SIMATIC

STEP 7 Professional 2017 SR1
Engineering Software for SIMATIC S7 / C7

Security Information:

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

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

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

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

http://www.siemens.com/industrialsecurity

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

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

http://www.siemens.com/industrialsecurity

Notes on Installation and Usage

These notes should be considered more up-to-date than the information in other documents. Read the notes carefully, because they contain information on installing and using STEP 7 Professional.

Also read the Special Notes of the STEP 7 Professional parts of products.

Note when printing the file that the left and right margins are set to a width of 25 millimeters for A4 portrait size.

Contents

Notes on Installation

The installation notes contain important information that you will require in order to install STEP 7 Professional. Read these notes <u>before</u> installing the software.

1 Contents of the Consignment

Contents of DVD STEP 7 Professional

- Folder "InstData":

  - STEP 7 V5.6 incl. SP1

  - Automation License Manager V6.0 incl. SP1

  - S7-GRAPH V5.6

  - S7-SCL V5.6 incl. HF1

  - S7-PLCSIM V5.4 incl. SP8

  - S7-PCT V3.5 incl. Upd1

  - S7 Web2PLC V1.0 SP3
    Application for creation and setup of user-defined Web pages for the Web server of the CPU.

  - S7 Block Privacy V1.0 SP4
    Application for encoding of blocks.
    Notes:
    A block protected with Block Privacy can only be loaded to the following CPUs:
    - S7-300 and ET 200 CPUs as of firmware V3.2
    - S7-400 CPUs as of firmware V 6.0
    - A block protected with "Block Privacy" will not be considered in the reference data lists! Keep this in mind when creating protected blocks. All global variables used in creating protected blocks cannot be entered in the reference data list. This means you should not use global variables in the protected blocks.

- Folder "_Manuals":

  - file "STEP 7 - What's New.rtf"

  - file "S7-GRAPH - What's New.rtf"

  - file "S7-SCL - What's New.rtf"

  - Electronic manuals for STEP 7 V5.6

  - Electronic manuals for S7-GRAPH V5.6

  - Electronic manuals for S7-SCL V5.6

  - Electronic manuals for S7-PLCSIM V5.4 incl. SP8

  - Command Interface description

  - Description of the Central Installation Procedure

The manuals are available in an installable form in the folder "_Manuals" and are optionally available on your computer after STEP 7 Professional has been installed. If you do not install the manuals, you can also view at any time on the data carrier.

Important note

The manuals are no longer updated. Please refer to the corresponding online help for up-to-date information.

- Folder "Optional Components" (Has to be explicitly installed by the user if necessary).
  - Folder "Communication Blocks"

    Documentation of blocks FETCH/WRITE-FBs 210 and 220.

  - Folder "PROFIenergy"

    Projects (ET200S) and descriptions

  - Folder "OC Wizard"

    With this tool, link modules for open TCP/IP communication can be created.

    The wizard can be installed from this folder by means of "Setup". An existing installation must be removed beforehand.

    In this folder, please read the provided documentation with application examples (PDF file) as well as the conditions of warranty, liability and support.

  - Folder "SIMATIC iMap STEP 7 Addon"

  - Folder "SCT Security Configuration Tool"

    Configuration of the Security functions of SIMATIC NET products

  - Folder "CP PtP-Param"

    Configuration of the communications processors CP 340, CP 341, CP 440, CP 441-1, CP 441-2

  - Folder "FM Configuration Package"

    Configuration of the function modules FM 350-1, FM 350-2, FM 351, FM 352, FM 352-5, FM 355, FM 355-2, FM 450-1, FM 451, FM 452, FM 455

- Folder "Open Source Software"
  Source code of the OSS software

2　Hardware Requirements

In order to work with the STEP 7 Professional, you need a suitable programming device or a suitable PC. There are no special hardware requirements. Therefore, the minimum requirements specific to the operating system apply. You can find these requirements on the appropriate Microsoft websites.

When using a PC instead of a PG, you also need to have an external prommer for SIMATIC Memory Cards / MMC if you want to save your S7 user program to EPROMs. A communications card (CP) or SIMATIC NET connection is necessary for PC online functions to the automations system (PLC).

As of STEP 7 V5.5 you can use the USB prommer without installating additional software. The necessary functionality has been integrated as of STEP 7 V5.5.

3 Software Requirements

3.1 Operating Environment

Operating System

STEP 7 Professional 2017 SR1 can be used with the following operating systems:

- MS Windows 7 Ultimate, Professional and Enterprise (64-bit), with SP1

- MS Windows 10 Pro and Enterprise (64-bit)

- MS Windows Server 2008 R2 (64-bit) with SP1 (Standard Edition as work station computer)

- MS Windows Server 2012 R2 (64-bit) (Standard Edition as work station computer)

- MS Windows Server 2016 (64-bit) (Standard Edition as work station computer)

STEP 7 Professional has not been tested on any other operating systems; use at your own risk.

Important additional information:

- STEP 7 V5.6 checks during the installation of HSPs and other functions, that the files have a valid certificate. This check requires a corresponding root certificate, which has to be available on the computer in a current version. If the root certificate is unavailable or expired, errors can occur during the installation of HSPs or the performance in connection with GSDML files can suffer. This behavior is described in FAQ 87057037.
  http://support.automation.siemens.com/WW/view/de/87057037

- Special considerations when installing the software on MS Windows Server 2008:
  You need administrator rights to configure the PG/PC interface or install hardware support packages. The user rights from the user group "Siemens TIA Engineer" are not sufficient.

- Special consideration when installing the software as of MS Windows 7: Observe the notes in the paragraph "Special Characeraistics of the Operating Systems" regarding the user group "Siemens TIA Engineer".

Supported virtualization platforms

You can install the SIMATIC STEP 7 Professional software package in a virtual machine. To do so, use one of the following virtualization platforms:

- VMware vSphere Hypervisor ESX(i) 6.0

- VMware Workstation Pro 14.1.2

- VMware Workstation Player 14.1.2

- Microsoft Windows Server 2016 Hyper-V.

You can use the following host operating systems within the selected virtualization platform to install SIMATIC STEP 7 Professional 2017 SR1:

- Windows 7 Ultimate (64-bit)

- Windows 10 Pro (64-bit).

There can be restrictions on the STEP 7 online functions.

Note

- The same hardware requirements as for SIMATIC STEP 7 Professional 2017 SR1 itself apply to the host operating systems.
- The plant operator must ensure that the host operating systems have sufficient system resources. .
- We recommend the use of hardware certified by the manufacturers when using HyperV-Server and ESX(i).
- When you use Microsoft Hyper-V, accessible stations cannot be displayed.
- With respect to the use of communications processors (e.g. CP5711…), please observe the relevant information in the module documentation and on the SIMATIC Support pages (http://support.automation.siemens.com).

Internet Explorer

All operating systems must be using MS Internet Explorer 6.0 (or higher).

Display of PDF files

To read the supplied PDF files, you need a PDF reader that is compatible with PDF 1.7 (ISO32000-1:2008 PDF).

Security settings

In project directories, all users who have write access are to receive write permission in case of non-exclusive use by one user only. These rights have to be set up by an administrator.

Note: The standard rights available in the operating system depend on the operating system in use. Tools used for the creation of partitions will implement their own security guidelines.

Hibernation mode

Shifting to hibernation mode is generally permitted in STEP 7 Professional. However, hibernation must not be triggered if online connections are open or projects are being accessed by STEP 7 applications via a network.

In such cases, online connections could be terminated unintentionally and open projects on networks may experience data loss.

For these reasons, the energy options for the operating system in the Windows Control Panel should be set so that hibernation is not automatically triggered (by timer). Hibernation should not be triggered manually by the user in the cases mentioned above.

3.2   Memory Requirements

STEP 7 Professional requires, depending on the installation, approx. 2 GB of memory on your hard disk. The exact value depends on your operating system and on the file system used on your programming device/personal computer.

MS Windows also requires additional free space on the hard disk (typically C:) for its swap file, depending on the memory configuration.

You should keep at least double the amount of main memory free on your hard disk (example: with a main memory of 1024 MB you will need 2048 MB hard disk space for the page file

following the installation of STEP 7 Professional).

Depending on the size of the project, it may be necessary to have a larger swap file, for example, when copying an entire project (twice the size of the project on the hard drive in addition). If the free memory area for the swap file is too small, errors may occur (the program could possibly crash). Additional Windows applications which run parallel to STEP 7 Professional (such as Microsoft Word) also require additional hard disk space for the swap file.

In order to ensure that the required memory for the swap file is really available, the minimum size for the swap file should be set to the above value. This can be set in Windows (for example, Windows 7) in the taskbar in **Start > Control Panel** (in **System >** Advanced system settings > Advanced > Performance > Settings > Advanced).

You must make certain that you have enough free memory on the drive where the project data are located. If there is not enough memory on the drive, the project data may be destroyed during an operation (for example, when compiling an STL source file into blocks). We also recommend that you do not store the project data on the same drive as the Windows swap file.

4   Installation

4.1   Installation of STEP 7 Professional

Insert the STEP 7 Professional DVD in the drive. STEP 7 Professional is installed via a user-led Setup, which you start with the MS Windows Explorer by double-clicking the SETUP.EXE program of the STEP 7 Professional DVD.

Before you can upgrade an older STEP 7 Professional Edition to STEP 7 Professional 2017 SR1, you eventually have to transfer your old authorization/license key to the corresponding authorization/license key medium using AuthorsW/Automation License Manager and change to the currently approved operating systems.

You can upgrade an existing installation of STEP 7 V5.3, V5.4, V5.5, V5.6 and V5.6 SP1 to STEP 7 Professional 2017 SR1. Observe the notes in the paragraph "Operating Environment" regarding the approved operating systems. You do not have to uninstall these STEP 7 versions and optional packages. However, you must uninstall older versions and their optional packages beforehand.

In General the Following Applies:

In order to obtain the optimum display of the information during the Setup, you should set the color scheme in the control panel of your programming device/personal computer to at least 65536 colors.

Before starting the Setup program, close all applications (such as Microsoft Word, etc.) and the "Control Panel" window, since you will need to restart Windows following the installation of STEP 7 Professional so that all system variables can be entered completely.

Insert the STEP 7 Professional DVD in the drive. In order to start installing STEP 7 Professional, double-click the SETUP.EXE program on the STEP 7 Professional DVD from the Windows Explorer. The Setup program will guide you through the installation.

In the component selection box, select STEP 7, Automation License Manager, and any other components (S7-SCL, S7-GRAPH, S7-PLCSIM,...) that you wish to install.

These components will then be installed and entries will be made in Microsoft Windows files.

The following notes are intended to help you make the correct user entries required during the Setup program:

- The drive on which you install your STEP 7 Professional system can be selected freely. On some PCs/programming devices, you will not be able to select the drive via the selection list. In this case, simply enter the drive with its path in the appropriate input box (for example, "e:\Step7"). Note that all STEP 7 optional packages must also be installed on this drive, so there must be sufficient space available. Avoid installing STEP 7 Professional on a SUBST drive.

- Before you use STEP 7 Professional, Windows must be restarted. Only then do all of the Microsoft Windows entries become active. If you do not restart Windows, STEP 7 Professional cannot run properly and data may be lost. If the installation procedure is aborted, you will also need to restart Windows.

- Refer to the tables in the S7KOMP_B.PDF file (the directory "Step7" following installation)

for information on which versions of the optional packages can run with STEP 7 Professional under Windows. Contact your Siemens representative for more up-to-date information or go to our website at: http://support.automation.siemens.com

Note

STEP 7 Professional registers itself in Microsoft Windows system files. You cannot delete, move or rename STEP 7 Professional files and folders using Microsoft Windows utilities such as the Explorer or modify STEP 7 Professional data in the Microsoft Windows registry. The program may no longer run properly after such modifications.

4.1.1 Firewall

Network settings

The table below shows the STEP 7 network settings you need to analyze network security and configure external firewalls:

Name	Port number	Transport protocoll	Direction	Function	Description
ALM	4410*	TCP	In-/Outbound	License service	This service provides the complete functionality for software licenses and is used by the Automation License Manager as well as all license-related software products.
RFC 1006	102	TCP	Outbound	S7 communication	Communication with the S7 controller via Ethernet / PROFINET for programming and diagnostic purposes.
PNIO	34964	UDP	Outbound	CLRPC	PNIO_EPM_PORT, used for Endpoint Mapper lookup operations.
* Standard port which can be changed with the user configuration					

Entries in the Windows firewall

The tables below show the entries made by STEP 7 setup in the Windows Firewall during a new installation or an upgrade. The entries are displayed during STEP 7 setup and must be accepted to install STEP 7.

You may have to make these entries yourself if you are using a firewall other than the Windows Firewall or an additonal firewall.

Additional firewall entries may be necessary when you use STEP 7 optional packages.

When determining/changing the "area" for which this firewall entry is active, take into consideration the network infrastructure in addition to the basic requirements for network security.

New installation

Name	Application	Area
Automation License Manager Service	C:\Program Files\Common Files\Siemens\sws\almsrv\almsrvx.exe	Subnet
Adaptive Server Anywhere Database Engine	C:\Program Files\Common Files\Siemens\SQLANY\Dbeng9.exe	Subnet
Adaptive Server Anywhere Network Server	C:\Program Files\Common Files\Siemens\SQLANY\Dbsrv9.exe	Subnet
SIEMENS STEP7 Block Administration	C:\WINNT\system32\S7otbxsx.exe	Subnet
SIEMENS STEP7 S7InfoBox	C:\<INSTALLDIR>SIEMENS\STEP7\S7INF\S7usiapx.exe	Subnet
SIEMENS STEP7 SIMATIC Manager	C:\<INSTALLDIR>SIEMENS\STEP7\S7BIN\S7tgtopx.exe	Subnet

Upgrade

Name	Application	Area
Automation License Manager Service	C:\Program Files\Common Files\Siemens\sws\almsrv\almsrvx.exe	Subnet
Adaptive Server Anywhere Database Engine	C:\Program Files\Common Files\Siemens\SQLANY\Dbeng9.exe	All computers
Adaptive Server Anywhere Network Server	C:\Program Files\Common Files\Siemens\SQLANY\Dbsrv9.exe	All computers
SIEMENS STEP7 Block Administration	C:\WINNT\system32\S7otbxsx.exe	All computers
SIEMENS STEP7 S7InfoBox	C:\<INSTALLDIR>SIEMENS\STEP7\S7INF\S7usiapx.exe	All computers
SIEMENS STEP7 SIMATIC Manager	C:\<INSTALLDIR>SIEMENS\STEP7\S7BIN\S7tgtopx.exe	All computers

4.2 License Key of STEP 7 Professional

Before you can start working with STEP 7 Professional, you must transfer the license key from the license key meduim to the computer. There are two ways of doing this:

- While you are installing STEP 7 Professional, the Setup program displays a message, if there is no suitable license key installed on your computer. You can then decide whether you want the license key to be installed by the Setup program or whether you want to install the license key manually at a later time using the Automation License Manager.

- If the license key cannot be installed during setup, continue the Setup program without installing the license key. Then boot the computer and install the license key using the taskbar (e.g. Windows 7) All Programs\Siemens Automation\Automation License Manager).

Note

As of STEP 7 Professional Edition 2004, all program components will be activated via a License Key. This license key can be installed on all local drives. See also the enclosed product information on the Automation License Manager.

The Automation License Manger prevents the authorizations/license keys from being installed on invalid drives or media such as RAM drives, diskettes or compressed drives. If the drive in a device is reported as being a "removable medium" and not, as usual, as a "hard drive", it will be treated as a CD, which means that no license key may be installed on it.

In the case of compressed drives, you can install the authorization on the associated host drive.

Read the notes on the Automation License Manager in the almreadme.rtf file on the STEP 7 Professional DVD under "Automation License Manager\ALM32\" or "...\ALM64\".

Hidden files are stored in the folder "<Drive on which the license key is installed>:\AX NF ZZ". These files and the folder must not be deleted, moved, or copied. They contain data required for the licensing of your software.

If you do not adhere to these guidelines, the license key may be irretrievably lost.

Notes on error-free use of the license keys

- The license key medium must not be read-only. Because the license key medium is to be used without write protection, there is a danger that a virus could be transferred from the hard disk to the medium. You should therefore run a virus check on your PC or programming device every time you install or remove a license key.

- If you use an optimizing program which enables you to move fixed blocks of memory, only use this option once you have moved the license key from the hard disk back to the license key medium.

- With the License Key a specially marked cluster is shown on the target drive. Some check programs display this cluster as "defective". Do not try to restore it.

- Do not forget to transfer the license key to the license key medium before formatting, compressing, or restoring your hard disk or before installing a new operating system.

- If a backup copy of your hard disk contains copies of license keys, there is a danger that these copies may overwrite the valid installed license keys when you restore your backup data to the hard disk, thereby destroying the valid license keys. To prevent a valid license key from being overwritten by a backup copy, you must remove all license keys before you make a backup copy or exclude the license keys from the backup.

Using the trial license:

If no valid license key is installed for STEP 7 Professional, the Trial License Keys of the individual products which are always supplied with STEP 7 Professional can be installed. However, these License Keys are only valid for 21 days.

4.3 Uninstalling STEP 7 Professional

Note

Software products must be removed according to MS Windows.

Use the Microsoft Windows application "Programs and Features" (for example, under MS Windows 7 in the taskbar in **…> Control Panel > Programs and Features > Uninstall a program**) to remove your software package (for example, "STEP 7").

As an alternative, you can use the setup program to uninstall a program.

If you uninstall an older version of STEP 7 in order to install STEP 7 Professional, you must **first** uninstall any existing optional packages for STEP 7 as well.

5 Additional Notes

You will find further information on notes on installation and usage, as well as notes on the operating system versions of the individual products, in the folders of the individual components on the DVD folder "InstData" and in the 'Programs to be installed' Setup dialog when you select the program and via the "Readme" button.

5.1 Special Characteristics of the Operating Systems

Note that as of MS Windows 7 offers an extended protection concept.

This means that access to protected areas of the file system, such as the directories "Programs" and "Windows", are virtualized. Your data will be forwarded by the operating system in such a case to user-specific areas.

If the Windows screen display is set to greater than 100% in the control panel, the representation of certain STEP 7 dialogs (e.g. OC Wizard) is impaired.

Setting the access rights in the operating system

Important changes have been made to the MS Windows 7 safety concept as of STEP 7 V5.5. This concept is used in case of a new installation (STEP 7 has never been installed on this computer). In this case, most settings, such as the STEP 7 language and mnemonic method are user-defined. This means users can make settings using a PC and their login information. An exception is the setting of the configuration language for the PG/PC interface.

A user group "Siemens TIA Engineer" will be created under MS Windows 7. The installer will automatically be added to this user group. Users from this user group have additional rights, such as configuration of the PG/PC interface under MS Windows 7 (32 Bit) and installation of the hardware support packages as well as for global setting of the STEP 7 language and mnemonic for all users of the "Siemens TIA Engineer" group. This language also applies to the function "Set PG/PC Interface…" if this was started by means of the SIMATIC interface.

You have to make sure that the rights for the user group "SIEMENS TIA Engineer" are set up in the domain as well as locally.

The administrator has to assign these user rights and it is his responsibility.

Access rights in project directories

See "Security settings" in section 3.1 Operating environment.

Project files on network drives

If several users work on the same project saved on a network drive at the same time, MS Windows 7 clients may not recognize changes made to blocks by other users. Possible remedies include a restart of STEP 7 on the MS Windows 7 client or deactivation of the opportunistic locking of the respective PG/PC. The latter influences the performance of the client. Given this background, we do not recommend that several users work on the same project simultaneously.

User account control

STEP 7 V5.6 SP1 under MS Windows 7 can be operated with enabled (3 levels possible) and disabled (never notify) user account control (UAC) mode.

Following the conversion of the user account control (e.g. by UAC conversion of a program installed by the system administrator), some of the settings made by the user may no longer be present. The position and size of the application windows may, for example, be reset to older (default) values. Some of the projects processed by the user may no longer be visible. You will have to enter them once again in the project management of STEP 7 (SIMATIC Manager > Open Project > Find).

Set up domain global user group "Siemens TIA Engineer"

For operation in a domain, you can create a domain global user group that will be mapped to the local user groups "Siemens TIA Engineer" and "Network configuration operators".

The following prerequisites will have to be met:

- The domain administrator has created a domain global user group.

- The domain administrator has added users to the domain global user group whose login will be used for access to STEP 7.

Editing projects

You need at least normal user rights to reconfigure the PG/PC interface as of MS Windows 7 64-bit.

A project can include an implicit configuration of the PG/PC interface (PG/PC).

If the PG/PC interface in such a project was implicitly reconfigured by a user with "Siemens TIA-Engineer" rights, then operators with user rights will not be able to undo this configuration. This means you will not be able to work online again until an operator with Siemens TIA-Engineer" rights has reconfigured the PG/PC interface. Otherwise operators will see the following alarm: "Insufficient user rights for operation of STEP 7".

Temporary IP address assignment

When the device status is being read out, the assignment of temporary IP addresses in the device may have the result that no diagnostics information is shown. If this happens, update the list of accessible nodes and repeat the action.

Note

Do not use the hibernate / standby function uas of MS Windows 7.

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6 Terms of License and Disclaimer of Liability for

Open Source Software

Before installation, please read the "Readme_OSS.rtf" file.