EcoStruxure Machine Expert - Basic V1.4

Release Notes

Original instructions

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www.se.com

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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 Book

Document Scope

This document contains important information about the hardware/firmware/software delivery of the product EcoStruxure Machine Expert - Basic and the history of previous Release Notes. Read the complete document before you use the product or products that are described herein.

Validity Note

The information in this Release Notes document is applicable only for EcoStruxure Machine Expert - Basic compatible products.

This document has been updated for the release of EcoStruxure™ Machine Expert - Basic V1.4.

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

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 Information

Product Information

Overview

EcoStruxure Machine Expert - Basic is a graphical programming tool, designed to help configure, develop, and commission programs for logic controllers.

Product Identification

Reference	Version
EcoStruxure Machine Expert - Basic	V1.4

Release History

Version	Release Date	Description
V1.3	April 2024	EcoStruxure Machine Expert - Basic V1.3
V1.2 SP1 Patch 1	March 2023	EcoStruxure Machine Expert - Basic V1.2 SP1 Patch 1
V1.2 SP1	June 2022	EcoStruxure Machine Expert - Basic V1.2 SP1
V1.2	June 2021	EcoStruxure Machine Expert - Basic V1.2
V1.1 Patch 1	October 2020	EcoStruxure Machine Expert - Basic V1.1
V1.1	September 2020	EcoStruxure Machine Expert - Basic V1.1
V1.0 SP2	March 2020	EcoStruxure Machine Expert - Basic V1.0 SP2
V1.0 SP1	July 2019	EcoStruxure Machine Expert - Basic V1.0 SP1
V1.0	January 2019	EcoStruxure Machine Expert - Basic V1.0

System Requirements

EcoStruxure Machine Expert - Basic V1.4 can be installed on a personal computer with the following hardware:

- Processor Core 2 Duo or greater
- RAM Memory 2 GB or greater
- Hard disk 1 GB or greater
- Display 1280 x 768 resolution or greater
- Mouse or compatible pointing device
- USB interface
- Internet access

EcoStruxure Machine Expert - Basic V1.4 can be installed on a personal computer with the following operating systems:

- Microsoft Windows 10 (64-bit processor)
- Microsoft Windows 11 (64-bit processor)

EcoStruxure Machine Expert - Basic requires Microsoft .NET Framework 4.7.2 or greater.

Installation Instructions

EcoStruxure Machine Expert - Basic requires administrator rights for installation.

Remove any USB connection between your PC and the controller, if any, while installing or uninstalling EcoStruxure Machine Expert - Basic.

For further information, contact your Schneider Electric support center.

New Release Information

Hardware/Firmware Information

Overview

Description	Firmware version
M221.mfw	1.14.1.0

New Features

No new features.

Mitigated Anomalies

ID	Description
MEBASIC-3435	Fixed an issue where the controller was not sending the DHCP renewal request by unicast.
MEBASIC-3520	Fixed an issue where the controller application failed to start when the data logging feature was enabled.

Known Operational Anomalies

No new operational anomalies.

Software Information

Overview

Description	Software version
EcoStruxure Machine Expert - Basic	1.4

New Features

- Microsoft Windows 11 (64-bit processor) is supported.
- Added password protection for User Defined Functions and User Defined Function Blocks.
- Added configuration tooltip for User Defined Function Blocks.
- Improved background program validation.

Mitigated Anomalies

ID	Description
MEBASIC-1701	Fixed an issue where some part of the code is lost when performing ladder to IL conversion.
MEBASIC-3319	Fixed an issue where the configuration for serial line devices is lost after opening a project by double clicking.
MEBASIC-3320	Fixed an issue with print report function when the project contains big function blocks.
MEBASIC-3495	Fixed a compilation error occurring when a symbol is used to index an array from IL program.
MEBASIC-3529	Fixed an issue where software incorrectly indicated that a program was modified since the last download, even when no changes were made.

Known Operational Anomalies

No new operational anomalies.

Additional Information

Overview

Documentation

Reference	Title	Document version
EIO0000003345	Modicon TM3 Expansion Modules - Programming Guide (EcoStruxure Machine Expert - Basic)	05

Mitigated Anomalies

Documentation

ID	Description
MEBASIC-3434	Corrected documentation regarding the behavior of TM3 modules connected after a TM3XREC1 module, when a communication error or a bus error occur.

Known Operational Anomalies

Documentation

No new operational anomalies.

Release Notes History

EcoStruxure Machine Expert - Basic V1.3

Hardware/Firmware Information

Description	Firmware version
M221	1.13.1.0

Hardware/Firmware New Features

No new features.

Software New Features

- **New option in System Settings**: Ladder Editor allows you to configure the number of rungs to store in memory in order to improve re-loading speed of rungs when scrolling through application. Default value is 25; maximum value is 200.

  NOTE: Set a smaller cache size value if memory usage of operating system needs to be reduced.
- **New System Bit**: System Bit %S32 enables the reset of device using CIP identity object in the Ethernet/IP protocol.
  - 0 – Disable device reset through CIP identity object
  - 1 – Enable device reset through CIP identity object

Software Mitigated Anomalies

ID	Description
MEBASIC-660	Slow loading of rungs in program editor when scrolling
MEBASIC-1732	PID status is not reflected correctly when the PV and SP are lower than 150
MEBASIC-1738	Modbus TCP IO Scanner values are not properly refreshed in the animation table after cable is disconnected
MEBASIC-3209	%EXCHG and %MSG Function Block are showing incorrect behavior after several resets
MEBASIC-3217	Serial Modbus IO Scanner showing incorrect behavior when a slave device is restarted
MEBASIC-3239	Incorrect compiler message shown for program with more than 120 labels
MEBASIC-3269	Proper validation of values that can be entered in Init Request for Generic device added under Modbus IO Scanner

Software Known Operational Anomalies

No new operational anomalies.

Documentation Mitigated Anomalies

No new operational anomalies.

Documentation Known Operational Anomalies

No new operational anomalies.

EcoStruxure Machine Expert - Basic V1.2 SP1 Patch 1

Hardware/Firmware Information

Description	Firmware version
M221	1.12.2.0

Hardware/Firmware New Features

No new features.

Software New Features

No new features.

Software Mitigated Anomalies

ID	Description
MEBASIC-1709	Cybersecurity improvement
MEBASIC-1717	

Software Known Operational Anomalies

No new operational anomalies.

Documentation Mitigated Anomalies

ID	Description
MEBASIC-663	Updated the documentation with details of the Bus Coupler diagnostics information.
MEBASIC-724	Updated the documentation related to the maximum quantity that can be send/receive using the *SEND_RECV_MSG* function block.
MEBASIC-800	Updated the documentation related to the Ethernet network configuration.
MEBASIC-943	Updated the documentation related to the HSC preset mode behavior.
MEBASIC-944	Updated the documentation with an explanation of the behavior of the device while replacing the battery.
MEBASIC-953	Updated the documentation related to the Modbus register 932 in TM3BCSL.
MEBASIC-1115	Updated the TM221 Hardware guide with information regarding new coin battery.
MEBASIC-1146	Updated the documentation with more information about the Modbus TCP IOScanner channel diagnostic codes.
MEBASIC-1336	Updated the documentation with details of the UDFB allocation.
MEBASIC-1464	Updated the documentation related to the HSC configuration and TM3D functional level configuration.

ID	Description
MEBASIC-1465	Updated the documentation with an explanation of the behavior of the TM3 Module output values after recovering from a timeout.
MEBASIC-1510	Updated the documentation related to the correction of the Maximum Frequency of the Frequency Generator.
MEBASIC-1511	Updated the documentation with a description of the application protection.
MEBASIC-1625	Updated the documentation with details of the Modbus TCP registers providing the information about TM3 modules attached to the TM3BCEIP.
MEBASIC-1628	Updated the documentation with ID codes of TM3 modules.

Documentation Known Operational Anomalies

No new operational anomalies.

EcoStruxure Machine Expert - Basic V1.2 SP1

Hardware/Firmware Information

Description	Firmware version
M221	1.12.2.0

Hardware/Firmware New Features

No new features.

Software New Features

New system words. System word %61 to indicate the Ethernet hardware ID. Values and firmware compatibility are as follows:

- 0 – Reserved for backward compatibility. Compatible with all firmware versions.
- 1 – Legacy. Compatible with all firmware versions.
- 2 – Type A. Compatible with firmware version 1.12.1.1 or later.

Software Mitigated Anomalies

ID	Description
MEBASIC-1269	With both **Timer Properties** and **Behavior** views open simultaneously, when **Functional Level** is changed to less than 12.0, it was possible to enable **Dynamic Preset** via the **Timer Properties** view, leading to inoperable timer blocks.
MEBASIC-1296	After printing a report of the project, the selections **Bus Coupler 1** and **Bus Coupler 2** were no longer visible under **Print > Settings**.
MEBASIC-1300	In an application with Grafcet (SFC), the program closed unexpectedly when increasing the number of columns for **Ladder Editor**.
MEBASIC-1334	POUs were not included when using the **Print Report** tool.
MEBASIC-1335	The **Search and Replace** tool did not contain the scroll bar, preventing you from seeing the full list of results.
MEBASIC-1337	Software advised that the applications in the PLC and the PC were different even when they were identical.

ID	Description
MEBASIC-1460	Remote display (TMH2GDB) displayed **Transfer In Progress** indefinitely while performing a download.
MEBASIC-1461	TM221 PLC entered the HALT state when RTC time was updated with PC time.
MEBASIC-1462	In an application with Grafcet (SFC), the program closed unexpectedly when an undo operation was performed after deleting a grafcet step.
MEBASIC-1504	Transfer tool was not operational.

Software Known Operational Anomalies

ID	Description
MEBASIC-596	An error message appears when removing the timer function that is used in the "OR" logic.
MEBASIC-663	I/O values are invalid if TM3 bus coupler status returns an error.
MEBASIC-712	The variables in user-defined function blocks can only be set as a parameter, not a numeric value.
MEBASIC-726	**Compare Projects** feature may flag differences in projects containing user-defined function blocks even when the applications are identical.
MEBASIC-789	The application size has an impact on the time needed to establish a connection with the controller or start the simulator. The connection time can be greater than one minute.
MEBASIC-1173	When performing an online modification of a Timer block address (%TMi), the error message displayed does not clearly state that action is not allowed. **Workaround**: Do not attempt to modify Timer block addresses in online mode.
MEBASIC-1331	Unable to paste back the instructions in the ladder after 'cutting' while in online mode.
MEBASIC-1468	SMS is not received properly with the modem if there are more than 20 characters in the message.
MEBASIC-1509	Compilation error detection is generated when variable names containing keywords (like BLK) are used.

Documentation Mitigated Anomalies

No mitigated anomalies.

Documentation Known Operational Anomalies

No new operational anomalies.

EcoStruxure Machine Expert - Basic V1.2

Hardware/Firmware Information

Description	Firmware version
M221	1.12.0.0
TM3DQ8T/G	2.0
TM3DQ8R/G	2.0
TM3DQ8U/G	2.0
TM3DQ16T/G	2.0
TM3DQ16TK	2.0
TM3DQ16R/G	2.0
TM3DQ16U/G	2.0

Description	Firmware version
TM3DQ16UK	2.0
TM3DQ32TK	2.0
TM3DQ32UK	2.0
TMH2GDB	221.1.4.5

Hardware/Firmware New Features

- Support of TM3DQ SV 2.0 modules
- Support of new Timer mode (dynamic preset)

Software New Features

- Software performance enhancement:
  - The software performance can be accelerated by suspending the program analysis until it is compiled.
  - A check mark icon is now used to enable or suspend validation.
  - The “Download” icon for compiling projects has changed.
- Cybersecurity enhancement:
  - Software integrity is automatically checked.
  - Alerts indicate when untrusted dynamic link libraries (DLLs) and executable files (.exe) are detected.
- Additional function block features:
  - Dynamic change of the preset value of TIMER block (%TMi.P), which can now be taken into account on state of %TMi.IN, in addition to rising edge.
- Ergonomic features (multiple view, trace icon, symbol centric) :
  - Multiple property views: Animation tables, cross references, search and replace can be displayed at the same time.
  - Trace button added to tool bar
  - Symbol centric programming: The corresponding relationship between the variable and the address in the symbol table can be changed without modifying the program, so as to change the address in the program.
- Support of TM3DQ SV 2.0 modules:
  - Configuration of Fallback value for New Digital Output modules.
- Updated project template "XPSU support" (xSample_XpsuSupport.smbe), replaces "Preventa XPS Support" (xSample_PreventaSupport.smbe).

Software Mitigated Anomalies

ID	Description
MEBASIC-656	Improved presentation of configuration under TM3 bus coupler when comparing projects
MEBASIC-734	Inclusion of TM3 bus coupler in project print report
MEBASIC-768	Resolves issue with software crashing when opened multiple times
MEBASIC-778	Ability to anchor the properties window when it is on the right side of the screen
MEBASIC-790	Improve performance when inserting, deleting, coping and pasting a rung or a POU for large application
MEBASIC-821	"%Qx.y:z := a AND b OR c " Instruction is now accepted

ID	Description
MEBASIC-979	Resolved memory leak issue when converting an old SoMachine Basic application to EcoStruxure Machine Expert - Basic
MEBASIC-990	Resolved regression issue in V1.1 “no longer possible to extract bit from word %PARAM”
MEBASIC-1013	Symbol list: Renaming of indexed variables no longer generates an error
MEBASIC-1184	An error could occur in online editing mode with IL editor

Software Known Operational Anomalies

ID	Description
MEBASIC-596	An error message appears when removing the timer function that is used in the "OR" logic.
MEBASIC-663	I/O values are invalid if TM3 bus coupler status returns an error.
MEBASIC-712	The variables in user-defined function blocks can only be set as a parameter, not a numeric value.
MEBASIC-789	The application size has an impact on the time needed to establish a connection with the controller or start the simulator. The connection time can be greater than one minute.
MEBASIC-1173	When performing an online modification of a Timer block address (%TMi), the error message displayed does not clearly state that action is not allowed. Do not attempt to modify Timer block addresses in online mode.
MEBASIC-1269	With both “Timer Properties” and “Behavior” views open simultaneously, when Functional Level is changed to less than 12.0, it is possible to enable Dynamic Preset via the “Timer Properties” view. This will lead to inoperable timer blocks. To help avoid inoperable timer function blocks, enable Dynamic Preset only when Functional Level is greater than or equal to 12.0.
MEBASIC-1296	After printing a report of the project, the selections “Bus Coupler 1” and “Bus Coupler 2” are no longer visible under “Print -> Settings”. Workaround: Re-launch EcoStruxure Machine Expert - Basic.
MEBASIC-1300	In an application with Grafcet (SFC), the program closes unexpectedly when increasing the number of columns for Ladder Editor.

Documentation Mitigated Anomalies

ID	Description
MEBASIC-176	Error on **OCCUR_ARR** return value when **OP2/OP3** are floats is corrected
MEBASIC-179	Table **Rotate Shift & SORT** Functions now includes the variable format `%KW`
MEBASIC-200	Syntax error in the OnLine Help for the conversion instruction *DINT TO ASCII* is corrected
OEM00045507	**DUT** can be **HALT** when **MAST** task is in freewheeling mode is now documented
OEM00048918	[PTO]: Function Block reporting **PTO_error 3006** when **HwLimP** and **HwLimN** are 0 is now documented
OEM00069171	“EtherNet/IP” is no longer translated in Chinese
OEM00070080	**%S1** write is now documented correctly
OEM00070221	Errors in the pages **The Start Page** have been corrected
OEM00070232	Errors in the chapter **User-Defined Functions** and **User-Defined Function Blocks** have been corrected
OEM00070303	Errors in Chinese translation for **Post configuration** have been corrected
OEM00070315	Improved the **write to post configuration file** functionality description
OEM00070434	Description for **%SW158** is corrected in Chinese translation
OEM00070444	Chinese translation of **%IWE %QWE** objects now consistent
OEM00070457	Error in German translation of **%WRITE_VAR** Function code evolution have been corrected

ID	Description
OEM00070458	Chinese translation of **Enable** input is now correct
OEM00070477	Error in Chinese translation of new PID Auto-Tuning document is corrected
OEM00071616	PCR 448051R: **%SW18** range is 0-32768 is corrected
OEM00072081	PCR-CKZ-France-**SEND_RCV_SMS**: Busy pin remains **TRUE**
OEM00072923	PCR-CKZ-Spain-Modbus TCP IOScanner: x3 timeout multiplier is now documented
OEM00073635	CKZ-India-Doc: PID output tab help text has been improved
OEM00074709	PCR-Display: Alarm history is now correctly described
OEM00077742	Project/Application Protection: Read-protect the application when retrieving from SD card is now documented
OEM00077803	PCR-JMT-IT-OLH: Information added regarding the loss of RTC and data when replacing the battery
OEM00078099	PCR-Abus: Improved polarization information on M221 references

Documentation Known Operational Anomalies

No known anomalies.

EcoStruxure Machine Expert - Basic V1.1 Patch 1

Software Mitigated Anomalies

ID	Description
MEBASIC-820	Data logging function doesn't work correctly.
MEBASIC-804	Some German translations are solved in the software messages.
MEBASIC-803	DRAFT release notes added instead of the final version.
MEBASIC-801	Ability to enter a value for Analog inputs of TM3TI4D in simulation mode.

EcoStruxure Machine Expert - Basic V1.1

Hardware/Firmware Mitigated Anomalies

TM221 FW V1.10.2.x

ID	Description
OEM00050233	No information when cartridge is missing
PEP054482R	TM221 compliant to RFC2132 - DHCP - Request and Discover with source IP zeros
OEM00057604	Modbus TCP server FC23: Wrong exception code01 instead of 03 for wrong byte count
PEP0562215R	TM3DM24R• SV2.0 makes TM3 bus in error if it is placed before TM3A• SV1.5
PEP0564420R	TM3 bus doesn't start properly after a power cycle
PEP0547020R	TM3TI4 - Accuracy issue about Ni1000 between temperature range 170 °C to 185 °C
MEBASIC-612	TM221 Firmware version V1.10.1.3 detects TM3 bus error when TM3DQ32*K SV2.0 is placed before TM3A• SV1.5
MEBASIC-614	EcoStruxure Machine Expert - Basic freezes when a corrupted XAR file is opened
MEBASIC-618	Ethernet Subnet mask change only when highest digit of Ethernet IP address is modified

Software New Features

- Support of TM3BCEIP bus coupler on Modbus TCP IOScanner
- Support of TM3BCSL bus coupler on Serial Line IO Scanner
- New features of TM3 Digital I/O Modules
  - Filtering on digital inputs
  - Latch function on digital inputs
  - Firmware update for all TM3 modules
- Local FB instances in UDFB: timers, counters, communication, PTO function blocks, and Drive functions blocks

Software Mitigated Anomalies

ID	Description
MEBASIC-699	An out of memory condition caused a reset of the controller.
MEBASIC-659	Comparison Block from the second transition cannot be edited.
MEBASIC-658	ApplicationProtection: Disclaimer was missing in French language.
MEBASIC-620	Communication function blocks reported errors after upload if no %MW were allocated.
MEBASIC-619	Write protection information was not displayed in the right place on the compare file project.
MEBASIC-552	Needed to adapt error messages when using the output of FB in parallel of a contact.
MEBASIC-499	IOscaning status value %IWNS303 and %IWN303.x were not refreshed after cable disconnection.

EcoStruxure Machine Expert - Basic V1.0 SP2

Software New Features

- Cybersecurity improvements with a new password policy
- ACTIVATION ID is present in ABOUT window
- AUTO-SAVE project
- Capability to compare opened project with another .smbp project file
- Double-click TM3 modules I/O area to go to configuration grid
- The number of IOScanner bit requests has been increased to 512
- Adapt %QWx:=REAL_TO_INT(%MFx)
- The carriage return at the end of constant STRING can be moved
- Capability to support the table assignment for network objects: output/input registers (IOScanner)
- Non-program data is not taken into account by the compiler
- Capability to see the configured controller in the first position in Ethernet devices
- Add option/function to be able to swap word
- The address can be copied on the clipboard
- Cyrillic characters can be used with TMH2GDB

Software Mitigated Anomalies

ID	Description
OEM00079117	PCR-GGI-EST-M221-HSC: Parameters cannot be edited in animation table
OEM00078703	PCR-CKZ-Spain: Uploaded program cannot be compiled
OEM00078622	PCR-JMT-RU: Compiler error message when using INT_TO_REAL with %IWx.y
OEM00078304	PCR-JMT-PL-Multi-Op: Value written into the variable while the rung is not active
OEM00078208	PCR-JMT-IT-Editor mode: Slowness when switching from a POU to another one when many lines in rungs
OEM00050233	No information when cartridge is missing

EcoStruxure Machine Expert - Basic V1.0 SP1

Software New Features

- Write protection of the controller application
- Several function blocks in parallel in a rung
- Up to 32 each of *READ_VAR*, *WRITE_VAR*, and *WRITE_READ_VAR* instances can be configured
- Up to 255 instances each of *RISING* and *FALLING* functions can be declared
- Improve text visibility on **Controller info** page
- When minimized, the simulator stays in the Windows taskbar
- Additional project templates
  - xSample_PreventaSupport.smbe
- Corrections
  - Correct full screen size when using multiple monitors with different resolutions
  - Correct full screen position when Windows taskbar is not at the bottom of the screen
  - Correct synchronization issue with project having a **Display** device configured

EcoStruxure Machine Expert - Basic V1.0

Software New Features

- New name and new GUI (EcoStruxure conformance)
- **Transfer tool**: console application allowing scripting operations without using EcoStruxure Machine Expert - Basic to
  - Upload the application from the controller or download an application
  - Update the controller firmware
  - Backup and restore application data
- Possibility to name user-defined function/function block parameters and variables
- Support of memory bits indexed by *%PARAMx* in the code of user-defined functions/function blocks
- User-defined function blocks can have up to 32 Boolean inputs and 32 Boolean outputs

- Up to 200 Grafcet (SFC) steps can be configured
- It is now possible to use *RISING* and *FALLING* functions in parallel branches
- Possibility to tun off the battery LED
- Cybersecurity improvements
  - Protect against cycle time influenced by network flooding (CVE-2018-7821)
  - Restrict permissions on local resources (CVE-2019-7822, CVE-2019-7823)
- Corrections
  - Allow EcoStruxure Machine Expert - Basic to start from SoMachine V4.3
  - Eliminate incorrect message containing indexed instructions appearing after online modification on application

SoMachine Basic

New Features In SoMachine Basic V1.6 SP2

- Cyber security improvements
  - Improve application password strategy (CVE-2018-7790, CVE-2018-7791, CVE-2018-7792)
  - Protect against some incorrect Modbus requests (CVE-2018-7789)
- Firmware update tool helps ensure controller is not in *RUN* state before starting the update. If in *RUN* state, a confirmation is requested
- When deleting a drive(s) from the IOScanner configuration, the software tests the application for consistency and proposes to remove the deleted drive(s) from the respective function blocks
- Additional project templates
  - xSample_DataLogging_FB.smbe
  - xSample_ModbusTcp_IOScanner.smbe
  - xSample_TeSysU_1adv123.smbe
  - xSample_User-Defined_FB.smbe
  - xSample_User-Defined_Function.smbe
- Customer issues addressed
  - Editor will jump to another rung when selecting a tool
  - Unexpected halt of the controller with PTO functions
  - Unexpected halt of the controller with intensive serial line exchanges and USB connection in parallel

New Features In SoMachine Basic V1.6 SP1

- New TM3TI4DG module support
- Increase the possibilities of online modification in *RUN* state
- The configuration of a user-defined function block can be modified even if an instance is in use in the application
- The runtime values of user-defined function block parameters and variables are now accessible in animation table (requires firmware V1.6.1.x or greater)
- SMS now supports strings in **Message**, **Command**, and **Phone number** configuration tables (requires functional level 6.1 or greater)
- Log files moved to a more accessible folder and an entry was added into the **Start** menu
- Possibility to detach multiple animation tables

New Features In SoMachine Basic V1.6

- Data logging on SD card
  - New function block to create data history or to create an **Events** log (strings)
  - Save and restore a batch of memory words
- Modbus TCP IOScanner
  - ATV drives can be controlled with *Drive* function blocks
  - Possible control of serial devices through an Ethernet gateway
  - Integration of new devices on IOScanner (ATV340, ATV312, and TesysU)
- *User-defined* function block (create your own function block)
- *User-defined* function (defined instruction called from *OPERATION* block)
- String support
  - Configuring strings in constant words (%KW)
  - Assigning strings in memory words (%MW)
  - Managing strings with new instructions
- Structured Ladder block elements
  - `IF THEN ELSE ENDIF` test
  - `FOR – ENDFOR` loop
- *RISING* and *FALLING* edge functions
- Increase ladder usability
  - Several function blocks in a rung
  - Drag and drop ladder elements between rungs
  - Operate block can be everywhere on a line
  - Cross reference view
- Increase space for programming
  - Zoom-in/zoom-out function
  - Detach property view or bring it to the right
  - Show/hide rung names and comments
  - Set/unset full screen mode
- Other features
  - Copy/paste and export/import animation tables
  - Export/import constant values
  - Option to download the metadata to the controller
  - New settings to program **Schedule Blocks** parameters
  - More than two operands in `COMPARE` instructions
  - Direct edition of function block parameters in Ladder editor offline and online
  - Modification of memory values in Ladder editor in online mode
  - Review and improve online help on auto tuning
  - Having a setting to switch between **F1** and **Shift + F1** for contextual help
  - Creation of default symbols for used memory objects for Vijeo-Designer
  - Read PLC serial number in system words
  - Read last error code in system words

New Features In SoMachine Basic V1.5 SP1

This Service pack addresses the following security strategy modifications

- Reinforce application protection (requires an upgrade to the latest functional level and firmware)
- Reinforce the project file encryption when enabling the **Project Protection**
- The *download only* mode is no longer available from the **Project Protection** view. **Restore to Controller** feature is available for this purpose. It requires the .smbk file generated by the **Create Controller image** feature (available within the **Memory Management** view)
- The communication with some ION meters has been improved

New Features In SoMachine Basic V1.5

- ModbusSerial IOScanner
- More than two operands in *OPERATION* instructions
- *Drive* function blocks - to replace Twido Modbus macros
- RTC function block (read and write RTC)
- Project comparison with controller application
- Copy/paste of configuration, symbols, comments, constant values, function block parameters
- Re-compile only required on program modification
- Smart coding and smart assistant on *OPERATION* block in Ladder
- Import/export of POUs or Free POUs
- Detachment of the Grafcet view in a new window
- %S9 (fallback values) implementation
- Extended mode on TM3A8/G module
- Master and periodic tasks can be configured from 1 ms
- Extension to 2000 persistent variables
- Add Modbus requests 5 and 6 in *Write Var* function block
- PTO using only one output
- One Licensing registration brick
- Three additional project example templates
  - xSample_Analog_Data_Scaling
  - xSample_PTO_Motion_Table
  - xSample_Drive_FB_Display
- A search tool for the templates
- Help button menu has been extended
- Capability to update TM3 firmware with an SD card
- A protected project is hidden from view after application upload, until the password is provided
- Create symbols and comments in online mode
- New I/O bus error management (active mode)
- New user interface language: Czech (the online help remains available in English)

New Features In SoMachine Basic V1.4 SP1

Configuration and Twido conversation enhancements

- Keeping configuration and symbols when replacing I/O module (for example, TM2 to TM3
- Improving Twido project conversation messages, like possibility to not convert macro when opening Twido application
- Support of modem on SL2
- TM3TI8T and TM2ARI8HT temperature expansion modules with assistant
- Grid for IWS and QWS objects
- Custom symbols for system objects can be viewed and exported from **Symbol list** view and are no more reset when modifying the controller reference
- Configure automatically new memory bit in PID AT configuration

Online enhancements

- Add or delete rung online
- Allow the modification of some configuration parameters online
  - Constant values
  - *Timer*, *Counter*, *LIFO/FIFO register*, *Drum* and *Schedule* function blocks
  - Set/reset/force/unforce contact and coil value in ladder rung
  - Add all objects used in a rung to the current animation table
- Inform if a newer firmware is available for the connected controller and allow to upgrade it
- Synchronize non-program data with the controller

Graphical Grafcet usability enhancements

- Remove partial link
- Insert step above or below the cursor position
- Cell focus under mouse
- Preview result when creating link
- Improve `OR` and `AND` operators display
- Improve tooltips and transition preview in case of `OPEN` transition or error state
- Improve drawing to avoid cross wires

Ladder usability enhancements

- Improve management of empty lines at the end of rungs
- Improve keyboard navigation in Ladder editor
- Highlight with a different color the selected or modified rung
- Drag and drop bits of word from symbol table to Ladder editor
- Choice to display memory words in **Decimal** or **Hexadecimal** in *online* mode
- Display constant objects in different format (**Decimal**, **Hexadecimal**, **Binary**, **ASCII-8**)
- Improve suggestion list in Ladder: FB parameters/outputs are suggested
- Free POUs can be cut and pasted

Two new project templates

- xSample_M221_COMM_conversation
- xSample_M221_Drive_conversation

Miscellaneous

- Improving documentation and contextual help
- Web link to user guide for Twido conversation
- Improved **Memory Consumption** view with metadata detail

New Features In SoMachine Basic V1.4

Four new M221 controller references with sink transistor outputs

- TM221C16U, TM221C24U
- TM221CE16U, TM221CE24U

Two new M221 controller references with sink transistor outputs and four PTOs

- TM221C40U, TM221CE40U

Programming Grafcet language (SFC)

Pulse output enhancements

- PTO multi-segments (new *MC_MotionTask_PTO* FB and a motion task table)
- Frequency generator (new %FREQGEN FB)

Remote graphic display enhancements

- Chinese and Turkish localization languages
- Operator interface application improvements
  - New page template with two horizontal Bargraph
  - New control table template with monostable command
  - Use of bits of word in control table template
  - Help page available on alarm page
  - Configurable **Alarm** key

Memory and SD card management

- With SD card
  - Upload/download memory variables to/from SD card (in addition to application, firmware, and post configuration already supported)
  - Firmware update of display device
- With SoMachine Basic
  - Offline: Creating and reading controller image
  - Online: Backup and restore memory parts of controller

    Erase in controller

Ladder Editor enhancements

- Increase **Symbol area size** by hiding symbol comments
- Allow multi-rung selection for copy/paste between two projects
- Remove several rungs at the same time
- Insert new rung in the middle of a POU or insert a new POU
- Switch IL/Ladder to *online* mode

Additionally, the default displayed language is Ladder, after a Twido conversation or an application upload, and a *Timer* function block can be configured as retentive.

New Features In SoMachine Basic V1.3 SP3

This version was reserved to Chinese market.

PTO improvements

- More function block instances available (up to 86 for movement function block and 40 for administrative function block)
- Backlash compensation

Immediate read/write of embedded digital I/O (*READ_IMM_IN* and *WRITE_IMM_OUT*).

New Features In SoMachine Basic V1.3 SP2

EthernetNet/IP adapter

Modbus TCP mapping table

TM2/TM3 optional feature

SMS function block

Report improvements (**Hardware objects** configuration, **Animation tables**, **Memory Consumption** view, **Remote Graphic Display** and **Software objects** configuration

Remote Graphic Display enhancements in **Operator** interface and **Setup** application

- The **Graphic Display** home page is a page from the **Operator** interface
- A page can be selected from the controller application
- Information on the resolution of alarms is displayed in history page
- Faster adjustment of values in **Setup** menu
- The setting of IP address is faster and automatically saved
- New %S to display the alarm page on an alarm and/or display it with red backlight

Commissioning enhancements

- Download a new application without erasing memory bits and words
- Backup of persistent variables can now be done in *RUNNING* mode
- Remote connection through Ethernet devices (transactional and unit ID)

Improve Twido conversation by better diagnostics concerning system words and bits

Two-character strings in Operation function

Improved performance in Ladder Editor

Improved management of %S0 during the first cycle

Grafcet steps objects have been added in **Tools** view

New Features In SoMachine Basic V1.3 SP1

New controller starting mode: **Unconditional start in Run** (allows controller to start in *Run* after applying power without battery charged or present)

Memory Consumption view

Trace

Report (Print): cover page, project info, symbol list, cross-ref, user program (IL +LD)

Symbolization of function block members

Possibility to remove temporary project protection

New Features In SoMachine Basic V1.3 Patch 1 Content

This patch fixes an issue on **symbolization of bits extracted from words** feature.

In previous versions, when a symbol was associated to a bit extracted from a word, the variable animation was not refreshed.

New Features In SoMachine Basic V1.3

Remote Graphic Display support

- Configuration of display
- Creation of **Operator interface** pages

Synchronization retained after modifying only symbol/comment or animation table

Modem support on controller

Modem connection from SoMachine Basic

Communication function blocks

Improvements on the PID auto tuning algorithm (filter added)

Support for up to 4 mono-phase HSC

Extension of memory bits from 512 to 1024

New instructions to allow immediate read/write update of embedded I/O

Add **Advise** or **Error** icon in **Task** tab and in **Tasks** tree

Pre-symbolization (*Tesys* objects, safety-related objects, and system objects)

Backup of online modification to boot application in Flash memory while in *RUNNING* state

Improvements to SoMachine Basic program editor usability

- Undo/redo in Ladder editor
- Drag and drop data from **Detailed View** to Ladder
- Symbolization of bits extracted from words

Contextual help (through **Shift + F1** key)

New Features In SoMachine Basic V1.2

Functional level management: your system could include logic controllers with different firmware versions, and therefore with different capability levels. SoMachine Basic supports functional level management to allow you to control the differences between your application and the target controller.

PTO (Pulse Train Output) function blocks control the positioning or speed of one or two independent linear single-axis stepper or servo drives.

%S49 (output rearming) enables automatic rearming of embedded outputs following a short-circuit.

Documentation - Known Operational Anomalies

EcoStruxure Machine Expert - Basic Software

User-defined function and user-defined function blocks

- The runtime values of %VAR objects are no longer reset after a power cycle. This requires a new download using SoMachine Basic V1.6 SP1 or greater.

Graphical Grafcet

- When editing a transition in IL containing a function block, the `ENDT` keyword must precede the `END_BLK` instruction
- Moving a step on the graphical page will require you to download again your application

- %S23 is not supported in Graphical Grafcet
- In some specific cases, the Grafcet chart may be difficult to read. Zoom the chart and move Grafcet steps further apart to increase readability.
- In some specific cases, the Grafcet chart may be missing in the report. Re-launch the report process in such a case.

When using bit string instructions on Grafcet bits, be sure that all associated steps are defined, otherwise, the results of the operation must be considered invalid.

The **undo action** list is deleted after converting a rung to `IL` or to `LD`.

Use of double quote inside an immediate string is not supported, use two-char string instead.

Configurable software object types (**Drums**, **Schedule Blocks**, **PID**) appear in search results but are not replaceable.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Verify, and if necessary, update any I/O addresses contained in your **Remote Graphic Display** application every time the hardware configuration of the logic controller is modified.

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

When the hardware configuration is modified, the **Remote Graphic Display** pages that contain I/O addresses are not dynamically displaced.

Refrain from having more than 200 rungs in one POU: separate rungs between different POUs to increase the performance of EcoStruxure Machine Expert - Basic.

Avoid online modifications when the controller is running and the scan time is close to the configured watchdog value: you may trigger a watchdog timeout and bring your controller to the *HALT* state, creating a de-synchronization between the program in EcoStruxure Machine Expert - Basic and the controller.

You may encounter a de-synchronization between EcoStruxure Machine Expert - Basic and the controller after an upload from the controller in one of the following conditions

- The application in the controller comes from SoMachine Basic V1.3 and a HSC is configured with threshold values `S0` and/or `S1` set to the maximum possible value (65535 in simple word or 4294967295 in double word format). Uploading an application configured as such to SoMachine Basic V1.4 will change threshold values from this maximum value to `1` for `S0` and/or from this maximum value to `2` for `S1`.
- The application in the controller comes from SoMachine Basic V1.3 SP2, and a **Remote Graphic Display** (TMH2GDB) is configured on the serial line with a Modbus address different from the default value of `1`.

If printing a report of your application does not work on your printer, use the intermediate pdf format and print the generated pdf file.

When an output is reserved by an *I/O* function block (HSC reflex output, PLS, PWM, or PTO, FREQGEN), its on-screen animation value is not refreshed (neither in the program editor nor the animation table).

If you temporarily switched the protocol on your serial line (using %SW103-106 and %S103/104) together with SMS exchanges, re-initialize the modem with the `INIT` string (using %S105) each time an SMS exchange ends unsuccessfully.

SMS phone numbers format precisions

- 336XXXXXXXX; 00336XXXXXXXX are supported
- The `+` syntax (for example, +33XXXXXXXXX) is not supported

In *POWERLESS* mode, the values in animation tables may not be valid.

Programming messages prefixed with **Compiler Message** are only refreshed when doing a new compilation.

When updating variables from a EcoStruxure Machine Expert - Basic project to Vijeo-Designer, verify that previous configured variables in Vijeo-Designer are still valid.

It is not possible to import variables from a EcoStruxure Machine Expert - Basic project to Vijeo-Designer if the project is protected.

M221 Logic Controller

Boot evolutions starting with V50 (refer to the system word %SW13

- If the SD card name is **DATA**, the controller starts normally (eventual script file is ignored)
- If the SD card is non-empty and without a script file, the controller starts normally

The function *FLOAT_TO_ASCII* now returns up to 6 digits after the coma separator.

Do not use a write-protected SD car when performing a firmware update by SD card as the controller may stay in the *BOOTING* state (the firmware has been deleted but not updated). If you face this situation, remove the write protection and restart the process.

During a controller reset when the controller first enters an *EMPTY* state, all outputs are set to zero for the first cycle of the controller. If you set the default (fallback) value of an output to one in the configuration, it will not take effect until after this first cycle, the duration of which is dependent upon your application (size, communications,...). You may, given you intend a default (fallback) value of 1 for any or all outputs, need to take this into consideration. Thoroughly test your application and ascertain whether a reset of the controller, followed by an *EMPTY* state and the setting of outputs to zero, would cause your machine or process to react in ways that would have adverse consequences.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

- Verify that your machine is brought to a known, safe state before initiating a reset of the controller.
- Account for an *EMPTY* state as you would for the interruption of power to your outputs, such as in the case of a power outage.

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

Force states are maintained in case of a warm start and cleared in case of a cold start.

If there are more modules in the physical configuration that in the EcoStruxure Machine Expert - Basic software configuration, only the bit corresponding to the first module missing is set to `1`.

HSC reflex behaviour: if the auxiliary preset input is set to `1` with the input `IN` at `0` (the function is inhibited), the outputs are not monitored so they keep their current values.

If you make a connection with a defective or otherwise nonstandard USB cable, and power cycle the controller, it may stay locked in boot phase. This is usually because there is a short circuit between pins 4 and 5. Replace the USB cable or at least disconnect it in case of a power cycle.

When using Vijeo-Designer prior to V6.2 SP1, and using a logic controller with I/O cartridges, the values of the I/O from the cartridges cannot be directly accessed by the HMI. To access these values, write them pro-grammatically to controller

memory addresses so that they can be used by the HMI. To avoid this situation, upgrade your Vijeo-Designer to V6.2 or greater.

Refer to the hardware guide of your logic controller when using inputs outside the range %I0.2-%I0.5 for PTO input signals (**Touch Probe** for instance) as these inputs have different performance.

When using PTO function in Pulse/Direction mode, the state change of the direction output may have a variable delay of up to 5 µs for %Q0.0, %Q0.1, % Q0.2, and %Q0.3, and up to 300 µs for the other outputs.

When doing a program backup (after an online modification), or a memory backup, communication to and from the controller may be interrupted.

The `INIT` command may disconnect the Ethernet connection with EcoStruxure Machine Expert - Basic.

Remote Graphic Display

The controller is protected by a password randomly generated by the controller firmware, to prevent unauthorized modifications to the application or state of the controller. To access protected pages, it is mandatory to configure a **Remote Graphic Display** in your application. This allows defining a password to access these pages.

The system language of the **Remote Graphic Display** can only be modified using the **Remote Graphic Display**.

Do not disconnect the **Remote Graphic Display** in the following situations

- while the controller is transferring the application to the **Remote Graphic Display** (~10 seconds after connection)
- during a firmware update or an application download to the controller

If the message **Connection in progress** continues to be displayed on the **Remote Graphic Display**: verify that the **Remote Graphic Display** is correctly connected to the logic controller. You may also need to disconnect and reconnect the **Remote Graphic Display** to re-establish the communication with the controller.

Do not use Modbus exchange instructions on the **Remote Graphic Display** serial port in your controller application when using the **Remote Graphic Display**.

The **Remote Graphic Display** does not dynamically allocate memory in the controller application, although you can create pages with memory references that have not been allocated.

Embedded Simulator

You may only launch one simulator instance regardless of the number of EcoStruxure Machine Expert - Basic instances.

If the simulator does not start, it may be due to a local TCP port conflict with another application running on your computer. You may try another port by replacing the default 502 with another one in the **System Settings** view of EcoStruxure Machine Expert - Basic.

The minimum time base for the simulator is 50 ms. All tasks with a period lower than 50 ms will be configured to 50 ms.

Down-counters (%SW76-%SW79) have 50 ms resolution.

Event task priorities are not considered (tasks are executed in the order in which they were activated).

You cannot simulate hardware features like Fast Counter, PID, EXCH, PWM, PLS, PTO, HSC, filters and latches.

Serial line and Ethernet communications are not simulated.

SD card functionality is not simulated.

Security parameter settings are not simulated.

Remote Graphic Display is not simulated.

System Objects

%SW33 to %SW36 may be incorrect when the controller is configured in BOOTP or DHCP, and the BOOTP/DHCP server does not answer during the IP address assignment.

Compatibility With the Schneider Electric Legacy Controller Offer

Quantum DHCP and BOOTP server are not compatible with controllers configured by EcoStruxure Machine Expert - Basic.

Clone Management

Windows 8 or 8.1 creates hidden files on SD cards.

This may result in disabling actions that depend on the SD card being empty.

Online Mode Modifications

The new `OPER` instruction (possibility to have an *Operation* block placed anywhere in a rung) has the same restrictions as a `Multiple Operands` instruction.

Precision Regarding Schedule Block Objects

The object %SCHi.DOW contains the days of the week to activate the **Schedule Blocks**. Each bit of this word corresponds to a day: bit 0 being Monday, bit 1 Tuesday... bit 6 Sunday. Set each bit to 1 for those days that you wish the block to execute.

Precision Regarding Modbus TCP IOScanner Configuration

- Configuring Modbus TCP/Serial Line IOScanner

  Care must be taken when the Modbus TCP IOScanner, **Communication** function blocks and **Message** (%MSG) function blocks are used in your application, as this can lead to the cancellation of on-going IOScanner communication. If needed, you can suspend momentarily the IOScanner using system bit %S113 on SL1, %S114 on SL2, or %S115 on Ethernet.

- Adding TCP remote devices

  Regarding drive selection

  - Select from the list the name with suffix `ETH_DIRECT` if you connect directly to the Ethernet port of the device. In this case, ensure `0` is configured for **Initialization Requests Unit ID** and `255` for **Channels Unit ID** (default values)

    If you need to access additional registers, add a **Generic** device with the same IP address and **Channel Unit ID** set to `0`.

  - Select from the list the name with no suffix if you connect to a device behind a Modbus TCP/Serial gateway. In this case, set the IP address of the gateway in the **IP address** field, **Device Slave Address** for both **Initialization Requests Unit ID** and **Channels Unit ID**.

- Verification to be done with your drive configuration

  - By default, ETI and DP0 registers are not configured in the list of input scanned registers in your drive settings. You need to add them using the associated external application SoMove...)

    Refer to your drive documentation for more information. Also, do not add additional registers to be scanned by the controller.

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