

SIEMENS

SIMATIC

S7-1500
Web server

Function Manual

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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

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Disclaimer of Liability

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

Preface

Purpose of the documentation

This documentation supports you in the operation of the Web server.

The Web server of the S7-1500 CPU and the ET 200SP CPU offer, among other things, web page access to diagnostics data and to process data of the CPU.

Basic knowledge required

The following knowledge is required in order to understand the documentation:

- General knowledge in the field of automation technology
- Knowledge of the industrial automation system SIMATIC
- Experience of working with Windows-based computers
- Knowledge about how to use STEP 7 (TIA Portal)

Scope of validity of the documentation

This documentation is valid for CPUs as of firmware version V1.7 and contains illustrations of the Web server user interface. The illustrations used were prepared for the CPU 1516-3 PN/DP and are applicable to all S7-1500 and ET 200SP CPUs.

The displayed illustrations can differ in their details depending on the browser used.

Changes compared to previous version

Compared to the previous version, this documentation contains the following amendments:

- Information on the use of the Web server for safety-related central processing units
- Integration of a customized home page
- Rules for reading and writing PLC tags when creating user pages

Conventions

- In this documentation, "STEP 7" is used as a synonym for all versions of the configuration and programming software "STEP 7 (TIA Portal)".
- This documentation uses the term "User pages" for the designation "User-defined web pages" that is used in STEP 7 (TIA Portal).

Please also observe notes marked as follows:

Note

A note contains important information on the product described in the documentation, on the handling of the product and on the section of the documentation to which particular attention should be paid.

Additional support

- The range of technical documentation for the individual SIMATIC products and SIMATIC systems is available on the Internet (<http://www.siemens.com/simatic-tech-doku-portal>).
- The online catalog and the ordering system are available on the Internet (<http://mall.automation.siemens.com>).

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. You can find more information about industrial security on the Internet (<http://www.siemens.com/industrialsecurity>).

To stay informed about product updates as they occur, sign up for a product-specific newsletter. You can find more information on the Internet (<http://support.automation.siemens.com>).

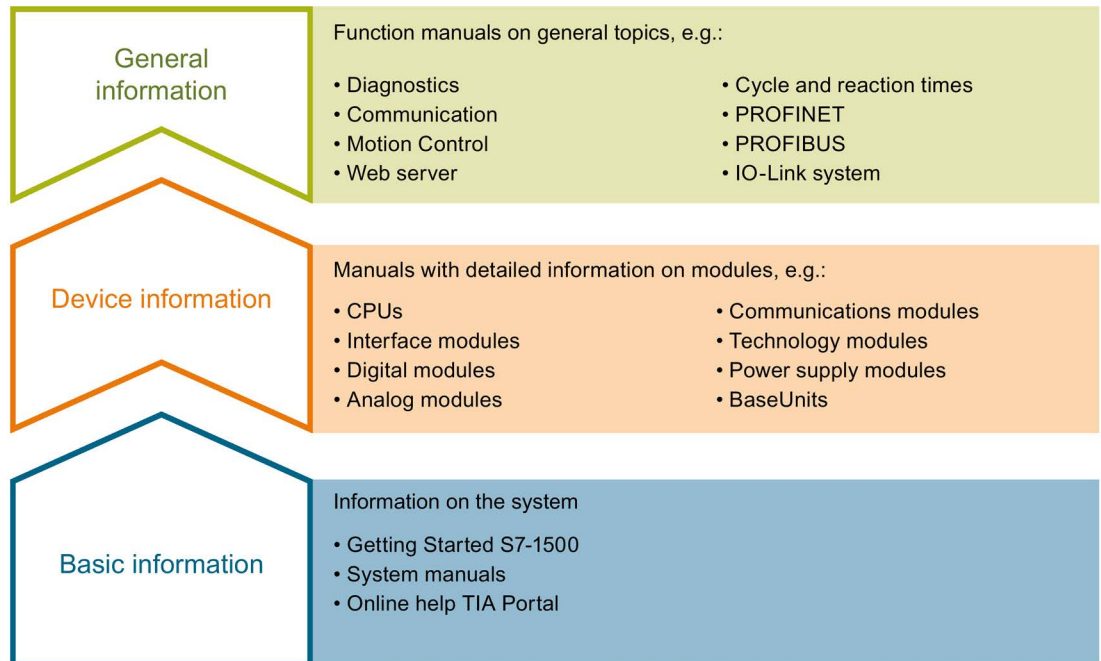
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Documentation guide

The documentation for the SIMATIC S7-1500 automation system and the SIMATIC ET 200MP, ET 200SP and ET 200AL distributed I/O systems is divided into three areas. This division allows you easier access to the specific information you require.



Basic information

System manuals and Getting Started describe in detail the configuration, installation, wiring and commissioning of the SIMATIC S7-1500, ET 200MP, ET 200SP and ET 200AL systems. The STEP 7 online help supports you in the configuration and programming.

Device information

Product manuals contain a compact description of the module-specific information, such as properties, terminal diagrams, characteristics and technical specifications.

General information

The function manuals contain detailed descriptions on general topics such as diagnostics, communication, Motion Control, Web server.

You can download the documentation free of charge from the Internet (<http://w3.siemens.com/mcims/industrial-automation-systems-simatic/en/manual-overview/Pages/Default.aspx>).

Changes and additions to the manuals are documented in product information sheets.

Manual Collections

The Manual Collections contain the complete documentation of the systems put together in one file.

You will find the Manual Collections on the Internet:

- S7-1500/ET 200MP (<http://support.automation.siemens.com/WW/view/en/86140384>)
- ET 200SP (<http://support.automation.siemens.com/WW/view/en/84133942>)
- ET 200AL (<http://support.automation.siemens.com/WW/view/en/95242965>)

My Documentation Manager

The My Documentation Manager is used to combine entire manuals or only parts of these to your own manual.

You can export the manual as PDF file or in a format that can be edited later.

You can find the My Documentation Manager on the Internet (<http://support.automation.siemens.com/WW/view/en/38715968>).

Applications & Tools

Applications & Tools supports you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus in individual products.

You can find Applications & Tools on the Internet (<http://support.automation.siemens.com/WW/view/en/20208582>).

CAX Download Manager

The CAX Download Manager is used to access the current product data for your CAX or CAE systems.

You configure your own download package with a few clicks.

In doing so you can select:

- Product images, 2D dimension drawings, 3D models, internal circuit diagrams, EPLAN macro files
- Manuals, characteristics, operating manuals, certificates
- Product master data

You can find the CAX Download Manager on the Internet (<http://support.automation.siemens.com/WW/view/en/42455541>).

TIA Selection Tool

With the TIA Selection Tool, you can select, configure and order devices for Totally Integrated Automation (TIA).

This tool is the successor of the SIMATIC Selection Tool and combines the known configurators for automation technology into one tool.

With the TIA Selection Tool, you can generate a complete order list from your product selection or product configuration.

You can find the TIA Selection Tool on the Internet

(<http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool>).

General information

2.1 Properties of the Web server

Benefits of the Web server

The Web server lets you monitor and administer the CPU through authorized users by means of a network. This permits evaluation and diagnostics over long distances. Monitoring and evaluation is possible without STEP 7; all you need is a web browser. Make sure that you take appropriate measures (e.g., limiting network access, using firewalls) to protect the CPU from being compromised.

Activating the Web server

The Web server is deactivated in the delivery state of the CPU. This means that you must load a project in which the Web server is activated to enable access using the web browser.

Safety functions

The Web server provides the following security functions:

- Access via secure transmission protocol "https"
- User authorizations you can configure by means of user list
- Enabling for specific interfaces

Web browser

You need a web browser to access the HTML pages of the CPU.

The following web browsers have been tested for communication with the CPU:

- Internet Explorer (Version 8 to 11)
- Mozilla Firefox (Version 22 to 32)
- Google Chrome (version 33 to 38)
- Mobile Safari and Chrome for iOS (iOS 8)
- Android Browser and Android Chrome (JellyBean operating system)

Note

If you access the Web server of the CPU using a communication processor (CP), ensure that the cache (temporary Internet files) is enabled in your browser. Choose the "Automatically" option in the cache settings of your browser.

If the cache is disabled or if a setting other than "Automatically" is made in the cache settings of your browser, this may result in slow access times and incomplete display.

Reading out information

The following information can be read out from the CPU with the Web server:

- Start page with general CPU information (Page 21)
- Information on Diagnostics (Page 25)
 - Identification
 - Memory usage
- Content of the diagnostics buffer (Page 27)
- Module information (Page 28)
- Alarms (Page 37) (without acknowledgment option)
- Information on Communication (Page 39)
 - Important interface parameters
 - Port statistics
 - Display of the communication resources
 - Display of the communication connections
- PROFINET-Topology (Page 45)
 - Display of the actual topology
 - Display of the set topology specified in configuration data
- Tag status (Page 55)
- Watch tables (Page 57)
- User pages (Page 59)
- File browser (Page 88)
- DataLogs (Page 89)
- Reading out service data (Page 90)
- Basic websites (Page 91)

On the following pages you will find detailed information on the HTML pages.

Web access to the CPU via PG/PC, HMI devices and mobile terminal devices

Proceed as follows to access the Web server:

1. Use STEP 7 to download a project to the CPU in which the Web server is enabled.
2. Enable WLAN on the display device and establish a connection to the access point (e.g., SCALANCE W788-1RR or SCALANCE W784-1, etc.).
If you are not working with WLAN, connect the display device (PG/PC, HMI, mobile terminal device, such as tablet PC or smartphone) with the CPU or a communication module using a PROFINET interface.
3. Open the web browser on the display device.
4. Enter the IP address of the CPU in the "Address" field of the web browser in the following format: http://a.b.c.d or https://a.b.c.d (input example: http://192.168.3.141).
The CPU intro page opens. From the intro page you can navigate to additional information. Additional information on access using the secure transmission protocol "https" is available in the section Configuring the Web server (Page 12) in the section "Permit access only with HTTPS only".

For HMI devices operating with the preinstalled Windows CE operating system (V 5.x or earlier), the CPU information is processed in a browser especially developed for Windows CE. The information appears in a simplified format in this browser.

2.2 Configuring the Web server

Requirements

You have opened the properties dialog of the CPU in the STEP 7 project view.

Procedure

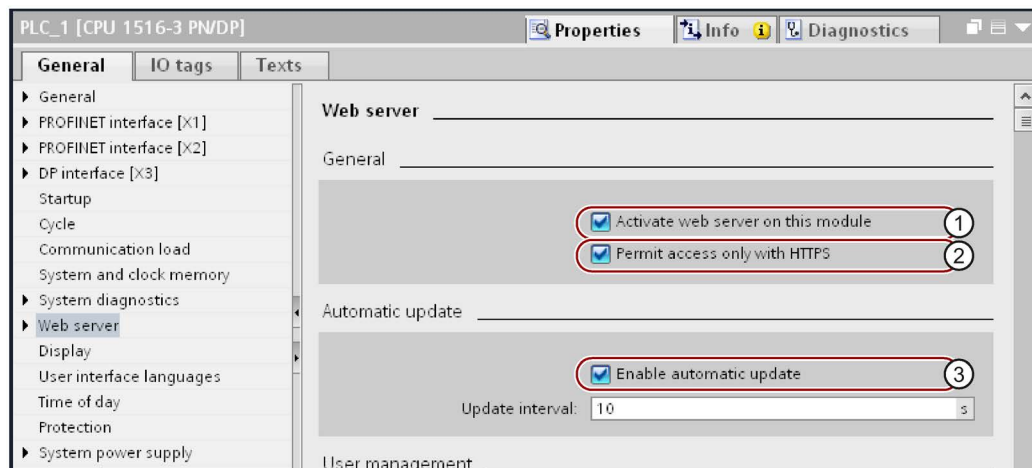


Figure 2-1 Web server settings in STEP 7

To use the full range of functions offered by the Web server, you need to make the following listed settings in STEP 7:

- ① **Activating the Web server**

In the basic setting of a configured CPU, the Web server is disabled. Proceed as follows to enable the Web server:

- Open the "Devices & Networks" view with a double-click in the STEP 7 project tree.
- Select the required CPU in the device view, network view or topology view.
- Navigate to the "Web server" area in the Inspector window properties, "General" tab.
- Select the "Enable Web server on this module" check box.

The following notice is output:

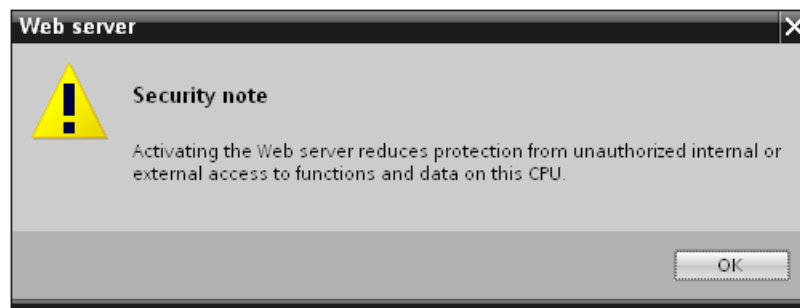


Figure 2-2 Security notice upon activation of the Web server in STEP 7

Note

When projects from deliveries are applied in which the Web server was already activated and configured on the module, this security notice is not shown.

- ② **Permit access only with HTTPS**

The web pages are transmitted by default via insecure connection and are not protected from attacks by third parties. If you always want to transmit web pages and login information to the browser in secure form, enable the "Permit access only with HTTPS" option in the CPU properties. Note that the URL of the CPU starts with "https://" in this case.

For error-free https access to the CPU, the following conditions must be met:

- The current time is set on the CPU.
- The IP address of the CPU is set (example: https://192.168.3.141).
- A valid certificate is installed in the Web browser.

If no certificate is installed, a warning is output recommending that you do not use the page. To view this page, you must explicitly "Add an exception".

A valid certificate (Certification Authority) is available for download from the "Intro" web page, "Download certificate". Instructions for installing the certificate are available in the help system of your Web browser.

Note

To protect against manipulation from the outside, download the certificate only in an environment that is guaranteed not to be compromised. You have to download the certificate once for each display device you are going to use.

- **Access protection**

The certificate establishes an encrypted connection that prevents wiretapping or distortion of the communication but does not provide access protection. This means you have to protect your CPU from unauthorized access with the corresponding configuration in the user administration.

- **③ Automatic updating**

Automatic updating is activated in the basic setting of a configured CPU.

The following web pages are updated automatically:

- Home page
- Memory usage
- Diagnostics buffer
- Module information
- Alarms
- Information about communication
- Topology
- Tag status
- Watch tables
- File browser
- Data logs

Note

The preset update interval is 10 seconds.

Larger amounts of data or several http-/https connections increase the update time.

- **Setting the language for the web**

Activate the project languages you want to use and then select up to two languages for the web. Assign one of the activated project languages to each of the languages for the web.

You can find additional information in section Language settings (Page 18).

- Amending user administration

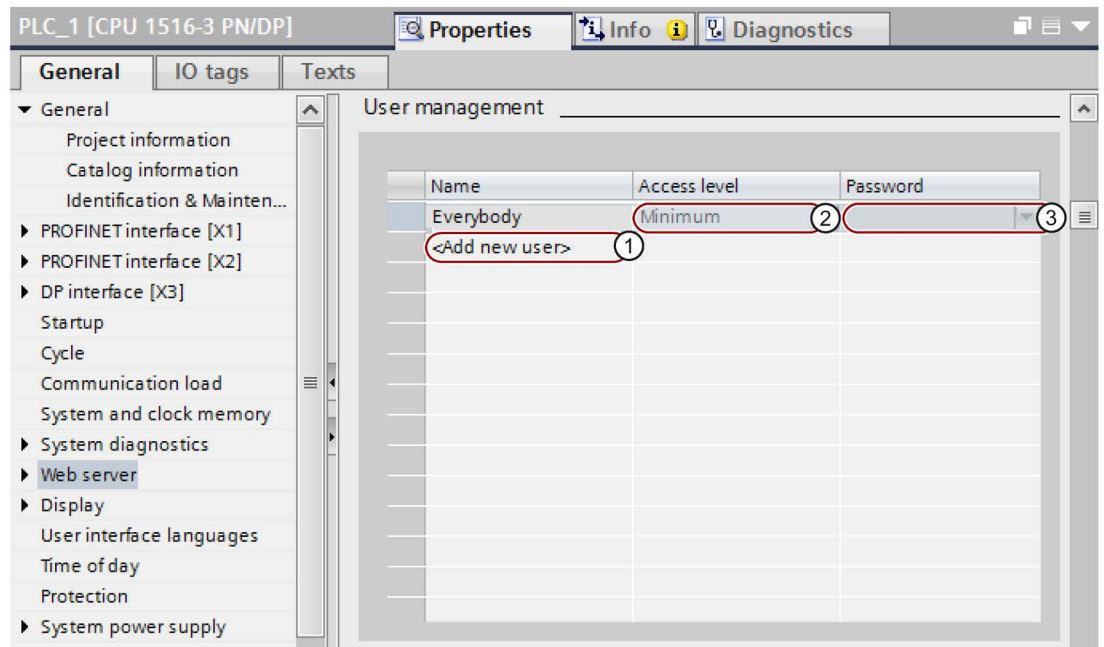


Figure 2-3 User administration in STEP 7

In STEP 7, you can manage the user list in the "Web server > User administration" area.

The user list provides the following options:

- ① Create user
- ② Specify access permissions
- ③ Assign passwords

Users only have access to the options that are permanently linked to the access permissions.

You can assign different user rights depending on the used CPU and firmware.

The available user rights can be available for selection as follows in STEP 7:

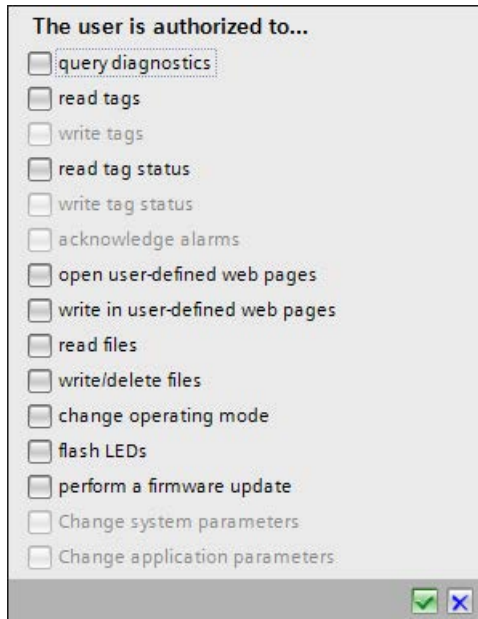


Figure 2-4 Assignment of user rights in STEP 7

If you are not logged in, you automatically access the Web server as the user "Everybody".

It does not matter in this case whether you have configured additional users.

User "Everybody"

A user with the name "Everybody" is preset in the user list; this user has minimum access rights. These are read-only access to the intro page and home page. The user "Everybody" is defined without a password. However, you can assign all access authorizations available in STEP 7 to this user.

You can create a maximum of 20 users and a user "Everybody".

Because the user "Everybody" is defined in STEP 7 without assignment of a password, be careful of the access authorizations which you assign to this user.

Certain authorizations, such as the possibility of changing the operating state, could represent a security risk.

For the assignment of security-relevant authorizations, we recommend that you create a user with password protection in STEP 7.

Passwords should always be more than 8 characters in length and contain uppercase and lowercase characters as well as special characters and numbers (?!+%\$1234...). Computer keyboard character strings and words from the dictionary are unsuitable. Change the password regularly.

If possible, always enable the option "Only permit access via HTTPS".

Note

When assigning rights, note that read access to the watch tables and tag status is retained even if you have cleared the "Permit access with HMI" check box when configuring the data block in STEP 7.

- **User pages**

In the "User pages" area you can download your own web pages to the CPU and make available your own web applications by means of the web browser.

You can find additional information in section User pages (Page 59).

- **Activation of the Web server for specific interfaces**

In the area "Overview of interfaces", you have the option to enable or disable access to the Web server.

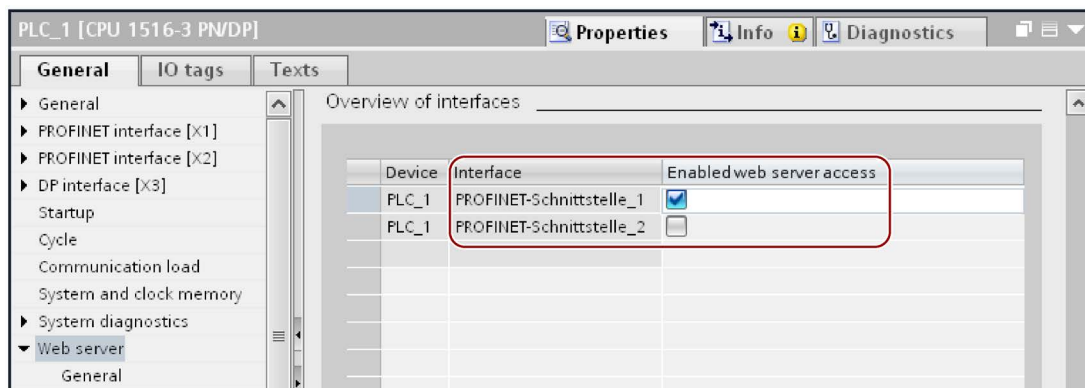


Figure 2-5 Activation of access to the Web server via the interfaces

2.3 Language settings

Introduction

The Web server provides alarms and diagnostic information in the following languages:

- German (Germany)
- English (U.S.)
- French (France)
- Italian (Italy)
- Spanish (traditional sorting)
- Japanese
- Chinese (Simplified)
- Korean
- Russian
- Turkish
- Portuguese (Brazil)

The two Asian languages can be combined as follows:

- Chinese with English
- Japanese with English

Requirements for the availability of the Asian languages

The following requirements must be met for the Chinese and Japanese languages:

- The corresponding support package for East Asian languages is installed on the display device (e.g., PC).
For this purpose, activate the "Install files for East Asian languages" option in the "Regional and Language Options > Languages" tab of the Windows Control Panel.
- STEP 7 for Asian languages is installed on the programming device used to configure the CPU.

Note

Asian languages are not supported for SIMATIC HMI devices with Windows CE operating system.

Requirements for multilingual output of text

The following two language settings must be made in STEP 7 to permit that the Web server displays the different languages correctly:

- Set the Web server interface languages in the properties dialog of the CPU
- Assign one project language each to the selected languages

Note

The project languages you want to assign must be activated and the corresponding texts (translations) must be available in the project. The project languages selection is available in the project tree under "Languages & Resources".

Setting the language for the web

Once you have activated the Web server on your module, set up the interface languages for the Web server and assign them a project language from the drop-down list.

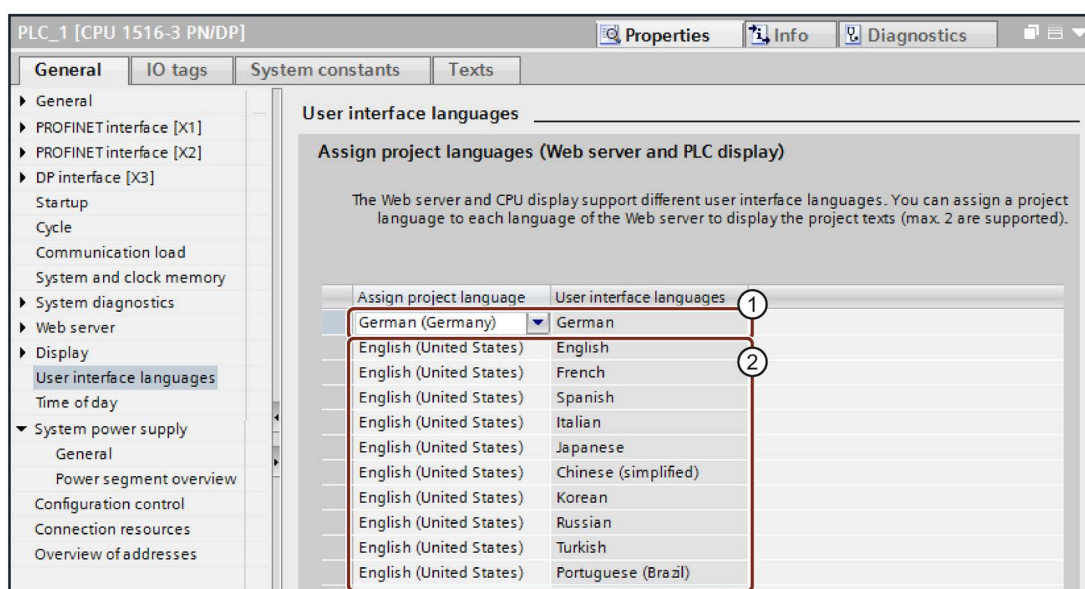


Figure 2-6 Language settings for the Web server in STEP 7

You can also assign all relevant interface languages the same project language:

- ① Project language German for the interface language: German.
- ① Project language English (USA) for the interface language: English (USA), French and all other existing interface languages.

Reference

Additional information on how to set the project language in STEP 7, is available in the online help for STEP 7, keyword: "Selecting project languages".

See also

Configuring the Web server (Page 12)

2.4 Updating and saving information

Updating the screen content


Automatic updating is activated in the default setting. The preset update time is 10 s.

You update the web pages manually with the <F5> function key.

Disabling automatic updating for an individual web page

Click  **Off** to temporarily deactivate automatic updating for a web page.

Note that the deactivation affects only the currently visited web page. Automatic updating is activated again when you change to a different web page.


You reactivate automatic updating by clicking .

Note

If the CPU usage is very high during operation, for example, due to a large number of PROFINET interrupts or extensive communication jobs, the updating of web pages may be significantly delayed for the duration of this high CPU usage.

Saving alarms and diagnostics buffer entries

You can save alarms and diagnostics buffer entries to a csv file for further processing in a spreadsheet calculation program or database program.

Save the data by clicking .

A dialog opens in which you can specify the file name and target directory.

Printing web pages

The Web server offers you a print preview. Click  to open it.

Created printouts always contain the current information in the CPU. This means that is possible that the information in the print preview is more up-to-date than the information in the standard view.

Websites

3.1 Start page with general CPU information

Connecting to the Web server

Set up a connection to the Web server by entering the IP address of the configured CPU in the address bar of the web browser, for example, <http://192.168.3.141> or <https://192.168.3.141>. The connection is set up and the "Intro" page opens.

The examples in the next section provide information about the different web pages.

Intro

The figure below shows the first page (Intro) called by the Web server.



Figure 3-1 Welcome page of the Web server of the CPU 1516-3 PN/DP

Click the ENTER link to go to the Web server pages.

Note

Select the "Skip Intro" check box in order to skip the Intro. As of now, the Web server will take you directly to its home page. You can undo the setting "Skip Intro" by clicking the "Intro" link on the home page.

Home page

Before the log in, the home page offers information as shown in the figure below. The CPU image with LEDs returns the actual CPU status at the time of the data request.

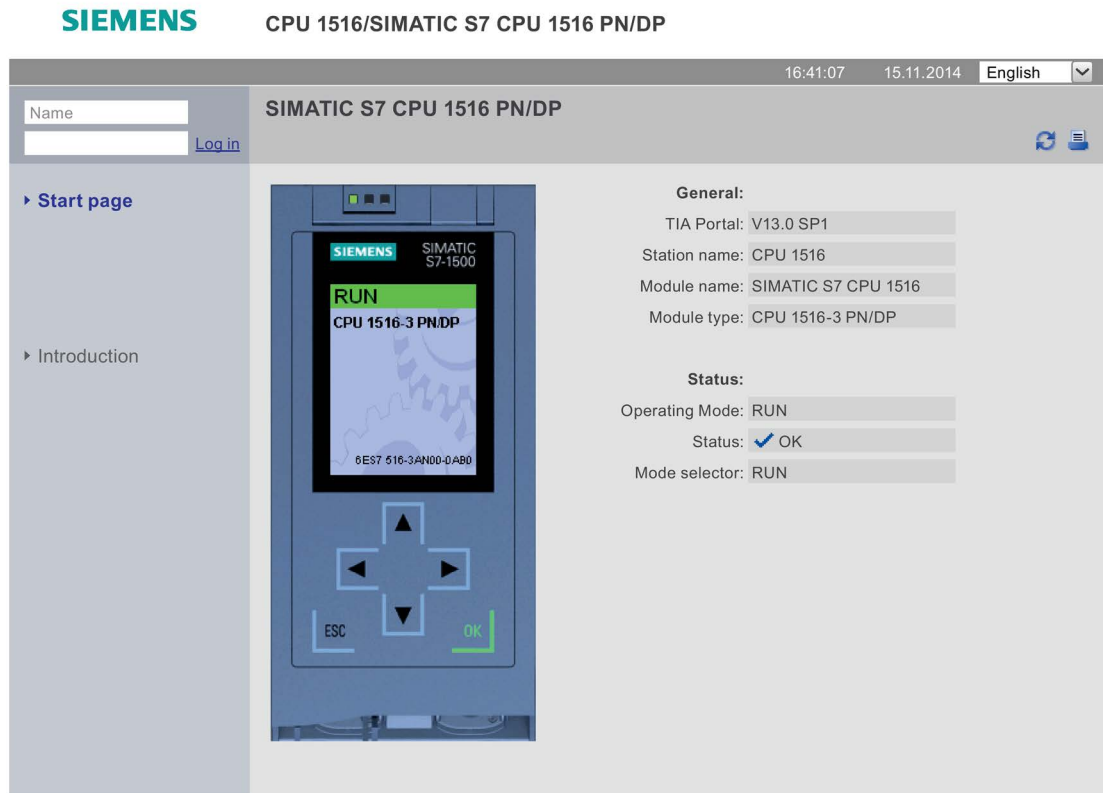


Figure 3-2 Home page before log in

Log in

To use the full functionality of the web pages, you must be logged in. Log in with a user name and password specified in the web configuration in STEP 7. You now have corresponding permissions to access the web pages released for this user. If you have not configured a user, read-only access is granted to welcome and home pages by default.

Note

After carrying out your required actions, log out explicitly from the Web server by clicking "Logout" in order to minimize the risk of unauthorized external access.

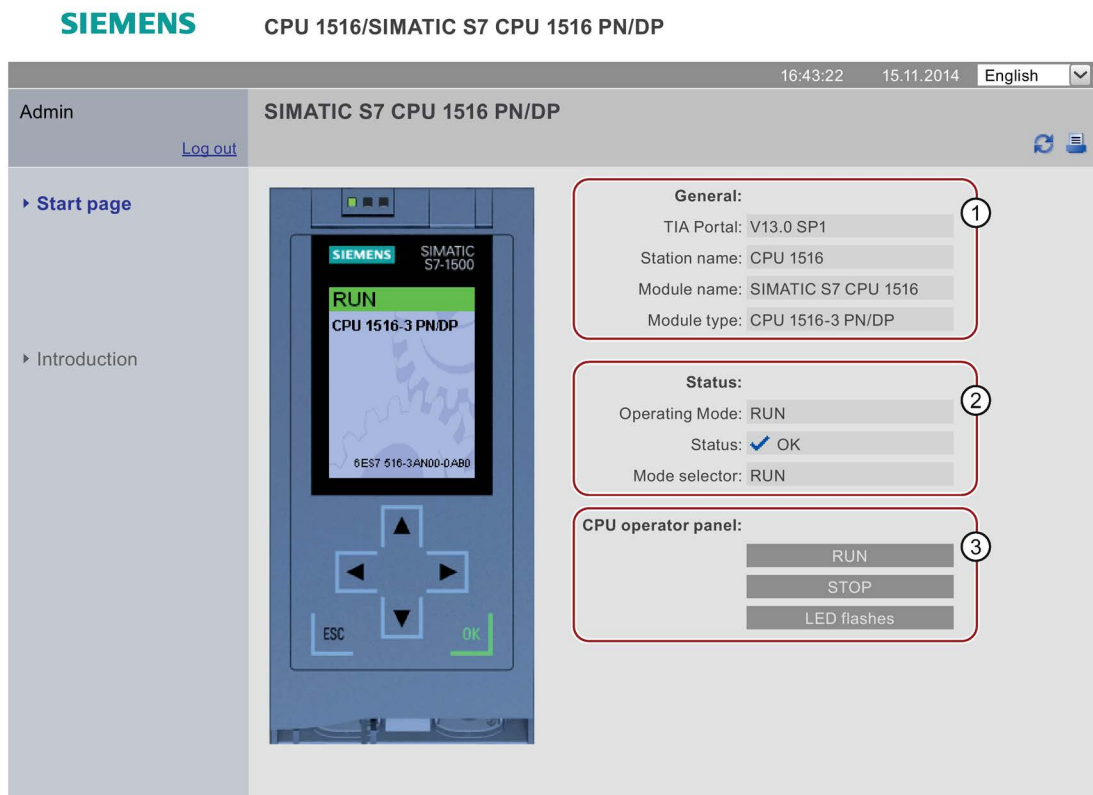


Figure 3-3 Home page after login

① "General"

"General" contains information on the CPU with whose Web server you are currently connected, as well as the version of the TIA Portal with which the CPU was configured.

② "Status"

"Status" contains information about the CPU at the moment of the query.

③ "CPU operator panel"

If you have the necessary access permissions, you can change the operating mode of the CPU ("RUN"/"STOP" buttons) or have the LEDs flash ("Flash LED" button) in the section "CPU operator panel".

Additional information for F-CPUs

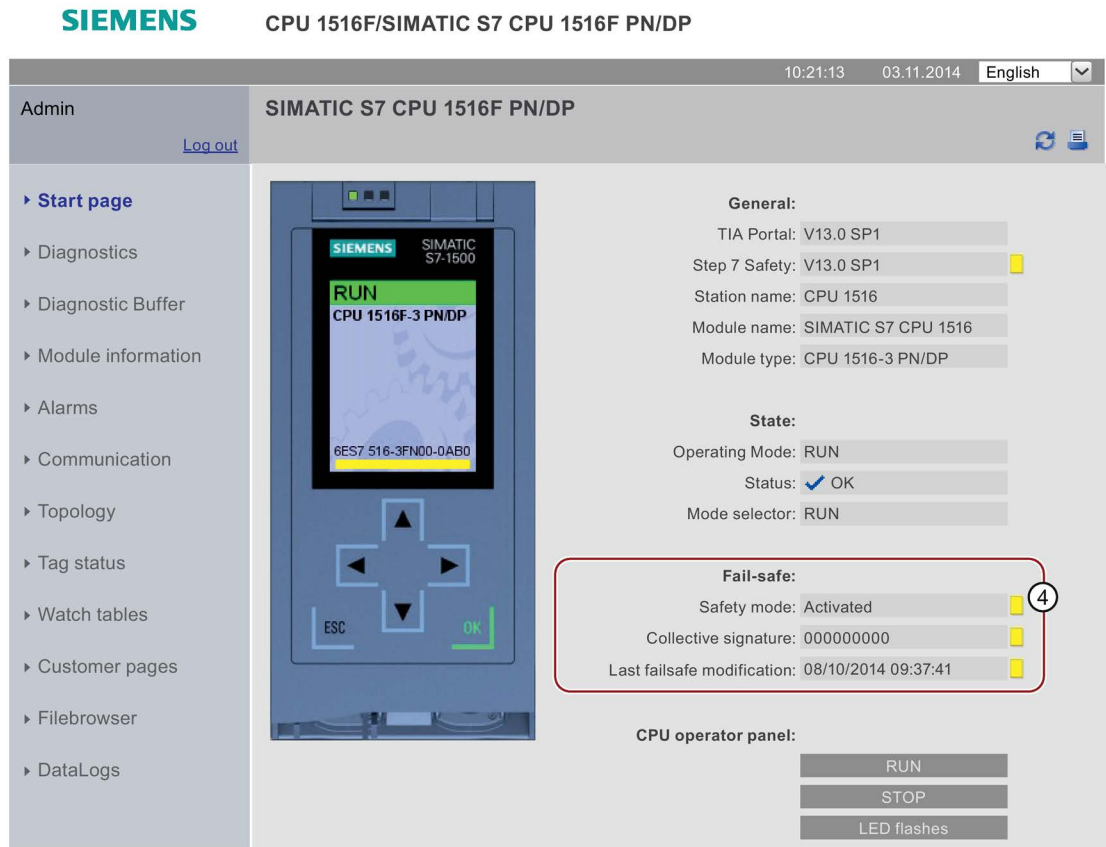


Figure 3-4 Home page after login to the F-CPU

④ Fail-safe

"Fail-safe" contains additional information on the F-CPU.

Reference

You can find additional information in the section Configuring the Web server (Page 12).

3.2 Diagnostics

Overview

The "Diagnostics" web page provides more information about the tabs:

- Identification
- Memory

"Identification" tab

The CPU characteristics are available in the "Identification" tab.

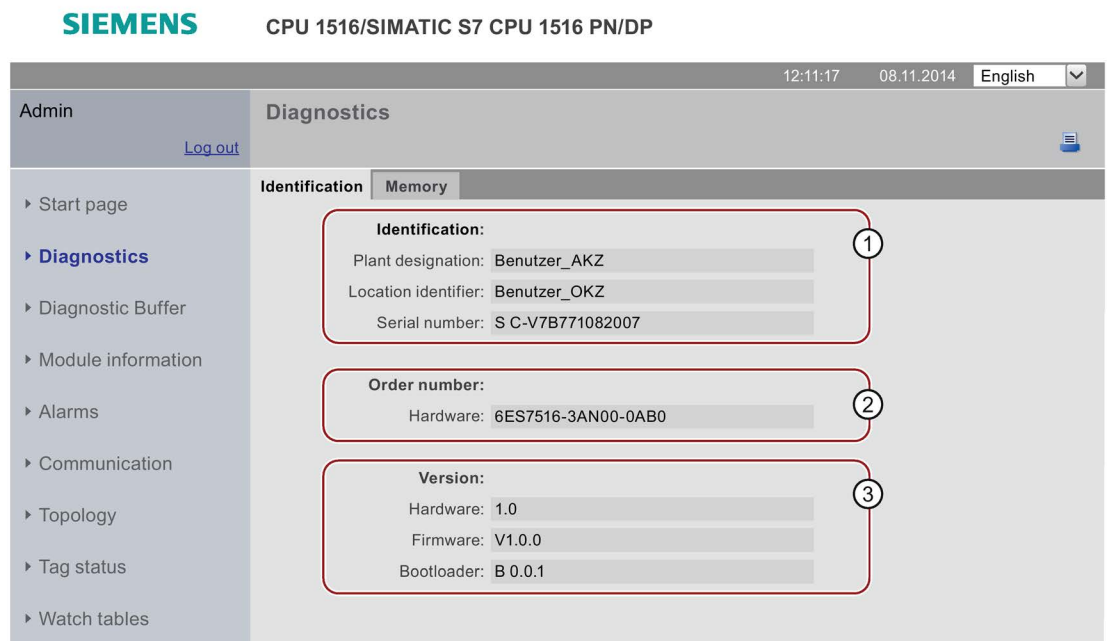


Figure 3-5 Identification

① "Identification"

The "Identification" info box contains the plant and location designation and the serial number. Plant and location designations can be configured in STEP 7 in the properties dialog box of the CPU, in the "General" tab.

② "Order number"

The "Order number" info box contains the order number for the hardware.

③ "Version"

You can find the hardware, firmware and bootloader versions in the "Version" info box.

"Memory" tab

The "Memory" tab contains current values on the memory currently in use.

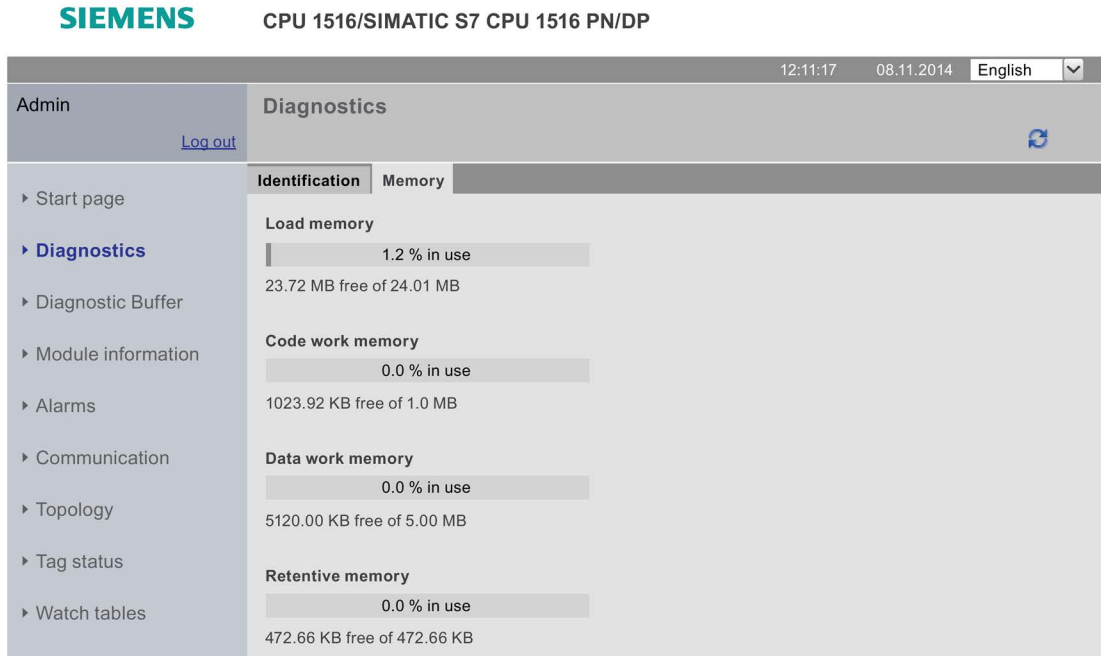


Figure 3-6 "Memory" tab

3.3 Diagnostics buffer

Diagnostics buffer

The browser displays the content of the diagnostics buffer on the "Diagnostics buffer" web page.

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English

Admin [Log out](#)

Diagnostic Buffer

Diagnostic buffer entries 1-50

Number	Time	Date	Status	Event
1	10:45:20:907	13.11.2014	incoming event	Mode transition from STARTUP to RUN
2	10:45:20:905	13.11.2014	incoming event	Request for Automatic warm restart
3	10:45:20:873	13.11.2014	incoming event	Parameter assignment error
4	10:45:20:856	13.11.2014	incoming event	Parameter assignment error
5	10:45:20:834	13.11.2014	incoming event	Mode transition from STOP to STARTUP
6	10:45:16:805	13.11.2014	incoming event	Distributed I/Os: end of the synchronization with a DP ...
7	10:44:57:159	13.11.2014	incoming event	All modules are ready for operation
8	10:42:36:635	13.11.2014	incoming event	Module monitoring time started
9	10:42:36:467	13.11.2014	incoming event	Power on backed up
10	10:42:36:321	13.11.2014	incoming event	Power failure

Details: 1 Event ID: 16# 4302

Mode transition from STARTUP to RUN
 Startup information:
 - Startup with modified system configuration
 - Difference between setpoint and actual configuration
 - Time for time stamp at the last backed up power on
 - Single processor operation
 Current/last startup type:
 - Automatic warm restart after backed up power on
 Permissibility of certain startup types:
 - Manual warm restart permitted
 - Automatic warm restart permitted
 Last valid operation or setting of automatic startup type at power on:
 - Automatic warm restart after backed up power on
 Previous operating mode: STARTUP (warm restart)
 Requested operating mode: RUN
 Incoming event

Figure 3-7 Diagnostics buffer

Requirements

The Web server is activated, languages are set, the text libraries are loaded and the project has been compiled and downloaded with STEP 7.

① "Diagnostics buffer entries 1-50"

The diagnostics buffer can accommodate different numbers of alarms depending on the CPU used.

For information on the maximum number of diagnostics buffer entries, refer to the technical specifications of the relevant CPU.

Select an interval for the entries from the drop-down list. Each interval comprises 50 entries.

② "Event"

The "Event" info box contains the diagnostics interrupts with date and time.

③ "Details"

This field outputs detailed information about a selected event. Select the corresponding event from the ② "Event" info field.

3.4 Module information

Module information

The status of a device is indicated by means of symbols and comments on the "Module information" web page.

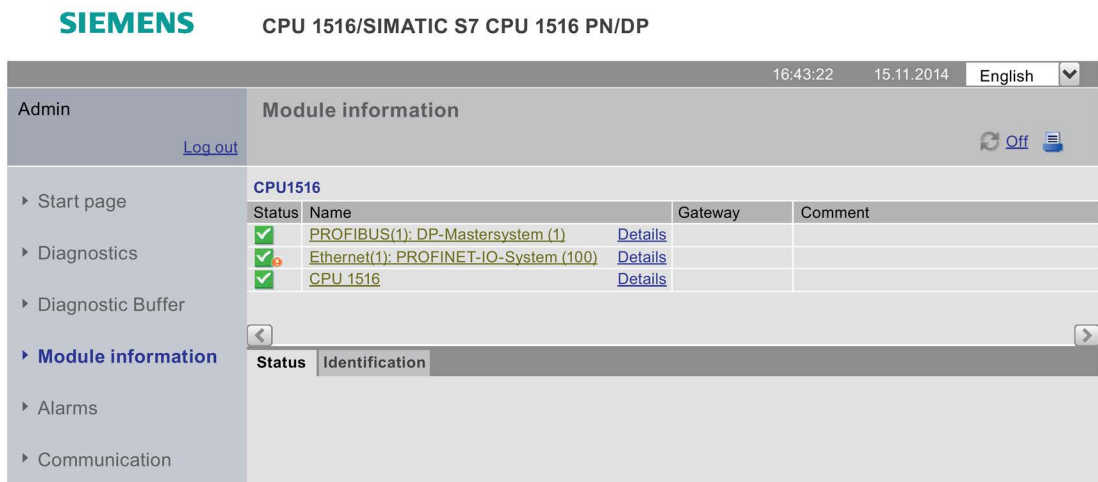











Figure 3-8 Module information

Meaning of the symbols in the "Status" column

Table 3- 1 Meaning of symbols

Symbol	Symbol color	Meaning
	green	Component is OK
	gray	Deactivated PROFIBUS slaves or PROFINET devices.
	gray	State cannot be determined <ul style="list-style-type: none"> • "Status cannot be determined" is displayed during system diagnostics for all configured I/O modules and I/O systems after restart of the CPU. • However, this status can also be displayed temporarily during operation if a diagnostics interrupt burst occurs for all modules. • It is not possible to determine the status of modules on a subsystem that is connected to a CP.
	red	Components "not reachable" "Not reachable" is displayed when a module has been removed or a module has been configured but does not exist.
	black	No input or output data available. Input or output channels of the sub(module) are disabled.
	green	Maintenance required (Maintenance Required)
	yellow	Maintenance demanded (Maintenance Demanded)
	red	Error - component faulty or not available due to an incorrect type
	red	A module in a lower module level does not have the status "Component OK"

Navigation to further module levels

The status of individual components/modules/submodules is displayed when you navigate to the further module levels:

- To the next higher module level using the links in the display of the module levels
- To the next lower module level using the links in the "Name" column

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English

Admin [Log out](#)

1 Module information

2 [CPU1516 - Ethernet\(1\): PROFINET-IO-System\(100\)](#)

Status	Name	Order number	IP Address	Comment
✓	MySCALANCE	6GK5204-0AB00-2BA3	192.168.3.217	Topology
✓	IM155-5PNST	6ES7155-5AA00-0AB0	192.168.3.122	Topology
✓	IM155-6PNST	6ES7155-6AA00-0BN0	192.168.3.123	Topology

3 [Topology](#)

4 [Topology](#)

5 [Details](#)

6 **Module information**

7 **Identification**

8 **Statistics**

Total statistics

Sent data packages:

Sent without errors: 6159

Collision during sending attempt: 0

Canceled due to other errors: 0

Received data packages:

Received without errors: 1435

Rejected due to error: 0

Rejected due to resource bottleneck: 0

Statistics Port 1

Sent data packages:

Sent without errors: 869

Figure 3-9 Navigation to further module levels

① "Module information"

Depending on the selected level, the table contains information about the rack, the DP master system, the PROFINET IO master system, about the devices, the individual modules, as well as the modules or submodules of the device.

② "Display of the module levels"

The links are used to access the "Module information" of the higher module levels.

③ "Topology"

The two web pages, "Topology" and "Module information", are linked. A click on "Topology" of the selected module automatically takes you to this module in the graphic view of the target topology on the "Topology" web page. The module is displayed in the visible area of the "Topology" web page. The device header of the selected module flashes for a few seconds.

④ "IP address"

If a link is available, you can use it to access this Web server of the configured device you selected.

⑤ "Details"

Further information about the selected module is provided in the "Status" and "Identification" tabs via the "Details" link.

⑥ "Status" tab

The tab contains information about the status of the selected module when a fault or alarm exists.

⑦ "Identification" tab

The tab contains data on the identification of the selected module.

Note

This tab displays only the data configured offline of the module.

⑧ "Statistics" tab

The tab is only displayed for PROFINET IO devices and includes the following information on communication statistics of the selected IO device:

- "Total statistics - Sent data packages"
You can assess the quality of the data transmission on the transmit line based on the key data in this info box.
- "Total statistics - Received data packages"
You can assess the quality of the data transmission on the receive line based on the key data in this info box.
- "Statistics port x - Sent data packages"
You can assess the quality of the data transmission on the transmit line based on the key data in this info box.

- "Statistics port x - Received data packages"

You can assess the quality of the data transmission on the receive line based on the key data in this info box.

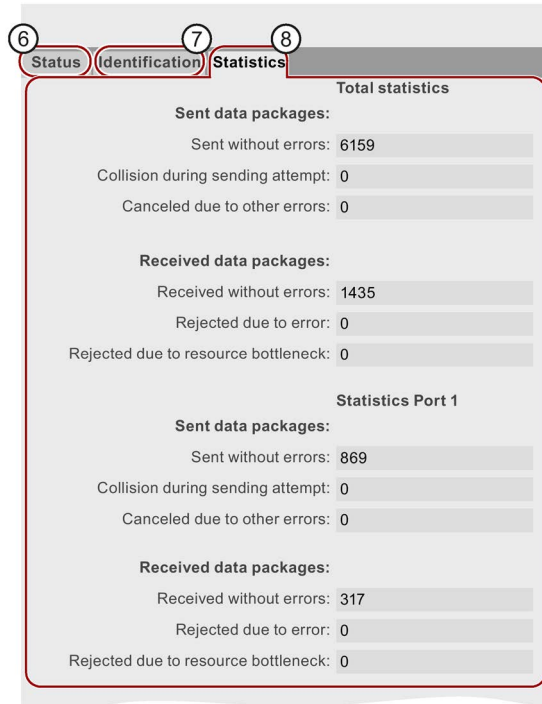


Figure 3-10 Tabs

Reference

You can find additional information in "Statistics" tab in section Communication (Page 39).

Example: Module information - module

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English

Admin [Log out](#)

Module information [Off](#) [Print](#)

[CPU1516 - Ethernet\(1\): PROFINET-IOSystem \(100\) - IM155-5PNST](#)

Slot	Status	Name	Order number	I address	Q address	Comment
0	✓	IM155-5PNST Details	6ES7155-6AA00-0BN0			
1	✓	PS 1505 25Wx24 VDC Details	6ES7505-5KA00-0AB0			...Module PS (3)
2	✓	DI 16x24VDC HF Details	6ES7521-1BH00-0AB0	2		...Module DI (3)
3	✗	DQ 16x24VDC/0.5A ST Details	6ES7522-1BH00-0AB0		5	...Module DQ (3)

Status Identification

PN device 3 on PN system 100 Slot 3: Module removed
 Name: IM155-5PNST Module: DQ 16x24VDC/0.5 ST
 I/O address: Q1

Start page
 Diagnostics
 Diagnostic Buffer
Module information
 Messages
 Communication
 Topology

Figure 3-11 Example: Module information - module

Example: Module information - submodule

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English

Admin [Log out](#)

Module information [Off](#) [Print](#)

[CPU1516 - Ethernet\(1\): PROFINET-...-IM155-5PNST - IM155-5PNST](#)

Slot	Status	Name	Order number	I address	Q address	Comment
X1	✓	MyIM155-5PNST(3) Details	6ES7155-5AA00-0AB0			
X1 P1	✓	MyPort1 (3) Details				
X1 P2	✓	MyPort2 (3) Details				

Status Identification

Start page
 Diagnostics
 Diagnostic Buffer
Module information
 Messages
 Communication
 Topology

Figure 3-12 Example: Module information - submodule

Reference

You can find additional information on the "Module information" in the online help for STEP 7, keyword: "Module information".

3.5 Firmware update

Introduction

You update the firmware as a user with the corresponding access rights on the "Module information" web page at the module level. You will find information on user administration in section Configuring the Web server (Page 12), section "Amending user administration". You use an update file to update the firmware of the CPU, the display of the CPU, or the individual central or distributed modules. Note that all modules you want to update must be compatible with the TIA Portal as of V12.0.

Note

A firmware update is not possible if access is via a mobile terminal device with the "iOS" operating system.

Procedure

The following steps are required to perform a firmware update:

- Click on "Browse" in the Firmware Loader area.
- Select a file on your display device or a storage medium that holds the firmware update to be loaded. The available firmware updates are available on the Service&Support page on the Internet (<http://support.automation.siemens.com>).

CPU 1516/SIMATIC S7 CPU 1516 PN/DP

09:37:53 15.11.2014 English

Admin **Module information** Slot Filter

[Log out](#) **CPU1516 - Ethernet(1): PROFINET-IOSystem (100) - IM155-5PNST** [Off](#) [Menu](#)

Slot	Status	Name	Order number	I address	Q address	Comment
0	✓	IM155-5PNST Details	6ES7155-6AA00-0BN0			
1	✓	PS 1505 25Wx24 VDC Details	6ES7505-5KA00-0AB0	4		
2	✓	DI 16x24VDC HF Details	6ES7521-1BH00-0AB0	2		
3	✗	DQ 16x24VDC/0.5A ST Details	6ES7522-1BH00-0AB0		1	

Status **Identification** **Firmware**

Online data:

Order number: 6ES7521-1BH00-0AB0

Firmware: R6.0.0

Name: DI 16x24VDC HF

Rack: ---

Slot: 2

Firmware loader:

Firmware file: D:\Documents\users\la

Firmware Version: V1.0

Suitable for modules: 6ES7521-1BH00-0AB0

Status: Ready for update ①

②

① Status of the selected firmware file

② Button to execute the update

Figure 3-13 Module information, "Firmware" tab, "Ready for update" status

The Firmware Loader checks the file name of the selected firmware file and outputs the message "Firmware is not suitable" or "Ready for update" in the "Status" line.

- If the status is "Ready for update", click "Run update". If the CPU is in RUN mode during the update, the following message is output:

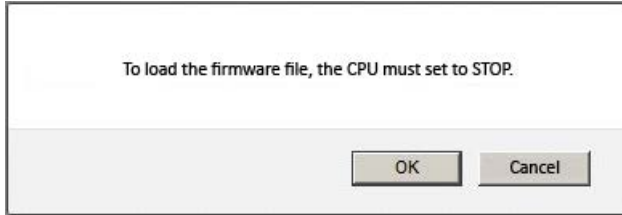


Figure 3-14 Message after clicking "Run update"

Acknowledge the message output by clicking "OK". The CPU is set to STOP mode and the firmware update is executed.

If you click "Cancel", the CPU remains in the current mode and the firmware update is canceled.

- A message informs you about the order number and version ID of the updated firmware once the update is complete.

The CPU is automatically started when the mode selector of the CPU is in RUN and when you acknowledge the message with "OK".

If you click "Cancel", the CPU remains in STOP mode and you can run additional updates.

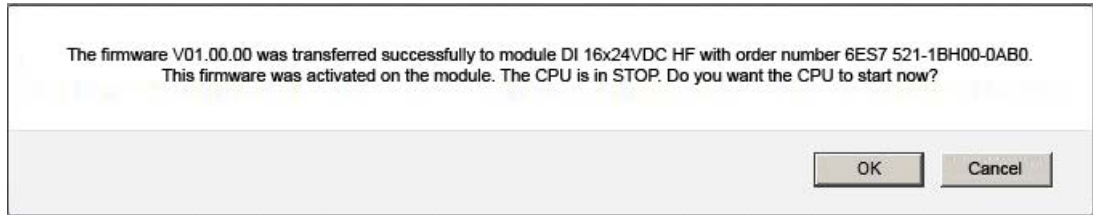


Figure 3-15 Message: Firmware successfully transferred

3.6 Alarms

Alarms

To receive compact information on fault analysis, we recommend that you first read out the content of the alarm buffer. This is the most effective method to get an overview of the pending faults.

The browser displays the content of the alarm buffer on the "Alarms" web page. The alarms cannot be acknowledged on the Web server.

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English

Admin	Messages																																																	
Log out																																																		
<ul style="list-style-type: none"> ▶ Start page ▶ Diagnostics ▶ Diagnostic Buffer ▶ Module information ▶ Messages 	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>MessageNr.</th> <th>Date</th> <th>Time</th> <th>Message text</th> <th>Status</th> <th>Acknowledgement</th> </tr> </thead> <tbody> <tr><td>1</td><td>13.11.2014</td><td>08:23:24.644</td><td>PN device 5 on PN system...</td><td>incoming</td><td></td></tr> <tr><td>2</td><td>13.11.2014</td><td>08:23:24.796</td><td>PN device 4 on PN system...</td><td>incoming</td><td></td></tr> <tr><td>3</td><td>13.11.2014</td><td>08:23:24.948</td><td>PB slave 3 on PB system...</td><td>incoming</td><td></td></tr> <tr><td>4</td><td>13.11.2014</td><td>08:23:25.099</td><td>PB slave 1 on PB system...</td><td>incoming</td><td></td></tr> <tr><td>5</td><td>13.11.2014</td><td>08:23:25.251</td><td>PN device 3 on PN system...</td><td>incoming</td><td></td></tr> <tr><td>6</td><td>13.11.2014</td><td>08:23:25.402</td><td>PN device 2 on PN system...</td><td>incoming</td><td></td></tr> <tr><td>7</td><td>13.11.2014</td><td>08:23:25.553</td><td>PN device 1 on PN system...</td><td>incoming</td><td></td></tr> </tbody> </table>	MessageNr.	Date	Time	Message text	Status	Acknowledgement	1	13.11.2014	08:23:24.644	PN device 5 on PN system...	incoming		2	13.11.2014	08:23:24.796	PN device 4 on PN system...	incoming		3	13.11.2014	08:23:24.948	PB slave 3 on PB system...	incoming		4	13.11.2014	08:23:25.099	PB slave 1 on PB system...	incoming		5	13.11.2014	08:23:25.251	PN device 3 on PN system...	incoming		6	13.11.2014	08:23:25.402	PN device 2 on PN system...	incoming		7	13.11.2014	08:23:25.553	PN device 1 on PN system...	incoming		1
MessageNr.	Date	Time	Message text	Status	Acknowledgement																																													
1	13.11.2014	08:23:24.644	PN device 5 on PN system...	incoming																																														
2	13.11.2014	08:23:24.796	PN device 4 on PN system...	incoming																																														
3	13.11.2014	08:23:24.948	PB slave 3 on PB system...	incoming																																														
4	13.11.2014	08:23:25.099	PB slave 1 on PB system...	incoming																																														
5	13.11.2014	08:23:25.251	PN device 3 on PN system...	incoming																																														
6	13.11.2014	08:23:25.402	PN device 2 on PN system...	incoming																																														
7	13.11.2014	08:23:25.553	PN device 1 on PN system...	incoming																																														
<div style="border: 1px solid gray; padding: 2px;"> <p>Details on message number: 93</p> <p>Short name: SCALANCE-X204IRT Order number: 6GK5204-0BA00-2BA3</p> </div>							2																																											

Figure 3-16 Alarms

Requirements

The alarm texts were configured in the user-specific languages. For information about configuring alarm texts refer to STEP 7 and to the Service&Support pages (<http://www.siemens.com/automation/service&support>).

① "Alarms"

CPU alarms are displayed in chronological order in info box ②, including **date** and **time**.

The **alarm text** parameter is an entry which contains the alarm texts configured for the corresponding fault definitions.

Sorting

You can also view the individual parameters in ascending or descending order. For this purpose, click on one of the parameters in the column header:

- Alarm number
- Date
- Time (of the CPU)
- Alarm text
- Status
- Acknowledgment

The alarms are returned in chronological order when you click the "Date" entry. Incoming and outgoing events are output at the **Status** parameter.

② "Details on alarm number"

You can view detailed alarm information in this info box. Select the corresponding alarm from the info field ②.

3.7 Communication

Overview

The "Communication" web page provides more information about the following tabs:

- Parameters
- Statistics
- Resources
- Connections

① "Parameters" tab

A summary of the information on the PROFINET and Ethernet interfaces of the selected CPU is available in the "Parameters" tab.

The screenshot shows the Siemens SIMATIC Manager web interface for a CPU 1516/SIMATIC S7 CPU 1516 PN/DP. The 'Communication' section is active, and the 'Parameter' tab is selected. The interface displays the following information:

PROFINET Interface [X1]:

Network connection:

- MAC address: 00-0E-8C-84-DE-F0
- Name: PNIO

IP parameter:

- IP Address: 192.168.2.80
- Subnet mask: 255.255.255.0
- Default router: ---
- IP settings: IP address set in project

Physical properties:

Port number	Link status	Settings	Mode	Connection medium
X1 P1	OK	automatic	100 MBit/s full-duplex	Copper cable
X1 P2	OK	automatic	100 MBit/s full-duplex	Copper cable

Figure 3-17 Parameters of the integrated PROFINET and Ethernet interfaces

② "Network connection"

The item "Network connection" includes information for identification of the integrated PROFINET and Ethernet interfaces of the corresponding CPU. The MAC address is located on the CPU above the respective PROFINET or Ethernet interface.

③ "IP parameters"

This parameter includes information on the configured IP address and number of the subnet in which the corresponding CPU is located.

④ "Physical properties"

The following information on the interface hardware is available in the "Physical properties" field:

- Port number
- Link status
- Settings
- Mode
- Connection medium

① "Statistics" tab

Information on the data transmission can be found on the "Statistics" tab.

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English

Admin [Log out](#) Off

Communication

Parameter **Statistics** Resources Connections

Total statistics

Sent data packages:

- Sent without errors: 193241885 Bytes
- Collision during sending attempt: 0
- Canceled due to other errors: 0

Received data packages:

- Received without errors: 17270647 Bytes
- Rejected due to error: 0
- Rejected due to resource bottleneck: 0

Statistics X1 P1

Sent data packages:

- Sent without errors: 193241309 Bytes
- Collision during sending attempt: 0
- Canceled due to other errors: 0

Received data packages:

- Received without errors: 17270647 Bytes
- Rejected due to error: 0
- Rejected due to resource bottleneck: 0

Statistics X1 P2

Sent data packages:

- Sent without errors: 0 Bytes
- Collision during sending attempt: 0
- Canceled due to other errors: 0

Received data packages:

- Received without errors: 0 Bytes
- Rejected due to error: 0
- Rejected due to resource bottleneck: 0

Statistics X2 P2

Sent data packages:

- Sent without errors: 576 Bytes
- Collision during sending attempt: 0
- Canceled due to other errors: 0

Received data packages:

- Received without errors: 0 Bytes
- Rejected due to error: 0
- Rejected due to resource bottleneck: 0

Figure 3-18 "Statistics" tab with key data on data transmission

② "Total statistics - Sent data packages"

You can assess the data transmission on the transmit line based on the key data in this info box.

③ "Total statistics - Received data packages"

You can assess the data transmission on the receive line based on the key data in this info box.

④ "Statistics Port x - Sent data packages"

You can assess the data transmission on the transmit line for each port based on the key data in this info box.

⑤ "Statistics port x - Received data packages"

You can assess the data transmission on the receive line for each port based on the key data in this info box.

① The "Resources" tab

For information about the load of connections on resources, refer to the "Resources" tab.

The screenshot shows the Siemens SIMATIC Manager interface for a CPU 1516/SIMATIC S7 CPU 1516 PN/DP. The 'Communication' section is active, and the 'Resources' tab is selected. The interface displays the following information:

- Number of connections:**
 - Maximum connections: 256
 - Connections not assigned: 253
- Connections:**

	reserved	assigned
ES communication	4	0
HMI communication	4	0
S7 communication	0	0
OpenUser communication	0	0
Web communication	2	3
Other communication	--	0

Figure 3-19 "Resources" tab

② Number of connections

Under "Number of connections", you will find information on the maximum number of connections and the number of connections not assigned.

③ Connections

The item "Connections" provides information on the number of connections reserved or used for ES, HMI, S7, OpenUser, web communication and other communication functions.

① "Connections" tab

The "Connections" tab contains information on the status of the communication connections.

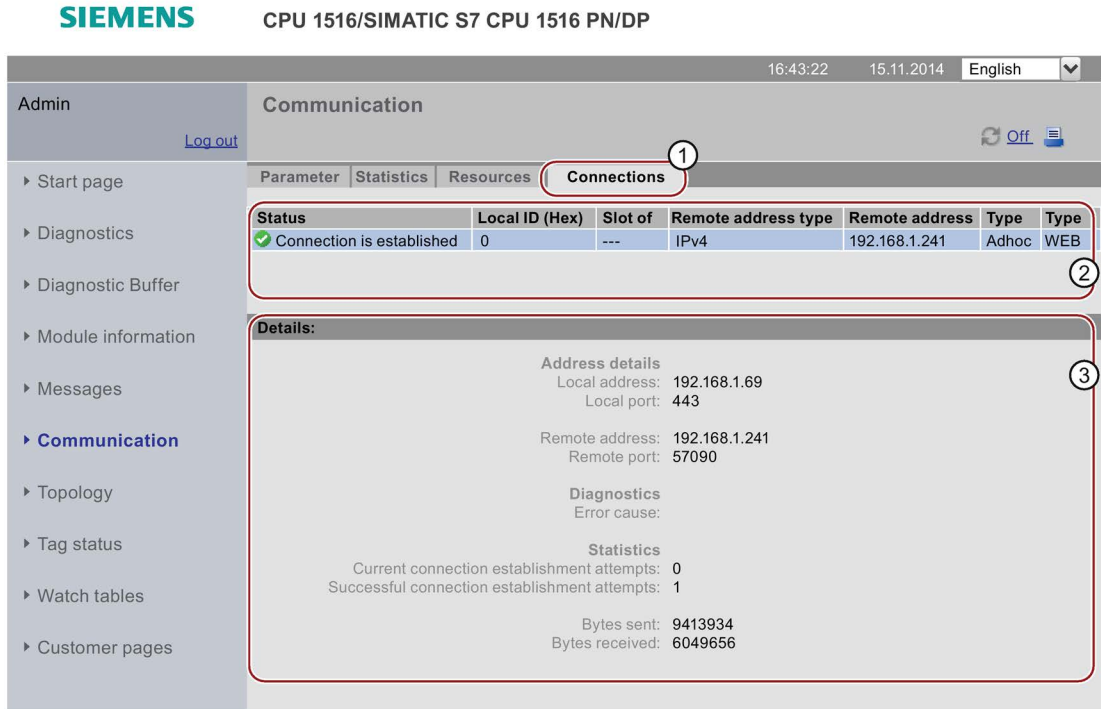


Figure 3-20 "Connections" tab

② Status

Under "Status", you will find an overview of the communication connections being set up and the already set-up communication connections.

For each connection, the table contains the following information: status of the connection, local ID, slot of gateway, remote address (IP address), the corresponding remote address type, method of connection, and type of connection.

③ Details

Under "Details", you will find detailed information about the selected connection.

Reference

For an explanation of the error message displayed when a connection is interrupted or an attempt to establish a connection fails, refer to the STEP 7 online help.

3.8 Topology

3.8.1 Introduction

Topology of the PROFINET devices

The "Topology" web page provides information on the topological configuration and status of the PROFINET devices on your PROFINET IO system.

There are three tabs for the following views:

- Graphical view (target and actual topology)
- Tabular view (actual topology only)
- Status overview (excluding topological correlations)

The tabular view and status overview can be printed. Before printing, use the print preview of your browser and, if necessary, correct the format.

Set topology

The target topology is displayed if you have topologically interconnected the connections in the configuration with STEP 7.

This view identifies the topological assignment of PROFINET devices that have failed, the differences between the target and actual topology, and interchanged ports.

Note

The configured set topology is always displayed by default in the following scenarios:

- When the "Topology" web page is called via the navigation bar
- When you change from the overview of PROFINET IO devices on the "Module information" web page to the "Topology" web page by means of the "Topology" link.

If a set topology was not configured, the actual topology is displayed.

Actual topology

Displays the actual topological layout of the "configured" PROFINET devices of a PROFINET IO system and the directly adjacent, non-configured PROFINET devices (display of the relations, provided these can be determined; but the status of these adjacent PROFINET devices is not displayed).

3.8.2 Graphical view

Requirements

For error-free operation of the topology, the following conditions must be met:

- You completed the Language settings (Page 18).
- In the Topology Editor of STEP 7, you configured the topological interconnection of ports (requirement for display of the set topology and the corresponding topological target connections).
- You compiled the project in STEP 7.
- The project is completely loaded.

Target and actual topology - graphical view

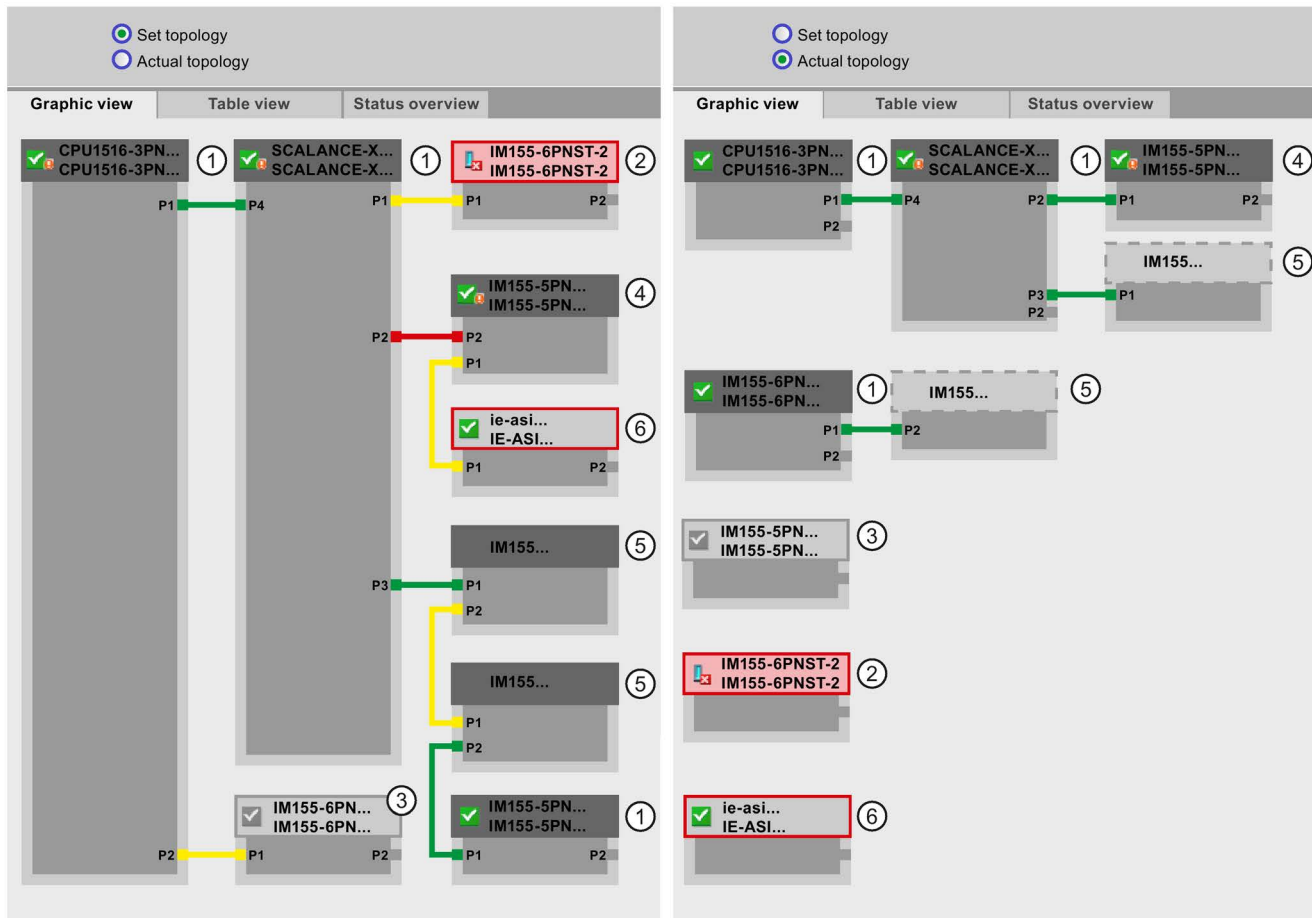


Figure 3-21 Graphical view - Target and actual topology

Meaning of the colored connections in the target/actual topology:

Table 3- 2 Meaning of the colored connections in the target/actual topology

Connection	Meaning	
	Set topology	Actual topology
green	The current actual connection matches the configured target connection.	Connections detected
red	Mismatch between the current actual connection and the configured target connection (e.g., port interchanged).	-
yellow	Connection diagnostics not possible. Causes: <ul style="list-style-type: none"> • Malfunction of communication with a device (e.g., cable was removed) • Connection to a passive component (e.g., switches or cables) • Connection to devices/PROFINET devices on a different IO controller or IO subsystem. 	-

① Configured and accessible PROFINET devices

Configured and accessible PROFINET devices are displayed in dark gray. Connections indicate the ports used to connect the PROFINET devices of a station.

② Configured but inaccessible PROFINET devices

Configured but inaccessible PROFINET devices are indicated in pink color with red frame (e.g., device failure, cable disconnected).

③ Deactivated devices

All deactivated, configured PROFINET devices are displayed in light gray.

④ Interchanged ports

Interchanged ports are highlighted in red color in the set topology view. The actual topology view indicates the actually connected ports, while the set topology view displays the configured target connections.

⑤ PROFINET devices of a different PROFINET IO subsystem

- In the set topology:

A PROFINET device of a different PROFINET IO subsystem is indicated by means of a green link (or red link for interchanged ports) if it is available on the bus and directly adjacent to an accessible configured PROFINET device ①. If the PROFINET device of a different PROFINET IO is inaccessible, it is identified by means of a yellow connecting line.

The connection between two PROFINET devices which both belong to a different PROFINET IO subsystem cannot be identified and is always indicated in yellow color.

- In the actual topology:

The PROFINET device of a different PROFINET IO subsystem is not displayed unless it is directly adjacent to a configured PROFINET device. The PROFINET device is shown in light gray with a dashed line around the device header.

The status of PROFINET devices of a different PROFINET IO subsystem is **not** displayed in the device header.

⑥ Displaying faulty neighbor relationships



Devices from which the relation data could not be read completely or with error are highlighted in light gray with a red frame.

Note

Displaying faulty neighbor relationships

If a device does not have the matching firmware, the relationships cannot be displayed correctly. This means a firmware update of the respective device is required in case a faulty neighbor relationship is displayed.

Views after changes to the configuration

- If a device fails, it remains at the same position in the "Set topology" view. This error state is indicated with a red border around the device header and the icon .
- If a device fails, it is displayed in the "Actual topology" view. This error state is indicated separately in the bottom area with a red border around the device header and the icon .

Link between the "Topology" and "Module information" websites

The two websites, "Topology" and "Module information", are linked. A click on the header of a selected module in the topology view automatically takes you to this module on the "Module information" website.

You can find additional information on this in the chapter Module information (Page 28).

Reference

Additional examples for graphical topology view are available in the chapter Examples for graphical topology views (Page 52).

3.8.3 Tabular view

Topology - tabular view

The "Tabular view" always shows the "Actual topology".

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

16:43:22 15.11.2014 English





Admin		Topology				
Log out		Off				
		Graphic view	Table view	Status overview		
		Port			Partner port	
		Status	Name	Module type	Port	Port
			CPU 1516-3PN/DP	CPU 1516-3PN/DP	port-001	SCALANCE-X-204IRT port-001
			IM155-6PN-2	IM 155-6PN ST		
			IM155-5PN	IM 155-5PN ST	port-001	SCALANCE-X-204IRT port-004
			SCALANCE-X-204IRT	SCALANCE-X-204IRT	port-002	cpux6-7-1xet200mp port-002
					port-001	CPU1516-3PN/DP port-001
					port-002	
					port-003	
					port-004	IM155-5PN port-001
			SCALANCE-X-208	SCALANCE-X-208		
			cpux6-7-1xet200mp		port-002	IM155-5PN port-002

① ②

Figure 3-22 Topology - tabular view









① Meaning of the symbols relating to the status of the PROFINET devices

Table 3-3 Meaning of the symbols relating to the status of the PROFINET devices

Symbol	Meaning
	Configured and accessible PROFINET devices
	Unconfigured and accessible PROFINET devices
	Configured but inaccessible PROFINET devices
	Devices for which neighbor relations cannot be determined, or for which the neighbor relationship could not be read out completely, or only with errors

② Meaning of the symbols relating to the module status of the PROFINET devices

Table 3-4 Meaning of the symbols relating to the module status of the PROFINET devices

Symbol	Color	Meaning
	green	Component is OK.
	gray	Deactivated PROFIBUS slaves or PROFINET devices
	black	State cannot be determined <ul style="list-style-type: none"> For example, "Status cannot be determined" is always displayed while the CPU is in STOP mode, or during startup evaluation of "Report system error" for all configured I/O modules and I/O systems after a CPU restart. However, this status can also be displayed temporarily during operation if a diagnostics interrupt burst occurs at all modules. It is not possible to determine the status of modules on a subsystem that is connected to a CP.
	red	Component failed or is not reachable <ul style="list-style-type: none"> "Not reachable" is displayed for e.g. a module that has been removed or a module that has been configured but does not exist.
	green	Maintenance required (Maintenance Required)
	yellow	Maintenance demanded (Maintenance Demanded)
	red	Error - component faulty or not available due to an incorrect type.
	-	A module in a lower module level does not have the status "Component OK".

Reference

For additional information on the "Report System Error" function, refer to the STEP 7 online help, keyword: "System diagnostics".

3.8.4 Status overview

Topology - status overview

The "Status overview" provides a clear presentation of all PROFINET IO devices/PROFINET devices (without connection relations) on one page. A quick error diagnostics is possible based on the symbols that show the module statuses.

The overview also provides a link of the modules to the "Module information (Page 28)" website.

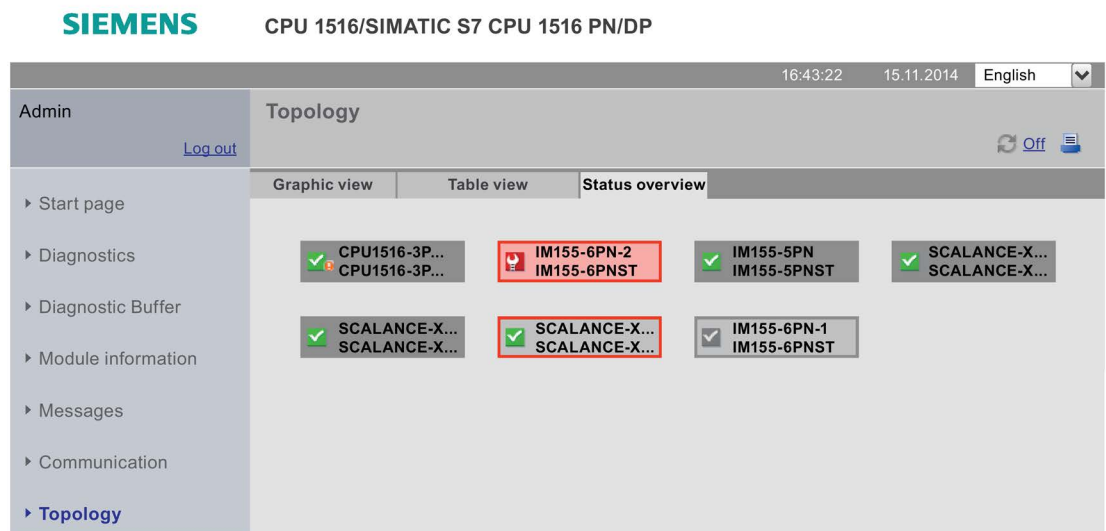


Figure 3-23 Topology - status overview

3.8.5 Examples for graphical topology views

The following section shows, as an example, some displays of the different topology views for a simple project.

"Set topology" is OK

Here you see the connections as they are configured in the topology editor by STEP 7. The configuration and wiring match.

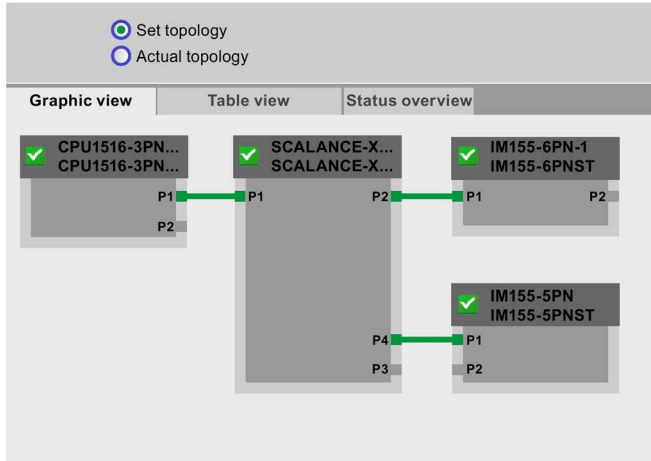


Figure 3-24 "Set topology" is OK

"Actual topology" is OK

Shows the actual layout of all configured devices that can be reached topologically.

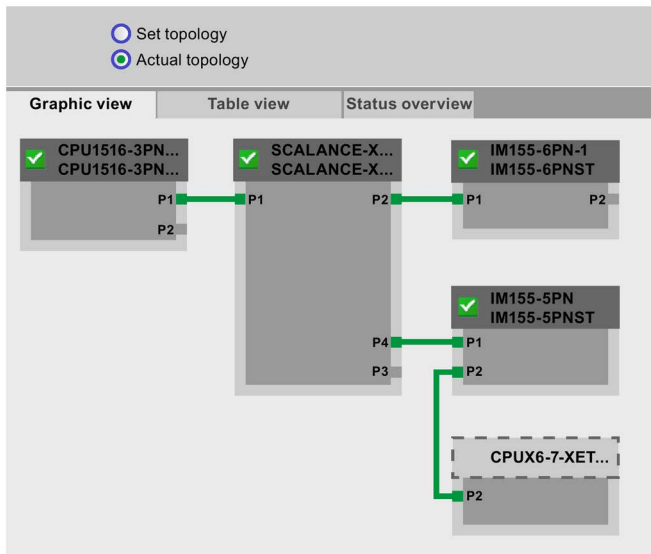



Figure 3-25 "Actual topology" is OK

"Set topology" with failed device

If a device has failed in the meantime, this device remains in the same place in the "Set topology" view. The failed device is displayed with a red border around the device header and the  icon.

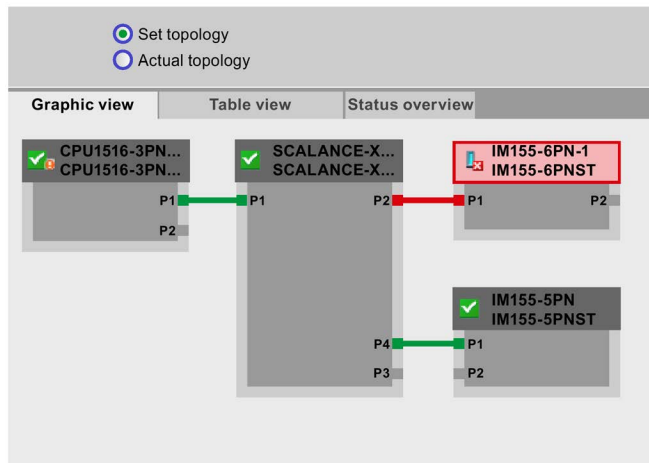



Figure 3-26 "Set topology" with failed device

"Actual topology" with failed device

In the "Actual topology" view, the device that has failed in the meantime is displayed separately in the bottom area of the view. The failed device is displayed with a red border around the device header and the  icon.

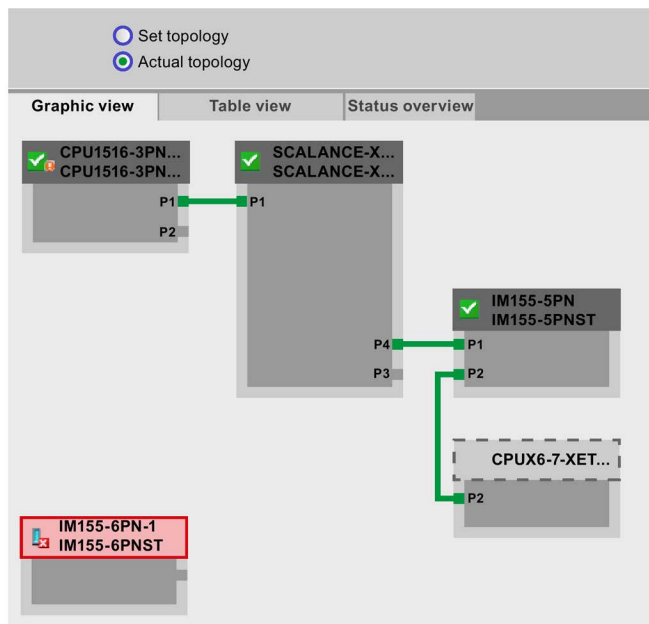


Figure 3-27 "Actual topology" with failed device

"Set topology" with interchanged ports

If a port was interchanged for a configured, directly adjacent PROFINET device, this device remains in the same place in the "Set topology" view. The interchanged connection is indicated by a red line.

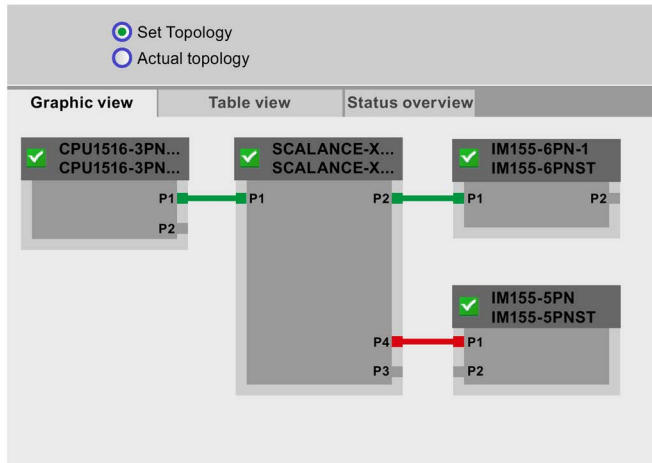


Figure 3-28 "Set topology" with interchanged ports

3.9 Tag status

Tag status

The browser outputs the tag status on the web page of the same name.

Note

Saving the tag status as a bookmark

When the page is exited, the entries made on it are not saved. If you want to monitor the same entered tag again later on, then create a bookmark in your Web browser for the "Tag status" page. Otherwise, you will have to enter the tag again when the page is re-displayed.

If you have defined your user page as home page of the Web server, you cannot access the tag status via the saved bookmarks. You can find more information in the section Defining the user page as home page (Page 76)

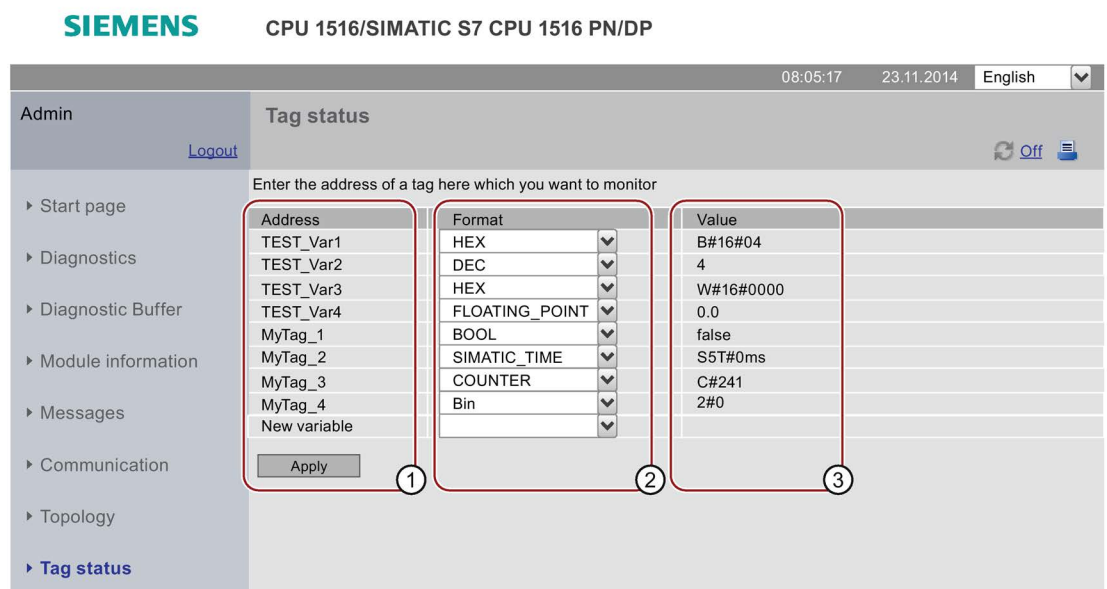


Figure 3-29 Tag status

① "Address"

In the "Address" text field, enter the symbolic address of the tags whose behavior you want to monitor. The input of an absolute address is not permitted. Invalid entries are displayed in red font.

② "Format"

Using the drop-down list box, select the desired display format of the respective tag. If the tag cannot be displayed in the desired format, it will be displayed in hexadecimal format.

③ "Value"

Under "Value", the value of the corresponding operand is displayed in the selected format.

Special considerations when changing languages

You can change the language, e.g., from German to English, in the upper right corner. Note that the German mnemonics differ from those of the other languages.

For monitoring available data types

In principle, data types of PLC tags that can be monitored in the TIA Portal can also be monitored via the Web server.

Note that structured data types such as ARRAY, STRUCT and DTL are not available as data types for PLC tags because of their data volume.

3.10 Watch tables

Watch tables

The browser displays the content of the configured, web-enabled watch tables on the web page of the same name.

Note

If you are monitoring many large watch tables on the Web server, the update time may be increased due to the large data quantities.

The number of watch tables you can monitor depends on the size of the SIMATIC Memory Card used.

If the available memory is exceeded by the configured alarms and tags, only incomplete watch tables will be displayed in the Web browser.

The screenshot shows the Siemens SIMATIC Manager Web browser interface. The page title is "SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP". The interface includes a navigation menu on the left with "Watch tables" selected. The main content area shows a table of watch tables with columns: Name, Address, Format, Value, and Comment. A drop-down menu at the top is set to "VAT_1". Red boxes and numbered circles (1-5) highlight specific elements: (1) the drop-down menu, (2) the "Name" column, (3) the "Address" column, (4) the "Format" column, and (5) the "Value" column.

Name	Address	Format	Value	Comment
"Tag_1"	%I0.0	BIN	2#0	
"Tag_2"	%I0.1	BOOL	FALSE	
"Tag_3"	%Q0.0	BIN	2#1	
"Tag_4"	%Q0.0	BOOL	TRUE	
"Tag_5"	%I3.3	DEZ	0	

Figure 3-30 Watch tables

① Selection

Select one of the configured watch tables from the drop-down list.

② "Name"

The symbolic name of the tag is shown in this info box.

③ "Address"

The address of the tag is shown in this info box.

③ "Format"

Select the display format of the respective tag from the drop-down list.

⑤ "Value"

This column shows the values in the corresponding display format.

3.11 User pages

User pages

In the "User pages" area of the Web server you can upload HTML pages you have created yourself for reading out data of the target system.

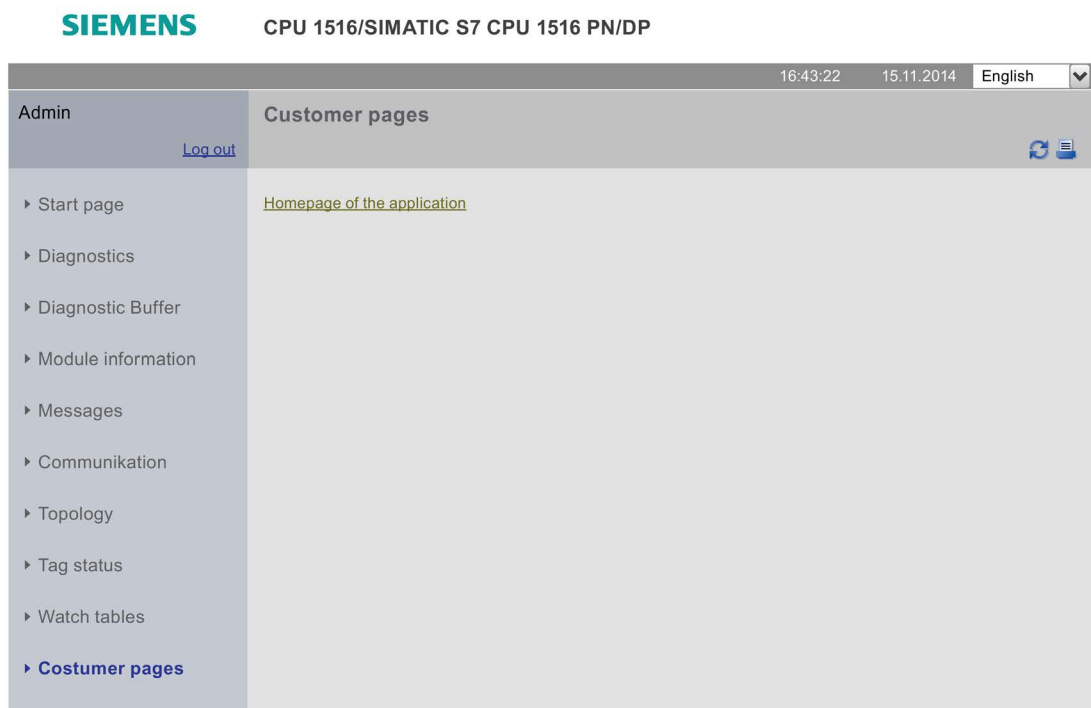


Figure 3-31 User pages

You create the pages with an HTML editor of your choice from which you generate data blocks (Web control DB and Fragment DBs) in STEP 7 and download them to the CPU. The "WWW" instruction synchronizes the user program with the Web server on the CPU and initializes the Web server. With the first call of the "WWW" instruction, the link to the user page is displayed on the web page of the CPU. A click on the link opens the user page in a new window.

Note

Write access to user pages allows the process parameters and, thus, the operation of the CPU to be influenced.

To prevent external manipulation of user pages, always assign a password for users with write access to user pages in the user administration. You will find information on user administration in section Configuring the Web server (Page 12), section "Amending user administration".

Requirements

- You have assigned symbolic names to the tags you want to use on your web page in STEP 7 .
- In the Inspector window under "Properties > General > Web server", you have at least:
 - Activated the Web server
 - Assigned read-only or read and write permissions to the users for user-defined pages (see section Properties of the Web server (Page 10))
- You have completed all necessary communication settings (IP address parameter, subnet mask, etc.).
- You have downloaded the configuration.
- You have created your user page in an HTML editor of your choice:
 - Automatic HTML pages, if you want to **disable** control of the page layout by means of the user program (requires at least one call of SFC 99). Changes in mode from RUN to STOP do not affect the call of the user pages.
 - Manual HTML pages, if you want to **enable** control of the page layout by means of the user program (cyclic call of SFC 99 required).

Creating user pages

You can use any HTML editor to create your own user page(s). Make sure that your HTML code complies with the standards of the W3C (World Wide Web Consortium), because STEP 7 does not check the HTML syntax in any way. In addition to the simple HTML code, you can also use JavaScript commands in your user pages.

Proceed as follows:

1. Create the HTML file for your user page with an HTML editor.
To allow data from the CPU to be read out on your web page, integrate the AWP commands as HTML comments (see section AWP commands (Page 62)).
2. Store the HTML file and all associated source files (e.g., *.gif, *.jpg, *.js, etc.) in a directory on your PG/PC and note the storage path.
3. Call the "WWW" instruction in STEP 7 and program it (see section Programming the WWW instruction (Page 74)).
4. Configure the user page in STEP 7 (see section Configuring user pages (Page 73)). In this way, you compile the contents of your HTML files, among other things, into data blocks.
5. Download the configuration and the user program to the CPU.
6. Open your user page with your display device by means of a web browser in the Web server of the CPU.

Note

Comprehensive HTML pages, especially those with a lot of images, take up a lot of memory in the load memory. Make sure you select a SIMATIC memory card with sufficient memory to provide ample load memory.

Updating user pages

User pages are not updated automatically in the browser. You can program the HTML code so that the pages are updated automatically.

Pages which read out data from the controller, are always up-to-date due to regular updates.

Note

If the HTML page contains form fields for data input, automatic update can impair the correct data input by the user.

To update the entire page automatically, you can add the following instruction in the <head> area of your HTML page, whereby the number "10" stands for the update interval in seconds:

```
<meta http-equiv="refresh" content="10">
```

Reference

The description of a user page is available in the section Example of a user page (Page 78).

Additional help for visualization with user-defined web pages is available in the application examples on the Internet:

- S7-1200 and STEP 7 V11
(<http://support.automation.siemens.com/WW/view/en/58862931>)
- S7-300 / S7-400 and STEP 7 as of V5.5
(<http://support.automation.siemens.com/WW/view/en/44212999>)

You will find more information on JavaScript commands in the ECMAScript specification on the Internet (<http://www.ecma-international.org/ecma-262/5.1/>).

3.11.1 AWP commands

Overview

Automation Web Programming (AWP) commands are a special command syntax for data exchange between CPU and user page (HTML file).

AWP commands are entered as HTML comments and offer the following options for your user pages:

- Reading PLC tags
- Writing PLC tags
- Reading special tags
- Writing special tags
- Defining enum types
- Assigning enum types to tags
- Defining data block fragments
- Importing data block fragments

General syntax

All AWP commands, except for the command for reading a PLC tag, have this structure:
<!-- AWP_< command name and parameter> -->

Files including AWP commands:

- must be UTF-8 encoded.
To define UTF-8 as character set of the page, add the following line to your HTML code:
<meta http-equiv="content-type" content="text/html; charset utf-8">

Note

Saving the HTML page

Make sure that you save the file in the editor in UTF 8 character encoding as well.

- may not include the following sequence:]]>
- may not include the following sequence outside "Reading tag areas" (:=<Varname>): :=
- depending on the use, must identify special characters in tag names or data block names with character escape sequences or quotation marks
- are case-sensitive
- should be additionally enclosed by JavaScript comments ("/*...*/") in JavaScript files

Overview of AWP commands

Table 3- 5 AWP commands

Function	Representation
Reading PLC tags	<code>:=<Varname>:</code>
Writing PLC tags	<code><!-- AWP_In_Variable Name='<Varname1>' --></code>
Reading special tags	<code><!-- AWP_Out_Variable Name='<Typ>:<Name>' --></code>
Writing special tags	<code><!-- AWP_In_Variable Name='<Typ>:<Name>' --></code>
Defining enum types	<code><!-- AWP_Enum_Def Name='<Name Enum-Typ>' Values='0: "<Text 1>",1:"<Text 2>",<...>,x:"<Text y>"' --></code>
Assigning enum types to tags	<code><!-- AWP_Enum_Ref Name='<Varname>' Enum='<Name Enum-Typ>' --></code>
Defining data block fragments	<code><!-- AWP_Start_Fragment Name='<Name>' [Type=<Typ>] [ID=<Id>] --></code>
Importing data block fragments	<code><!-- AWP_Import_Fragment Name='<Name>' --></code>

3.11.1.1 PLC tags

Introduction to PLC tags

User pages can read PLC tags from the CPU and write data to the CPU.

To do so, PLC tags must:

- be enclosed by double quotation marks ("...").
- also be enclosed by single quotation marks (' ... ') or with quotation marks masked with a backslash ("\" ... ").
- be specified by a PLC tag name.
- identify, if the PLC tag name includes the characters \ (backslash) or ' , these characters with the escape sequence \\ or \' as normal characters of the PLC tag name.
- be enclosed with single quotation marks ('...'), if an absolute address (input, output, bit memory) is used in the AWP command.

Reading PLC tags

These out-tags (output direction as seen from the controller) are inserted at any place in the HTML text with the syntax described below.

Syntax

`:=<Varname>:`

<Varname> corresponds to the tag to be read from your STEP 7 project and can be a simple shared tag or a complete tag path to a structural element. Make sure that you use the name of the data block and not its number when you use data blocks.

Examples

```
:= "Conveying speed":  
:= "My_datablock".bitmemory1:  
:= MW100:
```

Reading tags of the String and Character type

Below, these types of quotation marks are used in the explanation: single quotes ('), double quotes (").

As of firmware V1.6, with the "Read PLC tags" function, the CPU outputs tags of the String or Character type enclosed in single quotes to the browser.

For example:

- "Varname".MyString = ABC string tag
- You read the tag in HTML using the function := "Varname".MyString:
- The Web server outputs the character string 'ABC' to the browser

Using String or Character tags in expressions

On your HTML page, you use an expression in which the character string for reading a tag is enclosed in quotes, for example in forms.

Possible HTML code used:

```
<input type="text" name="appfield" value="myvalue">
```

If you read the displayed value for the "value" attribute from a PLC tag in this expression, the HTML code appears as follows:

```
<input type="text" name="appfield" value=":="Varname".MyString:">
```

By reading the PLC tag, the Web server outputs the value 'ABC'. In HTML, the code is then represented as follows:

```
<input type="text" name="appfield" value=" 'ABC' ">
```

If you have used single quotes instead of double quotes in your HTML code to enclose the attributes, the Web server passes on the content of the tags enclosed in two single quotes to the browser. As a result of this, the browser does not output the content of the String or Character tag, since two consecutive single quotes each form a closed sequence. The values to be read are located between these sequences and are not output by the browser.

In this context, note in particular that the character string with double quotes is not identical to two single quotes even if they appear to be identical.

Note

The code is not adapted automatically during an update to firmware as of V1.6.

Adapt your HTML code if you have used single quotation marks to enclose attributes for the "Read PLC tags" function.

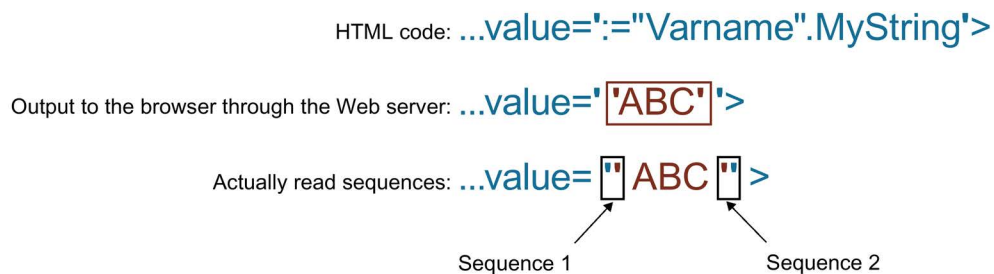


Figure 3-32 Example of HTML code with attribute in single quotation marks

Writing PLC tags

These in-tags (input direction as seen from the controller) are set on the browser page. This can take place in a form on your HTML page, for example, with text input or list selection boxes that correspond to the tags that can be written.

The tags are either set in the HTTP Header (per cookie or POST method) or in the URL (GET method) by the browser in the HTTP request and are then written by the Web server into the respective PLC tag.

Note

Write access during operation

For data to be written from a user page to the CPU, a user must have the required write permissions and be logged on as this user. This applies to all write accesses of web pages to the CPU.

Syntax

```
<!-- AWP_In_Variable Name='<Varname1>' Name='<Varname2>'
Name='<Varname3>' -->
```

If the name of the tag that you are using for the web application is not identical with the name of the PLC tag, you can assign it to a PLC tag with the "Use" parameter.

```
<!-- AWP_In_Variable Name='<Varname_Webapp>' Use='<PLC_Varname>' -->
```

Examples with HTML input boxes

```
<!-- AWP_In_Variable Name='<Target_Level>' -->
<form method="post">
<p>Input Target Level: <input name='<Target_Level>'
type="text"><input type="submit" value="Write to PLC"> </p>
</form>
```

```
<!-- AWP_In_Variable Name='<Data_block_1>.Braking' -->
<form method="post">
<p>Braking: <input name='<Data_block_1>.Braking' type="text"> <input
type="submit" value="Write to PLC"></p>
</form>
```

Examples with HTML drop-down list

```
<!-- AWP_In_Variable Name='<Data_block_1>.ManualOverrideEnable' -->
<form method="post">
<select name='<Data_block_1>.ManualOverrideEnable'>
<option value=1>Yes</option>
<option value=0>No</option>
</select><input type="submit" value="submit setting"> </form>
```

3.11.1.2 Special tags

Special tags

Special tags are mainly the HTTP tags specified in the definitions of the World Wide Web Consortium (W3C). Special tags are also used for cookies and server tags.

Reading special tags

The Web server can read PLC tags and transfer them to special tags in the HTTP response header. You can, for example, read out a path name from a PLC tag to redirect the URL to another storage location with the special tag "HEADER:Storage location".

Syntax

```
<!-- AWP_Out_Variable Name='<Type>:<Name>' Use='<Varname>' -->
```

<Type> corresponds to the type of special tag.

Options are:

- HEADER
- COOKIE_VALUE
- COOKIE_EXPIRES

<Name> corresponds to the name of the HEADER tag or the cookie:

- HEADER tags:
 - Status: HTTP status code (if no other value was set, status code 302 is returned).
 - Location: path for redirection to another page. Status code 302 must be set.
 - Retry-After: time for which the service is most likely not available. Status code 503 must be set.
- COOKIE_VALUE:name: value of the named cookie.
- COOKIE_EXPIRES:name: expiration time of the named cookie in seconds.

Examples

The HTTP HEADER tag is written to the PLC tag of the same name:

```
<!-- AWP_Out_Variable Name='"HEADER:Status"' -->
```

If the name of the special tag is not identical with the name of the PLC tag, you can assign it to a PLC tag with the "Use" parameter:

```
<!-- AWP_Out_Variable Name='"HEADER:Status"' Use='"Status"' -->
```

Writing special tags

The Web server gives you the option to write values of special tags written in the HTTP header in the CPU. You can, for example, save information on the cookie of a user page or on the user that accesses a page in STEP 7.

Syntax

```
<!-- AWP_In_Variable Name='<Type>:<Name>' Use='Varname' -->
```

<Type> corresponds to the type of special tag.

Options are:

- HEADER
- SERVER
- COOKIE_VALUE

<Name> corresponds to the name of the HEADER tag or the cookie:

- HEADER tags:
 - Accept-Language: accepted or preferred language
 - User-Agent: information on the browser
 - Authorization: credentials for a requested resource
- SERVER tags:
 - current_user_id: Indicates whether a user is logged on:
current_user_id=0: No user is logged on / access by "Everybody" user.
current_user_id=1: At least one user is logged on.
 - current_user_name: user name of the logged-on user
- COOKIE_VALUE:name: value of the named cookie.

Examples

The HTTP-SERVER tag is written to the PLC tag of the same name:

```
<!-- AWP_In_Variable Name='"SERVER:current_user_id"' -->
```

The HTTP-SERVER tag is written to the PLC tag "My_userID":

```
<!-- AWP_In_Variable Name='"SERVER:current_user_id"'
Use='"My_userID"' -->
```

3.11.1.3 Enum types

Enumeration types (enum types)

Enum types convert numerical values from the PLC program into texts or vice versa. The numerical values may also be assigned for use with several languages.

Define enum types

You can define enum types in your user pages and assign the values in an AWP command.

Syntax

```
<!-- AWP_Enum_Def_Name='<Name Enum-Typ>' Values='0:"<Text_1>",  
1:"<Text_2>",...,x:"<Text_y>"' -->
```

Examples

To store German values as HTML file in the "de" folder of the HTML directory:

```
<!-- AWP_Enum_Def Name="Enum1" Values='0:"on", 1:"off", 2:"Fault"' -  
->
```

To store English values as HTML file in the "en" folder of the HTML directory:

```
<!-- AWP_Enum_Def Name="Enum1" Values='0:"on", 1:"off", 2:"error"' -  
->
```

Assigning enum types to tags

The assignment of tags from the user program to the individual enum types takes place by means of a separate AWP command. The used tag can be used at a different location of the user pages in a read operation or in a write operation.

For a read operation, the Web server replaces the value read from the CPU with the enum text value defined correspondingly. For a write operation, the Web server replaces the defined enum text value with the corresponding integer value of the enumeration before the value is written to the CPU.

Syntax

```
<!-- AWP_Enum_Ref_Name='<Varname>' Enum="<Enum-Type>" -->
```

<Varname> is the symbolic tag name from the user program; <Enum-Type> the previously specified name of the enum type.

Example for a declaration

```
<!-- AWP_Enum_Ref_Name='"Alarm"' Enum="AlarmEnum" -->
```

Example for use when reading a tag

```
<!-- AWP_Enum_Def Name='AlarmEnum' Values='0:"No alarms",
1:"Container is full", 2:"Container is empty"' -->
<!-- AWP_Enum_Ref Name='"Alarm"' Enum="AlarmEnum" -->
...
<p> The current value of "Alarm" is := "Alarm": </p>
```

If the value of "Alarm" in the CPU is 2, the HTML page shows 'The current value of "Alarm" is container is empty' because the definition of the enum type assigns the numerical value 2 to the character sequence "Container is empty".

Example for use when writing a tag

```
<!-- AWP_Enum_Def Name='AlarmEnum' Values='0:"No alarms",
1:"Container is full", 2:"Container is empty"' -->
<!-- AWP_In_Variable_Name='"Alarm"' -->
<!-- AWP_Enum_Ref Name='"Alarm"' Enum="AlarmEnum" -->
...
<form method="post">
<p><input type="hidden" name ="Alarm" value='Container is full'
/></p>
<p><input type="submit" value='Set container is full' /></p>
</form>
```

The value 1 is written to the PLC tag "Alarm" because the definition of the enum type assigns the numerical value 1 the text "Container is full".

Keep in mind that the name specified in "AWP_In_Variable" must be exactly the same in "AWP_Enum_Ref".

3.11.1.4 Fragments

Fragments

Fragments are "short paragraphs" of a website that the CPU processes separately.

Fragments are usually entire pages, but they can be individual elements, such as files (e.g. images) or documents.

Note

In each fragment in which enum texts are referenced by a PLC tag, this PLC tag must be assigned to the enum type name with the appropriate AWP command.

Defining fragments

A fragment extends to the beginning of the next fragment or to the end of the file.

Syntax

```
<!-- AWP_Start_Fragment_Name='<Name>' [Type="<Typ>"] [ID="<Id>"] -->
```

This command specifies the start of a fragment.

- <Name> Specifies the name of the fragment. The name must start with a letter [a-zA-Z] or an underscore (_). This first character can be followed by letters, underscores or numbers [0-9].
- <Type> Specifies the type of the fragment.
 - "manual": The user program is notified of the request for a fragment and can react accordingly. The function of the fragment must be controlled with STEP 7 and the tags of the control DB.
 - "automatic": The page is automatically processed (default)
- <Id> You can specify a numerical ID for the fragment. If no ID is assigned, the fragment is automatically assigned an ID. For manual pages (<Type>=manual), the fragment can be addressed with this ID in the user program of the CPU.

Note

ID assignment

Set the ID as low as possible because the highest ID influences the size of the Web control DB.

- <Modus>
 - "visible": The contents of the fragment are displayed on the user page (default).
 - "hidden": The contents of the fragment are **not** displayed on the user page.

Importing fragments

You can specify a fragment in an HTML page and import this fragment into other websites.

Note

Ensure that no AWP command for importing fragments is positioned between an enum assignment and enum usage, because this import can result in the enum assignment being located in a different fragment than the enum usage.

Example

A company logo is to be displayed on all websites of a web application.

The HTML code for the fragment that displays the company logo exists only once. You can import the fragment as often and into as many HTML files as necessary.

Syntax

```
<!-- AWP_Import_Fragment_Name='<Name>' -->
```

<Name> corresponds to the name of the fragment to be imported.

Example

HTML code within a website that creates a fragment for displaying an image:

```
<!-- AWP_Start_Fragment Name='My_company_logo' -->  
<p></p>
```

HTML code that imports the created fragment into another website:

```
<!-- AWP_Import_Fragment Name='My_company_logo' -->
```


3.11.2 Configuring user pages

Configuring user pages

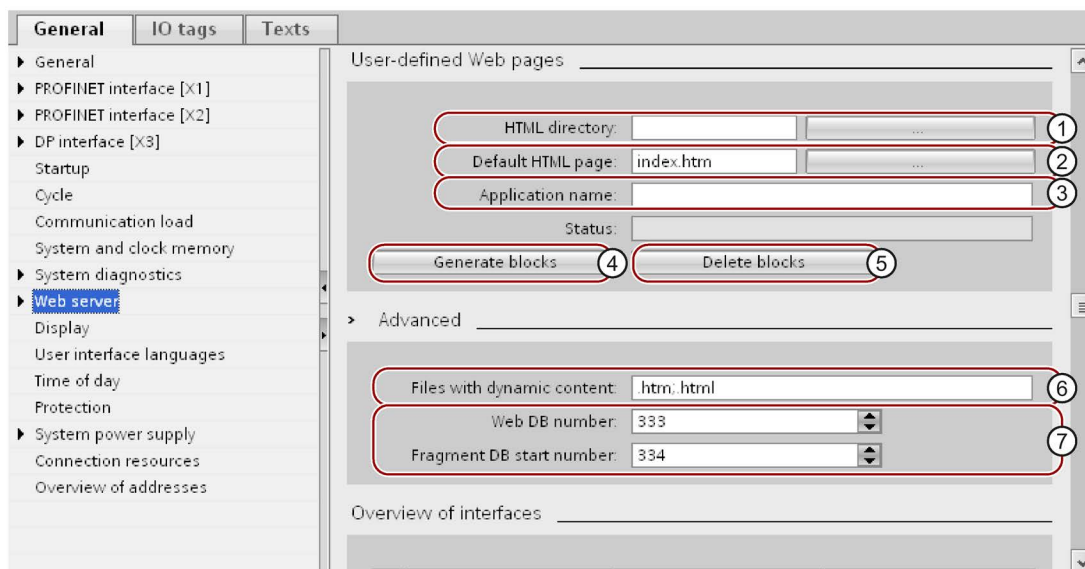


Figure 3-33 Configuring user pages in STEP 7

Proceed as follows to configure the user pages in STEP 7:

1. Select the CPU in the device configuration.
2. Open the settings in the Inspector window of the CPU under "Properties > General > Web server".
3. In the area "User pages" under ① "HTML directory", select the folder on your display device in which you have saved your HTML page.
4. Enter the name of the HTML page under ② "Start HTML page" that is to open when you start the application.
5. You can also specify a name for your application under ③ "Application name". This name is used to further divide or group the webpages. If an application name already exists, the URL is displayed in the following format: `http://a.b.c.d/awp/<application name>/<page name>.html`
6. In the "Extended" area, enter the file extensions that have to be checked for AWP commands in input box ⑥ "Files with dynamic contents". By default, STEP 7 analyses files with the extensions ".js", ".htm" and ".html". Here you can enter other file extensions that you have used when creating your user page.
7. You can accept the number for the Web DB ⑦ and the fragment DB start number ⑦ or you can assign a new number of your choice that is not assigned.

8. Click the button ④ "Create blocks" to create data blocks from the source files. The created data blocks are stored in the STEP 7 project tree in the folder "System blocks > Web server". These data blocks consist of a control data block (Web control DB) that controls the display of the webpages and one or several data block fragments (fragment DBs) with the compiled webpages.
9. In the network view, select the CPU you want to download and select the command "Download to device" in the "Online" menu to download the blocks. The compilation of the blocks is implicitly triggered before the download. If errors are signaled during this process, they must be remedied before you can download the configuration.

Deleting data blocks

Click the "Delete block" button ⑤ to delete previously generated data blocks. STEP 7 deletes the Web Control DB and all fragment DBs from the project containing your user pages.

3.11.3 Programming the WWW instruction


The WWW instruction

The WWW instruction initializes the Web server of the CPU or synchronizes the user pages with the user program in the CPU. The Web control DB is the input parameter for the WWW instruction and specifies the content of the pages as they are displayed in the fragment DBs as well as the status and control information. STEP 7 creates the Web control DB when you click the button "Create blocks".

Programming the WWW instruction

The user program must execute the WWW instruction so that the user pages can be accessed in the Web server.

Table 3- 6 WWW instruction

LAD/FBD	SCL	Description
	<pre>ret_val :=WWW(ctrl_db:=uint_in_);</pre>	<p>Access to user pages by means of the Web server</p>

Parameters

The table below shows the parameters of the WWW instruction.

Table 3- 7 Parameters

Parameters	Declaration	Data type	Description
CTRL_DB	Input	DB_WWW	Data block that describes the user pages (Web control DB)
RET_VAL	Output	INT	Error information

RET_VAL parameter

Table 3- 8 RET_VAL

Error code (W#16#...)	Explanation
0000	No error has occurred. There are no pending website requests that must be released by the user program.
00xy	x: indicates if an error occurred during initialization of the Web control DB (CTRL_DB): x=0: no errors. x=1: errors occurred. The error is encoded in the "CTRL_DB.last_error" byte of the Web control DB. y: Number of the pending request. Several requests are possible (e.g., request "0" and "1" are pending: y="3"). y="1": Request "0" y="2": Request "1" y="4": Request "2" y="8": Request "3"
803A	The specified Web Control DB does not exist on the CPU.
8081	Incorrect version or incorrect format of the Web Control DB.
80C1	There are no resources available to initialize the Web application.

3.11.4 Defining the user page as home page

Defining the user page as home page

In addition to the default intro page, you can also define the home page of your user pages as the home page of the Web server.

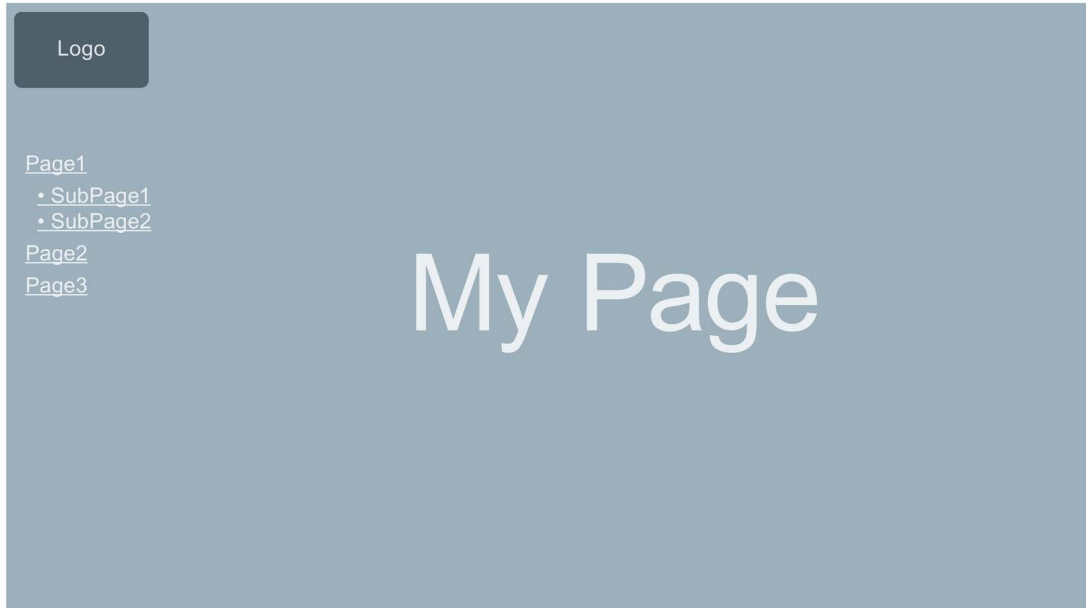


Figure 3-34 Example of user page as home page of the Web server

Requirements

1. You have configured a user in STEP 7, whom you have assigned at least the authorization "... open user-defined web pages".
2. The CPU is in RUN mode.

Procedure

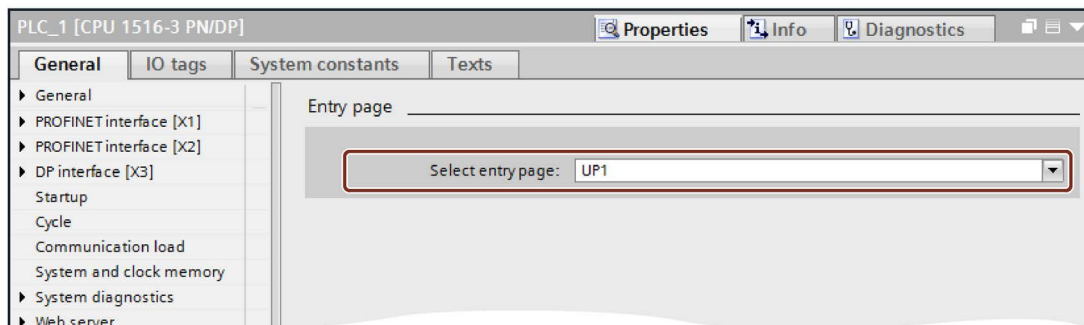


Figure 3-35 Setting user page in STEP 7 as home page

Proceed as follows to define the user pages in STEP 7 as home page of the Web server:

1. Select the CPU in the device configuration.
2. Open the settings in the Inspector window of the CPU under "Properties > General > Web server".
3. Select the entry "AWP1" in the area "Entry page" under "Select entry page".

If you now enter the IP address of the CPU in the browser, a connection is automatically established to your user pages.

If you want to again access the web pages of your CPU, link the web pages from your user pages, via the URL "<http://a.b.c.d/Portal/Portal.mwsl?PriNav=Start>" or "<https://a.b.c.d/Portal/Portal.mwsl?PriNav=Start>" for example. In this case, the information "a.b.c.d" represents, as an example, the IP address of the configured CPU.

Example of link in HTML:

```
<a href="/Portal/Portal.mwsl?PriNav=Start">SIMATIC web pages</a>
```

Note

If you define your user page as home page of the Web server, all direct access to the web pages of the CPU is disabled. This applies also to the bookmarks you saved for the web pages of the CPU as well as the page for reading out the service data.

Reading out service data

If you define your user page as home page of the Web server, all direct access to the web pages for reading out the service data is also disabled.

If you want to continue to read out service data via the Web server if necessary, here is how you can link the service data page directly to your user page.

Just as for the web pages of the CPU, link the service data page e.g. via the URL "http://a.b.c.d/save_service_data" or "https://a.b.c.d/save_service_data", the "a.b.c.d" here is an example of the IP address of the configured CPU.

Example of link in HTML:

```
<a href="/save_service_data">Service data</a>
```

3.11.5 Example of a user page

3.11.5.1 Website for monitoring and controlling a wind turbine

Example of a user page

Here you see a user page for monitoring and controlling a wind turbine:



Figure 3-36 Overview of user page wind turbine

The user page was created in English in this example, but you can select any language you wish when you create your own user page.

In this application, each wind turbine of the wind farm has a data block in STEP 7 with specific data for the respective location and the turbine.

The user page gives you the option to access the turbine remotely with a display device. A user can open the standard websites for a CPU of a specific wind turbine and go to the "Remote Wind Turbine Monitor" user page to view the turbine data. A user with the corresponding access permissions can also set the turbine into the manually controlled mode and thus control the tags for speed, orientation and angle of attack of the turbine by means of the website. The user can also specify a brake value regardless of manual or automatic control of the turbine.

STEP 7 checks the Boolean values for override of the automatic control and, if set, uses the values for speed, orientation and angle of attack of the turbine as defined by the user.

Files used

Three files are used in the application example:

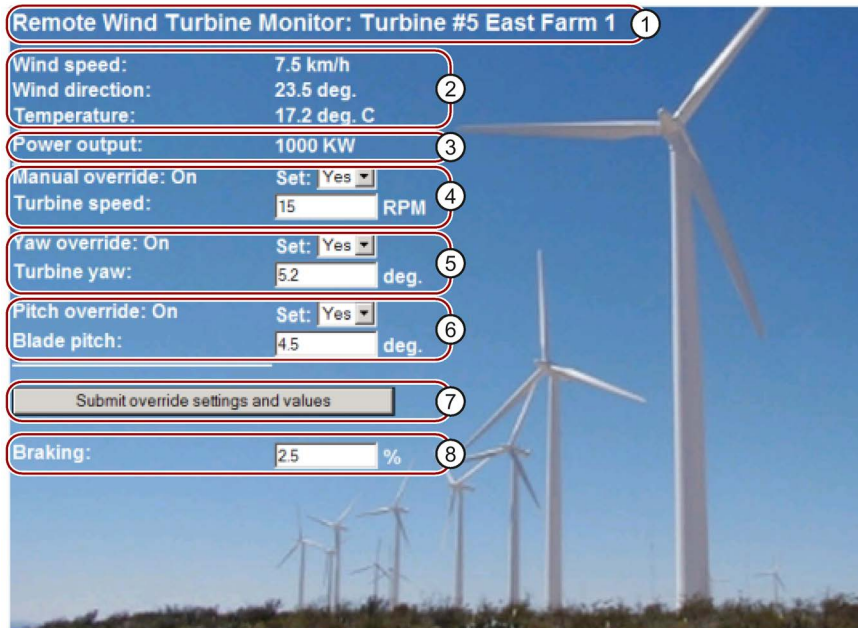
- `Wind_turbine.html`: The user page in the figure shown above. The control data is accessed by AWP commands.
- `Wind_turbine.css`: The Cascading Style Sheet which includes the formatting specifications of the user page. The use is optional but can simplify the design of the user page.
- `Wind_turbine.jpg`: The background image displayed on the user page. The use of images is optional, user pages with lots of images require a lot more memory in the load memory.

These files are not part of your installation but they are described as an example below.

Implementation

The user page uses AWP commands to read out values from the CPU as well as writing values to it. The user page also uses AWP commands for the definition of enum types, such as the assignment of tags to enum types for handling the ON/OFF settings.

The user page is structured as follows:



- ① Header of the website with number and location of the wind turbine.
- ② Atmospheric conditions at the turbine, wind speed, wind direction and current temperature are displayed.
- ③ Read-out power output.
- ④ Manual override: Activates manual override of the turbine. To make manual settings for speed, orientation and angle of attack, the STEP 7 user program requires that manual override has been activated.
- ⑤ Override of the orientation: Activates manual override of the turbine orientation.
- ⑥ Override of the angle of attack: Activates manual override of the angle of attack of the rotor blades.
- ⑦ By clicking this button, you transfer the override settings to the CPU.
- ⑧ Manual setting of a percentage value for braking. The setting "Manual override" is not required to enter a brake value.

Figure 3-37 Overview of user page wind turbine

The user page also uses an AWP command which writes the special tag into the tag table; it includes the user ID of the user who currently accesses the page.

3.11.5.2 Reading and displaying data from the CPU

Example HTML code for reading out and displaying data from the CPU

This part of the HTML code is used for displaying the power output on the user side.

The text "Power Output:" is displayed on the left-hand side; on the right-hand side, the value of the tags for the power output including the unit ("KW") is displayed.

The AWP command `:= "Data_block_1".PowerOutput` executes the reading operation. The data block is referenced by its symbolic name here and not by its number ("Data_block_1" instead of "DB1").

The code used in the example is:

```
<tr style="height:2%;">
<td>
<p>Power output:</p>
</td>
<td>
<p style="margin-bottom:5px;"> := "Data_block_1".PowerOutput: KW</p>
</td>
</tr>
```

See also

PLC tags (Page 63)

3.11.5.3 Using enum types

Definition of enum types

The described user page uses enum types in three locations. "On" or "Off" is displayed for a Boolean value at these locations.

The enum type for "On" results in a value of 1; the enum type for "Off" results in a value of 0. The following excerpts from the HTML code of the user page show the declaration of an enum type with the name "OverrideStatus" and the values "0" and "1" for "Off" or "On" as well as the specification of an enum type reference of "OverrideStatus" for the tag "ManualOverrideEnable" in the data block "Data_block_1".

Note**Assignment of enum types**

If the user page writes into a tag by using an enum type, there has to be a declaration "AWP_In_Variable" for each "AWP_Enum_Ref" declaration.

The code used in the example is:

```
<!-- AWP_In_Variable_Name='\"Data_block_1\".ManualOverrideEnable' -->
<!-- AWP_Enum_Def_Name='OverrideStatus' Values='0: \"Off\",1: \"On\"' -->
<!-- AWP_Enum_Ref_Name='\"Data_block_1\".ManualOverrideEnable'
Enum='OverrideStatus' -->
```

The following code describes a display box for displaying the current status of "ManualOverrideEnable". A normal read command for tags is used but because of the declared and referenced enum type, the website displays the values "On" and "Off" instead of "1" and "0".

```
<td style='width:24%; border-top-style: Solid; border-top-width:
2px; border-top-color: #ffffff;'>
<p>Manual override: :=\"Data_block_1\".ManualOverrideEnable:</p>
</td>
```

The following code describes a drop-down list for changing "ManualOverrideEnable" by the user. The drop-down list consists of the "Yes" and "No" options that are assigned to the "On" or "Off" values by means of the enum type reference. If you make no selection, the status remains the same.

```
<select name='\"Data_block_1\"ManualOverrideEnable'>
<option value=':\"Data_block_1\".ManualOverrideEnable:'> </option>
<option value='On'>Yes</option>
<option selected value='Off'>No</option>
</select>
```

The drop-down list is included in the form on the website. The form is uploaded, when the user clicks on the "Send" button. If the user has selected "Yes", the value "1" is written in the tag "ManualOverrideEnable" in the "Data_block_1" data block; if the user has selected "No", the value "0" is written.

3.11.5.4 Writing user inputs into the controller

Setting options

The user page "Remote Wind Turbine Monitor" includes different AWP commands for writing data into the controller. A user with the corresponding access permissions can control the wind turbine manually, activate the override for the turbine speed and the turbine orientation as well as the angle of attack of the rotor blades with the declaration of different "AWP_In_Variable" write commands. The user can also specify floating-point numbers for turbine speed, orientation angle of attack and percentage of braking. The user page uses an HTTP command in the format "POST" to write the tags into the controller.

The code used in the example for setting the brake value is:

```
<!-- AWP_In_Variable Name='"Data_block_1"' -->
...
<tr style="vertical-align: top; height: 2%;">
<td style="width: 22%;"><p>Braking:</p></td>
<td>
<form method="POST">
<p><input name='"Data_block_1".Braking' size="10" type ="text">
%</p>
</form>
</td>
</tr>
```

This excerpt from the HTML code first defines a "AWP_In_Variable" for the "Data_block_1" data block which enables the user page to write any number of tags into the data block. The text "Braking:" is displayed on the left-hand side; on the right-hand side is a box in which the user can make entries for the "Braking" tag in the data block.

The user page reads out the actual braking value from the controller and displays it in the text box. A user with the corresponding access permissions can then write a brake value that controls the braking process into the data block of the CPU.

Note

Declaration of data blocks

If you declare an entire data block by means of a "AWP_In_Variable", each tag in the data block can be written by means of the user page. If only certain tags in the data block are to be writable, you declare this specifically using `<!-- AWP_In_Variable`

`Name='"Data_block_1".Braking' -->`, for example.

3.11.5.5 Writing special tags

Using special tags

The user page "Remote Wind Turbine Monitor" writes the special tag "Server:current_user_id" into a tag of the CPU. The tag value contains the value "1" if a user is logged on and "0" if a user is not logged on. In this example, a user is logged on, so the tag value is set to "1". The special tag is written into the CPU by the user page and does not need a user interface.

The code used in the example is:

```
<!-- AWP_in_variable Name="SERVER:current_user_id" Use="User_ID" -->
```

3.11.5.6 HTML code of the user page "Remote Wind Turbine Monitor"

The complete HTML code of the example user page "Remote Wind Turbine Monitor" as well as the used Cascading Style Sheet (CSS) is listed below.

Wind_turbine.html

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd"><!--
This test program simulates a website for monitoring and operating a
wind turbine.
Required PLC tags and data block tags in STEP 7:
PLC tag:
User_ID: Int
Data blocks:
Data_block_1
Tags in Data_Block_1:
TurbineNumber: Int
WindSpeed: Real
WindDirection: Real
Temperature: Real
PowerOutput: Real
ManualOverrideEnable: Bool
TurbineSpeed: Real
YawOverride: Bool
Yaw: Real
PitchOverride: Bool
Pitch: Real
Braking: Real
The user-defined website shows the current values for the PLC data
and offers a drop-down list to specify the three Boolean values with
the assigned enumeration type. The selected Boolean values as well
as the data text boxes for speed, orientation and angle of attack of
the turbine are uploaded with the "Send" button. The brake value can
be specified without the "Send" button.
```

No actual STEP 7 program is required for using this page. The STEP 7 program would theoretically only respond to the values for speed, orientation and angle of attack of the turbine, if the assigned Boolean values were specified. The only requirement for STEP 7 is that the WWW instruction is called with the DB number of the generated data blocks for this page.

```
-->
-->
<!-- AWP_In_Variable Name='"Data_block_1"' -->
<!-- AWP_In_Variable Name='"Data_block_1".ManualOverrideEnable'
Enum="OverrideStatus" -->
<!-- AWP_In_Variable Name='"Data_block_1".PitchOverride'
Enum="OverrideStatus" -->
<!-- AWP_In_Variable Name='"Data_block_1".YawOverride'
Enum="OverrideStatus" -->
<!-- AWP_In_Variable Name="SERVER:current_user_id" Use="User_ID"-->
<!-- AWP_Enum_Def Name="OverrideStatus" Values='0:"Off",1:"On"' -->

<html>
<head>
<meta http-equiv="content-type" content="text/html;
charset=utf-8"><link rel="stylesheet" href="Wind_turbine.css">
<title>Remote monitoring of wind turbines
  </title>
  <body>
<table cellpadding="0" cellspacing="2">
<tr style="height: 2%;">
<td colspan="2">
<h2>Remote Wind Turbine Monitor: Turbine
#:="Data_block_1".TurbineNumber:</h2>
</td>
<tr style="height: 2%;"><td style="width: 25%;"><p>Wind speed:</p></
td>
<td><p> :="Data_block_1".WindSpeed: km/h</p></td>
</tr>
<tr style="height: 2%;">
<td style="width: 25%;"><p>Wind direction:</p></td>
<td><p> :="Data_block_1".WindDirection: deg.</p></td>
</tr>
<tr style="height: 2%;"><td style="width:
25%;"><p>Temperature:</p></
td>
<td><p> :="Data_block_1".Temperature: deg. C</p></td>
</tr>
<tr style="height: 2%;">
<td style="width: 25%;"><p>Power output:</p></td>
<td><p style="margin-bottom:5px;"> :="Data_block_1".PowerOutput:
kW</p>
</td>
</tr>
<form method="POST" action="">
<tr style="height: 2%;" >
<td style="width=25%; border-top-style: Solid; border-top-width:
2px; border-top-color: #ffffff;">
<p>Manual override: :="Data_block_1".ManualOverrideEnable:</p>
```

```

</td>
<td class="Text">Set:
<select name="Data_block_1".ManualOverrideEnable'>
<option value=':="Data_block_1".ManualOverrideEnable:'> </option>
<option value="On">Yes</option>
<option value="Off">No</option>
</select>
</td>
</tr>
<tr style="vertical-align: top; height: 2%;"><td style="width:
25%;"><p>Turbine speed:</p></td>
<td>
<p style="margin-bottom:5px;"><input
name="Data_block_1".TurbineSpeed' size="10"
value=':="Data_block_1".TurbineSpeed:' type="text"> RPM</p>
</td>
</tr>
<tr style="vertical-align: top; height: 2%;">
<td style="width: 25%;">
<p>Yaw override: :="Data_block_1".YawOverride: </p>
</td>
<td class="Text">Set:
<select name="Data_block_1".YawOverride'>
<option value=':="Data_block_1".YawOverride:'> </option>
<option value="On">Yes</option>
<option value="Off">No</option>
</select>
</td>
</tr>
<tr style="vertical-align: top; height: 2%;">
<td style="width: 25%;">
<p>Turbine yaw:</p>
</td>
<td>
<p style="margin-bottom:5px;"><input name="Data_block_1".Yaw'
size="10" value=':="Data_block_1".Yaw:' type="text"> deg.</p>
</td>
</tr>
<tr style="vertical-align: top; height: 2%;">
<td style="width: 25%;">
<p>Pitch override: :="Data_block_1".PitchOverride: </p>
</td>
<td class="Text">Set:
<select name="Data_block_1".PitchOverride'>
<option value=':="Data_block_1".PitchOverride:'> </option>
<option value="On">Yes</option>
<option value="Off">No</option>
</select>
</td>
</tr>
<tr style="vertical-align: top; height: 2%;">
<td style="width=25%; border-bottom-style: Solid; border-
bottomwidth:
2px; border-bottom-color: #ffffff;">
<p>Blade pitch:</p>

```

```

</td>
<td>
<p style="margin-bottom:5px;"><input name='"Data_block_1".Pitch'
size="10" value=':="Data_block_1".Pitch:' type="text"> deg.</p>
</td>
</tr>
<tr style="height: 2%;">
<td colspan="2">
<input type="submit" value="Submit override settings and values">
</td>
</tr>
</form>
<tr style="vertical-align: top; height: 2%;">
<td style="width: 25%;"><p>Braking:</p></td>
<td>
<form method="POST" action="">
<p> <input name='"Data_block_1".Braking' size="10"
value=':="Data_block_1".Braking:' type="text"> %</p>
</form>
</td>
</tr>
</table>
</body>
</html>

```

Wind_turbine.css

```

BODY {
    background-image: url('./Wind_turbine.jpg');
    background-position: 0% 0%;
    background-repeat: no-repeat;
    background-size: cover;
H2 {
    font-family: Arial;
    font-weight: bold;
    font-size: 14.0pt;
    color: #FFFFFF;
    margin-top:0px;
    margin-bottom:10px;
}
P {
    font-family: Arial;
    font-weight: bold;
    color: #FFFFFF;
    font-size: 12.0pt;
    margin-top:0px;
    margin-bottom:0px;
}
TD.Text {
    font-family: Arial;
    font-weight: bold;
    color: #FFFFFF;
    font-size: 12.0pt;
    margin-top:0px;
    margin-bottom:0px;
}
}

```

3.12 File browser

Requirements

Execute permissions must be assigned for the user in the user administration.

File browser

The browser displays the content of the SIMATIC memory card on the "File browser" web page. This means, for example, that you can read and edit the log files generated by the CPU without having to use STEP 7.

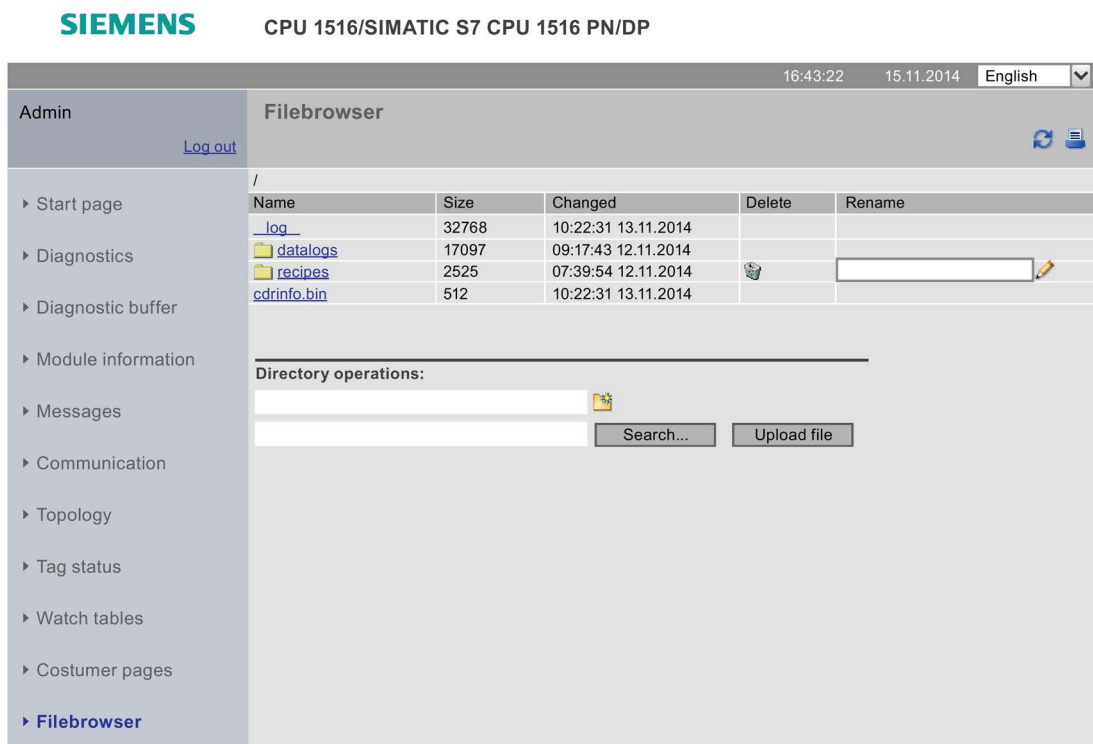


Figure 3-38 File browser view

The file browser lists all existing files and directories on the SIMATIC memory card. The files can be downloaded, deleted, renamed and uploaded; the directories can be created, deleted and renamed.

Note

The file browser only grants you read access to DataLogs.

Exception system files

The system files include the job file and all special directories including their contents to which the job file refers. System files are not displayed, and cannot be changed or deleted.

3.13 DataLogs


DataLogs

On the DataLogs web page, you can have all the DataLogs that you created displayed.

You can sort the DataLogs according to the individual parameters in ascending or descending order.

For this purpose, click on one of the parameters in the column header:

- Name
- Size
- Changed on

You can call and empty the relevant DataLog file by clicking the icon .

SIEMENS CPU 1516/SIMATIC S7 CPU 1516 PN/DP

08:12:03 23.07.2014 English

Admin		DataLogs			
Log out		Off			
	Name	Size	Changed		Retrieve and clear
▶ Start page	MyDataLog1.csv	43	12:05:18	22.07.2014	
	MyDataLog2.csv	17	09:32:07	22.07.2014	
▶ Diagnostics	MyDataLog3.csv	8	17:01:41	22.07.2014	
▶ Diagnostic buffer					
▶ Module information					
▶ Messages					
▶ Communication					
▶ Topology					
▶ Tag status					
▶ Watch tables					
▶ Costumer pages					
▶ Filebrowser					
▶ DataLogs					

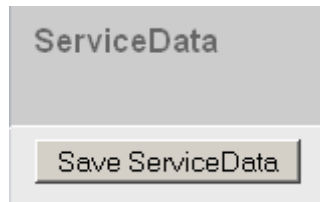
Figure 3-39 DataLogs

3.14 Reading out service data

The Web server gives you the option to save service data. In addition to the content of the diagnostic buffer, they include additional information on the internal status of the CPU. If you should encounter a problem with the CPU that cannot be resolved otherwise, you therefore have the option to submit the service data to the Service&Support team.

Procedure

1. Enter the following address in the address bar of your web browser:
"http://<CPU IP address>/save_service_data", e.g.,
"http://192.168.3.141/save_service_data"
2. Your screen displays the service data page with a button for saving the service data.



3. Save the service data locally on your display device by clicking "Save ServiceData".

Result

The data is saved into a .dmp file with the following naming convention: "<MLFB><serial number><time stamp>.dmp". The user can change the file name at a later time.

Note

If you have defined your user page as the start page, observe the note on reading out service data in section Defining the user page as home page (Page 76).

3.15 Basic websites

Web pages with reduced contents

Basic web pages are offered for display devices with smaller screens, for example HMI, on the Web server.

Basic web pages have reduced contents that are adapted to meet the requirements of smaller screens.

These sites do not support JavaScript for the sake of fast access. This means that not all standard web pages are available as basic web pages. The basic web page can also have fewer functions than the standard web page.

The switch to basic web pages takes place automatically for HMI devices.

You access basic web pages from other end devices by entering the IP address of the configured and the extension "/basic" in the address bar of the Web browser, for example <http://192.168.3.141/basic> or <https://192.168.3.141/basic>.

The following standard web pages are also available as basic web pages:

- Home page (in Basic: "Status")
- Diagnostics
- Diagnostics buffer
- Memory usage
- Module information
- Alarms
- Communication
- Tag status
- Watch tables
- User pages
- File browser (read access only)
- DataLogs
- Intro

The basic web pages are displayed as follows:

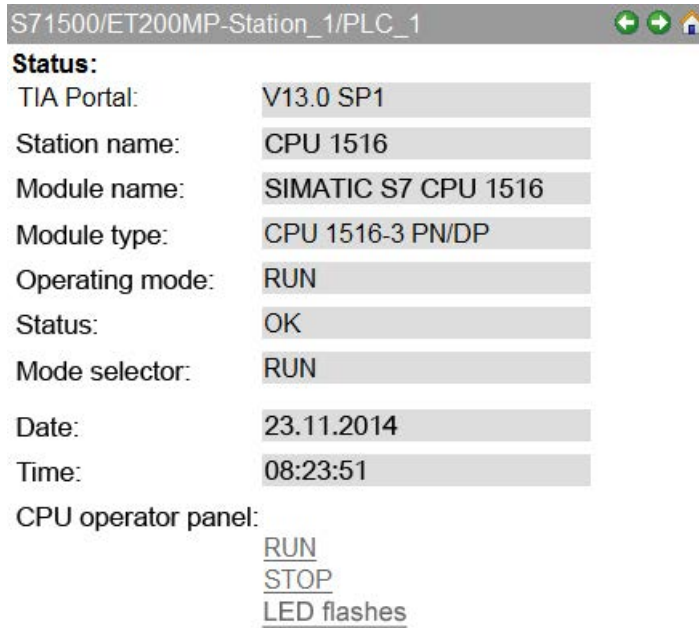


Figure 3-40 Example basic web pages, "Status" web page

Glossary

Automation system

An automation system is a programmable logic controller that consists of at least one CPU, various input and output modules, as well as operating and monitoring devices.

AWP

Automation Web Programming

AWP commands

Special command syntax for data exchange between CPU and HTML file.

Configuration

Systematic arrangement of individual modules (design).

CSS

A CSS (Cascading Style Sheet) specifies how an area or content marked up in HTML is displayed.

Device

Device that can send, receive or amplify data via the bus, e.g., IO controller.

Diagnostics

The detection, localization, classification, visualization and further evaluation of errors, malfunction and alarms.

Diagnostics provides monitoring functions that run automatically during plant operation. This increases the availability of plants by reducing commissioning times and downtimes.

Firewall

A firewall is used to restrict the network access based on sender or target address of the used services. The firewall decides based on specified rules which of the network packets it handles are forwarded and which are not. This way the firewall tries to prevent unauthorized network access.

It is not the function of a firewall to detect attacks. It only implements rules for network communication.

HTTP

Hypertext Transfer Protocol (HTTP). Protocol for data transmission across a network.

HTTPS

Hypertext Transfer Protocol Secure (HTTPS). Protocol for tap-proof transmission of sensitive data across a network.

Identification data

Identification data is stored on a module, and contains information which supports the user in

- Checking the system configuration
- Locating hardware changes in a system
- Correcting errors in a system

Modules can be clearly identified online using the identification data.

Master

The master in possession of the token is an active device. This master has the option to receive data from other devices and to send data to other devices.

PROFIBUS

PROcess Field BUS, process and field bus standard specified in standard IEC 61784-1:2002 Ed1 CP 3/1. It specifies functional, electrical, and mechanical properties for a bit-serial field bus system.

PROFIBUS is available with the protocols DP (= Distributed I/O), FMS (= Fieldbus Message Specification), PA (= Process Automation), or TF (= Technological Functions).

PROFINET

Within the framework of Totally Integrated Automation (TIA), PROFINET represents the consistent continuation of:

- PROFIBUS DP, the established field bus
- Industrial Ethernet, the communications bus for the cell level

Experience gained from both systems was and is being integrated into PROFINET.

PROFINET as an Ethernet-based automation standard from PROFIBUS International (previously PROFIBUS User Organization) defines a vendor-independent communication, automation, and engineering model.

PROFINET component

A PROFINET component includes the entire data of the hardware configuration, the parameters of the modules, and the corresponding user program. The PROFINET component is made up as follows:

- Technological Function

The (optional) technological (software) function includes the interface to other PROFINET components in the form of interconnectable inputs and outputs.

- Device

The device is the representation of the physical programmable controller or field device including the I/O, sensors and actuators, mechanical parts, and the device firmware.

PROFINET IO

As part of PROFINET, PROFINET IO is a communication concept that is used to implement modular, distributed applications.

PROFINET IO allows you to create automation solutions which are familiar to you from PROFIBUS.

PROFINET IO is implemented by the PROFINET standard for automation devices on the one hand, and on the other hand by the engineering tool STEP 7.

That is, you have the same application view in STEP 7, regardless of whether you configure PROFINET or PROFIBUS devices. Programming your user program is essentially the same for PROFINET IO and PROFIBUS DP if you use the extended blocks and system status lists for PROFINET IO.

PROFINET IO controller

Device used to address connected I/O devices. This means that the IO controller exchanges input and output signals with assigned field devices. The IO controller is often the controller on which the automation program runs.

PROFINET IO device

A distributed field device that is assigned to one of the IO controllers (e.g., remote IO, valve terminals, frequency converters, switches).

URL

Uniform Resource Locator (URL). Identifies and localizes a source, such as a web page, uniquely via the method of access used and the location of the source in computer networks.

UTF-8

Abbreviation for 8-bit UCS (Universal Character Set) transformation format. Most popular coding of Unicode characters.

Each Unicode character is assigned a specially coded byte string of variable length in this format. UTF-8 supports up to four bytes on which all Unicode characters can be mapped.

Web browser

Web browsers are visualization programs for web pages and can communicate with Web servers.

Typical web browsers are, for example:

- Microsoft Internet Explorer
- Mozilla Firefox

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