SIEMENS

SITOP Power Supply

SITOP UPS1600 Firmware V2.2 : Faceplates and Communication Blocks V2.2

Function Manual

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Preface 2

Purpose of this document

This document describes SITOP UPS1600 Block Library for SIMATIC STEP 7 V5.5, STEP 7 Professional V14 SP1, WinCC Flexible, WinCC V7.3, WinCC Comfort/Advanced V14 SP1 and WinCC Professional V14 SP1. The block library provides tested code with clearly defined interfaces. You can use it as the basis for the task you wish to realize.

The main focus of this document is to describe:

● All Function Blocks (FB) pertaining to the block library.

● The functionality implemented through these blocks.

The documentation furthermore illustrates the possible operating conditions and applications of the block library for SIMATIC STEP 7 V5.5, STEP 7 Professional V14 SP1, WinCC Flexible, WinCC V7.3, WinCC Comfort/Advanced V14 SP1 and WinCC Professional V14 SP1.

References

For more information on SITOP UPS1600 manuals and related documentation, refer the following links,

● Siemens Industry Online Support
  (https://support.industry.siemens.com/cs/start?lc=en-US)

● SITOP UPS1600 Manual
  (https://support.industry.siemens.com/cs/ww/en/view/84977415)

● STEP 7 Professional V13 System Manual
  (https://support.industry.siemens.com/cs/ww/en/view/109011420)

● WinCC Advanced V14.0 SP1 System Manual
  (https://support.industry.siemens.com/cs/ww/en/view/109091876)

● SIMATIC Programming with SIMATIC STEP 7 V5.5
  (https://support.industry.siemens.com/cs/ww/en/view/45531107)

● WinCC flexible 2008 System Manual
  (https://support.industry.siemens.com/cs/ww/en/view/18796010)

● WinCC System Manual
  (https://support.industry.siemens.com/cs/ww/en/view/102754925)

● GSD for SITOP UPS1600 for integration into SIMATIC STEP 7 V5.5
  (https://support.industry.siemens.com/cs/ww/en/view/75854605)

● HSP for SITOP UPS1600 for integration into STEP 7 V14 TIA
  (https://support.industry.siemens.com/cs/ww/en/view/75854606)

Task $\qquad$ 3

Overview of the automation task

The figure below provides an overview of the automation task.
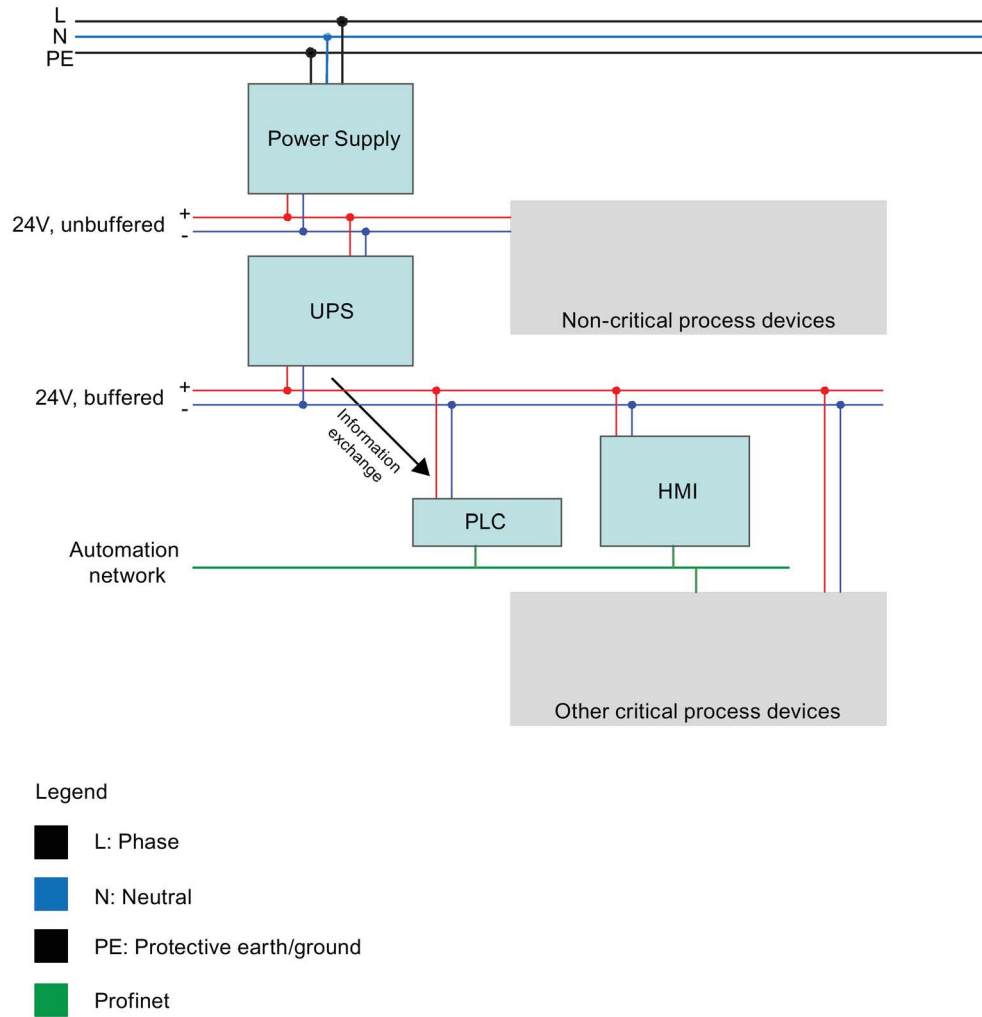

Figure 3-1

Task Description

Your task is to equip the automation plant with Uninterruptible Power Supply (UPS). In the event of a power failure, critical process participants are to be protected.

In the event of a power failure of the automation plant, process values are to be maintained and plant components be safeguarded against mechanical damage by means of a defined stopping process.

UPS is integrated into the automation network via PROFINET.

The status and diagnostic information of the UPS is displayed in the individual Human Machine Interfaces (HMI) stations.

Structure

4

4.1 Solution overview

Structure

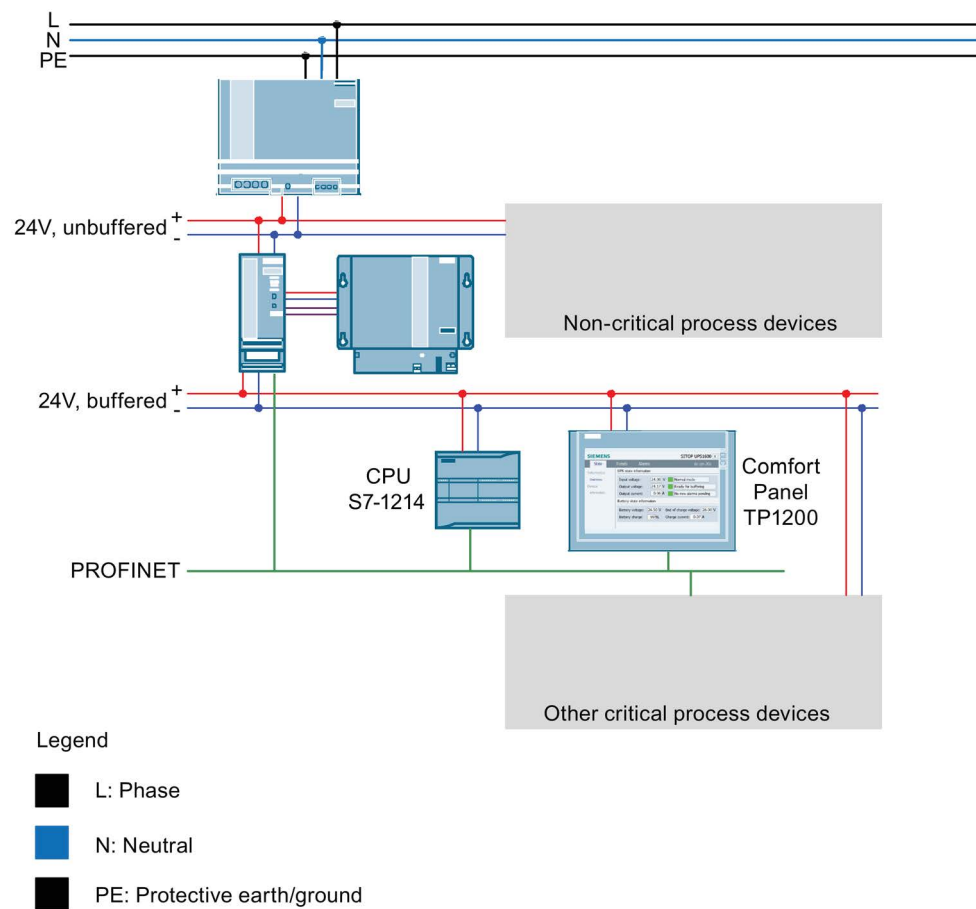The figure below shows a schematic overview of the most important components of the solution:

Figure 4-1

Scope of this application example

This application example provides FB162 function block for communication between the controller and SITOP UPS1600.

It also provides faceplates and screen windows for monitoring and operation.

Note
SITOP UPS1600 is termed as UPS1600 throughout this document.

Function of the hardware components

The table below describes the function of the Hardware (HW) components used in figure 4-1.

Table 4- 1

Name	Function
SITOP Power Supply	Central 24 V power supply for all process devices.
Non-critical process devices	Symbol for other non-critical process devices. (Devices that can be switched off when there is sufficient pressure, for example: compressors.)
SITOP UPS1600 and SITOP UPS1100	UPS with buffer (example, battery module).
S7-1214	Automation controller
Comfort Panel TP1200	Control panel for process visualization.
Other critical process devices	Symbol for other critical process devices.
PROFINET	Central process bus of all automation devices.

Advantages

This application offers the following advantages:

- Time and cost saving by means of FB162, HMI faceplates and screen windows.
- Easy and comprehensive introduction to integrating UPS1600 within a PROFINET network.

Scope

This application does not include description of:

- Creating program blocks in SIMATIC STEP 7 V5.5/STEP 7 Professional V14 SP1.
- Creating screens and objects in WinCC flexible/WinCC TIA Portal/WinCC.
- Configuring communication between the described terminal devices.
- Handling all the described SIMATIC terminal devices.

Assumed knowledge

The user is assumed to have knowledge on the mentioned points:

- Using SIMATIC STEP 7 V5.5, STEP 7 Professional V14 SP1, WinCC flexible, WinCC, and WinCC TIA Portal.

- Operating, handling, and configuring SIMATIC S7 controllers (S7-300/400 and S7-1200/1500).

- Operating, handling, and configuring HMI control panels (Multi Panels, Comfort Panels) and Runtime systems (WinCC flexible Runtime, WinCC Runtime Advanced, WinCC Runtime, WinCC Runtime Professional).

- Handling and operating SITOP UPS1600.

4.2 Description of the core functionality

Sequence of the core functionality

Communication between UPS1600 and controller runs via PROFINET. The UPS1600 is connected to the controller as PROFINET IO node. Thus, the entire UPS1600 information (voltage, power, possible buffer time, battery state) is available in the controller.

In this application example, two scenarios are realized.

● The Programmable Logic Controller (PLC) via the supplied program block FB162 recognizes power failure. The information is made permanently available in the control program which can be then evaluated. This allows your process to respond and switch off your process devices in a defined manner.

● The Programmable Logic Controller (PLC) via the supplied program block FB164 recognizes diagnostic interrupts and generates alarm messages to WinCC.

● With the provided faceplates and screen windows, relevant information and important parameters are displayed on the HMI control panel.

Note

FB164 is applicable only to SIMATIC STEP7 V5.5

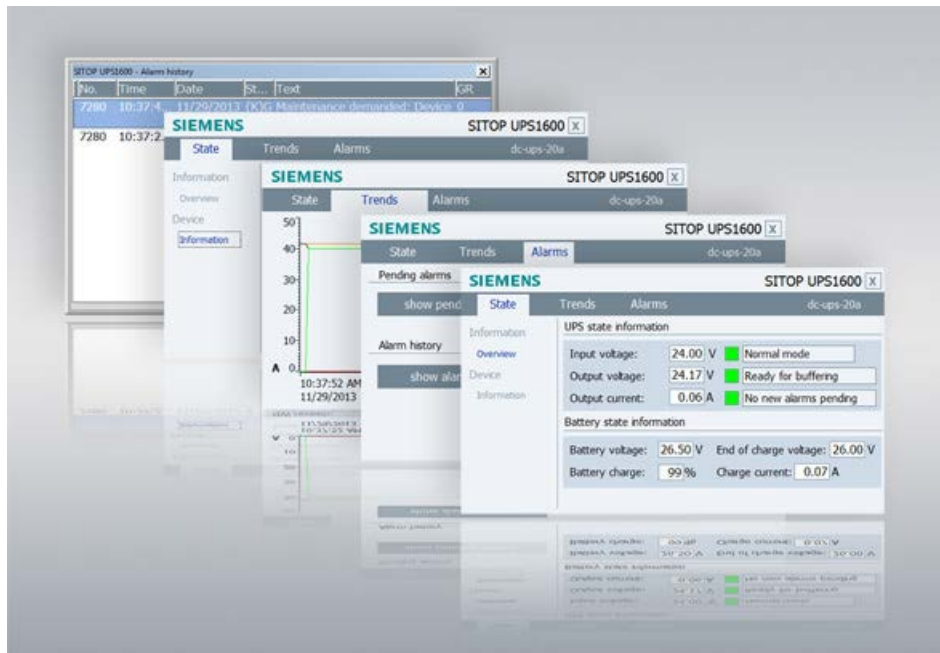### Overview and description of the user interface

Figure 4-2

The application example provides the following views in the faceplate:

- UPS state

- General Device information

- Output Data

- Voltage and power trend curves

- Currently pending alarms/alarm history

4.3   Hardware and software components used

Hardware components

Table 4- 2

Component	No.	Article number	Note
SITOP UPS1600 20 A	1	6EP4136-3AB00-2AY0	Alternatively, SITOP UPS1600 10 A 6EP4134-3AB00-2AY0 or SITOP UPS1600 40 A 6EP4137-3AB00-2AY0 is used.
MP277 8" Touch	1	6AV6643-0CB01-1AX5	Refer to Requirements (Page 71).
Comfort Panel TP1200	1	6AV2124-0MC01-0AX0	Refer to Requirements (Page 95).
CPU 1214C DC/DC/RLY PN/DP	1	6ES7214-1HG40-0XB0	Or other S7-1200/1500 CPU
CPU 317-2 PN/DP	1	6ES7317-2EK14-0AB0	Or other S7-300 CPU
SITOP UPS1100 3.2 Ah (Battery module)	1	6EP4133-0GB00-0AY0	

Note

The UPS1600 is upgraded with Firmware (FW) version 2.1 or higher.

Standard software components

Table 4- 3

Component	No.	Article number	Note
WinCC Flexible 2008 SP3 Advanced	1	6AV6613-0AA51-3CA5	Alternatively, WinCC flexible 2008 SP3 Standard
WinCC Advanced V14 SP1	1	6AV2102-4AA03-0AE5	Alternatively, WinCC Comfort V13 SP1
STEP 7 Professional V5.5	1	6ES7810-4CC10-0YA5	-
STEP 7 Professional V14 SP1	1	6ES7822-1AA03-2YA6	-
WinCC Professional V14 SP1	1	6AV2103-0DA03-0AA5	-
WinCC V7.3 update 4	1	6AV6381-2BD07-3AH0	-

Sample files and projects

The following list in the table includes all files and projects that are used in this example.

Table 4- 4

Component	Note
UPS1600 V2.2 library TIA Portal V14 SP1.zip	This zip file contains the library for TIA Portal V14 SP1 and master copies for STEP 7 V14 SP1 and WinCC V14 SP1.
Library_STEP7-V5_SITOP-UPS1600_V2-2-1.zip	This zip file contains the following subfolders. • UPS1600_STEP7_V5_5 • UPS1600_lib_WinCC_flexible_2008 • UPS1600_lib_WinCC_V7_3 • UPS1600_lib_WinCC_V7_4
UPS1600_STEP7_V5_5	This zip file contains the library of the function blocks (FB) for SIMATIC STEP 7 V5.5.
UPS1600_lib_WinCC_flexible_2008	This zip file contains the library of the faceplates for WinCC flexible 2008 SP3.
UPS1600_lib_WinCC_V7_3	This zip file contains the library of the screen windows for WinCC V7.3.
UPS1600_lib_WinCC_V7_4	This zip file contains the library of the screen windows for WinCC V7.4.

Function blocks

<div style="text-align: right; font-size: 2em;">5</div>

5.1 Function and task of the function blocks

Overview

This chapter describes the application and requirements of FB162 and FB164 and its integration into a SIMATIC STEP 7 project.

Task description and application

- In the event of a plant power failure, it is essential to safeguard certain machine components against damage and to back-up process relevant data in order to prevent data loss. The application of FB162 provides the option to bring your plant into a safe state and switch it off in a program-controlled manner while UPS1600 buffers the voltage.

- The Programmable Logic Controller (PLC) via the supplied program block FB164 recognizes diagnostic interrupts and generates alarm messages to WinCC.

FB162 Function description

The FB162 cyclically monitors the operating mode of the UPS1600. When UPS1600 is in buffer mode, a 10 s timer within the FB starts. This timer prevents the plant from being brought into a safe state in the event of just a short voltage dip/drop. If the UPS is still in buffer mode after expiry of the timer, the parameter `UPS_ready_for_reset` is set from FALSE to TRUE. Further, this parameter is also used to bring the plant components into a safe state (maintenance mode). When the plant is brought into a safe state, the parameter `UPS_execute_reset` is set from FALSE to TRUE. The FB162 then sends a command to the UPS1600, which then switches off autonomously. The following flow diagram displays the program sequence of the FB162.
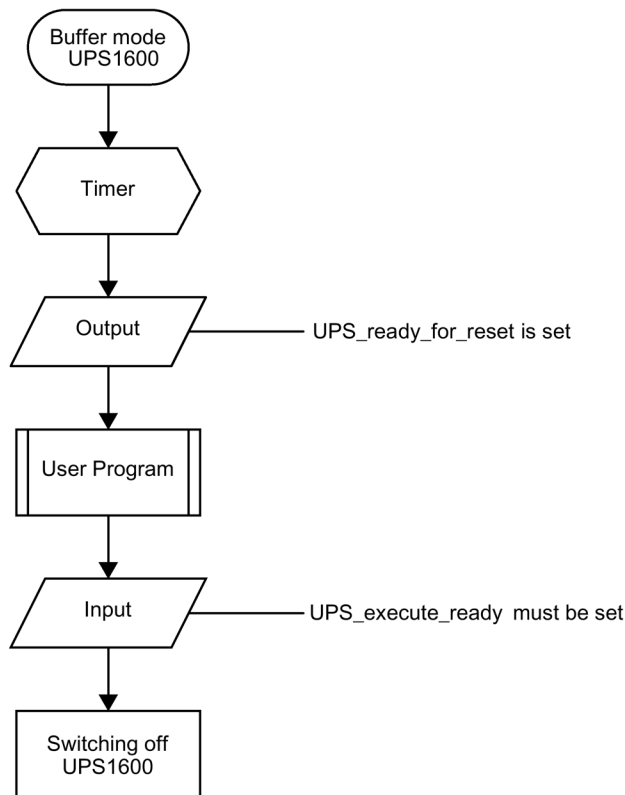
Figure 5-1

Notes regarding the FB162

- If the UPS1600 returns to the normal mode when the timer is running, the parameter `UPS_ready_for_reset` is not set.

  The timer is then reset.

- After the parameter `UPS_execute_reset` is set, the further program sequence is executed until UPS1600 is switched off via the FB162.

- The buffer time of UPS1600 must be set such that there is sufficient time to bring the plant into a safe state and switch off the UPS via the FB162.

Notes regarding the FB164

- In Report system error system diagnostics blocks, alarm messages will not include extended error information. So in order to show detailed message of interrupt, FB164 is developed. If we use this block, no need to generate system diagnostic blocks using RSE (Report system error).

5.2 Operating conditions

Configuration

FB162 and FB164 are approved for the following configuration:

- SIMATIC STEP 7 V5.5 and application of a CPU 300/400
- STEP 7 V14 SP1 and application of a CPU 300/400 or CPU 1200/1500

Faceplates

6

The HMI faceplate displays actual values and various states of the UPS1600 on HMI control panel/runtime system.

6.1 Description

Overview

This faceplate visualizes parameters of UPS1600 on a HMI control panel.
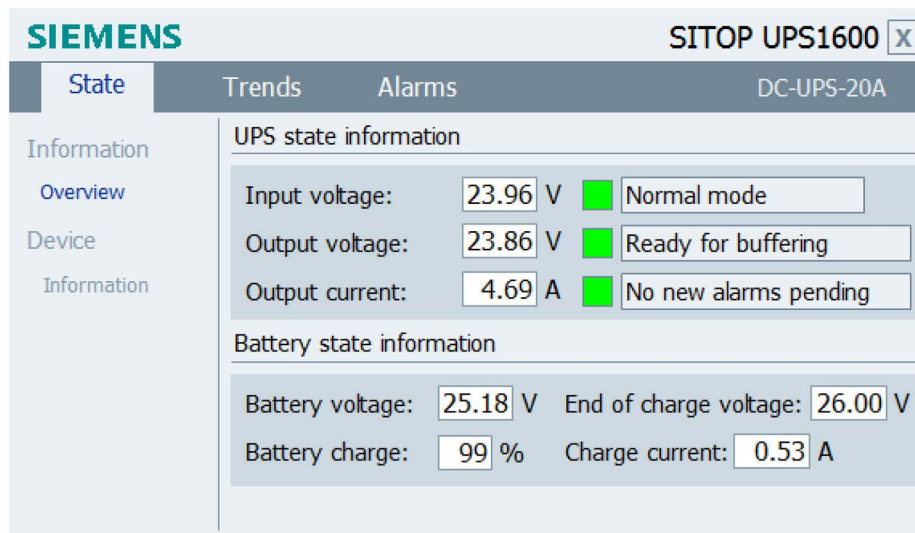
Figure 6-1

The parameters of UPS1600 are distributed over three tabs in the faceplate, clicking on the relevant tab displays specific information. The three tabs are:

- State
- Trends
- Alarms

The contents of the tabs and the parameters are described in detail in the following sections.

To close the faceplate, press the "X" button provided at the top right corner of the faceplate.

6.2 State

Introduction

The "State" tab displays two menu options:

- Information > Overview
- Device > Information

Information > Overview

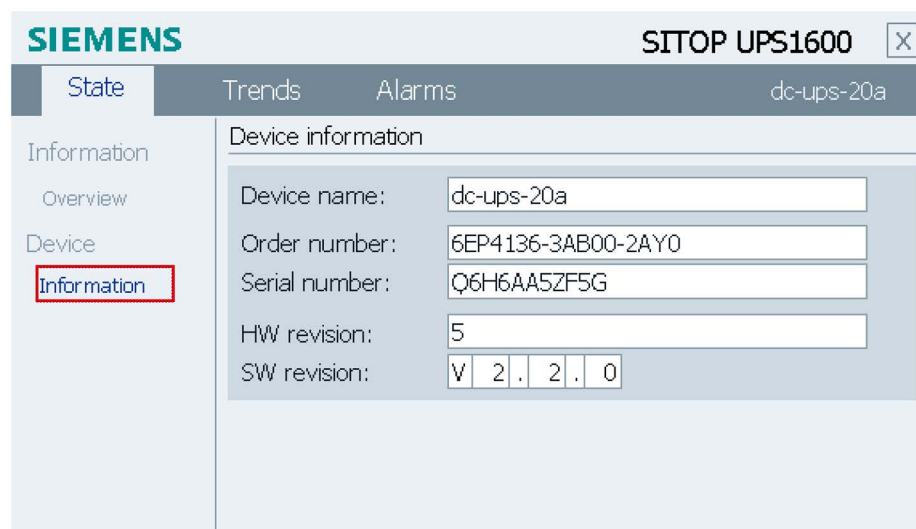This menu item displays the operating state and battery state of UPS1600.
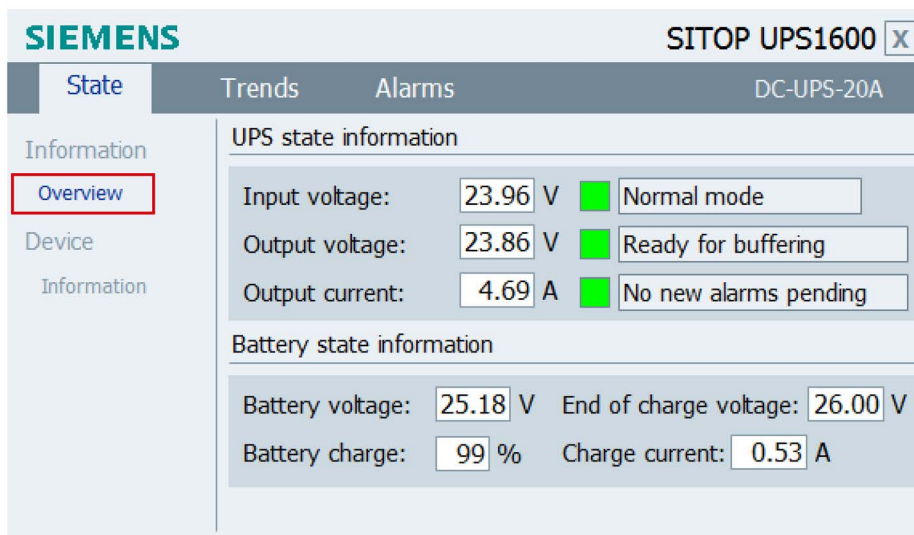
Figure 6-2

The following table shows all parameters displayed under this menu with its corresponding display names.

Table 6- 1

Display name	Parameter of the UPS
Input voltage	`Input_voltage`
Output voltage	`Output_voltage`
Output current	`Output_current`
Battery voltage	`Battery_voltage`
Battery charge	`Battery_charge_level`
End-of-charge voltage	`End_of_charge_voltage`
Charge current	`Measured_charge_current`
Normal mode/Buffer mode	`Buffer_mode`
Ready for buffering/Not ready for buffering	`Ready_for_buffering`
No new alarms pending/New alarms pending	`New_alarms_pending`

The values of the parameters `Buffer_mode`, `Ready_for_buffering`, and `New_alarms_pending` are output via symbolic I/O fields.

In addition to this output, a rectangle is displayed in front of each symbolic I/O field, which is subject to the color dynamization dependent on the parameter value.

The following table shows the possible parameter states with its corresponding color dynamization.

Table 6- 2

Parameter	State/display name	Color
Normal mode	Normal mode	Green
	Buffer mode	Yellow
Ready for buffering	Ready for buffering	Green
	Not ready for buffering	Red
No new alarms pending	No new alarms pending	Green
	New alarms pending	Yellow

Note

All the I/O fields in the faceplate are read only values.

Device > Information

This menu displays general device information about UPS1600.

Figure 6-3

The following table shows all parameters displayed under this menu with its corresponding display names.

Table 6- 3

Display name	Parameter of the UPS
Device name	`Device_name`
Order number	`Order_number`
Serial number	`Serial_number`
HW revision	`HW_revision`
SW revision	`SW_revision`

6.3 Trends

Description

The "Trends" tab displays the following attributes of UPS1600 in trend curves:

- Input voltage
- Output voltage
- Output current
- Battery voltage
- Charge current
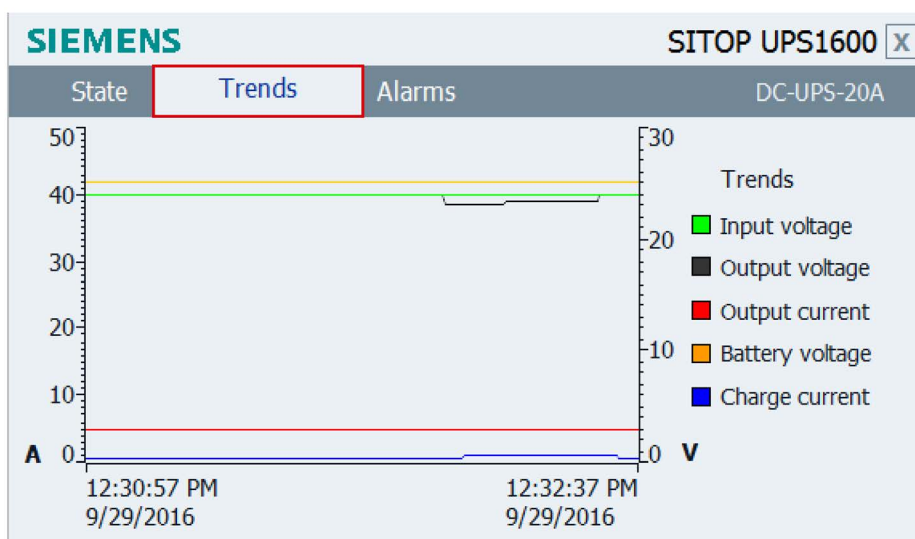
Figure 6-4

The time range of the X axis of the trend curve is 100 seconds. The trend variables used have an acquisition cycle of 1 second and are refreshed cyclically.

The table below describes UPS1600 parameters with their respective display names, color and unit representation.

Table 6- 4

Display name	Parameter of the UPS	Color	Unit
Input voltage	Input_voltage	Green	V
Output voltage	Output_voltage	Black	V
Output current	Output_current	Red	A
Battery voltage	Battery_voltage	Orange	V
Charge current	Measured_charge_current	Blue	A

6.4 Alarms

Description

The "Alarms" tab displays PROFINET diagnostic messages of SITOP UPS1600.
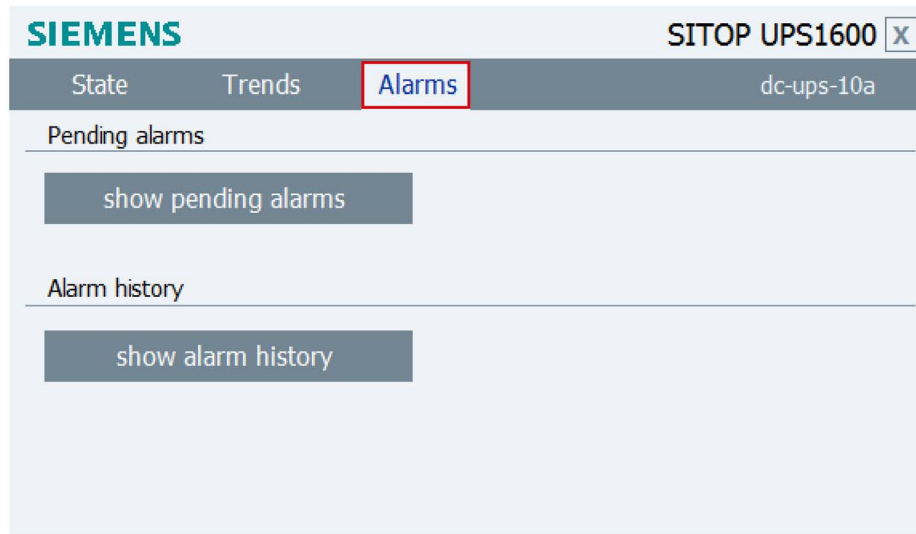
Figure 6-5

When you click on "show pending alarms" and "show alarm history" buttons, two separate message windows open.

The message window for "Pending alarms" displays all currently pending PROFINET diagnostic messages of the UPS1600. The message window for "Alarm history" displays all PROFINET diagnostic messages of UPS1600 stored in the internal message buffer of the HMI control panel used.

Prerequisites for displaying the PROFINET diagnostic messages

In order to display PROFINET diagnostic messages of UPS1600 within the faceplate, the respective WinCC flexible/WinCC TIA Portal project must be configured.

A list of the PROFINET diagnostic messages of UPS1600 is available in the chapter 4 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

Application of the function blocks $\qquad$ 7

7.1 Application of the function blocks in SIMATIC STEP 7 V5.5

7.1.1 Prerequisites

FB162 requirements

The following requirements must be met in order to use the FB in combination with UPS1600 and SIMATIC STEP 7 V5.5.

- The GSD file of the UPS1600 is installed in the Hardware (HW) configuration of SIMATIC STEP 7 V5.5 and the UPS is configured as PROFINET node in the HW configuration of the SIMATIC S7 controller.
- S7 communication between UPS1600 and SIMATIC S7 controller is already configured.
- The library UPS1600_STEP_7_V5_5 is available on your computer.

Installation of GSD file

The required information about installation of the GSD file of the UPS1600 in SIMATIC STEP 7 V5.5 is available in the chapter 3.4.2 of the SITOP UPS1600 User Manual. (https://support.industry.siemens.com/cs/ww/en/view/84977415)

S7 communication

The required information about establishing communication between a UPS1600 and a SIMATIC S7 controller is available in the chapter 3.4 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

7.1.2 Content of the library for SIMATIC STEP 7 V5.5

Content of the library for SIMATIC STEP 7 V5.5

The library UPS1600_STEP_7_V5_5 contains:

- Blocks (FB162, FB164, UDT8, UDT4500, UDT4501 and UDT4502)
- Symbol table Symbols_UPS1600
- SCL source file of the code blocks FB162, FB164, UDT8, UDT4500, UDT4501 and UDT4502
- "Text Libraries"

The table below shows the blocks available in the library.

Table 7- 1

Block	Name	Description
FB162	UPS1600	FB for program-controlled switch-off of the UPS1600
UDT4500	tUPS1600 strings V2_1	UDT which contains UPS1600 string variable declarations
UDT4501	tUPS1600 mixed V2_1	UDT which contains all parameters of the UPS1600.
UDT4502	UDT_UPS1600_Data_V2_1	Combined UDT of UDT4500 and UDT4501
FB164	SITOP_UPS1600_DIAG	FB to raise UPS1600 diagnostic alarms
UDT8	SStartInf	UDT structure of local data of OB82

Opening the library in SIMATIC STEP 7 V5.5

Follow the procedure to open the library in a SIMATIC STEP 7 V5.5 project:

1. Open SIMATIC Manager.

2. In the menu bar, click "File > Open".
   The "Open Project" dialog box opens.

3. Select the "Libraries" tab.
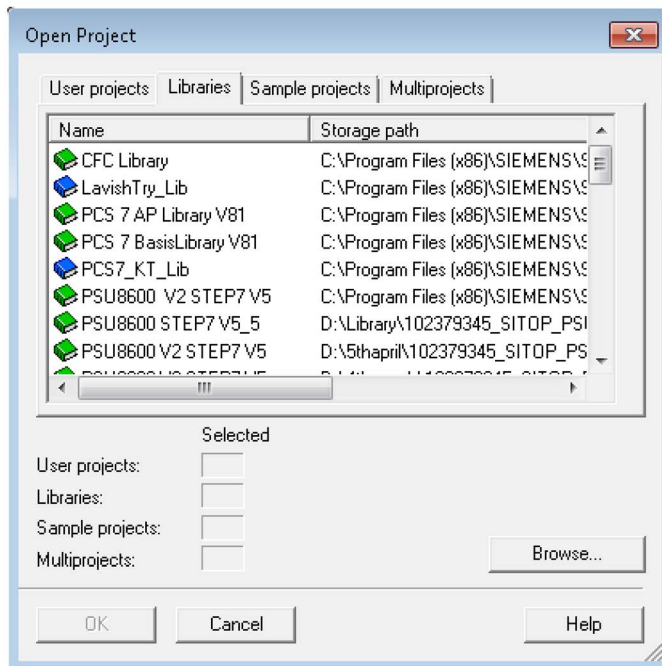
Figure 7-1

4. Click "Browse".
   The "Browse" dialog box opens.

5. Navigate to the stored location of the library in your computer and open the folders "UPS1600_V2_2_Library > UPS1600_STEP7_V5_5".

6. Select "UPS1600_" and click "OK".
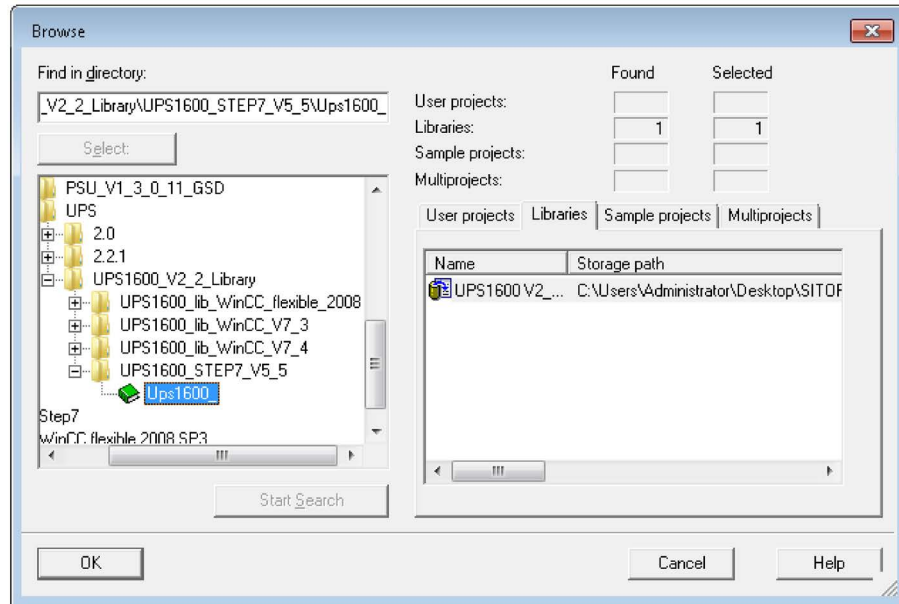
Figure 7-2

7.1.3 Interfaces of the function block

Block diagram

The following figure shows the block diagram of FB162:
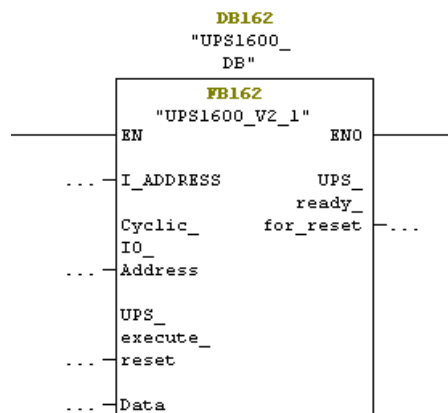
Figure 7-3

Interface description

The table below describes parameters of FB162.

Table 7- 2

Parameter	Declaration	Data type	Description
I_ADDRESS	Input	INT	PROFINET diagnostic address of the UPS1600 within the project. The diagnostic address must be specified in decimal format.
Cyclic_IO_Address	Input	INT	Input address of the UPS1600 within the project. The input address must be specified in decimal format.
UPS_execute_reset	Input	BOOL	Switch-off signal to the UPS1600.
UPS_ready_for_reset	Output	BOOL	Signal for plant shut-down.
Data	InOut	UDT_UPS1600_Data	Data area for data exchange to the HMI faceplate.

The table below describes parameters of FB164.

Table 7- 3

Parameter	Declaration	Data type	Description
Diag_Address	Input	INT	PROFINET diagnostic address of the UPS1600 within the project. The diagnostic address must be specified in decimal format.
MsgEvId100_01 .. MsgEvId100_27	Input	DWORD	Message event ids for Device failures alarms
MsgEvId101_01 .. MsgEvId101_27	Input	DWORD	Message event ids for Device Diagnostic alarms
MsgEvId102_01 .. MsgEvId102_12	Input	DWORD	Message event ids for Battery Diagnostic alarms

Input and diagnostic address of the UPS1600 module

To fetch the input and diagnostic address of the UPS1600 module, follow the instructions given below:

1. Open the hardware configuration settings of the PLC used in the project. The "HW Config - [SIMATIC 300(1) (Configuration)..." dialog box opens.

2. Select the UPS1600 module.

3. Note down the value in the "Diagnostic Address" column (A). We need to add value to the given parameter I_ADDRESS of FB162 and Diag_Address of FB164.

4. Note down value in the "I Address" column (B), value given to the parameter Cyclic_IO_Address of FB162.
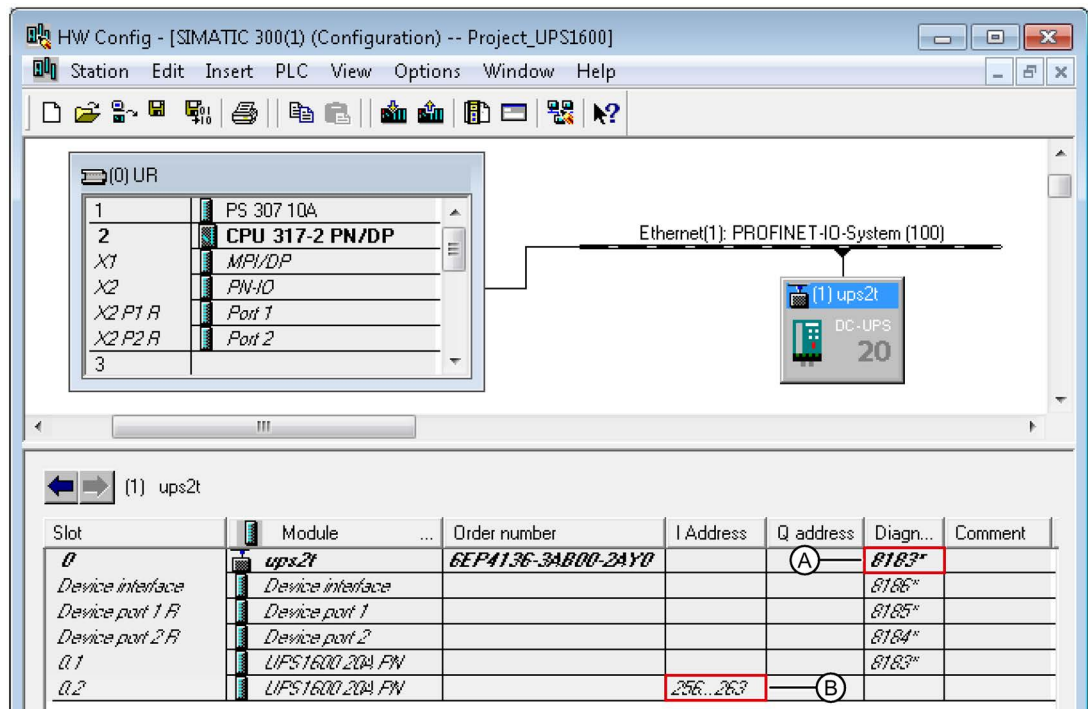
Figure 7-4

In this case,

- `I_ADDRESS` value is 8183.
- `Cyclic_IO_Address` is 256.

7.1.4   UDT_UPS1600_Data_V2_1 (UDT4502)

Data block DB161

The Data Block (DB) contains all the parameters of UPS1600 displayed within the HMI faceplate.

The following table lists all the parameters in UDT4502:

Table 7- 4

Parameter	Data type	Remarks
Order_number_string	STRING [20]	Char to string > Order_number
Serial_number_string	STRING [20]	Char to string > Serial_number
Device_name_string	STRING [20]	Char to string > Device_name
Version_number_string	STRING [30]	Char to string > Version_number
Battery_capacity	REAL	[Ah]
End_of_charge_voltage	REAL	[V]

Parameter	Data type	Remarks
Charge_current	REAL	[A]
HW_revision1	BYTE	-
HW_revision2	BYTE	-
SW_revision1	BYTE	-
SW_revision2	BYTE	-
Max_output_current	BYTE	[A]
Padding	BYTE	-
Order_number	ARRAY [0 to 29] Of CHAR	[30 characters]
Serial_number	ARRAY [0 to 29] Of CHAR	[30 characters]
Device_name	ARRAY [0 to 29] Of CHAR	[30 characters]
Version_number	ARRAY [0 to 49] Of CHAR	[50 characters]
Input_voltage	REAL	[V]
Input_current	REAL	[A]
Output_voltage	REAL	[V]
Load_current	REAL	[A]
Measured_charge_current	REAL	[A]
Battery_voltage	REAL	[V]
Output_current	REAL	[A]
Charge_voltage	REAL	[V]
Buffer_mode	BYTE	Active = 255, Inactive = 0; Undefined = 127
Ready_for_buffering	BYTE	Yes = 255; No = 0
New_alarms_pending	BYTE	Yes = 255; No = 0
Battery_charge_level	BYTE	0 to100% = battery charging; 255 = unknown battery
Total_calculated_battery_capacity	REAL	[Ah]
Total_calculated_battery_health	BYTE	[%]
Buffer_time	INT	[s]
Buffer_threshold	REAL	[V]
Buffering_allowed	BYTE	[0/255]
CommandID	INT	Remote reset = 8195
Parameter	BYTE	-
Padding_command	BYTE	-
Device-HWRevision	INT	-
Device-SWRevision1	BYTE	-
Device-SWRevision2	BYTE	-
Device-SWRevision3	BYTE	-

Note

Further information about the system parameters is available in the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

7.1.5   Integrating the function block

Integrating FB162

The following sections describe all the steps required to integrate FB162 into a SIMATIC STEP 7 V5.5 project.

Hardware used:

- CPU 317-2 PN/DP
- SITOP UPS1600 24 V/20 A

The procedure for other SIMATIC S7 controllers is identical.

Note

Please ensure that all requirements for the integration of the FB are met. The requirements are described in these Prerequisites (Page 29).

Inserting blocks from the library into the program

Follow the procedure to integrate FB162 and associated data blocks into a SIMATIC STEP 7 V5.5 project.

1. In the "SIMATIC Manager", open the required project.

2. Open the "Blocks" folder available in the connected PLC.

3. In the "SIMATIC Manager", open the global library UPS1600 V2_2 STEP7 V5_5 and select "UPS1600_V2_2 > Blocks".
   The procedure for opening the library is described in Content of the library for SIMATIC STEP 7 V5.5 (Page 29).

4. Select all the blocks in the library and drag-and-drop them into the "Blocks" folder of your target project folder.
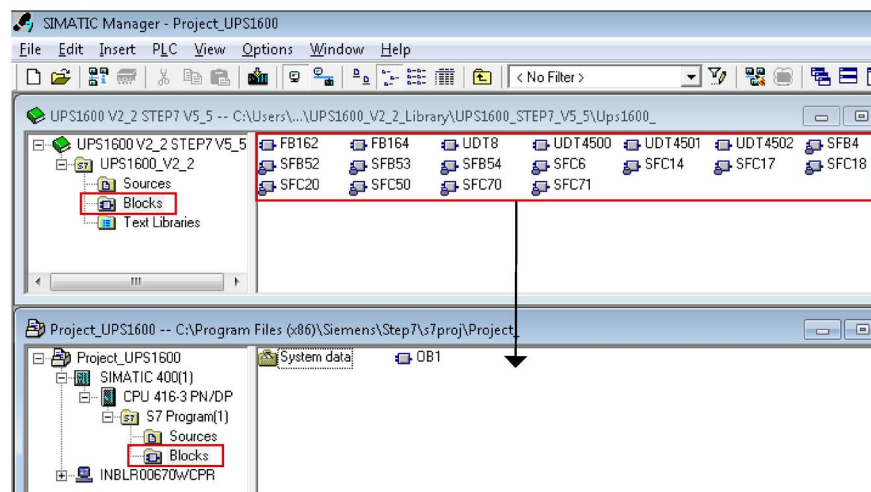
Figure 7-5

5. Insert OB40 in order to avoid PLC going to stop mode in case of hardware interrupt.

Inserting Text libraries from the library into the program

Follow the procedure to insert "Text Libraries" from the library into a SIMATIC STEP 7 V5.5 project.

1. In the "SIMATIC Manager", open the required project.

2. Open the "S7 Program" folder available in the connected PLC. Insert Text Library folder under S7 Program folder if it doesn't exist.

3. In the "SIMATIC Manager", open the global library UPS1600 V2_2 STEP 7 V5_5 and select "UPS1600_V2_2".

4. The procedure for opening the library is described in Content of the library for SIMATIC STEP 7 V5.5.

5. Copy "SITOP_MODULES", "SITOP_UPS1600_DiagText", "SITOP_UPS1600_HlpText" which are present under "Text Libraries" folder in the library and paste them into the "Text Libraries" folder of target project folder.

6. Open text library "SITOP_MODULES" and make an entry to the text library with index as modules diagnostic address and PSU8600/UPS1600 device name under English/ German Language column as shown below.
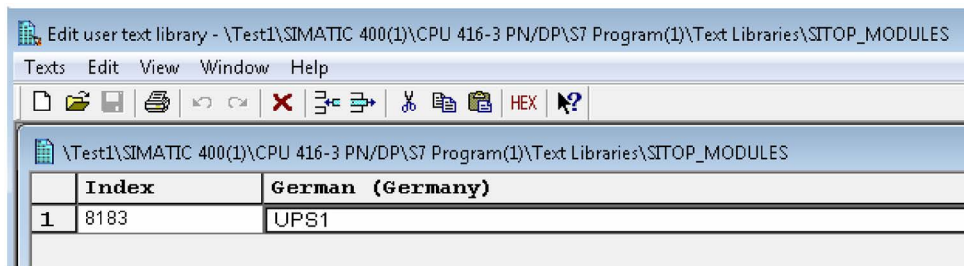
Figure 7-6

7. Save and close text library.

Create a global data block with UDT structure

Follow the procedure to create a global DB with UDT:

1. In your project, open the "Blocks" folder available in the connected PLC folder.

2. Right-click on the blocks element area and select "Insert New Object > Data Block".

   The "Properties - Data Block" dialog box opens to create a DB.

3. In the "Properties - Data Block" dialog box,

   – Enter a name and number for the DB (DB15) in the "Name and type:" text box.

   – For the same field, open the first drop-down list and select "Shared DB".

   – Enter a symbolic name as desired (UPS_global) in the "Symbolic Name:" text box.
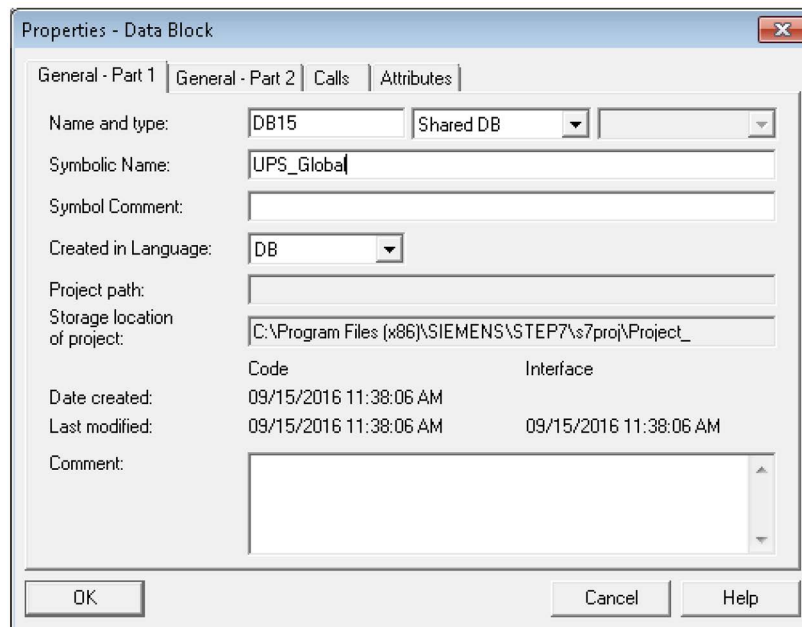
Figure 7-7

4. Click "OK".
   The created DB appears in the "Blocks" folder.

5. Open the DB created in Step 2 (DB15).

   A new window opens.

6. At the address "+0.0",

    – In the "Name" column, enter a name for your tag (UPS).

    – In the "Type" column, replace INT with UDT_UPS1600_Data_V2_1.

    – In the "Initial" column, delete the initial value and remove the comment.

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	DB_VAR	INT	0	Temporary placeholder variable
=2.0		END_STRUCT		

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	UPS	"UDT_UPS1600_Data_V2_1"		
=310.0		END_STRUCT		
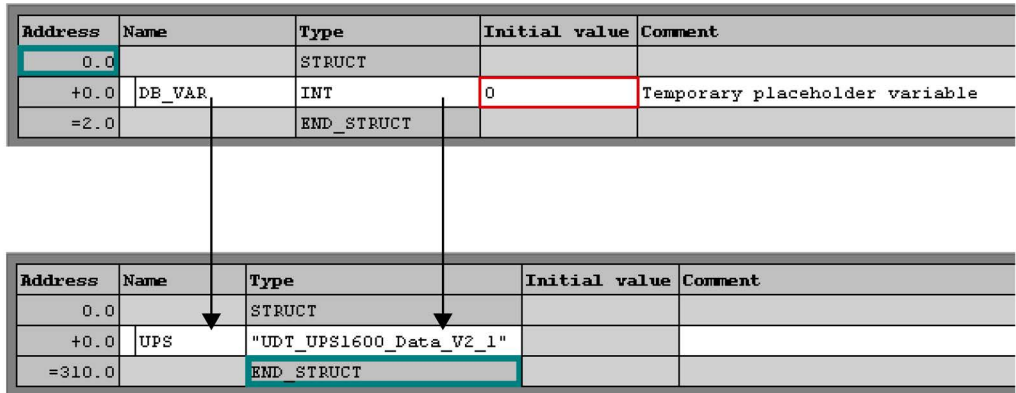
Figure 7-8

7. Save the settings and close the window.

Calling the function block FB162

Follow the procedure to call the FB within an organization block (OB). In this description, FB162 is called within OB33.

1. In the "Blocks" folder of the controller, create an instance DB.

2. Right click on the blocks element area and select "Insert New Object > Data block". The "Properties - Data Block" dialog box opens.

3. In the "Properties - Data Block" dialog box,

   – Enter a name and number for the DB (DB12) in the "Name and type:" text box.

   – For the same field, select "Instance DB" and "FB162" from the drop-down lists.

   – Enter the symbolic name as "UPS1600_DB" in the "Symbolic name:" text box.

   – Click "OK"
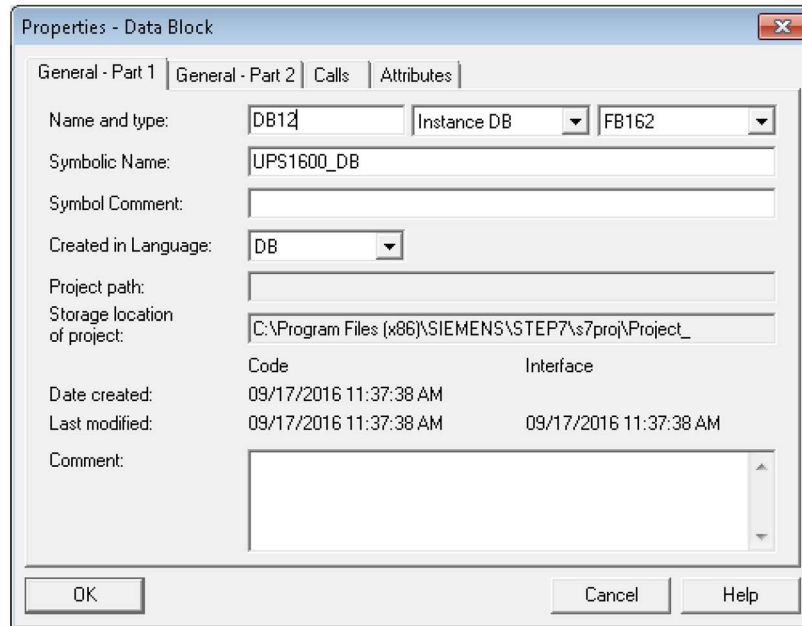
Figure 7-9

4. In the same "Blocks" folder, create an Organization Block (OB) with the name OB33. (Right click and select "Insert New Object > Organization block".)

Open the created OB33.
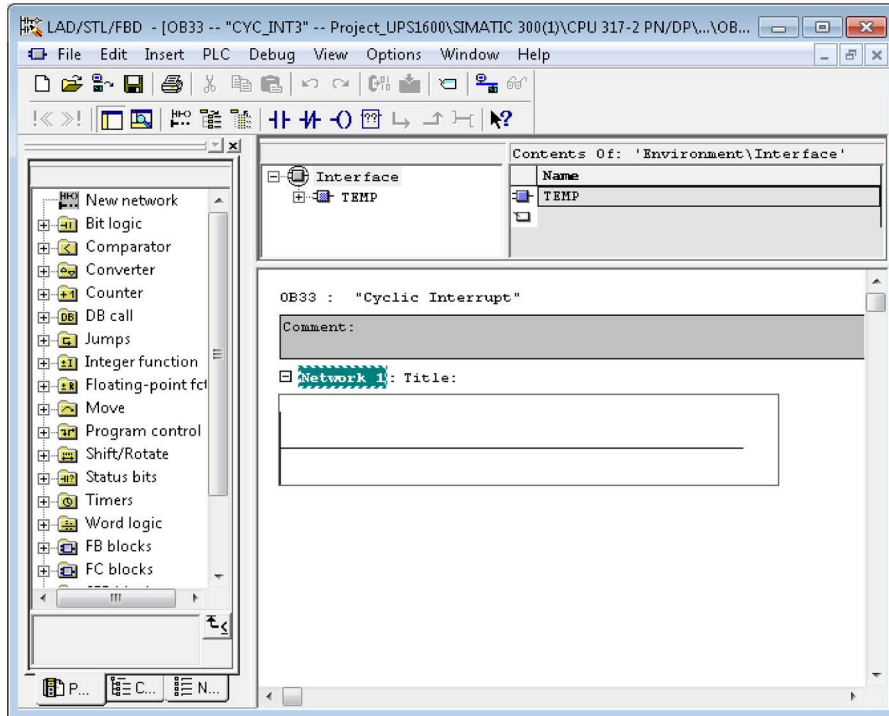
Figure 7-10

5. In the "Program elements" tab, expand the "FB blocks" folder.

6. Drag-and-drop "FB162 (UPS1600_V2_1)" onto the empty network area.
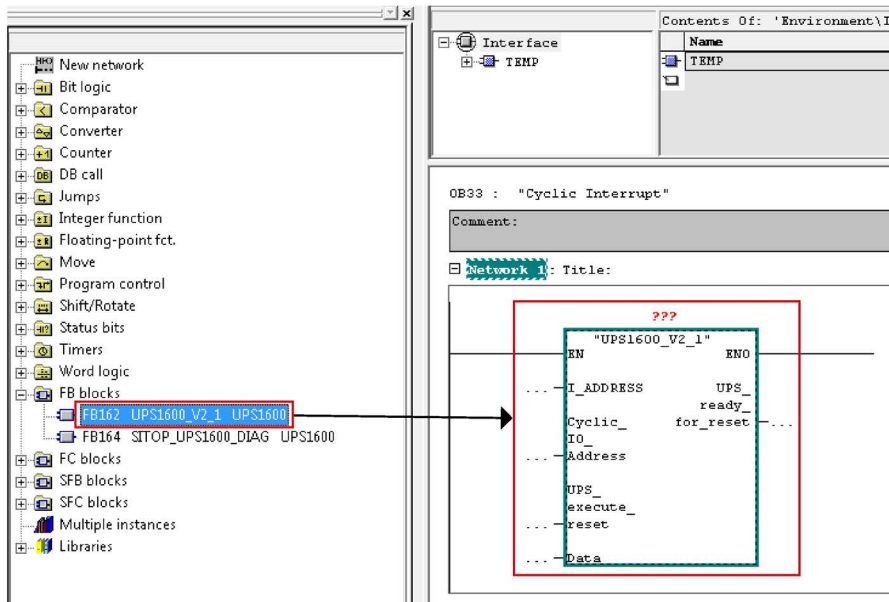
Figure 7-11

7. For the block in the network area,

   – Interconnect FB162 with the instance DB created in step 1 (DB12).

   – For the parameter `I_ADDRESS`, enter the PROFINET diagnostic address of the SITOP UPS1600 within your STEP 7 project (8183).

   – For the parameter `Cyclic_IO_Address`, enter the input address of the SITOP UPS1600 within your STEP 7 project (256).

   – Connect the parameter `UPS_ready_for_reset` to the tag through which you bring the plant into a safe state (flag M0.0 is used).

   – Connect the parameter `UPS_execute_reset` to the tag through which you switch off the UPS (flag M0.1 is used).
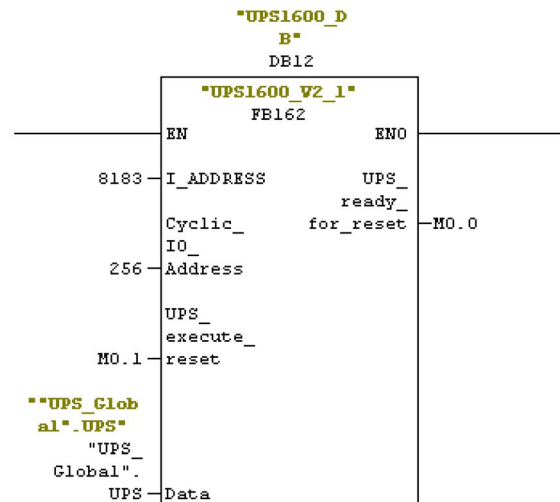
Figure 7-12

For further information about the block parameters, see Interfaces of the function block (Page 31).

8. Save the changes and close the window.

Note

`I_ADDRESS` and `Cyclic_IO_Address` of FB162

To know the diagnostic and input address of FB162, refer section **Input and diagnostic address of the UPS1600 module** in Interfaces of the function block (Page 31).

Calling the function block FB164

Follow the procedure to call the FB164 within an organization block (OB). In this description, FB164 is called within OB82.

1. In the "Blocks" folder of the controller, create an instance DB.

2. Right click on the blocks element area and select "Insert New Object > Data block". The "Properties - Data Block" dialog box opens.

3. In the "Properties - Data Block" dialog box,

   – Enter a name and number for the DB (DB) in the "Name and type:" text box.

   – For the same field, select "Instance DB" and "FB164" from the drop-down lists.

   – Enter the symbolic name as "UPS1600_Diag_DB" in the "Symbolic name:" text box.

   – Click "OK"
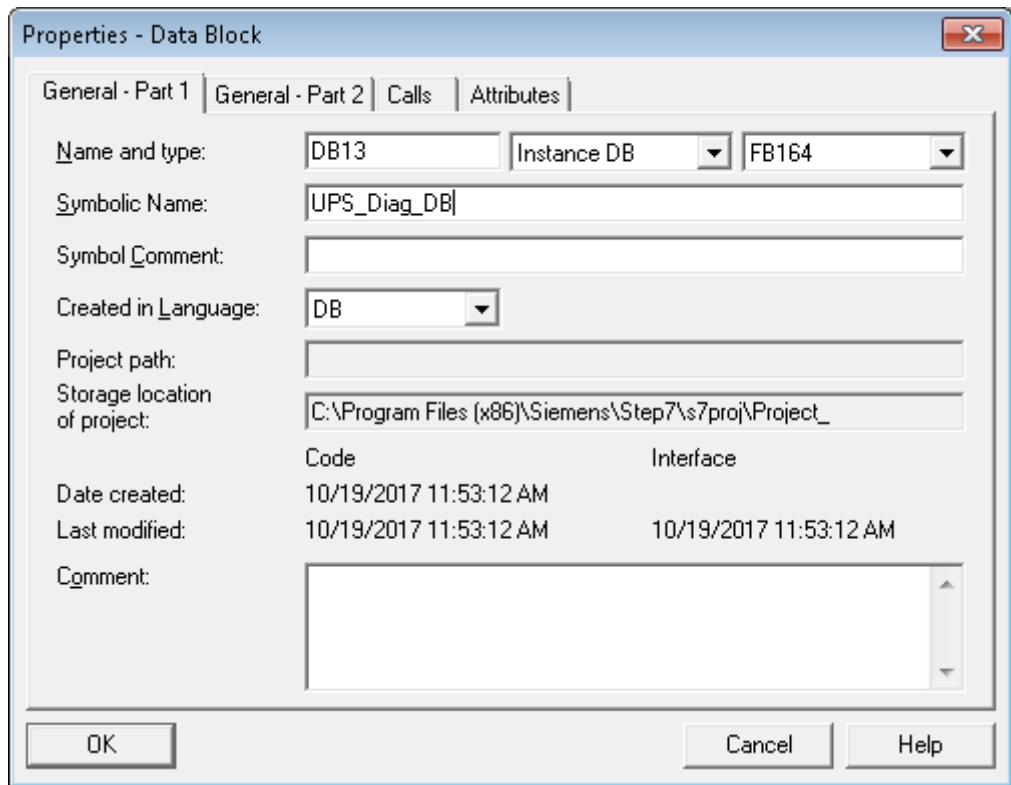
Figure 7-13

4. In the same "Blocks" folder, create an Organization Block (OB) with the name OB82. (Right click and select "Insert New Object > Organization block".) Open the created OB82.
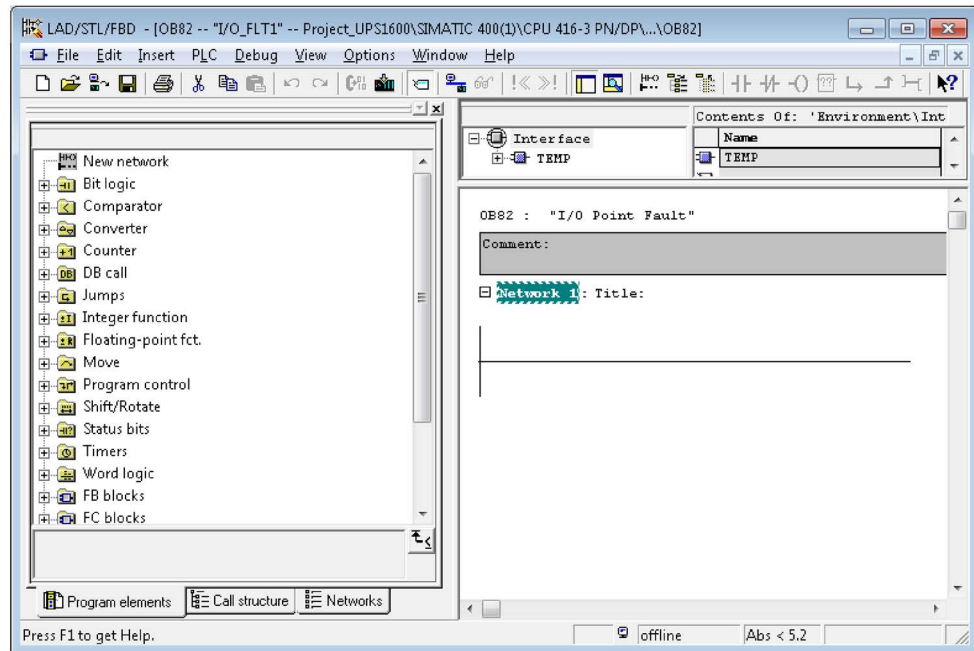
Figure 7-14

5. In the "Program elements" tab, expand the "FB blocks" folder.

6. Drag-and-drop "FB164 (SITOP_UPS1600_DIAG)" onto the empty network area.
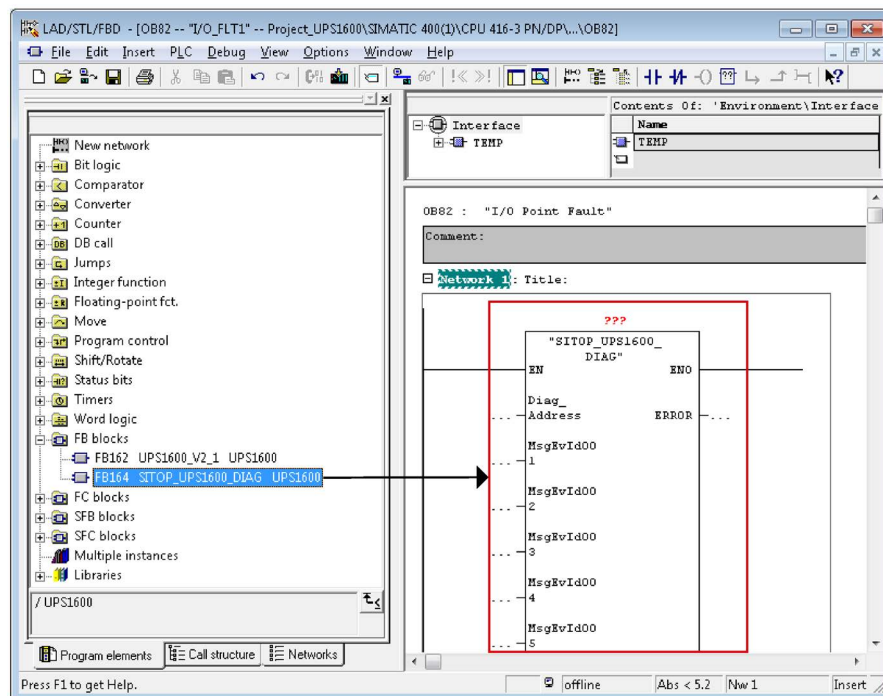
Figure 7-15

7. For the block in the network area,

   – Interconnect FB164 with the instance DB created in step 1 (DB).

   – For the parameter `Diag_Address`, enter the PROFINET diagnostic address of the SITOP UPS1600 within your SIMATIC STEP 7 project (8183).

```
                              DB13
                           "UPS_Diag_
                              DB"

                             FB164
                        UPS1600 Diagnostic
                              block
                          "SITOP_UPS1600_
                              DIAG"
                   ─┤EN                 ENO├─

                     Diag_
             8183 ─┤Address            ERROR├─...

    DW#16#6000  │MsgEvId00
          0001 ─┤1

    DW#16#6000  │MsgEvId00
          0002 ─┤2

    DW#16#6000  │MsgEvId00
          0003 ─┤3

    DW#16#6000  │MsgEvId00
          0004 ─┤4

    DW#16#6000  │MsgEvId00
          0005 ─┤5

    DW#16#6000  │MsgEvId00
          0006 ─┤6

    DW#16#6000  │MsgEvId00
          0007 ─┤7

    DW#16#6000  │MsgEvId00
          0008 ─┤8

    DW#16#6000  │MsgEvId00
          0009 ─┤9

    DW#16#6000  │MsgEvId01
          000A ─┤0

    DW#16#6000  │MsgEvId01
          000B ─┤1
```

Figure 7-16

8. Save the changes and close the window.

Follow the same procedure to call FB164 in OB86 and cyclic interrupt OB. In this example OB33 with the same instance DB which is created in step 3.

Note

`Diag_Address` of FB164

To know the diagnostic and input address of FB164, refer section **Input and diagnostic address of the** UPS1600 **module** in Interfaces of the function block (Page 31)

7.2 Application of the function blocks under STEP 7 Professional V14 SP1

7.2.1 Prerequisites

Prerequisites

The following requirements must be met in order to use the FB in combination with UPS1600 and STEP 7 V14 SP1:

- Hardware Support Package (HSP) for UPS1600 is installed in STEP 7 V14 SP1.
- S7 communication between UPS1600 and SIMATIC S7 controller is already configured.
- UPS1600 V2.2 library TIA Portal V14 SP1 is available on your computer.

Installation of Hardware Support Package

The required information about installation of Hardware Support Package of UPS1600 in STEP 7 V14 SP1 is available in the chapter 3.3.2 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

S7 communication

The required information about establishing communication between UPS1600 and a SIMATIC S7 controller is available in the chapter 3.3 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

7.2.2 Content of the library for STEP 7 V14

Content of the library for STEP 7 V14 SP1

The STEP 7 V14 SP1 library contains the library elements for:

- S7-300/400
- S7-1200/1500

The following sections describes in detail about the library elements and how to open the library in STEP 7 V14 SP1.

Library elements S7-300/400 and S7-1200/1500

The following code blocks are present in this library element:

Table 7- 5

Folder	Description
Function Block	It contains the UPS1600_V2.1 (FB162) function block for program-controlled switch-off of the UPS1600.
UDT	It contains UDT_UPS1600 which is a master copy of the data types tUPS1600 mixed, tUPS1600 strings and UDT_UPS1600_V2_1.

Opening the library in STEP 7 V14 SP1

Follow the procedure to open the library in STEP 7 V14 SP1 project:

1. Open STEP 7 V14 SP1 in the "Project view" and select the "Libraries" tab.

2. Under the "Global libraries" palette, click on the highlighted icon to import the library. The "Open global library" dialog box opens.
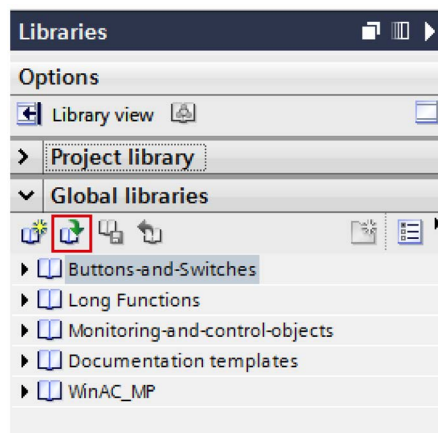
Figure 7-17

3. In the "Look in:" drop-down list, navigate to the stored location of the library folder UPS1600 V2.2 library TIA Portal V14 SP1 on your computer and open it.

4. Select "UPS1600 V2.2 library TIA Portal V14 SP1.al13".
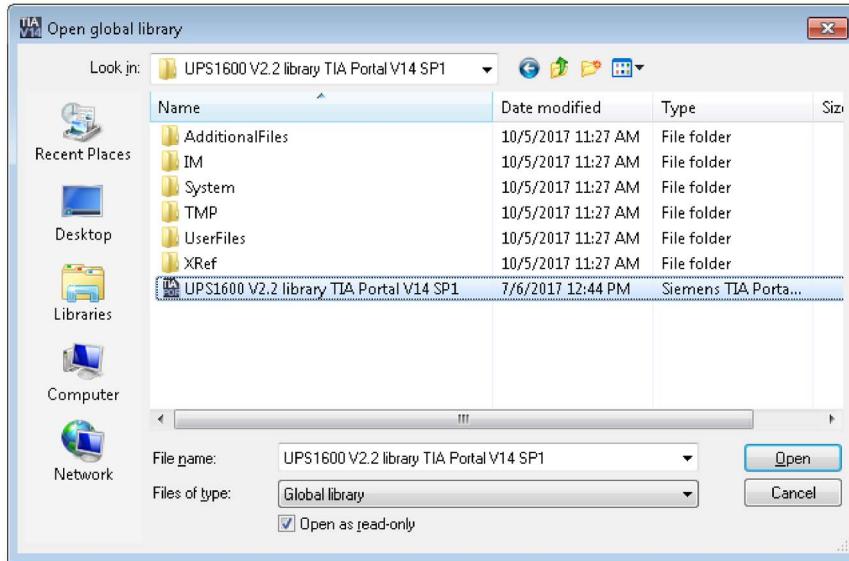
Figure 7-18

5. Click "Open".

The library is displayed in the "Global libraries" palette.

7.2.3 Interfaces of the function block FB162

Function block FB162 for S7-300/400

Block diagram

The following figure shows the block diagram of FB162:
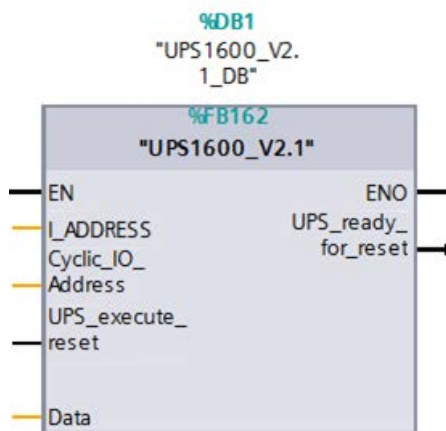
Figure 7-19

Interface description

Table 7- 6

Parameter	Declaration	Data type	Description
`I_ADDRESS`	Input	DWORD	PROFINET diagnostic address of the UPS1600 within the project
`Cyclic_IO_Address`	Input	WORD	I/O Data input address of UPS1600 within the project
`UPS_execute_reset`	Input	BOOL	Switch-off signal to the UPS1600
`Data`	InOut	UDT_UPS1600_Data	Data area for data exchange to the HMI faceplate.
`UPS_ready_for_reset`	Output	BOOL	Signal for plant shut-down

`I_Address` and `Cyclic_IO_Address` of FB162 for S7-300/400

To fetch the input and diagnostic address of the UPS1600 module for S7-300/400, follow the instructions given below:

1. In the "Project tree", open "Devices and Networks".

2. Select the UPS1600 module and go to "Device view > Device overview".

3. Note down the value in the "I address" column (A), this value is given to the parameter `I_Address`.

4. Select the UPS1600 module and go to "Properties > General > I/O data > I/O addresses > Input addresses"

5. Note down the value in the "Start address" variable (B), this value is given to the parameter `Cyclic_IO_Address`.
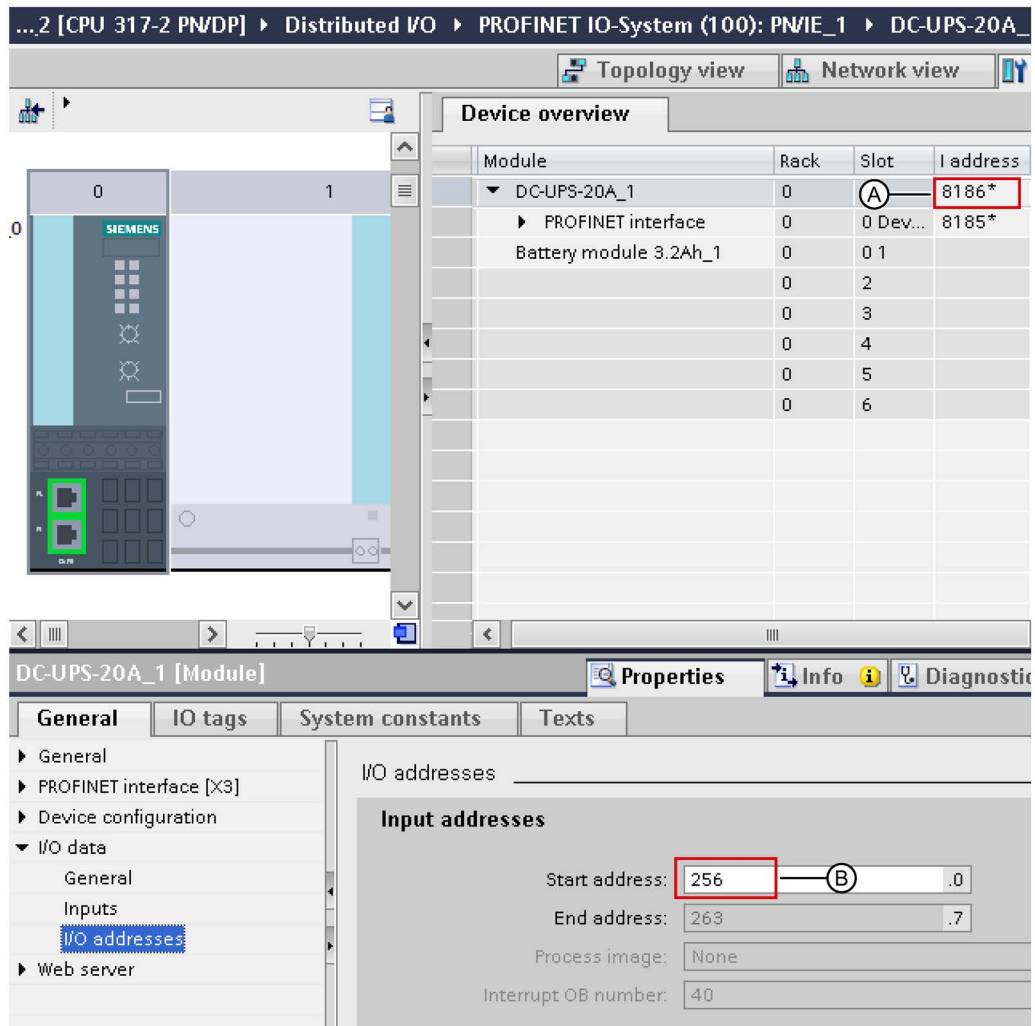
Figure 7-20

In this case,

- Value of `I_ADDRESS` is 8186 (A).
- Value of `Cyclic_IO_Address` is 256 (B).

Function block FB162 for S7-1200/1500

Block diagram

The following figure shows the block diagram of the FB162:
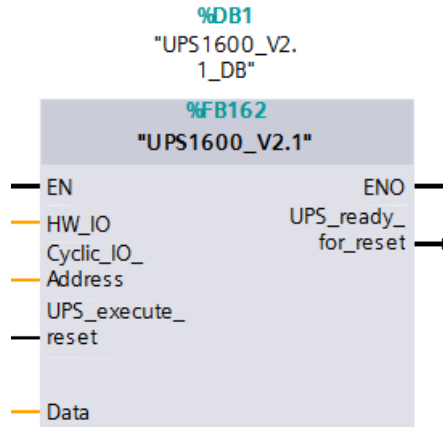
Figure 7-21

Interface description

Table 7- 7

Parameter	Declaration	Data type	Description
HW_IO	Input	HW_IO	Hardware ID of the UPS1600 within the project, for example: DC-UPS-20A_1~Head.
Cyclic_IO_Address	Input	HW_IO	IO Data submodule address of UPS1600 within the project
UPS_execute_reset	Input	BOOL	Switch-off signal to the UPS1600
Data	InOut	UDT_UPS1600_Data	Data area for data exchange to the HMI faceplate.
UPS_ready_for_reset	Output	BOOL	Signal for plant shut-down

`HW_IO` and `Cyclic_IO_Address` of FB162 for S7-1200/1500

To fetch the input and diagnostic address of the UPS1600 module for S7-1200/1500, follow the instructions given below:

1. In the "Project tree", open "Devices and Networks".

2. In the "Network view", select the UPS1600 module and go to "Properties > System constants".

3. Note down the value in the "Hardware identifier" column of DC-UPS-20A_1~Head (A), value given to `HW_IO`.

4. Note down the value in "Hardware identifier" column of DC-UPS-20A_1~IO_Data_Submodule (B), value given to `Cyclic_IO_Address`.
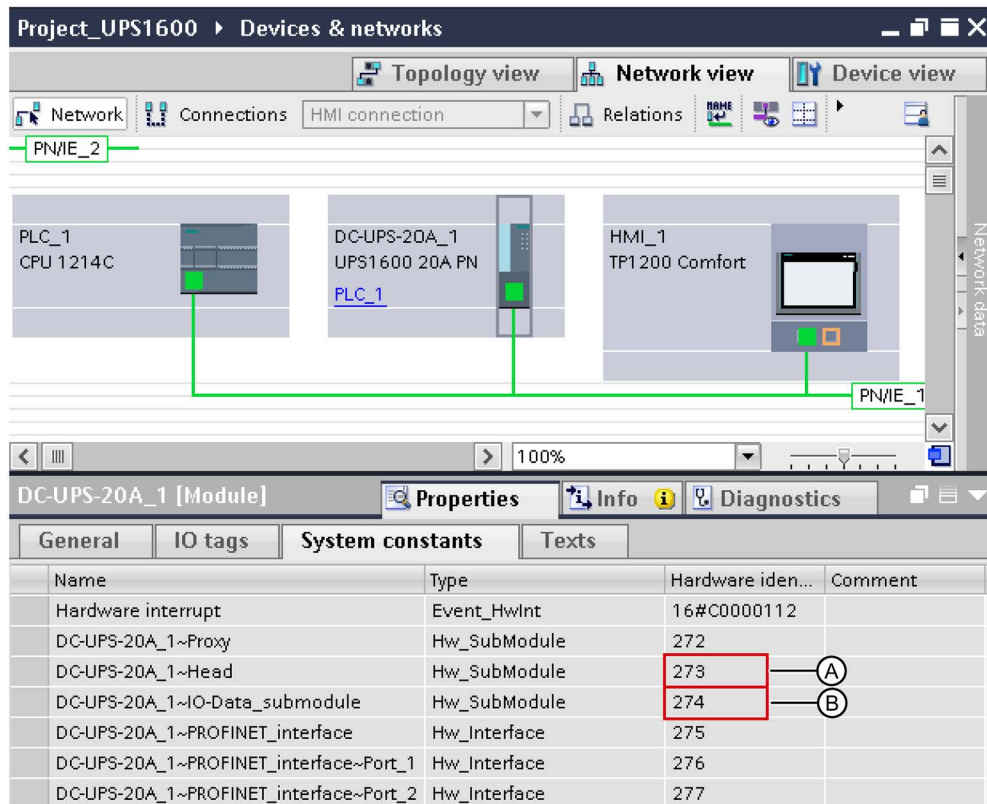
Figure 7-22

In this case,

- Value of HW_IO is DC-UPS-20A_1~Head or 273 (A).

- Value of Cyclic_IO_Address is DC-UPS-20A_1~IO-Data_Submodule or 274 (B).

7.2.4 UDT_UPS1600_Data

UDT_UPS1600_Data

The data block contains parameters of UPS1600 displayed within the HMI faceplate.

The following table lists parameters present in UDT_UPS1600_Data.

Table 7- 8

Parameter	Data type	Remarks
UPS_DataS	tUPS1600 strings	-
Order_number_string	STRING [20]	Order number (String)
Serial_number_string	STRING [20]	Serial number (String)
Device_name_string	STRING [20]	Device name (String)
Version_number_string	STRING [30]	Version number (String)
UPS_DataM	tUPS1600 mixed	-
Battery_capacity	REAL	[Ah]
End_of_charge_voltage	REAL	[V]
Charge_current	REAL	[A]
HW_revision1	BYTE	-
HW_revision2	BYTE	-
SW_revision1	BYTE	-
SW_revision2	BYTE	-
Max_output_current	BYTE	[A]
Padding	BYTE	-
Order_number	ARRAY [0 to 29] Of CHAR	[30 characters]
Serial_number	ARRAY [0 to 29] Of CHAR	[30 characters]
Device_name	ARRAY [0 to 29] Of CHAR	[30 characters]
Version_number	ARRAY [0 to 49] Of CHAR	[50 characters]
Input_voltage	REAL	[V]
Input_current	REAL	[A]
Output_voltage	REAL	[V]
Load_current	REAL	[A]
Measured_charge_current	REAL	[A]
Battery_voltage	REAL	[V]
Output_current	REAL	[A]
Charge_voltage	REAL	[V]
Buffer_mode	BYTE	Active = 255 Inactive = 0; Undefined = 127
Ready_for_buffering	BYTE	Yes = 255; No = 0
New_alarms_pending	BYTE	Yes = 255; No = 0
Battery_charge_level	BYTE	0 to 100% = battery charging; 255 = unknown battery
Total_calculated_battery_capacity	REAL	[Ah]

Parameter	Data type	Remarks
`Total_calculated_battery_health`	BYTE	[%]
`Buffer_time`	INT	[s]
`Buffer_threshold`	REAL	[V]
`Buffering_allowed`	BYTE	[0/255]
`CommandID`	INT	Remote reset = 8195
`Parameter`	BYTE	-
`Padding_command`	BYTE	-
`Device-HWRevision`	INT	-
`Device-SWRevision1`	BYTE	-
`Device-SWRevision2`	BYTE	-
`Device-SWRevision3`	BYTE	-

7.2.5 Integrating the function block

7.2.5.1 Procedure when using an S7-300/400

Overview

Hardware used:

- CPU 317-2 PN/DP
- SITOP UPS1600 24V/20A

The procedure for other SIMATIC S7-300/400 controllers is identical.

Note

Please ensure that all the requirements for the integration of the FB are met.
The requirements are described in the Prerequisites (Page 46).

Inserting blocks from the library into the program

Follow the procedure to insert the FB162 and associated data blocks into a STEP 7 V14 SP1 project.

1. Open the required project in "Project view".

2. In the "Libraries" window, under "Global libraries", open the library "UPS1600 2.2 library TIA Portal V14 SP1".

   The procedure for opening UPS1600 2.2 library TIA Portal V14 SP1 global library is described in Content of the library in STEP 7 V14 (Page 47).

3. In the library, select "Master copies > UPS1600 TIA Library > UPS1600 Step7 > S7-300/400 > UDT > UDT_UPS1600".
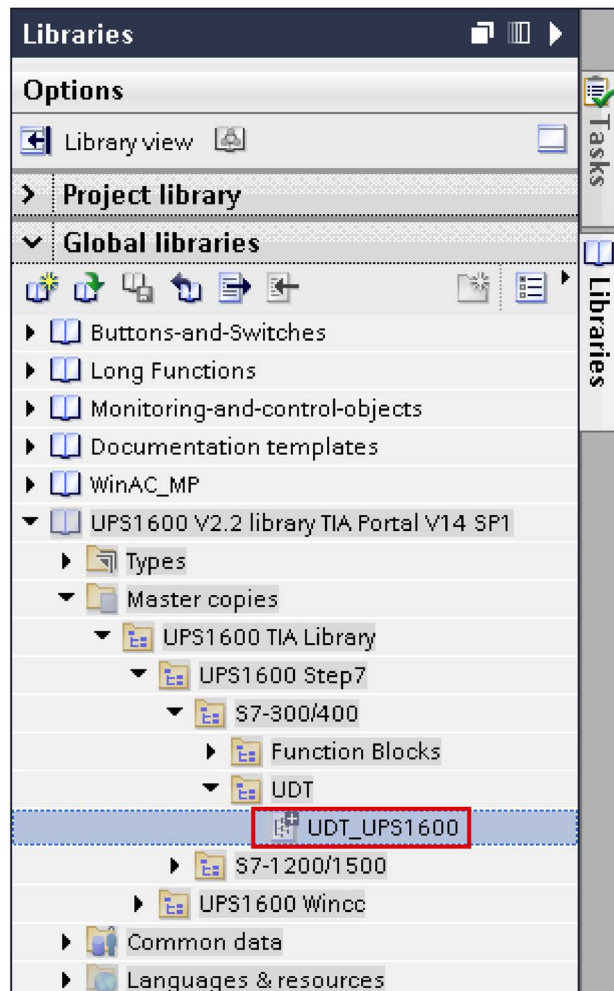
Figure 7-23

4. Drag-and-drop "UDT_UPS1600" into the "PLC data types" folder in the "Project tree".
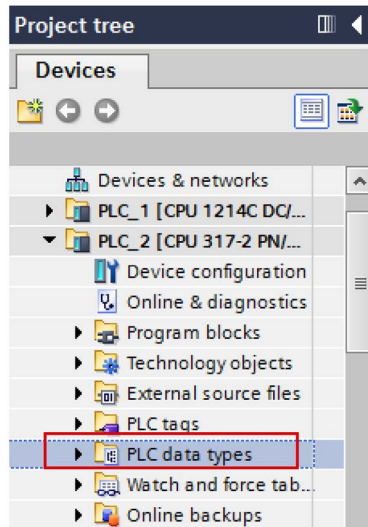
Figure 7-24

5. In the library, select "Master copies > UPS1600 TIA Library > UPS1600 Step7 > S7-300/400 > Function Blocks > UPS1600_V2.1".
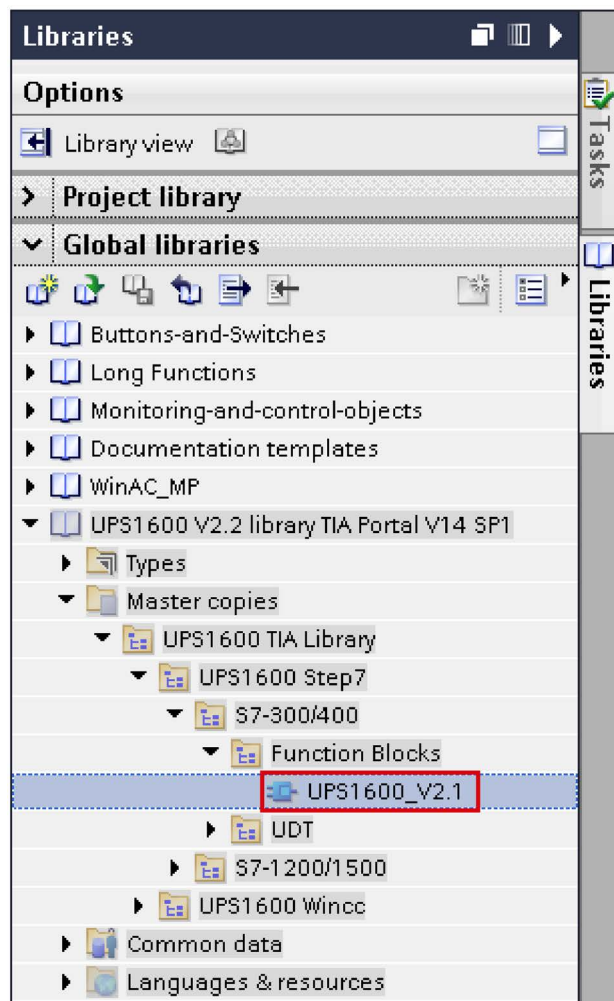
Figure 7-25

6. Drag-and-drop "UPS1600_V2.1" into the "Program blocks" folder in the "Project tree".
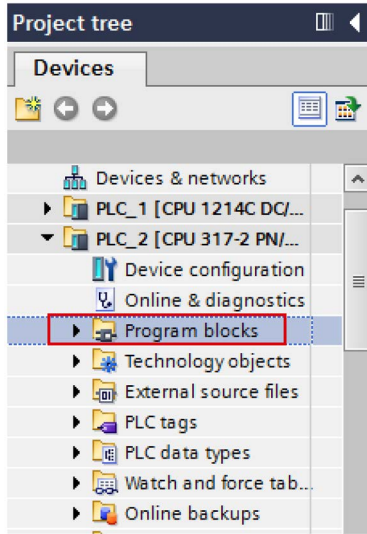
Figure 7-26

Calling the function block

Follow the procedure to call FB162 within an Organization Block (OB). In this description, FB162 is called within OB33.

1. In the "Project tree", open the "Program blocks" folder.

2. Create a cyclic interrupt OB with the name "CYC_INT3[OB33]" and open it. This displays an empty network.

3. From the "Program blocks" folder, drag-and-drop "UPS1600_2.1 [FB162]" to the empty network of OB33. The "Call options" dialog box opens.
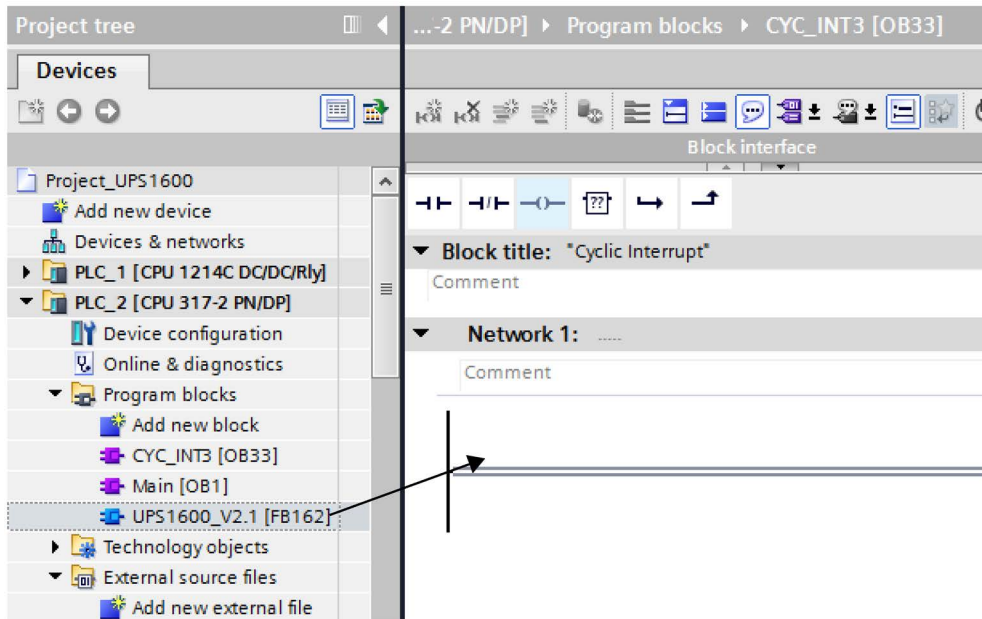
Figure 7-27

4. Keep the default settings of the dialog box and click "OK".

5. Double click on "Add new block" to add a new DB. The "Add new block" window opens.

6. In the "Add new block" window,

    –   Select "Data block"

    –   Enter a name as desired (UPS_Global).

    –   In the "Type:" drop-down list, select "Global DB".

    –   Click "OK".
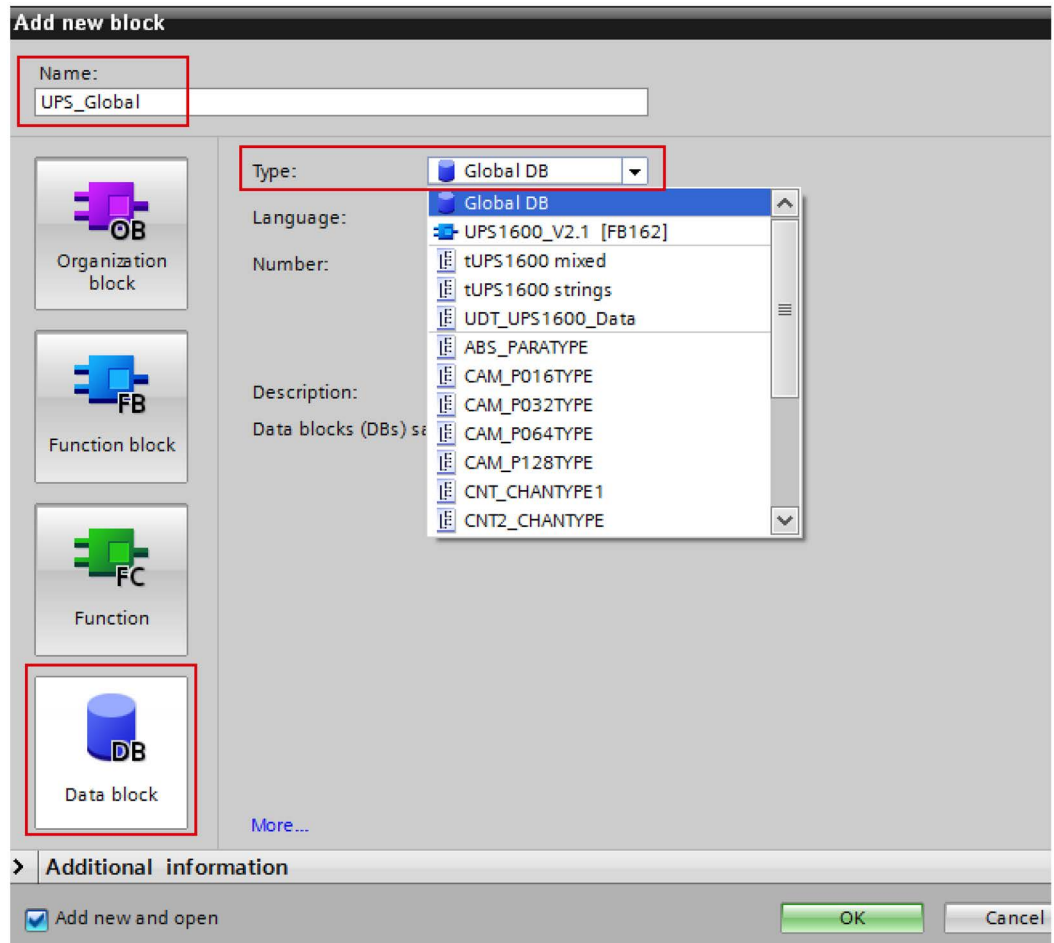
Figure 7-28

7. Open the global DB created in step 6 (UPS_Global). Add a new tag with data type as "UDT_UPS1600_Data".
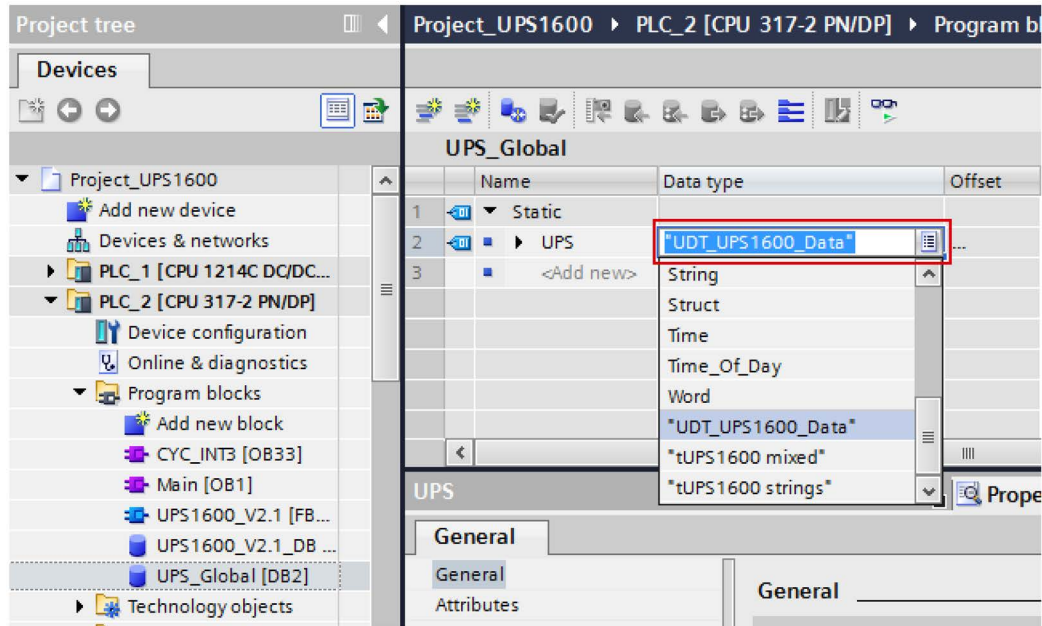
Figure 7-29

8. In the network area of OB33,

Note

OBs are called cyclically and in numerical order. Observe this when calling the communication blocks in an operation block. This ensures that you are reading the current data of the power supply.

– For the parameter `I_ADDRESS`, enter the PROFINET diagnostic address of the UPS1600 module (8186).

– For the parameter `Cyclic_IO_Address`, enter the start address of the UPS1600 module (256).

– Connect the parameter `UPS_ready_for_reset` with a tag of your project that you use to bring the plant into a condition in which it can be shut down.

– Connect the parameter `UPS_execute_reset` with a tag of your project that you use to switch off the UPS when the plant is in a condition in which it can be shut down.

– Connect the parameter `Data` with Global DB UPS_Global.
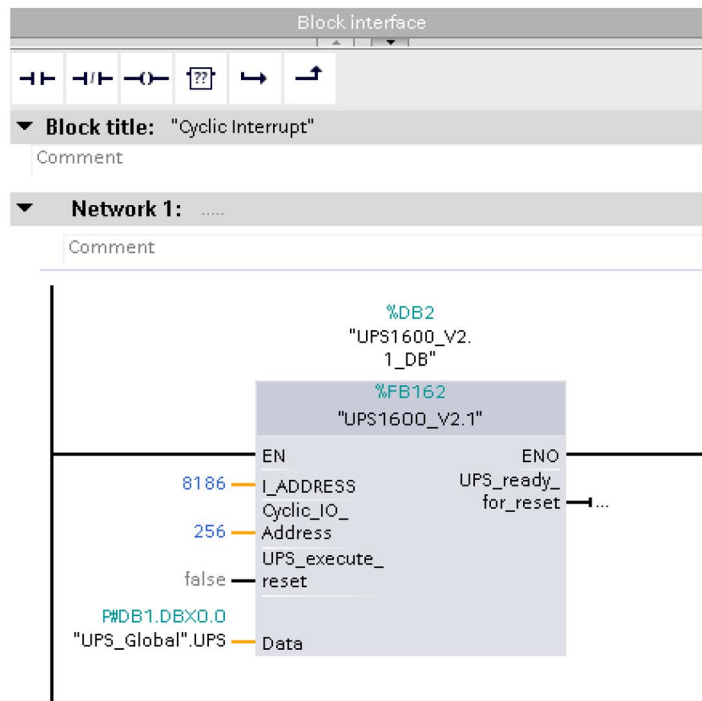
Figure 7-30

Note

I_ADDRESS and Cyclic_IO_Address parameters

To know the I_ADDRESS and Cyclic_IO_Address parameter values of the UPS1600 module, refer Interfaces of the function FB162 (Page 48).

7.2.5.2   Procedure when using an S7-1200/1500

Overview

Hardware used:

- CPU 1214C DC/DC/Rly
- SITOP UPS1600 24 V/20 A

The procedure for other SIMATIC S7-1200/1500 controllers is identical.

Note

Please ensure that all requirements for the integration of the FB are met. The requirements are described in the Prerequisites (Page 46).

Inserting blocks from the library into the program

Follow the procedure to insert the blocks and the associated data blocks into a STEP 7 V14 SP1 project:

1. Open the required project in "Project view".

2. In the "Libraries" tab, under "Global libraries", open the library "UPS1600 2.2 library TIA Portal V14 SP1".
   The procedure for opening the library is described in the Content of the library in STEP 7 V14 (Page 47).

3. Select "Master copies > UPS1600 TIA Library > UPS1600 Step7 > S7-1200/1500 > UDT > UDT_UPS1600".
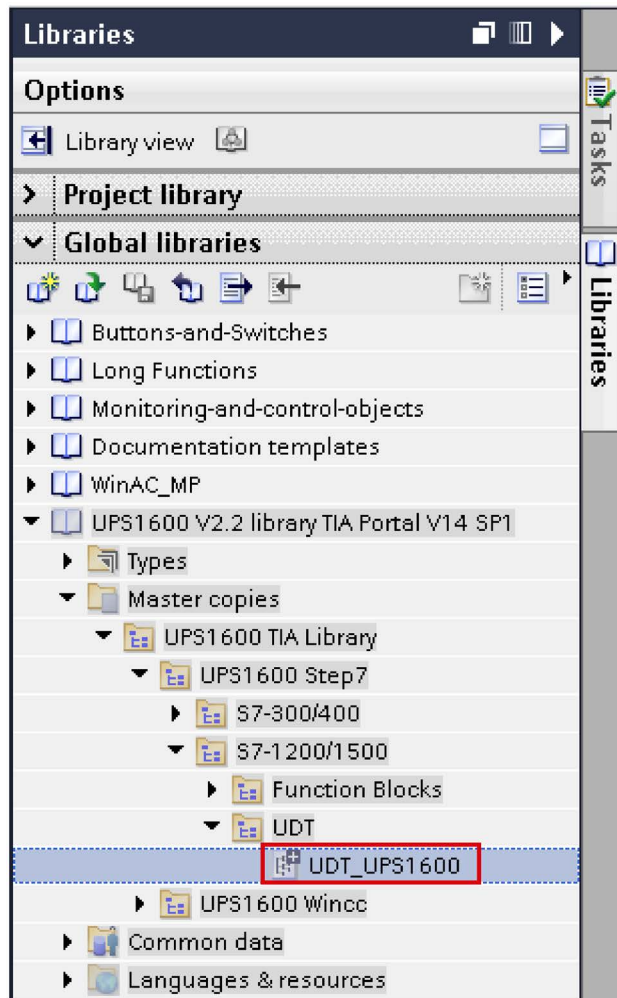
Figure 7-31

4. Drag-and-drop "UDT_UPS1600" into the "PLC data types" folder in the "Project tree".
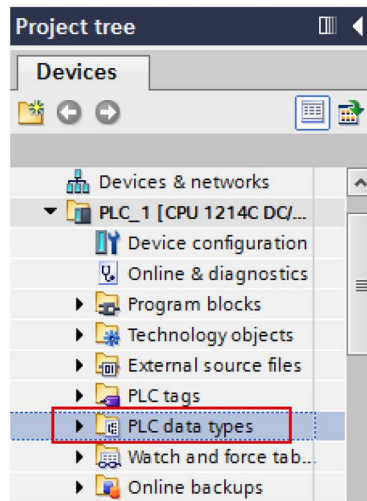
Figure 7-32

5. In the library, select "Master copies > UPS1600 TIA Library > UPS1600 Step7 > S7-1200/1400 > Function Blocks > UPS1600_V2.1".
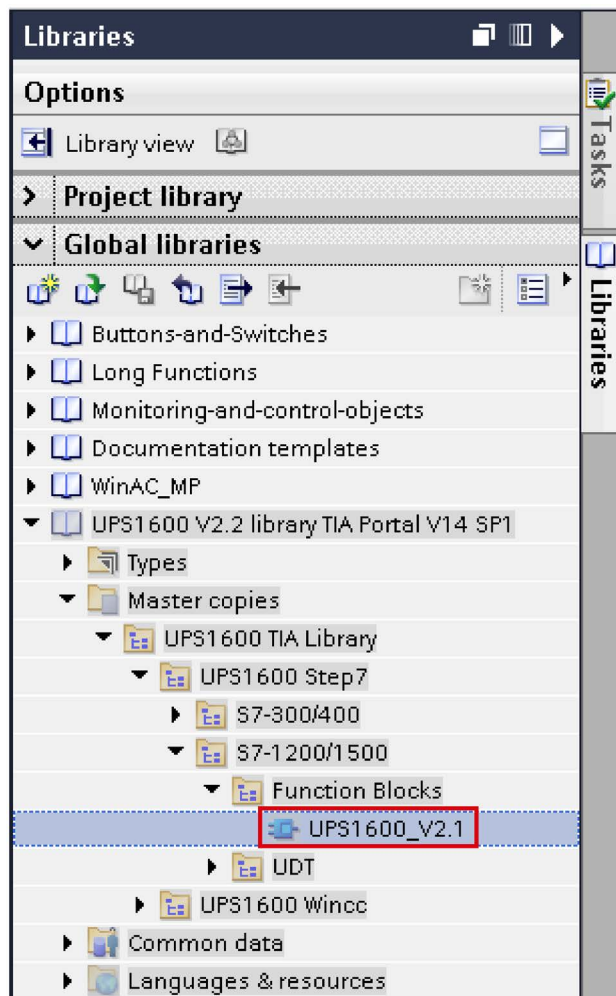
Figure 7-33

6. Drag-and-drop "UPS1600_V2.1" into the "Program blocks" folder in the "Project tree".
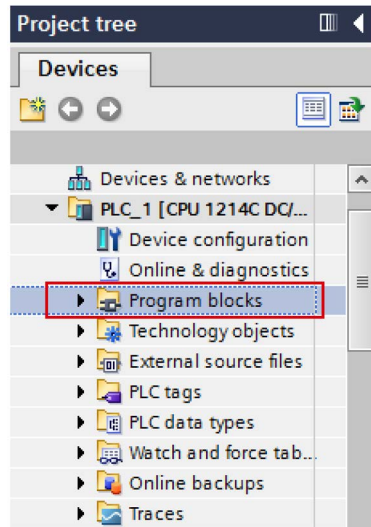
Figure 7-34

Calling the function block

Follow the procedure to call the FB within an organization block (OB). In this description, FB162 is called within OB30.

1. In the "Project tree", open the "Program blocks" in the controller.

2. Create an OB with the name "Cyclic interrupt [OB30]" and open it. This displays an empty network.

3. Drag-and-drop "UPS1600_V2.1 [FB162]" from the "Program blocks" folder to the empty network of OB30. The "Call options" dialog box opens.
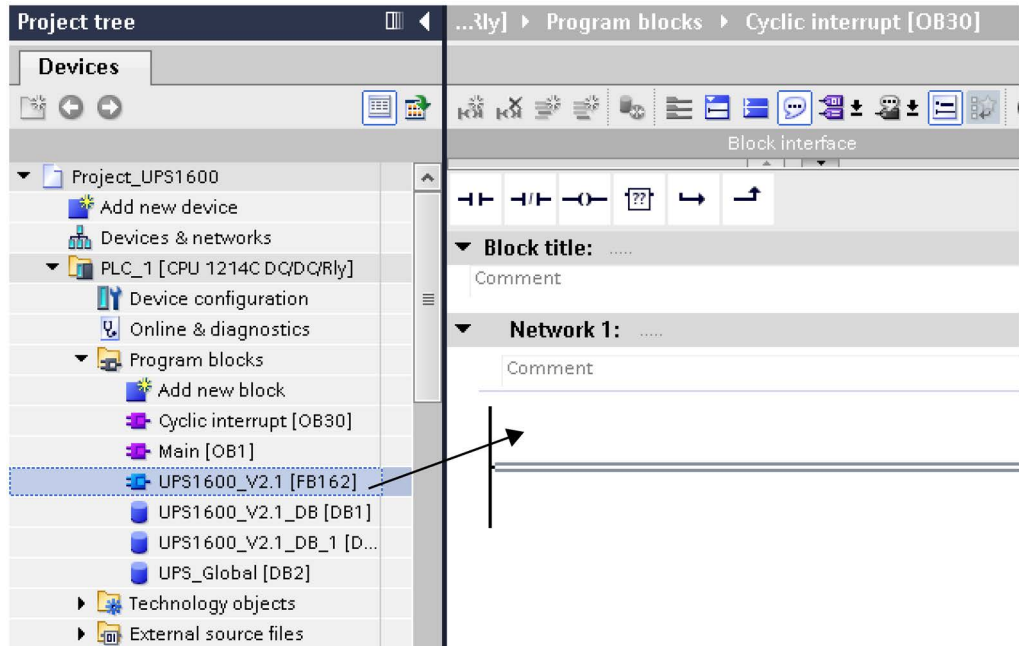
Figure 7-35

4. Keep the default settings of the dialog box and click "OK".

5. Double click on "Add new block" to add a new DB. The "Add new block" window opens.

6. In the "Add new block" window,

   – Select "Data block".

   – Enter a name as desired (UPS_Global).

   – In the "Type:" drop-down list, select "UDT_UPS1600_Data".

   – Click "OK".
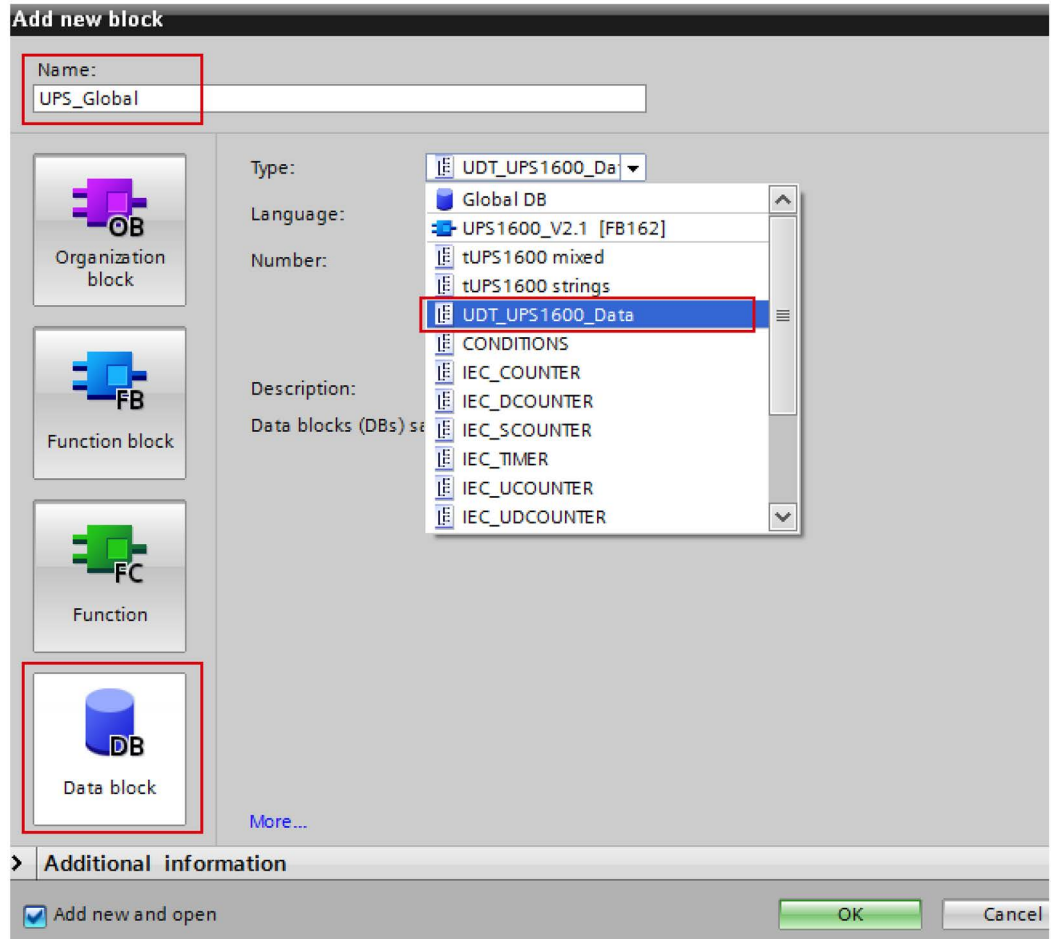
Figure 7-36

7. Right click on the global DB created in step 5 (UPS_Global) and go to "Properties > General > Attributes".

8. Uncheck the attribute "Optimized block access" and click "OK".
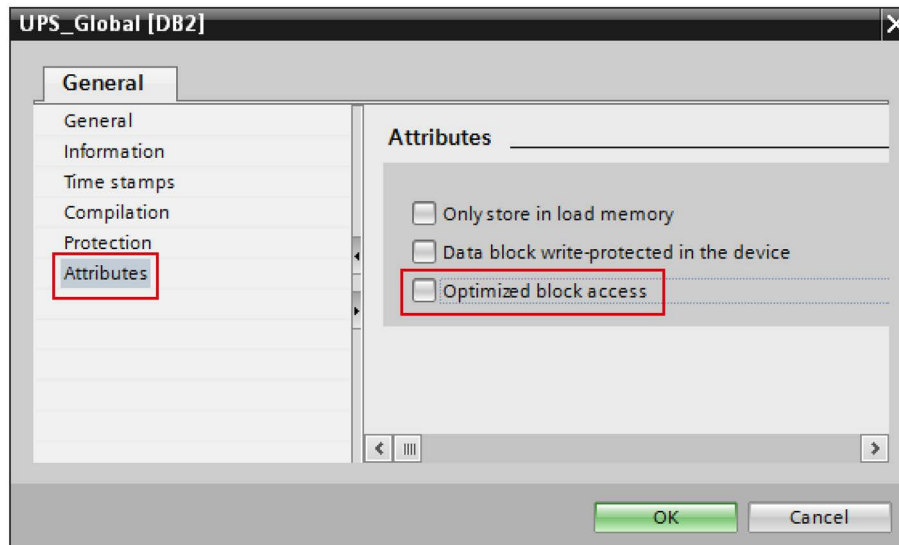
Figure 7-37

9. In the network area of OB30 for FB162,

   – For the parameter `HW_IO`, enter the hardware ID of DC-UPS-20A_1~Head of the UPS1600 (273).

   – For the parameter `Cyclic_IO_Address`, enter the hardware ID of DC-UPS-20A_1~IO-Data_Submodule of the UPS1600 (274).

   – Connect the parameter `UPS_ready_for_reset` with a tag of your project that you use to bring your plant into a condition in which it can be shut down.

   – Connect the parameter `UPS_execute_reset` with a tag of your project that you use to switch off the UPS when the plant is in a condition in which it can be shut down.

   – Connect the parameter `Data` with the global DB created in step 6, (UPS_Global).
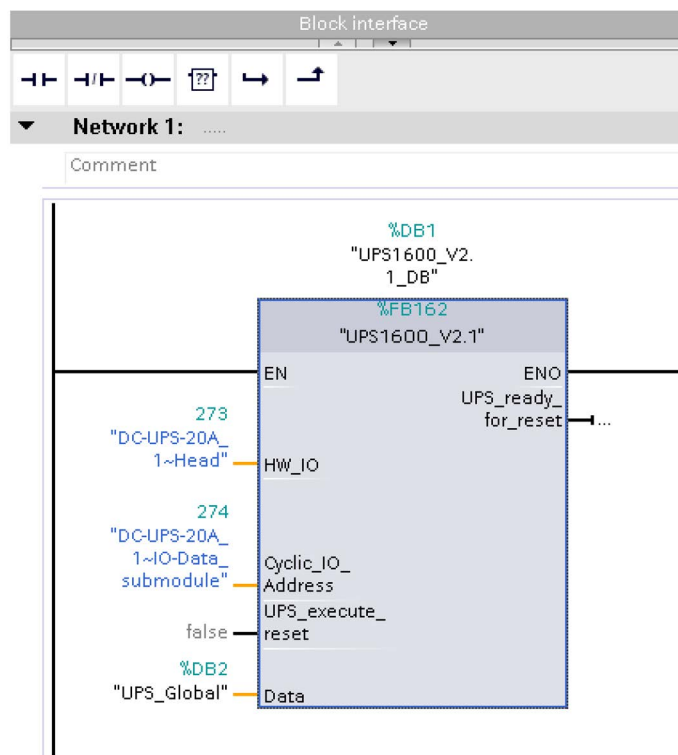
Figure 7-38

Further information about the block parameters, refer Interfaces of the function block FB162 (Page 31).

Note

HW_IO and Cyclic_IO_Address parameters

To know the HW_IO and Cyclic_IO_Address parameter values of your UPS1600 module, refer Interfaces of the function FB162.

Application of the faceplates

8.1 Application of the faceplates in WinCC flexible 2008

8.1.1 Prerequisites

Prerequisites

The following requirements must be met to use the faceplates in WinCC flexible 2008 SP3:

- The GSD file of the SITOP UPS1600 is installed in SIMATIC STEP 7 V5.5 and UPS is configured as PROFINET node in the HW configuration of the CPU.
- S7 communication between SITOP UPS1600 and CPU is already configured.
- All the program blocks from the library UPS1600 V2_2 STEP 7 V5_5 are integrated into the STEP 7 application program and executable.
- The library 'UPS1600 V2_2 library WinCC Flexible 2008' for WinCC flexible 2008 SP3 is available on your computer.

Supported control panels

The faceplates are supported for the following control panels:

- TP270 10"
- OP270 10"
- MP270 10" Touch
- MP277 8" Touch/Key
- MP277 10" Touch/Key
- MP377 Touch/Key
- WinCC flexible Runtime 2008 SP3

Supported languages

The faceplates support the following languages:

- English (USA)
- German (Germany)
- Chinese (PR China)

8.1.2 Library for WinCC flexible

Library for WinCC flexible

The library 'UPS1600 V2_2 library WinCC flexible 2008' for WinCC flexible 2008 SP3 comprises of the following objects:

Table 8- 1

Name	Type	Description
UPS1600 V2_1 HMI Tag table	Tag folder	A tag folder with all the required tags
Faceplate_UPS1600_V2_1	Faceplate	Contains the faceplate 'Faceplate_ UPS1600_V2_1'.
HMI Alarm views	Message window	Contains two message windows for displaying diagnostic messages of the UPS1600
UPS1600_Data	Structure	Contains a group of structure elements required for UPS1600 faceplate

8.1.3 Integrating the faceplates

Overview

The following sections describe all the steps required to integrate a faceplate into a WinCC flexible 2008 SP3 project.

Hardware used:

- MP277 8" Touch

An overview of the supported HMI control panels is available in the Prerequisites (Page 71).

Opening the library

The following procedure describes how to open the library in WinCC flexible 2008 SP3.

1. Open the WinCC flexible project into which you want to insert the faceplate.

2. In the "Tools" window, select the "Library" tab and click on the highlighted icon to open the library. The "Open global library" dialog box opens.
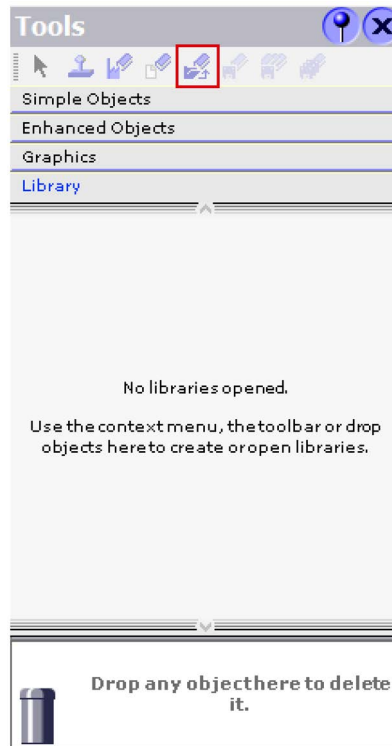
Figure 8-1

3. Click the "Look in:" drop-down list and browse to the stored location of the library "UPS1600_V2_2_Library > UPS1600_lib_WinCC_flexible_2008" on your computer.
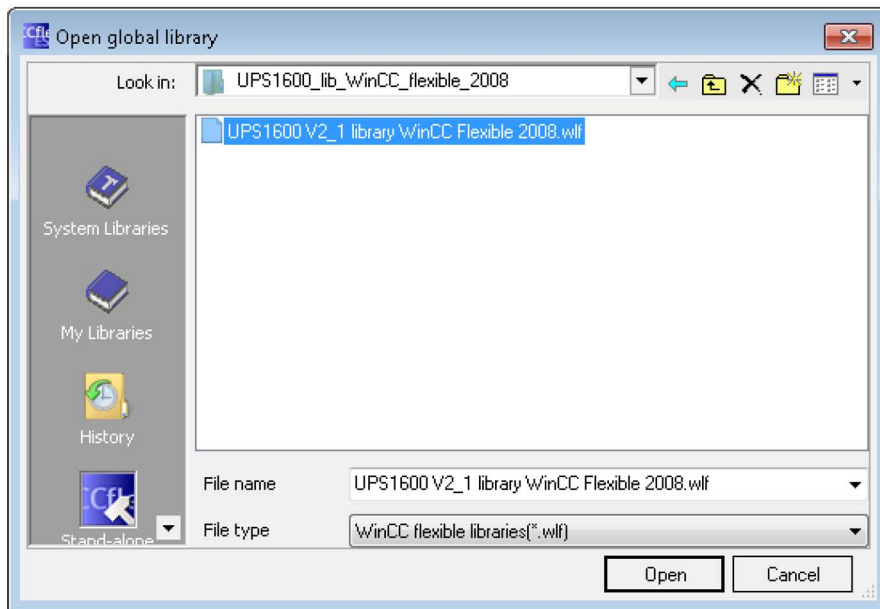
Figure 8-2

4. Select "UPS1600 V2_2 library WinCC flexible 2008.wlf" and click "Open".

   This imports the library into your project.

Inserting faceplates into a project

The following procedure describes how to integrate the faceplate from the library into an existing WinCC flexible project.

1. Open the required WinCC flexible project.

2. In the "Project" window, open the screen into which you want to insert the faceplate (Screen_1).
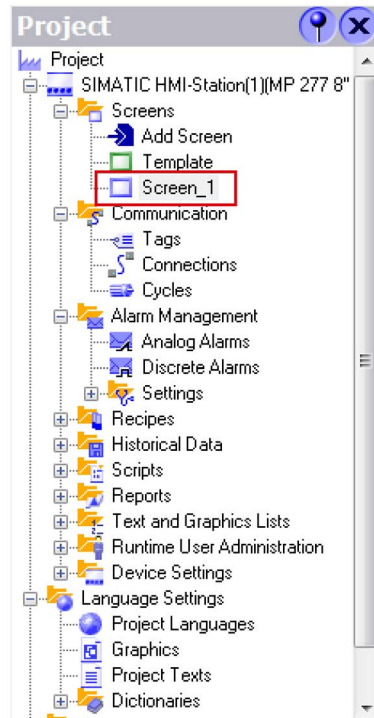
Figure 8-3

3. In the "Tools" window, under the "Library" tab, select the faceplate element "Faceplate_UPS1600_V2_1".

4. Drag-and-drop "Faceplate_UPS1600_V2_1" into the opened screen.
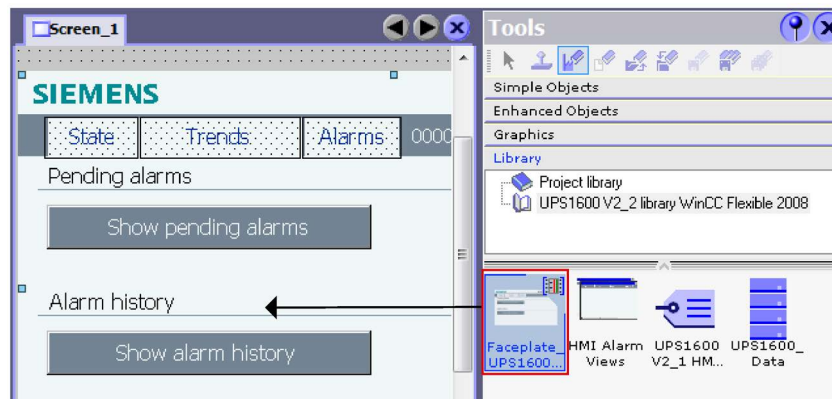
Figure 8-4

5. In the "Project" window, select "Screens" and open "Template".
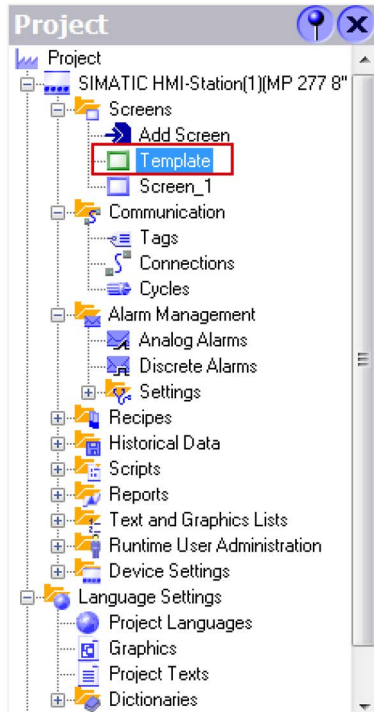
Figure 8-5

6. In the "Tools" window, select the "HMI Alarm views" element of the library.

7. Drag-and-drop "HMI Alarm views" into the template. Two message windows are inserted.
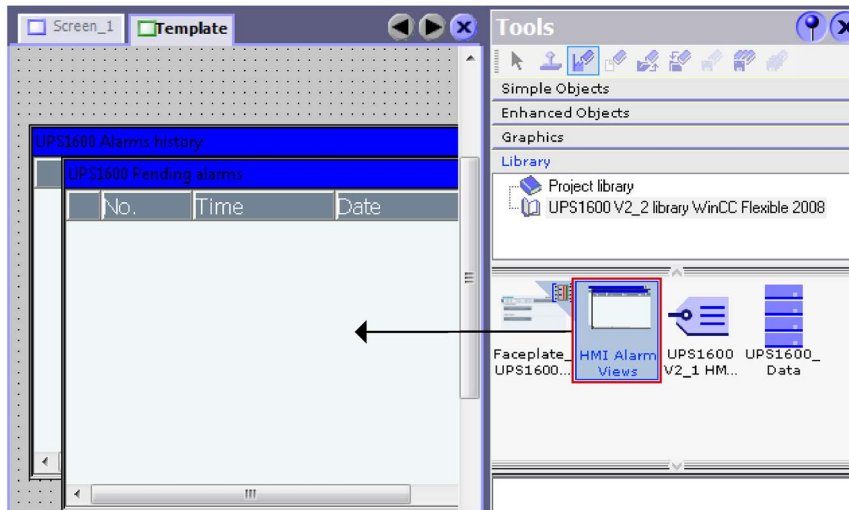
Figure 8-6

8. Select "Alarmview_UPS_Pending" alarm window, right-click on the "Properties" and select "Properties > Display > Enable "ACK" button". Repeat the same procedure for enabling "ACK" button in "Alarmview_UPS_History" alarm window.

9. In the "Project" window, select "Communication > Tags".

10. In the "Tools" window, select the "UPS1600 V2_1 HMI tag table" library element.
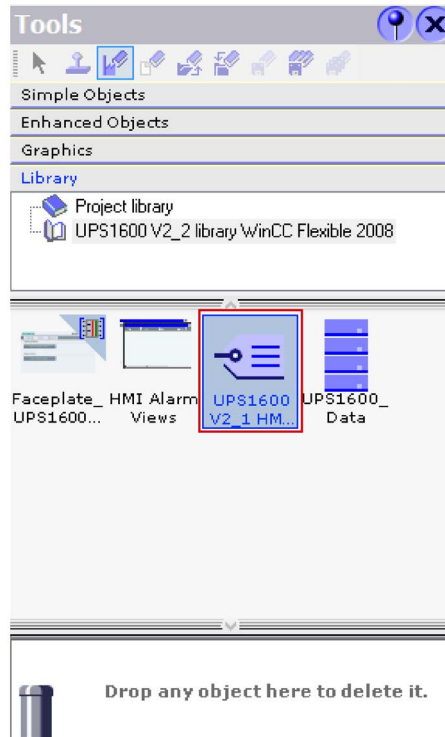
Figure 8-7

11. Drag-and-drop "UPS1600 V2_1 HMI tag table" into the "Tags" folder.
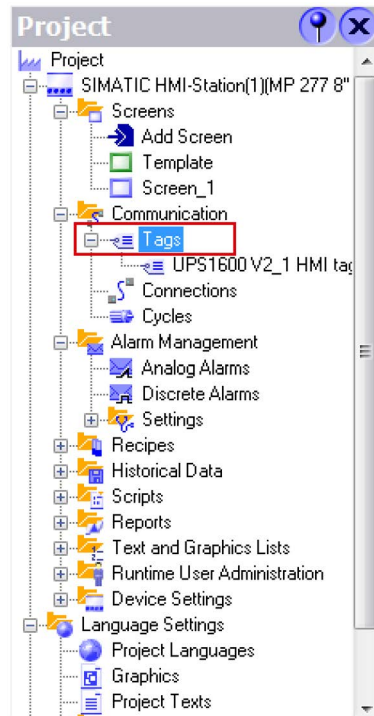
Figure 8-8

12. Open the tag table "UPS1600 V2_1 HMI tag table", for the "UPS_Data" tag,

    – In the "Connection" column, select the required connection. (The connection name must be identical to the name of the connection created during configuring connection to the controller.)

    – Assign the global DB "UPS_Global" number to the tag (DB15).
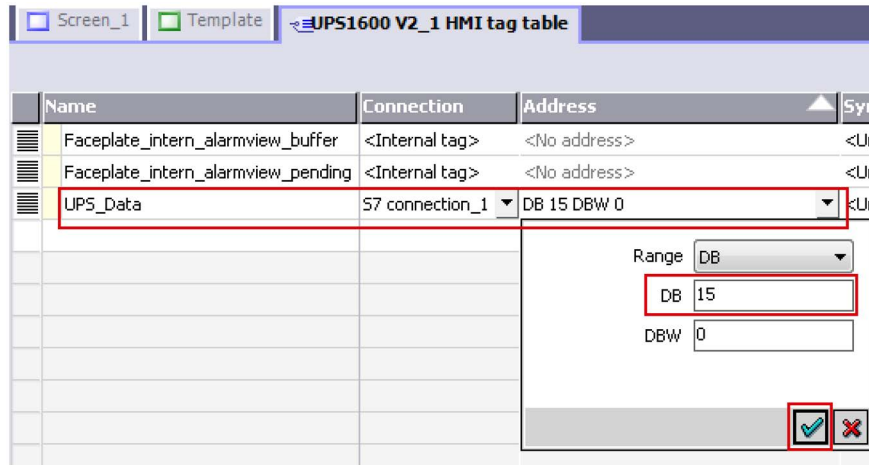
Figure 8-9

13. In the tag table, select the tag "Faceplate_intern_alarmview_buffer". Check the properties of the tag where in the "ShowAlarmWindow" function is inserted and its variable "Object name" is assigned to the tag "Alarmview_UPS_History".
    If the "Properties" window does not open then right click on the tag and go to "Properties".
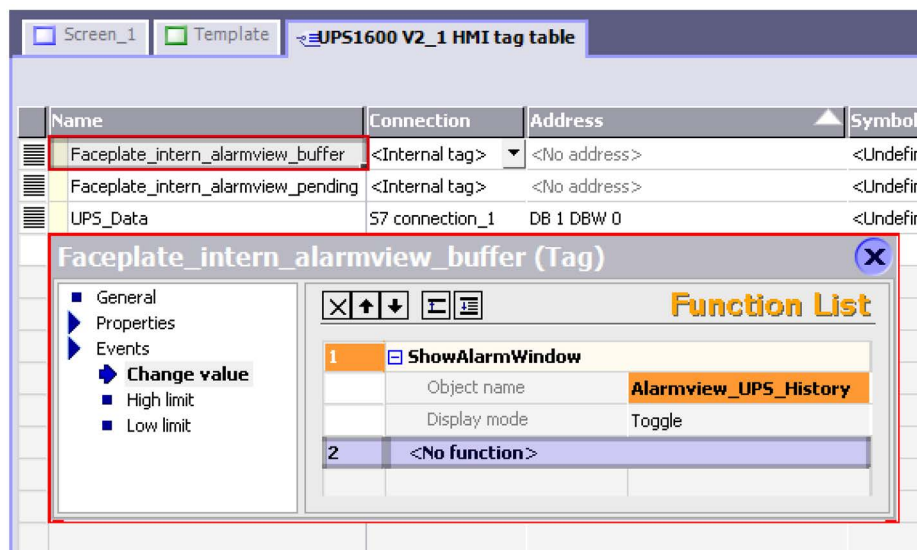
Figure 8-10

Similarly, check the properties of the tag "Faceplate_intern_alarmview_pending" where in the "ShowAlarmWindow" function is inserted and its variable "Object name" is assigned to the tag "Alarmview_UPS_Pending".

If the "ShowAlarmWindow" function is not inserted for these two tags, refer the section **Adding "ShowAlarmWindow" function to the tags** described below.

14. Select the faceplate inserted in step 4 (Screen_1) and go to "Properties > Dynamic Interface".

15. Under the "Data" section, for the "UPS_Data" property assign the "UPS_Data" tag created in step 11.
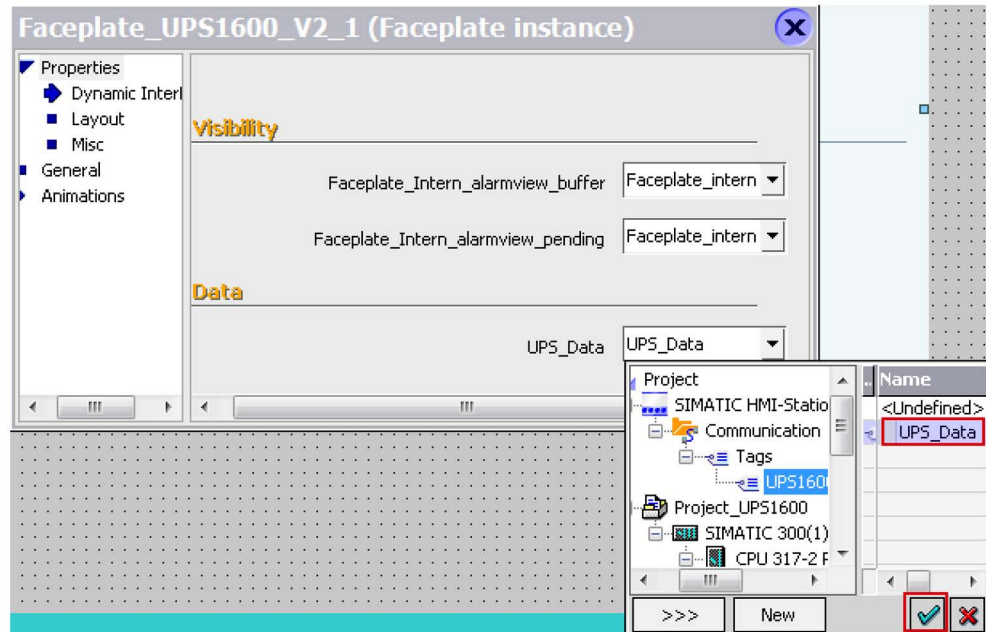
Figure 8-11

16. Under the "Visibility" section, for the "Faceplate_intern_alarmview_buffer" property insert the "Faceplate_intern_alarmview_buffer" tag from the "UPS1600 V2_1 HMI tag table" tag table.
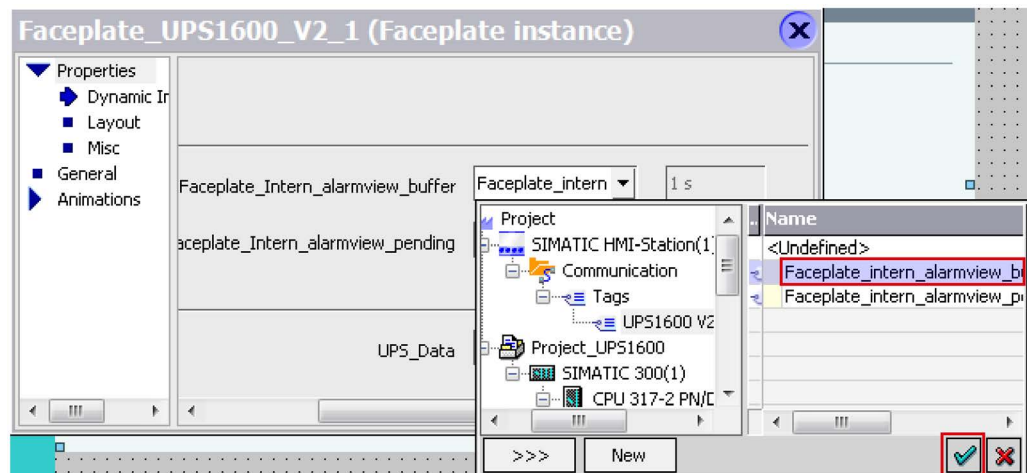
Figure 8-12

Similarly, for the "Faceplate_intern_alarmview_pending" property insert the "Faceplate_intern_alarmview_pending" tag from the "UPS1600 V2_1 HMI tag table" tag table.

Note

Connection in the UPS1600 V2_1 HMI tag table

A default connection is always created automatically when a project is created.
Delete the default connection if you have created another connection for your project.

Adding "ShowAlarmWindow" function to the tags

The following procedure describes how to add the "ShowAlarmWindow" function to "Faceplate_intern_alarmview_buffer" and "Faceplate_intern_alarmview_pending" tags in the "UPS1600 V2_1 HMI tag table" tag table:

1. Select the "Faceplate_intern_alarmview_buffer" tag. A new window opens.

2. Go to "Events > Change value".

3. Click on "<No function>".

4. In the drop-down list select "System functions > Alarms > ShowAlarmWindow".
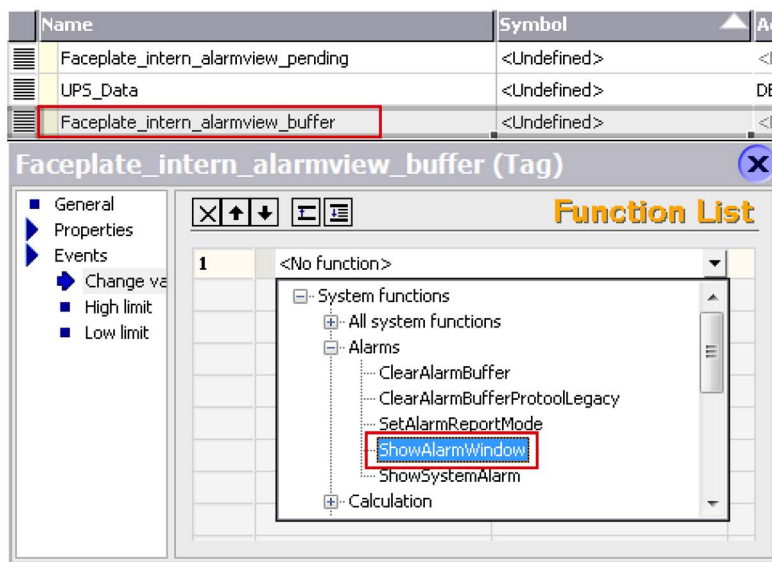
Figure 8-13

5. For the "Object name" variable click on "<No value>".

6. In the drop-down list select "Alarmview_UPS_History".

Follow the same procedure for the "Faceplate_intern_alarmview_pending" tag, add "ShowAlarmWindow" function and select "Alarmview_UPS_Pending" for the "Object name" variable.

Displaying the PROFINET diagnostic messages

To display the PROFINET diagnostic messages of UPS1600 within the faceplate, the respective WinCC flexible project must already be configured.

Information on the display and configuration of diagnostic messages in WinCC flexible is available in the entry ID: 22533916 (https://support.industry.siemens.com/cs/ww/en/view/22319131).

Further notes regarding the PROFINET diagnostic messages of the SITOP UPS1600 are available in the chapter 4 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

Connecting trends of the faceplates with data sources

The following procedure describes how to create and connect trends to a faceplate.

1. Open WinCC project and select "Communication > Tags > UPS1600 V2_1 HMI tag table" and open the tag table.
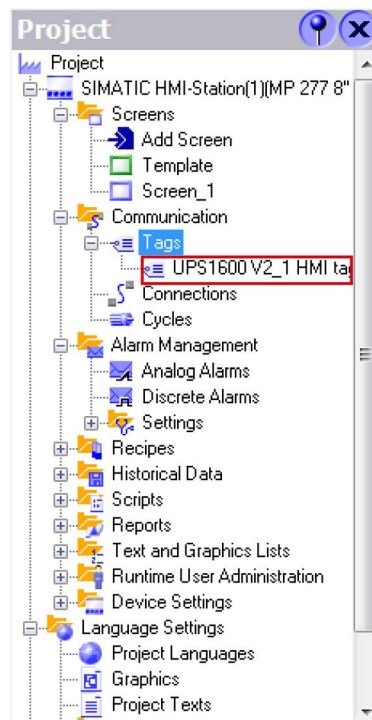
Figure 8-14

2. In the tag table, create a new tag.

   In the "Symbol" column, click the drop down box, navigate to the global DB tag created in the project (UPS_Global) and select "Input_voltage" tag. (Here, select "Project > Project_UPS1600 > SIMATIC 300(1) > UPS 317-2 PN/DP > S7 Program(1) > DB > UPS_Global > UPS > UPS_DataM > Input_voltage".)
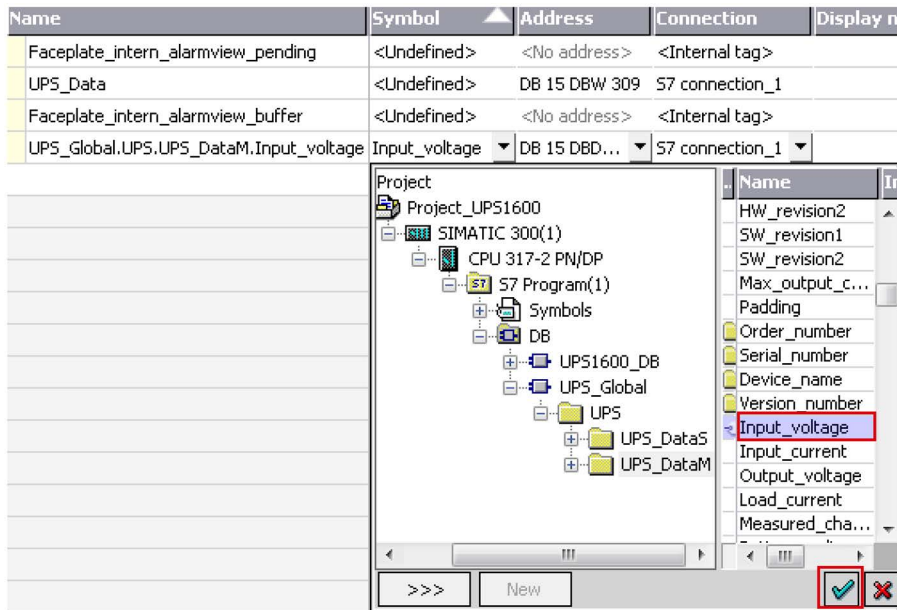
Figure 8-15

3. Repeat step 2 to create four more tags and assign the following symbols:

   – Output_voltage

   – Output_current

   – Battery_voltage

   – Measured_charged_current.
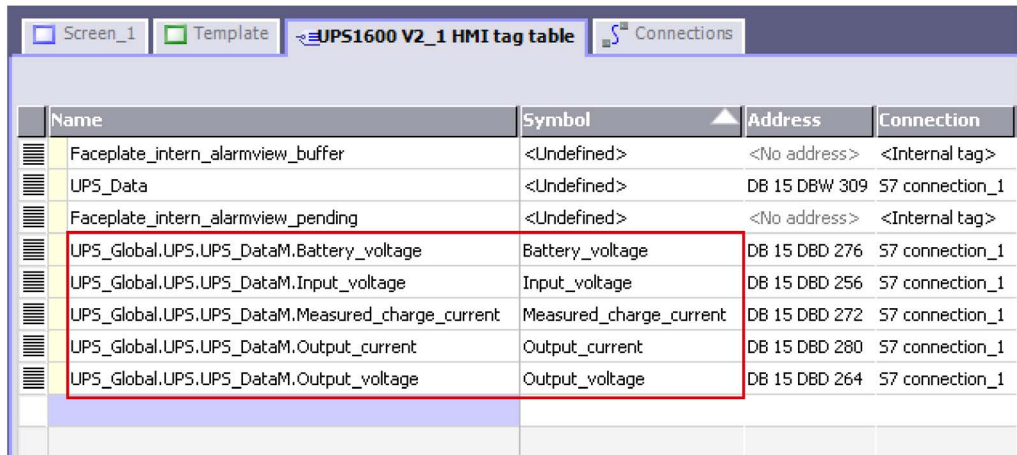
Figure 8-16

4. Select the faceplate in your screen and go to "Properties > General".

5. Under the "Trends" section, select the "Trends" variable to add trends to the faceplate. A new window appears.
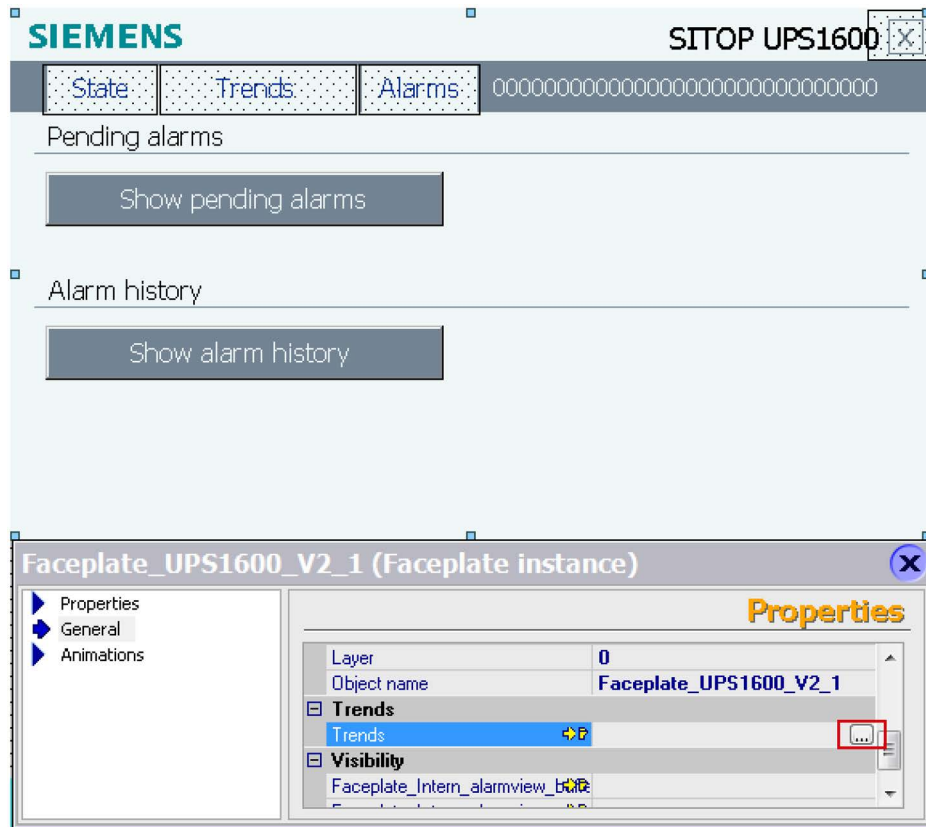
Figure 8-17

6. In the window, add five trends.

    – In the "Samples" column, enter 600 points for the trend representation.

    – For "Trend type", select "Realtime Cyclic Triggered".

    – In the "Source settings" column, for each of the trends assign the data sources in the "Trend tag" variable:
    Trend 1: Input_voltage

    Trend 2: Output_voltage

    Trend 3: Output_current

    Trend 4: Battery_voltage

    Trend 5: Measured_charged_current
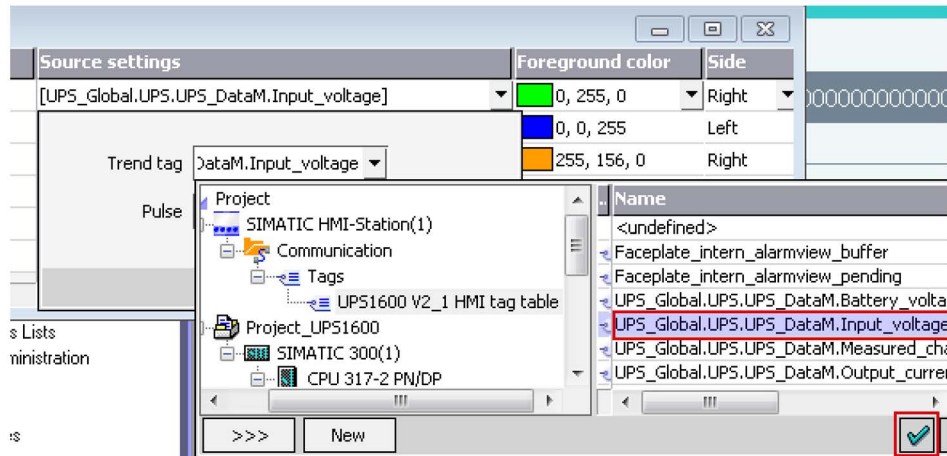
Figure 8-18

Also, set the "Pulse" value to 0.5 s for each of the trends.
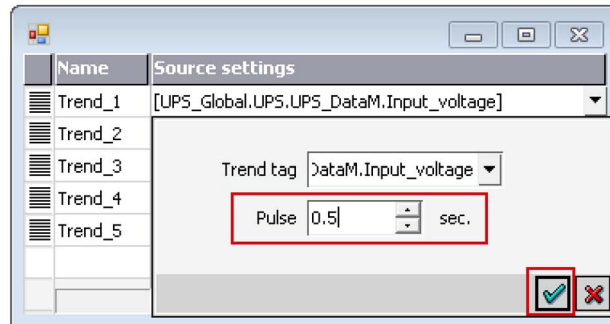
Figure 8-19

– In the "Foreground color" column, select the trend colors for the individual outputs according to the legend.
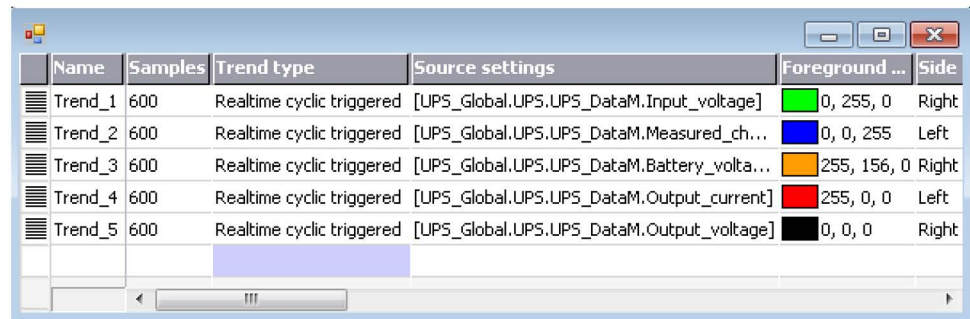
Trends

Input voltage

Charge current

Battery voltage

Output current

Output voltage

Figure 8-20

– In the "Side" column, select the side as "Right" for voltage related tags (Volts scale) and "Left" for current related tags (Ampere scale).

	Name	Samples	Trend type	Source settings	Foreground ...	Side
	Trend_1	600	Realtime cyclic triggered	[UPS_Global.UPS.UPS_DataM.Input_voltage]	0, 255, 0	Right
	Trend_2	600	Realtime cyclic triggered	[UPS_Global.UPS.UPS_DataM.Measured_ch...	0, 0, 255	Left
	Trend_3	600	Realtime cyclic triggered	[UPS_Global.UPS.UPS_DataM.Battery_volta...	255, 156, 0	Right
	Trend_4	600	Realtime cyclic triggered	[UPS_Global.UPS.UPS_DataM.Output_current]	255, 0, 0	Left
	Trend_5	600	Realtime cyclic triggered	[UPS_Global.UPS.UPS_DataM.Output_voltage]	0, 0, 0	Right

Figure 8-21

8.2 Application of screen windows in WinCC V7.3

8.2.1 Prerequisites

Prerequisites

The following requirements must be met to use the screen windows in WinCC V7.3.

- The GSD file of the SITOP UPS1600 is installed in SIMATIC STEP 7 V5.5 and the UPS is configured as PROFINET node in the HW configuration of the CPU.

- S7 communication between the SITOP UPS1600 and CPU is already configured.

- All program blocks from the library UPS1600 V2_2 STEP7 V5_5 are integrated into STEP 7 application program and executable.

- The library UPS1600_lib_WinCC_V7_3 for WinCC V7.3 is available on your computer.

- Existing WinCC OS (PC station) with already configured connection and active communication.

PC Station

The screen windows are supported for the following PC Station:

- WinCC V7.3 Runtime

Supported languages

The screen windows support the following languages:

- English (USA)

- German (Germany)

- Chinese (PR China)

8.2.2 Library for WinCC V7.3

Library for WinCC V7.3

The library UPS1600_lib_WinCC_V7_3 for WinCC V7.3 comprises the following file folders:

Table 8- 2

Name	Type	Description
HMI Tag table (WinCC V7.3)	Tags	File for tag import
HMI Screens (WinCC V7.3)	Screens	Comprises screen 'UPS1600_V2_1.pdl'

HMI Tag table (WinCC V7.3)

This folder contains the file UPS1600_HMIUDT.txt. This text file comprises all the tags and structure required for the functioning of UPS1600 screens.

HMI Screens (WinCC V7.3)

This folder contains the screen UPS1600_V2_1.pdl.

8.2.3 Integrating the screen windows

Overview

Target system used:

- WinCC V7.3 Runtime

Inserting the project screens

The following procedure describes how to insert the HMI screen from the library into the project directory of your WinCC project.

1. Open "Windows Explorer" in your computer machine and navigate to the "GraCS" folder in your project directory. Here, path to the folder is: "C:\Program Files(x86)\SIEMENS\STEP7\S7Proj\Ups1600\wincproj\OS(6)\GraCS".

2. Open another instance of "Windows Explorer" in your computer machine and navigate to the stored location of the "UPS1600_V2_2_Library" library folder.

3. In the library folder, open "UPS1600_lib_WinCC_V7_3 > HMI Screens (WinCC V7.3)".

4. Copy the "UPS1600_V2_1.pdl" screen element from the library and paste it into the "GraCS" folder.
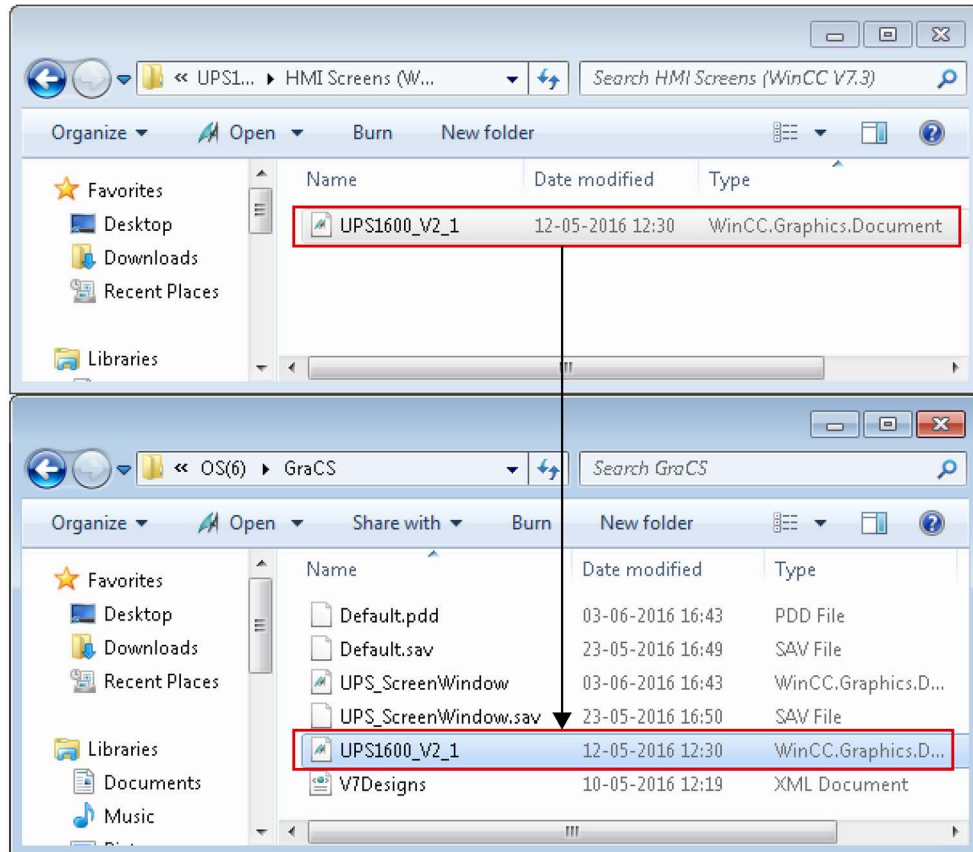
Figure 8-22

Importing tags

The following procedure describes how to import the HMI tag table file from the library folder into your WinCC project.

1. Open your WinCC project in WinCC Eplorer.

2. Open the "Tag Management" element. The "Tag Management – WinCC Configuration Studio" window opens.
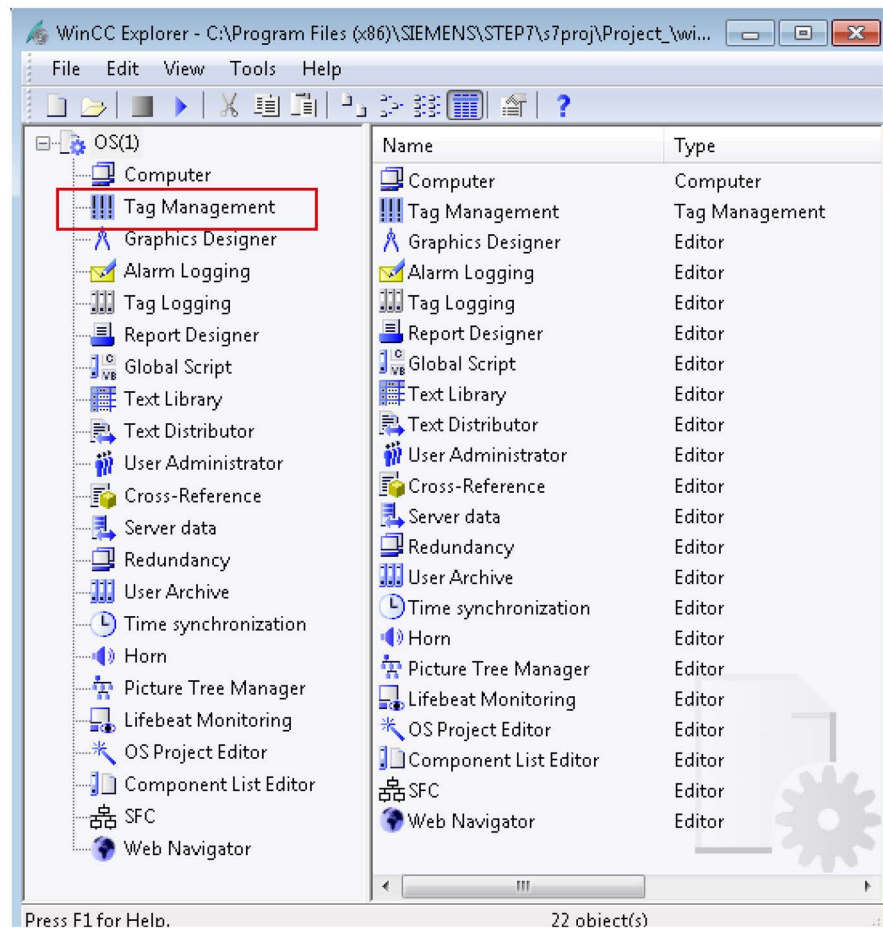
Figure 8-23

3. In the "Tag Management" window, select "Structure tags".
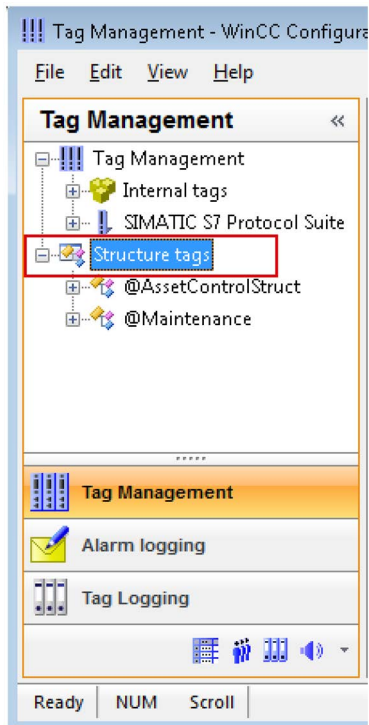
Figure 8-24

4. In the menu bar, select "Edit > Import". The "Import" window opens.

5. Browse to the stored location of "UPS1600_V2_2_Library" library folder in your machine and open "UPS1600_lib_WinCC_V7_3 > HMI Tag table (WinCC V7.3)".

6. Select "UPS1600_HMIUDT".
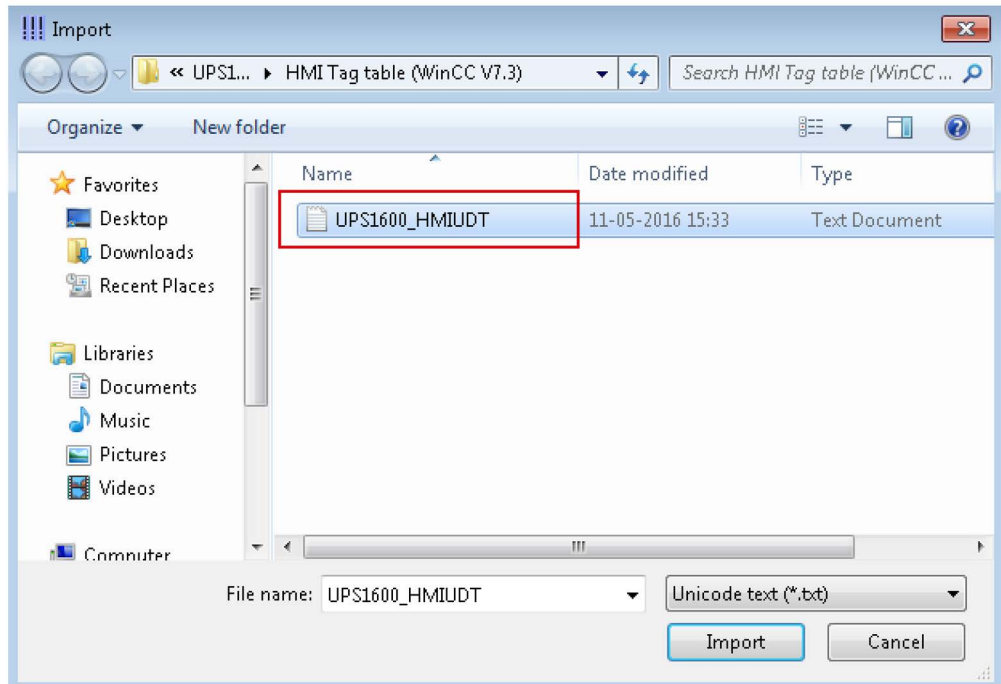
Figure 8-25

7. Click "Import". "UPS1600_Data" structure tag element appears under "Structure tags" in "Tag Management" window.
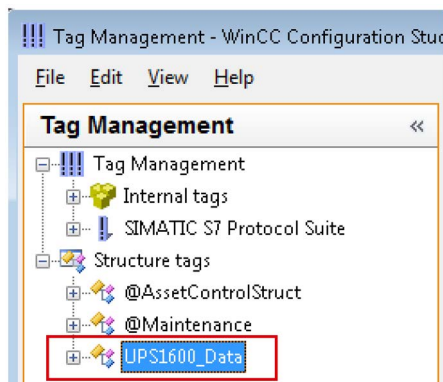
Figure 8-26

8. Close the window.

Configuring screen windows

The following procedure describes how to configure a screen window:

1. In the WinCC project, select "Graphics Designer".

2. On its right window pane, right click on the empty space and select "New picture" option to add a new pdl file.
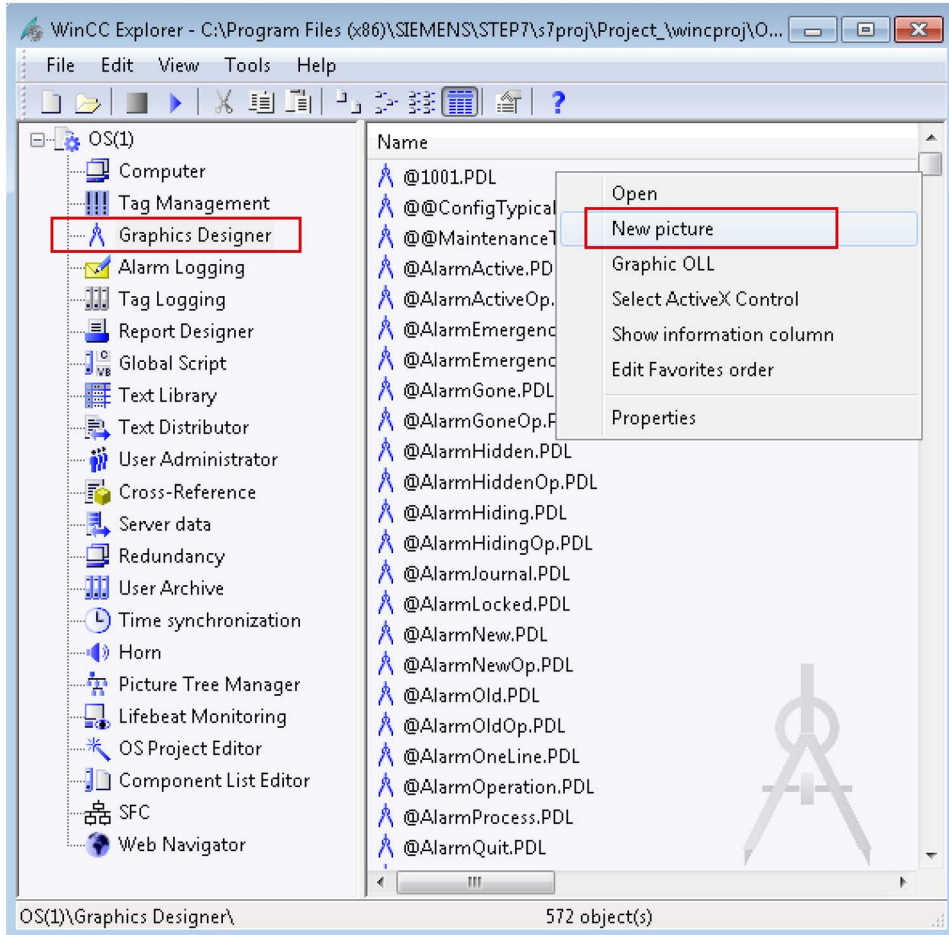
Figure 8-27

3. Rename the pdl created in step 2 as required (UPS_ScreenWindow) and open it. The "Graphics Designer" window opens.

4. In the "Standard" window of the Graphics Designer go to "Smart Objects" folder and select "Picture Window".

5. Click on the "UPS_ScreenWindow.pdl" screen area to insert the "Picture Window".
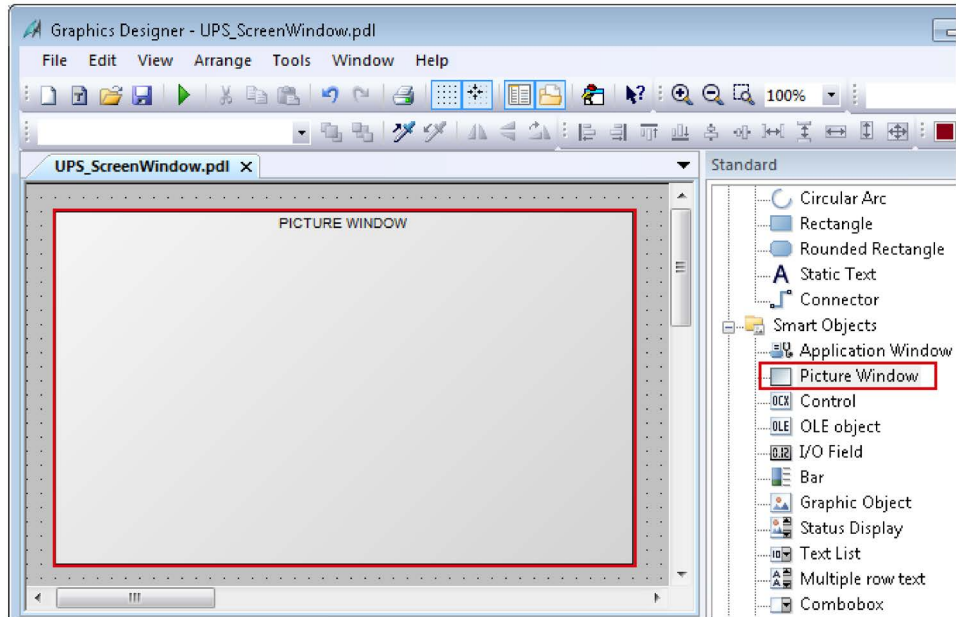
Figure 8-28

6. Select the added screen window and go to "Properties > Miscellaneous".

7. For the "Picture Name" attribute assign "UPS1600_V2_1.pdl" and for the "Tag Prefix" attribute assign the tag "UPS_Global" created during importing the HMI tag table (refer STEP 7 in Configuring Screen windows procedure). If your structure tag name is 'StructureTag' then add a '.' at the end of your tag name, that is 'StructureTag.' (<Structure tag name>.). Here, "UPS_Global.".
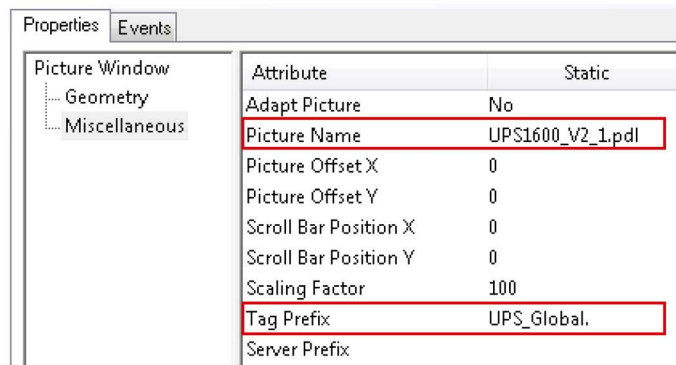
Figure 8-29

Displaying the PROFINET diagnostic messages

In order to display the PROFINET diagnostic messages of the SITOP UPS1600 within the screen windows, the respective WinCC project must already be configured for the display of PROFINET diagnostic messages.

Information on the display and configuration of diagnostic messages in WinCC is available under the entry ID: 245799373 (https://support.industry.siemens.com/cs/ww/en/view/23730649).

Further notes regarding the PROFINET diagnostic messages of the SITOP UPS1600 are available in the chapter 4 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

8.2.4 Application of screen windows in WinCC V7.4

8.2.4.1 Overview

To work with the library in WinCC V7.4 follow the similar process as mentioned in Application of screen windows in WinCC V7.3 (Page 86), except opening the library UPS1600_lib_WinCC_V7_4 in place of UPS1600_lib_WinCC_V7_3.

8.3 Application of faceplates in WinCC Comfort/Advanced V14 SP1

8.3.1 Prerequisites

Prerequisites

The following requirements must be met to use the faceplates in WinCC Comfort/Advanced V14 SP1.

- The HSP for the SITOP UPS1600 is installed in STEP 7 V14 SP1.
- S7 communication between SITOP UPS1600 and SIMATIC S7 controller is already configured.
- Program blocks for STEP 7 V14 SP1 from UPS1600 V2.2 library TIA Portal V14 SP1 are integrated into the application program and executable.
- UPS1600 V2.2 library TIA Portal V14 SP1 is available on your computer.

Supported control panels

The faceplates are supported for the following control panels:

- TP700 Comfort/KP700 Comfort
- TP900 Comfort/KP900 Comfort
- TP1200 Comfort/KP1200 Comfort
- TP1500 Comfort/KP1500 Comfort
- TP1900 Comfort
- TP2200 Comfort
- MP277 8" Touch/MP277 8" Key
- MP277 10" Touch/MP277 10" Key
- MP377 Touch/Key
- WinCC RT Advanced V14 SP1

Supported languages

The faceplates support the following languages:

- English (USA)
- German (Germany)
- Chinese (PR China)

8.3.2 Library for WinCC Comfort/Advanced

Library for WinCC Comfort/Advanced

The following objects are part of UPS1600 V2.2 library TIA Portal V14 SP1 for WinCC Comfort/Advanced.

Table 8- 3

Name	Type	Description
Faceplate_Comfort/Advanced	Faceplates	Comprises three faceplates • Faceplate_SITOP_V2_1_300/400 • Faceplate_SITOP_V2_1_1200 • Faceplate_SITOP_V2_1_1500 Selection of faceplate depends on the PLC that is used.
Tag Table Comfort Panels/Advanced	Tag folder	Contains the tag table 'TagTable_1200_UPS1600_Comfort'.
Comfort panels/Advanced	Alarm views	Comprises 'Alarm windows' screen that has two message windows to display the PROFINET diagnostic messages of the UPS1600.

8.3.3 Integrating the faceplates

Overview

Hardware used:

• TP1200 Comfort

An overview of the supported HMI control panels is available in the Precondition (Page 95).

Opening the library in WinCC V14 SP1

The procedure for opening the library in WinCC Professional V14 SP1 is explained in the Content of the library for STEP 7 V14 (Page 47).

Inserting faceplates into a project

The following procedure describes how to integrate the faceplates from UPS1600 V2.2 library TIA Portal V14 SP1 into an existing WinCC project.

1. Open the required project in "Project view".

2. In the "Project tree", open the "Screens" folder.

3. Double click on "Add new screen" to add a new screen into your project.
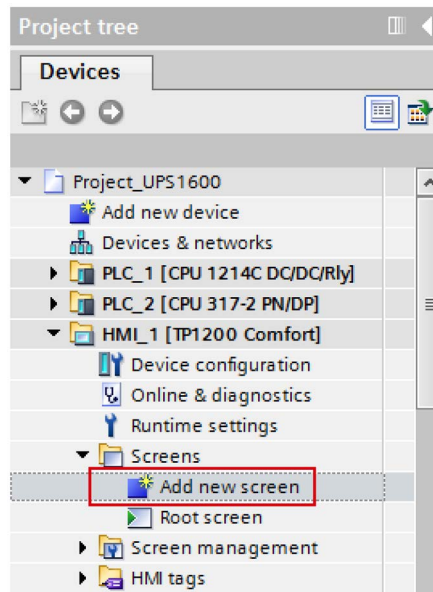
Figure 8-30

Open the new screen (Screen_1).
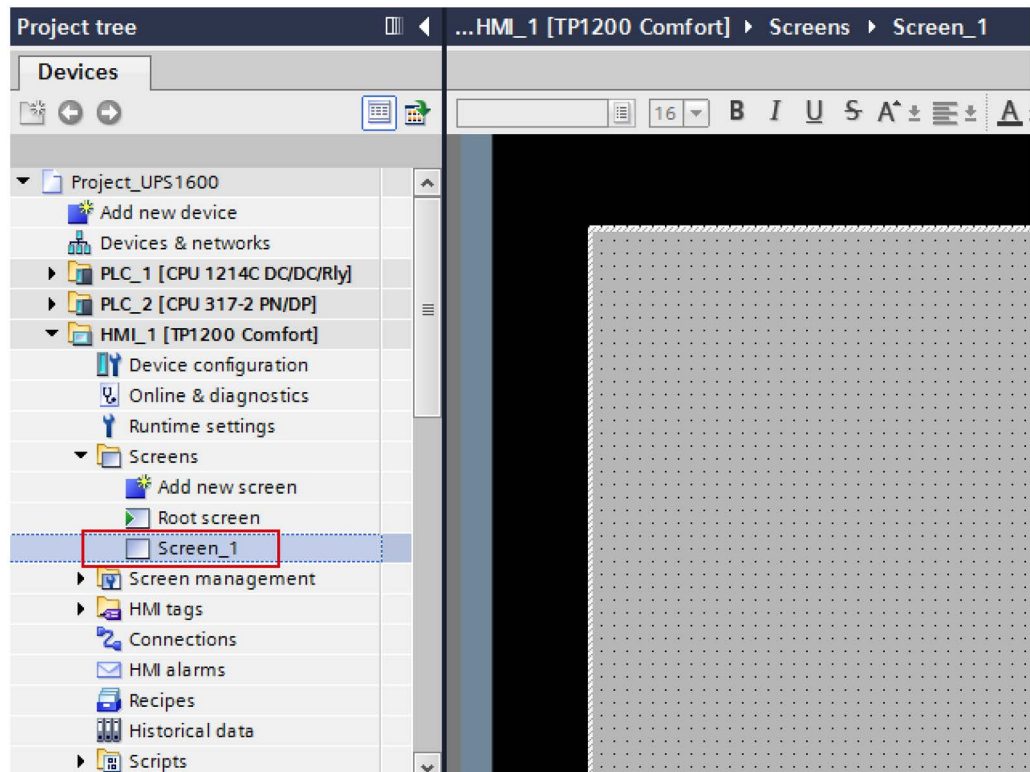
Figure 8-31

4. In the "Libraries" window, select "Global libraries > UPS1600 V2.2 library TIA Portal V14 SP1 > Types > UPS1600 Wincc > Screens > Faceplate_Comfort/Advanced > Faceplate_SITOP_V2_1_1200".
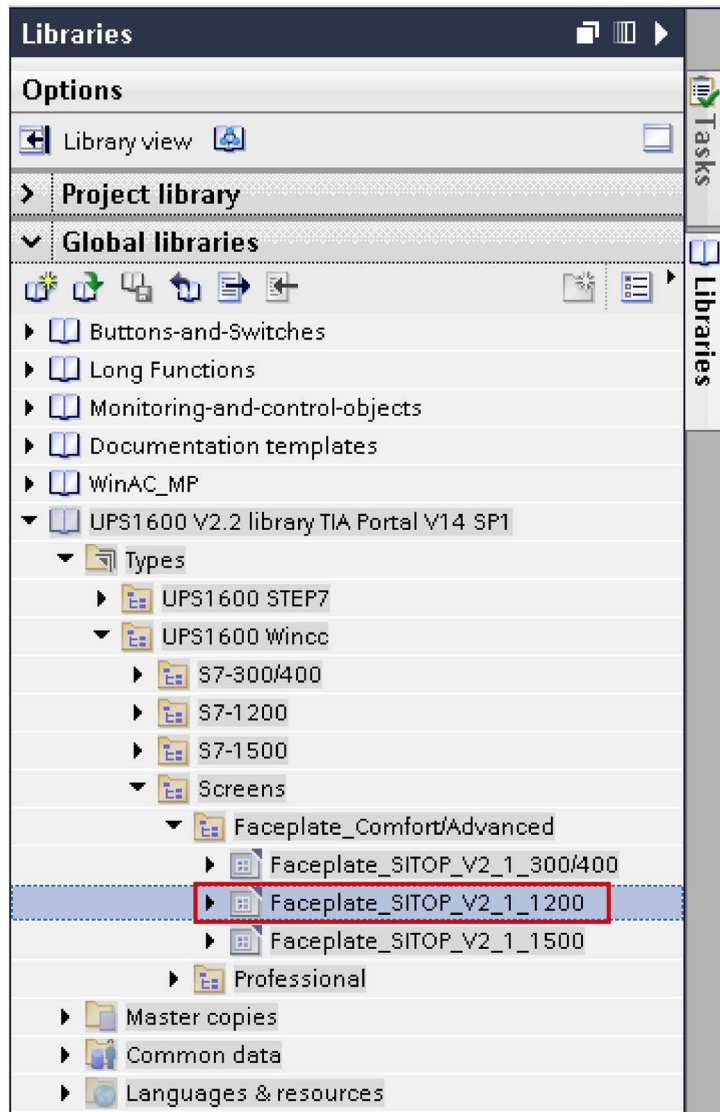
Figure 8-32

5. Drag-and-drop "Faceplate_SITOP_V2_1_1200" into the opened screen in step 3.

Creating a connection to the data block for global data exchange

The following procedure describes how to create a connection to the data block for global data exchange.

1. In the "Libraries" window, select "Global libraries > UPS1600 V2.2 library TIA Portal V14 SP1 > Master copies > UPS1600 TIA Library > UPS1600 Wincc > S7-1200 > Tag Table Comfort Panels/Advanced > TagTable_1200_UPS1600_Comfort".
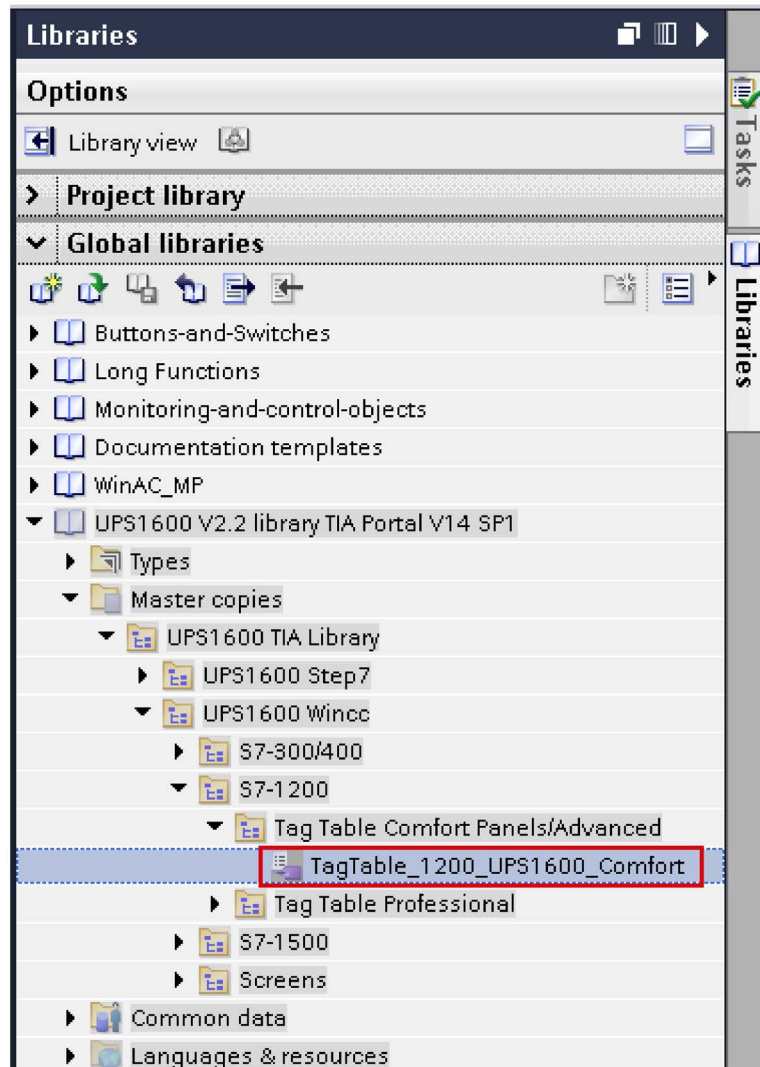
Figure 8-33

Note

S7-300/400 PLC

For S7-300/400 PLCs, go to the folder "S7-300/400" instead of "S7-1200". Similarly for S7-1500 PLCs go to the folder "S7-1500".

---

2. Drag-and-drop "TagTable_1200_UPS1600_Comfort" into the "HMI tags" folder in the "Project tree".
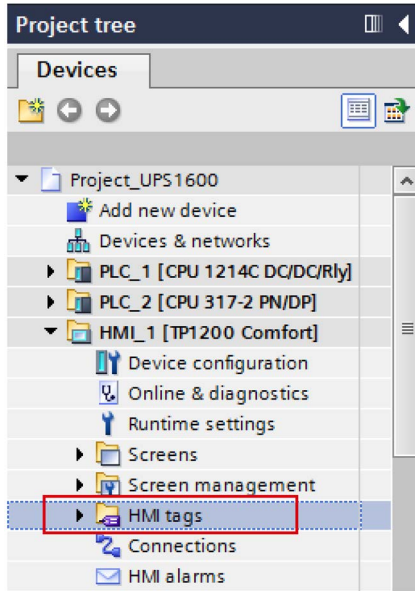
Figure 8-34

3. Open "TagTable_1200_UPS1600_Comfort" in the "HMI tags" folder.

4. For the "UPS_Data" tag,

   – Select the "Connection" as required ("HMI_Connection_1").

   – Assign the global DB number in the "Address" column (2).

Figure 8-35

SITOP UPS1600 Firmware V2.2 : Faceplates and Communication Blocks V2.2
Function Manual, 01.2018, A5E39439812-02-76
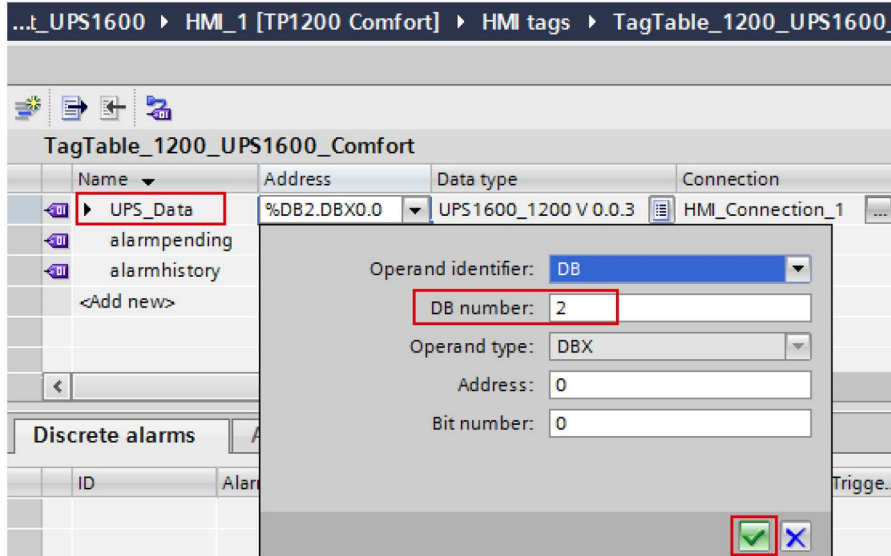
5. Select the "UPS_Data" tag and go to "Properties > Properties > Settings".

   – Change the "Acquisition mode" to "Cyclic continuous".

   – Set the "Acquisition cycle" value to "500 ms".
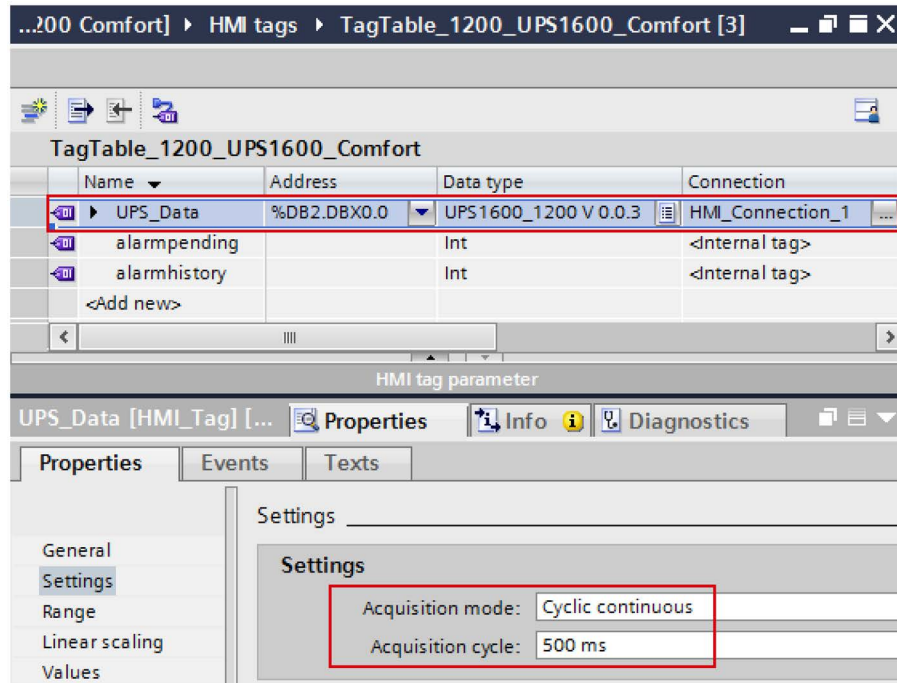
Figure 8-36

6. In the "Project tree", open the screen with the inserted faceplate (Screen_1).

7. Select the faceplate on the screen in the display area and go to "Properties > Interface > Data".

8. Select the "UPS1600_Data" property and connect the "UPS_Data" tag in "TagTable_1200_UPS1600_Comfort" under the "Dynamization" column.
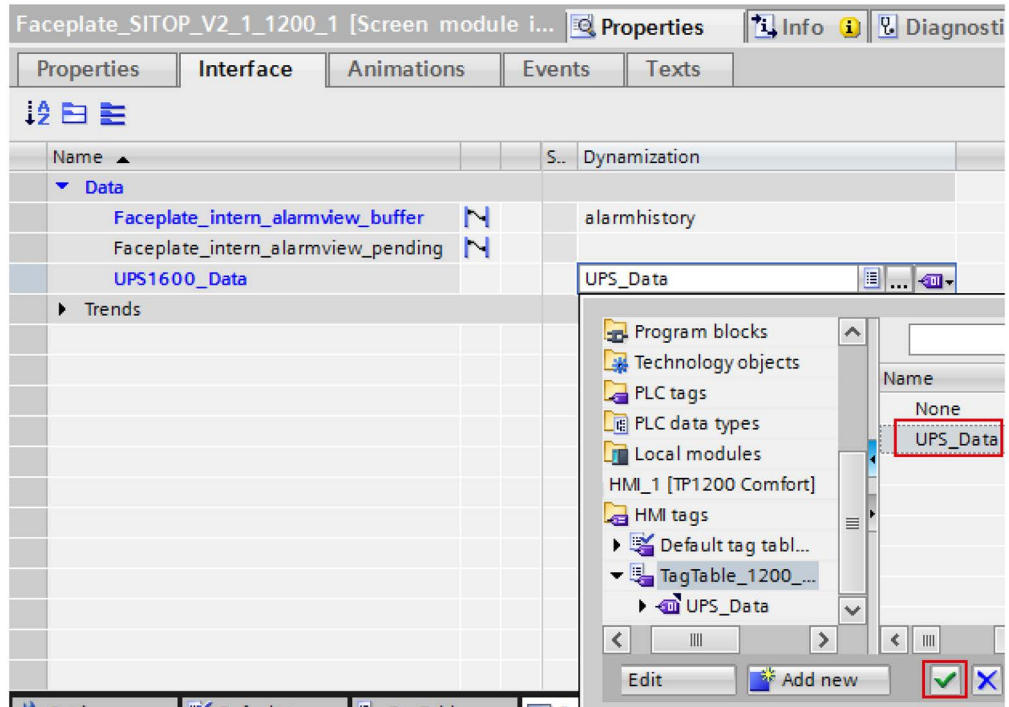
Figure 8-37

Connecting trends of the faceplate with data sources

The following procedure describes how to connect the trends of the faceplate with data sources.

1. In the "Project tree", open the screen with the inserted faceplate (Screen_1)

2. Select the faceplate and go to "Properties > Interface > Trends".

3. Select "Trends" and click on the marked area in the "Static value" column to open the settings for the trends of the UPS1600 module.
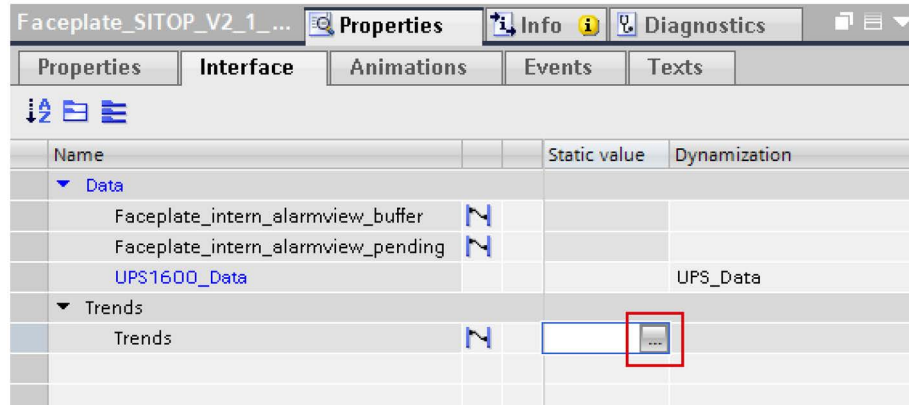
Figure 8-38

The "Trend" window opens.

4. In the "Trend" window, add five trends in the "Name" column.

5. Set the "Trend value" to 600 to all the five trends.

6. In the "Source settings" column, click the drop-down. "Data source" dialog box opens.

7. For the "Process values" click on the highlighted area to navigate to the HMI tags and assign the following tags to each of the trends

  – Input_Voltage

  – Output_Voltage

  – Output_Current

  – Battery_voltage

  – Measured_charge_current
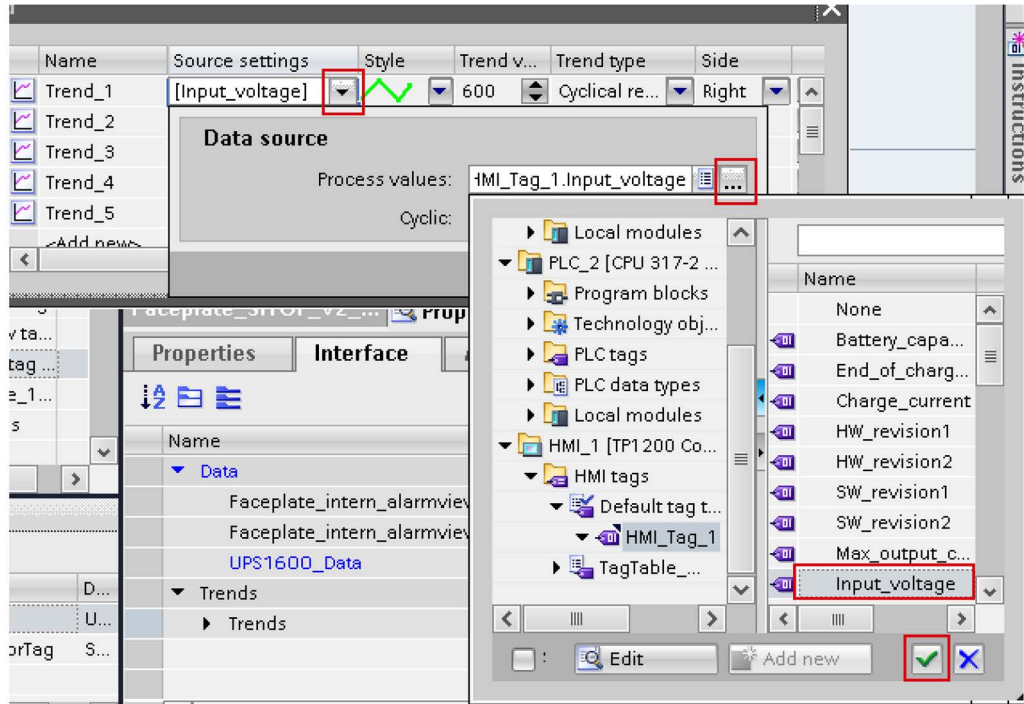
Figure 8-39

8. Set the "Cyclic" value to 0.5.
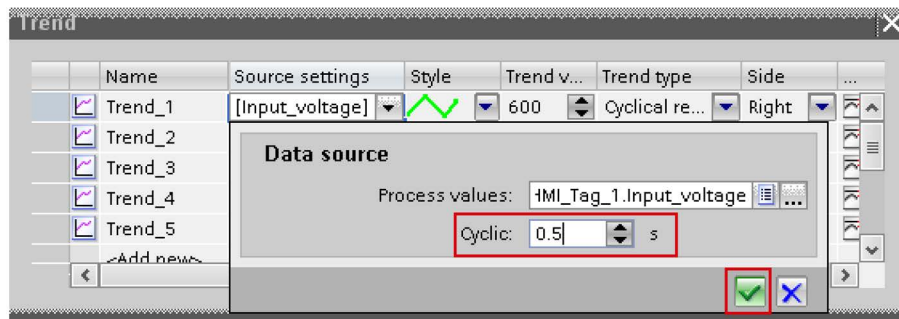
Figure 8-40

9. In the "Style" column, select the trend color for the individual trends according to the legend given below.
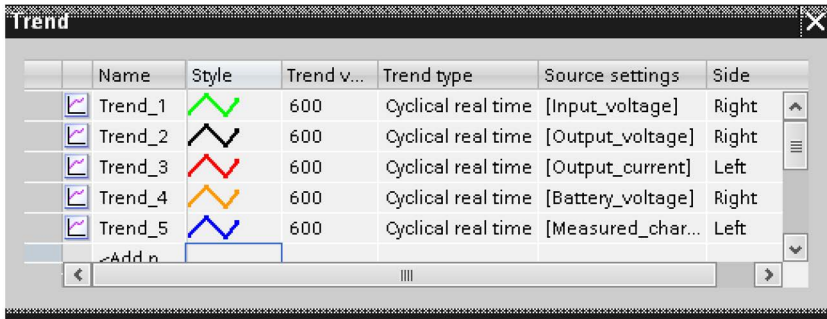
Trends

 Input voltage

 Charge current

 Battery voltage

 Output current

 Output voltage

Figure 8-41

10. In the "Side" column, select the value as "Right" to voltage tags and select the value as "Left" to current tags assigned for the trends in step 6.

Figure 8-42

Activating the alarms display

1. In the "Project tree", double click on "Runtime settings" and select "Alarms".
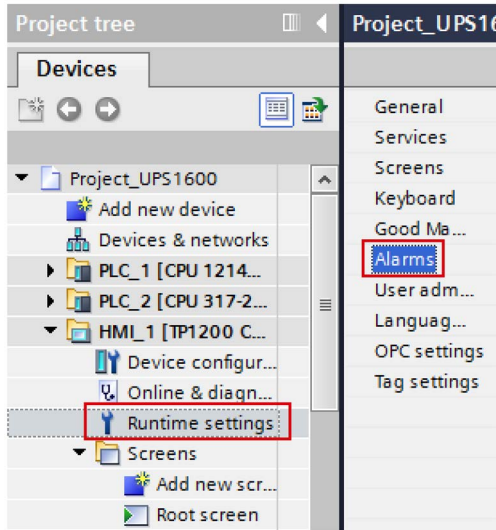
Figure 8-43

2. Check the options "S7 diagnostic alarms" and "With event text".
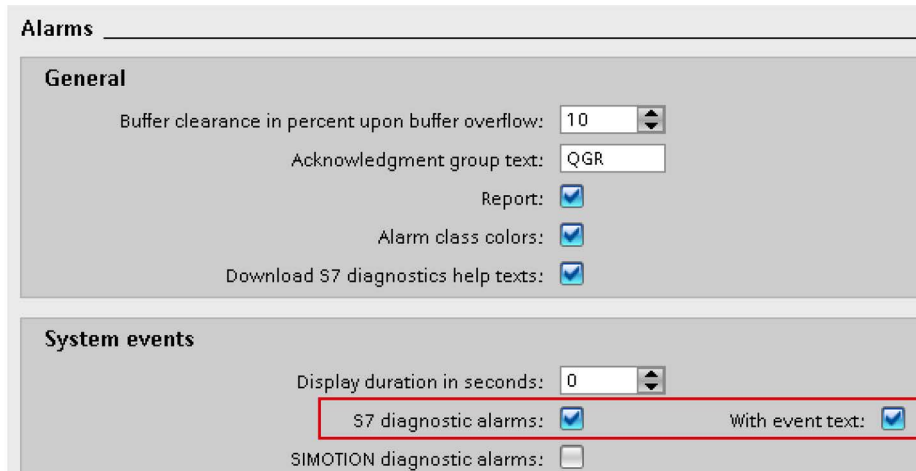
Figure 8-44

Note

When configuring an S7-300/400 controller in TIA Portal, you also need to activate the S7 diagnostic alarm on the controller side.

The following entry describes how to proceed: 62121503 (https://support.industry.siemens.com/cs/ww/en/view/62121503), see Chapter 3.2.2 'Configuring CPU system diagnostic alarms', description 'Settings in STEP 7 Professional'.

Configuring the alarms display

1. In the "Libraries" window, select "Global libraries > UPS1600 V2.2 library TIA Portal V14 SP1 > Master copies > UPS1600 TIA Library > UPS1600 Wincc > Screens > Comfort Panels/Advanced > Alarm windows".
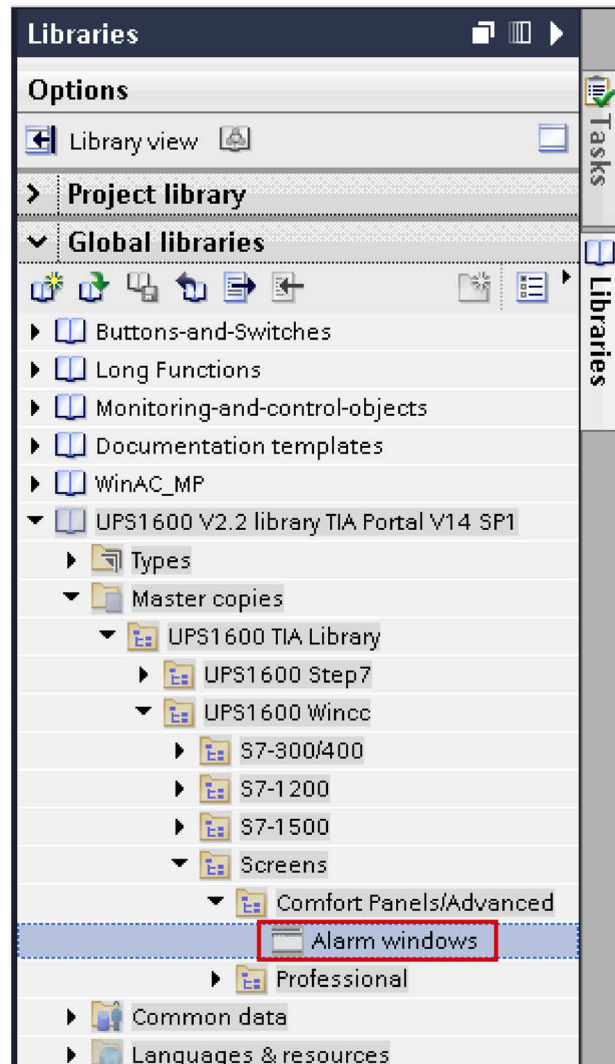
Figure 8-45

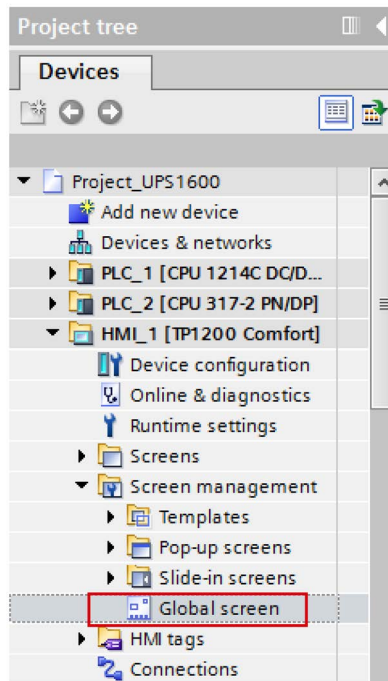2. In the "Project tree", select "Screen management" and open "Global screen".

Figure 8-46

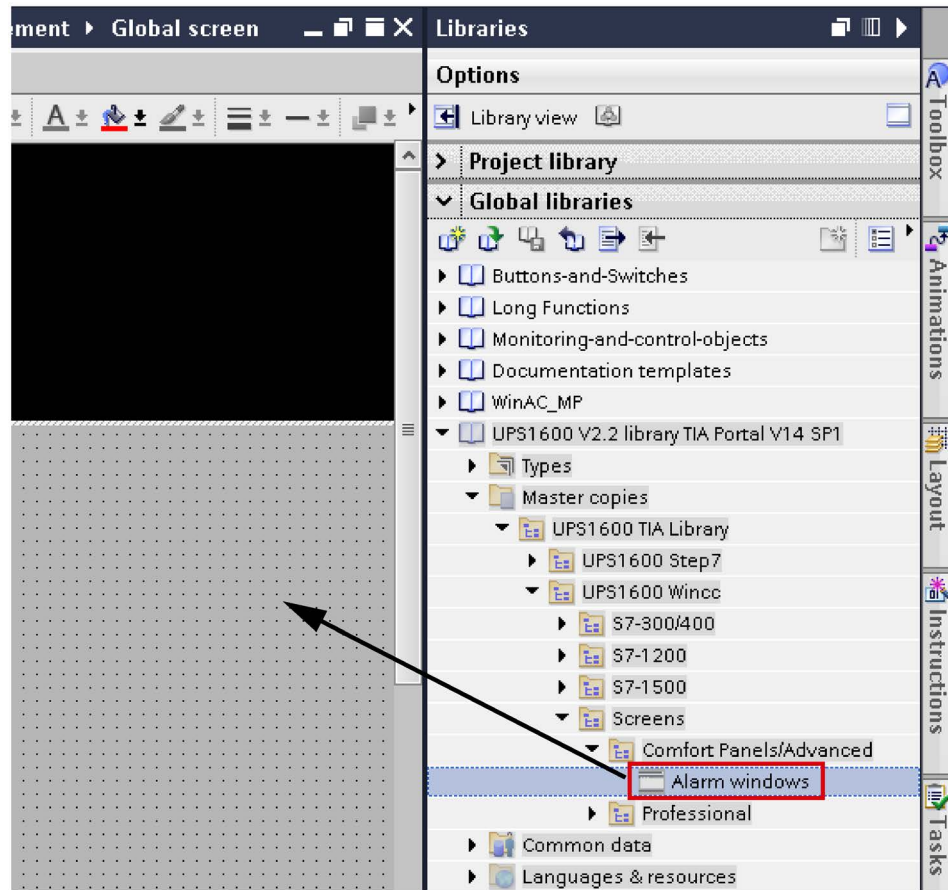3. Drag-and-drop "Alarm windows" into the global screen.

Figure 8-47

Configuring the alarms display call

1. In the "Project tree", under the "HMI tags" folder open "TagTable_1200_UPS1600_Comfort".
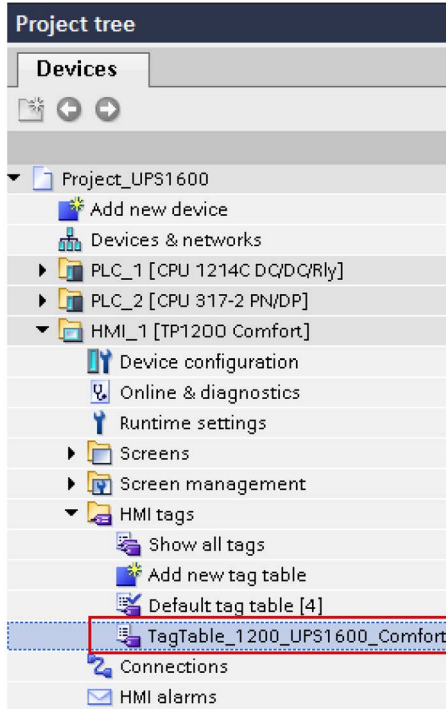
Figure 8-48

2. For the tags "alarmhistory" and "alarmpending", check if the assigned "Data type" is "Int" and the "Connection" is "Internal tag".
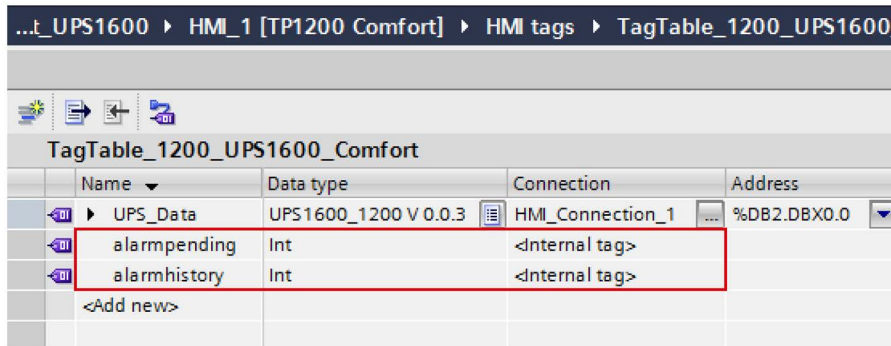

Figure 8-49

3. Select the "alarmpending" tag and go to "Properties > Events > Value change". Check the properties of the tag where in the "ShowAlarmWindow" function is inserted and its variable "Object name" is assigned to the tag "Alarmview_UPS_Pending".
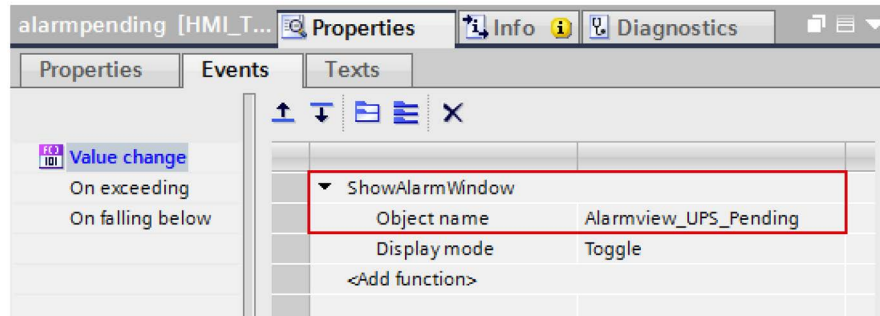

Figure 8-50

Similarly, check the properties of the tag "alarmhistory" where in the "ShowAlarmWindow" function is inserted and its variable "Object name" is assigned to the tag "Alarmview_UPS_History".

4. Open the screen (Screen_1) and select the faceplate. Go to "Properties > Interface > Data".

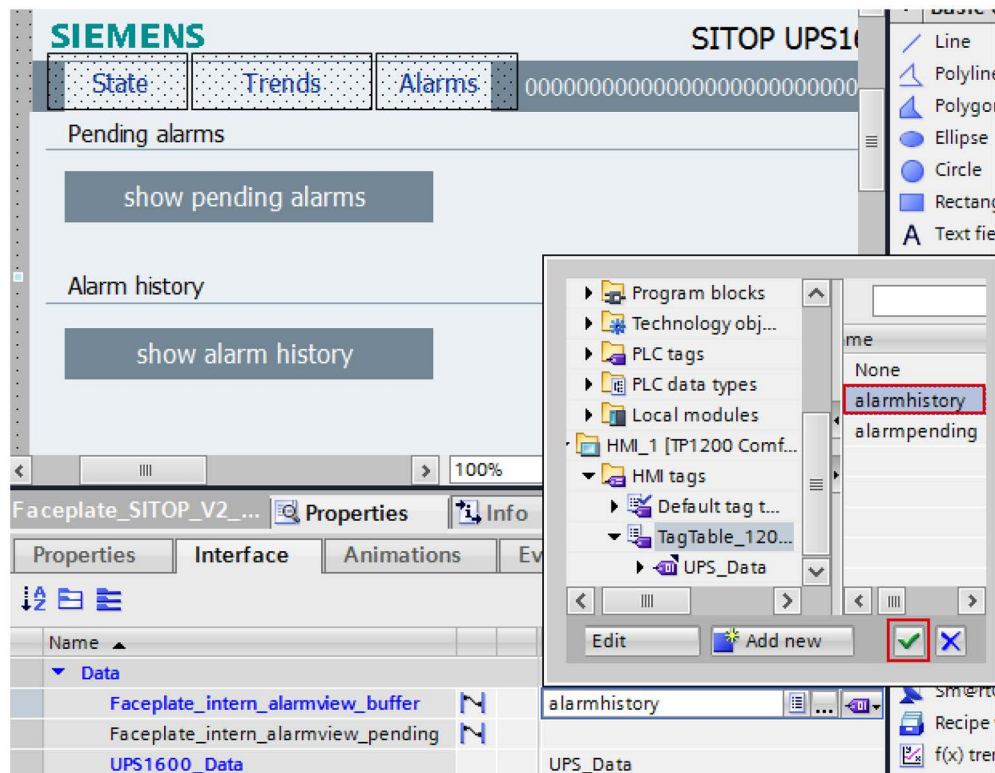5. Assign the "alarmhistory" tag to "Faceplate_intern_alarmview_buffer" element.

Figure 8-51

6. Assign the "alarmpending" tag to "Faceplate_intern_alarmview_pending" element.

Displaying the PROFINET diagnostic messages

To display the PROFINET diagnostic messages of the SITOP UPS1600 within the faceplate, the respective WinCC TIA Portal project must already be configured.

Information on the display and configuration of diagnostic messages in WinCC TIA Portal is available under the entry ID: 62121503 (https://support.industry.siemens.com/cs/ww/en/view/62121503).

Activation of the PROFINET diagnostic messages of the UPS1600 is found in the "Device view" of the UPS1600.
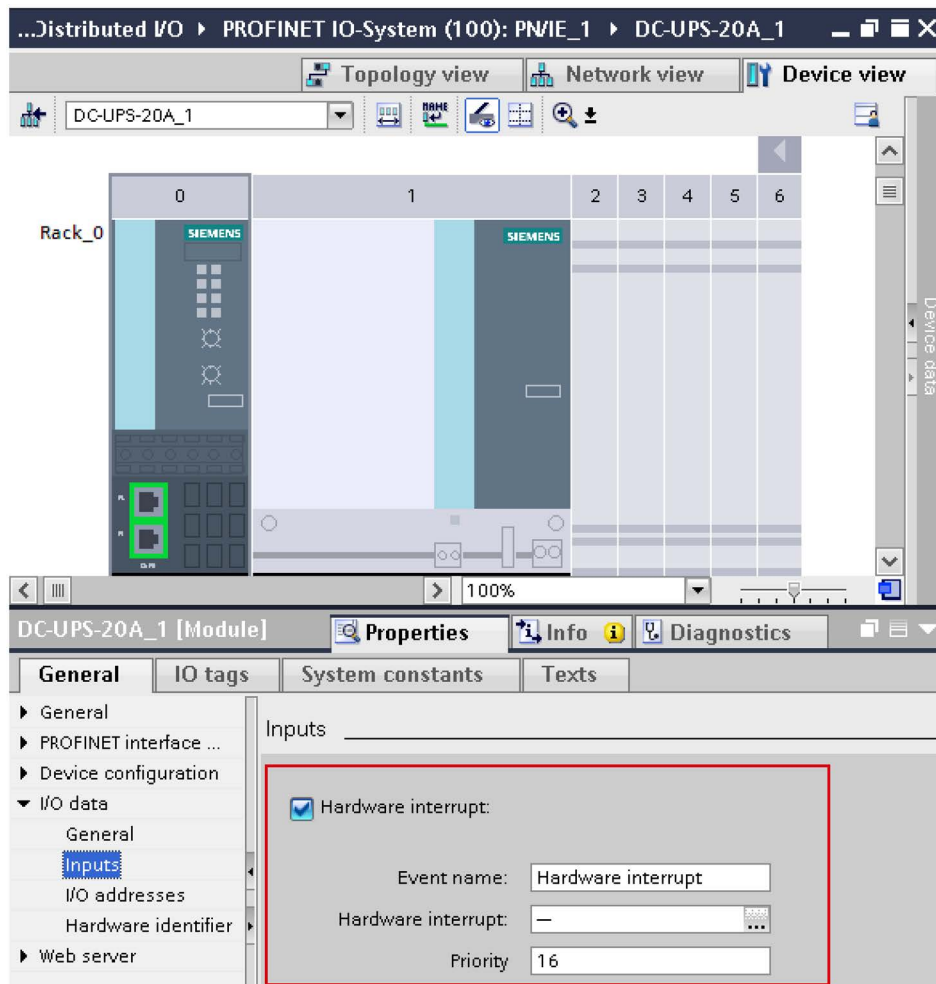

Figure 8-52

Further notes regarding the PROFINET diagnostic messages of the SITOP UPS1600 is available in the chapter 4 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).

8.4 Application of screen windows in WinCC Professional V14 SP1

8.4.1 Prerequisites

Prerequisites

The following requirements must be met to use the screen windows in WinCC Professional V13 SP1.

- The HSP for the SITOP UPS1600 is installed in STEP 7 V14 SP1.

- S7 communication between the SITOP UPS1600 and SIMATIC S7 controller is already configured.

- All program blocks for STEP 7 V14 SP1 from UPS1600 V2.2 library TIA Portal V14 SP1 are integrated into the application program and executable.

- UPS1600 V2.2 library TIA Portal V14 SP1 is available on your computer.

Supported control panels

The screen windows are supported for the following control panels:

- WinCC RT Professional V14 SP1

Supported languages

The screen windows support the following languages:

- English (USA)

- German (Germany)

- Chinese (PR China)

8.4.2 Library for WinCC Professional

Library for WinCC Professional

The following objects are part of the master copy "UPS1600 TIA Library > UPS1600 Wincc > Screens > Professional" in UPS1600 V2.2 library TIA Portal V14 SP1.

Table 8- 4

Name	Type	Description
Screen Windows	Screen window	Comprises the screen window
UPS1600	Screen	Comprises the screen 'UPS1600'

8.4.3 Integrating the screen windows

Overview

The following sections describe all the steps required to integrate the screen windows into a WinCC Professional V14 SP1 project.

Target system used:

- WinCC RT Professional V14 SP1

Opening the library in WinCC V14 SP1

The procedure for opening the library in WinCC Professional V14 SP1 is explained in the Content of the library for STEP 7 V14 (Page 47).

Inserting HMI tag table in WinCC

The following procedure describes how to insert HMI tag table into the WinCC project.

1. In the "Libraries" window, select "Global libraries > UPS1600 V2.2 library TIA Portal V14 SP1 > Master copies > UPS1600 TIA Library > UPS1600 Wincc > S7-1200 > Tag Table Professional > TagTable_1200_UPS1600".
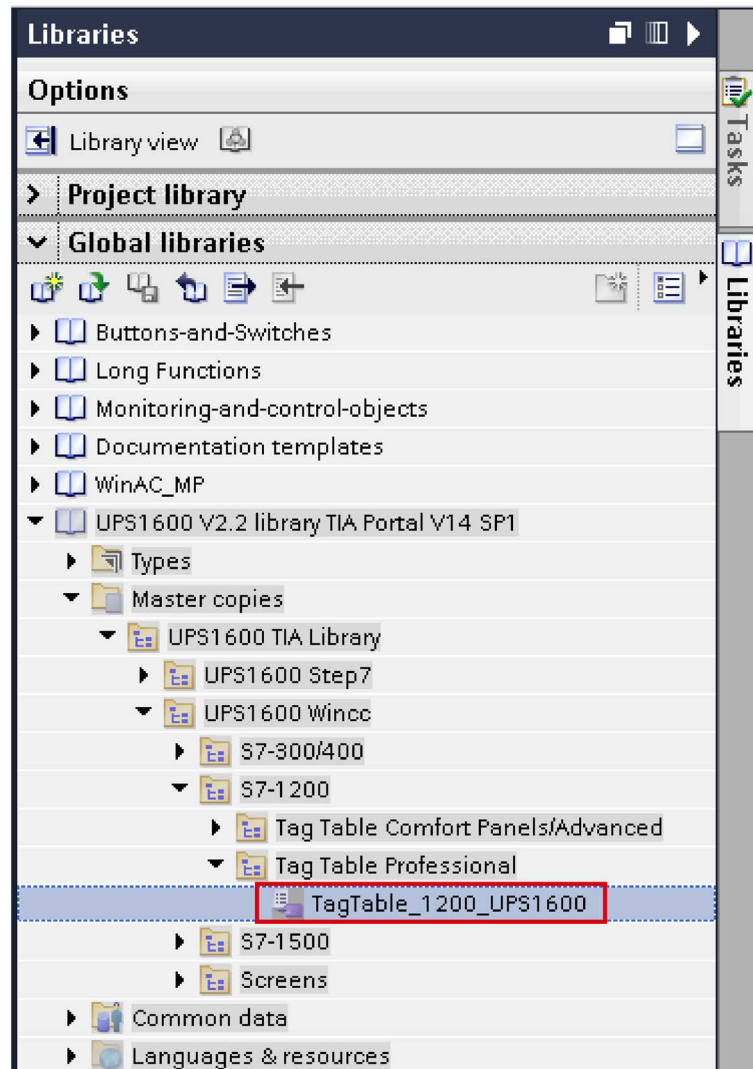

Figure 8-53

Note

S7-300/400 PLCs

For S7-300/400 PLCs, go to the folder "S7-300/400" and for S7-1500 PLCs go to the folder "S7-1500".

---

2. Drag-and-drop "TagTable_1200_UPS1600" into the "HMI tags" folder in the "Project tree".
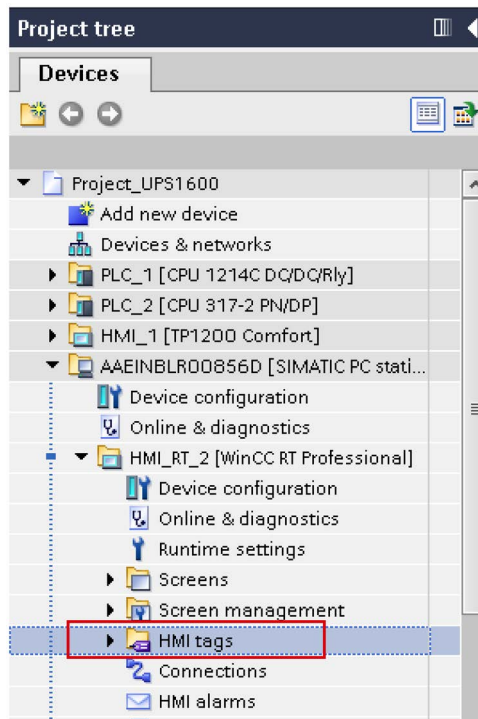
Figure 8-54

Configuring connections of HMI tag table

The following procedure describes how to configure connections of HMI tag table.

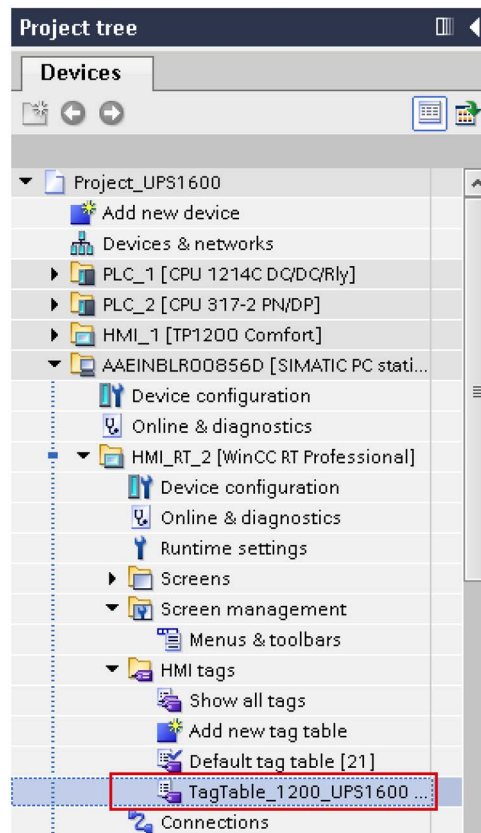1. In the "Project tree", select "HMI tags > TagTable_1200_UPS1600" and open the tag table.

Figure 8-55

2. Adjust the connections of the tag.

   – In the "Connection" column, select your HMI connection of the controller and Runtime Professional.

   – In the "Address" column define the address of the global DB number created in the PLC (DB2).
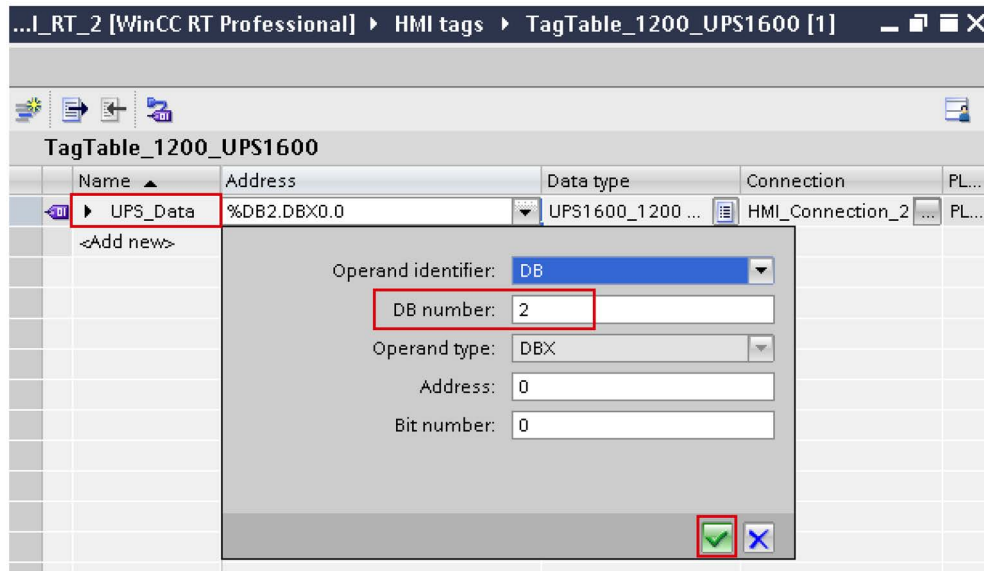

Figure 8-56

Inserting screen windows into a project

The following procedure describes how to integrate a screen from the library into an existing WinCC project.

1. Open the project in "Project view".

2. In the "Libraries" window, select "Global libraries > UPS1600 V2.2 library TIA Portal V14 SP1 > Master copies > UPS1600 TIA Library > UPS1600 Wincc > Screens > Professional > UPS1600".
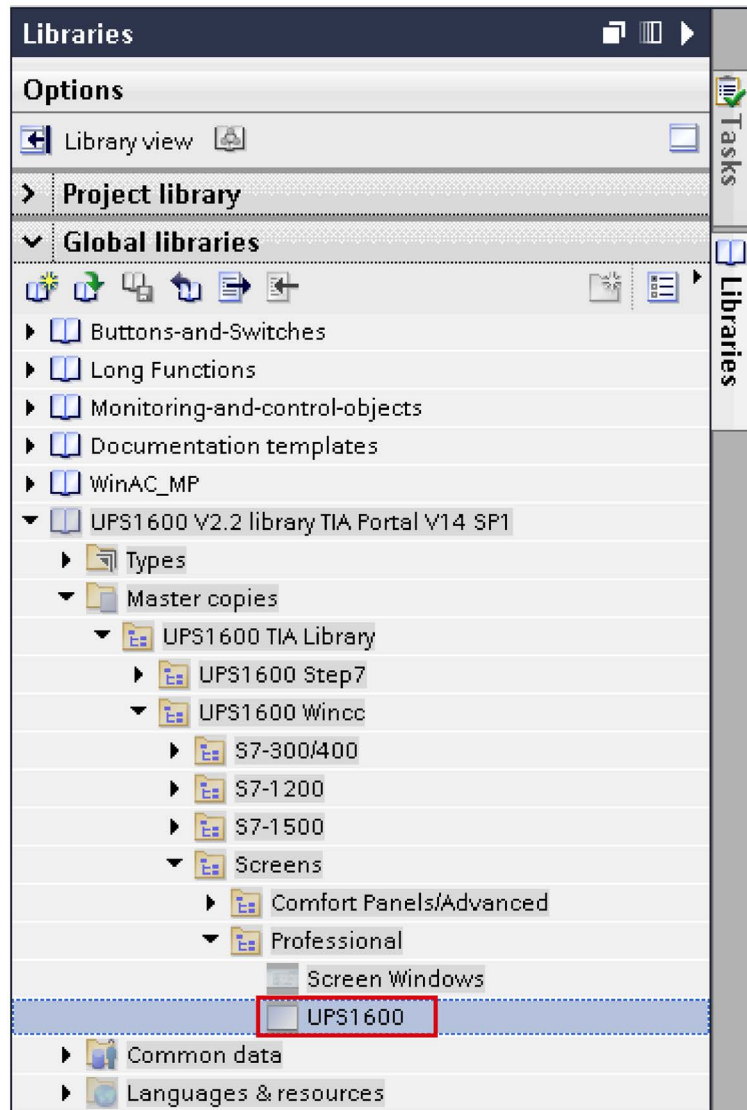

Figure 8-57

3. In the "Project tree", open the "Screens" folder of the HMI used in the project.

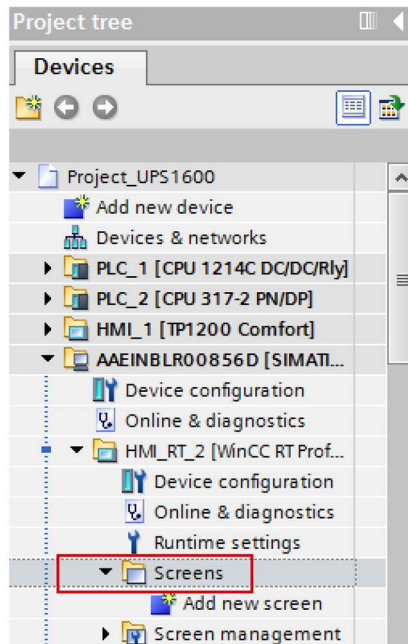4. Drag-and-drop "UPS1600" into the "Screens" folder.

Figure 8-58

Integrating screen windows into a project

The following procedure describes how to integrate the screen window from the library into an existing WinCC project.

1. In the "Project tree", open the screen into which you want to insert the screen windows (Screen_1).
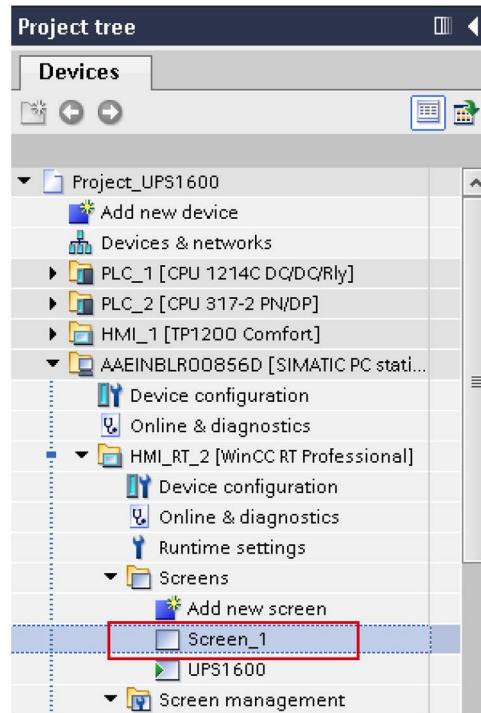

Figure 8-59

2. In the "Libraries" window, select "Global libraries > UPS1600 V2.2 library TIA Portal V14 SP1 > Master copies > UPS1600 TIA Library > UPS1600 Wincc > Screens > Professional > Screen Windows".
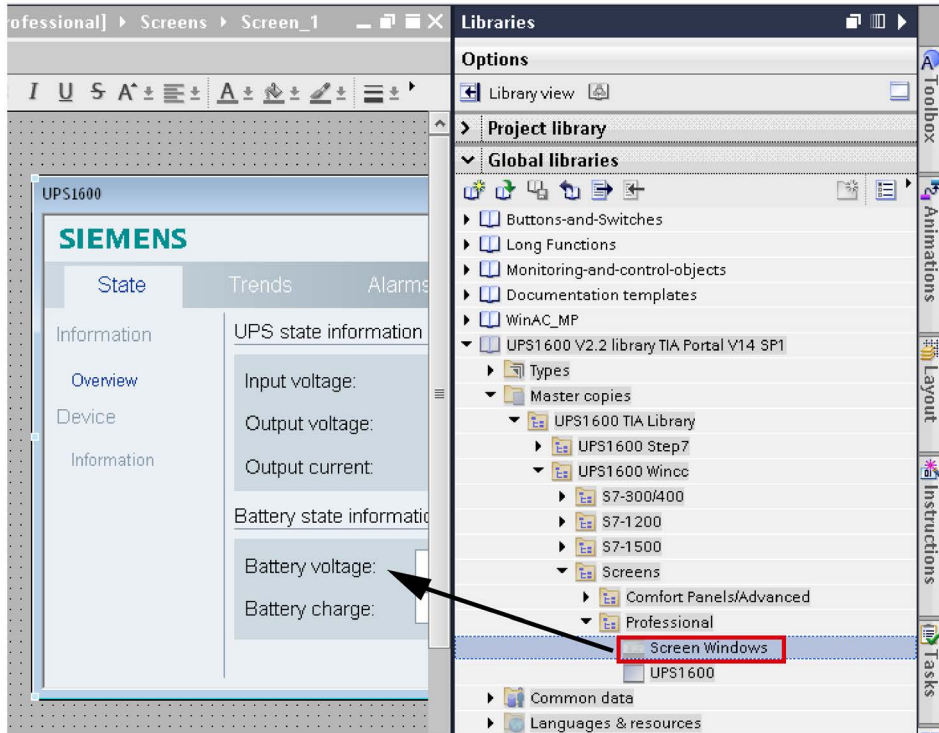
3. Drag-and-drop "Screen Windows" to the screen.

Figure 8-60

4. Select the screen window and go to "Properties > Properties > General".

Assign "Tag prefix" variable with the "UPS_Data" tag present in "TagTable_1200_UPS1600" folder.
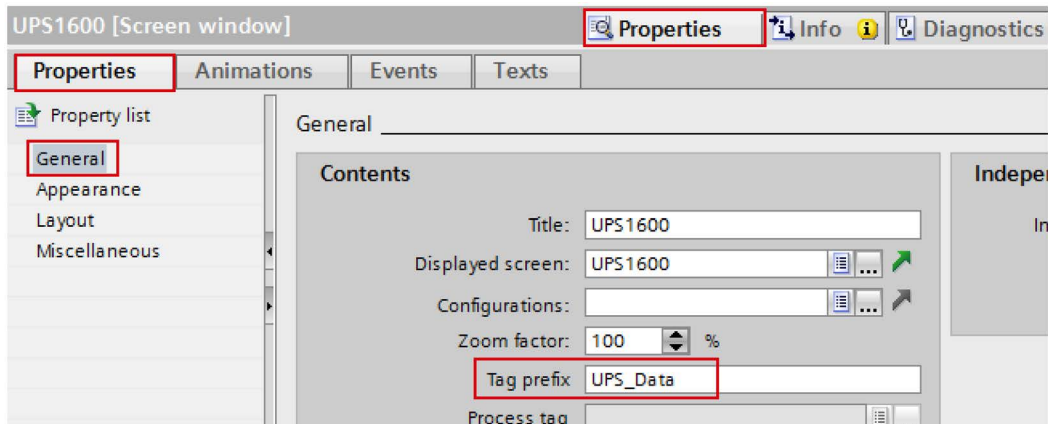

Figure 8-61

Displaying the PROFINET diagnostic messages

To display the PROFINET diagnostic messages of the UPS1600 within the screen windows, the respective WinCC TIA Portal project must already be configured.

Information on the display and configuration of diagnostic messages in WinCC TIA Portal is available under the entry ID: 62121503 (https://support.industry.siemens.com/cs/ww/en/view/62121503).

The activation of the PROFINET diagnostic messages of the UPS1600 is found in the "Device view" of the UPS1600.
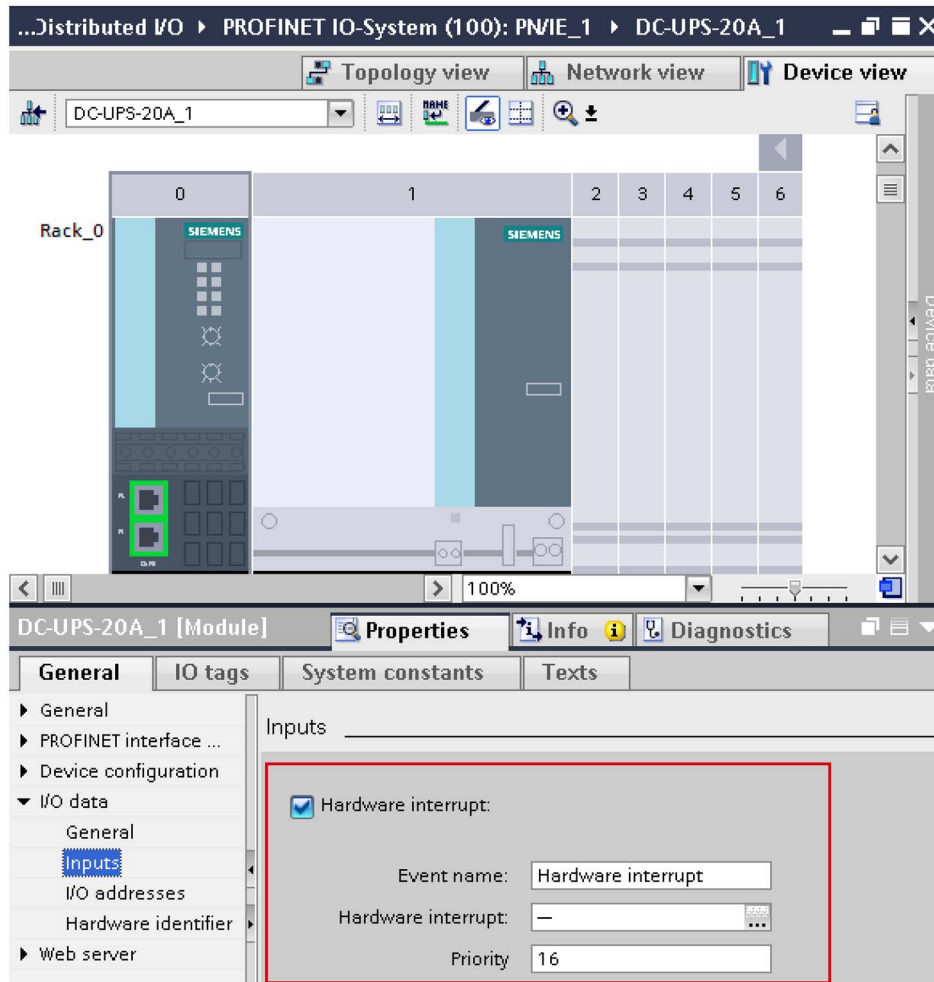

Figure 8-62

Note

- When configuring an S7-300/400 controller in TIA Portal, you also need to activate the S7 diagnostic alarm on the controller side.

- The following entry describes how to proceed: 62121503, see Chapter 3.2.2 'Configuring CPU system diagnostic alarms', description 'Settings in STEP 7 Professional'.

- There can be differences regarding the S7-1200 diagnosis with respect to the S7-1500

Further notes regarding the PROFINET diagnostic messages of the SITOP UPS1600 are available in the chapter 4 of the SITOP UPS1600 User Manual (https://support.industry.siemens.com/cs/ww/en/view/84977415).