APPLICATION NOTES



CODESYS v. 2.3, Ethernet driver for AGI 3xx

- Use the CODESYS Ethernet driver in the AGI Creator
- Set up the CODESYS for use with the AGI Creator

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1. General information

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1. General information

1.1 Warnings, legal information and safety

1.1.1 Warnings and notes

Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings

Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

Notes

Notes provide general information, which will be helpful for the reader to bear in mind.

1.1.2 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the unit. If there is any doubt about how to install or operate the unit, the company responsible for the installation or the operation must be contacted.

The unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

1.1.3 Safety issues

Installation of the unit should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

1.1.4 Electrostatic discharge awareness

Sufficient care must be taken to protect the terminal against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

1.2 About the application notes

1.2.1 General purpose

This document includes application notes for DEIF's AGI 300 series. It mainly includes general product information, how to use and set up the CODESYS .

The general purpose of the application notes is to help the user with the first steps of using the CODESYS Ethernet driver in the AGI Creator and setting up the CODESYS for use with the AGI Creator.

Please make sure to also read the Installation Instructions before starting to work with the AGI 300. Failure to do this could result in human injury or damage to the equipment.

1.2.2 Intended users

The Application Notes are mainly intended for the panel builder in charge. On the basis of this document, the panel builder designer will give the electrician the information he needs in order to get started to set up and use the CODESYS with the AGI 300 Creator. For detailed electrical drawings, please refer to the Installation Instructions.

1.2.3 Contents and overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

2. Contents

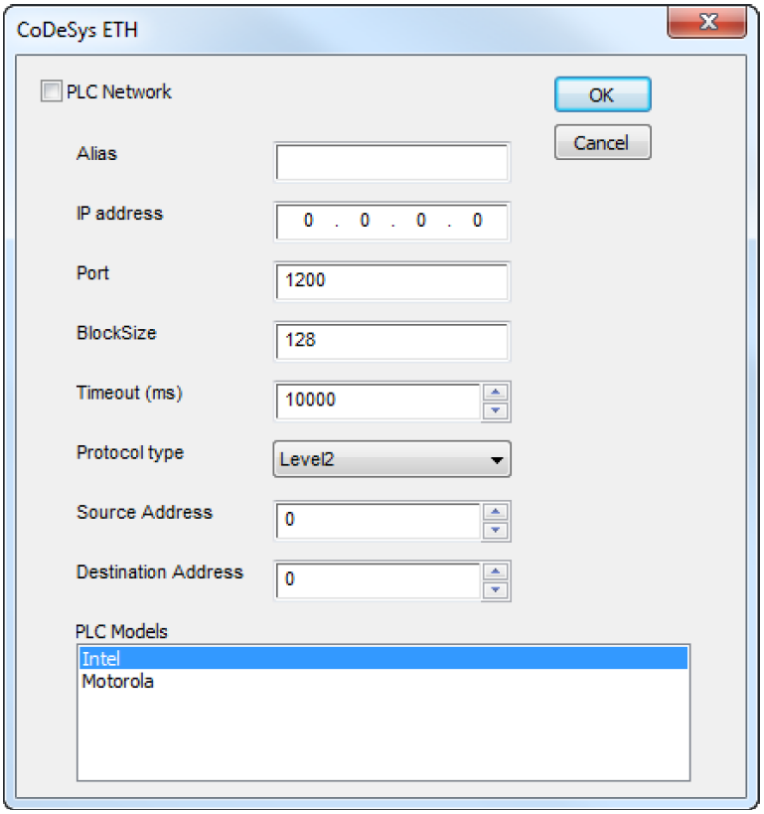
2.1 CODESYS v.2.3 Ethernet driver

The CODESYS communication driver for Ethernet supports communication switch controllers based on the v. 2.3 CODESYS version.
Please note that changes in the controller protocol or hardware, which may interfere with the functionality of this driver, may have occured since this documentation was created. Therefore, always test and verify the functionality of the application. To accommodate developments in the controller protocol and hardware, drivers are continuously updated. Accordingly, always ensure that the latest driver is used in the application.

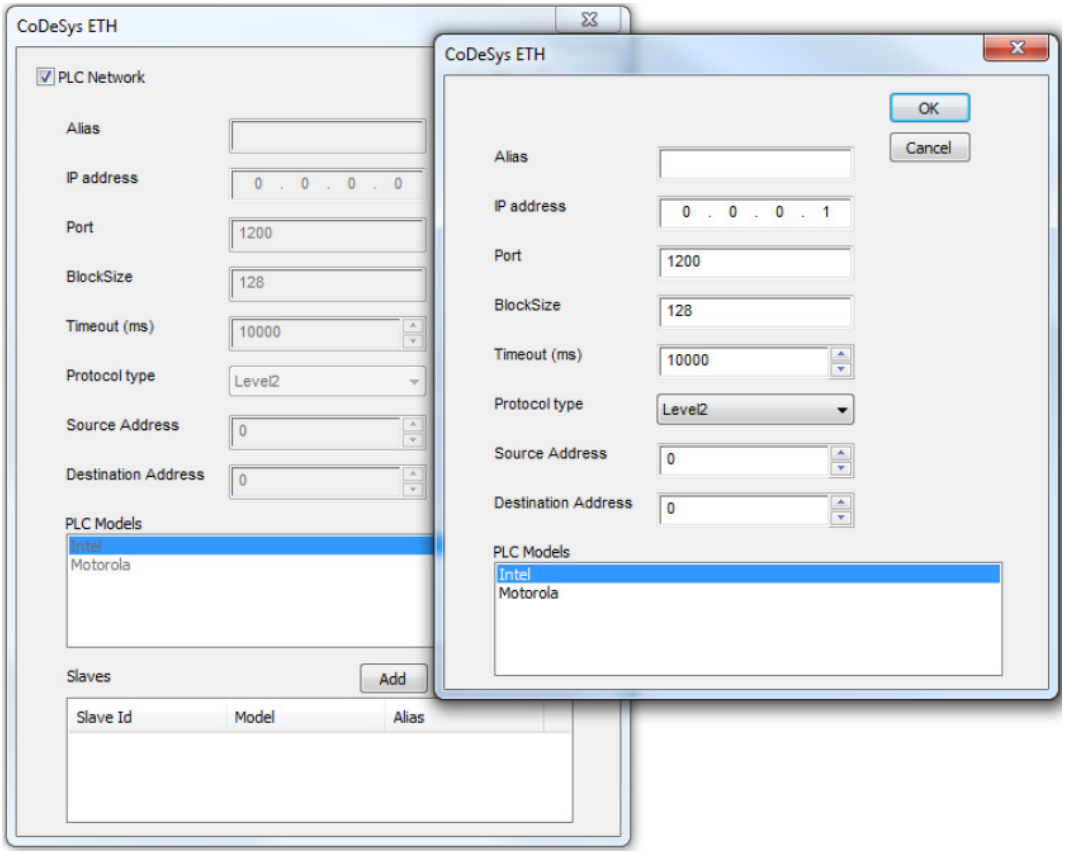
2.2 Protocol editor settings

Add (+) a driver in the protocol editor and select the protocol called "CODESYS v2 ETH" from the list of available protocols.
The CODESYS v2 ETH driver supports three different protocol types:
- Level2
- Level2 Route
- Level4

The "Protocol type" is selected from the dedicated dropdown menu.



Alias	Name to be used to identify nodes in network configurations. The name will be added as a prefix to each tag name imported for each network node.
IP address	Ethernet IP address of the controller
Port	This parameter allows changing the port number used for the communication. Default value for this parameter is set to 1200 and it corresponds to the default setting of CODESYS-based controllers.
PLC model	Defines the byte order that will be used by the communication driver when sending communication frames to the PLC.
Block size	Enter the max block size supported by your controller (limit is 1024 KB).
Protocol type	Shows a list with the available protocol variants. Please make sure you check what protocol variant is supported by the CODESYS run-time you want to connect.
Time-out	The number of milliseconds between retries when communication fails.
Source address and destination address	Source and destination address are available only when TCP/IP level 2 route is selected in Controller Setup. The destination is the node of the PLC and allows the protocol to read variables in a sub-network. The address is used to read variables when multiple PLCs are connected in a sub-network (serial network) but only one if it has the Ethernet interface.
PLC network	The protocol allows the connection of multiple controllers to one operator panel. To set up multiple connections, check "Access Multiple PLCs" checkbox and enter IP address for all controllers.

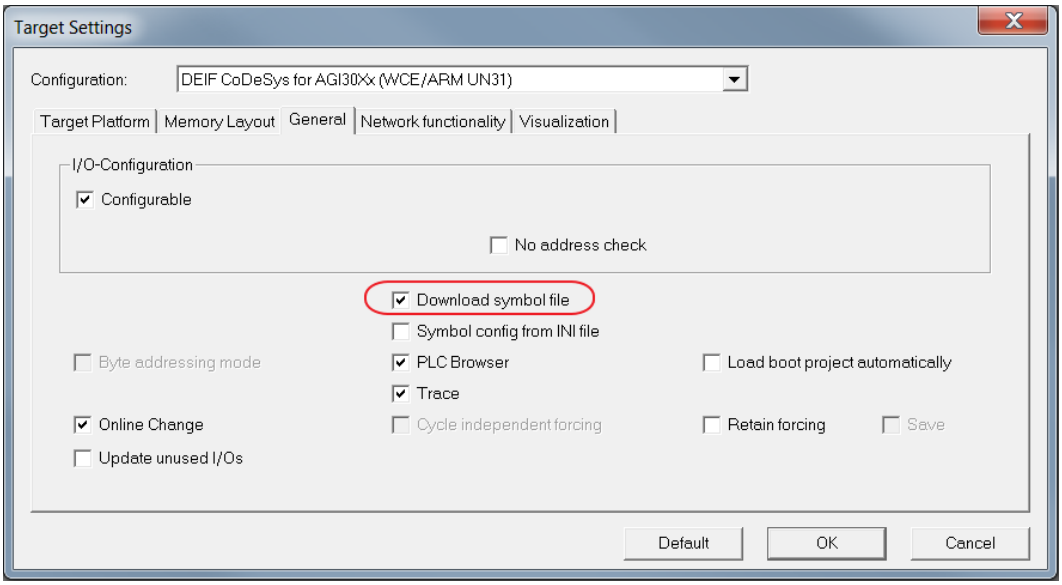


The CODESYS v2 Ethernet driver supports the connections to mulitple controllers starting from version v1.60.

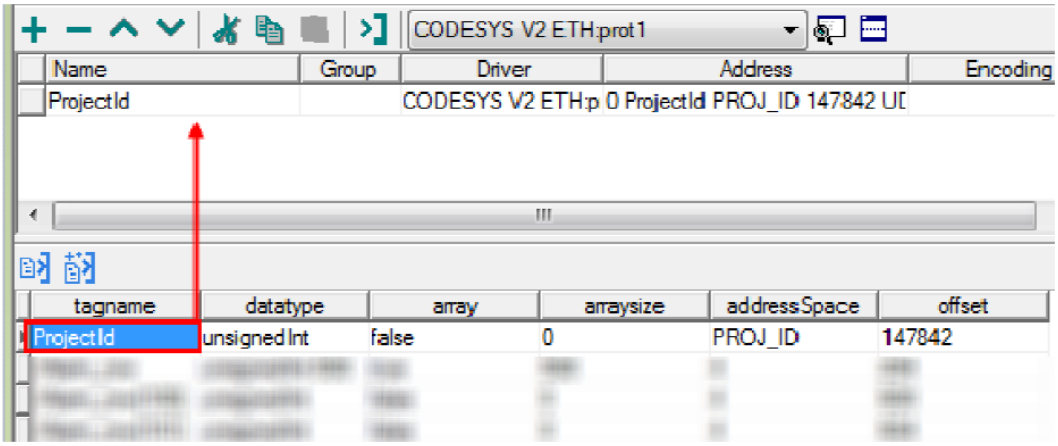
The CODESYS v2 ETH driver is the best choice also when creating projects for the internal controller iPLC CODESYS. To use the CODESYS v2 ETH driver for communication with iPLC, it is enough to configure the IP address of the PLC as local host (127.0.0.1). The iPLC CODESYS supports communication with CODESYS v2 ETH driver with symbol-based support (next section), starting from v1.55 and later.

2.3 CODESYS software settings

When creating the project in CODESYS, the option download symbol file (in target settings/general) must be checked.

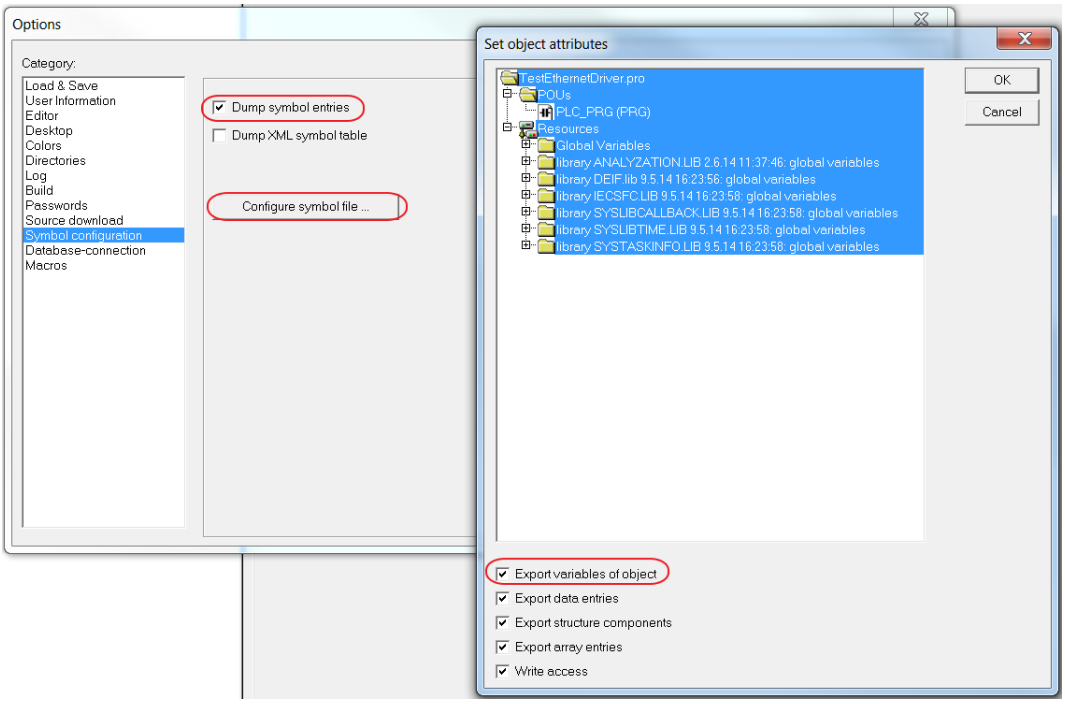


CODESYS V2 ETH communication driver supports the automatic symbol file (SDB) upload from the PLC; any change in the tag offset due to new compilation of the PLC programme does not require a symbol file re-import. Tag file has to be re-imported only in case of tag rename or definition of new tags.
When the option Download symbol file is not available or not checked, the protocol can work only if the ProjectId tag is imported. Any change in the tag offset due to new compilation of the PLC programme requires that symbol file is imported again.



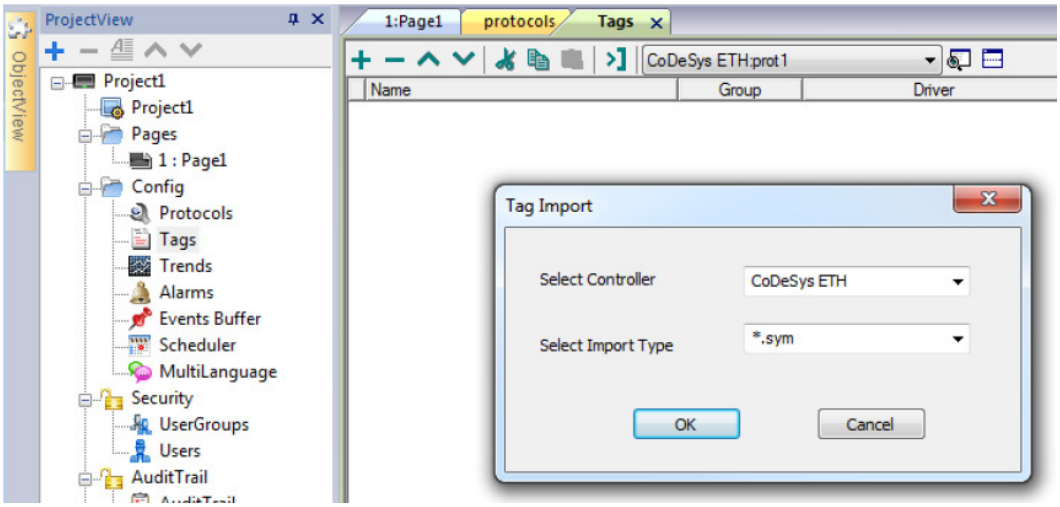
2.4 Tag import

When configuring PLC using the manufacturer's configuration software, make sure to enable Symbol file creation (file with .SYM extension). It can be done under the CODESYS programming software, by selecting "Project\Option\Symbol configuration" and then mark the check box "Dump symbol entries" as shown in the picture below.

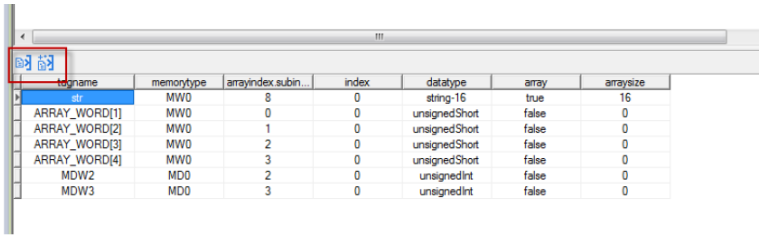


Then click the "Configure symbol file...." button and make sure the "Export variables of object" check box is marked as shown in the following picture. We recommend to un-check the check box and mark it again to be sure about the proper settings.

Select the driver in AGI Creator tag editor and click the "Import tag" button to start the importer.



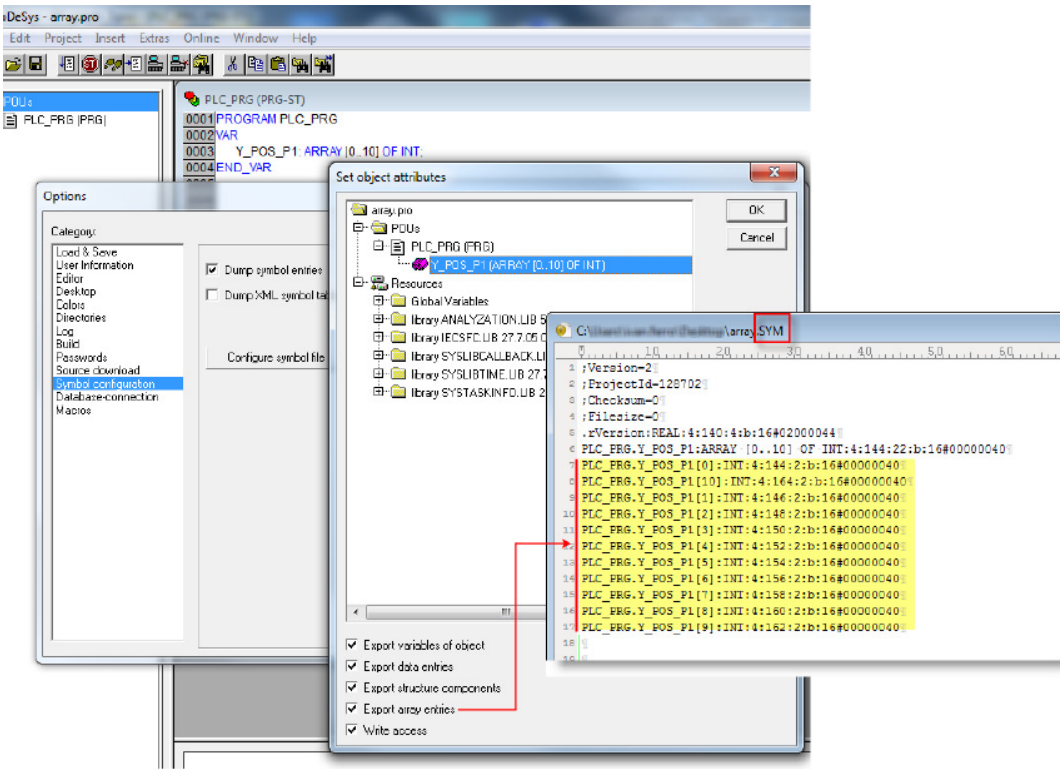
Locate the ".sym" file and confirm.
The tags presented in the exported document are listed in the tag dictionary from where they can be directly added to the project using the add tags button as shown in the following figure.



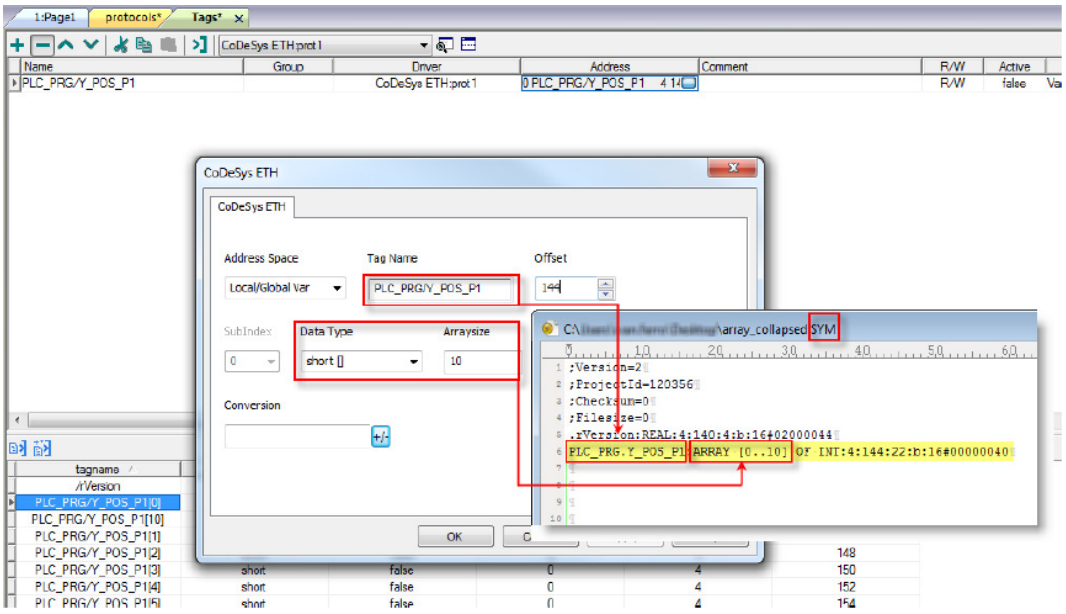
tagname	memorytype	arrayindex.subin...	index	datatype	array	arraysize
str	MW0	8	0	string-16	true	16
ARRAY_WORD[1]	MW0	0	0	unsignedShort	false	0
ARRAY_WORD[2]	MW0	1	0	unsignedShort	false	0
ARRAY_WORD[3]	MW0	2	0	unsignedShort	false	0
ARRAY_WORD[4]	MW0	3	0	unsignedShort	false	0
MDW2	MD0	2	0	unsignedInt	false	0
MDW3	MD0	3	0	unsignedInt	false	0

2.5 Tag array

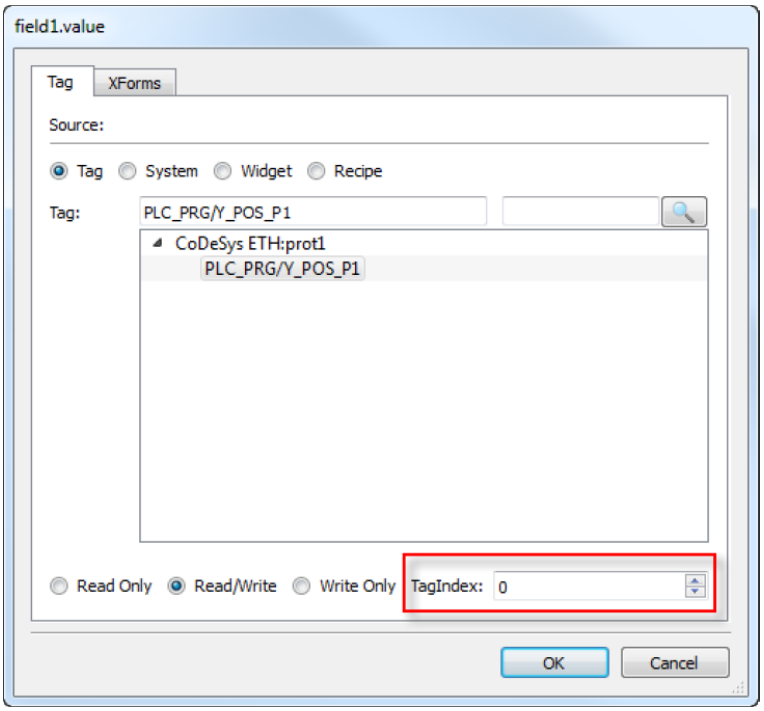
Tag arrays are split into individual elements and one tag for each element is created. The figure below shows an example of one array with 10 elements.



When "Export array entries" is set, a tag for each element is created and exported into the SYM file. The entire tag list is automatically imported into the Tag Editor. The amount of tags can be reduced and only one tag for each one array can be created by removing the checkbox "Export array entries", see figure below.



All tag elements can be referenced in the editor using "TagIndex" in the "Attach to Tag" dialogue box.



2.6 Data types

The import module supports variables of standard data types and user-defined data types.

2.7 Standard data types

The following data types in the CODESYS programming tool are considered standard data types by the import module:
BOOL
WORD
DWORD
INT
UINT
UDINT
DINT
STRING
REAL
TIME
DATE & TIME
and 1-dimensional ARRAY of the types above.
The 64-bit data types LWORD, LINT and LREAL are not supported.
String length for a STRING variable in PLC should be max 80 characters. Declare a STRING variable either with a specified size (str: STRING(35)) or default size (str: STRING) which is 80 characters.

2.8 Special data types

The CODESYS v2 ETH driver provides one special data type called "IP Override".

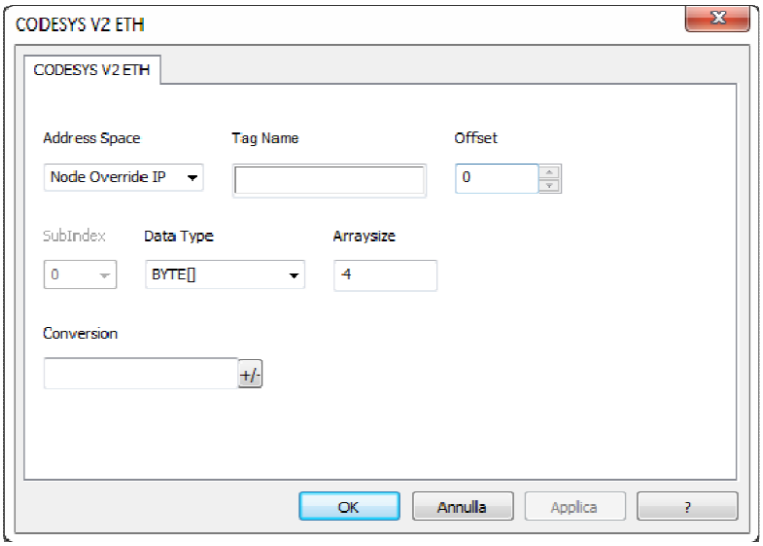
The IP Override IP allows changing at run-time the IP address of the target controller you want to connect. This memory type is an array of 4 unsigned bytes, one per each byte of the IP address. The node override IP is initialised with the value of the controller IP specified in the project at programming time.

If the IP Override is set to 0.0.0.0, all the communication with the node is stopped, no request frames are generated anymore.

If the IP Override has a value different from 0.0.0.0, it is interpreted as node IP override and the target IP address is replaced run-time with the new value.

In case the panel has been configured to access to a network of controllers, each node has its own override variable.

The IP Override values assigned at run-time are retained through power cycles.



2.9 Limitations

Max block size is 1024 byte.

2.10 DEIF target files for CODESYS

The target files are available upon request - support@deif.com.