Panasonic

Servo Drives

Quick Start Guide

Position control in EtherCAT networks (MINAS A5B/A6B)

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1 Introduction

1.1 Before you start

Before operating this product, read the safety instructions in the related *Operating Instructions*.

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 servo drive system. It is based on information from the MINAS series manuals and the practical experience of our engineers.

Step-by-step instructions will guide you through connecting an FP7 EtherCAT Motion Controller to a MINAS servo driver.

1.3 Related documents

Please refer to the original servo drive manuals for detailed information. Click on the following links to download the documents from our Panasonic Download Center.

- Information on wiring, position control, and parameters:

  For MINAS A5:

  Operating Instructions (Overall) AC Servo Motors & Driver MINAS A5 series

  Reference Specifications MINAS A5BA1/A5B01 Series DSV02471

  Functional specification for MINAS A5B series SX-DSV02472

  Technical Reference – EtherCAT Communication Specifications MINAS A5B Series SX-DSV02473

  For MINAS A6:

  Operating Instructions (Overall) AC Servo Motors & Driver MINAS A6 series

  Reference specifications MINAS A6B/A6F Series SX-DSV03190

  Technical reference - Functional Specification MINAS A6B Series SX-DSV03241

  Technical Reference – EtherCAT Communication Specification for MINAS A6B series SX-DSV03242

- Information on how to reduce electromagnetic interference (EMI):

Recommendations for EMC-compliant wiring of servo drivers and motors

- Other Quick Start Guides:

  QS2000, Position control by pulse and direction signals (MINAS A5/A5E/A6SG/A6SF)

  QS2001, Position control by block operation using input signals (MINAS A6SG/A6SF)

  QS2002, Position control by block operation using Modbus commands (MINAS A6)

  QS2004, Position control using RTEX (MINAS A5N/A6N)

  QS3000, Velocity control (MINAS A5/A6F)

  QS4000, Torque control (MINAS A5/A6)

  QS5000, PANATERM - Trial run

  QS5001, PANATERM - Auto-tuning

  QS5002, PANATERM - Fit gain tuning

1.4 Available software

The following software is available free of charge in our Panasonic Download Center. Click on the link to start the download.

- PC configuration software PANATERM
- Control Motion Integrator tool

  You can download a trial version. A dongle is required after the 60-day trial period.
- PC programming software Control FPWIN Pro 7
- MC_EtherCAT_Library for Control FPWIN Pro 7

  This programming library was developed for the FP7 EtherCAT unit and offers convenient functions and function blocks for basic positioning tasks.

2 Functional overview

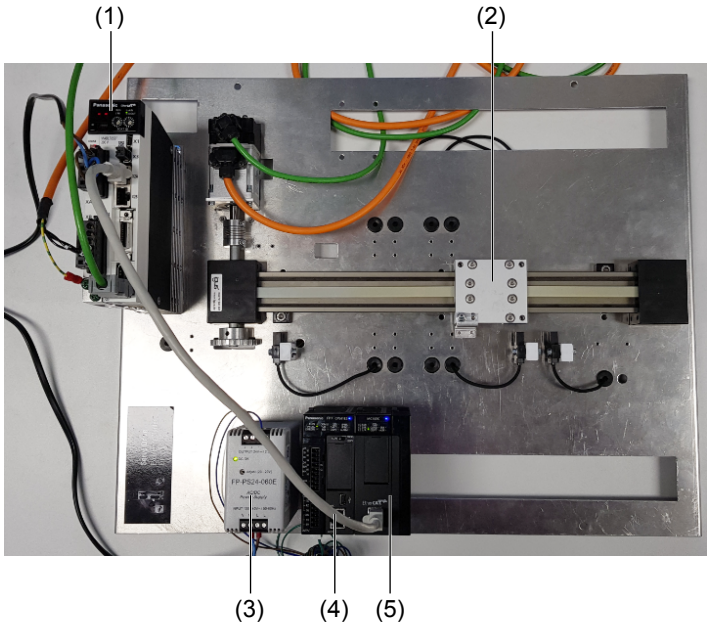
Position control is a control mode in which the motor moves the load to a specified target position.

The servo driver can be controlled via EtherCAT from any host controller which supports EtherCAT communication. This *Quick Start Guide* explains how to wire and configure the servo driver and the host controller to get your system up and running.

Use the Control Motion Integrator to configure the FP7 EtherCAT unit.

Example

The host controller is an FP7 EtherCAT unit. It is connected to a MINAS A6B servo driver by an EtherCAT cable.



(1) MINAS A6B driver
(2) Load to be moved
(3) 24 VDC power supply
(4) EtherCAT cable
(5) FP7 PLC + EtherCAT Motion Controller

Data transmission between motion control unit and servo driver via network cable

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.

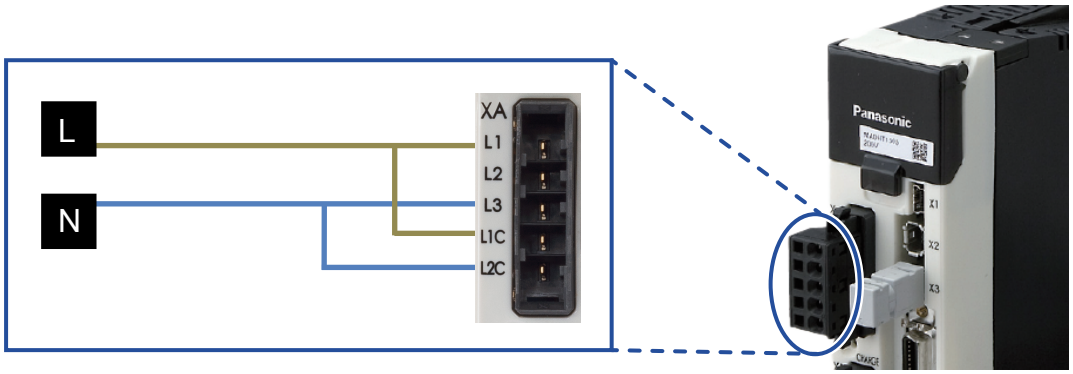
Do not forget to meet the specifications indicated in the hardware manual for each of the devices being wired. If any specifications in the manual conflict with the information in this document, the manufacturer's manual takes preference.

For detailed information on reducing EMI, please refer to *Recommendations for EMC-compliant wiring of servo drivers and motors*.

3.2 Connectors of the servo driver

XA connector (main power connector)

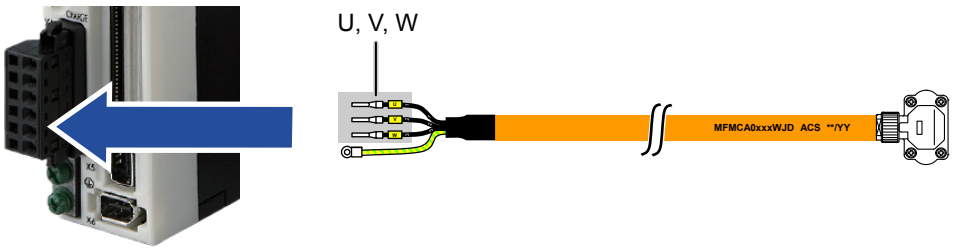
Connect the power supply cable to the XA connector. For a 1-phase power supply of 230V, connect a 2-wire cable to the servo driver as illustrated. The L2 pin is not used in 1-phase mode.



Wiring of the XA connector for a power supply of 230V

XB connector (motor connector)

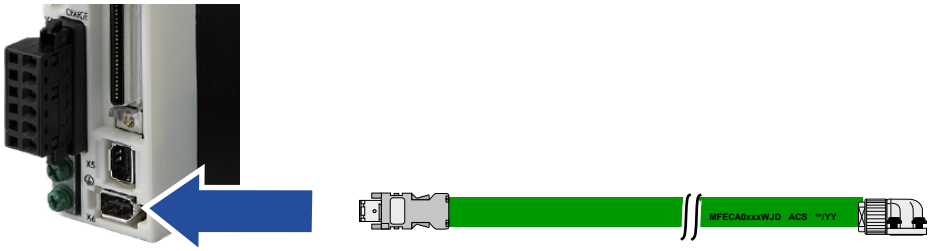
Connect the motor cable to the XB connector. The wires are labeled with the letters U, V, and W. Do not change the sequence of the motor phases, e.g. by connecting V to W.



Wiring of the XB connector for the motor power supply

X6 connector (encoder connector)

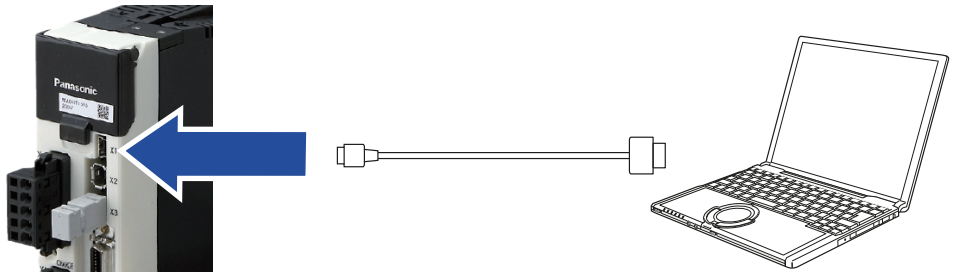
Connect the encoder cable to the X6 connector.



Wiring of the X6 connector for the encoder connection

X1 connector (USB connector for PC connection)

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



Connector X1 for PC connection

X2A connector (EtherCAT connector)

Connect an Ethernet cable to the X2A connector of the MINAS A6B driver and to the EtherCAT port of the FP7 EtherCAT unit.

Connect the FP7 EtherCAT unit to a 24V power supply.

Connector X2A for EtherCAT connection on MINAS A6B

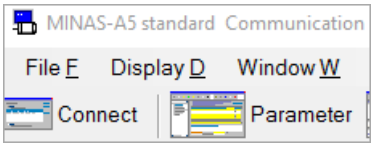
FP7 CPU connected to 24V power supply and FP7 EtherCAT unit with EtherCAT cable

4 Make parameter settings in PANATERM

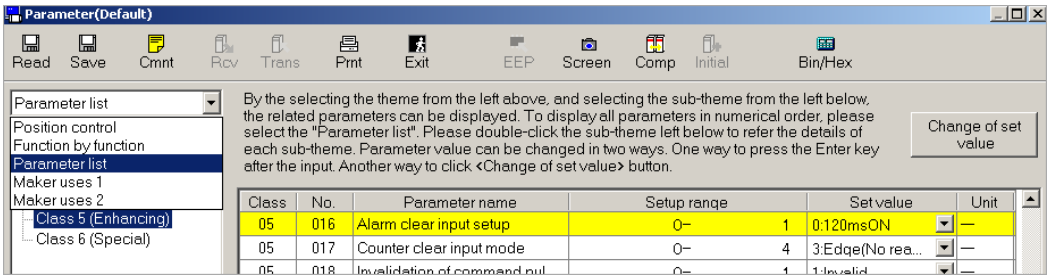
Use the PC configuration software PANATERM to configure the MINAS servo driver.

Click on the following link to download PANATERM from our Panasonic Download Center:
PC configuration software PANATERM

1. Connect your PC to the X1 connector and turn on the servo driver.
2. Start the PANATERM configuration software.
   The software automatically detects the type of servo driver connected.
3. Select “OK” and confirm the connected series by selecting your type of servo driver.
4. Select the “Parameter” tab.



5. In the “Selection of parameter to be read” dialog, select “Read the default”. There is a message if the parameter values in the servo driver are not the default values. To overwrite the parameters in the servo driver, select the “Trans” icon.
6. Select the parameter list for your type of servo driver.

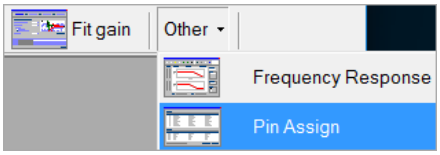


7. To change a parameter setting, select the desired parameter class and enter a value. For parameter descriptions, please refer to the Operating Instructions. You can find each parameter by its unique parameter number. The parameter number is written in the format PrX.YY (X: Class, YY: No.).
   Make sure, that Pr7.40 (Station Alias setup (high)) is set to 0 and Pr7.41 (Station alias selection) is set to 1: SII.
8. Depending on the parameter, select the “Trans” or the “EEP” icon to transfer a setting to the servo driver. For yellow parameters, select the “EEP” icon. The parameters will be saved in the EEPROM of the servo driver. To activate the settings, you need to restart the servo driver.
   All other parameters are transferred simply by selecting the “Trans” icon.

5 Make pin assignments in PANATERM

In EtherCAT networks, the POT and NOT limit switches cannot be used and must be set to “Invalid”.

1. Connect your PC to the servo driver.
2. Start the PANATERM configuration software.
3. Select “Other” > “Pin Assign”.



The current pin assignment is uploaded from the servo driver.

4. Double-click on the lines of pin number 07 (SI2) and 08 (SI3).

Input

Pin number	Position / Full-closed control	Velocity control	Torque control
05 (SI1)	SI-MON5_ConnectA	SI-MON5_ConnectA	SI-MON5_ConnectA
07 (SI2)	POT_ConnectB	POT_ConnectB	POT_ConnectB
08 (SI3)	NOT_ConnectB	NOT_ConnectB	NOT_ConnectB
09 (SI4)	HOME_ConnectA	HOME_ConnectA	HOME_ConnectA
10 (SI5)	EXT1_ConnectA	EXT1_ConnectA	EXT1_ConnectA
11 (SI6)	EXT2_ConnectA	EXT2_ConnectA	EXT2_ConnectA
12 (SI7)	SI-MON3_ConnectA	SI-MON3_ConnectA	SI-MON3_ConnectA
13 (SI8)	SI-MON4_ConnectA	SI-MON4_ConnectA	SI-MON4_ConnectA

5. Select „Invalid” for each pin.
6. Select “Apply” to transfer the pin assignment to the servo driver.

6 Make parameter settings in Control Motion Integrator

Use the Control Motion Integrator tool to make the configuration settings for the FP7 EtherCAT unit. The software can be started as a stand-alone product or from within the PLC configuration software Control FPWIN Pro. In this procedure, we assume that you are using the stand-alone version. For details on the procedure in Control FPWIN Pro, refer to the online help of the MC_EtherCAT_Library.

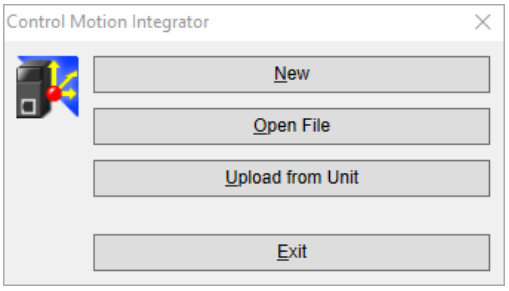
Note

If the trial version of 60 days for the Control Motion Integrator software has expired, you must connect a hardware dongle to your PC to be able to change the EtherCAT communication settings.

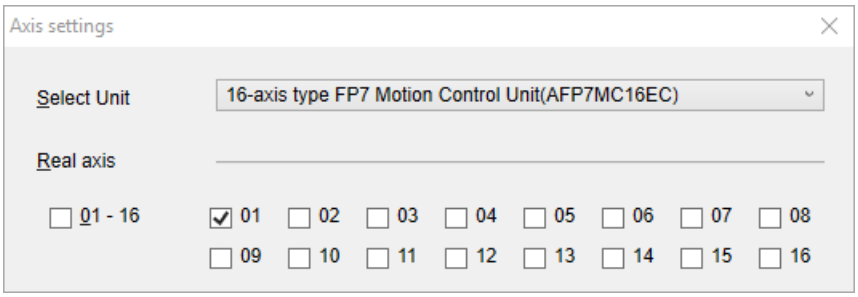
Hardware dongle for Control Motion Integrator

Click on the following link to download Control Motion Integrator from our Panasonic Download Center: Control Motion Integrator tool

1. Connect the FP7 CPU to your PC using a USB cable.
2. Start the Control Motion Integrator software.
3. Select “New”.

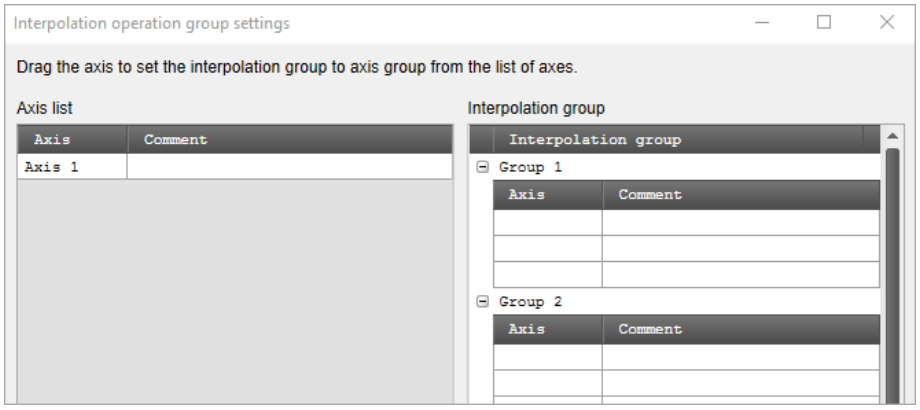


4. Select the unit and the number of connected axes. In our example, it is one axis only.

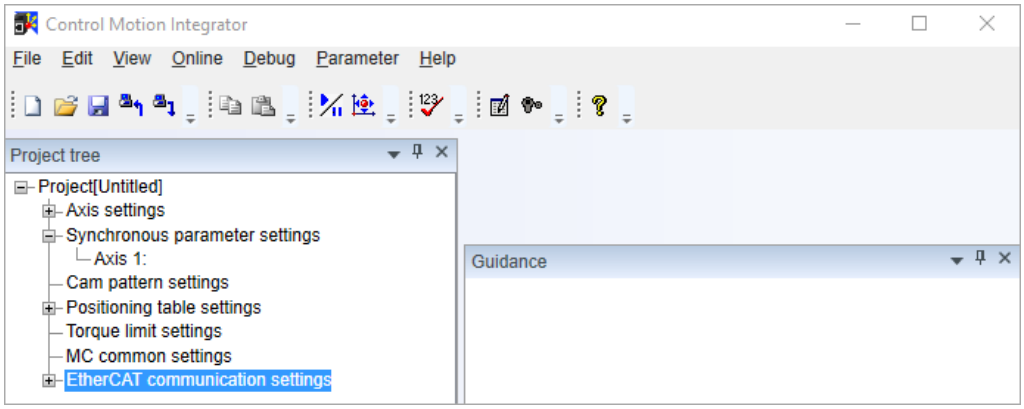


5. Select “OK”.

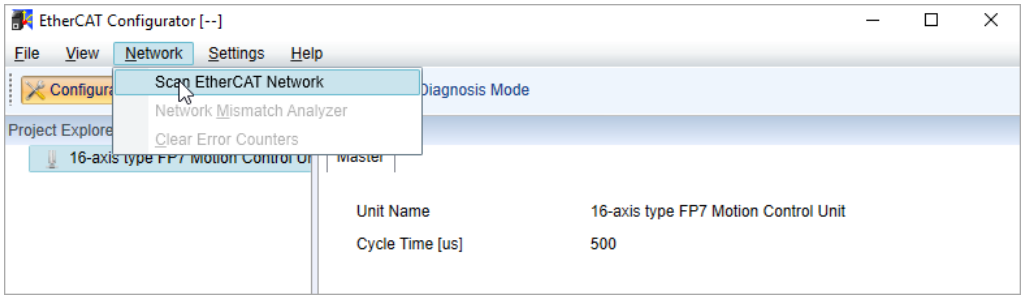
6. In this example, we do not use interpolation because there is only one axis. Select “OK”.



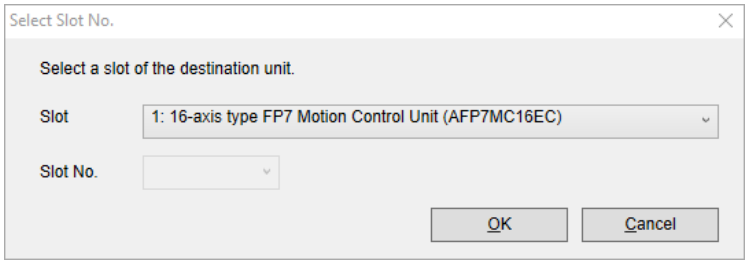
7. Double-click on “EtherCAT communication settings” to search for connected axes.



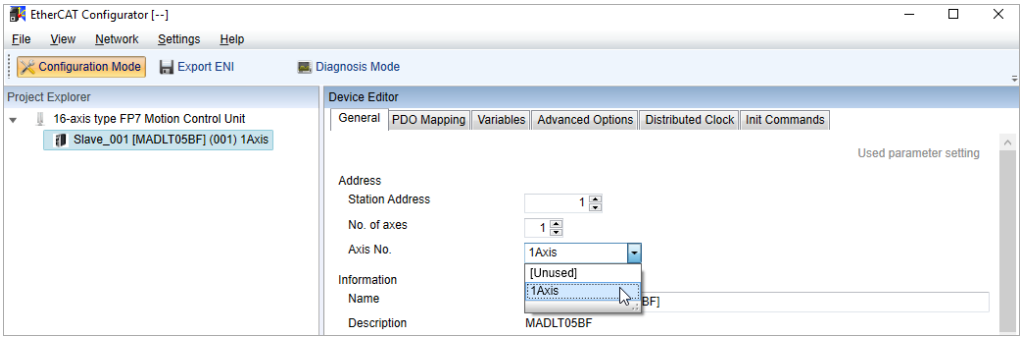
8. Select “Network” > “Scan EtherCAT Network”.



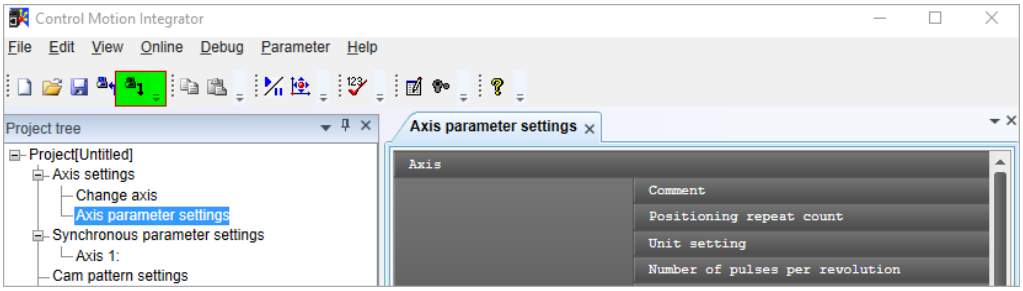
9. Select the number of the slot where you have physically installed the FP7 EtherCAT unit and select “OK”.



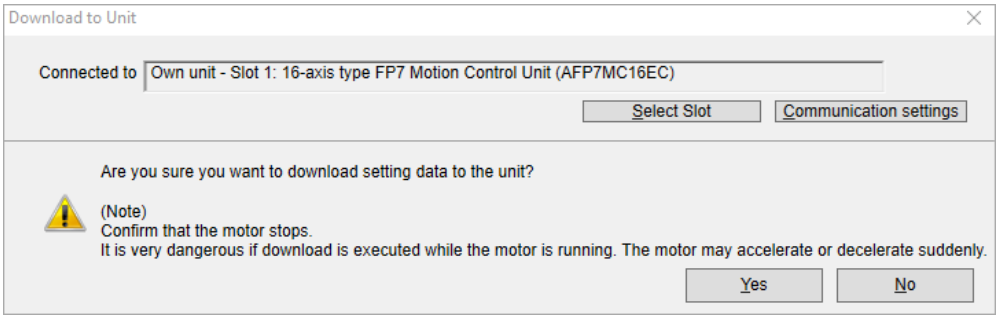
10. The connected axis is displayed in the “Project Explorer”. Select the “Axis No.” of the corresponding station address. Then close the window.



11. Download the configuration by selecting the green highlighted button.

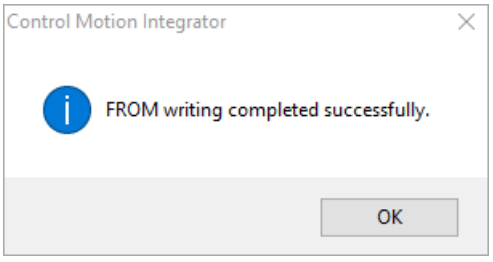


12. Select the number of the slot where you have physically installed the FP7 EtherCAT unit and select “Yes”.



13. To additionally save the configuration in the FROM, select “Yes” in the next dialog. Otherwise, the configuration data will be lost when the FP7 EtherCAT unit is turned off.

14. Select “OK” to complete the process.



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.

Servo.peweu@eu.panasonic.com

+49 (0) 8945354-2750

8 Record of changes

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First edition

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Panasonic Electric Works

Please contact our Global Sales Companies in:

Europe

▸ **Headquarters**	**Panasonic Electric Works Europe AG**	Robert-Koch-Straße 100, 85521 Ottobrunn, Tel. +49 89 45354-1000, Fax +49 89 45354-2111, www.panasonic-electric-works.com
▸ **Austria**	**Panasonic Electric Works Austria GmbH**	Josef Madersperger Str. 2, 2362 Biedermannsdorf, Tel. +43 (0) 2236-26846, Fax +43 (0) 2236-46133 www.panasonic-electric-works.at
	Panasonic Industrial Devices Materials Europe GmbH	Ennshafenstraße 30, 4470 Enns, Tel. +43 (0) 7223 883, Fax +43 (0) 7223 88333, www.panasonic-electronic-materials.com
▸ **Benelux**	**Panasonic Electric Works Sales Western Europe B.V.**	De Rijn 4, (Postbus 211), 5684 PJ Best, (5680 AE Best), Netherlands, Tel. +31 (0) 499 372727, Fax +31 (0) 499 372185, www.panasonic-electric-works.nl
▸ **Czech Republic**	**Panasonic Electric Works Europe AG, organizační složka**	Administrative centre PLATINIUM, Veveří 3163/111, 616 00 Brno, Tel. +420 541 217 001, Fax +420 541 217 101, www.panasonic-electric-works.cz
▸ **France**	**Panasonic Electric Works Sales Western Europe B.V.**	Succursale française, 10, rue des petits ruisseaux, 91370 Verrières Le Buisson, Tél. +33 (0) 1 6013 5757, Fax +33 (0) 1 6013 5758, www.panasonic-electric-works.fr
▸ **Germany**	**Panasonic Electric Works Europe AG**	Robert-Koch-Straße 100, 85521 Ottobrunn, Tel. +49 89 45354-1000, Fax +49 89 45354-2111, www.panasonic-electric-works.de
▸ **Hungary**	**Panasonic Electric Works Europe AG**	Magyarországi Közvetlen Kereskedelmi Képviselet, 1117 Budapest, Neumann János u. 1., Tel. +43 2236 26846-25, Mobile: +36 20 264 9896, Fax +43 2236 46133, www.panasonic-electric-works.hu
▸ **Ireland**	**Panasonic Electric Works UK Ltd.**	Irish Branch Office, Dublin, Tel. +353 (0) 14600969, Fax +353 (0) 14601131, www.panasonic-electric-works.co.uk
▸ **Italy**	**Panasonic Industry Italia srl**	Via del Commercio 3-5 (Z.I. Ferlina), 37012 Bussolengo (VR), Tel. +39 0456752711, Fax +39 0456700444, www.panasonic-electric-works.it
▸ **Nordic Countries**	**Panasonic Electric Works Europe AG**	Filial Nordic, Knarrarnäsgatan 15, 164 40 Kista, Sweden, Tel. +46 859476680, Fax +46 859476690, www.panasonic-electric-works.se
	Panasonic Fire & Security Europe AB	Jungmansgatan 12, 21119 Malmö, Tel. +46 40 697 7000, Fax +46 40 697 7099, www.panasonic-fire-security.com
▸ **Poland**	**Panasonic Electric Works Polska sp. z o.o**	ul. Wołoska 9A, 02-583 Warszawa, Tel. +48 42 230 9633, www.panasonic-electric-works.pl
▸ **Spain**	**Panasonic Electric Works España S.A.**	Barajas Park, San Severo 20, 28042 Madrid, Tel. +34 913293875, Fax +34 913292976, www.panasonic-electric-works.es
▸ **Switzerland**	**Panasonic Electric Works Schweiz AG**	Grundstrasse 8, 6343 Rotkreuz, Tel. +41 (0) 41 7997050, Fax +41 (0) 41 7997055, www.panasonic-electric-works.ch
▸ **United Kingdom**	**Panasonic Electric Works UK Ltd.**	Sunrise Parkway, Linford Wood, Milton Keynes, MK14 6 LF, Tel. +44 (0) 1908 231555, Fax +44 (0) 1908 231599, www.panasonic-electric-works.co.uk

North & South America

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▸ **Japan**	**Panasonic Corporation**	1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8501, Japan, Tel. +81-6-6908-1121, www.panasonic.net
▸ **Singapore**	**Panasonic Industrial Devices Automation Controls Sales Asia Pacific**	No.3 Bedok South Road, Singapore 469269, Tel. +65-6299-9181, Fax +65-6390-3953

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