OMRON
INDUSTRIAL AUTOMATION

OMRON's Accurax G5
EtherCAT with TwinCAT

Quick Start Guide

Mechatronics Application Center
OMRON Europe B.V.
Motion & Drives

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TABLE OF CONTENTS

1 PURPOSE OF THIS DOCUMENT

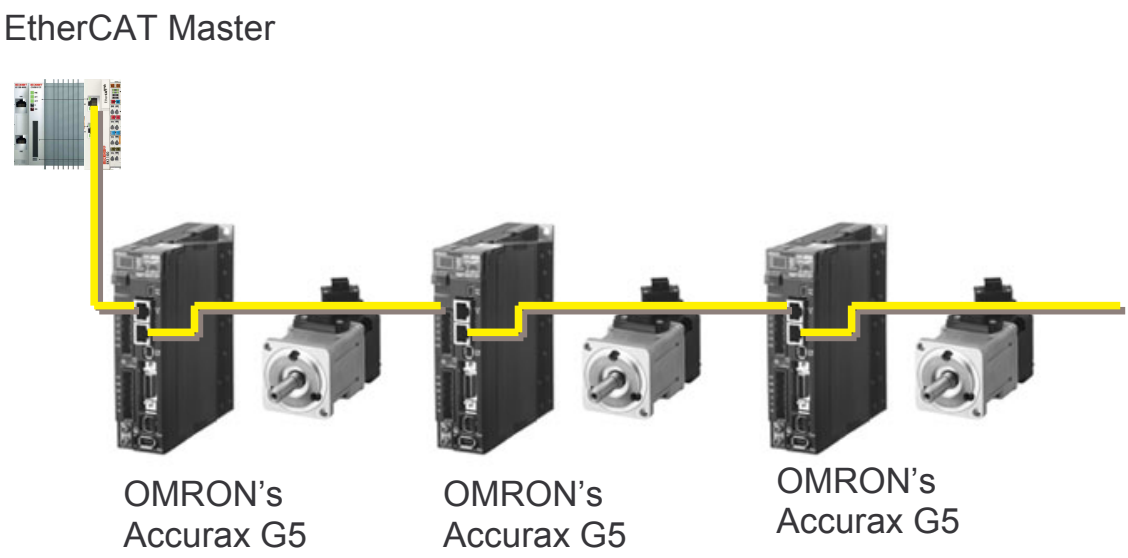
This document details the setup procedure used to run an Accurax G5 –KNxx-ECT EtherCAT (CoE) Amplifier using TwinCAT on a Beckhoff EtherCAT Master device.

This document covers minimum setup required to perform an Accurax Drive test run.

2 REQUIRED HARDWARE AND SOFTWARE

- TwinCAT Software (TwinCAT NC)
- OMRON's Accurax G5 EtherCAT servo (R88D-KN**-ECT)
- EtherCAT master (In this tech note we use CX1020 PLC series + EtherCAT EK1110 master).
- CX-Drive (direct USB) connection eventually needed to access Servo Drive.

3 WIRING LAYOUT



EtherCAT protocol principle is based on a very efficient usage of the Ethernet media, data telegram can be modified by every EtherCAT device on the fly.
Because of this smart feature, each Accurax G5 device has two EtherCAT ports:

- ECAT IN (placed in the upper position)
- ECAT OUT (placed in the upper position).

In order to allow daisy-chain configuration, EtherCAT incoming network must be always plugged to (ECAT IN port); EtherCAT outsourcing cable must be always plugged to (ECAT OUT port).

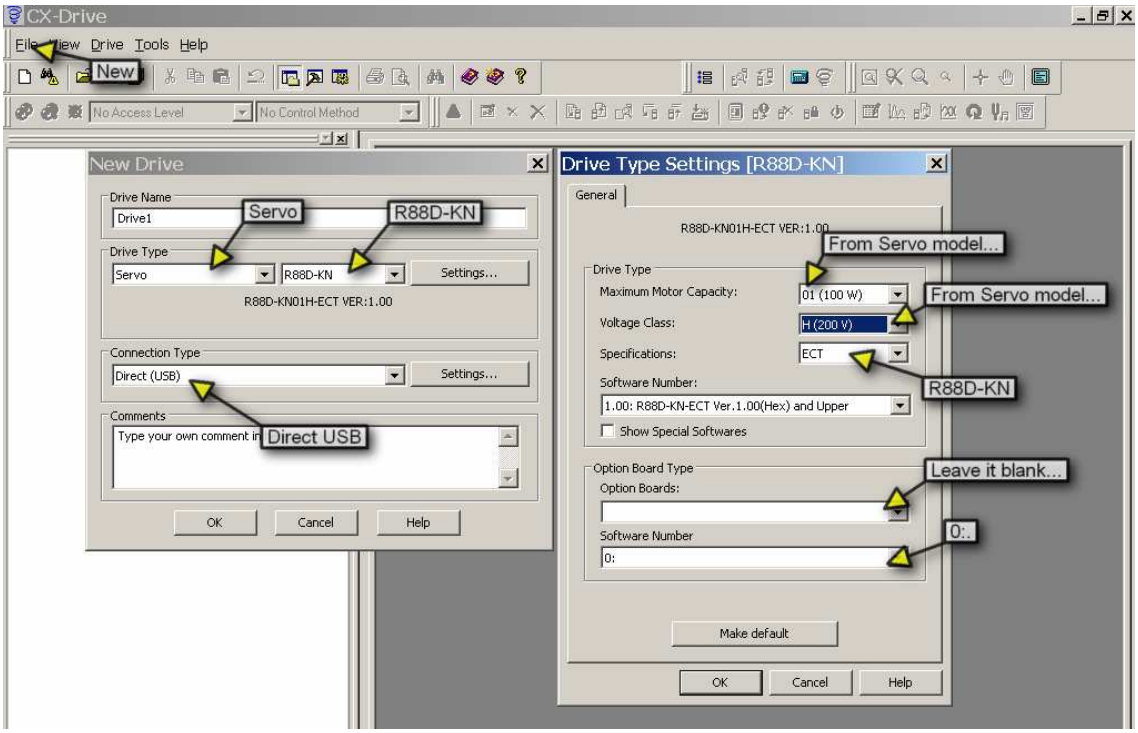
When Ethernet cable is correctly plugged between Master and Servos and devices are powered On, green LED (L/A IN) and (L/A OUT) will be lighting on to show wiring is Ok.

4 ACCURAX G5 SERVO SETTINGS

Purpose of this document is to provide a quick start, therefore we will provide minimum and easiest configuration to make system running. Appropriate application and tune settings are out of the scope of this document.

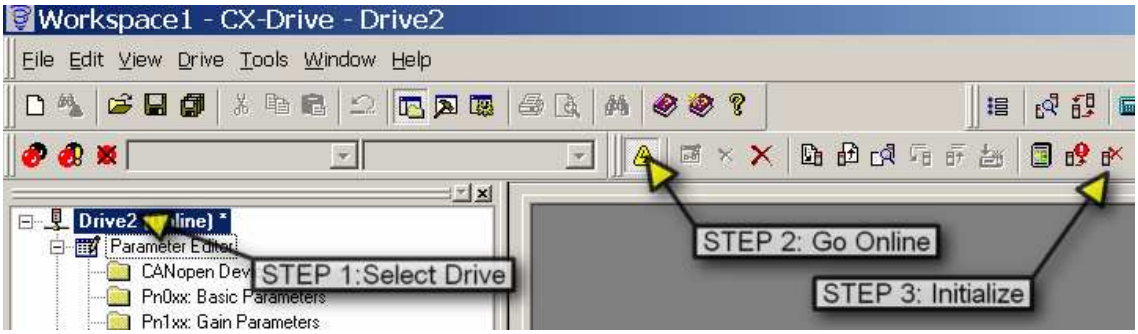
This section can be skipped by users familiar with Accurax G5 series drive.

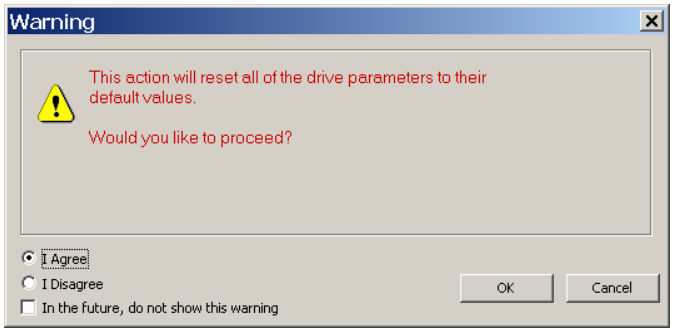
Please use OMRON's CX-Drive Software (USB connection) in order to go online with the Drive.

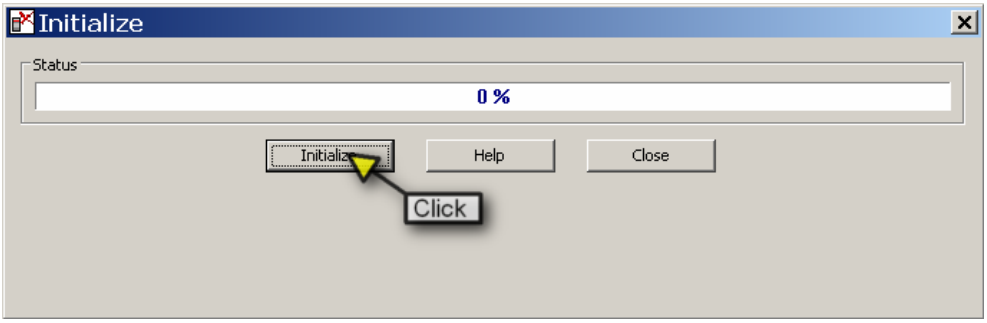


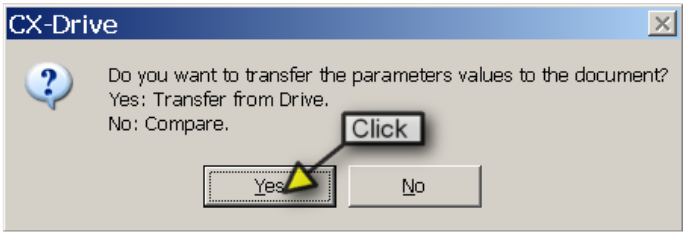
Go Online with the servo, once in online mode, eventually alarms may appear, i.e. emergency stop, position over travel, etc…

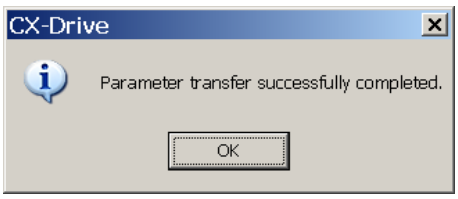
In order to simplify, we will restore servo to factory defaults.

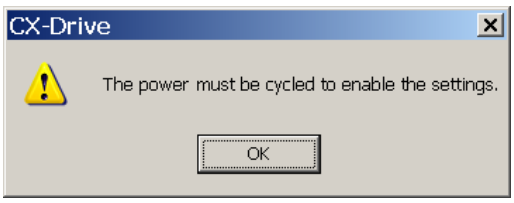








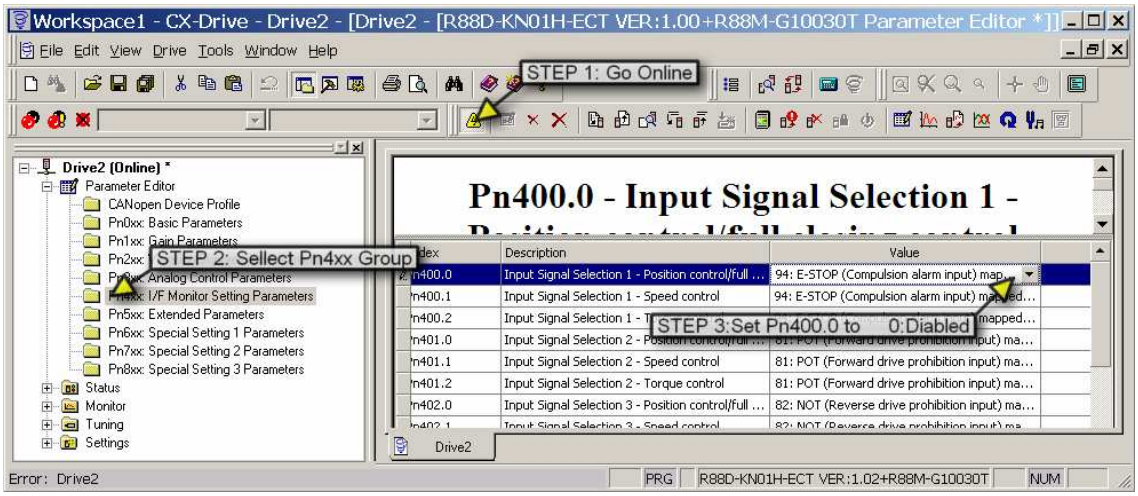




At the end of this process you must cycle servo control power in order to allow changes to take effect.

Normally you will face the alarm "**87**" displayed in the servo. This is due to the fact that (E-STOP) input is not powered to ON. (Note. - This input is an auxiliary input not related with the CN8 safety certified Emergency Stop inputs).

Please, go online again with CX-Drive and modify the value of parameter **Pn400.0** and set it to **0:Disabled**



You will need to cycle power in order to allow changes to take effect.

After cycling power, Servo display must not show any error, only "**--**" will be displayed in the numeric display of the servo showing that servo is Ok.

Note- Servo using absolute encoder requires further configuration. (To simplify the test , you can set the absolute encoder to incremental).

5 ETHERCAT SLAVE INFORMATION (ESI) FILES

ESI files contains standardized information required for EtherCAT Master Software (in this case TwinCAT) describing the EtherCAT device.

Those files use .xml extension, and must be present into TwinCAT IO EtherCAT directory before TwinCAT is started.

File provided by Slave manufacturer (i.e. :***Omron_R88D-KNxxx-ECT_v1.xml***), must be copied to TwinCAT directory

Default path is:

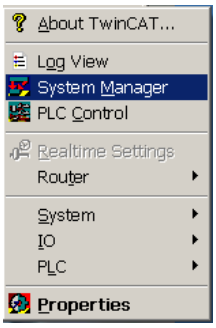
C:\TwinCAT\Io\EtherCAT

To ensure that TwinCAT has recognized the new ESI it is recommended to restart computer.

6 TWINCAT CONNECTION

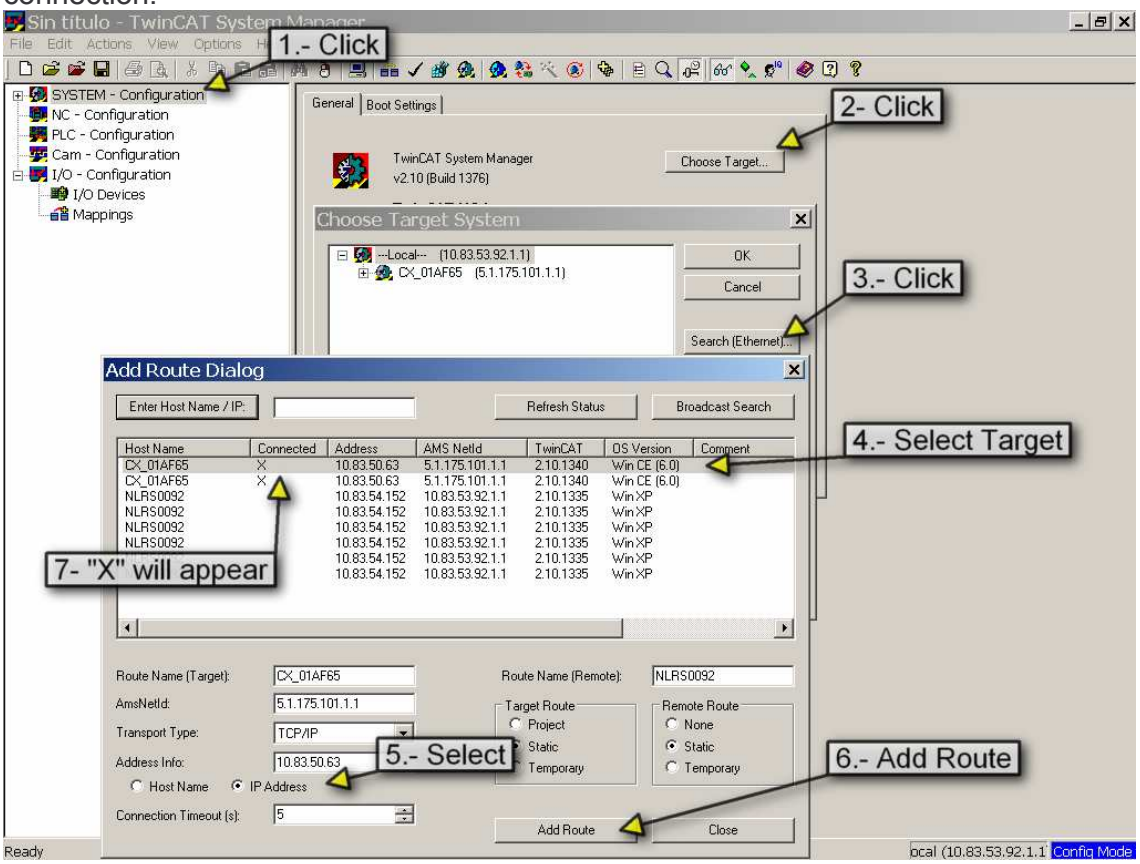
- **Start TwinCAT's System Manager Software**

From the desktop, right-click on the TwinCAT icon in the system tray
Choose System Manager:



- **Connect to Target device**

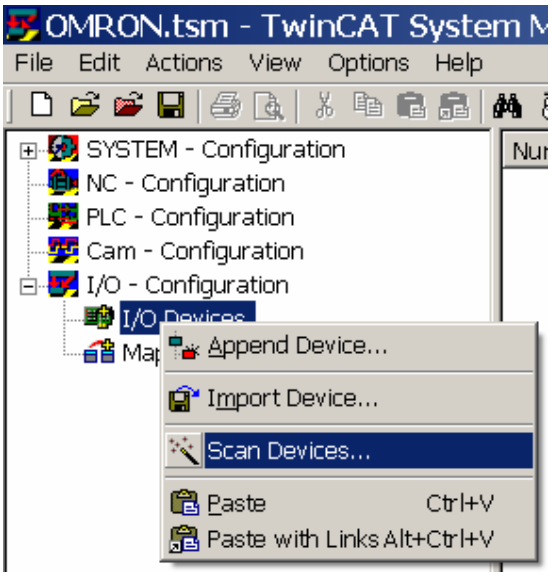
Choose Target device (CX series in this example) and follow the steps to establish connection:



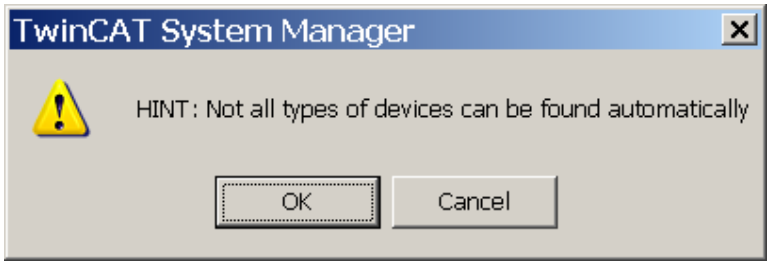
7 SCAN FOR I/O DEVICES

Ensure that TwinCAT is in “Config Mode” (SHIFT + F4), otherwise won’t be able to SCAN for I/O Devices.

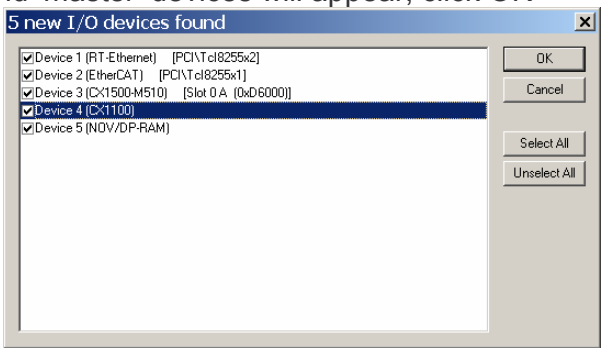
Select I/O- Configuration > I/O Devices, click right mouse button and choose ‘Scan Devices…’



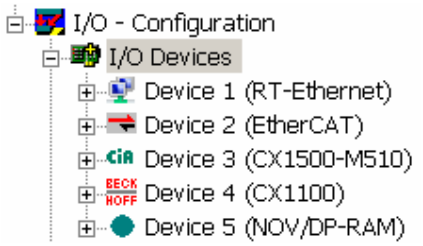
HINT window may appear, please click OK...



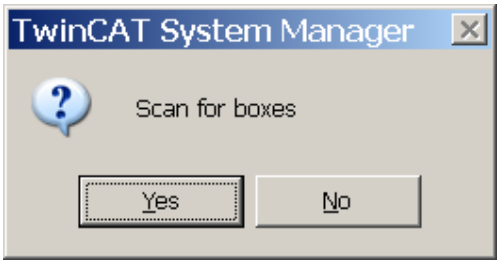
The list with the found ‘master’ devices will appear, click OK



Notice that I/O-Configuration is now populated with all the I/O 'master' found in the target device.

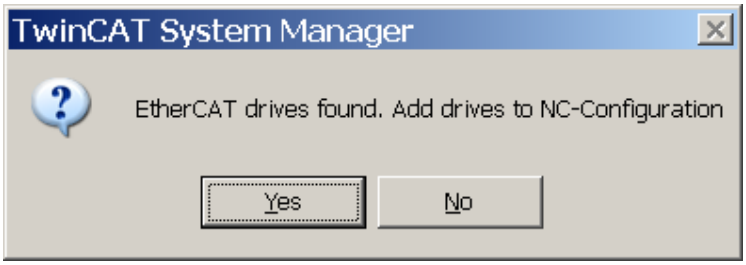


Scan for boxes? → YES.

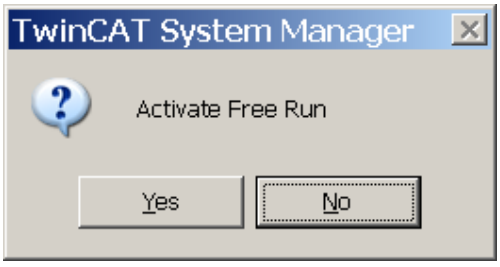


Process will start searching for slaves; we are obviously interested in the EtherCAT master.

Software will automatically detect EtherCAT drives, so R88D-xx-ECT will be found (please remember that ESI "xml" file must be present in TwinCAT software as explained before)

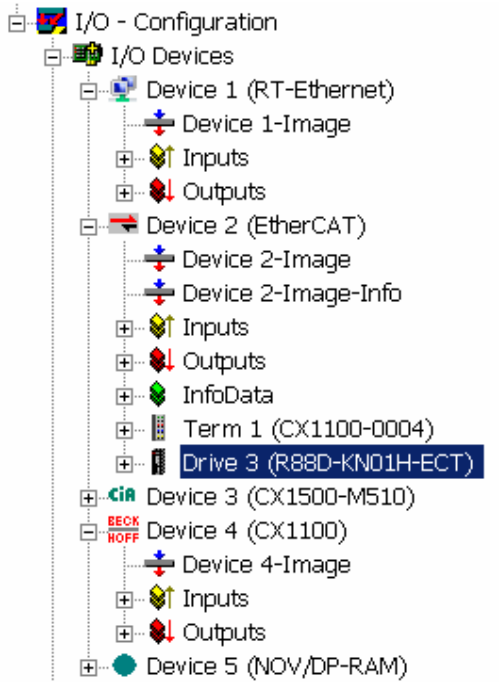


Click 'YES' to add drives to NC- Configuration.



It is not necessary to Activate Free Run now…

If everything was Ok, as expected…, R88D-KN**-ECT will appear as a Slave Drive of the EtherCAT master.



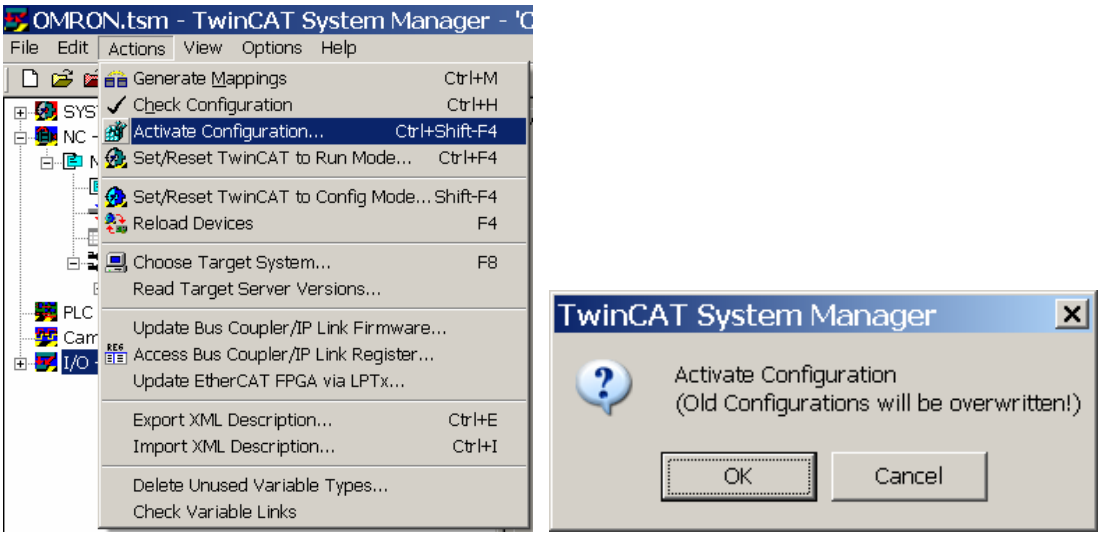
You will notice that OMRON's Accurax G5 servo LED's are flashing:

- L/A IN flashing shows the incoming EtherCAT traffic
- L/A OUT flashing shows the outcome EtherCAT traffic (if another device is present…)
- RUN LED will be flashing GREEN when servo is ready
- The Red numeric display shows "- - "

8 TEST RUN THE ACCURAX G5 DRIVE

Accurax G5 is successfully included in the master's scan. Now is the time to see axis moving.

In order to allow TwinCAT to manage the axis, it is necessary to 'Activate Configuration'



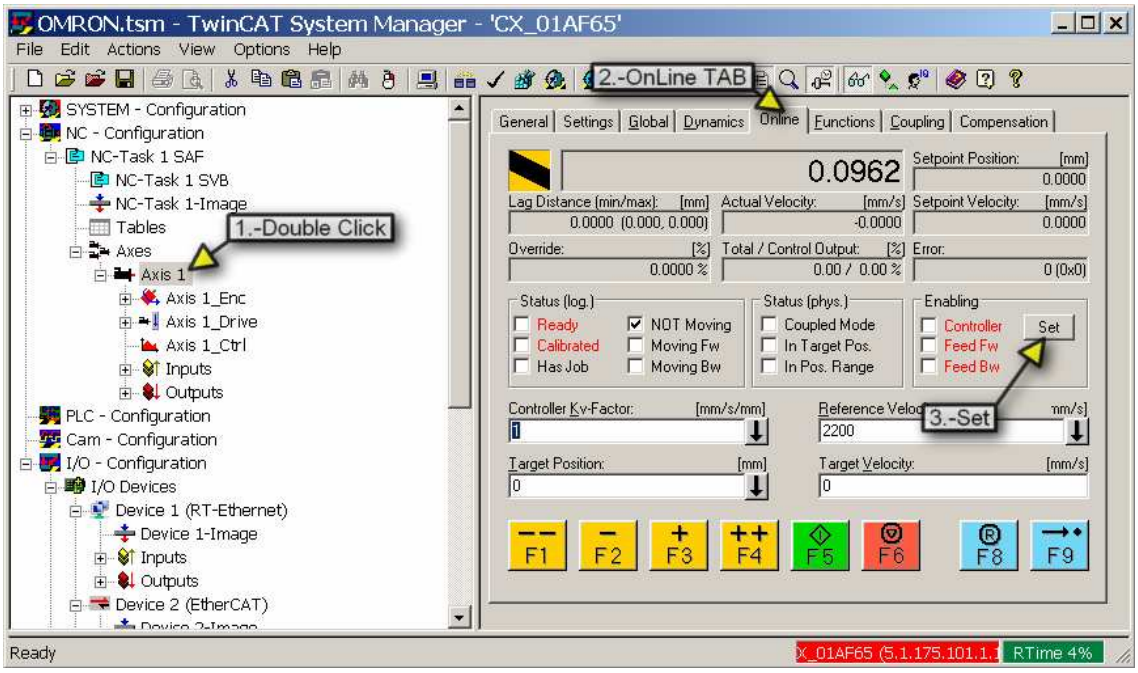
Notice that when Accurax G5 was detected, we accepted to include the axis into the NC- Configuration. As a consequence, NC controller created a new axis "Axis 1", that is linked to the Accurax G5 Servo Drive.

Please ensure that TwinCAT is in RUN mode (CTRL + F4). (You'll notice that Accurax G5 'RUN' LED is solid green).

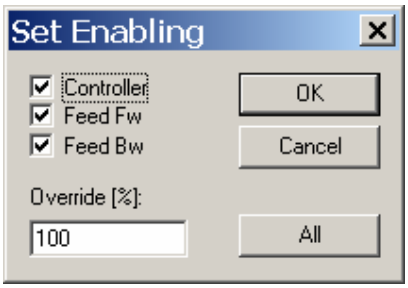
1. - Select Axis 1
2. - Go to the Online TAB
3. - Click SET Button in order to Enable Servo Drive.

Note.1- If Buttons are grayed out, please re-confirm if TwinCAT is in RUN mode (CTRL + F4)and configuration has been activated (CTRL+SHIFT+F4)

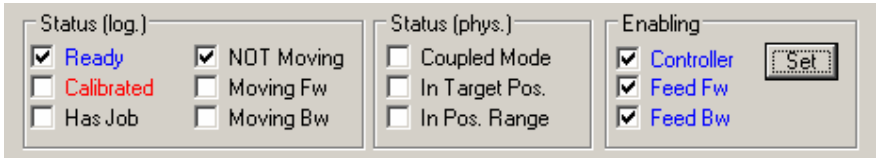
Note.2- If servo is in fault or warning, you can try to reset the servo drive by using Reset button (F8). If fault persist please use CX-Drive in order to handle this error.



Mark all selections: Controller, Feed Fw, Feed Bw, and set the override value to 100%.



Press OK button and notice that Accurax G5 motor will be Enabled ! (Accurax does not show " **- -** " anymore but "**00**" in the display.
TwinCAT Software will show Servo Ready and the motion Status: NOT Moving, Moving Fw, Moving Bw,…



Use the command buttons (or Function Key Shortcuts ⌨) to JOG axis.

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