

How to connect CMMT to a BOSCH ctrlX-OS

Step by step description of how to start a project in BOSCH ctrlX-OS and what needs to be done to integrate CMMT into the motion control element

CMMT-ST
CMMT-AS

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1 Components/Software used

Type/Name	Version Software/Firmware	Date of manufacture
CMMT-ST	36.11.0	
CMMT-AS	36.11.1	
CMMT-ST Plug-in	2.10.0.103	
CMMT-AS Plug-in	2.10.0.103	
Festo Automation Suite	2.10.1.1	
COREX-C-X3-11-ANNN-21.01	02RS-NN-NN	
ctrlX I/O Engineering	3.6.3	
ctrlX PLC Engineering	3.6.3	
EtherCat Master App	3.6.3	
Motion App	3.6.4	
PLC App	3.6.4	

Table 1.1: Components/Software used



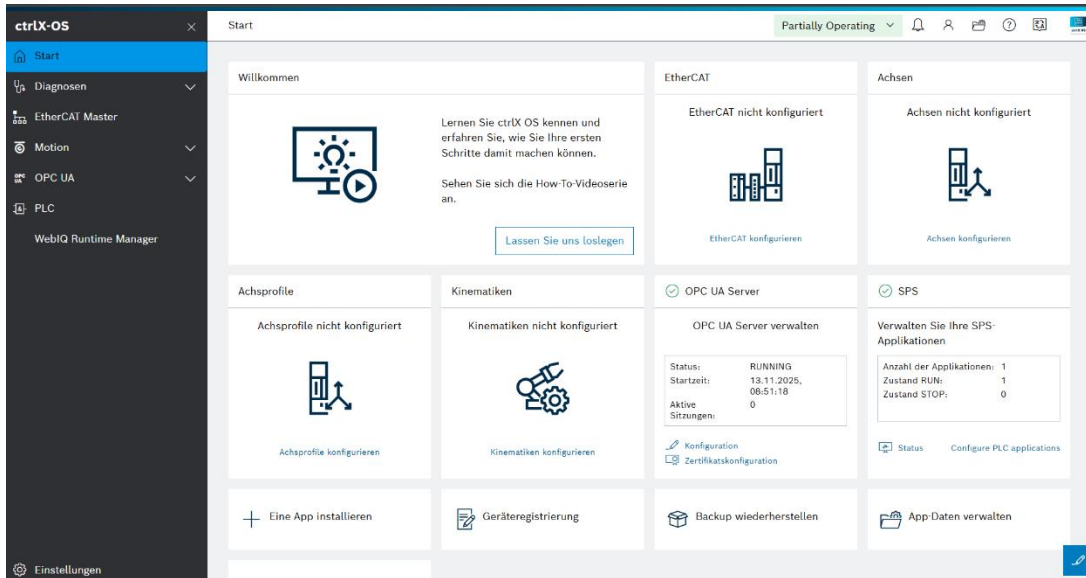
Information

This AppNote describes the procedure with the CMMT-AS motor controller. The CMMT-AS servo drive controller and CMMT-ST servo drive controller for extra-low voltage are based on the same software platform. Therefore, the described settings can also be used as a reference for its parameterization. It is hereby expressly pointed out, that this has not been explicitly tested and therefore the function cannot be guaranteed!

2 BOSCH ctrlX-OS

2.1 Connection to PLC

Open the web interface via the PLC's IP address

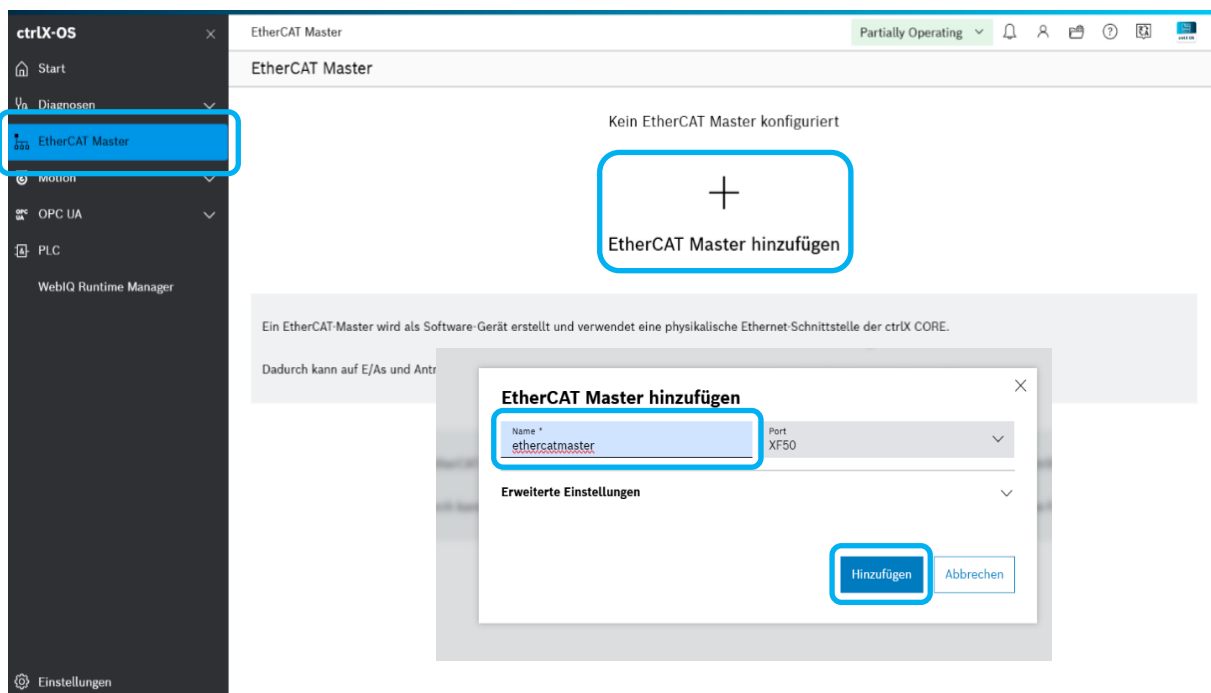


Note

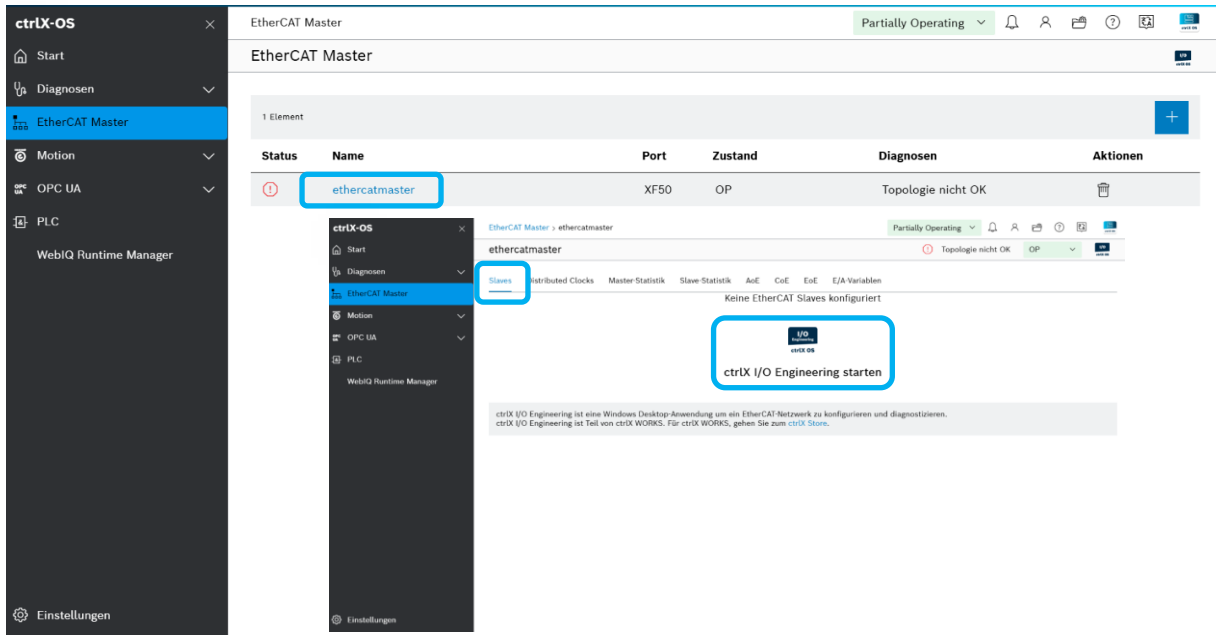
Make sure that the laptop and the PLC are within the same network through the IP settings

2.2 Configuration EtherCAT Master

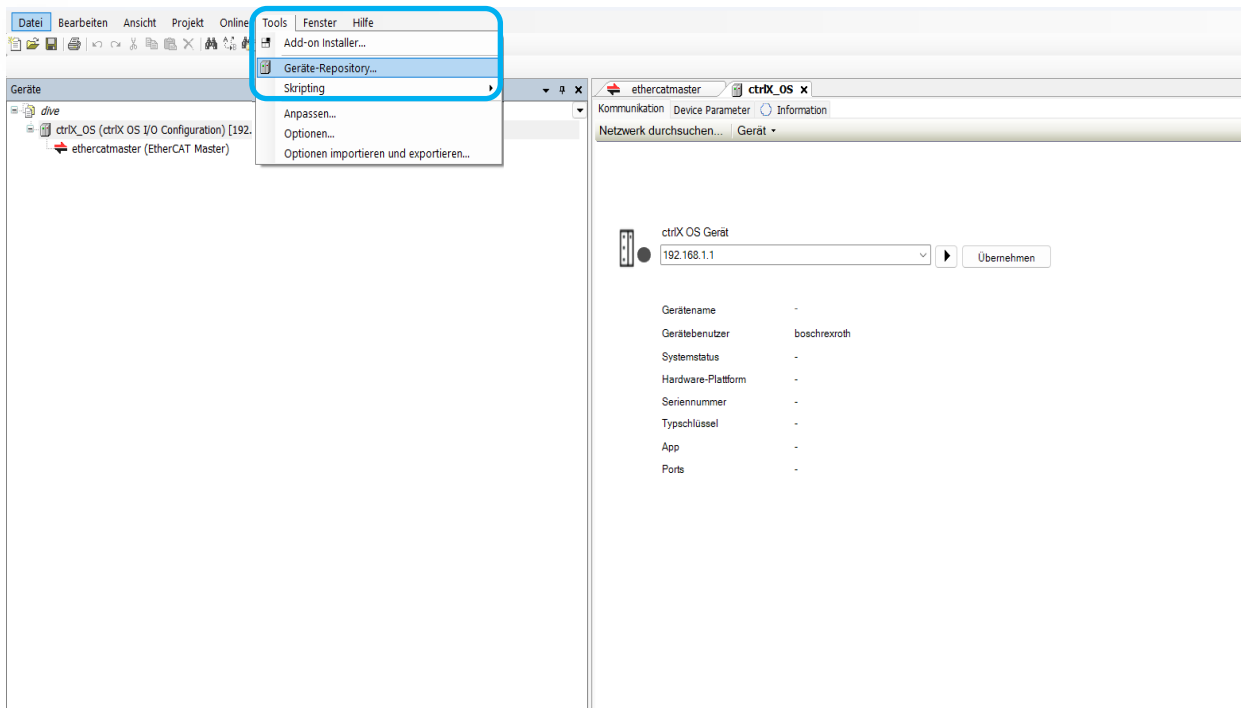
1. Adding an EtherCAT master in the ctrlX-OS web interface



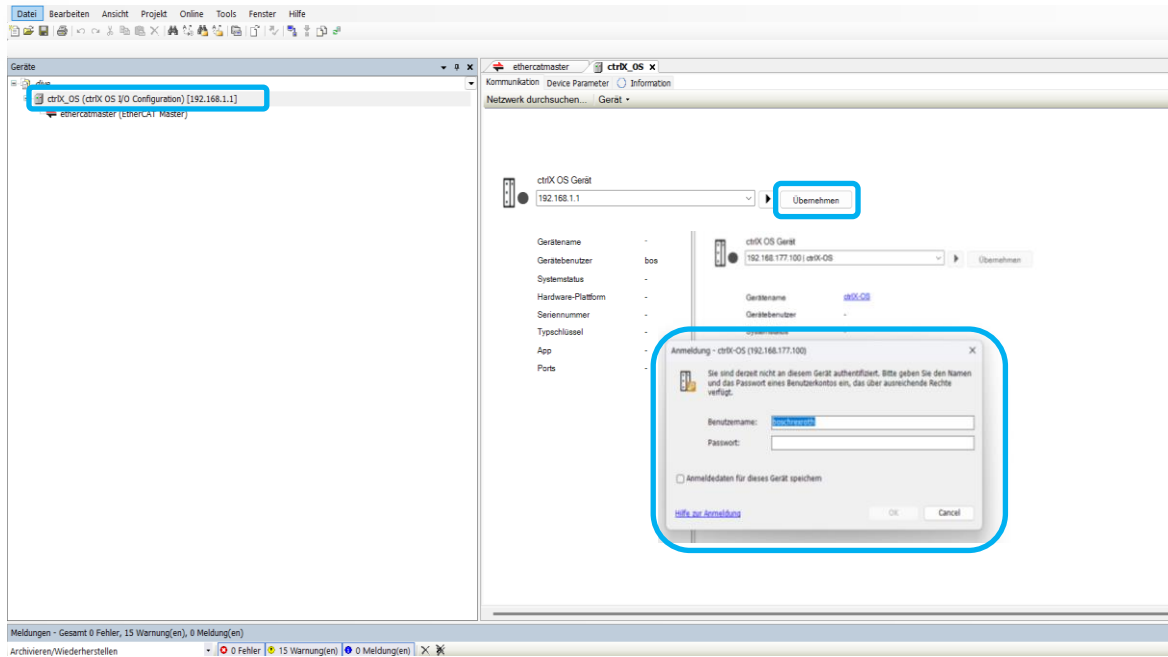
2. Open ctrlX I/O Engineering



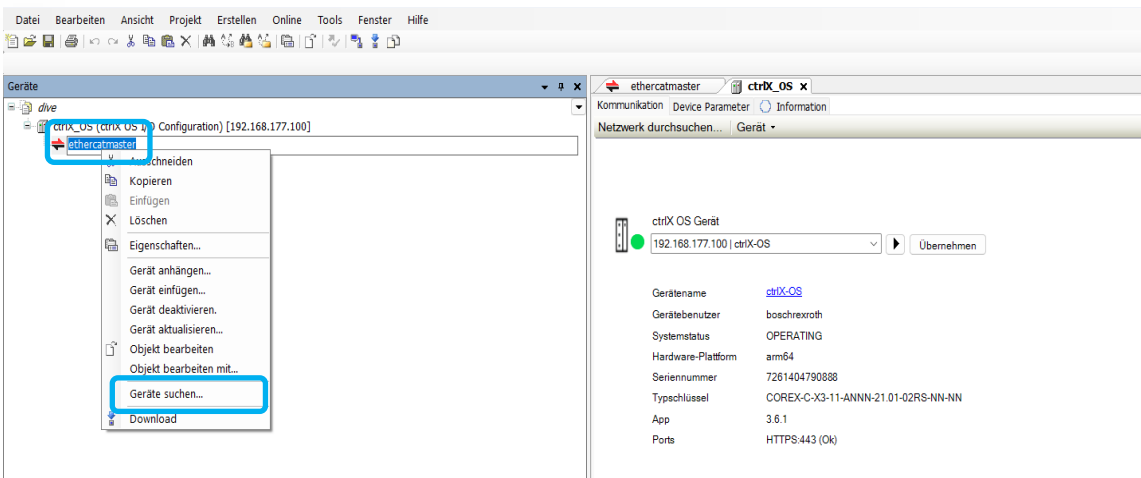
3. Installing the EtherCAT XML files



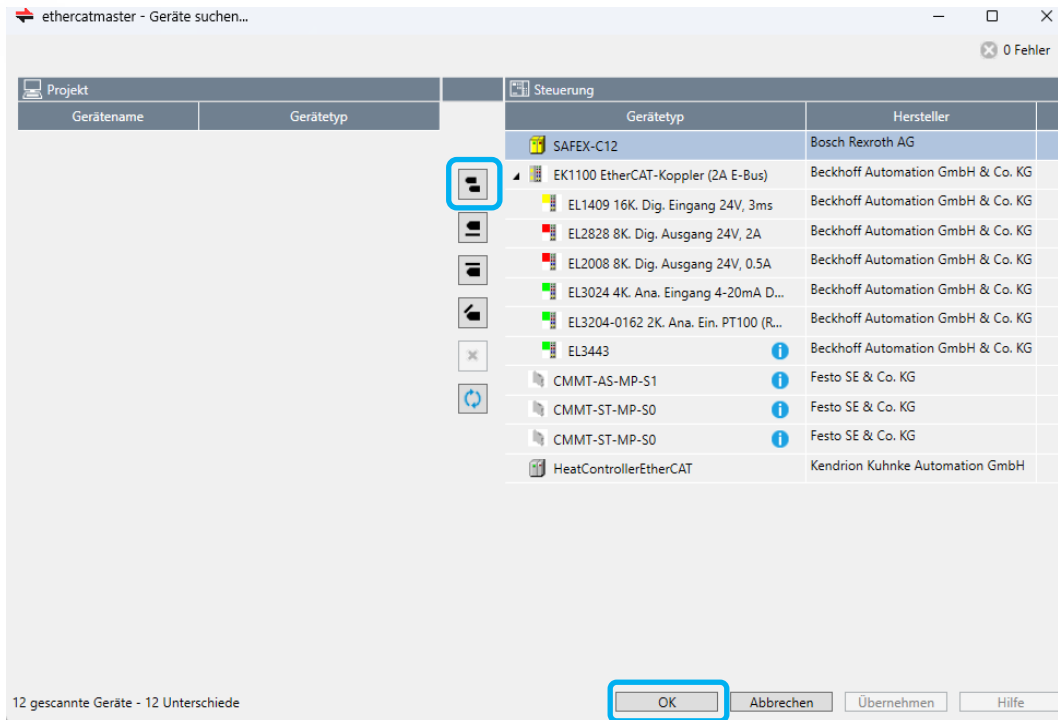
4. Connect to the controller via the correct IP address
5. Select IP address and press play button
6. Log in to the PLC with administrator password



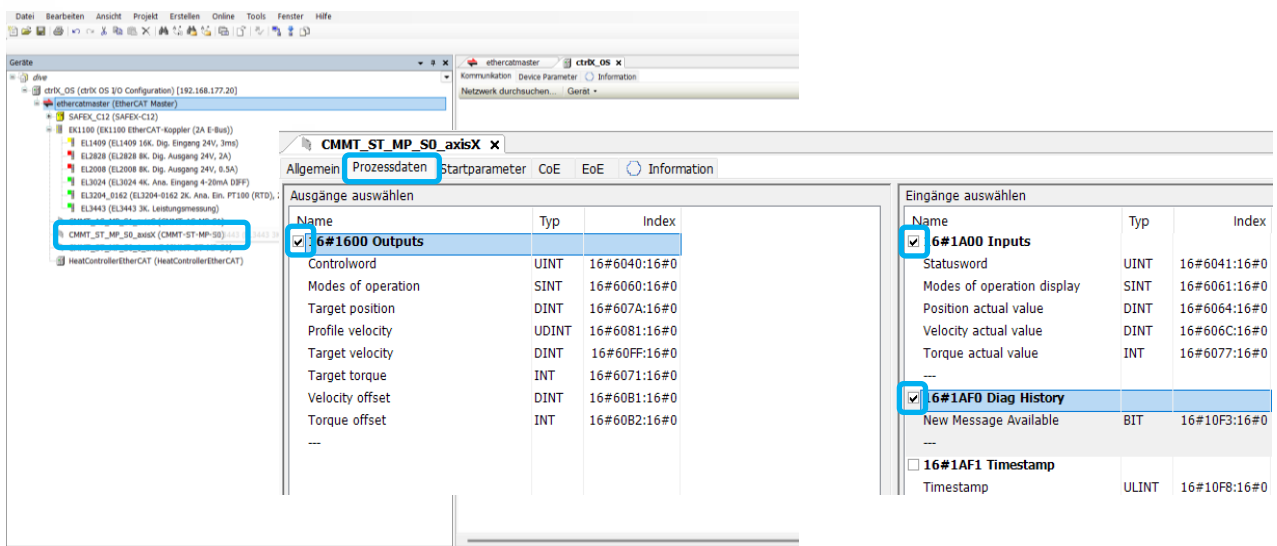
7. Online search for EtherCAT devices → Right-click on EtherCAT Master → Search devices



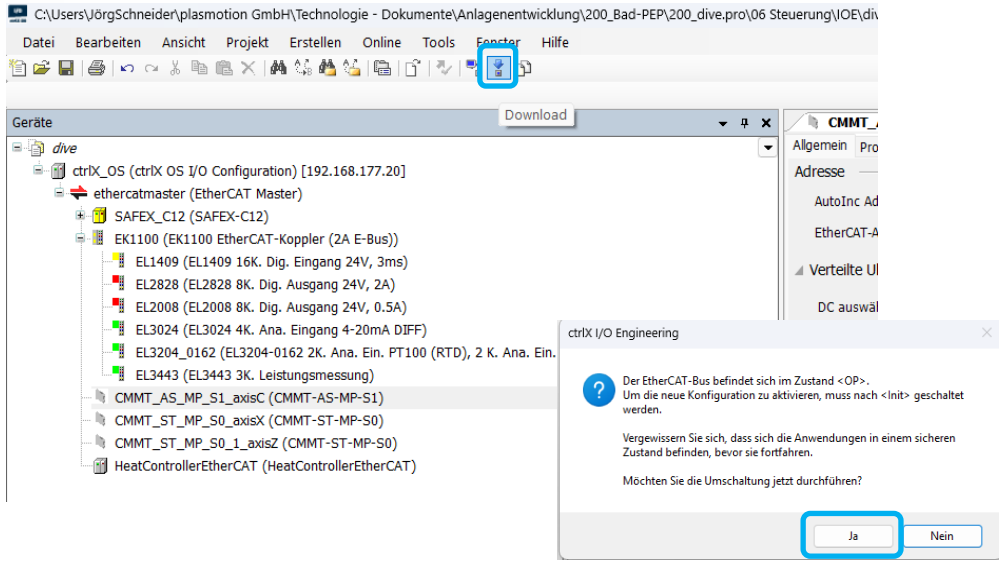
8. Copy online devices into the project using the top button and confirm with OK



9. Activate process data for the drive controller
 → Open CMMT settings → Process data tab → Activate checkbox

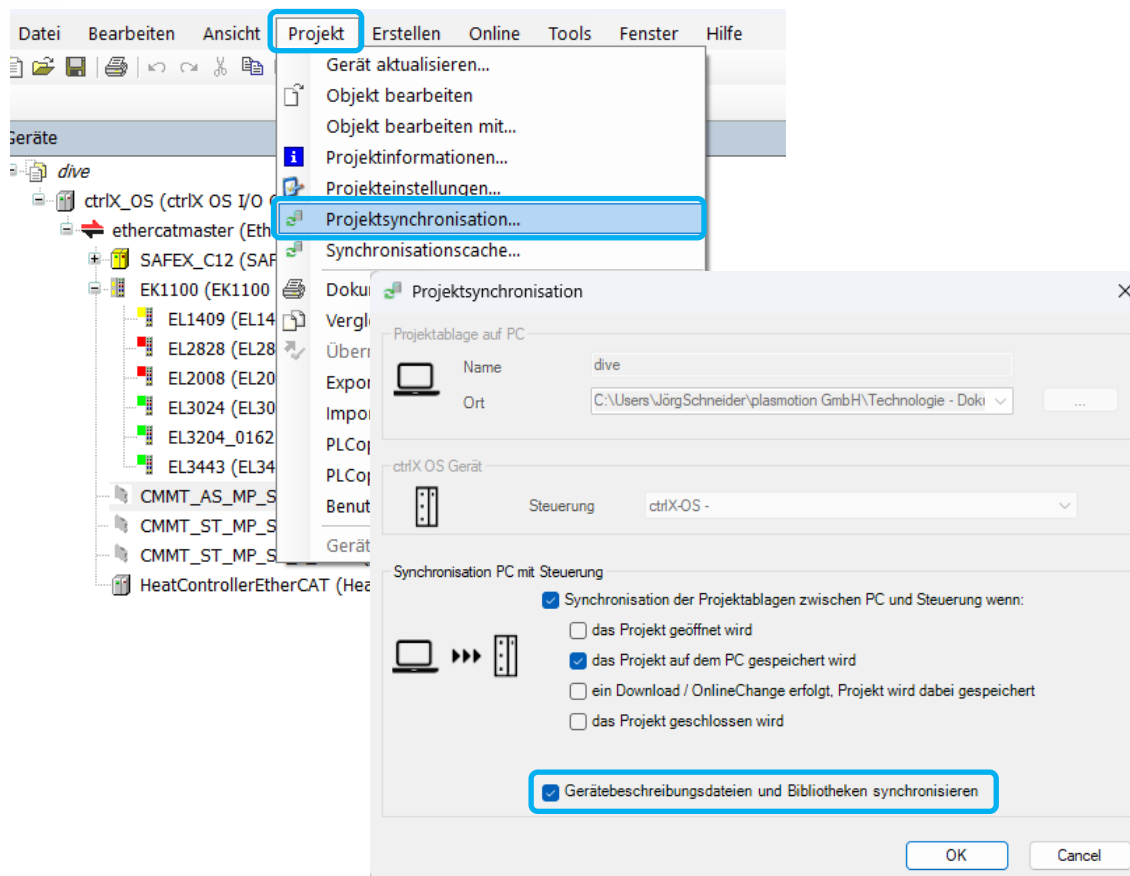


10. Download EtherCAT configuration → Start EtherCAT Master



3 General settings

Set the check box to synchronize device description files and libraries



4 ctrlX – create motion axis

1. Add axis with "+" → Read active I/O configuration → Select CMMT Controller and edit axis name → Add button

The screenshot shows the 'Achsen hinzufügen' dialog box in the ctrlX-OS software. The dialog is titled 'Achsen hinzufügen' and contains a table with columns: Antrieb, Achsprofil, Achse, Kategorie, Typ, Format, and Aktionen. The 'Achse' column is highlighted, and the 'Aktive E/A-Konfiguration einlesen' button is also highlighted. The main window shows 'Keine Achse konfiguriert' and a '+ Achsen hinzufügen' button.

2. Adding axes is completed

The screenshot shows the 'Achsen' configuration table in the ctrlX-OS software. The table has columns: Name, Typ, Format, Profilname, and Aktionen. The 'Achsen' button is highlighted.

Name	Typ	Format	Profilname	Aktionen
Axis_C	Rotatorisch	Absolut	pAxis_5_axisC	[Edit] [Copy] [Refresh] [Delete] [Dropdown]
Axis_X	Linear	Absolut	pAxis_6_axisX	[Edit] [Copy] [Refresh] [Delete] [Dropdown]
Axis_Z	Linear	Absolut	pAxis_7_axisZ	[Edit] [Copy] [Refresh] [Delete] [Dropdown]

- Axis profile settings - Manual weighting settings for **rotary axis**. The value for resolution and counter is determined by the encoder resolution of the motor (example 19bit = 524288), Denominator := 360.000.000 (360° → Resolution in conjunction with the factor group in Festo Automation Suite)

The screenshot shows the 'Achsprofile' configuration window for 'pAxis_5_axisC'. The 'Wichtung' tab is selected. Under 'Wichtungsstrategie', 'Manuelle Konfiguration' is chosen. The 'Typ' dropdown is set to 'Rotatorisch'. The 'Auflösung' (Resolution) is 524288 and the 'Zähler' (Counter) is 524288. The 'Nenner' (Denominator) is 360000000. The 'Faktorgruppe' is 'Grad [°, °/s, ...] (5)'. The 'Position' is set to -6 and 'Geschwindigkeit' (Velocity) is set to -3. Buttons for 'Speichern' (Save) and 'Abbrechen' (Cancel) are visible.

- Axis profile settings - Manual weighting settings for **linear axis**. The value for resolution and counter is determined by the encoder resolution of the motor (example 17bit = 131072), Denominator := 1000 (Resolution in conjunction with the factor group in Festo Automation Suite → Target value specification in mm)

The screenshot shows the 'Achsprofile' configuration window for 'pAxis_6_axisX'. The 'Wichtung' tab is selected. Under 'Wichtungsstrategie', 'Manuelle Konfiguration' is chosen. The 'Typ' dropdown is set to 'Linear'. The 'Auflösung' (Resolution) is 131072 and the 'Zähler' (Counter) is 131072. The 'Nenner' (Denominator) is 1000. The 'Faktorgruppe' is 'Metrisch [m, m/s, ...] (6)'. The 'Position' is set to -6 and 'Geschwindigkeit' (Velocity) is set to -3. Buttons for 'Speichern' (Save) and 'Abbrechen' (Cancel) are visible.

5. Setting of units and limit values. Limit values are based on application

The screenshot shows the ctrlX-OS configuration interface for axes. The main window displays a table of axes with the following data:

Name	Typ	Format	Profilname	Aktionen
Axis_C	Rotatorisch	Absolut	pAxis_5_axisC	[Edit] [Copy] [Trash]
Axis_X	Linear	Absolut	pAxis_6_axisX	[Edit] [Copy] [Trash]
Axis_Z	Linear	Absolut	pAxis_7_axisZ	[Edit] [Copy] [Trash]

Two pop-up windows are shown for configuring Axis_X:

Axis_X Grenzwerte

Grenzwerte	Basis	Einheiten
Position (Min.)	-1	mm
Position (Max.)	995	mm
Geschwindigkeit (Neg.)	0,2	m/s
Geschwindigkeit (Pos.)	0,2	m/s
Beschleunigung	20	m/s ²
Verzögerung	20	m/s ²
Beschleunigungsruck	0	m/s ³
Verzögerungsruck	0	m/s ³
Drehmoment	10	Nm

Axis_X Einheiten

- Position + Länge: mm
- Geschwindigkeit: m/s
- Beschleunigung: m/s²
- Ruck: m/s³
- Kraft: N
- Drehmoment: Nm
- Drehmomentrampe: Nm/s

5 Commissioning/ testing/ manual movement

The screenshot shows the 'Achsen' (Axes) control interface in the ctrlIX-OS software. The interface is divided into a sidebar on the left and a main control area on the right.

Sidebar (Left):

- ctrlIX-OS
- Start
- Diagnosen
- EtherCAT Master
- Motion
- Achsen** (highlighted)
- Achsprofile
- Koordinierte Bewegungen
- OPC UA
- PLC
- WebIQ Runtime Manager
- Einstellungen

Main Area (Right):

- Operating status: Operating
- Running status: Running
- Navigation: Konfiguration, **Inbetriebnahme** (highlighted), Punktetabellen
- Warning: **Vorsicht**: Diese Funktionen verursachen Maschinenbewegungen. Führen Sie alle Maßnahmen durch, um Personenschäden oder Schäden an Maschinen zu vermeiden!
- 3 Elemente

Achse ↑	Position	Geschwindigkeit	Zustand	Aktionen
Axis_C	612.3947 grad	-0.0011 grad/s	DISABLED	[Edit] [Dropdown]
Axis_X	836.5990 mm	0.0000 m/s	DISABLED	[Edit] [Dropdown]
Axis_Z	0.0000 mm	0.0000 m/s	STANDSTILL	[Edit] [Dropdown]

Control Panel (Bottom):

- State: Zustand: ON
- Modus: Positionieren
- Verschieben: Absolut
- Velocity: Vel: 0.08 m/s
- Acceleration: Acc: 14 m/s²
- Deceleration: Dec: 14 m/s²
- AccJerk: 5 m/s³
- DecJerk: 5 m/s³
- Buttons: Start, Stopp, Schnellstopp
- Target Position: Zielposition* 0 mm

6 Programming

1. Open ctrlX PLC Engineering
2. Copy the axis name from ctrlX for the variable declaration

