



SITOP UPS1600 under STEP 7 V12

Getting Started

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Legal information

Warning notice system

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

DANGER

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

WARNING

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

CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

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

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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

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Introduction

1.1 Purpose of this document

This Getting Started guides you through configuring the UPS1600 under STEP 7 V12 for the following two tasks:

- Buffering the S7 IO controller, including the I/O when the power fails
- Switching off the UPS when the power fails by the user program

Basic knowledge required

The following are required to understand the Getting Started:

- Knowledgeable about using personal computers with the Windows operating system
- Knowledgeable about how to configure an uninterruptible power supply using the UPS1600, including the S7 IO controller and connected battery modules
- Creating and editing projects under STEP 7 V12 in the TIA-Portal.

Range of validity

Getting Started is valid for STEP 7 V12, Version 12.0 with service pack 1 (SP1).

1.2 Technical support

Technical support

Technical support for all IA/DT products can be accessed through the following communication channels:

- Phone: + 49 (0) 911 895 7222
- E-Mail (<mailto:support.automation@siemens.com>)
- Internet:
Online support request form (<http://www.siemens.com/automation/support-request>)

Technical documentation on the Internet

Operating instructions and manuals for SITOP are available in the Internet:
Operating instructions/manuals (<http://www.siemens.com/sitop/manuals>)

SITOP power supply homepage

General news about our power supplies is available in the Internet at the SITOP home page (<http://www.siemens.com/sitop>).

1.3 Additional documentation

Further information is available in the following documents:

- UPS1600 and UPS1100 manuals
- IO controller manual
- STEP 7 V12 manual

WARNING

Correct handling of the devices

When operating electrical devices, it is inevitable that certain components will carry dangerous voltages.

Therefore, failure to handle the units properly can result in death or serious physical injury as well as extensive property damage.

Only appropriately qualified personnel may work on or in the vicinity of this equipment.

Perfect, safe, and reliable operation of this equipment is dependent on proper transportation, storage, installation and mounting.

Before installation or maintenance work can begin, the system's main switch must be switched off and measures taken to prevent it being switched on again.

If this instruction is not observed, touching live parts can result in death or serious injury.

The relevant DIN/VDE regulations or country-specific specifications (e.g. VDE 0510 Part 2 / EN50272-2) must be observed for the storage, assembly and operation of the lead accumulators. It must be ensured that the battery location is suitably ventilated. Potential ignition sources must be separated by at least 50 cm.

Description

3.1 System overview

Application

The principal tasks that you can perform with the SITOP UPS Management:

- Connecting the uninterruptible SITOP UPS1600 power supply to the IO controller S7
- Configuring the SITOP UPS1600 uninterruptible power supply
- Protecting a computer or a computer network using the uninterruptible power supply
- Defining the battery maintenance intervals

Device integration

SITOP UPS Management supports the following devices:

- UPS1600
- UPS1100

UPS1600 can be used with STEP 7 V12 as of version 12.0 with Servicepack 1 (SP1).

After the UPS1600 has been saved in the hardware catalog of STEP 7 V12 by installing the hardware support package, it can be integrated into projects, parameterized and diagnosed.

Languages

German, English

French, Italian, Spanish and Chinese being prepared.

Assigning the IP address

Just like all devices connected to PROFINET, SITOP UPS1600 requires an IP address. This is defined by the person responsible for the system. In this Getting Started, the configuration of the SITOP UPS1600 interface is described using the Primary Setup Tool.

General information

The Primary Setup Tool is a Siemens product that is free of charge and which is used to identify and configure network-conform devices. You can download the Primary Setup Tool under (<http://support.automation.siemens.com/WW/view/en/19440762>).

Note

Additional information

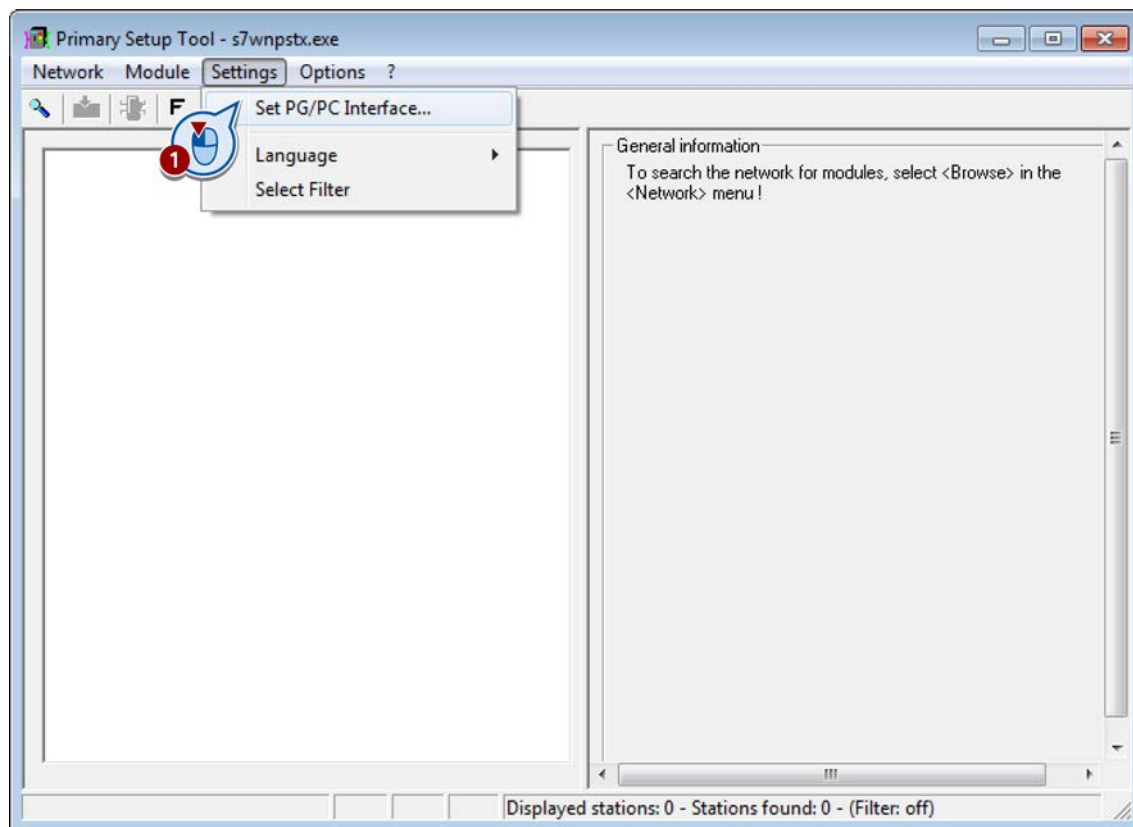
Additional information is contained in the Primary Setup Tool manual. This manual and further links can be found under (<http://support.automation.siemens.com/WW/view/en/19440762>).

Preconditions

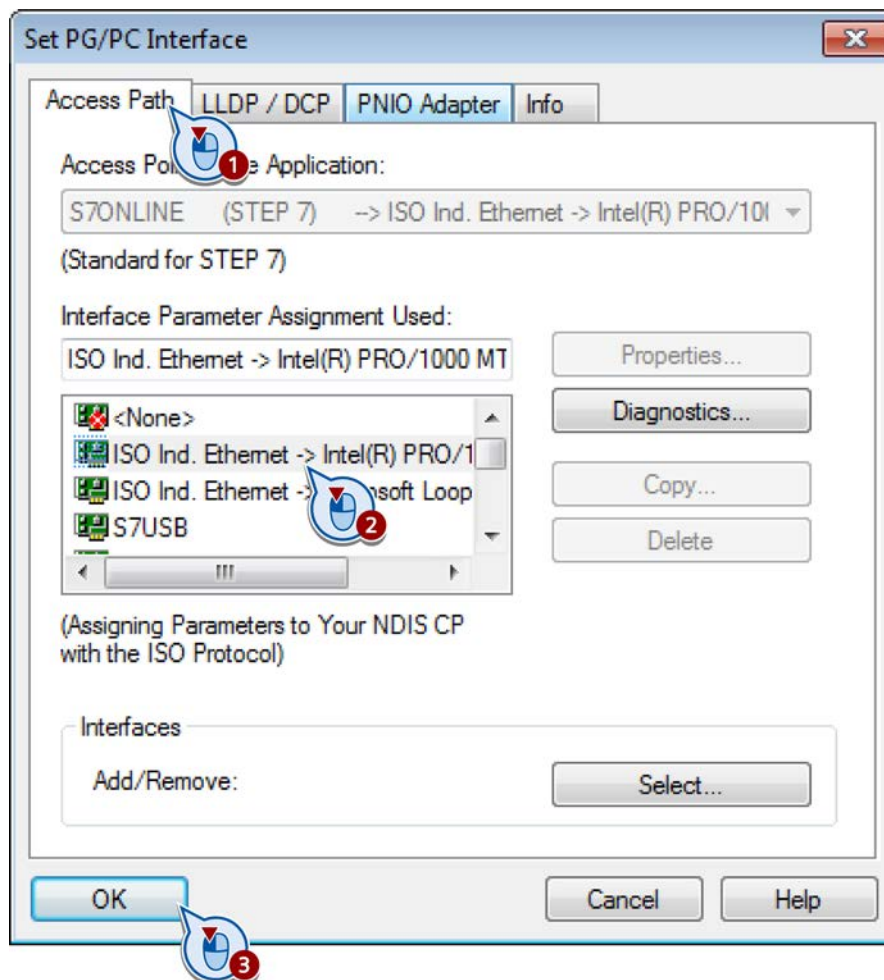
- The SITOP UPS1600 is connected with the client (PG/PC) via the Ethernet interface.
- The Primary Setup Tool is installed on the client.

Procedure

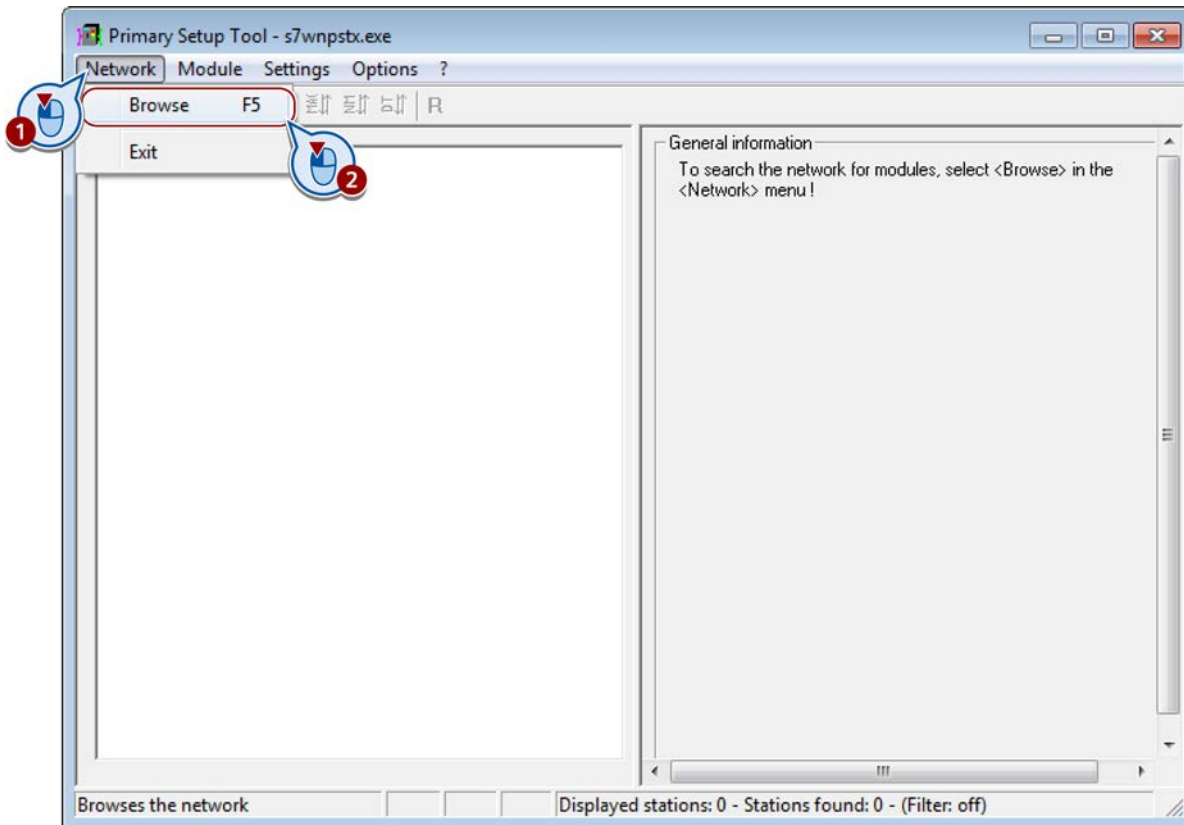
1. Called the Primary Setup Tool.
2. In the Primary Setup Tool select the menu command "Settings > Set PG/PC Interface..."



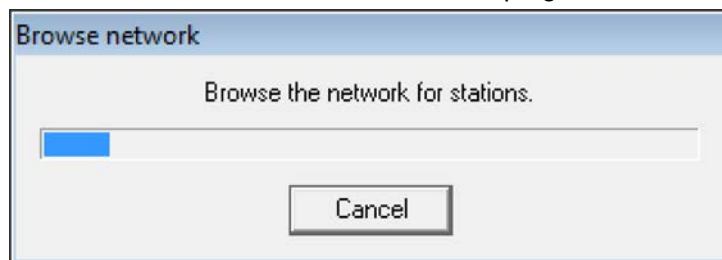
3. In the dialog box "Set PG/PC Interface", select the "Access Path" tab.
4. From the interfaces listed, select the Ethernet interface with which SITOP UPS1600 is connected, and confirm with "OK".



5. Select the menu command "Network > Browse", to view the network stations connected at the interface.

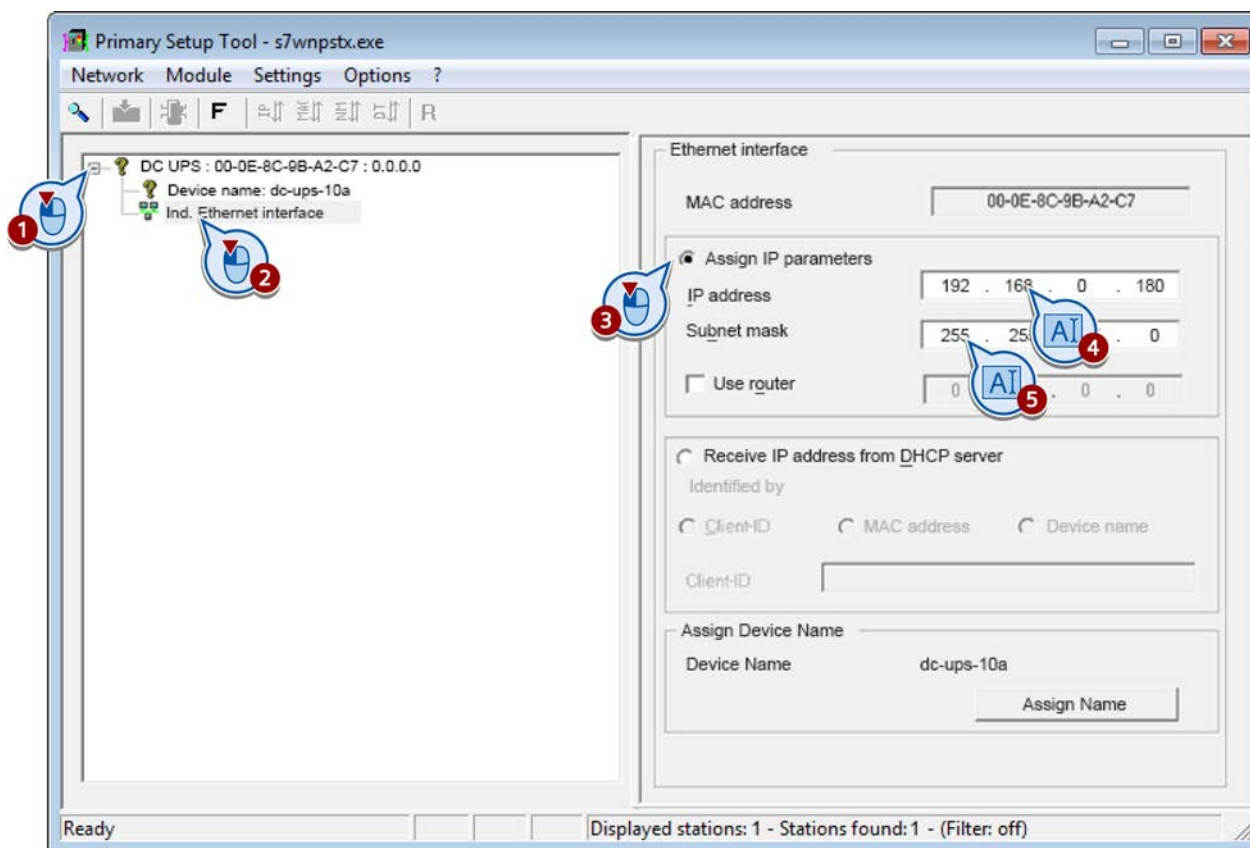


The "Browse network" window shows the progress of the search



6. From the search results, select the SITOP UPS1600.
The SITOP UPS1600 is displayed as "DC-UPS:" with its MAC address and IP address.
7. Open the menu of the SITOP UPS1600 in the tree view and select "Incl. Ethernet interface".
8. Select the "Assign IP parameters" checkbox.

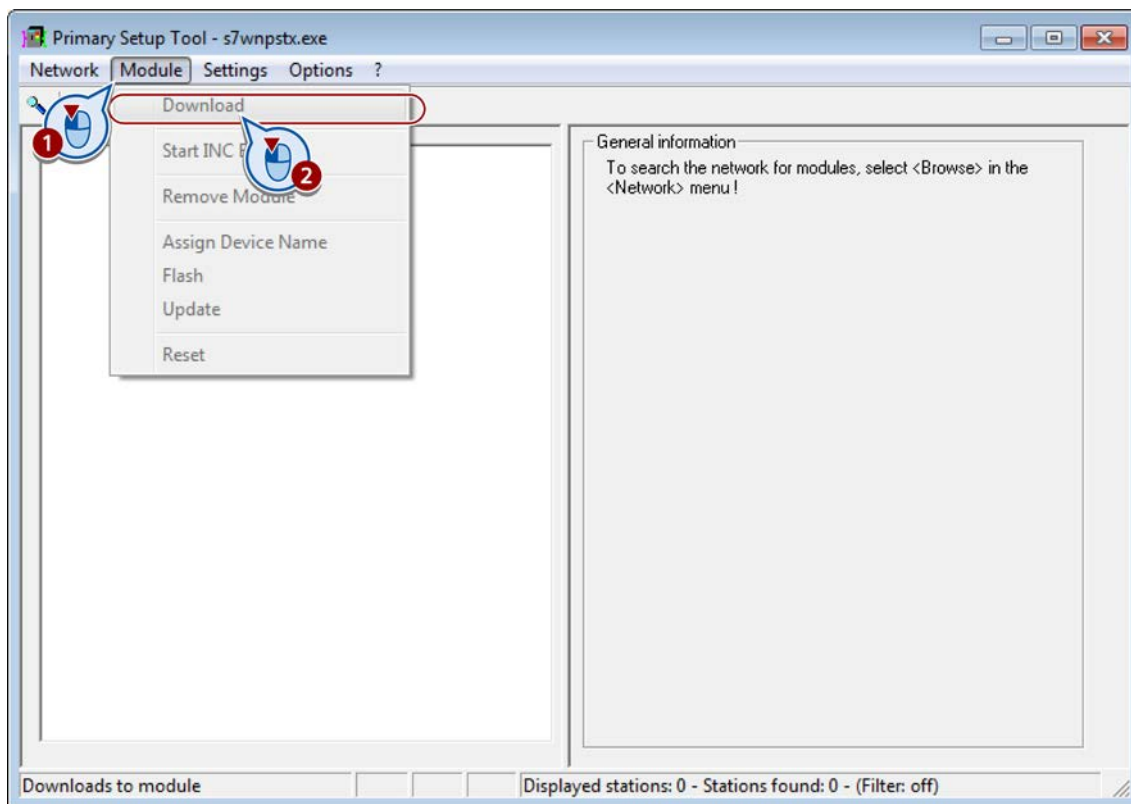
9. Specify the IP address and subnet mask.
If required, select the checkbox "Use router" and enter the IP address of the router.



10. Select the SITOP UPS1600 in the tree view.
The configuration can only be loaded to the device if the SITOP UPS1600 has been selected at the upper level.



11. In the Primary Setup Tool, select the menu command "Module > Download", to load the configuration to the SITOP UPS1600.



You have assigned an IP address to the SITOP UPS1600, and you can now communicate with the SITOP UPS1600.

Installing and configuring the SITOP UPS1600 in STEP 7 V12

5

To use the SITOP UPS1600, it must be assigned as IO device to an IO controller (S7 PLC). The SITOP UPS1600 in the project can also be equipped with one or more SITOP UPS1100 battery modules.

Preconditions

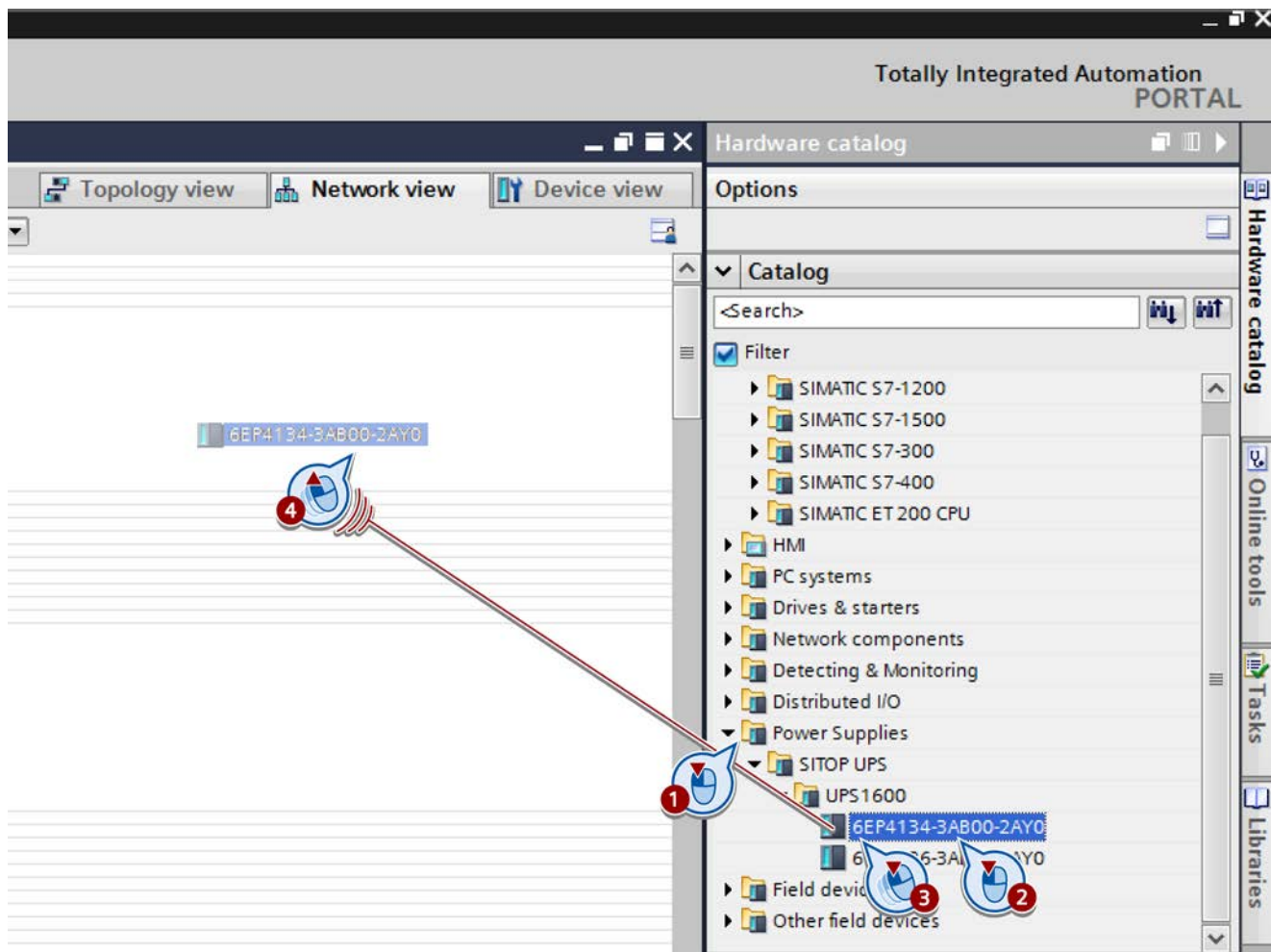
- STEP 7 V12 has been opened.
- The Hardware Support Package (HSP) of the SITOP UPS1600 has been installed correctly.
- A project with an S7 IO controller has been created.

Integrating the SITOP UPS1600

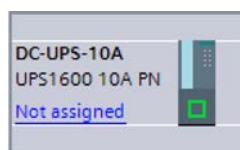
Inserting UPS1600 from the hardware catalog

1. Open the project with the S7 IO controller and change to the project view.
2. Call the network view.
3. In the hardware catalog, navigate to the correct version of the UPS1600.
4. Under the task card "Hardware catalog" in the palette "Catalog" open the folder "Power Supplies > SITOP UPS > UPS1600" and click on the UPS1600.

5. Drag and drop the UPS1600 into the work cell of the network view.



The UPS1600 is visible in the work cell.



6. Save your project.

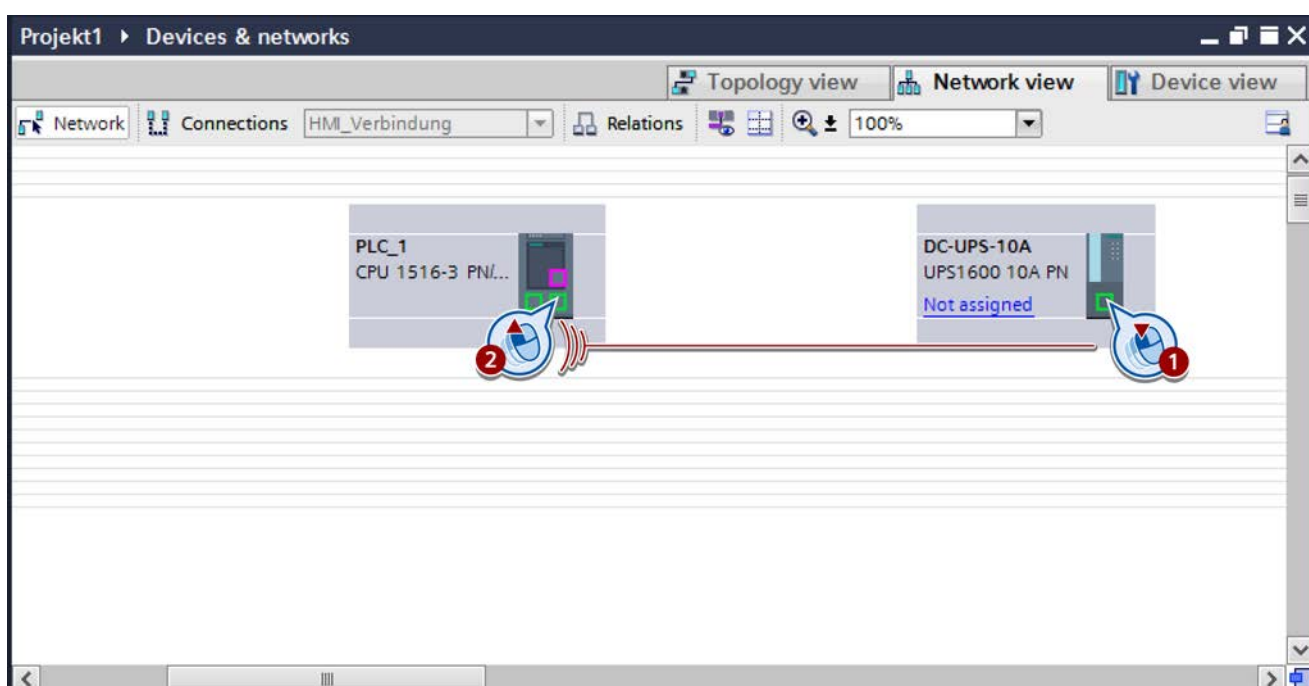
The UPS1600 is integrated in the project.

Assigning the UPS1600 to the S7 IO controller

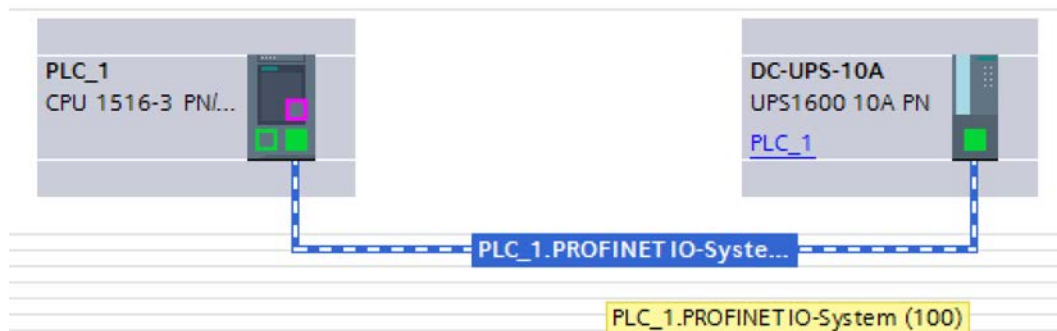
1. Keeping the mouse key pressed, drag a connection from the green input symbol of the UPS1600 to the green input symbol of the S7 IO controller in which the PROFINET cable to the UPS1600 is inserted.

Note

Ensure that you establish the connection to the **PROFINET input** of the IO controller. A connection to the Ethernet input of the IO controller will lead to errors later on.

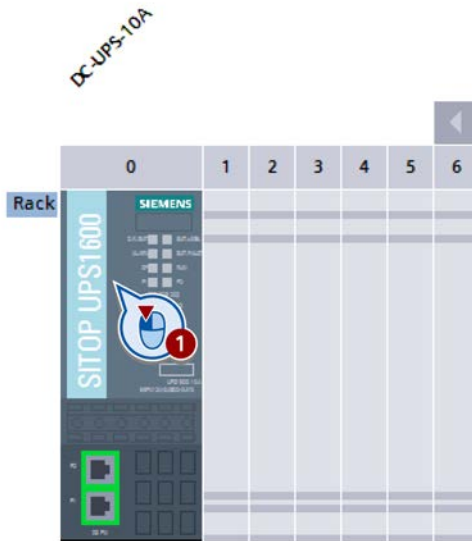


The connection is graphically shown.



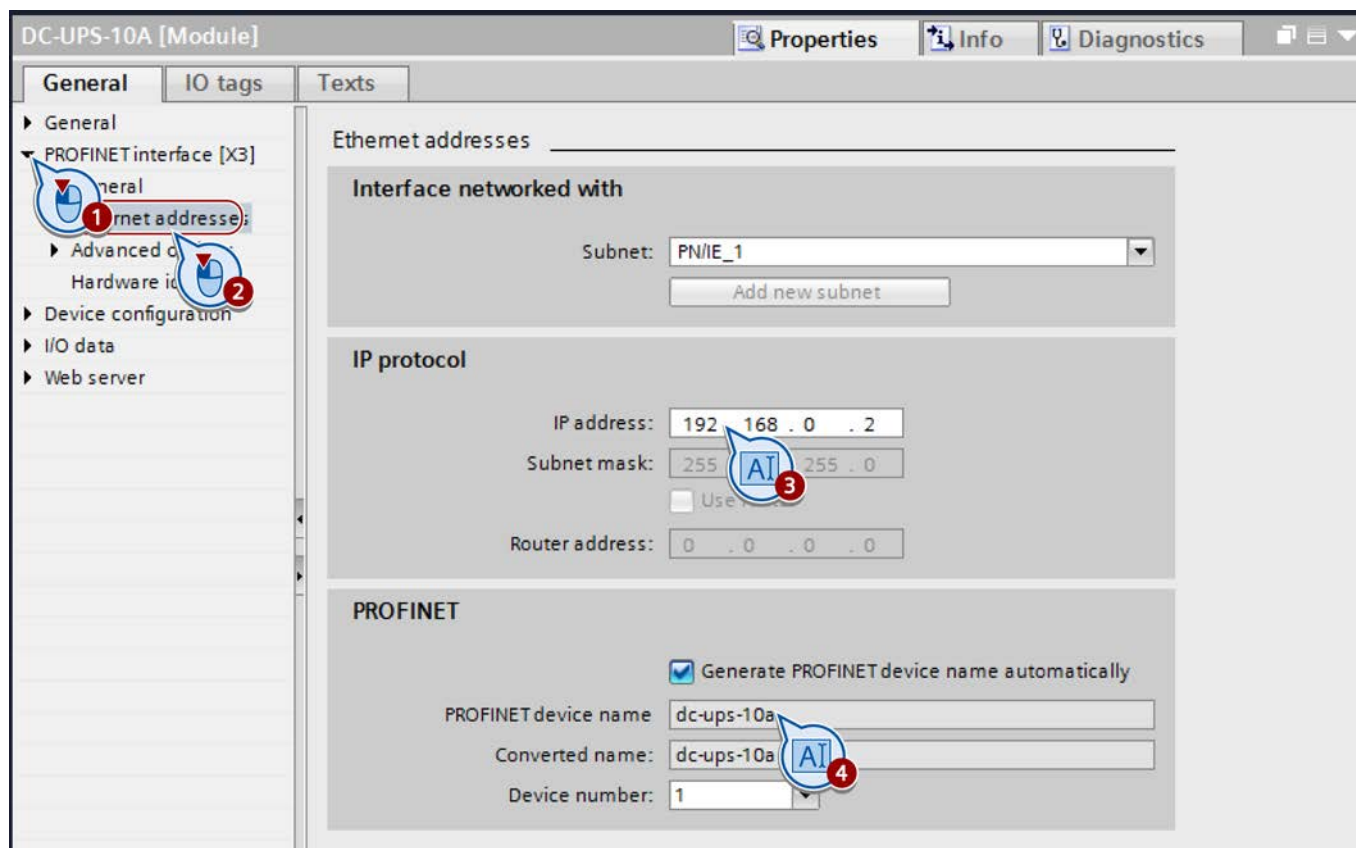
2. Double-click on the UPS1600 to display it in the device view in the work cell.

3. Click in the work cell of the device view on the UPS1600.



4. In the inspector window click on the "Properties" and "General" tab.
5. Click on the symbol to open the "Profinet interface [X3]".

6. Select the "Ethernet address", enter the required IP address and the PROFINET device name of the UPS1600 into the appropriate entry fields.

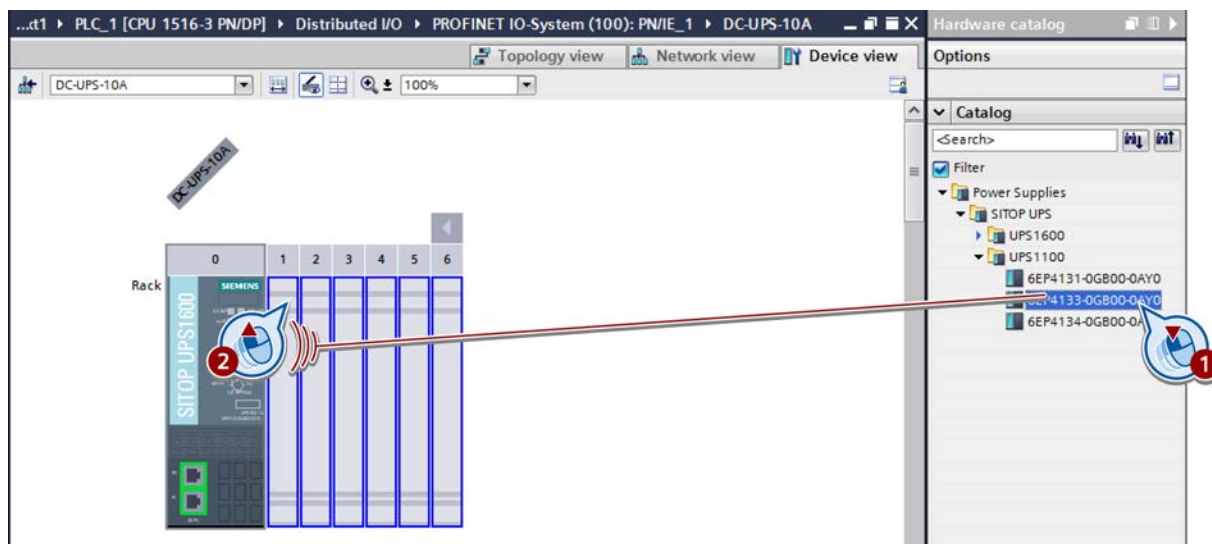


7. Save your project.

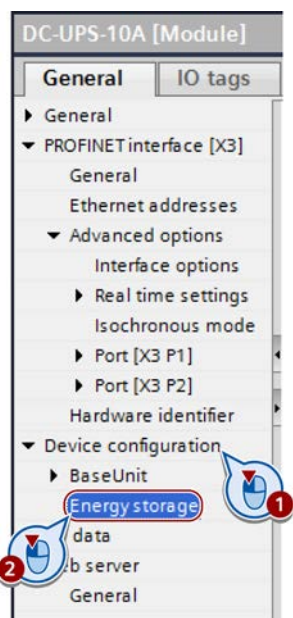
The UPS1600 is now assigned to the S7 IO controller and integrated in the project.

Integrating the SITOP UPS1100 battery module

1. Ensure that you are in the device view.
2. Navigate to below the task card "Hardware catalog" in the palette "Catalog" to the required UPS1100 battery module.
3. Click on the UPS1100 and drag it to the free rack location next to the UPS1600 and drop it.

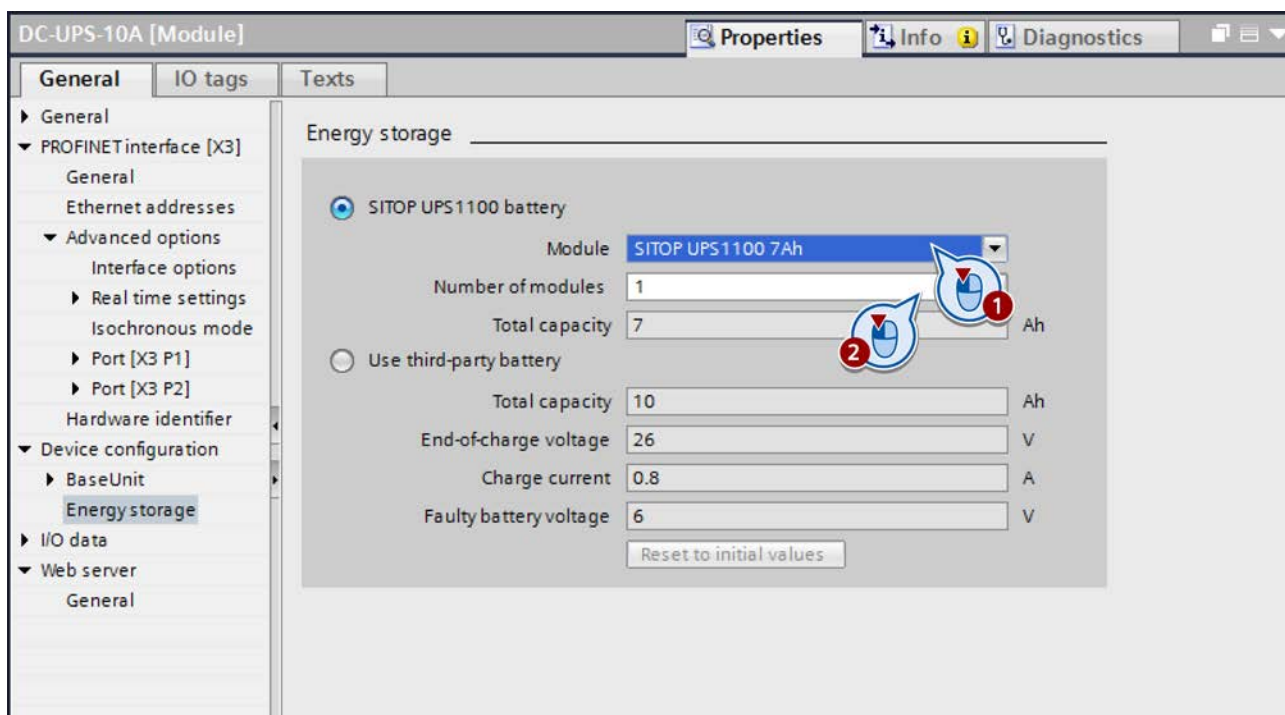


4. To subsequently configure the module type and number of modules, click on the UPS1600 and in the inspector window, on the "Properties" and "General" tab.
5. Click on the symbol to open the "Device configuration" and select "Energy storage".



6. Check whether the "SITOP UPS 1100 battery" option field is activated. Activate it if it is deactivated.

7. Select the appropriate entries in the drop-down lists "Module" and "Number of modules".



8. Save your project.

The SITOP UPS1100 battery module is integrated.

Parameterizing the SITOP UPS1600

The following examples show you how the uninterruptible SITOP UPS1600 power supply is parameterized:

- Buffering an S7 IO controller, including the I/O when the power fails
- Switching off the UPS when the power fails by a user program

Parameterizing the uninterruptible SITOP UPS1600 power supply for additional tasks, please refer to the UPS1600 Manual.

6.1 Buffering an S7 IO controller, including the I/O when the power fails

Preconditions

- STEP 7 V12 has been started and a project with an S7 IO controller and SITOP UPS1600 has been created.
- The hardware has been completely wired up.

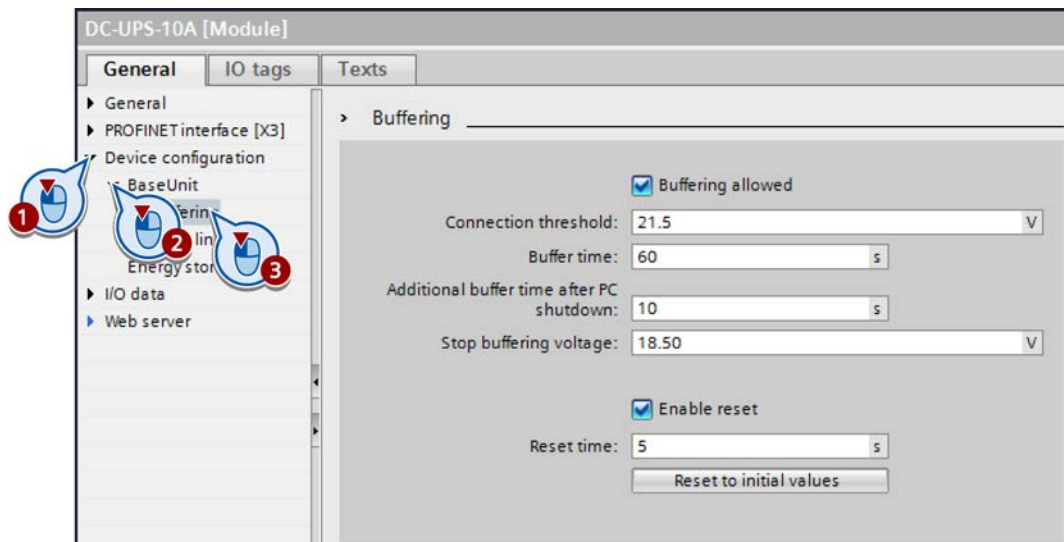
Assigning parameters

Note

If you click in the entry fields, the value range is displayed that you can enter.

1. Double-click in the network view on the UPS1600 to display it in the device view.
2. Click in the device view of the UPS1600 to select it.
3. In the inspector window click on the "Properties" and "General" tab.

4. Click on the symbols to open the "Device configuration" and select "Base Unit".

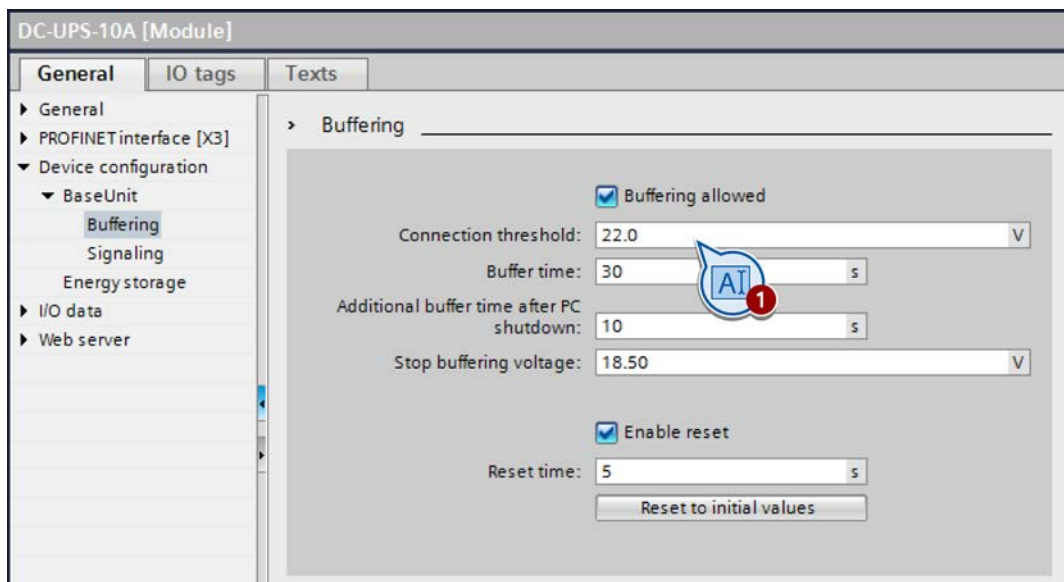


5. Check that the checkbox "Buffering allowed" is selected. Select it if it is deactivated.

Note

If the checkbox "Buffering allowed" is not selected, independent of the following entries, there is **no** buffering.

6. For "Connection threshold", enter the voltage value, which, when it is fallen below the UPS, starts to buffer.



7. Enter the buffer time in "Buffer time".

DC-UPS-10A [Module]

General IO tags Texts

► General
► PROFINET interface [X3]
▼ Device configuration
 ▼ BaseUnit
 Buffering
 Signaling
 Energy storage
► I/O data
► Web server

> Buffering

☒ Buffering allowed

Connection threshold: 22.0 V

Buffer time: 30 s

Additional buffer time after PC shutdown: 10 s

Stop buffering voltage: 18.50 V

☒ Enable reset

Reset time: 5 s

Reset to initial values

8. Enter "Additional buffer time after PC shutdown".

DC-UPS-10A [Module]

General IO tags Texts

► General
► PROFINET interface [X3]
▼ Device configuration
 ▼ BaseUnit
 Buffering
 Signaling
 Energy storage
► I/O data
► Web server

> Buffering

☒ Buffering allowed

Connection threshold: 22.0 V

Buffer time: 30 s

Additional buffer time after PC shutdown: 10 s

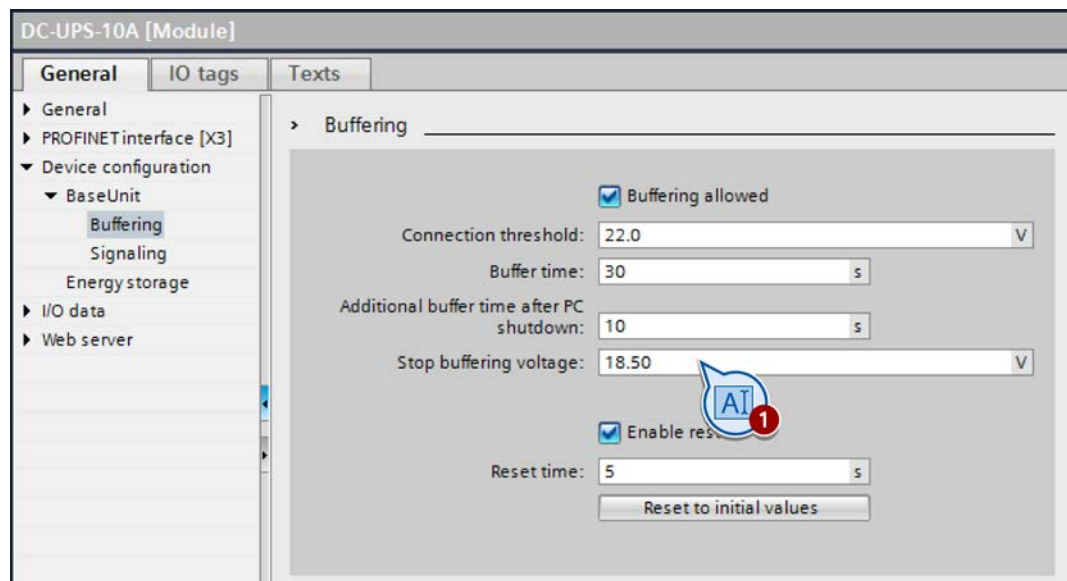
Stop buffering voltage: 18.50 V

☒ Enable reset

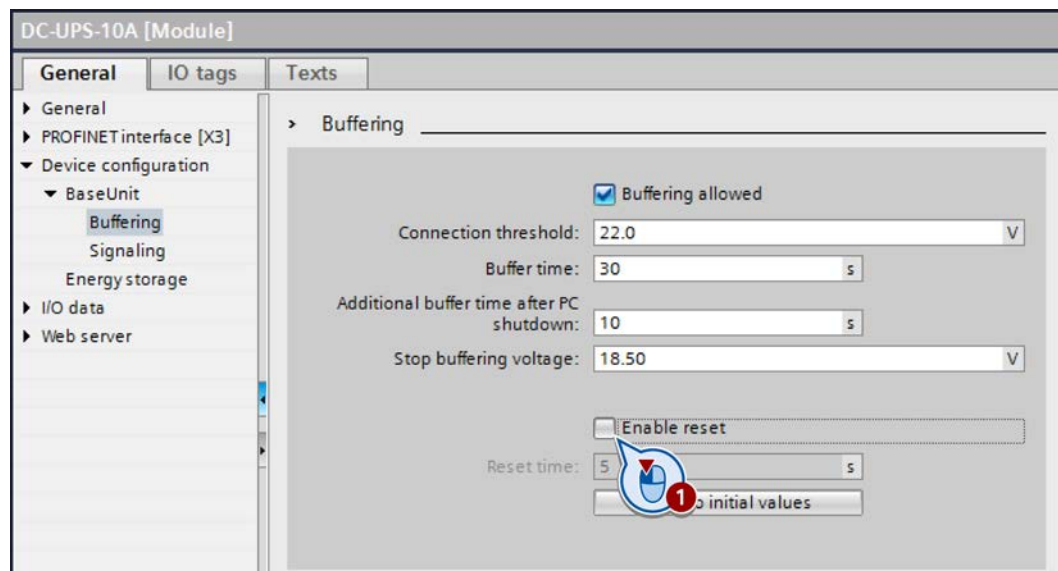
Reset time: 5 s

Reset to initial values

9. Under "Stop buffering voltage" enter the battery voltage value where buffering should be stopped – or accept the standard value of 18.50 Volt.



10. Deactivate the checkbox "Enable reset".



11. Save your project.
12. Load the parameters into the S7 IO controller.

6.2 Switching off the UPS when the power fails by a user program

To switch off the UPS when the power fails, Siemens provides the FB160 function block in the Internet under address (<http://support.automation.siemens.com/WW/view/en/78817848>).

Content of the code block package

Code block	Name	Description
FB160	UPS1600	Function block for program-controlled shutdown of the UPS1600
DB160	UPS160_iDB	Instance data block of the FB160
DB161	UPS1600_Infos	The data block contains all parameters of the UPS1600, which are displayed within the HMI screen block.

FB160 function description

The FB160 function block cyclically monitors the operating mode of the UPS1600. The following actions are executed if the UPS goes into the buffer mode:

- Initially, within the FB160 function block, a timer is started with a time duration of 10 seconds. This prevents that a system is brought into the safe state, even for a short voltage dip / power failure.
- If the UPS1600 is still in the buffer mode after the timer has expired, FB160 parameter "UPS_ready_for_reset" parameter is set from "FALSE" to "TRUE".
In the rest of the program execution, this parameter must be used to set all system sections into a safe state (maintenance setting).
- As soon as the safe state of the system has been established, parameter "UPS_execute_reset" must be set from "FALSE" to "TRUE" using a signal from the program execution.
Function block FB160 then sends a command to the UPS1600, which in turn shuts itself off.

Notes regarding the function

- If the UPS1600 switches back into normal operation while the timer is running, parameter "UPS_ready_for_reset" is not set. The timer is reset again.
- After parameter "UPS_execute_reset" has been set, the rest of the program sequence **must be** executed by function block FB160 until the UPS1600 is shut down.

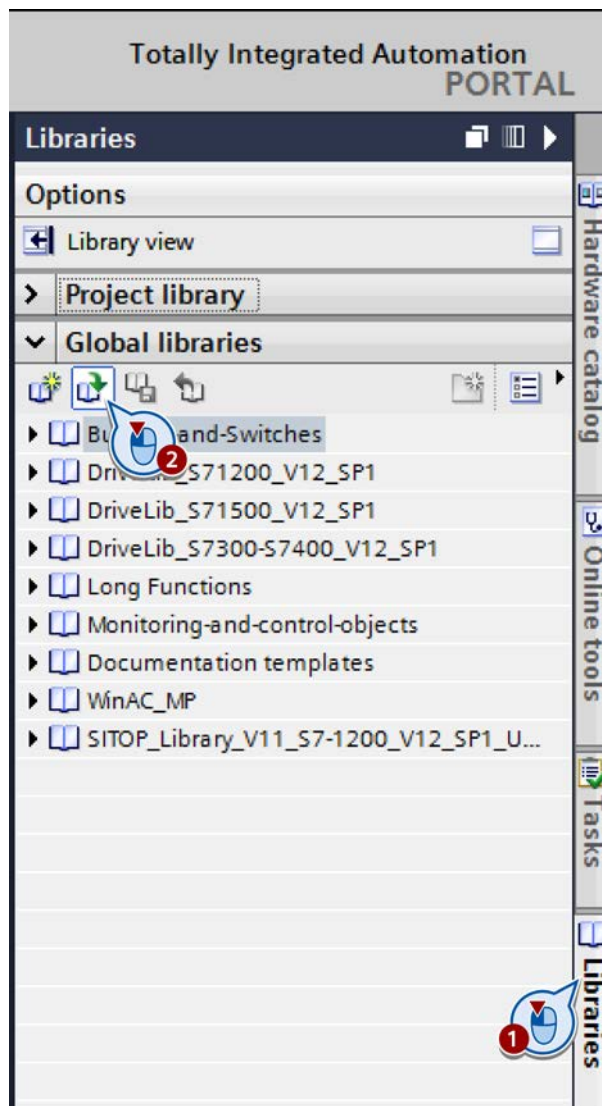
Preconditions

The following preconditions must be fulfilled in order to be able to use function block FB160:

- The library with the function block has been downloaded to the PC.
- The Hardware Support Package (HSP) for the UPS1600 has been installed in STEP 7 V12.
- The UPS1600 has been setup for buffer operation (see Chapter Buffering an S7 IO controller, including the I/O when the power fails (Page 25)).

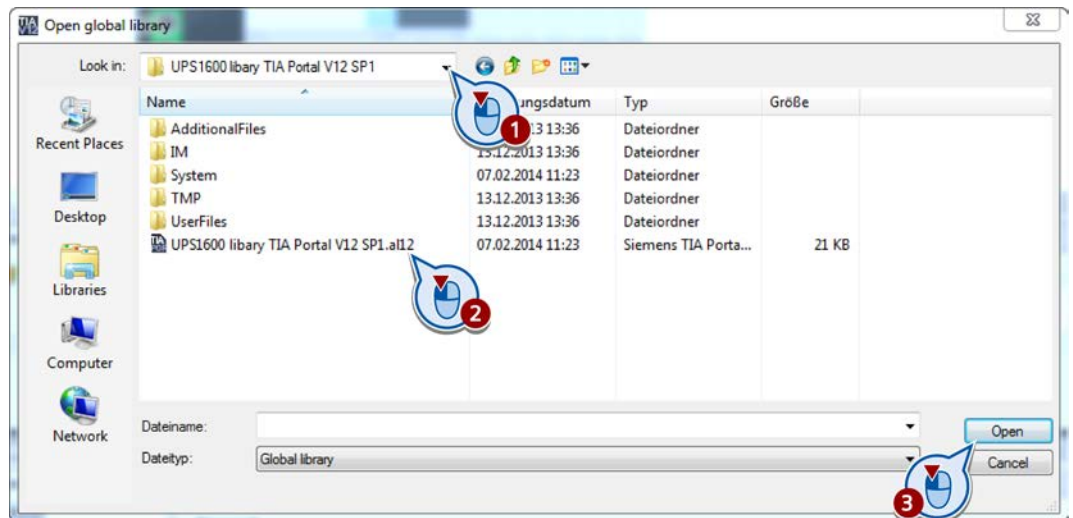
Installing the "UPS1600 library TIA Portal V12 SP1"

1. Open STEP 7 V12 and change to the project view.
2. Open a global library under task card "Libraries".

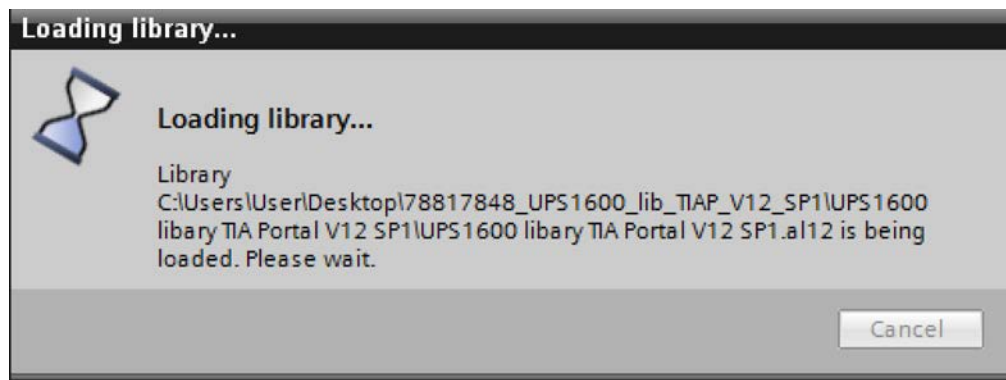


The dialog box "Open global library" is opened.

3. Under "Search in" select the storage location of the code block package that has been downloaded, select library "UPS1600 library TIA Portal V12 SP1" and open this.



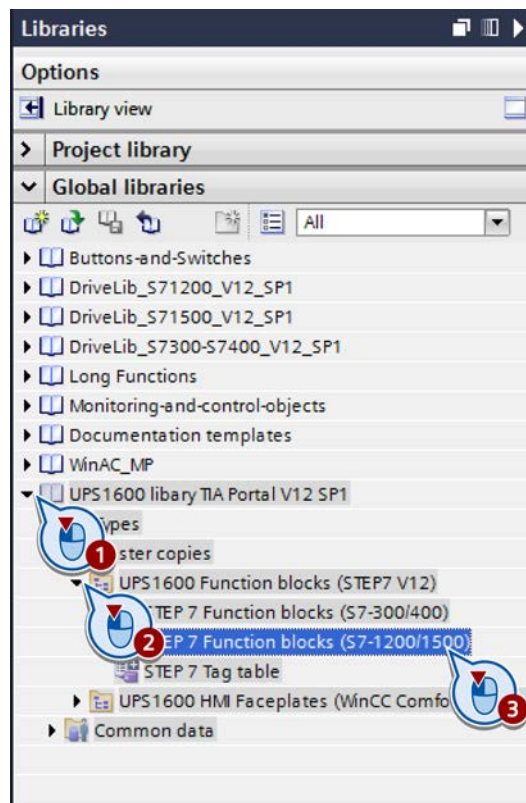
4. The library is loaded.



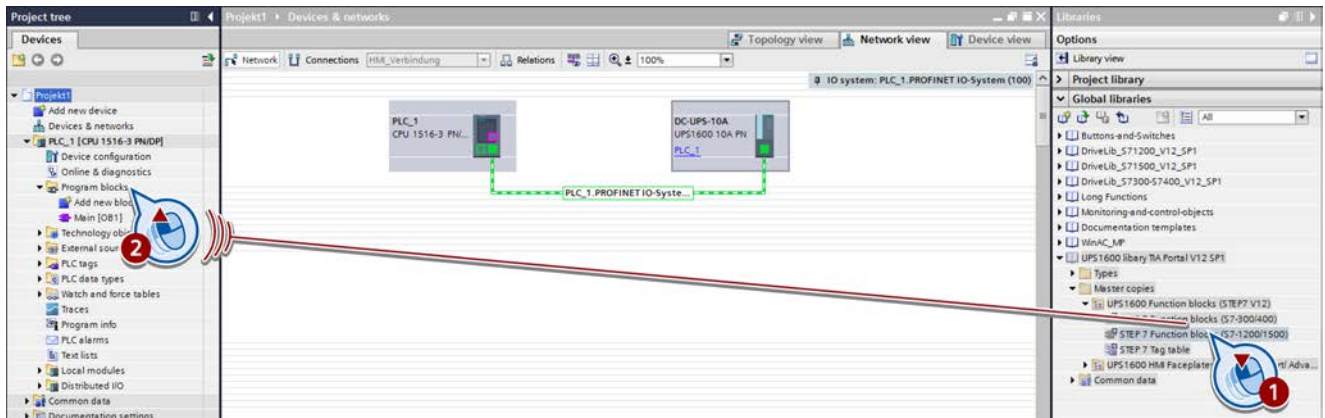
The library is installed and displayed under the palette "Global libraries".

Integrating the library into the program

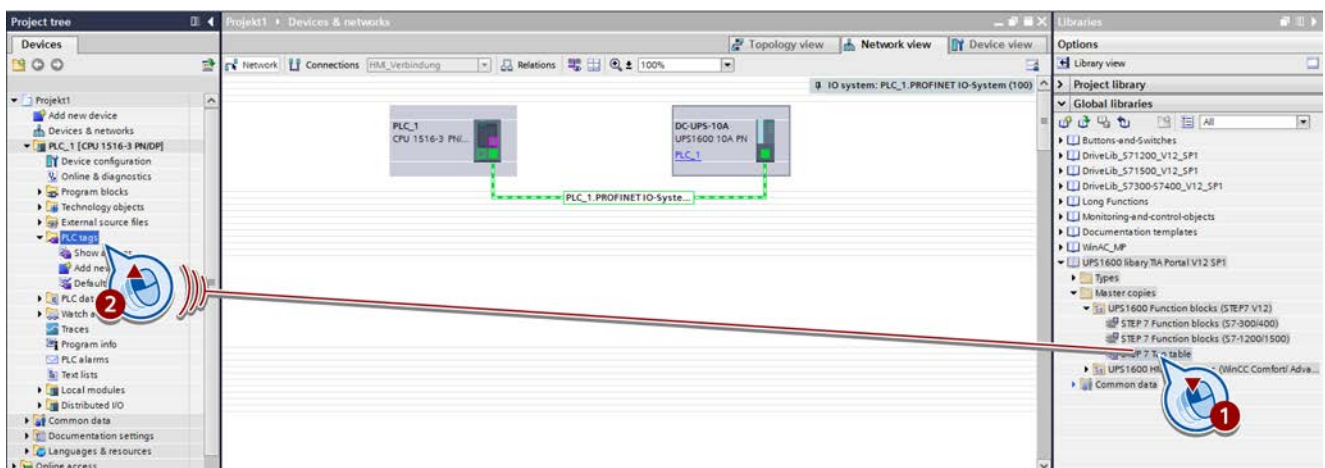
1. Open the project into which function block FB160 should be inserted, and change into the project view.
2. Under global libraries, open the folder "UPS1600 library TIA Portal V12 SP1 > Copy templates > UPS1600 function blocks (TIA V12)" and depending on the S7 IO controller being used, select the appropriate function block folder:
 - IO controller S7-300/400: "STEP 7 function blocks (S7-300/400)"
 - IO controller S7-1200/1500: "STEP 7 function blocks (S7-1200/1500)"



3. Drag the selected folder to the "Program blocks" folder in the project navigation and drop it there.



4. Under global libraries, in the folder "Copy templates > UPS1600 function blocks (TIA V12)", select folder "STEP 7 Tag table" and drag it to the "PLC variables" folder in the project navigation and drop it there.



The library has now been integrated into the program.

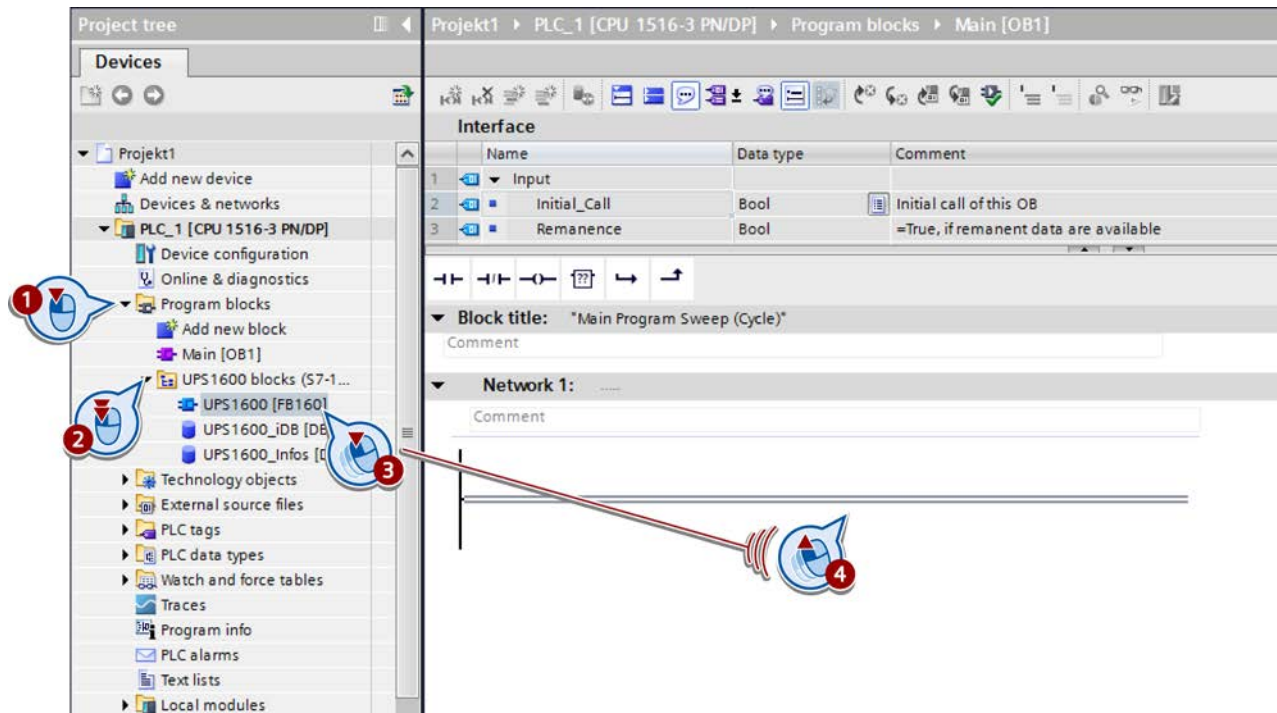
Calling function block FB160

Calling the function block within an organization block (OB) is described in the following. In this case, function block FB1600 is called within organization block OB1.

Note

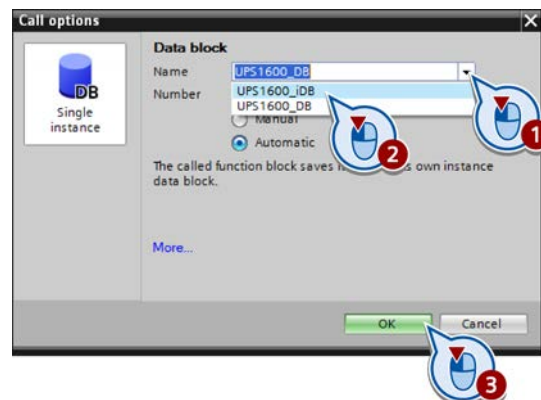
Ensure that the update cycle of the organization block being used has a direct influence on the update time of the function block.

1. Under project navigation, in the "Program blocks", open block "Main [OB1]" and drag it to the function block "UPS1600 [FB160]" in an empty network of block main [OB1] and drop it there.



The "Call options" dialog box opens.

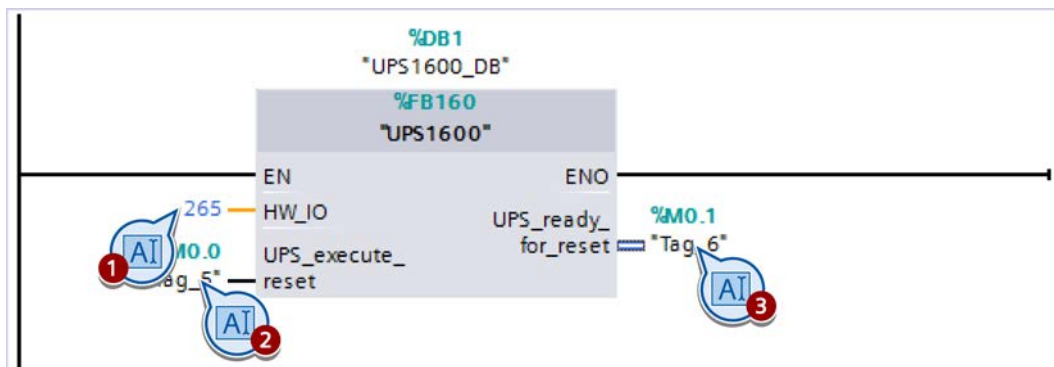
2. Under "Name", select the entry "UPS1600_iDB" and confirm the call options.



6.2 Switching off the UPS when the power fails by a user program

3. At parameter block "HW_IO", enter the hardware ID of the UPS1600 within your project, and connect block parameter "UPS_execute_reset" and "UPS_ready_for_reset" (parameter description, refer to the table below).

Example: The hardware ID of UPS1600 is "265"; for block parameters, the bit memory "M0.0" or "M0.1" is set.



Parameters	Declaration	Data type	Description
UPS_execute_reset	Input	Bool	Shutdown signal at the UPS1600
UPS_ready_for_reset	Output	Bool	Signal to run down the system

4. Save your project.

Adapting the symbol table/address area

When function block FB160 is executed, the cyclic data of address area of UPS1600 is accessed. In this particular case, the required address areas are transferred to the function block via four variables. You must adapt the addresses of these variables corresponding to your selected address area in the symbol table of the code block package.

The following table shows the I/O address area of the UPS1600, which is used within the function block.

Note

You can find the setting of the I/O address area for the UPS1600 in the device configuration of the UPS1600 that you created.

Variable in the symbol table	UPS1600 parameters	Information	Address area in the following example
UPS_Buffer_mode	buffer mode	Buffer mode/ normal mode	%IB 257
UPS_Ready_for_buffering	ready for buffering	Ready for buffering / not ready	%IB 258

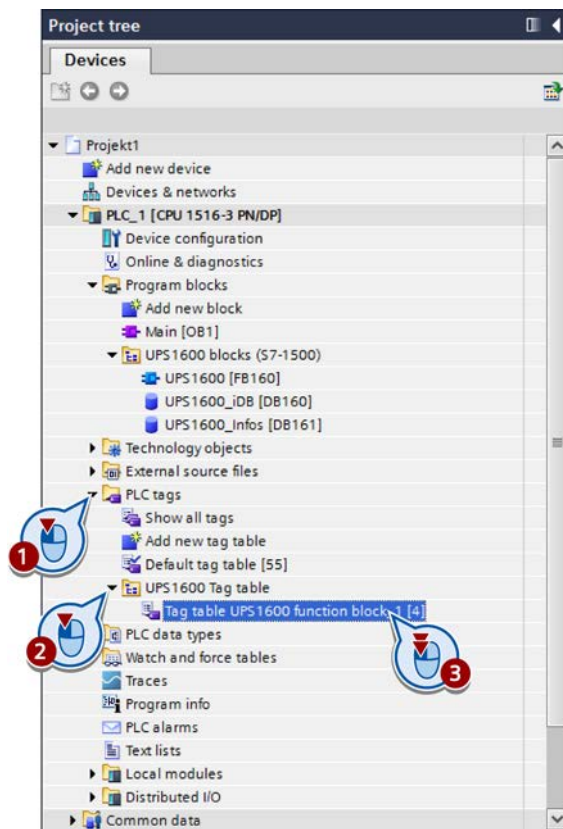
Variable in the symbol table	UPS1600 parameters	Information	Address area in the following example
UPS_New_alarms_pending	New alarms pending	New / no pending alarms	%IB 261
UPS_battery_charge_level	battery_charge level	Charging state of the battery	%IB 262

Note

You can find additional information on the I/O address area of the UPS1600 in the UPS1600 Manual.

Procedure

1. Under project navigation, in folder "PLC variables > UPS1600 Tag table", open the variable table "Tag table UPS1600".



6.2 Switching off the UPS when the power fails by a user program

2. Match the addresses of the following symbols with the selected I/O address areas of the corresponding UPS1600 parameters:

- UPS_Buffer_mode
- UPS_Ready_for_buffering
- UPS_New_alarms_pending
- UPS_battery_charge_level

UPS1600_Test > PLC_1 [CPU 1516-3 PN/DP] > PLC-Variablen > UPS1600 Tag table > Tag table UPS1600 function block_1

Tag table UPS1600 function block_1

	Name	Datentyp	Adresse	Rema...	Sichtb...	Erreic...	Kommentar
1	Tag_1	Byte	%I8257		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PE-Adresse UPS / Buffermode UPS
2	Tag_2	Byte	%I8258		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PE-Adresse UPS / ReadyForBuffering UPS
3	Tag_3	Byte	%I8261		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PE-Adresse UPS / NewAlarmsPending UPS
4	Tag_4	Byte	%I826...		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PE-Adresse UPS / BatteryCharge UPS
5	<add>						

Diagram showing four callouts with 'AI' labels and numbers 1, 2, 3, and 4 pointing to the addresses in the table:

- 1 points to %I8257
- 2 points to %I8258
- 3 points to %I8261
- 4 points to %I826...

3. Save the project and load the parameters into the S7 IO controller.

When the power fails, the user program now switches off the UPS.

