



## KREO HMI TUTORIAL Integration with Codesys softPLC

Tutorial dedicated to the tag database sharing between KREO runtime and the Codesys 3.5 runtime

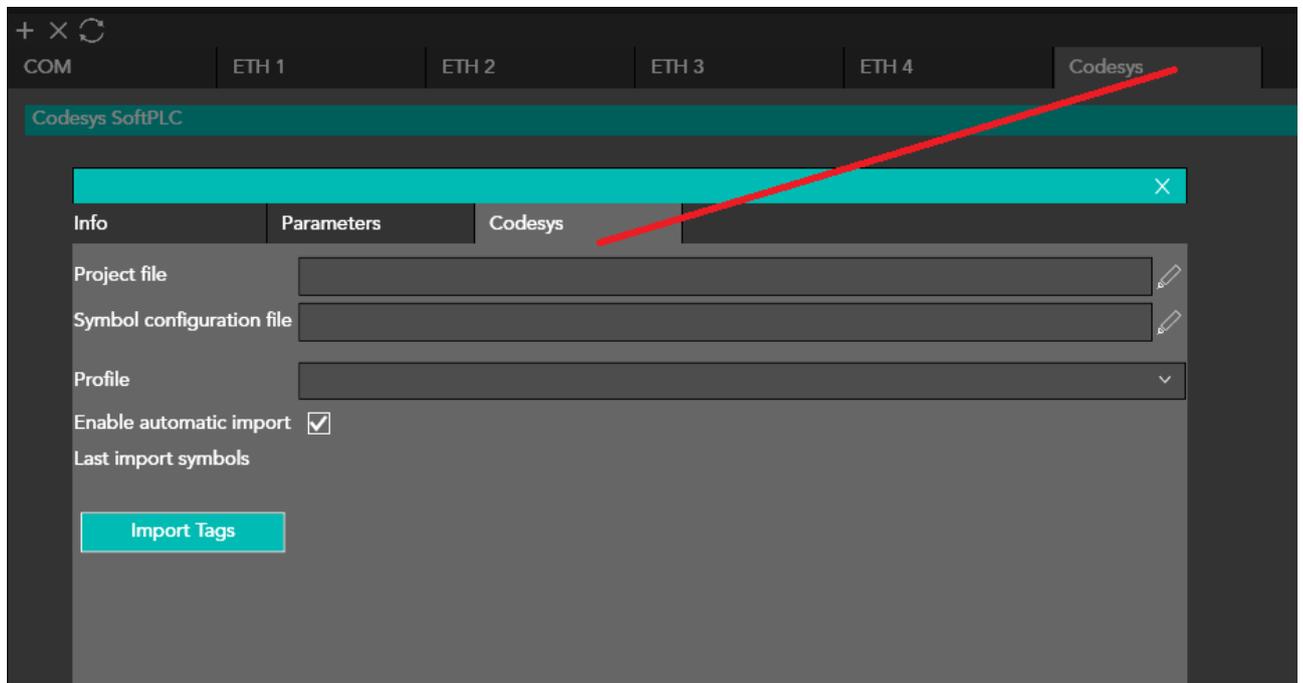
Connect  
Ideas.  
Shape  
solutions.



# Introduction

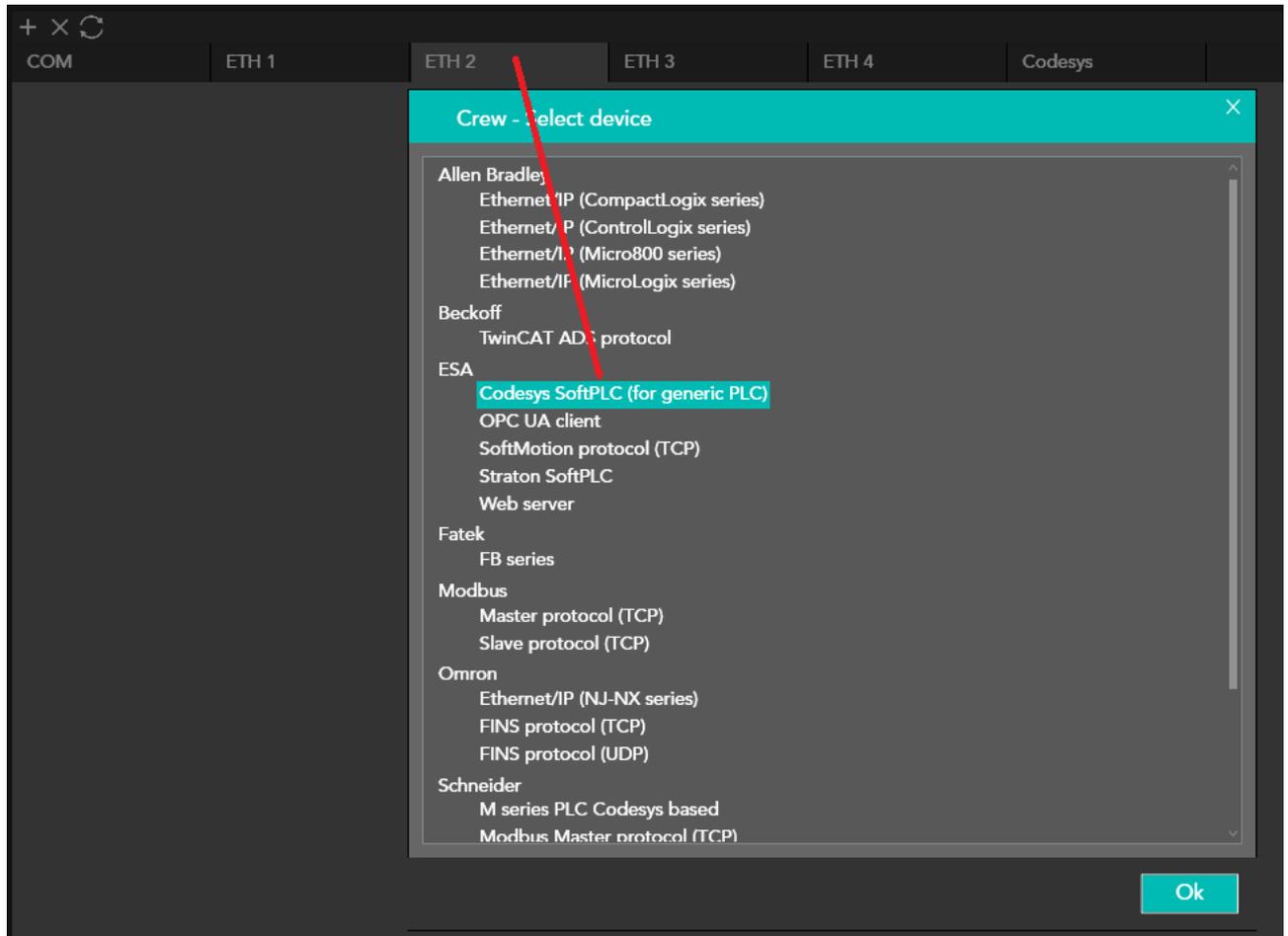
KREO supports the CODESYS driver. Communication is managed in two different modes and two different drivers based on the application configuration:

1. CODESYS INTEGRATED SOFT PLC (the driver to communicate with the CODESYS soft-plc, both for embedded HMI or PC based device running PC Control Win V3).





2. CODESYS SOFT PLC DRIVER FOR GENERIC PLC BASED ON CODESYS RUNTIME (the driver dedicated to PLC based on codesys run time or a PC with CODESYS RTE on board).



The only difference between the 2 drivers is in the definition of the communication parameters:

The first one requires you to define the PROJECT- File, XML-SymbolicFile and the PROFILE TYPE of the CODESYS project.

The second one has generic parameter settings that depends on the different types of CODESYS 2.x, 3.x plc/RTE.



COM | ETH 1 | ETH 2 | ETH 3 | ETH 4 | Code

Codesys SoftPLC (for generic PLC)

Info | Parameters

### Device properties

Is offscan       Disable Optimization

User Address Field Format: Default

Address prefix:

### Device parameters

Download	Name	Value	Format
<input checked="" type="checkbox"/>	Instance	ESA_Codesys_Connection	
<input checked="" type="checkbox"/>	Interface Type	Arti V2	
<input checked="" type="checkbox"/>	Device	Tcp/Ip (Level 4): TCP/IP Level 4	
<input checked="" type="checkbox"/>	Address		
<input checked="" type="checkbox"/>	Port	0	0 - 65535
<input checked="" type="checkbox"/>	TargetID	0	0 - 65535
<input checked="" type="checkbox"/>	Motorola byteorder	Yes	
<input checked="" type="checkbox"/>	Motorola	Yes	
<input type="checkbox"/>	Gateway	Tcp/Ip	
<input type="checkbox"/>	Gateway address		
<input type="checkbox"/>	Gateway port	0	0 - 65535
<input type="checkbox"/>	Gateway password		
<input type="checkbox"/>	NoLogin	1	0 - 1
<input checked="" type="checkbox"/>	Buffersize	0	0 - 65535
<input checked="" type="checkbox"/>	PrecheckIdentity	0	0 - 1

Ok



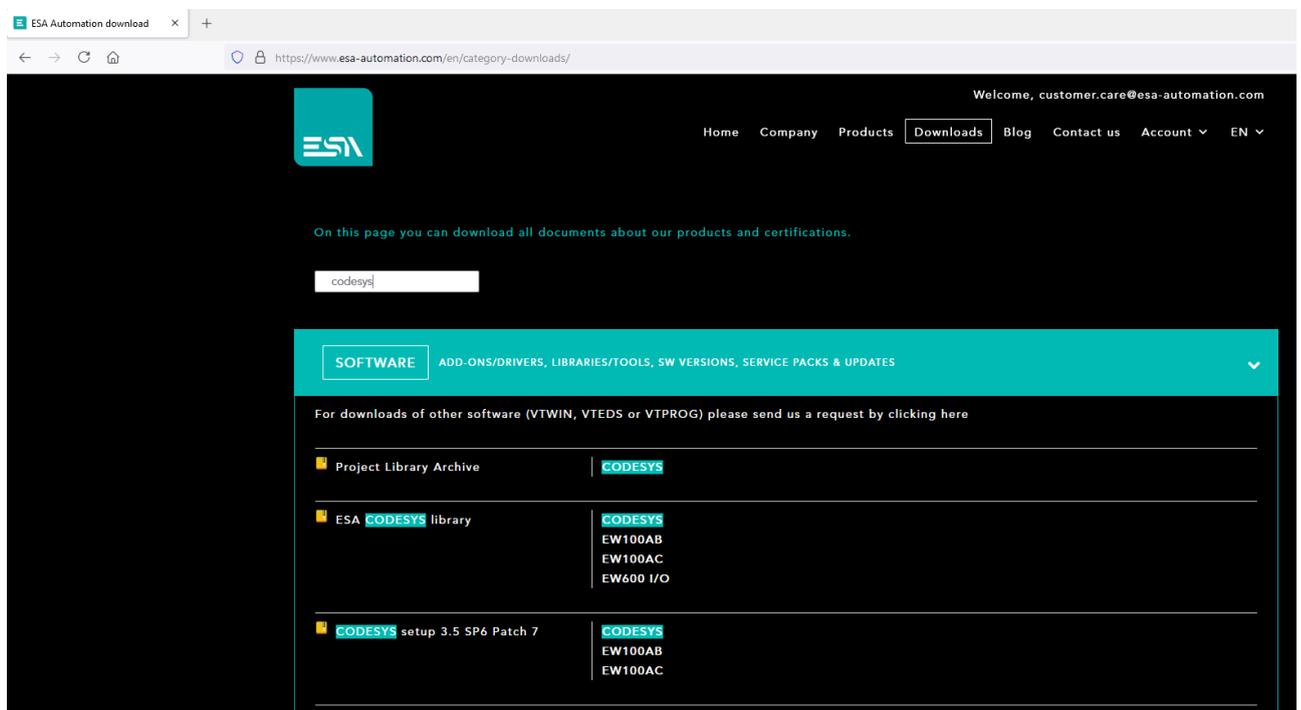
### Note1:

The codesys runtime preinstalled in the ESA embedded devices is based on CODESYS 3.5SP6P7 profile.

### CODESYS editor customization

Before starting the project you need to configure the CODESYS editor with some ESA files that will allow you to use libraries and configure typical ESA devices.

From the ESA website you can download the below files:

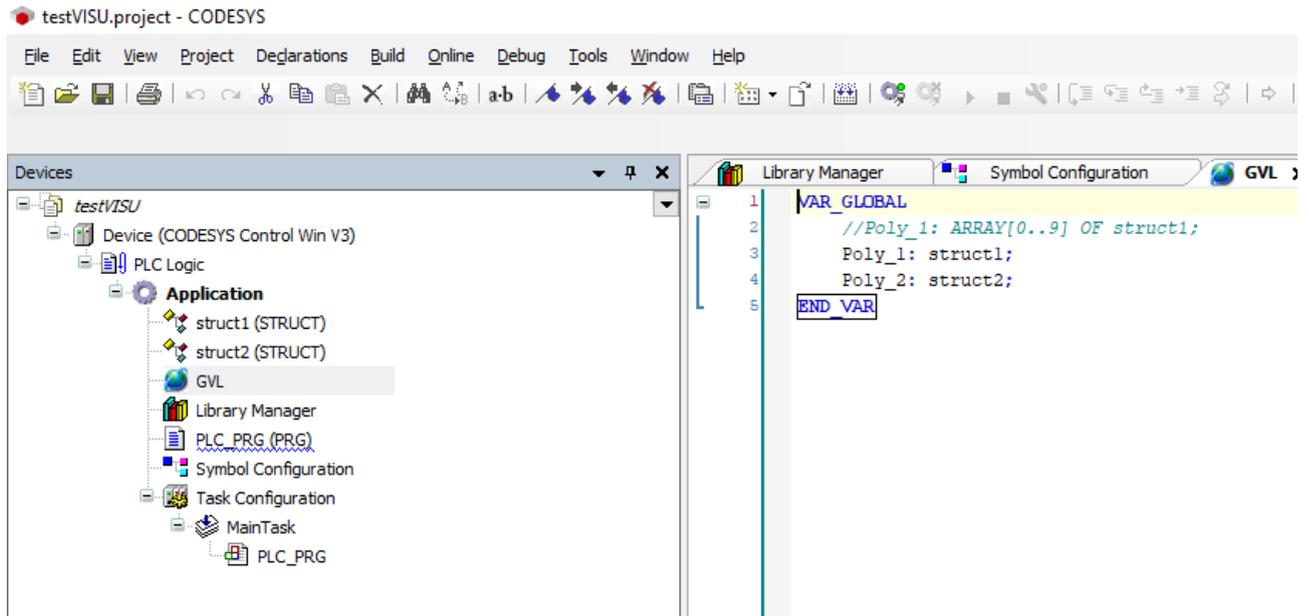


- Project Library Archive: archive project to be opened on your PC. This will install the ESA system libraries.
- Codesys setup 3.5sp6 Patch7: CODESYS editor setup.



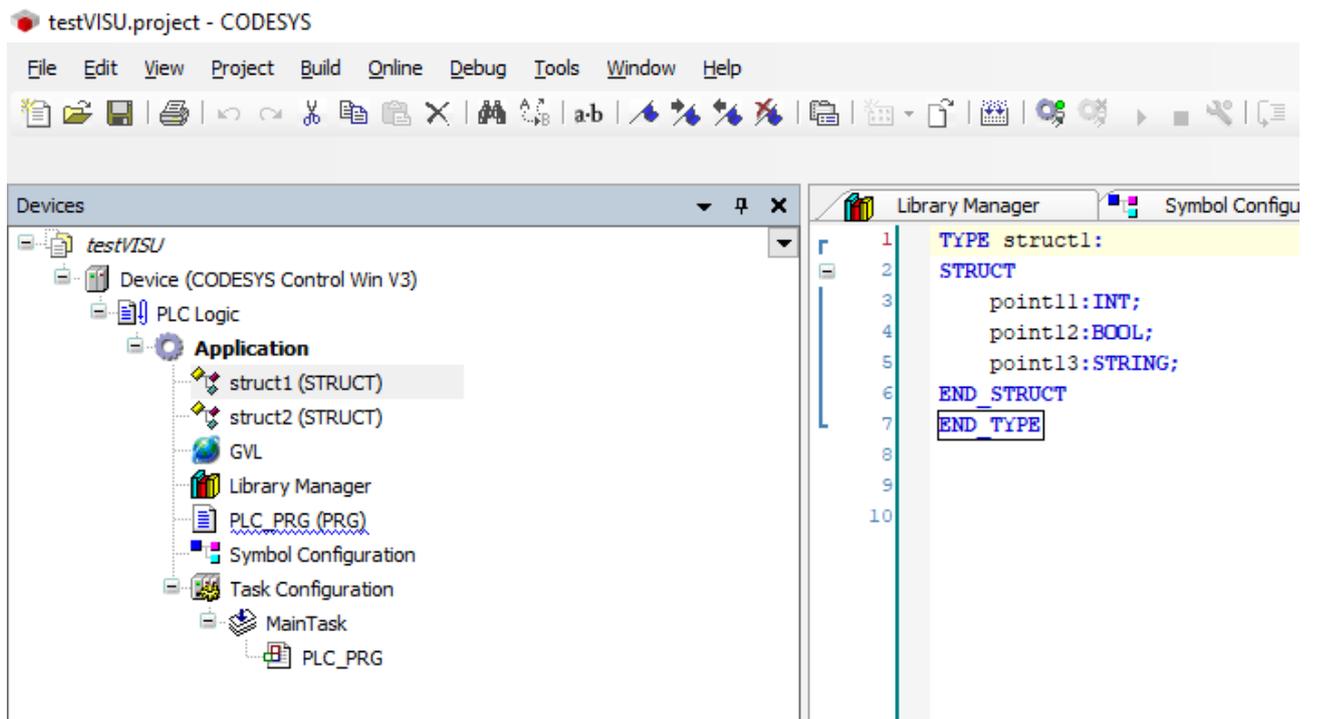
## How to do:

- 1) Let's suppose you have a CODESYS project with different types of tags (single and structure) in the different sections of the project:



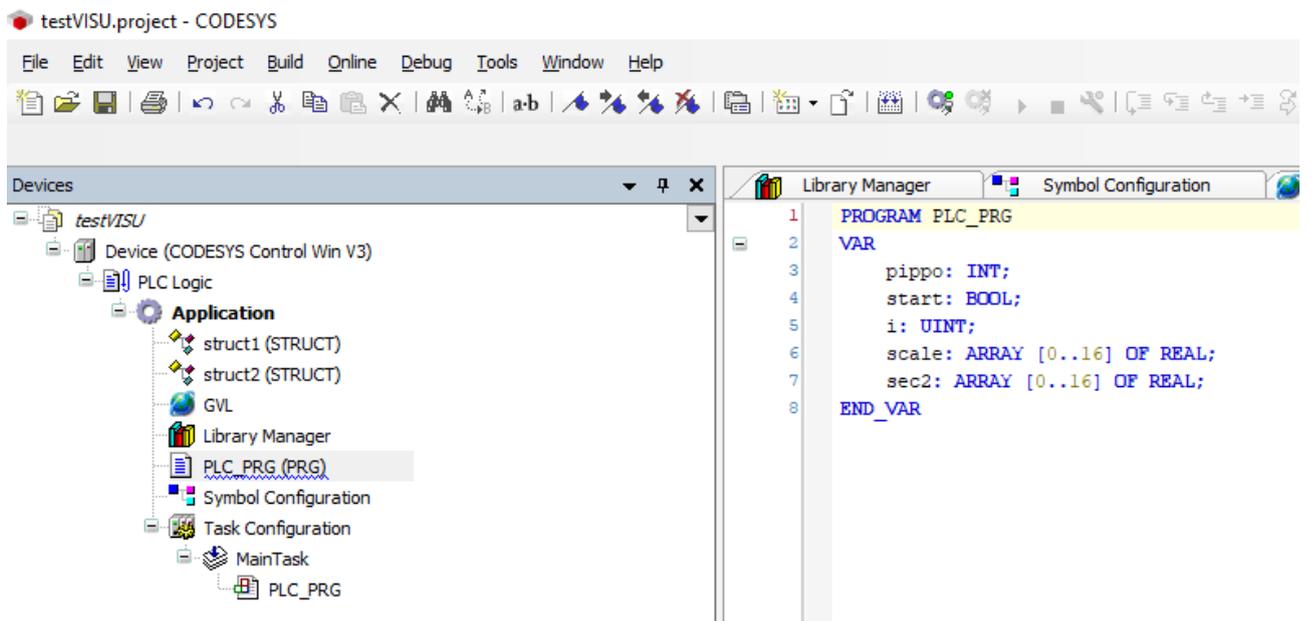
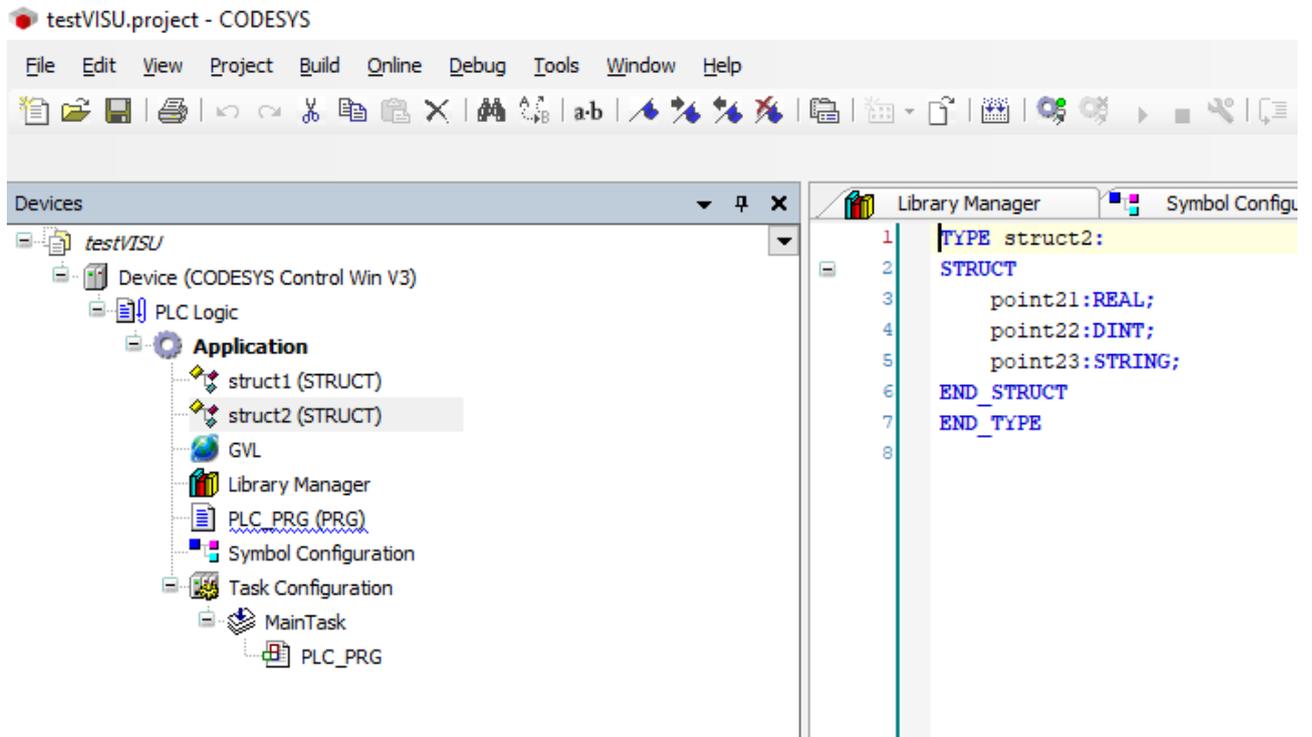
The screenshot shows the CODESYS IDE interface for a project named 'testVISU.project'. The 'Devices' tree on the left shows the project structure, including 'Application' with sub-items 'struct1 (STRUCT)', 'struct2 (STRUCT)', 'GVL', 'Library Manager', 'PLC\_PRG (PRG)', 'Symbol Configuration', 'Task Configuration', and 'MainTask'. The 'Library Manager' window on the right displays the following code:

```
1  VAR_GLOBAL
2      //Poly_1: ARRAY[0..9] OF struct1;
3      Poly_1: struct1;
4      Poly_2: struct2;
5  END_VAR
```



The screenshot shows the CODESYS IDE interface for the same project. The 'Library Manager' window on the right displays the following code:

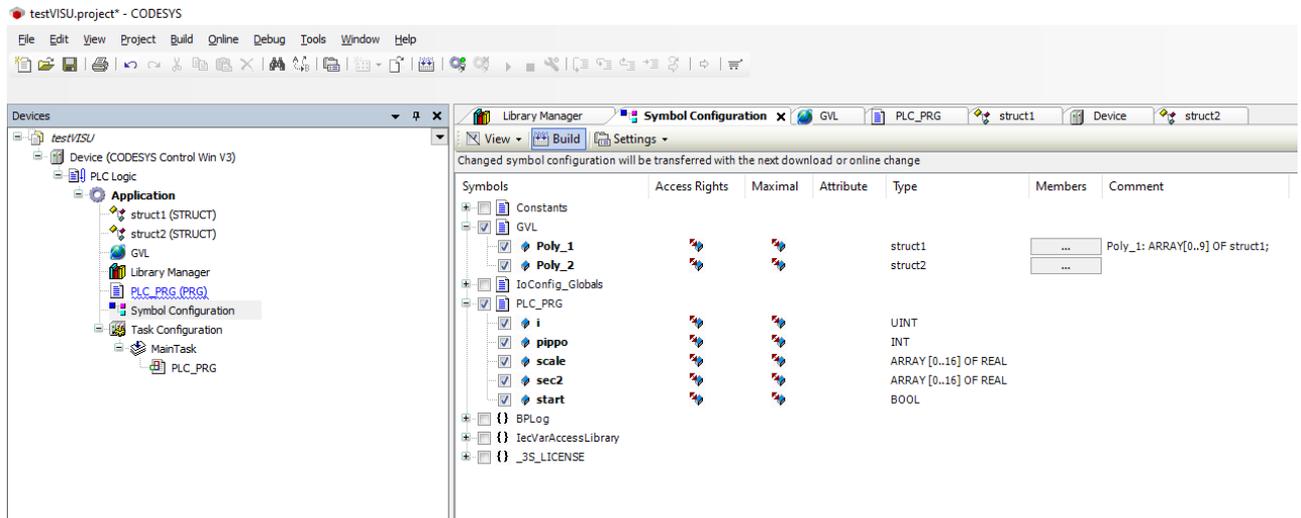
```
1  TYPE struct1:
2  STRUCT
3      point11:INT;
4      point12:BOOL;
5      point13:STRING;
6  END_STRUCT
7  END_TYPE
```



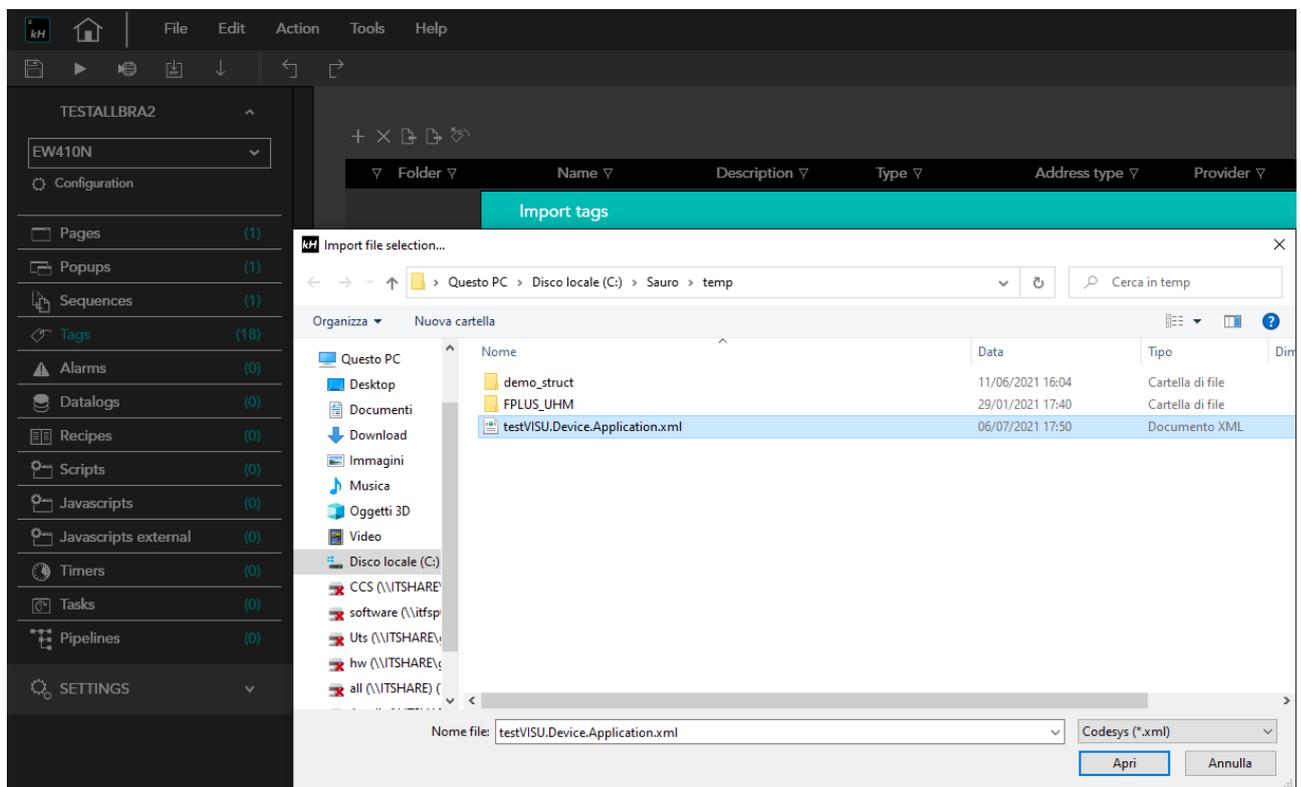
2) In the SYMBOL CONFIGURATION components select the tags that need to be imported into the KREO project.



CODESYS creates an .XML file in the project folder (via the build command >> GENERATE CODE or after a simple project download).

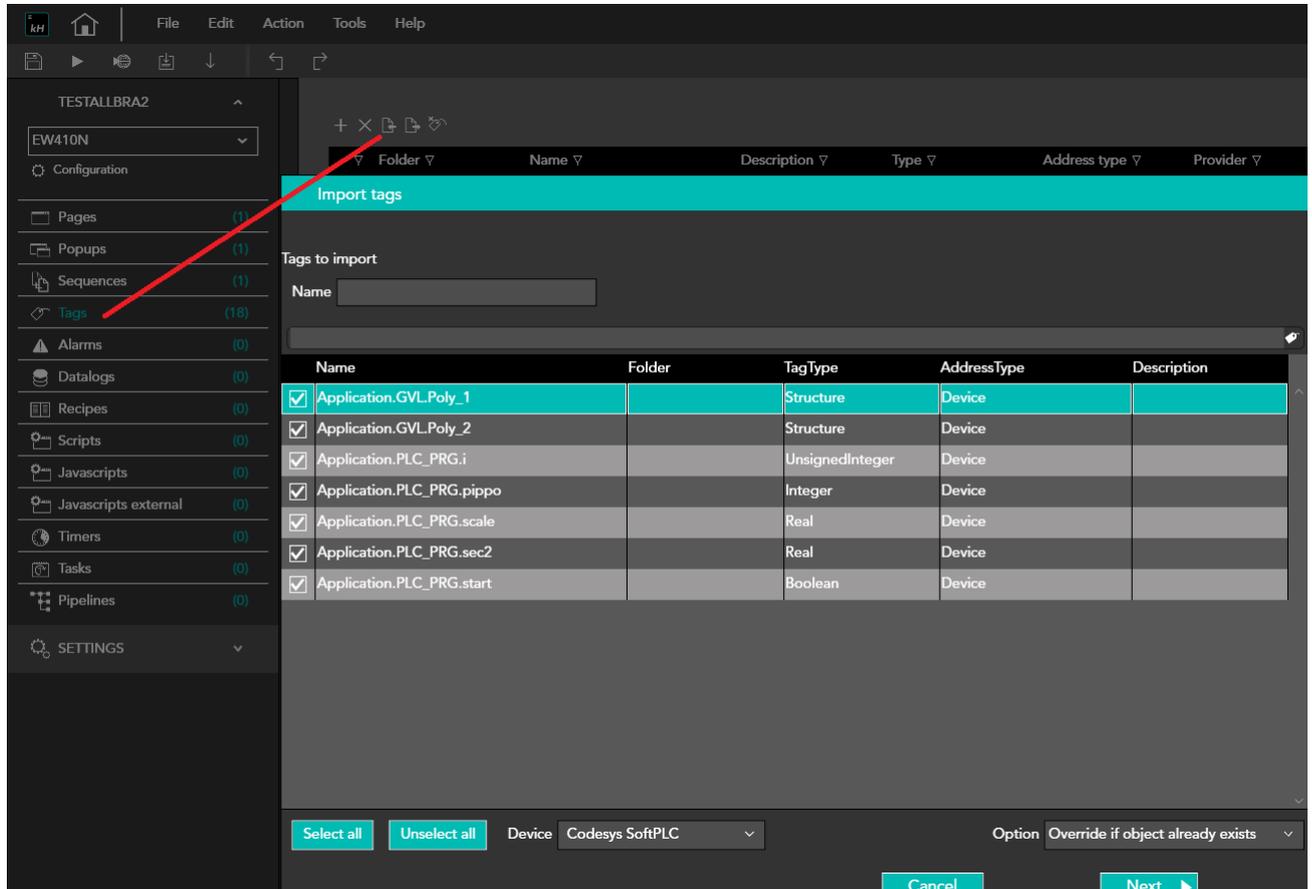


3) From the tags section of KREO import the XML file created by CODESYS.





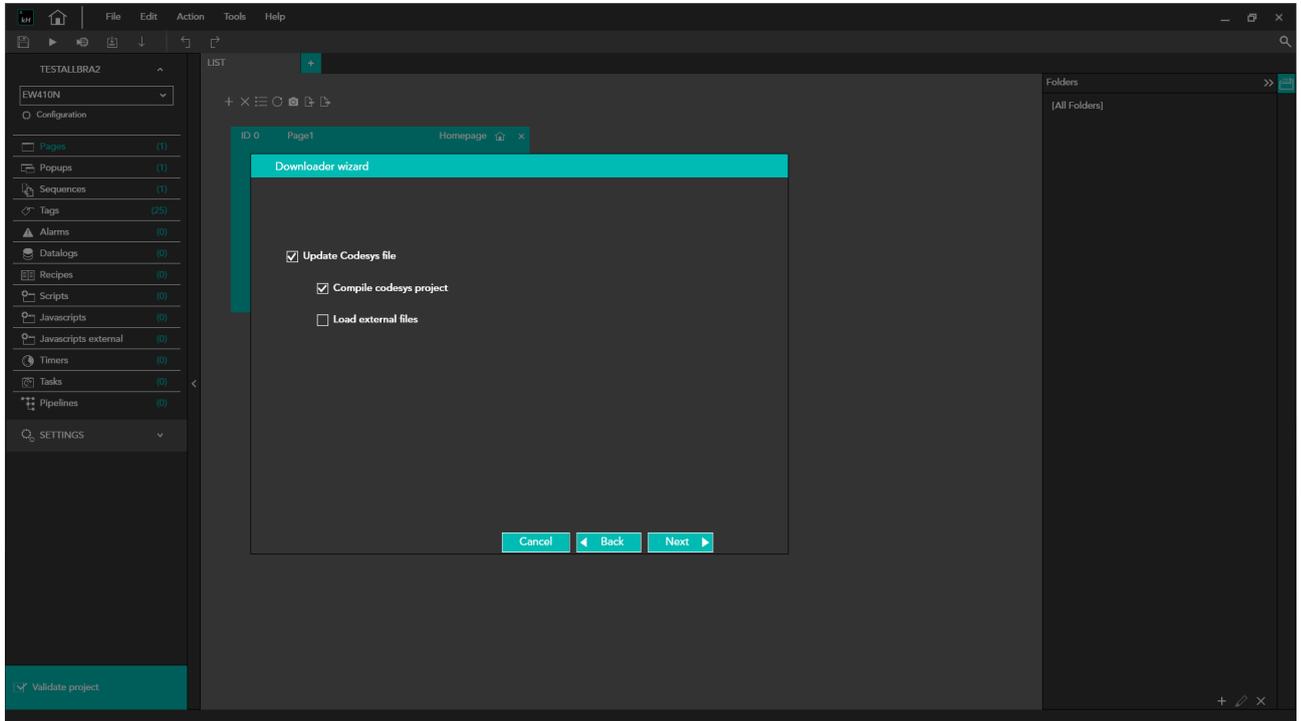
4) The tags are imported to KREO and can be used in the project.



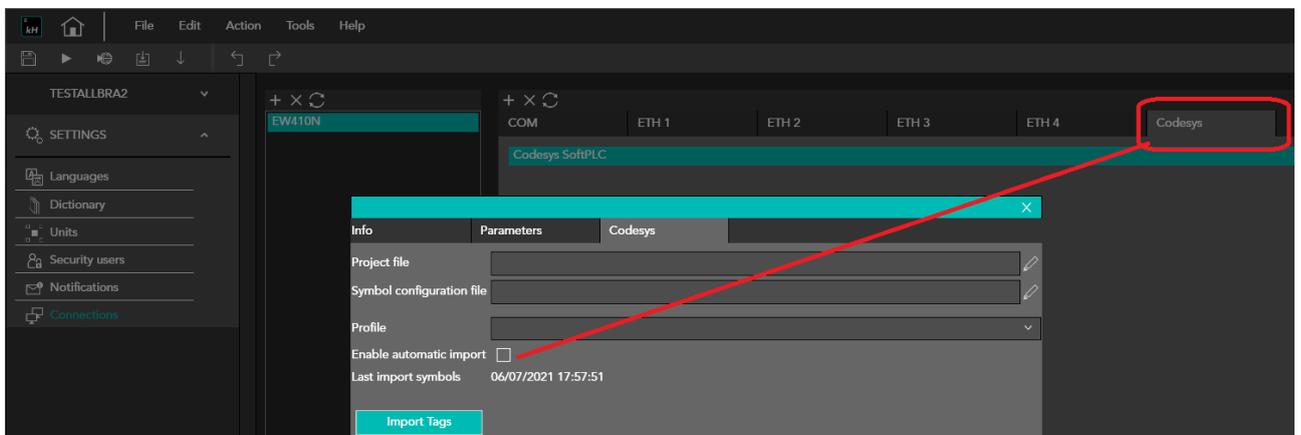
5) In the download procedure of the KREO+CODESYS SOFT-PLC projects (embedded in the HMI-ESA) you can choose whether to transfer the 2 projects separately, each with their respective editors, in 2 distinct operations or in a single KREO operation.



In the download procedure it is necessary to select UPDATE CODESYS FILES:



**Note2:** In developing the KREO project you can use the automatic import of tags but be careful that this does not lead to unwanted imports of codesys-tags in the KREO project. It is therefore recommended to disable it in the case of a more controlled import operation.





**Note3:** In CODESYS it is recommended to enable the 3 options displayed below (right click on Application >> Properties) to keep the project and boot-app synchronized.

The screenshot shows the CODESYS IDE interface. A dialog box titled "Properties - Application [Device: PLC Logic]" is open, displaying three checked options under the "Application build options" tab:

- Create implicit boot application on download
- Create implicit boot application on Online Change
- Remind boot application on project close

The background shows a ladder logic program with the following code:

```
PROGRAM PLC_PRG
VAR
pippo: INT;
start: BOOL;
i: TIME;
scale: ARRAY [0..16] OF REAL;
sec2: ARRAY [0..16] OF REAL;
END_VAR
```

The bottom status bar shows build information: "Build" with 0 errors, 0 warnings, and 4 messages. The messages list includes:

- Size of global data: 36929 bytes
- Total allocated memory size for code and data: 152736 bytes
- Memory area 0 contains Data, Input, Output, Memory and Code: size: 1048576 bytes, highest used address: 152736, largest contiguous memory gap: 895840 bytes (85 %)

At the bottom right, it indicates "Last build: 0 errors, 0 warnings, 0 precompile" and "Current user: (nobody)".



**Note4:** In KREO project with CODESYS SOFT PLC FOR GENERIC PLC drivers we have defined that the generic communication parameters are as follows:

The screenshot shows the 'Parameters' tab of the 'Device properties' dialog. The 'Device parameters' section contains a table with the following data:

Download	Name	Value	Format
<input checked="" type="checkbox"/>	Instance	ESA_Codesys_Connection	
<input checked="" type="checkbox"/>	Interface Type	Arti V2	
<input checked="" type="checkbox"/>	Device	Tcp/Ip (Level 4): TCP/IP Level 4	
<input checked="" type="checkbox"/>	Address		
<input checked="" type="checkbox"/>	Port	0	0 - 65535
<input checked="" type="checkbox"/>	TargetID	0	0 - 65535
<input checked="" type="checkbox"/>	Motorola byteorder	Yes	
<input checked="" type="checkbox"/>	Motorola	Yes	
<input type="checkbox"/>	Gateway	Tcp/Ip	
<input type="checkbox"/>	Gateway address		
<input type="checkbox"/>	Gateway port	0	0 - 65535
<input type="checkbox"/>	Gateway password		
<input type="checkbox"/>	NoLogin	1	0 - 1
<input checked="" type="checkbox"/>	Buffersize	0	0 - 65535
<input checked="" type="checkbox"/>	PrecheckIdentity	0	0 - 1

In case of projects based on CODESYS 3.x, the communication parameters involved are those highlighted in red (and not all necessarily).



**Note5:** The ADDRESS PREFIX filtering option allows you to import the Codesys tags and hide the initial part of the name.

So for example, a tag with *name Application.GVL.Poly\_2* and with ADDRESS PREFIX = *Application.* will be imported into KREO with name: *GVL. Poly\_2.*

**Note6:** The DISABLE OPTIMIZATION parameter may help the user in identifying which Tag is causing the communication error.

If we have a situation of one single tag not defined in the plc we could have ??? displayed RT on the complete page even if the others tags are correctly defined.

This is because the communication protocol optimize the requests by packing in the frame sent to the plc the max. number of tags.

However, this can affect the communication on all tags in the package in the event of an error and this does not help the user to identify which tag is causing the problem.

The DISABLE OPTIMIZATION parameter instead forces a single request for each tag of the page, slowing down communication with the plc but highlighting exactly the ??? on the only tags that have a communication error.



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