

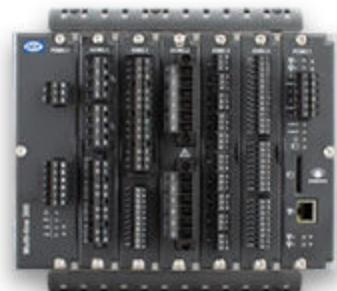
CODESYS Guidelines

4189341353A

for AMC 300, AMC 600, AWC 500, and iE 250



Improve
Tomorrow



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1. About this manual

1.1 Software versions

The information in this document corresponds to the following software versions.

Software	Details	Version
BSP/OS	AMC 300 Board Support Package	PCM3.1 BSPv4 (4.0.5.0) or later PCM3.3 BSPv4 (5.0.0.0) or later
	AWC 500 Operating System	PCM5.2 OSv3 (3.0.1.0) or later
	AMC 600 Operating System	PCM6.1 OSv3 (1.0.1.0) or later
	iE 250 PLC Operating System	BSPv5 (5.0.0.0) or later
CODESYS CONTROL	CODESYS run-time	V3.5 SP 15 3.5.15.20 V3.5 SP 18 3.5.18.40 or later
CODESYS IDE	PC software for development of CODESYS applications	V3.5 SP 15 3.5.15.20 V3.5 SP 18 3.5.18.40 or later
CODESYS TSP	AMC 300 CODESYS Target Support Package (TSP) AWC 500 CODESYS Target Support Package (TSP) AMC 600 CODESYS Target Support Package (TSP) iE 250 PLC CODESYS Target Support Package (TSP)	1.3.0.7 or later

1.2 Technical support

CODESYS in general	
The CODESYS store	My question: Ask questions about CODESYS. FAQ: Frequently asked questions. Forum: Discuss different CODESYS topics with other users.
CODESYS Development System online help	Online help is available from the Help menu.

DEIF support options	
Technical documentation	Download all technical product documentation from https://www.deif.com/documentation .
Support	DEIF offers 24-hour support. See www.deif.com for contact details, there may be a DEIF subsidiary located near you. You can also e-mail support@deif.com .
Service	DEIF engineers can help with design, commissioning, operating and optimisation.
Training	DEIF regularly offers training courses at the DEIF offices worldwide.

1.3 System requirements

The requirements for the development PC to install the Development packages, PC tools and drivers are:

- Microsoft Windows 10, 32 bit version
- Microsoft Windows 10, 64 bit version (Recommended)

As the AMC 300 and the AMC 600 support SSH (Secure Shell) and SCP (Secure Copy) as basic communication protocols, it can be accessed from any system supporting these protocols (if enabled).

NOTE Not all browsers are suitable for this software. We recommend to use Google Chrome or Mozilla Firefox.

1.4 Warnings and safety

Recommendations for data security

To minimise the risk of data security breaches we recommend to:

- As far as possible, avoid exposing controllers and controller networks to public networks and the Internet.
- Use additional security layers like a VPN for remote access, and install firewall mechanisms.
- Restrict access to authorised persons.

1.5 Legal information

Disclaimer

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

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

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2. Installation

2.1 CODESYS development package

2.1.1 About the CODESYS development package

The AMC 300, AMC 600, AWC 500, and iE 250 PLC CODESYS development packages consist of three parts:

- CODESYS IDE: Installed on the development PC.
- CODESYS TSP (targeting AMC 300, AMC 600, AWC 500, or iE 250 PLC): Target support package installed into the IDE.
- CODESYS CONTROL run-time: Runs on the controller hardware.

CODESYS CONTROL run-time

The installation process for the CODESYS CONTROL run-time depends on the BSP/OS version.

For:

- AMC 300 PCM3.1 (BSPv4)
- AMC 300 PCM3.3 (BSPv5)
- AMC 600 PCM6.2 (BSPv5)
- iE 250 PLC PCM2.1 (BSPv5)

the CODESYS CONTROL run-time is bundled in the operating system. An update of the PLC run-time follows the update of a new bundle.

Whereas for:

- AWC 500 PCM5.2
- AMC 600 PCM6.1 (OSv3)

the CODESYS CONTROL run-time is added via the installation package (.dupdate file). This package is pre-installed from the DEIF factory when you order the controller. You can update the CODESYS CONTROL run-time independently from the operating system.

2.1.2 Download the CODESYS development package

You can download the CODESYS IDE, CODESYS TSP, and the CODESYS run-time by submitting your email address via the DEIF website. A link is sent to you to download the CODESYS IDE and CODESYS TSP, respectively.

Follow these steps to download the CODESYS IDE:

1. Go to the DEIF website www.deif.com.
2. Open the search bar , and type the controller name to open a list of product options.
3. Select the controller from the list.
4. Select the **Software** tab.
5. Open the **CODESYS** list, and select either:
 - **AMC 300 CODESYS TSP v1.3.0.x**
 - **AWC 500 CODESYS TSP v1.3.0.x**
 - **AMC 600 CODESYS TSP v1.3.0.x or**
 - **iE 250 PLC CODESYS TSP v1.3.0.x**
6. Submit your email address to receive a download link to the software.

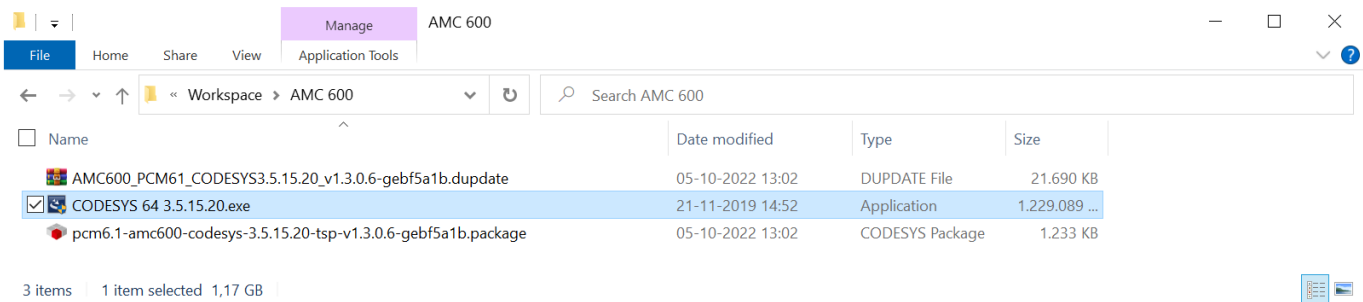
☒ E-mail notification on future releases
[Download](#)

7. Follow the link in the email to download the DEIF CODESYS software package to your computer.
8. Repeat the steps to download the **CODESYS IDE** installation file, for example:
 - **CODESYS V3.5 SP15 or**
 - **CODESYS V3.5 SP18**
9. If it is necessary to update the CODESYS run-time, download the CODESYS CONTROL run-time. For example,
 - **AMC 300 PCM3.1 Code package**
 - **AWC 500 CODESYS run-time for PCM5.2**
 - **AMC 600 CODESYS run-time for PCM6.1 or**
 - **iE 250, AMC 300, or AMC 600 Code package (common for PCM2.1, PCM3.3 and PCM6.2)**

2.2 Install CODESYS V3.5 SP15

This section guides you through the installation of the CODESYS IDE and installation of the CODESYS TSP.

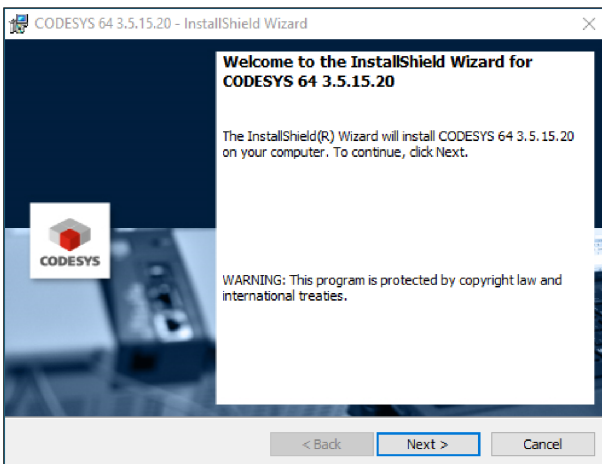
1. Run the installation file (for example, CODESYS 64 3.5.15.20.exe) to install CODESYS IDE to the development computer with default settings.



2. If you are prompted to install necessary Microsoft Visual C++ packages, follow the instructions on the screen.

The CODESYS InstallShield Wizard

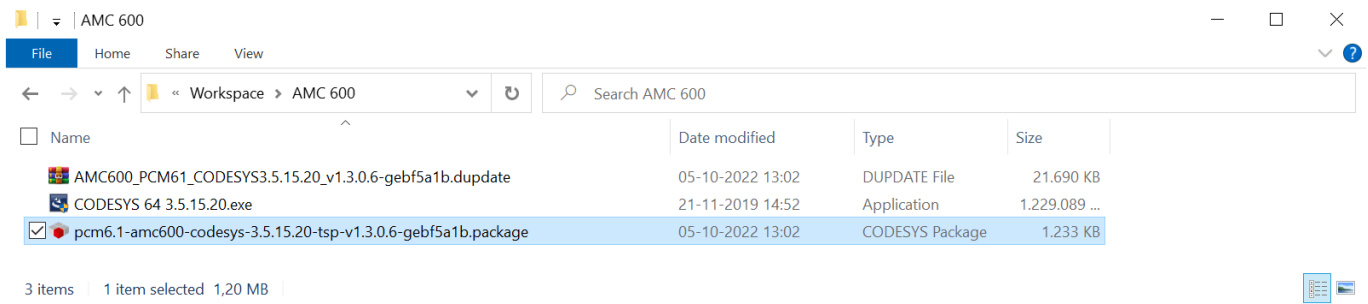
1. When the CODESYS InstallShield Wizard starts, select **Next**.



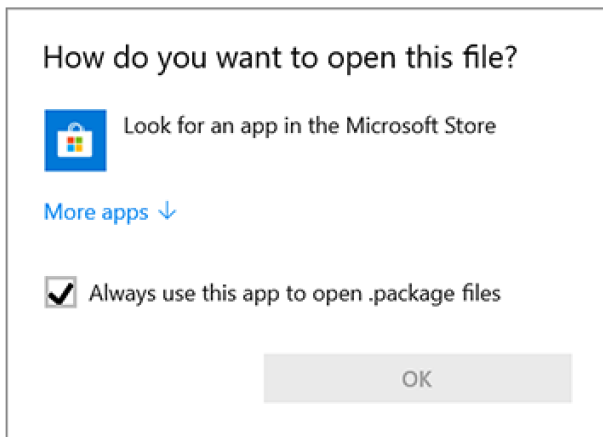
2. **Licence Agreement:** Accept the agreement and select **Next**.
3. **Choose Destination Location:** Choose a folder for the installation, and select **Next**.
4. **Select Features:** Choose the features you want to install, and select **Next**.
5. **Select Program Folder:** Choose a program folder, and select **Next**.
6. **Start Copying Files:** The chosen features and the destination folder are shown. If everything is correct, select **Next**.
7. **Very important information:** Confirm that you have read the information, and select **Next**.
8. **InstallShield Wizard Complete:** Select **Finish** to exit the installation wizard.

2.2.1 Install the CODESYS TSP

1. Run the installation file (for example, pcm6.1-amc600-codesys-3.5.15.20-geb5a1b.package) to install the AMC 600 CODESYS TSP (Target Support Package) to the development computer with default settings.



- The file extension .package is registered with CODESYS on Windows. If CODESYS is not installed or you do not have the correct version, you will see this message:

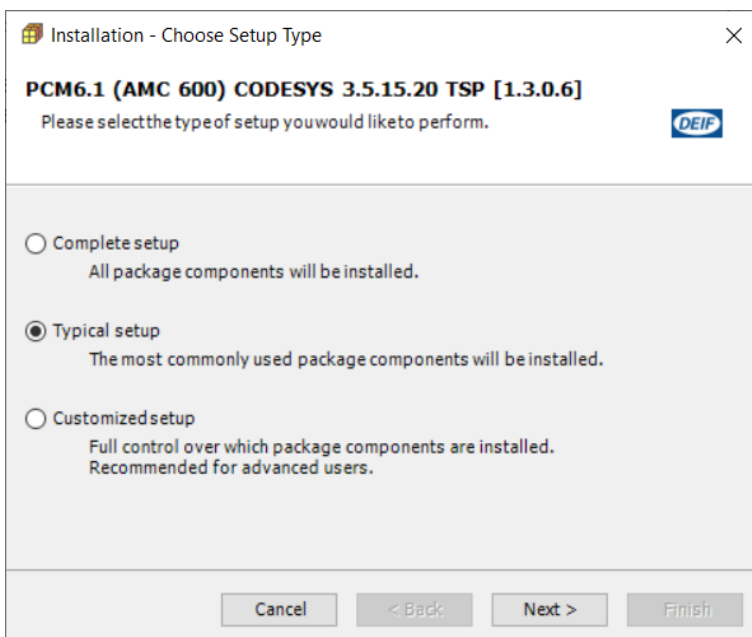


- Install a correct version of CODESYS (see section **Install CODESYS V3.5 SP15**), then run the installation file again.

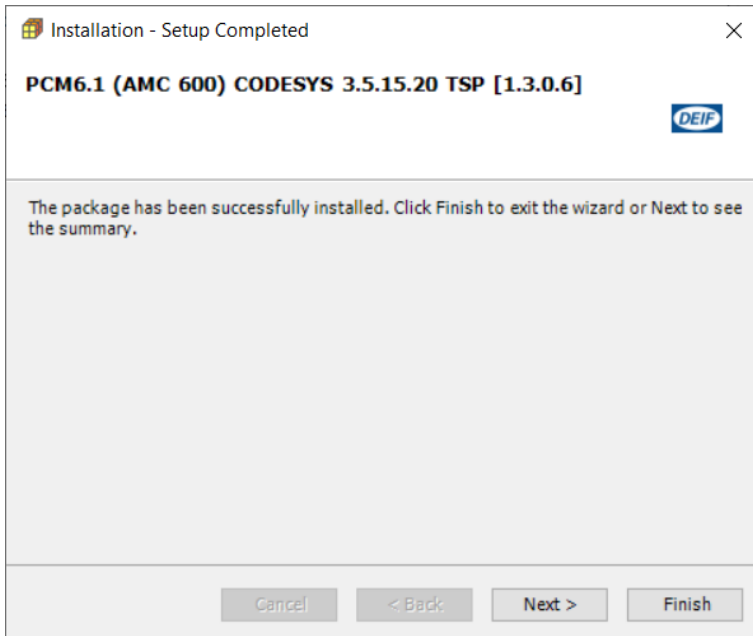
If CODESYS is installed, but you do not want the AMC 600 CODESYS TSP package associated with it, you can open CODESYS and install the package file with **Open > Install package**.

This starts the Package Manager and installs the required AMC 600 Device Descriptions (and the EtherCAT Slave Information files).

- Choose a setup, and select **Next**.



- When the package is installed, select **Next** to finish the installation.



3. Select **Finish** to exit the installation wizard or **Next** to see a summary.

2.2.2 Open CODESYS for the first time

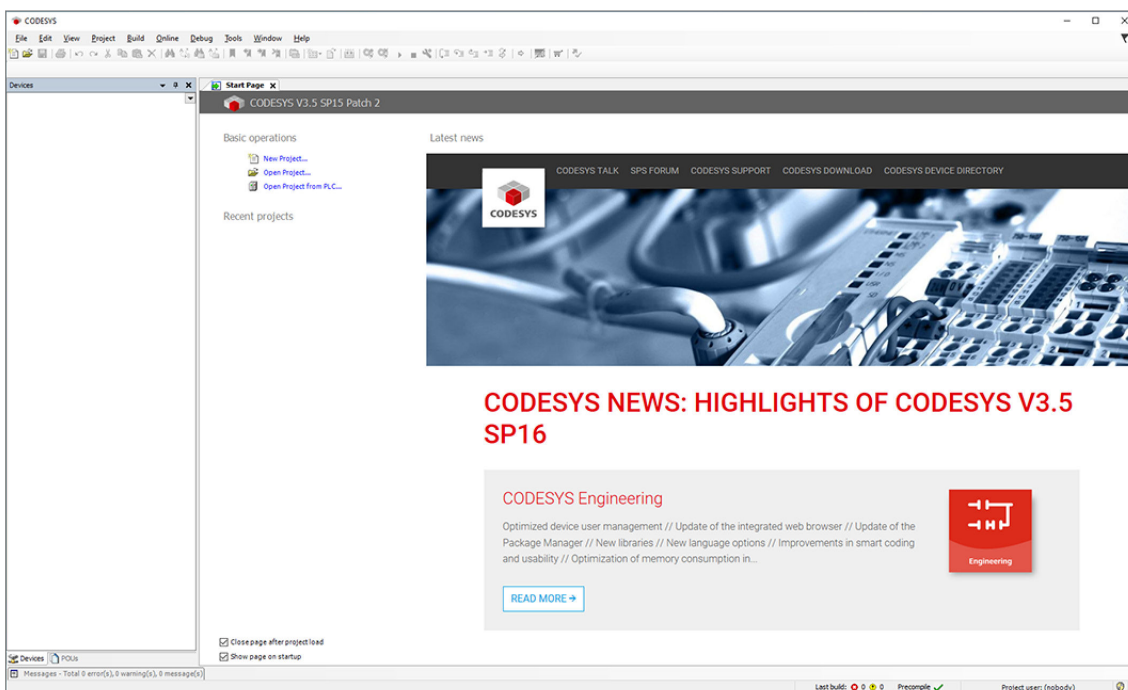
To open CODESYS you can:

- Double-click the desktop icon



- In the start menu, select **Start > 3S CODESYS > CODESYS V3.5 SP15 (or later version)**

The CODESYS start page:

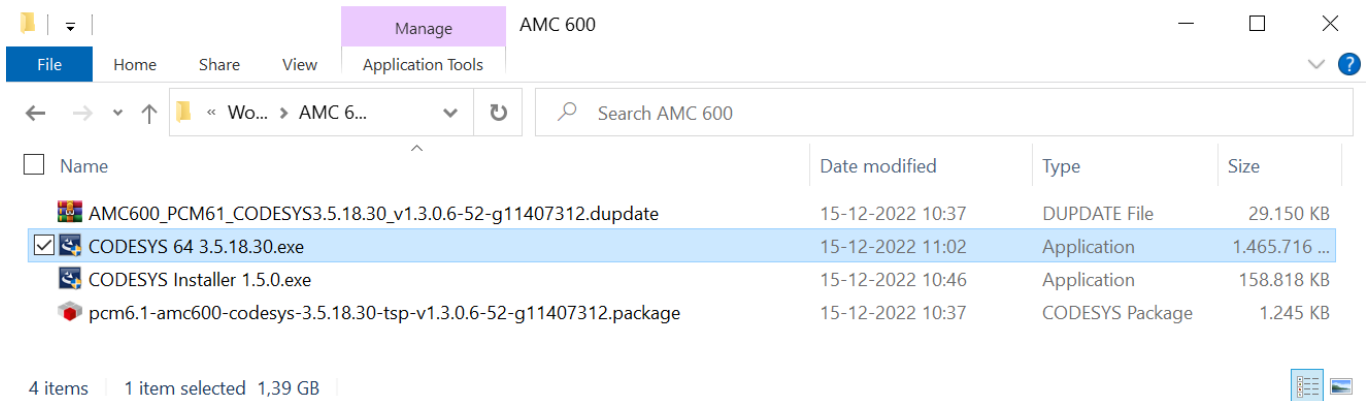


2.3 Install CODESYS V3.5 SP18

This section guides you through the installation of the CODESYS IDE and installation of the CODESYS TSP.

From CODESYS V3.5 SP18, you have the option to use the direct installation or install CODESYS via the CODESYS Installer. Both methods are shown in this section.

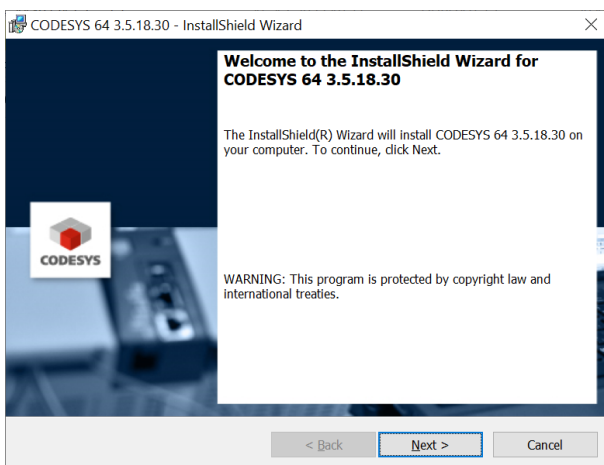
1. Run the installation file (for example, CODESYS 64 3.5.18.30.exe) to install CODESYS IDE to the development computer with default settings.



2. If you are prompted to install necessary Microsoft Visual C++ packages, follow the instructions on the screen.

The CODESYS InstallShield Wizard

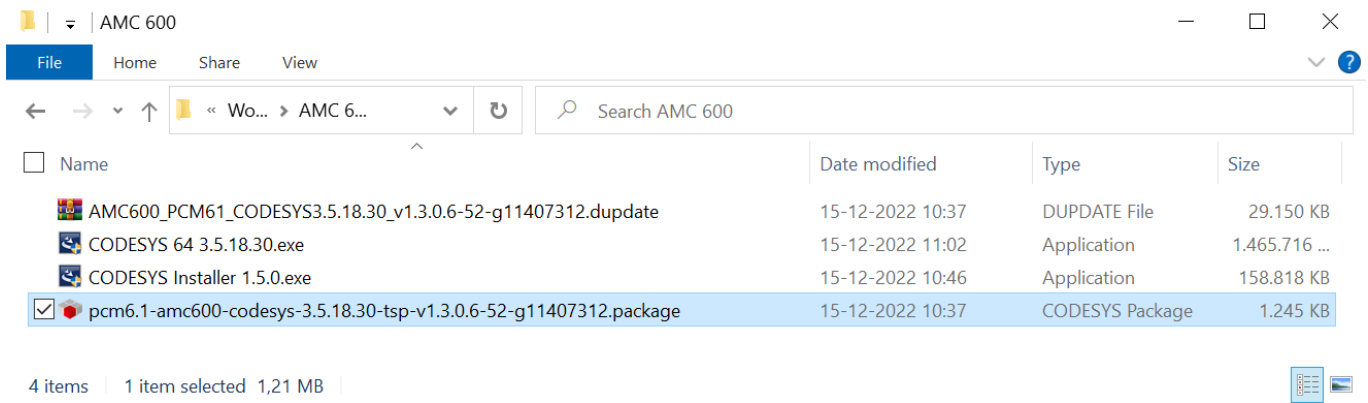
1. When the CODESYS InstallShield Wizard starts, select **Next**.



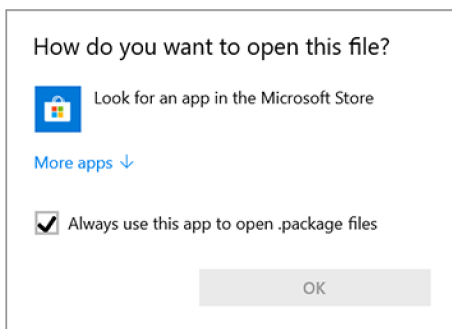
2. **Licence Agreement:** Accept the agreement and select **Next**.
3. **Choose Destination Location:** Choose a folder for the installation, and select **Next**.
4. **Select Features:** Choose the features you want to install, and select **Next**.
5. **Select Program Folder:** Choose a program folder, and select **Next**.
6. **Start Copying Files:** The chosen features and the destination folder are shown. If everything is correct, select **Next**.
7. **Very important information:** Confirm that you have read the information, and select **Next**.
8. **InstallShield Wizard Complete:** Select **Finish** to exit the installation wizard.

2.3.1 Install the CODESYS TSP

1. Run the installation file (for example, pcm6.1-amc600-codesys-3.5.18.30-tsp-v1.3.0.6-52-g11407312) to install the AMC 600 CODESYS TSP (Target Support Package) to the development computer with default settings.



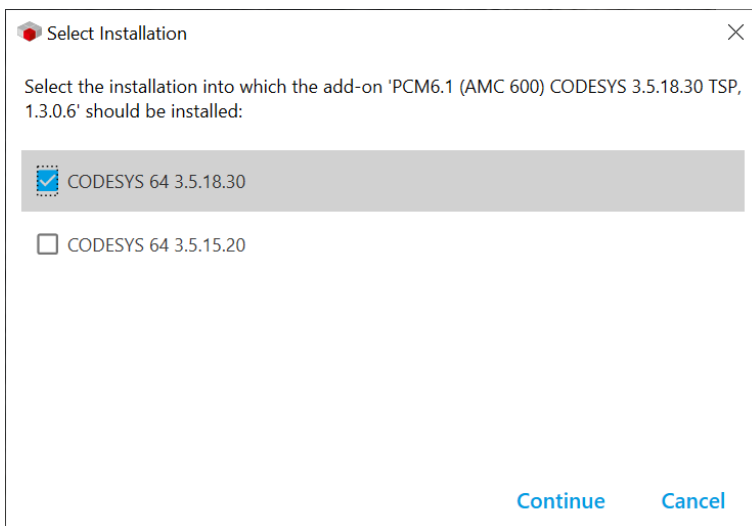
- The file extension .package is registered with CODESYS on Windows. If CODESYS is not installed or it is not a correct version, you will see this message.



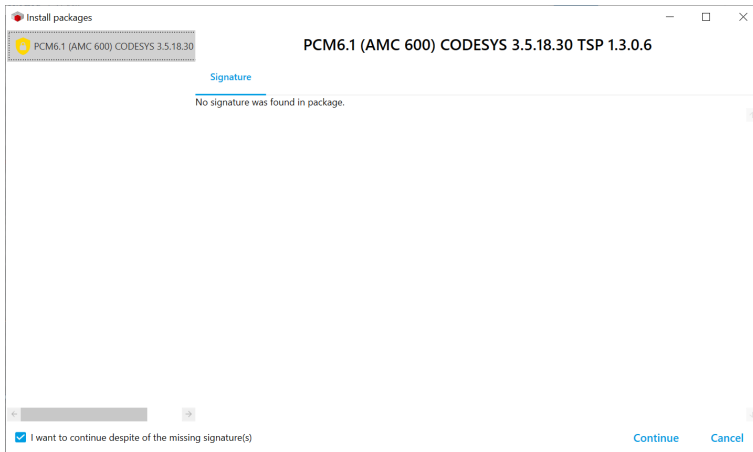
- Install a correct version of CODESYS (see section **Install CODESYS V3.5 SP18**), then run the installation file again.

If CODESYS is installed, but you do not want the CODESYS TSP package associated with it, you can open CODESYS and install the package file via **Open > Install package**. This starts the Package Manager and installs the required EtherCAT Device Descriptions for the controller products (and the EtherCAT Slave Information files)

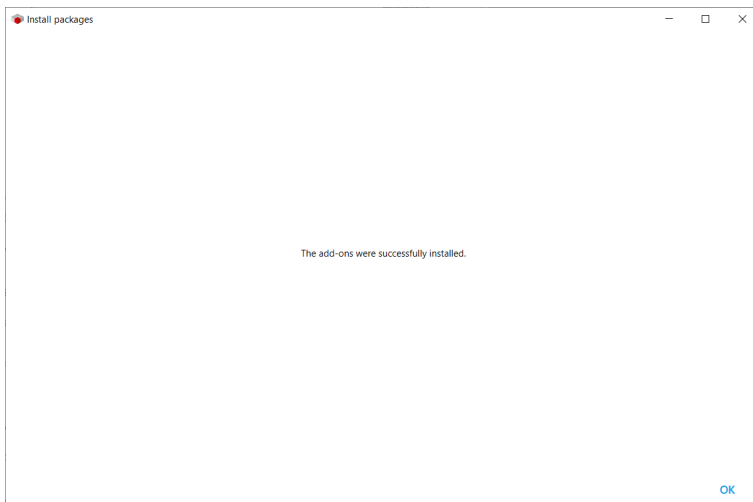
- When the installation starts, select the CODESYS version for installation.



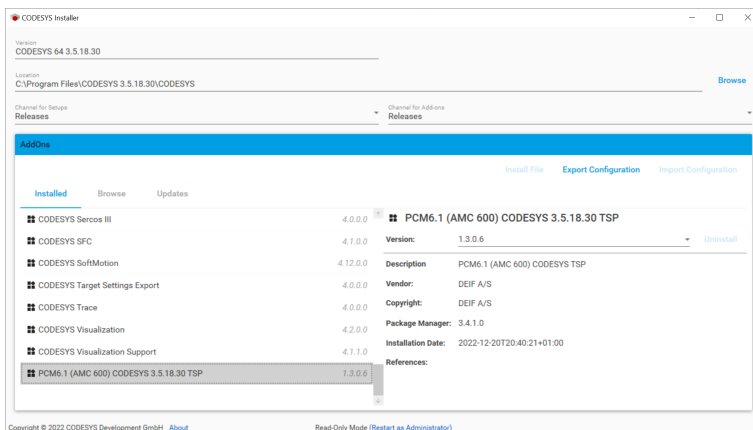
- Select that you want to **Continue** although there is a missing installation package.



6. Select **OK** when the installation has been completed.



You can view the installed CODESYS TSP in the CODESYS Installer, as shown below.

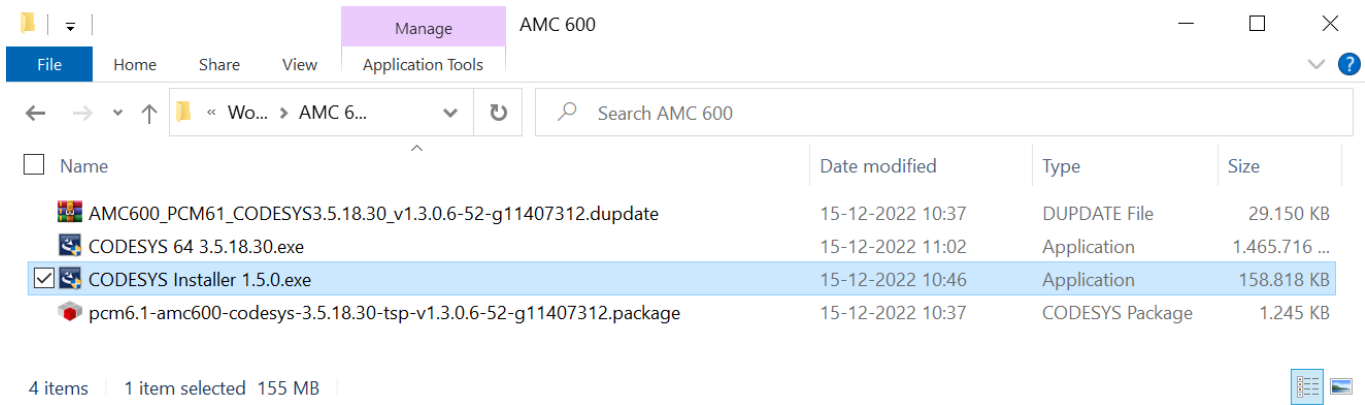


7. Choose a setup, and select **Next**.
8. When the package is installed, select **Next** to finish the installation.
9. Select **Finish** to exit the installation wizard, or **Next** to see a summary.

2.3.2 Install/upgrade CODESYS V3 installation via CODESYS Installer

The CODESYS Installer is a Package Manager that can be used to manage CODESYS Installations.

1. Run the installation file for CODESYS Installer (for example, CODESYS Installer 1.5.0.exe) to install the CODESYS Installer to the development computer with default settings.



- If you are prompted to install necessary Microsoft Visual C++ packages, follow the instructions on the screen.

The CODESYS Installer InstallShield Wizard

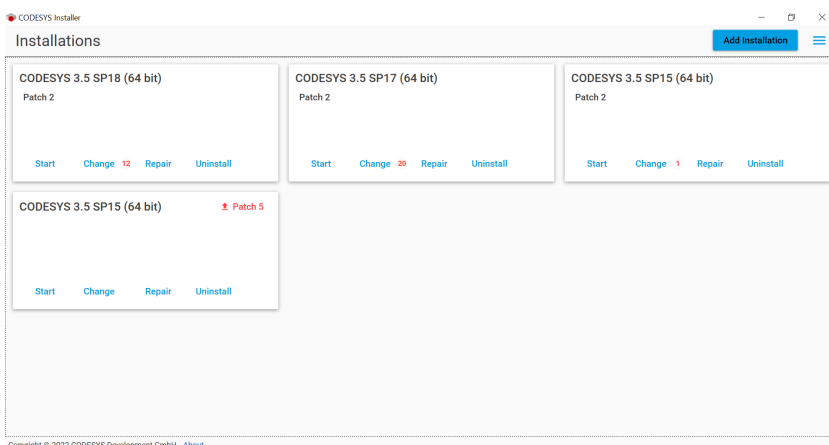
- When the CODESYS InstallShield Wizard starts, select **Next**.



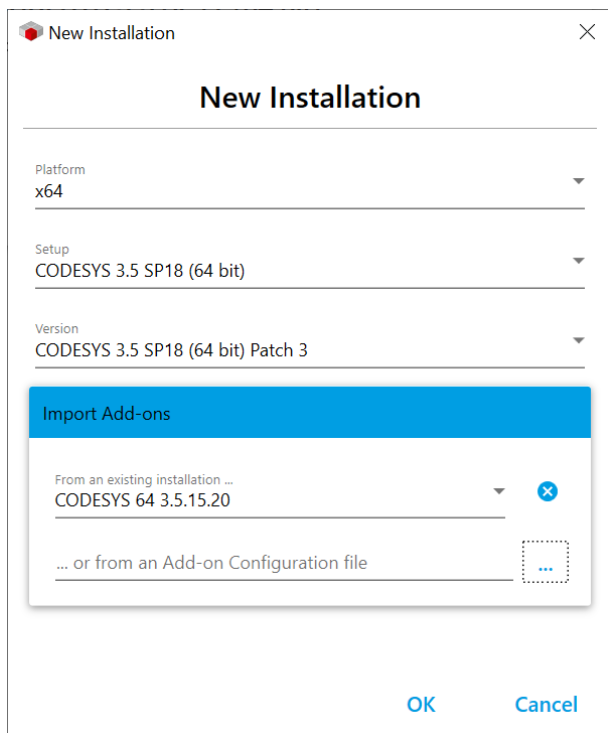
- Licence Agreement:** Accept the agreement, and select **Next**.
- InstallShield Wizard Complete:** Select **Launch CODESYS Installer** and **Finish** to exit the installation.

Add new CODESYS Installation

- Open CODESYS Installer, and select New Installation in the upper right corner.



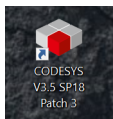
- Select the new CODESYS version to install and the previous version to import settings from.



2.3.3 Open CODESYS for the first time

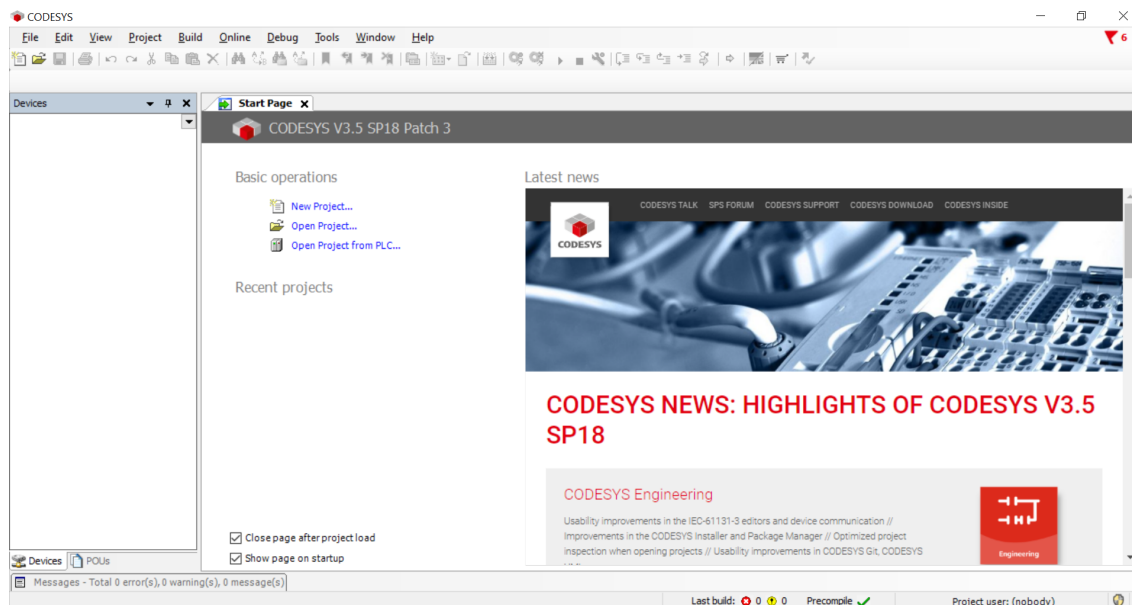
To open CODESYS you can:

- Double-click the desktop icon



- In the start menu, select **Start > 3S CODESYS > CODESYS V3.5 SP18 (or later version)**

The CODESYS start page:

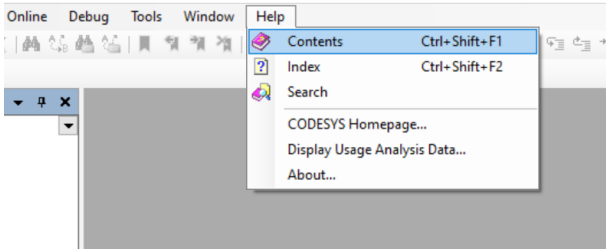


3. CODESYS Online Help

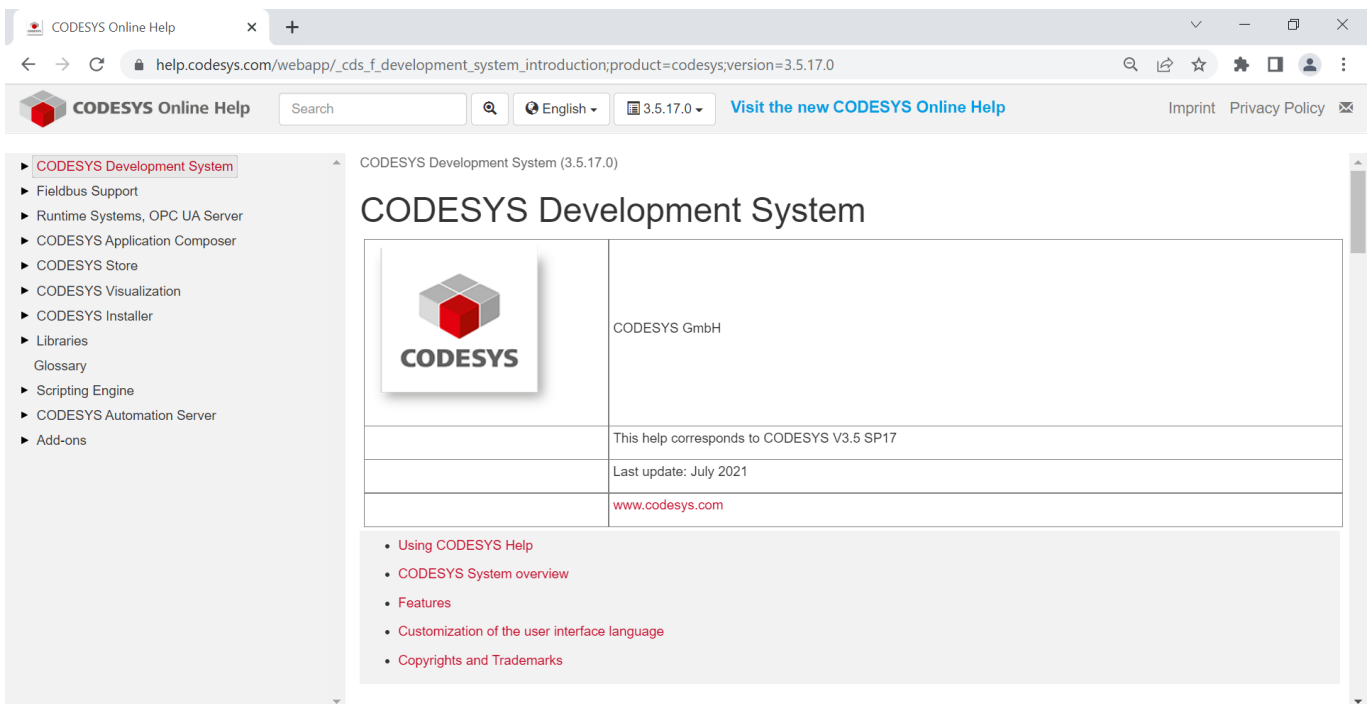
3.1 Start the CODESYS Online Help

Use the CODESYS Online Help to get more detailed information about the CODESYS programming environment.

On the CODESYS start page, select **Help > Contents** in the menu.



This opens the CODESYS Online Help page.



3.2 New to CODESYS

If you are new to CODESYS, we recommend you start with the guide under the menu **Your First CODESYS Program**.

The screenshot shows the CODESYS Online Help interface in a web browser. The address bar displays the URL: `help.codesys.com/webapp/_cde_tutorial_refrigerator_control;product=codesys;version=3.5.17.0`. The page title is "CODESYS Online Help". The left sidebar contains a navigation tree with the following items: CODESYS Development System, Whitepaper: Modularization from the User Perspective, Configuring CODESYS, **Your First CODESYS Program** (highlighted), Creating and Configuring a Project, Exporting and Transferring Projects, Comparing Projects, Protecting and Saving Projects, Localizing Projects, Configuring I/O Links, Programming of Applications, Working with Controller Networks, Downloading an Application to the PLC, Testing and Debugging, Application at Runtime, Updating an Application on the PLC, Copying Files to/from PLC, Redundancy, Using the Command-Line Interface, Using Libraries, Managing Devices, and Managing Packages and Licenses. The main content area is titled "Your First CODESYS Program (3.5.17.0)" and contains a list of topics: Before you get started, Contents of your first project, Preparation, Creating the project and selecting the PLC device, To program the controller application in the project, see the following sections: Declaring the global variables, Creating the main program for the cooling control in the CFC editor, Creating a POU for signal management in the ladder diagram editor, Calling the `signals` program in the main program, Creating an ST POU for a simulation, Defining the programs to be executed in the task configuration, Defining the "active application" for the communication with the PLC, Debugging the application program, To establish a connection to the PLC, see the following sections: Starting the gateway server and PLC, and In the very first communication configuration: Adding the gateway.

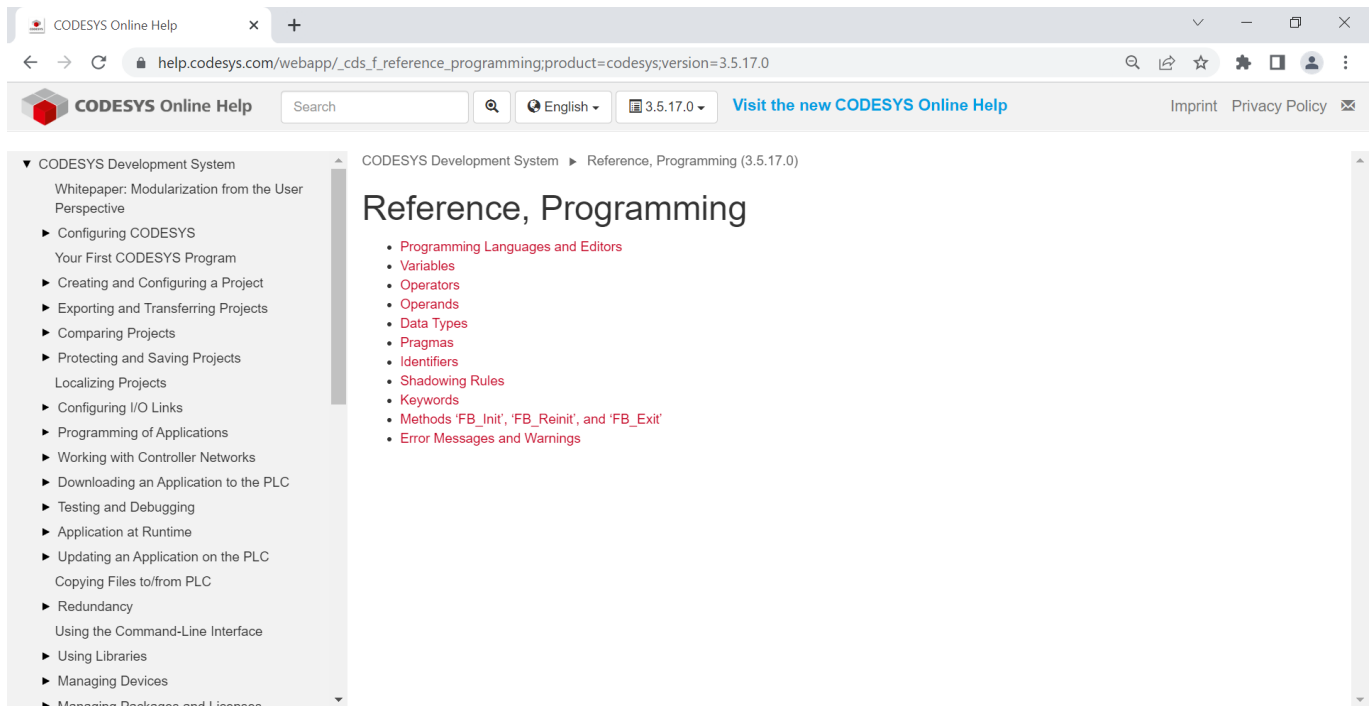
3.3 Visualization

Under the menu **CODESYS Visualization**, you can read more about the possibilities with visualization.

The screenshot shows the CODESYS Online Help interface in a web browser. The address bar displays the URL: `help.codesys.com/webapp/_visu_f_core_visualization;product=core_visualization;version=3.5.17.0`. The page title is "CODESYS Online Help". The left sidebar contains a navigation tree with the following items: CODESYS Development System, Fieldbus Support, Runtime Systems, OPC UA Server, CODESYS Application Composer, CODESYS Store, **CODESYS Visualization** (highlighted), Preparing CODESYS and a Project, Designing a Visualization with Elements, Configuring User Inputs, Setting Up User Management, Setting Up Multiple Languages, Animation of Visualization Elements, Visualizing Array Data, Displaying Data Curve with Trace, Displaying Data Graphs with a Trend Element, Displaying and Editing Text Files, Maintaining Data Consistency for Multicore Operation, Configuring a Variable Assignment with Unit Conversion, Using Recipes in Visualization Elements, and Configuring and Visualizing Alarms. The main content area is titled "CODESYS Visualization (3.5.17.0)" and contains the following sections: Everything in one project (In the same CODESYS project, you use CODESYS Visualization to create the suitable user interface for your application. You link the visualization to the application variables and in this way they can animate and display data. When creating a visualization and an application, you use common functions, for example, as library and source code management or find/replace throughout the project.), Note (For some hints and best practises for configuring and creating a visualization see the document "Best Practices, Visualization". It is available in PDF format with the CODESYS installation.), Functionality overview (Display variant depending on the target platform: You can run the same visualization on different target platforms. Possible display variants include CODESYS WebVisu, CODESYS TargetVisu, and CODESYS HMI. Moreover, In addition, there is a display integrated in the development system. Visualization editor: In the graphic editor, you design the desired user interface from visualization elements. The visualization elements are provided from libraries in a toolbox. You

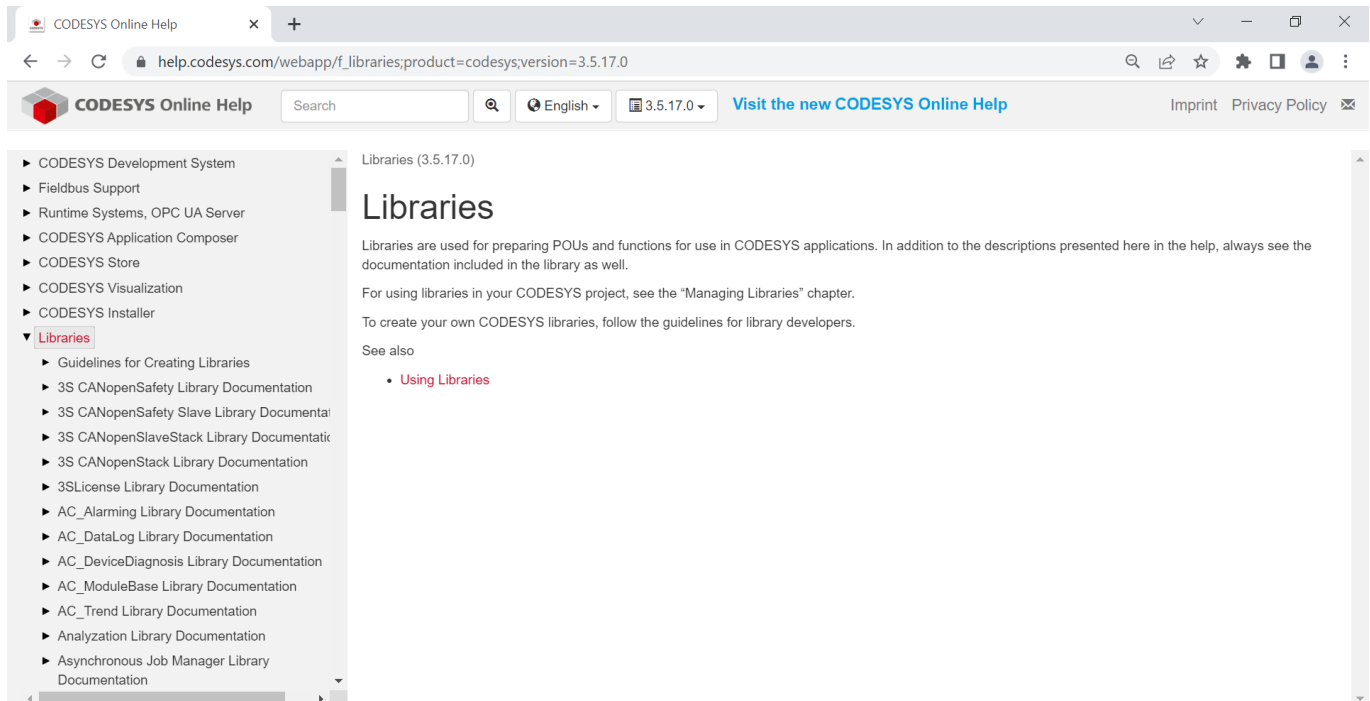
3.4 Programming references

Detailed information about programming is found under the menu **Reference, Programming**.



3.5 Libraries included in CODESYS

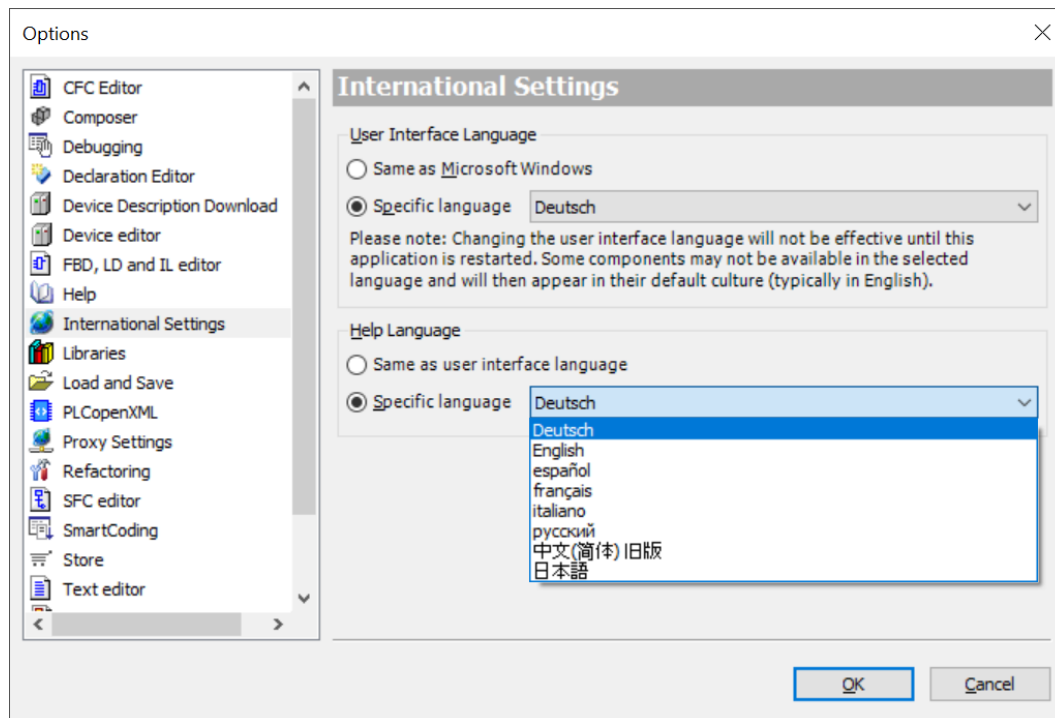
The standard libraries are described under the menu **Libraries**.



More information about libraries is found in the **Library Manager** for DEIF specific libraries.

3.6 Language settings

The default language for the menu and help files is English. You can change this under **Tool > Options > International Settings** to a variety of languages.



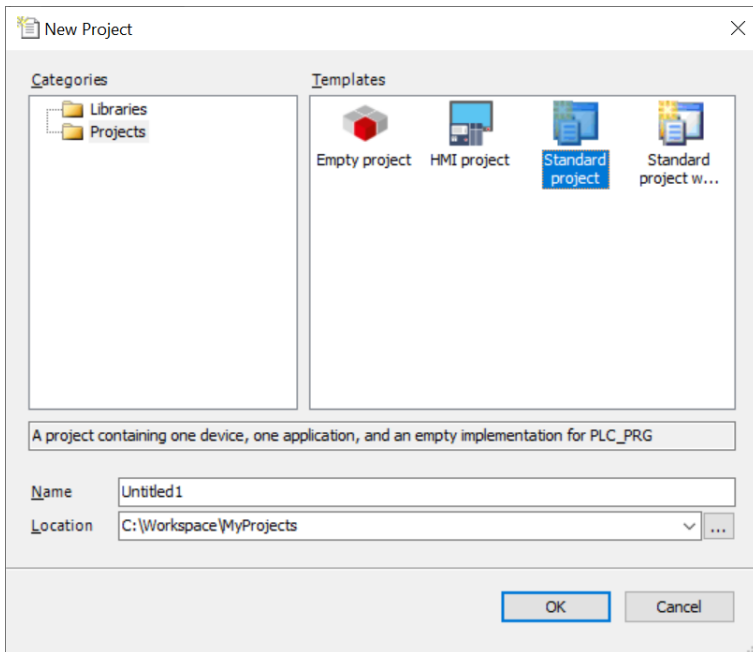
NOTE The CODESYS TSP must be installed before you change the language settings.

4. Create a CODESYS project

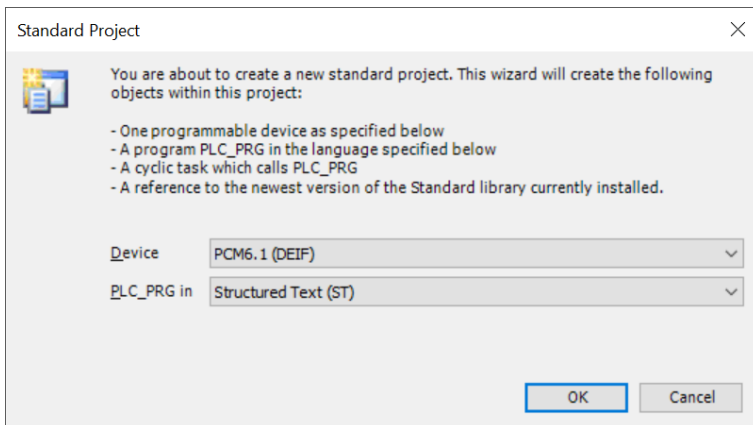
4.1 Create a new project

To create a new CODESYS project:

1. Go to **File > New Project ***.



2. Select **Standard project** in the Templates field.
3. Write a project name.
4. Select a location path for the project file.
5. Select **OK** to open the Standard Project window.



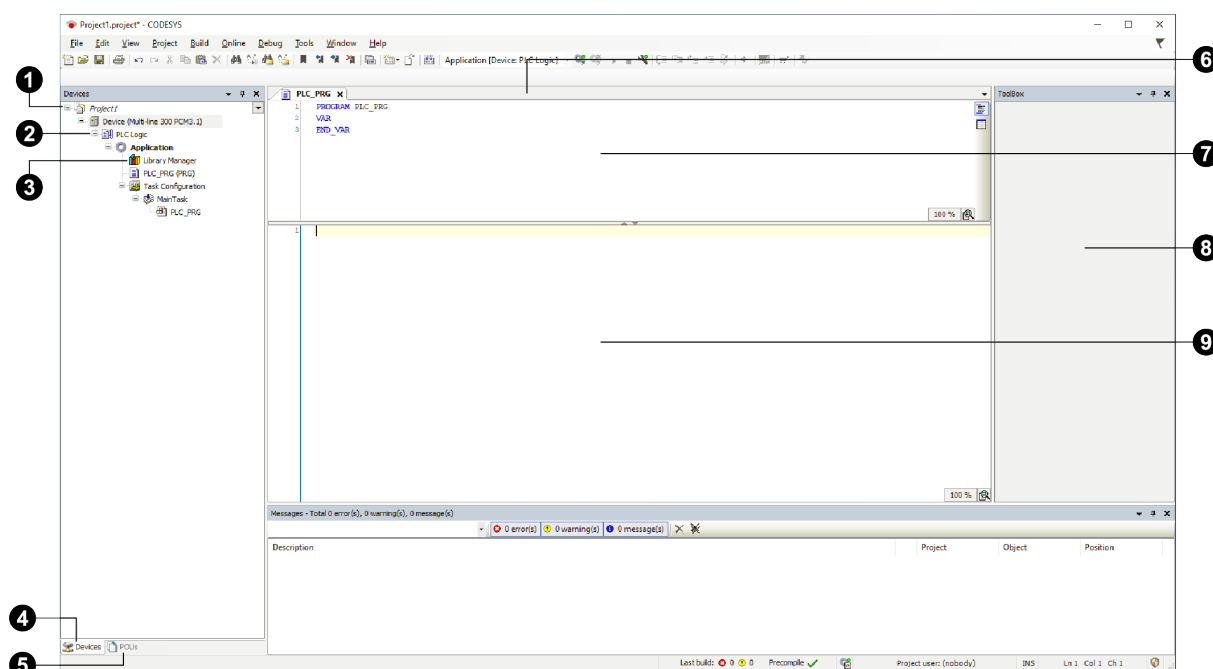
6. In the Device field, select one of these as the device:
 - **AMC 300 PCM 3.1 (DEIF A/S)**
 - **AWC 500 PCM 5.2 (DEIF A/S)**
 - **AMC 600 PCM 6.1 (DEIF A/S)** or
 - **IE 250 PCM2.1 (DEIF A/S)**
7. In the PLC_PRG in field, select **Structured Text (ST)** as the programming language. **
8. Select **OK** to continue.

NOTE * You can also select **Empty project** if you want to create an entire project from scratch.

NOTE ** New POU's can use a different programming language.

4.2 CODESYS layout

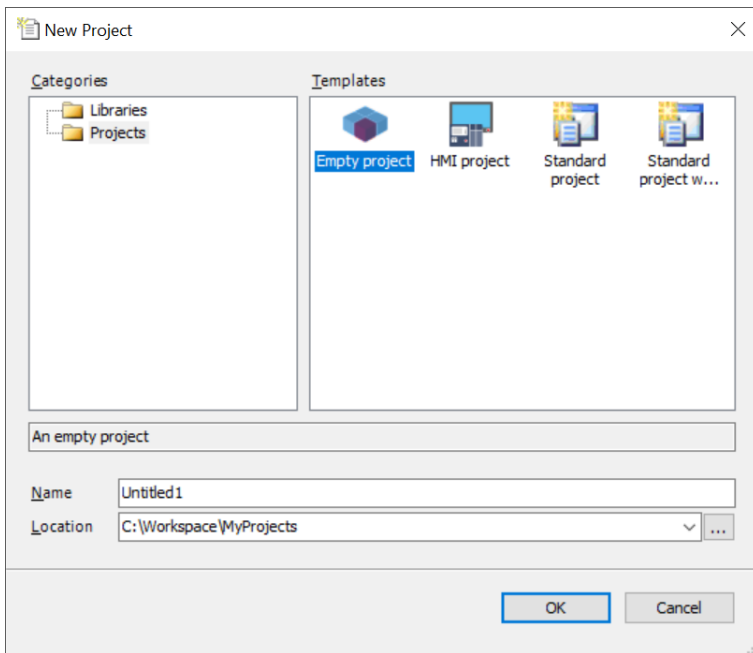
The image below shows the terminology used for the project view throughout the CODESYS manual.



No.	Item	Description
1	Project tree	The project tree is an overview of your project. A typical project will consist of: - One or more devices (AMC 300, AWC 500, AMC 600, or iE 250 PLC controllers). - One or more applications containing the Libraries, POU's and tasks.
2	PLC Logic node	A PLC Logic node shows that the device is a programmable device and has no other functions associated to it.
3	Library manager	The Library manager contains the libraries for the project. Each library consists of functions and function blocks that can be used in your programs.
4	Devices tab	The Devices tab gives you quick access to the project tree.
5	POUs tab	The POU's (Program Object Units) tab gives you quick access to the device independent POU's.
6	Working area	The working area consists of tabs representing different parts of the project. These project parts can be opened from the project tree. The illustration shows the working area for the POU, PLC_PRG. The working area for this POU consists of a declaration workspace, an implementation workspace and a toolbox menu.
7	Declaration workspace	The declaration workspace consists of the variables for the POU functions.
8	Additional toolboxes	Some elements have additional toolboxes to help you build your program, for example Visualisation.
9	Implementation workspace	The implementation workspace is used to program your POU.

4.3 Build from an empty project

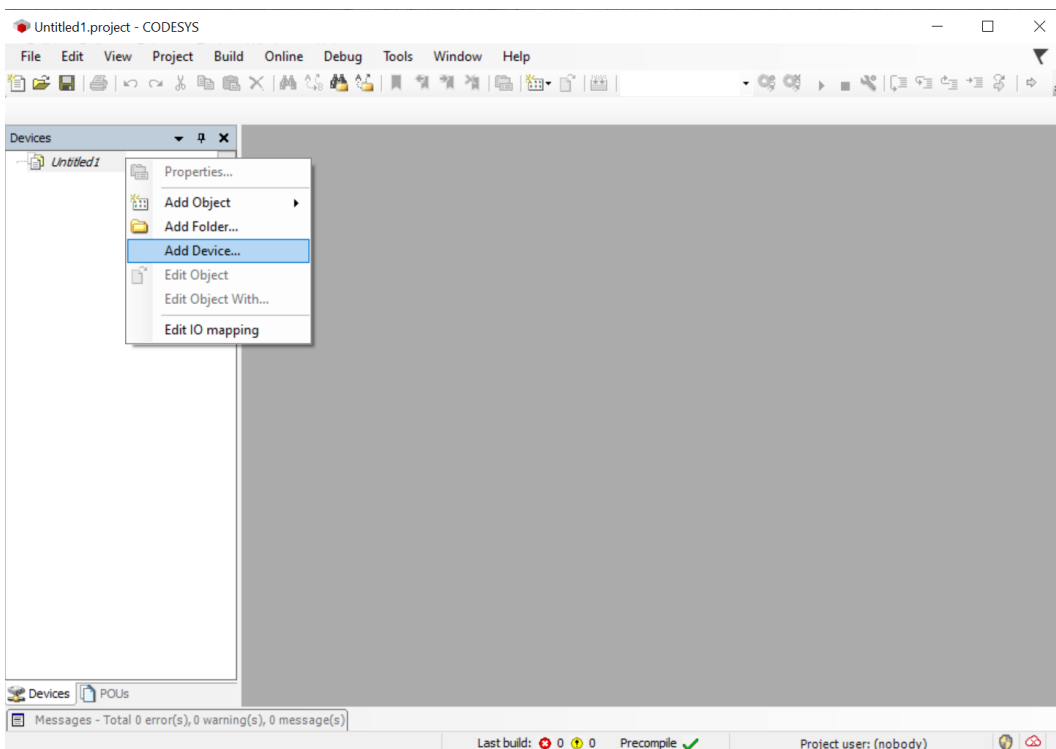
1. Select **File > New Project > Empty project**.



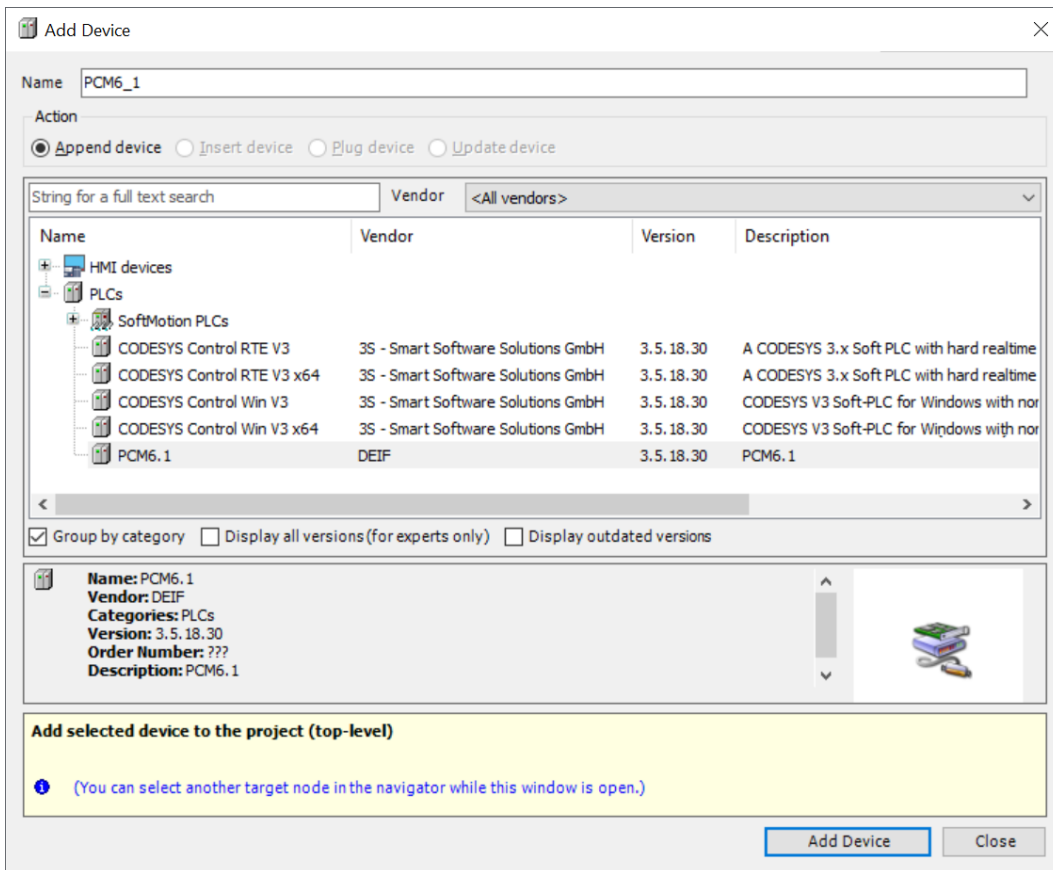
2. Write a project name in the field **Name** (for example, Project1).
3. Select a location to save the project (for example, C:\Workspace\MyProject\).
4. Select **OK** to continue.

4.4 Add the DEIF Device

1. In the project window, select **Add Device**.



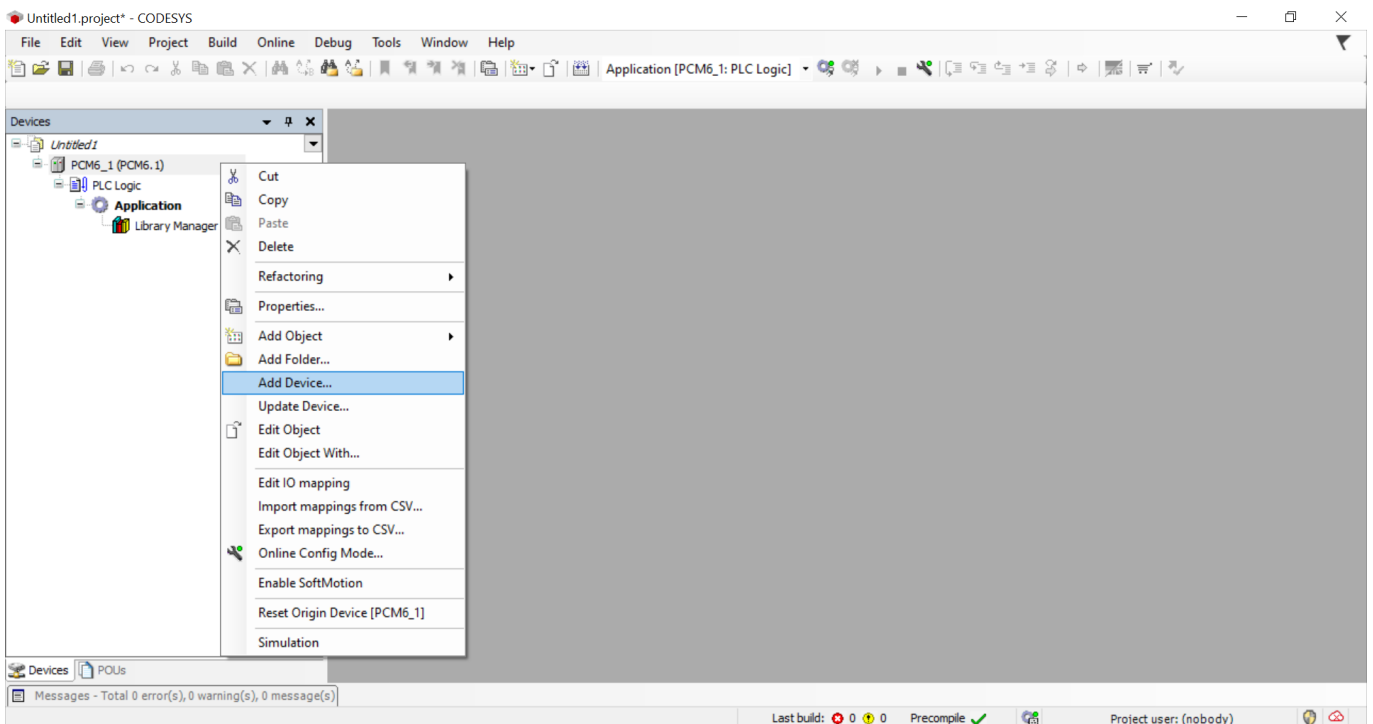
2. In the Add Device window, select a device from the list.



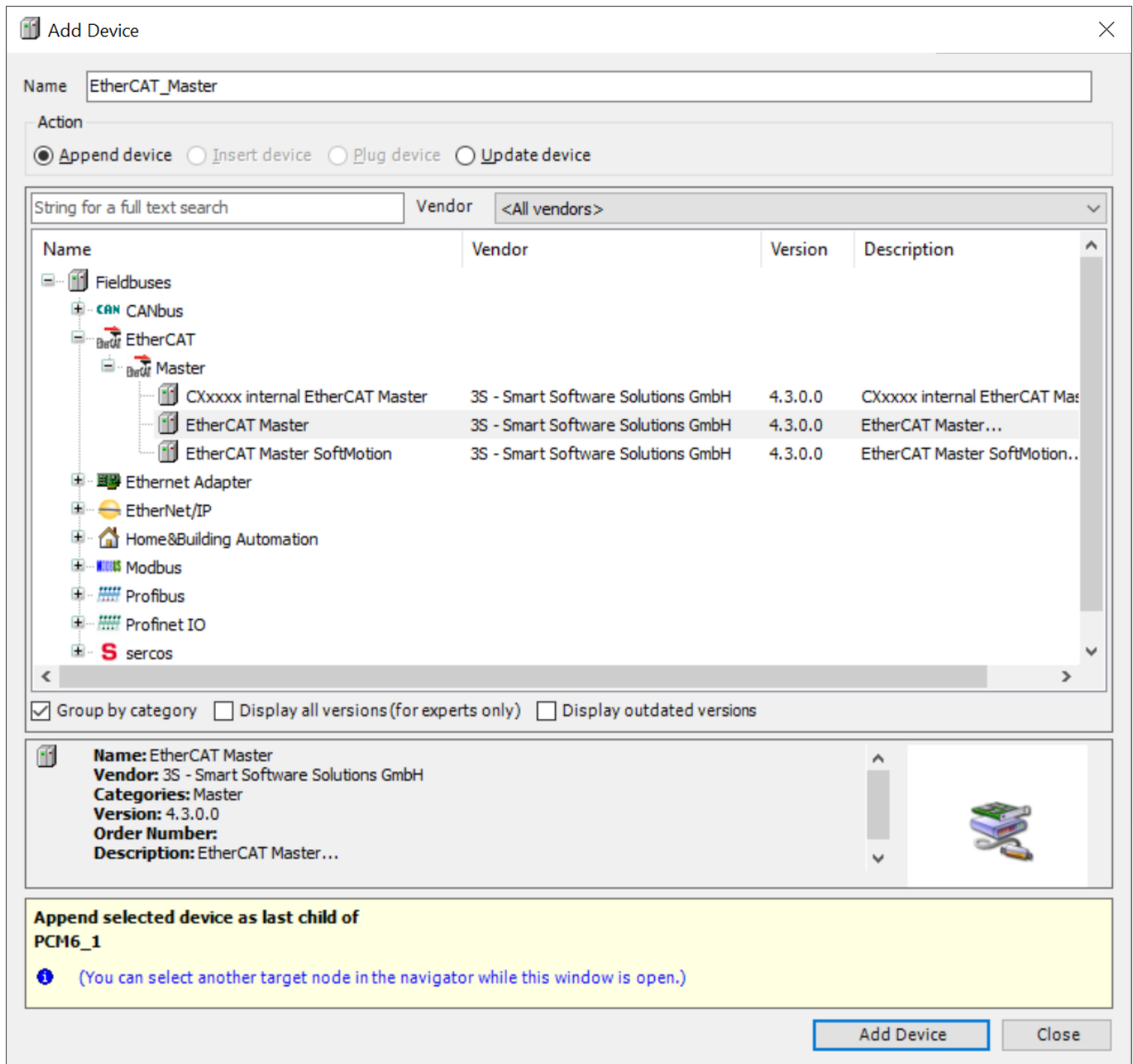
3. Select **Add Device**.

4.5 Add EtherCAT master device

1. In the project window, select **Add Device**.



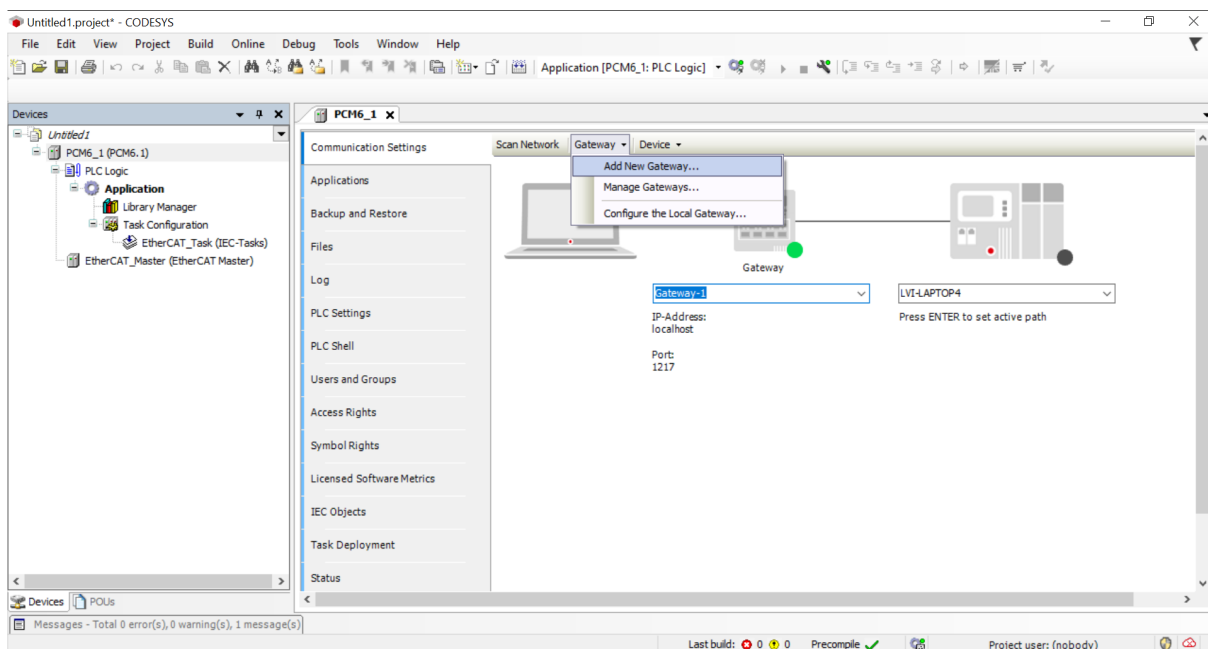
2. In the Add Device window, select a device from the list.



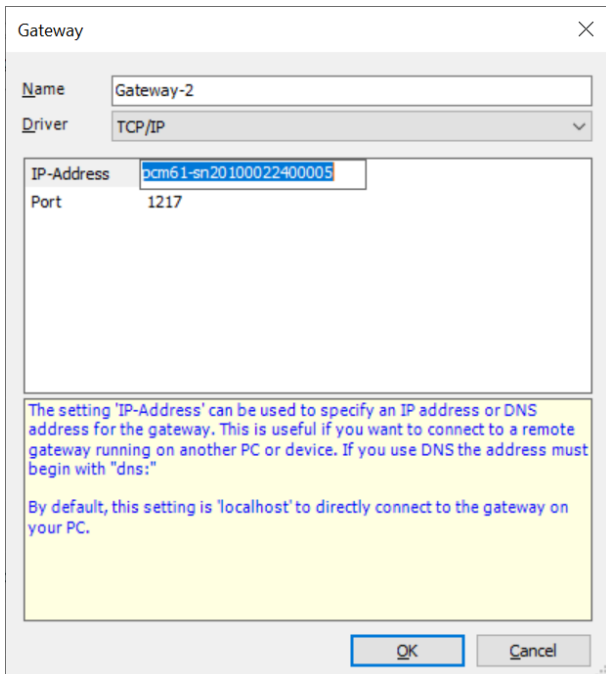
3. Select **Add Device**.

4.6 Connect to the AMC 300, AWC 500, AMC 600, or iE 250 PLC controller

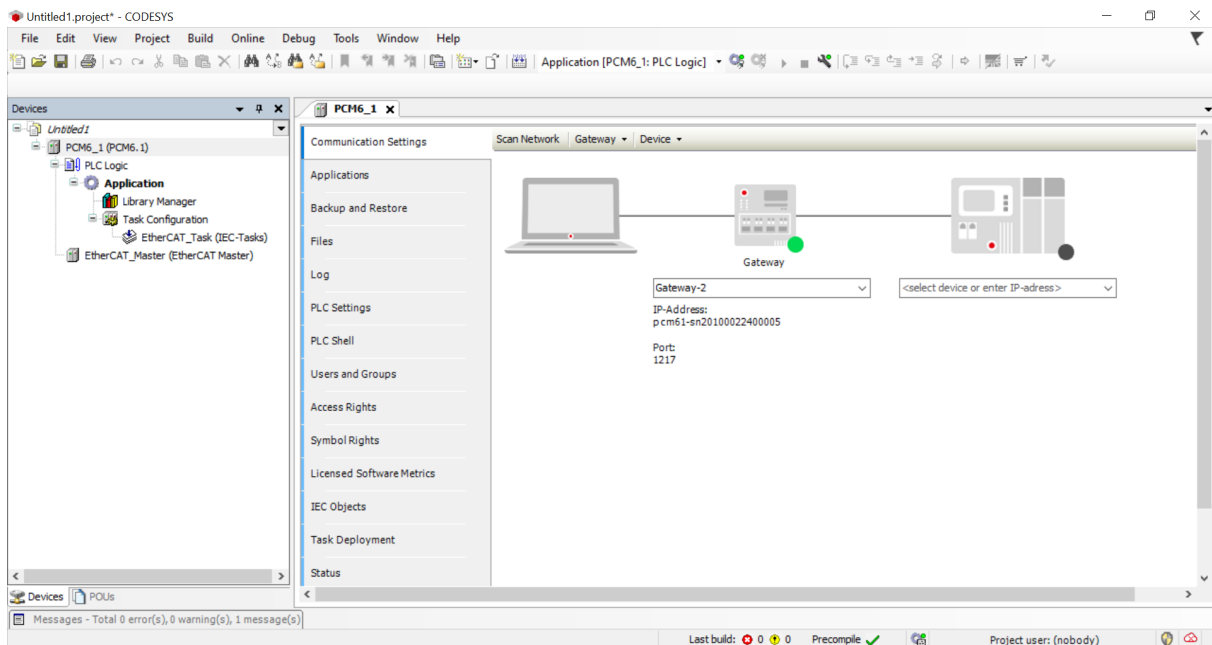
1. In the project window, double-click the AMC 300, AWC 500, AMC 600, or iE 250 PLC controller.
 - A gateway with the default IP address **localhost** is shown.
 - We recommend you create a new gateway with a new IP address or hostname for the controller.
2. Select **Gateway > Add new gateway**.



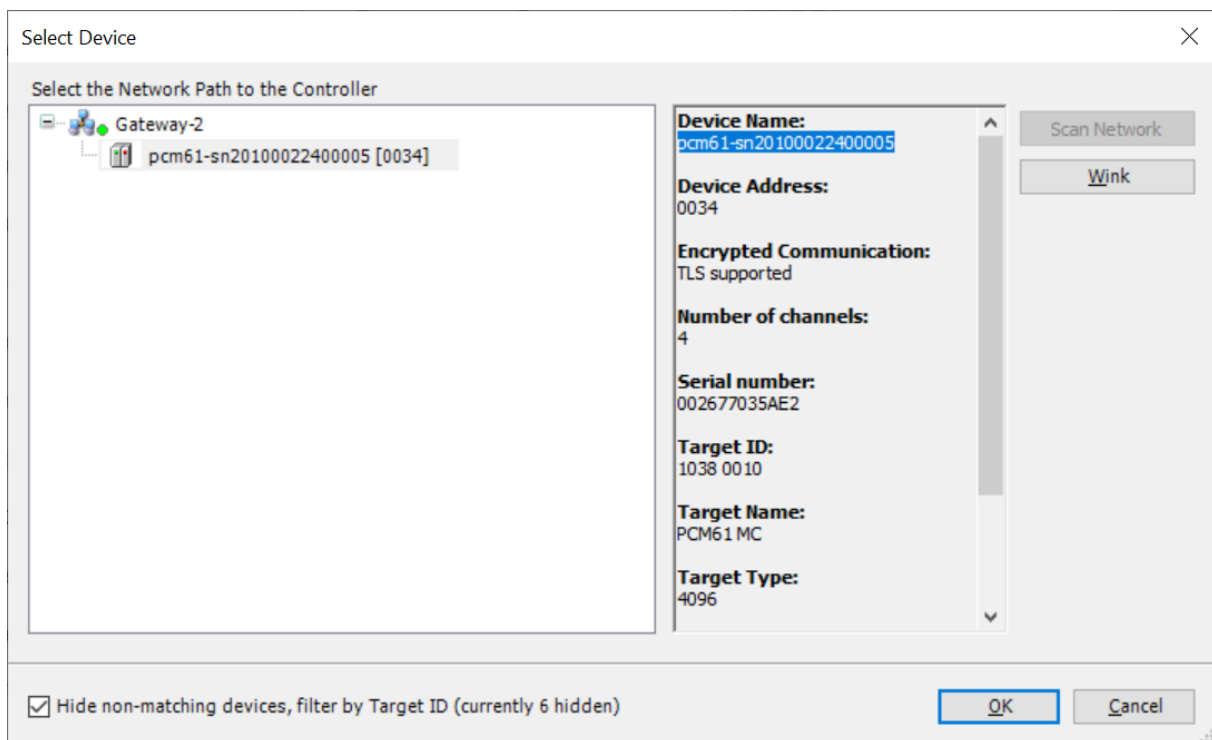
3. Enter the hostname or the IP address for AMC 300, AWC 500, AMC 600, or iE 250 PLC controller (for example, 192.168.20.13).



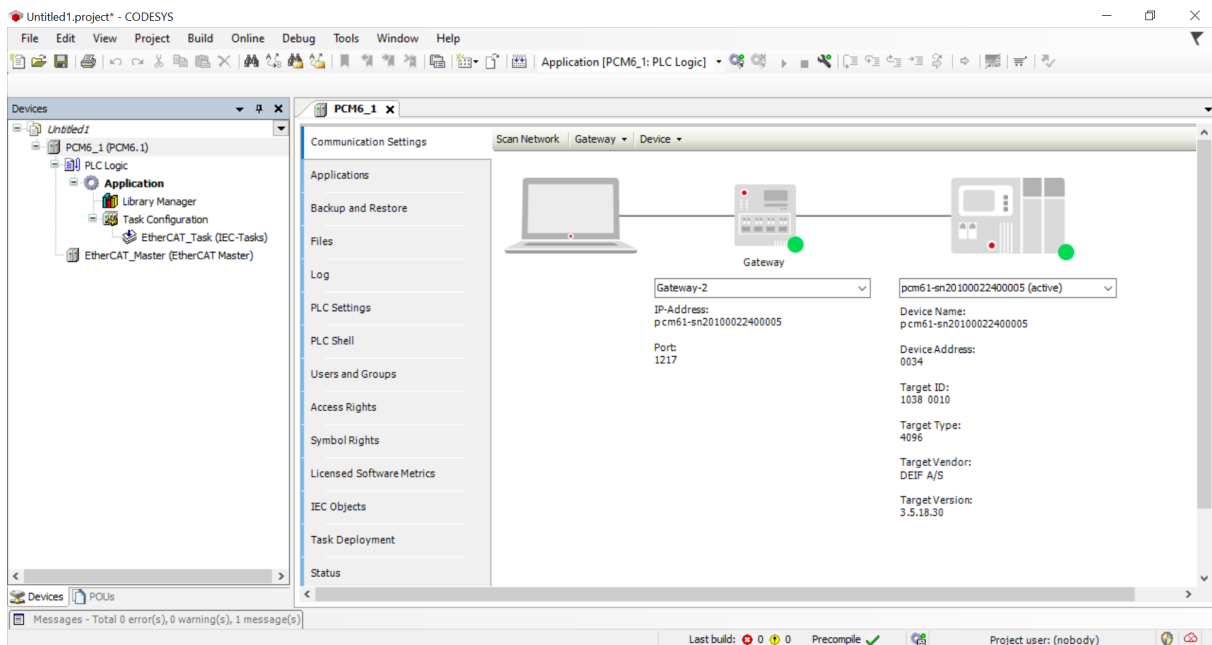
4. Select **OK**.
5. Select **Scan Network** to find the PLC controller on the network.



6. Select the device.
7. Select **OK**.
8. Select **Device**.
9. Select the device to set the active network path to the controller.

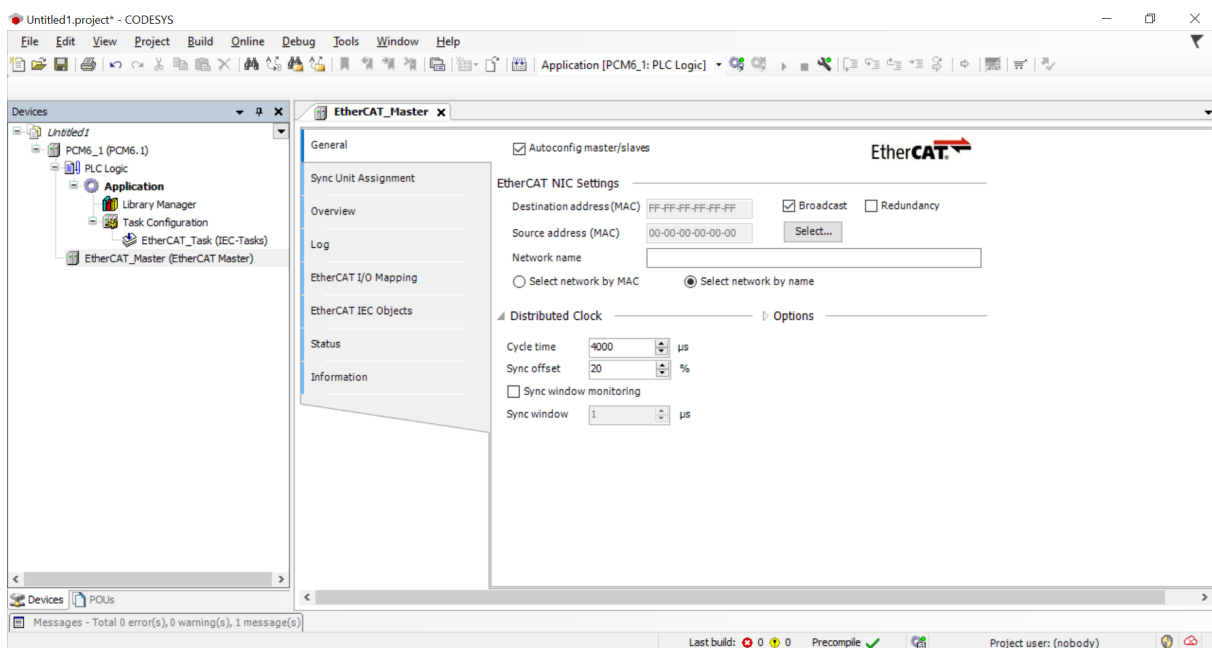


10. Select **OK**.
11. The connection is now active.

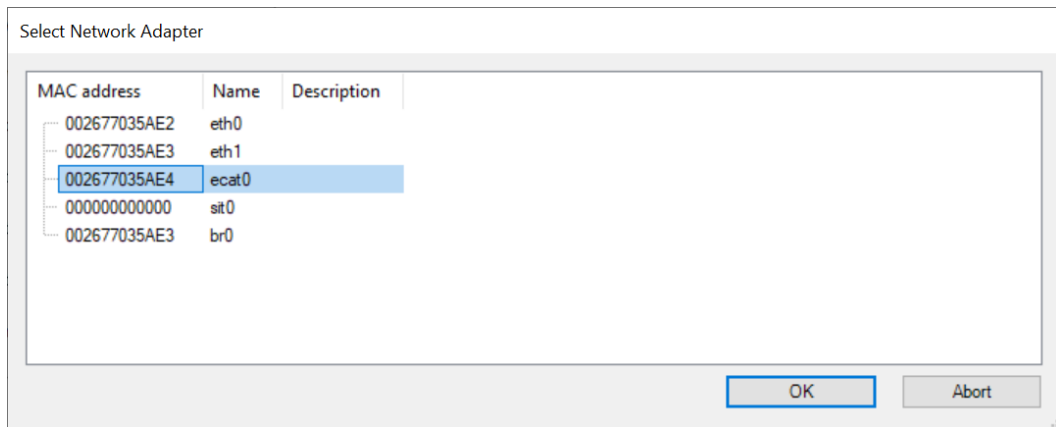


4.7 Setup EtherCAT master

1. Open the **EtherCAT_Master** tag.



2. Change the NIC Settings to **Select network by name**.
3. Select **Browse** to find the network interface to bind the EtherCAT master to.



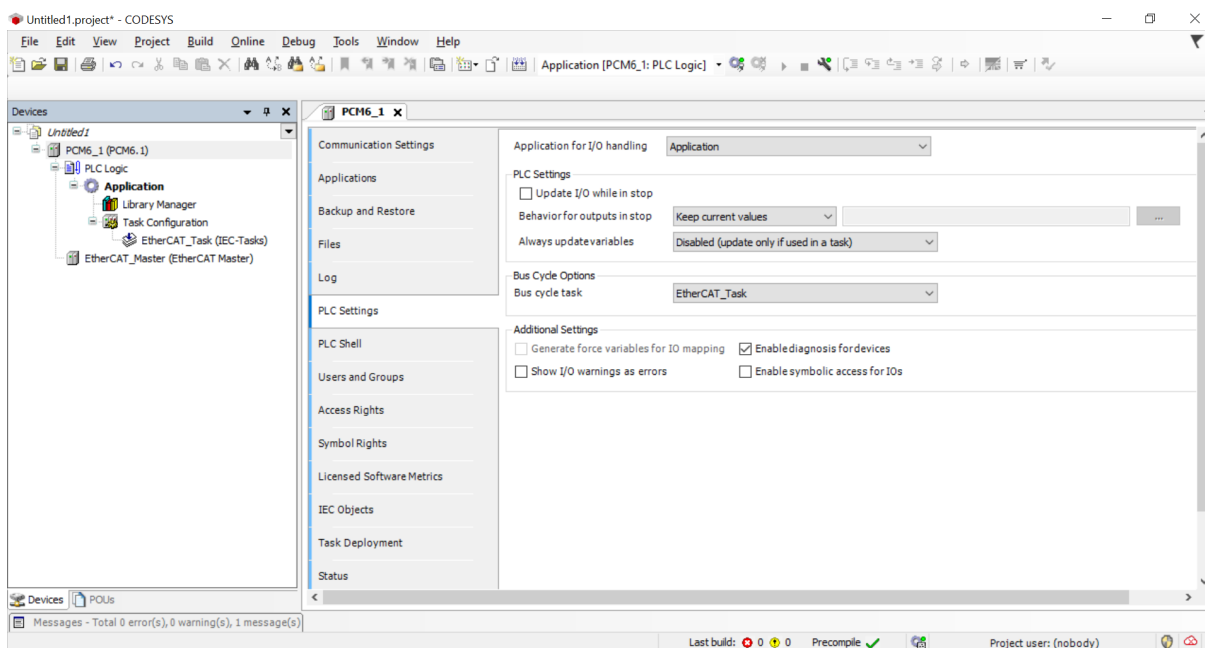
4. Select:

- AMC 300: **eth0 adapter*** (corresponding to EtherCAT OUT port 1 and EtherCAT OUT port 2)
- AWC 500: **ecat0 adapter***
- AMC 600: **ecat0 adapter***

NOTE *The same network adapter number for the eth0 (EtherCAT port) is used on all shipped devices.

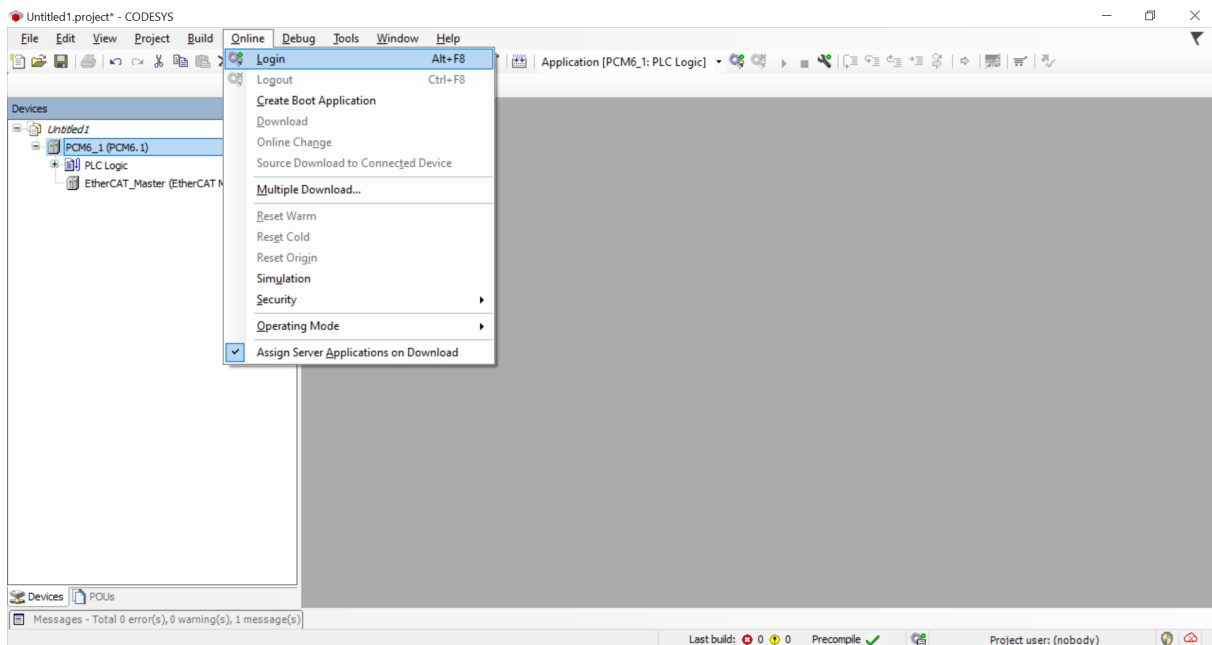
We recommend to specify which task handles the bus communication:

- In **Device > PLC Settings > Bus cycle options**: Specify the **Bus cycle task** to **EtherCAT_master**.

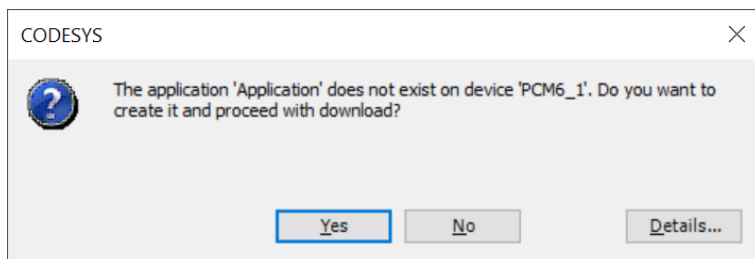


4.8 Scan for devices

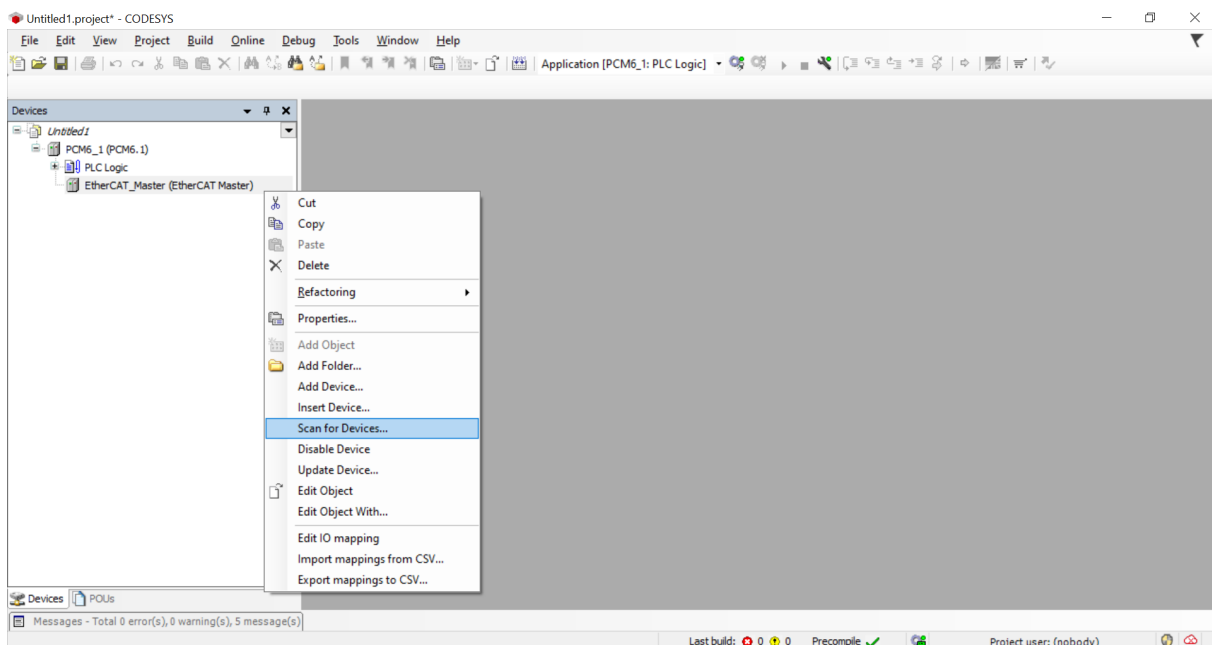
1. Login to the PLC.



2. In the pop-up window, select **Yes** to create an application.

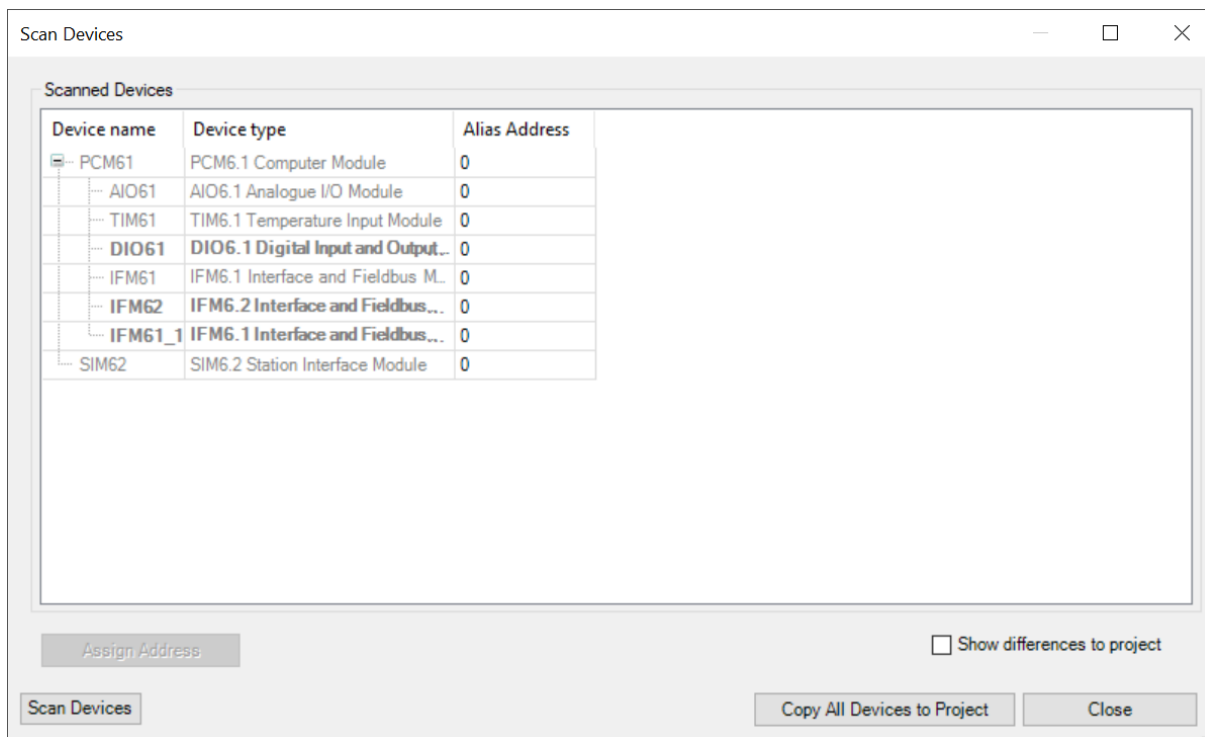


3. Select **EtherCAT_Master (EtherCAT_Master)**, and then **Scan For Devices...** in the drop-down menu.

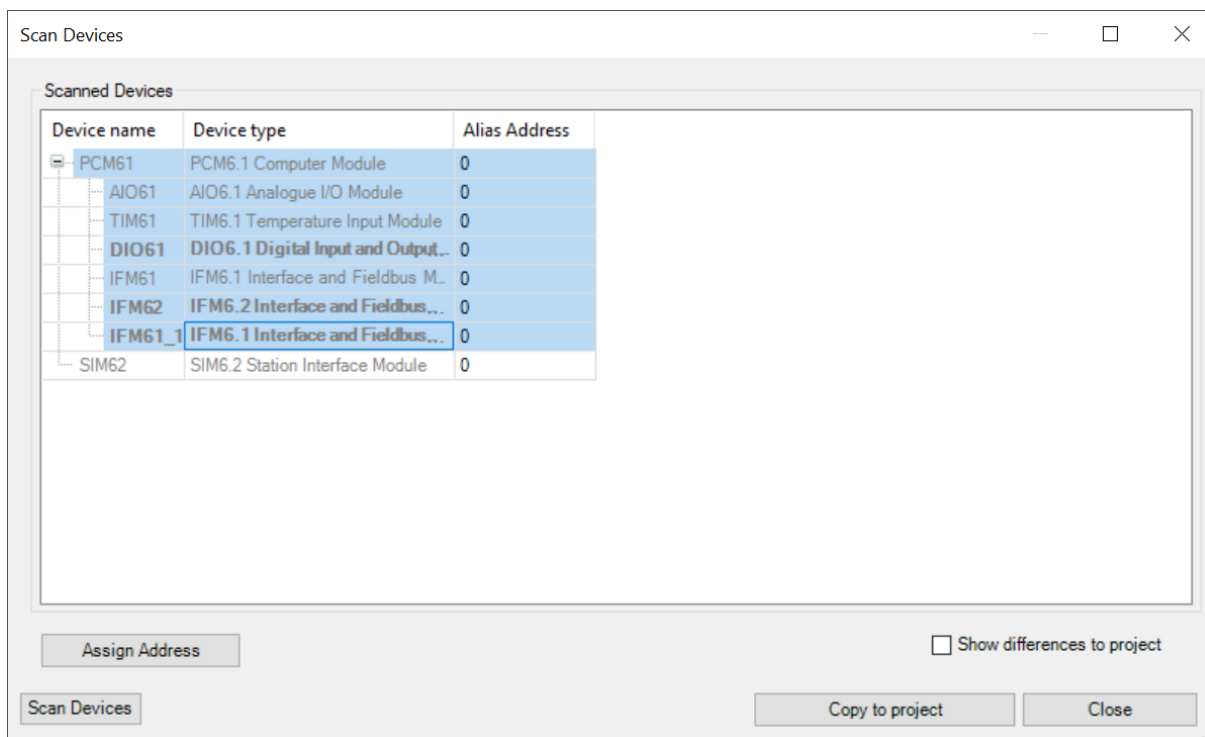


NOTE If EtherCAT Master is running on the PLC, you can scan for devices without being logged in. If a scan fails, then use the above procedure.

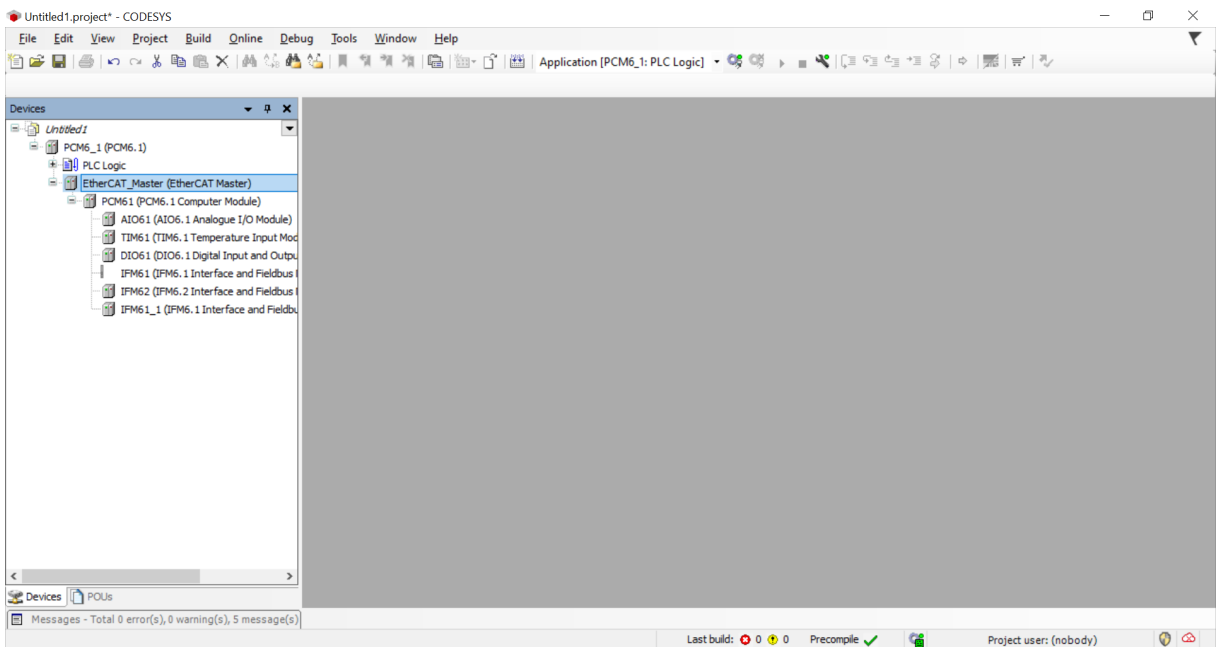
4. In the devices window, select **Copy All Devices to Project**.



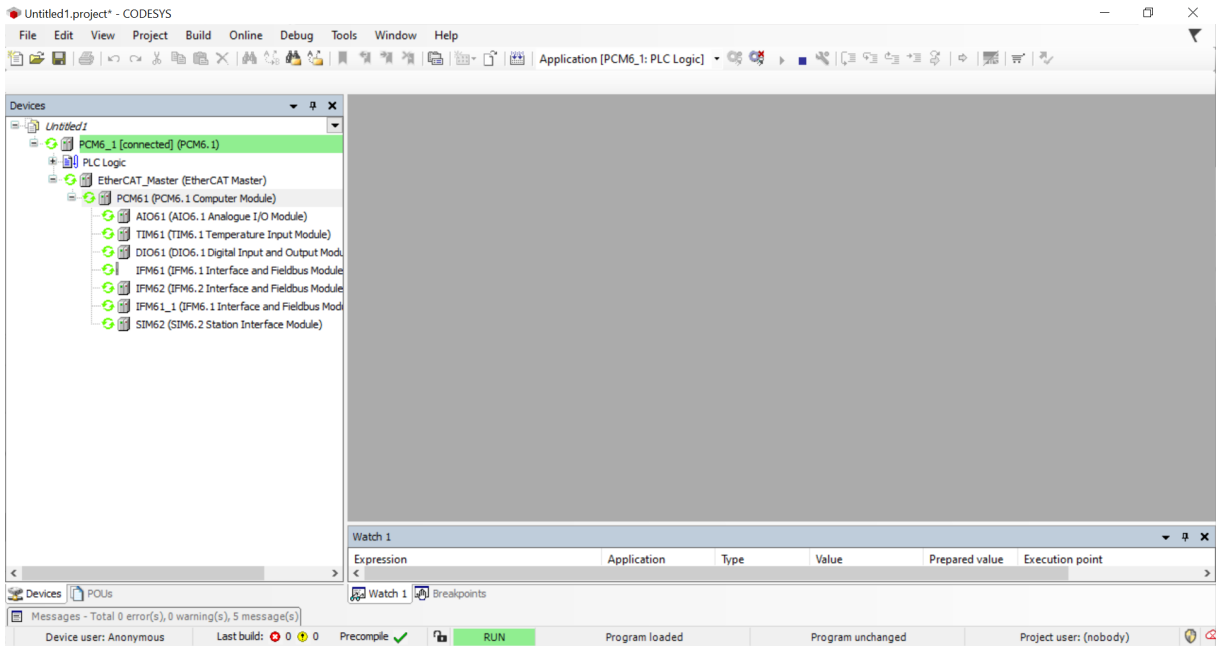
NOTE Due to a bug in CODESYS TSP, select the devices and **Copy to project**. Then add the SIM6.2 manually under PCM6.1.



5. The devices are now displayed in the Devices tree.



6. If the project is downloaded again, the entire EtherCAT network can enter operation.



4.9 I/O module variables

In this section, an overview of the IO mapper of each module for the different controllers is shown.

4.9.1 AMC 300

IOM3.1 variables

Project1.project - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

Project1

Device (Multi-line 300 PCM3.1)

PLC Logic

Application

Library Manager

Task Configuration

EtherCAT_Task

EtherCAT_Master (EtherCAT Master)

PSM_3.1 (PSM 3.1 - Power Supply Module 3.1)

ACM_3.1 (ACM 3.1 - Alternating Current Module 3.1)

IOM_3.1 (IOM 3.1 - Input Output Module 3.1)

IOM_3.2 (IOM 3.2 - Input Output Module 3.2)

IOM_3.3 (IOM 3.3 - Input Output Module 3.3)

IOM_3.4 (IOM 3.4 - Input Output Module 3.4)

Port 1

PSM_3.2 (PSM 3.2 - Power Supply Module 3.2)

ACM_3.1_1 (ACM 3.1 - Alternating Current Module 3.1)

IOM_3.2_1 (IOM 3.2 - Input Output Module 3.2)

IOM_3.3_1 (IOM 3.3 - Input Output Module 3.3)

Port 1

Device

IOM_3.1

General

Process Data

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel...

Variable	Mapping	Channel	Address	Type	Unit	Description
		Relay 1	%QX10.2	BIT		Relay 1
		Relay 2	%QX10.3	BIT		Relay 2
		Relay 3	%QX10.4	BIT		Relay 3
		Relay 4	%QX10.5	BIT		Relay 4
		DI 1	%IX632.0	BIT		DI 1
		DI 2	%IX632.1	BIT		DI 2
		DI 3	%IX632.2	BIT		DI 3
		DI 4	%IX632.3	BIT		DI 4
		DI 5	%IX632.4	BIT		DI 5
		DI 6	%IX632.5	BIT		DI 6
		DI 7	%IX632.6	BIT		DI 7
		DI 8	%IX632.7	BIT		DI 8
		DI 9	%IX633.0	BIT		DI 9
		DI 10	%IX633.1	BIT		DI 10

Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Devices

POUs

Modules

Last build: 0 0 0 Precompile Project user: (nobody)

IOM3.2 variables

Project1.project - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

Project1

- Device (Multi-line PCM3.1)
 - PLC Logic
 - Application
 - Library Manager
 - Task Configuration
 - EtherCAT_Task
 - EtherCAT_Master (EtherCAT Master)
 - PSM_3_1 (PSM 3.1 - Power Supply Module 3.1)
 - ACM_3_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_1 (IOM 3.1 - Input Output Module 3.1)
 - IOM_3_2 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3 (IOM 3.3 - Input Output Module 3.3)
 - IOM_3_4 (IOM 3.4 - Input Output Module 3.4)
 - Port 1
 - PSM_3_2 (PSM 3.2 - Power Supply Module 3.2)
 - ACM_3_1_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_2_1 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3_1 (IOM 3.3 - Input Output Module 3.3)
 - Port 1

General

Process Data

Startup Parameters

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel...

Variable	Mapping	Channel	Address	Type	Unit	Description
		Relay_1	%QX12.0	BIT		Relay_1
		Relay_2	%QX12.1	BIT		Relay_2
		Relay_3	%QX12.2	BIT		Relay_3
		Relay_4	%QX12.3	BIT		Relay_4
		Output Value	%QD4	REAL		Output Value
		Output Value	%QD5	REAL		Output Value
		Output Value	%QD6	REAL		Output Value
		Output Value	%QD7	REAL		Output Value
		DI1	%IX636.0	BIT		DI1
		DI2	%IX636.1	BIT		DI2
		DI3	%IX636.2	BIT		DI3
		DI4	%IX636.3	BIT		DI4
		Output Value	%ID160	REAL		Output Value
		Output Enabled	%IW322	INT		Output Enabled
		Output Value	%ID162	REAL		Output Value
		Output Enabled	%IW326	INT		Output Enabled
		Output Value	%ID164	REAL		Output Value
		Output Enabled	%IW330	INT		Output Enabled
		Output Value	%ID166	REAL		Output Value
		Output Enabled	%IW334	INT		Output Enabled
		Input Value	%ID168	REAL		Input Value
		Status	%IW338	INT		Status
		Input Value	%ID170	REAL		Input Value
		Status	%IW342	INT		Status
		Input Value	%ID172	REAL		Input Value
		Status	%IW346	INT		Status
		Input Value	%ID174	REAL		Input Value
		Status	%IW350	INT		Status

Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Last build: 0 0 0 Precompile Project user: (nobody)

IOM3.3 variables

Project1.project - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

Project1

- Device (Multi-line PCM3.1)
 - PLC Logic
 - Application
 - Library Manager
 - Task Configuration
 - EtherCAT_Task
 - EtherCAT_Master (EtherCAT Master)
 - PSM_3_1 (PSM 3.1 - Power Supply Module 3.1)
 - ACM_3_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_1 (IOM 3.1 - Input Output Module 3.1)
 - IOM_3_2 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3 (IOM 3.3 - Input Output Module 3.3)
 - IOM_3_4 (IOM 3.4 - Input Output Module 3.4)
 - Port 1
 - PSM_3_2 (PSM 3.2 - Power Supply Module 3.2)
 - ACM_3_1_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_2_1 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3_1 (IOM 3.3 - Input Output Module 3.3)
 - Port 1

General

Process Data

Startup Parameters

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel...

Variable	Mapping	Channel	Address	Type	Unit	Description
		Reserved	%QW16	UINT		Reserved
		Input Value	%ID176	REAL		Input Value
		Status	%IW354	INT		Status
		Input Value	%ID178	REAL		Input Value
		Status	%IW358	INT		Status
		Input Value	%ID180	REAL		Input Value
		Status	%IW362	INT		Status
		Input Value	%ID182	REAL		Input Value
		Status	%IW366	INT		Status
		Input Value	%ID184	REAL		Input Value
		Status	%IW370	INT		Status
		Input Value	%ID186	REAL		Input Value
		Status	%IW374	INT		Status
		Input Value	%ID188	REAL		Input Value
		Status	%IW378	INT		Status
		Input Value	%ID190	REAL		Input Value
		Status	%IW382	INT		Status
		Input Value	%ID192	REAL		Input Value
		Status	%IW386	INT		Status
		Input Value	%ID194	REAL		Input Value
		Status	%IW390	INT		Status
		MI_PowerEnabled	%IX782.0	BIT		MI_PowerEnabled
		Temperature_1	%ID196	REAL		Temperature_1
		Temperature_2	%ID197	REAL		Temperature_2
		Temperature_3	%ID198	REAL		Temperature_3
		Temperature_4	%ID199	REAL		Temperature_4
		Temperature_5	%ID200	REAL		Temperature_5
		CompensationTemperature_1	%ID201	REAL		CompensationTemperature_1

Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Last build: 0 0 0 Precompile Project user: (nobody)

IOM3-4 variables

Project1.project - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

Project1

- Device (Multi-line 300 PCM3.1)
 - PLC Logic
 - Application
 - Library Manager
 - Task Configuration
 - EtherCAT_Task
 - EtherCAT_Master (EtherCAT Master)
 - PSM_3_1 (PSM 3.1 - Power Supply Module 3.1)
 - ACM_3_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_1 (IOM 3.1 - Input Output Module 3.1)
 - IOM_3_2 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3 (IOM 3.3 - Input Output Module 3.3)
 - IOM_3_4 (IOM 3.4 - Input Output Module 3.4)
 - Port 1
 - PSM_3_2 (PSM 3.2 - Power Supply Module 3.2)
 - ACM_3_1_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_2_1 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3_1 (IOM 3.3 - Input Output Module 3.3)
 - Port 1

General

Process Data

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel...

Variable	Mapping	Channel	Address	Type	Unit	Description
		Relay 1	%QX34.0	BIT		Relay 1
		Relay 2	%QX34.1	BIT		Relay 2
		Relay 3	%QX34.2	BIT		Relay 3
		Relay 4	%QX34.3	BIT		Relay 4
		Relay 5	%QX34.4	BIT		Relay 5
		Relay 6	%QX34.5	BIT		Relay 6
		Relay 7	%QX34.6	BIT		Relay 7
		Relay 8	%QX34.7	BIT		Relay 8
		Relay 9	%QX35.0	BIT		Relay 9
		Relay 10	%QX35.1	BIT		Relay 10
		Relay 11	%QX35.2	BIT		Relay 11
		Relay 12	%QX35.3	BIT		Relay 12
		DI 1	%IX846.4	BIT		DI 1
		DI 2	%IX846.5	BIT		DI 2
		DI 3	%IX846.6	BIT		DI 3
		DI 4	%IX846.7	BIT		DI 4
		DI 5	%IX847.0	BIT		DI 5
		DI 6	%IX847.1	BIT		DI 6
		DI 7	%IX847.2	BIT		DI 7
		DI 8	%IX847.3	BIT		DI 8
		DI 9	%IX847.4	BIT		DI 9
		DI 10	%IX847.5	BIT		DI 10
		DI 11	%IX847.6	BIT		DI 11
		DI 12	%IX847.7	BIT		DI 12
		DI 13	%IX848.0	BIT		DI 13
		DI 14	%IX848.1	BIT		DI 14
		DI 15	%IX848.2	BIT		DI 15
		DI 16	%IX848.3	BIT		DI 16

Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Devices POUs Modules

Last build: 0 0 0 Precompile Project user: (nobody)

ACM3-1 variables

Project1.project - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

Project1

- Device (Multi-line 300 PCM3.1)
 - PLC Logic
 - Application
 - Library Manager
 - Task Configuration
 - EtherCAT_Task
 - EtherCAT_Master (EtherCAT Master)
 - PSM_3_1 (PSM 3.1 - Power Supply Module 3.1)
 - ACM_3_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_1 (IOM 3.1 - Input Output Module 3.1)
 - IOM_3_2 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3 (IOM 3.3 - Input Output Module 3.3)
 - IOM_3_4 (IOM 3.4 - Input Output Module 3.4)
 - Port 1
 - PSM_3_2 (PSM 3.2 - Power Supply Module 3.2)
 - ACM_3_1_1 (ACM 3.1 - Alternating Current Module 3.1)
 - IOM_3_2_1 (IOM 3.2 - Input Output Module 3.2)
 - IOM_3_3_1 (IOM 3.3 - Input Output Module 3.3)
 - Port 1

General

Process Data

Startup Parameters

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel...

Go to Instance

Variable	Mapping	Channel	Address	Type	Unit	Description
		InhibitPdo_Out	%Q01	UDINT		InhibitPdo_Out
		SuppressFastDetectPdo_Out	%QW4	UINT		SuppressFastDetectPdo_Out
		RMS_AC1V_UL1N	%ID12	REAL		RMS_AC1V_UL1N
		RMS_AC1V_UL2N	%ID13	REAL		RMS_AC1V_UL2N
		RMS_AC1V_UL3N	%ID14	REAL		RMS_AC1V_UL3N
		RMS_AC1V_URESIDUAL	%ID15	REAL		RMS_AC1V_URESIDUAL
		RMS_AC1V_UL1L2	%ID16	REAL		RMS_AC1V_UL1L2
		RMS_AC1V_UL2L3	%ID17	REAL		RMS_AC1V_UL2L3
		RMS_AC1V_UL3L1	%ID18	REAL		RMS_AC1V_UL3L1
		RMS_AC3C_IL4_ACV1	%ID19	REAL		RMS_AC3C_IL4_ACV1
		RMS_AC2V_UL1N	%ID20	REAL		RMS_AC2V_UL1N
		RMS_AC2V_UL2N	%ID21	REAL		RMS_AC2V_UL2N
		RMS_AC2V_UL3N	%ID22	REAL		RMS_AC2V_UL3N
		RMS_AC2V_URESIDUAL	%ID23	REAL		RMS_AC2V_URESIDUAL
		RMS_AC2V_UL1L2	%ID24	REAL		RMS_AC2V_UL1L2
		RMS_AC2V_UL2L3	%ID25	REAL		RMS_AC2V_UL2L3
		RMS_AC2V_UL3L1	%ID26	REAL		RMS_AC2V_UL3L1
		RMS_AC3C_IL1	%ID27	REAL		RMS_AC3C_IL1
		RMS_AC3C_IL2	%ID28	REAL		RMS_AC3C_IL2
		RMS_AC3C_IL3	%ID29	REAL		RMS_AC3C_IL3
		RMS_AC3C_IRESIDUAL	%ID30	REAL		RMS_AC3C_IRESIDUAL
		RMS_AC3C_IL4_ACV2	%ID31	REAL		RMS_AC3C_IL4_ACV2
		RMS_AC3C_I_EARTH_IL4_ACV2	%ID32	REAL		RMS_AC3C_I_EARTH_IL4_ACV2
		P_AC2V_L1	%ID33	REAL		P_AC2V_L1
		P_AC2V_L2	%ID34	REAL		P_AC2V_L2
		P_AC2V_L3	%ID35	REAL		P_AC2V_L3
		P_AC2V_L4	%ID36	REAL		P_AC2V_L4
		P_AC1V_ULX4	%ID37	REAL		P_AC1V_ULX4

Detectors032 Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Devices POUs Modules

Last build: 0 0 0 Precompile Project user: (nobody)

The screenshot displays the CODESYS Project Manager interface. The left pane shows the project tree with 'PSM_3_1' selected. The right pane shows the 'EtherCAT I/O Mapping' configuration for the selected device. The table lists various I/O channels and their corresponding addresses and types.

Variable	Mapping	Channel	Address	Type	Unit	Description
Relay 1		Relay 1	%QX0.0	BIT		Relay 1
Relay 2		Relay 2	%QX0.1	BIT		Relay 2
Relay 3		Relay 3	%QX0.2	BIT		Relay 3
Temperature		Temperature	%ID0	REAL		Temperature
CardOK		CardOK	%IW2	INT		CardOK
LinkStatus		LinkStatus	%IW3	INT		LinkStatus
Battery voltage		Battery voltage	%ID2	REAL		Battery voltage
Backplane voltage		Backplane voltage	%ID3	REAL		Backplane voltage
Power Fail Early Warning		Power Fail Early Warning	%IW8	INT		Power Fail Early Warning
PSM counter		PSM counter	%ID5	DINT		PSM counter
Min		Min	%ID6	REAL		Min
Max		Max	%ID7	REAL		Max
ADCvalue		ADCvalue	%IW16	UINT		ADCvalue
index		index	%IW17	UINT		index
Start		Start	%IW18	UINT		Start
Gain		Gain	%IW19	UINT		Gain
Offset		Offset	%IW20	INT		Offset

Legend:
 * = Create new variable
 * = Map to existing variable

The screenshot displays the Siemens SIMATIC Manager software interface, specifically the 'EtherCAT I/O Mapping' configuration window. The interface is divided into several panes:

- Left Pane (Project Tree):** Shows the project hierarchy for 'Project1'. It includes a 'Device (Multi-line 300 PCM3.1)' with 'PLC Logic' and 'Application' sub-items. The 'Application' sub-item is expanded, showing 'Library Manager', 'Task Configuration', and 'EtherCAT_Master (EtherCAT Master)'. Under 'EtherCAT_Master', there are two 'PSM' (Power Supply Module) entries: 'PSM_3_1 (PSM 3.1 - Power Supply Module 3.1)' and 'PSM_3_2 (PSM 3.2 - Power Supply Module 3.2)'. Each PSM entry has associated 'ACM' (Alternating Current Module) and 'IOM' (Input Output Module) sub-items. The 'PSM_3_2' entry is currently selected.
- Top Pane (Device Selection):** Shows the selected device 'Device' and its associated modules: 'IOM_3_1', 'ACM_3_1', 'IOM_3_2', 'IOM_3_3', 'IOM_3_4', 'PSM_3_1', and 'PSM_3_2'.
- Right Pane (EtherCAT I/O Mapping):** This pane is divided into two sections: 'Find' and 'Filter Show all'. The 'Find' section contains a table with columns: 'Variable', 'Mapping', 'Channel', 'Address', 'Type', 'Unit', and 'Description'. The table lists various I/O channels and their corresponding addresses and types. The 'Filter Show all' section contains a table with columns: 'Variable', 'Mapping', 'Channel', 'Address', 'Type', 'Unit', and 'Description'. This table lists the same I/O channels and their corresponding addresses and types.

The 'Find' section table is as follows:

Variable	Mapping	Channel	Address	Type	Unit	Description
Relay 1		Relay 1	%QX36.0	BIT		Relay 1
Relay 2		Relay 2	%QX36.1	BIT		Relay 2
Relay 3		Relay 3	%QX36.2	BIT		Relay 3
Temperature		Temperature	%ID213	REAL		Temperature
CardOK		CardOK	%IW428	INT		CardOK
LinkStatus		LinkStatus	%IW429	INT		LinkStatus
Battery voltage		Battery voltage	%ID215	REAL		Battery voltage
Backplane voltage		Backplane voltage	%ID216	REAL		Backplane voltage
Power Fail Early Warning		Power Fail Early Warning	%IW434	INT		Power Fail Early Warning
PSM counter		PSM counter	%ID218	DINT		PSM counter
Min		Min	%ID219	REAL		Min
Max		Max	%ID220	REAL		Max
ADCvalue		ADCvalue	%IW442	UINT		ADCvalue
index		index	%IW443	UINT		index
Start		Start	%IW444	UINT		Start
Gain		Gain	%IW445	UINT		Gain
Offset		Offset	%IW446	INT		Offset

The 'Filter Show all' section table is as follows:

Variable	Mapping	Channel	Address	Type	Unit	Description
Relay 1		Relay 1	%QX36.0	BIT		Relay 1
Relay 2		Relay 2	%QX36.1	BIT		Relay 2
Relay 3		Relay 3	%QX36.2	BIT		Relay 3
Temperature		Temperature	%ID213	REAL		Temperature
CardOK		CardOK	%IW428	INT		CardOK
LinkStatus		LinkStatus	%IW429	INT		LinkStatus
Battery voltage		Battery voltage	%ID215	REAL		Battery voltage
Backplane voltage		Backplane voltage	%ID216	REAL		Backplane voltage
Power Fail Early Warning		Power Fail Early Warning	%IW434	INT		Power Fail Early Warning
PSM counter		PSM counter	%ID218	DINT		PSM counter
Min		Min	%ID219	REAL		Min
Max		Max	%ID220	REAL		Max
ADCvalue		ADCvalue	%IW442	UINT		ADCvalue
index		index	%IW443	UINT		index
Start		Start	%IW444	UINT		Start
Gain		Gain	%IW445	UINT		Gain
Offset		Offset	%IW446	INT		Offset

At the bottom of the 'Find' section, there are two buttons: 'Reset Mapping' and 'Always update variables'. Below these buttons, there is a text field containing 'Use parent device setting'. At the bottom of the 'Filter Show all' section, there are two buttons: 'Create new variable' and 'Map to existing variable'.

4.9.2 AMC 600

DIO6-1 variables

Untitled1.project* - CODESYS

FileEditViewProjectBuildOnlineDebugToolsWindowHelp

Application [PCM6_1: PLC Logic]

Devices

PCM6_1 (PCM6.1)

- PLC Logic
- EtherCAT_Master (EtherCAT Master)
 - PCM61 (PCM6.1 Computer Module)
 - AIO61 (AIO6.1 Analogue I/O Module)
 - TIM61 (TIM6.1 Temperature Input Module)
 - DIO61 (DIO6.1 Digital Input and Output Module)
 - IFM61 (IFM6.1 Interface and Fieldbus Module)
 - IFM62 (IFM6.2 Interface and Fieldbus Module)
 - IFM61_1 (IFM6.1 Interface and Fieldbus Module)

DIO61

General

Process Data

Log

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

FilterShow all

Add FB for IO Channel...

Go to Ins

Variable	Mapping	Channel	Address	Type	Unit	Description
		DO1	%QX6.0	BIT		DO1 (terminal 1)
		DO2	%QX6.1	BIT		DO2 (terminal 2)
		DO3	%QX6.2	BIT		DO3 (terminal 3)
		DO4	%QX6.3	BIT		DO4 (terminal 4)
		DO5	%QX6.4	BIT		DO5 (terminal 5)
		DO6	%QX6.5	BIT		DO6 (terminal 16)
		DO7	%QX6.6	BIT		DO7 (terminal 17)
		DO8	%QX6.7	BIT		DO8 (terminal 18)
		DO9	%QX7.0	BIT		DO9 (terminal 19)
		DO10	%QX7.1	BIT		DO10 (terminal 20)
		Output status	%IX122.6	BIT		Output status (false if the output drivers are overc
		DI1	%IX123.0	BIT		DI1 (terminal 7)
		DI2	%IX123.1	BIT		DI2 (terminal 8)
		DI3	%IX123.2	BIT		DI3 (terminal 9)
		DI4	%IX123.3	BIT		DI4 (terminal 10)
		DI5	%IX123.4	BIT		DI5 (terminal 11)
		DI6	%IX123.5	BIT		DI6 (terminal 12)
		DI7	%IX123.6	BIT		DI7 (terminal 13)

Reset Mapping

Always update variables

Use parent device setting

Create new variable

Map to existing variable

Messages - Total 0 error(s), 0 warning(s), 5 message(s)

Last build: 0 0 0 Precompile Project user: (nobody)

AIO6-1 variables

Untitled1.project* - CODESYS

FileEditViewProjectBuildOnlineDebugToolsWindowHelp

Application [PCM6_1: PLC Logic]

Devices

PCM6_1 (PCM6.1)

- PLC Logic
- EtherCAT_Master (EtherCAT Master)
 - PCM61 (PCM6.1 Computer Module)
 - AIO61 (AIO6.1 Analogue I/O Module)
 - TIM61 (TIM6.1 Temperature Input Module)
 - DIO61 (DIO6.1 Digital Input and Output Module)
 - IFM61 (IFM6.1 Interface and Fieldbus Module)
 - IFM62 (IFM6.2 Interface and Fieldbus Module)
 - IFM61_1 (IFM6.1 Interface and Fieldbus Module)

AIO61

General

Process Data

Startup Parameters

Log

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

FilterShow all

Add FB for IO Channel...

Go to Ins

Variable	Mapping	Channel	Address	Type	Unit	Description
		AO 1 Value	%QW1	INT		AO 1 Value
		AO 2 Value	%QW2	INT		AO 2 Value
		AI 1 Under range	%IX2.0	BIT		AI 1 Under range
		AI 1 Over range	%IX2.1	BIT		AI 1 Over range
		AI 1 Error	%IX2.6	BIT		AI 1 Error
		AI 1 TxPDO State	%IX3.6	BIT		AI 1 TxPDO State
		AI 1 TxPDO Toggle	%IX3.7	BIT		AI 1 TxPDO Toggle
		AI 1 Value	%IW2	INT		AI 1 Value
		AI 2 Under range	%IX6.0	BIT		AI 2 Under range
		AI 2 Over range	%IX6.1	BIT		AI 2 Over range
		AI 2 Error	%IX6.6	BIT		AI 2 Error
		AI 2 TxPDO State	%IX7.6	BIT		AI 2 TxPDO State
		AI 2 TxPDO Toggle	%IX7.7	BIT		AI 2 TxPDO Toggle
		AI 2 Value	%IW4	INT		AI 2 Value
		AI 3 Under range	%IX10.0	BIT		AI 3 Under range
		AI 3 Over range	%IX10.1	BIT		AI 3 Over range
		AI 3 Error	%IX10.6	BIT		AI 3 Error
		AI 3 TxPDO State	%IX11.6	BIT		AI 3 TxPDO State
		AI 3 TxPDO Toggle	%IX11.7	BIT		AI 3 TxPDO Toggle

Reset Mapping

Always update variables

Use parent device setting

Create new variable

Map to existing variable

Messages - Total 0 error(s), 0 warning(s), 5 message(s)

Last build: 0 0 0 Precompile Project user: (nobody)

TIM6.1 variables

Untitled1.project* - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [PCM6.1: PLC Logic]

Devices

Untitl1

PCM6_1 (PCM6.1)

PLC Logic

EtherCAT_Master (EtherCAT Master)

PCM61 (PCM6.1 Computer Module)

AI061 (AI06.1 Analogue I/O Module)

TIM61 (TIM6.1 Temperature Input Module)

DIO61 (DIO6.1 Digital Input and Output Module)

IFM61 (IFM6.1 Interface and Fieldbus Module)

IFM62 (IFM6.2 Interface and Fieldbus Module)

IFM61_1 (IFM6.1 Interface and Fieldbus Module)

TIM61

General

Process Data

Startup Parameters

Log

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel... Go to Ins

Variable	Mapping	Channel	Address	Type	Unit	Description
		RTD 1 Under range	%IX66.0	BIT		RTD 1 Under range
		RTD 1 Over range	%IX66.1	BIT		RTD 1 Over range
		RTD 1 Error	%IX66.6	BIT		RTD 1 Error
		RTD 1 TxPDO State	%IX67.6	BIT		RTD 1 TxPDO State
		RTD 1 TxPDO Toggle	%IX67.7	BIT		RTD 1 TxPDO Toggle
		RTD 1 Value	%IW34	INT		RTD 1 Value
		RTD 2 Under range	%IX70.0	BIT		RTD 2 Under range
		RTD 2 Over range	%IX70.1	BIT		RTD 2 Over range
		RTD 2 Error	%IX70.6	BIT		RTD 2 Error
		RTD 2 TxPDO State	%IX71.6	BIT		RTD 2 TxPDO State
		RTD 2 TxPDO Toggle	%IX71.7	BIT		RTD 2 TxPDO Toggle
		RTD 2 Value	%IW36	INT		RTD 2 Value
		RTD 3 Under range	%IX74.0	BIT		RTD 3 Under range
		RTD 3 Over range	%IX74.1	BIT		RTD 3 Over range
		RTD 3 Error	%IX74.6	BIT		RTD 3 Error
		RTD 3 TxPDO State	%IX75.6	BIT		RTD 3 TxPDO State
		RTD 3 TxPDO Toggle	%IX75.7	BIT		RTD 3 TxPDO Toggle
		RTD 3 Value	%IW38	INT		RTD 3 Value
		RTD 4 Under range	%IX78.0	BIT		RTD 4 Under range

Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Messages - Total 0 error(s), 0 warning(s), 5 message(s)

Last build: 0 0 0 Precompile Project user: (nobody)

IFM6.1 variables

Untitled1.project* - CODESYS

File Edit View Project Build Online Debug Tools Window Help

Application [PCM6.1: PLC Logic]

Devices

Untitl1

PCM6_1 (PCM6.1)

PLC Logic

EtherCAT_Master (EtherCAT Master)

PCM61 (PCM6.1 Computer Module)

AI061 (AI06.1 Analogue I/O Module)

TIM61 (TIM6.1 Temperature Input Module)

DIO61 (DIO6.1 Digital Input and Output Module)

IFM61 (IFM6.1 Interface and Fieldbus Module)

IFM62 (IFM6.2 Interface and Fieldbus Module)

IFM61_1 (IFM6.1 Interface and Fieldbus Module)

IFM61

General

Process Data

Startup Parameters

Log

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Find

Filter Show all

Add FB for IO Channel... Go to Ins

Variable	Mapping	Channel	Address	Type	Unit	Description
		COM1 Ctrl	%QW4	UINT		COM1 Ctrl
		COM1 Data out 0	%QB10	BYTE		COM1 Data out 0
		COM1 Data out 1	%QB11	BYTE		COM1 Data out 1
		COM1 Data out 2	%QB12	BYTE		COM1 Data out 2
		COM1 Data out 3	%QB13	BYTE		COM1 Data out 3
		COM1 Data out 4	%QB14	BYTE		COM1 Data out 4
		COM1 Data out 5	%QB15	BYTE		COM1 Data out 5
		COM1 Data out 6	%QB16	BYTE		COM1 Data out 6
		COM1 Data out 7	%QB17	BYTE		COM1 Data out 7
		COM1 Data out 8	%QB18	BYTE		COM1 Data out 8
		COM1 Data out 9	%QB19	BYTE		COM1 Data out 9
		COM1 Data out 10	%QB20	BYTE		COM1 Data out 10
		COM1 Data out 11	%QB21	BYTE		COM1 Data out 11
		COM1 Data out 12	%QB22	BYTE		COM1 Data out 12
		COM1 Data out 13	%QB23	BYTE		COM1 Data out 13
		COM1 Data out 14	%QB24	BYTE		COM1 Data out 14
		COM1 Data out 15	%QB25	BYTE		COM1 Data out 15
		COM1 Data out 16	%QB26	BYTE		COM1 Data out 16
		COM1 Data out 17	%QB27	BYTE		COM1 Data out 17

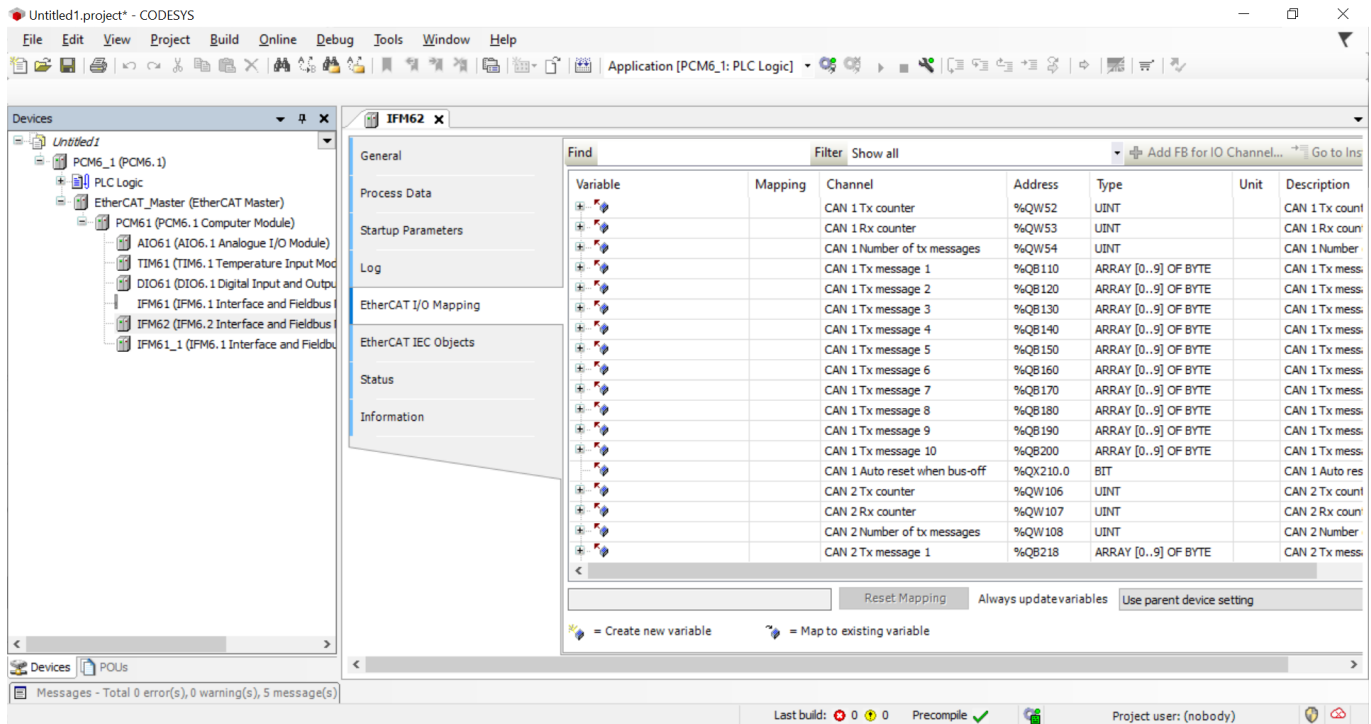
Reset Mapping Always update variables Use parent device setting

Create new variable Map to existing variable

Messages - Total 0 error(s), 0 warning(s), 5 message(s)

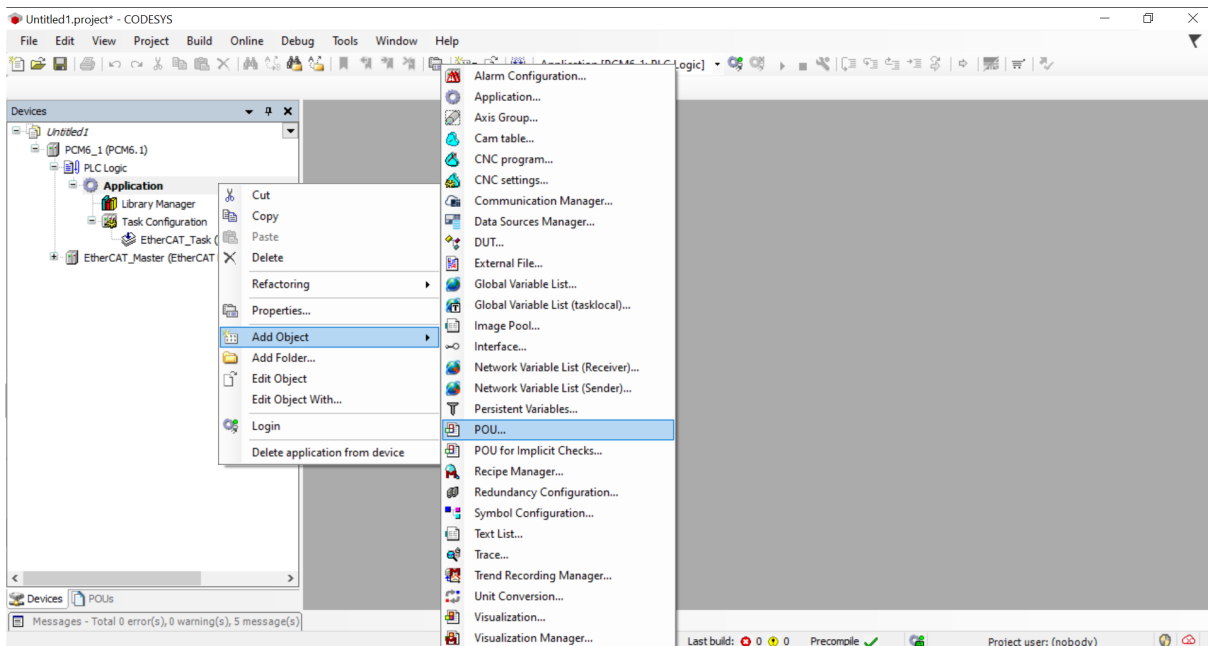
Last build: 0 0 0 Precompile Project user: (nobody)

IFM6-2 variables



4.10 Add a program

1. Select **Application > Add Object > POU....**



2. In the Add POU window, tick **Program** and select **Add**.

Add POU

Create a new POU (Program Organization Unit)

Name

PLC_PRG

Type

☒ Program

☐ Function block

Extends

Implements

Final

Abstract

Access specifier

Method implementation language

Continuous Function Chart (CFC)

☐ Function

Return type

Implementation language

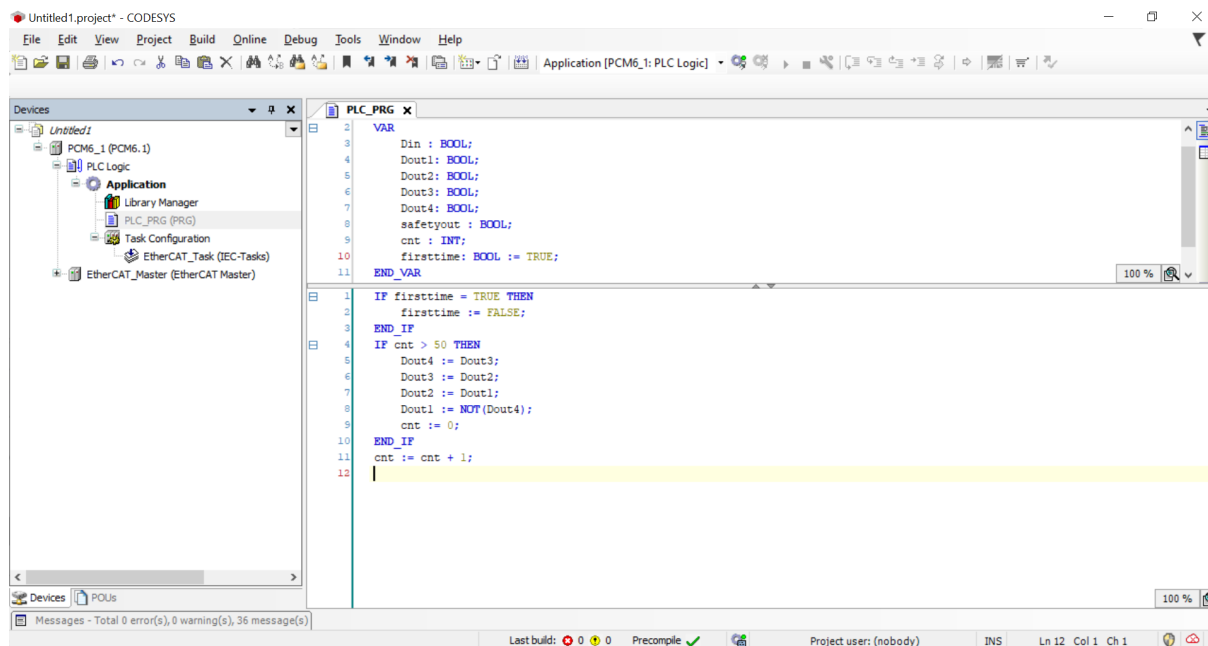
Structured Text (ST)

Add

Cancel

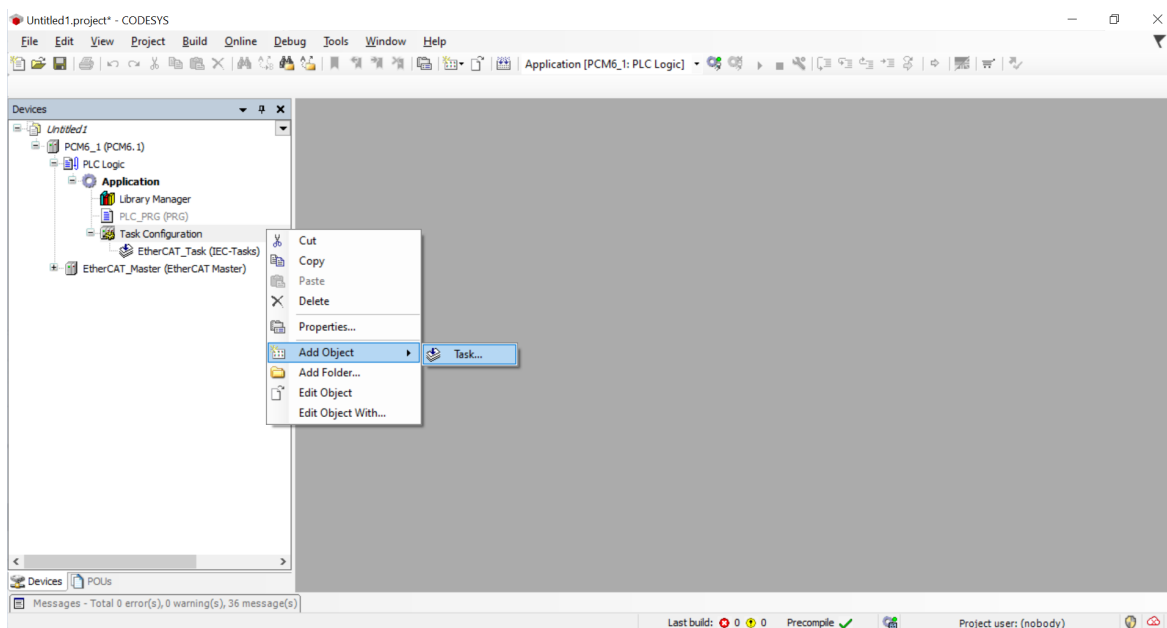
4.11 Write a program

Example of a program.

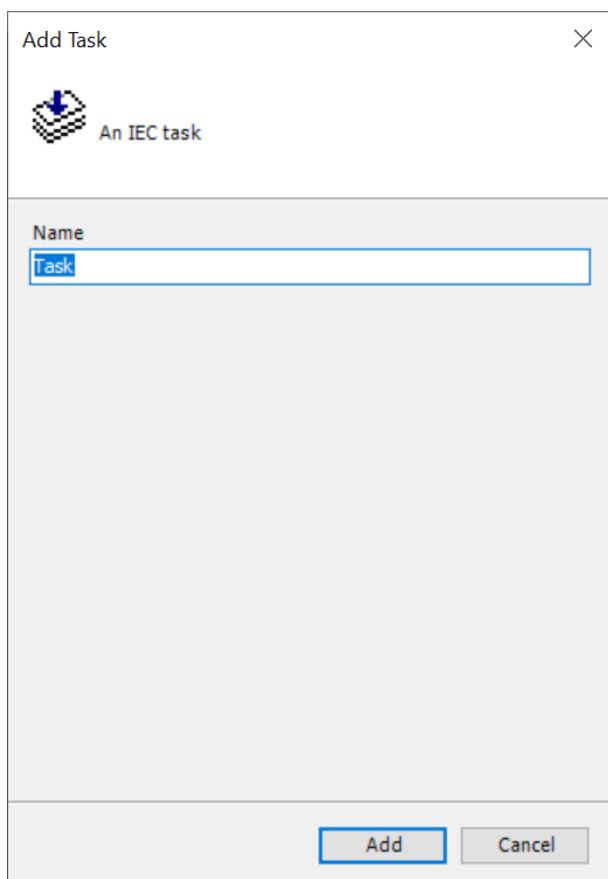


4.11.1 Add a task

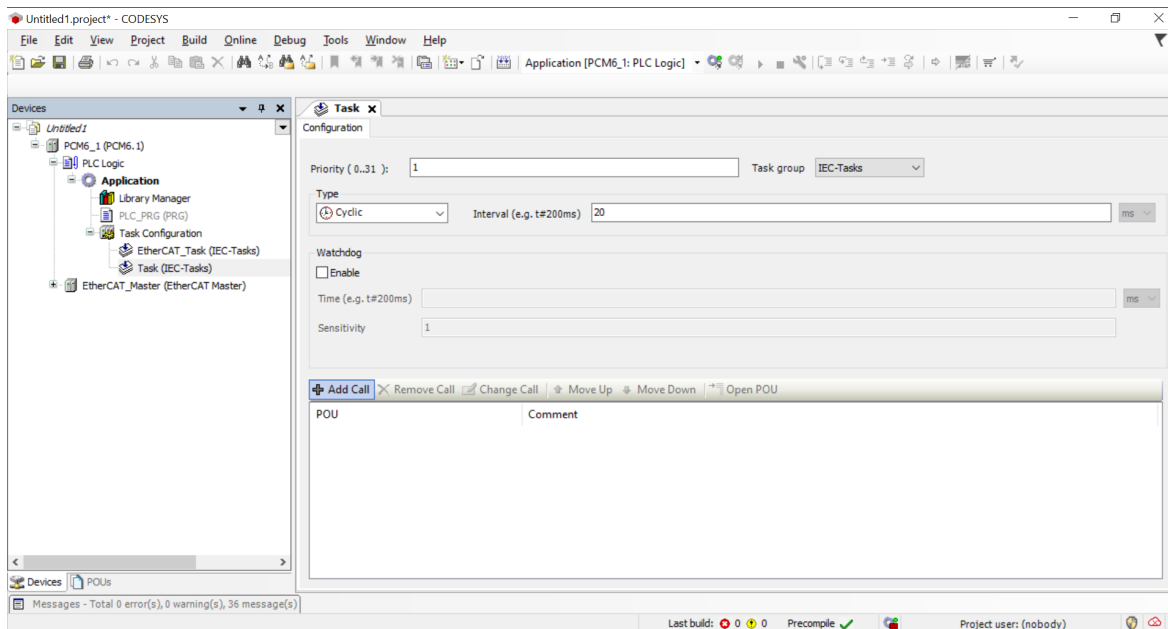
1. Select **Task configuration > Add Object > Task....**



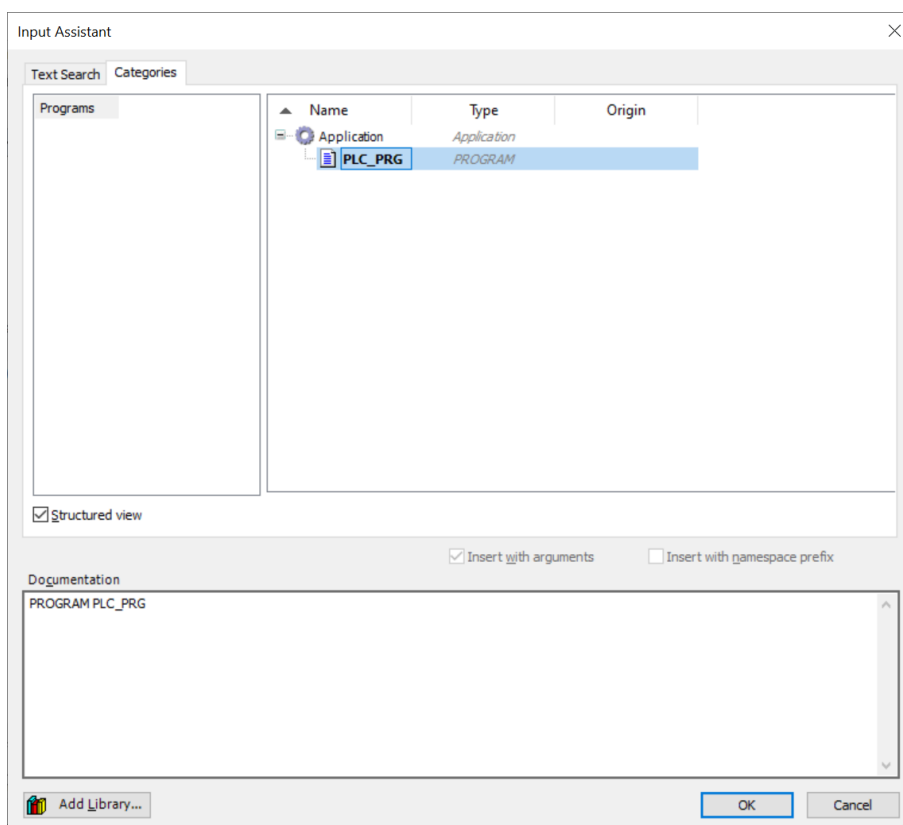
2. In the Add Task window, write a Task name and select **Add**.



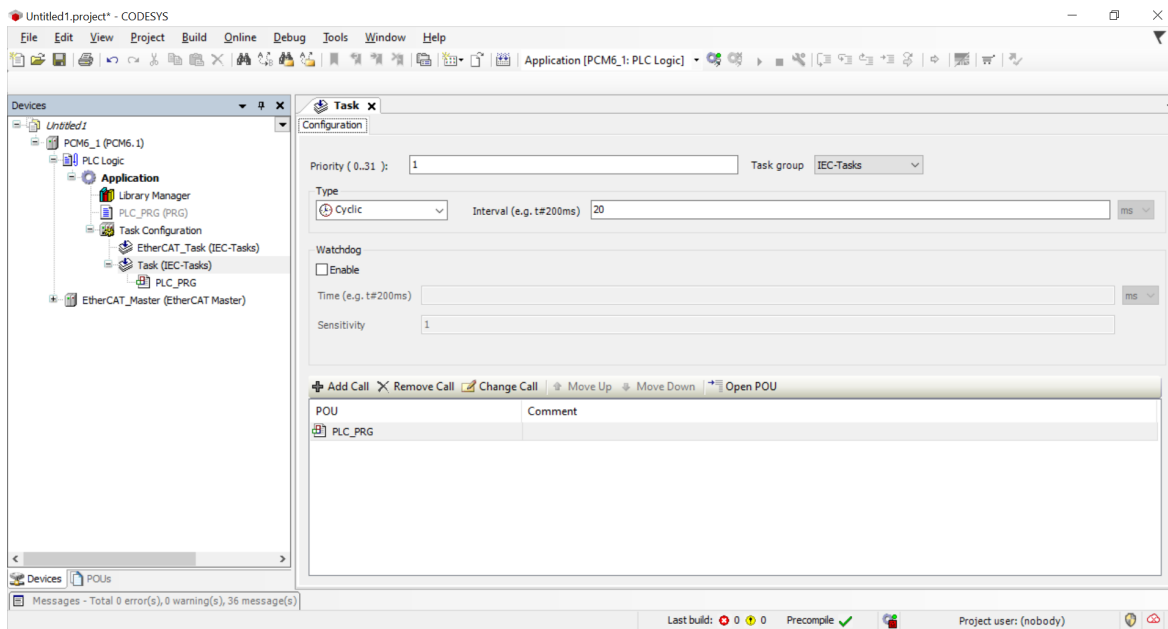
3. Select the **Add Call** tab.



4. In the Input Assistant window, select the program **PLC_PRG**.



5. The program **PLC_PRG** is now added to the project.

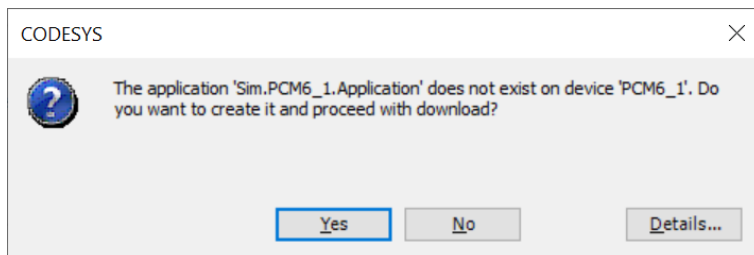


6. Login to the PLC.

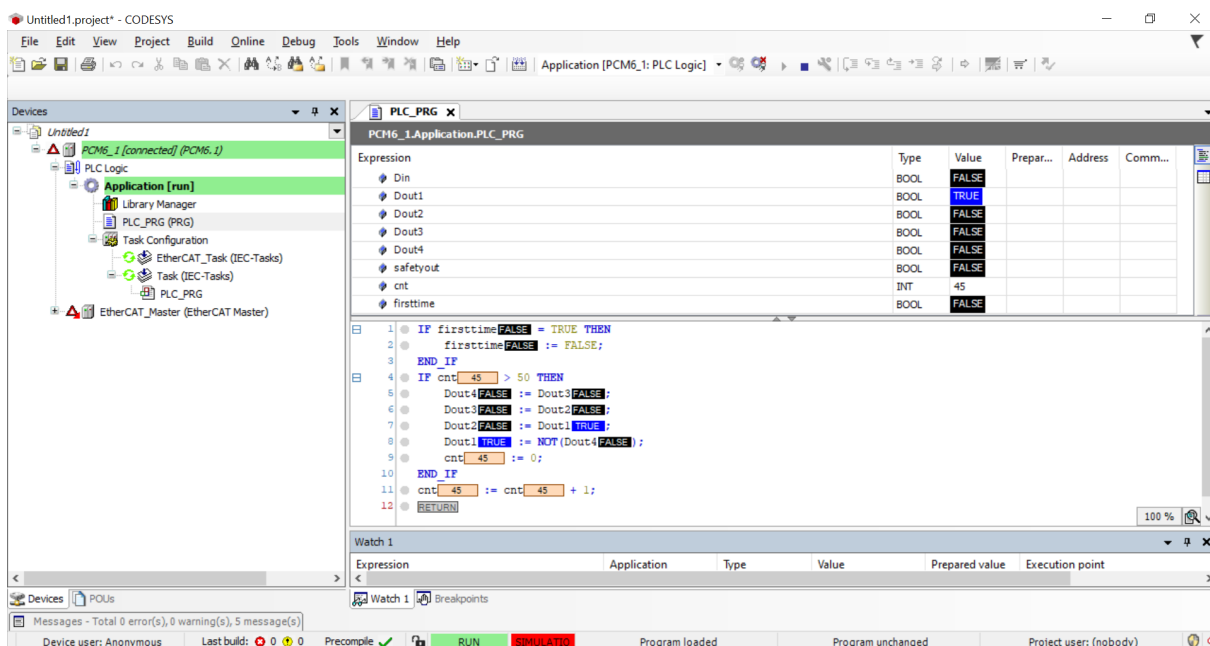
4.11.2 Simulation mode

It is possible to use Simulation mode, if a PLC controller is not connected.

1. Select Simulation mode with **Online > Simulation**.
2. Login to the AMC 300 with **Online > Login**.
3. In the pop-up window, select **Yes** to create the program.

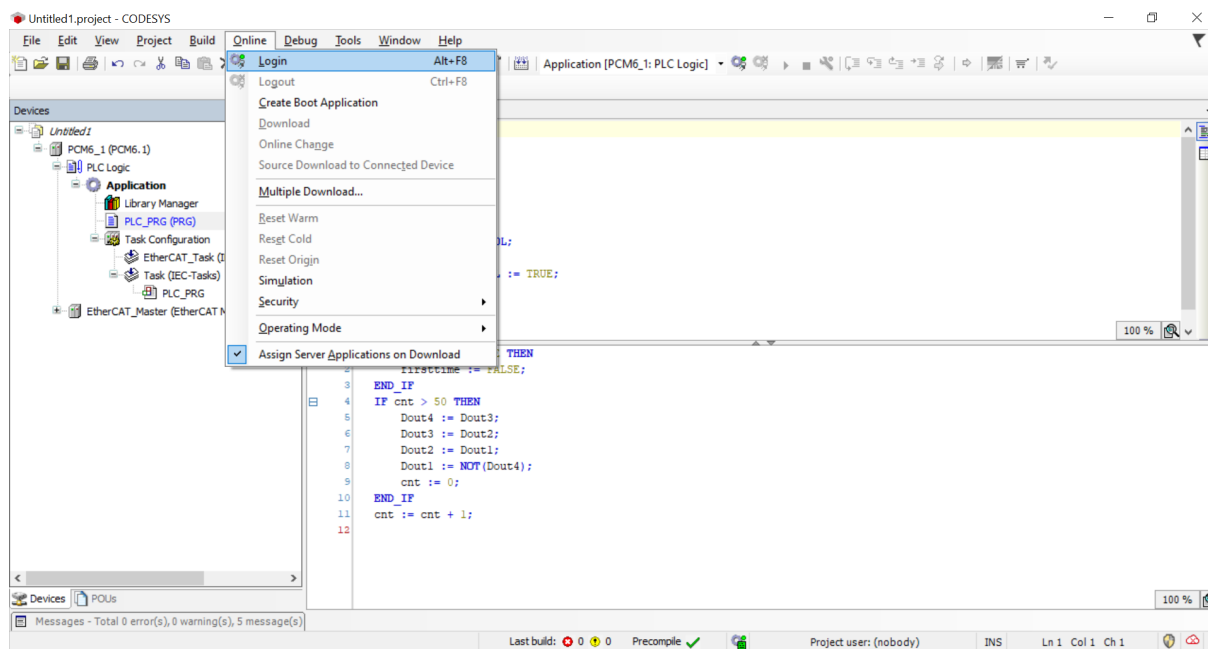


4. Select **Debug > Start** to run the program.



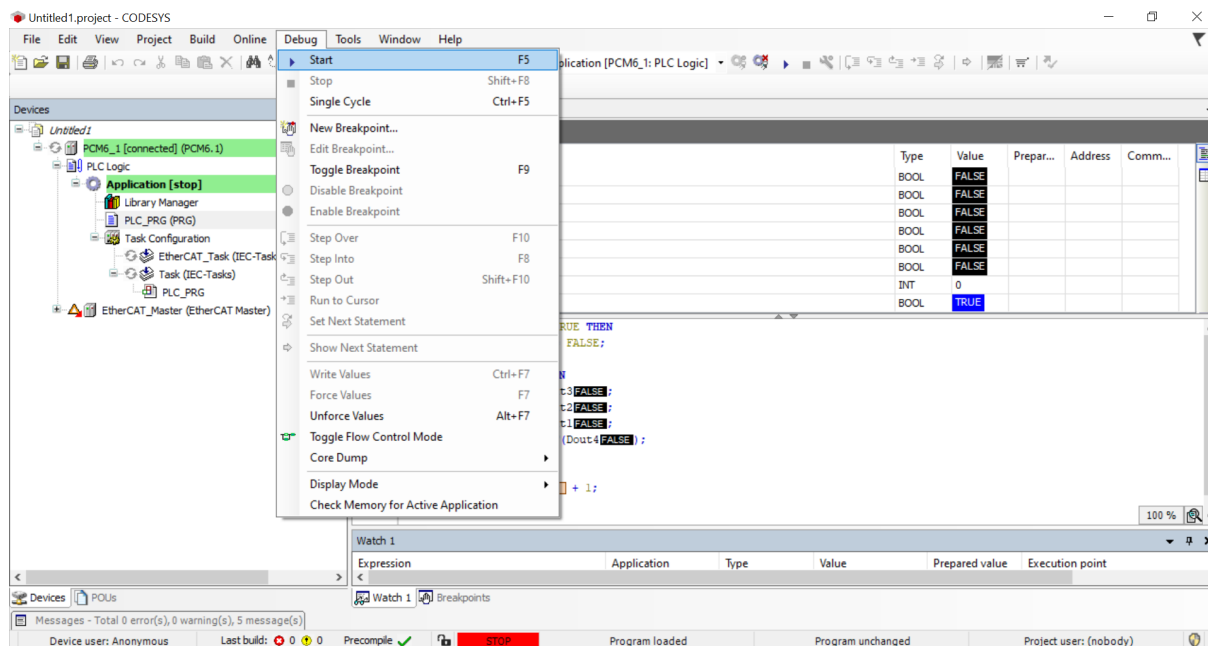
4.11.3 Login to the PLC

Select **Online > Login**.

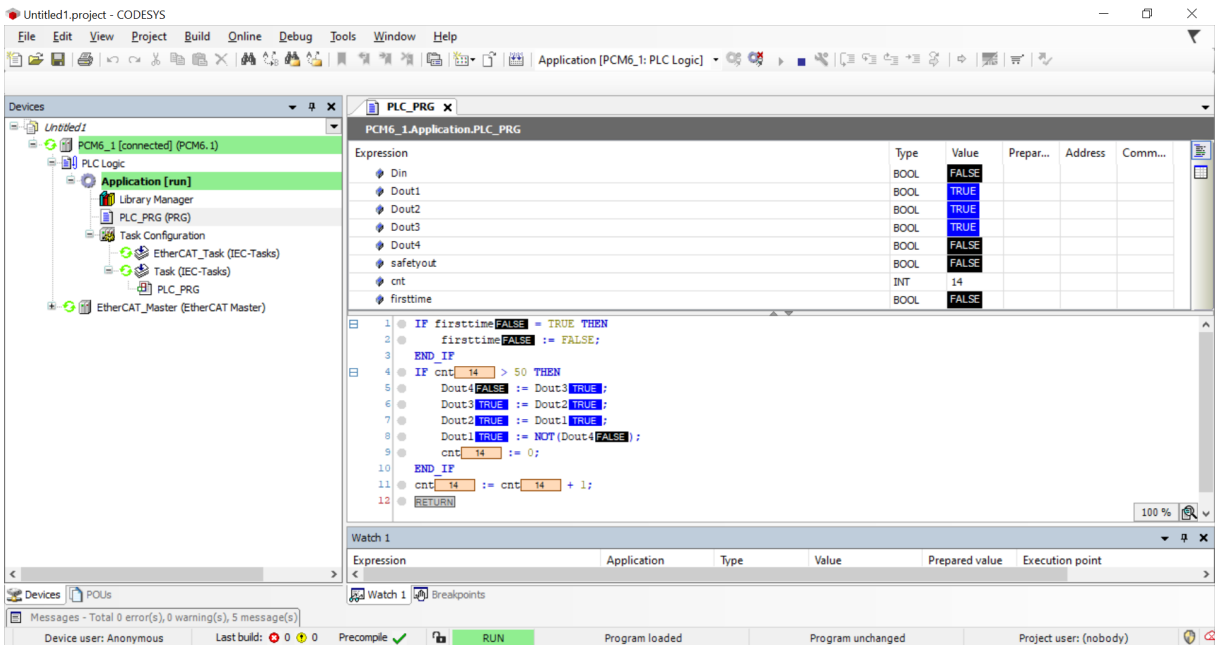


4.11.4 Start the program

To start the program, select **Debug > Start**.

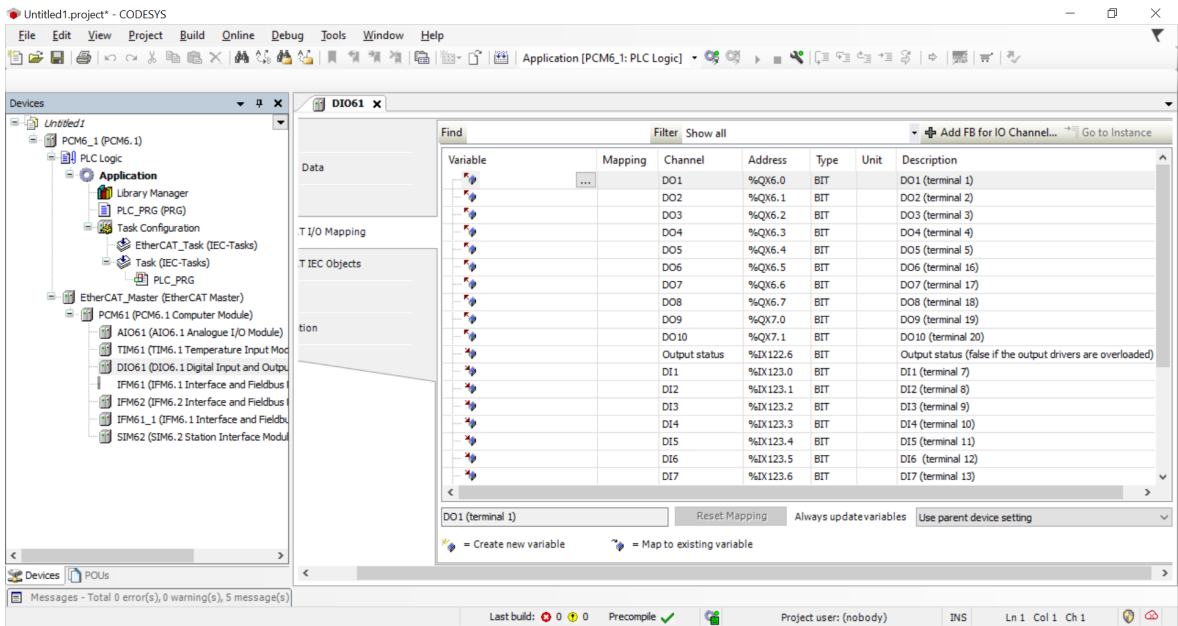


The project is now running.

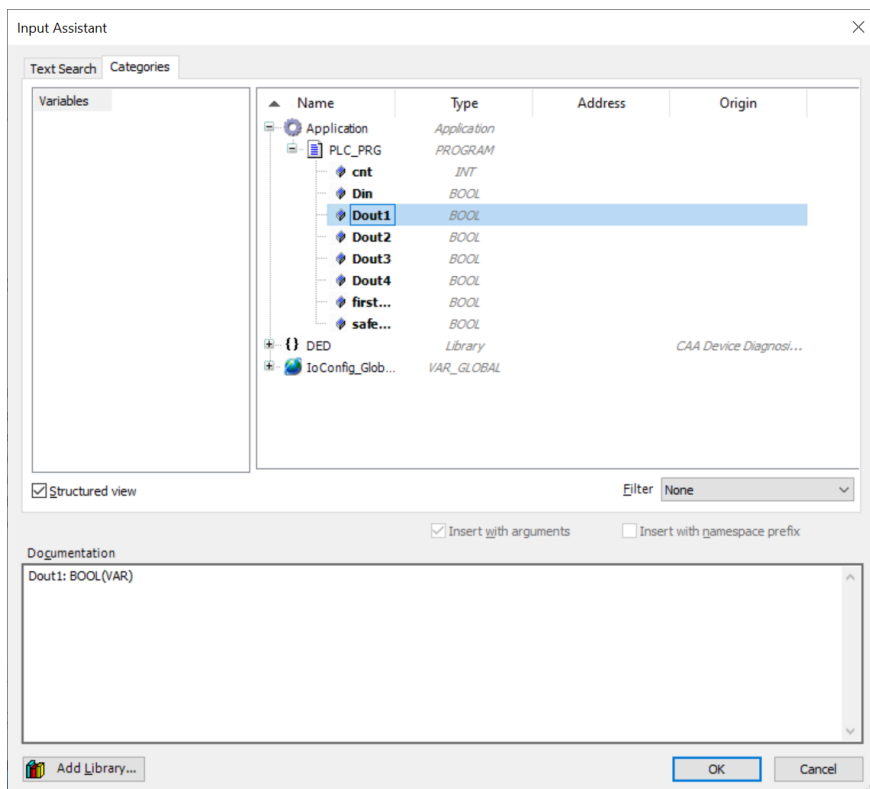


4.12 Link I/O variables to physical I/O

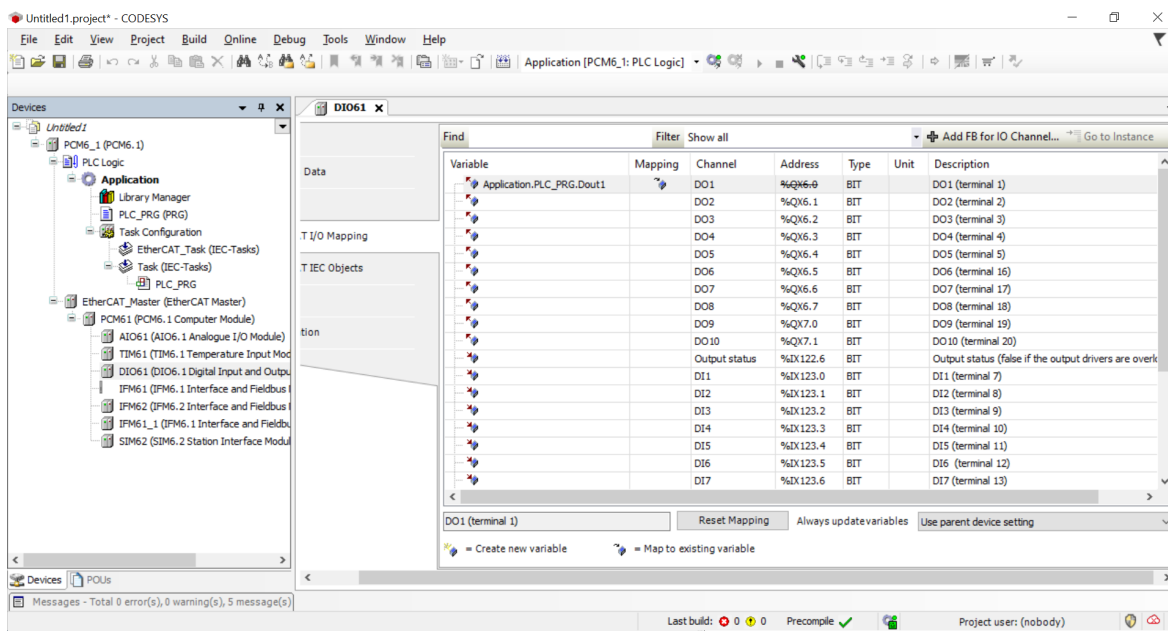
1. Select **Online > Logout** to go to offline mode.
2. Select a physical I/O.



3. Select ... of **F2** to edit.
4. In the Input Assistant window, select a variable.



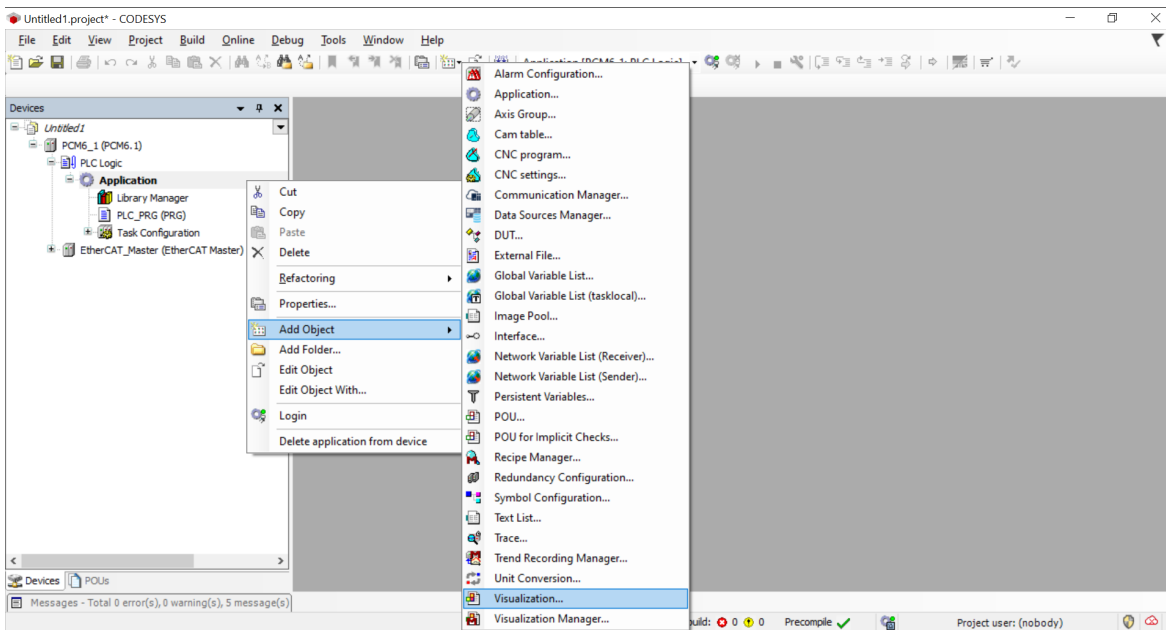
5. Select **OK** to link the variable to the physical I/O.



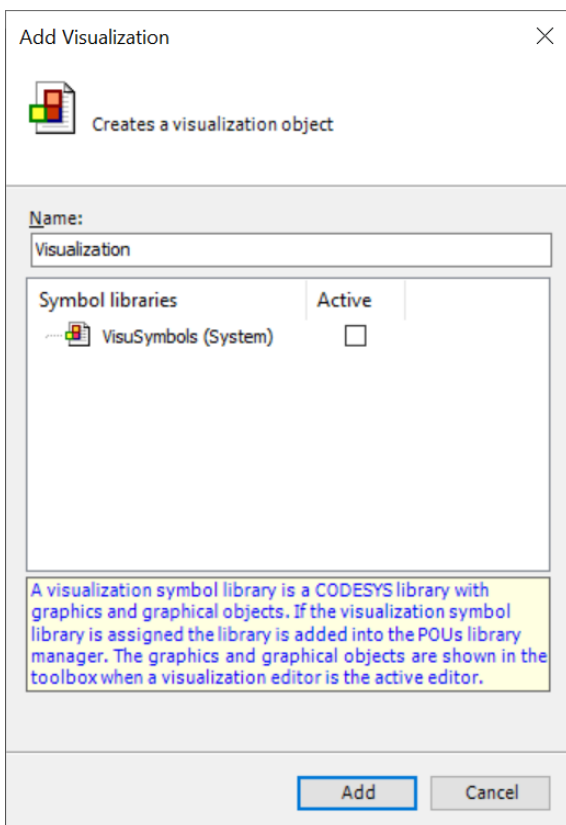
6. Repeat steps 1 to 5 for all output variables.

4.13 Add visualization

1. Select **Application > Add Object > Visualization**.

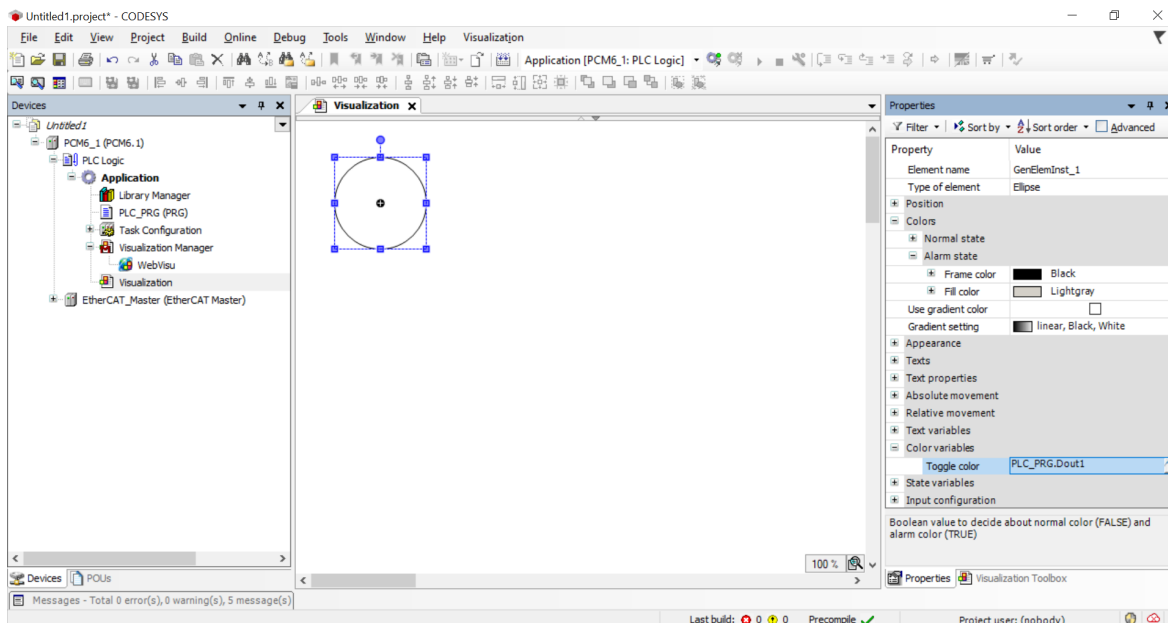


2. In the Add Visualization window, activate the **VisuSymbols (System)** library.
3. Select **Add**.

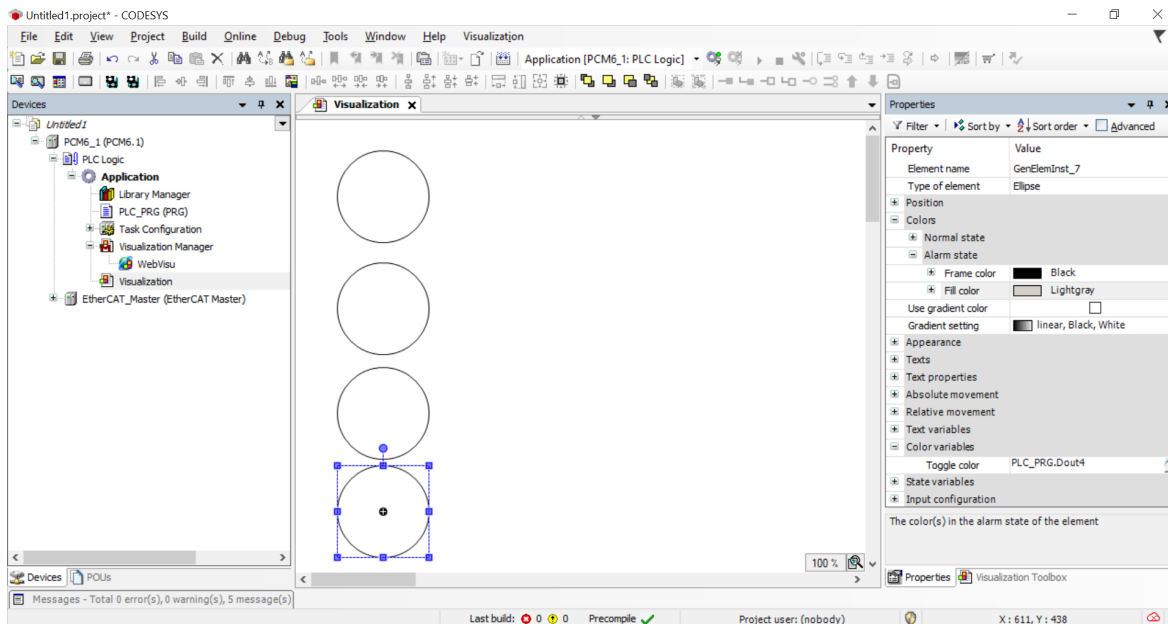


4.13.1 Drawing visualization (example)

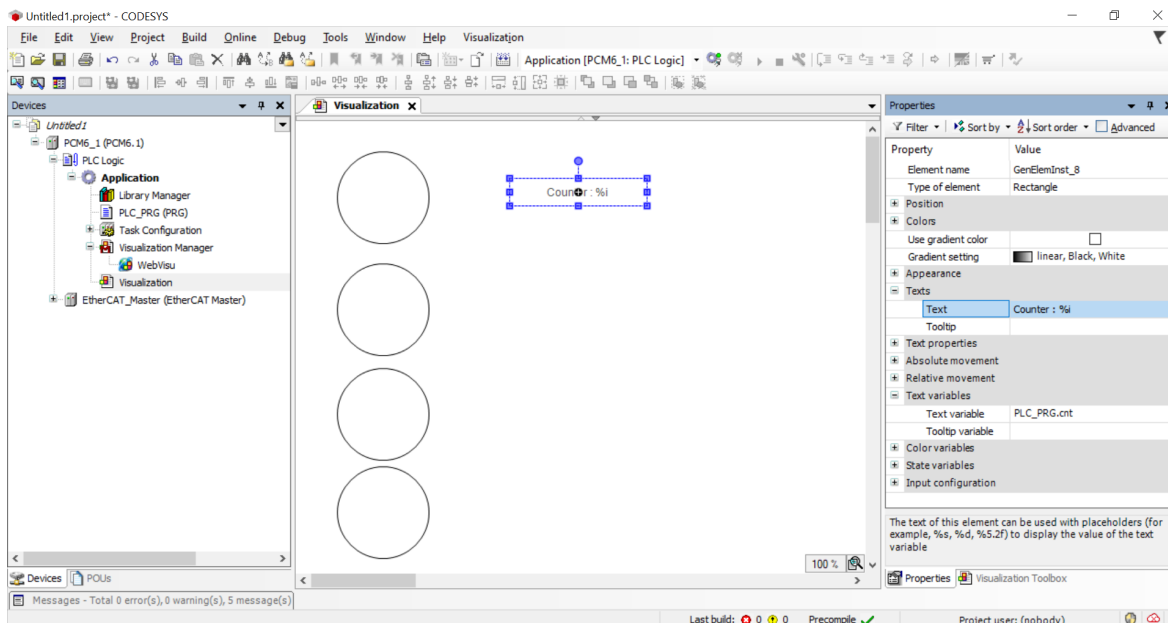
1. Draw an ellipse in the Visualization field.
2. Select **Properties > Color variation > Toggle Color** to link the ellipse to a variable.



3. Set **Properties > Colors > Alarmstate > Frame color** to Black.
4. Set **Properties > Colors > Alarmstate > Fill color** to Grey.
5. Repeat steps 1 to 4 (or copy-paste the ellipse) 3 times.

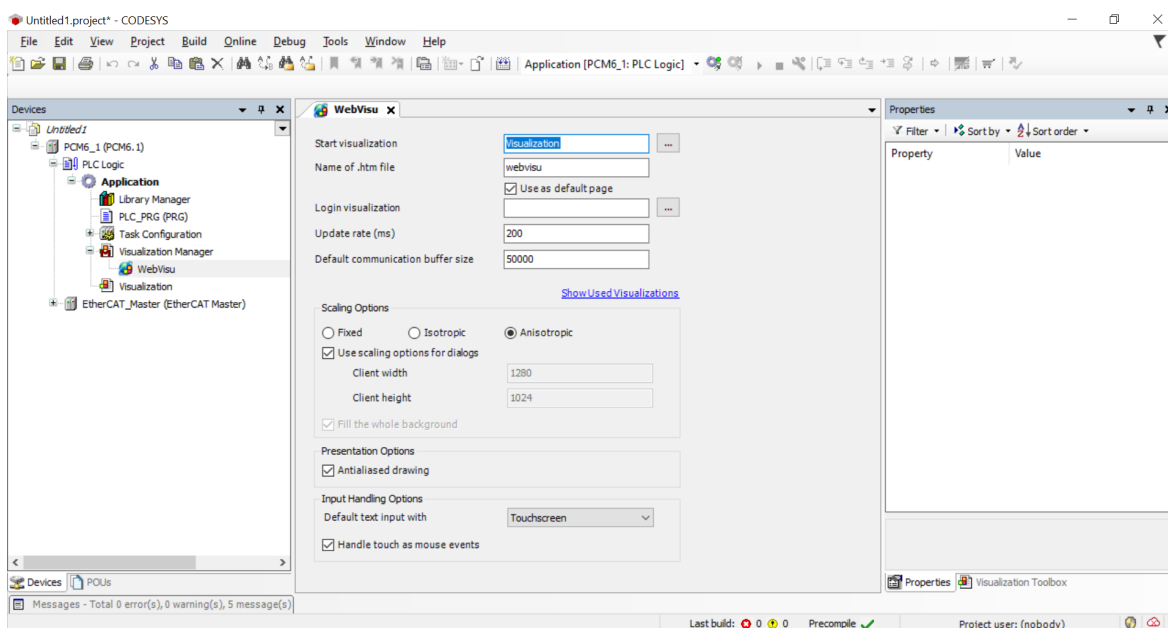


6. Use **Toggle Color** to change the new variables to other outputs.
7. Add a counter field (rectangle).

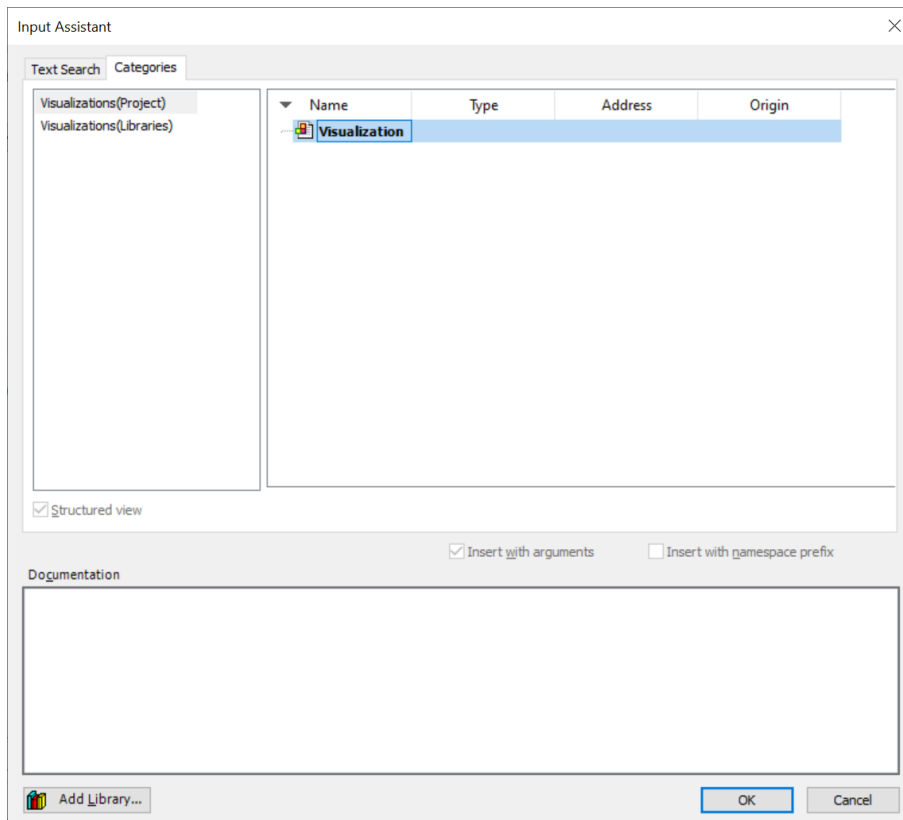


4.13.2 Set main visualization

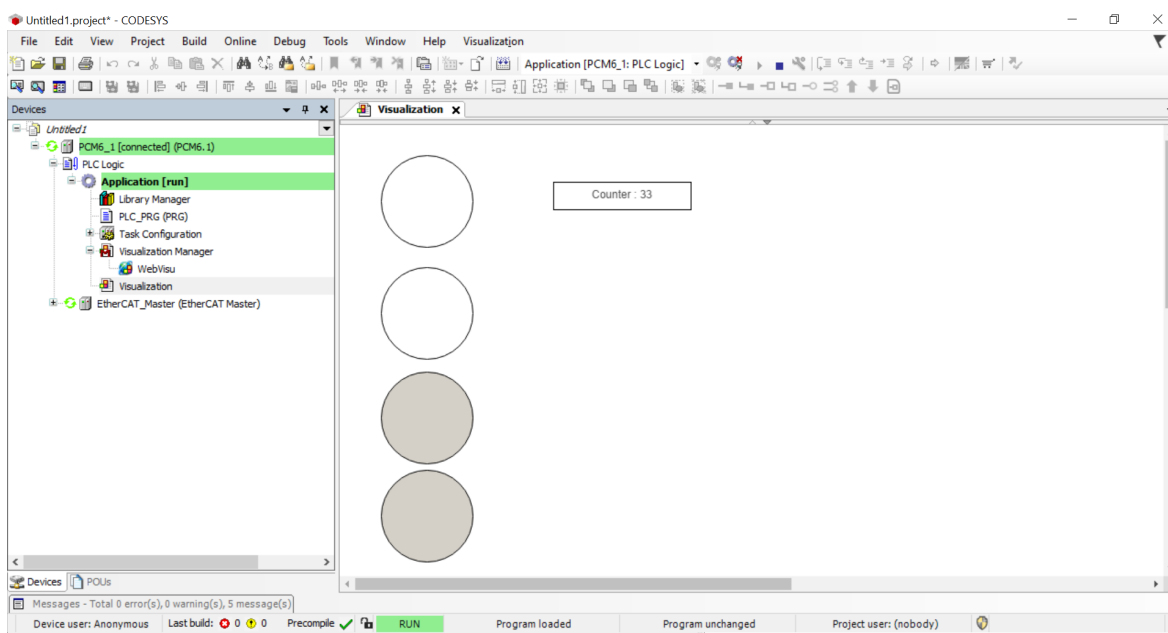
1. Select the **WebVisualization** tab.



2. In the Input Assistant window, select **Visualization**.



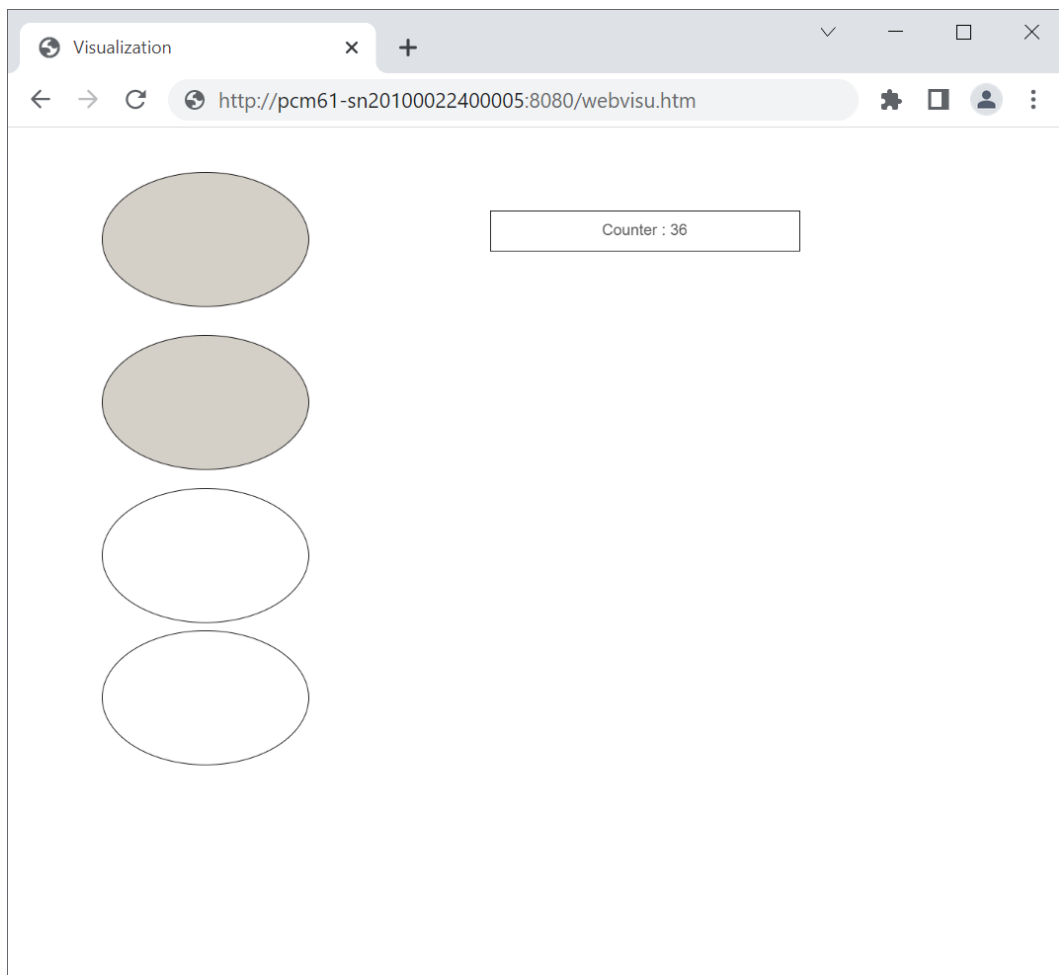
3. Select **OK**.
4. Login and run the program.
5. Select Visualization to view the first page.



4.13.3 View webvisualization or remote visualization

To see the webvisualization go to either

- [http://\[hostname or ip\]:8080/webvisu.htm](http://[hostname or ip]:8080/webvisu.htm) (for example, <http://amc600.local:8080/webvisu.htm>)
- via secure http to [https://\[hostname or ip\]:8443/webvisu.htm](https://[hostname or ip]:8443/webvisu.htm) (for example, <https://amc600.local:8443/>)

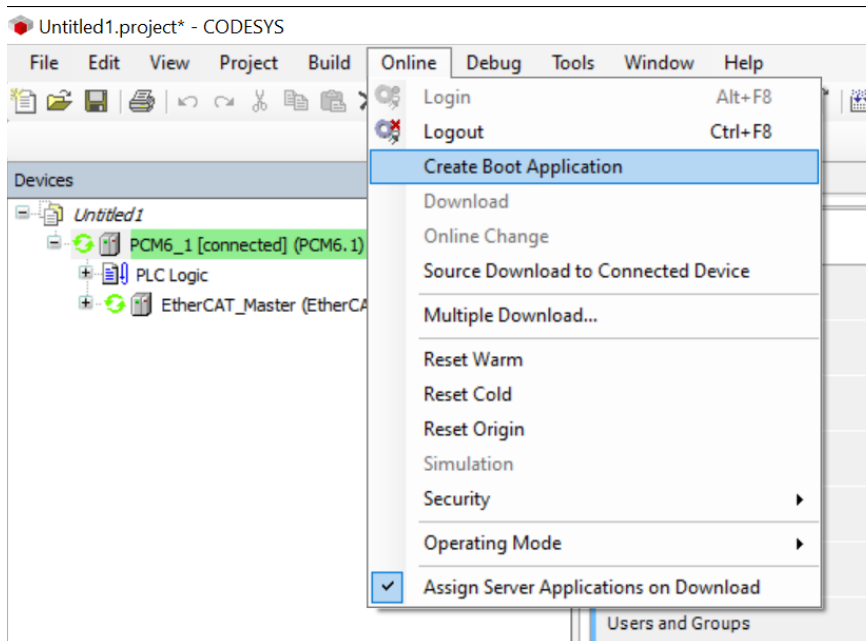


NOTE The port for http may be 8000 in some software versions.

4.14 Create a boot project

To make the PLC start with the application at power up, you can create a boot project in CODESYS.

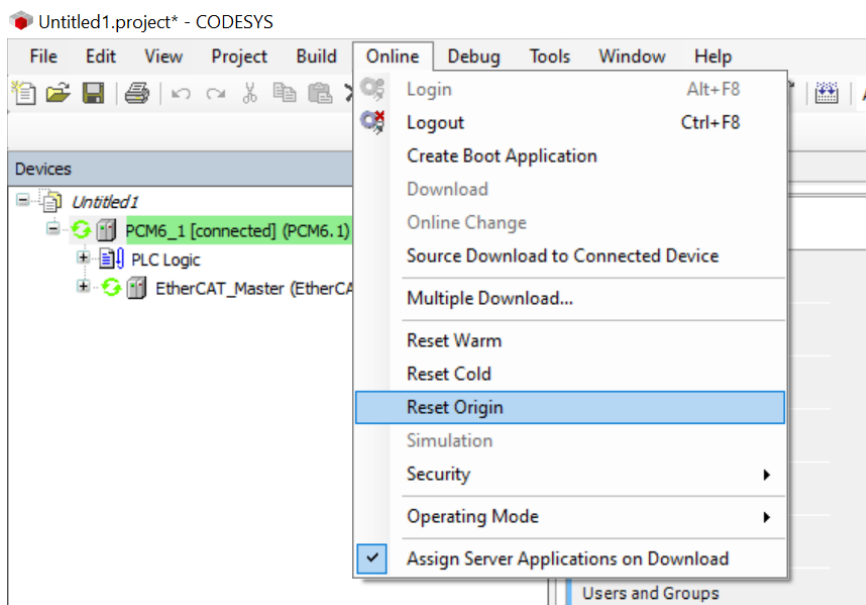
1. Login to the PLC via **Online > Login**.
2. Select **Online > Create boot application**.



3. The boot project files are created under:
 - /app/codesysapp/PlcLogic/Application
 - /app/codesysapp/PlcLogic/visu
4. Reboot the PLC.

Remove a boot project

1. Login to the PLC via **Online > Login**.
2. Select **Online > Reset origin**.

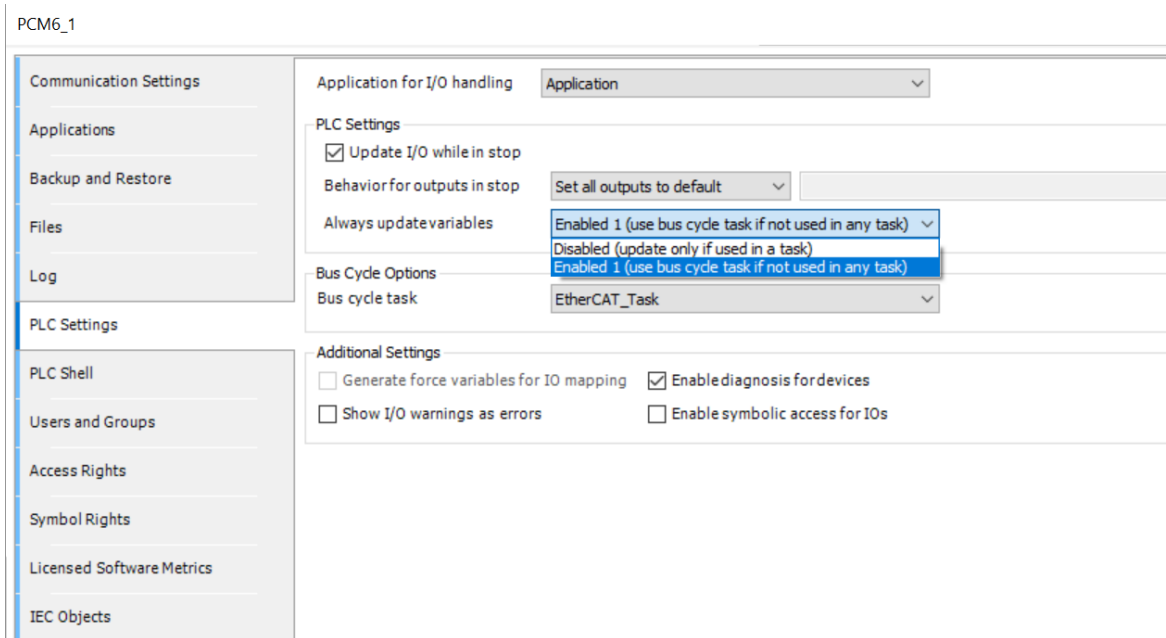


3. Or you can remove boot project and clean all the application files in:
 - /app/codesysapp/PlcLogic/Application and
 - /app/codesysapp/PlcLogic/visu folders.

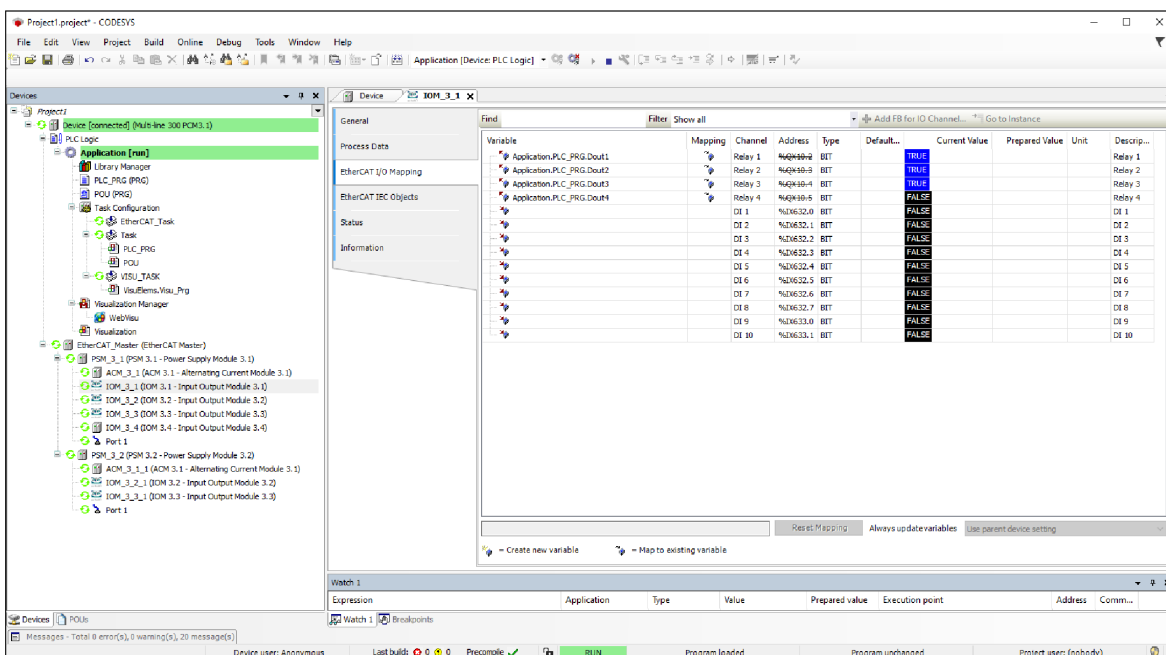
4.15 Manually force digital outputs for system testing

To manually force the digital outputs, for example for system testing, you must create a new empty project (see section **Create a new project**).

1. Scan for devices.
2. Add devices.
3. Select **PCM6_1 > PLC Settings**.
4. Tick the box **Update IO while in stop**.
5. In the **Always update variables** drop-down list, select **Enable 1 (use bus cycle task if not used in any task)**.



6. In the **Bus cycle task** drop-down list, select **EtherCAT_Task**.
7. Select **PCM6_1 > Application [run]**.
8. Under a module tab, select **EtherCAT I/O Mapping** to see the values of all inputs.
9. Double-click **Prepared value** for the value you want to change.



10. Select **F7** to force the new value.
11. Repeat steps 6 to 8 for other modules.

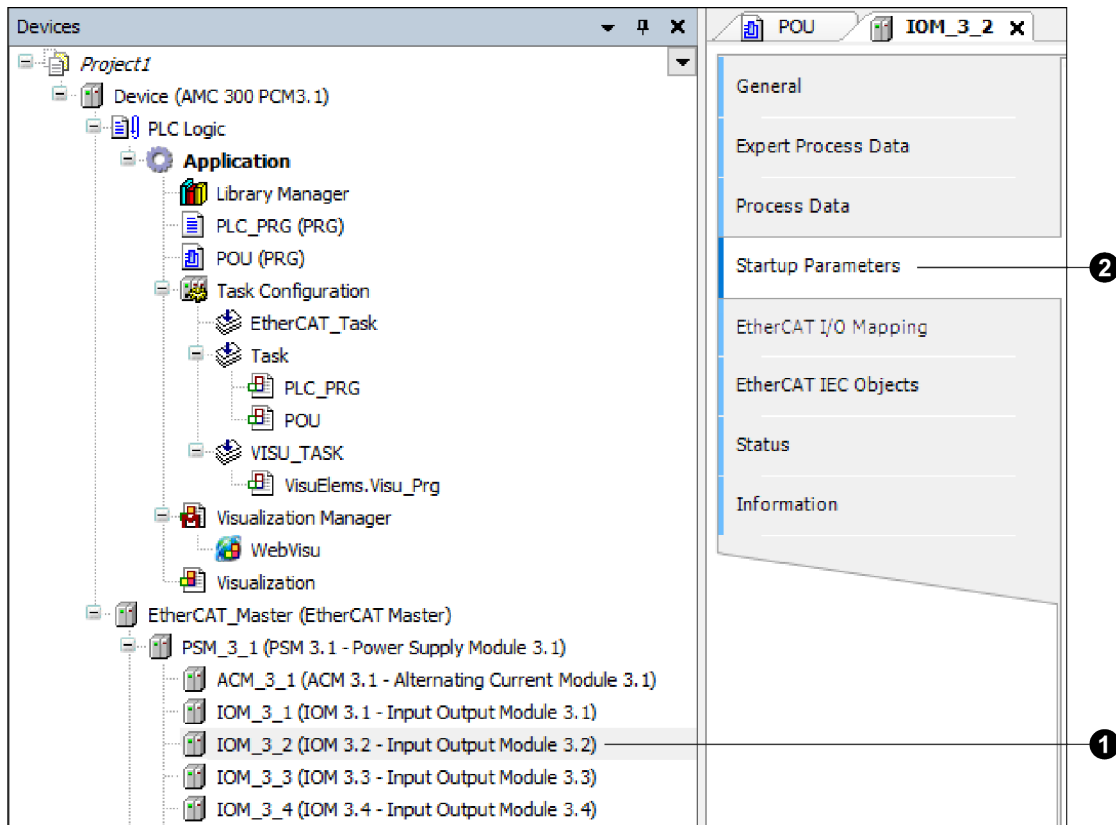
5. AMC 300 I/O configuration

This chapter guides you through the configuration of the AMC 300 I/O modules.

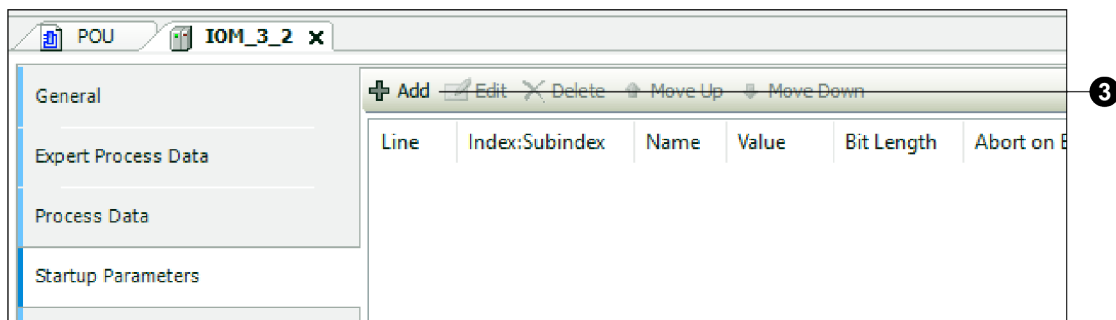
5.1 Configure AMC 300 Multifunctional Inputs/Outputs

5.1.1 Set the startup parameters (EtherCAT SDOs)

1. Select the relevant I/O module (example, IOM3.2).
2. Select *Startup parameters*.



3. Select *Add*.



4. Select the setup parameters for an analogue output (example, MultiOutput_4).

Select Item from Object Directory

Index:Subindex	Name	Flags	Type	Default
16#7202:16#00	MultiOutput_2			
16#7203:16#00	MultiOutput_3			
16#7204:16#00	MultiOutput_4			
16#8201:16#00	MultiOutput_1_Configuration			
16#8202:16#00	MultiOutput_2_Configuration			
16#8203:16#00	MultiOutput_3_Configuration			
16#8204:16#00	MultiOutput_4_Configuration			
16#01	Output Enable	RW	INT	0
16#02	Mode	RW	INT	0
16#03	Frequency	RW	REAL	0
16#04	Low	RW	REAL	0
16#05	High	RW	REAL	0
16#06	PWMVoltageLevel	RW	REAL	6
16#82F1:16#00	MultiOutput_1_Calibration			
16#82F2:16#00	MultiOutput_2_Calibration			
16#82F3:16#00	MultiOutput_3_Calibration			

Name:

Index: 16# Bit length:

SubIndex: 16# Value:

☐ Byte array

OK Cancel

- a. Output Enable
b. Mode
c. Low
d. High

5. In the Value field, set the values for the MultiOutput Startup Parameters.

Example: Multi-functional output configured as a 4 to 20 mA analogue current output.

IOH_3_2 x

General Expert Process Data Process Data Startup Parameters EtherCAT I/O Mapping EtherCAT IEC Objects Status Information

Line	Index:Subindex	Name	Value	Bit Length	Abort on Error	Jump to Line on Error	Next Line	Comment
1	16#8204:16#01	Output Enable	1	16	☐	☐	0	
2	16#8204:16#02	Mode	2	16	☐	☐	0	
3	16#8204:16#04	Low	4.0	32	☐	☐	0	
4	16#8204:16#05	High	20.0	32	☐	☐	0	
5	16#8301:16#01	Mode	2	16	☐	☐	0	
6	16#8301:16#02	Low	4.0	32	☐	☐	0	
7	16#8301:16#03	High	20.0	32	☐	☐	0	

- a
b
c
d

Parameter	Value	Note
a. Output Enable	0 = Output not active 1 = Output active	
b. Mode	0 = Unknown 15 = Voltage out mode 16 = Current out mode	
c. Low	4.0 or -10.0	Lower measured limit. Examples: • 4 to 20 mA • ± 10 V
d. High	20.0 or 10.0	Upper measured limit.

6. Configure the start parameters for a multi-functional input (example, MultiInput_1).

Select Item from Object Directory

Index:Subindex	Name	Flags	Type	Default
16#8204:16#00	MultiOutput_4_Configuration			
16#82F1:16#00	MultiOutput_1_Calibration			
16#82F2:16#00	MultiOutput_2_Calibration			
16#82F3:16#00	MultiOutput_3_Calibration			
16#82F4:16#00	MultiOutput_4_Calibration			
16#8300:16#00	Multi Input General Configuration			
16#8301:16#00	MultiInput_1_Configuration			
16#8301:16#01	Mode	RW	UINT	0
16#8301:16#02	Low	RW	REAL	0
16#8301:16#03	High	RW	REAL	0
16#8301:16#04	Settling Time	RW	UINT	0
16#8301:16#05	Sample Rate	RW	UINT	0
16#8302:16#00	MultiInput_2_Configuration			
16#8303:16#00	MultiInput_3_Configuration			
16#8304:16#00	MultiInput_4_Configuration			
16#83F1:16#00	MULTIN_CAL_1_Calibration Values			

Name

Index: 16#

0

Bit length

8

SubIndex: 16#

0

Value

0

☐ Byte array

OK

Cancel

e

f

g

e. Mode
f. Low
g. High

7. In the Value field, set the values for the Multilnput Startup Parameters.

Example: Multi-functional output configured as a 4 to 20 mA analogue current output.

IOM_3.2 x									
General	+ Add ✎ Edit ✕ Delete ↕ Move Up ↕ Move Down								
Expert Process Data									
Process Data									
Startup Parameters									
EtherCAT I/O Mapping									
EtherCAT IEC Objects									
Status									
Information									
	Line	Index:Subindex	Name	Value	Bit Length	Abort on Error	Jump to Line on Error	Next Line	Comment
	1	16#8204:16#01	Output Enable	1	16	☐	☐	0	
	2	16#8204:16#02	Mode	2	16	☐	☐	0	
	3	16#8204:16#04	Low	4.0	32	☐	☐	0	
	4	16#8204:16#05	High	20.0	32	☐	☐	0	
	5	16#8301:16#01	Mode	2	16	☐	☐	0	
	6	16#8301:16#02	Low	4.0	32	☐	☐	0	
	7	16#8301:16#03	High	20.0	32	☐	☐	0	

Parameter	Value	Note
e. Mode	0 = Unknown 1 = Voltage mode 2 = Current mode 3 = Resistance mode 4 = Temperature mode 5 = Dry Contact mode	
f. Low	4.0 or -10.0	Lower measured limit. Examples: 4 to 20 mA ± 10 V
g. High	20.0 or 10.0	Upper measured limit.

5.1.2 Configuration example for PWM

The PWM signals of the IOM3-2 can be configured like this:

+ Add Edit Delete Move Up Move Down								
Line	Index:Subindex	Name	Value	Bit Length	Abort on Error	Jump to Line on Error	Next Line	Comment
1	16#8201:16#01	Output Enable	1	16	☐	☐	0	
2	16#8201:16#02	Mode	26	16	☐	☐	0	
3	16#8201:16#03	Frequency	490.0	32	☐	☐	0	
4	16#8201:16#04	Low	0	32	☐	☐	0	
5	16#8201:16#05	High	100.0	32	☐	☐	0	
6	16#8201:16#06	PWMVoltageLevel	6	32	☐	☐	0	

5.1.3 Attach I/Os to variables

I/Os can be attached from the POU tab to variables and used in the application logic.

The screenshot displays the IOM3-2 configuration interface. On the left, a 'POU' tab is active, showing a variable declaration: `VAR`
`AI_1:REAL;`
`AO_1:REAL;`
`END_VAR`. A red circle highlights the `VAR` section. A red arrow points from this circle to the 'Variable' column in the 'IOM3-2 [Device: EtherCAT_Master: PSM_3_1]' table. The table lists various I/O channels and their mappings to variables.

Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
		Relay_1	%QX12.0	BIT			Relay_1
		Relay_2	%QX12.1	BIT			Relay_2
		Relay_3	%QX12.2	BIT			Relay_3
		Relay_4	%QX12.3	BIT			Relay_4
		Output Value	%QD4	REAL			Output Value
		Output Value	%QD5	REAL			Output Value
		Output Value	%QD6	REAL			Output Value
		Output Value	%QD7	REAL			Output Value
		DI1	%IX652.0	BIT			DI1
		DI2	%IX652.1	BIT			DI2
		DI3	%IX652.2	BIT			DI3
		DI4	%IX652.3	BIT			DI4
		Output Value	%ID164	REAL			Output Value
		Output Enabled	%IW330	INT			Output Enabled
		Output Value	%ID166	REAL			Output Value
		Output Enabled	%IW334	INT			Output Enabled
		Output Value	%ID168	REAL			Output Value
		Output Enabled	%IW338	INT			Output Enabled
		Output Value	%ID170	REAL			Output Value
		Output Enabled	%IW342	INT			Output Enabled
		Input Value	%ID172	REAL			Input Value

A simple test is to wire the terminals of the MultiOutput as feedback to the MultiInput.

After download of the application, the MultiOutput analogue value can be forced and seen on the MultiInput analogue input.

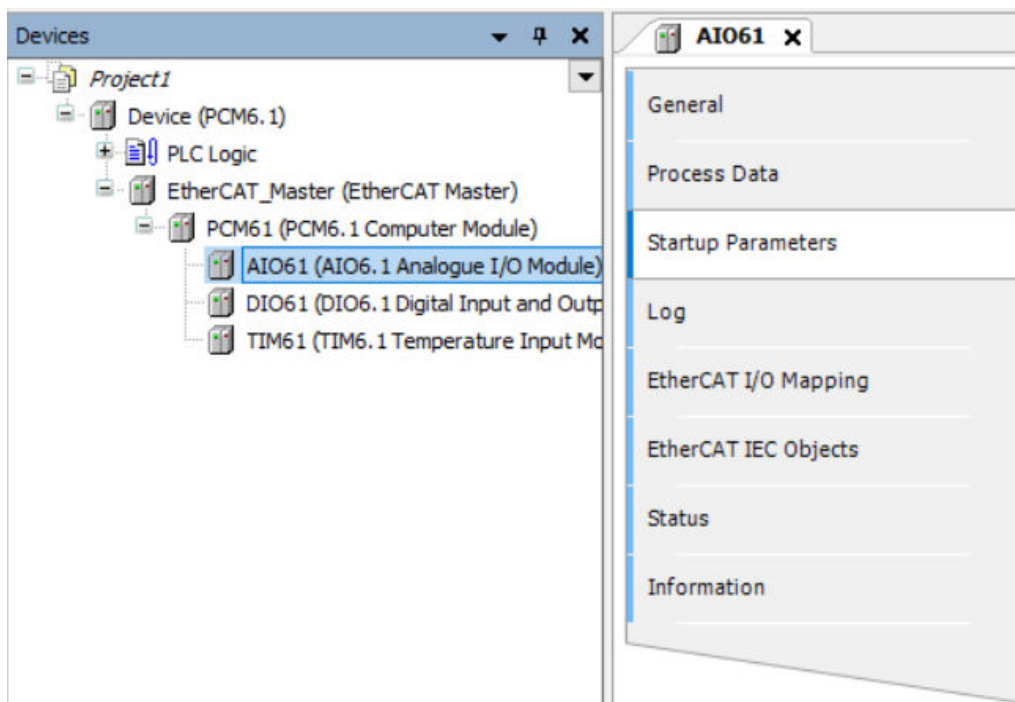
6. AMC 600 I/O configuration

This chapter guides you through the configuration of the AMC 600 modules, usually AIO6.1 and TIM6.1.

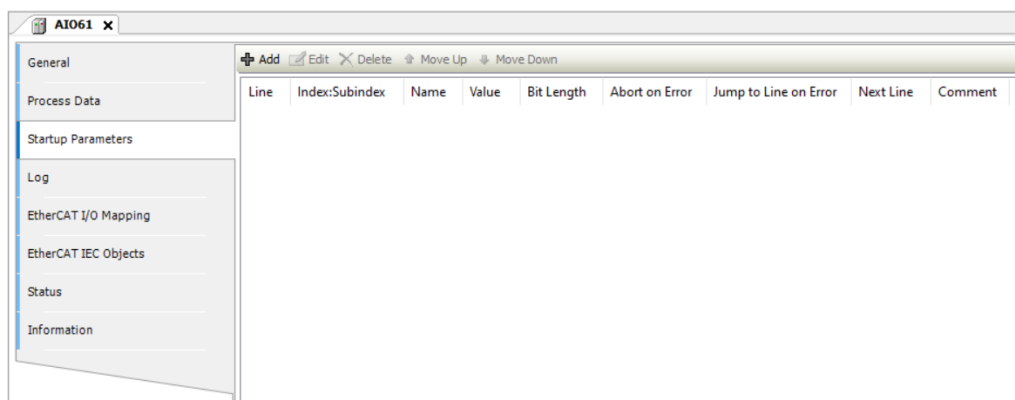
NOTE The DIO6.1 does not need configuration via startup parameters.

6.1 Set startup parameters (EtherCAT SDOs)

1. Select the relevant I/O module, for example, AIO6.1.
2. Select **Startup Parameters**.



3. Select **Add**.



4. Select the setup parameter for an analogue output (for example, AO 1 Advanced settings > AO 1 Output type). Use the drop-down list to select the type supported.

Example: Analogue output configured as a 0 to 10 V analogue voltage output.

Select Item from Object Directory

Index:Subindex	Name	Flags	Type	Default
16#10F3:16#00	Diagnosis History			
16#1C12:16#00	RxPDO-Assign			
16#1C13:16#00	TxPDO-Assign			
16#800D:16#00	AO 1 Advanced settings			
16#800E:16#11	AO 1 Output type	RW	USINT	16#0e
16#800F:16#00	AO 1 vendor data			
16#801D:16#00	AO 2 Advanced settings			
16#801F:16#00	AO 2 vendor data			
16#810D:16#00	AI 1 Advanced settings			
16#810F:16#00	AI 1 vendor data			
16#811D:16#00	AI 2 Advanced settings			
16#811F:16#00	AI 2 vendor data			
16#812D:16#00	AI 3 Advanced settings			
16#812F:16#00	AI 3 vendor data			
16#813D:16#00	AI 4 Advanced settings			
16#813F:16#00	AI 4 vendor data			

Name: AO 1 Output type

Index: 16# 800D Bit length: 8

SubIndex: 16# 11 Value: 0 - 10 V

☐ Byte array

OK Cancel

5. Same method is used to configure **Analogue input**. Select the setup parameters for an analogue input (for example, AI 1 Advanced settings > AI 1 Input type).

Example: Analogue input configured as a 0 to 10 V analogue voltage input.

Select Item from Object Directory

Index:Subindex	Name	Flags	Type	Default
16#10F3:16#00	Diagnosis History			
16#1C12:16#00	RxPDO-Assign			
16#1C13:16#00	TxPDO-Assign			
16#800D:16#00	AO 1 Advanced settings			
16#800F:16#00	AO 1 vendor data			
16#801D:16#00	AO 2 Advanced settings			
16#801F:16#00	AO 2 vendor data			
16#810D:16#00	AI 1 Advanced settings			
16#810E:16#11	AI 1 Input type	RW	USINT	16#0e
16#810F:16#00	AI 1 vendor data			
16#811D:16#00	AI 2 Advanced settings			
16#811F:16#00	AI 2 vendor data			
16#812D:16#00	AI 3 Advanced settings			
16#812F:16#00	AI 3 vendor data			
16#813D:16#00	AI 4 Advanced settings			
16#813F:16#00	AI 4 vendor data			

Name: AI 1 Input type

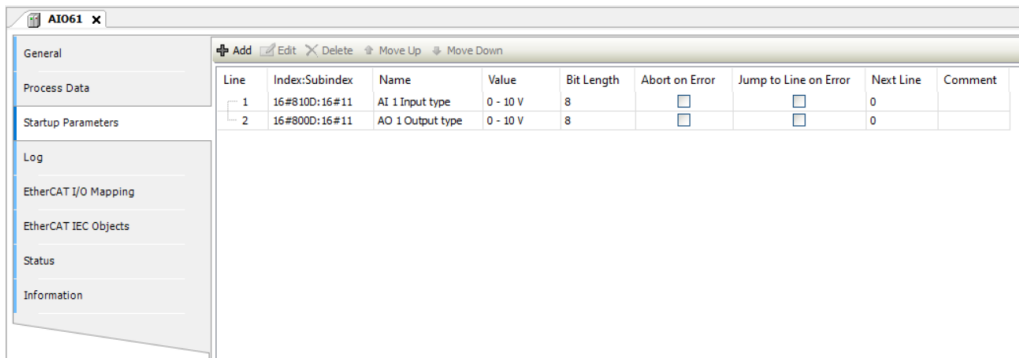
Index: 16# 810D Bit length: 8

SubIndex: 16# 11 Value: 0 - 10 V

☐ Byte array

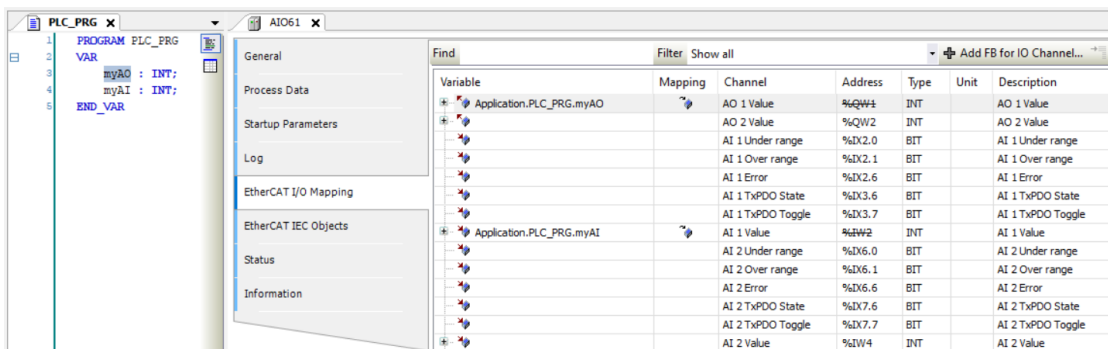
OK Cancel

6. Once added, the startup parameters are automatically transferred to the EtherCAT I/O modules.



6.2 Attach I/Os to variables

You can attach I/Os from the POU tab to variables, and used in the application logic.



A simple test is to wire the terminals of the analogue output as feedback to the analogue input.

After download of the application, the analogue output value can be forced and seen on the analogue input.