

Manual | EN

TS1810

TwinCAT 2 | PLC HMI Web

Supplement | System

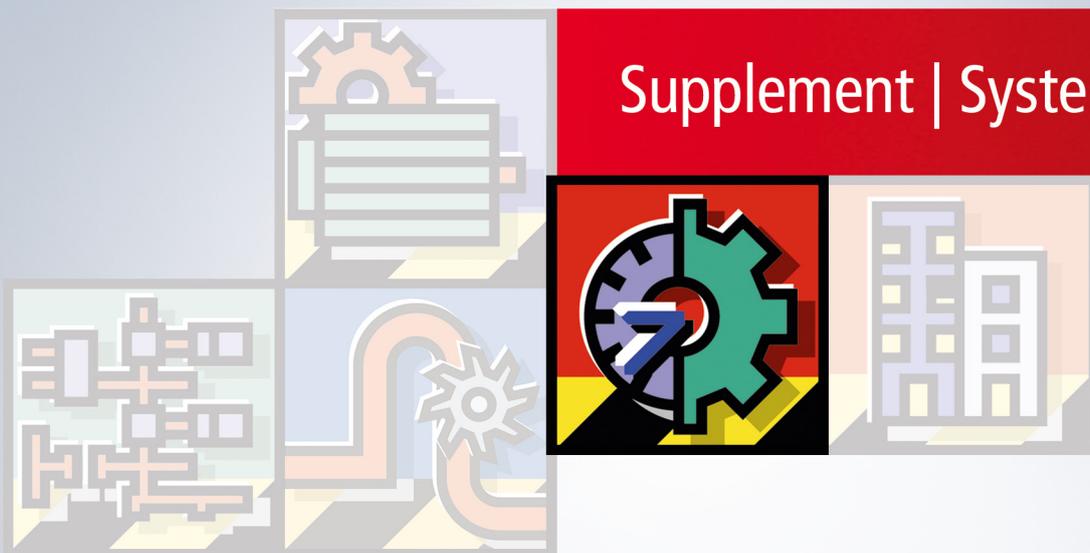


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1 Foreword

1.1 Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with applicable national standards.

It is essential that the documentation and the following notes and explanations are followed when installing and commissioning the components.

It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702
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1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

DANGER

Serious risk of injury!

Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.

WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

CAUTION

Personal injuries!

Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTE

Damage to the environment or devices

Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.



Tip or pointer

This symbol indicates information that contributes to better understanding.

1.3 Notes on information security

The products of Beckhoff Automation GmbH & Co. KG (Beckhoff), insofar as they can be accessed online, are equipped with security functions that support the secure operation of plants, systems, machines and networks. Despite the security functions, the creation, implementation and constant updating of a holistic security concept for the operation are necessary to protect the respective plant, system, machine and networks against cyber threats. The products sold by Beckhoff are only part of the overall security concept. The customer is responsible for preventing unauthorized access by third parties to its equipment, systems, machines and networks. The latter should be connected to the corporate network or the Internet only if appropriate protective measures have been set up.

In addition, the recommendations from Beckhoff regarding appropriate protective measures should be observed. Further information regarding information security and industrial security can be found in our <https://www.beckhoff.com/secguide>.

Beckhoff products and solutions undergo continuous further development. This also applies to security functions. In light of this continuous further development, Beckhoff expressly recommends that the products are kept up to date at all times and that updates are installed for the products once they have been made available. Using outdated or unsupported product versions can increase the risk of cyber threats.

To stay informed about information security for Beckhoff products, subscribe to the RSS feed at <https://www.beckhoff.com/secinfo>.

2 Overview

TwinCAT PLC HMI Web is a TwinCAT supplement product offering web-based visualization pages from the TwinCAT PLC.

TwinCAT PLC HMI Web can be installed via Setup.

The IEC1131 PLC "TwinCAT PLC Control" is available as HTML editor. The process of creating the visualization pages in TwinCAT PLC-Control is analogous to "TwinCAT Target Visualization" and "TwinCAT PLC HMI" visualization.

In addition to compiling the PLC code, the visualization pages are also converted to HTML pages and transferred to the target control system together with the PLC project.

The seamless integration into TwinCAT PLC Control has the advantage that, in addition to creating the IEC1131 PLC code for the visualization, all variables for the TwinCAT PLC control program are directly available.

Licence

A license is required for each Runtime (CE/XP). (The editor is included "free of charge" in TwinCAT PLC Control).

Demo version

A limited demo version is not available.

Product components:

- Editor: The IEC1131 PLC editor "TwinCAT PLC Control" is available as editor.
- Runtime CE: The CE platforms supported by Beckhoff are available as CE platform: CE-X86 and CE-ARM.
- Runtime XP: The product has been tested for Windows XP/Windows XPE/Windows Standard. System tests for Vista and Windows server have not yet been carried out.

Requirements:

- For creating web pages: TwinCAT 2.10 Build 1326 (or higher)
- Runtime CE:
 - Beckhoff CE-X86 or CE-ARM device with CE Image 2.18 (or higher)
 - Minimum TwinCAT Level PLC
- Runtime XP:
 - Minimum TwinCAT Level PLC
- Web page display: A client (browser) requires a Java VM to display the web-based visualization **TwinCAT PLC HMI Web**.
 - For XP-based systems this is available free of charge from several providers (e.g. Sun).
 - We are not aware of a free Java-VM for CE-based system.

3 Visualization features

It is shown in this table which possibilities the visualisation offers with TwinCAT.

Feature	PLC Control	PLC HMI (TS1800)	PLC HMI Web (TS1810)	PLC HMI CE (TS1800-0030)	Comment
Current test version:	Build 1010	2.10.0.900	1.0.0.7	1.0.9.10	From TwinCAT 2.10 Build 1334
Rectangle	✓	✓	✓	✓	
Rounded rectangle	✓	✓	✓	✓	
Ellipse	✓	✓	✓	✓	
Polygon	✓	✓	✓	✓	
Curve	✓	✓	✓	✓	
Pie	✓	✓	✓	✓	
Bitmap	✓	✓	✓	✓	
Visualisation	✓	✓	✓	✓	
Button	✓	✓	✓	✓	
WMF/JPG File	✓	✓	✓	✓	
Table	✓	✓	✓	✓	
ActiveX element	✓	✓	✗	✗	
Trend	✓	✓	✗	✓ / ✗	HMI CE: Only online trend is available
Alarm table	✓	✓	✗	✗	
Meter	✓	✓	✓	✓	
Bar display	✓	✓	✓	✓	
Histogram	✓	✓	✗	✗	
Invisible elements	✓	✓	✓	✓	
Change color	✓	✓	✓	✓	
Background bitmap	✓	✓	✓	✓	
Button background	✓	✓	✓	✓	
Tooltip	✓	✓	✓	✓	HMI CE: Elements not too near to the edge or tooltip is outside the window

Feature	PLC Control	PLC HMI (TS1800)	PLC HMI Web (TS1810)	PLC HMI CE (TS1800-0030)	Comment
Security	✓	✓	✓	✓	
Placeholder	✓	✓	✓ / ✗	✓ / ✗	Web/HMI CE: Zoom to visu with placeholders in the zoom command is not possible
Print function	✓	✓	✗	✗	
Password change	✓	✓	✓	✓	
Change user level	✓	✓	✓	✓	
Language dialog	✓	✓	✓	✓	
Language automatic change	✓	✓	✓	✓	
Exit	✓	✓	✗	✗	
Trace	✓	✓	✗	✗	
Text input 'Text'	✓	✓	✓	✓	Web: Please don't exceed the maximum string length of your variable HMI CE: The hidden function is not supported
Text input 'Numpad'	✓	✓	✓	✓	HMI CE: The hidden function is not supported
Text input 'Keypad'	✓	✓	✓	✓	Web: Please don't exceed the maximum string length of your variable HMI CE: The hidden function is not supported

3.1 Restrictions

Intern commands

PRINT

Printout of the current visualization is not possible.

EXITPROGRAM

This command is not supported.

TRACE

This command for opening the Sampling Trace window is not supported.

SAVEPROJECT

This command for saving the project is not usable for the Target-Visualization.

Grafic formats

In the Target-Visualization currently only simple bitmaps are supported. Not supported formats: .jpg, .tif, .ico
The format .jpg is supported from version 1.0.9 of the TargetVisu DLL.

Others**Slider in Table**

The slider for scrolling is not displayed.

Texts

Texts exceeding the borders of an element currently do not get clipped.

Alarm handling

TheAlarming is not supported.

Trend

The Online Trend is supported from Version 1.0.8 (without history).

Place holder

The delivery of parameter to replace placeholder at the call is not supported.

Example:

```
<Visuname>(<Placeholder1>:=<Text1>, <Placeholder2>:=<Text2>, ..., <Placeholder n>:=<Textn>)
```

VAR_IN_OUT

It is not possible to use VAR_IN_OUT variables in TwinCAT HMI CE.

Visu-Side

It is not possible to use the scroll bar in the HMI CE on your visualisation side.

4 Installation

4.1 CE Runtime: Installation

Requirement:

- On the host PC: Editor: TwinCAT 2.10 Build 1320
- On the CE device: CE Image 2.18 (or higher)

Installation:

- **Step 1:**
Install the Supplement Software **TwinCAT PLC HMI Web** on the host PC.
Once the required licence key has been entered and the licence agreement has been acknowledged, the Supplement Software is installed in subfolder `..\TwinCAT\CE` on your PC.

Example: Installation of TwinCAT PLC HMI Web

The installation of the software on the host PC generates a folder "`..\TwinCAT\CE\TwinCAT PLC HMI Web`" containing the CE*.cab installation files

Example:

X86: `TwinCAT_PLC_HMI_Web_CE.I586.CAB`

ARM: `TwinCAT_PLC_HMI_Web_CE.ARM.CAB`

- **Step 2:**
Transfer of the CE Cab installation files to the CE device (via memory stick/FTP/Public folder/CF adapter...)

While the CE device is running, double-click on the Cab file and confirm with "OK".
After the installation the Cab file will destroy itself.

Reboot the device once via "Start -> Suspend" (no power cycle !) to save all data on the flash or the CF card.

The device is now configured for TwinCAT PLC HMI Web.

4.2 Windows 7 Runtime: Installation and configuration

Requirement:

- On the host PC: Editor: TwinCAT 2.10 Build 1326 or higher

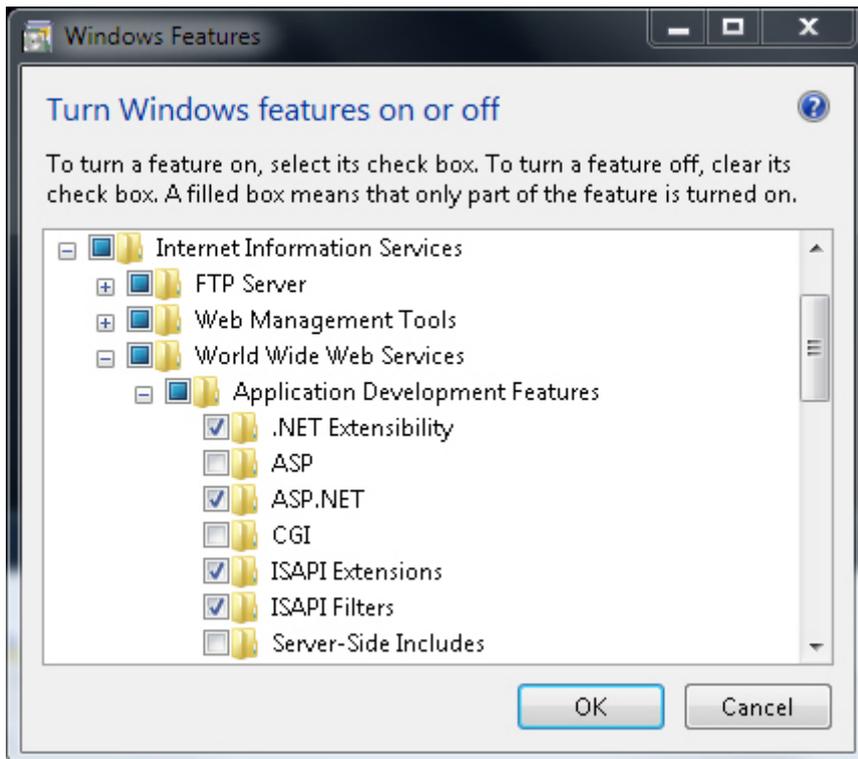
Installation:

TwinCAT PLC HMI Web is available as supplement and can be installed via Setup. A licence is required. A limited demo version is not available.

The installation consists of three steps:

1: Installation of the Internet Information Server IIS

- The Internet Information Server (IIS) is not installed as standard in Windows 7. This function must be subsequently installed
- See <http://technet.microsoft.com/de-de/library/cc725762%28v=ws.10%29.aspx>
- Make sure that the ISAPI filter and extensions are also installed (see picture)

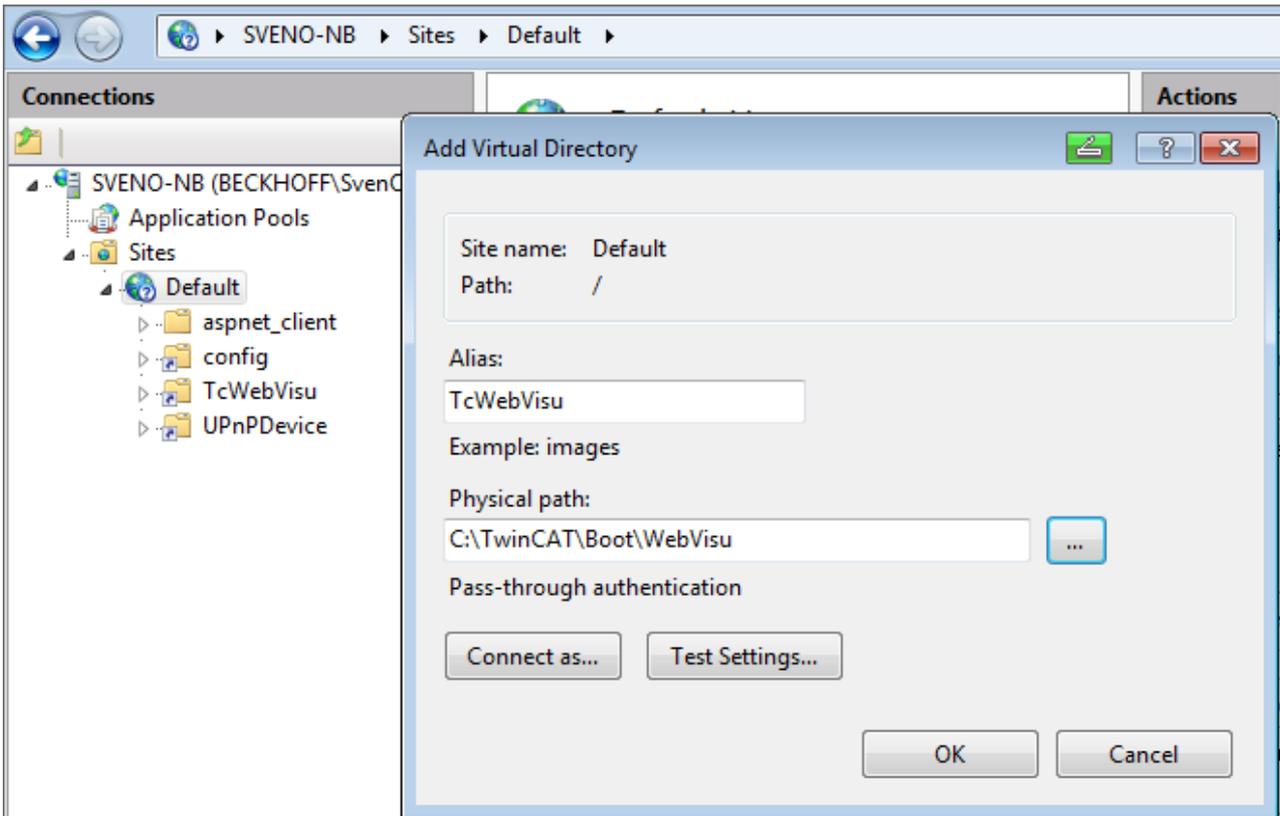


2: Installation of the supplement software on the host PC

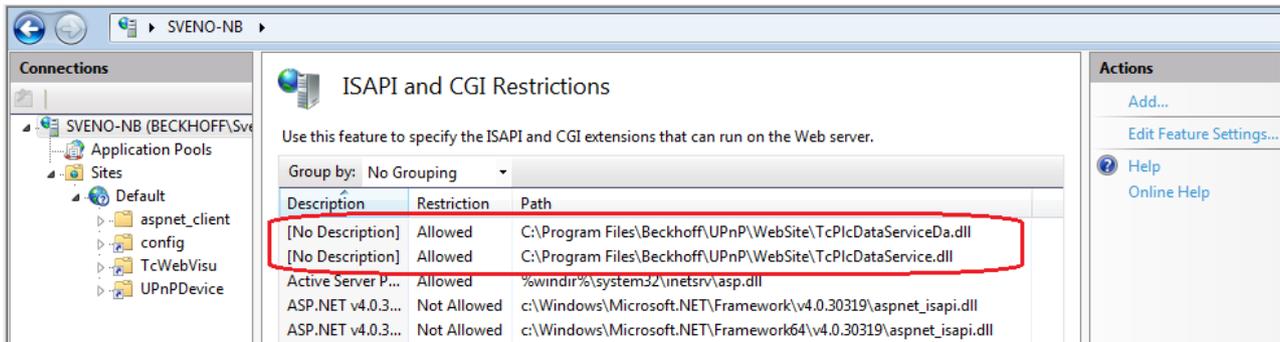
- The supplement software is installed on your PC with the Win 7 runtime by entering the required licence key and agreeing to the licensing conditions

3: Configuration of the Internet Information Server (IIS)

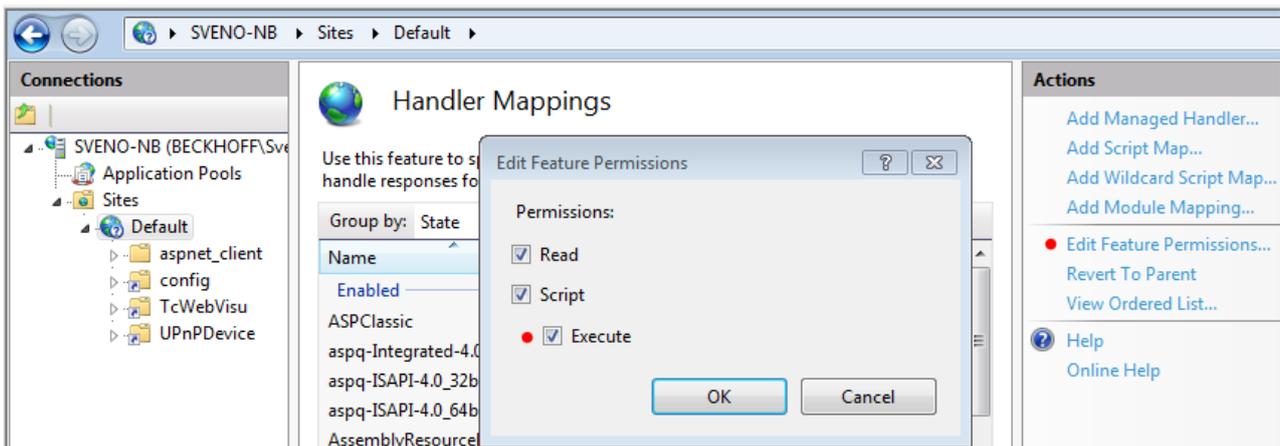
- Create a "virtual directory" with the name "UPnPDevice" with a link to the directory ".\Programs\Beckhoff\UPnP\WebSite"
- Create a "virtual directory" with the name "TcWebVisu" with a link to the directory ".\TwinCAT\Boot\WebVisu"



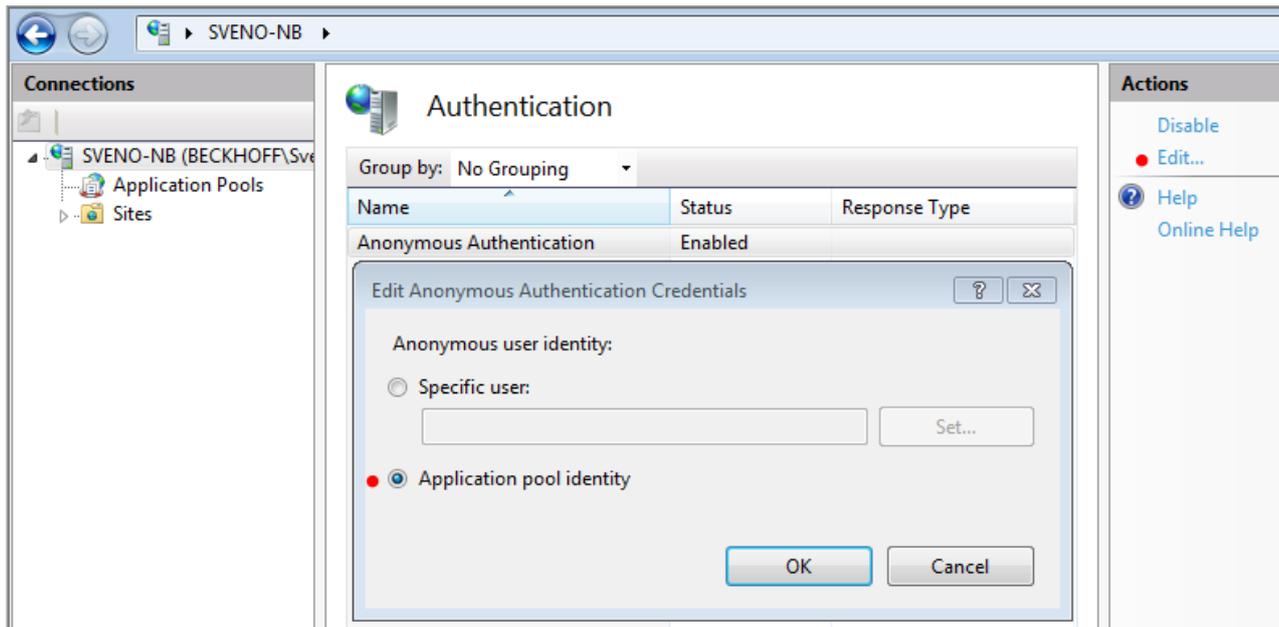
- Add the following DLLs under “**IIS/ISAPI and CGI Restrictions**” and permit their execution:
 - C:\Program Files\BeckhoffUPnP\WebSite\TcPlcDataServiceDa.dll
 - C:\Program Files\BeckhoffUPnP\WebSite\TcPlcDataService.dll



- Permit the action “**Execute**” under “**Handler Mappings**”



- Select “Applications pool identity” under “IIS \Authentication\Anonymous Authentication”.

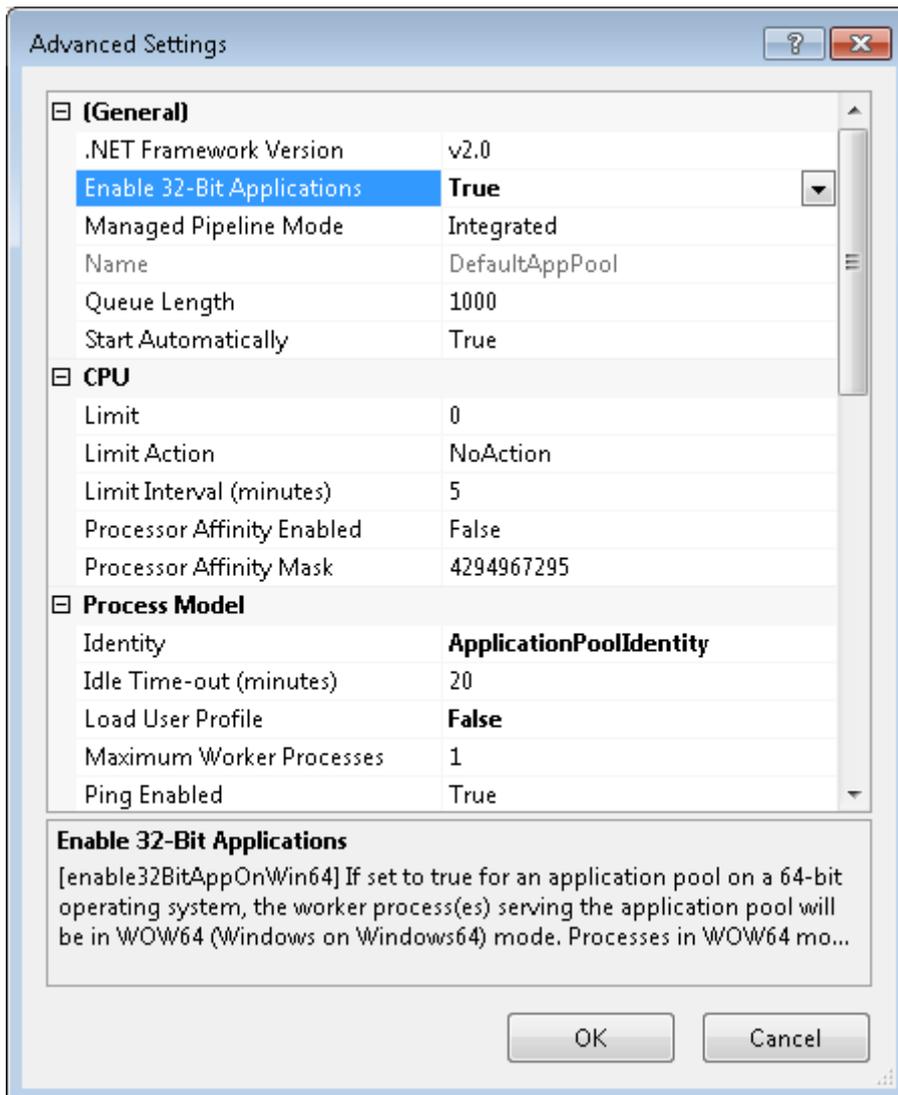


- Restart the IIS service
- The installation is now completed.

Windows 7 64 Bit Operation

If you use Windows 7 64-bit, you need to explicitly enable 32-bit ISAPI-DLLs in IIS. In this case, please perform the following steps:

- Open "Internet Information Service (IIS) Manager" which can be found under "Control Panel\Administrative Tools"
- Click on "Application Pools"
- Select the "DefaultAppPool" and click on "Advanced Settings..." from the Actions panel
- Set the entry "Enable 32-bit Applications" to "True", then click on "OK" to commit the changes



5 Configuration: Editor

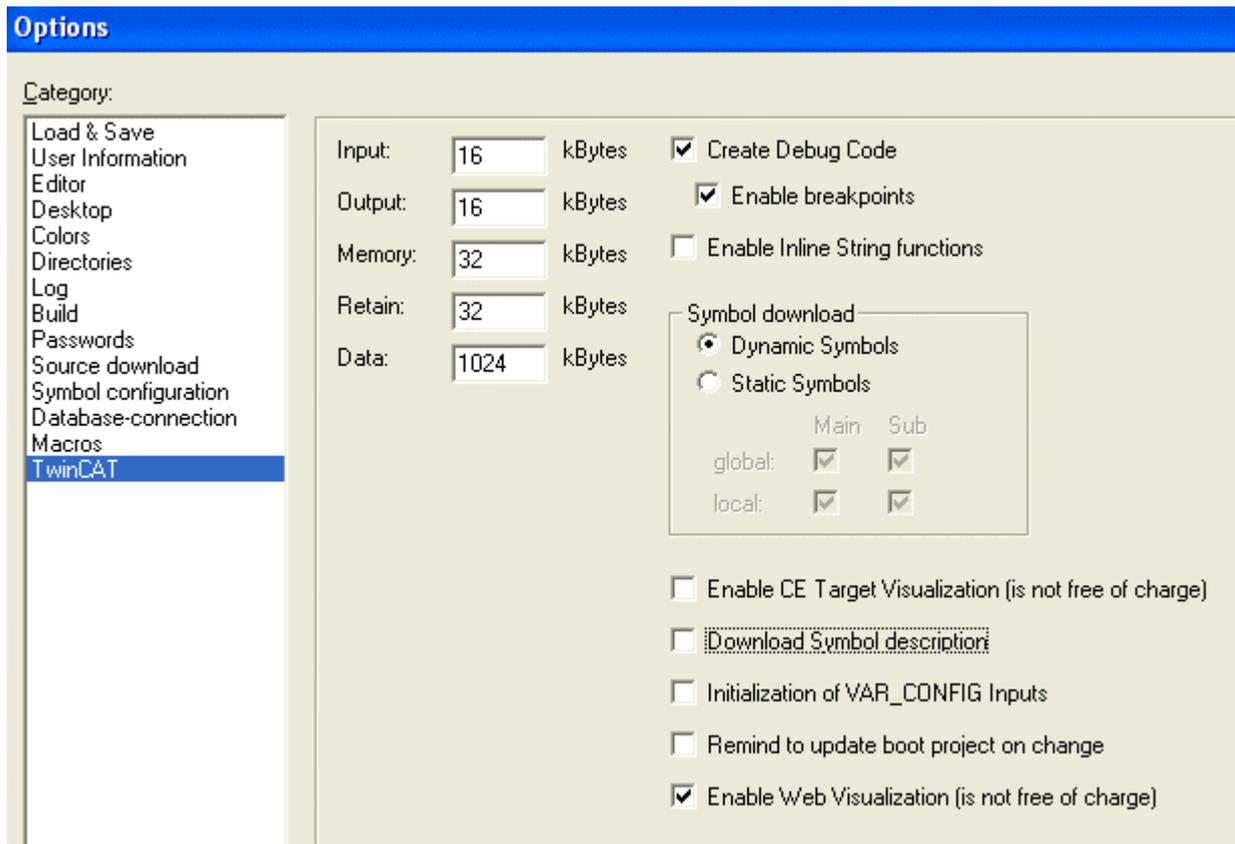
Requirement:

- On the host PC: Editor: TwinCAT 2.10 Build 1320 or higher (for creating a web solution for CE)
- On the host PC: Editor: TwinCAT 2.10 Build 1326 or higher (for creating a web solution for XP)

Configuration:

Once the **Runtime for TwinCAT PLC HMI Web** visualisation has been installed on the target system, the web option has to be selected once in the IEC1131 editor **TwinCAT PLC Control** in the PLC project:

Select "Enable Web Visualization" in PLC Control dialog "Project:"-->"Options..."-->"TwinCAT".



With the next download of the PLC project to the target system, the files required for the web-based visualisation are loaded into the target system and stored in folder **.\TwinCAT\Boot\WebVisu.**

With the transition of the PLC to "Run" mode, the web-based visualisation is now available for clients (browser).



Selection of "Download Symbol description" is not required for the application of TwinCAT PC HMI Web.

6 Samples: Website call

Requirements

A client (browser) requires a Java VM to display the web-based visualization TwinCAT PLC HMI Web (for Java VM versions see our information below).

- For PC-based systems this is available free of charge from several providers, e.g. <https://www.oracle.com/java/technologies/downloads/>
- For CE-based systems no free Java-VM is available

Start

The client calls up the website with this URL (irrespective of the name under which the VISU page was created in TwinCAT PLC Control.)

http://<ip-or-hostname-of-device>/TcWebVisu/Index.htm

or

http://<ip-or-hostname-of-device>/TcWebVisu/

Examples:

http://192.16.18.213/TcWebVisu/Index.htm

http://192.16.18.213/TcWebVisu/

http://CX_012345/TcWebVisu/Index.htm

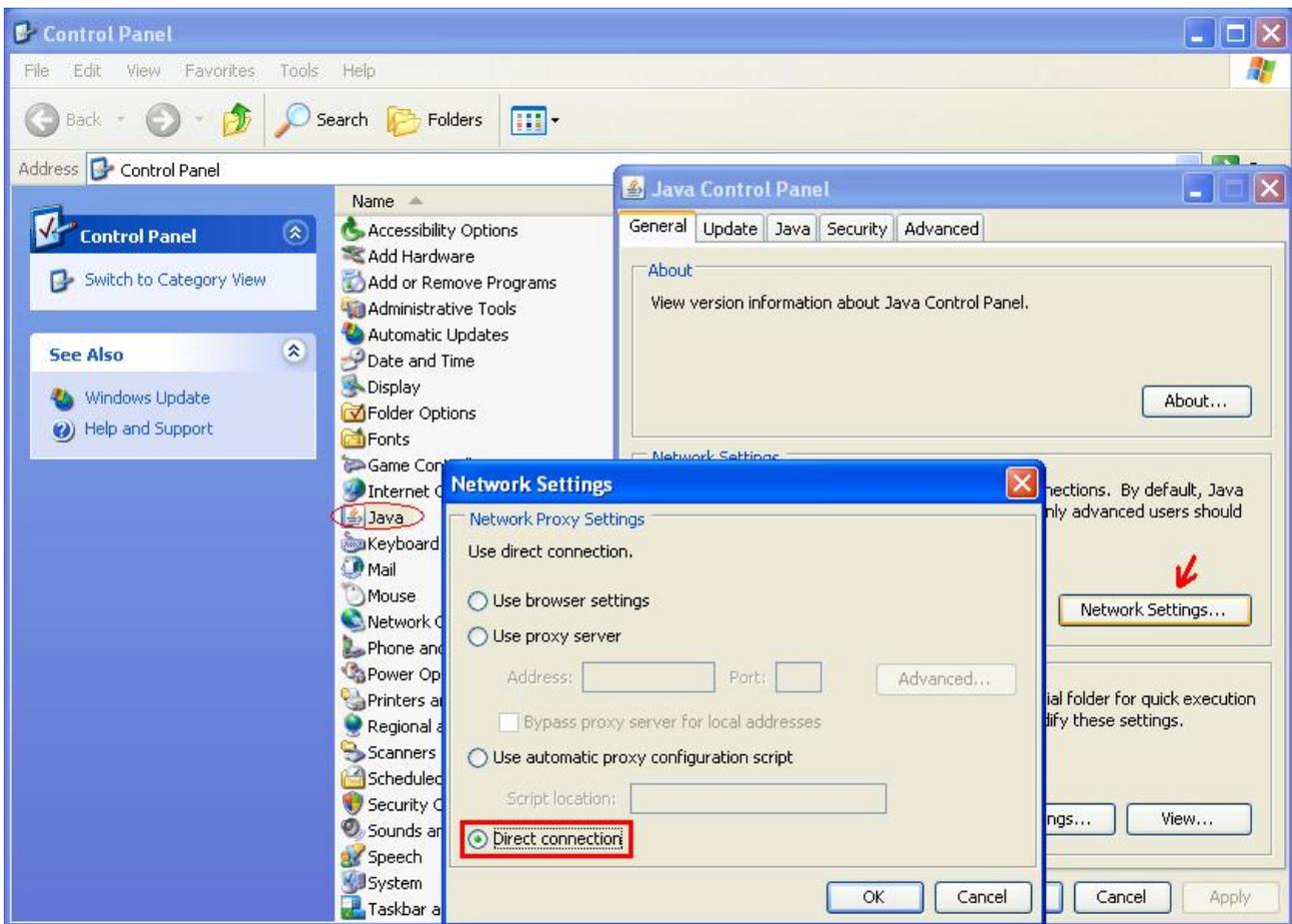
http://CX_012345/TcWebVisu/

If you want to make a project change while the browser is showing the old project you would possibly have to empty the cache of your browser to display the new pages. For Internet Explorer 8 it would be: Shift-button + side-refresh-button with the mouse. A new browser window or a normal refresh does not work here.

i In Windows XP-based systems, the IP address and the NetID of the host computer must be identical for successful communication. Example: If the IP address is 192.16.18.213, the NetID must be 192.16.18.213.1.1.

i Not operational: <http://localhost/TcWebVisu/>

i Since Java-VM version 1.6.0_14 you must carry out the following settings: In your Control Panel (Windows XP / XPe) you can find the entry "Java". If you select this entry, the "Java Control Panel" window opens. Now please select the button "Network Settings...". Here you must set the option "Direct connection".



Due to Java-related restrictions in the other browsers, Internet Explorer (currently version 11) is the only browser that supports the TwinCAT 2 PLC HMI Web.

7 Supported visualization elements

Text placeholders

TwinCAT PLC HMI Web Visualisation currently supports the following text placeholders:

Placeholder	Argument/Output
%d	Decimal number
%o	Octal number without sign (without leading zero)
%x	Hexadecimal number without sign (without leading 0X)
%s	String
%f	REAL values [-]m.<dddddd>, with the number of d determining the accuracy (default: 6). The plus or minus sign defines right (default) or left alignment, m defines the number of decimals.

Date and time data (%t)

TwinCAT PLC HMI Web Visualisation currently supports the following date and time data:

Placeholder	Format
%a	Day of the week, abbreviated, e.g. "Wed"
%A	Day of the week, full name, e.g. "Wednesday"
%b	Month name, abbreviated, e.g. "Feb"
%B	Month name, full name, e.g. "February"
%c	Date and time in format <month>/<day>/<year> <hours>:<minutes>:<seconds>, e.g. "08/28/02 16:58:45"
%d	Day of the month as a number (01-31), e.g. "24"
%H	Hour, 24 h format (01-24), e.g. "16"
%I	Hour, 12 h format (01-12), e.g. "05" for 5pm
%j	Day of the year (001 – 366), e.g. "241"
%m	Month (01 – 12), e.g. "3" for March
%M	Minutes (00 – 59), e.g. "13"
%p	AM (hours <12) or PM (>12) indicator for 12 h format.
%S	Seconds (00 – 59)
%U	Week number, with Sunday used as the first day of the week (00 – 53)
%W	Week number, with Monday used as the first day of the week (00 – 53)
%x	Date in format <month>/<day>/<year>, e.g. "08/28/02"
%X	Time in format <hours>:<minutes>:<seconds>, e.g. "16:58:45"
%y	Year, two-digit format (00 – 99), e.g. "02"
%Y	Year, full format, e.g. "2002"
%z, %Z	Time zone (if known), e.g. "Western European Daylight Time"
%%	Percent sign

General

Moving of elements in the Web Visualisation is supported.

NOTE

Spaces between the "%" sign and the symbol prevent the value being read by the Web Visualization!

NOTE

Scrolling is currently not available in the Web Visualization. The Web Visualization design should therefore consider the intended window size.

Limitations and special features

Input

The Web Visualization currently *only* supports text input if 'Text' is selected as text entry in the variable 'Text Output'.

Alarm tables

The Web Visualization does currently *not* support alarm tables.

Trend function

The Web Visualization does currently *not* support the trend function.

Histogram

The Web Visualization does currently *not* support histograms.

Internal commands (see section on special input options)

- `PRINT` - this command for printing the current visualization is *not* supported for the Web Visualization.
- Execute external program - The command for executing an external program is *not* supported for the Web Visualization.
- `LANGUAGE DIALOG` - The command for calling up the configuration dialog for a visualization containing the language category is *not* supported for the Web Visualization.
- `EXIT PROGRAM` - The command to exit the program is *not* supported for the Web Visualization, although `INTERN LINK` is available for this purpose.
- `TRACE` - The command for opening a trace recording window is *not* supported for the Web Visualization.
- `SAVE PROJECT` - The command for saving the project is *not* supported for the Web Visualization.

Variable access

- Dynamic indexing within an array - "`Array1[Index].a`" is *not* possible, although "`Array1[10].a`" is possible.
- Placeholder substitutions - Placeholder substitutions are currently *not* possible within the Web Visualization.
- Pointer - Pointer variables such as `MAIN.pdw2^` *cannot* be displayed.

Miscellaneous

- Transparent bitmaps - Transparent bitmaps are *not* yet supported.
- Alarm handling - Alarm handling is *not* supported for the Web Visualization.
- IEC operators - The following IEC operators are currently *not* supported by the Web Visualization:
 - Arithmetic operators: `MOVE`, `INDEXOF`, `SIZEOF`
 - Bit string operators: `XOR`
 - Bit shift operators: `SHL`, `SHR`, `ROL`, `ROR`
 - Selection operators: `LIMIT`, `MUX`
 - Comparison operators: `EQ`, `NE`
 - All address operators
 - All call operators
 - All conversion operators
 - Numeric operators: `SQRT`, `LN`, `LOG`, `EXP`, `ASIN`, `ACOS`, `ATAN`, `EXPT`

More Information:
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