

Servo Drives

Quick Start Guide MINAS A6 Multi

Position control with Beckhoff
host controller over EtherCAT



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1 Introduction

1.1 Before you start

Before operating this product, read the safety instructions in the following manuals:

- [“SX-DSV03514, MINAS A6 Multi, Technical Reference – Integrated Safety Part”](#)
- [“SX-DSV03508, MINAS A6 Multi, Programming Manual – PANATERM for Safety”](#)

This product is for industrial use only.

Electrical connections must be made by qualified electrical personnel.

1.2 About this document

This “Quick Start Guide” is intended to help you set up a MINAS A6 Multi servo drive system. It is based on information from the MINAS A6 Multi series manuals and the practical experience of our engineers.

Step-by-step instructions will guide you through connecting a Beckhoff C6015 host controller to a MINAS A6 Multi servo drive system. You will also learn how to configure a PLC program and an HMI program using Beckhoff’s TwinCAT 3 Runtime and TwinCAT 3 Engineering software to perform a simple positioning task. Communication is achieved using EtherCAT.

In these instructions we assume that you are using a Windows 10 operating system.

Please refer to the original documentation of our servo drive systems for detailed information. It is available free of charge in our [Panasonic Download Center](#).

1.3 Related documents

Select the following links to download the documents from our Panasonic Download Center.

- Safety specifications:
[“SX-DSV03514, MINAS A6 Multi, Technical Reference – Integrated Safety Part”](#)
- Information on wiring the MINAS A6 Multi servo drive system:
[“SX-DSV03454, MINAS A6 Multi, Reference Specifications – Driver Module”](#)
- Information on wiring the MINAS A6 Multi power supply module:
[“SX-DSV03452, MINAS A6 Multi, Reference Specifications – Power Supply Module”](#)
- Information on EtherCAT communication:
[“SX-DSV03456, MINAS A6 Multi, Technical Reference – EtherCAT Communication Specification”](#)

- Description of the servo driver functions:
“SX-DSV03455, MINAS A6 Multi, Technical Reference – Functional Specification”
- Information on safety programming:
“SX-DSV03508, MINAS A6 Multi, Programming Manual – PANATERM for Safety”
- Information on how to reduce electromagnetic interference (EMI):
“Recommendations for EMC-compliant wiring of servo drivers and motors”
- Related Quick Start Guides:
“QS10001, MINAS A6 Multi, Ethernet over EtherCAT with PANATERM”
“QS10002, MINAS A6 Multi, Safe Torque Off (STO)”
“QS10003, MINAS A6 Multi, Safe Stop 1 (SS1)”
“QS10004, MINAS A6 Multi, Safe Speed Monitoring (SSM)”
“QS10005, MINAS A6 Multi, Position control with Omron host controller over EtherCAT”
“QS10006, MINAS A6 Multi, Position control with TRIO host controller over EtherCAT”

1.4 Available software

The following software is available free of charge in our [Panasonic Download Center](#):

- PC configuration software PANATERM for MINAS A6 Multi, 32 bit, or PC configuration software PANATERM for MINAS A6 Multi, 64 bit
- Programming software Control FPDWIN Pro 7
- Panasonic ESI file

The following software can be downloaded from Beckhoff's Web site (<https://www.beckhoff.de>):

- TwinCAT 3 Runtime software (Go to “Download” > “Software” > “TwinCAT3” > “Runtime”)
- TwinCAT3 Engineering software (Go to “Download” > “Software” > “TwinCAT3” > “Engineering”)

2 Functional overview

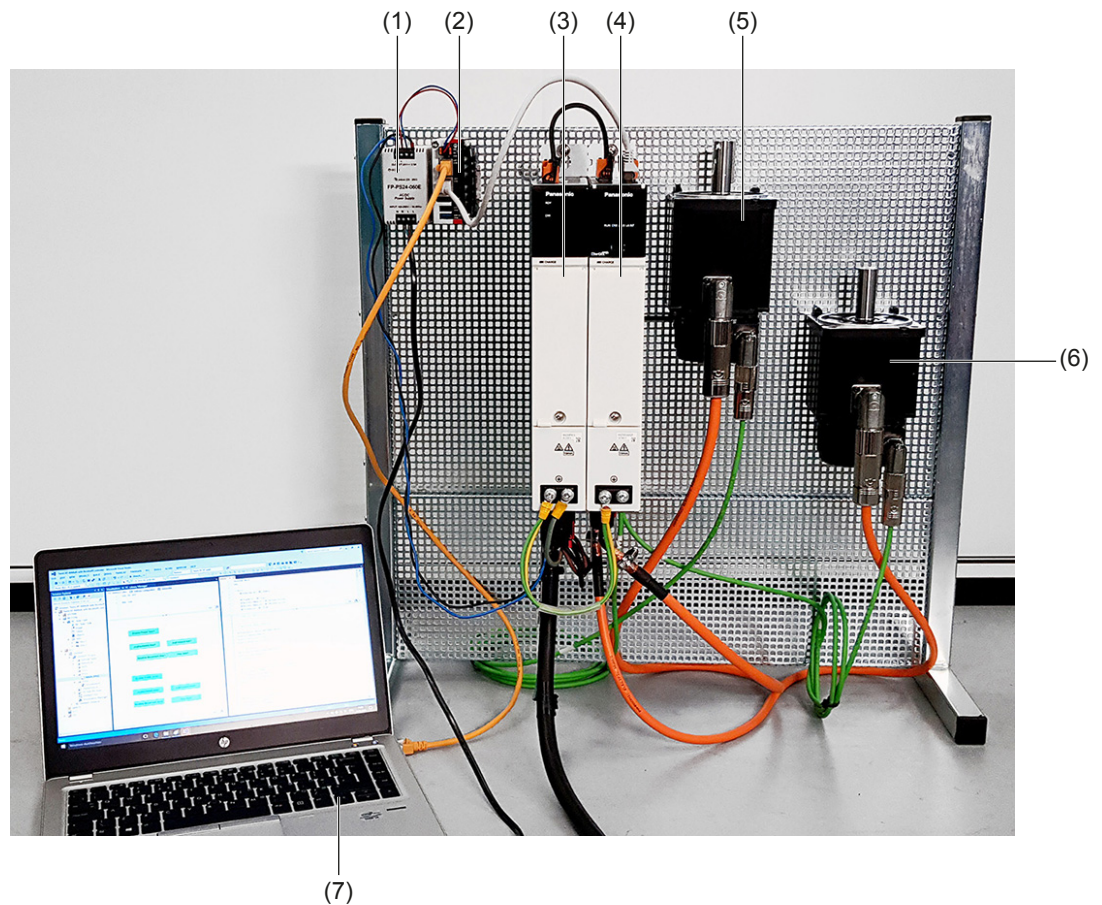
A Panasonic MINAS A6 Multi servo drive system includes a power supply module, one or more 400V driver modules, and one or two motors connected to each driver module. Communication can be achieved through EtherCAT with any host controller that supports the CAN application protocol over EtherCAT (CoE).

Example

A servo drive system, consisting of an 15kW power supply module, an A-size 1.5kW two-axis driver module, and two servo motors with a rated power of 1.0kW and 1.5kW, is connected to a Beckhoff C6015 host controller by an Ethernet cable to communicate via EtherCAT.

Use the following accessories:

- 1 x 400V AC power supply cable
Connects the MINAS A6 Multi power supply module to the main power supply (400V AC).
- 1 x 24V DC power supply cable
Connects the power supply unit (24V DC) and the host controller.
- 1 x grounding wire (M4 round terminal)
Connects the PE terminals of the power supply module and the driver module.
- 2 x Panasonic motor cable
Connects the motor and the driver module.
- 2 x Panasonic encoder cable
Connects the encoder and the driver module.
- 1 x Ethernet cable
Connects the PC and the host controller.
- 1 x Ethernet cable (used for EtherCAT communication)
Connects the host controller and the driver module.
- 1 x RJ11 communication cable (2 x RJ11 plug)
Connects the power supply module and the driver module.
- 1 x feed bus bar (50mm) with end cap for the DC link bus (535V DC to 675V DC)
Connects the power supply module and the driver module.
- 1 x feed bus bar (50mm) with end cap for the control bus (24V DC)
Connects the power supply module and the driver module.



- (1) Power supply unit (24V DC)
- (2) Beckhoff C6015 host controller with TwinCAT 3 Runtime software
- (3) MINAS A6 Multi power supply module (400V AC, 15kW)
- (4) Two-axis MINAS A6 Multi driver module (1.5kW)
- (5) MINAS A6 servo motor B (1.5kW)
- (6) MINAS A6 servo motor A (1kW)
- (7) PC with TwinCAT 3 Engineering software

Set-up of a MINAS A6 Multi servo drive system with a Beckhoff C6015 host controller

3 Wiring

3.1 Recommendations for wiring

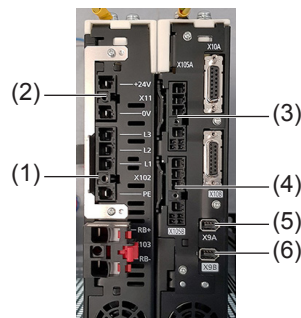
It is the customer's responsibility to apply the countermeasures that they consider necessary to comply with current regulations on wiring, safety and reducing EMI.

Do not forget to meet the specifications indicated in the hardware manual for each of the devices being wired. If any specifications in the manual conflict with the information in this document, the manufacturer's manual takes preference.

For detailed information on reducing EMI, please refer to ["Recommendations for EMC-compliant wiring of servo drivers and motors"](#).

3.2 Bottom side connectors of the servo drive system

The image shows the most important connectors of a power supply module (left) and a driver module (right). Please refer to the technical documentation for details about other connectors.

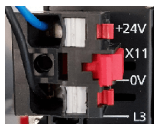


- (1) X102: Main power supply (400V AC)
- (2) X11: Control power supply (24V DC)
- (3) X105A: Motor A
- (4) X105B: Motor B
- (5) X9A: Encoder A
- (6) X9B: Encoder B

Bottom view of power supply module (left) and driver module (right)

X11 connector (control power supply)

Connect the 24V DC control power supply to X11.



Wiring of the X11 connector

X102 connector (main power supply)

Connect the 400V AC main power supply cable to X102.



Wiring of the X102 connector

X105A and X105B connectors (motor connectors)

Connect the motor cable for servo motor A to X105A and the motor cable for servo motor B to X105B.



Wiring of the X105A and X105B connectors

X9A and X9B connectors (encoder connectors)

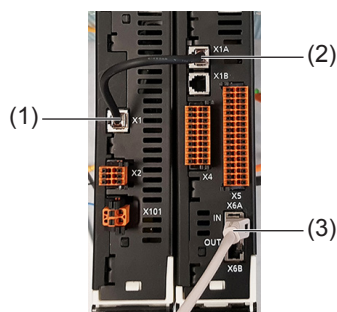
Connect the cable of encoder A to X9A and the cable of encoder B to X9B.



Wiring of the X9A and X9B connectors

3.3 Top side connectors of the servo drive system

The image shows the most important connectors of a power supply module (left) and a driver module (right). Please refer to the technical documentation for details about other connectors.



- (1) X1: Internal communication connector on power supply module
- (2) X1A: Internal communication connector on driver module
- (3) X6A: EtherCAT communication connector on driver module

Top view of power supply module (left) and driver module (right)

X1, X1A connectors (internal communication connectors)

Connect X1 and X1A with the RJ11 communication cable.

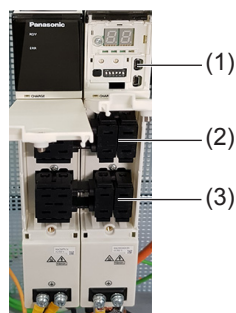
X6A connector (EtherCAT connector)

Connect an Ethernet cable between the EtherCAT connector of the host controller and X6A of the driver module.

In this example, we will define X103 as the EtherCAT connector.

3.4 Front side connectors of the servo drive system

The image shows the most important connectors of a power supply module (left) and a driver module (right). Please refer to the technical documentation for details about other connectors.

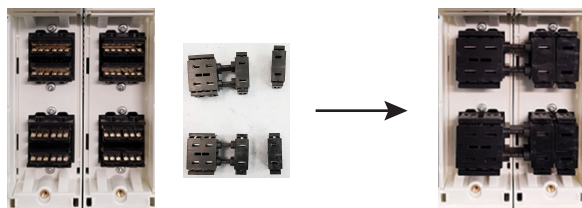


- (1) X7: USB connector (for driver configuration) on driver module
- (2) X104: DC link bus connectors on power supply module and driver module (535V DC to 675V DC)
- (3) X12: Control bus (24V DC) connectors on power supply module and driver module

Front view of power supply module (left) and driver module (right) with bus bars

X104 and X12 connectors (DC bus)

Attach the bus bars to X104 and X12 to connect the DC circuits of the power supply module and the driver module.



Connectors for DC circuits with and without bus bars

X7 connector (for driver configuration)

The driver module is configured using the PC configuration software PANATERM. Use a commercially available USB A to mini-B cable to connect the PC to the driver module.

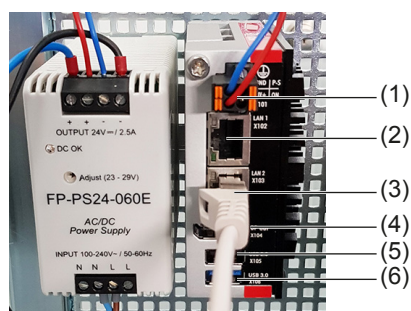


(1) X7: USB connector on driver module

Connector X7 for PC connection

3.5 Connectors of the Beckhoff C6015 host controller

The image shows the front view of the host controller. Connector X104 can be used to connect a monitor. Connectors X105 and X106 can be used to connect a keyboard, mouse or USB flash drive, if required.



- (1) X101: 24V power supply
- (2) X102: Ethernet connector
- (3) X103: Ethernet connector
- (4) X104: DisplayPort connector
- (5) X105: USB 2.0 connector
- (6) X106: USB 3.0 connector

Front view of Beckhoff C6015 host controller

X101 connector (24V power supply)

Connect X101 to 24V DC.

X102 connector (Ethernet connector)

Connect an Ethernet cable between X102 and the Ethernet port of your PC.

X103 connector (Ethernet connector)

Connect an Ethernet cable between X103 and the X6A connector of the driver module.

In this example, we will define X103 as the EtherCAT connector.

X104 connector (DisplayPort connector)

Connect a monitor (optional).

X105 connector (USB 2.0)

Connect a mouse or keyboard (optional).

X106 connector (USB 3.0)

Connect a mouse or keyboard (optional).

4 Set up the host controller

4.1 Install TwinCAT 3 Runtime and establish an Ethernet connection

To install TwinCAT 3 Runtime on the host controller, connect a monitor to the DisplayPort connector (X104) of the Beckhoff C6015 host controller and a mouse to one of its USB connectors.

The download link can be found under [Available software](#) (page 5).

1. Unzip the downloaded TwinCAT 3 Runtime file and copy the installation file to a USB flash drive.
2. Connect the USB flash drive to one of the host controller's USB connectors and execute the installation file.
3. Set the IP address in your PC.

In Windows, go to "Network Connections" > "Change adapter options". Select "Ethernet" > "Properties". On the "Network" tab, select "Internet protocol, Version 4 (TCP/IPv4)" > "Properties". Select "Use the following IP address" and set the IP address.

Example:

IP address: 192.168.178.100

Subnet mask: 255.255.255.0

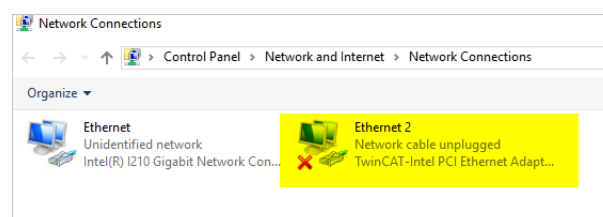
(settings for default gateway and preferred DNS server not required)

4. Set an IP address in the "Ethernet Properties" dialog of the system settings of the host controller, e.g. IP address: 192.168.178.10, subnet mask: 255.255.255.0.
5. Start a remote desktop connection by entering "mstsc" in the Windows start menu of your PC. Enter the IP address of your host controller (e.g. 192.168.178.10) and select "Connect".

4.2 Install the EtherCAT driver

One of the two Ethernet connectors of the Beckhoff C6015 host controller must be configured as an EtherCAT port. In this example we will use connector X103.

1. In the operating system of the host controller, select "Control Panel" > "Network and Internet" > "Network and Sharing Center" > "Change adapter settings" > "Ethernet2" (Ethernet2 refers to the X103 connector of the host controller).



2. Right-click and select "Properties" in the context menu.
3. Select "Configure..." and go to the "Driver" tab.
4. Select "Update Driver".
5. Search manually for the driver in the following location: `C:\TwinCAT\3.1\Driver`.
6. Select "Next" to install the driver.
7. After successful installation, select "Close" to finish the installation.
8. To activate the EtherCAT driver, go to `C:\TwinCAT\3.1\System` and execute `TcRteInstall.exe`.

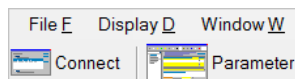
5 Set up the MINAS A6 Multi servo drive system

Use the PC configuration software PANATERM to set up the MINAS A6 Multi servo drive system.

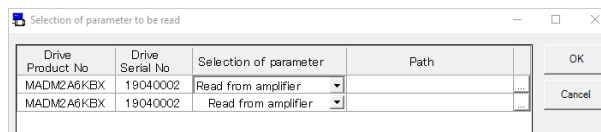
The download links can be found under [Available software](#) (page 5).

For safety reasons, parameter Pr0.13: “1st torque limit” is, by default, set to 10% of the rated motor torque. To be able to use the full range of motor torque and to avoid follow-up errors, set Pr0.13 to 300%. This will be the only setting we will make in PANATERM.

1. Connect your PC to the USB connector X7 of the servo driver module and turn on the servo drive system.
2. Start PANATERM.
The software automatically detects the connected devices.
3. Select “OK” to confirm the detected series.
4. Select the “Parameter” tab.



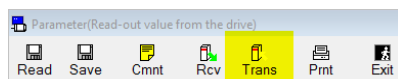
5. In the “Selection of parameter to be read” dialog, select “Read from amplifier” and select “OK”.



6. Select Pr0.13: “1st torque limit” from the parameter list and change the value to 300%:

00	001	Control mode setup	0-	6	<input type="checkbox"/>	0 Positi...	0 Positi...	---
00	002	Real-time auto tun...	0-	6	<input type="checkbox"/>	1:Stand...	1:Stand...	---
00	003	Machine stiffness ...	0-	31	<input type="checkbox"/>	13	19	---
00	004	Inertia ratio	0-	10000	<input type="checkbox"/>	0	1	%
00	008	Command pulse ...	0-	0	<input type="checkbox"/>	0	0	After ...
00	009	1st numerator of e...	1-	1	<input type="checkbox"/>	1	1	---
00	010	Denominator of el...	1-	1	<input type="checkbox"/>	1	1	---
00	011	Output pulse coun...	1-	2097152	<input type="checkbox"/>	2500	2500	Before...
00	012	Reversal of pulse...	0-	3	<input type="checkbox"/>	0 Enco...	0 Enco...	---
00	013	1st torque limit	0-	500	<input type="checkbox"/>	300	300	%
00	014	Position deviation...	0-	1073741824	<input type="checkbox"/>	83886080	83886080	Unit...
00	015	Absolute encoder...	0-	4	<input type="checkbox"/>	1	1	---
00	016	Encoder resolution	0-	0	<input type="checkbox"/>	24144	24144	---

7. Transfer the new value to the driver by selecting the “Trans” icon:



6 Start drive control

6.1 Install TwinCAT 3 Engineering on your PC

To control the servo drive system, you must install the TwinCAT 3 Engineering software and the Panasonic ESI file on your PC.

We highly recommend that you use a PC without security software (e.g. McAfee) because TwinCAT 3 Engineering needs access to the kernel. Security checks could cause blue screen errors and damage to your files.

1. Unzip the downloaded software package and execute the installation file.
2. Reboot your PC.
3. After the reboot, copy the Panasonic ESI file (Panasonic_MINAS_A6Multi_V*.xml) to C:\TwinCAT\3.1\Config\Io\EtherCAT on your PC.

The download links can be found under [Available software](#) (page 5).

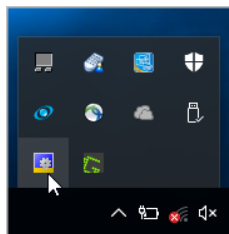
6.2 Before starting TwinCAT 3

1. Before you start the TwinCAT 3 Engineering software, execute the batch file C:\TwinCAT\3.1\System\win8settick.bat to avoid a system clock setup error. You must execute this file as an administrator.
2. Reboot your PC.

6.3 Create a new TwinCAT project

Before you can connect your PC to the Beckhoff C6015 host controller, you must create a new project in TwinCAT 3.

1. Select the TwinCAT icon in the taskbar to start the TwinCAT 3 Engineering software.

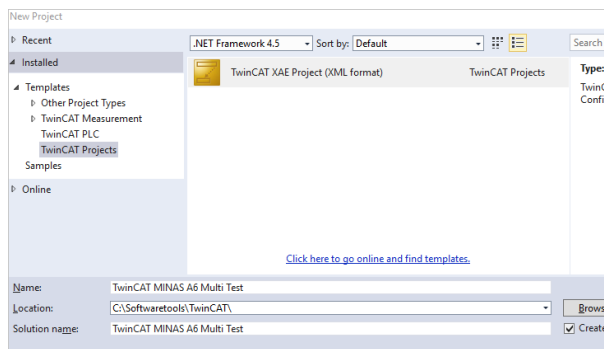


2. Select "TwinCAT XAE (VS2013)".

- On the “Start Page” select “New TwinCAT Project...”.



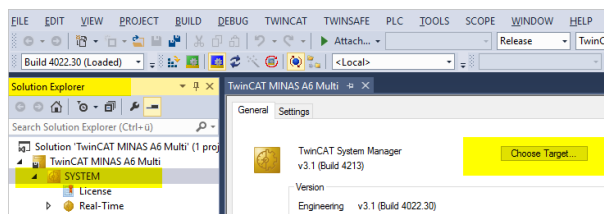
- Select “TwinCAT XAE Project (XML format)”, enter a project, and select “OK”.



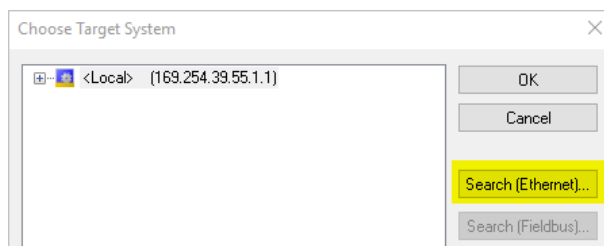
6.4 Connect your PC to the host controller

To establish a connection to the Beckhoff C6015 host controller, send a broadcast request for an IP address to the devices in the EtherCAT network.

- In the “Solution Explorer”, go to “SYSTEM” and select the “Choose Target” button.



- Select “Search (Ethernet)”.



- Under “Address Info”, select “IP Address” and select the “Broadcast Search” button to display the connected EtherCAT devices.

The 'Add Route Dialog' window is shown. At the top, there is a text field 'Enter Host Name / IP:' and two buttons: 'Refresh Status' and 'Broadcast Search' (highlighted in yellow). Below this is a table with columns: Host Name, Connected, Address, AMS NetId, TwinCAT, OS Version, and Comment. The table is currently empty. Below the table, there are several configuration fields: 'Route Name (Target):', 'AmsNetId:', 'Transport Type:' (set to TCP_IP), 'Address Info:' with radio buttons for 'Host Name' and 'IP Address' (selected and highlighted in yellow), 'Connection Timeout (s):' (set to 5), and 'Max Fragment Size (kByte):' (set to 0). On the right side, there are fields for 'Route Name (Remote):' (set to SYS003), 'Target Route' (radio buttons for Project, Static (selected), and Temporary), and 'Remote Route' (radio buttons for None, Static (selected), and Temporary). At the bottom right are 'Add Route' and 'Close' buttons.

- Select the host controller and select “Add Route”.

The 'Add Route Dialog' window is shown. The 'Broadcast Search' button is now disabled. The table below the search fields now contains two entries:

Host Name	Connected	Address	AMS NetId	TwinCAT	OS Version	Comment
CP-453CF8		192.168.1.50	169.254.128.14...	3.1.4022	Windows (1...	
Sys003		192.168.1.1	169.254.39.55.1.1	3.1.4022	Windows (1...	

 The first row (CP-453CF8) is highlighted in yellow. Below the table, the configuration fields are the same as in the previous screenshot, but the 'Connection Timeout (s):' is now set to 4. The 'Add Route' button is highlighted in yellow.

- Enter the login data for the host controller. The default password is "1". Select “OK”.

The 'Logon Information' dialog box is shown. It contains a message: 'Enter a user name and password that is valid for the remote system.' Below this are two input fields: 'User name:' (containing 'Administrator') and 'Password:' (containing a single dot). At the bottom, there is a checked checkbox labeled 'Encrypt Password (TwinCAT 3 only)'.

The system is now establishing a connection to the host controller.

- Check the connection between your PC and the host controller: An “X” means that the PC is connected to the host controller. Select “Close” to close the window and confirm with “OK”.

The 'Add Route Dialog' window is shown. The 'Broadcast Search' button is disabled. The table now shows the connection status for the host controller:

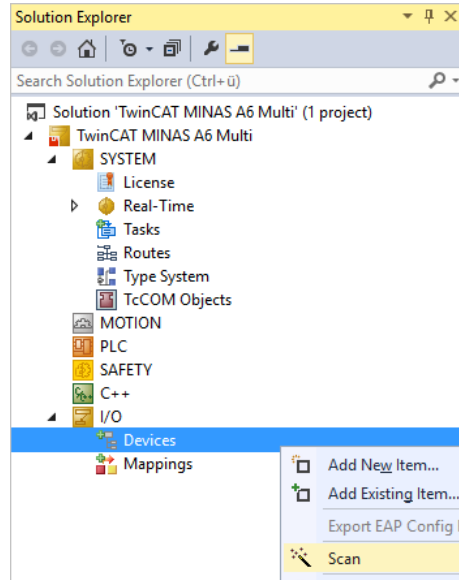
Host Name	Connected	Address	AMS NetId	TwinCAT	OS Version	Comment
CP-453CF8	X	192.168.1.50	169.254.128.14...	3.1.4022	Windows (1...	
Sys003		192.168.1.1	169.254.39.55.1.1	3.1.4022	Windows (1...	

 The 'Connected' column for CP-453CF8 now contains an 'X'. The 'Add Route' button is no longer highlighted.

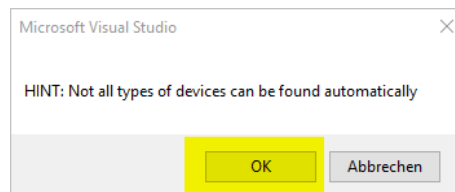
6.5 Add connected devices to your project

You must add the connected devices to your TwinCAT project.

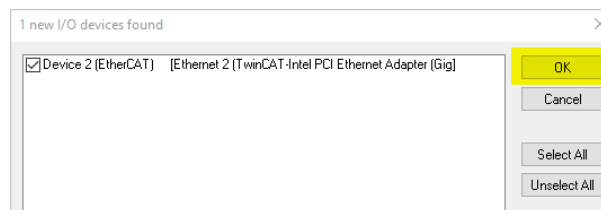
1. In the “Solution Explorer”, go to “I/O” and right-click on “Devices”. Select “Scan”.



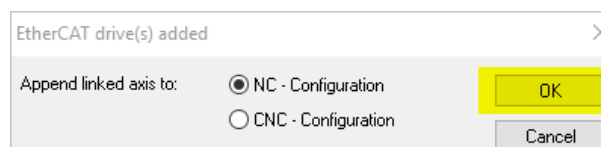
2. Confirm the message that not all devices can be found automatically.



3. When the EtherCAT master device is found, select “OK”.

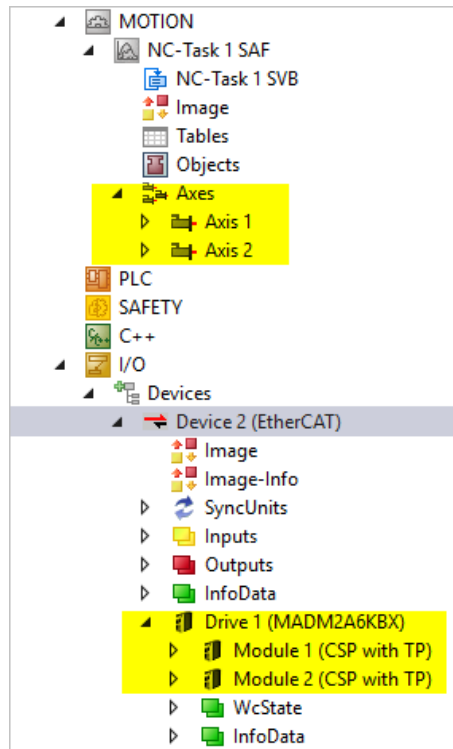


4. Confirm “Scan for boxes” with “Yes”.
5. When the MINAS A6 Multi driver module is found, the following message comes up that you confirm with “OK”.



6. Confirm the message “Activate Free Run” with “No”.

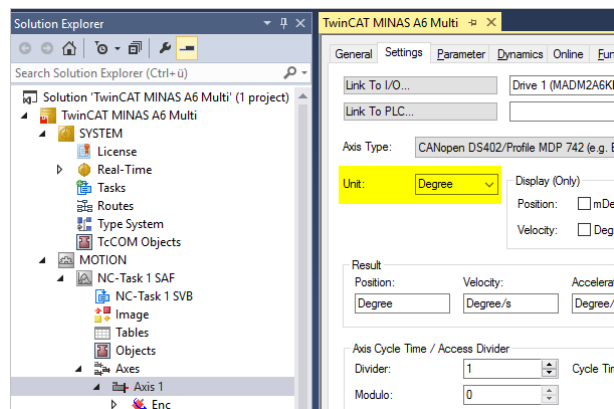
- The “Solution Explorer” displays the added driver module with its two connected motors under “I/O” > “Devices”. It also displays all found axes under “MOTION” > “NC-Task 1 SAF”.



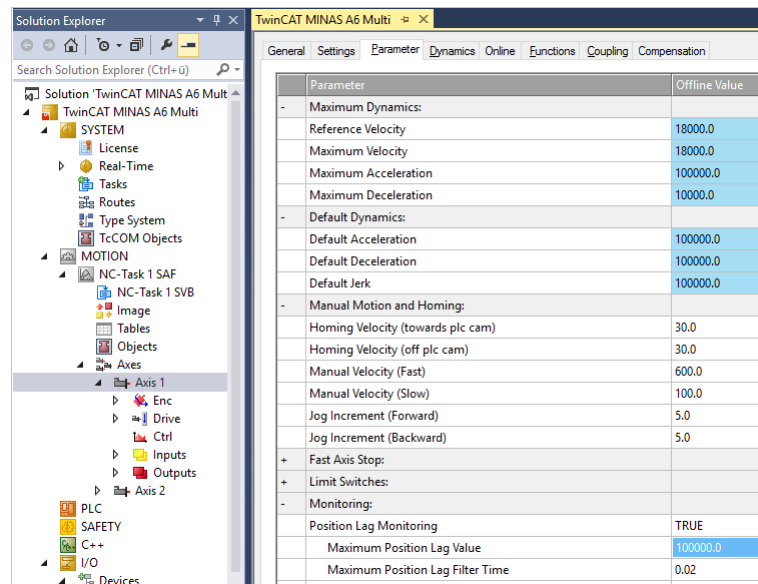
6.6 Set the movement parameters

Set the movement parameters and make general settings and encoder settings for each axis.

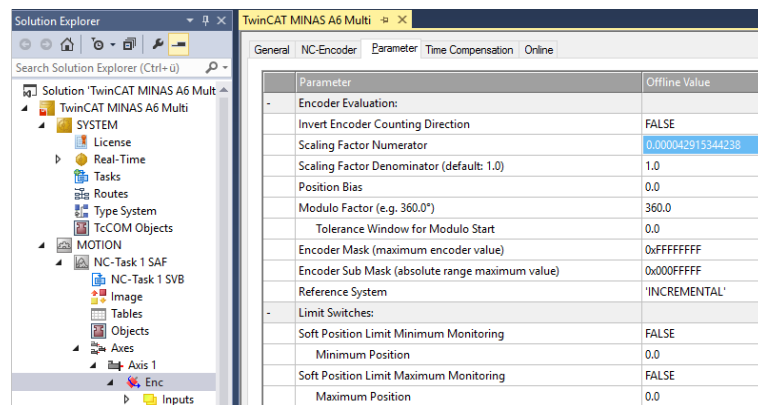
- Go to “Solution Explorer” > “MOTION” > “NC-Task 1 SAF” > “Axes” > “Axis 1”. Select the “Settings” tab.
- In this example, change the unit to “Degree”.



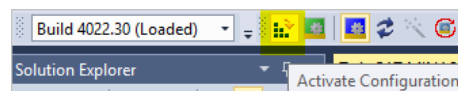
- Select the “Parameter” tab and set the values for velocity, acceleration, deceleration, jerk, and lag error (highlighted in the screenshot in blue color).



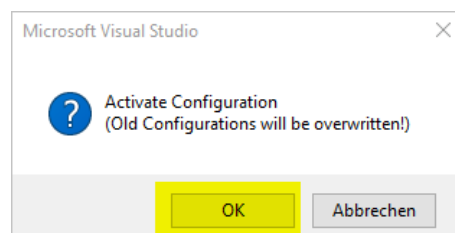
- Go to “Solution Explorer” > “MOTION” > “NC-Task 1 SAF” > “Axes” > “Axis 1” > “Enc”. Select the “Parameter” tab.
- Set the desired scaling factor for the encoder.
For example, set $360^\circ/8388608=0.00004291534423828125$ for a motor rotation of 8388608 pulses/rotation.



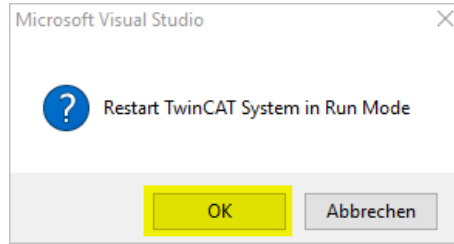
- Repeat the steps for axis 2.
- Select the “Activate Configuration” icon from the toolbar.



- Confirm the message that the new configuration will be activated and old configurations will be overwritten.



9. Confirm the message that the TwinCAT system will be restarted in run mode.



The TwinCAT system is now in run mode and the corresponding icon is active.



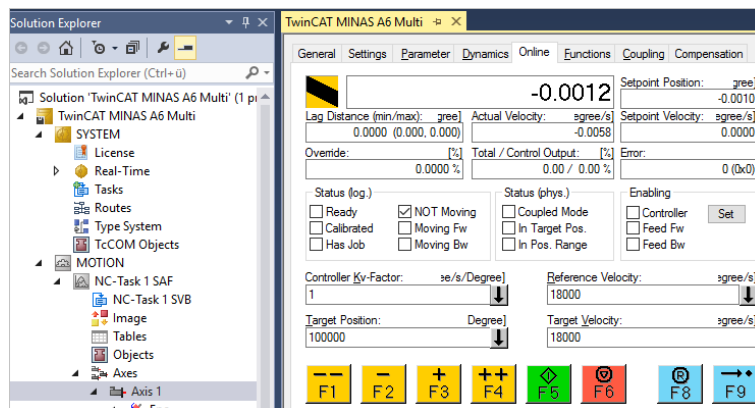
(To switch back to configuration mode, select the blue icon on the right of the green icon.)

10. If the TwinCAT system does not switch to run mode and a system clock setup error occurs, execute the batch file `win8settick.bat`. Refer to [Before starting TwinCAT 3](#) (page 16) for details.

6.7 Start position control

Use the “Online” tab to manually start and to check the motor movement.

1. Go to “Solution Explorer” > “MOTION” > “NC-Task 1 SAF” > “Axes” > “Axis 1”. Select the “Online” tab.



2. Select “Set” and “All” to activate position control.

The screenshot shows the 'Coupling' tab of a software interface. The main display area shows a large number '0.0726' and a smaller number '0.0098'. Below these, there are fields for 'Setpoint Position' (0.0705), 'Setpoint Velocity' (0.0000), and 'Error' (0 (0x0)). There are also checkboxes for 'Status (phys.)' (Coupled Mode, In Target Pos., In Pos. Range) and 'Enabling' (Controller, Feed Fw, Feed Bw). A yellow 'Set' button is highlighted. A 'Set Enabling' dialog box is open, showing checkboxes for 'Controller', 'Feed Fw', and 'Feed Bw', with an 'All' button highlighted.

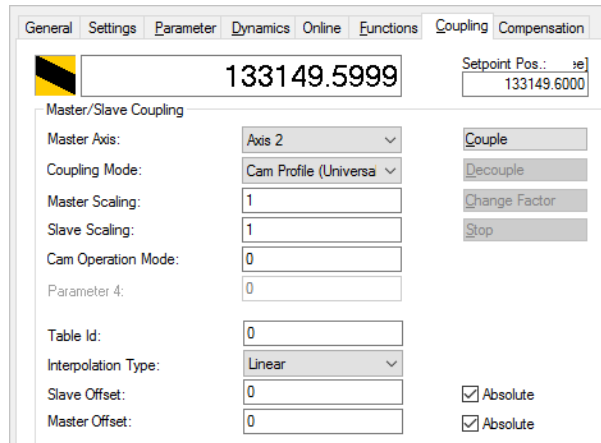
3. From the “Online” tab, you can now start JOG operations, absolute value control, home return operations, etc.

The screenshot shows the 'Online' tab of a software interface. It displays 'Target Position' (100000) and 'Target Velocity' (18000). Below these are buttons for F1 to F9. A legend below the buttons explains their functions: F1 to F4: jogging the axis; F5: absolute movement; F6: stopping the axis; F8: Reset error; F9: Homing.

4. From the “Functions” tab you can test relative value control, endless movement, etc. by changing the acceleration, deceleration, and jerk values.

The screenshot shows the 'Functions' tab of a software interface. It displays 'Extended Start' settings with 'Start Mode' set to 'Relative'. Below this are fields for 'Target Position' (80000), 'Target Velocity' (18000), 'Acceleration' (100000), 'Deceleration' (100000), and 'Jerk' (100000). There are also fields for 'Output Mode' (Percent) and 'Output Value' (0). At the bottom, there are fields for 'Set Actual Position' and 'Set Target Position', both set to 'Absolute' and '0'.

5. Use the “Coupling” tab to test electronic coupling, cam profiles, flying saw, etc.



The screenshot shows the 'Coupling' tab of a drive control software interface. At the top, there are tabs for General, Settings, Parameter, Dynamics, Online, Functions, Coupling, and Compensation. The 'Coupling' tab is active. Below the tabs, there is a large numerical display showing '133149.5999'. To the right of this display, there is a 'Setpoint Pos.: [] [e]' field with the value '133149.6000'. Below these, there is a section titled 'Master/Slave Coupling'. This section contains several parameters and controls:

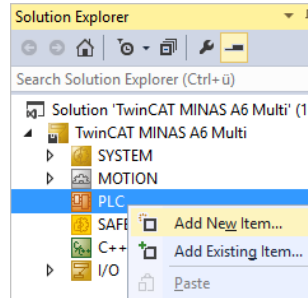
- Master Axis:** A dropdown menu set to 'Axis 2'.
- Coupling Mode:** A dropdown menu set to 'Cam Profile (Universal)'.
- Master Scaling:** A text input field with the value '1'.
- Slave Scaling:** A text input field with the value '1'.
- Cam Operation Mode:** A text input field with the value '0'.
- Parameter 4:** A text input field with the value '0'.
- Table Id:** A text input field with the value '0'.
- Interpolation Type:** A dropdown menu set to 'Linear'.
- Slave Offset:** A text input field with the value '0'.
- Master Offset:** A text input field with the value '0'.

On the right side of the 'Master/Slave Coupling' section, there are several buttons: 'Couple', 'Decouple', 'Change Factor', and 'Stop'. Additionally, there are two checkboxes, both of which are checked: 'Absolute' (next to Slave Offset) and 'Absolute' (next to Master Offset).

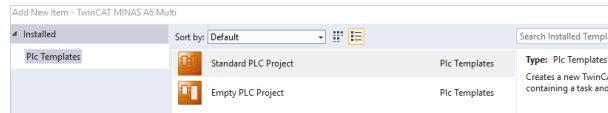
7 Create a PLC program with motion control functions (optional)

To program a positioning task, use one of the libraries included in TwinCAT 3.

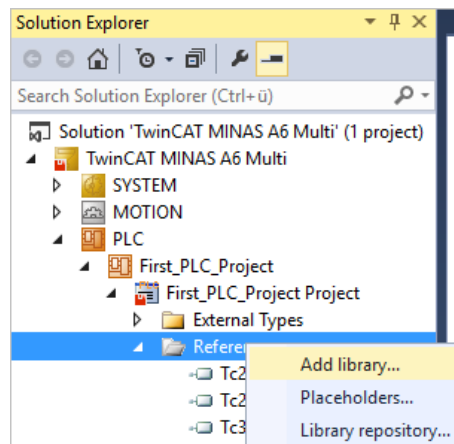
1. In the “Solution Explorer”, right-click “PLC” and select “Add New Item”.



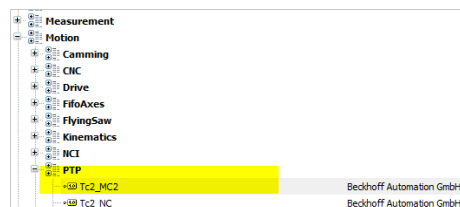
2. Select “Standard PLC Project”, enter a name for your new PLC project, and select “Add”.



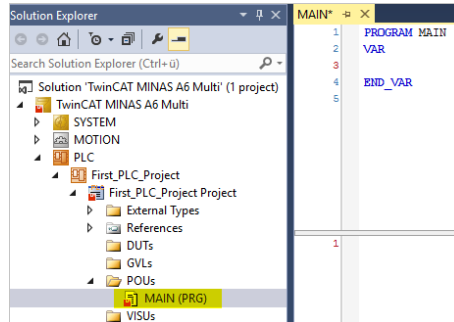
3. Go to “Solution Explorer” > “PLC” > “First_PLC_Project”. Right-click “References” and select “Add library”.



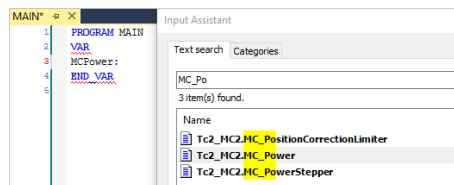
4. Add the library Tc2_MC2.



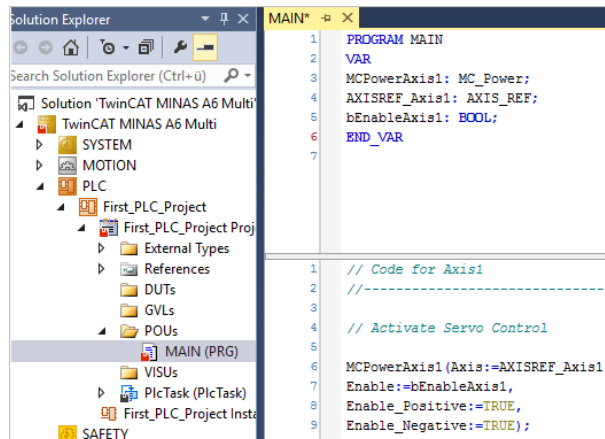
5. Go to “Solution Explorer” > “PLC” > “First_PLC_Project” > “POUs” > “MAIN (PRG)”.



6. In this example, we will enable the servo control for axis 1. Press F2 to open the “Input Assistant” which helps you to find the desired PLCopen function in the TwinCAT library.
7. Select the function **Tc2_MC2.MC_Power** and select “OK”. Then add the **AXIS_REF** structure in the same manner.



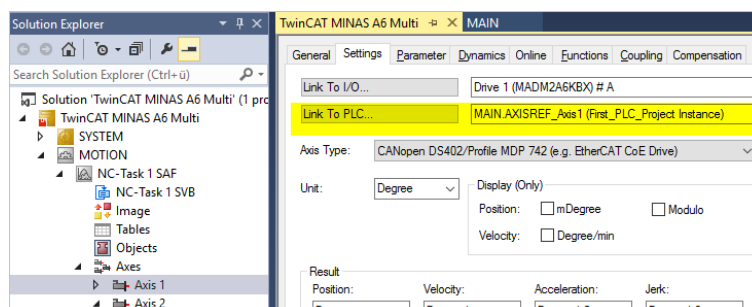
The example program you created should look like this:



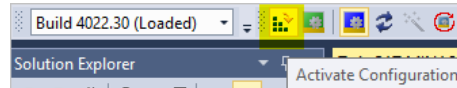
8. Select “BUILD” > “Build Solution” to compile the project.



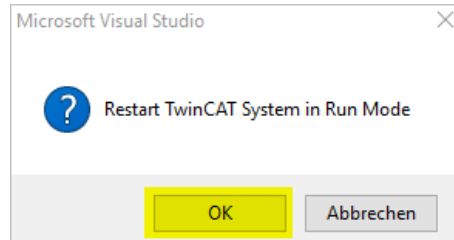
9. Assign a connection to “Axis 1”. Click the “Link To PLC...” button to select the **AXISREF_Axis1** structure from your PLC program.



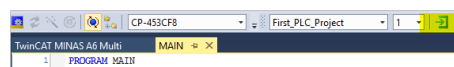
10. Activate the configuration.



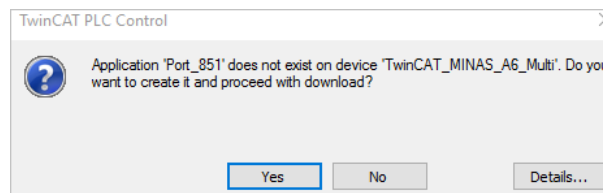
11. Confirm the message that the TwinCAT system will be restarted in run mode.



12. Select the "Login" icon from the toolbar.

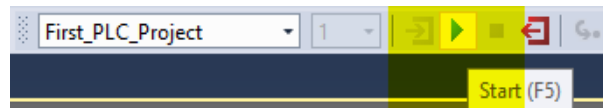


13. Select "Yes" to create port 851.

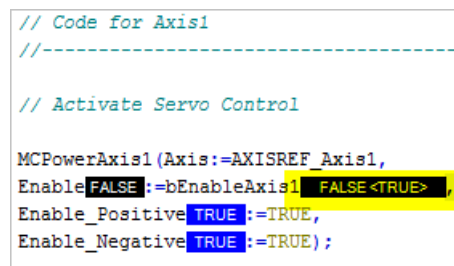


If an error occurs, try again by selecting the "Login" icon.

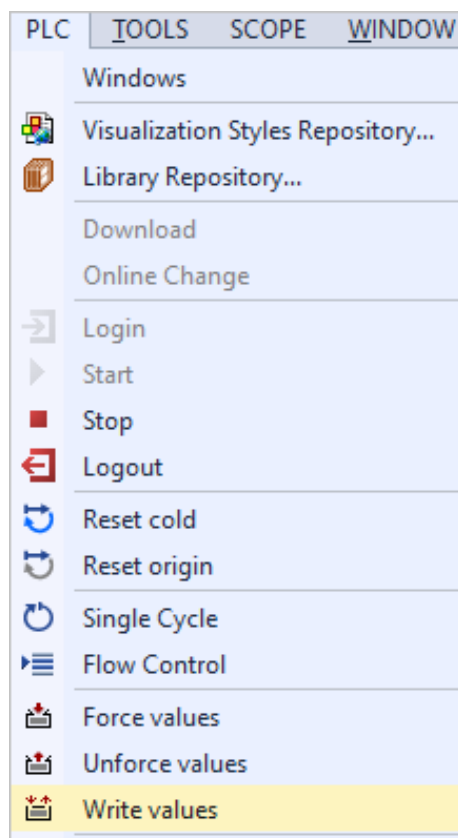
14. Select the highlighted "Start" icon to start the PLC program.



15. Double-click on the value of **bEnableAxis1** to set the variable to TRUE.



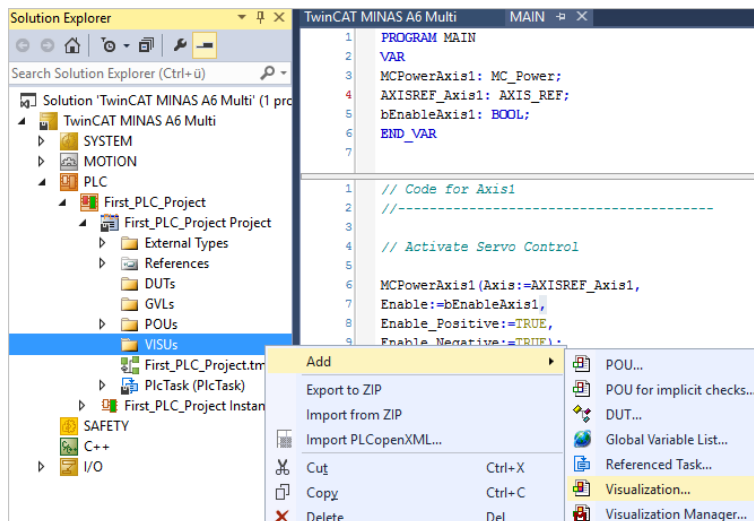
16. Select "PLC" > "Write values" to write the value and to enable servo control of the motor.



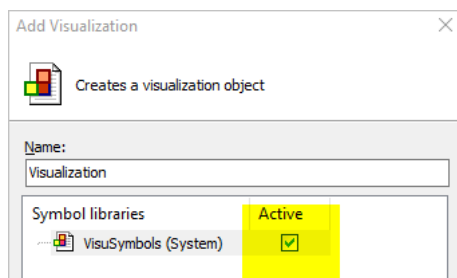
8 Add visual controls to your PLC program (optional)

To enhance your PLC program, you can add visual controls, e.g. a button to enable servo control.

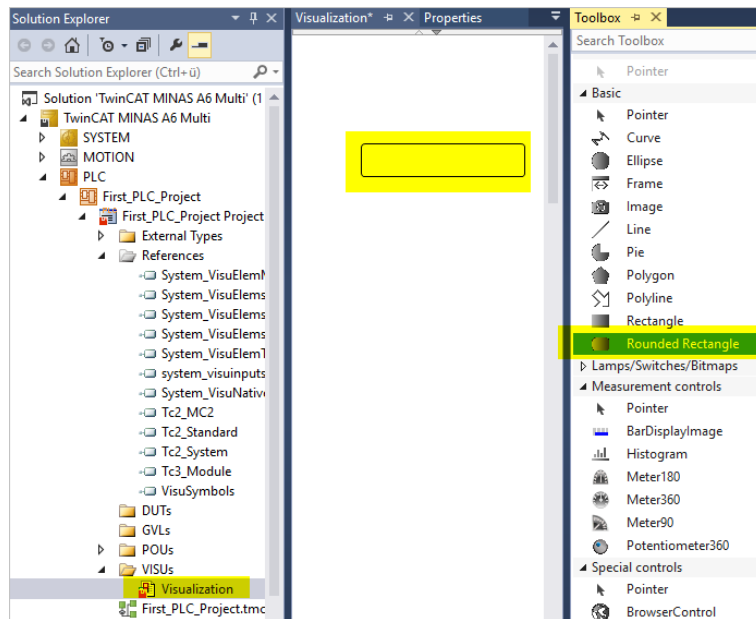
1. Go to “Solution Explorer” > “PLC” > “First_PLC_Project” > “First_PLC_Project Project”. Right-click on “VISUs” and select “Add” > “Visualization”.



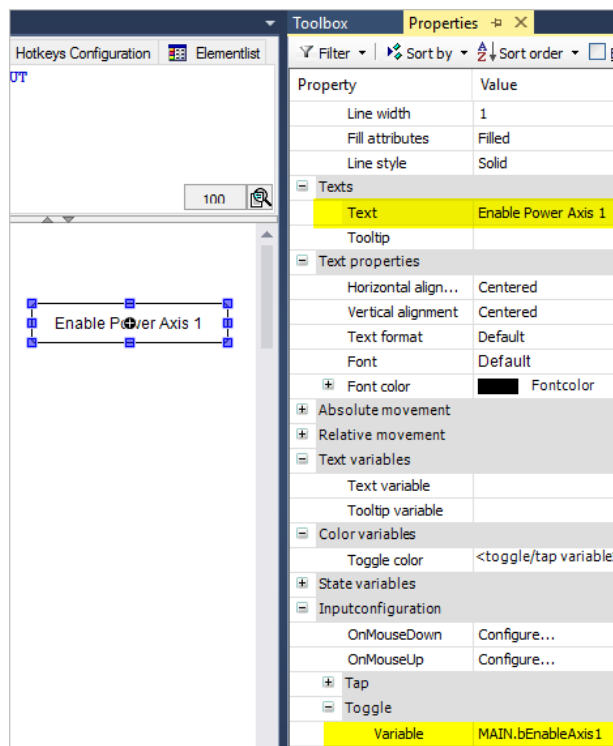
2. Select “VisuSymbols (System)” and then “Open”.



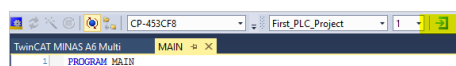
- Double-click on "Visualization". From the "Toolbox", select "Rounded Rectangle" and place the form in the "Visualization" screen.



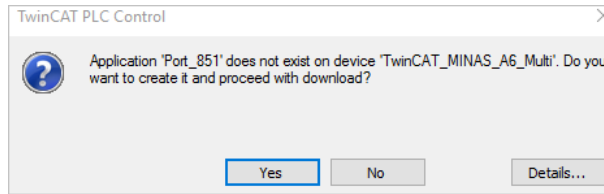
- Use the "Properties" window to enter a text in the rectangle and add the variable **bEnableAxis1** from your main PLC program.



- Select the "Login" icon from the toolbar.

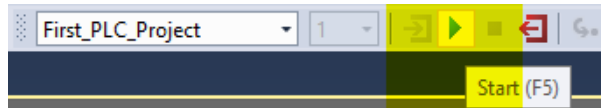


6. If the following message appears, select “Yes” to create port 851.

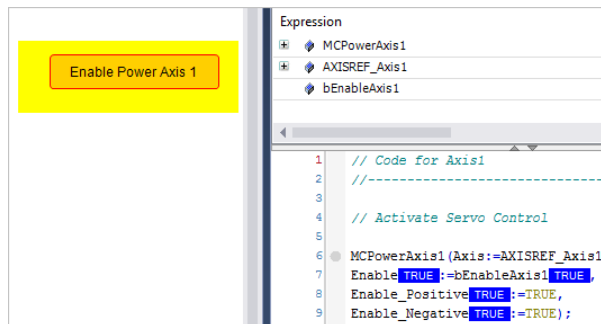


If an error occurs, try again by selecting the “Login” icon.

7. Start the PLC program.



8. Select “Enable Power Axis 1” to enable servo control.



Servo control for axis 1 is now enabled.

9 Help us improve

Please feel free to contact us if you have any questions, or if you have any suggestions for improvement. In that case, we ask you to include the Quick Start Guide number in the email subject line. You can find the number starting with "QS" on the cover page.

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10 Record of changes

QS1000_V1.1_EN, 2020.11

- Updated links.
- Changed title.

QS10000_V1.0_EN, 2020.01

First edition

11 Panasonic hotline

If you have questions that cannot be clarified by the manuals or online help, please contact your sales office.

Europe

Austria:	02236 / 2 68 46, info.pewat@eu.panasonic.com
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