SIEMENS

Readme

Programming and Operating Manual

TIA Portal Readme 1

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11/2024

Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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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:

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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.

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

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Ⓟ 11/2024 Subject to change

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TIA Portal Readme

1

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.

Information on TIA Portal in online support

Overview of the most important technical information and solutions for 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/ww/en/)

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

Collection of diagnostic and feedback data

We collect and process licensing information as well as statistical usage and diagnostic data, such as frequency of use of TIA Portal editors or functions to keep the TIA Portal secure and up-to-date, to detect, diagnose and remedy problems, and for product improvements.

The usage and diagnostic data is initially saved locally on your computer in readable format where you can view it. Storage location: "...\ProgramData\Siemens\Automation\TelemetryConnector\EventPersistence". (Note: The Windows administrator can set the folder so that it is visible.)

In a second step, the usage and diagnostic data is transferred to Siemens via secure communication for the purposes listed above.

The collection of usage and diagnostics data can be disabled in the TIA Portal settings.

When the setting is disabled, no data is collected on the computer and transferred to Siemens (except for the message to disable the setting).

When the setting is reactivated, the statistical usage data is collected again and transferred to Siemens. The collection and transmission of statistical usage data only takes place in the corresponding version of the TIA Portal. Data from other TIA Portal installations with disabled setting will not be collected and transferred after reactivation.

Clearing the cache in the event of display problems with the information system

If problems occur with the display of the information system in the browser, you should clear the browser cache.

Reading out log files of the information system

Log files of the information system are stored in the following directory:
C:\ProgramData\Siemens\Automation\Logfiles\HelpViewer

Should any problems arise with the information system, these log files can be made available to Support.

Improved search function in the information system

The search function has been improved with synonym recognition. When you search for a term, defined synonyms of the term are now also found.

Starting TIA Portal

When you start 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 might occur and delay the start of TIA Portal.

Minimizing the risk of cyber threats

To minimize the risk of cyber threats, it is recommended to keep the Windows operating system including .NET and the VC++ redistributables up-to-date when working with the TIA Portal.

Installing new .Net versions or .Net service packs

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

Display of Asian characters in TIA Portal

Texts in TIA Portal might not display correctly if you install a Chinese TIA Portal on another Asian operating system (for example, 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 can cause display problems in other programs.

Entry of decimal places

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

Detection of devices in the network

Firewalls can block the PN DCP protocol that is used by the TIA Portal for the detection of devices in the network. Therefore, it is advisable to configure a rule in the firewall to enable the connection.

You can find detailed information on configuring a firewall rule, e.g. for McAfee Endpoint Security, under:

https://support.industry.siemens.com/cs/ww/en/view/109762832 (https://support.industry.siemens.com/cs/ww/en/view/109762832)

Migration of STEP 7 projects

The integrated migration of STEP 7 projects is no longer supported as of TIA Portal V20.

Use the migration tool to convert the initial project to a migration file that can be read by the TIA Portal (*.am20). Following conversion, this file is transferred to the target system and migrated in TIA Portal.

The migration tool is available for downloading from the Siemens Industry Online Support.

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 (https://support.industry.siemens.com/cs/ww/en/view/109772992)

See also

FAQ 109748887 (https://support.industry.siemens.com/cs/ww/en/view/109748887)

1.2 Notes on libraries

Contents

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

Copying 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. 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.

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.

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.

Access to current memory cards with older product versions

The format of memory cards is not backwards compatible with older product versions. This means that if you want to use a memory card from a current product version in an older product version, first delete the data from the memory card.

1.4 Notes on using 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 TIA Portal in a virtual environment (private cloud)

You can find instructions on how to use 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 TIA Portal in a Virtual Environment (Private Cloud).

Self-signed certificates using HTTPS as 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.

1.5 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.

Installing 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".

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.

Installing the TIA Portal Teamcenter Gateway - data model

- Teamcenter 13.x: You can find a description of installing the TIA Portal Teamcenter Gateway data model on the installation data medium in the directory "\Support\Teamcenter_13\ServerSetupDocument\" on the STEP 7/WinccA_pro_DVD2. Open the PDF document "Datamodel_Installation_enUS". The instructions for installing the TIA Portal Teamcenter Gateway data model are only available in English.
- Teamcenter 14.x: You can find a description of installing the TIA Portal Teamcenter Gateway data model on the installation data medium in the directory "\Support\Teamcenter_14\ServerSetupDocument\" on the STEP 7/WinccA_pro_DVD2. Open the PDF document "Datamodel_Installation_enUS". The instructions for installing the TIA Portal Teamcenter Gateway data model are only available in English.
- Teamcenter V2312: You can find a description of installing the TIA Portal Teamcenter Gateway data model on the installation data medium in the directory "\Support\Teamcenter_V2312\ServerSetupDocument\" on the STEP 7/WinccA_pro_DVD2. Open the PDF document "Datamodel_Installation_enUS". The instructions for installing the TIA Portal Teamcenter Gateway data model are only available in English.

Updating the existing TIA Portal Teamcenter Gateway data model

- Restart TIA Portal after updating the existing TIA Portal Teamcenter Gateway data model.
- In TIA Portal Teamcenter Gateway V2312, no changes to the existing TIA Portal Teamcenter Gateway data model or changes specific to Teamcenter were made.
- In the TIA Portal Teamcenter Gateway V19, changes were made to the existing TIA Portal Teamcenter Gateway data model. You can find a description for installing the TIA Portal Teamcenter Gateway data model on the installation medium in the directory "\Support\Teamcenter_14\ServerSetupDocument\" on the STEP 7/WinCC DVD2.
- In the TIA Portal Teamcenter Gateway V17, changes were made to the existing TIA Portal Teamcenter Gateway - data model. You can find a description for installing the TIA Portal Teamcenter Gateway data model on the installation medium in the directory "\Support\Teamcenter_13.3.03\ServerSetupDocument\" on the STEP 7/WinCC DVD2.
- In the TIA Portal Teamcenter Gateway V15 and V15.1, 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

To work with the TIA Portal Teamcenter Gateway, Teamcenter Rich Application Client (RAC) or Teamcenter Client Communication System (TCCS) as of version 13.3.03 must be installed on your PG/PC.

Note on TCCS (Teamcenter Client Communication System)

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

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

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.

Basic information on working with TIA Portal Teamcenter Gateway

1. As of TIA Portal Teamcenter Gateway version V19, you can open TIA Portal projects, global libraries, program blocks and PLC data types (UDTs) from the Teamcenter Active Workspace Client (AWC) in TIA Portal.
2. As of TIA Portal Teamcenter Gateway version V18, you can link "Non-TIA objects", e.g. motors, plant objects, etc., to TIA Portal objects.
3. As of TIA Portal Teamcenter Gateway version V18, you can navigate from objects in Teamcenter to TIA Portal.
4. As of TIA Portal Teamcenter Gateway version V18, you can create TIA Portal object structures as new item when saving.
5. As of TIA Portal Teamcenter Gateway version V18, you can save internal data of a TIA Portal project as a separate unit under an item or revision in Teamcenter with "Save as new item..." or "Save as new revision...".
6. As of TIA Portal Teamcenter Gateway version V17, the Teamcenter operation "Open in TIA Portal" is available for TIA Portal projects.
7. 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 separated from Teamcenter, use this operation instead of the "Save as" operation because "Save as" retains Teamcenter information in the project.

Connecting to Teamcenter

As of TIA Portal Teamcenter Gateway V15.1 Update 3, you can establish a connection between TIA Portal and Teamcenter both via HTTP and via HTTPS.

Teamcenter version information

In order to work with the TIA Portal Teamcenter Gateway version **V.xx.x.x.x** and Teamcenter version **Vyy or Vyy.y** , Teamcenter version **Vzz.z.z.z** must be installed.

TIA Portal Teamcenter Gateway version V.xx.x.x.x	**Teamcenter version Vyy or Vyy.y**	**Required Teamcenter version Vzz.z.z.z**
TIA Portal Teamcenter Gateway **V20.0.0.0**	Teamcenter version **V14, V14.1, V14.2.2, V14.3, V2312**	Teamcenter version **V14.0.0.0, V14.1.0.0, V14.2.2.0, V14.3.0.0, V2312**
TIA Portal Teamcenter Gateway **V19.0.0.0**	Teamcenter version **V14, V14.1, V14.2.2, V14.3**	Teamcenter version **V14.0.0.0, V14.1.0.0, V14.2.2.0, V14.3.0.0**
TIA Portal Teamcenter Gateway **V18.0.0.0**	Teamcenter version **V14**	Teamcenter version **V14.0.0.0**
TIA Portal Teamcenter Gateway **V18.0.0.0**	Teamcenter version **V13, V13.1, V13.2, V13.3**	Teamcenter version **V13.0.0.0, V13.1.0.0, V13.2.0.0, V13.3.0.0**
TIA Portal Teamcenter Gateway **V18.0.0.0**	Teamcenter version **V12.4, V12.3, V12.2**	Teamcenter version **V12.4.0.0**, **V12.3.0.0**, **V12.2.0.0**
TIA Portal Teamcenter Gateway **V17.0.0.0**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0**
TIA Portal Teamcenter Gateway **V17.0.0.2**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4, V13, V13.1, V13.2, V13.3**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0, V13.0.0.0, V13.1.0.0, V13.2.0.0, V13.3.0.0**
TIA Portal Teamcenter Gateway **V17.0.0.5**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4, V13, V13.1, V13.2, V13.3, V14.0**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0, V13.0.0.0, V13.1.0.0, V13.2.0.0, V13.3.0.0, V.14.0.0.0**
TIA Portal Teamcenter Gateway **V16.0.0.0**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4,**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0**
TIA Portal Teamcenter Gateway **V16.0.0.3**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4, V13**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0, V13.0.0.0**
TIA Portal Teamcenter Gateway **V15.1.0.0**	Teamcenter version **V11.2, V11.3, V11.4, V11.5**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0**
TIA Portal Teamcenter Gateway **V15.1.0.3**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5***	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5***

TIA Portal Teamcenter Gateway version V.xx.x.x.x	Teamcenter version Vyy or Vyy.y	Required Teamcenter version Vzz.z.z.z
TIA Portal Teamcenter Gateway **V15.1.0.4**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0**
TIA Portal Teamcenter Gateway **V15.1.0.6**	Teamcenter version **V11.2, V11.3, V11.4, V11.5, V11.6.0.5*, V12.2, V12.3, V12.4, V13**	Teamcenter version **V11.2.0.0, V11.3.0.0, V11.4.0.0, V11.5.0.0, V11.6.0.5*, V12.2.0.0, V12.3.0.0, V12.4.0.0 V13.0.0.0**
TIA Portal Teamcenter Gateway **V15.0.0.0**	Teamcenter version **V11.2, V11.3**	Teamcenter version **V11.2.0.0, V11.3.0.0**
TIA Portal Teamcenter Gateway **V14.0.0.0**	Teamcenter version **V11.2**	Teamcenter version **V11.2.0.0**
TIA Portal Teamcenter Gateway **V14.0.0.1**	Teamcenter version **V11.2**	Teamcenter version **V11.2.0.0**

* To work with the TIA Portal Teamcenter Gateway version V15.1 or the TIA Portal Teamcenter Gateway version V16 and Teamcenter version **V11.6**, it is a prerequisite that you have Teamcenter version **V11.6.0.5** or higher installed. As of the Teamcenter version **V11.6.0.5**, improvements have been that allow it to work smoothly with Teamcenter version **V11.6**.

From TIA Portal version V18 and higher, Teamcenter version V11 will no longer be supported.

In order to work with Teamcenter version V11.6.0.0, the prerequisite is that you have Teamcenter version V11.6.0.5 or higher installed.

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 must not be empty.

Performing TIA Portal Teamcenter Gateway operations while WinCC Professional Simulation is running

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

1.6 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 project server.

The installation of the project server enables you to use the "Multiuser Engineering", "Multiuser Commissioning" and "Exclusive Engineering" functions available with the corresponding TIA Portal.

Multiuser Engineering: Name changes

Compared with predecessor versions, the following name changes have been made in the context of Multiuser Engineering in newer TIA Portal versions:

Name in predecessor versions	New name	Changed as of
TIA Project Server	TIA Project Server Short form: Project server	TIA Portal V18
Multiuser server	TIA Project Server	TIA Portal V16
Local Multiuser server	Local project server	TIA Portal V16
Multiuser server project	Server project	TIA Portal V16
Multiuser network profiles	Network profiles	TIA Portal V16
Multiuser Administrative Tools	Project Server Administrative Tools	TIA Portal V18
Multiuser Power Tools	Project Server Power Tools	TIA Portal V18

TIA Project Server

The project server can be used for Multiuser Engineering, and also for Multiuser Commissioning and Exclusive Engineering

There are no functionality restrictions between the project server V16 and the Multiuser server V15.1.

The functionality of the server remains unchanged depending on the version.

The project server is backward compatible with the multiuser server V14.

Command line tools

In TIA Portal V18 and higher, the "Multiuser Power Tools" and "Multiuser Administrative Tools" have been renamed to "Project Server Power Tools" and "Project Server Administrative Tools", respectively.

Use the "pspt" and "prjsrv" commands in the commands.

If you are working with project servers from versions prior to TIA Portal V18, use the commands "mupt" and "musrv" in the commands.

Microsoft system account for project server

When the project server is installed, a Microsoft system account is created for the project 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 project server needs to be restarted.

Error message when starting the project server

If you get an error message during or after installing the project server stating that the service for the project server cannot be started, 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: FAQ with ID 109739926 (https://support.industry.siemens.com/cs/ww/en/view/109739926)
3. Alternatively, you can contact Customer Support directly.
   Internet link to Customer Support: TIA Portal in Siemens Industry online support (https://support.industry.siemens.com/cs/ww/en/view/65601780)

STEP 7: Software unit only supported to a limited extent

The Multiuser Engineering functionality is only available to a limited extent for software units.

- The "Software unit" object is not supported in Multiuser Engineering.
  Changes are not applied to the server project on check-in.
  Relations and software units can only be edited in the server project view.
- Included blocks are supported.

More information:

- "Using Team Engineering > Using Multiuser Engineering > Supported objects for Multiuser Engineering"

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 V17 as part of a V17 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 have been 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 the download to the device from the project tree with the menu command "Download to device > Hardware configuration" in commissioning mode, the dialog informing 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, disable the "Check for different data before download (recommended)" option 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)

Readme STEP 7

2

2.1 Cybersecurity information

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
https://www.siemens.com/cybersecurity-industry (https://www.siemens.com/cybersecurity-industry)

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

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under:
https://www.siemens.com/cert (https://www.siemens.com/cert)

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.

STEP 7 Professional					
RFC 1006	102	TCP	Outbound	S7 communication	Communication to the S7 controller via Ethernet/PROFINET for programming and diagnostic purposes.
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.
TIA	5112*	TCP	Inbound/ outbound	Help Viewer	This service provides the complete functionality of the TIA Portal Help Viewer. Port 5112 is blocked by the firewall by default. When you open Port 5112, take corresponding protective measures.
* 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.

Security note on know-how-protected blocks

When protecting blocks, note that full password protection is not provided until you have archived the project.

After archiving, only the archived project no longer contains any unprotected blocks.

Optimization of project data during archiving removes older, possibly unprotected, blocks.

If you want to distribute protected blocks, only pass on the archived project, or copy the building blocks to a new global library.

2.2 Notes on use

Contents

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

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.

Automatic installation of GSDX files

GSDX files are only installed automatically when a project is opened in TIA Portal Openness if the signature check is successful.

If an error is detected when checking the signature, opening the project is canceled. Unsigned GSDX files and native GSD files with a security marking are evaluated as faulty.

Unsigned GSDX files can alternatively be installed via the TIA Portal in compliance with the security instructions.

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 Parallel online connections

Contents

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

Online connections on a S7-1200 CPU

Simultaneous online connections from multiple instances of the TIA Portal to the same S7-1200 CPU are not possible.

Online connections to an S7-300/S7-400 CPU

Simultaneous online connections from multiple instances of the TIA Portal to the same S7-300/S7-400 CPU are not approved. Multiple accesses to the same CPU from this family can lead to errors.

Simultaneous online connections of STEP 7 V5.6 or earlier and STEP 7 (TIA Portal) have also not been approved and can result in errors.

2.4 Editing devices and networks

2.4.1 General information on devices and networks

Contents

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

SIMATIC S7-PCT (Port configuration tool)

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)

Verified external access

Contrary to the description in the information system, the "Verified external access" function is not available for the current S7-1500 CPUs (firmware version V3.0). The described settings, which determine the behavior of the CPU in relation to external read/write access, are not available.

2.4.2 Notes on the hardware configuration

Contents

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.

2.4.3 Information about OPC UA functions

2.4.3.1 Information about OPC UA functions

Contents

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

Used nodeset and schema files 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 / nodesets.

In addition, the OPC Foundation provides basic information models via nodesets, which are integrated into the firmware of the S7-1200/1500 CPUs as well as in the TIA Portal via SDKs (System Development Kits). These are Core Model Nodeset (namespace 0) and the DI Model Nodeset (device integration). The DI information model functions like a companion standard, but is maintained exclusively by the OPC Foundation. It forms the basis for other companion standards for modeling a wide variety of devices.

The following schema and nodeset files are used for TIA Portal version V20:

Schema/Nodeset	Explanation
https://opcfoundation.org/UA/schemas/1.05/Opc.Ua.NodeSet2.xml https://opcfoundation.org/UA/schemas/1.05/UANodeSet.xsd	OPC UA ("CORE") Model Version 1.05.03 (2023-12-15) XML scheme for NodeSet files (UANodeSet.xsd and Opc.Ua.Types.xsd)
https://opcfoundation.org/UA/schemas/DI/1.1/Opc.Ua.Di.NodeSet2.xml	OPC UA for Devices ("DI") Model Version 1.03.0 (2021-03-09)

Useful information about the core or base information model

The Core information model (nodeset) is a requirement for every OPC UA server and is integrated in the OPC UA server of the S7-1200/1500 CPU.

The nodes of this information model are thus known to the CPU. The version of this nodeset is tied to the firmware version of the CPU and cannot be changed at this time.
The Core information model is also integrated in the TIA Portal.

When an OPC UA server configuration is loaded, this nodeset is not loaded because it is already known to the CPU (integrated).
The Core Information Model is also integrated in the SiOME modeling editor.

Recent versions of the Core information model may contain nodes that were not present in previous versions. Loading a server configuration in CPUs with older firmware versions may cause problems in rare cases. When exporting the SIMATIC OPC UA address space from TIA Portal and also from SiOME, the Core information model is not exported as well.

Useful information about the DI information model

The DI information model is also integrated in the CPUs and in the TIA Portal.

To configure the CPU, you may have to load the current DI information model (DI nodeset). You download a current DI nodeset from the OPC Foundation website (https://opcfoundation.org/UA/schemas/DI/) and import it into your TIA project as a reference namespace.

Make sure that the DI information model matches the Core model – in the nodeset file Opc.Ua.Di.NodeSet2.xml it is documented via the "RequiredModel" element which version the Core model must have.

Example: The DI information model version "1.03.1" requires at least Core Information Model version="1.04.4":

```
<Model ModelUri="http://opcfoundation.org/UA/DI/" Version="1.03.1"
PublicationDate="2021-09-07T00:00:00Z">
<RequiredModel ModelUri="http://opcfoundation.org/UA/"
Version="1.04.4" PublicationDate="2020-01-08T00:00:00Z"/>
```

When loading a server configuration with the newer DI nodeset, the following happens:

- The nodes already present in the CPU are not overwritten.
- New nodes (for example, new data types or structures) are instantiated.

This "mixture" is not expected to cause any problems in the CPU, as DI nodesets of the OPC UA Foundation are downward-compatible.

When exporting the DI information model, the following cases must be distinguished:

- Standard SIMATIC server interface (CPU properties: OPC UA > Server > Export): The exported OPC UA XML file does not contain the DI information model, only references to it. If you use the XML export e.g. for OPC UA clients, then you have to add the used DI information model additionally for this, so that the OPC UA address space is consistent.
- OPC UA communication > Server interface of type "Interface": The exported OPC UA XML file does not contain either the DI information model or references to it.
- OPC UA communication > Server interface of type "Companion Specification": The exported OPC UA XML file still corresponds to the import nodeset. If the imported nodeset contained nodes from the DI information model, then these nodes are also contained in the exported file.

The DI information model is not integrated in the SiOME modeling editor. In SiOME, you must import the appropriate nodeset as described above. When exporting, SiOME exports all non-nodeset 0 nodesets, unless you have excluded the corresponding namespace from the export.

OPC UA server starts during start-up although it was deactivated in the configuration

Requirements:

- An S7-1500 CPU or SIMATIC S7-1200 CPU is running with an activated OPC UA server.
- You deactivate the OPC UA server in the TIA Portal.
- You load the changed hardware configuration to the CPU.

Result:

During start-up of the CPU, the OPC UA server starts for a short time before it is finally shut down in accordance with the newly loaded configuration.

This possibly irritating process is recorded in the diagnostic buffer.

Global Discovery Push (GDS Push) function

Rejected certificates are not stored

Unlike the description in section "Address model for push certificate management", rejected certificates are not currently stored by the OPC UA server of the S7-1500 CPUs. The "GetRejectedList" method therefore always returns an empty array (RejectedList).

Update problem with downloaded certificates

Under certain conditions, the CPU does not register a downloaded certificate (e.g. a new OPC UA server certificate, or an updated web server certificate). A certificate error may be signaled during a connection attempt in this case.

The update problem occurs only when the CPU still manages certificates that were provided during runtime (GDS Push) and when certificates are then transferred by loading the hardware configuration to the CPU. The certificates loaded via the hardware configuration are not registered by the CPU under these conditions.

Examples:

- You have initially enabled the GDS Push function and selected the option "... use certificates provided during runtime" for the certificate settings and loaded this configuration. The required server certificate as well as the trust lists/CRLs are provided exclusively via GDS Push methods in this case.
- You then change the hardware configuration by adding new certificates or changing existing certificates (e.g. web server certificates or certificates for secure PG/HMI communication). During loading, you have **not** deleted existing certificates provided during runtime so that you can use them later.
  Result: The loaded server certificates are not registered by the CPU.
- The problem also occurs when you have disabled the GDS Push function and selected the option "... use configured and downloaded certificates" for the certificate settings and loaded this configuration. During loading, you have **not** deleted existing certificates provided during runtime so that you can use them later.
  Result: The newly loaded OPC UA server certificate is not registered by the CPU.

Solution: When the CPU still has certificates that were provided during runtime and you want to transfer new/changed certificates by loading the hardware configuration to the CPU, proceed as outlined below:

- After loading the configuration, perform a "Memory reset" or restart the CPU (POWER OFF > POWER ON). After these measures, the CPU reorganizes the loaded configuration and uses the current certificates.

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.

Solution**:**

- 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 number of nodes for server interfaces to fewer than 30000.

Additional measures:

- If you do not disable the standard SIMATIC server interface:
  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.

Copying SCL program examples from the information system

SCL program code from the OPC UA programming examples, which was copied using the "Copy" icon in the information system and pasted in the program editor, cannot be compiled.

To copy the program code without errors, select the program code in the information system and use the "Copy" command in the shortcut menu or the key combination "Ctrl+C". Insert the program code in the program editor using the "Paste" command in the shortcut menu or using the key combination "Ctrl+V".

2.4.4 Certificate checks during connection establishment (S7-1500 CPU)

Contents

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

Certificate checks when establishing encrypted connections (e.g. OPC UA)

An S7-1500 CPU with firmware version V3.1 has an extended certificate check compared with predecessor versions.

Consequently, additional warnings/errors may appear in the diagnostics buffer (BadSecurityChecksFailed), which did not occur in predecessor versions. However, these messages do not prevent the connection from being established.

The following messages are involved:

Error code (hexadecimal values)	Name of the error	Explanation
2852_0000	Key Usage Certificate Sign invalid for non CA	In a CA-derived certificate, the keyCertSign bit has been set in the KeyUsage field despite not being permitted.
2859_0000	Basic constraints not critical	The BasicContraints field of the CA of a certificate is not set as "critical" despite always being required in CA certificates.
2017_0000	CA-Signed Application Instance CA Certificate	In a CA-derived certificate, the CA bit has been set despite not being permitted.
2018_0000	Self-Signed Application Instance CA Certificate	In a self-signed certificate, the CA bit has been set despite not being permitted.

2.4.5 Online access to a CPU with access protection via accessible nodes

Contents

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

Password transfer to the CPU using an untrusted connection for CPU access via accessible nodes

Affected devices: S7-1500 CPU (firmware version V2.9), S7-1200 CPU (firmware version V4.5) and SW Controller (firmware version V21.9).

When you use the TIA Portal to access one of the CPUs listed above online via the "Accessible nodes" function and access to the CPU is protected by a password "no access (full protection)", the encrypted password may be transferred via an untrusted connection to the CPU during connection setup.

Only when a connection is made with a fully protected CPU from the list of accessible nodes is the password for the required access level requested and possibly transferred via an untrusted connection.

Solution:

- Only connect online via accessible nodes with CPUs in a protected environment that cannot be accessed externally.
- Make sure that you are connected to the correct CPU.
- For online access to accessible nodes use the password for the access level with the lowest access rights: In case of full protection, use the password for HMI access. This requires the configuration of a password for HMI access.

2.4.6 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".

2.4.7 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
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.

2.4.8 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.

2.4.9 Loading of S7-1500 CPUs (temporarily not possible)

Contents

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

Error when loading (temporary error)

The loading of the CPU is denied with an error message (temporary error).

Possible cause: The OPC UA server of CPU is just starting. As soon as the server can be accessed again, loading is possible again.

2.4.10 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.

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.

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.

2.4.11 Module change for I-devices (S7-1500 CPU FW versions < V3.1 and V3.1)

Contents

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

I-device and assigned IO controllers in a project: Module change

If you have configured an I-device (S7-1500 CPU) and want to change from this I-device to another S7-1500 CPU, this gives rise to the following scenarios, depending on the firmware versions used (valid for TIA Portal version V19):

Current device	New device	Explanations
S7-1500 CPU FW V3.1	S7-1500 CPU FW V3.1	Module can be changed
S7-1500 CPU FW < V3.1	S7-1500 CPU FW V3.1	Module can be changed; the new I-device can **not** be used as a shared I-device within the project. If you want to use the new I-device as a shared I-device within the project, you must deselect the "IO device" option at the relevant PROFINET interface of the current device before changing the module.
S7-1500 CPU FW V3.1	S7-1500 CPU FW < V3.1	Module can be changed. You must deselect the "IO device" option at the relevant PROFINET interface of the current device before changing the module.

2.4.12 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 an WinLC RTX to configure the standard modules.

2.4.13 Elimination of TS adapters

Contents

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

Elimination of TS adapters

With the release of TIA Portal version V19, the following TeleService (TS) adapters are no longer supported:

- TS ADAPTER IE BASIC SIMATIC TELESERVICE (**6ES7972-0EB00-0XA0**)
- TS ADAPTER IE ADV. SIMATIC TELESERVICE (**6ES7972-0EA00-0XA0**)

These products have been discontinued since **October 1, 2023** and, consequently, they can no longer be configured in the TIA Portal user interface.

As a successor product, we recommend our SINEMA Remote Connect solution – the management platform for remote networks. It enables simple remote access via TeleService for remote maintenance applications.

Further information can be found at: SINEMA Remote Connect (http://www.Siemens.com/sinema-remote-connect)

2.5 Programming a PLC

2.5.1 General notes on PLC programming

Contents

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

Instance-specific attributes when importing blocks via TIA Portal Openness

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

Modifying the application cycle of an isochronous mode interrupt OB

When you change the "Application cycle (ms)" parameter of an isochronous mode 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 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.

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-WW)

2.5.2 Notes on the SIMATIC SD format

Contents

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

Export of multilingual comments

After a TIA Portal project has been updated from an older TIA Portal version to TIA Portal V20, comments are not exported. Accordingly, no S7res file is generated. Therefore, when exporting in SIMATIC SD format, only files in s7dcl format are generated in upgraded TIA Portal projects.

Behavior of organization blocks (OBs)

Currently, certain restrictions apply to the export and import of organization blocks in SIMATIC SD format. When you export an organization block in SIMATIC SD format, the information on the type of the OB is lost during the export. When this OB is upgraded into the TIA Portal project again, the OB is always created with the cycle OB type. In addition, a free three-digit number is automatically assigned to the imported block in the TIA Portal.

To receive an OB of the correct type, manually create an OB of this type with a lower number. Copy the information from the imported block and paste it here. After the copied data has been pasted into the correct OB, the imported OB can be deleted again.

Non-supported display formats of tags

The octal display format is not supported when exporting a block in SIMATIC SD format. If you are using blocks with tags that are written with an octal value in a TIA Portal project, you can export them in SIMATIC SD format. During the export process, the display format of the tags is automatically converted to hexadecimal display format (Hex).

See also:

AUTOHOTSPOT

2.5.3 Note on software units

Contents

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

Loading software units

In the following case, you cannot load a software unit into the device individually:

- You have created a new organization block in a software unit.
- The organization block is assigned to an event that has already been assigned another OB in another software unit.

In this case, load the entire PLC program into the device.

Changed loading behavior as of V20

The loading behavior of software units has been changed so that you can now more easily load individual software units independently of other software units.

When downloading software units a check is carried out whether further software units have to be downloaded as well to ensure the consistency of the ONLINE project.

Previously two software units had to be downloaded together when the following conditions were fulfilled:

- There is a relation between the software units. The relation is contained both in the offline as well as in the ONLINE project.
- At the software units on the relations target side an interface-relevant change at the published programming elements was performed since the last download.

The check of the actual usage of changed programming elements is new in V20. If changed programming elements in the dependent software unit are not used, this does not have to be included in the download. Software units can now be downloaded more independently of each other through the additional check.

The following table shows the changed download behavior in detail:

Scenario	Checking during download	Reaction
Software unit on relation source side was selected for download	Check in offline program: Does the software unit to be loaded use interface-relevant changed, published programming elements from the software unit on the relation target side?	• If check is met: Software unit on relation target side must be included in the download scope. • If check is not met: The selected software unit can be loaded independently.
Software unit on the relation target side was selected for downloading	Check in the ONLINE program: Does the software unit on the relation source side use interface-relevant changed, published programming elements from the software unit to be downloaded?	• If check is met: Software unit on relation source side must be included in the download scope. • If check is not met: The selected software unit can be loaded independently.

Note

The new check of the downloading dependencies can only be performed once you have downloaded your project once with V20. After an upgrade, we recommend downloading once with the function "Download to device > Software (all)".

Version Control Interface (VCI)

Versioning of Software Units via the Version Control Interface is not supported. You can, however, version the individual elements of a software unit in VCI.

Technology objects

Since technology objects cannot be contained in software units, it is not possible to define namespaces for technology objects.

Namespaces for PLC tags

It is not possible to define namespaces for PLC tags.

Namespaces in libraries

Libraries have the following restrictions regarding namespaces:

- Namespaces are not considered when harmonizing names and path structures.
- When you export types from libraries via Openness, namespaces are not included in the export.
- All versions of a type must have the same namespace. It is therefore not possible to create a new version of a type and assign it a new namespace. Instead, create a new type with a new namespace.

2.5.4 Information on named value data types

Contents

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

Online functions: HMI and web server

The HMI and Web server online functions do not show the declared name of a named value data type. Instead, the basic data type is displayed with its current value.

Example: For the following named value data type, only values 1, 2, or 3 are displayed. The declared names "RED", "YELLOW", "GREEN" cannot be displayed.

```
TYPE
       nvtTrafficLight : INT
       (
               RED := 1,
               YELLOW := 2,
              GREEN := 3
       );
   END_TYPE
```

Named value data types in the online view

Named value data types that exist only online cannot be displayed in the project tree or opened via the "Online access" folder.

Load the named value data type from the device instead and open it in the offline project.

Downloading with synchronization

In team engineering, several users can work on one project with several engineering systems at the same time and access one S7-1500 CPU. To ensure consistency within the shared project, the changed data is synchronized prior to loading so that nothing is overwritten unintentionally. Named value data types are not included in the synchronization.

Cross-references and program information

Cross-references and program information cannot yet be displayed for named value data types.

Detailed comparison

No detailed comparison is carried out for documents in the TIA Portal. However, you can compare the documents with standard tools.

Copying named value data types between TIA Portal instances

If you copy named value data types to another instance of the TIA Portal, you should save the project beforehand. Always use the saved version of a named value data type when copying. Unsaved changes to named value data types cannot be copied.

TIA Openness explorer

You can navigate through the directory tree of a library with TIA Openness Explorer. However, navigation is restricted in V20 if you use named value data types in the library:

If a directory in the library contains named value data types, the elements in this directory are not shown.

To remedy this, store all named value data types in a separate directory in the library. You can then access all other directories without restrictions.

2.5.5 Notes on CEM (S7-1200, S7-1500)

Contents

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

Tutorial

Note

Video tutorial on CEM

Automate in less than 10 minutes: Efficient engineering with Cause Effect Matrix (CEM) (https://youtu.be/FaR9rVXUkJo)

CEM in F-programs

It is not possible to generate fail-safe blocks with CEM. Therefore, you cannot use CEM blocks in F-programs.

Modifying operands during monitoring

It is not possible to modify operands during monitoring in the CEM Editor.

Insert the operands that you wish to modify into a watch table. Alternatively, you can also modify the operands in the open data block or in the PLC tag table.

Search

The local and global search is not supported in the CEM editor.

Implicit data type conversion

No implicit data type conversion is performed at the inputs and outputs of the CEM instructions. Only interconnect the operand of the required data type there.

Block comparison

The detailed comparison of CEM blocks is not supported.

Print

CEM blocks cannot be printed. A print preview is also not available.

Multilingual project texts

It is not possible to export and import project texts for translation.

Openness

CEM blocks cannot be exported and imported via Openness.

Multiple instance capability

CEM blocks do not have multiple instance capability.

Version Control Interface

Versioning via the Version Control Interface is not supported.

2.5.6 Testing the user program

2.5.6.1 Information on testing with the watch table

Contents

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

Loading data blocks during an active control job

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 might have changed in the data block. Complete active control jobs before loading data blocks.

"Enable peripheral outputs" function

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

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

Testing of programs that were migrated into the TIA Portal from older STEP 7 versions.

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

2.5.6.2 Information on 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: I0.0:P, IB0:P, IW0:P and ID0:P.

2.5.6.3 Information on testing with breakpoints

Contents

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

Setting breakpoints in the standard user program at S7-1500 F-CPUs

When a breakpoint is reached and the program is stopped for longer than the maximum F-scan cycle monitoring time, the CPU goes into STOP. It is not possible to continue the program. If you want to change back to RUN mode after the "HOLD" in order to continue testing your default user program, use S7 PLCSIM for your test, or test your program without F-components.

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

2.5.7 Upgrading blocks

Contents

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

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

When upgrading to the current version, know-how protected blocks that were set up with an older version of TIA Portal can be loaded in the controller without entering a password and are executable.

To open and edit these blocks in the current version, proceed as follows:

- For blocks with know-how protection set up using version V13 SP1 or higher:
  - Remove the know-how protection in the current version, edit the block and reset the know-how protection.
- For blocks with know-how protection set up using a version earlier than V13 SP1:
  - Remove the know-how protection in V13 SP1 and then update the block to the current version. Now edit the block and reset the know-how protection in the current version.

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

After upgrading a project 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 that contains GRAPH blocks is upgraded from V15.x, the program blocks must be compiled before they can be monitored.

Upgrading of blocks that contain alarms

If you are upgrading a project from a TIA Portal version V15.1 or earlier, you must re-compile all the blocks containing alarms and load them to the PLC before monitoring is possible again. Under certain circumstances, this means that the PLC has to be put into stop mode.

Updating device specifications

When upgrading your project, internal device specifications of the used employed CPUs are updated in certain cases.

The following message indicates that an update is being performed: "The device configuration of the PLCs in the project has been updated."

The update has no effect on the program running in the CPU.

See also

Compatibility of PLC programs from older versions (Page 43)

2.5.8 Compatibility of PLC programs from older versions

2.5.8.1 Compatibility of PLC programs from versions prior to V20

Compatibility

In V20, you can generally continue to use all PLC programs that were created with older versions of TIA Portal. However, because improvements and bug fixes to the compiler were made in V20, in a few cases the program may behave differently after the upgrade or you may have to adapt the program code manually. These cases are described in detail below.

Using named value data types in libraries

Before V20 named value data types could not be used as types in global libraries or project libraries. However, named value data types could be used by typized library elements, without themselves being part of the library. No warning was issued in V19 for this application case while compiling.

As of V20 it is possible to use named value data types in libraries. For this reason errors are output while compiling if a named value data type is not contained in a library and is nevertheless used by a library element.

To resolve the problem, include the respective named value data type in the library.

Handing over data blocks as actual parameters

Data blocks which contain both retentive as well as non-retentive elements, can not be handed over to a formal parameter of the data types STRUCT during the block call. In older versions a syntax error was not always reported for this error scenario. As of V20 a syntax error is output in all programming languages.

2.5.8.2 Compatibility of PLC programs from versions prior to V19

Compatibility

In V19, you can generally continue to use all PLC programs that were created with older versions of TIA Portal. However, because improvements and bug fixes to the compiler were made in V19, in a few cases the program may behave differently after the upgrade or you may have to adapt the program code manually. These cases are described in detail below.

SCL: Name conflicts between data blocks and elements from system libraries

If a data block was given a name that was already assigned for an element from the system library, this could result in compile errors. This behavior has been corrected.

Nevertheless, it is still not recommended to assign a code block, data block, data type, tag or constant a name that is a keyword or has been assigned for an element from the system library.

Session log of the program editor

The technology for storing the session log for the program editor has been revised in V19. Therefore, when upgrading to V19, individual information cannot be retrieved from the session log of the V18 project. However, if you continue to work with V19, the session log is still available to you as usual.

2.5.8.3 Compatibility of PLC programs from versions prior to V18

Compatibility

In V18, you can generally continue to use all PLC programs that were created with older versions of TIA Portal. However, because improvements were made to the compiler and errors corrected in V18, there may be some rare cases in which the program reacts differently after the upgrade or that you may have to adjust the program code manually. These cases are described in detail below.

Online/offline differences after upgrading to V18

If no changes were made to the PLC program in an upgraded project, an online/offline difference is usually not indicated. The right column in the project tree shows the following symbol: 

If an online/offline difference is shown when programs were not modified, the problem is most likely a checksum inconsistency. The right column in the project tree shows the following symbol: 

For more information, refer to the Compare editor:

- Online/offline differences in the following categories are caused by checksum inconsistencies. The program is compatible despite the checksum inconsistency, that is, the program execution is not affected by the upgrade. You can establish an online connection and start monitoring immediately after upgrading:
  - "Program code" checksum
  - "Event" checksum
  - Checksum "Interface of published blocks without comments (software units)"
- Online/offline differences in the following categories, however, indicate actual differences in the program code and mean that you must recompile and reload the program.
  - All checksums in the "Target data" category

See also: AUTOHOTSPOT

Inverted result of logic operation at the enable input EN (FBD, S7-1200/S7-1500)

Under the following conditions, an inversion at the enable input EN was not correctly evaluated:

- In an FBD network, a multiple instruction is directly connected to the negated EN input of an instruction.
- The instruction has additional Boolean inputs.
- At least one of the Boolean inputs is not directly supplied with an operand.

This behavior has been corrected in V18. If you use inversions at the enable input EN, ensure that the program flow is correct after upgrading.

SCL: Math instructions with untyped constants (S7-1200/S7-1500)

The behavior of a math instruction in which one of the operators is a typed LReal expression and another operator is an untyped 2#, 8# or 16# constant has been changed in SCL. The untyped constant is always interpreted as an unsigned integer.

See also

Upgrading blocks (Page 42)

2.5.8.4 Compatibility of PLC programs from versions prior to V17

Compatibility

In principle, you can continue to use in V17 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 V17, 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.

Compatibility of data blocks after upgrading to V17

After upgrading data blocks that are derived from a PLC data type (UDT), online/offline differences may be displayed, even though the online and offline programs are identical.

These differences are mostly due to a checksum inconsistency. The blocks or PLC data types are compatible despite the checksum inconsistency, i.e. the program execution is not affected by the upgrade. You can establish an online connection and start monitoring immediately after upgrading.

For more information, refer to the Compare editor:

- Online/offline differences in the "Block properties" category are due to checksum inconsistency. The blocks or PLC data types are compatible.
- On the other hand, online/offline differences in the "Target data" category indicate actual differences in the program code and mean that you have to recompile and reload the program.

See also: AUTOHOTSPOT

Loading and monitoring changed data blocks (S7-1200/S7-1500)

The following rule has been in effect when loading blocks:

If the block in the offline project had a newer interface time stamp than in the online project, the block always had to be reloaded. As a result, the tag values were always reinitialized. Inconsistencies in the running plant operation could result.

Starting with V17, the time stamps are no longer compared, the structure of the online and offline blocks is compared instead. Data blocks are only reinitialized when downloaded if their structure has actually changed. Another advantage is that in these cases the program status can be continuously monitored, even if differences are displayed in the online-offline program.

Note:

Changes to the program code in the blocks of the GRAPH, CEM or CFC languages can result in a change of internal interface data. These changes require a reinitialization even if no structural changes are visible at the block interface.

Examples:

You can download a data block without reinitialization in the following cases:

- You generate a data block with the same structure multiple times from an external source, via the Openness function or via the Version Control Interface.
  Note: When you generate a GRAPH block or a block, whose memory reserve is activated, via the functions mentioned, the block must be reloaded and reinitialized.
- You add a parameter to the interface and then delete it again.

Note

Use of the function for blocks created with a version prior to V17 or with an S7-300/400 CPU.

The new function is only available for blocks whose interface has already been changed and loaded in V17 with an S7-1200/1500 CPU. Only then is the information about the online block structure available and can be used for a comparison during loading in the future.

Open data blocks

When opening data blocks, it is tested whether a block contains inconsistent snapshots of actual values. These will be deleted and you will be informed with a message. Running the program in the CPU is not influenced by this.

SCL: Derived data types in arithmetic expressions or Boolean operations

The rules for derived data types have been standardized. It is now no longer permitted to use these data types in arithmetic expressions or Boolean operations in SCL.

Example:

The following expressions are no longer permissible in V17:

```
#myWord := #myHW_IO AND 100;
```

or

```
#myInt := #myHW_IO + 5;
```

In such cases, use a temporary tag of the basic data type:

```
#myTempUInt := #myHW_IO;
```

```
#myINt := #myTempUInt + 5;
```

Alternatively, you can also convert the operand explicitly to the basic data type:

```
#myInt := UINT_TO_INT(#myHW_IO) + 5;
```

Actual parameters of data type REMOTE (S7-1200/S7-1500)

The parameter passing rules for the REMOTE data type have been unified. It is no longer allowed to pass an operand of the REMOTE data type as an actual parameter if it is in an instance.

Example:

The actual parameter "myRemote" of the REMOTE data type must no longer be passed in V17 because it is in an instance.

```
"Block_2"("Block_1_DB".myRemote);
```

In addition, it is no longer permitted to interconnect a formal parameter of the data type VARIANT with an actual parameter of the data type REMOTE.

Example:

The actual parameter "myRemote" of the REMOTE data type must no longer be passed in V17 to an actual parameter of the DATA type VARIANT.

```
"Block_1_DB"(myVariant:=myRemote);
```

FBD: CMP== (equal) and CMP<> (unequal) with data type VARIANT (S7-1200/S7-1500)

It is no longer permissible in the FBD to negate the output of the instructions "CMP==" and "CMP<>" with the function "Invert RLO" when "VARIANT" is selected as data type. If you have used one of the two instructions with the data type "VARIANT" and a negated output, an error is signaled during compilation. Use the function "Software (rebuild all)" to locate all uses in your program.

To remedy the error, use the instruction "CMP<>" instead of "CMP==" and vice versa. Remove the negation of the output.

ARRAY access error (S7-1200/S7-1500)

In rare cases, no check was performed for ARRAY access errors if the access was performed in a loop. This behavior has been corrected. In case of ARRAY access errors, the CPU goes to STOP or performs a programmed error handling operation.

Importing source files (S7-1200/S7-1500)

Blocks, instructions or PLC data types may contain write-protected parameters with start values that must not be initialized. For example, certain parameters of IEC timers must not be initialized as otherwise their function would be disturbed. As of V17, the import of external source files is therefore rejected when they contain initializations for write-protected parameters.

If the maximum number of 600 errors is reached during the import of an SCL file, the import is aborted. The source file cannot be imported.

Serialize (S7-1500)

In V17, it is once again possible to link to the parameter "DEST_ARRAY" an operand whose access path contains an ARRAY with a variable index.

Example:

```
DEST_ARRAY => "myDB".buffersArray[#fieldNo].receiveBuffer
```

Serialize and Deserialize (S7-1200/S7-1500)

The optimized versions of the Serialize and Deserialize instructions as of V2.1 require more work memory than their predecessor versions due to the complexity of the processed data.

With Serialize/Deserialize version 2.2, it is no longer permissible to interconnect an element of a technology object (e.g. TO_SpeedAxis.Statusword) to input or output parameters for serialize (SRC_VARIABLE/DEST_ARRAY) or deserialize (SRC_ARRAY/DEST_VARIABLE).

SCL: Implicit data type conversion

When the SCL block was called, the data type of the in/out parameter (InOut) was not implicitly converted to the target data type. This behavior has been corrected. If you use SCL blocks in your program and transfer in-out parameters, check that the program is running correctly after upgrading.

Transfer of an ARRAY to the VARIANT data type

In rare cases, an ARRAY that was part of a structure and whose access path had a dereferencing, returned an incorrect length when it was transferred to a VARIANT. This behavior was corrected in V15.0.1.

Example

#ArrayLength := "myFC"(myVARIANT := #ref_to_mySTRUCT^.myARRAY);

//"myFC" calculates the length of the array that is transferred at the "myVariant" input.

See also

Upgrading blocks (Page 42)

2.5.8.5 Compatibility of PLC programs from versions prior to V16

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 V16 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 V16, 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.

Compatibility after upgrading a project to V16

After upgrading a project to V16, online/offline differences might be indicated although the online and offline programs are identical. These differences are due to optimization of the calculation of checksums in V16. But the blocks are still compatible in most cases.

In some rare cases, however, you might have to recompile and download the project again due to the changes in the checksum calculation before you can monitor and test the project online.

You can find more information in the log files for upgrading in the project properties. If a checksum inconsistency is reported in the log files, then the online/offline differences are due to the changed checksum calculation.

You can find additional information in section: "Online connection after upgrading a project".

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

After upgrading a project to V16 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.x to V16, the program blocks have to be compiled before they can be monitored.

Software units

As of V16, the following rules apply for the name of a software unit:

- Permissible characters are all alphanumeric characters and the underscore.
- The maximum number of characters is 125.
- The name of a software unit must be unique for the entire CPU and no block with the same name must exist in the CPU.

If the software unit in your program does not conform to these rules, a syntax error is displayed after the upgrade. In this case, change the property of the software unit and recompile the program.

Syntax check for instances (LAD, FBD, STL, GRAPH)

A more thorough check is now performed when calling a function block to determine whether the specified instance data block is of the type of the called FB. In addition to the block number and the block structure, the block name is now also being checked.

A syntax error is output after the upgrade in case of inconsistencies. In this case, check the type of the instance data block in the "General" section of the block properties. If the type does not match the called FB, you must change the block call and specify a matching instance.

Instructions "UPPER_BOUND" and "LOWER BOUND" (LAD, S7-1200/S7-1500)

The enable input "EN" of the two instructions "UPPER_BOUND" and "LOWER BOUND" is now evaluated correctly. If the input "EN" has the signal state "0", the instruction is not executed and the enable output "ENO" has the signal state "0". When you use one of the two instructions, check whether your program sequence is still the same after the upgrade.

Instruction "S_CONV" (LAD)

The enable input "EN" of the "S_CONV" instruction was not evaluated in older TIA Portal versions during conversion from (W)Char to (W)String when no parameter was interconnected at the enable output "ENO". This behavior has been corrected. When you use "S_CONV", check whether your program sequence is still the same after the upgrade.

Initialization of STRUCT data type when importing external source files (SCL)

The initialization rules for STRUCT have been made uniform. The initialization lists are now always evaluated according to the same rules, regardless of whether you are working in the tabular form or in the textual block interface.

If you use a different syntax in an initialization list and initialize some elements by specifying the element name and others only by specifying the value, for example, check your program after importing it into TIA Portal V16.

The following example shows how the structure elements in V16 are evaluated both in tabular form and in the textual block interface:

```
myStruct : Struct
   member_1 : Int;
   member_2 : Int;
   member_3 : Int;
   member_4 : Int;
   member_5 : Int;
End_Struct:=(1,mem_3:=33,2,3);


//The structure elements are initialized as follows:
//mem_1 := 1;
//mem_3 := 33;
//mem_4 := 2;
//mem_5 := 3;
```

AT declaration

In rare cases, incorrect values were written to block parameters that immediately followed an AT declaration in the interface. This behavior has been corrected.

It is no longer possible to overlay block parameters of the data types BOOL, BYTE, SINT, USINT or CHAR with tags of the data types STRUCT and UDT. Overlays with ARRAY type tags are only possible as long as the array size does not exceed the data size of the overlaid type.

If you use AT declarations, check your program after the upgrade.

"MOVE" instruction

With the "MOVE" instruction you can only copy all the tags of a data block into another data block ("DA a" := "DB b") if both blocks have the same structure, i.e. the number, the data type and the declaration sequence of the declared tags are identical. In addition, both data blocks must have the same storage format (optimized or non-optimized).

If both blocks are available in an optimized storage format, all tags of both blocks must be either retentive or non-retentive.

"MOVE" instruction (AWL)

As of TIA Portal V16, it is no longer possible in AWL to supply the OUT output of a MOVE instruction with a tag of the VARIANT data type from the sections InOut or Out of the block interface.

Instructions "SCATTER_BLK" and "GATHER_BLK" (SCL)

As of V16 the permissible data types have been restricted: When using structures (STRUCT or PLC data type) as parameters, these must only contain tags of the data type BOOL.

Non-typed constants (SCL)

The semantics check for non-typed constants has been adapted to the other programming languages: If a non-typed constant is not compatible with the assigned operand, a compilation error is always reported if the IEC check is activated.

Addressing ARRAYs via variable index and I/O access (S7-1200)

In a CPU of the S7-1200 series, addressing ARRAYs via a variable index in combination with the I/O access identifier ":P" is no longer possible.

Example of an invalid ARRAY addressing:

```
#array[0, #myIndexTag, 2]:P
```

Examples of permissible ARRAY addressing with I/O access:

```
#array[0, #myConstant, 2]:P
```

```
#array[0, 1, 2]:P
```

Examples of permissible ARRAY addressing with variable index:

```
#array[0, #myIndexTag, 2]
```

Block size when using ARRAYs in structures

When using structures (STRUCT) that contain more than one ARRAY element, the following error can occur:

If multiple ARRAY accesses were outside the valid range, the CPU did not switch to STOP but an ARRAY element was accessed.

This behavior has been corrected in V16: The CPU switches to STOP in this case or runs a local or global troubleshooting if it is programmed.

This correction allows for the respective blocks to be larger.

Assignment of non-typed constants (SCL)

An error message is generated for assignments of non-typed constants to tags of the "Real" type when the IEC Check is enabled, and when the constant is also located within the value range of an LReal and outside the value range of a Real.

See also

Upgrading blocks (Page 42)

2.5.8.6 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.

2.5.8.7 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.

2.5.8.8 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.

2.5.8.9 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.

2.5.8.10 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 >= 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'

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 valve 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 valve 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	The ENO enable output returns the signal state "0" even if you have deactivated the ENO enable output: • For an invalid character at the CHARS parameter • For an invalid ARRAY index at the PCHARS parameter • If the sum of the PCHARS and STRG parameters exceeds the length of the target ARRAY.
Chars_TO_Strg: Convert Array of CHAR to character string	The ENO enable output returns the signal state "0" even if you have deactivated the ENO enable output: • If the sum of the PCHARS and CNT parameters exceeds the length of the source ARRAY.

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.

2.6 Using online and diagnostics functions

2.6.1 Notes on online and diagnostics

Contents

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

Long-term trace: Restricted display of points of intersection with a vertical measuring cursor

As soon as there is a vertical measuring cursor outside of the area shown in the time diagram, a "NaN" is shown for this measuring cursor in the "Trace > Measuring cursor" task card for the intersection with the selected signal "Y(tn)".

If a "NaN" is shown for at least one measuring cursor with "Y(tn)", "NaN" is also shown with Δ Y.

Event recording: Delays when creating the csv file

The upload to create the csv file takes some time. The TIA Portal may respond with delays during this time.

Interruption of long-term trace recording when the long-term trace editor window is closed

Do not close the long-term trace editor window during a long-term trace recording!

If you close the long-term trace editor window during a long-term trace recording, the recording will be interrupted and no data will be saved in the csv file.

To resume the interrupted long-term trace recording, open the respective long-term trace configuration and start recording again.

The missing data appears as a gap in the time diagram.

Recommendation: Limited number of long-term traces

Due to the essential connection between TIA Portal and the CPU, we recommend limiting the use of the long-term trace as follows:

- Simultaneous recording of max. two long-term traces installed on the CPU
- Max. 32 signals of the "LReal" data type per long-term trace
- Minimum recording cycle 1 ms

NCMOnlineTools

During the installation of TIA Portal V20, the help files for the NCMOnlineTools (NCM Special Diagnostics, NCM Firmware Loader, Sinaut Special Diagnostics) are stored under <TIA>\Win32\Services\NCMOnlineTools.

To allow context-sensitive access to the help files, extract the ZIP folders. The following subdirectories are shown when the folders are extracted:

<TIA>\Win32\Services\NCMOnlineTools\s7ncmdiag

<TIA>\Win32\Services\NCMOnlineTools\s7wbtcd

<TIA>\Win32\Services\NCMOnlineTools\s7wnfwl

<TIA>\Win32\Services\NCMOnlineTools\s7stolh

To completely uninstall the TIA Portal, delete the directories with the help files again.

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 article numbers are identical in the actual CPU and the offline CPU.

2.7 Inter Project Engineering (IPE)

2.7.1 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.

2.8 Technological functions

2.8.1 Notes on Motion Control (S7-1200, S7-1500, S7-1500T)

2.8.1.1 Motion Control (S7-1200)

No entries available.

2.8.1.2 Motion Control (S7-1500, S7-1500T)

General functions (S7-1500, S7-1500T)

PC-based PLCs

The software controllers T/TF with firmware version V40.0 can only be used for selected IPC configurations of the BX-59A.

With firmware version V31.1, the software controllers 1508S T/TF offer the following improved property:

- Increased Motion Control resources to 26,800

With firmware version V30.1, the software controllers 1505SP T/TF offer the following improved property:

- Increased Motion Control resources to 5,120

Axis functions (S7-1500, S7-1500T)

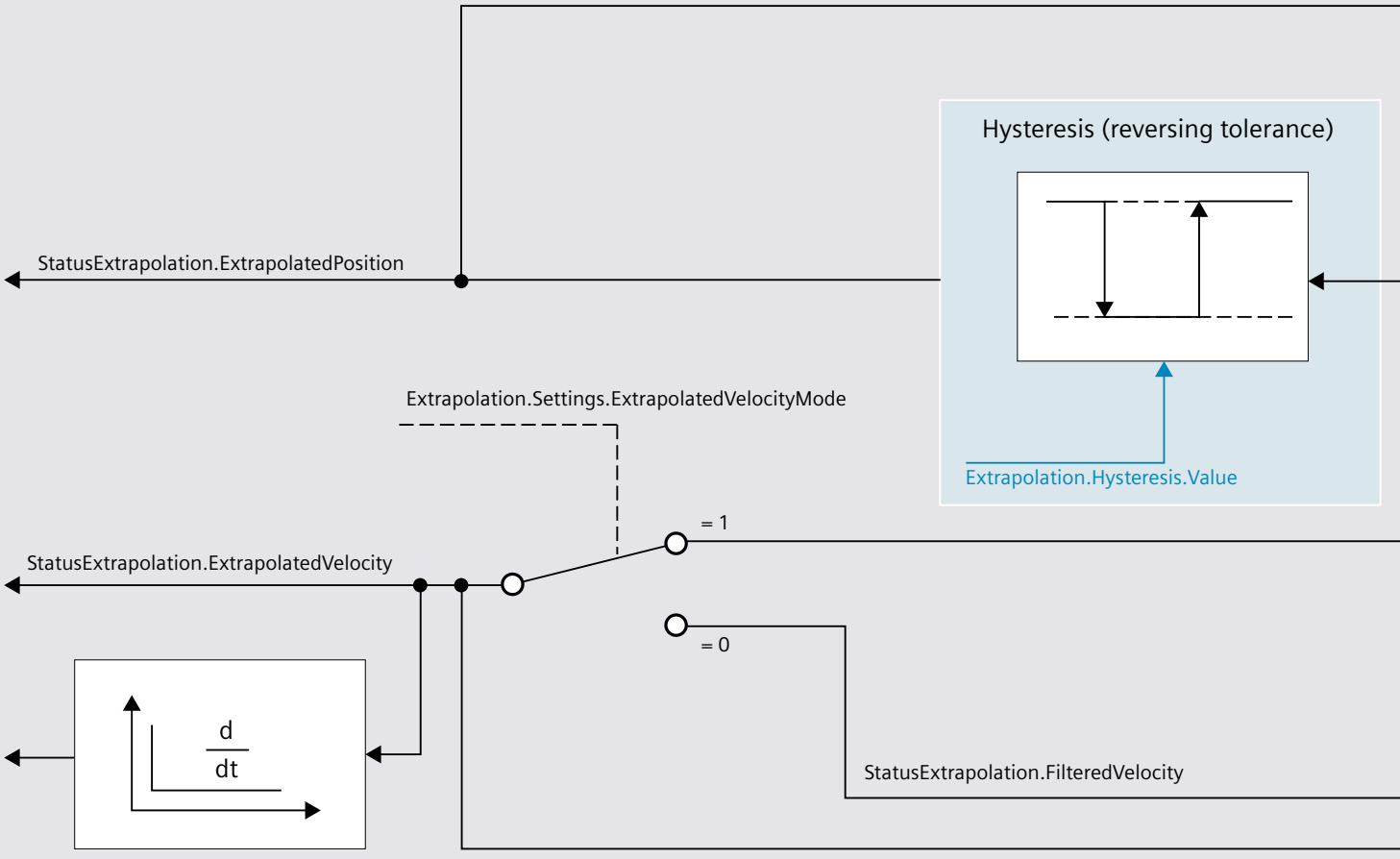
Signal flow diagram

Contrary to the representation in the signal flow diagram in the online help, the actual value extrapolation of the master value is represented as shown in the section below.

The complete signal flow diagram is available in the Siemens Industry Online Support in the FAQ entry 109770664 (https://support.industry.siemens.com/cs/ww/de/view/109770664).

Extract from signal flow diagram master value extrapolation

Master value extrapolation



①	T_{eff}	Effective extrapolation time
	T_{LA}	Leading axis-dependent extrapolation time (<TO>.Extrapolation.LeadingAxisDependentTime)
	T_{FA}	Following axis-dependent extrapolation time (<TO>.Extrapolation.FollowingAxisDependentTime)
	T_{PLCGL}	Time from cross-PLC synchronous operation (<TO>.CrossPlcSynchronousOperation.LocalLeadingValueDelayTime)
	T_{dp}	Send clock (PROFINET/PROFIBUS)
	T_{ipo}	Cycle time of MC Interpolator [OB92]
	T_{vtc}	Velocity control loop substitute time (T_{vtc} from "<TO>.DynamicAxisModel.VelocityTimeConstant")
	T_i	Time of actual value acquisition
	T_o	Time of setpoint output
	$T_{1; PosFltr}$	Position filter time constant T1 (<TO>.Extrapolation.PositionFilter.T1)
	$T_{2; PosFltr}$	Position filter time constant T2 (<TO>.Extrapolation.PositionFilter.T2)
	Kv	Gain factor (Kv from "<TO>.PositionControl.Kv")

Synchronous operation functions (S7-1500, S7-1500T)

Configuring the actual value extrapolation (S7-1500T)

You configure the actual value extrapolation of the master value in the configuration of the leading axis under "Technology object > Configuration > Extended parameters > Actual value extrapolation":

- To use the extrapolated velocity, select the check box "Activate differentiation".
- Deactivate the check box "Activate differentiation" to use the filtered actual value velocity.

Synchronizing following axis in advance using dynamic parameters with "MC_GearInPos"

If the leading and following axes are already at their synchronous positions when the "MC_GearInPos" job is started, synchronous operation immediately has "Synchronous" status. In terms of application, you can only achieve this with a setpoint coupling by positioning the leading and following axes absolutely on the synchronous positions.

Switching setpoint cam/cam tracks in cross-PLC synchronous operation with PN/PN coupler (S7-1500T)

If you are operating cross-PLC synchronous operation with a PN/PN coupler and a reduction ratio of the send clocks, the technology objects receive the setpoints with a time offset. Nevertheless, the setpoints become effective on the drives at the same time.

You can find more information on the behavior of setpoint cams and setpoint cam tracks in cross-PLC synchronous operation in Siemens Industry Online Support in the FAQ entry 109975409 (https://support.industry.siemens.com/cs/ww/en/view/109975409).

Kinematics functions (S7-1500T)

Velocity override in the kinematics control panel

NOTICE
Deviating jog velocity due to velocity override If the velocity override is changed by the user program while the kinematics control panel is active, undesired deviations in the jog velocity can occur. With active master control, both settings on velocity override take effect in jog mode of the kinematics. The value set under "Adapt" with the "Velocity" slider as well as the value configured in the "<TO>.Override.Velocity" variable have a multiplicative effect on the final velocity in jog mode. For example, the following settings result in a final velocity of 25 mm/s: • Jog velocity = 100 mm/s • "<TO>.Override.Velocity>" is set cyclically to 50% in OB1. • The "Velocity" slider is set to 50%. The resulting final velocity is calculated as follows: 100 mm/s × 0.5 × 0.5 = 25 mm/s. To avoid undesired deviations in the resulting final velocity, make sure that both parameters are set correctly and the velocity override with active master control is not changed by the user program. With a query of the kinematics control panel status (<TO>.StatusWord.X4 (ControlPanelActive)) when the "<TO>.Override.Velocity>" variable is written, you can prevent writing of the variable with an active kinematics control panel.

Interpreter functions (S7-1500T)

No entries available.

2.8.2 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 ≤ 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 <> 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 ≥ 0.0).

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

2.8.3 Notes on other technology functions (S7-1200)

PtP modules 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 ≤ 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

2.8.4 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.

2.8.5 SIMATIC STEP 7 Easy Motion Control

2.8.5.1 Notes on SIMATIC STEP 7 Easy Motion Control

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

2.8.6 SIMATIC STEP 7 PID Professional

2.8.6.1 Notes on SIMATIC STEP 7 PID Professional

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

Readme WinCC Basic, Advanced, Professional 3

3.1 Important information

3.1.1 Security information

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions only form one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary, and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For more information on protective industrial cybersecurity measures for implementation, visit:

www.siemens.com/industrialsecurity (https://www.siemens.com/industrialsecurity)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends applying product updates as soon as they are available and always using only 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 at all times, subscribe to the Siemens Industrial Cybersecurity RSS Feed under.

www.siemens.com/cert (https://www.siemens.com/cert)

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 integrated 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, although the option "HTML pages" is deactivated. 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.

WinCC Simulation for 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 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	HTTP channel server HTML pages	The web server is only available when HTTP channel servers or HTML pages are 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	HTTP channel server HTML pages	The web server with HTTPS protocol is only available when HTTP channel servers or HTML pages are 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					

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.
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.
ARP	---	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 HMI 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.
NetBIOS over TCP/IP	137	UDP	Outbound	With the use of Remote File Share	Register / log on to a remote server.

Communication connections for Panels and WinCC Runtime Advanced					
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 Hypertext Transfer Protocol	The HTTP protocol is used for communication with the HMI 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 DeviceManager 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 DeviceManager 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.
* Default port that can be changed by user configuration ** Port is assigned automatically. *** Supported by WinCC Runtime Advanced only.					

3.1.2 Data protection

Siemens observes the data protection guidelines, especially the requirements regarding data minimization (privacy by design). This means the following for this SIMATIC product: The product does not process / save any personal information, but only technical functional data (e.g. time stamps). If the user links this data to other data (e.g. shift plans) or if the user saves personal information on the same medium (e.g. hard disk) and therefore creates a personal reference in the process, the user has to ensure meeting the guidelines regarding data protection.

3.1.3 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 might 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 can lead to errors when compiling the project.

Upgrading user data types

During an upgrade, only the user data types that are used in a project are upgraded.

Installation path

If you had the simulation installed in an earlier version, you cannot adjust the installation path during the installation.

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 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".

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 might 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"

PostScript fonts

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

Tasks with tag trigger

A task with tag trigger is executed when the value of the internal tag is written, even if the value of the internal tag does not change.

Advanced loading (RT Professional)

If only WinCC Professional V19 Engineering is installed on a PC and the "Advanced loading" dialog cannot be opened after installing an update, install at least the simulation from the DVD with WinCC Professional Runtime. It is recommended that you then install the latest WinCC Runtime Professional update.

3.1.4 Screens and Screen Objects

Contents

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

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.

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 might not be completely legible and can be concealed by operator controls.

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.

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

The display of the text configured in a screen object might 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.

Dynamization of faceplates (RT Professional)

The dynamization of a faceplate instance with user data type connection is not intended, but can be realized in certain scenarios using an auxiliary tag. Read the information about this in FAQ 109766634 (https://support.industry.siemens.com/cs/ww/en/view/109766634).

Events cannot be dynamized at a faceplate instance via a function list or a C script.

When using a VB script, you must use SmartTag functions.

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 that what is expected. Check the sequence of the execution in runtime and adapt the configuration if necessary.

My controls

"My controls" might not be displayed correctly in the engineering system. However, they can be configured without restrictions. There are also no restrictions for the representation and operability in Runtime. If this control is based on OCX technology, a switch to .Net is recommended.

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.

Grouping of screen objects

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

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.

Network changes in the PLC code view (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 view to be displayed correctly for criteria analysis, the message must be triggered again.

PLC code view

When a ProDiag alarm is displayed, network changes in the PLC code display are updated in Runtime. In order for network changes in the PLC code display to be displayed correctly for criteria analysis, the alarm must be triggered again.

Fonts in the header of window objects (Panels, Runtime Advanced)

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.

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.

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.

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.

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.

Invalid graphic types in graphic lists after upgrading (Runtime Professional)

When you upgrade your project to TIA Portal version V16, invalid graphic types in the graphic list result in compiling errors that were displayed as warnings in V14.

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

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.

Connection to Char data type

If you connect the I/O field to a controller tag of data type "Char", the following restrictions apply:

- The input accepts only digits: 0 ... 9.
  The entered string of digits is converted to the corresponding character according to the ASCII table.
  Example: Input 6 + 5 becomes "A".
- Only enter digit sequences between 0 and 129.

To input alphanumeric characters directly, use the alternative data type "WChar", for example.

3.1.5 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.

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 restriction for variable names (RT Professional)

The variable name must not exceed 128 characters.

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, do so 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 tab 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 is displayed.

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

Tags under "Tag box ID" (Mobile Panel)

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.

Using 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 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.

3.1.6 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 you upgrade a project from versions V13SP1 or V13 SP2 to versions V14, V14 SP1, V15, V15.1, V16, 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.

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.

3.1.7 System functions and scripts

Contents

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

Simulation with script debugger

To start the "Simulation with script debugger" from TIA Portal, the registry key HKEY_CLASSES_ROOT\CLSID\{834128A2-51F4-11D0-8F20-00805F2CD064}\LocalServer32 must contain an entry "(Default)" of the type "String", which contains the whole path of the default script debugger "devenv.exe". The debugger can be connected to a simulation which is already running without this registry key.

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.

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.

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

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".

Supply trend view by means of user-defined function

When you read values from a log with a VBS function to display them in a trend view, you must ensure that the difference between the time stamps is greater than zero.

Maximum number of parameters (Panels and RT Advanced)

The maximum number of parameters of a global function is 8 for the type "sub" and 7 for the type "func".

Scripts on the WebUX or WebNavigator server

C or VBS scripts triggered by services such as Global Script, Alarm Logging or Tag Logging are independent of Graphics Runtime and therefore run only on WebUX or WebNavigator servers.

- Any output of such functions, e.g. via printf() or HMIRuntime.Trace(), is not visible in the script diagnostics window on a WebUX or WebNavigator client.
- All accesses to Graphics Runtime from such functions are always made to the local Graphics Runtime of the WinCC server.

Addressing the "WaitForDocumentReady" function

When using the "WaitForDocumentReady" function, if you address the screen window via an absolute path, you must put a colon ":" at the end of the path.

Example: WaitForDocumentReady("Start.Picture:")

See also

Debug (https://msdn.microsoft.com/en-us/library/wk3y866c(v=vs.84).aspx)

Err (https://msdn.microsoft.com/en-us/library/sbf5ze0e(v=vs.84).aspx)

3.1.8 Reports

Contents

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

3.1.9 Recipes

Contents

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

Recipe synchronization (Basic Panels, Panels, Comfort Panels and RT Advanced)

When data record values are sent to the controller, the values are only validated if the "Manual transfer of individually modified values (teach-in mode)" option is selected for the recipe under "General > Synchronization > Settings".

Requirements for using recipes in redundant systems (Runtime Professional)

- Recipes are only synchronized if WinCC components are used, e.g. functions of the UA API, control tags, WinCC recipe control. Recipes are not synchronized if the data is accessed via ODBC, for example.
- For online synchronization, the "Last access" option must be selected in the Inspector window of the recipe under "System fields".

3.1.10 User administration

Contents

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

UMAC domain user

In WinCC V16.0, only local UMAC users may be used, no UMAC domain users.

3.1.11 Communication

Contents

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

Secure communication

Secure communication via the TLS protocol can only be established via integrated connections.

If you use Inter-Project Engineering (IPE) in your project, i.e. an HMI device is connected to a device proxy PLC, and an error message about inconsistent certificates appears during compiling, you need to correct the certificates of the associated PLC in the original project. Then you have to compile, export and re-import the PLC.

Establishing a connection to WinCC Runtime Advanced

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 might 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.

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 might 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.

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 Commissoning > IP-Adaptation" menu on the HMI device. If you want to change the IP settings or the device name of a PLC, 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"

"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 can 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 must 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-station 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.

PROFIenergy communication

To set up PROFIenergy communication, contact Customer Support.

Number of SmartClient connections

Even if the Basic Panel allows an unlimited number of SmartClient connections, configuring a maximum of two connections is recommended. Any additional connection affects performance.

Integrated Web server: Communication via OPC UA

If the error message 8010_0000 occurs during the communication of the integrated Web server via OPC UA, check the length of the transmitted arrays. If arrays are to be transmitted via OPC UA, the array may only have a maximum of 20 elements.

Communication with controllers from third-party providers

For communication with controllers from third-party providers, HMI user data types do not support any settings with regard to offset.

3.1.12 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".

3.1.13 Compiling and loading

Contents

Information that could not 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.

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.

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".

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)".

Transport password

The transport password protects other passwords from unauthorized access during loading in the target system. Therefore, the transport password is only prompted for if at least one other password – for example, an access password – has been defined.

See also

Microsoft KB3083806 (https://support.microsoft.com/en-us/kb/3083806)

3.1.14 Runtime

3.1.14.1 Notes on operation in Runtime

Contents

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

Note

If Runtime is operated in Kiosk mode with disabled shortcut keys in full-screen, you should disable access to online help in the ActiveX controls, otherwise the operator can gain access to the operating system.

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\Windows\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\Windows\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).

Variable fonts on HMI devices

Windows 10 supports variable fonts ("OpenType Font Variations") since version 1709. You can also use the variants of a variable font in the engineering system. The actual display in Runtime depends on the HMI device and the installation conditions:

- Basic Panels, Comfort Panels: Variable fonts are not supported. The basic version is always displayed.
- Runtime Advanced, Runtime Professional: Variable fonts are supported if at least Windows 10 Version 1709 is used as the operating system and the font is installed with administrator rights.

Deactivating NTLMv1 and SMBv1

The NTLMv1 and SMBv1 protocols can be disabled. Deactivating the protocols does not have any effect on the operation of WinCC Runtime Professional.

Note

Security risk from NTLMv1 and SMBv1

Use of the NTLMv1 and SMBv1 protocols is a significant security risk. Communications in the network could be compromised, for example, by man-in-the-middle attacks.

Depending on the operating system, the procedure for deactivating protocols may differ.

Encryption with TLS

Always use the latest version of TLS. Disable older versions.

The use of older versions (TLS 1.0 and 1.1) is at your own risk.

3.1.14.2 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.

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
- WinCC Engineering System
- "ProSave" service tool

Note

The "USB" transfer channel remains available if Windows 7 is installed on the configuration PC.

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.

Status change of an alarm

In case of status changes of the alarm, the existing text lists and variable fields are updated, if necessary.

3.1.14.3 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 V17 can be started from the Engineering System. Other versions of WinCC Runtime can only be simulated.

Authorization for starting Runtime Advanced

On a computer running the Windows operating system, WinCC Runtime Advanced can only be started if a user starting runtime is a member and has the rights of the group "Siemens TIA Engineer".

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.

.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 above software updates. For the system to run reliably on a multi-station 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 deactivate the "Check for updates daily" option.

Access to array variables via OPC

If you use WinCC Runtime Advanced as OPC UA server, reading array tags is only supported when the "OPC UA Server Array index range access" setting is activated.

Array variables can only be written if the OPC UA client supports the setting "Write array elements without IndexRange".

Autostart of Runtime Advanced with Open Controller

Autostart of WinCC Runtime Advanced cannot be configured with connected Open Controller.

Start Runtime manually or add "HmiRTM.exe" to the Windows Autostart folder.

Entry of LINT (Long integer) data type at an I/O field

If you have used a LINT data type at an I/O field and enter a floating-point number into the I/O field, then the decimal places are neglected.

Status change of an alarm

In case of status changes of the alarm, the existing text lists and variable fields are updated, if necessary.

3.1.14.4 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 user 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.

Locking shortcuts

If you want to lock shortcut keys in Windows, 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 shared 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.. > Configuration Tools > SQL Server.. 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".
   "Log On As" must be entered for "LocalSystem" for "SQL Server (WinCC)".
   "SQL Server Browser" must be entered for "LOCALSERVICE".
   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.

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-station 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.

Memory requirement of logs

To calculate the memory requirement for alarms across all segments and for individual segments, you need information on how many alarms are received as average per second. The maximum memory requirement of an alarm of approx. 4000 bytes is taken into account. The following applies:
Memory requirement = Number of alarms/s * 4000 bytes * 60 s/min * 60 min/h * 24 h/day * 31 days/month * y months.

The example is based on one alarm per second:

- The maximum size across all segments for 2 months is approx. 20 GB
- For a single segment it is approx. 330 MB per day

To calculate the storage requirements for data logs across all segments and for individual segments, you need information about how many values are logged per second and the average length of a process value. The following applies:
Memory requirement = number of log values/s * x bytes * 60 s/min * 60 min/h * 24 h/day * 31 days/month * y months

The example is based on 750 log values per second:

- For process values with 16 bytes, this results in a memory requirement of approx. 60 GB
- For process value with 6 bytes, this results in a memory requirement of approx. 22 GB

Automatic logout on multitouch devices

To ensure that a configured automatic logout works on devices with a multi-touch screen even when using SIMATIC Logon V1.6 Update 3, configure any function, for example, to set a bit of a tag to the "Touched" event of the screen. This resets the logoff time timer when the screen is touched.

3.1.14.5 Secure communication via certificate (RT Professional)

Runtime Professional certificate-based communication has been enhanced.

Overview

Supported S7 PLCs

WinCC Runtime Professional can communicate with the following S7 PLCs via certificates:

- S7-1500 PLCs as of firmware 2.9
- S7-1200 PLCs as of firmware 4.5

Note

All of the following statements apply only to S7 PLCs with this firmware.

Expansions

Certificate-based communication between Runtime Professional and S7 PLCs has been enhanced as follows:

- Communication between HMI devices and S7 PLCs with a non-integrated connection now supports self-signed certificates.
- Upgrading S7 PLCs has been simplified. Upgrading in the TIA Portal is no longer mandatory. An S7 PLCs that was only upgraded in the field now communicates with the HMI device via a self-signed certificate. The self-signed certificate is automatically loaded from the PLC into the certificate store of the HMI device.

To use these functions, enable the "ForceSecure" option on the HMI device.

Using self-signed certificates

The following self-signed certificate options are available:

- Use a self-signed certificate generated in the TIA Portal.
  Use the certificate created automatically when adding an S7 PLC or upgrading an existing S7 PLC. Or select certificate settings that differ from the default settings and generate a self-signed certificate yourself.
  When loaded, the certificate is copied to the Runtime project folder.
- Use a self-signed default certificate.
  Do not provide a certificate for the PLC in the TIA Portal and instead enable the "ForceSecure" option on the HMI device for the PLC connection type.
  A self-signed certificate is generated when loading to the PLC. The certificate is copied to the certificate store of the HMI device during the first attempt to make a connection between the PLC and the HMI device. After the certificate is copied to the folder with trusted certificates, it is used for communication.

Enabling or disabling the "ForceSecure" option

Introduction

The "ForceSecure" option ensures that communication between the HMI device and the S7 PLC is protected by a certificate for the following connections:

- Non-integrated connections

- Connections for which no certificate has been configured in the TIA Portal

If the option is enabled and no PLC certificate is found in the Runtime project folder, Runtime searches for a suitable certificate in the "trusted" folder of the HMI device's certificate store.

Note

This option does not affect communication with S7 PLCs that do not support certificates.

Default setting

This option is disabled by default for integrated connections, non-integrated connections and device proxies.

Procedure

Note

It is recommended to enable the option for all connection types.

To configure the option for an HMI device, proceed as follows:

1. Create the "ForceSecure.xml" file.
2. Copy the following XML structure into the file:
```
<?xml version="1.0"?>
   <root>
   <NonIntegrated>true</NonIntegrated>
   <Integrated>true</Integrated>
   <IntegratedProxy>true</IntegratedProxy>
   </root>
```
3. To disable certificate store evaluation for one of the connection types, set its node to "false".

   Note

   Certificate-protected communication for non-integrated connections is not possible in this case.

   For integrated connections and device proxy, certificate-protected communication is possible only after upgrading the PLCs in the TIA Portal.

4. Copy the file on the engineering device into the TIA project directory of the project to which the HMI device was added into the following folder:
   "...\AdditionalFiles\Rdp"
5. Compile and download the HMI device.
   Your settings will be applied to the communication between the HMI device and its connected S7 PLCs.

To configure the "ForceSecure" option centrally for all projects created in the TIA Portal, proceed as follows:

1. Perform steps 1 to 3 as described above.
2. Copy the file on the engineering device into the program directory "C:\ProgramData\Siemens\Automation\ConfigFiles\RDP".
3. To use a different configuration for individual projects, proceed as described in steps 1 to 4 above.

If the XML file is located in the program directory and in the TIA project directory, the configuration from the project directory takes effect.

Upgrading S7 PLCs

The following options are available when using self-signed certificates.

Upgrading in the field without upgrading the S7 PLC in the TIA Portal

Requirement:
On the HMI device connected to an S7 PLC, the "ForceSecure" option is enabled for the S7 PLC connection type.

Procedure:

1. Upgrade the HMI device in the TIA Portal.
2. Replace the S7 PLC and the HMI device in the field.
3. Download the S7 PLC and the HMI device.
   After the download, the Runtime project folder does not contain a certificate for this S7 PLC.
4. Start Runtime.
   At the first attempt to make a connection, the self-signed certificate is automatically loaded from the S7 PLC. It ends up in the certificate store of the HMI device in the following folder:
   `%PROGRAMDATA%\Siemens\Automation\device-certificate-store\untrusted`
5. Copy the PLC certificate in the certificate store of the HMI device to the folder with the trusted certificates manually or per script:
   `%PROGRAMDATA%\Siemens\Automation\device-certificate-store\trusted\certs`

Upgrading in the field and upgrading in the TIA Portal

Procedure for integrated connections and device proxy:

1. Upgrade the S7 PLC and HMI device in the TIA Portal.
2. Replace the S7 PLC and the HMI device in the field.
3. Download the S7 PLC and the HMI device.
   After the download, the Runtime project folder contains the certificate for this S7 PLC.
4. Start Runtime.
   HMI device and PLC trust each other's certificates. There are no further steps for you.

Procedure for non-integrated connections:

1. Upgrade the S7 PLC and HMI device in the TIA Portal.
2. Enable the option "ForceSecure" for the non-integrated connection type for the HMI device.
3. Replace the PLC and the HMI device in the field.
4. Download the PLC and the HMI device.
   After the download, the Runtime project folder does not contain a certificate for this S7 PLC.
5. Start Runtime.
   At the first attempt to make a connection, the self-signed certificate is automatically loaded from the S7 PLC. It ends up in the certificate store of the HMI device in the following folder:
   `%PROGRAMDATA%\Siemens\Automation\device-certificate-store\untrusted`
6. Copy the PLC certificate in the certificate store of the HMI device to the folder with the trusted certificates manually or per script:
   `%PROGRAMDATA%\Siemens\Automation\device-certificate-store\trusted\certs`
   HMI device and PLC trust each other's certificates.

Alternatively, you can export the PLC certificate from the TIA Portal in advance and copy it to the "`...\trusted\certs`" folder before starting Runtime. The certificate file must have the following name:

"S7PlusChannel_<PLC_IP>.der", e.g. "S7PlusChannel_192.168.0.1.der"

3.1.15 Add-ons

3.1.15.1 Sm@rtServer

Content

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

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.

3.1.15.2 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.

3.1.15.3 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 "Repair" setting in the WinCC/DataMonitor setup.

Excel Workbook on a PC with Windows 7

If you use Excel Workbook on a PC with Windows 7, you must disable the "Aero Glass" display mode.

Working with reports: Excel workbooks

If you want to make an Excel workbook available as the reporting tool or want to create a report with an Excel workbook, the file size of the Excel workbook must be smaller than 4 MBytes.

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.

3.1.15.4 WebNavigator

General information about WebNavigator

Introduction

These release notes contain important information.

The statements in these release notes take precedence over information provided in the manuals and in the online help.

Read these release notes carefully as they contain useful information.

Notes on the security of the system

Cybersecurity information

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 cybersecurity concept.

Siemens' products and solutions constitute one element of such a concept.

You can find additional information about industrial cybersecurity under:

- AUTOHOTSPOT

Security restrictions with the WebNavigator client

NOTICE
Security restrictions and response times in Internet Explorer Please note the Internet-specific security restrictions when using the WebNavigator client. The WebNavigator client may take significantly longer (>20 seconds) than a regular WinCC client to recognize that the WebNavigator server is down or that the communication is faulty.

Using a secure connection via HTTPS

To increase the security of your communication, configure the WebNavigator server in such a way that only HTTPS connections are supported.

You need a digital certificate for the WebNavigator server for this. Also use the SSL certificate on the WebNavigator client.

You can find more detailed information under "Setting up a secure connection via HTTPS".

Communication via proxy server

When communicating through a proxy server, the following applies:

- The WebNavigator client must be a member of the server domain.
- If the users registered on the WebNavigator client have no access to the proxy server, logon to the proxy server with NTLM authentication is as follows:
  1. The logon dialog for the proxy server appears.
  2. The logon dialog for the WinCC user appears.
  3. The logon dialog for the proxy server appears again.

Avoid cross-site request forgery for the WebNavigator

Cross-site request forgery is similar to the vulnerability caused by cross-site scripting (XSS, Cross Site Scripting).

The attack is triggered when an authenticated user clicks on a malicious link. However, this vulnerability also works if the user has disabled scripting in the browser.

Siemens recommends:

- Do not work with other applications or services that have anything to do with the Internet.
- Log off when you no longer need the WebNavigator.

Defense in depth

Follow the instructions on "Industrial Cybersecurity" on the Siemens website:

- AUTOHOTSPOT

WebNavigator server: Do not configure the standard port "80"

When configuring the port in the WinCC Web Configurator, use "8080", for example, rather than the standard port "80".

General information about WebNavigator

Project Change

Following a change of projects, a sporadic inoperable period of the Internet Information Services (IIS) may occur.

The computer must then be restarted.

Terminal server: Login with user certificate

The following group policy affects the logon behavior of a user with a user certificate:

Local group policy	Setting
Computer Configuration > Windows Settings > Security Settings > Local Policies > Security Options: "System cryptography: Force strong key protection for user keys stored on the computer"	User must enter a password each time they use a key

This setting can cause the password prompt for the user certificate to be displayed in the session of another logged-on user when the terminal session is established.

Corrective measure

To prevent this Windows behavior, use the default setting "Not defined" on the system that is used as the terminal server.

This behavior occurs only when this group policy is activated.

Custom ActiveX controls (Industrial X)

Compatibility with WinCC and WebNavigator server or WebNavigator client must be ensured if custom ActiveX controls (Industrial X) are used:

- Direct installation of the ActiveX control on the computer with WinCC and WebNavigator server or client.
  You must install the ActiveX control before installing WinCC and the WebNavigator server or client.
  If the ActiveX control does not function without errors after this step, there is no compatibility.
- Installation as a plug-in via the Web Navigation user interface on the WebNavigator client.
  If the ActiveX Control is packaged in a plug-in and installed via download, an upgrade of WinCC and the WebNavigator server or client will also require the generation of a new plug-in using this ActiveX control.
  Ensure compatible binaries (DLL, OCX, etc.) are used when creating the plug-in.

Visual C++ Redistributable for Visual Studio

Microsoft Redistributable Packages for Visual Studio C++ 2015 are installed along with WinCC.

For example, if you are using ActiveX controls or Visual Basic projects created with versions prior to Visual Studio 2015, you must install the corresponding package.

The installation files for redistributables < Visual Studio 2015 are included in the WinCC scope of delivery:

- "Additional Content" DVD:
  "VCRedist" folder

Select the setup for the required version:

- 2005x86 / 2005x64
- 2008x86 / 2008x64
- 2010x86 / 2010x64
- 2012x86 / 2012x64

Notes on WebNavigator installation

Notes on installation

Uninstalling WinCC: WebNavigator client must be installed later

If you uninstall WinCC, you will need to post-install the WebNavigator client.

Message after installation of a plug-in

The Program Compatibility Wizard may possibly output an message during installation of a plug-in.

The plug-in is installed correctly.

Therefore, confirm this message with "The program was installed correctly."

WebNavigator client: WinCC Computer with "Basic Process Control"

The plug-in "WinCC Basic Process Control" must be installed on the WebNavigator client if the client is connected to a computer with WinCC Basic Process Control.

Without the plug-in, the functionality of WinCC Basic Process Control will not be available on the WebNavigator client. For example, the relevant ActiveX controls and the group display will not be available.

Installing the plug-in

The plug-in is located on the WebNavigator server in the folder <wincc_installationpath>"\WebNavigator\Server\Web\Install\Custom".

You can download the plug-in via the WebNavigator navigation user interface from the download area.

A description of the functions supported/not supported can be found in the WinCC Information System:

- "Options for Process Control > Overview of process control system options > Configuration in the PCS 7 environment > Web client"

Dedicated Web server with WinCC Basic Process Control

If the WebNavigator client is to be installed on a dedicated web server with WinCC Basic Process Control, the plug-in "WinCC Basic Process Control" must be installed immediately after installation of the WebNavigator client.

The download page for the plug-in is displayed. You will only be able to exit this page after installation of the plug-in for displaying the process pictures.

For more information on the supported functionalities of the WebNavigator client when connected to a PCS 7 OS, please refer to the PCS 7 documentation.

WebNavigator server: User WNUSR_DC92D7179E29

After the installation of the WinCC/WebNavigator server, the user "WNUSR_DC92D7179E29" is created during the initial configuration with the WinCC Web Configurator.

The user is only used internally. To maintain the functioning of the Web server, do not delete or modify this user.

To increase the security of the system, change the password for the user on a regular basis. To do this, use the tool "CCSetWebNavPwd.exe".

You can find more information in the documentation for WinCC/WebNavigator:

- "WinCC/WebNavigator Documentation > Configuring the WebNavigator system > Configuring the WebNavigator Server > Configuring the WebNavigator web page > WinCC Web Configurator"

Setting a password for the configuration

To define your own password before configuration, you can create a temporary key in the PC's registry.

You can find more information in the "Industry Support Siemens".

General notes on WebNavigator client

Notes on the web client

Security restrictions with the WebNavigator client

NOTICE
Security restrictions and response times in Internet Explorer Please note the Internet-specific security restrictions when using the WebNavigator client. The WebNavigator client may take significantly longer (>20 seconds) than a regular WinCC client to recognize that the WebNavigator server is down or that the communication is faulty.

Windows Server operating system: Loading process pictures in WinCCViewerRT

It is possible that the web client does not display any process pictures in WinCCViewerRT on PCs with the "Windows Server 2016 / 2019 / 2022" operating systems.

Check the settings of the web client:

1. To display the icons in the control system, select, for example, "Small icons" in the "View by" drop-down list.
2. Click the "Internet options" entry.
   The property dialog opens.
3. Deactivate the following entry in the "Advanced" tab in the "Security" area:
   – Do not save encrypted pages to the disk
4. Close the dialog with "OK".

Changing setting via group policy

If you manage the web clients via group policies, follow these steps:

1. To open the editor for local group policies, enter "gpedit.msc" in the Windows search field.
2. Select the following entry in the navigation area:
   – Computer configuration > Administrative templates > Windows components > Internet Explorer > Internet control system > "Advanced" Page

   To sort the list alphabetically, click the column header "Setting".
3. Double-click "Do not save encrypted pages to disk".
4. Select the "Disabled" or "Not Configured" option.
5. Close the dialog with "OK".

WebNavigator client: Firewall settings for printing from WinCC controls

To be able to print out on the client, you need to define the following Firewall settings for the profiles used:

1. Open "Control system > System and security > Windows firewall".
2. In the navigation bar, click "Allow a program or feature through Windows Firewall".
3. In the "Allowed programs and features:" list, activate the entry "File and printer sharing" for the relevant profile.
4. Return to the Windows Firewall start page.
5. In the navigation bar, click "Turn Windows Firewall on or off".
6. If the firewall is enabled, disable the setting "Block all incoming connections, including those in the list of allowed programs".

WebNavigator client: ODK function "PWRTCheckPermissionOnPicture"

In order to use the ODK function "PWRTCheckPermissionOnPicture" on a WebNavigator client, install the plug-in "WinCC Basic Process Control" and "Advanced Process Control".

WebNavigator client: WinCC Alarm Control on a WebNavigator server in WinCC ServiceMode

Initial Situation

The WebNavigator client is connected with a WebNavigator server operated in WinCC ServiceMode.

Behavior

If you are using WinCC Alarm Control prior to WinCC V7 that is connected via a server prefix, you will not be able to open the selection dialog.

Solution

Use the WinCC AlarmControl that is offered as of WinCC V7.

WebNavigator client: Diagnostics file "WebNavReconnnect.log"

After installation of the WebNavigator client, the diagnostics file "WebNavReconnnect.log" is saved in the folder "<User>\Application Data\LocalLow\Siemens\SIMATIC.WinCC\WebNavigator\Client".

The diagnostics file will be saved into the respective user profile so that this user no longer requires administrator rights.

WebNavigator client: Control "WinCC Channel Diagnosis"

You cannot use the "WinCC Channel Diagnosis" Control on a web client without WinCC installation.

WebNavigator client: "FLAG_COMMENT_DIALOG" of the "GCreateMyOperationMsg" function

The WebNavigator client does not support the parameter "FLAG_COMMENT_DIALOG" for the "GCreateMyOperationMsg" function.

WinCC/ODK: SSMRT functions in the web client

The "SSMRT" functions of the Split Screen Manager do not work in the WebNavigator client.

Instead, use the appropriate "SSM" function.

The "SSMRTOpenTopFieldEx" ODK function is not available in the WebNavigator client.

Example

The following script checks the environment and can thus be called in the WebNavigator client and in WinCC Runtime.

```
void OnClick(char* lpszPictureName, char* lpszObjectName, char* lpszPropertyName)
{
    #pragma code("ssmrt.dll")
        #include "ssmrt.h"
    #pragma code()
    char szFullTopfieldPath[MAXFULLPATHLEN] = { 0 };
    long lBufferLen = MAXFULLPATHLEN;
    OPENTOPFIELDSTYLE MyStyle;
    CMN_ERRORA Err;
    BOOL bResult;
    DWORD dwTopfieldStyle = 0;
    long lTopfieldUsed;
    #ifndef RUN_ON_WEBNAVIGATOR
        MyStyle.bAdaptSize = TRUE;
        bResult = SSMRTOpenTopFieldEx (SSMGetScreen(lpszPictureName), "PictureA.pdl",
szFullTopfieldPath, lBufferLen, &MyStyle, &Err);
    #else
        // Declaration of _SSMOpenTopField3:
        //     BOOL _SSMOpenTopField3 (TCHAR Screen, TCHAR* PictureName, DWORD dwStyle,
TCHAR* retPictureName, DWORD dwReturnPathLen, long* plTopfieldUsed, LPCMN_ERROR Err, long
lXPos, long lYPos, BOOL bDefaultPos)
        // dwTopfieldStyle can be 0, TOP_FIELDFIXEDSIZE, TOP_ATTACHTOWORKFIELD, or
TOP_FIELDFIXEDSIZE + TOP_ATTACHTOWORKFIELD
        dwTopfieldStyle = TOP_FIELDFIXEDSIZE;
        bResult = _SSMOpenTopField3 (SSMGetScreen(lpszPictureName), "PictureA.pdl",
dwTopfieldStyle, szFullTopfieldPath, lBufferLen, &lTopfieldUsed, &Err, 0, 0, TRUE);
    #endif
}
```

Notes on Internet Explorer for WebNavigator

Notes on Internet Explorer

Security settings in Internet Explorer: Installation via SSL connection

If you want to download the WebNavigator from an ASP portal via an SSL connection, note that the download is not possible under certain conditions.

You can correct this with one of the following settings:

- Deactivate the "Do not save encrypted pages to disk" option in the "Advanced" tab for the Internet options of the Internet Explorer.
- Deactivate the "Internet Explorer Enhanced Security Configuration" option in the "Control Panel/Add/Remove Programs/Windows Components".

WebNavigator server: Display virtual folder in Internet Explorer

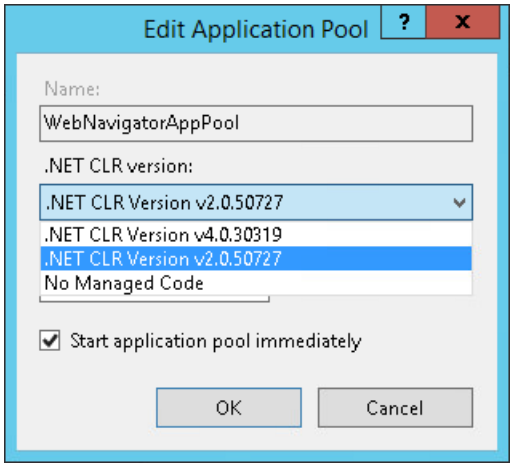
Note the following when using Internet Explorer as WebNavigator browser:

To add a virtual folder to an existing website, create this website in a subdirectory of the drive.

When the website is created in the root directory, e.g. under D:\, Internet Explorer may not show the contents of the virtual folder.

To always display the contents, change the .NET settings in the IIS:

1. Open the Internet Information Services (IIS) Manager.
2. In the navigation, click on the entry "Application pools".
3. In the shortcut menu of "WebNavigatorAppPool", select the "Basic settings" entry.
4. In the ".NET CLR version" list, select the .NET version "v2", for example:



WebNavigator client: Display of ActiveX controls in Internet Explorer

ActiveX controls are disabled in Internet Explorer by default.

For this reason, the WinCC controls are not displayed correctly in Internet Explorer on a WebNavigator client.

To display the WinCC controls correctly, add the Web server as a trusted website and enable the ActiveX controls only for the "Trusted sites" zone.

To continue protecting Internet Explorer from foreign ActiveX controls, check that the restricted security settings still apply to the other zones after making the changes.

For more information, refer to the following documentation:

- WinCC/WebNavigator: "WinCC/WebNavigator Installation Notes > Installation of WebNavigator Client > AUTOHOTSPOT"

WebNavigator client: Updating pictures with faceplates

To display changed faceplates in process pictures, refresh the view of the web client in the browser, e.g. with <F5> or using the button.

3.1.15.5 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.

3.1.15.6 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.

3.1.15.7 WebUX

Contents

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

Functional scope

The following functions are supported for WebUX:

- C scripts
- Local session tags
- Faceplates
- Alarm filters in the alarm view

3.1.16 Migration

Contents

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

Migrating a project created with WinCC V7

A prerequisite for the migration is that this project was processed with at least WinCC V7.5 Update 3.

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.

3.1.17 HMI devices

3.1.17.1 Notes on HMI devices

Contents

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

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)

The following HMI devices are no longer supported as of TIA Portal V15.1:

- WinCC Runtime Advanced V11

Unsupported HMI devices (as of TIA Portal V16)

The following HMI devices are no longer supported as of TIA Portal V15.1:

- Mobile Panel with device version 12.x
- Comfort Panel with device version 12.x
- KP1500 Comfort with device version 13.x
- TP1500 Comfort with device version 13.x
- TP1900 Comfort with device version 13.x
- TP2200 Comfort with device version 13.x

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 overloading the panel.

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.

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).

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.

See also

PI Mobile (https://support.industry.siemens.com/cs/ww/en/view/109758056)

3.1.17.2 Notes on Basic Panels

Contents

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

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.

Simulation of Basic Panels 2nd Generation

3D hardware acceleration of the graphics card should be enabled for simulating the Basic Panels 2nd Generation.

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.

Basic Panels 2nd Generation

Basic Panel 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.

Even if you do not need a license for the Sm@rtServer option on a Basic Panel 2nd Generation as of WinCC V17, the "Load preview" dialog will display a note indicating a missing license under certain circumstances.

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 successfully startup, assign a fixed IP address.

Dynamic parameters in text lists

Dynamic parameters in text lists are not supported with Basic Panels.

3.1.17.3 Notes on Mobile Panel

Contents

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

Printing alarms

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.

Mobile Panel

Mobile Panels 2nd Generation can be configured with TIA Portal V16 in the device version V15. The compiled project cannot be downloaded to these devices, however.

To work with Mobile Panels 2nd Generation in TIA Portal V16, an upgrade to at least device version V15.1 is necessary.

Sm@rtServer with 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.

3.1.17.4 Notes on Comfort Panels

Contents

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

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 might 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.

VB function "CDate"

You can only use the VB "CDate" function with static parameters on the following HMI devices:

- TP1200 Comfort Pro
- TP1500 Comfort Pro / V2
- TP1900 Comfort Pro / V2
- TP2200 Comfort Pro / V2

3.2 Visualizing Processes with View of Things

Contents

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

Performance features of the View of Things web application

The number of screens and tags used in a web application is displayed during compiling. A warning is issued if any of the following limits are exceeded:

- You have used more than 10 screens.
- You have used more than 100 tags. This includes all HMI tags displayed in the overview table. This also includes all automatically created tags that are not currently required, for example, because the associated dynamization has been deleted.

Tags of the DTL data type

The tags of the DTL data type cannot be read or written with View of Things.

Error diagnostics with View of Things

For View of Things no error diagnosis is possible with the WinCC Unified Trace Viewer.

Instead select one of the following options:

- Use the development console of the browser which is used as the Unified web client.
- In the web client press [Shift]+F12.
  The internal WinCC Unified diagnostics opens. The right side of the web browser lists the "HMIRuntime.Traces", warnings and errors.

Script debugging is not supported for View of Things.

Readme WinCC Unified

4

4.1 Security Information

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions only form one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary, and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For more information on protective industrial cybersecurity measures for implementation, visit:

https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html (https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends applying product updates as soon as they are available and always using only 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 at all times, subscribe to the Siemens Industrial Cybersecurity RSS Feed under.

https://new.siemens.com/global/en/products/services/cert.html (https://new.siemens.com/global/en/products/services/cert.html)

Network settings

The following table shows the network ports that are used by WinCC Unified for internal and external communication. These ports must not be used for any other purpose.

The setup configures the firewall to ensure smooth operation.

WinCC Unified		
Name	**Port number**	**Transport protocol**
ILScs Manager	20008	TCP
UMC	20009	TCP

WinCC Unified		
ILPmon Manager	4999	TCP
ILEvent Manager	1235	TCP
ILDist Manager	4777	TCP
ILDataManager	1234 5001	TCP
Node Processes	3103 443 8888	TCP
Graphics Runtime	1339 1345	TCP
License server	1366	TCP
Screen debugger	9222	TCP
Job debugger	9224	TCP
WCCIL Proxy Manager	5678	TCP
WCCILRedu	4776	TCP
Network Discovery (IS)	137	TCP
UMC AttachAgent	4002	TCP
OPC UA Discovery	4840	TCP
RFID	5003	TCP
GraphQL	4000	TCP

Unified Comfort Panel		
Name	Port number	Transport protocol
HmiRuntime	1234	TCP
HmiRuntime	1235	TCP
HmiRuntime	1344	TCP
HmiRuntime	4700	TCP
HmiRuntime	4701	TCP
HmiRuntime	4776	TCP
HmiRuntime	4777	TCP
HmiRuntime	4778	TCP
HmiRuntime	4999	TCP
HmiRuntime	5678	TCP
Snmpd	162	TCP
FwPnManager	34964	UDP

Note

Block HTTP port

For security reasons, it is recommended that Port 80 be disabled on the IIS server.

1. Start "Internet Information Services (IIS) Manager" on the Unified PC.
2. Right-click "Default Web Site".
3. Select "Remove" or "Manage Website > Stop".

4.2 Breaking changes

PI options in ODK

ODK does not support PI options.

Scrolling behavior for pop-ups

If you move the visible screen section of a process screen in Runtime and a pop-up window is visible there, for example a faceplate container, Runtime behaves as follows:

WinCC Unified V17	The pop-up window is moved together with the screen section.
As of WinCC Unified V18	The pop-up window is not moved with it.
Simulation of an HMI device with installed device version V17 in a WinCC project V18 or higher	The pop-up window is moved together with the screen section.

Operation of objects behind a screen window

If a screen window has an empty area and the screen or faceplate displayed in the screen window has the "transparent" setting as the fill pattern for the background, Runtime behaves as follows:

WinCC Unified V17	Objects that are in the background of the screen window in the empty area of the screen window are visible. The objects cannot be operated by clicking.
As of WinCC Unified V18	The objects can be operated by clicking. Application example: You use a round menu with a button next to it. To prevent the rectangular border surrounding the menu from obscuring the button, make the menu available in a screen window.

Zoom behavior of screen windows on touch devices

Runtime now supports panning and zooming with a two-finger gesture.

WinCC Unified V17	No panning and zooming with two-finger gestures.
As of WinCC Unified V18	Panning and zooming with two-finger gestures is supported. Default: Activated If you want, you can disable this feature by clearing "Format > Allow zoom" property for the screen window.

Exclusion of "Uncertain - initial value" quality code as trigger

WinCC Unified V17	If a tag is used as a trigger for a script and the tag is used in a screen, e.g. by an I/O field, the script is executed twice in quick succession when the screen is loaded: • When reporting the initial value • When reporting the process value
As of WinCC Unified V18	Default setting: QualityCode 0x4C (Quality status: Uncertain, Substatus: Initial value) is ignored as a tag trigger. If a tag is used as a trigger for a script and the variable is used in a screen, e.g. by an I/O field, the script is only executed when the process value is reported as the screen is loaded. To enable the quality code as a trigger, proceed as described below.

To enable QualityCode 0xC4 as a trigger in V18 or higher, do the following:

1. Open a file browser and navigate to the following folder:
   `C:\Program Files\Siemens\Automation\WinCCUnified\bin\_config`
2. Open the following configuration file:
   - For scripts in screens: `IOWA_GfxComponentConfigurationSrv.xml`
   - For scheduled tasks: `IOWA_SchedComponentConfiguration.xml`
3. Delete the line for <Attribute key>:

```
<ComponentConfiguration componentKey="GfxTriggerManager"
name="Trigger Manager">
   <AttributeList>
      <Attribute key="IgnoredTagQualities" value="0x4c"/> <!—
0x4c: “Initial Value” quality >
   </AttributeList>
</ComponentConfiguration>
```

Simulation of Runtime

To use the simulation, you must install WinCC Unified Runtime. If no license is found for Runtime, start the simulation in demo mode.

OPC UA with OpenSSL 3.0

WinCC Unified uses OPC UA OpenSSL 3.0 from V18 Update 3 and higher.

If the OPC UA certificate of an HMI device has been created before V18 Update 3, it becomes incompatible through the device upgrade and has to be recreated. Follow these steps.

IF the HMI device uses a CA-based OPC UA certificate:

1. Upgrade the certificate authority device and the HMI device.
2. Re-create the OPC UA certificate of the HMI device on the certificate authority device with WinCC Unified Certificate Manager.
3. Install the certificate on the HMI device.
   If the communication partner already trusts the root certificate of the certificate authority, it automatically also trusts the newly created OPC UA certificate of the HMI device.

If the HMI device uses a self-signed OPC UA certificate:

1. Delete the certificate from the certificate store before upgrading the HMI device:
   - For Unified PCs:
     The certificate store is located in the folder with the Runtime projects in the subfolder "`certstore`".
     Default: `C:\ProgrammData\SCADAProjects\certstore`
   - For Unified Panel:
     Select "Control Panel > Security > Certificates" and as the "Certificate store" the entry "My Certificates". Select the certificate and delete it.
2. Upgrade the HMI device.
   For Unified PC: The certificate is automatically generated and installed.
3. For Unified Panel: Start Runtime.
   The certificate is automatically generated and installed.
4. Trust the certificate at the communication partner.

4.3 Notes on use

Contents

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

Copying between WinCC Unified and other devices

Copying data via the clipboard or via the library, for example is only supported between Unified devices. Copying data between Unified devices and other devices is not supported.

Secure communication

If you use Inter-Project Engineering (IPE) in your project, i.e. an HMI device is connected to a device proxy PLC, and an error message about inconsistent certificates appears during compiling, you need to correct the certificates of the associated PLC in the original project. Then you have to compile, export and re-import the PLC.

Changing HMI device names or log paths

If you make the following changes in the engineering system for a project that is already loaded in Runtime, the existing log data is lost when you load the device again:

- You rename the HMI device in the project navigation
- You rename a log folder or change the log path in the Runtime settings

The data from the old log is not available in the new log after reloading.

Storage location for databases

If the Runtime project folder is configured as the storage location for a database and you change the location of the project folder, this results in data loss.

To avoid data losses select a different storage location for databases than that of the project folder or do not change the project folder.

For more information, refer to the help "SIMATIC Unified PC Installation" under the keyword "Loading projects".

Access to subnets via TCP/IP Auto

Use the TCP/IP Auto setting on your engineering device (programming device) when you connect the device to a local subnet. (Control Panel > Set PG/PC interface)

The engineering device then allows additional IP addresses from the subnet to be added to its network adapter.

Note

This setting cannot be used if you use a router.

No setting is necessary on the devices belonging to the external network.

For stationary operation, use the TCPI/IP setting.

Fault in the connection between the server and the client

If there is a fault in the connection between the server and client, check the settings of the PG/PC interface. TCP/IP Auto should not be used for the setting "Interface parameter assignment used". Use fixed IP addresses instead.

Changes at a PLC user data type

After a change to a PLC user data type, the PLC must be compiled to make this change known to all Unified devices that use this user data type. If compilation of the PLC does not take place, error messages can occur during the compilation of the HMI devices.

Inter Project Engineering (IPE) in faceplates

Inter Project Engineering is not supported by faceplates. User data types of a device proxy PLC cannot be interconnected with a faceplate.

Collaboration certificates and Runtime version

Runtime Collaboration requires that the Collaboration certificates of 2 Collaboration partners have been created with a Certificate Authority device whose installed Runtime version is equal to or higher than the installed Runtime version of the Collaboration partner with the higher Runtime version.

This is why upgrading Collaboration devices may require re-creation, distribution, and installation of Collaboration certificates.

Example:

- A Unified PC and a Unified Panel with a V17 Runtime are Collaboration partners.
- You upgrade the Panel to V18.
- On a Certificate Authority device with an Runtime version V18 or higher, create new Collaboration certificates for both HMI devices. Distribute and install them on the devices.

Starting Runtime

Runtime cannot be started via WinCC Runtime Start if the "Load preview" dialog is displayed in the engineering system.

Status "Partly running"

If it is not possible to start the simulation or the Unified Runtime, open the Runtime Manager. If the status of the project is displayed as "partly running", check

- whether the user currently logged on in Runtime has sufficient rights. Is the user entered in the following Windows user groups:
  PLCSimUsers
  RTIL Tracing Users
  Siemens TIA Engineer
  SIMATIC HMI
  SIMATIC HMI VIEWER
- whether the computer name is not longer than 15 characters.
- whether "OPC UA" is activated in the Runtime settings and a certificate exists.
- whether "Runtime Collaboration" is enabled in the Runtime settings of a Unified Panel and a certificate is available.

Simulation with S7-PLCSIM

Always start the simulation in WinCC and then S7-PLCSIM.

WinCC Unified Tag Simulator

The WinCC Unified Tag Simulator is not part of WinCC Unified V18 and higher.

Dynamic SVG types

If you manually assign a type version to a dynamic SVG type or rename the type, a delta download is no longer possible.

Encryption with TLS

Always use the most current version of TLS. Disable the older version.

The use of older versions (TLS 1.0 und 1.1) is at your own risk.

Assigning text lists and graphics lists for reports

It is not possible to read in values from texts lists and graphics lists, neither in the add-in nor when generating the report.

Page numbering in audit

Because of a problem with the page numbering, the system functions "ReadElectronicRecord" and "ExportElectronicRecordAsCSV" only deliver the first 1000 electronic data records on the provided filter.

Protecting drives through UWF

If you are using UWF (Unified Write Filter) on a Unified PC, exclude the following folders from UWF:

- Project folder
  Preset project folder: C:\ProgramData\SCADAProjects
- C:\ProgramData\Siemens

In accordance with the UWF implementation of Microsoft, all write accesses are then written directly into these folders, but also into the overlay. If the size of the overlay approaches or exceeds the upper limit, this causes problems when loading projects or in Runtime.

You have the following options:

- Start WinCC Unified Configuration and, in the "Storage location for projects" step, select a folder whose drive is not protected by UWF as the project folder.
- Increase the size of the overlay.

- Change the type of overlay from RAM-based to disk-based.
- Start the Unified PC before reloading a project into the device.
  The overlay is emptied during the restart. This may slow down the restart.

Communication with LOGO! PLC

For the communication with a LOGO! PLC, select "Standard Modbus TCP/IP" in the connection as the communications driver.

Parallel installation of TIA Portal and Runtime

To operate TIA Portal and WinCC Unified Runtime on the same PC, install both programs in the same version or upgrade them to the same version.

"My Controls"

If a device was upgraded to V19 in the engineering system, it is possible that My Controls were not displayed correctly in the "Images" editor. Compiling of the device results in errors.

In that case, click the refresh icon in the "My Controls" palette:



Working with text list types

Text list types can now be added to the library. You proceed as with adding other types in the library. In the Text List Type editor, select selection mode for the text list. Create the entries with the corresponding values/ranges and the texts. If you have configured several project languages, you can also create multilingual texts.

You can use text list types in the following use cases in the project:

- **Resource list**
  Use text list types on objects that support resource lists as a static value, e.g. symbolic I/O fields.

  Note

  Objects in faceplate types

  For faceplate types, configure an interface property of the "Resource list" type and transfer it to the object. Then transfer the text list type to the faceplate instance at the interface property.

- **Script**
  Use text list types in scripts via the JavaScript object "HMIRuntime.Resources.TextLists". Usages of text list types are shown in the script editor as a reference. You can use text list types in scripts of other types, e.g. faceplate or script module types.
  Example:
  ```
  let entry1 =
  HMIRuntime.Resources.TextLists("@Default.Text_list_type_1_V_0_0_1"
  ).Item(1);
  ```
- **System function**
  You can use text list types in system functions such as `InsertElectronicRecord` and `Lookuptext`.

When you change a text list type, the changes are checked for consistency. If there are consistency errors when the version is released, you can view the error messages under "Info > General" in the Inspector window.

If you release a new version of a text list type, you can update all usages automatically. Types that use the text list type can be automatically set to processing status.

Text list types can be stored in global libraries.

IO field in scripts

The properties "MeasurementUnit" and "MeasurementUnitType" of an IO field are reserved for future versions.

Renewed loading of the Unified Panel after updating of the CPU configuration

If the configuration of the CPU is changed and loaded into the control unit, the PLC communications certificate of the control unit is updated.

In this case the Unified Panel connected with the CPU also has to be reloaded. After loading, the Panel trusts the PLC certificate.

Configuring automatic logout for central user management

To configure automatic logout on the UMC ring server, it is necessary to empty the cache of the browser in which you open the ring server UI after upgrading the UMC ring server. The ring server is automatically upgraded if the ring server and engineering system are installed on the same PC and you upgrade the engineering system.

Follow these steps:

1. Start a browser and open the web UI of the ring server.
2. Press Shift+F5 or Shift+Ctrl+R.
3. If automatic logout is still not configured correctly after this, follow these steps:
   In Chrome and Edge:
   - Enter `chrome://settings/clearBrowserData` in the address bar.
   - In the "Clear browsing data" window, disable all options except for "Cached images and files".
   - Click "Clear data".

   In Firefox:
   - Enter `about:preferences#privacy` in the address bar.
   - Scroll down to "Cookies and Site Data".
   - Click "Clear Data".
   - Select "Cached Web Content".
   - Click "Clear".

Nesting depth of PLC user data types

As of PLC firmware version 4.0, structured user data types can be nested on 26 levels.

Communication via the MPI interface

It is not possible to configure a connection with interface type MPI between a PLC and an HMI device with Unified Runtime.

Supported database types for Panels

Unified Comfort Panels and Basic Panels do not support Microsoft SQL as a database type.

Logging tags - logging cycle

The cycle times 100 ms and 250 ms cannot be configured for the cyclic logging of data. Multiples of these cycle times are also not permitted.

The smallest configurable cycle time is 500 ms.

See also

SIOS - WinCC manuals (https://support.industry.siemens.com/cs/products?dtp=Manual&mfn=ps&pnid=24212&lc=en-WW)

4.4 Screens and screen objects

Contents

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

Adaptations to screens and screen objects

The settings that you define under "Settings > Visualization" in the "Resize screen" area have no effect on the HMI devices:

- SIMATIC Unified PC
- SIMATIC Unified Comfort Panel

Text box

In the Engineering System, in the task card "Tools", the "Text box" object was moved to the "Elements" pallet and is identified by the following icon .

SVG graphics

SVG graphics and dynamic SVG graphics support the SVG 1.2 Tiny standard. The use of SVG graphics that include the elements or commands according to the SVG 2.0 standard can lead to unexpected behavior.

The file names of SVG graphics must not include German umlauts or Chinese characters.

Dynamization of the group properties

After the ungrouping of an object group, the dynamization of the group properties is not transferred to the object properties.

Faceplates: Passing interface properties of the "Resource list" data type to pop-ups

When you call pop-up windows outside a faceplate type, you pass the interface properties by script. For interface properties of the "Resource List" data type, text and graphic lists can be passed.

To specify graphic lists, use the prefix "GraphicListCollection", for example, "GraphicListCollection.Graphic_List_1".

To specify text lists, use "@Default" as a prefix, e.g. "@Default.Text_list_1".

Faceplates: Passing interface properties of the "Multilingual text" data type to pop-ups

When you call pop-up windows outside a faceplate type, you pass the interface properties by script. Interface properties of the "Multilingual text" data type cannot be passed.

In this case, use the interface property of the "configuration string" data type. The configuration string contains the different values of the text in the respective language

separated by a semicolon. Use the script to read the active Runtime language and then use the "Case" command to make a case distinction depending on the active Runtime language.

Faceplates: "Cleared" event

The "Cleared" event occurs when the faceplate is closed. The relevant faceplate container is dissolved.

Therefore, no interface tags or interface properties can be passed on the "Cleared" event.

Faceplates: Available functions depending on the device version

Function	Available as of version
Use of color palettes via scripting	19.0.0.2
Using color palettes: • Configuration of color references • Direct interconnection to object properties • Dynamization	20.0.0.0

Dynamizing screen objects

You can dynamize screen objects in screens using properties.

In faceplates, you can dynamize screen objects via interface properties.

You have the option of using formulas, e.g. to scale values.

The following data types are supported for dynamization via formula and/or evaluation type:

- Bool
- LInt
- ULInt
- LReal
- Color

You can also define the evaluation type. The result of the enabled formula is the basic value for the evaluation type.

- None
- Range
- Multiple bits
- Single bit

Define the properties for the respective evaluation type.

The evaluation type can also be used if the formula is disabled.

The following conditions and restrictions apply to the evaluation type:

- If formula is disabled:
  - The data type of the evaluation type corresponds to the data type of the property/ interface property.
  - Values up to 64 bits are supported for the "Single bit" and "Multiple bits" evaluation types and negative values are not permitted.
  - Values up to 32 bits and a maximum of 15 decimal places are supported for the "Range" evaluation type.
- If formula is enabled:
  - The data type of the evaluation type is "LReal".
  - Values up to 32 bits are supported for the "Single bit" and "Multiple bits" evaluation types.
  - Values up to 32 bits and a maximum of 15 decimal places are supported for the "Range" evaluation type.
- If formula is enabled and the data type of the property/interface property is "Color", you can only use the evaluation types in conjunction with formula.

Trend view: Bit-triggered trends

Bit-triggered trends are not supported in the control "Trend view".

4.5 Basic object "Text"

Use

The "Text" object is a closed object used for displaying simple texts and has a limited number of properties. The object is particularly well suited for use on small devices.

You can find the "Text" object in the "Toolbox" task card in the "Simple objects" pallet. The object is marked with the following icon A.

Important properties of the "Text" object

The "Text" object facilitates:

- Entering text directly
- Entering multi-line text
- Entering multilingual text
- Dynamizing an object with a text list

4.6 Alarms and alarm view

Contents

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

Alarms and alarm view

Controller alarms

If the connection between HMI device and controller is interrupted, only the last occurring controller message can be sent and displayed after restarting the runtime software. When the connection is re-established, all controller messages are transmitted correctly again.

Alarm block "Duration"

Alarm block "Duration" is not supported in V17.

Text lists

If you assign a text list, whose entries point to a tag, to an alarm text, the contents of the alarm view are not shown correctly in Runtime. This also applies to nesting, when, for example, a text list points to another text list which in turn points to a tag. The use of parameterized text lists in alarm texts is not recommended.

Alarm log backup

WinCC Unified does not support backup files in the "*.ldf" and "*.mdf" formats. The supported formats are "*.shm" and "*.wal".

4.7 Tags

Contents

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

System tag @CurrentLanguage

The system tag @CurrentLanguage is a local system tag of the current session. This means that the system tag cannot be used as an index for a text list in a WebClient project, for example.

Multiplexing instance data blocks

Multiplexing instance data blocks is not available for GMP-compliant configuration.

Creating array tags

The note "HMI array tags of the following data types are only supported with connected PLC array tags" in the documentation is not correct.

All data types assigned to the following HMI data types are supported in a one-dimensional array:

- Bool
- Byte
- Date/Time (not in V19)
- DInt
- DWord
- Int
- LInt
- LReal
- LTime (not in V19)
- LWord
- Real
- SInt
- UDInt
- UInt
- ULInt
- USInt
- Word
- WString (not in V19)

4.8 "Smoothing" property for logging tags

Contents

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

Smoothing (Unified Comfort Panel)

The following applies to logging tags and PLC tags: If the value "No smoothing" is set in the Logging tag properties under "Smoothing > Mode", the values are nevertheless smoothed.

Example:

A logging tag changes its value as follows: "100" > "101" > "101".

Even if "No smoothing" is set in the properties of the tag, the values [100, 101] are stored in the log.

4.9 System functions and scripts

Contents

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

JavaScript arguments of specific object events

The following applies to the rectangle, gauge, button and circle objects: If you configure a JavaScript to an event, only the "Item" argument is passed correctly to the script. You can process the event in the script, but not the other arguments.

"StartProgram" in the Scheduler - Unified Comfort Panel

Calling up a program via the "StartProgram" system function in the Scheduler is not supported by Unified Comfort Panel. Instead, use a "Tag" trigger in the Scheduler to initiate the system function.

Methods of the "ProDiag" object

With the "OpenTIAPortal" methods of the "ProDiag" object, TIA Portal can be opened from the Runtime. Prerequisite for this is that the "Allow start of external processes via Unified Runtime" setting is activated on the HMI device in SIMATIC Runtime Manager.

The following system functions are reserved for future versions:

- "ResetToConfiguration"
- "OpenPlcCodeViewByFCCall"
- "OpenProDiagDetailsByCall"

With the parameter "screenItemPath" of the " IsJumpableAlarm" method, you transfer the path of the screen object which is activated when the alarm that is selected in the alarm display is a ProDiag alarm – not the path of the code viewer as described in the user help. Example: Transfer the path of a button for which a jump into the PLC code display was configured. If the selected alarm is a ProDiag alarm, operators jump to the PLC code display in Runtime by clicking the button.

The system function "OpenViewerGraphByBlock" expects the name of the data block of the GRAPH function block as second parameter.

ExportParameterSets

The system function "ExportParameterSets" expects as third parameter the path plus file name of the file to which the ParameterSets are exported.

Uniform display of custom web controls

To make the display of a Custom Web Control independent of the browser you are using, you must use a stylesheet when programming the Custom Web Control.

TextsByValues

The "TextsByValues" method returns a list of all the texts of a language for the given values from a text list. To achieve this, the parameter "lcid" for the language and the parameter "values" for the desired values have to be transferred (passed). The method can be used in scripts for objects of type "HMITextList".

OpenFaceplateInPopup

- The following optional parameters were inserted in the "OpenFaceplateInPopup" method:

Parameters	Description
popupWindowName	Name of the popup window. Note that the name must be unique in the project. If the parameter is omitted, a unique name is generated automatically.
adaptWindow	If `true`, the size of the popup window is automatically matched to the size of the faceplate and cannot be defined by the "width" and "height" parameters. The default value is `true`.
left	Left coordinate of the position of the popup window. The default value is 10.
top	Upper coordinate of the position of the popup window. The default value is 10.
width	Width of the popup window. Is used if the "adaptWindow" parameter is `false`. The default value is 100.
height	Height of the popup window. Is used if the adaptWindow parameter is `false`. The default value is 100.

  By using the new parameters, faceplates are shown in the correct size in popup windows. Since the parameters are optional, this has no effect on existing scripts.

- The `Faceplate.OpenFaceplateInPopup` system function now processes the `Invisible` parameter correctly.
  - `Invisible` is `true`: The faceplate is not rendered.
  - `Invisible` is `false`: The faceplate is rendered.

Dynamizing interface properties in faceplates

Interface properties of the "Authorization" data type have "Read-only" access. The property can therefore only be read via a script, but not written.

4.10 Parameter sets and parameter set display

Contents

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

Using parameter set display from V16 project

If you have configured a parameter set control in WinCC V16 without updates, open this project with WinCC V17 and download it to the HMI device, then the numbers of the parameter sets are not displayed on the HMI device. Proceed as follows to continue using this parameter set control:

1. Create a new project in a new instance of WinCC V16 with installed update.
2. Insert a Unified Comfort Panel or a SIMATIC Unified PC into the project.
3. Copy the devices from the original project into the new project.

Configuring a storage medium for parameter sets

Select the same storage medium that you have configured for tag persistence or alarm logging under "Properties > Information" for parameter set types. If you specify different storage media, the "EjectStorageMedium" system function is not available.

Deleting a simple tag from a parameter data set

If you have created a parameter data set with simple tags and want to remove a single tag again, follow these steps:

1. Select the element in the parameter data set.
2. Press [Del] on the keyboard.

The shortcut menu is not supported here.

Exporting parameter sets of a parameter set type

The file name of the export file can be freely selected using the "..." button.

4.11 WinCC Unified PC

4.11.1 Breaking changes

PI options in ODK

ODK does not support PI options.

Scrolling behavior for pop-ups

If you move the visible screen section of a process screen in Runtime and a pop-up window is visible there, for example a faceplate container, Runtime behaves as follows:

WinCC Unified V17	The pop-up window is moved together with the screen section.
As of WinCC Unified V18	The pop-up window is not moved with it.
Simulation of an HMI device with installed device version V17 in a WinCC project V18 or higher	The pop-up window is moved together with the screen section.

Operation of objects behind a screen window

If a screen window has an empty area and the screen or faceplate displayed in the screen window has the "transparent" setting as the fill pattern for the background, Runtime behaves as follows:

WinCC Unified V17	Objects that are in the background of the screen window in the empty area of the screen window are visible. The objects cannot be operated by clicking.
As of WinCC Unified V18	The objects can be operated by clicking. Application example: You use a round menu with a button next to it. To prevent the rectangular border surrounding the menu from obscuring the button, make the menu available in a screen window.

Zoom behavior of screen windows on touch devices

Runtime now supports panning and zooming with a two-finger gesture.

WinCC Unified V17	No panning and zooming with two-finger gestures.
As of WinCC Unified V18	Panning and zooming with two-finger gestures is supported. Default: Activated If you want, you can disable this feature by clearing "Format > Allow zoom" property for the screen window.

Exclusion of "Uncertain - initial value" quality code as trigger

WinCC Unified V17	If a tag is used as a trigger for a script and the tag is used in a screen, e.g. by an I/O field, the script is executed twice in quick succession when the screen is loaded: • When reporting the initial value • When reporting the process value
As of WinCC Unified V18	Default setting: QualityCode 0x4C (Quality status: Uncertain, Substatus: Initial value) is ignored as a tag trigger. If a tag is used as a trigger for a script and the variable is used in a screen, e.g. by an I/O field, the script is only executed when the process value is reported as the screen is loaded. To enable the quality code as a trigger, proceed as described below.

To enable QualityCode 0xC4 as a trigger in V18 or higher, do the following:

1. Open a file browser and navigate to the following folder:
   `C:\Program Files\Siemens\Automation\WinCCUnified\bin\_config`
2. Open the following configuration file:
   - For scripts in screens: `IOWA_GfxComponentConfigurationSrv.xml`
   - For scheduled tasks: `IOWA_SchedComponentConfiguration.xml`
3. Delete the line for <Attribute key>:

```
<ComponentConfiguration componentKey="GfxTriggerManager"
name="Trigger Manager">
   <AttributeList>
      <Attribute key="IgnoredTagQualities" value="0x4c"/> <!—
0x4c: “Initial Value” quality >
   </AttributeList>
</ComponentConfiguration>
```

Simulation of Runtime

To use the simulation, you must install WinCC Unified Runtime. If no license is found for Runtime, start the simulation in demo mode.

OPC UA with OpenSSL 3.0

WinCC Unified uses OPC UA OpenSSL 3.0 from V18 Update 3 and higher.

If the OPC UA certificate of an HMI device has been created before V18 Update 3, it becomes incompatible through the device upgrade and has to be recreated. Follow these steps.

IF the HMI device uses a CA-based OPC UA certificate:

1. Upgrade the certificate authority device and the HMI device.
2. Re-create the OPC UA certificate of the HMI device on the certificate authority device with WinCC Unified Certificate Manager.
3. Install the certificate on the HMI device.
   If the communication partner already trusts the root certificate of the certificate authority, it automatically also trusts the newly created OPC UA certificate of the HMI device.

If the HMI device uses a self-signed OPC UA certificate:

1. Delete the certificate from the certificate store before upgrading the HMI device:
   - For Unified PCs:
     The certificate store is located in the folder with the Runtime projects in the subfolder "`certstore`".
     Default: `C:\ProgrammData\SCADAProjects\certstore`
   - For Unified Panel:
     Select "Control Panel > Security > Certificates" and as the "Certificate store" the entry "My Certificates". Select the certificate and delete it.
2. Upgrade the HMI device.
   For Unified PC: The certificate is automatically generated and installed.

3. For Unified Panel: Start Runtime.
   The certificate is automatically generated and installed.
4. Trust the certificate at the communication partner.

4.11.2 GDPR - General Data Protection Regulations

Siemens takes data privacy principles, such as the privacy by design and default principle, into account when developing its products and services. For this product WinCC Unified Runtime this means the following:

Personal data processed by the Application

This product collects and processes the following personal data:

- User names, i. e. login data, which might directly contain or establish a reference to the family name and/or first name
- Timestamps: date / time of login, logoff and access
- Location data (time zone)
- Computer name
- IP addresses
- Optional: With UMC, the following additional personal data can be added in the tool:
  - Full name
  - Comment

  This data is not needed for the product functionality and should not be stored on the same medium.

If the user links the above-mentioned data with other data, e. g. shift plans, or stores personal data on the same medium, e. g. hard disk, and thus establishes a personal reference, the user must ensure compliance with data protection regulations.

Purposes

The above data is required for the following purposes:

- Access protection and security measures (e. g. Login, IP address)
- Process synchronization and integrity (e. g. time zone information, IP addresses)
- Archiving system for traceability and verification of processes (e. g. access timestamps)
- Alarm system for traceability and availability (for example, e-mail notification)

The storage of data is appropriate and limited to what is necessary, as it is essential to identify the authorized operators and process events.

Data configuration

The customer can configure the data collected via the product as follows:

- Display data in process pictures
- Data output in form of reports, e. g. for printing or display as electronic file
- Data collection and evaluation in form of graphics, e. g. for KPI analysis

Deletion policy

The product does not provide an automatic deletion of the above data.

If necessary, these can be deleted manually if desired. To do this, refer to the product documentation or contact customer support.

Securing of data

The above data will not be stored anonymously or pseudonymized, because the purpose of access and event identification cannot be achieved otherwise.

For WinCC Unified PC-based, the data specified above should be secured by appropriate technical measures:

- Encryption of log data
- Storing the process data in access-protected SQL databases
  The user must ensure the access protection as part of their process configuration.

You can find information on data backup on the WinCC Unified Comfort Panel in the operating instructions for the Comfort Panel.

4.11.3 Notes on installation

Contents

Important notes on installation.

Special characters in the installation path

Special characters in the installation path may lead to objects not being visible when inserted into a screen. To see the object, you have to close the screen and open it again.

Record/play function

When the record/play function is used, the Runtime system settings made in WinCC Unified Configuration Manager during or after installation are not recorded.

Silent installation of Runtime using the record/play function is not supported.

Parallel installation of TIA Portal and Runtime

To operate TIA Portal and WinCC Unified Runtime on the same PC, install both programs in the same version or upgrade them to the same version.

Parallel installation with PCS7

It is not recommended to install WinCC Unified Runtime and PCS7 on the same device. A parallel installation is at the user's own risk.

Repair installation

Proceed as follows after a repair installation:

1. Start the "WinCC Unified Configuration" application from the desktop.
2. Enable the "Make additional settings" option.
3. Check or correct the configuration of the "Website settings" step.
4. All other settings can be applied with "Keep the existing configuration".

4.11.4 Notes on use

Contents

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

Windows 11: Smart App Control

Unified Runtime does not support the Windows 11 function "Smart App Control". If you are using Unified Runtime on a PC running on Windows 11, make sure that "Smart App Control" is disabled.

Secure communication

If you use Inter-Project Engineering (IPE) in your project, i.e. an HMI device is connected to a device proxy PLC, and an error message about inconsistent certificates appears during compiling, you need to correct the certificates of the associated PLC in the original project. Then you have to compile, export and re-import the PLC.

Changing HMI device names or log paths

If you make the following changes in the engineering system for a project that is already loaded in Runtime, the existing log data is lost when you load the device again:

- You rename the HMI device in the project navigation
- You rename a log folder or change the log path in the Runtime settings

The data from the old log is not available in the new log after reloading.

Storage location for databases

If the Runtime project folder is configured as the storage location for a database and you change the location of the project folder, this results in data loss.

To avoid data losses select a different storage location for databases than that of the project folder or do not change the project folder.

For more information, refer to the help "SIMATIC Unified PC Installation" under the keyword "Loading projects".

Access to subnets via TCP/IP Auto

Use the TCP/IP Auto setting on your engineering device (programming device) when you connect the device to a local subnet. (Control Panel > Set PG/PC interface)

The engineering device then allows additional IP addresses from the subnet to be added to its network adapter.

Note

This setting cannot be used if you use a router.

No setting is necessary on the devices belonging to the external network.

For stationary operation, use the TCPI/IP setting.

Fault in the connection between the server and the client

If there is a fault in the connection between the server and client, check the settings of the PG/PC interface. TCP/IP Auto should not be used for the setting "Interface parameter assignment used". Use fixed IP addresses instead.

Changes at a PLC user data type

After a change to a PLC user data type, the PLC must be compiled to make this change known to all Unified devices that use this user data type. If compilation of the PLC does not take place, error messages can occur during the compilation of the HMI devices.

Inter Project Engineering (IPE) in faceplates

Inter Project Engineering is not supported by faceplates. User data types of a device proxy PLC cannot be interconnected with a faceplate.

Collaboration certificates and Runtime version

Runtime Collaboration requires that the Collaboration certificates of 2 Collaboration partners have been created with a Certificate Authority device whose installed Runtime version is equal to or higher than the installed Runtime version of the Collaboration partner with the higher Runtime version.

This is why upgrading Collaboration devices may require re-creation, distribution, and installation of Collaboration certificates.

Example:

- A Unified PC and a Unified Panel with a V17 Runtime are Collaboration partners.
- You upgrade the Panel to V18.
- On a Certificate Authority device with an Runtime version V18 or higher, create new Collaboration certificates for both HMI devices. Distribute and install them on the devices.

Starting Runtime

Runtime cannot be started via WinCC Runtime Start if the "Load preview" dialog is displayed in the engineering system.

Status "Partly running"

If it is not possible to start the simulation or the Unified Runtime, open the Runtime Manager. If the status of the project is displayed as "partly running", check

- whether the user currently logged on in Runtime has sufficient rights. Is the user entered in the following Windows user groups:
  PLCSimUsers
  RTIL Tracing Users
  Siemens TIA Engineer
  SIMATIC HMI
  SIMATIC HMI VIEWER
- whether the computer name is not longer than 15 characters.
- whether "OPC UA" is activated in the Runtime settings and a certificate exists.
- whether "Runtime Collaboration" is enabled in the Runtime settings of a Unified Panel and a certificate is available.

Simulation with S7-PLCSIM

Always start the simulation in WinCC and then S7-PLCSIM.

WinCC Unified Tag Simulator

The WinCC Unified Tag Simulator is not part of WinCC Unified V18 and higher.

Dynamic SVG types

If you manually assign a type version to a dynamic SVG type or rename the type, a delta download is no longer possible.

Encryption with TLS

Always use the most current version of TLS. Disable the older version.

The use of older versions (TLS 1.0 und 1.1) is at your own risk.

Assigning text lists and graphics lists for reports

It is not possible to read in values from texts lists and graphics lists, neither in the add-in nor when generating the report.

Page numbering in audit

Because of a problem with the page numbering, the system functions "ReadElectronicRecord" and "ExportElectronicRecordAsCSV" only deliver the first 1000 electronic data records on the provided filter.

Protecting drives through UWF

If you are using UWF (Unified Write Filter) on a Unified PC, exclude the following folders from UWF:

- Project folder
  Preset project folder: C:\ProgramData\SCADAProjects
- C:\ProgramData\Siemens

In accordance with the UWF implementation of Microsoft, all write accesses are then written directly into these folders, but also into the overlay. If the size of the overlay approaches or exceeds the upper limit, this causes problems when loading projects or in Runtime.

You have the following options:

- Start WinCC Unified Configuration and, in the "Storage location for projects" step, select a folder whose drive is not protected by UWF as the project folder.
- Increase the size of the overlay.
- Change the type of overlay from RAM-based to disk-based.
- Start the Unified PC before reloading a project into the device.
  The overlay is emptied during the restart. This may slow down the restart.

Communication with LOGO! PLC

For the communication with a LOGO! PLC, select “Standard Modbus TCP/IP” in the connection as the communications driver.

Parallel installation of TIA Portal and Runtime

To operate TIA Portal and WinCC Unified Runtime on the same PC, install both programs in the same version or upgrade them to the same version.

"My Controls"

If a device was upgraded to V19 in the engineering system, it is possible that My Controls were not displayed correctly in the "Images" editor. Compiling of the device results in errors.

In that case, click the refresh icon in the "My Controls" palette:



Working with text list types

Text list types can now be added to the library. You proceed as with adding other types in the library. In the Text List Type editor, select selection mode for the text list. Create the entries with the corresponding values/ranges and the texts. If you have configured several project languages, you can also create multilingual texts.

You can use text list types in the following use cases in the project:

- **Resource list**
  Use text list types on objects that support resource lists as a static value, e.g. symbolic I/O fields.

  Note

  Objects in faceplate types

  For faceplate types, configure an interface property of the "Resource list" type and transfer it to the object. Then transfer the text list type to the faceplate instance at the interface property.

- **Script**
  Use text list types in scripts via the JavaScript object "HMIRuntime.Resources.TextLists". Usages of text list types are shown in the script editor as a reference. You can use text list types in scripts of other types, e.g. faceplate or script module types.
  Example:
  ```
  let entry1 =
  HMIRuntime.Resources.TextLists("@Default.Text_list_type_1_V_0_0_1"
  ).Item(1);
  ```
- **System function**
  You can use text list types in system functions such as `InsertElectronicRecord` and `Lookuptext`.

When you change a text list type, the changes are checked for consistency. If there are consistency errors when the version is released, you can view the error messages under "Info > General" in the Inspector window.

If you release a new version of a text list type, you can update all usages automatically. Types that use the text list type can be automatically set to processing status.

Text list types can be stored in global libraries.

IO field in scripts

The properties "MeasurementUnit" and "MeasurementUnitType" of an IO field are reserved for future versions.

Renewed loading of the Unified Panel after updating of the CPU configuration

If the configuration of the CPU is changed and loaded into the control unit, the PLC communications certificate of the control unit is updated.

In this case the Unified Panel connected with the CPU also has to be reloaded. After loading, the Panel trusts the PLC certificate.

Configuring automatic logout for central user management

To configure automatic logout on the UMC ring server, it is necessary to empty the cache of the browser in which you open the ring server UI after upgrading the UMC ring server. The ring server is automatically upgraded if the ring server and engineering system are installed on the same PC and you upgrade the engineering system.

Follow these steps:

1. Start a browser and open the web UI of the ring server.
2. Press Shift+F5 or Shift+Ctrl+R.
3. If automatic logout is still not configured correctly after this, follow these steps:
   In Chrome and Edge:
   - Enter `chrome://settings/clearBrowserData` in the address bar.
   - In the "Clear browsing data" window, disable all options except for "Cached images and files".
   - Click "Clear data".

   In Firefox:
   - Enter `about:preferences#privacy` in the address bar.
   - Scroll down to "Cookies and Site Data".
   - Click "Clear Data".
   - Select "Cached Web Content".
   - Click "Clear".

Nesting depth of PLC user data types

As of PLC firmware version 4.0, structured user data types can be nested on 26 levels.

Communication via the MPI interface

It is not possible to configure a connection with interface type MPI between a PLC and an HMI device with Unified Runtime.

Supported database types for Panels

Unified Comfort Panels and Basic Panels do not support Microsoft SQL as a database type.

Logging tags - logging cycle

The cycle times 100 ms and 250 ms cannot be configured for the cyclic logging of data. Multiples of these cycle times are also not permitted.

The smallest configurable cycle time is 500 ms.

SQLite and Microsoft SQL Server

SQLite

When using SQLite, one segment is appended per memory location at the same time.
The restriction of 10 simultaneously connected databases (SQLITE_MAX_ATTACHED) is not relevant here.

SQLite has no limit as it does not have to manage the databases simultaneously.

We recommend a maximum of 1000 segments.

See also the technical restrictions for SQLite: https://www.sqlite.org/limits.html

Microsoft SQL Server

When using Microsoft SQL Server, a limit of 5000 segments is necessary due to Microsoft SQL Server restrictions.

We recommend a maximum of 3000 segments.

If the limit is exceeded, performance may be impaired depending on the hardware used.

We recommend the use of Microsoft SQL Servers for over 500 tag value changes/sec, 125 alarm changes/sec.

4.11.5 Notes on the operation of Unified PC

Contents

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

Version compatibility

The Runtime functionality of a device with Runtime version V20 is ensured, even if you configure the device in TIA Portal V18 or V19 with device version V18 or V19.
If you configure a device version V16 in TIA Portal V16 and load it onto a device with Runtime version V20, Runtime functionality is not ensured.
If you configure a device version V16 or V17 in TIA Portal V17 and load it onto a device with Runtime version V20, Runtime functionality is not ensured.

Generic logon error due to browser language settings

If a language that is not supported by Unified Runtime is set as the browser language, the "Generic error" occurs during logon.

Follow these steps:

1. Open the browser language settings.
2. Select one of the languages supported by Unified Runtime.
3. Log on in Runtime.

RFID with central user administration

When RFID and central user administration are used, the connection between UMC-L (local) and UMC-S (central) must be trusted in both directions. The user who sets up two-way trust in the Runtime Manager must be in the "umcd_global_admin" group.

My WinCC Unified: IP address for a local client

To configure a client configuration for the local device in My WinCC Unified, enter the IP address of the local device under "Client settings > IP address".

Do not enter 127.0.0.1 as IP address.

User-specific customization of controls

If configured accordingly in the engineering system, user-specific customizations to the alarm control, the trend control and the function trend control can be saved. The customizations can be saved automatically or by clicking the "User profile settings" button in the toolbar and saving your customizations.

The following customizations are not saved:

- Changes to the styles (themes)
  Only changes to the controls are saved.
- If you select a trend in the trend control or function trend control in dark style or light style, this selection is not saved. This does not apply if automatic saving is active or if you click on "User profile settings" in the toolbar and save your customizations.
  To change the selected trend, select it using the "Next trend" or "Previous trend" buttons. Then save your customization using the "User profile settings" button.
- All changes made by scripts
  It is possible to save user-defined customizations by configuring a script that calls the SaveCustomizations system function.
- Maximization/restoration of the controls
- Closing the control
- Context filter
- Customizations to the controls when the control is displayed in a pop-up
- Z index of the control
- Focus of the controls

Note the following:

- If two users with the required rights save their customizations as global default values, the last changes are always saved.
- It is not possible to reset the user-specific customizations stored in the database by starting Runtime with a reset.
  To reset the controls to the default values, select one of the following options:
  - Click the "User profile settings" > "Reset to default" button in the controls in the toolbar.
  - Configure a script that calls the "ResetCustomizations" system function
  - Remove the database in the file system.
- When migrating projects with My controls that support the saving of user-specific customizations and for which customizations have been saved:
  - Migration to V20:
    If errors occur during the migration, the customizations are not migrated. If the migration of the customizations fails, this is logged in the trace log.
    Customize the My control again after the migration and save the customizations.
  - Migration of projects with V18 or lower, especially for PFI controls and calendar control:
    After the migration to V20, manually modify the GUIDs of the controls in the configuration files.
    More information can be found in SIOS under the entry ID 109820995, in the Readme Performance Insight and Calendar V19, on page 18 in the section "Runtime project migration".

4.11.6 Notes on Unified Station Configurator

Contents

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

4.11.7 Internet browsers for WinCC Unified PC

Ensure you have the latest operating system and browser version if you want to access Runtime Unified with this device.

WinCC Unified displays the runtime elements in HTML5. The browser used also has to support this standard. Since the browsers interpret HTML5 differently, it is possible that objects are displayed differently depending on the browser and the browser version used. For example, browsers sometimes display fonts differently.

Compatibility tests were performed for the following browsers. The focus of the compatibility tests was on the browsers marked with *:

Operating system	Browser
Microsoft Windows	• Google Chrome* • Microsoft Edge • Mozilla Firefox, Mozilla Firefox ESR
Android	• Google Chrome* • Firefox • Edge
iOS, Mac	• Safari* • Google Chrome • Firefox • Edge

Browser recommendation

In view of the performance and support of the Runtime standard elements, Google Chrome has proven to be the preferred browser. Its memory requirements are slightly higher than those of the other browsers.

Note

Operating system and browser version

For Runtime operation via Android or iOS, always use the latest operating system.

Use the latest browser version.

Note

Performance differences in different versions of individual browsers

The browser versions can differ from each other, which can result in different behavior regarding the memory requirements and speed.

Note

Suitability for continuous operation

Mozilla Firefox has proven to be problematic in continuous operation.

Known browser problems

The following restrictions apply to the following browsers:

Internet browser	Limitation
MS Edge	• If you want to start Runtime in Microsoft Edge and enter the address "https://localhost", the error message "INET_E_RESOURCE_NOT_FOUND" appears. In this case, use the address "https://localhost/WebRH".
Mozilla Firefox	• High memory capacity utilization in continuous operation
Mozilla Firefox ESR	• Support of touch gestures for touch panels as of Firefox ESR V59
Google Chrome	• High memory capacity utilization in uninterrupted duty depending on the version. • On Android: Grid lines with a line width ≤1 are not displayed correctly. This is due to the browser's own line thickness representation. As a solution, it is helpful to use a line width ≥1. • No correct representation of elements that use an SVG graphic as background graphic scaled in the Engineering System.

Restrictions to the various functions can also occur, such as the availability of the before and after buttons in the controls.

Current information on browser problems

You can find up-to-date information on display problems in browsers at the Siemens Online Support under the entry ID 109757952.

4.11.8 Remote access to a Unified device

Contents

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

Synchronize client values with server time

By default, the following controls display values with client time:

- Alarm control
- Trend companion
- Trend control

- f(x) trend control
- Process control

To synchronize the time displayed on the client with the server, proceed as follows:

- iOS devices:
  To prevent an iOS device from synchronizing with time.apple.com, create a profile file and upload it to the device.
  Profile files enable time synchronization within a secure corporate network.
- Android devices:
  Use a third-party app for time synchronization.

Access to a Unified device

Ensure you have the latest operating system and browser version if you want to access Runtime Unified with this device.

WinCC Unified displays the runtime elements in HTML5. The browser used also has to support this standard. Since the browsers interpret HTML5 differently, it is possible that objects are displayed differently depending on the browser and the browser version used.

Compatibility tests were performed for the following browsers. The focus of the compatibility tests was on the browsers marked with *:

Operating system	Browser
Microsoft Windows	• Google Chrome* • Microsoft Edge • Mozilla Firefox, Mozilla Firefox ESR
Android	• Google Chrome* • Firefox • Edge
iOS, Mac	• Safari* • Google Chrome • Firefox • Edge

With respect to the performance and support of the standard Runtime elements, Google Chrome has proven to be the preferred browser. Its memory requirements are slightly higher than those of the other browsers.

Note

Performance differences in different versions of individual browsers

The browser versions can differ from each other, which can result in different behavior regarding the memory requirements and speed.

Note

Suitability for continuous operation

Mozilla Firefox has proven to be problematic in continuous operation.

Unified Collaboration

Unified Collaboration is only permitted between devices with the same device version (starting from V16).

If Unified Collaboration uses local user management and the Collaboration partners are configured in different projects, it is possible to create users with the same name but different function rights. If one of these users logs on to a device in Runtime, the user has the function rights configured for this device as well as the function rights configured for the Collaboration partner. If you use several projects, you should configure the local user management identically in all projects.

4.12 Notes on the operation of Unified Panel

Contents

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

Version compatibility

The Runtime functionality of a device with image version V20 is ensured, even if you configure the device in TIA Portal V18 or V19 with device version V18 or V19.
If you configure a device version V16 in TIA Portal V16 and load it onto a device with image version V20, Runtime functionality is not ensured.
If you configure a device version V16 or V17 in TIA Portal V17 and load it onto a device with image version V20, Runtime functionality is not ensured.

Changes to the settings of the SOC1 interface (X1)

The following changes to the settings of the SOC1 interface (X1) require a manual restart of the Panel:

- Settings related to the mode and speed of the SOC1 ports
- Media redundancy settings
- Deactivating the forwarding of DCP broadcasts
- Deactivating the sending of LLDP

Objects with buttons

Some objects such as the trend control or the parameter set control have buttons for which you can configure access rights. To operate access-protected buttons, a user with the required authorization must log on via the Control Panel or a configured operating object.

Alarm control - Displaying logged alarms

Logged alarms are not displayed after starting the Runtime software if the static value "Logged alarms updated" is configured in the properties of the alarm control under "General > Alarm source". To make logged alarms visible in the alarm control, click the "Show logged alarms" or "Show and update logged alarms" button in the alarm control.

The "Update and display logged alarms" list shows a maximum of 100 alarms.

"StopRuntime" system function

The StopRuntime system function only works if encrypted transfer has been configured in the Runtime settings of the Panel.

System function "StartProgram" in the Scheduler

Calling up a program via the "StartProgram" system function in the Scheduler is not supported by Unified Comfort Panel. Instead, use a "Tags" trigger in the Scheduler to initiate the system function.

Access to MS SQL databases and SQLite databases

You can access MS SQL databases and SQLite databases via JavaScript functions from Unified Comfort Panel. Note that the resource utilization is directly proportional to the number of the requests to the database and the size of the data to be read or written. This means that the accesses to databases also affect the performance in Runtime. In order to not impair the operation as a visualization system the possibility to access databases should be used prudently.

From a Unified Comfort Panel you can only access databases which support the driver "Microsoft ODBC Driver for SQL Server" in Version 17.9.

These include:

- Azure SQL Database
- Azure Synapse Analytics
- Azure SQL Managed Instance
- SQL Server 2019
- SQL Server 2017
- SQL Server 2016
- SQL Server 2014
- SQL Server 2012

Gauge output format

If you specify the value {H} (Hexadecimal) in the Inspector window of a gauge under "Properties > General > Scale > Output format", negative values in the gauge will not be displayed correctly. If you want to output negative values via a gauge, use {F}, {N} or {I} as output format.

Runtime Collaboration - function trend control

If a function trend control is configured in a screen to display logged data and you access this screen with Runtime Collaboration, no existing logged data is displayed in the trend control. The first value displayed is the value that will be written to the log after the screen is opened.

Differences between simulation and Unified Comfort Panel

There are differences in the simulation regarding the following screen objects as compared to the Unified Comfort Panel Runtime:

- Alarm control:
  - Filter options
- Faceplates:
  - Scaling in JavaScript method "OpenFaceplateInPopup"
  - Arrangement of the faceplate containers for JavaScript method "OpenFaceplateInPopup"
- Screen window:
  - Scaling with system function "OpenScreenInPopup"
- I/O field: Default display for Word and DWord data types
- Parameter set display: Default display for Word data type
- Browser:
  - The display of pages of the S7 WebServer is not possible in the simulation.

Simulation in connection with SD-X51

The simulation of tag retentivity and alarm logging in connection with the "SD-X51" storage medium is not supported.

Incorrect counting of tags

When using faceplates in Unified Panels, tag arrays and tags based on User Data Types (UDT) are incorrectly counted as 1 tag.

4.13 Remote access to a Unified device

Contents

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

Synchronize client values with server time

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- Process control

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- iOS devices:
  To prevent an iOS device from synchronizing with time.apple.com, create a profile file and upload it to the device.
  Profile files enable time synchronization within a secure corporate network.
- Android devices:
  Use a third-party app for time synchronization.

Access to a Unified device

Ensure you have the latest operating system and browser version if you want to access Runtime Unified with this device.

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Compatibility tests were performed for the following browsers. The focus of the compatibility tests was on the browsers marked with *:

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Performance differences in different versions of individual browsers

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If Unified Collaboration uses local user management and the Collaboration partners are configured in different projects, it is possible to create users with the same name but different function rights. If one of these users logs on to a device in Runtime, the user has the function rights configured for this device as well as the function rights configured for the Collaboration partner. If you use several projects, you should configure the local user management identically in all projects.

4.14 Working with plant objects and plant views

Contents

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

Introduction

You have the possibility to upgrade the project to V17 when opening your V16 project with a system configuration. The configured Runtime version of the HMI devices must be changed separately to V17.

Updating blocks

If blocks from a global or from a project library are used in the project, do the following:

1. Open the plant object type that uses a block from a library.
2. Delete the interconnection of the PLC tag.
3. Open the "Library" task card.
4. In the library, open the shortcut menu of the block used.
5. Click on "Project" under "Update types".
   The "Update types in the project" dialog opens.
6. Select the option "Force update (types including their dependent types are updated regardless of their version number)".
   All other options are already selected by default.
7. Click "OK".
8. Compile the PLC.
9. Interconnect the PLC tag for the plant object type.
10. Compile and download your project.

Note

Alternatively, delete all plant objects (instances) from the plant hierarchy, perform the update and create all plant objects (instances) again in the plant hierarchy. If you have linked a screen to the plant object in the "Visualization" tab, deleting the plant object not only deletes the link, but also entire screen. Create a copy of the screen and link the screen to the new plant object after updating the blocks.

4.15 Redundancy

PLC alarms

If you notice that no PLC alarms are received on the redundant partner, contact Siemens Technical Support (https://support.industry.siemens.com/cs/my/src?lc=en-US). The problem can be corrected with the patch "20.00.00.00_Patch_Redundancy.zip". After you have installed the patch, you need to stop Runtime on both redundant partners, compile both devices completely and perform a full download to both redundant partners.

Restriction with redundancy

It is not possible to reset the log data on Runtime start using the TIA Portal Download dialog. Use the Runtime Manager instead.

4.16 Audit

Contents

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

Restore database segments in Runtime

To analyze the logged and deferred data, as an HMI Administrator of an HMI device, you can restore backed up audit database segments in Runtime.

After the analysis, these segments can be discarded again to empty the memory space.

Parameters of an Audit Trail report

Type of operation

Due to the harmonization of the type of operation and to avoid changes to already logged data in the Audit Trail, the description of the type of operation of the previously logged data records differs from the new description.

Logging scope of the Audit Trail

The following Audit-relevant processes are logged depending on the configuration of the tags of the project:

- Value changes of GMP-relevant tags by the user (including Multiplex tags)
- User management: Log on/log off (only for local user management)

- "InsertElectronicRecord" system function
  You use the "InsertElectronicRecord" system function to record user actions that are not automatically recorded by the Audit Trail.
  You can configure this system function to screen calls, for example, or you configure function lists containing system functions that do not require acknowledgment.
- DB name multiplexing

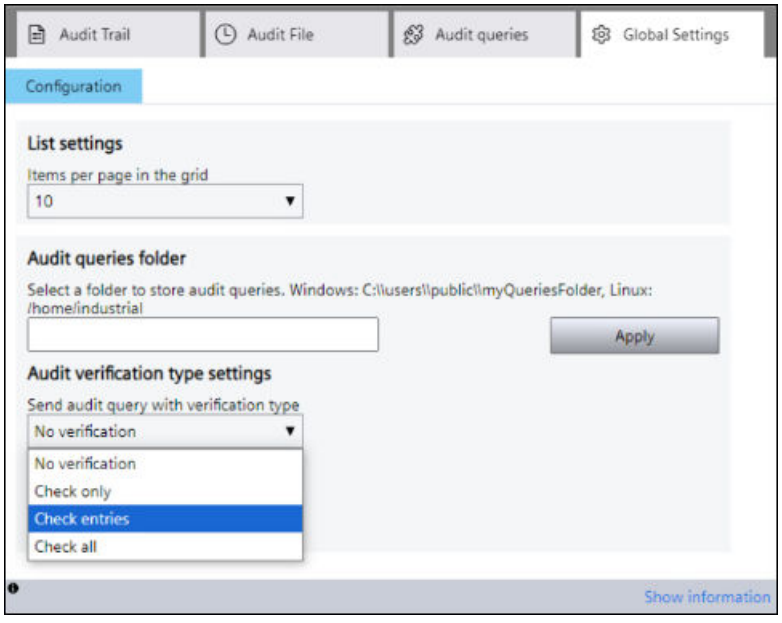
An Audit entry is also generated by:

- Status change of GMP-relevant bit and analog alarms by the user
  - Acknowledge
  - Shelve
  - Canceling a shelving
- Single/multiple electronic signature

Defining global settings for Audit Viewer

With this option, you set global settings that are assigned to the Audit Viewer.

1. Under "List settings", set the number of records to be displayed on a page. The maximum number of recordings is 50 entries.
2. Under "Audit queries folder", specify the path where the records should be saved.
   - For Windows: C:\\users\\public\\myQueriesFolder
   - For Linux: /home/industrial
3. Select a check mode under "Audit verification type settings".
4. Specify a filter type under "Audit filter type settings".
5. Click "Apply".



6. Click the button in the toolbar of the Audit Viewer to update the global settings.

Audit Trail logging concept

Storage location and medium

You can specify the storage location of the Audit Trail log in a similar way to the storage location of a tag log or alarm log.

Depending on the hardware configuration of the HMI device, the data may be logged locally (on the hard disk of a PC or on the storage card of a Panel) or, if present, on a network drive.

Note

Logging on network drives

We do not recommend that you log Audit Trail directly on a network drive. Power supply can be interrupted at any time. This means that reliable operation of logs and Audit Trail is not guaranteed.

It is recommended to save the logs on your local hard drive, or on a storage medium of the HMI device. To additionally save the logs on a network drive for long-term logging, configure a backup.

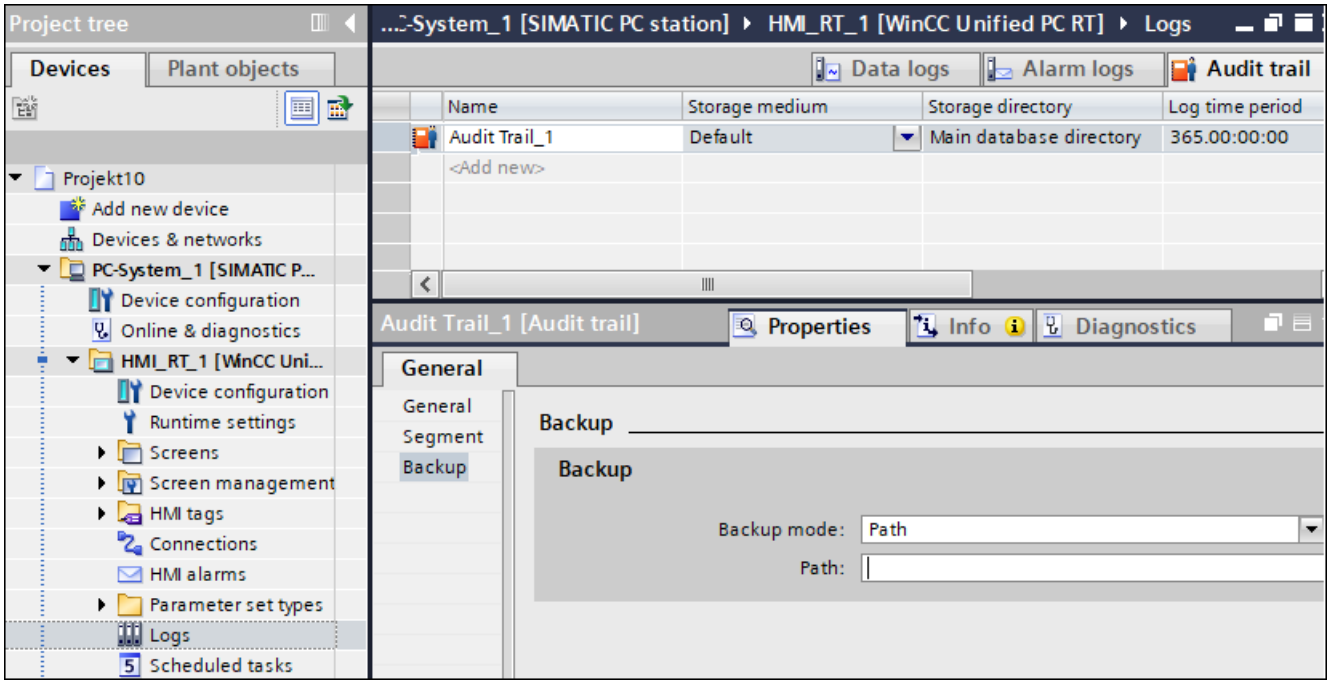
For the correct function of "Configuration conforms to GMP", it must be possible to save audit-relevant user actions in the Audit Trail. Therefore, it is important to ensure that sufficient memory space is available for the Audit Trail and that the connection to the storage location of the Audit Trail is not interrupted.

Configuring Backup

You can configure a backup for both SQLite and Microsoft SQL database types. Proceed as follows:

1. Double-click "Logs" in the project tree.
2. Click on "Audit Trail" in the open work area.

3. In the Inspector window under "Properties > General > Backup > Backup mode", select the "Path" setting.
4. Enter a storage location under "Path".



If the backup is configured, completed log segments are copied to the backup location with a delay of approx. 10 minutes.

Error handling for inaccessible storage medium

If the configured Audit Trail database is not accessible, e.g. there is not enough storage space available for the Audit Trail or the storage medium is missing, the audit-relevant user actions are saved in an internal cache.

As soon as the Audit Trail database is accessible again, e.g. the storage medium is inserted again, the temporarily saved data is automatically written to the log.

4.17 View of Things

Contents

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

Supported functionalities

The following functionalities are supported in the VoT application:

- Event "Input finished" for the object I/O field
- Simple object "Label"
- Multiuser support for configuration of screens

Improvements in the screen editor

The following improvements in the screen editor are supported in the VoT application:

- Functions in the toolbar:
  - Font
  - Text alignment
  - Determining the border width or line width
  - Line type
- "Hide change events" function
- Resetting the properties of screens and screen objects from the manually set value to the default value of the style
- Centrally configuring the background color for all screens in the project
- Moving objects between layers by means of the "Layer" property

Displaying the properties of a collection

Some screen objects contain a collection of similar elements under the properties. The properties of the elements in the collection are displayed and managed in a table in the Inspector window.

When managing the properties of the elements in a collection, you can:

- Show or hide the individual properties
- Show all columns
- Optimize the width of a column
- Optimize the width of all columns

Unsupported functionalities

The following functionalities are not supported in the VoT application:

- Configuring of the screen management
- Controls:
  - System diagnostics view
  - ProDiag overview
- Number of failed login attempts

- User-defined styles
- Zooming without holding down the Control key

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5.1 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
https://www.siemens.com/cybersecurity-industry (https://www.siemens.com/cybersecurity-industry).

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

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
https://new.siemens.com/cert (https://www.siemens.com/cert).

5.2 Notes on use

Contents

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

Comparison in Version Control Interface (F-CPUs)

If there is an F-CPU present in the project, you must log in to the Safety Administration Editor to be able to compare an object of the project with the relevant file in the Workspace.

Name space information in Version Control Interface

If you export the object with name spaces from software units, the name space information is no longer used in the file name as of TIA Portal V20. It is recommended that objects with the same name and different name spaces should be placed in different folders to carry out export.

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