

Servo Drives

Quick Start Guide MINAS A6 Multi

PANATERM
Ethernet over EtherCAT (EoE)



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Table of contents

1 Introduction	4
1.1 Before you start.....	4
1.2 About this document.....	4
1.3 Related documents.....	4
1.4 Available software.....	5
2 Functional overview	6
3 Wiring	8
3.1 Basic wiring of the MINAS A6 Multi.....	8
3.2 Connect the EtherCAT communication cable.....	8
4 Set up the host controller	9
4.1 Set the IP address in your PC.....	9
4.2 Check the EtherCAT driver installation.....	9
4.3 Add connected devices to your project.....	9
4.4 Activate the EoE functionality in your TwinCAT project.....	11
5 Connect PANATERM via EoE	13
6 Activate the TwinCAT Runtime software license	14
7 Help us improve	15
8 Record of changes	16
9 Panasonic hotline	17

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.

A PC can be used as a host controller to perform Ethernet communication via EtherCAT (EoE) with a MINAS A6 Multi servo drive system. Step by step instructions will guide you through installing Beckhoff’s TwinCAT 3 software to configure the EtherCAT functionality on your PC. And you will learn how to connect the PC configuration software PANATERM with the MINAS A6 Multi servo drive system via 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:
“QS10000, MINAS A6 Multi, Position control with Beckhoff host controller over EtherCAT”
“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
- Panasonic ESI file

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

- 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).

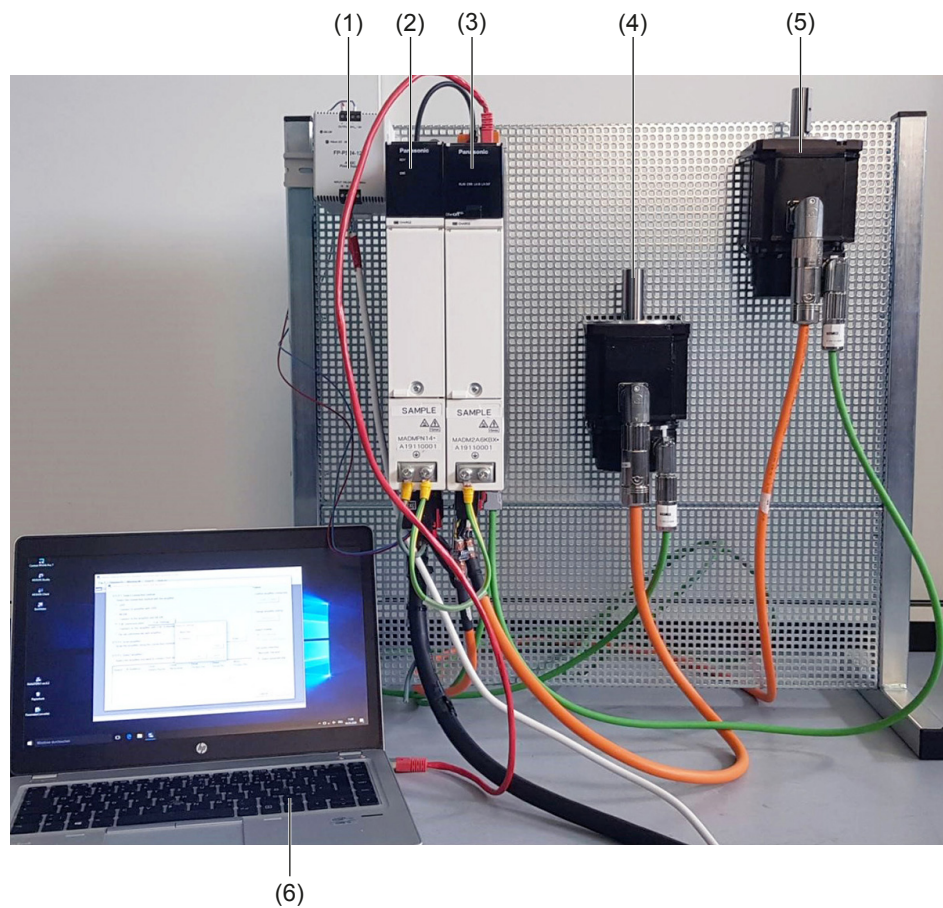
With Beckhoff's TwinCAT 3 software, a PC can be configured as an EtherCAT host controller. The PC configuration software PANATERM is used to perform the communication with the MINAS A6 Multi servo drive system.

Example

A servo drive system, consisting of a 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 PC by an Ethernet cable to communicate via EoE.

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 (RJ45)
Connects the PC 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) MINAS A6 Multi power supply module (400V AC, 15kW)
- (3) Two-axis MINAS A6 Multi driver module (1.5kW)
- (4) MINAS A6 servo motor B (1.5kW)
- (5) MINAS A6 servo motor A (1kW)
- (6) PC with TwinCAT 3 Engineering software and PANATERM

Set-up of a MINAS A6 Multi servo drive system - Ethernet over EtherCAT with PANATERM

3 Wiring

3.1 Basic wiring of the MINAS A6 Multi

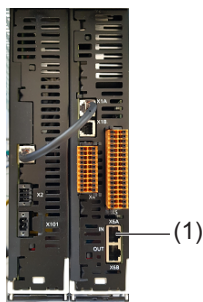
Check the hardware connections of your servo drive system:

- 24V DC control power supply connected to X11
- 400V AC main power supply cable connected to X102
- Motor cable for servo motor A connected to X105A
- Motor cable for servo motor B connected to X105B
- Encoder cable for servo motor A connected to X9A
- Encoder cable for servo motor B connected to X9B
- X1 and X1A connected with RJ11 communication cable
- Bus bars attached to X104 and X12
- PE terminals of power supply module and driver module connected by grounding wire

For details on how to do the wiring of the MINAS A6 Multi servo drive system, refer to “Wiring” in [“QS10000, MINAS A6 Multi, Position control with Beckhoff host controller over EtherCAT”](#).

3.2 Connect the EtherCAT communication cable

Connect an Ethernet cable between the PC and the EtherCAT connector (X6A) of the driver module. The connector is located on the top side of the driver module.



(1) X6A: EtherCAT connector on driver module

4 Set up the host controller

4.1 Set the IP address in your PC

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

Example:

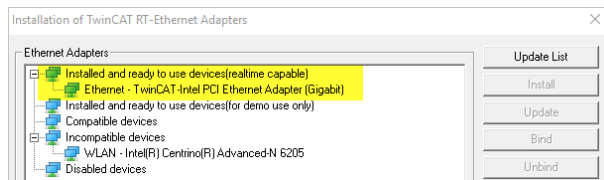
IP address: 192.168.0.100

Subnet mask: 255.255.255.0

4.2 Check the EtherCAT driver installation

The EtherCAT driver is installed with TwinCAT 3. Check whether the Ethernet interface of the PC is correctly configured as an EtherCAT interface.

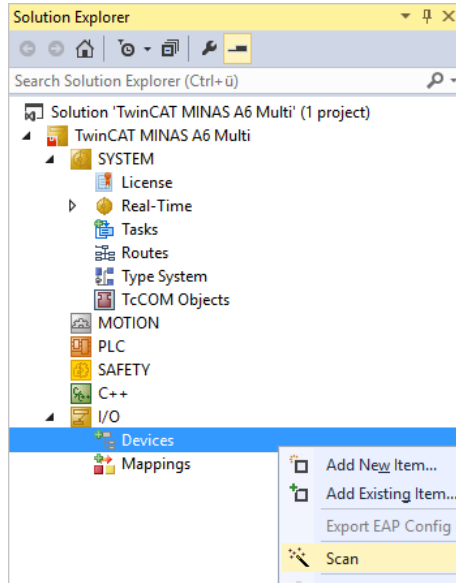
1. Select “TwinCAT” > “Show Real Time Ethernet Compatible Devices” in the TwinCAT 3 toolbar.
2. Make sure the Ethernet network adapter is displayed under “Installed and ready to use devices (realtime capable)”.



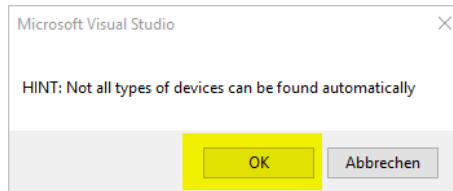
4.3 Add connected devices to your project

You must add the connected devices to your TwinCAT project.

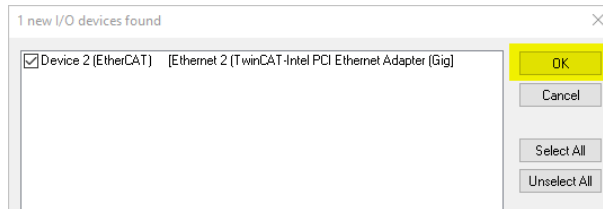
1. In the “Solution Explorer”, go to “I/O” and right-click on “Devices”. Select “Scan”.



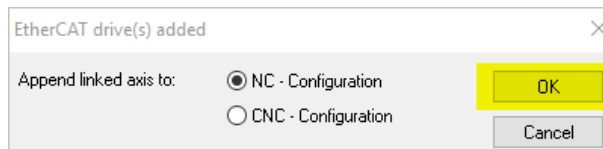
2. Confirm the message that not all devices can be found automatically.



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

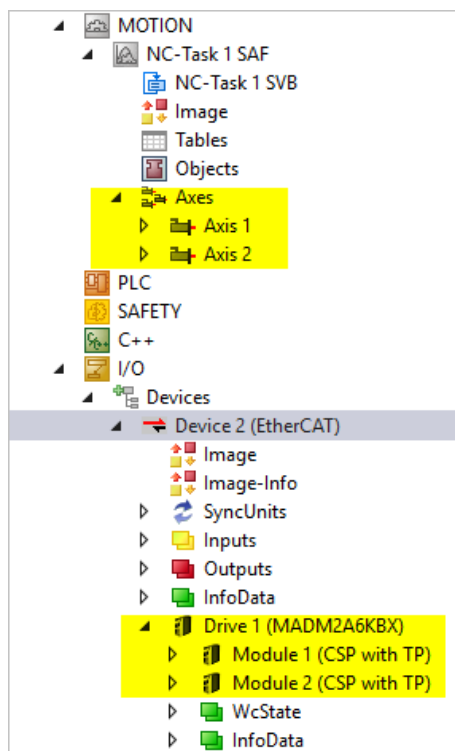


4. Confirm “Scan for boxes” with “Yes”.
5. When the MINAS A6 Multi driver module is found, the following message comes up that you confirm with “OK”.



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”.

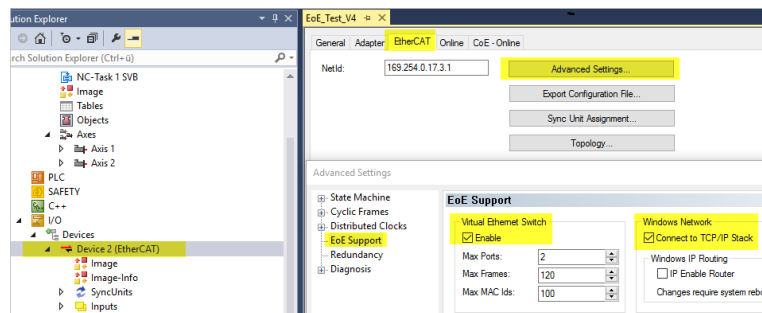


4.4 Activate the EoE functionality in your TwinCAT project

You must activate the EoE functionality for the EtherCAT master and slave.

Make settings for the EtherCAT master:

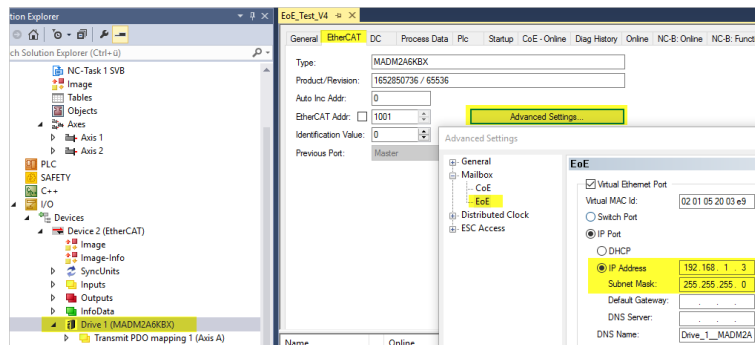
- In the “Solution Explorer”, go to “Device2 (EtherCAT)” > “EtherCAT” > “Advanced Settings” > “EoE Support”.
- Select “Enable” under “Virtual Ethernet Switch”.
- Select “Connect to TCP/IP Stack” under “Windows Network”.



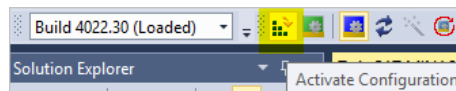
Make settings for EtherCAT slave:

- In the “Solution Explorer”, select “Drive1(MADM2A6KBX)” > “EtherCAT” > “Advanced Settings” > “EoE”.

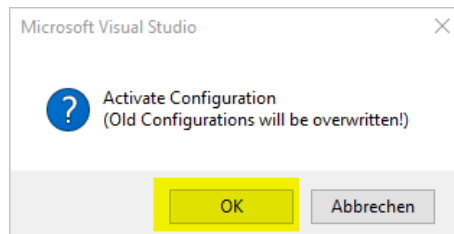
- Set the IP address and subnet mask in the “EoE” section. Make sure the IP addresses of the MINAS A6 Multi driver module and the PC are in the same subnet.



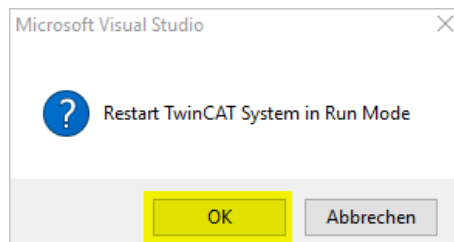
- Select the “Activate Configuration” icon from the toolbar.



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



- 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.



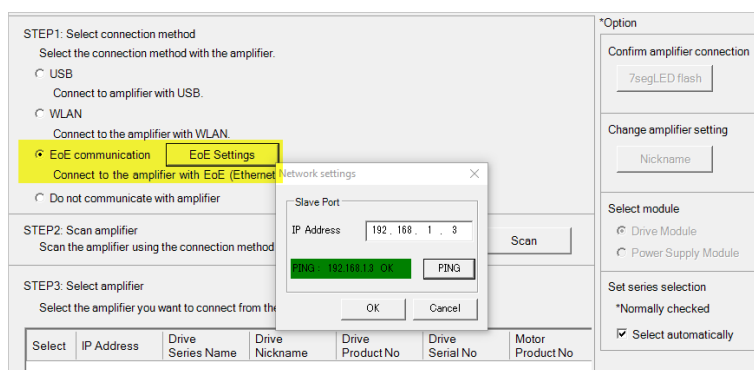
(To switch back to configuration mode, select the blue icon on the right of the green icon.)

- If the TwinCAT system does not switch to run mode and a system clock setup error occurs, execute the batch file `C:\TwinCAT\3.1\System\win8settick.bat`. You must execute this file as an administrator. Then reboot your PC.
- Reboot the driver module to update the IP address.

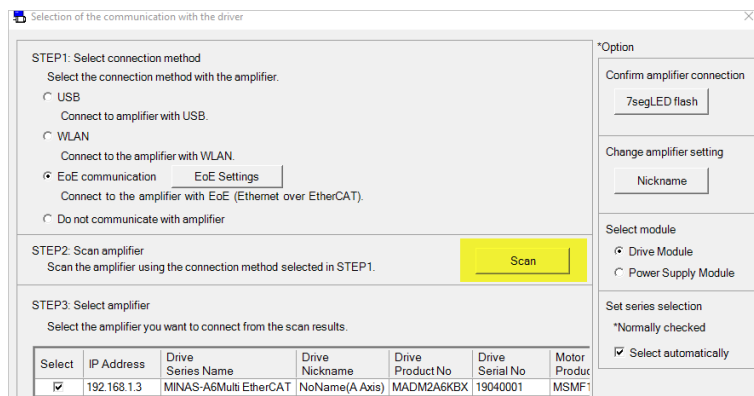
5 Connect PANATERM via EoE

The system is now ready to perform EoE communication with the PC configuration software PANATERM.

1. Start PANATERM and select “EoE communication”.
2. Select “EoE Settings”.
3. Enter the IP address of the MINAS A6 Multi driver module you want to connect to.
4. Select “PING” to test the connection between the PC and the driver module.
5. Select “OK”.



6. Select “Scan” to search for the driver module. Then select the driver module and close the window with “OK”.

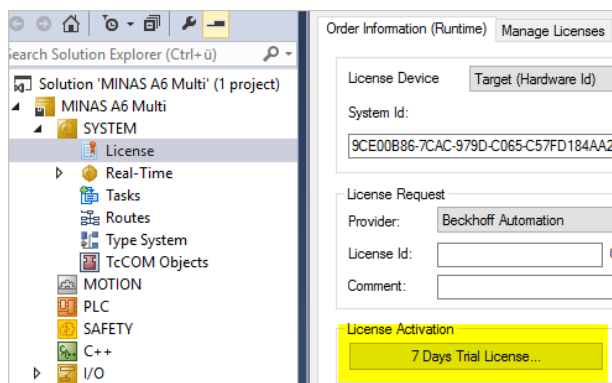


The EoE connection between PANATERM and the driver module has now been established.

6 Activate the TwinCAT Runtime software license

The TwinCAT Runtime software is free of charge for 7 days. The trial license can be renewed as needed.

1. Go to “Solution Explorer” > “SYSTEM” > “License” and select the licenses needed for your project from the “Manage Licenses” tab.
2. Go to the “Order Information (Runtime)” tab and select “7 Days Trial License”.



3. Enter the security code to activate the libraries and select “OK”.

When the license file has been generated, a message appears. The license is valid for 7 days.

7 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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8 Record of changes

QS10001_V1.0_EN, 2020.11

First edition

9 Panasonic hotline

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

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