

EtherCAT Configurator User guide

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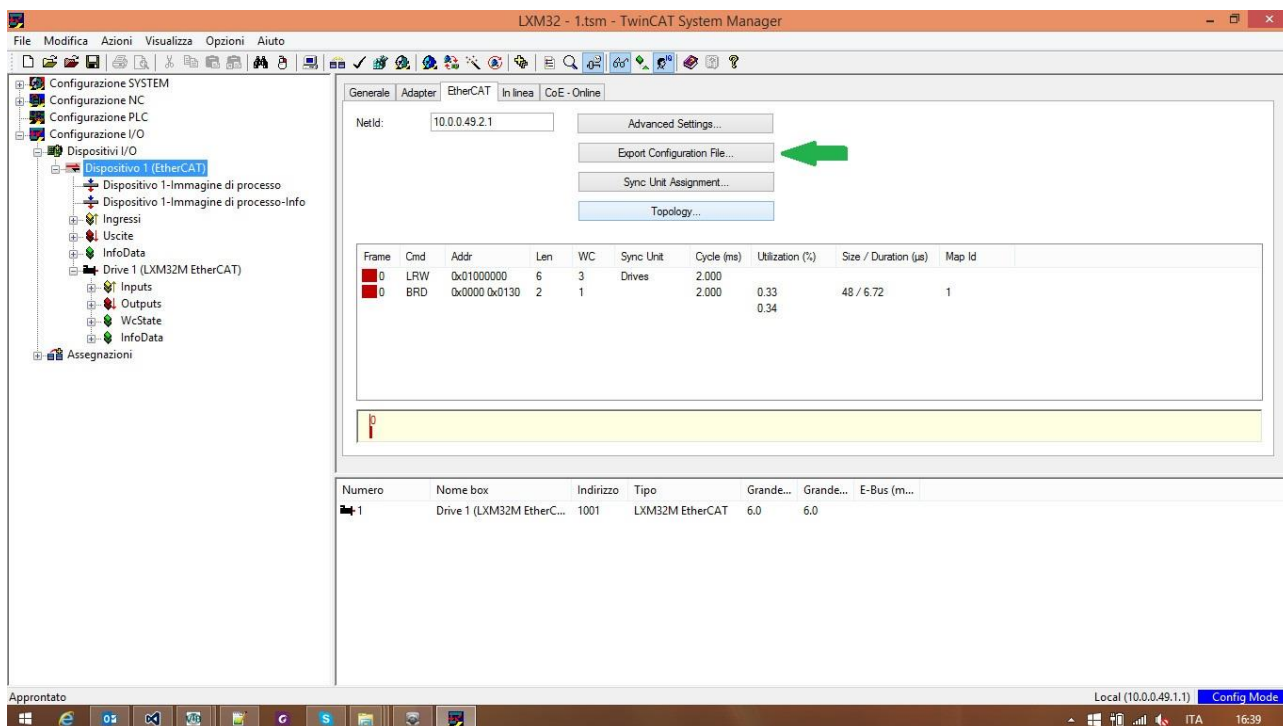
1 Introduction

This user guide explains how to use EtherCAT Configurator developed by Promax srl.

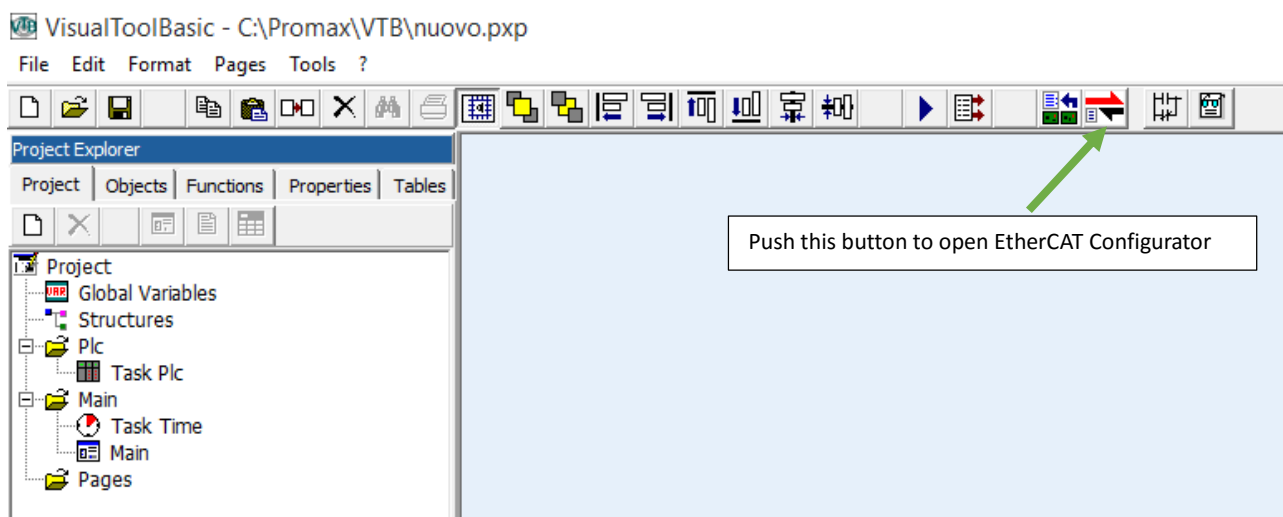
The plugin configuration does not occur executable independently, but it is included within the VTB application, which can be called at any time by the operator simply by pressing the appropriate button in the toolbar.

Before using EtherCAT Configurator the user needs a special configuration file, created by using another external software (TwinCat). This file .xml, containing a start EtherCAT configuration with the settings chosen by the user, will be used inside the Configurator.

The image shown below is a screenshot of TwinCat. You can see the section of the program to access and the button to push (indicated by the green arrow) if you want to generate the .xml configuration file with your start settings.

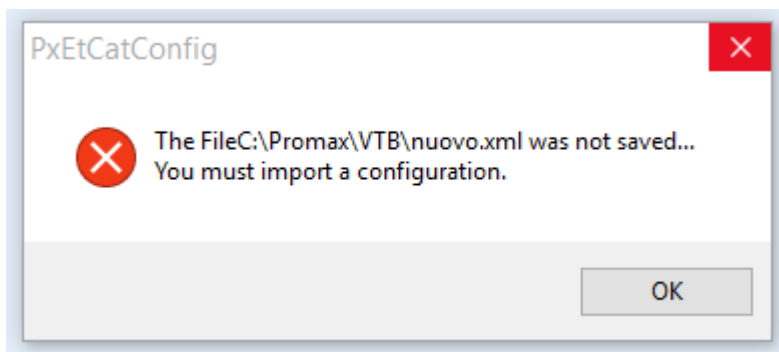


After that, open VTB and load your project or create a new one. Next, to launch EtherCAT Configurator push the dedicated button in the toolbar (indicated by the green arrow)

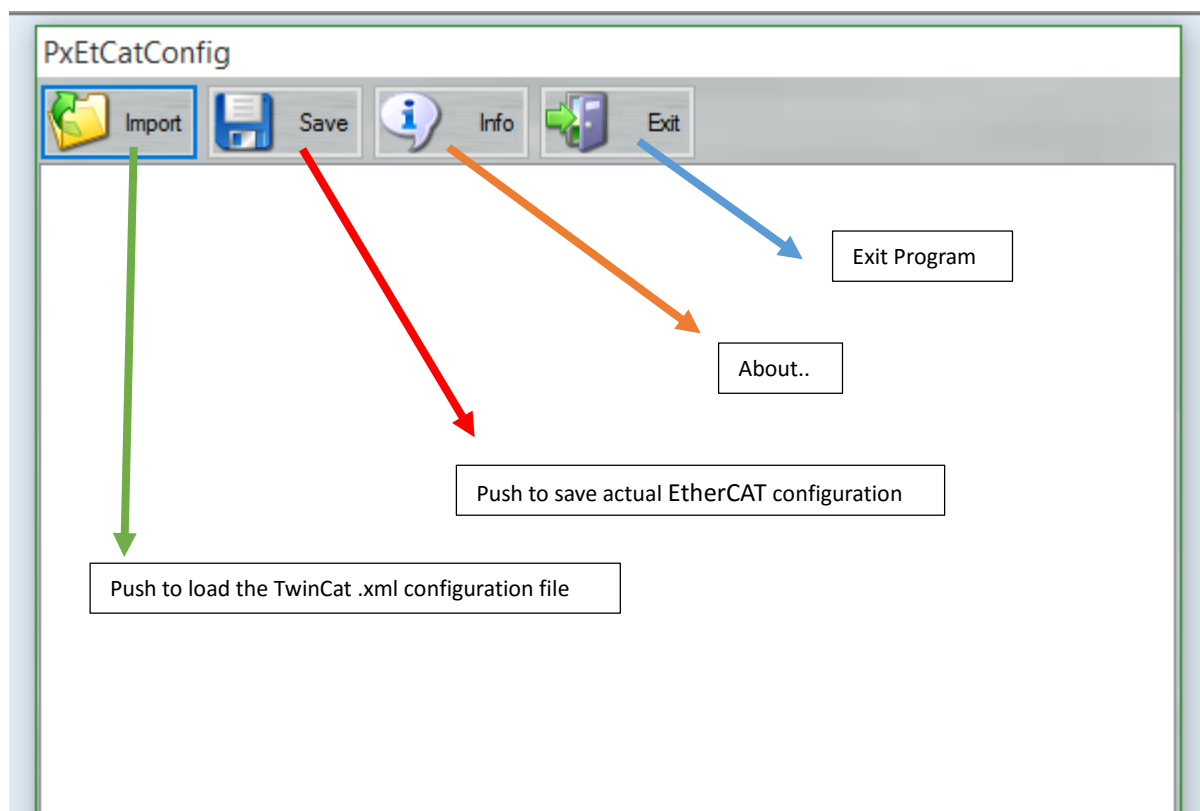


2 Program Interface

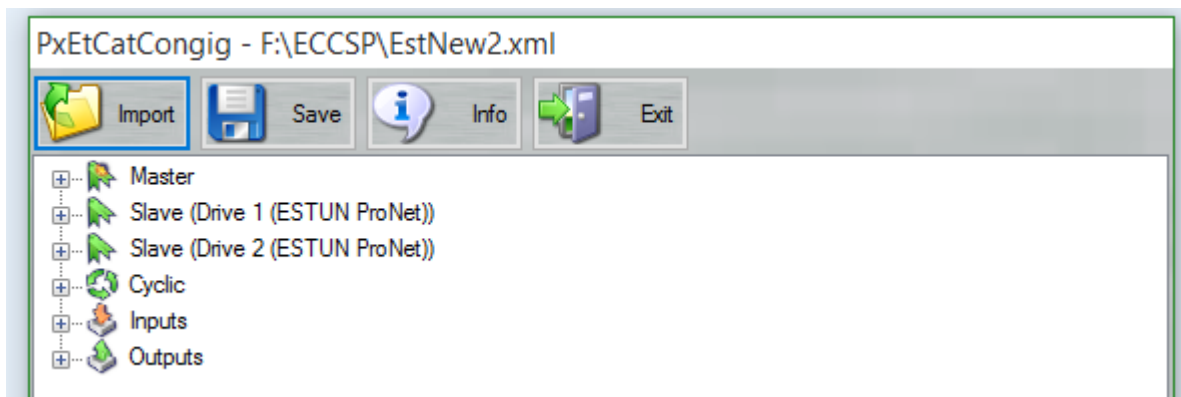
EtherCAT Configurator interface is composed by an only one window, not resizable and really easy to use. If no project has been loaded when opening VTB, the push of the EtherCAT Configurator button will generate an error message like this:



To proceed, push the OK button. EtherCAT Configurator will be launched, but with an empty window. Push the Import button and select your .xml configuration file generated by TwinCat: a tree view with the main settings will appear in the window. If you don't have this configuration file there's no way to proceed and you must generate it by using TwinCat. The image shown below is a screenshot which describes the use of the buttons in the window.



By pushing the Import button a list of main settings of the TwinCat .xml configuration file will appear like shown in the example screenshot below:



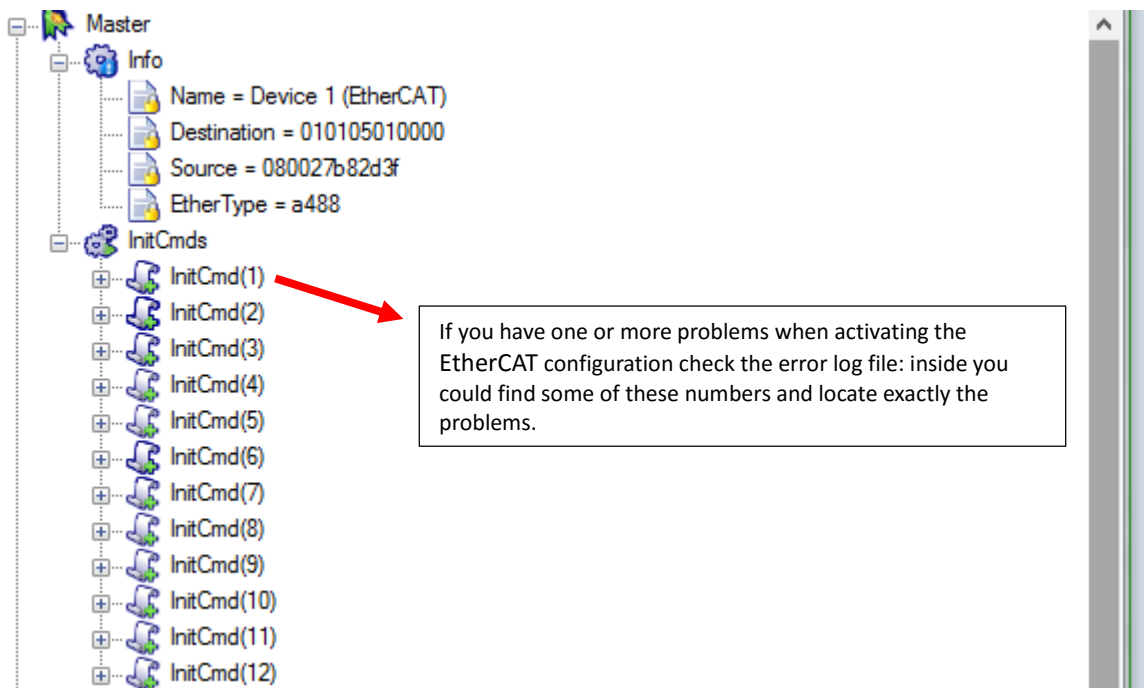
Whatever is the start configuration, these are the nodes that will appear in the tree view:

- A Master device;
- One or more Slave devices;
- A “Cyclic” node;
- An “Inputs” node;
- An “Output” node.

3 Overview of the various sections

3.1 Master

It is possible to get some information by expanding the Master node of the tree view.



The section “Info” contains general information about the Master device. The section “InitCmds” contains a series of associated commands to the Master.

All the values of these properties come from the TwinCAT .xml original configuration file and aren't editable by the user,

so this guide will not dwell further on these topics. For more details about these properties check other EtherCAT communication documents.

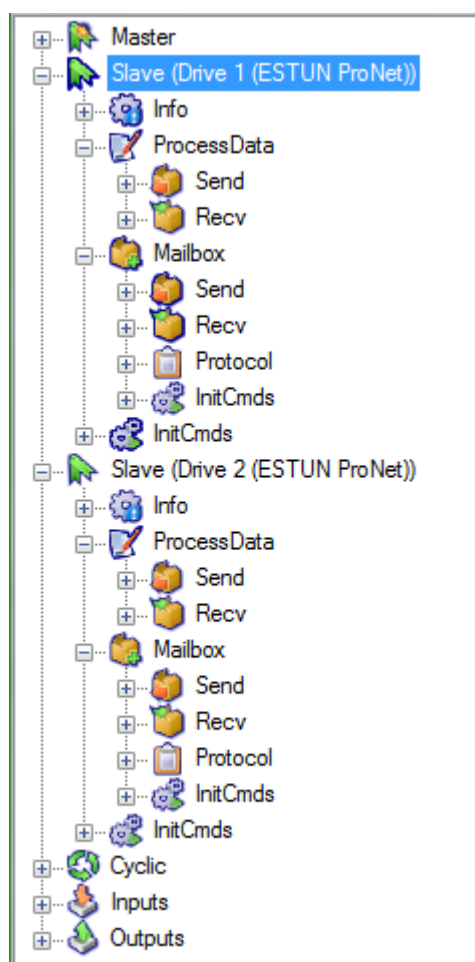
Only one thing is useful to know: as you can see in the previous screenshot, every InitCmd has an index. This number is important because when activating the EtherCAT Configuration if there are any problems, the user can find where exactly the problems are, looking for these InitCmd index inside the error log file.

3.2 Slaves

After you import the TwinCat .xml configuration file, a tree view with some nodes will appear in the window. Slaves are devices which are subordinated to the Master device in the EtherCAT configuration.

If you expand a Slave node in the tree view you can get other four nodes:

- Info;
- ProcessData;
- Mailbox;
- InitCmds.

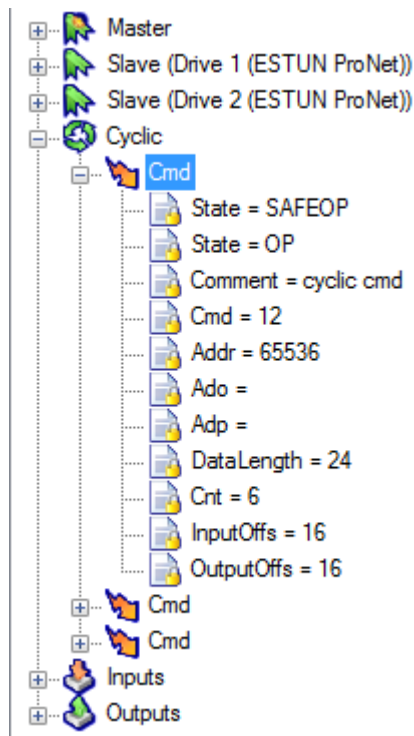


Just like Master section, all the slaves properties come from the TwinCat .xml original configuration file and aren't editable by the user which can only take a look at them. The number and the properties of the slaves are the same that the user set in the Twincat .xml file.

As we have already seen in the previous section even here we have a series of index associated to the various InitCmds. The importance is the same of those seen in the Master section: if there is an error in the error log file, the user, by looking for this numbers, can go back to the font of the problem.

3.3 Cyclic

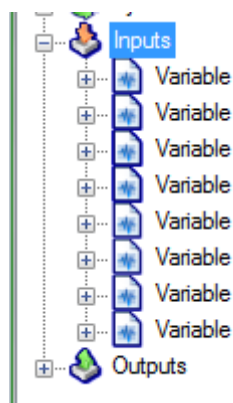
The Cyclic Section contains a series of commands, “Cmd”, which are sent through the EtherCAT configured net. The number and the kind of commands sent, reflects the settings established by the user during the development of the TwinCat .xml configuration file. Expand each Cmd node if you want to get some useful information, but remember that this properties aren’t editable.



3.4 Inputs

While previous sections have been illustrated faster since only information content, because the parameters which they contain are not modifiable by the operator, the next two sections are more important for practical purposes and this user guide will give them more space.

The Inputs Section contains a series of variables relatives to the communication from the slaves to the PLC. These variables are generated from the setting established by the user developing the TwinCat .xml configuration file.

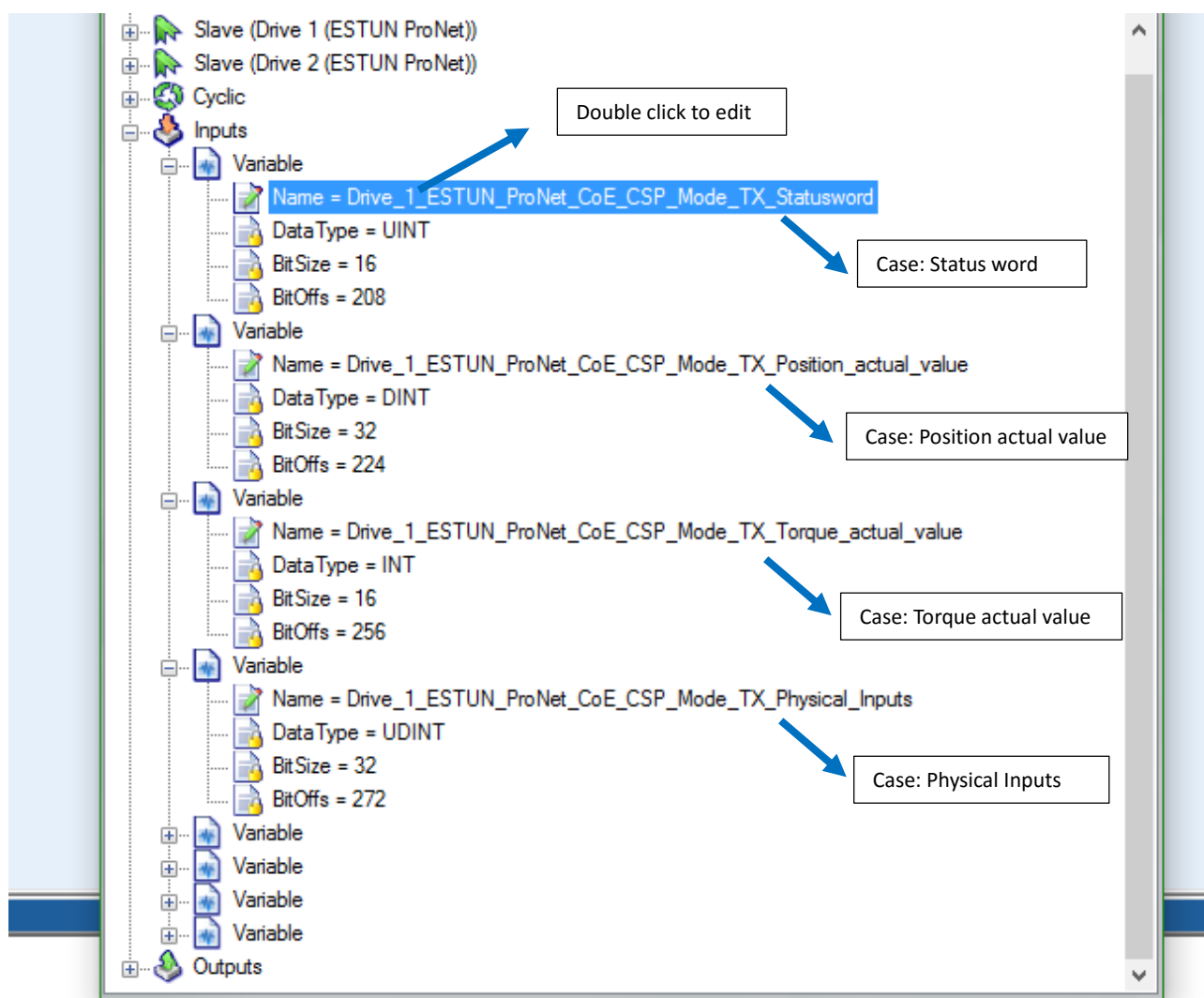


The user can only edit the “Name” parameter for each variable. All the remaining parameters are locked for editing. You can get only information from them.

The Name edit operation is essential only if the VTB project contains the use of IsoNs objects, but is absolutely

recommended because original variables names are a little too long and impractical.

In the image shown below you can find a screenshot which contains the variables generated by using a TwinCat .xml file for a 2 axis configuration. As you can see, without any edit operation, variables names are very long.

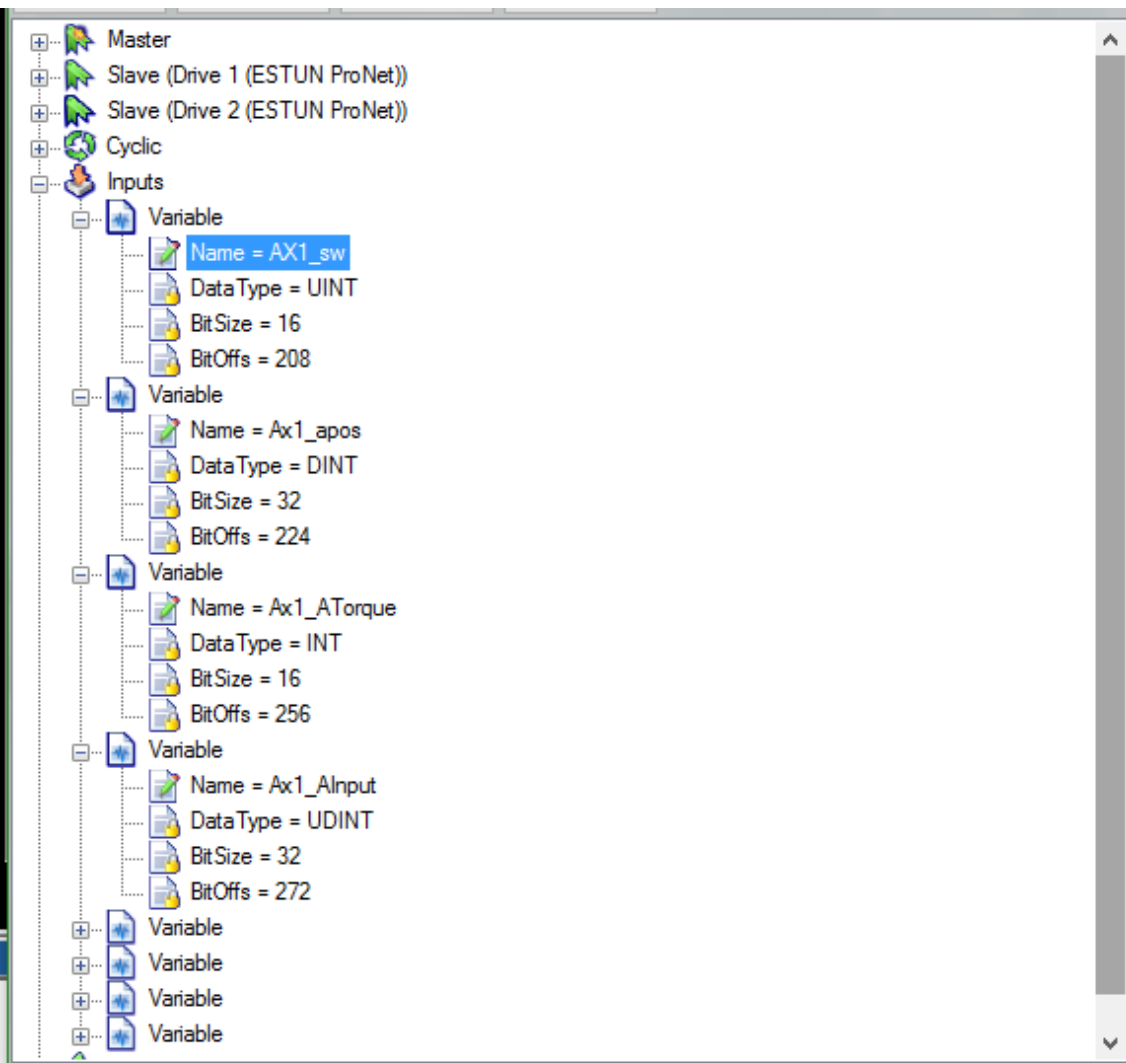


If the VTB project contains IsoNs objects these are the rules to follow to edit the variables names:

1. In the case of a Status word -> Name = Prefisso pdo_sw
2. In the case of a Position actual value -> Name = Prefisso pdo_apos
3. In the case of a Torque actual value -> Name = Prefisso pdo_ATorque
4. In the case of a Physical inputs -> Name = Prefisso pdo_inp

“Prefisso pdo” is unique for each driver and its value must be the same of the one set in the properties of the Iso-ECAT.vco object associated to the driver.

So we assume that the VTB project contains two Iso-ECAT.vco objects with “AX1” and “AX2” values for this property: in the screenshot below you’ll find the correct changes to be made.



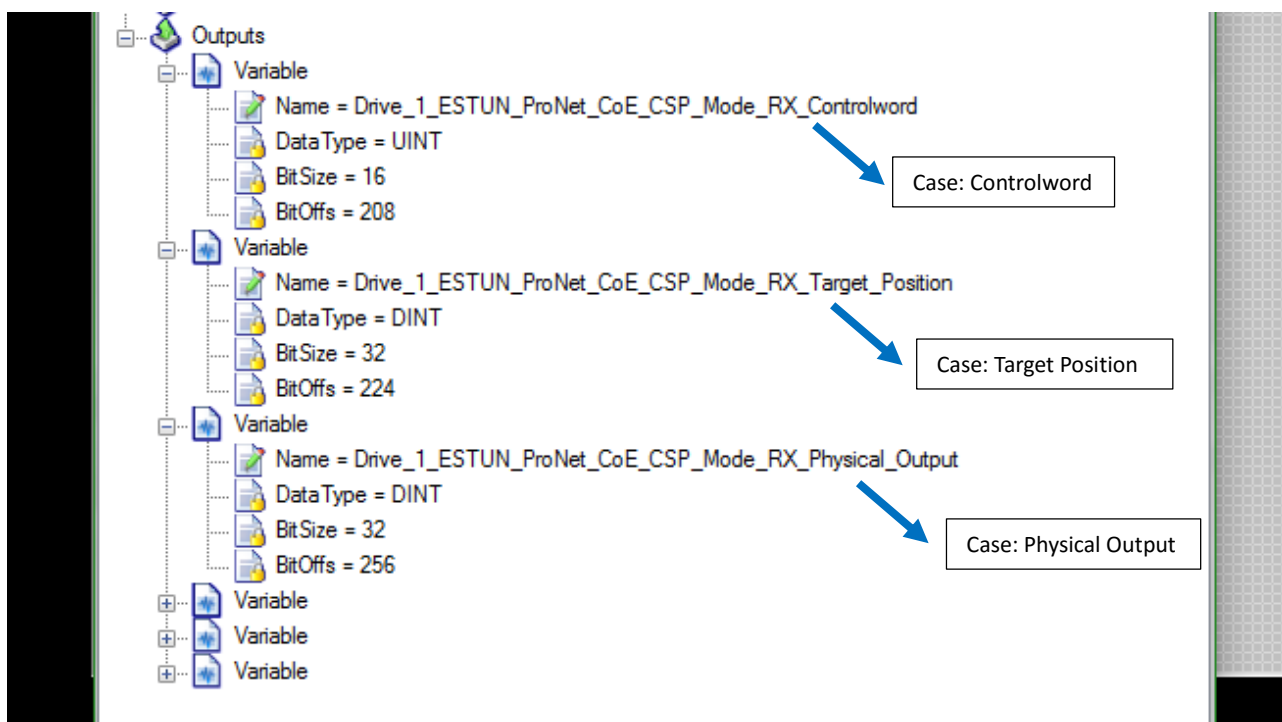
3.5 Outputs

Just like previous section, this one is very important in EtherCAT Configurator.

Here you can find a series of variables related to the communication from PLC to Slaves. All parameters for each variable are derived from the settings of the TwinCat .xml configuration file.



Among all variables parameters the only one the user can edit is “Name”. The other parameters are for information purpose only.



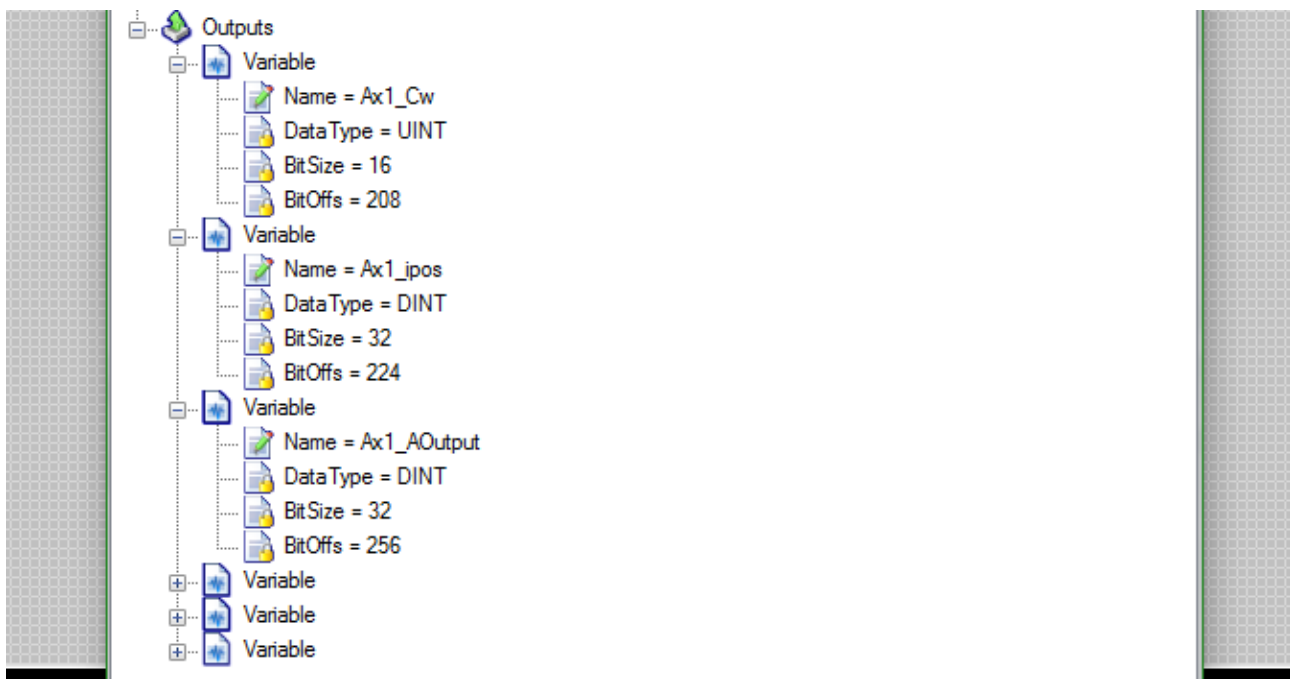
The Name edit operation is essential only if the VTB project contains the use of IsoNs objects, but is absolutely recommended because original variables names are a little too long and impractical. To edit it, double click on it.

If the VTB project contains Iso-ECAT.vco objects follow these rules to edit variables names:

1. In the case of Controlword -> Name = Prefisso pdo_cw
2. In the case of Target Position -> Name = Prefisso pdo_ipos
3. In the case of Physical Output -> Name = Prefisso pdo_AOutput

“Prefisso pdo” is unique for each driver and its value must be the same of the one set in the properties of the Iso-ECAT.vco object associated to the driver.

So we assume that the VTB project contains two Iso-ECAT.vco objects with “AX1” and “AX2” values for this property: in the screenshot below you’ll find the correct changes to be made.



4 Example: EtherCAT Configurator for 3 interpolated IsoNS axes with PEC70

In this chapter an example will be shown to make easier the use of EtherCAT Configurator.

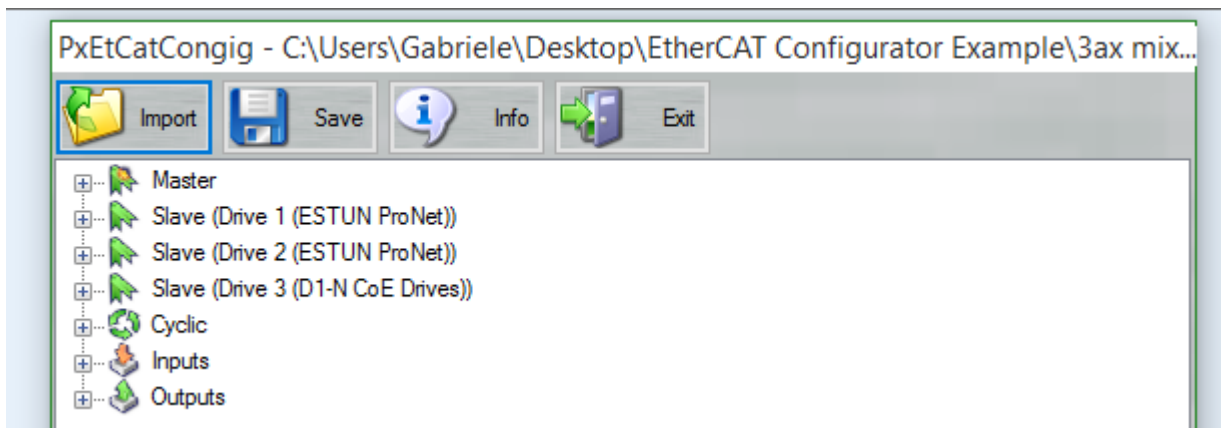
We assume a configuration that includes a PLC PEC70 and three interpolated IsoNS axes. The first part is about the creation of the final EtherCAT configuration by using Promax EtherCAT Configurator plugin. To start, it is essential that the user has the related correct TwinCat .xml configuration file. In the example we omit the entire procedure to create this file, leaving it to the user.

The second part is about the creation of the related VTB project by inserting the correct objects and adding the correct code.

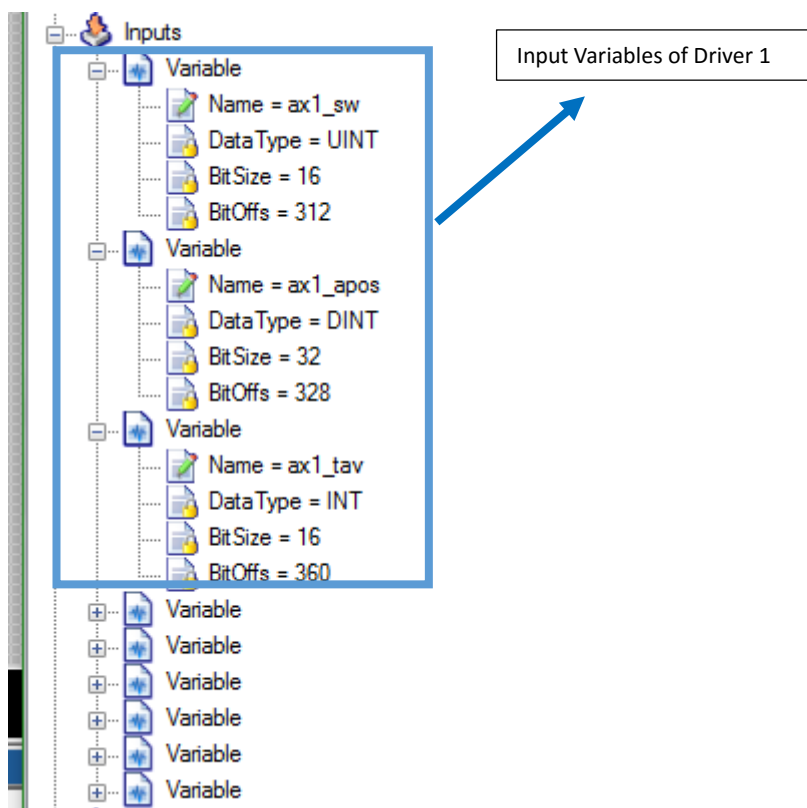
0. By using TwinCat generate the .xml start configuration file and copy this file in a directory that will contain the future VTB project. In this example we assume that the file name is "3axmixed.xml" and the directory name is "EtherCAT Configurator Example"
1. Open a new VTB project and save it (we use the name "ExampleProject") in the directory containing the TwinCat .xml file. Next, open EtherCAT Configurator by pushing the related button (indicated by the blue arrow in the screenshot shown below) in the toolbar.

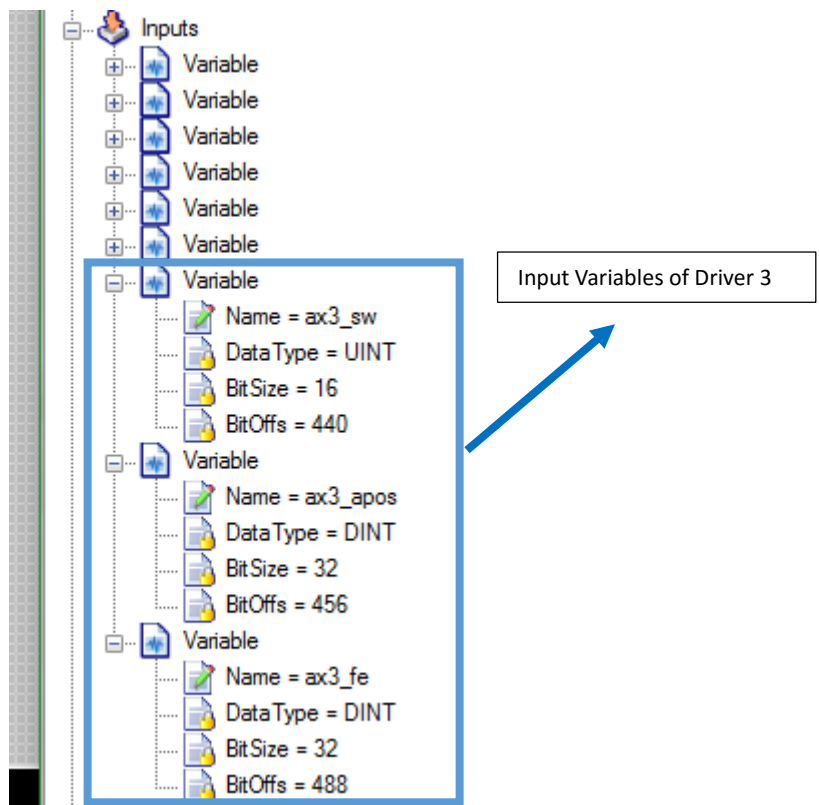
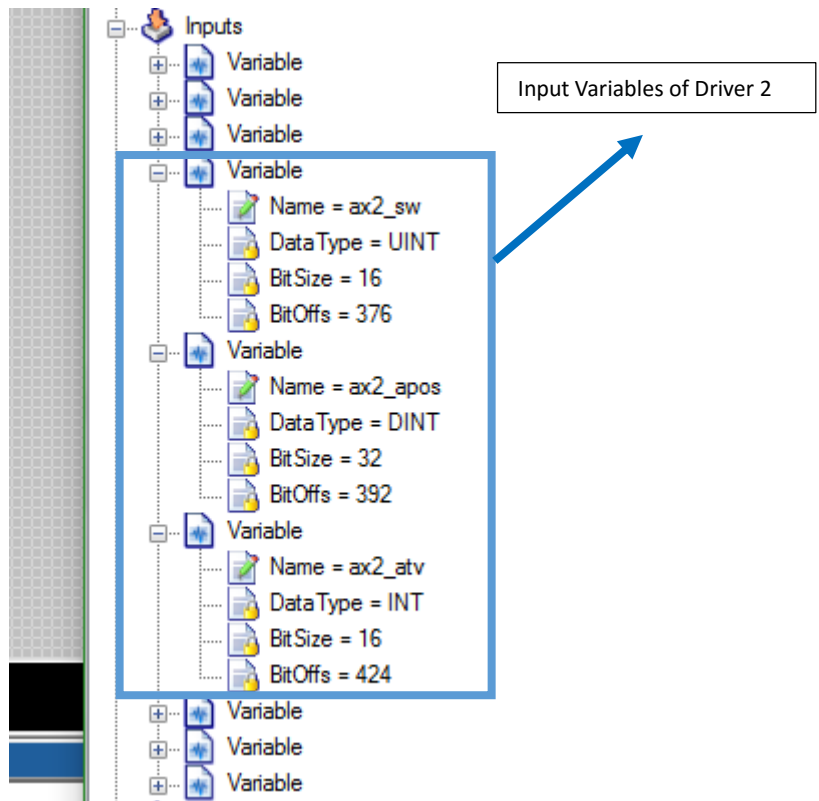


2. When pushing the button an error message box will appear. No problem, just push the OK button to go on. EtherCAT Configurator window will appear on the screen. Push the Import button, select the .xml TwinCAT file and open it. This will be the new look of the window:

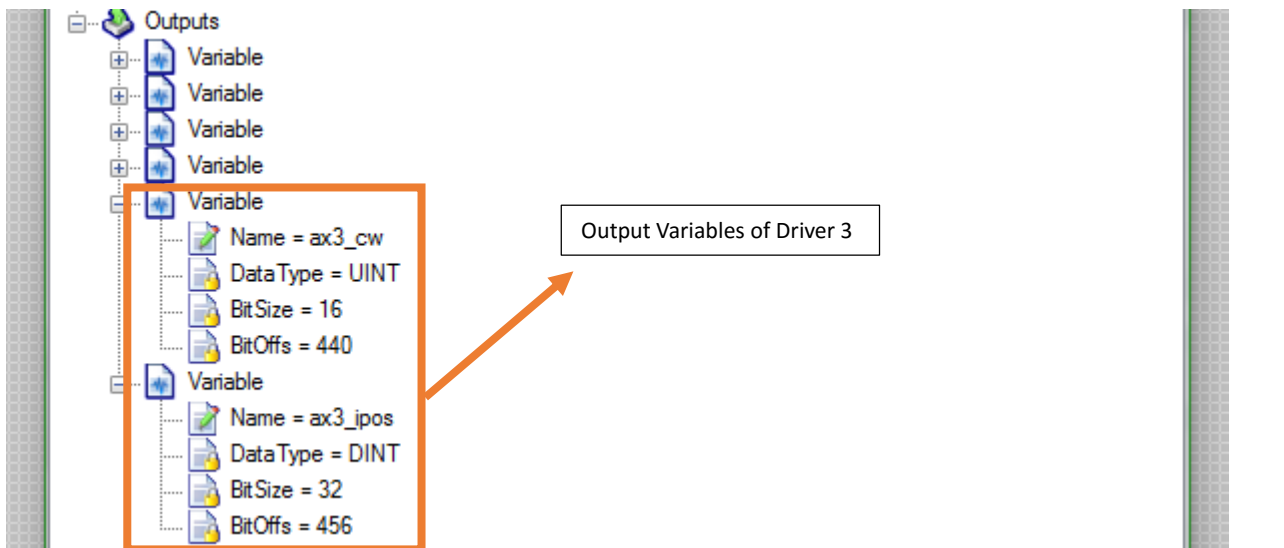
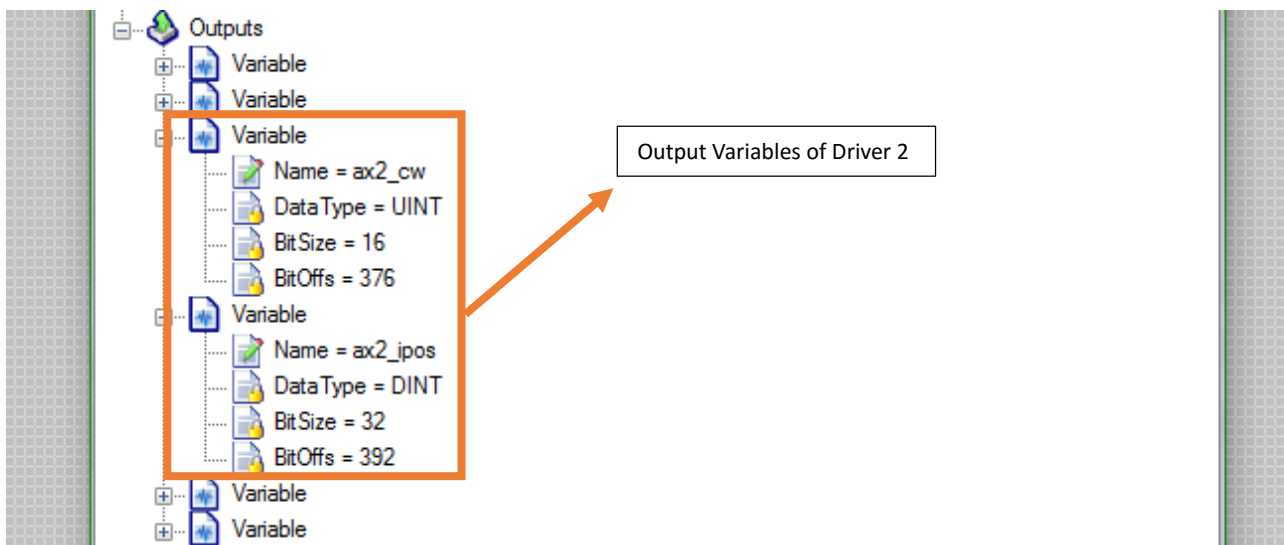
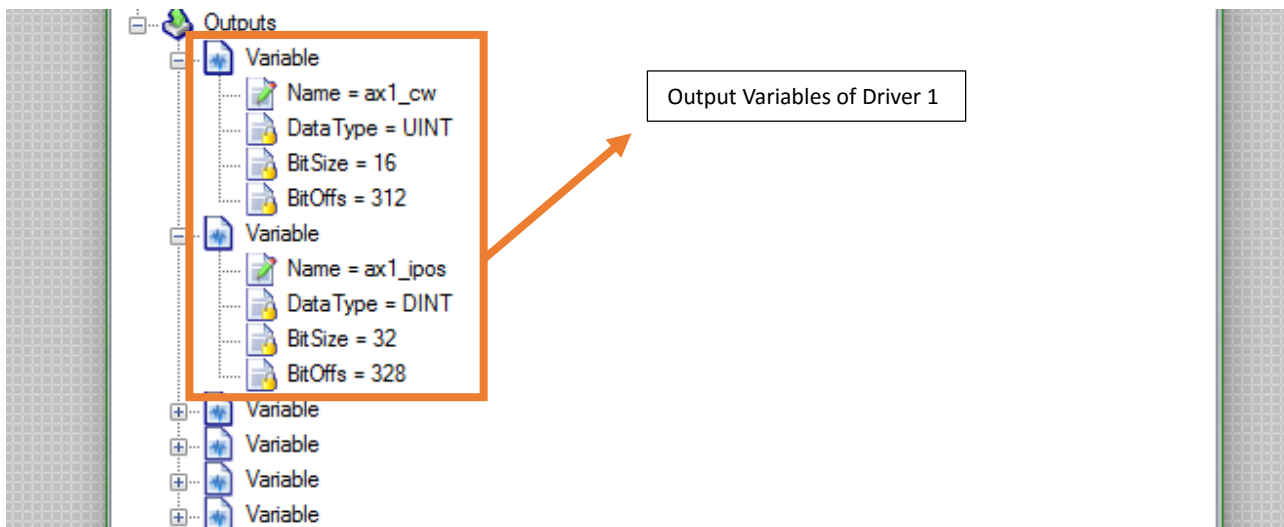


- Master, Slaves and Cyclic sections aren't editable, so let's see how modify the next two sections, starting from Inputs. If you open this section you'll see variables names too long and not good to create the final configuration. Here are shown three screenshots containing the new and correct variables names:

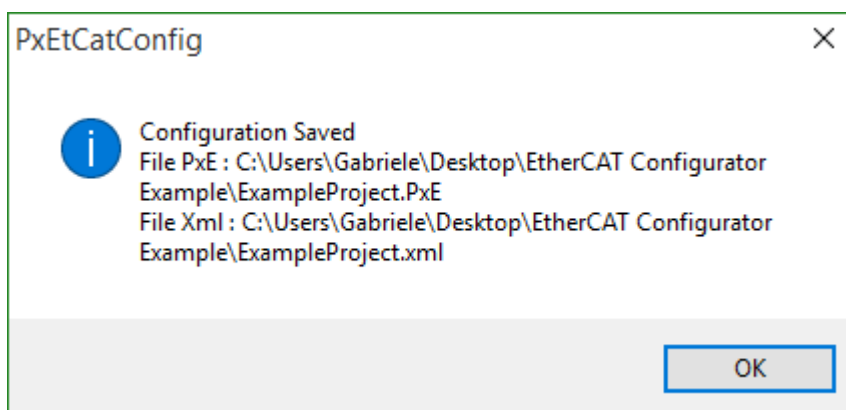




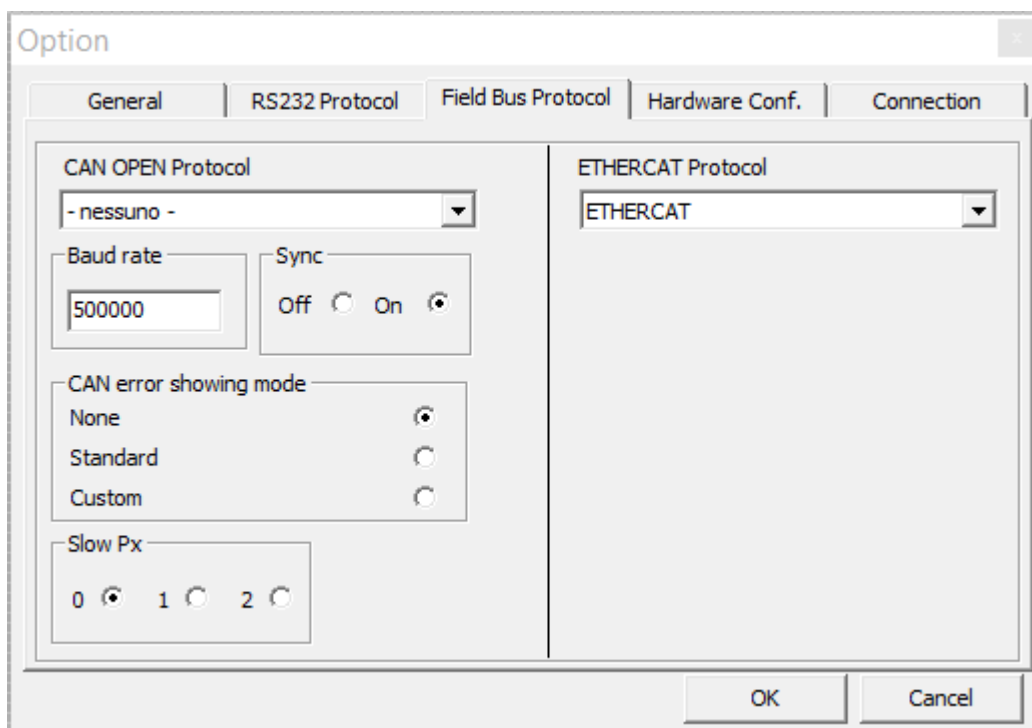
- After that, let's check Outputs variables. Even in this section the names of the variables are wrong, so let's edit them like shown in the next screenshots below:



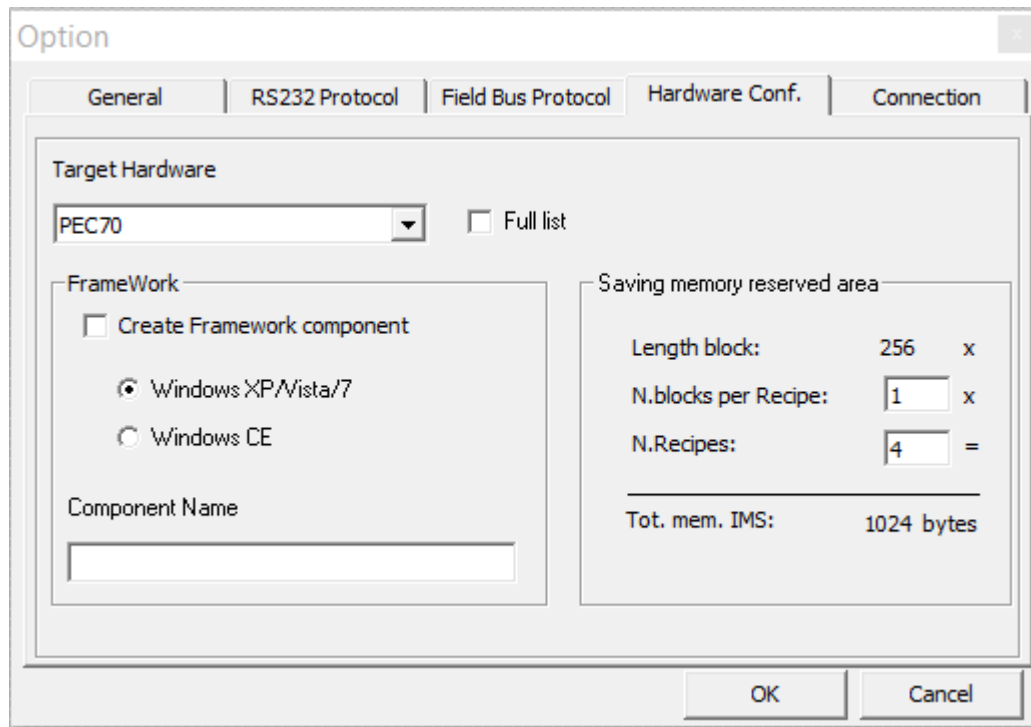
- After that, we can push the Save button. A success message box will appear and two new files (a .PxE and a .xml) will be automatically created in the directory of the project:



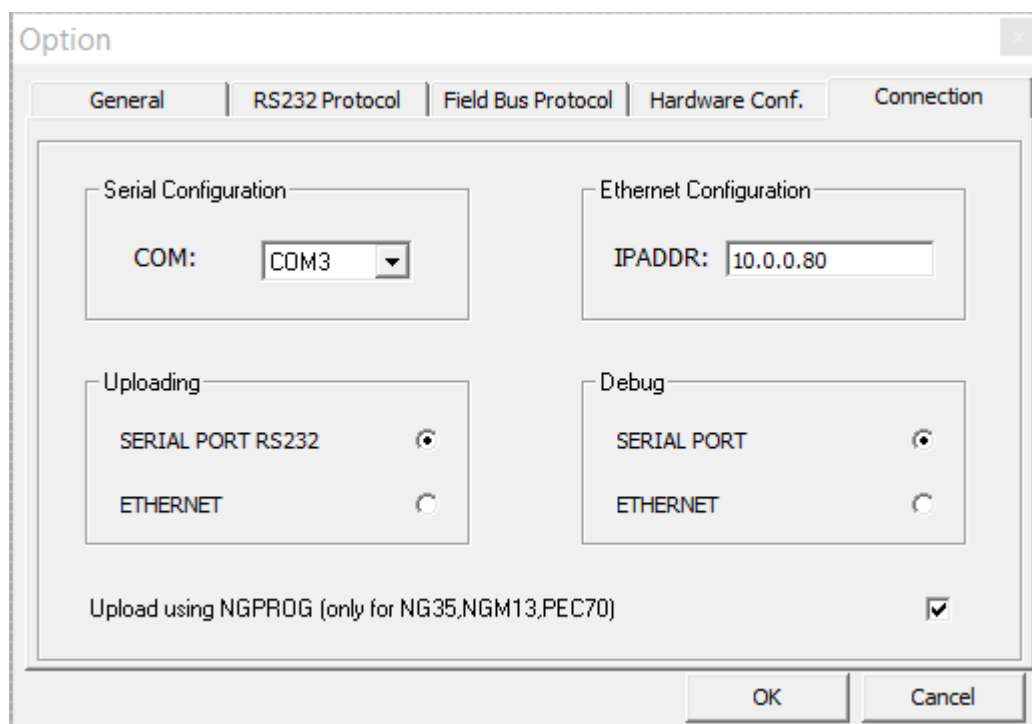
- EtherCAT configuration is ready. Now let's check how to configure the related VTB project, starting from the general options. In the menu bar select Tools->Options. Next, select "Field Bus Protocol" and use these settings:



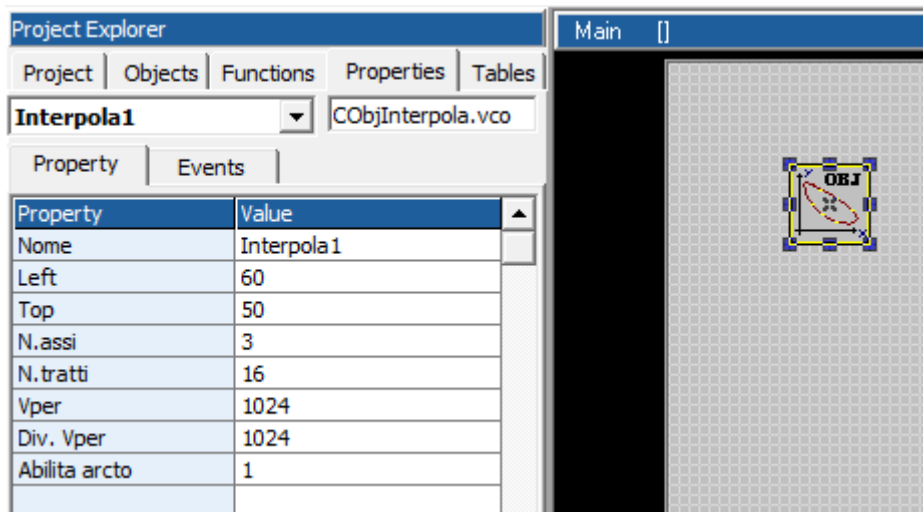
- After that select "Hardware Conf." and use these settings:



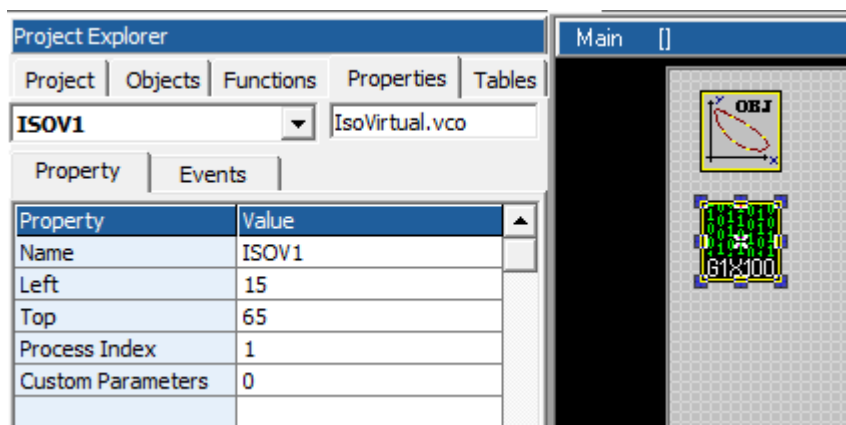
8. Select “Connection”, use these settings and then press OK to confirm.



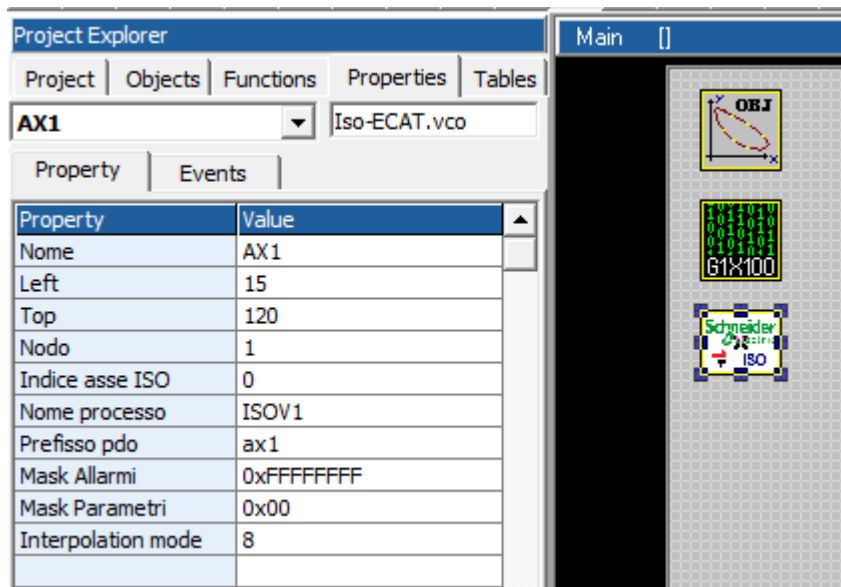
9. Now let's go adding the objects to the project. The first one is "CObjInterpola.vco". In "Project Explorer", on the left side of the window, select Objects->Motor Control->CObjInterpola.vco and double click on it. When a window will appear select the first object on your left and then press OK. Add the object to the window. Next click on the object and in Project Explorer select "Properties". A list of the object properties will appear. Configure them like shown below:



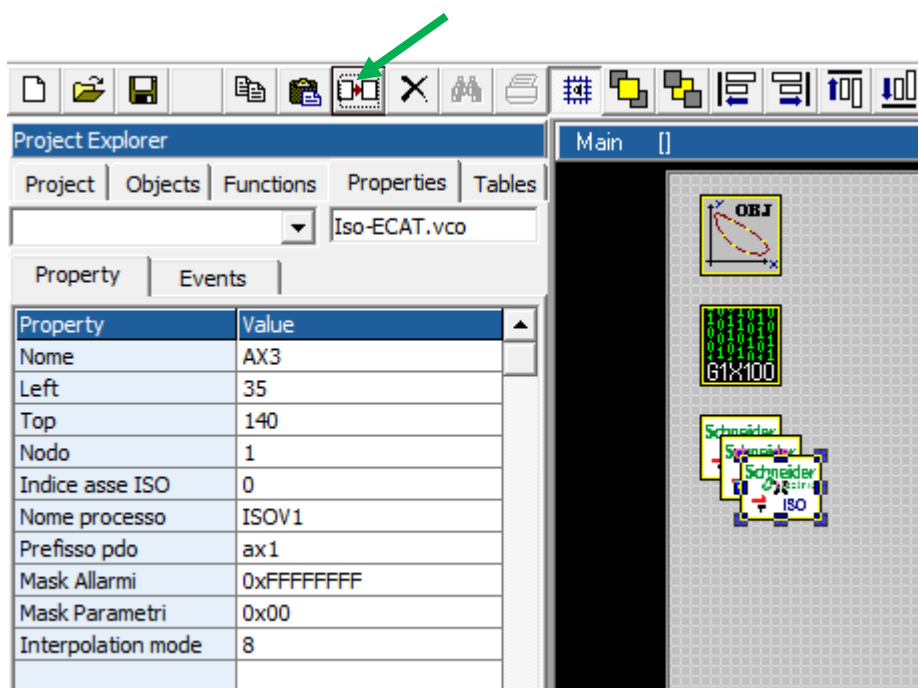
10. The next object to add is "IsoVirtual.vco". To add it, in Project Explorer select Objects->Iso_NS->IsoVirtual.vco. A window will appear. Select the first object on the left and press OK. After adding it, configure its properties like shown:



11. Next, let's have a look to the objects associated to the drivers. In Project Explorer select Objects->Iso_NS->Iso-ECAT.vco and double click on it. A window will appear: select the first object on the left and then press OK. After adding it, configure it like this:



12. After configuring it, select the object and push twice the “Duplicate Button” (green arrow) in the toolbar. The object will be duplicated, having a final result of three Iso-ECAT.vco



13. Next step is to configure also the new duplicated objects. Configure the one which has the property “Nome = AX2” using these settings:

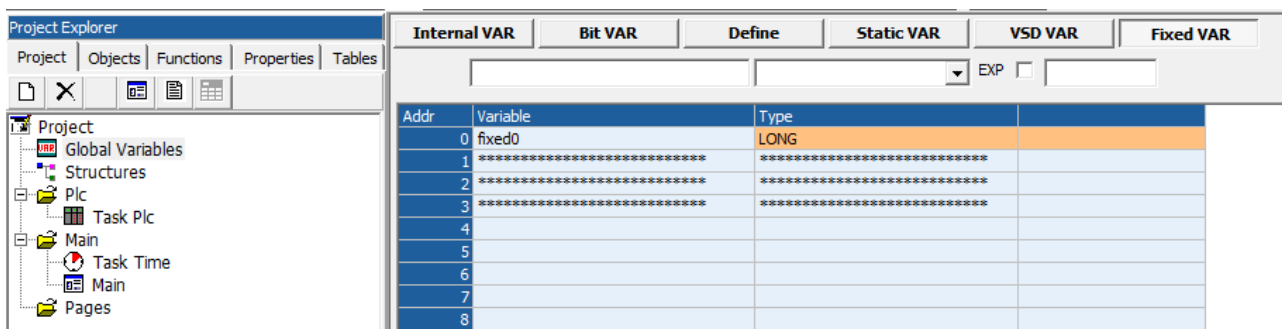
- Nodo = 2
- Indice asse ISO = 1
- Prefisso pdo = ax2

Next, configure the one which has the property “Nome = AX3” like this:

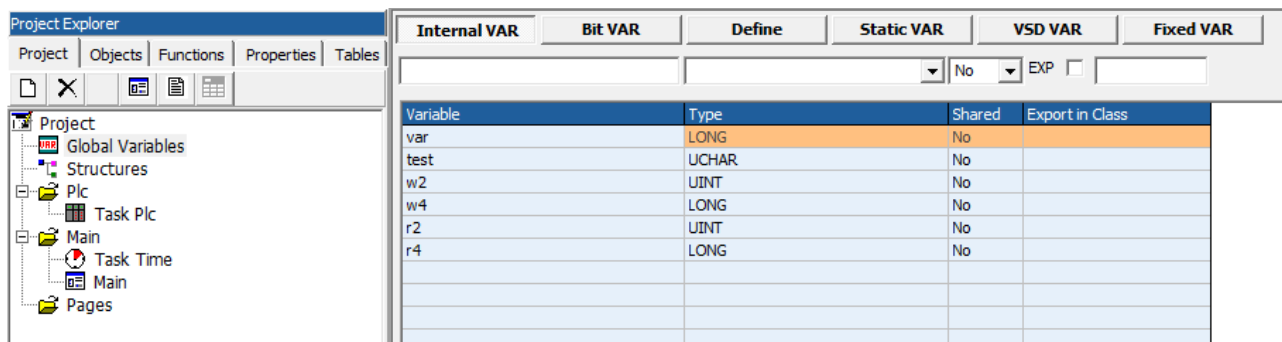
- Nodo = 3
- Indice asse ISO = 2
- Prefisso pdo = ax3

(To edit the property “Prefisso pdo” double click on the value and when a window will appear write in the label and press OK to confirm)

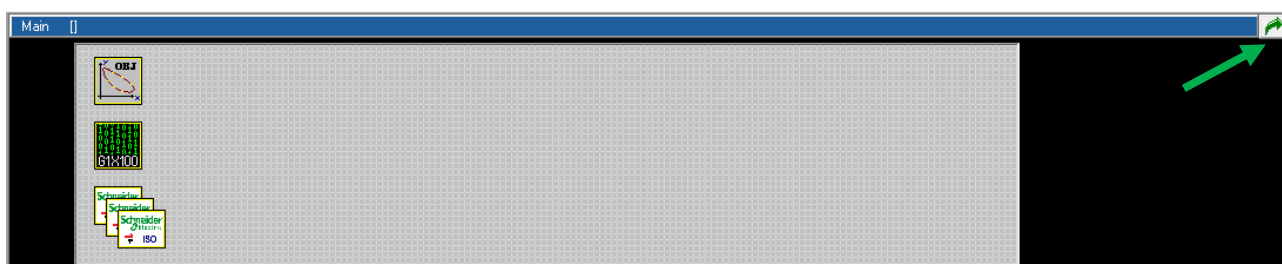
14. Now in Project Explorer select Project->Global Variables-> “Fixed VAR” and add fixed0 like shown below:



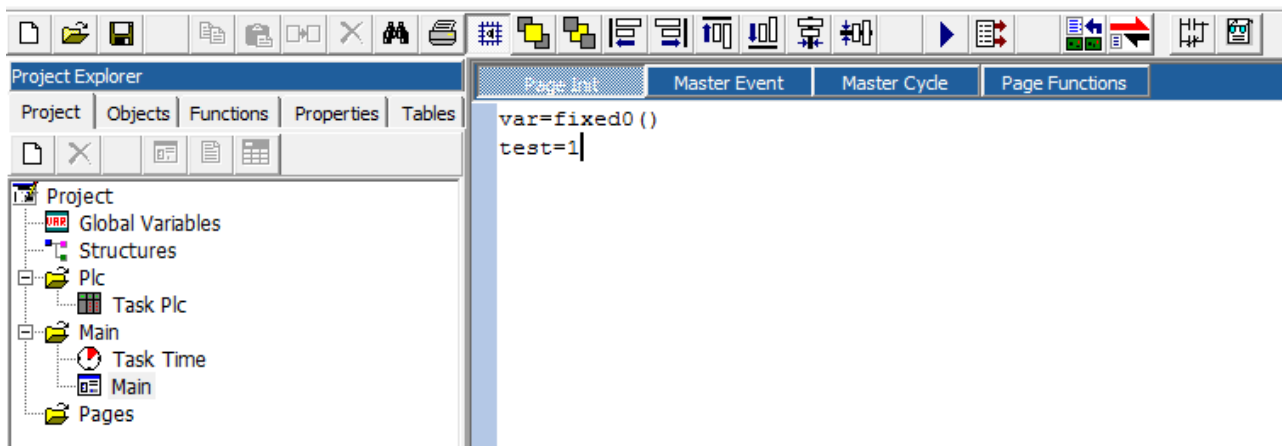
15. Next, add these variables in the section Internal VAR:



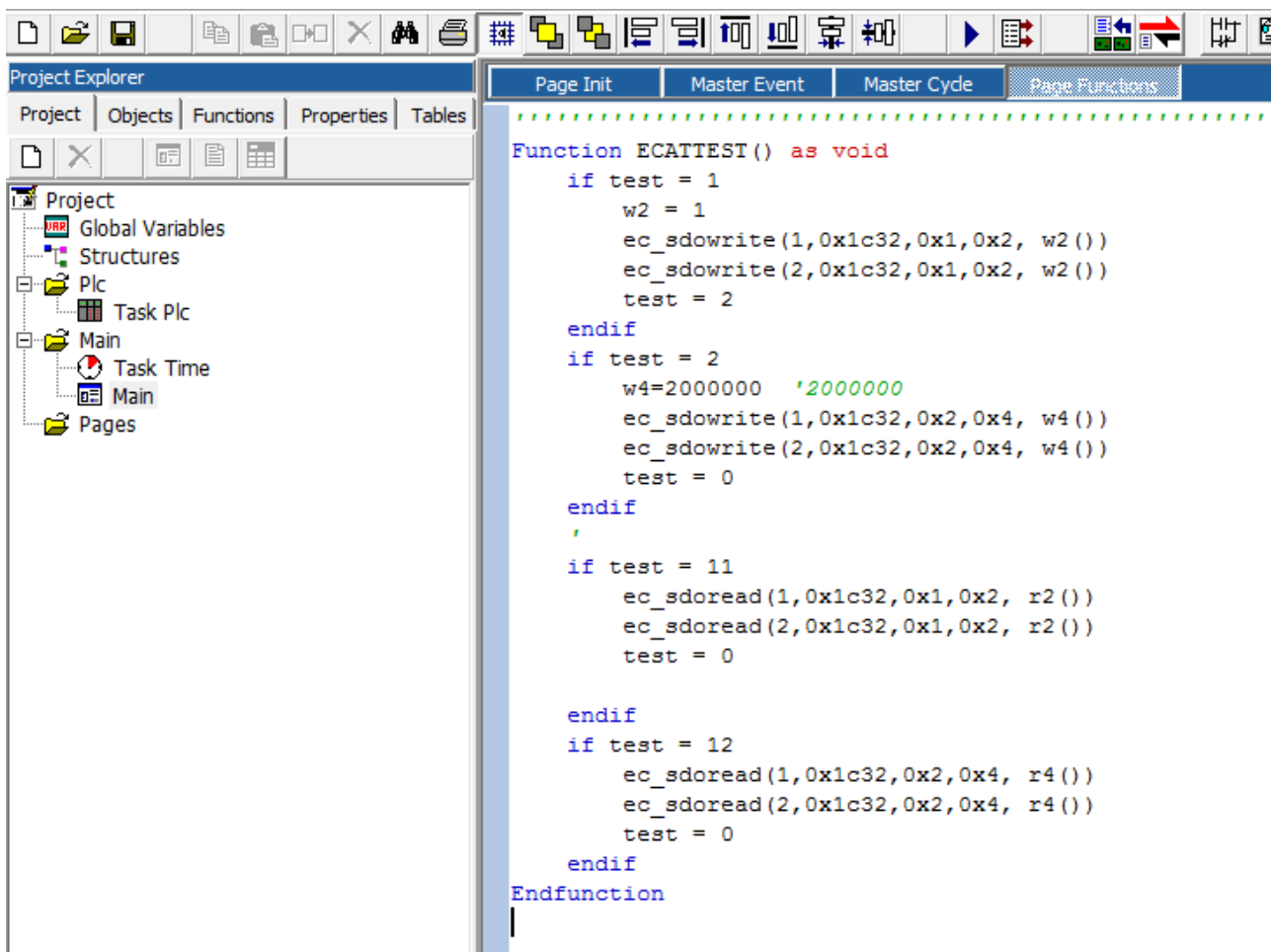
16. In Project Explorer select Main and push the button indicated by the green arrow like shown in the screenshot below:



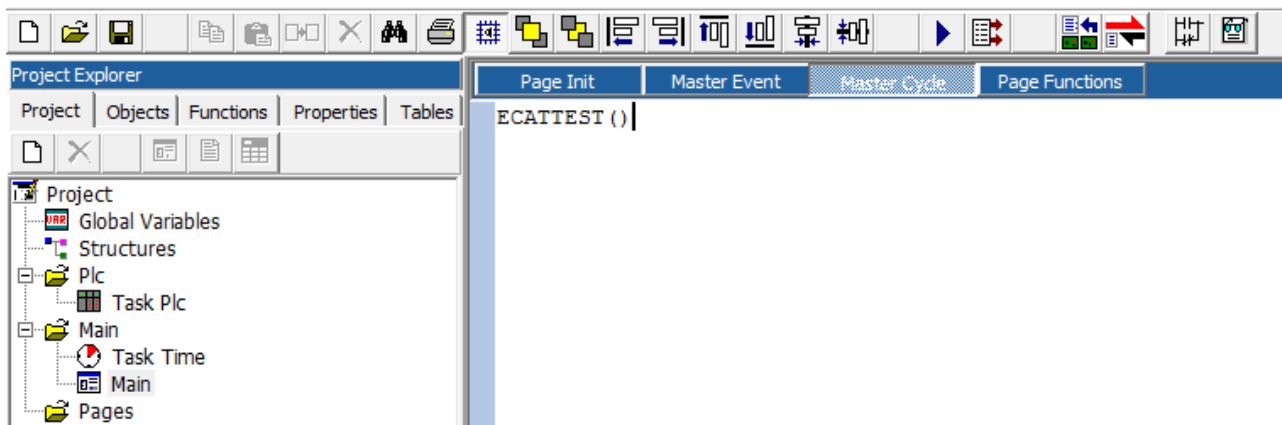
17. Select “Page Init” and add this code:



18. Next, go to “Page Functions” and add this code:



19. After that, open “Master Cycle” section and add this code:



20. That's all. Push the “Compile Button” (green arrow) in the toolbar and if all the settings are OK the operation is terminated. To download the project on your PLC push the “Download Button” (red arrow). The EtherCAT configuration is now ready to be used. Save the project and next time you load it, the EtherCAT configuration will be automatically imported when pushing the related button in the toolbar.

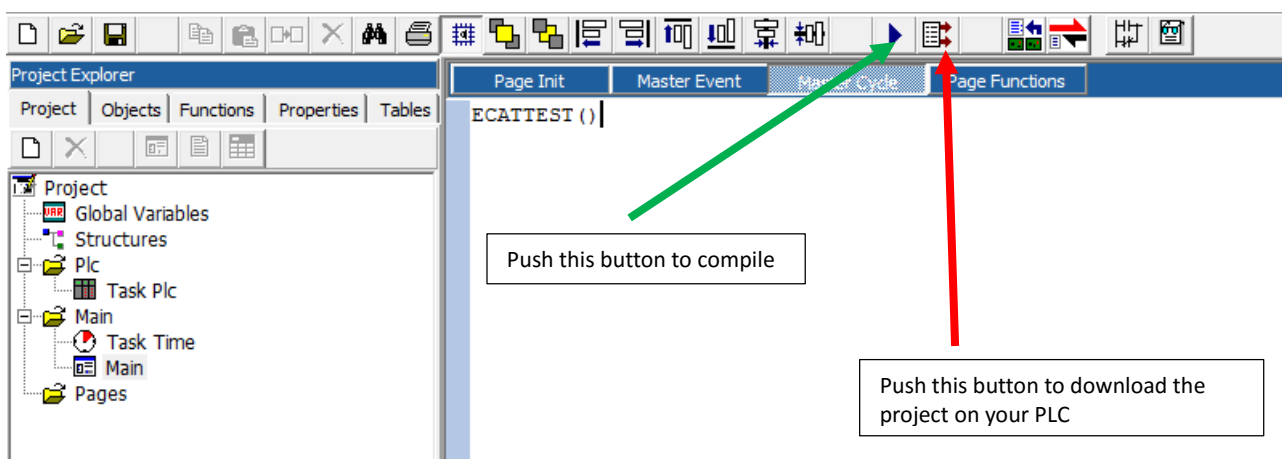


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