

# BECKHOFF New Automation Technology

Manual | EN

# TF1800

TwinCAT 3 | PLC HMI

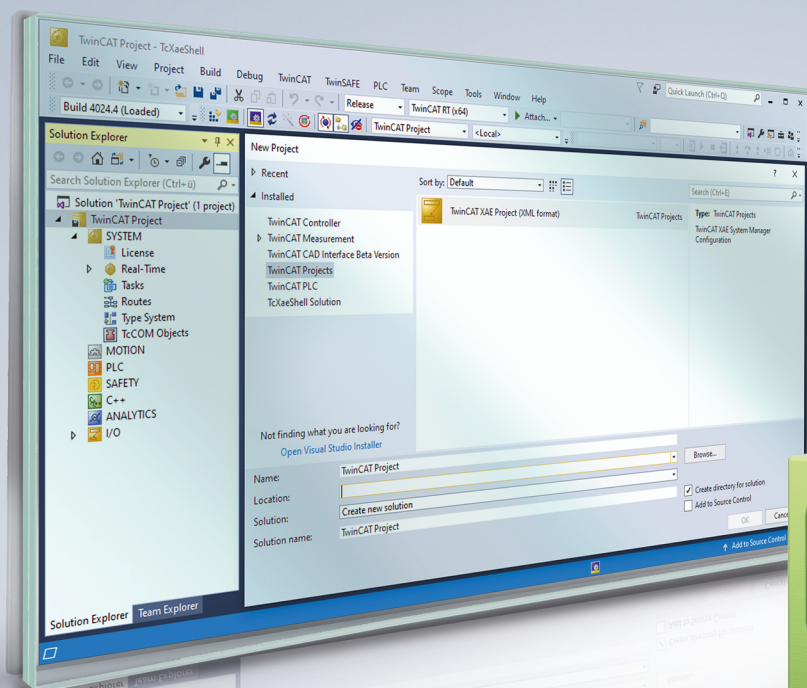








Table of contents

1 Foreword..... 5

1.1 Notes on the documentation ..... 5

1.2 For your safety ..... 5

1.3 Notes on information security..... 7

2 PLC HMI..... 8

3 Support and Service ..... 13







# 1 Foreword

## 1.1 Notes on the documentation

This description is intended exclusively for trained specialists in control and automation technology who are familiar with the applicable national standards.

For installation and commissioning of the components, it is absolutely necessary to observe the documentation and the following notes and explanations.

The qualified personnel is obliged to always use the currently valid documentation.

The responsible staff must ensure that the application or use of the products described satisfies all 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 notice.

No claims to modify products that have already been supplied may be made on the basis of the data, diagrams, and descriptions in this documentation.

### Trademarks

Beckhoff®, TwinCAT®, TwinCAT/BSD®, TC/BSD®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, Safety over EtherCAT®, TwinSAFE®, XFC®, XTS® and XPlanar® are registered and licensed trademarks of Beckhoff Automation GmbH.

If third parties make use of designations or trademarks used in this publication for their own purposes, this could infringe upon the rights of the owners of the said designations.

### Patents

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents:

EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702  
and similar applications and registrations in several other countries.



EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

### Copyright

© Beckhoff Automation GmbH & Co. KG, Germany.

The distribution and reproduction of this document as well as the use and communication of its contents without express authorization are prohibited.

Offenders will be held liable for the payment of damages. All rights reserved in the event that a patent, utility model, or design are registered.

## 1.2 For your safety

### Safety regulations

Read the following explanations for your safety.

Always observe and follow product-specific safety instructions, which you may find at the appropriate places in this document.



## Exclusion of liability

All the components are supplied in particular hardware and software configurations which are 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 technology who are familiar with the applicable national standards.

## Signal words

The signal words used in the documentation are classified below. In order to prevent injury and damage to persons and property, read and follow the safety and warning notices.

### Personal injury warnings

#### **DANGER**

Hazard with high risk of death or serious injury.

#### **WARNING**

Hazard with medium risk of death or serious injury.

#### **CAUTION**

There is a low-risk hazard that could result in medium or minor injury.

### Warning of damage to property or environment

#### **NOTICE**

The environment, equipment, or data may be damaged.

### Information on handling the product



This information includes, for example:  
recommendations for action, assistance or further information on the product.



## **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 PLC HMI


The PLC HMI is an extension of the runtime system and enables the visualization to be executed on the control computer or a third computer without a development environment. The visualization code is created based on the existing visualization objects and downloaded to the control computer. Avoiding the use of the development environment results in significant memory savings. This can be useful for small computers.

The following topics are described below:

- [Commissioning the PLC HMI \[► 8\]](#)
- [Remote operation of a PLC HMI Client \[► 10\]](#)
- [Editor of the TargetVisualization object \[► 11\]](#)

### Commissioning the PLC HMI

#### Step 1: Enable the PLC HMI

The object "TargetVisualization" (  ) enables the PLC HMI. It can be added to the object "Visualization Manager" in the PLC project tree via the context menu command **Add > TargetVisualization** (see also PLC documentation: Creating a visualization > [Visualization object](#)).

With the TargetVisualization object a visualization task "VISU\_TASK" is created in the Solution and a reference to this task in the PLC project. The reference is used to call the visualization code. Therefore, you have to reactivate the configuration after adding the object.

#### ● Deleting a TargetVisualization object

**i** If you delete a TargetVisualization object and have not added an additional WebVisualization object, you have to delete the task "VISU\_TASK" under **System > Tasks** in the TwinCAT project tree. This task is not required in the integrated visualization. (See also [Editor of the object WebVisualization](#) and [Integrated visualization](#))

#### Step 2: Configure the PLC HMI Client

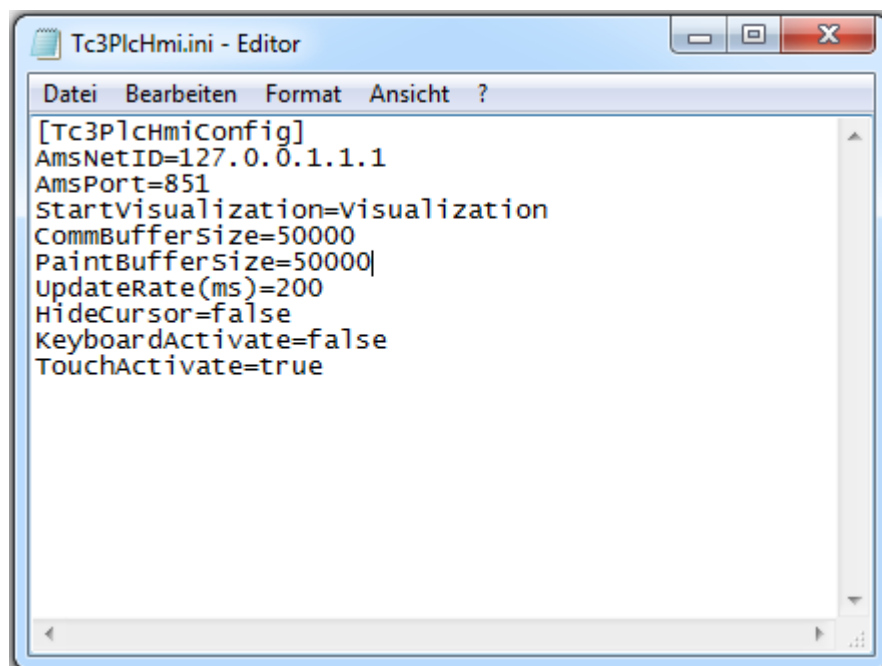
**i** Step 2 is only necessary if you are using a Build <4022.0 or if you want to start a PLC HMI Client with a remote connection to the runtime device. From Build 4022.0 or higher, the .ini file is automatically generated and updated in the folder *C:\TwinCAT\3.1\Boot\Plc*. From Build 4026.0 or higher, the .ini file is automatically generated and updated in the folder *C:\ProgramData\Beckhoff\TwinCAT\3.1\Boot\Plc*.

In order to establish the connection between the client and the device on which the corresponding visualization code is executed, you must adapt the Tc3PlcHmi.ini file.

The .ini file is available for Builds <4022.0 in the folder *C:\TwinCAT\3.1\Components\Plc\Tc3PlcHmi*, for Builds >=4022.0 in the folder *C:\TwinCAT\3.1\Boot\Plc* and for Builds >=4026.0 in the folder *C:\ProgramData\Beckhoff\TwinCAT\3.1\Boot\Plc\Tc3PlcHmi*.

Example of a .ini file:





AMSNETID	AmsNetID of the device, on which the visualization code is executed. Preset: 127.0.0.1.1.1
AmsPort	AmsPort of PLC project, to which the visualization belongs. Preset: 851
StartVisualization	Name of the visualization object to be opened as start page. Preset: Visualization
CommBufferSize	Memory size in bytes that the visualization allocates for this PLC HMI Client and uses for the communication. Preset: 50000
PaintBufferSize	Memory size in bytes that the visualization allocates for this PLC HMI Client and uses for the drawing actions. Preset: 50000
UpdateRate(ms)	Update rate in milliseconds, at which the client data are queried again. Preset: 200
HideCursor	Setting through which the cursor can be hidden. Preset: false
KeyboardActivate	Setting through which input via a hardware keyboard is enabled. A software keyboard is used automatically if this setting is disabled. Preset: false
TouchActivate	Setting through which touch-based input is enabled. Preset: true

### Step 3: Set PLC HMI as startup application



Step 3 is only necessary if you are using a Build <4024.0 or if you want to start a PLC HMI Client with a remote connection to the runtime device. From Build 4024 or higher, the PLC HMI Client is automatically started locally on the runtime device.

If PLC HMI is to start automatically when the computer is booted with the boot project, there must be a link to the Tc3PlcHmi.exe application in the *StartUp* folder.

Execute the following steps to do this:

1. Open the directory *C:\TwinCAT\3.1\Target\StartUp*.
2. Add a new link via the context menu command **New**.



3. Enter `C:\TwinCAT\3.1\Components\Plc\Tc3PlcHmi\Tc3PlcHmi.exe` as storage location.
4. Confirm this dialog and the following dialog.

Execute the following steps for Beckhoff CE devices:

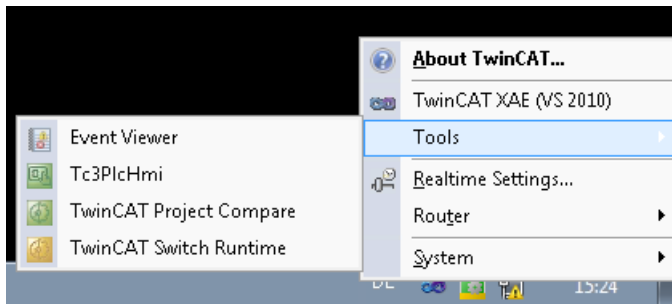
1. Start the Beckhoff Startup Manager under **Start > StartMan**.
2. Add a new item via the **New** button.
3. Give the item the name "Tc3PlcHmi" and select the type "ShellCommand".
4. Confirm the dialog.
5. Under the **Startup Options**, select "Autostart" and enter a time under **Delay** in order to open the client only when the PLC project has already been started.
6. Switch to the **Shell Command** tab.
7. In the field **Enter Shell command**, enter  
`"\\Hard Disk\\TwinCAT\\3.1\\Components\\Plc\\Tc3PlcHmi\\X.exe"`. Replace the "X" with the name of the Client Exe that is stored under the specified path. This may differ between ARM and ATOM devices, for example.
8. Confirm the dialog.

#### Step 4: Start the PLC HMI Client



Step 4 is only necessary if you are using a Build <4024.0 or if you want to start a PLC HMI Client with a remote connection to the runtime device. From build 4024 or higher, the PLC HMI Client is automatically started locally on the runtime device.

A PLC HMI Client is started with the aid of the Tc3PlcHmi.exe application. This is located in the directory `C:\TwinCAT\3.1\Components\Plc\Tc3PlcHmi`, but can also be linked to any desired location. If you create a link in the directory `C:\TwinCAT\3.1\Target\StartMenuAdmin\Tools` you can start the application via the TwinCAT icon in the context menu under **Tools**.



If the development PC is connected, the visualization can also be displayed in the development environment. However, it is not equivalent to an integrated visualization, but is also based on a PLC HMI Client.

For Beckhoff CE devices you have to activate a setting in the visualization manager before starting the client; this setting enables all image files in the svg format to be automatically converted to the bmp format. This step is required, because under CE only image files in bmp format are supported in the PLC HMI Client. Both image file formats are nevertheless loaded on the target system, since a PLC HMI Web Client continues to use the svg format. The PLC HMI Client for CE can be found in directory `\\Hard Disk\\TwinCAT\\3.1\\Components\\Plc\\Tc3PlcHmi`.

#### See also:

- PLC documentation: Creating a visualization > Visualization Manager > [Settings](#)
- PLC documentation: Creating a visualization > Visualization variants > [Integrated visualization](#)
- Documentation [TC3 PLC HMI Web](#)

#### Remote operation of a PLC HMI Client


A PLC HMI Client can also be operated remotely on a third computer, which is neither the development computer nor the control computer. To do this, the following requirements must be met:

- A TwinCAT 3 Build 4018.0 ADS or later is installed on the system.

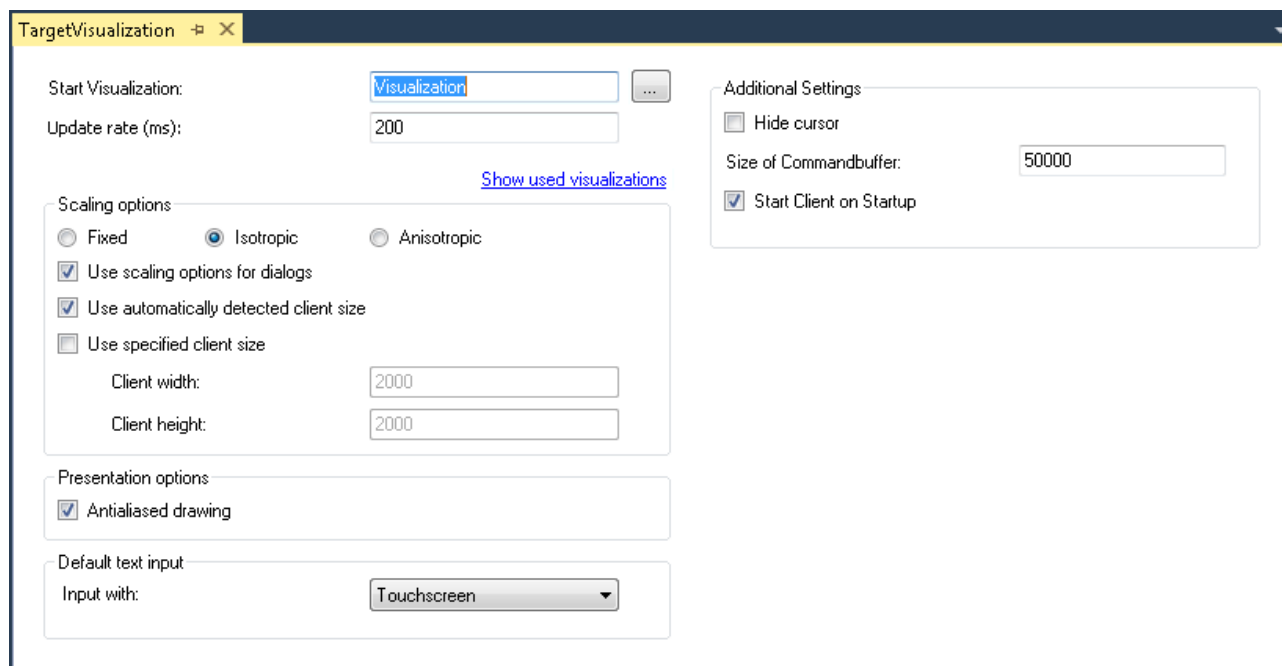


- ADS communication is established with the control computer on which the visualization code is executed (**TwinCAT Icon > Router > Edit Routes > Add...**).
- The Tc3PlcHmi folder has been copied from the development or control computer to the third system. The path for the folder must be added manually.
- The Tc3PlcHmi.ini file was adjusted on the system, on which the client is to run.

## Editor of the TargetVisualization object

The "TargetVisualization" object (  ), which you can add in the PLC project tree below the "Visualization Manager" object, enables the PLC HMI and contains its settings. Double-click on the object in order to edit the settings in an editor window.

**i** The settings in the object "TargetVisualization" are adopted automatically into the .ini file from build 4022.0 onwards. If you wish to use an older build or start a PLC HMI Client with a remote connection to the runtime device, you have to make the changes to the settings in the .ini file manually.



Start visualization	Name of the visualization object that is to be opened as the first page when starting the PLC HMI. A visualization object is already entered here by default. The input assistant can be used to select a different visualization object. If the PLC project contains only one visualization object, this is automatically used as start visualization.
Update rate (ms)	The update rate in milliseconds, with which the data in the PLC HMI is updated.
Show used Visualizations	Button for opening the standard dialog of the Visualization Manager: Here you can select the visualizations that are to be used for the PLC HMI. (See also PLC documentation: Creating a visualization > Visualization Manager > Visualizations)

## Scaling options



Fixed	The size of the visualization is retained, irrespective of the screen size.
Isotropic	The size of the visualization depends on the size of the screen. The visualization retains its proportions.
Anisotropic	The size of the visualization depends on the size of the screen. The visualization does not retain its proportions.
Using scaling options for dialogs	The dialogs, also keypad and numpad, are scaled with the same scaling factor as the visualization. This is advantageous if a dialog was created to match the visualization.
Use automatically determined client size	The PLC HMI fills the client screen.
Use specified client size	The PLC HMI fills the screen area determined by the following dimensions. <ul style="list-style-type: none"> <li>• Client height: height in pixels</li> <li>• Client width: width in pixels</li> </ul>

### Presentation options

Characters with antialiasing	Activate this option, if antialiasing is to be used when the visualizations are drawn in the visualization editor window of the programming system. (Offline or online)
------------------------------	---

### Standard text input

This setting is only then active if the input type "Standard" is selected in the input configuration of the visualization element. In this case, the default text entries defined in the Visualization Manager are used.

Touchscreen	Select this option if the target device is operated with a touch screen by default.
Keyboard	Select this option if the target device is operated with a keyboard by default.

### Advanced Settings

Hide mouse pointer	Setting through which the cursor can be hidden.
Size of the command buffer	Memory size in bytes that the visualization allocates for this PLC HMI Client and uses for the communication.
Start client on startup	The PLC HMI client is automatically started locally on the runtime system.



### 3 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

#### Download finder

Our download finder contains all the files that we offer you for downloading. You will find application reports, technical documentation, technical drawings, configuration files and much more.

The downloads are available in various formats.

#### Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on our internet page: [www.beckhoff.com](http://www.beckhoff.com)

You will also find further documentation for Beckhoff components there.

#### Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

Hotline: +49 5246 963-157  
e-mail: [support@beckhoff.com](mailto:support@beckhoff.com)

#### Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

Hotline: +49 5246 963-460  
e-mail: [service@beckhoff.com](mailto:service@beckhoff.com)

#### Beckhoff Headquarters

Beckhoff Automation GmbH & Co. KG

Huelshorstweg 20  
33415 Verl  
Germany

Phone: +49 5246 963-0  
e-mail: [info@beckhoff.com](mailto:info@beckhoff.com)  
web: [www.beckhoff.com](http://www.beckhoff.com)







More Information:  
**[www.beckhoff.com/tf1800](http://www.beckhoff.com/tf1800)**

Beckhoff Automation GmbH & Co. KG  
Hülshorstweg 20  
33415 Verl  
Germany  
Phone: +49 5246 9630  
[info@beckhoff.com](mailto:info@beckhoff.com)  
[www.beckhoff.com](http://www.beckhoff.com)

