# Establishing a Connection with the Fenac Ethernet IP Encoder Device

Power cable and data cable are correctly connected to the device. Details about the connection pinout structure are explained in the section "4.Connector & Pin Assignment". Power cable and data cable are indicated in the figure on the side. It is also specified to which input ports the power cable and data cable will be connected to the Fenac Ethernet IP encoder. The device can be supplied with DC voltage in the range of 10V to 30V. The other end of the data cable must be connected to an Ethernet IP master. Here we will talk about two methods. Defining a personal computer as an ethernet IP master device and connect the data cable to the ethernet port of a PC is an easy method, as no external hardware is required. You can do your various tests in this way. The other method is to use a PLC device with Ethernet IP Master as traditionally
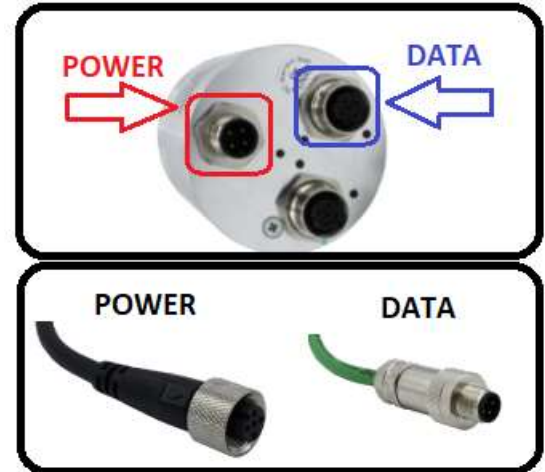
EtherNet/IP™

Method 1
PC as Master

Method 2
PLC as Master

Method 1: PC as Ethernet IP Master

If you have a PC with an Ethernet Ip compatible ethernet card, you can quickly establish a connection with this method without any external hardware. This method may not work depending on the chipset of your computer's ethernet card. After supplying the Ethernet Ip encoder by a voltage in the range of 10-30V from the power supply, connect the data cable to the Ethernet port of your PC. After this process, the status LEDs on the ethernet port of your PC will light up, indicating that there is a successful connection.

TwinCAT version 3 must be installed in your PC. Open the TwinCAT 3 interface.

Click on File>New>Project to start a new project. Give the project to a name then click OK.
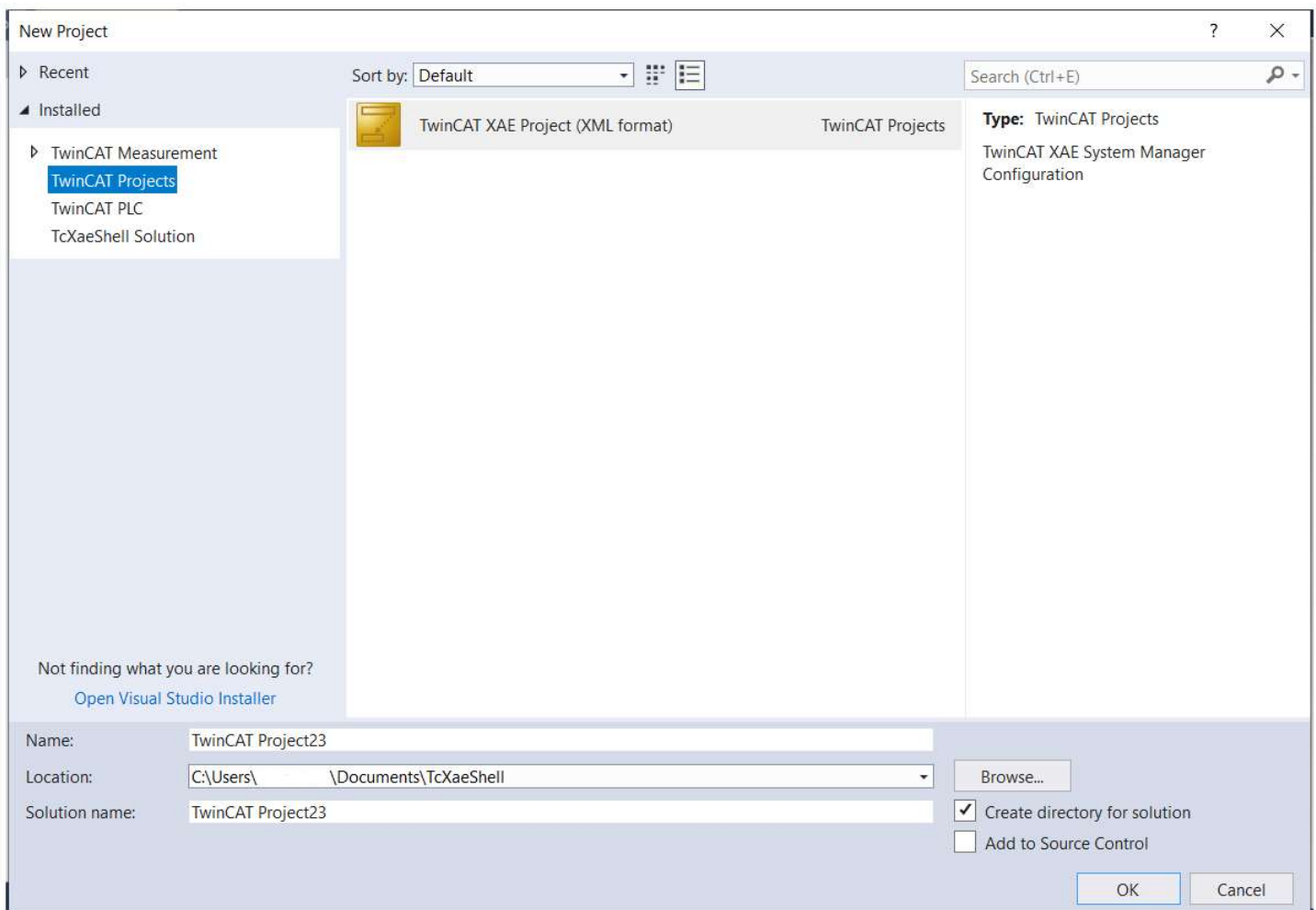
From the left tab click on I/O>Devices right click and Add a new item to add EtherNET IP master device. To define your PC as EtherNET IP master device chose "EtherNET/IP Scanner" and select Target Type as "PC only". Then click ok.
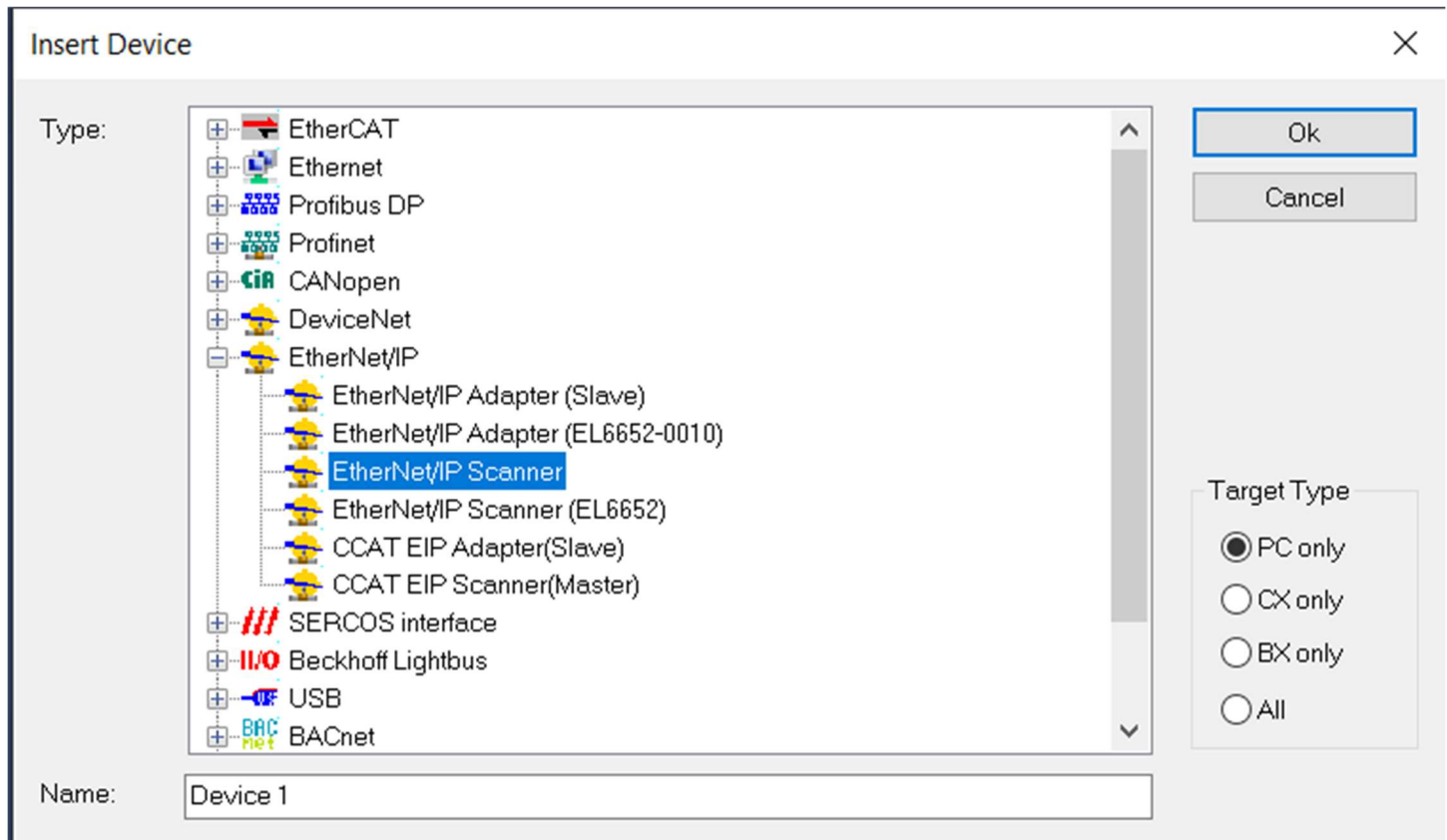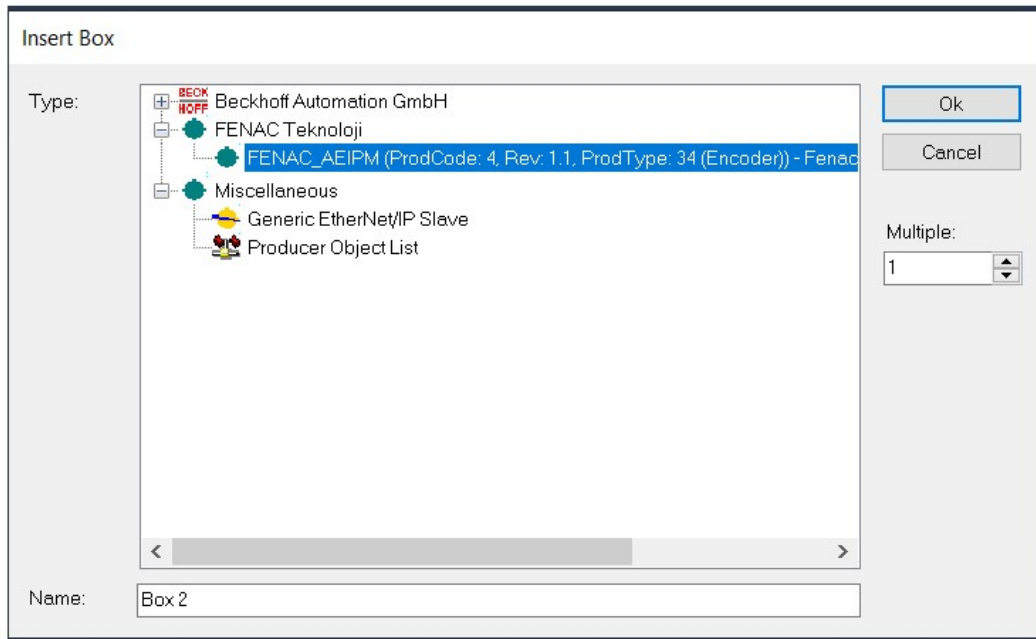

In our case, Ethernet(Realtek Gaming GbE Family Controller) supports ethernet IP communication so we chose it and click OK.
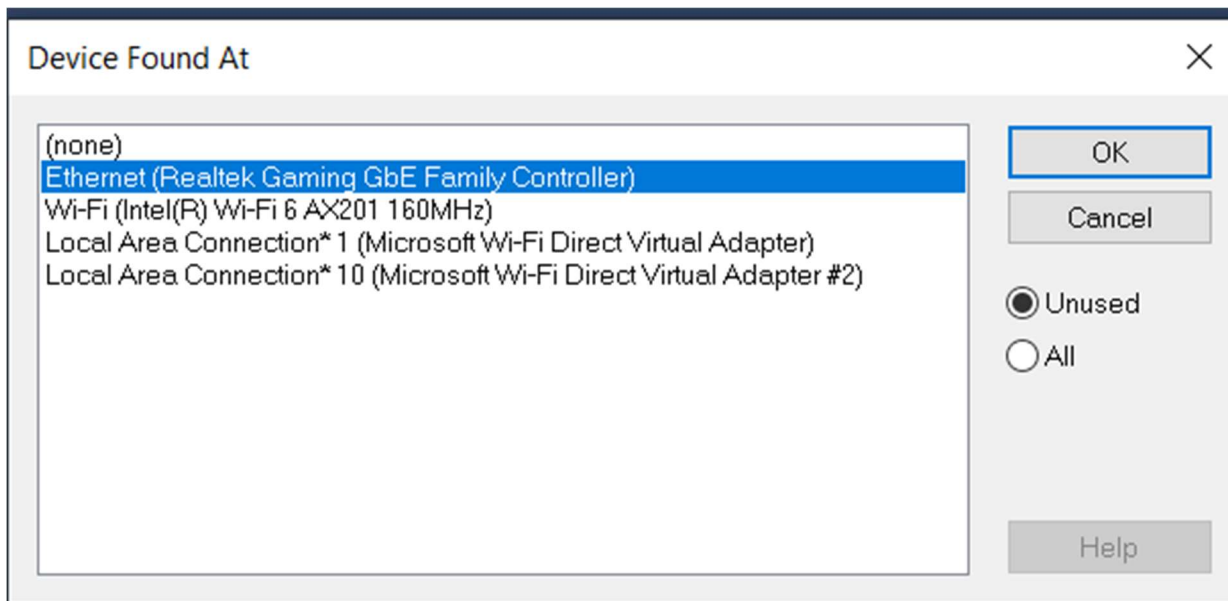
In the left side The Device 1(TC3 EIP Scanner) added. Right click on it to "Import EDS File". Related twinCAT directory on your PC should open up and you need to add "Fenac_Ethernet_IP_Encoder_AEIPM.EDS" file to this folder. After that click on Fenac_Ethernet_IP_Encoder_AEIPM.EDS to select it and click Open.
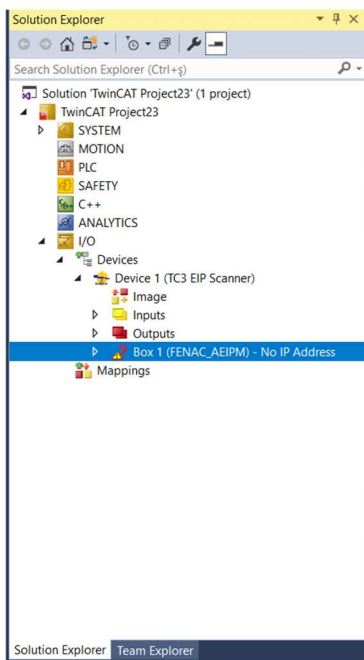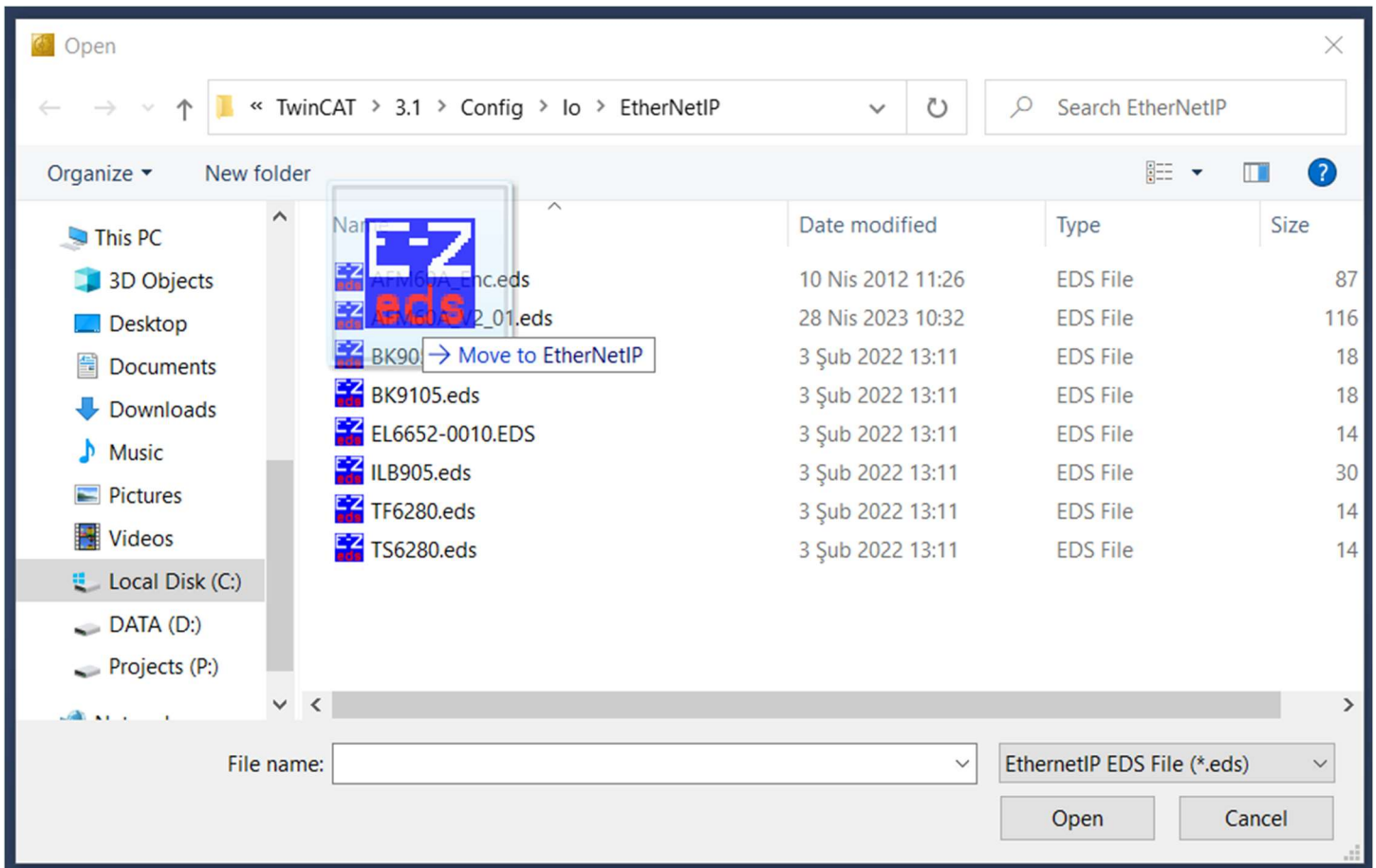

On the left side again right click on Device 1(TC3 EIP Scanner) and add new item to add encoder slave device from our eds file. Find FENAC_AEIPM device from there and select it and click OK to add it. If you don't have the EDS file you can download it from www.fenac.com.tr .

Insert Box

Type:
- Beckhoff Automation GmbH
- FENAC Teknoloji
    - FENAC_AEIPM (ProdCode: 4, Rev: 1.1, ProdType: 34 (Encoder)) - Fenac
- Miscellaneous
    - Generic EtherNet/IP Slave
    - Producer Object List

Ok
Cancel

Multiple: 1

Name: Box 2

After this addition you should configure the Master's Ip address. Double Click to "Device 1(TC3 EIP Scanner) to open settings. In the "settings" tab you should set an IP address under the F800:0 object. Set the master IP address and Network mask. In our case we are using 192.168.2.123 as master. And set the Network Mask as 255.255.255.0.
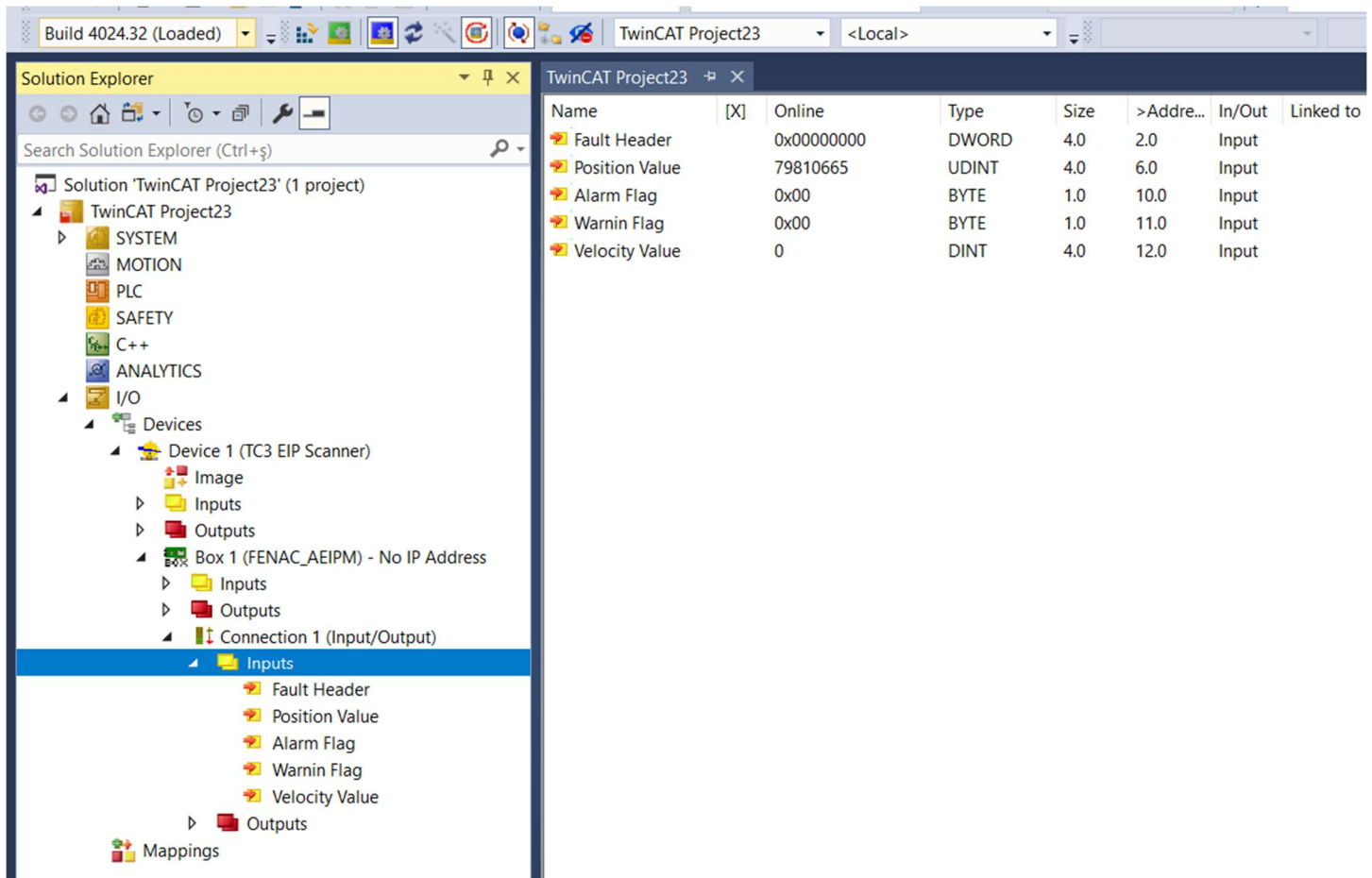
General | Adapter | EtherNet/IP | Sync Task | Settings | Explicit Messaging List | Diag History | DPRAM (Online)

Master Settings

Index	Name	Flags	Value	Unit
F800:0	Master Settings	M RO	> 43 <	
F800:01	Number	M RO	0x0001 (1)	
F800:03	Product Name	M RW	Device 1 (TC3 EIP Scanner)	
F800:04	Device Type	M RO	0x000C (12)	
F800:05	Vendor ID	M RO	0x006C (108)	
F800:06	Product Code	M RO	0x1889 (6281)	
F800:07	Revision	M RO	3.1	
F800:08	Serial Number	M RO	0x00000000 (0)	
F800:20	MAC Address	M RO	6E 02 E0 5B F2 38	
F800:21	IP Address	M RW	192.168.2.123	
F800:22	Network Mask	M RW	255.255.255.0	
F800:23	Gateway Address	M RW	0.0.0.0	
F800:24	DHCP Max Retries	M RW	0	
F800:25	TCP/IP TTL	M RW	128	
F800:26	TCP/IP UDP Checksum	M RW	TRUE	
F800:27	TCP/IP TCP Timeout	M RW	30 Seconds	
F800:28	MultiCast TTL	M RW	1	
F800:29	MultiCast UDP Checksum	M RW	FALSE	
F800:2A	Forward Class3 to AmsPort	M RW	DISABLED	
F800:2B	Advanced Options	M RW	0x0000 (0)	
F900:0	Master Info	RO	> 43 <	

Finally we can set our FENAC_AEIPM encoders IP address to. To do that right click on Box1 (FENAC_AEIPM) and set the IP address as 192.168.2.101 then click OK. After this step the question mark on our encoder will disappear.
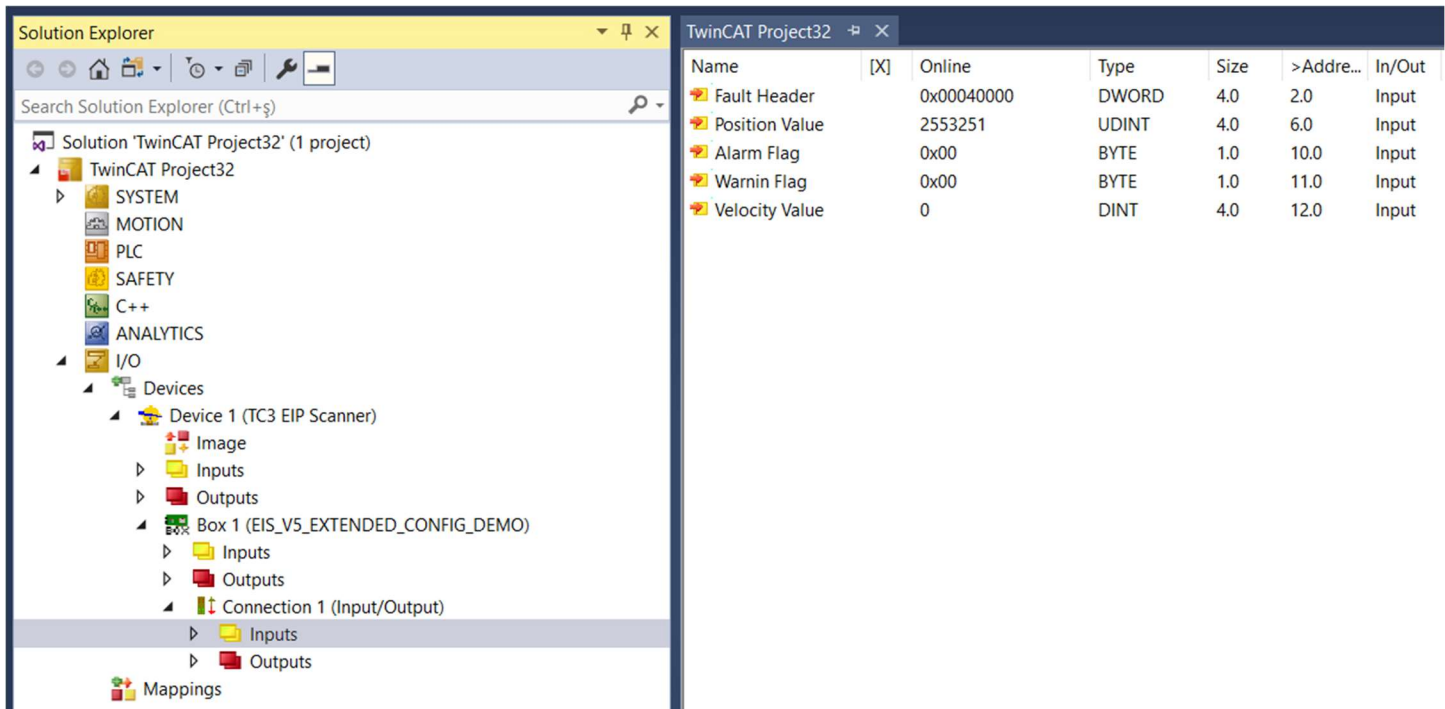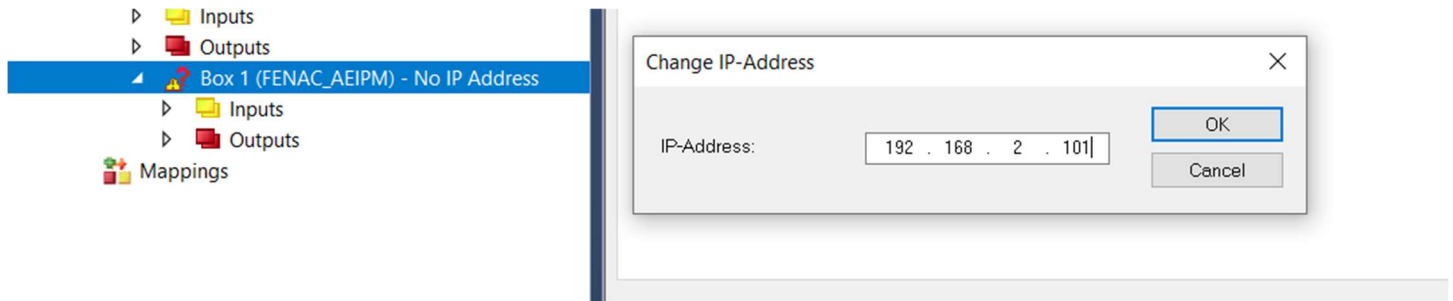

Right-click on Box 1(FENAC_AEIPM) > Append I/O connection > Exclusive Owner to add connection to our project.

Open the Connection 1 and click on Inputs then press reload devices button. You sould see the Proccess Datas such as Position Alarm and Velocity. If you do not see the outputs, you should click on the 'Reload Devices' button above. ( )
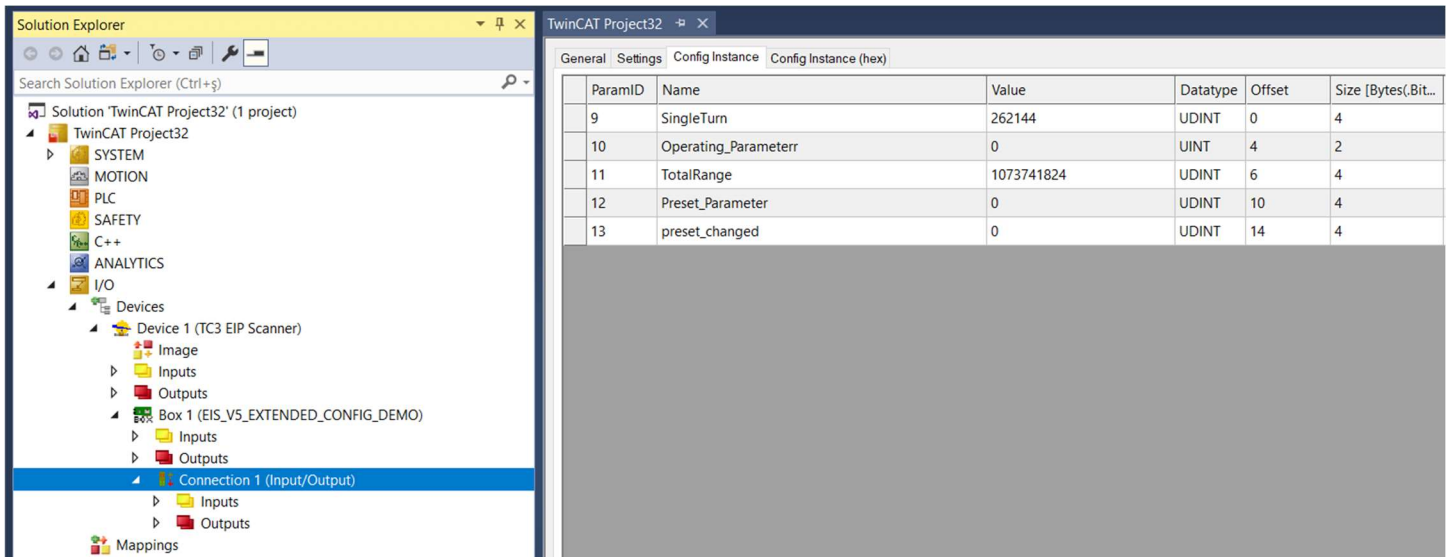
ETHERNET IP ENCODER OUTPUTS AND CONFIGURATION

Here you can see the position value and Velocity Value changing when you turn the encoder shaft. These are the Process Data and it updates cyclically.

CHANGING THE RESOLUTION

ParamID	Name	Value	Datatype	Offset	Size [Bytes(.Bit...
9	SingleTurn	262144	UDINT	0	4
10	Operating_Parameterr	0	UINT	4	2
11	TotalRange	1073741824	UDINT	6	4
12	Preset_Parameter	0	UDINT	10	4
13	preset_changed	0	UDINT	14	4

As shown in the above picture Config Instance has the SingleTurn Value to configure revolution per span. You can set it to a new value and enable scaling option to configure new resolution per span. TotalRange parameter is also same but it limits the highes countable point (overflow point). Both of this SingleTurn and TotalTurn value to work you should enable scaling by setting Operating_Parameter's 2rd bit as 1 . Operating_Parameter also configures the CW and CCW increment options. By setting zeroth bit of the Operating_Parameter you can configure the CW/CCW incrementations. 0 is CW and 1 is CCW so you should set it 1 for CCW.

CHANGING SINGLE-TOTAL TURN RESOLUTION EXAMPLE

In this example we set Scaling enable and CCW increment method by setting zeroth and second bits of Operating_Parameter which means setting it as 5. We also configured SingleTurn as 10 count and TotalRange as 100. As shown in the below we should see 10 counts changing for every span int the Position Value parameter. And It will overflows and return back to 0 when Position Value reaches its high limit as TotalRange.

ParamID	Name	Value	Datatype	Offset	Size [Bytes(.Bit...
9	SingleTurn	10	UDINT	0	4
10	Operating_Parameterr	5	UINT	4	2
11	TotalRange	100	UDINT	6	4
12	Preset_Parameter	0	UDINT	10	4
13	preset_changed	0	UDINT	14	4

Name	[X]	Online	Type	Size	>Addre...	In/Out
Fault Header		0x0000000a	DWORD	4.0	2.0	Input
Position Value		20	UDINT	4.0	6.0	Input
Alarm Flag		0x00	BYTE	1.0	10.0	Input
Warnin Flag		0x00	BYTE	1.0	11.0	Input
Velocity Value		-15	DINT	4.0	12.0	Input

CHANGING PRESET PARAMETER

When you need to set a pirtucular physical (mechanical) position as the starting point you should preset this position to achive this.

In this example we change the Preset_Parameter as 100 to start from 100 counts. To do this we also set preset_changed value as 1. As you can see below the new Position Value is 100

TwinCAT Project32

General | Settings | Config Instance | Config Instance (hex)

ParamID	Name	Value	Datatype	Offset	Size [Bytes(.Bit...
9	SingleTurn	262144	UDINT	0	4
10	Operating_Parameterr	0	UINT	4	2
11	TotalRange	1073741824	UDINT	6	4
12	Preset_Parameter	100	UDINT	10	4
13	preset_changed	1	UDINT	14	4

TwinCAT Project32

Name	[X]	Online	Type	Size	>Addre...	In/Out
Fault Header		0x00040000	DWORD	4.0	2.0	Input
Position Value		100	UDINT	4.0	6.0	Input
Alarm Flag		0x00	BYTE	1.0	10.0	Input
Warnin Flag		0x00	BYTE	1.0	11.0	Input
Velocity Value		0	DINT	4.0	12.0	Input

STORING PARAMETERS

To Store parameters you should write 0x65766173 the signature which is actually "save" (evas).

In this example below we configure single turn as 10 and totalRange as 50 and scaling enabled by setting Operating_Parameter to 4. To store all this parameter to be able to save after power down situations we set Store_Parameters as 0x65766173.

ParamID	Name	Value	Datatype	Offset	Size [Bytes(.Bit...	Help String
9	SingleTurn	10	UDINT	0	4	
10	Operating_Parameterr	4	UINT	4	2	
11	TotalRange	50	UDINT	6	4	
12	Preset_Parameter	0	UDINT	10	4	
13	preset_changed	0	UDINT	14	4	
14	Store_Parameters	0x65766173	UDINT	18	4	0x65766173 The signature that shall be written is \"save\" (evas)
15	Restore_Parameters	0	UDINT	22	4	0x64616F6C The signature that shall be written is \"load\" (doal)

After that we should click on Reload button to send this datas to our slave device in out case it is our encoder device.

Now our parameters saved inside of our Ethernet IP encoder. To test it we can restart the encoder by power down. After restart we should see the configurations from single turn and total turn values.

Name	[X]	Online	Type	Size	>Addre...
Fault Header		0x0000000a	DWORD	4.0	2.0
Position Value		28	UDINT	4.0	6.0
Alarm Flag		0x00	BYTE	1.0	10.0
Warnin Flag		0x00	BYTE	1.0	11.0
Velocity Value		0	DINT	4.0	12.0

RESTORING PARAMETERS

If we need to go back to the factory default configuration parameters we should restore the parameters. Click on Restore defaults button to get the default parameter values from the eds file. After that enter 0x64616F6C to Restore_Parameters which is actually signature for "load" (doal).
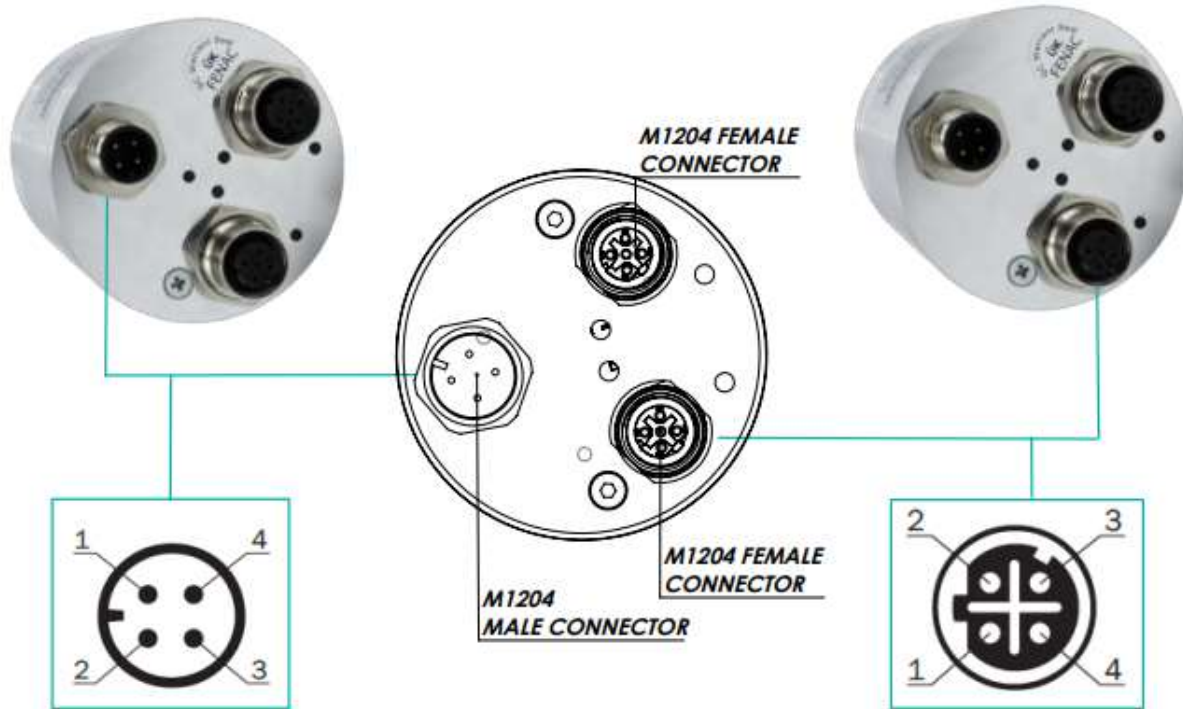

Click on Reload button again to pass this info to our encoder. After that you can see the factory configuration like from below image.

![FENAC Automation Control]

4. Connector & Pin Assignment

Pin Assignment

M1204 FEMALE CONNECTOR

M1204 FEMALE CONNECTOR

M1204 MALE CONNECTOR

PIN	Signal
1	U_s 10 V...30V
2	Not assigned
3	GND
4	Not assigned

PIN	Signal
1	T x D+
2	R x D+
3	T x D-
4	R x D-

Counter Connector Part Number
FCSF M1204   : M1204 Female Connector
FCSF M1204 R200 : M1204 Female Connector with 2 meter cable

Counter Connector Part Number
FCSM DTM1204   : D Type M1204 Female Connector
FCSM DTM1204 R200 : D Type M1204 Female Connector with 2 meter cable