

TwinCAT 3 Engineering



Manual

Folder and file types

TwinCAT 3

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BECKHOFF

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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 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.

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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.

2 TwinCAT PLC project files

2.1 Port_xxx.app

Binary file of the PLC project

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.2 Port_xxx.autostart

Empty file that activates the Autostart option

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate Autostart option (project-independent system setting)
Requirement	-	-

2.3 Port_xxx.cid

File containing the Compileinfo_IDs

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.4 Port_xxx.crc

File containing the checksum of the PLC project

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.5 Port_xxx.occ

Symbolics of the PLC project

- The file contains the changes of the symbolics of the PLC project for an online change.
- If the **Symbolic Mapping** option is not activated, this file also contains the changes of the mapping configuration for an activate/update boot project.
- On activating the configuration the occ file is reset in both directories.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.6 Port_xxx.ocm

Description file of the mapping configuration

- If the **Symbolic Mapping** option is activated, this file contains the changes of the mapping configuration of the PLC project for an activate/update boot project.
- On activating the configuration the ocm file is reset in both directories.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a TwinCAT project • Recreating a TwinCAT project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.7 Port_xxx_boot.tizip

Archive folder containing the COMPILEINFO file of the boot project

The COMPILEINFO file contains the compilation information and the login information of the PLC project.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.8 Port_xxx_act.tizip

Archive folder containing the COMPILERINFO file of the currently running PLC project

Storage location

	Project Directory	TwinCAT boot directory
Path	-	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	-	<ul style="list-style-type: none"> • PLC login with change
Requirement	-	-

2.9 Port_xxx.bootdata

Boot file that saves the persistent data

Once the TwinCAT system has started and the PLC has been loaded, the file extension .bootdata is renamed .bootdata-old.

Storage location

	Project Directory	TwinCAT boot directory
Path	-	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	-	<ul style="list-style-type: none"> • Stop the TwinCAT system • Use of FB_WritePersistentData
Requirement	-	-

2.10 Port_xxx.bootdata-old

Backup file for the persistent data

The file is deleted once the new boot file has been completely written.

Storage location

	Project Directory	TwinCAT boot directory
Path	-	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	-	<ul style="list-style-type: none"> • Activate configuration • Restarting the TwinCAT system
Requirement	-	-

2.11 PLC_Name.tpzip

Archive folder of the PLC project

The scope of the content is configurable in the project properties.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\CurrentConfig\	C:\TwinCAT\3.1\Boot\CurrentConfig\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	-	-

2.12 PLC_Name.tmc

TC3 module description file

Storage location

	Project Directory	TwinCAT boot directory
Path	A)..\<Solution name>\<Project name> \<PLC name>\ B)..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	A) - B) TMC activated as target file	<ul style="list-style-type: none"> • TMC activated as target file

2.13 PLC_Name.tpy

TC2 PLC description file

Storage location

	Project Directory	TwinCAT boot directory
Path	A)..\<Solution name>\<Project name> \<PLC name>\ B)..\<Solution name>\<Project name> _Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Activate boot project • PLC login with boot project update
Requirement	A) - B) TPY activated as target file	<ul style="list-style-type: none"> • TPY activated as target file

3 TwinCAT C++ project files

File	Description	Further Information
Engineering / XAE		
*.sln	Visual Studio Solution file, hosts TwinCAT and non-TwinCAT projects	
*.tsproj	TwinCAT project, collection of all nested TwinCAT projects, such as TwinCAT C++ or TwinCAT PLC project	
_Config/	Folder contains further configuration files (*.xti) that belong to the TwinCAT project.	See menu Tools Options TwinCAT XAE-Environment File Settings
_Deployment/	Folder for compiled TwinCAT C++ drivers	
*.tmc	TwinCAT Module Class file (XML-based)	See TwinCAT Module Class Editor (TMC)
*.rc	Resource file	See Set version/vendor information
.vcxproj.	Visual Studio C++ project files	
*ClassFactory.cpp/.h	Class Factory for this TwinCAT driver	
*Ctrl.cpp/.h	Upload and remove drivers for TwinCAT UM platform	
*Driver.cpp/.h	Upload and remove drivers for TwinCAT RT platform	
*Interfaces.cpp/.h	Declaration of the TwinCAT COM interface classes	
*W32.cpp./def/.idl		
*.cpp/.h	One C++/Header file per TwinCAT module in the driver. Insert user code here.	
Resource.h	Required by *.rc file	
TcPch.cpp/.h	Used for creating precompiled headers	
%TC_INSTALLPATH%\Repository\ <vendor>\<prjname>\<version>\<platform>*.tmx< td=""> <td>Compiled driver that is loaded via the TcLoader. <i>C:\TwinCAT\3.x\Repository\C++ Module Vendor\Untitled1\0.0.0.1\TwinCAT RT * \Untitled1.tmx</i></td> <td>See Versioned C++ Projects</td> </vendor>\<prjname>\<version>\<platform>*.tmx<>	Compiled driver that is loaded via the TcLoader. <i>C:\TwinCAT\3.x\Repository\C++ Module Vendor\Untitled1\0.0.0.1\TwinCAT RT * \Untitled1.tmx</i>	See Versioned C++ Projects
%TC_INSTALLPATH%\CustomConfig\Modules*	Published TwinCAT driver package normally <i>C:\TwinCAT\3.x\CustomConfig\Modules*</i>	See Export modules
Runtime / XAR		
%TC_BOOTPRJPATH%\CurrentConfig*	Current configuration setup usually <i>C:\TwinCAT\3.x\Boot</i>	
%TC_DRIVERAUTOINSTALLPATH%*.sys/pdb	Compiled, platform-specific driver that is loaded via the operating system. <i>C:\TwinCAT\3.x\Driver\AutoInstall</i> (system loaded)	
%TC_INSTALLPATH%\Boot\Repository\ <vendor>\<prjname>\<version>*.tmx< td=""> <td>Compiled platform-specific driver that is loaded via the TcLoader. <i>C:\TwinCAT\3.x\Boot\Repository\C++ Module Vendor\Untitled1\0.0.0.1\Untitled1.tmx</i></td> <td></td> </vendor>\<prjname>\<version>*.tmx<>	Compiled platform-specific driver that is loaded via the TcLoader. <i>C:\TwinCAT\3.x\Boot\Repository\C++ Module Vendor\Untitled1\0.0.0.1\Untitled1.tmx</i>	
%TC_BOOTPRJPATH%\TM\OBJECTID.tmi	TwinCAT Module Instance File Describes variables of the driver File name is <i>ObjectID.tmi</i> Usually <i>C:\TwinCAT\3.x\Boot\TM\OTCID.tmi</i>	
Temporary files		

File	Description	Further Information
*.sdf	IntelliSense Database	
*.suo / *.v12.suo	User-specific and Visual Studio-specific files	
*.tsproj.bak	Automatically generated backup file from <i>tsproj</i>	
ipch/	Intermediate directory created for precompiled headers	

4 TwinCAT project files

4.1 CurrentConfig.xml

Description file of the current configuration.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\	C:\TwinCAT\3.1\Boot\
Time of creation	<ul style="list-style-type: none"> • Creating a TwinCAT project • Recreating a TwinCAT project 	<ul style="list-style-type: none"> • Activate configuration
Requirement	-	-

4.2 CurrentConfig.tszip

Archive folder containing the tsproj file and all referenced xti files.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\	C:\TwinCAT\3.1\Boot\
Time of creation	<ul style="list-style-type: none"> • Creating a TwinCAT project • Recreating a TwinCAT project 	<ul style="list-style-type: none"> • Activate configuration
Requirement	<ul style="list-style-type: none"> • Auto Save <TwinCAT project name> to Target as Archive is active 	

5 PLC HMI files

5.1 Port_xxx.textlistname.txt

For each text list existing in the project, a file is created containing all the entries in this text list.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\Plc\Port_xxx\Visu	C:\TwinCAT\3.1\Boot\Plc\Port_xxx\Visu
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Online Change / Download
Requirement	<ul style="list-style-type: none"> • Target and/or web visualization object added 	

5.2 Port_xxx Folder

In this folder a further folder "Visu" is automatically created in which the files and the images of the PLC HMI are saved in turn.

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\Plc\	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration
Requirement	<ul style="list-style-type: none"> • Target and/or web visualization object added 	

6 PLC HMI files (Target Visualization)

6.1 tc3plchmi.ini

Configuration file containing the settings of the target visualization client

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc	C:\TwinCAT\3.1\Boot\Plc\
Time of creation	<ul style="list-style-type: none">• Creating a PLC project• Recreating a PLC project	<ul style="list-style-type: none">• Activate configuration• Online Change / Download
Requirement	<ul style="list-style-type: none">• Target visualization object added	

7 PLC HMI Web files

7.1 port_xxx.imagepoolcollection.csv

File containing a list of the entries of all image pools available in the PLC project

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\Plc\Port_xxx\Visu	C:\TwinCAT\3.1\Boot\Plc\Port_xxx\Visu
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Online Change / Download
Requirement	<ul style="list-style-type: none"> • Web visualization object added 	

7.2 webvisu.cfg.json

Configuration file containing the settings of the web visualization object

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\Plc\Port_xxx\Visu	C:\TwinCAT\3.1\Boot\Plc\Port_xxx\Visu
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Online Change / Download
Requirement	<ul style="list-style-type: none"> • Web visualization object added 	

7.3 webvisu.htm

HTML page used to display the visualization in the internet browser

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name>_Boot\<Platform>\Plc\Port_xxx\Visu	C:\TwinCAT\3.1\Boot\Plc\Port_xxx\Visu
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Online Change / Download
Requirement	<ul style="list-style-type: none"> • Web visualization object added 	

7.4 webvisu.js

File containing the Java Script logic that is used in the visualization

Storage location

	Project Directory	TwinCAT boot directory
Path	..\<Solution name>\<Project name> _Boot\<Platform>\Plc\Port_xxx\Visu	C:\TwinCAT\3.1\Boot\Plc\Port_xxx\Visu
Time of creation	<ul style="list-style-type: none"> • Creating a PLC project • Recreating a PLC project 	<ul style="list-style-type: none"> • Activate configuration • Online Change / Download
Requirement	<ul style="list-style-type: none"> • Web visualization object added 	