Manual

TC3 PLC HMI

TwinCAT 3

BECKHOFF

Table of contents

BECKHOFF

Version: 1.2 TC3 PLC HMI

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 the 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.

Trademarks

Beckhoff®, TwinCAT®, EtherCAT®, Safety over EtherCAT®, TwinSAFE®, XFC® and XTS® are registered trademarks of and licensed by Beckhoff Automation GmbH.

Other designations used in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owners.

Patent Pending

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

EP1590927, EP1789857, DE102004044764, DE102007017835

with corresponding applications or registrations in various other countries.

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

EP0851348, US6167425 with corresponding applications or registrations in various other countries.

EtherCAT.

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

Copyright

© Beckhoff Automation GmbH & Co. KG, Germany.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited.

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

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.
Attention	**Damage to the environment or devices** Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.
Note	**Tip or pointer** This symbol indicates information that contributes to better understanding.

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

Step 1: Enable the PLC HMI

The object "TargetVisualization" ( ) enables the PLC HMI. You add it to the "Visualization Manager" object 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.

i **Note**	**Deleting a TargetVisualization object** 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 Twin-CAT project tree. This task is not required in the integrated visualization. (See also Editor of the WebVisualization object and Integrated visualization)

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

i **Note**	Step 2 is necessary only if you are using a build older than 4022.0 or if you wish to start a PLC HMI Client with a remote connection to the runtime device.

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 located in the folder *C:\TwinCAT\3.1\Components\Plc\Tc3PlcHmi* for builds older than 4022.0 and in the folder *C:\TwinCAT\3.1\Boot\Plc* for build 4022.0 and newer.

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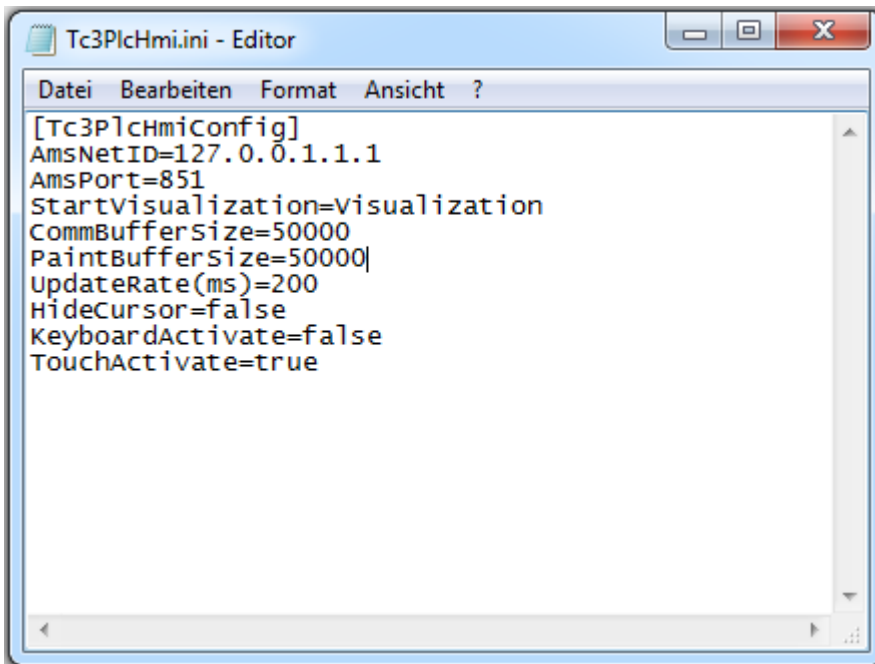
AmsNetID	AmsNetID of the device, on which the visualization code is executed.
	Default: 127.0.0.1.1.1
AmsPort	AmsPort of PLC project, to which the visualization belongs.
	Default: 851
StartVisualization	Name of the visualization object to be opened as start page.
	Default: Visualization
CommBufferSize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

Step 3: Set PLC HMI to be the startup application

If PLC HMI is to start automatically when the computer is booted up, 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 next to **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

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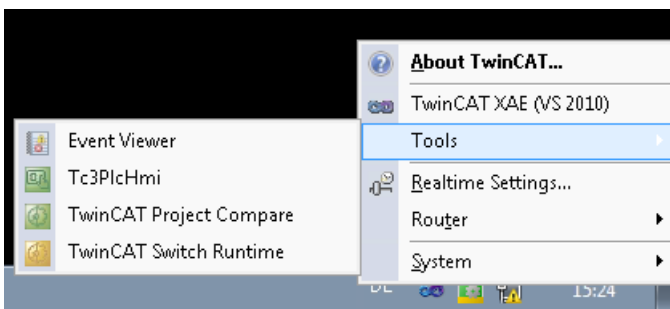
If the development PC is connected, the visualization can also be displayed in the development environment. However, it is not equivalent to an integrated visualization, but is also based on a PLC HMI Client.

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
• TC3 PLC HMI Web documentation
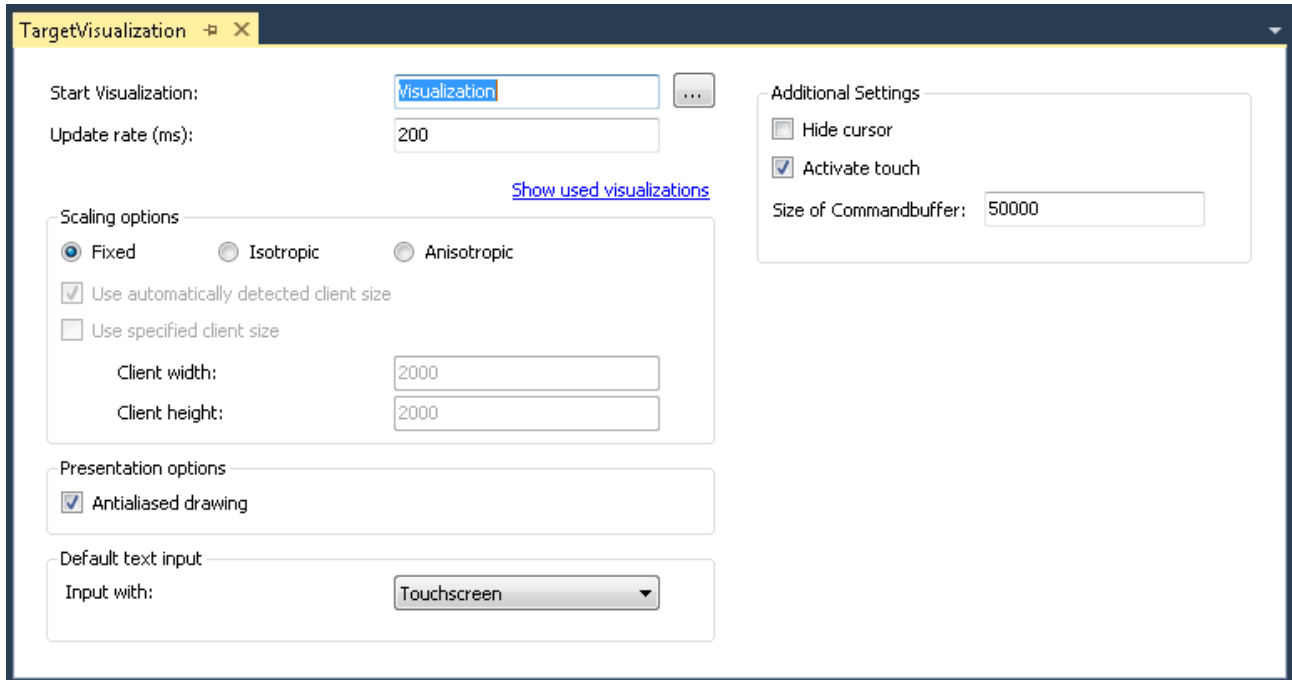
Remote operation of a PLC HMI Client

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 **Note**	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.
Use automatically detected 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. • Client height: height in pixels • Client width: width in pixels

Presentation options

| Antialiased drawing | 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) |

Default 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. |

Additional settings

Hide cursor	Setting through which the cursor can be hidden.
Activate touch	Setting through which touch-based input is enabled.
Size of Commandbuffer	Memory size in bytes that the visualization allocates for this PLC HMI Client and uses for the communication.