



EcoStruxure™ Machine Expert

Software for developing, configuring,
and commissioning the entire machine
in a single software environment

Quick access to product information

Get technical information about your product

References

Modicon TM3
I/O expansion modules for Modicon controllers
Analog I/O modules

Number and type of channels	Input range	Output range	Resolution	Input terminal block (I)	Output terminal block (O)	Reference	Weight (kg)
2 voltage/current inputs	±15...±10 VDC 0...20 mA/4...20 mA	16 bits 0V 10 bits ± sign	16 bits 0V 10 bits ± sign	0.5 m	0.5 m	TM3A12H	0.110
4 voltage/current inputs	±15...±10 VDC 0...20 mA/4...20 mA	12 bits 0V 10 bits ± sign	12 bits 0V 10 bits ± sign	0.5 m	0.5 m	TM3A12H	0.110
4 voltage/current or temperature inputs (T)	±15...±10 VDC 0...20 mA/4...20 mA	12 bits 0V 10 bits ± sign	12 bits 0V 10 bits ± sign	0.5 m	0.5 m	TM3A12H	0.110
4 differential temperature inputs (T)	±15...±10 VDC 0...20 mA/4...20 mA	12 bits 0V 10 bits ± sign	12 bits 0V 10 bits ± sign	0.5 m	0.5 m	TM3A12H	0.110
4 differential temperature inputs (T)	±15...±10 VDC 0...20 mA/4...20 mA	12 bits 0V 10 bits ± sign	12 bits 0V 10 bits ± sign	0.5 m	0.5 m	TM3A12H	0.110

Each commercial reference presented in a catalog contains a hyperlink. Click on it to obtain the technical information of the product:

- Characteristics, Dimensions and drawings, Mounting and clearance, Connections and schemas, and Performance curves
- Product image, Instruction sheet, User guide, Product certifications, and End of life manual

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All products Industrial Automation and Control PLC, PAC and Dedicated Controllers Distributed Input/Output (I/O) Modules Modicon TM3

View all Modicon TM3

TM3A12H

Module TM3 - 2 analog inputs high resolution

Show more characteristics >

Related Software >

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Product Datasheet User guide Catalogue CAD Document

Characteristics Documents and Downloads Technical FAQs Additional Information Dimensions Drawings >

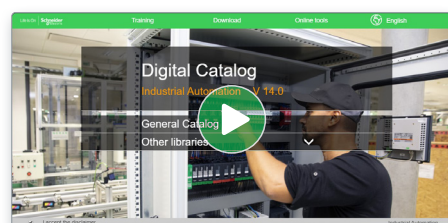
Main

range of product Modicon TM3

product or component type Analog input module

range compatibility Modicon M251

Find your catalog



- > With just 3 clicks, you can access the Industrial Automation and Control catalogs, in both English and French
- > Consult digital automation catalogs at [Digi-Cat Online](#)

General Catalog

Products, Services, PLCs, I/O, and more

Books, Catalogs and Interfaces

Signaling Devices

HMI (Terminals and Industrial PC)

Sensors & RFID System

Motor Starters and Load Management

Components for Motor Starters

Variable Speed Drives & Soft Starters

Motor Control & Robotics

Interface, Measurement & Control Relays

PLC, PAC & other Controllers

Industrial Automation

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A single software environment to automate machines

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To be competitive in today's digital era, machine builders must be innovative. Smart machines, those that are better connected, more flexible, more efficient, and safe, are enabling machine builders to innovate in ways never before possible.

EcoStruxure, Schneider Electric's open, IoT-enabled architecture and platform, offers powerful solutions for the digital era. As part of this, EcoStruxure Machine brings powerful opportunities for machine builders and OEMs, empowering them to offer smart machines and compete in the new, digital era.

EcoStruxure Machine brings together key technologies for product connectivity and edge control on premises, and cloud technologies to provide analytics and digital services. EcoStruxure Machine helps you bring more innovation and added value to your customers throughout the entire machine life cycle.

Innovation at Every Level for Machines is full systems across three layers:

- Connected products
Our connected products for measuring, actuating, device level monitoring, and control adhere to open standards to provide unmatched integration opportunities and flexibility
- Edge Control
We are IIoT-ready with a proven set of tested and validated reference architectures that enable the design of end-to-end open, connected, and interoperable systems based on industry standards. Ethernet and OPC UA facilitates IT/OT convergence meaning machine builders reap benefits from web interfaces and cloud.

- Apps, Analytics & Services
Seamless integration of machines to the IT layer allows the collection and aggregation of data ready for analysis – for machine builders and end users alike this means increased uptime and the ability to find information faster for more efficient operations and maintenance.

These levels are completely integrated from shop floor to top floor. And we have cloud offers and end-to-end cybersecurity wrapped around.

EcoStruxure Machine makes it easier for OEMs/ machine builders to offer their customers smarter machines. The advent of smart machines is driven by the changing needs of end users:

- Evolving workforce
- Reducing costs
- Dynamic markets
- Shorter life cycles
- Prioritizing functional safety and cybersecurity

EcoStruxure Machine provides one solution for the whole machine life cycle:

- With Smart Design & Engineering the time to market is reduced by up to 30% using our automated engineering and the simulation capabilities
- During Commissioning & Operation of the machine, resources such as energy, material and loss can be improved, and with seamless integration to the IT world efficiency can be improved by up to 40%
- Smart Maintenance & Services reduces the time for corrective actions up to 50%

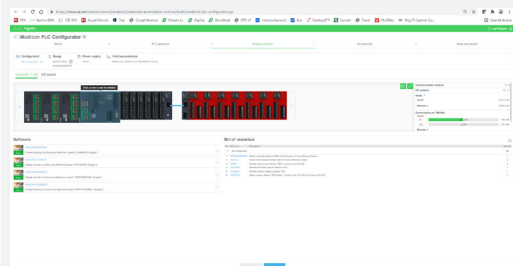
EcoStruxure™ Machine



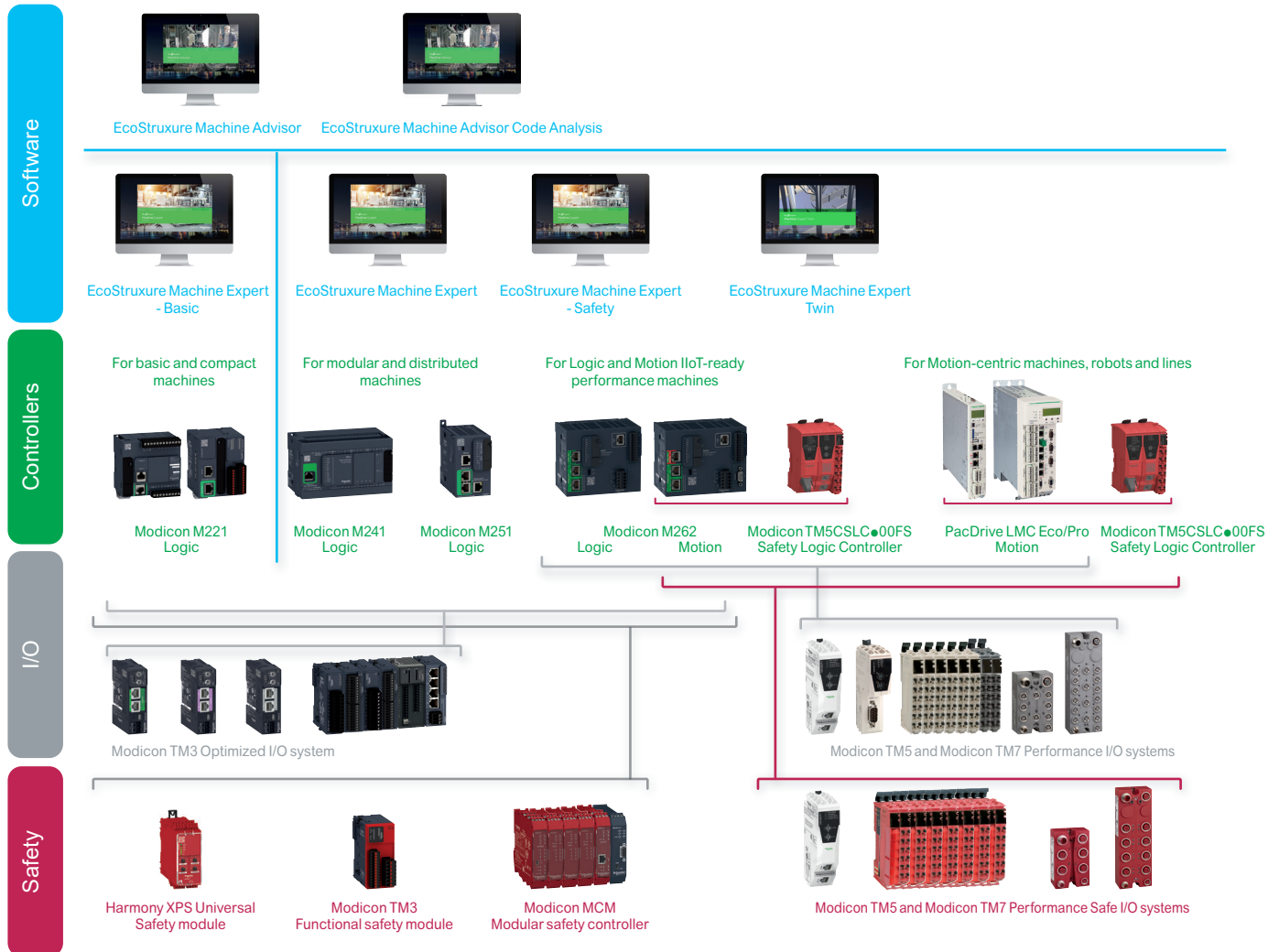
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EcoStruxure Machine Expert

A single software environment to automate machines
Controllers for industrial machines

Applications		Type	Logic controller			Logic / Motion controller	Motion controller	
		Specification	For hardwired architectures	For performance-demanding applications	For modular and distributed architectures	IIoT ready for performance machines	For automating machines/lines with 0 - 130 servo or robot axes	
								
Memory			640 KB RAM, 2 MB Flash	64 MB RAM, 128 MB Flash	64 MB RAM, 128 MB Flash	192 MB RAM, 256 MB Flash	128 KB to 256 KB NV RAM, 512 MB DDR2 to 1 GB DDR3L	
Supply voltage			24 V $\overline{\text{---}}$ or 100...240 V $\sim$	24 V $\overline{\text{---}}$ or 100...240 V $\sim$	24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	
Communication fieldbus and networks		Embedded	EtherNet/IP Adapter Modbus TCP RS 232/RS 485 Serial Line USB mini-B programming port	EtherNet/IP Modbus TCP CANopen (master) and SAE J1939 Serial Line USB mini-B programming port	EtherNet/IP Modbus TCP CANopen (master) and SAE J1939 Serial Line USB mini-B programming port	EtherNet/IP Modbus TCP Sercos III Serial Line USB mini-B programming port	EtherNet/IP Sercos III CANopen Profibus Profinet EtherCAT	
		OPC Unified Architecture (OPC UA)	—	Server	Server	Server (encrypted) Client (encrypted) (depending on reference)	Server (encrypted) Client (encrypted)	
		Optional	1 Serial Line	Ethernet Profibus DP	Ethernet Profibus DP	Ethernet, EtherNet/IP Adapter CANopen Master	CANopen Profibus DP RT-Ethernet	
Embedded I/O		Input types	Up to 40 logic inputs 2 analog inputs	Up to 24 logic inputs	—	4 fast digital inputs	Up to 20 digital inputs Up to 16 touch probe inputs Up to 4 interrupt inputs Up to 2 analog inputs	
		Output types	Up to 16 relay outputs Up to 16 transistor outputs	Up to 16 transistor outputs	—	4 fast digital outputs	Up to 16 digital outputs Up to 2 analog outputs	
Synchronized axes			—	—	—	Up to 24 synchronized axes	Up to 130 synchronized axes	
Configuration software			EcoStruxure Machine Expert-Basic	EcoStruxure Machine Expert				
Compatible expansion I/O module ranges (Consult the catalog)		Local I/O Remote I/O Distributed I/O on Ethernet	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	—	
			Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	—	
			Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM5 (DIA3ED2131204EN)	
		Distributed I/O on CANopen	—	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN) Modicon TM5 (DIA3ED2131204EN) Modicon TM7 (DIA3ED2140405EN)
			—	—	—	Modicon TM5 (DIA3ED2131204EN)	Modicon TM5 (DIA3ED2131204EN)	
			Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	—	
Distributed I/O on Sercos Distributed I/O on Modbus Serial Line Safety I/O	—	—	—	Modicon TM5 (DIA3ED2131204EN)	Modicon TM5 (DIA3ED2131204EN)			
	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Modicon TM3 (DIA3ED2140109EN)	Safety I/Os are only supported by the Motion variant of M262 Modicon TM3 (DIA3ED2140109EN) Modicon TM5 (DIA3ED2131204EN) Modicon TM7 (DIA3ED2140405EN)	Modicon TM5 (DIA3ED2131204EN) Modicon TM7 (DIA3ED2140405EN)			
Controller range			Modicon M221/M221 Book	Modicon M241	Modicon M251	Modicon M262	PacDrive LMC Eco, LMC Pro2	
More details on our website		Consult the catalogs	DIA3ED2140106EN	DIA3ED2140107EN	DIA3ED2140108EN	DIA3ED2180503EN	DIA7ED2160303EN	
		Try the configuration tool	 > Select your architecture of controller and I/O by - Usage and application - Connectivity, services and IIOT (Protocols, WeB and communication services) - I/O - Power supply					

Machine Automation



Machine control

The scalability and consistency of I/O ranges allow you to select the right offer depending on your needs

Embedded Safety provides holistic solutions to Modicon M262 and PacDrive 3 LMC motion controllers, increasing overall safety demand in Machine Automation

All of those devices are managed within a single software, **EcoStruxure Machine Expert**, a powerful and collaborative engineering environment

- > From basic to motion- and robot-centric machines with the PacDrive 3 offer, Modicon controllers and solutions bring a consistent and scalable response to achieving flexibility, performance, productivity and digitization.
- > Modicon TM3 Optimized I/O system for more compact and modular machines
- > Modicon TM5 for more performance-demanding machines, with Modicon TM7 for harsh environments: Both Performance I/O ranges (Modicon TM5 and Modicon TM7) allow safety functions to be implemented using Modicon TM5CSLC●00FS safety logic controller
- > Modicon TM5CSLC●00FS safety logic controllers are suitable safety option for Medium to large size applications with Motion safety functions
- > Harmony XPS Universal safety modules cover a wide range of safety functions, suitable for small applications with 4-5 safety functions, with diagnostic information provided to controllers via a single wire connection
- > Modicon TM3 safety functional modules are suitable for small applications covering E-Stop functions and diagnostics via TM3 I/O bus
- > Modicon MCM modular safety controllers are suitable for medium size applications with up to 64 dual channel safety functions and diagnostics via Modbus TCP, Modbus RTU, EtherNet/IP, CANopen, EtherCAT and Profibus
- > EcoStruxure Machine Expert – Safety: an optional add-on for programming TM5CSLC●00FS safety logic controllers
- > EcoStruxure Machine Expert – Basic: a software for programming Modicon M221 logic controllers, an intuitive standalone environment accessible to basic skilled technicians
- > EcoStruxure Machine Advisor: a cloud-based services platform designed for machine builders to track machines in operation worldwide, monitor performance data and resolve exceptional events

Machine Automation

Comprehensive Schneider offers for machine builders

- > Lexium servo drives, motors and robotics are designed to control applications ranging from a single independent axis up to high-performance synchronized multi-axis machines requiring high-speed and precise positioning and movements



[Multi carrier systems](#)



[Robotics](#)



[Integrated drives](#)

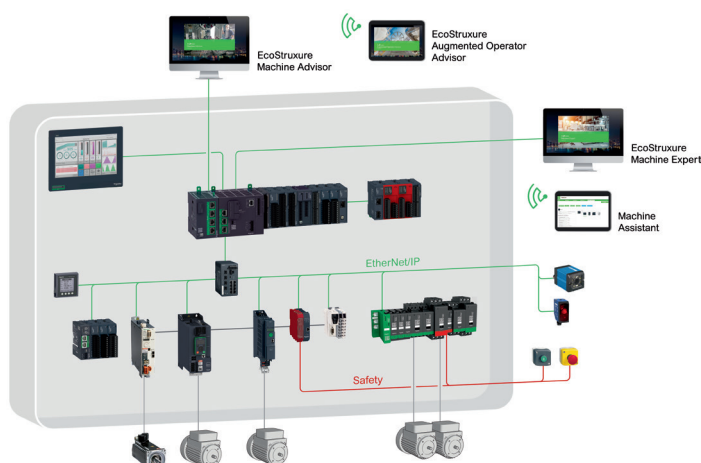


[Servo Drives & Motors](#)



[Steppers Drives & Motors](#)

- > The Lexium offer is designed for a broad range of motion-centric machines in applications such as [Packaging](#), [Material Handling](#), [Material Working](#), [Food and Beverage](#) and Electronics



- > Schneider Electric has developed Tested Validated & Documented Architectures (TVDA) applicable for generic machine control applications as well as for dedicated segment applications such as Packaging, Material Working, Material Handling, Hoisting, Pumping, or generic [Machine Control applications](#)

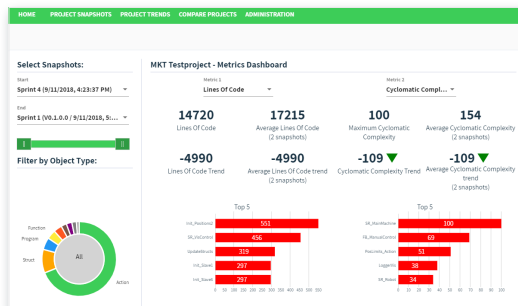
Choose Schneider Electric to help secure your investment and benefit from worldwide services at every step of your project



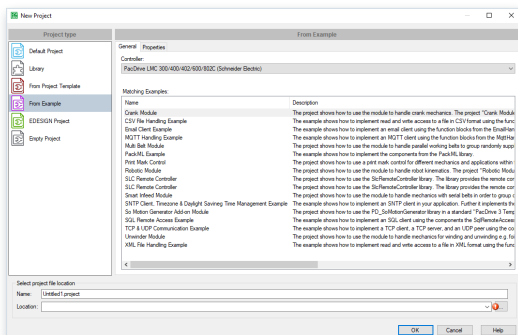
- > From planning and inception to modernization, we help ensure optimal technical and business performance. Our field service engineers combine 30+ years of manufacturer-level experience with the latest technology to bring innovation to every level of our offer and every step of your project.
- > Our machine control dedicated services empower you to maximize your business infrastructure and face increasingly stringent demands on productivity, safety, equipment availability and performance optimization.



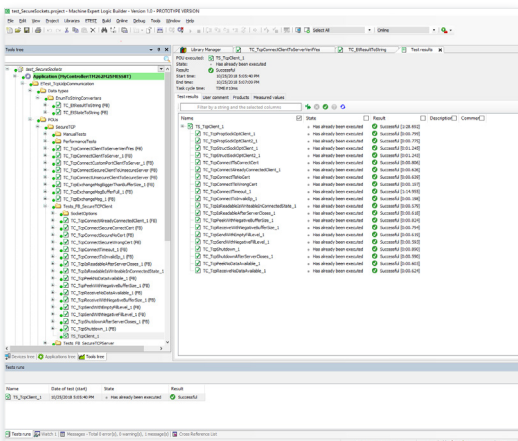
EcoStruxure Machine Expert V2.1 programming software



Cloud based code analysis



New project



ETEST result view

Presentation

EcoStruxure Machine Expert (1) V2.1 is the machine builder's solution software for developing, configuring, and commissioning the entire machine in a single software environment, including logic control, motion control, remote IO systems, safety programming, motor control, and related network automation functions.

- **EcoStruxure Machine Expert** is a single software environment:
 - One software package
 - One project file
 - One connection
 - One download operation
- It covers the full engineering lifecycle:
 - Version management
 - Testing
 - Deployment
 - Diagnostics and remote services
 - In addition Machine Expert interfaces with various engineering tools via open interfaces
- It supports all the IEC 61131-3 languages, integrated fieldbus configurators, expert diagnostic and debugging functions, motion design as well as multiple capabilities for commissioning, maintenance and visualization.

Capacities

EcoStruxure Machine Expert introduces innovative features for efficient machine development:

- Collaborative work with **SVN** client
- New **IIoT** standard libraries (MQTTs, HTTPs, JSON...) to connect the controller to web APIs, our cloud services ([EcoStruxure Machine Advisor](#)) or third party systems. Project examples and function templates help the usage of these technologies.
- **EcoStruxure Machine Advisor Code Analysis**: a cloud based service, integrated into EcoStruxure Machine Expert, to track deviations from your code quality over the life time of the application.
- **EcoStruxure Machine Expert Code Analysis**: a [plugin](#) to improve coding efficiency, code quality coding consistency in teams and now uses cloud technology to store the evolution of your code quality:
 - Check code convention using standard or customized rules
 - Understand the DNA of the code with structured graphical code exploration and identify critical sections in the code
 - Get metrics with quality indicators
- New Functional view in the project tree to program machines in a modular way
- Python programming language interface:
 - Increase Programming Efficiency, by automating development and project generation
 - Integrate **Machine Expert** in the company's individual environment and automatize workflows
- **ETEST** framework for higher quality of application code, thanks to automated IEC software unit test
- Import projects from **SoMachine** and **SoMachine Motion** software
- Import projects from **SoSafe Programmable** and **Machine Expert** (earlier version) software
- New HTML5 browser responsive documentation accessible offline or online from any smart device with an internet connection
- Multi Carrier configurator:
 - Single editor to configure the complete Lexium™ MC12 multi carrier
 - Including automatic generation of emulation data
 - Integrated digital twin for emulation

HMI programming

EcoStruxure Machine Expert V2.1 embeds:

- > EcoStruxure Operator Terminal Expert to program a wide range of Harmony industrial HMI
- > Vijeo-Designer: an optional installation of the HMI application development tool
- > A Webvisu editor to design and program a visualization screens that are running on the controller's runtime. A controller Webvisu can be accessed remotely via any web browser on many different devices (computers, tablets...)

(1) *EcoStruxure Machine Expert* is the new name and the next release of the three-engineering software: **SoMachine** and **SoMachine Motion** and **SoSafe Programmable**, now merged into one single environment.

Configured controllers with EcoStruxure Machine Expert software

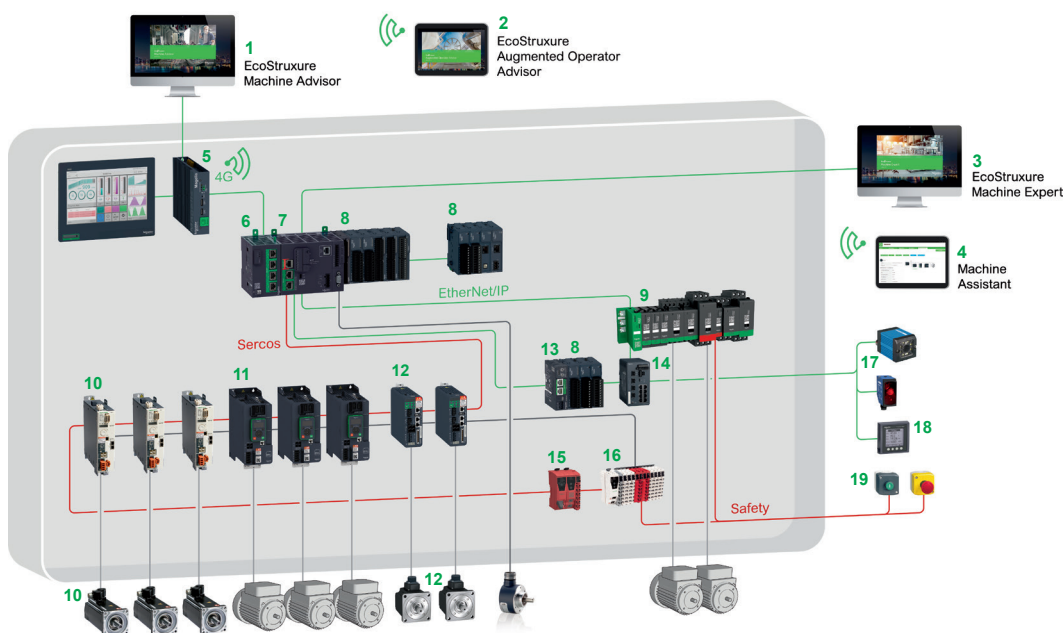
- > Motion controllers: PacDrive 3 LMC/Modicon M262, Please visit [Motion Controllers](#) website
- > Logic controllers: Modicon M241/M251, Please visit [PLC Programmable Logic Controllers](#) website
- > HMI controllers: Harmony SCU, Please visit [HMI Controllers](#) website

Configured devices with EcoStruxure Machine Expert software

Devices can be easily inserted to the project from the Hardware catalog window using simple drag & drop.

- > Servo drives: Lexium 28/32/52/62/SD3, Please visit [Servo Drives and Motors](#) website
- > Integrated drives: Lexium ILA/ILE/ILS, Lexium 62 ILM/32i, /ILD detached, Please visit [Integrated Drives](#) website
- > Robotics: Lexium T/P/PAS/CAS/TAS/MAX/Cobot, Please visit [Robotics](#) webpage
- > Transportation system: Lexium MC12 multi carrier, Please visit [Multicarrier systems](#) webpage
- > I/O systems: Modicon TM3/TM5/TM7, Please visit [Input/Output. I/O\) modules for PLC Controllers](#) webpage
- > Safety logic controllers: Modicon TM5CLC●00FS (See catalog ref. [DIA3ED2131204EN](#))
- > HMI: Harmony XBTGH/GK/GTO/GTU/GTUX/STU, Harmony iPC, Please visit [Human Machine Interfaces](#) website
- > Variable speed drives: Altivar Machine ATV320/ATV340, Please visit [Low Voltage AC Machine Drives](#) website, Altivar Process ATV600/ATV900, Please visit [Low Voltage AC Process Drives](#) website
- > Sensors: RFID sensors XG, Vision sensors XUW, Please visit [RFID and Inductive Identification Systems](#) website
- > Battery-less and wireless pushbuttons: Harmony XB5R/XB4R, Ø 22 mm), Please visit [Industrial Wireless Remote Control](#) website)
- > Connected load management system: Please visit [Tesy island](#) website

Managed architecture with EcoStruxure Machine Expert software



Solution breakdown

- | | |
|--|---|
| 1 EcoStruxure Machine Advisor Digital Services for machines | 10 Lexium 32 Servo drives and BMH/BSH servo motors |
| 2 Ecostruxure Augmented operator Advisor Augmented reality for instant diagnosis and contactless maintenance | 11 Altivar Machine ATV340 Variable speed drive |
| 3 EcoStruxure Machine Expert Software | 12 Lexium 28 Servo drives and BCH2 servo motors |
| 4 Machine Assistant Programming guide (part of Ecostruxure machine Expert software) | 13 Modicon TM3 Ethernet bus coupler |
| 5 Harmony iPC Touchscreen display and IIoT Edge Box | 14 Modicon Switch Managed switch |
| 6 Modicon TMSE4 smart communication module | 15 Modicon TM5 Safety logic controller |
| 7 Modicon M262 Logic / Motion controller | 16 Modicon TM5 Sercos interface module and I/O modules (digital, analog and safety I/O) |
| 8 Modicon TM3 Expansion modules (digital, analog and Expert I/O) | 17 Telemecanique Photoelectric/Vision sensors |
| 9 TeSys island Digital multifunctional load management solution | 18 PowerLogic Power Meter |
| | 19 Harmony® XB5 Plastic pushbutton and Emergency stop |

Functions

Related functions configured with EcoStruxure Machine Expert V2.1 software

Hardware related functions can be configured:

- > Discrete, analog I/O: from simple IO to sophisticated features like controller to controller communication.
- > High speed counter (HSC) inputs
- > High speed outputs:
 - Pulse width modulation (PWM)
 - Pulse generator (PLS)
 - Pulse train output (PTO)
 - Frequency generator
- > Communication ports (Ethernet, Sercos III, serial links):
 - Ethernet: EtherNet/IP, Modbus TCP client and server, Exchange table
 - Sercos III bus
 - Serial links: Modbus RTU or ASCII, ASCII protocol, Display
 - The Modbus Serial IO Scanner and Modbus TCP IO Scanner protocols are used to automatically configure an Altivar variable speed drive, other Schneider devices, or a generic device.

Learning, Training and Examples

From the help menu, several tools and links help you to get started with EcoStruxure Machine Expert. This section provides content access to both beginners and advanced users to learn how to use and take advantage of the software:

Discover:

- Project examples and their documentation
- Project templates
- How to guides
- Video tutorials to be consulted on [YouTube](#)

Project management

The project management function is used to:

- > Create a new project from scratch or by using project templates or examples
- > Open a project from the PC (hard disk, CD-ROM, USB flash drive, etc.)
- > Retrieve a project from a controller (logic, safety, motion or motor controller) or a servo drive
- > Open a project from former SoMachine or SoMachine Motion versions
- > Open a Twido or M221 project using conversion tools
- > Print a project as a customized report

It is possible to define additional project specific information properties (company & creator details, project protection information, application information...), attach documents and custom or configuration pictures.

The software also supports automatic versioning.

Installation

- > EcoStruxure Machine Expert software can be installed directly from the cloud.
- > Either perform a full installation or select the components you need.
- > **Schneider Electric Installer** downloads the required components only, from [Schneider Electric website](#). It is updated and improves installation performance and the possibility to change installed languages.

Offline installation from a local folder is also possible.

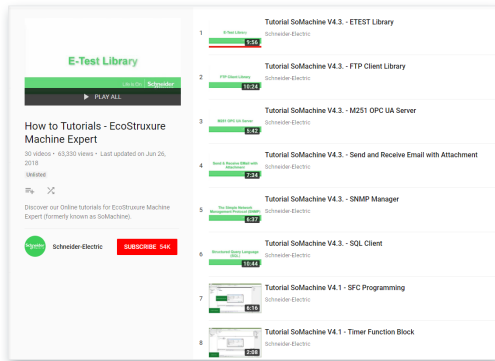
Application Function Block (AFB) libraries for dedicated solutions

EcoStruxure Machine Expert includes application function block libraries for selected machines. Their simple configuration speeds up design, commissioning, installation, and troubleshooting.

These libraries cover the following applications:

-  Packaging
-  Hoisting
-  Handling
-  Pumping
-  Material working

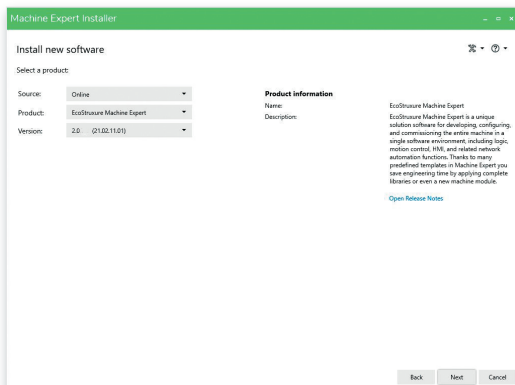
and more ...



Video tutorials on [YouTube](#)



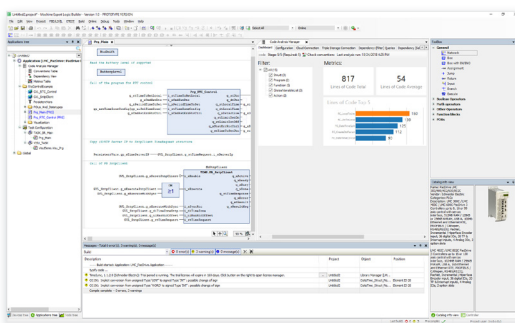
Video tutorials on [YouTube](#)



[Schneider Electric Installer](#)



Download installer



Logic Builder

Characteristics (Depending on the controller capabilities)		
Feature		Description
IEC 61131-3 programming languages		■ IL (Instruction List) ■ LD (Ladder Diagram) ■ SFC (Sequential Function Chart) ■ ST (Structured Text) ■ FBD (Function Block Diagram) ■ CFC (Continuous Function Chart)
Programming services		■ Multi-tasking: Cyclic, Fast, Event ■ Functions (Func) and Function Blocks (FBs) ■ Data Unit Types (DUTs) ■ On-line changes ■ Watch windows ■ Graphical monitoring of variables (trace) ■ Breakpoints, step-by-step execution ■ Simulation ■ Visualization for application and machine set-up ■ "ETEST" automated unit testing system to improve the quality of the application
HMI-based services		■ Graphics libraries containing more than 4,000 2D and 3D objects ■ Simple drawn objects (points, lines, rectangles, ellipses, etc.) ■ Preconfigured objects (button, switch, bargraph, etc.) ■ Recipes (32 groups of 256 recipes with max 1,024 ingredients) ■ Action tables ■ Printing ■ Java scripts ■ Multimedia file support: wav, png, jpg, emf, bmp ■ Variable trending
Motion control	For PacDrive LMC motion controllers	■ Motion design (cam editor/motion, intelligent line shaft, software motion generator...) ■ Ready to use function blocks for motion applications like:  Multi-belt  Smart infeed  Unwinder  Crank  Robotics - and more...
	For Modicon M262 motion controllers	■ SM_Drive_PosControl - Get a library for Modicon M262 to run position control loop - Extended Motion library (EXM): Providing a position feedback and configuring the control loop get the velocity setpoint to a drive controlled in velocity mode - Benefit to get a position control for low performance applications (position accuracy, low dynamics...) without servomotor control ■ MC_CamIn Enhancement - Gets Slave position (Y) from Master position (X) - Supports MC_DigitalCamSwitch - Supports Master/Slave Scaling Input - Supports cubic interpolation - Support linear interpolation for non-equidistant curve table
PLCopen MC		■ PLCopen Motion Control Function Blocks Motion and drive function block libraries for variable speed drives, servo drives, and stepper drives ■ Visualization screens for commissioning
Global services		■ User access and profile ■ Project documentation printing ■ Project comparison (control) ■ Variable sharing based on publish/subscribe mechanism ■ Library version management ■ Machine energy efficiency monitoring
Integrated Fieldbus configurators	     	■ Fieldbus - EtherNet/IP - Modbus TCP - Modbus Serial link - Sercos III - CANopen (supported CANopen protocols: J1939, CANmotion) - EtherCAT - PROFINET - PROFIBUS

Characteristics (Depending on the controller capabilities)

Feature	Description
Connectivity services and networks	■ FTP Client library The controller can send or get files to/from a FTP server on the network ■ Encrypted Secure FTPs server Some controllers also have an embedded FTPs server ■ SQL Client library To read or write in the databases from the controller ■ Machine to cloud connectivity - MQTT Handling (Message Queue Telemetry Transport) - JSON (JavaScript Object Notation), a lightweight data-interchange format ■ HTTPs library To access to web services/servers, call APIs and push data to cloud services in a secure, simple and standard way ■ Secured Email library To send and receive emails with attachments to/from the controller ■ SNMP Manager (Simple Network Management Protocol) To control or read information about SNMP devices on the network ■ TCP/UDP library ■ SNTP (Simple Network Time Protocol) Client function blocks for synchronizing the clock with other systems ■ OPC UA Server embedded in the controller, for direct communication with OPC UA clients - PacDrive motion controllers: - Multiple Symbol Sets and Rights for OPC UA communication - Arrays and Data Structures supported in OPC UA communication - Modicon M262 motion controllers: - New improvement in library OPC UA Handling, providing to M262 the new feature to call methods (function blocks) implemented in OPC UA servers. Modicon M262 is able to run function blocks with complex functions implemented inside OPC UA servers. It enables Modicon M262 to do one more step in "Machine to Machine" (M2M) communication via OPC UA. ■ File Format utility library - For reading and writing XML (eXtended Markup Language) and CSV (Character Separated Values) files - To simplify and standardize communication between the controller and external systems
Expert and solutions libraries	■ PLCopen function blocks for motion control. Examples: MC_MoveAbsolute, MC_CamIn, ServoDrive, etc. ■ Packaging function blocks. Examples: analog film tension control, rotary knife, unwinder, AutoTune etc.. ■ PackML library (Packaging Machine Language) ■ Material handling: tracking, turntable, conveyor, multi belt, smart infeed, etc. ■ Hoisting functions: - Hoisting function blocks: anti-sway, anti-crab, hoisting position synchronization, etc. - Application template for industrial crane ■ Pumping application: - Pumping function blocks: cavitation protection, friction loss, PID, stage/destage functions, etc. - Application template for booster ■ Material working and processing: application templates, rotary knife, flying shear, temperature monitoring, etc. ■ Robotics Library - Twin Communications Library with robotics support - OPC UA connection to Machine Expert Twin is generated by smart Template based on an updated Twin communication library – with Lexium P, T Delta robots available in Machine Expert Twin - Motion profile - Current: Jerks appearing with concatenated motions with different motion parameters as acceleration drops to 0 for one Sercos cycle - NEW: An additional motion profile improves performance and reduces stress on the mechanic for concatenated motions with different motion parameters - 3D Tracking - Current: Tracking of objects along a predefined path (conveyour). Supports anticipatory pick and place positions - Free tracking allows to track freely moving objects in X,Y,Z + rotation of an auxiliary axis, e.g. to track objects on multi carrier continuously even in straight curve transitions - Smart Template: Integrated vision system configuration - Integrated in standard projects - Supported by Robotic Toolbox since Machine Expert 2.0.3 - Supports Encryption configuration

Characteristics (Depending on the controller capabilities)	
Feature	Description
Expert and solutions libraries <i>(continued)</i>	■ IIOT cloud communication - Provides objects to facilitate the implementation of the communication with an IoT cloud server - EcoStruxure Machine Advisor – Monitoring API - Recording of data and creating a data message in Charlie format (JSON) - Publishing of data (values) to the API - Supported protocols: MQTTs and HTTPs ■ OAuth support in HttpHandling library - HttpHandling library supports the OAuth protocol V2.0 - OAuth (Open – Authorization) supports a standardized and secure API authorization for client applications. - Supported flows (grant types) in HttpHandling library: - Resource – Owner – Password flow - Client – Credentials flow - Supports Refresh Token to renew an invalid or expired Access Token - Supported controllers: Modicon M262 and PacDrive LMC (https)
Advanced software development	■ Source Code Management with Subversion (SVN) for collaborative work on the same project ■ Import/Export in PLC Open format ■ EcoStruxure Machine Expert Code Analysis - Analyzes the application code with semantic web technologies which understand the DNA of the code and identify code pain-points to rework - Stores the result of your code analysis to a cloud repository and follow the evolution of your code quality over the time ■ Python programming interface to automate development tasks and project generation - Python interface for Lexium MC12 Multi carrier, enabling methods/properties such as import/export, Sync (to device, to code, ...), Add/Remove/modify objects (segments, tracks, stations...) ■ Functional View to develop a machine project (code and devices) into modules and reuse them
Software Tools	■ Software tools are installed with EcoStruxure Machine Expert to assist Machine Builders at every step of the machine lifecycle: - Design & engineering, - Commissioning & operation, - Maintenance & service ■ Controller assistant - Manage the firmware and application without opening EcoStruxure Machine Expert - Create images and backup of the controller ■ Schneider Electric Installer To install, modify, upgrade and uninstall EcoStruxure Machine Expert software suite ■ License manager - Activate and manage licenses for all Schneider Electric licensed products - Support registration and license transfer ■ Software Update - Online notification of all available updates and news about the installed Schneider Electric software products - Download and install updates, patches, and extensions from the web ■ Diagnostics Be informed of the machine status, including save operations, device parameters, the state of the I/O, and a graphic view of the Sercos III ring architecture ■ Device assistant - Firmware manager for Lexium servo drives ■ Logic Builder Diff Viewer A tool to differentiate 2 source codes ■ Motion Sizer A tool for CAM design and power unit dimensioning Includes a product selector feature out of more than 13000 products (Drives, Motors, and Gearboxes)
Transparency – FDT/DTM	EcoStruxure Machine Expert is a FDT (Field Device Tool) container and supports standard DTM (Device Type Manager) files. This allows any device having a DTM to be configured inside EcoStruxure Machine Expert software, and reduces the number of tools to use to configure a machine.



Download installer

EcoStruxure Machine Expert software V2.1

EcoStruxure Machine Expert software V2.1 can be downloaded and installed for free, using the [Schneider Electric installer](#).

At the end of a 42-days trial period, EcoStruxure Machine Expert becomes in "maintenance mode": a license is required to continue to use it.

- > Some maintenance features remain available and free of access and do not require a license
- > EcoStruxure Machine Expert software is available in 9 languages: English, French, German, Italian, Japanese, Portuguese, Simplified Chinese, Spanish, and Turkish
- > Operating systems for engineering PC: Microsoft Windows® 8.1 Professional 64-bit, Microsoft Windows® 10 Professional 64-bit
- > Documentation is supplied in electronic format: complete online help with complementary documentation in online version:
<https://product-help.schneider-electric.com/Machine%20Expert/V2.1/LandingPages/en/index.html>.

Software licenses description			
	Free (No license)	STANDARD license	PROFESSIONAL license
Basic maintenance tools Open project, save, program offline, compile, download program, view online status Maintenance tools...	☑	☑	☑
STANDARD programming features Debug/breakpoints, variable forcing, pause, online change, manage project archive, Web visu, 3D Visualization, offline documentation ... ETEST limited, J1939, OPC UA server. Expert libraries...	Trial (1)	☑	☑
Advanced features Collaborative Work (SVN), ETEST full	Trial (1)	Trial (1)	☑
EcoStruxure Machine Expert Code Analysis	Trial (1)	Trial (1)	Trial (1)
Robotic libraries and toolbox	Trial (1)	–	☑
Machine Safety maintenance Former SoSafe Programmable maintenance software	☑	☑	☑
Machine safety development Former SoSafe Programmable software	Trial (1)	Trial (then EcoStruxure Machine Expert – Safety license is requested)	Trial (then EcoStruxure Machine Expert – Safety license is requested)
HMI design EcoStruxure Operator Terminal Expert	Trial (1)	☑	☑
Emulation and 3D Visualization Ecostruxure Machine Expert Twin	☑	☑	☑

(1) Trial period lasts 42 days.



Modicon TM5CSLC300FS safety logic controller

EcoStruxure Machine Expert – Safety addon

EcoStruxure Machine Expert – Safety (former SoSafe programmable software) is the software addon to program Modicon TM5CSLC●00FS safety logic controllers (1). This addon is to be installed via **Schneider Electric Installer**.

Apart from the maintenance features, a dedicated license is required to program this controller.

- > Modicon TM5CSLC●00FS safety logic controllers are suitable for safety applications requiring distributed safety connected to physical input/output devices over Sercos III common network and certified up to EN ISO 13849-1 PLe Category 4, and EN/IEC 62061 SIL3.
- > They can be added to PacDrive 3 or in a Modicon M262 Logic/Motion controller architectures.
- > The architectures comprises a PacDrive LMC motion controller or a Modicon M262 Motion controller (Sercos bus masters) and Modicon TM5CSLC safety logic controller (Sercos slave interface).
- > Modicon TM5CSLC safety logic controller manages the safety-related application over the Sercos III bus.
- > Input/outputs are connected to Sercos bus with the use of Modicon TM5 Sercos interface module.
- > Programming: Each hardware component is defined within EcoStruxure Machine Expert environment such as the controller, Modicon TM5 (1) and Modicon TM7 (2) safety I/O modules, Lexium 62 safety servo drives (3), and Lexium 62 ILM integrated drives with optional safety module (4). The application program and configuration of the safety hardware is managed within the EcoStruxure Machine Expert – Safety editor.

(1) Please refer to catalog Ref [DIA3ED2131204EN](#)

(2) Please refer to catalog Ref [DIA3ED2140405EN](#)

(3) Please refer to catalog Ref [DIA7ED2160305EN](#)

(4) Please refer to catalog Ref [DIA7ED2160306EN](#)



[DIA3ED2131204EN](#)



[DIA3ED2140405EN](#)



[DIA7ED2160305EN](#)



[DIA7ED2160306EN](#)

Reference

Software installation

Description

Schneider Electric Installer Setup software

References

Downloadable from our [website](#)

User licenses

Designation	Supported controller	License type	Reference		
			Portability	Seats	Digital (1)
EcoStruxure Machine Expert V2.1	- PacDrive 3 LMC Eco/Pro2 motion controllers - Modicon M241/M251 logic controllers - Modicon M262 Logic/Motion controllers - Harmony SCU HMI controllers	STANDARD license	Node Locked	Single (1 seat)	ESEEXPCZZSPAZZ
				Team (10 seats)	ESEEXPCZZTPAZZ
			Floating	Team (10 seats)	ESEEXPCZZTPBZZ
				Team (10 seats)	ESECAPCZZSPAZZ
		PROFESSIONAL license	Node Locked	Single (1 seat)	ESECAPCZZTPAZZ
				Team (10 seats)	ESECAPCZZEPAZZ
			Floating	Entity (100 seats)	ESECAPEZZEPAZZ
				University (100 seats)	ESECAPEZZEPBZZ
			Floating	Team (10 seats)	ESECAPEZZTPBZZ
				Entity (100 seats)	ESECAPEZZEPBZZ

Addon licenses

> **Safety addon licenses to program TM5CSLC●00FS safety logic controller** (Additional to EcoStruxure Machine Expert **STANDARD** or **PROFESSIONAL** licenses)

Designation	Supported controller	Description	Reference		
			Portability	Seats	Digital (1)
Safety	Modicon TM5CSLC●00FS safety logic controllers	- Creates complex logical conditions using logical functions and safety functions, such as muting, timer, counters, Emergency stop, light curtain etc. via a graphic configuration interface. - Can be installed from Schneider Electric Installer	Node Locked	Single (1 seat)	ESESAAACZZSPAZZ
				Team (10 seats)	ESESAAACZZTPAZZ
				Entity (100 seats)	ESESAAACZZEPAZZ
			Floating	Team (10 seats)	ESESAAACZZTPBZZ
				Entity (100 seats)	ESESAAACZZEPBZZ
ASi Safety	Modicon TM5CSLC●00FS safety logic controllers	Networking solution for connecting simple field I/O devices in discrete manufacturing and process applications using a single 2-conductor cable. AS-Interface Gateway gathers data from the AS-Interface network.	Node Locked	Single (1 seat)	ESESADCZZSPAZZ
				Team (10 seats)	ESESADCZZTPAZZ
				Entity (100 seats)	ESESADCZZEPAZZ
			Floating	Team (10 seats)	ESESADCZZTPBZZ
				Entity (100 seats)	ESESADCZZEPBZZ

> **Digital Multi-User (SVN) addon license** (For EcoStruxure Machine Expert **STANDARD** license owners: included in EcoStruxure Machine Expert **PROFESSIONAL** licenses)

Designation	Description	Reference		
		Portability	Seats	Digital (1)
Digital Multi-User (SVN)	- SVN acts as a control system for tracking changes to files, folders and directories. It is used to assist in recovering data and recording the history of changes made over time. - In addition to detailed recordings of changes and metadata for files and folders, Subversion's features include: - Easy implementation of new network functions - Consistent storage and handling of text and binary files - Efficient creation of branches and tags - Easy use with programming languages.	Node Locked	Team (10 seats)	ESESVNCZZTPAZZ
		Floating	Team (10 seats)	ESESVNCZZTPBZZ

(1) Digital licenses are delivered by e-mail after registering with Schneider Electric Customer Care Center.

Reference				
Addon licenses (continued)				
> ETEST full addon license (For EcoStruxure Machine Expert STANDARD license owners: included in EcoStruxure Machine Expert PROFESSIONAL licenses)				
Designation	Description	Reference		
		Portability	Seats	Digital (1)
ETEST full	■ Powerful innovative tool for improving the IEC program quality of your projects and helping to avoid potential setbacks throughout the life cycle of the machine. ■ Used to program unit tests simply within a EcoStruxure Machine Expert project and to enhance the robustness of the application program. ■ In the STANDARD license, ETEST framework is available but users are limited to program a maximum number of 5 test cases objects. ■ The ETEST full license addon allows STANDARD license owners to program unlimited number of ETEST test cases. ■ The PROFESSIONAL license owners can program unlimited number of ETEST test cases objects.	Node Locked	Team (10 seats)	ESEETTCZZTPAZZ
		Floating	Team (10 seats)	ESEETTCZZTPBZZ
> SQL Gateway addon license (Independent from any STANDARD or PROFESSIONAL licenses)				
Designation	Description	Reference		
		Portability	Seats	Digital (1)
SQL Gateway	■ To activate the standalone “SQL Gateway” tool. ■ To connect one or more controllers to one or more databases. ■ The machine can access a database remotely and read or write data with SQL syntax: the controller configured with EcoStruxure Machine Expert has an integrated SQL Client for connecting to one or more databases via the SQL gateway. ■ The SQL gateway runs on Microsoft Windows and is available in 9 languages: English, French, German, Italian, Japanese, Portuguese, Simplified Chinese, Spanish, and Turkish. It includes 42 days trial.	Node Locked	Single (1 seat)	SOMSQLCZZSPAZZ
		Floating	Single (1 seat)	SOMSQLCZZSPBZZ
			Team (10 seats)	SOMSQLCZZTPBZZ
> EcoStruxure Machine Advisor Code Analysis addon license (For STANDARD or PROFESSIONAL license owners)				
Designation	Description	Reference		
EcoStuxure Machine Advisor Code Analysis	■ Machine builders can track and improve the quality of their applications over their lifetime and avoid regression or deviation using Machine Advisor Code Analysis. ■ It provides software and cloud tools to analyze, understand and improve machine application code thanks to: - Graphical representation of the “code DNA” - Visualize code complexity and metrics - Check and avoid coding rules violations. ■ The frame work is integrated inside EcoStruxure Machine Expert and the analysis results are processed and stored on the cloud. The programmer can improve his application and also share the results to his team members. ■ With this one year validity addon license, users can: - Upload, analyze and monitor the results of one project inside the cloud portal - Multiple users can access the cloud portal and their company projects - Use all code analysis features (unlimited Convention tables, Dependency view and Metrics table) inside EcoStruxure Machine Expert desktop software for up to 100 computers.	Downloadable from our website		
> Ecostruxure Machine Expert Twin (For STANDARD or PROFESSIONAL license owners)				
EcoStruxure Machine Expert Twin – Visu	■ Emulation and 3D visualization integrated in EcoStruxure Machine Expert. ■ Test PLC application code of single mechatronic object like Lexium MC12 multi carrier or Lexium P4 Delta robots.	Consult catalog ref. DIA3ED2211202EN		

(1) Digital licenses are delivered by e-mail after registering with Schneider Electric Customer Care Center.

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DIA3ED2180701EN
June 2023 - V4.0