EcoStruxure Machine Expert Twin

Communication

User Guide

EIO0000005046.01
10/2025

www.se.com

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.

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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.

About the Document

Document Scope

This document provides information on how to configure connections to controllers or higher level systems for different communication protocols. For further information, refer to the separate documents provided in the EcoStruxure Machine Expert Twin online help.

Validity Note

This document has been updated for the release of EcoStruxure Machine Expert Twin V2.3.

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

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

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

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.

EcoStruxure Machine Expert Twin is a simulation and emulation software suite to create digital models of real machines to start the virtual design, virtual pre-commissioning, and to support co-development before building the machine – thus enabling parallel engineering of mechanical, electrical and controls work assignments.

The simulation, emulation and machine visualization functions of EcoStruxure Machine Expert Twin are intended to support you in developing your application and its configuration by simulating the behavior of the various machine or process components. These functions are not intended to substitute for, but to complement the processes of risk assessment, risk evaluation, validation, and commissioning as well as any ancillary processes, tasks, and obligations according to the applicable regulations and standards such as ISO/EN 13849 and IEC 62061. The product, though powerful, does not, nor can it, simulate every aspect of the application and its environment.

⚠WARNING

INSUFFICIENT TEST COVERAGE

- Do not use EcoStruxure Machine Expert Twin as the sole means for risk assessment, risk evaluation, validation, and commissioning as well as any ancillary processes, tasks, and obligations according to the applicable regulations and standards such as, but not limited to, ISO/EN 13849 and IEC 62061.
- Verify and validate your results on the intended equipment before placing your machine or process into service.

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

Based on the system configuration and operation, a hazard and risk analysis must be conducted for the system (for example, according to ISO 12100 or ISO 13849-1) independent of the work with EcoStruxure Machine Expert Twin. The results of this analysis must be considered when designing the machine, and subsequently applying safety-related equipment and safety-related functions. The results of your analysis may deviate from any digital models of physical machines that you may create. For example, additional safety components may be required. In principle, the results from the hazard and risk analysis have priority.

⚠WARNING

NON-CONFORMANCE TO SAFETY FUNCTION REQUIREMENTS

- Specify the requirements and/or measures to be implemented in the risk analysis you perform.
- Verify that your safety-related application complies to applicable safety regulations and standards.
- Make certain that appropriate procedures and measures (according to applicable sector standards) have been established to help avoid hazardous situations when operating the machine.
- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Validate the overall safety-related function and thoroughly test the application.

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

Catalogs contain important data, parameters and operational aspects of the devices defined within. This information is subject to change over time for a variety of reasons. Therefore, it is necessary to maintain the relationship between the models you create and the catalogs you have used to do so. Version mismatches of catalogs may cause your models to operate in ways that are incongruent with the equipment they represent and may lead to errors in design and operation.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

- Impose a system of file name conventions that readily indicate the version of the catalogs you use and models you create.
- Create documentation that records catalog and model versions, as well as firmware versions of the equipment used in your models.

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

In addition, changes to your underlying application (logic, data address, functions, I/O configurations, device types and configuration, etc.) can have serious impact on the models you have created.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

- Update your models every time you modify your application or change the physical hardware configuration.
- Verify that objects you have created in your models are coherent with the modifications and/or changes you have made to your application and that they are associated with the correct variables.

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

It is also important to connect to the correct automation logic/motion controller in a networked, multi-controller environment.

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION Verify that you have connected to the intended automation controller. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

It is important to manage the amount of data that is transmitted between your automation logic/motion controller and EcoStruxure Machine Expert Twin. Large amounts of data, or data that is not contiguous in the controller memory may impact performance of EcoStruxure Machine Expert Twin, the controller or both.

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

Refer to the Cybersecurity Guidelines for EcoStruxure Machine Expert, Modicon and PacDrive Controllers and Associated Equipment User Guide.

NOTE: 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.

Related Documents

Document title	Reference
Cybersecurity Best Practices	CS-Best-Practices-2019-340
Cybersecurity Guidelines for EcoStruxure Machine Expert, Modicon and PacDrive Controllers and Associated Equipment	EIO0000004242
EcoStruxure Machine Expert Twin Getting Started - User Guide	EIO0000005022 (ENG)
EcoStruxure Machine Expert Twin How to Create Device Catalogs - User Guide	EIO0000005034 (ENG)
EcoStruxure Machine Expert How to Emulate - User Guide	EIO0000004858 (ENG)
Modicon M262 Logic/Motion Controller Programming Guide	EIO0000003651 (ENG) EIO0000003652 (FRE) EIO0000003653 (GER) EIO0000003654 (SPA) EIO0000003655 (ITA) EIO0000003656 (CHS)

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 61496-1:2020	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

Standard	Description
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

What’s in This Part

General Information

What's in This Chapter

General Information

Overview

EcoStruxure Machine Expert Twin provides the **Connections** view that allows you to create connections to your controllers or higher level systems. A general description of the **Connections** view is provided in the EcoStruxure Machine Expert Twin Getting Started User Guide.

This document provides detailed information on how to configure the individual connection types for the supported communication protocols.

Supported Communication Protocols

By default, the following communication protocols are supported:

Address-based communication protocols:

- **Siemens**
- **Modbus**
- **Serial (Raw)**
- **XCom**

  NOTE: For address-based communication protocols, perform the configuration offline before a connection can be established.

Tag-based communication protocols:

- **Beckhoff ADS**
- **Ethernet/IP - CIP Browsable**
- **OPC UA Client**

  NOTE: For tag-based communication protocols, establish a connection to the controller to display the available variables.

Messages-based communication protocols:

- **STC/ETX**
- **3964R**
- **RFC 1006**

Configuring Connections

You can configure a connection in two steps:

1. Create and manage connections in the **Connections** view.
2. Select a connection in the **Connections** view and configure the corresponding settings in the **Properties** view.

Both the **Connections** and the **Properties** views provide general settings and commands that apply to all types of connections. They are listed in this chapter. The settings and commands that are specific to a certain type of connection are listed in the individual chapters.

General Commands of the Connections View

The **Connections** view provides the following general commands in the contextual menu upon right-clicking a connection in the list:

Command	Description
Connect All / **Disconnect All**	Connects / disconnects all controllers simultaneously provided that you have entered an IP address for each connection. You can exclude connections from this command by activating the **Ignore When Connection All** option in the **Properties** view of the connection.
Connect / **Disconnect**	Connects to / disconnects from the selected controller.
Delete	Deletes the connection.

General Parameters of the Properties View

The **Properties** view provides the following general parameters when a connection is selected in the **Connections** view:

Parameter	Description
Identification	
Id	An identification number is assigned to each connection and is displayed in the **ID** column of the **Connections** view. To customize the identification number, edit the string in this field.
Name	A name is assigned to each connection and is displayed in the **Name** column of the **Connections** view. To customize the name, edit the string in this field.
Type	The type of connection is entered as fixed value and cannot be edited.
Communication	
Auto Connect	Select the check box to establish the selected connection automatically when opening the EcoStruxure Machine Expert Twin project.
Auto Connect Delay	When **Auto Connect** is selected, enter a delay (in ms) that must elapse after the EcoStruxure Machine Expert Twin project has been opened before the attempt to establish the connection.
Ignore When Connection All	Select the check box to exclude the selected connection when running the **Connect All** or **Disconnect All** command from the contextual menu of the **Connections** view. With the check box selected, you must select this connection and run the **Connect** or **Disconnect** command individually to establish or terminate the connection. You can also double-click the connection to perform the action.

Configuring Connections

What’s in This Part

Address-based Communications

What's in This Chapter

Modbus Connection

Creating a Modbus Connection

To create a Modbus connection, proceed as follows:

Step	Action
1	In the **Connections** view, right-click inside the table and run the **Modbus** command from the contextual menu. **Result**: A new row is added to the table with **Protocol** = **Modbus**.
2	Select this row and configure the connection in the **Properties** view.
3	In the **Communication** section: • For the parameter **IP Address**, enter the IP address of the Modbus server. • For the parameter **Port Number**, enter the number of the port (by default, 502).
4	To configure a Modbus address for this Modbus connection, you can create, for example, a **Kinematic Axis Motor** in the **Solution Explorer** and configure the **Forward** variable in the **Properties** view to be provided by the controller. From the **Source** parameter list, select the Modbus register type: **Coils**, **Discrete Inputs**, **Holding Registers** or **Input Registers**, then: • Enter a Modbus **Address**, for example, `1`. • Enter a Modbus **Bit No.**, for example, `0`.
5	In the **Connections** view, right-click the row you created for the **Modbus TPC** connection, and run the **Connect** command from the contextual menu. **Result**: The message **Insecure Connection** is displayed because Modbus communication is not encrypted.
6	To establish a Modbus connection, click **Yes**. **Result**: After the connection to the controller is established, you will see **Status** = **Connected** displayed in the Modbus connection row within the **Connections** view.

Modbus-Specific Commands of the Connections View

When you right-click the Modbus connection in the list, the **Connections** view provides the following Modbus-specific commands in the contextual menu:

Command	Description
Enable Logging / **Disable Logging**	To create a log file for Modbus communication with the selected controller, run the **Enable Logging** command. This creates a log file in the folder *%localappdata%\Schneider Electric\Machine Expert Twin \2\Work\Logs*. Run the **Disable Logging** command to stop writing log entries to this file.
Truncate Log	Run the **Truncate Log** command to write truncated log entries to the Modbus log file.
Import (PLC x)	Run the **Import (PLC x)** command to open an **Import Schneider configuration** dialog box that allows you to browse your file system for an **.XSY* file for importing an address configuration.
Show PLC Inputs / **Show PLC Outputs**	Run the **Show PLC Inputs** / **Show PLC Outputs** commands to open separate **Inputs** and **Outputs** views for monitoring. The **Show PLC Inputs** / **Show PLC Outputs** commands are only visible in the contextual menu when you are connected to a Modbus TCP server and input addresses or output addresses are configured in your project. To configure the update frequency and to switch from the table to the tabbed view, see Modbus-Specific Settings in the **Properties** View, page 19.
Cleanup Addresses	Run the **Cleanup Addresses** command to remove the addresses configured for this connection. A confirmation dialog box is displayed; click **Yes** to remove the addresses.
Alarms	Run the **Alarms** command to open the **Alarm Scheme** dialog box (see the EcoStruxure Machine Expert Twin Getting Started User Guide for details). Click **Add** to add an alarm for a specific **Address** and **Bit** and enter text in the **Description** field. Your description is displayed in the **Alarms** view (see the EcoStruxure Machine Expert Twin Getting Started User Guide for details) when the alarm is detected at the configured **Address** and **Bit** for the connection. In the status bar at the bottom of the **Model** view, the describing text is also indicated when the alarm is detected and is extended by the connection name.

Modbus-Specific Settings in the Properties View

The following settings of the **Properties** view are specific to Modbus connections:

Parameter	Description
I/O Window	
Update Frequency	Enter a value (in ms) specifying the update interval for the values displayed in the I/O monitoring (**Show PLC Inputs** and **Show PLC Outputs**) views. Default value: 500 ms **NOTE:** Consider the impact this polling frequency can have on the performance of the Modbus server when modifying the value.
Tabbed I/O Window	Select this check box to display the values in the I/O monitoring views in a tabbed view instead of the default table view.
Tab Size	When the **Tabbed I/O Window** check box is selected, enter a value defining the number of addresses per tab. Default value: 100 addresses per tab
Addressing	
Word Swap Enabled	Configure the interpretation of data types that use more than one WORD size according to the little endian or the big endian convention. This setting must comply with the convention used by the Modbus master. Default value: The check box is cleared. Data types requiring two WORD size are interpreted according to the little endian convention. Example: The addresses of the axis positions of the Lexium Cobot are of data type REAL and thus require two WORD size. The two WORD data fields are provided according to the big endian convention. Thus, for communication with the Lexium Cobot, select the check box.
Communication	
Port Number	Enter the port number for the Modbus connection (by default, 502).
IP Address	Enter the IP address of the Modbus master server.
Auto Re-Connect	Select this option to perform automatic reconnection attempts when the Modbus connection is interrupted.
Auto Re-Connect Delay	Enter a delay for starting the first reconnection attempt after the connection has been interrupted and between the individual reconnection attempts. Default value: 5000 ms
Infinite Re-Connect attempts	Select this option for an unlimited number of reconnection attempts. The waiting time between each attempt is defined by the **Auto Re-Connect Delay** parameter.
Auto Re-Connect Max. attempts	Enter a maximum number of reconnection attempts. The waiting time between each attempt is defined by the **Auto Re-Connect Delay** parameter. Default value: 5
Slave	
Address	Enter an address value if a specific value is required by your Modbus master server. Otherwise you can leave the default value 255 unchanged. Value range: 1...255

For a description of the general settings, refer to General Parameters of the **Properties** View, page 15.

Tag-based Communications

What's in This Chapter

OPC UA Connection

Prerequisites

As a prerequisite for creating an OPC UA connection, an OPC UA server must be configured on your controller and must be started.

- For a description of the procedure required for starting the emulation of Schneider Electric controllers from EcoStruxure Machine Expert, refer to the *How to Emulate User Guide* in the EcoStruxure Machine Expert online help.
- For information about starting an OPC UA server on a PacDrive LMC controller, refer to the *OPC UA Server Configuration* in the *LMC Device Objects and Parameters* part of the EcoStruxure Machine Expert online help.
- For information about starting an OPC UA server on a Modicon M262 Logic/Motion Controller, refer to the *OPC UA Server Configuration* in the *M262 Logic/Motion Controller - Programming Guide* in the EcoStruxure Machine Expert online help.

Creating an OPC UA Connection

To create an OPC UA connection, proceed as follows:

Step	Action
1	In the **Connections** view, right-click inside the table and run the command **OPC UA Client** from the contextual menu. **Result**: A new row is added to the table with **Protocol** = **OPC UA**.
2	Select this row and configure the connection in the **Properties** view.
3	In the **Communication** section, edit the **OPC Server Address** parameter to enter the IP address and the port of the controller you want to connect to. Use the following format as an example, using the default port 4840: `opc.tcp://127.0.0.0:4840`
4	In the **Connections** view, right-click the row you created for the **OPC UA** connection and run the **Connect** command from the contextual menu.
5	Enter the **Username** and **Password** in the **OPC UA Credentials** dialog box. **NOTE:** If anonymous login is allowed by the OPC UA server, select the check box **Anonymous Login** in the **Properties** view, page 21 to avoid this dialog box for future logins. **Result**: The message **Untrusted Certificate** is displayed.
6	Verify that you are about to connect to the correct URL and you trust the certificate. Click **Yes** to proceed or **No** to cancel. **Result**: After the connection to the controller is established, you can see **Status** = **Connected** displayed in the row of the selected connection. The available tags are read from the OPC UA server, as indicated in the **Logs** view by the messages **Started reading tags** and **Finished reading tags**. The controller variables can be selected within EcoStruxure Machine Expert Twin. Subscribed controller variables are listed in the **Outputs** view (for details, refer to the EcoStruxure Machine Expert Twin Getting Started User Guide).

OPC UA-Specific Commands of the Connections View

The contextual menu of the **Connections** view does not provide any OPC UA-specific commands apart from those described in General Commands of the **Connections** View, page 15.

OPC UA-Specific Settings in the Properties View

The following settings of the **Properties** view are specific to OPC UA connections:

Parameter	Description
Communication	
Auto Re-Connect	Select this option to perform automatic reconnection attempts when the OPC UA connection is interrupted.
Auto Re-Connect Delay	Enter a delay for starting the first reconnection attempt after the connection has been interrupted and between the individual reconnection attempts. Default value: 5000 ms
Infinite Re-Connect attempts	Select this option for an unlimited number of reconnection attempts. The waiting time between each attempt is defined by the **Auto Re-Connect Delay** parameter.
Auto Re-Connect Max. attempts	Enter a maximum number of reconnection attempts. The waiting time between each attempt is defined by the **Auto Re-Connect Delay** parameter. Default value: 5
Anonymous Login	If anonymous login is allowed in the OPC UA server (for details, refer to the description of the **Disable anonymous login** parameter in the *OPC UA Server Configuration* in the *M262 Logic/Motion Controller - Programming Guide* in the EcoStruxure Machine Expert online help) select this check box to avoid entering credentials.
Communication Interval	Enter the minimum delay (in ms) that must elapse between the OPC UA client data requests sent to the OPC UA server. Default value: 16 ms **NOTE:** Consider the impact this polling frequency can have on the performance of the OPC UA server when reducing the value. If you transfer a large amount of data using an OPC UA connection, consider increasing the polling frequency to avoid slowing down the performance of the OPC UA server.
OPC Server Address	Enter the IP address and the port of the controller you want to connect to. Use the following format as an example, using the default port 4840: `opc.tcp://127.0.0.0:4840`
Use Publish-Subscribe	Select this check box to activate the publish/subscribe data exchange between the OPC UA client and server.

For a description of the general settings, refer to General Parameters of the **Properties** View, page 15.

Glossary

D

digital twin:

A digital twin refers to a virtual representation or digital replica of a physical object, system, or process. It is a digital counterpart that simulates the behavior, characteristics, and performance of its physical counterpart in real-time or historical contexts. The concept of a digital twin allows for the integration of the physical and digital worlds, enabling organizations to monitor, analyze, and optimize the performance of their assets or processes.

EcoStruxure Machine Expert Twin provides features for visualization, simulation, and emulation of machines and automation lines throughout the complete lifecycle.

E

emulation:

Based on the *ISO 24765-2017 International Standard - Systems and software engineering--Vocabulary*, emulation is defined as the use of a data processing system to imitate another data processing system, so that the imitating system accepts the same data, executes the same programs, and achieves the same results as the imitated system.

M

Model view: In EcoStruxure Machine Expert Twin, the **Model** view provides the graphical representation of the scene.

P

physical simulation: The physical simulation is a software library that is designed to simulate and model physical systems in a computer-generated environment. It is used to create realistic and dynamic animations and simulations of objects, environments, and interactions between them. In EcoStruxure Machine Expert Twin the physical simulation uses mathematical algorithms to simulate physical phenomena, such as gravity, friction, and collision detection.

project: An EcoStruxure Machine Expert Twin project file is saved with the extension **.experior*. It contains the information about assemblies, connections, loads, settings.

S

scene: In the EcoStruxure Machine Expert Twin context, a scene is a representation of a set of assemblies interacting with loads.

simulation:

Based on the *ISO 24765-2017 International Standard - Systems and software engineering--Vocabulary*, simulation describes two concepts:

- A model that behaves or operates like a given system when provided a set of controlled inputs.
- The use of a data processing system to represent selected behavioral characteristics of a physical or abstract system.

In the context of this manual, the term simulation is used whenever it is referred to modeling physical systems in EcoStruxure Machine Expert Twin.

STEP: (STandard for the Exchange of Product model data) This ISO 10303 standard specifies a standard file format for 3-D models and allows for product data exchange across different platforms.

U

URDF: (unified robotics description format) A special type of eXtensible Markup Language (XML) file that includes the physical description of a robot and contains information on the mechanical structure, joints, 3-D modelling graphics, motors and colliders. URDF files are provided by numerous robotic manufacturers for download. EcoStruxure Machine Expert Twin allows importing URDF files for integrating third-party robots into a project without manual programming.

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