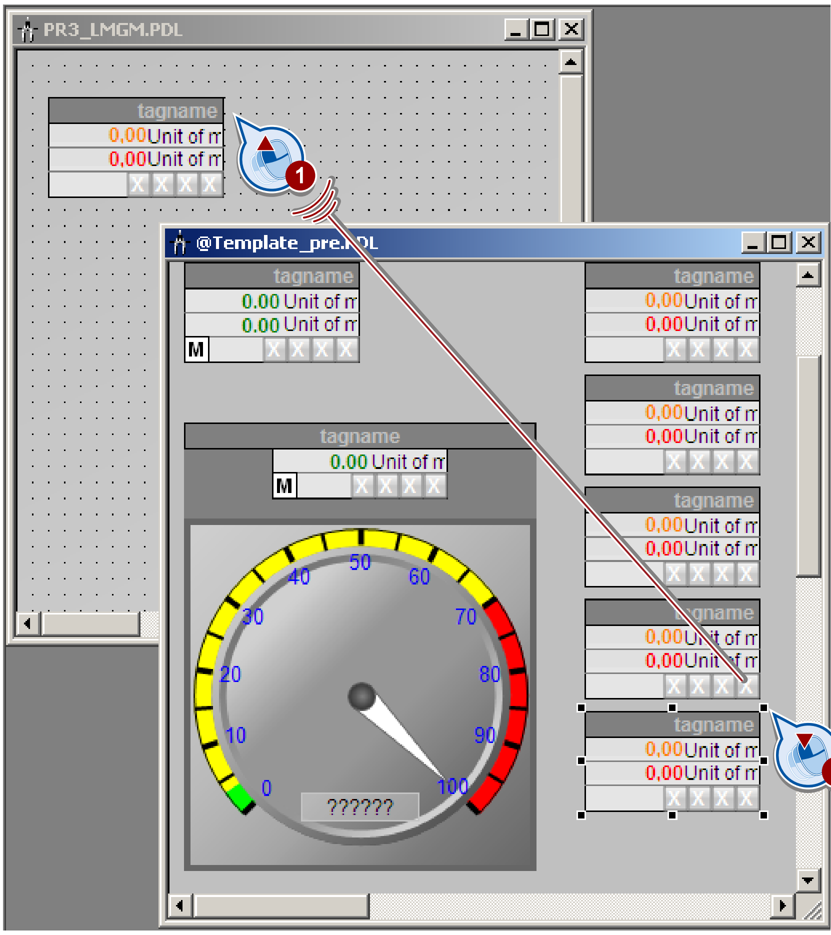
To configure the faceplate for PRE_LMGM / PR3_LMGM, use the same procedure as the one used for the faceplate for PRE_SUM / PR3_SUM. For additional information, refer to "Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)".

Requirements

- "Compile OS" was executed.
- The OS project editor has been run.
- The powerrate wizard has been run and user archives for load management have been configured.
- You have opened a process picture in the WinCC Graphics Designer in which the block icon is to be displayed.

Procedure

1. Copy the "PR3_LMGM_10/1" block icon, for example, into your process picture from the "@Template_pre.PDL" template process picture.



2. Select the block icon and start the "Interconnect faceplate with measurement point" Dynamic Wizard.
3. Link the faceplate with the corresponding structure tag. For PR3_LMGM_10, connect the structure tag "<tagname>/DB_LMGM_10".

Result

The "PR3_LMGM_10/1" faceplate is connected to the structure tag "<tagname>/DB_LMGM_10".

2.10.6 Commissioning load management from the faceplate

2.10.6.1 Operating the PRE_LMGM / PR3_LMGM faceplate in Runtime

Introduction

When you activate the WinCC project in Runtime, the faceplates are displayed with the corresponding values.

In the description of the PRE_LMGM / PR3_LMGM (Page 261) block,
you will find a detailed description of the icons and the faceplate (Page 307).

Configure the faceplate in WinCC Runtime to define the settings for load management. This includes the following adaptations:

- Parameters in the "Parameter" view, for example, settling time
- Rates with the respective power values
- Parameters for the individual consumers
- Activating consumers in load management

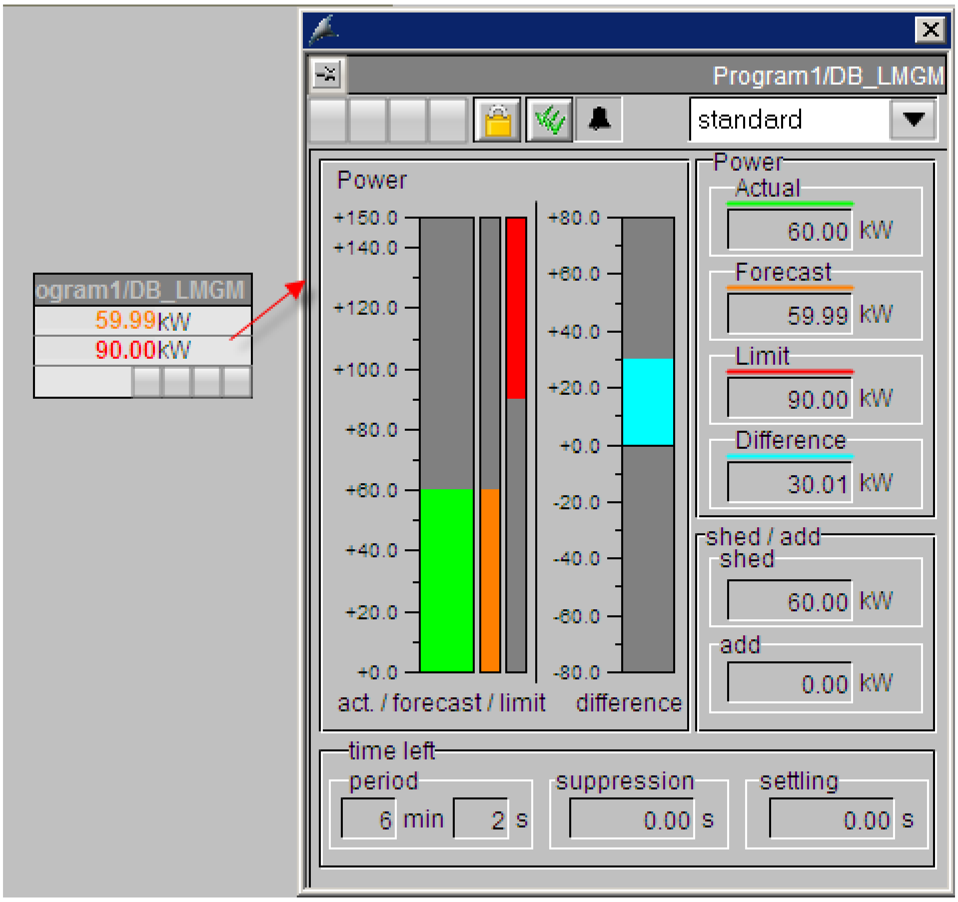
After performing configuration, load the data block for load management from the controller back into your project.

Requirements

- The S7-300 or the S7-400 is linked to the configuring PC.

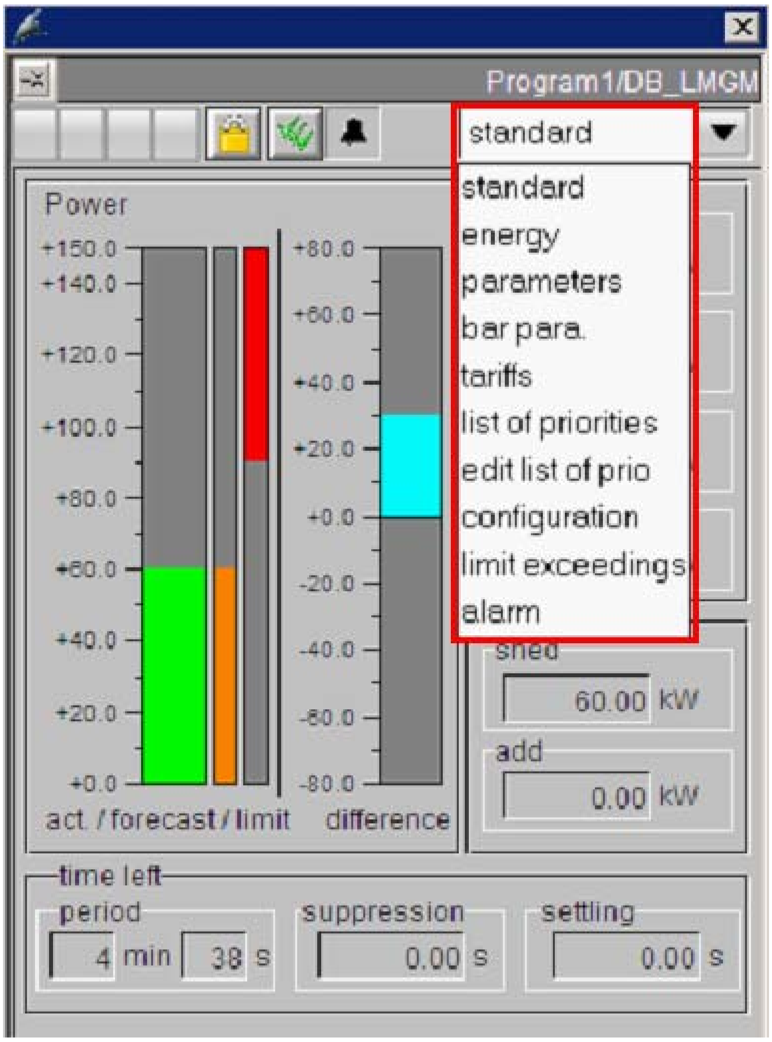
Opening the faceplate

The associated faceplate is opened by clicking the block icon.



Views

You can select the various views using the drop-down menu.



See also

Changing values in the "Parameter" view (Page 154)
Changing values in the "Rates" view (Page 155)
Changing values in the "Edit priority list" view (Page 156)
Changing values in the "Edit priority list" view (Page 157)

2.10.6.2 Changing values in the "Parameter" view

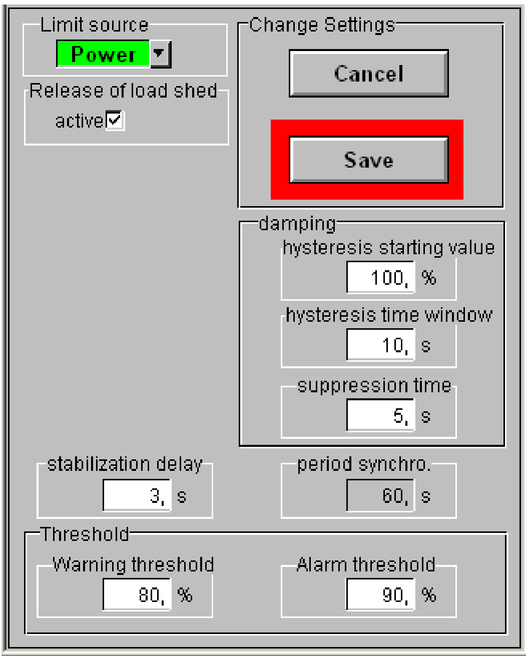
Introduction

You make the basic settings, such as whether to display energy or power, in the "Parameter" view.

Procedure

1. Select the "Parameter" view of the LMGM faceplate.
2. Click the "Edit" button.
3. Change the parameters to the following values, for example:
   – "Type of limit" to power
   – "Settling time" to 3 seconds
   – "Start value hysteresis" to 100%
   – "Warning limit" to 80%
   – "Alarm limit" to 90%
4. Click "Save". The settings are written to the CPU and added to the user archive.

Result



See also

Operating the PRE_LMGM / PR3_LMGM faceplate in Runtime (Page 151)

2.10.6.3 Changing values in the "Rates" view

Introduction

You set the rates and the rate limits in the "Rates" view.

You define the time periods and average power values for day, night and holiday rates.

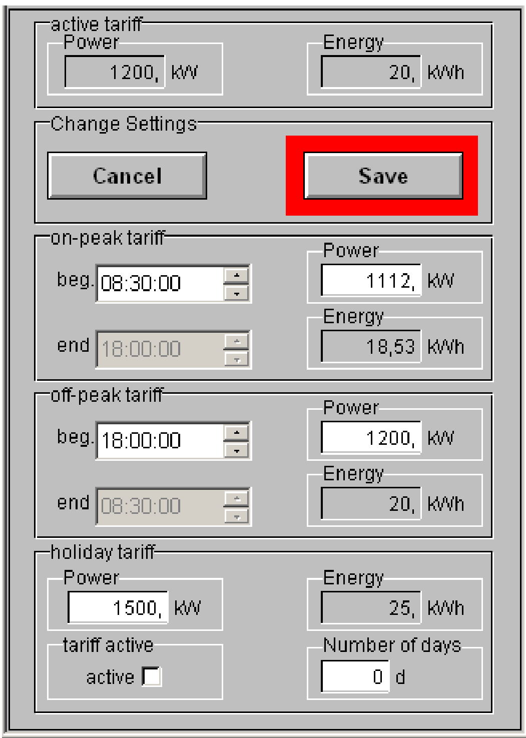
Procedure

1. Select the "Rates" view of the LMGM faceplate.
2. Click the "Edit" button.

> **Note**
>
> If interconnectable limit values are active (LIM_L = TRUE), you cannot edit the rates.

3. Define the times and power values for the three rates:
   – On-peak rate
   – Off-peak rate
   – Holiday rate
4. Click "Save". The settings are written to the CPU and added to the user archive.

Result



See also

Operating the PRE_LMGM / PR3_LMGM faceplate in Runtime (Page 151)

2.10.6.4 Changing values in the "Edit priority list" view

Introduction

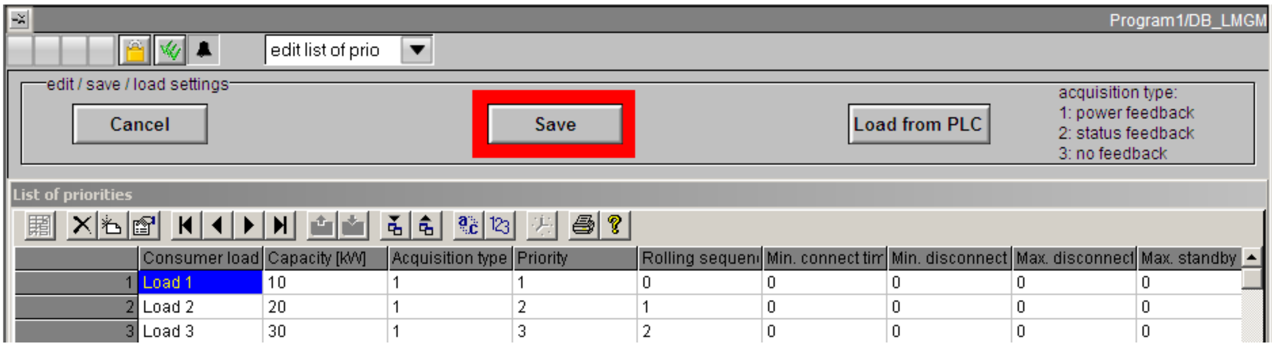
You set the order in which consumers are to be switched off in the "Edit priority list" view.

If you have not yet edited the list, the default values in the table are applied during loading from the PLC. All values are then set to "0".

Procedure

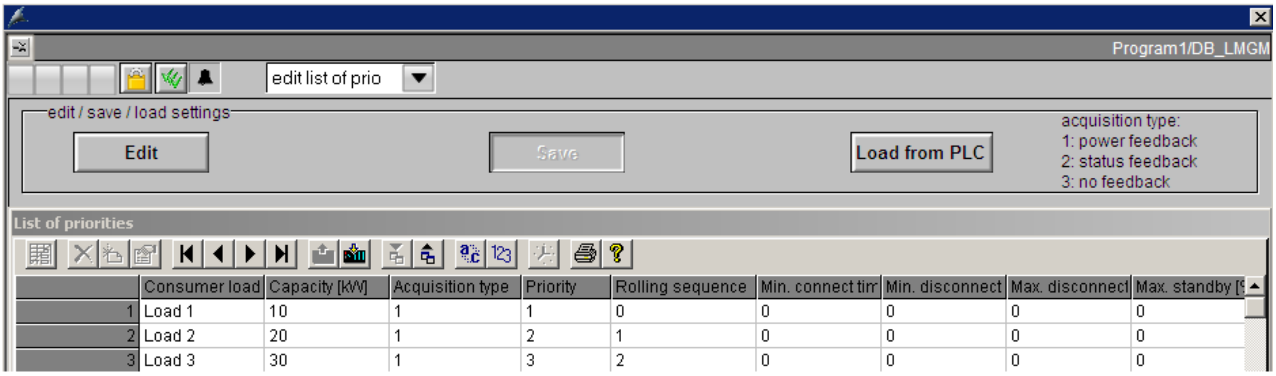
1. Select the "Edit priority list" view of the LMGM faceplate.

   The number of data records in the list must correspond to at least the number of consumers contained by the MAX_LOAD input.
2. Click the "Edit" button.
3. Change the value for the consumer:
   - Rated power
   - Mode
   - Priority
   - Rolling sequence



4. Click "Save". The settings are written to the CPU and added to the user archive.

Result



See also

Operating the PRE_LMGM / PR3_LMGM faceplate in Runtime (Page 151)

2.10.6.5 Changing values in the "Edit priority list" view

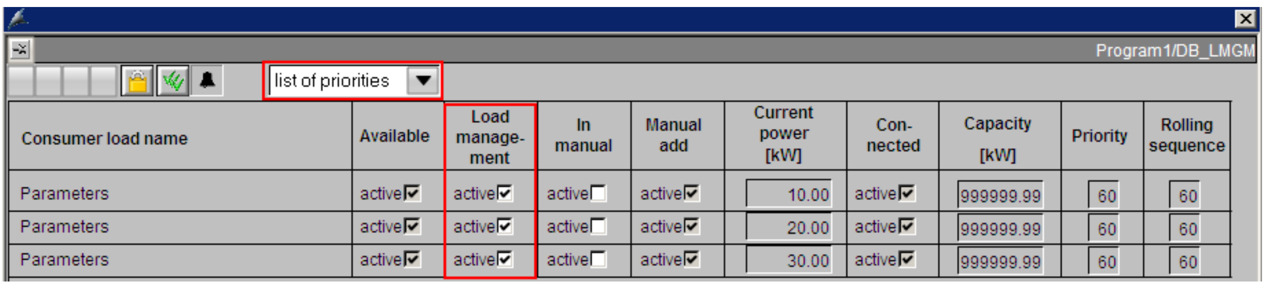
Introduction

This priority list shows the current status of the individual consumers in load management. You can remove individual consumers from load management or release them manually.

If a consumer does not participate in load management, it is not switched off automatically when the alarm limit is reached.

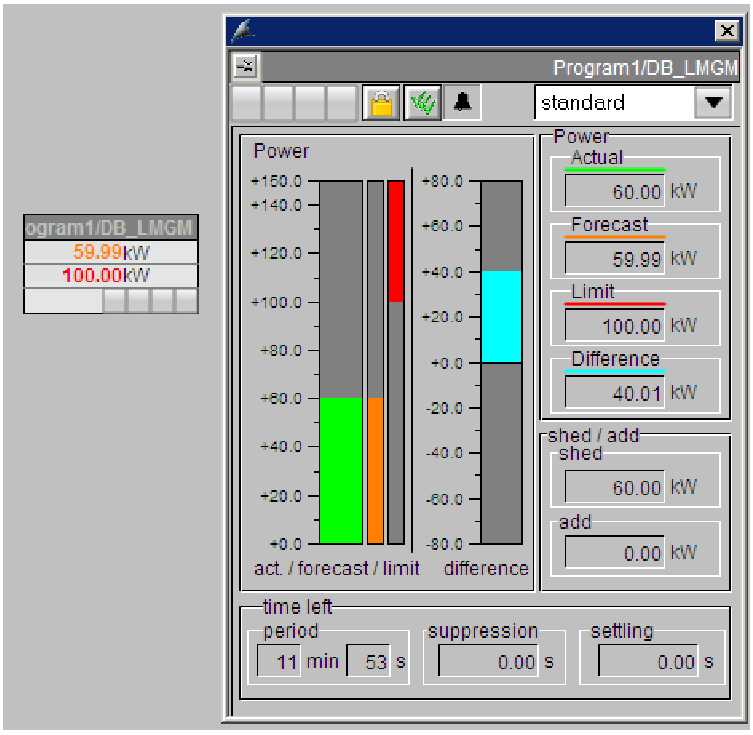
Procedure

1. Select the "Edit priority list" view of the LMGM faceplate.
2. In the "In load management" column, select the consumers you want to integrate into the load management.
3. Select the "Active" option.



Result

After configuring the various views, a summary of the values is displayed in the default view.



See also

Operating the PRE_LMGM / PR3_LMGM faceplate in Runtime (Page 151)

2.10.6.6 Loading data block for load management from the PLC

Introduction

To back up the current parameters of load management, load the instance data block of the PRx_LMGM block from the PLC to the STEP 7 project. These parameter are also saved in the user archive PRx_LMGM_CONFIG_x.

Procedure

1. Open the project in the SIMATIC Manager.
2. Open the online view in the SIMATIC Manager.
3. Copy the data block DB4 (DB_LMGM) from the online view to the offline view of the project.

Result

You have backed up all parameters for load management in your STEP 7 project.

2.11 Configuration of SIMATIC powerrate Reports

2.11.1 powerrate Reports

Introduction

SIMATIC powerrate Reports offers functions for energy analysis and analysis for batch-related energy measurement.

Selected energy data is read from the process value archive and from user archives from the WinCC Runtime database. On the basis of Microsoft Excel, powerrate creates reports from this data which you can use further for your analysis.

Energy analyses

The following energy analyses can be performed:

- Export of archive measured values

  Export of energy values from the process value archive to Excel without reporting
- Cost center report

  Assigns energy values and costs to cost centers
- Duration curve report

  Represents average power values as a duration curve

Access to swapped-out archives is not supported.

Batch values

The following batch analyses can be performed:

- Export of batch values

  Export of batch-related energy values from user archives to Excel without report creation
- Batch report (sorted by time)

  Sorting of batch-related energy values based on the starting time
- Batch report (sorted by name)

  Sorting of batch-related energy values based on the batch name

Exporting values and creating reports

To use the powerrate Reports function, following these steps:

- Open powerrate Reports.
- Configuring general settings
  - Server name
  - Rate tables
- Configuring reports
- Configure times
- If necessary, create virtual process tags.
- Start the export to Excel or generate the report.

2.11.2 Opening powerrate Reports

Introduction

You use the "powerrate Reports" editor to configure reporting and to display the created reports in Runtime.

Opening powerrate Reports

You have two options to start the "powerrate Reports" editor:

- Configuration and Runtime:

  In the WinCC Explorer, select "Start Report Tool" in the powerrate shortcut menu.
- Runtime:

  If you have copied the "powerrate Reports" button to the process picture,
  you can use it to open the editor in Runtime.

Language setting

The "powerrate Reports" editor is available in the following user interface languages:

- German
- English
- Chinese

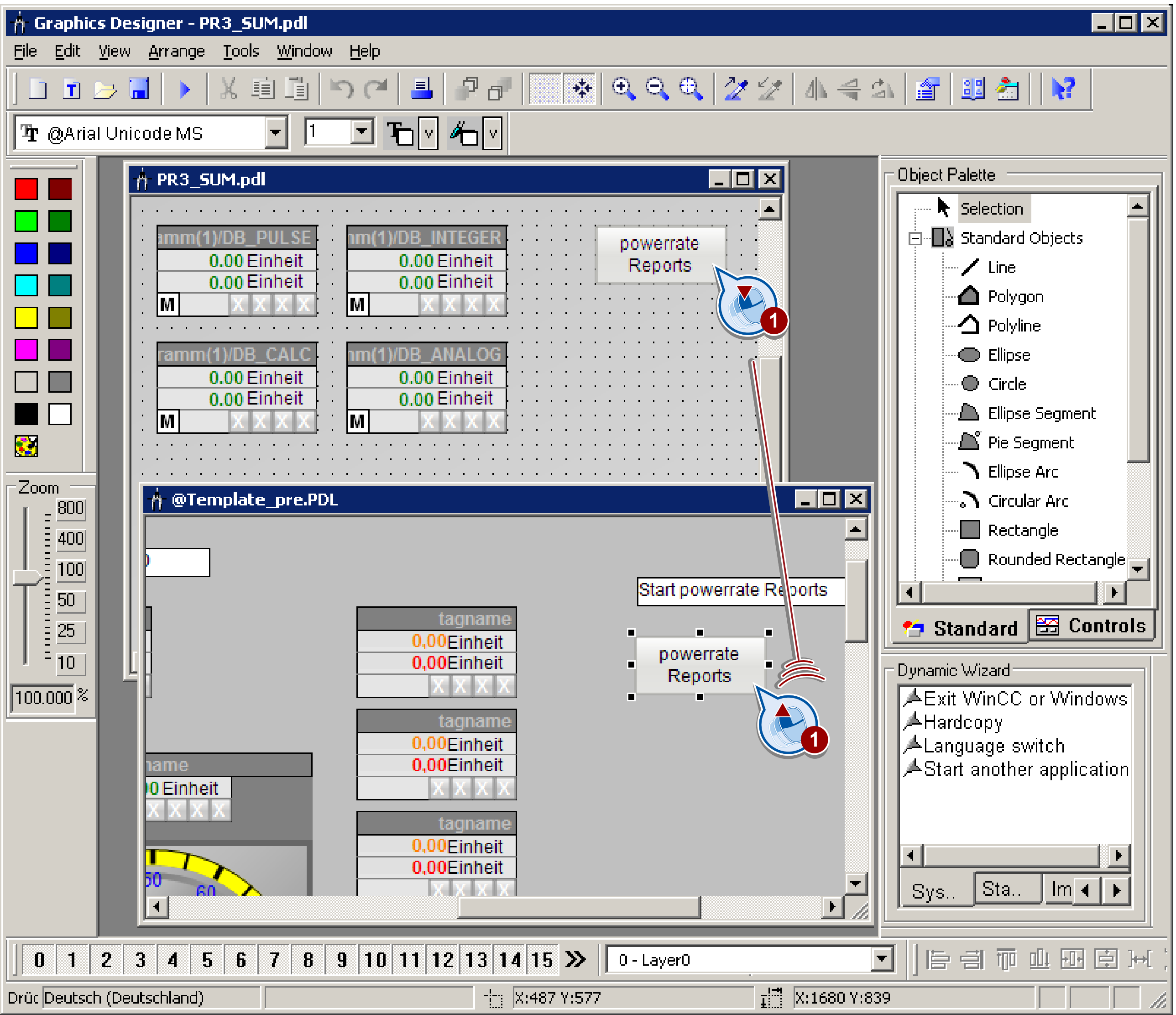
You can use the menu command "Settings > Language" to change the language.

Inserting the powerrate Reports button

1. In the WinCC Graphic Designer, open the template picture @Template_pre.pdl and the process picture from which you want to open powerrate Reports.

2. Copy the "powerrate Reports" button from the template picture @Template_pre.pdl to the process picture.

   Save the process picture.



3. Activate WinCC Runtime and click the "powerrate Reports" button in the edited process picture.

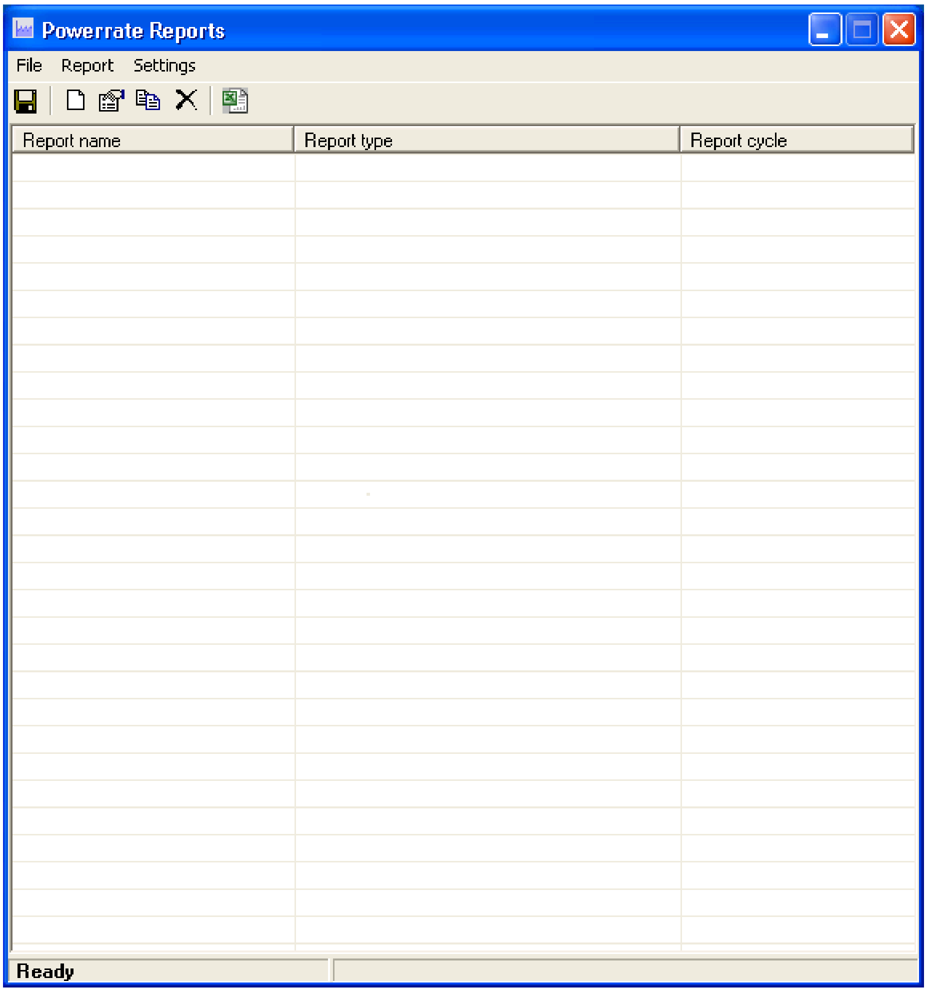
   The "powerrate Reports" editor is opened.

   If the powerrate Reports function is not installed, an error message is displayed.

Result

You have opened the "powerrate Reports" editor.

To sort the list of displayed reports, click on the title of the desired column, for example, "Report type" to sort by report type.



"powerrate Reports" editor in WinCC Runtime

You can configure WinCC projects to prevent access to the operating system in the Runtime. To hide the task bar, make the following settings in the "Taskbar and Start Menu Properties" Windows dialog:

- Disable "Lock the Taskbar".
- Enable "Auto-hide the taskbar".
- Disable "Keep the taskbar on top of other windows".

This setting may have the effect that the "powerrate Reports" editor is not displayed in the foreground when it opens. Click again on the "powerrate Reports" button in the WinCC process picture to bring the editor into the foreground.

2.11.3 Configuring powerrate Reports

2.11.3.1 Configuring general settings

Introduction

Before creating reports, you first configure the general settings for powerrate Reports:

- Set up automatic report creation
- Configure server name
- Configuring rate tables

Configure server name

To create the reports, the server name must be specified. If you are working with a S7-400 in a redundant system, you also enter the name of the redundant server.

Server for automatic report creation

Automatic reports can only be generated on a WinCC client or WinCC server.

Requirements

- A valid powerrate license must be installed on the WinCC server.
- Requirements for distributed systems:

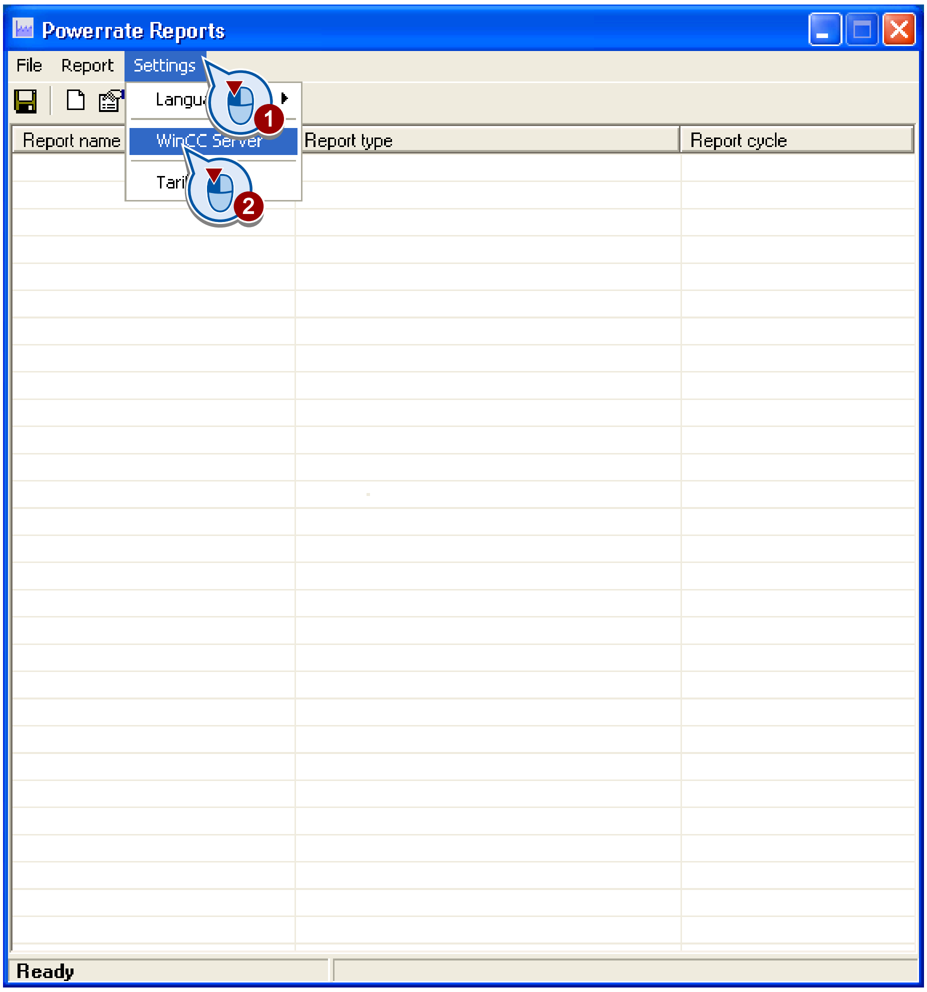
  Define which WinCC server provides the data. The reports will then be configured and created for the data of the selected server.

  If you want to create the reports for another server, you will have to change the settings. Only those reports that were assigned to the configured WinCC server will be displayed.

  When you open powerrate Reports in Runtime, the computer name of the server is automatically transferred to the application and does not have to be configured. For a client in a distributed system, the server that was used at the start of the powerrate Reports will be selected.

Procedure

1. Open "Settings" > "WinCC Server" in the menu bar in the "powerrate Reports" editor.



2. Enter the name of the WinCC server on which the Runtime databases are located.

   If required, enter the name of the redundant WinCC server.

See also

Creating reports automatically (Page 179)

Configuring rate tables (Page 165)

Configuring reports (Page 171)

2.11.3.2 Configuring rate tables

Introduction

To calculate costs when creating cost center reports, you can define different rate tables that are each assigned to a physical variable. The rate tables are assigned to the cost center report when it is created.

Adding and managing rate tables

You can create several rate tables.

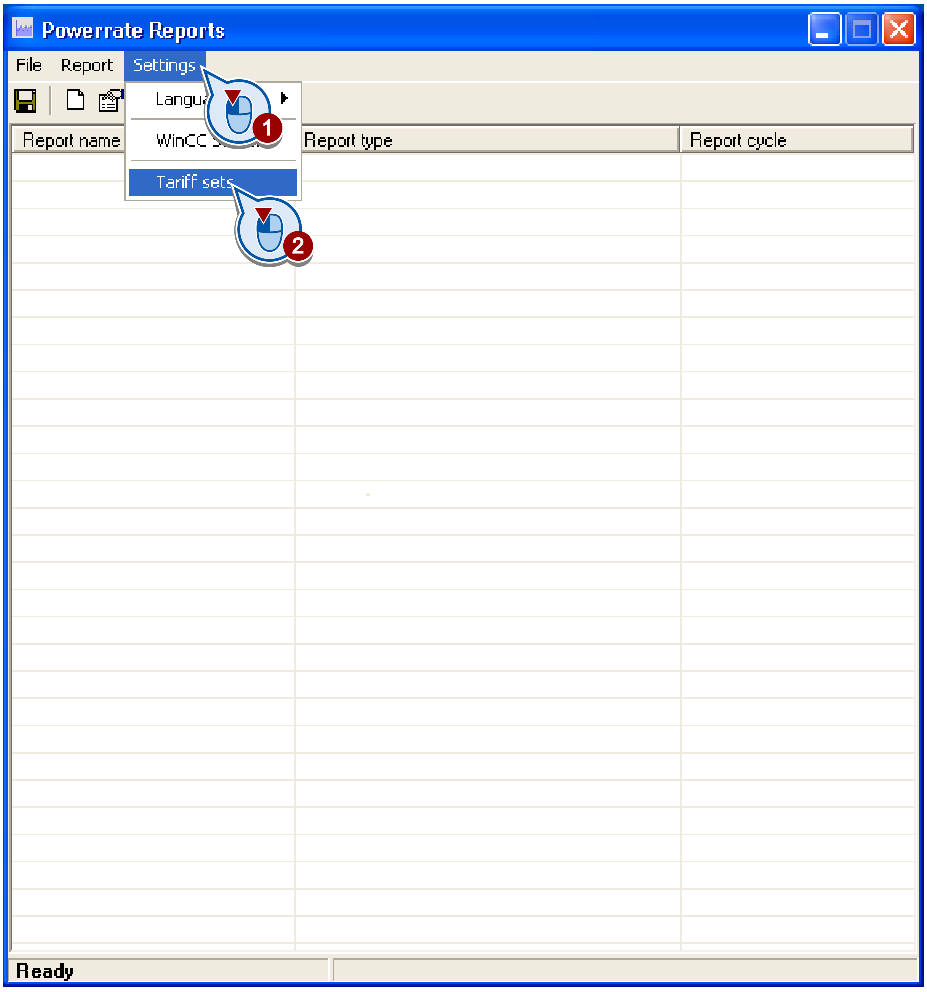
You can define up to twelve rates for each rate table. Define the applicable weekdays, times of day and costs for each rate.

The following requirements apply to the rate tables:

- The entire period of a week must be covered by the created rate tables.
  There may be no gaps.
- Only one rate may be valid for any point in time. There may be no overlaps of the rates.

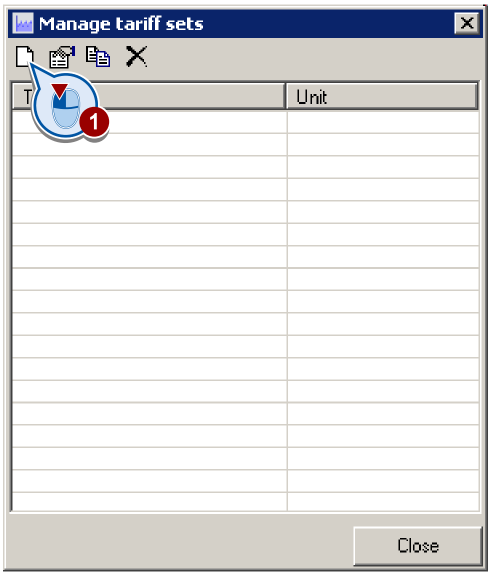
Procedure

1. Open the "Manage rate tables" editor in the menu bar via "Settings > Rate tables".



2. Create a rate table using the "Add rate" button.

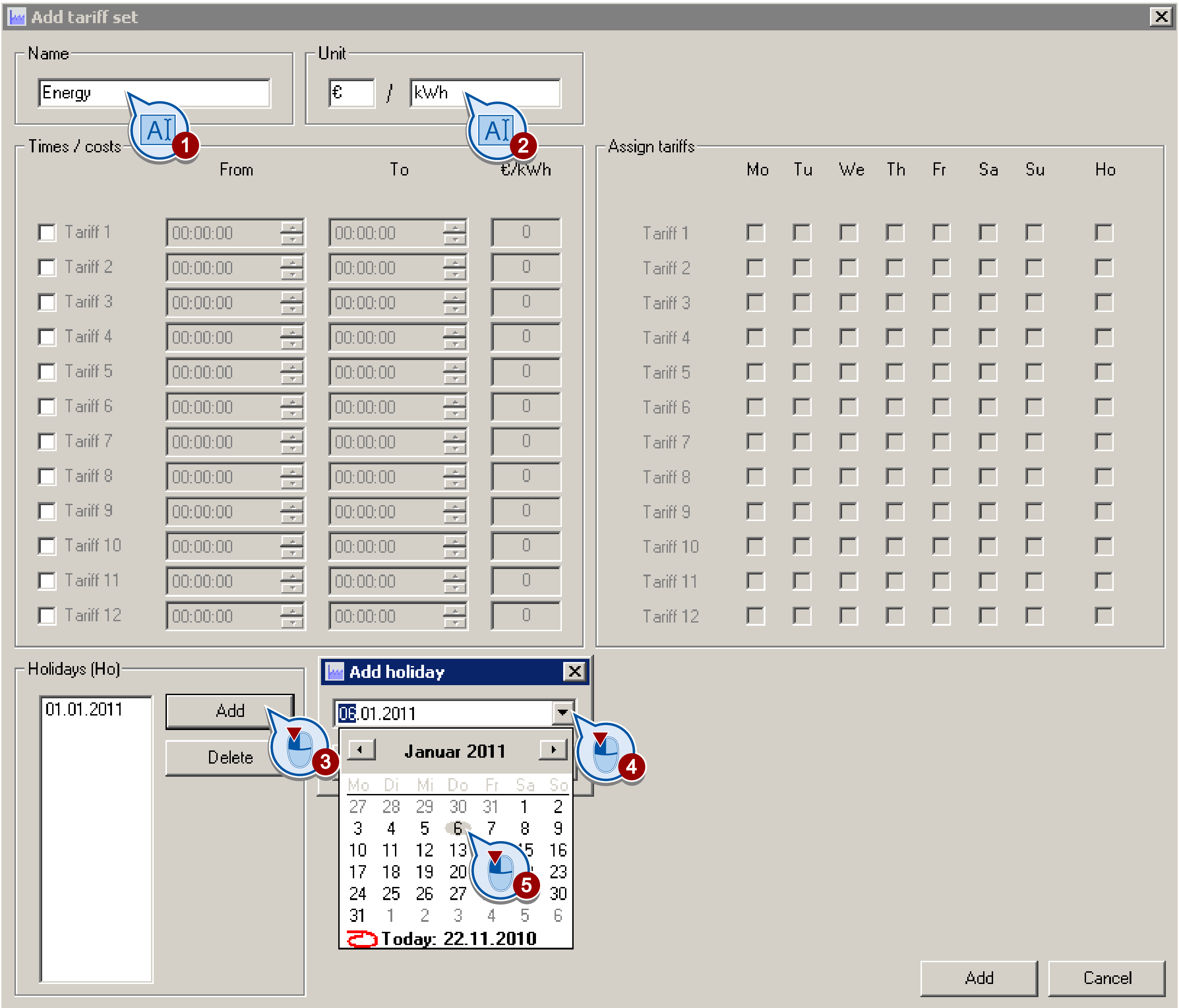
   The "Add rate" editor opens.



3. Enter a name for the rate, for example "Energy".

   If required, change the currency and calculated unit.
   The default unit is Euros per kilowatt hour (KWh).

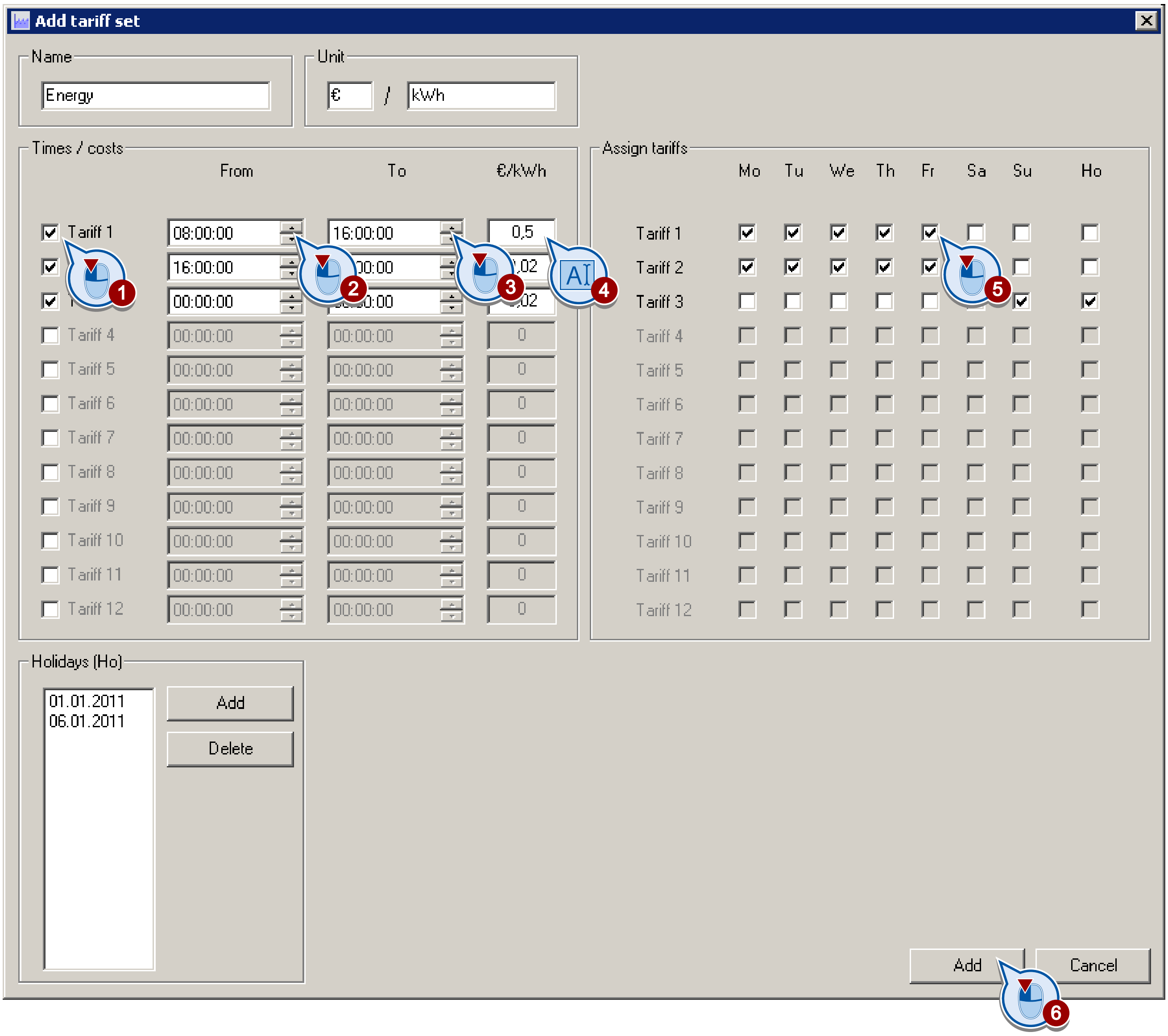
   If required, specify public holidays for which a separate or weekend rate applies.



4. Specify the following for each rate:
   – Start and end of the time period for which the rate applies.

     You can set the time period down-to-the-minute.
     Entries made in seconds will not be accepted.
   – Costs, e.g. per kWh in euro.
   – Weekdays on which this rate applies.
   – If appropriate, public holidays on which this rate applies.

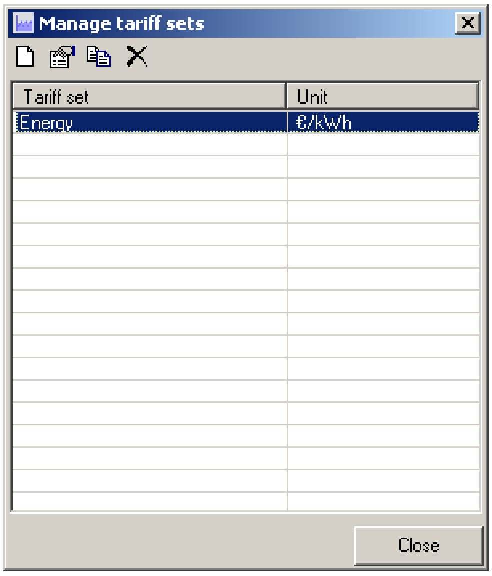
   Ensure that there are no time gaps and that the rates do not overlap.



5. Close the editor via "Add".

Result

You have created the "Energy" rate.



See also

Creating a cost center report (Page 192)
Configuring general settings (Page 163)

2.11.3.3 Configuring reports

Introduction

SIMATIC powerrate Reports creates reports from the powerrate archive data in the form of MS Excel spreadsheets and graphics.

You can use the "powerrate Reports" editor to configure the reports that you can then create manually or automatically on a regular basis. Depending on the type of report, the editor offers various data contents to choose from for report creation.

You can make the following settings in the editor:

- Report type
- Creation type (manual or automatic)
- Report name and storage path
- Archives and tags to be evaluated
- Time period that the report evaluates (reporting period)
- Reporting cycle and start time for automatic reports (report date)
- Validity period of automatically generated reports
- Rate tables and cost centers for cost center reports
- If necessary, compression and time of reading for counter values

If you generate reports automatically, follow the instructions in the section "Creating reports automatically (Page 179)".

Changing Configuration

To change the settings of a created report, select the required report in the "powerrate Reports" editor. Click the "Change report" button.

Reporting period

When configuring the report, specify the period which should be evaluated in each case.

Time period	Meaning	Example: Evaluated time period Start time: Thursday, 05/20/2010, 10:30
Last day	Previous 24 hours	Start: Wednesday, 05/19/2010, 10:30:00 End: Thursday, 05/20/2010, 10:29:59
Elapsed day	Previous day from 0:00 to 24:00	Start: Wednesday, 05/19/2010, 00:00:00 End: Wednesday, 05/19/2010, 23:59:59
Last week	Last seven days	Start: Thursday, 05/13/2010, 10:30:00 End: Thursday, 05/20/2010, 10:29:59
Elapsed week (Mon - Sun)	Previous week from Monday to Sunday	Start: Monday, 05/10/2010, 00:00:00 End: Sunday, 05/16/2010, 23:59:59
Last month	Preceding days since the same day of the previous month	Start: Tuesday, 04/20/2010, 10:30:00 End: Thursday, 05/20/2010, 10:29:59
Elapsed month (1st to end of the month)	Preceding month from 1st until last day	Start: Thursday, 04/01/2010, 00:00:00 End: Friday, 04/30/2010, 23:59:59
Timer range	Date and time can be freely specified.[1]	Start: Saturday, 05/01/2010, 10:00:00 End: Monday, 05/31/2010, 10:00:00

[1] The final date of the report can be in the future. However, the current data and time are used as final date when generating the report; for example, 05/20/2010 in the report. If you want to prepare the report for the vacation period, for example, enter a final date that is in the future.

Template file

The report data is output as an MS Excel file. A template file is available for this purpose in the following folder:

- ..\Siemens\powerrate\bin\config\pre_Reports.xlt

Note

Template file pre_Reports.xlt

The assignment of the cells within the MS Excel worksheet is fixed.

Requirements

- The WinCC project is open.

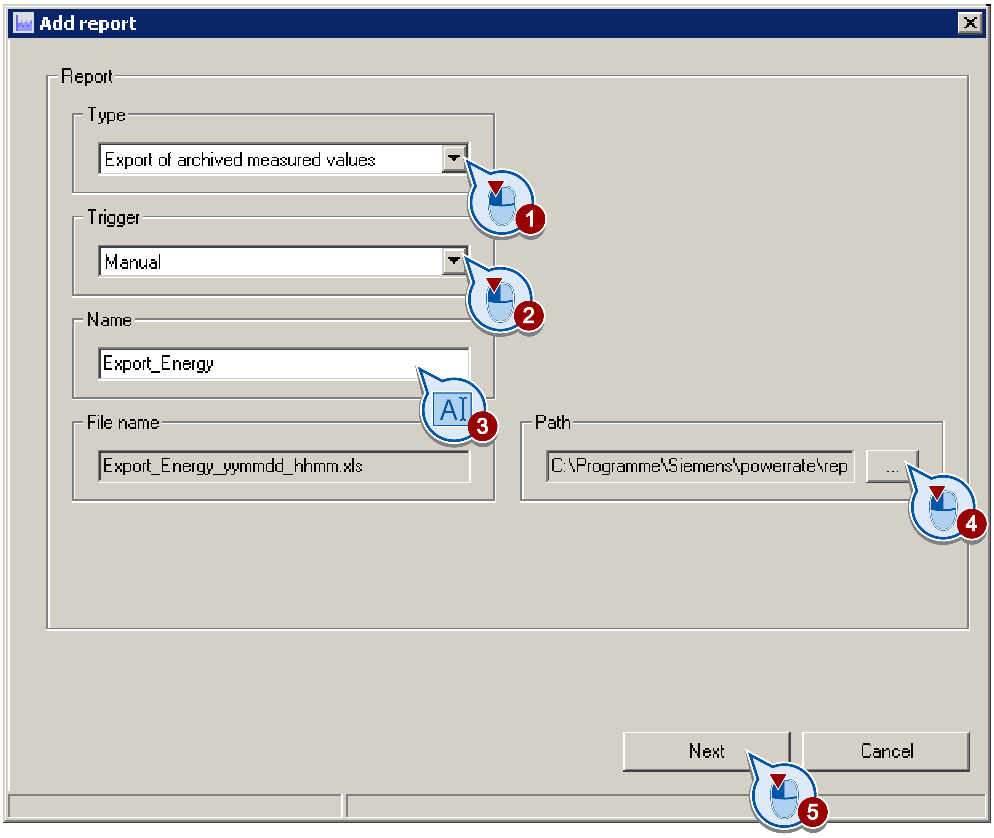
Procedure

1. Select "Report" > "Add" in the menu bar in the "powerrate Reports" editor.

   The "Add report" dialog box opens.
2. Specify the type of report, creation, the report name and the storage path.

   The report name is copied to the "File name" box.

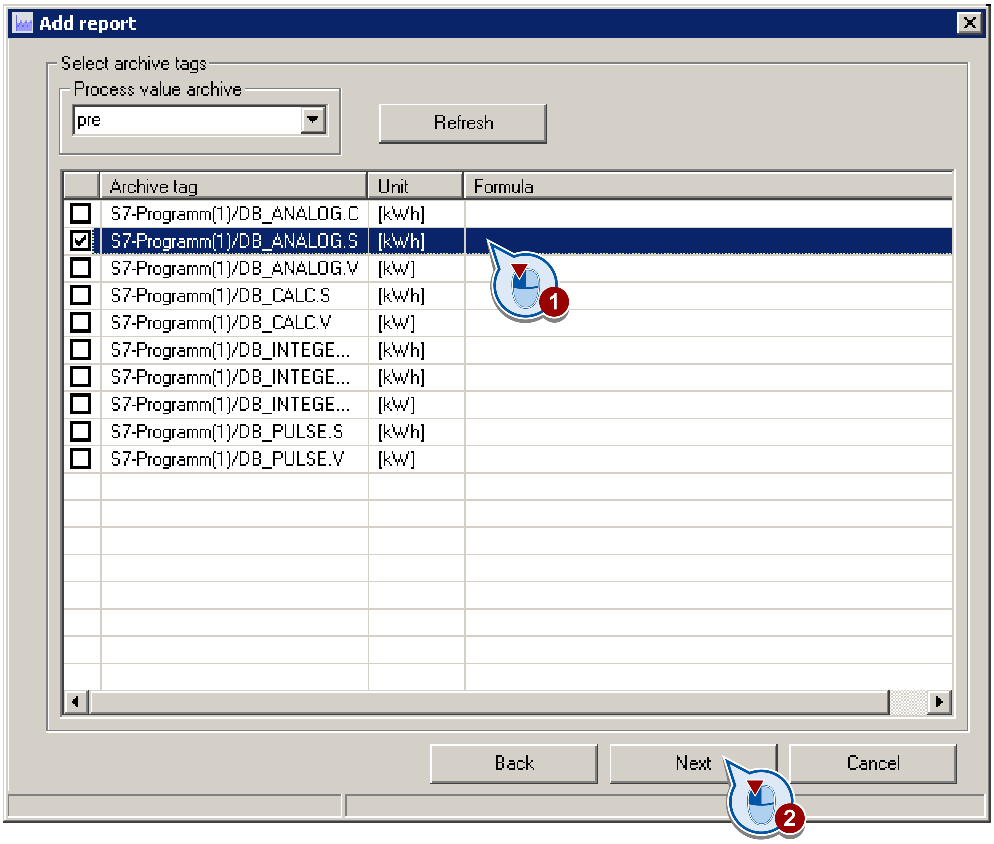
   In this example the folder "Export of archive measured values" is created.



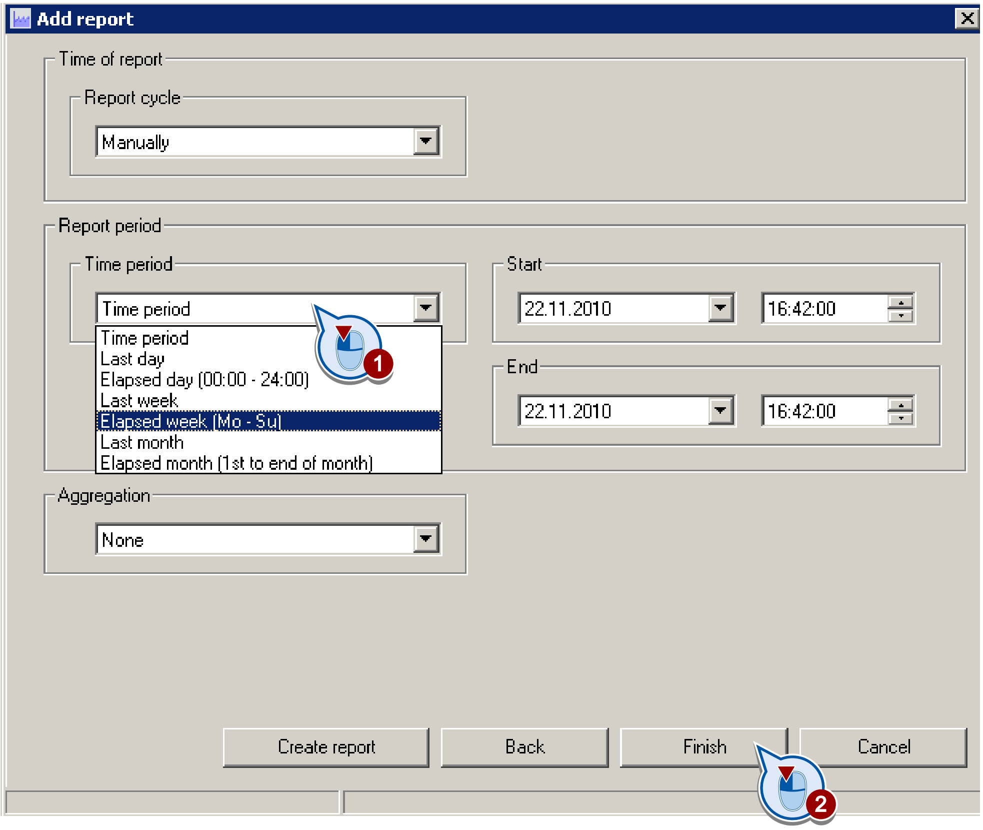
3. Select the process value archive and the archive tags, the values of which the report is to analyze.

   If you are not using the PRx_SUM block for energy measurement, the archive tags are perhaps not be stored in the "pre" process value archive. In this case, select the appropriate process value archive.

   You can select one or more archive tags of an archive.



4. Specify the time period to be contained in the report.



Instead of clicking "Finish" to complete the editor, you can create a report after the configuration. The configuration is then also saved.

5. Save the configuration by clicking the "Save" button.

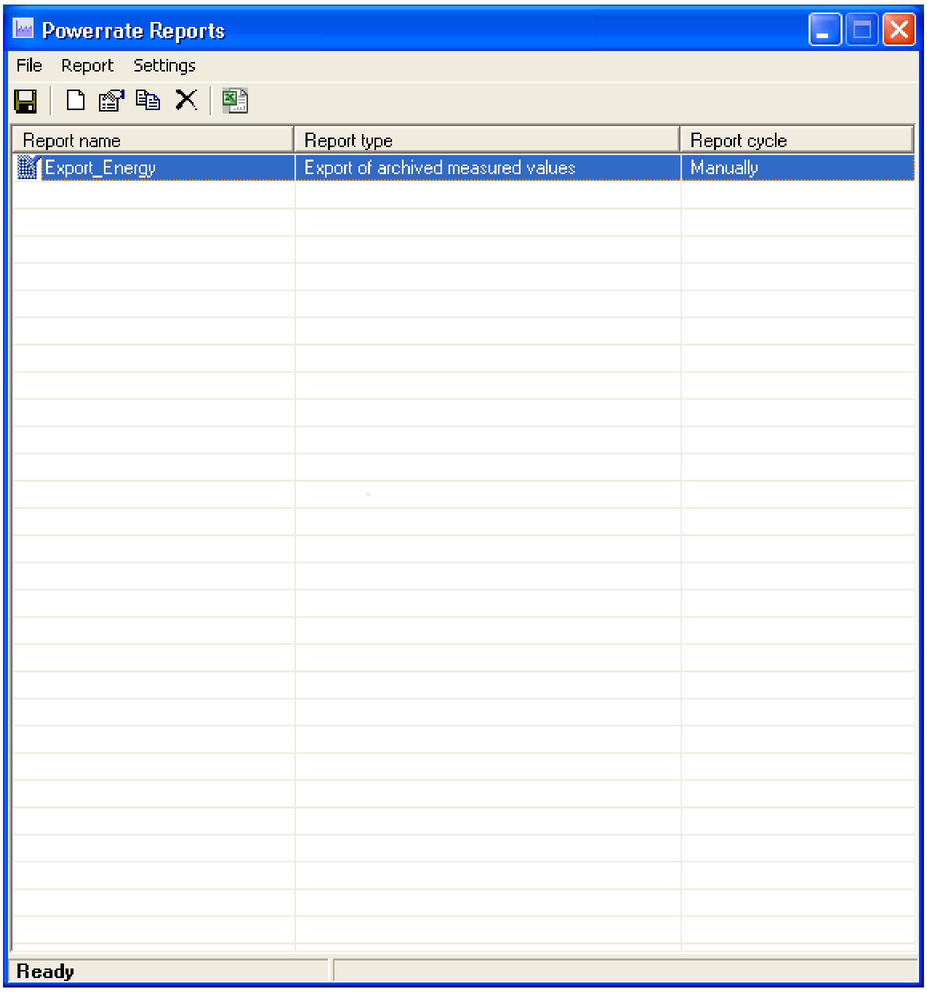
6. To change the configuration of a report, select the report in the "powerrate Reports" dialog and click "Change report".

   The editor is opened and you can change the settings.

Result

You have created a report which you can create in Runtime.

The Excel files are created in the specified directory when a report is generated.



See also

Creating reports automatically (Page 179)

Configuring general settings (Page 163)

Creating reports manually (Page 177)

2.11.3.4 Creating reports manually

Introduction

powerrate Reports enables you to create reports manually on a non-recurring basis or automatically on a regular basis.

You can create a configured report at any time in runtime if you do it manually.
You can also manually generate an automatically created report.

You create a report in the "powerrate Reports" editor.

Requirements

- WinCC Explorer has been started.

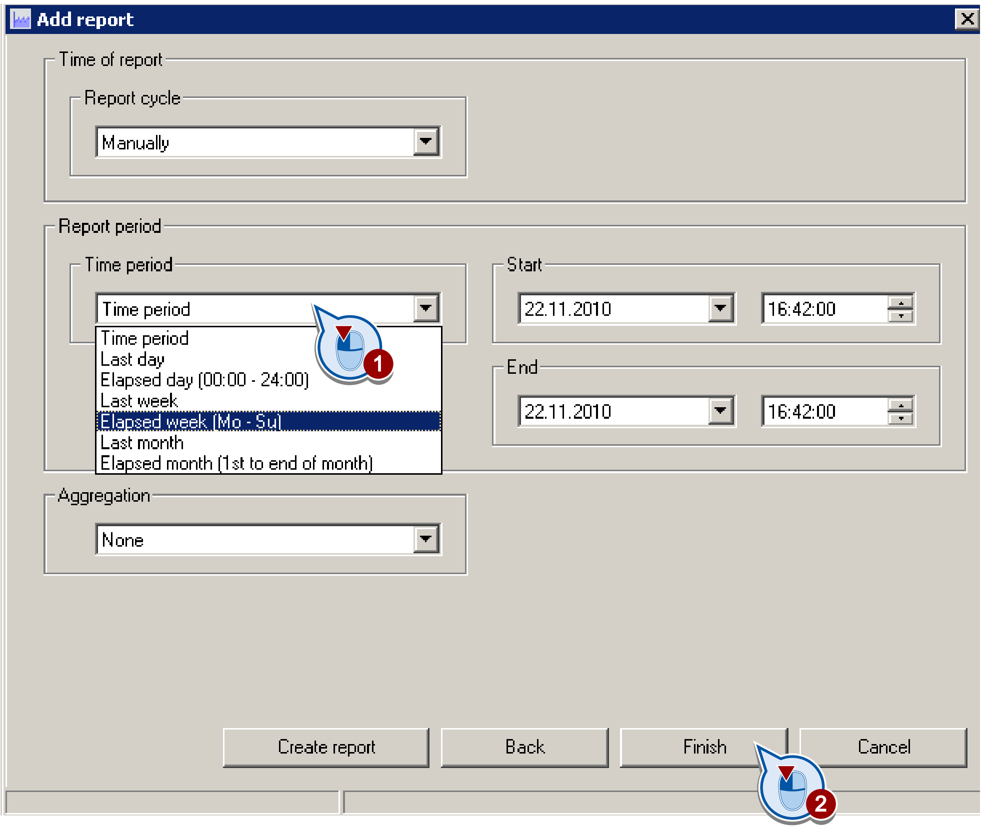
Procedure

1. Select the configured report.
2. Click on the "Create Report" icon .

   If you have selected to generate the report automatically, you can confirm the message "<Name>: Create report? " with "Yes".

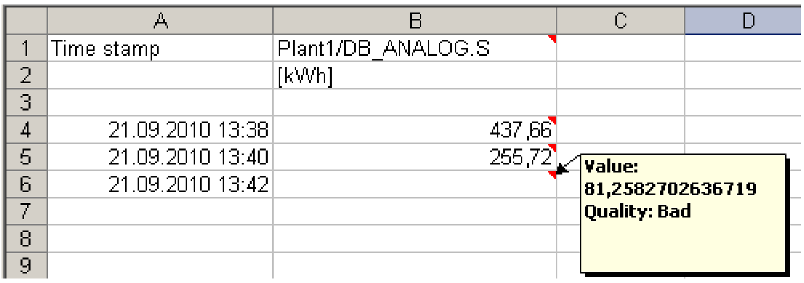
   If you have chosen to create the report manually, the "Create Report" dialog opens.
3. Enter the reporting period and start the report creation with "Generate Report".

   The progress is displayed while the data is read.



Result

The report is created in the configured storage path.



See also

Configuring reports (Page 171)

2.11.3.5 Creating reports automatically

Introduction

You can create configured reports at regular intervals in Runtime using the automatic setting. You can also manually generate an automatically created report.

You create a report in the "powerrate Reports" editor.

Report date

Make the following settings for the report date:

- Reporting cycle: Frequency of report generation
  - Daily (time)
  - Weekly (day and time)
  - Monthly (day of the month and time)
- Time of day: Time when report generation is started

The reporting period depends on the selected reporting cycle:

Reporting period	Reporting cycle		
	Daily	Weekly	Monthly
Time period (start time and end time of data acquisition)	X	-	-
Last day	X	-	-
Elapsed day	X	-	-
Last week	-	X	-
Elapsed week	-	X	-
Last month	-	-	X
Elapsed month	-	-	X

Validity period

An automatic report is generated only during the validity period.

For each report, you set a start date from which the reports are automatically created and an end time. You can use this function to specifically create a report only at certain times, for example, during the holiday season.

When the end of the validity period expires, the C actions for the report are deleted in the WinCC project. This step ensures that no additional reports are created.

Extending the validity period

If you want the report creation to continue, change the validity period in the "powerrate Reports" editor. Compile and save the newly created C action to activate the report creation in Runtime.

C actions (global script)

powerrate Reports requires certain C actions to create automatic reports:

- The "PRE_Reports.pas" C action is copied by the powerrate Wizard into the WinCC project on the WinCC server as of SIMATIC powerrate V4.0.

  If you want to start automatic reporting on a client, run powerrate Wizard on the client as well. The C action "PRE_Reports.pas" in the project directory of the client is copied to the path "..\<computername>\PAS".
- If you have activated automatic report creation, a C action which starts the report creation is created for each report.

Note the following information:

Copy C actions to the ES

To prevent the C actions from being deleted when loading the OS, you need to copy the C actions to the relevant WinCC project on the ES.

Newly created and modified reports: Compile and save C actions

To activate the newly created C actions, compile and save the C actions in the Global Script Editor after creating or modifying automated reports.

Deleted and changed report names: Disable C actions

When you delete an automatic report or change its name, the existing C action is disabled for this report.

Disable the WinCC project for this purpose and activate Runtime again.

A new C action is created for the new name of a renamed report.

Configuring automatically created reports on a WinCC client

If you wan to configure automatic creation on a WinCC client, the powerrate Wizard must run on the client. The powerrate Wizard configures all the required components on the WinCC client.

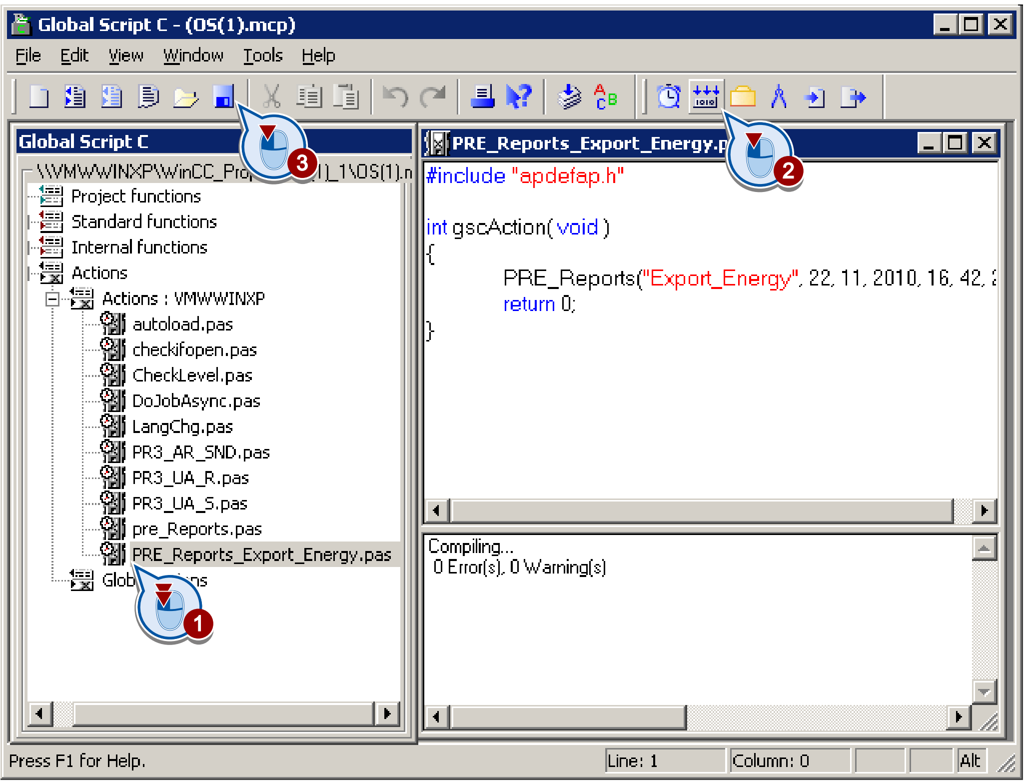
Requirements

- A report is configured.
- The C actions are current.
- A WinCC computer is entered as a server.
- The WinCC project is selected in Runtime.

Procedure

1. Open the newly created C actions in the Global Script Editor.

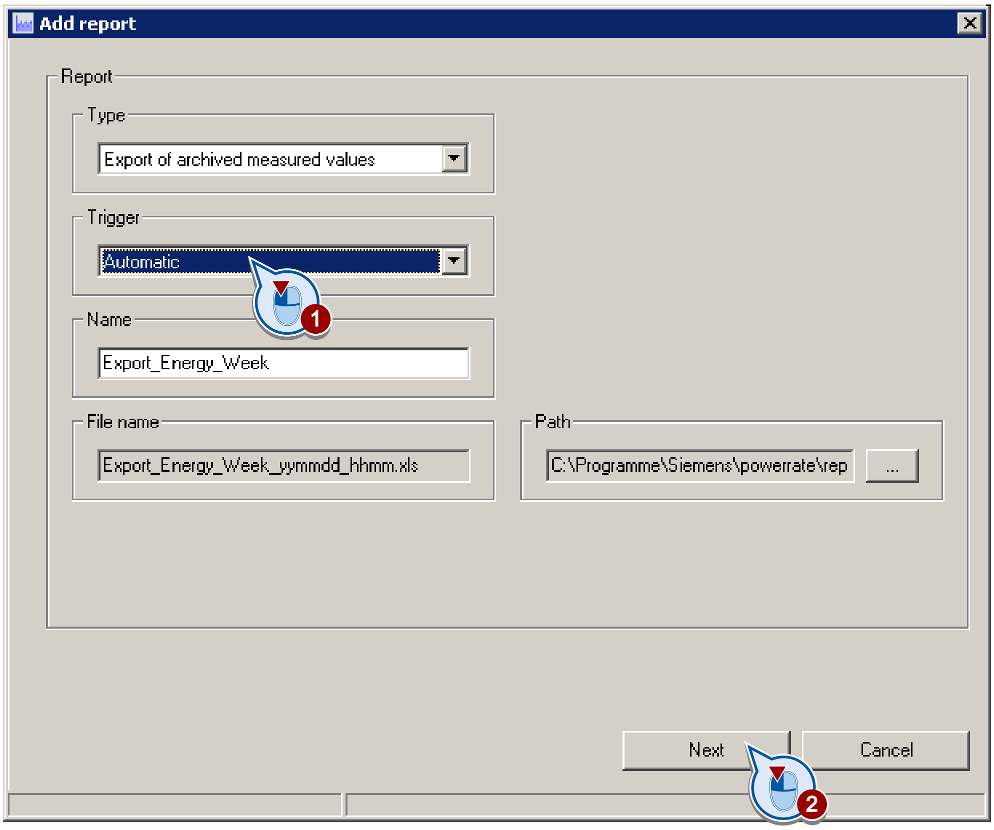
Compile and save the C actions and enable them.



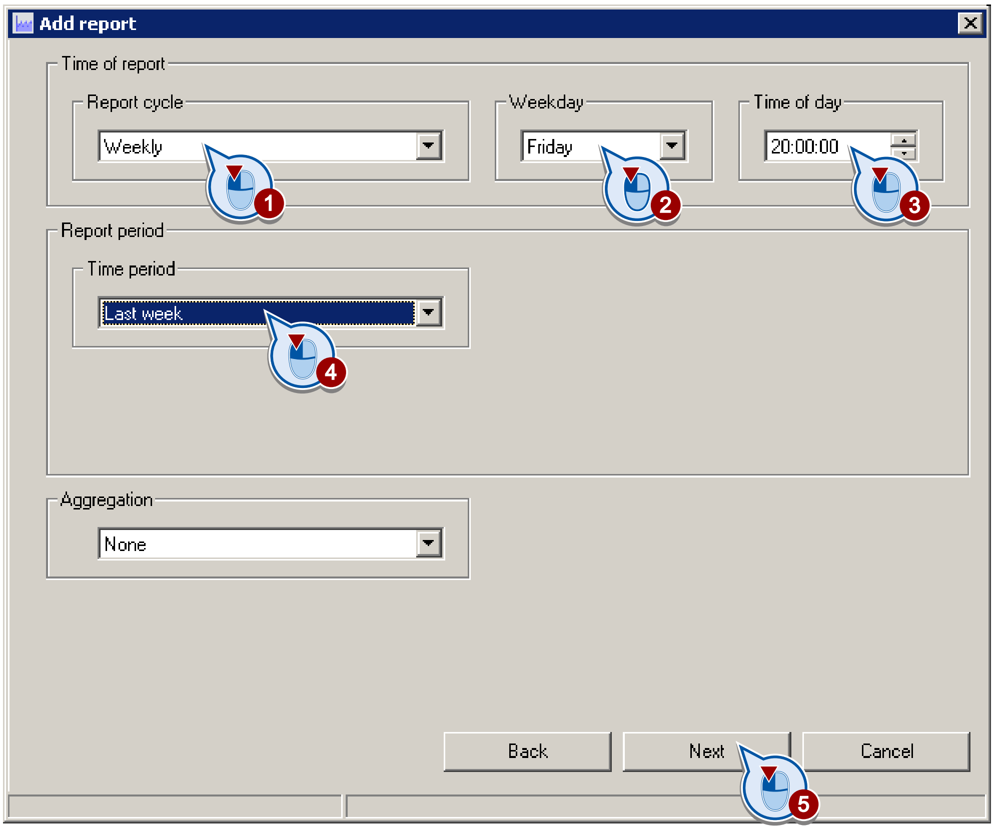
2. Create a report in the "powerrate Reports" editor or open an existing report by double-clicking it.

3. Select the "Automatic" creation type for "Execution".

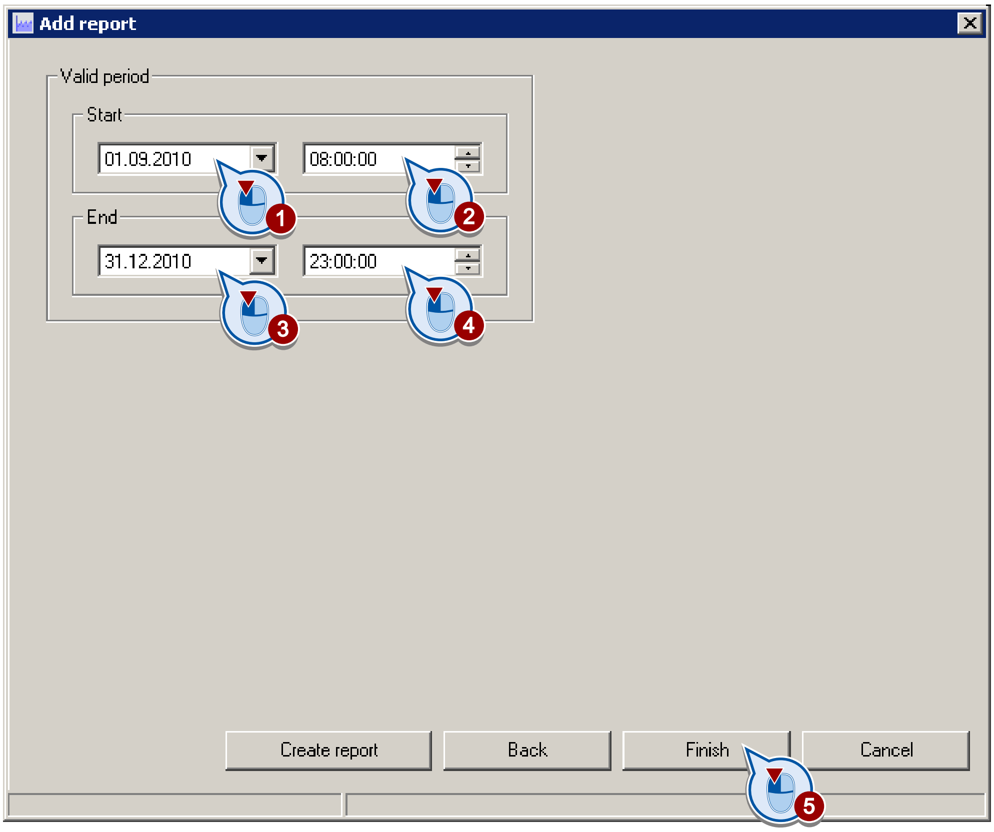
   Select the archive tags to be evaluated in a newly created report.



4. Select the reporting cycle, for example, "Weekly, every Friday at 20:00.
5. Select the reporting period, for example, "Last week",
   from Friday evening to Friday evening.



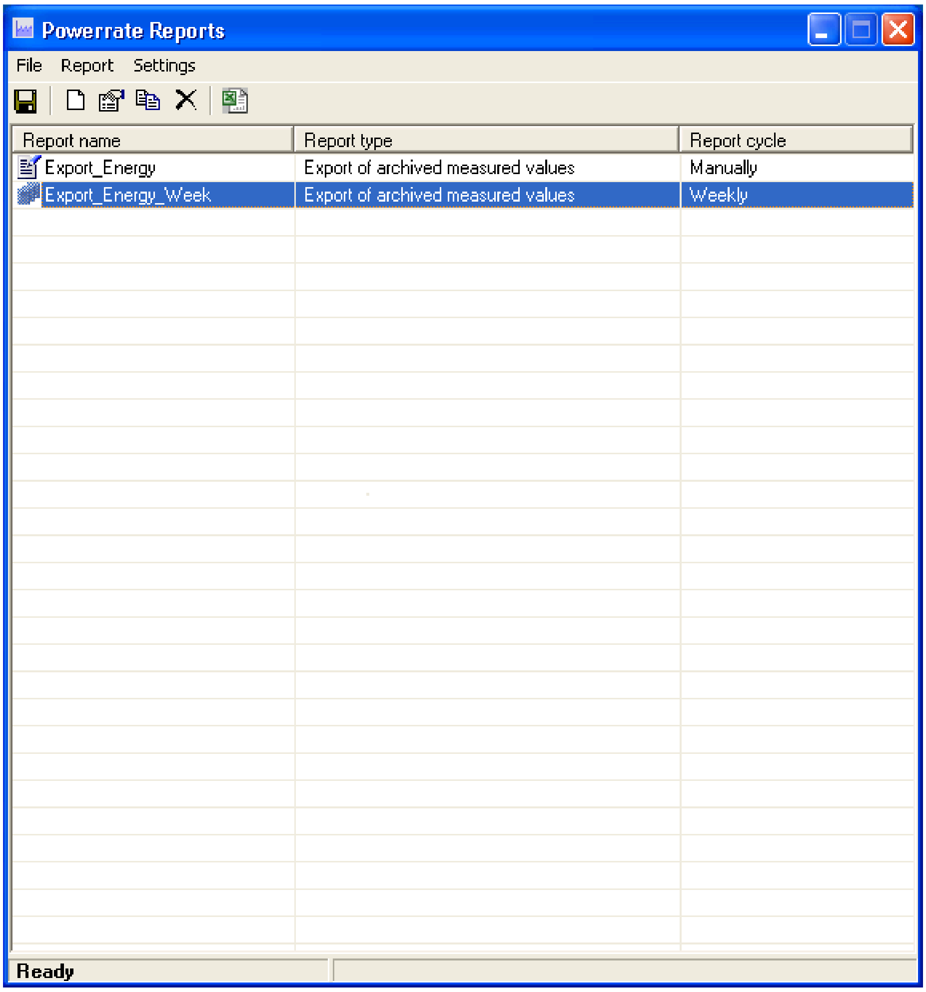
6. Select the validity period and close the editor with "Finish".



Result

You have created an automatically generated report.

The green symbol in front of the report name indicates automatic reports.
The creation interval is shown in the "Reporting cycle" column.



See also

Configuring reports (Page 171)

Configuring general settings (Page 163)

2.11.3.6 powerrate Reports for energy analyses

Reports for energy analyses

Introduction

The following report types are available for energy analysis:

- Export of archive measured values
- Cost center report
- Duration curve report

Archive tags of the process value archives are evaluated in these reports. The wizard only displays the tags needed for the respective report type in the "Select archive tags" dialog.

Archive tags used

The following types of archive tags are analyzed:

Archive tag name extension	Meaning
.C	Absolute counter value (for energy count values only, for example DB_INTEGER or DB_ANALOG)
.S	Energy value
.V	Average power demand

To read the list of archive tags again, select the process value archive and click the "Update" button.

If you are not using the PRx_SUM block for energy measurement, the archive tags may not be stored in the "pre" process value archive. In this case, select the appropriate process value archive for configuration of the report. This means that you can, for example, read measured values of the 7KT PAC3200 or 7KT PAC4200 measuring devices.

Compression

You can enter compression times for energy values. The energy values from archive tags with the ".S" ending can be evaluated in the following reports:

- Export of archive measured values
- Cost center report

Note the following when performing configuration:

- Work only with compression times greater than or equal to the archiving cycle of the archive tags. Smaller compression times can lead to incorrect values, especially when energy values are entered manually.
- If you want to show different rates by the hour, set a maximum of one hour for the compression.

Creating virtual process tags

Virtual process tags

You can create and evaluate virtual process tags in addition to the archive tags of the process value archives.

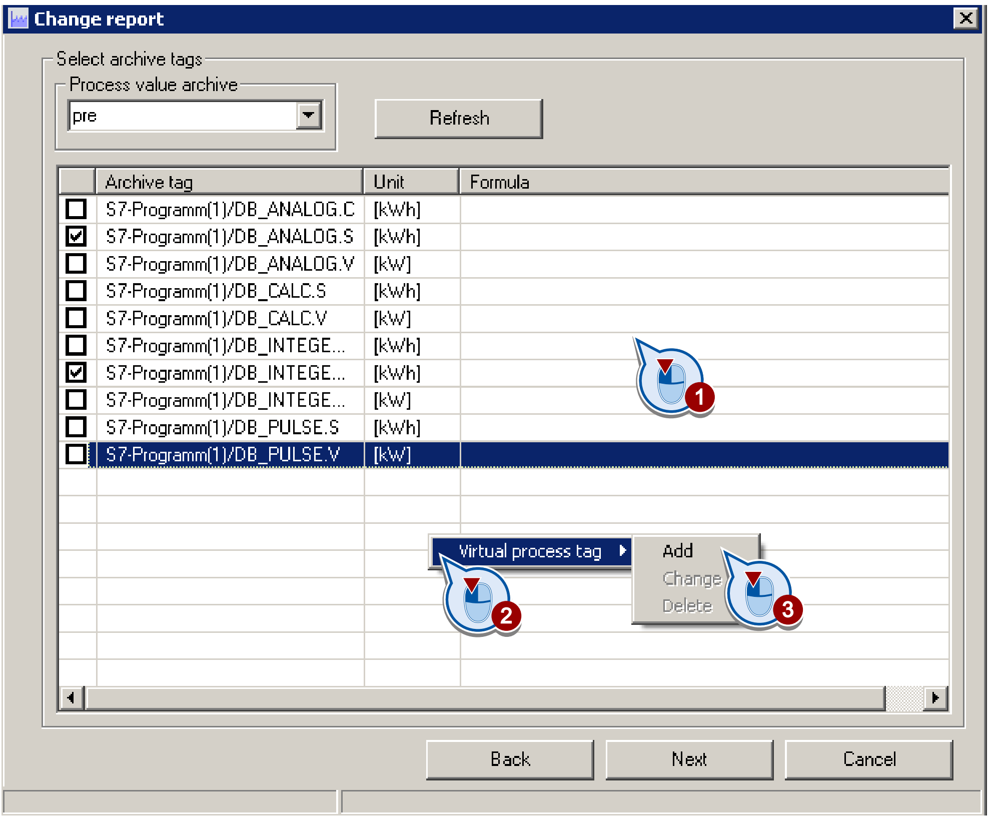
You use virtual tags to work with formulas and to calculate new measured values from existing archive tags. This enables you, for example, to convert units or distribute an energy value to different cost centers.

When the "Formula" column is displayed in the "powerrate Reports" editor, you can create virtual process tags for the configured report.

Procedure

1. Open a report in the "powerrate Reports" editor and go to the "Select archive tags" dialog box.
2. Add a virtual measurement point in the shortcut menu by right-clicking.

   The "Add virtual measurement point" dialog opens.

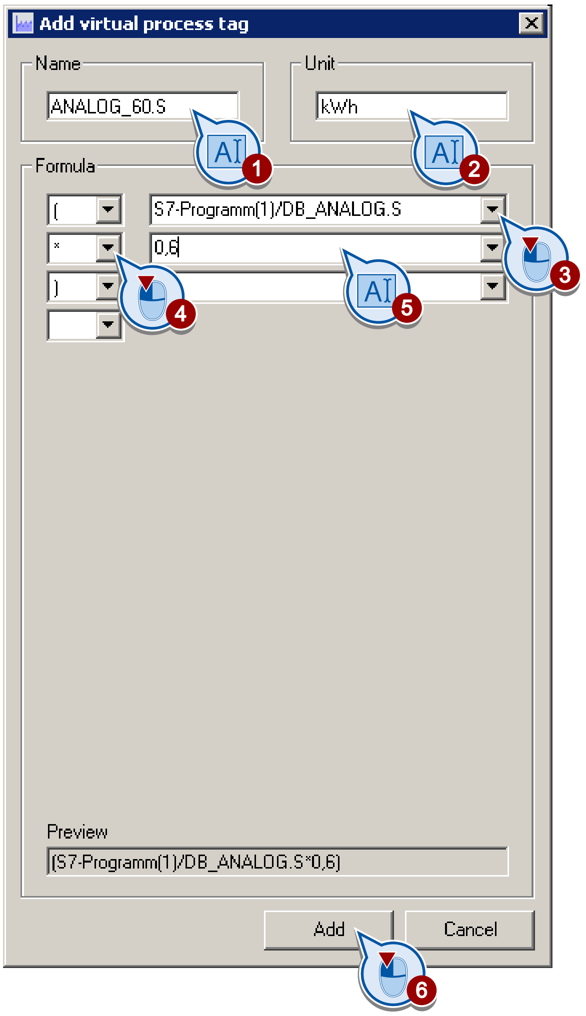


3. Enter a name and a unit, for example "ANALOG_60.S" and "kWh".

   Always use the endings ".C", ".S" and ".V" in the tag names.
   The endings are used to assign the virtual process tags to the various report types.

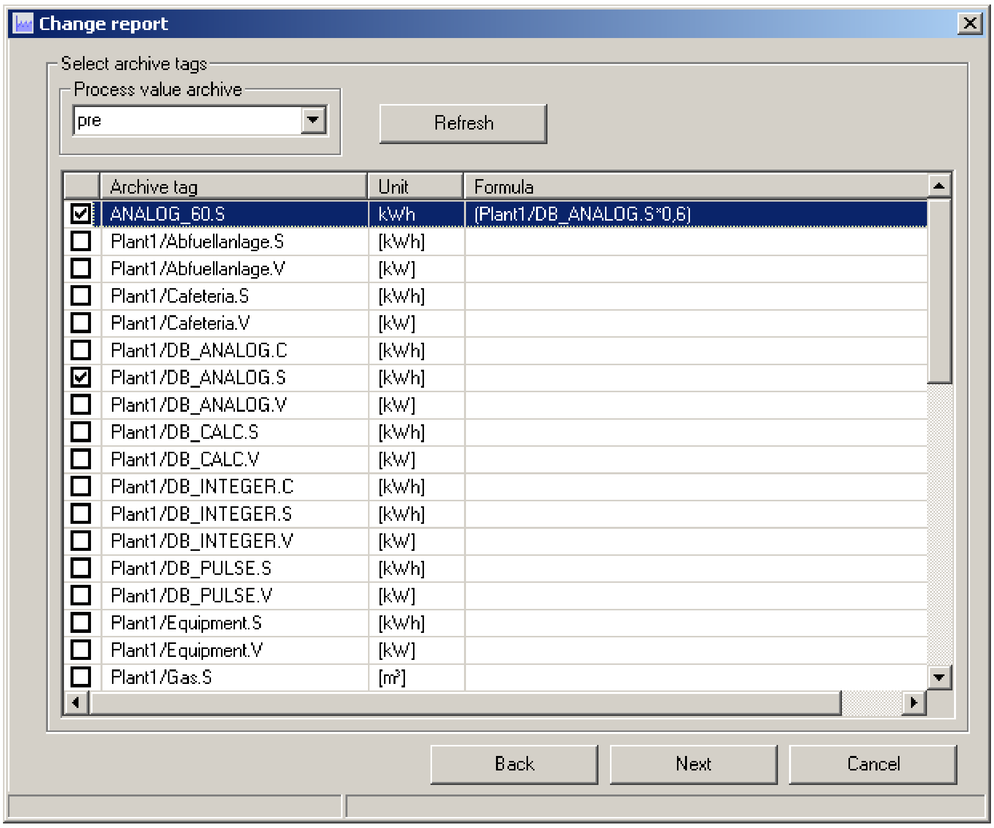
4. Create the formula, for example, "tagname/DB_ANALOG.S" archives tag multiplied by 0.6.

   The available operands and tag names can be selected from the drop-down lists.
   An incorrect formula will be rejected at transfer. The selected formula is shown in the "Preview" field.



Result

You have created a virtual process tag that you can use in the report for the energy analysis.



Export of archive measured values

Overview

The following values are exported as raw data to MS Excel using "Export of archive measured values":

- Archived energy values
- Power values
- Counter values
- Values calculated with these values

The values are stored in the Excel spreadsheet "Archive Data". The values calculated from virtual process tags are stored in the Excel spreadsheet "Virtual measurement points".

The generated export file can be used for further data processing by other applications.

Time stamp	S7-Programm(1)/DB_ANALOG.S	S7-Programm(1)/DB_INTEGER.S
	[Wh]	[kWh]
12/11/2008 12:00:00 PM	437,66	3600,01
12/11/2008 12:15:00 PM	255,72	3599,83
12/11/2008 12:30:00 PM	514,31	3590,51

Reading time for the export of counter values

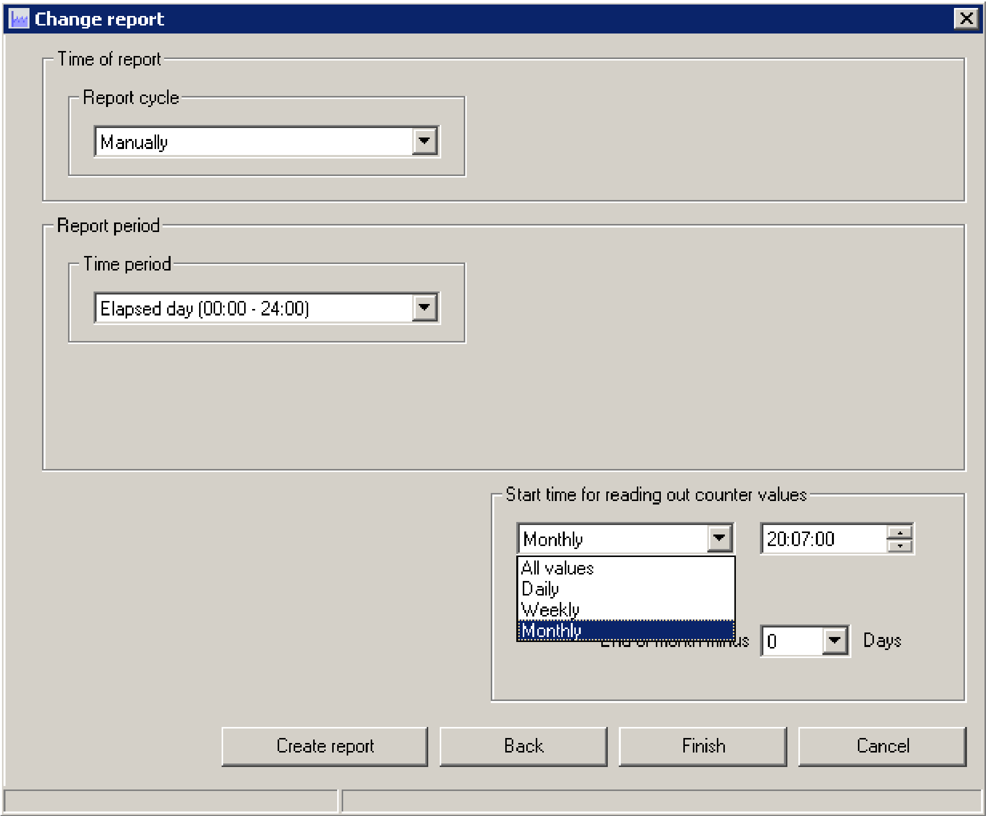
You can evaluate absolute counter values in a report using archive measured values. To do this, use the archive tags with the ".C" ending.

You must specify a reading time for these counter values. This reading time corresponds to the time stamp of the archived tag value.

You can set the following reading time for the tag values from one or more tags:

- All values: No restrictions, all recorded values are evaluated.
- Daily: Value to be read at the specified time.
- Weekly: Value to be read on the specified weekday at the specified time.
- Monthly: Value to be read on the specified day of the month at the specified time.

  The day is calculated from the end of the month minus the specified number of days. For example, if you enter "5", values are evaluated on the following days: January26, February 23 or 24, March 26, April 25, etc.



Creating a cost center report

Overview

The "Cost Center Report Table" and "Cost Center Report Chart" reports are created for the evaluation of energy values.

Appropriate cost centers and rate tables are defined to associate the individual cost centers with the respective consumers and costs. The cost centers are not contained in the WinCC databases.

The cost center report only evaluates energy values from the archive tags with the file extension ".S".

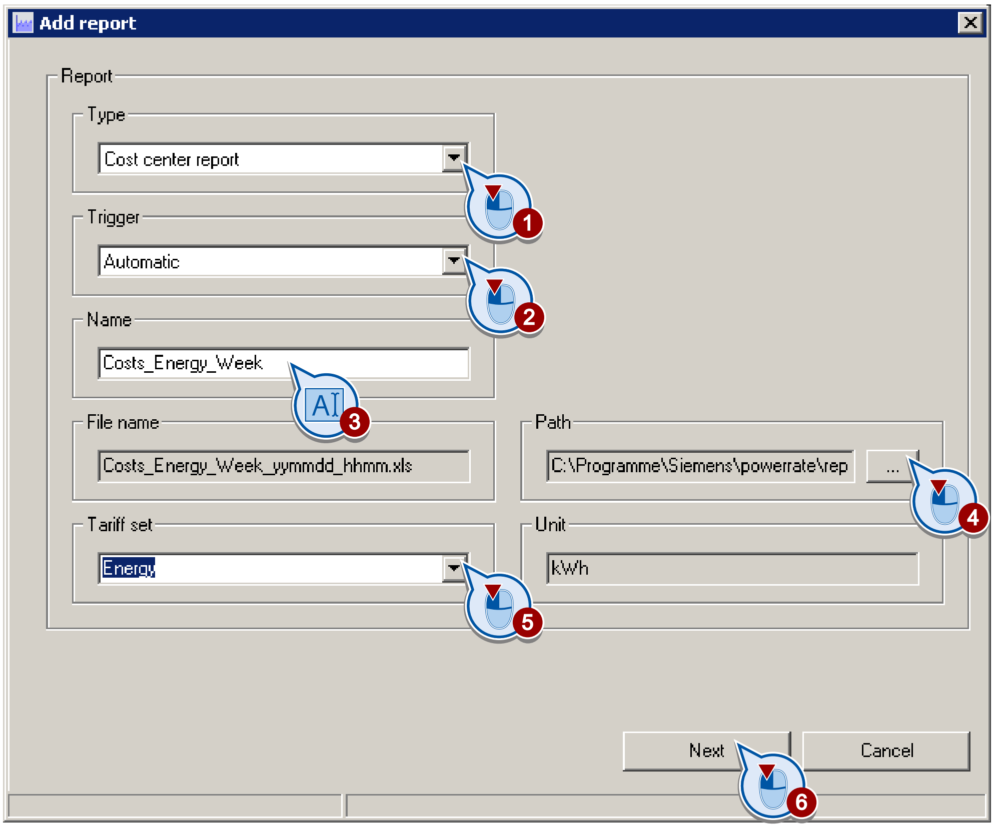
The values are stored in the Excel spreadsheet "Archive Data". The values calculated from virtual process tags are stored in the Excel spreadsheet "Virtual measurement points".
The list of cost centers is saved in the Excel spreadsheets "Cost Center Report Chart" and "Cost Center Report Table".

Requirements

- Rate tables have been created (Configuring rate tables (Page 165))
- The WinCC project is open.

Procedure

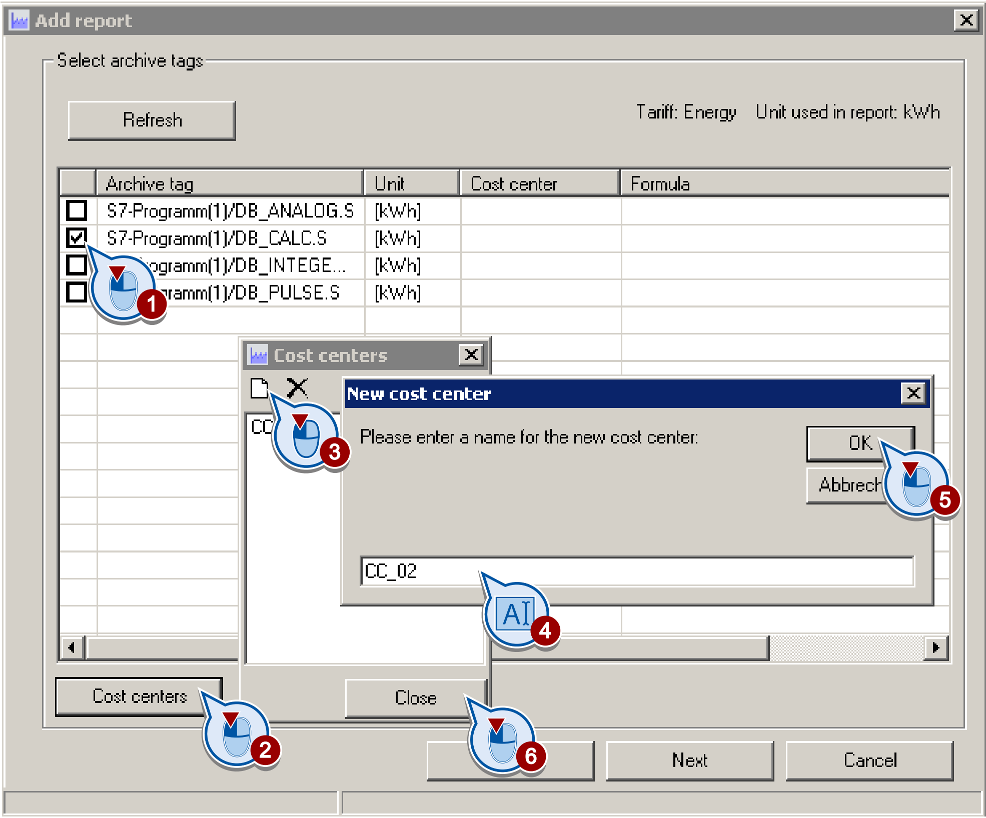
1. To create a report, select "Add report" in the "powerrate Reports" editor.
2. Specify the type of report, the creation type, the report name and the storage path.
3. Assign a rate table.



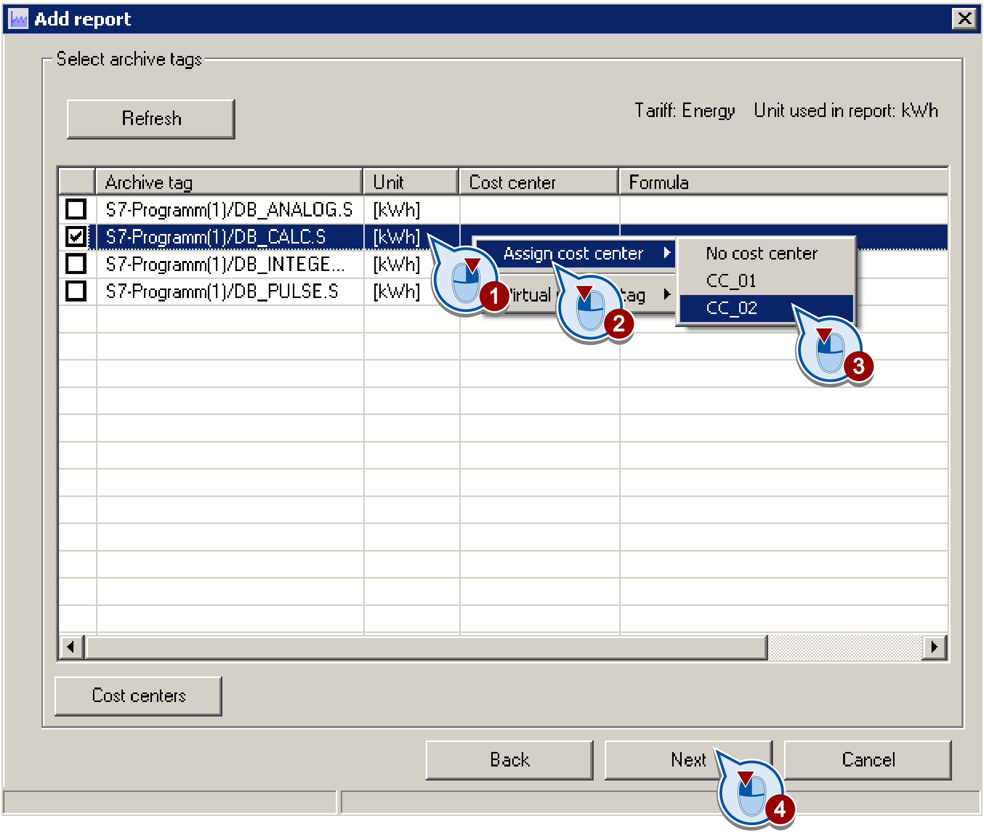
4. Assign the archive tags. The editor displays only the "*.S" energy values.

   If you need a virtual measurement point, also create a virtual process tag (Creating virtual process tags (Page 187)). If archive tags used in the formula are not to be displayed, do not assign these archive tags to cost centers.

5. Create one or more cost centers, for example "CC_01" and "CC_02".



6. Assign the tags to a cost center.



7. Select report date, reporting period and the compression period, when appropriate.

   For automatically generated reports, select the validity period for the reporting cycle.
8. Complete the configuration with "Finish".

Result

You have created a cost center report. The report contains the following worksheets:

"Cost center report table" worksheet

SIEMENS 1/9/2009

Cost center report

Time settings

Start time	12/11/2008 12:00:00 PM
End time	12/18/2008 12:00:00 PM
Aggregation time	None

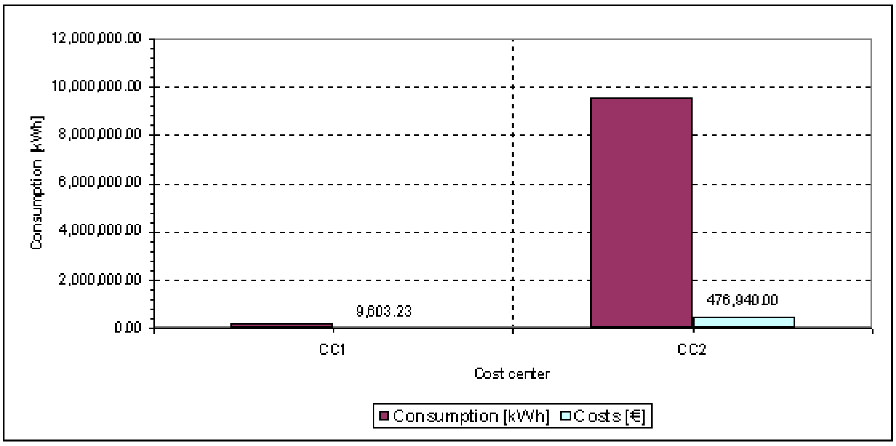
Cost center	Consumption [kWh]	Costs [€]
CC1	19,206.45	9,603.23
CC2	9,538,800.00	476,940.00
Total	973,086.45	486,543.23

"Cost center report diagram" worksheet

SIEMENS 1/9/2009

Cost center report

Time settings	
Start time	12/11/2008 12:00:00 PM
End time	12/18/2008 12:00:00 PM
Aggregation time	None



Duration curve reports

Overview

The "Duration curve report" evaluates the archive tags with the ".V" ending to display the average power values.

It shows the frequency with which particular average power demands occur.
This graphic can then be used to deduce whether temporary power peaks are present.

The values are stored in the Excel spreadsheet "Archive Data". The values calculated from virtual process tags are stored in the Excel spreadsheet "Virtual measurement points".
The representation is stored as a chart in the Excel spreadsheet "Duration curve report".

Selecting an archive tag

Select only one tag. This tag must have been archived during the reporting period with a uniform archiving cycle.

Duration curve report

The duration curve report is shown as a trend in the Excel file:

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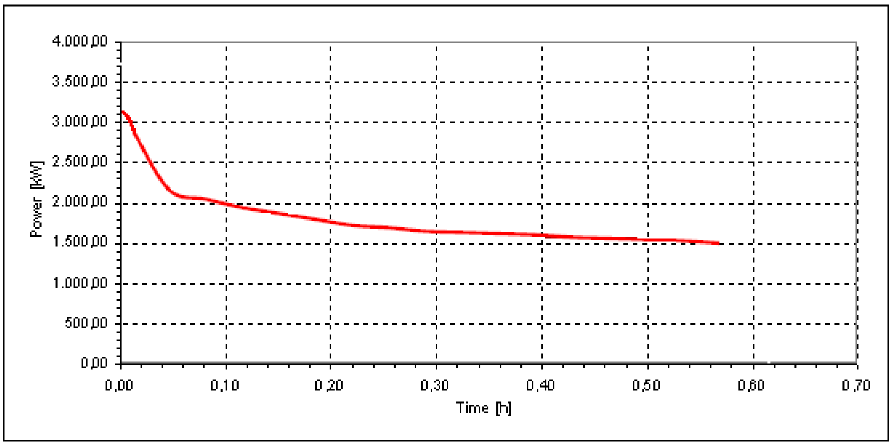
Duration curve report

Time settings	
Start time	12/11/2008 12:00:00 PM
End time	12/18/2008 12:00:00 PM



2.11.3.7 powerrate Reports for batch reports

Reports for batch evaluations

Introduction

The following report formats are available for batch evaluations:

- Export of batch values

  Export of batch-related energy values from user archives to Excel without report creation
- Batch report (sorted by time)

  Sorting of batch-related energy values based on the starting time
- Batch report (sorted by name)

  Sorting of batch-related energy values based on the batch name

Batch evaluation

The user archives whose name starts with "PRE_SUMC_" are evaluated for the batch reports and export of batch values.

Export of batch values

Overview

Using the "Export of batch values" function, the data assigned to specific batches are exported as raw data to MS Excel from the WinCC "PRE_SUMC_..." user archives.
The values are stored in the Excel spreadsheet "Archive Data".

The generated export file can be used for further data processing by other applications.

Charge	Time stamp	Time stamp	Unit	ID	Recipe name	Value 1	Unit value 1	Type value 1
	from	to						
Charge_x	8/15/2008 8:31:00 AM	8/15/2008 12:10:00 PM	Unit 1	4660	Milk	720.00	kWh	Current
Charge_a	8/15/2008 12:20:00 PM	8/15/2008 3:33:00 PM	Unit 2	5660	Yoghourt	1,020.00	kWh	Current
Charge_f	8/15/2008 3:45:00 PM	8/15/2008 6:05:00 PM	Unit 3	6660	Cream	562.00	kWh	Current

Batch reports

Overview

The reports "Batch report (sorted by time)" and "Batch report (sorted by name)" are created to evaluate the "PRE_SUMC_ ..." WinCC user archives.

Depending on the report type, the batch is sorted by the batch name or by date/time of the data.

The reports always show the consumption for the listed batches.

The values are stored in the Excel spreadsheet "Archive Data". The list of batches is saved in the Excel spreadsheets "Batch report (time)" and "Batch Report (name)".

Examples of batch reports

"Batch report (time)" spreadsheet

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Charge report (sorted acc. to time)

Time settings

Start time	8/15/2008 12:00:00 AM
End time	8/16/2008 12:00:00 AM

Time period		**8/15/2008 8:31 AM**	**8/15/2008 12:10 PM**
Charge_x	Current	720.00 kWh	
	Energy	8,740.00 Wh	
	Water	44.00 l	
Time period		**8/15/2008 12:20 PM**	**8/15/2008 3:33 PM**
Charge_a	Current	1,020.00 kWh	
	Energy	9,945.00 Wh	
	Water	87.00 l	
Time period		**8/15/2008 3:45 PM**	**8/15/2008 6:05 PM**
Charge_f	Current	562.00 kWh	
	Energy	6,346.00 Wh	
	Water	34.00 l	

"Batch report (name)" spreadsheet

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Charge report (sorted acc. to name)

Time settings

Start time	8/15/2008 12:00:00 AM
End time	8/16/2008 12:00:00 AM

	From	To		Consumption
Charge_a				
	8/15/2008 12:20 PM	8/15/2008 3:33 PM	Current	1,020.00 kWh
			Energy	9,945.00 Wh
			Water	87.00 l
Charge_f				
	8/15/2008 3:45 PM	8/15/2008 6:05 PM	Current	562.00 kWh
			Energy	6,346.00 Wh
			Water	34.00 l
Charge_x				
	8/15/2008 8:31 AM	8/15/2008 12:10 PM	Current	720.00 kWh
			Energy	8,740.00 Wh
			Water	44.00 l

2.12 Acquiring measured values with PROFIenergy

2.12.1 Measured value acquisition with PROFIenergy

Requirements

To acquire measured values with PROFIenergy, the PLC and the device must be located in the same PROFINET network. In addition, the device must support the PROFIenergy entity type 2 or 3. The PROFIenergy entity types are defined in the application profile of PROFIenergy. Only PROFIenergy entity types 2 and 3 support measurements.

Principle of the measured value acquisition

The PROFIenergy Entity ID of each device in the PROFINET network is uniquely identified. The diagnostic address of the device from the STEP 7 hardware configuration is used as PROFIenergy Entity ID.

The document "PROFIenegry Technical Specification for PROFINET, Annex A List of electrical measurements" also defines measured variables A unique measured value ID is assigned to each measured variable. The device documentation provides information on which measured value IDs are supported by a device.

Block for measured value acquisition

To acquire measured values via PROFIenergy, use the block PR3_PE_RD / PRE_PE_RD; this block acquires up to ten different measured values from a device.

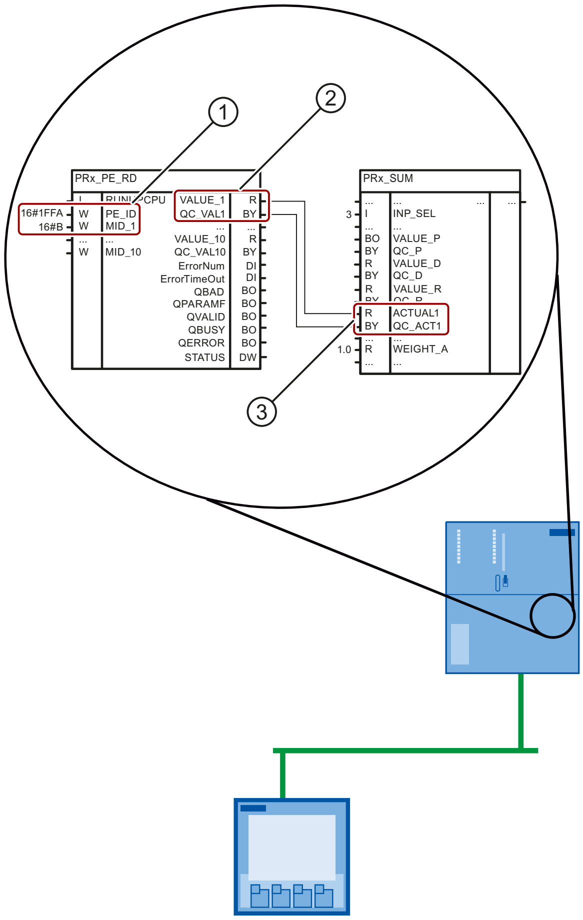
2.12.2 Acquiring a measured value with PROFIenergy

Note

Measured value acquisition via PROFIenergy supports PROFIenergy V1.0.

Example of a block parameterization

The following figure shows the acquisition and processing of a measured value in a PROFINET network in schematic form. The block PR3_PE_RD / PRE_PE_RD is called cyclically in OB1 in the user program of the PLC. Once it has been acquired, the measured value is transferred to the PR3_SUM / PRE_SUM block for further processing.



① The "PE-ID" parameter is used to define the PROFIenergy entity ID of the desired device in hexadecimal format.

The "MID_1" parameter is used to define the measured value ID to be read from the device in hexadecimal format.

Example of parameterization:

`PE_ID := DW#16#1FFA` (corresponds to decimal diagnostic address 8186)

`MID_1 := W#16#B` (corresponds to decimal measured value ID 11; this measured value ID represents the measured apparent power.)

② When the measurement has been successfully completed the acquired measured value is written to the "VALUE_1" and "QC_VAL1" parameters with the quality code. These two output parameters are interconnected with the corresponding input parameters of the PR3_SUM / PRE_SUM block.

Example of parameterization:

```
VALUE_1 := DB161.ACTUAL1
QC_VAL1 := DB161.QC_ACT1
```

③ The measured value and the quality code transferred to the parameters "ACTUAL1" and "QC_ACT1" are further processed in the PR3_SUM / PRE_SUM block. The parameterization of the signal type and the norming factor is required for further processing.

Example of parameterization:

`INP_SEL := 3` (result from arithmetic block)

`WEIGHT_A := 1.0` (norming factor)

Notes on measured value processing

If you want to further process the measured values acquired by the PR3_PE_RD / PRE_PE_RD block, note the following:

- The PR3_PE_RD / PRE_PE_RD block acquires up to *ten* measured values from *one* measuring device.
- The PR3_SUM / PRE_SUM block processes only *one* measured value.

Therefore, interconnect a PR3_PE_RD / PRE_PE_RD block with the PR3_SUM / PRE_SUM block for each measured value, respectively.

Requirements for measured value acquisition

- The PROFIenergy Entity ID of the measuring device is available in hexadecimal format.
- The measured value ID of the measured unit is available in hexadecimal format.
- PLC and measuring device are located in the same PROFINET network.

Requirements for measured value processing

If the acquired measured values are to be processed, the following *additional* requirements apply:

- The PR3_SUM / PRE_SUM block is interconnected with all blocks required for measured value processing.
- The "INP_SEL" parameter of the PR3_SUM / PRE_SUM block is parameterized according to the measured variable.

Procedure

1. Insert the PR3_PE_RD / PRE_PE_RD block into the organization block OB1.
2. Enter the PROFIenergy Entity ID of the measuring device at the PE_ID parameter.

   Example: `PE_ID := DW#16#1FFA`
3. Enter the measured value ID of the measured variable at the MID_x parameter.

   Example: `MID_1 := W#16#B`
4. To transfer an acquired measured value with its quality code to the PR3_SUM / PRE_SUM block:
   - Interconnect the VALUE_x parameter with the input parameter assigned to the measured variable.

     Example: `VALUE_1 := DB161.ACTUAL1`
   - Interconnect the QC_VALx parameter with the input parameter assigned to the quality code of the measured variable.

     Example: `QC_VAL1 := DB161.QC_ACT1`
5. Compile and download the user program.

Result

The PR3_PE_RD / PRE_PE_RD block is called cyclically in the user program. With each call, the block requests the measured value ID from the measuring device. This process is repeated until the measuring device supplies the requested measured value or is canceled with a timeout.

You find additional information on this topic in the description of the PR3_PE_RD / PRE_PE_RD block.

See also

PRE_PE_RD / PR3_PE_RD: Energy measuring with PROFIenergy (Page 341)

PRE_SUM / PR3_SUM: Acquisition of measured energy values (Page 356)

2.12.3 Using PROFIenergy to acquire measured values from an I device

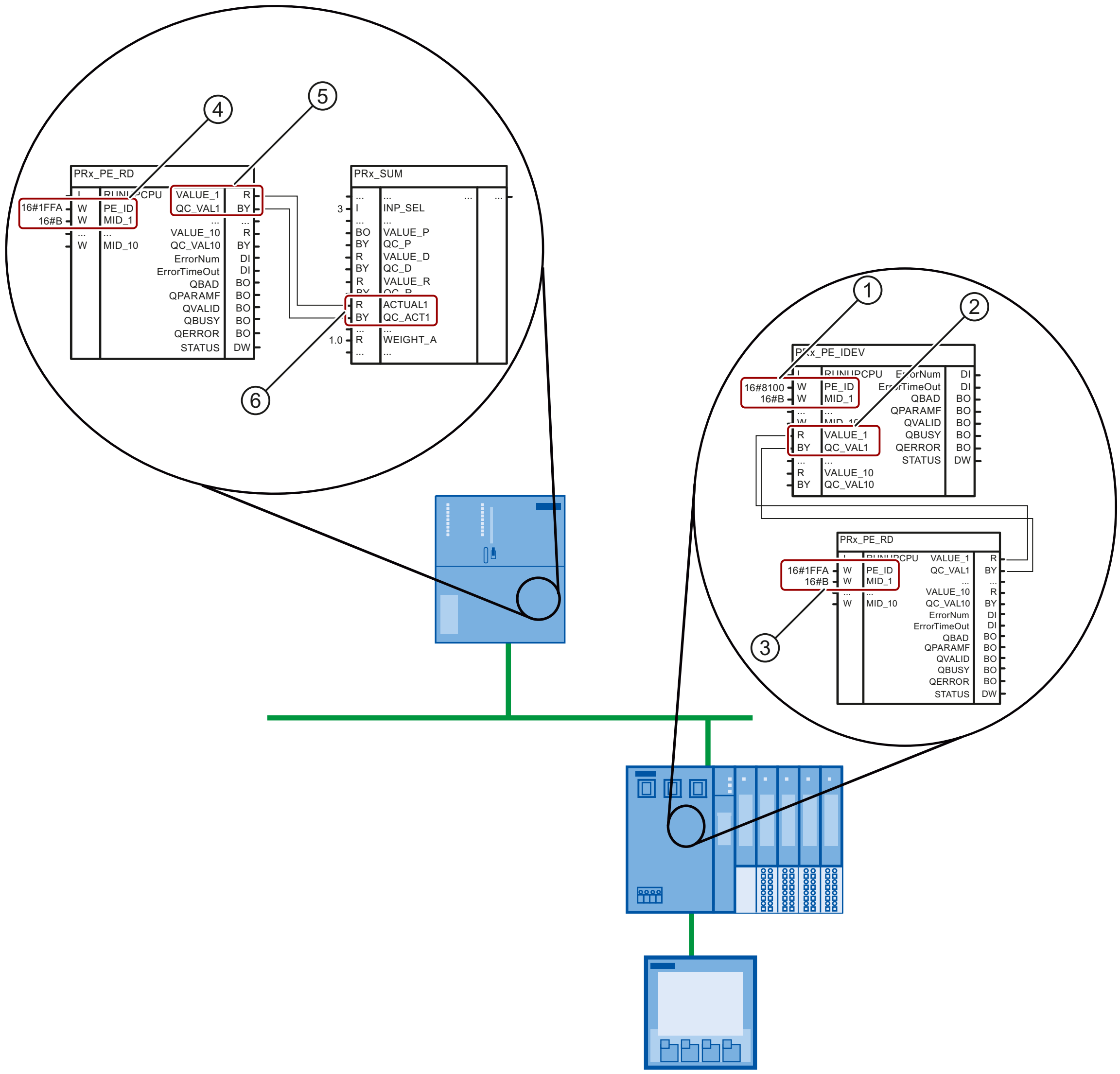
Introduction

You can forward up to ten measured values acquired on an I device to an IO controller with the PRE_PE_IDEV / PR3_PE_IDEV block. Compared to a PR3_PE_RD / PRE_PE_RD block parameterized on the IO controller, the I device responds like a device that supports PROFIenergy.

This allows you to also acquire measured values from devices that do not support PROFIenergy, for example, via PROFIenergy. The measured values, for example, are acquired and processed from one or more devices via the I device.

Example of a block parameterization

The following figure shows (in schematic form) the acquisition of measured values on an I device. The PRE_PE_IDEV / PR3_PE_IDEV and PR3_PE_RD / PRE_PE_RD blocks are called cyclically in OB1 in the user program of the I device. The acquired measured values are requested and further processed there by the IO controller.



① The "PE-ID" parameter is used to define the PROFIenergy entity ID at which the I device can be reached in the PROFINET network. The diagnostic address of the I device in hexadecimal format is used as PROFIenergy Entity ID. In addition, the value "8000" is added.

You can use the MID_1 parameter to specify the measured value ID in hexadecimal format by which the measured variable is made available to the I device.

Example of parameterization:

`PE_ID := DW#16#8100` (corresponds to the decimal diagnostic address 256)

`MID1 := W#16#B` (corresponds to the decimal measured value ID 11)

② The block receives the acquired measured value and its quality code via the parameters VALUE_1 and QC_VAL1. The two input parameters are interconnected with the corresponding output parameters of the block for measured value acquisition, for example PR3_PE_RD / PRE_PE_RD.

Example of parameterization:

```
VALUE_1 := DB202.VALUE_1
QC_VAL1 := DB202.QC_VAL1
```

③ These two parameters request the measured value from the measuring device via PROFIenergy. The measuring device is linked to the I device via PROFINET.

Example of parameterization:

`PE_ID := DW#16#1FFA` (corresponds to decimal diagnostic address 8186)

`MID_1 := W#16#B` (corresponds to decimal measured value ID 11)

④ The "PE-ID" parameter is used to define the PROFIenergy entity ID of the I device in hexadecimal format.

The "MID_1" parameter is used to define the measured value ID in hexadecimal format to be read from the I device.

Example of parameterization:

```
PE_ID := DW#16#8100
MID1 := W#16#B
```

⑤, ⑥ The acquired measured value is transferred together with the quality code to the PR3_SUM / PRE_SUM block for further processing.

Requirements for measured value acquisition from an I device

- The diagnostic address of the I device is available in hexadecimal format.
- The value "8000" is added to the diagnostic address.
- The measured value ID of the measured unit is available in hexadecimal format.
- The blocks for measured value acquisition are parameterized in the user program of the I device.
- IO controller and I device are located in the same PROFINET network.
- PROFIenergy library is contained in the STEP 7 project.

Procedure

1. Open the PROFIenergy block library in STEP 7.

   You can find the block library at "Libraries > Standard Library > PROFIenergy blocks".
2. Copy all blocks with the exception of FB815 and FB816 to the block folder of the I device.
3. Enter the following in the symbol table of the I device for FB817 and its instance DB:
   - PE_I_DEV = FB817
   - PE_I_DEV__DI = <Instance DB from FB817>
4. Insert the PR3_PE_RD_IDEV / PRE_PE_RD_IDEV block into OB1 of the I device.
5. Enter the diagnostic address of the I device at the "PE_ID" parameter.

   Example: `PE_ID := DW#16#8100`
6. At the MID_x parameter, enter the measured value ID of the measured variable which the I device provides.

   Example: `MID_1 := W#16#B`
7. To transfer the acquired measured value with its quality code to the PR3_PE_RD_IDEV / PRE_PE_RD_IDEV block:
   - Interconnect the VALUE_x parameter with the input parameter assigned to the measured variable.

     Example: `VALUE_1 := DB202.VALUE_1`
   - Interconnect the QC_VALx parameter with the input parameter assigned to the quality code of the measured variable.

     Example: `QC_VAL1 := DB202.QC_VAL1`
8. Compile and download the user program.
9. Set the parameters for the PR3_PE_RD / PRE_PE_RD block in the user program of the IO controller:
   - PE_ID := <Parameterized PROFIenergy Entity ID of the I device>
   - MID_x := <Parameterized measured value ID of the I device>

Result

The PR3_PE_RD_IDEV / PRE_PE_RD_IDEV block is called cyclically in the user program. If the IO controller of the I device requests measured values, the PR3_PE_RD_IDEV / PRE_PE_RD_IDEV block compares the requested measured value IDs with its parameterized measured value IDs. If the measured value IDs match, the block creates a response frame with the measured values and sends it to the IO controller.

You can find additional information on this topic in the description of the PR3_PE_RD_IDEV / PRE_PE_RD_IDEV block.

See also

PRE_PE_IDEV / PR3_PE_IDEV: Energy measurement with PROFIenergy from an I device (Page 336)

Acquiring a measured value with PROFIenergy (Page 201)

2.13 Replacing the PR3_AR_DATA block with the PR3_AR_DATA_B block

Introduction

The data interface for sending archive data between an S7-300 and WinCC has been improved on the block end in SIMATIC powerrate V4.0 SP1. Advantages:

- Release of several buffers
- Faster buffer emptying

The improved data interface has been implemented as of SIMATIC powerrate V4.0 SP1 in the PR3_AR_DATA_B block.

Notes on use of the blocks PR3_AR_DATA and PR3_AR_DATA_B

Note the following rules:

- You create a new project based on SIMATIC powerrate V4.0 SP1:

  Only use the block PR3_AR_DATA_B.

- You update SIMATIC powerrate V4.0 to SIMATIC powerrate V4.0 SP1:

  Continue to use the block PR3_AR_DATA in the project even if you are adding new measuring points. You cannot use the PR3_AR_DATA and PR3_AR_DATA_B blocks simultaneously in a project.

Note

Conversion to improved data interface

If you also want to convert the project to use the improved data interface during the update, you will find the detailed instructions on how to proceed correctly as FAQ in the Internet.

CAUTION
Loss of data possible Archive data may be lost during the migration from PR3_AR_DATA by means of the PR3_AR_DATA_B block. Note the procedure described in the FAQ listed below to prevent loss of data. The FAQ includes additional information on the tags or names that you should never change.

See also

FAQ: Entry ID "60307962" (http://support.automation.siemens.com/WW/view/en/60307962)

PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA: Data interface for sending the archive data (Page 221)

System limits of the PRE_SUM / PR3_SUM block (Page 428)

3 Description of blocks

3.1 Overview of the blocks

Introduction

The powerrate library contains blocks for S7-400, S7-300 as well as user-defined data types.

The following tables list the block name, the block number and the function of each block. The following chapters contain detailed information required for configuration for each block.

Configuration of blocks

Observe the following for configuring blocks:

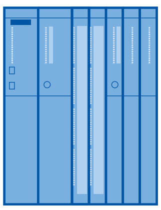
- You can change the number of those blocks that are not used internally in the SIMATIC Manager.
- The numbers of the internal blocks PRE_BR , PRE_BS, PRE_CALC, PR3_CALC and PR3_FIFO_IO can be changed using the "Rewire" function.
- The numbers of the UDT blocks, the block numbers of the function blocks PRE_BR, PRE_BS, and the functions cannot be changed.

You can change block numbers in the SIMATIC Manager or with the "Rewire" function. Instructions can be found under "Changing block numbers (Page 220)".

Blocks for S7-400

The following figure shows which blocks are used for what:

Overview of the S7-400 blocks



System blocks

PRE_SYNC
PRE_FIFO_DATA
PRE_AR_DATA
PRE_UA_S
PRE_UA_R

Energy measurement

PRE_SUM
PRE_CALC
PRE_SUMC
PRE_PE_RD
PRE_BIN_ACQ
PRE_INT_ACQ

Monitoring

PRE_PAC
PRE_SWITCH

Load management

PRE_LMGM
PRE_LMGM_10 ...
PRE_LMGM_25 ...
PRE_LMGM_50 ...
PRE_LMGM_75

Communication

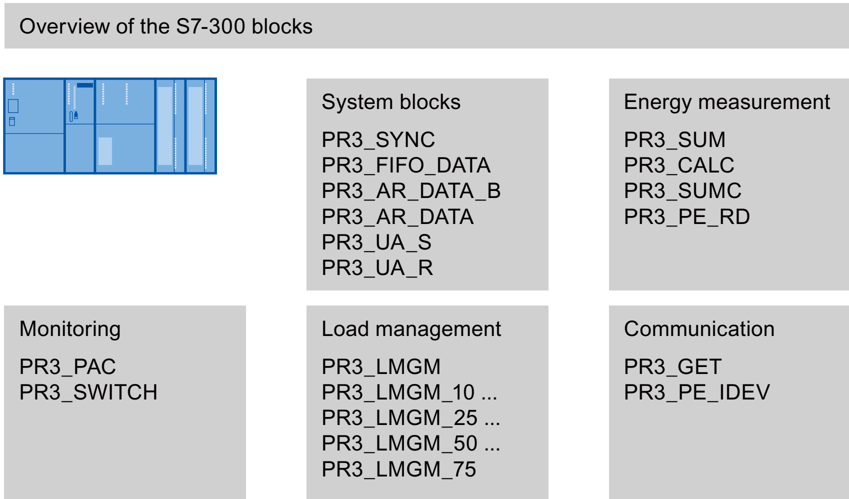
PRE_AS_SEND
PRE_AS_RECV
PRE_SND_H
PRE_RCV_H
PRE_GET
PRE_PE_IDEV

Number	Name	Function
FB1060	PRE_SYNC (Page 394)	Time synchronization
FB1061	PRE_SUM (Page 356)	Block for energy measurement and processing
FB1062	PRE_FIFO_DATA (Page 252)	FIFO buffer
FB1063	PRE_AR_DATA (Page 221)	Data interface for sending the archive data
FB1064	PRE_AR_SND (Page 228)	Archiving of measured values in the WinCC Tag Logging archive (only used internally)
FB1065	PRE_LMGM (Page 261)	Load management for up to 100 loads
FB1066	PRE_LMGM_75 (Page 261)	Load management for up to 75 loads
FB1067	PRE_LMGM_50 (Page 261)	Load management for up to 50 loads
FB1068	PRE_LMGM_25 (Page 261)	Load management for up to 25 loads
FB1069	PRE_LMGM_10 (Page 261)	Load management for up to 10 loads
FB1070	PRE_AS_SEND (Page 237)	Send block for AS-to-AS communication
FB1071	PRE_AS_RECV (Page 233)	Receive block for AS-to-AS communication
FB1072	PRE_SND_H (Page 351)	Send block for AS-4xxH to AS-400 communication
FB1073	PRE_RCV_H (Page 346)	Receive block for AS-4xxH to AS-400 communication
FB1074	PRE_BS (Page 249)	Calls the BSEND system function block (only used internally)
FB1075	PRE_BR (Page 248)	Calls the BRCV system function block (only used internally)
FB1076	PRE_GET (Page 256)	AS-to-AS communication, read out of data from S7-300
FB1077	PRE_SUMC (Page 380)	Block for batch-related energy measurement
FB1078	PRE_UA_S (Page 404)	Archive manager for writing archive data to the user archive
FB1079	PRE_UA_R (Page 397)	Archive manager for reading archive data from the user archive
FB1090	PRE_BIN_ACQ (Page 241)	Block for energy measurement. Extension of the PRE_SUM block.
FB1092	PRE_INT_ACQ (Page 245)	Block for energy measurement. Extension of the PRE_SUM block.
FB1750	PRE_SWTCH (Page 387)	Block for general switch
FB1751	PRE_PAC (Page 327)	Block for basic functionality of the PAC3200 / PAC4200
FB1752	PRE_PE_RD (Page 341)	Block for measured value acquisition via PROFIenergy

Number	Name	Function
FB1753	PRE_PE_IDEV (Page 336)	Block for measured value transfer via PROFIenergy
FC1061	PRE_CALC (Page 250)	Calculation block
FC1062	PRE_FIFO_IO (Page 254)	Organization of the FIFO buffer (only used internally)

Blocks for S7-300

The following figure shows which blocks are used for what:



Number	Name	Function
FB160	PR3_SYNC (Page 394)	Time synchronization
FB161	PR3_SUM (Page 356)	Block for energy measurement and processing
FB162	PR3_FIFO_DATA (Page 252)	FIFO buffer
FB163	PR3_AR_DATA (Page 221)	Data interface for sending the archive data
FB164	PR3_AR_SND (Page 228)	Archiving of measured values in the WinCC Tag Logging archive (only used internally)
FB165	PR3_LMGM (Page 261)	Load management for up to 100 loads
FB166	PR3_LMGM_75 (Page 261)	Load management for up to 75 loads
FB167	PR3_LMGM_50 (Page 261)	Load management for up to 50 loads
FB168	PR3_LMGM_25 (Page 261)	Load management for up to 25 loads
FB169	PR3_LMGM_10 (Page 261)	Load management for up to 10 loads

Number	Name	Function
FB173	PR3_AR_DATA_B (Page 221)	Data interface for sending the archive data
FB174	PR3_AR_SND_B (Page 228)	Archiving of measured values in the WinCC Tag Logging archive (only used internally)
FB176	PR3_GET (Page 256)	AS-to-AS communication, read out of data from S7-300
FB177	PR3_SUMC (Page 380)	Block for batch-related energy measurement
FB178	PR3_UA_S (Page 404)	Archive manager for writing archive data to the user archive
FB179	PR3_UA_R (Page 397)	Archive manager for reading archive data from the user archive
FB190	PR3_BIN_ACQ (Page 241)	Block for energy measurement. Extension of the PR3_SUM block.
FB192	PR3_INT_ACQ (Page 245)	Block for energy measurement. Extension of the PR3_SUM block.
FB200	PR3_SWTCH (Page 387)	Block for general switch
FB201	PR3_PAC (Page 327)	Block for basic functionality of the PAC3200 / PAC4200
FB202	PR3_PE_RD (Page 341)	Block for measured value acquisition via PROFIenergy
FB203	PR3_PE_IDEV (Page 336)	Block for measured value transfer via PROFIenergy
FC161	PR3_CALC (Page 250)	Calculation block
FC162	PR3_FIFO_IO (Page 254)	Organization of the FIFO buffer (only used internally)

User-defined data types

Number	Name	Function
UDT1060	UDT_PRE_FIFO (Page 413)	Data type for check data for organizing the FIFO buffer
UDT1061	UDT_PRE_ITEM (Page 414)	Data type for measured value
UDT1062	UDT_PRE_TLG (Page 419)	Data type for message frame item for sending to the WinCC tag logging archive
UDT1063	UDT_PRE_SND_REQ (Page 418)	Data type for write data request
UDT1064	UDT_PRE_SND (Page 417)	Data type for archive manager checkback signal for writing
UDT1065	UDT_PRE_RCV_REQ (Page 416)	Data type for read data request
UDT1066	UDT_PRE_RCV (Page 415)	Data type for archive manager acknowledgment signal for reading
UDT1067	UDT_PRE_ANY (Page 412)	Data type for Any pointer

See also

Important inputs and IDs (Page 215)

Faceplates in WinCC process pictures (Page 74)

3.2 Important inputs and IDs

Introduction

When configuring blocks you must observe a number of basic settings.
Check the parameter assignment of each of the blocks.

This chapter lists the most important inputs and default assignments for the powerrate blocks.

Applying connection ID from NetPro

For the PRx_UA_S, PRx_UA_R and PR3_AR_DATA_B blocks, configure the "ID_1" input with the connection ID from NetPro.

Basic settings

After copying the function blocks from the powerrate library, the calls of the function blocks are assigned default parameters. The IDs for certain inputs are assigned default values.

These inputs are assigned IDs which are important for communication or configuration of the project. If a function block is assigned these type of IDs, you must observe the following:

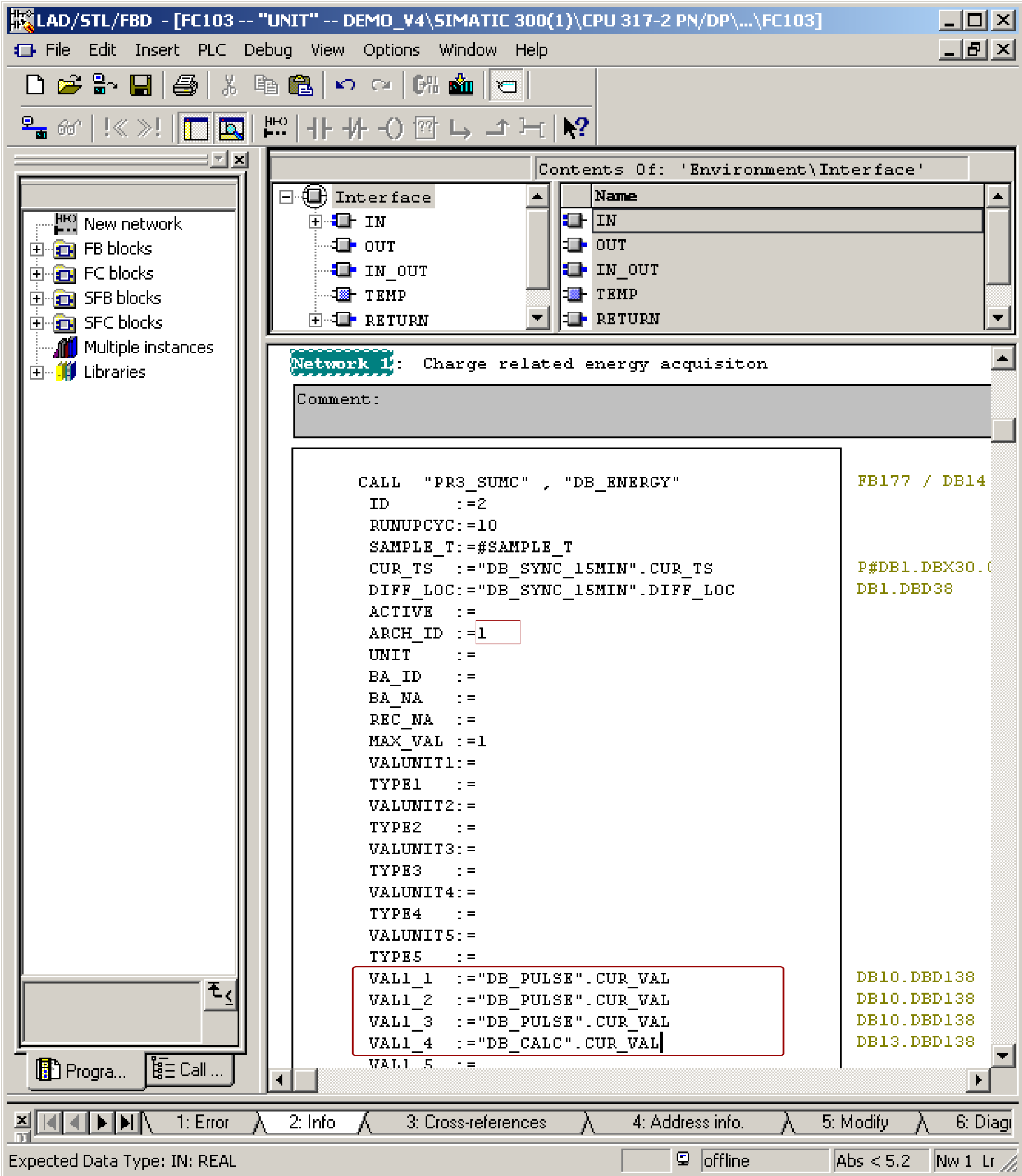
- One of these IDs must be unique for each PLC. They must not be assigned twice. If you call a function block several times, you must increment the ID accordingly.
- If you are using several PLCs, certain IDs must also be unique within the entire project. If required, adapt the corresponding IDs by incrementing them. In this case, we recommend specifying certain number ranges for the PLC.

Further information about block configuration can be found in the STEP 7 documentation.

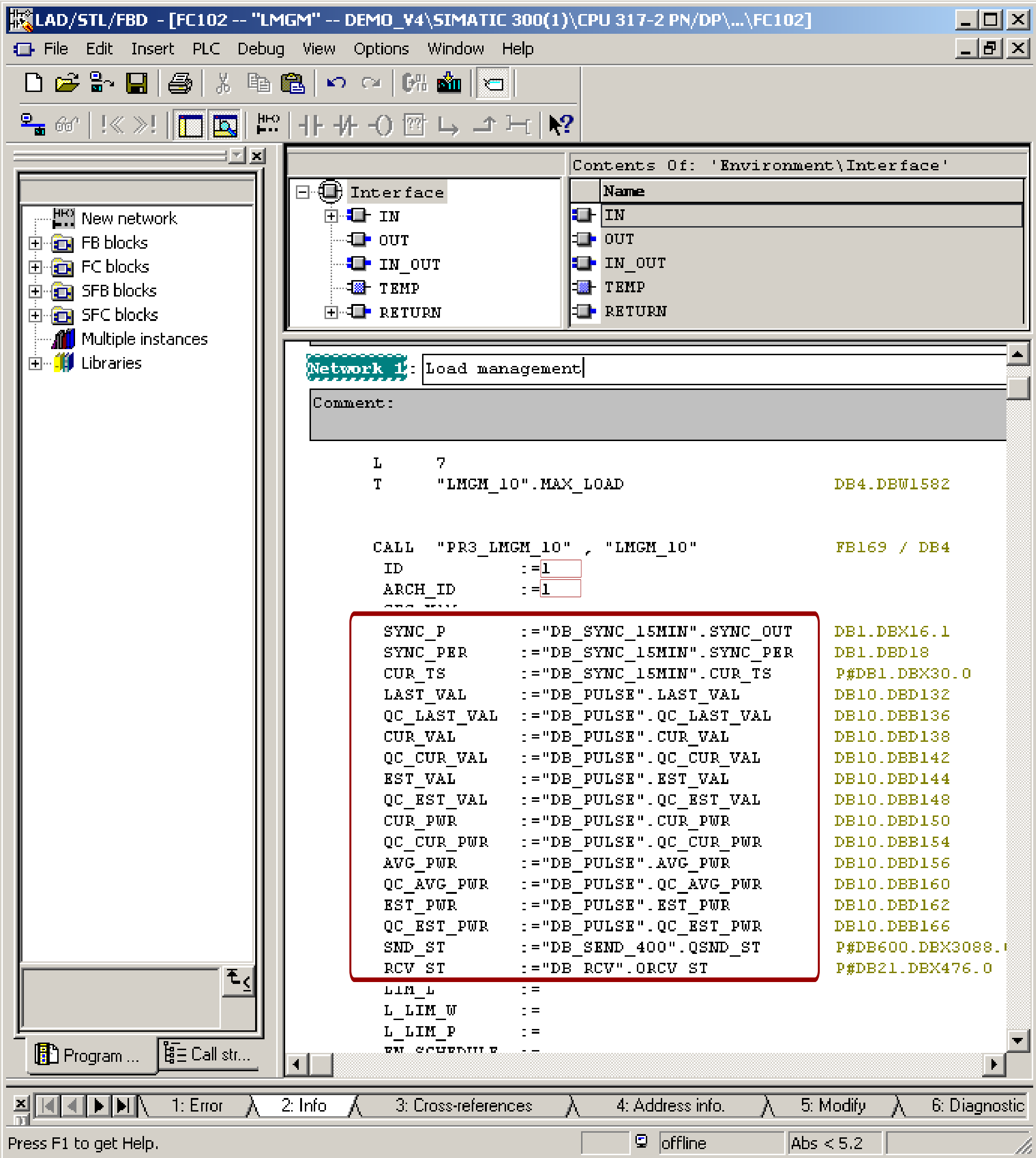
The following table contains the essential inputs and information on their use. During configuration, check whether these inputs are present and configured correctly in the function blocks used.

Inputs	Use	Own PLC / Within a PLC	Multiple PLCs
ID	ID for the communication blocks PRE_UA_S and PRE_UA_R.	The ID must be unique.	ID can be used once per PLC. The same ID can be used several times throughout the project.
ID_1	Connection ID assigned in NetPro of the PLC to the server (own PLC)	Identical in all blocks for each addressed connection.	Identical in all blocks for each PLC and addressed connection.
ID_2	Only for S7-400: Connection ID assigned in NetPro to the standby server	Identical in all blocks for each addressed connection.	Identical in all blocks for each PLC and addressed connection.
ARCH_ID	Designation of the user archives for PRx_SUM and PRx_LMGM	ARCH_ID must be unique for each block group, e.g. for the LMGM blocks. Different blocks may have the same ARCH_ID, for example, PRE_SUMC and an LMGM block.	ARCH_ID must be unique for each block group throughout the project.
R_ID	User archives: Job ID for the communication blocks, PRx_UA_S, PRx_UA_R and PR3_AR_DATA_B	Must not be changed. R_ID for send block and receive block must be unique.	Must not be changed. The same R_ID can be used several times throughout the project.
ARSNO_S / ARSNO_V / ARSNO_C	Tag Logging: Archive subnumbers for the archive tags in the Tag Logging archive	Must not be changed. Archive subnumbers must be unique.	Must not be changed. Can be used once per PLC. The same archive subnumbers can be used several times throughout the project.
AR_EVID	Tag Logging Archive number for the AR_SEND archive send block	AR_EVID must be unique.	AR_EVID must be unique throughout the project.

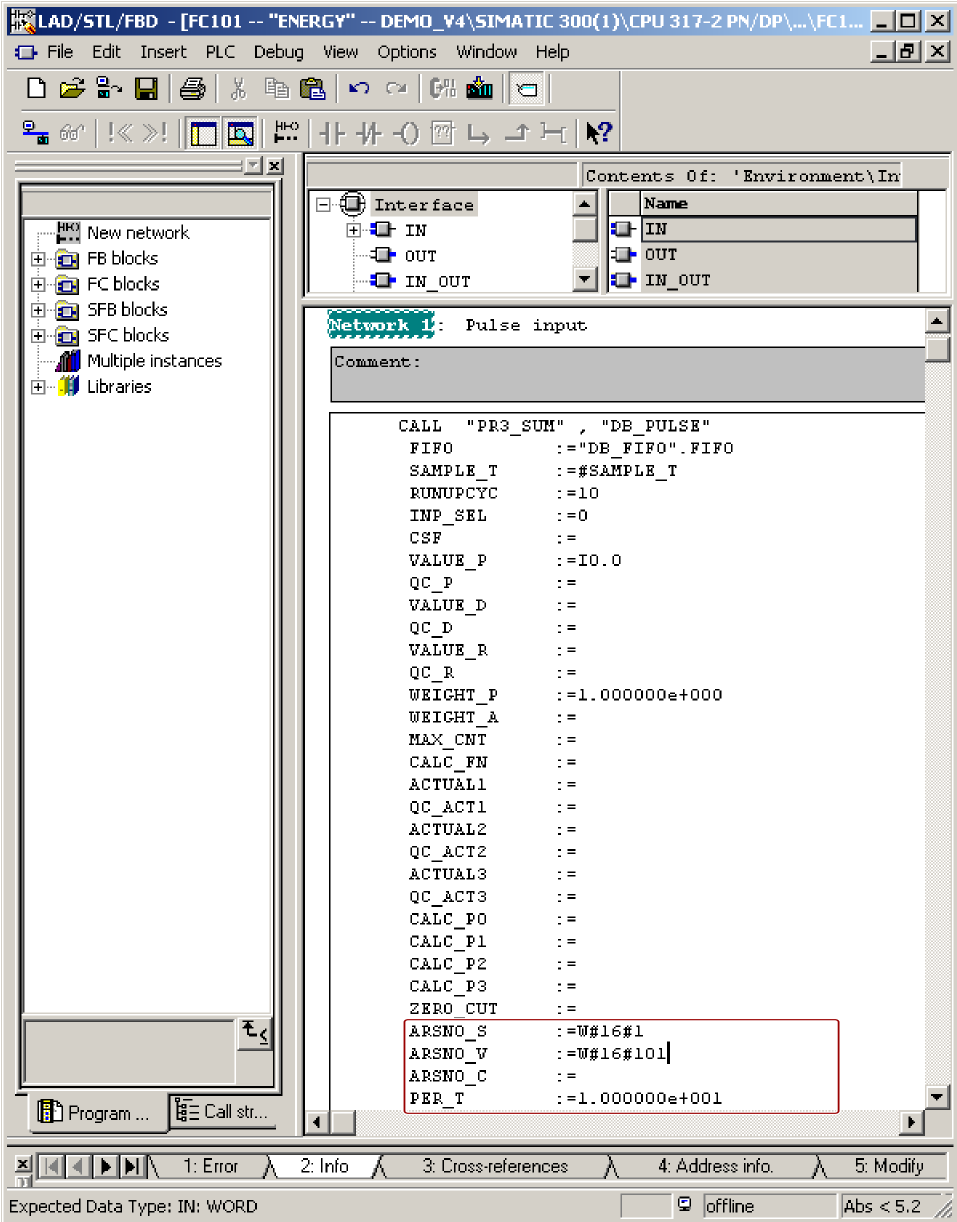
Example of ARCH_ID



Example of ID and ARCH_ID



Example of ARSNO_S / ARSNO_V / ARSNO_C



See also

Overview of the blocks (Page 211)

Configuration basics (Page 17)

Copying blocks from the powerrate library (Page 46)

3.3 Changing block numbers

Introduction

You change block numbers in the SIMATIC Manager or with the "Rewire" function.

Observe the following for configuring blocks:

- You can change the number of those blocks that are not used internally in the SIMATIC Manager.
- The numbers of the internal blocks PRE_BR, PRE_BS, PRE_CALC, PR3_CALC and PR3_FIFO_IO can be changed using the "Rewire" function.
- You cannot change the numbers of the UDT blocks.
- You cannot change the block numbers of the PRE_BR, PRE_BS function blocks and the functions.

"Rewire" procedure

1. Copy the library into an S7 project.
2. Select the block container.

   Open the dialog for editing of block numbers with the "Rewire" command in the shortcut menu.
3. Fill in the table by entering the values for "Old address" and "New address" one after the other.
4. Start the rewiring function.

   An error message appears reporting that a block cannot be rewired.
   You can ignore this message.

   Open the "Calls" tab in the object properties of the blocks and check the changed block numbers.
5. Update the symbol table with the new block numbers.

See also

Copying blocks from the powerrate library (Page 46)

Downloading blocks to the controller and PC station (Page 50)

Overview of the blocks (Page 211)

3.4 PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA: Data interface for sending the archive data

3.4.1 Function - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

PRE_AR_DATA	FB1063
PR3_AR_DATA_B	FB173
PR3_AR_DATA	FB163

Description of block

- Calling OBs - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 223)
- Called blocks - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 223)
- Message characteristics - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 224)
- Error response - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 225)
- Startup characteristics - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 225)
- Block parameters - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 225)

Function description

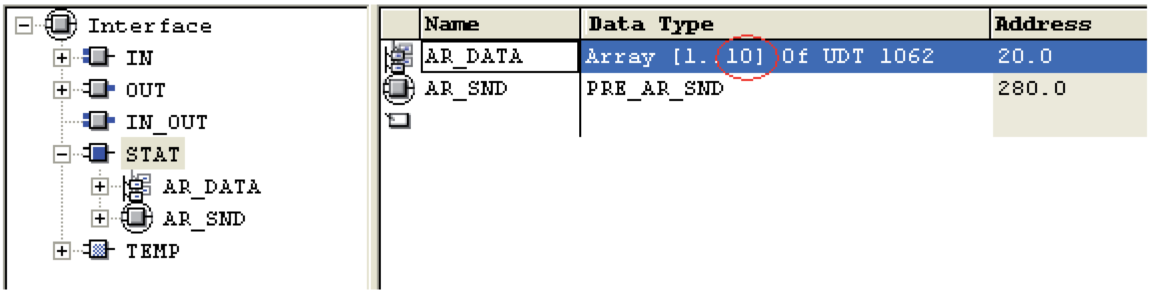
The PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA function block contains the data interface for the archive data to be sent and calls the PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND block which sends the archive data to WinCC.

The memory area for frame data is located in the instance DB.

PRE_AR_DATA

The source of the block is contained in the library.
The user can thereby adjust the length of the frame data.

The number of items inside the frame data can be changed by adaption of the maximum size of the array AR_DATA .



Please note the resource restrictions when using the S7 functions "AR_SEND" and "BSEND / BRCV" to communicate with a S7-400. No more than 16 Kbytes of data can be simultaneously sent by the AS to WinCC using the AR_SEND and/or BSEND / BRCV functions.

The message frame items are of data type UDT_PRE_TLG
(see Description - UDT_PRE_TLG (Page 419)) and are 26 bytes in length.

PR3_AR_DATA_B / PR3_AR_DATA

Note

Using the PR3_AR_DATA_B and PR3_AR_DATA blocks

You cannot use the PR3_AR_DATA_B and PR3_AR_DATA blocks simultaneously in a project. For performance reasons, use the PR3_AR_DATA_B block whenever possible.

If you nevertheless use the two blocks at the same time, the powerrate wizard will generate an error message during execution.

The source of the block is not contained in the library, because the set length of the frame data cannot be modified due to resource restrictions with communication with S7-300.

- PR3_AR_DATA_B: Max. 10 message frame items are transferred.
- PR3_AR_DATA: Max. 7 frame items are transferred.

See also

Replacing the PR3_AR_DATA block with the PR3_AR_DATA_B block (Page 208)

3.4.2 Calling OBs - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.4.3 Called blocks - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

PRE_AR_DATA

The block calls the following blocks:

FB1064 PRE_AR_SND

PR3_AR_DATA_B

The block calls the following blocks:

FB174 PR3_AR_SND_B

PR3_AR_DATA

The block calls the following blocks:

FB164 PR3_AR_SND

3.4.4 Message characteristics - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

The message characteristics are programmed in the called block PRE_AR_SND / PR3_AR_SND. The interface to the messages is the PRE_AR_DATA / PR3_AR_DATA FB.

PRE_AR_DATA

PRE_AR_DATA generates the following messages:

Message block	Message number	Block parameters	Message text	Message class
MSG_EVID	1	QERR	Communication error	PLC pr ctrl Failure
	2	QPARAMF	Parameter assignment error	PLC pr ctrl Failure
	3	-	Not assigned	-
	4	-	Not assigned	-
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_AR_DATA_B

PR3_AR_DATA_B generates the following messages:

Message block	Message number	Block parameters	Message text	Message class
MSGEVID1	1	QERR	Communication error	PLC pr ctrl Failure
MSGEVID2	1	QPARAMF	Parameter assignment error	PLC pr ctrl Failure
MSGEVID3	1	QPARAMF	Parameter assignment error	PLC pr ctrl Failure

PR3_AR_DATA

PR3_AR_DATA generates the following messages:

Message block	Message number	Block parameters	Message text	Message class
MSGEVID1	1	QERR	Communication error	PLC pr ctrl Failure
MSGEVID2	1	QPARAMF	Parameter assignment error	PLC pr ctrl Failure

3.4.5 Error response - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

The block has no error behavior.

3.4.6 Startup characteristics - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

Messages are suppressed during startup.

3.4.7 Block parameters - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA

PRE_AR_DATA

Item	Data type	Type	Meaning	HMI
ACK_TEL	DWORD	IO	Acknowledgment frame	+
AR_EVID	DWORD	I	Archive number for the AR_SEND archive send block	
AR_STAT	WORD	O	AR_SEND: STATUS Output	
FIFO	INT	I	Link to FIFO data	
MSG_ACK	WORD	O	Messages acknowledged, ALARM_8P block	
MSG_EVID	DWORD	I	Event ID of the ALARM_8P message block	
MSG_STAT	WORD	O	MESSAGE: STATUS Output	
QERR	BOOL	O	1 = Error sending archive	
QMSG_ERR	BOOL	O	1 = ALARM_8P Error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	1 = Parameter assignment error	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SEND_T	REAL	I	Monitoring time send request	

PR3_AR_DATA_B

Item	Data type	Type	Meaning	HMI
ACK_TEL	BOOL	IO	1 = Request for archiving	+
AR_EVID	DWORD	I	Archive number for the archive send block BSEND Note: Use the same number for the AR_EVID and R_ID parameters.	
AR_STAT1	WORD	O	BSEND: STATUS Output	
AR_STAT2	WORD	O	BSEND: STATUS Output (for redundancy)	
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
FIFO	INT	I	Link to FIFO data	
ID_1	WORD	I	NetPro ID	
ID_2	WORD	I	NetPro ID (for redundancy)	
MSG_ACKx	BOOL	O	Messages acknowledged, ALARM_DQ block x (x = 1 ... 3)	
MSGEVIDx	DWORD	I	Event ID of message block ALARM_DQ x (x = 1 ... 3)	
MSGSTATx	WORD	O	MESSAGE x (x = 1 ... 3): STATUS Output	
QERR1	BOOL	O	1 = Error sending archive	
QERR2	BOOL	O	1 = Error sending archive (for redundancy)	
QMSG_ERR	BOOL	O	1 = ALARM_DQ Error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	1 = Parameter assignment error	
R_ID	DWORD	I	BSEND ID for raw data tag Note: Use the same number for the AR_EVID and R_ID parameters.	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SEND_T	REAL	I	Monitoring time send request	

PR3_AR_DATA

Item	Data type	Type	Meaning	HMI
AR_EVID	DWORD	I	Archive number for the AR_SEND archive send block	
AR_STAT	WORD	O	AR_SEND: STATUS Output	
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
FIFO	INT	I	Link to FIFO data	
MSG_ACKx	BOOL	O	Messages acknowledged, ALARM_DQ block x (x = 1 ... 2)	
MSGEVIDx	DWORD	I	Event ID of message block ALARM_DQ x (x=1..2)	
MSGSTATx	WORD	O	MESSAGE x (x = 1 ... 2): STATUS Output	
QERR	BOOL	O	1 = Error sending archive	
QMSG_ERR	BOOL	O	1 = ALARM_DQ Error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	1 = Parameter assignment error	
REPEAT_T	REAL	1	Waiting time between 2 send requests	
REQUEST	BOOL	IO	1 = Request for archiving	+
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SEND_RST	BOOL	I	1 = Reset Send request	
SEND_T	REAL	I	Monitoring time send request	
SERVERNAME	STRING(16)	I	Name of the archiving server	±

3.5 PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND: Archiving measured values

3.5.1 Function - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

PRE_AR_SND	FB1064
PR3_AR_SND_B	FB174
PR3_AR_SND	FB164

Description of block

- Calling blocks - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND (Page 229)
- Called blocks - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND (Page 229)
- Message characteristics - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND (Page 230)
- Error response - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND (Page 230)
- Startup characteristics - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND (Page 230)
- Block parameters - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND (Page 230)

Function description

PRE_AR_SND

The PRE_AR_SND function block reads the values from the FIFO buffer, produces the frame data for writing the values to the OS, and sends them to WinCC with SFB37AR_SEND.

PR3_AR_SND_B

The PR3_AR_SND_B function block reads the values from the FIFO buffer, produces the message frame data for writing the values to the OS, and sends them via a raw data tag with SFB12 BSEND to WinCC.

The powerrate wizard generates the "PRE_AR_SND_B.pas" script. The script has a trigger and confirms that the data sent by the block was written to the archive.

PR3_AR_SND

The PR3_AR_SND function block reads the values from the FIFO buffer, produces the frame data for writing the values to the OS and sends them via a raw data variable to WinCC. The raw data variable is evaluated by the function PR3_AR_SND.fct and writes the archive data to the WinCC Tag Logging Archive.

Note

Using the PR3_AR_SND_B and PR3_AR_SND blocks

You cannot use the PR3_AR_SND_B and PR3_AR_SND blocks simultaneously in a project. For performance reasons, use the PR3_AR_SND_B block whenever possible.

If you nevertheless use the two blocks at the same time, the powerrate wizard will generate an error message during execution.

3.5.2 Calling blocks - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

The block is called by FB PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA.

3.5.3 Called blocks - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

PRE_AR_SND

The block calls the following blocks:

SFB35	ALARM_8P
SFB37	AR_SEND
SFC6	RD_SINFO
SFC24	TEST_DB
FC1062	PRE_FIFO_IO

PR3_AR_SND_B

The block calls the following blocks:

SFC6	RD_SINFO
SFB12	BSEND
SFC19	ALARM_SC
SFC24	TEST_DB
SFC107	ALARM_DQ
FC162	PR3_FIFO_IO

PR3_AR_SND

The block calls the following blocks:

SFC6	RD_SINFO
SFC19	ALARM_SC
SFC24	TEST_DB
SFC107	ALARM_DQ
FC162	PR3_FIFO_IO

3.5.4 Message characteristics - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

See Message characteristics - PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA (Page 224) in "PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA: Data interface for sending the archive data".

3.5.5 Error response - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

The QPARAMF error output is set when

- The parameterized archive DB is not present
- The archive DB length is too short

The QERR error output is set when

- An error occurred while writing to WinCC.

3.5.6 Startup characteristics - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

Messages are suppressed during startup.

3.5.7 Block parameters - PRE_AR_SND / PR3_AR_SND_B / PR3_AR_SND

PRE_AR_SND

Item	Data type	Type	Meaning	HMI
ACK_TEL	DWORD	IO	Acknowledgment frame	
AR_DB	INT	I	DB number for archive data	
AR_EVID	DWORD	I	Archive number for the AR_SEND archive send block	
AR_STAT	WORD	O	AR_SEND: STATUS Output	
FIFO_DB	INT	I	DB number for FIFO	
MSG_ACK	WORD	O	Messages acknowledged, ALARM_8P block	
MSG_EVID	DWORD	I	Event ID of the ALARM_8P message block	
MSG_STAT	WORD	O	MESSAGE: STATUS Output	
QERR	BOOL	O	1 = Error sending archive	
QMSG_ERR	BOOL	O	1 = ALARM_8P Error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	1 = Parameter assignment error	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SEND_T	REAL	I	Monitoring time send request	

PR3_AR_SND_B

Item	Data type	Type	Meaning	HMI
ACK_TEL	DWORD	IO	Frame ID for confirmation of receipt	
AR_DB	INT	I	DB number for archive data	
AR_EVID	DWORD	I	Archive number	
AR_STAT1	WORD	O	AR_SEND: STATUS Output 1	
AR_STAT2	WORD	O	AR_SEND: STATUS Output 2 (for redundancy)	
CMP__ID	DWORD	I	Component identifier for ALARM_DQ	
FIFO_DB	INT	I	DB number for FIFO	
ID_1	WORD	I	NetPro ID	
ID_2	WORD	I	NetPro ID (for redundancy)	
MSG_ACKx	BOOL	O	Messages acknowledged ALARM_DQ block x (x = 1 ... 3)	
MSGEVIDx	DWORD	I	Event ID of message block ALARM_DQ x (x = 1... 3)	
MSGSTATx	WORD	O	MESSAGE x (x = 1 ... 3): STATUS Output	
QERR1	BOOL	O	1 = Error sending archive	
QERR2	BOOL	O	1 = Error sending archive (for redundancy)	
QMSG_ERR	BOOL	O	1 = ALARM_DQ error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	1 = Parameter assignment error	
R_ID	DWORD	I	BSEND ID for raw data tag	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SEND_T	REAL	I	Monitoring time send request	

Description of the status

AR_STATx	Description
0	No error
1	Connection error

PR3_AR_SND

Item	Data type	Type	Meaning	HMI
AR_DB	INT	I	DB number for archive data	
AR_EVID	DWORD	I	Archive number	
AR_STAT	WORD	O	AR_SEND: STATUS Output	
CMP__ID	DWORD	I	Component identifier for ALARM_DQ	
FIFO_DB	INT	I	DB number for FIFO	
MSG_ACKx	BOOL	O	Messages acknowledged ALARM_DQ block x (x = 1 ... 2)	
MSGEVIDx	DWORD	I	Event ID of message block ALARM_DQ x (x=1..2)	
MSGSTATx	WORD	O	MESSAGE x (x = 1..2): STATUS Output	
QERR	BOOL	O	1 = Error sending archive	
QMSG_ERR	BOOL	O	1 = ALARM_DQ error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	1 = Parameter assignment error	
REPEAT_T	REAL	I	Waiting time between 2 send requests	
REQUEST	BOOL	IO	1 = Request for archiving	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SEND_RST	BOOL	I	1 = Reset Send request	
SEND_T	REAL	I	Monitoring time send request	

Description of the status

AR_STAT	Description
0	No error
1	Connection error
2	Writing to Tag Logging archive failed
3	Job retry
4	Ini file cannot be read
6	Tag name not available in ini file
7	Number of values to be written is 0

3.6 PRE_AS_RECV: AS-to-AS communication

3.6.1 Function - PRE_AS_RECV

PRE_AS_RECV FB1071

Description of block

- Calling blocks - PRE_AS_RECV (Page 233)
- Called blocks - PRE_AS_RECV (Page 234)
- Message behavior - PRE_AS_RECV (Page 234)
- Error response - PRE_AS_RECV (Page 235)
- Startup characteristics - PRE_AS_RECV (Page 235)
- Block parameters - PRE_AS_RECV (Page 235)

Function description

The block uses S7 communication (BRCV) to receive data from another S7 station (BSEND). A maximum of 30 REAL values and 30 binary values can be sent. Each value also has a binary quality code, which specifies whether the measured value is free of errors or not.

Quality Code

The QC_Rx and QC_Bx (x=1..30) parameters contain the quality codes of the input signals and must be connected to the QUALITY output of the associated driver blocks when using the input signals selected

In addition to the quality codes received, the quality code also provides the following information:

Quality code = 16#14: Communication error, last valid value
Quality Code = 16#18: Communication error, no valid value available

3.6.2 Calling blocks - PRE_AS_RECV

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.6.3 Called blocks - PRE_AS_RECV

The block calls the following blocks:

FB1075	PRE_BR
SFC6	RD_SINFO
SFB35	ALARM_8P

3.6.4 Message behavior - PRE_AS_RECV

PRE_AS_RECV generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QERR	Communication error	PLC pr ctrl failure
	2	MSG_2	-	-
	3	MSG_3	-	-
	4	MSG_4	-	-
	5	MSG_5	-	-
	6	MSG_6	-	-
	7	MSG_7	-	-
	8	MSG_8	-	-

The auxiliary values of the message blocks are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSG_EVID	1	QSTATUS	Data transfer status
	2	AUX_PR02	Not assigned
	3	AUX_PR03	Not assigned
	4	AUX_PR04	Not assigned
	5	AUX_PR05	Not assigned
	6	AUX_PR06	Not assigned
	7	AUX_PR07	Not assigned
	8	AUX_PR08	Not assigned
	9	AUX_PR09	Not assigned
	10	AUX_PR10	Not assigned

The auxiliary values (AUX_PRx, x=02..10) of the message block can be freely assigned

3.6.5 Error response - PRE_AS_RECV

Monitoring the receive process

The connection with the partner station is monitored. When an error is detected, the QERR output is set and a summary event is sent to the OS. The QSTATUS status is also sent as an auxiliary value, which indicates the precise cause of the error. A message is not generated until the SUPPTIME (suppression time) has elapsed. This parameter is adjustable. The send error is reset when at least one telegram containing valid data has been successfully sent.
If SUPPTIME < SAMPLE_T, the error message is generated immediately

3.6.6 Startup characteristics - PRE_AS_RECV

The RUNUPCYC parameter can be used to set for how long (number of cycles) messages are to be suppressed.
RESTART = TRUEcan be used to simulate a restart.

3.6.7 Block parameters - PRE_AS_RECV

Item	Data type	Type	Meaning	HMI
AUX_PRx	ANY	IO	Auxiliary value 02 - 10	
BOOLx	REAL	O	BOOL values 1 - 30 for connection	
ERR_COUNT	DINT	IO	Error counter	
FIRST_VAR	BOOL	IO	Start of receive data	
HISTLAST_STATUS	WORD	O	Status of the last error	
HISTLAST_TIME_STAMP	DATE_AND_TIME	O	Time stamp of the last error	
HISTx_STATUS	WORD	O	Status of errors 1 - 4	
HISTx_TIME_STAMP	DATE_AND_TIME	O	Time stamp of errors 1 - 4	
ID	WORD	I	Connection ID	
IN_BOOLx	REAL	O	BOOL values 1 - 30 receive buffer	
IN_QC_Bx	BYTE	O	Quality code BOOL value 1 – 30 receive buffer	
IN_QC_Rx	BYTE	O	Quality code REAL value 1 – 30 receive buffer	
IN_REALx	REAL	O	REAL values 1 - 30 receive buffer	
L_MSGLCK	BOOL	I	Central message suppression can be connected	
LAST_VAR	BOOL	I	End of receive data	
LEN_COUNT	DINT	IO	Integration of the sent data count	
MSG_ACK	WORD	O	Messages acknowledged	
MSG_EVID	DWORD	I	MESSAGE ID/ALARM_8P event ID	
MSG_STAT	WORD	O	STATUS output	
MSG_x	BOOL	I	Message input 2 - 8	

Item	Data type	Type	Meaning	HMI
NDR	BOOL	O	Receive new data	
QC_Bx	BYTE	O	Quality code BOOL value 1 – 30	
QC_Rx	BYTE	O	Quality code REAL value 1 – 30	
QERR	BOOL	O	1 = data transfer error	
QLEN	INT	O	Length of the received data	
QMSG_ERR	BOOL	O	ALARM_8P error	
QMSG_SUP	BOOL	O	Message suppression	
QSTATUS	INT	O	Data transfer status	
R_ID	DWORD	I	Request ID for connection	
REALx	REAL	O	REAL values 1 - 30 for connection	
RES_HIST	BOOL	IO	Reset history	
RESTART	BOOL	I	Manual startup	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SUPPTIME	REAL	I	Suppression time in [s]	

Description of the status

xSTATUS	Description
11	Alarm: New job not active because the previous job is still busy.
17	Alarm: Block receiving data asynchronously.
25	Communication has started. The job is being processed.
1	Communication problems, e.g. connection description not loaded (local or remote), connection interrupted (e.g. cable, CPU off, CP in STOP mode)
2	The function cannot be carried out.
4	Error in the receive area pointer RD_1 regarding data length or data type (data block sent is longer than receive area).
5	Reset request received, incomplete transfer.
8	Access error in the corresponding SFB12 "BSEND": The data packet to be sent is larger than 452 bytes and after the first data segment is sent, ERROR = 1 and STATUS = 4 are reported.
10	Access to local user memory not possible (for example, access to deleted DB).
12	When the SFB was called, an instance DB that does not belong to SFB13 was specified. A shared DB was specified instead of an instance DB. No instance DB was found (loading a new instance DB from the PG).
18	R_ID already exists in the connection.
20	Insufficient work memory
-1	Connection error FIRST_VAR and / or LAST_VAR
-2	Internal error SFC20 BLKMOV
-3	Internal error SFC20 BLKMOV: Destination area too small
-4	Internal error SFC6 RD_SINFO

3.7 PRE_AS_SEND: AS-to-AS communication

3.7.1 Function - PRE_AS_SEND

PRE_AS_SEND FB1070

Description of block

- Calling blocks - PRE_AS_SEND (Page 237)
- Called blocks - PRE_AS_SEND (Page 237)
- Message behavior - PRE_AS_SEND (Page 238)
- Error response - PRE_AS_SEND (Page 238)
- Startup characteristics - PRE_AS_SEND (Page 239)
- Block parameters - PRE_AS_SEND (Page 239)

Function description

The block uses S7 communication BSEND) to send data to another S7 station (BRCV).
A maximum of 30 REAL values and 30 binary values can be sent. Each value also has a binary quality code, which specifies whether the measured value is free of errors or not.

Quality Code

The QC_Rx and QC_Bx (x=1..30) parameters contain the quality codes of the input signals and must be connected to the QUALITY output of the associated driver blocks when using the input signals selected.

3.7.2 Calling blocks - PRE_AS_SEND

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.7.3 Called blocks - PRE_AS_SEND

The block calls the following blocks:

FB1074	PRE_BS
SFB35	ALARM_8P
SFC6	RD_SINFO

3.7.4 Message behavior - PRE_AS_SEND

PRE_AS_SEND generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QERR	Communication error	PLC pr ctrl failure
	2	MSG_2	-	-
	3	MSG_3	-	-
	4	MSG_4	-	-
	5	MSG_5	-	-
	6	MSG_6	-	-
	7	MSG_7	-	-
	8	MSG_8	-	-

The auxiliary values of the message blocks are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSG_EVID	1	QSTATUS	Data transfer status
	2	AUX_PR02	Not assigned
	3	AUX_PR03	Not assigned
	4	AUX_PR04	Not assigned
	5	AUX_PR05	Not assigned
	6	AUX_PR06	Not assigned
	7	AUX_PR07	Not assigned
	8	AUX_PR08	Not assigned
	9	AUX_PR09	Not assigned
	10	AUX_PR10	Not assigned

The auxiliary values (AUX_PRx, x=02..10) of the message block can be freely assigned

3.7.5 Error response - PRE_AS_SEND

Monitoring the send process

The connection with the partner station is monitored. When an error is detected, the QERR output is set and a summary event is sent to the OS. The QSTATUS status is also sent as an auxiliary value, which indicates the precise cause of the error. A message is not generated until the SUPPTIME (suppression time) has elapsed. This parameter is adjustable.
The send error is reset when at least one telegram containing valid data has been successfully sent. If SUPPTIME < SAMPLE_T, the error message is generated immediately.

3.7.6 Startup characteristics - PRE_AS_SEND

The RUNUPCYC parameter can be used to set for how long (number of cycles) messages are to be suppressed.
RESTART = TRUEcan be used to simulate a restart.

3.7.7 Block parameters - PRE_AS_SEND

Item	Data type	Type	Meaning	HMI
AUX_PRx	ANY	IO	Auxiliary value 02 - 10	
BOOLx	REAL	I	BOOL values 1 - 30	
DONE	BOOL	O	Data transfer complete	
ERR_COUNT	DINT	IO	Error counter	
FIRST_VAR	BOOL	I	Start of send data	
HISTLAST_STATUS	WORD	O	Status of the last error	
HISTLAST_TIME_STAMP	DATE_AND_TIME	O	Time stamp of the last error	
HISTx_STATUS	WORD	O	Status of errors 1 - 4	
HISTx_TIME_STAMP	DATE_AND_TIME	O	*Time stamp of errors 1 - 4	
ID	WORD	I	Connection ID	
L_MSGLCK	BOOL	I	Central message suppression can be connected	
LAST_VAR	BOOL	I	End of send data	
LEN_COUNT	DINT	IO	Integration of the sent data count	
MODE	BYTE	I	0 = Send once 1 = Send cyclically 2 – 255 = Send every nth cycle	
MSG_ACK	WORD	O	Messages acknowledged	
MSG_EVID	DWORD	I	MESSAGE ID/ALARM_8P event ID	
MSG_STAT	WORD	O	STATUS output	
MSG_x	BOOL	I	Message input 2 - 8	
QC_Bx	BYTE	I	Quality code BOOL value 1 – 30	
QC_Rx	BYTE	I	Quality code REAL value 1 – 30	
QERR	BOOL	O	1 = data transfer error	
QLEN	INT	O	Length of the sent data	
QMSG_ERR	BOOL	O	ALARM_8P error	
QMSG_SUP	BOOL	O	Message suppression	
QSTATUS	INT	O	Data transfer status	
R_ID	DWORD	I	Request ID for connection	
REALx	REAL	I	REAL values 1 - 30	
RES_HIST	BOOL	IO	Reset history	
RESTART	BOOL	I	Manual startup	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SUPPTIME	REAL	I	Suppression time in [s]	
SWITCH	BOOL	I	1=Sending	

Description of the status

xSTATUS	Description
11	Alarm: New job not active because the previous job is still busy.
25	Communication has started. The job is being processed.
1	Communication problems, e.g. connection description not loaded (local or remote), connection interrupted (e.g. cable, CPU off, CP in STOP mode)
2	Negative acknowledgment from partner SFB. The function cannot be executed.
3	R_ID is unknown on the connection specified by the ID or the receive block has not yet been called.
4	Error in the send area pointer SD_1 regarding data length or data type, or the value 0 was transferred with LEN.
5	Reset request was executed.
6	The status of the partner SFB is DISABLED (value of EN_R is 0).
7	The status of the partner SFB is not correct (receive block not called since last data transfer).
8	Access to remote object in the user memory was rejected: The destination area at the associated SFB13 "BRCV" is too small (ERROR = 1, STATUS = 4 is reported at the associated SFB13 "BRCV").
10	Access to the local user memory not possible (for example, access to a deleted DB).
12	When the SFB was called, an instance DB that does not belong to SFB12 was specified, a shared DB was specified instead of an instance DB, no instance DB was found (loading a new instance DB from the PG).
18	R_ID already exists in the connection.
20	Insufficient work memory
-1	Connection error FIRST_VAR and / or LAST_VAR
-2	Internal error SFC20 BLKMOV
-3	Internal error SFC20 BLKMOV: Destination area too small
-4	Internal error SFC6 RD_SINFO

3.8 PRE_BIN_ACQ / PR3_BIN_ACQ: Acquisition of measured energy values

3.8.1 Function - PRE_BIN_ACQ / PR3_BIN_ACQ

PRE_BIN_ACQ	FB1090
PR3_BIN_ACQ	FB190

Description of block

Calling blocks - PRE_BIN_ACQ (Page 242)

Error response - PRE_BIN_ACQ (Page 243)

Block parameters - PRE_BIN_ACQ / PR3_BIN_ACQ (Page 244)

Function description

You can acquire the energy consumption of individual consumers with the PRE_BIN_ACQ / PR3_BIN_ACQ function block. The input signal is converted to a normalized energy value.

The PRE_BIN_ACQ / PR3_BIN_ACQ function block is an extension of the PRE_SUM / PR3_SUM function block and allows a more precise, more flexible and faster acquisition. Interconnect the PRE_BIN_ACQ / PR3_BIN_ACQ block upstream from the PRE_SUM / PR3_SUM block.

Measured value acquisition

The PRE_BIN_ACQ / PR3_BIN_ACQ function block is dedicated to acquiring pulses or edges. Assign parameters to the block input INP_SEL to specify which signal type to use. The table provides an overview of the various signal types.

INP_SEL	Signal type	Parameters	Quality code parameter	Normalization factor / calculation constants
0	Counter pulse	VALUE	QC	UNIT / INPUT_PER_UNIT
1	Counting edge			

An hour is used as the time basis for energy measurement. Energy values are displayed with the kWh unit.

The energy consumed is calculated by adding up the weighted pulses. The pulse value is configured using the normalization factor:

Consumed energy per pulse / edge	Normalization factor	
	UNIT	INPUT_PER_UNIT
0.025 kWh	1	40
0.1 kWh	1	10
1 kWh	1	1
5 kWh	10	2
10 kWh	10	1
50 kWh	100	2

At the end of the acquisition period, the power value CUR_PWR is calculated from the energy consumed.

Quality code

The QC parameter contains the quality code of the input signal. Interconnect the QUALITY output of the associated driver blocks with the quality code of the input signals used.

The following quality code data is evaluated:

Quality code	= 16#60:	Simulation on driver block active (QSIM = TRUE)
Quality code	= 16#80:	Valid value
Quality code	All other values	Invalid value, external error (QBAD = TRUE)

In the event of an error, the quality code from the input is displayed at the outputs.

See also

Function - PRE_SUM / PR3_SUM (Page 356)

3.8.2 Calling blocks - PRE_BIN_ACQ / PR3_BIN_ACQ

The cyclic interrupt OB in which you install the PRE_BIN_ACQ block.

Make sure that the call cycle for the calling OB does not exceed 15 ms, for example 10 ms. Background: According to EN 62053-31 (S0 interface), a pulse and an edge are pending for at least 30 ms. By selecting a call cycle less than 15 ms, you make sure that no pulse and no edge gets lost.

In OB100, you also have the option of using the RESET parameter to reset all internal tags.

3.8.3 Error response - PRE_BIN_ACQ / PR3_BIN_ACQ

Error output QPARAMF

If a faulty parameter assignment of the PRE_BIN_ACQ function block is detected, the error output QPARAMF is set. The following parameter assignments or events result in the error output being set:

- The acquisition period PER_T ≤ 0
- Normalization factor UNIT unequal to 1, 10, 100 or 1000
- Normalization factor INPUT_PER_UNIT ≤ 0.0
- The limit for the zero point ZERO_CUT <= 1

Error output QBAD

If an external error is present at the CSF input, the error output QBAD is set.

3.8.4 Block parameters - PRE_BIN_ACQ / PR3_BIN_ACQ

Item	Data type	Type	Meaning
CONSUMER_STATUS	BOOL	I	Status of consumer (ON = TRUE, OFF = FALSE)
VALUE	BOOL	I	Input for count pulse/edge for energy measurement
QC	BYTE	I	Quality code for input VALUE (input for count pulse/edge for energy measurement)
INP_SEL	INT	I	Selector for signal type: 0 = pulse input 1 = edge input
CSF	BOOL	I	External error: FALSE = not an external error TRUE = external error
UNIT	INT	I	Unit (1, 10, 100 or 1000 kWh, kvarh, m3)
INPUT_PER_UNIT	INT	I	Number of pulses or edges per unit
PER_T	REAL	I	Acquisition period in [s]
ZERO_CUT	INT	I	Limit for zero point during calculation
SAMPLE_T	REAL	I	Sampling time in [s]
QPARAMF	BOOL	O	Parameter assignment error at the function block: FALSE = No parameter assignment error TRUE = Parameter assignment error
QBAD	BOOL	O	Current status of the external error: FALSE = No external error pending TRUE = External error pending
QSIM	BOOL	O	Current status of simulation: FALSE = Simulation deactivated TRUE = Simulation activated
CUR_VAL_D	REAL	O	Current accumulated value as integer count value
QC_CUR_VAL_D	BYTE	O	Quality code of output CUR_VAL_D (Current accumulated value)
MAX_ VAL_D	REAL	I	Maximum count value for CUR_VAL_D
CUR_VAL_R	REAL	O	Current accumulated value as analog count value
QC_CUR_VAL_R	BYTE	O	Quality code of output CUR_VAL_R (Current accumulated value)
MAX_ VAL_R	REAL	I	Maximum count value for CUR_VAL_R
CUR_PWR	REAL	O	Current power at end of acquisition period
QC_CUR_PWR	BYTE	O	Quality code of output CUR_PWR (Average power at end of time interval)
RESET	BOOL	IO	Reset accumulated value: FALSE = Accumulated value is updated normally TRUE = Reset accumulated value

3.9 PRE_INT_ACQ / PR3_INT_ACQ: Acquisition of measured energy values

3.9.1 Function - PRE_INT_ACQ / PR3_INT_ACQ

PRE_INT_ACQ	FB1092
PR3_INT_ACQ	FB192

Description of block

Calling blocks - PRE_INT_ACQ (Page 246)

Error response - PRE_INT_ACQ (Page 246)

Block parameters - PRE_INT_ACQ (Page 247)

Function description

You can acquire the energy consumption of individual consumers with the PRE_INT_ACQ / PR3_INT_ACQ function block. The input signal is converted to a normalized energy value.

The PRE_INT_ACQ / PR3_INT_ACQ function block is an extension of the PRE_SUM / PR3_SUM function block and allows a more precise, more flexible and faster acquisition. Interconnect the PRE_INT_ACQ / PR3_INT_ACQ function block upstream from the PRE_SUM / PR3_SUM. block.

Measured value acquisition

The PRE_INT_ACQ / PR3_INT_ACQ function block is dedicated to acquiring integer energy values.

An hour is used as the time basis for energy measurement. Energy values are displayed with the kWh unit.

The calculation of the difference of the weighted counter states is used to find out how much energy was consumed. The counter value is configured using the normalization factor:

Energy consumed Counter unit in	Normalization factor UNIT
1 Wh	1
10 Wh	10
1 kWh	1000
10 kWh	10000

At the end of the acquisition period, the power value CUR_PWR is calculated from the energy consumed.

Quality code

The QC parameter contains the quality code of the input signal. Interconnect the QUALITY output of the associated driver blocks with the quality code of the input signals used.

The following quality code data is evaluated:

Quality code	= 16#60:	Simulation on driver block active (QSIM = TRUE)
Quality code	= 16#80:	Valid value
Quality code	All other values	Invalid value, external error (QBAD = TRUE)

In the event of an error, the quality code from the input is displayed at the outputs.

See also

Function - PRE_SUM / PR3_SUM (Page 356)

3.9.2 Calling blocks - PRE_INT_ACQ / PR3_INT_ACQ

The cyclic interrupt OB in which you install the block. It is recommended that you use a fast call cycle, for example 10 ms.

In OB100, you also have the option of using the RESET parameter to reset all internal tags.

3.9.3 Error response - PRE_INT_ACQ / PR3_INT_ACQ

Error output QPARAMF

If a faulty parameter assignment of the PRE_INT_ACQ function block is detected, the error output QPARAMF is set. The following parameter assignments or events result in the error output being set:

- The acquisition period PER_T ≤ 0
- Normalization factor UNIT unequal to 1, 10, 100, 1000, 10000, 100000 or 1000000
- The limit for the zero point ZERO_CUT <= 1

Error output QBAD

If an external error is present at the CSF input, the error output QBAD is set.

3.9.4 Block parameters - PRE_INT_ACQ / PR3_INT_ACQ

Item	Data type	Type	Meaning
CONSUMER_STATUS	BOOL	I	Status of consumer (ON= TRUE, OFF = FALSE)
VALUE_D	BOOL	I	Input for count pulse/edge for energy measurement
QC_D	BYTE	I	Quality code for input VALUE (input for count pulse/edge for energy measurement)
CSF	BOOL	I	External error: FALSE = not an external error TRUE = external error
UNIT	INT	I	Unit (1, 10, 100, 1000, 10000, 100000 or 1000000 Wh, varh, l)
PER_T	REAL	I	Acquisition period in [s]
ZERO_CUT	INT	I	Limit for zero point during calculation
SAMPLE_T	REAL	I	Sampling time in [s]
QPARAMF	BOOL	O	Parameter assignment error at the function block: FALSE = No parameter assignment error TRUE = Parameter assignment error
QBAD	BOOL	O	Current status of the external error: FALSE = No external error pending TRUE = External error pending
QSIM	BOOL	O	Current status of simulation: FALSE = Simulation deactivated TRUE = Simulation activated
CUR_VAL_D	REAL	O	Current accumulated value as integer count value
QC_CUR_VAL_D	BYTE	O	Quality code of output CUR_VAL_D (Current accumulated value)
MAX_ VAL_D	REAL	I	Maximum count value for CUR_VAL_D
CUR_VAL_R	REAL	O	Current accumulated value as analog count value
QC_CUR_VAL_R	BYTE	O	Quality code of output CUR_VAL_R (Current accumulated value)
MAX_ VAL_R	REAL	I	Maximum count value for CUR_VAL_R
CUR_PWR	REAL	O	Current power at end of acquisition period
QC_CUR_PWR	BYTE	O	Quality code of output CUR_PWR (Average power at end of time interval)
RESET	BOOL	IO	Reset accumulated value: FALSE = Accumulated value is updated normally TRUE = Reset accumulated value

3.10 PRE_BR: Calling the BRCV system function block

3.10.1 Function - PRE_BR

PRE_BR FB1075

Description of block

- Calling blocks - PRE_BR (Page 248)
- Called blocks - PRE_BR (Page 248)

Function description

The block forms the internal interface for communication in the receive direction.

3.10.2 Calling blocks - PRE_BR

The block is called internally.

3.10.3 Called blocks - PRE_BR

The block calls the following blocks:

SFB13	BRCV
SFC1	READ_CLK
SFC6	RD_SINFO
SFC20	BLKMOV

3.11 PRE_BS: Calling the BSEND system function block

3.11.1 Function - PRE_BS

PRE_BS FB1074

Description of block

- Calling blocks - PRE_BS (Page 249)
- Called blocks - PRE_BS (Page 249)

Function description

The block forms the internal interface for communication in the send direction.

3.11.2 Calling blocks - PRE_BS

The block is called internally.

3.11.3 Called blocks - PRE_BS

The block calls the following blocks:

SFB12	BSEND
SFC1	READ_CLK
SFC6	RD_SINFO
SFC20	BLKMOV

3.12 PRE_CALC / PR3_CALC: Calculations

3.12.1 Function - PRE_CALC / PR3_CALC

PRE_CALC	FC1061
PR3_CALC	FC161

Description of block

- Calling blocks - PRE_CALC / PR3_CALC (Page 251)
- Message behavior - PRE_CALC / PR3_CALC (Page 251)
- Error response - PRE_CALC / PR3_CALC (Page 251)
- Startup characteristics - PRE_CALC / PR3_CALC (Page 251)
- Block parameters - PRE_CALC / PR3_CALC (Page 251)

Function description

The PRE_CALC / PR3_CALC function contains the calculation algorithms which can be used when producing measured values for the FB PRE_SUM / PR3_SUM.

The function is a source in the library and the user can therefore add other calculations to it. The function interface must not be changed.

The following algorithms are implemented:

Function CALC_FN	Algorithm
0	OUT = P0 + P1 * IN1 + P2 * IN2 + P3 * IN3
1	Calculation of heat quantity for liquids OUT = P0*IN1*P1*IN2 where: P0 = specific heat capacity c P1 = density ρ IN1 = flow V IN2 = difference in temperature ΔT

Assignment input parameters PRE_CALC / PR3_CALC to input parameters PRE_SUM / PR3_SUM:

PRE_CALC / PR3_CALC	PRE_SUM / PR3SUM
CALC_FN	CALC_FN
INx	ACTUALx
Px	CALC_Px

See also

Configuration basics (Page 17)
The PRE_SUM / PR3_SUM block (Page 84)

3.12.2 Calling blocks - PRE_CALC / PR3_CALC

The block is called by PRE_SUM / PR3_SUM.

3.12.3 Message behavior - PRE_CALC / PR3_CALC

The block has no message behavior.

3.12.4 Error response - PRE_CALC / PR3_CALC

The QERR error output is set when

- an error is established during the calculation (e.g. division by 0)

3.12.5 Startup characteristics - PRE_CALC / PR3_CALC

The block has no start-up characteristics.

3.12.6 Block parameters - PRE_CALC / PR3_CALC

Item	Data type	Type	Meaning	HMI
CALC_FN	INT	I	Calculation function	
INx	REAL	I	Input value x (x = 1 ... 3):	
Px	REAL	I	Constant x (x = 0 ... 3):	
QERR	BOOL	O	1 = Error	
OUT	REAL	O	Results	

3.13 PRE_FIFO_DATA / PR3_FIFO_DATA: FIFO buffer

3.13.1 Function - PRE_FIFO_DATA / PR3_FIFO_DATA

PRE_FIFO_DATA	FB1062
PR3_FIFO_DATA	FB162

Description of block

- Calling OBs - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 253)
- Called blocks - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 253)
- Message behavior - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 253)
- Error response - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 253)
- Startup characteristics - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 253)
- Block parameters - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 253)

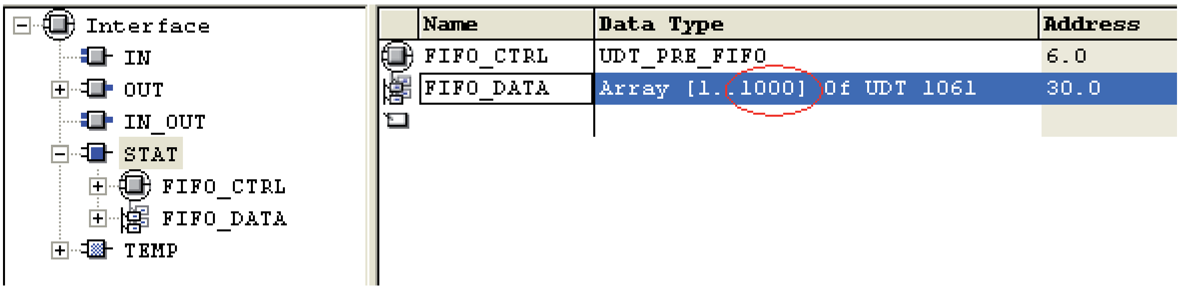
Function description

The PRE_FIFO_DATA / PR3_FIFO_DATA block serves as a buffer for measured values to be archived which supply the PRE_SUM / PR3_SUM and are sent by the PRE_AR_SND / PR3_AR_SND to WinCC.

It is used as a place holder for the buffer data block and passes the data block number to the blocks PRE_SUM / PR3_SUM and PRE_AR_SND / PR3_AR_SND.

The PRE_FIFO_IO / PR3_FIFO_IO function is responsible for organizing the cyclic buffer.

The source of the block is contained in the library. The user can thereby adjust the length of the buffer.
The number of elements inside the FIFO buffer can be changed by adaption of the maximum size of the array FIFO_DATA .



The buffer elements are of data type UDT_PRE_ITEM (see "Description - UDT_PRE_ITEM (Page 414)").

3.13.2 Calling OBs - PRE_FIFO_DATA / PR3_FIFO_DATA

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.13.3 Called blocks - PRE_FIFO_DATA / PR3_FIFO_DATA

PRE_FIFO_DATA

The block calls the following blocks:

SFC6	RD_SINFO
FC1062	PRE_FIFO_IO

PR3_FIFO_DATA

The block calls the following blocks:

SFC6	RD_SINFO
FC162	PR3_FIFO_IO

3.13.4 Message behavior - PRE_FIFO_DATA / PR3_FIFO_DATA

The block has no message behavior.

3.13.5 Error response - PRE_FIFO_DATA / PR3_FIFO_DATA

The block has no error behavior.

3.13.6 Startup characteristics - PRE_FIFO_DATA / PR3_FIFO_DATA

The block initializes the PRE_FIFO_IO / PR3_FIFO_IO function during initial startup. When the CPU is started up subsequently, the pointers are retained.

3.13.7 Block parameters - PRE_FIFO_DATA / PR3_FIFO_DATA

Item	Data type	Type	Meaning	HMI
FIFO	INT	O	Number of the FIFO DB	
ITEM_LEN	INT	O	Length of an element	
ITEM_NO	INT	O	Number of elements Standard size of buffer: 1000	

3.14 PRE_FIFO_IO / PR3_FIFO_IO: Organization the FIFO buffer

3.14.1 Function - PRE_FIFO_IO / PR3_FIFO_IO

PRE_FIFO_IO	FC1062
PR3_FIFO_IO	FC162

Description of block

- Calling blocks - PRE_FIFO_IO / PR3_FIFO_IO (Page 254)
- Called blocks - PRE_FIFO_IO / PR3_FIFO_IO (Page 254)
- Message behavior - PRE_FIFO_IO / PR3_FIFO_IO (Page 255)
- Error response - PRE_FIFO_IO / PR3_FIFO_IO (Page 255)
- Startup characteristics - PRE_FIFO_IO / PR3_FIFO_IO (Page 255)
- Block parameters - PRE_FIFO_IO / PR3_FIFO_IO (Page 255)

Function description

The PRE_FIFO_IO/ PR3_FIFO_IO function organizes reading and writing access on the FIFO buffer which is represented by the PRE_FIFO_DATA / PR3_FIFO_DATA.

The FIFO contains the functionality of a cyclic buffer. Old data are overwritten when the buffer overflows.

The status of the FIFO buffer is displayed at the QEMPTY (buffer empty) and QFULL (buffer full) outputs.

3.14.2 Calling blocks - PRE_FIFO_IO / PR3_FIFO_IO

The block is called by the PRE_SUM / PR3_SUM, PRE_FIFO_DATA PR3_FIFO_DATA, and PRE_AR_SND / PR3_AR_SND FBs.

3.14.3 Called blocks - PRE_FIFO_IO / PR3_FIFO_IO

The block calls the following blocks:

SFC24 TEST_DB

3.14.4 Message behavior - PRE_FIFO_IO / PR3_FIFO_IO

The block has no message behavior.

3.14.5 Error response - PRE_FIFO_IO / PR3_FIFO_IO

The QPARAMF error output is set when

- The parameterized FIFO-DB is not present
- the FIFO-DB length is too short

3.14.6 Startup characteristics - PRE_FIFO_IO / PR3_FIFO_IO

During initial startup, the block initializes the check data of the FIFO buffer. This call takes place in the FB PRE_FIFO_DATA / PR3_FIFO_DATA.

When the CPU is started up subsequently, the pointers are retained.

3.14.7 Block parameters - PRE_FIFO_IO / PR3_FIFO_IO

Item	Data type	Type	Meaning	HMI
DONE	BOOL	O	1 = Order completed	
FIFO_DB	INT	I	DB number for FIFO	
FIFO_INIT	BOOL	I	1 = Initializing FIFO	
ITEM_LEN	INT	I	Length of element	
ITEM_MAX	INT	I	Maximum number of elements in FIFO	
ITEM_PTR	POINTER	I	Pointer to element	
ITEM_RD	BOOL	I	1 = Read request	
ITEM_WR	BOOL	I	1 = Write request	
QEMPTY	BOOL	O	1 = FIFOBlank	
QFULL	BOOL	O	1 = Full FIFO	
QPARAMF	BOOL	O	1 = Parameterization error	

3.15 PRE_GET / PR3_GET: AS-to-AS communication, read out of data

3.15.1 Function - PRE_GET / PR3_GET

PRE_GET	FB1076
PR3_GET	FB176

Description of block

Function description

The block uses S7 communication (GET) to read data from another S7 station.
A maximum of 400 bytes can be read out of a DB.

3.15.2 Calling blocks - PRE_GET / PR3_GET

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.15.3 Called blocks - PRE_GET / PR3_GET

PRE_GET

The block calls the following blocks:

SFC6	RD_SINFO
SFB14	GET
SFB35	ALARM_8P

PR3_GET

The block calls the following blocks:

SFC6	RD_SINFO
SFC19	ALARM_SC
SFC107	ALARM_DQ
SFB14	GET

3.15.4 Message behavior - PRE_GET / PR3_GET

PRE_GET

PRE_GET generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QERR	Communication error	PLC pr ctrl failure
	2	MSG_2	-	-
	3	MSG_3	-	-
	4	MSG_4	-	-
	5	MSG_5	-	-
	6	MSG_6	-	-
	7	MSG_7	-	-
	8	MSG_8	-	-

The auxiliary values (AUX_PRx) of the message block can be freely assigned.

PR3_GET

PR3_GET generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QERR	Communication error	PLC pr ctrl failure

The auxiliary values (AUX_PR01) of the message block can be freely assigned.

3.15.5 Error response - PRE_GET / PR3_GET

Monitoring the communication process

The connection with the partner station is monitored. When an error is detected (error of SFC GET or no change in the status of the monitoring input LIFE_BIT within the monitoring time TIME_MON), the QERR output is set and a summary event is sent to the OS. A message is not generated until the SUPPTIME (suppression time) has elapsed. The parameters TIME_MON and SUPPTIME are adjustable. The send error is reset when at least one telegram containing valid data has been successfully sent and the lifebeat monitoring is ok.

If SUPPTIME <SAMPLE_T , the error message is generated immediately.

3.15.6 Startup characteristics - PRE_GET / PR3_GET

The RUNUPCYC parameter can be used to set for how long (number of cycles) messages are to be suppressed.

RESTART = TRUE can be used to simulate a restart.

3.15.7 Block parameters - PRE_GET / PR3_GET

PRE_GET

Item	Data type	Type	Meaning	HMI
ADDR_DST	DWORD	I	Start address of data in destination DB	
ADDR_SRC	DWORD	I	Start address of data in source DB	
AUX_PRx	ANY	IO	Auxiliary value 01 - 10	
DBNO_DST	INT	I	Number of destination DB	
DBNO_SRC	INT	I	Number of source DB	
EN_LIFE	BOOL	I	1 = Enable Lifebeat monitoring	
ID	INT	I	Connection ID	
L_MSGLCK	BOOL	I	Central message suppression can be connected	
LENGTH	INT	I	Length of data to be read in bytes	
LIFE_BIT	BOOL	I	Lifebeat monitoring bit	
MONITOR	BOOL	I	Monitoring: 1 = ON	
MSG_ACK	WORD	O	Messages acknowledged	
MSG_EVID	DWORD	I	MESSAGE ID/ALARM_8P event ID	
MSG_STAT	WORD	O	STATUS output	
MSG_x	BOOL	I	Message input 2 - 8	
QUERR	BOOL	O	1 = data transfer error	+
QLIFE_BIT	BOOL	O	1 = Error lifebeat monitoring	
QMSG_ERR	BOOL	O	ALARM_8P error	
QMSG_SUP	BOOL	O	Message suppression	+
QMSGLCK	BOOL	O	1 = Message suppression active	+
QNDR	BOOL	O	Receive new data	
QSTATUS	INT	O	Data transfer status	
RESTART	BOOL	I	Manual startup	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
START	BOOL	I	1 = Start reading	
SUPPTIME	REAL	I	Suppression time in [s]	
TIME_MON	REAL	I	Monitoring time in [s]	

PR3_GET

Item	Data type	Type	Meaning	HMI
ADDR_DST	DWORD	I	Start address of data in destination DB	
ADDR_SRC	DWORD	I	Start address of data in source DB	
AUX_PR01	ANY	IO	Auxiliary value 1	
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
DBNO_DST	INT	I	Number of destination DB	
DBNO_SRC	INT	I	Number of source DB	
EN_LIFE	BOOL	I	1 = Enable Lifebeat monitoring	
ID	INT	I	Connection ID	
L_MSGLCK	BOOL	I	Central message suppression can be connected	
LENGTH	INT	I	Length of data to be read in bytes	
LIFE_BIT	BOOL	I	Lifebeat monitoring bit	
MONITOR	BOOL	I	Monitoring: 1 = ON	
MSG_ACK	BOOL	O	Messages acknowledged	
MSG_EVID	DWORD	I	MESSAGE ID / ALARM_DQ event ID	
MSG_STAT	WORD	O	STATUS output	
QUERR	BOOL	O	1 = data transfer error	+
QLIFE_BIT	BOOL	O	1 = Error lifebeat monitoring	
QMSG_ERR	BOOL	O	ALARM_DQ error	
QMSG_SUP	BOOL	O	Message suppression	+
QMSGLCK	BOOL	O	1 = Message suppression active	+
QNDR	BOOL	O	Receive new data	
QSTATUS	INT	O	Data transfer status	
RESTART	BOOL	I	Manual startup	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
START	BOOL	I	1 = Start reading	
SUPPTIME	REAL	I	Suppression time in [s]	
TIME_MON	REAL	I	Monitoring time in [s]	

3.16 PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x: Load management

3.16.1 PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x: Load management

PRE_LMGM	FB1065
PRE_LMGM_75	FB1066
PRE_LMGM_50	FB1067
PRE_LMGM_25	FB1068
PRE_LMGM_10	FB1069
PR3_LMGM	FB165
PR3_LMGM_75	FB166
PR3_LMGM_50	FB167
PR3_LMGM_25	FB168
PR3_LMGM_10	FB169

Description of blocks:

- Calling OBs - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 278)
- Called blocks - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 279)
- Function - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 262)
- Message characteristics - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 280)
- Error reaction - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 284)
- Startup characteristics - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 286)
- Block parameters:
  – General specifications - PRE_LMGM (Page 287)
  – General specifications - PR3_LMGM (Page 297)
- Description of icons and faceplates - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 307)

3.16.2 Function

3.16.2.1 Function - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Energy supply contracts in the industrial sector are usually made within the utility power limits and in specific time periods. The time period depends on the type of energy. When purchasing electricity, such a time period typically lasts 15 minutes. When purchasing gas, an hour is a common time period. Using the load management of powerrate, you can monitor the agreed power limits for each time period.

The following general functions of the load management are implemented in powerrate:

- Calculating the differential power based on actual consumption and the projected end of the period provided by the PRE_SUM / PR3_SUM block
- Monitoring the reference limit
- Generating a warning or alarm if a limit is about to be exceeded
- Archiving of supplementary information in the case of limit violations
- Generating a release signal for every consumer, based on the priority list and taking into account the consumer minimum or maximum disconnect times and minimum connect times
- Generating a lock signal for every consumer, based on the priority list and taking into account the consumer minimum or maximum disconnect times and minimum connect times

Blocks are provided for this purpose with different quantity structures depending on the required number of consumers:

The following blocks are available:

PRE_LMGM_10 / PR3_LMGM_10	up to 10 consumers
PRE_LMGM_25 / PR3_LMGM_25	up to 25 consumers
PRE_LMGM_50 / PR3_LMGM_50	up to 50 consumers
PRE_LMGM_75 / PR3_LMGM_75	up to 75 consumers
PRE_LMGM / PR3_LMGM	up to 100 consumers

Only the block PRE_LMGM is listed in the remaining description. All functions are identical in the other blocks for the used CPUs with regard to the restriction regarding the number of consumers.

Description of functions:

See also

Block parameters (Page 287)

Description of icons and faceplates (Page 307)

Calling OBs - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 278)

Called blocks - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 279)

Message characteristics - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 280)

Error reaction - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 284)

Startup characteristics - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 286)

The PRE_LMGM / PR3_LMGM block (Page 142)

3.16.2.2 General information on configuration - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

General information about the configuration

The configuration data of load management is saved in WinCC user archives.

For this reason, you require a user archive license in Runtime.

A CS license for user archives is no longer required as of WinCC version V6.0 SP3.

Configure the load management in the respective views of the faceplate. When you edit and save the parameters in the various views, the data is both loaded in the controller and written to the WinCC user archives.

If you want to incorporate the most recent version of the priority list, first run the "Load from PLC" function in the "Edit priority list" view of the faceplate.

Load the instance DB of the PRE_LMGM block from the controller before you perform a complete download of the controller. This will ensure that the most recent configuration is active again following restart of the CPU.

If it is not possible to restore the configuration, download the entire configuration using the "Configuration" view of the faceplate of the controller. Do the same if you want to load an old configuration.

You can identify the most recent configuration by the Config ID. If you cannot remember the Config ID, identify this configuration by the "Start of configuration" and "End of configuration" time stamps. In this case, the "End of configuration" field does not yet have an entry for the current configuration.

See also

Load management with SIMATIC powerrate (Page 141)

3.16.2.3 Configuration of the total energy consumption / total supply power - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Configuration of total energy consumption/total supply power

The PRE_SUM block measures the total energy (CUR_VAL) / total supply power (CUR_PWR), including the projection until the end of the interval (EST_VAL / EST_PWR) and the energy / average power value at the end of the interval (LAST_VAL / AVG_PWR). The block parameters must be connected accordingly.

3.16.2.4 Configuration of consumers - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Configuration of consumers

The block can manage up to 100 consumers. The number of the highest input to which a consumer will be connected must be specified via the MAX_LOAD input. Settings must be made for each consumer. The associated parameters are described below,
where x represents the number of the consumer and can be a value from 1 to 100.

If you set the MODEx input to 1, the power feedback of consumer x is expected at the Px input.

The rated output is specified at the CAPx input. The rated output always serves as the basis for performing a calculation during connection. If MODEx = 2 or 3, it is assumed that the consumer will run at the rated output when enabled.

The ONx input is connected to the consumer switch state (only if MODEx = 2).

The type of consumer is set via the MODEx input:

Parameter assignment	Type of consumer
MODEx = 1	Power feedback of the consumer is connected to the Px input
MODEx = 2	Switch state of the consumer is connected to the ONx input
MODEx = 3	Only the consumer's rated output is known

Depending on its type, a consumer will be considered to be disabled under the following conditions:

Type of consumer	Condition for "OFF"
MODEx = 1	Px < CAPx*MAX_STBYs / 100.0 Current consumer power is lower than maximum standby power of the consumer
MODEx = 2	ONx = FALSE Feedback: "OFF"
MODEx = 3	QONx = FALSE Consumer not released by load management

A minimum connect time, a minimum disconnect time, and a maximum disconnect time are configured at the MIN_ONx, MIN_OFFx, and MAX_OFFx inputs for each consumer:

Input	Type of monitoring	Meaning
MIN_ONx	Minimum connect time:	The minimum amount of time the consumer is connected following its release before it can be locked again.
MIN_OFFx	Minimum disconnect time	The minimum amount of time the consumer is disconnected before it can be released again
MAX_OFFx	Maximum disconnect time	The maximum amount of time the consumer can be disconnected before it is connected once again (MAX_OFFx = 0 means no maximum disconnect time)

The block contains the SHED_Tx and EN_Tx output tags for each consumer, which are of the REAL. data type. The time in seconds since the last connect/disconnect is saved in these outputs. A consumer cannot be held until the minimum connect time has elapsed, nor can it be released again until the minimum disconnect time has elapsed. After expiration of the maximum disconnect time, the shed consumer is released again without consideration of the settling time SETTLE_T and without consideration of other conditions. This does not apply to consumers in manual mode.

Configure the MAX_STBYx input for each consumer with its maximum standby power.

The load management block generates a so-called lock or release signal based on the specified limit and the calculated trend.

A lock signal means that load management calculations have indicated that the consumer should be disconnected. You can use the lock signal to directly disconnect consumers by a corresponding interconnection. You can link the lock signal with additional conditions to take into account the constraints of the process. The same applies to the release signal, which indicates that a consumer should be connected.
Where reference is made in the following to connection/disconnection or consumer shedding, it is assumed that the release/lock signals have caused the consumer to be directly connected/disconnected. But it does not always have to be the case.

The differential power is calculated from the difference between the specified power limit and the projected power at the end of the period (EST_PWR). The power limit value may take a hysteresis into account at the start of the period, if necessary. Consumer shedding takes place if the differential power is less than 0 and both the SUPP_T suppression time and the SETTLE_T settling time have elapsed.
Consumers are released or consumer groups are shed until the sum of the shed power is greater than the differential power. The selection of consumers is made in accordance with the priority list, taking into consideration the minimum connect times.
Consumers who are assigned a priority based on a group are always shed together.
Following consumer shedding, the SETTLE_T settling time is permitted to expire before a new consumer shedding procedure is executed or consumers are reconnected, if required.

Requirements for consumer shedding:

Condition	Meaning
EN_SHED = TRUE	General release for load shedding
EN_SHEDx = TRUE	Consumer is in load management mode, so is not deactivated
MANx = FALSE	Consumer is not in manual mode
P_DIFF < 0	Negative differential power
QSUPP_T ≤ 0	Suppression time has elapsed
QSETTLE_T ≤ 0	Settling time has elapsed
QMIN_ONx = FALSE	Consumer's minimum connect time has elapsed

The QONx output is set to FALSE for shed consumers.

See also

The PRE_LMGM / PR3_LMGM block (Page 142)

3.16.2.5 Consumers with status feedback - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Loads with status feedback

If load x does not have separate power feedback, but just ONx status feedback, and ONx = TRUE it is assumed that the load is running at its rated output CAPx; if ONx = FALSE it is assumed that no power is being used. A disabled load (ONx = FALSE) will also be shed, if it is next in line according to the priority list. However, no power is added in order to reach the difference in power.

3.16.2.6 Release of shed consumers - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Releasing shed consumers

If consumers have been shed and the P_DIFF differential power is greater than 0 once the SETTLE_T settling time has elapsed, consumers are released again. Shed consumers or consumer groups are released until the sum of the shed power (rated output CAPx) is greater than the differential power. The selection of consumers is made in accordance with the priority list, taking into account the minimum disconnect times. If the differential power permits, consumers with the same priority are always released together. It is not possible to release individual consumers within a group. Following release, the SETTLE_T settling time is permitted to expire before another consumer is shed or another release is performed as required.

If a low-priority consumer cannot be released because its rated output is greater than the available differential power, no high-priority consumer is released either.

If the settling time and maximum disconnect time (MAX_OFFx) of disconnected consumer x have elapsed, the consumer is released unconditionally.

The QONx output is set to TRUE for released consumers.

3.16.2.7 Consumer control - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Consumer control

Hysteresis

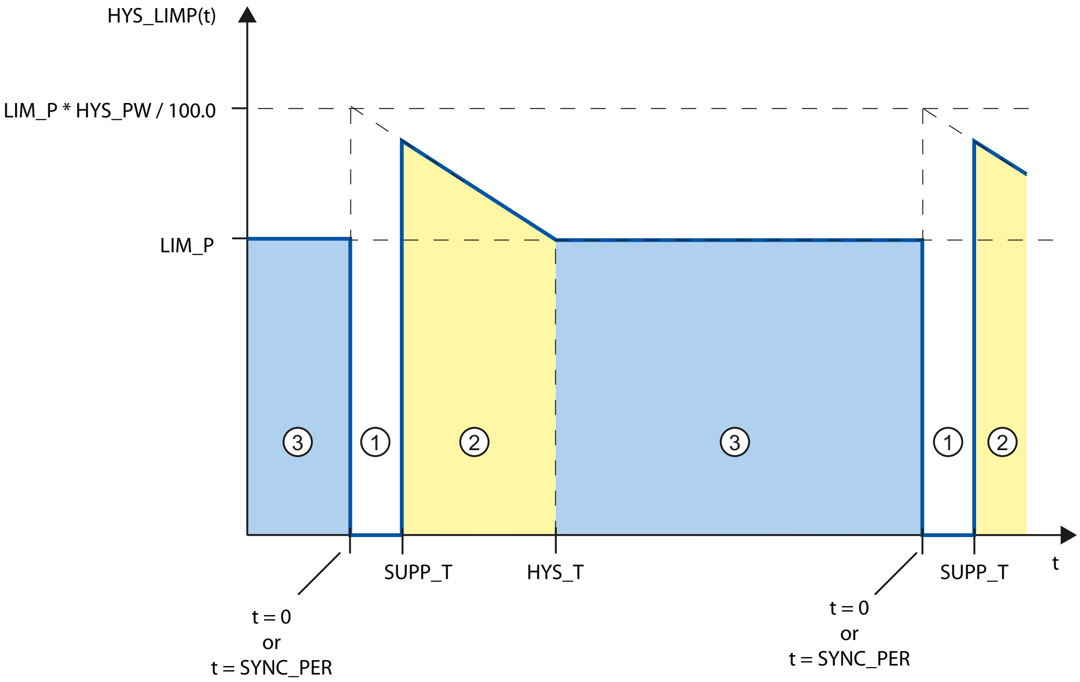
To avoid switching operations occurring too frequently at the start of the time interval, you can configure a hysteresis in accordance with the algorithm shown below. You can use this HYS_LIMP function to deactivate or increase the limit at the beginning of the time interval.

This functionality divides the monitored time interval into the following 3 subsections:

Subsection	Time window	Function
1	Beginning of the time interval until t = SUPP_T	Limit monitoring of the power value is deactivated
2	t = SUPP_T until t = HYS_T	The power value is monitored for increased limit. The increased limit falls in a linear fashion until to the value LIM_P.
3	t = HYS_T until the end of the time interval	The power value is continually monitored for the limit LIM_P.

The block checks the parameter assignment of the HYS_T input for plausible values. Permitted parameter assignment are positive values that are lower than the period time SYNC_PER. In the event of invalid parameter assignment of the HYS_T input, the last valid value is retained.
If you change the period time SYNC_PER to a value lower than HYS_T, HYS_T is set to the new period time.

Load management



① 0 ≤ t < SUPP_T:

HYS_LIMP(t) = 0

② SUPP_T ≤ t < HYST_T:

$$\text{HYS\_LIMP(t)} = \text{LIM\_P} * \text{HYS\_PW} - \frac{(\text{LIM\_P} * \text{HYS\_PW} / 100.0 - \text{LIM\_P})}{\text{HYS\_T}} * t$$

③ HYST_T ≤ t < SYNC_PER:

HYS_LIMP(t) = LIM_P

Description of parameters

HYS_LIMP	Current power limit which takes the hysteresis into account
HYS_PW	Start value of the hysteresis in % of the maximum value of the power or energy value at the beginning of the time interval
HYS_T	Time after start of the time interval after which hysteresis is no longer taken into account
LIM_P	Power limit
SUPP_T	On-delay of limit monitoring at the start of the time interval
t	Time since start of current period

Delay time

Another way of preventing unnecessary switching operations at the start of the time interval is the configuration of an on-delay SUPP_T. Load shedding does not take place during this time. The warning or alarm messages indicating a "pending limit violation" are also suppressed.

Idle time

An idle time can be configured to take into consideration the inertia of a load following a switching operation.

After load shedding or release of loads, the block takes the settling time SETTLE_T into consideration. Further load shedding or release cannot occur until this time has elapsed. If you assign the parameter zero to the SETTLE_T input, no settling time is taken into consideration.

If a load is connected due to the elapsed maximum disconnect time, a further load can be connected without waiting for the settling time.

3.16.2.8 Priority list - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Priority list

Assigning a priority

Each load has a PRIOx input, at which the load's priority is parameterized as a number (1 to 255). 1 is the highest priority, 0 means that the load is not participating in load management or that no load is present. Disconnection is performed from the highest priority down to the lowest, i.e. the load with priority 1 is disconnected first.

Loads with the same priority form a priority group.

Maximum disconnect time is the maximum length of time the load may be shed before it has to be re-enabled. Assign the load to a priority group and / or a rolling group in the "Edit priority list" view of the faceplate in WinCC. Then load the priority list in the PLC with the "Save" button.

Note

If priorities (PRIOx) or assignments to rolling groups ROLLx have been changed in the program, it is essential that a recalculation is performed in the faceplate. In the "Edit priority list" view of the faceplate, click on the "Load from PLC" button. The changed block parameters are then applied in WinCC.

3.16.2.9 Rolling consumers - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Rolling loads

Each load has an input ROLLx, which you use to define the settings for rolling loads. Corresponding configuration indicates whether this is a rolling consumer within the priority group (ROLLx > 0) . Rolling loads all have the same priority. The ROLLx parameter is used to specify the sequence in which these loads are disconnected. Loads where the parameter zero has been assigned to the input ROLLx are not switched in a rolling process.

This procedure means that the consumer disconnected for a particular priority is not always the same one; rather, it changes each time.

Groups can also be formed in order to switch loads together. Loads with the same priority and parameter assignment of the input ROLLx form a load group. The loads of this group are switched together. Several load groups may exist for the same priority.

If a load group with the same priority is shed, all the non-rolling loads are shed. The rolling loads starting with the first ROLLx number are also shed. If loads have the same parameter assignment of the ROLLx input, they are shed together too.

Behavior of rolling load groups

If several loads have the same parameter assignment of the ROLLx input, they are only shed under the following conditions:

- At least one of the loads is not in manual mode
- This consumer's minimum connect time has elapsed

If one of these conditions is not met, an attempt is made to shed the next group of rolling loads.

If the maximum disconnect time of a load located within a group of rolling loads elapses, this load is reconnected without consideration of the settling time. The next group of rolling loads is not disconnected until it is required due to the difference in power.

Rolling load groups are only ever connected as a group in the case of a positive difference in power. If the differential power is only sufficient for connecting individual loads of this group, these loads are not connected.

If at least one rolling consumer of the next groups has not been connected again, this group cannot be disconnected. To prevent a blockade in this case, consumers of the next priority are disconnected. Irrespective of that, the next group of rolling loads will be connected as soon as all loads in the current group have been reconnected.

3.16.2.10 Rates - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Tariffs

The following three tariffs are defined in the function block:

- On-peak tariff
- Off-peak tariff
- Sunday or holiday tariff

You specify either an energy limit or power limit for each tariff.

The limit values can be defined either via the faceplate or the configurable inputs. You can switch between the operator-controllable limit values (LIM_L = FALSE) and the configurable limit values (LIM_L = TRUE) via the (LIM_L input.

Energy limits:

- LIM_W_H: Operator-controllable energy limit for on-peak tariff
- LIM_W_L: Operator-controllable energy limit for off-peak tariff
- LIM_W_SH: Operator-controllable energy limit for Sunday or holiday rate
- L_LIM_W: Interconnectable energy limit

Power limits:

- LIM_P_H: Operator-controllable power limit for on-peak tariff
- LIM_P_L: Operator-controllable power limit for off-peak tariff
- LIM_P_SH: Operator-controllable power limit for Sunday or holiday rate
- L_LIM_P: Configurable power limit

The SEL_PW input is used to define whether the limits are specified as energy limits (SEL_PW = FALSE) or power limits (SEL_PW = TRUE).

The function block receives the current UTC time via its CUR_TS input from the PRE_SYNC / PR3_SYNC block. The current UTC time is internally converted to local time. The block uses the start time for on-peak tariff BEG_HT and the start time for off-peak tariff BEG_LT to decide whether the limit for the on- or off-peak tariff applies.

The following applies for the time intervals of the two normal tariffs:

- For BEG_HT < BEG_LT, the duration of the time interval of the on-peak tariff is from BEG_HT to BEG_LT. The off-peak tariff applies for the remaining time of day.
- For BEG_LT < BEG_HT, the duration of the time interval of the off-peak tariff is from BEG_LT to BEG_HT.. The on-peak tariff applies for the remaining time of day.
- For BEG_LT = BEG_HT, the off-peak applies the whole day.

Setting the SH_ACT input causes the Sunday or holiday tariff to be active for the next day. The Sunday or holiday tariff applies the whole day from 00:00 to 23:59. The SH_NUM input is used to specify how many consecutive days the Sunday or holiday tariff will remain active. It is switched back to the on-peak or off-peak tariff the next day.

The effective work and power limits are displayed at the LIM_W and LIM_P outputs.

3.16.2.11 Quality code - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Quality Code

If you interconnect the QC_CUR_PWR, QC_CUR_VAL and QC_EST_VAL block inputs with the group signals of the associated quality codes, the input variables CUR_PWR, CUR_VAL, EST_VAL are monitored for validity. The current power Px or status feedback ONx of each individual load is monitored for validity in the same manner. Interconnect the associated quality codes with the block input QC_Px or QC_ONx.

The quality code of the load power or status feedback does not influence the choice of loads to be shed. In case of a bad quality code no power credit is granted for accomplishing the difference in power.

The following quality code data is evaluated:

Quality Code	Meaning
16#80	Value is valid.
All other values	Value is invalid. External error or simulation on driver block active.

3.16.2.12 Archiving - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Archiving

You can archive the following configuration data from the PLC with the faceplate:

- All the configuration data via the S_CFG block input
- Priority list via the S_PRIO block input

If the PRE_LMGM function block detects a limit violation, the associated data is also archived. The PRE_LMGM function block sends a request for archiving data via its output structureQREQ_S_ST. The archive manager PRE_UA_S recognizes the request and then initiates the write job.

The archive manager informs the PRE_LMGM function block that the job has been completed with or without errors via the input structure SND_ST.

If the job has been saved and can be transferred to the archive manager, the ARCH_OK block output is set. The ARCH_OK block output is reset with the next archiving request.

The archiving job is time-monitored by the PRE_LMGM function block.

The number of the archive containing the configuration data of the block instance of the PRE_LMGM is defined at the input parameter ARCH_ID. For this reason, each instance of the PRE_LMGM function block must be assigned a unique archive ID ARCH_ID> 0.
If the ARCH_ID has the value 3, for example, the instance data is contained in the PRE_LMGM_CONFIG_3 / PR3_LMGM_CONFIG_3, PRE_LMGM_PRIO_3 / PR3_LMGM_PRIO_3 and PRE_LMGM_LIM_3 / PR3_LMGM_LIM_3 archives.

Note

Only archive IDs 1 to 5 are supported for display and operation in the faceplate for load management.

Structure of the user archives

The user archive for the priority list PRE_LMGM_PRIO_x / PR3_LMGM_PRIO_x has the following data structure:

Field name	Data type	Block parameter	Meaning
NAME	STRING[y] *	NAMEx	Consumer name
CAP	FLOAT	CAPx	Rated output [kW]
MODUS	INTEGER	MODEx	Mode
PRIO	INTEGER	PRIOx	Priority
ROLL_NO	INTEGER	ROLLx	Disconnection order for rolling loads
GRP	INTEGER	GRPx	Group
MIN_ON	FLOAT	MIN_ONx	Minimum connect time [s]
MIN_OFF	FLOAT	MIN_OFFx	Minimum disconnect time [s]
MAX_OFF	FLOAT	MAX_OFFx	Maximum disconnect time [s]
MAX_STBY	FLOAT	MAX_STBYx	Maximum standby power [%]

* PRE_LMGM_PRIO_x: y = 32, PR3_LMGM_PRIO_x: y = 12

The user archive for the configuration data PRE_LMGM_CONFIG_x / PR3_LMGM_CONFIG_x has the following data structure:

Field name	Data type	Block parameter	Meaning
SRT_T	DATE_AND_TIME	-	Start time of the configuration
END_T	DATE_AND_TIME	-	End time of the configuration
BEG_HT	STRING[8]	BEG_HT_S	Start time on-peak rate
BEG_LT	STRING[8]	BEG_LT_S	Start time off-peak rate
LIM_W_H	FLOAT	LIM_W_H	Energy limit for on-peak rate [kWh]
LIM_P_H	FLOAT	LIM_P_H	Power limit for on-peak rate [kW]
LIM_W_L	FLOAT	LIM_W_L	Energy limit for off-peak rate [kWh]
LIM_P_L	FLOAT	LIM_P_L	Power limit for off-peak rate [kW]
LIM_W_SH	FLOAT	LIM_W_SH	Energy limit for Sunday or holiday rate [kWh]
LIM_P_SH	FLOAT	LIM_P_SH	Power limit for Sunday or holiday rate [kWh]
SEL_PW	INTEGER	SEL_PW	0 = Energy, 1 = Power
EN_SHED	FLOAT	EN_SHED	General release for load shedding
SETTLE_T	FLOAT	SETTLE_T	Settling time [s]
LIM_WRN	FLOAT	LIM_WRN	Warning threshold [%]
LIM_ALM	FLOAT	LIM_ALM	Alarm threshold [%]
HYS_PW	FLOAT	HYS_PW	Hysteresis start value [%]
HYS_T	FLOAT	HYS_T	Hysteresis time range [s]
SUPP_T	FLOAT	SUPP_T	On-delay of limit monitoring [min]
NAME	STRING[y] *	NAMEx	Consumer
CAP	FLOAT	CAPx	Rated output [kW]
MODUS	INTEGER	MODUSx	Mode
PRIO	INTEGER	PRIOx	Priority
ROLL_NO	INTEGER	ROLLx	Disconnection order for rolling loads
GRP	INTEGER	GRPx	Group
MIN_ON	FLOAT	MIN_ONx	Minimum connect time [s]
MIN_OFF	FLOAT	MIN_OFFx	Minimum disconnect time [s]
MAX_OFF	FLOAT	MAX_OFFx	Maximum disconnect time [s]
MAX_STBY	FLOAT	MAX_STBYx	Maximum standby power [%]
CONFIG_ID	INTEGER	-	Configuration ID

* PRE_LMGM_CONFIG_x: y = 32, PR3_LMGM_CONFIG_x: y = 12

The user archive for the limit violations PRE_LMGM_LIM_x / PR3_LMGM_LIM_x has the following data structure:

Field name	Data type	Block parameter	Meaning
DATE_TIME	DATE_AND_TIME	LT_DT	Local time
LIM_W	FLOAT	LT_LIM_W	Energy limit of last time interval
LIM_P	FLOAT	LT_LIM_P	Power limit of last time interval
W	FLOAT	LT_W	Energy value of last time interval
P	FLOAT	LT_P	Average power in the last time interval
SHED_POS	FLOAT	LT_SHED_POS	Number of consumers which could be shed at the end of last time interval
P_SHED_POS	FLOAT	LT_P_SHED_POS	Power of consumers which could be shed at the end of last time interval
LOAD_SHED	FLOAT	LT_LOAD_SHED	Number of disconnected consumers at the end of the time interval
P_SHED	FLOAT	LT_P_SHED	Power of disconnected consumers at the end of the time interval

3.16.2.13 Archiving for limit violations - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Archiving in the case of limit violations

When a limit is violated, an archiving request is issued at the end of the time interval.
The function block for load management calculates and saves the time of the limit violation.

The current values archived in the user archive at the time of the limit violation are copied to block outputs in parallel. This involves the following values:

Block output	Meaning
LT_DT	Time stamp of last limit violation
LT_LIM_P	Power limit of last measurement period with limit violation
LT_LIM_W	Energy limit of last measurement period with limit violation
LT_LOAD_SHED	Number of shed consumers at end of last measurement period with limit violation
LT_P*	Average power of last measurement period with limit violation
LT_P_SHED*	Power of shed consumers at end of last measurement period with limit violation
LT_P_SHED_POS*	Power of sheddable consumers at end of last measurement period with limit violation
LT_SHED_POS*	Number of sheddable consumers at end of last measurement period with limit violation
LT_W*	Accumulated energy value of last measurement period

*These parameters are not evaluated or supplied in this version.

3.16.2.14 Archiving the configuration - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Archiving of the configuration

All the configuration data is saved under a configuration ID (CONFIG_ID) in the user archive PRE_LMGM_CONFIG_x / PR3_LMGM_CONFIG_x. The configuration data can be roughly divided into the following areas:

- General parameters for load management
- Tariff data
- Priority list

Every time the configuration data is resaved, the configuration ID is incremented by 1. The configuration ID starts with 1 and is incremented up to the value that is parameterized at the CFG_MAX input. The configuration is overwritten with ID 1 on the next save. Each saved configuration contains the times at which the configuration was valid.

When the operator clicks on the "Load from PLC" button in the "Configuration" view, the current configuration data is saved to the user archive. This data is archived automatically after the tariff data, general parameters, or the priority list have been loaded.

When you open the "Configuration" faceplate view, the currently valid configuration is always selected. Other configurations that can also be loaded into the controller as required are displayed by deleting or modifying the selection criterion.

3.16.2.15 Loading the configuration to the controller - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Downloading the configuration to the controller

Configuration data can be transferred to the controller from the faceplate views "Parameters", "Rates", "Edit Priority List" and "Configuration".

With the "Save" button in the "Parameters" or "Rates" views, the data entered in the faceplate is written to the user archive PRE_LMGM_CONFIG_x / PR3_LMGM_CONFIG_x and then transferred to the controller. If the "Parameters" or "Rates" views are closed before the data is saved, the changes made are lost. However, the data in the "Edit Priority List" and "Configuration" views in the user archives is retained but not transferred to the controller.

You can load the following configuration data to the controller with the faceplate:

- All the configuration data via the R_CFG block in-out
- General parameters for load management via the R_PARA block in_out
- Information on rates via the R_TARIFF block in_out
- Priority list via the R_PRIO block in_out

The PRE_LMGM function block sends a request for reading data via its output structureQREQ_R_ST. The archive manager PRE_UA_R recognizes the request and then initiates the read job.

The archive manager informs the load management block that the job has been completed with or without errors via the input structure RCV_ST.

The NDR output is set when new data has been received. NDR is reset with the next request for reading data.

A job is time-monitored by the PRE_LMGM function block.

The number of the archive from which the configuration data of the block instance of PRE_LMGM is read is defined at the input parameter ARCH_ID. For this reason, each instance of the PRE_LMGM function block must be assigned a unique archive ID ARCH_ID> 0.
If the ARCH_ID has the value 3, for example, the instance data is contained in the PRE_LMGM_CONFIG_3 / PR3_LMGM_CONFIG_3, PRE_LMGM_PRIO_3 / PR3_LMGM_PRIO_3 and PRE_LMGM_LIM_3 / PR3_LMGM_LIM_3 archives.

Every time configuration data is loaded, the current configuration is automatically saved in the configuration archive PRE_LMGM_CONFIG_x / PR3_LMGM_CONFIG_x.

3.16.2.16 Consumer and load management on different controllers - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Consumers and load management on different controllers

If loads and load management are running on different controllers, then transfer the current load power Px and current status messages ONx to the controller with the associated load management block. The same applies to the associated quality codes QC_Px and QC_ONx.

Conversely, the output signals QON_x (FALSE = shedding or TRUE = release) formed by load management have to be transferred back to the PLC in which the load is configured.

You can use the following powerrate blocks for communication:

Block	Function	Communication partner
PRE_AS_SEND	Send block for AS-to-AS communication	S7-400 / S7-400
PRE_AS_RECV	Receive block for AS-to-AS communication	S7-400 / S7-400
PRE_SND_H	Send block for AS-4xxH to AS-400 communication	S7-400 / S7-400H
PRE_RCV_H	Receive block for AS-4xxH to AS-400 communication	S7-400 / S7-400H
PRE_GET	Fetch telegrams	S7-400
PR3_GET	Fetch telegrams	S7-300

3.16.3 Calling OBs - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.16.4 Called blocks - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

PRE_LMGM

The block calls the following blocks:

FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
SFB31	NOTIFY_8P
SFB35	ALARM_8P
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL
SFC51	RDSYSST

PR3_LMGM

The block calls the following blocks:

FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
SFC6	RD_SINFO
SFC19	ALARM_SC
SFC20	BLKMOV
SFC21	FILL
SFC107	ALARM_DQ
SFC108	ALARM_D

3.16.5 Message characteristics - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

PRE_LMGM

PRE_LMGM generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QLIM_WRN	Warning approaching of limit @1 %.2f@ kWh / @3 %.2f@ kW (limit @2 %.2f@ kWh / @4 %.2f@ kW)	WH
	2	QLIM_ALM	Alarm approaching of limit @1 %.2f@ kWh /@ 3 %.2f@ kW (limit @2 %.2f@ kWh / @4 %.2f@ kW)	AH
	3	QLIM_ERR	Exceeding of limit:: @5 %.2f@ kWh /@ 6 %.2f@ kW (limit @2 %.2f@ kWh /@ 4 %.2f@ kW)	AH
	4	QSHED_IMP	No consumer available to shed	AH
	5	QLMGM_OFF	Load management disabled	AH
	6	QELD_PARA	Error loading parameters	AH
	7	QLIM_E	Invalid limit	AH
	8	QP_ERR	Invalid supply power	AH
MSG_EVID2	1	-	Reserved	-
	2	-	Reserved	-
	3	-	Reserved	-
	4	-	Reserved	-
	5	QPRIO_LST_E	Invalid priority list	AH
	6	QPARAMF	Parameter assignment error communication	PLC process control failure
	7	QERR_R	Invalid data loading parameters	PLC process control failure
	8	QERR_S	Invalid data during archiving	PLC process control failure

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID3	1	QMONERR_S	Monitoring error archiving	PLC process control failure
	2	QOVL_LIM	Overflow of user archive for limit violations	PLC process control failure
	3	-	Not assigned	-
	4	-	Not assigned	-
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-
MSG_EVID4	1	QSHED	Consumer @1%s@ was locked	Status PLC
	2	QFREE	Consumer @2%s@ was released	Status PLC
	3	-	Not assigned	-
	4	-	Not assigned	-
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

The ALARM_8P auxiliary values are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSG_EVID1 MSG_EVID2 MSG_EVID3	1	EST_VAL	Projected energy value at end of time interval
	2	HYS_LIMW	Current average energy limit including hysteresis
	3	EST_PWR	Average power value at end of time interval
	4	HYS_LIMP	Current average power limit including hysteresis
	5	LAST_VAL	Last archived, accumulated work value
	6	AVG_PWR	Average power at end of the last time interval
	7	-	Not assigned
	8	-	Not assigned
	9	-	Not assigned
	10	-	Not assigned

The NOTIFY_8P auxiliary values are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSG_EVID4	1	NAMEx	Name of the consumer which has been locked
	2	NAMEx	Name of the consumer which has been released
	3	-	Not assigned
	4	-	Not assigned
	5	-	Not assigned
	6	-	Not assigned
	7	-	Not assigned
	8	-	Not assigned
	9	-	Not assigned
	10	-	Not assigned

PR3_LMGM

PR3_LMGM generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSGEVID1	1	QLIM_WRN	Warning approaching of limit @1 %.2f@ kW	WH
MSGEVID2	1	QLIM_ALM	Alarm approaching of limit @1 %.2f@ kW	AH
MSGEVID3	1	QLIM_ERR	Limit @1 %.2f@ kW	AH
MSGEVID4	1	QSHED_IMP	No consumer available to shed	AH
MSGEVID5	1	QLMGM_OFF	Load management disabled	AH
MSGEVID6	1	QELD_PARA	Error loading parameters	AH
MSGEVID7	1	QLIM_E	Invalid limit	AH
MSGEVID8	1	QP_ERR	Invalid supply power	AH
MSGEVID9	1	-	Reserved	-
MSGEVID10	1	-	Reserved	-
MSGEVID11	1	-	Reserved	-
MSGEVID12	1	-	Reserved	-
MSGEVID13	1	QPRIO_LST_E	Invalid priority list	AH
MSGEVID14	1	QSHED	Consumer @1%s@ was locked	Status PLC
MSGEVID15	1	QFREE	Consumer @2%s@ was released	Status PLC
MSGEVID16	1	QPARAMF	Parameter assignment error communication	PLC process control failure

Message block	Message number	Block parameter	Message text	Message class
MSGEVID17	1	QERR_R	Invalid data loading parameters	PLC process control failure
MSGEVID18	1	QERR_S	Invalid data during archiving	PLC process control failure
MSGEVID19	1	QMONERR_S	Monitoring error archiving	PLC process control failure
MSGEVID20	1	QOVL_LIM	Overflow of user archive for limit violations	PLC process control failure

The auxiliary values of the ALARM_DQ / ALARM_D blocks are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSGEVID1	1	EST_VAL	Projected energy value at end of time interval
MSGEVID2	1	EST_PWR	Average power value at end of time interval
MSGEVID3	1	AVG_PWR	Average power at end of the last time interval
MSGEVID4	1	-	Not assigned
MSGEVID5	1	-	Not assigned
MSGEVID6	1	-	Not assigned
MSGEVID7	1	-	Not assigned
MSGEVID8	1	-	Not assigned
MSGEVID9	1	-	Not assigned
MSGEVID10	1	-	Not assigned
MSGEVID11	1	-	Not assigned
MSGEVID12	1	-	Not assigned
MSGEVID13	1	-	Not assigned
MSGEVID14	1	NAMEx	Name of the consumer which has been locked
MSGEVID15	1	NAMEx	Name of the consumer which has been released
MSGEVID16	1	-	Not assigned
MSGEVID17	1	-	Not assigned
MSGEVID18	1	-	Not assigned
MSGEVID19	1	-	Not assigned
MSGEVID20	1	-	Not assigned

3.16.6 Error reaction - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Validity of input parameters

If one of the input variables CUR_PWR, CUR_VAL or EST_VAL is detected as invalid, an "Invalid supply power" message is issued and load management is switched off. The input signal fault is detected via the associated quality code.

If a load with invalid feedback is shed, then the shortfall of this power is not taken into consideration when calculating the differential power.

Switching load management off

If an error occurs which leads to the power management being switched off, then the function block PRE_LMGM / PR3_LMGM exhibits the following behavior:

- Consumer control remains in its current state until the end of the current time interval. This has the result that no further consumers are released or held. However, the user can still perform a manual release/hold operation.
- If the error is still present once the current time interval has ended, all loads are released, taking their hold times into account.
- If a trend can still be calculated, this calculation is also performed and the result displayed. No alarms/warnings relating to pending overshoots are issued.

Error output QPARAMF

If a faulty parameter assignment of the function block is detected, the error output QPARAMF is set. The following parameter assignments or events result in the error output being set:

- The monitoring time T_OUT_LD is ≤ 0
- Block ID ≤ 0
- The archive ID ARCH_ID ≤ 0 or parameterized value is not present
- The archive manager PRE_UA_R / PR3_UA_R reports an error when reading the archive via its output QARCHERR
- The archive manager PRE_UA_S / PR3_UA_S reports an error when writing the archive via its output QARCHERR

In the event of a defective parameter assignment for the monitoring time T_OUT_LD, no new requests are generated.

Error in communication with WinCC user archives

The error output QERR_R / QERR_S is set under the following conditions:

- If a read or write request is issued to the archive manager, the parameters ID, JOB_ID and ARCH_ID are monitored for plausibility. If these IDs do not match between the request and the response of the archive manager, the corresponding error output is set.

As soon as a new request is present, the QERR_R / QERR_S output is reset. If the repeat of a job (COUNT > 0) is parameterized, the output QERR_R / QERR_S is reset as soon as the IDs of the request match those of the response.

If the archive manager does not respond within the monitoring time, the error output QELD_PARA / QMONERR_S is set. To prevent unnecessary error messages the number of permitted job repetitions can be set at the COUNT input. If a monitoring time of 10 seconds is set and COUNT = 1 is parameterized, the monitoring error is not signaled until 20 seconds have elapsed. The parameter assignment error QPARAMF is an exception to this. This error is signaled immediately.

All errors remain pending until a new request is transmitted.

A job is always repeated when one of the errors described above has occurred.

3.16.7 Startup characteristics - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

After a CPU restart, the PRE_SUM / PR3_SUM block does not provide a valid supply power at its CUR_VAL output until after the first synchronization pulse. Until this time, load management is not performed.

The following applies between a restart and the first synchronization pulse:

- All loads are released (QONx = TRUE).
- The time since the loads were released EN_Tx starts at 0. This time forms the basis for the minimum connect time.
- The outputs HYS_LIMW and HYS_LIMP, which usually take the hysteresis into consideration, do not take the hysteresis into account during this time.
- All messages have the "sent" state.
- The remaining time BAL_TM and BAL_TS in the current period is set to 0.
- The differences in energy W_DIFF and power P_DIFF are set to 0.
- The available connection and disconnection power P_ON and P_SHED are already calculated.
- The number of consumers that can be connected and disconnected EN_POS and SHED_POS are already calculated.
- The number of shed loads (LOAD_SHED is 0.
- The available connection and disconnection energy W_ON_POS and W_SHED_POS is set to 0, as the time intervals's remaining time is not known.
- The average power LT_P and accumulated energy LT_W of the last time interval are set to 0.
- Flags for last rolling load (LAST_ROLLx) are set to 0.
- If necessary, the processes of editing and downloading a configuration with the faceplate are aborted (CFG_EDIT = FALSE and CFG_LOAD = FALSE).
- The on-delay of limit monitoring at the beginning of the time interval QSUPP_T is set to 0.
- The remaining settling time after load shedding QSETTLE_T is set to 0.

The following also applies after restart:

- The error outputs are reset.
- The request structure QREQ_R_ST and QREQ_S_ST for the read and write requests from/to user archives are reset.

3.16.8 Block parameters

3.16.8.1 PRE_LMGM

General specifications - PRE_LMGM

General specifications

Item	Data type	Type	Meaning	HMI
BAL_TM	INT	O	Remaining time of time interval in [min]	+
BAL_TS	INT	O	Remaining time of time interval in [s]	+
CUR_TS	DT	I	Current time stamp when block is called	
DIFF_LOC	REAL	O	Difference between UTC and local time in [h]	
MAX_LOAD	INT	IO	Highest order number of input that is connected to a consumer	+
MSG_ACKx	WORD	O	Messages acknowledged, ALARM_8P block x (x = 1 ... 2)	
MSG_EVIDx	DWORD	I	Event ID x (x = 1 ... 4) of message block ALARM_8P / NOTIFY_8P	
MSG_LOCK	BOOL	I	Current status of the message lock: FALSE = Message lock is disabled TRUE = Message lock is enabled	
MSG_STATx	WORD	O	MESSAGE x (x = 1 ... 4): STATUS Output	
QMSG_ERR	BOOL	O	Current status of the system function block ALARM_8P / NOTIFY_8P: FALSE = No error TRUE = Error	
QMSG_SUP	BOOL	O	Current status of the message suppression: FALSE = Message suppression is disabled TRUE = Message suppression is enabled	
RES_IN_DW1*	DWORD	I	Reserve input	
RES_IN_DW2*	DWORD	I	Reserve input	
RES_IN_R1*	REAL	I	Reserve input	
RES_IN_R2*	REAL	I	Reserve input	
RES_IN_B1*	BOOL	I	Reserve input	
RES_IN_B2*	BOOL	I	Reserve input	
RES_IN_B3*	BOOL	I	Reserve input	
RES_IN_B4*	BOOL	I	Reserve input	
RES_OUT_DW1*	DWORD	O	Reserve output	
RES_OUT_DW2*	DWORD	O	Reserve output	
RES_OUT_R1*	REAL	O	Reserve output	
RES_OUT_R2*	REAL	O	Reserve output	
RES_OUT_B1*	BOOL	O	Reserve output	
RES_OUT_B2*	BOOL	O	Reserve output	
RES_OUT_B3*	BOOL	O	Reserve output	

Item	Data type	Type	Meaning	HMI
RES_OUT_B4*	BOOL	O	Reserve output	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SYNC_P	BOOL	I	Synchronization pulse	
SYNC_PER	REAL	I	Synchronization period in [s]	+

* These parameters are not evaluated or supplied in this version.

Supply - PRE_LMGM

Supply

Item	Data type	Type	Meaning	HMI
AVG_PWR	REAL	I	Average power at end of the time interval	
CUR_PWR	REAL	I	Current power at end of the time interval	+
CUR_PWRHR	REAL	I	High limit of the bar for the current power	+
CUR_VAL	REAL	I	Current accumulated value	+
CUR_VALHR	REAL	I	High limit of the bar for the current accumulated energy value	+
EST_PWR	REAL	I	Average power projected at end of time interval	+
EST_VAL	REAL	I	Projected value until the end of the time interval	+
LAST_VAL	REAL	I	Last archived, accumulated value	+
P_DIFFHLR	REAL	I	High limit of the bar for the differential power	+
QC_AVG_PWR	BYTE	I	Quality code for input signal AVG_PWR (average power until the end of the time interval)	
QC_CUR_PWR	BYTE	I	Quality code for input signal CUR_PWR (current power at the end of the time interval)	
QC_CUR_VAL	BYTE	I	Quality code for input signal CUR_VAL (current accumulated value)	
QC_EST_PWR	BYTE	I	Quality code for input signal EST_PWR (average power until the end of the time interval)	
QC_EST_VAL	BYTE	I	Quality code for input signal EST_VAL (projected value until the end of the time interval)	
QC_LAST_VAL	BYTE	I	Quality code for input signal LAST_VAL (last archived accumulated value)	
W_DIFFHLR	REAL	I	High limit of the bar for the differential energy value	+

Consumer data - PRE_LMGM

Consumer data

Item	Data type	Type	Meaning	HMI
CAPx	REAL	I	Rated output of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	
DUMMY_IN	STRUCT	I	Internal structure	
DUMMY_PARA	STRUCT	I	Internal structure	
DUMMY_OUT	STRUCT	O	Internal structure	
EN_SHEDx	BOOL	I	Participation of consumer x in the load shedding: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer x not released for load shedding TRUE = Consumer x released for load shedding	
EN_Tx	REAL	O	Elapsed time since the release of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	+
GR_NAMEx	STRING[32]	I	Name of consumer group x (x = 01 ... 10 or 20)	+
GRPx	BYTE	I	Assignment of consumer x to a consumer group (x = 01 ... 10, 25, 50, 75 or 100)	
LAST_ROLLx	BOOL	I	Rolling status of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer is not the last disconnected, rolling consumer in this priority class TRUE = Consumer is the last disconnected, rolling consumer in this priority class	
MAN_ENx	BOOL	I	Release for consumer x in manual mode (MANx = TRUE): (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Disconnect consumer TRUE = Release consumer	+
MANx	BOOL	I	Operating mode of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer not in manual mode TRUE = Consumer in manual mode	+
MAX_OFFx	REAL	I	Maximum disconnect time of consumer x in [s] (x = 01 ... 10, 25, 50, 75 or 100)	
MAX_STBYx	REAL	I	Share of rated output in [%] of consumer x for the maximum standby power (x = 01 ... 10, 25, 50, 75 or 100)	
MIN_OFFx	REAL	I	Minimum disconnect time of consumer x in [s] (x = 01 ... 10, 25, 50, 75 or 100)	
MIN_ONx	REAL	I	Minimum connect time of consumer x in [s] (x = 01 ... 10, 25, 50, 75 or 100)	
MODEx	BYTE	I	Type of power measurement for consumer type x: (x = 01 ... 10, 25, 50, 75 or 100) 0 = No consumer available 1 = Actual power of consumer is connected at input Px 2 = Switch state of the consumer is connected to input ONx 3 = Only the rated output for the consumer is known	

Item	Data type	Type	Meaning	HMI
NAMEx	STRING[32]	I	Name of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	
ONx	BOOL	I	Status feedback of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer x is not connected TRUE = Consumer x is connected with the rated output CAPx	+
PRIOLSTx	DWORD	I	Priority list for load shedding entry x (x = 01 ... 10, 25, 50, 75 or 100)	
PRIOx	BYTE	I	Priority of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) 0 = No participation of the consumer in load management 1 = Highest priority ... Decreasing priority until: 255 = Lowest priority	
Px	REAL	I	Current power of consumer x: (x = 01 ... 10, 25, 50, 75 or 100)	+
QC_ONx	BYTE	I	Quality code for input signal ONx (x = 01 ... 10, 25, 50, 75 or 100) (Status feedback of consumer x)	
QC_Px	BYTE	I	Quality code for input signal Px (x = 01 ... 10, 25, 50, 75 or 100) (Current power of consumer x)	
QMAX_OFFx	BOOL	O	Status of maximum disconnect time for consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Maximum disconnect time has expired TRUE = Maximum disconnect time has not yet expired	+
QMIN_OFFx	BOOL	O	Status of minimum disconnect time for consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Minimum disconnect time has expired TRUE = Minimum disconnect time has not yet expired	+
QMIN_ONx	BOOL	O	Status of minimum connect time for consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Minimum connect time has expired TRUE = Maximum connect time has not yet expired	+
QMSG_OFFx	BOOL	O	Message to WinCC that consumer x has been locked: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer is not locked TRUE = Consumer has been locked	
QMSG_ONx	BOOL	O	Message to WinCC that consumer x has been released: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer is not released TRUE = Consumer has been released	
QONx	BOOL	O	Status of consumer x for load management: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer has been shed TRUE = Consumer is released	+

Item	Data type	Type	Meaning	HMI
ROLLx	BYTE	I	Disconnect order of consumer x for rolling consumers: (x = 01 ... 10, 25, 50, 75 or 100) 0 = No rolling consumer	
SHED_Tx	REAL	O	Elapsed time since the lock of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	+

Consumer control - PRE_LMGM

Consumer control

Item	Data type	Type	Meaning	HMI
Dx	BOOL	I	Internal tag (x = 101 ... 107 and 201 ... 207)	
EN_POS	INT	O	Number of consumers which can be connected	
EN_SHED	BOOL	I	General release for load shedding	
HYS_LIMP	REAL	O	Current power limit which takes the hysteresis into account	+
HYS_LIMW	REAL	O	Current energy limit including hysteresis (Load shedding performed for EST_VAL > HYS_LIMW)	+
HYS_PW	REAL	I	Start value of the hysteresis in [%] of the maximum value of the power or energy value at the beginning of the time interval	
HYS_T	REAL	I	Time after start of the time interval in [min], after which hysteresis is no longer taken into account	
LIM_ALM	REAL	I	Limit for alarm message indicating a pending limit violation in [%] of LIM_W or LIM_P	
LIM_P	REAL	O	Effective power limit (without hysteresis)	+
LIM_W	REAL	O	Effective energy limit (without hysteresis)	+
LIM_WRN	REAL	I	Limit for warning message indicating a pending limit violation in [%] of LIM_W or LIM_P	
LOAD_SHED	INT	O	Number of consumers shed by load management	
LT_DT	DT	O	Time stamp of last limit violation	
LT_LIM_P	REAL	O	Power limit of last measurement period with limit violation	
LT_LIM_W	REAL	O	Energy limit of last measurement period with limit violation	
LT_LOAD_SHED	DINT	O	Number of shed consumers at end of last measurement period with limit violation	
LT_P*	REAL	O	Average power of last measurement period with limit violation	
LT_P_SHED*	REAL	O	Power of shed consumers at end of last measurement period with limit violation	
LT_P_SHED_POS*	REAL	O	Power of sheddable consumers at end of last measurement period with limit violation	
LT_SHED_POS*	DINT	O	Number of sheddable consumers at end of last measurement period with limit violation	
LT_W*	REAL	O	Accumulated energy value of last measurement period	
P_DIFF	REAL	O	Calculated average power to avoid load shedding: HYS_LIMP – EST_PWR	+

Item	Data type	Type	Meaning	HMI
P_ON_POS	REAL	O	Available connection power	+
P_SHED	REAL	O	Shed power	
P_SHED_POS	REAL	O	Available disconnection power	+
QC_P_DIFF	BYTE	O	Quality code of output P_DIFF (Calculated average power to avoid load shedding)	
QC_W_DIFF	BYTE	O	Quality code of output W_DIFF (Available energy until load shedding)	
QFREE	BOOL	O	Current status of load management: FALSE = No consumer is released TRUE = Consumer has been released	
QLIM_ALM	BOOL	O	Monitoring of violations of the reference limit: FALSE = No alarm for pending limit violation TRUE = Alarm for pending limit violation	
QLIM_E	BOOL	O	Monitoring the reference limit: FALSE = Valid limit TRUE = Invalid limit	
QLIM_ERR	BOOL	O	Monitoring of violations of the reference limit: FALSE = Limit not yet violated TRUE = Limit violated	
QLIM_WRN	BOOL	O	Monitoring of violations of the reference limit: FALSE = No warning for pending limit violation TRUE = Warning for pending limit violation	
QLMGM_OFF	BOOL	O	Current status of the load management: FALSE = Load managements is enabled TRUE = Load managements is disabled	
QP_ERR	BOOL	O	Monitoring the specified supply power: FALSE = Valid supply power TRUE = Invalid supply power	
QPRIO_LST_E	BOOL	O	Monitoring of the priority list: FALSE = Priority list is correct TRUE = Priority list is incorrect	
QSETTLE_T	REAL	O	Remaining settling time after consumer shedding/release in [s]	+
QSHED	BOOL	O	Current status of load management: FALSE = No consumer is locked TRUE = Consumer is locked	
QSHED_IMP	BOOL	O	Current status of load management: FALSE = Consumer available for load shedding TRUE = No consumer available for load shedding	
QSUPP_T	REAL	O	Remaining suppression time after start of period in [s]	+
SEL_PW	BOOL	I	Selector for monitoring mode of the reference limit: FALSE = Specification of the maximum average power (LIM_P_H, LIM_P_L and LIM_P_SH) within a period TRUE = Specification of the maximum energy (LIM_W_H, LIM_W_L and LIM_W_SH) within a period	
SETTLE_T	REAL	I	Settling time in [s]	
SHED_POS	INT	O	Number of interconnectable consumers	
SUPP_T	REAL	I	On-delay of limit monitoring at the start of the time interval in [min]	

Item	Data type	Type	Meaning	HMI
W_DIFF	REAL	O	Available energy until load shedding: HYS_LIMW - EST_VAL	+
W_ON_POS	REAL	O	Available connection energy	+
W_SHED_POS	REAL	O	Available disconnection energy	+

*These parameters are not evaluated or supplied in this version.

Rates - PRE_LMGM

Rates

Item	Data type	Type	Meaning	HMI
ADJ_D_H*	DWORD	I	Date [DDMMYYYY] on which adjustment of the high rate ends for automatic adjustment	+
ADJ_D_L*	DWORD	I	Date [DDMMYYYY] on which adjustment of the low rate ends for automatic adjustment	+
ADJ_D_SH*	DWORD	I	Date [DDMMYYYY] on which adjustment of the Sunday and holiday rate ends for automatic adjustment	+
ADJ_LIM*	BOOL	I	Automatic limit adjustment after limit violation: FALSE = No automatic limit adjustment TRUE = Automatic limit adjustment	+
ADJ_TEOM*	BOOL	I	Validity of automatic limit adjustments after a timeout: FALSE = The ADJ_TIME time begins with limit violation TRUE = The ADJ_TIME time first begins at the end of the month	+
ADJ_TIME*	INT	I	Time in months for which a limit is valid following automatic adjustment	+
ADJ_VAL*	REAL	I	Percentage by which the limit is adjusted automatically following an overshoot	+
BEG_HT	DINT	I	Start time for on-peak tariff (local time) [ms]	
BEG_HT_S	STRING[8]	I	Start time for on-peak tariff (local time) [ms] as string	
BEG_LT	DINT	I	Start time for off-peak tariff (local time) [ms]	
BEG_LT_S	STRING[8]	I	Start time for off-peak tariff (local time) [ms] as string	
EN_SCHEDULE*	BOOL	I	Schedule for load management: FALSE = Load management is not enabled in schedule TRUE = Load management is enabled in schedule	+
L_LIM_P	REAL	I	Configurable power limit	
L_LIM_W	REAL	I	Interconnectable energy limit	
LIM_L	BOOL	I	Enabling interconnectable limits (L_LIM_P / L_LIM_W): FALSE = Load management is not enabled in schedule TRUE = Load management is enabled in schedule	
LIM_P_H	REAL	I	Power limit for on-peak tariff	
LIM_P_L	REAL	I	Power limit for off-peak tariff	
LIM_P_SH	REAL	I	Power limit for Sunday or holiday rate	
LIM_W_H	REAL	I	Energy limit for on-peak tariff	

Item	Data type	Type	Meaning	HMI
LIM_W_L	REAL	I	Energy limit for off-peak tariff	
LIM_W_SH	REAL	I	Energy limit for Sunday or holiday rate	
NT_END_D*	REAL	I	End date for next period in [DDMMYYYY]	+
NT_END_D*	REAL	I	End time for next period in [hhmm]	+
NT_P*	REAL	I	Maximum average power for next period	+
NT_SRT_D*	REAL	I	Start date for next period in [DDMMYYYY]	+
NT_SRT_T*	REAL	I	Start time for next period in [hhmm]	+
QADJ_LIM_H*	BOOL	O	Automatic adjustment of the on-peak tariff: FALSE = No automatic adjustment performed TRUE = Automatic adjustment performed	+
QADJ_LIM_L*	BOOL	O	Automatic adjustment of the off-peak tariff: FALSE = No automatic adjustment performed TRUE = Automatic adjustment performed	+
QADJ_LIM_SH*	BOOL	O	Automatic adjustment of the Sunday and holiday rate: FALSE = No automatic adjustment performed TRUE = Automatic adjustment performed	+
QNXT_LE*	BOOL	O	Reference limit for next period: FALSE = Reference limit for next period TRUE = No reference limit for next period	+
SH_ACT	BOOL	IO	Sunday and holiday tariff: FALSE = Sunday and holiday tariff disabled TRUE = Sunday and holiday tariff enabled with 00:00 of the next day	+
SH_NUM	INT	IO	Number of days for which the Sunday and holiday tariff is valid (only has effect with SH_ACT = TRUE)	+

*These parameters are not evaluated or supplied in this version.

Archiving - PRE_LMGM

Archiving

Item	Data type	Type	Meaning	HMI
ARCH_ID	INT	I	Archive ID, Archiving - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 273)	
ARCH_OK	BOOL	O	Current status of the archive job: FALSE = Job still in progress or ended with error TRUE = Job ended without error	
CFG_CUR	INT	I	ID of the current configuration in the user archive	+
CFG_EDIT	BOOL	I	Processing status of the current configuration: FALSE = Configuration not being processed TRUE = Configuration being processed	+
CFG_MAX	INT	I	Maximum number of possible configurations in the user archive	+
CFG_READ	INT	I	ID of the configuration to be read in the user archive	
COUNT	INT	I	Number of possible job repetitions	
ID	INT	I	Unique ID for this block	
NDR	BOOL	O	Current status of the receive job: FALSE = No new data received TRUE = New data received	
QARCH_ID	INT	O	Archive ID	
QELD_PARA	BOOL	O	Error loading parameters: FALSE = No error loading parameters TRUE = Error loading parameters	
QERR_R	BOOL	O	Current status of the receive job: FALSE = No group error in receive job TRUE = Group error in receive job	
QERR_S	BOOL	O	Current status of the send job: FALSE = No group error in send job TRUE = Group error in send job	
QMONERR_S	BOOL	O	Current status of the send job: FALSE = No monitoring error in send job TRUE = Monitoring error in send job	
QMSG_ERR	BOOL	O	Current status of message generation: FALSE = No error in message generation TRUE = Error in message generation	
QREQ_ACT	BOOL	O	Current status of the request: FALSE = No request in progress TRUE = Request in progress	
QREQ_R_ST	UDT_PRE_REV_REQ	O	Request structure for receive request to archive manager	
QREQ_S_ST	UDT_PRE_SND_REQ	O	Request structure for send request to archive manager	
QOVL_LIM	BOOL	O	Current status of the user archive for limit violation: FALSE = No buffer overflow in user archive TRUE = Buffer overflow in user archive	

Item	Data type	Type	Meaning	HMI
QPARAMF	BOOL	O	Parameter error at the function block: FALSE = No parameter error TRUE = Parameter error	
QT_LD	REAL	O	Remaining time for loading parameters	
R_CFG	BOOL	IO	Job status for current configuration data: FALSE = No configuration data read TRUE = All configuration data read	+
R_PARA	BOOL	IO	Job status for current configuration data: FALSE = No parameters read TRUE = Parameters read	+
R_TARIFF	BOOL	IO	Job status for current configuration data: FALSE = No rates read TRUE = Rates read	+
R_PRIO	BOOL	IO	Job status for current configuration data: FALSE = No priority list read TRUE = Priority list read	+
RCV_ST	UDT_PRE_RCV	I	Checkback signals from the receive job of the archive manager	
SCHED_CUR*	INT	IO	ID of the data record from the PRE_SCHEDULE user archive, which contains the currently valid limits	+
S_CFG	BOOL	IO	Job status for current configuration data: FALSE = No configuration data sent TRUE = All configuration data sent	
S_PRIO	BOOL	IO	Job status for current configuration data: FALSE = No priority list sent TRUE = Priority list sent	
SND_ST	UDT_PRE_SND	I	Checkback signals from the send job of the archive manager	
T_OUT_LD	REAL	I	Timeout loading parameters	

*These parameters are not evaluated or supplied in this version.

3.16.8.2 PR3_LMGM

General specifications - PR3_LMGM

General specifications

Item	Data type	Type	Meaning	HMI
BAL_TM	INT	O	Remaining time of time interval in [min]	+
BAL_TS	INT	O	Remaining time of time interval in [s]	+
CMP_ID	DWORD	I	Component identifier for ALARM_DQ block (CMP_ID = 0 is not permitted) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 ... 65535 - high word: 0 You will not experience any problems with other Siemens program packages if you comply with this recommendation.	
CUR_TS	DT	I	Current time stamp when block is called	
DIFF_LOC	REAL	I	Difference between UTC and local time in [h]	+
MAX_LOAD	INT	IO	Highest order number of input that is connected to a consumer	+
MSG_ACKx	BOOL	O	Acknowledge messages ALARM_DQ- block x (x = 1 ... 20): FALSE = Unacknowledged messages pending TRUE = All messages acknowledged	
MSGEVIDx	DWORD	I	Event ID x (x = 1 ... 20) of message block ALARM_DQ / ALARM_D	
MSGSTATx	WORD	O	MESSAGE x (x = 1 ... 20): STATUS Output	
QMSG_ERR	BOOL	O	Current status of the system function block ALARM_DQ / ALARM_D FALSE = No error TRUE = Error	
QMSG_SUP	BOOL	O	Current status of the message suppression: FALSE = Message suppression is disabled TRUE = Message suppression is enabled	
RES_IN_DW1*	DWORD	I	Reserve input	
RES_IN_DW2*	DWORD	I	Reserve input	
RES_IN_R1*	REAL	I	Reserve input	
RES_IN_R2*	REAL	I	Reserve input	
RES_IN_B1*	BOOL	I	Reserve input	
RES_IN_B2*	BOOL	I	Reserve input	
RES_IN_B3*	BOOL	I	Reserve input	
RES_IN_B4*	BOOL	I	Reserve input	
RES_OUT_DW1*	DWORD	O	Reserve output	
RES_OUT_DW2*	DWORD	O	Reserve output	
RES_OUT_R1*	REAL	O	Reserve output	
RES_OUT_R2*	REAL	O	Reserve output	

Item	Data type	Type	Meaning	HMI
RES_OUT_B1*	BOOL	O	Reserve output	
RES_OUT_B2*	BOOL	O	Reserve output	
RES_OUT_B3*	BOOL	O	Reserve output	
RES_OUT_B4*	BOOL	O	Reserve output	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SYNC_P	BOOL	I	Synchronization pulse	
SYNC_PER	REAL	I	Synchronization period in [s]	+

* These parameters are not evaluated or supplied in this version.

Supply - PR3_LMGM

Supply

Item	Data type	Type	Meaning	HMI
AVG_PWR	REAL	I	Average power at end of the time interval	
CUR_PWR	REAL	I	Current power at end of the time interval	+
CUR_PWRHR	REAL	I	High limit of the bar for the current power	+
CUR_VAL	REAL	I	Current accumulated value	+
CUR_VALHR	REAL	I	High limit of the bar for the current accumulated energy value	+
EST_PWR	REAL	I	Average power projected at end of time interval	+
EST_VAL	REAL	I	Projected value until the end of the time interval	+
LAST_VAL	REAL	I	Last archived, accumulated value	+
P_DIFFHLR	REAL	I	High limit of the bar for the differential power	+
QC_AVG_PWR	BYTE	I	Quality code for input signal AVG_PWR (average power until the end of the time interval)	
QC_CUR_PWR	BYTE	I	Quality code for input signal CUR_PWR (current power at the end of the time interval)	
QC_CUR_VAL	BYTE	I	Quality code for input signal CUR_VAL (current accumulated value)	
QC_EST_PWR	BYTE	I	Quality code for input signal EST_PWR (average power until the end of the time interval)	
QC_EST_VAL	BYTE	I	Quality code for input signal EST_VAL (projected value until the end of the time interval)	
QC_LAST_VAL	BYTE	I	Quality code for input signal LAST_VAL (last archived accumulated value)	
W_DIFFHLR	REAL	I	High limit of the bar for the differential energy value	+

Consumer data - PR3_LMGM

Consumer data

Item	Data type	Type	Meaning	HMI
CAPx	REAL	I	Rated output of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	
DUMMY_IN	STRUCT	I	Internal structure	
DUMMY_PARA	STRUCT	I	Internal structure	
DUMMY_OUT	STRUCT	O	Internal structure	
EN_SHEDx	BOOL	I	Participation of consumer x in the load shedding: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer x not released for load shedding TRUE = Consumer x released for load shedding	
EN_Tx	REAL	O	Elapsed time since the release of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	+
GR_NAMEx	STRING[32]	I	Name of consumer group x (x = 01 ... 10 or 20)	+
GRPx	BYTE	I	Assignment of consumer x to a consumer group (x = 01 ... 10, 25, 50, 75 or 100)	
LAST_ROLLx	BOOL	I	Rolling status of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer is not the last disconnected, rolling consumer in this priority class TRUE = Consumer is the last disconnected, rolling consumer in this priority class	
MAN_ENx	BOOL	I	Release for consumer x in manual mode (MANx = TRUE): (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Disconnect consumer TRUE = Release consumer	+
MANx	BOOL	I	Operating mode of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer not in manual mode TRUE = Consumer in manual mode	+
MAX_OFFx	REAL	I	Maximum disconnect time of consumer x in [s] (x = 01 ... 10, 25, 50, 75 or 100)	
MAX_STBYx	REAL	I	Share of rated output in [%] of consumer x for the maximum standby power (x = 01 ... 10, 25, 50, 75 or 100)	
MIN_OFFx	REAL	I	Minimum disconnect time of consumer x in [s] (x = 01 ... 10, 25, 50, 75 or 100)	
MIN_ONx	REAL	I	Minimum connect time of consumer x in [s] (x = 01 ... 10, 25, 50, 75 or 100)	
MODEx	BYTE	I	Type of power measurement for consumer type x: (x = 01 ... 10, 25, 50, 75 or 100) 0 = No consumer available 1 = Actual power of consumer is connected at input Px 2 = Switch state of the consumer is connected to input ONx 3 = Only the rated output for the consumer is known	

Item	Data type	Type	Meaning	HMI
NAMEx	STRING[12]	I	Name of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	
ONx	BOOL	I	Status feedback of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer x is not connected TRUE = Consumer x is connected with the rated output CAPx	+
PRIOLSTx	DWORD	I	Priority list for load shedding entry x (x = 01 ... 10, 25, 50, 75 or 100)	
PRIOx	BYTE	I	Priority of consumer x: (x = 01 ... 10, 25, 50, 75 or 100) 0 = No participation of the consumer in load management 1 = Highest priority ... Decreasing priority until: 255 = Lowest priority	
Px	REAL	I	Current power of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	+
QC_ONx	BYTE	I	Quality code for input signal ONx (x = 01 ... 10, 25, 50, 75 or 100) (Status feedback of consumer x)	
QC_Px	BYTE	I	Quality code for input signal Px (x = 01 ... 10, 25, 50, 75 or 100) (Current power of consumer x)	
QMAX_OFFx	BOOL	O	Status of maximum disconnect time for consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Maximum disconnect time has expired TRUE = Maximum disconnect time has not yet expired	+
QMIN_OFFx	BOOL	O	Status of minimum disconnect time for consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Minimum disconnect time has expired TRUE = Maximum disconnect time has not yet expired	+
QMIN_ONx	BOOL	O	Status of minimum connect time for consumer x: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Minimum connect time has expired TRUE = Minimum connect time has not yet expired	+
QMSG_OFFx	BOOL	O	Message to WinCC that consumer x has been locked: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer is not locked TRUE = Consumer has been locked	
QMSG_ONx	BOOL	O	Message to WinCC that consumer x has been released: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer is not released TRUE = Consumer has been released	
QONx	BOOL	O	Status of consumer x for load management: (x = 01 ... 10, 25, 50, 75 or 100) FALSE = Consumer has been shed TRUE = Consumer is released	+

Item	Data type	Type	Meaning	HMI
ROLLx	BYTE	I	Disconnect order of consumer x for rolling consumers: (x = 01 ... 10, 25, 50, 75 or 100) 0 = No rolling consumer	
SHED_Tx	REAL	O	Elapsed time since the lock of consumer x (x = 01 ... 10, 25, 50, 75 or 100)	+

Consumer control - PR3_LMGM

Consumer control

Item	Data type	Type	Meaning	HMI
Dx	BOOL	I	Internal tag (x = 101 ... 107 and 201 ... 207)	
EN_POS	INT	O	Number of consumers which can be connected	
EN_SHED	BOOL	I	General release for load shedding	
HYS_LIMP	REAL	O	Current power value which takes the hysteresis into account	+
HYS_LIMW	REAL	O	Current energy limit including hysteresis (Load shedding performed for EST_VAL > HYS_LIMW)	+
HYS_PW	REAL	I	Start value of the hysteresis in [%] of the maximum value of the power or energy value at the beginning of the time interval	
HYS_T	REAL	I	Time after start of the time interval in [min], after which hysteresis is no longer taken into account	
LIM_ALM	REAL	I	Limit for alarm message indicating a pending limit violation in [%] of LIM_W or LIM_P	
LIM_P	REAL	O	Effective power limit (without hysteresis)	+
LIM_W	REAL	O	Effective energy limit (without hysteresis)	+
LIM_WRN	REAL	I	Limit for warning message indicating a pending limit violation in [%] of LIM_W or LIM_P	
LOAD_SHED	INT	O	Number of consumers shed by load management	
LT_DT	DT	O	Time stamp of last limit violation	
LT_LIM_P	REAL	O	Power limit of last measurement period with limit violation	
LT_LIM_W	REAL	O	Energy limit of last measurement period with limit violation	
LT_LOAD_SHED	DINT	O	Number of shed consumers at end of last measurement period with limit violation	
LT_P*	REAL	O	Average power of last measurement period with limit violation	
LT_P_SHED*	REAL	O	Power of shed consumers at end of last measurement period with limit violation	
LT_P_SHED_POS*	REAL	O	Power of sheddable consumers at end of last time interval with limit violations	
LT_SHED_POS*	DINT	O	Number of sheddable consumers at end of last measurement period with limit violation	
LT_W*	REAL	O	Accumulated energy value of last measurement period	
P_DIFF	REAL	O	Calculated average power to avoid load shedding: HYS_LIMP – EST_PWR	+

Item	Data type	Type	Meaning	HMI
P_ON_POS	REAL	O	Available connection power	+
P_SHED	REAL	O	Shed power	
P_SHED_POS	REAL	O	Available disconnection power	+
QC_P_DIFF	BYTE	O	Quality code of output P_DIFF (Calculated average power to avoid load shedding)	
QC_W_DIFF	BYTE	O	Quality code of output W_DIFF (Available energy until load shedding)	
QFREE	BOOL	O	Current status of consumer management: FALSE = No consumer is released TRUE = Consumer has been released	
QLIM_ALM	BOOL	O	Monitoring of violations of the reference limit: FALSE = No alarm for pending limit violation TRUE = Alarm for pending limit violation	
QLIM_E	BOOL	O	Monitoring the specified reference limit: FALSE = Valid limit TRUE = Invalid limit	
QLIM_ERR	BOOL	O	Monitoring of violations of the reference limit: FALSE = Limit not yet violated TRUE = Limit violated	
QLIM_WRN	BOOL	O	Monitoring of violations of the reference limit: FALSE = No warning for pending limit violation TRUE = Warning for pending limit violation	
QLMGM_OFF	BOOL	O	Current status of the load management: FALSE = Load managements is enabled TRUE = Load managements is disabled	
QP_ERR	BOOL	O	Monitoring the specified supply power: FALSE = Valid supply power TRUE = Invalid supply power	
QPRIO_LST_E	BOOL	O	Monitoring of the priority list: FALSE = Priority list is correct TRUE = Priority list is incorrect	
QSETTLE_T	REAL	O	Remaining settling time after consumer shedding/release in [s]	+
QSHED	BOOL	O	Current status of load management: FALSE = No consumer is locked TRUE = Consumer is locked	
QSHED_IMP	BOOL	O	Current status of load management: FALSE = Consumer available for load shedding TRUE = No consumer available for load shedding	
QSUPP_T	REAL	O	Remaining suppression time after start of period in [s]	+
SEL_PW	BOOL	I	Selector for monitoring mode of the reference limit: FALSE = Specification of the maximum average power (LIM_P_H, LIM_P_L and LIM_P_SH) within a period TRUE = Specification of the maximum energy (LIM_W_H, LIM_W_L and LIM_W_SH) within a period	
SETTLE_T	REAL	I	Settling time in [s]	
SHED_POS	INT	O	Number of interconnectable consumers	
SUPP_T	REAL	I	On-delay of limit monitoring at the start of the time interval in [min]	

Item	Data type	Type	Meaning	HMI
W_DIFF	REAL	O	Available energy until load shedding: HYS_LIMW - EST_VAL	+
W_ON_POS	REAL	O	Available connection energy	+
W_SHED_POS	REAL	O	Available disconnection energy	+

*These parameters are not evaluated or supplied in this version.

Rates - PR3_LMGM

Tariffs

Item	Data type	Type	Meaning	HMI
ADJ_D_H*	DWORD	I	Date [DDMMYYYY] on which adjustment of the high rate ends for automatic adjustment	+
ADJ_D_L*	DWORD	I	Date [DDMMYYYY] on which adjustment of the low rate ends for automatic adjustment	+
ADJ_D_SH*	DWORD	I	Date [DDMMYYYY] on which adjustment of the Sunday and holiday rate ends for automatic adjustment	+
ADJ_LIM*	BOOL	I	Automatic limit adjustment after limit violation: FALSE = No automatic limit adjustment TRUE = Automatic limit adjustment	+
ADJ_TEOM*	BOOL	I	Validity of automatic limit adjustments after a timeout: FALSE = The ADJ_TIME time begins with limit violation TRUE = The ADJ_TIME time first begins at the end of the month	+
ADJ_TIME*	INT	I	Time in months for which a limit is valid following automatic limit adjustment	+
ADJ_VAL*	REAL	I	Percentage by which the limit is adjusted automatically following a violation	+
BEG_HT	DINT	I	Start time for on-peak tariff (local time) [ms]	
BEG_HT_S	STRING[8]	I	Start time for on-peak tariff (local time) [ms] as string	
BEG_LT	DINT	I	Start time for off-peak tariff (local time) [ms]	
BEG_LT_S	STRING[8]	I	Start time for off-peak tariff (local time) [ms] as string	
EN_SCHEDULE*	BOOL	I	Schedule for load management: FALSE = Load management is not enabled in schedule TRUE = Load management is enabled in schedule	+
L_LIM_P	REAL	I	Configurable power limit	
L_LIM_W	REAL	I	Interconnectable energy limit	
LIM_L	BOOL	I	Enabling the interconnectable energy limits (L_LIM_P / L_LIM_W): FALSE = Interconnectable energy limit disabled TRUE = Interconnectable energy limit enabled	+
LIM_P_H	REAL	I	Power limit for on-peak tariff	
LIM_P_L	REAL	I	Power limit for off-peak tariff	
LIM_P_SH	REAL	I	Power limit for Sunday or holiday rate	
LIM_W_H	REAL	I	Energy limit for on-peak tariff	

Item	Data type	Type	Meaning	HMI
LIM_W_L	REAL	I	Energy limit for off-peak tariff	
LIM_W_SH	REAL	I	Energy limit for Sunday or holiday rate	
NT_END_D*	REAL	I	End date for next period in [DDMMYYYY]	+
NT_END_T*	REAL	I	End time for next period in [hhmm]	+
NT_P*	REAL	I	Maximum average power for next period	+
NT_SRT_D*	REAL	I	Start date for next period in [DDMMYYYY]	+
NT_SRT_T*	REAL	I	Start time for next period in [hhmm]	+
QADJ_LIM_H*	BOOL	O	Automatic adjustment of the on-peak tariff: FALSE = No automatic adjustment performed TRUE = Automatic adjustment performed	+
QADJ_LIM_L*	BOOL	O	Automatic adjustment of the off-peak tariff: FALSE = No automatic adjustment performed TRUE = Automatic adjustment performed	+
QADJ_LIM_SH*	BOOL	O	Automatic adjustment of the Sunday and holiday rate: FALSE = No automatic adjustment performed TRUE = Automatic adjustment performed	+
QNXT_LE*	BOOL	O	Reference limit for next period: FALSE = Reference limit for next period TRUE = No reference limit for next period	+
SH_ACT	BOOL	IO	Sunday and holiday rate: FALSE = Sunday and holiday rate disabled TRUE = Sunday and holiday rate enabled with 00:00 of the next day	+
SH_NUM	INT	IO	Number of days for which the Sunday and holiday rate is valid (only has effect with SH_ACT = TRUE)	+

*These parameters are not evaluated or supplied in this version.

Archiving - PR3_LMGM

Archiving

Item	Data type	Type	Meaning	HMI
ARCH_ID	INT	I	Archive ID, Archiving - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (Page 273)	
ARCH_OK	BOOL	O	Current status of the archive job: FALSE = Job still in progress or ended with error TRUE = Job ended without error	
CFG_CUR	INT	I	ID of the current configuration data in the user archive	+
CFG_EDIT	BOOL	I	Processing status of the current configuration: FALSE = Configuration not being processed TRUE = Configuration being processed	+
CFG_MAX	INT	I	Maximum number of possible configurations in the user archive	+
CFG_READ	INT	I	ID of the configuration to be read in the user archive	
COUNT	INT	I	Number of possible job repetitions	
ID	INT	I	Unique ID for this block	
NDR	BOOL	O	Current status of the receive job: FALSE = No new data received TRUE = New data received	
QARCH_ID	INT	O	Archive ID	
QELD_PARA	BOOL	O	Error loading parameters: FALSE = No error loading parameters TRUE = Error loading parameters	
QERR_R	BOOL	O	Current status of the receive job: FALSE = No group error in receive job TRUE = Group error in receive job	
QERR_S	BOOL	O	Current status of the send job: FALSE = No group error in send job TRUE = Group error in send job	
QMONERR_S	BOOL	O	Current status of the send job: FALSE = No monitoring error in send job TRUE = Monitoring error in send job	
QMSG_ERR	BOOL	O	Current status of message generation: FALSE = No error in message generation TRUE = Error in message generation	
QREQ_ACT	BOOL	O	Current status of the request: FALSE = No request in progress TRUE = Request in progress	
QREQ_R_ST	UDT_PRE_REV_REQ	O	Request structure for receive request to archive manager	
QREQ_S_ST	UDT_PRE_SND_REQ	O	Request structure for send request to archive manager	
QOVL_LIM	BOOL	O	Current status of the user archive for limit violation: FALSE = No buffer overflow in user archive TRUE = Buffer overflow in user archive	

Item	Data type	Type	Meaning	HMI
QPARAMF	BOOL	O	Parameter error at the function block: FALSE = No parameter error TRUE = Parameter error	
QT_LD	REAL	O	Remaining time for loading parameters	
R_CFG	BOOL	IO	Job status for current configuration data: FALSE = No configuration data read TRUE = All configuration data read	+
R_PARA	BOOL	IO	Job status for current configuration data: FALSE = No parameters read TRUE = Parameters read	+
R_TARIFF	BOOL	IO	Job status for current configuration data: FALSE = No rates read TRUE = Rates read	+
R_PRIO	BOOL	IO	Job status for current configuration data: FALSE = No priority list read TRUE = Priority list read	+
RCV_ST	UDT_PRE_RCV	I	Checkback signals from the receive job of the archive manager	
SCHED_CUR*	INT	IO	ID of the data record from the PRE_SCHEDULE user archive, which contains the currently valid limits	+
S_CFG	BOOL	IO	Job status for current configuration data: FALSE = No configuration data sent TRUE = All configuration data sent	
S_PRIO	BOOL	IO	Job status for current configuration data: FALSE = No priority list sent TRUE = Priority list sent	
SND_ST	UDT_PRE_SND	I	Checkback signals from the send job of the archive manager	
T_OUT_LD	REAL	I	Timeout loading parameters	

*These parameters are not evaluated or supplied in this version.

3.16.9 Description of icons and faceplates

3.16.9.1 Description of icons and faceplates - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Description of icons and faceplates:

- Block icon - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x
- Faceplate - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x
- Standard - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (STANDARD)
- Work - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (ENERGY)
- Parameter - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (PARAMETERS)
- Bar parameter - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x. (BAR_PARA)
- Tariffs - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (TARIFFS)
- Priority list - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (PRIOLIST)
- Edit priority list PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (EDITPRIOLIST)
- Configuration - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x (CONFIG)
- Limit violations - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x. (LIM_EXCEEDINGS)
- Messages - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

3.16.9.2 Block icon - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Block icon

The following parameters are displayed:

Pos.	Item	Parameter	Description
(1)	Power – Trend	EST_PWR	Average power projected at end of time interval
(2)	Power – Limit	HYS_LIMP	Currently valid power limit

3.16.9.3 Faceplate - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Faceplate

The associated faceplate is described in this section.

The following views are available:

- Overview
- Standard
- Energy
- Parameter
- Bar parameter
- Rates
- Priority list
- Edit priority list
- Configuration
- Limit violations
- Messages
- Consumption
- Shed / add quantity

PRE_LMGM / PRE_LMGM_x

The file name of the associated views of the faceplate can be found in the following table.

View	Name of the file
Overview	@PG_PRE_LMGM_OVERVIEW.pdl or @PG_PRE_LMGM_xx_OVERVIEW.pdl*
Standard	@PG_PRE_LMGM_STANDARD.pdl or @PG_PRE_LMGM_xx_STANDARD.pdl*
Energy	@PG_PRE_LMGM_ENERGY.pdl or @PG_PRE_LMGM_xx_ENERGY.pdl*
Parameter	@PG_PRE_LMGM_PARAMETERS.pdl or @PG_PRE_LMGM_xx_PARAMETERS.pdl*
Bar parameter	@PG_PRE_LMGM_BAR_PARA.pdl or @PG_PRE_LMGM_xx_BAR_PARA.pdl*
Tariffs	@PG_PRE_LMGM_TARIFFS.pdl or @PG_PRE_LMGM_xx_TARIFFS.pdl*
Priority list	@PG_PRE_LMGM_PRIOLIST.pdl or @PG_PRE_LMGM_xx_PRIOLIST.pdl*
Edit priority list	@PG_PRE_LMGM_EDITPRIOLIST.pdl or @PG_PRE_LMGM_xx_EDITPRIOLIST.pdl*
Configuration	@PG_PRE_LMGM_CONFIG.pdl or @PG_PRE_LMGM_xx_CONFIG.pdl*
Limit violations	@PG_PRE_LMGM_LIM_EXCEEDINGS.pdl or @PG_PRE_LMGM_xx_LIM_EXCEEDINGS.pdl*
Messages	Uses standard faceplate
Consumption	@PG_PRE_LMGM_CONSUMPTION.pdl or @PG_PRE_LMGM_xx_CONSUMPTION.pdl*
Shed / add quantity	@PG_PRE_LMGM_AMMOUNT.pdl or @PG_PRE_LMGM_xx_AMMOUNT.pdl*

* The following rules apply:
  xx = 10 for function block PRE_LMGM_10
  xx = 25 for function block PRE_LMGM_25
  xx = 50 or function block PRE_LMGM_50
  xx = 75 for function block PRE_LMGM_75

PR3_LMGM / PR3_LMGM_x

The file name of the associated views of the faceplate can be found in the following table.

View	Name of the file
Overview	@PG_PR3_LMGM_OVERVIEW.pdl or @PG_PR3_LMGM_xx_OVERVIEW.pdl*
Standard	@PG_PR3_LMGM_STANDARD.pdl or @PG_PR3_LMGM_xx_STANDARD.pdl*
Energy	@PG_PR3_LMGM_ENERGY.pdl or @PG_PR3_LMGM_xx_ENERGY.pdl*
Parameter	@PG_PR3_LMGM_PARAMETERS.pdl or @PG_PR3_LMGM_xx_PARAMETERS.pdl*
Bar parameter	@PG_PR3_LMGM_BAR_PARA.pdl or @PG_PR3_LMGM_xx_BAR_PARA.pdl*
Tariffs	@PG_PR3_LMGM_TARIFFS.pdl or @PG_PR3_LMGM_xx_TARIFFS.pdl*
Priority list	@PG_PR3_LMGM_PRIOLIST.pdl or @PG_PR3_LMGM_xx_PRIOLIST.pdl*
Edit priority list	@PG_PR3_LMGM_EDITPRIOLIST.pdl or @PG_PR3_LMGM_xx_EDITPRIOLIST.pdl*
Configuration	@PG_PR3_LMGM_CONFIG.pdl or @PG_PR3_LMGM_xx_CONFIG.pdl*
Limit violation	@PG_PR3_LMGM_LIM_EXCEEDINGS.pdl or @PG_PR3_LMGM_xx_LIM_EXCEEDINGS.pdl*
Messages	Uses standard faceplate
Consumption	@PG_PR3_LMGM_CONSUMPTION.pdl or @PG_PR3_LMGM_xx_CONSUMPTION.pdl*
Shed / add quantity	@PG_PR3_LMGM_AMMOUNT.pdl or @PG_PR3_LMGM_xx_AMMOUNT.pdl*

* The following rules apply:
  xx = 10 for function block PR3_LMGM_10
  xx = 25 for function block PR3_LMGM_25
  xx = 50 or function block PR3_LMGM_50
  xx = 75 for function block PR3_LMGM_75

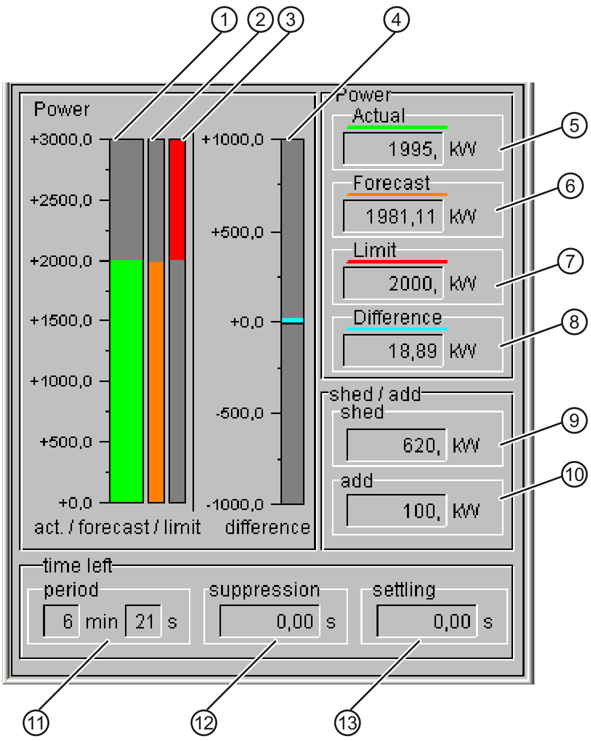
See also

Operating the PRE_LMGM / PR3_LMGM faceplate in Runtime (Page 151)

3.16.9.4 Standard - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Standard

This view shows the current load management status, based on calculated power values.



The following parameters are displayed:

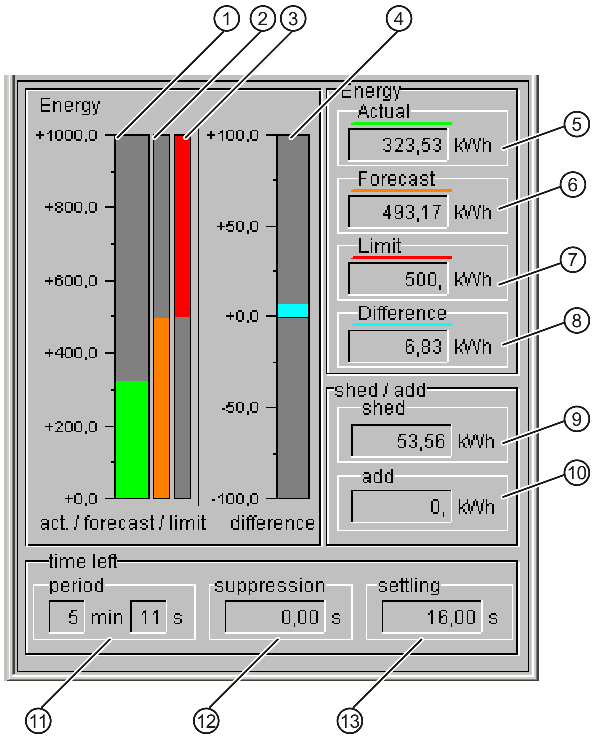
Pos.	Item	Parameter	Description
(1)	Power – Actual	CUR_PWR	The current supply power, (shown as a bar graph)
(2)	Power – Trend	EST_PWR	Average power projected at end of time interval (shown as a bar graph)
(3)	Power – Limit	HYS_LIMP	The currently valid power limit (shown as a bar graph)
(4)	Power – Difference	P_DIFF	The difference between the trend and the current limit (shown as a bar graph)
(5)	Power – Actual	CUR_PWR	The current supply power (shown in numerical format)
(6)	Power – Trend	EST_PWR	Average power projected at end of time interval (shown in numerical format)
(7)	Power – Limit	HYS_LIMP	The currently valid power limit (shown in numerical format)
(8)	Power – Difference	P_DIFF	The difference between the trend and the current limit (shown in numerical format)
	shed / add		
(9)	Disconnection power	P_SHED_POS	The disconnection power still available according to the priority list
(10)	Connection power	P_ON_POS	The connection power still available according to the priority list
	Remaining times		

Pos.	Item	Parameter	Description
(11)	Period	BAL_TM BAL_TS	Remaining time of the time interval (minute part) Remaining time of the time intervals (seconds part)
(12)	Suppression	QSUPP_T	Remaining suppression time until load management becomes active
(13)	Settling	QSETTLE_T	Remaining settling time after consumer shedding/release

3.16.9.5 Work - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Energy

This view shows the current load management status, based on calculated energy (work) values.



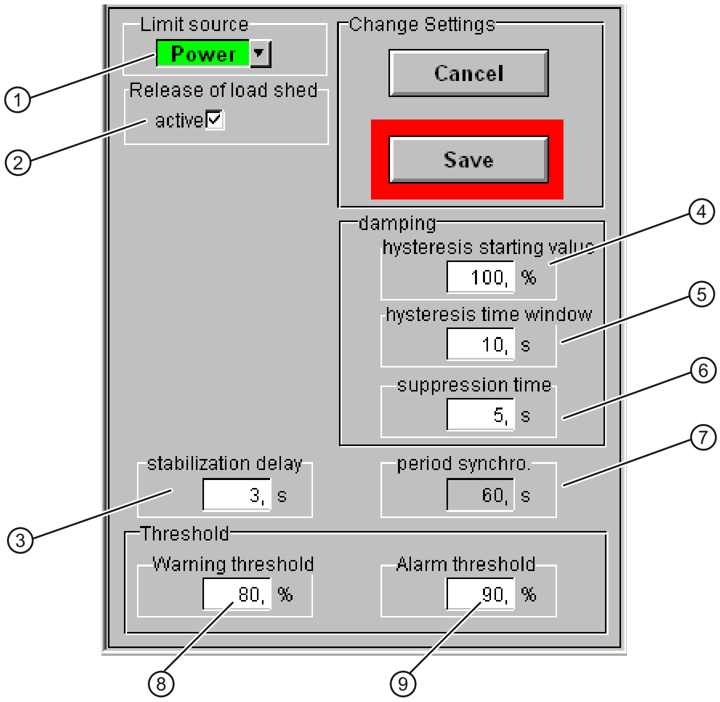
The following parameters are displayed:

	Item	Parameter	Description
(1)	Energy – Actual	CUR_VAL	The current supply energy (shown as a bar graph)
(2)	Energy – Trend	EST_VAL	Accumulated energy value projected at end of time interval (shown as a bar graph)
(3)	Energy – Limit	HYS_LIMW	The currently valid energy limit (shown as a bar graph)
(4)	Energy – Difference	W_DIFF	The difference between the trend and the current limit (shown as a bar graph)
(5)	Energy – Actual	CUR_VAL	The current supply energy (shown in numerical format)
(6)	Energy – Trend	EST_VAL	Accumulated energy value projected at end of time interval (shown in numerical format)
(7)	Energy – Limit	HYS_LIMW	The currently valid energy limit (shown in numerical format)
(8)	Energy – Difference	W_DIFF	The difference between the trend and the current limit (shown in numerical format)
	shed / add		
(9)	Disconnection energy	W_SHED_POS	The disconnection energy still available according to the priority list
(10)	Connection work	W_ON_POS	The connection energy still available according to the priority list
	Remaining times		
(11)	Period	BAL_TM BAL_TS	Remaining time of the time interval (minute part) Remaining time of the time intervals (seconds part)
(12)	Suppression	QSUPP_T	Remaining suppression time until load management becomes active
(13)	Settling	QSETTLE_T	Remaining settling time after consumer shedding/release

3.16.9.6 Parameter - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Parameter

General load management parameters can be set in this view.



	Item	Parameter	Description
(1)	Type of limit	SEL_PW	This combobox is used to specify whether the limit will be defined as energy (work) or power.
(2)	Release of load shed	EN_SHED	General release for load shedding If this box is checked, loads are released or held in accordance with the priority list. If this box is not checked, only the trend calculation and limit monitoring is performed. In the event of a pending limit violation, corresponding messages are output.
(3)	Stabilization delay	SETTLE_T	Specifies the time which must elapse following release/hold before a new signal can be set.
	Loss		
(4)	Hysteresis start value	HYS_PW	Start value of the hysteresis in [%] of the maximum value of the power or energy value at the beginning of the time interval.
(5)	Hysteresis time range	HYS_T	Time after start of the time interval in [min], after which hysteresis is no longer taken into account.
(6)	Suppression time	SUPP_T	On-delay of limit monitoring at the start of the time interval in [min].
(7)	Period synchro.	SYNC_PER	Time interval for monitoring predefined limits. When purchasing electricity, the time interval is usually 15 minutes. This value is configured on the function block PRE_SUM / PR3_SUM.

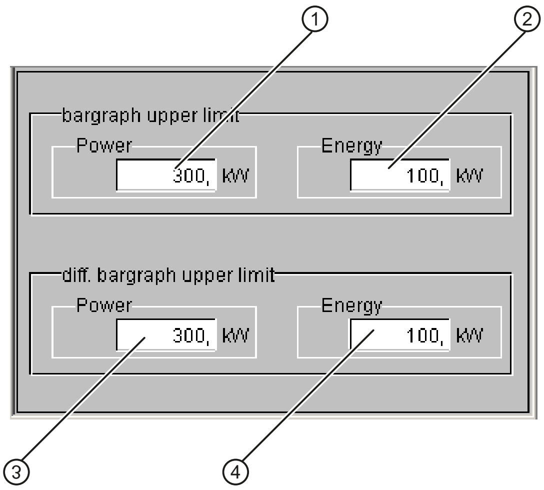
	Item	Parameter	Description
	Threshold for limit violation		
(8)	Warning limit	LIM_WRN	Limit for warning message indicating a pending limit violation in [%] of LIM_W or LIM_P.
(9)	Alarm threshold	LIM_ALM	Limit for alarm message indicating a pending limit violation in [%] of LIM_W or LIM_P.

The faceplate does not directly access the parameters in brackets. When you open the faceplate, the values are read from the user archive PRE_LMGM_CONFIG_x. When the parameters are saved, these values are written back to the user archive. These values are then transferred from the user archive to the parameters of the PRE_LMGM / PR3_LMGM function block.

3.16.9.7 Bar parameter - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Bar parameter

The limits for bar graphs displayed in the standard view are specified in this view.



The following parameters are displayed:

	Item	Parameter	Description
	Bar graph - High limit value		
(1)	Power	CUR_PWRHR	High limit of the bar for the current power
(2)	Energy	CUR_VALHR	High limit of the bar for the current accumulated energy value
	Bar graph - High limit value		
(3)	Power	P_DIFFHLR	High limit of the bar for the differential power
(4)	Energy	W_DIFFHLR	High limit of the bar for the differential energy value

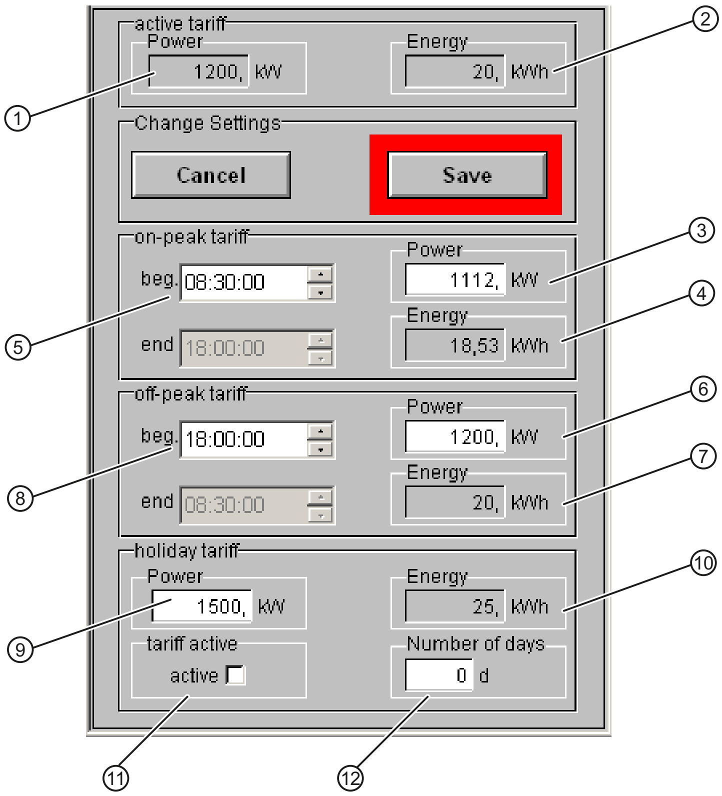
3.16.9.8 Tariffs - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Tariffs

This view shows the current tariff and enables the individual tariff limits to be changed.

Note

If interconnectable limit values are active (LIM_L = TRUE), you cannot edit the rates.



	Item	Parameter	Description
	Current tariff		
(1)	Power	LIM_P	Effective power limit (without consideration of the hysteresis)
(2)	Energy	LIM_W	Effective energy limit (without consideration of the hysteresis)
	On-peak tariff		
(3)	Power	LIM_P_H	Power limit for on-peak tariff
(4)	Energy	LIM_W_H	Energy limit for on-peak tariff
(5)	Start time on-peak tariff	BEG_HT_S	Start time for on-peak tariff
	Off-peak tariff		
(6)	Power	LIM_P_L	Power limit for off-peak tariff

	Item	Parameter	Description
(7)	Energy	LIM_W_L	Energy limit for off-peak tariff
(8)	Start time off-peak tariff	BEG_LT_S	Start time for off-peak tariff
	Holiday tariff		
(9)	Power	LIM_P_SH	Power limit for Sunday or holiday rate
(10)	Energy	LIM_W_SH	Energy limit for Sunday or holiday rate
(11)	Tariff active	SH_ACT	From 00:00 of the next day, the Sunday or holiday tariff applies for "Number of days" (until 24:00)
(12)	Number of days	SH_NUM	Duration of the Sunday or holiday tariff in days

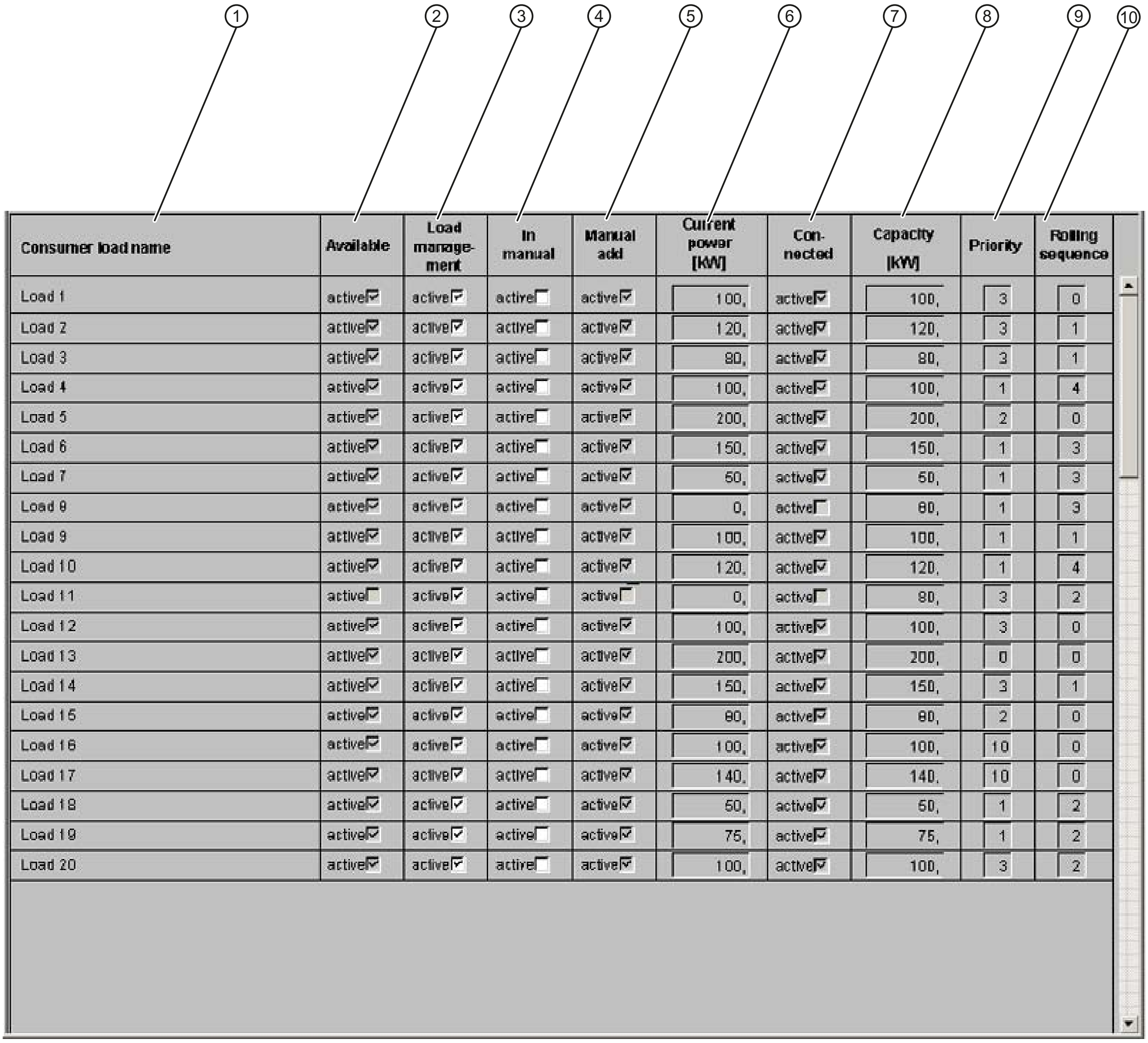
If power is selected as "type of limit" in the "Parameters" view, only the power values can be edited. If work is selected as "type of limit", only the energy values can be edited. The other limit in each case is calculated on the basis of the period time when saving.

The faceplate does not directly access the parameters in brackets. When you open the faceplate, the values are read from the user archive PRE_LMGM_CONFIG_x. When the parameters are saved, these values are written back to the user archive. These values are then transferred from the user archive to the parameters of the PRE_LMGM / PR3_LMGM function block.

3.16.9.9 Priority list - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Priority list

This view shows the current status of the individual loads in load management mode and allows the user to remove certain loads from load management control and to release them manually.



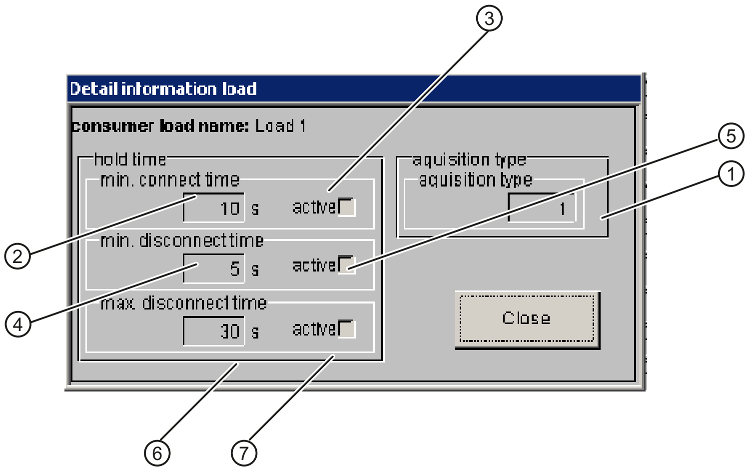
Consumer load name	Available	Load management	In manual	Manual add	Current power [kW]	Con-nected	Capacity [kW]	Priority	Rolling sequence
Load 1	active ☑	active ☑	active ☐	active ☑	100,	active ☑	100,	3	0
Load 2	active ☑	active ☑	active ☐	active ☑	120,	active ☑	120,	3	1
Load 3	active ☑	active ☑	active ☐	active ☑	80,	active ☑	80,	3	1
Load 4	active ☑	active ☑	active ☐	active ☑	100,	active ☑	100,	1	4
Load 5	active ☑	active ☑	active ☐	active ☑	200,	active ☑	200,	2	0
Load 6	active ☑	active ☑	active ☐	active ☑	150,	active ☑	150,	1	3
Load 7	active ☑	active ☑	active ☐	active ☑	50,	active ☑	50,	1	3
Load 8	active ☑	active ☑	active ☐	active ☑	0,	active ☐	80,	1	3
Load 9	active ☑	active ☑	active ☐	active ☑	100,	active ☑	100,	1	1
Load 10	active ☑	active ☑	active ☐	active ☑	120,	active ☑	120,	1	4
Load 11	active ☐	active ☑	active ☐	active ☐	0,	active ☐	80,	3	2
Load 12	active ☑	active ☑	active ☐	active ☑	100,	active ☑	100,	3	0
Load 13	active ☑	active ☑	active ☐	active ☑	200,	active ☑	200,	0	0
Load 14	active ☑	active ☑	active ☐	active ☑	150,	active ☑	150,	3	1
Load 15	active ☑	active ☑	active ☐	active ☑	80,	active ☑	80,	2	0
Load 16	active ☑	active ☑	active ☐	active ☑	100,	active ☑	100,	10	0
Load 17	active ☑	active ☑	active ☐	active ☑	140,	active ☑	140,	10	0
Load 18	active ☑	active ☑	active ☐	active ☑	50,	active ☑	50,	1	2
Load 19	active ☑	active ☑	active ☐	active ☑	75,	active ☑	75,	1	2
Load 20	active ☑	active ☑	active ☐	active ☑	100,	active ☑	100,	3	2

	Item	Parameter	Description
(1)	Load name	NAMEx	Name of the consumer x
(2)	Released	QONx	Indicates whether load x is currently released via load management
(3)	In the load management	EN_SHEDx	Defines whether load x is included in load management control or not
(4)	"Manual" operation	MANx	Defines whether the load can be released manually.
(5)	Manual add	MAN_ENx	Releases load x manually. Load is no longer controlled by load management.
(6)	Current power [kW]	Px	Current power of load x (measured value)
(7)	activated	ONx	Load x is activated (status feedback)
(8)	Rated output	CAPx	Configured rated output of load x
(9)	Priority	PRIOx	Priority of load on load shedding
(10)	Rolling sequence	ROLLx	Specifies the sequence in which loads of the same priority are disconnected in a rolling process. If the parameter "Rolling sequence" and the priority of several loads are identical, these loads are switched together as a group.

x = 01 to 10, 25, 50, 75 or 100

Detailed information about the load

The "Detailed information about the load" dialog box contains important information about every load. The dialog box is opened by clicking on the name of the load.



The dialog shows which hold times are currently active and which times have been configured for hold times. The type of load feedback is also displayed.

	Item	Parameter	Description
	Load		
(1)	Type of load	MODEx	Type of power measurement for load x: 0 = No load present 1 = Actual value of the power is connected at the Px input 2 = Feedback of the switching state is connected at the ONx input 3 = Only the load's rated output is known
	Hold times		
(2)	Minimum connect time	MIN_ONx	Minimum time load x must be released before it can be held again
(3)	Minimum connect time active	QMIN_ONx	Status of the minimum connect time: "no check mark" = minimum connect time has expired "check mark" = minimum connect time has not yet expired
(4)	Minimum disconnect time	MIN_OFFx	Minimum time load x must be held before it can be released again
(5)	Minimum disconnect time active	QMIN_OFFx	Status of the minimum disconnect time: "no check mark" = minimum disconnect time has expired "check mark" = minimum disconnect time has not yet expired
(6)	Maximum disconnect time	MAX_OFFx	Maximum time load x may be held
(7)	Maximum disconnect time active	QMAX_OFFx	Status of the maximum disconnect time: "no check mark" = maximum disconnect time has expired "check mark" = maximum disconnect time has not yet expired

x = 01 to 10, 25, 50, 75 or 100

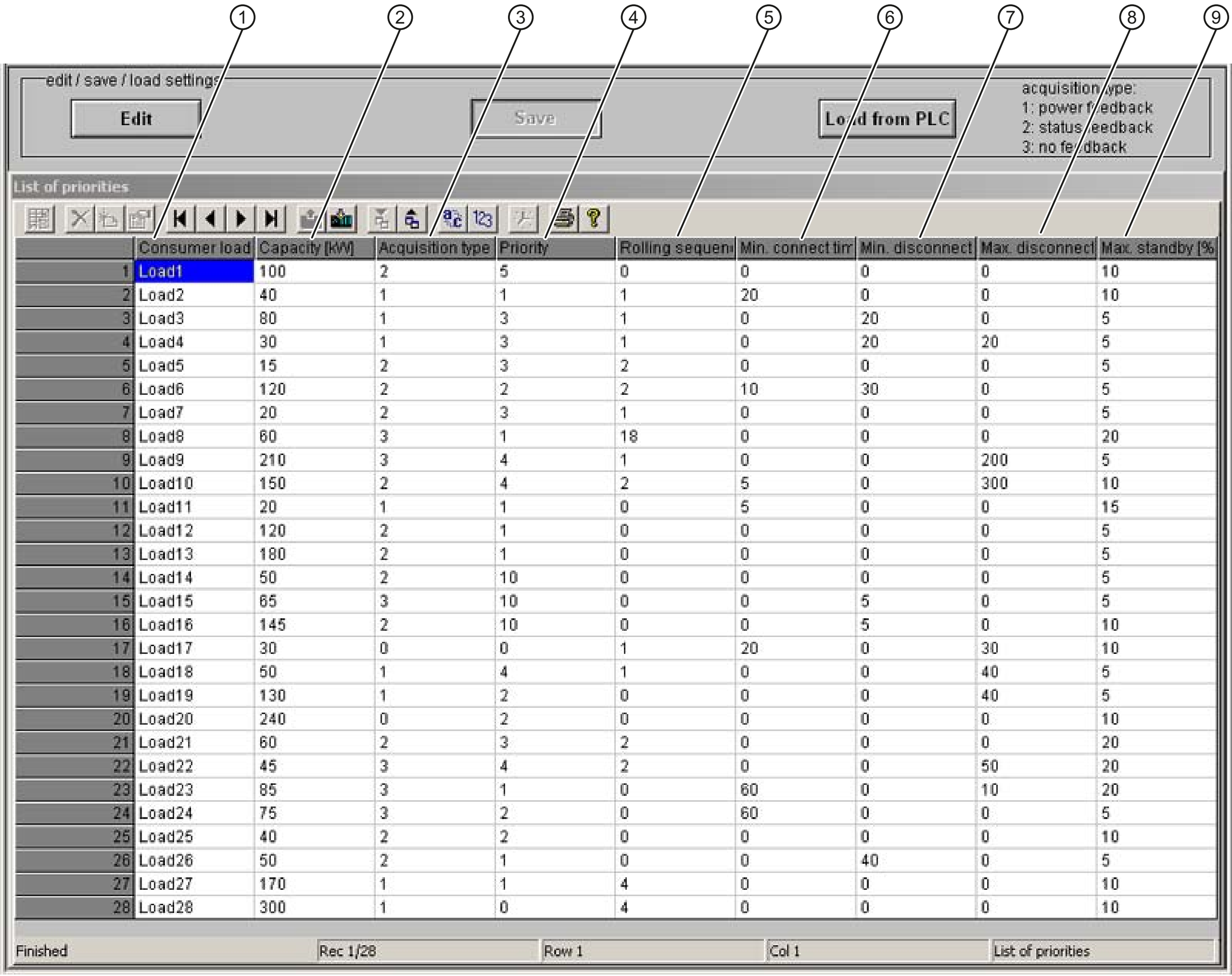
The faceplate does not directly access the parameters in brackets. When you open the faceplate, the values are read from the user archive PRE_LMGM_CONFIG_x.

3.16.9.10 Edit priority list PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Edit priority list

In this view, the contents of the user archive PRE_LMGM_PRIO_x is displayed. With this view you can also load the current configuration from the controller. You then edit the parameters of each load and then the changed data in the user archive PRE_LMGM_PRIO_x.

You can also export and import the priority list.



	Consumer load	Capacity [kW]	Acquisition type	Priority	Rolling sequen	Min. connect tim	Min. disconnect	Max. disconnect	Max. standby [%
1	Load1	100	2	5	0	0	0	0	10
2	Load2	40	1	1	1	20	0	0	10
3	Load3	80	1	3	1	0	20	0	5
4	Load4	30	1	3	1	0	20	20	5
5	Load5	15	2	3	2	0	0	0	5
6	Load6	120	2	2	2	10	30	0	5
7	Load7	20	2	3	1	0	0	0	5
8	Load8	60	3	1	18	0	0	0	20
9	Load9	210	3	4	1	0	0	200	5
10	Load10	150	2	4	2	5	0	300	10
11	Load11	20	1	1	0	5	0	0	15
12	Load12	120	2	1	0	0	0	0	5
13	Load13	180	2	1	0	0	0	0	5
14	Load14	50	2	10	0	0	0	0	5
15	Load15	65	3	10	0	0	5	0	5
16	Load16	145	2	10	0	0	5	0	10
17	Load17	30	0	0	1	20	0	30	10
18	Load18	50	1	4	1	0	0	40	5
19	Load19	130	1	2	0	0	0	40	5
20	Load20	240	0	2	0	0	0	0	10
21	Load21	60	2	3	2	0	0	0	20
22	Load22	45	3	4	2	0	0	50	20
23	Load23	85	3	1	0	60	0	10	20
24	Load24	75	3	2	0	60	0	0	5
25	Load25	40	2	2	0	0	0	0	10
26	Load26	50	2	1	0	0	40	0	5
27	Load27	170	1	1	4	0	0	0	10
28	Load28	300	1	0	4	0	0	0	10

	Item	Parameter	Description
(1)	Consumers	NAMEx	Name of the consumer x
(2)	Rated power (kW)	CAPx	Configured rated output of load x
(3)	Mode	MODEx	Type of power measurement for load x: 0 = No load present 1 = Actual value of the power is connected to the Px input 2 = Feedback of the switching state is connected at the ONx input 3 = Only the load's rated output is known
(4)	Priority	PRIOx	Priority of load on load shedding
(5)	Rolling sequence	ROLLx	Specifies the sequence in which loads of the same priority are disconnected in a rolling process. If the parameter "Rolling sequence" and the priority of several loads are identical, these loads are switched together as a group.
(6)	Minimum connect time	MIN_ONx	Minimum time load x must be released before it can be held again
(7)	Minimum disconnect time	MIN_OFFx	Minimum time load x must be held before it can be released again
(8)	Maximum disconnect time	MAX_OFFx	Maximum time load x may be held
(9)	Maximum standby power	MAX_STBYx	Maximum standby power as a [%] of rated output for load x

x = 01 to 10, 25, 50, 75 or 100

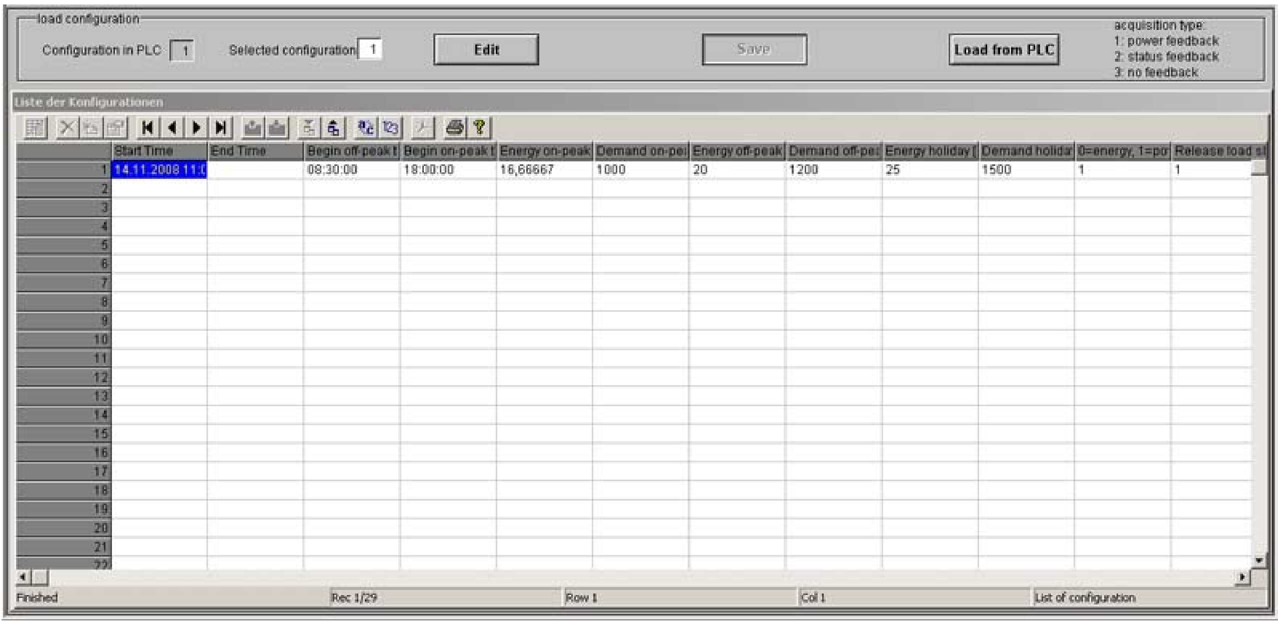
3.16.9.11 Configuration - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

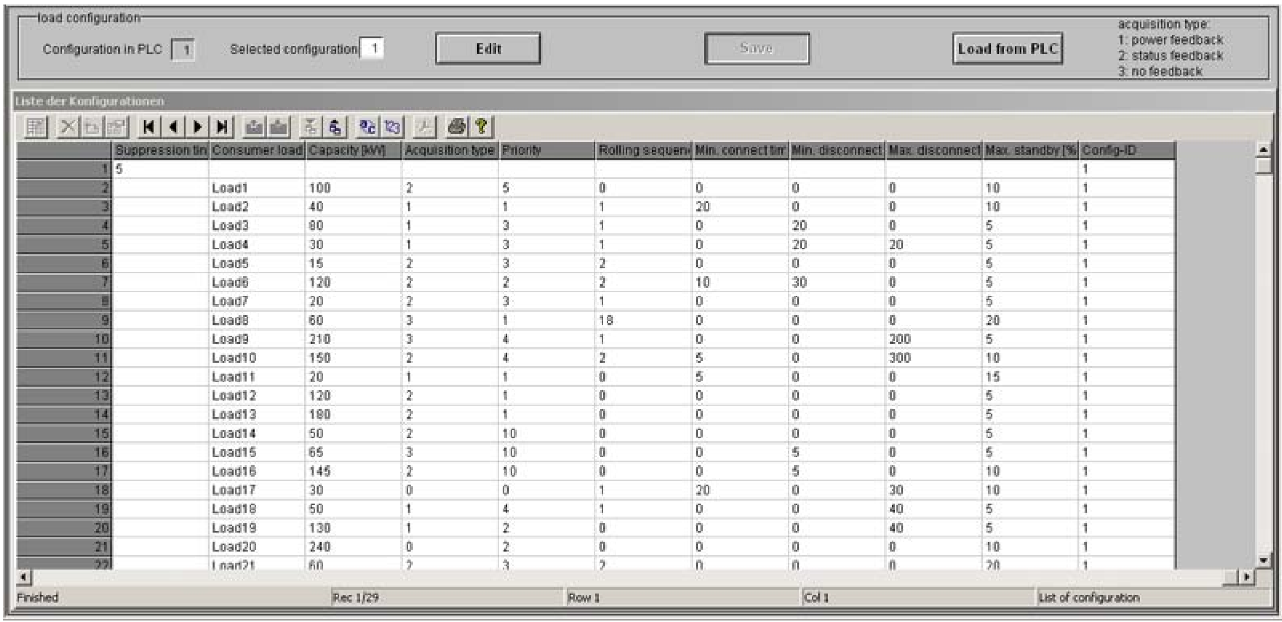
Configuration

This view contains the current and the last configurations of the load management. The maximum number of configurations is specified by the parameter CFG_MAX. The configuration data displayed is read from the user archive PRE_LMGM_CONFIG_x.

When opening the faceplate view, the data of the current configuration (CONFIG_ID = CFG_CUR) is always displayed. Enter a CONFIG_ID to select any configuration. Use the selection dialog to select all the configurations which satisfy the filter criteria.

You can display, print, export and import the configurations and load them into the PLC. In addition to the time stamp of their validity, each configuration contains the views "Parameters", "Rates" and "Edit Priority List".



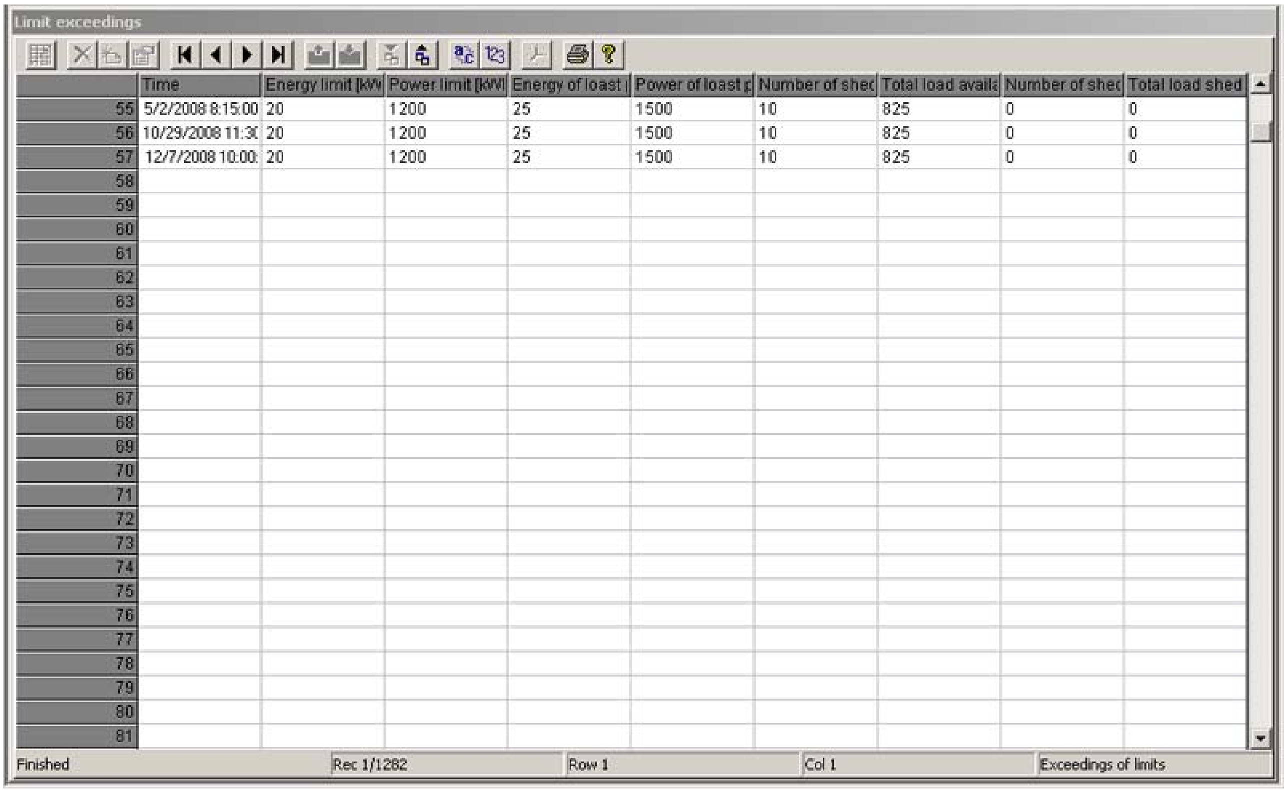


	Suppression tin	Consumer load	Capacity [kW]	Acquisition type	Priority	Rolling sequen	Min. connect tim	Min. disconnect	Max. disconnect	Max. standby [%	Config-ID
1	5										1
2		Load1	100	2	5	0	0	0	0	10	1
3		Load2	40	1	1	1	20	0	0	10	1
4		Load3	80	1	3	1	0	20	0	5	1
5		Load4	30	1	3	1	0	20	20	5	1
6		Load5	15	2	3	2	0	0	0	5	1
7		Load6	120	2	2	2	10	30	0	5	1
8		Load7	20	2	3	1	0	0	0	5	1
9		Load8	60	3	1	18	0	0	0	20	1
10		Load9	210	3	4	1	0	0	200	5	1
11		Load10	150	2	4	2	5	0	300	10	1
12		Load11	20	1	1	0	5	0	0	15	1
13		Load12	120	2	1	0	0	0	0	5	1
14		Load13	180	2	1	0	0	0	0	5	1
15		Load14	50	2	10	0	0	0	0	5	1
16		Load15	65	3	10	0	0	5	0	5	1
17		Load16	145	2	10	0	0	5	0	10	1
18		Load17	30	0	0	1	20	0	30	10	1
19		Load18	50	1	4	1	0	0	40	5	1
20		Load19	130	1	2	0	0	0	40	5	1
21		Load20	240	0	2	0	0	0	0	10	1
22		Load21	60	2	3	2	0	0	0	20	1

3.16.9.12 Limit violations - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Limit violations

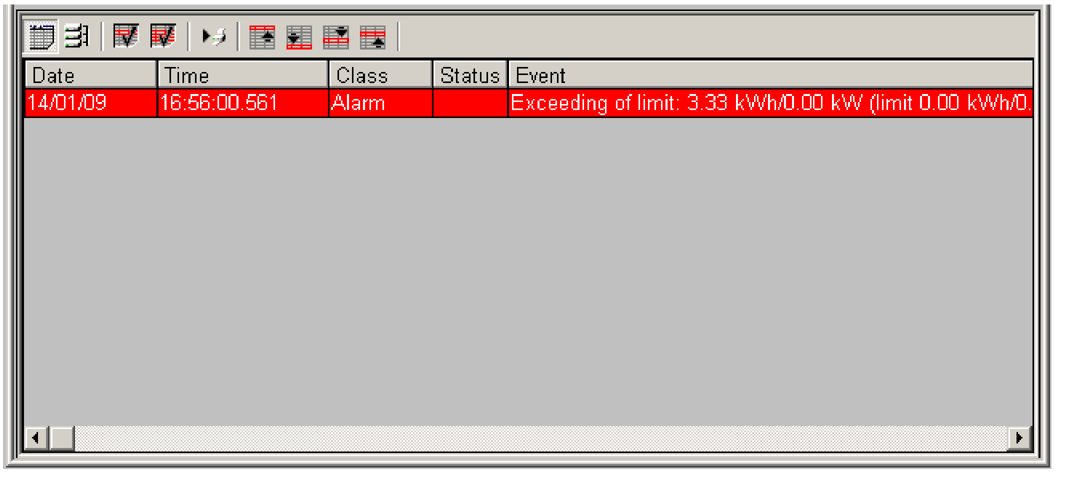
The archived limit violations which are saved in the user archive PRE_LMGM_LIM_x are displayed in this view. You can export this table with the data for the limit violations.



3.16.9.13 Messages - PRE_LMGM / PR3_LMGM / PRE_LMGM_x / PR3_LMGM_x

Messages

This view shows the messages relating to load management.



3.17 PRE_PAC / PR3_PAC: Basic functionality of the PAC3200/PAC4200

3.17.1 Function - PRE_PAC / PR3_PAC

PRE_PAC	FB1751
PR3_PAC	FB201

Description of block

- Calling OBs - PRE_PAC / PR3_PAC (Page 329)
- Called blocks - PRE_PAC / PR3_PAC (Page 329)
- Message behavior - PRE_PAC / PR3_PAC (Page 330)
- Error response - PRE_PAC / PR3_PAC (Page 330)
- Startup characteristics - PRE_PAC / PR3_PAC (Page 330)
- Block parameters - PRE_PAC / PR3_PAC (Page 331)
- Description of icons and faceplates (Page 333)

Function description

The function block PRE_PAC / PR3_PAC is used to display selected measured values and to report status information of the PAC3200 and PAC4200 Power Monitoring Devices.

Measured value display

Data of the basic type 1 and 2 can be selected for displaying measured values. However, when configuring PAC in HW Config, make sure that the basic types whose data is to be displayed are configured in each case.

The parameters BASADR1 and BASADR2 must each be supplied with the logical basic address of the basic types 1 and 2, if used.

The measured value type is determined with the TYPE_x parameter.

Measurement type TYPE_x	Basic type	Meaning	Unit
1	1	Current L1	A
2	1	Current L2	A
3	1	Current L3	A
4	1	Total active power	W
5	2	Voltage PH-PH L1-L2	V
6	2	Voltage PH-PH L2-L3	V
7	2	Voltage PH-PH L3-L1	V
8	2	Total power factor	-

The active energy is read out and displayed dependent on the EN_ACENER parameter.

Status information

The status information is output to the STATDIAG parameter. The bits relevant for the messages are also output at binary output parameters (see table).

Assignment of the status double wordSTATDIAG

Byte	Bit	Binary status information	Block parameter
0	0	No synchronization pulse	-
0	1	Local configuration active	-
0	2	Voltage overload	QE_VOLTOVER
0	3	Current overload	QE_CUROVER
0	4 ... 7	Reserved	-
1	0	Reserved	-
1	1	Maximum pulse rate exceeded	QE_PULSOVER
1	2 ... 7	Reserved	-
2	0	Relevant parameter changes	-
2	1	High/low limit violated	-
2	2	Maximum pulse rate exceeded	QE_PULSOVER
2	3	Restart of the device	-
2	4	Resetting of energy counter by user	-
2	5 ... 7	Reserved	-
3	0 ... 7	Reserved	-

3.17.2 Calling OBs - PRE_PAC / PR3_PAC

The block must be installed in the processing sequence in the following OBs:

OB1	Cyclic program
OB82	Diagnostic interrupt
OB83	Insert/remove interrupt
OB85	Program execution error
OB86	Rack failure
OB100	Warm restart

3.17.3 Called blocks - PRE_PAC / PR3_PAC

PRE_PAC

The block calls the following blocks:

SFB35	ALARM_8P
SFC6	RD_SINFO

PR3_PAC

The block calls the following blocks:

SFC6	RD_SINFO
SFC19	ALARM_SC
SFC107	ALARM_DQ

3.17.4 Message behavior - PRE_PAC / PR3_PAC

PRE_PAC

PRE_PAC generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QBAD	External error	PLC pr ctrl failure
	2	QPARAMF	Parameter error	PLC pr ctrl failure
	3	QE_VOLTOVER	Voltage out of range	PLC pr ctrl failure
	4	QE_CUROVER	Current out of range	PLC pr ctrl failure
	5	QE_PULSOVER	Maximum pulse rate exceeded	PLC pr ctrl failure
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_PAC

PR3_PAC generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSGEVID1	1	QBAD	External error	PLC pr ctrl failure
MSGEVID2	1	QPARAMF	Parameter error	PLC pr ctrl failure
MSGEVID3	1	QE_VOLTOVER	Voltage out of range	PLC pr ctrl failure
MSGEVID4	1	QE_CUROVER	Current out of range	PLC pr ctrl failure
MSGEVID5	1	QE_PULSOVER	Maximum pulse rate exceeded	PLC pr ctrl failure

3.17.5 Error response - PRE_PAC / PR3_PAC

The QPARAMF error output is set when

- a measured value TYPE_x < 1 or > 8 is entered or
- One of the UNITx parameters is set to an invalid value
  (see "Description of icons and faceplates (Page 333)")

The VALUE_x measured value is set to 0 if the associated measured value type is invalid.

3.17.6 Startup characteristics - PRE_PAC / PR3_PAC

After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.17.7 Block parameters - PRE_PAC / PR3_PAC

PRE_PAC

Item	Data type	Type	Meaning	HMI
AEIT1DW1	DWORD	O	Active energy import tariff 1 DWORD 1	+
AEIT1DW2	DWORD	O	Active energy import tariff 1 DWORD 2	+
BASADR1	INT	I	Basic address of the basic type 1	
BASADR2	INT	I	Basic address of the basic type 2	
CSF	BOOL	I	External error	
EN_ACENER	BOOL	I	1 = Active energy available	+
MSG_ACK	WORD	O	Acknowledge status of the ALARM_8P block	
MSG_EVID	DWORD	I	Event ID for ALARM_8P block	
MSG_STAT	WORD	O	Status of the ALARM_8P block	
QBAD	BOOL	O	1 = External error	
QE_CUROVER	BOOL	O	Current out of range	
QE_PULSOVER	BOOL	O	Maximum pulse rate exceeded	
QE_VOLTOVER	BOOL	O	Voltage out of range	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	+
QPARAMF	BOOL	O	1 = Parameterization error	
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	
STATDIAG	DWORD	O	Device diagnostics and status	
TYPE_x	INT	I	Measured value type of VALUE_x (x = 1 ... 3)	+
UNITACENER	BYTE	I	Active energy units	+
UNITACPOW	BYTE	I	Active power units	+
UNITVOLT	BYTE	I	Voltage units	+
VALUE_x	REAL	O	Measured value x (x = 1 ... 3)	+

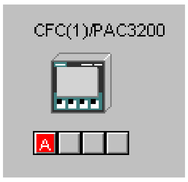
PR3_PAC

Item	Data type	Type	Meaning	HMI
AEIT1DW1	DWORD	O	Active energy import tariff 1 DWORD 1	+
AEIT1DW2	DWORD	O	Active energy import tariff 1 DWORD 2	+
BASADR1	INT	I	Basic address of the basic type 1	
BASADR2	INT	I	Basic address of the basic type 2	
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
CSF	BOOL	I	External error	
EN_ACENER	BOOL	I	1 = Active energy available	+
MSG_ACKx	WORD	O	Acknowledgment status of the ALARM_D Q block x (x = 1 ... 5)	
MSGEVIDx	DWORD	I	Event ID of the ALARM_DQ block x (x = 1 ... 5)	
MSGSTATx	WORD	O	Status of the ALARM_DQ block x (x = 1 ... 5)	
QBAD	BOOL	O	1 = External error	
QE_CUROVER	BOOL	O	Current out of range	
QE_PULSOVER	BOOL	O	Maximum pulse rate exceeded	
QE_VOLTOVER	BOOL	O	Voltage out of range	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	+
QPARAMF	BOOL	O	1 = Parameterization error	
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	
STATDIAG	DWORD	O	Device diagnostics and status	
TYPE_x	INT	I	Measured value type of VALUE_x (x = 1 ... 3)	+
UNITACENER	BYTE	I	Active energy units	+
UNITACPOW	BYTE	I	Active power units	+
UNITVOLT	BYTE	I	Voltage units	+
VALUE_x	REAL	O	Measured value x (x = 1 ... 3)	+

3.17.8 Description of icons and faceplates

3.17.8.1 Block icon - PRE_PAC / PR3_PAC

Block icon



3.17.8.2 Faceplate - PRE_PAC / PR3_PAC

Faceplate

The faceplate available is described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Parameter	PARAMETERS
Messages	

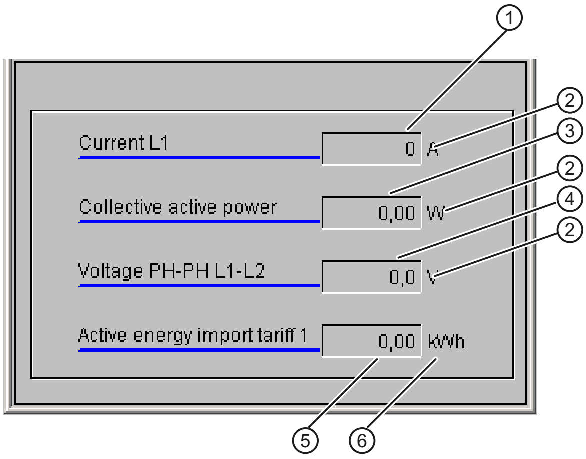
The file name is composed as follows: @PG_PRE_PAC_<view>.PDL / @PG_PR3_PAC_<view>.PDL

A standard display is used for the Messages view.

The structure of the individual views of faceplates is described below.

3.17.8.3 Standard (STANDARD) - PRE_PAC / PR3_PAC

Standard (STANDARD)



(1) VALUE_1
(2) UNITVOLT / UNITACPOW
(3) VALUE_2
(4) VALUE_3
(5) AEIT1DW1 / AE1T1DW2
(6) UNITACENER

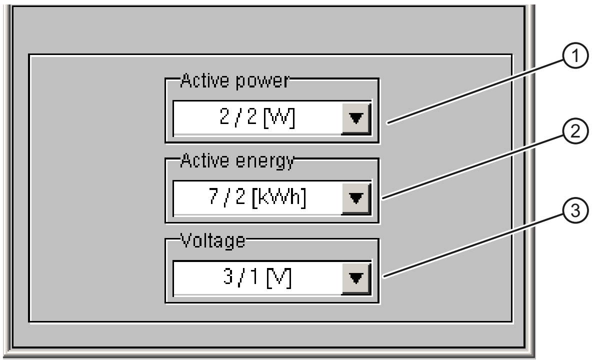
The following parameters are displayed:

Item	Parameter	Description
Values 1 ... 3	VALUE_x TYPE_x	Depending on the TYPE_x measured value, the relevant value is displayed with a description.
	UNITVOLT / UNITACPOW	The format and unit of the measured value can be set in the Parameters view.
Active energy import tariff 1	AEIT1DW1 / AE1T1DW2	The active energy is displayed if the parameter EN_ACENER = TRUE.
	UNITACENER	The format and unit of the measured value can be set in the Parameters view.

3.17.8.4 Parameters (PARAMETERS) - PRE_PAC / PR3_PAC

Parameters (PARAMETERS)

The format (integer place/decimal place) and unit can be parameterized for the different measured value types.



	Item	Parameter	Description
(1)	Active power	UNITACPOW	0 ≙ 2 / 2 [W] 1 ≙ 3 / 1 [kW] 2 ≙ 4 / 0 [kW] 3 ≙ 4 / 0 [MW]
(2)	Active energy	UNITACENER	The selection box for the active energy is displayed if the parameter EN_ACENER = TRUE. 0 ≙ 7 / 2 [kWh] 1 ≙ 9 / 0 [kWh] 2 ≙ 9 / 0 [MWh] 3 ≙ 9 / 0 [GWh]
(3)	Voltage	UNITVOLT	0 ≙ 3 / 1 [V] 1 ≙ 2 / 2 [kV] 2 ≙ 3 / 1 [kV]

3.18 PRE_PE_IDEV / PR3_PE_IDEV: Energy measurement with PROFIenergy from an I device

3.18.1 Function - PRE_PE_IDEV / PR3_PE_IDEV

PRE_PE_IDEV	FB1753
PR3_PE_IDEV	FB203

Description of block

- Calling OBs - PRE_PE_IDEV (Page 338)
- Called blocks - PRE_PE_IDEV (Page 338)
- Message characteristics - PRE_PE_IDEV (Page 338)
- Error response - PRE_PE_IDEV (Page 338)
- Startup characteristics - PRE_PE_IDEV (Page 339)
- Block parameters - PRE_PE_IDEV (Page 339)

Function description

You can forward up to ten measured values acquired on an I device to an IO controller with the PRE_PE_IDEV / PR3_PE_IDEV block.

Forwarding the acquired measured values

The PRE_PE_IDEV / PR3_PE_IDEV block forwards the measured values acquired on an I device to an IO controller as follows:

- The IO controller addresses the I device via PROFIenergy Entity ID. At the same time, the I device responds to the IO controller like a PROFIenergy measuring device.

Note

In the PRE_PE_IDEV / PR3_PE_IDEV block, you define the PROFIenergy entity ID at which the I device can be accessed by the IO controller. The diagnostic address of the I device is used as PROFIenergy Entity ID in the STEP 7 hardware configuration.

- The IO controller requests measured values from the I device via measured value IDs.

Note

In the PRE_PE_IDEV / PR3_PE_IDEV block, you define the measured value IDs that the I device makes available. The measured value IDs can be found in the PROFIenergy specification "PROFIenergy Technical Specification for PROFINET, Annex A List of electrical measurements".

- The PRE_PE_IDEV / PR3_PE_IDEV block compares the measured value IDs requested by the IO controller with its measured value IDs.
- The PRE_PE_IDEV / PR3_PE_IDEV block creates a response frame and sends it to the IO controller. If the measured value IDs match, the response frame contains the acquired measured values VALUE_1 to VALUE_10 and their quality codes QC_VAL1 to QC_VAL10. If the PRE_PE_IDEV / PR3_PE_IDEV block does not supply the requested measured IDs or the quality code of an acquired measured value is not valid, the PRE_PE_IDEV / PR3_PE_IDEV block sends an empty message frame to the IO controller.

Note

To acquire measured values on the I device, interconnect the PRE_PE_IDEV / PR3_PE_IDEV block with the powerrate blocks for energy measurement.

Data record transfer

The PRE_PE_IDEV / PR3_PE_IDEV block calls the FB817 block and the auxiliary blocks FC0 to FC8 from the PROFIenergy library. In turn, the FB817 block calls the SFB73 and SFB74 blocks for the acyclic services to read and write PNIO data record. For additional information, refer to the data record transfer of the PRE_PE_RD block.

Note

The FB817 block is called via a symbolic name. Define the name PE_I_DEV for FB817 and the name PE_I_DEV_DI for the instance DB in the symbol table.

3.18.2 Calling OBs - PRE_PE_IDEV / PR3_PE_IDEV

The block must be installed in the following OB:

OB1	Cyclic program

3.18.3 Called blocks - PRE_PE_IDEV / PR3_PE_IDEV

The block calls the following blocks:

SFC6	RD_SINFO
FB817	PE_I_DEV
FC0	PE_Error_RSP
FC7	PE_Measurement_List_RSP
FC8	PE_Measurement_Value_RSP

3.18.4 Message behavior - PRE_PE_IDEV / PR3_PE_IDEV

The block has no message behavior.

3.18.5 Error behavior - PRE_PE_IDEV / PR3_PE_IDEV

The PRE_PE_IDEV / PR3_PE_IDEV block sends an empty message frame to the IO controller in the following cases:

1. The IO controller requests measured value IDs which the PRE_PE_IDEV / PR3_PE_IDEV block does not make available.
2. The quality code of a measured value requested by the IO controller is unequal to 0X60.

The following table shows the status of the empty message frame set in case of an error:

Situation	Value of the "Status_of_Measurement_Value"	Meaning
1	2	not available = not supported
2	3	not available = not valid

If this data is received in the IO controller with the PRE_PE_RD / PRE_PE_RD block, the VALUE_x and QC_VALx parameters are set to 0.

3.18.6 Startup characteristics - PRE_PE_IDEV / PR3_PE_IDEV

The block has the following startup characteristics:

- The accumulated values are reset.
- Timers are restarted.
- Messages are suppressed.

3.18.7 Block parameters - PRE_PE_IDEV / PR3_PE_IDEV

Item	Data type	Type	Meaning	HMI
RUNUPCYC	INT	I	Number of startup cycles	
PE_ID	DWORD	I	Logical address of the PROFIenergy entity (hexadecimal number of the diagnostic address of the I device)	
MID_x	WORD	I	Measured value ID x of the measured variable (x = 1 to 10); see PROFIenergy specification "PROFIenergy technical Specification for PROFINET, Annex A List of electrical measurements"	+
VALUE_x	REAL	I	Acquired measured value x (x = 1 to 10)	+
QC_VALx	BYTE	I	Quality code for the measured value x: 00: Invalid or faulty value 60: Simulated value 80: Valid value	
AD_x	BYTE	I	Accuracy_Domain[1]; accuracy of the measured value x according to PROFIenergy specification "PROFIenergy technical Specification for PROFINET".	
AC_x	BYTE	I	Accuracy_Class[2]; accuracy of the measured value x according to PROFIenergy specification "PROFIenergy technical Specification for PROFINET".	
QBAD	BOOL	O	External error: FALSE = no external error TRUE = external error	
QPARAMF	BOOL	O	Parameterization error at the function block: FALSE = no parameterization error TRUE = parameterization error	
QVALID	BOOL	O	Status of measurement: FALSE = acquired measured value x (x = 1 to 10) is invalid TRUE = measurement has been completed successfully	
QBUSY	BOOL	O	Status of the data record transfer: FALSE = data record transfer has been completed or has not been started yet TRUE = data record transfer in progress	

Item	Data type	Type	Meaning	HMI
QERROR	BOOL	O	Error during measuring: FALSE = no error during measuring TRUE = error during measuring	
STATUS	DWORD	O	Block status / Error number When the parameter is interpreted as ARRAY[1 to 4] OF BYTE, the error information has the following structure:	
[1] The parameters are used if a list of supported measured values is requested from the I device. Information on the accuracy of the supported measured values is transferred in addition to these values in the response frame.				

3.19 PRE_PE_RD / PR3_PE_RD: Energy measuring with PROFIenergy

3.19.1 Function - PRE_PE_RD / PR3_PE_RD

PRE_PE_RD	FB1752
PR3_PE_RD	FB202

Description of block

- Calling OBs - PRE_PE_RD (Page 342)
- Called blocks - PRE_PE_RD (Page 343)
- Message behavior - PRE_PE_RD (Page 343)
- Error response - PRE_PE_RD (Page 343)
- Startup characteristics - PRE_PE_RD (Page 344)
- Block parameters - PRE_PE_RD (Page 345)

Function description

You acquire up to ten measured values of a measuring device with PROFIenergy with the PRE_PE_RD block. The acquired measured values can be further processed with the PRE_SUM and PRE_SUMC blocks.

Measured value acquisition

The PRE_PE_RD / PR3_PE_RD block acquires measured values as follows:

- The PRE_PE_RD / PR3_PE_RD block addresses the PROFIenergy Entity via the PE_ID parameter.

  Note

  The diagnostic address of the measuring device is used as PROFIenergy Entity ID in the STEP 7 hardware configuration.

- The PRE_PE_RD / PR3_PE_RD block sends the measured value IDs to the PROFIenergy entity via the MID_1 to MID_10 parameters.

  Note

  For the measured value IDs, refer to the PROFIenergy specification "PROFIenergy Technical Specification for PROFINET, Annex A List of electrical measurements".

- The PRE_PE_RD / PR3_PE_RD block copies the acquired measured values to the VALUE_1 to VALUE_10 parameters; each of these measured values has a quality code. The PRE_PE_RD / PR3_PE_RD block copies quality codes to the QC_VAL1 to QV_VAL10 parameters.
- When the measured values have been completely acquired, the PRE_PE_RD / PR3_PE_RD block sets the QVALID parameter to TRUE.

Data record transfer

The measured values are transferred as data records between the PRE_PE_RD / PR3_PE_RD block and the measuring device. In return, the PRE_PE_RD / PR3_PE_RD block calls the FB816 block from the PROFIenergy library. In turn, the FB816 block calls the SFB52 and SFB53 blocks for the acyclic services to read and write PNIO data record. The acyclic services are assigned a lower priority than the cyclic services. If the PROFIenergy entity is requested at the same time by the PNIO master (cyclic service) and the PRE_PE_RD / PR3_PE_RD block (acyclic service), the PROFIenergy entity first processes the request from the PNIO master. Several cycles may pass before the PROFIenergy entity transfers the measured values requested by the PRE_PE_RD / PR3_PE_RD block.

Note

The PROFIenergy library is available as of STEP 7 Version V5.5 SP1.

3.19.2 Calling OBs - PRE_PE_RD / PR3_PE_RD

The block must be installed in the following OB:

OB1	Cyclic program

3.19.3 Called blocks - PRE_PE_RD / PR3_PE_RD

The block calls the following blocks:

SFC6	RD_SINFO
FB816	PE_CMD

3.19.4 Message behavior - PRE_PE_RD / PR3_PE_RD

The block has no message behavior.

3.19.5 Error behavior - PRE_PE_RD / PR3_PE_RD

The parameter QPARAMF is set to TRUE in the following cases:

- The PE_ID parameter has a PROFIenergy Entity ID that the PROFIenergy Entity does not support.
- The MD_x parameter has a measured value ID that the PROFIenergy Entity does not support.
- The PROFINET communication protocol reports errors.
- The PROFIenergy Entity returns no measured values within 10 seconds.
  The measurement is canceled with a timeout.

Note

If the PROFIenergy Entity is requested at the same time by the cyclic PNIO master and the acyclic PNIO data record services, the PROFIenergy Entity processes the request from the PNIO master first. If this processing takes longer than 10 seconds,
the PRE_PE_RD / PR3_PE_RD block sends a timeout error.

Note

Parallel data record operations

The number of parallel data record operations depends on the CPU used. With the CPU 400, for example, eight parallel data record operations are permitted.

You can find additional information on this topic in the technical specifications of the CPU.

Note

The PROFIenergy status on the availability of a measured value is output as follows at the parameter QC_VALx:

- "not available" and "temporarily not available": "bad" (Value: 0)
- "valid": "valid" (Value: 1)

The following table shows block parameters that are set in case of an error:

Parameter	Value
ErrorNum	<Number of cumulative errors>
ErrorTimeout	<Number of timeout errors>
QPARAMF	TRUE
VALUE_x	-1
QC_VALx	0

Note

You receive a reliable block status when the QBAD parameter is set to TRUE.

3.19.6 Startup behavior - PRE_PE_RD / PR3_PE_RD

The block has the following startup characteristics:

- The accumulated values are reset.
- Timers are restarted.
- Messages are suppressed.

3.19.7 Block parameters - PRE_PE_RD / PR3_PE_RD

Item	Data type	Type	Meaning	HMI
RUNUPCYC	INT	I	Number of startup cycles	
PE_ID	DWORD	I	Logical address of the PROFIenergy entity (hexadecimal number of the diagnostic address of the measuring device or I device[1])	
MID_x	WORD	I	Measured value ID x of the measured variable (x = 1 to 10); see PROFIenergy specification "PROFIenergy technical Specification for PROFINET, Annex A List of electrical measurements"	+
VALUE_x	REAL	O	Acquired measured value x (x = 1 to 10)	+
QC_VALx	BYTE	O	Quality code for the measured value x: Quality code = 0 (error during measuring)	
ErrorNum	DINT	O	Number of cumulative errors, including timeout errors	
ErrorTimeout	DINT	O	Number of timeout errors	
QBAD	BOOL	O	External error: FALSE = no external error TRUE = external error	
QPARAMF	BOOL	O	Parameterization error at the function block: FALSE = no parameterization error TRUE = parameterization error	
QVALID	BOOL	O	Status of measurement: FALSE = acquired measured value x (x = 1 to 10) is invalid TRUE = measurement has been completed successfully	
QBUSY	BOOL	O	Status of the data record transfer: FALSE = data record transfer has been completed or has not been started yet TRUE = data record transfer in progress	
QERROR	BOOL	O	Error during measuring: FALSE = no error during measuring TRUE = error during measuring	
STATUS	DWORD	O	Block status / Error number	
ExtPERQ		I	reserved	
ReqToken		O	reserved	

[1] You must add 8000 to the diagnostic address of the I device. Proceed as follows:

1. Convert the diagnostic address of the I device into a hexadecimal number, for example 256 = 100.
2. Add 8000 to the hexadecimal number of the diagnostic address of the I device, e.g., 100 + 8000 = 8100.

3.20 PRE_RCV_H: AS-4xxH to AS-4xx communication

3.20.1 Function - PRE_RCV_H

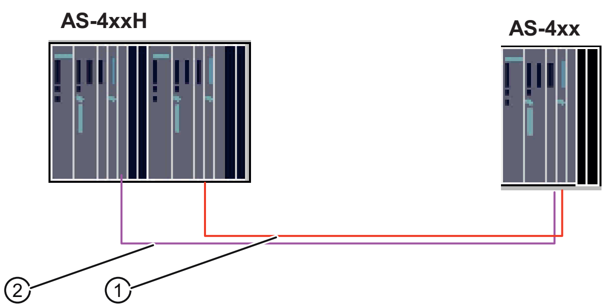
PRE_RCV_H FB1073

Description of block

- Calling blocks - PRE_RCV_H (Page 347)
- Called blocks - PRE_RCV_H (Page 347)
- Message behavior - PRE_RCV_H (Page 347)
- Error response - PRE_RCV_H (Page 348)
- Startup characteristics - PRE_RCV_H (Page 348)
- Block parameters - PRE_RCV_H (Page 349)

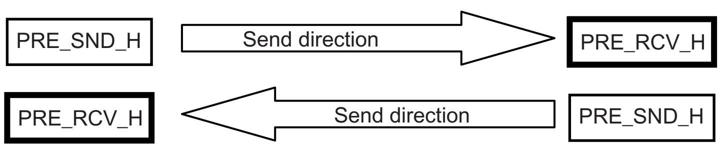
Function description

The block coordinates the process of receiving telegrams between a redundant and a non-redundant automation station by means of S7 communication (BRCV). A maximum of 30 REAL values and 30 binary values can be sent. Each value also has a binary quality code, which specifies whether the measured value is free of errors or not.



① Connection #1

② Connection #2



Quality Code

The QC_Rx and QC_Bx (x=1..30) parameters contain the quality codes of the input signals and must be connected to the QUALITY output of the associated driver blocks when using the input signals selected.

In addition to the quality codes received, the quality code also provides the following information:

Quality code = 16#14: Communication error, last valid value
Quality Code = 16#18: Communication error, no valid value available

3.20.2 Calling blocks - PRE_RCV_H

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.20.3 Called blocks - PRE_RCV_H

The block calls the following blocks:

FB1075	PRE_BR
SFB35	ALARM_8P
SFC6	RD_SINFO

3.20.4 Message behavior - PRE_RCV_H

PRE_RCV_H generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QERR_1	Communication failure conn. 1	PLC pr ctrl failure
	2	QERR_2	Communication failure conn. 2	PLC pr ctrl failure
	3	QERR_1, QERR_2	Complete loss of communication	PLC pr ctrl failure
	4	MSG_4	-	-
	5	MSG_5	-	-
	6	MSG_6	-	-
	7	MSG_7	-	-
	8	MSG_8	-	-

The auxiliary values of the message blocks are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSG_EVID	1	QSTATUS_1	Data transfer status, connection 1
	2	QSTATUS_2	Data transfer status, connection 2
	3	AUX_PR03	Not assigned
	4	AUX_PR04	Not assigned
	5	AUX_PR05	Not assigned
	6	AUX_PR06	Not assigned
	7	AUX_PR07	Not assigned
	8	AUX_PR08	Not assigned
	9	AUX_PR09	Not assigned
	10	AUX_PR10	Not assigned

The auxiliary values (AUX_PRx, x=03..10) of the message block can be freely assigned

3.20.5 Error response - PRE_RCV_H

Monitoring the receive process

The two connections to the sending partner are monitored separately. If the process is functioning without errors, the receive data is transferred from the first connection; if one connection fails, the data is transferred from whichever of the two connections still exists.

When an error is detected, the relevant QERR_1 / QERR_2 output is set and a summary event is sent to the OS. Following a total failure of both connections, the auxiliary value (quality code) supplied for every value is also activated. A message is not generated until the SUPPTIME (suppression time) has elapsed. This parameter is adjustable.

The send error is reset when at least one telegram containing valid data has been successfully sent. If SUPPTIME < SAMPLE_T, the error message is generated immediately.

3.20.6 Startup characteristics - PRE_RCV_H

The RUNUPCYC parameter can be used to set for how long (number of cycles) messages are to be suppressed.

RESTART = TRUE can be used to simulate a restart.

3.20.7 Block parameters - PRE_RCV_H

Item	Data type	Type	Meaning	HMI
AUX_PRx	ANY	IO	Auxiliary value 03 - 10	
BOOLx	REAL	O	BOOL values 1 - 30 for connection	
DUMMY	WORD	IO	Dummy	
ERR_CNT_1	DINT	O	Error counter	
FIRST_VAR_1	BOOL	IO	Pointer initial value, connection 1	
FIRST_VAR_2	BOOL	IO	Pointer initial value, connection 2	
HISTLAST_STATUS_x	WORD	O	Status of the last error, connection x	
HISTLAST_TIME_STAMP_x	DATE_AND_TIME	O	Time stamp of the last error, connection x	
HISTx_STATUS_x	WORD	O	Status of errors 1 - 4, connection x	
HISTx_TIME_STAMP_x	DATE_AND_TIME	O	Time stamp of errors 1 - 4, connection x	
ID_1	WORD	I	Connection ID, connection 1	
ID_2	WORD	I	Connection ID, connection 2	
IN_BOOLx_1	REAL	IO	BOOL values 1 - 30 for readback	
IN_BOOLx_2	REAL	IO	BOOL values 1 - 30 for readback	
IN_QC_Bx_1	BYTE	IO	Quality code BOOL value 1 – 30 for readback	
IN_QC_Bx_2	BYTE	IO	Quality code BOOL value 1 – 30 for readback	
IN_QC_Rx_1	BYTE	IO	Quality code REAL value 1 – 30 for readback	
IN_QC_Rx_2	BYTE	IO	Quality code REAL value 1 – 30 for readback	
IN_REALx_1	REAL	IO	REAL values 1 - 30 for readback	
IN_REALx_2	REAL	IO	REAL values 1 - 30 for readback	
L_ACT_CON	BOOL	O	Last active connection: 0 = connection 1, 1 = connection 2	
L_MSGLCK	BOOL	I	Central message suppression can be connected	
LAST_VAR_1	BOOL	IO	End ID receive buffer readback, connection 1	
LAST_VAR_2	BOOL	IO	End ID receive buffer readback, connection 2	
LEN_CNT_1	DINT	O	Integration of the sent data count	
MSG_ACK	WORD	O	Messages acknowledged	
MSG_EVID	DWORD	I	MESSAGE ID/ALARM_8P event ID	
MSG_STAT	WORD	O	STATUS output	
MSG_x	BOOL	I	Message input 4 - 8	
NDR_2	BOOL	O	Receive new data for connection 2	
QC_Bx	BYTE	O	Quality code BOOL value 1 – 30	
QC_Rx	BYTE	O	Quality code REAL value 1 – 30	
QERR_2	BOOL	O	1 = Error during data transfer for connection	
QLEN_2	INT	O	Length of the received data for connection	
QMSG_ERR	BOOL	O	ALARM_8P error	
QMSG_SUP	BOOL	O	Message suppression	
QSTATUS_2	INT	O	Data transfer status for connection	
R_ID_1	DWORD	I	Request ID for connection 1	
R_ID_2	DWORD	I	Request ID for connection 2	

Item	Data type	Type	Meaning	HMI
REALx	REAL	O	REAL values 1 - 30 for connection	
RES_HI_x	BOOL	IO	Reset history, connection x	
RESTART	BOOL	I	Manual startup	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SUPPTIME	REAL	I	Suppression time in [s]	

Description of the status

xSTATUS	Description
11	Alarm: New job not active because the previous job is still busy.
17	Alarm: Block receiving data asynchronously.
25	Communication has started. The job is being processed.
1	Communication problems, e.g. connection description not loaded (local or remote), connection interrupted (e.g. cable, CPU off, CP in STOP mode)
2	The function cannot be carried out.
4	Error in the receive area pointer RD_1 regarding data length or data type (data block sent is longer than receive area).
5	Reset request received, incomplete transfer.
8	Access error in the corresponding SFB12 "BSEND": The data packet to be sent is larger than 452 bytes and after the first data segment is sent, ERROR = 1 and STATUS = 4 are reported.
10	Access to local user memory not possible (for example, access to deleted DB).
12	When the SFB was called, an instance DB that does not belong to SFB13 was specified. A shared DB was specified instead of an instance DB. No instance DB was found (loading a new instance DB from the PG).
18	R_ID already exists in the connection.
20	Insufficient work memory
-1	Connection error FIRST_VAR and/or LAST_VAR
-2	Internal error SFC20 BLKMOV
-3	Internal error SFC20 BLKMOV: Destination area too small
-4	Internal error SFC6 RD_SINFO

3.21 PRE_SND_H: AS-4xxH to AS-4xx communication

3.21.1 Function - PRE_SND_H

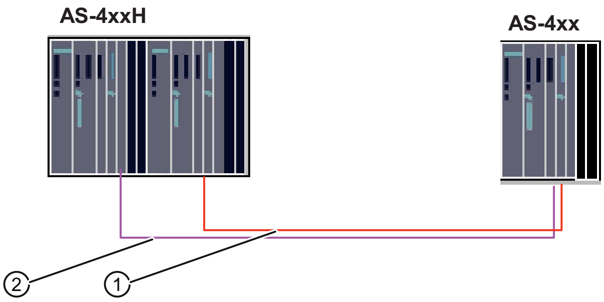
PRE_SND_H FB1072

Description of block

- Calling blocks - PRE_SND_H (Page 352)
- Called blocks - PRE_SND_H (Page 352)
- Message behavior - PRE_SND_H (Page 352)
- Error response - PRE_SND_H (Page 353)
- Startup characteristics - PRE_SND_H (Page 353)
- Block parameters - PRE_SND_H (Page 354)

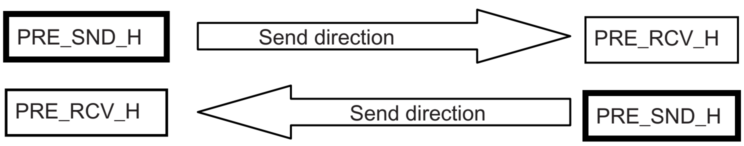
Function description

The block coordinates the process of sending telegrams between a redundant and a non-redundant automation station by means of S7 communication (BSEND). A maximum of 30 REAL values and 30 binary values can be sent. Each value also has a binary quality code, which specifies whether the measured value is free of errors or not.



① Connection #1

② Connection #2



Quality Code

The QC_Rx and QC_Bx (x=1..30) parameters contain the quality codes of the input signals and must be connected to the QUALITY output of the associated driver blocks when using the input signals selected.

3.21.2 Calling blocks - PRE_SND_H

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.21.3 Called blocks - PRE_SND_H

The block calls the following blocks:

FB1074	PRE_BS
SFB35	ALARM_8P
SFC6	RD_SINFO

3.21.4 Message behavior - PRE_SND_H

PRE_SND_H generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QERR_1	Communication failure conn. 1	PLC pr ctrl failure
	2	QERR_2	Communication failure conn. 2	PLC pr ctrl failure
	3	QERR_1, QERR_2	Complete loss of communication	PLC pr ctrl failure
	4	MSG_4	-	-
	5	MSG_5	-	-
	6	MSG_6	-	-
	7	MSG_7	-	-
	8	MSG_8	-	-

The auxiliary values of the message blocks are assigned as follows:

Message block	Auxiliary value	Parameter	Meaning
MSG_EVID	1	QSTATUS_1	Data transfer status, connection 1
	2	QSTATUS_2	Data transfer status, connection 2
	3	AUX_PR03	Not assigned
	4	AUX_PR04	Not assigned
	5	AUX_PR05	Not assigned
	6	AUX_PR06	Not assigned
	7	AUX_PR07	Not assigned
	8	AUX_PR08	Not assigned
	9	AUX_PR09	Not assigned
	10	AUX_PR10	Not assigned

The auxiliary values (AUX_PRx, x=03..10) of the message block can be freely assigned

3.21.5 Error response - PRE_SND_H

Monitoring the send process

The two connections to the receiving partner are monitored separately. The block usually sends data via both connections simultaneously.
When an error is detected, the relevant QERR_1 / QERR_2 output is set and a summary event is sent to the OS. Following a total failure of both connections, the auxiliary value (quality code) supplied for every value is also activated. A message is not generated until the SUPPTIME (suppression time) has elapsed. This parameter is adjustable.
The send error is reset when at least one telegram containing valid data has been successfully sent. If SUPPTIME < SAMPLE_T, the error message is generated immediately.

3.21.6 Startup characteristics - PRE_SND_H

The RUNUPCYC parameter can be used to set for how long (number of cycles) messages are to be suppressed.
RESTART = TRUEcan be used to simulate a restart.

3.21.7 Block parameters - PRE_SND_H

Item	Data type	Type	Meaning	HMI
AUX_PRx	ANY	IO	Auxiliary value 03 - 10	
BOOLx	REAL	I	BOOL values 1 - 30	
DONE_x	BOOL	O	Data transfer complete, connection x	
ERR_CNT_x	DINT	O	Error counter, connection x	
FIRST_VAR	BOOL	I	Start of send data	
HISTLAST_STATUS	WORD	O	Status of the last error, connection x	
HISTLAST_TIME_STAMP_x	DATE_AND_TIME	O	Time stamp of the last error, connection x	
HISTx_STATUS_x	WORD	O	Status of errors 1 - 4, connection x	
HISTx_TIME_STAMP_x	DATE_AND_TIME	O	Time stamp of errors 1 - 4	
ID_1	WORD	I	Connection ID, connection 1	
ID_2	WORD	I	Connection ID, connection 2	
L_MSGLCK	BOOL	I	Central message suppression can be connected	
LAST_VAR	BOOL	I	End of send data	
LEN_CNT_x	DINT	O	Integration of the sent data count, connection x	
MODE	BYTE	I	0 = Send once 1 = Send cyclically 2 ... 255 = Send every nth cycle	
MSG_ACK	WORD	O	Messages acknowledged	
MSG_EVID	DWORD	I	MESSAGE ID/ALARM_8P event ID	
MSG_STAT	WORD	O	STATUS output	
MSG_x	BOOL	I	Message input 4 - 8	
QC_Bx	BYTE	O	Quality code BOOL value 1 – 30	
QC_Rx	BYTE	O	Quality code REAL value 1 – 30	
QERR_x	BOOL	O	1 = Error during data transfer, connection x	
QLEN_x	INT	O	Length of the sent data, connection x	
QMSG_ERR	BOOL	O	ALARM_8P error	
QMSG_SUP	BOOL	O	Message suppression	
QSTATUS_x	INT	O	Data transfer status, connection x	
R_ID_1	DWORD	I	Request ID for connection 1	
R_ID_2	DWORD	I	Request ID for connection 2	
REALx	REAL	I	REAL values 1 - 30	
RES_HI_1	BOOL	IO	Reset history, connection 1	
RES_HI_2	BOOL	IO	Reset history, connection 2	
RESTART	BOOL	I	Manual startup	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SUPPTIME	REAL	I	Suppression time in [s]	
SWITCH	BOOL	I	1=Sending	

Description of the status

XSTATUS	Description
11	Alarm: New job not active because the previous job is still busy.
25	Communication has started. The job is being processed.
1	Communication problems, e.g. connection description not loaded (local or remote), connection interrupted (e.g. cable, CPU off, CP in STOP mode)
2	Negative acknowledgment from partner SFB. The function cannot be executed.
3	R_ID is unknown on the connection specified by the ID or the receive block has not yet been called.
4	Error in the send area pointer SD_1 regarding data length or data type, or the value 0 was transferred with LEN.
5	Reset request was executed.
6	The status of the partner SFB is DISABLED (value of EN_R is 0).
7	The status of the partner SFB is not correct (receive block not called since last data transfer).
8	Access to remote object in the user memory was rejected: The destination area at the associated SFB13 "BRCV" is too small (ERROR = 1, STATUS = 4 is reported at the associated SFB13 "BRCV").
10	Access to the local user memory not possible (for example, access to a deleted DB).
12	When the SFB was called, an instance DB that does not belong to SFB12 was specified. A shared DB was specified instead of an instance DB. No instance DB was found (loading a new instance DB from the PG).
18	R_ID already exists in the connection.
20	Insufficient work memory
-1	Connection error FIRST_VAR and/or LAST_VAR
-2	Internal error SFC20 BLKMOV
-3	Internal error SFC20 BLKMOV: Destination area too small
-4	Internal error SFC6 RD_SINFO

3.22 PRE_SUM / PR3_SUM: Acquisition of measured energy values

3.22.1 Function - PRE_SUM / PR3_SUM

PRE_SUM	FB1061
PR3_SUM	FB161

Description of block

- Calling OBs - PRE_SUM / PR3_SUM (Page 362)
- Called blocks - PRE_SUM / PR3_SUM (Page 363)
- Message behavior - PRE_SUM / PR3_SUM (Page 364)
- Error behavior - PRE_SUM / PR3_SUM (Page 365)
- Start-up characteristics - PRE_SUM / PR3_SUM (Page 366)
- Block parameter - PRE_SUM / PR3_SUM (Page 367)
- Description of icons and faceplates (Page 373)

Function description

You can acquire the energy consumption or power consumption of individual consumers with the function block PRE_SUM / PR3_SUM. The input signal is converted to a normalized energy value. In addition, the block calculates the following variables of the consumer:

- Accumulated energy value for the current time interval
- Average power consumption for the current time interval
- Projected energy value for the current time interval
- Projected average power consumption for the current time interval

The accumulated energy value and the average power demand of each completed time interval are buffered in the automation system in a cyclic buffer. The buffered values are permanently archived in the WinCC database through appropriate configuration.

The PRE_SUM / PR3_SUM function block forms the interface to the OS. You can visualize the relevant values on the OS with the block icon and the associated faceplate.

Measured value acquisition

The function block does not have its own driver functionality. This enables you to use different signal types for acquisition of the energy consumption. Assign parameters to the block input INP_SEL to specify which signal type to use. The table provides an overview of the various signal types.

INP_SEL	Signal type	Parameters	Quality code parameter	Normalization factor / calculation constants
0	Counter pulse	VALUE_P	QC_P	WEIGHT_P
1	Integer count value	VALUE_D	QC_D	WEIGHT_A
2	Analog count value	VALUE_R	QC_R	WEIGHT_A
3	Power value* calculated using arithmetic function	ACTUALx (x = 1 ... 3)	QC_ACTx (x = 1 ... 3)	CALC_Px (x = 0 ... 3), CALC_FN*

* See calculation algorithms contained in the PRE_CALC / PR3_CALC block (see "PRE_CALC / PR3_CALC: Calculations (Page 250)")

An hour is used as the time basis for energy measurement. For this reason all energy values are displayed with the unit kWh.

Signal type count pulse (INP_SEL = 0)

For signal type count pulse, the energy consumed (work) is established by adding together the weighted pulses. You parameterize the valency of the pulse via the normalization factor for pulse inputs (WEIGHT_P). Parameterize the normalization factor as shown as an example in the following table:

Energy consumed per pulse	Normalization factor (InputWEIGHT_P)
0.025 kWh	2.500000e-002
0.75 kWh	7.500000e-001
1 kWh	1.000000e+000
7.5 kWh	7.500000e+000
23 kWh	2.300000e+001

At the end of the acquisition period PER_T, the power value (CUR_PWR) is calculated from the energy consumed (work).

Signal type integer count value (INP_SEL = 1)

For signal type integer count value, the difference (normalized) between the current and last count value is the energy consumed (work). You parameterize the valency of the counter increment via the normalization factor for integer and analog count inputs (WEIGHT_A). Parameterize the normalization factor as shown as an example in the following table:

Energy consumed per counter increment	Normalization factor (Input WEIGHT_A)
0.025 kWh	2.500000e-002
0.75 kWh	7.500000e-001
1 kWh	1.000000e+000
7.5 kWh	7.500000e+000
23 kWh	2.300000e+001

At the end of the acquisition period PER_T, the power value (CUR_PWR) is calculated from the energy consumed (work).

Signal type analog count value (INP_SEL = 2)

For signal type analog count value, the difference (normalized) between the current and last count value is the energy consumed (work). You parameterize the valency of the counter difference via the normalization factor for integer and analog count inputs (WEIGHT_A). Parameterize the normalization factor as shown as an example in the following table:

Energy consumed for counter difference = 1.0	Normalization factor (Input WEIGHT_A)
0.025 kWh	2.500000e-002
0.75 kWh	7.500000e-001
1 kWh	1.000000e+000
7.5 kWh	7.500000e+000
23 kWh	2.300000e+001

At the end of the acquisition period PER_T, the power value (CUR_PWR) is calculated from the energy consumed (work).

Note

When measuring values with analog numbers, be aware that STEP 7 works with a computational accuracy of six decimal places. This means a difference for a count of "10 to the power > 6" is not recognized.

Signal type calculated power value (INP_SEL = 3)

For the signal type calculated power value, the function PRE_CALC / PR3_CALC returns the current power value CUR_PWR. The calculated power value is converted into an energy value in the function block with the help of the cycle time.

You can configure a dead band function for the calculated power value. If the calculated power value is less than the value configured at the input ZERO_CUT, the calculated power value is set to 0. You can disable the dead band function by assigning the parameter 0 to the input ZERO_CUT.

For more information, please read Function - PRE_CALC / PR3_CALC (Page 250)

Calculations at the end of the time interval

At the beginning of the new time interval, the current count value CUR_VAL and the elapsed duration of the time interval SYNC_PER are reset. The beginning of a new time interval is detected by a signal change at the input for the synchronization pulse SYNC_P. At the start of the time interval, the synchronization pulse changes from FALSE to TRUE.

During the time interval, the energy values recorded are added to the CUR_VAL parameter in cycles.

At the end of the time interval, the average power demand (AVG_PWR) is calculated from the energy consumed (work).

The change to the current energy value is projected to the total time interval EST_VAL. The expected, average power EST_PWR for the current time interval is determined from this value.

Mode changeover for measured value acquisition (signal type integer / analog count value)

For the signal type integer / analog count value, the operator can select the mode for measured value acquisition via the AUT_ON_OP input. To change the mode, the operator needs the appropriate enabling signal (AUTOP_EN / MANOP_EN).

The mode selected is displayed at the QMAN_AUT parameter.

Automatic mode (signal type integer / analog count value)

In automatic mode (QMAN_AUT = TRUE), the energy value is formed from the corresponding VALUE_D or VALUE_R input.

Manual mode (signal type integer / analog count value)

In manual mode (QMAN_AUT = FALSE), the operator can enter a new total energy value via the V_MAN input of the faceplate.

If the following conditions are satisfied, the value is valid and is applied:

- Signal type integer count value (INP_SEL = 1) or analog count value (INP_SEL = 2) is configured
- Manual mode (QMAN_AUT = FALSE) is activated
- The manual value entered V_MAN is not greater than the maximum count value MAX_CNT
- The manual value entered V_MAN is not less than the last valid manual value V_MAN_L1
- The time stamp of the entered manual value V_MAN_DATE and V_MAN_TIME is more current than the time stamp of the last valid manual value V_MAN_L1_DATE and V_MAN_L1_TIME

The total energy consumed CUR_VAL for this acquisition period is calculated using the following formula:
CUR_VAL = (V_MAN - V_MAN_L1) * (V_MAN_xxx - V_MAN_L1_xxx)

The following rules apply:

CUR_VAL	Current accumulated energy value
V_MAN	Manual value entered
V_MAN_L1	Last valid manual value
V_MAN_xxx	Time stamp (date V_MAN_DATE and time V_MAN_TIME) of the manual value entered
V_MAN_L1_xxx	Time stamp (date V_MAN_L1_DATE and time V_MAN_L1_TIME) of the last valid manual value

The power values AVG_PWR and CUR_PWR are calculated from the total energy consumed.

The projected energy and power values EST_VAL and EST_PWR are equated with the current values CUR_VAL and CUR_PWR for the acquisition period.

Note

In "Manual" mode, ensure that the values are entered in chronological order. Particularly when you switch from "Automatic" to "Manual" mode, it is important that you do not enter old values.

Archiving

You can archive the following values of the function block in the WinCC database:

LAST_VAL	Last archived, accumulated energy value of time interval
AVG_PWR	Average power demand at end of time interval
VALUE_D	Last acquired count value at end of time interval (only for integer count signal type)
VALUE_R	Last acquired count value at end of time interval (only for analog count signal type)

In manual mode, the energy consumed within the time period stated CUR_VAL and the average power demand AVG_PWR in the time period stated are archived.
The values are given the time stamp entered.

The data awaiting archiving are written to the FIFO buffer using the PRE_FIFO_IO / PR3_FIFO_IO function. You configure the archiving of the values in the WinCC database with the block PRE_AR_DATA / PR3_AR_DATA_B / PR3_AR_DATA.

Disabling individual archive values

You can disable archiving for each of the 3 values by assigning the parameter 0 to the subnumber of the corresponding archive tags.

ARSNO_S = 0	Archiving of the accumulated energy value is deactivated
ARSNO_V = 0	Archiving of the average power demand is deactivated
ARSNO_C = 0	Archiving of the count value is deactivated

Quality code

The parameters QC_P, QC_D, QC_R, QC_ACTx (x = 1 ... 3) contain the quality codes of the input signals. For this, interconnect the QUALITY output of the associated driver blocks with the quality codes of the input signals used.

Depending on the signal type used, the corresponding inputs are used to form the quality codes on the output side. Refer to the following table to find the input signals from which these output quantities are formed:

	InputQC_P	InputQC_D	InputQC_R	Input QC_ACTx (x = 1 ... 3)
Output QC_LAST_VAL Output QC_CUR_VAL Output QC_EST_VAL Output QC_AVG_PWR Output QC_CUR_PWR Output QC_EST_PWR	Signal type count pulse (INP_SEL = 0)	Signal type integer count value (INP_SEL = 1)	Signal type analog count value (INP_SEL = 2)	Signal type calculated power value (INP_SEL = 3)

The following quality code data is evaluated:

Quality code	= 16#60:	Simulation on driver block active (QSIM = TRUE)
Quality code	= 16#80:	Valid value
Quality code	All other values	Invalid value, external error (QBAD = TRUE)

In the event of an error, the value -1 is displayed at the outputs.

See also

Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)

Function - PRE_BIN_ACQ / PR3_BIN_ACQ (Page 241)

Function - PRE_INT_ACQ / PR3_INT_ACQ (Page 245)

3.22.2 Calling OBs - PRE_SUM / PR3_SUM

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.22.3 Called blocks - PRE_SUM / PR3_SUM

PRE_SUM

The block calls the following blocks:

SFB35	ALARM_8P
SFC6	RD_SINFO
FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
FC14	GT_DT (IEC function from the STEP 7 Standard Library)
FC34	SB_DT_DT (IEC function from the STEP 7 Standard Library)
FC1061	PRE_CALC
FC1062	PRE_FIFO_IO

PR3_SUM

The block calls the following blocks:

SFC6	RD_SINFO
SFC19	ALARM_SC
SFC107	ALARM_DQ
FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
FC14	GT_DT (IEC function from the STEP 7 Standard Library)
FC34	SB_DT_DT (IEC function from the STEP 7 Standard Library)
FC161	PR3_CALC
FC162	PR3_FIFO_IO

3.22.4 Message behavior - PRE_SUM / PR3_SUM

PRE_SUM

PRE_SUM generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QPARAMF	Parameterization error	PLC pr ctrl failure
	2	QPF_FIFO	FIFO parameterization error	PLC pr ctrl failure
	3	QOVL	FIFO buffer overflow	PLC pr ctrl failure
	4	QCALCERR	Error in arithmetic function	PLC pr ctrl failure
	5	QOP_ERR	Invalid manual value	OS pr ctrl failure
	6	QBAD	External error	PLC pr ctrl failure
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_SUM

PR3_SUM generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSGEVID1	1	QPARAMF	Parameterization error	PLC pr ctrl failure
MSGEVID2	1	QPF_FIFO	FIFO parameterization error	PLC pr ctrl failure
MSGEVID3	1	QOVL	FIFO buffer overflow	PLC pr ctrl failure
MSGEVID4	1	QCALCERR	Error in arithmetic function	PLC pr ctrl failure
MSGEVID5	1	QOP_ERR	Invalid manual value	OS pr ctrl failure
MSGEVID6	1	QBAD	External error	PLC pr ctrl failure

3.22.5 Error behavior - PRE_SUM / PR3_SUM

The function block PRE_SUM / PR3_SUM indicates faulty block parameter assignments, extraordinary operating states and invalid operator entries at numerous outputs.

Error output QPARAMF

If a faulty parameter assignment of the function block is detected, the error output QPARAMF is set. The following parameter assignments or events result in the error output being set:

- The acquisition period PER_T ≤ 0
- The synchronization period SYNC_PER ≤ 0
- Normalization factor WEIGHT_P ≤ 0.0 and the signal type count pulse (INP_SEL = 0) is configured
- Normalization factor WEIGHT_A ≤ 0.0 and the signal type integer count (INP_SEL = 1) or analog count (INP_SEL = 2) is configured
- The maximum counter value MAX_CNT ≤ 0.0
- The count input VALUE_D > MAX_CNT for the selected signal type integer count value (INP_SEL = 1)
- The count input VALUE_R > MAX_CNT for the selected signal type analog count value (INP_SEL = 2)
- The limit for zero point ZERO_CUT < 0 for the calculated power value if the signal type calculation function is selected
- Subnumber for archive tag (ARSNO_V > 16#0FFF
- Subnumber for archive tag (ARSNO_S > 16#0FFF
- Subnumber for archive tag (ARSNO_C > 16#0FFF

Error output QBAD

If an external error is present at the CSF input, the error output QBAD is set.

Error output QCALCERR

If the arithmetic function called internally PRE_CALC / PR3_CALC reports an error in the calculation, the error output QCALCERR is set.

Error output QPF_FIFO

If the internal PRE_FIFO_IO / PR3_FIFO_IO function for managing the FIFO buffer reports an error, the QPF_FIFO error output is set. The following errors are detected:

- The configured FIFO DB is not available
- The FIFO DB length is too short

Error output QOVL

If a buffer overflow occurs in the FIFO Puffer, the error output QOVL is set.

Error output QOP_ERR

If an operating error is detected in manual mode, the error output QOP_ERR is set for one processing cycle. The following operating errors and events result in the error output being set:

- invalid time stamp
- A manual value V_MAN < 0 is entered
- A manual value V_MAN > maximum count valueMAX_CNT is entered

3.22.6 Start-up characteristics - PRE_SUM / PR3_SUM

During startup, the accumulated values are reset, the times restarted, and the messages suppressed.

3.22.7 Block parameter - PRE_SUM / PR3_SUM

PRE_SUM

Item	Data type	Type	Meaning	HMI
ACTUALx	REAL	I	Current value x (x = 1 ... 3) for calculation function*	
ARSNO_C	WORD	I	Subnumber for archive tag of count value .C	+
ARSNO_S	WORD	I	Subnumber for archive tag of accumulated value .S	+
ARSNO_V	WORD	I	Subnumber for archive tag of average power value .V	+
AUT_ON_OP	BOOL	IO	Mode selection for measured value acquisition: FALSE = Manual TRUE = Automatic	+
AUTMAN_EN	BOOL	I	Release for automatic changeover to manual in the event of an external error: FALSE = No release for automatic changeover TRUE = Release for automatic changeover	
AUTOP_EN	BOOL	I	Operator-control enable for automatic mode FALSE = No operator-control enable for automatic mode TRUE = Operator-control enable for automatic mode	
AVG_PWR	REAL	O	Average power at end of time interval	+
CALC_FN	INT	I	Arithmetic function*	
CALC_Px	REAL	I	Parameter x (x=0...3) of arithmetic function *	
CSF	BOOL	I	External error: FALSE = not an external error TRUE = external error	
CUR_PWR	REAL	O	Current power at end of acquisition period	+
CUR_VAL	REAL	O	Current accumulated value	+
EST_VAL	REAL	O	Projected value to end of time interval	+
EST_PWR	REAL	O	Average power at end of time interval	+
FIFO	INT	I	Link to FIFO data	
INP_SEL	INT	I	Selector for signal type: 0 = Pulse input 1 = Integer count input 2 = Analog count input 3 = Result from arithmetic block	+
LAST_VAL	REAL	O	Last archived, accumulated value	+
MANOP_EN	BOOL	I	Operator-control enable for manual mode: FALSE = No operator-control enable for manual mode TRUE = Operator-control enable for manual mode	
MAX_CNT	REAL	I	Maximum count value for the two signal types Integer and analog counter input	+
MSG_ACK	WORD	O	Messages acknowledged, ALARM_8P block	
MSG_EVID	DWORD	I	Event ID of the ALARM_8P message block	
MSG_STAT	WORD	O	MESSAGE: STATUS output	
PER_T	REAL	I	Acquisition period for current power value in [s]	

Item	Data type	Type	Meaning	HMI
QAUTOP	BOOL	O	Current status of operator-control enable for automatic mode: FALSE = Operator-control enable for automatic mode not activated TRUE = Operator-control enable for automatic mode activated	+
QBAD	BOOL	O	Current status of external error: FALSE = No external error present TRUE = External error present	
QC_ACTx	BYTE	I	Quality code for input ACTUALx (current value x (x = 1 ... 3) of arithmetic function*)	
QC_AVG_PWR	BYTE	O	Quality code of output AVG_PWR (Average power at end of time interval)	
QC_CUR_PWR	BYTE	O	Quality code of output CUR_PWR (Average power at end of time interval)	
QC_CUR_VAL	BYTE	O	Quality code of output CUR_VAL (Current accumulated value)	
QC_D	BYTE	I	Quality code for input VALUE_D (input for integer count value for energy acquisition)	
QC_EST_PWR	BYTE	O	Quality code of output EST_PWR (Average power until end of time interval)	
QC_EST_VAL	BYTE	O	Quality code of output EST_VAL (Projected value until end of time interval)	
QC_LAST_VAL	BYTE	O	Quality code of output LAST_VAL (Last archived, accumulated value)	
QC_P	BYTE	I	Quality code for input VALUE_P (input for count pulse for energy measurement)	
QC_R	BYTE	I	Quality code for input VALUE_R (input for analog count for energy measurement)	
QCALCERR	BOOL	O	Error when processing the function PRE_CALC*: FALSE = No error when processing the arithmetic function TRUE = Error when processing the arithmetic function	
QMAN_AUT	BOOL	O	Current status of mode selection for measured value acquisition: FALSE = Manual TRUE = Automatic	+
QMANOP	BOOL	O	Current status of operator-control enable for manual mode: FALSE = Operator-control enable for manual mode not activated TRUE = Operator-control enable for manual mode activated	+
QMSG_ERR	BOOL	O	Current status of system function block ALARM_8P: FALSE = No error present TRUE = Error present	
QMSG_SUP	BOOL	O	Current status of message suppression: FALSE = Message suppression is deactivated TRUE = Message suppression is activated	+
QOP_ERR	BOOL	O	Invalid manual value: FALSE = No invalid manual value present TRUE = Invalid manual value present	
QOVL	BOOL	O	Overflow of FIFO buffer: FALSE = No buffer overflow TRUE = Buffer overflow	

Item	Data type	Type	Meaning	HMI
QPARAMF	BOOL	O	Parameter assignment error at the function block: FALSE = No parameter assignment error TRUE = Parameter assignment error	
QPF_FIFO	BOOL	O	Parameter assignment error of the FIFO buffer: FALSE = No parameter assignment error of the FIFO buffer TRUE = Parameter assignment error of the FIFO buffer	
QSIM	BOOL	O	Current status of simulation: FALSE = Simulation deactivated TRUE = Simulation activated	+
RESET	BOOL	IO	Reset accumulated value: FALSE = Accumulated value is updated normally TRUE = Reset accumulated value	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SET	BOOL	IO	Set manual value: FALSE = No action TRUE = Manual value is accepted by the block	+
SYNC_P	BOOL	I	Synchronization pulse	
SYNC_PER	REAL	I	Synchronization period in [s]	+
SYNC_TS	DATE_AND_TIME	I	Time stamp: Date and time of synchronization pulse	
V_MAN	REAL	IO	Current manual value	+
V_MAN_DATE	DWORD	IO	Time stamp: Date of current manual value	+
V_MAN_Lx	REAL	IO	Last manual value x (x = 1 ... 3)	+
V_MAN_Lx_DATE	DWORD	IO	Time stamp: Date of last manual value x (x = 1 ... 3)	+
V_MAN_Lx_TIME	DWORD	IO	Time stamp: Time of last manual value x (x = 1 ... 3)	+
V_MAN_TIME	DWORD	IO	Time stamp: Time of current manual value	+
VALUE_D	DINT	I	Input for integer count value for energy acquisition	
VALUE_P	BOOL	I	Input for count pulse for energy acquisition	
VALUE_R	REAL	I	Input for analog count value for energy acquisition	
WEIGHT_A	REAL	I	Normalization factor for integer and analog counter input	
WEIGHT_P	REAL	I	Normalization factor for pulse input	
ZERO_CUT	REAL	I	Limit for zero point during calculation	

* See calculation algorithms contained in the PRE_CALC block
(see "PRE_CALC / PR3_CALC: Calculations (Page 250)")

PR3_SUM

Item	Data type	Type	Meaning	HMI
ACTUALx	REAL	I	Current value x (x = 1 ... 3) for calculation function*	
ARSNO_C	WORD	I	Subnumber for archive tag of count value .C	+
ARSNO_S	WORD	I	Subnumber for archive tag of accumulated value .S	+
ARSNO_V	WORD	I	Subnumber for archive tag of average power value .V	+
AUT_ON_OP	BOOL	IO	Mode selection for measured value acquisition: FALSE = Manual TRUE = Automatic	+
AUTMAN_EN	BOOL	I	Automatic changeover to manual mode in the event of an external error: FALSE = No release for automatic changeover TRUE = Release for automatic changeover	
AUTOP_EN	BOOL	I	Operator-control enable for automatic mode FALSE = No operator-control enable for automatic mode TRUE = Operator-control enable for automatic mode	
AVG_PWR	REAL	O	Average power at end of time interval	+
CALC_FN	INT	I	Arithmetic function*	
CALC_Px	REAL	I	Parameter x (x=0...3) of arithmetic function *	
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
CSF	BOOL	I	External error: FALSE = not an external error TRUE = external error	
CUR_PWR	REAL	O	Current power at end of acquisition period	+
CUR_VAL	REAL	O	Current accumulated value	+
EST_VAL	REAL	O	Projected value to end of time interval	+
EST_PWR	REAL	O	Average power at end of time interval	+
FIFO	INT	I	Link to FIFO data	
INP_SEL	INT	I	Selector for signal type: 0 = Pulse input 1 = Integer count input 2 = Analog count input 3 = Result from arithmetic block	+
LAST_VAL	REAL	O	Last archived, accumulated value	+
MANOP_EN	BOOL	I	Operator-control enable for manual mode: FALSE = No operator-control enable for manual mode TRUE = Operator-control enable for manual mode	
MAX_CNT	REAL	I	Maximum count value for the two signal types Integer and analog counter input	+

Item	Data type	Type	Meaning	HMI
MSG_ACKx	BOOL	O	Messages acknowledged ALARM_DQ-Block x (x = 1 ... 6): FALSE = Unacknowledged messages are present TRUE = All messages are acknowledged	
MSGEVIDx	DWORD	I	Event ID x (x = 1 ... 6) of message block ALARM_DQ	
MSGSTATx	WORD	O	MESSAGE x (x = 1 ... 6): STATUS Output	
PER_T	REAL	I	Acquisition period for current power value in [s]	
QAUTOP	BOOL	O	Current status of operator-control enable for automatic mode: FALSE = Operator-control enable for automatic mode not activated TRUE = Operator-control enable for automatic mode activated	+
QBAD	BOOL	O	Current status of external error: FALSE = No external error present TRUE = External error present	
QC_ACTx	BYTE	I	Quality code for input ACTUALx (current value x (x = 1 ... 3) of arithmetic function*)	
QC_AVG_PWR	BYTE	O	Quality code of output AVG_PWR (Average power at end of time interval)	
QC_CUR_PWR	BYTE	O	Quality code of output CUR_PWR (Average power at end of time interval)	
QC_CUR_VAL	BYTE	O	Quality code of output CUR_VAL (Current accumulated value)	
QC_D	BYTE	I	Quality code for input VALUE_D (input for integer count value for energy acquisition)	
QC_EST_PWR	BYTE	O	Quality code of output EST_PWR (Average power until end of time interval)	
QC_EST_VAL	BYTE	O	Quality code of output EST_VAL (Projected value until end of time interval)	
QC_LAST_VAL	BYTE	O	Quality code of output LAST_VAL (Last archived, accumulated value)	
QC_P	BYTE	I	Quality code for input VALUE_P (input for count pulse for energy measurement)	
QC_R	BYTE	I	Quality code for input VALUE_R (input for analog count for energy measurement)	
QCALCERR	BOOL	O	Error when processing the function PR3_CALC*: FALSE = No error when processing the arithmetic function TRUE = Error when processing the arithmetic function	
QMAN_AUT	BOOL	O	Current status of mode selection for measured value acquisition: FALSE = Manual TRUE = Automatic	+
QMANOP	BOOL	O	Current status of operator-control enable for manual mode: FALSE = Operator-control enable for manual mode not activated TRUE = Operator-control enable for manual mode activated	+
QMSG_ERR	BOOL	O	Current status of system function block ALARM_DQ: FALSE = No error present TRUE = Error present	
QMSG_SUP	BOOL	O	Current status of message suppression: FALSE = Message suppression is deactivated TRUE = Message suppression is activated	+

Item	Data type	Type	Meaning	HMI
QOP_ERR	BOOL	O	Invalid manual value: FALSE = No invalid manual value present TRUE = Invalid manual value present	
QOVL	BOOL	O	Overflow of FIFO buffer: FALSE = No buffer overflow TRUE = Buffer overflow	
QPARAMF	BOOL	O	Parameter assignment error at the function block: FALSE = No parameter assignment error TRUE = Parameter assignment error	
QPF_FIFO	BOOL	O	Parameter assignment error of the FIFO buffer: FALSE = No parameter assignment error of the FIFO buffer TRUE = Parameter assignment error of the FIFO buffer	
QSIM	BOOL	O	Current status of simulation: FALSE = Simulation deactivated TRUE = Simulation activated	+
RESET	BOOL	IO	Reset accumulated value: FALSE = Accumulated value is updated normally TRUE = Reset accumulated value	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time in [s]	
SET	BOOL	IO	Set manual value: FALSE = No action TRUE = Manual value is accepted by the block	+
SYNC_P	BOOL	I	Synchronization pulse	
SYNC_PER	REAL	I	Synchronization period in [s]	+
SYNC_TS	DATE_AND_TIME	I	Time stamp: Date and time of synchronization pulse	
V_MAN	REAL	IO	Current manual value	+
V_MAN_DATE	DWORD	IO	Time stamp: Date of current manual value	+
V_MAN_Lx	REAL	IO	Last manual value x (x = 1 ... 3)	+
V_MAN_Lx_DATE	DWORD	IO	Time stamp: Date of last manual value x (x = 1 ... 3)	+
V_MAN_Lx_TIME	DWORD	IO	Time stamp: Time of last manual value x (x = 1 ... 3)	+
V_MAN_TIME	DWORD	IO	Time stamp: Time of current manual value	+
VALUE_D	DINT	I	Input for integer count value for energy acquisition	
VALUE_P	BOOL	I	Input for count pulse for energy acquisition	
VALUE_R	REAL	I	Input for analog count value for energy acquisition	
WEIGHT_A	REAL	I	Normalization factor for integer and analog counter input	
WEIGHT_P	REAL	I	Normalization factor for pulse input	
ZERO_CUT	REAL	I	Limit for zero point during calculation	

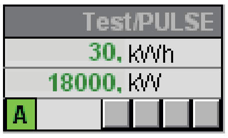
* See calculation algorithms contained in the PR3_CALC block
(see "PRE_CALC / PR3_CALC: Calculations (Page 250)")

3.22.8 Description of icons and faceplates

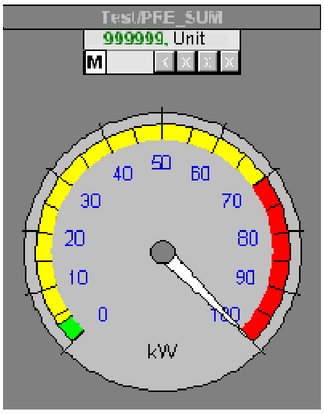
3.22.8.1 Block icon - PRE_SUM / PR3_SUM

Block icon

Variant 1



Variant 2



See also

Operating the PRE_SUM / PR3_SUM faceplate in Runtime (Page 108)

3.22.8.2 Faceplate - PRE_SUM / PR3_SUM

The associated faceplate is described in this section.

The following views can be selected:

- Overview
- Standard
- Table
- Input
- Maintenance
- Message
- Trend

PRE_SUM

The file name of the associated views of the faceplate can be found in the following table.

View	Name of the file
Overview	@PG_PRE_SUM_OVERVIEW.pdl
Standard	@PG_PRE_SUM_STANDARD.pdl
Table	@PG_PRE_SUM_TABLE.pdl
Input	@PG_PRE_SUM_EDIT.pdl
Maintenance	@PG_PRE_SUM_MAINTENANCE.pdl
Messages	Uses standard faceplate
Trend	Uses standard faceplate

PR3_SUM

The file name of the associated views of the faceplate can be found in the following table.

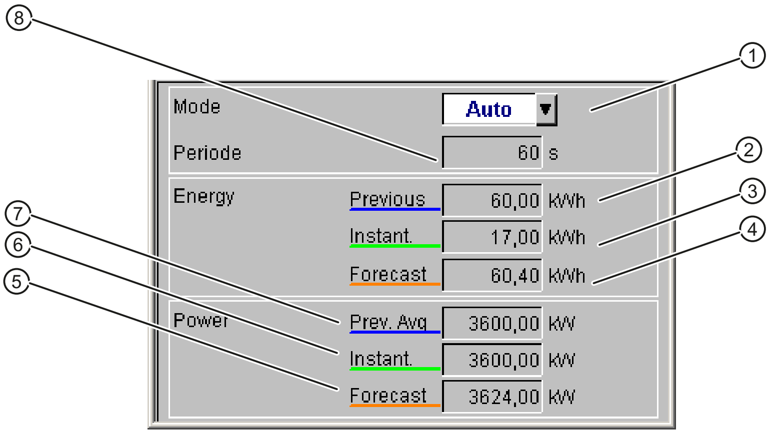
View	Name of the file
Overview	@PG_PR3_SUM_OVERVIEW.pdl
Standard	@PG_PR3_SUM_STANDARD.pdl
Table	@PG_PR3_SUM_TABLE.pdl
Input	@PG_PR3_SUM_EDIT.pdl
Maintenance	@PG_PR3_SUM_MAINTENANCE.pdl
Messages	Uses standard faceplate
Trend	Uses standard faceplate

See also

Operating the PRE_SUM / PR3_SUM faceplate in Runtime (Page 108)

3.22.8.3 Standard - PRE_SUM / PR3_SUM

Standard



	Item	Parameter	Description
	General data		
(1)	Manual/Auto mode	AUT_ON_OP QMAN_AUT	Manual/Automatic mode selection for measured value acquisition
	Energy		
(2)	Last	LAST_VAL	Last archived, accumulated work value
(3)	Current	CUR_VAL	Current accumulated energy value
(4)	Forecast	EST_VAL	Energy value which was projected until the end of the time interval
	Power		
(5)	Forecast	EST_PWR	Average power at end of time interval
(6)	Current	CUR_PWR	Current power at end of the time interval
(7)	Last average value	AVG_PWR	Average power at end of time interval
	General data		
(8)	Period synchro.	SYNC_PER	Synchronization period in [s]

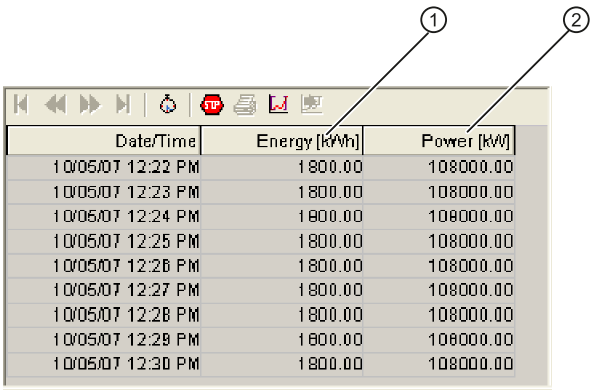
Explanation of values

Item		Signal type 0, 1 – 2 (automatic)	Signal type 1 – 2 (manual)	Signal type 3
Energy: (work)	Last	Last archived energy value from the previous time interval	Last archived energy value from the previous time interval	Last archived energy value from the previous time interval
	Current	Energy value accumulated within the current time interval	Last manually entered energy value of the current time interval	Energy value accumulated within the current time interval
	Forecast	Projected accumulated energy value to end of time interval	Last manually entered energy value of the current time interval	Projected accumulated energy value to end of time interval
Power:	Last average value	Last archived average power demand	Last archived average power value from the previous time interval	Last archived average power demand
	Current	Current power value	Average power demand for the last time period entered	Current power value
	Forecast	Projected average power value at end of time interval	Average power demand for the last time period entered	Projected average power value at end of time interval

3.22.8.4 Table - PRE_SUM / PR3_SUM

Table

Display of archived, accumulated energy values and average power values from the database

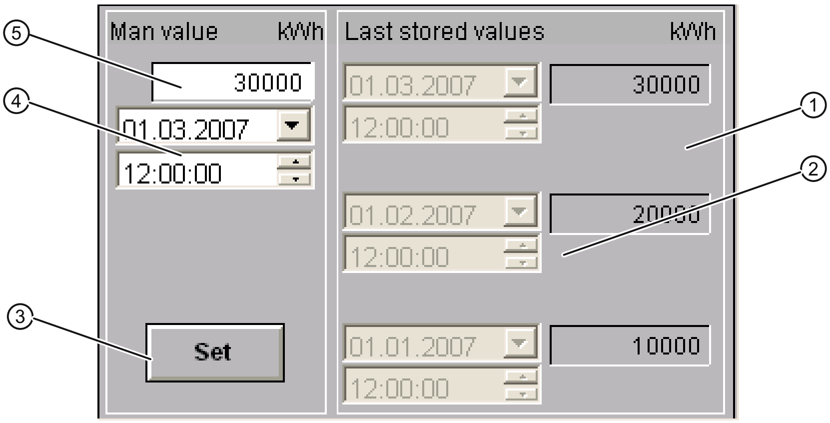


Date/Time	Energy [kWh]	Power [kW]
10/05/07 12:22 PM	1800.00	108000.00
10/05/07 12:23 PM	1800.00	108000.00
10/05/07 12:24 PM	1800.00	108000.00
10/05/07 12:25 PM	1800.00	108000.00
10/05/07 12:26 PM	1800.00	108000.00
10/05/07 12:27 PM	1800.00	108000.00
10/05/07 12:28 PM	1800.00	108000.00
10/05/07 12:29 PM	1800.00	108000.00
10/05/07 12:30 PM	1800.00	108000.00

	Item	Parameter	Description
(1)	Energy [kWh]	LAST_VAL	Archive tag .S: Accumulated energy value
(2)	Power [kW]	AVG_PWR	Archive tag .V: Average power demand

3.22.8.5 Input - PRE_SUM / PR3_SUM

Input



	Item	Parameter	Description
	Last manual values		
(1)	Manual value x	V_MAN_Lx (x = 1 ... 3)	Last manual value x (x = 1 ... 3)
(2)	Time stamp manual value x	V_MAN_Lx_DATE V_MAN_Lx_TIME (x = 1 ... 3)	Date and time of default setting of manual value x (x = 1 ... 3)
	Manual value		
(3)	Set	SET	Accept manual value
(4)	Time stamp manual value	V_MAN_DATE V_MAN_TIME	Date and time of default setting of manual value
(5)	Manual value	V_MAN	Current manual value

3.22.8.6 Maintenance - PRE_SUM / PR3_SUM

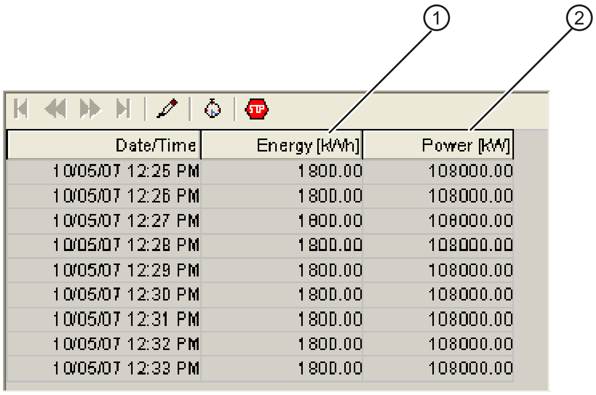
Maintenance

You can change the following archive values in this view:

- accumulated energy values
- average power values

Note

The changed values are not checked for consistency. The user is responsible for ensuring the values are correct.



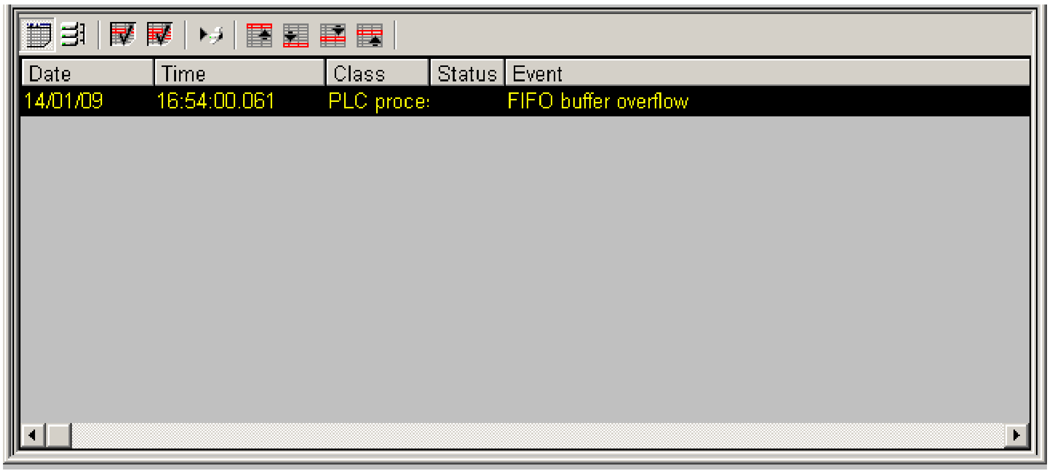
Date/Time	Energy [kWh]	Power [kW]
10/05/07 12:25 PM	1800.00	108000.00
10/05/07 12:26 PM	1800.00	108000.00
10/05/07 12:27 PM	1800.00	108000.00
10/05/07 12:28 PM	1800.00	108000.00
10/05/07 12:29 PM	1800.00	108000.00
10/05/07 12:30 PM	1800.00	108000.00
10/05/07 12:31 PM	1800.00	108000.00
10/05/07 12:32 PM	1800.00	108000.00
10/05/07 12:33 PM	1800.00	108000.00

	Item	Parameter	Description
(1)	Energy [kWh]	LAST_VAL	Archive tag .S: Accumulated energy value
(2)	Power [kW]	AVG_PWR	Archive tag -V: Average power demand

3.22.8.7 Messages- PRE_SUM / PR3_SUM

Messages

In this view, the messages which were generated via the function block PRE_SUM / PR3_SUM are displayed.

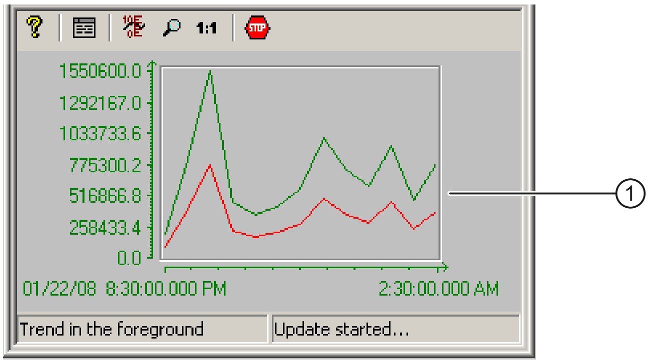


3.22.8.8 Trend - PRE_SUM / PR3_SUM

Trend

If archiving of accumulated energy values is active, the S (added energy value) and V (average power value) archive tags are shown in the trend view.

If accumulated energy values are not archived, the trend view contains the CUR_VAL (current energy) and CUR_PWR (current power) online tags.



	Item	Parameter	Description
(1)	Archived energy values	LAST_VAL CUR_VAL	Archive tag .S: accumulated energy value or current energy value
		and	
	Archived power values	AVG_PWR CUR_PWR	Archive tag .V: average power value or current power

3.23 PRE_SUMC / PR3_SUMC: Batch-related energy acquisition

3.23.1 Function - PRE_SUMC / PR3_SUMC

PRE_SUMC	FB1077
PR3_SUMC	FB177

Description of block

- Calling OBs - PRE_SUMC / PR3_SUMC (Page 382)
- Called blocks - PRE_SUMC / PR3_SUMC (Page 382)
- Message behavior - PRE_SUMC / PR3_SUMC (Page 383)
- Error response - PRE_SUMC / PR3_SUMC (Page 384)
- Startup characteristics - PRE_SUMC / PR3_SUMC (Page 384)
- Block parameters - PRE_SUMC / PR3_SUMC (Page 385)

Function description

The PRE_SUMC / PR3_SUMC block adds the energy consumption for 5 energy types from each of 10 loads (VALx_y) with the same unit and allocates the entire energy consumption (CUR_VALx, LASTVALx) to one batch.

Recording of energy consumption is started and stopped with an input signal. The energy consumption recorded in this period is archived in WinCC user archives (PRE_SUMC_x) with the start and end point and information about the batch. Archiving is carried out with the archive manager block for writing PRE_UA_S / PR3_UA_S.

The input signal for energy measurement is independent of the synchronization pulse.

The PRE_SUM / PR3_SUM block supplies the work values of the individual loads.

Structure of the user archives

The user archive has the following data structure:

Field name	Data type	Block parameter	Meaning
BA_NA	STRING[32]	BA_NA	Batch name
STARTTIME	DATE_AND_TIME	-	Start time
ENDTIME	DATE_AND_TIME	-	End time
UNIT	STRING[24]	UNIT	System
BA_ID	INT	BA_ID	Batch ID
REC_NA	STRING[32]	REC_NA	Recipe name
VALUEx	REAL	CUR_VALx	Total work value x (x = 1 ... 5)
VAL_UNITx	STRING[8]	VALUNITx	Unit x (x = 1 ... 5)
TYPEx	STRING[32]	TYPEx	Energy type x (x = 1 ... 5)

The PRE_SUMC / PR3_SUMC block combines the consumption data pending at the inputs, with the exception of the start and end point. These data points are derived from the Boolean input signal ACTIVE.

The user archives have the name PRE_SUMC_x (x corresponds to the archive ID).
A more meaningful name can be entered in the alias. This name can contain, for example, the designation of the PCELL that you can use as the filter criterion for export.

Archiving

In the case of a positive edge of ACTIVE, a start request is issued to the archive manager, and saved in the internal buffer if another job is still active. This is necessary to ensure no data is lost when jobs follow each other in quick succession. Only one job can be buffered.

The PRE_SUMC / PR3_SUMC block calculates and saves the start time. The default end time is 01.01.1990 (corresponding to "0").

The archive manager informs the PRE_SUMC / PR3_SUMC block that the job has been completed with or without errors via the input structure SND_ST.

The START_OK output is set if the job has been saved and can be transferred to the archive manager. START_OK is reset when the ACTIVE input returns to "0".

An end request is issued to the archive manager with a negative edge at the ACTIVE input. The block calculates the end time. The saved value of the start job is taken as the start time. The previously created data set is overwritten with the current data.

Further execution is identical to ACTIVE with a positive edge.

The data is written to the PRE_SUMC_x archive.

If you detect in WinCC that a change of month has taken place at the start of a batch and there are already 13 months available in the user archive, the data sets of the first month available in the user archive are deleted in the user archive. Archiving then continues. The data for the last 12 months + the current month is thus always available for analysis.

If the max. limit of 320,000 fields (corresponding here to 13,333 data sets) defined by WinCC is reached within one user archive, the block generates a message. No further archiving can be carried out until the user data sets have been deleted from the user archive.

To back up the old data, the reporting function integrated in powerrate can be used to execute cyclic exporting of the data to Excel before overwriting.

The ARCH_OK output is set if the job has been saved and can be transferred to the archive manager. ARCH_OK is reset with a positive edge on ACTIVE.

A job is time-monitored by the PRE_SUMC / PR3_SUMC block.

See also

Creating a WinCC UserArchiveControl for PRE_SUMC / PR3_SUMC (Page 138)

The PRE_SUMC / PR3_SUMC block (Page 131)

3.23.2 Calling OBs - PRE_SUMC / PR3_SUMC

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.23.3 Called blocks - PRE_SUMC / PR3_SUMC

PRE_SUMC

The block calls the following blocks:

SFB35	ALARM_8P
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL
SFC51	RDSYSST
FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
FC28	NE_DT (IEC function from the STEP 7 Standard Library)

PR3_SUMC

The block calls the following blocks:

SFC6	RD_SINFO
SFC19	ALARM_SC
SFC20	BLKMOV
SFC21	FILL
SFC51	RDSYSST
SFC107	ALARM_DQ
FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
FC28	NE_DT (IEC function from the STEP 7 Standard Library)

3.23.4 Message behavior - PRE_SUMC / PR3_SUMC

PRE_SUMC

PRE_SUMC generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QPARAMF	Parameter error	PLC pr ctrl failure
	2	QMON_ERR	Monitoring error	PLC pr ctrl failure
	3	QERR	Invalid data	PLC pr ctrl failure
	4	QOVL	Overflow of user archive	PLC pr ctrl failure
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_SUMC

PR3_SUMC generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSGEVID1	1	QPARAMF	Parameter error	PLC pr ctrl failure
MSGEVID2	1	QMON_ERR	Monitoring error	PLC pr ctrl failure
MSGEVID3	1	QERR	Invalid data	PLC pr ctrl failure
MSGEVID4	1	QOVL	Overflow of user archive	PLC pr ctrl failure

3.23.5 Error response - PRE_SUMC / PR3_SUMC

A parameterization error QPARAMF is generated when

- The monitoring time TIME_MON is ≤ 0
- ID ≤ 0
- ARCH_ID ≤ 0 or ARCH_ID not available, or
- The archive manager block signals ID QARCHERR if the block ID agrees

If the monitoring time is incorrect, a new request cannot be generated.

The QERR output is set when

- A request has been issued to the archive manager and the parameters JOB_ID und ARCH_ID do not agree between the request and the response of the archive manager.

The QERR output is not reset until a new request is pending or until the request agrees with the job data again when the job is repeated (COUNT > 0).

If a valid response is not received from the archive manager within the monitoring time, the QMON_ERR error output is set. At the COUNT input, a number of job repetitions can be set before the occurred errors are output. If, for example, a monitoring time of 10 seconds is set and COUNT = 1, the monitoring error is not signaled until 20 seconds have elapsed. The parameterization error is an exception to this. This error is signaled immediately.

All errors remain pending until a new request is transmitted.

A job is always repeated when one of the errors described above has occurred.

3.23.6 Startup characteristics - PRE_SUMC / PR3_SUMC

During startup, the QREQ_ST output structure and the user data are reset and no job is executed.

3.23.7 Block parameters - PRE_SUMC / PR3_SUMC

PRE_SUMC

Item	Data type	Type	Meaning	HMI
ACTIVE	BOOL	I	Batch active	
ARCH_ID	INT	I	Archive ID	
ARCH_OK	BOOL	O	Job completion OK	
BA_ID	DWORD	I	Batch ID	
BA_NA	STRING[32]	I	Batch name	
COUNT	INT	I	Number of job repetitions	
CUR_TS	DT	I	Current time stamp when block is called	
CUR_VALx	REAL	O	Current total work value x (x = 1 ... 5)	
ID	INT	I	Block ID; unique number for this block	
LASTVALx	REAL	O	Last archived, accumulated total work value x (x = 1 ... 5)	
MAX_VAL	REAL	I	Maximum number of work values	
MSG_ACK	WORD	O	Acknowledge status of the ALARM_8P block	
MSG_EVID	DWORD	I	Event ID for ALARM_8P block	
MSG_STAT	WORD	O	Status of the ALARM_8P block	
QARCH_ID	INT	O	Archive ID	
QERR	BOOL	O	Group error	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QOVL	BOOL	O	Overflow of user archive	
QPARAMF	BOOL	O	Parameterization error	
QREQ_ACT	BOOL	O	Request pending	
QREQ_ST	UDT_PRE_SND_REQ	O	Request structure for request to archive manager	
REC_NA	STRING[32]	I	Recipe name	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time [s]	
SND_ST	UDT_PRE_SND	I	Acknowledgment signals from archive manager	
START_OK	BOOL	O	Batch start OK	
TIME_MON	REAL	I	Monitoring time [s]	
TYPEx	STRING[32]	I	Energy type x (x = 1 ... 5)	
UNIT	STRING[24]	I	System name	
VALUNITx	STRING[8]	I	Unit of the value of the energy type x (x = 1 ... 5)	
VALx_y	REAL	I	Current work value of the energy type x of the load y (x = 1 ... 5, y = 1 ... 10)	

PR3_SUMC

Item	Data type	Type	Meaning	HMI
ACTIVE	BOOL	I	Batch active	
ARCH_ID	INT	I	Archive ID	
ARCH_OK	BOOL	O	Job completion Ok	
BA_ID	DWORD	I	Batch ID	
BA_NA	STRING[32]	I	Batch name	
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
COUNT	INT	I	Number of job repetitions	
CUR_TS	DT	I	Current time stamp when block is called	
CUR_VALx	REAL	O	Current total work value x (x = 1 ... 5)	
DIFF_LOC	REAL	I	Difference between UTC and local time in [h]	
ID	INT	I	Block ID; unique number for this block	
LASTVALx	REAL	O	Last archived, accumulated total work value x (x = 1 ... 5)	
MAX_VAL	REAL	I	Maximum number of work values	
MSG_ACKx	WORD	O	Acknowledgment status of the ALARM_DQ block x (x=1..4)	
MSGEVIDx	DWORD	I	Event ID of the ALARM_DQ block x (x = 1 .. 4)	
MSGSTATx	WORD	O	Status of the ALARM_DQ block x (x = 1 .. 4)	
QARCH_ID	INT	O	Archive ID	
QERR	BOOL	O	Group error	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QOVL	BOOL	O	Overflow of user archive	
QPARAMF	BOOL	O	Parameterization error	
QREQ_ACT	BOOL	O	Request pending	
QREQ_ST	UDT_PRE_SND_REQ	O	Request structure for request to archive manager	
REC_NA	STRING[32]	I	Recipe name	
RUNUPCYC	INT	I	Number of startup cycles	
SAMPLE_T	REAL	I	Sampling time [s]	
SND_ST	UDT_PRE_SND	I	Acknowledgment signals from archive manager	
START_OK	BOOL	O	Batch start OK	
TIME_MON	REAL	I	Monitoring time [s]	
TYPEx	STRING[32]	I	Energy type x (x = 1 ... 5)	
UNIT	STRING[24]	I	System name	
VALUNITx	STRING[8]	I	Unit of the value of the energy type x (x = 1 ... 5)	
VALx_y	REAL	I	Current work value of the energy type x of the load y (x = 1 ... 5, y = 1 ... 10)	

3.24 PRE_SWTCH / PR3_SWTCH: General switch

3.24.1 Function - PRE_SWTCH / PR3_SWTCH

PRE_SWTCH	FB1750
PR3_SWTCH	FB200

Description of block

- Calling OBs - PRE_SWTCH / PR3_SWTCH (Page 388)
- Called blocks - PRE_SWTCH / PR3_SWTCH (Page 388)
- Message behavior - PRE_SWTCH / PR3_SWTCH (Page 389)
- Startup characteristics - PRE_SWTCH / PR3_SWTCH (Page 389)
- Block parameters - PRE_SWTCH / PR3_SWTCH (Page 390)
- Description of icons and faceplates (Page 392)

Function description

The PRE_SWTCH / PR3_SWTCH function block is used to display and operate a switch via digital inputs and outputs.

Status

The input parameters ON, OFF, TRIP and UNPLUG are used to generate the switch status.

The input parameters TRIP and UNPLUG are not evaluated if EN_TRIP or EN_UNPLUG = FALSE.

The following switch states are generated dependent on the inputs and displayed in the faceplate and icon:

Status	Output QSTATUS	Input ON	Input OFF	Input TRIP	Input UNPLUG
On	Bit 0	TRUE	FALSE	FALSE	FALSE
Off	Bit 1	FALSE	TRUE	FALSE	FALSE
Tripped	Bit 2	X	X	TRUE	FALSE
Unplugged	Bit 3	X	X	X	TRUE

Cells indicated with X are irrelevant in this status and are not evaluated. States not available in the table are regarded as undefined and the QERR output is set after expiration of the monitoring time TIME_MON if it is not equal to 0.

Activation

Dependent on the switch state and the input parameter for operator-control enable (ON_OP_EN, OFFOP_EN) switching can be performed from the faceplate (QON_OP, QOFFOP).

The output signals QON and QOFF are set in accordance with the operator input and then reset after the requested status has been reached or after the monitoring time has expired.

Monitoring

The QMON_ERR output parameter is set if the requested control state has not been reached within the monitoring time set using TIME_MON. This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

The issued command is revoked.

QMON_ERR is reset if RESET or L_RESET is set.

3.24.2 Calling OBs - PRE_SWTCH / PR3_SWTCH

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.24.3 Called blocks - PRE_SWTCH / PR3_SWTCH

PRE_SWTCH

The block calls the following blocks:

SFB31	NOTIFY_8P
SFB35	ALARM_8P
SFC6	RD_SINFO

PR3_SWTCH

The block calls the following blocks:

SFC6	RD_SINFO
SFC19	ALARM_SC
SFC107	ALARM_DQ
SFC108	ALARM_D

3.24.4 Message behavior - PRE_SWTCH / PR3_SWTCH

PRE_SWTCH

PRE_SWTCH generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QBAD	External error	PLC pr ctrl failure
	2	QSTATUS	Tripped	AH
	3	QSTATUS	Unplugged	WH
	4	QSTATUS	Undefined status	AH
	5	QMON_ERR / QON	Monitoring error On	AH
	6	QMON_ERR / QOFF	Monitoring error Off	AH
	7	-	Not assigned	-
	8	-	Not assigned	-
MSG_EVID2	1	QSTATUS	On	Status PLC
	2	QSTATUS	Off	Status PLC
	3	QSTATUS	Operation On successful	Status PLC
	4	QSTATUS	Operation Off successful	Status PLC
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_SWTCH

PR3_SWTCH generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QBAD	External error	PLC pr ctrl failure
MSG_EVID2	1	QSTATUS	Tripped	AH
MSG_EVID3	1	QSTATUS	Unplugged	WH
MSG_EVID4	1	QSTATUS	Undefined status	AH
MSG_EVID5	1	QMON_ERR / QON	Monitoring error	AH
MSG_EVID6	1	QSTATUS	On	Status PLC
MSG_EVID7	1	QSTATUS	Off	Status PLC

3.24.5 Startup characteristics - PRE_SWTCH / PR3_SWTCH

After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.24.6 Block parameters - PRE_SWTCH / PR3_SWTCH

PRE_SWTCH

Item	Data type	Type	Meaning	HMI
CSF	BOOL	I	External error	
EN_TRIP	BOOL	I	1 = TRIP input available	+
EN_UNPLUG	BOOL	I	1 = UNPLUG input available	+
L_RESET	BOOL	I	Configurable input for resetting QMON_ERR	
MAN_ON	BOOL	IO	Control input: 0 = Off, 1 = On	+
MONITOR	BOOL	I	1 = Monitoring on	+
MSG_ACK1	WORD	O	Acknowledge status of the ALARM_8P block	
MSG_EVID1	DWORD	I	Event ID for ALARM_8P block	
MSG_EVID2	DWORD	I	Event ID for NOTIFY_8P block	
MSG_STAT1	WORD	O	Status of the ALARM_8P block	
MSG_STAT2	WORD	O	Status of the NOTIFY_8P block	
MT_TYPE	BOOL	I	Type of installation: 0 = Fixed installation, 1 = Withdrawable	+
OFF	BOOL	I	Switch off	
OFFOP_EN	BOOL	I	Operator authorization for off	
ON	BOOL	I	Circuit breaker CLOSED	
ON_OP_EN	BOOL	I	Operator authorization for on	
QBAD	BOOL	O	1 = External error	
QC_OFF	BYTE	I	Quality code for OFF	
QC_ON	BYTE	I	Quality code for ON	
QC_QOFF	BYTE	O	Quality code for QOFF	
QC_QOFF_I	BYTE	I	Quality code for QOFF input	
QC_QON	BYTE	O	Quality code for QON	
QC_QON_I	BYTE	I	Quality code for QON input	
QC_QSTATUS	BYTE	O	Quality code for QSTATUS output	
QC_TRIP	BYTE	I	Quality code for TRIP	
QC_UNPLUG	BYTE	I	Quality code for UNPLUG	
QERR	BOOL	O	1 = Error	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	+
QOFF	BOOL	O	Control output for off	
QOFF_OP	BOOL	O	Operator authorization for off	+
QON	BOOL	O	Control output for on	
QON_OP	BOOL	O	Operator authorization for on	+
QSIM	BOOL	O	1 = Simulation active	+
QSTATUS	BYTE	O	Status of the switch	+
RESET	BOOL	IO	Control input for resetting QMON_ERR	+
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	

Item	Data type	Type	Meaning	HMI
SAMPLE_T	REAL	I	Sampling time in [s]	
STYPE	INT	I	Type of switch	+
TIME_MON	REAL	I	Monitoring time in [s]	+
TRIP	BOOL	I	Switch is tripped	
UNPLUG	BOOL	I	Switch withdrawn	

PR3_SWTCH

Item	Data type	Type	Meaning	HMI
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
CSF	BOOL	I	External error	
EN_TRIP	BOOL	I	1 = TRIP input available	+
EN_UNPLUG	BOOL	I	1 = UNPLUG input available	+
L_RESET	BOOL	I	Configurable input for resetting QMON_ERR	
MAN_ON	BOOL	IO	Control input: 0 = Off, 1 = On	+
MONITOR	BOOL	I	1 = Monitoring on	+
MSG_ACKx	WORD	O	Acknowledgment status of the ALARM_DQ block x (x = 1 ... 5)	
MSGEVIDx	DWORD	I	Event ID of the ALARM_DQ block x (x = 1 ... 5)	
MSGEVIDx	DWORD	I	Event ID for the ALARM_D block x (x = 6 ... 7)	
MSGSTATx	WORD	O	Status of the ALARM_D block x (x = 6 ... 7)	
MT_TYPE	BOOL	I	Type of installation: 0 = Fixed installation, 1 = Withdrawable	+
OFF	BOOL	I	Switch off	
OFFOP_EN	BOOL	I	Operator authorization for off	
ON	BOOL	I	Circuit breaker CLOSED	
ON_OP_EN	BOOL	I	Operator authorization for on	
QBAD	BOOL	O	1 = External error	
QC_OFF	BYTE	I	Quality code for OFF	
QC_ON	BYTE	I	Quality code for ON	
QC_QOFF	BYTE	O	Quality code for QOFF	
QC_QOFF_I	BYTE	I	Quality code for QOFF input	
QC_QON	BYTE	O	Quality code for QON	
QC_QON_I	BYTE	I	Quality code for QON input	
QC_QSTATUS	BYTE	O	Quality code for QSTATUS output	
QC_TRIP	BYTE	I	Quality code for TRIP	
QC_UNPLUG	BYTE	I	Quality code for UNPLUG	
QERR	BOOL	O	1 = Error	
QMON_ERR	BOOL	O	Monitoring error	

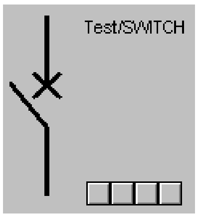
Item	Data type	Type	Meaning	HMI
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	+
QOFF	BOOL	O	Control output for off	
QOFF_OP	BOOL	O	Operator authorization for off	+
QON	BOOL	O	Control output for on	
QON_OP	BOOL	O	Operator authorization for on	+
QSIM	BOOL	O	1 = Simulation active	+
QSTATUS	BYTE	O	Status of the switch	+
RESET	BOOL	IO	Control input for resetting QMON_ERR	+
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	
SAMPLE_T	REAL	I	Sampling time in [s]	
STYPE	INT	I	Type of switch	+
TIME_MON	REAL	I	Monitoring time in [s]	+
TRIP	BOOL	I	Switch is tripped	
UNPLUG	BOOL	I	Switch withdrawn	

3.24.7 Description of icons and faceplates

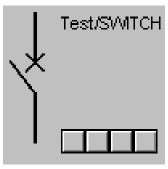
3.24.7.1 Block icon - PRE_SWTCH / PR3_SWTCH

Block icon

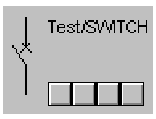
Variant 1



Variant 2



Variant 3



3.24.7.2 Faceplate - PRE_SWTCH / PR3_SWTCH

Faceplate

The faceplate available is described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Messages	

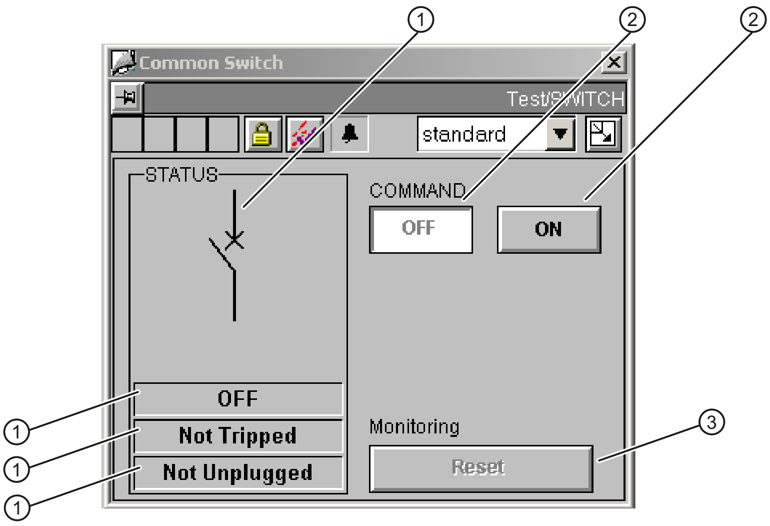
The file name is composed as follows: @PG_PRE_SWTCH_<view>.PDL / @PG_PR3_SWTCH_<view>.PDL

A standard display is used for the Messages view.

The structure of the individual views of faceplates is described below.

3.24.7.3 Standard view (STANDARD) - PRE_SWTCH / PR3_SWTCH

Standard view (STANDARD)



The following parameters are displayed:

	Item	Parameter	Description
(1)	Status	QSTATUS	Circuit breaker state
(2)	Command	MAN_ON	0 = Off, 1 = On
(3)	Monitoring – Reset	RESET	Reset monitoring error

3.25 PRE_SYNC / PR3_SYNC: Time synchronization

3.25.1 Function - PRE_SYNC / PR3_SYNC

PRE_SYNC	FB1060
PR3_SYNC	FB160

Description of block

- Calling OBs - PRE_SYNC / PR3_SYNC (Page 394)
- Called blocks - PRE_SYNC / PR3_SYNC (Page 395)
- Message behavior - PRE_SYNC / PR3_SYNC (Page 395)
- Error response - PRE_SYNC / PR3_SYNC (Page 395)
- Startup characteristics - PRE_SYNC / PR3_SYNC (Page 395)
- Block parameters - PRE_SYNC / PR3_SYNC (Page 396)

Function description

The block acts as the clock for time synchronization for the block for energy measurement PRE_SUM / PR3_SUM and other powerrate blocks.

The SYNC_OUT clock is triggered by an external synchronization signal (EXT_SYNC) or the internal CPU time.

If the external synchronization is deactivated (EXT_EN = FALSE), REQ_PER contains the period time for synchronization.

During external synchronization (EXT_EN = TRUE) the time stamp for the synchronization pulse (SYNC_TS) is rounded to the next whole time value (e.g. 15-minute value) according to the expected period time of the external synchronization signal (REQ_PER) and of the current CPU time stamp.

See also

Configuring the faceplate for PRE_SUM / PR3_SUM (Page 99)

The PRE_SUM / PR3_SUM block (Page 84)

3.25.2 Calling OBs - PRE_SYNC / PR3_SYNC

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.25.3 Called blocks - PRE_SYNC / PR3_SYNC

The block calls the following blocks:

SFC1	READ_CLK
SFC6	RD_SINFO
FC1	AD_DT_TM (IEC function from the STEP 7 Standard Library)
FC34	SB_DT_DT (IEC function from the STEP 7 Standard Library)

3.25.4 Message behavior - PRE_SYNC / PR3_SYNC

The block has no message behavior.

3.25.5 Error response - PRE_SYNC / PR3_SYNC

The QPARAMF error output is set when

- Synchronization period REQ_PER or synchronisation pulse REQ_T ≤ 0
- Synchronization period REQ_PER is less than the period of synchronization pulse REQ_T
- Synchronization period REQ_PER is greater than one hour
- Synchronization period REQ_PER is not a whole second value
- Synchronization period REQ_PER is not a divisor of an hour

3.25.6 Startup characteristics - PRE_SYNC / PR3_SYNC

The times are restarted during startup.

3.25.7 Block parameters - PRE_SYNC / PR3_SYNC

PRE_SYNC

Item	Data type	Type	Meaning	HMI
CUR_TS	DATE_AND_TIME	O	Current time stamp when block is called	
EXT_EN	BOOL	I	1 = Release for external synchronization	
EXT_SYNC	BOOL	I	External synchronization pulse	
QPARAMF	BOOL	O	1 = Parameterization error	
REQ_PER	REAL	I	Synchronization period in [s]	
REQ_T	REAL	I	Period of synchronization pulse in [s]	
SAMPLE_T	REAL	I	Sampling time in [s]	
SYNC_OUT	BOOL	O	Synchronization pulse	
SYNC_PER	REAL	O	Synchronization period in [s], copy of REQ_PER	
SYNC_TS	DATE_AND_TIME	O	Time stamp of synchronization pulse	

PR3_SYNC

Item	Data type	Type	Meaning	HMI
CUR_TS	DATE_AND_TIME	O	Current time stamp when block is called	
DIFF_LOC	REAL	O	Difference between UTC and local time in [h]	+
EXT_EN	BOOL	I	1 = Release for external synchronization	
EXT_SYNC	BOOL	I	External synchronization pulse	
QPARAMF	BOOL	O	1 = Parameterization error	
REQ_PER	REAL	I	Synchronization period in [s]	
REQ_T	REAL	I	Period of synchronization pulse in [s]	
SAMPLE_T	REAL	I	Sampling time in [s]	
SYNC_OUT	BOOL	O	Synchronization pulse	
SYNC_PER	REAL	O	Synchronization period in [s], copy of REQ_PER	
SYNC_TS	DATE_AND_TIME	O	Time stamp of synchronization pulse	

3.26 PRE_UA_R / PR3_UA_R: Archive manager for reading archive data from the user archive

3.26.1 Function - PRE_UA_R / PR3_UA_R

PRE_UA_R	FB1079
PR3_UA_R	FB179

Description of block

- Calling OBs - PRE_UA_R / PR3_UA_R (Page 399)
- Called blocks - PRE_UA_R / PR3_UA_R (Page 399)
- Message behavior - PRE_UA_R / PR3_UA_R (Page 400)
- Error response - PRE_UA_R / PR3_UA_R (Page 401)
- Startup characteristics - PRE_UA_R / PR3_UA_R (Page 401)
- Block parameters - PRE_UA_R / PR3_UA_R (Page 402)

Function description

The PRE_UA_R / PR3_UA_R block (archive manager for reading) receives configuration data from WinCC user archives for the PRE_LMGM / PR3_LMGM receive block.

The PRE_LMGM / PR3_LMGM block sends a request to the archive manager to fetch data from the WinCC user archive. The data is provided as a data array for the receive block. For this, a pointer is transferred to the receive block, which then copies the data with this information to its own instance data block. Only one archive manager block is provided per AS.

PRE_UA_R

The archive manager block can process up to 128 requests and can provide up to 8 KB of data.

PR3_UA_R

The archive manager block can process up to 32 requests and can provide up to 8 KB of data.

Mode of operation

Data request from receive block

The receive block requests data from the archive manager block. The data is available in the archive manager block in the form of an input structure.

Description of the structure:

ID	Block ID; used to assign the job data to the archive block.
JOB_ID	Job ID
RECORD_NO	Data record number
ARCH_TY	Archive type
ARCH_ID	Archive ID
REQ	Data is requested
MON_ERR	Monitoring error

After the receive block has received the data, the REQ request is reset. WinCC confirms resetting of the request by setting the REQ_FIN parameter (job completed) in a script.

REQ_FIN is also set by the archive manager block if the active job reports a runtime error or a positive edge is detected at the RESET parameter.

This deletes the output structure and the archive manager block is ready for a new job.

Data request to WinCC user archives

The archive manager block continuously scans its 128/32 request inputs for a pending request. If a request is pending and no other job is in progress, the job data is accepted and transferred to WinCC. Only one job can be processed at any time.

Data from WinCC user archives

If a request has been issued to WinCC, WinCC sets the REQ_ACC parameter and writes the data to the transfer interface for the AS. The block waits until new data has arrived at the associated BRCV. To avoid jobs being lost, the request parameter REQ is not reset until REQ_ACC = TRUE is returned.

A check is then made to see if the parameters ID, RECORD_NO and ARCH_ID of the job are identical with the received data. If the result is positive, the user data is written to a static data area and the request to WinCCis canceled. The receive block is informed of the presence of new data via the outputs NDR, ID, RECORD_NO and ARCH_ID. In the event of an error, the outputs QERR, QARCHERR or QMON_ERR are set, enabling the receive block to repeat the job immediately or to cancel it.

If the data transfer is successful, the receive block can fetch the data from the archive manager with the transferred pointer. The data is not deleted until the receive block has acknowledged receipt of the data (parameter REQ → FALSE).

If the REQ_FIN parameter from WinCC has been set to TRUE, a new job can be initiated. This parameter indicates that WinCC has detected the falling edge of REQ and execution of the job has been completed.

Mode of operation in WinCC

Requests and data return from the archive manager block

For each archive manager block there is a global C action (PRE_UA_R.pas) in WINCC that responds to a request (status change of the REQ parameter) of the associated archive manager block.

Preprocessing of the data

There is a user archive for each type of receive block. The following nomenclature applies for the archive:

ARCH_TY = 0: General archive

PRE_+"ARCH_ID" e.g. PRE_1, PRE_2 to PRE_10

The meaning of the archives can be fixed here in the alias.

ARCH_TY = 1: Load management configuration

PRE_LMGM_CONFIG_+"ARCH_ID" e. g. PRE_LMGM_CONFIG_1

ARCH_TY = 2: Load management priority list

PRE_LMGM_PRIO_+"ARCH_ID" e. g. PRE_LMGM_PRIO_1

ARCH_TY = 3: Load management limit violation

PRE_LMGM_LIM_+"ARCH_ID" e. g. PRE_LMGM_LIM_1

ARCH_TY = 4: Batch-related energy measurement

PRE_SUMC_+"ARCH_ID" e. g. PRE_SUMC_1

3.26.2 Calling OBs - PRE_UA_R / PR3_UA_R

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.26.3 Called blocks - PRE_UA_R / PR3_UA_R

PRE_UA_R

The block calls the following blocks:

SFB13	BRCV
SFB35	ALARM_8P
SFC6	RD_SINFO
SFC20	BLKMOV

PR3_UA_R

The block calls the following blocks:

FB13	BRCV
SFC6	RD_SINFO
SFC19	ALARM_SC
SFC20	BLKMOV
SFC107	ALARM_DQ

3.26.4 Message behavior - PRE_UA_R / PR3_UA_R

PRE_UA_R

PRE_UA_R generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QPARAMF	Parameter error	PLC pr ctrl failure
	2	QMON_ERR	Communication error	PLC pr ctrl failure
	3	QERR	Invalid data	PLC pr ctrl failure
	4	-	Not assigned	-
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_UA_R

PR3_UA_R generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSGEVID1	1	QPARAMF	Parameter error	PLC pr ctrl failure
MSGEVID2	1	QMON_ERR	Communication error	PLC pr ctrl failure
MSGEVID3	1	QERR	Invalid data	PLC pr ctrl failure

3.26.5 Error response - PRE_UA_R / PR3_UA_R

If an error occurs in the C functions and WinCC cannot read out the requested archive data (archive or data set not available), only the parameters ID, RECORD_NO and ARCH_ID are sent to the the AS with the value 0. The block signals the QARCHERR error in this case. This error is reported to the receive block that generates an error message.

If a request is issued to WinCC and the parameters ID, RECORD_NO and ARCH_ID do not agree between the request and the response from WINCC, QERR is set and the received data is not forwarded.

If ID, RECORD_NO and ARCH_ID = 0, QARCHERR is set.

QERR and QARCHERR are not reset until no more requests are pending, or the request agrees with the job again, or valid data are available.

The QMON_ERR error is set if the internally called SFB / FBBRCV cannot establish a connection to WinCC. The error is reset when it is again possible to establish the connection. The status of the system block is used to monitor the connection via BRCV.

A parameterization error QPARAMF exists if the ID parameter in the REQx_ST input structures is not unique, or if no valid ID_1 / ID_2, and R_ID parameters (<>0) are available.

No new job is executed while QMON_ERR or QPARAMF are pending.

3.26.6 Startup characteristics - PRE_UA_R / PR3_UA_R

The block has start-up characteristics. During OB100 startup including RUNUPCYC, the QRCV_ST output structure and the user data are reset and no job is executed.

3.26.7 Block parameters - PRE_UA_R / PR3_UA_R

PRE_UA_R

Item	Data type	Type	Meaning	HMI
ARCH_ID	INT	IO	Archive ID	+
ARCH_TY	INT	IO	Archive type	+
ID	INT	IO	Block ID	+
ID_1	WORD	I	Connection parameter ID for BRCV_1	
ID_2	WORD	I	Connection parameter ID for BRCV_2	
JOB_ID	INT	IO	Job ID	+
MSG_ACK	WORD	O	Acknowledge status of the ALARM_8P block	
MSG_EVID	DWORD	I	Event ID for ALARM_8P block	
MSG_STAT	WORD	O	Status of the ALARM_8P block	
QARCH_ID	INT	O	Archive ID	
QARCH_ID	INT	O	Active archive ID	
QARCH_TY	INT	O	Archive type	
QARCHERR	BOOL	O	Error while reading out the archive	
QERR	BOOL	O	Error	
QID	INT	O	Active ID	
QJOB_ID	INT	O	Job ID	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	Parameterization error	
QRCV_ST	UDT_PRE_RCV	O	Recipe data	
QREC_NO	DINT	O	Active data set number	
R_ID	WORD	I	Connection parameter R_ID for BRCV	
RECORD_NO	DINT	IO	Data record	+
REQ	BOOL	IO	Data request	+
REQ_ACC	BOOL	IO	1 = Data accepted from OS	+
REQ_FIN	BOOL	IO	1 = Data completed by OS	+
REQx_ST	UDT_PRE_RCV_REQ	I	x. request (x = 001 ... 128)	
RESET	BOOL	IO	1 = Reset job	+
RUNUPCYC	INT	I	Number of startup cycles	

PR3_UA_R

Item	Data type	Type	Meaning	HMI
ARCH_ID	INT	IO	Archive ID	+
ARCH_TY	INT	IO	Archive type	+
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
ID	INT	IO	Block ID	+
ID_1	WORD	I	Connection parameter ID for BRCV_1	
ID_2	WORD	I	Connection parameter ID for BRCV_2	
JOB_ID	INT	IO	Job ID	+
MSG_ACKx	WORD	O	Acknowledgment status of the ALARM_DQ x (= 1..3)	
MSGEVIDx	DWORD	I	Event ID of the ALARM_DQ x (x = 1..3)	
MSGSTATx	WORD	O	Status of the ALARM_DQ block x (x=1..3)	
QARCH_ID	INT	O	Archive ID	
QARCH_ID	INT	O	Active archive ID	
QARCH_TY	INT	O	Archive type	
QARCHERR	BOOL	O	Error while reading out the archive	
QERR	BOOL	O	Error	
QID	INT	O	Active ID	
QJOB_ID	INT	O	Job ID	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	Parameterization error	
QRCV_ST	UDT_PRE_RCV	O	Recipe data	
QREC_NO	DINT	O	Active data set number	
R_ID	WORD	I	Connection parameter R_ID for BRCV	
RECORD_NO	DINT	IO	Data record	+
REQ	BOOL	IO	Data request	+
REQ_ACC	BOOL	IO	1 = Data accepted from OS	+
REQ_FIN	BOOL	IO	1 = Data completed by OS	+
REQx_ST	UDT_PRE_RCV_REQ	I	x. request (x = 01 ... 032)	
RESET	BOOL	IO	1 = Reset job	+
RUNUPCYC	INT	I	Number of startup cycles	

3.27 PRE_UA_S / PR3_UA_S: Archive manager for writing archive data to the user archive

3.27.1 Function - PRE_UA_S / PR3_UA_S

PRE_UA_S	FB1078
PR3_UA_S	FB178

Description of block

- Calling OBs - PRE_UA_S / PR3_UA_S (Page 407)
- Called blocks - PRE_UA_S / PR3_UA_S (Page 407)
- Message behavior - PRE_UA_S / PR3_UA_S (Page 408)
- Error response - PRE_UA_S / PR3_UA_S (Page 409)
- Startup characteristics - PRE_UA_S / PR3_UA_S (Page 409)
- Block parameters - PRE_UA_S / PR3_UA_S (Page 410)

Function description

The PRE_UA_S / PR3_UA_S block (archive manager for writing) writes batch-related energy data for the PRE_SUMC / PR3_SUMC archive blocks and for PRE_LMGM / PR3_LMGM detailed information on limit violations and configuration data to the WinCC user archives.

The blocks PRE_SUMC / PR3_SUMC and PRE_LMGM / PR3_LMGM send a request to the archive manager to write data to a WinCC user archive. The user data is transferred to the archive manager as a data array. For this, a pointer is transferred to the archive manager block which then copies the data with this information to its own instance data block.
Only one archive manager block is provided Pro AS.

PRE_UA_S

The archive manager block can process up to 128 jobs with up to 8 KB of user data.

PR3_UA_S

The archive manager block can process up to 32 requests and can provide up to 8 KB of data.

Mode of operation

Data request from archive block

The archive block issues a request to the archive manager block. The data is available in the archive manager block in the form of an input structure.

Description of the structure:

ID	Block ID; used to assign the job data to the archive block.
JOB_ID	Job ID; specifies the job type: 1 = Append new data set to archive, 2 = Overwrite existing data set
RECORD_NO	Data set number; JOB_ID = 1: Number of the month of the last year of the data sets to be deleted JOB_ID = 2: Number of the data set to be overwritten
ARCH_TY	Archive type
ARCH_ID	Archive ID
REQ	Request for job
MON_ERR	Monitoring error
DATA	Pointer to the user data

After the archive data has been successfully written to the WinCC user archive, the successful execution of the job and the ID of the written data set is signaled to the archive block with JOB_ID = 1. The archive block then cancels the REQ request to the archive manager. When WinCC completes execution, a script sets the REQ_FIN parameter (job completed).

REQ_FIN is also set if the active job signals a runtime error, or if a positive edge is detected at the RESET parameter.

With this, the archive manager block is ready for a new job.

Requests to WinCC user archives

The archive manager block continuously scans its 128/32 request inputs for a pending request. If a request is pending and no other job is in progress, the user data is accepted and written to WinCC. Only one job can be processed at any time.

Request confirmation of WinCC

After a request has been sent to its WinCC transfer interface, the archive manager block expects confirmation that the data has been successfully written.

For this purpose, a check is made to see if the parameters ID, RECORD_NO and ARCH_ID of the request are identical with the sent data. If the result is positive, this is reported to the archive block with QDONE = TRUE, and the request to WinCC is canceled. In the event of an error, the outputs QERR, QARCHERR or QMON_ERR are set, enabling the archive block to repeat the job immediately or to cancel it.

In the case of JOB_ID = 1, the information RECORD_NO from WinCC is forwarded to the archive block. If the job has been completed, the achive block confirms this with the parameter REQ=FALSE.

If the REQ_FIN parameter from WinCC has been set to TRUE, a new job can be initiated. This parameter indicates that WinCC has detected the falling edge of REQ and execution of the job has been completed.

Mode of operation in WinCC

Requests and data from the archive manager block

For each archive manager block there is a global C action (PRE_UA_S.pas) in WINCC that responds to a request (status change of the REQ parameter) of the associated archive manager block.

Using the JOB_ID, either a new data set is appended to the user archive (JOB_ID = 1) or an existing data set is overwritten with the RECORD_NO (JOB_ID = 2). If JOB_ID = 1, the newly generated data set number is saved in RECORD_NO and transferred to the archive manager.

If the data set has been written to the user archive, the job data is written to the transfer interface of the archive manager block.

Preprocessing of the archive data

There is a user archive for each type of archive block. The following nomenclature applies for the archive:

ARCH_TY = 0: General archive

PRE_+"ARCH_ID" e.g. PRE_1, PRE_2 to PRE_10

The meaning of the archives can be fixed here in the alias.

ARCH_TY = 1: Load management configuration

PRE_LMGM_CONFIG_+"ARCH_ID" e. g. PRE_LMGM_CONFIG_1

ARCH_TY = 2: Load management priority list

PRE_LMGM_PRIO_+"ARCH_ID" e. g. PRE_LMGM_PRIO_1

ARCH_TY = 3: Load management limit violation

PRE_LMGM_LIM_+"ARCH_ID" e. g. PRE_LMGM_LIM_1

ARCH_TY = 4: Batch-related energy measurement

PRE_SUMC_+"ARCH_ID" e. g. PRE_SUMC_1

Return value for archive manager block

After the Write data set, the information ID, JOB_ID, RECORD_NO and ARCH_ID is written to the WinCC transfer interface of the archive manager block.

See also

The PRE_SUMC / PR3_SUMC block (Page 131)

3.27.2 Calling OBs - PRE_UA_S / PR3_UA_S

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (see start-up characteristics).

3.27.3 Called blocks - PRE_UA_S / PR3_UA_S

PRE_UA_S

The block calls the following blocks:

SFB12	BSEND
SFB35	ALARM_8P
SFC6	RD_SINFO
SFC20	BLKMOV

PR3_UA_S

The block calls the following blocks:

FB12	BSEND
SFC6	RD_SINFO
SFC19	ALARM_SC
SFC20	BLKMOV
SFC107	ALARM_DQ

3.27.4 Message behavior - PRE_UA_S / PR3_UA_S

PRE_UA_S

PRE_UA_S generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID	1	QPARAMF	Parameter error	PLC pr ctrl failure
	2	QMON_ERR	Communication error	PLC pr ctrl failure
	3	QERR	Invalid data	PLC pr ctrl failure
	4	-	Not assigned	-
	5	-	Not assigned	-
	6	-	Not assigned	-
	7	-	Not assigned	-
	8	-	Not assigned	-

PR3_UA_S

PR3_UA_S generates the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSGEVID1	1	QPARAMF	Parameter error	PLC pr ctrl failure
MSGEVID2	1	QMON_ERR	Communication error	PLC pr ctrl failure
MSGEVID3	1	QERR	Invalid data	PLC pr ctrl failure

3.27.5 Error response - PRE_UA_S / PR3_UA_S

If an error occurs in the C functions and WinCC cannot write the archive data (archive or data set not available, or the length of the user data of the archive manager does not agree with the actual length of the user archive), the QARCHERR error is set. This error is reported to the archive block. An error message is generated by the archive block.

If a request is issued to WinCC and the parameters ID, JOB_ID, ARCH_ID do not agree between the request and the reply from WinCC, QERR is set.

If ID, JOB_ID and ARCH_ID = 0, QARCHERR is set.

QERR and QARCHERR are not reset until no more requests are pending, or the request agrees with the job again, or valid data are available.

The QMON_ERR error is set if the internally called SFB / FBBSEND cannot establish a connection to WinCC. The error is reset when it is again possible to establish the connection. The status of the system block is evaluated to monitor the connection via BSEND.

A parameterization error QPARAMF exists if the ID parameter in the REQx_ST input structures is not unique, or if no valid ID_1 / ID_2, and R_ID parameters (<>0) are available.

No new job is executed while QMON_ERR or QPARAMF are pending.

3.27.6 Startup characteristics - PRE_UA_S / PR3_UA_S

The block has start-up characteristics. No job is executed during OB100 startup including RUNUPCYC.

3.27.7 Block parameters - PRE_UA_S / PR3_UA_S

PRE_UA_S

Item	Data type	Type	Meaning	HMI
ARCH_ID	INT	IO	Archive ID	+
ARCH_TY	INT	IO	Archive type	+
ID	INT	IO	Block ID;	+
ID_1	WORD	I	Connection ID for BSEND_1	
ID_2	WORD	I	Connection parameter ID for BSEND_2	
JOB_ID	INT	IO	Job ID 1 = Append, 2 = Overwrite	+
MSG_ACK	WORD	O	Acknowledge status of the ALARM_8P block	
MSG_EVID	DWORD	I	Event ID for ALARM_8P block	
MSG_STAT	WORD	O	Status of the ALARM_8P block	
QARCH_ID	INT	O	Active archive ID	
QARCH_TY	INT	O	Archive type	
QARCHERR	BOOL	O	Error while writing the archive	
QERR	BOOL	O	Error	
QID	INT	O	Active ID	
QJOB_ID	INT	O	Active job ID	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	Parameterization error	
QREC_NO	DINT	O	Active data set number	
QSND_ST	UDT_PRE_SND	O	Return value archiving	
R_ID	WORD	I	Connection parameter R_ID for BSEND	
RECORD_NO	DINT	IO	Data set number for overwriting	+
REQ	BOOL	IO	Request for archiving	+
REQ_FIN	BOOL	IO	1 = Job from OS completed	+
REQx_ST	UDT_PRE_SND_REQ	I	x. request (x = 001 ... 128)	
RESET	BOOL	IO	1 = Reset job	+
RUNUPCYC	INT	I	Number of startup cycles	

PR3_UA_S

Item	Data type	Type	Meaning	HMI
ARCH_ID	INT	IO	Archive ID	+
ARCH_TY	INT	IO	Archive type	+
CMP_ID	DWORD	I	Component identifier for ALARM_DQ (not permitted: 0) Name of the subsystem to which the message is assigned. Recommended values: - low word: 1 to 65535 - high word: 0 You will not experience any problems with Siemens program packages if you comply with this recommendation.	
ID	INT	IO	Block ID	+
ID_1	WORD	I	Connection ID for BSEND_1	
ID_2	WORD	I	Connection parameter ID for BSEND_2	
JOB_ID	INT	IO	Job ID 1 = Append, 2 = Overwrite	+
MSG_ACKx	WORD	O	Acknowledgment status of the ALARM_DQ x (= 1..3)	
MSG_EVIDx	DWORD	I	Event ID of the ALARM_DQ x (x = 1..3)	
MSG_STATx	WORD	O	Status of the ALARM_DQ block x (x=1..3)	
QARCH_ID	INT	O	Active archive ID	
QARCH_TY	INT	O	Archive type	
QARCHERR	BOOL	O	Error while writing the archive	
QERR	BOOL	O	Error	
QID	INT	O	Active ID	
QJOB_ID	INT	O	Active job ID	
QMON_ERR	BOOL	O	Monitoring error	
QMSG_ERR	BOOL	O	1 = Signal generation error	
QMSG_SUP	BOOL	O	1 = Message suppression	
QPARAMF	BOOL	O	Parameterization error	
QREC_NO	DINT	O	Active data set number	
QSND_ST	UDT_PRE_SND	O	Return value archiving	
R_ID	WORD	I	Connection parameter R_ID for BSEND	
RECORD_NO	DINT	IO	Data set number for overwriting	+
REQ	BOOL	IO	Request for archiving	+
REQ_FIN	BOOL	IO	1 = Job from OS completed	+
REQx_ST	UDT_PRE_SND_REQ	I	x. request (x = 001 ... 032)	
RESET	BOOL	IO	1 = Reset job	+
RUNUPCYC	INT	I	Number of startup cycles	

3.28 UDT_PRE_ANY

3.28.1 Description - UDT_PRE_ANY

UDT_PRE_ANY UDT1067

Description of block

- Structure - UDT_PRE_ANY (Page 412)

Function description

The user data type UDT_PRE_ANY contains the structure of the Any pointer. It is used as a transfer pointer to the send/receive areas for the archive manager.

3.28.2 Structure - UDT_PRE_ANY

Item	Data type	Meaning
SYNC	BYTE	Syntax ID
TYP	BYTE	Data type
LENGTH	WORD	Length
DB_NR	WORD	DB number
P	DWORD	Range pointer

3.29 UDT_PRE_FIFO

3.29.1 Description - UDT_PRE_FIFO

UDT_PRE_FIFO UDT1060

Description of block

- Structure - UDT_PRE_FIFO (Page 413)

Function description

The UDT_PRE_FIFO user data type contains internal check data for organizing the FIFO buffer.

The UDT is used internally.

3.29.2 Structure - UDT_PRE_FIFO

Item	Data type	Meaning
FIFO_ST	DWORD	Pointer at start of FIFO
FIFO_END	DWORD	Pointer at end of FIFO
WR_POS	DWORD	Pointer at current write position
RD_POS	DWORD	Pointer at current read position
ITEM_CNT	INT	Counter for elements
LOCKED	BOOL	1 = Access locked
SPARE	ARRAY[1 ... 4] of BYTE	Spare

3.30 UDT_PRE_ITEM

3.30.1 Description - UDT_PRE_ITEM

UDT_PRE_ITEM UDT1061

Description of block

- Structure - UDT_PRE_ITEM (Page 414)

Function description

The UDT_PRE_ITEM user data type contains the storage structure of a measured value.

The UDT is used internally.

See also

Function - PRE_FIFO_DATA / PR3_FIFO_DATA (Page 252)

3.30.2 Structure - UDT_PRE_ITEM

Item	Data type	Meaning
TS	DATE_AND_TIME	Time stamp of measured value
VALUE	REAL	Measured value
AR_SNO	WORD	Subnumber for archive tag

3.31 UDT_PRE_RCV

3.31.1 Description - UDT_PRE_RCV

UDT_PRE_RCV UDT1066

Description of block

- Structure - UDT_PRE_RCV (Page 415)

Function description

The user data type UDT_PRE_RCV contains the archive manager acknowledgment of the request to read data from a WinCC user archive.

3.31.2 Structure - UDT_PRE_RCV

Item	Data type	Meaning
ID	INT	ID of the requesting function
JOB_ID	INT	Requested job number
ARCH_TY	INT	Requested archive type
ARCH_ID	INT	Requested archive ID
RECORD_NO	DINT	Data record number
QERR	BOOL	Error
QARCHERR	BOOL	Error while writing to the archive
QMON_ERR	BOOL	Monitoring error
NDR	BOOL	New data present
DATA	UDT_PRE_ANY	Pointer to user data

3.32 UDT_PRE_RCV_REQ

3.32.1 Description - UDT_PRE_RCV_REQ

UDT_PRE_RCV_REQ UDT1065

Description of block

- Structure - UDT_PRE_RCV_REQ (Page 416)

Function description

The user data type UDT_PRE_RCV_REQ contains the structure for the request to read data from a WinCC user archive.

3.32.2 Structure - UDT_PRE_RCV_REQ

Item	Data type	Meaning
ID	INT	ID of the requesting function
JOB_ID	INT	Requested job number
ARCH_TY	INT	Requested archive type
ARCH_ID	INT	Requested archive ID
RECORD_NO	DINT	Data record number
REQ	BOOL	Request to read data from the archive
MON_ERR	BOOL	Monitoring error

3.33 UDT_PRE_SND

3.33.1 Description - UDT_PRE_SND

UDT_PRE_SND UDT1064

Description of block

- Structure - UDT_PRE_SND (Page 417)

Function description

The user data type UDT_PRE_SND contains the acknowledgment of the archive manager for the request to write data to a WinCC user archive.

3.33.2 Structure - UDT_PRE_SND

Item	Data type	Meaning
ID	INT	ID of the requesting function
JOB_ID	INT	Requested job number
ARCH_TY	INT	Requested archive type
ARCH_ID	INT	Requested archive ID
RECORD_NO	DINT	Data record number
QERR	BOOL	Error
QARCHERR	BOOL	Error while writing to the archive
QMON_ERR	BOOL	Monitoring error
QDONE	BOOL	Archiving takes place

3.34 UDT_PRE_SND_REQ

3.34.1 Description - UDT_PRE_SND_REQ

UDT_PRE_SND_REQ UDT1063

Description of block

- Structure - UDT_PRE_SND_REQ (Page 418)

Function description

The user data type UDT_PRE_SND_REQ contains the structure for the request to write data to a WinCC user archive.

3.34.2 Structure - UDT_PRE_SND_REQ

Item	Data type	Meaning
ID	INT	ID of the requesting function
JOB_ID	INT	Requested job number
ARCH_TY	INT	Requested archive type
ARCH_ID	INT	Requested archive ID
RECORD_NO	DINT	Data record number
REQ	BOOL	Request to write data to the archive
MON_ERR	BOOL	Monitoring error
DATA	UDT_PRE_ANY	Pointer to user data

3.35 UDT_PRE_TLG

3.35.1 Description - UDT_PRE_TLG

UDT_PRE_TLG UDT1062

Description of block

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Function description

The UDT_PRE_TLG user data type contains the structure of a telegram element for sending into the WinCC Tag Logging archive.

The UDT is used internally.

3.35.2 Structure - UDT_PRE_TLG

Item	Data type	Meaning	Preassignment
HEAD_TYPE	WORD	Header Type	8 : With time stamp
CYCLE	TIME	Cycle	0: Not relevant
U_TYPE	BYTE	Unit (Type)	2 : Each process value has a time stamp
U_AREA	BYTE	Units (Range)	0: Not relevant
AR_SNO	WORD	Subnumber of archive tag	
DT_TYPE	INT	Data type of element	5 : Analog value
NO_ITEMS	INT	Number of elements to be sent	1
TS	DATE_AND_TIME	Time stamp of element	
VALUE	REAL	Measured value	

4 Technical data

4.1 Technical data

The table contains the following specifications:

Block (type name)

The symbolic identifier in the library's icon table for the relevant FB.
It must be unique to the project.

Object name

Consists of the type of block (FB) and the number.

Typical runtime

The time that the CPU typically needs to process the associated block program.

The table below includes the runtimes in a CPU S7 412 or CPU S7 317;
the runtime for other CPUs depends on their performance.

The runtimes of blocks called up internally will not be determined separately.

Block length in load/work memory

Memory requirement of program code, once per block type.

Length of instance data in load/work memory

Memory requirement of an instance DB.

Temporary memory

The local data memory needed when calling the block in an execution level. This is limited depending on the CPU. If exceeded, you must check this in the CPU configuration and, if necessary, redistribute to OBs of the size actually needed.

Called blocks

The blocks stated here are used by the block in question and must be located in the user program. They are saved in the same library.

Blocks for S7-400

Block (type name)	Object name	Typical runtime CPU412 (µs)	Block length in the load/ work memory (bytes)	Length of instance data in the load/ work memory (bytes)	Temporary memory (bytes)	Called blocks
PRE_SYNC	FB1060	140	14164 / 1262	238 / 92	80	FC1 FC34 SFC1 SFC6
PRE_SUM	FB1061	210	6972 / 6074	912 / 456	92	FC1 FC14 FC34 FC1061 FC1062 SFB35 SFC6
PRE_FIFO_DATA*	FB1062	21	476 / 310	14218 / 14066	64	FC1062 SFC6
PRE_AR_DATA*	FB1063	270	498 / 210	792 / 518	10	FB1064
PRE_AR_SND	FB1064	-	1866 / 1518	480 / 210	102	FC1062 SFB35 SFB37 SFC6 SFC24
PRE_LMGM	FB1065	4900	333758 / 25300	16902 / 9874	310	FC1 SFB31 SFB35 SFC6 SFC20 SFC21 SFC51
PRE_LMGM_75	FB1066	3000	264436 / 19814	13478 / 7874	310	FC1 SFB31 SFB35 SFC6 SFC20 SFC21 SFC51

Block (type name)	Object name	Typical runtime CPU412 (µs)	Block length in the load/ work memory (bytes)	Length of instance data in the load/ work memory (bytes)	Temporary memory (bytes)	Called blocks
PRE_LMGM_50	FB1067	2400	25010 / 19802	10052 / 5874	310	FC1 SFB31 SFB35 SFC6 SFC20 SFC21 SFC51
PRE_LMGM_25	FB1068	2100	23546 / 19762	6628 / 3874	310	FC1 SFB31 SFB35 SFC6 SFC20 SFC21 SFC51
PRE_LMGM_10	FB1069	1500	22660 / 19762	4202 / 2334	310	FC1 SFB31 SFB35 SFC6 SFC20 SFC21 SFC51
PRE_AS_SEND	FB1070	290	2174 / 1430	1878 / 1156	44	FB1074 SFB35 SFC6
PRE_AS_RECV	FB1071	390	5616 / 4334	3008 / 1996	46	FB1075 SFB35 SFC6
PRE_SND_H	FB1072	430	3010 / 2070	2692 / 1782	44	FB1074 SFB35 SFC6
PRE_RCV_H	FB1073	-480	9820 / 7806	4592 / 3460	44	FB1075 SFB35 SFC6
PRE_BS	FB1074	-	2052 / 1758	792 / 594	38	SFB12 SFC1 SFC6 SFC20

Block (type name)	Object name	Typical runtime CPU412 (µs)	Block length in the load/ work memory (bytes)	Length of instance data in the load/ work memory (bytes)	Temporary memory (bytes)	Called blocks
PRE_BR	FB1075	-	1846 / 1590	1374 / 1192	36	SFB13 SFC1 SFC6 SFC20
PRE_GET	FB1076	240	1864 / 1482	752 / 424	78	SFB14 SFB35 SFC6
PRE_SUMC	FB1077	440	10924 / 10158	2162 / 21584	350	FC1 FC28 SFB35 SFC6 SFC20 SFC21 SFC51
PRE_UA_S	FB1078	2300	8618 / 4310	26994 / 22804	84	SFB12 SFB35 SFC6 SFC20
PRE_UA_R	FB1079	1800	6814 / 4160	22778 / 20254	80	SFB13 SFB35 SFC6 SFC20
PRE_SWTCH	FB1750	250	2816 / 2306	678 / 326	44	SFB31 SFB35 SFC6
PRE_PAC	FB1751	160	2052 / 1702	450 / 212	64	SFB35 SFC6
PRE_CALC*	FC1061	-	264 / 172	-	4	-
PRE_FIFO_IO	FC1062	-	1070 / 914	-	22	SFC24
PRE_PE_RD	FB1752	-	3216 / 2586		118	SFC6 FB816
PRE_PE_IDEV	FB1753	-	3420 / 2838		326	SFC6 FB817 FC0 FC7 FC8

* The technical specifications relate to the condition of the blocks on delivery. If modified by the user, the data may differ from those provided.

Blocks for S7-300

Block (type name)	Number	Typical runtime CPU317 (µs)	Block length in the load/ work memory (bytes)	Length of instance data in the load/ work memory (bytes)	Temporary memory (bytes)	Called blocks
PR3_SYNC	FB160	330	1466 / 11262	244 / 96	80	FC1 FC34 SFC1 SFC6
PR3_SUM	FB161	220	8546 / 7618	840 / 378	106	FC1 FC14 FC34 FC161 FC162 SFC6 SFC19 SFC107
PR3_FIFO_DATA*	FB162	17	474 / 308	14218 / 14066	64	FC162 SFC6
PR3_AR_DATA*	FB163	240	510 / 256	606 / 360	10	FB164
PR3_AR_SND	FB164	-	2122 / 1812	344 / 104	118	FC162 SFC6 SFC19 SFC24 SFC107
PR3_LMGM	FB165	8300	31706 / 23736	14402 / 7488	306	FC1 SFC6 SFC19 SFC20 SFC21 SFC107 SFC108
PR3_LMGM_75	FB166	7300	30282 / 23736	11478 / 5988	306	FC1 SFC6 SFC19 SFC20 SFC21 SFC107 SFC108

Block (type name)	Number	Typical runtime CPU317 (µs)	Block length in the load/ work memory (bytes)	Length of instance data in the load/ work memory (bytes)	Temporary memory (bytes)	Called blocks
PR3_LMGM_50	FB167	3300	28856 / 23736	8552 / 4488	306	FC1 SFC6 SFC19 SFC20 SFC21 SFC107 SFC108
PR3_LMGM_25	FB168	2900	27432 / 23736	5628 / 2988	306	FC1 SFC6 SFC19 SFC20 SFC21 SFC107 SFC108
PR3_LMGM_10	FB169	1500	26546 / 23736	3502 / 1748	306	FC1 SFC6 SFC19 SFC20 SFC21 SFC107 SFC108
PR3_GET	FB176	180	1660 / 1364	460 / 220	90	SFB14 SFC6 SFC19 SFC107
PR3_SUMC	FB177	430	11624 / 10872	2062 / 1498	354	FC1 FC28 SFC6 SFC19 SFC20 SFC21 SFC51 SFC107
PR3_UA_S	FB178	1900	6748 / 5006	20392 / 18780	90	FB12 SFC6 SFC19 SFC20 SFC107

Block (type name)	Number	Typical runtime CPU317 (µs)	Block length in the load/ work memory (bytes)	Length of instance data in the load/ work memory (bytes)	Temporary memory (bytes)	Called blocks
PR3_UA_R	FB179	1800	6344 / 5012	19344 / 18154	86	FB13 SFC6 SFC19 SFC20 SFC107
PR3_SWTCH	FB180	180	4550 / 4062	420 / 130	64	SFC6 SFC19 SFC107 SFC108
PR3_PAC	FB181	170	3230 / 2890	362 / 128	84	SFC6 SFC19 SFC107
PR3_CALC*	FC161	-	276 / 1784	-	4	-
PR3_FIFO_IO	FC162	-	1070 / 914	-	22	SFC24
PR3_PE_RD	FB202	-	3216 / 2586		118	SFC6 FB816
PR3_PE_IDEV	FB203	-	3420 / 2838		326	SFC6 FB817 FC0 FC7 FC8

* The technical specifications relate to the condition of the blocks on delivery. If modified by the user, the data may differ from those provided.

4.2 System limits of the PRE_SUM / PR3_SUM block

The following table shows the maximum number of possible measuring points based on the PLC used. In comparison to this WinCC.

Note

The specified system limits only apply when using the PR3_AR_DATA_B block.

PLC / WinCC	FIFO[1]	PRx_SUM (pulse)	PRx_SUM (analog)
IM151-8 CPU	2	30	20
CPU 315-2 PN/DP	3	60	40
CPU 317-2 PN/DP	10	200	130
CPU 319-3 PN/DP	20	400	320
CPU 412-2 PN	4	80	52
CPU 414-3 PN	16	320	200
CPU 416-3 PN/DP	32	640	416
CPU 417-4 (via PN CP)	64	1280	832
WinAC RTX 2010	- [2]	- [2]	- [2]
WinCC (Single-user station or server)	150	-	2000

[1] : 1 FIFO = 4000 values = 20 PRE_SUM / PR3_SUM (pulse) = 24 h

[2] : Depending on the power of the PC, on which WinAC RTX 2010 is installed

Glossary

Absolute counter value ("C")

The absolute counter value contains the counter status of a measuring device. Measuring devices distinguish between floating-point counters and integer counters. As a result, the absolute counter value can be specified as floating-point number or integer. The energy value is calculated on the basis of the counter status.

The absolute counter value is stored in archive tags with the ".C" extension.

Accumulated energy value ("S")

The energy consumed by a consumer during the current time period.
The energy consumed is summed during the time period.

The cumulative energy value is stored in archive tags with the ".S" extension.

AS

Abbreviation for "automation system".

Average power demand ("V")

The average power produced by a consumer in the previous time period.

The absolute counter value is stored in archive tags with the ".V" extension.

Basic Process Control

Basic Process Control supports the user in implementing typical process control requirements: for example, group displays, fixed screen layout, picture hierarchy or sign-of-life monitoring.

Batch-related energy measurement

The batch-related energy measurement measures the total energy consumption of a batch.

See also: PRE_SUMC / PR3_SUMC block

Compression time

The compression time is the time to which the measured energy values are compressed from the archive tags with the ".S" extension.

Cumulative energy value

See "Accumulated energy value"

Current power value

The power rating of a consumer currently measured by a measuring device.

Delay time

The delay time suppresses avoidable switching operations for a configured period at the start of a time interval. No load shedding takes place during this period. Messages indicating a "pending limit violation" are also suppressed.

Energy efficiency

Energy efficiency is a term referring to the relationship between the power supplied to a unit or device and the power actually used by the unit or device.

The closer the efficiency is to 1, the less loss there is during transformation or transfer.

Energy management

Energy management is the predictive, organized and systematic coordination of the procurement, conversion, distribution and use of energy to cover requirements while taking into account ecological and economic aims.

Energy procurement

Energy procurement refers to the purchase of the required energy source, for example electricity or gas. It describes amounts of energy which have to be procured from distribution systems within a fixed time scale.

Energy value

The time basis for the energy measurement is one hour. All energy values are displayed with the unit kWh for this reason. The cycle time is used to convert the calculated power values into an energy value.

Idle time

The idle time takes into account the slowness of a consumer after a switching operation. The consumer can only be switched on or off again after the configured idle time has elapsed.

Load management

In the context of energy management, load management means monitoring the power limits for each time interval. This time interval is specified by the power utility. It is usually 15 minutes for electricity and one hour for gas, for example.

Measuring devices 7KT PAC1500 and 7KM PAC3100/3200/4200

Measuring and monitoring devices for safe and intelligent energy distribution, for example digital and analog e-meters and power monitoring devices.

Operator Station (OS)

An operator station is the central station for monitoring and controlling a WinCC or PCS 7 plant.

Usually, an operator station consists of a PC with OCM software, for example WinCC.

Priority list

This priority list shows the current status of the individual consumers in load management, for example, active, prioritization, rolling. Priority lists can be used to remove individual consumers manually from the load management or to reconnect disconnected consumers.

PROFIenergy

PROFIenergy is an application profile based on PROFINET. Field devices that support PROFIenergy can be switched off separately; this is accomplished by using PROFIenergy commands to acquire the values of those consumers that are not required. This saves energy consumption and costs. The PROFIenergy commands are transmitted throughout the entire PROFINET network. Note: SIMATIC powerrate currently manages the value measurement in the Profienergy environment.

Projected accumulated energy value

The amount of energy a consumer is likely to consume until the end of the current time period.

Projected average power demand

The average amount of power a consumer is likely to produce until the end of the current time period. Calculation is based on the characteristic curve of the average power previously produced for the current time period. The characteristic curve can be rising, falling or constant.

Rolling loads

Within a group of consumers with identical priority, the Load Management block can be used to assign the "rolling" parameter to the consumers. This parameter assignment provides for alternating shutdown of consumers.

Supply limit

The supply limit refers to the maximum permissible power supply value stipulated in the supply contract. The power supply contract stipulates a quarter-hour mean value.

Synchronization period

The synchronization period is the time within the measuring period at which the synchronization pulse is sent.

See synchronization pulse

Synchronization pulse

The synchronization pulse is used to synchronize the energy measuring blocks to a common clock time.

Total energy value

Energy consumption of a consumer for the previous time period. (see PRE_SUM block)