BECKHOFF New Automation Technology

Manual | EN

TE1120

TwinCAT 3 | XCAD Interface
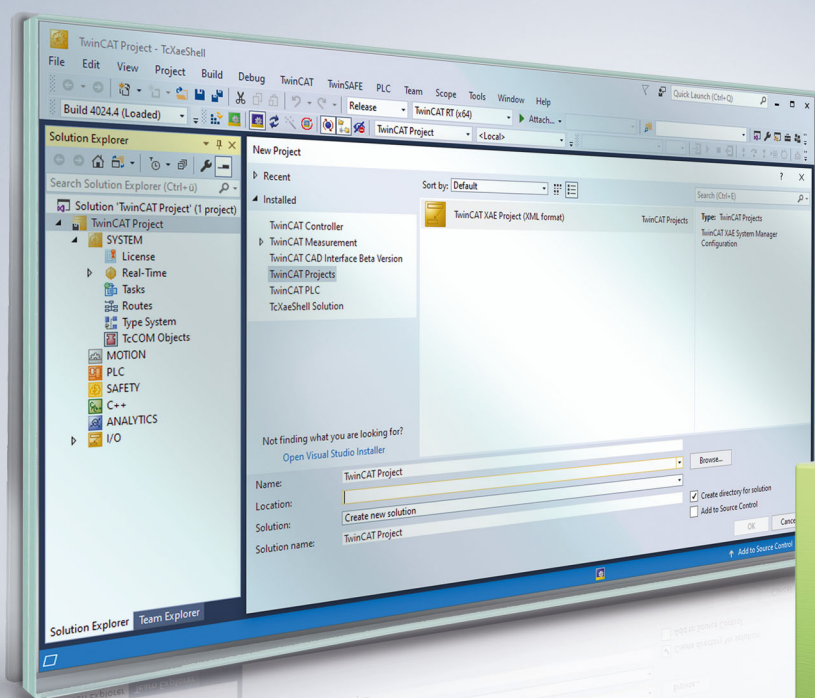
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Version: 1.3

1 Foreword

1.1 Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning the components.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.
We reserve the right to revise and change the documentation at any time and without prior announcement.
No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

Trademarks

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents:
EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702
with corresponding applications or registrations in various other countries.

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

Copyright

1.2   Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

⚠ **DANGER**
Serious risk of injury!
Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.

⚠ **WARNING**
Risk of injury!
Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

⚠ **CAUTION**
Personal injuries!
Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTE
Damage to the environment or devices
Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.

● Tip or pointer

ℹ This symbol indicates information that contributes to better understanding.

1.3   Notes on information security

The products of Beckhoff Automation GmbH & Co. KG (Beckhoff), insofar as they can be accessed online, are equipped with security functions that support the secure operation of plants, systems, machines and networks. Despite the security functions, the creation, implementation and constant updating of a holistic security concept for the operation are necessary to protect the respective plant, system, machine and networks against cyber threats. The products sold by Beckhoff are only part of the overall security concept. The customer is responsible for preventing unauthorized access by third parties to its equipment, systems, machines and networks. The latter should be connected to the corporate network or the Internet only if appropriate protective measures have been set up.

In addition, the recommendations from Beckhoff regarding appropriate protective measures should be observed. Further information regarding information security and industrial security can be found in our https://www.beckhoff.com/secguide.

Beckhoff products and solutions undergo continuous further development. This also applies to security functions. In light of this continuous further development, Beckhoff expressly recommends that the products are kept up to date at all times and that updates are installed for the products once they have been made available. Using outdated or unsupported product versions can increase the risk of cyber threats.

To stay informed about information security for Beckhoff products, subscribe to the RSS feed at https://www.beckhoff.com/secinfo.

2   Overview

The new TwinCAT 3 XCAD interface replaces the previous version and is based on the standardized AML format, as described in more detail in Concept [▶ 9], but continues to support the old Beckhoff XML format. We therefore recommend using the TwinCAT 3 XCAD Interface for planning new projects.

Pre-requisites

- Windows 7 or higher
- Visual Studio 2015, 2017 and TC XAE Shell
- TwinCAT 3.1 Build 4024 or higher

Installation

The installation is carried out via the separate installer TE1120 – XAD interface. Follow the installation wizard to accomplish this.

Licensing

The TwinCAT 3 XCAD Interface has its own engineering license. If no license is available, initial I/O topologies and up to ten tags can be imported as a test.

Bus systems supported

The current version only supports EtherCAT topologies.

3　Concept

An efficient engineering process becomes more and more important as the complexity and level of automation of machines and systems increases. The manual transfer to a TwinCAT project of an I/O topology that you have already created within the scope of electrical planning in an ECAD tool leads to high additional costs and is a potential cause of error, especially with large topologies. The TwinCAT 3 AML data exchange, on which the new TwinCAT 3 XCAD Interface is based, therefore facilitates automated creation of a topology by importing data from the ECAD tool, which saves a great deal of time.

The fundamental import and export functionality is based on the standardized exchange format AutomationML (AML for short), with whose help the topology data can be exchanged bidirectionally between the ECAD tools and TwinCAT. This is ensured by a simple and universal change management, as you can adopt changes from both directions into the respective other tool.

The AML format also allows an incremental import. Therefore, you can commence with the implementation of the software and the first import of the I/O topology into TwinCAT at an early stage of the electrical planning, because further imports of the updated version are also possible later on. Differences between the versions from the ECAD tool and from TwinCAT can be compared and managed with the help of the TwinCAT Project Compare during the import. This allows you to parallelize the electrical planning and software engineering and to minimize the time required for the entire engineering process. Further information about TwinCAT 3 AML data exchange can be found in the corresponding documentation.

XCAD Plugins

The TwinCAT 3 XCAD interface internally uses the TwinCAT 3 AML data exchange and supplements its function with a plugin concept. This concept provides for additional functionalities to be executed both when importing and exporting the AML file via the XCAD interface. These additional functionalities make it possible to enrich the AML file on the one hand and the TwinCAT project on the other, thus generating the highest possible added value in the exchange between the ECAD software and TwinCAT.

Global variables are used for information exchange between plugins. A part of these variables is provided directly by the XCAD interface, the other part is generated by the plugins. This creates dependencies between the plugins. For example, the Prepare PLC variables [▶ 28] plugin generates a list of PLC variables, which in turn is used as a basis in the Convert PLC variable names [▶ 28] plugin. If the first plugin is disabled, a corresponding warning will be displayed in the other plugin. All available plugins are listed in the XCAD Interface Options [▶ 21], where they can be activated and set. A description of the plugins can be found in the chapter Reference plugins [▶ 27].

The additional functions of the TwinCAT 3 XCAD Interface compared to TwinCAT 3 AML Data Exchange are summarized in the following table. More information about the workflow and the resulting possibilities are described in the following chapter [▶ 11].

	TwinCAT 3 AML Data Exchange	TwinCAT 3 XCAD Interface
Automatic generation of the I/O topology	✔	✔
Incremental data update	✔	✔
Bidirectional data exchange	✔	✔
Automatic generation of a linked GVL	✘	✔
Renaming the channel variables	✘	✔
Transfer of comments for the channel variables	✘	✔
Enrichment of AML	✘	✔
Addendum: support for the old Beckhoff XML format for import	✘	✔

See also

- TwinCAT 3 AML data exchange
- Workflow [▶ 11]
- Dialog: XCAD Interface Options [▶ 21]
- Reference plugins [▶ 27]

4 Workflow

Using the plugin concept of the XCAD interface, you can enrich both the AML file and the TwinCAT project to generate the highest possible added value in the exchange between the ECAD software and TwinCAT. Each plugin can be enabled or disabled and configured as needed in the XCAD Interface Options [▶ 21]. The basis of the plugins is, among others, the so-called tag tables in AutomationML. They represent lists of variables (tags) that are derived on ECAD side from the information of the channels configured there. These tags are connected to the channels of the hardware components via links in the AutomationML.

Enriching the I/O topology in the TwinCAT project

It is possible to automatically adjust the channel variables of the I/O topology, which are associated with a tag in the AutomationML, in TwinCAT when importing the AutomationML file. This means that the standard variable names, such as "Input" for an EL1008, are replaced by the tag name. In addition, the comment of the tag can be adopted for the channel variable. This allows the user to draw conclusions about the use of the channels more easily and quickly. (Plugin: Rename channel variables [▶ 32])

Using the template identifier attribute in AutomationML, a preconfigured template in .xti format for one of the hardware components can also be loaded during import. In this way, certain settings that cannot otherwise be made on the ECAD side can be set automatically.

Generating TwinCAT PLC project content

Based on the tag tables, one or more global variable lists (GVLs) can be created in a PLC project and corresponding variables can be generated from the tags, which are assigned to the GVLs. The names of the variables are derived from the tag names and can be adapted to a valid PLC variable name using a converter, if necessary. In addition, the tag comment is written over the corresponding PLC variable. (Plugins: Convert PLC variable names [▶ 28], Create global PLC variable list [▶ 30]) These variables of the PLC project can finally be automatically linked to the corresponding channel variables of the I/O topology. (Plugin: Create PLC variable links [▶ 32]) Time-consuming manual linking is therefore no longer necessary.

See also

- Concept [▶ 9]

## 4.1 Importing topology

1. Create a new TwinCAT project.

2. Right-click the TwinCAT project entry in the Solution Explorer.

3. Select the command Import via XCAD… [▶ 18].

4. In the drop-down menu for the file formats, select one of the two formats AML or Beckhoff-ECAD-XML in the default browse dialog.

5. Select the desired file in the standard browser dialog.

6. Confirm the dialog with **Open**.

See also

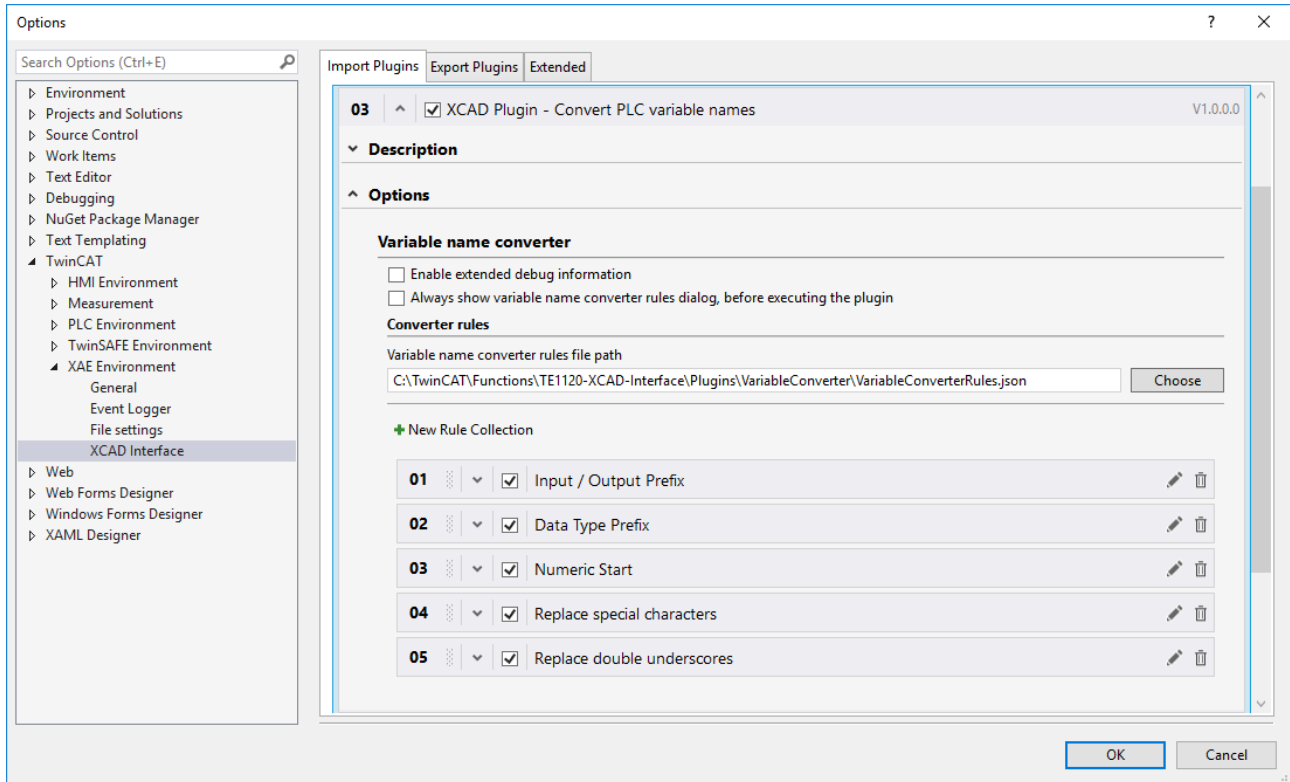- Command: Import via XCAD… [▶ 18]

4.2 Enabling/disabling plugins
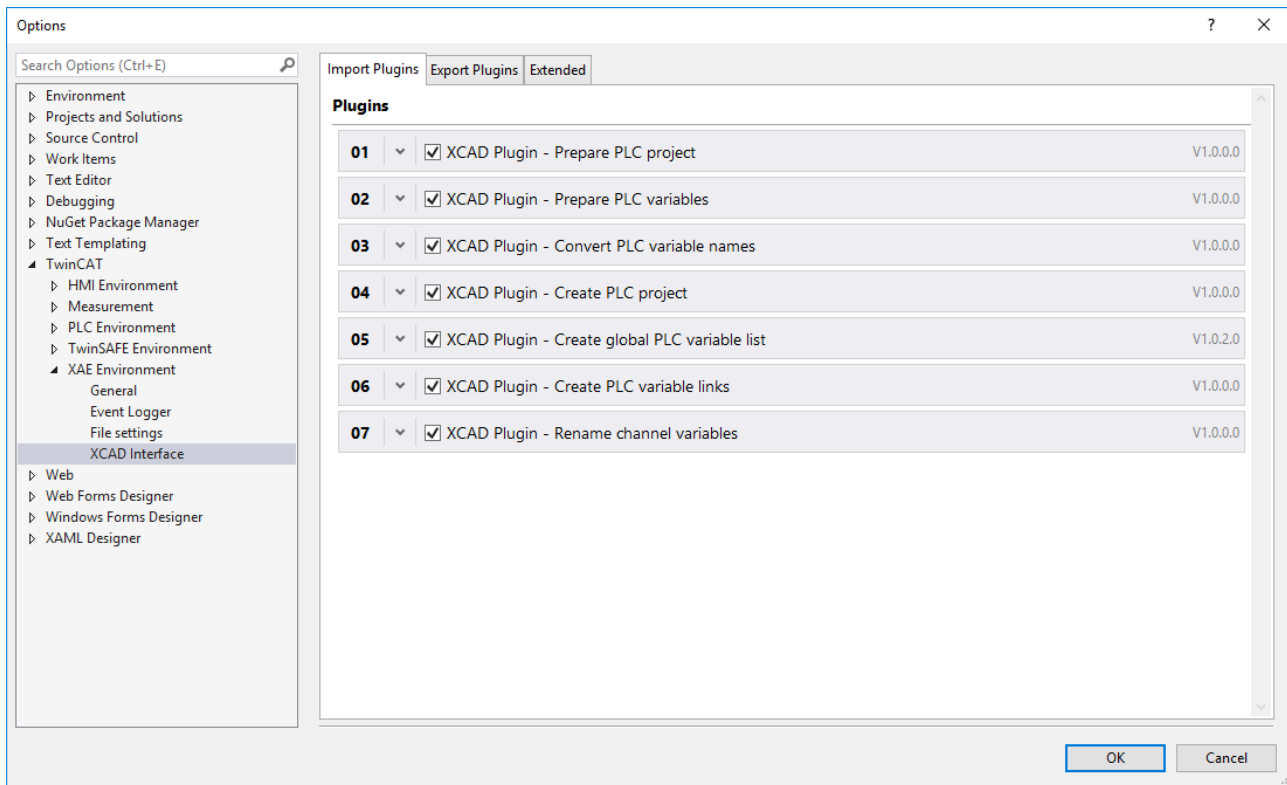
1. Open the <u>XCAD Interface Options</u> [▶ 21].

2. Switch to the tab **Import Plugins** or **Export Plugins**.

3. Find the desired plugin in the list.

4. Enable / disable the plugin via the checkbox.

5. Confirm the dialog with **OK** to save the setting.

See also

- Dialog: <u>XCAD Interface Options</u> [▶ 21]

4.3   Configuring plugins

1. Open the XCAD Interface Options [▶ 21].

2. Switch to the tab **Import Plugins** or **Export Plugins**.

3. Find the desired plugin in the list.

4. Expand the plugin settings using the arrow button

5. Change the desired settings.

6. Confirm the dialog with **OK** to save the settings.

See also

- Dialog: XCAD Interface Options [▶ 21]
- Reference plugins [▶ 27]

4.4   Changing the converter rule path

The converter rule path can be changed in the settings of the Convert PLC variable names [▶ 28] plugin and in the Variable Name Converter Rules [▶ 18] dialog.
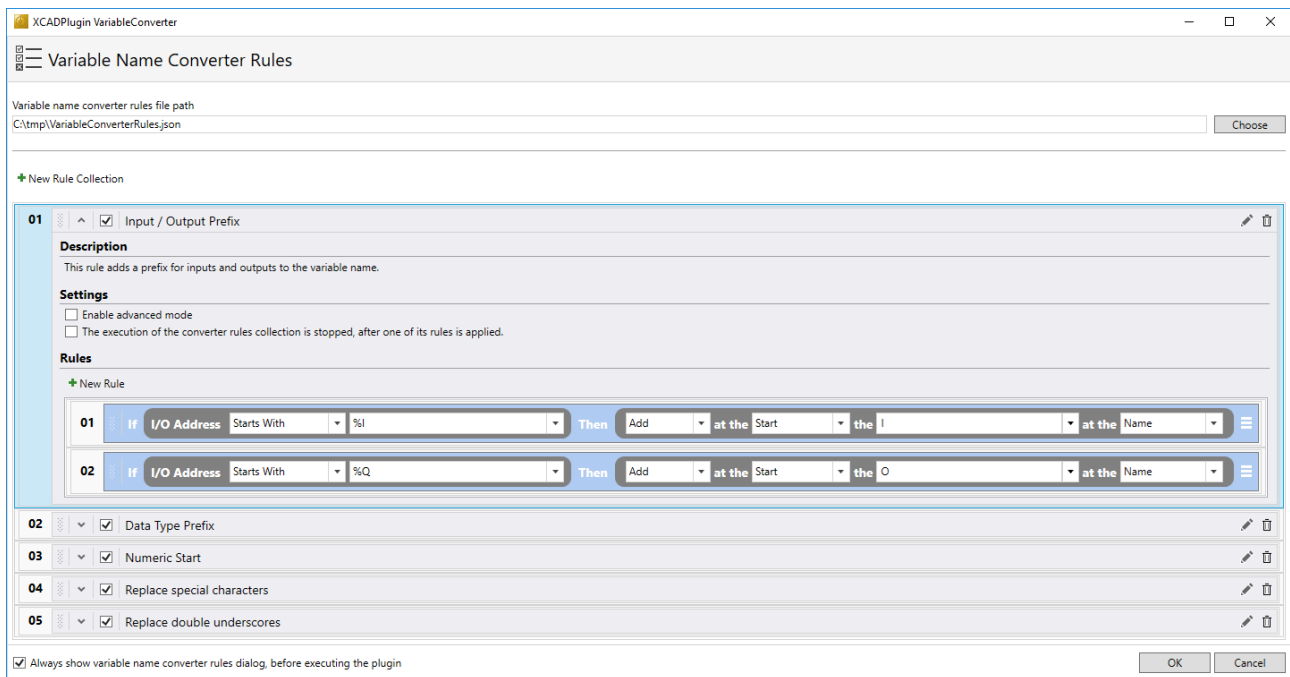
1. Open the plugin settings or the above-named dialog.

2. Open the default browse dialog with **Choose**.

3. Select the path to the desired converter rule file.

4. Confirm the dialog with **OK** to save the settings.

> **ℹ Loading new rules**
>
> If the new converter rule file is formatted correctly, the rules are automatically loaded after the new path is selected and displayed in the dialog.

> **ℹ Saving changes**
>
> Any changes you have made to the rules in the dialog are automatically saved to the rule file when you confirm the dialog.

See also

- Changing converter rules [▶ 14]
- Dialog: Variable Name Converter Rules [▶ 18]
- Plugin: Convert PLC variable names [▶ 28]

4.5 Changing converter rules

The existing converter rules can be changed in the settings of the Convert PLC variable names [▶ 28] plugin and in the Variable Name Converter Rules [▶ 18] dialog. If you want to add new rules, you can make these changes directly in the converter rule file.
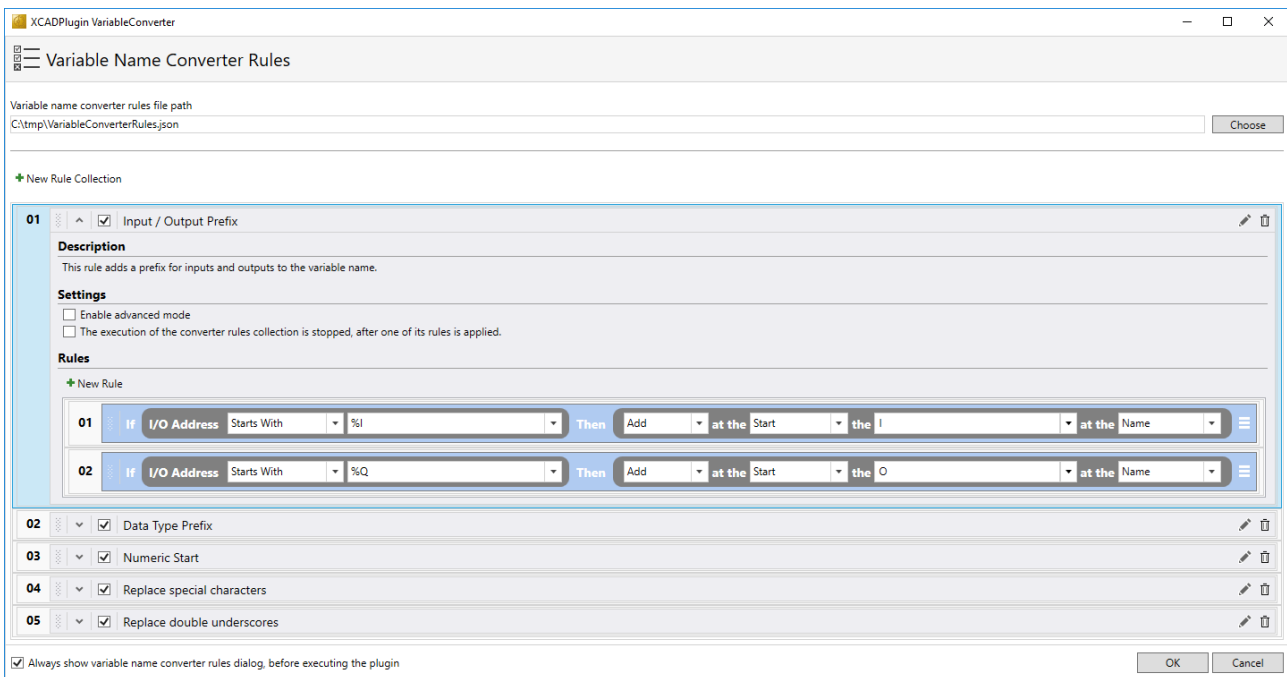
Changing an existing rule collection

1. Open the plugin settings or the above-named dialog.

2. Open the dialog for changing the name and description of a rule collection with the ✏ button.

3. Confirm the dialog with **OK** to save the settings.

Changing an existing rule collection

1. Open the plugin settings or the above-named dialog.

2. Delete the rule collection with the 🗑 button.

3. Confirm the dialog with **OK** to save the settings.

Adding a new rule collection

1. Open the plugin settings or the above-named dialog.

2. Open the dialog to enter the name and description of a new rule collection with the ✚ **New Rule Collection** button.

3. Confirm this dialog with **OK** to add the new rule collection.

4. Confirm the dialog with **OK** to save the settings.

Changing existing converter rules

1. Open the plugin settings or the above-named dialog.

2. Expand the corresponding rule collection.

3. Change the desired rule.

4. Confirm the dialog with **OK** to save the setting.

i **Saving changes**

Any changes you have made to the rules in the dialog are automatically saved to the rule file when you confirm the dialog.

Adding converter rules

1. Open the plugin settings or the above-named dialog.

2. Expand the corresponding rule collection.

3. Add a new rule of a desired type [▶ 21] with the ✚ New Rule button.

i The new rule is added at the end of the rule collection.

4. Confirm the dialog with **OK** to save the setting.

Copying a converter rule

1. Open the plugin settings or the above-named dialog.

2. Expand the corresponding rule collection.

3. Open the context menu of the desired rule with the ▤ button.

4. Select the **Copy Rule** item from the context menu.

i The new rule is added at the end of the rule collection.

5. Confirm the dialog with **OK** to save the setting.

Deleting converter rules

1. Open the plugin settings or the above-named dialog.

2. Expand the corresponding rule collection.

3. Open the context menu of the desired rule with the ▤ button.

4. Select the **Delete Rule** item from the context menu.

5. Confirm the dialog with **OK** to save the setting.

See also

- Changing the converter rule path [▶ 13]
- Dialog: Variable Name Converter Rules [▶ 18]
- Plugin: Convert PLC variable names [▶ 28]

4.6 Add Plugin reference

If you want to add more plugins or adapt the paths for existing plugins, you can do this via XCAD Interface Options [▶ 21], as described below. After you have added a new reference and restarted TwinCAT Engineering, you can configure [▶ 13] the plugin as usual under Plugins.
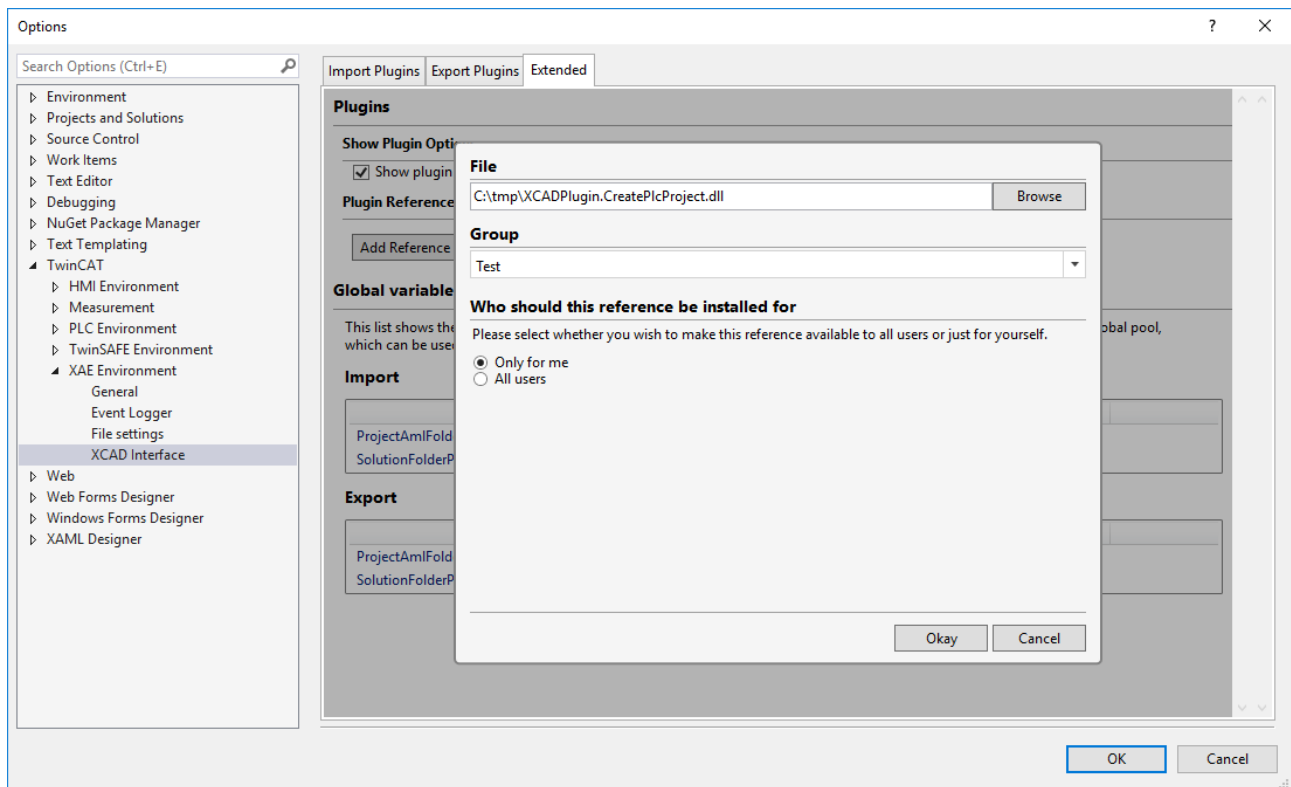
1. Open the XCAD Interface Options [▶ 21].
2. Switch to the tab XCAD Interface Options [▶ 21].
3. Press the **Add Reference** button.
4. Press the **Browse** button in Plugin Reference Dialog [▶ 26].
5. Select the desired Plugin Dll.
6. Enter the desired group name or select an existing group from the drop-down menu.
7. Select whether this plugin should only be available for the account currently logged in or for all accounts set up.
8. Confirm with **OK**.
9. Confirm the options dialog with **OK**.
10. Restart the TwinCAT Engineering.

Change of the plugin references

The plug-in added via the new reference is then only displayed at XCAD Interface Options [▶ 21] in the XCAD interface options and can be configured once TwinCAT Engineering has been restarted. Then the plugin will be listed.

See also

- Plugin Reference Dialog [▶ 26]
- XCAD Interface Options [▶ 21] Tab
- Configuring plugins [▶ 13]

5 Reference user interface

The TwinCAT 3 XCAD Interface offers various commands and dialogs. These are described below.

5.1 Import via XCAD...

Function: The command opens the standard browser dialog, which can be used to search for and import either a file in AutomationML format or in the old Beckhoff ECAD XML format. The plugins activated in the XCAD Interface Options are then automatically executed.

Call: The command can be called from the context menu of the TwinCAT project under **Import AutomationML** or via the **TwinCAT** item in the menu bar under **AutomationML** and **Import AutomationML**.

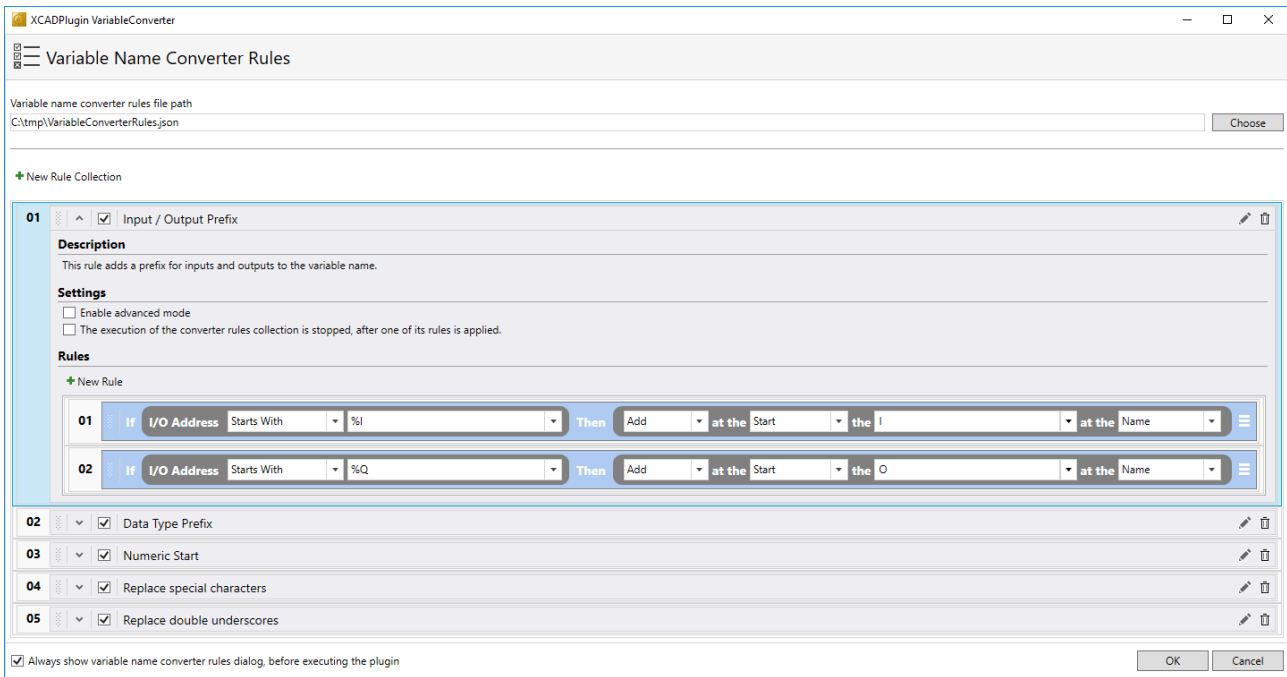**Requirement:** The TwinCAT project is selected in the Solution Explorer.

See also

- Importing topology [▶ 11]
- Dialog: XCAD Interface Options [▶ 21]

5.2 Export via XCAD...

Function: the command opens the standard browse dialog, which can be used to select an existing AML file or create a new one. Confirming the dialog automatically executes the plugins enabled in the XCAD Interface options for exporting the I/O topology.

Call: the command can be called from the context menu of the TwinCAT project under **Export AutomationML** or via the TwinCAT item in the menu bar under **AutomationML** and **Export AutomationML**.

Requirement: the TwinCAT project is selected in the Solution Explorer.

See also

- Dialog: XCAD Interface Options [▶ 21]

5.3 Variable Name Converter Rules

Function: The **Variable Name Converter Rules** dialog displays the rules of the currently selected set of rules. It can be used to select a path to another set of rules or to make final changes to existing rules before import. All changes are adopted in the set of rules when the dialog is confirmed. These rules can also be changed in the Convert PLC variable names [▶ 28] plugin.

Call: The dialog is automatically called when executing the command Import via XCAD... [▶ 18] if the Convert PLC variable names [▶ 28] plugin and the corresponding setting Always show variable name converter rules dialog [▶ 29] have been activated.

Variable name converter rules file path	In this section you can select the path to the file with the JSON format from which the rules for converting variable names will be loaded.
	Note: By default, this path points to the plugin folder in the directory *%USERPROFILE%\Documents\Beckhoff\TE1120 - TC3 XCAD Interface\Plugins*.
☑ / ☐ Always show variable name converter rules dialog, before executing the plugin	Use this checkbox to select whether the **Variable Name Converter Rules** dialog is automatically opened before the plugin is executed.
	• ☑ : The dialog will open automatically.
	• ☐ : The dialog will not open automatically.

Rule collections

✚ New Rule Collection	You can add a new rule collection using this button. The new rule collection is automatically added to the end of the list.
Numbering	The order in which the individual rule collections are executed is shown here. The numbering is derived from the position in the list. You can change the order by dragging and dropping the rule collection to a new position.
⌄ / ⌃	This button allows you to select whether the plugin settings should be displayed or hidden. • ⌄ : The plugin settings are collapsed. Pressing the button expands and displays them. • ⌃ : The plugin settings are expanded. Pressing the button collapses them, so that they are no longer displayed.
☑ / ☐	Use this checkbox to enable or disable the corresponding rule collection. If it is enabled, your rules will be applied automatically when the plugin is executed. • ☑ : The rule collection is enabled. • ☐ : The rule collection is disabled.
Name	The name of the rule collection is displayed here.
✎	With this button you can open a dialog that allows you to adapt the name of the rule collection and change the description.
🗑	With this button you can delete the rule collection including its rules.

Description	Here you will find the short description of the rule collection.
Settings	
☑ / ☐ Enable advanced mode	You can enable the advanced mode with this checkbox. It offers further setting options for the rules. • ☑ : Advanced mode is enabled. • ☐ : Advanced mode is disabled.
☑ / ☐ The execution of the converter rules collection is stopped, after one of its rules is applied.	Use this checkbox to select whether all rules in the rule collection should always be applied or whether execution of the rule collection should be stopped once one of the rules has been applied. • ☑ : Execution is aborted. • ☐ : Execution continues.
Rules	Here you will find a list of all the rules that have been added to the rule collection.

✚ New Rule	You can add a new rule using this button. The new rule is automatically added to the end of the list.
Numbering	The order in which the individual rules are executed is shown here. The numbering is derived from the position in the list. You can change the order by dragging and dropping the rule to a new position.
☰	With this button you can open a menu via which a rule can be deleted or copied. If you copy the rule, the copy will be added to the end of the list.

Predefined rule collections

Input / Output Prefix	The rules of this collection add a defined prefix for inputs and outputs to the variable name.
Data Type Prefix	The rules in this collection add a defined prefix for the variable data type to the variable name.
Numeric Start	The rules of this collection check whether the first character of the variable name is numeric and, if so, add a defined prefix.
Replace special characters	The rules in this collection search for special characters in the variable name and replace them with defined characters.
Replace double underscores	The rules in this collection search for double underscores in the variable name and replace them with single underscores.

Rule types

Each rule is graphically represented as an If-Then construct. With the condition, you can query various attributes (name, comment, data type, I/O address) of the tags from the AML file with the help of various rule types. Depending on the configured condition, you can then influence the name or comment:

- Add: A character string to be defined is added at the start or end.
- Remove: A character string to be defined is deleted at the start or end.
- Find Replace: A search is performed for a character string to be defined, which is then replaced by a second character string to be defined.

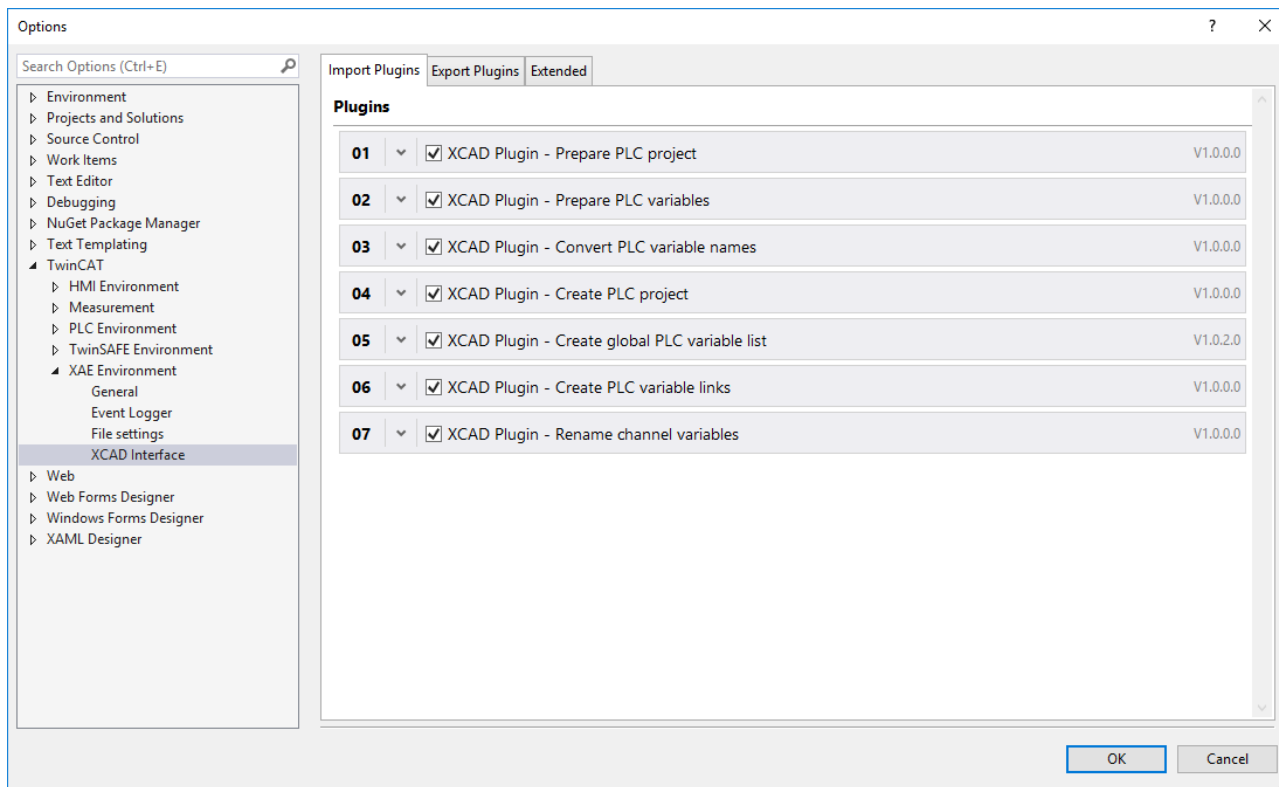**See also**

- Command: Import via XCAD... [▶ 18]
- Plugin: Convert PLC variable names [▶ 28]

5.4   XCAD Interface Options

Function: in the XCAD Interface options you will find all settings of the XCAD Interface and the installed XCAD Interface plugins. The plugins for import and export are each listed in a separate tab. In the third tab you will find the global settings.

Call: open the dialog **Options** in the Visual Studio menu via **Tools** and navigate via **TwinCAT** and **XAE Environment** to the entry **XCAD Interface**.
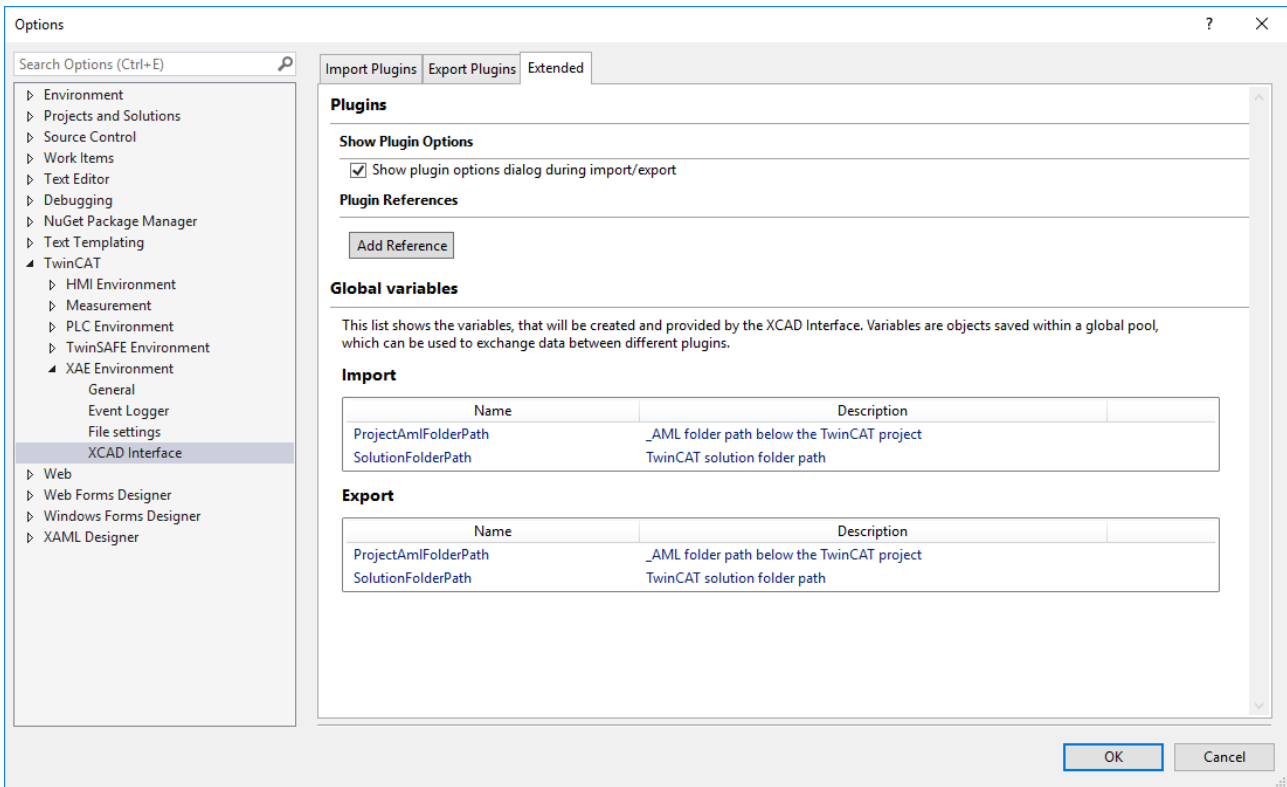
Import / Export Plugins tab

Function: the **Import / Export Plugins** tab displays a list of all import and export plugins and their settings. The position of the plugins in the list corresponds to their execution order, with the topmost plugin being executed first. A description of the plugins can be found in the chapter Reference plugins [▶ 27].

Numbering	The order in which the plugins are executed is shown here. The numbering is derived from the position in the list. You can change the order by dragging and dropping the rule collection to a new position.
	If an error or warning has been found for the plugin, this will be indicated here. • : an error was found. • : a warning was found.
	This button allows you to select whether the plugin settings should be displayed or hidden. • : the plugin settings are collapsed. Pressing the button expands and displays them. • : the plugin settings are expanded. Pressing the button collapses them, so that they are no longer displayed.
	Use this checkbox to enable or disable the corresponding plugin. If it is enabled, it is automatically called up when the **Import AutomationML via XCAD...** command is executed. • : the plugin is enabled. • : the plugin is disabled.
Plugin Name	The name of the plugin is displayed in this section.
Plugin Version	The plugin version is displayed in this section.

Extended tab

Function: general settings and additional information are available in the **Extended** tab.

Plugins

Show plugin options during import/export	This checkbox allows you to select whether a dialog with the plugin options should be displayed when starting the XCAD import/export. In this dialog you can enable and disable the plugins and make settings comparable to the **Plugins** tab in the XCAD options. (See below) • ☑ : the plugin options are opened at the start of the XCAD import/export. • ☐ : the plugin options are not opened at the start of the XCAD import/export.
Add Reference	With this button you can open the Plugin Reference dialog to make new plugins known to the XCAD interface if required.

Global variables

Global variables	This shows a list of variables created by the XCAD interface and made available in a global pool. These variables are used, for example, to exchange information between the different plugins.

See also

- Concept [▶ 9]
- Reference plugins [▶ 27]
- Command: Import via XCAD... [▶ 18]

5.5   Open XCAD Interface Log (local)...

Function: this command opens the log of the last XCAD interface import in the Output window [▶ 24]. If there has not yet been any import into the open TwinCAT project, a corresponding message is displayed.

Call: The command can be called via the **TwinCAT** item in the menu bar under **AutomationML** and **Open Log**.

Requirement: The TwinCAT project is selected in the Solution Explorer and an import has already been carried out via the XCAD interface. In this case, the log in the TwinCAT project path is stored in the _AML folder.

See also

- Command: Import via XCAD... [▶ 18]
- Dialog: Output window [▶ 24]

5.6   Find Log...

Function: The command opens the standard browse dialog, via which any XCAD interface or AML data exchange log file can be opened in the Output window [▶ 24].

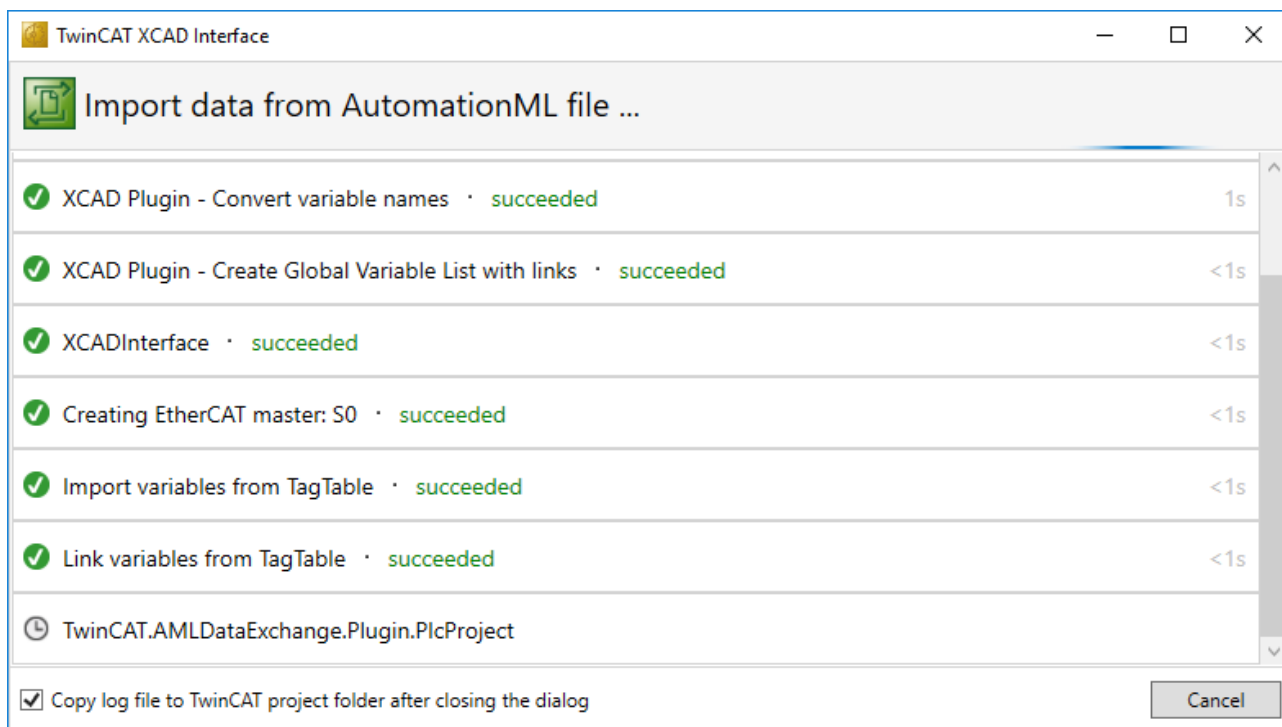**Call:** The command can be called via the **TwinCAT** item in the menu bar under **AutomationML** and **Open Log**.

See also

- Dialog: Output window [▶ 24]

5.7   Output window

Function: In the output window, the log messages output during import or export are summarized in sections. When a section is selected, a detail window opens with all the messages in the section.

Call: The output window is called automatically when importing or exporting. It also opens when a log is called retrospectively via the command Open XCAD Interface Log (local)... [▶ 23] or Find Log... [▶ 24].

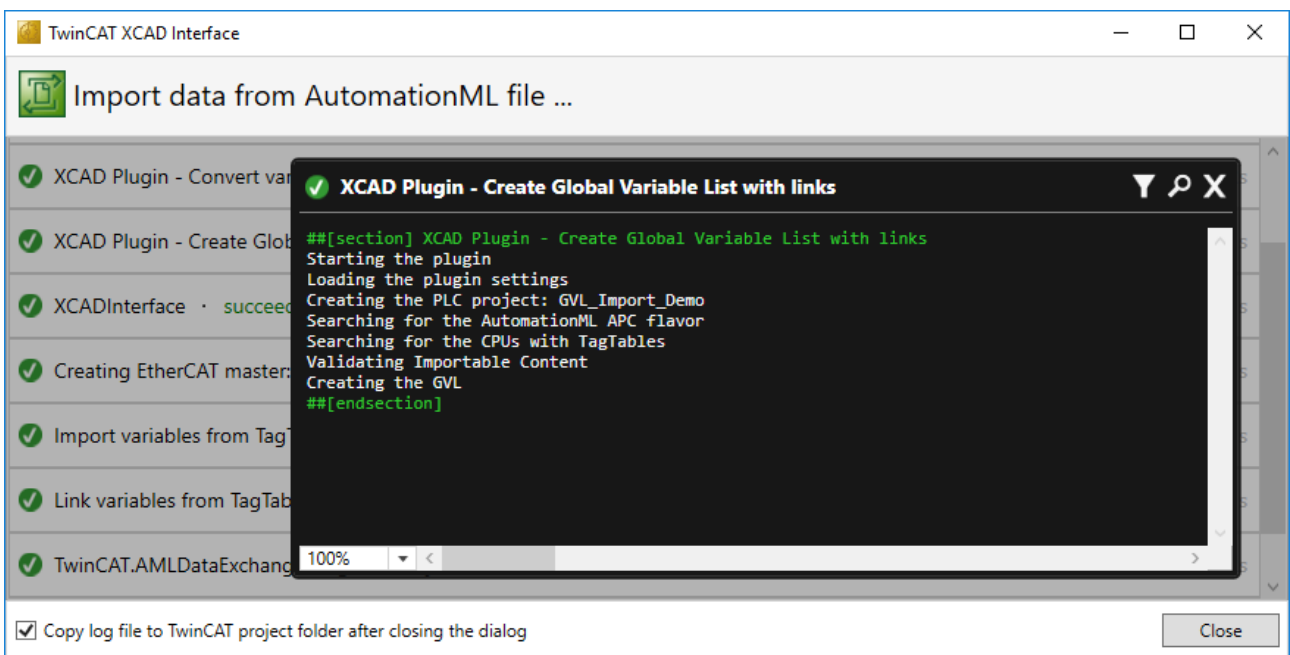|	The state of the section is displayed here.
✅ / ❌ / 🕐	• ✅ : The section has been successfully edited. • ❌ : An error occurred while editing the section. • 🕐 : The section is currently being edited.
Name	The name of the section is displayed here.
Number of messages	The numbers of messages (gray), warnings (orange) and errors (red) are displayed behind the name. The number of messages is only visible as long as the mouse pointer is on the section. "Succeeded" is displayed as long as no error has been output.
Time	The time it took to edit the section is displayed here.
☑ / ☐ Copy log file after closing the dialog	Here you can choose whether the XCAD interface should copy the log file to the _AML folder in the project directory after closing the dialog.

	With this button you can display the selection of other information.
▼ (filter)	• ☑ / ☐ Name: Instance that output the message • ☑ / ☐ Date: Date of the message • ☑ / ☐ Time: Time of the message
🔍 (search)	With this button you can open a search box in which you can enter search terms. You can then search for these search terms in the section.

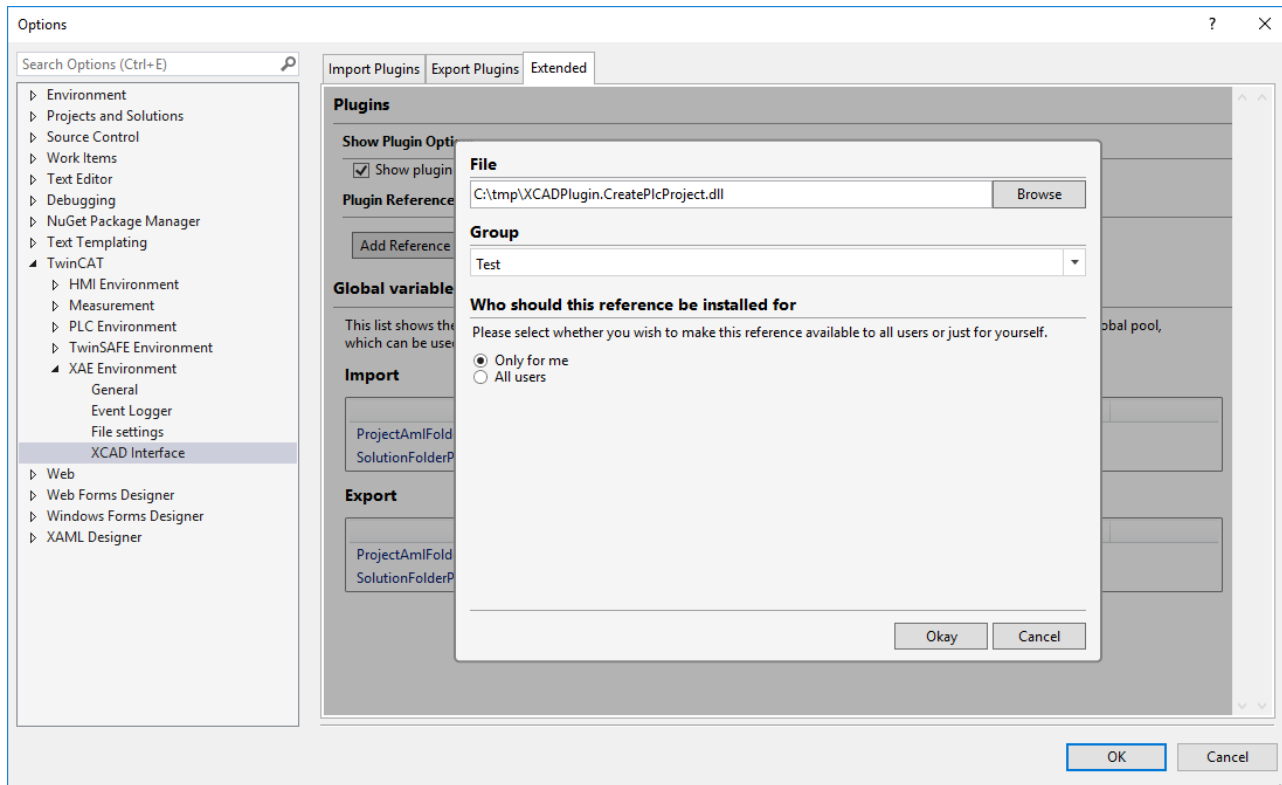**See also**

- Command: Import via XCAD... [▶ 18]
- Command: Open XCAD Interface Log (local)... [▶ 23]
- Command: Find Log... [▶ 24]

5.8   Plugin Reference Dialog

Function: using the Plugins Reference dialog, you can add a new reference to a Plugin Dll. This is displayed in the plugin list after a restart of TwinCAT Engineering.

Call up: in the Visual Studio menu, open the **Options** dialog via **Tools**. Navigate to the entry **XCAD Interface** via **TwinCAT** and **XAE Environment**. Then switch to the **Plugins** tab and press the **Add Reference** button.

File	Use the **Browse** button to open the standard browse dialog to select a plugin Dll.
Group	This drop-down menu allows you to select an existing group or define a new group to which the plugin reference should be added.
Who should this reference be installed for	Here you can choose whether the new plugin reference should only be added for the account currently logged in or for all accounts. • Only for me: the plugin reference is only added for the account that is currently logged in. • All users: the plugin reference is added for all accounts.

See also

- Add Plugin reference [▶ 16]

6   Reference plugins

With the TwinCAT 3 XCAD interface, various plugins are available, with the help of which additional functionalities can be executed during import but also during export of the AML file. All available plugins are listed in the XCAD interface options on the XCAD Interface Options [▶ 21] tab, where they can be enabled or disabled and adjusted. The activated plugins are executed fully automatically according to the order in the list when calling the Import via XCAD… [▶ 18] or Export via XCAD… [▶ 18] command. In the following chapters you will find the description of the plugins.

See also
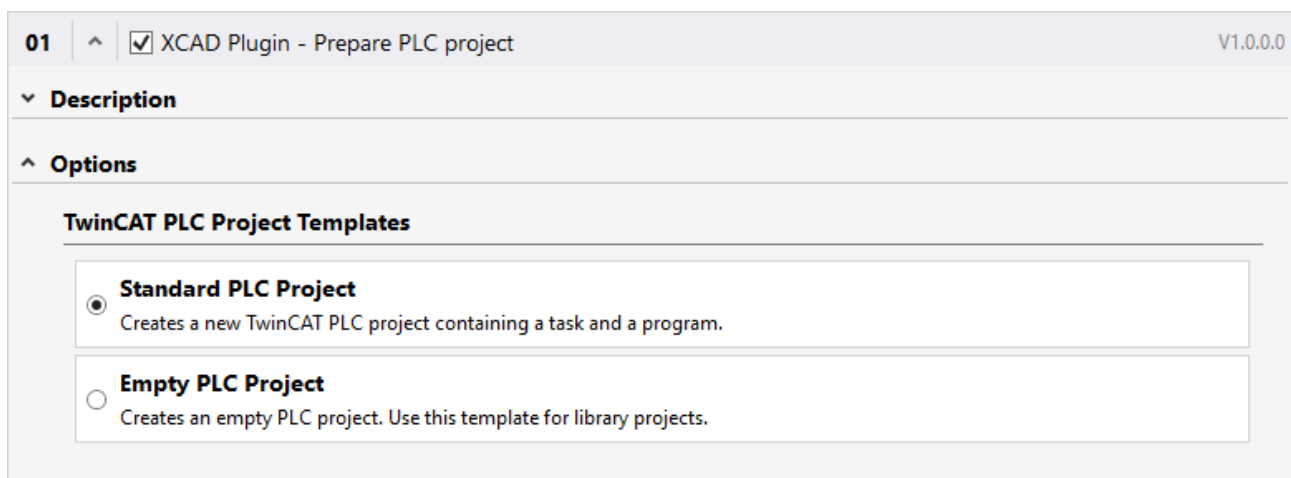
- Concept [▶ 9]
- Workflow [▶ 11]

6.1   Prepare PLC project

Function: the "Prepare PLC project" plugin defines the TwinCAT PLC project template, which is used as a basis when automatically creating the PLC project, and makes this information available to all subsequent plugins.

Generated variables:

PlcProjectTemplateName	TwinCAT PLC Project Template Name

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

Options

TwinCAT PLC Project Templates	These radio buttons allow you to select the PLC project template that will be used as the basis when automatically creating the PLC project:
	1. Standard PLC Project: the "Standard PLC Project" is used as a basis.
	2. Empty PLC Project: the "Empty PLC Project" is used as a basis.

See also

- Concept [▶ 9]
- Dialog: XCAD Interface Options [▶ 21]
- Command: Import via XCAD… [▶ 18]

6.2   Prepare PLC variables

Function: the "Prepare PLC variables" plugin loads the information of all tags of the tag tables in the AML file and prepares the corresponding PLC variables on this basis. The tags are then made available to all following plugins together with the PLC variables.

Generated variables:

PlcVariableList	Dictionary of the tags from the tag tables of the AML file with the associated PLC variables

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

See also

- Concept [▶ 9]

- Dialog: XCAD Interface Options [▶ 21]

- Command: Import via XCAD… [▶ 18]

6.3   Convert PLC variable names

Function: the plugin "Convert PLC variable names" converts the names of the tags from the tag tables of the AML file to a valid PLC variable name. This is done using the conversion rules listed under **Options**, which you can adapt and expand there using the built-in editor. It is necessary to run the "Prepare PLC variables [▶ 28]" plugin beforehand, as it provides the PlcVariableList variable on which the converter is based.

Used variables:

PlcVariableList	Dictionary of the tags from the tag tables of the AML file with the associated PLC variables

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

Options

The variable names derived from the tag names can be automatically adjusted using the integrated variable name converter. A set of rules is used for the adjustments, which is saved in JSON format by default under *%userprofile%\Documents\Beckhoff\TE1120 - TC3 XCAD Interface\Plugins\XCADPlugins.CreateGVLWithLinks*. The storage location is freely customizable [▶ 13].

The rules contained in the set of rules can be displayed and changed here in the options of the plugin as well as in the Variable Name Converter Rules [▶ 18] dialog. The rulebook can also be adapted at file level in the rule file.

Enable extended debug information	Use this checkbox to select whether to output additional information about the name before and after conversion: • ☑ : detailed information is output. • ☐ : only errors and warning are output.
☑ / ☐ Always show variable name converter rules dialog, before executing the plugin	Use this checkbox to select whether the **Variable Name Converter Rules** dialog is automatically opened before the plugin is executed. • ☑ : the dialog will open automatically. • ☐ : the dialog will not open automatically.
Variable name converter rules file path	In this section you can select the path to the file with the JSON format from which the rules for converting variable names will be loaded. **Note:** By default, this path points to the plugin folder in the directory *%USERPROFILE%\Documents\Beckhoff\TE1120 - TC3 XCAD Interface\Plugins*.

See also

6.4 Create PLC project

Function: the "Create PLC project" plugin creates a PLC project with the name specified in the options in PLCopen XML format, which is later automatically added to the TwinCAT project, and makes the project available to all subsequent plugins.

Generated variables:

PlcOpenXmlProject	PLC project in PLCopen XML format

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

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∨ **Description**

∧ **Options**

TwinCAT PLC project name

This setting defines the name of the automatically generated TwinCAT PLC project.

○ Use the automation project name in the AML file as the PLC project name

◉ Use the following default name as the PLC project name

    XCAD PLC Project

Options

TwinCAT PLC project name	Via these radio buttons you can select which name should be used for the automatically generated TwinCAT PLC project: 1. The PLC project name corresponds to the Automation Project name specified in the AML file. 2. The PLC project name corresponds to the name specified in the following field.

Also see about this

📄 XCAD Interface Options [▶ 21]

6.5 Create global PLC variable list

Function: the "Create global PLC variable list" plugin optionally adds only one global variable list or a separate global variable list for each tag table in the AML file, if several exist. In the first case all PLC variables are added to the one variable list. In the second case, the PLC variables are distributed according to the affiliation of their tags to the tag tables.
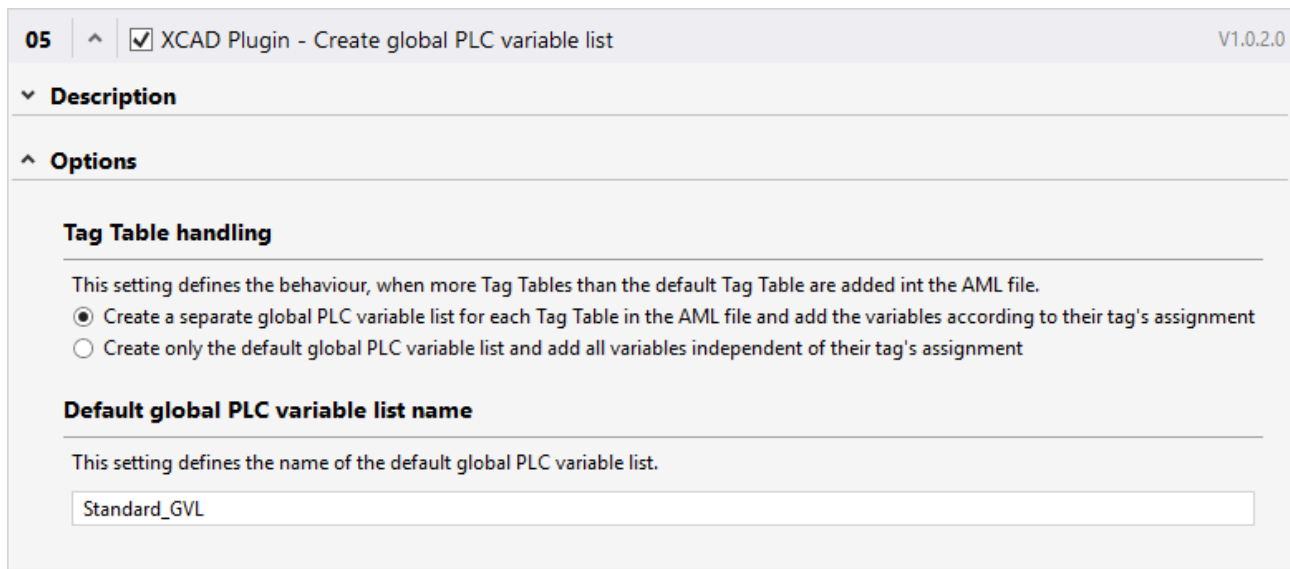
For the default tag table named "TagTable" you can predefine the name of the corresponding global variable list. For all other variable lists the Table-Name tag is used automatically.

It is necessary to run the "Prepare PLC variables [▶ 28]" and "Create PLC project [▶ 30]" plugins beforehand, as they provide the first two of the variables mentioned below.

Used variables:

PlcVariableList	Dictionary of the tags from the tag tables of the AML file with the associated PLC variables
PlcOpenXmlProject	PLC project in PLCopen XML format
SolutionFolderPath	Path to the TwinCAT Solution folder
ProjectAmlFolderPath	Path to the _AML folder below the project
XCAD_DTE	XCAD DTE Analyzer

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

Options

Tag Table handling	Via these radio buttons you can select whether a separate global variable list for each tag table or only a global variable list should be added to the PLC project:
	1. A separate global variable list is added for each tag table in the AML file and the PLC variables are distributed according to the assignment of their tags.
	2. Only one global variable list is created and all PLC variables are added to this list.
Default global PLC variable list name	Here you can specify the name to be used for the global variable list of the default tag table named "TagTable".

See also

- Concept [▶ 9]
- Dialog: XCAD Interface Options [▶ 21]
- Command: Import via XCAD... [▶ 18]
- Plugin: Prepare PLC variables [▶ 28]
- Plugin: Create PLC project [▶ 30]

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6.6 Create PLC variable links

Function: the "Create PLC variable links" plugin creates the links between the process image variables of the PLC project and the channel variables of the I/O topology. It is necessary to run the "Prepare PLC variables [▶ 28]" plugin beforehand, as it provides the PlcVariableList variable on which the linking is based.

Used variables:

PlcVariableList	Dictionary of the tags from the tag tables of the AML file with the associated PLC variables
XCAD_DTE	XCAD DTE Analyzer

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

See also

- Concept [▶ 9]

- Dialog: XCAD Interface Options [▶ 21]

- Command: Import via XCAD... [▶ 18]

- Plugin: Prepare PLC variables [▶ 28]

6.7 Rename channel variables

Function: the "Rename channel variables" plugin renames all channel variables of the I/O topology that are associated with a tag in the AML file. For renaming, the name of the corresponding tag is used. In addition, the comment of this tag is set as the comment of the channel variable.

Used variables:

XCAD_DTE	XCAD DTE Analyzer

Calling up the settings: open the dialog XCAD Interface Options [▶ 21] and switch to the XCAD Interface Options [▶ 21] tab.

See also

- Concept [▶ 9]

- Dialog: XCAD Interface Options [▶ 21]

- Command: Import via XCAD... [▶ 18]

More Information:
www.beckhoff.com/te1120