

FAULHABER MC and Omron PLC

Summary

How to use an Omron PLC to command a FAULHABER EtherCAT motion controller

Applies To

All FAULHABER Motion Controller with EtherCAT
Omron NJ..., NX1...

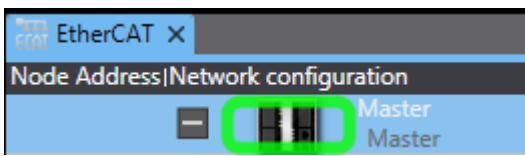
Licensing

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

Pre-Requisites

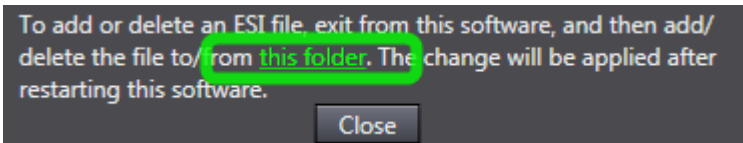
A FAULHABER motion controller is connected to your Omron PLC.
Sysmac Studio has online connection to the Omron PLC.

Install ESI Files

Right-click the master  and select "Display ESI Library".

To add or delete an ESI file, exit from this software, and then add/delete the file to/from this folder. The change will be applied after restarting this software.

Click the 'this folder':



Insert **only the needed FAULHABER ESI** files into this directory.

NEVER insert ESI files ending in _06.xml!

Also insert the file "**Faulhaber_Module_Sync.xml**".

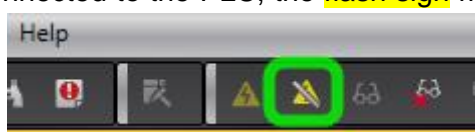
Restart Sysmac Studio.

Basic Set-Up

Go Online

Make sure the Sysmac Studio is online connected to the PLC, the **flash sign** must be crossed out

and there must be a yellow line beneath it:





If the flash sign looks like this:
the crossed out version is highlighted.

→ Press the flash sign so that

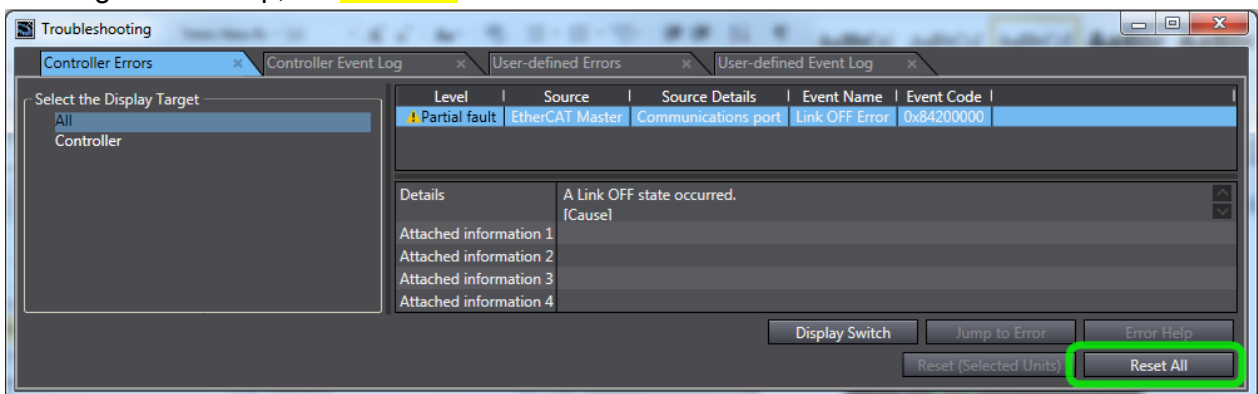
Reset Errors

Always do this step, even if there are no errors!

Repeat this as often as possible!

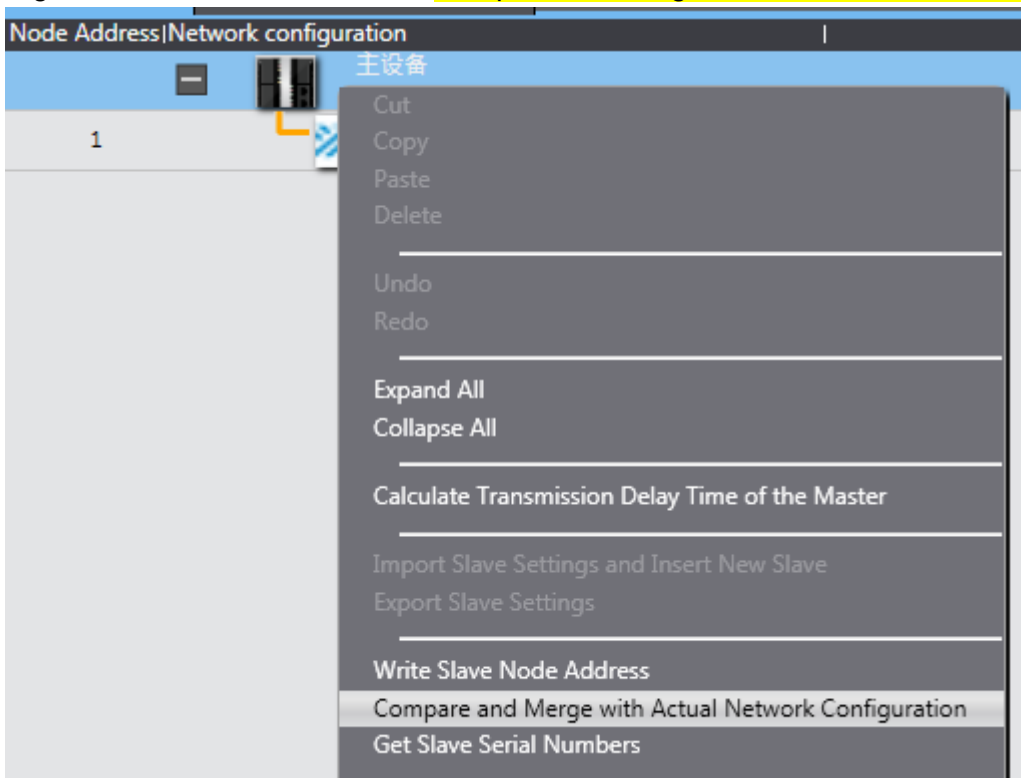
Click 'Troubleshooting' in the main menu 'Tools'.

A dialog will show up, hit 'Reset All':



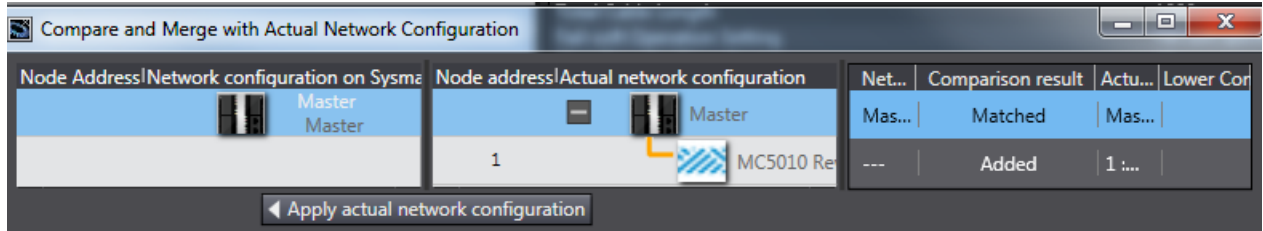
Check Actual Configuration

Right click on the master, select 'Compare and Merge with Actual Network Configuration':



Insert Slave

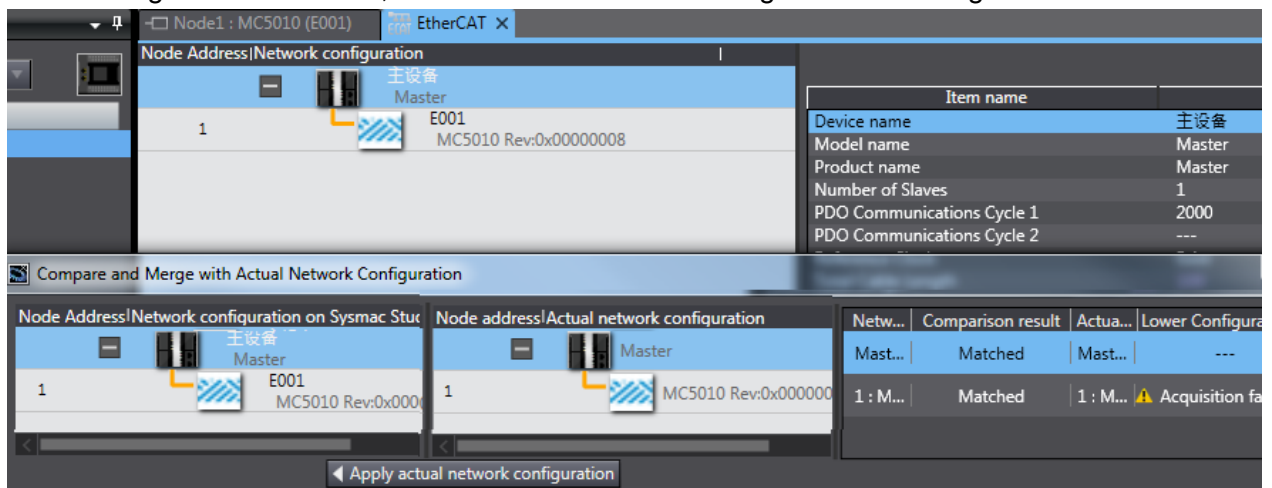
If you started this for the first time or changed the slaves connected to the PLC, you must update that information. Press “**Apply actual network configuration**”:



Then synchronize this. This is described in the last chapter “Synchronize Setup with Slave”

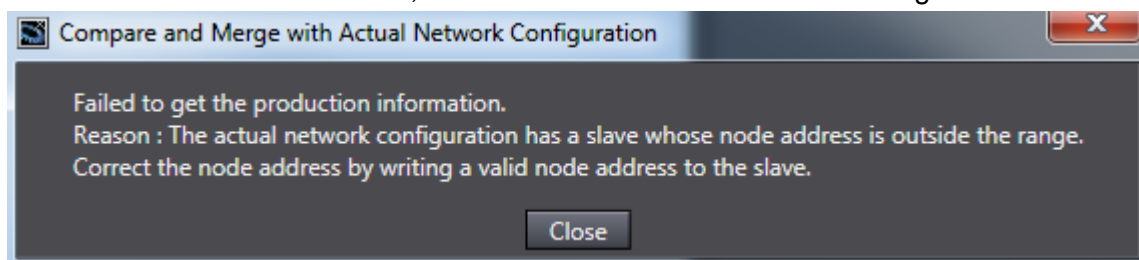
Correct Slave

If this configuration is correct, there will be no error message and the dialog will look like this:



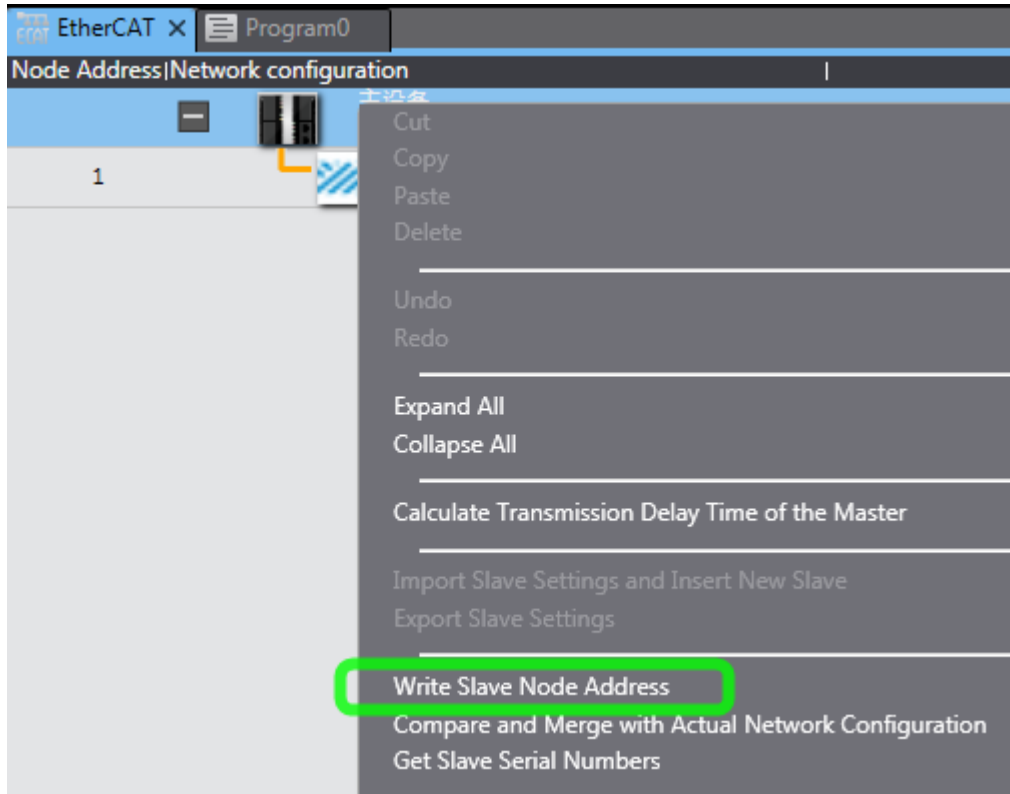
Wrong Node Number

If the slave’s node address is 0, Omron PLC cannot access it and will give this error message:



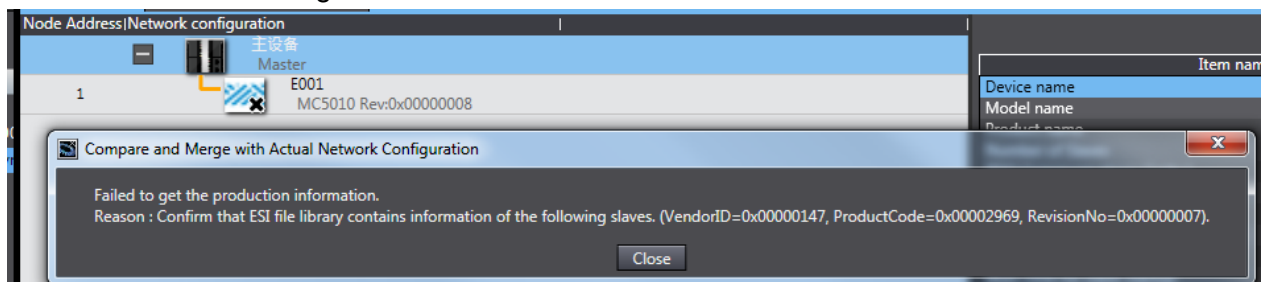
Resolve Wrong Node Number

Right-Click the master and click 'Write Slave Node Address'. As new value, enter a number other than 0. Then, you must **cycle power** of the motion controller (turn it off and on again)



Wrong Slave Revision

This slave has the wrong revision number 7. It should be revision number 8:



Resolve Wrong Slave Revision

Use a Beckhoff PLC to update the slave to the right value. This is described in FAULHABER application note 154, "Updating EtherCAT EEPROM".

Setup Synchronisation

Go Offline

Make sure the Sysmac Studio is offline and not connected to the PLC: The **flash sign** must NOT be crossed out and there must NOT be a yellow line beneath it:



If the flash sign looks like this:



→ Press the crossed out flash sign so that the normal version gets highlighted.

Change 'Distributed Clock' Setting

If '**Enable Distributed Clock**' is set to 'Disabled', change it to 'Enabled' so that this setting looks like:

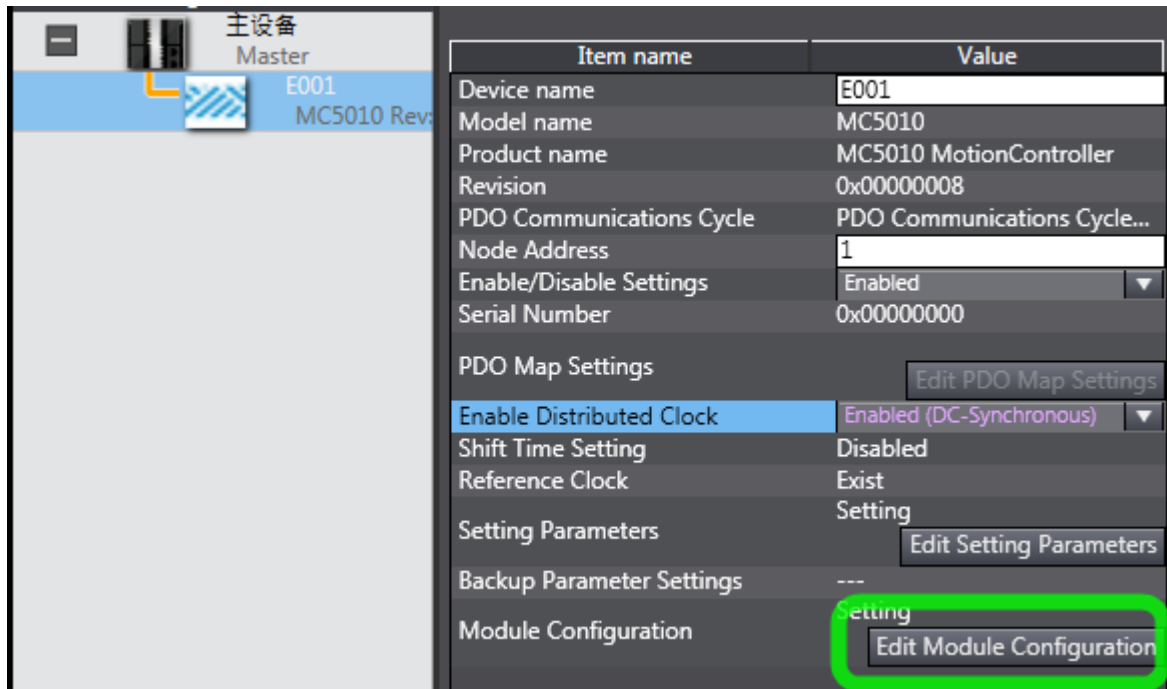
主设备
Master

E001
MC5010 Rev...

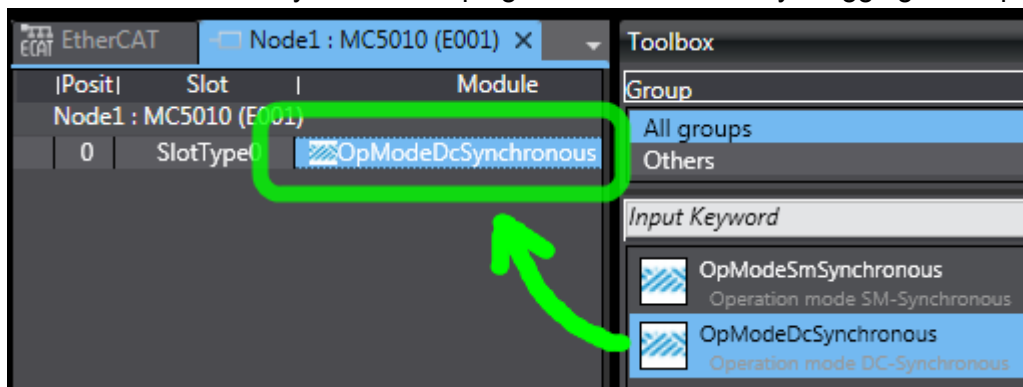
Item name	Value
Device name	E001
Model name	MC5010
Product name	MC5010 MotionController
Revision	0x00000008
PDO Communications Cycle	PDO Communications Cycle...
Node Address	1
Enable/Disable Settings	Enabled
Serial Number	0x00000000
PDO Map Settings	
	Edit PDO Map Setting
Enable Distributed Clock	Enabled (DC-Synchronous)
Shift Time Setting	Disabled
Reference Clock	Exist
Setting Parameters	Setting
	Edit Setting Parameters
Backup Parameter Settings	---
Module Configuration	Setting
	Edit Module Configuration

Plug in DC-Sync Module

Select 'Edit Module Configuration':



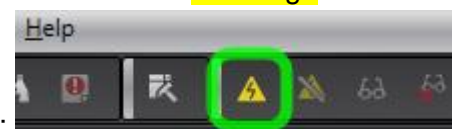
Make sure the module plugged into the slot is called "OpModeDcSynchronous". If it is empty or shows "OmModeSmSynchronous" plug in the DC module by dragging it into place:



Change PDO Mapping

Go Offline

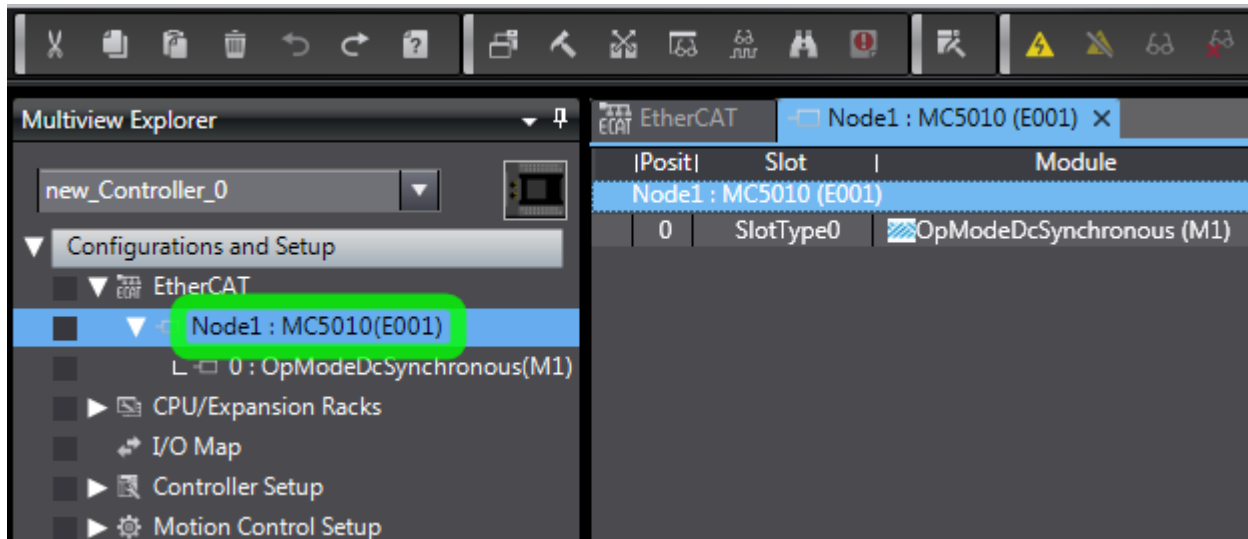
Make sure the Sysmac Studio is offline and not connected to the PLC: The **flash sign** must NOT be crossed out and there must NOT be a yellow line beneath it:



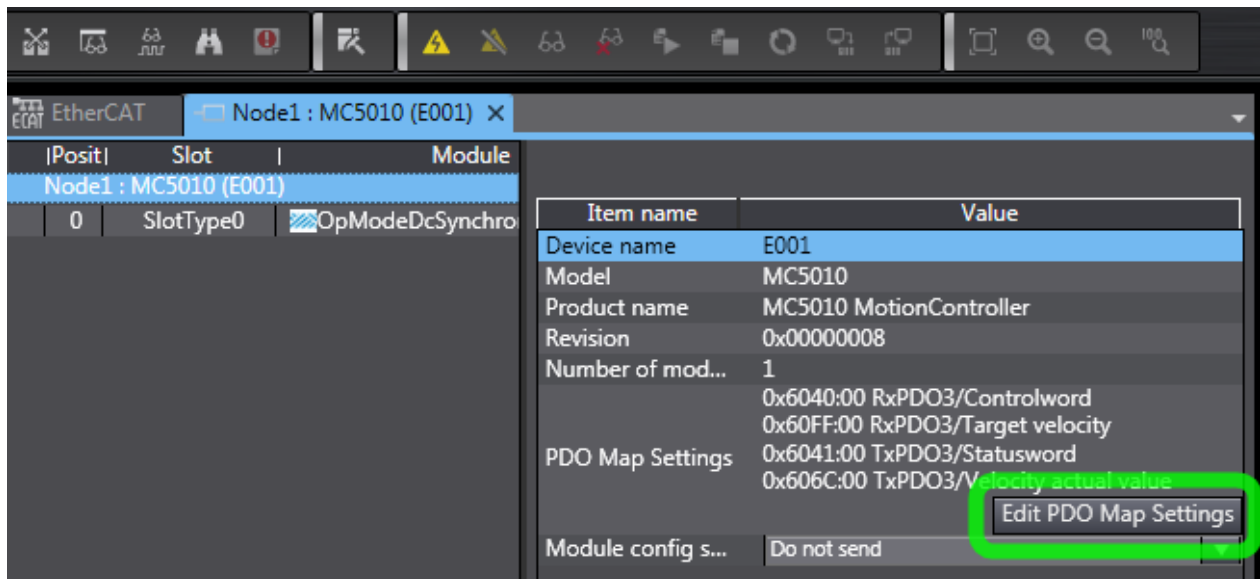
If the flash sign looks like this: → Press the crossed out flash sign so that the normal version is highlighted.

Modify Mapping

Double-click the node which is the FAULHABER drive:

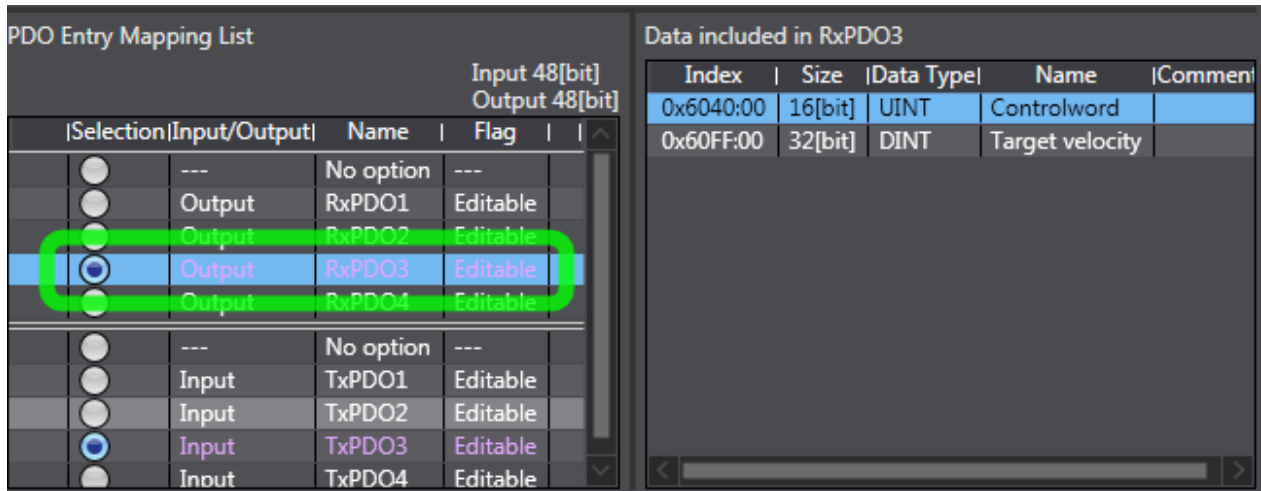


Click the PDO-button:



A new window opens.

On the left hand side, select the PDO you want to edit:



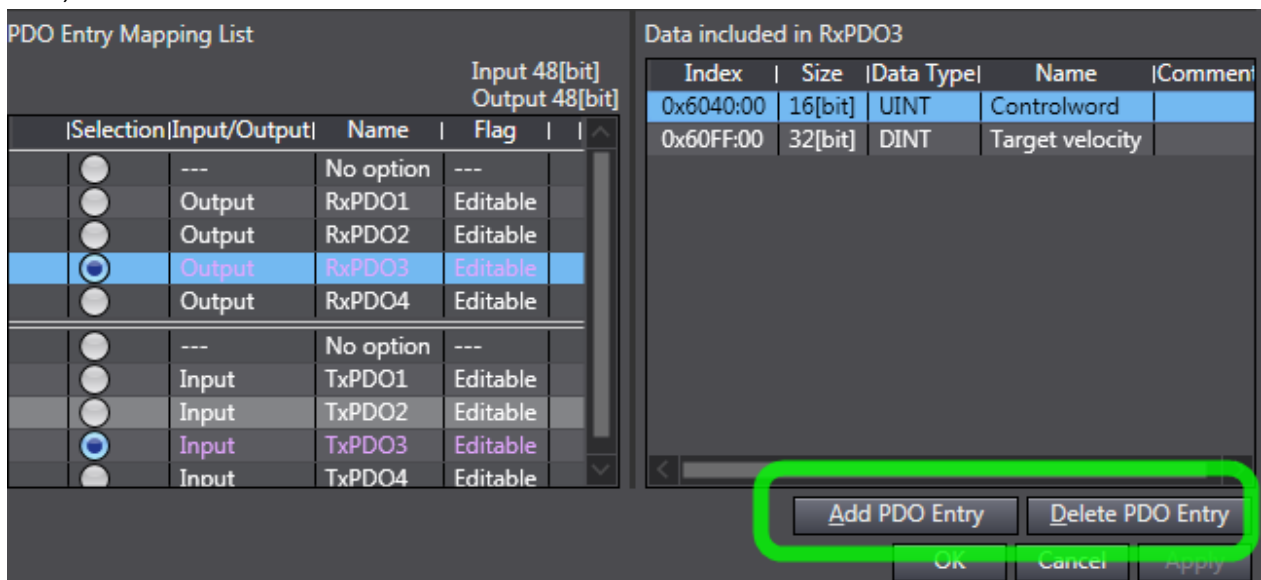
PDO Entry Mapping List

[Selection]	Input/Output	Name	Flag	Input 48[bit] Output 48[bit]
<input type="radio"/>	---	No option	---	
<input type="radio"/>	Output	RxPDO1	Editable	
<input type="radio"/>	Output	RxPDO2	Editable	
<input checked="" type="radio"/>	Output	RxPDO3	Editable	
<input type="radio"/>	Output	RxPDO4	Editable	
<input type="radio"/>	---	No option	---	
<input type="radio"/>	Input	TxPDO1	Editable	
<input type="radio"/>	Input	TxPDO2	Editable	
<input checked="" type="radio"/>	Input	TxPDO3	Editable	
<input type="radio"/>	Input	TxPDO4	Editable	

Data included in RxPDO3

Index	Size	Data Type	Name	Comment
0x6040:00	16[bit]	UINT	Controlword	
0x60FF:00	32[bit]	DINT	Target velocity	

Then, on the right hand side, right-click the existing entries and change them (add or delete entries):



PDO Entry Mapping List

[Selection]	Input/Output	Name	Flag	Input 48[bit] Output 48[bit]
<input type="radio"/>	---	No option	---	
<input type="radio"/>	Output	RxPDO1	Editable	
<input type="radio"/>	Output	RxPDO2	Editable	
<input checked="" type="radio"/>	Output	RxPDO3	Editable	
<input type="radio"/>	Output	RxPDO4	Editable	
<input type="radio"/>	---	No option	---	
<input type="radio"/>	Input	TxPDO1	Editable	
<input type="radio"/>	Input	TxPDO2	Editable	
<input checked="" type="radio"/>	Input	TxPDO3	Editable	
<input type="radio"/>	Input	TxPDO4	Editable	

Data included in RxPDO3

Index	Size	Data Type	Name	Comment
0x6040:00	16[bit]	UINT	Controlword	
0x60FF:00	32[bit]	DINT	Target velocity	

Buttons: Add PDO Entry, Delete PDO Entry, OK, Cancel, Apply

If you are done, hit OK.

Synchronize Setup with Slave

Synchronise your program with the PLC to activate the new configuration: Go online and then hit

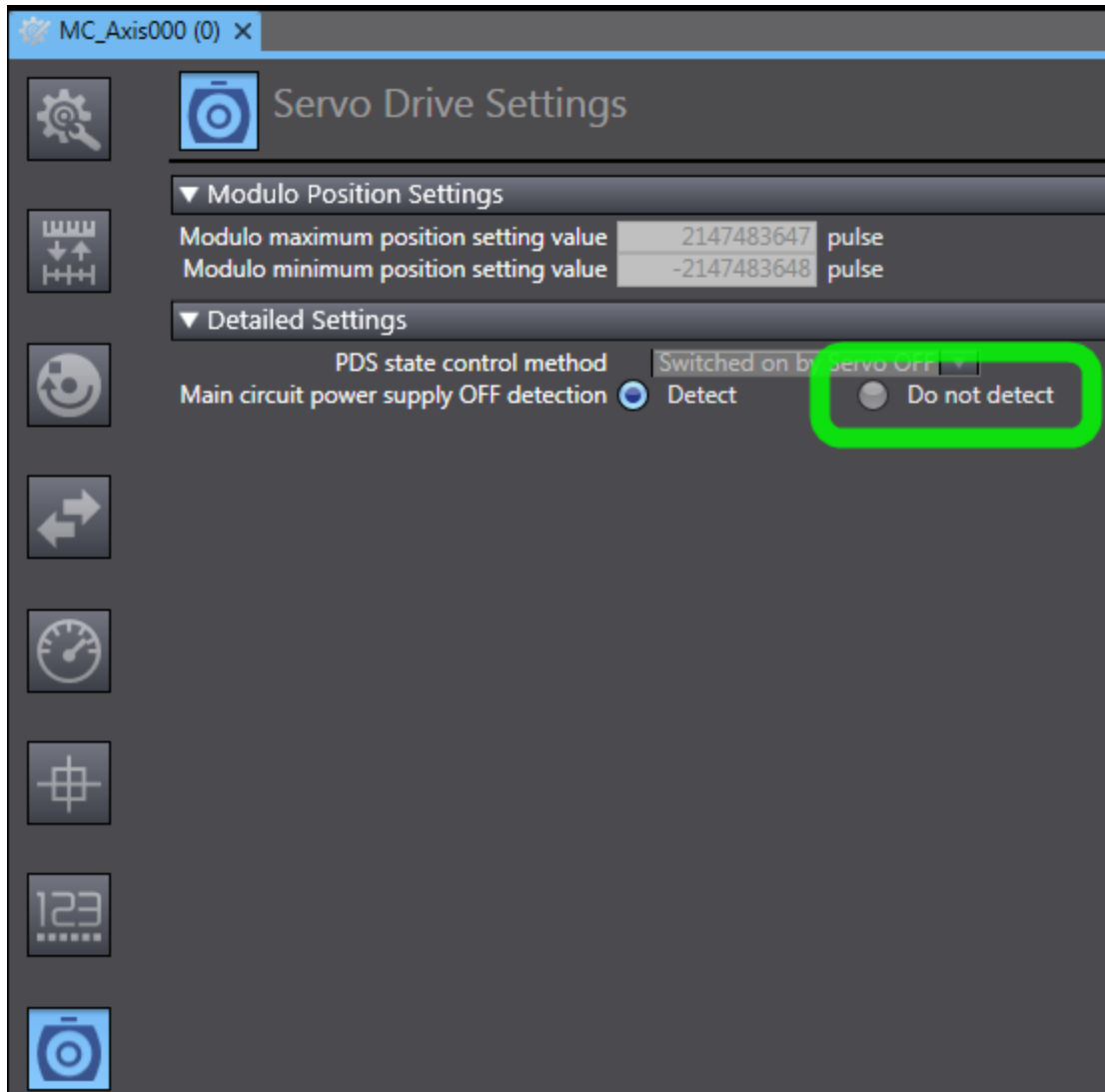
the synchronization button:



Using Motion Control Axes

If you are using motion control axes, Omron wants to check the power state of the axes. It assumes this information to be in bit five of the status word. However, this is not the case and the axis will never turn on.

To disable this check, go to the 'Axis Settings' of the corresponding axis, highlight 'Servo Drive Settings' and check the button 'do not detect' for the entry "Main Circuit power off detection".



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