

## STEP 7 and WinCC V15.1 Readme

Programming and Operating Manual

## 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.

<b>⚠ DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.

<b>⚠ WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.

<b>⚠ CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.

<b>NOTICE</b>
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:

<b>⚠ WARNING</b>
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.

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# Notes on the TIA Portal

## 1.1 General notes

The information in this readme file supersedes statements made in other documents.

Read the following notes carefully because they include important information for installation and use. Read these notes prior to installation.

### Windows 7 / Windows Server 2008 R2: Invalid certificate validation

The new certificates used for signing may possibly not be validated on the Windows 7 and Windows Server 2008 R2 operating systems.

If you do not have the possibility to update the certificate store online, the signature of the product files is displayed as invalid. In this case, update the root certificates provided by Microsoft on the offline systems. To do so, follow the instructions in FAQ 109748887 (<https://support.industry.siemens.com/cs/ww/en/view/109748887>).

### Display of Asian characters in the TIA Portal

Due to a change in behavior in Microsoft Windows, it may occur that texts are not displayed correctly in the TIA Portal when a Chinese TIA Portal is installed on another Asian operating system (e.g. Korean). To view the texts in TIA Portal correctly, open the Windows Control Panel and select "English" under "Language for non-Unicode programs". Note, however, that this may cause display problems in other programs.

### Installing new .Net versions or .Net service packs

- Close the TIA Portal before installing a new .Net version or a new .Net service pack on your programming device/PC.
- Restart the TIA Portal only after successful installation of the new .Net version or the new .Net service pack.

### Notes on handling

- If a project in the list of projects last used is located on a network drive that is not connected, you may experience delays when opening the "Project" menu.
- When you insert a CPU, you may need to wait for some time if the project editor is open at the same time. This generally takes longer when you insert the first CPU in a newly created project. To be able to continue working at a good pace, you should close the project text editor before inserting a CPU.
- The alarm "Application is not responding" may appear in Windows 7 with functions that take a long time to run (loading the CPU for example). If this occurs, wait until the function has correctly finished.

## 1.1 General notes

- If you have installed a Microsoft mouse with IntelliPoint, you may find that it superimposes components over the buttons of the title bar. If this is the case, uninstall the IntelliPoint software from Microsoft.
- Enabling the "Virtual Desktop" options with NVIDIA graphics cards can cause problems. In this case, disable the "nView virtual desktop manager" of your NVIDIA graphics driver.

### Working with automatically synchronized network drives

A TIA Portal project consists of multiple files that are saved together in one directory. If you store a project that is automatically synchronized on a network drive or in a cloud directory (e.g. Dropbox, Syncplicity or GoogleDrive), this can lead to data loss if the synchronization only takes place partially or asynchronously. For this reason, we do not recommend editing TIA Portal projects directly on synchronized network drives or in cloud directories. Always close the TIA Portal project before synchronization and make sure that all directories and files from the project directory are synchronized together and completely. You may wish to disable automatic synchronization while working with the TIA Portal. The synchronization itself must be implemented in such a way that the current (local) project data replaces the project data on the network drive or in the cloud directory.

### Entry of decimal places

With certain Windows language settings, it may occur that the entry of values with a comma as decimal place is not recognized (entering "1,23" leads to an error). Instead, use the international format ("1.23").

### Information on the TIA Portal in online support

Overview of the most important technical information and solutions for the TIA Portal in the Siemens Industry online support.

Internet link: TIA Portal in Siemens Industry online support (<https://support.industry.siemens.com/cs/ww/en/view/65601780>)

All information on service and support in the Siemens Industry online support:

Internet link: Service and support in Siemens Industry online support (<https://support.industry.siemens.com/cs/de/en/>)

Here, you can also subscribe to the newsletter that provides you with latest information relating to your products.

### Opening projects with missing software components

If a project cannot be opened in TIA Portal due to missing software components, you can download and install it as trial software from Siemens Industry online support. You can then open the project. Note that the trial software can only be used for a limited period of time.

Use the following link to open the page in Siemens Industry online support, where the various software products are available to you as trial software: [www.siemens.com/tia-portal-trial](http://www.siemens.com/tia-portal-trial) ([www.siemens.com/tia-portal-trial](http://www.siemens.com/tia-portal-trial))

## **Starting the TIA Portal**

When you start the TIA Portal, Windows attempts to update the Certificate Revocation List (CRL) of "windowsupdate.com".

If no Internet access is available and there are multiple DNS servers, a timeout may occur and delay the start of the TIA Portal.

## **1.2 Notes on libraries**

### **Contents**

Information that could not be included in the online help and important information about product characteristics.

### **Comparing library elements**

If master copies and types have the same name, the corresponding objects in the project are overwritten when the action "Copy" is used. Please note that this takes place without a prompt. The same behavior occurs when the name of the master copy is different to the name of the type, but an object within the master copy has the same name as the type.

## **1.3 Notes on memory cards**

### **Contents**

Information that could not be included in the online help and important information about product characteristics.

### **Notes on SIMATIC memory cards**

The SIMATIC memory cards have been formatted and set up by Siemens for use with S7-1200 and S7-1500 modules. This format must not be overwritten; otherwise, the card will no longer be accepted by the modules. Formatting with Windows tools is therefore not permitted.

### **Behavior in case of open force job**

Note that an active force job is retained even after you have loaded a new project to the SIMATIC memory card. This means you should first delete the active force job before you remove a SIMATIC memory card from the CPU and before you overwrite the card in the PC with a new project. If you use a SIMATIC memory card with unknown content, you should format the SIMATIC memory card before the next download.

### Access protection for memory cards in USB card readers

By improving the security mechanisms for online access and engineering of S7-1500 CPUs, the data storage on memory cards has been changed. For this reason, this version of STEP 7 cannot evaluate the passwords of the configured protection level when reading project data from memory cards that is accessed via a USB card reader. The changed response affects the memory cards for CPUs of the S7-1200/1500 series. Therefore, use physical safeguards to protect critical project data on memory cards for these devices.

---

#### Note

This restriction is not related to online access to devices or the know-how protection of program blocks.

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## 1.4 Notes on the hardware configuration

### Content

Information that could not be included in the online help and important information about product characteristics.

### Editing a device IP address

Do not use the address range from 192.168.x.241 to 192.168.x.250 when editing a device IP address. If necessary, this address range is automatically assigned by the system to a programming device. Depending on the subnet mask, this applies also for all network classes.

### Drivers for the CP 5512 communications processor

The drivers for the CP 5512 are no longer included in this software version. If you want to use the CP 5512, the following needs to be installed prior to the installation of this software:

<http://support.automation.siemens.com/WW/view/78453460> (<http://support.automation.siemens.com/WW/view/en/78453460>)

Please note that the CP 5512 can be used with a maximum of Windows 7 32-bit. As of Windows 8 or with 64-bit operating systems, the CP 5512 is not compatible.

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#### Note

Since 2009, the functional successor the USB 2.0 module CP 5711 has been available.

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## 1.5 Notes on using the TIA Portal in a virtual environment (private cloud)

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Instructions for using the TIA Portal in a virtual environment (private cloud)

You can find instructions on how to use the TIA Portal in a virtual environment (private cloud) on the installation disk in the directory "Documents\Readme\<language directory>". You can open the PDF document "TIAPortalCloudConnectorHowTo<language ID>.pdf" here.

The TIA Portal Cloud Connector can be used with the Windows 7 (64-bit) and Windows 10 (64-bit) operating systems.

### Environment variables "TiaUserSettingsPath" and "TiaDefaultProjectPath"

The environment variables "TiaUserSettingsPath" and "TiaDefaultProjectPath" can be used to set the location of the user and project settings different from the system default. This can be used, for example, to save the user and project settings at a central location.

You can find additional information on the use of environment variables in the Instructions on Using the TIA Portal in a Virtual Environment (Private Cloud).

### Note on using self-signed certificates when using HTTPS as the communication protocol

Microsoft regularly checks whether the certificates in the Windows Certificate Store are from a trusted source. Certificates from untrusted sources are deleted. Therefore, ensure that your self-signed certificates are signed with a secure certificate.

## 1.6 Notes on using the TIA Portal Teamcenter Gateway

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Information on the installation of the TIA Portal Teamcenter Gateway

You can find instructions for installing the TIA Portal Teamcenter Gateway in the TIA Portal Teamcenter Gateway online help under "Installing and uninstalling TIA Portal Teamcenter Gateway".

### Information on the use of the TIA Portal Teamcenter Gateway

This readme file provides information on using the TIA Portal Teamcenter Gateway.

The installation of the TIA Portal Teamcenter Gateway gives you access to the TIA Portal Teamcenter Gateway function that is available as of TIA Portal V14 and higher.

### Notes on installing the TIA Portal Teamcenter Gateway data model

You can find a description for installing the TIA Portal Teamcenter Gateway data model on the installation data medium in the directory "\\Support\Teamcenter\_11\ServerSetupDocument\" on the STEP 7/WinCC DVD2. Open the PDF document "Datamodel\_Installation\_enUS". The instructions for installing the TIA Portal Teamcenter Gateway data model are only available in English.

### Note on updating the existing TIA Portal Teamcenter Gateway data model

Note the following:

- In the TIA Portal Teamcenter Gateway V15, no changes were made to the existing TIA Portal Teamcenter Gateway data model and no changes specific to the Teamcenter as well.

### Notes on Teamcenter

Note the following:

- To work with the TIA Portal Teamcenter Gateway, Teamcenter Rich Application Client (RAC) or Teamcenter Client Communication System (TCCS) as of version 11.2 must be installed on your PG/PC.

### Note on TCCS (Teamcenter Client Communication System)

Note the following:

- If you have completed the installation of TCCS (Teamcenter Client Communication System) as a "standalone" installation, you also need to install "Microsoft Visual C++ 2013 – Redistributable".

### Note on UTF-8

Note the following:

- In order to display data from Teamcenter with non-English character sets, e.g. for Asian languages, in TIA Portal, Unicode character sets need to be used.

### Note on cloud computing

Note the following:

- If you run TIA Portal in a Cloud (for example virtual machine), this system has to be integrated into the Teamcenter environment. Direct integration via a remote connection is not supported by TIA Portal Teamcenter Gateway.

## Notes on the basics of working with TIA Portal Teamcenter Gateway

As of TIA Portal Teamcenter Gateway version V15, the Teamcenter operation "Teamcenter > Export..." is available for TIA Portal projects and global libraries.

With this operation, you create a copy of the current project, which is completely free of any Teamcenter information. If you need to work separated from Teamcenter, use this operation instead of "Save as" because "Save as" retains Teamcenter information in the project.

## Setting the TIA Portal Teamcenter Gateway cache path

By default, the value entered under "Options > Settings > General > Teamcenter Gateway" in the "TIA Portal Teamcenter Gateway Cache Path" area is taken as "TIA Portal Teamcenter Gateway Cache Path".

By default, this value refers to the project directory path.

If you change the value of the "TIA Portal Teamcenter Gateway Cache Path", Teamcenter Gateway checks the validity of the values entered by default and the changed values.

---

### Note

The default value entered cannot be empty.

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## Note on TIA Portal Teamcenter Gateway operations during a started WinCC Professional simulation

Do not perform Teamcenter Gateway operations, such as "Check in" or "Undo check out" during a started WinCC Professional Simulation.

# 1.7 Information on working with Multiuser Engineering

## Contents

Information that could not be included in the online help and important information about product features of Multiuser Engineering and about the multiuser server.

Installation of the Multiuser Server gives you access to the corresponding "Multiuser Engineering" function that is available with TIA Portal.

## Microsoft system account for multiuser server

When the multiuser server is installed, a Microsoft system account is created for the multiuser server. Microsoft changes the password cyclically for this account.

If the password for this account has expired, the password needs to be changed and then the multiuser server needs to be restarted.

### Error message during start of the multiuser server

If an error message is displayed during or after the installation of the multiuser server indicating that the service cannot be started for the Multiuser Server, the following procedure is recommended:

1. Open the Windows event view and check whether an error entry with the error number "1069" is present.
2. If this is the case, information on how to proceed is provided below.  
Internet link: TIA Portal in Siemens Industry online support (<https://support.industry.siemens.com/cs/ww/en/view/65601780>)
3. Alternatively, you can contact Customer Support directly.  
Internet link to Customer Support: FAQ with ID 109739926 (<https://support.industry.siemens.com/cs/ww/en/view/109739926>)

### Working with active monitoring jobs and forcing jobs in the local session

Active monitoring jobs and forcing jobs must be closed before a check-in or update in the local session. It is not possible to check in or update in the local session while monitoring or forcing jobs are active.

### Working in the local session with the "Keep local session" option

If the "Keep local session" option is selected after the check-in, all checked-in objects in the local session appear as outdated, even if their content is identical.

### Working with different versions of TIA Portal

Local sessions created with <x.y> version of TIA Portal can only be worked on with this version.

Example: A local session created with TIA Portal V15.1 for a V15.1 project cannot be edited with an earlier version of TIA Portal.

### Working with Multiuser Commissioning

- When you work with Multiuser Commissioning, a new revision of the server project is created after each download to the CPU. However, a new revision is not created when objects that **cannot** be marked were edited in the local session. Changes to objects that cannot be marked are lost during check-in and are not downloaded to the CPU.
- When you start download to the device in Commissioning mode from the project tree with the menu command "Download to device > Hardware configuration", the dialog which informs you that different data exists on the CPU and in the server project is always displayed.
- When you work in Commissioning mode, only S7-1500 CPUs are fully supported. When using an S7-300/400 CPU, the dialog which informs you that different data exists on the CPU and in the server project is always displayed in Commissioning mode. The reason is that S7-300/400 CPUs do not support synchronization. To prevent this message from being displayed, you should disable the option "Check for data mismatch before loading (recommended)" in the Administration tool.

## See also

TIA Portal in Siemens Industry online support (<https://support.industry.siemens.com/cs/ww/en/view/65601780>)

FAQ with ID 109739926 (<https://support.industry.siemens.com/cs/ww/en/view/109739926>)

## 1.8 Information about engineering options

### Contents

Information that could not be included in the online help and important information about product characteristics.

### What's new at SINAMICS in AutomationML

Contrary to the statement in the section "What's new in TIA Portal V15" in the section "SIMATIC TIA Portal Openness", V90 slaves and SINAMICS G120 PROFINET head modules cannot be exported and imported using AutomationML.



## STEP 7

### 2.1 Security information

#### Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit

<https://www.siemens.com/industrialsecurity> (<https://www.siemens.com/global/en/home/company/topic-areas/future-of-manufacturing/industrial-security.html>)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

<https://www.siemens.com/industrialsecurity> (<https://www.siemens.com/global/en/home/company/topic-areas/future-of-manufacturing/industrial-security.html>)

#### Network settings

The following tables show the network settings of each product you need to analyze the network security and to configure external firewalls:

STEP 7 Professional					
Name	Port number	Transport protocol	Direction	Function	Description
ALM	4410*	TCP	Inbound/outbound	License service	This service provides the complete functionality for software licenses and is used by both the Automation License Manager as well as all license-related software products.
RFC 1006	102	TCP	Outbound	S7 communication	Communication to the S7 controller via Ethernet/PROFINET for programming and diagnostic purposes.

## STEP 7

### 2.2 Notes on use

STEP 7 Professional					
DCP	---	Ethernet	Outbound	PROFINET	The DCP protocol (Discovery and Basic Configuration Protocol) is used by PROFINET and provides the basic functionality for locating and configuring PROFINET devices.
SNMP	161	UDP	Outbound	PROFINET	The SNMP client functionality is used by STEP 7 to read status information from PROFINET devices.
* Default port that can be changed by user configuration					

WinCC ES Basic (without simulation)					
Name	Port number	Transport protocol	Direction	Function	Description
ALM	4410*	TCP	Inbound/outbound	License service	This service provides the complete functionality for software licenses and is used by both the Automation License Manager as well as all license-related software products.
HMI Load	1033	TCP	Outbound	HMI Load (RT Basic)	This service is used to transmit images and configuration data to Basic Panels.
* Default port that can be changed by user configuration					

Simulation RT Basic					
Name	Port number	Transport protocol	Direction	Function	Description
HMI Load	1033	TCP	Inbound	HMI Load (RT Basic)	This service is used to transmit images and configuration data to Basic Panels.
Ethernet/IP	44818	TCP	Outbound	Ethernet/IP channel	The Ethernet/IP protocol is used for connections to Allen Bradley PLCs.
	2222	UDP	Inbound	Ethernet/IP channel	The Ethernet/IP protocol is used for connections to Allen Bradley PLCs.
Modbus TCP	502	TCP	Outbound	Modbus TCP channel	The Modbus TCP protocol is used for connections to Schneider PLCs.
RFC 1006	102	TCP	Outbound	S7 channel	Communication to the S7 controller via Ethernet/PROFINET
Mitsubishi MC	5002	TCP	Outbound	Mitsubishi MC channel	The Mitsubishi protocol is used for connections to Mitsubishi PLCs.

## 2.2 Notes on use

### Contents

Information that could not be included in the online help and important information about product characteristics.

## Online operation

The simultaneous online operation of STEP 7 V5.6 or earlier and STEP 7 Professional V15.1 has not been approved.

## Simultaneous online connections on an S7-1200 CPU (S7-1200)

It is not possible to establish an online connection from multiple instances of TIA Portal simultaneously to the same S7-1200 CPU.

## Parallel use

If the term "Combo" appears in the name or license key of the software after installation, the use of the following products/versions is permitted in accordance with Article 1.6 of the General Terms and Conditions (see also setup text):

- STEP 7 Professional 2017
- STEP 7 Professional 2010
- STEP 7 Professional 2006

## PLC migration

No instruction profile should be activated during PLC migration.

Deactivate your instruction profile before you perform the PLC migration. You can then reactivate the profile again.

## Removing/inserting the memory card

After removing or inserting a memory card, always perform a memory reset on the CPU in order to restore the CPU to a functional condition.

## Removing and inserting Ethernet modules

If Ethernet modules are removed and re-inserted during operation, you must boot the PC; otherwise, the "Accessible devices" functionality in STEP 7 or NCM PC will not display all devices. While the PC boots, Ethernet modules must be activated.

## Loading project data with TIA Portal V12 and V13 (S7-1200)

If you load the project data of an S7-1200 CPU with TIA Portal V13, you can no longer use TIA Portal V12 to access this data. To do this, first restore the factory settings of the CPU. Read the additional information on this in the online help under "How to reset a CPU to factory settings".

### Compatibility (S7-1200)

The device configuration and program of an S7-1200 CPU must always be configured with the same STEP 7 version. Usually, TIA Portal makes sure that no version conflicts occur by outputting appropriate notifications during loading to the device.

This automatic verification is not possible with S7-1200 CPUs with firmware version V1.x. In this case, users themselves must ensure that no version conflicts occur.

## 2.3 Editing devices and networks

### 2.3.1 General information on devices and networks

#### Content

Information that could not be included in the online help and important information about product characteristics.

#### S7-PCT IO-Link (S7-1200)

The S7 Port Configuration Tool is available for free download at the following link.

<http://support.automation.siemens.com/WW/view/37936752> (<https://support.industry.siemens.com/cs/ww/en/view/32469496>)

#### Port Configuration Tool PCT

If you use the PCT tool, make sure that you always use the current version that is available free of charge with the following link:

<http://support.automation.siemens.com/WW/view/32469496> (<http://support.automation.siemens.com/WW/view/en/32469496>)

The PCT tool is available for installation on the DVD in the "Support" folder.

### 2.3.2 Information about OPC UA functions

#### Contents

Information that could not be included in the online help and important information about product characteristics.

## Schema files used for OPC UA functionality

The OPC Foundation provides its members with schemes that manufacturers can use for their respective server/client implementations. These files are used, for example, to validate imported information models / node sets.

The following scheme files are used for TIA Portal version V15.1 or S7-1500 CPU firmware version V2.6:

Scheme	Explanation
<a href="https://opcfoundation.org/UA/schemas/1.04/UANodeSet.xsd">https://opcfoundation.org/UA/schemas/1.04/UANodeSet.xsd</a>	XML scheme for NodeSet data
<a href="https://opcfoundation.org/UA/schemas/1.04/Opc.Ua.NodeSet2.xml">https://opcfoundation.org/UA/schemas/1.04/Opc.Ua.NodeSet2.xml</a>	OPC UA ("CORE") Model from 2018-06-20
<a href="https://opcfoundation.org/UA/schemas/DI/1.1/Opc.Ua.Di.NodeSet2.xml">https://opcfoundation.org/UA/schemas/DI/1.1/Opc.Ua.Di.NodeSet2.xml</a>	OPC UA for Devices ("DI") Model from 2018-06-06

## PLC object not visible in the server address space

With very large projects, it can happen in rare cases that, despite successful compiling of the project and successful downloading to the CPU, the CPU node or PLC object is not visible in the address space of the OPC UA server. In this case the memory reserved for OPC UA in the CPU is insufficient.

Diagnostics, e.g. using UaExpert, returns the "Failed" server status.

### Remedy

Disable the standard SIMATIC server interface in the CPU properties if it is not required.

Reduce the quantity or size of the elements that contribute towards the consumption of OPC UA resources. Reduce the file size to less than 250 MB and the number of nodes to fewer than 30000.

Examples:

- Reduce the number of tags in the address space of the OPC UA server, in particular of tags with the data type structure.  
To remove tags from the address space, disable the option "Accessible from HMI/OPC UA" in the PLC tag table or in the data blocks.  
With data blocks, you also have the possibility to remove the DB with all tags completely from the address space. To do this, disable the option "DB accessible from OPC UA" in the properties of the DB.
- Reduce the length of names of the elements in extensive data structures.
- Shorten the descriptions of the nodes.
- Reduce the number of implemented methods.

## Resource bottleneck during connection with fast establishment and termination of connections

Error 0x80810000 (OpcUa\_BadTcpNotEnoughResources) can occur during connection establishment (OPC\_UA\_Connect) of the client CPU, although free connection resources are still temporarily displayed.

**Possible cause**

During the termination of an OPC UA connection (OPC\_UA\_Disconnect), the connection resource used for this connection remains occupied for approx. 60 seconds.

This behavior is also called "Graceful Shutdown" and conforms to TCP RFC 793.

The following applies to the period of the Graceful Shutdown:

- The TIA Portal ("Diagnostics > Connection information" area) counts these resources that are still occupied as free resources, so that you may not diagnose a resource bottleneck even though there is a resource bottleneck.
- The instruction to terminate an OPC UA connection (OPC\_UA\_Disconnect) indicates that the connection has been terminated with DONE=1. However, the connection resource in the CPU remains occupied for approx. 60 seconds after the transition DONE=0 => DONE=1.

**Remedy**

The described behavior quickly has an effect on connection and disconnection: Correct termination of a connection still binds the connection resource used for 60 seconds.

If a client initiates connection establishment again in this phase, an additional resource is used, since the resource of the disconnected connection is still being used. If connection and disconnection occur in quick succession in your application and the above message occurs, the frequency of this sequence should therefore be reduced if possible.

**Description of the OPC UA instructions OPC\_UA\_ServerMethodPre and OPC\_UA\_ServerMethodPost****Declaration of the tags in the description of the "OPC\_UA\_ServerMethodPre" instruction: Preparation of the server method call**

Contrary to the tag declaration (table) described in the help for this server instruction, you cannot declare an InOut tag "UAMethod\_OutParameters". Otherwise, the method call is rejected with an error message.

**Declaration of the tags in the description of the "OPC\_UA\_ServerMethodPost" instruction: Post preparation of the server method call**

Contrary to the tag declaration (table) described in the help for this server instruction, you cannot declare an InOut tag "UAMethod\_OutParameters". Otherwise, the method call is rejected with an error message.

**Example program for OPC\_UA\_TranslatePathList**

In the example program for OPC\_UA\_TranslatePathList, the call of the instruction "OPC\_UA\_NamespaceGetIndexList" (#OPC\_UA\_NamespaceGetIndexList\_Instance (...)) is incorrect because not all required variant parameters are supplied.

The following applies to all client instructions: All required variant parameters must be supplied.

These are the parameters "NamespaceUri" and "NamespaceIndexes" in the case of the "OPC\_UA\_NamespaceGetIndexList" instruction used.

## Restart of the OPC UA server

The OPC UA server is stopped at each download to the CPU (e.g. after downloading a configuration or a block) and then restarts.

Please note that OPC UA clients cannot continue to use the running services for this server in this case and that the resources therefore need to be released again.

These services need to be requested again:

- Re-initiate connection setup
- Regenerate subscriptions
- Recreate read/write jobs

## 2.3.3 Hardware detection of IO devices

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Incomplete hardware recognition at ET 200SP stations

With STEP 7 V15 you can use the online function "Hardware detection" to determine the station configuration of IO devices and to import them in your project including all plugged modules.

If you import an ET 200SP via the hardware detection in your project, you have to complete the determined station configuration manually yourself:

- Check and correct the configured potential group properties (light or dark BaseUnit) for each slot. STEP 7 cannot determine through the hardware detection which BaseUnit actually exists on which slot.
- Check at the interface module whether the suitable bus adapter was determined in the hardware configuration (for example BA 2xRJ45 instead on the BA 2xFC really present).
- At a mixed configuration ET 200SP/ET 200AL with bus adapter BA-Send the ET 200AL distributed modules are not recognized. Complete the station configuration manually, meaning supplement the missing modules from the hardware catalog.

### Modules/submodules with ET 200S (GSDML) are not detected

Although the following IO devices of the ET 200S (GSDML) are taken into account during hardware detection, their plugged-in modules/submodules are not recognized. If such IO devices are added to the project, any modules/submodules that may be used must be subsequently taken from the HW catalog and configured.

Affected are:

- 6ES7 151-3AA00-0AB0 (with firmware V1.0)
- 6ES7 151-3AA10-0AB0 (with firmware V2.0)

- 6ES7 151-3BA00-0AB0 (with firmware V2.0)
- 6ES7 151-3AA20-0AB0 (with firmware V3.0)
- 6ES7 151-3BA20-0AB0 (with firmware V3.0)

### 2.3.4 HW ID of type "Hw\_SubModule" for an HMI Panel IO device

#### Contents

Information that could not be included in the online help and important information about product characteristics.

#### Determination of the HW ID with the "Hw\_SubModule" type for an HMI Panel IO device

The "ID" parameter of the PROFIenergy "PE\_START\_END" program block must be supplied with the hardware identifier (HW ID) with the type "Hw\_SubModule" of the IO device. The hardware ID with the "Hw\_SubModule" type of the HMI Panel IO device is not displayed in the system constants on an S7-1500/S7-1200/ET200SP CPU, but it can be determined. To do this, the symbol for the IO device in the HMI panel with the type "Hw\_Device" is determined in the list of PLC tags in the "System constants" tab and reduced by one, for example, "HMI\_1\_IE\_CP\_1~PROFINET\_Interface\_1~IODevice -1".

### 2.3.5 Use of modules on the S7-1200

#### Content

Information that could not be included in the online help and important information about product characteristics.

#### Use of modules on the S7-1200

The modules listed below are not supported on the S7-1200.

Family	Module	Order number
S7-300 FMs	SM 338	6ES7 338-4BC01-0AB0
	FM 350-1	6ES7 350-1AH03-0AE0
	FM 350-2	6ES7 350-2AH00-0AE0, 6ES7 350-2AH01-0AE0
	FM 351	6ES7 351-1AH01-0AE0, 6ES7 351-1AH02-0AE0
	FM 352	6ES7 352-1AH02-0AE0
	FM 355 S	6ES7 355-1VH10-0AE0
	FM 355 C	6ES7 355-0VH10-0AE0
	FM 355-2 C	6ES7 355-2CH00-0AE0
	FM 355-2 S	6ES7 355-2SH00-0AE0

Family	Module	Order number
S7-300 PtP-CP	CP 340	6ES7 340-1AH02-0AE0, 6ES7 340-1BH02-0AE0, 6ES7 340-1CH02-0AE0
	CP 341	6ES7 341-1AH01-0AE0, 6ES7 341-1AH02-0AE0, 6ES7 341-1BH01-0AE0, 6ES7 341-1BH02-0AE0, 6ES7 341-1CH01-0AE0, 6ES7 341-1CH02-0AE0
Network component	Diagnostics repeater	6ES7 972-0AB01-0XA0
ET 200M	SIWAREX	7MH4900-2AA01, 7MH4900-3AA01, 7MH4950-1AA01, 7MH4950-2AA01

### Loading S7-1200 module comments to the PG/PC

In central configurations with S7-1200, comments of modules, submodules and signal boards are not loaded. With CPs/CMs, only the comments of the IE interface or DP interface are loaded. In distributed configurations with ET 200SP or ET 200MP, only the comment of the channels is loaded from the I/O modules.

## 2.3.6 CP 343-2 on SIMATIC S7 Embedded Controller EC31-RTX

### Contents

Information that could not be included in the online help and important information about product characteristics.

### CP 343-2 on SIMATIC S7 Embedded Controller EC31-RTX

The module AS-Interface CP 343-2 (article no.: 6GK7 343-2AH01) can be inserted in an expansion rack of the SIMATIC S7 Embedded Controller EC31-RTX (article no.: 6ES7 677-1DDxx-0BB0), but the CP 343-2 cannot be operated with the EC31-RTX.

## 2.3.7 Loading of S7-1500 CPUs (SIPLUS)

### Contents

Information that could no longer be included in the online help and important information about product features.

### Behavior of a SIMATIC S7-1500 CPU SIPLUS (6AG1...) FW <V2.5 with formatted memory card

Components involved:

- CPU 151x SIPLUS (6AG1...) with firmware version prior to V2.5
- SIMATIC memory card

If you load a SIPLUS CPU to a formatted SIMATIC memory card and then set the CPU to RUN, the CPU runs without errors. But once the power supply has been switched off and on again or if a memory reset (MRES) has been performed, the SIPLUS CPU goes into STOP with an error message. The error message states that the memory card is not recognized because it is missing, is of an incorrect type, contains incorrect data or is protected.

This behavior does not occur with a CPU 151x SIPLUS (6AG1...) with firmware version V2.5 or higher or if a configuration with a S7-1500 SIMATIC CPU (6ES7...) already exists on the memory card and is overwritten by a configuration with a SIPLUS CPU (6AG1...) of the same type.

Remedy:

1. A configuration with SIMATIC CPU must be loaded on the SIMATIC memory card. Only a CPU of the corresponding type must be available; the I/O is not required in this case.
2. The SIPLUS CPU is loaded to the card. The existing SIMATIC configuration on the memory card is overwritten with the SIPLUS configuration.

This procedure prevents an error message of the TIA Portal.

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**Note**

The procedure ONLY works for online loading to the CPU. The error remains if the card is programmed by means of an external card reader.

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If you want to load a CPU 1511-1 PN SIPLUS (6AG1 511-1AK00...), for example, do the following.

1. Insert a blank memory card with sufficient available memory into the SIPLUS CPU.
2. Configure a SIMATIC CPU of the same type, here an S7-1511-1 PN (6ES7 511-1AK00...). I/O modules are not required for the first load step.
3. Load the configuration onto the SIPLUS CPU.
4. Replace the SIMATIC CPU in STEP 7 with the SIPLUS CPU (6AG1 511-1AK00...) and complete the configuration with the planned I/O modules and distributed I/O devices.
5. Load the changed configuration onto the SIPLUS CPU.

### 2.3.8 ET 200MP (IM 155-5 DP ST) on a WinLC RTX

#### Contents

Information that could not be included in the online help and important information about product characteristics.

## ET 200MP (IM 155-5 DP ST) can currently not be operated on a WinLC RTX via PROFIBUS.

Components involved:

- PC systems with logic controller functionality WinLC RTX as DP master (all versions: EC31-RTX (F), WinAC RTX (F) software PLC), referred to as "WinLC RTX" below.
- ET 200MP (IM 155-5 DP ST) as DP slave

If you configure standard modules or F-modules in an ET 200MP and use a WinLC RTX as DP master, these modules are not configured by the DP master in the ET 200MP. After loading the configuration and startup of the components involved, the modules in the ET 200MP signal the missing parameter assignment by means of flashing green LEDs.

STEP 7 does not show the readiness for operation of the modules online (status "OK").

Remedy:

- Recommendation: Use an IM 155-5 PN interface module to connect the ET 200MP to a WinLC RTX via PROFINET IO.  
or
- If no F-modules are inserted in the ET 200MP: Use the GSD version of the ET 200MP on a WinLC RTX to configure the standard modules.

## 2.3.9 Compiling ET 200SP HF V2.1 and higher, ET 200SP HS V4.0

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Compilation error for ET 200SP HF V2.1 and higher, ET 200SP HS V4.0

Affected components:

- ET 200SP HF V2.1 and higher
- ET 200SP HS V4.0

A compilation error can occur in isochronous mode of the ET200SP (ET 200SP HF V2.1 and higher, ET 200SP HS V4.0) with the setting "From OB" even if the settings are valid. The typical error message is: "The specific Ti value is invalid" or "The specific To value is invalid". But other error messages are possible as well.

Remedy:

Upgrade the module description of the ET200SP header module in this case. You can upgrade the module description of the ET 200SP header module in the network view or in the device view of the Inspector window with the function "Update module description". The error can still occur with the current module description after the first compilation. If you have selected valid settings, the error will no longer occur with the subsequent compilation.

## 2.3.10 Notes on online and diagnostics

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Hardware detection followed by online connection

When the "Online > Hardware detection" command is performed for an unspecified CPU, the online configuration is not loaded from the CPU. If you do not load the configuration resulting from the hardware detection to the CPU, the device and network views will always show a difference between the offline and online configurations. It will appear that there are different configurations in the online and diagnostic views, although the MLFBs are identical in the actual CPU and the offline CPU.

### Deleting measurements in the device (memory card) (S7-1200)

Do not delete any measurements in the device as long as a trace in the device still generates new measurements on the memory card.

## 2.3.11 Network components

### 2.3.11.1 Network and communication modules

### Online connections for special diagnostics and firmware loader

#### Special diagnostics: Establishing an online connection

Some network components (S7-300/400 CPs, PC CPs, gateways) provide expanded diagnostics data in special diagnostics.

**Requirement:**

A PG/PC interface is physically connected to the destination device, e.g. via an Ethernet cable.

**Procedure:**

Follow the steps outlined below to start special diagnostics:

1. Open the online and diagnostics view of the module.
2. In the "Functions" folder, select the group "Special diagnostics".
3. In the "Special diagnostics" area, click the "Start special diagnostics" button.

As of STEP 7 Professional V14 for several CPs only one online connection can be established from the engineering station via the CP. This connection can be established either with STEP 7 or special diagnostics.

If special diagnostics is not started by the steps listed above and an error message is output follow the steps below:

1. Disconnect the existing online connection to the station.
2. Open the online and diagnostics view of the module again as described above and start special diagnostics.

#### **32-bit applications; NCM S7 diagnostics, firmware loader**

If you have established a connection to a PC CP from a 32-bit application and want to establish another online connection via the same interface of the PC CP, you must first terminate the connection of the 32-bit application.

### **Special diagnostics and firmware loader: Chinese GUI**

When you open the special diagnostics or the firmware loader with a Chinese GUI, you need to set the language for non-Unicode applications in the operating system to Chinese.

### **S7-CM/CP**

#### **No S7 routing with CP 300/400 < V3 as router**

With S7 routing between S7-1200 or S7-1500 stations, no connection is established when older S7-300/400 CPs are connected in between as routers. The following types of communication that run over ISO transport or ISO-on-TCP connections are affected:

- S7 communication
- PG communication
- HMI communication

The behavior applies to S7-300/400 CPs with a firmware version < V3.0 for which the TSAP length is limited to 2 bytes.

In contrast, like the S7-1200/1500, S7-300/400 CPs as of V3.0 support long TSAPs and thus also S7 routing.

### **CM 1542-1: Remove retentive storage of the IP address if there are duplicate addresses**

The IP address and the device name of the CM 1542-1 remain installed retentively:

If, for example during startup, the CM detects a duplicate address in another network, the CM is not connected to the network. The CM changes to RUN and cannot be reached via the Ethernet interface.

To be able to connect the CM to the network, you can remove the retentively stored IP address as follows:

1. Remove the memory card of the CPU.
2. Using DCP with the Primary Setup Tool (PST) and with the CPU in STOP, set the IP address of the CM to 0.0.0.0 without configuration.  
You have removed the retentively stored IP address of the CM. The CM can be connected into the network.
3. Insert the memory card in the CPU again.

## PC CPs and applications

### PC CPs for VMware vSphere Hypervisor ESXi

The following communications processors have been released for operation with VMware vSphere Hypervisor ESXi for STEP 7 Professional V14:

- CP 5711
- VMware E1000 network adapter

The following communications processors have not been released for operation with VMware vSphere Hypervisor ESXi:

- CP 5611
- CP 5612
- CP 5621
- CP 5622
- CP 5512

Other communications processors such as the CP 1623 and CP 1628 are released following installation of the SIMATIC NET PC software. You will find information on this in the readme file of the SIMATIC NET PC software.

### Download to PC stations

If you download project data to a PC station with PC-CP, make sure that the CP is available.

In the "Extended download to device" dialog, do not enable the check box for the search for compatible nodes.

If you want to download to a different CP from the one selected earlier in the project, change the IP address of the CP manually in the "Extended download to device" dialog in the list of configured access nodes.

### PROFIBUS S7 connections with OPC servers

The configuration of an S7 connection via PROFIBUS is not possible between an OPC server as of V12 and an S7-1200 as of V4 or an S7-1500.

Remedy: Use an OPC server / PC application < V12 or use an S7-1200 < V4 or an S7-300 or S7-400 as the S7 station.

### Visibility of PLC tags for OPC UA communication

If in the S7 communication between a PC station and an S7 station you configure PLC tags with the option "Reachability from HMI/OPC UA" deactivated, this does not affect the visibility in the OPC UA server of the PC station.

### Access rights of an OPC client for access to PLC tags

If you want to write PLC tags of S7 stations that are provided via S7 communication in the OPC UA server of a PC station from an OPC client, make sure that the following settings are made in the configuration of the tags:

- The option "Can be written from HMI/OPC UA" is activated for the PLC tags.
- The access right "Read/Write" is activated in the symbol configuration of the OPC UA server application of the PC station.

### Security modules

#### Migration of projects with Ethernet CPs and activated security functions

In STEP 7 V5.5 projects that contain Industrial Ethernet CPs with activated security functions, the security settings are disabled during migration to STEP 7 Professional.

If necessary, follow these steps after the migration:

1. Activate the security functionality.
2. Configure the required security settings.

#### Migration of IP access protection lists when activating the security functions

An active IP access protection list is converted to firewall rules when security functions are activated. These rules are visible in advanced firewall mode and can be adjusted there. The advanced firewall mode is activated automatically.

#### Security online diagnostics of S7 CPs

Security online diagnostics of a CP with security capability is only possible if the online connection is established directly via the CP. If the online connection was established by STEP 7 via the CPU to the station, with the "Connect online" button on the security diagnostics page "Security" > "Status" of the security CP you can establish a direct connection to the CP to run security online diagnostics. As an alternative, you can also terminate the online connection to the CPU and enter the IP address of the CP in the "Station address" input box under the entry "Online access" in online diagnostics.

## IKE mode

When negotiating the key in phase 1 the IKE mode "Main" should be preferred. This mode normally provides a reliable procedure compared with the "Aggressive" mode. One reason for using the "Aggressive" setting is when you have VPN groups with different pre-shared keys.

The IKE "Aggressive" mode should not be used in conjunction with certificates. In the IKE "Aggressive" mode, only use pre-shared keys.

A security module must not be used in VPN groups that use different IKE modes.

## Downloading configuration data to an S7-300/400 via a VPN tunnel

When you download configuration data via the gigabit interface of a CP x43-1 Advanced to an S7-300/S7-400 station, the path via which the download takes place is stored in the project. If the project is then downloaded via a VPN tunnel established between a SCALANCE S module and the CP x43-1 Advanced, the download fails due to the changed path.

To download via the VPN tunnel, follow the steps below:

1. Using the "Go online" button, connect the engineering station to the gigabit interface of the CP x43-1 Advanced.
2. Disconnect the online connection to the CP x43-1 Advanced.
3. Download the project to the station via the gigabit interface of the CP x43-1 Advanced.

## VPN tunnel establishment with 1200/1500 CPs capable of VPN

The establishment of VPN tunnel connections by 1200/1500 CPs capable of VPN with the authentication method "pre-shared key" is only possible if the VPN connection partner is also a 1200/1500 CP capable of VPN. The establishment of VPN tunnel connections by a 1200/1500 CP capable of VPN to all other VPN connection partners is only possible with the "certificate" authentication method.

## Security configurations from old projects

Before a security configuration from an older STEP 7 version in STEP 7 V14 can be used, a user with administrator rights needs to log in to this security configuration in STEP 7 V13 SP1 and save the project. After opening the project in STEP 7 V14, a user must log on again to the security configuration with administrator rights. Thereafter, it is possible to use this security configuration in STEP 7 V14.

## Copying security modules between STEP 7 instances

Copying security modules between different instances of STEP 7 is not supported.

### Device certificates for CP 1543-1 V2.0 and CP 1543SP-1

For CP 1543-1 V2.0 and CP 1543SP-1, only those device certificates that are assigned to the module via the local certificate manager as device certificates are loaded to the module. This assignment takes place in the local security settings of the module in the "Certificate manager" entry via the "Device certificates" table editor. The certificates of the global certificate manager are available for the certificate assignment.

### No fallback VPN profiles for CP 1200/1500

Fallback VPN profiles are not supported by the CP 1200/1500. Configured fallback VPN profiles are therefore not loaded on the CP 1200/1500.

### Media converters

When you migrate a project, you need to reconfigure the media converters.

## 2.3.12 Notes on the S7-1500R/H redundant system

### Content

Information that could not be included in the online help and important information about product characteristics.

### S7-1500R/H redundant systems

GRAPH blocks, ProDiag blocks and the "Program\_Alarm" instruction are not supported in V15.1 of S7-1500R/H-CPU. If your program contains one of these elements, a compilation message notifies you of this.

You can find additional information under "Principle of operation of the redundant S7-1500R/H system" and "Programming S7-1500R/H CPUs" in the information system and in the section "Basics of program processing" in the S7-1500R/H system manual.

## 2.4 Programming a PLC

### 2.4.1 General notes on PLC programming

#### Contents

Information that could not be included in the online help and important information about product characteristics.

### Compiling blocks

If the message "The network is not supported in this version" is displayed, use a TEMP tag of the BOOL data type to distribute multiple assignments that are not connected to the first Boolean input of the instruction across several networks.

### Instance-specific attributes when importing blocks via TIA Openness

In certain situations, the import rules can mean the loss of instance-specific attributes, such as start values.

### Display of the CPU name in system alarms

As of V15.1, the name of the CPU (or for H or R CPUs, the name of the station) is displayed in the "Additional text 1" column of the system alarms. To do this, you need to compile the hardware of the device in question. If the CPU name is not displayed via the "Compile > Hardware (only changes)" option, use the option "Compile > Hardware (rebuild all)".

Make sure that loading to the device is actually performed; the message that the hardware is up-to-date is not enough!

### Modifying the application cycle of an isochronous cycle interrupt OB

When you change the "Application cycle (ms)" parameter of an isochronous cycle interrupt OB, you implicitly also modify the hardware configuration. To ensure that the modified value for the application cycle duration becomes effective after the next loading process of the CPU you have to explicitly include the hardware configuration in loading. To this purpose select either the menu command "Load to device > Hardware and software" or the command "Load to device > Hardware configuration".

### Information for setting breakpoints in the standard user program at S7-1500 F-CPU

If a breakpoint is enabled and is reached, the CPU immediately goes to "STOP" after "HOLD". If you want to change back to RUN mode after the "HOLD" in order to continue testing your default user program, you can simulate this with S7-PLCSIM.

Further information about testing with breakpoints at F-CPU is available in the "SIMATIC Safety – Configuring and Programming" manual.

### Using the system data type "TDiag\_StatusExt" (S7-1200/1500)

Alternatively to the "TDiag\_Status" system data type, the extended system data type "TDiag\_StatusExt" can be used to obtain more detailed information about the cause of a lost connection. In particular, the reading out of the structure element "LastConnErrTimeStamp" causes the CPU to switch to "Defect" system state and must not be used currently.

### Total size of the associated values for ProDiag (S7-1500)

The alarm procedure of the S7-1500 CPU allows a maximum of 512 bytes for associated values. For internal information, ProDiag requires part of this associated value total. This means that the three possible associated values in the specific text field can use a maximum of 400 bytes.

This value was not validated in TIA Portal V14 during compilation. As of TIA PortalV14 SP1, there is a corresponding validation, which returns an error if this value is exceeded.

This must be taken into account during migration of projects from version 14 to version 14 SP1.

### Upgrading know-how-protected blocks (S7-1200/1500)

After an upgrade from V13 SP1 to a version <V15, know-how-protected devices that have been set up with a version >=V15 can be loaded in the controller without entering a password and are executable. To edit a know-how-protected block in >=V15, remove the know-how protection and set it again. The block can then be renumbered and renamed in know-how-protected state.

- For know-how protected blocks that were set up with V13 SP1:
  - To edit the know-how-protected block in >=V15, remove the know-how protection and set it again. The block can then be renumbered and renamed in know-how-protected state.
- For know-how protected blocks that were set up PRIOR TO V13 SP1:
  - To edit, remove the know-how protection in V13 SP1 and reset it when done.

### Upgrading of GRAPH blocks (S7-300, S7-400, S7-1500)

After upgrading a project to V15.1 from a version lower than V15, check whether repaired GRAPH blocks are listed in the log file and test whether these blocks are executable in your program.

If a project contains GRAPH blocks and is upgraded from V15.0 to V15.1, the program blocks have to be compiled before they can be monitored.

### Information about network security

For communications access between TIA Portal and CPU or between HMI (except for HMI access using "GET/PUT communication") and CPU, there are integrated security functions. These provide greater protection from manipulation and higher access protection. To protect against unauthorized network access to a CPU with standardized communications access such as "GET/PUT", "TSEND/TRCV", "Modbus", "FETCH/WRITE", you should also take suitable additional measures (e.g. cell protection concept).

### Functions from the global library "Long Functions" with PLCSIM (S7-1500)

The compilation process links the functions of the S7-1500 CPU family to the CPU to protect them from manipulation. Function from the global library "Long Functions" that are used in the CPU and have such a link cannot be loaded to a simulation. However, it is possible to replace such elements with their originals from the global library. These are not linked to a CPU.

### Loading inconsistent programs to an S7-1500 CPU (S7-1500)

In TIA Portal, it is not possible to download inconsistent programs to an S7-1500 CPU without a consistency check. During the loading process, all blocks of the program are implicitly checked and are compiled again in the event of inconsistencies. If, however, there are programs on your CPU which were loaded with earlier versions of STEP 7, these programs could demonstrate inconsistencies.

In this case, note the following:

If you load an inconsistent program from a device, you will not be able to load the program back to an S7-1500 CPU unchanged afterwards, because a consistency check always takes place during the loading process and existing inconsistencies are corrected.

### Changed access rights for displaying the comparison status (S7-1200/1500)

**Valid for:**

- CPU 1500 < V2.0 (as well as ET200 SP and Software Controller)
- CPU 1200 V4.0 and V4.1

As of TIA Portal V14, the required access rights for displaying the comparison status of blocks have changed for the specified CPUs from the S7-1200/1500 series.

Previously, you only needed the "HMI access" access level for the listed CPUs to display the comparison status. As of V14, you need the "read access" access level to display the comparison status.

This change means that you are prompted to enter the password for "read access" when you go online.

If you only have the password for "HMI access", you can still establish an online connection.

In this case, click "Cancel" in the password prompt for read access and enter the password for "HMI access" in the subsequent dialog. The online connection is then established with the available "HMI access rights", but no comparison status of the blocks is displayed.

Only question marks are displayed in place of the icons for the comparison status.

**Valid for:**

- CPU 1200 <=V3.x.

As of TIA Portal V14, there is now a password prompt for the above specified CPUs when you go online for displaying the comparison status of blocks, provided that these CPUs are configured with write protection and/or read protection.

If you do not know the password for access to read-protected blocks on a protected CPU, you can still establish an online connection.

In this case, leave the displayed password prompt dialog with "Cancel".

The online connection is still established, but no comparison status of the blocks is displayed.

Only question marks are displayed in place of the icons for the comparison status.

## Data exchange between standard and F-program when using Team Engineering

To ensure data consistency between standard and safety program, you should:

- Do not exchange data via bit memory, use global data blocks instead.
- Limit access between safety programs and standard user programs to two standard data blocks.

You can find additional information on this in section 5.13 of the Programming Guidelines under: <https://support.industry.siemens.com> (<https://support.industry.siemens.com/cs/document/81318674/programming-guideline-and-programming-styleguide-for-s7-1200-and-s7-1500?dti=0&lc=en-VWV>)

## Compare offline/online

Corrections to internal project data have been made in the current version in order to enhance data integrity. After installation, this enables individual blocks to be corrected automatically upon opening, which is why the offline/online comparison displays different checksums.

## Online/offline differences in the project tree (S7-1200 FW V2.0 and V2.1)

If you use the "WRIT\_DBL" instruction to change a data block, the resulting difference between online and offline block is initially not displayed correctly by the symbols in the project tree. The difference is only shown when you terminate an online connection and then go back online.

## 2.4.2 Notes on instructions

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Instruction "TSEND\_C: Establishing a connection and sending data" for S7-1200 and S7-1500 CPUs

Contrary to the information in the online help, the value 7002 of the "STATUS" parameter has the following meaning:

- STATUS=7002: Connection is currently being established (REQ irrelevant)

### Instruction "TRCV\_C: Establishing a connection and receiving data" for S7-1200 and S7-1500 CPUs

Contrary to the information in the online help, the value 7002 of the "STATUS" parameter has the following meaning:

- STATUS=7002: Connection is currently being established (REQ irrelevant)

### Instruction "GetSMCinfo: Read information about the SIMATIC memory card"

In addition to the values described in the online help, the "Status" parameter can also have the following value:

- 8091: The selected value of the "Mode" parameter is only permitted for S7-1500-R/H CPUs.

### Instruction "RH\_CTRL: Influence sequences in R/H systems"

Contrary to the information in the online help, the values 3 and 4 for the "Mode" parameter have the following meaning:

- Mode=3: Disable execution of SYNCUP
- Mode=4: Enable execution of SYNCUP again

## 2.4.3 Note on software units

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Using software units for shared commissioning (S7-1500)

Note that only blocks can be synchronized with shared commissioning. Relations are ignored during the synchronization process.

### Manual comparison of software units (SIMATIC S7-1500)

When comparing software units manually, the property comparison overview icon does not always display the correct result. However, the comparison results of the individual source and target data are correct.

## 2.4.4 Testing the user program

### 2.4.4.1 Testing with the watch table

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Multiple access to the same CPU (S7-300/400/1200)

Online access to a CPU (S7-300/400/1200) from a PG/PC is permitted only when a TIA Portal is open. Multiple access to the same CPU of this family is not permitted and can lead to errors.

### Loading data blocks during an active control job

---

#### Note

Loading changed data blocks during an active control job can result in unforeseen operating states. The control job continues to control the specified address, although the address assignment may have changed in the data block. Complete active control jobs before loading data blocks.

---

### "Enable peripheral outputs" function

The function "Enable peripheral outputs" is not available for CPUs of the S7-1500 series in the TIA Portal.

This function can only be executed with an S7-300, S7-400 or S7-1200 CPU in the TIA Portal.

### Testing programs converted from older STEP 7 versions

To monitor and test a program converted from an older STEP 7 version, you first need to compile and download the program with the current STEP 7 version.

### Changed display formats in the watch table

The number of display formats has been reduced so that display formats that are used but no longer supported are reset to the defaults during a project upgrade.

Example: Pointers can now only be shown in "Pointer" or "Hexadecimal" format.

#### 2.4.4.2 Testing with the force table

#### Contents

Information that could not be included in the online help and important information about product characteristics.

### Forcing tags for direct I/O access (S7-300)

If you use direct I/O access for an S7-300 CPU in your user program, forcing this I/O address is not permitted.

## Example

If I/O access to the address "IB0:P" takes place in the user program, it is not permitted to force the following I/O address areas: IO.0:P, IB0:P, IW0:P and ID0:P.

## Changed display formats in the force table

The number of display formats has been reduced so that display formats that are used but no longer supported are reset to the defaults during a project upgrade.

Example: Pointers can now only be shown in "Pointer" or "Hexadecimal" format.

## 2.4.5 Compatibility of PLC programs from older versions

### 2.4.5.1 Compatibility of PLC programs from versions prior to V15.1

#### Contents

Information that could not be included in the online help and important information about product characteristics.

#### Compatibility

Basically, you can continue to use all PLC programs that were created with older versions of TIA Portal in V15.1. However, because improvements were made to the compiler and errors corrected there in V15.1, in rare cases the program may react differently after the upgrade or you may have to adapt the program code manually. These cases are described in detail below.

#### Processing sequence of function calls in SCL (S7-1200/S7-1500)

In older versions of the TIA Portal, the processing sequence of assignments containing expressions or function calls was not always clear. Processing was not carried out consistently from right to left; rather, in certain cases, parts of the expression on the left side were evaluated first.

This behavior was corrected in V15.1 so that the right side of the assignment is always calculated first and then the left side is determined.

Example:

```
#myArr["FC_1"()] := #x + #y;
```

In earlier versions, the "FC1" was run here first in order to determine an ARRAY element. Then, #x + #y was calculated.

As of V15.1, the program is now correctly processed from right to left: First, #x + #y is calculated and then "FC1" is run.

This correction can have the result that your program behaves differently after upgrade, e.g. when the tags #x or #y are set in "FC1". Therefore, please check your program after upgrading.

## Comparators (SCL S7-1200 >= 4.2 and S7-1500 >= 2.0)

When comparing two instance data blocks via comparison instructions in SCL, not the structure of the blocks but only the block numbers are compared. As of V15.1, an error message during compiling notifies you that this instruction may not return the desired result (FALSE is generally returned because the numbers of the blocks are different).

Example:

The result of the following comparison instruction is FALSE even if the structure of the two blocks is identical.

```
IF "MyDBofFB" = "MyDBofSameFB" THEN ...
```

## Importing IEC timers (S7-1200/S7-1500)

IEC timers contain read-only parameters, e.g. ET (current time value). In older versions of the TIA Portal, the start values of these read-only parameters were overwritten in some cases when external source files were imported. This behavior was corrected with V15.1: Start values for read-only parameters are now ignored when source files are imported. Instead, the default values of the data type are used. Therefore, please check your program after an import.

## Replacing invalid Unicode characters during upgrade

Invalid Unicode characters in your program are corrected when upgrading to V15.1. For example, invalid characters in string constants are replaced with the escape sequences defined by IEC. This can change the checksum of the program and indicate differences between the online and offline program. Compile your program and reload it in this case.

## Instructions "SCATTER" / "SCATTER\_BLK" and "GATHER" / "GATHER\_BLK" (SIMATIC S7-1200/1500)

You can use the "SCATTER" / "SCATTER\_BLK" instructions to parse the bit sequence into individual bits. You can use the "GATHER" / "GATHER\_BLK" instructions to combine individual bits into a bit string.

The values with which the instructions work must not be in the I/O area or in the DB of a technology object, since data consistency cannot be guaranteed in these areas.

As of V15.1, this rule undergoes a more precise syntax check. If you have the above-mentioned instructions with invalid input parameters in your program, an error is now reported during compiling.

As a remedy, you can first copy the tags to a temporary memory area and transfer them from there to "SCATTER" or "GATHER" instructions.

## Instructions "BLKMOV" / "UBLKMOV" and "FILL" / "UFILL"

Use the "BLKMOV" / "UBLKMOV" and "FILL" / "UFILL" instructions to copy the contents of a memory area (source range) to another memory space (target range). If these instructions access a memory area that does not exist, a programming error is output. In previous versions, in rare cases an error code was generated at the "RET\_VAL" parameter instead of a programming error. This behavior has been corrected for S7-1500 CPUs as of firmware version 2.6.

**"RUNTIME" instruction (SCL/STL S7-1200/S7-1500)**

The "Mem" parameter of the "RUNTIME" instruction has the data type "LREAL" and can only be used with a tag of this data type. Implicit conversion is not possible here. In V15.1, this rule undergoes a more precise syntax check. If you have provided the "Mem" parameter of the "RUNTIME" instruction with an invalid data type in your program, an error is now reported during compiling.

**2.4.5.2 Compatibility of PLC programs from versions prior to V15****Contents**

Information that could not be included in the online help and important information about product characteristics.

**Compatibility**

In principle, you can continue to use in V15 all PLC programs that were created with older versions of TIA Portal. However, because improvements were made to the compiler and errors corrected there in V15, it can occur in rare cases that the program reacts differently after the upgrade or that you have to adjust the program code manually. These cases are described in detail below.

**S7-GRAPH: Implicit conversions "Hardware data type <> INT"**

As of TIA Portal V15 it is no longer possible to program implicit conversions of hardware data types (for example INT -> DB\_ANY or DB\_ANY -> INT), as is already the case in LAD, FBD, STL and SCL.

Please use either the UINT data type or an explicit conversion instead.

**Subcategories in ProDiag (S7-1500)**

From TIA Portal V14 SP1 update 2 the individual subcategories for ProDiag are no longer added manually, but activated or deactivated in the "Activation" column.

This results in the fact that following the upgrade of a project <V14 SP1 Update 2, which uses already existing subcategories in at least one monitoring, the "Repair" button must first be selected before you can create new subcategories.

**Instructions "(U)MOVE\_BLK" and "(U)FILL\_BLK" (S7-1500)**

The instructions "(U)MOVE\_BLK" and "(U)FILL\_BLK" only accessed the process image in TIA Portal <= V15 when directly accessing the I/O.

This behavior has been corrected and now causes a runtime error because direct I/O access is not permitted for BLK instructions.

## Program loops in SCL (S7-1200/S7-1500)

In S7-1200/S7-1500 it is not possible to change the index of a program loop from within the loop with SCL.

The following program example would therefore be invalid:

```
FOR #i := 1 TO 10 DO
#i := #i + 1;
END_FOR;
```

As of TIA Portal V15, a more exact syntax check is conducted in this regard during compilation and a compilation error is output.

## Return values for functions in SCL

The behavior for functions whose return values have a structured data type has been adjusted. Structured data types are e.g. PLC data types or STRING.

Regardless of whether or not the ENO output uses the function, until now, it could happen that a temporary working copy of the function value was created although no working copy was created by the same call without ENO. The assignment of these temporary copies to the interconnected tag is made when the function is exited.

This behavior was changed as follows:

Using the output parameter ENO now no longer has any influence on whether the return value is transferred with a copy or with a reference. If the return value has a structured data type, it is generally transferred as a reference. The transfer rules are described in detail in the section "Transfer parameter as copy or as pointer".

## LDT\_TO\_DATE in SCL (S7-1500)

The reaction of LDT\_TO\_DATE to a conversion error in runtime was corrected.

## Comparison of an ARRAY element with a variable of the data type "VARIANT" in SCL (S7-1200/1500)

In the past the comparison of a variably indexed ARRAY element with a VARIANT was not carried out correctly in some cases. Instead of the ARRAY element the complete ARRAY was used for the comparison.

This behavior has been corrected in V15: The indexed ARRAY element is now evaluated for the comparison. If you use such comparisons in your program, you have to check the respective block after upgrading.

Example:

```
IF (#my_Array[#1] = #my_variant) THEN...
```

In the past "my\_variant" was compared with "my\_Array". As of V15 the comparison is carried out correctly and "my\_variant" is compared with Element #1 of "my\_Array".

**Instruction "GetSymbolPath" (S7-1200/S7-1500)**

If an FB interconnects a static variable to a formal parameter of a call and a nested block uses "GetSymbolPath" V1.0 or V1.1 for the parameter, compiling this block results in an additional display of the DB name before the name of the static variable, however, without a period as a delimiter and without replacement of the #. Version V1.2 of "GetSymbolPath" shows the path correctly with a period as a delimiter and without #.

If you use the "GetSymbolPath" instruction in your program, you should use the "GetSymbolPath" V1.2 instruction after upgrading to >=V15.

**Instruction "GetInstancePath" (S7-1200/S7-1500)**

If an FB interconnects a static variable to a formal parameter of a call and a nested block uses "GetInstancePath", compiling this block results in an additional display of the DB name before the name of the static variable.

**Additions and subtractions with DTL/LDT/DT**

In additions and subtractions with the data types DTL/LDT/DT, non-typed constants can no longer be used. A syntax error is signaled.

The following arithmetic operations, for example, are no longer possible:

```
#myDTL + 1
#myLDT + 1
#myDate_And_Time +1
```

Use constants of the data type "Time" or "LTime" instead

```
#myDTL + TIME#1d
#myLDT + TIME#1ms
#myDate_And_Time + LTIME#1ns
```

**Runtime information (S7-1200/S7-1500)**

The extended instructions "GetInstanceName", "GetInstancePath", "GetSymbolName", "GetSymbolPath" and "GetBlockName" now behave in the same way in all programming languages: If the character string to be output does not fit in the output parameter on account of size restrictions, the name is truncated and the character "..." is displayed at the end of the character string.

**ARRAYs of multi-instances**

In the past ARRAYs of multi-instances could not be addressed correctly when variables were used to address the index of a multi-instance that was in turn instantiated in a further multi-instance, that in turn was an element of an ARRAY of multi-instance.

Example:

```
#MyMultiArray[#index].MyMultiMember := 10;
```

This behavior has been corrected in V15:

If you have used such accesses in your program, you may have to check the affected block after upgrading and possibly recompile it.

### Block parameters of the data type "VARIANT" (S7-1200/1500)

As is already the case in LAD, FBD, STL and GRAPH, it is now no longer possible either in SCL to assign and instance DB as the actual parameter to a formal parameter of the data type "VARIANT".

An exception is formed by instance DBs that are derived from a PLC data type or a system data type. You assign these to a block parameter of the data type "VARIANT" in all programming languages.

It is no longer possible to assign a write-protected tag for a block parameter of the data type "VARIANT" as an actual parameter.

If possible, remove the write protection of the variable. If this is not possible, check how you can change your program to prevent access to the write-protected variable. If you only want to have read access, for example, you can copy the content of the write-protected variable in the calling block into a different variable without write protection. Subsequently you can hand over this variable as an actual parameter.

### Importing external sources

When importing an external source in which an instruction is used as a multi- or single-instance, the entire program was changed to the instruction version used in the source in the past. As of Version V15 of TIA Portal this behavior has been corrected: The instructions already contained in the project are no longer changed over, but rather retain the instruction version configured by you.

If the project contains different versions of an instruction after the import, a syntax error is reported. In this case compile the complete project again. To do so, select the "Program blocks" folder in the project tree and select the command "Compile > Software (only changes)" or "Compile > Software (compile all)" from the shortcut menu.

### Size of ARRAY of BOOL/BYTE/CHAR (S7-1500)

In the past ARRAYS of the data types BOOL, BYTE or CHAR had different sizes depending on whether they were used within a structure or not. As of V15 the size of the ARRAYS has been standardized. If you access absolutely in your program, for example by using an ANY pointer to an ARRAY of the type of BOOL, BYTE or CHAR, you have to check the program after upgrading.

#### 2.4.5.3 Compatibility of PLC programs from versions prior to V14 SP1

### Contents

Information that could not be included in the online help and important information about product characteristics.

## Compatibility

In V14 SP1 you can generally continue to use all programs that were created with older versions of TIA Portal. However, because improvements were made to the compiler and errors corrected there in V14 SP1, it can occur in rare cases that the program reacts differently after the upgrade or that you have to adjust the program code manually. These cases are described in detail below.

In addition, you have the option of editing the project in compatibility mode. You can find additional information on the compatibility under "Compatibility of projects".

## Total size of the associated values for program messages

The alarm procedure of the S7-1500 CPU allows a maximum of 512 bytes for associated values (SD parameters) of the instruction "Program\_Alarm".

You will only see a warning regarding this number in TIA Portal <= V14 during compilation. There is a stricter check as of TIA Portal V14 SP1. If this number is exceeded, an error is output during compilation to rule out error scenarios during runtime. This check from now on no longer refers to the actual size of the SD parameters at the time the instruction "Program\_Alarm" is called, but to the maximum possible size of the SD parameters. This means you must decide beforehand with what length you declare the character string tags you are transferring, as these take up a large number of bytes.

This must be taken into account in the migration of projects from version <= V14 to version V14 SP1 Update 1.

## Program loops in SCL (S7-1200/S7-1500)

In S7-1200/S7-1500 it is not possible to change the index of a program loop from within the loop with SCL.

The following program example would therefore be invalid:

```
FOR #i := 1 TO 10 DO
  #i := #i + 1;
END_FOR;
```

As of TIA Portal V14.0.1, a more exact syntax check is conducted in this regard during compilation and a compilation error is output.

## CASE statements in SCL

Labels without associated "GOTO" instruction are no longer permitted in a CASE statement. A syntax error is signaled.

## ARRAYs of multi-instances

In some cases ARRAYs of multi-instances could not be correctly be addressed in V14 when individual tags within a multi-instance had the retentivity setting "Set in IDB". This behavior has been corrected in V14 SP1.

If you have used such tags in your program, you may have to recompile the affected block after upgrading.

### Parameter type "Block\_DB" for entry of the instance DB

In LAD and FBD, you cannot enter the instance DB of an instruction using an input of the data type "BLOCK\_DB". This behavior has been made uniform for all CPU families and all block types.

As of TIA Portal V14 SP1, a syntax error is output.

If you have transferred instance DBs in your program with the help of the "Block\_DB" data type, you change your program. Instead use a parameter instance to transfer the instance during runtime.

### I/O accesses as input parameters of blocks (S7-1500 as of FW V2.1)

In the event of an I/O access error, direct I/O accesses which are interconnected as input parameters to blocks no longer result in the block being run through. Instead of this, the system uses the replacement value of the signal in the block.

For CPUs S7-1500 with FW smaller than V2.1 and all CPUs S7-1200, system behavior is unchanged:

The block is not called as a result of the I/O access error. Program execution is continued after the block call. If OB 122 exists or local error handling is enabled, these are executed.

## 2.4.5.4 Compatibility of PLC programs from versions prior to V14

### Contents

Information that could not be included in the online help and important information about product characteristics.

### Compatibility

In principle, you can continue to use in V14 all PLC programs that were created with older versions of TIA Portal. However, because improvements were made to the compiler and errors corrected there in V14, it can occur in rare cases that the program reacts differently after the upgrade or that you have to adjust the program code manually. These cases are described in detail below.

### STL: Instructions "SRW", "SLW" and "SSI" (S7-300, S7-400, S7-1500)

The permitted value range of the offset number of these instructions has changed in TIA Portal V14 from TIA Portal V13 SP1.

In version V13 SP1, it is possible to specify a number in the range 0 to 31 as an offset number on a CPU of the S7-1200/1500 series and a number in the range 0 to 15 as an offset number on a CPU of the S7-300/400 series.

As of Version V14, the value ranges for all CPU series (S7-300/400/1200/1500) was set to the uniform value from 0 to 15.

### Representation of the BCD format

The representation of the BCD format has changed in regard to the sign from TIA Portal V13 SP1 to TIA Portal V14.

The values in BCD format are show without signs in version V13 SP1.

As of version V14, the values in BCD format are show with sign. This can lead to an altered representation of the values in BCD format.

Integers (decimal system)	Hexadecimal numbers	Representation in V13 SP1	Representation in V14
0	16#0000	BCD#0	BCD#0
-26215	16#9999	BCD#9999	BCD#-999
1365	16#0555	BCD#555	BCD#555
21845	16#5555	BCD#5555	BCD#555
4096	16#1000	BCD#1000	BCD#0
-28672	16#9000	BCD#9000	BCD#0

### Instructions "SET\_BF: Set bit field" and "RESET\_BF: Reset bit array" (S7-1200, S7-1500)

The response of the instruction in regard to the structures has changed from TIA Portal V13 SP1 to TIA Portal V14.

In version V13 SP1, the number of bits that set or reset are always indicated at the input. This also applies, for example, if you have specified a structure of data type of the STRUCT or ARRAY PLC data type. If you want, for example, you want set or reset 10 bits and the structure contains only 5 bits, then the following 5 bits within the address sequence is also set or reset.

With structures of the type PLC data type, as of version V14 STRUCT or ARRAY the number of bits contained in the structure represents the maximum number of bits that can be reset: If you specify the value "20", for example, and the structure only contains 10 bits, only these 10 bits are set. If you specify the value "5", for example, and the structure contains 10 bits, then exactly 5 bits are set.

### Instructions "SCALE: Scale" and "UNSCALE: Unscale" (S7-1500)

The response of the instruction has changed from TIA Portal V13 SP1 to TIA Portal V14 in regard to specifying the limits (LO\_LIM> HI\_LIM).

In version V13 SP1, you received an error message when the low limit was greater than the high limit.

As of version V14, this value is allowed and the result is inversely proportional to the input value.

On CPUs of the S7-300/400 series, the instruction has always scaled the result inversely proportional to the input value.

### Unused bits of PLC data types (UDT) with firmware >= V1.8.1

The unused bits of PLC data types in standard memory areas are occupied or overwritten, for example, for a PLC data type that contains 4 bits.

With firmware versions < V1.8.1, you could not use the unused bits of a PLC data type elsewhere.

With firmware version >= V1.8.1, all bits are occupied or overwritten even if only 4 bits are used.

---

**Note****Address assignments**

Ensure you do not assign the same absolute address twice to different symbolic address assignments.

---

**Explicit data type conversion in SCL (S7-1200) with firmware >= V4.2**

With firmware versions < V4.2, the string was transferred aligned to the right and filled with leading spaces during explicit data type conversion of SINT/INT/DINT/REAL\_TO\_STRING/WSTRING in SCL.

Example: REAL\_TO\_WSTRING(12) = ' 1.200000E+1'

As of TIA Portal V13, the string is displayed with a leading sign during explicit data type conversion of SINT/INT/DINT/REAL\_TO\_STRING/WSTRING in SCL and transferred aligned to the left.

Example: REAL\_TO\_WSTRING(12) = '+1.200000E+1'

**SCL: EN/ENO mechanism with block parameters of data type (W)STRING (S7-1200/1500)**

As of TIA Portal V14, it is checked whether block parameters of data type (W)STRING are truncated when parameters are transferred during runtime. This can occur if formal and actual parameters have different declared lengths. If the declared length of the target parameter during runtime is insufficient to accept the (W)STRING, the (W)STRING is truncated and the enable output ENO is set to "FALSE".

If you evaluate the enable output ENO in your program, the semantics of your program may change.

**Forwarding STRING parameters between optimized blocks and standard blocks (S7-1200/1500)**

Prior to TIA Portal V14, no length information about STRINGs was transferred when parameters were transferred between optimized and non-optimized blocks. This meant that access errors not detected by the ENO mechanism could occur during the further processing of the STRING. The enable output ENO remained at TRUE despite an access error.

As of TIA Portal V14, the STRING length information is transferred and access errors are monitored by the ENO mechanism. If you evaluate the enable output ENO in your program, the semantics of your program may change.

### Length declaration for constants of the "STRING" or "WSTRING" data type

Length declarations are no longer permitted for local and global (W)STRING constants. If your program includes length declarations, for example, "MyStringConst [7]", these are automatically removed during the upgrade. This change has no semantic effect on your program, however.

### Changing the base data type for HW\_ANY from WORD to UINT

The hardware data type "HW\_ANY" is used to identify any hardware component, such as a module. In V14, the base data type of "HW\_ANY" was changed from WORD to UINT. After the conversion to V14, compiling errors can therefore occur if you have assigned an explicit WORD constant (such as W#16#1) or a tag of data type WORD at a parameter of data type "HW\_ANY".

In this case, change the notation of the constant (e.g. to 16#1) or change the data type of the tag to UINT.

### Length of block comments

As of TIA Portal V14, the block comments must not exceed a length of 32767 Unicode characters.

### Syntax check of the instructions "SR: Set/reset flip-flop" and "RS: Reset/set flip-flop"

Inputs, outputs, bit memories as well as static or local data can be used as operands at the "S" input. Use of constants is not permitted. So far, the use of the constants "0" and "1" was not rejected by the syntax check. As of TIA Portal V14 the syntax check was improved so that the use of "0" or "1" is now rejected at the "S" input. You may now receive an error message during the compiling of a program that has been compiled without errors up to this point. Change your program in this case and use a permitted operand.

### Any pointer: Access to optimized data

For a CPU of the S7-1500 series, the ANY pointer can also only point to memory areas with "Standard" access mode. Access to optimized data is not permitted with an ANY pointer.

A more detailed syntax check of ANY pointers is performed as of TIA Portal V14. Access to optimized data is now rejected. You may now receive an error message during the compiling of a program that has been compiled without errors up to this point.

### "(L)REAL" data type

With 64-bit Windows versions, the LREAL data type is sometimes evaluated differently than with the previous 32-bit versions of Windows. A difference may occur when rounding and (L) real values of constants in the least significant bit.

The potential difference is in the last digit of the mantissa and in most cases therefore only has a slight effect on the accuracy.

If you evaluate the last digit of the mantissa, the semantics of your STEP 7 program may change after the conversion.

## "ST" parameter for IEC timers

The "ST" parameter of an IEC timer is used internally and it is prohibited to write it. This why this parameter is no longer visible as of TIA Portal V14. If you have write access in your program to the "ST" parameter, an error message is generated during compiling after the upgrade.

If you exchange data with Inter Project Engineering and you have access to the "ST" parameter with HMI, you must first export the project and then re-import it into the proxy CPU. Only then does the "ST" parameter disappear in the HMI configuration.

## Associated values for messages (S7-1500)

Projects created with an older version of the TIA Portal can contain embedded associated values with different structures in the different project languages. The associated values may have a different order or may be missing in a different language. When a project of this type is upgraded, the order of the associated values is harmonized. It is based on the reference language set in the original project. In this case, it is recommended to have the translated texts checked and corrected.

## Implicit data type conversion for block parameters of the "DB\_ANY" data type

When accessing a block parameter of the "DB\_ANY" data type with the syntax `DB_ANY.%DB(B|W|D)`, no implicit data type conversion was performed previously. The bit pattern of the source value was simply converted into the target data type. If the target data type was smaller than the source data type, an overflow occurred and the written value may have been wrong or inaccurate. The enable output ENO is not set to "FALSE" when accuracy is lost or runtime errors occur.

As of V14, conversion is performed according to the rules of implicit data type conversion when parameters are passed with the syntax `DB_ANY.%DB(B|W|D)`. Note that after the upgrade a different value may be written and the semantics of your program may change. In addition, the enable output ENO is set to "FALSE" when a runtime error occurs.

## Interface of organization blocks with standard access

The interface of organization blocks with standard access must have a minimum size of 20 bytes. In older versions of TIA Portal, only the interface of OB1 was checked with regard to the minimum size during the compilation run. As of V14, interfaces of all organization blocks are checked. You may now receive an error message during the compiling of a program that has been compiled without errors up to this point.

## Comparing tags of WORD data type to tags of the S5TIME data type (S7-1500)

As of TIA Portal V14, both variables are converted to the TIME data type when comparing a variable of WORD data type to a variable of S5TIME data type. The WORD tag is interpreted as an S5TIME value. If one of the variables cannot be converted, the comparison is not performed and the result is FALSE. After successful conversion, the comparison is performed based on the selected comparison expression.

### 2.4.5.5 Compatibility of PLC programs from versions prior to V13 SP1

#### Content

Information that could not be included in the online help and important information about product characteristics.

#### Compatibility

You can continue to use in V13 SP1 all programs that were created with TIA Portal V12 SP1 or V13. However, because improvements were made to the compiler and errors corrected there (compilation of the program code) in V13 SP1, it can occur in rare cases that the program reacts differently after the upgrade or that you have to adjust the program code manually. These cases are described in detail below.

#### Unused bits of PLC data types (UDT) with firmware $\geq$ V1.8.1

The unused bits of PLC data types in standard memory areas are occupied or overwritten, for example, for a PLC data type that contains 4 bits.

With firmware versions  $<$  V1.8.1, you could not use the unused bits of a PLC data type elsewhere.

With firmware version  $\geq$  V1.8.1, all bits are occupied or overwritten even if only 4 bits are used.

---

**Note****Address assignments**

Ensure you do not assign the same absolute address twice to different symbolic address assignments.

---

#### Explicit data type conversion in SCL (S7-1200) with firmware $\geq$ V4.2

With firmware versions  $<$  V4.2, the string was transferred aligned to the right and filled with leading spaces during explicit data type conversion of SINT/INT/DINT/REAL\_TO\_STRING/WSTRING in SCL.

Example: `REAL_TO_WSTRING(12) = ' 1.200000E+1'`

As of TIA Portal V13, the string is displayed with a leading sign during explicit data type conversion of SINT/INT/DINT/REAL\_TO\_STRING/WSTRING in SCL and transferred aligned to the left.

Example: `REAL_TO_WSTRING(12) = '+1.200000E+1'`

## Reading an invalid peripheral input

In the TIA Portal as of version 12, the error code 16#2942 for the reading of an invalid peripheral input is only output if you have programmed the faulty access in such a way that this becomes effective, for example `%MW10 := "InvalidWordAccess":P`, and does not lie within an irrelevant sequence. For example, this would be `#tmp := "InvalidWordAccess":P`, if the tag `#tmp` is not used in the rest of the program block.

## Instruction "S\_CONV: Convert character string"

The EN/ENO mechanism behaves differently in TIA Portal V13 SP1 than in TIA Portal V13.

In version V13, the ENO enable output returns the signal state "0" in case of error, even if you have deactivated the ENO enable output. If you have switched an additional instruction to the ENO enable output, this is then not executed.

In version V13 SP1, the ENO enable output returns the signal state "1" in case of error, if you have deactivated the ENO enable output. If you have switched an additional instruction to the ENO enable output, this is then executed as expected.

## Instruction "SET: Set bit array" (S7-300/S7-400)

In the TIA Portal, you can also interconnect an element of a data block at the N parameter of the SET instruction.

## Instruction "MUX: Multiplex" (SCL)

Up to and including TIA Portal V13, the value of the tag at the input parameter was output unchanged as a function value, even if the K parameter had a negative integer. This behavior has changed in TIA Portal V13 SP1.

In TIA Portal V13 SP1, if you use a tag with a valid data type at the input parameters of the MUX instruction and the K parameter is a negative integer, the value of the tag is changed. You can find the valid data types in the description of the MUX instruction in the information system.

## Instruction "DEMUX: Demultiplex" (SCL)

Up to and including TIA Portal V13, no value was output at the OUTELSE output parameter if the value of the K parameter was  $< 0$ . In contrast, the value of the IN input parameter was output at the OUTELSE output parameter if the value of the K parameter was  $>$  available outputs. This behavior has changed in TIA Portal V13 SP1.

In the TIA Portal V13 SP1, if you specify at the K parameter a value that is outside the available outputs ( $K < 0$  or  $K >$  available outputs), then the value of the IN input parameter is output at the OUTELSE output parameter.

## Instruction "MOVE: Move value" (STL) (S7-1500)

As of the TIA Portal V13 SP1, a stricter syntax rule applies to the "MOVE" instruction in STL:

Up to and including TIA Portal V13, it was possible to specify non-typed constants, such as "0" at the input parameter IN.

If you want to copy, for example, the value "0" in the TIA Portal V13 SP1, you need to specify a typed constant according to the data type of the output parameter (e.g. INT#0, DINT#0, etc.).

### Instruction "Program\_Alarm: Generate program alarm with associated values" (S7-1500)

As of TIA Portal V13 SP1 the data type INT is no longer permitted for use for the associated values or an index tag of a text list. Use the UINT data type instead.

### Instructions "READ\_DBL: Read from data block in the load memory" and "WRIT\_DBL: Write to data block in the load memory"

TIA Portal V13 SP1 reports a compilation error if you use "READ\_DBL" V1.0 or "WRIT\_DBL" V1.0 and access a data block with the attribute "Only store in load memory" using the parameter DSTBLK.

Instead, use version 1.2 of both instructions.

### "READ\_DBL instructions: Read from data block in the load memory" and "WRIT\_DBL: Write to data block in the load memory" (SCL)

As of TIA Portal V13 SP1, the "READ\_DBL" and "WRIT\_DBL" instruction in SCL are subject to the same strict syntax rules as all other programming languages:

In TIA Portal V13, it was possible to specify "standard" data blocks at the SRCBLK and DSTBLK parameters that contained tags with different data types.

As of TIA Portal V13 SP1, the individual tags contained must have the same data type for both "standard" as well as for "optimized" data blocks; otherwise, compiling errors are reported.

### Function values (Return)

As of TIA Portal V13 SP1, more stringent syntax rules apply to function call:

It is checked that the function value (Return) is written in any case, even if multiple possible program paths can be run through in the function. Therefore, there is no longer any risk that the function values will accidentally not be written during runtime.

However, you may possibly receive syntax errors in functions during compiling, which it was still possible to compile without errors in V13. In such cases change the program code so that the function value is written in all possible program paths.

Example:

#### SCL

```
IF #MyIn1 = #MyIn2 THEN
    #Block_3 := #MyIn1 + 1;
END_IF;
```

In this example, the function value of "Block\_3" is not written if the condition of the IF instruction is not fulfilled. The function value then contains an undefined value.

#### SCL

```
#Block_3 := #MyIn1;  
IF #MyIn1 = #MyIn2 THEN  
    #Block_3 := #MyIn1 + 1;  
END_IF;
```

In this example the function value of "Block\_3" is definitely written in the program, since "MyIn1" is set as default before the IF loop is completed.

### Comparing the hardware data types HW\_IO and HW\_DEVICE

As of TIA Portal V13 SP1, there is a stricter syntax rule that is valid for the comparison of the data types HW\_IO and HW\_DEVICE:

Up until and including TIA Portal V13 it was possible to compare the data types HW\_IO and HW\_DEVICE directly with each other.

If you want to compare these data types in TIA Portal V13 SP1 you have to first create a tag of the data type HW\_ANY in the section "Temp" for the block interface and then copy the LADDR (from data type HW\_DEVICE) to the tag. It is then possible to compare HW\_ANY and HW\_IO.

### Implicit conversion of floating-point numbers to DWORD (GRAPH) (S7-1500)

As of TIA Portal V13 SP1 stricter syntax rules apply for the implicit conversion of floating-point numbers to DWORD:

Up to and including TIA Portal V13, it was possible to convert a non-typed constant (e.g. 1.0) implicitly to the data type DWORD if the value was less than 32 bits.

With TIA Portal V13 SP1, if you want to convert a floating-point number implicitly to the data type DWORD, you can only use typed constants (e.g. REAL#1.0) since a non-typed constant (e.g. 1.0) is interpreted as data type LREAL and can no longer be converted implicitly to DWORD.

### Assigning a value to a LTIME constant (S7-1500)

As of the TIA Portal V13 SP1, a stricter syntax rule applies to the definition of a value to a LTIME constant:

Up until and including TIA Portal V13 it was possible to assign a TIME value (e.g. T#10s) to a LTIME constant.

If you want to assign a value to a LTIME constant in TIA Portal V13 SP1, you have to use LTIME syntax (e.g. LT#10s).

Please note that the corresponding TIA Portal projects from previous versions already had to have been adjusted before the upgrade to TIA Portal V13 SP1.

### Indirect indexing of ARRAY components of data type bit string in SCL (S7-1200/S7-1500)

In TIA Portal V13, you can address the components of an ARRAY for a CPU of the S7-1200/1500 series in SCL with a tag of the data type BYTE, WORD, DWORD or LWORD as index in addition to a tag of the integer data type if the IEC check is not set. This is not possible for a CPU of the S7-300/400 series.

The result is an incompatibility with TIA Portal V12 SP1 in which indirect indexing with the data type bit string is also permitted on a CPU of the S7-300/400 series.

### EN/ENO mechanism for STRING conversion (S7-1200/S7-1500)

Conversion	Description
Strg_TO_Chars: Convert character string to Array of CHAR	<p>The ENO enable output returns the signal state "0" even if you have deactivated the ENO enable output:</p> <ul style="list-style-type: none"> <li>• For an invalid character at the CHARS parameter</li> <li>• For an invalid ARRAY index at the PCHARS parameter</li> <li>• If the sum of the PCHARS and STRG parameters exceeds the length of the target ARRAY.</li> </ul>
Chars_TO_Strg: Convert Array of CHAR to character string	<p>The ENO enable output returns the signal state "0" even if you have deactivated the ENO enable output:</p> <ul style="list-style-type: none"> <li>• If the sum of the PCHARS and CNT parameters exceeds the length of the source ARRAY.</li> </ul>

### Overflow of the local data stack (S7-300/S7-400)

As of TIA Portal V13 SP1, the size of the local data stack is checked to ensure it does not exceed what you have defined for the OB priorities in the hardware configuration.

This means that you may get error messages during compilation in projects that could be compiled without errors in V13. If this happens, change the maximum size of the local data stack in the hardware configuration.

## 2.5 Inter Project Engineering (IPE)

### 2.5.1 Notes on IPE

#### Contents

Information that could not be included in the online help and important information about product characteristics.

#### Using system diagnostics in the device proxy

To use the "system diagnostics" function in an IPE device proxy, for example, a system diagnostics view, insert the PLC alarms as content of a device proxy.

#### Connections to the SIMATIC S7-1500 software controller

Connections to the SIMATIC S7-1500 software controller as device proxy are only possible via the interfaces assigned to the software PLC.

#### Support of Alarm\_S alarms

The integrated configuration with WinCC and SIMATIC Manager support the Alarm\_S alarms, which are available via data blocks and Continuous Function Chart (CFC).

#### Compatibility

With TIA Portal V15.1, you can open the IPE files of the same version and earlier versions from V13 SP1.

IPE files created with TIA Portal version V15.1 cannot be opened with earlier versions.

## 2.6 Technological functions

### 2.6.1 Notes on S7-1500 Motion Control (S7-1500)

#### Exception error when fixed stop detection is activated with MC\_TorqueLimiting

When you start an "MC\_TorqueLimiting" job with parameter "Mode" = 1 and the technology object is not enabled, an exception error may occur in the execution system of the CPU. Make sure that the technology object is enabled (MC\_Power.Status = TRUE) before you start an "MC\_TorqueLimiting" job.

### Configuration of TM PosInput 1/TM PosInput 2 for position detection with the technology object measuring input

- **Technology object measuring input**  
For use with Motion Control and a technology object measuring input, select the measuring input type "Measuring using PROFIdrive telegram (drive or external encoder)" under "TO\_MeasuringInput > Hardware interface > Input measuring input".
- **TM PosInput 1/TM PosInput 2**  
You set the parameters for the encoder signals of the channel under "Module parameters" in "Position detection for Motion Control" mode. The parameters must be set depending on the encoder used.

---

#### Note

When a single-turn absolute encoder is used and two edges are to be measured ("MC\_MeasuringInput.Mode" = 2, 3 or 4), the distance between the measured edges of the measurement input must be < 1 encoder revolution. Otherwise, use a multi-turn absolute encoder.

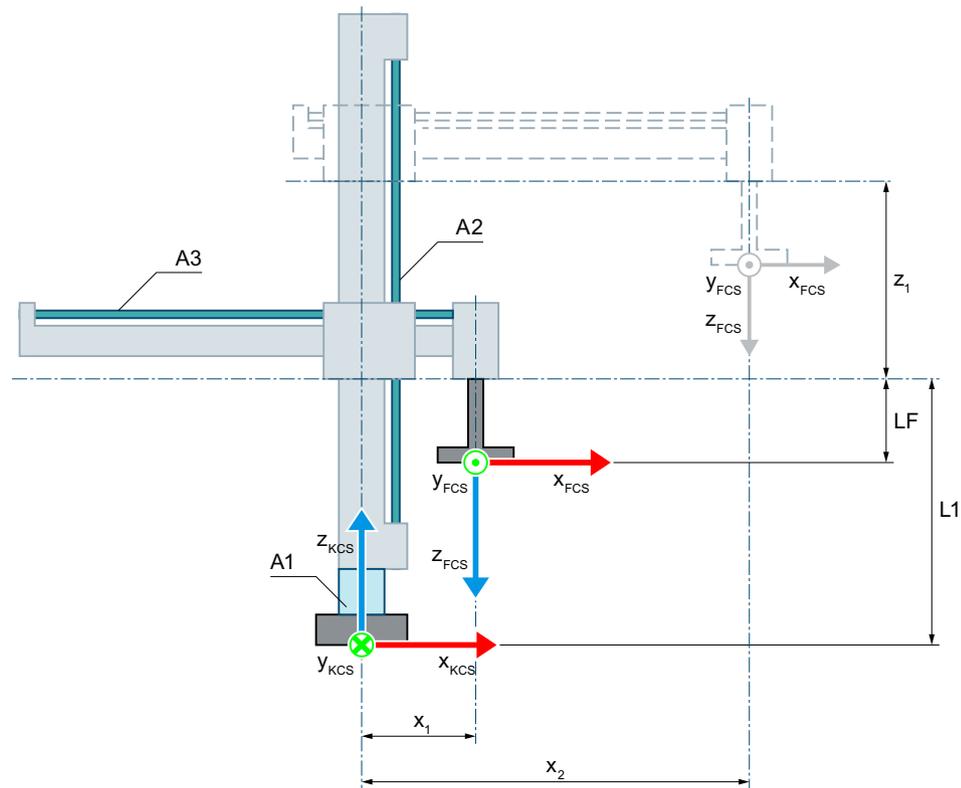
---

### Display of the geometry of the kinematics type "Cylindrical robot" (S7-1500T)

In contrast to the documented display of the kinematics type "Cylindrical robot", the length L1 represents the distance between the kinematics zero point (KZP) and the bottom edge of the articulated arm. The flange length LF represents the distance between the bottom edge of the articulated arm and the flange coordinate system (FCS). This applies both to the "3D" variant and the "3D with orientation" variant.

The graphic below shows the side view of the kinematics type "Cylindrical robot 3D" (xz plane) as an example:

- The position of the axes and the coordinate systems KCS and FCS
- The zero positions of the axes A1 and A2
- The deflection of the kinematics is indicated (dashed)



- Zero position of the axes A1 and A2
  - L1 At zero position of the axis A2:  
Distance of the FCS to the kinematics zero point (KZP) and flange length LF in z direction of the KCS
  - LF Flange length before the FCS in the z direction of the FCS
  - $x_1$  Positive deflection of the axis A3  
At the zero position of axis A3, the z axis of the FCS is located on the z axis of the KCS. For mechanical reasons, the kinematics shown cannot approach the zero position of the axis A3.
- Deflection of the kinematics
  - $x_2$  Positive deflection of the axis A3
  - $z_1$  Positive deflection of the axis A2

### Interrupt execution of the motion with an "MC\_GroupInterrupt" job (S7-1500T)

Contrary to the documented behavior, you can only interrupt the execution of the motion at the kinematics technology object during an active kinematics motion with an "MC\_GroupInterrupt" job. If the kinematics is already at a standstill, the execution of the motion is not interrupted for subsequent motion jobs. The kinematics is not in "Interrupted" state (StatusWord.X17 (Interrupted)).

By entering the value "0.0" for the velocity override, you can suspend the motion until all requested jobs have been entered in the job chain. Then you can continue the motion with a velocity override "100.0".

### Effect of the velocity override on kinematics motion jobs (S7-1500T)

If you change the velocity override, different results occur for motion jobs of the kinematics technology object, in which the orientation motion determines the duration of the overall motion. This depends on whether you change the velocity override before or after the motion job is issued.

For motion jobs that are already in the job sequence ("Busy" = TRUE) or being executed ("Active" = TRUE), the kinematics motion is already reduced to the possible orientation velocity. This means that the change to the velocity override only affects the path velocity.

For motion jobs that are added to the job sequence after the change to the velocity override, the changed velocity override also affects the orientation velocity.

For this reason, change the value of the velocity override before you issue motion jobs.

### Controlling velocity override with the Kinematics control panel (S7-1500T)

Contrary to the behavior described in the documentation, you can use the slider to set the velocity only in the world coordinate system (WCS) and object coordinate system (OCS). Kinematics motions in the machine coordinate system (MCS) are executed with the velocity override (<TO>.Override.Velocity) of the individually interconnected axes.

### Executing "MC\_GroupStop" following a "MC\_GroupInterrupt" (S7-1500T)

If you execute an "MC\_GroupStop" job after an "MC\_GroupInterrupt" job, you have to leave the parameter "Execute" at the "MC\_GroupStop" set to TRUE until the job sequence is empty (StatusMotionQueue.NumberOfCommands = 0). If the job sequence is not empty, the remaining motion jobs in the job sequence are executed.

## 2.6.2 Notes on additional technology functions (S7-1500)

### Parameters of the technology objects in TIA Portal Openness

You can find a list of the available technology object parameters in the product information "Parameters of the technology objects in TIA Portal Openness" on the internet (<https://support.industry.siemens.com/cs/ww/en/view/109744932>).

### S\_USSI on S7-1500

Note the following when using the instruction S\_USSI of the distributed I/O ET 200S 1SI on an S7-1500.

The parameter ANZ shows the value 0 even in the case of an error.

If the CPU is switched to stop with the S\_USSI instruction, check all possible errors listed at the parameter ANZ.

## PtP module with CM 1243-5 PROFIBUS Master

You have to make the following settings in the instance DB of the instructions when using the PtP modules CM PtP RS232 BA, CM PtP RS422/485 BA, CM PtP RS232 HF, CM PtP RS422/485 HF and CM PtP with a CM 1243-5 PROFIBUS Master with firmware  $\leq$  V1.3.4:

- **Send\_P2P**  
max\_record\_len = 240
- **Modbus\_Master**  
Send\_P2P.max\_record\_len = 240
- **Modbus\_Slave**  
Send\_P2P.max\_record\_len = 240

## PID\_Temp on CPU 1500 V1.7

Note the following when using PID\_Temp on a CPU 1500 with firmware version V1.7:

- The integrated dead zone in PID\_Temp must not be used on CPU 1500 V1.7.  
Do not change the preset 0.0 of the associated parameters  
Retain.CtrlParams.Heat.DeadZone and Retain.CtrlParams.Cool.DeadZone.
- If the cooling output is active (PidOutputSum < 0.0, OutputCool  $\neq$  0.0) for a closed loop controller with active cooling and PID parameter switchover (Config.ActivateCooling = TRUE, Config.AdvancedCooling = TRUE) while "Pretuning cooling" is started (Mode = 1, Heat.EnableTuning = FALSE, Cool.EnableTuning = TRUE), aborts with error ErrorBits = 16#0040\_0000.
  - In this case use "Fine tuning cooling" (Mode = 2, Heat.EnableTuning = FALSE, Cool.EnableTuning = TRUE)or
  - Before starting the pretuning, switch to manual mode with a manual value larger than 0.0 (Mode = 4, ManualValue  $\geq$  0.0).

As of firmware version V1.8, these two restrictions no longer apply.

## 2.6.3 Notes on technological functions (S7-1200)

### Display errors in the online/offline comparison for S7-1200 Motion Control

If you upgrade a TIA Portal project V15 to V15.1 and establish an online connection to the CPU on which the project with TIA Portal V15 was loaded, differences in the online/offline comparison are shown which do not actually exist. This can also be an invalid configuration.

Load the upgraded project to the CPU. The online/offline comparison shows the correct results once again.

## Parameters of the technology objects in TIA Portal Openness

You can find a list of the available technology object parameters in the product information "Parameters of the technology objects in TIA Portal Openness" on the internet (<https://support.industry.siemens.com/cs/ww/en/view/109744932>).

### PtP module with CM 1243-5 PROFIBUS Master

You have to make the following settings in the instance DB of the instructions when using the PtP modules CM PtP RS232 BA, CM PtP RS422/485 BA, CM PtP RS232 HF, CM PtP RS422/485 HF and CM PtP with a CM 1243-5 PROFIBUS Master with firmware  $\leq$  V1.3.4:

- **Send\_P2P**  
max\_record\_len = 240
- **Modbus\_Master**  
Send\_P2P.max\_record\_len = 240
- **Modbus\_Slave**  
Send\_P2P.max\_record\_len = 240

## 2.6.4 Notes on technological functions (S7-300, S7-400)

### Parameter assignment for the FM x51 and FM x52

In contrast to the information in the Online Help, if you change the measuring system, the previously entered parameter values are not converted to the new measuring system.

### Programming FM x50-1, FM x51 and FM x52

The "initial values" specified in the parameter tables in the online help regarding the instructions correspond to the "default value" in the software interface of the user programming.

### IM 174 migration

During the migration of projects with IM 174, the parameter assignment of IM 174 is set to default values. It is absolutely necessary to set parameters for IM 174 again after the migration.

## 2.6.5 SIMATIC STEP 7 Easy Motion Control

### 2.6.5.1 Notes on SIMATIC STEP 7 Easy Motion Control

There are no notes available on SIMATIC STEP 7 Easy Motion Control.

## 2.6.6 SIMATIC STEP 7 PID Professional

### 2.6.6.1 Notes on SIMATIC STEP 7 PID Professional

There are no notes available on SIMATIC STEP 7 PID Professional.



## 3.1 Security information

### Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit

<http://www.siemens.com/industrialsecurity> (<http://www.industry.siemens.com/topics/global/en/industrial-security/Pages/Default.aspx>)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

<http://www.siemens.com/industrialsecurity> (<http://www.industry.siemens.com/topics/global/en/industrial-security/Pages/Default.aspx>)

### Passwords

Various passwords are set by default in WinCC. For security reasons, you should change these passwords.

- For HMI devices with version 12, the default password for the Sm@rtServer and for the embedded Web server is "100". A default password is not preset for HMI devices with version V13.
- For the user "Administrator", the default password is "administrator".

### Integrated Web server

It is always possible on a PC to access HTML pages in Runtime, even though the option "HTML pages" is disabled. Setup always installs the standard pages of the Web Server on the PC. Assign an administrator password to prevent unauthorized access to the pages.

## Communication via Ethernet

In Ethernet-based communication, end users themselves are responsible for the security of their data network. The proper functioning of the device cannot be guaranteed in all circumstances; targeted attacks, for example, can lead to overload of the device.

## Use of SSL 3.0

For security reasons, the use of the protocol SSL 3.0 is not recommended on Comfort Panels or in Runtime Advanced. The use of the protocol SSL 3.0 is disabled by default on Comfort Panels. If you nevertheless wish to activate the use of SSL 3.0, select the following in Internet Explorer or in "Start Center > Settings: Internet Options > Advanced > Use SSL 3.0".

For RT Advanced, the use of SSL 3.0 can be disabled in Internet Explorer or in the Control Panel under "Internet Options > Advanced" by deactivating the "Use SSL 3.0" option.

## Network settings

The following tables show the network settings of each product which you need in order to analyze the network security and for the configuration of external firewalls:

WinCC Professional (without simulation)					
Name	Port number	Transport protocol	Direction	Function	Description
ALM	4410*	TCP	Inbound, Outbound	License service	This service provides the complete functionality for software licenses and is used by both the Automation License Manager as well as all license-related software products.
HMI Load	1033	TCP	Outbound	HMI Load (RT Basic)	This service is used to transmit images and configuration data to Basic Panels.
HMI Load	2308	TCP	Outbound	HMI Load (RT Advanced)	This service is used to transmit images and configuration data to panels.
RPC	**	UDP	Inbound, Outbound	Client / server & ES communication (CCAgent)	This service is used by WinCC Professional and WinCC Runtime Professional.
* Default port that can be changed by user configuration					
** Port is assigned automatically					

WinCC Simulation for Basic Panels					
Name	Port number	Transport protocol	Direction	Function	Description
HMI Load	1033	TCP	Inbound	HMI Load (RT Basic)	This service is used to transmit images and configuration data to Basic Panels.
EtherNet/IP	44818	TCP	Outbound	Ethernet/IP channel	The Ethernet/IP protocol is used for connections to Allen Bradley PLCs.
	2222	UDP	Inbound	Ethernet/IP channel	The Ethernet/IP protocol is used for connections to Allen Bradley PLCs.
Modbus TCP	502	TCP	Outbound	Modbus TCP channel	The Modbus TCP protocol is used for connections to Schneider PLCs.

WinCC Simulation for Basic Panels					
RFC 1006	102	TCP	Outbound	S7 channel	Communication with the S7 controller via Ethernet/PROFINET
Mitsubishi MC	5002	TCP	Outbound	Mitsubishi MC channel	The Mitsubishi protocol is used for connections to Mitsubishi PLCs.

WinCC Simulation for Panels and Runtime Advanced					
Name	Port number	Transport protocol	Direction	Function	Description
DCP	---	Ethernet	Outbound	PROFINET	The DCP protocol (Discovery and basic Configuration Protocol) is used by PROFINET and provides the basic functionality for locating and configuring PROFINET devices.
LLDP	---	Ethernet	Inbound, Outbound	PROFINET	The LLDP protocol (Link Layer Discover Protocol) is used by PROFINET for topology detection.
SMTP	25	TCP	Outbound	SMTP Communication	This service is used by WinCC Runtime Advanced to send e-mails.
HTTP	80*	TCP	Inbound	Sm@rtServer	The Web server is only available when Sm@rtService is activated. The used port may differ depending on automatically selected settings.
RFC 1006	102	TCP	Outbound	S7 channel	Communication with the S7 controller via Ethernet/PROFINET
NTP	123	UDP	Outbound	Time synchronization	The NTP protocol (Network Time Protocol) is used for time synchronization in IP-based networks.
SNMP	161	UDP	Outbound	PROFINET	The SNMP client functionality is used by STEP 7 to read status information from PROFINET devices.
HMI Load	2308	TCP	Outbound	HMI Load (RT Advanced)	This service is used to transmit images and configuration data to panels.
HTTPS	443*	TCP	Inbound	Sm@rtServer	The Web server with HTTPS protocol is only available when Sm@rtService is activated. The used port may differ depending on automatically selected settings.
VNC server	5900*	TCP	Inbound	Sm@rtServer	This service is only available when Sm@rtService is activated.
	5800*	TCP	Inbound	Sm@rtServer	This service is only available when Sm@rtService is activated.
VNC client	5500	TCP	Outbound	Sm@rtServer	This service is only available when Sm@rtService is activated.

\* Default port that can be changed by user configuration

## 3.1 Security information

WinCC Simulation for Runtime Professional					
Name	Port number	Transport protocol	Direction	Function	Description
RPC	**	UDP	Inbound, Outbound	Client / server & ES communication (CCAgent)	This service is used by WinCC Professional and WinCC RT Professional.
RPC	**	UDP	Inbound, Outbound	Client / server communication (CCEServer / CCEClient)	This service is used by WinCC Runtime Professional.
HTTP	80	TCP	Inbound, Outbound	Client / server communication (CCEServer / CCEClient)	This service is used by WinCC Runtime Professional.
RFC 1006	102	TCP	Outbound	S7 channel	Communication with the S7 controller via Ethernet/PROFINET
OPC UA	4840	TCP	Inbound	OPC UA server	This service is required for primary communication via OPC UA. It is activated and configured during installation.
OPC UA discovery	52601	TCP	Inbound	OPC UA server	This service provides information about the installed OPC server. It is installed and configured by the OPC UA server.
DCOM	135	TCP	Inbound	OPC server	This service is part of the Windows operating system. Since communication via OPC (DA) is based on DCOM, this service is required to initialize OPC (DA) connections.
DCOM	**	TCP	Inbound	OPC server	The communication via OPC (DA) is based on DCOM and uses unspecified ports assigned by the system. This should be taken into consideration when using OPC (DA) and creating rules for the firewall.
HTTP	80	TCP	Inbound	OPC server	This service is required for primary communication via OPC XML. It is activated and configured during installation.
NetBIOS	137	UDP	Inbound	OPC server	This service is part of the Windows operating system. Access to this service is required by OPC-Scout, for example, for browsing.
NetBIOS	138	UDP	Inbound	OPC server	This service is part of the Windows operating system. Access to this service is required by OPC-Scout, for example, for browsing.
SNMP	161	UDP	Outbound	SNMP OPC server	This service is used by the SNMP OPC server to change or query data on network drives, for example.
SNMP Traps	162	UDP	Inbound	SNMP OPC server	This service is used by the SNMP OPC server to query events from network drives, for example.
** Port is assigned automatically					

PROFINET protocols for Panels and Runtime Advanced					
Name	Port number	Transport protocol	Direction	Function	Description
DCP	---	Ethernet	Outbound	Lifelist, PROFINET Discovery and configuration	The DCP protocol (Discovery and basic Configuration Protocol) is used by PROFINET and provides the basic functionality for locating and configuring PROFINET devices.
LLDP	---	Ethernet	Inbound, Outbound	PROFINET Link Layer Discovery protocol	The LLDP protocol (Link Layer Discover Protocol) is used by PROFINET for topology detection.
MRP	---	Ethernet	Outbound	PROFINET medium redundancy	The MRP protocol (Medium redundancy protocol) enables control of redundant transmission paths using a ring topology.
PROFINET IO Data	---	Ethernet	Inbound, Outbound	PROFINET Cyclic IO data transfer	Cyclic data exchange is used by panels for direct keys and LEDs.
NARE	---	Ethernet	Inbound, Outbound	Name Address Resolution	This protocol is used to resolve network names and assign IP addresses.
PROFINET Context Manager	34964	UDP	Inbound, Outbound	PROFINET connection less RPC	The PROFINET Context Manager provides an endpoint mapper in order to establish an application relation (PROFINET AR).

Communication connections for Panels and WinCC Runtime Advanced					
Name	Port number	Transport protocol	Direction	Function	Description
Telnet	23	TCP	Inbound	Telnet	This service can be used for maintenance.
SMTP	25	TCP	Outbound	SendEmail	This service is used by Windows CE / PC Runtime to send e-mails.
HTTP	80*	TCP	Inbound	Hypertext Transfer Protocol	The HTTP protocol is used for communication with the internal Web server.
RFC 1006	102	TCP	Outbound	S7 channel	Communication with the S7 controller via Ethernet/PROFINET.
NTP	123	UDP	Outbound	Time synchronization	The NTP protocol (Network Time Protocol) is used for time synchronization in IP-based networks.
DCOM***	135	TCP	Inbound	OPC server	This service is a component of the Microsoft Windows operating system. Communication via OPC (DA) is based on DCOM. This service is therefore required to initialize OPC (DA) connections.
DCOM***	**	TCP	Inbound	OPC server	The communication via OPC (DA) is based on DCOM and uses unspecified ports assigned by the system. This should be taken into consideration when using OPC (DA) and creating rules for the firewall.

## 3.1 Security information

Communication connections for Panels and WinCC Runtime Advanced					
NetBIOS over TCP/IP	137	UDP	Outbound	With the use of Remote File Share	Register / log on to a remote server.
NetBIOS over TCP/IP	138	UDP	Outbound	With the use of Remote File Share	Register / log on to a remote server.
SNMP	161	UDP	Outbound	Simple Network Management Protocol	The SNMP client functionality is used by STEP 7 to read status information from PROFINET devices.
HTTPS	443*	TCP	Inbound	Secure Hyper-text Transfer Protocol	The HTTP protocol is used for communication with the CPU-internal Web server via Secure Socket Layer (SSL).
Modbus TCP	502*	TCP	Outbound	Modbus TCP channel	The Modbus TCP protocol is used for connections to Schneider PLCs.
Mitsubishi MC	1025*	TCP	Outbound	Mitsubishi MC channel	The Mitsubishi protocol is used for connections to Mitsubishi PLCs.
Printing	1032	TCP	Outbound	Printing	Printing on the control panel (via Ethernet).
HMI Load	2308	TCP	Outbound	Transfer	This service is used to transmit images and configuration data to panels. On Comfort Panels, this service has been replaced by Device-Manager and SCS as of V13. This service is used to transmit configuration data to WinCC Runtime Advanced.
HMI Load	50523	TCP	Outbound	Transfer	This port is used if port 2308 is not available. This service is used to transmit images and configuration data to panels. On Comfort Panels, this service has been replaced by Device-Manager and SCS as of V13. This service is used to transmit configuration data to WinCC Runtime Advanced.
ALM	4410*	TCP	Inbound, Outbound	Application License Manager	This service of RT Advanced makes available the complete functionalities for software licenses and is used by the Automation License Manager.
OPC UA	4870*	TCP	Inbound	OPC UA server	This service is required for communication via OPC UA.
HMI Load	5001	TCP	Outbound	Device Manager	This service is used to transmit images and Runtime to panels.
HMI Load	5002	TCP	Outbound	SCS (System Configuration Server)	This service is used to transmit configuration data to panels.
VNC client	5500	TCP	Outbound	Sm@rtServer	VNC client connection
VNC server	5800*	TCP	Inbound	Sm@rtServer	VNC server connection HTTP
	5900*	TCP	Inbound	Sm@rtServer	VNC server connection
SIMATIC Logon	16389*	TCP	Outbound	UMAC (User Management to the Access Control)	Register / log on to a remote server.
Allen Bradley Ethernet IP	44818	TCP	Outbound	Ethernet/IP channel	The Ethernet/IP protocol is used for connections to Allen Bradley PLCs.

Communication connections for Panels and WinCC Runtime Advanced					
Reserved	49152 ... 65535	TCP/UDP	Outbound		Dynamic port range is used, for example, to connect to the remote file sharing.
<p>* Default port that can be changed by user configuration</p> <p>** Port is assigned automatically.</p> <p>*** Supported by WinCC Runtime Advanced only.</p>					

## 3.2 Notes on use

### Contents

Information that could not be included in the online help and important information about product features.

### Change in response after upgrading

The new WinCC version contains new features and improvements as compared to the previous version. The new version may therefore demonstrate slight differences in the names or the response of properties and functions after the upgrade. Unlike in previous versions, the standard properties of newly created objects can also be changed.

These differences in response may lead to errors when compiling the project.

### Upgrading with subsequent device replacement (RT Advanced)

If you upgrade a project with a "Runtime Advanced" device and then replace the device with a panel with HMI version 14.0.1.0 or 15.0.0.0, the configured data can be lost. After upgrading, it is recommended that you either:

- First change the device to an IPC without adapting the screen and then switch back to a PC station with Runtime Advanced. You can then change the device to a panel without losing data.
- First change the device to a panel with an HMI device version lower than 14.0.1.0. You can then change the device to a panel with the desired device version without losing data.

### Working with standard user rights

If you are working with standard user rights in Windows 7, "User Account Control (UAC)" must not be disabled.

The "User Account Control" is enabled in Windows 7 by default.

For more information on the "User Account Control", refer to the online help for Windows 7.

### On-screen keyboard (RT Advanced)

Once you have opened the TIA Portal, you can no longer access the on-screen keyboard.

To access the on-screen keyboard in Windows, use the following command: "Start > All Programs > Accessories > Ease of Access > On-screen keyboard".

### **Installation on a computer with the regional setting "Turkish" (RT Professional)**

If the computer is operated with the regional setting "Turkish" at the time of the installation, WinCC Runtime Professional cannot be started.

### **Device change – character sets (RT Professional)**

If you have configured different fonts on screen objects for multilingual texts in the various project languages, you should check the screens after an HMI device replacement from a panel to a PC-based Runtime. The configured fonts may change if the device is replaced.

### **Texts in the simulation (RT Professional)**

If a Runtime language which does not correspond to an installed product language is used in the simulation, system texts are shown in an installed product language. Depending on the operating system and the installed product languages, this will be either English or Chinese.

If you wish to see all texts in Japanese, Korean or Taiwanese in the relevant language in the simulation, you should first install WinCC without simulation. Then install WinCC Runtime Professional with the required languages.

### **Online delta loading with user-defined cycles (RT Professional)**

If you have configured new custom cycles in the "Cycles" editor, "Load > Software (compile all)" command when loading the project. Online delta loading is not possible.

### **License transfer via S7USB**

You always need to run WinCC to transfer a license to a panel via S7USB.

### **Transferring licenses to a panel on 64-bit operating systems**

If you are running a 64-bit operating system and the "Edit > Connect target systems > Connect HMI device" menu command is not available in Automation License Manager, open command line input and run the following command with administrator rights:

```
"%WINDIR%\system32\RegSvr32.exe" "%CommonProgramFiles%\siemens\AlmPanelPlugin\ALMPanelParam.dll"
```

### **Installing East Asian project languages on a PC without an Asian operating system (Basic)**

If you select an East Asian project language on a PC that does not have an Asian operating system installed, the default font is marked as invalid in the "Runtime settings > Language & font" editor.

To resolve this problem, open the "Regional and Language Options > Languages" dialog in the Control Panel and enable the "Install files for East Asian languages" option.

### Operation on a network server (RT Professional)

The operation of WinCC Professional on a network server (e.g., domain controller, file and name utility server, router, software firewall, media server, exchange server) is not permissible.

### File browser on a Windows 10 PC with touchscreen

You can only operate the file browser dialog with a mouse, keyboard or on-screen keyboard (without using the touch function) on a Windows 10 PC with touchscreen. We recommend using the file browser dialog of the Windows operating system with the help of a script on a touchscreen PC with Windows 10.

### PostScript fonts

Only fonts that contain TrueType data can be used in the TIA Portal. PostScript fonts and open type fonts that contain PostScript data are not supported.

## 3.3 Migration

### Contents

Information that could not be included in the online help and important information about product features.

### Migrating an integrated project with ProTool objects

If you migrate a WinCC flexible project integrated in STEP 7 and the error message "PROTOOL option package(s) missing in STEP 7" is output, you have installed WinCC flexible 2008 SP3 or later. Moreover, the project still contains objects that were configured using ProTool. Do not open the project with WinCC flexible. To migrate the project, proceed as follows:

1. Open the project in the SIMATIC Manager.
2. Execute the "Save as" command in the "File" menu.
3. Enable the option "With reorganization" in the "Save project as" dialog.
4. Click OK.
5. Copy the project back to the original computer.
6. Restart the migration.

### Migrating a WinCC V7 project: Border line of rectangles (RT Professional)

In a WinCC V7 project, you have configured a rectangle with the settings "Line weight = 1" and "Draw insider border = yes".

You migrate the WinCC V7 project to WinCC V15. To have the rectangle displayed correctly, follow these steps.

1. Open the Inspector window of the rectangle.
2. Open the property list.
3. Disable "Widen border line inwards".

## Progress bar

As long as the progress bar still shows a value of 100%, the software is still busy running remaining tasks such as the closing of references. The software will not respond to user input while this status is given.

## Supported project languages in WinCC V7 (RT Professional)

Due to different Windows DotNet versions, there may be different names in WinCC V7 and the TIA Portal within the same language. This can result in different sorting orders in the same project.

The following table shows some examples with English spelling:

WinCC V7.x	TIA Portal
Bengali (Bangladesh)	Bangla (Bangladesh)
Bengali (India)	Bangla (India)
Chinese (Simplified, PRC)	Chinese (People's Republic of China)
Chinese (Simplified, Singapore)	Chinese (Singapore)
Chinese (Traditional, Hong Kong S.A.R)	Chinese (Hong Kong S.A.R)
Chinese (Traditional, Macao S.A.R)	Chinese (Macao S.A.R)
Chinese (Traditional, Taiwan)	Chinese (Taiwan)
French (Monaco)	French (Principality of Monaco)
Oriya (India)	Odia (India)
Sami (Inari, Finland)	Sami, Inari (Finland)
Sami (Skolt, Finland)	Sami, Skolt (Finland)
Sami, Northern (Norway)\$Sami	Sami, Northern (Norway)
Spanish (Bolivarian Republic of Venezuela)	Spanish (Venezuela)
Spanish (Spain, Traditional Sort)	Spanish (Spain)
Spanish (Spain, International Sort)	Spanish (Spain)
Yakut (Russia)	Sakha (Russia)

## 3.4 Engineering System

### 3.4.1 Screens and Screen Objects

#### Contents

Information that could not be included in the online help and important information about product features.

#### Screen objects after HMI device replacement

If you upgrade a device to the new HMI device versions, you should check the screens contained in the project. Because of the new appearance and improved operability, texts of symbolic I/O fields may not be completely legible and may be concealed by operator controls.

#### Grouping of screen objects

When you group screen objects in WinCC, performance problems can arise in WinCC in the case of large nesting depths.

#### ActiveX and .NET controls

For reasons of stability and performance, not all registered Active X controls can be configured in WinCC. Only the controls visible in the selection dialog can be used in WinCC.

ActiveX and .NET controls are always positioned in the foreground in runtime.

The configuration of ActiveX and .NET controls on levels is not supported.

#### Use of WinCC Control Development

WinCC Control Development can be used without a license.

You can find the current version of WinCC Control Development for download in the Siemens Industry Online Support, entry 109760182 "Control Development Kit" (<https://support.industry.siemens.com/cs/de/de/view/109760182>).

#### Border line of rectangles (RT Professional)

In a WinCC V7 project, you have configured a rectangle with the settings "Line weight = 1" and "Draw insider border = yes".

You migrate the WinCC V7 project to WinCC. To have the rectangle displayed correctly, follow these steps.

1. Open the Inspector window of the rectangle.
2. Open the property list.
3. Disable "Widen border line inwards".

### **Preview in screen window (RT Professional)**

You use your own designs with shadows for screen objects. The screen objects can be displayed in a screen window.

The shadows of the screen objects are not displayed in the preview of the screen window. The response occurs only in the engineering system. It is displayed correctly in runtime.

### **Many visually different screen objects**

The use of screen objects with many visually different properties (e.g. many different styles) can reduce performance in runtime and can increase the amount of available memory space used. Avoid using, for example, very many different corner radii: 0 pixel, 1 pixel, 2 pixels, 3 pixels, etc.

### **Dynamization of grouped objects (RT Professional)**

For groupings with multiple nestings (group in group, faceplate in group, group in faceplate, etc.), only the events of the outermost group and the innermost objects can be used for dynamization with system functions. System functions that are configured at events of the lower-level group or lower-level faceplate are not executed.

The configuration of simultaneous motion animation of an object group within this group can be executed in runtime in a way other than what is expected. Check the sequence of the execution in runtime and adapt the configuration if necessary.

### **Number of characters in text fields, lists and alarm texts**

The number of characters that can be used in the text of a screen object is not constant. Control instructions and formatting are taken into consideration when entering text data and the maximum number of characters is reduced accordingly.

### **Transparency in WinCC as of V13**

Transparent graphics can be displayed without any problems in runtime. This is true for all Comfort Panels and WinCC Runtime Advanced as of version 13.0.

To use the transparency in a graphic view or in a graphic I/O field, the "Fill pattern" property must be set to "Transparent" and the property "Use transparent color" must be disabled.

If the property "Use transparent color" is enabled in a device as of version 13.0, the transparency of the graphic is lost and the transparent pixels are displayed in black. We recommend that you check the "Use transparent color" property at the points of use of transparent graphics after upgrading existing projects to device version 13.0 or higher. If the graphics are not displayed correctly, disable this property.

### **Displaying SIMOTION PLC websites in the HTML browser**

If the SIMOTION PLC websites are not displayed correctly in the HTML browser, insert `"/basic"` after the website URL to display the websites in basic mode.

## Display differences between the configuration and the display on the HMI device

The display of the text configured in a screen object may be different on the HMI device due to the display configuration. If you are using the options for automatic size adjustment in the configuration, check the display on your HMI device in every language.

If texts that were configured with the "Fit object to contents" option cannot be displayed in full, they are reduced slightly on the HMI device. If this reduction leads to a distorted display of texts, disable the "Fit object to contents" option and expand the text with additional blanks. Optionally, you can increase the width of the object or use a shorter formulation for the text.

## GRAPH overview (RT Professional)

When upgrading to V14, the signature of the C function at the "Click" event is changed. The `propertyName` parameter from the previous versions has been removed. Functions that access this parameter are shown as faulty after the upgrade.

## Dynamization in ProDiag Overview (RT Professional)

Dynamization of the "Allow operator control" property with a variable is not possible in the "ProDiag Overview" object.

## Initial value acquisition and criteria analysis: Supported instructions

The FBD instructions "AND" and "OR" are also supported for initial value acquisition and criteria analysis.

The following instructions are supported for initial value acquisition and criteria analysis up to and including the instruction box:

- "Set/reset flip-flop"
- "Reset/set flip-flop"
- TP, TOF and TONR timers
- CTU, CTD, CTUD counters

## Updating faceplates with the UDTs of the type "IEC timer"

The "ST" element was automatically removed from the user-defined PLC data types (UDT) that use the "IEC timer" data type. Adapt the faceplates containing these UDTs to a new version of the UDT without an ST element.

A detailed description of this can be found in the FAQ with the entry ID "109740393" in the SIMATIC Customer Online Support.

## Higher-level controls with visibility animation

The higher-level configuration of table-based controls with visibility animation can lead to problems for touch operation with devices using the operating system Windows CE/Embedded Compact.

## SVG graphics

The SVG graphics are converted to Siemens SVG Standard. Note the following restrictions when using SVG graphics:

- The CSS definitions are converted to inline attributes.
- The embedded scripts and non-local URL links are not supported in the SVG graphics and are removed from the original graphics during conversion.
- The use of SVG graphics with embedded graphics and animations is not supported.
- The use of large SVG graphics affects performance due to the load associated with the increased characters.

The representation of SVG graphics depends on the browser used.

## Editing SVG graphics

It is not possible to open SVG graphics in an external editor using the "Edit" command.

## System diagnostics view: "HMI access" access protection

When using the "HMI access" protection level in conjunction with the SIMATIC S7-1200 PLC, correct display of the diagnostic data can only be ensured as of firmware version 4.1.

## Fonts in the header of window objects

The font that you configure in the runtime settings of the device is not used in the alarm window, system diagnostics window and dialog headers.

## Invalid graphic types in graphics lists after upgrading (WinCC Runtime Professional)

When you upgrade your project to TIA Portal version V15, invalid graphic types in the graphics list result in compiling errors that were displayed as warnings in V14.

To avoid error messages during compiling, you need to manually correct the graphic type in the graphics list if necessary.

## Multilingual graphics in faceplates

In a faceplate, insert a graphic in a screen object. This graphic is used in all specified project languages.

If you open the graphic using the shortcut menu command "Edit" with the option "Edit graphic centrally", the graphic is changed only for the currently set project language after editing and saving in an external editor, such as MS Paint. The change of the corresponding graphic is visible in all objects that use this graphic.

### Use of multilingual graphics (RT Professional)

Graphics are stored in the runtime project in the language that you specified in the Runtime settings under "Language & font > Language selection > Runtime language for non-multilingual objects".

The use of different graphics for individual runtime languages has no effect when switching languages in runtime.

Remedy: Configure individual graphic displays with the desired graphic in the set runtime language for non-multilingual objects and switch these to visible or invisible according to the runtime language in the script.

### PLC code view (RT Professional)

The button "Show whole function block" of the PLC code view can only be executed correctly when the names of the following objects do not contain any special characters, such as a comma:

- PLC name
- DB/FB name
- DB/FB interface element name

### Network changes in the PLC code display (RT Professional)

When a ProDiag alarm is pending, network changes in the PLC code view are updated in runtime.

In order for network changes in the PLC code display to be displayed correctly for criteria analysis, the message must be triggered again.

### PDF view (RT Advanced)

With the PDF view, no pop-up notes (sticky notes) can be displayed in PDF files.

### See also

<http://support.automation.siemens.com> (<http://support.automation.siemens.com/WW/view/en/62101921>)

## 3.4.2 Tags and connections

### Contents

Information that could not be included in the online help and important information about product features.

### Multiplexing tags (Basic Panels)

If you multiplex a tag with an external tag on a Basic Panel, the address is read from the PLC in runtime during the first read cycle. The value of the address read is not available until the second read cycle.

### Tag names in faceplates (RT Professional)

Use of the "." or "@" character in names of tags in faceplate types is not permitted. Do not use these special characters in the tag names in faceplates.

### Tags with symbolic addressing and "Char Array" data type (RT Professional)

Tags with symbolic addressing and the "WString" data type are not released for communication of RT Professional and SIMATIC S7-1200 V3.

### Length specification for tags of the "String" type (RT Professional)

The length specification for the internal HMI tags of the "String" type have no effect in the "Tag" editor. If you want to limit the tag length of an input field or output field, for example, limit the length using VB scripting or C scripting.

### Tag of the "String" type for connections with SIMOTION PLCs (Panels, RT Advanced)

The length of the String tags must not exceed 210 characters for SIMOTION controllers.

It is possible to create a String tag with more than 210 character in the engineering system. However, the tag in question is not written in Runtime. A message stating that the value limit is outside the tag appears.

In this case, adjust the length of the String tag.

### Tags under "Tag box ID"

The tag that you configure under "Tag box ID" with "Runtime Settings > General" may only be used in read-only mode.

No values may be written in this tag, however, they may be read in scripts, for example, or output to screens.

### Array elements in WinCC

If you have connected an HMI tag with an array from a STEP 7 data block which does not start with a low limit of 0, the array elements are mapped in WinCC to the low limit of 0.

To ensure that you do not have to rethink between the STEP 7 indices and the WinCC indices when accessing the individual array elements, the low limits of arrays should also start at 0 in STEP 7.

## Use of 64-bit data types

The use of 64-bit data types may result in a slight loss of accuracy as these data types are mapped in the HMI channel to the data type Double. It is therefore possible that integer data types are displayed with decimal places.

## System diagnostics of PLCs in the R/H system in non-redundant mode

Two PLCs and two corresponding connections are configured in an R/H system. If the R/H system is not in redundant mode, it may happen that the system diagnostics views of the connections show different diagnostics status symbols for the same PLC.

### 3.4.3 Alarm system and alarm displays

#### Contents

Information that could not be included in the online help and important information about product properties.

#### Boolean tags in alarm logs

Bool type tags are recognized as 0 and -1 in the alarm log. If you use a text list that is controlled by a tag of the type Bool in an alarm log, then add the entry for the value -1 to the corresponding text list.

#### PLC alarms

A PLC alarm is only visible in the "Alarms" editor of an HMI device if there is an instance data block for this FB.

#### Controller alarms in runtime (WinCC Professional)

If upgrade a project from versions V13SP1 or V13 SP2 to versions V14, V14 SP1, V15.x, you need to compile the project and load it in the controller and HMI device. Otherwise, the controller alarms are shown crossed out in the alarm view.

#### Controller alarms in runtime (Panels and RT Advanced)

If the property "Alarm > Basic settings > Information only" was selected for a controller alarm, it was not displayed in the alarm view in WinCC.

#### "Automatic update" of controller alarms activated on the HMI device (Panels and RT Advanced)

For controller alarms that are displayed in the alarm log, the following applies:

The info texts of the alarms are not logged and show "###Text missing###" when an alarm log is displayed in runtime.

### Copying projects with integrated connections

If you copy the devices with their integrated connections (between HMI devices and controllers) from a project to a global library and insert it from there in a new project, then the information about controller alarms can get lost on the HMI device. To avoid this loss of information, first copy all controllers and only then all HMI devices to the new project.

### Alarm 20013 on global scripts (Panels and RT Advanced)

In contrast to the description given in the help, the alarm with the number 20013 is only output on Runtime start if the script engine has not yet been initialized.

This alarm has no effect on the functioning of VB scripts in Runtime.

### Logging alarm texts with more than 6 values (Panels and RT Advanced)

If an alarm text contains more than 6 values, only the first 6 values are saved in the log file after logging.

An alarm view configured for the display of the logs shows all values contained in the alarm text.

## 3.4.4 System functions and scripts

### Contents

Information that could not be included in the online help and important information about product features.

### Scripts for service projects (RT Professional)

Since no interactive user is usually logged in service projects, C scripts and VB scripts lead to problems in the following cases:

- When the scripts require interaction, for example, operator input.
- When the scripts show message boxes.

There is no common data area for C scripting in service mode. Thus, for example, no global C variables can be exchanged between the "Scheduled tasks" and "Screens".

### Trigger tags of user-defined functions (RT Professional)

If you have configured an HMI or PLC user data type on a screen, you cannot use the elements of the user data type as trigger tags in newly created or changed user-defined user functions.

### Find and Replace in local scripts (RT Professional)

Use the "Find and Replace" function to find and replace texts within editors. It is not possible to use Find and Replace in local scripts.

## User-defined functions in faceplates

If you want to access tags in a faceplate with a user-defined function, you cannot dynamically compose the name of the tag.

## "SimulateTag" system function (Basic Panels)

If you use the system function "SimulateTag" with a short cycle time on a Basic Panel, the HMI device may be overloaded.

## System functions of the bit processing (Mobile Panels and RT Advanced)

Because of events it is not possible to manipulate bit arrays. System functions, e.g. InvertBit, SetBit etc., must not contain any elements of a bit array as argument.

## Properties no longer used (Comfort Panels and RT Advanced)

In WinCC V13, many new visual properties have been introduced and many existing properties have been harmonized.

In the course of revision of the object properties, some properties that could be used in VB scripts in earlier versions of WinCC are no longer supported for use in WinCC V13. Scripts that use properties that are no longer supported remain valid, but the relevant calls within the scripts have no function. These limitations pertain exclusively to Comfort Panels and RT Advanced in device version V13.0.

The following table shows the properties of screen objects that are no longer being used:

Property	Screen object
BorderBrightColor3D	Slider
BorderColor	Text field, I/O field, symbolic I/O field, date/time field
BorderInnerWidth3D	Slider
BorderOuterWidth3D	Slider
BorderShadeColor3D	Slider
BorderStyle3D	Text field, I/O field, button, symbolic I/O field, graphic I/O field, date/time field, bar, switch
BorderWidth	Text field, symbolic I/O field
CenterColor	Gauge
DialColor	Gauge
EdgeStyle	Text field, I/O field

## Debugging VB scripts

You can use the "Debug" object to enter custom texts in a debugger. The object has the methods "Write" and "WriteLine". You can find additional information about the "Debug" object on the Internet ([https://msdn.microsoft.com/en-us/library/wk3y866c\(v=vs.84\).aspx](https://msdn.microsoft.com/en-us/library/wk3y866c(v=vs.84).aspx)).

You can use the "Err" object to respond to error messages that are generated by another object. The object has the methods "Raise" and "Clear".

You can find additional information about the "Err" object on the Internet ([https://msdn.microsoft.com/en-us/library/sbf5ze0e\(v=vs.84\).aspx](https://msdn.microsoft.com/en-us/library/sbf5ze0e(v=vs.84).aspx)).

### Transferring parameters to VBScripts (Panels and RT Advanced)

In WinCC, you can define whether the parameters of VB scripts "ByRef" (address of the parameter) or "ByVal" (value of the parameter) are transferred.

Transferring the address of the parameter using "ByRef" (Call by Reference) is possible only for the internal tags of the VB script. With HMI tags, the value of the parameter is always transferred regardless of whether the parameter was defined as "ByRef" or as "ByVal".

### System functions with the parameter "Processing status".

For system functions, such as "SaveDataRecord" for example, you can only specify HMI tags for the "Processing status" parameter.

### Functions of the PLC code view (RT Professional)

The functions of the PLC code view "ShowCodeViewerFromAlarm" can only be executed correctly when the names of the following objects do not contain any special characters, such as a comma:

- PLC name
- DB/FB name
- DB/FB interface element name

### Accessing the "Height" and "Width" properties of some VBS objects in runtime

Contrary to what is described in the help, you have read access to the "Height" and "Width" properties for the following VBS objects:

AlarmView, Bar, BatteryView, Button, CameraControl, Clock, DateTimeField, FunctionTrendControl, Gauge, GraphicIOField, GraphicView, HTMLBrowser, IOField, Line, MediaPlayer, PDFView, PLCCodeViewer, Polygon, Polyline, ProDiagOverview, ProtectedAreaNameView, RangeLabelView, RangeQualityView, RecipeView, S7GraphOverview, Slider, SmartClientView, StatusForce, Switch, SymbolicIOField, SymbolLibrary, SysDiagControl, TextField, TrendView, UserView, WlanQualityView, ZoneLabelView, ZoneQualityView

With the following objects you have no access to the "BorderColor" property for Runtime Advanced:

TextField

You can find additional information on the VBS object model in the FAQ with entry ID "53752382" in the SIMATIC Customer Online Support:

<https://support.industry.siemens.com/cs/ww/en/view/53752382> (<https://support.industry.siemens.com/cs/ww/en/view/53752382>)

### 3.4.5 Reports

#### Contents

Information that could not be included in the online help and important information about product features.

#### Printing reports (Panels)

Depending on the printer used, the objects placed at the edge of the reports can be cut off during printing.

Make sure that your report has a suitable size.

### 3.4.6 Recipes

#### Contents

Information that could not be included in the online help and important information about product features.

#### Arrays in recipe elements

If you have configured both an array as well as the elements of this array for recipe elements of a recipe, the loading of data records aborts with the following error message: "290055: Import of data records aborted with error"

Use either the array or just the array elements for recipe elements of a single recipe.

### 3.4.7 User administration

#### Contents

Information that could no longer be included in the online help and important information about product features.

### 3.4.8 Communication

#### Contents

Information that could not be included in the online help and important information about product features.

### Establishing a connection to WinCC Runtime Advanced

Please ensure that the device version configured in the Engineering System matches the installed Runtime version; otherwise, communication when the project is loaded will not be established or will be delayed.

If the device version does not match the installed Runtime version, you have the following options:

1. Change the device version configured in the Engineering System.
2. Install the version of WinCC Runtime Advanced corresponding to the configured device version.

### Connection changing for non-integrated connections

If you want to change the communication from a non-integrated connection to another non-integrated connection, for example from Omron to Mitsubishi, you must ensure that the data types of the tags are also supported in the new connection.

### Connection interruptions with Mitsubishi PLCs

After multiple connection interruptions, a situation may arise where all the connection resources of the Mitsubishi PLC are in use and the connection can no longer be established. We recommend that you check these connection resources in the PLC program of the controller and enable them again.

### Self-signed certificates (RT Professional)

Self-signed certificates are no longer supported.

If a self-signed certificate is detected on the server side, the authentication takes place via the previously distributed PSK key (pre-shared key). If the PSK keys of the communication partners do not match, no communication is established.

### Communication between WebClient and Sm@rtServer

Java is no longer supported by future browser versions.

In these cases, use the following alternatives as Sm@rtClient:

- Sm@rtClient.exe
- Sm@rtClient app for smartphones

### Accuracy of the "DTL" data type

The "DTL" data type supports time information down to the nanosecond range. Because panels only support time information down to the millisecond, the following restrictions arise when used at the area pointers:

- Area pointer "Date/time"  
For the transmission of time information from a panel to the PLC, the smallest unit of time is 1 millisecond. The value range from microseconds to nanoseconds of the "DTL" data type is filled with zeros.
- Area pointer "Date/time PLC"  
For the transmission of time information from a PLC to a panel, the range from microseconds to nanoseconds is ignored. The time information down to and including milliseconds continues to be processed on the panel.

### Limited number of possible HMI connections

An error message is displayed during compilation of a device indicating that the configuration of the HMI connection in the "Devices & Networks" editor is invalid. The reason may be that the maximum number of possible connections of the HMI device or PLC has been exceeded.

Check the maximum number of available connections. Consult the device manuals of the devices you are using.

### Use of PROFINET IO with panel HMI devices

When using PROFINET IO to connect the direct keys and LEDs of HMI devices to the PLC, you can define an offset for the address area of the inputs and outputs during configuration in HW Config.

The following restriction applies when a PROFINET IO-capable S7-400 CPU is used with one of the HMI devices listed below:

The offset for the start of the address area of the inputs must not be greater than the offset for the start of the address area of the outputs.

The restriction applies to the following HMI devices:

- Mobile Panel 177

To configure the address parameters, open the PLC that contains the CPU of the 400 series in HW Config. Select the HMI device that is connected via PROFINET IO from the station window of HW Config. A table with the properties of the HMI device is displayed at the bottom of the station window in the detail view. Select the line containing the addresses of the HMI device in the table and open the object properties using the shortcut menu.

Enable the "Addresses" tab in the "Object properties" dialog. Configure the offset for the inputs under "Inputs > Start". Configure the offset for the outputs under "Outputs > Start".

### RT Advanced communication via Station Manager (SIMATIC NET) with an S7-1200

For communication of a SIMATIC S7-1200 with a PC with WinCC RT Advanced via a router, the following restrictions apply to the PC:

- Windows 7: Only with installed SIMATIC NET 8.1

These restrictions also apply when you use the Station Manager. Connections with the help of the Station Manager of Runtime Advanced are always treated as routed connections.

### Changing the IP settings and device name of a PLC in the Control Panel of the HMI device (Basic Panels)

The Control Panel is open in the "Service and Commissioning > IP-Adaptation" menu on the HMI device. If you want to change the IP settings or the device name of a PLC, please note:

In the Engineering System, you need to have selected the following options in the Inspector window of the PLC under "Properties > General > PROFINET interface > Ethernet addresses":

- "Set IP address using a different method"
- "Set PROFINET device name using a different method"

### HMI connections to SIMATIC S7-1200 PLCs

HMI connections to SIMATIC S7-1200 PLCs with firmware versions earlier than V2.0 are not possible.

### "Set the IP suite (address) of the PLC in the Control Panel" with SIMATIC S7-1200 V1 (Basic Panels)

The function "Set the IP suite (address) of the PLC in the Control Panel" has not been approved for the following PLCs:

- SIMATIC S7-1200 V1

### Connections via PROFIBUS DP

When a connection between a PLC and an HMI device via PROFIBUS DP is interrupted and then re-established, sporadically all other PROFIBUS DP connections in the communication network are interrupted and re-established.

De-energize the disconnected station before reconnecting it.

### Switching a connection

A connection may be interrupted when it is switched from an HMI device to a SIMATIC S7-300/400, SIMATIC S7-1500 or SIMATIC S7-1200 controller.

Note the following settings in the SIMATIC S7-1500 or SIMATIC S7-1200 PLCs:

- Absolute addressing of tags
- The "Disable PUT-GET communication" option must be selected
- The "Complete protection" protection level may not be set

### Communication of Runtime Professional with SIMATIC S7-1200

In productive operation, communication of WinCC Runtime Professional with SIMATIC S7-1200 is only released for single-user systems.

### RT Advanced in the Station Manager

If RT Advanced and WinAC RTX use the same communication processor of a PC, HMI communication with SIMATIC S7-1200 and SIMATIC S7-1500 is not possible.

### Raw data communication in redundant projects (RT Professional)

Simatic.NET, Named Connections and various communication blocks, such as BSEND/BRCV, for example, can only be used to a limited extent in a redundantly configured PC station because the connection parameters for the redundant partner server cannot be configured.

### Non-integrated connection to a SIMATIC S7-1500 software PLC (RT Advanced)

A non-integrated connection between an HMI device and a SIMATIC S7-1500 software PLC is not supported in WinCC.

### Transfer areas of the operating mode IO device and DP slave of the HMI devices

If you have activated the operating mode "IO device" or "DP slave" for HMI devices, no transfer areas should be added or deleted in the properties of the HMI device. If you have inadvertently deleted or added a transfer area, disconnect and reconnect the controller.

### Getting diagnostics data by means of HMI devices

In contrast to the description of diagnostics icons for modules and devices in the information system, the following icon has the meaning specified here for HMI devices:

Icon	Meaning
	No diagnostics data is available.

### PROFenergy communication

To set up PROFenergy communication, contact Customer Support.

## 3.5 System-wide functions

### Contents

Information that could not be included in the online help and important information about product features.

### Using system diagnostics in the device proxy

To use the system diagnostics function in an IPE device proxy, for example, a system diagnostics view, insert the PLC alarms as content of a device proxy.

### Initialize the device proxy with data from a project of the previous version

A device proxy cannot be initialized with the data from a project of the associated full version in a project with the Service Pack version.

Upgrade the source project to the Service Pack version to initialize the device proxy in the target project with the data from the source project.

### Import and export of library texts

The following objects are not supported when importing and exporting library texts:

- Import: Recipes, Recipe elements, Recipe data records, HMI alarms, Text list entries, Screens, Reports.
- Export: Text list entries, Screens, Reports.
- Import and export of library type "Screen".

## 3.6 Compiling and loading

### Contents

Information that could no longer be included in the online help and important information about product features.

### Compiling and loading

If internal errors or warnings occur during compiling, compile the complete project using the command "Compile > Software (rebuild all)" in the shortcut menu of the HMI device.

Before you start productive operation with your project, compile the entire project using the "Compile > Software (rebuild all)" command from the shortcut menu of the HMI device.

If you are using HMI tags that are connected to control tags in your project, compile all modified blocks with the command "Compile > Software" in the shortcut menu before you compile the HMI device.

### Incorrect installation of ProSave

If you receive an error message during installation of ProSave when loading data to a target device or maintenance of an HMI device, then you cannot remedy this error using the repair function of setup. Remove ProSave via the Control Panel. Then start setup and install the "ProSave" component again.

### Checking the address parameters

When an HMI device is compiled in the project tree with the command "Compile > Hardware and software (changes only)" in the shortcut menu, the address parameters of the HMI device, such as the IP address, are not checked. If you want to ensure that the address parameters are checked as well, you will have to compile the HMI device using the "Compile" button in the "Devices & Networks" editor of the toolbar.

### Error message when downloading data to the PLC

A panel and a PLC are connected and communicating with other.

If a tag is accessed while downloading data from the panel to the PLC, an error message is displayed on the panel.

### Delayed reaction in the "Extended download to device" dialog

If the settings in the "Extended download to device" dialog for "Type of the PG/PC interface" and "PG/PC interface" do not match the settings on the HMI device, this can result in the application not responding for up to a minute.

### Extended download with an S7-1200 and a Comfort Panel

An S7-1200 PLC and a Comfort Panel are located in the same physical network as the PG/PC. You open the "Extended download to device" dialog for the Comfort Panel.

If you enable the option "Show all accessible devices", it may occur that the application stops responding.

### Project transfer via USB

If you have connected more than one HMI device via USB to your configuration PC, project transfer is only possible to the last connected device.

### Comfort panels as of device version 13.0: Backing up data while loading projects

If the transfer is interrupted for Comfort Panels with a device version 13.0 or higher, WinCC automatically ensures that no data is lost and that existing data is only deleted on the HMI device after complete transmission.

### Displaying characters in transfer alarms

If characters are not displayed correctly in the transfer alarms during transfers to HMI devices with the device version V12 or older, please check the region and language settings in Windows. Set the corresponding language under "Language for non-Unicode programs".

### Missing fonts (panels)

The following fonts no longer belong to the standard installation pack in Windows 10 and are not pre-installed:

- MS PGothic (is used as standard for displaying Japanese characters)
- Gulim (is used as standard for displaying Korean characters)
- MingLiU for Chinese (is used as standard for displaying Chinese characters for Taiwan, Hong Kong and Macao)

If a font is not installed, an error message is displayed in the engineering system. The error message appears in every TIA Portal session if you navigate to “Runtime settings > Language and font” or open screen objects which use the missing font. The missing font is replaced with a suitable font by the TIA Portal.

Missing fonts cause problems during compilation and in Runtime.

For example, if you open an error-free V13 SP1 project that was created on a configuration PC with Windows 7 on a configuration PC of V14 SP1 with the Windows 10 operating system, error messages can be output during compilation because of the fonts that are not installed.

You can find more detailed information on fonts in Windows 10 at <https://support.microsoft.com/en-us/kb/3083806> (<https://support.microsoft.com/en-us/kb/3083806>)

#### **Solution**

1. Compile the project before you transfer it to your HMI device. How to determine whether the fonts you require are missing.
2. Install these fonts and/or the corresponding Windows language pack.

Alternatively, you can also compile the projects with substitute fonts.

The missing font is saved in the configuration. As soon as this font is available again, it is displayed and used in the configuration.

### **Reducing the project size**

When you compile your HMI device, an alarm appears informing you that the size of your project is approaching the system limits for the corresponding HMI device. In this case, perform a complete compilation of the software to reduce the project size. To do this, use the command "Compile > Software (rebuild all)".

## **3.7 Runtime**

### **3.7.1 Notes on operation in Runtime**

#### **Contents**

Information that could not be included in the online help and important information about product features.

#### **Focus in runtime**

If you have configured a low-contrast combination of focus color and border color for an HMI device with version 12.0.0 or earlier, the focus may no longer be identifiable in runtime after you change the device version in the TIA Portal. Change one of the two colors.

## Language behavior - Layout of on-screen keyboard

The layout of the on-screen keyboard does not change when you switch to a runtime language that is not installed for the keyboard layout.

In this case, the language setting for the keyboard remains set at the most recent valid language or the language setting for the default keyboard layout of Windows is used.

## Tag values exceed the maximum length

You enter a character string in a string tag via an I/O field. If the character string exceeds the configured number of tags, the character string will be shortened to the configured length.

## Empty alarm texts

Runtime is running with a project. The project is saved on a network drive.

In the event of interruptions to the network drive connection, Runtime may attempt to load alarm texts from the network drive.

In the event of disconnection, the alarm window or the alarm view remains empty.

To avoid this, copy the project to a local drive before the starting the project in Runtime.

## Duration of log initialization (Panels, RT Advanced)

Initialization of the logs on some storage media can take up to 5 minutes. The successful completion of initialization is immediately confirmed by a system event. If there is no storage medium for logging when Runtime starts, the appearance of the system event can also take up to 5 minutes.

## Large logs delay the ending of Runtime (Basic Panels 2nd Generation)

When very large logs are used, ending Runtime can take a long time. Use segmented logs as an alternative to very large circular logs.

## Slow reaction of SmartServer

The following programs may start and respond very slowly with Windows 7:

- HMI TouchInputPC
- SmartServer: <Ctrl+Alt+Del> shortcut in the logon dialog

The delay is caused by the callback for the Internet certificate validation.

Remedy:

You can find the following files on the product DVD under:  
Support\Windows7\CRL\_Check or CD\_RT\ Support\Windows7\CRL\_Check\:

- DisableCRLCheck\_LocalSystem.cmd
- DisableCRLCheck\_CurrentUser.cmd

1. Run the "DisableCRLCheck\_LocalSystem.cmd" file with administrator rights. Select the command "Run as administrator" from the shortcut menu of the file.
2. Reboot the PC.

If the problem persists, follow these steps:

1. Double-click the file and run the "DisableCRLCheck\_CurrentUser.cmd" file with user rights.
2. Reboot the PC.

---

#### Note

The callback for the certificate validation is disabled for all users or PCs. To restore the original state, perform the following files:

- RestoreDefaults\_LocalSystem.cmd
- RestoreDefaults\_CurrentUser.cmd

You can find the files in the following directory of the product DVD:

- Support\Windows7\CRL\_Check or CD\_RT\Support\Windows7\CRL\_Check\
- 

### Ending screensaver on the Sm@rtServer

When the screensaver is active on the Sm@rtServer on the server HMI device, you require write access to the Sm@rtClient side in order to end the screensaver on the server HMI device.

### Avoiding corrupt files during power failure

If a power failure occurs in Windows systems while the WinCC system is active, files may be corrupt or destroyed. Operation with the NTFS file system provides better security.

Secure, continuous operation is only ensured by using an uninterruptible power supply (UPS).

## 3.7.2 Notes on operation of panels in Runtime

### Contents

Information that could not be included in the online help and important information about product features.

### Using the mouse wheel in Runtime

The use of the mouse wheel in Runtime is not supported on all panels.

### Backup on the memory card of the PLC (Basic Panels)

Create the backup file "A.psb" on the memory card of the PLC. An error, for example a connection break, occurs when creating the backup.  
This will create a corrupt file on the memory card of the PLC. Such a file has "~\$" as prefix.  
Delete the file with the prefix "~\$" if you want to save a backup again under the same name "A.psb".

### Panel Data Storage and S7-1500F (Basic Panels)

The "Panel Data Storage" PDS function cannot be used on Basic Panels in conjunction with S7-1500F when the password for the protection level "Full access incl. fail-safe" is used.

### "Panel Data Storage" function (Basic Panels)

The "Panel Data Storage" (PDS) function provided by Basic Panels is only supported by SIMATIC S7-1200 as of firmware V4.0 and SIMATIC S7-1500. For the PDS function, the panel must be connected directly with the CPU and must not be connected via the CP.

### Fonts with file extension ".ttx"

The fonts with the file extension ".ttx" are available on all panels and Runtime Advanced and can be correctly displayed on all devices, for example, the "WinCC\_flexible\_smart" font.

### Languages in Runtime (Comfort Panels)

If the language set under "Region and Language" is not supported in Runtime on the HMI, all dialogs are displayed in the default language "English".

### Mass data transfer with USB

If you have installed Windows 10 on the configuration PC, the "USB" transfer channel is not available.

This restriction applies to the following devices and tools:

- Basic Panels: KP300 Basic, KP400 Basic, TP1500 Basic
- Mobile Panels: 170 series and 270 series
- WinCC Engineering System
- "ProSave" service tool

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#### Note

The "USB" transfer channel remains available if Windows 7 is installed on the configuration PC.

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#### Solution

Use other transfer channels to transfer the project data, such as the "Industrial Ethernet" or "PROFIBUS DP" channel.

### Modifying the IP address and device name for Panels

On Comfort Panels, the IP address or the device name can be modified even during runtime.

On Basic Panels, modification of the IP address or the device name during runtime is not possible.

## 3.7.3 Notes on operation of Runtime Advanced

### Contents

Information that could not be included in the online help and important information about product features.

### Starting Runtime

Only WinCC Runtime V15 can be started in TIA Portal V15. WinCC Runtime V11.02, V12, V13, V13 SP1, V14 and V14 SP1 can be simulated in TIA Portal V14 SP1.

### Screen saver on computers with Windows 10

On a computer with Windows 10, an activated screen saver is no longer terminated when an alarm of the "error" class is output.

### Windows 10 in tablet mode

It is not recommended to use Windows 10 in tablet mode.

When running applications in tablet mode in Windows 10, for example Runtime Advanced, Sinumerik Operate, etc., these applications are minimized after starting.

### Authorization for starting Runtime (RT Advanced)

On a computer running the 32-bit version of Windows 7, WinCC Runtime Advanced can only be started if a user is a member of the automatically created group "Siemens TIA Engineer".

### .Net-Controls in Runtime

If you have incorporated a .Net control in your project as "Custom .Net control", you have to copy the files belonging to these controls to the installation directory of WinCC Runtime, e.g. "C:\ProgramFiles\Siemens\Automation\WinCC RT Advanced". Otherwise, the control cannot be loaded in Runtime.

## Disabling automatic checking for software updates

If the Engineering System is installed together with Runtime on a PC, the operator gets notifications about software updates. For the system to run reliably on a multi-user system, the same software version must be installed on all PCs.

It is possible to disable the automatic checking for software updates and to thus improve performance.

To disable the automatic checking for software updates, go to "Settings > General > Software updates" and clear the "Check daily for updates" check box.

## 3.7.4 Notes on operation of Runtime Professional

### Contents

Information that could not be included in the online help and important information about product features.

### User authorizations within the operating system

1. All users must be added to the "SIMATIC HMI" user group. This also applies to users who want to open WinCC projects remotely.
2. The storage folders of the projects must have the NTFS authorizations "SIMATIC HMI" with full access and "SIMATIC HMI Viewer" with read access. The authorizations must be inherited for all subordinate objects.
3. Members of the Windows user group "SIMATIC HMI" should not simultaneously be members of the Windows user group "SQLServerMSSQLUser\$<Computename>\$WINCC". The members of this group have administrator rights to the SQL server. Therefore remove all Windows users from this group for whom restricted access to the WinCC database is sufficient.

### Windows 7: Locking shortcuts

If you want to lock shortcut keys in Windows 7, you must change the group policies in the administrative tools of the operating system.

A detailed description of this can be found in the FAQ with the entry ID "44027453" in the SIMATIC Customer Online Support:

Internet: WinCC FAQ 44027453 (<http://support.automation.siemens.com/WW/view/en/44027453>)

### Undocked toolbars

If the setting "Always on Top" is used for the Windows taskbar, undocked toolbars can be hidden behind the Windows taskbar in Runtime. Follow the steps below to show the toolbars again:

1. Select the "Properties" command in the shortcut menu of the taskbar.
2. Disable "Keep taskbar on top of other windows".

### Fault in the connection between the server and the client

If the connection between the server and client is faulty, check the settings of the PG/PC interface. TCP/IP(Auto) should not be used for the "Interface Parameter Assignment Used". Used fixed IP addresses instead.

### Fault in the connection between the server and the client

If the computer is simultaneously used as a server with the engineering system and a client cannot establish the connection to the server, you should check the releases set on the server.

1. Exit Runtime on the server.
2. Select the command "Find computer..." in the shortcut menu of the network environment on the desktop of the server.
3. Enter the name of the server as the computer to be found.
4. Open the computer found to see the released directories.
5. Remove all the releases that begin with "WinCC\_Project\_HMI". Information on this is available in the documentation for the operating system.

This malfunction is caused by the use of the command "Save as..." in conjunction with the startup of the Runtime of this new project. You can make copies of the projects for backup purposes using the "Save as..." command. You should, however, continue to work with the original project.

### Starting WinCC Runtime Professional

If Engineering System and Runtime are operated on one computer, Runtime or simulation for a project opened in the Engineering System should only be started and ended using the TIA Portal. Other options, for example, the symbol in the taskbar information area, should not be used.

When you configure autostart on the client, you are required to enter the logon name and password for each registered server project. To assign each server a logon name, the entry of the respective project path must be confirmed with the "Apply" button. This means that you must enter a logon name and password twice for redundant or alternative projects.

## Setting the services for the SQL server

In order to ensure the full functionality of the SQL server for WinCC and WinCC Runtime, you need to check the SQL server settings.

1. Start "Programme > Microsoft SQL Server 2014 > Configuration Tools > SQL Server 2014 Configuration Manager" in the Start menu.
2. Click "SQL Server Services" in the tree.
3. Check the services "SQL Server (WinCC)", "SQL Server (WINCCPLUSMIG)" and "SQL Server Browser". "Automatic" must be entered for "Start Mode". "LocalSystem" must be entered for "Log On As". Change the settings, if necessary.
4. Click "SQL Server Network Configuration" in the tree.
5. Click "Protocols for WinCC".
6. Check the "TCP/IP" protocol. "Enabled" must be entered for "Status". Change the settings, if necessary.

## "Report system error" in WinCC Runtime Professional

The "Report system error" functionality is limited in WinCC Runtime Professional in conjunction with an S7-300 or S7-400. In an alarm view, only one alarm is ever displayed for each diagnostics type. Alarms on other errors of the same diagnostics type are not displayed.

## WinCC interface and 64-bit operating system

The open interfaces of WinCC Runtime Professional do not offer native 64-bit support. Runtime API, VBS and the WinCC OleDb provider are primarily affected by this. To be able to use WinCC interfaces with a 64-bit operating system, note the following:

- VB scripts cannot be started by simply double-clicking. You must explicitly use the 32-bit version under "syswow64\wscript.exe".
- .NET applications that use the WinCC API have to be explicitly compiled as 32-bit applications, not with "AnyCPU", but with "x86".
- C++ applications must not be compiled as 64-bit applications.

## Dynamic graphics in WinCCViewer RT

If you use dynamic graphics from a graphics collection, e.g. linked with scripts, these graphics are not updated in the WinCCViewer RT.

Select the "User-defined" option under "Runtime Settings > Graphic Settings".

### Runtime Professional: Loading a project without connection to the configuration PC

Before you begin to load a project on the operator station, backup data such as "User administration" and "Recipe data".

1. User administration data are overwritten by default.  
Therefore, configure two buttons in your project for exporting and importing the user administration with the system function "ExportUserManagement". The data only needs to be exported if you have made changes to the user view in Runtime.
2. In the "Load preview" dialog, specify whether recipe data should be overwritten when loading the project.  
You can save recipe data in the recipe view using the operator controls "Export log" and "Import log".

Note that the most recently imported or loaded data are used in Runtime.

### Operation on a network server

Operation of WinCC Runtime Professional on a network server (e.g. domain controller, file server, name utility server, software firewall, media server, exchange server) is not permitted.

### Connection with S7-1200 in system diagnostics

Only a WinCC Runtime Professional HMI system can be connected with an S7-1200 (up to V3) when you use system diagnostics.

### Disabling automatic checking for software updates

If the Engineering System is installed together with Runtime on a PC, the operator gets notifications above software updates. For the system to run reliably on a multi-user system, the same software version must be installed on all PCs.

It is possible to disable the automatic checking for software updates and to thus improve performance.

To disable the automatic checking for software updates, go to "Settings > General > Software updates" and clear the "Check daily for updates" check box.

### Restriction in the online delta loading capability

When you replace a design, the online delta loading capability of the project is lost. TIA Portal does not output an error message in this case.

### Screen objects in reports as PDF

The quality of the screen objects in the reports that you generate in Runtime as PDF files depends on the PDF printer drivers used.

## Projects in Runtime after Windows 10 update

You have installed Windows 10 version 1709 on a PC with WinCC Professional V15 and a PC with WinCC Professional RT V15. You have performed a Windows 10 update to version 1803 on the Runtime PC. After the Windows 10 update, it may no longer be possible in Runtime to manually open a project loaded from the engineering system PC.

Remedy: Set the start type of the service for the WinCC SQL instance manually to "Automatic (Delayed Start)" and restart the system.

## 3.8 HMI devices

### 3.8.1 Notes on HMI devices

#### Contents

Information that could not be included in the online help and important information about product properties.

#### Unsupported HMI devices (as of TIA Portal V15)

All HMI devices with version 11.x are no longer supported as of TIA Portal V15.

The following HMI devices are no longer supported as of TIA Portal V15:

- WinAC MP 177, WinAC MP 277, WinAC MP 377
- Panels: OP and TP of the 70 series, 170 series and 270 series
- Multi Panels: Multi Panels of the 170 series, 270 series and 370 series

In order to use other devices in TIA Portal V15, for example Basic, Comfort or Mobile Panels, that have been configured with version 11.x, change the device version of the device in question.

The storage structure in the installation directory also no longer contains data for 11.0. This helps to reduce the size of the TIA Portal installation package compared to the previous versions.

#### Unsupported HMI devices (as of TIA Portal V15.1)

In addition to the devices that are not supported in TIA V15, the following devices are no longer supported as of TIA Portal V15.1:

- WinCC Runtime Advanced V11

## Multi-key operation

Unintentional actions can be triggered by multi-key operation:

- When you are using a key device, you cannot press more than two function keys at the same time.
- When you are using a touch device, a standard PC or a panel PC, you can only press one function key or button at the same time.

## HMI devices with high communication load

S7 Diagnostics should be enabled if a Panel is assigned many connections to PLCs or other HMI devices. Otherwise, you will risk overload on the Panel.

## TS Adapter with Ethernet interface

If an HMI device is connected via Ethernet and a TS adapter, it can not be reset to factory settings.

## Simulation with real PLC connection

The access point used by the simulation is independent from the settings of the engineering system and can only be altered in the Control Panel with the "Setting PG/PC Interface" tool. If the PLC connection is terminated right after the start of the simulation with alarm 140001, you should check the access point used by the simulation with "Setting PG/PC Interface".

1. Double-click "Setting PG/PC Interface" in the Control Panel. A dialog opens.
2. Select "S7ONLINE" in the "Access point of application" field as standard for HMI.
3. Select the interface in the "Interface Parameter Assignment Used" area.
4. Exit the "Set PG/PC Interface" dialog with OK.

## Upgrading Basic Panels to device version V12

Before you upgrade Basic Panels from device version V11 to device version V12, transfer the image of the V11 SP2 Update 5 or higher to the devices.

In the "SIMATIC ProSave [OS Update]" dialog, select the setting "Reset to factory settings".

In this way, you always start a functional update of the image.

Affected devices:

- KP300 Basic mono PN
- KP400 Basic color PN
- KTP400 Basic color PN

## Simulation of the Basic Panels

Use an output field in an alarm text to output an external tag. The content of this output field will then always be displayed with "0" during simulation.

## Basic Panels 2nd Generation

Basic Panels 2nd Generation support the Sm@rtServer option.

If you are not using a USB hub, select the USB port USB\_X60.1 as storage path.

## HMI devices with operating system Windows CE 5.0 or higher

Owing to a modified client-server communication security setting, the time difference between the HMI device (client) and PC (server) must not exceed 1 day. If you back up recipe data from the HMI device on a network drive, for example, make sure that the time is set correctly on the PC (server) and the HMI device (client).

## Connection switch in the Control Panel with Basic Panels

If you use the "Override protected connection information" function, the following restriction applies:

You cannot perform a connection switch in the Control Panel of a Basic Panel from a PLC without a protection level to a PLC with a "Complete protection" level.

## Mobile Panels 277F IWLAN

Mobile Panels 277F IWLAN are approved for use with CPUs of the type S7-1500F with WinCC V13 SP1 Update 4.

If this connection is not established automatically after the panel is switched on or after a fail-safe connection to a CPU S7-1500F is interrupted, a STOP/RUN transition needs to be performed on the CPU.

Affected MLFBs:

- 6AV6645-0EB01-0AX1
- 6AV6645-0EC01-0AX1
- 6AV6645-0EF01-0AX1
- 6AV6645-0GB01-0AX1
- 6AV6645-0GC01-0AX1
- 6AV6645-0GF01-0AX1
- 6AV6645-0EF02-0AX1
- 6AV6645-0EF01-0AX1

## Using Mobile Panel 277F IWLAN in the industrial environment

To avoid communication problems between the HMI device and access point, observe the following:

IWLAN planning: Wireless connection between the HMI device and access point

- Wireless field planning needs to be carried out. Radar influences need to be taken into consideration for channels requiring Dynamic Frequency Selection (DFS).
- Avoid radio frequency interference from other devices, such as hand-held devices with Bluetooth or WLAN functionality.
- For adjacent access points, use data channels that are separated by at least one wireless channel (e.g. 36 and 44 rather than 36 and 40).
- Do not place several access points in the immediately vicinity of one another. We recommend a minimum distance of 5 m.
- For the Mobile Panel 277F IWLAN, use the "Software retry number" 15 instead of the default value 3.

Using the "Rapid roaming" function with iPCF-MC

- Always use iPCF or iPCF-MC (rapid roaming) for PROFINET communication via PROFINET.
- Use the same SSID for all access points.
- The "Background scan" should be switched off on the HMI device ("Background scan interval" for the HMI device = 1 (default value)).
- Use the same "Management channel" and different, non-overlapping "Data channels" for all access points.
- Configure the "PN-IO cycle time" higher than the "iPCF scan cycle time".
- Observe the configured timeout when assigning PROFINET parameters.

### "Zone ID/Connection point ID" tag of a Mobile Panel 277 IWLAN V2

The tag used for the "Zone ID/Connection point ID" must be of data type INT for Mobile Panel 277 IWLAN V2 devices. Adapt this data type if necessary when migrating a project.

### Mobile Panels 277F IWLAN (RFID tag): F\_DB\_STATES

The F\_DB\_STATES block is no longer supplied with WinCC V14. The block F\_DB\_STATES serves only for data exchange. You can configure an F\_DB to replicate the function of the F\_DB\_STATES. Note the description of the F\_DB\_STATES in the operating instructions of your HMI device or in the information system.

### IPC427D

If an IPC427D is configured in a V12 or V13 project in which IE1 of the PC station is assigned and the device version of the PC station changes from V1 to V2 after upgrading to V14, the interface assignment of CP\_IE\_1 must initially be set to "None, or different Windows settings" and then changed to "SIMATIC PC Station" before compiling the project. Then, the project can be compiled without errors.

## Printing alarms (Mobile Panels 2nd Generation)

It is not possible to print alarms as PDF or HTML when the internal memory "/flash" is selected as "Storage Location". To print alarms as PDF or HTML, select an SD memory card or a USB stick as storage location.

## DHCP on KTP 400 PN, KTP 700 PN and KTP 900 PN

Operation with DHCP is not recommended for the KTP 400 PN, KTP 700 PN and KTP 900 PN devices.

In some circumstances, it is possible that the device will no longer boot. If that is the case, detach the network cable and reboot the device. After it has successfully started up, please assign a fixed IP address.

## 2nd Generation Mobile Panels

Mobile Panels 2nd Generation can be configured with TIA Portal V15.1 in device version V15. The compiled project cannot be downloaded to these devices, however.

An upgrade to device version V15.1 is required to work with Mobile Panels 2nd Generation in TIA Portal V15.1.

## Sm@rtServer with Mobile Panels 2nd Generation

As of WinCC V15.1 the Sm@rtServer option is available and configurable for all 2nd generation Mobile Panels without a license. See the important notes in the Siemens Industry Online Support entry ID 109758056 (<https://support.industry.siemens.com/cs/ww/en/view/109758056>).

## Sm@rtServer with KTP Mobile Panels

The evaluation of the safety operation via PROFIsafe is only guaranteed if the Sm@rtServer is disabled on the panel.

The use of Sm@rtServer on devices without a safety function is not recommended.

## Simulation of Basic Panels 2nd Generation

3D hardware acceleration of the graphics card should be enabled for simulating the Basic Panels 2nd Generation.

## Installing fonts

If you have installed new fonts on a panel with Prosave, you will need to restart the panel. The duration of the runtime startup process depends on the number and size of fonts.

## Interruption of the DH485 connection

If you connect the Ethernet cable to the "PN\_X1" connector of the HMI panel with Comfort Panels, the DH485 connection may be interrupted.

Remedy for Comfort Redesign/PRO Panels: When running the DH485 project on the HMI Panel, use the connector "PN\_X3(Gigabit)" for Ethernet communication.

### **Sm@rtServer with Fail-safe Mobile Panels KTP400F/700F/900F Mobile**

For correct evaluation of safety-related operation, ensure that Sm@rtServer is disabled on the HMI device.

### **Configure secure e-mail notification from Runtime**

E-mails encrypted with TLS1.2 can be sent as of TIA Portal V14 on Comfort Panels and KTP Mobile Panels.

## **3.9 Add-ons**

### **3.9.1 Sm@rtServer**

#### **Content**

Information that could not be included in the online help and important information about product features.

#### **File size for file browser**

The maximum file size for upload or download is 2 GB.

#### **Opening SmartClient \*.sac files under Windows 10**

You save the data of the current SmartServer connection using the executable file SmartClient.exe with the \*.sac format. To open the files generated in this way automatically under Windows 10, a \*.sac file with SmartClient.exe must be opened once manually via the selection button and dialog in SmartClient.exe.

### **3.9.2 Audit**

#### **Contents**

Information that could not be included in the online help and important information about product properties.

## WinCC Audit Viewer 7.2 Update

An update for manual installation is available for WinCC Audit Viewer 7.2, which can be installed optionally.

Install the update for WinCC Audit Viewer 7.2 by running the "AuditViewer\_V72\_00\_Upd1.exe" file from the Support directory on the product DVD.

## 3.9.3 DataMonitor

### Contents

Information that could no longer be included in the online help and important information about product features.

### Removal of WinCC Runtime

If you also want to use DataMonitor after removing WinCC Runtime Professional, you have to perform a repair of the installation as follows:

1. Open the Control Panel.
2. Double-click on "Add/Remove Programs".
3. Select "SIMATIC WinCC/DataMonitor client" in the list of programs installed
4. Click on the "Change/Remove" button.
5. Select the setting "Repair" in the WinCC DataMonitor setup.

### Name of the user groups

The name of the user groups differs at certain locations of the Online Help from the actually created user groups. The following assignment is valid:

SIMATIC Report Administrators corresponds to DM\_Admin

SIMATIC Report Users corresponds to DM\_User

### Excel-Workbook on a PC with Windows 7

If you operate Excel-Workbook on a PC with Windows 7, you need to disable the "Aero Glass" display mode.

### Importing configuration data

If you load a project to a device via an external data medium, DataMonitor cannot export a correct XML file on this device.

The exported XML file can then no longer be used for importing configuration data.

## Channel diagnostics view

The "Channel diagnostics view" object is not supported by the option WinCC DataMonitor.

## 3.9.4 WebNavigator

### Contents

Information that could not be included in the online help and important information about product features.

### Removal of WinCC Runtime

If you also want to use WebNavigator after removing WinCC Runtime Professional, you have to perform a repair of the installation as follows:

1. Open the Control Panel.
2. Double-click on "Add/Remove Programs".
3. Select "SIMATIC WinCC/WebNavigator client" in the list of programs installed
4. Click on the "Change/Remove" button.
5. Select the setting "Repair" in the WinCC/WebNavigator setup".

### WebNavigator Client Manual logoff

Users can now also log off manually from the WebNavigator client using the ODK function "PWRTLogout()". You can find one description of the function in the Runtime API documentation under "Functions of the user administration > Functions for logon, logoff".

### Virus scanner Trend Micro OfficeScan

It is not recommended to use the virus scanner of Trend Micro OfficeScan in combination with WebNavigator, as this virus scanner may have an adverse impact on screen loading times.

### ProDiag overview, GRAPH overview and PLC code view

The WinCC option Web Navigator does not support the use of the WinCC objects "GRAPH overview", "ProDiag overview" and "PLC code view".

### Time zone of Web parts

When you create and configure a Web part in a specific time zone in the Web center, the time zone is stored in the Web center.

If the time zone is changed in the operating system, this can lead to an incorrect display of the time in the Web part.

### **Characters not permitted in WinCC WebNavigator**

Use the characters of the ASCII character set in the picture names and project names. Do not use any special characters or national special characters.

### **Channel diagnostics**

The object "Channel diagnostics" is not supported by the option WinCC WebNavigator.

### **Automatic trigger for SmartTags in scripts**

Use the automatic trigger if you use SmartTags in scripts in the WebNavigator screens.

### **Delay when outputting the WebNavigator screens**

Due to the Web server technology, it may occur that updated WebNavigator screens are output with a delay in Runtime.

### **New function for WebNavigator client**

As of TIA Portal Version V15.1, you have the option to define a start screen and a start language for WebNavigator client in the ActiveX control UserAdminControl.

## **3.9.5 WebUX**

### **Content**

Information that could not be included in the online help and important information about product features.

### **Update cycles**

When accessing via WebUX, the refresh of the dynamics that use the screen cycle is always 2 seconds, even if a different screen cycle is configured.

### **Automatic login**

If automatic login is no longer desired, you must delete the browser history in the respective browser.

### **New function for WebUX client**

As of TIA Portal Version V15.1, you have the option to define a start screen and a start language for WebUX client in the ActiveX control UserAdminControl.

### 3.9.6 Redundancy

#### Contents

Information that could not be included in the online help and important information about product features.

#### Name in configuration of a redundant system

Only the computer name of the HMI devices is relevant for the configuration of a redundant system. You set the computer name of the HMI device in its operating system. The name of the HMI device from the project tree is only used for identification of the HMI device in the project.

### 3.9.7 SIMATIC Information Server

#### Contents

Information that could not be included in the online help and important information about product features.

#### Installation of SIMATIC Information Server and WinCC Runtime Professional on one PC

To set up the SIMATIC Information Server and WinCC Runtime Professional on one PC, adhere to the following installation sequence:

1. Install WinCC Runtime Professional.
2. Install the Information Server.

If you do not follow the installation sequence, connection problems may occur.

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