# EcoStruxure™ Control Engineering Documentation

## User Guide

**Original instructions**

**Schneider Electric**

# Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this document are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owner.

This document and its content are protected under applicable copyright laws and provided for informative use only. No part of this document may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the document or its content, except for a non-exclusive and personal license to consult it on an "as is" basis.

Schneider Electric reserves the right to make changes or updates with respect to or in the content of this document or the format thereof, at any time without notice.

**To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this document, as well as any non-intended use or misuse of the content thereof.**

# Table of Contents

# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

| ⚠ DANGER |
|---|
| **DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury. |

| ⚠ WARNING |
|---|
| **WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury. |

| ⚠ CAUTION |
|---|
| **CAUTION** indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury. |

| *NOTICE* |
|---|
| *NOTICE* is used to address practices not related to physical injury. |

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

## Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

> ## ⚠ WARNING
>
> **UNGUARDED EQUIPMENT**
>
> - Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
>
> - Do not reach into machinery during operation.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

> **NOTE:** Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

# Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check are made and that enough time is allowed to perform complete and satisfactory testing.

> ## ⚠ WARNING
>
> **EQUIPMENT OPERATION HAZARD**
>
> - Verify that all installation and set up procedures have been completed.
>
> - Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
>
> - Remove tools, meters, and debris from equipment.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

**Software testing must be done in both simulated and real environments.**

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

• Remove tools, meters, and debris from equipment.

• Close the equipment enclosure door.

• Remove all temporary grounds from incoming power lines.

• Perform all start-up tests recommended by the manufacturer.

# Operation and Adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-1995:

(In case of divergence or contradiction between any translation and the English original, the original text in the English language will prevail.)

• Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.

• It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.

• Only those operational adjustments required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

# About the Document

## Document Scope

The present user guide describes the functionality provided by EcoStruxure Control Engineering - Documentation.

## Validity Note

This document has been updated for the release of EcoStruxure Control Engineering V25.0.

## Product Related Information

| ⚠ **WARNING** |
| --- |
| **LOSS OF CONTROL** |
| • Perform a Failure Mode and Effects Analysis (FMEA), or equivalent risk analysis, of your application, and apply preventive and detective controls before implementation. |
| • Provide a fallback state for undesired control events or sequences. |
| • Provide separate or redundant control paths wherever required. |
| • Supply appropriate parameters, particularly for limits. |
| • Review the implications of transmission delays and take actions to mitigate them. |
| • Review the implications of communication link interruptions and take actions to mitigate them. |
| • Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and error conditions) according to your risk assessment, and applicable codes and regulations. |
| • Apply local accident prevention and safety regulations and guidelines.[1] |
| • Test each implementation of a system for proper operation before placing it into service. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

> **⚠ WARNING**
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> - Perform a risk assessment as per ISO 12100 and/or other equivalent assessment in view of your use of EcoStruxure Control Engineering.
>
> - In your risk assessment, consider all applicable regulations and standards that apply to your development process and to your machine/process.
>
> - Verify that your use of EcoStruxure Control Engineering is fully covered in the definition of your software development process and that your software development process meets all applicable regulations and standards.
>
> - After modifications of any type whatsoever to the source code of your application resulting from your use of EcoStruxure Control Engineering, commission or recommission the machine/process in compliance with all regulations, standards, and process definitions applicable to your machine/process.
>
> - During commissioning or recommissioning of the machine/process, verify the correct operation and effectiveness of all safety-related functions and non-safety-related functions by performing comprehensive tests for all operating states, for the defined safe state of your machine/process, and for all potential error situations.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

No tool can provide analysis procedures for all potential types of code and methods of creating code. For example, a code block in your source code may be semantically invalid, but syntactically correct. The tool may not be able to detect such a condition.

Software development environments may provide code protection features intended to, for example, block access to intellectual property. Unlock such protected code blocks in your software development environment before creating export files to be used with EcoStruxure Control Engineering.

> **⚠ WARNING**
>
> **INCORRECT OR INCOMPLETE SOURCE CODE ANALYSIS**
>
> - In your risk assessment, consider all potential effects of inappropriate, incorrect, or incomplete input files used with EcoStruxure Control Engineering.
>
> - Verify that the source code exported from your software development environment and to be used by EcoStruxure Control Engineering is complete and up to date.
>
> - After modifications of any type whatsoever to the source code of your application resulting from your use of EcoStruxure Control Engineering, verify the correctness of the modified source code.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

# General Cybersecurity Information

In recent years, the growing number of networked machines and production plants has seen a corresponding increase in the potential for cyber threats, such as unauthorized access, data breaches, and operational disruptions. You must, therefore, consider all possible cybersecurity measures to help protect assets and systems against such threats.

To help keep your Schneider Electric products secure and protected, it is in your best interest to implement the cybersecurity best practices as described in the Cybersecurity Best Practices document.

Schneider Electric provides additional information and assistance:

- Subscribe to the Schneider Electric security newsletter.
- Visit the Cybersecurity Support Portal web page to:
  ◦ Find Security Notifications.
  ◦ Report vulnerabilities and incidents.
- Visit the Schneider Electric Cybersecurity and Data Protection Posture web page to:
  ◦ Access the cybersecurity posture.
  ◦ Learn more about cybersecurity in the cybersecurity academy.
  ◦ Explore the cybersecurity services from Schneider Electric.

# Product Related Cybersecurity Information

Machines, controllers, and related equipment are usually integrated into networks. Unauthorized persons and malware may gain access to the machine as well as to other devices on the network/fieldbus of the machine and connected networks because of insufficiently secure access to software and networks.

Schneider Electric adheres to industry best practices in the development and implementation of control systems. This includes a "Defense-in-Depth" approach to secure an Industrial Control System. This approach places the controllers behind one or more firewalls to restrict access to authorized personnel and protocols only.

---

## ⚠ WARNING

**UNAUTHENTICATED ACCESS AND SUBSEQUENT UNAUTHORIZED MACHINE OPERATION**

- Evaluate whether your application environments are connected to your critical infrastructure and, if so, take appropriate steps in terms of prevention, based on Defense-in-Depth, before connecting the automation system to any network.
- Limit the number of devices connected to a network to the minimum necessary.
- Isolate your industrial network from other networks inside your company.
- Protect any network against unintended access by using firewalls, VPN, or other, proven security measures, such as an Intrusion Prevention System or Intrusion Detection System.
- Monitor activities within your systems.
- Prevent subject devices from direct access or direct link by unauthorized parties or unauthenticated actions.
- Install certificates that are issued by publicly known Trusted Certificate Authorities.
- Keep your systems up-to-date and rely only on legitimate sources.
- Prepare a recovery plan including backup of your system and process information.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

---

For more information on organizational measures and rules covering access to infrastructures, refer to ISO/IEC 27000 series, Common Criteria for Information Technology Security Evaluation, ISO/IEC 15408, IEC 62351, ISA/IEC 62443, NIST Cybersecurity Framework, Information Security Forum - Standard of Good Practice for Information Security, and refer to Cybersecurity Guidelines for EcoStruxure Machine Expert, Modicon and PacDrive Controllers and Associated Equipment.

For reasons of Internet security, for those devices that have a native Ethernet connection, TCP/IP forwarding is disabled by default. Therefore, you must manually enable TCP/IP forwarding. However, doing so may expose your network to possible cyberattacks if you do not take additional measures to protect your enterprise. In addition, you may be subject to laws and regulations concerning cybersecurity.

---

## ⚠ WARNING

**UNAUTHENTICATED ACCESS AND SUBSEQUENT NETWORK INTRUSION**

- Observe and respect any and all pertinent national, regional and local cybersecurity and/or personal data laws and regulations when enabling TCP/IP forwarding on an industrial network.
- Isolate your industrial network from other networks inside your company.
- Protect any network against unintended access by using firewalls, VPN, or other, proven security measures.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

---

Consult the Schneider Electric Cybersecurity Best Practices for additional information.

# Available Languages of the Document

The document is available in these languages:

- English (EIO0000004426)
- French (EIO0000004774)

# Related Documents

| Title of documentation | Reference number |
|---|---|
| EcoStruxure Control Engineering - Converter - User Guide | EIO0000004425 (eng)<br>EIO0000004773 (fre) |
| EcoStruxure Control Engineering - Verification - User Guide | EIO0000004424 (eng)<br>EIO0000004772 (eng) |
| EcoStruxure Control Engineering - Monitoring - User Guide | EIO0000004427 (eng)<br>EIO0000004775 (fre) |
| Cybersecurity Best Practices | 7EN52-0390 |
| EcoStruxure Control Engineering, Hardening Guide | EIO0000004982 (eng) |

To find documents online, visit the Schneider Electric download center (www.se.com/ww/en/download/).

# Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

# Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in the information contained herein, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as *safety*, *safety function*, *safe state*, *fault*, *fault reset*, *malfunction*, *failure*, *error*, *error message*, *dangerous*, etc.

Among others, these standards include:

| Standard | Description |
| --- | --- |
| IEC 61131-2:2007 | Programmable controllers, part 2: Equipment requirements and tests. |
| ISO 13849-1:2023 | Safety of machinery: Safety related parts of control systems. General principles for design. |
| EN 61496-1:2013 | Safety of machinery: Electro-sensitive protective equipment. Part 1: General requirements and tests. |
| ISO 12100:2010 | Safety of machinery - General principles for design - Risk assessment and risk reduction |
| EN 60204-1:2006 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |
| ISO 14119:2013 | Safety of machinery - Interlocking devices associated with guards - Principles for design and selection |
| ISO 13850:2015 | Safety of machinery - Emergency stop - Principles for design |
| IEC 62061:2021 | Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems |
| IEC 61508-1:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements. |
| IEC 61508-2:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems. |
| IEC 61508-3:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements. |
| IEC 61784-3:2021 | Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions. |
| 2006/42/EC | Machinery Directive |
| 2014/30/EU | Electromagnetic Compatibility Directive |
| 2014/35/EU | Low Voltage Directive |

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

| Standard | Description |
| --- | --- |
| IEC 60034 series | Rotating electrical machines |
| IEC 61800 series | Adjustable speed electrical power drive systems |
| IEC 61158 series | Digital data communications for measurement and control – Fieldbus for use in industrial control systems |

Finally, the term *zone of operation* may be used in conjunction with the description of specific hazards, and is defined as it is for a *hazard zone* or *danger zone* in the *Machinery Directive* (*2006/42/EC*) and *ISO 12100:2010*.

**NOTE:** The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.

# Introduction to EcoStruxure Control Engineering - Documentation

EcoStruxure Control Engineering - Documentation is a reverse engineering tool for controller applications that analyzes the source code and documents controller application information from existing source code. The tool generates an abstract representation of the program in the form of dependency trees and cross-references, to help you to understand the controller application even if you are unfamiliar with the system.

Because the documentation is generated from the source code, it is coherent with the given version of the controller application. Therefore, the tool can provide access to up-to-date program information even if the original paper documentation is out of date.

The documentation generated automatically by the tool includes two dynamic representations of the control program in the form of flow diagrams:

- A control flow for the procedures (call tree)
- A data flow for the variables

These representations support you in, among others, the following tasks:

- Re-documentation: Create a representation of the **structure** of the controller application.
- Design recovery: Support the understanding of the **functionality** of the controller application.

EcoStruxure Control Engineering - Documentation is a Software as a Service (SaaS) tool accessible using a web browser. It is an agnostic tool and supports controller applications written for a variety of controller types and models such as EcoStruxure™ Control Expert (formerly Unity Pro), EcoStruxure™ Machine Expert, PL7-PRO, Siemens TIA Portal, Siemens Simatic Step 7, Rockwell Automation® RSLogix 5000®.

In terms of Web Content Accessibility Guidelines (WCAG), the software meets level AA.

# Registration, Login, Account Settings, Licenses and Sessions

## Registration

### Overview

The EcoStruxure Control Engineering tools are accessible using the cloud version or using a dedicated server for your organization.

The URL of the cloud version is https://ecostruxure-control-engineering.se.app/.

If a dedicated server has been set up for your organization, the URL is available from your system administrator.

In both cases, you must create a user account to use the tools.

### Browser Compatibility

The following web browsers are supported:

- Mozilla Firefox from version 102
- Google Chrome from version 127
- Microsoft Edge from version 127
- Apple Safari from version 17

### Account Types

The following types of accounts are available:

- For the cloud version: Schneider Electric Account
- For the dedicated server version: EcoStruxure Control Engineering Account

### Registration with the Cloud Version

Registration procedure:

| Step | Action |
|------|--------|
| 1 | Go to https://ecostruxure-control-engineering.se.app/. |
| 2 | Click **Use a Schneider Electric Account**. |
| 3 | Click **Register**. |
| 4 | Enter your registration information and complete the registration by following the on-screen instructions. |

### Registration with the Dedicated Server Version
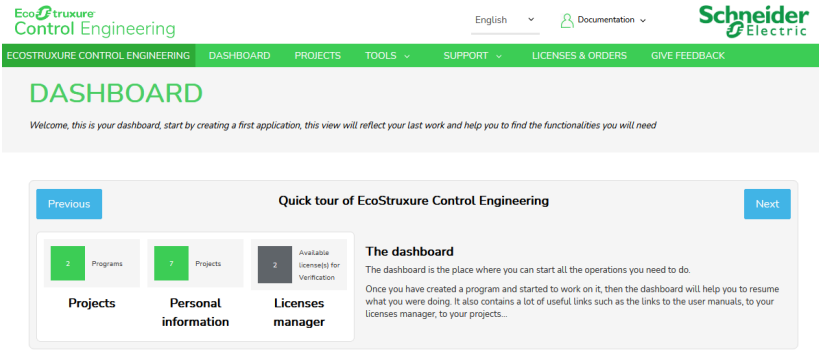
Contact your system administrator to coordinate the registration before you begin the registration procedure.

Registration procedure:

| Step | Action |
|------|--------|
| 1 | In your browser, go to the URL of the dedicated server. |
| 2 | Click **Sign up**. |
| 3 | Fill in the form with your first and last names, your phone number, your e-mail address (which is used as your identifier) and select a password. Password requirements:<br>• At least one uppercase character<br>• At least one lowercase character<br>• At least one numerical character<br>• At least one special character (such as "{", "/", "$" )<br>• Password length at least 12 characters |
| 4 | Read the *Terms and Conditions* and, if you agree, select **I agree to the Terms and Conditions**. |
| 5 | Click **Sign Up**.<br><br>**Result**: If the dedicated server version is configured to send emails, a verification e-mail is sent to you. If the dedicated server version is not configured to send emails, your account is activated immediately. |
| 6 | If the verification e-mail is sent to you: The email contains a link that you must follow.<br><br>**Result**: Your account is activated. |
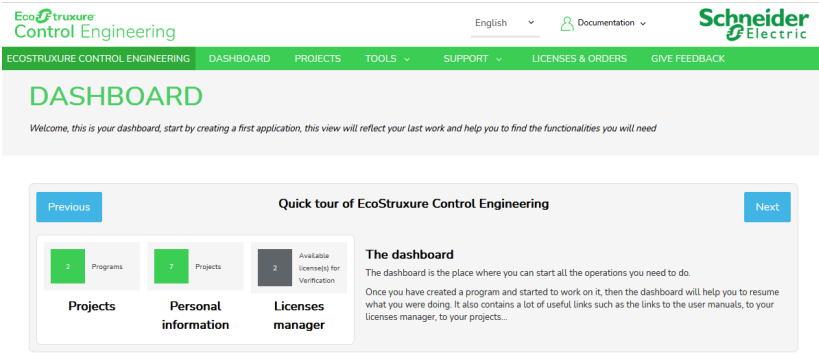
# Login

## Logging into the Cloud Version Using a Schneider Electric Account

| Step | Action |
|---|---|
| 1 | When your registration on the Schneider Electric account is completed and your account is ready, go to https://ecostruxure-control-engineering.se.app/. |
| 2 | Click **Use a Schneider Electric Account**. |
| 3 | Enter your email address, click **Next** and then enter your password.<br><br>**Result**: After validation, you are redirected to your dashboard.<br><br> |

NOTE: If you use an EcoStruxure Control Engineering account but want to migrate to a Schneider Electric account, create a Schneider Electric user account that uses the same email address as your EcoStruxure Control Engineering account. After the first login with a Schneider Electric account, subsequent logins must be completed using your Schneider Electric account. For more information on Schneider Electric accounts, contact your local Schneider Electric service representative.

## Logging into the Dedicated Server Version Using an EcoStruxure Control Engineering Account

| Step | Action |
|---|---|
| 1 | In your browser, go to the URL of the dedicated server. |
| 2 | Enter your email address and password. |
| 3 | Click **Login**.<br><br>**Result**: After validation, you are redirected to your dashboard.<br><br> |

# Account Settings

## Account Settings if a Schneider Electric Account is Used

The **Settings** page lets you access the personal information of the account and the global EcoStruxure Control Engineering platform settings.

| Step | Action |
|------|--------|
| 1 | In the **Dashboard** window, click  . <br><br> **Result**: A menu is displayed. |
| 2 | Click **Settings**. <br><br> **Result**: The **Settings** page is displayed. |

The **Schneider Electric Profile** tab displays personal information such as your identity, phone number and country. To update this information, you must edit your Schneider Electric profile.

The **Third-Party Apps Settings** tab allows you to generate a password (also referred to as "Token", depending on the third-party software) to connect your application to EcoStruxure Control Engineering if your application does not support the Schneider Electric account authentication.

The **Notifications** tab allows you to configure the type of email notifications sent to you by the web platform. For example, you can choose to receive a confirmation email after a controller code analysis.

The **View Settings** tab allows you to select the default view for projects.

The **Privacy** tab provides general information on privacy and on the cookies policy. It describes how personal data is used and how you can exercise your rights relating to personal data. In addition, you can delete your personal data.

The **Accessibility** tab allows you to adapt the on-screen representation to your personal needs, for example, **Light mode**/**Dark mode** or themes for color-blindness. Themes can also be selected in the dashboard by clicking **Themes** at the top right.

## Account Settings if an EcoStruxure Control Engineering Account is Used

The **Settings** page helps you to access the personal information of the account and the global EcoStruxure Control Engineering platform settings.

| Step | Action |
|------|--------|
| 1 | In the **Dashboard** window, click  . <br><br> **Result**: A menu is displayed. |
| 2 | Click **Settings**. <br><br> **Result**: The **Settings** page is displayed. |

The **Profile** tab displays personal information such as your identity, phone number and country. You can update this information at any time.

The **Password** tab provides the password change form. You can change your password at any time.

The **Notifications** tab allows you to configure the type of email notifications sent to you by the web platform. For example, you can choose to receive a confirmation email after a controller code analysis.

The **View Settings** tab allows you to select the default view for projects.

The **Privacy** tab provides general information on privacy, company-specific information on privacy (if available), and information on the cookies policy. It describes how personal data is used and how you can exercise your rights relating to personal data. In addition, you can delete your personal data.

The **Accessibility** tab allows you to adapt the on-screen representation to your personal needs, for example, **Light mode**/**Dark mode** or themes for color-blindness. Themes can also be selected in the dashboard by clicking **Themes** at the top right.

# Licenses

## General

Schneider Electric offers various license plans for EcoStruxure Control Engineering tools.

## Paid License Plans

Contact your local Schneider Electric service representative for details on the available license plans for EcoStruxure Control Engineering tools. A selection of licenses is also directly available from Schneider Electric Software Shop Catalog at https://www.se.com/us/en/shop/software/?offerid=ECEE.

## Free Trial Licenses

As of version 22.1 of EcoStruxure Control Engineering, free trial licenses are available to help you evaluate the EcoStruxure Control Engineering tools after you have created a user account. A trial license allows you to work with many of the functions of the EcoStruxure Control Engineering tool. The number of results provided by the tools and the available functions are limited if you use a trial license. You can upgrade a trial license to a paid license.

## Overview of Your Paid Licenses, Your Orders And Your Contract

In the main menu click **LICENSES & ORDERS** to get an overview of your paid licenses, your orders and your contract.

The overview contains three tabs:

- The **Licenses** tab contains a list of your available licenses.
- The **Orders** tab contains a list of your orders.
- The **Contract** tab contains details of your contract.

## Licenses Tab

The **Licenses** tab contains a list of licenses associated with your account. The list contains information such as license ID, name and type.

The buttons **Buy New Licenses On Schneider Electric Software Shop** (cloud version) and **Order Licenses** (dedicated server version) allows you to buy additional licenses.

- If you use the cloud version, the **Buy New Licenses On Schneider Electric Software Shop** button opens the Schneider Electric Software Shop Catalog (https://www.se.com/us/en/shop/software/?offerid=ECEE). After the checkout process, your licenses are automatically added to your account (within approximately 30 minutes).

- If you use the dedicated server version, the **Order Licenses** button opens a wizard. With the wizard you can add the licenses you want to buy. At the end of the process, you must download the license request file and send it to your local Schneider Electric service representative. The local Schneider Electric service representative then sends you a license file. You must install the license file manually using the **Install Licenses** button.

The **Quick Filters** button allows you to filter your licenses. The licenses can be filtered by logic controller brand or by expiration date (licenses that expire within the next three weeks).

The **Transfer Licenses** button allows you to transfer one or more licenses to a different user. A license can only be transferred if the license has not yet been used, has not expired and is not currently associated to a program.

# Orders Tab

The **Orders** tab contains a list of orders associated with your account. The list contains information such as name, status and description.

The details of an order can be displayed by clicking the name of an order.

Information for each order:

- The **Overview** tab shows details on the person who created the order and the state of the order.
- The **Order content** tab shows details on the ordered products.
- The **Licenses** tab shows a list of the associated licenses.

If you use the dedicated server version, this tab allows you to download once again the license request file for orders created via the wizard.

# Contract Tab

The **Contract** tab contains details of your contract. A contract allows you to provide seat licenses for a group of users and to set default **Glips versions**.

The **Summary** button provides a summary of your contract (contract name, description, contract manager, company and subscribed products) and a list of the members of the contract.

The **Repository** button shows a list of files that are shared between the contract members, for example, the rules file.

As a contract manager, you can do the following:

- The buttons **Reporting > Activity summary** and **Reporting > History** show usage statistics of the contract members.
- The **Administrate > Contract members** button allows you to add and remove contract members.
- The **Administrate > Default Glips versions** button allows you to set the default **Glips version** for each use case. Verify that the **Glips version** you select meets your requirements and matches the specifics of the input code.

# Sessions

## Automatic Log-Out (Session Time-Out)

After 11 minutes of inactivity in an EcoStruxure Control Engineering session, you are automatically logged out. If you work with multiple browser tabs, the most recent activity in any of the tabs applies. For example, if you work in tab 1, but not in tab 2, tab 2 does not disconnect you because there is activity in tab 1.
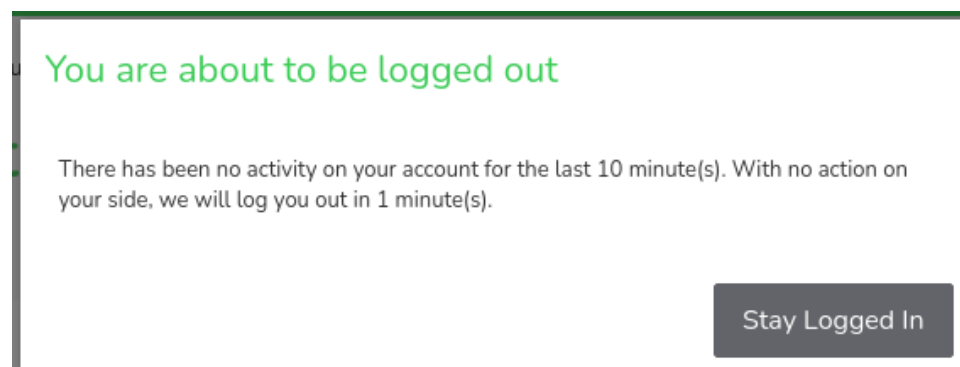


## Multiple Sessions

If your credentials are used in multiple sessions, you receive a notification. For example, if you are logged in and another session is established with the same credentials, you receive the following message:
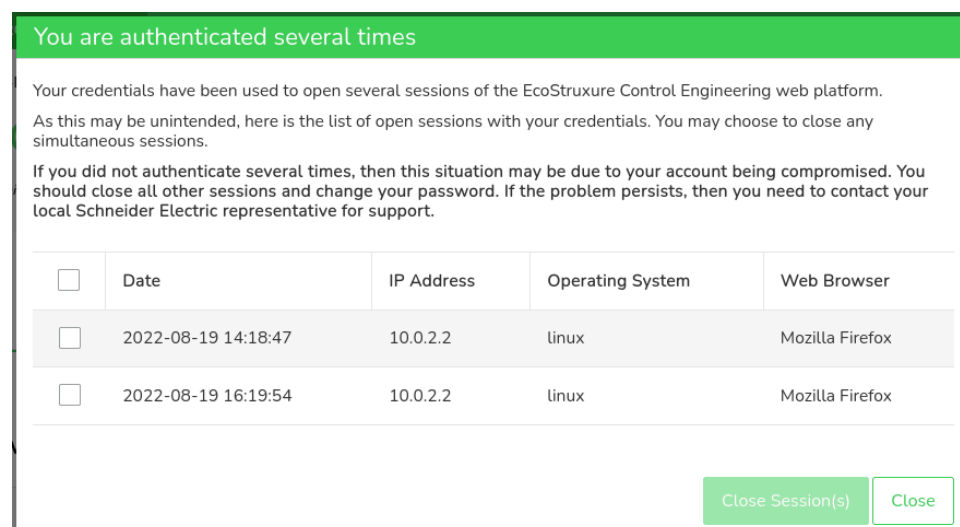


The information on the connection date and time, the IP address, the operating system and the browser help you to determine whether or not a session is legitimate. You can select and close a session with **Close Session(s)**.

# Creating Projects and Programs

## Introduction to Projects and Programs

### Overview

EcoStruxure Control Engineering provides projects and programs for you to organize your work.

A project is a type of container that can hold programs. A project is not specific to an EcoStruxure Control Engineering tool.

When you register with EcoStruxure Control Engineering, the platform provides one default project for you.

A program is assigned to a project. A program is created in conjunction with one of the tools provided by EcoStruxure Control Engineering. A program typically comprises metadata you entered during its creation, the uploaded source code of a controller application, and the results generated with the EcoStruxure Control Engineering tools.

The EcoStruxure Control Engineering tools are launched from within a program. Whether or not a specific EcoStruxure Control Engineering tool is available for a program depends on the source controller/development environment you select during the creation of the program (**PLC Brand** or **PLC source brand**).

Programs can be shared with other users.

### Example

Assume you have been assigned the task of improving a machine ABC with two controllers X and Y. In a first step, you want a deeper understanding of the code of the two controller applications. You create a project "Machine ABC". Then you add two programs to this project: "Controller X" and "Controller Y".

In both of these programs, you run EcoStruxure Control Engineering - Documentation to visualize the data flow and the control flow.
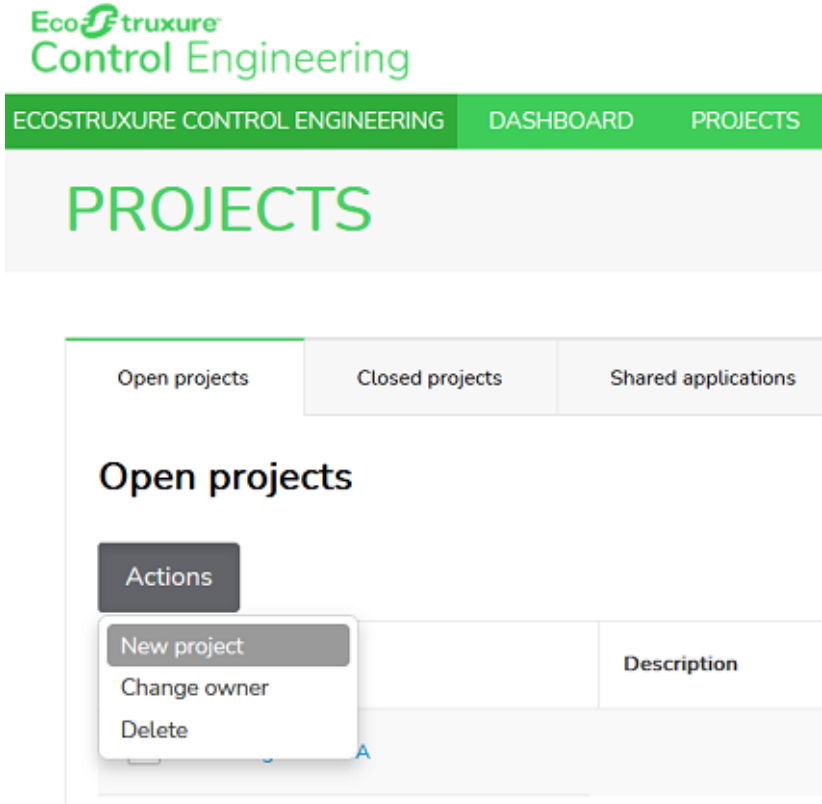
In the next phase, you manage the creation of a new version of the controller applications with improved quality. You start by running EcoStruxure Control Engineering - Verification in your programs to verify the existing code. You share the two programs with the developers so they can access the results of the code verification for assistance in updating the code.

In subsequent phases, you can upload intermediate versions of the updated code into your program and re-run EcoStruxure Control Engineering - Documentation and EcoStruxure Control Engineering - Verification to document the progress and verify that your coding rules have been properly implemented.

# Creating Projects and Programs

## Creating Projects

Procedure for creating a project:

| Step | Action |
|---|---|
| 1 | Select **PROJECTS** in the top menu to display the **Projects** page. |
| 2 | Select **Actions > New project**.<br><br>Eco truxure Control Engineering<br><br>ECOSTRUXURE CONTROL ENGINEERING    DASHBOARD    PROJECTS<br><br>**PROJECTS**<br><br>Open projects    Closed projects    Shared applications<br><br>**Open projects**<br><br>Actions<br><br>New project        Description<br>Change owner<br>Delete |
| 3 | Provide a unique name for your project. Lowercase and uppercase are ignored which means that, for example, the name of a project to be created cannot be "Controller xyz" if you already have a project with the name "Controller XYZ". |
| 4 | Click **Add** to create the project.<br><br>**Result**: The project is added to your list of projects on the **Open projects** tab. |

Clicking a project in the list displays three tabs. The **Overview** tab provides general information on the project. The **Programs** tab contains the list of programs assigned to this project. The **Settings** tab contains the project settings.

## Creating Programs

There are three ways to start the creation of a program:

- From outside of a project select **TOOLS** on the main menu
- From the dashboard click **New ...**
- From inside a project on its **Programs** tab select **Actions > New program**
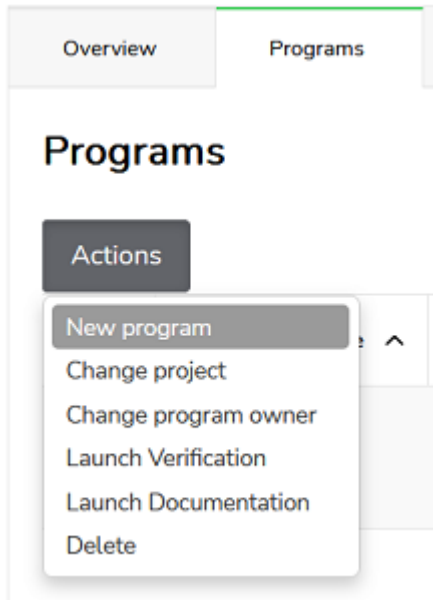
Creating a program from outside of a project:

| Step | Action |
|------|--------|
| 1 | From the main menu, select **TOOLS** to display a list of the available tools. |
| 2 | Select the tool you want to use for the program.<br><br>**Result**: EcoStruxure Control Engineering starts the program creation wizard. |

Creating a program from the dashboard:

| Step | Action |
|------|--------|
| 1 | From the main menu, select **DASHBOARD**. |
| 2 | Click the **New ...** button for the tool you want to use for the program.<br><br>**Result**: EcoStruxure Control Engineering starts the program creation wizard. |

Creating a program from inside a project:

| Step | Action |
|------|--------|
| 1 | From the main menu, select **PROJECTS**. |
| 2 | Select the required project from the list. |
| 3 | Display the **Programs** tab of the project. |
| 4 | Select **Actions > New program**.<br><br><br><br>**Result**: EcoStruxure Control Engineering prompts you for the tool to be used for the program and starts the program creation wizard. |

# Program Creation Wizard

## Overview

A wizard guides you through the different steps required to create your program and launch the selected EcoStruxure Control Engineering tool.

The project to which the new program is assigned depends on how the wizard is started. If the wizard is started from outside of a project or from the dashboard, the program is assigned to your default project. If the wizard is started from inside a project, the program is assigned to this project. In both cases, the project assignment can be adjusted in step 1 of the wizard.

Refer to Creating Programs, page 23 for details.

## Step 1 - Start

The first step consists of providing setup information on the program.



Provide the following information:

- The fields **Application name** and **Customer name** are mandatory. The defined **Application name** is used to identify the program in the different views of EcoStruxure Control Engineering.
- Add additional information in the other fields so that you can identify this program in your project.

Continue with the next step by clicking **Validate And Next Step**.

## Step 2 - Parameters

The second step consists of selecting the development environment that was used to develop the controller application.



Select the **PLC Brand** and continue with the next step by clicking **Validate And Next Step**.

# Step 3 - License

The third step consists of selecting the EcoStruxure Control Engineering license to be used with your new program.



Choose one of the **Licensing possibilities for this program**:

| Licensing possibilities | Description |
|---|---|
| **Do not assign a license now** | Select this option when you will not run the analysis immediately. |
| **Use a license ID** | Select this option when you have a license code. If you have a license, but the license has not yet been assigned to your user account, you can still use it by entering its identifier in the **License #id** field. |
| **Use a free trial license** | Select this option to launch a trial version of the tool. This is not possible if you have already used all trial licenses that have been associated with your user account. |
| **Use a contract license** | This option becomes available when you have a contract for EcoStruxure Control Engineering. This allows you to automatically generate a license, as part of your contract, to run the analysis. |
| **Use an account license** | This option becomes available when licenses are available in your account. In this case, you can select the license from a dropdown list. |

Click **Validate And Next Step** to continue.

If no license is available, you can still continue creating the program by clicking **Validate And Next Step**. In this case, a license can be added to the program after you have created the program. Without a valid license, the EcoStruxure Control Engineering tool selected for this program cannot be used.

# Step 4 - Source file

The fourth step consists of uploading the file with the source code of the controller application that you have exported from the development environment (refer to Manufacturer-Specific File Export Procedures, page 46 for details). This source code is the input material for EcoStruxure Control Engineering. Depending on the EcoStruxure Control Engineering tool used for the program, you may be prompted to upload additional files.

Drag and drop the files to the location indicated or click **Select Files…** to import the files.

Unwanted files can be removed with the garbage can symbol.

Then click **Validate And Next Step** to continue.

If the input files are not yet available when you create the program, you can skip the upload with **Validate And Next Step** and provide the files at a later point in time. Without the uploaded input files, the EcoStruxure Control Engineering tool selected for this program cannot be used.

# Step 5 - Summary

The fifth step displays a summary of the information you have provided in creating your program.



Review the information. If you want to make modifications, click **Previous Step** to return to the step you want to modify.

To cancel the wizard, click the **X** button in the top right-hand corner. As a result, the information entered and the files uploaded up to this point in time are removed.

If the information is correct, click **Create Without Executing** to create the program or click **Create And Execute** to create the program and to start the EcoStruxure Control Engineering tool selected for this program (this is possible if you have selected a valid license and if you have uploaded the required files).

# Overview of the Program

## General Information

After you have completed the wizard, the system displays an overview of the program with the following tabs:

- **Overview** tab
- Tool-specific tab
- **Admin** tab

## Overview Tab

The **Overview** tab displays program-specific information, such as creation date and controller-related information.

The **Glips version** determines the way the code is interpreted.

The default **Glips version** for each program is either set by the system or, if you are a Contract Member, by your Contract Manager.

You can modify the **Glips version** to be used for your program. This implies that the results that you receive after a modification of the **Glips version** may be different. Verify that the **Glips version** you select meets your requirements and matches the specifics of the input code.

## Tool-Specific Tab

The tool-specific tab allows you to access settings and results related to the tool used for the program.

The menu **<tool-specific> > User awareness > Execution messages** allows you to access the list of categorized messages regarding errors detected while using the tool.
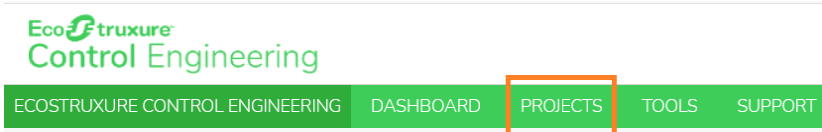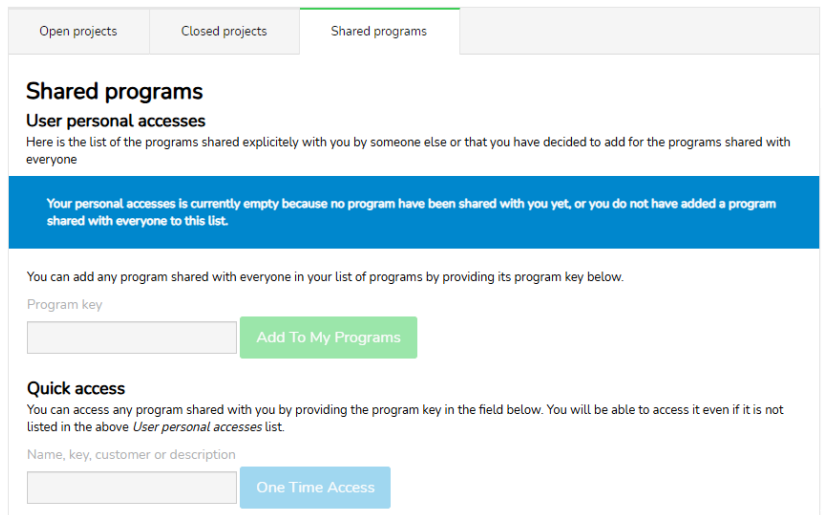
## Admin Tab

The **Admin** tab allows you to access settings specific to the program.

# Accessing a Shared Program

If a program is shared with you, or if access to the program is not restricted (refer to Sharing a Program, page 30), you can add it to your list of programs by providing its unique program key. The unique program key can be found in the program overview under **Program key**.

Procedure for adding a program to your list of programs:

| Step | Action |
|---|---|
| 1 | From the main menu, select **PROJECTS** to access the Projects page.  |
| 2 | Click **Shared programs** to display the corresponding tab. |
| 3 | Enter the unique program key in the **Add To My Programs** field if you want to add this program to your personal records for access at a later point in time. If you only want to access it once without adding it to your list of programs, enter the program key in the **One Time Access** field.  |
| 4 | Click **Add To My Programs** or **One Time Access**, depending on the field in which you entered the program key. |

# Sharing Programs with Other Users

## Overview

You can share your programs with other users so that a team can work on the same project. As the owner, you can share your program. Selected users with whom you share your program cannot delegate their access rights, that is, they cannot share this shared program with further users.
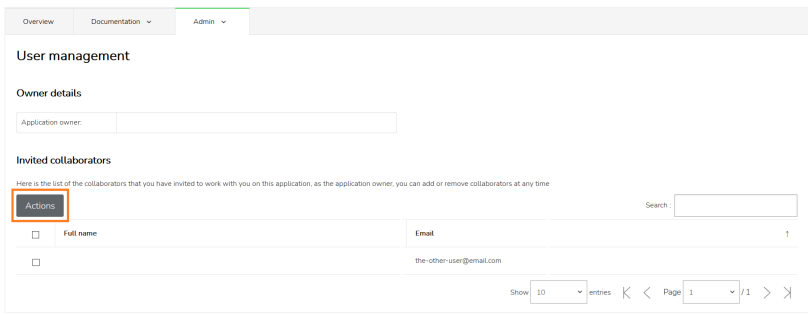
In sharing programs, consider confidentiality rules that may apply.

There are two ways of sharing a program:

- Share with selected users: You choose who can access your program. By default, other users cannot share this program because you are the owner.

- Share with everyone: Everyone can access your program.

## Sharing with a Specific User

Procedure for sharing a program with selected users:

| Step | Action |
|---|---|
| 1 | Navigate to the **Program** page. |
| 2 | Select **Admin > Collaboration > Users access rights** to display the **User management**. |
| 3 | Below **Invited collaborators**, select **Actions > Add** .  |
| 4 | Enter the email address of the user to be invited. You can enter the email address the user specified for registration with EcoStruxure Control Engineering, or you can use any other email address. You can also send an invitation notification to the user. On a dedicated server, the invitation notification function requires an email server.<br><br>Users added to the list of invited users can perform the same actions as you, except for sharing the program and modifying its settings. If you do not want invited users to perform any further actions, deactivate the program with the **Active program** checkbox in **Admin > Settings**. This sets your program to read-only. |

**NOTE:** If your program uses the EcoStruxure Control Engineering - Verification tool, invited users may not be able to update the rules file and may not be able to work with the **Justifications** function. Refer to the EcoStruxure Control Engineering - Verification user guide for details.

You can revoke sharing by selecting the user account(s) you want to remove from your program and selecting **Actions > Remove access**.

## Sharing with Everyone

Procedure for sharing a program with everyone:

| Step | Action |
|------|--------|
| 1 | Navigate to the **Program** page. |
| 2 | Select **Admin > Settings**. |
| 3 | Deactivate the checkbox **Private program**.<br><br>Users accessing your program can perform the same actions as you, except for sharing the program and modifying its settings. If you do not want invited users to perform any further actions, deactivate the program with the **Active program** checkbox in **Admin > Settings**. This sets your program to read-only. |

> **NOTE:** If your program uses the EcoStruxure Control Engineering - Verification tool, invited users may not be able to update the rules file and may not be able to work with the **Justifications** function. Refer to the EcoStruxure Control Engineering - Verification user guide for details.

You can disable sharing with everybody by activating the checkbox **Private program**. With this setting, only users explicitly invited can access your program.

# File Repository of Programs

## General

Each program has a file repository. You can directly access the files belonging to a program via the file repository.

## File Operations

The **Actions** menu contains the following menu items:

| Menu item | Description |
|---|---|
| **Add file** | You can add additional files to the repository. |
| **Add file synchronized with contract** | You can add links to files contained in the contract repository which are then available in your program repository. Any subsequent modifications to such linked files in the contract repository are reflected in your program repository. |
| **Rename file** | You can rename a file in the repository. |
| **Delete** | You can delete one or several files from the repository. |
| **Get Checksum** | You can display the SHA256 checksum of one or several files in the repository.<br><br>Use the following **Windows PowerShell** command to compute the checksum of your local file:<br>`Get-FileHash <Path to the file> -Algorithm SHA256 \| Format-List`<br><br>The result is, for example:<br>`Get-FileHash C:\Users\SE\Downloads\ruleset_ documentation.pdf -Algorithm SHA256 \| Format-List`<br><br>`Algorithm : SHA256`<br>`Hash      : A5978FECDBE98C2C9C6479328AB2F717EBC239C9DA59-D55015AD3D5D50C63750`<br>`Path      : C:\Users\SE\Downloads\ruleset_ documentation.pdf` |

The **Download Repository (ZIP)** button lets you download the files contained in the repository as a single zip file.

# Documenting Controller Applications

## Creating a Documentation of a Controller Application

### Procedure

No tool can provide analysis procedures for all potential types of code and methods of creating code. For example, a code block in your source code may be semantically invalid, but syntactically correct. The tool may not be able to detect such a condition.

Software development environments may provide code protection features intended to, for example, block access to intellectual property. Unlock such protected code blocks in your software development environment before creating export files to be used with EcoStruxure Control Engineering.

---

### ⚠ WARNING

**INCORRECT OR INCOMPLETE SOURCE CODE ANALYSIS**

- In your risk assessment, consider all potential effects of inappropriate, incorrect, or incomplete input files used with EcoStruxure Control Engineering.
- Verify that the source code exported from your software development environment and to be used by EcoStruxure Control Engineering is complete and up to date.
- After modifications of any type whatsoever to the source code of your application resulting from your use of EcoStruxure Control Engineering, verify the correctness of the modified source code.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

---

| Step | Action |
|------|--------|
| 1 | Click **Launch Documentation** on the Program page.  |
| 2 | Upload the source files of the controller application exported from your software development environment as described in Program Creation Wizard, page 25. |
| 3 | Specify the files to be analyzed. If you do not want to generate the documentation for each file, you can remove unwanted files by unselecting them in the list. |
| 4 | Start the documentation process by clicking **Launch**.<br>**NOTE:** The time required to generate your documentation depends on the size and complexity of the source code of the controller application. Progress information is displayed on the Program page. |

# Displaying Documentation Code Results

## Overview

After you run EcoStruxure Control Engineering - Documentation for the first time, the **Documentation** tab provides access to the dashboard and to the documentation details.

## Dashboard

The dashboard provides a summary of the documentation results. To display the dashboard, click **Documentation > Dashboard**.

The dashboard provides various elements, for example, number of Programmable Organization Units (POUs), variables and communication in your controller application.

## POUs

The term Program Organizational Unit (POU) is used for all programming objects (programs, function blocks, functions, etc.) which are used to create a controller application.

The dashboard displays the total count of programmable entity calls (for instance, if POU1 calls POU3 and POU2 calls POU3, then this counter displays **2**) in your controller program.

Select **Documentation > Control flow** for more information.

## Variables

The dashboard displays the number of variables read and/or of write operations detected in your controller application.

Select **Documentation > Data flow** for more information.

A table is displayed listing the variables by datatype, the number of variables tagged with this datatype and examples.

## Communication

The dashboard displays the data exchanges between other controller systems detected in the program.

Select **Documentation > Communication** for more information.

# The Data Flow View

## General

The **Data Flow** view displays the relationships between variables of a controller application from input to output, or vice versa.

This view displays how the values of the variables of the controller application are read or written.

## Displaying the Data Flow View

If you work with the EcoStruxure Control Engineering platform, select **Documentation > Data flow**.
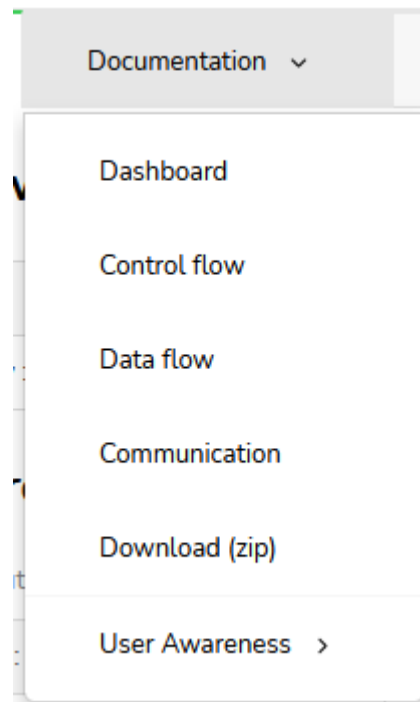
**NOTE:** If you have downloaded a copy of the online results and want to work with the downloaded copy, open the **index.html** file and click the **Display Data Flow** button. Refer to Downloading an Offline Version of the Documentation, page 44

## Overview of the Data Flow View

The Data Flow view consists of four parts:
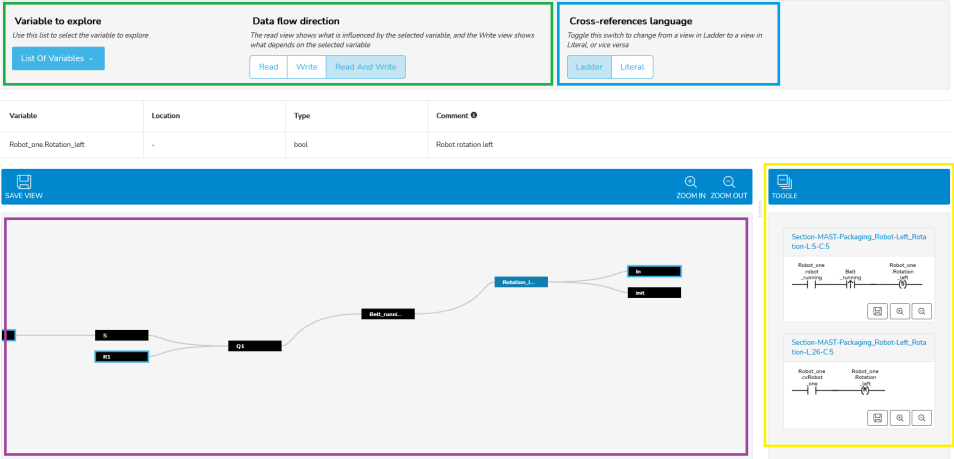
- List of variables to explore and settings for variables (top left, green frame)
- Dependency tree (bottom left, purple frame)
- Language settings (top right, blue frame)
- Cross-references snippets (bottom right, yellow frame)

# List of Variables

The list of variables to explore lets you select a variable whose dependencies you want to display. Click **List Of Variables** to select a variable.
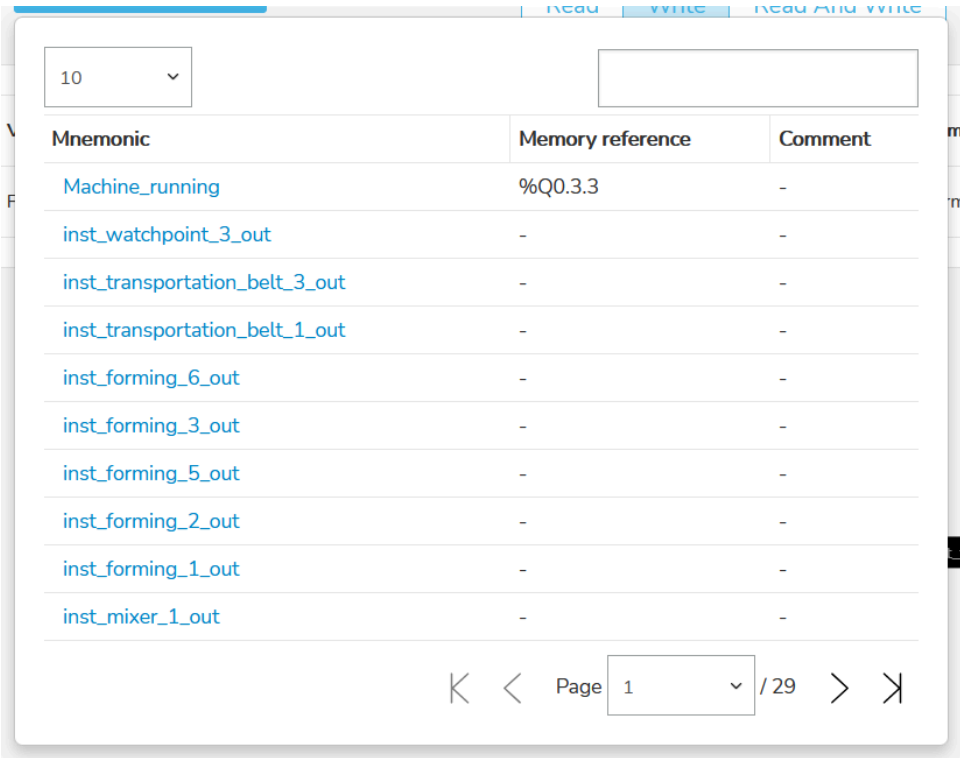


Functions for finding a variable:

- You can scroll through the list using the page buttons at the bottom of the view. You can specify the number of variables to be displayed on a single page using the dropdown list at the top left part of the table.
- You can filter the variables using the search field at the top right part of the list. You can search by full or partial name, address and comment of a variable.

Click the name of a variable to display it in the dependency tree and in the cross-references snippets parts of the page.

The **Data flow direction** lets you specify the way the dependencies are listed and displayed. **Write** displays only the dependencies that write the value of the variable. **Read** displays only the variables that are used to write to other variables that are using the selected variable. **Read and write** displays both. This selection also affects the way the dependency tree is displayed.

The list of variables is not exhaustive in the sense that if a selected variable does not form a dependency (not written to or not used to write to other variables), it will not appear in the list depending on the data flow direction you have chosen.

# Dependency Tree

The dependency tree is a graphical representation of the dependencies between the variables. If a variable is used to compute or to determine another value, this variable is displayed with a link to that other variable.
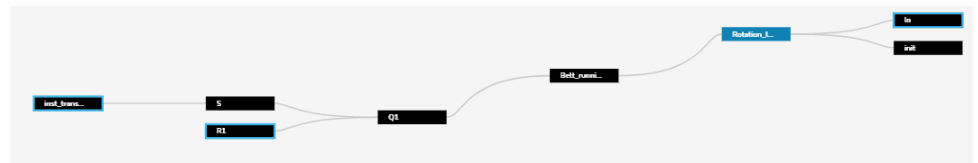


In the example above, the following is true of the selected (blue) variable (**Data flow direction** is set to **Read and write**):

- The variable needs the values of the two linked variables displayed to its left in order to calculate its own value.
- The variable is used to calculate the values of the linked variables displayed to its right.

You can explore the relationships between variables by clicking their names.

This view is helpful to locate the variables affected if code is modified in the controller application, or to determine an unwanted value of a variable in the running controller application.

# Language Settings

The language settings let you select **Ladder** or **Literal** as the language for the cross-references snippets.

Depending on the different types of variables, a representation of the code in Ladder may not be available. In such a case, the cross-references snippets are displayed in Literal.

Creating a flow chart from a controller application is a complex operation. Depending on the complexity of the code and the different types of objects, EcoStruxure Control Engineering - Documentation may not be able to generate a precise flow if a variable is indexed and/or if its address is accessed indirectly using a variable in the controller application.

# Cross-References Snippets

The cross-references snippets part of the page displays how the variables are used in the calculations of one another.

It consists of a code extract (displayed in Ladder or Literal language) that highlights the relations. The code extract is not displayed in the same way it is written in the original code in order to provide a synthetic view. Its logic still remains the same as in the original code. The logic can be retrieved using the location displayed above each snippet.

For instance, if you access a variable inside several nested conditional instructions, the snippet compresses these instructions into a single one.
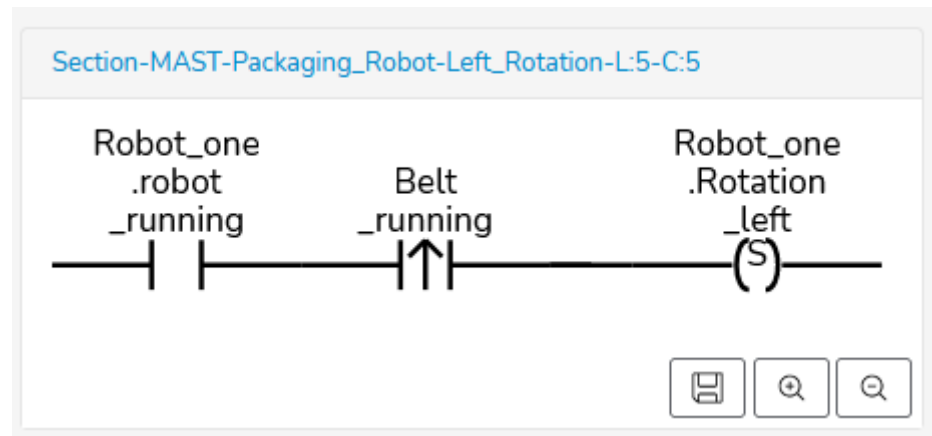


The cross-references snippets view is updated each time you select a variable either in the list of variables or in the dependency tree.
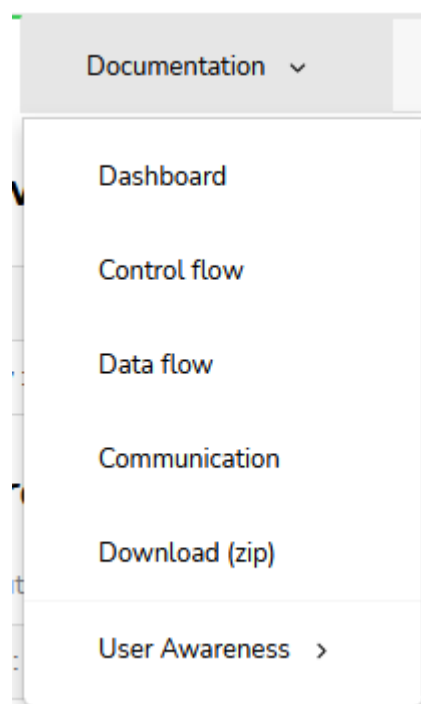
# The Control Flow View

## General

The **Control Flow** view displays the order in which the function calls or procedure calls are executed or evaluated.

This view displays the way the logic of the controller application is called.

## Displaying the Control Flow View

Select **Documentation > Control flow**.



**NOTE:** If you have downloaded a copy of the online results and want to work with the downloaded copy, open the **index.html** file and click the **Display Control Flow** button. Refer to Downloading an Offline Version of the Documentation, page 44

## Overview of the Control Flow View

The Control flow view consists of four parts:
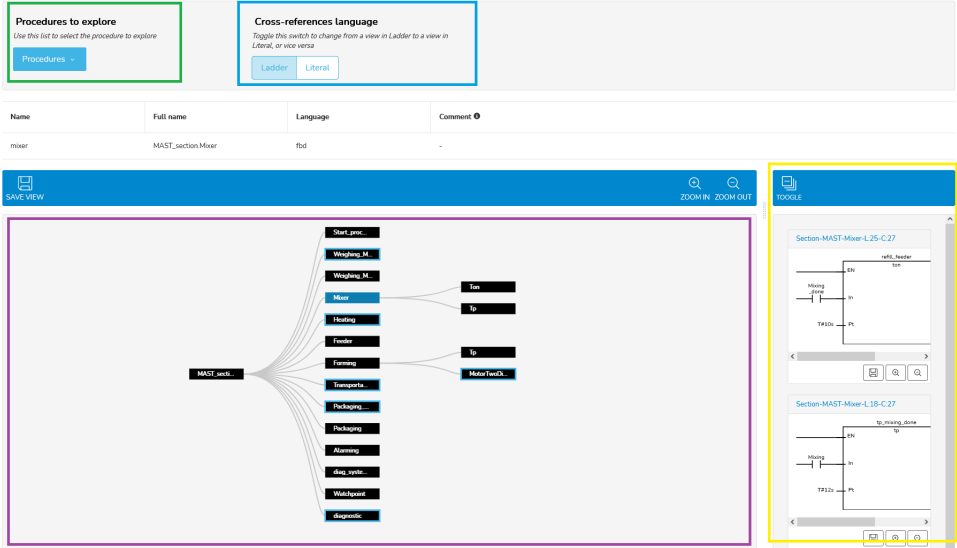
- List of procedures to explore (top left, green frame)
- Dependency tree (bottom left, purple frame)
- Language settings (top right, blue frame)
- Cross-references snippets (bottom right, yellow frame)

# List of Procedures

The list of procedures lets you select a procedure whose call tree you want to display. Click **List Of Procedures** to select a function, function block or task (which are generally referred to as called "procedure" in the EcoStruxure Control Engineering tools).
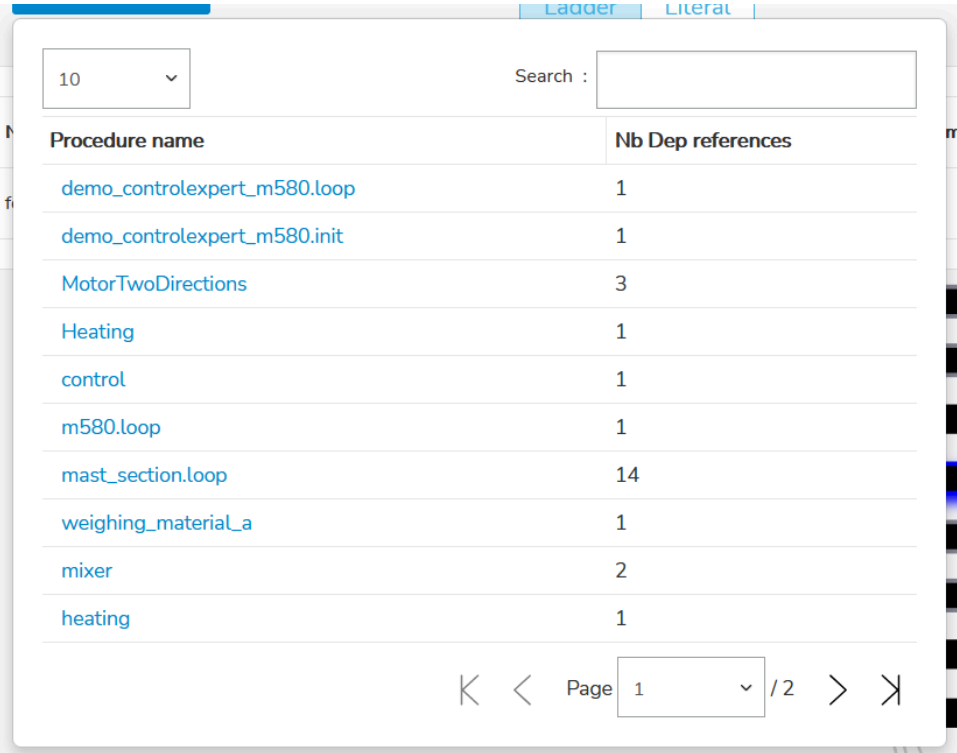


Functions for finding a procedure:

- You can scroll through the list using the page buttons at the bottom of the view. You can specify the number of procedures to be displayed on a single page using the dropdown list at the top left part of the table.
- You can filter the procedures using the search field at the top right part of the list. You can search by full or partial name of the procedure.

Click the name of a procedure to display it in the dependency tree and in the cross-references snippets parts of the page.

# Dependency Tree

The dependency tree is a graphical representation of the dependencies between the procedures.



The selected procedure is highlighted in blue. Each linked procedure displayed to its left is a procedure that calls it. Each linked procedure displayed to its right is a procedure that is called by it.

You can explore the relationships between procedures by clicking their names.

This view is helpful to determine how the procedures call each other.

# Language Settings

The language settings let you select **Ladder** or **Literal** as the language for the cross-references snippets.

Depending on the different types of procedures, a representation of the code in Ladder may not be available. In such a case, the cross-references snippets are displayed in Literal.

# Cross-References Snippets

The cross-references snippets part of the page displays how the different procedures call each other.

It consists of a code extract (displayed in Ladder or Literal language) that highlights the relations. The code extract is not displayed in the same way it is written in the original code in order to provide a synthetic view. Its logic still remains the same as in the original code. The logic can be retrieved using the location displayed above each snippet.

For instance, if you call a procedure inside several nested conditional instructions, the snippet compresses these instructions into a single one.

Section-MAST-Mixer-L:25-C:27

```
                          refill_feeder
                              ton
          ┌──── EN                    ENO ────┐
          │                                   │
  Mixing  │                                   │    Fill
  _done   │                                   │   _feeder
  ──┤ ├───┤ In                        Q ──────┤   ─( E )─
          │                                   │
  T#10s ──┤ Pt                        Et ─────┤   Refill
          │                                   │   _feeder.Et
          └───────────────────────────────────┘
```
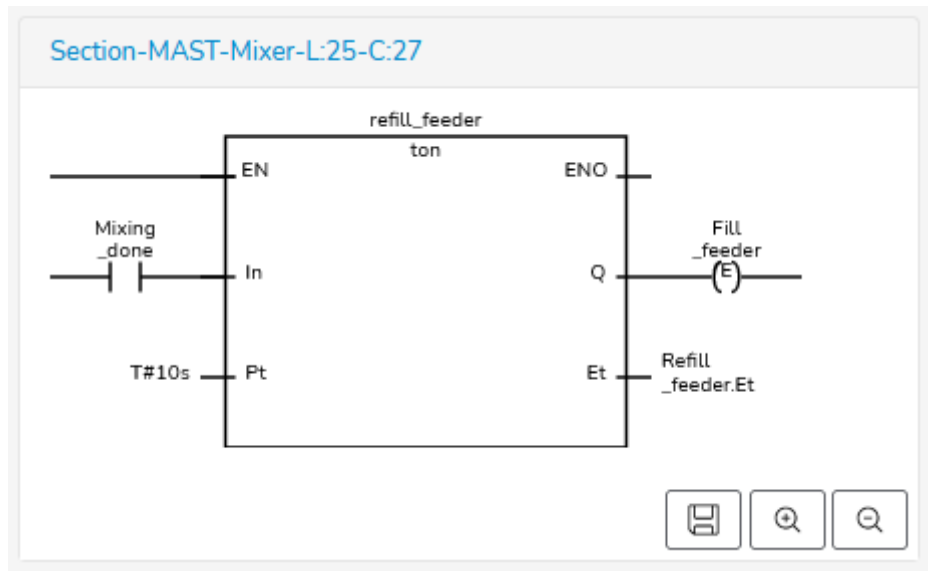
The cross-references snippets view is updated each time you select a procedure either in the list of procedures or in the dependency tree.

# The Communication View

This screen allows you to display the exchanges between the controller code and other controllers.

| Source (current code) | Target (remote code) | Protocol | Mode | Role | Exchanged data |
|---|---|---|---|---|---|
| | | local | READ | LOCAL | **Area name** <br> L1 INPUT <br> L2 INPUT |
| | | local | WRITE | LOCAL | **Area name** <br> L2 OUTPUT <br> Machine_running OUTPUT |
| 192.168.10.1/16 | | MODBUS_TCP | NONE | ABSTRACTIVE | |

Show 10 entries  |< < Page 1 / 1 > >|

The table provides various information:

- The **source** IP address (if available)
- The **target** IP address (if available)
- The **protocol** used (if available)
- The **mode** (reading data, writing data, both or nothing)
- The **role** (depends on the protocol; in addition, it can, for instance, identify whether the controller initiates communication)
- The **exchanged data** (for example, variable names, blocks of data, or memory addresses)

# Downloading an Offline Version of the Documentation

You can download a copy of the EcoStruxure Control Engineering - Documentation online results from the server to your local PC.

Download procedure:

| Step | Action |
|------|--------|
| 1 | Navigate to the **Program** page. |
| 2 | Select **Documentation > Download (zip)**.<br><br>**Result**: A ZIP file with the documentation in HTML format is downloaded to your PC. |
| 3 | Extract the contents of the downloaded ZIP file and open the file **index.html** if you want to work with the downloaded documentation.<br><br>**NOTE:** Security policies in your organization may keep your browser from displaying certain or all HTML content stored on your PC. In such cases, contact your administrator to resolve this condition. |

# Limitations of the Free Trial Version

If the documentation has been created with a free trial license of EcoStruxure Control Engineering - Documentation, the results are limited as shown in the following list.

| Functionality | Trial version | Paid license |
|---|---|---|
| **Control Flow** | | |
| **List of procedures** | Included | Included |
| **Number of dependencies per procedure** | Limited to 3 | No license limitations |
| **Number of cross-references per procedure** | Limited to 2 | No license limitations |
| **Data Flow** | | |
| **List of variables** | Included | Included |
| **Number of dependencies/ influences per variable** | Limited to 3 | No license limitations |
| **Number of cross-references per variable** | Limited to 2 | No license limitations |
| **Flow direction** | Unidirectional | Unidirectional and bidirectional |
| **Communications** | | |
| **Number of communications** | Limited to 2 | No license limitations |
| **Other features** | | |
| **Save tree view** | Unavailable | Included |
| **Download offline version** | Unavailable | Included |

**NOTE:** Free license does not allow to download the cross-references.

The functions that are not available or limited are highlighted on the **Documentation** tab of your program:

• Trial: Limited results

• Unavailable: Function is not accessible

• No indication: No license limitations
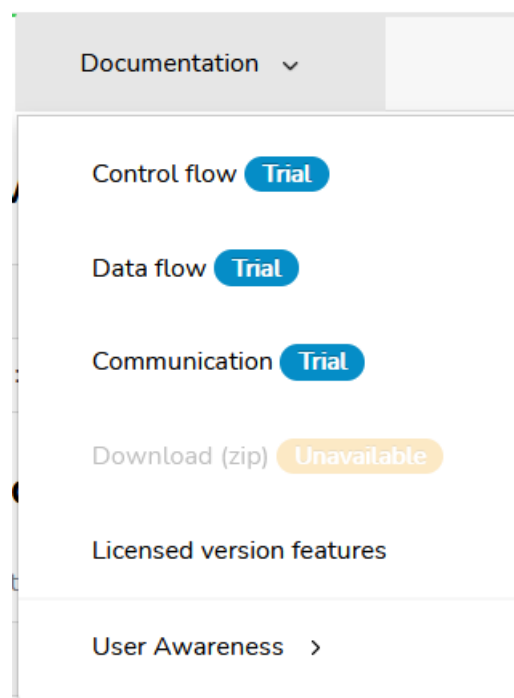


You can upgrade to a paid license to get the full functionality of your program.

# Manufacturer-Specific File Export Procedures

EcoStruxure Control Engineering tools use the source code files of controller applications as input files. These files are exported from the corresponding software development environments. The following sections provide information on generating these export files in various software development environments.

## EcoStruxure Control Expert (.XEF / .ZEF / .XVM File Export)

Export the EcoStruxure Control Expert (formerly Unity Pro) controller application to an XEF, ZEF or XVM export file in order to process them with EcoStruxure Control Engineering tools.

To export the file, you can use the EcoStruxure Control Engineering Import/Export tool. In the menu, select **SUPPORT > DOWNLOADS**.
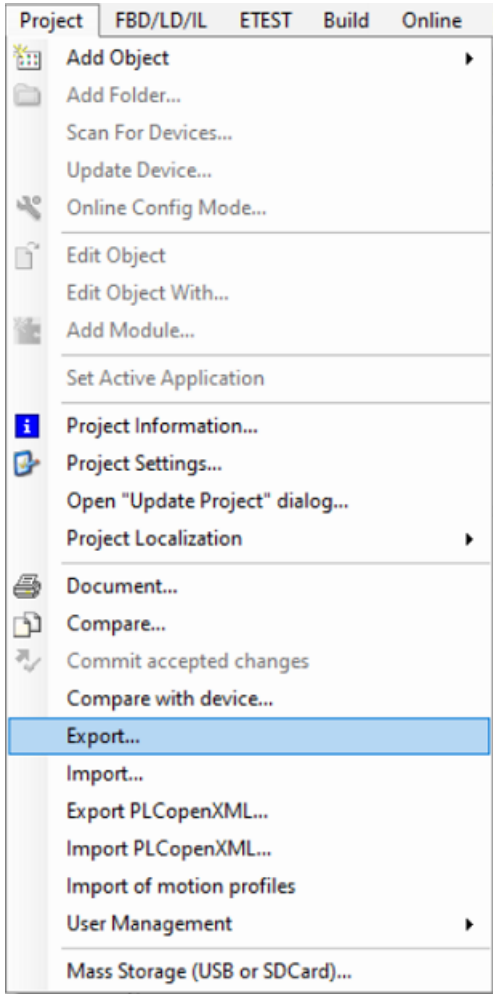
It is also possible to export the files using the EcoStruxure Control Expert menu:
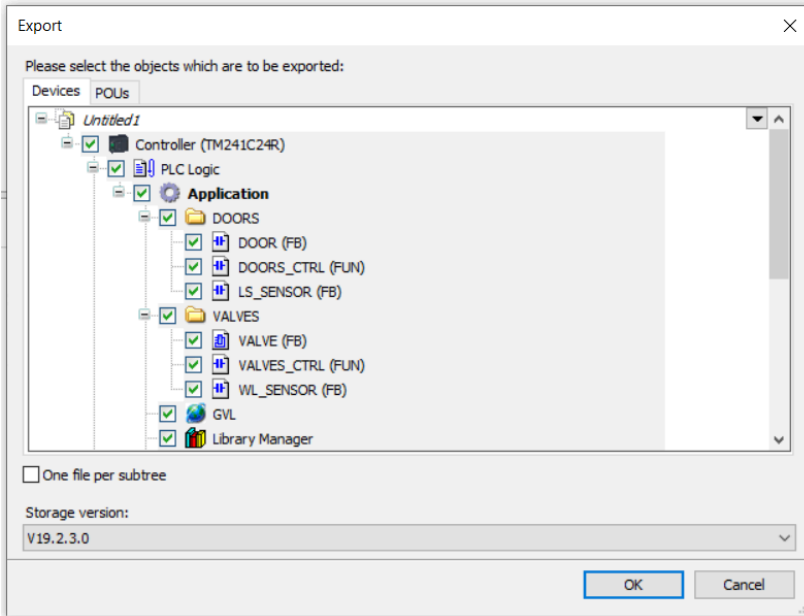
| Step | Action |
|------|--------|
| 1 | From the menu, select **File > Export application…**. |
| 2 | In the **Export application…** dialog box, provide a name for the XEF, ZEF or XVM file. |
| 3 | If required, modify the storage location for the XEF, ZEF or XVM file. |
| 4 | Click **Save**. |

# EcoStruxure Machine Expert (.EXPORT File Export)

Export the EcoStruxure Machine Expert controller application to an XML export file (with the extension **.export**) in order to be processed with EcoStruxure Control Engineering tools.
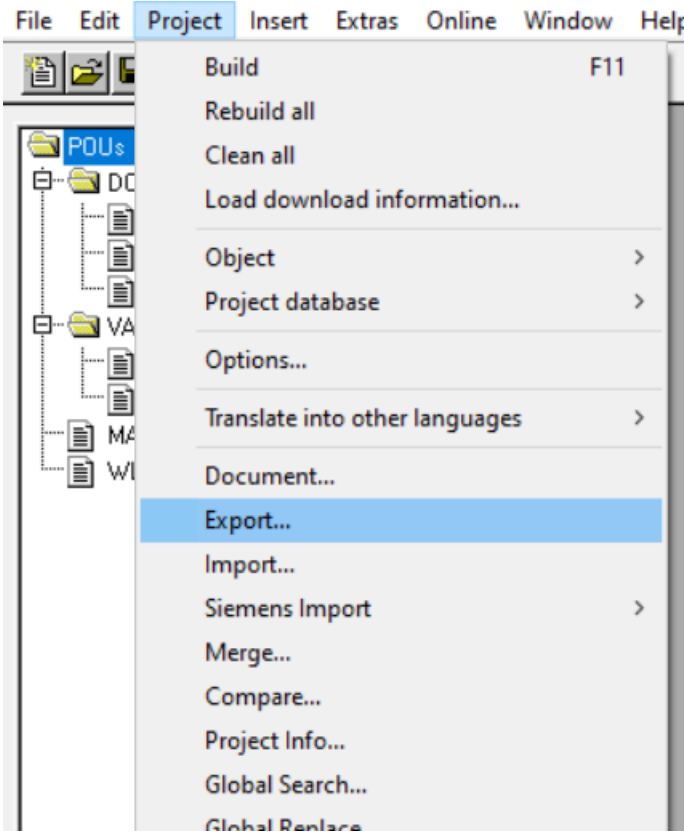
Procedure:

| Step | Action |
|------|--------|
| 1 | From the menu, select **Project > Export…**. <br><br> Project    FBD/LD/IL    ETEST    Build    Online <br> Add Object   ▶ <br> Add Folder… <br> Scan For Devices… <br> Update Device… <br> Online Config Mode… <br> Edit Object <br> Edit Object With… <br> Add Module… <br> Set Active Application <br> Project Information… <br> Project Settings… <br> Open "Update Project" dialog… <br> Project Localization   ▶ <br> Document… <br> Compare… <br> Commit accepted changes <br> Compare with device… <br> **Export…** <br> Import… <br> Export PLCopenXML… <br> Import PLCopenXML… <br> Import of motion profiles <br> User Management   ▶ <br> Mass Storage (USB or SDCard)… |
| 2 | You can export particular objects or a full tree. From the tabs in the **Export** dialog box, select the objects to be included in the export file. |

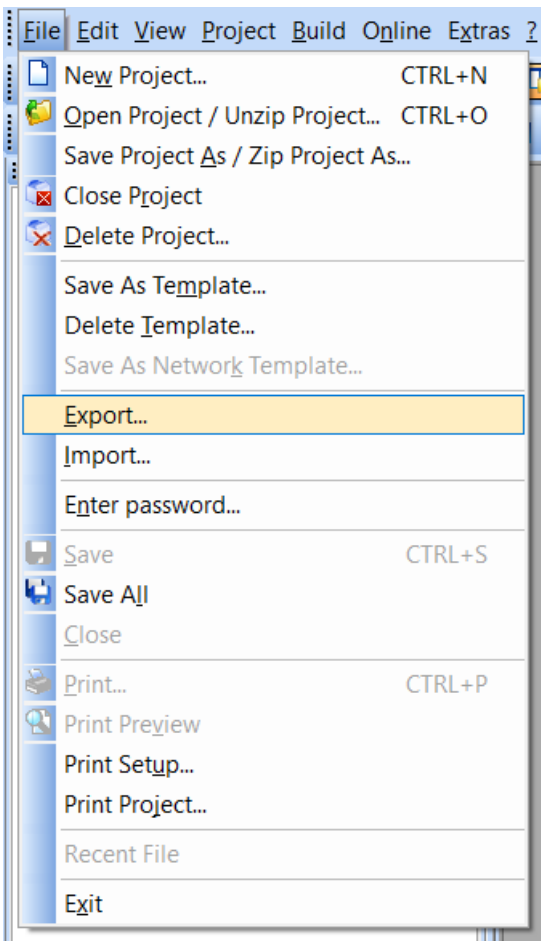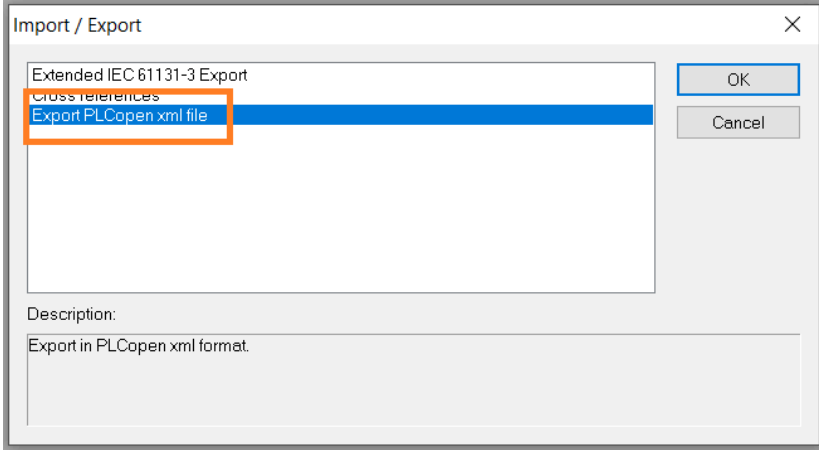| Step | Action |
|------|--------|
| |  NOTE: The checkbox **One file per subtree** allows you to generate separate export files for the selected subtrees. You can export the file with a specific EcoStruxure Machine Expert version that you select from the dropdown list **Storage version**. To re-import the file, this EcoStruxure Machine Expert version is used. |
| 3 | Click **OK** and provide a file name and a folder name as prompted. |
| 4 | Click **Save**. |

# PL7 Pro (.FEF File Export)

Export the PL7 Pro controller application to an FEF export file in order to be processed with EcoStruxure Control Engineering tools.

Prerequisites:

| Step | Action |
|------|--------|
| 1 | Open the PL7 Pro configuration file **Pl7sys.ini** using a text editor. The file is located in the **Windows** folder (for example, C:\Windows or C:\Winnt). |
| 2 | Search for the section **[PL7TOOL132]**. |
| 3 | Verify that the entry **ExportPl7Converter=True** exists. |
|  | If the entry does not exist, add the entry in the section **[PL7TOOL132]**. |
| 4 | Save the file. |
|  | The modification is taken into account with the next start of PL7 Pro. |
|  | **NOTE:** This feature is only available with version 4.5 or later of PL7 Pro. |
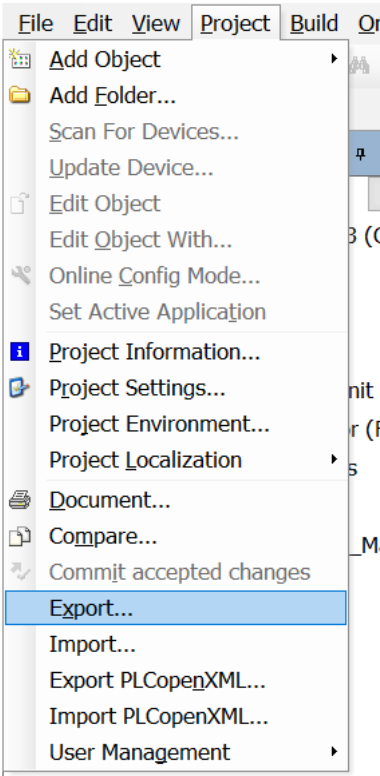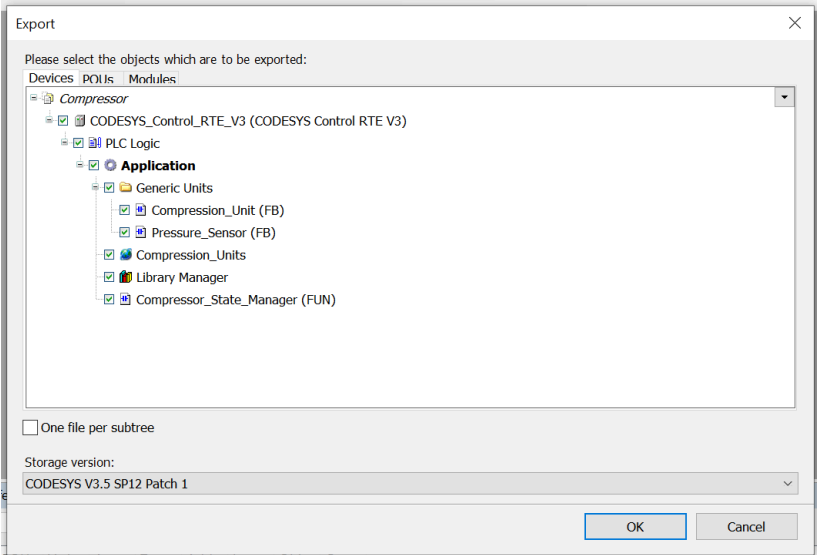
Procedure:

| Step | Action |
|------|--------|
| 1 | From the menu, select **File > Export application…**. |
| 2 | In the **Export application…** dialog box, provide a name for the FEF file. |
| 3 | If required, modify the storage location for the FEF file. |
| 4 | Click **Save**. |

# 3S CODESYS V3 (.EXPORT File Export)

Export the CODESYS V3 controller application to an XML export file (with the extension **.export**) in order to be processed with EcoStruxure Control Engineering tools.

Procedure:

| Step | Action |
|---|---|
| 1 | From the menu, select **Project > Export…**.<br><br> |
| 2 | You can export particular objects or a full tree. From the tabs in the **Export** dialog box, select the objects to be included in the export file.<br><br><br><br>**NOTE:** The checkbox **One file per subtree** allows you to generate separate export files for the selected subtrees. You can export the file with a specific CODESYS version that you select from the dropdown list **Storage version**. This version is then used to re-import the file in CODESYS. If you work on CODESYS V3 code, select a version from the version 3 family (**CODESYS V3 …**). |

| Step | Action |
|------|--------|
| 3 | Click **OK**. |
| 4 | Provide a file name and a folder name as prompted and click **Save**. |

# 3S CODESYS V2 (.EXP File Export)
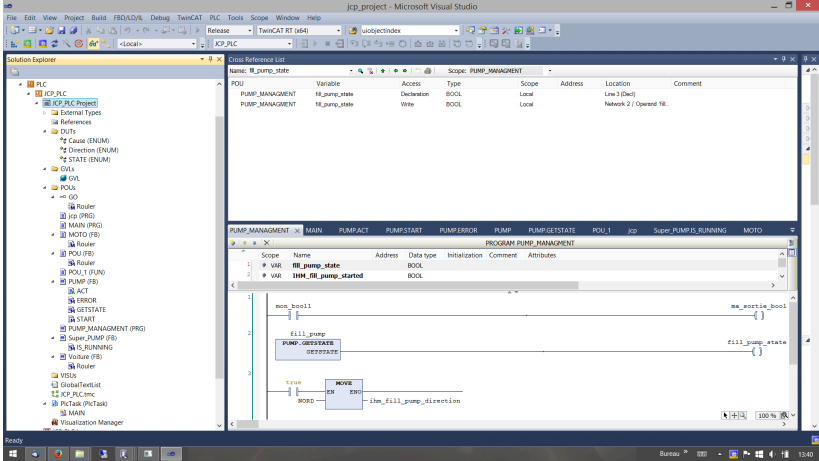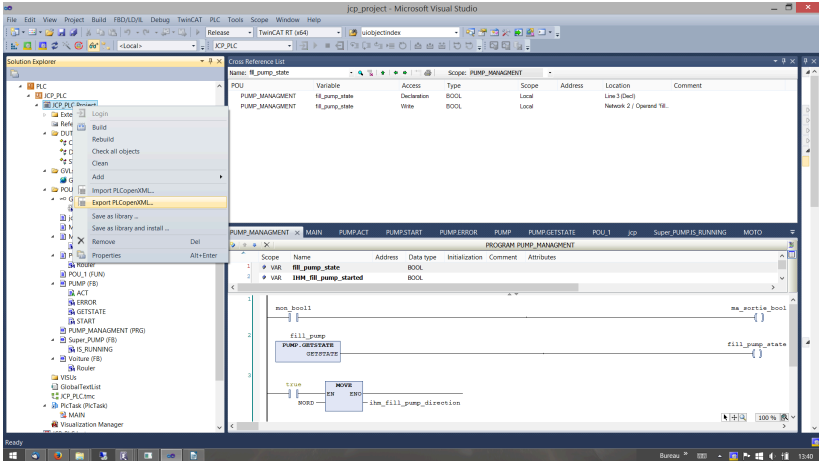
Export the CODESYS V2 controller application to an EXP export file in order to be processed with EcoStruxure Control Engineering tools.
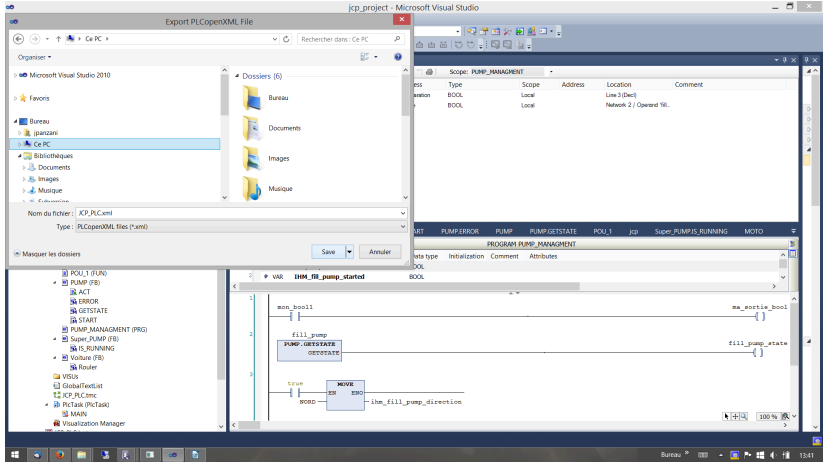
| Step | Action |
|------|--------|
| 1 | From the menu, select **Project > Export…**. |
| 2 | In the **Export Project** dialog box, select the objects to be included in the export file (with the default settings, a selected item has a blue background), then click **OK**. |

| Step | Action |
|------|--------|
| | Export Project  |
| 3 | Click **OK** and provide a file name and a folder name as prompted. |
| 4 | Click **Save**. |

# BECKHOFF TwinCAT V3 (.XML File Export)

Export the Beckhoff TwinCAT controller application to an XML export file (PLCopen) in order to be processed with EcoStruxure Control Engineering tools.

| Step | Action |
|------|--------|
| 1 | In the **Solution Explorer** window, select the project.<br><br> |
| 2 | Right-click the project and select **Export PLCopenXML…**.<br><br> |

| Step | Action |
|---|---|
| 3 | Click **Save**.<br> |
| 4 | Open the XML file in a text editor to verify whether the XML file is valid.<br><br>Search for the following:<br>`< name="TwinCAT_Configuration" ...>`<br>`...`<br>`</>`<br><br>Modify as follows:<br>`<globalVars name="TwinCAT_Configuration" ...>`<br>`...`<br>`</globalVars>`<br><br>If the element name `globalVars` is already available, nothing has to be modified. |

# PHOENIX CONTACT Multiprog v5.5 (.XML File Export)

Export the MULTIPROG controller application to an XML export file in order to be processed with EcoStruxure Control Engineering tools.

| Step | Action |
|------|--------|
| 1 | From the menu, select **File > Export…**.<br> |
| 2 | Select **Export PLCopen xml file**.<br> |
| 3 | Provide a name for the export file. |
| 4 | Click **Save**. |

As MULTIPROG can export the controller application in different versions of PLCopen, there may be differences in the way your EcoStruxure Control Engineering tool processes the export file, depending on the PLCopen version.

# Rockwell Automation® RSLogix 5000® or Studio 5000 (. L5K File Export)

Export the Rockwell Automation® RSLogix 5000® controller application to a L5K export file in order to be processed with EcoStruxure Control Engineering tools.

| Step | Action |
|------|--------|
| 1 | From the menu, select **File > Save as…**. |
| 2 | In the **Save as…** dialog box, provide a name for the L5K file. |
| 3 | If required, modify the storage location. |
| 4 | Select the file type: **RSLogix 5000 Import/Export File (*.L5K)**. |
| 5 | Click **Save**. |

# Siemens SIMATIC STEP 7 (.ASC, .AWL, .GR7 and .SCL File Export)
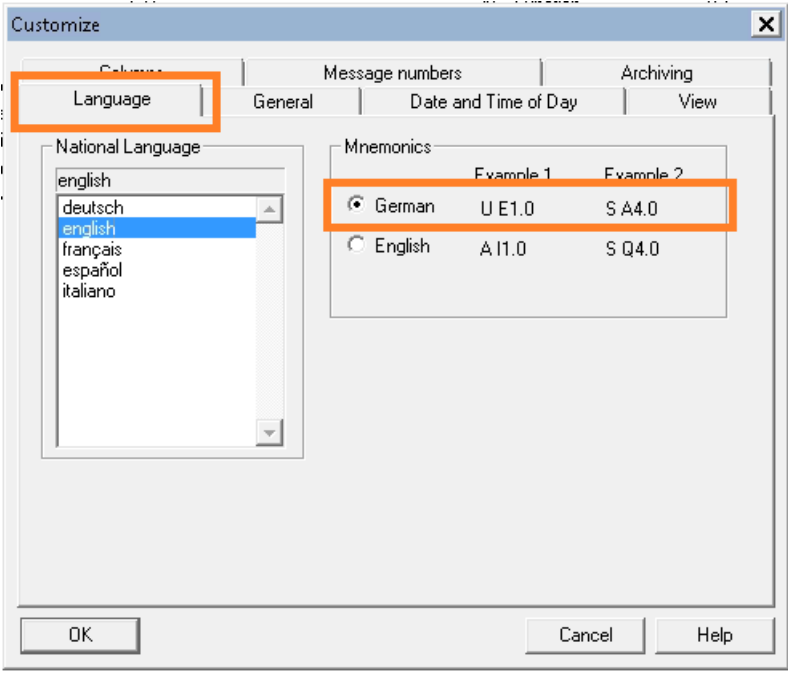
## Overview

The following steps are required to process a Siemens SIMATIC STEP 7 controller application with EcoStruxure Control Engineering tools:
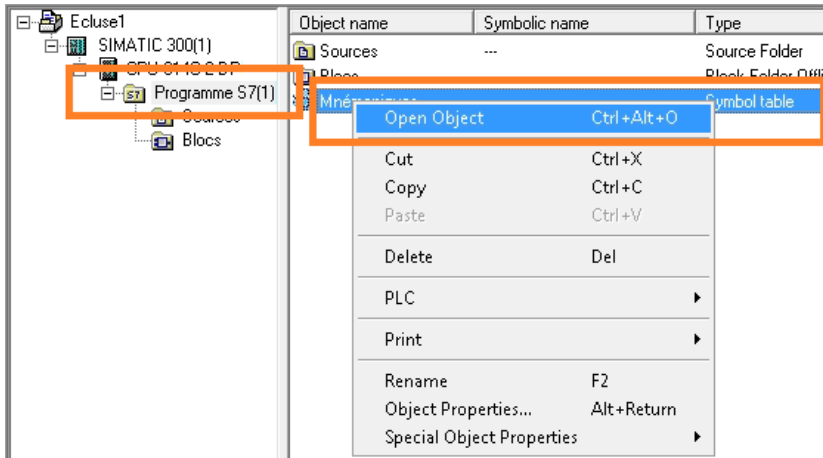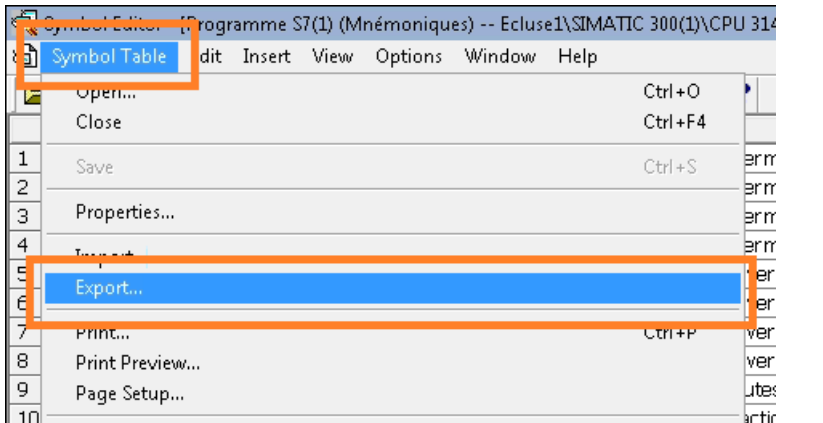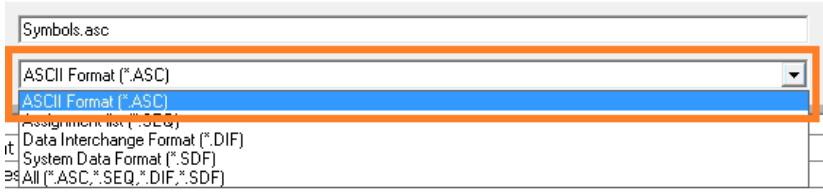
• Set your SIMATIC STEP 7 workshop to German abbreviations (mnemonics).

• Create and export the symbols of the controller application to an **.ASC** file.

• Create and export the contact code (CONT) to an **.AWL** file.

• Create and export the graph blocks (GRAPH) to **.GR7** files.

• Compile the CFC code (if any) to create the corresponding **SCL** sources.

• Export structural codes (SCL) to **.SCL** files.

## Setting German Mnemonics

Before creating the export files, set your SIMATIC STEP 7 workshop to German abbreviations (mnemonics):
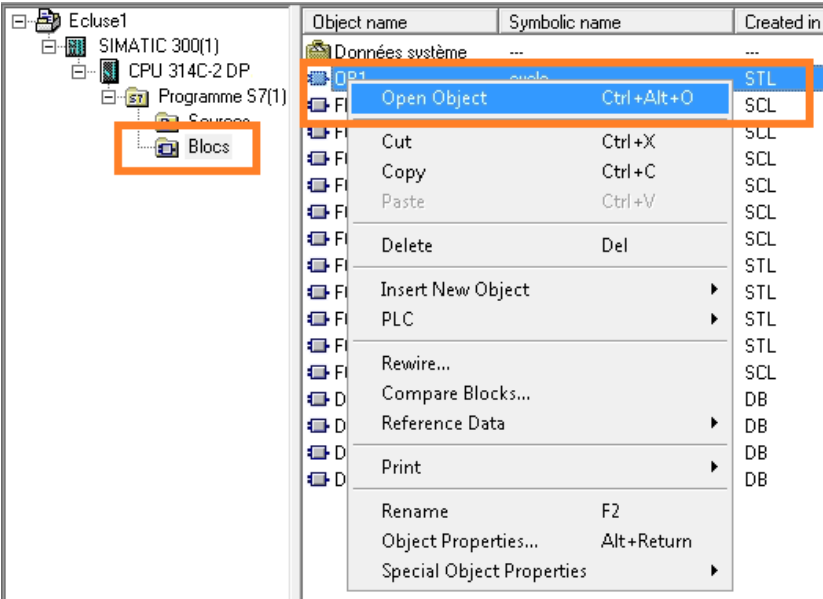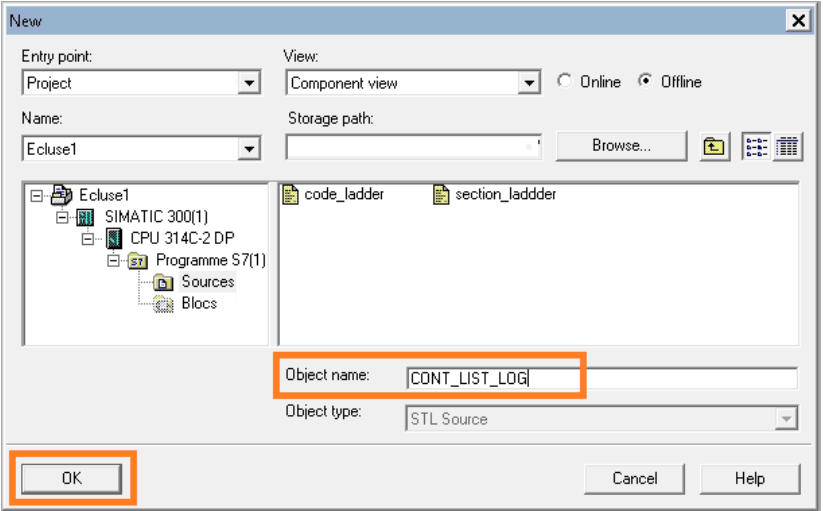
| Step | Action |
|------|--------|
| 1 | From the menu, select **Options > Customize…**. |
| 2 | Display the **Language** tab.<br> |
| 3 | Select **German** mnemonics. |
| 4 | Click **OK**. |
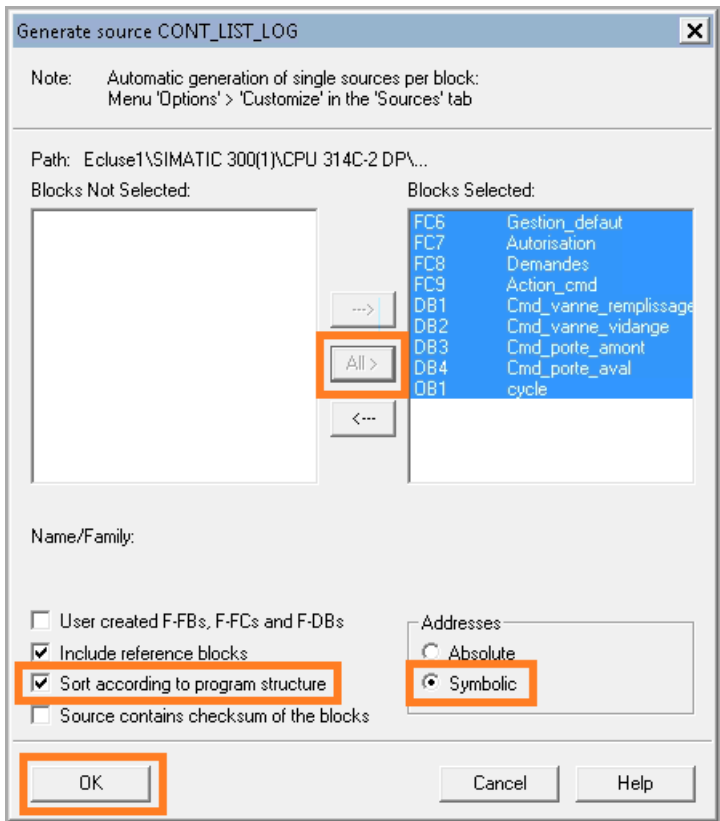
# Creating an ASC File

| Step | Action |
|------|--------|
| 1 | Right-click the **Symbol Table** in your program folder and select **Open object**.<br> |
| 2 | From the menu of the **Symbol Editor**, select **Symbol Table > Export…**.<br> |
| 3 | Select **ASCII Format (*.ASC)**.<br> |
| 4 | Provide a name and select a directory for the **.ASC** export file. |
| 5 | Click **Save**. |

# Creating an AWL File

To create an **.AWL** file, first generate the LIST source for the code blocks developed in the languages CONT, LIST and LOG.
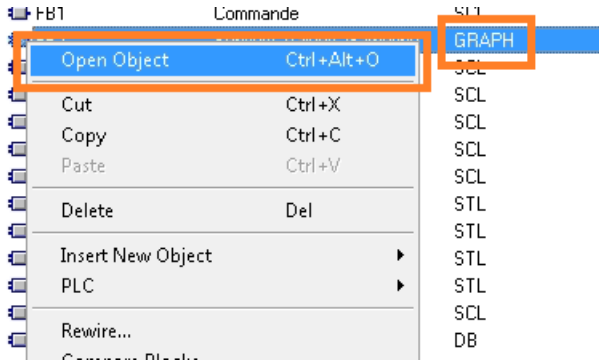
| Step | Action |
|---|---|
| 1 | Right-click a CONT, LIST or LOG source and select **Open Object** to open the CONT/LIST/LOG code editor.<br><br> |
| 2 | From the menu, select **File > Close** to close all open objects. |
| 3 | From the menu, select **File > Generate source…** to generate the program source. |
| 4 | Provide an object name and click **OK**.<br><br> |

| Step | Action |
|------|--------|
| 5 | Click **All** to select all program blocks and select the options **Sort according to program structure** and **Symbolic** addresses.<br><br> |
| 6 | Click **OK** to confirm. |
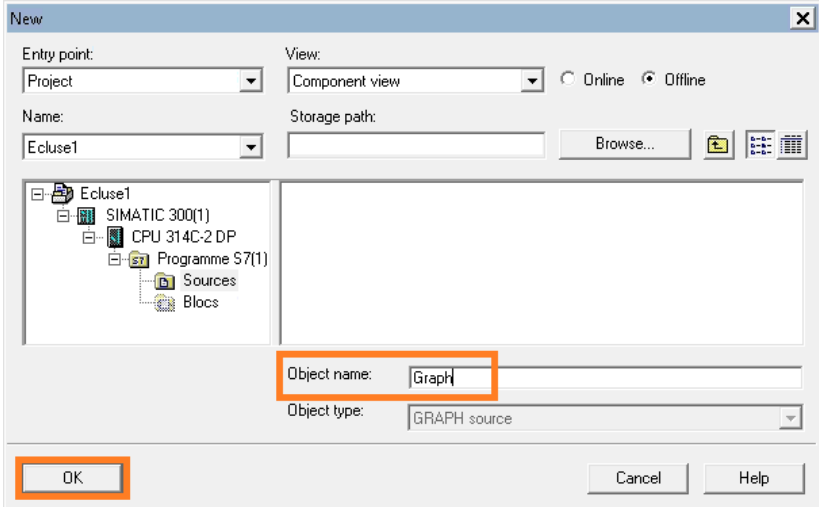
If your controller application contains safety-related blocks, export those blocks in a separate **AWL** file. Refer to Safety-Related Applications, page 63 for details.

# Creating GR7 Files

The **.GR7** sources must be created for each GRAPH blocks separately. Repeat the following procedure for each GRAPH block to be exported.

| Step | Action |
|------|--------|
| 1 | Right-click a GRAPH object and select **Open Object**.<br><br> |
| 2 | From the menu, select **File > Generate Source File**. |

| Step | Action |
|---|---|
| 3 | Provide a name for the GRAPH object.  |
| 4 | Click **OK** to confirm. |
| 5 | Repeat the procedure for each GRAPH object to be exported. |
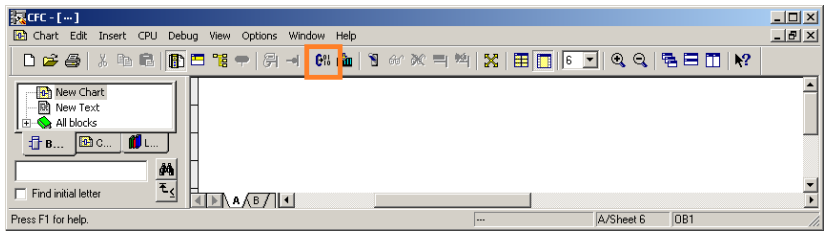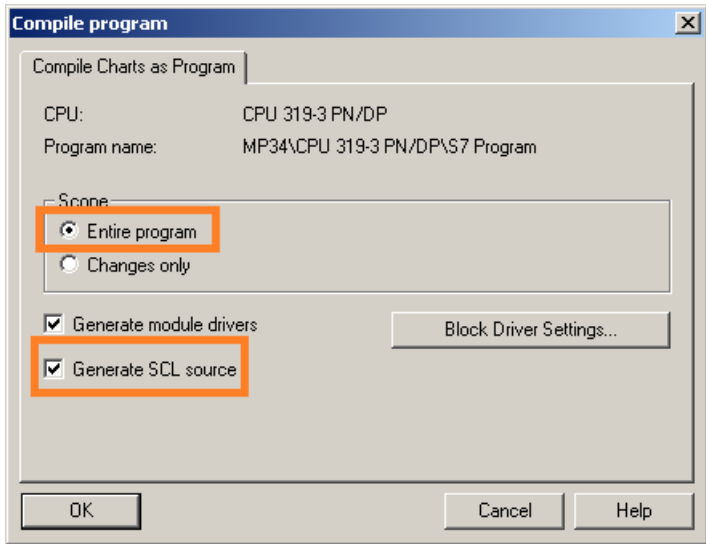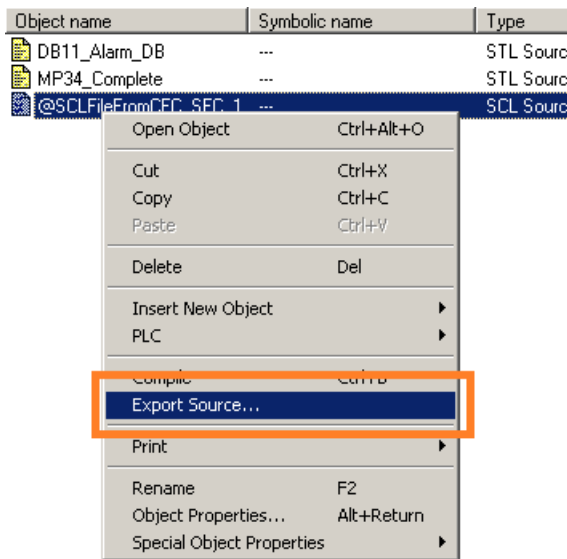
# Creating a CFG File

The CFG file is required for analyzing the communication and the hardware configuration of the station.

| Step | Action |
|---|---|
| 1 | Double-click your controller links in the main window to open NetPro. |
| 2 | In the NetPro window, double-click the controller of the station to be exported open the HW Config utility. |
| 3 | From the **Station** menu, select **Export…** to export your station configuration (leave the default settings in the dialog box). |

# Creating a SCL File for CFC Codes

If the controller application contains CFC code, compile the code to generate the corresponding SCL source file which is the file to be processed with EcoStruxure Control Engineering tools.
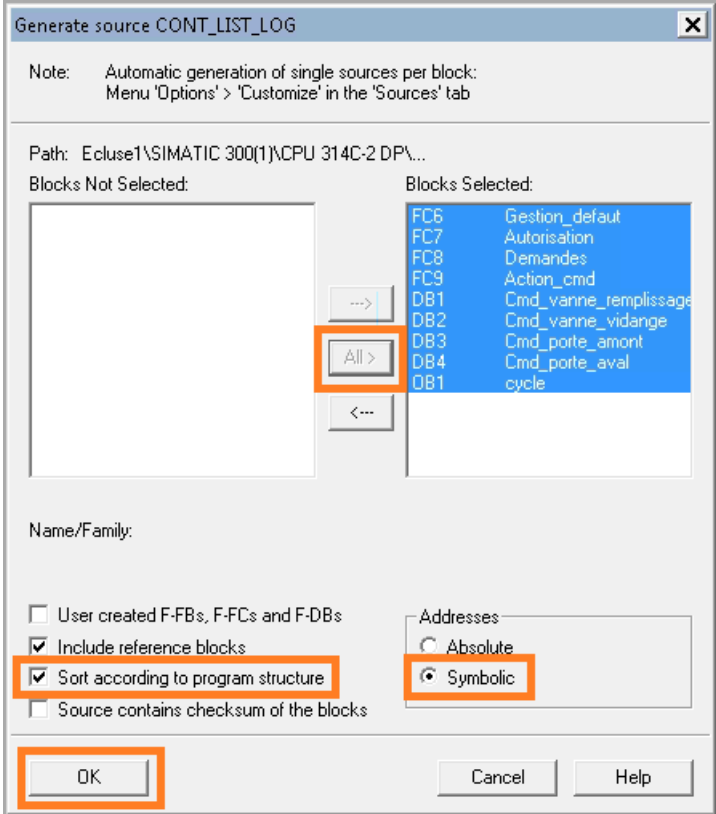
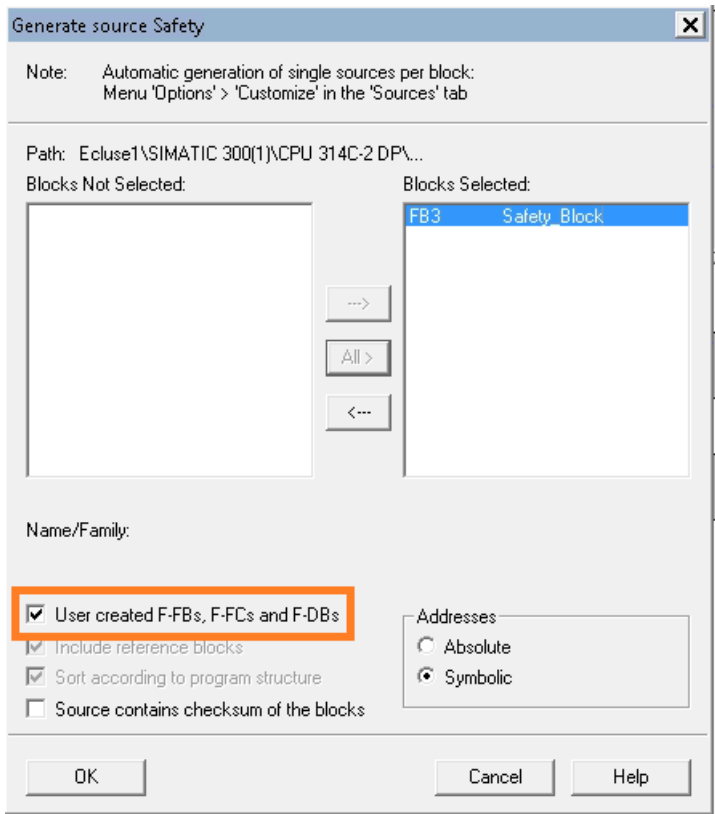| Step | Action |
|---|---|
| 1 | Open the CFC code editor by clicking its icon in the toolbar of the main window.<br><br> |
| 2 | Compile the code with the options **Entire program** and **Generate SCL sources** and click **OK**.<br><br> |
| 3 | The generated SCL source file can then be exported like other source files (refer to Exporting Files, page 66).<br><br> |

# Safety-Related Applications

A safety-related controller application contains two code parts:

- The non-safety-related code part
- The safety-related code part
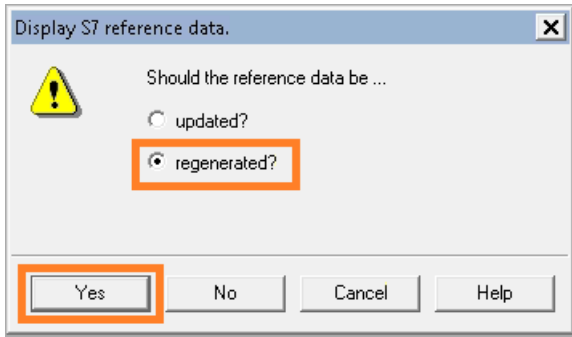
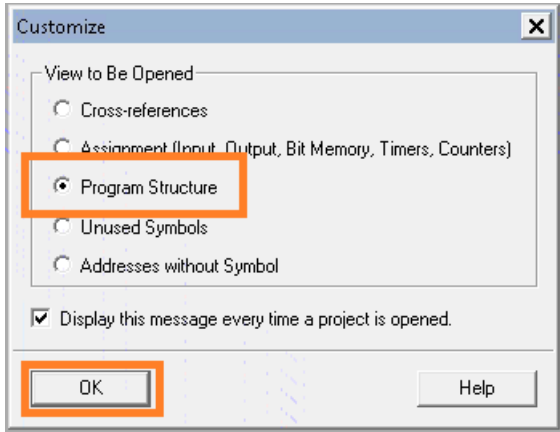Procedure for exporting controller applications that contain safety-related code:

| Step | Action |
|---|---|
| 1 | Export the **.ASC** file that contains the database for the safety-related code and for the non-safety-related code (refer to Creating an ASC File, page 59). |
| 2 | Generate the sources for the non-safety-related code parts (refer to Creating an AWL File, page 59 and Creating a GR7 File, page 61). |
| 3 | Click **All** to select all program blocks and select the options **Sort according to program structure** and **Symbolic** addresses.<br><br> |
| 4 | Click **OK** to confirm. |
| 5 | Follow the procedure for Creating an AWL File, page 59 until the dialog box **Generate source Safety** is displayed. |

| Step | Action |
|------|--------|
| 6 | Select the option **User-created F-FBs, F-FCs and F-DBs** and click **OK** to confirm. |



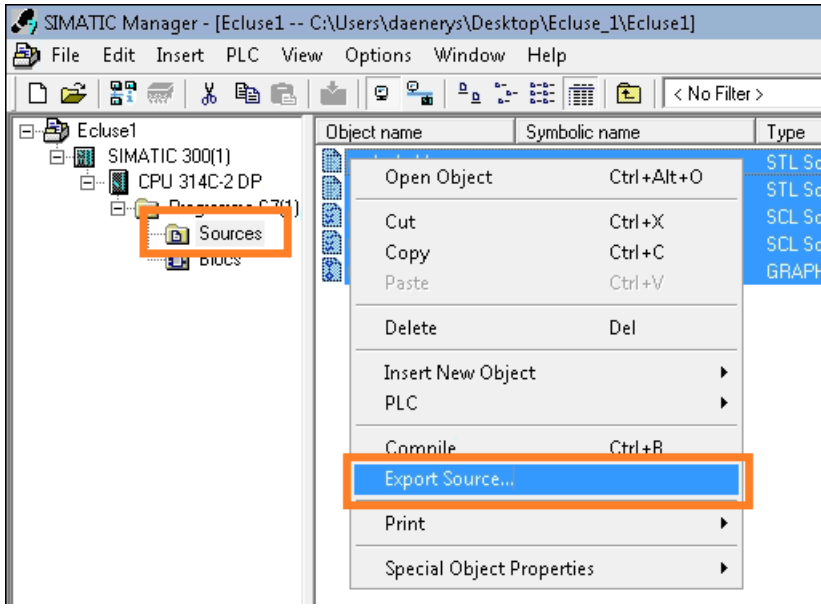| Step | Action |
|------|--------|
| 7 | Create a **.dif** file (refer to Creating a dif File, page 65). The **.dif** file is used to determine whether code is safety-related. |

# Creating a dif File

A **.dif** file is created in the SIMATIC Manager of SIMATIC STEP 7 in the following way:

| Step | Action |
|------|--------|
| 1 | From the menu, select **Options > Reference Data > Display**. |
| 2 | In the **Display S7 reference data** dialog box, select the option **regenerated?** and click **Yes**. |

| Step | Action |
|------|--------|
| 3 | In the **Customize** dialog box, select the option **Program Structure** and click **OK** to display the program structure.<br><br> |
| 4 | From the menu, select **View > Export** to open the **Save** dialog box. |
| 5 | Provide a name for the **.dif** and click **Save**. |

# Exporting Files

After you have created the files, export them from SIMATIC STEP 7:

| Step | Action |
|------|--------|
| 1 | Select the LIST, GRAPH (or **.AWL** and **.GR7** files) and SCL sources that you have generated. |
| 2 | Right-click the sources and select **Export source…**.<br><br> |
| 3 | Select a file name and a storage location and click **Save**. |

# Siemens TIA Portal SIMATIC STEP 7 (.ZIP File Export)

Export the Siemens TIA Portal SIMATIC STEP 7 controller application to a ZIP export file in order to be processed with EcoStruxure Control Engineering tools.

The export can be performed automatically with the EcoStruxure Control Engineering - Import/Export tool. Select **SUPPORT > DOWNLOADS**.

Refer to the EcoStruxure Control Engineering - Import/Export user guide for details on the export procedure.

As standards, specifications, and design change from time to time, please ask for confirmation
of the information given in this publication.

EIO0000004426.08