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1 New SILworX Version

- Version **2.36** for:
 - HIMax controllers, firmware version 2.0 and beyond.
 - HIMatrix controllers, CPU operating system version 7.0 and COM operating system version 12.0.

This document describes the new functions of version 2.36 and its restrictions and improvements compared to the previous versions 1.12 and 1.20:

- Chapter 2 contains the new functions.
- Chapter 3 specifies the current restrictions of version 2.36.
- Chapter 4 describes the procedure to migrate from versions 1.12 and 1.20 to version 2.36.
- Chapter 5 outlines the restrictions of the previous versions that were remedied in version 2.36.

2 Remarks about Version 2.36

Version 2.36 contains the following enhancements with respect to the previous versions 1.12 and 1.20:

2.1 *New: Support of HIMatrix Controllers and Remote I/Os*

SILworX supports HIMatrix controllers and remote I/Os, CPU operating system version 7.0 and COM operating system version 12.0.

HIMatrix controllers can be entered in the Hardware Editor.

HIMatrix remote I/Os can be connected directly (without cross-project communication).

2.2 *New: Support of OPC Server*

The OPC server X-OPC transmits current process values and events to clients, e.g., control systems. X-OPC is a product of its own and normally installed on a separate PC.

SILworX configures the controller such that X-OPC is supported.

2.3 *General Enhancements*

- Jump directly to the editor.
The editor can be opened directly from error messages and corresponding cross-references.
- Copy and paste functionality is also supported between function blocks.
- Reload and version comparison with data from another project is possible.
Generation of reloadable code, and version comparison can be based upon an imported project or project version. This is possible because the corresponding information can be transferred by exporting and importing it from one project to another or from one project version to another.
- User-defined data types for global variables (Array, Struct).
Global variables with user-defined data types can also be transmitted via protocols.
- Exchange of variables using drag&drop functionality.
- Enhanced automatic routing.
- Code generation and reload are faster.
- Support of user-defined POU's:
 - Know-how protection ensured by hiding contents.
 - POU's can be set to read-only.
 - User-defined online help in HTML format is supported.
- SILworX 2.36 can be used on Windows XP, service pack 2 and beyond, and on Vista Ultimate/Business Edition.
- New icons in many places.

2.4 Changes in the HIMax Support

SILworX V. 2.36 supports HIMax firmware version 2.14 and higher. Observe the following points:

- SILworX versions 1.12 and 1.20 can only co-operate with HIMax version 1.
 - SILworX version 2.36 can only co-operate with HIMax version 2.14 and beyond.
- Support of the SOE modules X-DI 32 04, X-DI 32 05, X-AI 32 02.
- Alarm&Event Editor to configure alarms and events.
- In the Hardware Editor, default values were adapted to practical requirements.
- Overview of module data in the Hardware Editor.
- The following point can be set using the MAC address instead of the IP address:
 - S.R.S
 - "Responsible" attribute with system bus modules.
- COM User Task: With HIMax, a non-safety-related C program can run on the communication module, e.g., to implement special communication protocols. SILworX supports loading this program.

3 Restrictions of Version 2.36

When using SILworX, version 2.36, take the following restrictions into account. If the following instructions are observed, the restrictions have no influence on safety and on the availability of the code generated for a HIMax controller.

3.1 Restrictions with Respect to the FBD Editor

- The Retain property can be removed from function block instances.
If the interface variables of type VAR_OUT of a function block are set to Retain = TRUE, they can be set to Retain = FALSE for the function block instances.
This does not affect the generated code. [HE14182]
- The processing sequence view is not refreshed.
If the logics is changed in the Function Block Editor, the processing sequence is displayed as before the change. [HE13841]
- Internal error during code generation of function blocks containing Struct and Array variables
If function blocks of type SEL, MOVE and MUX are used in connection with variables of Struct data type, the code generated may be faulty. The Struct variable can be empty in the generated code, although the Struct data type contains elements.
Workaround: Delete the function blocks of type SEL, MOVE, MUX causing the problems, and insert new function blocks of the same types.
Only insert such function blocks into the logics if a local variable of the same data type already exists. [HE 14384]
- SILworX terminates during code generation of copied function blocks
If a program contains copied function blocks or function blocks entered from a copied library, SILworX terminates during code generation.
Workaround: Before starting code generation, use "Connect references" on the "Extras" menu. [HE14318]
- Priorities of branches in sequential function charts (SFC) are not verified.
For an SFC branch (two transitions after a step), the following conditions must apply:
 - The priority of all transitions must be either set manually or automatically.
 - These priorities must be different.
These conditions are not checked during compilation. [HE 13911]
- Unintentional logic inversion.
In the FBD Editor, online and offline, inversions can be inadvertently set in the logics. This can happen when pressing the shift key while simultaneously moving the mouse.
In this way, inversions are also placed in positions in which they usually cannot be set.
Workaround: Avoid pressing the shift key when moving the mouse! [HE13002 and 14771]

- A resizable function block instance is not executed if all pins are hidden by re-sizing.

An instance of a user-defined function block is not executed under the following conditions, even if it deals with global variables:

- The function block can be resized up to 0 visible pins.
- The function block instance is resized to make at least one pin visible and then resized to make all pins invisible.

In this case, this instance is not compiled and therefore not executed - consider CRC.

Remedy: To determine whether such a function block instance is executed, activate the display of the execution sequence. Only if a frame is displayed around the instance, SILworX has recognized the instance as a network, and the instance will be executed. Otherwise, either resize the instance to make a pin visible, or delete and re-insert the instance.

To avoid the problem, define the function block type as resizable down to at least one pin. [HE15196]

- The generated application program does not correspond to the displayed logics. In very rare cases it may occur that the representation displayed in the FBD Editor does not correspond to the generated user program. Some of those cases are copying function blocks or value fields together with incomplete connection lines.

Workaround: When copying function blocks or value fields, make sure to copy the connection lines completely or not at all.

Test the user program thoroughly. [HE14655, HE14558]

- Internal value fields do not adopt the entered value. Internal value fields of function blocks do not adopt the entered value, but the initial value specified in the type definition.

Workaround: Use value fields instead of internal value fields. [HE15544]

3.2 Restrictions with Respect to Online View and Test

- Reconnecting the diagnostic view causes a module login, instead of a system login.

If the diagnostic view is opened during a system login and the connection is closed, the module login is offered when attempting to re-establish the connection.

Workaround: Establish the connections to the system either using the Hardware Online View or the Control Panel.

If the module login was opened, close all views of the module: The diagnostic and the module view. [HE11926]

- SILworX terminates during "Writing by MAC".
SILworX terminates if the MAC address of a device not connected to the network was entered in the "Writing by MAC" dialog box. [HE14448]

- Values of a function block's input variables are not displayed during online test (OLT).

The values of a function block's input variables are not displayed in the function block's OLT fields, if a literal is connected to the input. As well, for input vari-

ables of type BOOL, the color of the line does not change with the state, but remains blue. [HE14545]

- The user program can be changed during the online test.
If the user program is viewed during the online test, it can be modified using the control key and the drag&drop function. Function blocks and sections of the user program can be copied and pasted.
Furthermore, the changes performed can also be saved!
Workaround: During the online test, avoid pressing the control key while performing drag&drop operations. [HE14790]

3.3 Further Restrictions

- Problems of cross-project communication
The problems caused by cross-project communication hinder or impede connections between projects.
Workaround: Do not use cross-project communication!
[HE14824 und HE14742]
- The standard function blocks MIN and MAX do not process NaN correctly.
The standard function blocks MIN and MAX may provide incorrect results for ANY_REAL values if one of the inputs has the value NaN (not a number).
[HE14273]
- Is it impossible to save changes in an Editor?
After specific changes made within an Editor, the message "Impossible to save changes" appears while attempting to save. After confirming the message, however, the changes are saved.
If the Editor is then closed and re-opened, the message "The required data is being processed" appears.
Examples of changes in which this problem occurs are the cyclic renaming of variables (A => B, B => C, C => A).
Workaround: Avoid exchanging names.
If required, restart SILworX. [HE11613, Restriction]
- More than four OPC servers can be configured.
It is possible to configure more than four OPC servers for alarms and events, and to compile the project successfully. Four of those OPC servers can safely connect to the resource, the remaining, however, have connection problems.
Workaround: Make sure (manually) that not more than four OPC servers are configured. [HE 14543]
- Settings for safe**ethernet** of an OPC server set result in inconsistent configuration.
If the safe**ethernet** parameters "CommandInBudget" and "CommandOutBudget" are modified when configuring the OPC server, the configuration is no longer consistent.
Workaround: The parameters "CommandInBudget" und "CommandOutBudget" must be the same. Recommendation: Keep the default value 1!
- Global variables can be deleted in the Object Panel
Global variables can be deleted from the Object Panel of the safe**ethernet** Editor for OPC server sets, by pressing the delete key and clicking "OK" to confirm.

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These variables are deleted from the project and must be re-created, if required.

Workaround: After accidentally pressing the Delete key, do not confirm the dialog box.

- Error when reloading a controller with remote I/O
When reloading a resource with one or more remote I/Os, the force values of all global variables without source can be lost.
Workaround: Explicitly assign all global variables to a single source or abstain from forcing during reload. [HE 14859]
- When scalar events occur on an X-AI 32 01, the hysteresis is not always scaled correctly.
When scaling the hysteresis according to process values at 4 and 20 mA, the scaling offset is wrongly added. If this has not the default value 0, the hysteresis is calculated incorrectly. [HE 14882]
- Unrestricted use of SILworX is only allowed for users with administrator access
When SILworX is used with a Windows user account without administrator rights, the following problems occur:
 - No license despite the existence of an Windows XP license.
Only demo mode is possible.
 - The SILworX log book log file is not written to in Windows XP.
 - SILworX cannot write on the INI file. For this reason, no settings can be saved with Windows XP and Vista.
 - If a U3 USB stick is used for licensing, the OLicenseServer is terminated during start up. For this reason, SILworX has no valid license! No work-around exists under Windows XP!

Workaround: Allow the affected user account full access to the corresponding folder. Administrator rights are required to perform this action.

For Windows XP, it may be necessary to first unhide the security settings by changing the folder settings:

- Select Tool->Folder Options to open the settings window.
- In the View tab, disable the option "Simple file sharing".

For the user account, allow full access to the following folders:

- C:\Documents and Settings\All Users\Application Data\HIMA\SILworX_v2.38.0
- C:\Documents and Settings\All Users\Application Data\SILworX_v2.38.0

With Window Vista, allow full access to the following folders:

- C:\ProgramData\HIMA
- C:\ProgramData\SILworX_v2.38.0

[HE 14880]

- A project configuration with too much retain data is not recognized.
A project configuration exceeding the maximum storage capacity for retain data, is not considered as faulty and thus not rejected when generating the code.
Loading such a configuration into the controller causes the controller to reboot.
[HE14908, HE14942, HE14973]

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- No reload generation with changed project names.
If a project that contains data exchanged via **safeethernet** is renamed, SILworX can no longer generate reloadable code, even if no modifications other than the name were made. [HE14983, HE14992]
- Faults when copying modules in the Hardware Editor.
When copying modules in the Hardware Editor, the information is not transferred correctly such that the copied modules are defective.
Neither the verification nor the code generation function detects these modules as faulty.
Workaround: The affected base plates can be recognized in the Online View of the Hardware Editor because a module is displayed on the last slot of the base plate although no module occupies this slot nor is one planned in that position. Delete all modules of such a base plate and recreate them manually. [HE15133, HE15140]
- Repeated reload fault deletes the reload information in the project.
Faults occurring after repeated, consecutive reload attempts can destroy the reload information contained in the current project that corresponds to the configuration loaded into the controller.
Workaround: Absolutely save a copy of every project state that corresponds to the configuration loaded into the controller (e.g., on a server or data medium)! [HE 15121]
- If "CPU" is set as event source, A&E state variables are not written.
If "CPU" is set as event source while defining the events, the operating system does not write on the state variables, through which the event states can be used in the user program. The events, however, are created. [HE 15181]
- If the value is 0, A&E state variables are not written.
If 0 is set as threshold or hysteresis value while defining scalar events, the operating system does not write on the state variables, through which the event states can be used in the user program. The events, however, are created. [HE 15182]

4 Migration from Version V.1.12 or V.1.20 to Version V.2.36

HIMax firmware version must be changed when migrating to SILworX version 2.36, since SILworX V.1.12/1.20 can only co-operate with HIMax V.1.x, and SILworX V.2.36 can co-operate with HIMax V.2.14 and higher. The procedure described below must be adhered to.

During this procedure, the controller's operation is interrupted, therefore, only migrate to the new version during plant downtimes.

Starting Situation:

- The firmware 1.x is installed in the HIMax modules. HIMax runs in system operation.
- SILworX V.1.12 or V.1.20 is connected to the HIMax system using the processor module in rack 0, slot 3.

Migration:

- Load the new firmware V.2.14 or higher into all I/O and communication modules in all base plates using SILworX V.1.12/1.20.
- Load all system bus modules with the firmware V.2.14 or higher, use SILworX V.1.12/1.20.
For all base plates, firstly load the first system bus module. Only load the second system bus module of each base plate, if the first system bus module is restarted.
- Load all processor modules with the firmware V.2.14 or higher, use SILworX V.1.12/1.20:
First load all processor modules that are not connected to the PADT. Once they are loaded, these processor modules will remain in the Init state after a restart.
Stop system operation for the processor module connected to the PADT. This causes the system login connection to be lost.
Caution! Service interruption!
Use the module login to log in to the processor module connected to the PADT and load the new operating system. After loading, this processor module re-enters system operation, but with an invalid configuration.
- Terminate SILworX V.1.12/1.20, uninstall it, if required.
- Install SILworX 2.36, if required, start it and open the project. SILworX converts the project to version 2.36. Connect SILworX to HIMax.
- The previous system configuration in the processor modules is now invalid. The default IP address 192.168.0.99 is valid.
Note: The PADT must be located in same subnet. A routing table entry on the PADT may be required.
Use this address (or the MAC address) to open a connection and initiate system operation for the processor modules not connected to the PADT.
- Generate code for HIMax V.2.14 and *remove potential errors displayed*. In doing so, observe *the restrictions with respect to compatibility described in Chapter 3*.

- Load and start the resource.

Achieved Situation:

- The firmware version 2.14 and higher is installed in the HIMax modules. HIMax runs in system operation.
- SILworX version 2.36 is connected to the HIMax system.

Since HIMatrix resources are only supported by SILworX version 2.36 and higher, such a migration procedure does not exist for HIMatrix.

4.1 To Observe when Converting Projects

When projects created with versions 1.12/1.20 are opened and the user has confirmed the message, SILworX version 2.36 automatically converts them.

In doing so, observe the following points:

- SILworX version 2.36 cannot restore archives created with versions 1.12/1.20. Workaround: Restore the archives using versions 1.12/1.20 and convert them with version 2.36. After this step, create archives using version 2.36.
- For projects converted from versions 1.12 or 1.20 and containing array variables, no code can be generated. Workaround:
 - Set the data type to an elementary data type for all variables with array data types.
 - Reset the data type of the variables to the required data type.
 - Perform "Connect references"
 - Save.

Code generation is possible again. [HE14274, Restriction]

- Error message displayed when the code of projects converted from versions 1.12/1.20 and containing **safeethernet** is generated. Error message saying "Value of 'Fragments per cycle' must be at least 1". Workaround: In the **safeethernet** Editor, enter 1 into the "Fragments per cycle" box. [HE14275, Restriction]
- "Retain" property is lost when converting to V.2.36. After converting a project to version 2.36, function block instances previously marked as "retained" are no longer "retained". Workaround: Remark the function block instances concerned as "retained". [HE13975, Restriction]
- In the Detail View of the processor module within the Hardware Editor of versions 1.12/1.20, some parameters can only be changed if the parameter "Use extended settings" is activated. After converting a project in which this parameter is deactivated, the settings cannot be changed in version 2.36. Since the parameter "Use extended settings" does not exist in version 2.36, the extended settings can no longer be used. Workaround: Prior to converting, activate the parameter "Use extended settings" in SILworX versions 1.12/1.20. [HE 14504]

- The function blocks APPL_RELOAD_CYCLE, APPL_START_CYCLE, TASK_RELOAD_CYCLE in the library "System" do not exist in version 2.36. Error messages displayed when converting the project point to this fact.
Workaround: Use the system variables *Reload Cycle* and *Start Cycle*.
- **safeethernet**: The meaning of the states for the *Connection State* system variable changed.
- **safeethernet** - The following system variables have been removed:
 - Number of delayed message of the redundancy channel
 - Number of lost message of the redundancy channel
 - Number of usages of the redundancy channel
- Downloading to a resource is only possible, if a new code was generated with version 2.36.
- The task has been removed. The *Period* parameter is now located in the resource settings. The value is adopted when converting the project.
- The watchdog time for the program has been removed. The watchdog time for the resource applies.
- As initial value for a variable of a user-defined data type, the program always uses the initial value of that data type. This initial value may be different from the initial value used in version 1.12/1.20,
- The program writes the values to the outputs of functions and function blocks whenever the EN input is TRUE.
- The behavior of the ENO output changed for many functions and function blocks located in the IEC standard library.
- The program transmits the output value of a POU to a connected value field immediately after processing the POU.
- The program re-initializes the values of functions in each cycle. Values of previous cycles are no longer valid. For this reason, observe the following points:
 - Do not use functions as input value for actions since they are processed after the actions.
 - Feedback loops within functions or feedback loops only composed of functions are no longer functioning.
 - In general, observe the processing sequence more thoroughly.
- The processing time of the user program is shorter due to the following reasons:
 - Only variables of type VAR can be forced.
 - The floating-point unit is supported.

5 Improvements Compared to SILworX V.1.12 and V.1.20

The restrictions of versions 1.12 and 1.20 described below have been eliminated.

*The eliminated restrictions may lead to changes in the user program's behavior.
The program must be tested and modified, if required!*

5.1 Restrictions with Respect to Sequential Function Charts (SFC) in V 1.12

- Incorrect processing sequence in networks with SFC actions.
SFC actions change the processing sequence in discontinuous, partial networks. [HE12301]
- Inverted outputs of SFC actions are not taken into account.
If the Q output of a SFC action is inverted, the inversion is not executed. [HE12313]
- Incorrect, manual assignment of priorities causes incorrect behavior.
If the transition priorities are manually assigned within SFC networks, they are not verified. The transition priorities in the generated code are stochastic. Transition might possibly not be executed.
Workaround: Use the automatic function for assigning priorities (graphical priority) or thoroughly verify the priorities assigned manually, check in particular their completeness. [HE12322]
- Error message concerning SFC connections, even if the connection exists
After operating errors, SILworX may wrongly consider SFC connections as unconnected and may refuse to generate the code. [HE12251]
- Action block used several times is reset.
If an action block with the same action qualifier is called within several steps, only the instance that was processed last due to its graphical position is effective. [HE12465]

5.2 Restrictions with Respect to Function Blocks in V 1.12

- Incorrect processing sequence of function blocks with unconnected inputs.
If a program logic contains function blocks without inputs or with unconnected inputs, they are processed in the network before the function blocks with connected inputs. This particularly affects the functionality of function blocks that use global variables. [HE12175]
- Incorrect processing sequence of function blocks with unconnected outputs.
If a program logic contains function blocks without outputs or with unconnected outputs, they are processed in the network after the function blocks with connected outputs. This particularly affects the functionality of function blocks that use global variables. [HE12176]

5.3 Restrictions with Respect to the Function Block Editor in V.1.12

- If parts of the program logic that contain the connecting lines without corresponding input objects are copied, faulty logic parts are created that cause SILworX to terminate.

Workaround: If such faulty logic parts have been created in version 1.12, first delete the function blocks with unconnected outputs and then the connecting lines. [HE 12047]

- After a standard function block was moved, the "Display EN/ENO" menu option can no longer be selected. [HE 13481]

5.4 Restrictions with Respect to the Version Comparator in V.1.12

- Function blocks have the same CRC, in spite of modified logic.
After changing function blocks in a program, it could happen that a new CRC is calculated for the program, but not for the changed function blocks.
No change of the function blocks is thus reported by the version comparator!
For this reason, it is important to manually note if function blocks have been changed and to thoroughly test the user program! [HE12284]