

BECKHOFF New Automation Technology

Manual | EN

TwinCAT 3

Machine update at file level

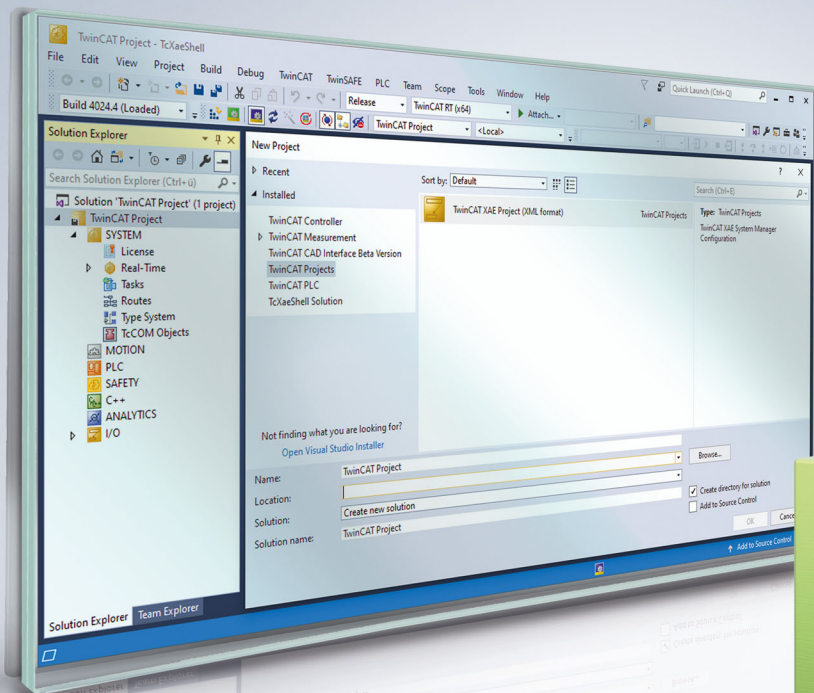


Table of contents

1 Foreword	5
1.1 Notes on the documentation	5
1.2 Safety instructions	6
1.3 Notes on information security.....	7
2 Overview	8
3 Performing a PLC update	9
4 Performing a C++ Update	10
5 Performing an update of the complete machine	11
6 Cloning a machine	12

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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Patent Pending

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

EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702
with corresponding applications or registrations in various other countries.



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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

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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

If no TwinCAT 3 development environment (XAE) is available, you can update the boot data of a TwinCAT PLC system or a complete TwinCAT system by means of a file copy.

- [Performing a PLC update \[► 9\]](#)
- [Performing a C++ update \[► 10\]](#)
- [Performing an update of the complete machine \[► 11\]](#)
- [Cloning a machine \[► 12\]](#)

A description of the various files as well as information on their storage location within the associated project (project directory) and on the machine (TwinCAT boot directory) can be found in the section [Folder and file types](#).

3 Performing a PLC update

- ✓ TwinCAT version TC3.1.4022.0 or higher
 - ✓ Boot data have been generated for the machine platform by creating (or recreating) the PLC project. A connection to the target system is not required when creating (or recreating) the project.
 - ✓ The process image and the hardware configuration have not changed since the last update.
 - ✓ The **Symbolic Mapping** option is activated in the PLC project settings.
1. Copy the boot data of the PLC project, i.e. all files and folders, from the folder `..\<Solution name>\<Project name>_Boot\<Platform>\Plc\`.
 2. Replace the boot data in the machine's TwinCAT PLC boot directory `C:\TwinCAT\3.1\Boot\Plc\` by the copied boot data.
 3. Restart the machine's TwinCAT system.
- ⇒ The boot data of the TwinCAT PLC system and thus the PLC runtime itself are updated.

● Source code update

i If you also store the source code of the PLC project on the runtime system in addition to the boot data, then you can also copy the archive folder from the folder `..\<Solution name>\<Project name>_Boot\<Platform>\CurrentConfig\` to the folder `C:\TwinCAT\3.1\Boot\CurrentConfig\` on the runtime system during an update at file level.

4 Performing a C++ Update

The runtime data can be transferred from one machine to another by means of a file copy if both originate from the same platform and are connected with equivalent hardware equipment.

The following steps describe a simple procedure to transfer a binary configuration from one machine, "source", to another, "destination".

- ✓ Empty the folder `C:\TwinCAT\3.x\Boot` on the source machine.
- 1. Create (or enable) the module on the source machine.
- 2. Transfer the folder `C:\TwinCAT\3.x\Boot` from the source to the destination.
This folder also contains the repository which contains the necessary TMX files.
- 3. For TwinCAT driver projects (.sys): transfer the driver itself from `C:\TwinCAT\3.x\Driver\AutoInstall\MYDRIVER.sys` and if necessary also the PDB file.
- 4. For TwinCAT driver projects (.sys) and if drivers are new on a machine:
TwinCAT must perform a registration once. Switch TwinCAT via SysTray (right-click->**System**->**Start/Restart**) into RUN mode.
Alternatively this call can be used ("%1" can be replaced as driver name):

```
sc create %1 binPath= c:\TwinCAT\3.1\Driver\AutoInstall\%1.sys type= kernel  
start= auto group= "file system" DisplayName= %1 error= normal
```

⇒ You can now start the target machine.

● Handling licenses



Note that licenses cannot be transferred in this manner. Please use pre-installed licenses, volume licenses or other mechanisms for providing licenses.

5 Performing an update of the complete machine

- ✓ Boot data have been generated for the machine platform by creating (or recreating) the TwinCAT project. A connection to the target system is not required when creating (or recreating) the project.
 - ✓ The real hardware configuration corresponds to the project configuration.
 - ✓ If the machine update is to be performed on several machines and not on a specific machine, the following options are activated:
 - Use Relative NetIds** in the Routes settings (System > Routes, NetIdManagement tab) and
 - Virtual Device Names** in the Adapter settings of all network and USB devices (e.g. I/O > Devices > EtherCAT Master, Adapter tab)The network adapter names of the machine must correspond to the adapter name of the configuration.
1. Copy the boot data of the TwinCAT project, i.e. all files and folders, from the folder `..\<Solution name>\<Project name>_Boot\<Platform>\`.
 2. Replace the boot data in the machine's TwinCAT boot directory `C:\TwinCAT\3.1\Boot\` by the copied boot data.
 3. If you use C++ modules, please copy the C++ drivers (described in chapter [Performing a C++ update \[► 10\]](#)).
 4. Restart the machine's TwinCAT system.
- ⇒ The boot data of the TwinCAT system and thus the TwinCAT system itself are updated.

6 Cloning a machine

In order to transfer the boot data of a TwinCAT or PLC project from one machine to another, copy the boot data from the first machine's boot directory and replace the boot data in the boot directory of the other machine.

If the TwinCAT system whose boot data are to be copied is in Run mode and persistent data are also to be exchanged, the TwinCAT system should first be switched from Run to Config mode so that the persistent data are saved in the file `.bootdata` and are available in the boot directory for copying. (See `Port_xxx.bootdata`)

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