EUROPEAN SPALLATION SOURCE

Project Specification	
Document Number	ESS-000xxxx
Date	Sep 24, 2012
Revision	v0-1
State	Preliminary

Operation of IndraDrive with TwinCAT – EtherCAT communication

Short start up manual

Motion Control & Automation Group

European Spallation Source ESS ERIC
Visiting address: ESS, Tunavägen 24
P.O. Box 176
SE-221 00 Lund
SWEDEN

www.esss.se

DOCUMENT REVISION HISTORY

Revision	Reason for revision	Date
v0-1	New Document, Draft	19.7.2017.

List of Authors	List of Reviewers	List of Approvers
Kristina Jurišić		

SUMMARY

The goal of the manual is to guide the user through the process of hardware and software setup of Beckhoff TwinCAT and third party drive – IndraDrive from Bosch Rexroth.

Beckhoff CPU and IndraDrive are connected through EtherCAT communication protocol.

In the manual, there is also a description of how to set and use Bosch Rexroth's software IndraWorks Engineering to communicate with the drive and read and write drive's parameters.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF ABBREVIATIONS

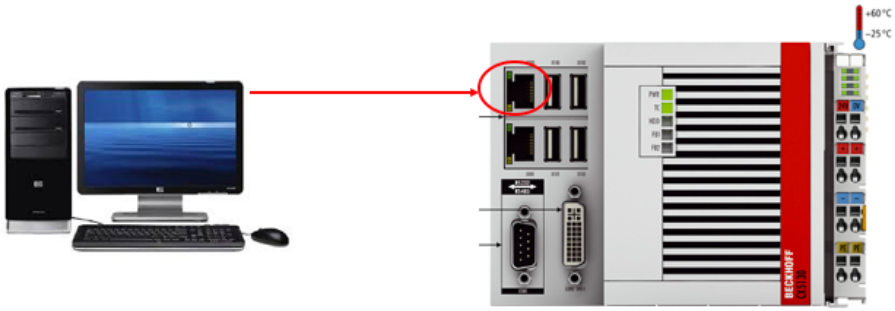
Abbreviation	Definition
ESS	European Spallation Source
MC&A, MCAG	Motion Control & Automation (Group)
ICS	Integrated Controls Systems Division
DMSC	Data Management & Software Centre
NSS	Neutron Scattering Systems
EPICS	Experimental Physics and Industrial Control System
MCU	Motion Control Unit
E2H2C	ESS Electronics Hardware Harmonisation Committee

1. HARDWARE SETUP

This chapter will cover basic hardware setup and how to connect Beckhoff CX 5130 CPU with IndraDrive through EtherCAT.

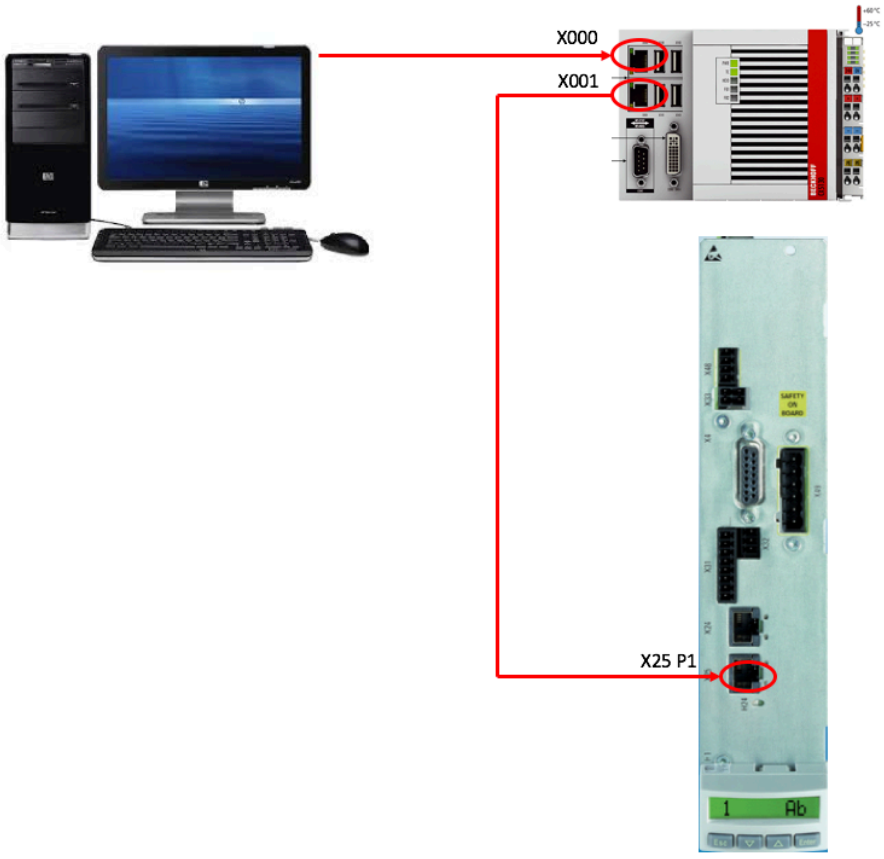
1.1 Connecting TwinCAT host computer with Beckhoff CPU

Host computer will be connected to the Beckhoff CPU via Ethernet port X000 on the CX5130:



1.2 Connecting Beckhoff CPU with IndraDrive

Beckhoff CPU should be connected to the IndraDrive through the X25 P1 port on the drive. It is imperative that this port is used as input on the drive!



2. SOFTWARE SETUP

This chapter will include all necessary steps in configuring software to enable EthercCAT communication between Beckhoff CPU as master and IndrDrrive as slave.

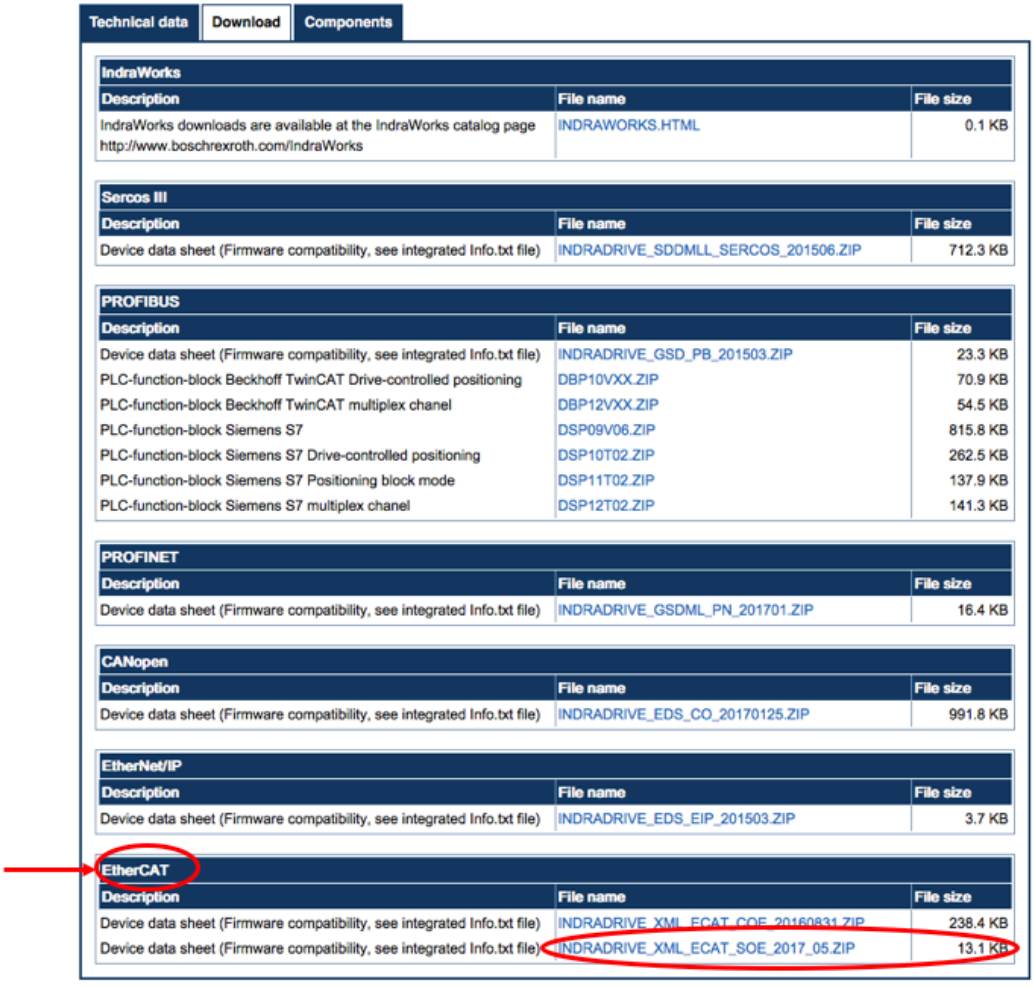
2.1 Downloading IndraDrive XML file

To use IndarDrive drive controller with EtherCAT, the electronic data sheet (XML Description) must be integrated into the TwinCAT System Manager.

Needed XML file can be found on the following link:

http://www.boschrexroth.com/dcc/Vornavigation/Vornavi.cfm?Language=EN&Variant=internet&VHist=g97568,g96067,g300682&PageID=p700759

The XML file that we need to download is Under EtherCAT, named INDRADRIVEW_XML_ECAT_SOE_2017_05:



Technical data | Download | Components

IndraWorks

Description	File name	File size
IndraWorks downloads are available at the IndraWorks catalog page http://www.boschrexroth.com/IndraWorks	INDRAWORKS.HTML	0.1 KB

Sercos III

Description	File name	File size
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_SDDMLL_SERCOS_201506.ZIP	712.3 KB

PROFIBUS

Description	File name	File size
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_GSD_PB_201503.ZIP	23.3 KB
PLC-function-block Beckhoff TwinCAT Drive-controlled positioning	DBP10VXX.ZIP	70.9 KB
PLC-function-block Beckhoff TwinCAT multiplex chanel	DBP12VXX.ZIP	54.5 KB
PLC-function-block Siemens S7	DSP09V06.ZIP	815.8 KB
PLC-function-block Siemens S7 Drive-controlled positioning	DSP10T02.ZIP	262.5 KB
PLC-function-block Siemens S7 Positioning block mode	DSP11T02.ZIP	137.9 KB
PLC-function-block Siemens S7 multiplex chanel	DSP12T02.ZIP	141.3 KB

PROFINET

Description	File name	File size
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_GSDML_PN_201701.ZIP	16.4 KB

CANopen

Description	File name	File size
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_EDS_CO_20170125.ZIP	991.8 KB

EtherNet/IP

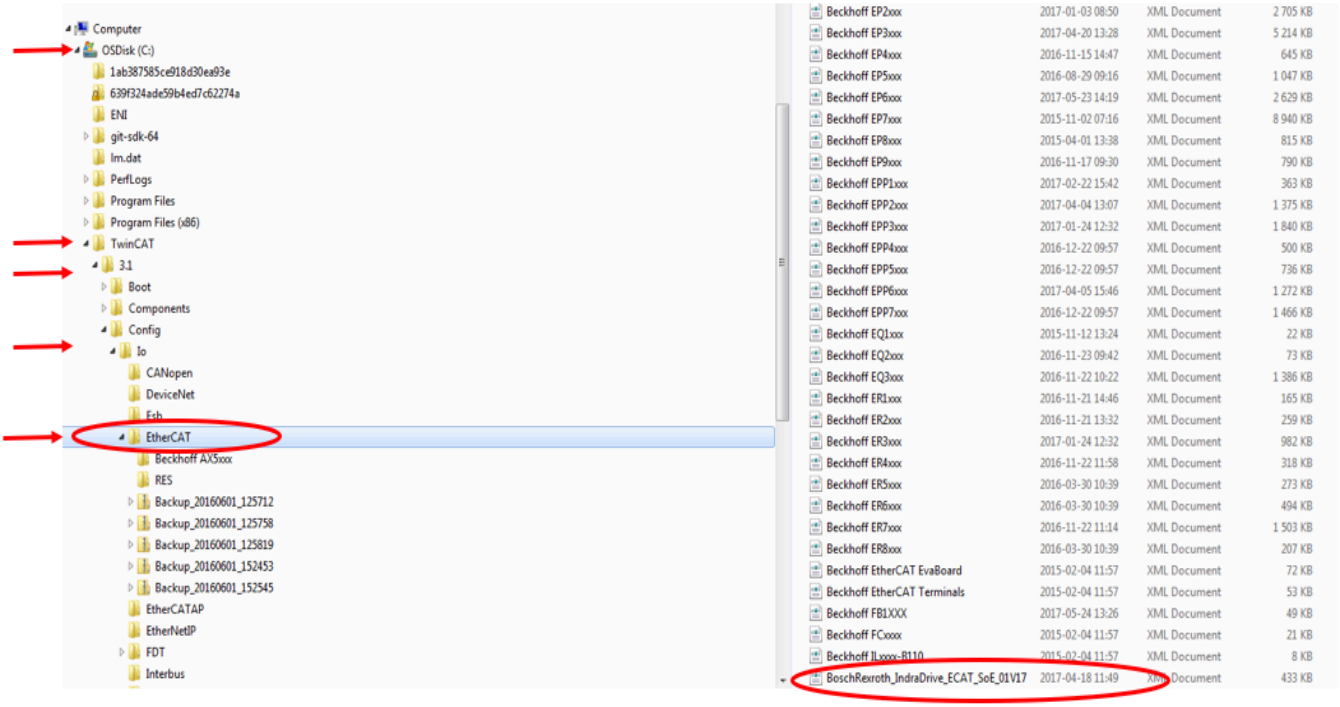
Description	File name	File size
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_EDS_EIP_201503.ZIP	3.7 KB

EtherCAT

Description	File name	File size
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_XML_ECAT_COE_20160831.ZIP	238.4 KB
Device data sheet (Firmware compatibility, see integrated Info.txt file)	INDRADRIVE_XML_ECAT_SOE_2017_05.ZIP	13.1 KB

This file now has to be extracted and added at the same location where TwinCAT is. In this case that's:

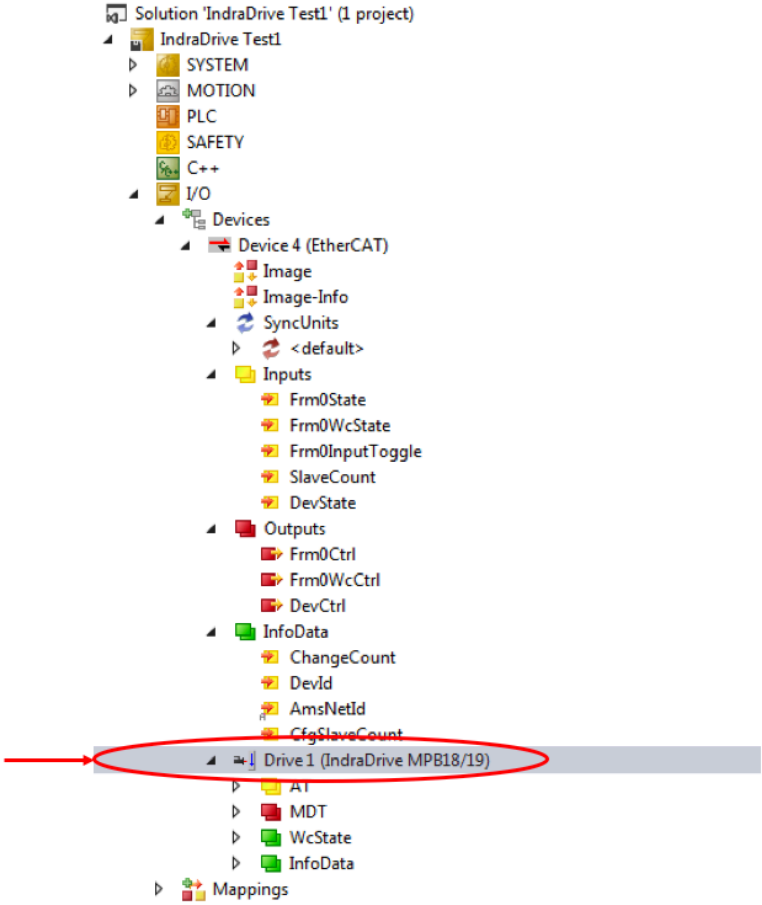
C:*\TwinCAT\3.1\Config\Io\EtherCAT (XML file needs to be copied in EtherCAT folder)



Sometimes the import of the XML descriptions will not be active until restart of the TwinCAT System Manager software!

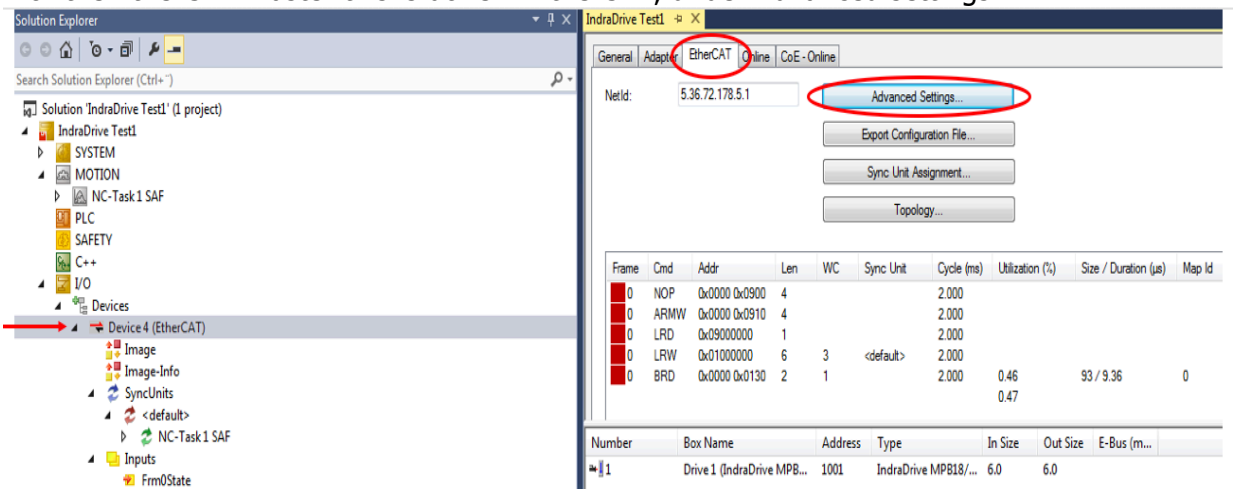
2.2 Configuring EtherCAT master and IndraDrive in TwinCAT

Now that XML file of third party drive is added In TwinCAT folder, after scanning the bus for new IO devices we should see the IndraDrive under EtherCAT devices:

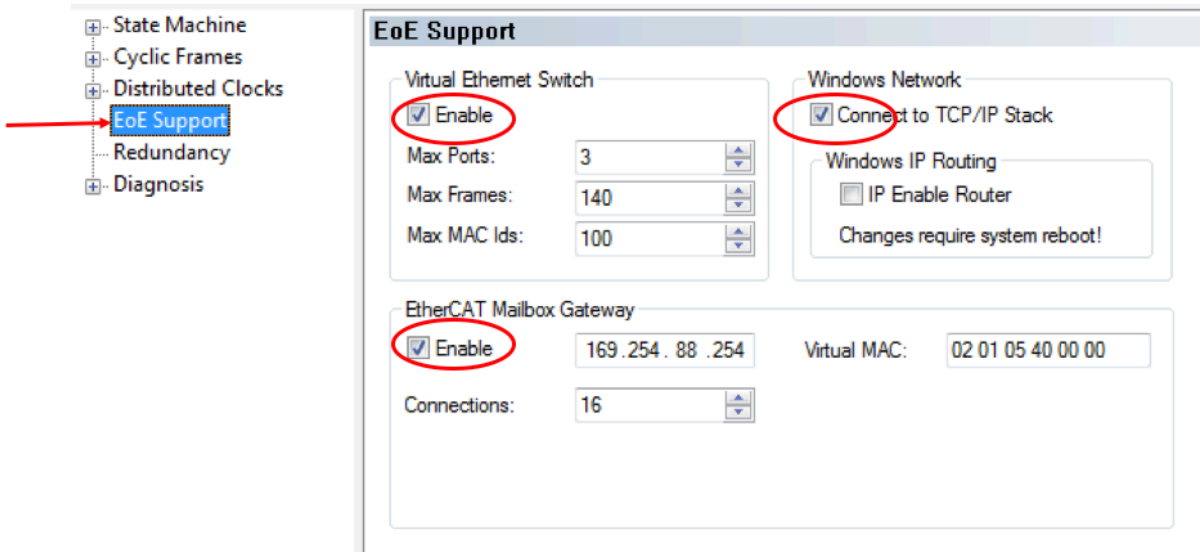


After this, IP addresses of EtherCAT master and IndraDrive need to be set.

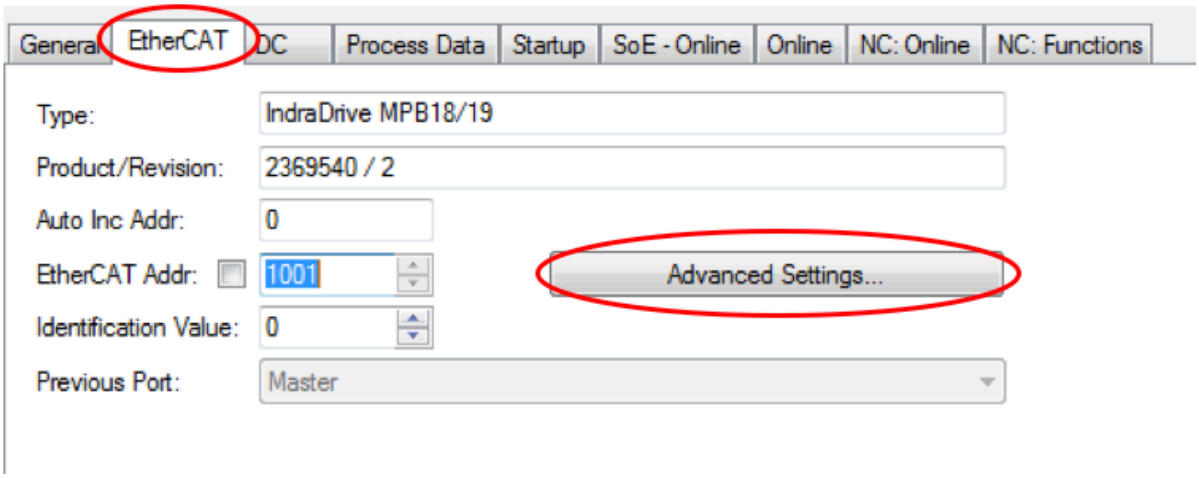
For the EtherCAT master this is done in EtherCAT, under Advanced settings:



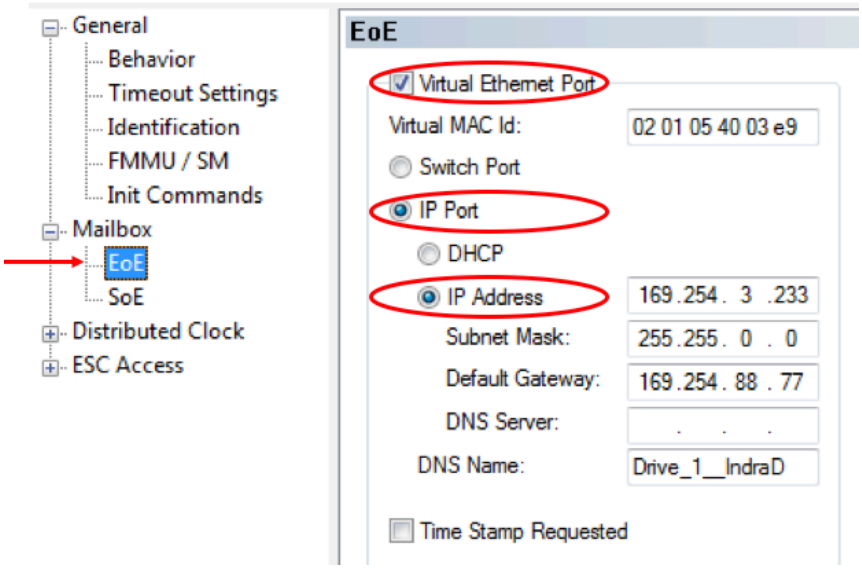
Under Advanced settings -> EoE Support, Virtual Ethernet Switch, EtherCAT Mailbox Gateway and Windows Network need to be enabled:



After this, IP address of the drive also needs to be set. That is done under EtherCAT -> Advanced Settings:



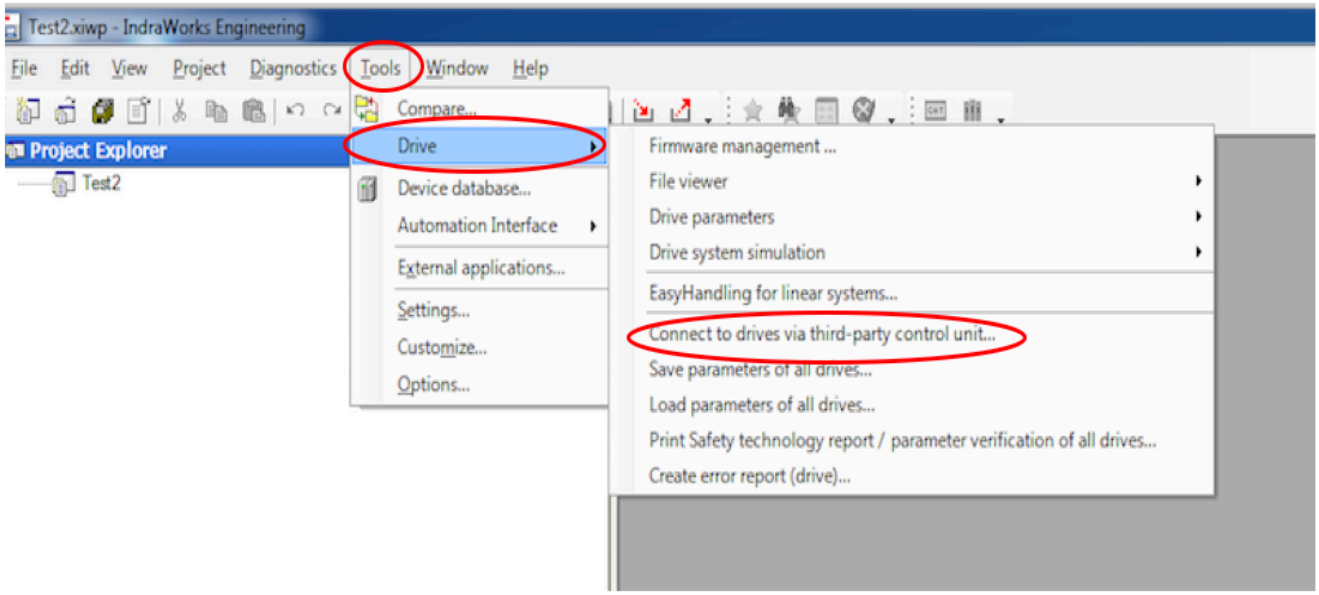
Under EoE, virtual Ethernet Port needs to be enabled and IP Port and IP Address checked:



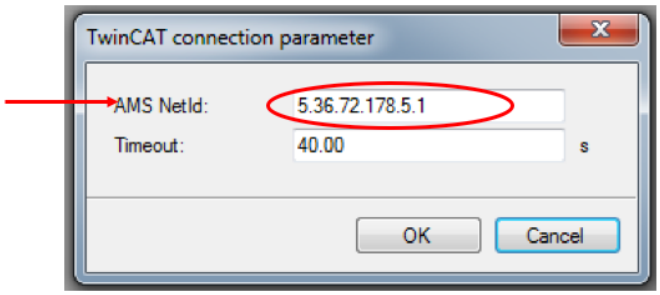
2.3 IndraDrive parametrization over IndraWorks

With IndraDrive Works Engineering there is a full access over TwinCAt to the IndraDrive Controllers.

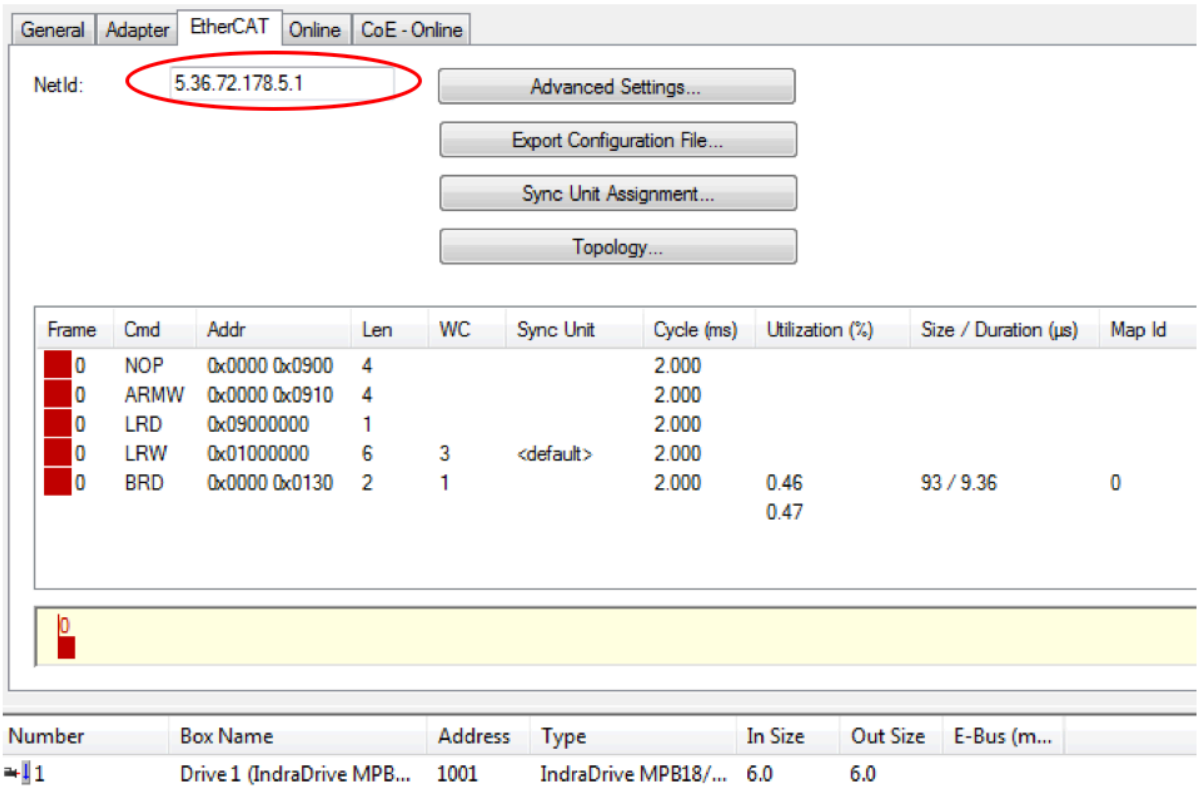
After starting new project in IndraWorks Engineering, choose Tools -> Drive -> Connect to drives via third-party control unit…:



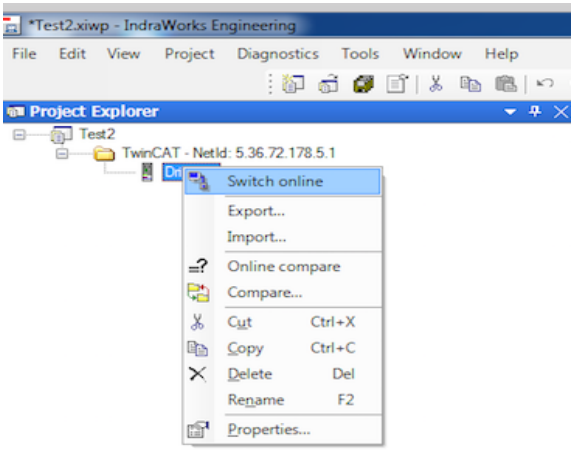
After selecting Connect to drives via third-party control unit… , following window will appear:

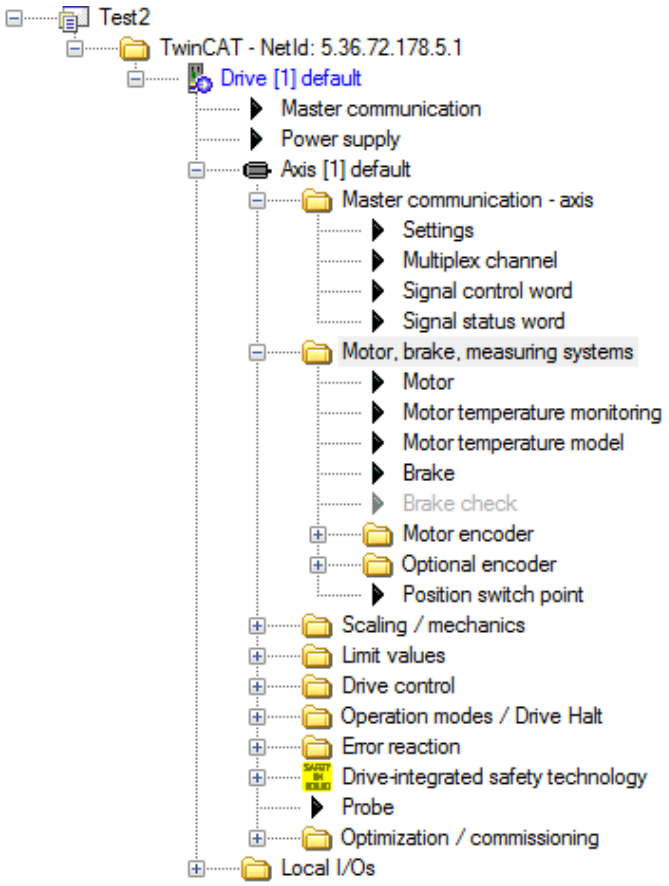


In the AMS NetId needs to be the same IP address as the Net Id address from the EtherCAT Master in TwinCAT:



Now, the drive can go online and all the settings will appear:





3. REFERENCES

[1] Ref 1

[2] Ref 2

[3] Ref 3

4. APPENDIX A: XXX