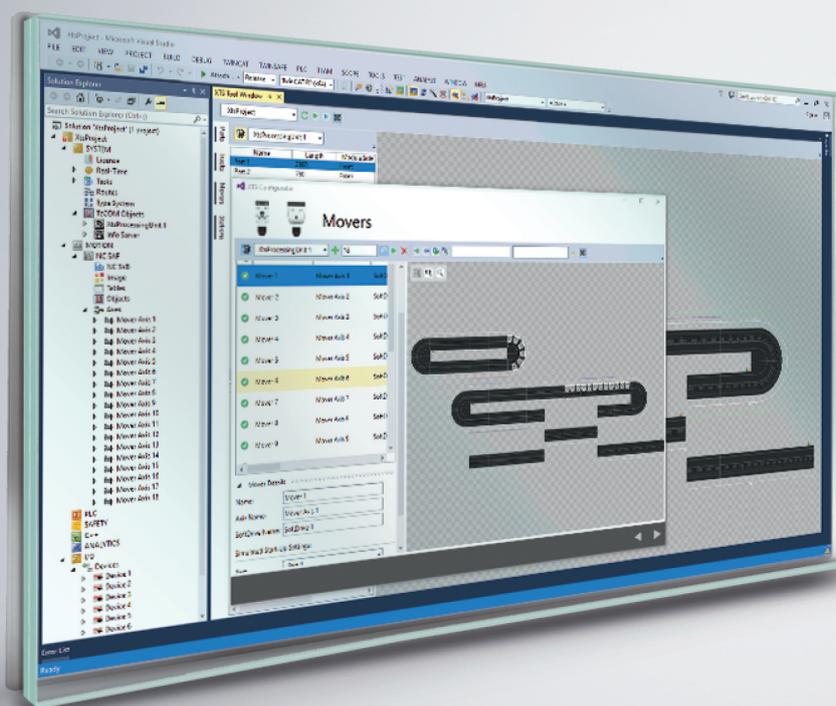


Manual | EN

# TF5850

TwinCAT 3 | XTS Extension





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## 1 Documentation notes

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.

The responsible staff is always obliged to use the currently valid documentation.

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.

### 1.1 Disclaimer

Beckhoff products are subject to continuous further development. We reserve the right to revise the documentation at any time and without notice. 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.

#### 1.1.1 Trademarks

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#### 1.1.2 Patents

The EtherCAT technology is protected by patent rights through the following registrations and patents with corresponding applications and registrations in various other countries:

- EP1590927
- EP1789857
- EP1456722
- EP2137893
- DE102015105702



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

### 1.1.3 Limitation of liability

The software described in this operating manual is combined with a specific configuration of hardware components depending on the application requirements. Modifications and changes to the hardware or software configuration that go beyond the documented options are prohibited and nullify the liability of Beckhoff Automation GmbH & Co. KG.

**The following is excluded from the liability:**

- Failure to observe this operating manual
- Improper use
- Use of untrained personnel
- Use of unauthorized spare parts

### 1.1.4 Copyright

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The copying, distribution and utilization of this document as well as the communication of its contents to others without express authorization is prohibited. Offenders will be held liable for the payment of damages.

We reserve all rights in the event of registration of patents, utility models and designs.

## 1.2 Version numbers



### **Provision of revision levels**

On request we can send you a list of revision levels for changes to the documentation.

- Send your request to: [motion-documentation@beckhoff.de](mailto:motion-documentation@beckhoff.de)

### **Origin of the document**

This documentation was originally written in German. All other languages are derived from the German original.

### **Product features**

The valid product features are always those specified in the current documentation. Further information given on the product pages of the Beckhoff homepage, in emails or in other publications is not authoritative.

## 1.3 Scope of the documentation

In addition to this documentation, the following documents are part of the complete documentation:

### **Manual | TF5410**

Description of the optional package for collision avoidance when operating multiple axes.



[Direct link to the documentation TF5410 | TwinCAT 3 Motion Collision Avoidance](#)

### **Translation of the original manual | XTS**

Description of the mechanical and electrical parameters as well as all necessary information for the assembly of the XTS system.

## 1.4 Explanation of symbols

Various symbols are used for a clear arrangement:

- ▶ The triangle indicates instructions that you should execute
- The bullet point indicates an enumeration

### 1.4.1 Pictograms

#### NOTICE

##### Notes

Notes are used for important information on the product. The possible consequences of failure to observe these include:

- Malfunctions of the product
- Damage to the product
- Damage to the environment



##### Information

This sign indicates information, tips and notes for dealing with the product or the software.



##### Examples

This symbol shows examples of how to use the product or software.

## 1.5 Beckhoff Services

Beckhoff and its international partner companies offer comprehensive support and service.

### 1.5.1 Support

The Beckhoff Support offers technical advice on the use of individual Beckhoff products and system planning. The employees support you in the programming and commissioning of sophisticated automation systems.

Hotline: +49(0)5246/963-157  
Fax: +49(0)5246/963-199  
E-mail: [support@beckhoff.com](mailto:support@beckhoff.com)  
Web: [www.beckhoff.de/support](http://www.beckhoff.de/support)

### 1.5.2 Training

Training in Germany takes place in our training center at the Beckhoff headquarters in Verl, at branch offices or, by arrangement, at the customer's premises.

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Fax: +49(0)5246/963-95000  
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### 1.5.3 Service

The Beckhoff Service Center supports you with after-sales services such as on-site service, repair service or spare parts service.

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E-mail: [service@beckhoff.com](mailto:service@beckhoff.com)  
Web: [www.beckhoff.de/service](http://www.beckhoff.de/service)

### 1.5.4 Download area

In the download area you will find product information, software updates, the TwinCAT software, documentation and much more.

Web: [www.beckhoff.de/download](http://www.beckhoff.de/download)

### 1.5.5 Headquarters

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Web: [www.beckhoff.de](http://www.beckhoff.de)

The addresses of the international Beckhoff branches can be found on the Beckhoff website: <http://www.beckhoff.de>

## 2 For your safety

Read this chapter containing general safety information. In all cases observe the safety instructions for your own safety, the safety of other persons and the safety of the product.

When working with control and automation products, many dangers can result from careless or incorrect use. Work particularly thoroughly, not under time pressure and responsibly towards other people.

### 2.1 General safety instructions

This chapter contains information on safety relating to the software and the associated products. Please also read the original operating manual for the hardware components you are using.

#### 2.1.1 Before operation

##### **Danger from magnetic fields**

The magnetic fields of some of the components of the XTS are dangerous to:

- people fitted with cardiac pacemakers
- persons with magnetically conducting implants
- implanted and external defibrillators
- magnetic data storage devices, chip cards with magnetic strips and other electronic devices

Maintain a safety distance to all magnetic parts and prevent direct contact between magnetic parts and parts that are sensitive to interference.

Observe the requirements of BGV B 11 for electromagnetic fields (Germany) and applicable national regulations in other countries.

##### **Use output voltages SELV / PELV**

Operate all electronic modules and components in the drive system only with a SELV (Safety Extra Low Voltage) or PELV (Protective Extra Low Voltage) output voltage.

##### **Keep the immediate environment clean**

Keep your workplace and the surrounding area clean. Ensure safe working.

##### **Shut down and secure the machine or plant**

Shut down the machine or plant. Secure the machine or plant against being inadvertently started up.

**Do not use damaged components**

Adhere to the specifications from the technical data for storage, transport and operation. Do not use damaged components.

**Risk of injury when handling cutting tools**

You can sustain cutting or puncturing injuries through careless working with cutting tools.

Ensure safe working. Wear protective gloves if necessary.

**Risk of injury when handling adhesives**

Adhesive can irritate the eyes, the respiratory organs and the skin. Do not inhale the vapor. Avoid contact of the adhesive with the eyes and skin. If adhesive should get into your eyes, immediately rinse out your eyes thoroughly with water and consult a doctor.

Refer to the manufacturer's documentation when handling adhesives. Wear protective gloves and safety glasses if necessary.

**Check safety pictograms**

Check whether the designated pictograms are on the product. Replace missing or illegible stickers.

**Observe tightening torques**

Mount and repeatedly check connections and components, complying with the prescribed tightening torques.

**Correctly ground electrical components or modules**

Avoid electric shocks due to improper grounding of electrical components or modules. Ground all conductive components according to the specifications in the chapters "Electrical Installation" and "Mechanical Installation".

**Use the original packaging only**

When shipping, transporting, storing and packing, use the original packaging or non-conductive materials.

## 2.1.2 During operation

**Observe the GND concept**

Special conditions need to be observed for the grounding of the XTS. Be sure to read the chapter "Grounding of the supply".

**Do not work on live electrical parts**

Ensure proper connection of the protective conductor. Never loosen electrical connections when live. Only work on the XTS when the voltage has dropped to < 10 V. Disconnect all components from the mains and secure them against being switched on again.

**Do not touch hot surfaces**

Check the cooling of the surfaces with a thermometer. Do not touch the components during and immediately after operation. Allow the components to cool sufficiently after switching off.

**Avoid overheating**

Operate the components according to the technical specifications. Refer here to the chapter: "Technical data". Provide for sufficient cooling. Switch the components off immediately if the temperature is too high.

**Do not touch any moving or rotating components**

Do not touch any moving or rotating components. Fasten all parts or components on the machine or plant.

## 2.1.3 After operation

**De-energize and switch off components before working on them**

Check the functionality of all safety-relevant devices. Secure the working environment. Secure the machine or plant against being inadvertently started up. Observe the chapter: "Decommissioning".

## 3 Notes on information security

The products from Beckhoff Automation GmbH & Co. KG – if they are reachable 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.

Beckhoff recommends the following protective measures for information security and industrial security:

 [www.infosys.beckhoff.com](http://www.infosys.beckhoff.com)

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. Subscribe to the RSS feed to stay informed about information security for Beckhoff products. For more information, see:

 [www.infosys.beckhoff.com](http://www.infosys.beckhoff.com)

## 4 General Information

These operating manual will help you to commission and program an XTS system.

The following chapters will guide you through the basic configuration of the XTS hardware components in *TwinCAT 3*, so that you can move the XTS movers via the basic NC interface and program them in the PLC. The aim is to move the XTS Mover for the first time and to verify the system concept. You will also receive an initial overview of all XTS functionalities of the *TF5850 TC3 XTS Extension*.



The documentation for the *TF5850 TC3 XTS Extension* is currently still under construction and will be continuously expanded. The current version of these operating manual can be found at:

 [www.beckhoff.com/de-de/support/downloadfinder/](http://www.beckhoff.com/de-de/support/downloadfinder/)

### 4.1 Compatibility

This documentation refers to the following software versions of *TF5850 TC3 XTS Extension*, *TF5400 TC3 Advanced Motion Pack Extension* and *TwinCAT 3*:

Software	Version
TF5850	3.21.703.0 or higher
TF5400	3.1.10.52 or higher
TC3	3.1.4024.22 or higher



This documentation is only suitable to a limited extent for commissioning XTS systems with older software versions. If you have any questions, please contact the product specialist responsible for your region.

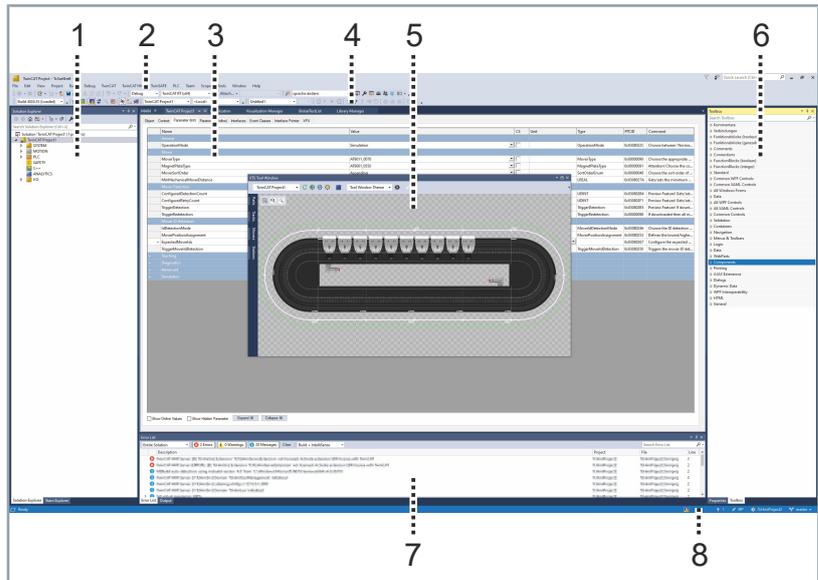
### 4.2 Presentation of the screenshots

The language setting *English* in *TwinCAT* was used for this documentation. All screenshots in this documentation are shown as examples in English. The terms from the screenshots are used in the corresponding instructions.

All functions and settings can be found in the same place in the software, regardless of the language set on your PC.

## 4.3 User interface overview

The TwinCAT user interface is divided into the following areas:



Position	Explanation
1	Solution Explorer
2	Menu bar
3	Project window
4	Toolbar
5	XTS Tool Window
6	Toolbox or Properties Window
7	Message window <i>Error List</i> and <i>Output</i>
8	Information bar and status bar

## 5 Installation and software update

Before you can commission an XTS system, you must first install the *TF5850 | TwinCAT 3 XTS Extension* software. The following steps are also required when updating to the latest version of *TF5850 | TwinCAT 3 XTS Extension*.

If you have already installed a software version, check if you have installed the latest version. Further information can be found in chapter "Check version", [Page 22].

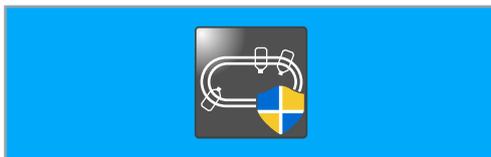


As a prerequisite for the installation, a version of *TwinCAT 3 XAE* (TcXaeShell or higher) must already exist on your system.

You can find the latest version of the software in the download finder:

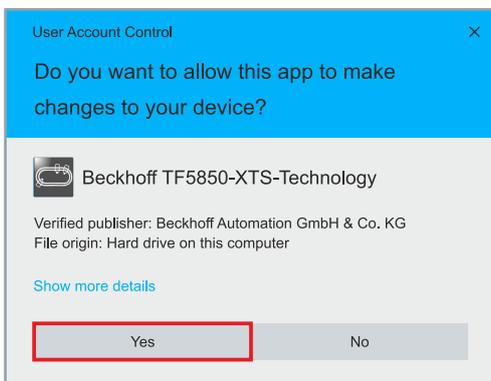
 [www.beckhoff.com/de-de/support/downloadfinder/](http://www.beckhoff.com/de-de/support/downloadfinder/)

- ▶ Download and save software **TF5850 | TwinCAT 3 XTS Extension**



- ▶ Double-click on the **TF5850-XTS-Technology** icon on your desktop

The installation is started.



- ▶ Click on **Yes** to allow changes to the device

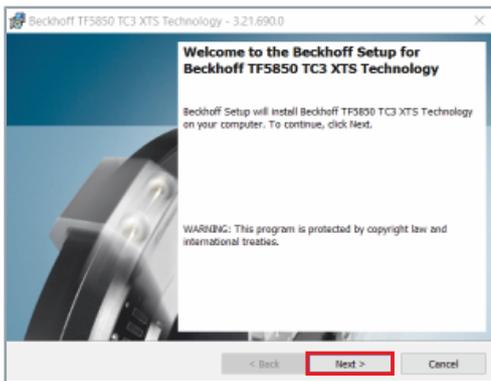


- ▶ Select the desired installation language from the drop-down menu
- ▶ Confirm with **OK**

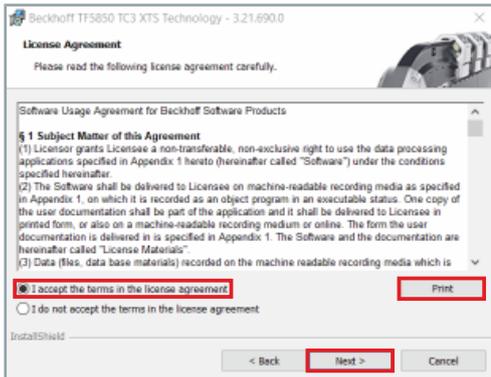


The installation is prepared.

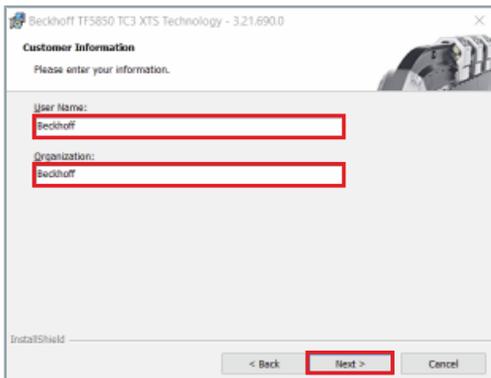
# Installation and software update



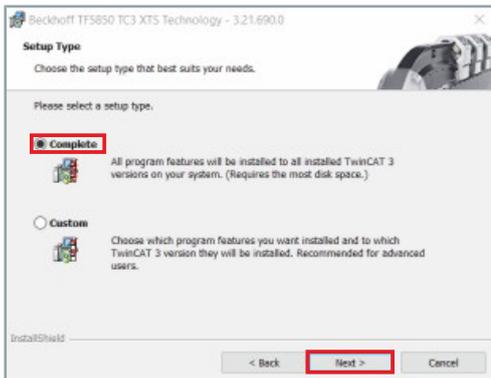
- ▶ Click on **Next >** to proceed with the installation
- ▶ Click on **Next >** to proceed with the installation



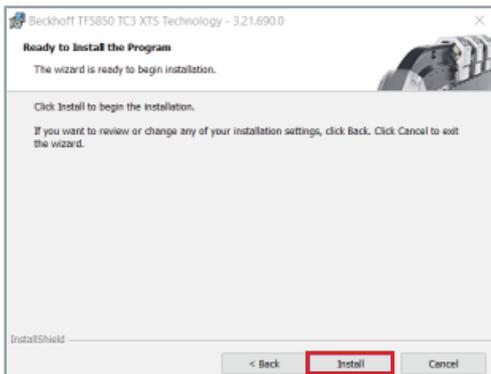
- ▶ Accept the license terms
- ▶ If required, click **Print** to print the license terms
- ▶ Click on **Next >** to proceed with the installation



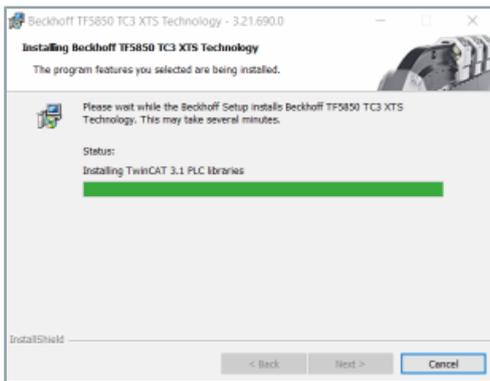
- ▶ Enter the user name in the input field **User Name**
- ▶ Enter the company name in the input field **Organization**
- ▶ Click on **Next >** to proceed with the installation



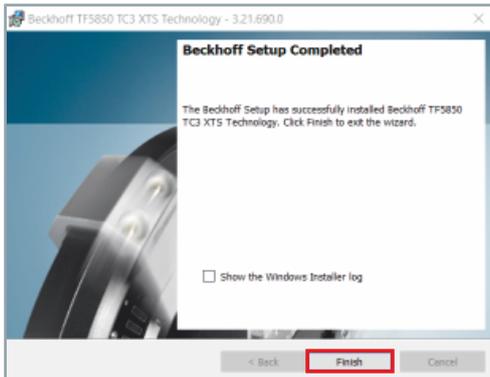
- ▶ Select **Complete** setup type
- ▶ Click on **Next >** to proceed with the installation



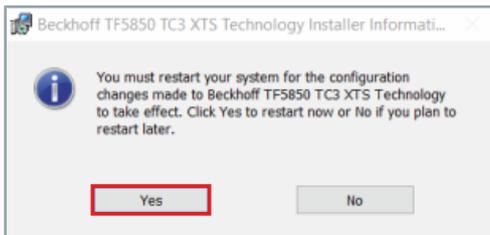
- ▶ Confirm with **Install**



The program will be installed.



► Click on **Finish**



► Click on **Yes** to restart the device and apply the changes



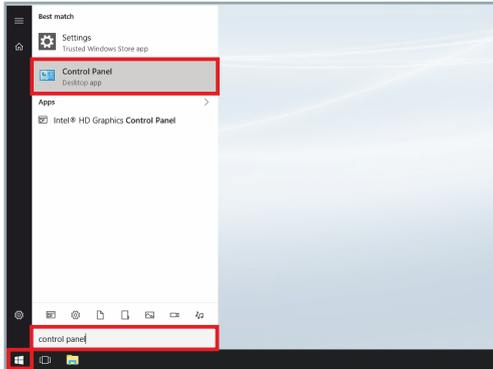
If you have updated the *TF5850 | TwinCAT 3 XTS Extension*, you must reload the TcCom objects. Further information can be found in chapter "Reload TcCom objects", [Page 23].

## 5.1 Check version

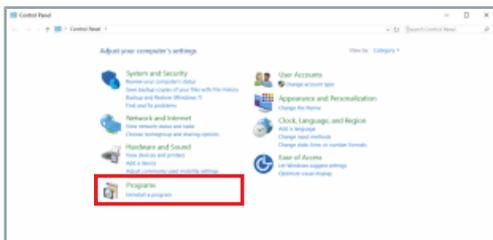


### Observe operating system

Calling up the version depends on the operating system installed on your device and may differ from the variant described here.

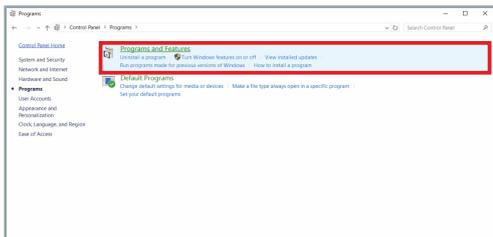


- ▶ Click **Start**
- ▶ Call up the **Control Panel**



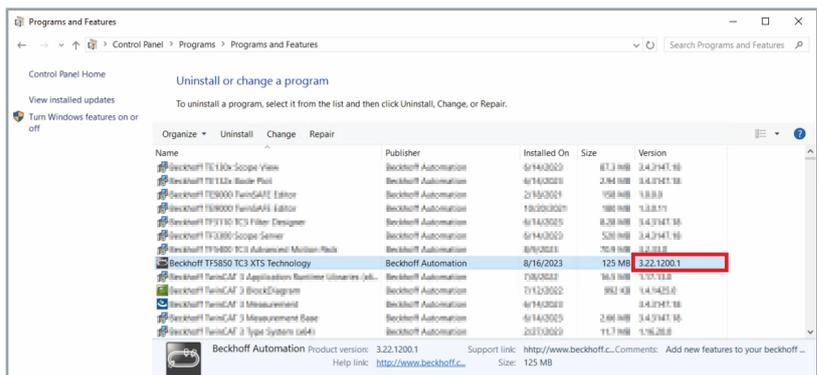
The window *Control Panel* opens.

- ▶ Click on **Programs**



The window *Programs* opens.

- ▶ Click on **Programs and Features**

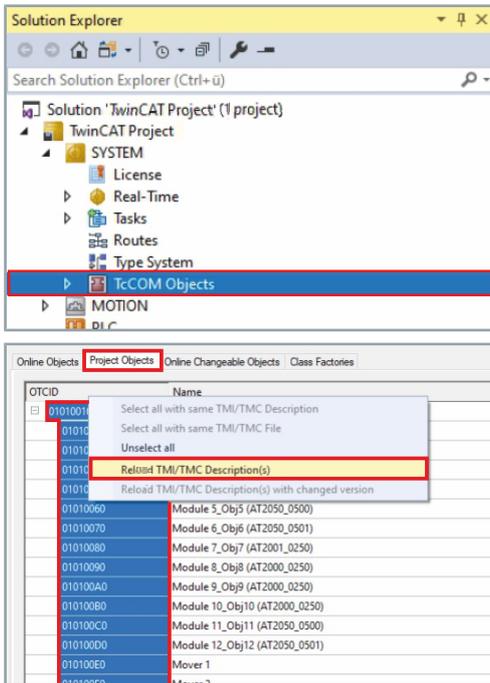


The *Programs and Features* window opens.

- ▶ Check the version of **Beckhoff TF5850 TC3 XTS Technology**

## 5.2 Reload TcCom objects

If you have updated the *TF5850 | TwinCAT 3 XTS Extension*, you must reload the TcCom objects.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM*
- ▶ Double click on **TcCOM Objects**

- ▶ In the project window click on the **Project Objects** tab
- ▶ Select all objects
- ▶ Right-click the selected objects to open the context menu
- ▶ Click on **Reload TMI/TMC Description(s)** in the context menu

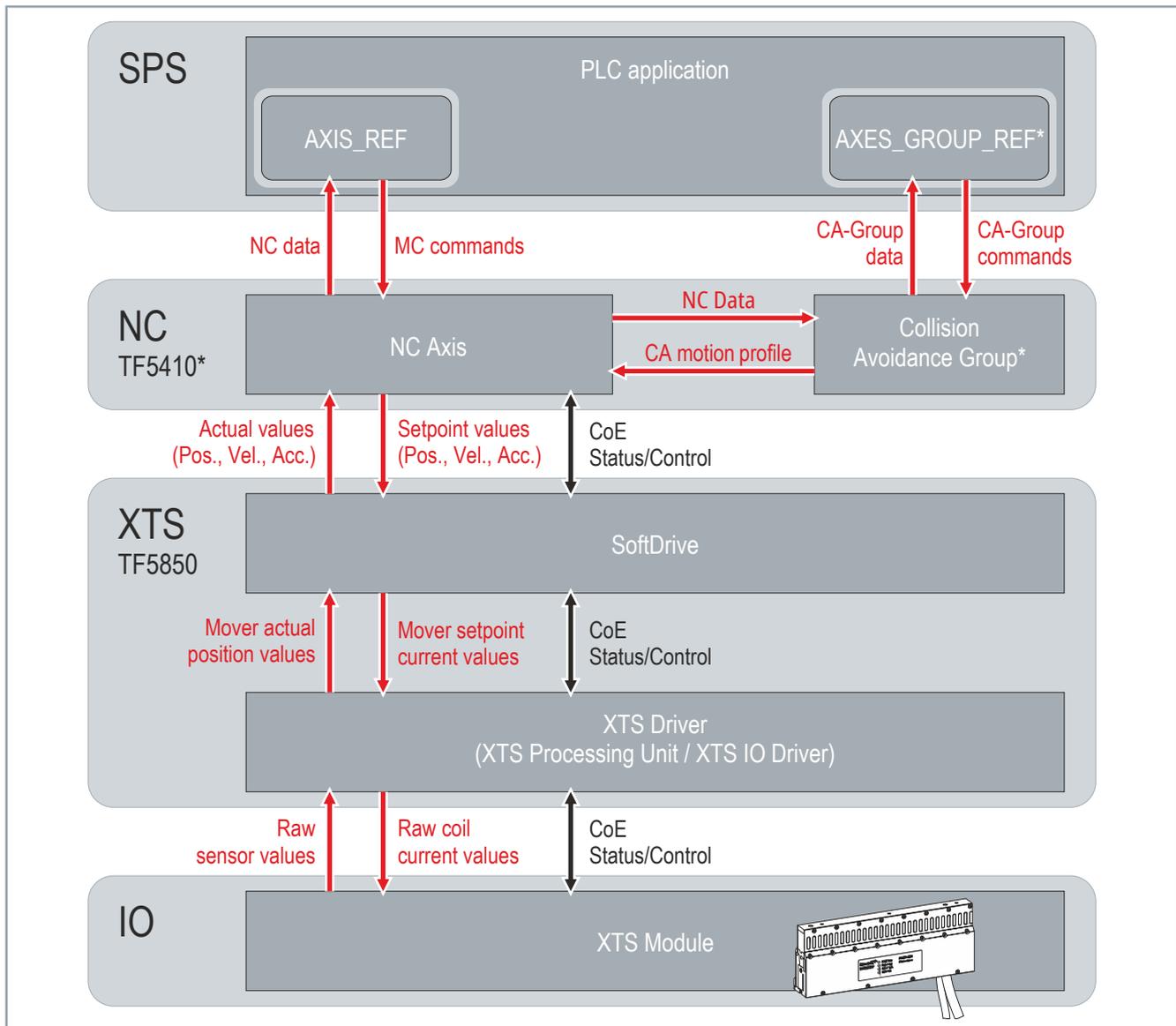
## 6 Functions of the driver

### 6.1 XTS Configuration

The XTS system consists of hardware components and software components that must communicate and function together. To make the system behave as expected, you need to understand the general processes and communication paths between software and hardware.

An XTS system consists of the modules, guide rails and movers as well as some software components running on an IPC.

#### Communication levels



\* Optional

The basis for communication is the hardware, consisting of the modules. The modules transmit sensor values to the driver.

The driver uses the sensor values of the modules to determine the position of the movers and transmits the position values of each individual mover to the respective SoftDrive.

The SoftDrive transmits the current position values and velocity values to the NC axes. The NC axes generate motion profiles based on the values received and transmit setpoints for the position and velocity back to the SoftDrive.

The SoftDrive interpolates the values and performs a set/actual value comparison and transmits the current values of the mover resulting from the control structure back to the driver. The driver calculates and transmits the current setpoints to the 15 coils of the modules.

If the NC axes are included in a Collision Avoidance group, the NC axes receive external setpoints back that represent the motion profile of each individual mover.

Motion commands and administrative commands are transferred by the user from the PLC application via libraries directly to the NC axes or the Collision Avoidance group.

The communication of the XTS is based on and takes place via the CANopen communication structure. Additional data is transferred between objects to calculate coil current, commutation, dynamics, and motion profiles.

For more information on the individual objects, please refer to the respective documentation.

## 6.1.1 Integration of the XTS driver

On the software side, the XTS system consists of several components that are inserted into a TwinCAT project as a TwinCAT Component object, or TcCom object for short. Each module and each mover requires a corresponding driver TcCom object, via whose interfaces data is exchanged with other components:

- The TcCom object *Module* has Data Pointers. These Data Pointers are interfaces that are linked to the process data of the XTS IO modules. The TcCom object *Module* receives the sensor values of the module via the Data Pointers.
- The TcCom object *Mover* has Data Areas. These Data Areas are interfaces to the corresponding SoftDrive object that is created under each NC axis. Via the Data Areas, the TcCom object *Mover* receives new current setpoints and supplies the current position to the NC axis via the SoftDrive.

In addition to the TcCom objects *Module* and *Mover*, the system requires other TcCom objects to perform general system calculations and to manage basic system parameters. For more information, see the chapters "Configuration setup", [Page 29] and "Create new XTS system manually", [Page 39].

## 6.1.2 Basic principles

The new user interface of the XTS software simplifies the work and handling of the ever larger and more sophisticated systems implemented with XTS. The simple pictorial structure makes a decisive contribution to fast commissioning and intuitive operation. A large number of XTS systems can now be set up very easily, regardless of length, shape or variant.

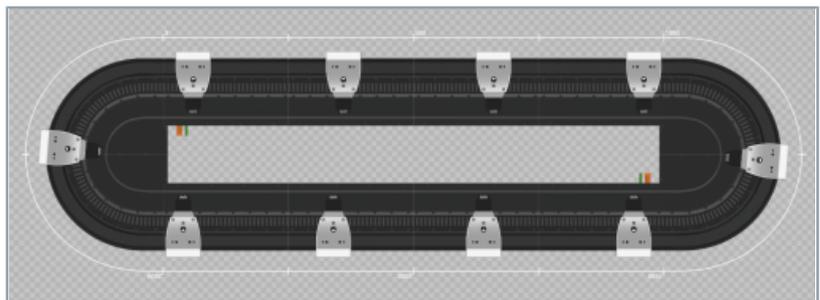
A main goal of the XTS software is to support the various software functionalities such as Track Management or Leave and Arrive:

- Using the Track Management function, you can split the XTS system into individual sections, which you then join together to form continuous tracks. This gives you the possibility to mechanically align individual sections in different ways and thus use the movers more flexibly on the system.
- Using the Leave and Arrive function, you can remove movers or add more movers while the system is running.

### 6.1.2.1 Example configurations for XTS systems

The two example configurations show how differently an XTS system can be set up.

#### Closed XTS system



A closed system with 180° turns and ten movers, corresponding to the configuration of a 3 m XTS starter kit.

Further information can be found in chapter "System configuration", [Page 261].

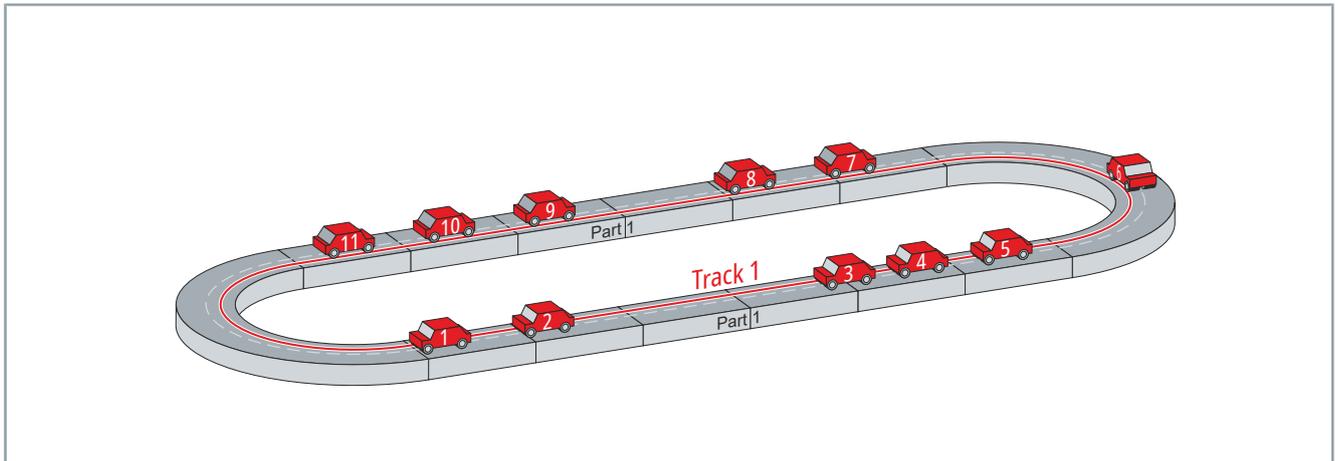
#### XTS system with Track Management



XTS Track Management with four XTS Parts and six movers. This setup is usually referred to as switch or elevator.

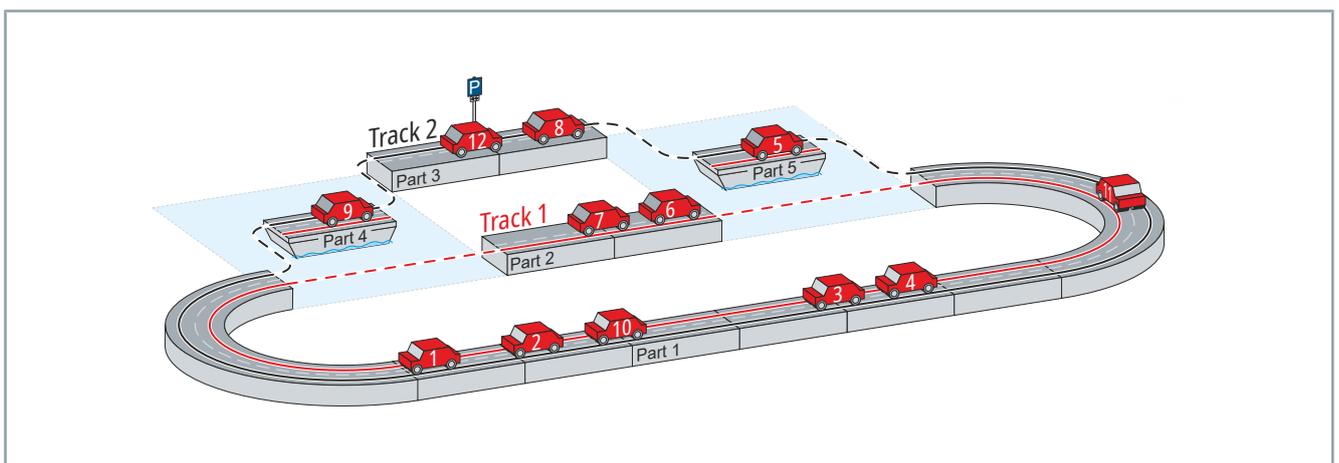
The difference between these two system configurations is that in a closed XTS system the order of modules and movers always remains constant. The movers thus have only one possible XTS Track on which they can move.

In an XTS system with Track Management, modules can change their position and align with other modules. Thus, the order of modules and movers can be changed, as new tracks can be formed. To be able to keep the overview of these new functions, the XTS Parts and XTS Tracks functions have been introduced.

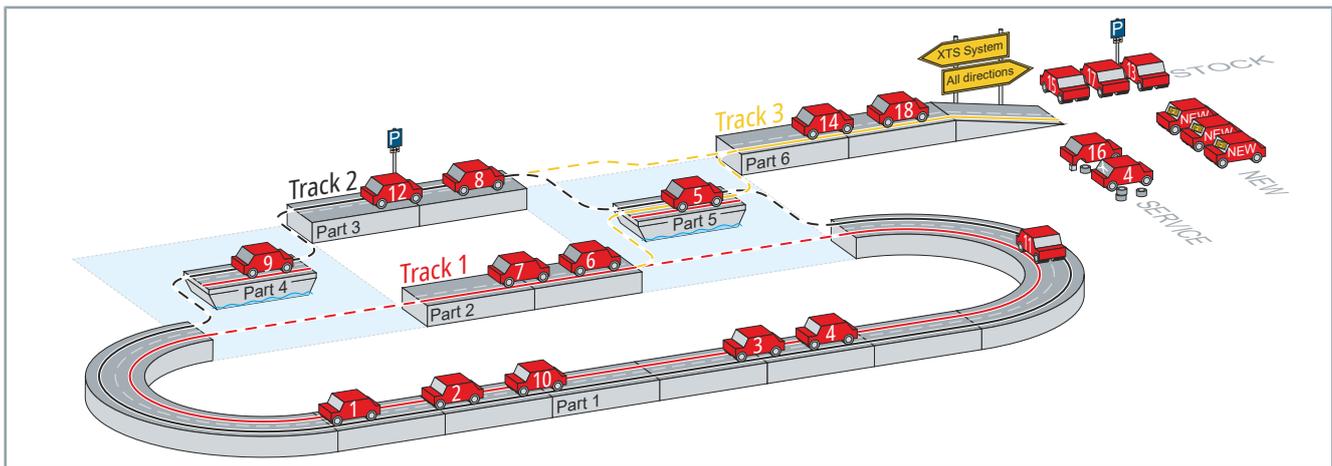


The XTS Part is the physical hardware component on which the mover travels, comparable to a road section for a car. The XTS Track, on the other hand, is the actual track of the mover. The track is created by assembling the individual hardware components. In comparison with the car, a possible track with different road sections is created.

XTS Parts and XTS Tracks are objects that can be created in the TwinCAT project using the *XTS Configurator*. A simple XTS system can be created with only one XTS Part and one XTS Track for all movers.



More sophisticated XTS systems can consist of several XTS Parts that are joined together to form different XTS Tracks. In comparison with the car, a car ferry is used between two possible tracks.



With the Leave and Arrive function, it is possible for single movers to be taken off the system or for additional movers to be brought onto the system. In comparison with the car, the additional road section serves as an entrance and exit. Outside the XTS Parts there are parking lots for unused cars, new car dealers with additional cars and workshops for broken cars.

Transferred to the XTS system, it means that you can, for example:

- Be able to remove the mover for maintenance
- Be able to add new movers if needed
- Be able to remove movers that are no longer needed

### 6.1.3 Configuration setup



#### **Manual creation or use of TwinCAT Tools**

You have the option of creating the hardware components and the I/O components manually or quickly and easily via the TwinCAT tools *XTS Configurator* and *XTS Simulation Builder*. Further information about the TwinCAT Tools can be found in chapters "XTS Configurator", [Page 258] and "XTS Simulation Builder", [Page 229].

#### **Configurator replaces the XTS Manager**

The Configurator replaces the XTS Manager, which was integrated in the XTS IO Driver object in the software versions up to version 3.18.715.0. Further information can be found in chapter "Compatibility mode", [Page 71].

Before you can use an XTS system, it must first be fully configured with all I/O components and all Real Time and Distributed Clock settings.

The main steps in configuring a system are as follows:

- XTS Processing Units
- XTS Parts
- XTS Modules
- XTS Tracks
- XTS Movers
- XTS Stations
- NC axis
- SoftDrive
- I/O Terminal

## 6.1.3.1 XTS Processing Units

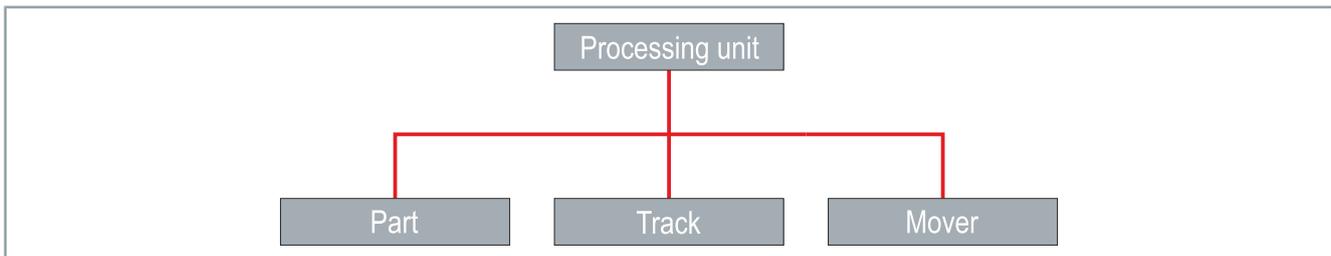


The Processing Unit is the center of an XTS system. All the necessary objects converge in the Processing Unit and are logically linked to each other.



The XTS Processing Unit replaces the XTS IO Driver object of the previous software version.

You can create one or more Processing Units, depending on the number of individual systems used in the machine. Each Processing Unit requires at least one Task that is not used in other Processing Units.



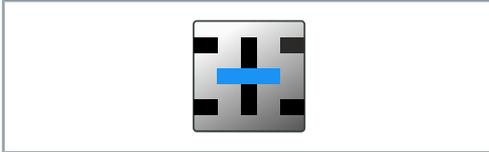
### Required settings:

- Task
- OperationMode
- MoverType
- MagnetPlateType
- IdDetectionMode
- IsTeachingEnabled

### Optional settings:

- MoverSortOrder
- MinMechanicalMoverDistance
- all other parameters

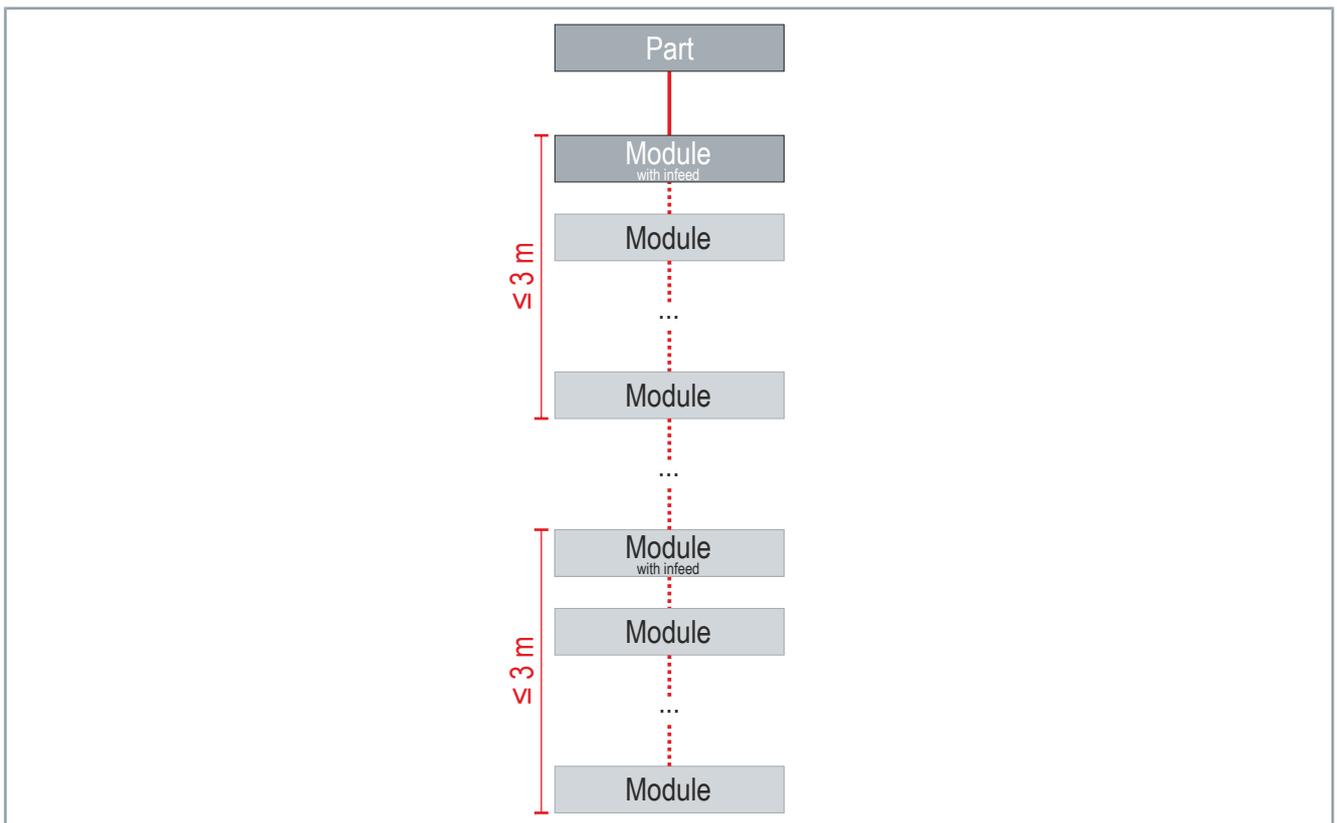
## 6.1.3.2 XTS Parts



A part is the minimum required component of an XTS system. The smallest possible part is a single module. Normally, a part consists of one infeed line, but multiple supplies within a part are also possible.

During manual creation in the correct order, it is determined which I/O Devices are included and to which Processing Unit the part belongs.

The optional settings are used to display the view in the XTS System View as realistically as possible.



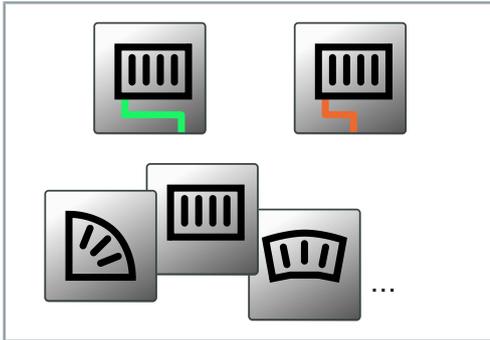
### Required settings:

- none

### Optional settings:

- TaskOID
- ModuleSide
- OriginTransform

## 6.1.3.3 XTS Modules



A module corresponds to a physical module AT2xxx-0xxx and is always a subordinate object of a part.

A task must be assigned to each Module in the *Context* tab in order to be able to perform active calculations. Only modules with feed and modules with connector have EtherCAT communication interfaces. Connector cards are used to establish the EtherCAT communication to other modules.

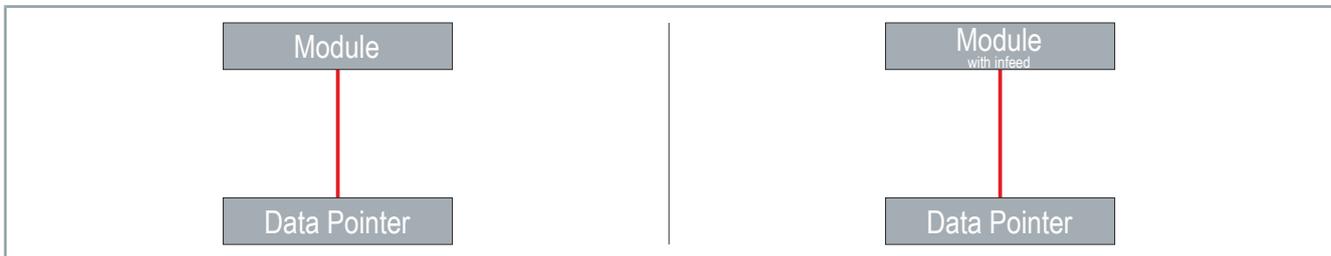


### Simulation mode or machine mode

No hardware is required for the simulation mode of the driver.

For real machine operation, a physical AT2xxx-0xxx module must be assigned to each module.

Each module must be assigned a corresponding hardware component.



### Required settings:

- Task
- PositionIndex
- MotorTerminalOid
- SensorTerminalOid
- Linking with I/O objects

### Optional settings:

- Gap
- Offset
- ScalingFactor

## 6.1.3.4 XTS Tracks



A track is a route that can be used by movers and consists of one or more parts. A part can also occur more than once in a particular XTS Track or be inserted in several different tracks. You can create as many tracks as you like.

To create a track, you must define which parts are contained in this track and in which order the parts occur.

An important setting option is whether the track is closed. With this specification you determine whether the movers have the possibility to drive endlessly in a circle or whether the system has endpoints.

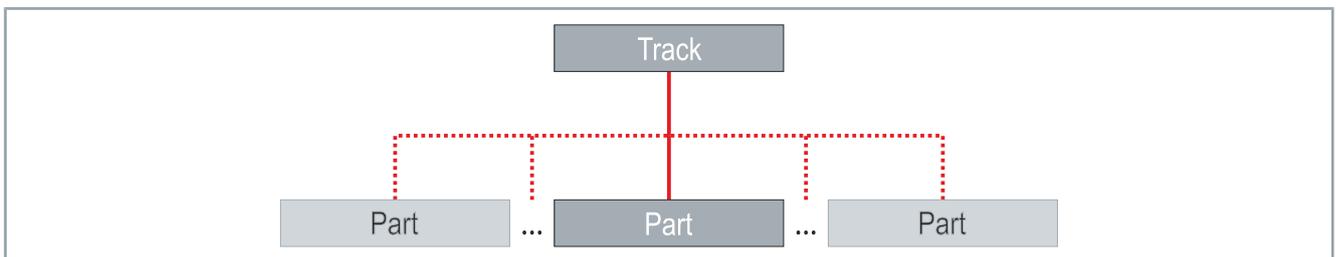
### NOTICE

#### Avoid damage to the product and functional errors

Be sure to correctly specify whether you are configuring a closed system or a system with defined endpoints.

*If the specification is incorrect, the movers may leave the system if it is open. In the case of a closed system with incorrect specification, the movers cannot travel in a circle as usual.*

To determine the correct number of movers when the system starts, you must define which tracks perform the detection. It is important that each part within a track only occurs once in the detection process, otherwise too many movers may be displayed. It is best to use all tracks to detect the movers that are active in your current hardware configuration. You can also set the detection parameters via the PLC.



#### Required settings:

- IsClosed
- IsIncludedInDetection
- PartConfigItems
- ObjectID

#### Optional settings:

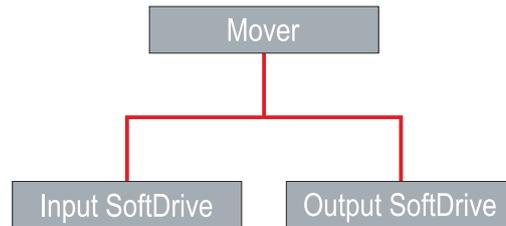
- Polarity
- Offset

## 6.1.3.5 XTS Movers



The movers, together with the modules, are the main components of the XTS system. The movers travel on the parts in the system by activating the corresponding tracks using NC functionalities of Twin-CAT 3. Currently, 250 movers with collision avoidance function can be controlled simultaneously within a project.

Each mover is connected to an NC axis via the SoftDrive and has its own SoftDrive object to communicate with the NC and establish compatibility with the basic control commands. The SoftDrive is a software controller for the axes that controls the movers of the lowest level. This means that the SoftDrive can adapt the control of the movers to different loads.



### Required settings:

- Task
- Linking with the SoftDrive of the NC axes
- SimulatedStartUpPart
- SimulatedStartUpPosition
- SimulatedStartUpId

### Optional settings:

- none

## 6.1.3.6 XTS Stations, Beta



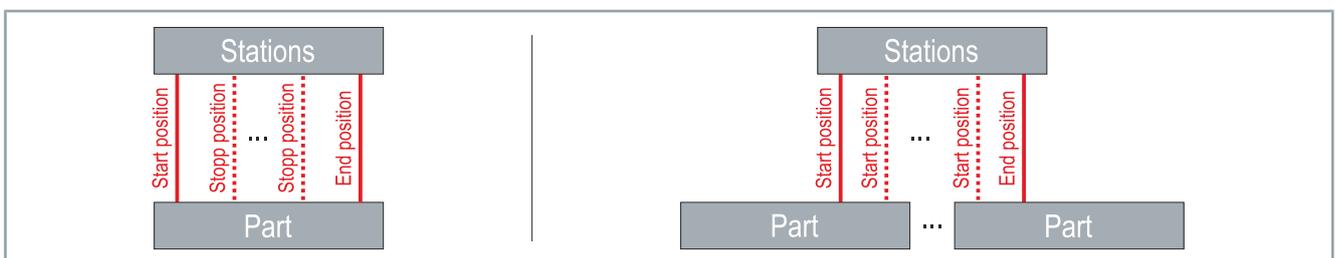
The XTS Stations function is currently still in beta phase. In the future, even more functions and information will be available and the current interface may also change.



The Stations are very useful to manage the system and related applications. A station provides information about where individual processes take place within the system to illustrate the structure of the entire application. The information can also be read out using the XTS Utility in the PLC.

Each station has its own identification data: ID, color, name and description. Regardless of the *Is Enabled* selection box, each station has a defined start position and end position. These positions form the frame of the station and can extend over several parts.

Within the station, you can configure stop positions that indicate where the movers should stop or where a specific task is completed.



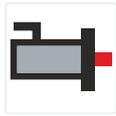
### Required settings:

- Part
- Start position
- End position

### Optional settings:

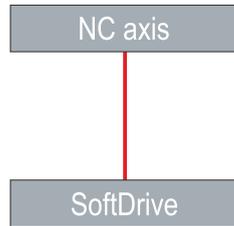
- all other parameters

## 6.1.3.7 NC axis



Each mover is connected to an NC axis that generates the setpoint profile for the movement of the respective mover. The NC axis is created in the project under *MOTION* and linked to a mover via a SoftDrive object.

The NC axes can be operated directly via the TwinCAT NC interface or via the PLC using libraries with PLC-open-compliant function blocks.



### Required settings:

- Link to I/O
- Axis type
- Maximum dynamics and default dynamics
- Modulo Factor
- Tolerance Window for Modulo Start

### Optional settings:

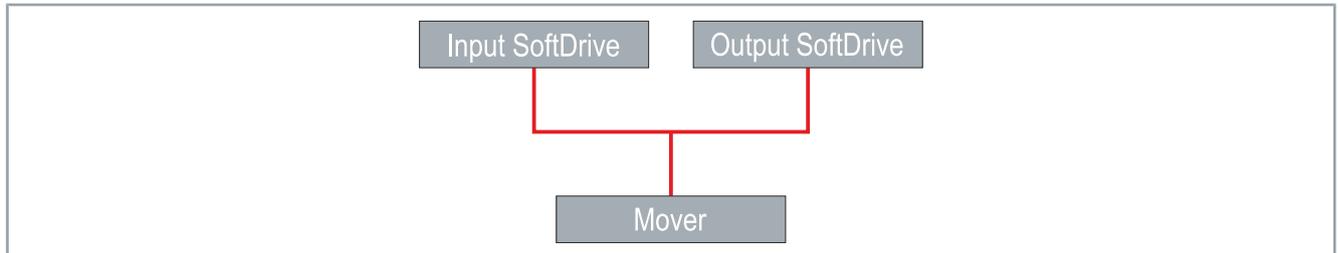
- Inversion of drive running direction and encoder running direction
- Following error monitoring

## 6.1.3.8 SoftDrive



The SoftDrive connects each mover to an NC axis. The SoftDrive uses the NC setpoint profile to control the position, velocity and current for moving the movers and generates the required current and current direction.

The SoftDrive provides the NC axis with the actual data required to generate the NC profiles. The connection between the SoftDrive and the respective Mover is made via DataPointer.



For more information on SoftDrive, refer to the XTS Soft Drive documentation or contact the product specialist responsible for your region.

### Required settings:

- Task
- Linking with TcCom object *Mover*
- Hardware modulo

### Optional settings:

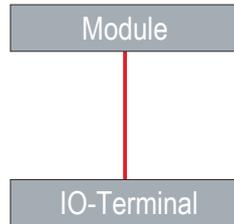
- Control parameters for velocity controller and position controller
- Control parameters for acceleration pre-control
- Filter
- Settings for the behavior of the encoder
- Switching control modes

## 6.1.3.9 I/O-Terminal



Each module is connected to the IPC via EtherCAT, this connection is represented by the I/O terminal. A physical module of an infeed line is assigned to each I/O terminal. Each infeed line is displayed as EtherCAT master in the I/O overview.

After scanning, the status of the EtherCAT connection and the individual sensor data and status data of the hardware can be called in the I/O overview. The connection of the I/O terminal with the module of the driver is done via DataPointer.



### Required settings:

- Link to TcCom objects *XTS modules*

### Optional settings:

- Access to CoE data

## 6.1.4 Create new XTS system manually



### Manual creation or use of TwinCAT Tools

You have the option of creating the hardware components and the TcCom objects manually or quickly and easily via the TwinCAT tools *XTS Configurator* and *XTS Simulation Builder*.

For more information, see the chapters "XTS Configurator", [Page 258] and "XTS Simulation Builder", [Page 229].

This chapter describes how to create hardware components and Tc-Com objects manually and without the help of XTS Tools.

### 6.1.4.1 Add TcCom objects

The TcCom objects must be created in the following order:

- Processing Unit
- Part
- Modules
- Track
- Mover

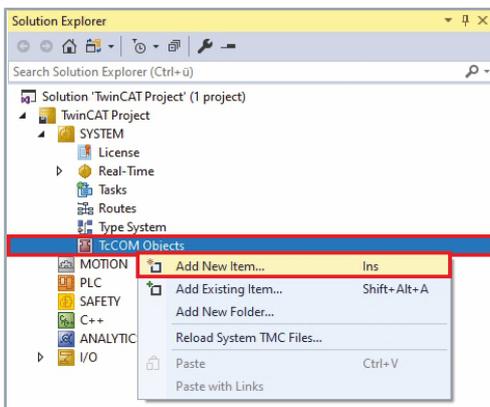


### Example configuration

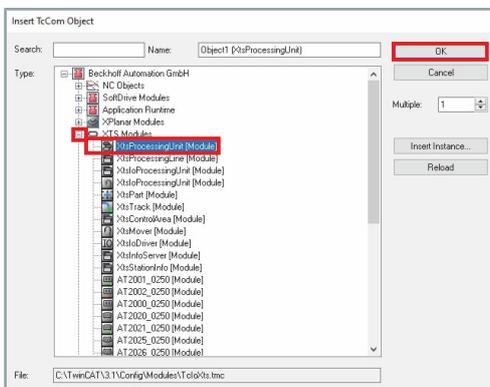
The creation of the XTS TcCom objects is shown once for each object as an example. Repeat the corresponding steps until you have created the configuration you want.

*Make sure that you always add all other TcCom objects to each Processing Unit you create.*

### Processing Unit



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM*
- ▶ Right-click on **TcCOM Objects** to open the context menu
- ▶ Click **Add New Item...** in the context menu



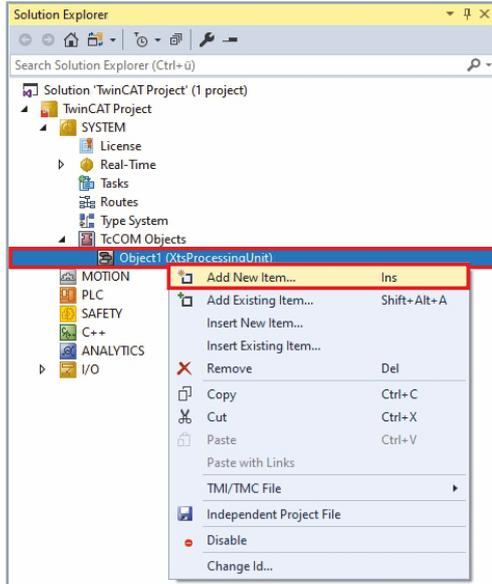
The *Insert TcCOM Object* dialog box opens.

- ▶ Expand *Beckhoff Automation GmbH* > *XTS Modules*
- ▶ Select **XtsProcessingUnit [Module]**
- ▶ Double click on the selection or confirm with **OK**

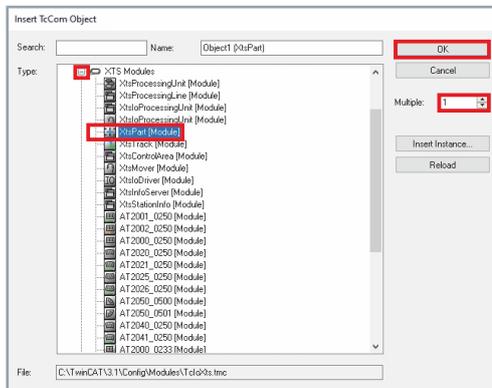
A Processing Unit is added to the TcCom objects.

# Functions of the driver

## Part



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-Com Objects*
- ▶ Right-click on **Object (XtsProcessingUnit)** to open the context menu
- ▶ Click **Add New Item...** in the context menu

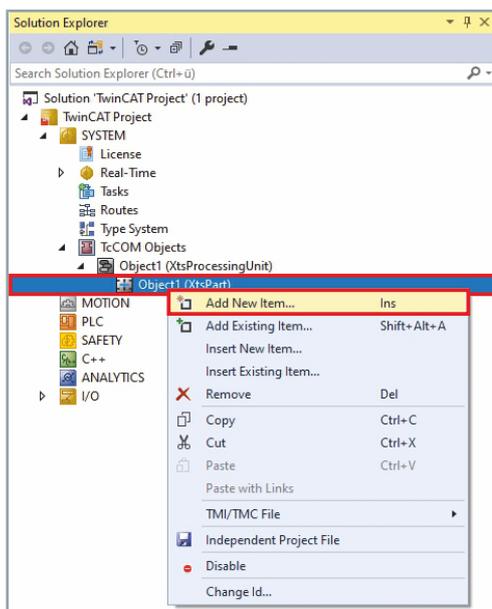


The *Insert TcCOM Object* dialog box opens.

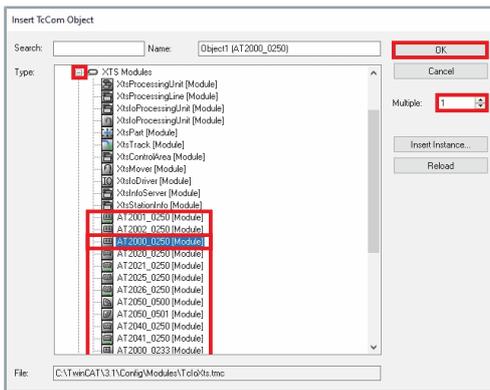
- ▶ Expand *Beckhoff Automation GmbH* > *XTS Modules*
- ▶ Select **XtsPart [Module]**
- ▶ Enter the number of parts required in the input field *Multiple*
- ▶ Double click on the selection or confirm with **OK**

One or more parts are added to the Processing Unit.

## Modules



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects* > *Object (XtsProcessingUnit)*
- ▶ Right-click on **Object (XtsPart)** to open the context menu
- ▶ Click **Add New Item...** in the context menu

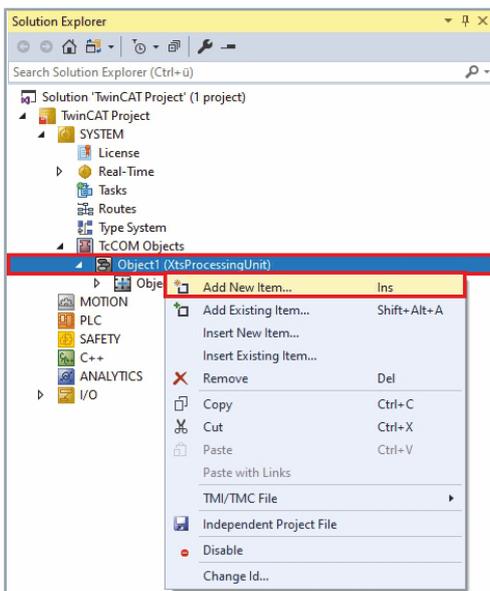


The *Insert TcCOM Object* dialog box opens.

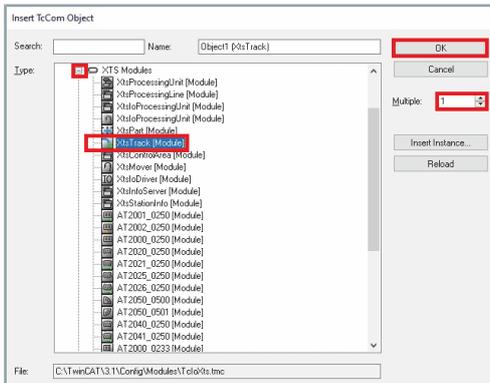
- ▶ Expand *Beckhoff Automation GmbH > XTS Modules*
- ▶ Select **ATxxx-0xxx [Module]**
- ▶ Enter the number of modules required in the input field *Multiple*
- ▶ Double click on the selection or confirm with **OK**

One or more modules are added to *Object (XtsPart)*.

## Track



- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > Tc-Com Objects*
- ▶ Right-click on **Object (XtsProcessingUnit)** to open the context menu
- ▶ Click **Add New Item...** in the context menu

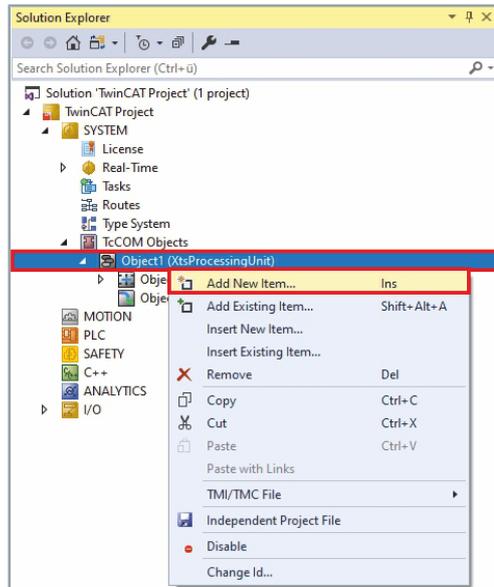


The *Insert TcCOM Object* dialog box opens.

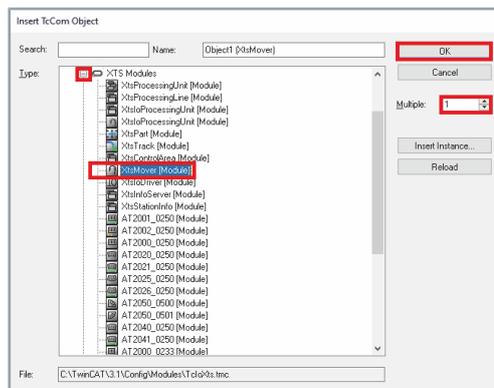
- ▶ Expand *Beckhoff Automation GmbH > XTS Modules*
- ▶ Select **XtsTrack [Module]**
- ▶ Enter the number of tracks required in the input field *Multiple*
- ▶ Double click on the selection or confirm with **OK**

One or more tracks are added to the Processing Unit.

## Mover



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-Com Objects*
- ▶ Right-click on **Object (XtsProcessingUnit)** to open the context menu
- ▶ Click **Add New Item...** in the context menu



The *Insert TcCOM Object* dialog box opens.

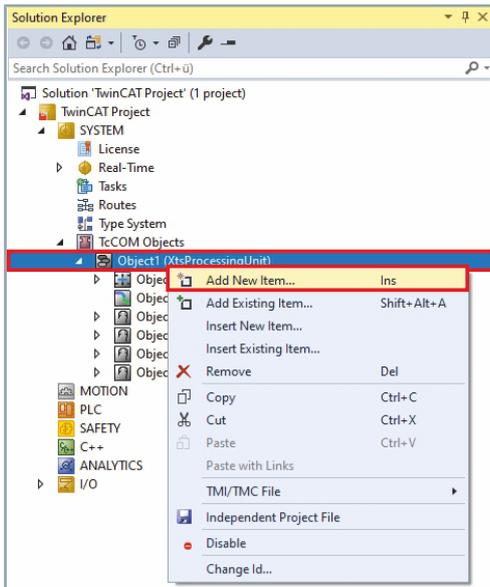
- ▶ Expand *Beckhoff Automation GmbH* > *XTS Modules*
- ▶ Select **XtsMover [Module]**
- ▶ Enter the number of movers required in the input field *Multiple*
- ▶ Double-click on the selection

OR

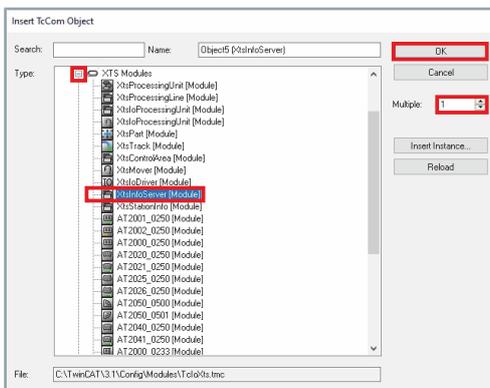
- ▶ Confirm with **OK**

One or more movers are added to the Processing Unit.

## InfoServer



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-Com Objects*
- ▶ Right-click on **Object (XtsProcessingUnit)** to open the context menu
- ▶ Click **Add New Item...** in the context menu

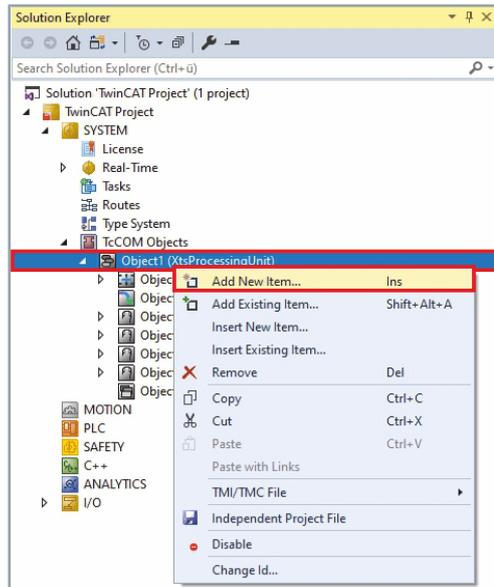


The *Insert TcCOM Object* dialog box opens.

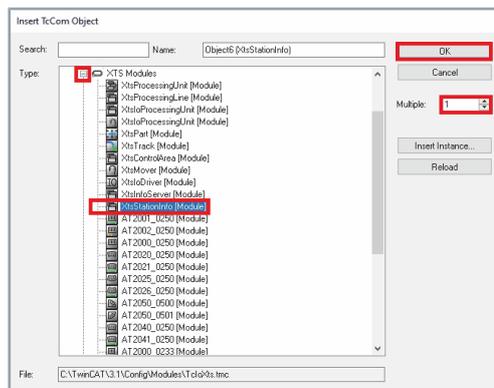
- ▶ Expand *Beckhoff Automation GmbH* > *XTS Modules*
- ▶ Select **XtsInfoServer [Module]**
- ▶ Enter the number of InfoServers required in the input field *Multiple*
- ▶ Double click on the selection or confirm with **OK**

One or more InfoServers are added to the Processing Unit.

## Stations



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-Com Objects*
- ▶ Right-click on **Object (XtsProcessingUnit)** to open the context menu
- ▶ Click **Add New Item...** in the context menu



The *Insert TcCOM Object* dialog box opens.

- ▶ Expand *Beckhoff Automation GmbH* > *XTS Modules*
- ▶ Select **XtsStationInfo [Module]**
- ▶ Enter the number of StationInfo required in the input field *Multiple*
- ▶ Double click on the selection or confirm with **OK**

One or more StationInfos are added to the Processing Unit.

### 6.1.4.2 Add Motion objects

The Motion objects must be created in the following order:

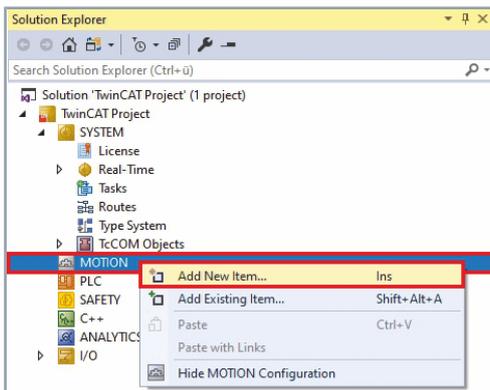
- NC task
- NC axis
- SoftDrive



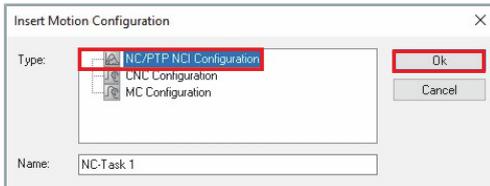
#### Example configuration

The creation of Motion objects is shown once for each object as an example. Repeat the corresponding steps until you have created the configuration you want.

#### NC task



- ▶ Expand *Solution-Explorer > TwinCAT Project*
- ▶ Right-click on **MOTION** to open the context menu
- ▶ Click **Add New Item...** in the context menu

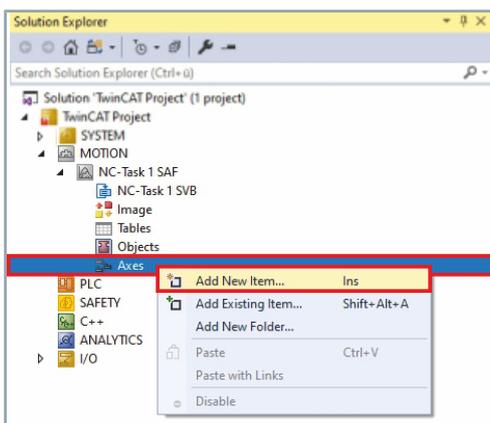


The *Insert Motion Configuration* dialog box opens.

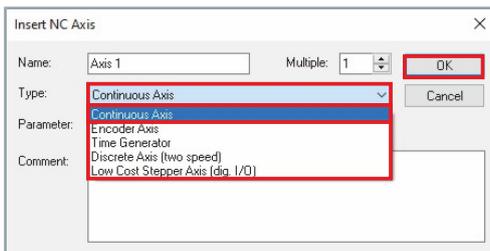
- ▶ Select **NC/PTP NCI Configuration**
- ▶ Confirm with **OK**

An NC task SAF is added.

#### NC axis



- ▶ Expand *Solution-Explorer > TwinCAT Project > MOTION > NC-Task 1 SAF*
- ▶ Right-click on **Axes** to open the context menu
- ▶ Click **Add New Item...** in the context menu



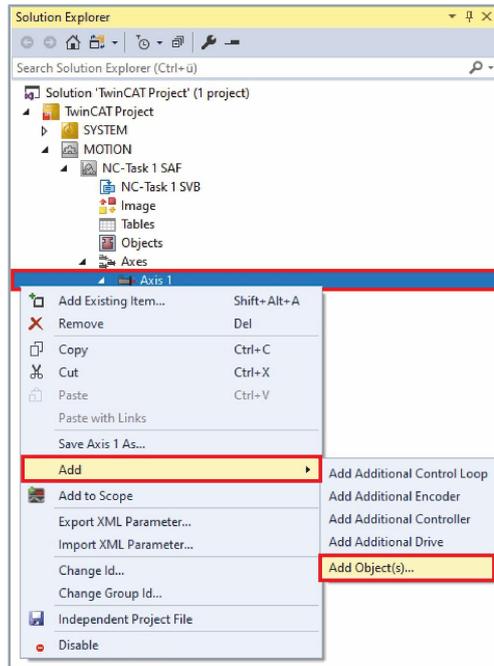
The *Insert NC Axis* dialog box opens.

- ▶ Select **Continuous Axis** in the drop-down menu *Type*
- ▶ Confirm with **OK**

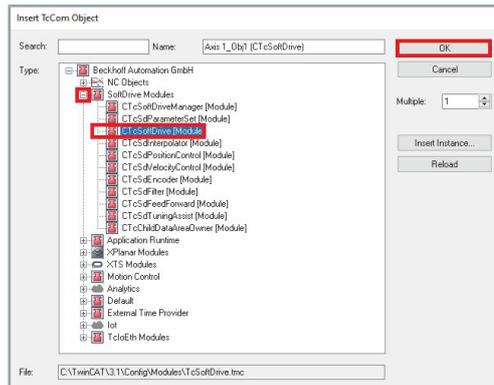
An NC axis is added.

# Functions of the driver

## SoftDrive



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *MOTION* > *NC-Task SAF* > *Axes*
- ▶ Right-click on **Axis** to open the context menu
- ▶ Click **Add** in the context menu
- ▶ Click **Add Object(s)...** in the submenu



The *Insert TcCom Object* dialog box opens.

- ▶ Expand *Beckhoff Automation GmbH* > *SoftDrive Modules*
- ▶ Select **CTcSoftDrive [Module]**
- ▶ Confirm with **OK**

A SoftDrive object is added.

6.1.4.3 Add I/O objects

**NOTICE**

**Scan existing XTS hardware**

If you want to use your existing XTS hardware, use the scan function of TwinCAT to avoid configuration errors and to save time. Further information can be found in chapter "XTS Configurator", [Page 258].

**Use XTS Simulation Builder**

With the *XTS Simulation Builder* you have the possibility to create I/O objects to save time. Further information can be found in chapter "XTS Simulation Builder", [Page 229].

**Manual configuration**

If you want to configure the I/O objects manually, you must ensure that you create exactly those components that are installed in your XTS system.

The I/O objects must be created in the following order:

- Real-time Ethernet adapter
- EtherCAT Master
- CU2508 Ethernet Port
- XTS module
- XTS sensor channel

Real-time Ethernet adapter

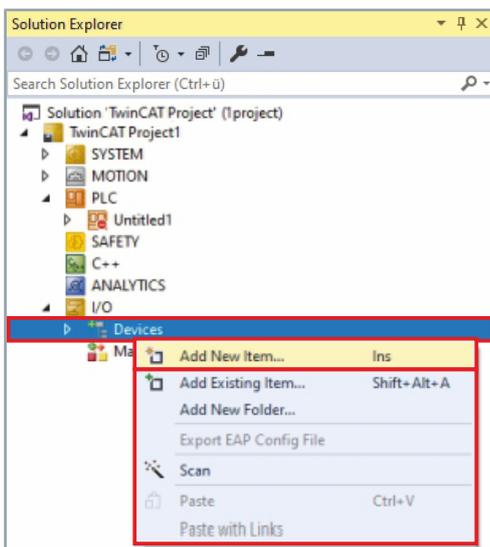
The Real-time Ethernet adapter is used to establish the physical connection between the XTS Ethernet lines and the IPC.



**Example CU2508 real-time Ethernet adapter**

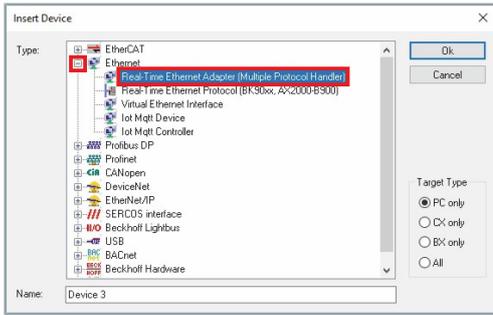
The addition of a real-time Ethernet adapter is shown with a CU2508 adapter as an example. You can add four EtherCAT masters to the CU2508 adapter. Depending on the number of EtherCAT masters, a corresponding number of real-time Ethernet adapters must be added.

You have the possibility to add other adapters. Note that these adapters differ in the form of display and have fewer connectors.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O*
- ▶ Right-click on **Devices** to open the context menu
- ▶ Click **Add New Item...** in the context menu

# Functions of the driver



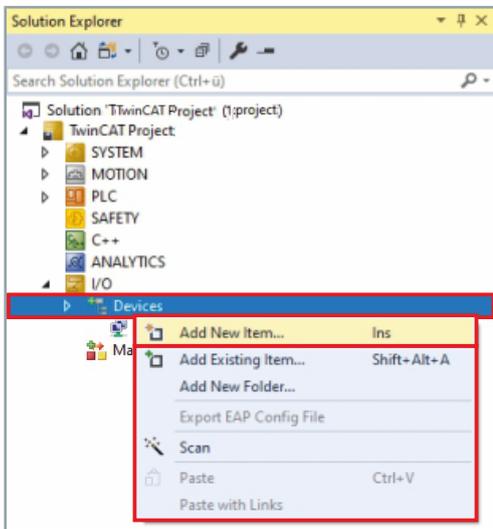
The *Insert Device* dialog box opens.

- ▶ Expand *Ethernet*
- ▶ Select **Real-Time Ethernet Adapter (Multiple Protocol Handler)**
- ▶ If required, enter a name for the Real-Time Ethernet adapter in the *Name* input field
- ▶ Confirm with **OK**

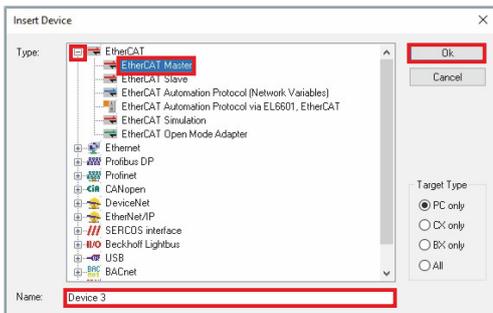
A *Device (RT-Ethernet Adapter)* is added to the I/O Devices.

## EtherCAT Master

For each infeed line an EtherCAT master is required among the I/O objects. You may use four EtherCAT masters under one Real-Time Ethernet adapter. If you use more than four EtherCAT masters, you have to add another Real-Time Ethernet adapter to the I/O objects.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O*
- ▶ Right-click on **Devices** to open the context menu
- ▶ Click **Add New Item...** in the context menu



The *Insert Device* dialog box opens.

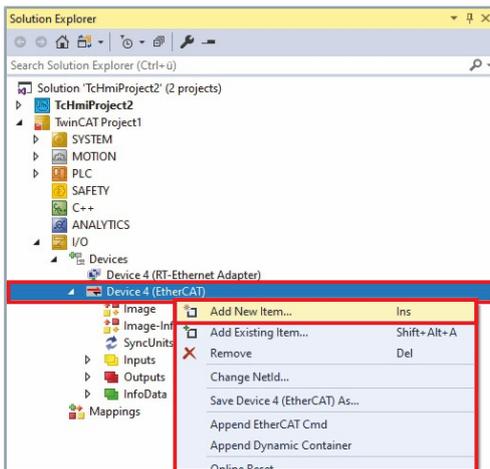
- ▶ Expand *EtherCAT*
- ▶ Select **EtherCAT Master**
- ▶ If required, enter a name for the EtherCAT Master in the *Name* input field.
- ▶ Confirm with **OK**

A *Device (EtherCAT)* is added to the I/O objects.

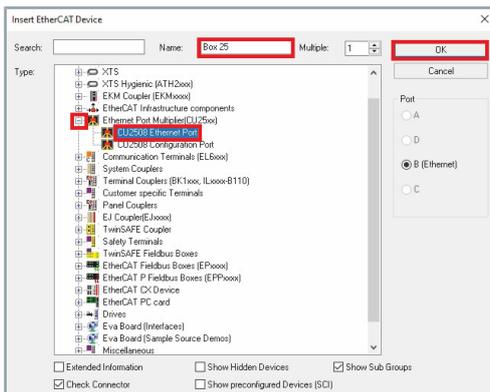
A CU2508 Ethernet port and the modules of an infeed line must be added to the EtherCAT master.

## CU2508 Ethernet Port

A CU2508 Ethernet port must be added to the EtherCAT master before the modules are added.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices*
- ▶ Right-click on **Device (EtherCAT)** to open the context menu
- ▶ Click **Add New Item...** in the context menu



The *Insert Device* dialog box opens.

- ▶ Expand *Beckhoff Automation GmbH & Co. KG* > *Ethernet Port Multiplier (CU25xx)*
- ▶ Select **CU2508 Ethernet Port**
- ▶ If required, enter a name for the CU2508 Ethernet Port in the *Name* input field
- ▶ Confirm with **OK**

A *Box (CU2508)* is added to the EtherCAT master.

## XTS module

After the CU2508 Ethernet port has been added to the EtherCAT master, the modules of the infeed line must be added.

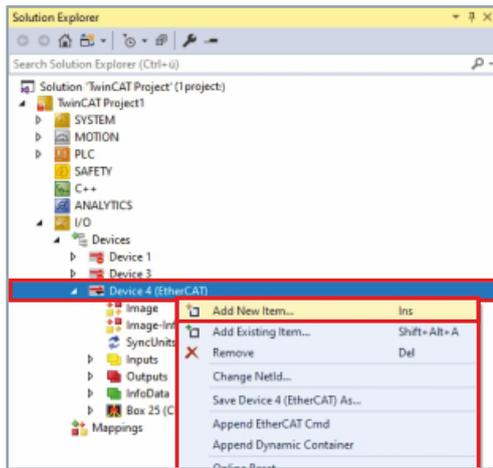


### Example module with feed

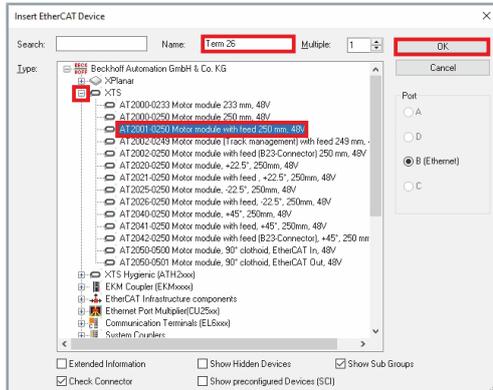
Since a module with feed has to be added to the EtherCAT master first, the addition of a module is shown with an *AT2001-0250* module with feed as an example.



Modules with feed are marked with *with feed* in the selection list.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices*
- ▶ Right-click on **Device (EtherCAT)** to open the context menu
- ▶ Click **Add New Item...** in the context menu



The *Insert Device* dialog box opens.

- ▶ Expand *Beckhoff Automation GmbH & Co. KG* > *XTS*
- ▶ Select **AT2001-0250 Motor module with feed 250 mm, 48 V**
- ▶ If required, enter a name for the module in the input field *Name*
- ▶ Confirm with **OK**

A *Term (AT2001-0250)* is added to the EtherCAT master.

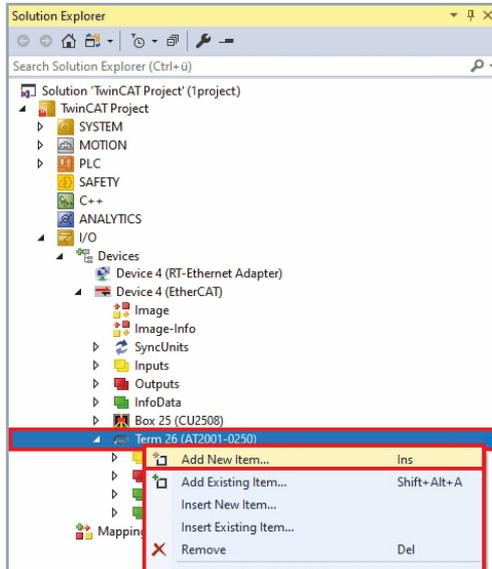
## XTS sensor channel

A sensor channel must be added to each module.

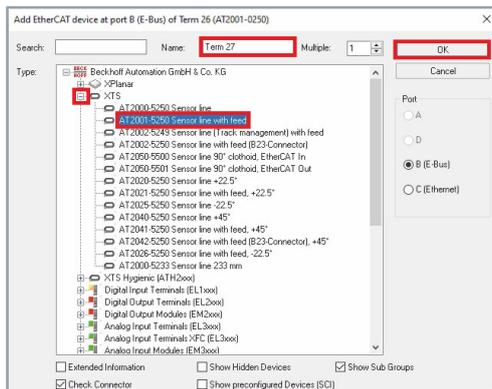


### Example sensor channel for module with feed

The addition of a sensor channel is shown with an AT0250-5250 as an example. It belongs to an AT2001-0250 module with feed.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices* > *Device (EtherCAT)*
- ▶ Right-click on **Term (AT2001-0250)** to open the context menu
- ▶ Click **Add New Item...** in the context menu



The *Insert Device* dialog box opens.

- ▶ Expand *Beckhoff Automation GmbH & Co. KG* > *XTS*
- ▶ Select **AT2001-5250 Sensor line with feed**
- ▶ If required, enter a name for the sensor channel in the input field *Name*
- ▶ Confirm with **Ok**

A *Term (AT2001-5250)* is added to the module *Term (AT2001-0250)*.

After the sensor channel has been added to the module with feed, all further modules of the infeed line can be added to the EtherCAT master.

- ▶ Add all further modules of the infeed line with a corresponding sensor channel in the same way

# Functions of the driver

## 6.1.4.4 Link TcCom objects

Once all objects have been created, some links have to be created in order to be able to exchange data between the objects.

### Modules and I/O objects

The modules must be linked to the corresponding I/O objects.

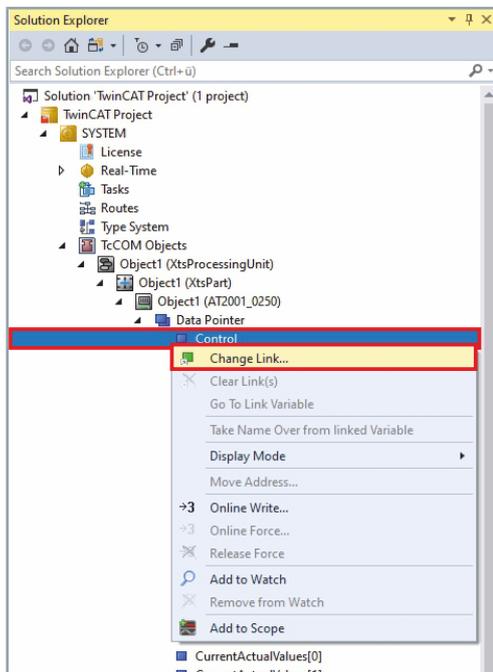
### NOTICE

#### Careful linking

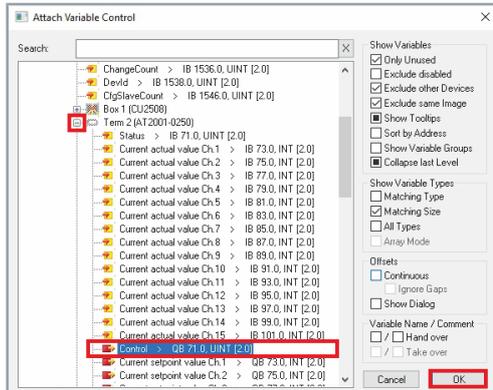
To ensure that the system can be started without problems, proceed carefully and in sequence when linking the modules to the I/O objects.

Incorrect linking can cause problems when starting the system.

### Control

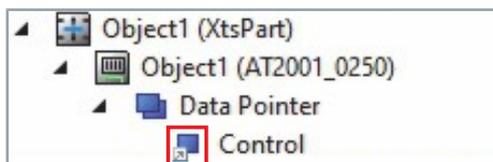


- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > TcCOM Objects > Object (XtsProcessingUnit) > Object (XtsPart) > Object (AT2001-0250) > Data Pointer*
- ▶ Right-click on **Control** to open the context menu
- ▶ Click on **Change Link...** in the context menu



The *Attach Variable Control* dialog box opens.

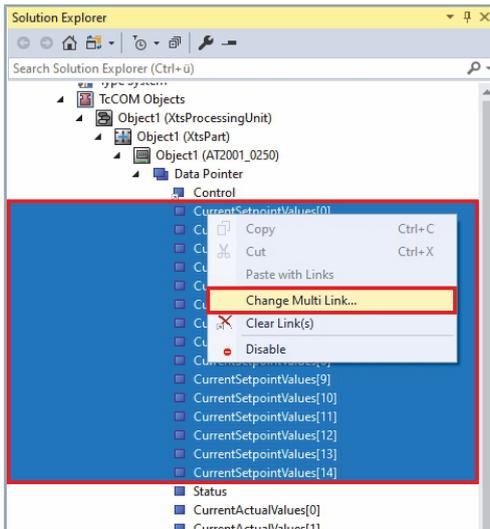
- ▶ Expand *Solution-Explorer > TwinCAT Project > I/O > Devices > Devices (EtherCAT) > Term 2 (AT2001-0250)*
- ▶ Select **Control**
- ▶ Confirm with **OK**



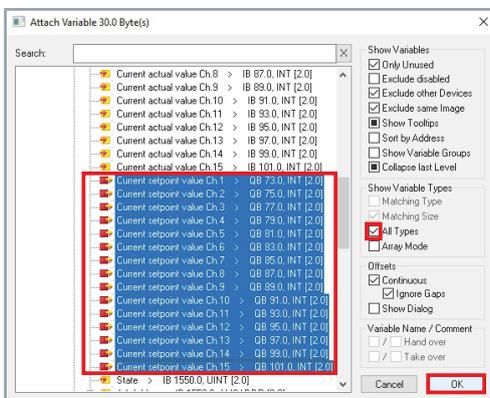
A gray arrow on the variable indicates successful linking.

Further information can be found in chapter "Linking details", [Page 57].

## CurrentSetpointValues

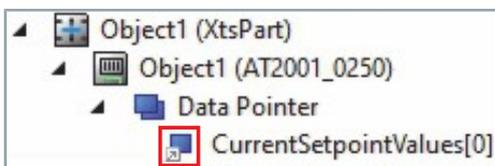


- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > Tc-COM Objects > Object (XtsProcessingUnit) > Object (XtsPart) > Objekt (AT2001-0250) > Data Pointer*
- ▶ Select **CurrentSetpointValues[0]** to **CurrentSetpointValues[14]** from top to bottom
- ▶ Right-click on the top variable of the selection to open the context menu
- ▶ Click **Change Multi Link...** in the context menu



The *Attach Variable 30.0 Byte(s)* dialog box opens.

- ▶ Expand *Solution-Explorer > TwinCAT Project > I/O > Devices > Devices (EtherCAT) > Term 2 (AT2001-0250)*
- ▶ Check checkbox at **All Types**
- ▶ Select **Current setpoint value Ch.1** to **Current setpoint value Ch.15**
- ▶ Confirm with **OK**

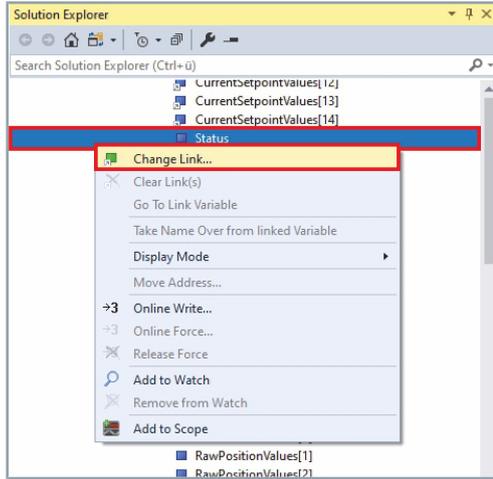


A gray arrow on the variable indicates successful linking.

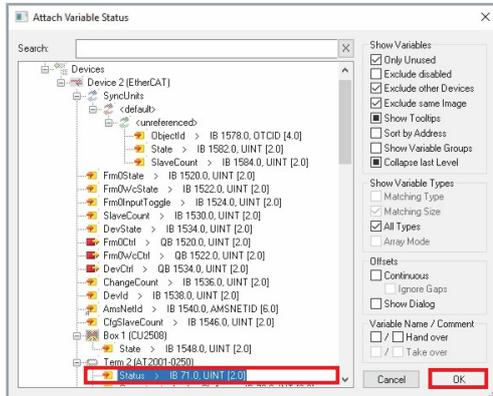
Further information can be found in chapter "Linking details", [Page 57].

# Functions of the driver

## Status

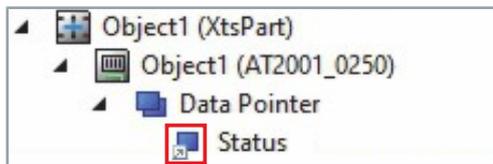


- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > Tc-COM Objects > Object (XtsProcessingUnit) > Object (XtsPart) > Object (AT2001-0250) > Data Pointer*
- ▶ Right-click on **Status** to open the context menu
- ▶ Click on **Change Link...** in the context menu



The *Attach Variable Status* dialog box opens.

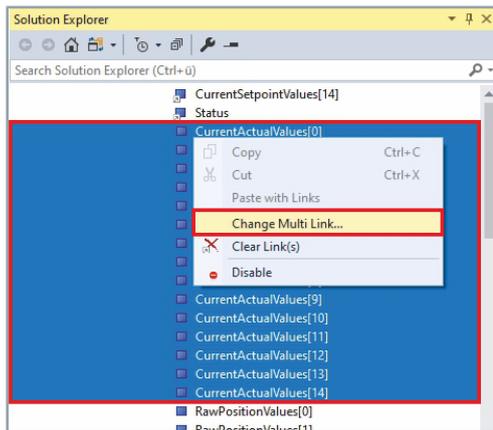
- ▶ Expand *Solution-Explorer > TwinCAT Project > I/O > Devices > Devices (EtherCAT) > Term 2 (AT2001-0250)*
- ▶ Select **Status**
- ▶ Confirm with **OK**



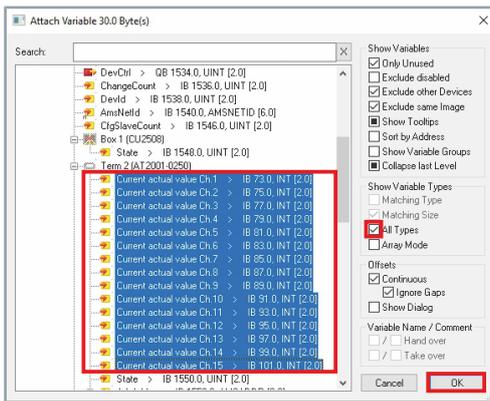
A gray arrow on the variable indicates successful linking.

Further information can be found in chapter "Linking details", [Page 57].

## CurrentActualValues

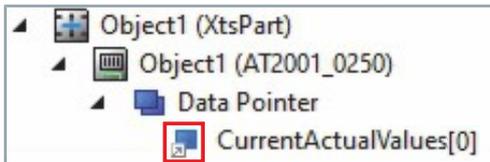


- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > Tc-COM Objects > Object (XtsProcessingUnit) > Object (XtsPart) > Objekt (AT2001-0250) > Data Pointer*
- ▶ Select **CurrentActualValues[0]** to **CurrentActualValues[14]** from top to bottom
- ▶ Right-click on the top variable of the selection to open the context menu
- ▶ Click **Change Multi Link...** in the context menu



The *Attach Variable 30.0 Byte(s)* dialog box opens.

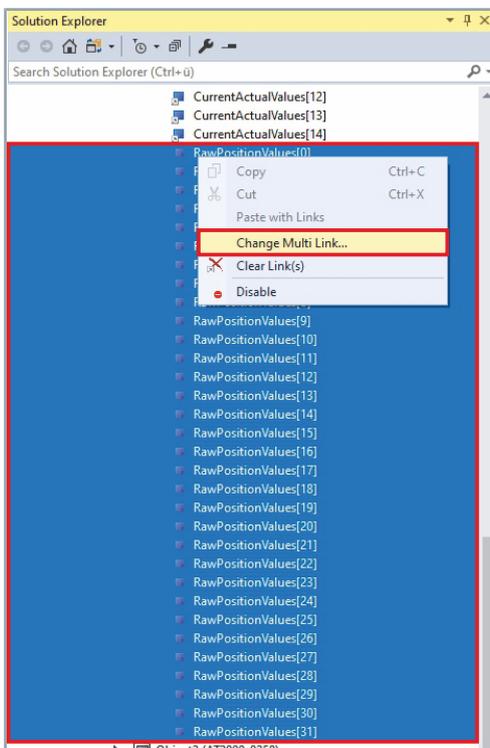
- ▶ Expand *Solution-Explorer > TwinCAT Project > I/O > Devices > Devices (EtherCAT) > Term 2 (AT2001-0250)*
- ▶ Check checkbox at **All Types**
- ▶ Select **Current actual value Ch.1 to Current actual value Ch.15**
- ▶ Confirm with **OK**



A gray arrow on the variable indicates successful linking.

Further information can be found in chapter "Linking details", [Page 57].

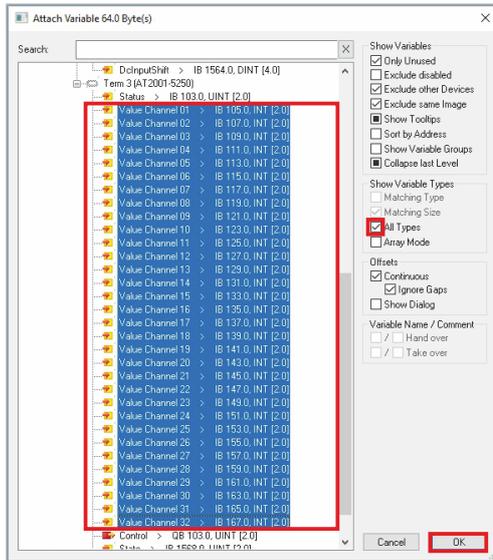
## RawPositionValues



- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > Tc-COM Objects > Object (XtsProcessingUnit) > Object (XtsPart) > Objekt (AT2001-0250) > Data Pointer*
- ▶ Select **RawPositionValues[0] to RawPositionValues[31]** from top to bottom
- ▶ Right-click on the top variable of the selection to open the context menu
- ▶ Click **Change Multi Link...** in the context menu

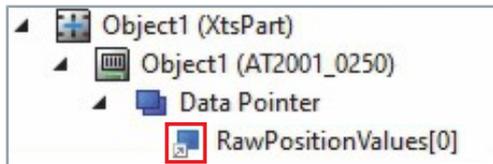


The corresponding Value Channels to the RawPositionValues are located in the added term of the XTS sensor channel. Be sure to select the correct term when linking.



The *Attach Variable 64.0 Byte(s)* dialog box opens.

- ▶ Expand *Solution-Explorer > TwinCAT Project > I/O > Devices > Devices (EtherCAT) > Term 3 (AT2001-0250)*
- ▶ Check checkbox at **All Types**
- ▶ Select **Value Channel 01 to Value Channel 32**
- ▶ Confirm with **OK**



A gray arrow on the variable indicates successful linking.

Further information can be found in chapter "Linking details", [Page 57].

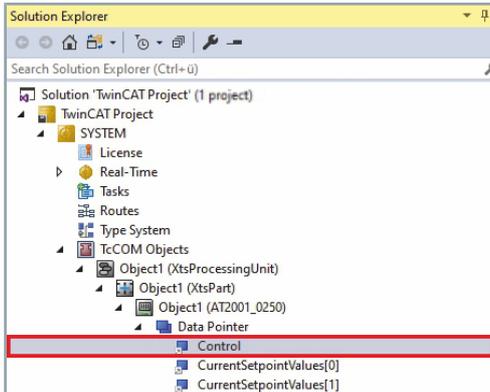
## Linking details

After successful linking of the modules TcCom objects with the physical modules of the I/O, the linking is indicated by gray arrows at the individual Data Pointer variables of the TcCom objects. You now have the option to view more details about the linking.

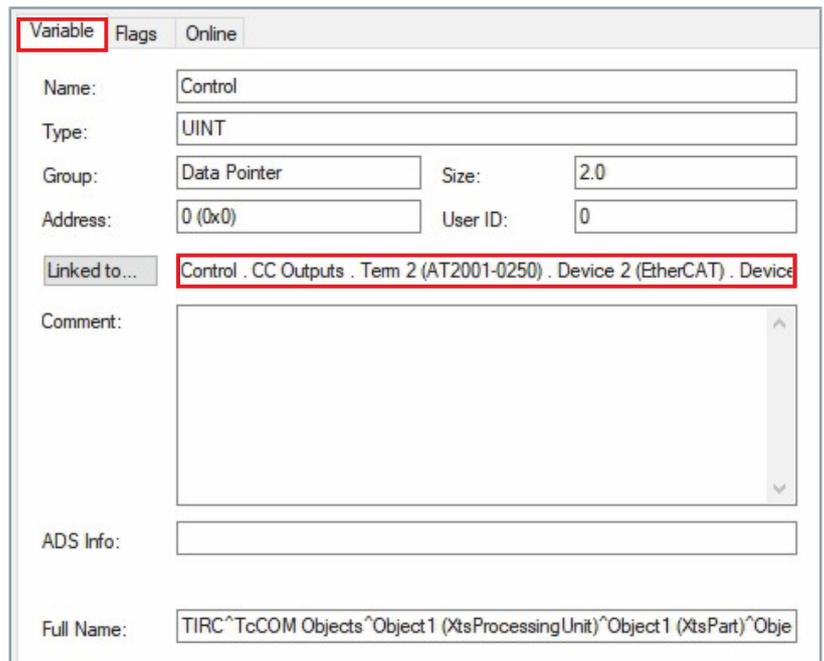


### Linking example

This chapter uses a successful control linking as an example to show you how to display the details of the linking.



- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > TcCOM Objects > Object (XtsProcessingUnit) > Object (XtsPart) > Objekt (AT2001-0250) > Data Pointer*
- ▶ Double click on **Control**



- ▶ Click on the **Variable** tab in the project window
- Details of the linking are displayed at **Linked to...**

## TcCom objects Mover and Motion

To be able to control the movers, the setpoints of the movers must be calculated. For this purpose, each TcCOM object *Mover* must be linked to an NC axis.



### Create corresponding TcCom objects Mover with TC1250 and TF5020

To link the TcCom objects with the NC axes, corresponding XTS Mover software objects must be created with the software *TC1250* | *TwinCAT 3 PLC/NC PTP 10* and *TF5020* | *TwinCAT 3 NC PTP Axes Pack unlimited*. For more information, please see the following links:

[Direct link to documentation TC1250 | TwinCAT 3 PLC/NC PTP 10](#)

[Direct link to the documentation TF50x0 | TwinCAT 3 | NC PTP](#)

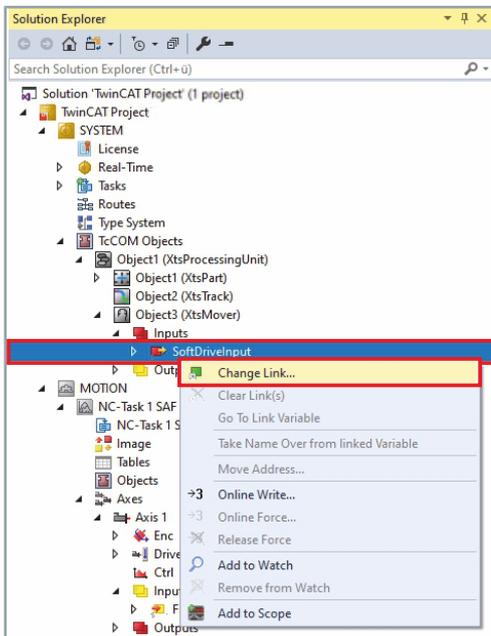
## NOTICE

### Careful linking

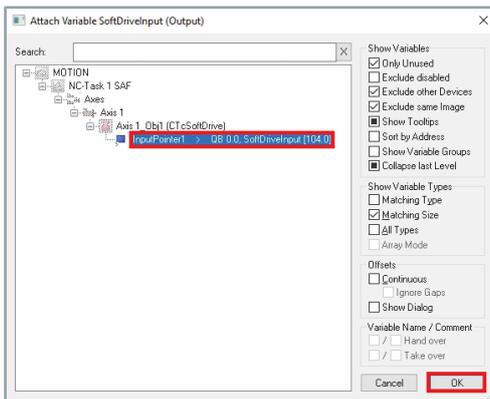
To ensure that the system starts smoothly, proceed carefully and sequentially when linking the movers to the Motion objects. Incorrect linking can cause problems when starting the system.

## SoftDrive Input

The position setpoints and dynamics setpoints for the mover are provided for the calculation.

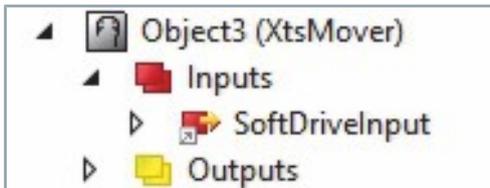


- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *Object (XtsProcessingUnit)* > *Object (XtsMover)* > *Inputs*
- ▶ Right-click on **SoftDriveInput** to open the context menu
- ▶ Click on **Change Link...** in the context menu



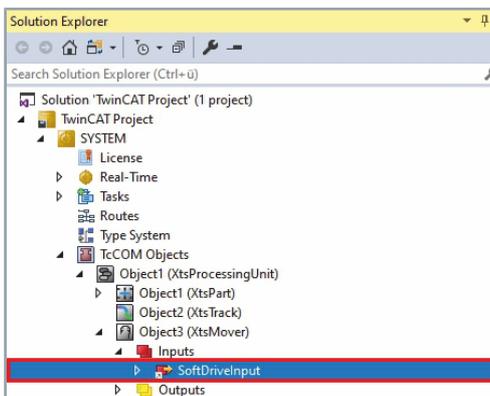
The *Attach Variable SoftDriveInput (Output)* dialog box opens.

- ▶ Expand *MOTION > NC-Task 1 SAF > Axes > Axis 1 > Axis 1\_Obj (CTcSoftDrive)*
- ▶ Select **InputPointer**
- ▶ Confirm with **OK**

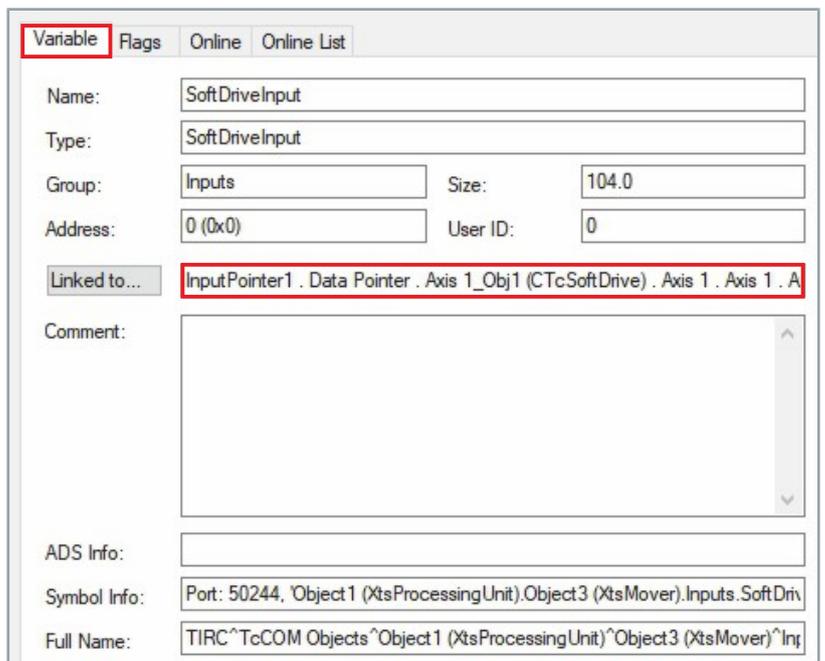


A gray arrow on the variable indicates successful linking.

## Linking details



- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > TcCOM Objects > Object (XtsProcessingUnit) > Object (XtsMover) > Inputs*
- ▶ Double-click on **SoftDriveInput**

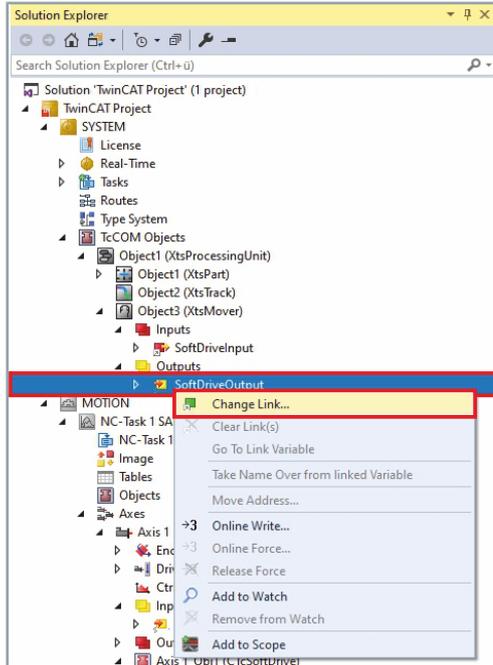


- ▶ Click on the **Variable** tab in the project window
- Details of the linking are displayed at **Linked to....**

# Functions of the driver

## SoftDrive Output

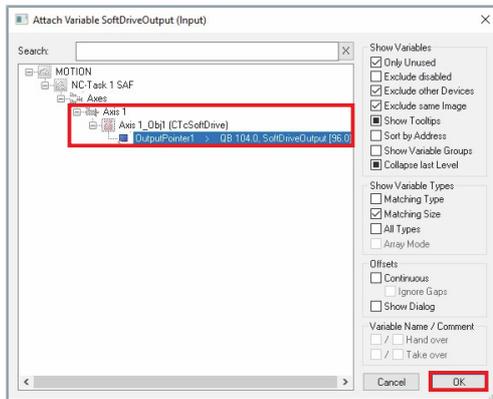
The actual values for the position and dynamics of the mover are provided for the application.



- ▶ Expand *Solution-Explorer > TwinCAT Project > SYSTEM > Tc-COM Objects > Object (XtsProcessingUnit) > Object (XtsMover) > Outputs*
- ▶ Right-click on **SoftDriveOutput** to open the context menu
- ▶ Click on **Change Link...** in the context menu

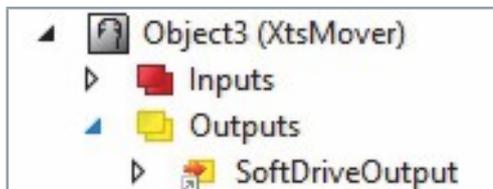
### NOTICE

For SoftDrive Output linking, make sure that you select the same mover that you used for SoftDrive Input linking.



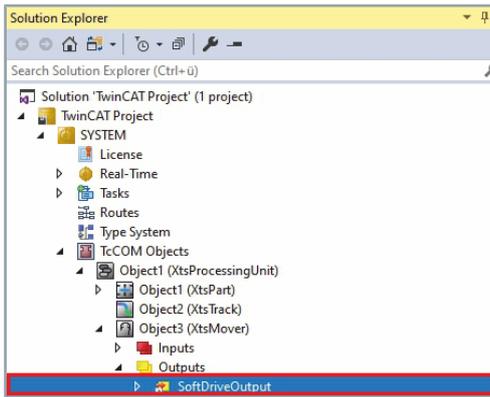
The *Attach Variable SoftDriveOutput (Input)* dialog box opens.

- ▶ Expand *MOTION > NC-Task 1 SAF > Axes > Axis 1 > Axis 1\_Obj (CTcSoftDrive)*
- ▶ Select **OutputPointer**
- ▶ Confirm with **OK**

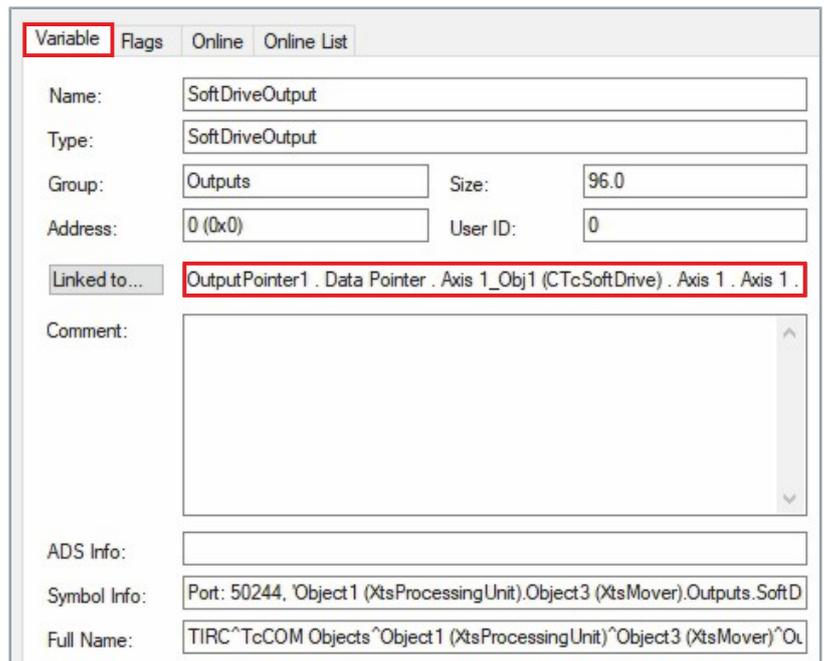


A gray arrow on the variable indicates successful linking.

## Linking details



- ▶ Expand *Solution-Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *Object (XtsProcessingUnit)* > *Object (XtsMover)* > *Outputs*
- ▶ Double-click on **SoftDriveOutput**



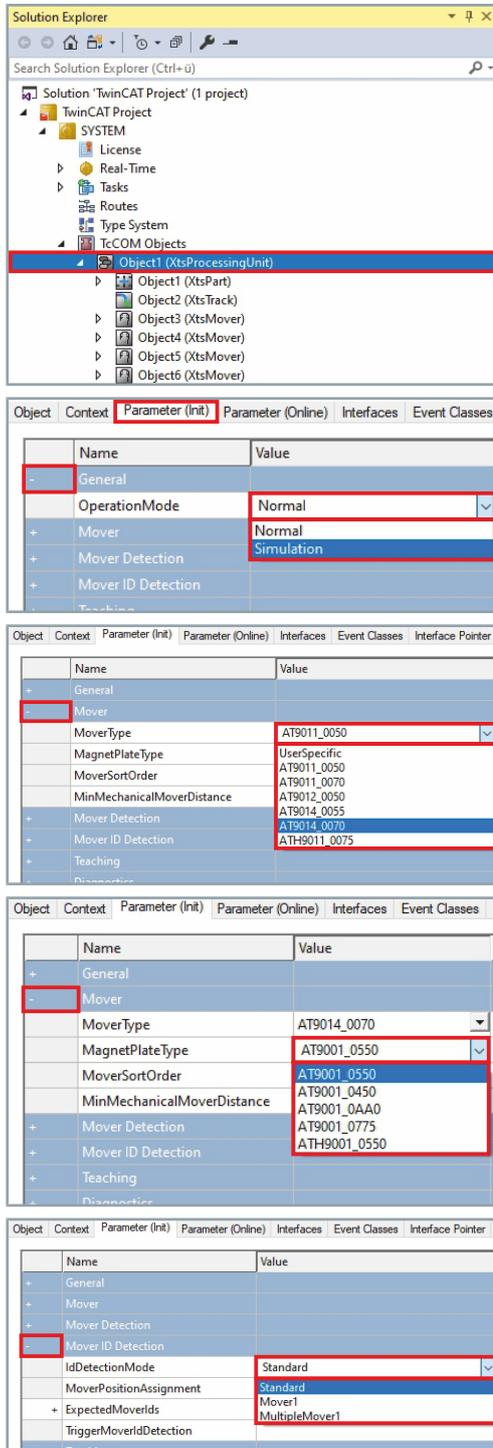
- ▶ Click on the **Variable** tab in the project window
- Details of the linking are displayed at **Linked to....**

## 6.1.4.5 Required settings

Once the linking has been completed, further settings are required for the TcCom objects, Motion objects and I/O objects before the XTS system can be put into operation.

If the XTS Configurator was used to create the XTS system, the required settings have been created automatically.

### Processing Unit



▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects*

▶ Double-click on **Object (XtsProcessingUnit)**

▶ Click the **Parameter (Init)** tab in the project window

▶ Expand *General*

▶ Select *OperationMode* **Normal** or **Simulation** in the drop-down menu

▶ Expand *Mover*

▶ Select the appropriate mover in the drop-down menu *MoverType*

▶ Select the corresponding magnetic plate set of the mover in the drop-down menu *MagnetPlateType*

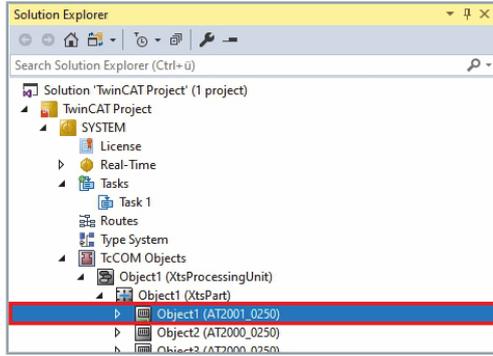
▶ Expand *Mover ID Detection*

▶ In the drop-down menu *IdDetectionMode*, select whether no, one or several Mover 1 are used on the XTS system

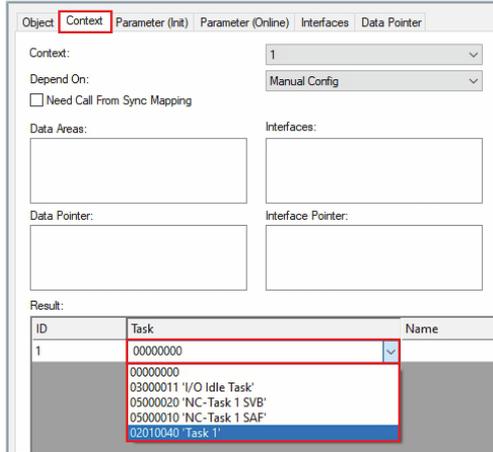
Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes	Interface Pointer	XPU
		Name	Value				
+		General					
+		Mover					
+		Mover Detection					
+		Mover ID Detection					
		Teaching					
		TeachingFileNumber	0				
		TeachingMappingMode	Automatic				
+		StartStandStillTeaching	...				
+		StartMovementTeaching	...				
		StopMovementTeaching					
		IsAbortOnTeachingWarningsEnabled	TRUE				
		IsTeachingChecksumCheckEnabled	FALSE				
		IsTeachingEnabled	TRUE				
+		TeachingChecksum	FALSE				
		TeachingWarningLevel	TRUE				

- ▶ Expand *Teaching*
- ▶ Select **TRUE** in the *IsTeachingEnabled* drop-down menu

## Modules



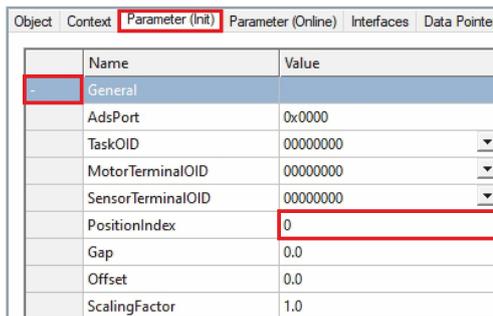
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects* > *Object (ProcessingUnit)*
- ▶ Double-click on **Object (AT2xxx-0xxx)**



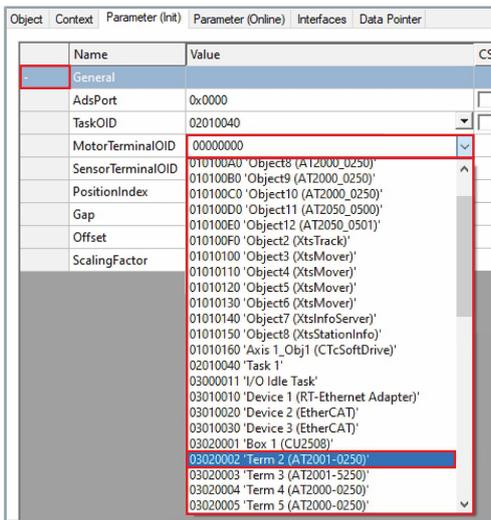
- ▶ In the project window click on the **Context** tab
- ▶ Select the appropriate task from the *Task* drop-down menu



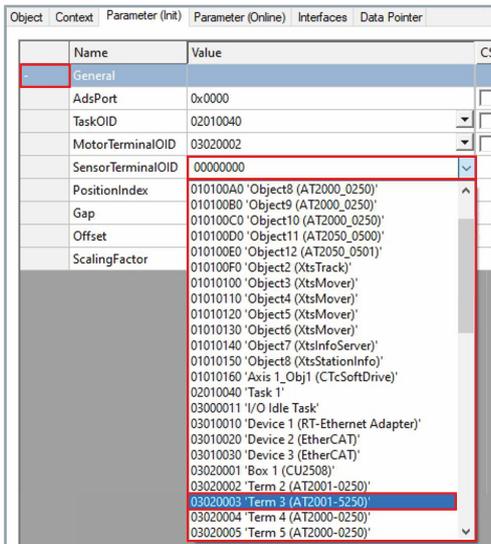
The *PositionIndex* defines the position of the module in the XTS system. The first module has the hardware position 0, the other modules are counted in ascending order. The number of modules minus one gives the hardware position for the last module.



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Enter a continuous value in the *PositionIndex* input field, starting with 0 for the first module



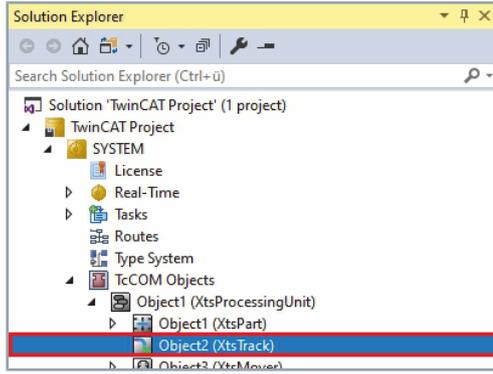
► Select the module used in the drop-down menu *MotorTerminalOID*



► Select sensor channel in the *SensorTerminalOID* drop-down menu

# Functions of the driver

## Track



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *Object (ProcessingUnit)*
- ▶ Double-click on **Object (XtsTrack)**

Name	Value	CS	Unit
TaskOID	00000000		
IsClosed	FALSE		
IsIncludedInDetection	FALSE		
Polarity	TRUE		
Offset	0.0		
PartConfigItems	[...]		1 (Array Elements)
[0].ObjectID	00000000		
[0].Polarity	Positive		

- ▶ Click the **Parameter (Init)** tab in the project window
  - ▶ Expand *General*
  - ▶ Select **TRUE** in the *IsClosed* drop-down menu if the system is closed
- OR
- ▶ Select **FALSE** in the *IsClosed* drop-down menu if the system is open

Name	Value	CS	Unit
TaskOID	00000000		
IsClosed	TRUE		
IsIncludedInDetection	FALSE		
Polarity	FALSE		
Offset	TRUE		
PartConfigItems	[...]		1 (Array Elements)
[0].ObjectID	00000000		
[0].Polarity	Positive		

- ▶ Select **TRUE** in the drop-down menu *IsIncludedInDetection* if the track is included from Mover ID detection
- OR
- ▶ Select **FALSE** in the drop-down menu *IsIncludedInDetection* if the track is excluded from Mover ID detection

Name	Value	CS	Unit
TaskOID	02010040		
IsClosed	TRUE		
IsIncludedInDetection	TRUE		
Polarity	Positive		
Offset	0.0		
PartConfigItems	[...]		1 (Array Elements)
[0].ObjectID	00000000		1 (Array Elements)
[0].Polarity	Positive		2 (Array Elements)
			3 (Array Elements)
			4 (Array Elements)
			5 (Array Elements)
			6 (Array Elements)
			7 (Array Elements)
			8 (Array Elements)
			9 (Array Elements)
			10 (Array Elements)
			11 (Array Elements)
			12 (Array Elements)
			13 (Array Elements)
			14 (Array Elements)
			15 (Array Elements)
			16 (Array Elements)
			17 (Array Elements)
			18 (Array Elements)
			19 (Array Elements)
			20 (Array Elements)
			21 (Array Elements)
			22 (Array Elements)
			23 (Array Elements)
			24 (Array Elements)
			25 (Array Elements)
			26 (Array Elements)
			1 to 100 Elements

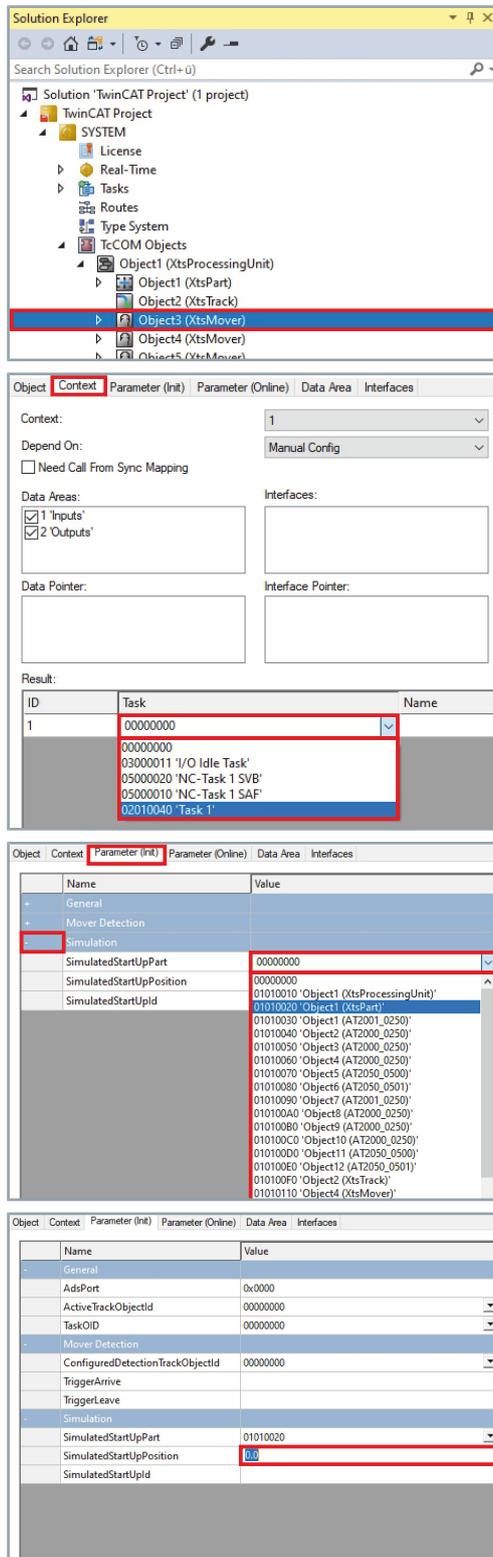
- ▶ In the column *Units* of the drop-down menu select the number of parts that are included in the track

Name	Value	CS	Unit
TaskOID	00000000		
IsClosed	TRUE		
IsIncludedInDetection	TRUE		
Polarity	Positive		
Offset	0.0		
PartConfigItems	[...]		1 (Array Elements)
[0].ObjectID	00000000		
[0].Polarity	00000000		
	01010010 'Object1 (XtsProcessingUnit)'		
	01010020 'Object1 (XtsPart)'		
	01010030 'Object1 (AT2000_0250)'		
	01010040 'Object2 (AT2000_0250)'		
	01010050 'Object3 (AT2000_0250)'		
	01010060 'Object4 (AT2000_0250)'		
	01010070 'Object5 (AT2050_0500)'		
	01010080 'Object6 (AT2050_0501)'		
	01010090 'Object7 (AT2002_0250)'		
	010100A0 'Object8 (AT2000_0250)'		
	010100B0 'Object9 (AT2000_0250)'		
	010100C0 'Object10 (AT2000_0250)'		
	010100D0 'Object11 (AT2050_0500)'		
	010100E0 'Object12 (AT2050_0501)'		
	03000011 I/O Idle Task		

- ▶ Expand *PartConfigItems*
- ▶ In the *ObjectID* drop-down menu, select the part or parts that belong to the track

## Mover

When creating movers manually, a universal mover object is inserted by default. In addition to the selection of the mover type, the start position of the mover must also be determined.



► Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *Object (XtsProcessingUnit)*

► Double-click on **Object (XtsMover)**

► In the project window click on the **Context** tab

► Select the task in the *Task* drop-down menu

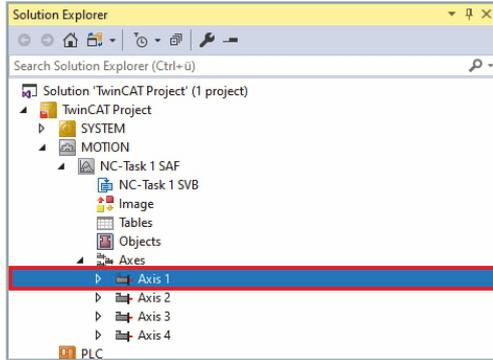
► Click the **Parameter (Init)** tab in the project window

► Expand *Simulation*

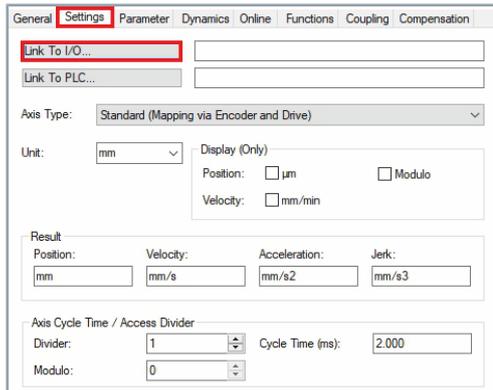
► In the *SimulatedStartUpPart* drop-down menu select a part on which the mover is to start

► Enter the exact position of the mover on the part in the *SimulatedStartUpPosition* input field

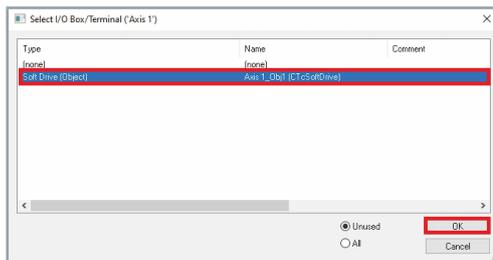
## NC axis



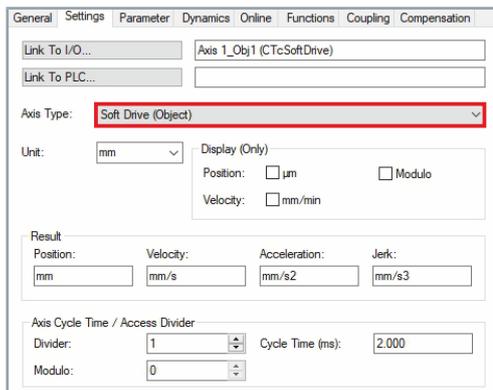
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC-SAF 1 Task* > *Axes*
- ▶ Double click on **Axis 1**



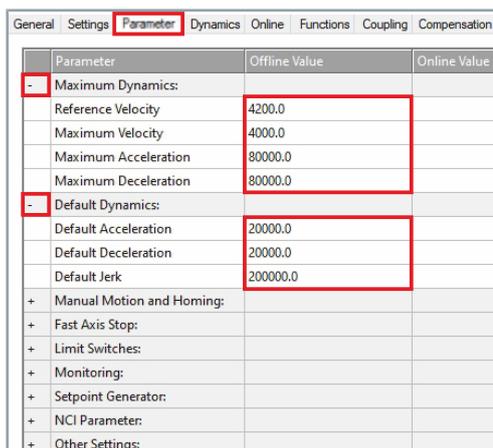
- ▶ In the project window click on the **Settings** tab
- ▶ Click **Link To I/O...**



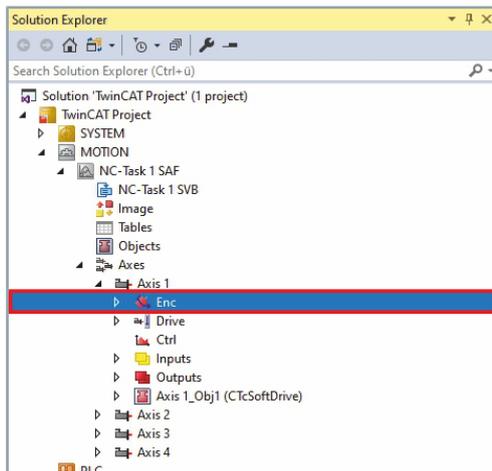
- The dialog box *Select I/O Box/Terminal* opens.
- ▶ Select the corresponding **SoftDrive (Object)** from the list
  - ▶ Confirm with **OK**



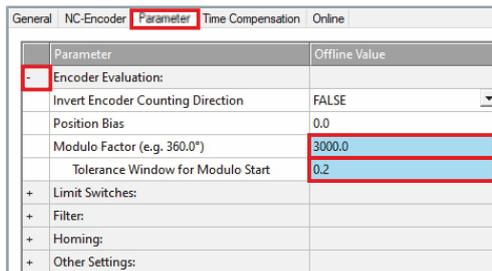
When the *SoftDrive* is selected, the **Axis Type** automatically changes to *SoftDrive (Object)*.



- ▶ In the project window click on the **Parameter** tab
- ▶ Expand *Maximum Dynamics*
- ▶ Enter the value **4200.0** in the input field *Reference Velocity*
- ▶ Enter the value **4000.0** in the input field *Maximum Velocity*
- ▶ Enter the value **80000.0** in the input fields *Maximum Acceleration* and *Maximum Deceleration*
- ▶ Expand *Default Dynamics*
- ▶ Enter the value **20000.0** in the input fields *Default Acceleration* and *Default Deceleration*
- ▶ Enter the value **200000.0** in the input field *Default Jerk*

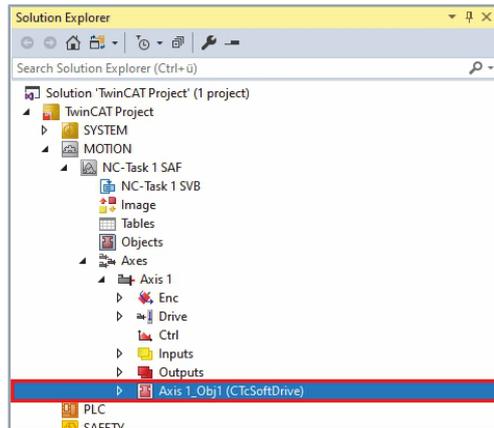


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC-Task 1 SAF* > *Axes* > *Axis 1*
- ▶ Double click on **Enc**

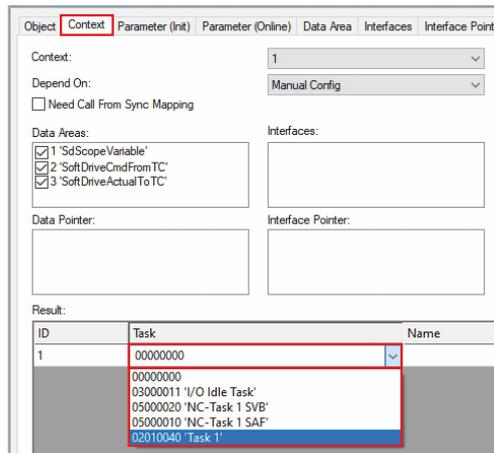


- ▶ In the project window click on the **Parameter** tab
- ▶ Expand *Encoder Evaluation*
- ▶ Enter the value **3000** in the input field *Modulo Factor*
- ▶ Enter the value **0.2** in the input field *Tolerance Window for Modulo Start*

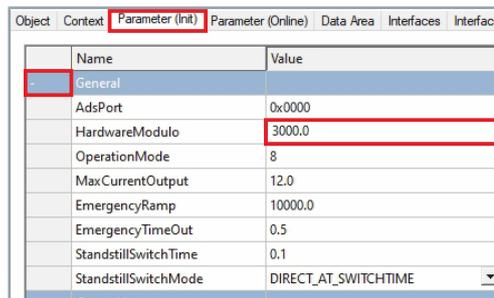
## SoftDrive



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC-Task 1 SAF* > *Axes* > *Axis*
- ▶ Double click on **Axis 1\_Obj1 (CTcSoftDrive)**



- ▶ In the project window click on the *Context* tab
- ▶ Select the appropriate task from the *Task* drop-down menu



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Enter the value **3000.0** in the input field *Hardware Modulo*

## NOTICE

### Configuration of existing hardware components

All objects must correspond to the existing hardware components so that the configuration can be used in simulation and operation.

Once all objects correspond to the desired XTS system, the configuration can be used in the simulation. If required, modules and objects can be added or removed for a pure simulation project without existing hardware.

## 6.1.5 Compatibility mode

The compatibility mode allows you to switch from the previous XTS Manager of software versions up to version 3.18.715.0 to the *TF5850 | TwinCAT 3 XTS Extension* without having to reconfigure the XTS system. The old XTS Manager can still be used with all functions. Old versions of the XTS Utility Library, the XTS Tools as well as the *XTS Viewer* and the *XTS Support Assistant* will still work after the update.



Please note that while using the compatibility mode, the new functions, such as XTS Track Management and the Leave and Arrive functionality, or some new functions for simulation and visualization are not available. To extend your XTS system and use the new functions, you must convert your current configuration of XTS objects into a new project. Further information can be found in chapter "Conversion of old XTS system", [Page 72].

Old configuration	New configuration
<p>TcCOM Objects</p> <ul style="list-style-type: none"> <li>Object1 (XtsIoDriver)                             <ul style="list-style-type: none"> <li>Info                                     <ul style="list-style-type: none"> <li>Module 1_Obj1 (AT2001_0250)</li> <li>Module 2_Obj2 (AT2000_0250)</li> <li>Module 3_Obj3 (AT2000_0250)</li> <li>Module 4_Obj4 (AT2000_0250)</li> <li>Module 5_Obj5 (AT2050_0500)</li> <li>Module 6_Obj6 (AT2050_0501)</li> <li>Module 7_Obj7 (AT2001_0250)</li> <li>Module 8_Obj8 (AT2000_0250)</li> <li>Module 9_Obj9 (AT2000_0250)</li> <li>Module 10_Obj10 (AT2000_0250)</li> <li>Module 11_Obj11 (AT2050_0500)</li> <li>Module 12_Obj12 (AT2050_0501)</li> </ul> </li> <li>Mover 1</li> <li>Mover 2</li> <li>Mover 3</li> <li>Mover 4</li> <li>Mover 5</li> <li>Mover 6</li> <li>Mover 7</li> <li>Mover 8</li> <li>Mover 9</li> <li>Mover 10</li> </ul> </li> </ul>	<p>TcCOM Objects</p> <ul style="list-style-type: none"> <li>XtsProcessingUnit 1                             <ul style="list-style-type: none"> <li>Part 1                                     <ul style="list-style-type: none"> <li>Module 1</li> <li>Module 2</li> <li>Module 3</li> <li>Module 4</li> <li>Module 5</li> <li>Module 6</li> <li>Module 7</li> <li>Module 8</li> <li>Module 9</li> <li>Module 10</li> <li>Module 11</li> <li>Module 12</li> </ul> </li> <li>Track 1                                     <ul style="list-style-type: none"> <li>Mover 1</li> <li>Mover 2</li> <li>Mover 3</li> <li>Mover 4</li> <li>Mover 5</li> <li>Mover 6</li> <li>Mover 7</li> <li>Mover 8</li> <li>Mover 9</li> <li>Mover 10</li> </ul> </li> <li>Info Server</li> </ul> </li> </ul>

To activate the new XTS software after the change, you only need to reload the XTS TcCOM objects. The old configuration and the XTS system work as usual without adjusting the project. Further information can be found in chapter "Reload TcCom objects", [Page 23].

OTCID	Name
03000000	IO
08500000	PlcCtrl
02000000	RTime
01010020	Object2 (XtsIoDriver)
01010010	Module 1_Obj1 (AT2001_0250)
01010030	Module 2_Obj2 (AT2000_0250)
01010040	Module 3_Obj3 (AT2050_0500)
01010050	Module 4_Obj4 (AT2050_0501)
01010060	Module 5_Obj5 (AT2000_0250)
01010070	Module 6_Obj6 (AT2000_0250)
01010080	Module 7_Obj7 (AT2050_0500)
01010090	Module 8_Obj8 (AT2050_0501)
01010490	Mover 1_Obj9 (XtsMover)
010104A0	Mover 2_Obj10 (XtsMover)
010104B0	Mover 3_Obj11 (XtsMover)
010104C0	Mover 4_Obj12 (XtsMover)
71010010	Object2 (XtsIoDriver)_ProcessingUnit
71010002	IOPU
7101000C	Object2 (XtsIoDriver)_DefaultPart
7101000D	Object2 (XtsIoDriver)_DefaultTrack

During operation, a hidden new configuration is created in the background using the new object structure XTS Parts and XTS Tracks, which is internally linked to the old objects. This configuration can be seen in the *Online Objects* tab.

## 6.1.6 Conversion of old XTS system



Please note that while using the compatibility mode, the new functions of the XTS Track Management as well as the Leave and Arrive functionality or some new functions for simulation and visualization are not available. To extend your XTS system and use the new functions, you must convert your current configuration of XTS objects into a new project.

When converting an old XTS system up to software version 3.18.715.0, the following areas must be adjusted and carefully controlled, as only small changes in these areas produce large effects in the entire project:

- XTS TcCOM objects
- NC axes and SoftDrives
- XTS Utility Library



### Example configuration

The conversion of an old system and the associated project is described using a closed system with 180° curves and four movers as an example.



To be safe, make a copy of your project before starting the conversion. It cannot be guaranteed that the following steps can be applied one hundred percent to every project. If you have difficulties with the conversion, contact the product specialist responsible for your region.

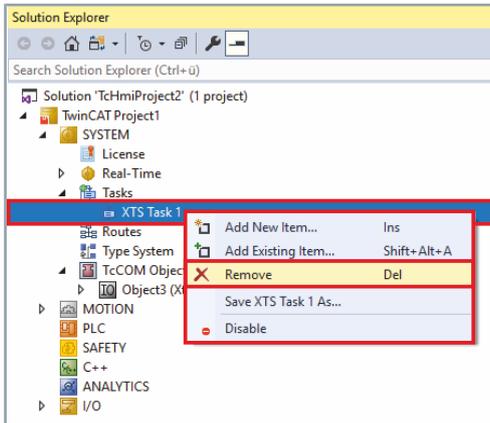
### 6.1.6.1 Removing old XTS Task and XtsIoDriver TcCOM object

First, the XTS Task and the structure of the *XtsIoDriver* TcCOM object must be removed from the old project.



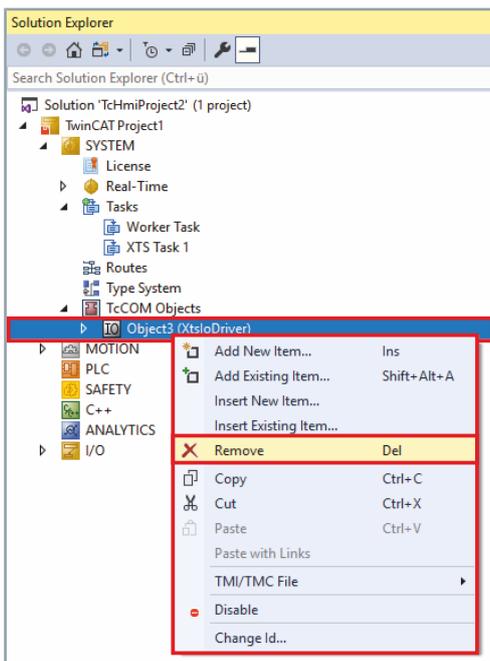
If required, create a list of the most important settings of the *XtsIoDriver* TcCOM object so that you can apply them later to the XTS Processing Unit object.

#### XTS Task



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tasks*
- ▶ Right-click on **XTS Task** to open the context menu
- ▶ In the context menu click **Remove**

#### XtsIoDriver TcCOM object

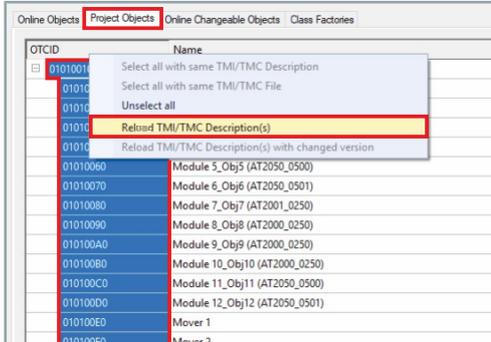


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Right-click on **Object (XtsIoDriver)** to open the context menu
- ▶ In the context menu click **Remove**

## Execute TMC Reload



If not already done, a TMC Reload must be performed. Further information can be found in chapter "Compatibility mode", [Page 71].



- ▶ In the project window click on the **Project Objects** tab
- ▶ Select all objects
- ▶ Right-click the selected objects to open the context menu
- ▶ Click on **Reload TMI/TMC Description(s)** in the context menu

## Creating a new XTS TcCOM structure

To convert an old XTS system, a new XTS system must first be configured. To do this, activate the *XTS Tool Window*. Further information can be found in chapter "Activation of the XTS Tool Window", [Page 224].

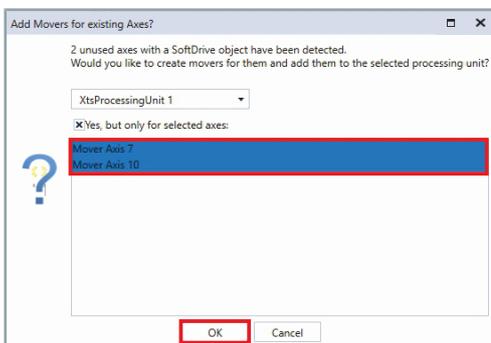
Start configuring the system. Further information can be found in chapter XTS system configuration. If required, you can set new parameters such as stations or simulation parameters for the movers already during configuration.

When configuring the movers, you can either accept the existing NC axes and SoftDrives or create new ones. Taking over the existing NC axes has the advantage that you do not have to set new links to the PLC. Furthermore, all tuning parameters and settings of the NC axes are taken over.

## Reuse of NC axes



The *Add Movers for existing Axes?* dialog box opens only if there are fewer movers than old NC axes in the new project.



The *Add Movers for existing Axes?* dialog box opens.

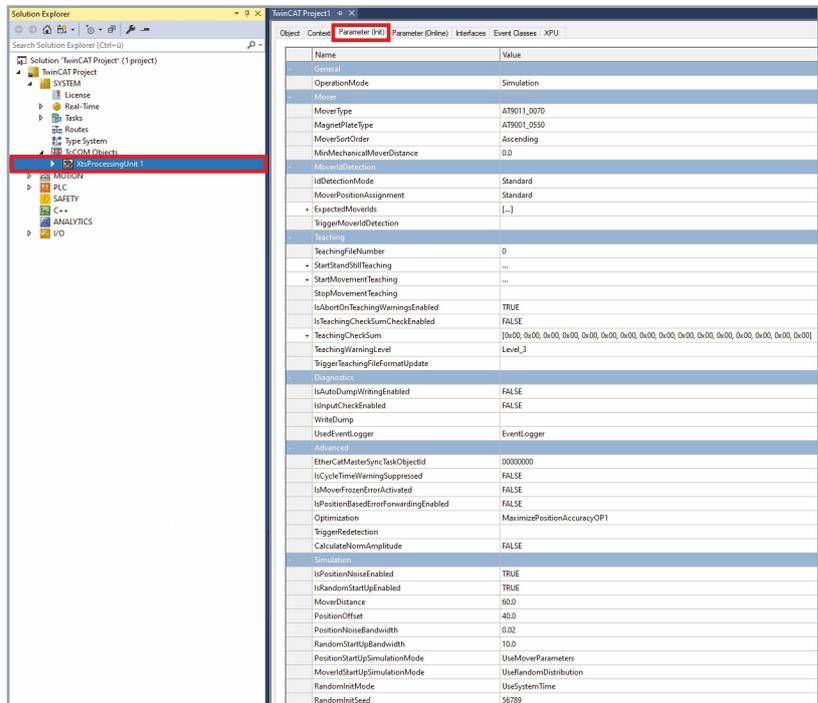
- ▶ Select all NC axes for which movers are to be created
- ▶ Confirm with **OK**

Note that the order in which the movers are selected has an influence on which mover is linked to which NC axis.



## 6.1.6.2 Reuse XtsIoDriver parameters

Special parameters, such as Mover 1 functionality, that you set under the old XtsIoDriver object can be set in the XTS Processing Unit object. In the XTS Processing Unit object you will find the setting options for all old parameters.

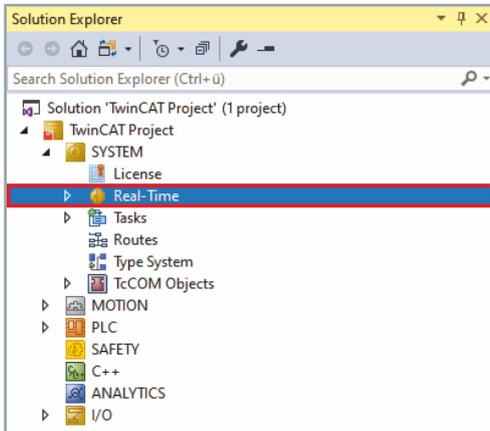


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects*
- ▶ Double click on **XtsProcessingUnit**
- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Check settings
- ▶ If necessary enter the settings of the old XTS project

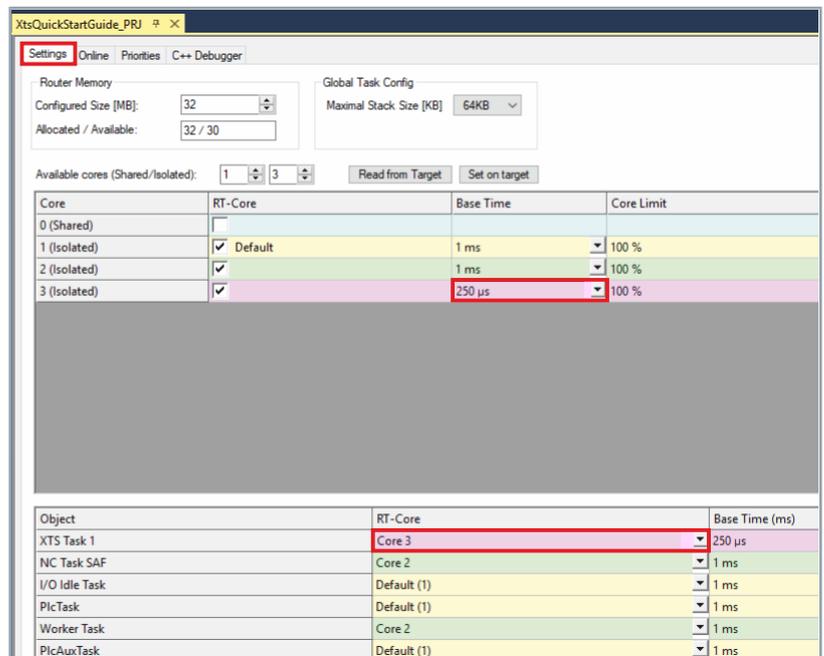
## 6.1.6.3 Adjusting the cycle time of the XTS task



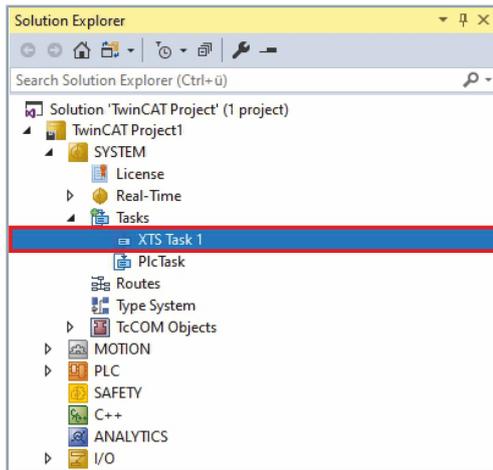
The cycle time of the new XTS task must be set to 250 µs.



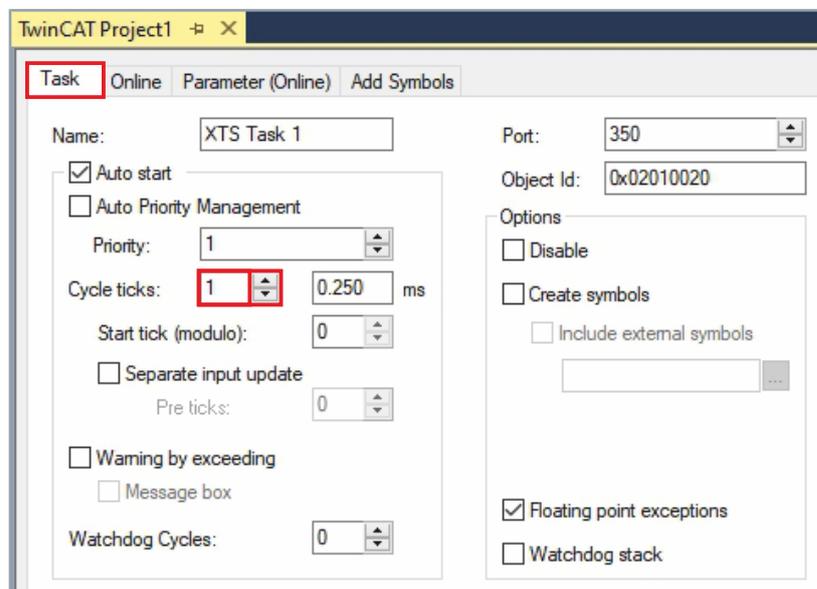
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM*
- ▶ Double-click on **Real-Time**



- ▶ In the project window click on the **Settings** tab
- ▶ Ensure that the XTS task is running on the correct **RT-Core**
- ▶ If required, change **RT-Core** via the drop-down menu
- ▶ Ensure that the **Base Time** is set to 250 µs
- ▶ If required, set **Base Time** value to 250 µs via the drop-down menu



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tasks*
- ▶ Double-click on the new **XTS Task**



- ▶ In the project window click on the **Task** tab
- ▶ Enter the value **1** in the input field *Cycle ticks* or set it using the arrow keys



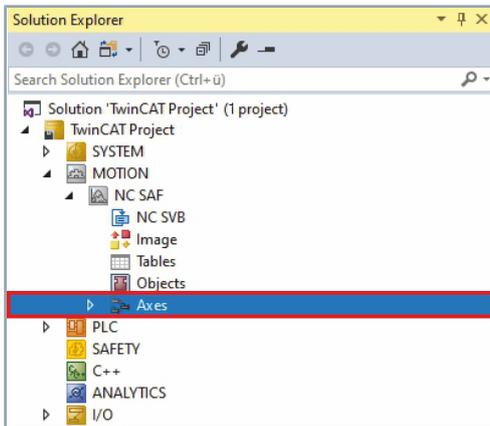
For more information on the required Real Time settings, please refer to the relevant documentation or contact the product specialist responsible for your region.

## 6.1.6.4 Check of NC axes and SoftDrive parameters

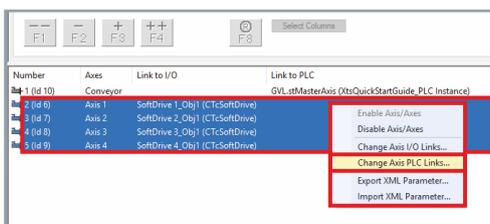
### New NC axes

If you use new NC axes, all previous parameters must be taken over from the old XTS project. The parameters can either be added manually or imported in the *XTS Configurator* as a parameter set of the movers. For more information on all available parameters for the NC axes and the SoftDrive, refer to the SoftDrive documentation.

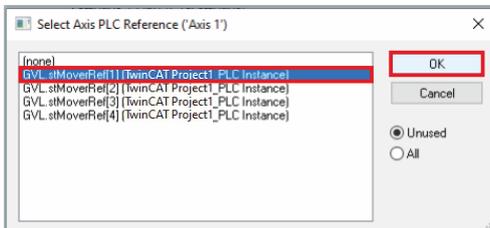
The new NC axes must be linked to the PLC:



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC SAF*
- ▶ Double click on **Axes**



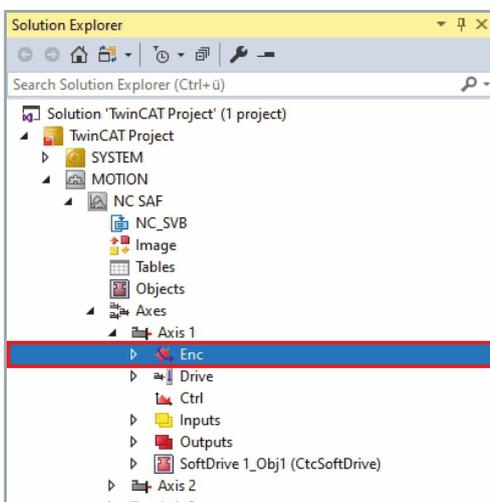
- ▶ In the project window, select all **axes** that are to be linked to the PLC
- ▶ Right-click the selected axes to open the context menu
- ▶ In the context menu click on **Change Axis PLC Links...**



The *Select Axis PLC Reference* dialog box opens.

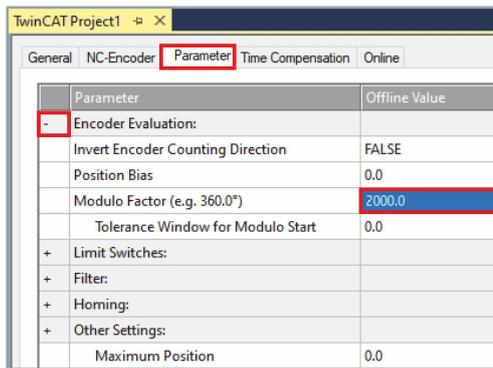
- ▶ Select the **PLC** with which the axes are to be linked
- ▶ Confirm with **OK**

The Modulo Factor for the NC axes and the SoftDrive must be set to the correct length of the system:

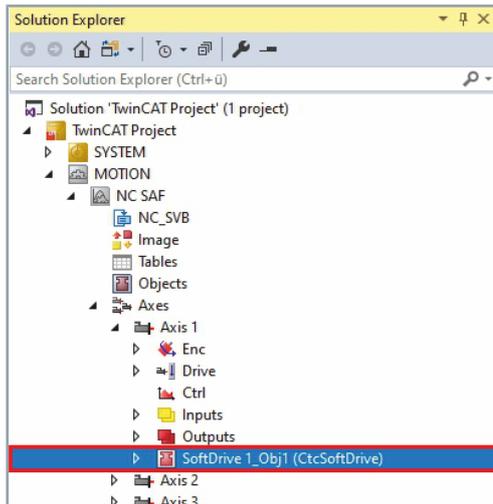


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC SAF* > *Axes*
- ▶ Expand the axis whose settings are to be adjusted
- ▶ Double click on **Enc**

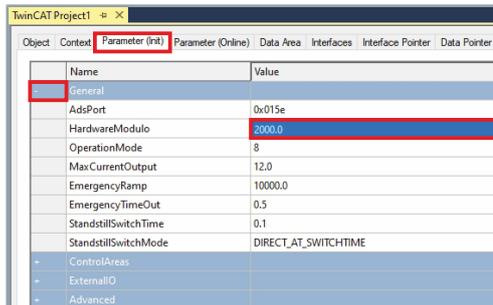
# Functions of the driver



- ▶ In the project window click on the **Parameter** tab
- ▶ Expand *Encoder Evaluation*
- ▶ Ensure that the **Modulo Factor** is set to the length of the current system
- ▶ If required, enter the length of the current system in the input field *Modulo Factor*



- ▶ Expand *Solution Explorer > TwinCAT Project > MOTION > NC SAF > Axes*
- ▶ Expand the axis whose settings are to be adjusted
- ▶ Double click on **SoftDrive**

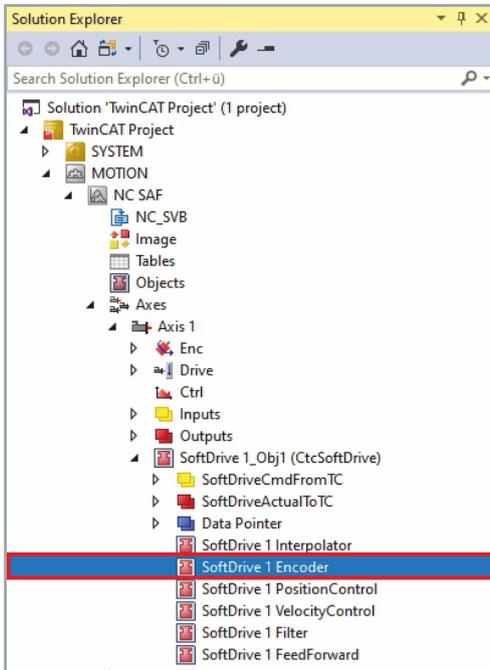


- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Ensure that the **HardwareModulo** value is set to the length of the current XTS system
- ▶ If required, enter the length of the current system in the input field *HardwareModulo*

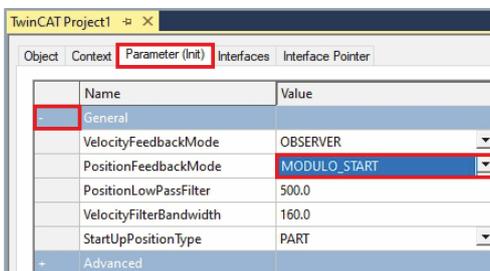
## Existing NC axes



If you use existing NC axes from your old project, you must check the parameter `PositionFeedbackMode` of the corresponding `SoftDrive` object. Incorrect settings can result in a changed behavior of the NC position.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC SAF* > *Axes*
- ▶ Expand the axis whose settings are to be adjusted
- ▶ Expand *SoftDrive*
- ▶ Double click on **SoftDriveEncoder**



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Ensure that the **PositionFeedbackMode** is set to `MODULO_START`
- ▶ If required, select `MODULO_START` in the *PositionFeedbackMode* drop-down menu

## 6.1.6.5 Replace old XTS Utility calls

```
1 // XTS Diagnostic
2 fbXtsUnit(Axis := stMoverRef);
3
4 fbXtsVisuDiag( pXtsDiag   := ADR(fbXtsUnit.stXtsUnit),
5               pGroupRef  := ADR(stGroupRef),
6               nXtsId     := 1);
7
```

As the structure of the XTS objects in the project has changed fundamentally during the conversion, the structure of the XTS Utility has also been changed. In the new configuration the old calls of the function blocks *FB\_XtsUnit* and *FB\_XtsVisuDiag* do not work correctly anymore.

Because the ADS read commands and write commands refer to other object IDs in the background, it is not possible to read data from or write data to the *XtsIoDriver* object. The *XtsUnit* structure does not allow access to the data of the corresponding XTS objects, such as the Module CoE data.

Each XTS Utility call to the PLC must be checked and replaced with a new function to obtain the desired values. It is necessary to find all the places where the old *XtsUnit* structure was used and determine the values that were written or read there.

Many of the old calls to the *XtsUnit* structure can be replaced with the XTS Environment structure method.

A basic example of what needs to be changed in the structure is the procedure for Mover ID detection:

```
//MoverId Functionality
//check whether the position detection of the Movers has been completed.
IF fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bAreAllMoverPositionsValid THEN

    //Check if "MoverIdDetectionMode" has been activated under the XtsIoDriver object
    IF fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.eMoverIdDetectionMode =
E_MoverIdDetectionMode.Mover1
    //and that we are not running in simulation.
    AND NOT bSimulation
    THEN
        //Check whether the "MoverIdDetection" has already been started or the Mover1 was found.
        IF NOT (bMoverIdDetectionStarted OR bMoverIdDetected)
        THEN
            //Trigger the "MoverIdDetection".
            fbXtsUnit.stXtsUnit.stTcIoXtsDrv.ipTcXtsIo.TriggerMoverIdDetection();
            // "bMoverIdDetectionStarted" is set to "True" after a single initiation.
            bMoverIdDetectionStarted := TRUE;
        END_IF

//Check for error or success of "MoverIdDetection".
bMoverIdDetectionError := fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bHasMoverIdDetectionError;
bMoverIdDetected := fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bIsMoverIdDetectionValid;

//Do not process any further until the "MoverId" was detected.
IF NOT bMoverIdDetected THEN
RETURN;
END_IF
// If the "MoverIdDetection" was not activated in the XtsIoDriver object or running in simulation,
// then the activation of the "MoverIdDetection" and the search of Moer1 is skipped.
ELSE
;
END_IF

//If not all Mover positions are valid, do not process any further.
ELSE
RETURN;
END_IF
```

```

8 // MoverId Functionality
9 // Check whether the position detection of the Movers has been completed.
10 IF fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bAreAllMoverPositionsValid THEN
11
12 // Check if "MoverIdDetectionMode" has been activated under the XtsIoDriver object
13 IF fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.eMoverIdDetectionMode = E_MoverIdDetectionMode.Mover1
14 //and that we are not running in simulation.
15 AND NOT bSimulation
16 THEN
17 // Check whether the "MoverIdDetection" has already been started or the Mover1 was found.
18 IF NOT (bMoverIdDetectionStarted OR bMoverIdDetected)
19 THEN
20 // Trigger the "MoverIdDetection".
21 fbXtsUnit.stXtsUnit.stTcIoXtsDrv.ipTcXtsIo.TriggerMoverIdDetection();
22 // "bMoverIdDetectionStarted" is set to "True" after a single initiation.
23 bMoverIdDetectionStarted := TRUE;
24 END_IF
25
26 // Check for error or success of "MoverIdDetection".
27 bMoverIdDetectionError := fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bHasMoverIdDetectionError;
28 bMoverIdDetected := fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bIsMoverIdDetectionValid;
29
30 // Do not process any further until the "MoverId" was detected.
31 IF NOT bMoverIdDetected THEN
32 RETURN;
33 END_IF
34
35 // If the "MoverIdDetection" was not activated in the XtsIoDriver object or running in simulation,
36 // then the activation of the "MoverIdDetection" and the search of Mover1 is skipped.
37 ELSE
38 ;
39 END_IF
40
41 // If not all Mover positions are valid, do not process any further.
42 ELSE
43 RETURN;
44 END_IF
45

```

In the old configuration, some calls to the Mover ID detection got the information of the XtsIoDriver object using the XtsUnit structure:

```

20 // Trigger the "MoverIdDetection".
21 fbXtsUnit.stXtsUnit.stTcIoXtsDrv.ipTcXtsIo.TriggerMoverIdDetection();

```

Since the XtsIoDriver object is not present in the new configuration, the calls must be adapted so that the XtsEnvironment structure provides the information of the XtsProcessingUnit object for the calls:

```

38 // Trigger the "MoverIdDetection".
39 fbTcIoXtsXpu.TriggerMoverIdDetection();

```

In this way, many of the calls can be replaced. It should be noted that the XtsEnvironment structure differs from the old XTS structure in terms of initialization and collection of cycle data. Further information can be found in chapter "Add library", [Page 428].

Once all XtsUnit calls have been removed from the project, the configuration can be activated.

## 6.1.6.6 Activating the configuration

When you have made all changes in the project, you can activate the configuration, switch to the operation mode and start the PLC. If you have difficulty during activation, contact the product specialist responsible for your region.

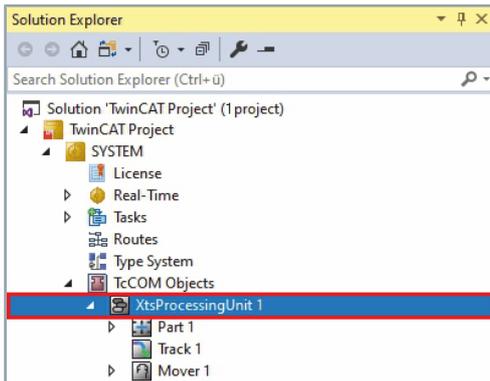
If all calls have been replaced correctly, there will be no differences in the operation of the XTS system compared to the old configuration. In addition, all new functions for simulation and visualization are now usable and the project is ready for future updates of the XTS driver.

## 6.2 XTS Simulation functionality

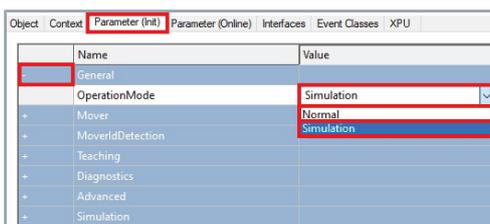
The simulation functionality allows you to test a system without using real hardware. Further information can be found in chapter "XTS Simulation Builder", [Page 229].

### 6.2.1 Activating simulation mode

When you configure a system with the *XTS Simulation Builder*, the simulation mode is automatically activated and it is not necessary to manually activate the simulation mode.



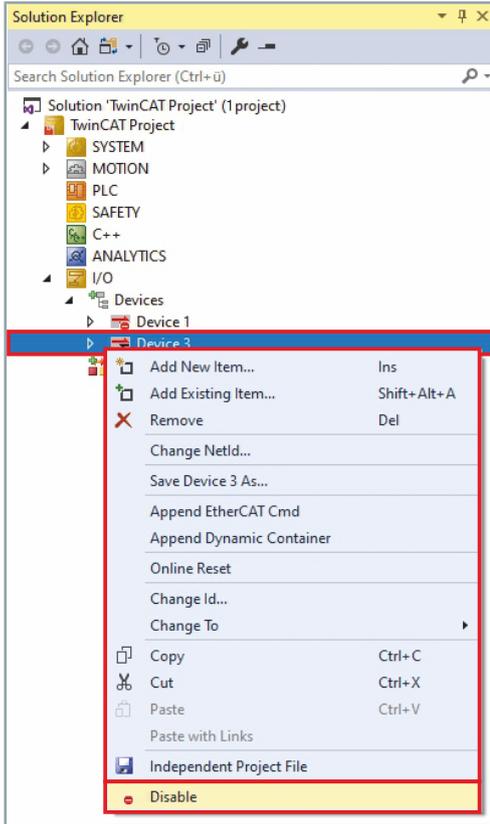
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Select **Simulation** in the drop-down menu *OperationMode*
- ▶ Set all other XTS Processing Units that are to run in simulation mode to simulation mode in the same way

Beckhoff recommends disabling the corresponding hardware of the XTS system in the I/O configuration to avoid accidental activation. All virtual devices must be disabled to activate an I/O configuration without existing hardware.

## 6.2.1.1 Disabling Devices

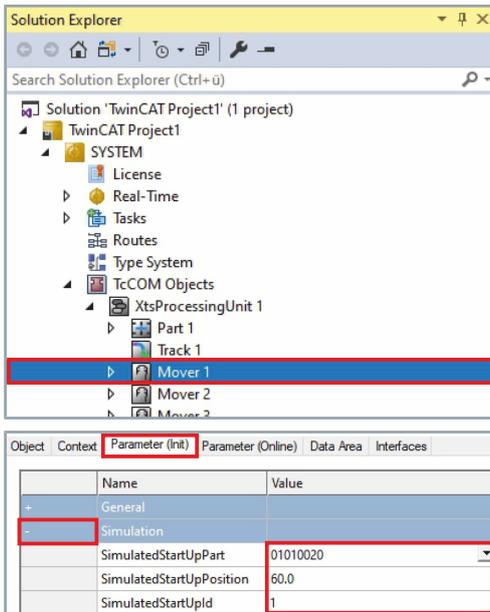


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices*
- ▶ Right-click on a **Device** to open the context menu
- ▶ Click **Disable** in the context menu

## 6.2.2 Important simulation settings

There are important parameters to be set under the TcCOM objects to determine how the simulation behaves when the XTS system is started. By default, the simulation behaves like a real system. For example, no XTS movers will be found if there are no XTS tracks in the detection process, or no axes can be activated if Mover ID detection has not been started.

### 6.2.2.1 XTS Mover Simulation Parameters



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *XtsProcessingUnit*
- ▶ Double-click **Mover 1**

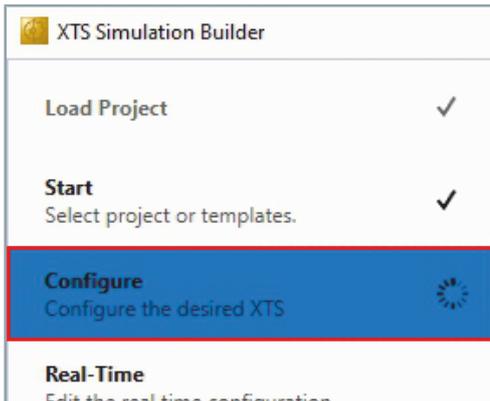
- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Simulation*
- ▶ In the *SimulatedStartUpPart* drop-down menu, select the part on which the mover is to start
- ▶ Enter the value for the start position of the mover in the input field *SimulatedStartUpPosition*
- ▶ Enter the value **1** in the input field *SimulatedStartUpId* so that the mover is detected as Mover 1 at startup

OR

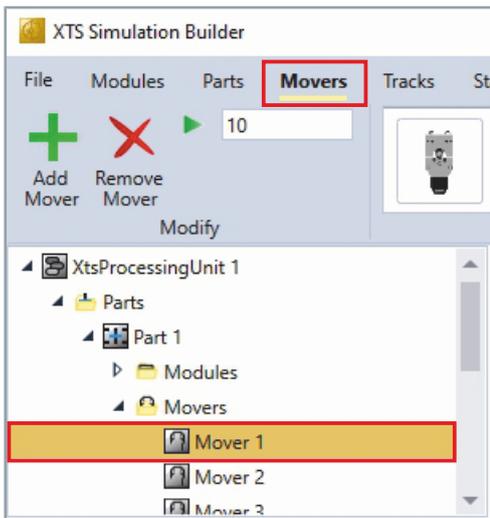
- ▶ Do not enter a value in the input field *SimulatedStartUpId* so that the mover is detected as a standard mover

These entries can also be made in the *XTS Configurator* and in the *XTS Simulation Builder* on the *Movers* page. For more information, see the chapters "XTS Configurator", [Page 258] and "XTS Simulation Builder", [Page 229].

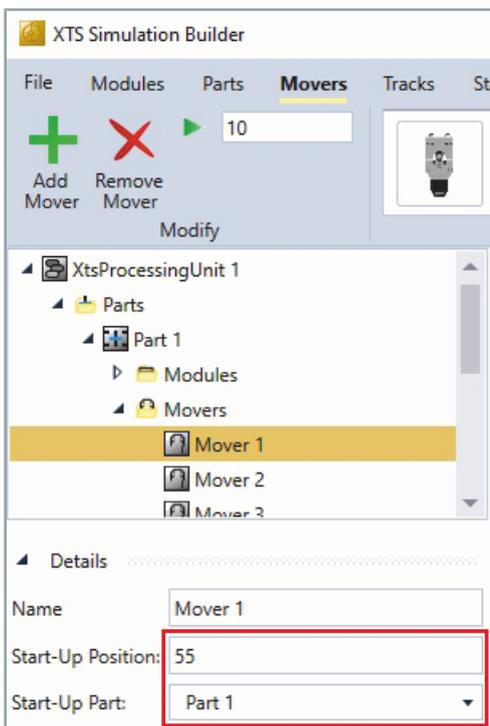
## XTS Simulation Builder



- ▶ Expand the sidebar and click on **Configure**

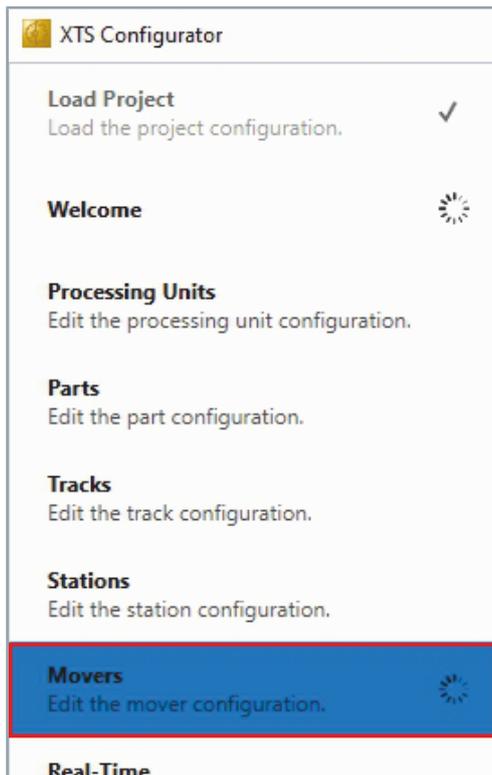


- ▶ Click on the tab **Movers**
- ▶ Select the mover for which the settings are to be adjusted

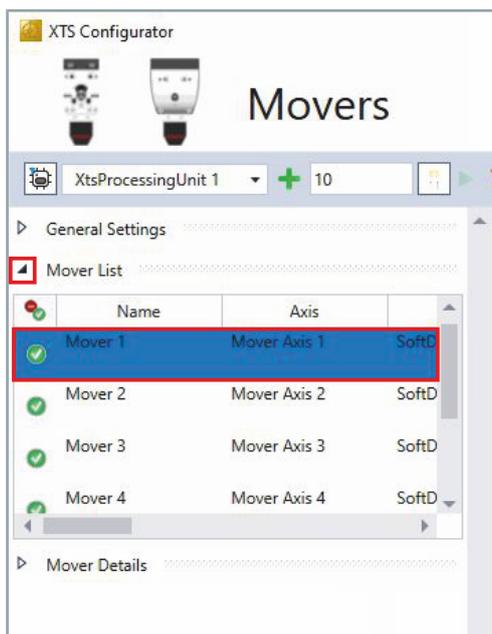


- ▶ Expand *Details*
- ▶ Enter the start position of the mover in the input field *Start-Up Position*
- ▶ In the *Start-Up Part* drop-down menu, select the part on which the mover is to start

## XTS Configurator



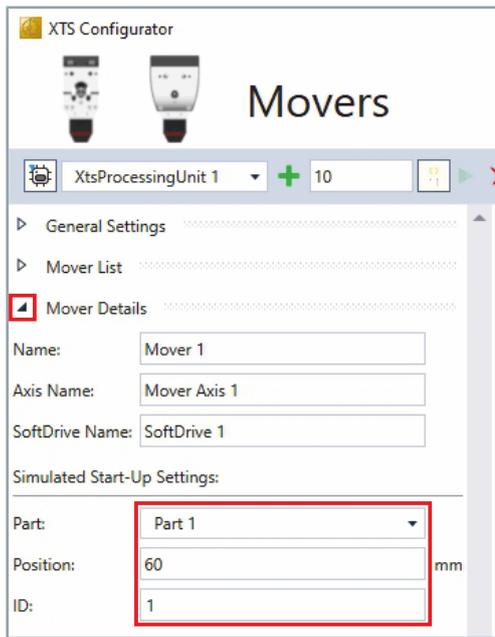
► Fold out the sidebar and click on **Movers**



► Expand **Mover List**

► Select the mover for which the settings are to be adjusted

# Functions of the driver



- ▶ Expand *Mover Details* to show the *Simulation Start-Up Settings*
- ▶ In the drop-down menu *Part*, select the part on which the mover is to start
- ▶ Enter the start position of the mover in the input field *Position*
- ▶ Enter **1** in the input field *ID* so that the mover is detected as Mover 1 when starting up

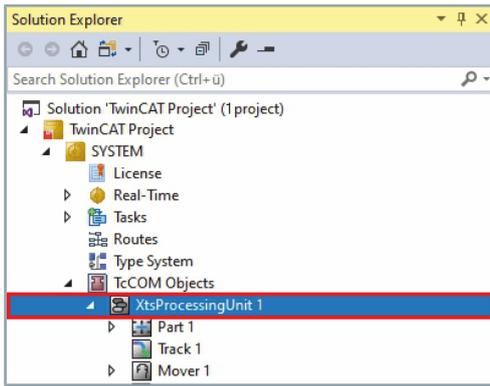
OR

- ▶ Do not enter a value in the input field *ID* so that the mover is detected as a standard mover

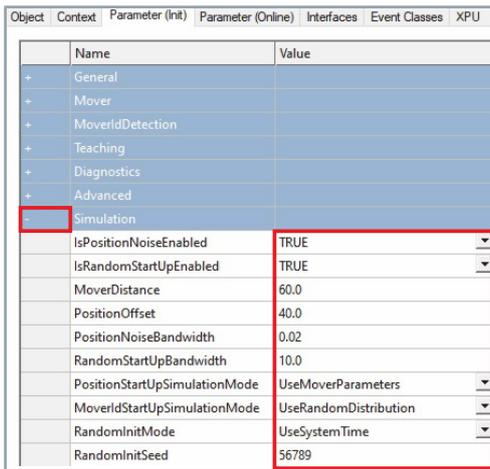
## Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
SimulatedStartUpPart	Simulation	OTCID	0x03080278	Determines the part on which the mover starts in simulation mode.
SimulatedStartUpPosition	Simulation	LREAL	0x03080279	Determines the position of the selected part at which the mover is in simulation mode.  Any position between 0 and the length of the part is possible. The mover will not be found if other values are used.  Unit: mm
SimulatedId	Simulation	STRING(3)	0x0308027E	Determines which ID the mover should have when the XTS system is in simulation mode and a Mover ID detection is started.
• 1				The mover is detected as Mover 1 in the simulation.
• -				The mover is detected as a standard mover in the simulation.

### 6.2.2.2 XTS Processing Unit Parameter



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Simulation*
- ▶ Select **TRUE** or **FALSE** in the drop-down menu *IsPositionNoiseEnabled* and *IsRandomStartUpEnabled*
- ▶ Enter a value in the input fields *MoverDistance*, *PositionOffset*, *PositionNoiseBandwidth* and *RandomStartUpBandwidth*
- ▶ Select parameters for the start position of the movers in the drop-down menu *PositionStartUpSimulationMode*
- ▶ Select parameters for the Mover ID in the drop-down menu *MoverIdStartUpSimulationMode*
- ▶ Select the type of random distribution in the drop-down menu *RandomInitMode*
- ▶ Enter a value in the input field *RandomInitMode*

Further information can be found in chapter "Parameter (Init)", [Page 91].

#### 6.2.2.2.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
MoverDistance	Simulation	LREAL	0x0308022E	Determines the distance between the movers when the <i>PositionStartUpSimulationMode UseOffsetAndDistance</i> is selected.  If the distance is too great, the movers will not fit on the XTS system and will therefore not be found.  Unit: mm
PositionOffset	Simulation	LREAL	0x0308022D	Determines the position of the first mover when the <i>PositionStartUpSimulationMode UseOffsetAndDistance</i> is selected.  If the offset is too large, the movers will not fit on the XTS system and will therefore not be found.  Unit: mm

## Functions of the driver

Parameter	Group	Type	PTCID	Explanation
PositionNoiseBandwidth	Simulation	LREAL	0x03080231	Determines the maximum deviation of the simulated position delay of the movers when the position noise is activated in the simulation. Unit: mm
RandomStartUpBandwidth	Simulation	LREAL	0x03080232	Determines the maximum deviation of the start position between the movers when the PositionStartUp simulation mode <i>UseOffsetAndDistance</i> is selected.  If the bandwidth is too large, the movers will not fit on the XTS system and will therefore not be found. Unit: mm
PositionStartUpSimulationMode	Simulation	XTS.PositionStartUpSimulationMode	0x03080230	Determines which parameter provides the start position of the mover in the simulation.
• UseOffsetAndDistance	–	–	–	The parameter of the Tc-COM object <i>ProcessingUnit</i> is used
• UseMoverParameters	–	–	–	The parameter of the Tc-COM object <i>Mover</i> is used
• UseRandomDistribution	–	–	–	The movers are distributed randomly.
MoverIdStartUpSimulationMode	Simulation	XTS.MoverIdStartUpSimulationMode	0x0308027D	Determines which parameter provides the Mover ID in the simulation.
• UseRandomDistribution	–	–	–	The movers get their ID randomly according to the settings of the parameters <i>IdDetectionMode</i> and <i>ExpectedMoverIds</i> .
• UseMoverParameters	–	–	–	The parameter of the Tc-COM object <i>Mover</i> is used.
• UseAlternation	–	–	–	The movers receive their ID one after the other, starting at 1.
RandomInitMode	Simulation	XTS.RandomInitMode	0x0308027F	Determines how the random distribution is applied.
• UseSystemTime	–	–	–	Creates a value based on the system time.
• UseInitSeed	–	–	–	Use of the value at parameter <i>RandomInitSeed</i> .
RandomInitSeed	Simulation	DINT	0x03080280	Determines the number for the random distribution if the RandomInitMode <i>UseInitSeed</i> is selected.

## 6.3 Mover 1 functionality

Mover 1 serves as the reference mover of the XTS system. It is equipped with a special magnetic plate set. The special magnetic plate set Mover 1 is identified by an engraving on the set itself and a logo on the encoder flag.

### 6.3.1 Mover ID detection

During Mover ID detection, all movers are set in motion, barely visible, and reordered by the system. Since Mover 1 exhibits different behavior than the other movers due to its special magnetic plate set, it is automatically detected by the system. In this way, a clear assignment of the mover hardware to the NC axis is possible.

If the setting *StartAtFirstMover* is selected at the parameter *Mover-PositionAssignment*, the Mover 1 always has either the largest or the smallest position of all NC axes. If this is not yet the case after startup, standard detection and successful Mover ID detection, the complete system length is added to the position of single movers.

#### Example position calculation

Planned Mover 1 position	Parameter Mover-SortOrder	Mover 1	Mover 6
<b>Positions in the NC axes before Mover ID detection [mm]</b>			
Smallest position	Ascending	360	27
Largest position	Descending	40	280
<b>Positions in the NC axes during Mover ID detection [mm]</b>			
Smallest position	Ascending	-	27 + 3000 system length
Largest position	Descending	40 + 3000 system length	-
<b>Positions in the NC axes after Mover ID detection [mm]</b>			
Smallest position	Ascending	360	3027
Largest position	Descending	3040	280

Planned Mover 1 position	Parameter Mover-SortOrder	Positions in the NC axes [mm]	Mover 1	Mover 6
Smallest position	Ascending	Before Mover ID detection	360	27
		During Mover ID detection	-	27 + 3000 system length
		After Mover ID detection	360	3027
Largest position	Descending	Before Mover ID detection	40 + 3000 system length	280
		During Mover ID detection	360	3027
		After Mover ID detection	3040	280

# Functions of the driver

Planned Mover 1 position	Parameter MoverSort-Order	Positions in the NC axes before Mover ID detection		Positions in the NC axes during Mover ID detection		Positions in the NC axes after Mover ID detection	
		Mover 1	Mover 6	Mover 1	Mover 6	Mover 1	Mover 6
Smallest position	Ascending	360 mm	27 mm	–	27 mm + 3000 mm system length	360 mm	3027 mm
Largest position	Descending	40 mm	280 mm	40 mm + 3000 mm system length	–	3040 mm	280 mm



### 48 V power supply required

The 48 V power supply is required to perform Mover ID detection.

## 6.3.2 Application in XTS Processing Unit object

### 6.3.2.1 Parameter



If you use the compatibility mode, you can control the Mover ID detection as usual via the *TcloXtsDrv* object. For this, follow the descriptions below for the application in the *XTS Processing Unit* object. In case of discrepancies between the two objects, it will be indicated separately.

Mover ID detection is controlled via the XTS Processing Unit object. You have the possibility to make settings via general parameters and to trigger the Mover ID detection manually without having to add a PLC project.

The following parameters are available for settings and for checking in the XTS Processing Unit object or in the *TcloXtsDrv* object:

#### XTS Processing Unit object

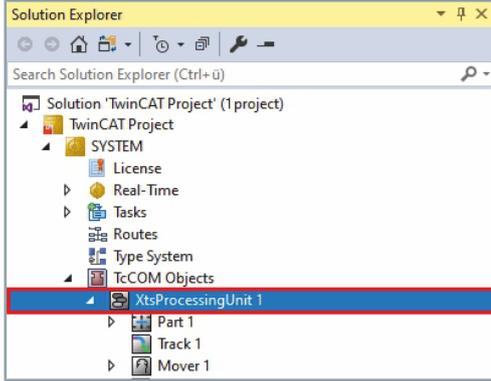
Parameter	Explanation
IdDetectionMode	Setting whether one or more Movers 1 are present in the system.
MoverPositionAssignment	Setting that the Mover 1 receives the largest or smallest position of the NC axes on the system depending on the sort order.
ExpectedMoverIds	
[0].Id	Configure the expected mover IDs for ID detection mode MultipleMover 1.
• 1	Mover with magnetic plate set Mover 1.
• 0	Mover with magnetic plate set Mover Standard.
[0].Count	Number of expected Movers 1.
TriggerMoverIdDetection	Manual start of Mover ID detection.
HasIdDetectionError	Display whether an error has occurred during Mover ID detection.
IsIdDetectionValid	Display whether Mover 1 was detected.
IsIdDetectionActive	Display whether Mover ID detection is running.

#### TcloXtsDrv object

Parameter	Explanation
MoverIdDetectionMode	Setting whether a Mover 1 is present in the system.
MoverPositionAssignment	Setting that the Mover 1 receives the largest or smallest position of the NC axes on the system depending on the sort order.
TriggerMoverIdDetection	Manual start of Mover ID detection.
IsMoverIdDetectionValid	Display whether Mover 1 was detected.
HasMoverIdDetection-Error	Display whether an error has occurred during Mover ID detection.

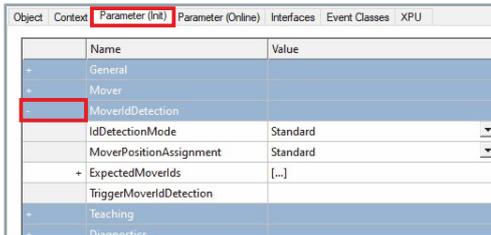
# Functions of the driver

## MoverIdDetection



- ▶ Expand *Solution Explorer* > *XtsProject* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click **XtsProcessingUnit**

## Parameter (Init)



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *MoverIdDetection*

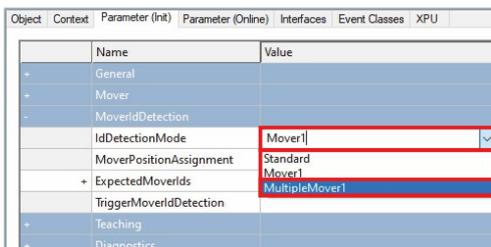
## ⚠ WARNING

### Risk of injury due to unforeseen movements

If you do not select a parameter even though there is one or more movers with the special Mover 1 magnetic plate set on the system, the movers will be energized incorrectly and the movers may move unpredictably.

Unforeseen movements of the movers can cause serious injuries to fingers due to crushing and damage to tools and the machine.

- Select the parameter *Mover1* or *MultipleMover1*.



- ▶ Select **Mover1** or **MultipleMover1** in drop-down menu *IdDetectionMode*

To apply the settings, the configuration must be reactivated and the TwinCAT system must be restarted.

- ▶ Restart *TwinCAT*



- ▶ Select **StartAtFirstMover** in the drop-down menu *MoverPositionAssignment*

To apply the settings, the configuration must be reactivated and the TwinCAT system must be restarted.

- ▶ Restart *TwinCAT*

Name	Value	Unit
ExpectedMoverIds	[...]	(Array Elements)
[0].Id	1	1 (Array Elements)
[0].Count	2	2 (Array Elements)

- ▶ Expand *ExpectedMoverIds*
- ▶ Select **1 (Array Elements)** or **2 (Array Elements)** in the drop-down menu *ExpectedMoverIds* in the column *Unit*
- ▶ Enter the Mover ID type in the input field *[0].Id*
- ▶ Enter the number of expected Movers 1 in the input field *[0].Count*

Name	Value
TriggerMoverIdDetection	[...]

- ▶ Right-click in the input field *TriggerMoverIdDetection* to open the context menu
- ▶ In the context menu click **Download**

The Mover ID detection is now manually triggered. All movers start the movement.

## Parameter (Online)

Name	Online
MoverDetection	
MoverIdDetection	
Teaching	
Diagnostics	
Info	
Structure	

- ▶ In the project window click on the **Parameter (Online)** tab

Name	Online
HasIdDetectionError	FALSE
IsIdDetectionValid	TRUE

- ▶ Check result at *HasIdDetectionError*:

### TRUE

Mover 1 was not detected. Possible causes:

- Mover ID detection was not started
- IsIdDetectionValid displays FALSE

### FALSE

Mover 1 was detected. No errors occurred.

Name	Online
HasIdDetectionError	FALSE
IsIdDetectionValid	TRUE

- ▶ Check result at *IsIdDetectionValid*:

### TRUE

Mover 1 was detected. No errors occurred.

### FALSE

Mover 1 was not detected. Possible causes:

- Mover ID detection was not started
- HasIdDetectionValid displays TRUE

If the Mover ID detection has failed:

- ▶ Check notifications in the message windows *Error List* and *Output*
- ▶ Activate the hidden parameter "DetectionInfoMessage", [Page 110]
- ▶ Adapt the parameter in the "TcSoftDrive object", [Page 107]
- ▶ Adjust hidden parameters of the XTS Processing Unit
- ▶ Perform Mover ID detection again

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes	XPU
		Name	Online			
-		MoverDetection				
-		MoverIdDetection				
		HasIdDetectionError	FALSE			
		IsIdDetectionValid	TRUE			
		IsIdDetectionActive	TRUE			

- ▶ Check result at *IsIdDetectionActive*

## TRUE

Mover ID detection is active. No errors occurred.

## FALSE

Mover ID detection is not active. Possible cause:

- Mover ID detection is not active

## Check Mover IDs

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes	Interface Pointer
		Name	Online			
-		Mover ID Detection				
		HasIdDetectionError	FALSE			
		IsIdDetectionValid	TRUE			
		IsIdDetectionActive	FALSE			
		MoverIds	[1, ]			
		[0]	1			
		[1]				
		[2]				

After the Mover IDs have been detected, you can call and check them via the Processing Unit or the Mover object:

Under the Processing Unit you will find the Mover IDs for all movers under the following path:

*Parameter (Online) > Mover ID Detection > MoverIds*

Object	Context	Parameter (Init)	Parameter (Online)	Data Area	Interfaces
		Name	Online		
-		Mover ID Detection			
		Id	1		
-		Info			

Under the Mover object, you will find the Mover IDs for each mover individually under the following path:

*Parameters (Online) > Mover ID Detection > Id*

## 6.3.2.2 Hidden Parameters

For the advanced operation of the Mover ID detection you have the option to use *Hidden Parameters*. For example, you can change the time delay with which movers are moved within a pack and define the intervals at which movers are detected as a pack. However, usually the default parameters match your XTS system. The Mover ID detection can be started immediately. The search takes a few seconds and depends on the number of movers and the respective settings.

The following hidden parameters are available for settings:

<b>IdDiagConfiguration</b>	Calculation parameters of Mover ID detection. Do not change!
<b>DelayBetweenMoversInPack</b>	Time delay [s] between triggering movers which are directly next to each other within the MoverPackGap. Unit: s.
<b>DelayBetweenMoverPacks</b>	Time delay [s] between triggering movers simultaneously which are not in the same mover pack. Unit: s
<b>GapToDefineMoverPack</b>	Gap [mm] between movers to define a new mover pack. Unit: mm
<b>CompleteCriteria</b>	Setting, from when a search should be evaluated as successful.



► Activate the check box **Show Hidden Parameter** to show the *Hidden Parameters*



To prevent movers mechanical influencing one another, only the movement of one mover is triggered at any one time in a mover pack. On expiry of the search of a preceding mover in a pack and on expiry of the time *DelayBetweenMoversInPack*, the search for the next mover in the pack is started.

## 6.3.3 Use in the PLC

### 6.3.3.1 Versions

Via the PLC you have the possibility to trigger the Mover ID detection by using the program code. Two options are available for this:

#### PLC variant I (trigger via XtsUtility)

Start Mover ID detection by calling the method *TriggerMoverIdDetection*.

#### PLC variant II (trigger via ADS-Write)

Start of Mover ID detection by an ADSWRITE command on the parameter *TriggerMoverIdDetection* in the XTS Processing Unit object.



#### Observe computing time

The call of the PLC variant I requires more computing time. If the computing time for the application proves to be a problem, use the PLC variant II.

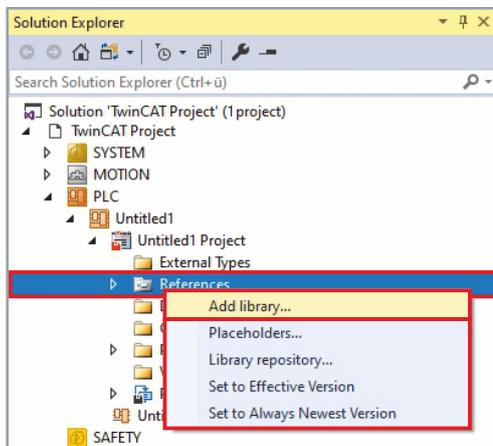
### Add library

For the application of the PLC variant I (trigger via XtsUtility) the suitable library must be added:

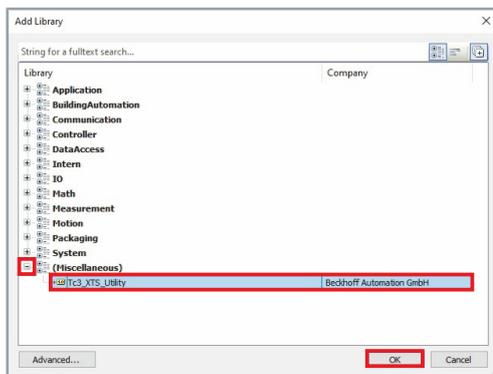


#### Name for file path different

When creating the library under PLC, a name must be assigned. In the following example, no name has been assigned, so the file path is shown as *Untitled*. Note that your file path will look different accordingly.



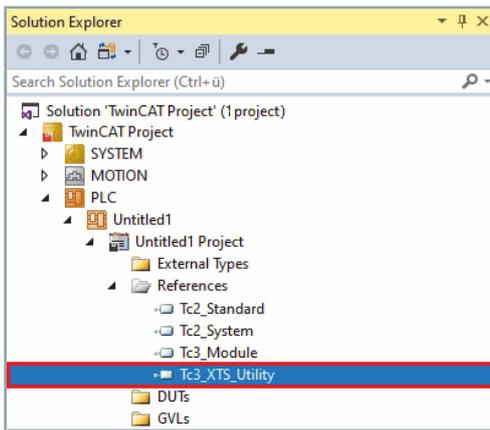
- ▶ Expand *Solution Explorer > TwinCAT Project > PLC > Untitled1 > Untitled Project*
- ▶ Right-click on **References** to open the context menu
- ▶ In the context menu click on **Add library ...**



The dialog box *Add Library* opens.

- ▶ Expand *(Miscellaneous)*
- ▶ Click on **Tc3\_XTS\_Utility**
- ▶ Confirm with **OK**

The library is added to the project.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *PLC* > *PLC1* > *PLC Project* > *References*
- ▶ Check whether the *Tc3\_XTS\_Utility* library has been added to the project



Depending on whether the Processing Unit object or the TcloXtsDrv object is used, the functions in the library differ.

## PLC variant I (trigger via XtsUtility)

You have the option to trigger the Mover ID detection via PLC variant I. To trigger the search automatically, you can use the following sample codes for the Processing Unit object or the TcIoXtsDrv object:

### XTS Processing Unit object

```
// Declaration Part
PROGRAM MAIN
VAR
    stMoverRef                : ARRAY [1..cAxcnt] OF AXIS_REF;

    fbXtsUnit                 : FB_XtsUnit;

    eMoverIdDetectionMode     : MoverIdDetectionMode:= MoverIdDetectionMode.Mover1;
    //Should be the same as shown in the TcIoXtsDrv object

    bStartMoverIdDetection    : BOOL := TRUE; //Can also be written to trigger the process
    manually after start up

    bMoverIdDetectionError    : BOOL;
    bMoverIdDetected          : BOOL;
    bMoverIdDetectionActive   : BOOL;
END_VAR

VAR CONSTANT
    cAxcnt                    : INT:=10; // Example
END_VAR

//-----

// Programm Part
// Cyclic call of the main block of the XtsUtility Library.
fbXtsUnit(Axis := stMoverRef);

// Check if the position detection of the Movers has been completed.
IF NOT fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bAreAllMoverPositionsValid THEN
    // If not all Mover positions are valid, do not process any further.
    RETURN;
END_IF

// Mover1 Functionality
// Check if "MoverIdDetectionMode" has been activated.
IF eMoverIdDetectionMode = E_MoverIdDetectionMode.Mover1 THEN

    // Check if the "MoverIdDetection" has already been started or the Mover1 was found.
    IF bStartMoverIdDetection AND NOT (bMoverIdDetectionActive OR bMoverIdDetected) THEN
        bStartMoverIdDetection:=FALSE;

        // Trigger the "MoverIdDetection".
        fbXtsUnit.stXtsUnit.stTcIoXtsDrv.ipTcXtsIo.TriggerMoverIdDetection();
        bMoverIdDetectionActive:=TRUE;
    END_IF

    // Check for error or success of "MoverIdDetection".
    bMoverIdDetectionError := fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bHasMoverIdDetectionError;
    bMoverIdDetected      := fbXtsUnit.stXtsUnit.stTcIoXtsDrv.stParameter.bIsMoverIdDetectionValid;

    // If the detection has an error, check for errors in output and try again.
    IF bMoverIdDetectionError THEN
        bMoverIdDetectionActive:=FALSE;
        RETURN;
    END_IF

    // Do not process any further until the "MoverId" was detected.
    IF NOT bMoverIdDetected THEN
        RETURN;
    END_IF
    bMoverIdDetectionActive:=FALSE;

// If the "MoverIdDetection" was not activated,
// then the start of the "MoverIdDetection" and the search of Mover1 is skipped.
ELSE
    ;
END_IF
```

## TcIoXtsDrv object

```

// Declaration Part
PROGRAM MAIN
VAR
    fbXtsEnvironment          : FB_TcIoXtsEnvironment;
    bInit                     : BOOL;

    bStartMoverIdDetection    : BOOL:=TRUE; // Can also be written to trigger the process
                                        manually after start up

    bMoverIdDetectionError    : BOOL;
    bMoverIdDetected          : BOOL;
    bMoverIdDetectionActive   : BOOL;
END_VAR

//-----

// Programm part
//Trigger only once in init.
IF NOT bInit THEN
    IF fbXtsEnvironment.Init(TRUE) THEN
        fbXtsEnvironment.Init(FALSE);
        bInit:=TRUE;
    END_IF
    RETURN;
END_IF

// Check if the position detection of the Movers has been completed.
IF NOT fbXtsEnvironment.XpuTcIo(1).GetAreAllPositionsValid() THEN
    // If not all Mover positions are valid, do not process any further.
    RETURN;
END_IF

// Mover1 Functionality
// Check if "MoverIdDetectionMode" has been activated under the XtsProcessingUnit object.
IF fbXtsEnvironment.XpuTcIo(1).GetMoverIdDetectionMode() = MoverIdDetectionMode.Mover1 THEN

    // Check if the "MoverIdDetection" has already been started or the Mover1 was found.
    IF bStartMoverIdDetection AND NOT (bMoverIdDetectionActive OR bMoverIdDetected) THEN
        bStartMoverIdDetection:=FALSE;

        // Trigger the "MoverIdDetection".
        fbXtsEnvironment.XpuTcIo(1).TriggerMoverIdDetection();
    END_IF

    // Check for error or success of "MoverIdDetection".
    bMoverIdDetectionError := fbXtsEnvironment.XpuTcIo(1).GetHasMoverIdDetectionError();
    bMoverIdDetected := fbXtsEnvironment.XpuTcIo(1).GetIsMoverIdDetectionValid();
    bMoverIdDetectionActive := fbXtsEnvironment.XpuTcIo(1).GetIsMoverIdDetectionActive();

    // If the detection has an error, check for errors in output and try again.
    IF bMoverIdDetectionError THEN
        RETURN;
    END_IF

    // Do not process any further until the "MoverId" was detected.
    IF NOT bMoverIdDetected THEN
        RETURN;
    END_IF

    // Do not process any further until the "MoverId" was detected.
    IF NOT bMoverIdDetected THEN
        RETURN;
    END_IF

// If the "MoverIdDetection" was not activated in the XtsProcessingUnit object,
// then the activation of the "MoverIdDetection" and the search of Mover1 is skipped.
ELSE
    ;
END_IF
    
```

## PLC variant II (trigger via ADS-Write)

You have the option to trigger the Mover ID detection via PLC variant II. Parameters of the XTS Processing Unit object can be accessed via ADSREAD or ADSWRITE commands.

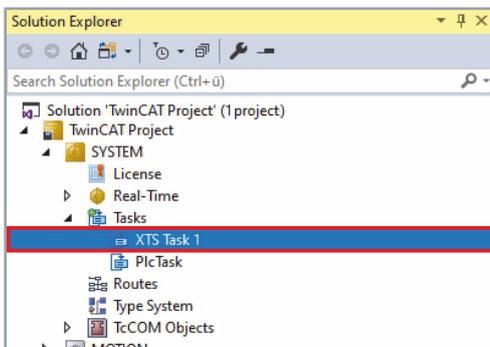
For more information, please see the following links:

[Direct link to the TE1000 TwinCAT 3 manual | PLC library: Tc2 System](#)

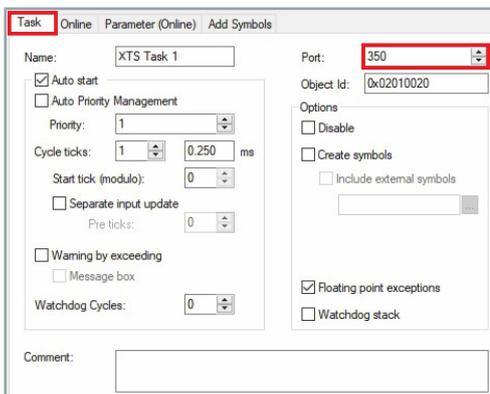
[Direct link to the function blocks](#)

You need the following XTS-specific information for parameterization:

Parameter	Code block	Explanation
Task Port	<code>PORT : T_AmsPort;</code>	Task Port of the XTS task.
Object Id	<code>IDXGRP : UDINT;</code>	Object ID from the XTS Processing Unit object.
PTCID	<code>IDXOFFS : UDINT;</code>	PTCID of the parameter.



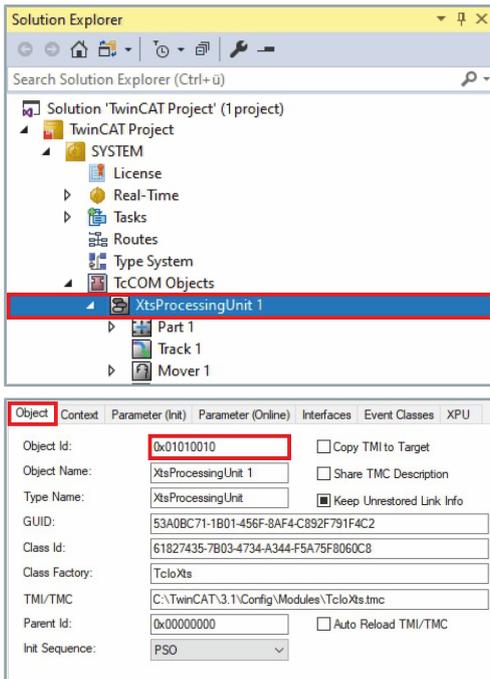
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tasks*
- ▶ Double-click on **XTS Task**



- ▶ In the project window click on the **Task** tab
- ▶ Read value at *Port*

The value 350 is preset by default.

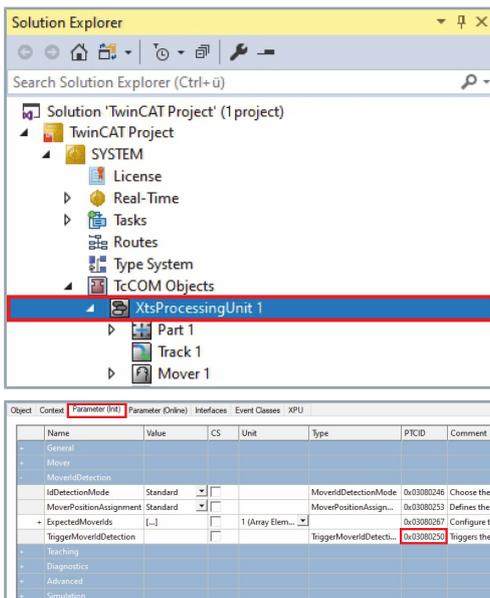
## Object Id



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects*
- ▶ Double-click on **XTS Processing Unit**

- ▶ In the project window, click on the **Object** tab
- ▶ Read value at *Object Id*

## PTCID



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects*
- ▶ Double-click on **XTS Processing Unit**

The displayed values of the XTS Processing Unit object and the TcloXtsDrv object differ from each other.

- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Read value at *TriggerMoverIdDetection*

## Sample TriggerMoverIdDetection

Below are sample codes for a *TriggerMoverIdDetection*:

### ADSWRITE

```
// Declaration part
PROGRAM MAIN
VAR
    fbAdsWrite      : ADSWRITE;
END_VAR

//-----

// Programm part
fbAdsWrite(
    NETID      := '',
    PORT       := 350,           // Taskport of the XTS-Task
    IDXGRP     := 16#01010010,  // Object Id of the driver object
    IDXOFFS    := 16#205,      // PTDCID of TriggerMoverIdDetection
    WRITE      := TRUE);      // Trigger
```

### ADSREAD

```
// Declaration part
PROGRAM MAIN
VAR
    fbAdsRead       : ADSREAD;
    TempData         : BOOL; // Needs to be the data type that is read
END_VAR

//-----

// Programm part
fbAdsRead(
    NETID      := '',
    PORT       := 350,           // Taskport of the XTS-Task
    IDXGRP     := 16#01010010,  // Object Id of the driver object
    IDXOFFS    := 16#251,      // PTDCID of IsIdDetectionValid
    LEN        := SIZEOF(TempData), // Size of the read out data
    DESTADDR   := ADR(TempData), // Address to which the data should be written to
    READ       := TRUE);      // Trigger
```

### 6.3.4 Extended operation in the TcSoftDrive object

#### 6.3.4.1 Parameter

The Processing Unit object is used to control and execute the Mover ID detection for each mover axis. You have the possibility to adjust the sequence of the search, by setting some parameters as well as configuring the detection procedure via the mover axis. However, usually the default parameters match your XTS system.

The following tables show the default parameters for the Beckhoff movers:

Parameter	Default	Min	Max	Unit	Tab
DetectionMinMovement	0.1	0.01	2.0	mm	Init
DetectionFilter	250	0	5000	Hz	Init
DetectionCurrentRamp	25	10	1000	mA/ms	Init
DetectionMaxCurrent	12	0.5	13	A	Init



#### Adjustment of the default parameters with customer-specific movers

With customer-specific movers that differ from the Beckhoff movers in terms of rigidity, mass or some other deviating mechanical behavior, it may be necessary to adjust the default parameters in order to optimize the Mover ID detection.

#### DetectionMinMovement

Minimum position change that the mover must experience during Mover ID detection for detection to be successful.

#### DetectionFilter

Filter for current change.

#### DetectionCurrentRamp

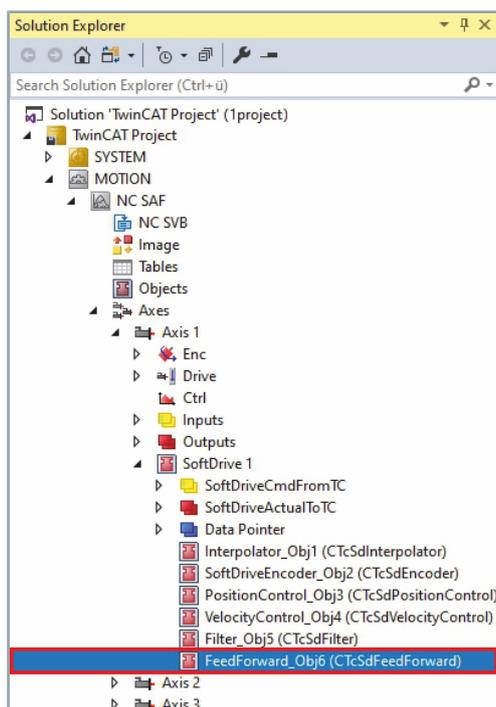
Ramp of the current of the Mover ID detection.

#### DetectionMaxCurrent

Maximum value of the current of the Mover ID detection.

#### DetectionStatus

Status of Mover ID detection.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC SAF* > *Axes* > *Mover Axis* > *SoftDrive* > *Data Pointer*
- ▶ Double click on **FeedForward\_Obj6 (CTcSdFeedForward)**

## Parameter (Init)

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Interface Pointer
		Name			Value
		+ General			
		- MoverIdDetection			
		DetectionMinMovement			0.1
		DetectionFilter			250.0
		DetectionCurrentRamp			25.0
		DetectionMaxCurrent			12.0
		+ Optimization			

- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *MoverIdDetection*

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Interface Pointer
		Name			Value
		+ General			
		- MoverIdDetection			
		DetectionMinMovement			0.1
		DetectionFilter			250.0
		DetectionCurrentRamp			25.0
		DetectionMaxCurrent			12.0
		+ Optimization			

- ▶ If necessary, reduce the value for the minimum position change during Mover ID detection in the input field *DetectionMinMovement* to reduce the position change of the movers

OR

- ▶ If necessary, increase the value for the minimum position change during Mover ID detection in the input field *DetectionMinMovement* to increase the position change of the movers

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Interface Pointer
		Name			Value
		+ General			
		- MoverIdDetection			
		DetectionMinMovement			0.1
		DetectionFilter			250.0
		DetectionCurrentRamp			25.0
		DetectionMaxCurrent			12.0
		+ Optimization			

- ▶ If necessary, reduce the value for the current change filter in the input field *DetectionFilter* to build up the current more slowly and make Mover ID detection smoother

OR

- ▶ If necessary, increase the value for the current change filter in the input field *DetectionFilter* to build up the current more quickly and make Mover ID detection more jerkily

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Interface Pointer
		Name			Value
		+ General			
		- MoverIdDetection			
		DetectionMinMovement			0.1
		DetectionFilter			250.0
		DetectionCurrentRamp			25.0
		DetectionMaxCurrent			12.0
		+ Optimization			

- ▶ If necessary, change the *DetectionCurrentRamp* value for the ramp of the Mover ID detection current

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Interface Pointer
		Name			Value
		+ General			
		- MoverIdDetection			
		DetectionMinMovement			0.1
		DetectionFilter			250.0
		DetectionCurrentRamp			25.0
		DetectionMaxCurrent			12.0
		+ Optimization			

- ▶ If necessary, change the *DetectionMaxCurrent* value for the limit of the Mover ID detection current

## Parameter (Online)

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Interface Pointer
Name			Online		
DetectionStatus			OFF		

► In the project window click on the **Parameter (Online)** tab

► Check result at *DetectionStatus*:

### **OFF**

Mover ID detection is not used.

### **ACTIVE**

Mover ID detection is running.

### **ERROR**

Mover ID detection failed.

### **FOUND\_Standard**

The standard magnetic plate set was found for a specific mover.

### **FOUND\_Mover1**

The magnetic plate set Mover 1 was found for a specific mover.

## 6.3.4.2 Hidden Parameters

For the advanced operation and configuration of the Mover ID detection you have the option to use *Hidden Parameters*. For example, you can adjust various waiting times of the movers.

The following table shows the default parameters:

Hidden Parameters	Default	Min	Max	Unit	Tab
DetectionStandstillVelocityLimit	15	1	1000	mm/s	Init
DetectionStandstillSwitchTime	0.015	0.00	1.0	s	Init
DetectionTimeOut	2	0	10	s	Init
DetectionInfoMessage	FALSE	FALSE	TRUE	--	Init



► Activate the checkbox **Show Hidden Parameter** to show the *Hidden Parameters*

### DetectionStandstillVelocityLimit

Definition of the maximum velocity for the standstill monitoring.

**Value < default parameter:**

The search changes to the next phase later.

**Value > default parameter:**

The search changes to the next phase earlier.

### DetectionStandstillSwitchTime

Time in which the velocity of the mover must be below the value of the parameter *DetectionStandstillVelocityLimit*.

**Value < default parameter:**

The search is accelerated.

**Value > default parameter:**

The search is decelerated.

### DetectionTimeOut

Total timeout for the Mover ID detection. An error occurs if this time is reached. Possible causes:

- too little movement due to too small a value in the input field *DetectionMaxCurrent*
- missing 48 V power supply
- too large a value in the input field *DetectionMaxMovement*
- too small a value in the input field *DetectionMaxMovement*

You should always be able to achieve the *DetectionMinMovement* with the default parameter *DetectionMaxCurrent*.

### DetectionInfoMessage

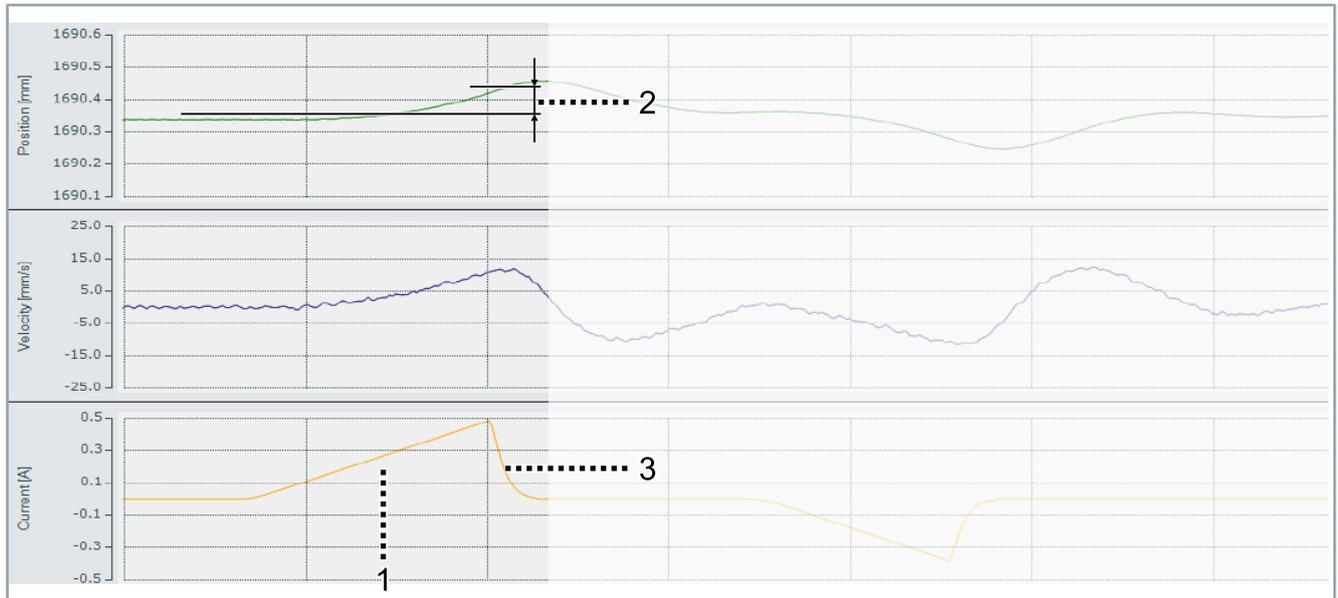
Messages are displayed in the TwinCAT output window.

### 6.3.5 Detection phases of Mover ID detection

The following figures show the effects of the parameters of a Mover ID detection. Phases 1 to 4 are mapped with the default parameters as an example.

#### 6.3.5.1 Phase 1

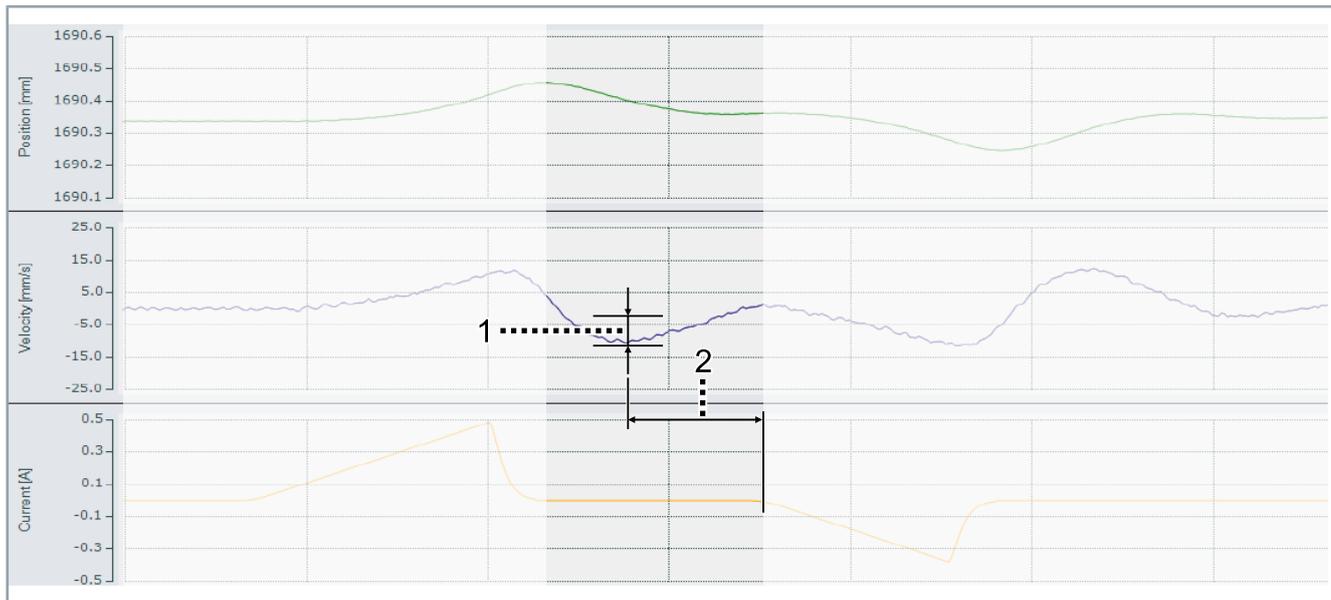
► Set first current vector



Position	Explanation
1	The absolute value of the current vector is increased in accordance with the parameter <i>Detection-CurrentRamp</i> .
2	The movement is monitored until the value of the <i>DetectionMinMovement</i> parameter is reached.
3	The current is decreased via a filter, defined by the <i>DetectionFilter</i> parameter.

## 6.3.5.2 Phase 2

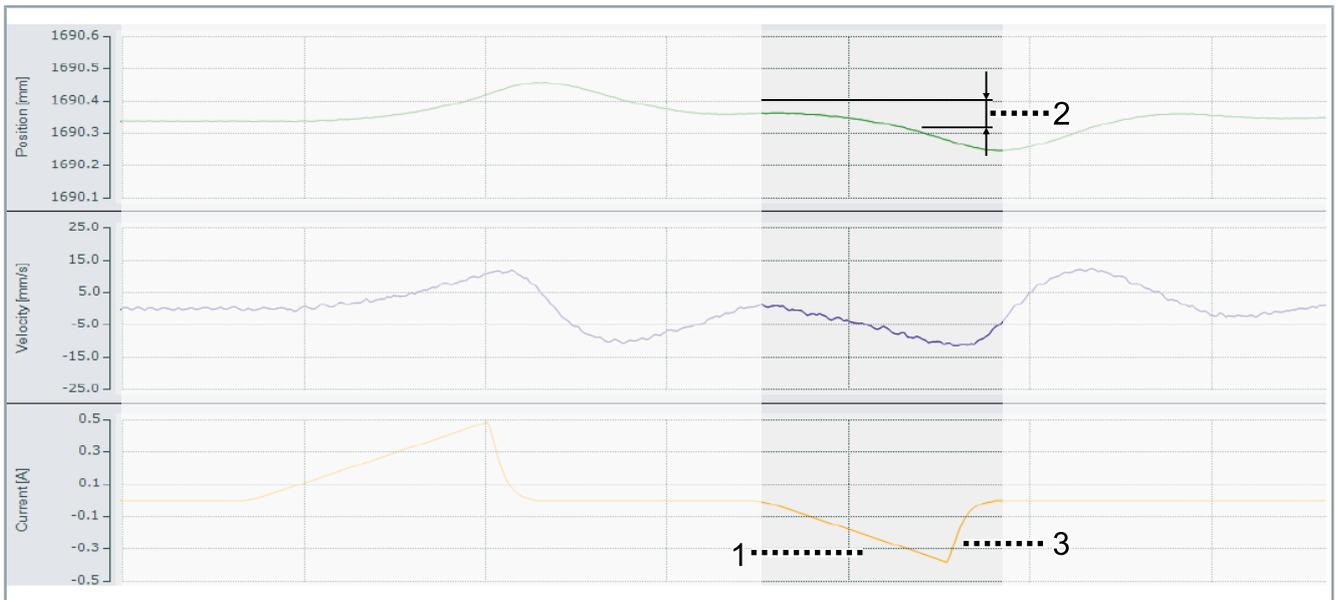
► Wait until the mover comes to a standstill again



Position	Explanation
1	Wait until the velocity is below the limit set with the parameter <i>DetectionStandstillVelocityLimit</i> .
2	The velocity must lie continuously below the limit velocity for the time set with the parameter <i>DetectionStandstillSwitchTime</i> .

6.3.5.3 Phase 3

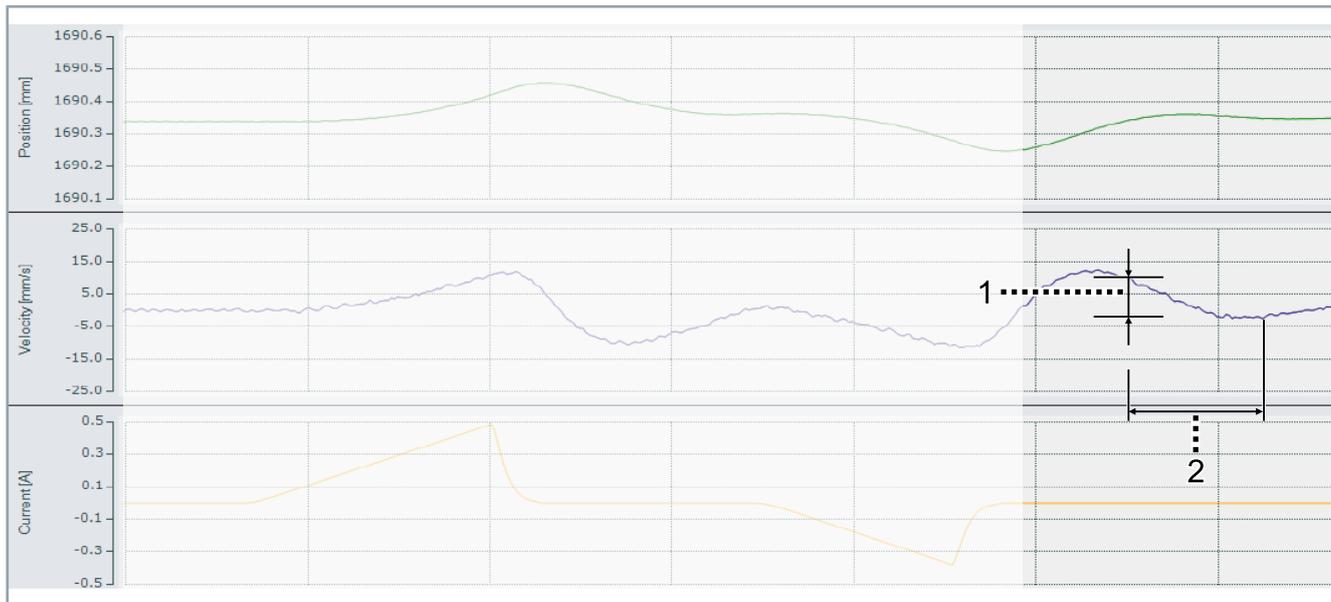
► Set a second current vector in the opposite direction



Position	Explanation
1	The absolute value of the current vector is increased in accordance with the parameter <i>Detection-CurrentRamp</i> .
2	The movement is monitored until the value of the <i>DetectionMinMovement</i> parameter is reached.
3	The current is decreased via a filter, defined by the <i>DetectionFilter</i> parameter.

## 6.3.5.4 Phase 4

► Wait until the mover comes to a standstill again

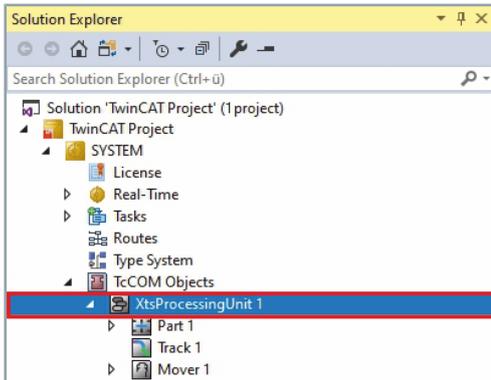


Position	Explanation
1	Wait until the velocity is below the set limit of the parameter <i>DetectionStandstillVelocityLimit</i> .
2	The velocity must lie continuously below the limit velocity for the time set with the parameter <i>DetectionStandstillSwitchTime</i> .



## 6.4.1.2 Enter the number of the teaching file

Teaching must be enabled in order to enter the number of the teaching file.



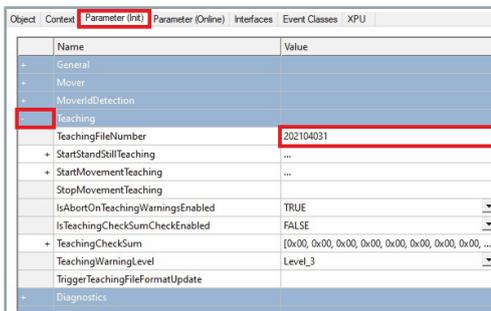
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**



### Change teaching file number

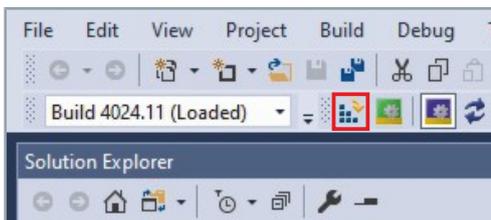
Always change the number of the teaching file before commencing with a new teaching. The old file will be used and overwritten if the number of the teaching file is not changed or if the configuration is not loaded.

Beckhoff recommends using the current date for the number of the teaching file. For the first teaching on April 3rd, 2021, for example, the numbers 202104031 could be used and for the second teaching on the same day the numbers 202104032 and so on.



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Teaching*
- ▶ Enter the number of the teaching file in the input field *TeachingFileNumber*

You also have the option of changing the TeachingFileNumber in the *XTS Configurator*. Further information can be found in chapter "Teaching", [Page 265].



- ▶ Click the **ActivateConfiguration** button to activate the configuration and load the number of the teaching file

## 6.4.1.3 Selecting the teaching mode

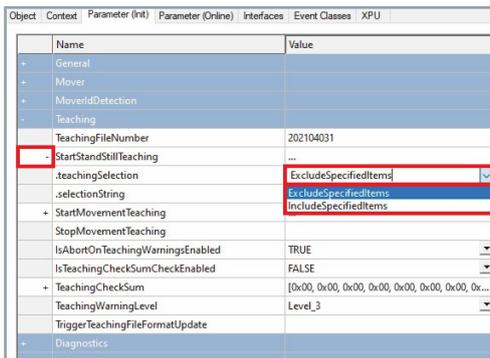
Before teaching at standstill, you must define the *teachingSelection* parameter with which the teaching is to be executed. The selection of the parameters decides which module has to be entered in the input field *.selectionString*.

### ExcludeSpecifiedItems

Modules on which a mover is present should be excluded from the teaching. The corresponding module numbers must be entered in the input field *.selectionString*.

### IncludeSpecifiedItems

Modules on which there are no movers are included in the teaching. The corresponding module numbers must be entered in the input field *.selectionString*.



► Expand *StartStandStillTeaching*

► Select **ExcludeSpecifiedItems** in the drop-down menu *.teachingSelection* to exclude modules with movers from the teaching

OR

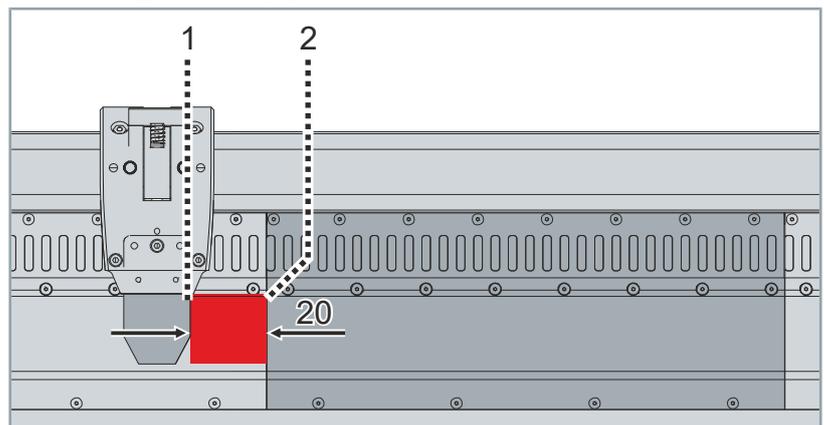
► Select **IncludeSpecifiedItems** in the drop-down menu *.teachingSelection* to include modules without movers into the teaching



### Pay attention to distances

Teaching a module on which a mover is present can lead to incorrect compensation of a neighboring module if the distance between the mover and the edge is too small.

► Make sure that the encoder flag of a mover does not affect the teaching of an empty module.



It is important when selecting the *teachingSelection* parameter that the distance between the encoder flag [1] of a mover and the outer edge [2] of an empty module is at least 20 mm.

## 6.4.1.4 Entering the module



The module number can be found in *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *XtsProcessingUnit* > *Part* > *Module*.

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes	XPU
		Name				Value
		General				
		Mover				
		MoverIdDetection				
		Teaching				
		TeachingFileNumber				202104031
		StartStandStillTeaching				...
		.teachingSelection				ExcludeSpecifiedItems
		.selectionString				1,2,3,5-8
		StartMovementTeaching				...
		StopMovementTeaching				
		IsAbortOnTeachingWarningsEnabled				TRUE
		IsTeachingChecksumCheckEnabled				FALSE
		TeachingChecksum				[0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x...
		TeachingWarningLevel				Level_3
		TriggerTeachingFileFormatUpdate				
		Diagnostics				

► Enter the module number in the input field of *.selectionString*

The module numbers can be entered using the characters - and , or a combination of both characters, for example 1-4, 1,2,3,4 or 1-3,4.

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Data Pointer
		Name			Value
		General			
		AdsPort			0x015e
		TaskOID			02010020
		MotorTerminalOID			03020001
		SensorTerminalOID			03020002
		PositionIndex			0
		Gap			0.0
		Offset			0.0
		ScalingFactor			1.0

► Click the **Parameter (Init)** tab in the project window

► Enter the hardware position in the input field *PositionIndex*

The first module has the hardware position 0.

## 6.4.1.5 Starting teaching

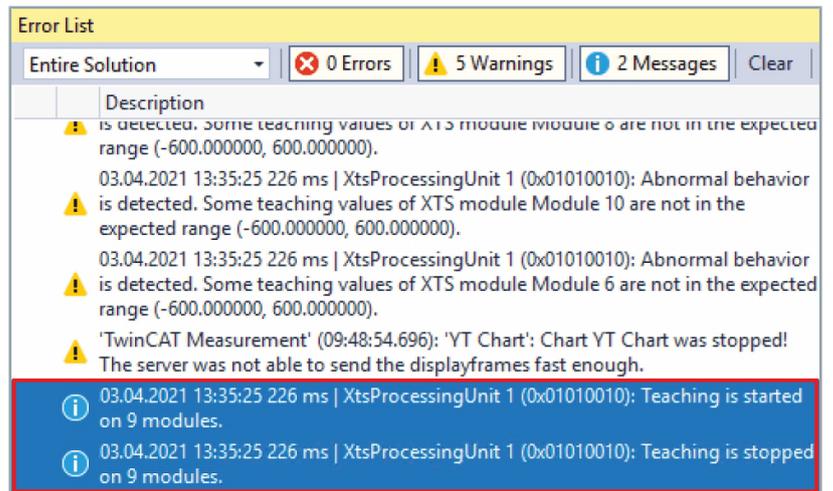
After selecting the teaching mode and entering the respective module, the teaching can be started.

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes	XPU
		Name				Value
		General				
		Mover				
		MoverIdDetection				
		Teaching				
		TeachingFileNumber				202104031
		StartStandStillTeaching				...
		.teachingSelection				ExcludeSp...
		.selectionString				1,2,3,5-8
		StartMovementTeaching				...
		StopMovementTeaching				
		IsAbortOnTeachingWarningsEnabled				TRUE
		IsTeachingChecksumCheckEnabled				FALSE
		TeachingChecksum				[0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x0...
		TeachingWarningLevel				Level_3
		TriggerTeachingFileFormatUpdate				
		Diagnostics				

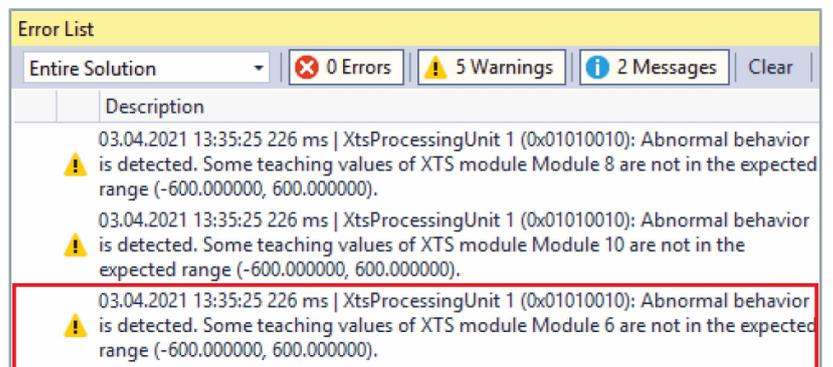
► Right-click in the input field *StartStandStillTeaching* to open the context menu

► In the context menu click **Download**

The teaching is started and takes a few seconds.



The messages *Teaching is started* and *Teaching is stopped* appear in the message window *Error List*.



If the message [...] *are not in the expected range (-600.000000, 600.000000)* appears, the modules are not compensated and have a sensor revision level of  $\leq 17$ .

If the message *Mover lost errors* appears:

- ▶ Check whether the correct teaching mode has been entered in the drop-down menu *teachingSelection*
- ▶ Check whether the correct modules have been entered in the input field *.selectionString*



If warnings are displayed in the *Error List* or *Output* message windows, there may be a problem with your module's encoder. Contact the product specialist responsible for your region.

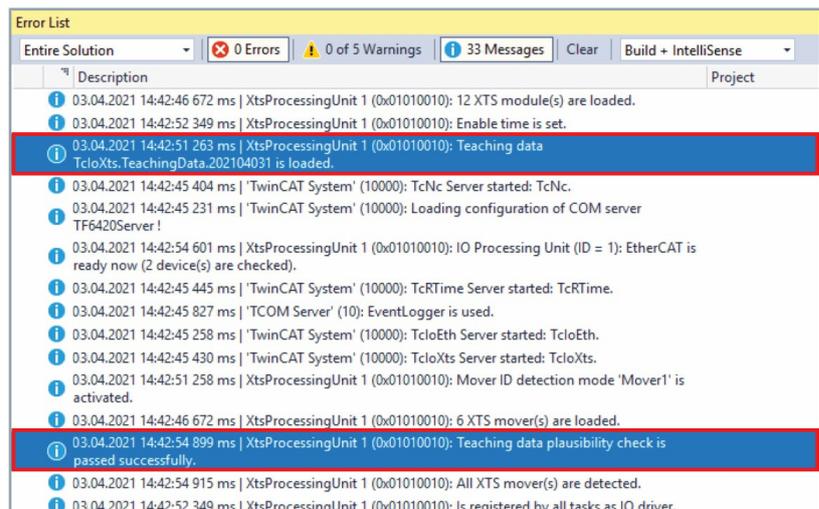
The teaching is complete as soon as all empty modules have been compensated. Depending on the number of modules, the movers and the teaching mode, teaching must be repeated several times until each module has been calibrated empty. In the *IncludedSpecifiedItems* mode, check that there are no movers on the modules entered in the input field *selectionString*.

The configuration must be activated again after checking and correcting the entries.



- ▶ Click on the button **Activate Configuration** to activate the configuration

Messages appear in the *Error List* message window indicating that the teaching file was loaded and the plausibility check was successful.



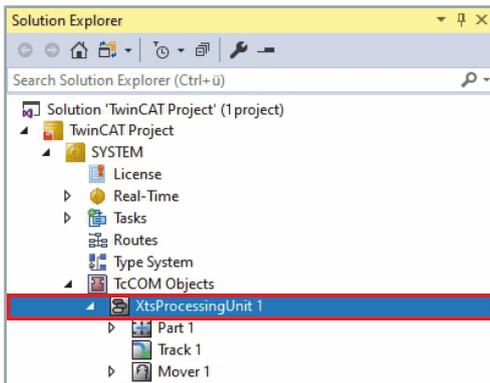
If the teaching file was not loaded and the plausibility check was not successful:

- ▶ Check which messages are displayed at *Output*



If warnings are displayed in the *Error List* or *Output* message windows, there may be a problem with your module's encoder. Contact the product specialist responsible for your region.

If TwinCAT is in Run mode, the result of the teaching can also be checked in the project window on the *Parameter (Online)* tab.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**

Object	Context	Parameter (Int)	Parameter (Online)	Interfaces	Event Classes	XPU
	Name					Online
	MoverDetection					
	MoverIDDetection					
	Teaching					
	IsTeachingChanged		TRUE			
	IsTeachingValid		TRUE			
	IsTeachingFileFormatUpToDate		TRUE			
	Diagnostics					
	Info					

- ▶ In the project window click on the **Parameter (Online)** tab
- ▶ Expand *Teaching*

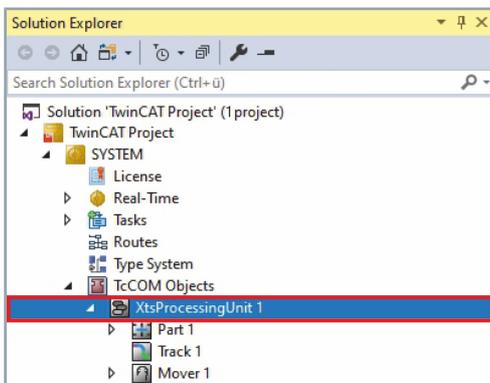
If the teaching file has been overwritten, the parameter *IsTeachingChanged* indicates TRUE.

If the teaching was valid and the teaching file was loaded correctly, the parameter *IsTeachingValid* indicates TRUE.

If the teaching file uses the latest version, the parameter *IsTeachingFileUpToDate* indicates TRUE.

## 6.4.1.6 Teaching file update

An already saved teaching that was created with an older software version can be used by the latest software version.

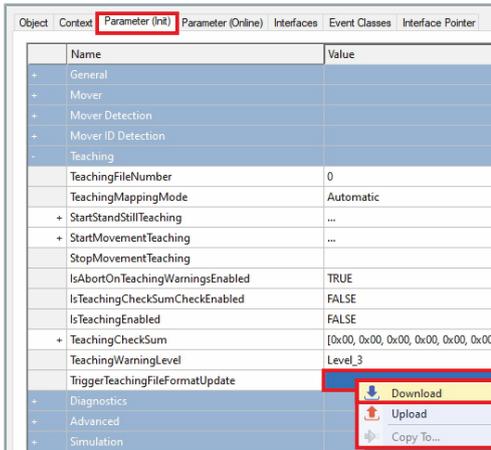


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**

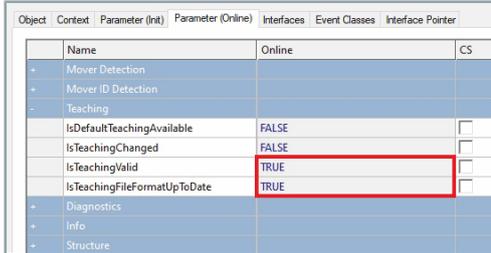
Object	Context	Parameter (Int)	Parameter (Online)	Interfaces	Event Classes	Interface Pointer
	Name					CS
	Mover Detection					
	Mover ID Detection					
	Teaching					
	IsDefaultTeachingAvailable	FALSE				<input type="checkbox"/>
	IsTeachingChanged	FALSE				<input type="checkbox"/>
	IsTeachingValid	FALSE				<input type="checkbox"/>
	IsTeachingFileFormatUpToDate	FALSE				<input type="checkbox"/>
	Diagnostics					
	Info					
	Structure					

- ▶ In the project window click on the **Parameter (Online)** tab
- ▶ Expand *Teaching*
- ▶ Check the online status of the parameter *IsTeachingFileFormatUpToDate*

If the online status of the parameter *IsTeachingFileFormatUpToDate* indicates FALSE:



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Teaching*
- ▶ Right-click in the input field *TriggerTeachingFileFormatUpdate* to open the context menu
- ▶ In the context menu click **Download**



If the download was successful, the parameters *IsTeachingValid* and *IsTeachingFileFormatUpToDate* indicate TRUE.

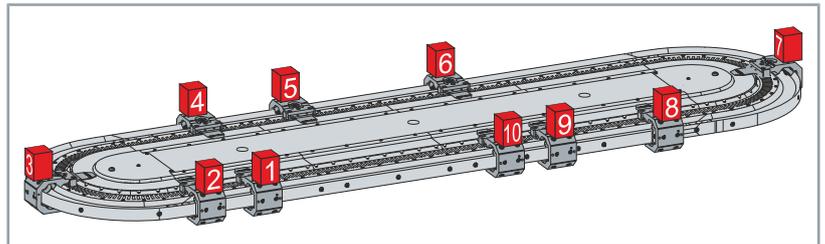
If the download was unsuccessful, the parameters *IsTeachingValid* and *IsTeachingFileFormatUpToDate* indicate FALSE and an error message is displayed in the *Error List* message window.

## 6.5 Track Management functionality

With the Track Management functionality, an XTS system can be split into individual, spatially separated track sections. Moving track sections, for example, allow movers to switch between two fixed but spatially separated track sections. On the moved track sections, both the movers and the modules have their full functionality and remain as a full track.

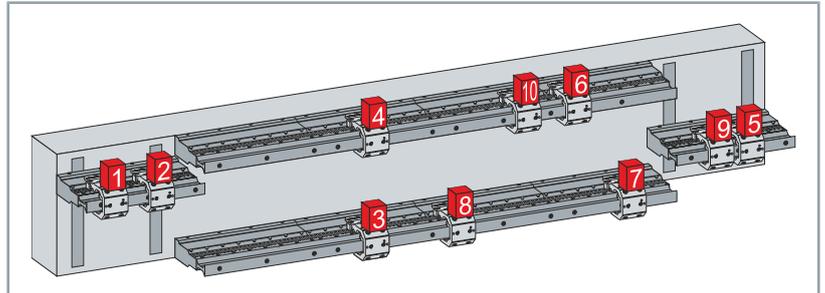
An XTS system with Track Management requires more advanced programming to move the movers and monitor their position than an XTS standard system because the movers no longer travel constantly on a single closed track and their sequence changes as they move to other tracks.

### 6.5.1 Closed XTS system



In a closed XTS system, the sequence of modules and movers always remains constant. The movers thus have only one possible track on which they can move.

### 6.5.2 XTS system with Track Management



In an XTS system with Track Management, modules can change their position and align with other modules. In this way, new tracks are created and the order of the movers changes.

## 6.5.3 Requirements

In order to use an XTS system with Track Management, some software and hardware requirements must be met.

### 6.5.3.1 Software

The following software versions must be available on your system:

Software	Version
TwinCAT 3	3.1.4024.0 or higher
TF5850   TwinCAT 3 XTS Extension	3.20.700.0 or higher
TF5400 TwinCAT 3 Advanced Motion Pack	3.1.10.14 or higher

### 6.5.3.2 Hardware

To implement XTS Track Management, you need at least one module with AT2002-0249 connector in addition to several modules, to enable an air gap between the modules for the moving track section. In addition, one or more movers and a suitable mechanical system for the moving track section, such as a spindle axis or linear motor, are required.

The following components must be present in your XTS system to use Track Management:

- At least one shortened module with connector AT2002-0249
- Cables with connectors
- Mover: AT9011-0x70, AT9014-0x70 or external Mover

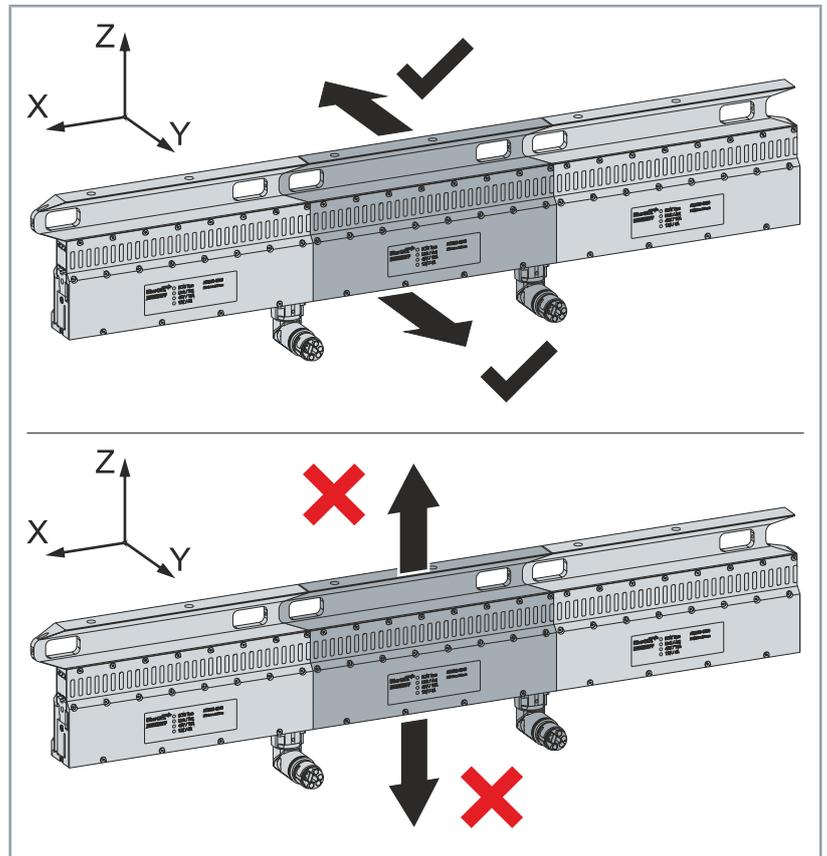
For more information, refer to the chapter "Configuration setup", [Page 125] and the XTS original operating instructions:

 [Direct link to the XTS original operating instructions](#)

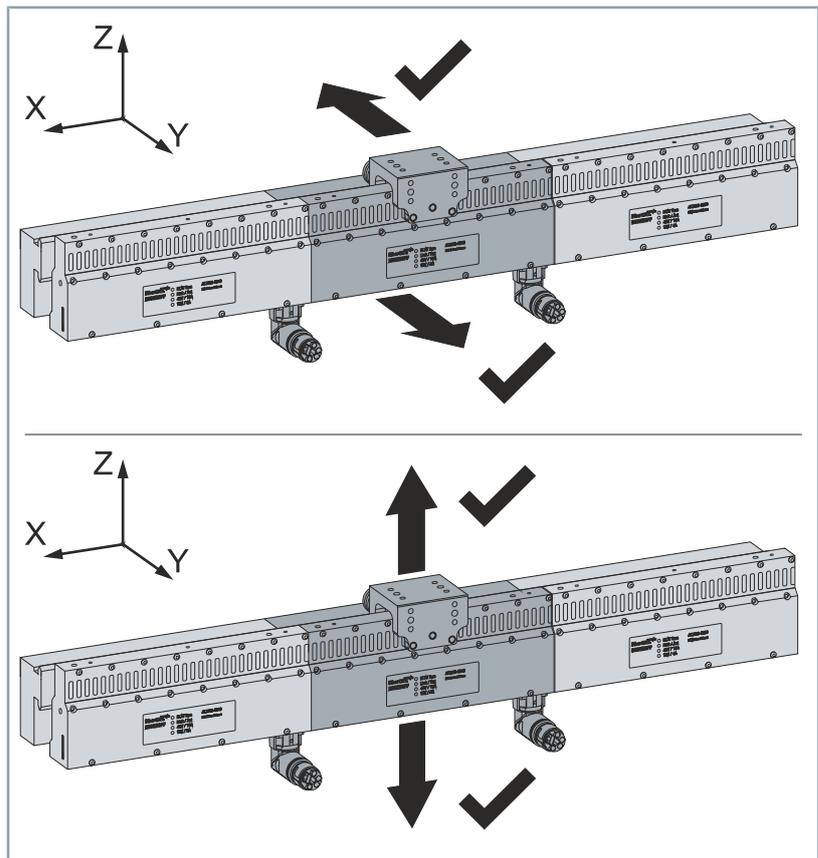
## 6.5.4 Configuration setup

In contrast to a closed XTS system, an XTS system with Track Management differs significantly in its structure with fixed and moving track sections. In order for a track section to be moved, an air gap is required between the moving and fixed track sections. The required air gap can be realized by using shortened modules and corresponding guide rails.

### 6.5.4.1 Traversing axes for moving track sections



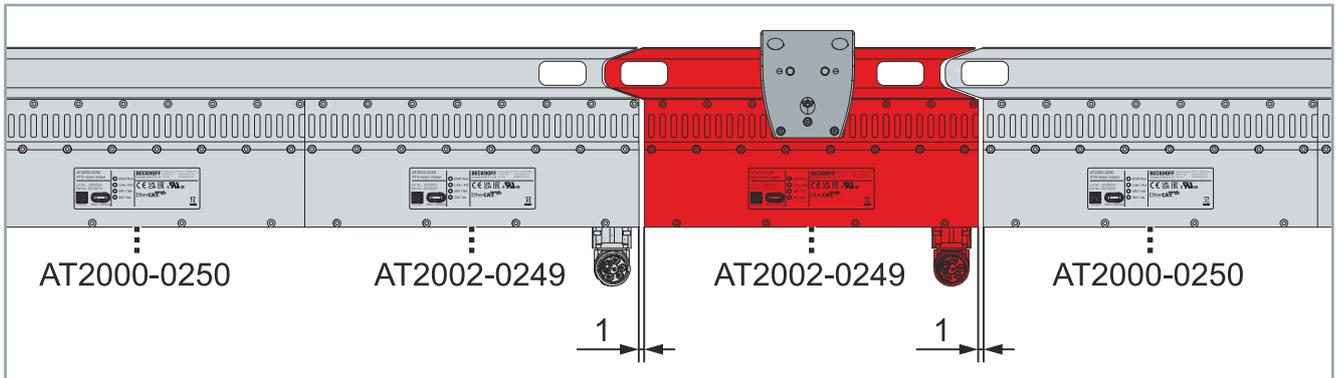
The interlocking of the Beckhoff guide rails enables a track section to be moved in the X-direction and Y-direction. Movement in the Z-direction is not possible due to the interlocking of the guide rails.



For moving a track section in X-direction and Y-direction or in Z-direction, parallel guide rails from third party manufacturers must be used, which do not interlock.

## 6.5.4.2 Air gap

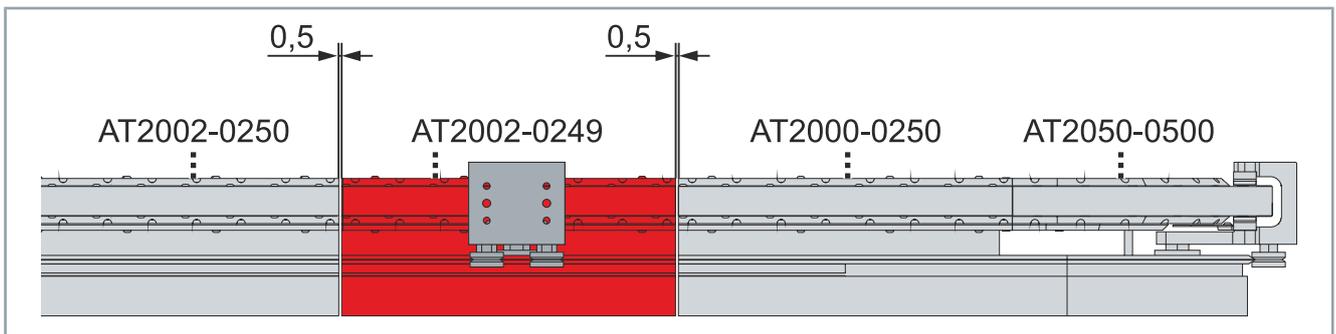
The required air gap can be realized with one or two AT2002-0249 modules. This module is 1 mm shorter than a standard XTS module and allows an air gap of 1 mm or 0.5 mm on both sides.



For an XTS system with Track Management with Beckhoff guide rails, two AT2002-0249 modules are used as modules with a length of 250 mm. This results in a gap of 1 mm on both sides of the moving track section.

Due to the interlocking of the Beckhoff guide rails, this air gap is large enough to move the track section and small enough to move the movers without problems.

The air gap must be entered in the parameters. Further information can be found in chapter "Enter air gap", [Page 135].



For a Track Management system without Beckhoff guide rails, an AT2002-0249 module is used as a module with a length of 250 mm. This results in a gap of 0.5 mm on both sides of the moving track section.

The air gap must be entered in the parameters. Further information can be found in chapter "Enter air gap", [Page 135].

### NOTICE

#### Only one AT2002-0249 module for external guide rails

External guide rails may only be used with a single AT2002-0249 module, as the tolerances are lower. Rails that do not interlock result in higher friction when passing over the physical air gap.

Contact the manufacturer of the external guide rail to clarify whether the guide rail can be used for XTS Track Management.

## 6.5.4.3 Mover



### **Only use Beckhoff 70 mm movers or external movers**

Only Beckhoff movers with a length of 70 mm and external movers that comply with the specified tolerances may be used for Track Management.

Only the following movers are approved for Track Management:

- AT9011-0070
- AT9014-0070
- External movers

Contact the manufacturer of the external mover to clarify whether the mover can be used for Track Management and whether the mover and the guide system are suitable.

## 6.5.4.4 Cabling

Compared to a closed XTS system, an XTS system with Track Management uses more modules with feed, since each moving track section requires its own feed.

For applications with more than 32 modules with feed, contact the product specialist responsible for your region.

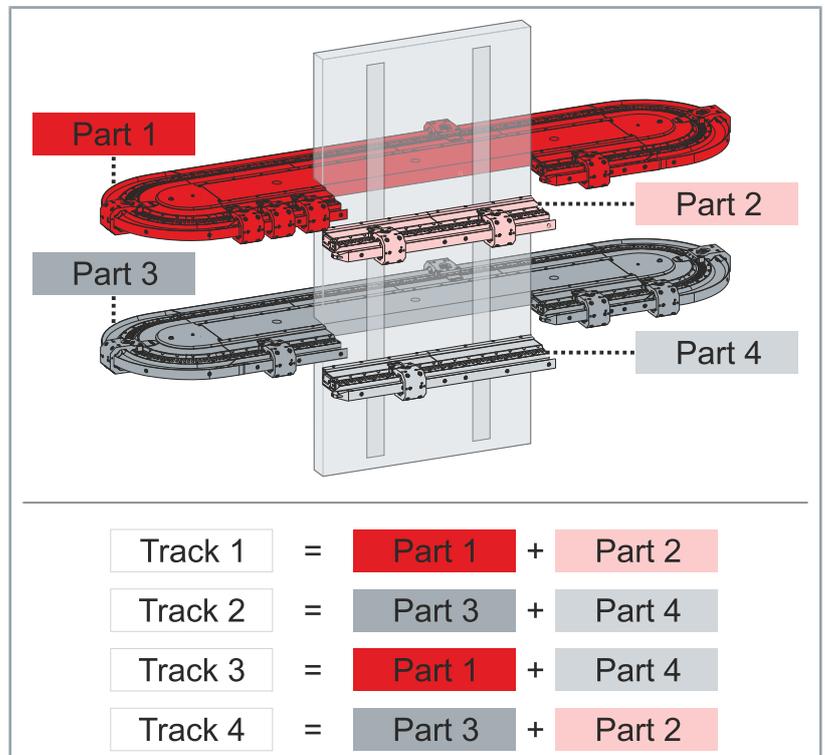
## 6.5.4.5 Tracks

Based on parts, the exact position of the mover and its travel path is determined. The different parts combine to form tracks on which the movers travel.



### Example with four parts

The composition of parts into tracks is illustrated using an XTS system with four parts as an example



Further information can be found in chapter "XTS Configuration", [Page 24].

## 6.5.4.6 Variants for the mover organization

The order of the movers changes permanently due to the moved track sections. Therefore, it is necessary to use object-oriented programming to organize the movers within the system.

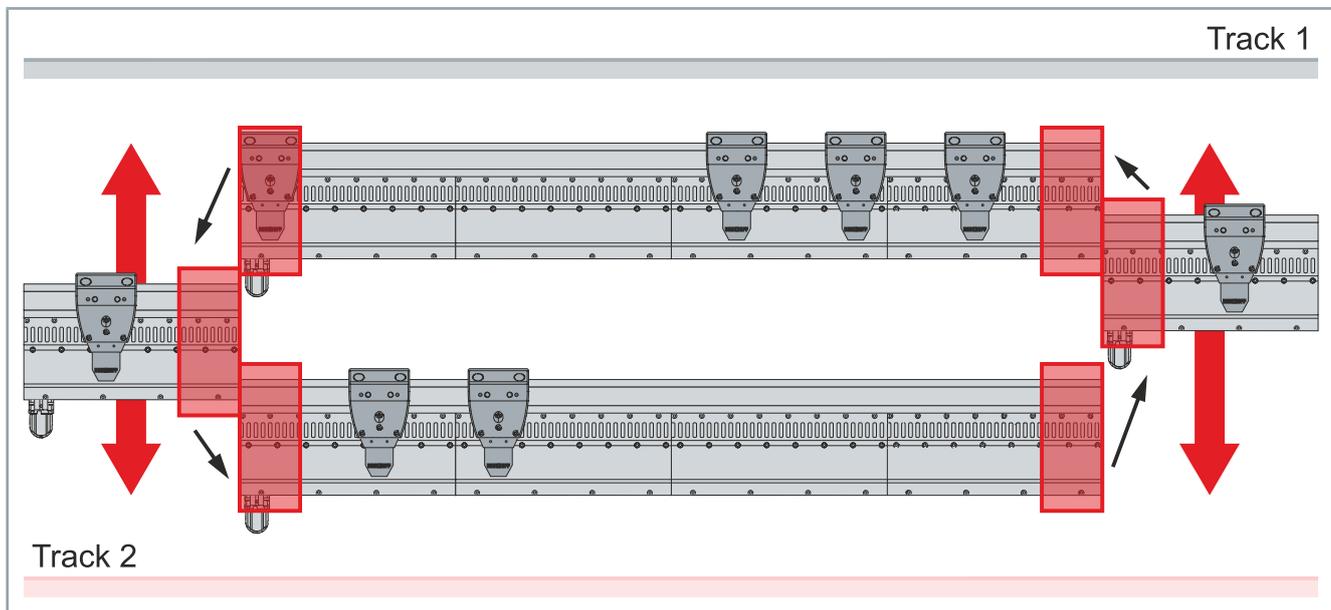
For example, the mover organization can take a local or a global approach. Furthermore, these approaches can be combined and the advantages of both approaches can be used optimally.

### Local approach

The local approach is suitable for an XTS system with:

- many movers
- many moving parts

This approach gives you the possibility to work with a small number of tracks. In this example, the XTS system has ten possible tracks, but only two tracks are used. Movers switch from one track to the next in virtual stations.



The decisive factor when using the local approach is that collision avoidance must be performed manually. When a mover changes from one track to another, the remaining movers no longer detect the mover on the moving track section, since collision avoidance is track-based. The programmer must ensure that the movers are on the correct track and do not collide with each other.

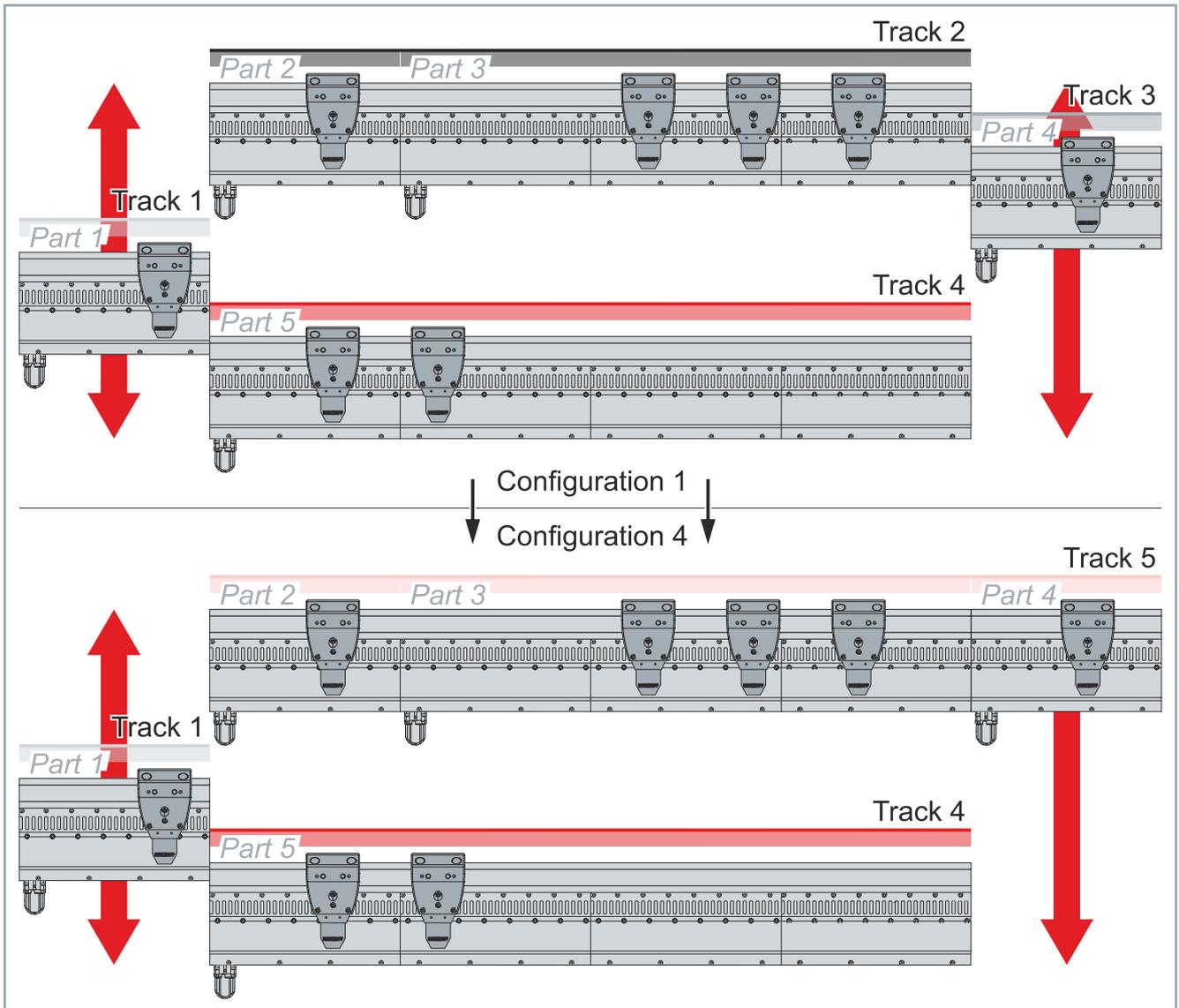
For more information on collision avoidance, see the chapter "Collision Avoidance functionality", [Page 140].

## Global approach

The global approach is suitable for an XTS system with:

- few movers
- few moving parts

This approach gives you the possibility to work without virtual stations and only with tracks. In this example, the XTS system has ten possible tracks that are not simultaneously activated for the movers. In this approach, the movers are switched to the correct track based on the position of the moving track sections.



While the two outer track sections move, in this configuration all parts are independent tracks. As soon as a moving track section matches the upper module, a new configuration with a new track is formed. In this example, Part 2, Part 3 and Part 4 together form Track 5 and the movers automatically switch to this new track.

This global approach is suitable for a manageable number of movers and tracks. The more moving track sections there are in your XTS system, the more possible tracks there are. The exponential growth leads to the fact that at a certain point the number of possible configurations is too large and the global approach is unsuitable for this system.

The collision avoidance of the movers takes place without manual testing and correctly.



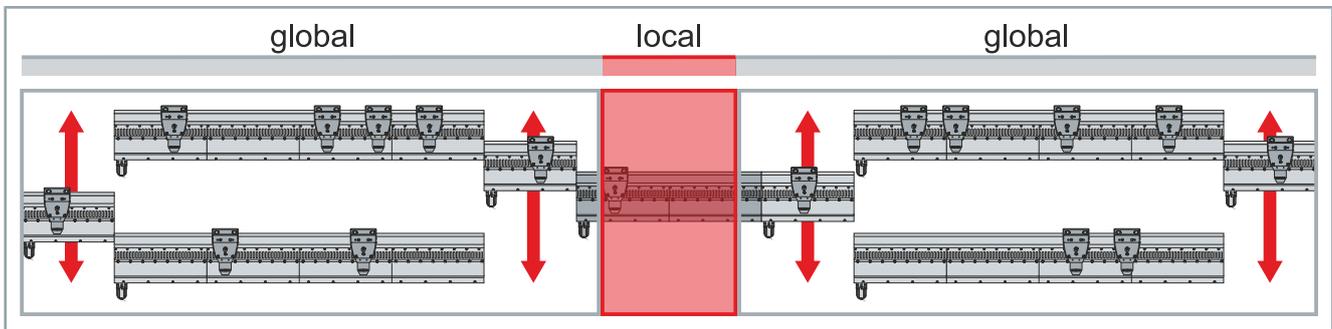
## Activation of a new track stops active movement commands

The MC\_ActivateTrack currently cancels the active movement command of all movers as soon as a new track is activated. The movement command must then be reactivated manually. You must check if it is possible to activate the new tracks for all movers, otherwise an error will be thrown at the function block.

## Mixed approach

The mixed approach combines the respective advantages of the local and global approach. The XTS system is split into sections where the tracks manage the movers globally. Each of these sections has a limited number of possible configurations that are easy to configure. Collision avoidance can be used to its full extent.

Two globally organized sections are then interconnected with a virtual station using the local approach, allowing movers to move from one global system to the other.

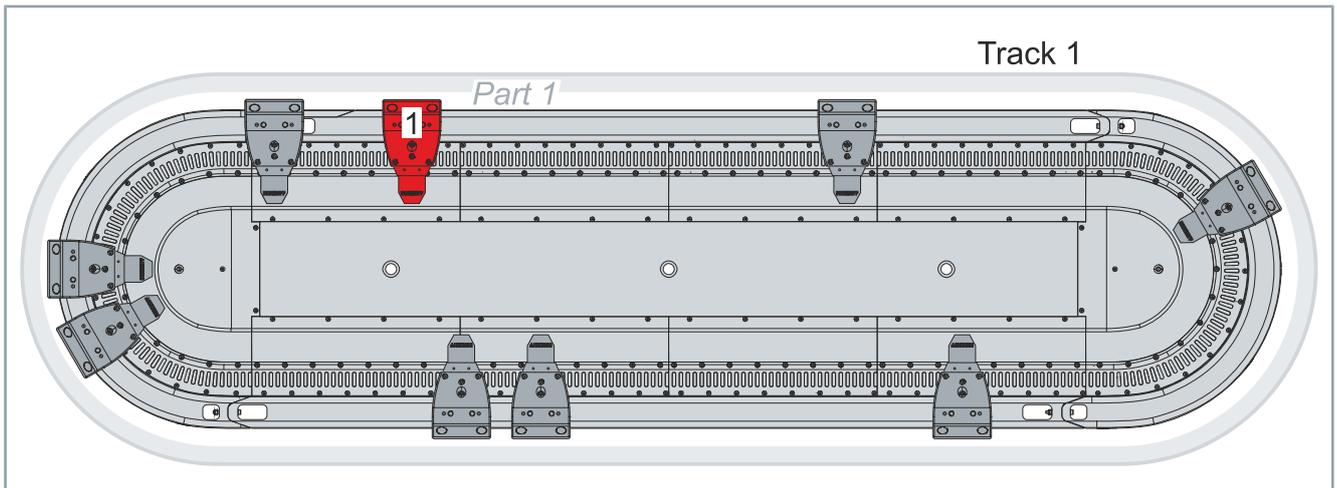


### 6.5.5 Programming of an XTS system with Track Management

Since the movers no longer travel constantly on a single closed track, their continuous position, which is specified by the NC, changes. Due to the moving track sections, it is possible for movers to overtake each other. As a result, the starting positions of the movers change and movers can have the same continuous position.

It is required that an XTS system with Track Management uses advanced programming to move and monitor the position of the movers.

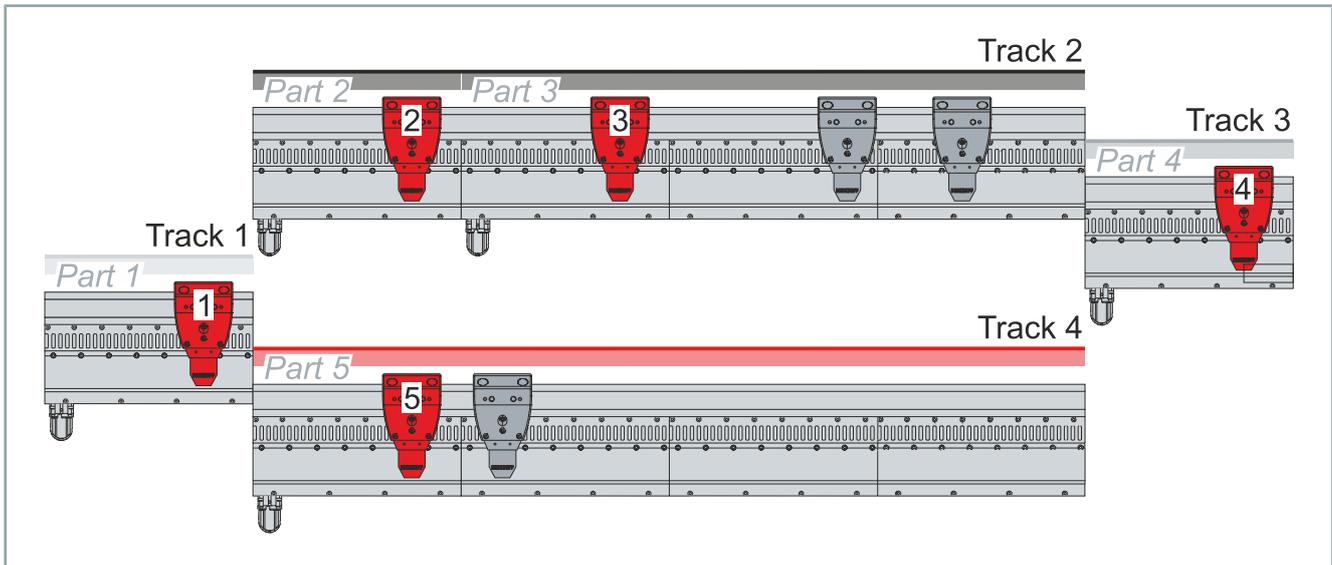
#### Standard XTS system



In a closed XTS system, each position exists only once. The maximum position corresponds to the length of the system. After the mover has traveled the entire length once, it is started again at position 0.

## XTS system with Track Management

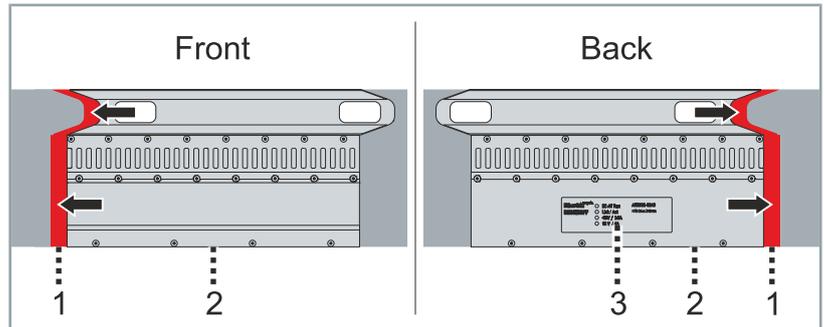
For the position determination of the movers on an XTS system with Track Management, the positions and the object IDs of all parts or all tracks are required to avoid duplicate positions of movers.



If the position determination is only based on the position on a part, Mover 1, Mover 2, Mover 3, Mover 4 and Mover 5 in this example all have the same position of 190 mm. Only by combining *PartPosition* and *PartId* is a single exact position determination for each mover possible. Alternatively, the combination of *TrackPosition* and *TrackId* can be used to determine the exact position of the movers, since this combination also only exists once in the system.

### 6.5.5.1 Enter air gap

The air gap for moving track sections realized with a shortened AT2002-0249 module must be entered in TwinCAT. When entering, please note from which side your system is displayed in TwinCAT.



If the XTS system is displayed in the view *Front*, the air gap [1] is located on the left side of the module [2].

If the XTS system is displayed in the *Back* view, the air gap [1] is located on the right side of the name plate [3] of the module [2].

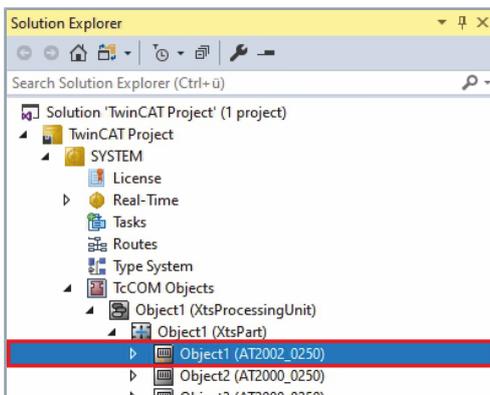


#### Manual input or use of TwinCAT Tools

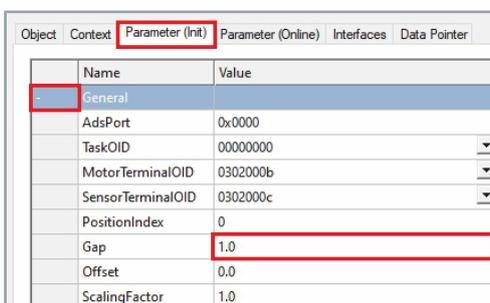
You have the option of creating the air gap manually or quickly and easily via the TwinCAT Tools *XTS Configurator* and *XTS Simulation Builder*.

For more information, see the chapters "XTS Configurator", [Page 258] and "XTS Simulation Builder", [Page 229].

#### Enter manually

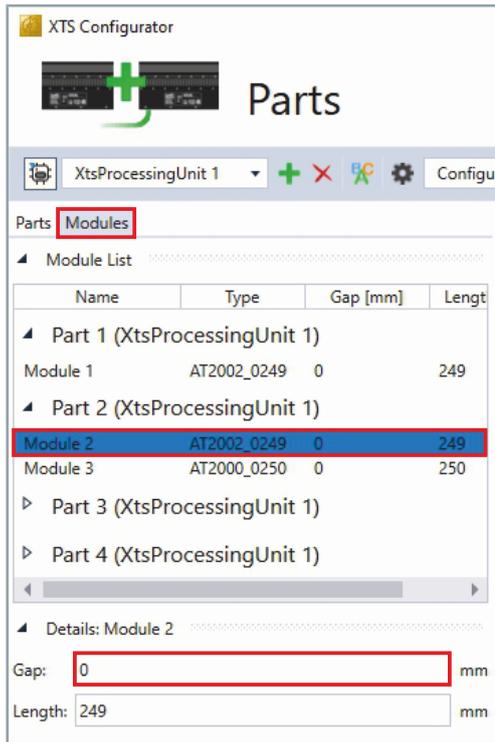


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Object* > *Object (XtsProcessingUnit)*
- ▶ Double-click on **Object (AT2002\_0249)**



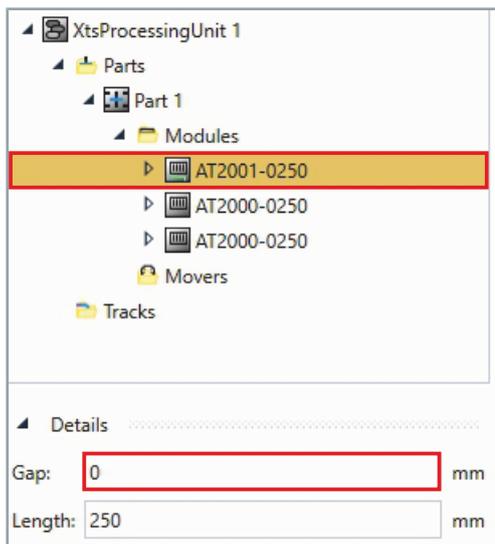
- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Enter a value for the gap between the modules in the *Gap* input field

## Enter in the XTS Configurator



- ▶ Open page *Parts*
- ▶ Click on the **Modules** tab
- ▶ Click on a module
- ▶ Enter a value for the gap between the modules in the *Gap* input field

## Enter in the XTS Simulation Builder



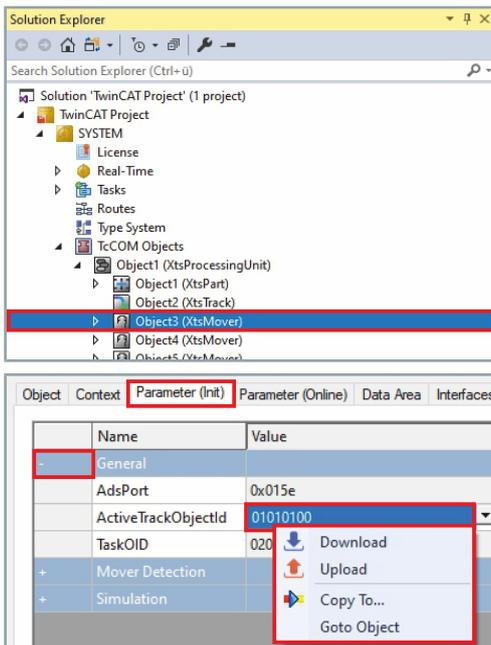
- ▶ Expand *XtsProcessingUnit > Parts > Part 1 > Modules*
- ▶ Click on a module
- ▶ Enter a value for the gap between the modules in the *Gap* input field

## 6.5.5.2 Enable track

The movers need activated tracks so that the XTS Driver gets the information which coils have to be activated to move the movers. After the start, all movers have their active track on which they are found. You have the possibility to activate tracks manually by downloading the respective parameters with the TrackId. To activate another track for a mover, the mover must be on a part of the XTS track to be activated.

### Read with XTS Utility library or ADS

The actual values for the position can be read using the XTS Utility library or ADS.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *XtsProcessingUnit*
- ▶ Double-click on **Object (XtsMover)**

- ▶ In the project window click on the **Parameter (Online)** tab
- ▶ Expand *General*
- ▶ Right-click in the input field *ActiveTrackObjectId* to open the context menu
- ▶ In the context menu click **Download**

## Read out in PLC



### MC\_ActivateTrack function block

The *MC\_ActivateTrack* function block is used to activate a track. The Execute command triggers an event and status bits can be read to get feedback from the function block.

The function block can be used in the PLC and takes over the Track Object ID from the track object. If the Track Object ID is set to 0, the absolute reference system, which is used by default, can be reactivated for the NC axis.

While the track for the mover is activated in the XTS driver in order to be able to drive over the modules, the track is also activated as a reference system in the NC. The reference system can then be used for positioning in various motion functions, for example *MoveAbsoluteCA*, *HaltCA*, *GearInPosCA*.

The axis must be part of a CA group for the function block to work. The function block *MC\_ActivateTrack* automatically cancels other motion commands when they are triggered.

Further information can be found in the documentation *TF5410 TwinCAT 3 | Collision Avoidance*:

[Direct link to the documentation TF5410 | TwinCAT 3 | Motion Collision Avoidance](#)

### 6.5.5.3 Determine track positions

Determining the position of the movers based on parts of a circulating track does not work for an XTS system with Track Management, since the parts can be parts of different tracks. The *MC\_ReadTrackPositions* function is used to determine the position and object ID of all parts and all tracks. This information can be used to determine the exact position of a mover in the system.

### Read with XTS Utility library or ADS

The actual values for the position can be read using the XTS Utility library or ADS.

The screenshot shows the **Solution Explorer** window with the project tree expanded to **TcCOM Objects > Object3 (XtsMover)**. Below it, the **Parameter (Online)** tab is active, showing a table of parameters for the selected object.

Name	Online
Mover Detection	Online
IsActive	TRUE
- PositionInfo	...
.partPosition	1506.82298850575
.trackPosition	1506.82298850575
.partObjectId	01010020
.trackObjectId	01010010
Mover ID Detection	
Info	

► Expand *Solution Explorer > TwinCAT Project > SYSTEM > TcCOM Objects > XTSProcessingUnit*

► Double-click on **Object (XtsMover)**

► In the project window click on the **Parameter (Online)** tab

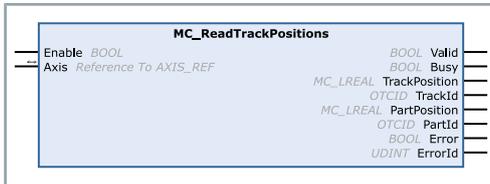
► Expand *Mover Detection > PositionInfo*

► Read values for *.partPosition*, *.trackPosition*, *.partObjectId* and *.trackObjectId*

Read out in PLC

The MC\_ReadTrackPosition function block can be used to transfer setpoints from the NC to the PLC.

**MC\_ReadTrackPositions function block**



This function block is different from the other motion function blocks. *Enable* activates the function block and enables a cyclic reading process of the positions. Status signals are read to get a feedback from the function block.

The function block returns the current set positions of the parts and tracks and the associated object IDs. The axis of the movers located on the parts and tracks must be part of a CA group so that the function block returns valid values. If no track is activated for the axis, the absolute setpoints, the track and the Part ID are returned with 0.

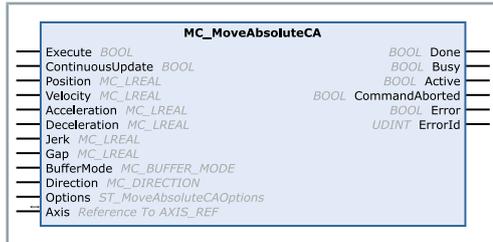
Further information can be found in the documentation *TF5410 TwinCAT 3 | Collision Avoidance*:

- 🌐 [Direct link to the documentation TF5410 | TwinCAT 3 | Motion Collision Avoidance](#)

## 6.5.5.4 Move to an absolute position

In the options of the motion command MC\_MoveAbsoluteCA there is a Position Reference System and a Dynamic Reference System where the track on which the mover is located must be specified. By entering the track, the motion profile is calculated correctly and rejected if necessary, if the motion profile is outside the limits of the track. If the input of the track is missing, it is calculated against the absolute system. If the part is entered instead of the track, it is calculated against the part.

### Read out in PLC



### MC\_MoveAbsoluteCA function block

This function block instructs a single axis to move to the absolute position defined in the function block, based on collision avoidance. Collision avoidance has higher priority than the motion command. Therefore, the axis may slow down or wait while the motion command is executed to avoid a collision. The function block does not output the signal *Done* until the axis has reached its target position.

Further information can be found in the documentation *TF5410 TwinCAT 3 | Collision Avoidance*:

[Direct link to the documentation TF5410 | TwinCAT 3 | Motion Collision Avoidance](#)

## 6.5.5.5 Collision Avoidance functionality

The Track Management supports the Collision Avoidance functionality. Collision Avoidance works like a closed XTS system, but there are a few special features to consider.

Only one CA group is required for an XTS system. Under the CA group, there is a hidden domain management that manages the collision avoidance for the different track combinations. Each track is represented by a domain and the movers of this domain can avoid collision among themselves. This means that collision avoidance works exclusively on the basis of tracks.

If the movers travel on the same track, they recognize each other and can automatically avoid a collision. If the movers are on different tracks but on the same part, they will not recognize each other and may collide without manual control.



### Track-based collision avoidance

Currently, only a track-based collision avoidance calculation is available. A parts-based collision avoidance system is still under development.

## 6.6 Leave and Arrive functionality

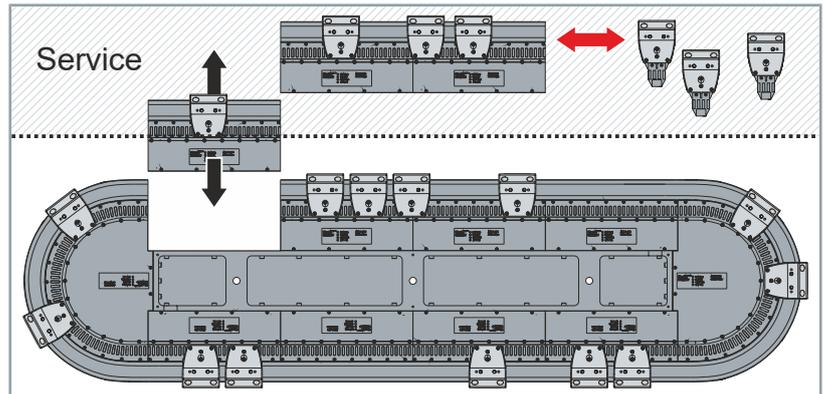
The *Leave and Arrive* functionality enables dynamic adjustment of the number of movers in an XTS system during operation. Movers can be removed from the system for service work, for example, or removed from the system and added again as required.



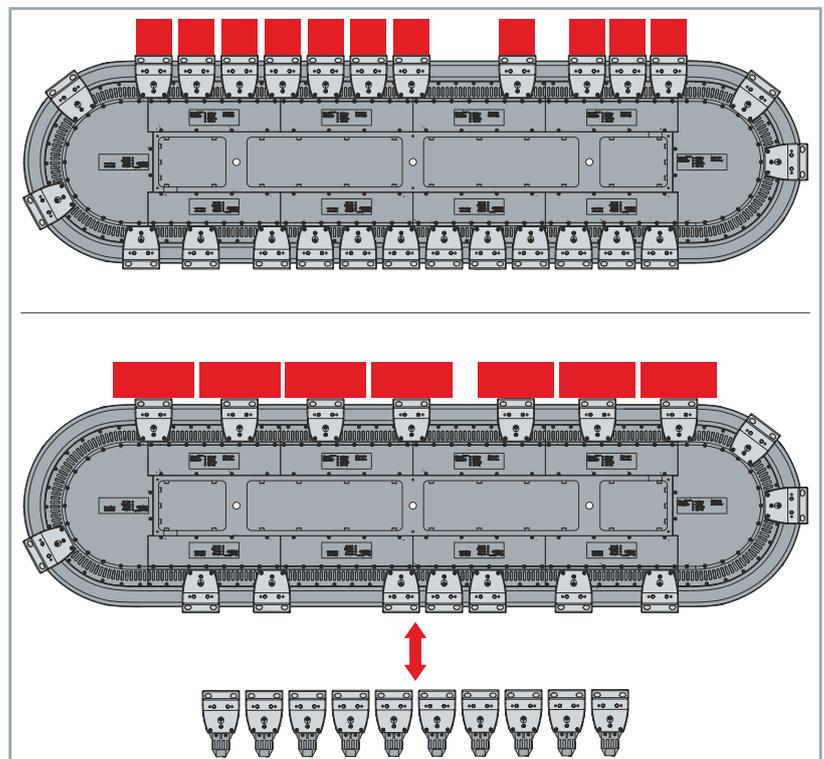
### Current cycle rate of 60 movers per minute

Adding and removing movers is currently limited to a cycle rate of 60 movers per minute.

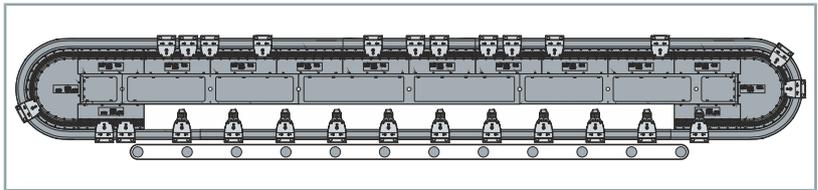
### 6.6.1 Examples



With the *Leave and Arrive* functionality, movers can be removed from the system for maintenance while the rest of the system remains in operation.



Movers can be removed from the system if they are temporarily not needed, for example, during a product change. Removed movers can be added back to the system if necessary.



Movers can leave the system, move to a track section without XTS functionality and be added back to the system at another location.

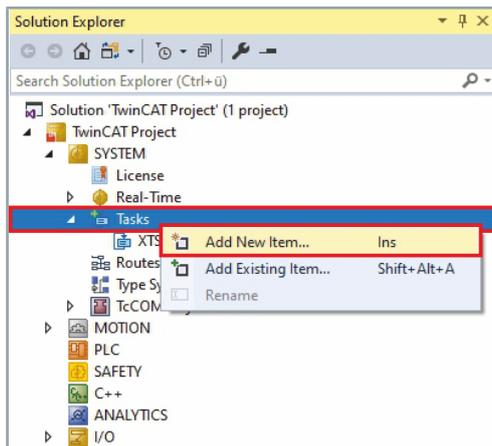
Beckhoff recommends transport using simple conveyor technology only for systems with a length of at least 30 m.

## 6.6.2 Requirement

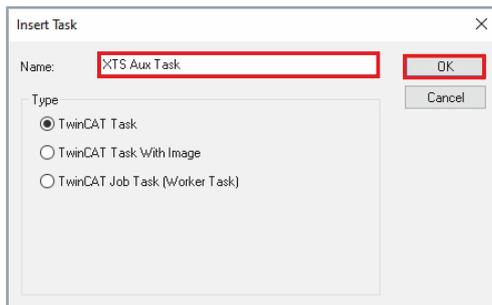
It is necessary to add an additional task so that the mover detection can take place in parallel with the operation of the other modules and movers.

The additional task is added during configuration with the *XTS Configurator*. However, the additional task can also be added manually if needed. Further information can be found in chapter "AUX Task for the Leave and Arrive functionality", [Page 310].

### 6.6.2.1 Add additional task manually

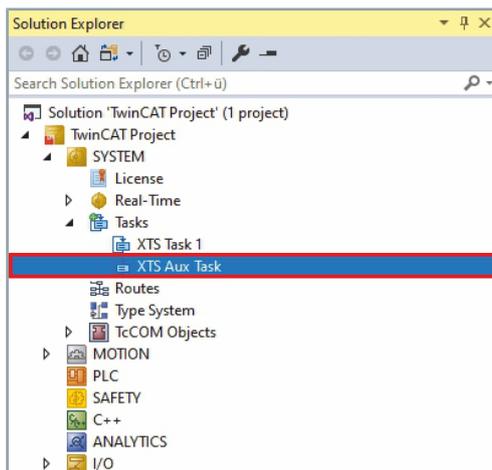


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM*
- ▶ Right-click on **Tasks** to open the context menu
- ▶ Click **Add New Item...** in the context menu



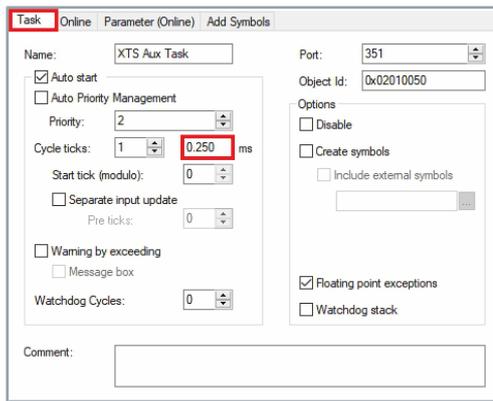
The *Insert Task* dialog box opens.

- ▶ Enter a name for the task in the input field *Name*
- ▶ Confirm with **OK**



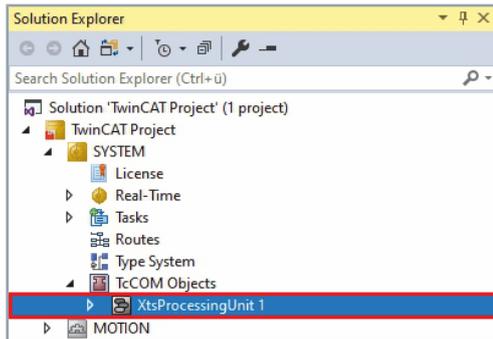
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tasks*
- ▶ Double-click on **XTS Aux Task**

# Functions of the driver

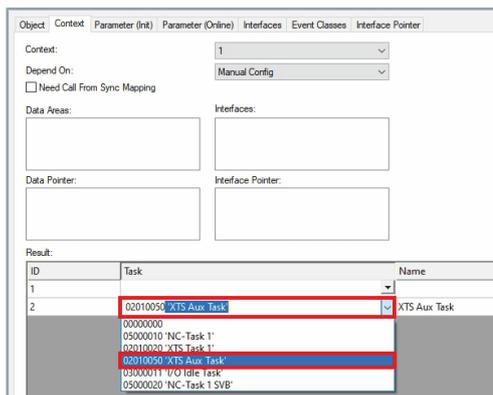


- ▶ In the project window click on the **Task** tab
- ▶ Make sure that the **Cycle ticks** are set to 0.250 ms

Further information can be found in chapter "Real-Time", [Page 305].



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-Com Objects*
- ▶ Double-click on **XTSProcessingUnit**



- ▶ In the project window click on the **Context** tab
- ▶ In the drop-down menu of *Results ID 2* select **XTS Aux Task**

After a task has been added for mover detection, movers can be removed using the Leave function or added again using the Arrive function.

### 6.6.3 System startup

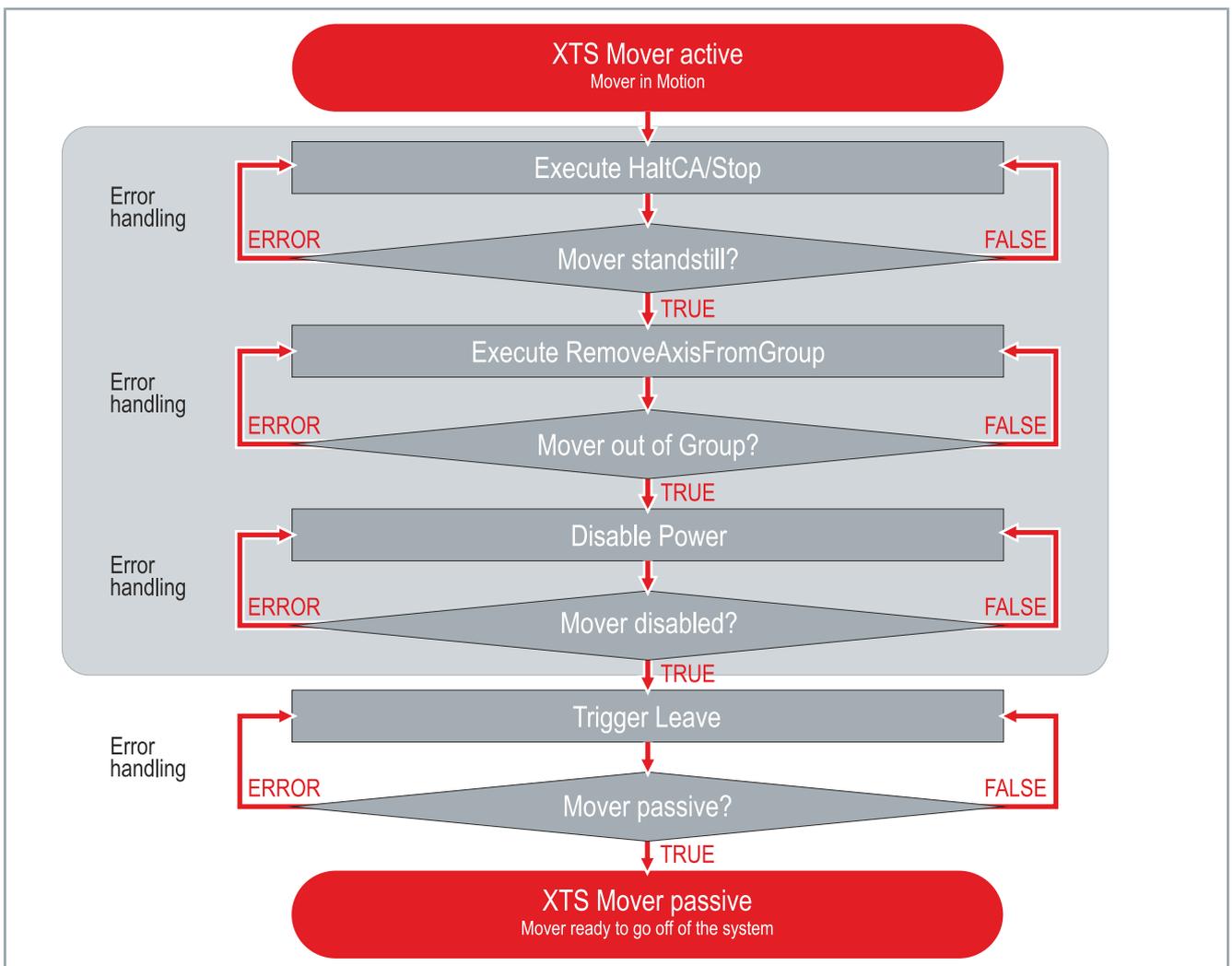
After the system startup and the first mover detection, all detected movers are switched to active. The first mover detection is required and is automatic. After the first mover detection you have the possibility to adjust the settings for further mover detections.

### 6.6.4 Leave function

The controllers of an active mover are switched on and the mover may be integrated into a CA motion command, for example *MC\_MoveAbsoluteCA*. The mover must first be stopped and removed from the control system before it can be removed from the system.

For the removal of the mover, the control is switched off for the Tc-COM object *Mover* using the PLC and the *AXIS\_REF* interface. Once the mover is passive via the XTS Utility, its information has been reset to the default settings and its position is 0, it can be removed from the system without the mover triggering an error. The links of the mover to its corresponding SoftDrive object and to its NC axis remain.

The diagram shows the structure of the *Leave* sequence required to remove a mover from the system.



## 6.6.4.1 Remove Mover

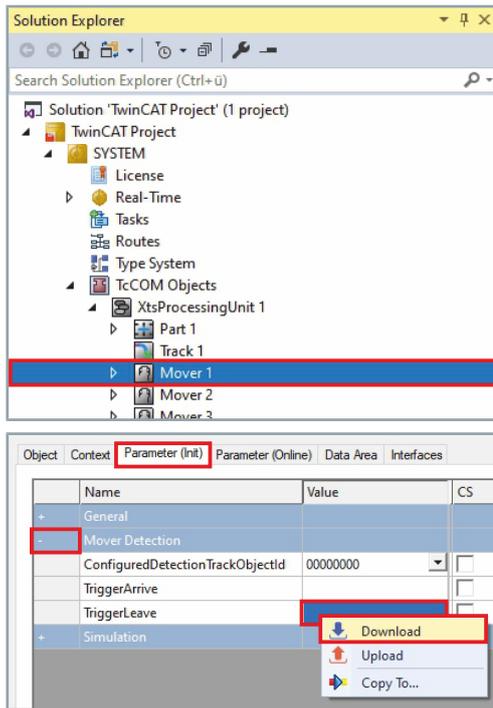
### NOTICE

#### Errors in the control system and damage to movers and modules due to incorrectly removed movers

If active movers are removed that are not in control, it can lead to problems with the control system and the entire system can be put into an error state.

- Remove from the system only passive movers that are not in control and have been removed from the CA group.

### Disabling movers

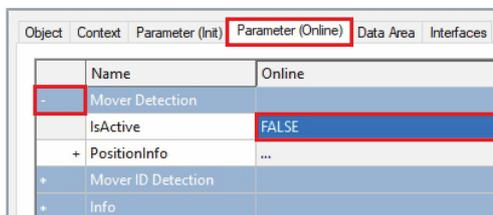


- Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *XtsProcessingUnit*
- Double-click on the **mover**, which is to be removed from the system

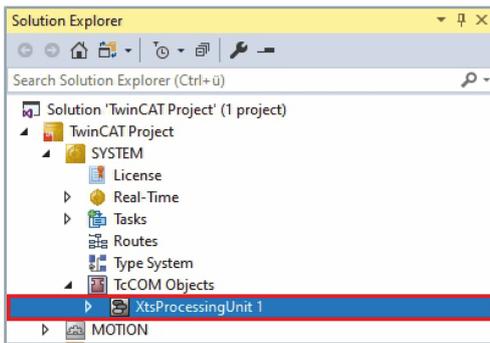
- Click the **Parameter (Init)** tab in the project window
- Expand *Mover Detection*
- Right-click in the input field *TriggerLeave* to open the context menu
- In the context menu click **Download**

### Checking the result

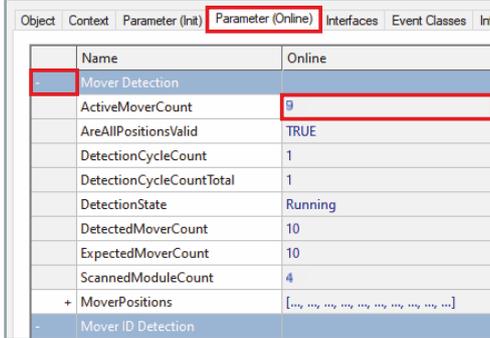
After the download, you can check whether the mover has been successfully deactivated and whether the total number of movers has decreased.



- In the project window click on the **Parameter (Online)** tab
- Expand *Mover Detection*
- Make sure the *IsActive* parameter is **FALSE**



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**



- ▶ In the project window click on the **Parameter (Online)** tab
- ▶ Expand *Mover Detection*
- ▶ Check if the number of movers has decreased at **ActiveMover-Count**

If the mover is passive and the number of movers has decreased, the mover can be removed from the system.

## 6.6.5 Arrive function



### **Use *Arrive* function only to add movers**

The *Arrive* function can only be used to add movers to an XTS system that were previously removed using the *Leave* function or were already passive when the system was started. It is not possible to change the configuration of an XTS system with the *Arrive* function.

One or more passive movers must be activated, placed in control and added to a group before they can be moved via a CA motion command.

The links of the mover to its corresponding SoftDrive object and to its NC axis already exist. The mover must be active, added to a group, and on the correct track to be powered up and moved on the system using the PLC and the *AXIS\_REF* interface.

### 6.6.5.1 Structure

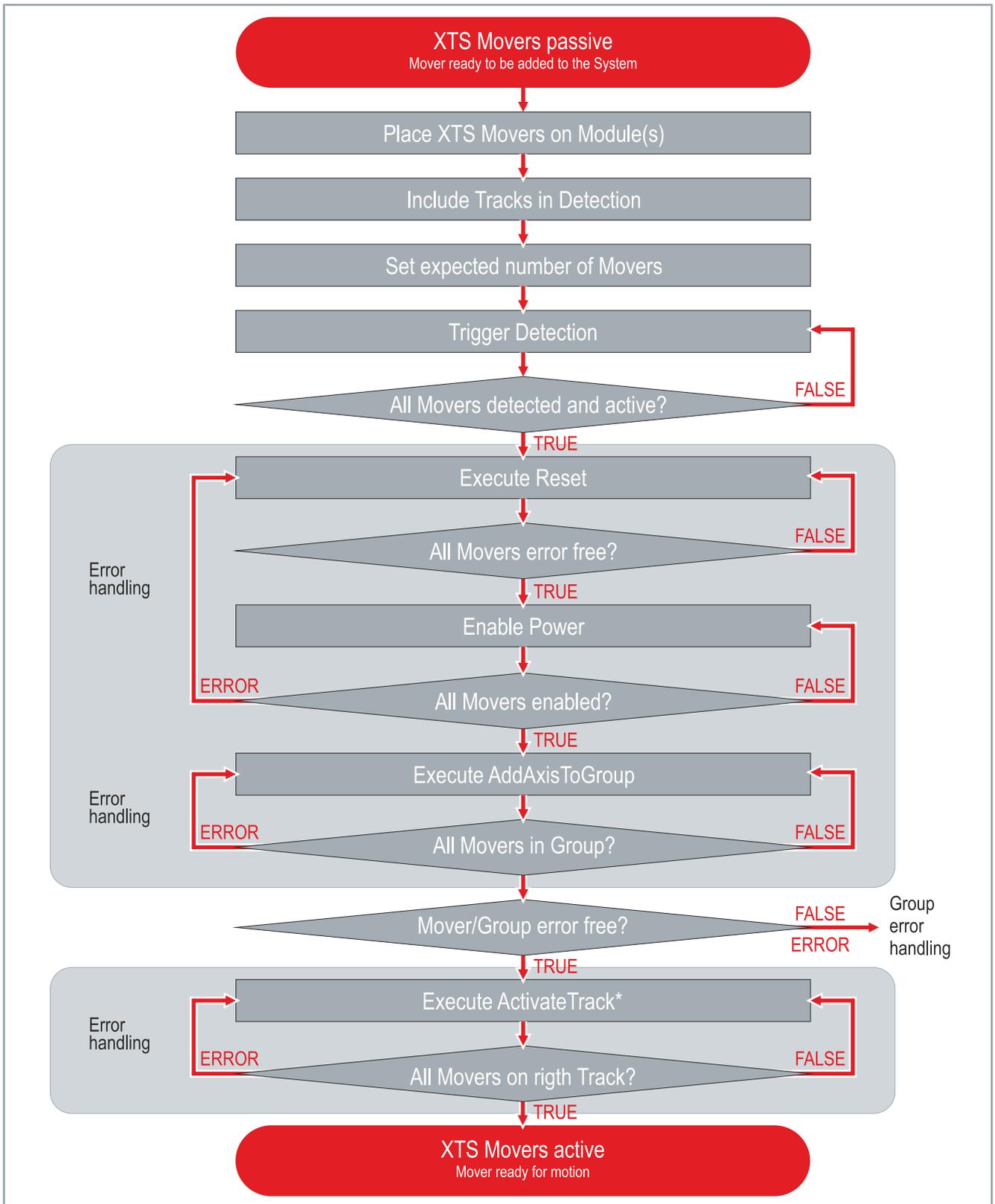
Adding movers can be done in two different ways:

- multiple movers
- single mover

The two *Arrive* sequences differ from each other in their structure. The corresponding sequences can be found on the following pages.

Multiple movers

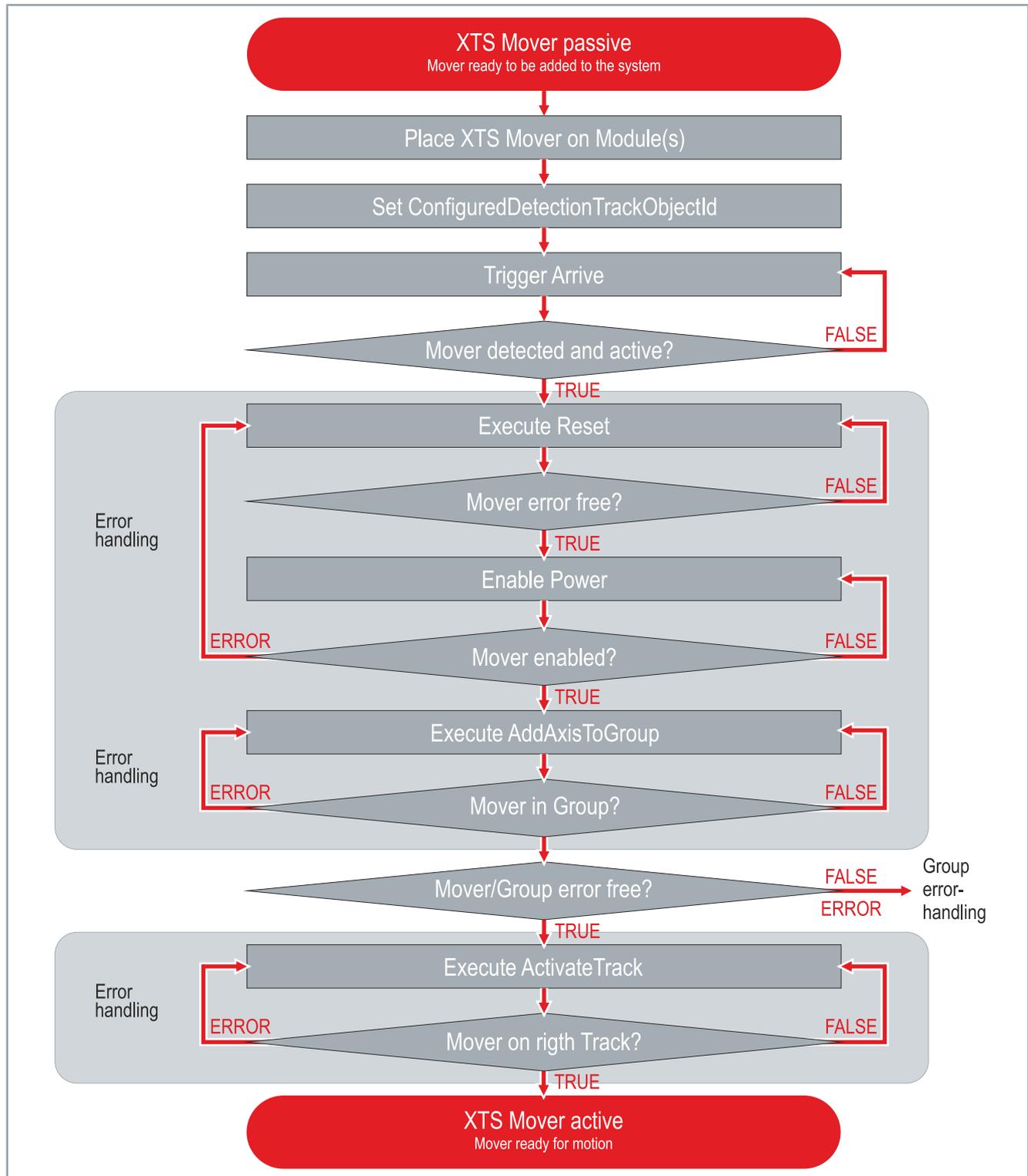
The figure shows the structure of the required *Arrive* sequence to add multiple passive movers to the system.



\* Required if not all movers return to the system and/or a separate track is used for mover detection.

## Single mover

The figure shows the structure of the required *Arrive* sequence to add a mover to the system.



## 6.6.5.2 Adding movers

You have the possibility to add several movers back to the system at the same time with a mover detection. You can also add a single mover in this way or use the variant for adding a single mover. With the second variant, only a single mover can be added at a time and not several movers at the same time. For more information on adding a single mover, see the chapter "Single mover", [Page 153].

### NOTICE

#### Errors in the control system and damage to movers and modules caused by other movers

Only movers that match the configuration may be added. It is not possible to add additional movers, a different type of mover or movers with a different magnetic plate set, since it is not possible to move these movers.

- Make sure to add only movers that match the configuration of your system.

## Multiple movers

If one or more movers are added, a new mover detection must be started to find the movers. After you have defined how many movers should be detected on which tracks, the mover detection can be started.

Unlike the initial mover detection, a mover detection to add movers is performed only once and is not repeated cyclically. Cyclic repetition only occurs if the corresponding parameter for repetition has been adjusted.

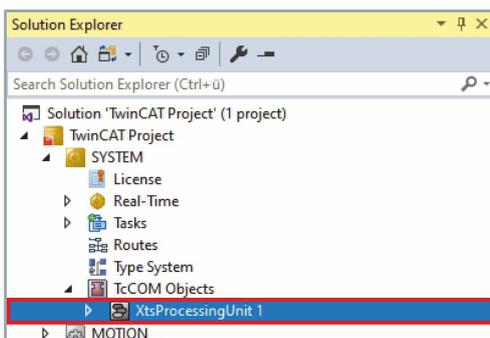
## Enabling movers

### NOTICE

#### Errors in the control system and damage to movers and modules caused by movers that are already in control

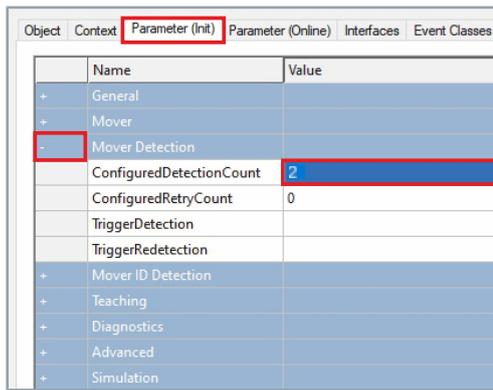
There must not be any movers on the track on which the mover detection of additional movers is to be executed that are already in control. Movers that are already in control can react uncontrollably in the event of a mover detection and cause damage to movers and modules.

- Make sure that there are no movers on the track for mover detection of new movers that are already in control.

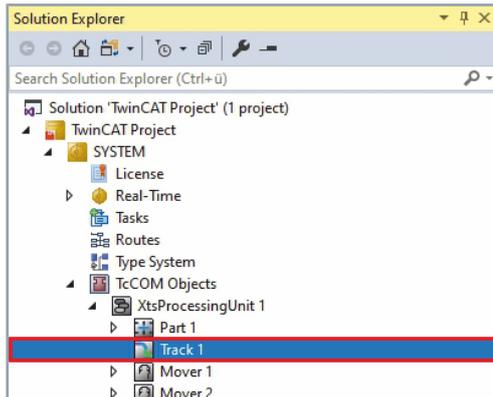


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**

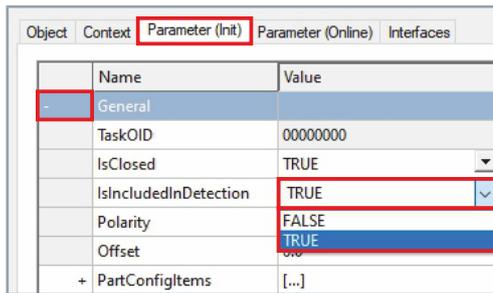
# Functions of the driver



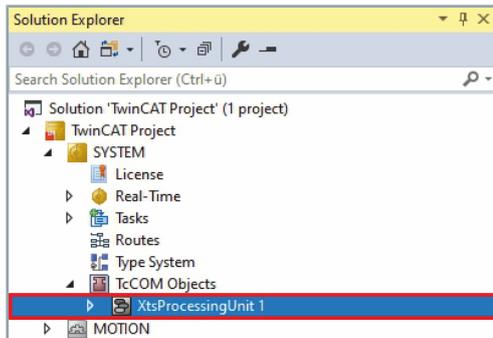
- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Mover Detection*
- ▶ Enter the number of movers to be detected in the input field *ConfiguredDetectionCount*
- ▶ Make sure that no movers that are in control are on the track that is to be used for mover detection



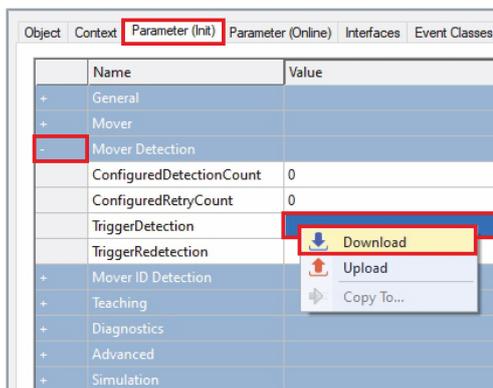
- ▶ Expand *Solution Explorer > TwinCAT Project > SYSTEM > TcCOM Objects > XtsProcessingUnit*
- ▶ Click on the **track** to be used for mover detection



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *General*
- ▶ Select **TRUE** in the drop-down menu *IsIncludedInDetection*



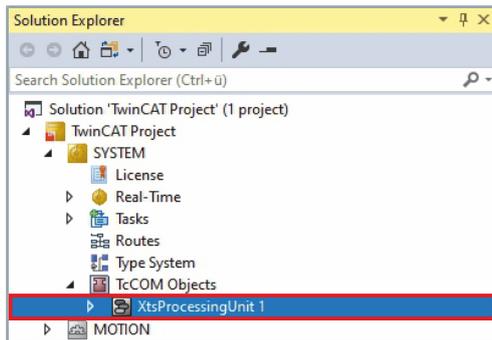
- ▶ Double click on **XtsProcessingUnit**



- ▶ Right-click in the input field *TriggerDetection* to open the context menu
- ▶ In the context menu click **Download**

## Checking the result

After downloading, you can check if the mover detection was successful or if the number of passive and detected movers differs.

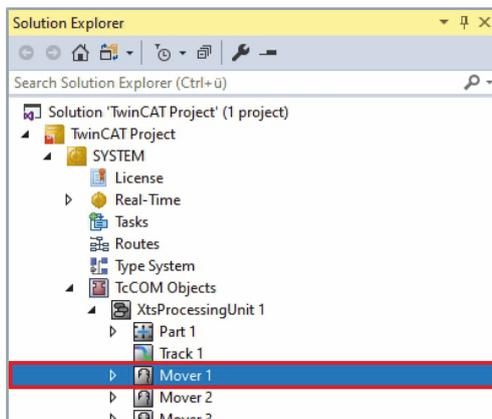


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes
		Name	Online		
		Mover Detection			
		ActiveMoverCount	10		
		AreAllPositionsValid	TRUE		
		DetectionCycleCount	1		
		DetectionCycleCountTotal	1		
		DetectionState	Succeeded		
		DetectedMoverCount	10		
		ExpectedMoverCount	10		
		ScannedModuleCount	0		
		+ MoverPositions	[...]		

- ▶ In the project window click on the **Parameter (Online)** tab
- ▶ Expand *Mover Detection*
- ▶ Check if the number of active movers is correct at *ActiveMoverCount*
- ▶ Check how many mover detections are displayed at *DetectionCycleCount*
- ▶ Check whether the parameter *DetectionState* indicates **Succeeded**

For each mover it is possible to check whether it is active or passive. Only active movers are displayed in the XTS View. Passive movers are not displayed in the XTS View because passive movers remain undetected by the system.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *XtsProcessingUnit*
- ▶ Click on the mover whose state is to be checked

Object	Context	Parameter (Init)	Parameter (Online)	Data Area	Interfaces
		Name	Online		
		Mover Detection			
		IsActive	TRUE		
		+ PositionInfo	...		
		+ Mover ID Detection			
		+ Info			

- ▶ Check whether the parameter *IsActive* indicates **TRUE**

## Single mover

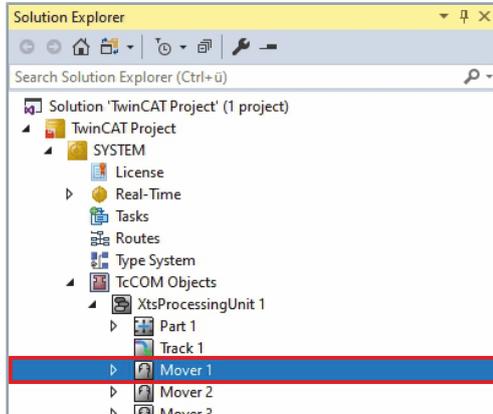


### Simultaneous addition of multiple movers not possible

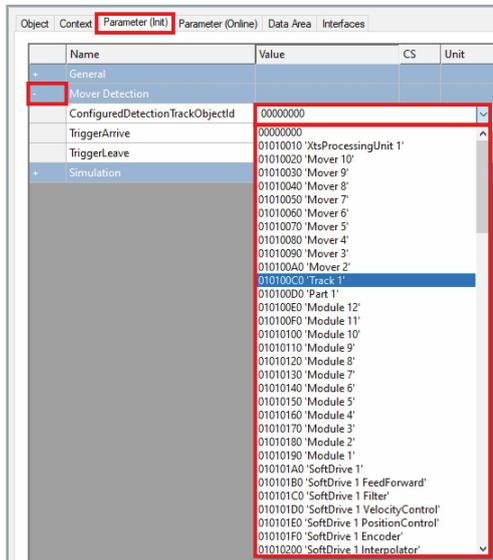
With this variant, only a single mover can be added to the system. If you want to add multiple movers, you need to repeat the steps for each mover or use the variant to add multiple movers. Further information can be found in chapter "Multiple movers", [Page 151].

A mover detection is needed to find a single mover and add it to the system. Unlike the initial mover detection after system startup, a mover detection to add movers is performed only once and is not repeated cyclically. Cyclic repetition only occurs if the corresponding parameter for repetition has been adjusted.

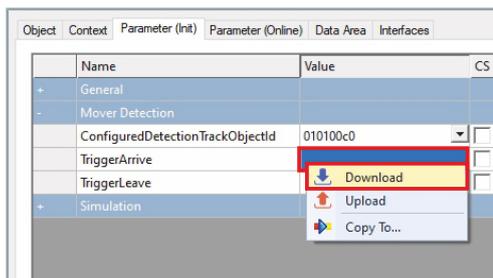
## Enabling movers



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects* > *XtsProcessingUnit*
- ▶ Click on the **Mover** to be activated

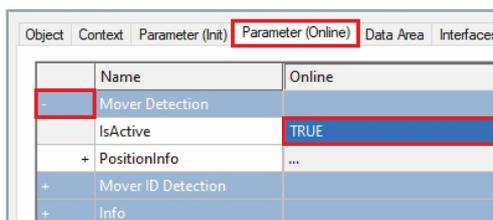


- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Mover Detection*
- ▶ In the drop-down menu *ConfiguredDetectionTrackObjectId* select the track on which the mover is located



- ▶ Right-click in the input field *TriggerArrive* to open the context menu
- ▶ In the context menu click **Download**

## Checking the result



- ▶ In the project window click on the **Parameter (Online)** tab
- ▶ Expand *Mover Detection*
- ▶ Check whether the parameter *IsActive* indicates **TRUE**

## 6.6.6 Parameter

Special parameters of the XTS system can be set for the *Leave and Arrive* functionality. The following tables contain all parameters that can be assigned to the *Leave and Arrive* functionality.

### 6.6.6.1 Processing Unit

#### 6.6.6.1.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
ConfiguredDetection-Count	Mover Detection	UDINT	0x030802B4	Sets the number of movers for mover detection.
ConfiguredRetryCount	Mover Detection	UDINT	0x030802F1	Sets the number of repetitions for mover detection if not all configured movers are detected.
TriggerDetection	Mover Detection	TriggerDetection	0x030802B5	When the TriggerDetection is downloaded, a mover detection is performed for the number of configured movers on the configured tracks.

## 6.6.6.1.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
ActiveMoverCount	Mover Detection	UDINT	0x030802B7	Returns the number of active movers.
AreAllPositionsValid	Mover Detection	BOOL	0x03080256	Returns TRUE if the positions of all movers are correct.
DetectionCycleCount	Mover Detection	UDINT	0x03080259	Returns the number of mover detections.
DetectionCycleCountTotal	Mover Detection	UDINT	0x030802EC	Returns the number of mover detections since the driver was started.
DetectionState	Mover Detection	XTS.DetectionStateEnum	0x030802ED	Returns the state of the mover detection.
DetectedMoverCount	Mover Detection	UDINT	0x0308033E	Returns the number of detected movers currently on the system.
DetectedMoverCount	Mover Detection	UDINT	0x03080257	Returns the number of movers detected during the last mover detection.
ExpectedMoverCount	Mover Detection	UDINT	0x03080258	Returns the number of expected movers - equal to the number of created mover objects.
ScannedModuleCount	Mover Detection	UDINT	0x03080225	Returns the number of modules found during a mover detection.

6.6.6.2 Mover

6.6.6.2.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
ConfiguredDetection-TrackObjectId	Mover Detection	UDINT	0x030802F0	Sets the object ID of the track on which the mover detection is executed when TriggerArrive is triggered.
TriggerArrive	Mover Detection	TriggerArrive	0x030802EE	When TriggerArrive is downloaded, a mover detection is performed for a mover on the configured track. After successful mover detection, the mover becomes active.
TriggerLeave	Mover Detection	TriggerLeave	0x030802EF	When TriggerLeave is downloaded, the active mover is removed from the control. The mover can no longer be used and can be removed from the system without triggering an error.

6.6.6.2.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
IsActive	Mover Detection	BOOL	0x030802B6	Determines the value indicating whether the mover is actively used or is currently passive. An active mover can be removed from the control if you plan to remove it from the system.

## 6.7 Parameter

Numerous parameters of the XTS system can be set with TwinCAT. The following tables contain all parameters that can be assigned to the TcCOM objects.

### 6.7.1 Processing Unit

#### 6.7.1.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
OperationMode	General	OperationMode	0x0308022C	Choose between 'Normal' to work with actual hardware and 'Simulation' to work in simulation.  For more information, see "OperationMode", [Page 188].
MoverType	Mover	MoverType	0x00000090	Choose the appropriate mover type. Use custom for a non Beckhoff mover.  For more information, see "MoverType", [Page 188].
MagnetPlateType	Mover	MagnetPlateType	0x00000091	Selection of the magnetic plate set.  <b>Attention!</b> Choose the correct magnet plate type. If not correct the mover can jump unexpectedly.  For more information, see "MagnetPlateType", [Page 188].
MoverSortOrder	Mover	SetOrderEnum	0x00000048	Choose the sort order of the movers.  For more information, see "MoverSortOrder", [Page 188].
MinMechanicalMover-Distance	Mover	LREAL	0x0308027A	Gets/sets the minimum position distance between the movers, which has to be measured in the curve. As a default the distance belonging to the mover type is used.
IdDetectionMode	MoverIdDetection	MoverIdDetection-Mode	0x03080246	Choose the ID detection mode to enable Mover 1 detection.  For more information, see "IdDetectionMode", [Page 189].
MoverPositionAssignment	MoverIdDetection	MoverPosition-Assignment	0x03080253	Defines the lowest/highest position  For more information, see "MoverPositionAssignment", [Page 189].

Parameter	Group	Type	PTCID	Explanation
ExpectedMoverIds	MoverIdDetection	–	0x03080267	Configure the expected mover IDs for ID detection mode MultipleMover 1. For more information, see "ExpectedMoverIds", [Page 189].
TriggerMoverIdDetection	MoverIdDetection	TriggerMoverIdDetection	0x03080250	Triggers the Mover ID detection. <b>Attention!</b> The axes controller will be momentary enabled.
TeachingFileNumber	Teaching	UDINT	0x0308022A	The number is appended to the teaching file name - like 'TcloXts.Teaching-Data.0.bootdata'. For more information, see "Enter the number of the teaching file", [Page 116].
StartStandStillTeaching	Teaching	–	0x03080228	On download the teaching is started on the specified modules and will be stopped automatically. For more information, see "StartStandStillTeaching", [Page 189].
StartMovementTeaching	Teaching	–	0x03080269	On download the teaching is started. Then move movers over every module. For more information, see "StartMovementTeaching", [Page 190].
StopMovementTeaching	Teaching	StopMovementTeaching	0x03080270	On download the teaching will be applied instantaneously.
IsAbortOnTeachingWarningsEnabled	Teaching	BOOL	0x00000057	If set to <i>TRUE</i> then a teaching warning causes that the driver does not start up. For more information, see "IsAbortOnTeachingWarningsEnabled", [Page 190].
IsTeachingChecksumCheckEnabled	Teaching	BOOL	0x00000055	If set to <i>TRUE</i> then the specified check sum is used to validate that the correct teaching file is loaded and is not corrupt. For more information, see "IsTeachingChecksumCheckEnabled", [Page 190].

## Functions of the driver

Parameter	Group	Type	PTCID	Explanation
TeachingChecksum	Teaching	–	0x00000054	Array of values of the teaching check sum. After a new teaching one can read (upload) the checksum from the driver.  For more information, see "TeachingChecksum", [Page 190].
TeachingWarningLevel	Teaching	TeachingWarningLevel	0x0308028C	Specifies how strict the values of the teaching are checked.  For more information, see "TeachingWarningLevel", [Page 191].  1 means very strict and 3 is the lowest level.
TriggerTeachingFileFormatUpdate	Teaching	TriggerTeachingFileFormatUpdate	0x000000A9	Triggers the system to update the teaching file format of the given teaching file on changing back to config mode (overwrites the old file).
IsAutoDumpWritingEnabled	Diagnostics	BOOL	0x00000049	If enabled then the driver writes dump files automatically in certain situations (at start up, in error cases).  For more information, see "IsAutoDumpWritingEnabled", [Page 191].
IsInputCheckEnabled	Diagnostics	BOOL	0x03080283	Enables the plausibility check of all input channels on the system.  For more information, see "IsInputCheckEnabled", [Page 191].
WriteDump	Diagnostics	WriteDump	0x00000044	If downloaded manually then the driver writes a dump file.
UsedEventLogger	Diagnostics	EventMessenger	0x000000A4	Specifies how events/messages are reported by the driver.  For more information, see "UsedEventLogger", [Page 191].
EtherCatMasterSyncTaskObjectId	Advanced	OTCID	0x03080233	Set the object ID of the task which is responsible for triggering the EtherCAT master which is set to independent DC time.  Suggested when using the 16 port EtherCAT network card.
IsCycleTimeWarningSuppressed	Advanced	BOOL	0x00000046	If enabled then the warning that the driver does not run at 250 us is disabled.

Parameter	Group	Type	PTCID	Explanation
IsMoverFrozenErrorActivated	Advanced	BOOL	0x00000097	If enabled then the mover position is observed - if it does not change for a number of cycles then an error is issued.  For more information, see "IsMoverFrozenErrorActivated", [Page 192].
IsPositionBasedErrorForwardingEnabled	Advanced	BOOL	0x00000092	If enabled then a hardware error is forwarded based on the position to the movers which are located on the faulting modules.  For more information, see "IsPositionBasedErrorForwardingEnabled", [Page 192].
Optimization	Advanced	OptimizationEnum	0x00000047	Optimizes the movers movement or positioning slightly. Standard is optimize positioning.  For more information, see "Optimization", [Page 192].
TriggerRedetection	Advanced	TriggerRedetection	0x00000098	If downloaded then all movers will loose their position and a new detection is performed. The order of movers might change.
CalculateNormAmplitude	Advanced	BOOL	0x030802B1	If set to <i>TRUE</i> then the mover's amplitude will be normalized.
IsPositionNoiseEnabled	Simulation	BOOL	0x0308022F	If enabled then a random noise using the specified bandwidth is added to the mover positions.
IsRandomStartUpEnabled	Simulation	BOOL	0x03080285	If enabled and mode <i>UseOffsetAndDistance</i> is active then the start-up positions of the movers are randomized using the specified bandwidth.
MoverDistance	Simulation	LREAL	0x0308022E	Gets/sets the distance between simulated movers at start-up.
PositionOffset	Simulation	LREAL	0x0308022D	Gets/sets the position where the first simulated mover should be detected.
PositionNoiseBandwidth	Simulation	LREAL	0x03080231	Gets/sets a bandwidth which describes how much a position should toggle.
RandomStartUpBandwidth	Simulation	LREAL	0x03080232	Gets/sets a bandwidth which is used to modify the start-up positions of the movers. It is additionally applied to the offset and distance.

Parameter	Group	Type	PTCID	Explanation
PositionStartUpSimulationMode	Simulation	PositionStartUpSimulationMode	0x03080230	Defines how the start-up positions for the movers should be generated. For more information, see "PositionStartUpSimulationMode", [Page 193].
MoverIdStartUpSimulationMode	Simulation	MoverIdStartUpSimulationMode	0x0308027D	Defines how the mover ID(s) are generated at start-up. For more information, see "MoverIdStartUpSimulationMode", [Page 193].
RandomInitMode	Simulation	RandomInitMode	0x0308027F	Defines the mode to initialize the random seed. For more information, see "RandomInitMode", [Page 193].
RandomInitSeed	Simulation	DINT	0x03080280	Gets/sets the seed which is used to generate random numbers used for the positions and IDs.

6.7.1.2 Hidden Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
IdDiagConfiguration	MoverIdDetection	–	0x03080100	Configure the memory size of ID Detection in the dump file. <b>Attention!</b> Do not change. For more information, see "IdDiagConfiguration", [Page 193].
DelayBetweenMoversIn-Pack	MoverIdDetection	LREAL	0x03080247	Time delay [s] between triggering movers which are directly next to each other within the MoverPackGap. Unit: s
DelayBetweenMover-Packs	MoverIdDetection	LREAL	0x03080248	Time delay [s] between triggering movers simultaneously which are not in the same mover pack. Unit: s
GapToDefineMoverPack	MoverIdDetection	LREAL	0x03080249	Gap [mm] between movers to define a new mover pack. Unit: mm
CompletionCriteria	MoverIdDetection	MoverIdDetection-CompletionCriteria	0x0308027B	Defines the criteria to complete the ID Detection. For more information, see "CompletionCriteria", [Page 194].
DumpWriterFallback-Mode	Diagnostics	DumpWriterFallback-Mode	0x030802B2	Gets/sets the mode which specifies if extra memory can be used to write a dump file or not. This may be used if the normal buffer for the dump is too small.
IsPartBasedHandling-Activated	Advanced	BOOL	0x03080284	If enabled then the status and control of all terminals is evaluated based on parts. <b>Attention!</b> Beta functionality.
IncludedTrackCheck-Timeout	Advanced	UDINT	0x03080293	Gets/sets the timeout in seconds after which a warning is thrown, if no tracks are included to detection. Unit: s

# Functions of the driver

## 6.7.1.3 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
AreAllPositionsValid	MoverDetection	BOOL	0x03080256	Returns <i>TRUE</i> if all mover positions are valid.
DetectionCycleCount	MoverDetection	UDINT	0x03080259	Returns the number of detection cycles.
DetectedMoverCount	MoverDetection	UDINT	0x03080257	Returns the number of detected movers during the latest detection cycle.
ExpectedMoverCount	MoverDetection	UDINT	0x03080258	Returns the number of expected movers - equal to the number of created mover objects.
ScannedModuleCount	MoverDetection	UDINT	0x03080225	Returns the number of modules which are scanned during one detection cycle.
MoverPositions	MoverDetection	–	0x0308020D	Returns an array containing the actual positions of all movers.
HasIdDetectionError	MoverIdDetection	BOOL	0x03080252	Returns <i>TRUE</i> if the mover ID detection has failed.
IsIdDetectionValid	MoverIdDetection	BOOL	0x03080251	Returns <i>TRUE</i> if the mover IDs are detected.
IsIdDetectionActive	MoverIdDetection	BOOL	0x03080268	Returns <i>TRUE</i> if the mover ID detection is running.
MoverIds	MoverIdDetection	–	0x0308027C	Returns an array containing the IDs of all movers.
IsTeachingChanged	Teaching	BOOL	0x0308022B	Returns <i>TRUE</i> if a teaching has been performed during the driver is running.
IsTeachingValid	Teaching	BOOL	0x03080255	Returns <i>TRUE</i> if the teaching is valid.
IsTeachingFileFormatUpToDate	Teaching	BOOL	0x03080290	Returns <i>TRUE</i> if the teaching file uses the latest format definition.
HasInputCheckError	Diagnostics	BOOL	0x0308028F	Returns the result of the inputs check.
DriveState	Info	DriveState	0x000000A0	Returns the state of the drive system.
PartOrigins	Info	–	0x03080261	Returns an array containing all the origin transforms of the parts.
VersionString	Info	STRING(31)	0x03080287	Returns the version string of the driver.
MoverCount	Structure	UDINT	0x0308020A	Returns the number of movers.
MoverObjectIDs	Structure	–	0x0308020B	Returns an array containing the object IDs of all movers.
PartCount	Structure	UDINT	0x03080203	Returns the number of parts.
PartObjectIDs	Structure	–	0x03080224	Returns an array containing the object IDs of all parts.
TaskCount	Structure	UDINT	0x0000009C	Returns the number of tasks.
TaskObjectIDs	Structure	–	0x0000009D	Returns an array with the task object IDs.

Parameter	Group	Type	PTCID	Explanation
TrackCount	Structure	UDINT	0x0308020E	Returns the number of tracks.
TrackObjectsIDs	Structure	–	0x0308020F	Returns an array containing the object IDs of all tracks.

## 6.7.2 Mover

### 6.7.2.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
AdsPort	General	WORD	0x03002090	Gets/sets the ads port. The port should be used to read/ write parameters via ADS.
ActiveTrackObjectId	General	OTCID	0x03080209	Gets/sets the Track object ID that is currently active/should be activated for the mover.
TaskOID	General	OTCID	0x03002060	Gets/sets the XTS Task that is used for calculations for the mover.
SimulatedStartUpPart	Simulation	OTCID	0x03080278	Gets/sets the part on which the mover is detected during simulation.
SimulatedStartUpPosition	Simulation	LREAL	0x03080279	Gets/sets the parts position on which the mover is detected during simulation.
SimulatedStartUpId	Simulation	STRING(3)	0x0308027E	Gets/sets the ID of the mover on which is used in simulation.

## 6.7.2.2 Hidden Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
IsCommutationInverted	General	BOOL	0x03080200	Attention! Parameter is only for tests - if the commutation is inverted and the magnet plate set does not match, the mover cannot be safely controlled!  <b>Attention!</b> Beta functionality. For more information, see "IsCommutationInverted", [Page 194].

## 6.7.2.3 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
Id	MoverIdDetection	STRING(3)	0x03080266	Returns the ID of the mover.
AxisId	Info	UDINT	0x03080288	Gets the ID of the associated axis.
AxisObjectId	Info	OTCID	0x0308028A	Gets the object ID of the associated axis.
DistanceDriven	Info	LREAL	0x00000050	Returns the value of the absolute distance driven by the mover in mm.  Unit: mm
DistanceDrivenInKm	Info	LREAL	0x00000051	Returns the value of the absolute distance driven by the mover in km.  Unit: km
DriveAddress	Info	UINT	0x00000087	Returns the address of the drive (motor) terminal on which the mover is currently on.
DriveModuleNumber	Info	UDINT	0x00000066	If <i>HasDriveError</i> is <i>TRUE</i> then the drive number is set to the first module number which signals an error.
DriveTerminalOid	Info	OTCID	0x00000070	If <i>HasDriveError</i> is <i>TRUE</i> then the object ID of the drive terminal is set.
EncoderAddress	Info	UINT	0x00000088	Returns the address of the encoder (sensor) terminal on which the mover is currently on.
EncoderModuleNumber	Info	UDINT	0x00000067	If <i>HasEncoderError</i> is <i>TRUE</i> then the encoder number is set to the first module number which signals an error.
EncoderTerminalOid	Info	OTCID	0x00000071	If <i>HasEncoderError</i> is <i>TRUE</i> then the object ID of the encoder is set.
HasDriveError	Info	BOOL32	0x00000068	Returns <i>TRUE</i> if the motor module which is used by a mover signals an error.

## Functions of the driver

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Parameter	Group	Type	PTCID	Explanation
HasEncoderError	Info	BOOL32	0x00000069	Returns <i>TRUE</i> if the encoder module which is used by a mover signals an error.
MasterNetId	Info	AMSNETID	0x00000089	Returns the NetId of the EtherCAT master to which the drive/encoder belong to.
PositionInfo	Info	–	0x03080286	Returns the part and track position as well as their object IDs.
SoftDriverOid	Info	OTCID	0x03080289	Gets the object ID of the soft drive.

## 6.7.2.4 Data Area

### Inputs

Parameter	Type	Size	Offset	Explanation
SoftDriveInput	SoftDriveInput	104	0	Cyclic data structure for communication from Mover object to SoftDrive object of the axis.

### Outputs

Parameter	Type	Size	Offset	Explanation
SoftDriveOutput	SoftDriveOutput	96	0	Cyclic data structure for communication from Soft-Drive object to Mover object.

## 6.7.3 Part

### 6.7.3.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
TaskOID	General	OTCID	0x03002060	Gets/sets the XTS Task that is used for calculations for the part.
ModuleSide	General	ModuleSide	0x03080262	Module side of the part shown in the Tool Window and XTS Viewer.  For more information, see "ModuleSide", [Page 194].
OriginTransform	General	–	0x03080260	Origin transformation for the Part shown in the Tool Window and XTS Viewer.

### 6.7.3.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
DriveState	Info	DriveState	0x000000A0	Returns the state of the drive system.
GlobalNumber	Info	UDINT	0x03080227	The <i>GlobalNumber</i> is used to distinguish all parts which are managed by one XPU.
Length	Info	LREAL	0x03080206	Returns the length of the part.
AreaCount	Structure	UDINT	0x03080234	Returns the number of areas.
AreaObjectIDs	Structure	–	0x03080235	Returns an array containing the object IDs of all areas.
ModuleCount	Structure	UDINT	0x03080207	Returns the number of modules.
ModuleObjectIDs	Structure	–	0x03080208	Returns an array containing the object IDs of all modules.

## 6.7.4 Info Server

### 6.7.4.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
AdsPort	General	WORD	0x03002090	Gets/sets the ads port. The port should be used to read/ write parameters via ADS.

### 6.7.4.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
StationInfoCount	Structure	UDINT	0x03080275	Returns the number of movers.
StationInfoObjectIds	Structure	–	0x03080276	Returns an array containing the object IDs of all station infos.

## 6.7.5 Station Info

### 6.7.5.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
AdsPort	General	WORD	0x03002090	Gets/sets the ads port. The port should be used to read/ write parameters via ADS.
StationId	General	UDINT	0x03080271	Gets/sets the station ID.
StationColor	General	UDINT	0x03080277	Gets/sets the station color in ARGB.
StartPositionOnPart	General	LREAL	0x03080272	Gets/sets the start position on the first part.
EndPositionOnPart	General	LREAL	0x03080273	Gets/sets the end position on the last part.
StopPositions	General	LREAL	0x03080274	Gets/sets an array of stop positions. The valid range starts from 0 mm to the total length of all configured parts.
PartObjectIds	General	–	0x03080224	Gets/sets the parts which belong to the station.
IsEnabled	General	BOOL	0x0308023C	Gets/sets whether the station is enabled or not. For more information, see "IsEnabled", [Page 194].
Description	General	STRING(1023)	0x0308023A	Description of the station. <b>Attention!</b> Entering a description is optional.

### 6.7.5.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
PartCount	Structure	UDINT	0x03080203	Returns the number of parts.
StopPositionCount	Structure	UDINT	0x0308028E	Returns the number of stop positions.

## 6.7.6 Io Driver

### 6.7.6.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
AdsPort	General	WORD	0x03002090	Gets/sets the ads port. The port should be used to read/ write parameters via ADS.
MoverType	General	MoverType	0x00000090	Choose the appropriate mover type. Use custom for a non Beckhoff mover. For more information, see "MoverType", [Page 188].
MagnetPlateType	General	MagnetPlateType	0x00000091	Selection of the magnetic plate set. <b>Attention!</b> Choose the correct magnet plate type. If not correct the mover can jump unexpectedly. For more information, see "MagnetPlateType", [Page 188].
MoverSortOrder	General	SortOrderNum	0x00000048	Choose the sort order of the movers. For more information, see "MoverSortOrder", [Page 188].
MinMechanicalMover-Distance	General	LREAL	0x0308027A	Gets/sets the minimum position distance between the movers, which has to be measured in the curve. As a default the distance belonging to the mover type is used.
PermanentDataConfiguration	Teaching	–	0x00000020	Gets/sets a structure containing the teaching file number.
StartStandStillTeaching-Parameter	Teaching	–	0x00000010	Gets/sets a structure containing the result of the teaching process.
StopStandStillTeaching-Parameter	Teaching	–	0x00000011	Gets/sets a structure containing the result of the teaching process.
IsAbortOnTeaching-WarningsEnabled	Teaching	BOOL	0x00000057	If enabled , will abort startup of the driver if there are teaching warnings. For more information, see "IsAbortOnTeachingWarningsEnabled", [Page 190].

Parameter	Group	Type	PTCID	Explanation
IsTeachingChecksum-CheckEnabled	Teaching	BOOL	0x00000055	If enabled, a teaching checksum check is applied at startup.  For more information, see "IsTeachingChecksum-CheckEnabled", [Page 190].
TeachingChecksum	Teaching	–	0x00000054	Array of values of the teaching check sum. After a new teaching one can read (upload) the checksum from the driver.
TeachingWarningLevel	Teaching	TeachingWarningLevel	0x0308028C	Determines the value above which the input check and the teaching issue warnings. Level_1: very strict Level_3: low
TriggerTeachingFileFormatUpdate	Teaching	TriggerTeaching-FileFormatUpdate	0x03080291	Triggers the system to update the teaching file format of the given teaching file on changing back to config mode  (overwrites the old file).
MoverIdDetectionMode	MoverIdDetection	MoverIdDetection-Mode	0x00000201	Choose the ID detection mode to enable Mover 1 detection. Standard means that mover ID detection is off.  For more information, see "MoverIdDetectionMode", [Page 194].
MoverPositionAssignment	MoverIdDetection	MoverPosition-Assignment	0x00000208	Defines the lowest/highest position.  For more information, see "MoverPositionAssignment", [Page 195].
TriggerMoverIdDetection	MoverIdDetection	TriggerMoverIdDetection	0x00000205	Triggers the Mover ID Detection.  <b>Attention!</b> The axes controller will be momentary enabled.
IsAutoDumpWritingEnabled	Diagnostics	BOOL	0x00000049	If enabled then the driver writes dump files automatically in certain situations (at start up, in error cases).  For more information, see "IsAutoDumpWritingEnabled", [Page 191].

Parameter	Group	Type	PTCID	Explanation
IsInputCheckEnabled	Diagnostics	BOOL	0x03080283	Enables the plausibility check of all input channels on the system.  For more information, see "IsInputCheckEnabled", [Page 191].
WriteDump	Diagnostics	WriteDump	0x00000044	If downloaded manually then the driver writes a dump file.
UsedEventLogger	Diagnostics	EventMessenger	0x03080292	Specifies how events/messages are reported by the driver.  For more information, see "UsedEventLogger", [Page 191].
IncludeModuleAreasInRecord	Diagnostics	BOOL	0x00000095	<b>Attention!</b> Do not change! Obsolete parameter.  For more information, see "IncludeModuleAreasInRecord", [Page 195].
IncludeMoverAreasInRecord	Diagnostics	BOOL	0x00000096	<b>Attention!</b> Do not change! Obsolete parameter.  For more information, see "IncludeMoverAreasInRecord", [Page 195].
DumpWriterFallbackMode	Diagnostics	DumpWriterFallbackMode	0x030802B2	Gets/sets, which extra memory can be used for dump writing, if the driver fails to write a dump in first attempt.
IsCycleTimeWarningSuppressed	Advanced	BOOL	0x00000046	If enabled, suppressed warnings for cycle times different than 250 us (only possible when working in simulation)
IsMoverFrozenErrorActivated	Advanced	BOOL	0x00000097	If enabled, throws an error instead of a warning, if a mover position is frozen.  For more information, see "IsMoverFrozenErrorActivated", [Page 192].
IsPositionBasedErrorForwardingEnabled	Advanced	BOOL	0x00000092	If enabled, makes it possible to start up and shut down single parts instead of the whole XTS.  <b>Attention!</b> Beta functionality.  For more information, see "IsPositionBasedErrorForwardingEnabled", [Page 192].
Optimization	Advanced	OptimaizationEnum	0x00000047	Optimizes the movers movement or positioning slightly. Standard is optimize positioning.  For more information, see "Optimization", [Page 192].

Parameter	Group	Type	PTCID	Explanation
TriggerRedetection	Advanced	TriggerRedetection	0x00000098	Triggers a new Mover detection process.
TriggerResort	Advanced	BOOL	0x00000061	Triggers a resort of the Mover Positions. Based on the MoverSortOrder parameter, the first Mover will get the lowest or highest position.

## 6.7.6.2 Hidden Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
DelayBetweenMoversIn-Pack	MoverIdDetection	LREAL	0x00000202	Time delay [s] between triggering movers which are directly next to each other within the MoverPackGap. Unit: s
DelayBetweenMover-Packs	MoverIdDetection	LREAL	0x00000203	Time delay [s] between triggering movers simultaneously which are not in the same mover pack. Unit: s
GapToDefineMoverPack	MoverIdDetection	LREAL	0x00000204	Gap [mm] between movers to define a new mover pack. Unit: mm
IncludedTrackCheck-Timeout	Advanced	UDINT	0x000000A5	Gets/sets the timeout in seconds after which a warning is thrown, if no tracks are included to detection. Unit: s

## 6.7.6.3 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
IsTeachingFileFormatUpToDate	Miscellaneous	BOOL	0x000000A8	Gets if the teaching file format of the current loaded teaching file is correct for the used driver version.
AreAllMoverPositionValid	Miscellaneous	BOOL32	0x00000072	Returns <i>TRUE</i> if all movers have been detected.
IsTeachingValid	Miscellaneous	BOOL32	0x00000073	Returns <i>TRUE</i> if teaching data is valid.
DetectedMoverCount	Miscellaneous	DINT	0x00000074	Returns the count of detected movers.
ExpectedMoverCount	Miscellaneous	DINT	0x00000075	Returns the count of expected movers.
ModuleCount	Miscellaneous	DINT	0x00000078	Returns the number of modules.
ModuleObjectIDs	Miscellaneous	–	0x00000079	Returns an array containing the object IDs of all modules.
MoverCount	Miscellaneous	DINT	0x00000080	Returns the number of movers.
MoverObjectIDs	Miscellaneous	–	0x00000081	Returns an array containing the object IDs of all movers.

Parameter	Group	Type	PTCID	Explanation
MoverPositions	Miscellaneous	–	0x0000008A	Returns an array containing the actual positions of all movers.
IsMoverIdDetectionValid	Miscellaneous	BOOL32	0x00000206	Returns <i>TRUE</i> if the Mover ID Detection have been detected.
HasMoverIdDetection-Error	Miscellaneous	BOOL32	0x00000207	Returns <i>TRUE</i> if the Mover ID Detection failed.

#### 6.7.6.4 Data Area

##### Info

Parameter	Type	Size	Offset	Explanation
AreAllMoverPositionsValid	BOOL32	4.0	0	Returns <i>TRUE</i> if all movers have been detected.
IsTeachingValid	BOOL32	4.0	4	Returns <i>TRUE</i> if teaching data is valid.
DetectedMoverCount	DINT	4.0	8	Returns the count of detected movers.
ExpectedMoverCount	DINT	4.0	12	Returns the count of expected movers.

## 6.7.7 Track

### 6.7.7.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
TaskOID	General	OTCID	0x03002060	Gets/sets the XTS Task that is used for calculations for the mover.
IsClosed	General	BOOL	0x0308021D	Gets/sets if the track is closed as a circle or open ended.
IsIncludedInDetection	General	BOOL	0x03080226	Gets/sets if the track is included in the detection process of the mover and the mover Id detection.
Polarity	General	Polarity	0x03080201	Gets/sets which direction the track has in the global context. <b>Attention!</b> Only <i>positive</i> is supported at the moment.
Offset	General	LREAL	0x03080202	Gets/sets the offset for the track.
PartConfigItems	General	–	0x03080204	Gets/sets an array of part configuration items containing the part object id and the polarity the part has, within the track. <b>Attention!</b> Only <i>positive</i> polarity is supported at the moment!

### 6.7.7.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
Length	Info	LREAL	0x03080206	Gets the actual length of the track.
ModuleCount	Info	UDINT	0x03080207	Gets the number of modules included in the track.
PartCount	Structure	UDINT	0x03080203	Gets the number of parts included in the track.
PartInfoItems	Structure	–	0x03080205	Gets an array of part information items containing the part object id, the polarity the part has within the track, the offset the part has in the track and the actual part length.

## 6.7.8 Control Area

### 6.7.8.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
Name	General	STRING(1023)	0x03080239	Name of the area. <b>Attention!</b> Entering a name is optional.
Description	General	STRING(1023)	0x0308023A	Description of the area. <b>Attention!</b> Entering a description is optional.
StartPosition	General	LREAL	0x03080236	Position on the part in mm where the area starts. Unit: mm
EndPosition	General	LREAL	0x03080237	Position on the part in mm where the area ends. Unit: mm
BlendInLength	General	LREAL	0x0308023E	Length from the start of the area until the new parameters are fully used.
BlendOutLength	General	LREAL	0x0308023F	Length before the end of the area where the previously used parameter set is started to be used again.
IsEnabled	General	BOOL	0x0308023C	Gets/sets if the current control areas is active or not. For more information, see "IsEnabled", [Page 194].

### 6.7.8.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
Length	Info	LREAL	0x03080238	The length of the area (end position – start position).
IsValid	Info	BOOL	0x0308023D	Returns <i>TRUE</i> , if all settings are valid and the control area can be used.

## 6.7.9 AT20xx\_0xxx

### 6.7.9.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
AdsPort	General	WORD	0X03002090	Gets/sets the ads port. The port should be used to read/ write parameters via ADS.
TaskOID	General	OTCID	0X03002060	Gets/sets the XTS Task that is used for calculations for the mover.
MotorTerminalOID	General	OTCID	0x00000009	Sets the object ID of the corresponding motor terminal.
SensorTerminalOID	General	OTCID	0x0000000A	Sets the object ID of the corresponding sensor terminal.
PositionIndex	General	UDINT	0x00000006	The index defines the position of the module in the XTS system. The first module has the hardware position 0, the other modules are counted in ascending order. The number of modules minus one gives the hardware position for the last module.
Gap	General	LREAL	0x0308028B	Defines the gap between the previous module and this module.
Offset	General	LREAL	0x00000007	Defines an offset for the module to compensate mechanical tolerances of the modules production process.
ScalingFactor	General	LREAL	0x00000008	Defines a ScalingFactor for the module to compensate mechanical tolerances of the modules production process.

## 6.7.9.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
Angle	Info	LREAL	0x00000083	Returns the angle of the module in mm. Unit: mm
GlobalNumber	Info	UDINT	0x03080227	The global number is used to distinguish all modules which are managed by one XPU.
Length	Info	LREAL	0x00000082	Returns the length of the module in mm. The length is measured along the center of the coils. Unit: mm
MasterNetId	Info	AMSNETID	0x00000086	Returns the NetId of the EtherCAT master to which the terminals belong to.
DriveAddress	Drive Info	UINT	0x00000084	Returns the address of the drive (motor) terminal.
DriveConfigIdentity	Drive Info	–	0x00000062	Gets a structure of the configured drive identity containing the vendor id, the code, the revision and the serial number.  For more information, see "DriveConfigIdentity", [Page 196].
DriveOnlineIdentity	Drive Info	–	0x00000063	Gets a structure of the online drive identity containing the vendor id, the code, the revision and the serial number.  For more information, see "DriveOnlineIdentity", [Page 196].
DriveState	Drive Info	DriveState	0x000000A0	Gets the state of the motor module.
EncoderAddress	Encoder Info	UINT	0x00000085	Returns the address of the encoder (sensor) terminal.
EncoderConfigIdentity	Encoder Info	–	0x00000064	Gets a structure of the configured encoder identity containing the vendor id, the code, the revision and the serial number.  For more information, see "EncoderConfigIdentity", [Page 196].
EncoderOnlineIdentity	Encoder Info	–	0x00000065	Gets a structure of the online encoder identity containing the vendor id, the code, the revision and the serial number.  For more information, see "EncoderOnlineIdentity", [Page 196].

## Functions of the driver

Parameter	Group	Type	PTCID	Explanation
EncoderSensorValues	Encoder Info	–	0x00000093	Gets the array of the 32 encoder sensor channel values. For more information, see "EncoderSensorValues", [Page 197].
DriveDeviceType	Drive CoE	UDINT	0x030802A0	Gets the DeviceType from the CoE interface of the motor Module.
DriveDeviceName	Drive CoE	STRING(15)	0x030802A1	Gets the DeviceName from the CoE interface of the motor Module.
DriveHardwareVersion	Drive CoE	STRING(7)	0x030802A2	Gets the HardwareVersion from the CoE interface of the motor Module.
DriveSoftwareVersion	Drive CoE	STRING(7)	0x030802A3	Gets the SoftwareVersion from the CoE interface of the motor Module.
DriveBtn	Drive CoE	Btn	0x030802AF	Gets the BTN* from the CoE interface of the motor Module.

\* The Beckhoff Traceability Number, BTN for short, can be found on every mover and on every module under the DataMatrix code.

### 6.7.9.3 Data Pointer

Parameter	Type	PTCID	HW VariableName	Size
Control	UINT	0x00000005	Control	2
CurrentSetpoint-Values[0..14]	INT	0x00000002	Current setpoint value Ch1-15	2
State	UINT	0x00000004	State	2
CurrentActual-Values[0..14]	INT	0x00000001	Current actual value Ch.1-15	2
RawPosition-Values[0..31]	INT	0x3F000101	Value Channel 01-32	2

## 6.7.10 ATH20x0\_0xxx

### 6.7.10.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
AdsPort	General	WORD	0x03002090	Gets/sets the ads port. The port should be used to read/ write parameters via ADS.
TaskOID	General	OTCID	0x03002060	Gets/sets the XTS Task that is used for calculations for the mover.
MotorTerminalOID	General	OTCID	0x00000009	Sets the object ID of the corresponding motor terminal.
SensorTerminalOID	General	OTCID	0x0000000A	Sets the object ID of the corresponding sensor terminal.
PositionIndex	General	UDINT	0x00000006	The index defines the position of the module in the XTS system. The first module has the hardware position 0, the other modules are counted in ascending order. The number of modules minus one gives the hardware position for the last module.
Gap	General	LREAL	0x0308028B	Defines the gap between the previous module and this module.
Offset	General	LREAL	0x00000007	Defines an offset for the module to compensate mechanical tolerances of the modules production process.
ScalingFactor	General	LREAL	0x00000008	Defines a ScalingFactor for the module to compensate mechanical tolerances of the modules production process.

## 6.7.10.2 Parameter (Online)

Parameter	Group	Type	PTCID	Explanation
Angle	Info	LREAL	0x00000083	Returns the angle of the module in mm. Unit: mm
GlobalNumber	Info	UDINT	0x03080227	The global number is used to distinguish all modules which are managed by one XPU.
Length	Info	LREAL	0x00000082	Returns the length of the module in mm. The length is measured along the center of the coils. Unit: mm
MasterNetId	Info	AMSNETID	0x00000086	Returns the NetId of the EtherCAT master to which the terminals belong to.
DriveAddress	Drive Info	UINT	0x00000084	Returns the address of the drive (motor) terminal.
DriveConfigIdentity	Drive Info	–	0x00000062	Gets a structure of the configured drive identity containing the vendor id, the code, the revision and the serial number. For more information, see "DriveConfigIdentity", [Page 196].
DriveOnlineIdentity	Drive Info	–	0x00000063	Gets a structure of the online drive identity containing the vendor id, the code, the revision and the serial number. For more information, see "DriveOnlineIdentity", [Page 196].
DriveState	Drive Info	DriveState	0x000000A0	Gets the state of the motor module.
EncoderAddress	Encoder Info	UINT	0x00000085	Returns the address of the encoder (sensor) terminal.
EncoderConfigIdentity	Encoder Info	–	0x00000064	Gets a structure of the configured encoder identity containing the vendor id, the code, the revision and the serial number. For more information, see "EncoderConfigIdentity", [Page 196].
EncoderOnlineIdentity	Encoder Info	–	0x00000065	Gets a structure of the online encoder identity containing the vendor id, the code, the revision and the serial number. For more information, see "EncoderOnlineIdentity", [Page 196].

Parameter	Group	Type	PTCID	Explanation
EncoderSensorValues	Encoder Info	–	0x00000093	Gets the array of the 64 encoder sensor channel values.  For more information, see "EncoderSensorValues", [Page 197].
DriveDeviceType	Drive CoE	UDINT	0x030802A0	Gets the DeviceType from the CoE interface of the motor Module.
DriveDeviceName	Drive CoE	STRING(15)	0x030802A1	Gets the DeviceName from the CoE interface of the motor Module.
DriveHardwareVersion	Drive CoE	STRING(7)	0x030802A2	Gets the HardwareVersion from the CoE interface of the motor Module.
DriveSoftwareVersion	Drive CoE	STRING(7)	0x030802A3	Gets the SoftwareVersion from the CoE interface of the motor Module.
DriveBtn	Drive CoE	Btn	0x030802AF	Gets the BTN* from the CoE interface of the motor Module.

\* The Beckhoff Traceability Number, BTN for short, can be found on every mover and on every module under the DataMatrix code.

## 6.7.10.3 Data Area

### Decompressed Sensor Data

Parameter	Type	Size	Offset	Explanation
EncoderSensorValues	ARRAY [0..53] OF LREAL	432.0	0	64 hall sensor values

### Data Pointers

Parameter	Type	PTCID	HW VariableName	Size
Control	UINT	0x00000005	Control	2
CurrentSetpoint-Values[0..14]	INT	0x00000002	Current setpoint value Ch.1-15	2
State	UINT	0x00000004	State	2
CurrentActual-Values[0..14]	INT	0x00000001	Current actual value Ch.1-15	2
HallSensorValues	ATHCompressed-Data64	0x000000A2	BinaryData	2

## 6.7.11 Data Recorder

### 6.7.11.1 Parameter (Init)

Parameter	Group	Type	PTCID	Explanation
BufferSize	General	ULINT	0x00010003	Gets/sets the number of samples for the buffer.
CycleDelay	General	UDINT	0x00010011	Gets/sets the number of cycles for the delay for the record.
ImageSections	General	–	0x00010001	Gets/sets an array of image section items containing object id, area number, start address and size.  For more information, see "ImageSections", [Page 197].
IsRingBufferModeActivated	General	BOOL	0x00010009	Gets/sets if the ring buffer is activated or not.  For more information, see "IsRingBufferModeActivated", [Page 197].
WriteRecord	General	WriteRecord	0x00010005	Triggers the recording process.
TraceLevelMax	Diagnostics	TcTraceLevel	0x03002103	Controls the amount of log messages.  For more information, see "TraceLevelMax", [Page 197].
FilePartSize	Advanced	UDINT	0x00010006	Gets/sets the size of a file part.
FileOperationTimeout	Advanced	UDINT	0x00010007	Gets/sets the time in ms after which the file operation should abort.  Unit: ms
ResetInfoArea	Advanced	BOOL	0x00010002	Gets/sets if the info area should be reset after record.  For more information, see "ResetInfoArea", [Page 197].

6.7.11.2 Parameter (Online)

Parameter	Type	PTCID	Explanation
FrameCount	ULINT	0x00010004	Gets the number of frames that should be recorded.
FrameSize	UDINT	0x00010008	Gets the size of the frames that should be recorded.
RecorderFrameCount	ULINT	0x00010010	Gets the number of frames that were actually recorded.

6.7.11.3 Data Area

Info

Parameter	Type	Size	Offset	Explanation
UpdateTime	LREAL	8.0	0	Estimated update time
UpdateTimeMin	LREAL	8.0	8	Minimal update time
UpdateTimeMax	LREAL	8.0	16	Maximum update time

## 6.7.12 Specific data types



These parameters provide you with additional information to the parameters listed so far. At the end of each table you have the option of jumping back to the beginning of the respective parameter group.

### 6.7.12.1 OperationMode

Parameter	Type	Explanation
Normal	OperationMode	TwinCAT runs with the current hardware.
Simulation	OperationMode	TwinCAT runs in simulation mode
Back to Processing Unit "Parameter (Init)", [Page 158]		

### 6.7.12.2 MoverType

EnumInfo	Type	Explanation
UserSpecific	MoverType	User-specific mover
AT9011_0050	MoverType	Mover AT9011-0050
AT9011_0070	MoverType	Mover AT9011-0070
AT9012_0050	MoverType	Mover AT9012-0050
ATH9011_0075	MoverType	Mover ATH9011-0075
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

### 6.7.12.3 MagnetPlateType

EnumInfo	Type	Explanation
AT9001_0550	MagnetPlateType	Magnetic plate set AT9001-0550
AT9001_0450	MagnetPlateType	Magnetic plate set AT9001-0450
AT9002_0550	MagnetPlateType	Magnetic plate set AT9002-0550
AT9001_0AA0	MagnetPlateType	Magnetic plate set AT9001-0AA0
AT9001_0883	MagnetPlateType	Magnetic plate set AT9001-0883
AT9001_0775	MagnetPlateType	Magnetic plate set AT9001-0775
ATH9001-0550	MagnetPlateType	Magnetic plate set ATH9001-0550
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

### 6.7.12.4 MoverSortOrder

Parameter	Type	Explanation
Ascending	SortOrderEnum	Movers will be counted positive, starting at 1 beginning at the XTS hardware zero position.
Descending	SortOrderEnum	Movers will be counted negative, starting at the highest mover number beginning at the XTS hardware zero position.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

6.7.12.5 IdDetectionMode

Parameter	Type	Explanation
Standard	MoverIdDetection-Mode	All movers have a Mover Standard magnetic plate set. Mover ID detection is switched off.
Mover1	MoverIdDetection-Mode	One Mover has the Mover 1 magnetic plate set.
MultipleMover1	MoverIdDetection-Mode	Several movers have the Mover 1 magnetic plate set.
Back to Processing Unit "Parameter (Init)", [Page 158]		

6.7.12.6 MoverPositionAssignment

Parameter	Type	Explanation
Standard	MoverPositionAssignment	All movers keep their absolute position.
StartAtFirstMover	MoverPositionAssignment	The first mover gets the highest or lowest absolute position depending on the <i>MoverPositionAssignment</i> .
Back to Processing Unit "Parameter (Init)", [Page 158]		

6.7.12.7 ExpectedMoverIds

Parameter	Type	Value	Explanation
Id	STRING(3)	1	Mover ID. "1" for movers with the magnetic plate set <i>Mover 1</i> . "- " for movers with magnetic plate set <i>Standard</i> .
Count	UDINT	2	Number of expected movers.
Back to Processing Unit "Parameter (Init)", [Page 158]			

6.7.12.8 StartStandStillTeaching

Parameter	Type	Explanation
TeachingSelection	TeachingSelection	Selection, if the modules from the string should be included or excluded for the teaching process.
• ExcludeSpecifiedItems	–	Modules with movers. These modules should be excluded from teaching.
• IncludeSpecifiedItems	–	Empty modules. These modules should be integrated into teaching.
selectionString	STRING(1023)	Module numbers according to the parameter <i>TeachingSelection</i> . The module numbers can be entered with the sign "-" or "," or a combination of both signs, e.g. "1-4", "1,2,3,4" or "1-3,4".
Back to Processing Unit "Parameter (Init)", [Page 158]		

## 6.7.12.9 StartMovementTeaching



### Pay attention to the type of system

*StartMovementTeaching* can only be used with the XTS Standard system and is not available for the XTS Hygienic system. These parameters are ignored in the XTS Hygienic system.

Parameter	Type	Explanation
teachingSelection	TeachingSelection	Selection, if the modules from the string should be included or excluded for the teaching process.
• ExcludeSpecifiedItems	–	Modules with movers. These modules should be excluded from teaching.
• IncludeSpecifiedItems	–	Empty modules. These modules should be integrated into teaching.
selectionString	STRING(1023)	Module numbers according to the parameter <i>TeachingSelection</i> . The module numbers can be entered with the sign "-" or "," or a combination of both signs, e.g. "1-4", "1,2,3,4" or "1-3,4".
Back to Processing Unit "Parameter (Init)", [Page 158]		

## 6.7.12.10 IsAbortOnTeachingWarningsEnabled

Parameter	Type	Explanation
TRUE	BOOL	Driver will abort start up when there are teaching warnings.
FALSE	BOOL	Driver will not abort start up when there are teaching warnings.
Back to Processing Unit "Parameter (Init)", [Page 158]		
Back to Io Driver "Parameter (Init)", [Page 173]		

## 6.7.12.11 IsTeachingChecksumCheckEnabled

Parameter	Type	Explanation
TRUE	BOOL	Teaching check sum check is performed at startup.
FALSE	BOOL	Teaching check sum check is not performed at startup.
Back to Processing Unit "Parameter (Init)", [Page 158]		
Back to Io Driver "Parameter (Init)", [Page 173]		

## 6.7.12.12 TeachingChecksum

Parameter	Type	Explanation
[0]...[15]	BYTE	Values for the teaching check sum.
Back to Processing Unit "Parameter (Init)", [Page 158]		

### 6.7.12.13 TeachingWarningLevel

Parameter	Type	Explanation
Level_1	TeachingWarningLevel	Very strict
Level_2	TeachingWarningLevel	Normal
Level_3	TeachingWarningLevel	Low
Back to Processing Unit "Parameter (Init)", [Page 158]		

### 6.7.12.14 IsAutoDumpWritingEnabled

Parameter	Type	Explanation
TRUE	BOOL	Dumps are written automatically at special events, e. g. mover detection, mover id detection, mover lost, ...
FALSE	BOOL	No dumps are written automatically.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

### 6.7.12.15 IsInputCheckEnabled

Parameter	Type	Explanation
TRUE	BOOL	Activates the plausibility check of all input channels of the system.
FALSE	BOOL	Deactivates the plausibility check of all input channels of the system.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

### 6.7.12.16 UsedEventLogger

Parameter	Type	Explanation
StandardMessage-Interface	EventMessenger	Messages are thrown in the user chosen standard messaging interface.
EventLogger	EventMessenger	Messages are thrown in the VS Event Logger.
TC3EventLogger	EventMessener	Messages are thrown in the TC3 Event Logger.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

## 6.7.12.17 IsCycleTimeWarningSuppressed

Parameter	Type	Explanation
TRUE	BOOL	No cycle time warnings are thrown.
FALSE	BOOL	Cycle time warnings are thrown if the XTS task cycle time deviates from 250us.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

## 6.7.12.18 IsMoverFrozenErrorActivated

Parameter	Type	Explanation
TRUE	BOOL	If a mover freezes, an error will be thrown.
FALSE	BOOL	If a mover freezes, a warning will be thrown.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

## 6.7.12.19 IsPositionBasedErrorForwardingEnabled

Parameter	Type	Explanation
TRUE	BOOL	DriveDeviceError bit of the NC axis will show TRUE if the respective Mover stands on a module with a fault even before the mover axis is enabled.
FALSE	BOOL	DriveDeviceError bit of the NC axis won't show TRUE if the respective mover stands on a module with a fault before the mover axis is enabled. It will show TRUE, when the mover axis is enabled.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

## 6.7.12.20 Optimization

Parameter	Type	Explanation
No	OptimizationEnum	No optimization is applied.
MaximizePositionAccuracyOP1	OptimizationEnum	The system will be optimized for position accuracy.
SmoothMovementOM1	OptimizationEnum	The system will be optimized for movement smoothness.
CombinationOC1	OptimizationEnum	The system will be optimized for a combination of smoother movements and position accuracy.
Back to Processing Unit "Parameter (Init)", [Page 158] Back to Io Driver "Parameter (Init)", [Page 173]		

6.7.12.21 PositionStartUpSimulationMode

Parameter	Type	Explanation
UseMoverParameters	PositionStartUpSimulationMode	Movers will start up in simulation with their given simulated start up position.
UseOffsetAndDistance	PositionStartUpSimulationMode	Movers will start up in simulation based on the configured offset and distance position parameters.
UseRandomDistribution	PositionStartUpSimulationMode	Movers will start up in simulation with a random position.
Back to Processing Unit "Parameter (Init)", [Page 158]		

6.7.12.22 MoverIdStartUpSimulationMode

Parameter	Type	Explanation
UseMoverParameters	MoverIdStartUpSimulationMode	Movers will start up in simulation with their given simulated start up position.
UseAlternation	MoverIdStartUpSimulationMode	Movers will start up in simulation with an alternating id based on the expected mover ids settings.
UseRandomDistribution	MoverIdStartUpSimulationMode	Movers will start up in simulation with a random id based on the expected mover ids settings.
Back to Processing Unit "Parameter (Init)", [Page 158]		

6.7.12.23 RandomInitMode

Parameter	Type	Explanation
UseSystemTime	RandomInitMode	Random distribution is calculated based on system time.
UseInitSeed	RandomInitMode	Random distribution is calculated based on seed.
Back to Processing Unit "Parameter (Init)", [Page 158]		

6.7.12.24 IdDiagConfiguration

Parameter	Type	Explanation
floatBufferSize	UDINT	Allocated buffer space for position and current values.
intBufferSize	UDINT	Allocated space for communication data between SoftDrive and TcloXts.
requiredCurrentDeviation	REAL	Necessary current change difference to consider.
requiredPositionDeviation	REAL	Necessary position change difference to consider.
Back to Processing Unit "Hidden Parameter (Init)", [Page 163]		

## 6.7.12.25 CompletionCriteria

Parameter	Type	Explanation
CheckEveryMover	MoverIdDetection-CompletionCriteria	Every Mover gets the detection movement and will be checked for its id.
CompleteAfter-Mover1Found	MoverIdDetection-CompletionCriteria	Once the mover with the special Mover 1 magnetic plate set is found, the detection process will be finished.
Back to Processing Unit "Hidden Parameter (Init)", [Page 163]		

## 6.7.12.26 IsCommutationInverted

Parameter	Type	Explanation
TRUE	OTCID	<b>Attention!</b> The parameter is only for tests - if the commutation is inverted and the magnetic plate set does not match, the inverter cannot be controlled safely!
FALSE	OTCID	<b>Attention!</b> The parameter is only for tests - if the commutation is inverted and the magnetic plate set does not match, the inverter cannot be controlled safely!
Back to Mover "Hidden Parameter (Init)", [Page 167]		

## 6.7.12.27 ModuleSide

Parameter	Type	Explanation
Back	ModuleSide	Modules are shown from the motor type plate side.
Front	ModuleSide	Modules are shown from the encoder side.
Back to Part "Parameter (Init)", [Page 170]		

## 6.7.12.28 IsEnabled

Parameter	Type	Explanation
TRUE	BOOL	Gets/sets whether the station is enabled.
FALSE	BOOL	Gets/sets whether the station is disabled.
Back to Station Info "Parameter (Init)", [Page 172] Back to Control Area "Parameter (Init)", [Page 179]		

## 6.7.12.29 MoverIdDetectionMode

Parameter	Type	Explanation
Standard	MoverIdDetection-Mode	Detection mode is disabled. Only standard movers are used.
Mover1	MoverIdDetection-Mode	Detection mode is enabled. A Mover 1 is used.
MultipleMover1	MoverIdDetection-Mode	Detection mode is enabled. Several Mover 1 are used.
Back to Io Driver "Parameter (Init)", [Page 173]		

6.7.12.30 MoverPositionAssignment

Parameter	Type	Explanation
Standard	MoverPositionAssignment	Defines the lowest/highest position.
StartAtFirstMover	MoverPositionAssignment	Defines the lowest/highest position.
Back to Io Driver "Parameter (Init)", [Page 173]		

6.7.12.31 IncludeModuleAreasInRecord

Parameter	Type	Explanation
TRUE	BOOL	Module areas are included in record. <b>Attention!</b> Do not change! Obsolete parameter.
FALSE	BOOL	Module areas are not included in record. <b>Attention!</b> Do not change! Obsolete parameter.
Back to Io Driver "Parameter (Init)", [Page 173]		

6.7.12.32 IncludeMoverAreasInRecord

Parameter	Type	Explanation
TRUE	BOOL	Mover areas are included in record. <b>Attention!</b> Do not change! Obsolete parameter.
FALSE	BOOL	Mover areas are not included in record. <b>Attention!</b> Do not change! Obsolete parameter.
Back to Io Driver "Parameter (Init)", [Page 173]		

6.7.12.33 IsClosed

Parameter	Type	Explanation
TRUE	BOOL	The track is closed as a circle.
FALSE	BOOL	The track is open ended.
Back to Track "Parameter (Init)", [Page 178]		

6.7.12.34 IsIncludedInDetection

Parameter	Type	Explanation
TRUE	BOOL	Track is included in process of mover detection and mover id detection.
FALSE	BOOL	Track is not included in process of mover detection and mover id detection.
Back to Track "Parameter (Init)", [Page 178]		

## 6.7.12.35 Polarity

Parameter	Type	Explanation
Positive	Polarity	Track has positive counting direction.
Negative	Polarity	Track has negative counting direction. <b>Attention!</b> Not supported at the moment.
Back to Track "Parameter (Init)", [Page 178]		

## 6.7.12.36 DriveConfigIdentity

Parameter	Type	Explanation
vendor	UDINT	Vendor ID
code	UDINT	Product code
revision	UDINT	Product revision
serial	UDINT	Serial number
Back to AT20xx_0xxx "Parameter (Online)", [Page 181] Back to ATH20x0_0xxx "Parameter (Online)", [Page 184]		

## 6.7.12.37 DriveOnlineIdentity

Parameter	Type	Explanation
vendor	UDINT	Vendor ID
code	UDINT	Product code
revision	UDINT	Product revision
serial	UDINT	Serial number
Back to AT20xx_0xxx "Parameter (Online)", [Page 181] Back to ATH20x0_0xxx "Parameter (Online)", [Page 184]		

## 6.7.12.38 EncoderConfigIdentity

Parameter	Type	Explanation
vendor	UDINT	Vendor ID
code	UDINT	Product code
revision	UDINT	Product revision
serial	UDINT	Serial number
Back to AT20xx_0xxx "Parameter (Online)", [Page 181] Back to ATH20x0_0xxx "Parameter (Online)", [Page 184]		

## 6.7.12.39 EncoderOnlineIdentity

Parameter	Type	Explanation
vendor	UDINT	Vendor ID
code	UDINT	Product code
revision	UDINT	Product revision
serial	UDINT	Serial number
Back to AT20xx_0xxx "Parameter (Online)", [Page 181] Back to ATH20x0_0xxx "Parameter (Online)", [Page 184]		

6.7.12.40 EncoderSensorValues

Parameter	Type	Explanation
[0] - [31]	LREAL	Encoder sensor value of respective channel
Back to AT20xx_0xxx "Parameter (Online)", [Page 181] Back to ATH20x0_0xxx "Parameter (Online)", [Page 184]		

6.7.12.41 ImageSections

Parameter	Type	Explanation
ObjectID	OTCID	Object ID
AreaNumber	UDINT	Area number
StartAddress	UDINT	Start position
Size	UDINT	Image size
Back to Data Recorder "Parameter (Init)", [Page 186]		

6.7.12.42 IsRingBufferModeActivated

Parameter	Type	Explanation
TRUE	BOOL	Ring buffer is active
FALSE	BOOL	Ring buffer is not active
Back to Data Recorder "Parameter (Init)", [Page 186]		

6.7.12.43 TraceLevelMax

Parameter	Type	Explanation
tlAlways	TcTraceLevel	Controls the amount of log messages. All messages are thrown.
tlError	TcTraceLevel	Controls the amount of log messages. Only error messages are thrown.
tlWarning	TcTraceLevel	Controls the amount of log messages. Error and warnings are thrown.
tlInfo	TcTraceLevel	Controls the amount of log messages. Errors, warnings and infos are thrown.
tlVerbose	TcTraceLevel	Controls the amount of log messages. No messages are thrown.
Back to Data Recorder "Parameter (Init)", [Page 186]		

6.7.12.44 ResetInfoArea

Parameter	Type	Explanation
TRUE	BOOL	Info area is reset.
FALSE	BOOL	Info area is not reset.
Back to Data Recorder "Parameter (Init)", [Page 186]		

## 7 Commissioning

The first steps of commissioning depend on whether you have hardware or not. If a different procedure is required, the corresponding links are shown at the beginning of the respective chapter.

### 7.1 Open or create project



#### Hardware available

If you have hardware, you can open an existing project or create a new project. You can continue with one of the following chapters:

- "Opening an existing project", [Page 198]
- "Creating a new project", [Page 199]



#### Hardware not available

If you do not have any hardware, you can open an existing project or create a new project using the *XTS Simulation Builder*. Beckhoff recommends using the *XTS Simulation Builder*. You can continue with one of the following chapters:

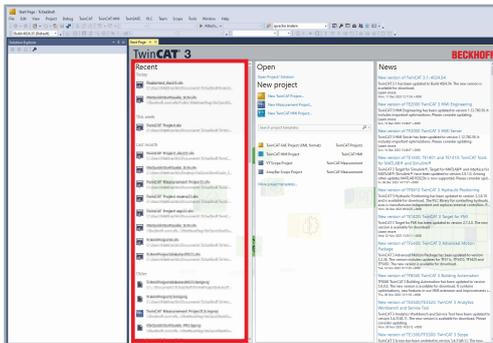
- "Opening an existing project", [Page 198]
- "XTS Simulation Builder", [Page 229]

#### 7.1.1 Opening an existing project

Once you have opened TwinCAT, you have the option of opening an existing project on the start screen or in the menu.

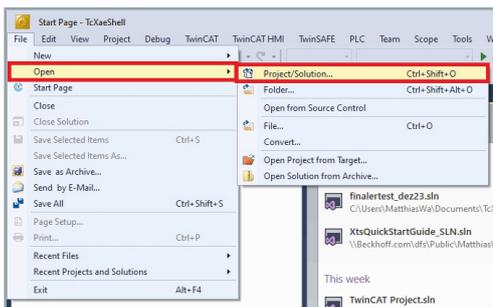
##### Start screen

The list shows you the most recently opened projects from the previous day, the previous week, the previous month and the previous period.



- ▶ Click on an existing project in the list to open it

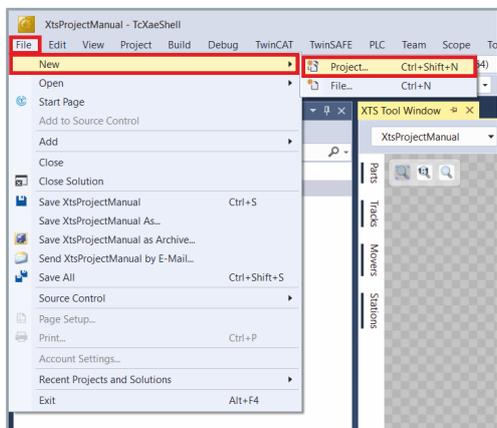
##### Menu



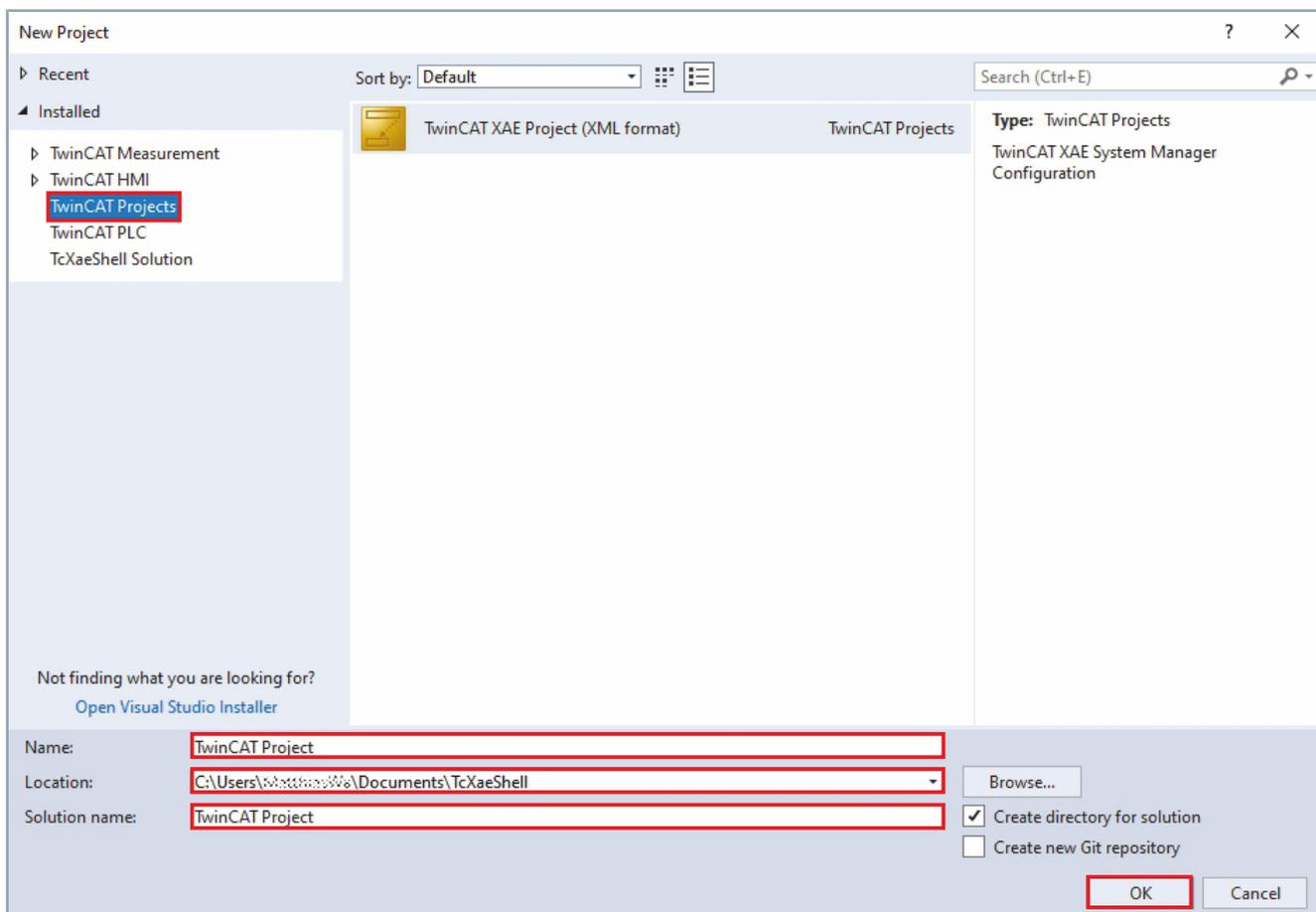
- ▶ In the menu **File** click on the menu item **Open...**
- ▶ Click on **Project/Solution** in the submenu
- ▶ Click on an existing project to open it

## 7.1.2 Creating a new project

To set up an XTS system and connect it to all hardware components, you must first set up a TwinCAT 3 project. For commissioning, you must create a new TwinCAT XAE project with Solution.



- ▶ In the menu **File** click on the menu item **New**
- ▶ Click on **Project** in the submenu



The *New Project* dialog box opens.

- ▶ Click on **TwinCAT Projects**
- ▶ Enter a name in the input field *Name*
- ▶ Select a file path from the drop-down menu *Location*

OR

- ▶ Click on **Browse** to open the *Project Location* dialog box and select a file path
- ▶ Enter a name in the input field *Solution name*
- ▶ Confirm with **OK**

## 7.2 Preparing hardware



### Hardware not available

If you do not have any hardware, you can configure a system. You can continue with the following chapter:

- "System configuration", [Page 204]



### Hardware available

If you have hardware, you can continue with the following steps.

### 7.2.1 Check hardware

- ▶ Check correct connection of all XTS hardware components to the IPC and the mains connection

The following LEDs must be lit on all modules:

- Link / Act
- 24 V / 4 A

#### If the LEDs do not light up:

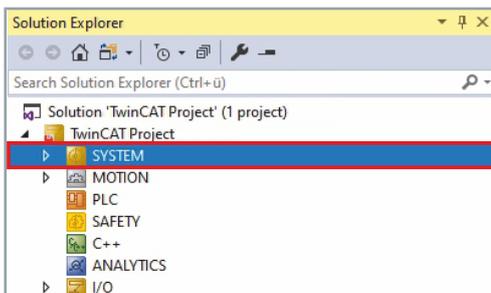
- ▶ Check cables and connectors
- ▶ Check EtherCAT settings for communication with the target PC

### 7.2.2 Connect target PC

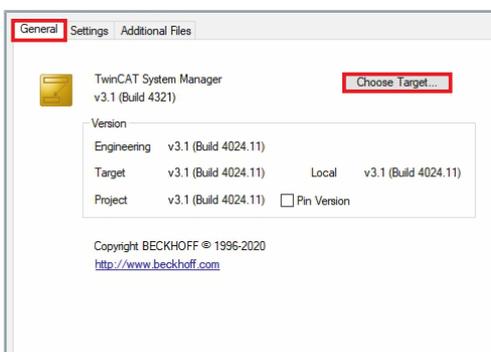


#### Same software version on target PC and engineering PC

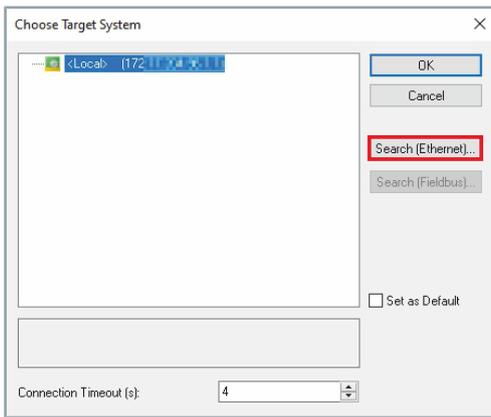
Make sure that the same software version is installed on your target PC as on your engineering PC.



- ▶ Expand *Solution Explorer* > *TwinCAT Project*
- ▶ Double-click on **SYSTEM**



- ▶ In the project window, click on the **General** tab
- ▶ Click **Choose Target**



The dialog box *Choose Target System* opens.

The dialog box *Choose Target System* lists all target PCs to which there are routes from the development system.

If the desired target PC is not yet listed:

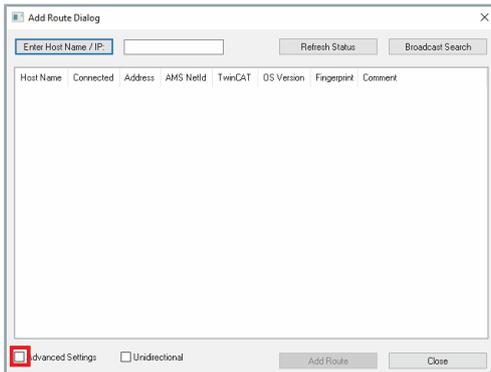
- ▶ Click **Search (Ethernet)...**

If you work locally on your engineering PC:

- ▶ Click **<Local>**

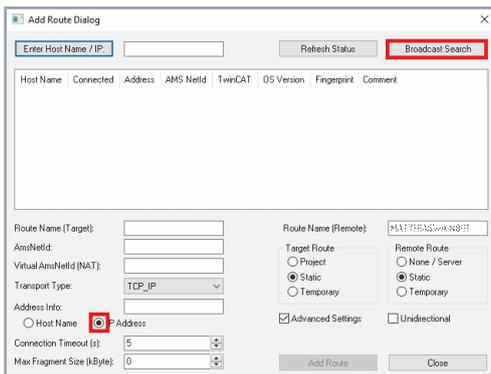
After you have selected <Local>, you can continue with the following chapter:

- "Check target PC", [Page 202]



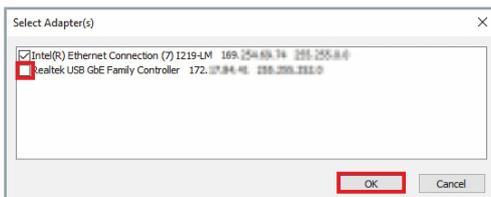
The dialog box *Add Route Dialog* opens.

- ▶ Activate the checkbox **Advanced Settings**



- ▶ Activate the checkbox **IP Address**

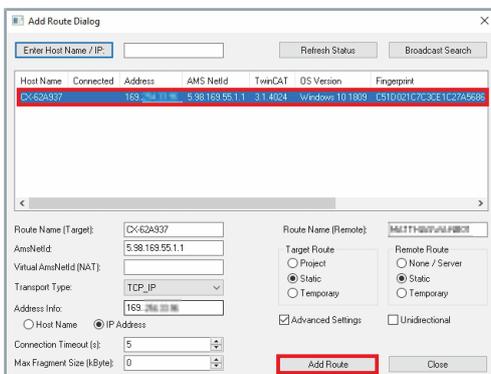
- ▶ Click **Broadcast Search**



The dialog box *Select Adapter(s)* opens.

- ▶ Deactivate the checkbox **Realtek USB GbE Family Controller**

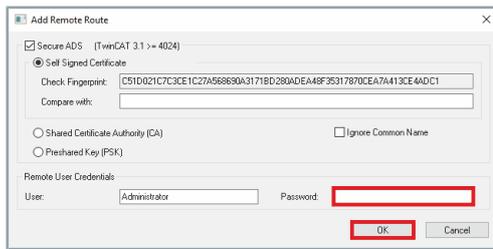
- ▶ Confirm with **OK**



- ▶ Click on the target PC

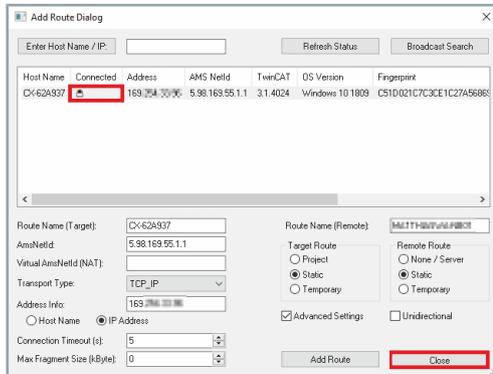
- ▶ Click **Add Route**

# Commissioning



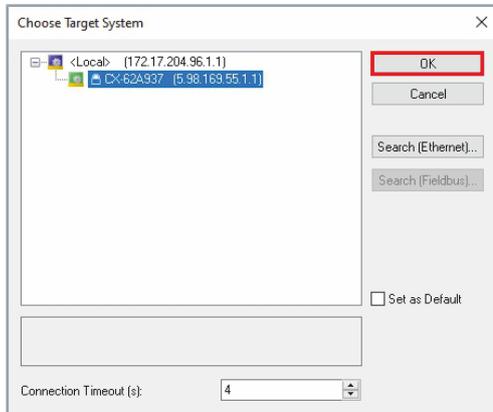
The dialog box *Add Remote Route* opens.

- ▶ Enter the password for the target PC in the input field *Password*
- ▶ Confirm with **OK**



The successful connection of the target PC is indicated by a closed lock in the *Connected* column.

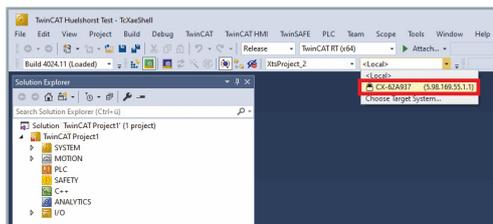
- ▶ Confirm with **Close**



The dialog box *Choose Target System* opens.

- ▶ Confirm with **OK**

## 7.2.2.1 Check target PC

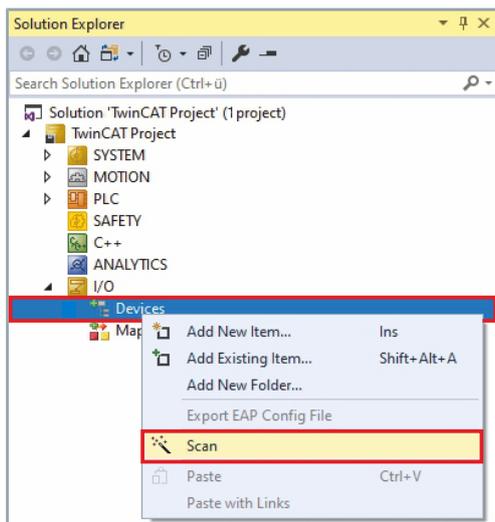


- ▶ Check whether the target PC is selected
- ▶ If required, select the target PC from the drop-down menu

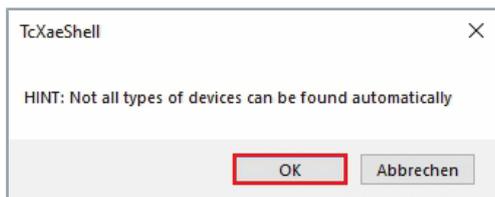
## 7.2.3 Scanning I/O Devices



- ▶ Ensure that TwinCAT is in **Config Mode**
- ▶ If required, click on the button **Restart TwinCAT (Config Mode)** to activate the *Config Mode*



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O*
- ▶ Right-click on **Devices** to open the context menu
- ▶ Click **Scan** in the context menu



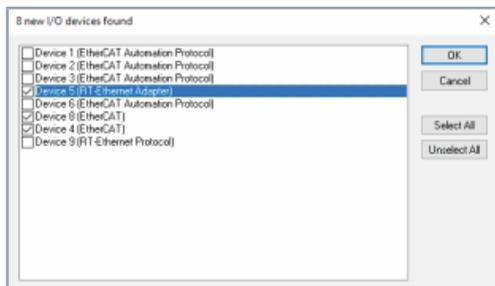
The dialog box *TcXaeShell* opens.

- ▶ Confirm with **OK**

Depending on the components of your XTS system, there are different devices to choose from:

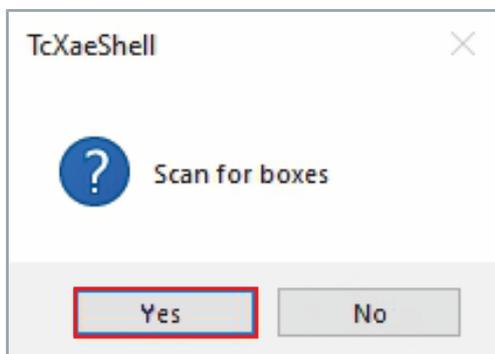
- one *RT-Ethernet* adapter for each connected CU2508
- one *EtherCAT Device* for each infeed line of the XTS system
- *EtherCat Devices* for the bus terminals contained in the control cabinet

Beckhoff recommends naming the devices clearly for a better overview.



The dialog box *8 new I/O devices found* opens.

- ▶ Activate the checkboxes of the devices that are to be selected for the current configuration
- ▶ Confirm with **OK**



The dialog box *TcXaeShell* opens.

- ▶ Confirm with **Yes**

## 7.3 System configuration

You have various options for configuring an XTS system. The procedure for configuring a system depends on whether you have hardware or not:



### **Hardware available**

If hardware is available, you can create the system with the *XTS Configurator* or manually. Beckhoff recommends using the *XTS Configurator*. You can continue with one of the following chapters:

- "XTS Configurator", [Page 258]
- "Create new XTS system manually", [Page 39]



### **Hardware not available**

If no hardware is available, you can create the system with the *XTS Simulation Builder* or manually. Beckhoff recommends using the *XTS Simulation Builder*. You can continue with one of the following chapters:

- "XTS Simulation Builder", [Page 229]
- "Create new XTS system manually", [Page 39]

## 7.4 Checking I/O devices



### Connection to the power supply and 48 V required

To commission a real XTS system, the system must be connected to the power supply and 48 V must be connected.

Once you have configured the XTS system, you can put the configuration into operation and move the movers.



### Hardware available

To put a system into operation, the I/O devices must be enabled.



### Hardware not available

To put a simulated system into operation, the I/O devices must be disabled.

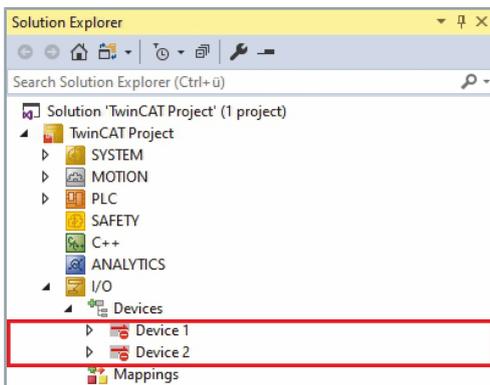
You can see whether the devices are enabled or disabled by the display of the devices in the Solution Explorer:



The device is enabled.



The device is disabled.

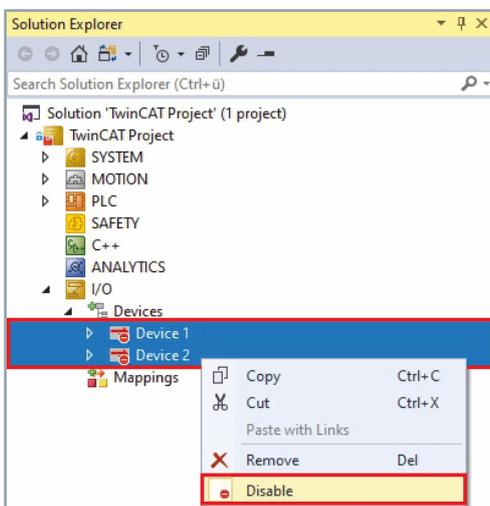


▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices*

▶ Check whether all XTS-relevant devices are enabled

If the devices are disabled, the devices must be enabled.

### 7.4.1 Activate

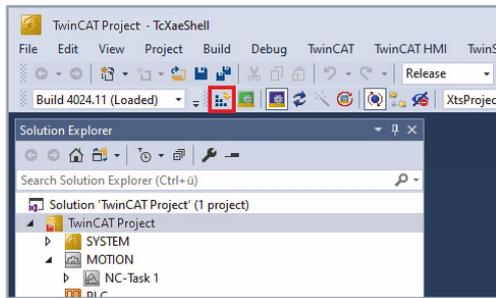


▶ Press and hold the button **Ctrl** to select the devices

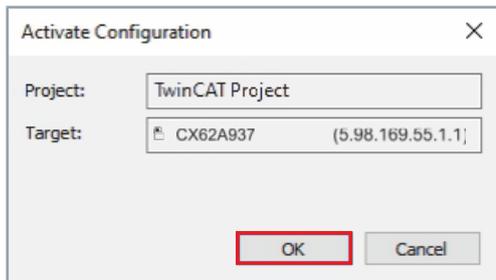
▶ Right-click on the XTS relevant devices

▶ Click **Disable** in the context menu

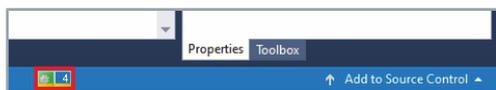
## 7.5 Activating the configuration



- ▶ Click on the button **Activate Configuration** to activate the configuration



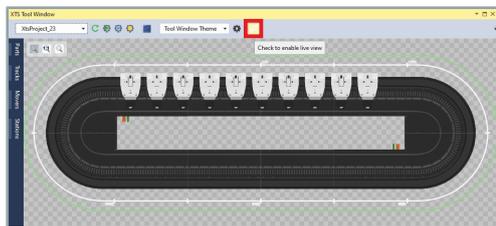
- The dialog box *Activate Configuration* opens.
- ▶ Make sure that the correct project and the correct target PC are selected in the input fields *Project* and *Target*
  - ▶ Confirm with **OK**



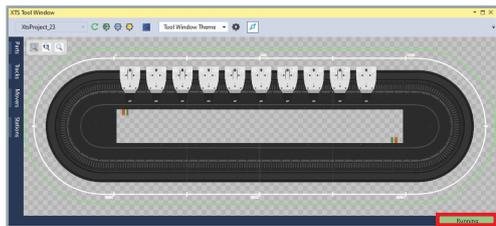
As soon as the system is activated, an animated TwinCAT symbol is displayed in the information bar and status bar. The XTS system is ready for operation. You can make changes to the current configuration at any time by reopening the *XTS Configurator*.



The *XTS Tool Window* can only be set to Running mode if the configuration is activated and TwinCAT is in Run mode.



- ▶ In the *XTS Tool Window* activate the button **Check to enable live view**



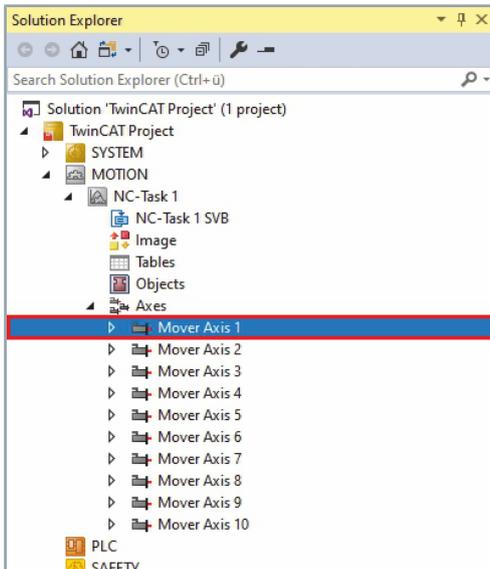
The *XTS Tool Window* is in Running mode and shows the current mover positions.

## 7.6 Mover ID detection

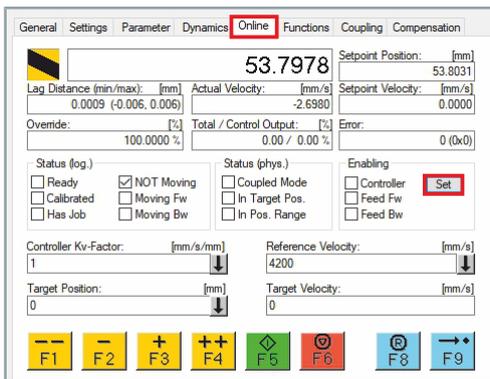
Perform a Mover ID detection to locate Mover 1 on the system. Further information can be found in chapter "Mover 1 functionality", [Page 93].

## 7.7 Activating NC axes

Before you can move a mover, you must activate the corresponding NC axis of the mover.



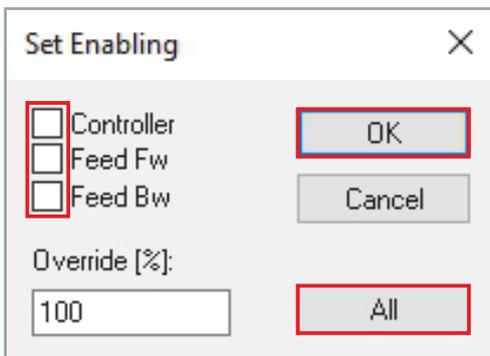
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *NC-Task 1* > *Axes*
- ▶ Double-click **Mover Axis 1**



- ▶ In the project window, click on the **Online** tab
- ▶ Click **Set**



Use the button *All* to enable the controllers *Controller*, *Feed Fw* and *Feed Bw* to move the movers. If you click on the button *All*, the *Set Enabling* window closes automatically.



The dialog box *Set Enabling* opens.

- ▶ Click on **All** to enable all controllers

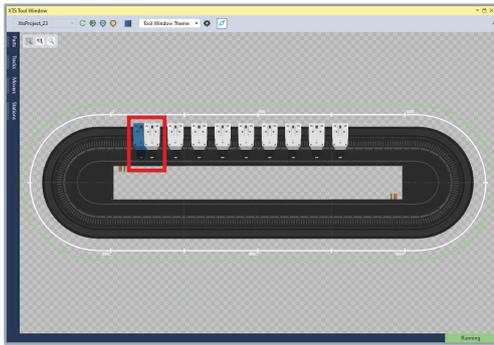
OR

- ▶ Activate the checkboxes **Controller**, **Feed Fw** and **Feed Bw** to enable the controllers
- ▶ Confirm with **OK**

The axis controllers are enabled and the corresponding mover can be moved.

## 7.8 Moving the mover

Once you have activated the configuration and the NC axes of the movers, you can now move one or more movers.



### Observe the representation of a simulated system

If no real XTS system is connected and you are working with a simulated system, the movers overtake and overlap in the display in the XTS Tool Window. In a real system, this overlapping is not possible; instead, the movers collide.

The movers can be moved to any position using the buttons or to a defined position using a direct motion command. In addition, certain functions can be used for movement, but these are not controlled via the buttons.

### 7.8.1 Controls

The list shows the most important controls:



#### Fast backwards

Moves the mover backwards at the velocity entered in the input field *Manual Velocity (Fast)*.

Preset: 600 [mm/s]



#### Slowly backwards

Moves the mover backwards at the velocity entered in the input field *Manual Velocity (Slow)*.

Preset: 100 [mm/s]



#### Slowly forward

Moves the mover forwards at the velocity entered in the input field *Manual Velocity (Slow)*.

Preset: 100 [mm/s]



#### Fast forward

Moves the mover forwards at the velocity entered in the input field *Manual Velocity (Fast)*.

Preset: 600 [mm/s]



#### Start a direct motion command

Starts a direct motion command to the target position entered in the input field *Target Position* at the velocity entered in the input field *Target Velocity*.



#### Stop direct motion command

Stops the direct motion command.



#### Cancel motion command and reset

Stops the current motion command and resets the NC axis.



#### Controller enable

Enables the controller for moving the movers.

Target Position:  [mm]

#### Target Position input field

Enables the target position of the mover to be entered for a direct motion command.

Target Velocity: [mm/s]  
0

## Velocity input field

Enables the velocity for the mover to be entered for a direct motion command.

## 7.8.2 Any position



### Button only controls the selected mover

The buttons for moving the movers only control the selected NC axis with the corresponding mover on the currently active track.

If you want to move several movers using the buttons, the movers must be coupled. Further information can be found in chapter "Coupling movers", [Page 222].



If the buttons are inactive, the selected NC axis of the mover is not activated or the NC axis is coupled with another NC axis.

### Backward

Has Job  Moving Bw  Ir

Controller Kv-Factor: [mm/s/mm]  
1

Target Position: [mm]  
0

**F1** **F2** F3 F4

▶ Left-click and hold the **F1** button to move the mover quickly backwards

OR

▶ Left-click and hold the **F2** button to move the mover slowly backwards

### Forward

Has Job  Moving Bw  Ir

Controller Kv-Factor: [mm/s/mm]  
1

Target Position: [mm]  
0

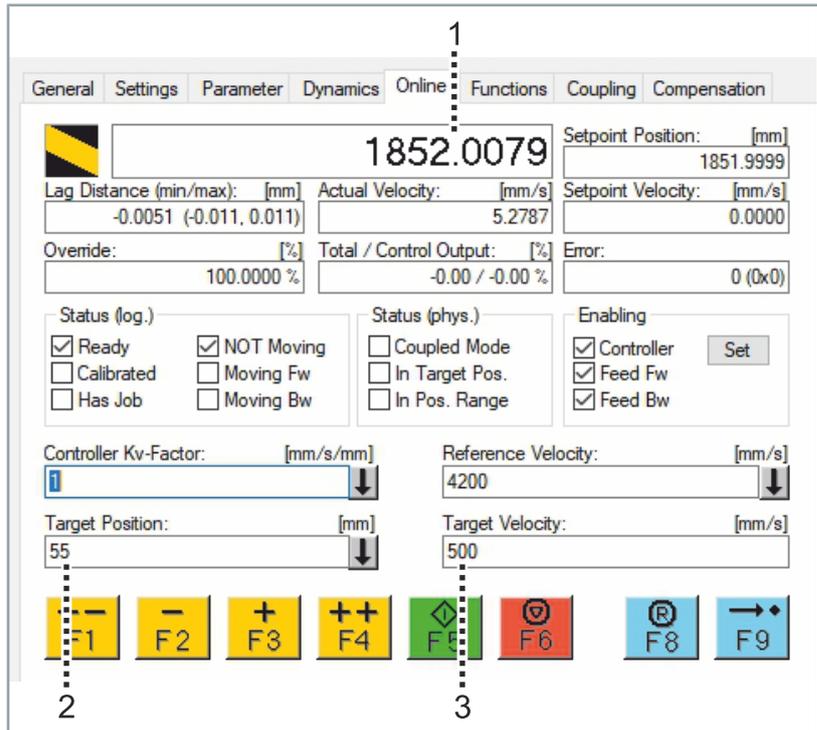
F1 **F2** **F3** **F4**

▶ Left-click and hold the **F3** button to move the mover slowly forwards

OR

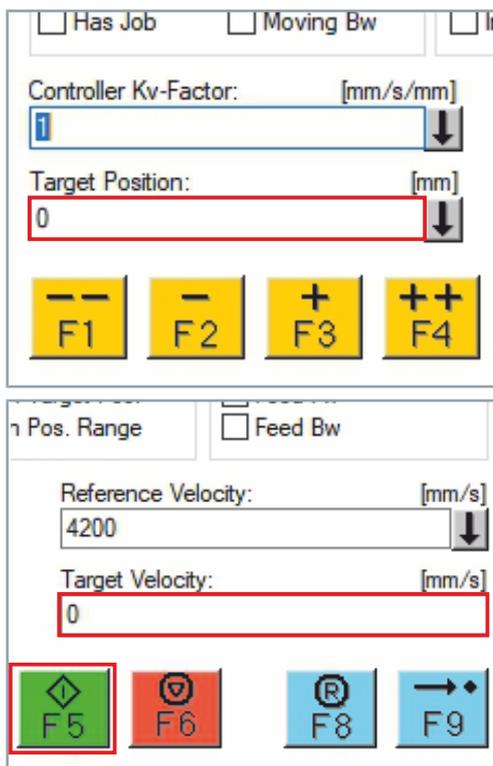
▶ Left-click and hold the **F4** button to move the mover quickly forwards

## 7.8.3 Direct motion command



The distances traveled so far are added up to an absolute position [1]. From this absolute position, the mover moves in a positive or negative direction until the target position [2] is reached at the defined velocity [3].

In contrast, with the *Modulo* function, the distances traveled are not added up and the distance already traveled does not have to be completely reversed in order to reach the target position. Further information can be found in chapter "Modulo / Modulo shortest way / Modulo plus direction / Modulo minus direction", [Page 215].



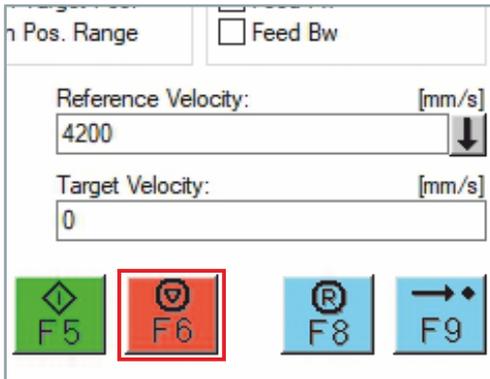
► Enter a value for the position to which the mover is to be moved in the input field *Target position*

► Enter the velocity at which the mover is to be moved in the input field *Target Velocity*

► Click on the **F5** button to start the direct motion command

The mover is moved to the target position at the defined velocity.

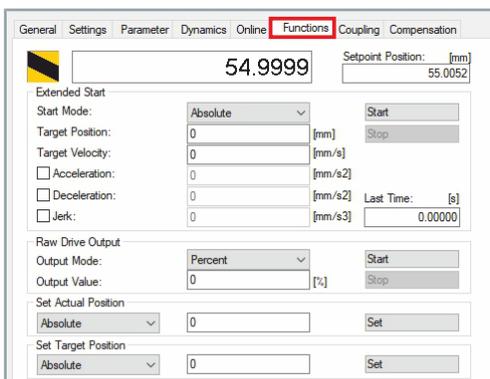
## Cancel direct motion command



- Click on the **F6** button to cancel the direct motion command

## 7.8.4 Functions

Various motion commands are available in the *Functions* tab and can be used after entering a few values.

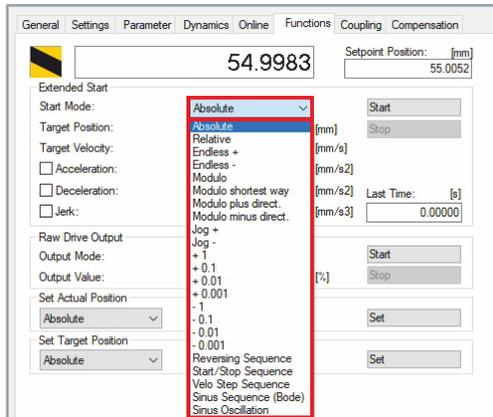


- In the project window, click on the **Functions** tab

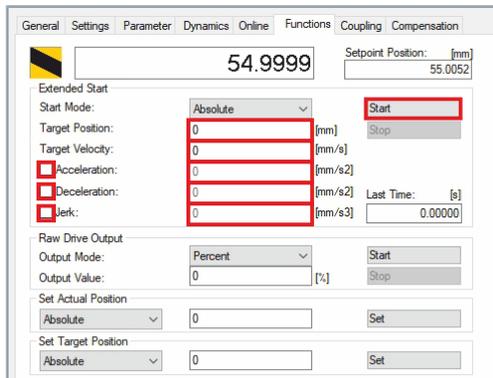
## 7.8.4.1 Absolute

This function moves the mover to the entered position.

### Starting



- ▶ Select **Absolute** in the drop-down menu *Start Mode*



- ▶ Enter the target positions in the input field *Target Position*
- ▶ Enter a value for the velocity in the input field *Target Velocity*
- ▶ If required, activate the checkbox **Acceleration** to enter a value for the acceleration in the input field
- ▶ If required, activate the checkbox **Deceleration** to enter a value for the deceleration in the input field
- ▶ If required, activate the checkbox **Jerk** to enter a value for the jerk in the input field
- ▶ Click on **Start** to start the function *Absolute*

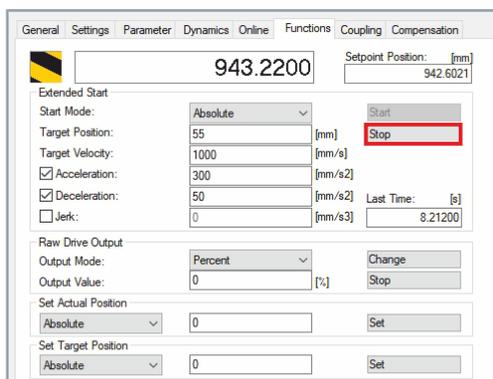
The mover moves to the target position entered.

### Stop



#### Stopping only during the procedure

The function can only be stopped during the movement to the target position. After moving to the target position, the button *Stop* is automatically disabled.



- ▶ Click on **Stop** to stop the function *Absolute*

## 7.8.4.2 Relative

With this function, the mover travels a defined route.

### Starting

- ▶ Select **Relative** in the drop-down menu *Start Mode*

- ▶ Enter a value for the length of the route in the input field *Target Position*
- ▶ Enter a value for the velocity in the input field *Target Velocity*
- ▶ If required, activate the checkbox **Acceleration** to enter a value for the acceleration in the input field
- ▶ If required, activate the checkbox **Deceleration** to enter a value for the deceleration in the input field
- ▶ If required, activate the checkbox **Jerk** to enter a value for the jerk in the input field
- ▶ Click on **Start** to start the function *Relative*

The mover travels the defined length of the route.

### Stop



#### Stopping only during the procedure

The function can only be stopped during the movement to the target position. After moving to the target position, the button *Stop* is automatically disabled.

- ▶ Click on **Stop** to stop the function *Relative*

## 7.8.4.3 Endless + / Endless -

With this function, the mover moves infinitely in a positive or negative direction.

### Starting

► Select **Endless +** in the drop-down menu *Start Mode*

OR

► Select **Endless -** in the drop-down menu *Start Mode*

► Enter a value for the velocity in the input field *Target Velocity*

► If required, activate the checkbox **Acceleration** to enter a value for the acceleration in the input field

► If required, activate the checkbox **Deceleration** to enter a value for the deceleration in the input field

► If required, activate the checkbox **Jerk** to enter a value for the jerk in the input field

► Click on **Start** to start the function *Endless +* or *Endless -*

The mover moves infinitely forwards or backwards.

### Stop

► Click on **Stop** to stop the function *Endless +* or *Endless -*

## 7.8.4.4 Modulo / Modulo shortest way / Modulo plus direction / Modulo minus direction

The mover moves to a defined position with these functions. Depending on the selected modulo function, the mover travels the shortest distance, forwards or backwards to the target position. The following functions are available:

### Modulo

The mover moves to the target position. If the value in the input field *Target Position* is negative, the mover moves backwards to the target position.

### Modulo shortest way

The mover moves forwards or backwards the shortest way to the target position. It is not possible to enter a negative value in the input field *Target Position*.

### Modulo plus direction

The mover only moves forward to the target position. It is not possible to enter a negative value in the input field *Target Position*.

### Modulo minus direction

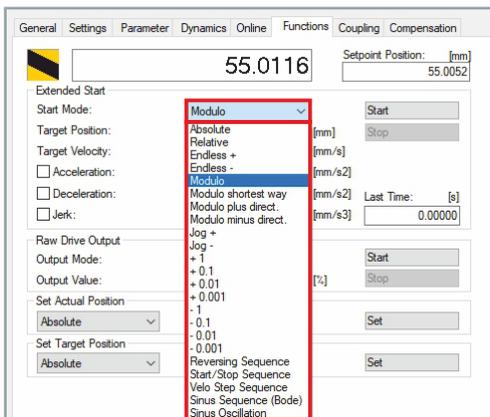
The mover only moves backwards to the target position. It is not possible to enter a negative value in the input field *Target Position*.



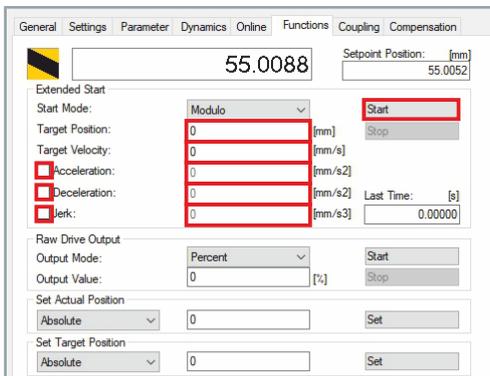
### Modulo example

The input of values is shown using the function *Modulo* as an example.

## Starting



- ▶ Select **Modulo** in the drop-down menu *Start Mode*



- ▶ Enter a value for the target position in the input field *Target Position*
- ▶ Enter a value for the velocity in the input field *Target Velocity*
- ▶ If required, activate the checkbox **Acceleration** to enter a value for the acceleration in the input field
- ▶ If required, activate the checkbox **Deceleration** to enter a value for the deceleration in the input field
- ▶ If required, activate the checkbox **Jerk** to enter a value for the jerk in the input field
- ▶ Click on **Start** to start the function *Modulo*

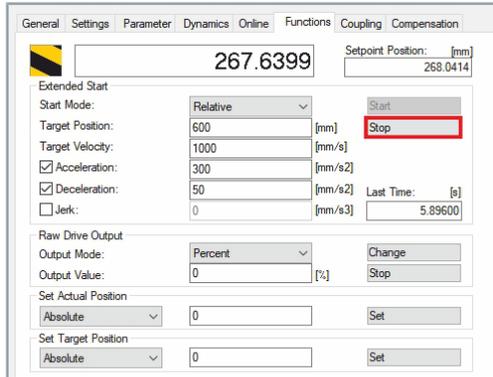
The mover moves to the target position entered.

## Stop



### Stopping only during the procedure

The function can only be stopped during the movement to the target position. After moving to the target position, the button *Stop* is automatically disabled.

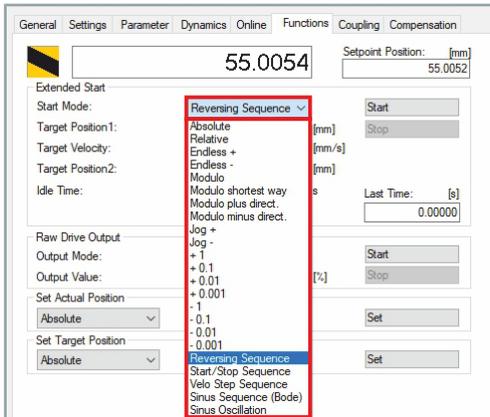


► Click on **Stop** to stop the function *Modulo*

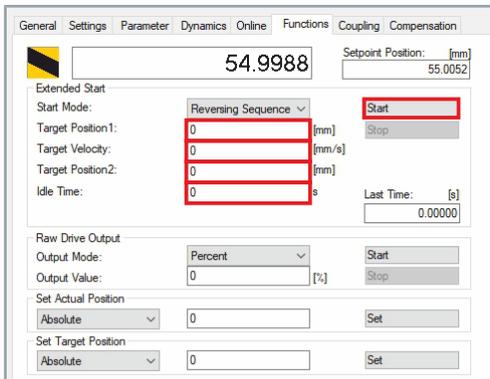
## 7.8.4.5 Reversing Sequence

With this function, the mover moves back and forth between two positions.

### Starting



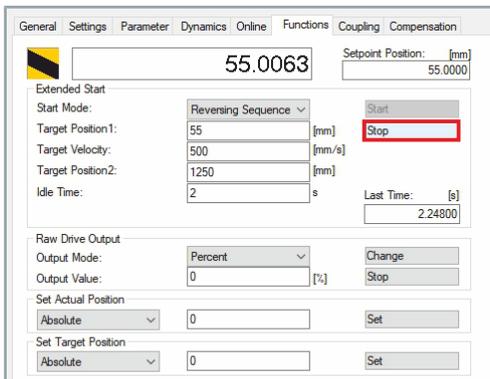
- ▶ Select **Reversing Sequence** in the drop-down menu *Start Mode*



- ▶ Enter a value for the first target position in the input field *Target Position 1*
- ▶ Enter a value for the velocity in the input field *Target Velocity*
- ▶ Enter a value for the second target position in the input field *Target Position 2*
- ▶ Enter a value for the idle time at the target in the input field *Idle Time*
- ▶ Click on **Start** to start the function *Reversing Sequence*

The mover now moves continuously back and forth between the two target positions.

### Stop



- ▶ Click on **Stop** to stop the function *Reversing Sequence*

## 7.8.4.6 Start/Stop Sequence

With this function, the mover travels a defined distance to the next stop and executes this function permanently.

### Starting

General Settings Parameter Dynamics Online Functions Coupling Compensation

55.0074 Setpoint Position: [mm] 55.0052

Extended Start

Start Mode: Start/Stop Sequence Start

Target Position: [mm] Stop

Target Velocity: [mm/s]

Idle Time: s Last Time: [s] 0.00000

Raw Drive Output

Output Mode: Jog + Start

Output Value: Jog - Stop

Set Actual Position

Absolute Set

Set Target Position

Absolute Set

- ▶ Select **Start/Stop Sequence** in the drop-down menu *Start Mode*

General Settings Parameter Dynamics Online Functions Coupling Compensation

55.0134 Setpoint Position: [mm] 55.0052

Extended Start

Start Mode: Start/Stop Sequence Start

Target Position: 0 [mm] Stop

Target Velocity: 0 [mm/s]

Idle Time: 0 s Last Time: [s] 0.00000

Raw Drive Output

Output Mode: Percent Start

Output Value: 0 [%] Stop

Set Actual Position

Absolute 0 Set

Set Target Position

Absolute 0 Set

- ▶ Enter a value for the distance to the next stop in the input field *Target Position*
- ▶ Enter a value for the velocity in the input field *Target Velocity*
- ▶ Enter a value for the idle time at the target in the input field *Idle Time*
- ▶ Click on **Start** to start the function *Start/Stop Sequence*

The mover now travels the entered distance continuously until the next stop.

### Stop

General Settings Parameter Dynamics Online Functions Coupling Compensation

8925.0087 Setpoint Position: [mm] 8925.0000

Extended Start

Start Mode: Start/Stop Sequence Start

Target Position: 150 [mm] Stop

Target Velocity: 800 [mm/s]

Idle Time: 1 s Last Time: [s] 0.31200

Raw Drive Output

Output Mode: Percent Change

Output Value: 0 [%] Stop

Set Actual Position

Absolute 150 Set

Set Target Position

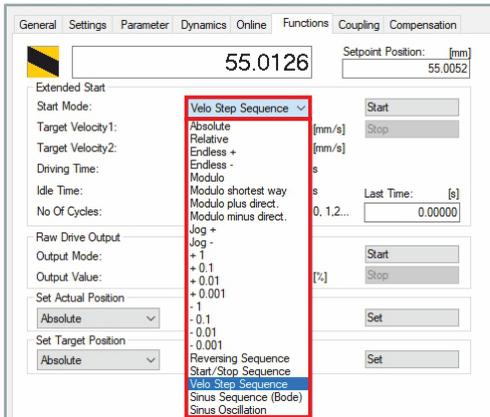
Absolute 850 Set

- ▶ Click on **Stop** to stop the function *Start/Stop Sequence*

## 7.8.4.7 Velo Step Sequence

With this function, the mover moves between two target positions at two different velocities.

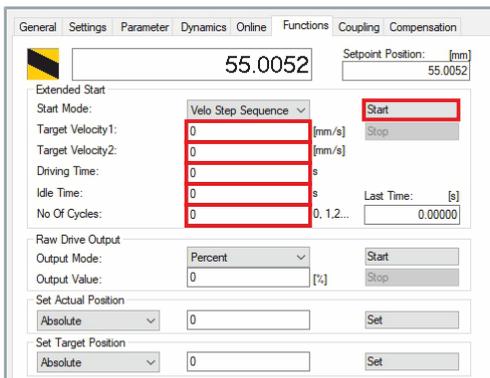
### Starting



- ▶ Select **Velo Step Sequence** in the drop-down menu *Start Mode*



The distances between the first and second target positions can be different, as they depend on the two velocities and the identical travel time.



- ▶ Enter the velocity values in the input fields *Target Velocity1* and *Target Velocity2*
- ▶ Enter a value for the driving time in the input field *Driving Time*
- ▶ Enter a value for the idle time at the target in the input field *Idle Time*
- ▶ Enter a value for the number of driving cycles in the input field *No of cycles*
- ▶ Click on **Start** to start the function *Velo Step Sequence*

The mover now travels the entered number of travel cycles or permanently the time-dependent route to the two target positions.

## Stop



### Stop depending on *No of cycles*

If no value has been entered in the input field *No of cycles*, the mover moves continuously. The function can be ended at any time using the *Stop* button.

If a value has been entered in the input field *No of cycles*, the mover stops automatically after the entered number of cycles and the *Stop* button is automatically disabled. The cycles can be ended at any time using the *Stop* button.

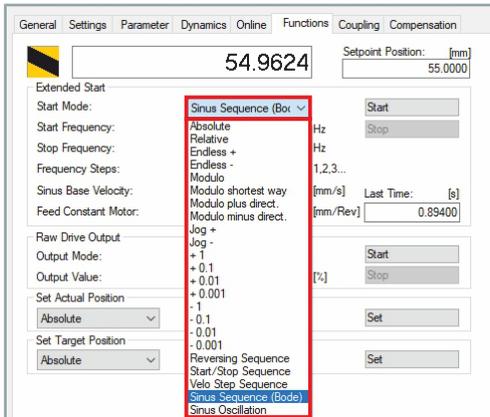
The screenshot shows the 'Velo Step Sequence' function configuration in the Beckhoff commissioning software. The 'No Of Cycles' field is set to 2, and the 'Stop' button is highlighted with a red box. The 'Start' button is also visible. The 'Setpoint Position' is 12246.8800 mm. The 'Raw Drive Output' is set to 0%.

► Click on **Stop** to stop the function *Velo Step Sequence*

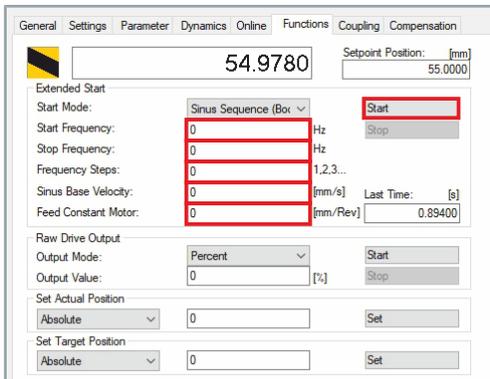
## 7.8.4.8 Sine Sequence (Bode)

With this function, the mover moves forwards and backwards periodically.

### Starting



- ▶ Select **Sinus Sequence (Bode)** in the drop-down menu *Start Mode*



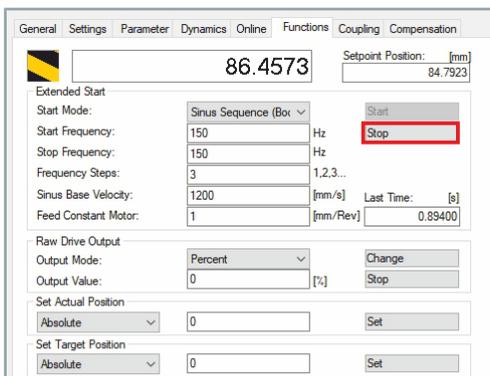
- ▶ Enter values for the frequencies in the input fields *Start Frequency* and *Stop Frequency*
- ▶ Enter a value for the number of frequencies in the input field *Frequency Steps*
- ▶ Enter a value for the velocity in the input field *Sinus Base Velocity*
- ▶ Enter a value for the feed motor in the input field *Feed Constant Motor*
- ▶ Click on **Start** to start the function *Sinus Sequence (Bode)*

### Stop



#### Stopping only during the procedure

The function can only be stopped during the movement to the target position. After moving to the target position, the button *Stop* is automatically disabled.



- ▶ Click on **Stop** to stop the function *Sinus Sequence (Bode)*

## 7.9 Coupling movers

You have the option of coupling different NC axes with each other and moving several movers simultaneously.



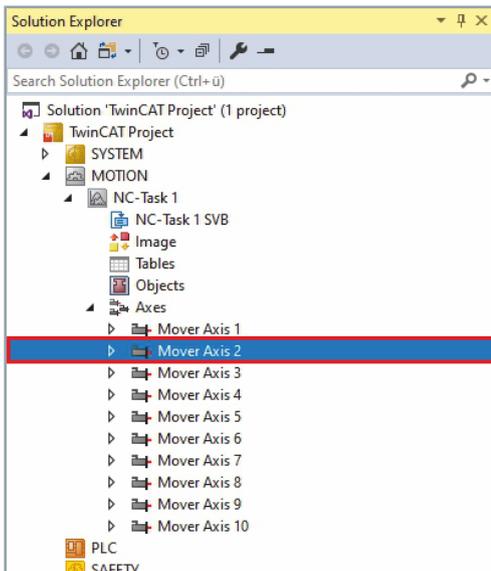
### Mover positions are retained

With the linear coupling of movers with a coupling factor of 1, the current positions of the movers to be coupled are used and the distance between the movers is maintained when the movers are moved.



### Coupling example NC axis 2 with NC axis 1

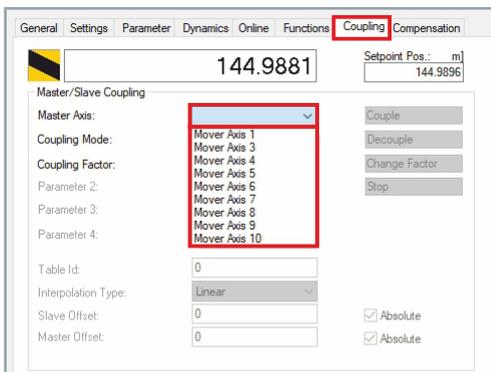
The coupling of the movers is described using NC axis 2 with NC axis 1 as an example.



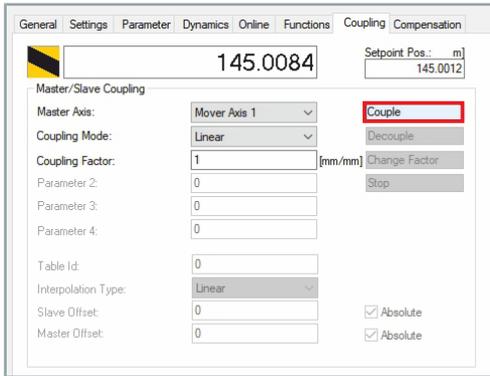
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *Axes*
- ▶ Click on **Mover Axis 2**



The selected NC axis is not listed, as the NC axis cannot be coupled with itself.

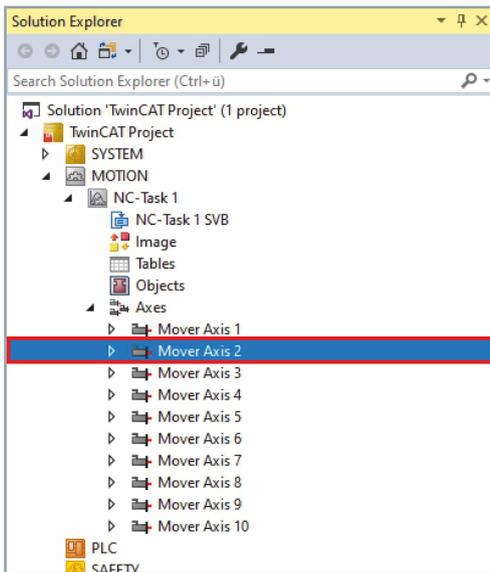


- ▶ In the project window, click on the **Coupling** tab
- ▶ Select the axis in the drop-down menu *Master Axis* to which the axis is to be coupled

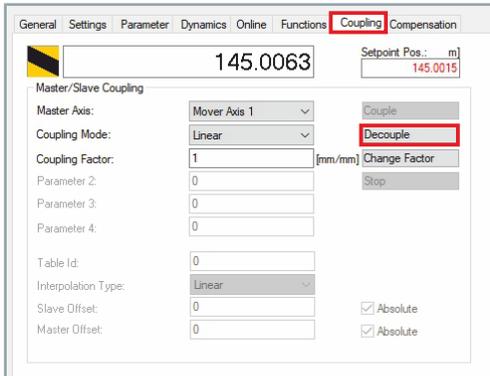


- ▶ Click on **Couple** to couple the NC axes

## 7.10 Decoupling movers



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *MOTION* > *Axes*
- ▶ Click on **Mover Axis 2**



- ▶ In the project window, click on the **Coupling** tab
- ▶ Click on **Decouple** to decouple the NC axis

The NC axis is decoupled and can be coupled with another NC axis or moved individually.

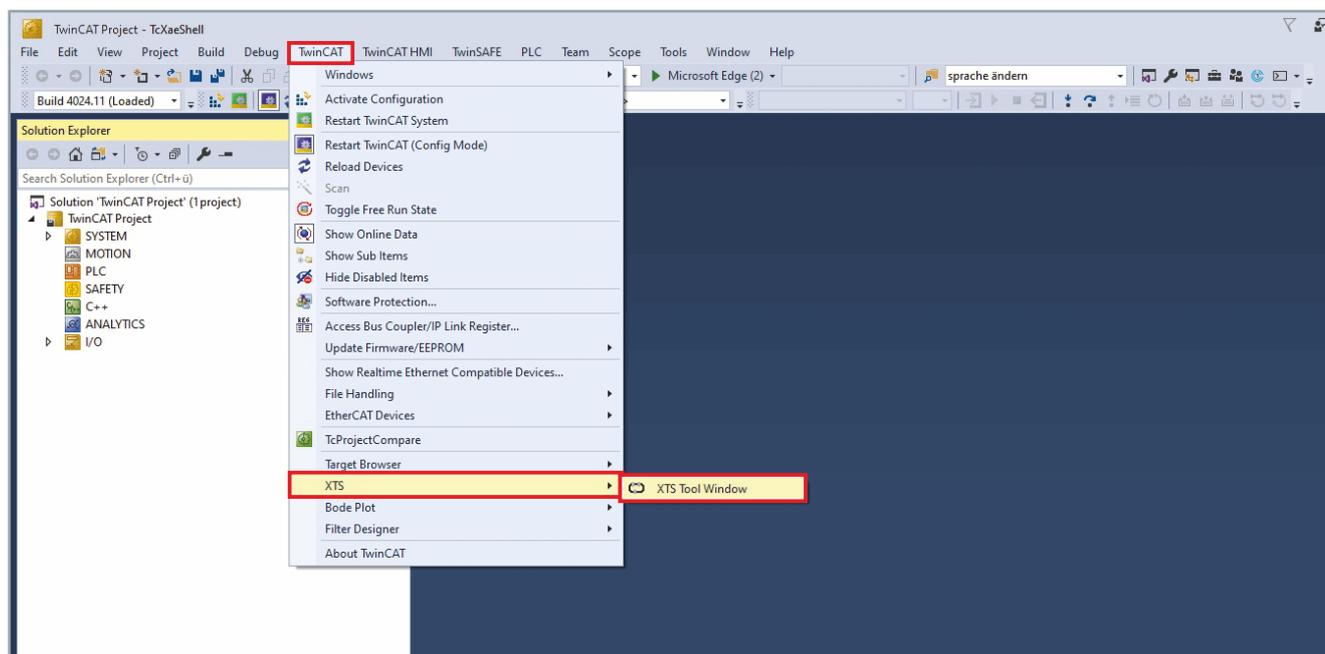
## 8 XTS Tools

### 8.1 XTS Tool Window

The *XTS Tool Window* is the user interface for all XTS-related components of your TwinCAT project. It is the main page to control all XTS systems of your running project. In the *XTS Tool Window* you will find helpful tools such as the *XTS Configurator*, the *XTS Simulation Builder* and the *XTS System View*.

#### 8.1.1 Activation of the XTS Tool Window

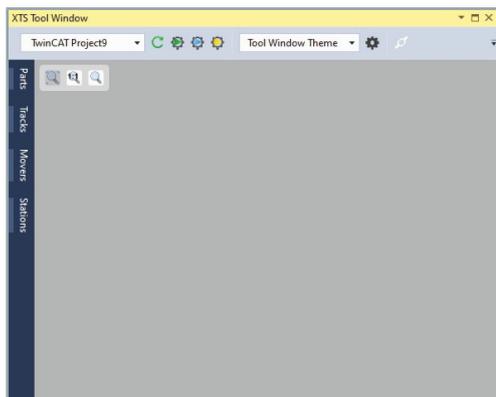
After you have successfully installed *TF5850 TC3 XTS Extension* and opened a new project in *TwinCAT 3 XAE (TcXaeShell or VS 2013)*, you must first activate the XTS Tool Window.



- ▶ In the menu **TwinCAT** click on the menu item **XTS**
- ▶ Click on **XTS Tool Window** in the submenu

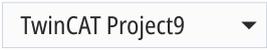
*XTS Tool Window* opens.

Like all other dialog boxes, you can place the *XTS Tool Window* in the Visual Studio environment.



## 8.1.2 Operating elements

The list shows the most important controls:

-  TwinCAT Project9 ▾
- Project selection drop-down menu**  
Displays the selected project and lists the available projects.
  -  **Update**  
Updates the contents of the selected project.
  -  **Open XTS Configurator**  
Opens the *XTS Configurator* to configure the hardware.
  -  **Open XTS Simulation Builder**  
Opens the *XTS Simulation Builder* to configure a simulated system.
  -  **Open XTS IO Timing Configurator**  
Opens the *XTS IO Timing Configurator* for configuring the real-time and distributed clocks.
-  Configurator Theme ▾
- Theme drop-down menu**  
Displays the selected theme and lists the available themes.
  -  **Options**  
Opens the dialog box *Options...*
  -  **Zoom window width**  
Scales the view to the window width.
  -  **Zoom original size**  
Scales the view to the preset original size.
  -  **Custom zoom**  
Scales the view to the custom size.
  -  **XTS Parts tab**  
Lists all XTS Parts of the current configuration.  
Displays the properties of all XTS Parts.
  -  **XTS Tracks tab**  
Lists all XTS Tracks of the current configuration.  
Displays the properties of all XTS Tracks.
  -  **XTS Mover tab**  
Lists all XTS Movers in the current configuration.  
Displays the properties of all XTS Mover.
  -  **XTS Stations tab**  
Lists all XTS Stations of the current configuration.  
Displays the properties of all XTS Stations.

## 8.1.3 Information lists

The information lists of Parts, Tracks, Movers and Stations provide detailed information about the respective objects and their properties.

### 8.1.3.1 Information list Parts

Name	Length	Module Side
Part 1	3000	Front

Name	Position Index	Drive Id
Module 1	0	0.0.0.0
Module 2	1	0.0.0.0
Module 3	2	0.0.0.0
Module 4	3	0.0.0.0
Module 5	4	0.0.0.0
Module 6	5	0.0.0.0
Module 7	6	0.0.0.0
Module 8	7	0.0.0.0
Module 9	8	0.0.0.0

► Click on the **Parts** tab to call up the information list *Parts*

The information list *Parts* displays all parts of the currently selected processing unit and provides information about the length, orientation and position in the coordinate system in the XTS View.

A processing unit can be selected using the filter in the upper area. The parts belonging to the processing unit are listed.

In the lower list all modules of a part are listed with the most important information. Selected modules are highlighted in the list and in the view.

### 8.1.3.2 Information list Tracks

Name	Processing Unit
Track 1	XtsProcessingUnit 1

Name	ObjectId
Part 1	#x01010020

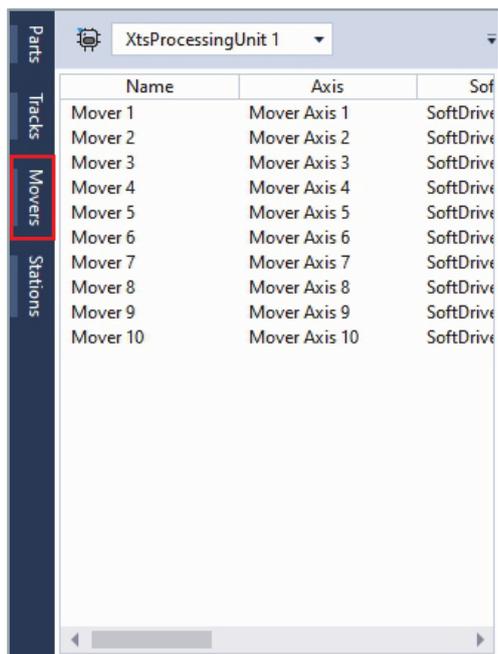
► Click on the **Tracks** tab to call up the information list *Tracks*

A processing unit can be selected via the filter in the upper area. The information list *Tracks* shows all tracks of the currently selected processing unit.

Selected tracks are visualized in the view.

All parts of a track are listed in the lower list. In addition, important information of the part is displayed.

### 8.1.3.3 Information list Movers



Name	Axis	SoftDrive
Mover 1	Mover Axis 1	SoftDrive
Mover 2	Mover Axis 2	SoftDrive
Mover 3	Mover Axis 3	SoftDrive
Mover 4	Mover Axis 4	SoftDrive
Mover 5	Mover Axis 5	SoftDrive
Mover 6	Mover Axis 6	SoftDrive
Mover 7	Mover Axis 7	SoftDrive
Mover 8	Mover Axis 8	SoftDrive
Mover 9	Mover Axis 9	SoftDrive
Mover 10	Mover Axis 10	SoftDrive

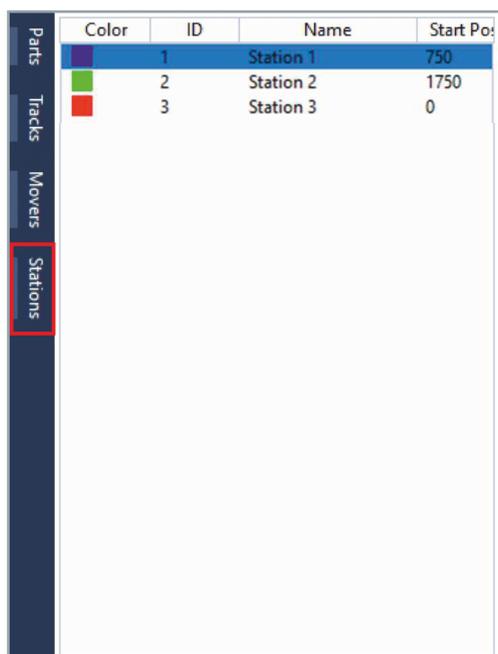
► Click on the **Movers** tab to call up the information list *Movers*

The information list *Movers* shows all movers of the currently selected processing unit and provides information about the NC axes, the SoftDrive and the simulation settings.

A processing unit can be selected using the filter in the upper area. The movers belonging to the processing unit are listed.

Selected movers are highlighted in the list and in the view.

### 8.1.3.4 Information list Stations



Color	ID	Name	Start Position
Blue	1	Station 1	750
Green	2	Station 2	1750
Red	3	Station 3	0

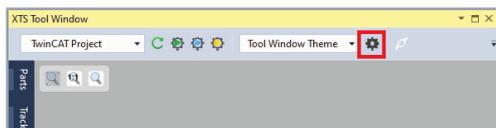
► Click on the **Stations** tab to call up the information list *Stations*

The information list *Stations* shows all stations and their properties. The start position and the end position on the respective part as well as all stop positions are listed.

The stations are visualized in the view.

## 8.1.4 Open Options... dialog box

Numerous options are available for configuring the XTS View. The settings of the XTS View are stored in so-called themes. These themes can be edited and used by all windows that can display XTS Views.



► Click on the button **Options...**

The dialog box *Options* opens.

Further information can be found in chapter "Dialog box Options...", [Page 353].

## 8.2 XTS Simulation Builder

With the *XTS Simulation Builder* you can create virtual constructions of the XTS hardware in Sandbox style and generate I/O components for simulation in TwinCAT.

The creation and adjustment of a virtual XTS system is fully supported by the XTS View, so that you can operate the *XTS Simulation Builder* intuitively. In addition, many configuration options of the XTS software are supported so that you can make full use of the tool for planning and simulating new XTS systems.

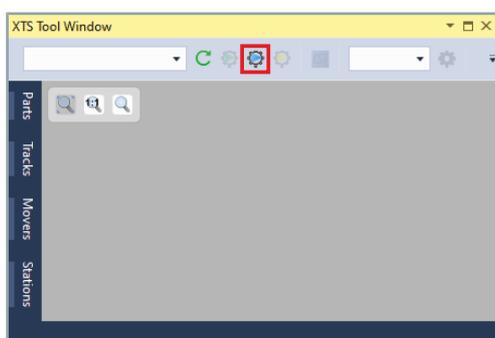


### Example configuration

In this example configuration, a closed XTS system with 180° clothoids and ten movers is set up, corresponding to the configuration of a 3 m XTS starter kit.

### 8.2.1 Open XTS Simulation Builder

- ▶ Activate the *XTS Tool Window* as described in the chapter "XTS Tool Window", [Page 224]



- ▶ Click on the button **Start the XTS Simulation Builder...** in the *XTS Tool Window*

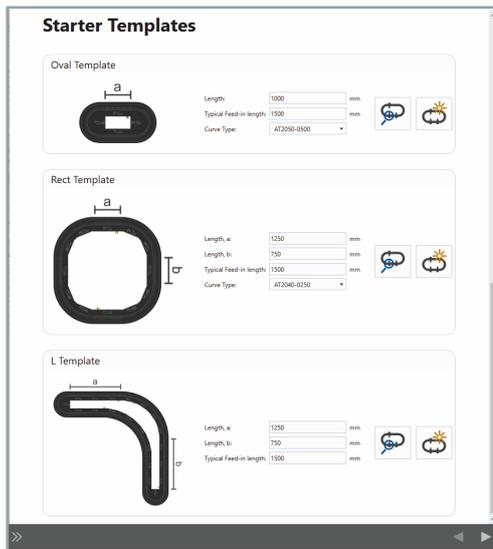


The *XTS Simulation Builder* opens.

When the *XTS Simulation Builder* is opened, the start page shows a welcome screen with information on the interactive usage options of the *XTS Simulation Builder*.

- ▶ If necessary, enlarge window for better operability
- ▶ If required, activate the checkbox **Don't show this again** to hide the welcome screen

You can reactivate the function at any time via the menu item *Options...*



Below the welcome screen is a list of templates from which you can select preconfigured XTS systems. You can easily change the templates with just a few parameters, for example to adjust the length of the system or the type of curve segments.

## 8.2.1.1 Controls

### Start page

The list shows the most important controls:



#### Preview and edit

Opens the page for previewing and editing the template.



#### Generate system

Accepts the template as a system and opens the page *Builder*.



#### Open sidebar

Opens the sidebar.



#### Close sidebar

Closes the sidebar.



#### Button *Go To Previous Step*

Opens the previous page.

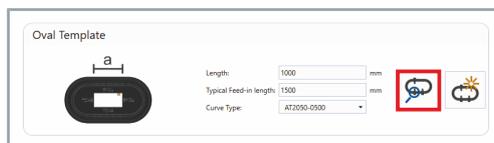


#### Button *Go To Next Step*

Opens the next page.

## 8.2.2 Open template

For a quick start, you can use one of the templates and adapt it to the desired size of the system if required.



- ▶ Click on the button **Oval Template**

The *Preview & Edit Template...* dialog box opens. The exact configuration of the system with the set parameters is displayed and can be adjusted and edited.



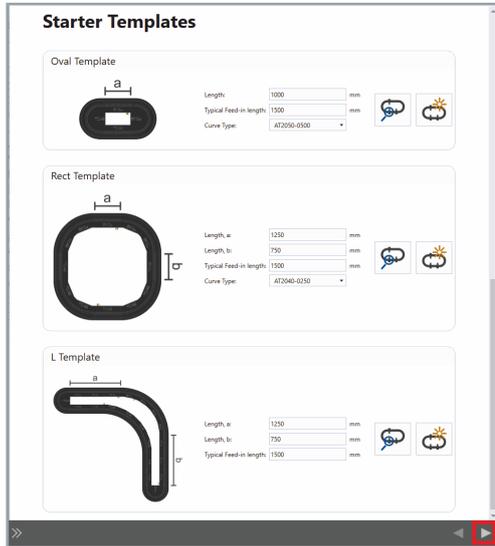
The small preview image shows the shape of the selected XTS system. The large display shows the exact system size and module arrangement for the set parameters.

- ▶ Select an XTS system in the drop-down menu
- ▶ Enter values for the exact system size in the input fields *Length* and *Typical Feed-in Length*
- ▶ Select the curve segment type of the modules in the drop-down menu *Curve Type*
- ▶ Click on the button **Create System from template and go to next page.** to continue

## 8.2.3 Simulate XTS system



The following pages describe how to set up an XTS system with the *XTS Simulation Builder* without using a template. The functions described are also available when using a template. The variant with template is therefore not described separately.



► Click on the button **Go To Next Step** to continue

OR

► Click on the button **>>** to expand the sidebar

Further information on the sidebar can be found in chapter "Sidebar", [Page 254].

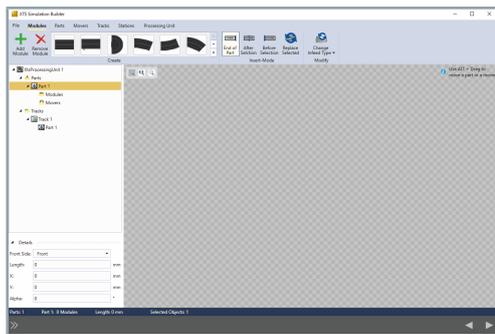


### Navigation with buttons or the sidebar

The pages can be accessed using the buttons *Go To Previous Step* and *Go To Next Step* or using the sidebar. Both variants can be combined with each other at any time.

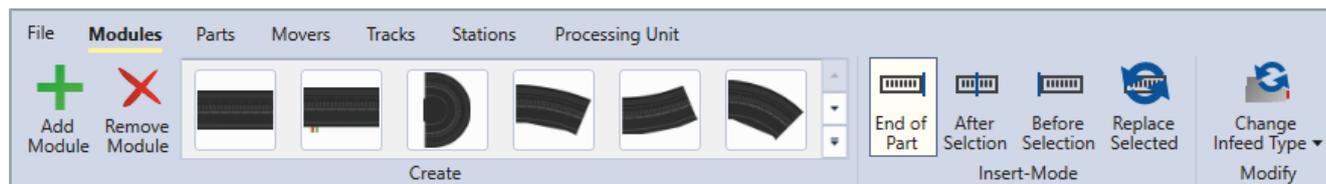


The individual steps are described using the variant with the buttons *Go To Next Step* as an example.



The page *Configure* opens.

## 8.2.3.1 Modules



The tab *Modules* contains all the functions for adding, removing, replacing or changing modules.

Existing modules can be selected by clicking on a single module, by clicking on several modules while holding down the Ctrl or Shift key or by clicking on all modules while holding down the Alt key.

## Controls

The list shows the most important controls:

**Add module**

Adds a module before or after the selection in the module list or replaces an existing module.

**Remove module**

Removes one or more selected modules.

**Modules drop-down menu**

Displays the available modules. The module type can be selected or added directly by double-clicking.

**Insert at the end of the part**

Activates the insertion of a new module at the end of the active part.

**Insert after selection**

Activates the insertion of a new module after the selected module. If several modules are selected, a new module is added after each module.

**Insert before selection**

Activates the insertion of a new module before the selected module. If several modules are selected, a new module is added before each module.

**Replace selection**

Activates the replacement of the selected module with a new module. If several modules are selected, each module is replaced by a new module.

**Infeed Type drop-down menu**

Displays the available infeed types and changes it for the selected module. If several modules are selected, all infeed types are changed.

## Add modules



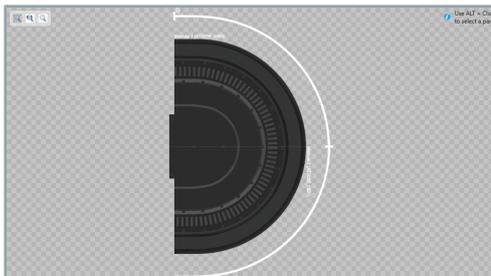
► Double-click on **AT2050-0500** to add the module to the XTS System View

OR

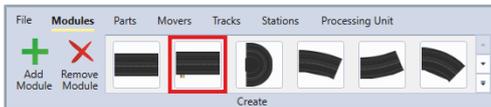
► Click on **AT2050-0500** to select the module



► Click **Add Module**



The module is displayed in the XTS System View.



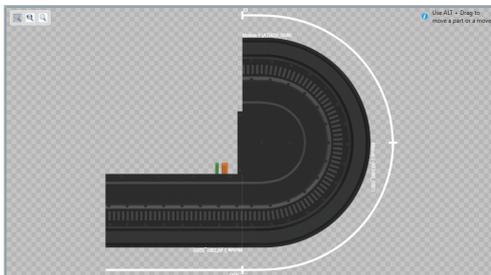
► Double-click on **AT2001-0250** to add the module to the XTS System View

OR

► Click on **AT2001-0250** to select the module



► Click **Add Module**



The module is displayed in the XTS System View.



► Double-click on **AT2000-0250** to add the module to the XTS System View

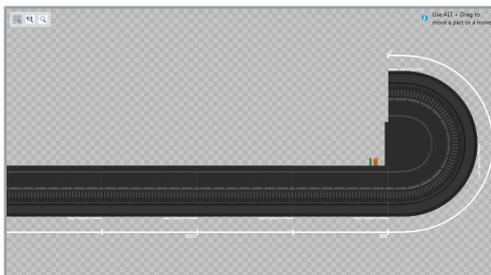
OR

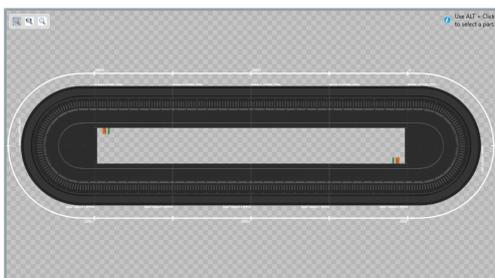
► Click on **AT2000-0250** to select the module

► Add three more modules **AT2000-0250** in the same way

The modules are displayed in the XTS System View.

► Add one module **AT2050-0500** and **AT2001-0250** and three modules **AT2000-0250** in the same order

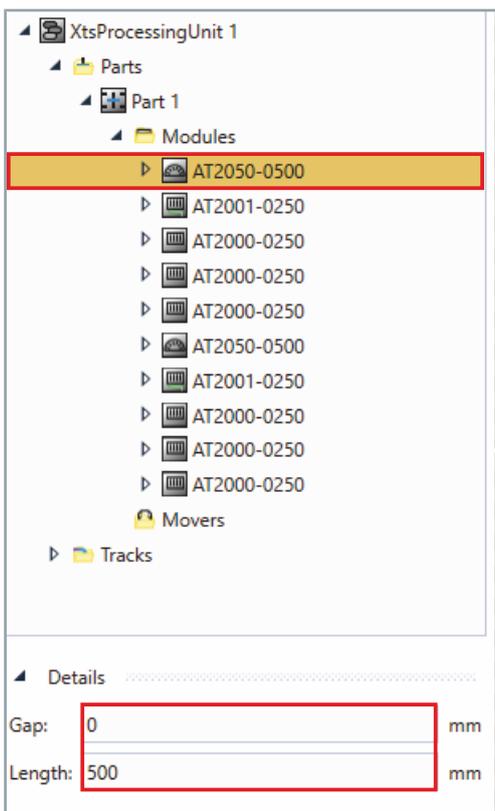




The system is closed and completed.

### 8.2.3.1.1 Check modules

You can click on the modules in the menu in the left-hand column to obtain further information.



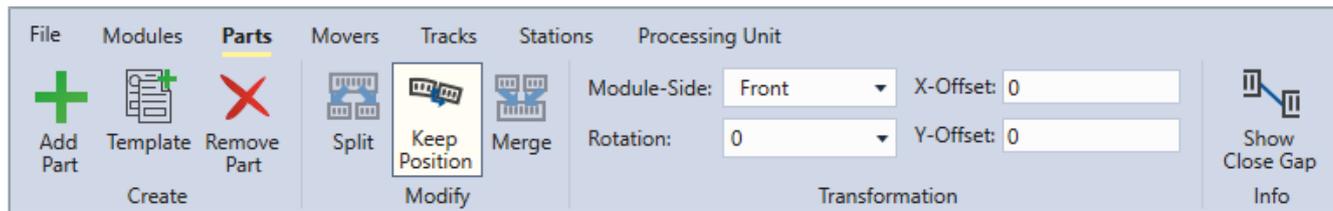
► Click on a **module**

The following information is displayed under *Details*:

- Gap
- Length of the selected module

Selected modules are highlighted in the list and in the *XTS System View*.

## 8.2.3.2 Parts



The *Parts* tab contains all settings and functions for creating and removing parts.

Parts can be selected by clicking on a single module, by clicking on several modules while holding down the Ctrl or Shift key or by clicking on all modules of a part while holding down the Alt key.

You can move parts in the coordinate system of the XTS view while pressing and holding the Alt key and the left mouse button. The X-coordinates and Y-coordinates are then automatically adjusted. Alternatively, you can move a part by changing the coordinates manually. With the function *Module-Side* you can choose between the front and rear view of the modules.

### Controls

The list shows the most important controls:



#### Add Part

Adds a part to the selected Processing Unit



#### Add from template

Opens the dialog box *Add part from template...* for inserting a part from a template.



#### Remove Part

Removes the selected part from the selected Processing Unit.



#### Split Part

Creates a separate part from the selected modules of a part.



#### Keep Position

Keeps the positions of the modules when splitting a part.



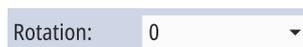
#### Merge Parts

Adds two selected parts to the first selected part.



#### Module-Side drop-down menu

Displays the selected module side and lists the available module sides.



#### Rotation drop-down menu

Allows you to select a preset angle between  $-180^\circ$  and  $180^\circ$  or enter your own value. The reference point is the first module of a part.



#### X-Offset input field

Allows you to enter an offset for the reference point of the first module of a part on the X coordinate.

Y-Offset: 0

**Y-Offset input field**

Allows you to enter an offset for the reference point of the first module of a part on the Y coordinate.



**Show Close Gap**

Shows the distance from the starting point to the end point of a part with a line. The exact distance of the X-coordinate and Y-coordinate are displayed as a tooltip when the mouse pointer is moved over the displayed value. If the button *Show Close Gap* is activated, all distances are also shown in the status bar.

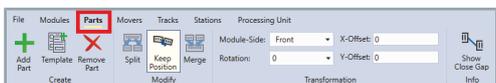
**Add Part**

All added modules are automatically assigned to a part. If required, the system can be split into several parts.



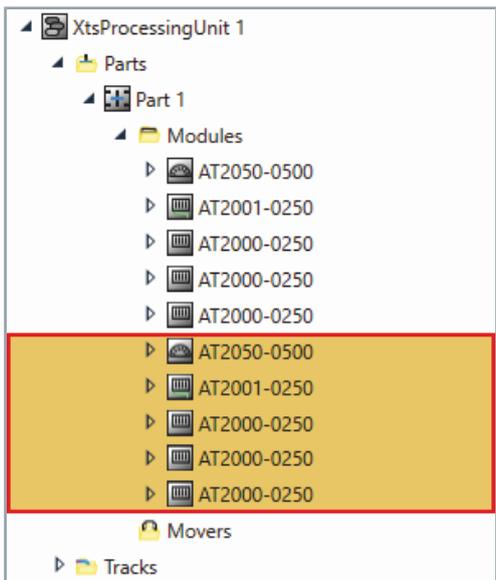
**Example configuration**

In this example configuration, one part is sufficient. The following description is for explanatory purposes only.

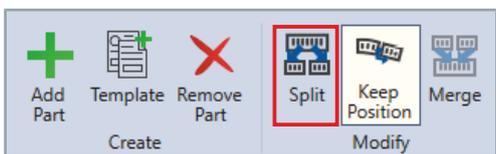


► Click on the tab **Parts**

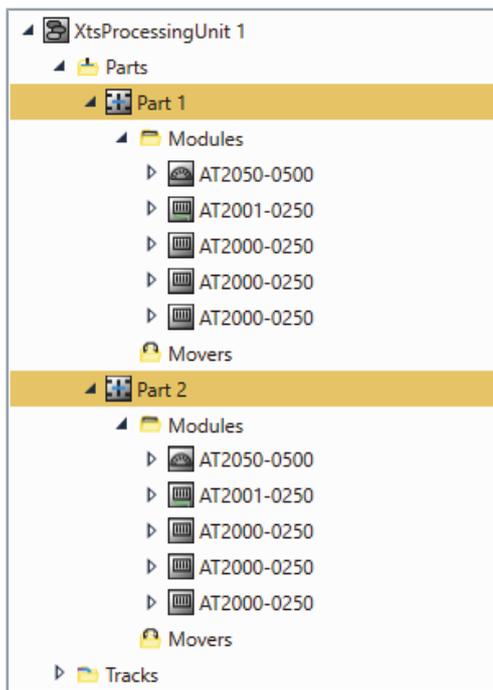
**Split the system into parts**



► Press and hold the button **Ctrl** to click on all modules that are to be added to a new part



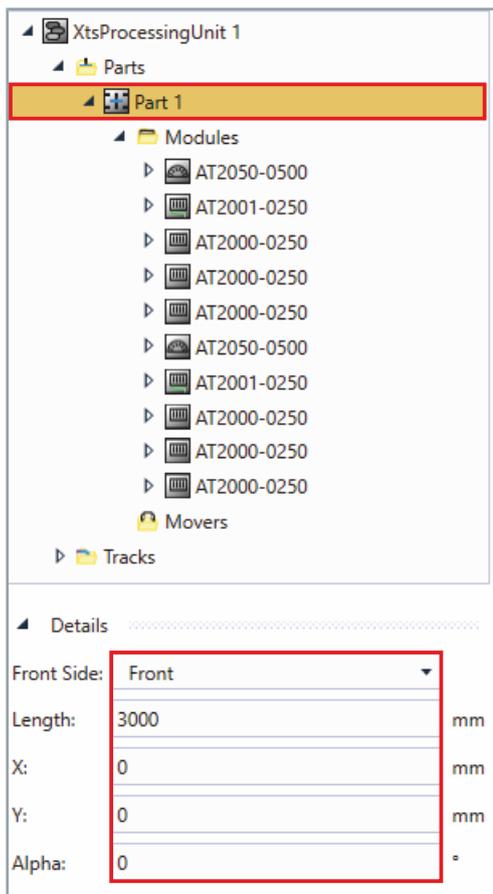
► Click on **Split**



The selected modules are removed from Part 1. A new Part 2 is added with the selected modules.

## Check parts

You can click on the parts in the menu in the left-hand column to obtain further information.



► Click on a part

The following information is displayed under *Details*:

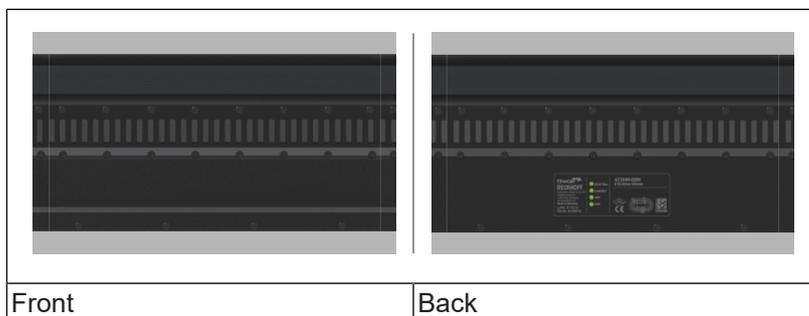
- Alignment in the coordinate system
- Position in the coordinate system

Selected parts are highlighted in the list and in the *XTS System View*.

## Set properties

You can select for each part whether the front or the back of the XTS modules is to be shown and how the position and installation position are to be displayed. With these properties, every possible view of an XTS system can be tested or adapted to your existing XTS system.

### Module side



Front

Back

Details

Front Side:

Length:  mm

X:  mm

Y:  mm

Alpha:  °

- ▶ Select the module side in the drop-down menu *Front Side*

Details

Front Side:

Length:  mm

X:  mm

Y:  mm

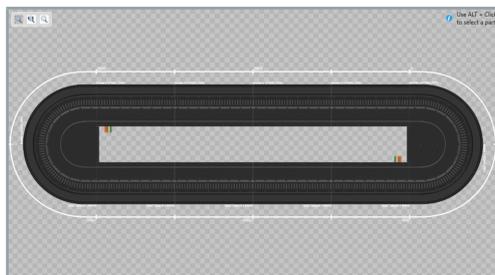
Alpha:  °

- ▶ Enter values for the position of the part in the input fields *X* and *Y*
- ▶ Enter the value for the installation position of the part in the *Alpha* input field



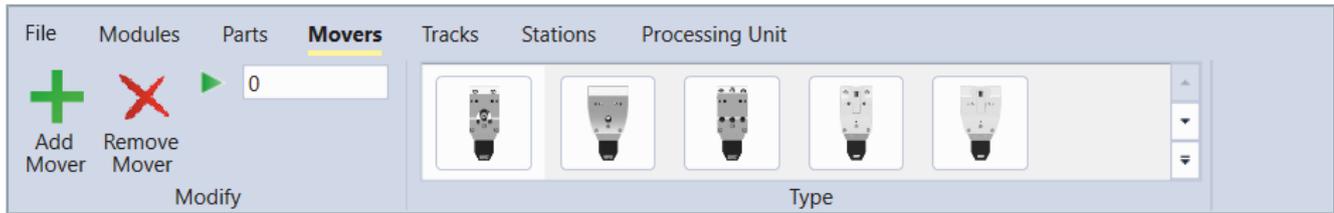
### Example configuration

In this example configuration, the part is positioned in the center of the XTS System View, the front is selected as the view, and the installation position is left at 0°.



- ▶ Press and hold the left mouse button and the **Alt** key to move the part into the correct position

## 8.2.3.3 Movers



The tab *Movers* contains all the functions for adding, removing, replacing or changing movers.

Movers can be selected by selecting a single mover, by selecting several movers while holding down the Ctrl or Shift key or by selecting all movers while holding down the Alt key.

### Controls

The list shows the most important controls:



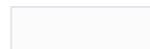
#### **Adding movers**

Adds a mover.



#### **Remove Mover**

Removes the selected mover(s).



#### **Input field number of movers**

Allows you to enter the required number of movers.



#### **Apply number**

Applies the number from the input field.

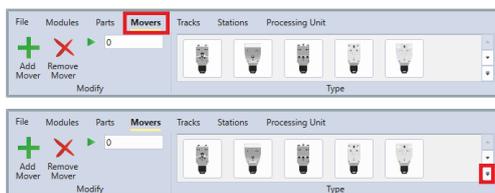


#### **Mover selection drop-down menu**

Displays the available mover types and allows you to select the mover type.

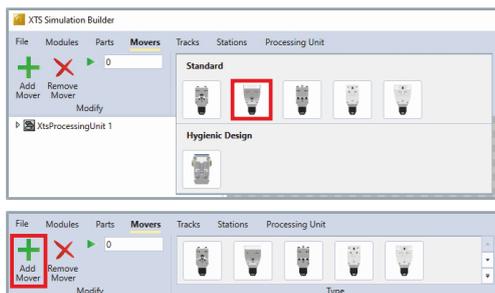
## Adding movers

You have the option of adding a single mover or several movers at the same time.



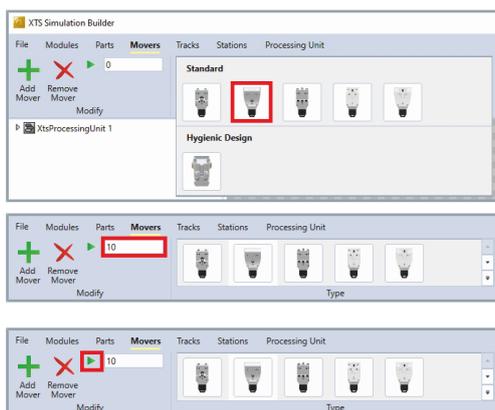
- ▶ Click on the tab **Movers**
- ▶ Expand the drop-down menu if required

## Single movers

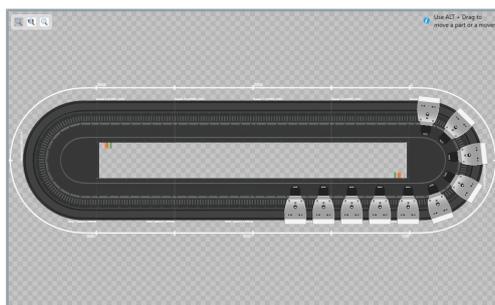


- ▶ Double-click on **AT9011-0070**, to add the mover to the XTS System View
- OR
- ▶ Click on **AT9011-0070** to select the mover
- ▶ Click on **Add Mover**
- ▶ Add more movers in the same way

## Multiple movers



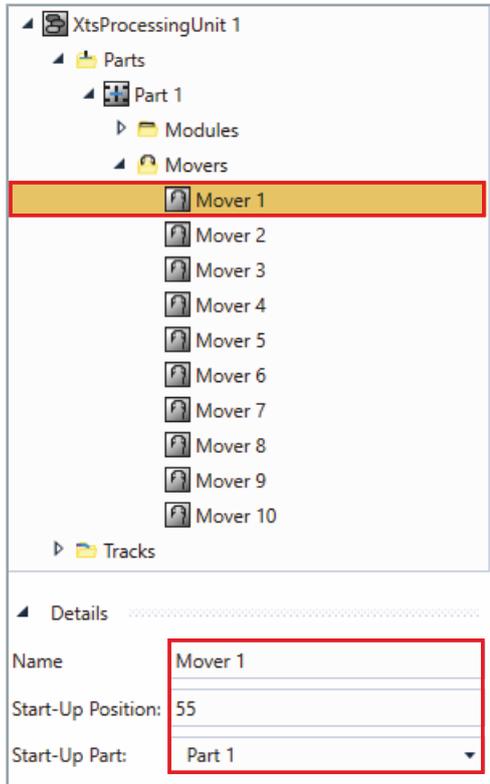
- ▶ Click on **AT9011-0070** to select the mover
- ▶ Enter the number of movers in the input field *Edit the Mover Count of the active Part*
- ▶ Click on the button **Apply** to add the number of movers



The movers are added to the system.

## Check movers

You can click on the movers in the menu in the left-hand column to obtain more detailed information.



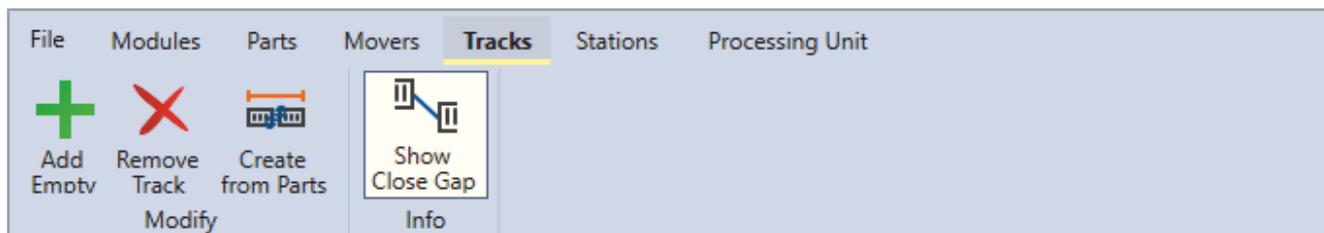
### ► Click on a **Mover**

The following information is displayed under *Details*:

- Name of the mover
- Start position of the mover
- Part on which the mover starts

Selected movers are highlighted in the list and in the XTS System View.

## 8.2.3.4 Tracks



The tab *Tracks* contains all the functions for adding and removing tracks.

You can select the tracks from the list. The parts and modules of the track are then marked with a green line.

## Controls

The list shows the most important controls:

**Add empty track**

Adds an empty track.

**Remove Track**

Removes the selected track.

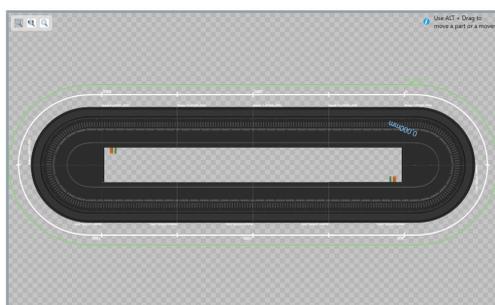
**Create track**

Creates a track from the selected parts. The order of the parts within the track is defined by the order in which the parts are selected

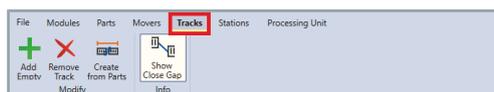
**Show Close Gap**

Shows the distance from the starting point to the end point of a part with a line. The exact distance of the X-coordinate and Y-coordinate are displayed as a tooltip when the mouse pointer is moved over the displayed value. If the button *Show Close Gap* is activated, all distances are also shown in the status bar.

## Add Track



All added parts are automatically assigned to a track. If required, a system with several parts can be split into several tracks.



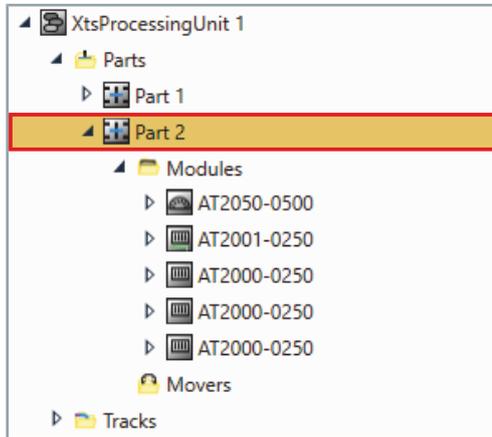
► Click on the tab **Tracks**

## Split system into tracks

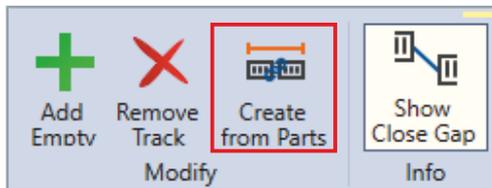


### Example configuration

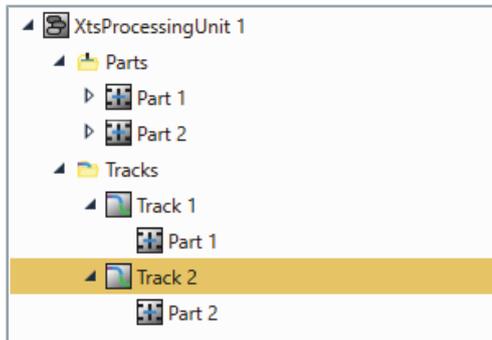
In this example configuration, one track is sufficient. The following description is for explanatory purposes only.



- ▶ In the menu or in the XTS System View, click on all parts that are to be added to a new track



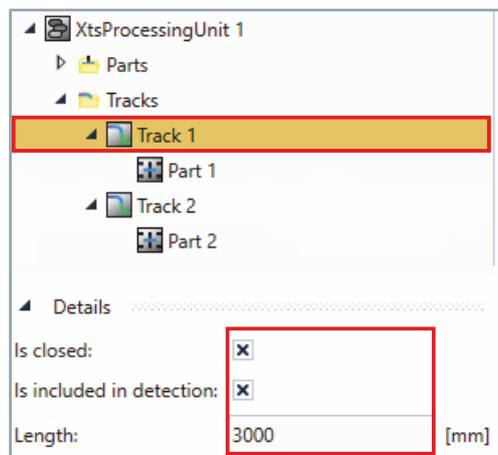
- ▶ Click on **Create from Parts**



A second track with the selected part is added.

## Check tracks

You can click on the tracks in the menu in the left-hand column to obtain more detailed information.



### ► Click on a **track**

The following information is displayed under *Details*:

- Length of the track
- Closed or open system
- included in mover detection or not

The selected track is displayed with a green line in the XTS System View.

## Set properties

### NOTICE

#### **Avoid damage to the product and functional errors**

Be sure to correctly specify whether you are configuring a closed XTS system or an XTS system with defined endpoints.

*If the specification is incorrect, the movers may leave the XTS system if the XTS system is open. In the case of a closed XTS system with incorrect specification, the movers cannot travel in a circle as usual.*

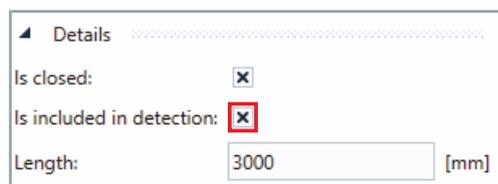


- Activate the checkbox **Is closed** so that the movers can move around the start/end position of the track

OR

- Deactivate the checkbox **Is closed**

For systems without Track Management or systems with only one track, the checkbox *Is included in detection* must always be activated.

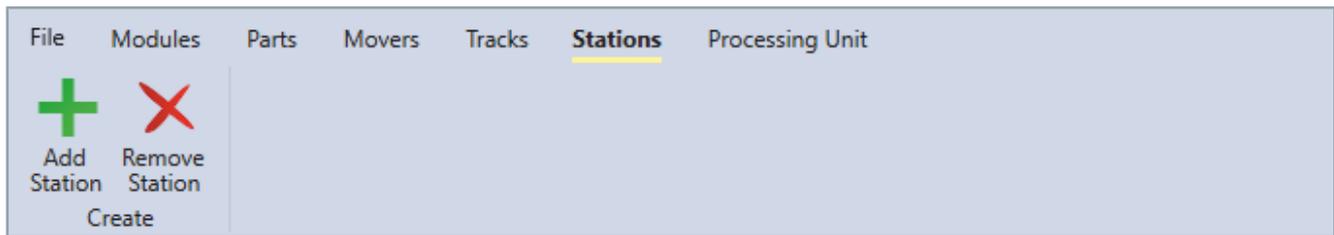


- Activate the checkbox **Is included in detection** so that all movers are detected by a module that belongs to the part of this track

OR

- Deactivate the checkbox **Is included in detection**

## 8.2.3.5 Stations



The *Stations* tab contains all the functions for adding and creating stations.

### Controls

The list shows the most important controls:



#### Add Station

Adds a station.



#### Remove Part

Removes the selected station.

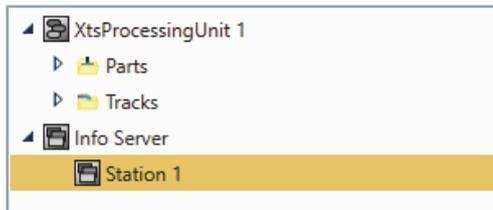
### Add Station



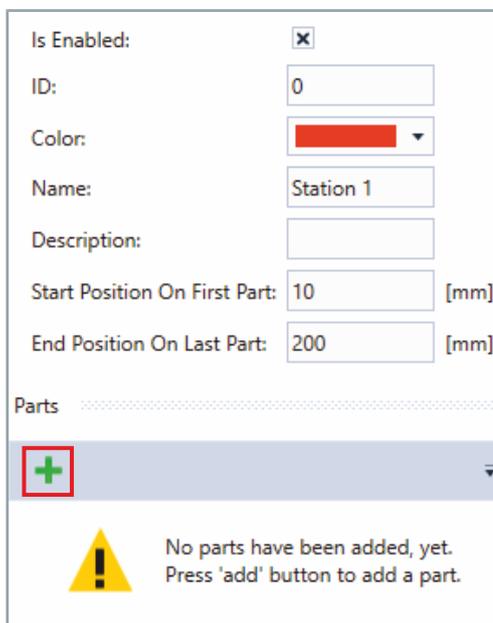
► Click on the tab **Stations**



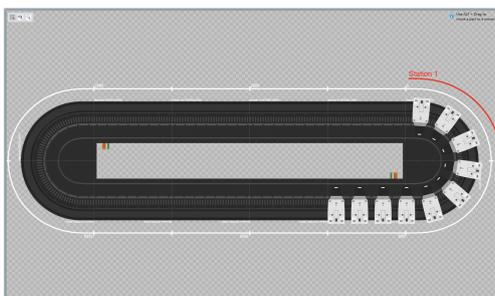
► Click on **Add Station**



A station is added to the system.



► Click on **Add Part** over which the station should be drawn to add a part to the station



The station is displayed in color in the XTS System View.

### Adding stop positions

**Details**

Is Enabled:

ID:

Color:

Name:

Description:

Start Position On First Part:  [mm]

End Position On Last Part:  [mm]

**Parts**



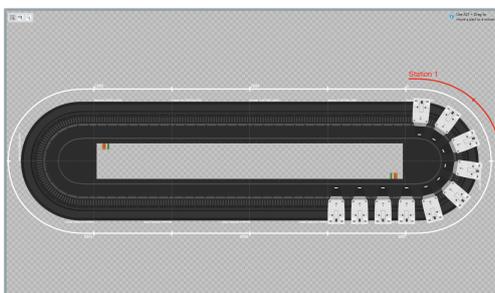
**Stop Positions**

► Click on **Add stop position** to add a stop position

**Stop Positions**

  [mm]

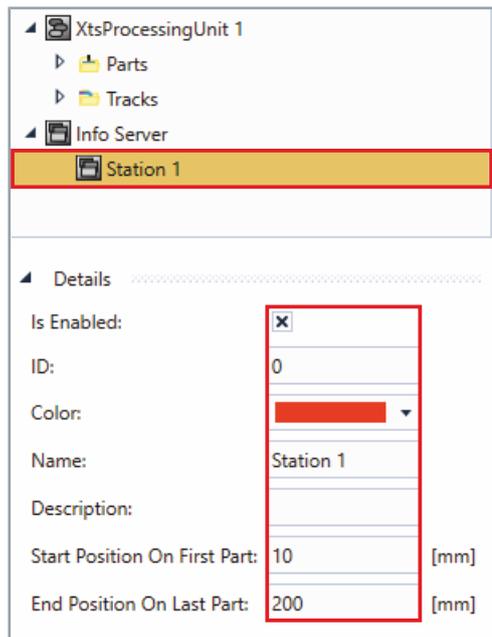
► Enter a value for the stop position in the input field



The stop position is displayed as a diamond on the line of the station.

## Check station

You can click on the stations in the menu in the left-hand column to obtain further information.



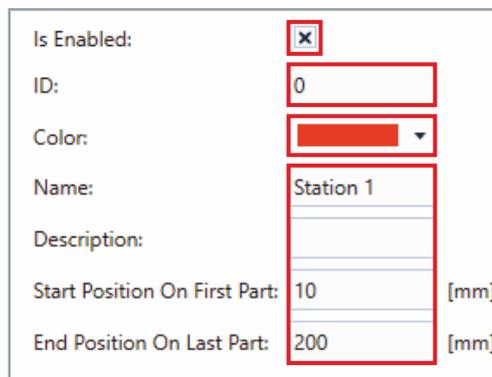
### ► Click on a **station**

The following information is displayed under *Details*:

- Enabled or disabled
- ID of the station
- Color of the station
- Name of the station
- Description of the station
- Start position
- End position

The properties of the selected station are displayed under the menu.

## Set properties



### ► Activate the checkbox **Is enabled** to show the station

OR

### ► Deactivate the checkbox **Is enabled** to hide the station

### ► Enter a value in the input field *ID*

### ► Choose a color from the drop-down menu *Color*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

### ► Enter a name for the station in the input field *Name*

### ► If required, enter a short description of the station in the *Description* input field

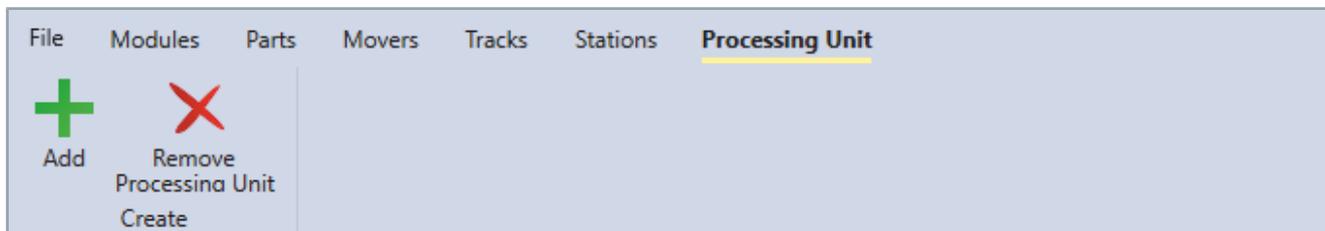
### ► Enter a value in the input field *Start Position On First Part*

### ► Enter a value in the input field *End Position On Last Part*

### 8.2.3.6 Processing Unit

The tab *Processing Unit* contains all settings and functions for creating and removing Processing Units.

*Processing Units* can be selected by clicking on them in the list. *Processing Unit* settings can be edited directly below the list after selection and important information are displayed.



#### Controls

The list shows the most important controls:



#### Add Processing Unit

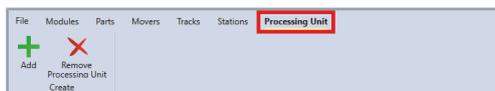
Adds a Processing Unit.



#### Remove Processing Unit

Removes the selected Processing Unit.

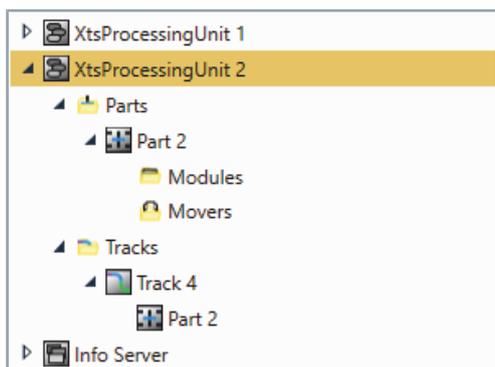
#### Add Processing Unit



► Click on the tab **Processing Unit**



► Click on **Add**

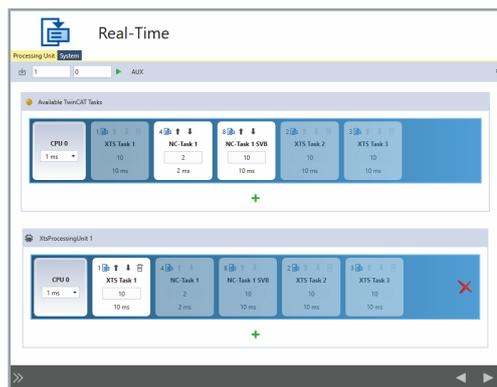


A Processing Unit is added to the system.



► Click on the button **Go To Next Step** to continue

## 8.2.3.7 Real-Time



In the last step, the real-time settings for the XTS system can be made.

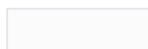
### Controls

The list shows the most important controls:



#### Load target CPU

Loads a new target CPU and overwrites existing CPUs.



#### Input field Number of CPUs

Allows you to enter the number of CPUs required.



#### Input field Number of isolated CPUs

Allows you to enter the number of isolated CPUs.



#### Apply number

Applies the number from the input field.

AUX

#### AUX Task display

Displays the configuration of the AUX task.



#### Move CPU upwards

Moves the selected task up one CPU.



#### Move CPU downwards

Moves the selected task down one CPU.



#### Remove task

Removes the selected task from the CPU.

Processing Unit System

#### Processing Unit and System button

Switches between the Processing Unit and System.



#### Add Processing Unit or TwinCAT System Task

Adds a Processing Unit or a TwinCAT System Task.



#### Remove Processing Unit

Removes the selected Processing Unit.



#### Open sidebar

Opens the sidebar.

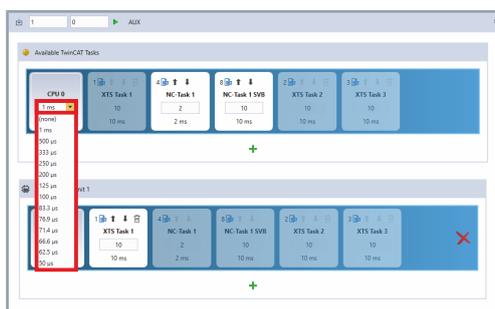
⏪ **Close sidebar**  
Closes the sidebar.

⏮ **Button Go To Previous Step**  
Opens the previous page.

⏭ **Button Go To Next Step**  
Opens the next page.

## Real-time settings

You have the option of making settings for the available TwinCAT tasks and the Processing Units.



► Select a value in the drop-down menu *Base Time* of the CPU

The set value is adopted for the task connected to the CPU and the number of cycle ticks is adjusted accordingly. Further information can be found in chapter "Real-Time", [Page 305].

If all settings have been made correctly, you can go to *Generation Settings*.



► Click on the button **Go To Next Step** to continue

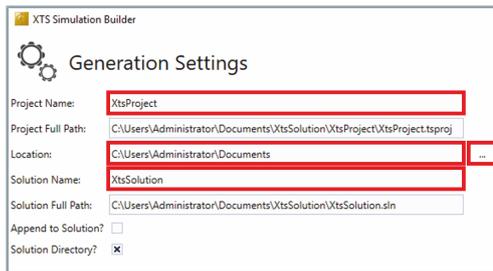
## 8.2.3.8 Generation settings

Finally, you can make general settings for I/O generation. For example, you can choose whether a new project or a new Solution should be created. You can also integrate the I/O objects into an existing project.

The generation settings of the *XTS Simulation Builder* help you to transfer the I/O configuration to an existing project or to generate a new TC3 XAE project and a solution in Visual Studio.

If a TC3 project is already open, the option *Modify TwinCAT Project* is available to add the I/O devices of the configured XTS system to the existing project.

There are several options that can be selected when creating the new project:



- ▶ Enter a name in the input fields *Project Name* and *Solution Name*

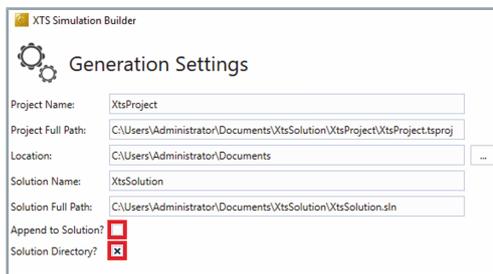
By default, the names *XtsProject* and *XtsSolution* are preset.

*Project Full Path* and *Solution Full Path* specify the exact path where the files are located after creation. These paths cannot be edited and are only used for a better overview.

- ▶ Enter a file path in the input field *Location*

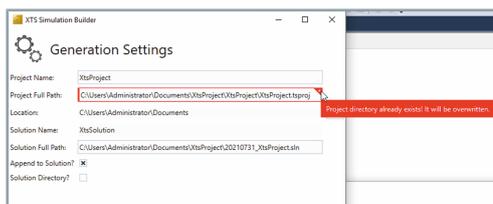
OR

- ▶ Click on ... to open the *Project Location* dialog box and select a file path



- ▶ Activate the checkbox **Append to Solution?** to create a Solution
- ▶ Activate the checkbox **Solution Directory?** to add the project to an existing Solution

If none of the options are selected, the project and the Solution are in the same directory.



If errors occur when creating the Solution or project with the specified settings, the input fields with incorrect entries are highlighted in red.

In this example, the Solution from the specified directory is to be appended. A warning appears as there is already a project and a Solution with the same name. If you continue with the creation, the existing files will be overwritten.

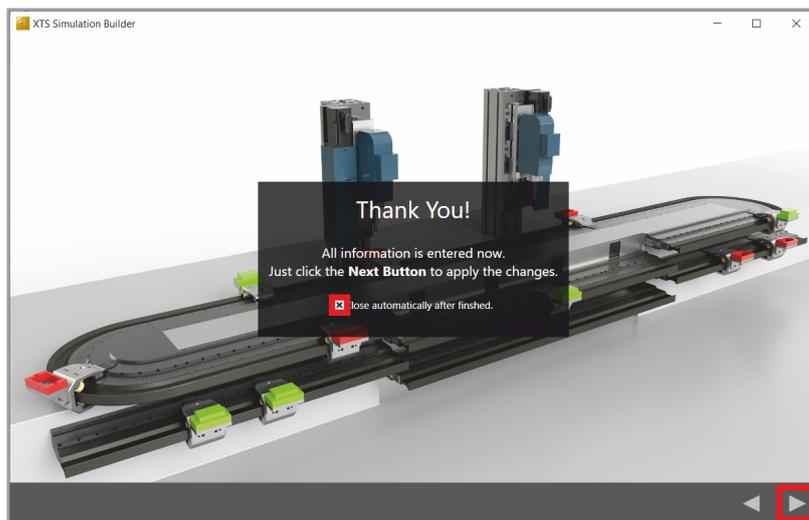
If all settings have been made correctly, you can create the Solution or project.



- ▶ Click on the button **Go To Next Step** to continue

## 8.2.3.9 Completing the configuration

On the next page, you will see that all the information has been entered and that the *XTS Simulation Builder* can generate the I/O objects.



- ▶ Click on the button **Go To Next Step** to continue

If the checkbox *Close automatically after finished* is deactivated, the page *Finished* is displayed.

- ▶ Click on **x** to close the *XTS Simulation Builder*

The *XTS Simulation Builder* closes. The I/O objects are created and the project is ready for use.

## 8.2.3.10 Sidebar

The sidebar can be expanded on every page of the *XTS Simulation Builder*. The sidebar provides an overview of the pages of the *XTS Simulation Builder* and can be used to navigate between the pages.

### Controls

The list shows the most important controls:



#### Open sidebar

Opens the sidebar.



#### Close sidebar

Closes the sidebar.

Load Project ✓

#### Project loaded

Indicates that the project has been loaded. This button cannot be clicked.

Welcome ⚙️

#### Start page

Displays the start page of the *XTS Simulation Builder*.

Configure  
Configure the desired XTS

#### Button Configure

Opens the page *Configure* to configure the desired system.

Real-Time  
Edit the real time configuration.

#### Button Real-Time

Opens the page *Real-Time* to edit the real-time settings.

Generation Settings  
Configure project name & target folder.

#### Button Generation Settings

Opens the page *Generation Settings* to edit the generation settings.

Summary

#### Button Summary

Opens the page *Summary*. The checkbox *Close automatically after finished* can be activated or deactivated.

Build  
Build the project.

#### Button Build

Applies all settings and builds the configuration.

Closes the *XTS Simulation Builder*.

Finished

#### Page Finished

Indicates that all settings have been applied and the configuration is finished. This page is only displayed if the checkbox *Close automatically after finished* is deactivated.



#### Display Page open

Indicates that the page has been opened and exited with a button in the sidebar.

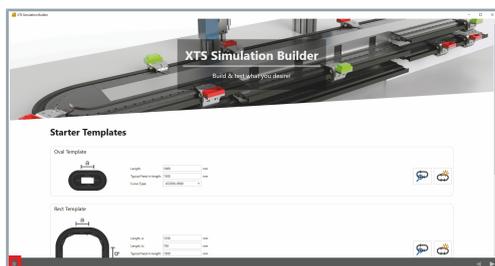


#### Display Page edited

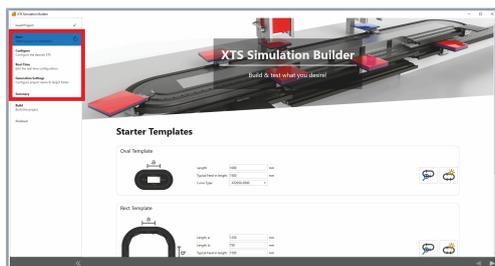
Indicates that the page has been opened and exited with the button *Go To Next Step*.

### Navigation

Instead of navigating with the buttons *Go To Next Step* and *Go To Previous Step*, you have the option of opening the sidebar and navigating between the individual pages of the *XTS Simulation Builder* using the buttons.



- ▶ Click on the button to open the sidebar



The sidebar opens. You can use the buttons to navigate between the pages of the *XTS Simulation Builder*:

- ▶ Click on a button to call up the corresponding page

## Completing the configuration



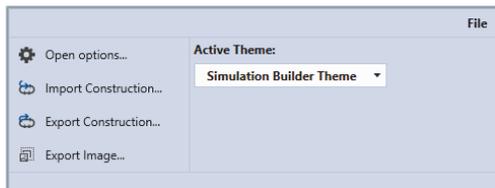
- ▶ Click on the button **Build** to build the configuration

OR

- ▶ Click on the button **Go To Next Step** to continue

The configuration is built and the *XTS Simulation Builder* closes.

## 8.2.4 File



The *File* tab contains all general settings for the *XTS Simulation Builder*, such as options and theme settings.

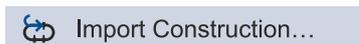
### 8.2.4.1 Controls

The list shows the most important controls:



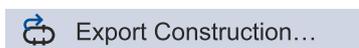
#### Options

Opens the dialog box *Options...*



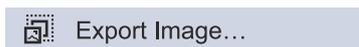
#### Import Construction

Opens the dialog box *Import Construction...* for importing an existing xml system construction.



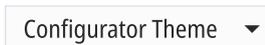
#### Export Construction

Opens the dialog box *Export Construction...* for exporting the current system construction as an xml file.



#### Export Image

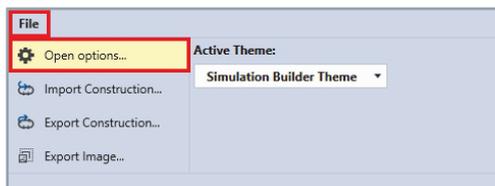
Opens the dialog box *Export Image...* for exporting the system construction as a png file.



#### Theme drop-down menu

Displays the selected theme and lists the available themes.

### 8.2.4.2 Open Options... dialog box



- ▶ Click on the **File** tab
- ▶ Click on **Open options...**

The dialog box *Options...* opens.

Further information can be found in chapter "Dialog box Options...", [Page 353].

### 8.2.4.3 Import system construction

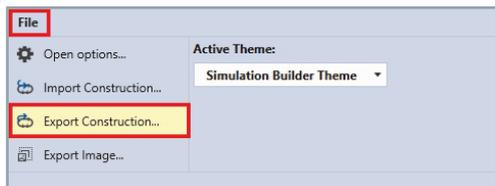


- ▶ Click on the **File** tab
- ▶ Click on **Import Construction...**

The dialog box *Import Construction...* opens.

- ▶ Select an xml file on the PC
- ▶ Click **Open**

### 8.2.4.4 Export system construction



- ▶ Click on the **File** tab
- ▶ Click on **Export Construction...**

The dialog box *Export Construction...* opens.

- ▶ Enter a name in the input field *Filename*
- ▶ Select a file path on the PC
- ▶ Click **Save**

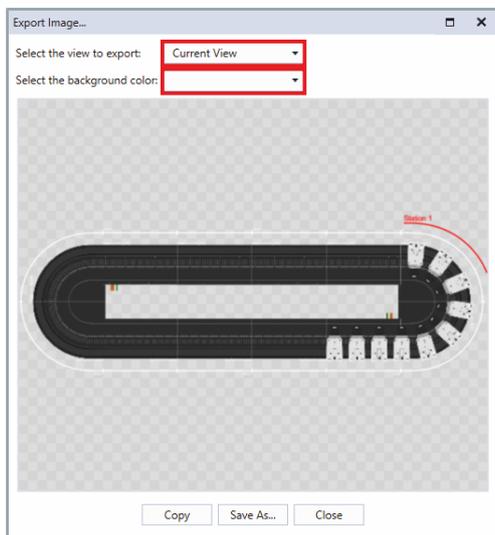
The current system construction is saved as an xml file on your PC.

### 8.2.4.5 Export Image

You have the option of exporting current views.



- ▶ Click on the **File** tab
- ▶ Click on **Export Image...**



The dialog box **Export Image...** opens.

- ▶ Select **Current View** in the drop-down menu *Select the view to export* to save only one view of the system without borders

OR

- ▶ Select **Full View** in the drop-down menu *Select the view to export* to save the entire view
- ▶ If required, select a color for the background in the drop-down menu *Select the background color*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

- ▶ Click on **Copy** to copy the view to the clipboard

OR

- ▶ Click on **Save As...** to save the view as a png image and select the storage location

OR

- ▶ Cancel with **Close**

## 8.3 XTS Configurator

The new user interface of the XTS software simplifies the work and handling of the ever larger and more sophisticated track layouts implemented with XTS. The simple pictorial structure makes a decisive contribution to fast commissioning and intuitive operation. A large number of XTS systems can be set up very easily, regardless of length, shape or variant. The new configurator replaces the XTS Manager, which was integrated in the XTS IO Driver object in the previous software version.

A main aim of the XTS software is to support the Track Management function. Using this function, you can split the XTS system into individual sections, which you then join together to form continuous tracks. This gives you the possibility to mechanically align individual sections in different ways and thus use the movers more flexibly on the XTS system.

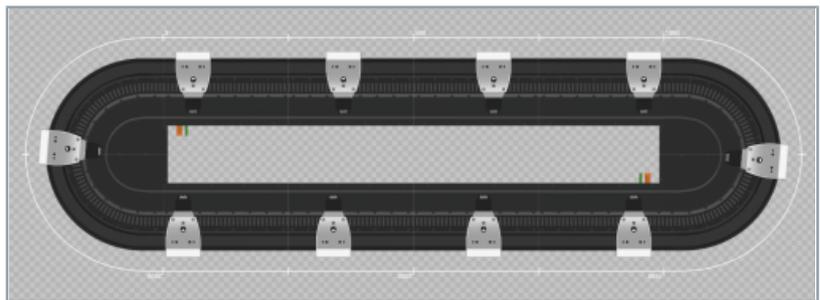


### Example presentation

This chapter shows the individual steps of the *XTS Configurator*. If there is a different procedure between a closed XTS system and an XTS system with Track Management, this is indicated in the text.

The individual steps of the *XTS Configurator* are shown as examples for the following two XTS systems:

#### Closed XTS system



A closed XTS system with 180° clothoids and ten movers, corresponding to the configuration of a 3 m XTS starter kit.

#### XTS system with Track Management



XTS Track Management with four parts and six movers.

The difference between these two configurations of an XTS system is that in a closed XTS system the order of modules and movers always remains constant. The movers thus have only one possible track on which they can move.

In an XTS system with Track Management, modules can change their position and align with other modules. Thus, the order of modules and movers can be changed, as new tracks can be formed. To be able to keep the overview of these functions, the parts and tracks have been introduced.

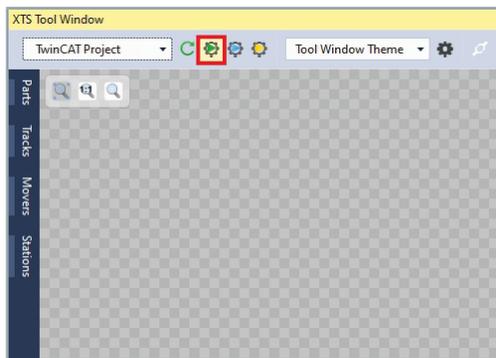
The part is the physical hardware component on which the mover travels, comparable to a road section for a car. The Track, on the other hand, is the actual path that the mover follows. The path is created by assembling the individual hardware components. In comparison with the car, a possible route with different roads is created. Further information can be found in chapter "Basic principles", [Page 26].

Parts and tracks are objects that can be created in the TwinCAT project using the *XTS Configurator*. A simple XTS system can be created with only one part and one track for all movers. More complex XTS systems can consist of several Parts that are joined together to form different tracks. This opens up completely new possibilities for handling XTS components.

## 8.3.1 Open XTS Configurator

Before you open the *XTS Configurator*, you must create a project, check your hardware, connect the system to the target PC and scan the I/O devices. Further information can be found in chapter "Commissioning", [Page 198].

- ▶ Activation of the XTS Tool Window
- ▶ Further information can be found in chapter "XTS Tool Window", [Page 224].



- ▶ Click on the button **Start the XTS Configurator...**



The *XTS Configurator* opens.

- ▶ If necessary, enlarge window for better operability
- ▶ Click on the button **Go To Next Step** to continue

OR

- ▶ Click on the button >> to expand the sidebar

Further information can be found in chapter "Sidebar", [Page 312].



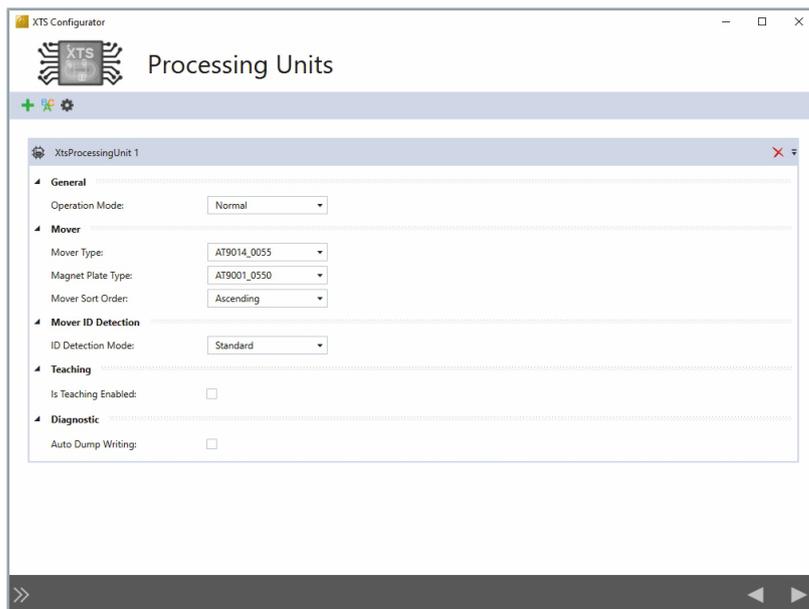
### Navigation with buttons or the sidebar

The pages can be accessed using the buttons *Go To Previous Step* and *Go To Next Step* or using the sidebar. Both variants can be combined with each other at any time.



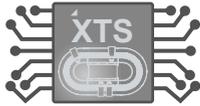
The individual steps are described using the variant with the buttons *Go To Next Step* as an example.

## 8.3.2 System configuration



The *Processing Unit* page opens.

## 8.3.2.1 Processing Units



On the first page of the *XTS Configurator*, the Processing Unit is created. To get an overview, it is possible to filter the objects of the Processing Unit.

Since software version 3.21.700, the Processing Unit has replaced the XTS IO Driver object.

### Controls

The list shows the most important controls:



#### **Add Processing Unit**

Adds a Processing Unit.



#### **Naming Assistant**

Opens the dialog box *Rename...*



#### **Options**

Opens the dialog box *Options...*



#### **Remove Processing Unit**

Removes the selected Processing Unit.



#### **Open sidebar**

Opens the sidebar.



#### **Close sidebar**

Closes the sidebar.



#### **Button Go To Previous Step**

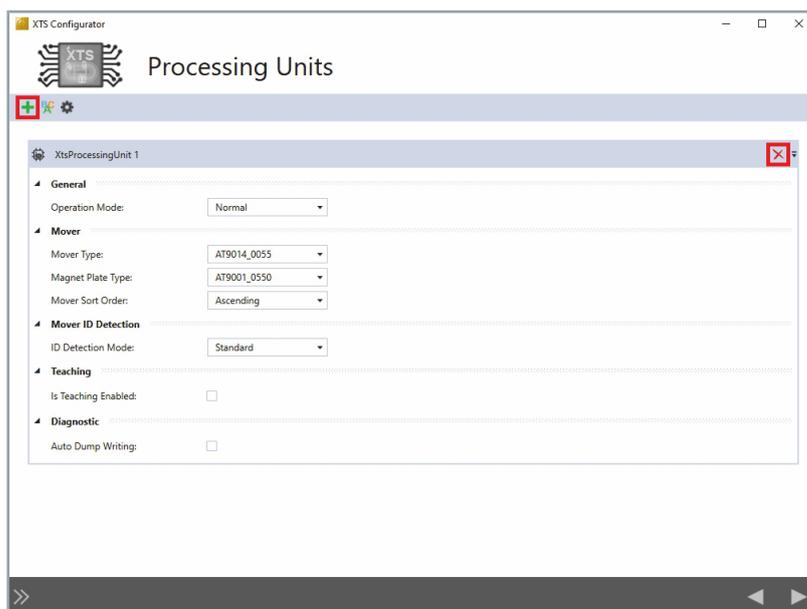
Opens the previous page.



#### **Button Go To Next Step**

Opens the next page.

## Add Processing Unit



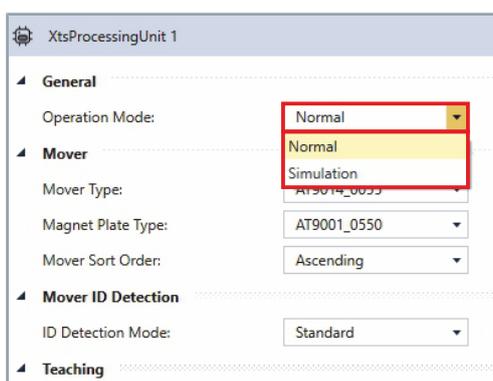
- ▶ Click the button **+** to add another Processing Unit
- ▶ If necessary, click the button **x** to remove a selected Processing Unit



In this example configuration, one Processing Unit is sufficient. Multiple Processing Units are used when there is more than one independent system on the IPC or in the project. Independent means that none of the modules or movers are used by another XTS system.

The following settings must be made for the Processing Unit:

## Operation Mode

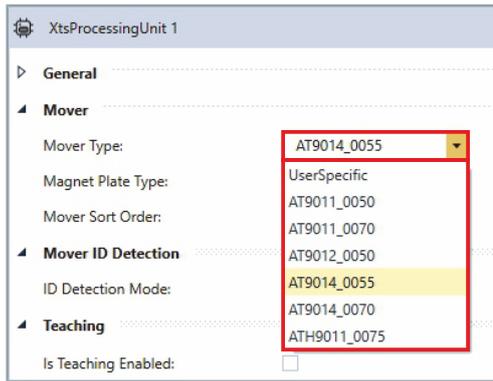


- ▶ Expand *General*
- ▶ Select **Normal** in the drop-down menu *Operation Mode* to specify that the system is in operation

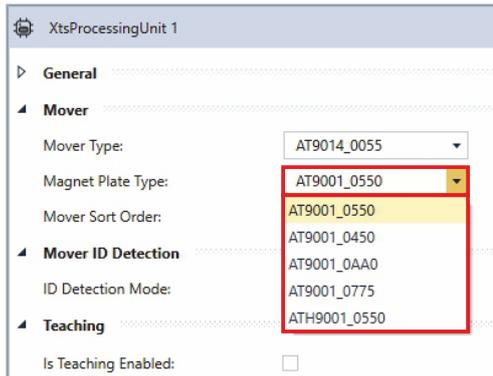
OR

- ▶ Select **Simulation** in the drop-down menu *Operation Mode* to specify that the system runs in simulation mode

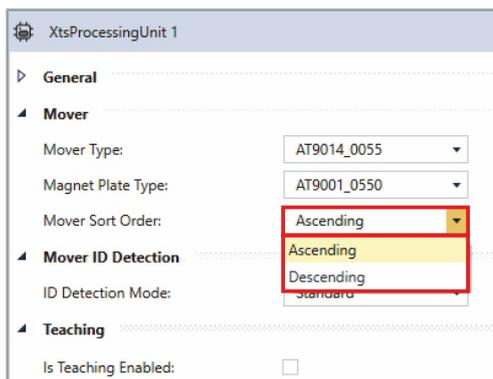
## Mover



- ▶ Expand *Mover*
- ▶ Select the mover type in the drop-down menu *Mover Type*



- ▶ Select the magnetic plate set in the drop-down menu *Magnet Plate Type*

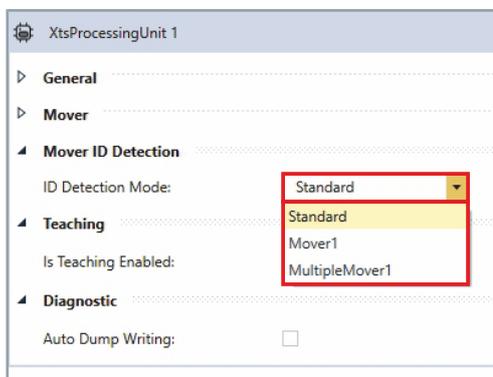


- ▶ Select **Ascending** in the drop-down menu *Mover Sort Order* if the movers are to be counted in ascending order from the system zero point

OR

- ▶ Select **Descending** in the drop-down menu *Mover Sort Order* if the movers are to be counted in descending order from the system zero point

## Mover ID detection



- ▶ Expand *Mover ID Detection*
- ▶ Select the number of Movers 1 in the drop-down menu *ID Detection Mode*

## Teaching



### Note the revision number on the module

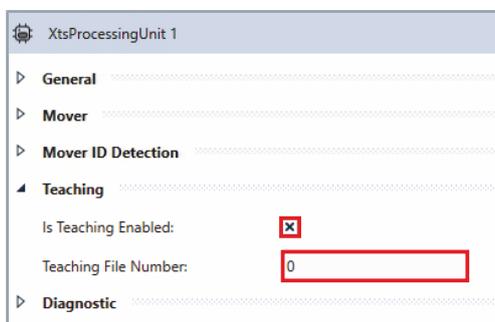
Teaching is only required for modules with a revision level less than or equal to 17. For more information, refer to the chapter "Name plate" in the *XTS Standard* original operating instructions.



### Change teaching file number

Always change the number of the teaching file before commencing with a new teaching. The old file will be used and overwritten if the number of the teaching file is not changed or if the configuration is not loaded.

Beckhoff recommends using the current date for the number of the teaching file. For the first teaching on April 3rd, 2021, for example, the numbers 202104031 could be used and for the second teaching on the same day the numbers 202104032 and so on.



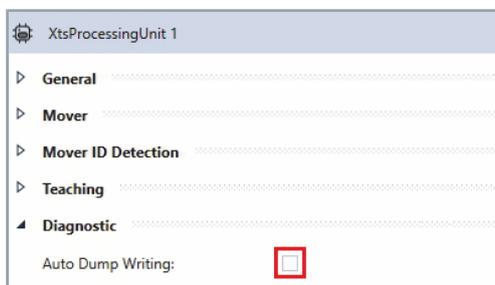
- ▶ Expand *Teaching*
- ▶ Activate the checkbox **Is Teaching Enabled** to display the input field *Teaching File Number*

OR

- ▶ Deactivate the checkbox **Is Teaching Enabled** to hide the input field *Teaching File Number*
- ▶ Enter a number in the input field *Teaching File Number*

Further information can be found in chapter "Teaching functionality", [Page 115].

## Diagnostic

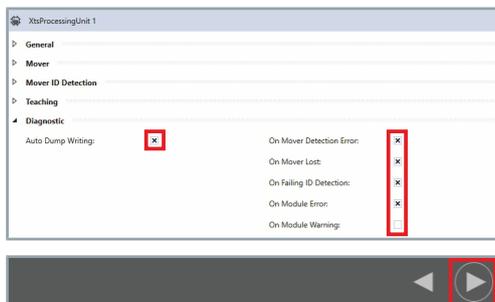


- ▶ Expand *Diagnostic*
- ▶ Activate the checkbox **Auto Dump Writing** to activate the automatic writing of dump files

OR

- ▶ Deactivate the checkbox **Auto Dump Writing** to switch off the automatic writing of dump files

If the *Auto Dump Writing* is activated, you can specify in which cases a dump file should be written.



- ▶ Activate the checkboxes **On Mover Detection Error**, **On Mover Lost**, **On Failing ID Detection**, **On Module Error** and **On Module Warning** to write a dump file

OR

- ▶ Activate the checkboxes **On Mover Detection Error**, **On Mover Lost**, **On Failing ID Detection**, **On Module Error** and **On Module Warning** to avoid writing dump files

- ▶ Click on the button **Go To Next Step** to continue

## 8.3.2.2 Parts



After you have created the Processing Unit and added a Task, the next step is to add parts.

A closed XTS system usually consists of a single part. For an XTS system with Track Management, several parts are required.

### Controls

The list shows the most important controls:



#### Filter Processing Unit

Filters the list based on the selected Processing Unit.



#### Processing Unit drop-down menu

Displays the selected Processing Unit and lists the available Processing Units.



#### Add Part

Adds a part to the selected Processing Unit.



#### Remove Part

Removes the selected part from the selected Processing Unit. The part remains in the list of available parts.



#### Naming Assistant

Opens the dialog box *Rename...*



#### Options

Opens the dialog box *Options...*



#### Theme drop-down menu

Displays the selected theme and lists the available themes.



#### Button Parts and Modules

Switches between the display of parts and modules.



#### Zoom window width

Scales the view to the window width.



#### Zoom original size

Scales the view to the preset original size.



#### Custom zoom

Scales the view to the custom size.



#### Open sidebar

Opens the sidebar.



#### Close sidebar

Closes the sidebar.

**Button Go To Previous Step**

Opens the previous page.

**Button Go To Next Step**

Opens the next page.

Controls in the *Parts* tab**Add device**

Opens the dialog box *Choose Devices for Part...* and shows the available infeed lines.

**Remove device**

Removes the selected device from the selected part. The device remains available in the list of available devices.

**Move device upwards**

Moves the selected device up one level.

**Move device downwards**

Moves the selected device down one level.

Controls in the dialog box  
*Choose Devices for Part...***Filter Devices**

Only shows available devices in the list.

**Filter infeed line**

Only shows available infeed lines in the list.

**Filter module**

Only shows available modules in the list.

OK

**Button OK**

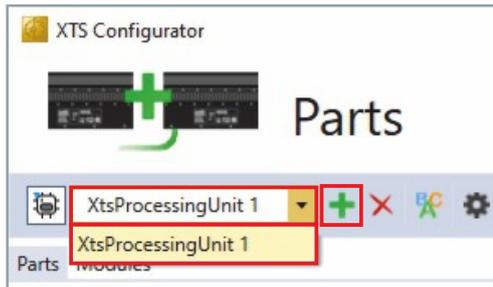
Confirms the entries and closes the dialog box.

Cancel

**Button Cancel**

Closes the dialog box without saving the entries.

## Add Part



- ▶ In the drop-down menu *XTS Processing Unit* select the Processing Unit to which a Part is to be added
- ▶ Click + button to add a new part
- ▶ If required, click on the x button to remove a selected part

## Filter

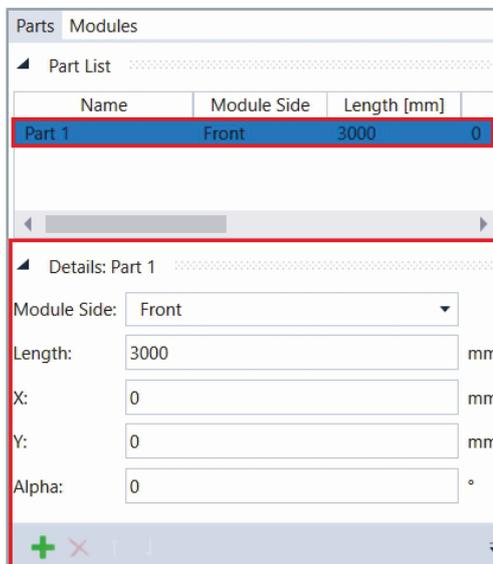


- ▶ Activate the **Filter** button to show only the parts of the selected Processing Unit

OR

- ▶ Deactivate the **Filter** button to show the Parts of the entire project

## Part properties



- ▶ Click on a part in the **Part List** to display its properties

The properties of the selected part are displayed at *Details: Part 1*. The information can also be read out using the *XTS Utility* in the PLC.

Depending on whether you want to configure a closed XTS system or an XTS system with Track Management, the following steps differ from each other.

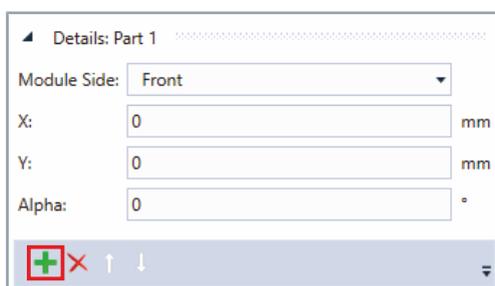
## Closed XTS system

The following steps are required if you want to configure a closed XTS system.

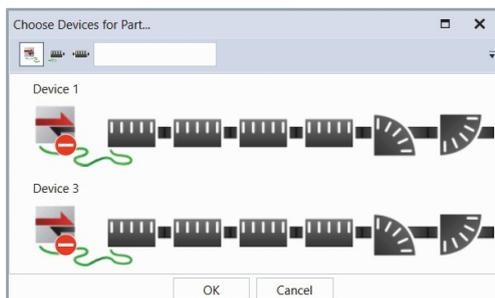
Further information on the configuration of an XTS system with Track Management can be found in chapter "XTS system with Track Management", [Page 273].

## Assigning devices

In the lower area of the detail display, you can select devices for your part. Select the order of the devices according to their occurrence in the XTS system.



► Click on the button + to add a device

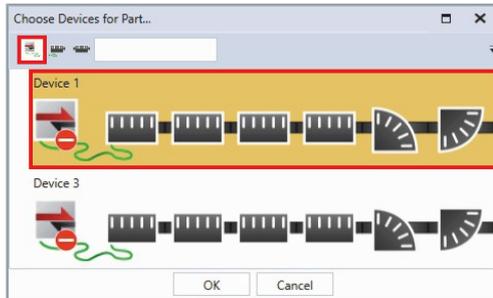


The dialog box *Choose Devices for Part...* opens.

You have the possibility to filter the devices or to add only single infeed lines or modules to the selected part. You can choose from the following filters:

- Select devices
- Select infeed lines
- Select individual modules

## Select devices

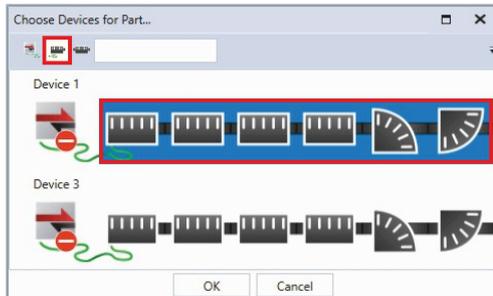


- ▶ Click on the button **Select devices** to activate the filter
- ▶ Click on a device

OR

- ▶ Press and hold the **Ctrl** key to select multiple devices in the appropriate order

## Select infeed lines

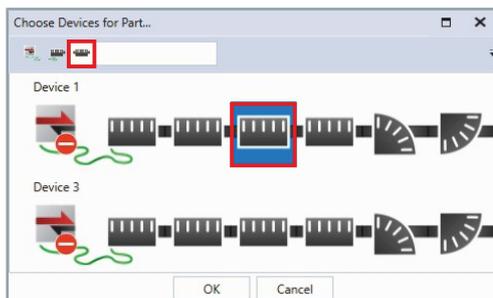


- ▶ Click on the button **Select infeed lines** to activate the filter
- ▶ Click on an infeed line

OR

- ▶ Press and hold the **Ctrl** key to select multiple infeed lines in the appropriate order

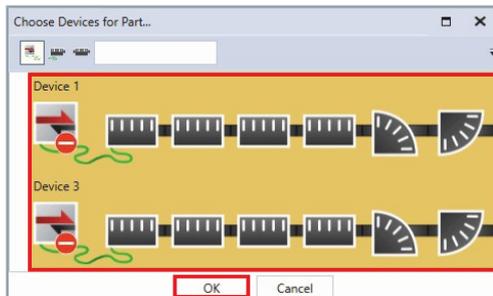
## Select individual modules



- ▶ Click on the button **Filter Module** to activate the filter
- ▶ Click on a module

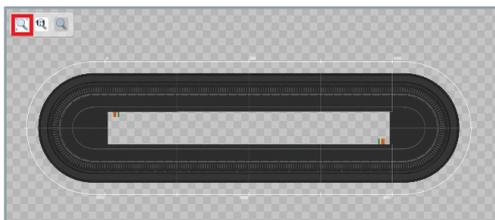
OR

- ▶ Press and hold the **Ctrl** key to select multiple modules in the appropriate order



- ▶ Confirm with **OK**

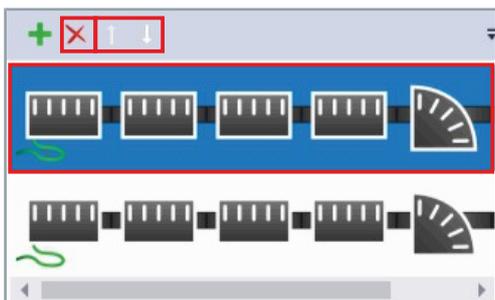
## Checking devices



- ▶ Click the **Zoom to fit** button

The configured part is displayed and can be scaled to the appropriate format.

- ▶ Check whether the correct devices have been selected in the appropriate order



### Sorting devices

If the order is not correct:

- ▶ Click on a device
- ▶ Use the arrow keys to move the device up or down

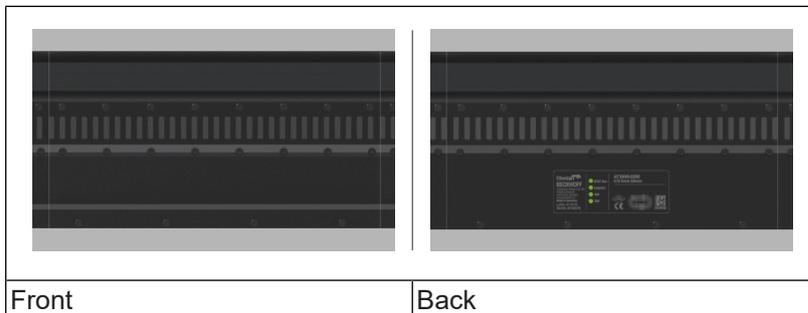
OR

- ▶ Click on the **x** button to remove a device
- ▶ Add more devices if needed

## Set properties

Next you can set the properties of the parts. You can select for each part whether the front or the back of the modules is to be shown and how the position and installation position are to be displayed. With these properties, every possible view of your XTS system can be mapped and adapted to your existing XTS system.

### Module side



Front

Back



The value for the length cannot be changed in the properties.

Parts Modules			
Part List			
Name	Module Side	Length [mm]	
Part 1	Front	2000	0

Details: Part 1

Module Side:

Length:  mm

X:  mm

Y:  mm

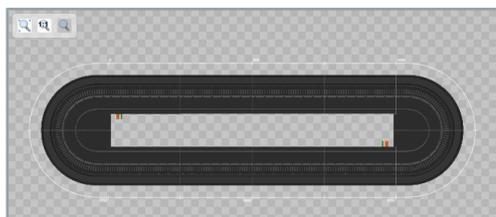
Alpha:  °

- ▶ Select module side in the drop-down menu *Module Side*
- ▶ Enter the position of the part in the input fields *X* and *Y*
- ▶ Enter the value for the installation position of the part in the *Alpha* input field



### Example configuration

In this example configuration, the part is positioned in the center of the XTS System View, the front is selected as the view, and the installation position is left at 0°.



You can enter the values for the position of the part manually or move the part to the correct position by holding down **Alt** and pressing the left mouse button.



- ▶ Click on the button **Go To Next Step** to continue



The following pages describe the steps required to configure the parts for an XTS system with Track Management. The further steps for a closed XTS system can be found in the chapter "Tracks", [Page 278].

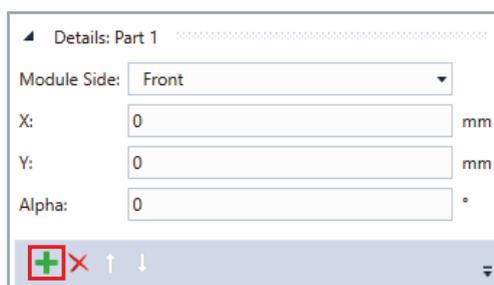
## XTS system with Track Management

The following steps are required if you want to configure an XTS system with Track Management.

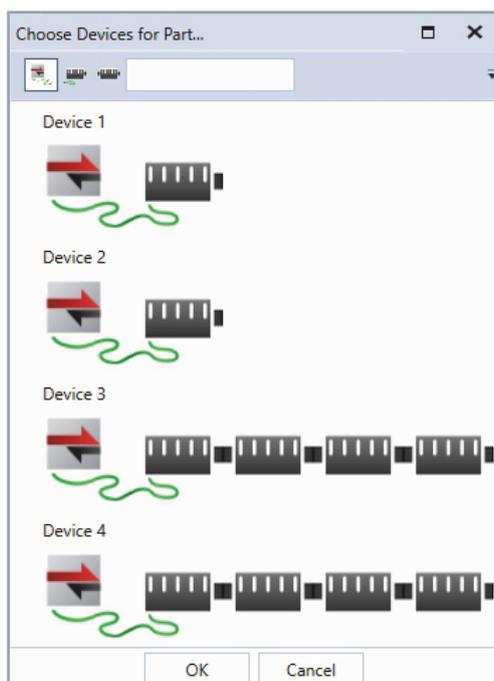
Further information on the configuration of a closed XTS system can be found in chapter "Closed XTS system", [Page 269].

### Assigning devices

Select the order of the devices according to their occurrence in the XTS system. In this example configuration, four parts with one device each are required. Two of these parts consist of one movable module and two further parts consist of four modules each, which form a 1 m long, fixed module segment.



► Click on the button + to add a device

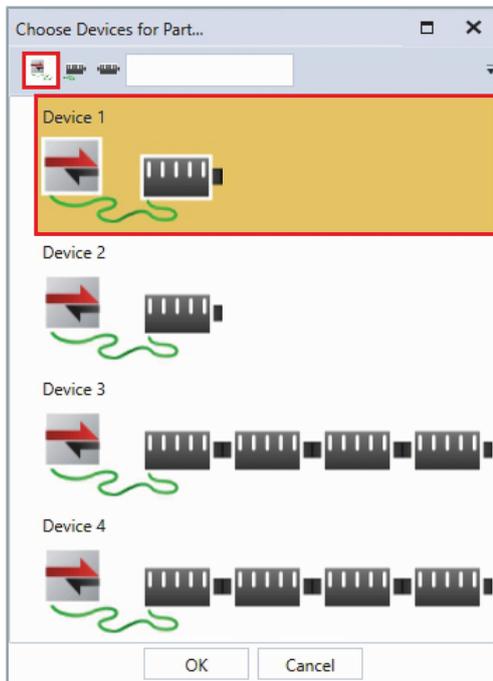


The dialog box *Choose Devices for Part...* opens.

You have the possibility to filter the devices or to add only single infeed lines or modules to the selected part. You can choose from the following filters:

- Device
- Infeed line
- Module

## Select devices



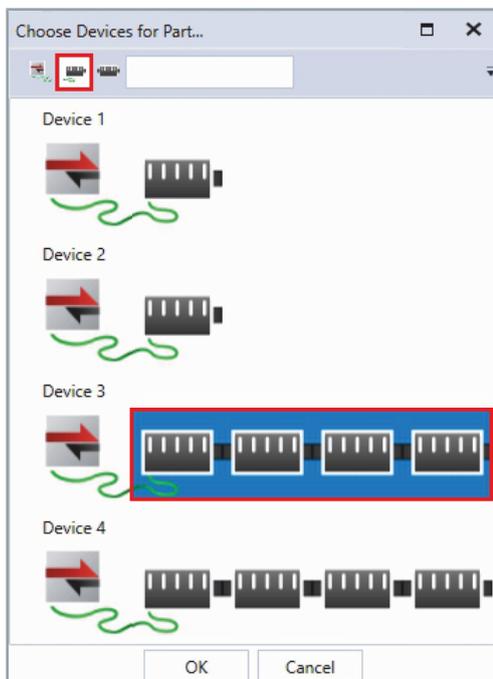
▶ Click on the button **Select devices** to activate the filter

▶ Click on a device

OR

▶ Press and hold the **Ctrl** key to select multiple devices in the appropriate order

## Select infeed lines



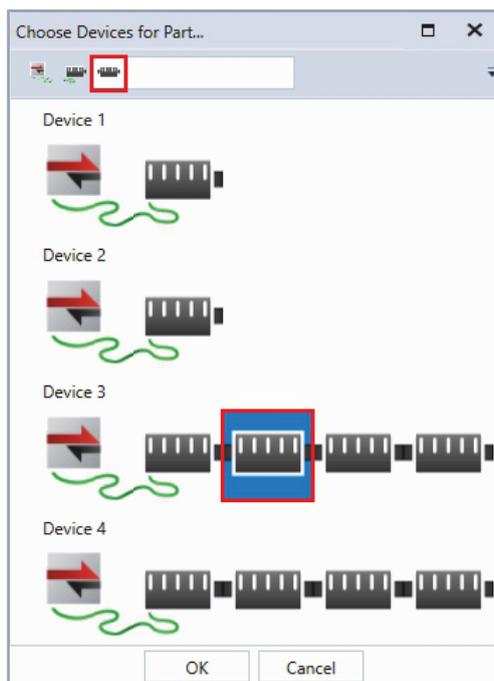
▶ Click on the button **Select infeed lines** to activate the filter

▶ Click on an infeed line

OR

▶ Press and hold the **Ctrl** key to select multiple infeed lines in the appropriate order

## Select individual modules

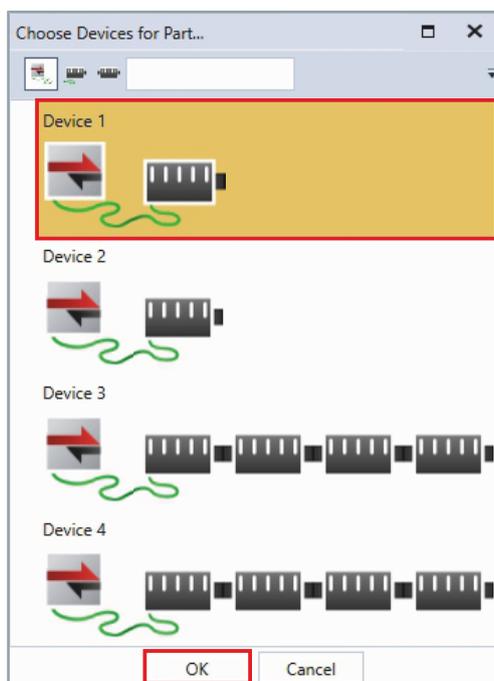


► Click on the button **Select individual modules** to activate the filter

► Click on a module

OR

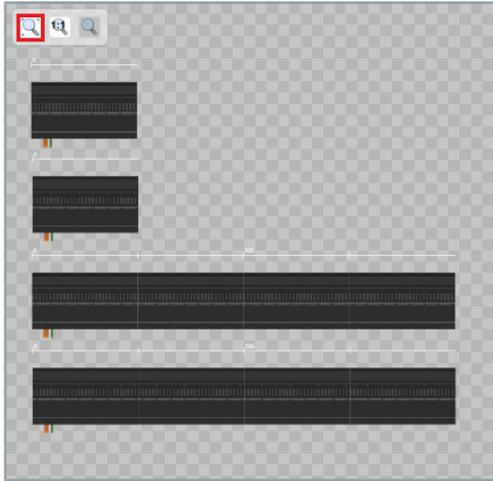
► Press and hold the **Ctrl** key to select multiple modules in the appropriate order



► Confirm with **OK**

To configure the XTS system with Track Management, three more parts must be configured.

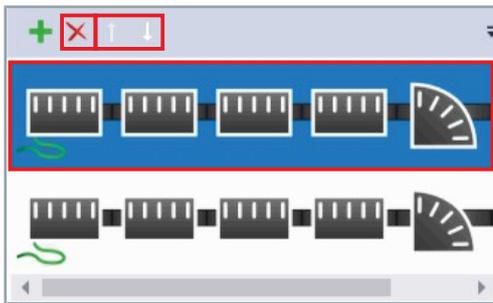
## Checking devices



- ▶ Click the **Zoom to fit** button

The configured parts are displayed and can be scaled to the appropriate format.

- ▶ Check whether the correct devices have been selected in the appropriate order
- ▶ If necessary, press and hold the left mouse button and the **Alt** key to move parts into the correct position



## Sorting devices

If the order is not correct:

- ▶ Click on a device
- ▶ Use the arrow keys to move the device up or down

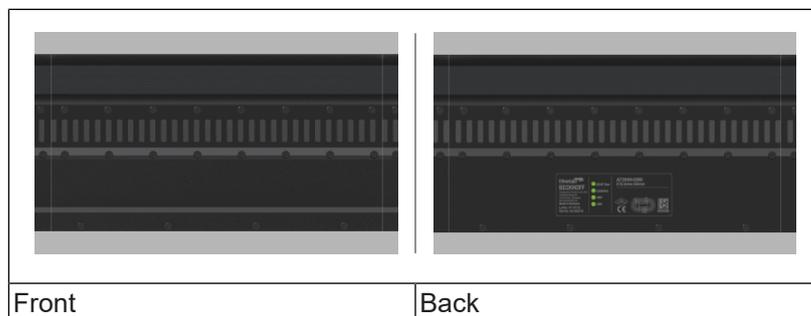
OR

- ▶ Click on the **x** button to remove a device
- ▶ Add more devices if needed

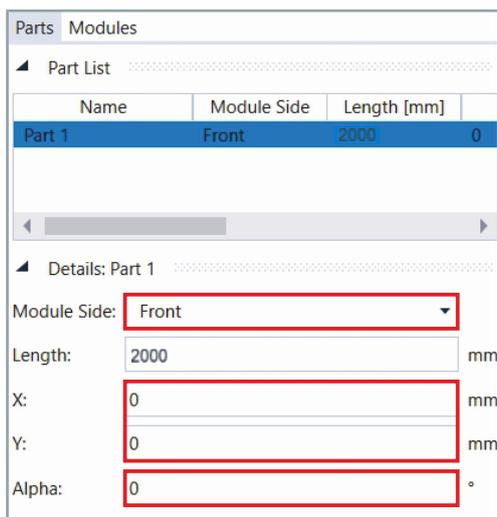
## Set properties

Next you can set the properties of the parts. You can select for each part whether the front or the back of the modules is to be shown and how the position and installation position are to be displayed. With these properties, every possible view of your XTS system can be mapped and adapted to your existing XTS system.

### Module side



The value for the length cannot be changed in the properties.

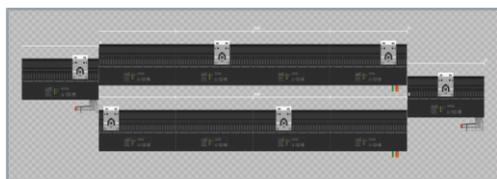


- ▶ Select module side in the drop-down menu **Module Side**
- ▶ Enter the position of the part in the input fields **X** and **Y**
- ▶ Enter the value for the installation position of the part in the **Alpha** input field



### Example configuration

In this example configuration, the parts are positioned in the center of the *XTS System View*, the front is selected as the view, and the installation position is left at 0°.



You can enter the values for the position of the parts manually or move the parts to the correct position by holding down **Alt** and pressing the left mouse button.



- ▶ Click on the button **Go To Next Step** to continue

## 8.3.2.3 Tracks



The next step is to add Tracks.

A closed XTS system usually consists of a single track that contains one or more parts. Several Tracks are required for an XTS system with Track Management so that the movers can switch between different part combinations.

## Controls

The list shows the most important controls:



### Filter Processing Unit

Filters the list based on the selected Processing Unit.



### Processing Unit drop-down menu

Displays the selected Processing Unit and lists the available Processing Units.



### Add Track

Adds a Track to the selected Processing Unit.



### Remove Track

Removes the selected Track from the selected Processing Unit.



### Naming Assistant

Opens the dialog box *Rename...*



### Options

Opens the dialog box *Options...*



### Theme drop-down menu

Displays the selected theme and lists the available themes.



### Zoom window width

Scales the view to the window width.



### Zoom original size

Scales the view to the preset original size.



### Custom zoom

Scales the view to the custom size.



### Add Part

Adds a part to the selected Processing Unit.



### Remove Part

Removes the selected part from the selected Processing Unit. The part remains in the list of available parts.



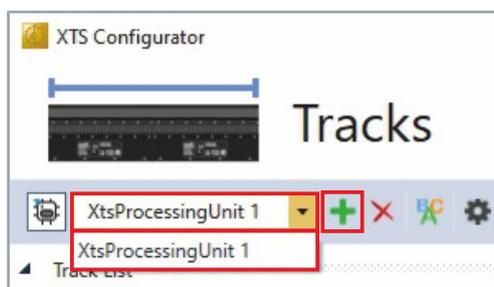
### Close sidebar

Closes the sidebar.

 **Button Go To Previous Step**  
Opens the previous page.

 **Button Go To Next Step**  
Opens the next page.

## Add track



- ▶ In the drop-down menu *XTS Processing Unit* select the Processing Unit to which a Track is to be added
- ▶ Click **+** button to add a new track
- ▶ If required, click on the **x** button to remove a selected track

## Filter

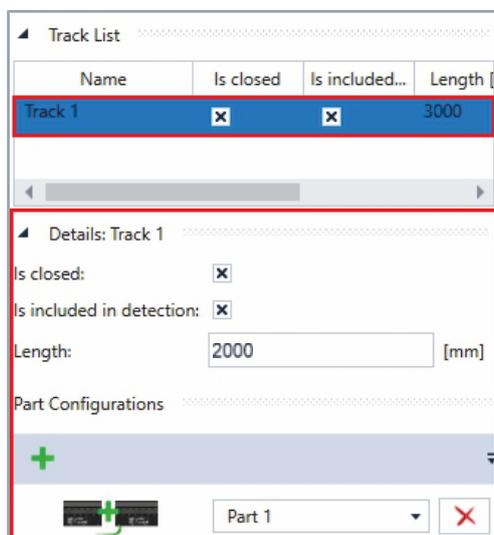


- ▶ Activate the **Filter** button to show only the tracks of the selected Processing Unit

OR

- ▶ Deactivate the **Filter** button to show all tracks of the entire project

## Track properties



- ▶ Click on a track in the **Track List** to display its properties

The properties of the selected track are displayed at *Details: Track 1*. The information can also be read out using the XTS Utility in the PLC.

## Define parameters

For each track you need to set the three most important parameters:

### NOTICE

#### Avoid damage to the product and functional errors

Be sure to correctly specify whether you are configuring a closed XTS system or an XTS system with defined endpoints.

*If the specification is incorrect, the movers may leave the XTS system if the XTS system is open. In the case of a closed XTS system with incorrect specification, the movers cannot travel in a circle as usual.*

▲ Details: Track 1

Is closed:

Is included in detection:

Length:  [mm]

► Activate the checkbox **Is closed** if the XTS system is closed

OR

► Deactivate the checkbox **Is closed** if the XTS system is open

▲ Details: Track 1

Is closed:

Is included in detection:

Length:  [mm]

► Activate the checkbox **Is included in detection** if the XTS system is closed or only has one track

OR

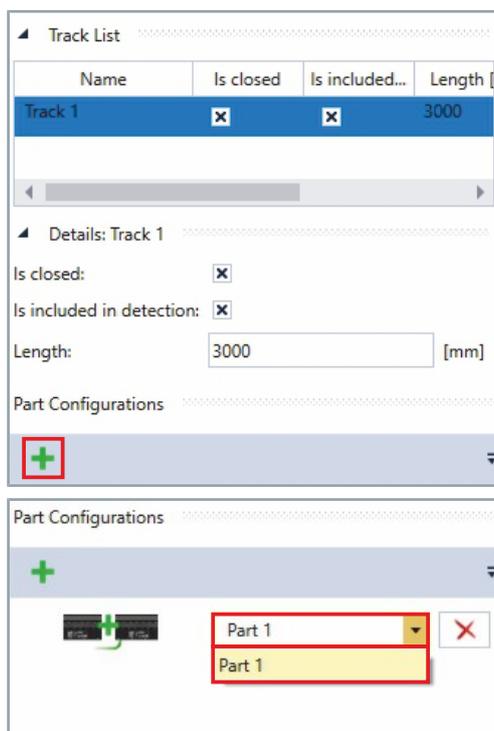
► Deactivate the checkbox **Is included in detection** if the XTS system is open or has multiple tracks



If the XTS system contains tracks that share parts, you must define which tracks perform the detection. It is important that each part within a Processing Unit only occurs once in the detection process, otherwise too many movers may be displayed and the startup of the XTS system may be prevented.

## Add Parts

Select the order of the parts according to their appearance in the XTS system. Make sure that the parts form a continuous line on which the movers can move.



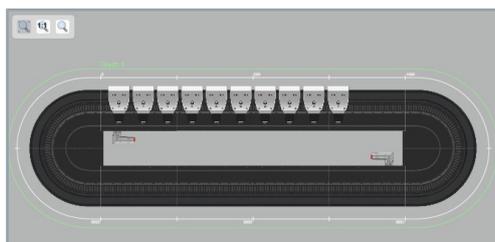
► Click + button to add an XTS Part

► In the drop-down menu *XTS Part* select the Part to be added to the current track

## Closed XTS system



In this example configuration, the track contains only the previously configured part. Thus, the circular track of the XTS system automatically appears as a colored line.

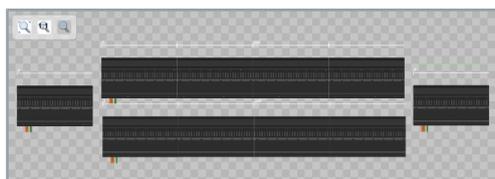


A colored line appears outside the tracks assigned to the part. Using this line you can check if the selected track is valid and if the parts have been added in the correct order.



► Click on the button **Go To Next Step** to continue

## XTS system with Track Management



A green line appears outside the tracks assigned to the part. Using the green line you can check if the selected track is valid and if the parts have been added in the correct order.

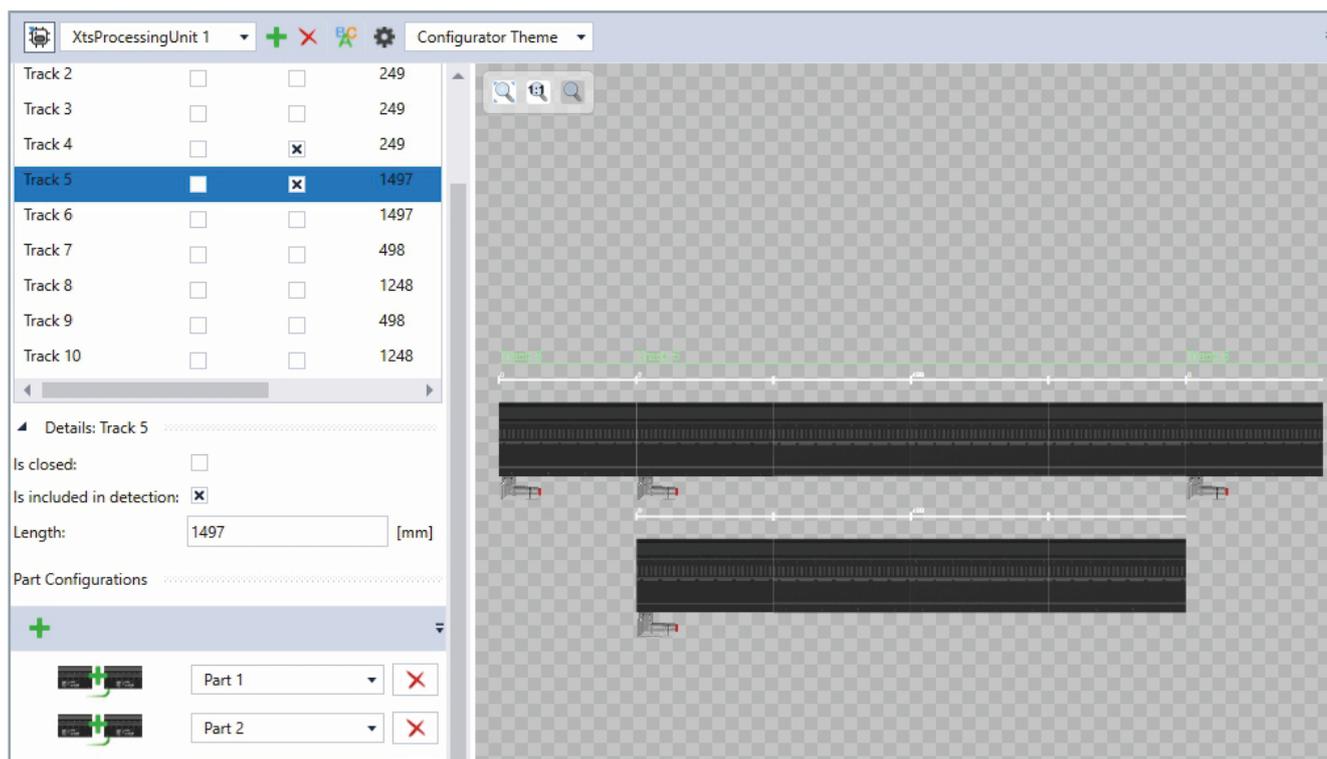
In this example configuration there are ten possible and reasonable configuration variants of the tracks:

- each part as single track = 4 tracks
- both movable modules are positioned next to the upper or lower part = 2 tracks
- only one of the movable modules is next to the lower and next to the upper part = 4 tracks

The more parts there are in the XTS system, the more possibilities there are to connect them mechanically to form tracks. However, it often does not make sense to configure as many tracks as possible. Each part must be assigned to a track so that the mover detection can be carried out. Additional tracks can be created on the XTS system depending on the required movements of the movers.

In this example configuration, none of the tracks has a closed track, so the checkbox *Is Closed* is not set for any of the configured tracks.

Since there are some tracks that share individual parts, the checkbox *Is included in detection* cannot be activated for every track. The checkbox must be activated for the tracks that match the current hardware configuration at the time of mover detection.



If both moving parts are next to the upper part, there are two tracks in the current configuration.

- Track 5 consists of Part 1, Part 2 and Part 3
- Track 4 consists of Part 4

For these two tracks, the checkbox *Is included in detection* is activated to ensure that the correct number of movers is detected on the XTS system. The checkbox is not activated for all other tracks.

If there are changes to the hardware configuration up to the time of commissioning, you can redefine the parameter *Is included in detection* via the PLC. If necessary, this change should be made during commissioning of the XTS system.

Often it is sufficient to include the track in the detection process. However, this only works if there is no mover on the transition between two parts, otherwise too many movers will be detected by the XTS system.



► Click on the button **Go To Next Step** to continue

## 8.3.2.4 Stations



The *Stations* function is currently still in beta phase. In the future, even more functions and information will be available and the current interface may also change.

The Stations are very useful to visualize the XTS system and related applications. A Station provides information about where individual processes take place within the XTS system to illustrate the structure of the entire application.

## Controls

The list shows the most important controls:

**Add Station**

Adds a station.

**Remove Part**

Removes the selected station.

**Naming Assistant**

Opens the dialog box *Rename...*

**Options**

Opens the dialog box *Options...*

Configurator Theme ▾

**Theme drop-down menu**

Displays the selected theme and lists the available themes.

**Zoom window width**

Scales the view to the window width.

**Zoom original size**

Scales the view to the preset original size.

**Custom zoom**

Scales the view to the custom size.

**Add Part**

Adds a part to the selected station.

Part 1 (XtsProcess) ▾

**Part selection drop-down menu**

Displays the selected part and lists the available parts.

**Remove Part**

Removes the selected part from the station. The part remains in the list of available parts. This button is only visible if a part has been added to the station.

**Add stop position**

Adds a stop position to the selected station.

-

Color	ID	Name	Start Position
		Station 1	10

Details: Station 1

Is Enabled:

ID:

Color:

Name:

Description:

Start Position On First Part:  [mm]

End Position On Last Part:  [mm]

Parts

► Activate the checkbox **Is Enabled** to show the station in the XTS View

OR

► Deactivate the checkbox **Is Enabled** to hide the station in the XTS View

► Enter a value in the input field *ID*

► Choose a color from the drop-down menu *Color*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

► Enter a name for the station in the input field *Name*

► If required, enter a short description of the station in the *Description* input field

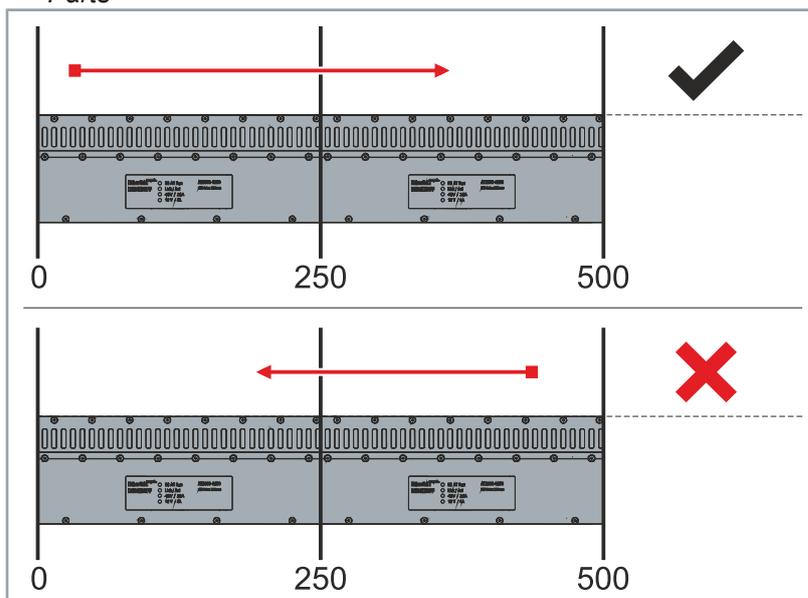
## Start position and end position

A start position and an end position must be defined for each station. It makes a difference whether you have created a single part or multiple parts in your XTS system.

### A single part

The following specifications must be observed for a single part:

- The value in the input field *End Position On Last Part* must be greater than the value in the input field *Start Position On First Part*
- The entered value in the input field *End Position On Last Part* can only be smaller than the entered value in the input field *Start Position On First Part*, if the part is added a second time to the *Parts*



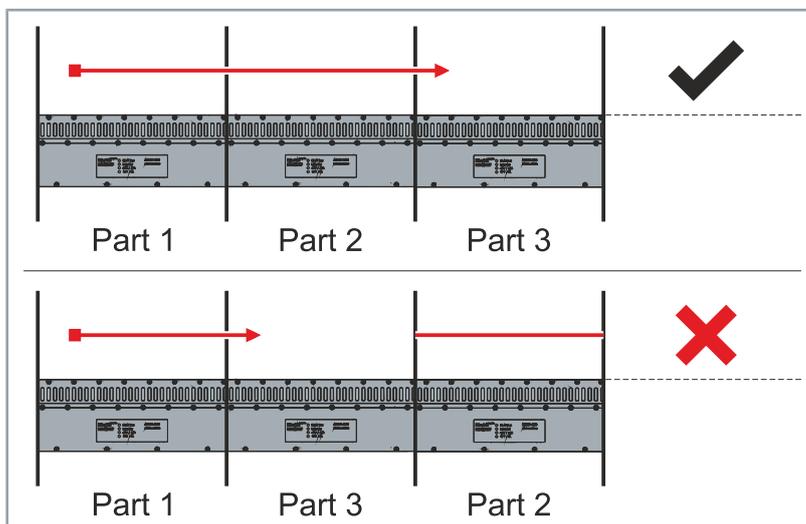
Symbol	Explanation
■	Start position of the station, <i>Start Position On First Part</i>
▶	End position of the station, <i>End Position On Last Part</i>

### Multiple parts

The following specifications must be observed for multiple parts:

- The start position is on the first part and the end position on the last part of the selected list
- The order of the parts must be selected according to their appearance in the XTS system. The parts must form a continuous line on which the movers can move

Further information can be found in chapter "Add Part", [Page 288].



Symbol	Explanation
■	Start position of the station, <i>Start Position On First Part</i>
▶	End position of the station, <i>End Position On Last Part</i>

Station List

Color	ID	Name	Start Position
		Station 1	10

---

Details: Station 1

Is Enabled:

ID:

Color:  

Name:

Description:

Start Position On First Part:  [mm]

End Position On Last Part:  [mm]

Parts

+

- ▶ Enter a value in the input field *Start Position On First Part*
- ▶ Enter a value in the input field *End Position On Last Part*

## Add Part

The stations have precisely defined start positions and end positions. The start position is on the first part and the end position on the last part of the selected list. For all other parts of the list, the station stretches over the full length.

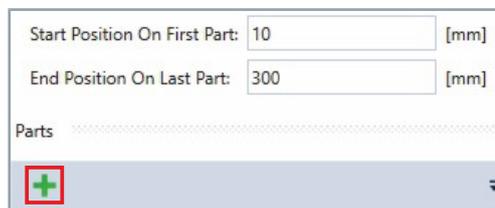


Select the order of the parts according to their appearance in the XTS system. Make sure that the parts form a continuous line on which the movers can move.

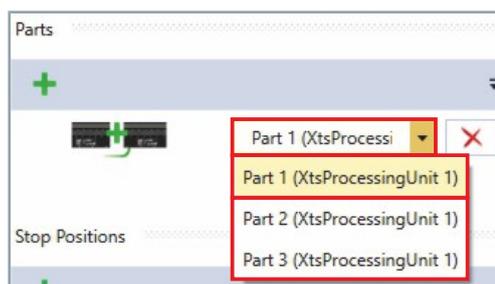
## Closed XTS system



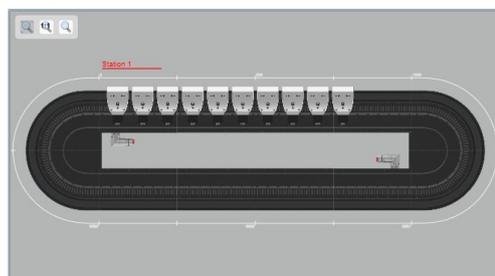
In this example configuration, the station only contains the previously configured part. For example, a simple station is created.



- ▶ Click on the + button to add a part
- ▶ If required, click on the x button to remove a selected part



- ▶ Select a part in the drop-down menu
- ▶ Add and select additional parts as needed



The station is displayed as a line outside the track. If the line is not displayed or the line is not continuous, check the entries of the start positions and end positions as well as the order of the parts.

## XTS system with Track Management



In this example configuration, a simple feeder station is created on the previously configured Part 3.

Start Position On First Part:  [mm]  
 End Position On Last Part:  [mm]

Parts

+

- ▶ Click on the + button to add a part
- ▶ If required, click on the x button to remove a selected part

Parts

+

Part 3 (XtsProcessi x

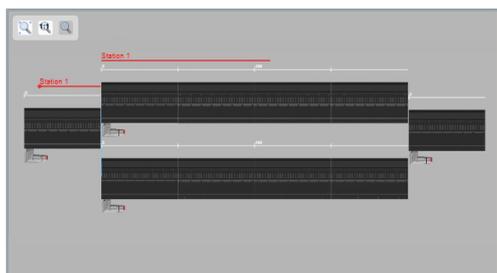
Part 1 (XtsProcessingUnit 1)

Part 2 (XtsProcessingUnit 1)

Part 3 (XtsProcessingUnit 1)

Stop Positions

- ▶ Select a part in the drop-down menu
- ▶ Add and select additional parts as needed



The station is displayed as a line outside the track. If the line is not displayed or the line is not continuous, check the entries of the start positions and end positions as well as the order of the parts.

## Adding stop positions

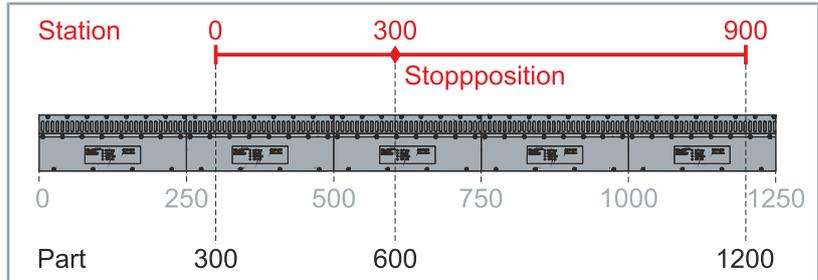
After all parts for the station have been added and selected, stop positions for the movers can be defined.



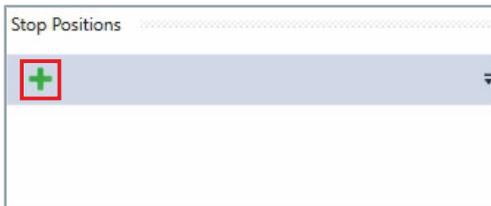
### Stop position within the station

A new stop position is always automatically located at the start of the station with the position 0 mm. When entering the position, make sure that you move the position from the start of the station and that the value is within the defined length of the station.

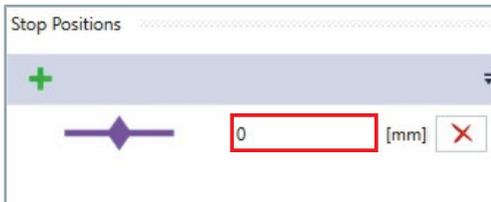
### Example of a stop position



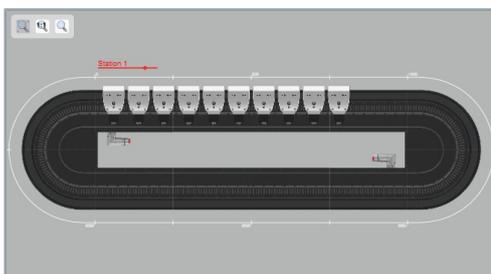
While the station shown has a start position of 300 mm and an end position of 1200 mm on the part, these values do not apply to the stop position. Only values between 0 mm and 900 mm can be assigned for the stop positions, which corresponds to the length of the station. In this example, an entered value of 300 mm for the stop position corresponds to a position of 600 mm on the part.



► Click on the + button to add a stop position



► Enter a value for the stop position in the input field



The stop position is displayed as a diamond on the line of the station.



► Click on the button **Go To Next Step** to continue

## 8.3.2.5 Movers



In this step, the movers for the XTS system are added. Each mover is connected to an NC axis and communicates with the NC via its SoftDrive object. Each XTS system requires at least one mover.

## Controls

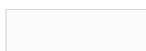
The list shows the most important controls:

**Filter Processing Unit**

Filters the list based on the selected Processing Unit.

**Adding movers**

Adds a mover to the selected Processing Unit.

**Input field number of movers**

Allows you to enter the required number of movers.

**Keep mover**

Deactivates excess movers if the number of movers entered in the input field is less than the existing number of movers.

**Apply number**

Applies the number from the input field.

**Display Mover activated**

Indicates that the mover is activated in the project.

**Display Mover deactivated**

Indicates that the mover is deactivated in the project.

**Remove Mover**

Removes the selected mover.

**Export parameter set**

Opens the dialog box *Export Parameter Set...*

**Import parameter set**

Opens the dialog box *Import Parameter Set...*

**Reset parameter set**

Resets the parameter sets of all movers to the default settings.

**Activation of the copy template of the parameter sets**

Activates or deactivates the parameter set copy template.

**Parameter set copy template input field**

Allows you to enter the copy template of the parameter sets that are to be applied to the movers of the selected Processing Unit.

**Display of the parameter set copy template**

Displays the copy templates of the parameter sets.



## **Naming Assistant**

Opens the dialog box *Rename...*



## **Options**

Opens the dialog box *Options...*

Configurator Theme ▾

## **Theme drop-down menu**

Displays the selected theme and lists the available themes.



## **Zoom window width**

Scales the view to the window width.



## **Zoom original size**

Scales the view to the preset original size.



## **Custom zoom**

Scales the view to the custom size.



## **Open sidebar**

Opens the sidebar.



## **Close sidebar**

Closes the sidebar.



## **Button *Go To Previous Step***

Opens the previous page.



## **Button *Go To Next Step***

Opens the next page.

## Filtering movers



- ▶ Activate the **Filter** button to show only the movers of the selected Processing Unit

OR

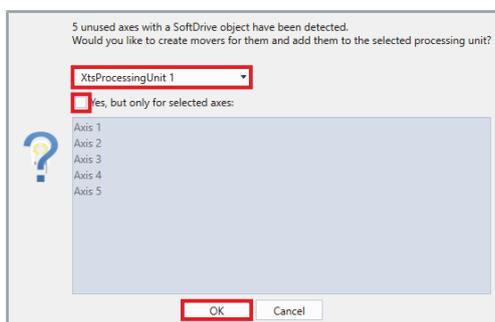
- ▶ Deactivate the **Filter** button to show all movers of the entire project

## Adding movers

You have the possibility to use existing axes or to create new ones.

## Use existing axes

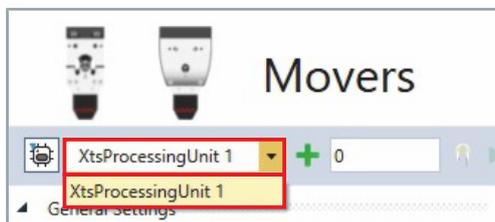
The following dialog box opens if you have already configured NC axes in the project with a SoftDrive object that are not yet linked.



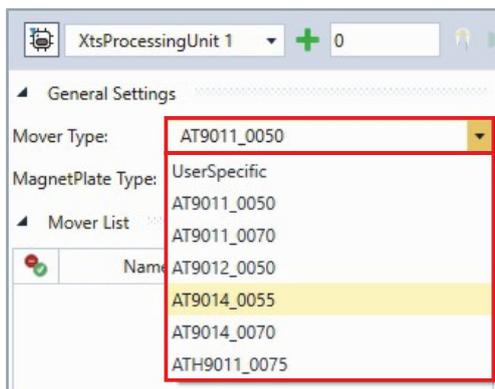
- ▶ In the drop-down menu *XTS Processing Unit*, select the Processing Unit to which movers are to be added
- ▶ Activate the checkbox **Yes, but only for selected axes** if not all axes are to be selected
- ▶ Select individual axes
- ▶ Confirm with **OK**

If the dialog box is closed with *Cancel*, it will open again the next time if there are still unused axes in the project.

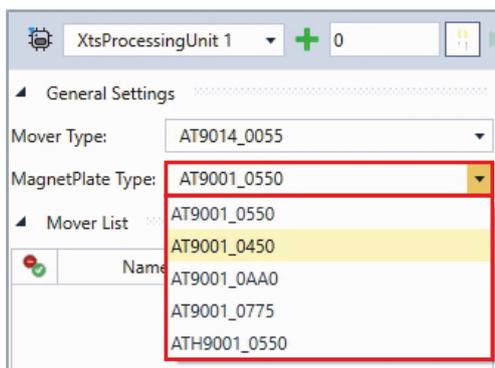
## Creating new movers



- ▶ In the drop-down menu *XTS Processing Unit*, select the Processing Unit to which movers are to be added

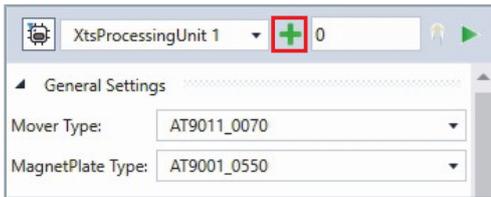


- ▶ Select the mover type used from the drop-down menu *Mover Type*



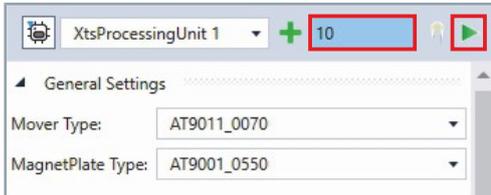
- ▶ Select the corresponding magnetic plate set of the mover in the drop-down menu *MagnetPlateType*

## Individual movers



- ▶ Click on the + button to add a new mover

## Multiple movers



- ▶ Enter the number of movers required in the input field *Number of Movers*

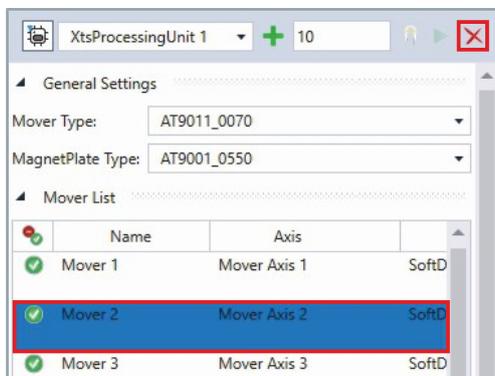
- ▶ Click on the **Apply** button to add the number of movers

The distance from the center of the mover to the center of the mover is 80 mm.

## Remove Mover

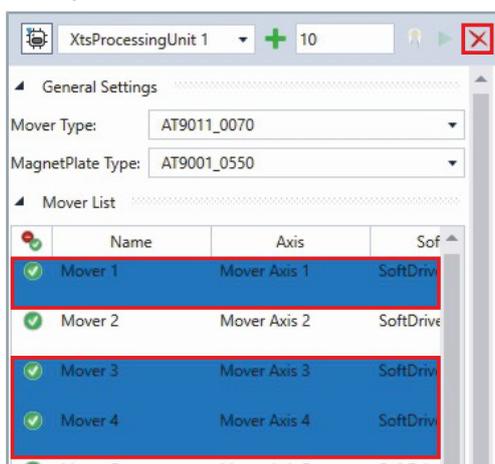
You have the possibility to remove a single mover or several movers at the same time. When removing multiple movers, you have two options.

### Single movers



- ▶ In the **Mover List**, click on a mover that is to be removed
- ▶ Click on the **x** button to remove the selected mover

### Multiple selected movers

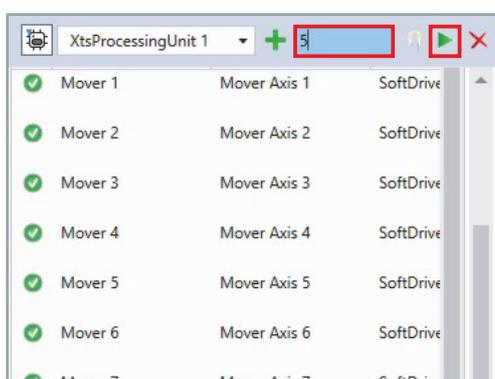


- ▶ Press and hold the **Ctrl** key to select multiple movers in the **Mover List**
- ▶ Click on the **x** button to remove the selected movers

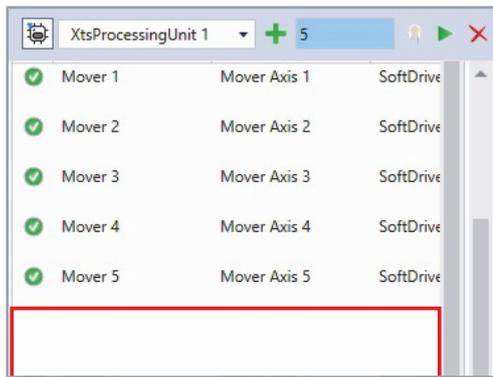
### Any several movers



- ▶ Deactivate the button **Keep existing Movers on Apply**



- ▶ Enter the number of movers required in the input field *Number of Movers*
- ▶ Click on the **Apply** button

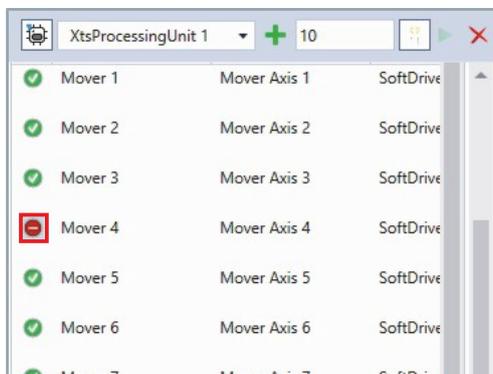


At the end of the *Mover List*, as many movers are deleted until the number of movers corresponds to the value in the input field *Number of Movers*.

## Disabling movers

You can disable single movers or several movers at the same time. By disabling them, the movers and their properties are preserved and do not need to be recreated later.

### Single movers



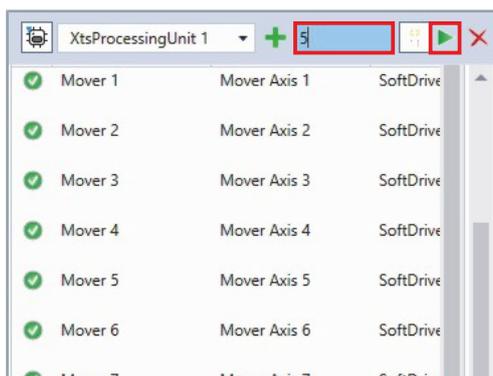
- ▶ Click on the button **Enable/Disable State** of a mover to disable the mover
- ▶ If required, click on the button **Enable/Disable State** of a mover to enable the mover again

### Multiple movers

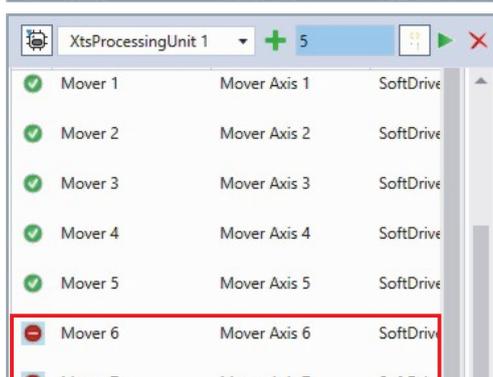
If the *Keep existing Movers on Apply* button is enabled, the movers will not be removed, but disabled.



- ▶ Activate the button **Keep existing Movers on Apply**



- ▶ Enter the number of movers required in the input field *Number of Movers*
- ▶ Click on the **Apply** button

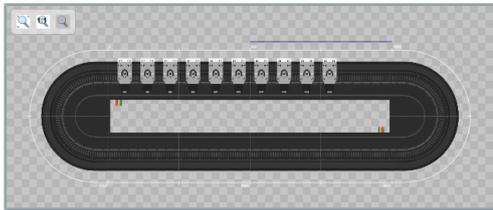


At the end of the *Mover List*, as many movers are disabled until the number of movers corresponds to the value in the input field *Number of Movers*.

## Mover properties



In this example configuration, we add a total of ten movers to the XTS system. These movers are automatically lined up on the first part of the selected Processing Unit. The movers can be selected to display their properties.



You can give each mover, NC axis and SoftDrive object its own name. If no name is assigned, the movers are numbered in sequence. When adding or removing movers, note that this may change the naming order.

Mover Details

Name:

Axis Name:

SoftDrive Name:

Simulated Start-Up Settings:

- ▶ If required, enter a name in the input fields *Name*, *Axis Name* and *SoftDrive Name*

## Simulation settings

To test the behavior of the movers virtually, you can create a simulation. There are three possible settings for the movers in this simulation:

- Selection of a part
- Determination of a precise position
- Using a mover as Mover 1

Simulated Start-Up Settings:

Part:

Position:  mm

ID:

- ▶ In the drop-down menu *Part* select a part on which the mover is to start

Simulated Start-Up Settings:

Part:

Position:  mm

ID:

- ▶ Enter a value for the exact position of the mover on the part at *Position*

If the *MoverIdDetection* is activated, the value in the input field ID defines whether the XTS Mover is created as Mover 1. Otherwise the input field ID remains without an entry.

Simulated Start-Up Settings:

Part:

Position:  mm

ID:

- ▶ Enter a mover ID in the input field *ID*
- ▶ Make sure that the number of IDs defined matches the settings of the *Parameters (Init)* tab under the Processing Unit object.

## Parameter Sets

By creating and reusing Parameter Sets, you can transfer special properties, such as the controller settings for a specific mover loading, from one mover to another. Furthermore, you have the possibility to use different standard Parameter Sets for different movers.

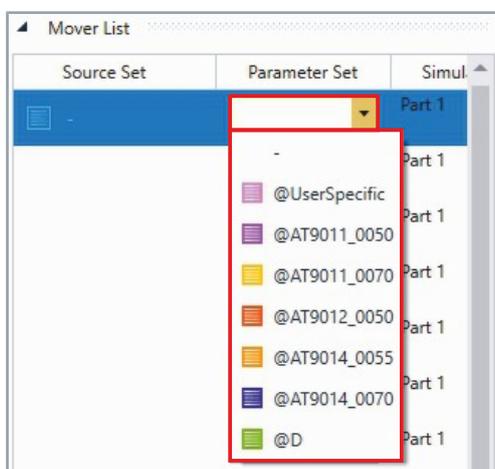
By default, new movers receive the Parameter Set that corresponds to the specified mover type. However, you have the option to assign an empty Parameter Set to each mover.

Movers that have already been created do not have a Parameter Set and will not be changed when the Configurator is run unless they are assigned a different Parameter Set.



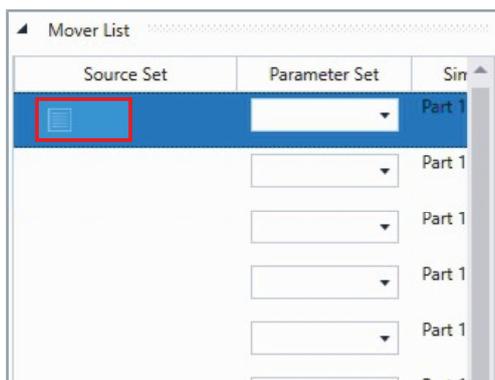
The Parameter Sets are defined for movers without load. If you use the movers with a load, the Parameter Sets must be adjusted. If you have any questions, please contact the product specialist responsible for your region.

### Selecting a Parameter Set



- Select a Parameter Set from the drop-down menu *Parameter Set*

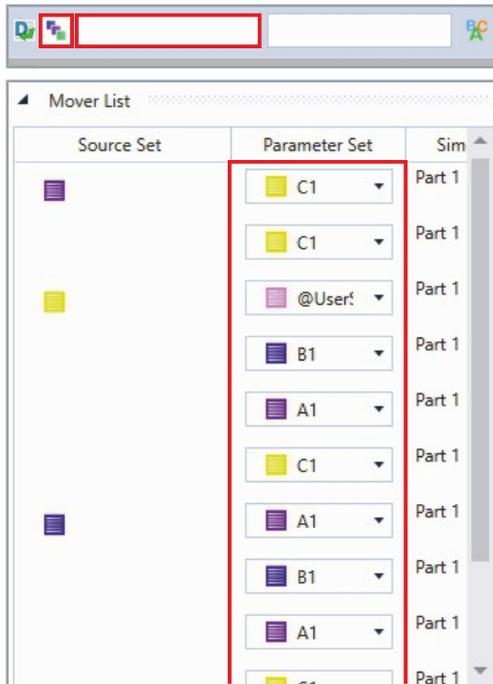
### Creating a Source Set



- Click on the button **Source Set** of a mover

A Source Set is added. The first Source Set is named A1. If there are already several Source Sets, continue with the next letter of the alphabet. For example, if there are already three Source Sets, the next Source Set will be named D1.

## Selecting a Source Set



- ▶ Activate the button **Enable or disable Parameter Copy Pattern** to enable the input field *Edit the Parameter Copy Pattern*

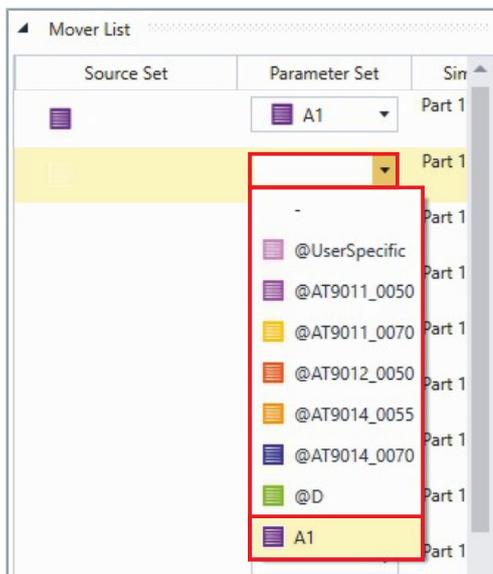
The Source Set can be selected manually for each mover.

## Transfer source set

You can transfer Source Sets to single or multiple movers. You can select a Source Set for each single mover or define one or more Source Sets using the *Parameter Copy Pattern* function. If different Source Sets are selected, this order is transferred to all movers of the selected Processing Unit.

## To a single mover

You can select Source Sets from the drop-down menu Parameter Sets and transfer them to other movers.



- ▶ Select a Parameter Set from the drop-down menu *Parameter Set*

### To multiple movers



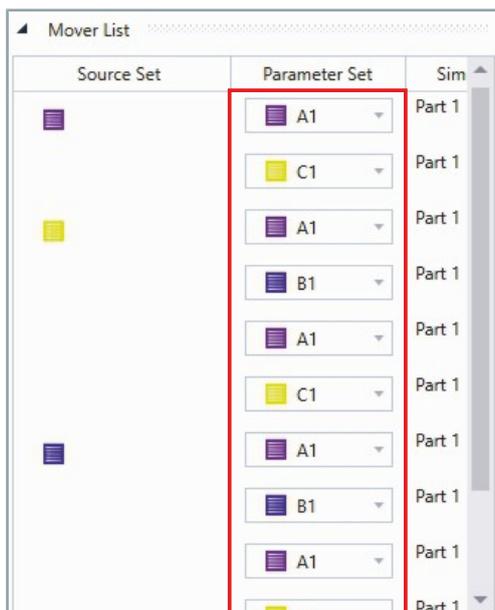
- ▶ Click on **Enable or disable Parameter Copy Pattern** to enable the input field for the Source Sets

#### Use existing Source Sets

If Source Sets have already been created, you can now enter them in the input field in the desired order. Source Sets can also be used several times.



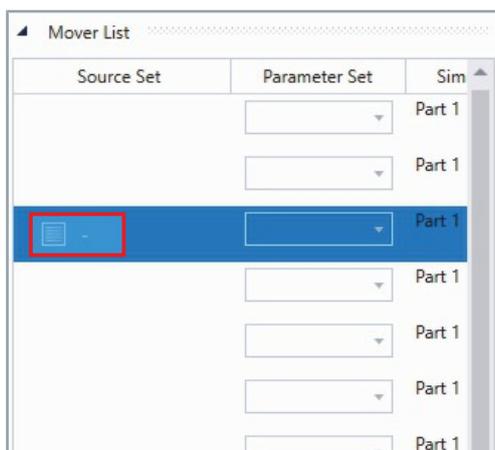
- ▶ The sequence of the new Source Sets is adopted in the input field *Edit the Parameter Copy Pattern*.



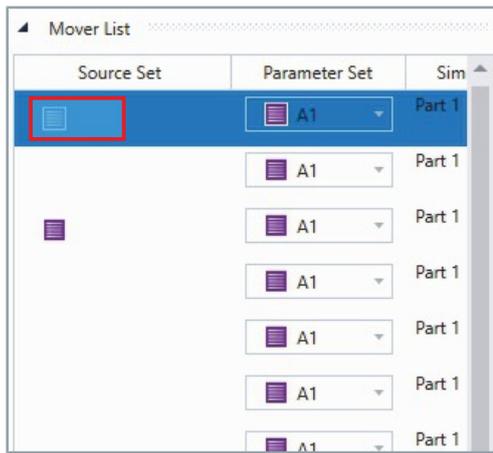
The entered Source Sets are transferred to the movers one after the other.

#### Using new Source Sets

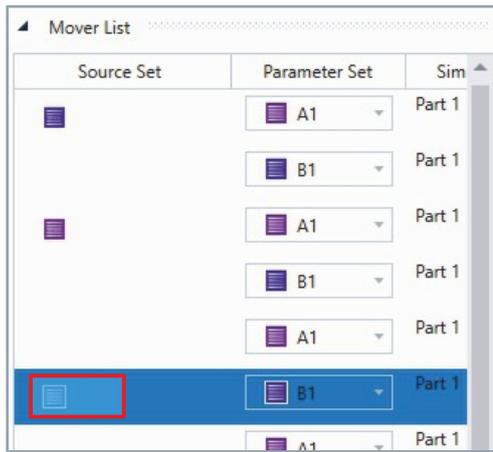
If no Source Sets have been created yet and *Parameter Copy Pattern* is enabled, the new Source Sets will be applied in the order in which you select them.



- ▶ Click on the button **Source Set** of a mover



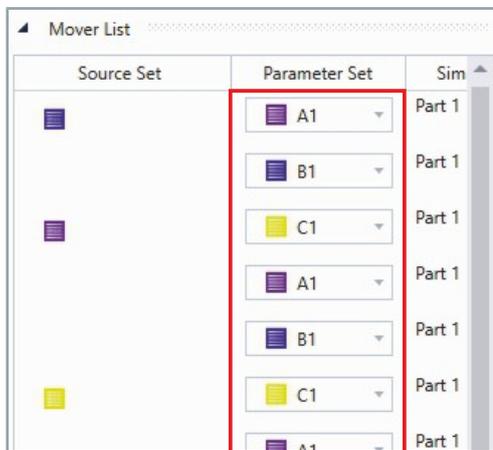
► Click on the **Source Set** button of another mover



► If required, click on the **Source Set** button of further movers



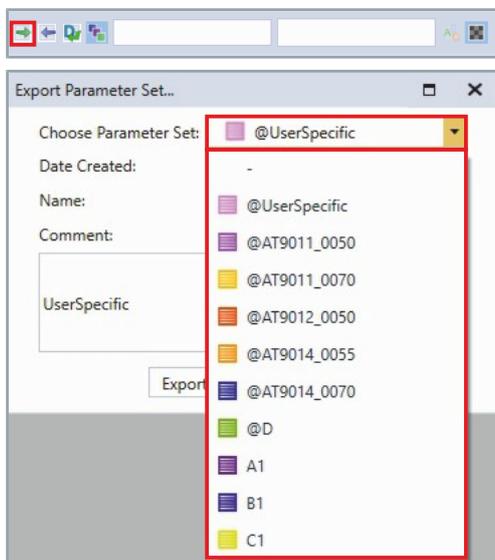
The sequence of the new Source Sets is adopted in the input field *Edit the Parameter Copy Pattern*.



The order of the new Source Sets is transferred to all movers simultaneously.

## Exporting Source Sets

Source Sets can be exported and imported as well as saved on your computer. This way you get a better overview of the different mover settings.

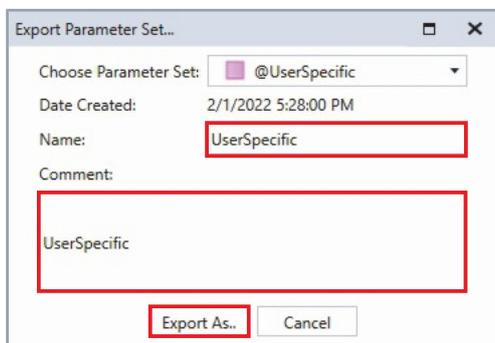


- ▶ Click on the button **Export a Parameter Set ...**

The dialog box *Export Parameter Set ...* opens.

- ▶ Select a Source Set for the export in the drop-down menu *Choose Parameter Set*

By default, the name of the selected Source Set of a mover type is copied to the input fields *Name* and *Comment*. For Source Sets that are self-added, the name of the mover that provides the basis for the Source Set is inserted.

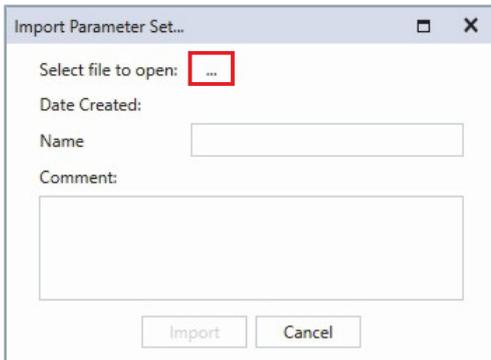


- ▶ Enter a name for the Source Set in the input field *Name*
- ▶ If required, enter a comment in the input field *Comment*
- ▶ Confirm with **Export As...** to start the export

## Importing a Source Set

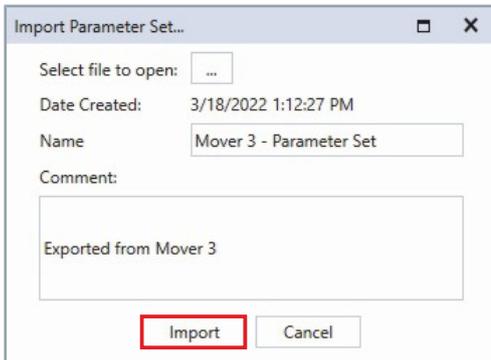


- ▶ Click on the button **Import a Parameter Set ...**



The dialog box *Import Parameter Set* opens.

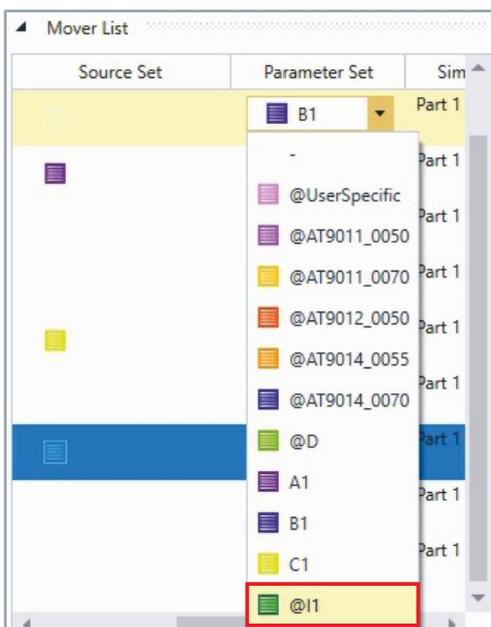
- ▶ Click the ... button to open the dialog box *Open a Parameter Set...*
- ▶ In the dialog box *Open a Parameter Set...* select a corresponding file on the computer



By default, the name of the selected Source Set of a mover type is copied to the input fields *Name* and *Comment*.

- ▶ Confirm with **Import** to start the import

Imported Source Sets are added to the end of the *Parameter Set* list and marked with @I and a consecutive number.



The Source Set is added to the list of Parameter Sets and can be selected from the Parameter Set drop-down menu of a mover.

## Resetting a Source Set

You can reset all movers to the *default Parameter Set* at the same time.



- ▶ Go to and click the button **Reset to Defaults**
- ▶ Click on the button **Go To Next Step** to continue

## 8.3.2.6 Real-Time



The last step is to make the real-time settings for the XTS system.

## Controls

The list shows the most important controls:

**Load target CPU**

Loads a new target CPU and overwrites existing CPUs.

**Input field Number of CPUs**

Allows you to enter the number of CPUs required.

**Input field Number of isolated CPUs**

Allows you to enter the number of isolated CPUs.

**Apply number**

Applies the number from the input field.

AUX

**AUX Task display**

Displays the configuration of the AUX task.

**Move CPU upwards**

Moves the selected task up one CPU.

**Move CPU downwards**

Moves the selected task down one CPU.

**Remove task**

Removes the selected task from the CPU.

Processing Unit **System**

**Processing Unit and System button**

Switches between the Processing Unit and System.

**Add Processing Unit or TwinCAT System Task**

Adds a Processing Unit or a TwinCAT System Task.

**Remove Processing Unit**

Removes the selected Processing Unit.

**Open sidebar**

Opens the sidebar.

**Close sidebar**

Closes the sidebar.

**Button Go To Previous Step**

Opens the previous page.



## Button **Go To Next Step**

Opens the next page.

## Real-time settings

You have the option of making settings for the available TwinCAT tasks and the Processing Units.

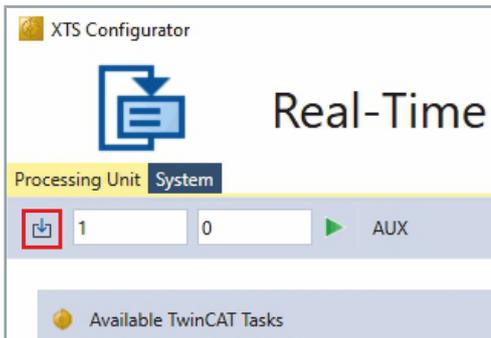


► Select a value in the drop-down menu *Base Time* of the CPU

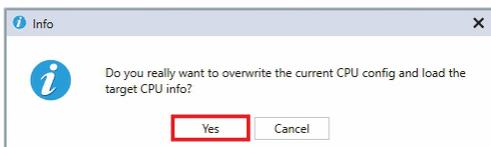
The set value is adopted for the task connected to the CPU. The number of Cycle Ticks is adjusted accordingly.

## Scan available cores

If you are using a real XTS system with a corresponding IPC, the available cores of the IPC must be scanned. The cores can also be isolated after scanning.

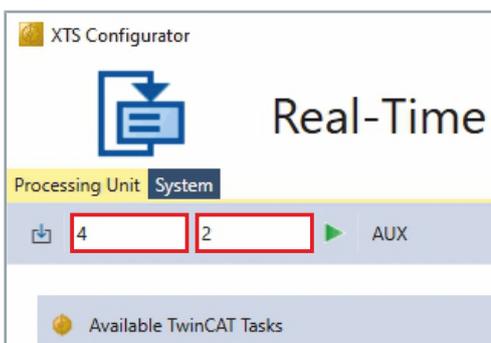


► Click on the button **Read target CPU** to scan the available cores



The dialog box *Info* opens.

► Confirm with **Yes**



The number of available cores is displayed in the left-hand field after scanning.

The number of isolated cores that are fully used for TwinCAT is displayed in the right-hand field.

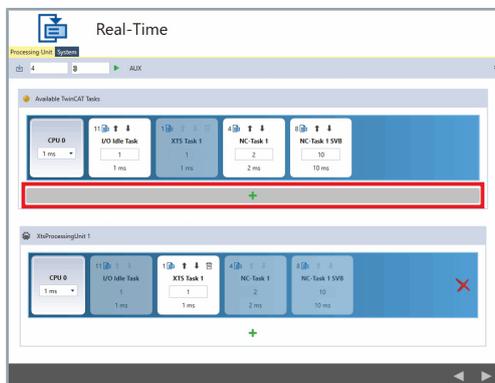
Further information on isolating cores can be found in chapter "Isolating cores", [Page 311].

## Enable cores for TwinCAT



### Example IPC with 4 cores

The procedure for distributing the tasks to the cores is shown as an example for an IPC with 4 cores.



- ▶ Click on the button **+** of *Available TwinCAT Tasks* to call up the overview of available cores and tasks



The dialog box *Add TwinCAT Task* opens.

The available cores and tasks are listed in the overview. The isolated cores are identified by a colored marking of the respective line.



Each task may only run on one core and must be set to 250  $\mu$ s.



- ▶ Activate the checkbox of the core **CPU 3**
- ▶ Ensure that the **Base Time** is set to 250  $\mu$ s
- ▶ If required, select **250  $\mu$ s** in the drop-down menu *Base Time*
- ▶ Click on the arrow buttons **Mover task CPU up** and **Mover task CPU down** to move the *XTS Task 1* to the core *CPU 3*



- ▶ Make sure that the **Cycle Ticks** of the *XTS Task 1* of the CPU 3 core are set to 1
- ▶ If required, select **1** in the drop-down menu *Cycle Ticks*
- ▶ Activate the checkbox of the core **CPU 2**
- ▶ Make sure that the **Base Time** is set to 1 ms
- ▶ If required, select **1 ms** in the drop-down menu *Base Time*
- ▶ Click on the arrow buttons **Mover task CPU up** and **Mover task CPU down** to move the *NC-Task 1 SVB* and the *NC-Task 1* to the core *CPU 2*

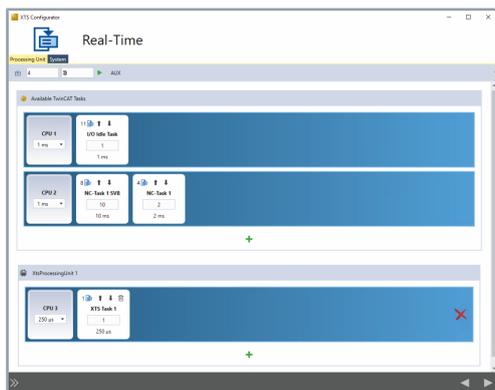


- ▶ Activate the checkbox of the core **CPU 1**
- ▶ Make sure that the **Base Time** is set to 1 ms
- ▶ If required, select **1 ms** in the drop-down menu *Base Time*
- ▶ Click on the arrow buttons **Mover task CPU up** and **Mover task CPU down** to move the *I/O Idle Task* to the core *CPU 1*



- ▶ Deactivate the checkbox of the core **CPU 0**
- ▶ Confirm with **OK**

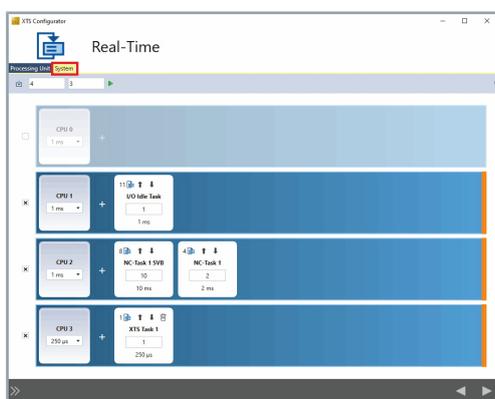
The dialog box *Add TwinCAT Task* is closed.



The settings are displayed in the *XTS Configurator* and XTS Task 1 is added to XtsProcessingUnit 1.

**Alternative view**

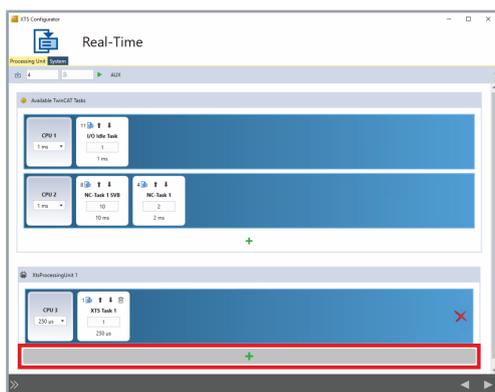
You have the option of displaying the distribution of cores and tasks in an alternative view. This view corresponds to the display of the cores and tasks in the dialog box *Add TwinCAT Task*.



► Click on the **System** tab to display the alternative view

**Add more cores**

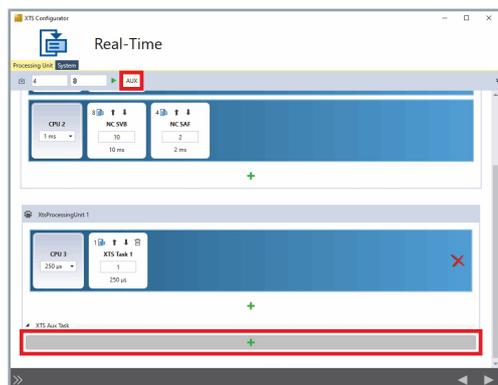
If you need more cores for your configuration, you can add them to XtsProcessingUnit 1.



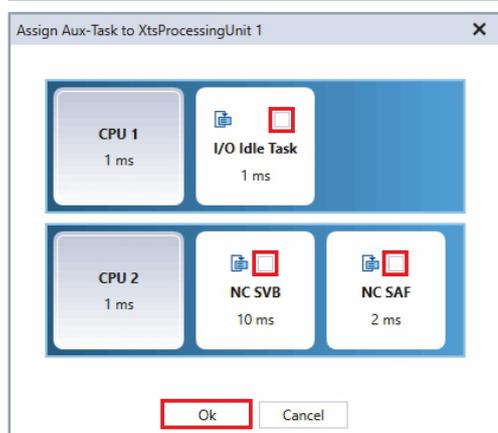
► Click on the button **+** of *XtsProcessingUnit 1* to add further cores

## AUX Task for the Leave and Arrive functionality

An AUX Task under XtsProcessingUnit 1 is required for the *Leave and Arrive* functionality.



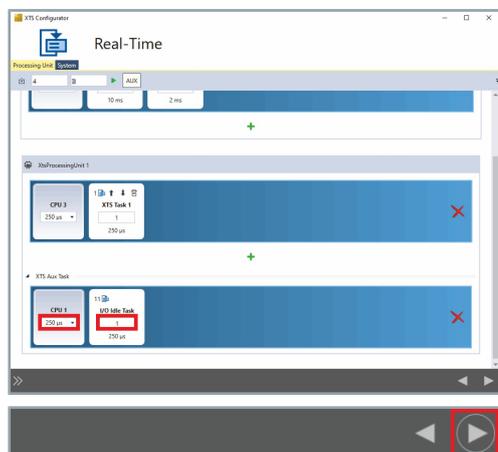
- ▶ Click on the button **AUX** to add an XTS Aux Task to XtsProcessingUnit 1
- ▶ Click on the button **+** of *XTS Aux Task* to add a task



The dialog box *Assign Aux-Task to XTSProcessingUnit 1* opens.

- ▶ Activate the checkbox of a task to select it
- ▶ Confirm with **OK**

The selected task is added to the XTS Aux Task.



- ▶ Ensure that the **Base Time** is set to 250 µs
- ▶ If required, select **250 µs** in the drop-down menu *Base Time*
- ▶ Make sure that the **Cycle Ticks** of the *I/O Idle Task* of the XTS Aux Task are set to 1
- ▶ If required, enter 1 in the input field **Cycle Ticks**

- ▶ Click on the button **Go To Next Step** to continue

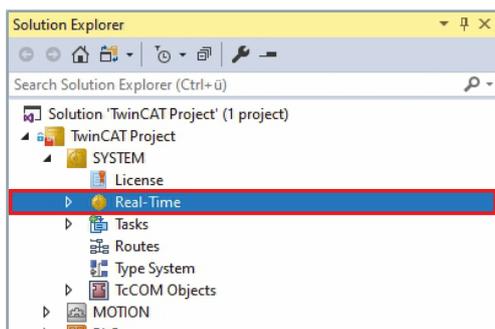
## Isolating cores

The number of available cores depends on the IPC used. Most systems have 4 or 12 cores, but 8 or 64 cores are also possible. Each core used for the XTS system must be isolated. At least one core must not be isolated in order to be able to use it for Windows. For more information on the distribution of cores, please contact the product specialist responsible for your region.

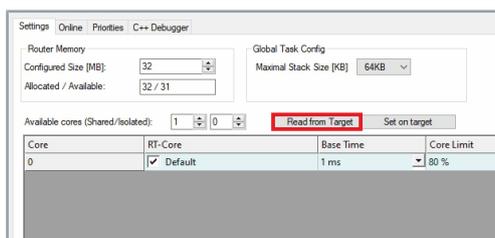


### XTS Configurator must be closed

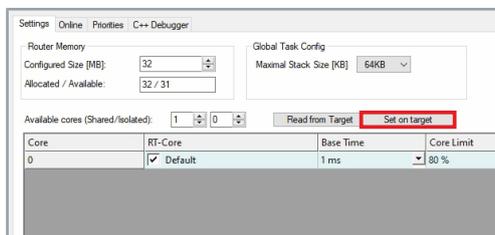
Isolating cores is only possible if the *XTS Configurator* is closed.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM*
- ▶ Double-click on **Real-Time**



- ▶ Click on **Read from Target** to call up the distribution of the cores

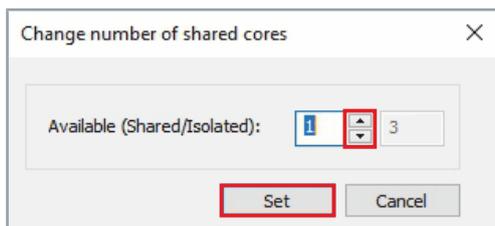


- ▶ Click on **Set on Target** to change the distribution of the cores

## NOTICE

### Saving and closing other applications

As the IPC is automatically restarted after entering the cores to be isolated, save and close all other applications that are open on the IPC.



The dialog box *Change number of shared cores* opens.

- ▶ Enter the number of isolated cores using the arrow keys
- OR
- ▶ Enter the number of isolated cores in the input field *Available (Shared/Isolated)*
- ▶ Confirm with **Set**

The IPC restarts automatically.

## 8.3.2.7 Sidebar

The sidebar can be expanded on every page of the Configurator. The sidebar provides an overview of the Configurator pages and can be used to navigate between the pages.

### Controls

The list shows the most important controls:



#### Open sidebar

Opens the sidebar.



#### Close sidebar

Closes the sidebar.



#### Project loaded

Indicates that the project has been loaded. This button cannot be clicked.



#### Start page

Displays the start page of the *XTS Configurator*.



#### Button *Processing Units*

Opens the page *Processing Units* to edit the Processing Units.



#### Button *Parts*

Opens the page *Parts* to edit the parts.



#### Button *Tracks*

Opens the page *Tracks* to edit the tracks.



#### Button *Stations*

Opens the page *Stations* to edit the stations.



#### Button *Movers*

Opens the page *Movers* to edit the movers.



#### Button *Real-Time*

Opens the page *Real-Time* to edit the real-time settings.



#### Button *Summary*

Opens the page *Summary*. The checkbox *Close automatically after finished* can be activated or deactivated.



#### Button *Build*

Applies all settings and builds the configuration.

Closes the *XTS Configurator*.



#### Page *Finished*

Indicates that all settings have been applied and the configuration is finished. This page is only displayed if the checkbox *Close automatically after finished* is deactivated.

**Display Page open**

Indicates that the page has been opened and exited with a button in the sidebar.

**Display Page edited**

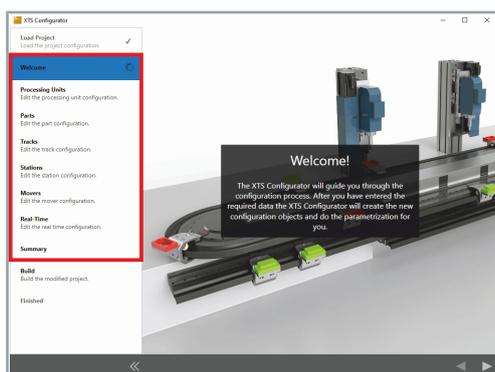
Indicates that the page has been opened and exited with the button *Go To Next Step*.

## Navigation

Instead of navigating with the arrow keys, you have the option of opening the sidebar and using the buttons to navigate between the pages of the *XTS Configurator*.



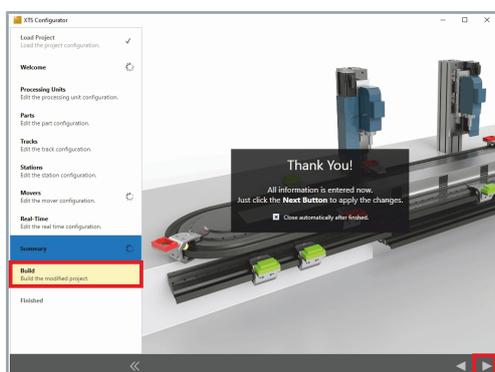
- ▶ Click on the button to open the sidebar



The sidebar opens. You can use the buttons to navigate between the pages of the *XTS Configurator*.

- ▶ Click on a button to call up the corresponding page

## Completing the configuration



- ▶ Click on the button **Build** to build the configuration

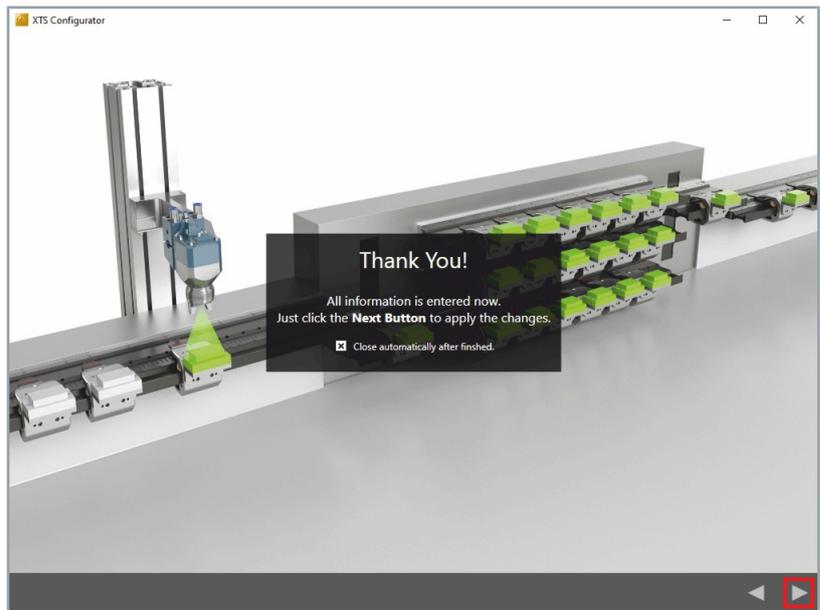
OR

- ▶ Click on the button **Go To Next Step** to continue

The configuration is built and the *XTS Configurator* closes.

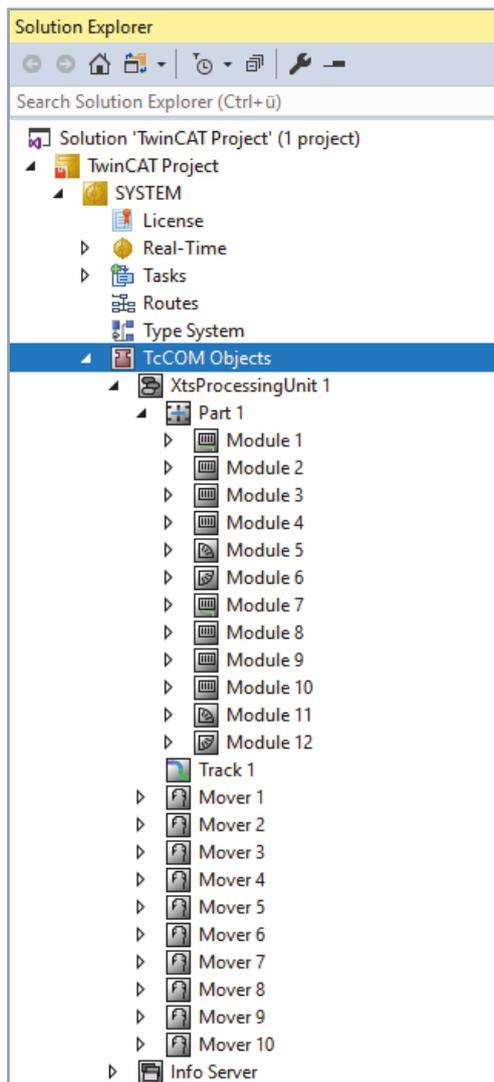
### 8.3.3 Completing the configuration

After all the required settings have been made, you can complete the configuration.

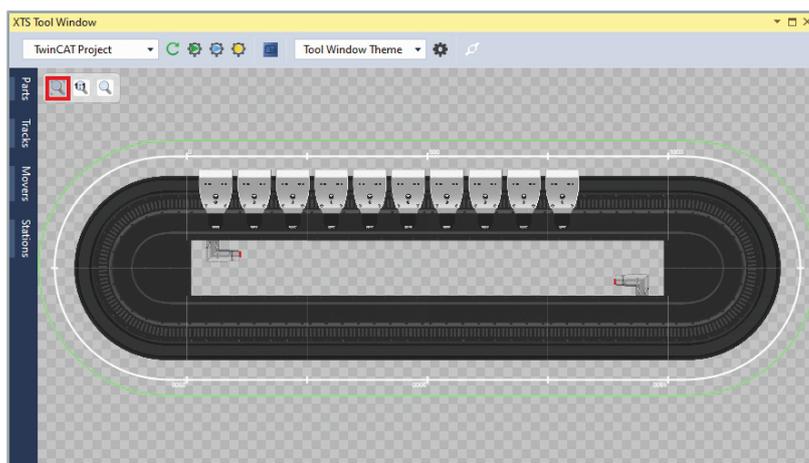


► Click on the button **Go To Next Step** to continue  
The changes are saved and the *XTS Configurator* closes.

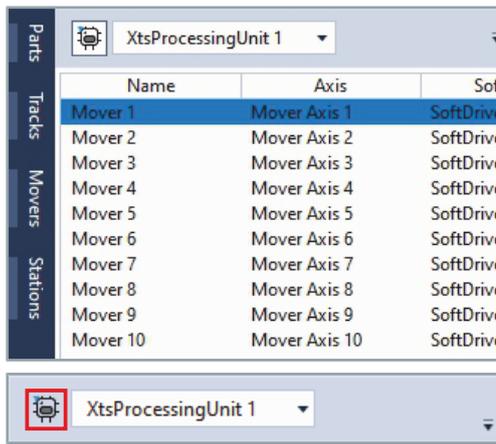
### 8.3.4 Checking the configuration



All configured TcCOM objects are displayed in the Solution Explorer project tree.



You can view the configured XTS system in the XTS System View of the XTS Tool Windows. Use the *Zoom to fit* function for a better detailed view.



The settings and properties of all configured objects can now be accessed in the information windows of the *Parts*, *Tracks*, *Mover* and *Stations*.

- ▶ Check that all settings and properties are correct
- ▶ Change settings and properties if required

- ▶ Activate the button **Filter** to show only the objects of the selected Processing Unit

OR

- ▶ Deactivate the button **Filter** to show all objects of the entire project

If all settings are correct, you can put the configuration into operation. Further information can be found in chapter "Commissioning", [Page 198].

## 8.3.5 Naming Assistant



The naming assistant is available in the *XTS Configurator* for all components. The procedure is illustrated using the renaming of a Processing Unit as an example.



The name of the button of the naming assistant depends on the component that is to be renamed. The appearance of the button is identical on every page of the XTS Configurator and the name always begins with *Choose names for*.



- ▶ Click on the button to open the naming assistant

The naming assistant *Rename Tasks and Processing Units...* opens.

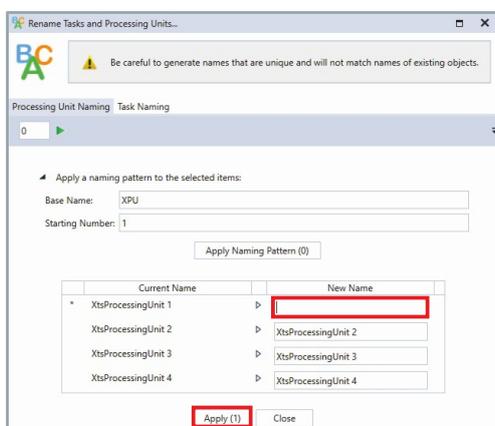
You have the option of renaming one or more components at the same time.

### NOTICE

#### Do not use duplicate names

Be careful not to enter names that are already in use. This can lead to configuration problems.

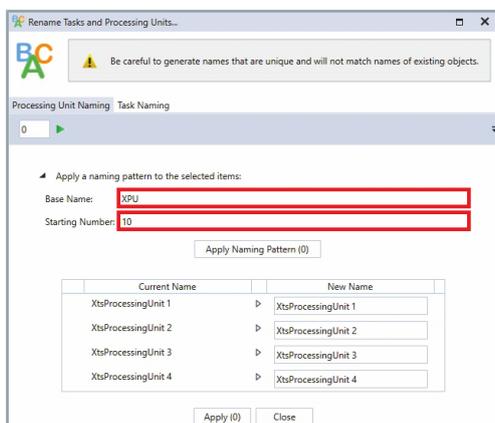
### 8.3.5.1 Renaming an individual component



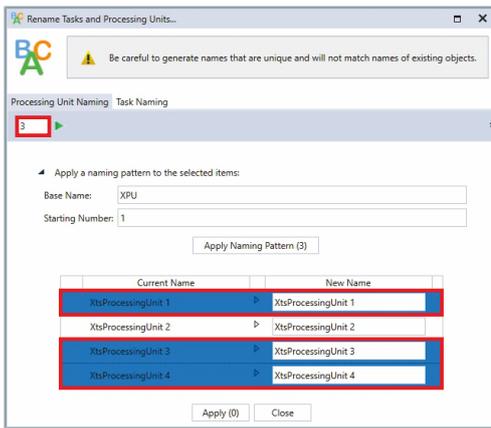
- ▶ Enter a name in the input field *New Name*
- ▶ Confirm with **Apply**

The entry is saved and the dialog box closes.

### 8.3.5.2 Renaming multiple components



- ▶ Enter a name in the input field *Base Name*
- ▶ Enter a number in the input field *Starting Number*



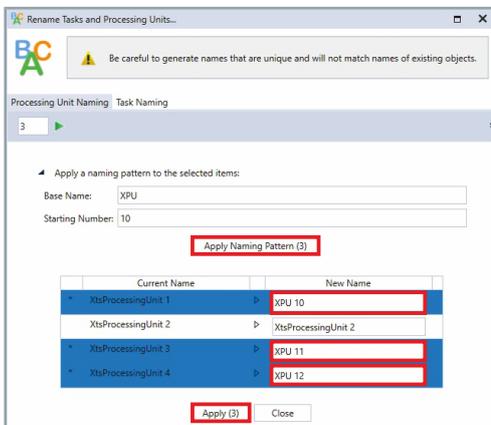
► Press and hold the **Ctrl** key to select several Processing Units in the list

The number of selected Processing Units is displayed in the field *Count of selected renamings to which the pattern is applied*.



## Second tab for renaming the tasks

The Processing Unit naming assistant is the only one to have a second tab. Tasks can be renamed in the same way using this second tab.



► Click the button **Apply Naming Pattern**

The *Base Name* and the *Starting Number* are applied to the selected Processing Units. The *Starting Number* is increased by the value 1 one after the other.

► Confirm with **Apply**

The entry is saved and the dialog box closes.

## 8.3.6 Open Options... dialog box



► Click on the button **Options...**

The dialog box *Options...* opens.

Further information can be found in chapter "Dialog box Options...", [Page 353].

## 8.4 IO Timing Configurator

The *IO Timing Configurator* contributes to fast commissioning and intuitive operation. It supports the setting of the distributed clocks required to synchronize all EtherCAT devices of the XTS system.

### 8.4.1 Checking I/O devices

The I/O devices that are not used for the XTS system must be disabled so that the automatic settings for the XTS system can be used. You can see whether the devices are enabled or disabled by the display of the devices in the Solution Explorer:



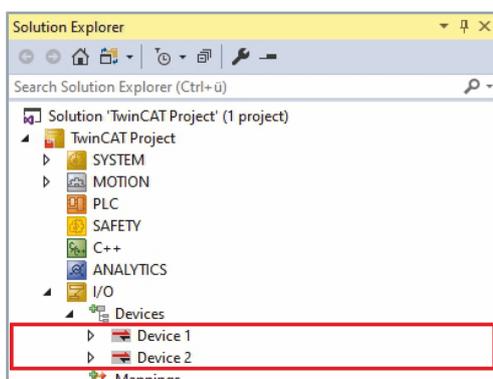
#### Enabled

The device is enabled.



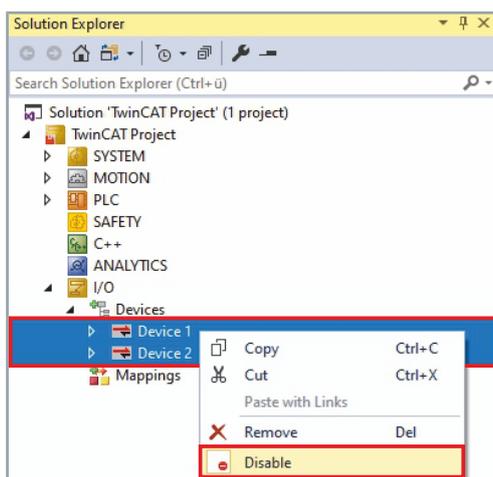
#### Disabled

The device is disabled



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices*
  - ▶ Check whether all XTS-relevant devices are disabled
- If the devices are enabled, the devices must be disabled.

#### 8.4.1.1 Disabling

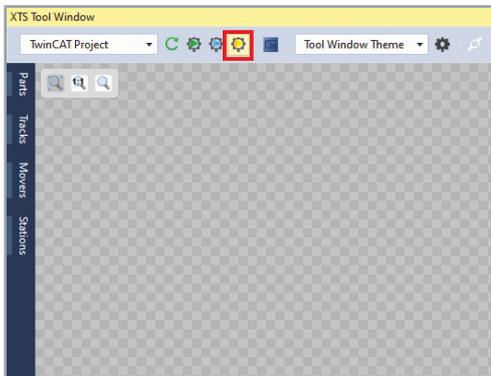


- ▶ Press and hold the **Ctrl** key to select all XTS relevant devices
- ▶ Right-click on all XTS relevant devices to open the context menu
- ▶ Click **Disable** in the context menu

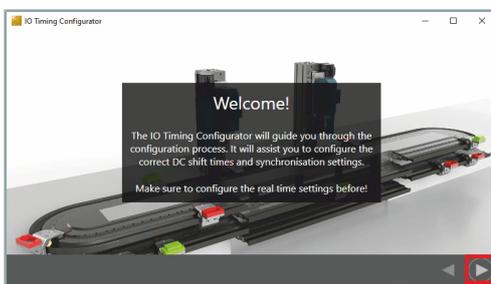
## 8.4.2 Opening of IO Timing Configurator

- ▶ Activation of the XTS Tool Window

Further information can be found in chapter "Activation of the XTS Tool Window", [Page 224].



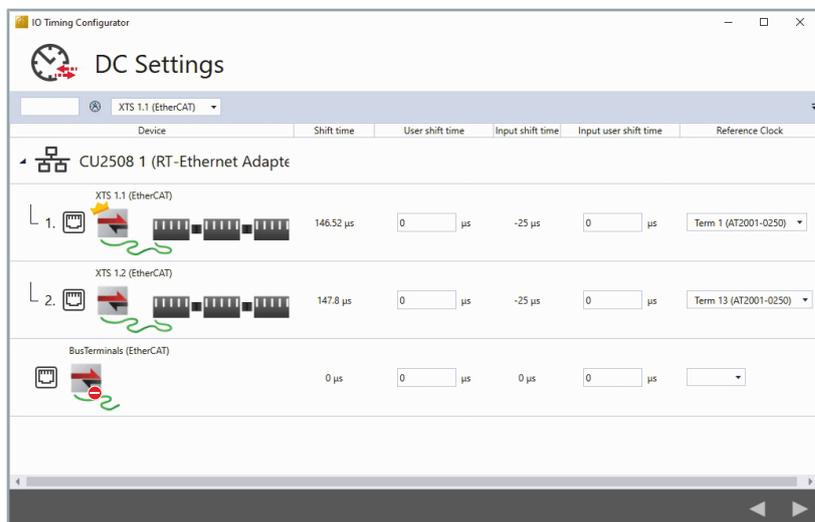
- ▶ Click on the button **Start the IO Timing Configurator ...** in the XTS Tool Window



The *IO Timing Configurator* opens.

- ▶ If necessary, enlarge window for better operability
- ▶ Click on the button **Go To Next Step** to continue

## 8.4.3 DC Settings



The *DC Settings* page opens.

## 8.4.3.1 Controls

The list shows the most important controls:

**Button Automatic configuration settings**

Applies the preset configuration settings for the devices.

Term 1 (AT2001-0250) ▾

**Drop-down menu Reference Clock**

Displays the reference clock selected for the device and lists the available reference clocks.

**Button Go To Previous Step**

Opens the previous page.

**Button Go To Next Step**

Opens the next page.

**Display DC Master**

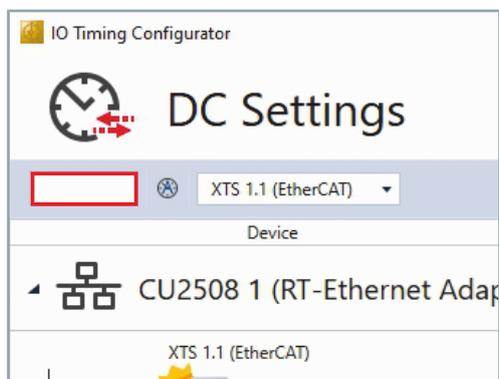
Identifies the selected DC Master.

## 8.4.3.2 Searching the device

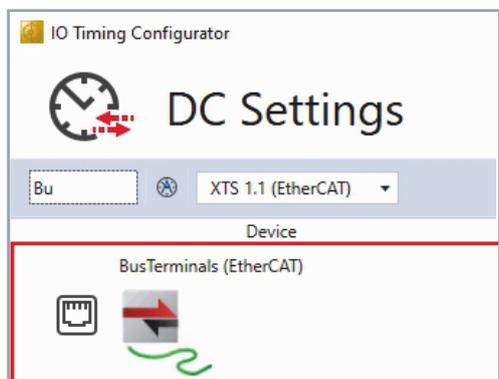
In the *DC Settings* menu you have the possibility to search for devices.

**Name parts sufficient for the search**

Only a part of the device name is needed for the search. All devices that contain the entered string at any position in the device name are listed.



- ▶ Enter a term or parts of the device name in the input field to search for one or more devices



The search result for the entered string is displayed.

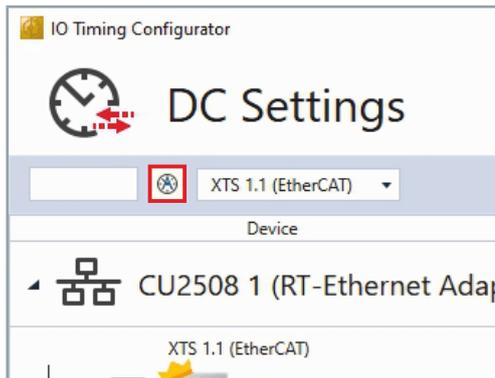
## 8.4.3.3 Automatic configuration settings

### NOTICE

#### Use automatic configuration settings

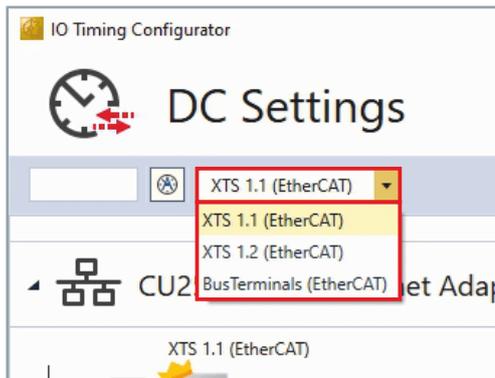
Beckhoff recommends using the automatic configuration settings and not changing these values.

To use the automatic configuration settings, the I/O devices that do not contain XTS components must be disabled. Further information can be found in chapter "Checking I/O devices", [Page 319].

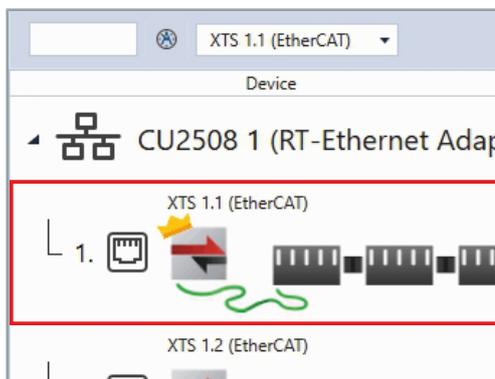


- ▶ Click on the button **Automatic configure settings** to apply the automatic configuration settings

## 8.4.3.4 Selecting DC Master



- ▶ Select a DC Master in the drop-down menu *Select a DC Master*



The selected *DC Master* is marked with a crown.

The DC Master is always the first supply segment, which later serves as master for all other CU2508. The port multiplier containing this infeed line is the master port multiplier from which lines are pulled to other port multipliers. For more information, see the Real-Time and Distributed Clocks documentation.



- ▶ Click on the button **Go To Next Step** to continue

## 8.4.4 DC Sync Cables



### Visibility depending on CU2508

The *DC Sync Cables* page is only displayed if a CU2508 is used in the configuration. For more information please refer to the Real-Time documentation.

### 8.4.4.1 Controls

The list shows the most important controls:



#### Button *Go To Previous Step*

Opens the previous page.

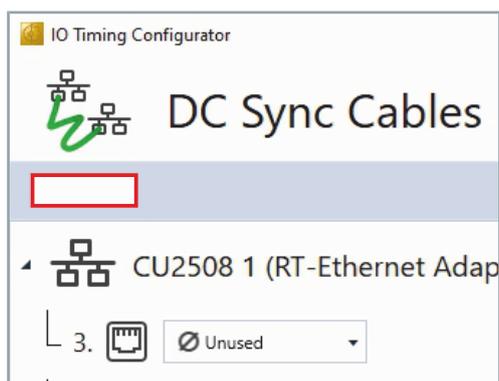


#### Button *Go To Next Step*

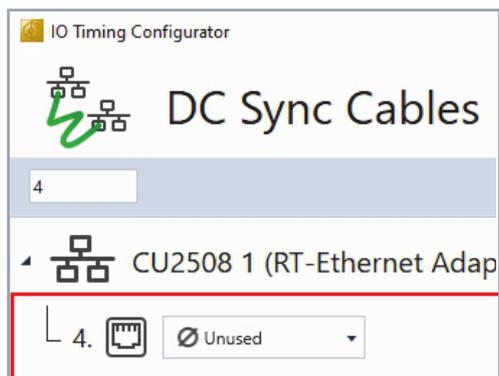
Opens the next page.

### 8.4.4.2 Searching for ports

In the *DC Sync Cables* menu you have the possibility to search for ports.



► Enter a digit in the input box to search for one or more ports



The search result for the entered digit is displayed.

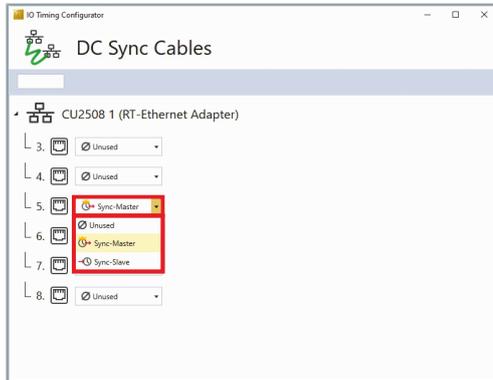
## 8.4.4.3 Setting ports

For each port, you have the option of selecting whether it should remain unused, be used as a Sync Master or as a Sync Slave.



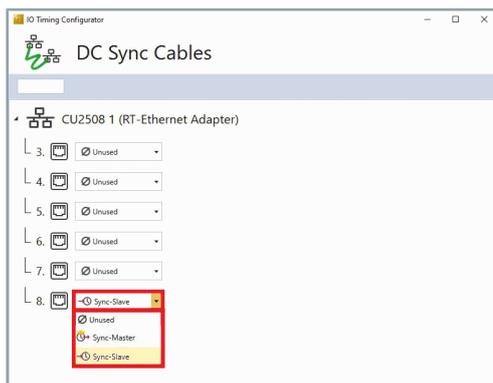
### Example CU2508

Setting a sync connection between Port 5 and Port 8 is shown as an example for two CU2508.



- ▶ Select **Sync-Master** in the drop-down menu of *Port 5*

The subordinate *CU2508* receives the data from the Sync Master and becomes a Sync Slave.



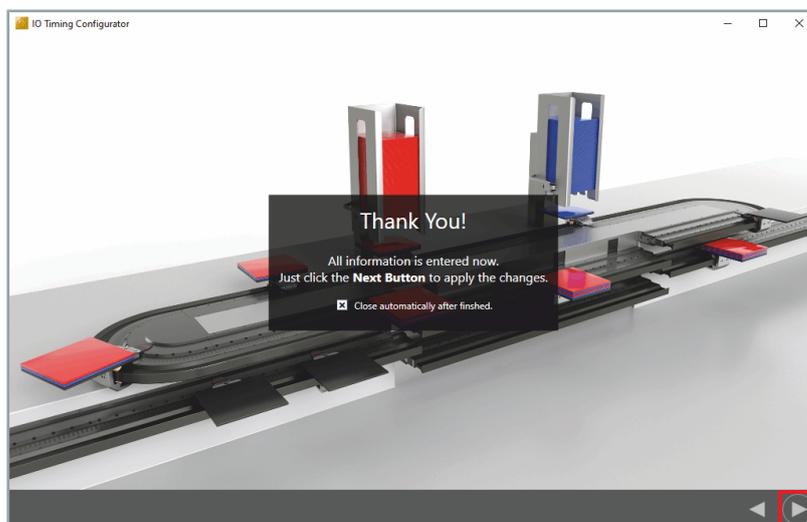
- ▶ Select **Sync-Slave** in the drop-down menu of *Port 8*



- ▶ Click on the button **Go To Next Step** to continue

## 8.4.5 Completing the configuration

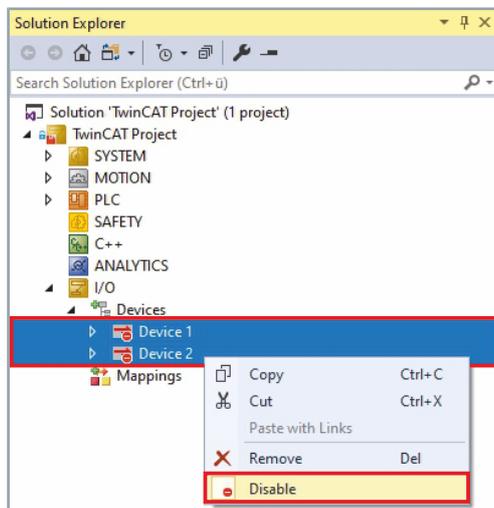
After all the required settings have been made, you can complete the configuration.



- ▶ Click on the button **Go To Next Step** to continue
- The changes are saved and the *IO Timing Configurator* closes.

## 8.4.6 Enabling I/O devices

After the *IO Timing Configurator* has been closed, all I/O devices can be enabled again in the Solution Explorer.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices*
- ▶ Press and hold the **Ctrl** key to select the XTS relevant devices
- ▶ Right-click on the XTS relevant devices to open the context menu
- ▶ Click **Disable** in the context menu

## 8.5 XTS Viewer

### 8.5.1 Opening the viewer

After you have successfully installed *TF5850 TC3 XTS Extension*, you can open the *XTS Viewer* like any other Windows application.

You can find the *XTS Viewer* under the file path *C:\TwinCAT\Functions\TF5850-TC3-XTS-Technology\TcXtsViewer* or as an icon on your desktop.



- ▶ Double-click on the **XTS Viewer** icon on your desktop  
The *XTS Viewer* opens.

### 8.5.2 Operating elements

The list shows the most important controls:

- 
**Drop-down menu Target PC**  
 Displays the configuration of the selected target PC and lists the available PCs.
- 
**Connect to target PC**  
 Enables the connection to the target PC.
- 
**Continuous update**  
 Continuously updates the connection with the target PC.
- 
**Add additional view**  
 Adds an additional window for the target PC.
- 
**Options**  
 Opens the dialog box *Options...*
- 
**Module-Side drop-down menu**  
 Displays the selected module side and lists the available module sides.
- 
**Rotation drop-down menu**  
 Allows you to select a preset angle between  $-180^\circ$  and  $180^\circ$  or enter your own value. The reference point is the first module of a part.
- 
**Theme drop-down menu**  
 Displays the selected theme and lists the available themes.
- 
**Configuring View**  
 Opens the dialog box *Configure View*.
- 
**Zoom window width**  
 Scales the view to the window width.

**Zoom original size**

Scales the view to the preset original size.

**Custom zoom**

Scales the view to the custom size.

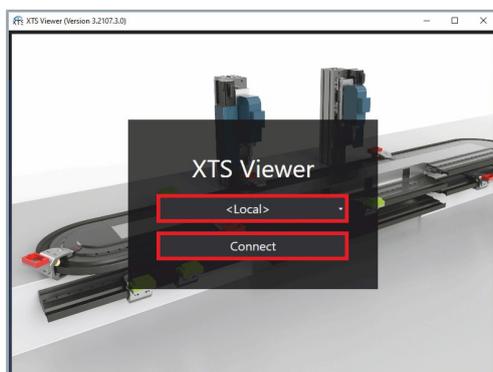
## 8.5.3 Connecting to the target system

An XTS Viewer application can only be connected to one target PC. The main window *XTS Viewer* and the additional windows *XTS View* can be customized, although they share the same target and options. To connect multiple target PCs, additional XTS Viewer applications must be opened.

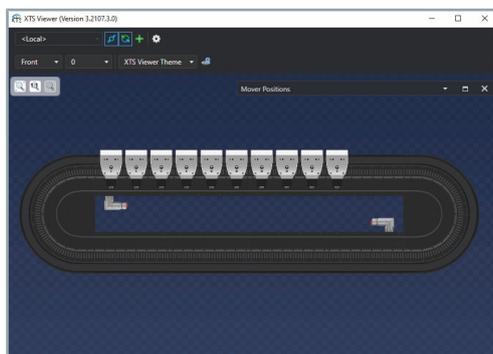
To connect an XTS Viewer application to a target PC, you have two options:

- Start screen
- In the Viewer

### 8.5.3.1 Start screen



- ▶ Select the target PC in the drop-down menu
- ▶ Click on the button **Connect**

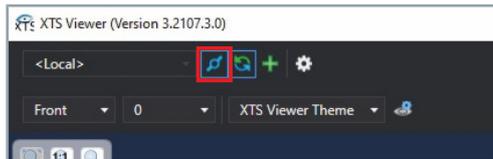


The XTS system of the target PC, which is in *Run Mode*, is displayed in the *XTS Viewer*.

**Target also valid for additional views**

The selected target PC also applies to any additional view added via the button *Add additional View*.

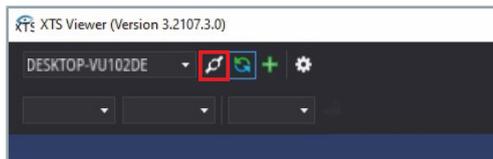
## 8.5.3.2 In the Viewer



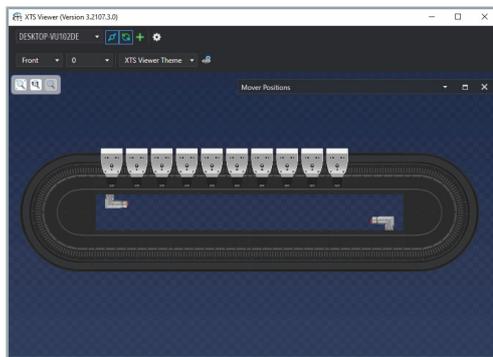
▶ Click on the button **Connect to selected Target** to deactivate the previous target PC



▶ Select a target PC in the drop-down menu *Choose Target...*



▶ Click on the button **Connect to selected Target** to activate the new target PC



The XTS system of the target PC, which is in *Run Mode*, is displayed in the *XTS Viewer*.

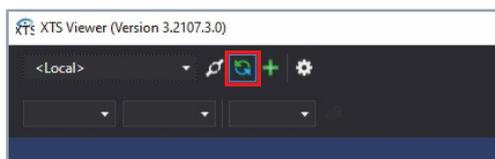
## 8.5.4 Continuous update

By deactivating the continuous update, the positions of the movers and modules are no longer updated. If the movers are moving too fast, it is possible to create a standstill view by deactivating the continuous update.



### Deactivation also applies to other XTS views

Disabling continuous updating also applies to any XTS views added via the button.

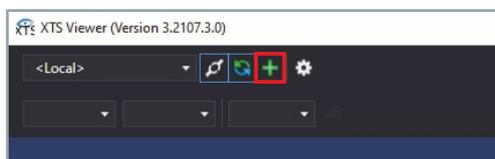


- ▶ Click on the button **Continuous Update** to disable continuous update

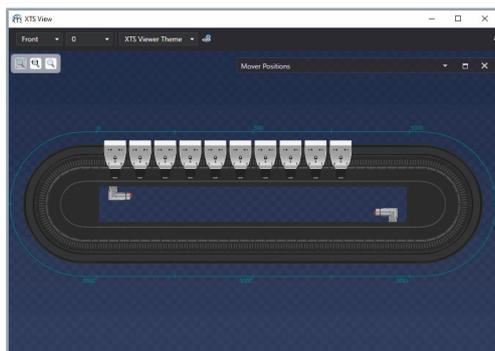
OR

- ▶ Click on the button **Continuous Update** to enable the continuous update

## 8.5.5 Create View



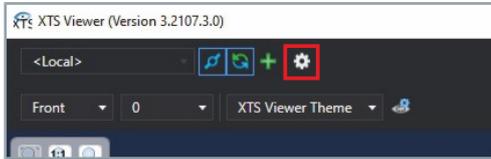
- ▶ Click on button **Additional View**



An additional XTS View opens.

## 8.5.6 Open Options... dialog box

Numerous options are available for configuring the XTS Views and for the basic settings of the XTS Tools. The settings of the XTS Views are stored in so-called themes. These themes can be edited and used by other windows with XTS View integration, such as the *XTS Tool Window*.

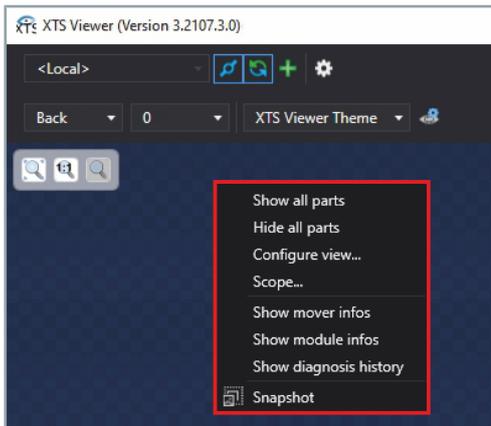


► Click on the button **Options...**

The dialog box *Options* opens.

Further information can be found in chapter "Dialog box Options...", [Page 353].

## 8.5.7 Open pop-up menu



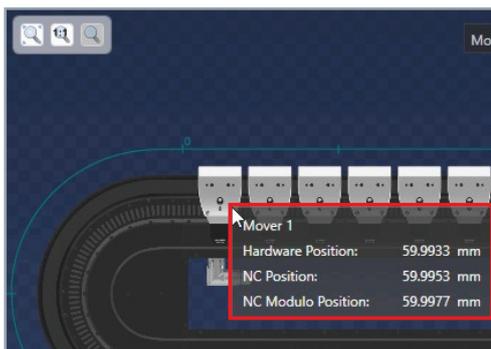
► Right-click on the background to open the pop-up menu

The pop-up menu opens. Further information can be found in chapter "Pop-up menu", [Page 337].

## 8.5.8 ToolTips

The ToolTips provide information on most of the *XTS Viewer* controls and components.

### 8.5.8.1 Mover



► Move the mouse pointer over the mover

The tooltip shows the name of the mover and its position.

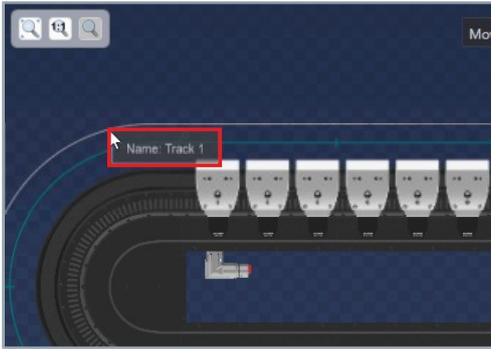
### 8.5.8.2 Modules



► Move the mouse pointer over the module

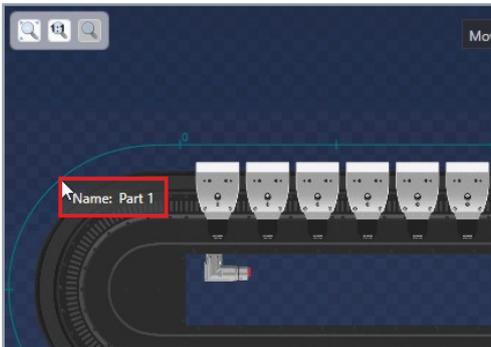
The tooltip shows the name and the type of the module as well as the affiliation to the part.

### 8.5.8.3 Tracks



- Move the mouse pointer over the track  
The tooltip shows the name of the track.

### 8.5.8.4 Parts



- Move the mouse pointer over the part  
The tooltip shows the name of the part.

## 8.6 XTS Support Assistant, Beta

The *XTS Support Assistant* collects debug information of the XTS system currently running on the TwinCAT target system. The desktop application stores the collected debug information in so-called reports. The reports can be sent to an XTS specialist or XTS support to get a quicker overview of the XTS system.

Currently reports can only be generated on the TwinCAT target PC. Running the *XTS Support Assistant* on an engineering PC does not provide all the required information.



The *XTS Support Assistant* is currently still in beta phase. In the future, even more functions and information will be available.

### 8.6.1 Open XTS Support Assistant

After you have successfully installed *TF5850 TC3 XTS Extension*, you can open the *XTS Support Assistant* like any other Windows application.

You can find the *XTS Support Assistant* as an icon on your desktop or under the file path *C:\TwinCAT\Functions\TF5850-TC3-XTS-Technology\TcXtsSupportAssistant*.



- ▶ Double-click on the **XTS Support Assistant** icon on your desktop

The *XTS Support Assistant* opens.

### 8.6.2 Operating elements

The list shows the most important controls:



#### Information area

Opens the input fields of the information area.



#### Drivers and versions

Opens the list of TwinCAT drivers and their versions.



#### Attachments

Opens the list of attachments.



#### Save

Opens the dialog box for saving the report.

## Controls in the attachments area

Boot Files

### Button *Boot Files*

Activates or deactivates whether the boot files should be sent as attachments.

Target Files

### Button *Target Files*

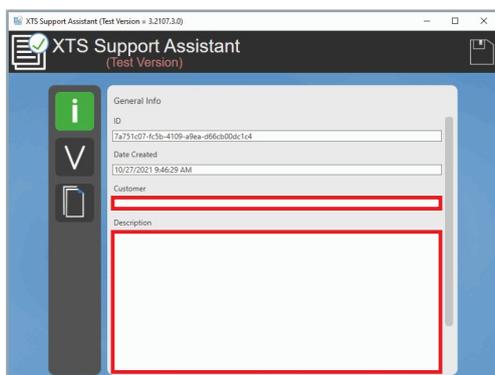
Activates or deactivates whether the target files should be sent as attachments.

TcloXts Dump Files

### Button *TcloXts Dump Files*

Activates or deactivates whether the TcloXts files should be sent as attachments.

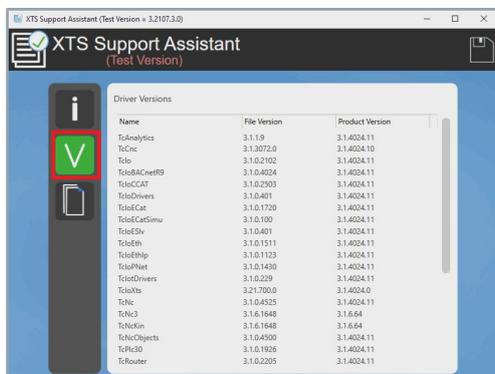
## 8.6.3 Information area



- ▶ Enter the customer name in the input field *Customer*
- ▶ Enter a detailed description of the problem in the field *Description*

The fields *ID* and *Date Created* are filled in automatically.

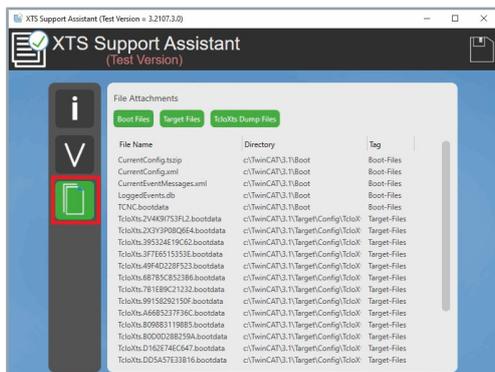
## 8.6.4 Driver versions



- ▶ Click on the button **Driver Versions**

The page *Drivers Versions* shows all installed TwinCAT drivers and the versions used.

## 8.6.5 Attachments



- ▶ Click on the button **File Attachments**

The page *File Attachments* shows all files that are sent as attachments. The files are divided into three categories:

- Boot Files
- Target Files
- TcloXts Dump Files

## Boot Files

## Target Files

## TcloXts Dump Files

The information that is sent as an attachment with the report is divided into the following categories:

The boot files are customer-specific files based on the project. For example, they contain the current project configuration without the PLC project and logged events from the application log.

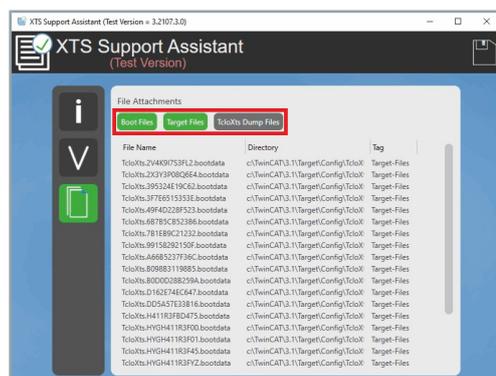
Target files are project-independent base files, such as system teaching files.

TcloXts Dump Files are files containing all relevant data written from the Processing Unit object or the XtsIoDrv object of the TcloXts Driver using the *WriteDump* parameter or the automatic dump functionality

### 8.6.5.1 Selecting

Beckhoff recommends sending as much information as possible with the report so that the product specialist responsible for your region has all the necessary information.

All categories are activated by default. Deactivated categories are excluded from the report.



- ▶ If required, click on the button **Boot Files**, **Target Files** or **TcloXts Dump Files** to deactivate the category and exclude it from the report

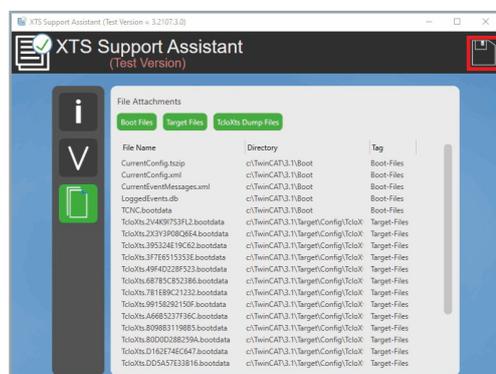
OR

- ▶ If required, click on the button **Boot Files**, **Target Files** or **TcloXts Dump Files** to activate the category and send it as attachments

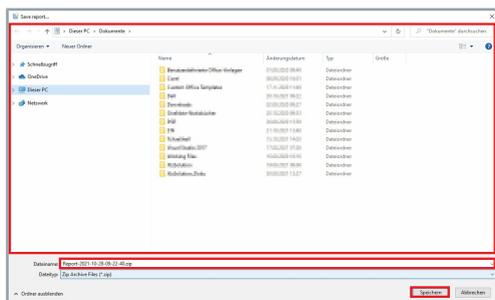
### Excluding a single file

Single files cannot be removed from the list of a category. You can exclude single files from the report only by moving the files from their original location to another location. After the report has been created, the files must be inserted back into their original location.

### 8.6.5.2 Saving



- ▶ Click on the **Save** button



The dialog box *Safe report...* opens.

- ▶ Select a file path
- ▶ Enter a name in the input field *File name*

By default, the file name consists of *Report*, the date and the time at which the *XTS Support Assistant* was started, for example *Report-2023-10-28-09-22-40.zip*

- ▶ Confirm with **Save**

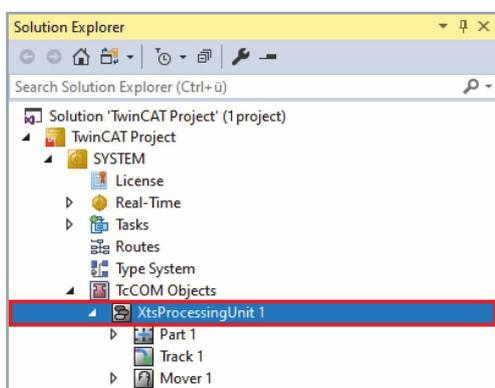
### 8.6.5.3 Writing dump files

The dump files can be written via the TcCom objects *XtsProcessingUnit* or *XtsIoDriver*.



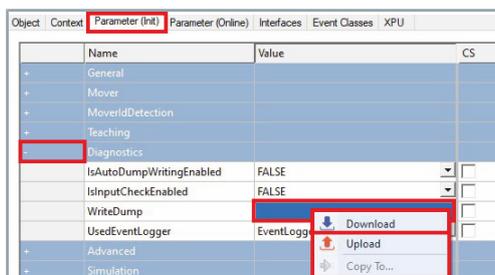
#### Example *XtsProcessingUnit*

Writing the dump files is shown using the TcCom object *XtsProcessingUnit* as an example.



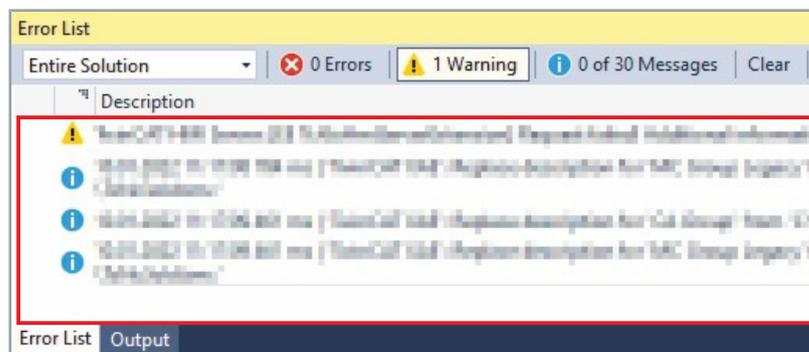
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects*
- ▶ Double click on **XtsProcessingUnit**

### Manual



- ▶ Click the **Parameter (Init)** tab in the project window
- ▶ Expand *Diagnostics*
- ▶ Right-click in the input field *Write Dump* to open the context menu
- ▶ In the context menu click **Download**

The dump files are written manually and stored in C:\ on your target PC.



The *Error List* and *Output* message windows display messages indicating that the dump files were written successfully.

## Automatic

Object	Context	Parameter (Init)	Parameter (Online)	Interfaces	Event Classes	XPU
		Name	Value			CS
+ General						
+ Mover						
+ MoverIdDetection						
+ Teaching						
- Diagnostics						
		IsAutoDumpWritingEnabled	FALSE			<input type="checkbox"/>
		IsInputCheckEnabled	FALSE			<input type="checkbox"/>
		WriteDump	TRUE			<input type="checkbox"/>
		UsedEventLogger	EventLogger			<input type="checkbox"/>
+ Advanced						
+ Simulation						

- ▶ Expand *Diagnostics*
- ▶ Select **TRUE** in the drop-down menu *IsAutoDumpWritingEnabled*

To apply the settings, the configuration must be reactivated and the TwinCAT system must be restarted.

- ▶ Restart TwinCAT

For example, the dump files are written automatically on events such as a Mover detection or a Mover ID detection and stored in C:\ on your target PC.

## 8.7 Pop-up menu

The pop-up menu is available in the *XTS Tool Window* and *XTS Viewer*.

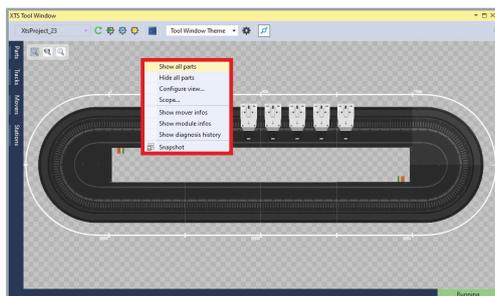


### Different display type

The color of the pop-up menu differs in the *XTS Tool Window* and in the *XTS Viewer*. The functionality is identical in both tools. The description of the functionality is illustrated using the *XTS Tool Window* as an example.

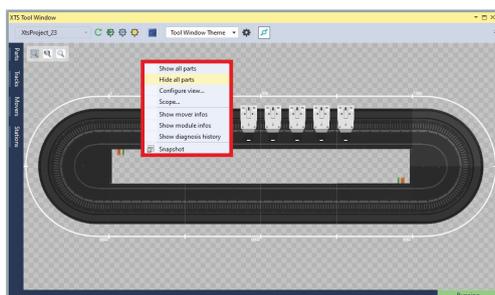
<i>XTS Tool Window</i>	<i>XTS Viewer</i>

### 8.7.1 Show parts



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Show all parts** in the pop-up menu to show all parts

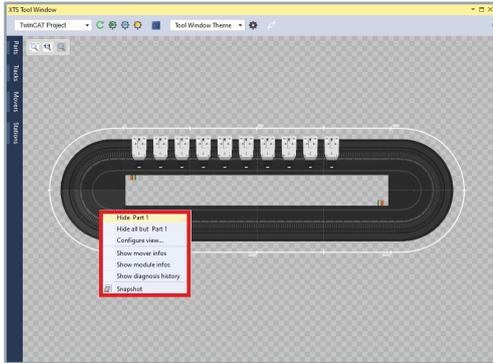
### 8.7.2 Hide parts



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Hide all parts** in the pop-up menu to hide all parts

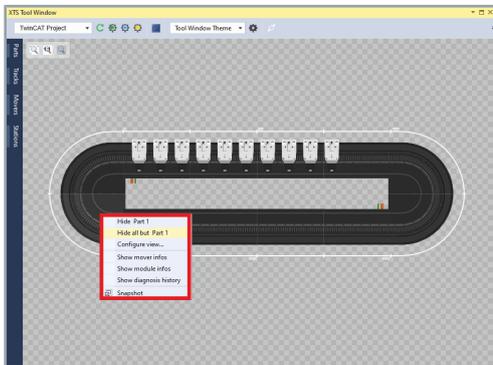
## 8.7.2.1 Hide a part

A pop-up menu with fewer setting options appears when you click on a module instead of the background.



- ▶ Right-click on the module to open the pop-up menu
- ▶ Click on **Hide Part 1** in the pop-up menu to hide Part 1

## 8.7.2.2 Do not hide a part

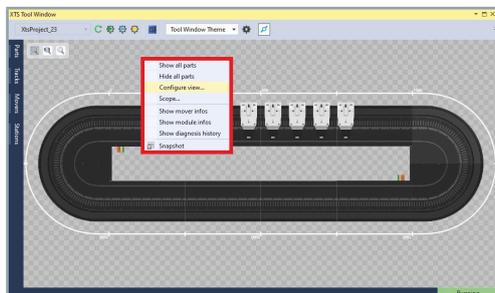


- ▶ Right-click on the module to open the pop-up menu
- ▶ Click on **Hide all but Part 1** in the pop-up menu to hide all parts except Part 1

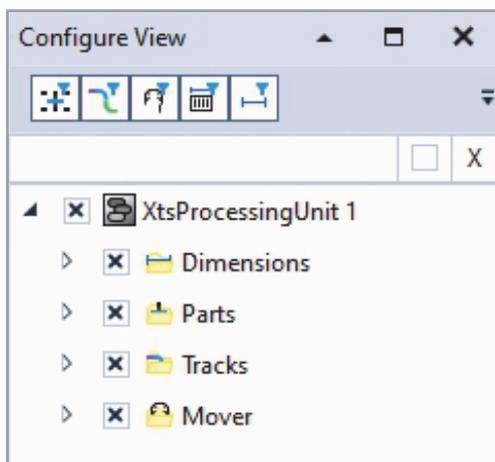
## 8.7.3 Configure View

The dialog box *Configure View...* is opened in the same way in the *XTS Tool Window* and in the *XTS Viewer*. The *XTS Viewer* also has an additional button to open the dialog box.

### Open dialog box in XTS Tool Window and XTS Viewer



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Configure View...** in the pop-up menu

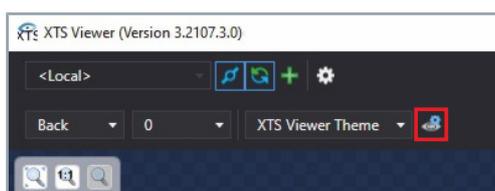


The dialog box *Configure View* opens.

- ▶ If required, adjust the positioning and opacity of the dialog box
- Further information can be found in chapter "Positioning and opacity", [Page 351].

The dialog box allows you to search for component types or for a specific component. You can also filter components and show or hide them.

### Open dialog box in XTS Viewer



- ▶ Click on button **Configure View**

The dialog box *Configure View* opens.

## 8.7.3.1 Controls

The list shows the most important controls:



### **Filter Parts**

Activates or deactivates the parts in the list.



### **Filter Tracks**

Activates or deactivates the tracks in the list.



### **Filter Mover**

Activates or deactivates the movers in the list.



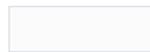
### **Filter Part Info Bars**

Activates or deactivates the part info bars and dimensions in the list.



### **Filter Info Bars**

Activates or deactivates the info bars in the list.



### **Component search input field**

Allows you to enter a search term. All components containing this term are searched for.



### **Exact search checkbox**

Activates or deactivates the search for an exact search term. If the checkbox is activated, only the component that exactly matches the search term is searched for.



### **Reset entries**

Deletes all entries in the Component search input field.

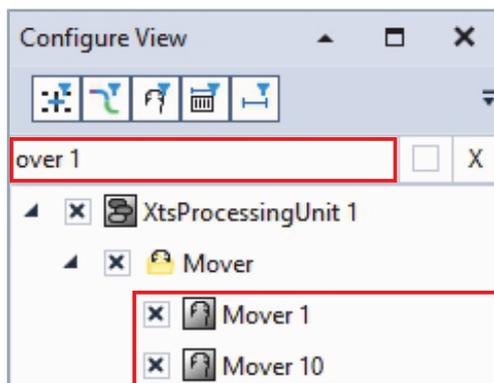
## 8.7.3.2 Search components

**Example search for Mover 1**

The effects of the spelling of a search term are illustrated using the search for Mover 1 as an example.

## Standard search

For the standard search, it is sufficient to enter only part of the search term. The upper or lower case of the search term is irrelevant.

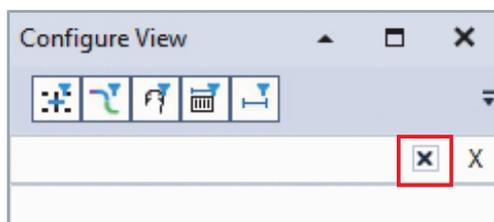


- ▶ Enter the search term **over 1** in the input field *Search*

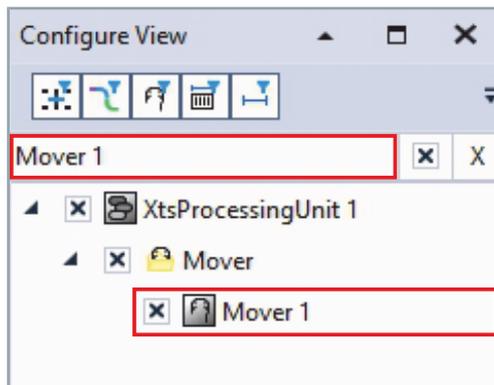
All components that contain the part of the search term are displayed in the results list. Both Mover 1 and Movers 10 to 19 contain the search term *over 1*.

## Exact search

With the exact search, the search term must be entered exactly. The upper or lower case of the search term is relevant.



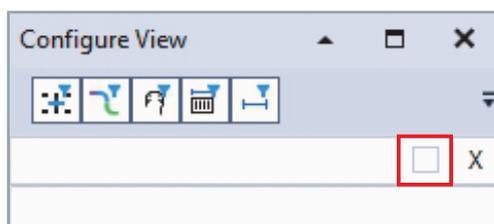
- ▶ Activate the checkbox **Exact text match**



- ▶ Enter the search term **Mover 1** in the input field *Search*

Only the component that corresponds exactly to the term entered is displayed in the results list. Only Mover 1 corresponds exactly to the search term. Movers 10 to 19 are not displayed as their name contains another digit.

If the search does not return a result, check the spelling of the search term. Pay attention to upper and lower case letters and the correct spelling of the search term.



Even if a new search does not return any results:

- ▶ Deactivate the checkbox **Exact text match** to use the standard search

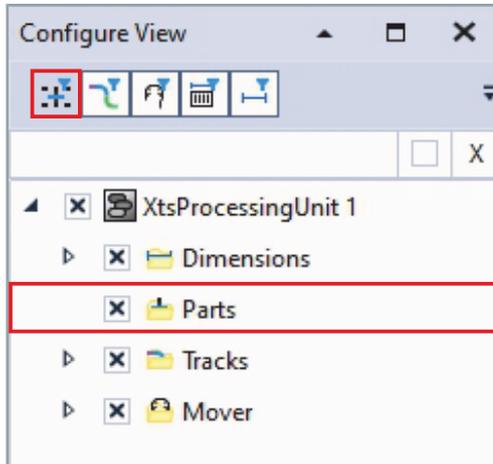
## 8.7.3.3 Filter components

You can filter by component type to show or hide certain components in the view. By default, all filters are enabled.



### Dependence of parts and tracks

It is not possible to hide only the part or the track. Parts and tracks are dependent on each other and can only be shown or hidden together. Single modules can also not be hidden.



#### ► Deactivate the button **Filter Parts**

The parts are deactivated and cannot be expanded in the *Configure View*.

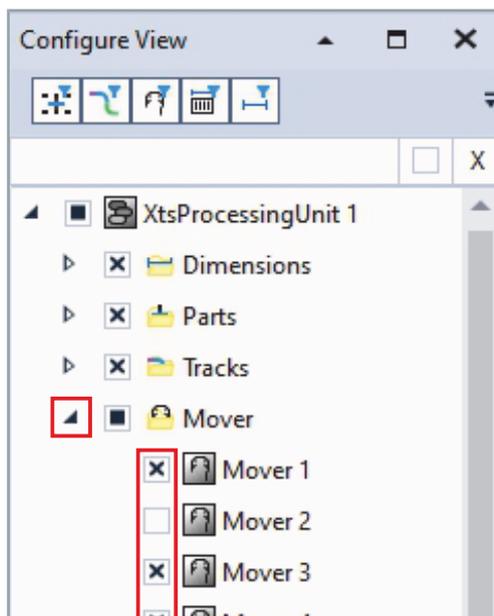
## 8.7.3.4 Show or hide components

You can use the list of components to show or hide single components or entire component types.

**Example Show or hide components**

Showing and hiding the components is illustrated using the movers as an example.

## Single components



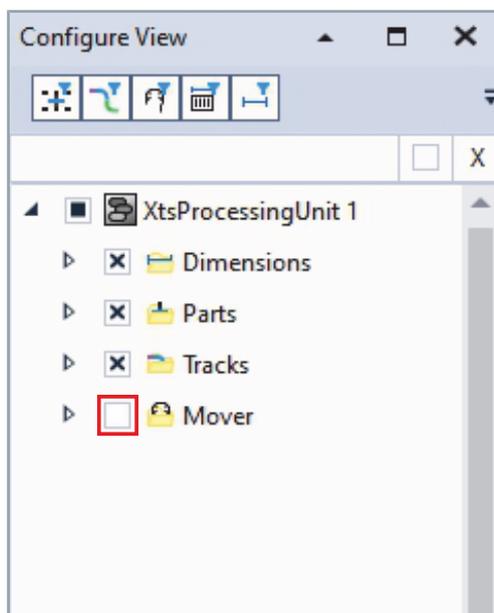
► Expand **Mover**

► Activate the checkbox of a mover to show the mover

OR

► Deactivate the checkbox of a mover to hide the mover

## Component group



► Activate the checkbox of the Mover component group to show all movers

OR

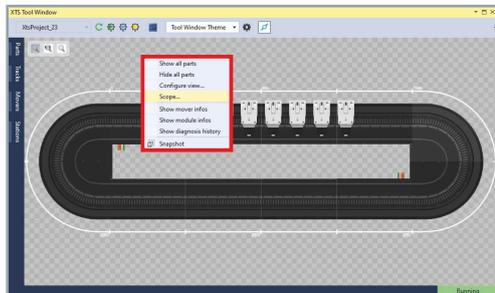
► Deactivate the checkbox of the Mover component group to hide all movers

## 8.7.4 Show scope

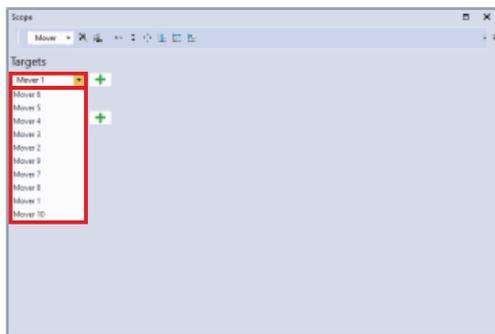


### Example scope for a mover and a parameter

The display of a scope is shown in the diagrams using Mover 1 and the parameter *Hardware Position* as an example. The procedure is identical for all movers and parameters.



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Scope...** in the pop-up menu



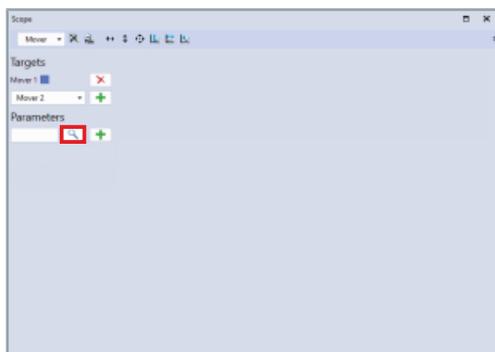
The dialog box *Scope* opens.

- ▶ If required, adjust the positioning and opacity of the dialog box
- Further information can be found in chapter "Positioning and opacity", [Page 351].

- ▶ Select a mover in the drop-down menu *Select target mode*



- ▶ Click on the button **+** to add the mover to the scope

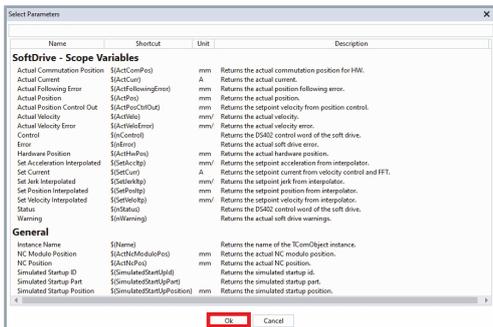


- ▶ Click the button

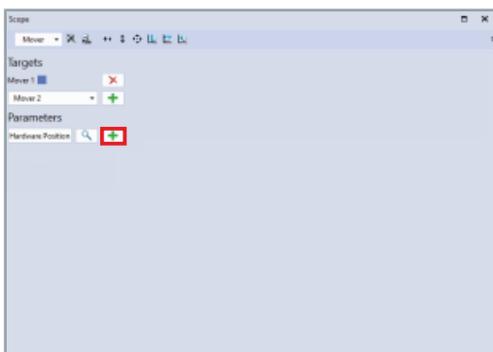
You have the possibility to select different parameters from the following categories:

- SoftDrive – Scope Variables
- General

The dialog box *Select Parameters* opens.



- ▶ Click on a parameter
- ▶ Confirm with **OK**

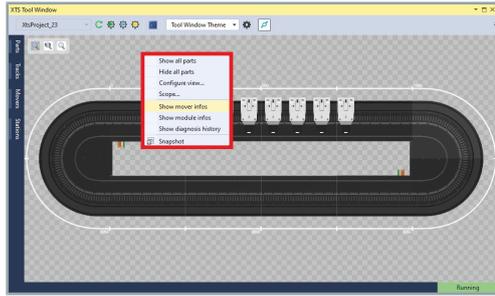


- ▶ Click on the button **+** to add the parameter



A scope for the selected mover and parameter is displayed.

## 8.7.5 Mover information



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Show mover infos** in the pop-up menu

Name	Hardware Position [mm]	NC Position [mm]	NC Module Position [mm]
XtsProcessingUnit 1			
Mover 1	2924.1911	2924.1983	2924.2000
Mover 2	140.0015	139.9947	140.0018
Mover 3	219.9987	219.9990	219.9959
Mover 4	299.9981	300.0070	299.9978
Mover 5	380.0088	379.9995	380.0021
Mover 6	459.9935	459.9979	459.9961
Mover 7	540.0090	540.0033	539.9990
Mover 8	620.0040	619.9970	619.9985
Mover 9	699.9941	700.0014	700.0023
Mover 10	780.0094	779.9938	779.9990

The dialog box *Movers* opens.

- ▶ If required, adjust the positioning and opacity of the dialog box
- Further information can be found in chapter "Positioning and opacity", [Page 351].

The positions of the movers are displayed.

- ▶ If required, click on the button to open the dialog box *Select Column Values*

You have the possibility to select different parameters from the following categories:

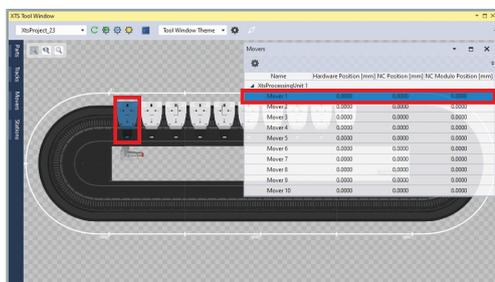
- SoftDrive – Scope Variables
- General

X	Name	Unit	Description
<input type="checkbox"/>	Actual Commutation Position	mm	Returns the actual commutation position for HW.
<input type="checkbox"/>	Actual Current	A	Returns the actual current.
<input type="checkbox"/>	Actual Following Error	mm	Returns the actual position following error.
<input type="checkbox"/>	Actual Position	mm	Returns the actual position.
<input type="checkbox"/>	Actual Position Control Out	mm	Returns the setpoint velocity from position control.
<input type="checkbox"/>	Actual Velocity	mm	Returns the actual velocity.
<input type="checkbox"/>	Actual Velocity Error	mm	Returns the actual velocity error.
<input type="checkbox"/>	Control		Returns the DS402 control word of the soft drive.
<input type="checkbox"/>	Error		Returns the actual soft drive error.
<input type="checkbox"/>	Hardware Position	mm	Returns the actual hardware position.
<input type="checkbox"/>	Set Acceleration Interpolated	mm	Returns the setpoint acceleration from interpolator.
<input type="checkbox"/>	Set Current	A	Returns the setpoint current from velocity control and FFT.
<input type="checkbox"/>	Set Jerk Interpolated	mm	Returns the setpoint jerk from interpolator.
<input type="checkbox"/>	Set Position Interpolated	mm	Returns the setpoint position from interpolator.
<input type="checkbox"/>	Set Velocity Interpolated	mm	Returns the setpoint velocity from interpolator.
<input type="checkbox"/>	Status		Returns the DS402 control word of the soft drive.
<input type="checkbox"/>	Warning		Returns the actual soft drive warnings.

The dialog box *Select Column Values* opens.

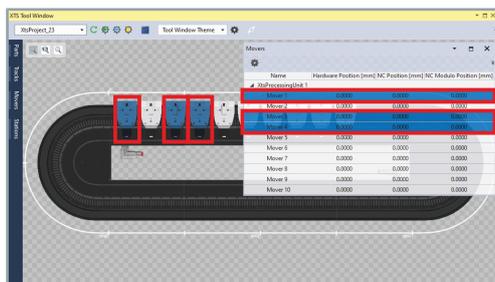
- ▶ Activate the checkboxes of the parameters
- OR
- ▶ Deactivate the checkboxes of the parameters
  - ▶ Confirm with **OK**

### Select Mover



- ▶ Click on a mover in the view
- OR
- ▶ Click on a mover in the dialog box *Movers*

The selected mover is highlighted in color in the *Movers* dialog box and in the view. This function facilitates the search for the corresponding mover and its position on the system.



▶ Click on a mover in the view

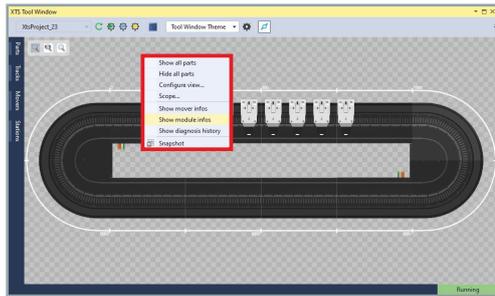
OR

▶ Click on a mover in the dialog box *Movers*

▶ Press and hold the **Ctrl** key to click on additional movers with the left mouse button

The selected movers are highlighted in color in the dialog box *Movers* and in the view. This function facilitates the search for the corresponding movers and their positions on the system.

### 8.7.6 Module information



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Show module infos** in the pop-up menu

The dialog box *Modules* opens.

Name	Length [mm]	Type	DriveBtn Angle [deg]
XtsProcessingUnit 1			
Part 1			
Module 1	250	AT2001_0250	0
Module 2	250	AT2000_0250	0
Module 3	250	AT2000_0250	0
Module 4	250	AT2000_0250	0
Module 5	250	AT2050_0500	90
Module 6	250	AT2050_0501	90
Module 7	250	AT2001_0250	0
Module 8	250	AT2000_0250	0
Module 9	250	AT2000_0250	0
Module 10	250	AT2000_0250	0
Module 11	250	AT2050_0500	90
Module 12	250	AT2050_0501	90

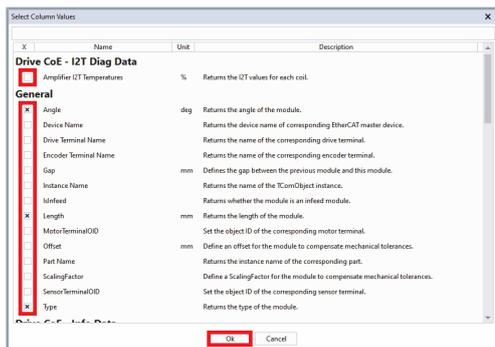
The dialog box *Modules* opens.

- ▶ If required, adjust the positioning and opacity of the dialog box
- Further information can be found in chapter "Positioning and opacity", [Page 351].

- ▶ If required, click on the button to open the dialog box *Select Column Values*

You have the possibility to select different parameters from the following categories:

- Drive CoE – I2T Diag Data
- General
- Drive CoE – Info Data
- Drive CoE – Vendor Data
- Drive CoE – General
- Drive CoE – Amplifier Settings
- Drive Info



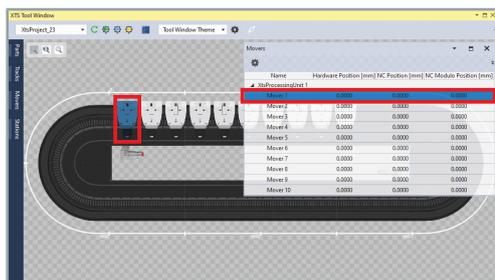
The dialog box *Select Column Values* opens.

- ▶ Activate the checkboxes of the parameters

OR

- ▶ Deactivate the checkboxes of the parameters
- ▶ Confirm with **OK**

### Selecting modules

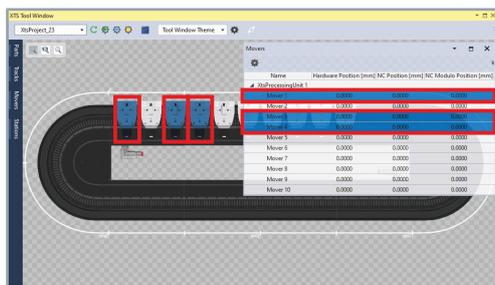


- ▶ Click on a module in the view

OR

- ▶ Click on a module in the dialog box *Modules*

The selected module is highlighted in color in the dialog box *Modules* and in the view. This function facilitates the search for the corresponding module and its position on the system.



► Click on a module in the view

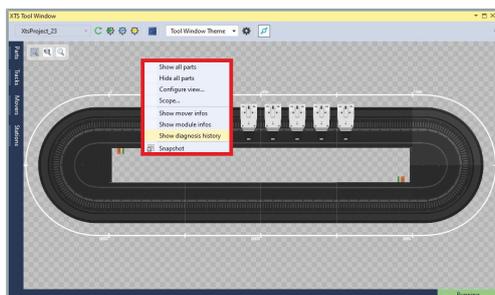
OR

► Click on a module in the dialog box *Moves*

► Press and hold the **Ctrl** key to click on additional modules with the left mouse button

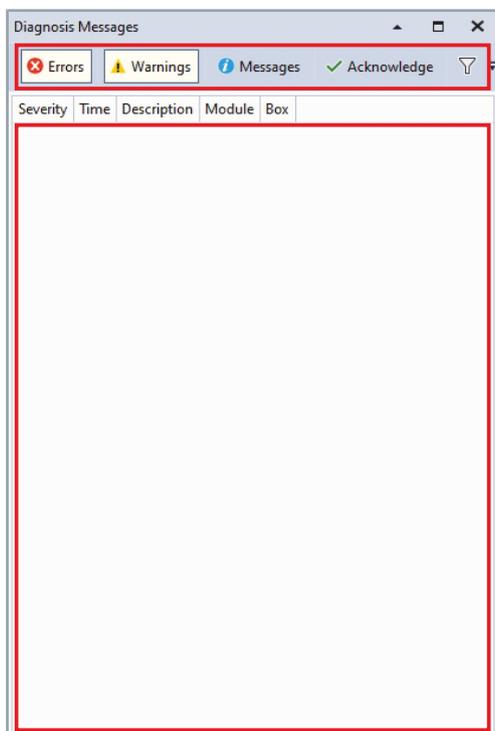
The selected modules are highlighted in color in the dialog box *Moves* and in the view. This function facilitates the search for the corresponding modules and their position on the system.

## 8.7.7 Diagnostic process



► Right-click on the background to open the pop-up menu

► Click on **Show diagnosis history** in the pop-up menu



The dialog box *Diagnosis Messages* opens.

► If required, adjust the positioning and opacity of the dialog box

Further information can be found in chapter "Positioning and opacity", [Page 351].

Error messages, warning messages and notes are displayed in the dialog box.

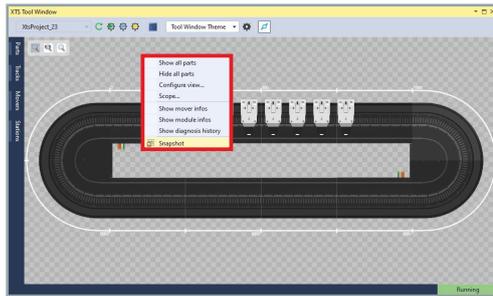
► Click on a module to display the associated error messages, warning messages and notes

► If required, activate the buttons **Errors**, **Warnings** and **Messages** to display the corresponding messages

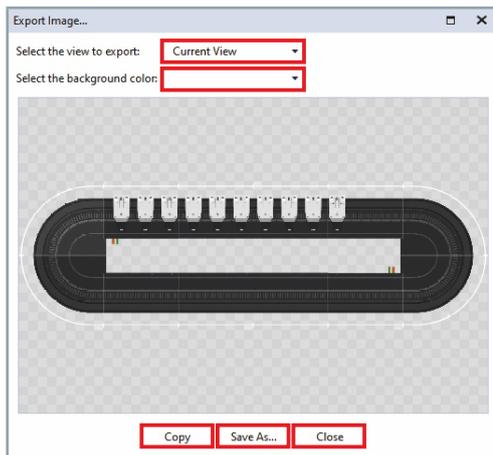
OR

► If required, deactivate the buttons **Errors**, **Warnings** and **Messages** to hide the corresponding messages

## 8.7.8 Save view



- ▶ Right-click on the background to open the pop-up menu
- ▶ Click on **Snapshot** in the pop-up menu



The dialog box *Export Image...* opens.

- ▶ If required, adjust the positioning and opacity of the dialog box
- Further information can be found in chapter "Positioning and opacity", [Page 351].

- ▶ Select **Current View** in the drop-down menu *Select the view to export* to save only one view of the system without borders

OR

- ▶ Select **Full View** in the drop-down menu *Select the view to export* to save the entire view
- ▶ If required, select a color for the background in the drop-down menu *Select the background color*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

- ▶ Click on **Copy** to copy the view to the clipboard

OR

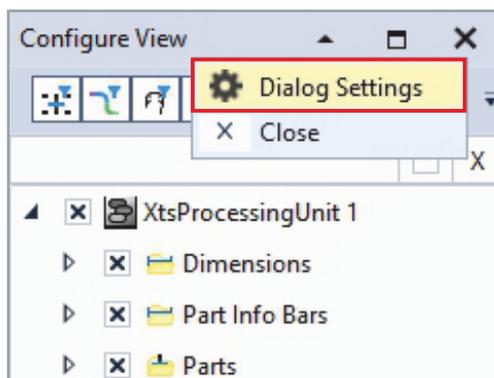
- ▶ Click on **Save As...** to save the view as a png image and select the storage location

OR

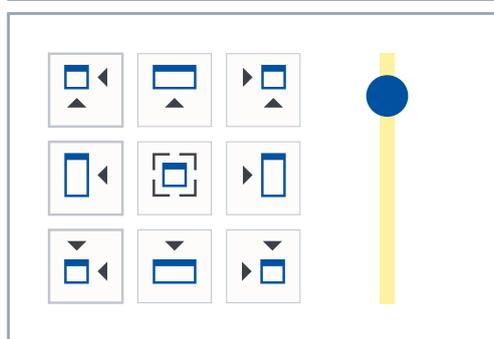
- ▶ Cancel with **Close**

## 8.7.9 Positioning and opacity

The dialog box opened with the pop-up menu can be positioned as required in the *XTS Tool Window* or in the *XTS Viewer*. You can also use the buttons in the dialog box *Dialog Settings* to position the respective dialog box at the outer edges and set the opacity.



- ▶ Right-click on the header of the dialog box to open the context menu
- ▶ Click on **Dialog Settings**

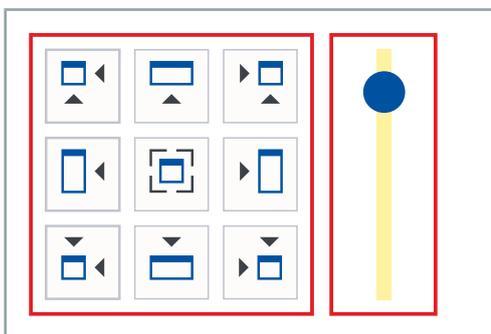


The dialog box *Dialog Settings* opens.

## 8.7.9.1 Controls

The list shows the most important controls:

- 
**Top left**  
 Aligns the dialog box at the top left of the open XTS tool.
- 
**Top**  
 Aligns the dialog box at the top across the entire width of the open XTS Tool.
- 
**Top right**  
 Aligns the dialog box at the top right of the open XTS Tool.
- 
**Left**  
 Aligns the dialog box to the left over the entire height of the open XTS Tool.
- 
**Middle**  
 Aligns the dialog box to the middle of the open XTS Tool.
- 
**Right**  
 Aligns the dialog box to the right over the entire height of the open XTS Tool.
- 
**Bottom left**  
 Aligns the dialog box at the bottom left of the open XTS Tool.
- 
**Bottom**  
 Aligns the dialog box at the bottom across the entire width of the open XTS Tool.
- 
**Bottom right**  
 Aligns the dialog box at the bottom right of the open XTS Tool.
- 
**Opacity slider**  
 Sets the opacity for the dialog box.



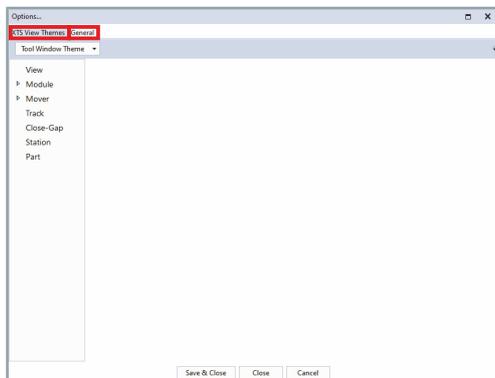
- ▶ Click on a button to set the orientation for the dialog box
- ▶ Use the slider **Opacity** to set the opacity for the dialog box

## 8.8 Dialog box Options...



### The dialog box Options... is valid for all XTS Tools

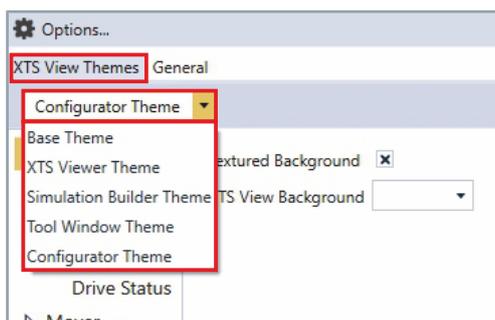
This chapter describes all the settings that you can make in all XTS Tools in the dialog box *Options...*



In the dialog box *Options...*, you can adjust the settings for the XTS Views using the tabs *XTS View Themes* and *General*.

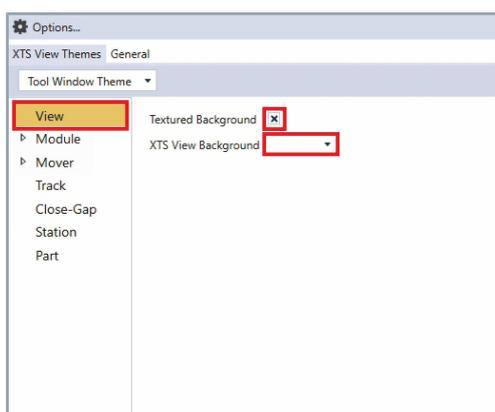
### 8.8.1 XTS View Themes

First, a theme must be selected for which the settings are to be adjusted.



- ▶ Click on the tab **XTS View Themes**
- ▶ Select the theme you want to adjust from the drop-down menu
  - Base Theme
  - XTS Viewer Theme
  - Simulation Builder Theme
  - Tool Window Theme
  - Configurator Theme

#### 8.8.1.1 View

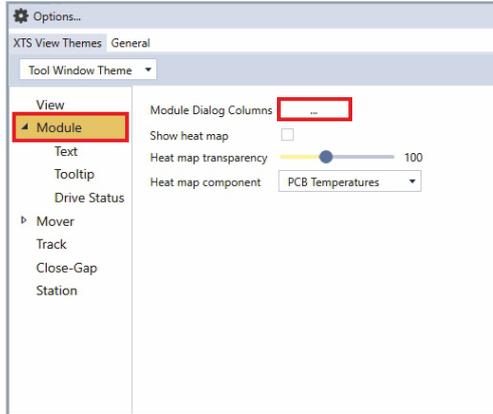


- ▶ Click on **View**
  - ▶ Activate the checkbox **Textured Background** to display a textured background
- OR
- ▶ Deactivate the checkbox **Textured Background** to display a single-color background
  - ▶ Select a color from the drop-down menu *XTS View Background*

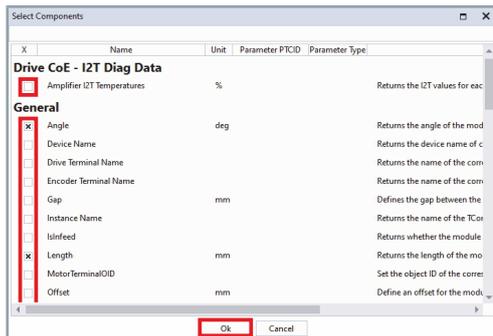
Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

Property	Explanation	Default setting
Textured Background	Textured background, chessboard pattern	Enabled
XTS View Background	Color for the background in XTS View	AliceBlue

## 8.8.1.2 Modules



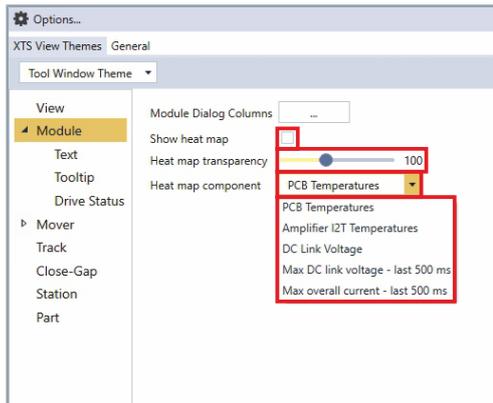
- ▶ Expand *Module*
- ▶ Click on ... of *Module Dialog Columns* to open the dialog box *Select Components*



The dialog box *Select Components* opens.

- ▶ Activate the parameter checkbox to select the parameter
- OR

- ▶ Deactivate the parameter checkbox to remove the parameter from the selection
- ▶ Confirm with **OK**



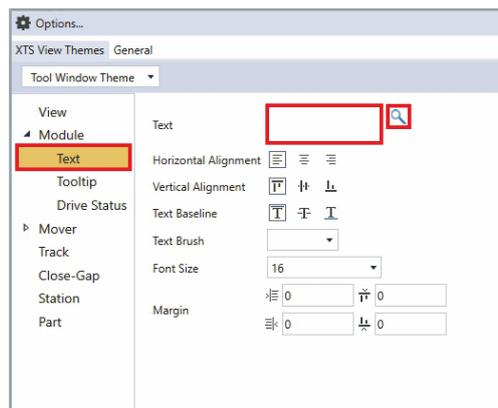
- ▶ Activate the checkbox **Show heat map** to display the temperature

OR

- ▶ Deactivate the checkbox **Show heat map** to hide the temperature
- ▶ Set opacity with the slider **Temperature heat map transparency**
- ▶ Select the component in the drop-down menu *Heat map component* whose temperature is to be displayed

Property	Explanation	Default setting
Show heat map	Temperature display	Disabled
Heat map transparency	Slider for the opacity of the temperature display	100
Heat map component	Selection of the component	PCB Temperatures
• PCB Temperatures	PCB Temperatures	—
• Amplifier I2T Temperatures	I2T controller temperatures	—
• DC Link Voltage	Direct current voltage	—
• Max DC link voltage - last 500 ms	Maximum DC voltage of the last 500 ms	—
• Max overall current - last 500 ms	Maximum overall current of the last 500 ms	—

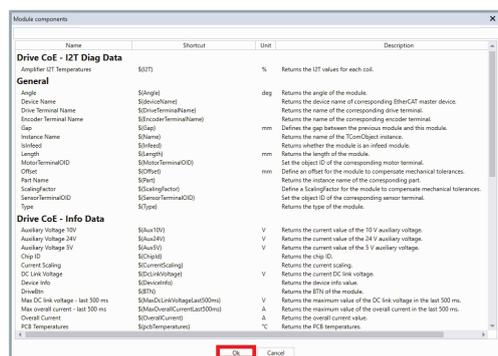
## Text



- ▶ Click on **Text**
- ▶ If required, enter a parameter in the input field *Text*

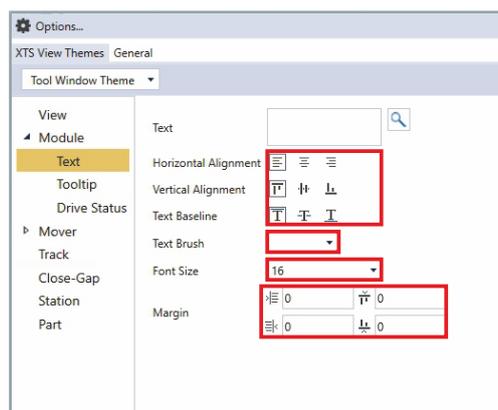
OR

- ▶ Click on **Browse** to open the dialog box *Module Components*



The dialog box *Module Components* opens.

- ▶ Click on a parameter
- ▶ Confirm with **OK**



- ▶ Click on the buttons at **Horizontal Alignment**, **Vertical Alignment** and **Text Baseline** to select the alignment of the text

- ▶ Choose a color from the drop-down menu *Text Brush*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

- ▶ Select the preset value in the drop-down menu *Font Size*

OR

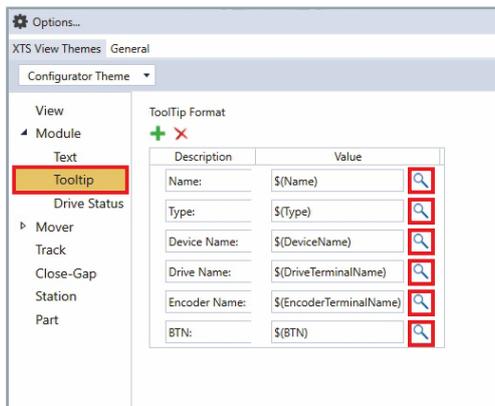
- ▶ Enter a value in the input field *Font Size*

- ▶ Enter values for the distances between the text and the frame in the input fields *Margin*

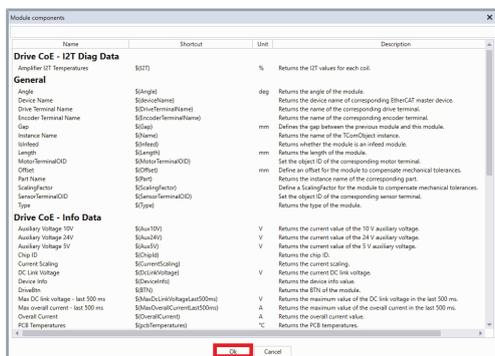
Property	Explanation	Default setting
Text	Input field for a parameter displayed on the modules.	–
Horizontal Alignment	Horizontal alignment of the text to the module	Left
☰ Left	Left aligned	–
☰ Center	Centered	–
☰ Right	Right aligned	–
Vertical Alignment	Vertical alignment of the text to the module	Top
☰ Top	Top	–
☰ Center	Centered	–
☰ Bottom	Bottom	–
Text Baseline	Text baseline	Top
☰ Top	Top	–
☰ Middle	Middle	–
☰ Bottom	Bottom	–
Text Brush	Font color	AliceBlue
Font Size	Font size	16
Margin	Distance of the text to the frame	–
☰ Left	Left	0
☰ Right	Right	0
☰ Top	Top	0
☰ Bottom	Bottom	0

## ToolTip

Use the *ToolTip* parameters to specify which information is displayed when you move the mouse over the modules.



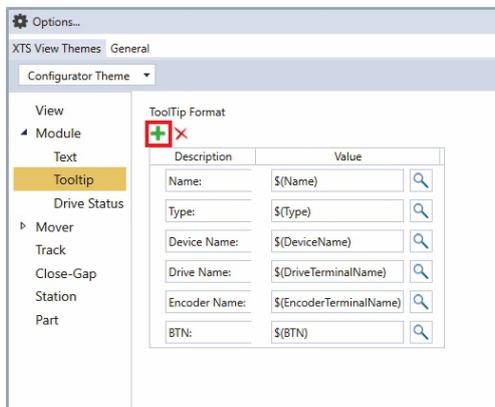
- ▶ Click on **ToolTip**
- ▶ Click on **Browse** to open the dialog box *Module Components*



The dialog box *Module Components* opens.

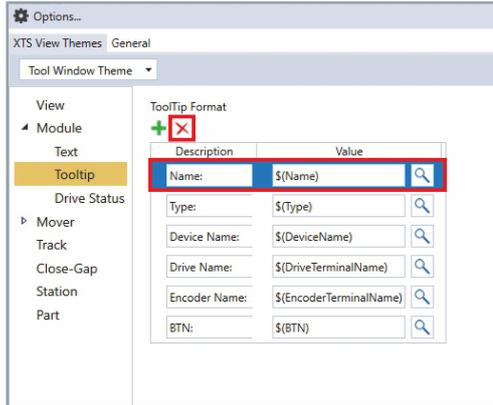
- ▶ Click on a parameter
- ▶ Confirm with **OK**

## Add ToolTip



- ▶ Click on the button **+** to add a new tooltip
- A new tooltip is added to the list.

## Remove tooltip

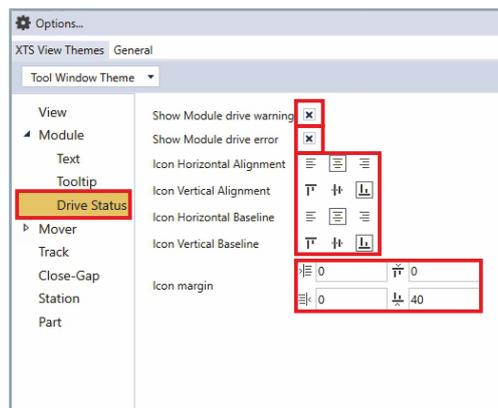


► Click on a tooltip to be removed

► Click on the button **x** to remove the selected tooltip from the list

The tooltip is removed from the list.

## Drive Status



► Click on **Drive Status**

► Activate the checkbox **Show Module drive warning** to display warnings

OR

► Deactivate the checkbox **Show Module drive warning** to hide warnings

► Activate the checkbox **Show Module drive error** to display error messages

OR

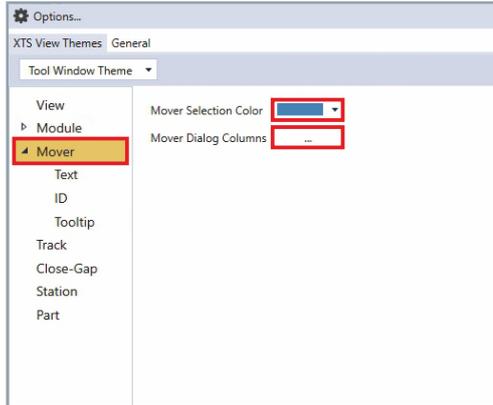
► Deactivate the checkbox **Show Module drive error** to hide error messages

► Click on the buttons of **Icon Horizontal Alignment**, **Icon Vertical Alignment**, **Icon Horizontal Baseline** and **Icon Vertical Baseline** to select the alignment of the icon

► Enter values for the distances between the icon and the frame in the input fields *Icon margin*

Property	Explanation	Default setting
Show Module drive warning	Display of the module warning	Enabled
Show Module drive error	Display of the module error	Enabled
Icon Horizontal Alignment	Horizontal alignment of the icon	Center
☰ Left	Left aligned	–
☰ Center	Centered	–
☰ Right	Right aligned	–
Icon Vertical Alignment	Vertical alignment of the icon	Bottom
☰ Top	Top	–
☰ Center	Centered	–
☰ Bottom	Bottom	–
Icon Horizontal Baseline	Horizontal icon baseline	Center
☰ Left	Left aligned	–
☰ Center	Centered	–
☰ Right	Right aligned	–
Icon Vertical Baseline	Vertical icon baseline	Bottom
☰ Top	Top	–
☰ Center	Centered	–
☰ Bottom	Bottom	–
Icon margin	Distance icon to frame	–
☰ Left	Left	0
☰ Right	Right	0
☰ Top	Top	0
☰ Bottom	Bottom	0

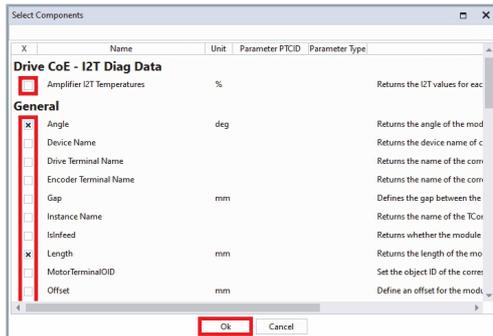
## 8.8.1.3 Mover



- ▶ Expand *Mover*
- ▶ Select a color for selected movers from the drop-down menu *Mover Selection Color*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

- ▶ Click on ... of *Mover Dialog Columns* to open the dialog box *Select Components*



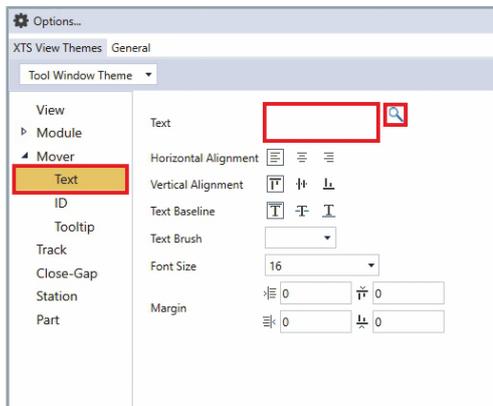
The dialog box *Select Components* opens.

- ▶ Activate the parameter checkbox to select the parameter

OR

- ▶ Deactivate the parameter checkbox to remove the parameter from the selection
- ▶ Confirm with **OK**

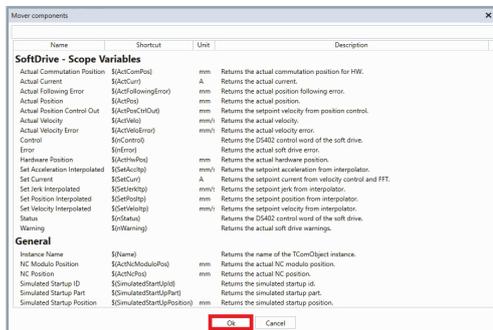
## Text



- ▶ Click on **Text**
- ▶ If required, enter parameter in the input field *Text*

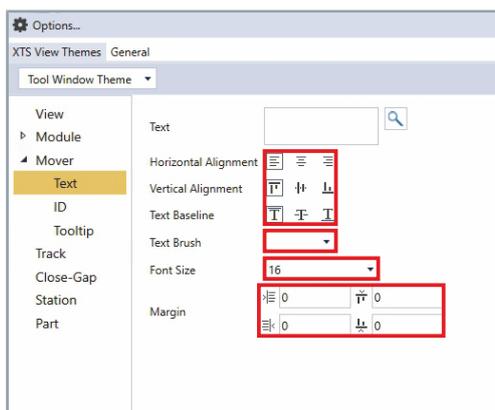
OR

- ▶ Click on **Browse** to open the dialog box *Mover Components*



The dialog box *Mover Components* opens.

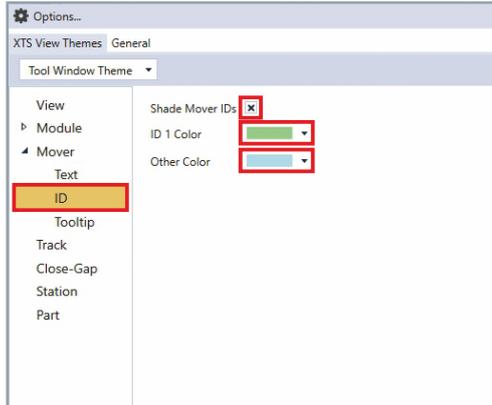
- ▶ Click on a parameter
- ▶ Confirm with **OK**



- ▶ Click on the buttons at **Horizontal Alignment**, **Vertical Alignment** and **Text Baseline** to select the alignment of the text
  - ▶ Choose a color from the drop-down menu *Text Brush*
- Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].
- ▶ Select the preset value in the drop-down menu *Font Size*
- OR
- ▶ Enter a value in the input field *Font Size*
  - ▶ Enter values for the distances between the text and the frame in the input fields *Margin*

Property	Explanation	Default setting
Text	Input field for parameters displayed on the movers	—
Horizontal Alignment	Horizontal alignment of the text to the module	Left
☰ Left	Left aligned	—
☰ Center	Centered	—
☰ Right	Right aligned	—
Vertical Alignment	Vertical alignment of the text to the mover	Top
☰ Top	Top	—
☰ Center	Centered	—
☰ Bottom	Bottom	—
Text Baseline	Text baseline	Top
☰ Top	Top	—
☰ Middle	Middle	—
☰ Bottom	Bottom	—
Text Brush	Font color	AliceBlue
Font Size	Font size	16
Margin	Distance of the text to the frame	—
☰ Left	Left	0
☰ Right	Right	0
☰ Top	Top	0
☰ Bottom	Bottom	0

## ID



- ▶ Click on **ID**
- ▶ Activate the checkbox **Shade Mover IDs** to highlight the Mover IDs

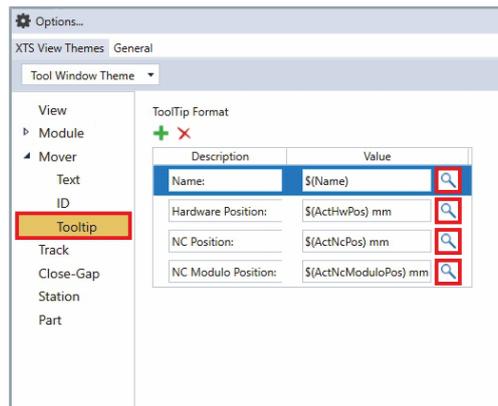
OR

- ▶ Deactivate the checkbox **Shade Mover IDs** to not highlight the Mover IDs
- ▶ Select a color for the color highlighting of Mover 1 in the drop-down menu *ID 1 Color*
- ▶ Select a color for the color highlighting of the movers in the drop-down menu *Other Color*

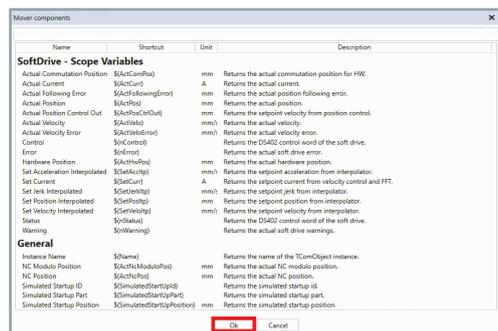
Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

Property	Explanation	Default setting
Shade Mover IDs	Color highlighting of the Mover IDs	Enabled
ID 1 Color	Color for highlighting the selected Movers 1	PaleGreen
Other Color	Color for highlighting the selected movers	Steelblue

## Tooltip



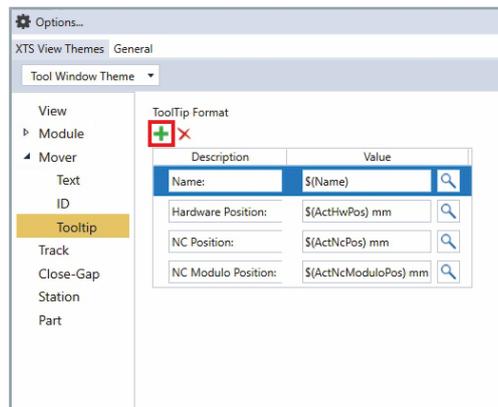
- ▶ Click on **Tooltip**
- ▶ Click on **Browse** to open the dialog box *Mover Components*



The dialog box *Mover Components* opens.

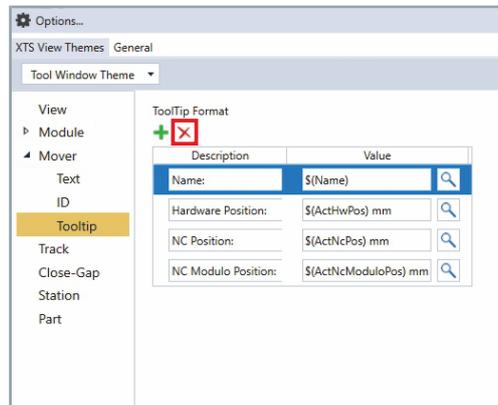
- ▶ Click on a parameter
- ▶ Confirm with **OK**

## Add Tooltip



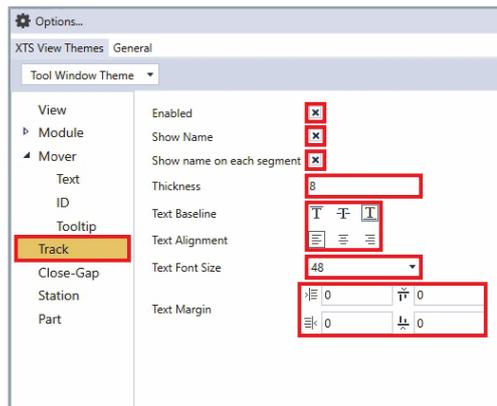
- ▶ Click on the button **+** to add a new tooltip
- A new tooltip is added to the list.

## Remove tooltip



- ▶ Click on a tooltip to be removed
  - ▶ Click on the button **x** to remove the selected tooltip from the list
- The tooltip is removed from the list.

## 8.8.1.4 Track



- ▶ Activate checkboxes **Enabled**, **Show Name** and **Show name on each segment**

OR

- ▶ Deactivate the checkboxes **Enabled**, **Show Name** and **Show name on each segment**

- ▶ If necessary, change the value in the input field *Thickness*

- ▶ Click on the buttons at **Text Baseline** and **Text Alignment** to select the alignment of the text

- ▶ Select the preset value in the drop-down menu *Text Font Size*

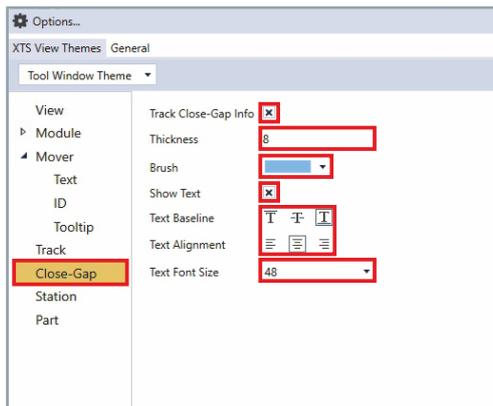
OR

- ▶ Enter a value in the input field *Text Font Size*

- ▶ Enter values for the distance between the text and the frame in the input fields *Text Margin*

Property	Explanation	Default setting
Enabled	Display of track information	Enabled
Show Name	Track name	Enabled
Show name on each segment	Name of the track for each segment	Enabled
Thickness	Line width	8
Text Baseline	Text baseline	Top
T Top	Top	—
⌵ Middle	Middle	—
I Bottom	Bottom	—
Text Alignment	Text alignment	Left
≡ Left	Left aligned	—
≡ Center	Centered	—
≡ Right	Right aligned	—
Text Font Size	Font size	48
Text Margin	Distance of the text to the frame	—
⌵ Left	Left	0
⌵ Right	Right	0
⌵ Top	Top	0
⌵ Bottom	Bottom	0

## 8.8.1.5 Close-Gap



► Click on **Close-Gap**

► Activate the checkbox **Track Close-Gap Info** to display the distance from the start point to the endpoint of the track

OR

► Deactivate the checkbox **Track Close-Gap Info** to hide the distance from the start point to the endpoint of the track

► If necessary, change the value in the input field *Thickness*

► Choose a color from the drop-down menu *Brush*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

► Activate the checkbox **Show Text** to show the text

OR

► Deactivate the checkbox **Show Text** to hide the text

► Click on the buttons at **Text Baseline** and **Text Alignment** to select the alignment of the text

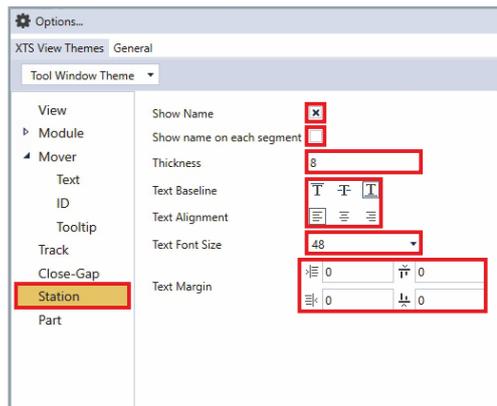
► Select the preset value in the drop-down menu *Text Font Size*

OR

► Enter a value in the input field *Text Font Size*

Property	Explanation	Default setting
Track Close-Gap Info	Display of the distance from the start point to the endpoint of the track	Enabled
Thickness	Line width	8
Brush	Font color	LightSkyBlue
Show text	Display of the text	Enabled
Text Baseline	Text baseline	Bottom
⌈ Top	Top	–
⌋ Middle	Middle	–
⌋ Bottom	Bottom	–
Text Alignment	Text alignment	Center
≡ Left	Left aligned	–
≡ Center	Centered	–
≡ Right	Right aligned	–
Text Font Size	Font size	48

## 8.8.1.6 Station



► Click on **Station**

► Activate the checkbox **Show Name** to display the name of the station

OR

► Deactivate the checkbox **Show Name** to hide the name of the station

► Activate the checkbox **Show name on each segment** to display the name of the station on each segment

OR

► Deactivate the checkbox **Show name on each segment** to hide the name at each station

► If necessary, change the value in the input field *Thickness*

► Click on the buttons at **Text Baseline** and **Text Alignment** to select the alignment of the text

► Select the preset value in the drop-down menu *Text Font Size*

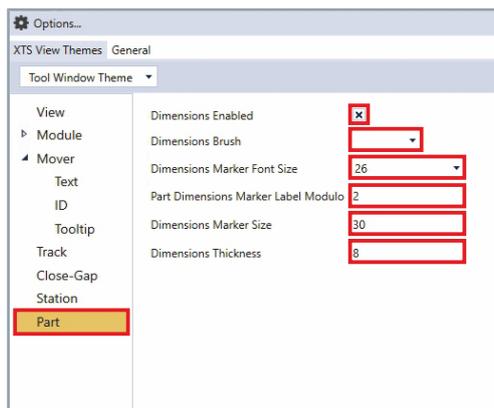
OR

► Enter a value in the input field *Text Font Size*

► Enter values for the distance between the text and the frame in the input fields *Text Margin*

Property	Explanation	Default setting
Show Name	Display of the name of the station	Enabled
Show name on each segment	Display of the name of the station on each segment	Disabled
Thickness	Line width	8
Text Baseline	Text baseline	Top
Top	Top	–
Middle	Middle	–
Bottom	Bottom	–
Text Alignment	Text alignment	Left
Left	Left aligned	–
Center	Centered	–
Right	Right aligned	–
Text Font Size	Font size	48
Text Margin	Distance of the text to the frame	–
Left	Left	0
Right	Right	0
Top	Top	0
Bottom	Bottom	0

## 8.8.1.7 Part



- ▶ Click on **Part**
- ▶ Activate the checkbox **Dimensions Enabled** to show the dimensions of the part

OR

- ▶ Deactivate the checkbox **Dimensions Enabled** to hide the dimensions of the part

- ▶ Choose a color from the drop-down menu *Dimensions Brush*

Further information can be found in chapter "Drop-down menu Brush | Color", [Page 374].

- ▶ Select the preset value in the drop-down menu *Dimensions Marker Font Size*

OR

- ▶ Enter a value in the input field *Dimensions Marker Font Size*
- ▶ If necessary, change the values in the input fields *Part Dimensions Marker Label Modulo*, *Dimensions Marker Size* and *Dimensions Thickness*

Property	Explanation	Default setting
Dimensions Enabled	Display of the part dimensions	Enabled
Dimensions Brush	Color of the dimensions	AliceBlue
Dimensions Marker Font Size	Font size for the dimensions at the marker	26
Part Dimensions Marker Label Modulo	Interval for displaying the label of the part dimensions at the marker	2
Dimensions Marker Size	Length of the marker of the dimensions	30
Dimensions Thickness	Width of the marker of the dimensions	8

## 8.8.2 General

General settings can be made in the *General* tab.

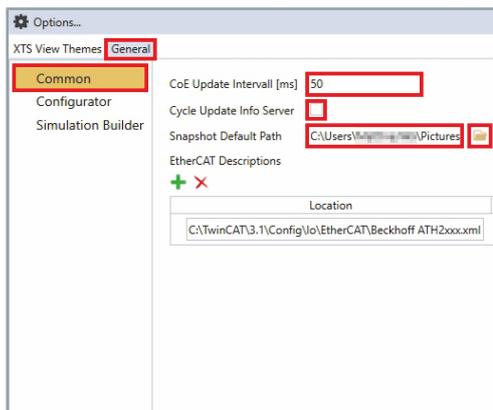
### 8.8.2.1 Common

#### NOTICE

##### Do not change the Common parameter

The parameters *Common* should not be changed in order to avoid communication errors.

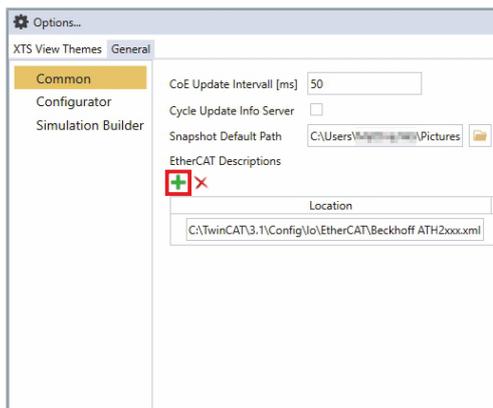
Proceed as follows if you need to change the parameters *Common*:



- ▶ Click on the **General** tab
  - ▶ Click on **Common**
  - ▶ If required, change the value in the input field *CoE Update Interval [ms]*
  - ▶ Activate the checkbox **Cycle Update Info Server**
- OR
- ▶ Deactivate the checkbox **Cycle Update Info Server**
  - ▶ Enter a storage location for the snapshots in the input field *Snapshot Default Path*
- OR
- ▶ Click on **Browse** to open the dialog box *Browse For Folder* and select a storage location for the snapshots

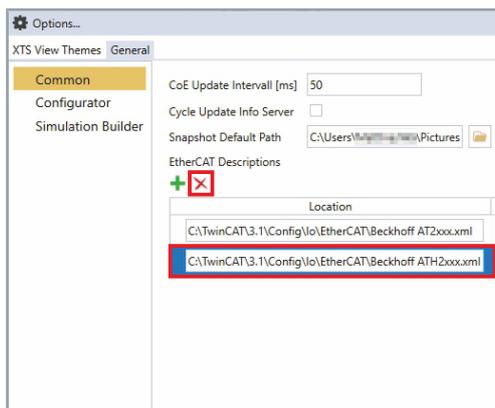
Property	Explanation	Default setting
CoE Update Intervall [ms]	CoE update interval	50
Cycle Update Info Server	Cycle update info server	Disabled

### Addition of an EtherCAT Description



- ▶ Click on the button **+** to add a file path

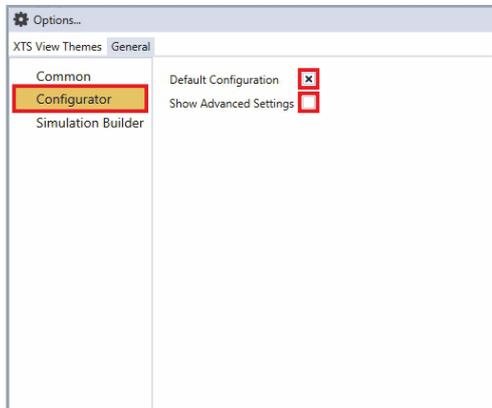
## Removing an EtherCAT Description



- ▶ Click on a file path that is to be removed
  - ▶ Click on the button **x** to remove the selected file path
- The file path is removed from the list.

## 8.8.2.2 Configurator

By default, the *Default Configuration* creates a part and a track with all necessary settings. This setting is useful if you want to configure a closed XTS system with the XTS Configurator. If you work mainly with Track Management, this setting should be disabled.



► Click on **Configurator**

► Activate the checkbox **Default Configuration** to configure a closed system

OR

► Deactivate the checkbox **Default Configuration** to configure a system with Track Management

► Activate the checkbox **Show Advanced Settings** to show advanced settings

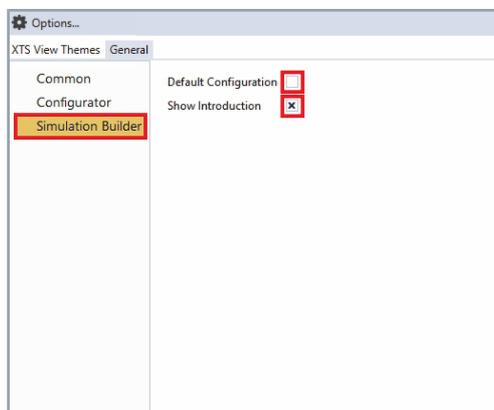
OR

► Deactivate the checkbox **Show Advanced Settings** to hide advanced settings

Property	Explanation	Default setting
Default Configuration	Simplifies the configuration of parts and tracks in a closed XTS system in the XTS Configurator	Enabled
Show Advanced Settings	Display of the advanced settings	Disabled

## 8.8.2.3 Simulation Builder

By default, the *Default Configuration* creates a part and a track with all necessary settings. This setting is useful if you want to configure a closed XTS system with the XTS Simulation Builder. If you work mainly with Track Management, this setting should be disabled.



► Click on **Simulation Builder**

► Activate the checkbox **Default Configuration** to configure a closed system

OR

► Deactivate the checkbox **Default Configuration** to configure a system with Track Management

► Activate the checkbox **Show Introduction** to display the welcome screen

OR

► Deactivate the checkbox **Show Introduction** to hide the welcome screen

Property	Explanation	Default setting
• Default Configuration	Simplifies the configuration of parts and tracks in a closed XTS system in the XTS Simulation Builder	Enabled
Show Introduction	Display of the welcome screen in the Simulation Builder	Enabled

## 8.8.3 Close Options... dialog box

The dialog box *Options...* can be closed in three different ways.

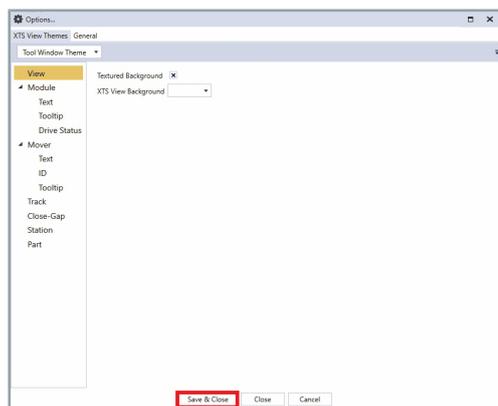
### 8.8.3.1 Save & Close

With *Save & Close* all settings are saved permanently.



#### Immediate use in the XTS Tool Window

The settings are applied after saving in the *XTS Tool Window*. In other tools, the settings are only applied after a restart.



► Click on **Save & Close** to save the settings permanently

The dialog box *Options...* closes.

### 8.8.3.2 Close

With *Close*, the updated settings in the dialog box *Options...* are temporarily saved. When you reopen the dialog box *Options...*, these settings are still available.

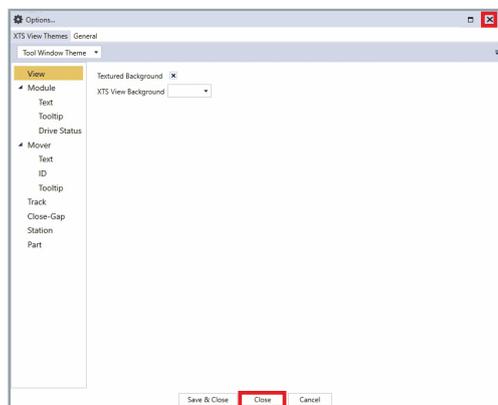
## NOTICE

### Save settings securely

Make sure that your settings are not accidentally deleted or saved.

*Use the Save & Close button to save the current settings in order to avoid accidental deletion when TwinCAT is closed.*

*Use the Cancel button to delete the updated settings to avoid accidentally saving them.*



► Click **Close** to close the dialog box *Options...*

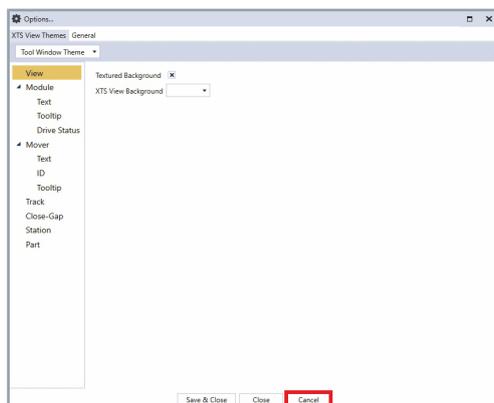
OR

► Click **x** to close the dialog box *Options...*

The settings are saved temporarily and are available until TwinCAT is closed.

### 8.8.3.3 Cancel

With *Cancel*, all updated settings that have not yet been saved with *Save & Close* are deleted.



#### ► Cancel with **Cancel**

All settings that have not yet been saved with *Save & Close* are deleted and are no longer available when the dialog box *Options...* is opened again.

## 8.8.4 Drop-down menu Brush | Color

In the drop-down menu *Brush | Color*, you have two options for setting a color:

- select a predefined color in the *System* tab
- define a color in the *Custom* tab

### 8.8.4.1 System

There are 141 predefined colors to choose from in the System area.



#### Show the name of the color

If you move the mouse pointer over the color, the name of the color is displayed.



- ▶ Open the drop-down menu



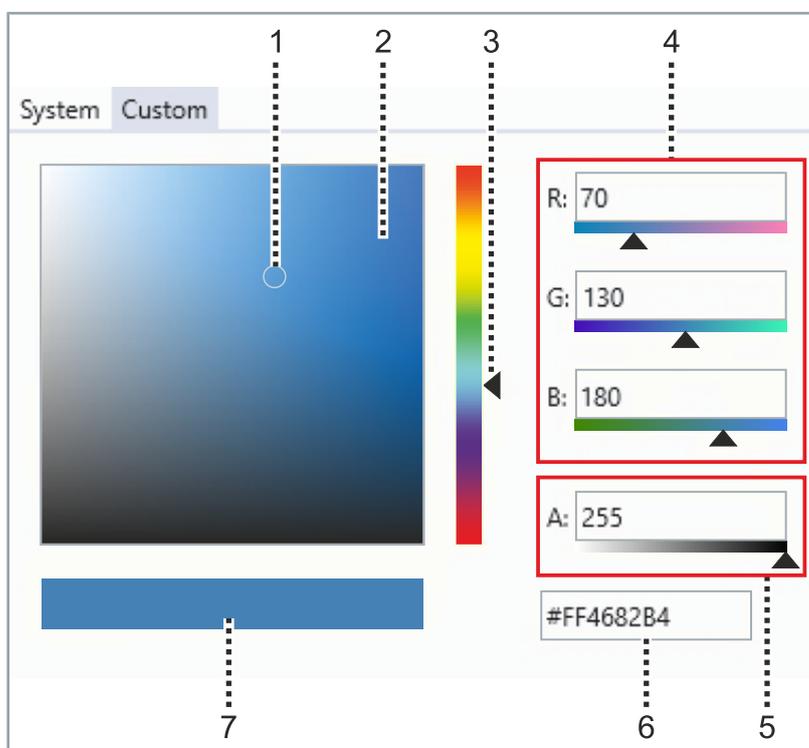
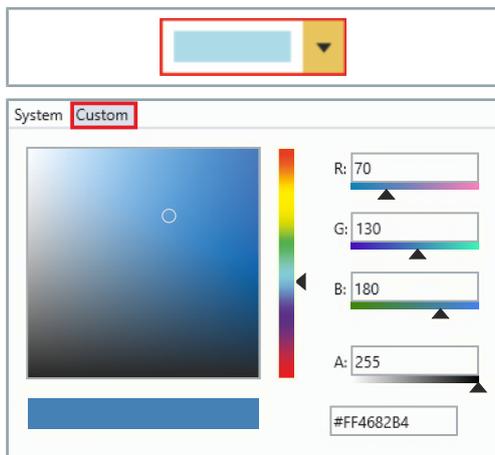
- ▶ Click on the **System** tab
- ▶ Select a color from the drop-down menu *System*

After selecting the desired color, the drop-down menu closes automatically.

8.8.4.2 Custom

In the Custom area you have the possibility to define a color.

- ▶ Open the drop-down menu
- ▶ Click on the **Custom** tab to display the settings area *Custom*



Position	Explanation
1	Selection tool in the selection area
2	Selection area
3	Color slider
4	Input fields and sliders for RGB color values
5	Input field and slider for the opacity
6	Input field for HEX color code
7	Display area of the defined color

The adjustment range *Custom* is displayed.

## **Set solid color**

▶ Define a color with the selection tool [1] in the selection area [2] and the color slider [3]

▶ Enter values in the input fields *R*, *G* and *B* [4] to define the color

OR

▶ Use the *R*, *G* and *B* [4] sliders to set values for the color

▶ Enter a value for the opacity in the input field *A* [5]

OR

▶ Use the *A* [5] slider to set the opacity

## **Enter HEX color code**

▶ Enter a code for the HEX color in the input field [6]

▶ Click outside the settings area to close the drop-down menu

## 8.8.5 Positioning and opacity

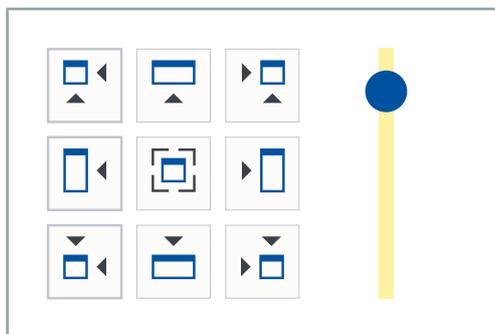
By default, the dialog box *Options...* opens in the center of the XTS Tool. You have the option of placing the dialog box with buttons in different places and setting the opacity of the dialog box.



► Right-click on the header of the dialog box to open the context menu

► Click on **Dialog Settings**

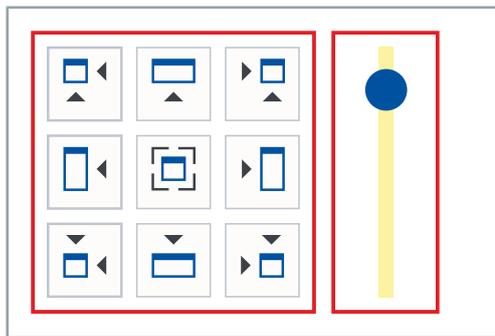
The dialog box *Dialog Settings* opens.



### 8.8.5.1 Controls

The list shows the most important controls:

- 
**Top left**  
 Aligns the dialog box at the top left of the open XTS tool.
- 
**Top**  
 Aligns the dialog box at the top across the entire width of the open XTS Tool.
- 
**Top right**  
 Aligns the dialog box at the top right of the open XTS Tool.
- 
**Left**  
 Aligns the dialog box to the left over the entire height of the open XTS Tool.
- 
**Middle**  
 Aligns the dialog box to the middle of the open XTS Tool.
- 
**Right**  
 Aligns the dialog box to the right over the entire height of the open XTS Tool.
- 
**Bottom left**  
 Aligns the dialog box at the bottom left of the open XTS Tool.
- 
**Bottom**  
 Aligns the dialog box at the bottom across the entire width of the open XTS Tool.
- 
**Bottom right**  
 Aligns the dialog box at the bottom right of the open XTS Tool.
- 
**Opacity slider**  
 Sets the opacity for the dialog box.



- ▶ Click on a button to set the orientation for the dialog box
- ▶ Use the slider **Opacity** to set the opacity for the dialog box

## 9 XTS HMI Controls

To install and use the *XTS HMI Controls*, you need the following software packages:

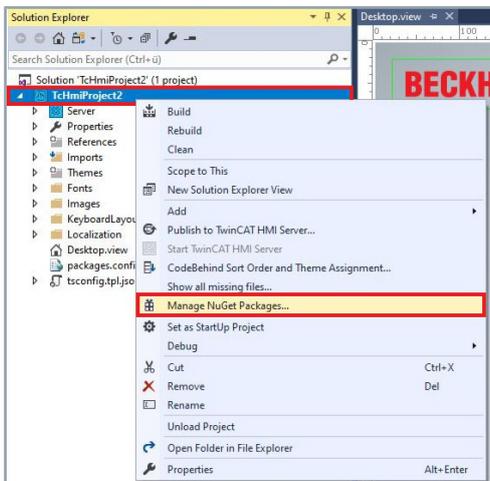
Software	Version
TE2000 HMI Engineering	1.12.748 or higher
TF2000 HMI Server	1.12.748 or higher
Beckhoff.TwinCAT.HMI.XTS.Controls	3.2107.1 or higher
Beckhoff.TwinCAT.HMI.XTS	3.2107.1 or higher
TF5850 TC3 XTS Extension	3.21.700.0 or higher
TwinCAT 3.1	3.1.4024.0 or higher

### System requirements for the XTS HMI Controls

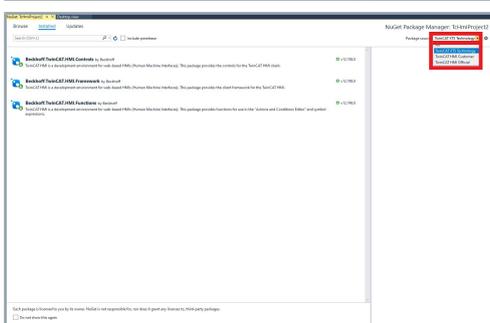
Operating system	Version
Windows	10 or higher

#### 9.1 Installation of the NuGet package

After you have successfully installed *TF5850 TC3 XTS Extension* and *TE2000 HMI Engineering* and opened a new HMI project, you can add the *XTS HMI Controls* to your project. To add the HMI controls, you need to add and configure the required NuGet packages.



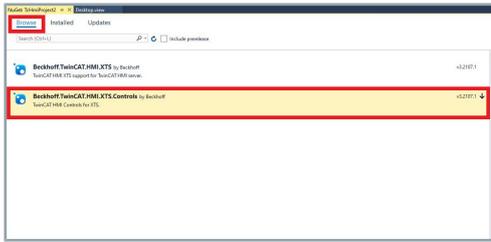
- ▶ In the *Solution Explorer* right-click on **TcHmiProject** to open the context menu
- ▶ In the context menu click on **Manage NuGet Packages ...**



In the project window, the tab *NuGet: TcHmiProject* opens.

- ▶ Select **TwinCAT XTS Technology** in the drop-down menu *Package source*

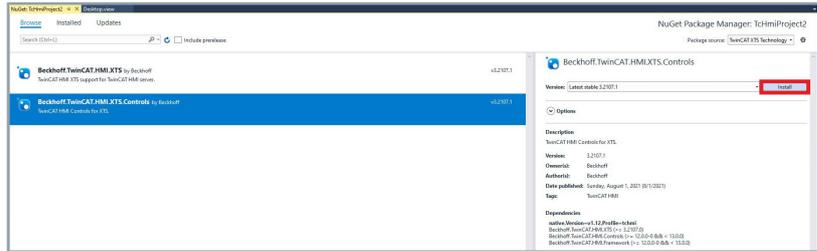
# XTS HMI Controls



- ▶ Click on **Browse**
- ▶ Click on **Beckhoff.TwinCAT.HMI.XTS.Controls**



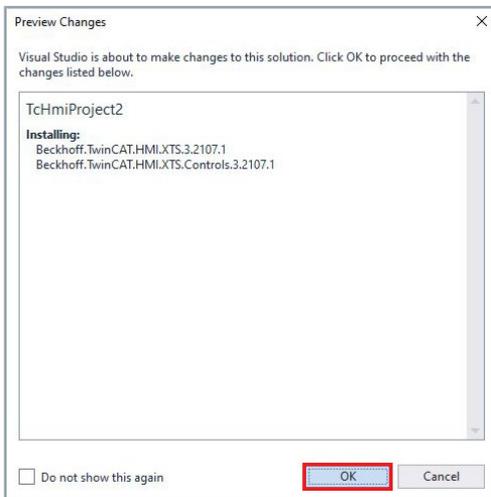
You can also find the *HMI XTS package and the HMI XTS Controls package* at the following file path in your Explorer:  
*C:\TwinCAT\Functions\TF5850-TC3-XTS-Technology\TcXtsHmi-Control.*



- ▶ Confirm with **Install** to install the *Beckhoff.TwinCAT.HMI.XTS.Controls* package

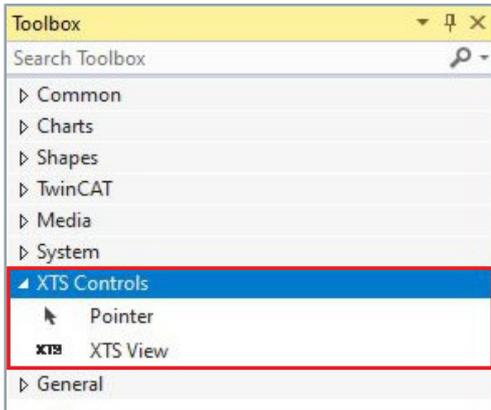


With the installation of the *Beckhoff.TwinCAT.HMI.XTS.Controls* package, the *Beckhoff.TwinCAT.HMI.XTS* package is also automatically installed.



The dialog box *Preview Changes* opens.

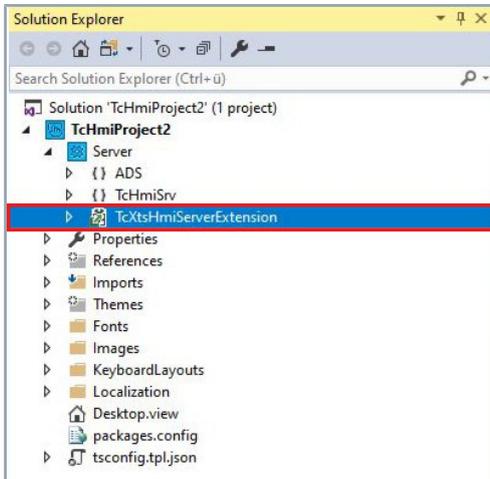
- ▶ Confirm with **OK**



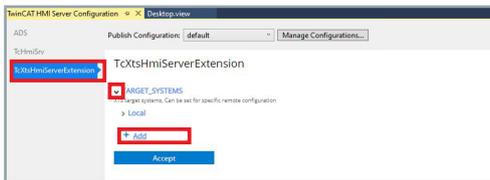
After installation, the *XTS View* is available at *XTS Controls* in the *Toolbox*.

## 9.2 Server Extension configuration

To view an XTS system in the XTS View, you must configure a connection to the target PC. On the target PC, an XTS project must be in *Run Mode*. A local connection is preconfigured.



- ▶ Expand *Solution Explorer* > *TcHmiProject* > *Server*
- ▶ Double click on **TcXtsHmiServerExtension**



The *TwinCAT HMI Server Configuration* tab opens in the project window.

- ▶ Click on **TcXtsHmiServerExtension**
- ▶ Expand *TARGET\_SYSTEMS*
- ▶ Click + **Add**



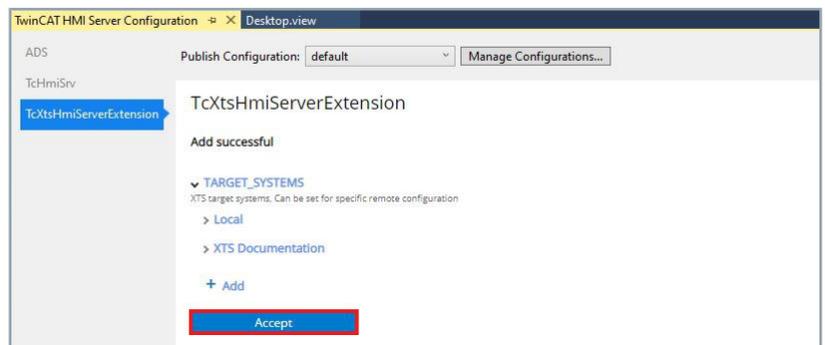
### Assign names for better overview

The name for the connection has no function. Beckhoff recommends assigning a name in order to identify the target PC.



The dialog box *Add* opens.

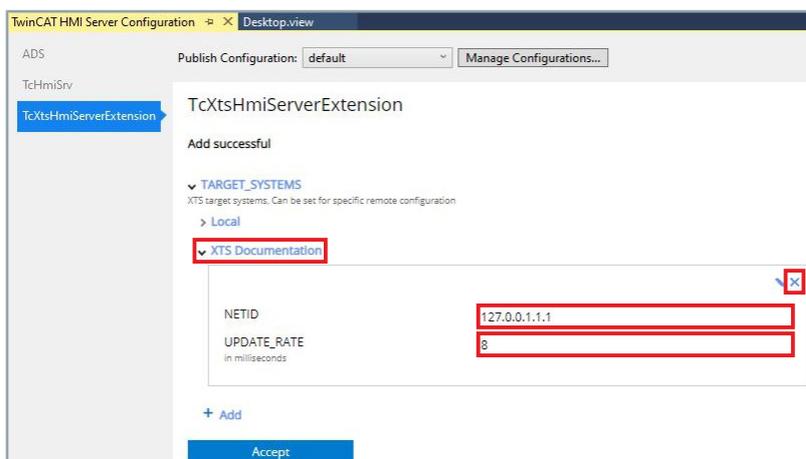
- ▶ Enter a name for the connection in the input field *Name*
- ▶ Enter the AMS Net Id of the target PC with which the connection is to be established in the input field *NETID*
- ▶ If necessary, adjust the value in the input field *UPDATE\_RATE*
- ▶ Confirm with **Add**
- ▶ Add more connections in the same way



- ▶ Confirm with **Accept** to complete the configuration

## 9.2.1 Edit entries

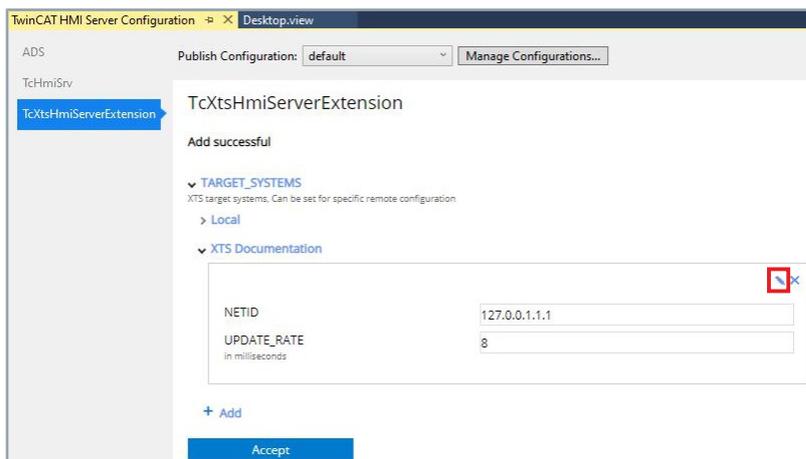
You can delete or edit your entries:



- ▶ Click on the name of the connection to expand the input fields
- ▶ Click on the button **x** to remove the connection

OR

- ▶ Click in the input fields *NETID* and *UPDATE\_RATE* to edit the entries



- ▶ Click on the edit button

The dialog box *Rename* opens.

- ▶ Enter a new name in the input field *New name*
- ▶ Confirm with **Rename**

OR

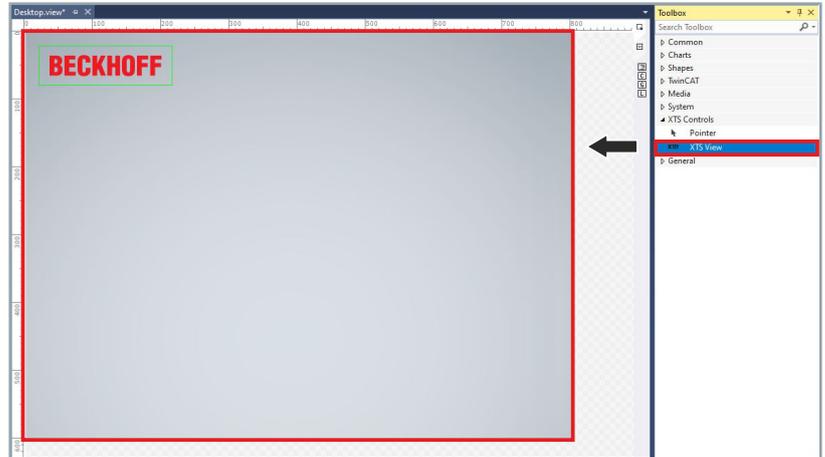
- ▶ Click on the button **x** to cancel the process and close the dialog box



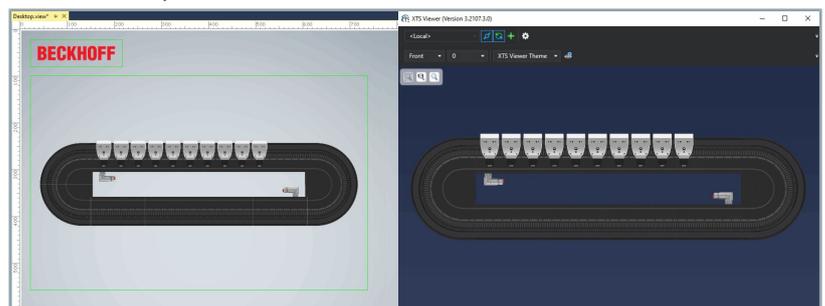
## 9.3 XTS View configuration

After installing the NuGet package and the Server Extension configuration, an XTS View Control instance can be added and then configured.

### 9.3.1 Add XTS View



- ▶ Expand *Toolbox* > *XTS Controls*
- ▶ Press and hold the **Ctrl** key to drag **XTS View** from the toolbox to *Desktop View*

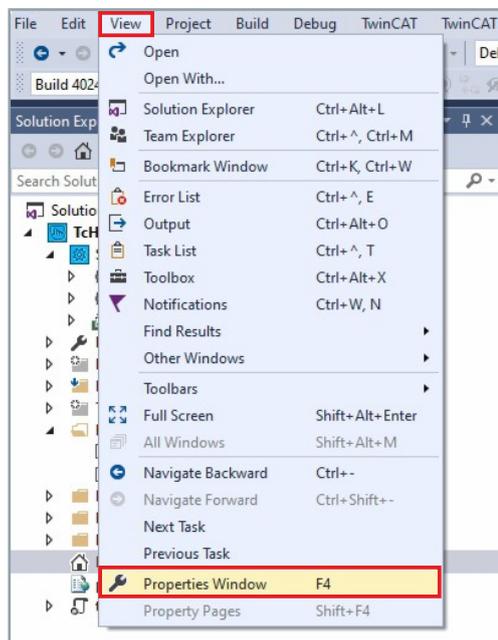


When the XTS system is in *Run mode*, the system is immediately displayed in the same layout as in the *XTS Viewer*. If the XTS system is not in *Run mode*, the Desktop View remains empty.

If you have a connection to another target PC, the system of the target PC will be displayed after the *TargetName* of the control has been changed. If the XTS system on the target PC is not in *Run mode*, the Desktop View remains empty.

## 9.3.2 XTS View properties

In addition to the usual layout properties such as frame, layout and background image, the controller supports some specific properties.

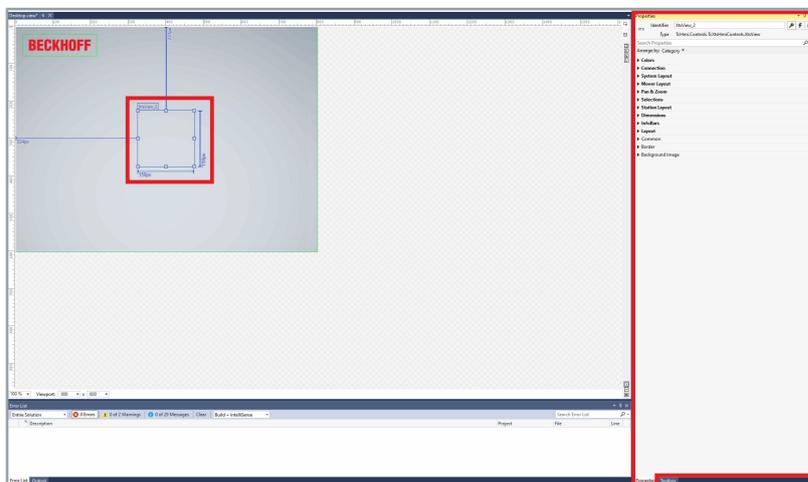


► Click on the menu item **Properties Window** in the menu **View**



### XtsView must be selected

The XtsView element must be selected to change the XTS HMI View properties. The *Properties* window remains empty if the XtsView element is not selected.



The *Properties Window* opens.

► Click on the XtsView element in the project window

In the *Properties* window the available properties are displayed and can be adjusted as required.

9.3.2.1 Reset settings

With the *XTS HMI Controller*, you have the option to reset settings made to the preset settings.

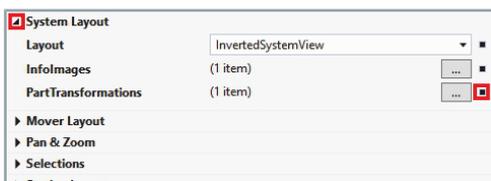


**Example using the settings under System Layout**

The settings under *System Layout* are used as an example to show you which parameters you have changed.

After you have selected settings in a drop-down menu or entered values in the input fields, the font size of the parameter changes and the checkbox behind the input field is activated.

Default settings	Settings changed
<ul style="list-style-type: none"> <li>• Font normal</li> <li>• no item added</li> <li>• Checkbox deactivated</li> </ul>	<ul style="list-style-type: none"> <li>• Font bold</li> <li>• an item added</li> <li>• Checkbox activated</li> </ul>



- ▶ Expand *Properties > System Layout*
- ▶ Click on the activated checkbox **PartTransformations**



- ▶ Click on **Reset** in the pop-up menu

The previous settings are deleted and reset to the preset values.

## 9.3.2.2 Link formula

With the *XTS HMI Controller* you can convert input fields to enter formulas.

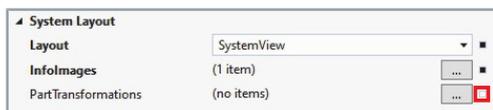


### Example using the settings under System Layout

The settings under *System Layout* show an example of how you can convert the input field.

After you have selected settings in a drop-down menu or entered values, the font size of the parameter changes and the checkbox behind the input field is activated.

Default settings	Settings changed
• Standard input field	• Input field converted

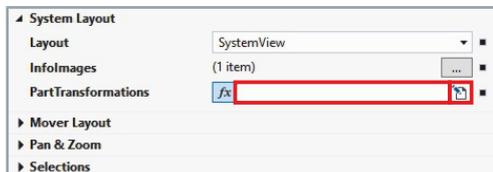


▶ Click on the deactivated checkbox



▶ Click on **Create function binding** in the pop-up menu

The previous input field is converted and an input field for a function is inserted.



▶ Enter a function in the input field *PartTransformations*

OR

▶ Click on the button to open the *Multiline editor*

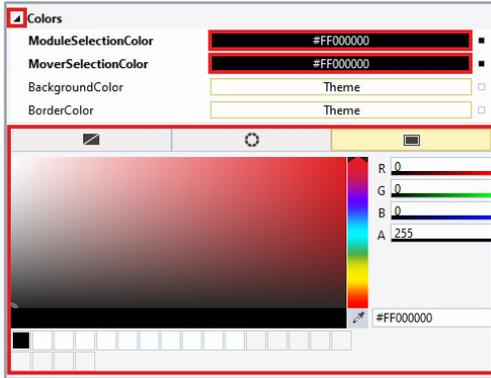


The dialog box *Multiline editor* opens when you click on the button.

▶ Enter a function in the input field

▶ Confirm with **OK**

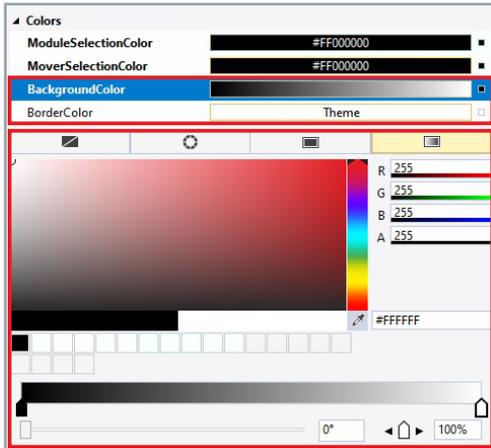
9.3.2.3 Colors



- ▶ Expand *Properties > Colors*
- ▶ Click in the input field *ModuleSelectionColor* to set the color for the module selection
- ▶ Click in the input field *MoverSelectionColor* to set the color for the mover selection

The adjustment range is displayed.

Further information can be found in chapter "Colors", [Page 424].



- ▶ Click in the input field *BackgroundColor* to set the color for the background
- ▶ Click in the input field *BorderColor* to set the color for the border

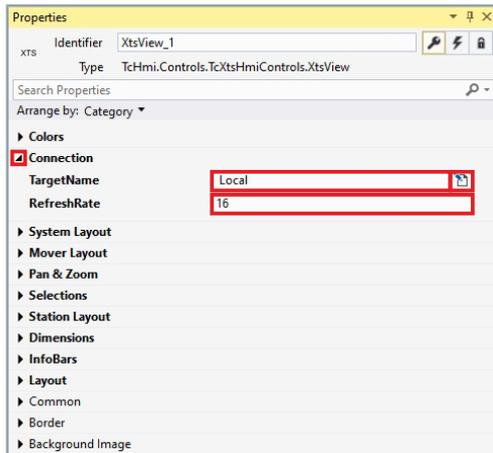
The adjustment range is displayed.

Further information can be found in chapter "Colors", [Page 424].

The table shows the default parameter settings for the *Colors* properties:

Property	Explanation	Default setting
<i>ModuleSelectionColor</i>	Module selection color	Solid Color
• None	No color	—
• Theme	Graphic	—
• Solid Color	Solid color	#FF000000
<i>MoverSelectionColor</i>	Mover selection color	Solid Color
• None	No color	—
• Theme	Graphic	—
• Solid Color	Solid color	#FF000000
<i>BackgroundColor</i>	Background color	Theme
• None	No color	—
• Theme	Graphic	—
• Solid Color	Solid color	—
• Gradient Color	Color gradient	—
<i>BorderColor</i>	Border color	Theme
• None	No color	—
• Theme	Graphic	—
• Solid	Solid color	—
• Gradient Color	Color gradient	—

## 9.3.2.4 Connection



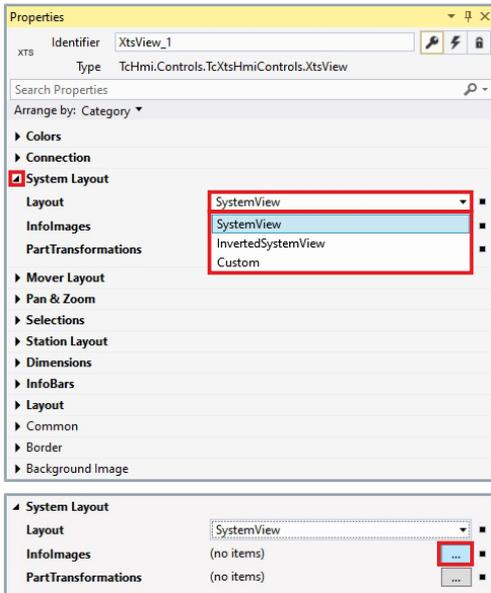
- ▶ Expand *Properties* > *Connection*
  - ▶ Enter the target PC in the input field *TargetName*
- OR
- ▶ Click on the button to open the *Multiline editor*
  - ▶ If necessary, adjust the value in the input field *RefreshRate*

The table shows the default parameter settings for the *Connection* properties:

Property	Explanation	Default setting
<i>TargetName</i>	Name of the target PC, specified connection to the XTS system	Local
<i>RefreshRate</i>	Refresh rate for adaptation to end devices	16

9.3.2.5 System Layout

With this setting you determine how your XTS system is displayed in the HMI.

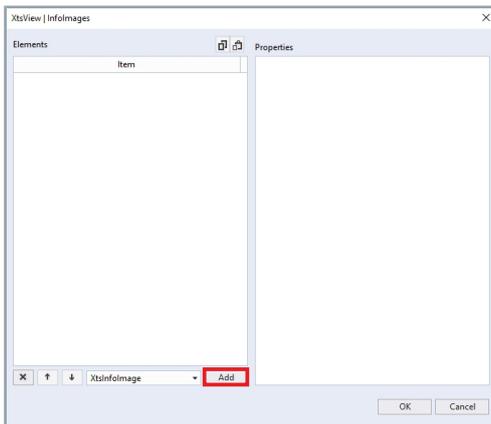


- ▶ Expand *Properties* > *SystemLayout*
- ▶ Select the appropriate display option in the drop-down menu *Layout*

- ▶ Click ... from *Infolmages*

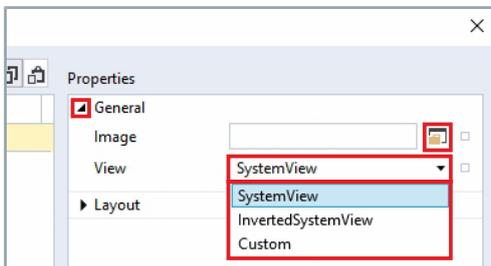
XtsInfolmages can be inserted into the controller and can be zoomed and moved with the XTS system. XtsInfolmages are used as an array.

The dialog box *XtsView | Infolmages* opens.



- ▶ Click on **Add**

An *XtsInfolmage* is added. The properties of the *XtsInfolmage* can be set in the *Properties* area.

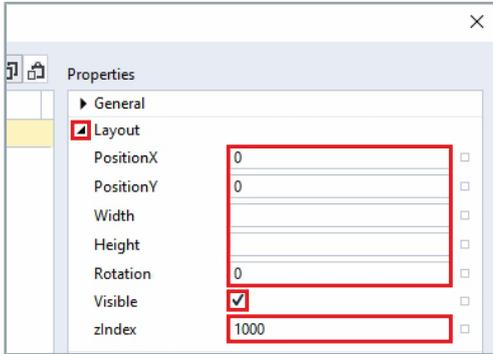


- ▶ Expand *General*
- ▶ Click on the button **Image** to select a file path for the graphic
- ▶ Select the display in the drop-down menu *View*



## Reference point and origin

The reference point for the graphic is the top left-hand corner. The origin refers to the first module added in the *XTS Configurator*.



- ▶ Expand *Layout*
- ▶ Enter values for the position in the input fields *PositionX* and *PositionY*
- ▶ Enter values for the size in the input fields *Width* and *Height*
- ▶ Enter a rotation angle in the input field *Rotation*
- ▶ Activate the checkbox **Visible** to show the graphic

OR

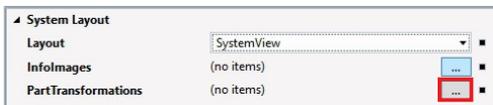
- ▶ Deactivate the checkbox **Visible** to hide the graphic
- ▶ Enter a value in the input field *zIndex*

Further information can be found in chapter "General settings", [Page 422].



- ▶ Confirm with **OK**

The dialog box *XtsView | Infolimages* closes.



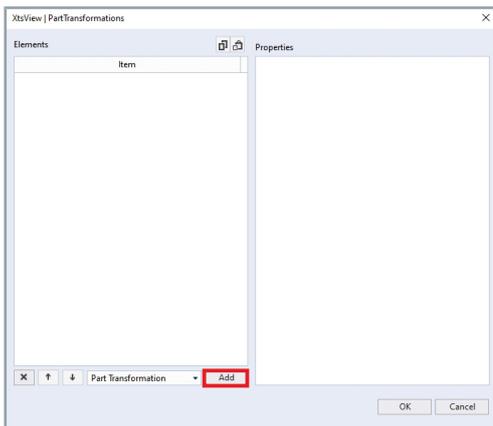
- ▶ Click ... from *PartTransformations*

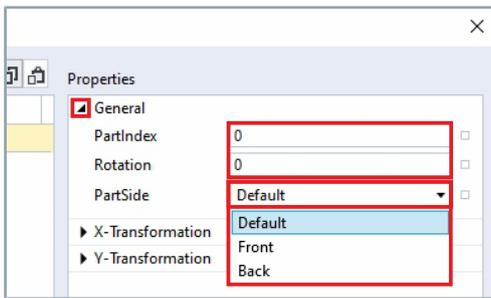
Part Transformations can be inserted into the controller and determine the XTS layout. You can define the layout for each XTS part. Part Transformations are used as an array.

The dialog box *XtsView | PartTransformations* opens.

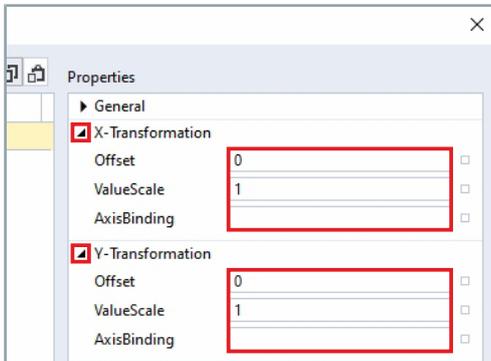
- ▶ Click on **Add**

A *Part Transformation* is added. The properties of the part transformation can be set in the *Properties* area.

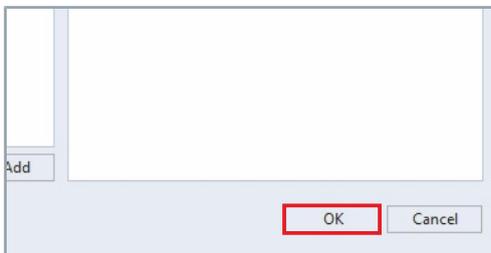




- ▶ Expand *General*
- ▶ Enter values in the input fields *PartIndex* and *Rotation*
- ▶ Select the appropriate display option in the drop-down menu *PartSide*



- ▶ Expand *X-Transformation*
- ▶ Enter values in the input fields *Offset*, *ValueScale* and *AxisBinding*
- ▶ Expand *Y-Transformation*
- ▶ Enter values in the input fields *Offset*, *ValueScale* and *AxisBinding*



- ▶ Confirm with **OK**

The dialog box *XtsView | PartTransformations* closes.

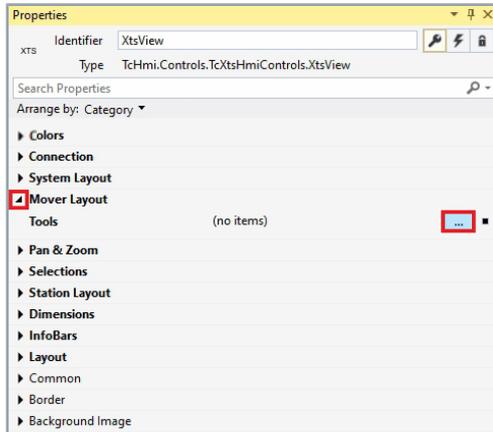
The table shows the default parameter settings for the *System Layout* properties:

Property	Explanation	Default setting
<i>Layout</i>	View of the system	SystemView
• SystemView	View of the system as previously configured in the <i>XTS Configurator</i>	–
• InvertedSystemView	View of the system as previously configured in the <i>XTS Configurator</i> , but from the other side of the system	–
• Custom	View of the system that is configured manually in the <i>PartTransformation</i> properties	–
<i>InfImages</i>		...
▲ General		
• Image	File path for the graphic	–
• View	View of the system	SystemView
• SystemView	View of the system as previously configured in the <i>XTS Configurator</i>	–
• InvertedSystemView	View of the system as previously configured in the <i>XTS Configurator</i> , but from the other side of the system	–
• Custom	View of the system that is configured manually in the <i>PartTransformation</i> properties	–
▲ Layout		
• PositionX	X-position of the graphic Reference point is the global zero point	0
• PositionY	Y-position of the graphic Reference point is the global zero point	0
• Width	Width of the graphic By default, the width of the graphic is indicated in px. Entering a value changes the width, proportionally the height of the graphic changes. Entering values for Width and Height can cause the graphic to be distorted. Unit: mm, related to the real system size	–
• Height	Height of the graphic. By default, the height of the graphic is indicated in px. Entering a value changes the height, proportionally the width of the graphic changes. Entering values for Width and Height can cause the graphic to be distorted. Unit: mm, related to the real system size	–
• Rotation	Rotation angle of the graphic. Unit: degrees	0
• Visible	Visibility of the tool	<input checked="" type="checkbox"/> True
• <input checked="" type="checkbox"/> True	Checkbox activated	–
• <input type="checkbox"/> False	Checkbox deactivated	–
• zIndex	Z-position of the graphic. Provides information about updating the graph.	1000

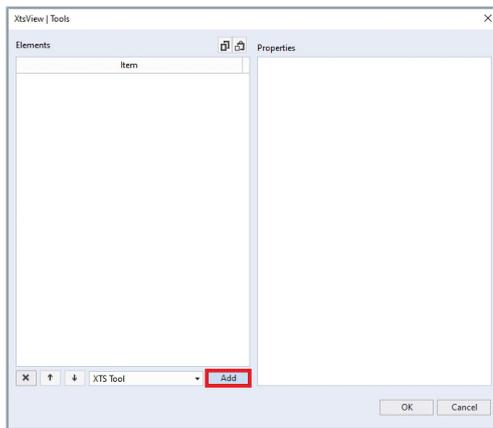
Property	Explanation	Default setting
<i>PartTransformations</i>		
▲ General		
• PartIndex	Index of the configured part	0
• Rotation	Rotation angle of the part. Unit: degrees	0
• PartSide	Display page of the part	Default
• Default	Default use of the view defined in the layout properties	–
• Front	Front side	–
• Back	Rear side	–
▲ X-Transformation		
• Offset	Configuration of the X offset of the part. Unit: mm, related to the real system size	0
• ValueScale	X-scaling of the axis offset when an X-axis binding is used.	1
• AxisBinding	Integration of a TwinCAT NC for transformation of an X offset, e.g. in order to represent a switching axis. Unit: mm, related to the real system size	–
▲ Y-Transformation		
• Offset	Configuration of the Y offset of the part. Unit: mm, related to the real system size	0
• ValueScale	Y-scaling of the axis offset when using a Y-axis binding	1
• AxisBinding	Integration of a TwinCAT NC for transformation of an Y offset, e.g. in order to represent a switching axis. Unit: mm, related to the real system size	–

## 9.3.2.6 Mover Layout

The Mover Layout allows you to display personalized tools in the form of images or text on a mover. The Mover Layout is used as an array.



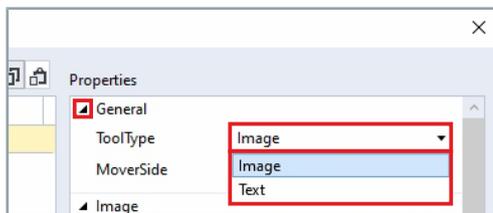
- ▶ Expand *Properties* > *Mover Layout*
- ▶ Click ... from *Tools*



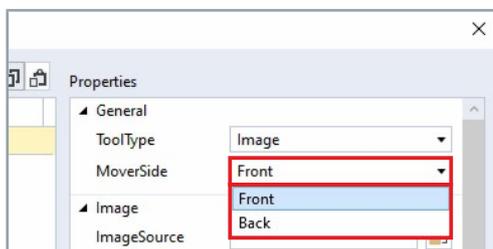
The dialog box *XtsView | Tools* opens.

- ▶ Click on **Add**

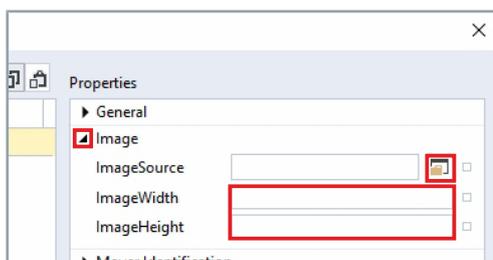
An *XTS Tool* is added. The properties of the XTS Tool can be set in the *Properties* area.



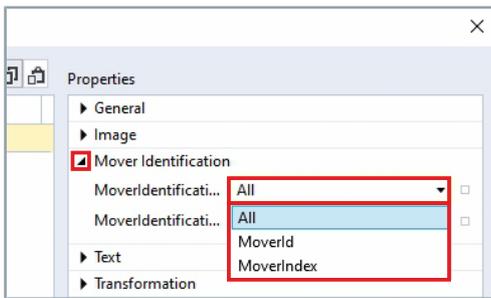
- ▶ Expand *General*
- ▶ Select the appropriate display option in the drop-down menu *ToolType*



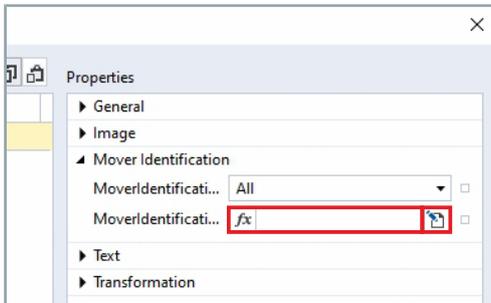
- ▶ Select the appropriate display option in the drop-down menu *MoverSide*



- ▶ Expand *Image*
- ▶ Click on the button **ImageSource** to select a file path for the graphic
- ▶ Enter values in the input fields *ImageWidth* and *ImageHeight*



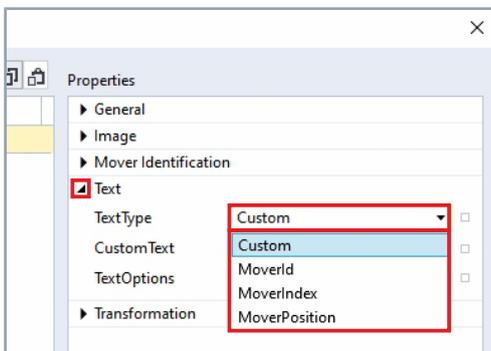
- ▶ Expand *Mover Identification*
- ▶ Select the appropriate display option in the drop-down menu *MoverIdentificationMode*



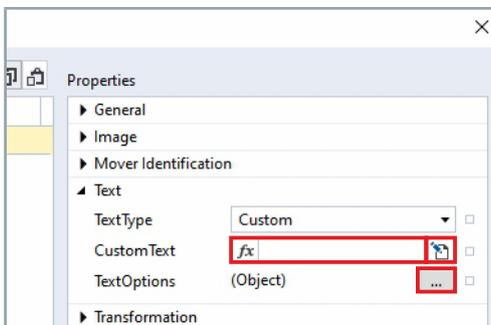
- ▶ Enter the Mover ID or the MoverIndex in the input field *MoverIdentification*

OR

- ▶ Click on the button to open the *Multiline editor*



- ▶ Expand *Text*
- ▶ Select the text type in the drop-down menu *TextType*



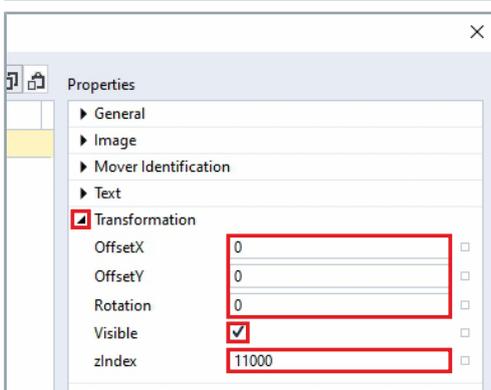
- ▶ Enter a text in the input field *CustomText*

OR

- ▶ Click on the button to open the *Multiline editor*
- ▶ Click ... from *TextOptions*

The dialog box *TextOptions* opens.

Further information can be found in chapter "TextOptions", [Page 422]"General settings", [Page 422].

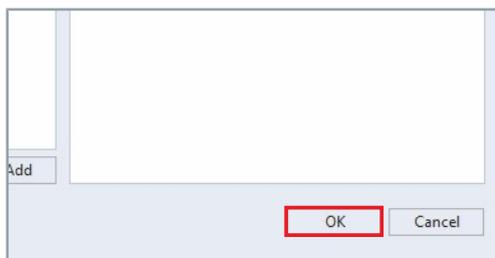


- ▶ Expand *Transformation*
- ▶ Enter values in the input fields *Position X*, *Position Y*, *Width*, *Height* and *Rotation*
- ▶ Activate the checkbox **Visible** to show the text

OR

- ▶ Deactivate the checkbox **Visible** to hide the text
- ▶ Enter a value in the input field *zIndex*

Further information can be found in chapter "General settings", [Page 422].



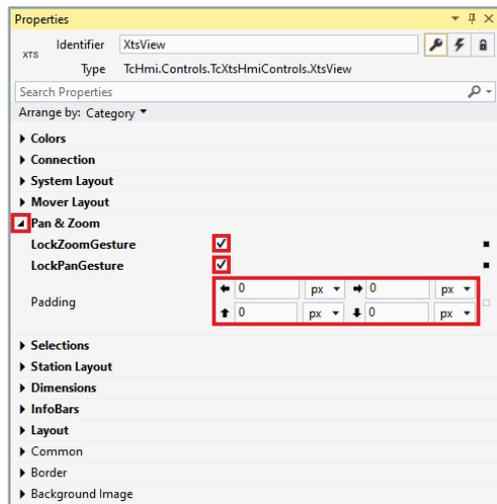
► Confirm with **OK**  
 The dialog box *TextOptions* closes.

The table shows the default parameter settings for the *Mover Layout* properties:

Property	Explanation	Default setting
<i>Tools</i>		...
▲ General		
• ToolType	Type of tool	Image
• Image	Graphic	–
• Text	Text	–
• MoverSide	Side of the mover on which the tool is displayed	Front
• Front	Front side	–
• Back	Rear side	–
▲ Image		
• ImageSource	File path of the graphic, if the ToolType <i>Image</i> is selected	–
• ImageWidth	Width of the graphic, if the ToolType <i>Image</i> is selected  By default, the width of the graphic is indicated in px. Entering a value changes the width, proportionally the height of the graphic changes. Entering values for Width and Height can cause the graphic to be compressed.  Unit: mm, related to the real system size	–
• ImageHeight	Height of the graphic, if the ToolType <i>Image</i> is selected  By default, the height of the graphic is indicated in px. Entering a value changes the height, proportionally the width of the graphic changes. Entering values for Width and Height can cause the graphic to be compressed.  Unit: mm, related to the real system size	–
▲ MoverIdentification		
• MoverIdentificationMode	Determining how a mover or mover group is defined	All
• All	All movers on the system	–
• MoverId	Requires an entry of the Mover ID in the input field of <i>MoverIdentification</i>	–
• MoverIndex	Requires an entry of the Mover Index in the input field of <i>MoverIdentification</i>	–
• MoverIdentification	Input field for the MoverId or the MoverIndex, according to the selected property at <i>MoverIdentification-Mode</i>	–

Property	Explanation	Default setting
▲ Text		
• TextType	Properties of the text, if the ToolType <i>Text</i> is selected Type of text node, if the ToolType <i>Text</i> is selected.	Custom
• Custom	Custom	–
• MoverId	Mover ID	–
• MoverIndex	Mover index	–
• MoverPosition	Mover position	–
• CustomText	Input field for text, if the ToolType <i>Text</i> and the Text- Type <i>Custom</i> are selected	–
• TextOptions	Properties for text design	...
▲ Transformation		
• OffsetX	X offset Unit: mm, related to the real system size	0
• OffsetY	Y offset Unit: mm, related to the real system size	0
• Rotation	Angle of rotation Unit: degrees	0
• Visible	Visibility	<input checked="" type="checkbox"/> True
• <input checked="" type="checkbox"/> True	Checkbox activated	–
• <input type="checkbox"/> False	Checkbox deactivated	–
• zIndex	Z-position of the graphic, information about the up- date of the graphic.	11000

## 9.3.2.7 Pan & Zoom



► Expand *Properties* > *Pan & Zoom*

► Activate the checkbox **LockZoomGesture** to enable the zoom function

OR

► Deactivate the checkbox **LockZoomGesture** to disable the zoom function

► Activate the checkbox **LockPanGesture** to enable the panning function

OR

► Deactivate the checkbox **LockPanGesture** to disable the panning function

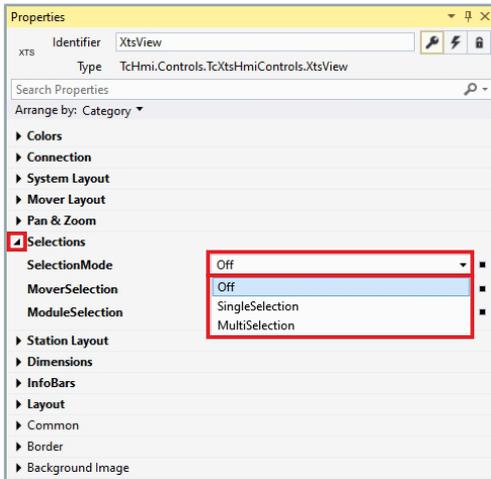
► Enter values in the input fields *Padding*

The table shows the default parameter settings for the *Pan & Zoom* properties:

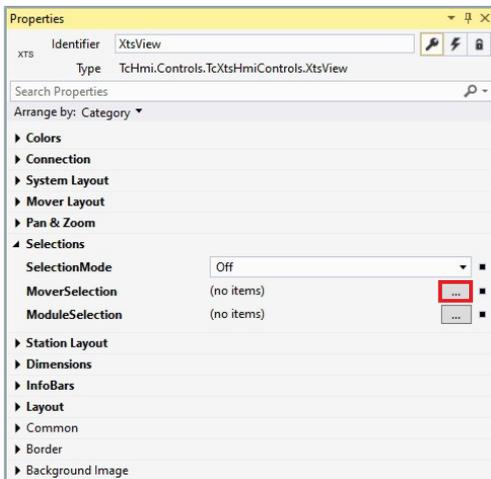
Property	Explanation	Default setting
<i>LockZoomGesture</i>	Zoom function	False
<i>LockPanGesture</i>	Panning function	False
<i>Padding</i>	Distance between the displayed XTS system and the edge of the controller. Default zoom when loading the control. Unit: px or %	px
• ←	Left distance	0
• →	Right distance	0
• ↑	Upper distance	0
• ↓	Lower distance	0

9.3.2.8 Selections

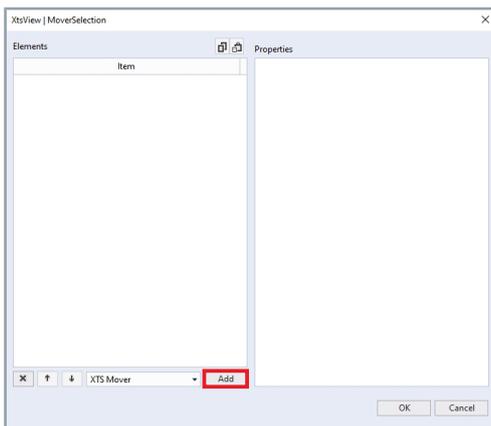
The Selection properties define how you can select the movers and modules in the controller.



- ▶ Expand *Properties > Selections*
- ▶ Select the selection mode in the drop-down menu *SelectionMode*



- ▶ Click ... from *MoverSelection*



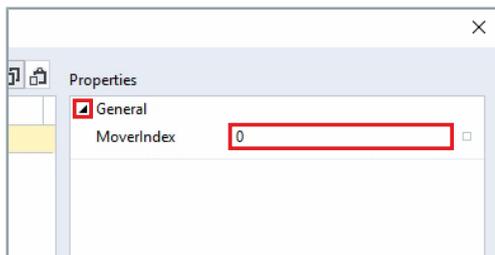
The dialog box *XtsView | MoverSelection* opens.

- ▶ Click on **Add**

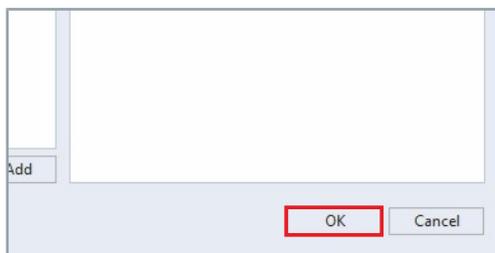
A *XTS Mover* is added. The properties of the XTS Mover can be set in the *Properties* area.

If the *SelectionMode* *SingleSelection* or *MultiSelection* is selected and the list of selected movers is edited by clicking on it, the event *onSelectedMoverChanged* is triggered.

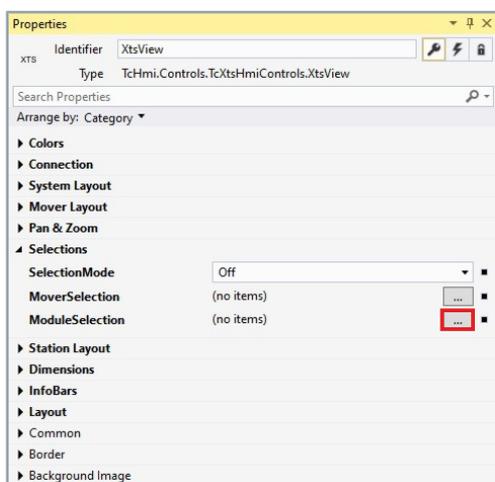
The mover is displayed in the color you have set at *MoverSelection-Color*. Further information can be found in chapter "Colors", [Page 387].



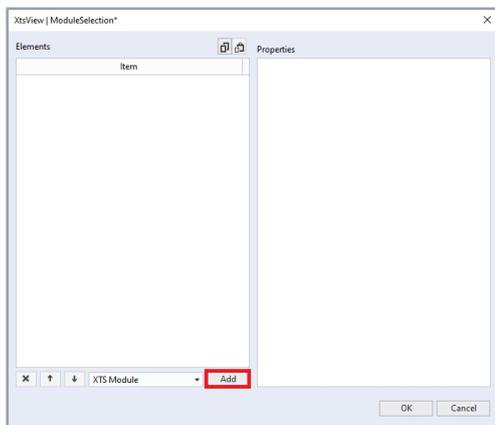
- ▶ Expand *General*
- ▶ Enter a value in the input field *MoverIndex*



- ▶ Confirm with **OK**



- ▶ Click on ... from *ModuleSelection*



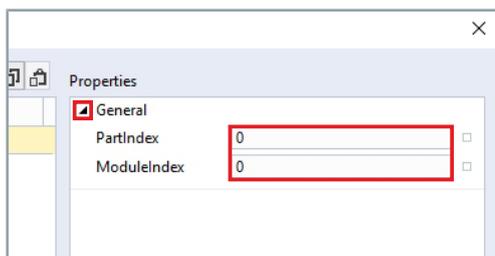
The dialog box *XtsView | ModuleSelection* opens.

- ▶ Click on **Add**

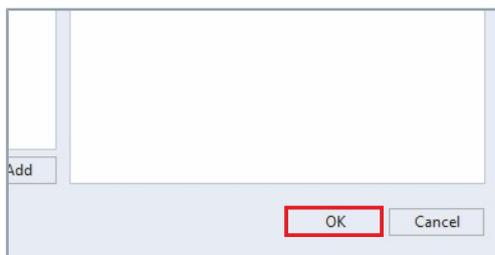
An *XTS module* is added. The properties of the XTS module can be set in the *Properties* area.

If the SelectionMode *SingleSelection* or *MultiSelection* is selected and the list of selected modules is edited by clicking on it, the event *onSelectedModuleChanged* is triggered.

The module is displayed in the color that you have set at *ModuleSelectionColor*. Further information can be found in chapter "Colors", [Page 387].



- ▶ Expand *General*
- ▶ Enter values in the input fields *PartIndex* and *ModuleIndex*

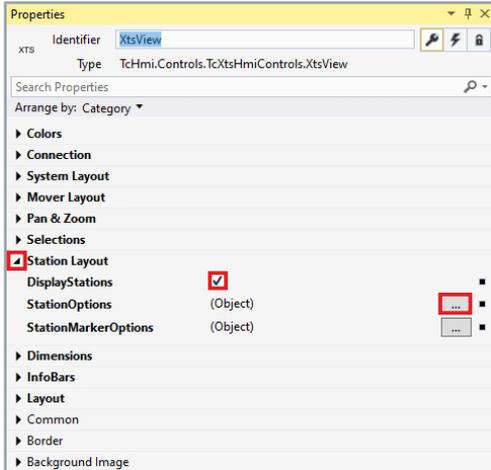


► Confirm with **OK**

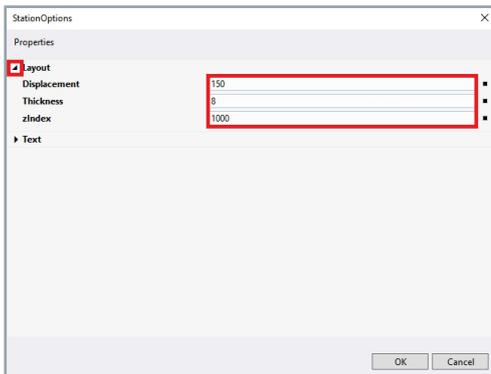
The table shows the default parameter settings for the *Selections* properties:

Property	Explanation	Default setting
<i>SelectionMode</i>		Off
• Off	Selection of a module or a mover by clicking not possible	–
• SingleSelection	Selection of a module or a mover by clicking on it. The selection of the previously selected module or mover is cleared. Clicking on an empty space deselects modules and movers. Trigger event <i>onSelectedMoverChanged</i> .	–
• MultiSelection	Selection of further modules or movers by clicking. Modules and movers that have already been selected can be removed from the selection by clicking on them again. Clicking on an empty space deselects modules and movers. Trigger event <i>onSelectedMoverChanged</i> .	–
<i>MoverSelection</i>		...
▲ General		
• MoverIndex	Identification of the selected mover	0
<i>ModuleSelection</i>		...
▲ General		
• PartIndex	Identification of the selected part	0
• ModuleIndex	Identification of the selected module	0

## 9.3.2.9 Station Layout

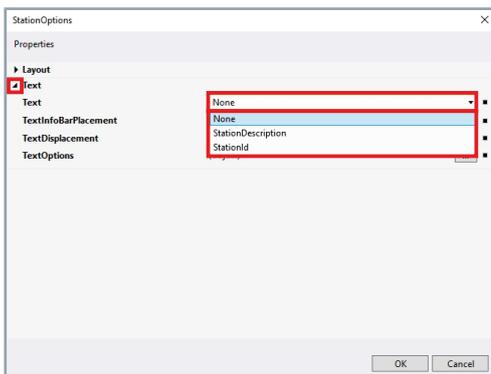


- ▶ Expand *Properties* > *StationLayout*
- ▶ Activate the checkbox **DisplayStations** to show the station
- OR
- ▶ Deactivate the checkbox **DisplayStations** to hide the station
- ▶ Click ... from *StationOptions*

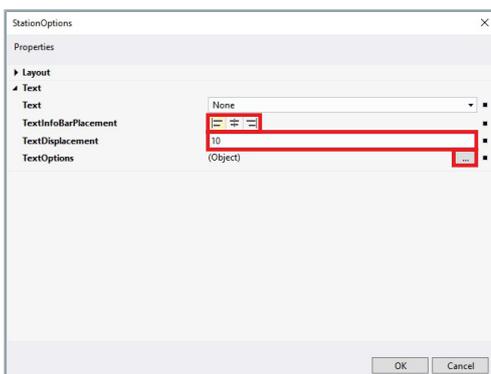


The dialog box *StationOptions* opens.

- ▶ Expand *Layout*
- ▶ Enter values in the input fields *Displacement*, *Thickness* and *zIndex*



- ▶ Expand *Text*
- ▶ Select the text for the station in the drop-down menu *Text*



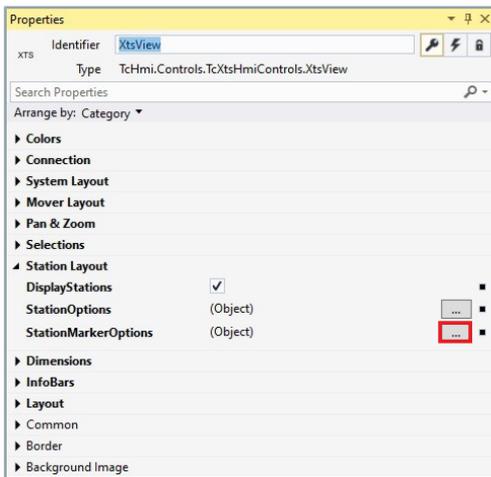
- ▶ Click on a button from **TextInfoBarPlacement** to select the alignment of the text
- ▶ Enter a value in the input field *TextDisplacement*
- ▶ Click ... from *TextOptions*

The dialog box *TextOptions* opens.

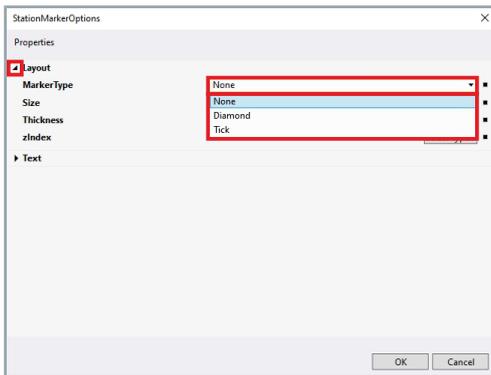
Further information can be found in chapter "TextOptions", [Page 422]"General settings", [Page 422].

- ▶ Confirm with **OK**

The dialog box *StationOptions* closes.

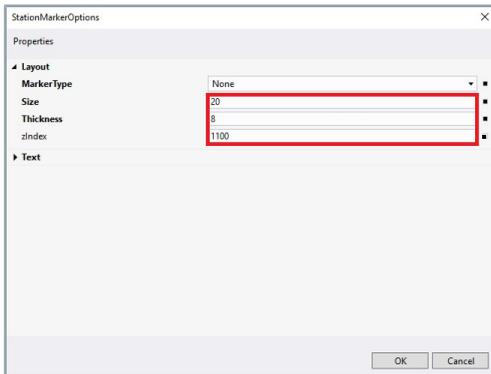


► Click ... from *StationMarkerOptions*



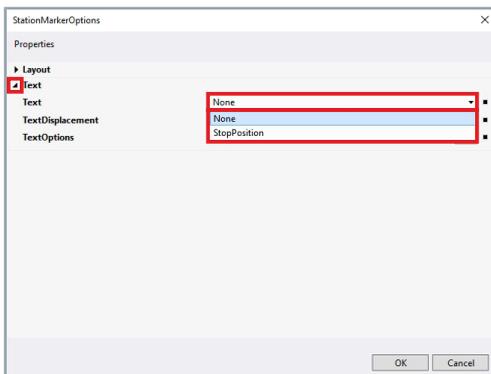
The dialog box *StationMarkerOptions* opens.

- Expand *Layout*
- Select the representation of the station endpoints in the drop-down menu *MarkerType*



► Enter values in the input fields *Size*, *Thickness* and *zIndex*

Further information can be found in chapter "General settings", [Page 422].

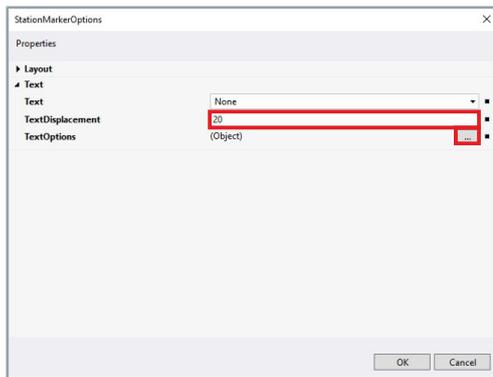


► Expand *Text*

► Select **None** in the drop-down menu *Text* if no text is to be displayed

OR

► Select **StopPosition** in the drop-down menu *Text* if the stop position is to be displayed

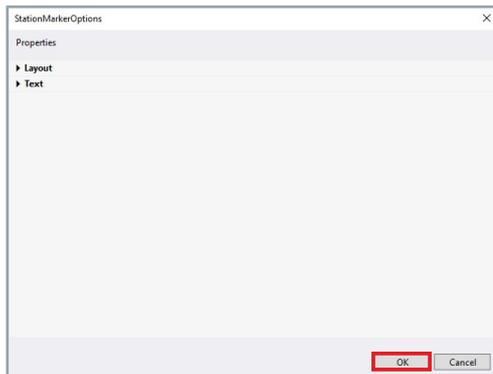


▶ Enter a value in the input field *TextDisplacement*

▶ Click ... from *TextOptions*

The dialog box *TextOptions* opens.

Further information can be found in chapter "TextOptions", [Page 422]"General settings", [Page 422].



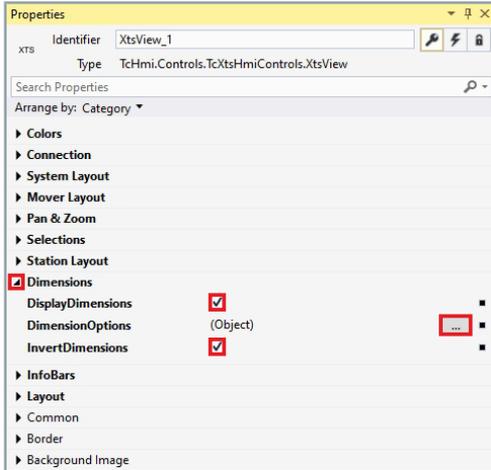
▶ Confirm with **OK**

The dialog box *StationMarkerOptions* closes.

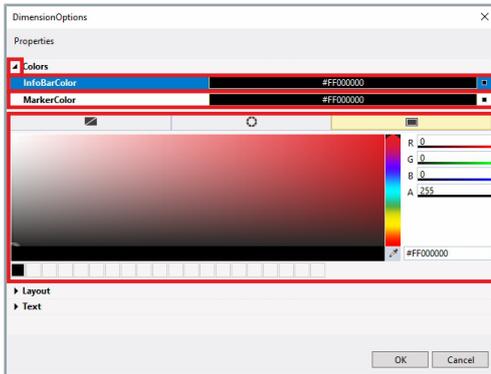
The table shows the default parameter settings for the *Station Layout* properties:

Property	Explanation	Default setting
<i>DisplayStations</i>	Display of the dimensions	True
<i>StationOptions</i>		...
▲ Layout		
• Displacement	Offset between InfoBar and the center of the stator	150
• Thickness	InfoBar thickness	8
• zIndex	Z-position, position of the visual element and information about the update of the visual element	1000
▲ Text		
• Text	Text for the station	None
• None	No text	–
• StationDescription	Description of the station	–
• StationId	Id of the station	–
• TextInfoBarPlacement	Alignment of the InfoBar	≡ left-justified
• ≡ left-justified	Left aligned	–
• ≠ centered	Centered	–
• =  right-justified	Right aligned	–
• TextDisplacement	Offset of the text	10
• TextOptions	Properties for text design	...
<i>StationMarkerOptions</i>		...
▲ Layout		
• MarkerType	Display of the station endpoints	None
• None	No endpoints	–
• Diamond	Diamond endpoints	–
• Tick	Tick endpoints	–
• Size	Size of the endpoint	20
• Thickness	Thickness of the endpoint	8
• zIndex	Z-position, position of the visual element and information about the update of the visual element	Select Type...
▲ Text		
• Text	Text for the station	None
• None	No text	–
• StopPosition	Stop position	–
• TextDisplacement	Offset of the text	20
• TextOptions	Properties for text design	...

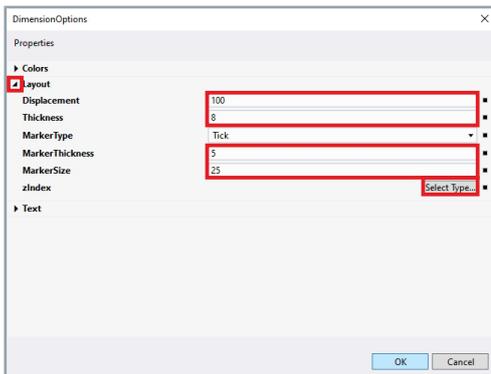
## 9.3.2.10 Dimensions



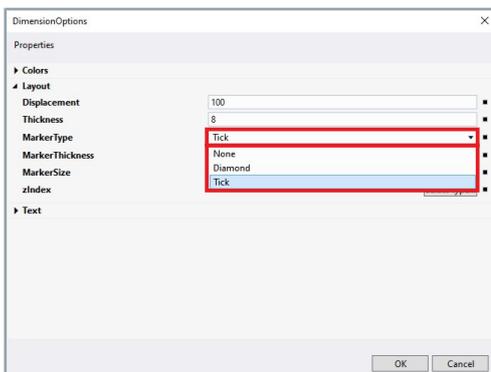
- ▶ Expand *Dimensions*
- ▶ Activate the checkbox **DisplayDimensions** to show the dimensions
- OR
- ▶ Deactivate the checkbox **DisplayDimensions** to hide the dimensions
- ▶ Activate the checkbox **InvertDimensions**
- OR
- ▶ Deactivate the checkbox **InvertDimensions**
- ▶ Click ... from *DimensionOptions*



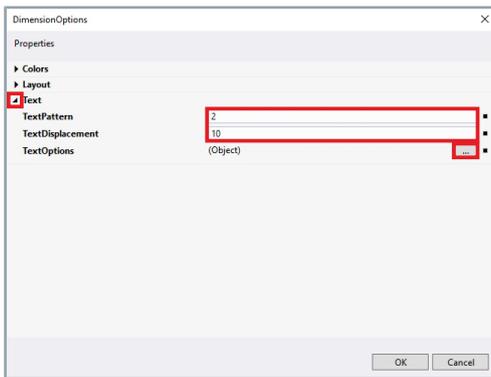
- The dialog box *DimensionOptions* opens.
- ▶ Expand *Colors*
  - ▶ Click on **InfoBarColor** or **MarkerColor** to set the color
- The adjustment range is displayed.
- Further information can be found in chapter "Colors", [Page 424].



- ▶ Expand *Layout*
  - ▶ Enter values in the input fields *Displacement*, *Thickness*, *MarkerThickness* and *MarkerSize*
  - ▶ Click on **Select Type...** from *zIndex*
- Further information can be found in chapter "zIndex", [Page 426].



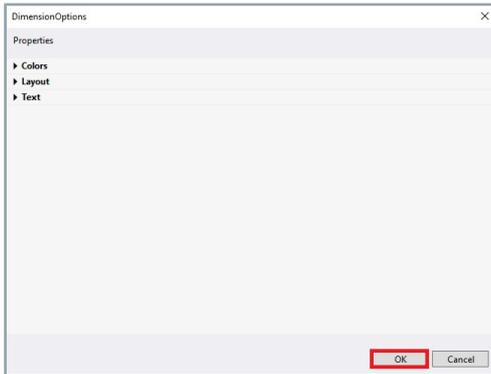
- ▶ Select the marker type from the drop-down menu *MarkerType*



- ▶ Expand *Text*
- ▶ Enter values in the input fields *TextPattern* and *TextDisplacement*
- ▶ Click ... from *TextOptions*

The window *TextOptions* opens.

Further information can be found in chapter "TextOptions", [Page 422]"General settings", [Page 422].



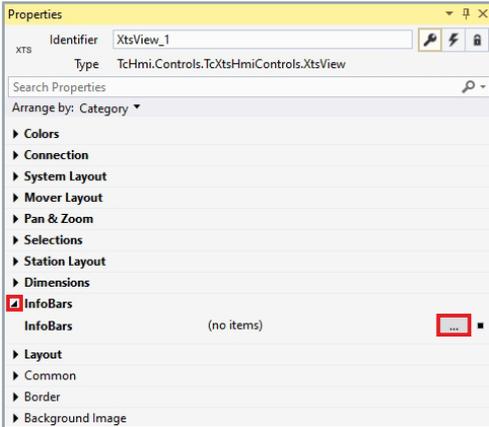
- ▶ Confirm with **OK**

The dialog box *DimensionsOptions* closes.

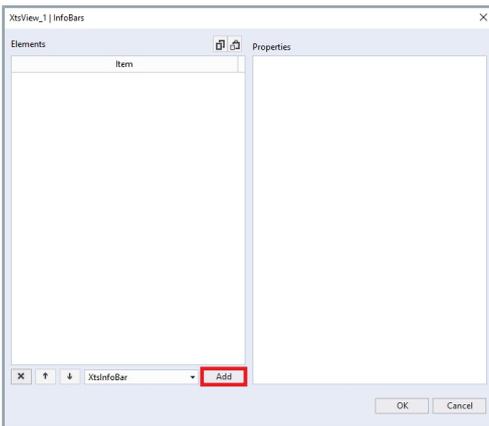
The table shows the default parameter settings for the *Dimensions* properties:

Property	Explanation	Default setting
<i>DisplayDimensions</i>	Display of the dimensions	False
<i>DimensionOptions</i>		...
▲ Colors		
• InfoBarColor	Color that can be defined for the InfoBar	#FF000000
• MarkerColor	Color that can be defined for the marker	#FF000000
▲ Layout		
• Displacement	Offset of the dimensions	100
• Thickness	Thickness of dimensions	8
• MarkerType	Selection of the marker type	Tick
• None	No marker	–
• Diamond	Diamond	–
• Tick	Tick	–
• MarkerThickness	Marker thickness	5
• MarkerSize	Marker size	25
• zIndex	Z-position, position of the visual element and information about the update of the visual element	1200
▲ Text		
• TextPattern	Text pattern for the description of the scaling of the system. With 1, for example, the scaling takes place in steps of 250.	2
• TextDisplacement	Offset of the text	10
• TextOptions	Properties for text design	...
<i>InvertDimensions</i>		False

### 9.3.2.11 InfoBars



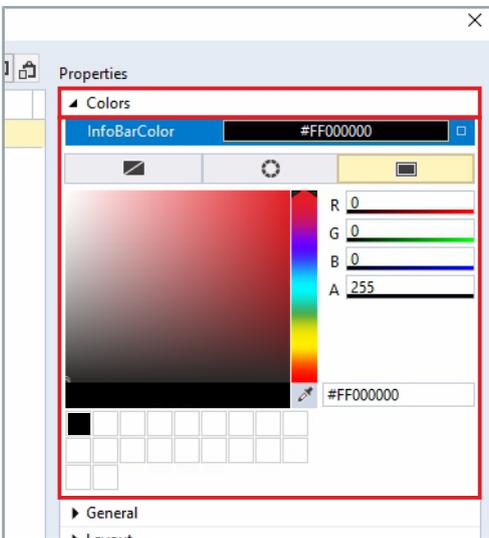
- ▶ Expand *InfoBars*
- ▶ Click ... from *InfoBars*



The dialog box *XtsView | InfoBars* opens.

- ▶ Click on **Add**

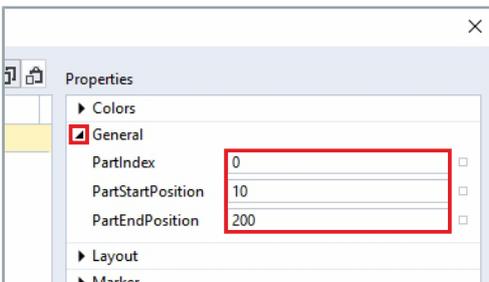
An *XtsInfoBar* is added. The properties of the *XtsInfoBar* can be set in the *Properties* area.



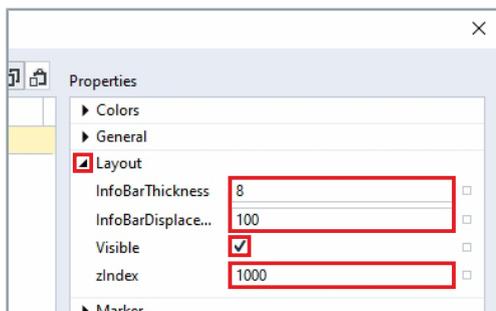
- ▶ Expand *Colors*

The adjustment range is displayed.

Further information can be found in chapter "Colors", [Page 424].



- ▶ Expand *General*
- ▶ Enter values in the input fields *PartIndex*, *PartStartPosition* and *PartEndPosition*

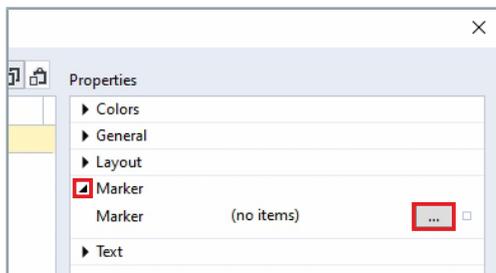


- ▶ Expand *Layout*
- ▶ Enter values in the input fields *InfoBarThickness* and *InfoBarDisplacement*

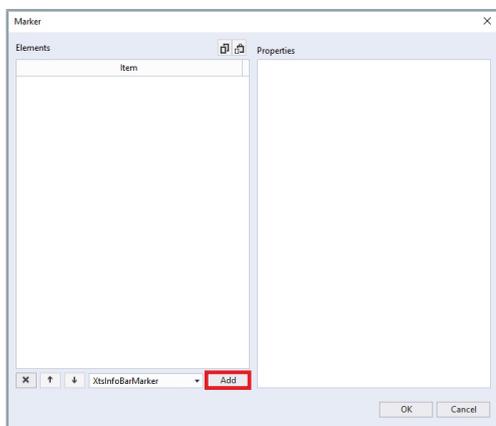
▶ Activate the checkbox **Visible** to show the InfoBar

OR

- ▶ Deactivate the checkbox **Visible** to hide the InfoBar
- ▶ Enter a value in the input field *zIndex*



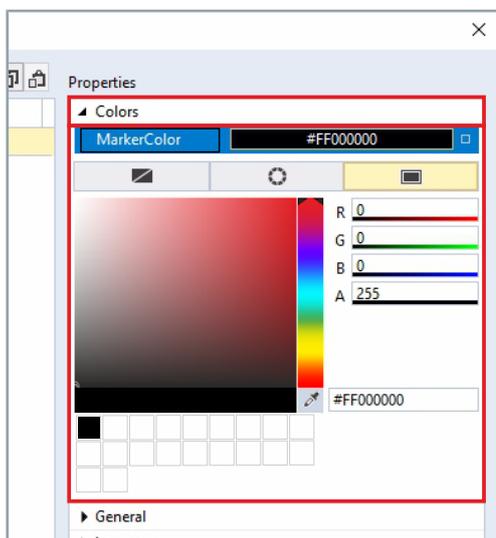
- ▶ Expand *Marker*
- ▶ Click ... from *Marker*



The dialog box *Marker* opens.

- ▶ Click on **Add**

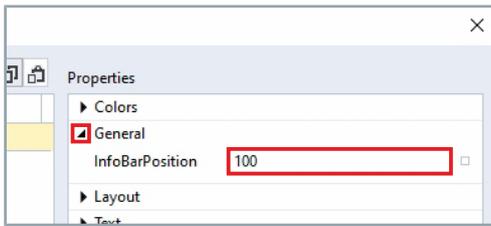
An *XtsInfoBarMarker* is added. The properties of the *XtsInfoBarMarker* can be set in the *Properties* area.



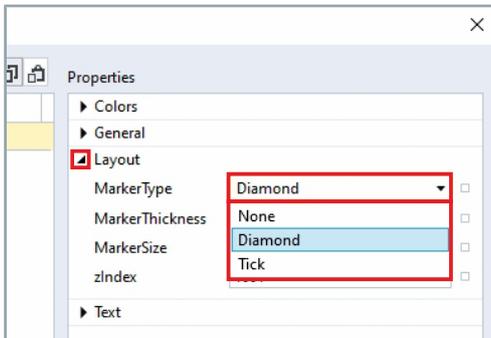
- ▶ Expand **Colors**

The adjustment range is displayed.

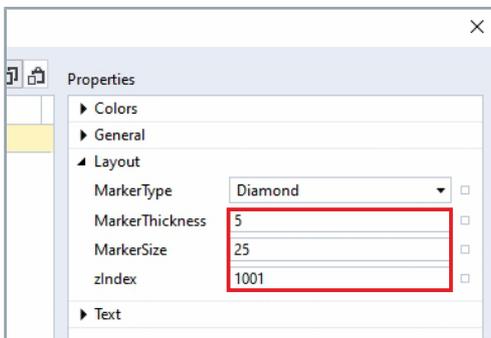
Further information can be found in chapter "Colors", [Page 424].



- ▶ Expand *General*
- ▶ Enter a value in the input field *InfoBarPosition*

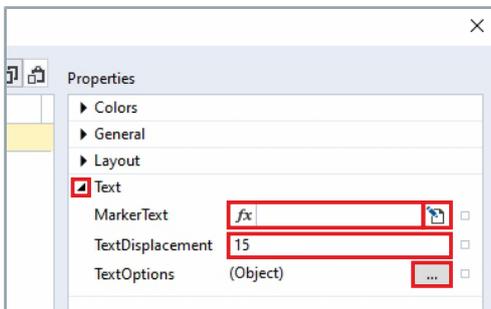


- ▶ Expand *Layout*
- ▶ Select the marker type from the drop-down menu *MarkerType*



- ▶ Enter values in the input fields *MarkerThickness*, *MarkerSize* and *zIndex*

Further information can be found in chapter "zIndex", [Page 426].



- ▶ Expand *Text*
- ▶ Enter a text in the input field *MarkerText*

OR

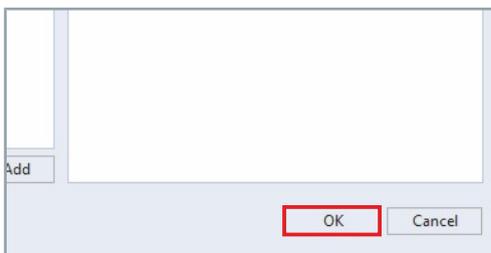
- ▶ Click on the button to open the *Multiline editor*

Further information can be found in chapter "Link formula", [Page 386].

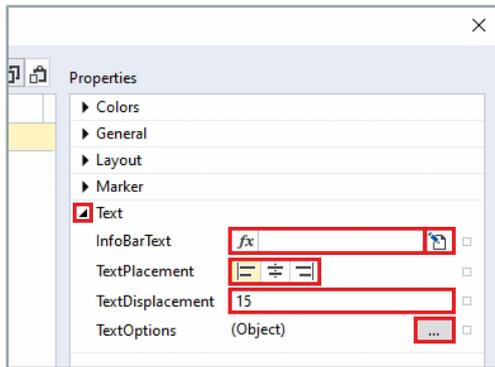
- ▶ Enter a value in the input field *TextDisplacement*
- ▶ Click ... from *TextOptions*

The dialog box *TextOptions* opens.

Further information can be found in chapter "TextOptions", [Page 422]"General settings", [Page 422].



- ▶ Confirm with **OK**
- The dialog box *Marker* closes.



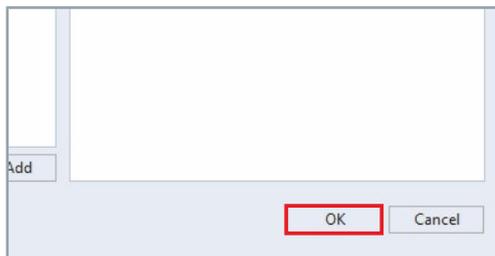
- ▶ Expand *Text*
- ▶ Enter a text in the input field *InfoBarText*

OR

- ▶ Click on the button to open the *Multiline editor*
- ▶ Click on a button at **TextPlacement** to select the alignment of the text
- ▶ Enter a value in the input field *TextDisplacement*
- ▶ Click ... from *TextOptions*

The dialog box *TextOptions* opens.

Further information can be found in chapter "TextOptions", [Page 422]"General settings", [Page 422].



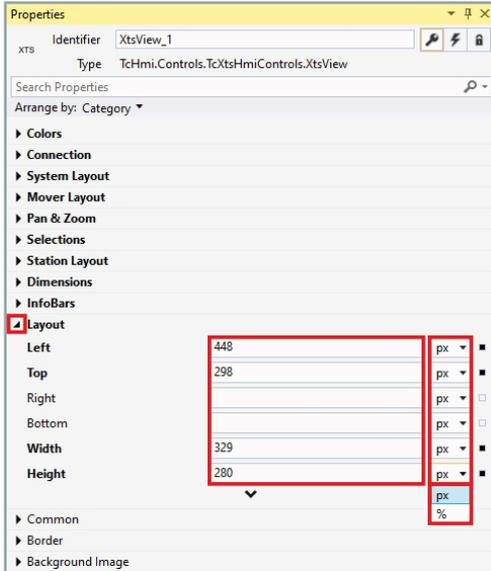
- ▶ Confirm with **OK**

The dialog box *XtsInfoBars* closes.

The table shows the default parameter settings for the *InfoBars* properties:

Property	Explanation	Default setting
<i>InfoBars</i>		...
▲ Colors		
• InfoBarColor	Color that can be defined for the InfoBar	#FF00000
▲ General		
• PartIndex		0
• PartStartPosition	Point at which the part begins	10
• PartEndPosition	Point at which the part ends	200
▲ Layout		
• InfoBarThickness	InfoBar thickness	8
• InfoBarDisplacement	Offset of the text	100
• Visible	Visibility of the tool	True
• zIndex	Z-position, position of the visual element and information about the update of the visual element	1000
▲ Marker		
Marker		...
• MarkerColor	Color that can be defined for the marker	#FF000000
• InfoBarPosition	Position of the InfoBar	100
• MarkerType	Selection of the marker type	Diamond
• None	No marker	–
• Diamond	Diamond	–
• Tick	Tick	–
• MarkerThickness	Marker thickness	5
• MarkerSize	Marker size	25
• zIndex	Z-position, position of the visual element and information about the update of the visual element	1001
• MarkerText	Text displayed with the marker	–
• TextDisplacement	Offset of the text	15
• TextOptions	Properties of the text design	...
▲ Text		
• InfoBarText	Text that is displayed in the InfoBar	–
• TextPlacement	Text alignment	Left-justified
• ≡ left-justified	Left aligned	–
• ≠ centered	Centered	–
• =  right-justified	Right aligned	–
• TextDisplacement	Offset of the text	15
• TextOptions	Properties of the text design	...

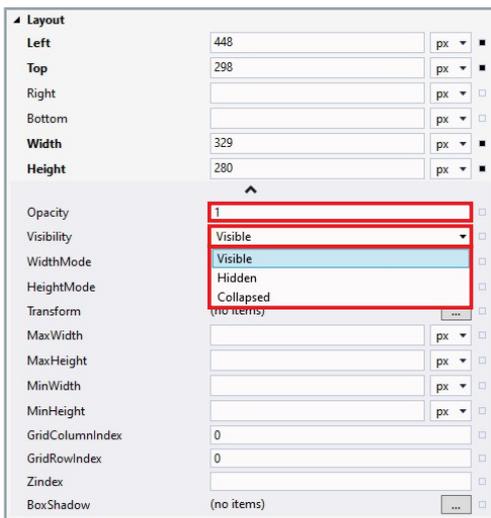
## 9.3.2.12 Layout



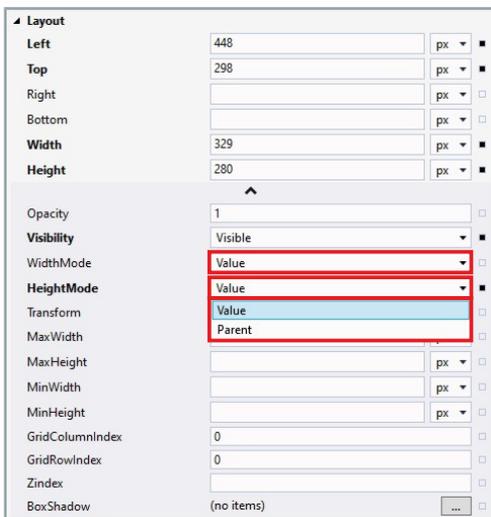
- ▶ Expand *Layout*
- ▶ Enter values in the input fields *Left*, *Top*, *Right*, *Bottom*, *Width* and *Height*
- ▶ Change the unit in the drop-down menu if required



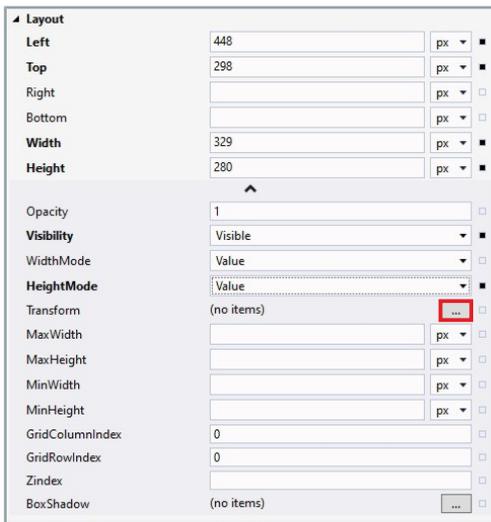
- ▶ Expand menu by clicking on the button



- ▶ Enter a value in the input field *Opacity*
- ▶ Select the visibility in the drop-down menu *Visibility*



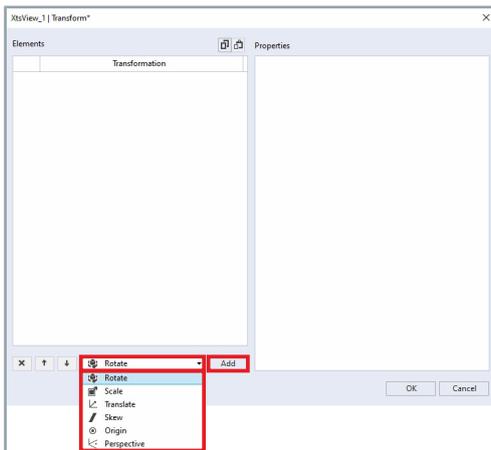
- ▶ Select **Value** in the drop-down menu *WidthMode*
- OR
- ▶ Select **Parent** in the drop-down menu *WidthMode*
- ▶ Select **Value** in the drop-down menu *HeightMode*
- OR
- ▶ Select **Parent** in the drop-down menu *HeightMode*



► Click ... from *Transform*

You can add different transformation types to *XtsView | Transform*. When the window opens, *Rotate* is selected by default. The following transformations are available:

- Rotate
- Scale
- Translate
- Skew
- Origin
- Perspective



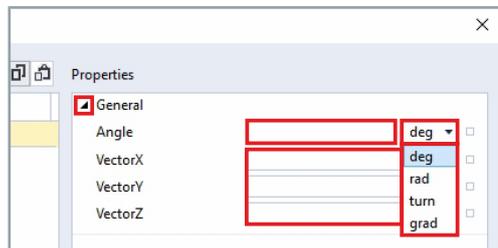
The dialog box *XtsView | Transform* opens.

- In the drop-down menu, select the transformation type to be added
- Click on **Add**

The selected transformation is added.

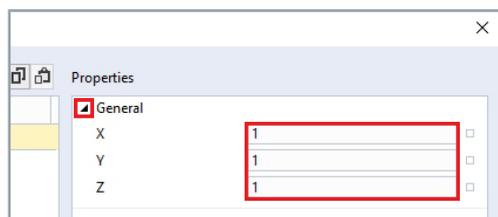
The different properties of the transformations can be set in the *Properties* area.

## Rotate



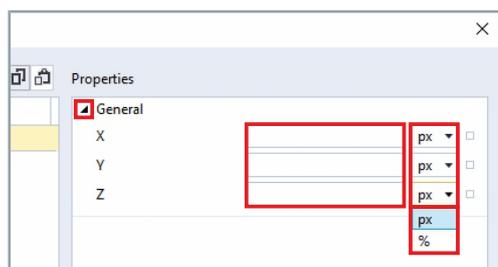
- ▶ Expand *General*
- ▶ Enter a rotation angle in the input field *Angle*
- ▶ Change the unit in the drop-down menu if required
- ▶ Enter values in the input fields *VectorX*, *VectorY* and *VectorZ*

## Scale



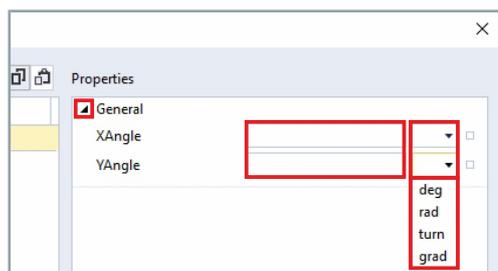
- ▶ Expand *General*
- ▶ Enter values in the input fields *X*, *Y* and *Z*

## Translate



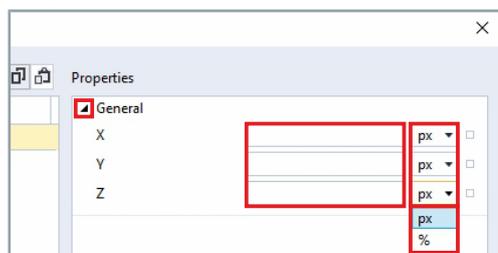
- ▶ Expand *General*
- ▶ Enter values in the input fields *X*, *Y* and *Z*
- ▶ Change the unit in the drop-down menu if required

## Skew



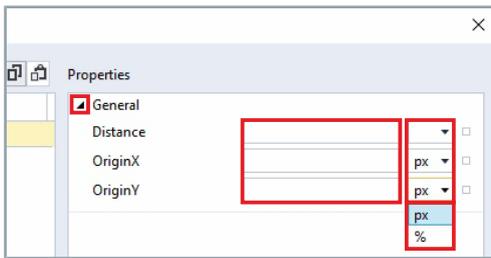
- ▶ Expand *General*
- ▶ Enter a value for the horizontal angle of inclination in the input field *XAngle*
- ▶ Enter a value for the vertical angle of inclination in the input field *YAngle*
- ▶ Change the unit in the drop-down menu if required

## Origin



- ▶ Expand *General*
- ▶ Enter values in the input fields *X*, *Y* and *Z*
- ▶ Change the unit in the drop-down menu if required

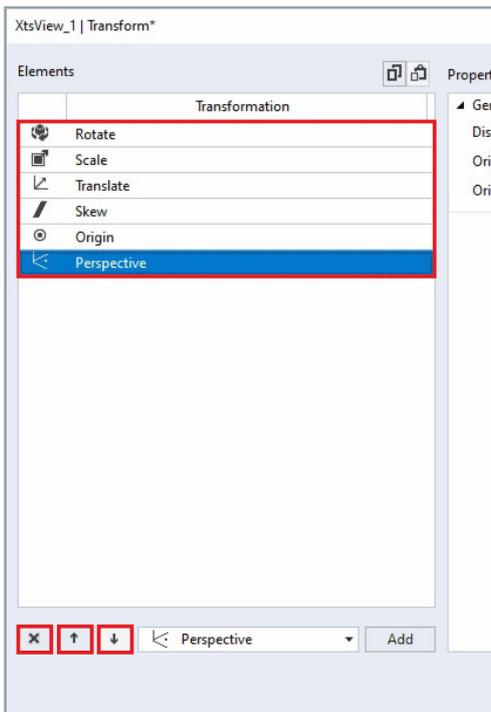
### Perspective



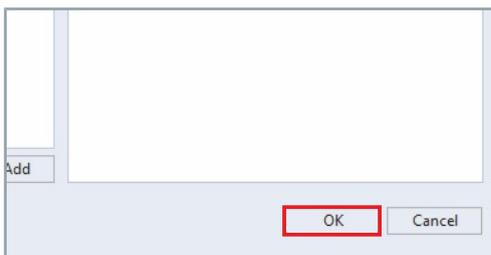
- ▶ Expand *General*
- ▶ Enter values in the input fields *Distance*, *OriginX* and *OriginY*
- ▶ Change the unit in the drop-down menu if required

### Remove or change transformation

You can remove individual transformations or change the order of the transformations.



- ▶ Select the transformation to be moved or removed
  - ▶ Click on **X** to remove the transformation
- OR
- ▶ Click on the buttons to move the transformation up or down step by step



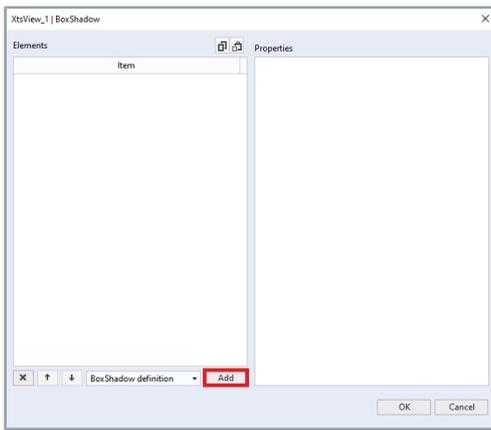
- ▶ Confirm with **OK**
- The dialog box *XtsView | Transform* closes.

- ▶ Enter values in the input fields *MaxWidth*, *MaxHeight*, *MinWidth* and *MinHeight*
- ▶ Change the unit in the drop-down menu if required

- ▶ Enter values in the input fields *GridColumnIndex*, *GridRowIndex* and *Zindex*

Further information can be found in chapter "zIndex", [Page 426].

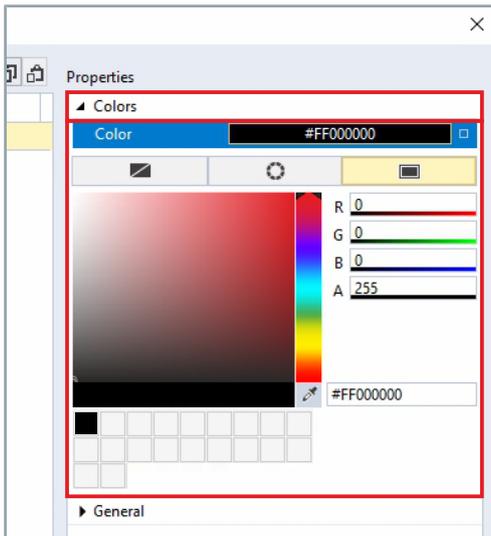
- ▶ Click ... from *BoxShadow*



The dialog box *XtsView | BoxShadow* opens.

- ▶ Click on **Add**

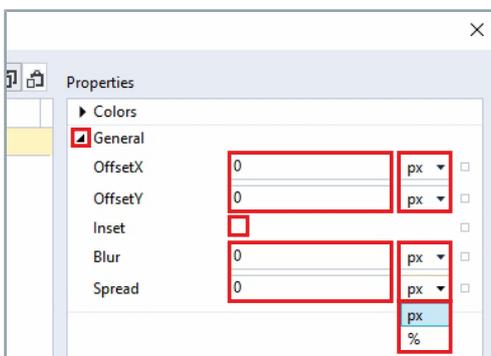
A *BoxShadow* definition is added. The properties of the shadow can be set in the *Properties* area.



- ▶ Expand *Colors*

The adjustment range is displayed.

Further information can be found in chapter "Colors", [Page 424].

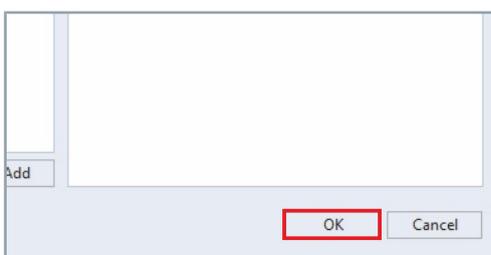


- ▶ Expand *General*

- ▶ Enter a value for the distance of the shadow in the X direction in the input field *OffsetX*
- ▶ Enter a value for the distance of the shadow in the Y direction in the input field *OffsetY* values
- ▶ Activate the checkbox **Inset**

OR

- ▶ Deactivate the checkbox **Inset**
- ▶ Enter a value for the blurring of the shadow in the input field *Blur*
- ▶ Enter a value for the spread of the shadow in the input field *Spread*
- ▶ Change the unit in the drop-down menu if required



- ▶ Confirm with **OK**

The dialog box *XtsView | BoxShadow* closes.

The table shows the default parameter settings for the *Layout* properties:

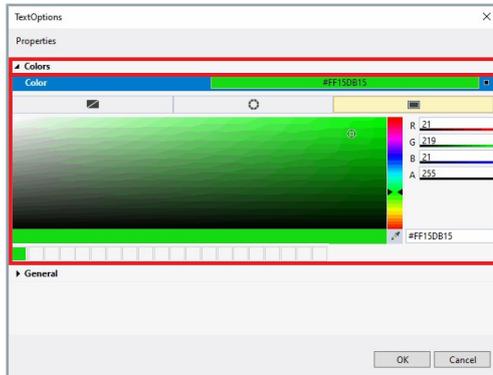
Property	Explanation	Default setting
<i>Left</i>	Left distance. Unit: px or %	448
<i>Top</i>	Upper distance. Unit: px or %	298
<i>Right</i>	Right distance. Unit: px or %	-
<i>Bottom</i>	Lower distance. Unit: px or %	-
<i>Width</i>	Width. Unit: px or %	329
<i>Height</i>	Height. Unit: px or %	280
<i>Opacity</i>	Value for the opacity	1
<i>Visibility</i>	Drop-down menu for visibility	Visible
• Visible	Visible	
• Hidden	Hidden	
• Collapsed	Collapsed	
<i>WidthMode</i>		Value
• Value	Value	-
• Parent	Parent	-
<i>HeightMode</i>		Value
• Value	Value	-
• Parent	Parent	-
<i>Transform</i>	Transformation type	...
Rotate	Rotational displacement	
▲ General		
• Angle	Angle of rotation	-
• VectorX	Vector X-axis	-
• VectorY	Vector Y-axis	-
• VectorZ	Vector Z-axis	-
Scale	Scaling	
▲ General		
• X	Value for width	1
• Y	Value for the height	1
• Z	Value for the depth	1
Translate	Translational displacement	
▲ General		
• X	Value for the displacement in the X direction. Unit: px or %	-
• Y	Value for the displacement in the Y direction. Unit: px or %	-
• Z	Value for the displacement in the Z direction. Unit: px or %	-

Property	Explanation	Default setting
Skew	Skew	
▲ General		
• XAngle	Angle for horizontal inclination	-
• YAngle	Angle for vertical inclination	-
Origin	Origin	
▲ General		
• X	Value in X direction	-
• Y	Value in Y direction	-
• Z	Value in Z direction	-
Perspective	Perspective distortion	
▲ General		
• Distance	Distance	-
• OriginX	Origin in X-direction	-
• OriginY	Origin in Y-direction	-
<i>MaxWidth</i>	Maximum width	-
<i>MaxHeight</i>	Maximum height	-
<i>MinWidth</i>	Minimum width	-
<i>MinHeight</i>	Minimum height	-
<i>GridColumnIndex</i>	Value for the grid column width	0
<i>GridRowIndex</i>	Value for the grid row height	0
<i>Zindex</i>		-
<i>BoxShadow</i>	Value for the shadow	...
▲ Colors		
• Color	Color of the shadow	###FF000000
▲ General		
• OffsetX	Offset of the shadow in the X direction. Unit: px or %	0
• OffsetY	Offset of the shadow in the Y direction. Unit: px or %	0
• Inset	Inset	False
• Blur	Blurring of the shadow. Unit: px or %	0
• Spread	Spread of the shadow. Unit: px or %	0

## General settings

In this chapter you will find more information about the settings *Colors*, *TextOptions* and *zIndex*.

### TextOptions



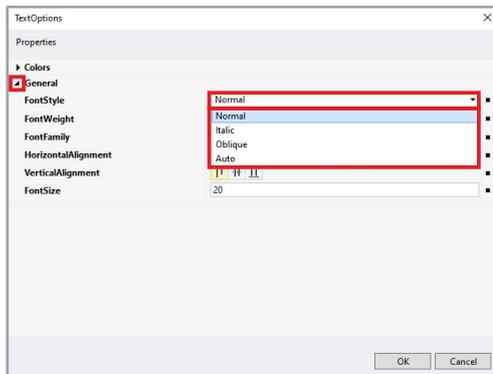
- ▶ Expand *Colors*

The adjustment range is displayed.

Further information can be found in chapter "Colors", [Page 424].

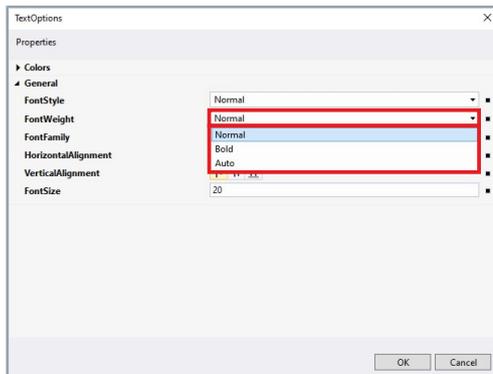
- ▶ Define color via the adjustment range

### General

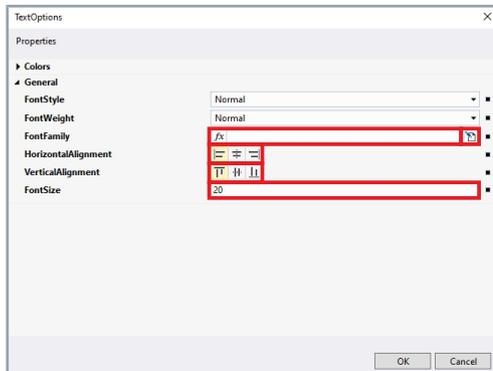


- ▶ Expand *General*

- ▶ Select the font style from the drop-down menu *FontStyle*



- ▶ Select the font weight from the drop-down menu *FontWeight*



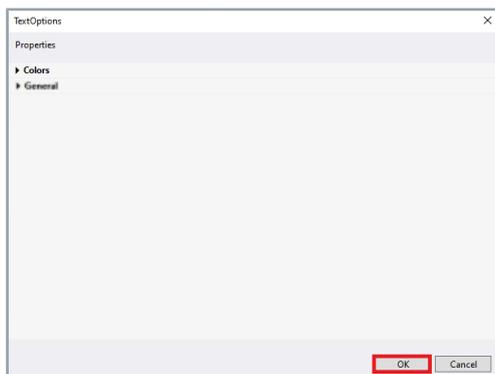
- ▶ Enter the font family in the input field *FontFamily*

OR

- ▶ Click on the button to open the *Multiline editor*

- ▶ Select text alignment at **HorizontalAlignment** and **VerticalAlignment**

- ▶ Enter a value in the input field *FontSize*



► Confirm with **OK**  
 The dialog box *TextOptions* closes.

The table shows the default parameter settings for the *TextOptions* properties:

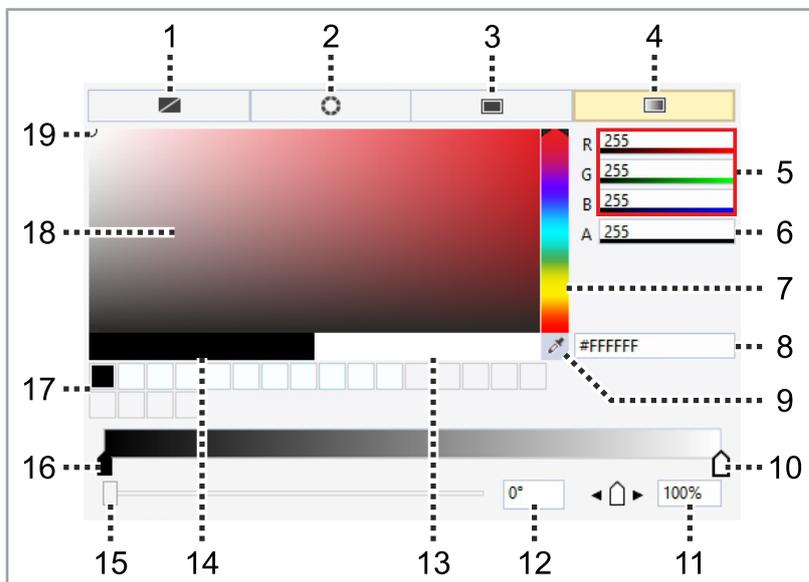
Property	Explanation	Default setting
▲ Colors		
• Color	Text color	Solid Color
• None	No color	–
• Theme	Graphic	–
• Solid Color	Solid color, RGBA	#FF000000
▲ General		
• FontStyle	Font	Normal
• Normal	Normal	–
• Italic	Italic font	–
• Oblique	Oblique font	–
• Auto	Automatic	–
• FontWeight	Font weight	Normal
• Normal	Normal	–
• Bold	Bold	–
• Auto	Automatic	–
• FontFamily	Font family	–
• HorizontalAlignment	Horizontal text alignment	Left-justified
• ⌵ Left-justified	Left aligned	–
• ⌵ Centered	Centered	–
• ⌵ Right-justified	Right aligned	–
• VerticalAlignment	Vertical text alignment	Bottom
• ⌵ Top	Top	–
• ⌵ Middle	Centered	–
• ⌵ Bottom	Bottom	–
• FontSize	Font size	20

In addition to defining a solid color, some setting areas offer the option of defining a color gradient. An additional tab is then available for defining the color gradient.



### Different setting ranges

The setting of the colors is shown as an example in a setting range with a color gradient.



Position	Explanation
1	No color
2	Graphic
3	Solid color
4*	Color gradient
5**	Input field for RGB color values
6**	Input field for opacity
7**	Color slider
8**	Input field for HEX color code
9**	Pipette
10***	Color 1 of the color gradient
11***	Position of color value 1 of the color gradient [%]
12***	Rotation angle of the color gradient [°]
13***	Display area of the defined color 1 of the color gradient
14***	Display area of the defined color 2 of the color gradient
15***	Slider for the rotation angle of the color gradient
16***	Color 2 of the color gradient
17**	Display range of the last colors used
18**	Selection area
19**	Selection tool in the selection area

\* not available in every adjustment range

\*\* only visible in the Solid color tab [3] or in the Gradient tab [4]

\*\*\* only visible in the Color gradient tab [4]

You have various options for setting a color for the background and the frame.

**No color**

- ▶ Click on the button [1] to not select a color

**Use graphic**

- ▶ Click on the button [2] to use a graphic

**Set solid color**

- ▶ Click on the button [3] to set a solid color
- ▶ Define a color with the selection tool [19] in the selection area [18] and the color slider [7]

OR

- ▶ Enter the values in the input fields *R*, *G* and *B* [5] to define the color
- ▶ Enter a value for the opacity in the input field *A* [6]

OR

- ▶ Enter a code for the HEX color in the input field [8]

OR

- ▶ Use the pipette [9] to select a color

**Setting the color gradient**

- ▶ Click on the button [4] to set a color gradient
- ▶ Click on Color 1 [17] to set the first color of the color gradient
- ▶ Set solid color to set the first color of the color gradient
- ▶ Click on Color 2 [16] to set the second color of the color gradient
- ▶ Set solid color to set the second color of the color gradient

The defined colors are shown in the display area.

- ▶ Left-click outside the adjustment range to close the adjustment range

## zIndex

The zIndex specifies the Z position where the visual element is located.

The first level has a zIndex of up to 5000, which includes modules with a zIndex of 0, for example. As soon as an interaction occurs, such as changing the padding, the first level is updated. An Infolmage can be placed on this first level.

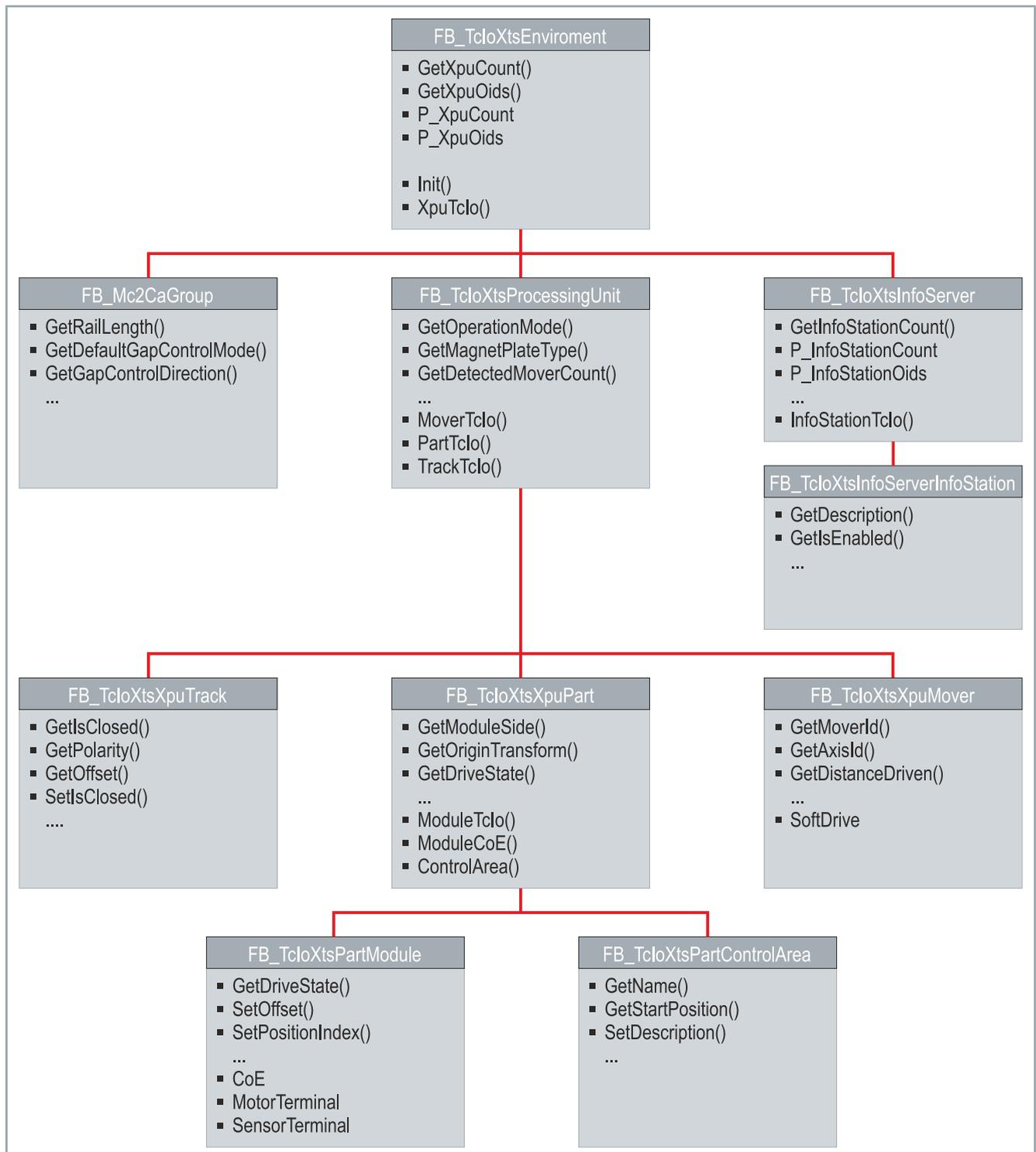
The next level has a zIndex of 5000-15000, this includes the movers with a zIndex of 10000. An Infolmage can be placed on this level, as it is updated with the movers.

As soon as the zIndex exceeds a value of 15000, the visual elements in this level are updated. An Infolmage that is not updated with the movers can be placed on this level.

## 10 Tc3 XTS Utility

The Tc3 XTS Utility is installed together with the TF5850 software package. The Tc3 XTS Utility is a PLC library and is used to read or set parameters of the XTS system.

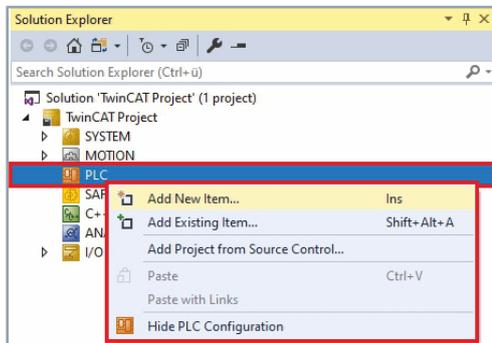
The following diagram shows the structure of the Tc3 XTS Utility:



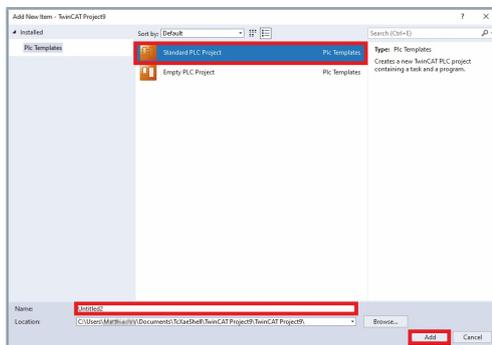
## 10.1 Add library

To be able to use the visualization, a Tc3 XTS Utility library must be added to the PLC.

### 10.1.1 Add standard PLC project



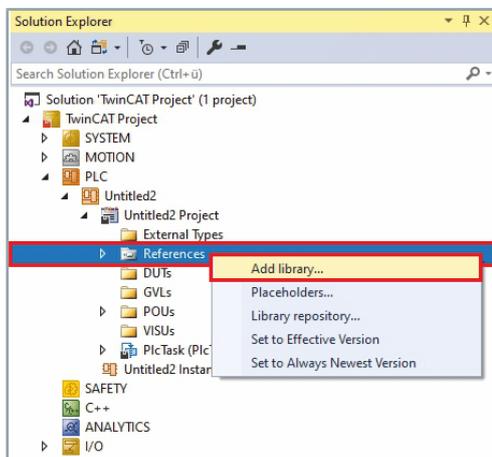
- ▶ Expand *Solution Explorer* > *TwinCAT Project*
- ▶ Right-click on **PLC** to open the context menu
- ▶ Click **Add New Item...** in the context menu



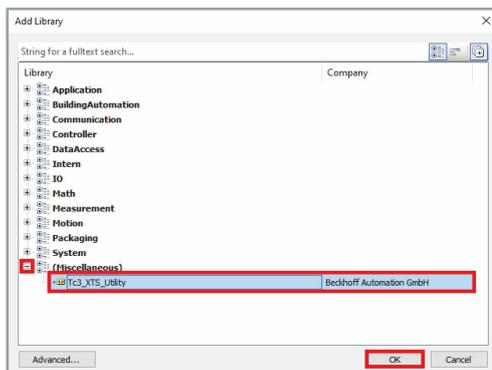
The dialog box *Add New Item* opens.

- ▶ Click on **Standard PLC Project**
- ▶ Enter a name in the input field *Name*
- ▶ Click on **Add** to add a PLC project

### 10.1.2 Adding the Tc3 XTS Utility library



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *PLC* > *Untitled* > *Untitled Project*
- ▶ Right-click on **References** to open the context menu
- ▶ In the context menu click on **Add library ...**



The dialog box *Add Library* opens.

- ▶ Expand (*Miscellaneous*)
- ▶ Click on **Tc3\_XTS\_Utility**
- ▶ Confirm with **OK**

The *Tc3\_XTS\_Utility* library is added.

## 10.2 Initialization

The function block *FB\_TcloXtsEnvironment* must be configured once for the XTS project so that all parameters of the Processing Unit can be accessed. If XTS objects are to be used in the project, the function block *FB\_XtsEnvironment* must also be configured.

The function blocks for accessing the parameters of the InfoServer and CA group are integrated in the Tc3 XTS Utility. You must activate the function blocks for initialization so that the function blocks can be used in the further course via the *FB\_Tclo-XtsEnvironment*.

The function block *FB\_TcloXtsEnvironment* must be initialized once when starting or during an online change in order to obtain information about all objects. After initialization all parameters are available via *FB\_TcloXtsEnvironment*. All parameters can be accessed by calling the corresponding methods. There is no automatic cyclic update of the data.

### 10.2.1 Sample code

```
// Declaration Part
PROGRAM MAIN
VAR
    fbXtsEnvironment           : FB_TcIoXtsEnvironment;
    stXtsEnvironmentConfiguration : ST_XtsEnvironmentConfiguration;
    nEnvironmentState         : INT:=1;
END_VAR

//-----

// Programm Part
CASE nEnvironmentState OF

    1: //Enable init items
        //Enable init Info Server if needed
        stXtsEnvironmentConfiguration.bEnableInitInfoServer := TRUE;

        //Enable init CA Group if needed
        stXtsEnvironmentConfiguration.bEnableInitCaGroup := TRUE;

        //Set configuration of XtsUtility init
        fbXtsEnvironment.P_XtsEnvironmentConfiguration := stXtsEnvironmentConfiguration;

        //Next Step
        nEnvironmentState:=2;

    2://Init
        //Start init
        IF fbXtsEnvironment.Init(TRUE) THEN
            //Stop init
            fbXtsEnvironment.Init(FALSE);

            //Next Step
            nEnvironmentState:=3;
        END_IF

    3: //Check if init succeeded
        //Check IsInitialized property
        IF fbXtsEnvironment.P_IsInitialized THEN

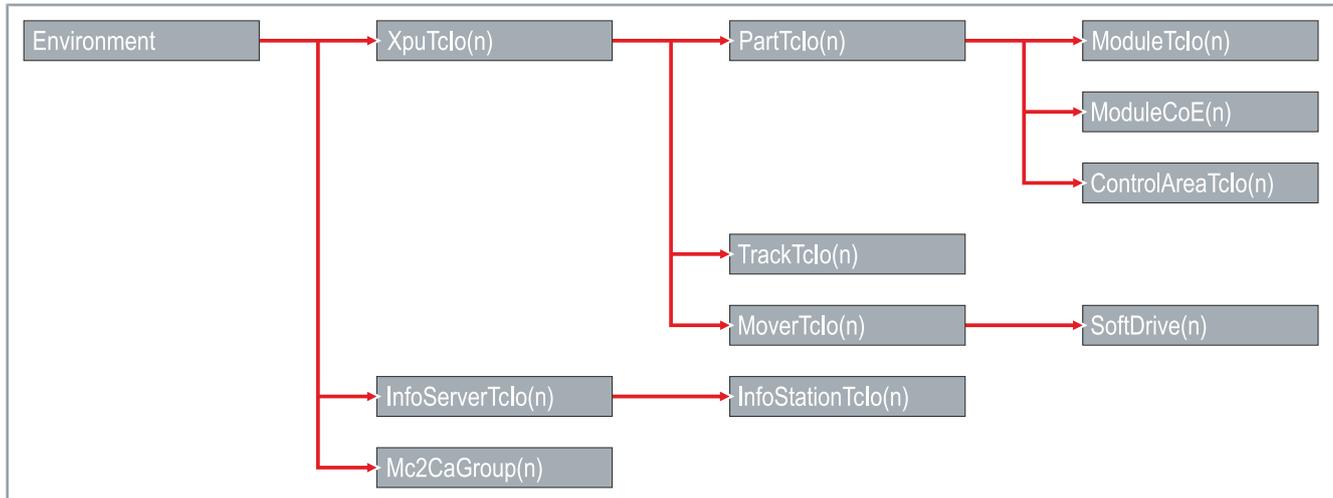
            //Next Step
            nEnvironmentState:=4;
        END_IF

    4: //Init done
        ;
END_CASE
```

## 10.3 PLC access

### 10.3.1 Call Chain

With the following Call Chain you have the possibility to access the essential parameters of the XTS objects. An overview of the parameters can be found in the chapter "Parameter", [Page 443].



### 10.3.2 Accessing TcIo parameters

In principle, all TcIo parameters can be accessed in the PLC. Access takes place via the TcCom objects in the Solution Explorer.



#### Example Number of detected movers

Access to TcIo parameters is illustrated by reading out the number of detected movers. Calling up the online parameters is done in the same way for all TcIo parameters.

The screenshot shows the Solution Explorer with the path: Solution 'TwinCAT Project' (1 project) > TwinCAT Project > SYSTEM > TcCOM Objects > XtsProcessingUnit 1. Below it, the Parameter (Online) window is open, showing a table of parameters for Mover Detection.

Name	Online	CS
Mover Detection		
ActiveMoverCount	1	<input type="checkbox"/>
AreAllPositionsValid	TRUE	<input type="checkbox"/>
DetectionCycleCount	1	<input type="checkbox"/>
DetectionCycleCountTotal	1	<input type="checkbox"/>
DetectionState	TRUE	<input type="checkbox"/>
DetectedMoverCount	6	<input type="checkbox"/>
ExpectedMoverCount	6	<input type="checkbox"/>
ScannedModuleCount	0	<input type="checkbox"/>
MoverPositions	[... ..]	<input type="checkbox"/>

▶ Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *Tc-COM Objects*

▶ Double click on **XtsProcessingUnit**

▶ In the project window click on the **Parameter (Online)** tab

▶ Expand *Mover Detection*

▶ Read out the number of detected movers at **DetectedMover-Count**

### 10.3.3 Access to the parameters in the PLC

You need these calls to access various parameters in the PLC:

#### Reading out the number of detected movers

```
nDetectedMoverCount := fbXtsEnvironment.XpuTcIo(1).GetDetectedMoverCount();
```

#### Reading the DriveState of XPU1

```
//read the DriveState of XPU1
eDrive:=fbXtsEnvironment.XpuTcIo(1).GetDriveState();
```

#### Reading the module count of XPU1

```
//read the ModuleCount of XPU1-Part2
nModuleCount:=fbXtsTcIo(1)-.PartTcIo(2).GetModuleCount();
```

#### Reading the length of XPU1

```
//read the Length of XPU1-Part2-Module3
fLength:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(2).ModuleTcIo(3).GetLength();
```

#### Reading the axis ID of XPU1

```
//read the AxisId of XPU1-Mover3
nAxisId:=fbXtsEnvironment.XpuTcIo(1).MoverTcIo(3).GetAxisId();
```

#### Reading the track length of XPU1

```
//read the Length of XPU1-Track2
fLength:=fbXtsEnvironment.XpuTcIo(1).TrackTcIo(2).GetLength();
```

#### Reading the start position of the InfoStation

```
//read the StartPositionOnPart of Infostation2
fPosition:=fbXtsEnvironment.InfoServerTcIo(1).InfoStationTcIo(2).GetStartPositionOnPart();
```

#### Reading the GabControl mode of the CA group

```
//read the GapControlMode of CaGroup1
GapControlMode:=fbXtsEnvironment.Mc2CaGroup(1).GetDefaultGapControlMode();
```

## 10.3.4 Access to the SoftDrive parameters

You need these calls to access the SoftDrive parameters:

### Reading the KP from VelocityControlLoop

```
//read Kp of velocity control loop  
fbXtsEnvironment.XpuTcIo(1).MoverTcIo(1).SoftDrive.VelocityControl.GetKp();
```

### Setting the KP of VelocityControlLoop

```
//set kp of velocity control loop  
fbXtsEnvironment.XpuTcIo(1).MoverTcIo(1).SoftDrive.VelocityControl.SetKp(1.5);
```

## 10.3.5 Access to the CoE data

The CoE data is accessed either via the module object or by reading the CoE register.

### 10.3.5.1 Module object

The driver offers the possibility to read the CoE data directly via the module object.



#### Driver interval influences up-to-dateness of CoE data

The driver updates the CoE data at a self-determined interval. It is therefore possible that the information issued is not up to date.



#### Sample

The access to the CoE data is illustrated by reading the *DC Link Voltage*. Calling up the CoE data takes place in the same way for all CoE data.

Name	Value	
+	Info	
+	Drive Info	
+	Encoder Info	
+	Drive CoE - General	
+	Drive CoE - Amplifier Settings	
+	Drive CoE - Info Data	
	Auxiliary Voltage 5V	0.0
	Auxiliary Voltage 10V	0.0
	Auxiliary Voltage 24V	0.0
	DC Link Voltage	0.0
	Current Scaling	0.0
	Device Info	0
+	PCB Temperatures	[0.0]
	Overall Current	0.0
	Max DC link voltage - last 500 ms	0.0
	Max overall current - last 500 ms	0.0
	Chip ID	0
+	Drive CoE - I2T Diag Data	
+	Drive CoE - Vendor Data	

► Expand *Solution Explorer* > *TwinCAT Project* > *SYSTEM* > *TcCOM Objects* > *XtsProcessingUnit* > *Part*

► Double-click on **Module**

► In the project window click on the **Parameter (Online)** tab

► Click on **+** of *Drive CoE - Info Data*

► Read value at **DC Link Voltage**

## Update of the CoE data via the TcIo module

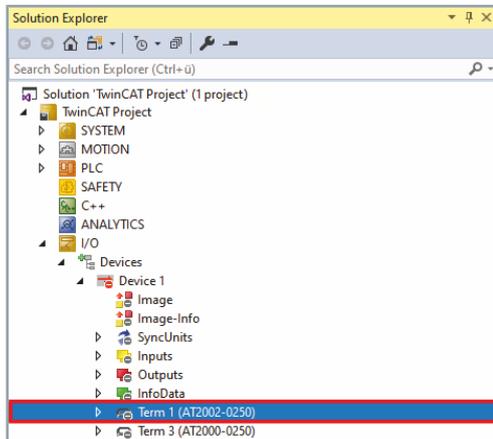
With the CoE read function via the TcIo module, you can access different CoE data simultaneously. The access takes place via the following call:

```
fDcLink:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).GetDCLinkVoltage();
aI2T REF:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).GetI2TTemperatures();
```

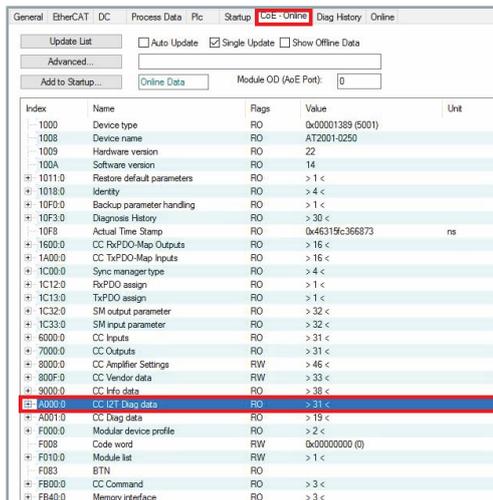
### 10.3.5.2 Update the CoE data by directly reading the CoE registers



The *Tc3 XTS Utility* organizes access to the CoE data to avoid communication errors. You can only update using an update method and you can only access one module of a supply segment at a time. In addition, the *Tc3 XTS Utility* offers the possibility to read CoE data via the I/O module.



- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *I/O* > *Devices* > *Device 1*
- ▶ Double-click on **Term 1**



- ▶ In the project window click on the **CoE - Online** tab
- ▶ Click on **CC I2T Diag Data**



### Call to read the registers (only possible with connected hardware)

Reading out the CoE data via the calls is only possible with connected hardware and only in Run mode.

*If no hardware is connected or the system is being operated in simulation, the calls may cause error messages.*

The following call prevents the registers from being read if no hardware is connected and the system is being operated in simulation:

```
IF NOT fbXtsEnvironment.XpuTcIo(1).GetOperationMode() = OperationMode.Simulation THEN
    "Methode, die genutzt werden soll"
END_IF
```

The following calls can be used to read the registers when hardware is connected and the system is being operated in Run mode:

```
IF fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.I2TdiagData.Update() THEN
    aI2T:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.I2TdiagData.TemperatureCoilCh;
END_IF
```

```
IF fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.InfoData.Update() THEN
    nDcLink:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.InfoData.DcLinkVoltage;
END_IF
```

#### 10.3.5.3 Access to all data of a CoE object

For example, if you need access to all I2T values, you can make the entire object available through the *all* property. The following calls are required for this:

```
pCoeI2TdiagData : POINTER TO ST_AT2xxxI2TdiagData;
```

```
IF fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.I2TdiagData.Update() THEN
    pCoeI2TdiagData:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.I2TdiagData.all;
END_IF
```

#### 10.3.5.4 Update and access to all CoE objects

The *Tc3 XTS Utility* allows you to update and access all CoE objects with just one call. The following calls are required for this:

```
stAllCoEData : ST_AT2xxxI2TdiagData;
```

```
IF fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.AllCoE.UpdateAllCoEData() THEN
    stAllCoEData:=fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.AllCoE.AllCoEData;
END_IF
```

### 10.3.6 Access to the diagnostic history

You can directly access the diagnostic history from the I/O module as well as other CoE data. The following call is required for this:

```
IF fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.DiagHistoryData.UpdateDiagHistory() THEN
  stAT2xxxI2TDiagHistory:= fbXtsEnvironment.XpuTcIo(1).PartTcIo(1).ModuleTcIo(1).CoE.DiagHistory-
  Data.DiagHistory;
END_IF
```

### 10.3.7 Setting Mover ID detection

The following call is required for Mover ID detection:

```
IF fbXtsEnvironment.XpuTcIo(1).SetMoverIdDetectionMode(MoverIdDetectionMode.Mover1) THEN
  nEnvironmentState:=8;
END_IF
```

### 10.3.8 Save mover commands

The command history function can be used to store up to 25 commands for a mover. Each command contains the command type, the station, a text and a timestamp.



If there is no timestamp, the function will add one automatically.

The following calls are required to manage the command history:

```
stCommand          : ST_TcIoXtsMoverCommand;

refCommandHistory : REFERENCE TO ARRAY[1..TcIoXtsEnvironmentParameterList.MaxMessageCommandHistory] OF
ST_TcIoXtsMoverCommand;

//preparing the message to store in command history
//if there is no time stamp in the message, the program will add one automatically
stCommand.sCommandType := 'MoverAbsoluteCA';
stCommand.sStation     := ',Station2';
stCommand.sText        := ',Pos:1000,Acc/Dec:10000';

//adding message int command history
fbXtsEnvironment.XpuTcIo(1).MoverTcIo(1).AddCommand(stCommand);

//read command history
refCommandHistory REF= fbXtsEnvironment.XpuTcIo(1).MoverTcIo(1).P_CommandHistory;

//clear all messages in command history
fbXtsEnvironment.XpuTcIo(1).MoverTcIo(1).ClearCommandHistory();
```

## 10.4 Visualization

The function block *FB\_XtsEnvironmentVisu* uses an interface pointer as input, which must refer to the function block *FB\_TcIoXtsEnvironment* in order to access the parameters of the XTS objects. The method *Cycle* of *FB\_XtsEnvironmentVisu* must be called for cyclic update of all parameters.

### NOTICE

#### Visualization only serves as support during programming

The visualization is only for support during programming of an XTS system and cannot be used for visualization in the plant operator interface.

- Further information can be found in chapter "XTS HMI Controls", [Page 379].

### 10.4.1 Sample code

```
// Declaration Part
PROGRAM MAIN

VAR
    fbXtsEnvironment          : FB_TcIoXtsEnvironment;
    nEnvironmentState        : INT:=1;
END_VAR

//-----

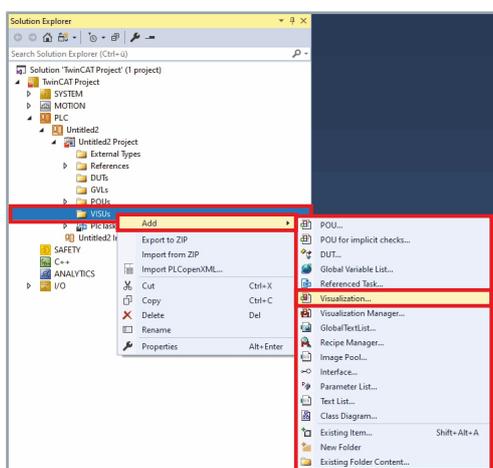
// Programm Part
CASE nEnvironmentVisuState OF

    1: //Link data pointer
        fbXtsEnvironmentVisu(ipTcIoXtsEnvironment:=fbXtsEnvironment);

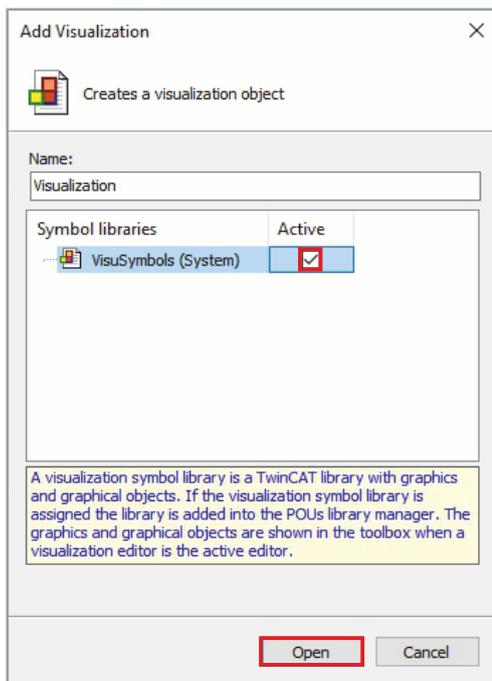
    Next Step
        nEnvironmentVisuState:=2;

    2: //Cyclic update of Visu information
        fbXtsEnvironmentVisu.Cycle();

END_CASE
```



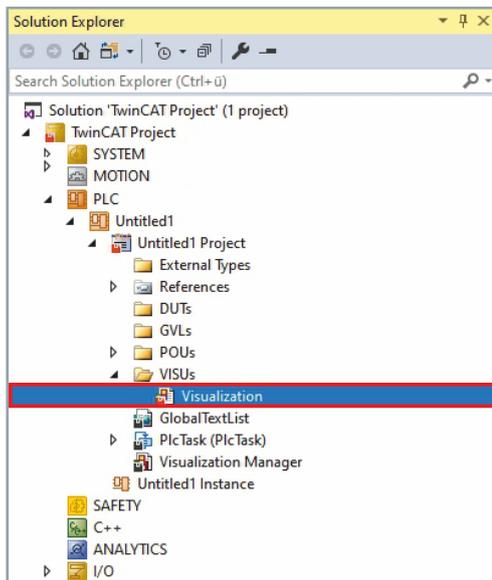
- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *PLC* > *Untitled* > *Untitled Project*
- ▶ Right-click on **VISUs** to open the context menu
- ▶ Click **Add** in the context menu to open another context menu
- ▶ In the context menu click on **Visualization...**



The dialog box *Add Visualization* opens.

- ▶ Activate the checkbox **VisuSymbols (System)**
- ▶ Click **Open**

The *Visualization* is added to VISUs.

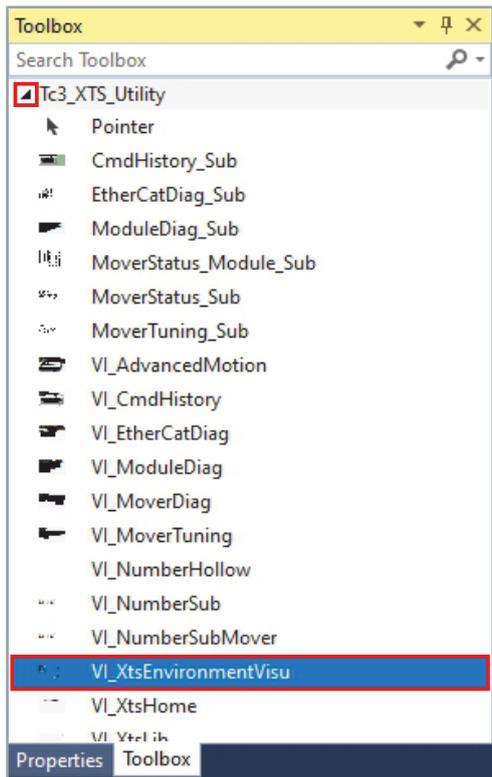


- ▶ Expand *Solution Explorer* > *TwinCAT Project* > *PLC* > *Untitled* > *Untitled Project* > *VISUs*

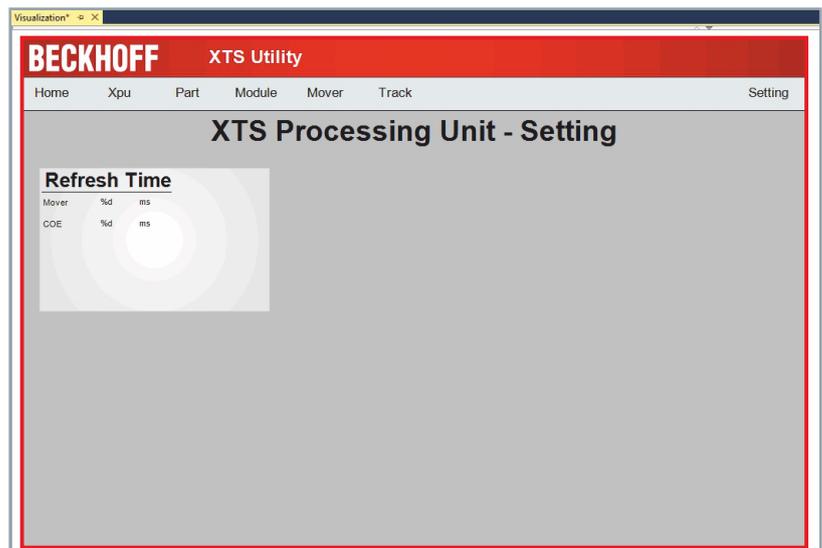
- ▶ Double click on **Visualization**

The *Visualization* tab opens in the project window.

## 10.4.2 Standard visualization



- ▶ Expand *Toolbox* > *Tc3\_XTS\_Utility*
- ▶ Press and hold the left mouse button and drag **VI\_Xts\_EnvironmentVisu** into the project window *Visualization*



The visualization is displayed in the project window *Visualization*.

- ▶ If required, enlarge the visualization for better operability
- ▶ If necessary, position the visualization in the project window

## 10.4.3 Update cycle data



To use the visualization, the *Tc3 XTS Utility* must be initialized beforehand.

After the DataPointer has been transferred, the *Cycle* method of the function block *FB\_XtsEnvironmentVisu* must be called cyclically in the PLC program to update the parameters of all XTS objects:

```
//Link data pointer  
fbXtsEnvironmentVisu(ipTcToXtsEnvironment:=fbXtsEnvironment);  
  
//Cyclic update of Visu information  
fbXtsEnvironmentVisu.Cycle();
```

## 10.4.4 Control visualization

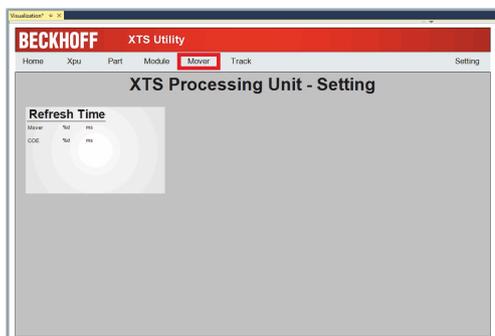
In addition to the start page, there are five other tabs for displaying parameters:

- Xpu
- Part
- Modules
- Mover
- Track

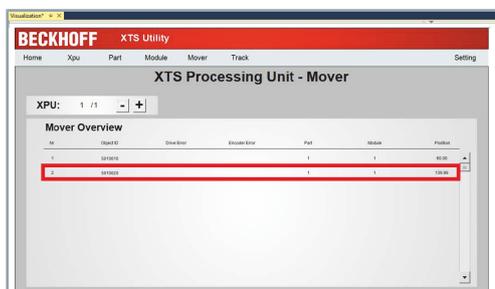


### Display example

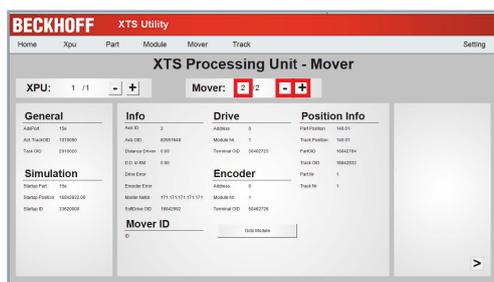
The parameter display is shown as an example on the *Mover* tab.



► Click on the **Mover** tab



► Click on a mover to open detailed information about the mover



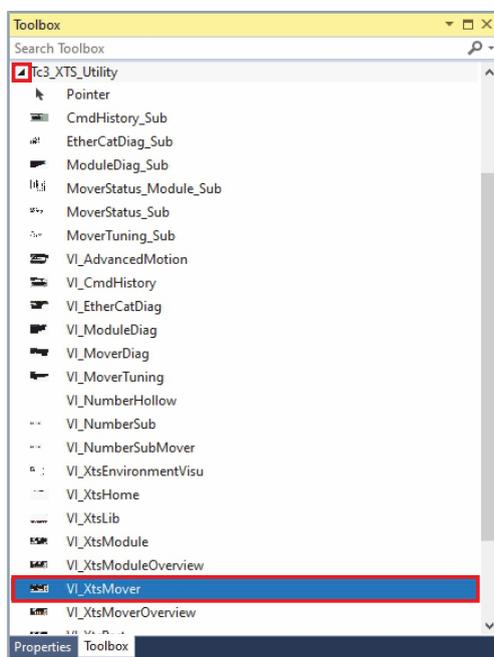
- ▶ Click on + or – to switch between the movers
- OR
- ▶ Enter the number of the mover in the input field

#### 10.4.4.1 Single page of visualization

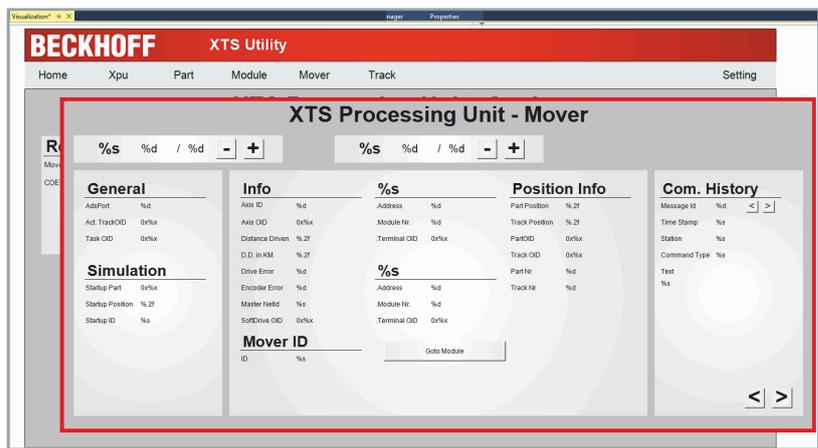
Besides using the default visualization *VI\_XtsEnvironmentVisu*, it is also possible to use a visualization as a standalone page. You can drag the desired page into the visualization by pressing and holding the left mouse button and then call the corresponding method in the PLC program to update the data.



In the following example, the *VI\_XtsMover* page is added to the visualization to show more detailed information of the mover.



- ▶ Expand *Toolbox >Tc3\_XTS\_Utility*
- ▶ Press and hold the left mouse button and drag **VI\_XtsMover** into the project window *Visualization*



The visualization of the movers is displayed in the project window *Visualization*.

- ▶ If required, enlarge the visualization for better operability
- ▶ If necessary, position the visualization in the project window

After the DataPointer has been transferred, the *CatMover* method must be called cyclically in the PLC to update the data:

```
//Link data pointer
fbXtsEnvironmentVisu(ipTcIoXtsEnvironment:=fbXtsEnvironment);

//cyclic update of Mover Visu information
fbXtsEnvironmentVisu.CatMover ();
```

## 10.5 Parameter

### 10.5.1 FB\_TcIoXtsEnvironment – I\_TcIoXtsEnvironment

#### 10.5.1.1 Method

Parameter	Group	Return Type	Input Type	Explanation
Init	–	BOOL	BOOL	Initialization
GetXpuCount	–	BOOL	BOOL	Updates the total number of Processing Units that can be get via <i>P_Xpu-Count</i> or <i>P_XpuCountUnit</i> .
GetXpuOids	–	BOOL	BOOL	Updates the object ID list of Processing Units, which can be get via <i>P_XpuOids</i> .
GetInfoServerCount	–	BOOL	BOOL	Updates the total number of InfoServers that can be get via the <i>P_InfoServer-Count</i> .
GetInfoServerOids	–	BOOL	BOOL	Updates the object ID list of InfoServers, which can be get via <i>P_InfoS-erverOids</i> .
GetCaGroupCount	–	BOOL	BOOL	Updates the total number of CA groups that can be get via <i>P_CaGroupCount</i> .
GetCaGroupOids	–	BOOL	BOOL	Updates the object ID list of CA groups, which can be get via <i>P_Ca-GroupOids</i> .
<b>Subitem</b>				
XpuTclo	–	I_TcloXtsProcessing-Unit	UINT	Entering the Processing Unit number selects this Processing Unit for further operation.
InfoServerTclo	–	I_TcloXtsInfoServer	UINT	Entering the InfoServer number selects this server for further operation.
Mc2CaGroup	–	I_Mc2CaGroup	UINT	Entering the CA group number selects this CA group for further operation.

## Properties

Parameter	Group	Return Type	Input Type	Explanation
P_XpuCount	–	UDINT	–	Returns the total number of Processing Units.
P_XpuCountUnit	–	UINT	–	Returns the total number of Processing Units in UINT.
P_XpuOids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsProcessingUnits] OF OTCID	–	Returns the object ID list of the XPU's.
P_InoServerCount	–	UINT	–	Returns the total number of InfoServers.
P_InfoServerCount-Oids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsInfoServer] OF OTCID	–	Returns the object ID list of the InfoServers.
P_CaGroupCount	–	UINT	–	Returns the total number of the CA group.
P_CaGroupCount-Oids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsCaGroup] OF OTCID	–	Returns the object ID list of the CA group.
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.
P_XtsEnvironment-Configuration	–	ST_XtsEnvironment-Configuration	–	Returns the configuration of the XTS environment. This parameter is used to select the initialization of the XTS environment, such as the initialization of the InfoServer or CA group.

## 10.5.2 FB\_TcIoXtsProcessingUnit – I\_TcIoXtsProcessingUnit

### 10.5.2.1 Method - parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetOperationMode	General	OperationMode	–	Returns the selected operation mode.
GetEtherCatMaster-SyncTaskObjectId	General	OTCID	–	Returns the EtherCAT Master Synchro Task Object ID.
GetMoverType	Mover	MoverType	–	Returns the selected mover type.
GetMagnetPlateType	Mover	MagnetPlateType	–	Returns the selected magnetic plate type.
GetMoverSortOrder	Mover	SortOrderEnum	–	Returns the selected sort order of the movers.
GetMoverWidth	Mover	LREAL	–	Returns the minimum distance between the movers.
GetConfiguredDetectionCount	MoverDetection	UDINT	–	Returns the specified detection count.
SetConfiguredDetectionCount	MoverDetection	BOOL	UDINT	Sets the detection count.
TriggerDetection	MoverDetection	BOOL	–	Triggers a mover detection.
TriggerRedetection	MoverDetection	BOOL	–	Triggers mover redetection.
GetExpected-MoverIds	MoverIdDetection	ARRAY[1..2] OF ST_Expected-MoverIds	–	Returns the expected mover IDs for ID detection with multiple Movers 1.
GetMoverIdDetectionMode	MoverIdDetection	MoverIdDetection-Mode	–	Returns the specified Mover ID detection mode
GetMoverPositionAssignment	MoverIdDetection	MoverPositionAssignment	–	Returns the mover position assignment.
TriggerMoverIdDetection	MoverIdDetection	BOOL	–	Triggers a Mover ID detection.
SetExpected-MoverIds	MoverIdDetection	BOOL	Expected-MoverIds : ARRAY[1..2] OF ST_Expected-MoverIds	Sets the expected Mover IDs in ID detection with multiple Movers 1.
SetMoverIdDetectionMode	MoverIdDetection	BOOL	MoverIdDetectionMode	Sets the Mover ID detection mode.
SetMoverPositionAssignment	MoverIdDetection	BOOL	MoverPositionAssignment	Sets the assignment of the mover position.
GetTeaching-FileNumber	Teaching	UDINT	–	Returns the numbering/ name of the teaching file.
GetIsAbortOnTeachingWarningEnabled	Teaching	BOOL	–	Returns the setting of the teaching warning. If TRUE, the system start may be aborted because of the warning.

Parameter	Group	Return Type	Input Type	Explanation
GetIsTeachingCheckSumCheckEnabled	Teaching	BOOL	–	Returns the setting of the teaching checksum check. Returns TRUE if the specified checksum is used to verify that the correct teaching file is loaded and not corrupted.
SetTeaching-FileNumber	Teaching	BOOL	UDINT	Sets the numbering/name of the applied teaching file
GetIsAutoDumpWriteEnabled	Diagnostics	BOOL	–	Returns the setting of automatic writing of the dump file. If TRUE, the driver automatically writes a dump file in certain situations like at startup or in case of an error.
GetIsInputCheckEnabled	Diagnostics	BOOL	–	Returns the settings of the input check. If TRUE, all plausibility checks of all input channels in the system are activated.
GetUsedEventLogger	Diagnostics	EventManager	–	Returns selected specifications how events and messages are transmitted by the driver
WriteDump	Diagnostics	BOOL	–	Writes a dump file.
SetIsInputCheckEnabled	Diagnostics	BOOL	BOOL	Sets the activation/deactivation of the input check
GetIsCycleTimeWarningSuppressed	Advanced	BOOL	–	Returns the setting of the suppressed cycle time warning. If enabled, the warning that the driver is not running at a cycle time of 250 us is disabled. ATTENTION: Only available in simulation mode.
GetIsMoverFrozenErrorActivated	Advanced	BOOL	–	Returns the setting of the error of a frozen mover. If enabled, the driver will give an error message instead of a warning when a position of the mover is frozen.
GetIsPositionBasedErrorForwardingEnabled	Advanced	BOOL	–	Returns the setting of the position-related error forwarding. If enabled, a hardware fault is forwarded to movers located on the faulty modules based on their position.
GetOptimization	Advanced	OptimizationEnum	–	Returns the selected optimization.
GetIsPositionNoiseEnabled	Simulation	BOOL	–	Returns position noise in the simulation.
GetIsRandomStartUpEnabled	Simulation	BOOL	–	Returns the setting of the random start position of movers.
GetMoverDistance	Simulation	LREAL	–	Returns the mover distance at startup

Parameter	Group	Return Type	Input Type	Explanation
GetPositionOffset	Simulation	LREAL	–	Returns the position offset of the movers at startup
GetPositionNoise-Bandwidth	Simulation	LREAL	–	Returns the bandwidth of the position noise
GetRandomStartUp-Bandwidth	Simulation	LREAL	–	Returns the bandwidth of the random start
GetPositionStartUp-SimulationMode	Simulation	PositionStartUpSimulationMode	–	Returns the selected mode for the start position
GetMoverIdStartUp-SimulationMode	Simulation	MoverIdStartUpSimulationMode	–	Returns the selected mode for generating the mover ID
GetRandomInitMode	Simulation	RandomInitMode	–	Returns the selected mode for initialization of random selection
GetRandomInitSeed	Simulation	DINT	–	Returns the start value used for random generation of mover position and mover ID.

## 10.5.2.2 Method - parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetAreAllPositionsValid	MoverDetection	BOOL	–	Returns the state when all mover positions are valid.
GetDetectionCycleCount	MoverDetection	UDINT	–	Returns the number of detection cycles.
GetDetectedMoverCount	MoverDetection	UDINT	–	Returns the number of movers detected during the last detection process.
GetExpectedMoverCount	MoverDetection	UDINT	–	Returns the number of movers expected on the system.
GetScannedModuleCount	MoverDetection	UDINT	–	Returns the number of modules that were scanned during the last detection.
GetMoverPositions	MoverDetection	BOOL	–	Updates the current position of all movers.
GetActiveMoverCount	MoverDetection	UDINT	–	Returns the number of active movers.
GetHasMoverIdDetectionError	MoverIdDetection	BOOL	–	Returns the state of the Mover ID detection. If TRUE, an error has occurred during Mover ID detection.
GetIsMoverIdDetectionValid	MoverIdDetection	BOOL	–	Returns the state of the Mover ID detection. If TRUE, the Mover ID has been detected.
GetIsMoverIdDetectionActive	MoverIdDetection	BOOL	–	Returns the state of the Mover ID detection. If TRUE, the Mover ID detection is running.
GetMoverIds	MoverIdDetection	ARRAY [1..Tc3Xts-EnvironmentParameterList.MaxXtsMoversPerXpu] OF STRING(3);	–	Returns a list of Mover IDs.
GetIsTeachingChanged	Teaching	BOOL	–	Returns the state of the teaching. If TRUE, the teaching is running.
GetIsTeachingValid	Teaching	BOOL	–	Returns the state of the teaching. If TRUE, the teaching is valid.
GetDriveState	Info	DriveState	–	Returns the state of the drive system.
GetMoverCount	Structure	UDINT	–	Returns the total number of movers.
GetMoverOids	Structure	BOOL	–	Updates the object ID of all movers.
GetPartCount	Structure	UDINT	–	Returns the total number of all parts.
GetPartOids	Structure	BOOL	–	Updates the object ID of all parts.
GetTaskCount	Structure	UDINT	–	Returns the total number of all tasks.

Parameter	Group	Return Type	Input Type	Explanation
GetTaskOids	Structure	BOOL	–	Updates the object ID of all tasks.
GetTrackCount	Structure	UDINT	–	Returns the total number of all tracks.
GetTrackOids	Structure	BOOL	–	Updates the object ID of all tracks.
<b>Subitems</b>				
MoverTclo	–	I_TcloXtsXpuMover	UINT	Selects a mover for further operation by entering the number of the selected mover.
PartTclo	–	I_TcloXtsXpuPart	UINT	Selects a part for further operation by entering the number of the selected part.
TrackTclo	–	I_TcloXtsXpuTrack	UINT	Selects a track for further operation by entering the number of the selected track.

### 10.5.2.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_MoverPositions	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsMoversPerXpu] OF ST_XpuMoverPositions	–	Returns the position of the part, the object ID of the part and the object ID of the track on which the mover is located.
P_MoverOids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsMoversPerXpu] OF OTCID	–	Returns the object ID of all movers.
P_PartOids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsPartsPerXpu] OF OTCID	–	Returns the object ID of all parts.
P_TaskOids	–	REFERENCE TO ARRAY [1..12] OF OTCID	–	Returns the object ID of all tasks.
P_TrackOids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxXtsTracksPerXpu] OF OTCID	–	Returns the object ID of all tracks.
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.3 FB\_TcIoXtsXpuPart - I\_TcIoXtsXpuPart

## 10.5.3.1 Method - parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetTaskOid	General	OTCID	–	Returns the object ID of the task.
GetModuleSide	General	ModuleSide	–	Returns the side of the module displayed in the <i>XTS Tool Window</i> and <i>XTS Viewer</i> . Selection between <i>Front</i> and <i>Back</i> .
GetOriginTransform	General	ST_OriginTransform	–	Returns the origin transformation for the part displayed in the <i>XTS Tool Window</i> and <i>XTS Viewer</i> .
SetIsClosed	General	BOOL	BOOL	Sets the part as a closed shape.
SetModuleSide	General	BOOL	ModuleSide	Returns the module side of the part displayed in the <i>XTS Tool Window</i> and <i>XTS Viewer</i> .
SetOriginTransform	General	ST_originTransform	–	Returns the origin transformation displayed in the <i>XTS Tool Window</i> and <i>XTS Viewer</i> .

## 10.5.3.2 Method - parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetDriveState	Info	DriveState	–	Returns the state of the drive system.
GetGlobalNumber	Info	UDINT	–	Returns the global number of a part. The global number is used to distinguish all parts managed by the Processing Unit.
GetLength	Info	LREAL	–	Returns the length of the selected part.
GetAreaCount	Structure	UDINT	–	Returns the total number of areas on the part.
GetAreaOids	Structure	BOOL	–	Updates the object ID of the areas on the part.
GetModuleCount	Structure	UDINT	–	Returns the total number of modules on the part.
GetModuleOids	Structure	BOOL	–	Updates the object ID of the modules on the part.
<b>Subitems</b>				
ModuleCoE	–	I_AT2xxxXtsMotor	UINT	Selects a module for further reading of the CoE by entering the number of the selected module.
ModuleTclo	–	I_TcloXtsPartModule	UINT	Selects a module for further operation by entering the number of the selected module.

## 10.5.3.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_AreaOids	–	REFERENCE TO ARRAY [1..100] OF OTCID	–	Returns the object ID of the areas on the part.
P_ModuleOids	–	REFERENCE TO ARRAY [1..TcloXts-EnvironmentParameterList.MaxModulesPerPart] OF OTCID	–	Returns the object ID of the modules on the part.
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.4 FB\_TcIoXtsPartControlArea – I\_TcIoXtsPartControlArea

## 10.5.4.1 Method - parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetName	General	STRING(1023)	–	Returns the name of the control area.
GetDescription	General	STRING(1023)	–	Returns the description of the control area.
GetStartPosition	General	LREAL	–	Returns the start position of the control area on the part.
GetEndPosition	General	LREAL	–	Returns the end position of the control area on the part.
GetBlendInLength	General	LREAL	–	Returns the length from the start of the control area to the position where the control parameters are completely used.
GetBlendOutLength	General	LREAL	–	Returns the length from which the control parameters are no longer completely used until the end of the control area.
GetIsEnabled	General	BOOL	–	Returns the activation state of the control area.
SetName	General	BOOL	STRING(1023)	Sets the name for the control area.
SetDescription	General	BOOL	STRING(1023)	Sets the description of the control area.
SetStartPosition	General	BOOL	LREAL	Sets the start position of the control area.
SetEndPosition	General	BOOL	LREAL	Sets the end position of the control area.
SetBlendInLength	General	BOOL	LREAL	Sets the <i>BlendInLength</i> .
SetBlendOutLength	General	BOOL	LREAL	Sets the <i>BlendOutLength</i> .
SetIsEnabled	General	BOOL	BOOL	Sets the activation/deactivation of the control area.

## 10.5.4.2 Method - parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetLength	Info	LREAL	–	Returns the length of the control area.
GetIsValid	Info	BOOL	–	Returns TRUE if all settings of the control area are valid.

## 10.5.4.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.5 FB\_TcIoXtsPartModule – I\_TcIoXtsPartModule

## 10.5.5.1 Method - parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetAdsPort	General	WORD	–	Returns the ADS port.
GetTaskOid	General	OTCID	–	Returns the object ID of the task.
GetMotorTerminalOid	General	OTCID	–	Returns the object ID of the associated motor terminal.
GetSensorTerminal	General	OTCID	–	Returns the object ID of the associated sensor terminal.
GetPositionIndex	General	UDINT	–	Returns the index of the module in the XTS system. The first module has the index 0.
GetOffset	General	LREAL	–	Returns the offset of the module to compensate for mechanical tolerances.
GetScalingFactor	General	LREAL	–	Returns the scaling factor to compensate for mechanical tolerances.
SetAdsPort	General	BOOL	WORD	Sets the ADS port.
SetTaskOid	General	BOOL	OTCID	Sets the task for a part by entering the task object ID.
SetMotorTerminalOid	General	BOOL	OTCID	Sets the object ID of the motor terminal.
SetSensorTerminalOid	General	BOOL	OTCID	Sets the object ID of the sensor terminal.
SetPositionIndex	General	BOOL	UDINT	Sets the index of the module in the XTS system.
SetOffset	General	BOOL	LREAL	Sets the offset of the module.
SetScalingFactor	General	BOOL	LREAL	Sets the scaling factor of the module.

## 10.5.5.2 Method - parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetAngle	Info	LREAL	–	Returns the angle of the module in mm.
GetGlobalNumber	Info	UDINT	–	Returns the global number of the module. The global number is used to distinguish all modules managed by the Processing Unit.
GetLength	Info	LREAL	–	Returns the length of the module in mm.
GetMasterNetId	Info	AMSNETID	–	Updates the Net ID of the EtherCAT master.
GetDriveAddress	DriveInfo	UINT	–	Returns the address of the drive terminal.
GetDriveConfigIdentity	DriveInfo	ST_DriveConfigIdentity	–	Returns the structure of the configured drive identity with the vendor ID, the code, the revision and the serial number.
GetDriveOnlineIdentity	DriveInfo	ST_DriveOnlineIdentity	–	Returns the structure of the online drive identity with vendor ID, the code, the revision and the serial number.
GetDriveState	DriveInfo	DriveState	–	Returns the state of the drive terminal.
GetEncoderAddress	EncoderInfo	UINT	–	Returns the address of the encoder terminal.
GetEncoderConfigIdentity	EncoderInfo	ST_EncoderConfigIdentity	–	Returns the structure of the configured encoder identity with the vendor ID, the code, the revision and the serial number.
GetEncoderOnlineIdentity	EncoderInfo	ST_EncoderOnlineIdentity	–	Returns the structure of the online encoder identity with vendor ID, the code, the revision and the serial number.
GetEncoderSensorValues	EncoderInfo	ARRAY[1..32] OF ST_EncoderSensorValues	–	Returns the values of the encoder sensor.
GetDriveBTN	General	BTN	–	Returns the Beckhoff Traceability Number (BTN).
GetDriveDeviceName	General	STRING(15)	–	Returns the device name.
GetDriveDeviceType	General	UDINT	–	Returns the device type.
GetDriveHardwareVersion	General	STRING(15)	–	Returns the hardware version.
GetDriveSoftwareVersion	General	STRING(15)	–	Returns the software version.
GetI2TWarnLevel	AmplifierSettings	USINT	–	Returns the I2T warning level.
GetI2TErrorLevel	AmplifierSettings	USINT	–	Returns the I2T error level.

Parameter	Group	Return Type	Input Type	Explanation
GetTemperatureWarnLevel	AmplifierSettings	UINT	–	Returns the temperature warning level.
GetTemperatureErrorLevel	AmplifierSettings	UINT	–	Returns the temperature error level.
GetMaxDcLinkVoltage	AmplifierSettings	UDINT	–	Returns the maximum of the DC link voltage.
GetMinDcLinkVoltage	AmplifierSettings	UDINT	–	Returns the minimum of the DC link voltage
GetEnabledBrakeChopper	AmplifierSettings	BOOL	–	Returns the settings of the brake chopper.
GetBreakAfterBridgeDisable	AmplifierSettings	BOOL	–	Returns the setting of the interruption after disabling the data transmission.
GetI2TTemperatures	I2T	REFERENCE TO ARRAY [1..15] OF REAL	–	Returns the I2T value.
GetAuxiliaryVoltage5V	InfoData	REAL	–	Returns the operating voltage of 5 V.
GetAuxiliaryVoltage10V	InfoData	REAL	–	Returns the operating voltage of 10 V.
GetAuxiliaryVoltage24V	InfoData	REAL	–	Returns the operating voltage of 24 V.
GetDCLinkVoltage	InfoData	REAL	–	Returns the DC link voltage.
GetCurrentScaling	InfoData	REAL	–	Returns the scaling of the current intensity.
GetChipID	InfoData	ULINT	–	Returns the chip ID.
GetDeviceInfo	InfoData	UDINT	–	Returns the device information.
GetMaxDCLinkVoltageLast500ms	InfoData	REAL	–	Returns the maximum DC link voltage of the last 500 ms.
GetMaxOverallCurrentLast500ms	InfoData	REAL	–	Returns the overall current of the last 500 ms
GetOverallCurrent	InfoData	REAL	–	Returns the overall current.
GetPCBTemperatures	InfoData	REFERENCE TO ARRAY [1..4] OF REAL	–	Returns the temperature of PCB.
GetCode	VendorData	ULINT	–	Returns the code.
GetCoilOvercurrentThreshold	VendorData	UDINT	–	Returns the overcurrent threshold of the coil.
GetCoilPeakCurrent	VendorData	UDINT	–	Returns the current peaks of the coil.
GetCoilRatedCurrent	VendorData	UDINT	–	Returns the nominal current of the coil.
GetCoilThermalTimeConstant	VendorData	UINT	–	Returns the thermal time constant of the coil.
GetEnableOverallCurrentPeakDetection	VendorData	BOOL	–	Returns the setting of the peak current detection.
GetEnableOverallNegativeCurrentChangeError	VendorData	BOOL	–	Returns the setting of the error for the negative overall current change.
GetEnableOverallNegativepowerError	VendorData	BOOL	–	Returns the setting of the overall negative error.

Parameter	Group	Return Type	Input Type	Explanation
GetOverallCurrentFilter	VendorData	UINT	–	Returns the overall current filter.
GetOverallCurrentGain	VendorData	UINT	–	Returns the gain of the overall current.
GetOverallCurrentOffset	VendorData	DINT	–	Returns the offset of the overall current.
GetOverallOvercurrentThreshold	VendorData	UDINT	–	Returns the overall overcurrent threshold.
GetPolarity	VendorData	UDINT	–	Returns the polarity.

### 10.5.5.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
<b>Subitems</b>				
CoE	–	I_AT2xxxXtsMotor	–	Selects the CoE read function for further operation.
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.6 FB\_AT2xxxXtsMotor (ModuleCoE/CoE) - I\_AT2xxxXtsMotor (ModuleCoE/CoE)

### 10.5.6.1 Method

Parameter	Group	Return Type	Input Type	Explanation
Update	–	BOOL	–	Updates the selected CoE data.
UpdateDiagHistory	–	BOOL	–	Updates the diagnosis history data. (beta version)
UpdateAllCoEData	–	BOOL	–	Updates the data of all CoE objects. The data can be accessed via the <i>UpdateAllCoEData</i> property.

## 10.5.6.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
AllCoE	UpdateAllCoEData	I_AT2xxxAllCoEData	–	Selects all CoE objects.
UpdateAllCoEData	UpdateAllCoEData	ST_AT2xxxAllCoE-Data	–	Returns the data of all CoE objects.
AmplifierSettings-Data	AmplifierSetting	I_AT2xxxAmplifier-Settings	–	Selects the amplifier settings.
BrakeAfterBridgeDis-able	AmplifierSetting	BOOL	–	Returns the state of the brake after the bridge has been disabled.
EnableBrakeChopper	AmplifierSetting	BOOL	–	Returns the state of the activation of the brake chopper.
I2TErrorLevel	AmplifierSetting	USINT	–	Returns the error level of I2T.
I2TWarnLevel	AmplifierSetting	USINT	–	Returns the warning level of I2T.
MaxDcLinkVoltage	AmplifierSetting	UDINT	–	Returns the maximum of the DC link voltage.
MinDcLinkVoltage	AmplifierSetting	UDINT	–	Returns the minimum of the DC link voltage.
TemperatureError- Level	AmplifierSetting	UINT	–	Returns the error level of the temperature.
TemperatureWarn- Level	AmplifierSetting	UINT	–	Returns the warning level of the temperature.
BtnData	BTN	I_AT2xxxBtn	–	Returns the Beckhoff Traceability Number (BTN).
Btn	BTN	STRING(13)	–	Returns the Beckhoff Traceability Number (BTN).
DeviceNameData	DeviceName	I_AT2xxxDevice-Name	–	Selects the device name.
DeviceName	DeviceName	STRING(17)	–	Returns the device name.
DeviceTypeData	DeviceType	I_AT2xxxDeviceType	–	Selects the device type.
DeviceType	DeviceType	UDINT	–	Returns the device type.
DiagData	DiagData	I_AT2xxxDiagData	–	Selects the diagnostic data.
WarningActual	DiagData	UINT	–	Returns the diagnostic data.
ErrorLatch	DiagData	UINT	–	Returns the memory error.
ErrorActual	DiagData	UINT	–	Returns the current error.
DiagHistoryData	DiagHistory	I_AT2xxxDiagHistory	–	Selects the diagnostic history.
DiagHistory	DiagHistory	ST_AT2xxxDiagHis-tory	–	Returns the diagnostic history.
AmsNetId	Ethercat	T_AMSNETID	–	Returns the Net ID.
DriveAdr	Ethercat	UINT	–	Returns address of the driver.
HardwareVersion- Data	HardwareVersion	I_AT2xxxHardware- Version	–	Selects the hardware version.
HardwareVersion	HardwareVersion	STRING(2)	–	Returns the hardware version.

Parameter	Group	Return Type	Input Type	Explanation
I2TDiagData	I2TDiagData	I_AT2xxxI2TDiag-Data	–	Selects the I2T diagnosis.
TemperatureCoilCh	I2TDiagData	ARRAY[1..15] OF USINT	–	Returns the I2T values of the coils.
IdentityData	IdentityData	I_AT2xxxIdentity	–	Selects the ID.
ProductCode	IdentityData	UDINT	–	Returns the product code.
Revision	IdentityData	UDINT	–	Returns the revision status.
SerialNumber	IdentityData	UDINT	–	Returns the serial number.
VendorId	IdentityData	UDINT	–	Returns the vendor ID.
InfoData	InfoData	I_AT2xxxInfoData	–	Selects the information data.
AuxiliaryVoltage10V	InfoData	UINT	–	Returns the measured auxiliary voltage of 10 V.
AuxiliaryVoltage24V	InfoData	UINT	–	Returns the measured auxiliary voltage of 24 V.
AuxiliaryVoltage5V	InfoData	UINT	–	Returns the measured auxiliary voltage of 5 V.
ChipId	InfoData	ARRAY [1..16] OF BYTE	–	Returns the ID of the chip.
CurrentScaling	InfoData	INT	–	Returns the scaling of the current.
DcLinkVoltage	InfoData	UINT	–	Returns the DC link voltage.
DeviceInfo	InfoData	UDINT	–	Returns the device information.
MaxDCLinkVoltage-Last500ms	InfoData	UDINT	–	Returns the maximum DC link voltage of the last 500 ms.
MaxOverallCurrent-Last500ms	InfoData	DINT	–	Returns the overall current of the last 500 ms.
OverallCurrent	InfoData	DINT	–	Returns the overall current.
PcbTemp	InfoData	ARRAY[1..4] OF UINT	–	Returns the temperature in the module.
SoftwareVersionData	SoftwareVersion	I_AT2xxxSoftware-Version	–	Selects the software version.
SoftwareVersion	SoftwareVersion	STRING(2)	–	Returns the software version.
VendorData	VendorData	I_AT2xxxVendorData	–	Returns the vendor data.
Code	VendorData	ARRAY [1..16] OF BYTE	–	Returns the software version.
CoilOvercurrent-Threshold	VendorData	UDINT	–	Returns the overcurrent threshold of the coil.
CoilPeakCurrent	VendorData	UDINT	–	Returns the current peaks of the coil.
CoilRatedCurrent	VendorData	UDINT	–	Returns the nominal current of the coil.
CoilThermalTime-Const	VendorData	UINT	–	Returns the thermal time constant of the coil.
EnableOverallCurrentPeakDetection	VendorData	BOOL	–	Returns the setting of the peak current detection.
EnableOverallNegativeCurrentChangeError	VendorData	BOOL	–	Returns the setting of the error for the negative overall current change.

Parameter	Group	Return Type	Input Type	Explanation
EnableOverallNegativePowerError	VendorData	BOOL	–	Returns the setting of the overall negative error.
OverallCurrentFilter	VendorData	UINT	–	Returns the overall current filter.
OverallCurrentGain	VendorData	UINT	–	Returns the gain of the overall current.
OverallCurrentOffset	VendorData	DINT	–	Returns the offset of the overall current.
OverallCurrent-Threshold	VendorData	UDINT	–	Returns the overall over-current threshold.
Polarity	VendorData	UDINT	–	Returns the polarity.
All	All	PVOID	–	Returns all data of a sub-range, for example <i>VendorData</i> and <i>SoftwareVersion</i> .

## 10.5.7 FB\_TcIoXtsModuleMotorTerminal - I\_TcIoXtsModuleMotorTerminal

### 10.5.7.1 Method

Parameter	Group	Return Type	Input Type	Explanation
GetObjectName	–	STRING(21)	–	Returns the name of the motor terminal.

### 10.5.7.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.8 FB\_TcIoXtsModuleSensorTerminal - I\_TcIoXtsModuleSensorTerminal

### 10.5.8.1 Method

Parameter	Group	Return Type	Input Type	Explanation
GetObjectName	–	STRING(20)	–	Returns the name of the sensor terminal.

### 10.5.8.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.9 FB\_TcIoXtsXpuTrack – I\_TcIoXtsXpuTrack

### 10.5.9.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetTaskOid	General	OTCID	–	Returns the object ID of the task for the track.
GetIsClosed	General	BOOL	–	Returns the state if the track is closed.
GetIsIncludedInDetection	General	BOOL	–	Returns the state whether the track is integrated into the detection mode.
GetPolarity	General	Polarity	–	Returns the polarity.
GetOffset	General	LREAL	–	Returns the offset.
GetPartConfigItems	General	ARRAY[1..TcIoXts-EnvironmentParameterList.MaxPartsPerTrack] OF ST_PartConfigItems	–	Returns the information of the part in this track.
SetIsClosed	General	BOOL	BOOL	Sets the state if the track is closed.
SetIsIncludedInDetection	General	BOOL	BOOL	Sets the state whether the track is integrated in the detection mode.
SetPolarity	General	BOOL	Polarity	Sets the polarity.
SetOffset	General	BOOL	LREAL	Sets the offset.
SetTaskOid	General	BOOL	OTCID	Sets the task for the track by entering the object ID.

### 10.5.9.2 Method – parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetLength	Info	LREAL	–	Returns the length of the track.
GetModuleCount	Info	UDINT	–	Returns the number of modules.
GetPartCount	Info	UDINT	–	Returns the number of parts.
GetPartInfoItems	Info	ARRAY[1..TcIoXts-EnvironmentParameterList.MaxPartsPerTrack] OF ST_PartInfoItems	–	Returns an array of part information containing the part object ID, the polarity of the part, the offset of the part in the track and the current length of the part.

### 10.5.9.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.10 FB\_TcIoXtsXpuMover – I\_TcIoXtsXpuMover

## 10.5.10.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetAdsPort	General	WORD	–	Returns the ADS port.
GetActiveTrackObjectId	General	OTCID	–	Returns the object ID of the active track.
GetTaskOid	General	OTCID	–	Returns the object ID of the task.
SetActiveTrackObjectId	General	BOOL	OTCID	Sets the active track by entering the object ID of the track.
GetIsActivated	General	BOOL	–	Returns the activated state of the mover.
SetIsActivated	General	BOOL	BOOL	Sets the activated state of the mover.
GetSimulatedStartUpPart	Simulation	OTCID	–	Returns the object ID of the start part in the simulation.
GetSimulatedStartUpPosition	Simulation	LREAL	–	Returns the position at startup.
GetSimulatedStartUpId	Simulation	STRING(3)	–	Returns the ID of the mover.
SetSimulatedStartUpPart	Simulation	BOOL	OTCID	Sets the start part by entering the object ID of the part.
SetSimulatedStartUpPosition	Simulation	BOOL	LREAL	Sets the start position.
SetSimulatedStartUpId	Simulation	BOOL	STRING(3)	Sets the ID of the mover.

## 10.5.10.2 Method – parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetMoverId	MoverIdDetection	STRING(3)	–	Returns the ID of the mover.
GetAxisId	Info	UDINT	–	Returns the ID of the axis.
GetAxisObjectId	Info	OTCID	–	Returns the object ID of the axis.
GetDistanceDriven	Info	LREAL	–	Returns the value of the absolute travel distance. Unit: mm
GetDistanceDrivenInKm	Info	LREAL	–	Returns the value of the absolute travel distance. Unit: km
GetDriveAddress	Info	UINT	–	Returns the address of the module on which the mover is located.
GetDriveModuleNumber	Info	UDINT	–	Returns the number of the module on which the mover is located.
GetDriveTerminalOid	Info	OTCID	–	Returns the object ID of the module on which the mover is located.
GetEncoderAddress	Info	UINT	–	Returns the address of the encoder terminal on which the mover is located.
GetEncoderModuleNumber	Info	UDINT	–	Returns the number of the encoder terminal on which the mover is located.
GetEncoderTerminalOid	Info	OTCID	–	Returns the object ID of the encoder terminal on which the mover is located.
GetHasDriveError	Info	BOOL32	–	Returns the error state of the drive.
GetHasEncoderError	Info	BOOL32	–	Returns the error state of the encoder terminal.
GetMasterNetId	Info	AmsNetId	–	Returns the Net ID of the module.
GetPositionInfo	Info	REFERENCE TO ST_PositionInfo	–	Returns the position information of the part and the track
GetSoftdriveOid	Info	OTCID	–	Returns the object ID of the SoftDrive.

## 10.5.10.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_AxisOid	Info	REFERNCE TO OTCID	–	Returns the object ID of the axis.
P_SoftdriveOid	Info	REFERENCE TO OTCID	–	Returns the object ID of the SoftDrive.
P_IsInitialised	Info	BOOL	–	Returns the state of the initialization.
Softdrive	Softdrive	I_McXtsMoverSoftdrive	–	Selects the SoftDrive for further operation.

## 10.5.11 FB\_McXtsMoverSoftdrive – I\_McXtsMoverSoftdrive

## 10.5.11.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetAdsPort	General	WORD	–	Returns the ADS port of the SoftDrive.
GetHardwareModulo	General	LREAL	–	Returns the hardware modulo factor.
GetOperationMode	General	UDINT	–	Returns the operation mode.
GetMaxCurrentOutput	General	LREAL	–	Returns the maximum output current.
GetEmergencyRamp	General	LREAL	–	Returns the emergency brake function.
GetEmergencyTimeOut	General	LREAL	–	Returns the total emergency downtime.
GetStandstillSwitchTime	General	LREAL	–	Returns the switching time required by the mover to switch to standstill. Control parameters after standstill.
GetStandstillSwitchMode	General	TcSdStandStillSwitchMode	–	Returns the mode in which the mover switches to standstill.
GetControlAreas	ControlAreas	REFERENCE TO ARRAY[1..TcIoXtsEnvironmentParameterList.MaxAreasPerPart] OF ST_ControlAreas	–	Returns the settings for the control areas.
GetAreaOwner	ExternalIO	OTCID	–	–
GetIoChildAreaLocation	ExternalIO	REFERNCE TO ARRAY[1..2] OF ST_IoChildAreaLocation	–	–

## 10.5.11.2 Method – parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetEncoderOid	General	OTCID	–	Returns the object ID of the encoder.
GetFeedForwardOid	General	OTCID	–	Returns the object ID of the feed forward control.
GetFilter1Oid	General	OTCID	–	Returns the object ID of filter 1.
GetFilter2Oid	General	OTCID	–	Returns the object ID of filter 2.
GetInterpolatorOid	General	OTCID	–	Returns the object ID of the interpolator.
GetMoverOid	General	OTCID	–	Returns the object ID of the mover.
GetPositionControlOid	General	OTCID	–	Returns the object ID of the position control.
GetSoftdriveOid	General	OTCID	—	Returns the object ID of the SoftDrive.
GetTcNc3ActData	General	REFERENCE TO ST_TcNc3ActData	–	Obsolete parameter.
GetTuningAssistOid	General	OTCID	–	Returns the object ID of the tuning assistant.
GetVelocityControlOid	General	OTCID	–	Returns the object ID of the velocity control.

## 10.5.11.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
Encoder	–	I_SoftdriveEncoder	–	Selects the encoder for further operation.
FeedForward	–	I_SoftdriveFeedForward	–	Selects the feed forward for further operation.
Filter1	–	I_SoftdriveFilter1	–	Selects the filter 1 for further operation.
Filter2	–	I_SoftdriveFilter2	–	Selects the filter 2 for further operation.
Interpolator	–	I_SoftdriveInterpolator	–	Selects the interpolator for further operation.
PositionControl	–	I_SoftdrivepositionControl	–	Selects the position control for further operation.
VelocityControl	–	I_SoftdriveVelocityControl	–	Selects the velocity control for further operation.
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.12 FB\_SoftdriveEncoder – I\_SoftdriveEncoder

### 10.5.12.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetVelocityFeed-backMode	General	TcSdVelocityFeed-backMode	–	Returns the feedback mode of the velocity.
GetPositionFeed-backMode	General	TcSdPositionFeed-backMode	–	Returns the feedback mode of the position.
GetPositionLowPass-Filter	General	LREAL	–	Returns the frequency of the position low-pass filter.
GetVelocityFilter-Bandwidth	General	LREAL	–	Returns the bandwidth of the velocity filters.
GetStartupPosition	General	TcSdStartupPositionType	–	Returns the type of the start position.
SetVelocityFeed-backMode	General	BOOL	TcSdVelocityFeedback-Mode	Sets the feedback mode of the velocity.
SetPositionLowPass-Filter	General	BOOL	LREAL	Sets the frequency of the position low-pass filter.
SetVelocityFilter-Bandwidth	General	BOOL	LREAL	Sets the bandwidth of the velocity filter.
GetCorrectionFactor	Advanced	LREAL	–	Returns the correction factor of the monitoring model.
GetSimulationOffset	Advanced	LREAL	–	Returns the offset of the start position in the simulation.
GetCommutation-ErrorVelocity	Advanced	LREAL	–	Returns the threshold value of the communication error velocity.
SetCorrectionFactor	Advanced	BOOL	–	Sets the correction factor.
SetSimulationOffset	Advanced	BOOL	–	Sets the offset of the start position in the simulation.
SetCommutation-ErrorVelocity	Advanced	BOOL	–	Sets the threshold value of the communication error velocity.

### 10.5.12.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.13 FB\_SoftdriveFeedForward – I\_SoftdriveEncoder

## 10.5.13.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetFeedForward-Type	General	TcSdFeedForward-Type	–	Returns the type of feed forward control.
GetKpAccFFT	General	LREAL	–	Returns the acceleration feed forward gain.
GetKpAccFFTArea	General	LREAL	–	Returns the acceleration feed forward gain of the area.
GetFrictionCompensation	General	LREAL	–	Returns the current feed forward to compensate for static friction.
GetFrictionCompensationArea	General	LREAL	–	Returns the current feed forward to compensate for the static friction of the area.
GetAreaCurrentLimit	General	LREAL	–	Returns the current limit of the area.
SetFeedForward-Type	General	BOOL	TcSdFeedForwardType	Sets the feed forward type.
SetKpAccFFT	General	BOOL	LREAL	Sets the acceleration feed forward gain.
SetKpAccFFTArea	General	BOOL	LREAL	Sets the acceleration feed forward gain of the area.
SetFrictionCompensation	General	BOOL	LREAL	Sets the current feed forward to compensate for static friction.
SetFrictionCompensationArea	General	BOOL	LREAL	Sets the current feed forward to compensate for the static friction of the area.
SetAreaCurrentLimit	General	BOOL	LREAL	Sets the current limit of the area.
GetDetectionMin-Movement	MoverIdDetection	LREAL	–	Returns the minimum movement of Mover 1 during Mover 1 detection.
GetDetectionFilter	MoverIdDetection	LREAL	–	Returns the low-pass filter of the Mover 1 detection.
GetDetectionCurrent-Ramp	MoverIdDetection	LREAL	–	Returns the current rise of the Mover 1 detection.
GetDetectionMax-Current	MoverIdDetection	LREAL	–	Returns the maximum current for Mover 1 detection.
SetDetectionMin-Movement	MoverIdDetection	BOOL	LREAL	Sets the minimum movement for Mover 1 during Mover 1 detection.
SetDetectionFilter	MoverIdDetection	BOOL	LREAL	Sets the low-pass filter of the Mover 1 detection.
SetDetectionCurrent-Ramp	MoverIdDetection	BOOL	LREAL	Sets the current rise of the Mover 1 detection.
SetDetectionMaxCurrent	MoverIdDetection	BOOL	LREAL	Sets the maximum current of the Mover 1 detection.
GetOpenloopMove-Current	Advanced	LREAL	–	Returns the motion current of the open loop.

Parameter	Group	Return Type	Input Type	Explanation
SetOpenloopMove-Current	Advanced	BOOL	LREAL	Sets the motion current of the open loop.

### 10.5.13.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.14 FB\_SoftdriveFilter1/ FB\_SoftdriveFilter2 - I\_SoftdriveFilter1/ I\_SoftdriveFilter2

### 10.5.14.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetConfigurationFilter	General	REFERENCE TO ST_ConfigurationFilter	–	Returns the configuration of the filter.
SetConfigurationFilter	General	BOOL	ST_ConfigurationFilter	Sets the configuration of the filter.

### 10.5.14.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.15 FB\_SoftdriveInterpolator – I\_SoftdriveInterpolator

### 10.5.15.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetInterpolatorType	General	TcSdInterpolato- torType	–	Returns the interpolator type.
SetInterpolatorType	General	BOOL	TcSdInterpolato- torType	Sets the interpolator type.

### 10.5.15.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the ini- tialization.

## 10.5.16 FB\_SoftdrivePositionControl – I\_SoftdrivePositionControl

### 10.5.16.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetPositionLoop-Type	General	TcSdPositionLoop-Type	–	Returns the control mode of the control loop.
GetKp	General	LREAL	–	Returns the proportional gain of the position control.
GetKpStandstill	General	LREAL	–	Returns the proportional gain of the position control at standstill.
GetKpArea	General	LREAL	–	Returns the proportional gain of the position control in the area.
GetKpAreaStandstill	General	LREAL	–	Returns the proportional gain of the position control in the area at standstill.
SetpositionLoopType	General	BOOL	TcSdPosition-LoopType	Sets the control mode of the control loop.
SetKp	General	BOOL	LREAL	Sets the proportional gain of the position control.
SetKpStandstill	General	BOOL	LREAL	Sets the proportional gain of the position control at standstill.
SetKpArea	General	BOOL	LREAL	Sets the proportional gain of the position control in the area.
SetKpAreaStandstill	General	BOOL	LREAL	Sets the proportional gain of the position control in the area at standstill.
GetPosLoopFilter	Advanced	LREAL	–	Returns the setting of the low-pass frequency of the position filter.
SetPosLoopFilter	Advanced	BOOL	LREAL	Sets the low-pass frequency of the position filter.

### 10.5.16.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.17 FB\_SoftdriveVelocityControl – I\_SoftdriveVelocityControl

## 10.5.17.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetVelocityLoopType	General	TcSdVelocityLoop- Type	–	Returns the control mode of the velocity control.
GetKp	General	LREAL	–	Returns the proportional gain of the velocity control.
GetKpStandstill	General	LREAL	–	Returns the proportional gain of the velocity control at standstill.
GetKpArea	General	LREAL	–	Returns the proportional gain of the velocity control in the area.
GetKpAreaStandstill	General	LREAL	–	Returns the proportional gain of the velocity control in the area at standstill.
GetTn	General	LREAL	–	Returns the integer time constant of the velocity control.
GetTnStandstill	General	LREAL	–	Returns the integer time constant of the velocity control at standstill.
GetTnArea	General	LREAL	–	Returns the integer time constant of the velocity control in the area.
GetTnAreaStandstill	General	LREAL	–	Returns the integer time constant of the velocity control in the area at standstill.
SetVelocityLoopType	General	BOOL	TcSdVelocity- LoopType	Sets the control mode of the velocity control loop.
SetKp	General	BOOL	LREAL	Sets the proportional gain of the velocity control.
SetKpStandstill	General	BOOL	LREAL	Sets the proportional gain of the velocity control at standstill.
SetKpArea	General	BOOL	LREAL	Sets the proportional gain of the velocity control in the area.
SetKpAreaStandstill	General	BOOL	LREAL	Sets the proportional gain of the velocity control in the area at standstill.
SetTn	General	BOOL	LREAL	Sets the integer time constant of velocity control.
SetTnStandstill	General	BOOL	LREAL	Sets the integer time constant of the velocity control at standstill.
SetTnArea	General	BOOL	LREAL	Sets the integer time constant of the velocity control in the area.
SetTnAreaStandstill	General	BOOL	LREAL	Sets the integer time constant of the velocity control in the area at standstill.
GetMaxVelocity	Advanced	LREAL	–	Returns the setting for the maximum velocity.

Parameter	Group	Return Type	Input Type	Explanation
SetMaxVelocity	Advanced	BOOL	LREAL	Sets the maximum velocity.

## 10.5.17.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.18 FB\_TcIoXtsInfoServer – I\_TcIoXtsInfoServer

## 10.5.18.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetAdsPort	General	WORD	–	Returns the ADS port of the InfoServer.

## 10.5.18.2 Method – parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetInfoStationCount	Info	UDINT	–	Updates and returns the total number of InfoStations.
GetInfoStationOids	Info	BOOL	–	Updates the object IDs of all InfoStations.
<b>Subitems</b>				
InfoStationTclo	–	–	–	Selects the InfoStation for further operation by entering the number of the InfoStation.

## 10.5.18.3 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_InfoStationCount	–	UINT	–	Returns the total number of InfoStations.
P_InfoStationOids	–	REFERENCE TO ARRAY[1..TcloXts-EnvironmentParameterList.MaxXtsInfoStation] OF OTCID	–	Returns all object IDs.
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.19 FB\_TcIoXtsInfoServerInfoStation – I\_TcIoXtsInfoServerInfoStation

### 10.5.19.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetAdsPort	General	WORD	–	Returns the ADS port of the station.
GetStationId	General	UDINT	–	Returns the ID of the station.
GetStationColor	General	UDINT	–	Returns the color of the station. Unit: ARGB
GetStartPositionOn-Part	General	LREAL	–	Returns the start position of the station on the part.
GetEndPositionOn-Part	General	LREAL	–	Returns the end position of the station on the part.
GetStopPosition	General	LREAL	–	Returns the stop position on the part.
GetStopPositions	General	ARRAY[1..TcIoXts-EnvironmentParameterList.MaxXtsStopPositionPerStation] OF LREAL	–	Returns the stop positions on the part.
GetPartObjectIds	General	ARRAY[1..TcIoXts-EnvironmentParameterList.MaxXtsStopPositionPerStation] OF OTCID	–	Returns all part information of the station.
GetIsEnabled	General	BOOL	–	Returns the state of the station.
GetDescription	General	STRING(1023)	–	Returns the description of the station.

### 10.5.19.2 Method – parameter (Online)

Parameter	Group	Return Type	Input Type	Explanation
GetPartCount	Structure	UDINT	–	Returns the number of parts that belong to this station.
GetStopPosition-sCount	Structure	UDINT	–	Returns the total number of stop positions.

### 10.5.19.3 Properties

Name	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

## 10.5.20 FB\_Mc2CaGroup – I\_Mc2CaGroup

## 10.5.20.1 Method – parameter (Init)

Parameter	Group	Return Type	Input Type	Explanation
GetRailLength	Geometry	LREAL	–	Returns the length of the guide rails.
GetRailsRing	Geometry	BOOL	–	Returns that the guide rails are closed.
SetRailLength	Geometry	BOOL	LREAL	Sets the length of the guide rails.
SetRailsRing	Geometry	BOOL	BOOL	Sets that the guide rails are closed.
GetDefaultGapControlMode	Gap Control	MC_DEFAULT_GAP_CONTROL_MODE	–	Returns the gap control mode.
GetGapControlDirection	Gap Control	MC_GAP_CONTROL_DIRECTION	–	Returns the direction of the gap control.
GetStandbyGapControl	Gap Control	BOOL	–	Returns the standby state of the gap control.
GetDefaultGap	Gap Control	LREAL	–	Returns the default value of the gap.
GetDefaultVelocity	Gap Control	LREAL	–	Returns the default velocity of the gap control.
GetDefaultAcceleration	Gap Control	LREAL	–	Returns the default acceleration of the gap control.
GetDefaultDeceleration	Gap Control	LREAL	–	Returns the default deceleration of the gap control.
GetDefaultJerk	Gap Control	LREAL	–	Returns the default jerk of the gap control.
SetDefaultGapControlMode	Gap Control	BOOL	MC_DEFAULT_GAP_CONTROL_MODE	Sets the gap control mode.
SetGapControlDirection	Gap Control	BOOL	MC_GAP_CONTROL_DIRECTION	Sets the direction of the gap control.
SetStandbyGapControl	Gap Control	BOOL	BOOL	Sets the standby state of gap control.
SetDefaultGap	Gap Control	BOOL	LREAL	Sets the default value of the gap.
SetDefaultVelocity	Gap Control	BOOL	LREAL	Sets the default velocity of the gap control.
SetDefaultAcceleration	Gap Control	BOOL	LREAL	Sets the default acceleration of the gap control.
SetDefaultDeceleration	Gap Control	BOOL	LREAL	Sets the default deceleration of the gap control.
SetDefaultJerk	Gap Control	BOOL	LREAL	Sets the default jerk of the gap control.

## 10.5.20.2 Properties

Parameter	Group	Return Type	Input Type	Explanation
P_IsInitialised	–	BOOL	–	Returns the state of the initialization.

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