SIEMENS

SIMATIC

WinCC
SIMATIC Visualization Architect

System Manual

Online help printout

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Legal information

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This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

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Security information

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement (and continuously maintain) a comprehensive, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

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Network drive

Ensure that network drives are protected from unauthorized access in your network infrastructure and computers.

Communication via Ethernet

In Ethernet-based communication, end users themselves are responsible for the security of their data network. Proper functioning of the device cannot be guaranteed in all circumstances; targeted attacks, for example, can lead to overload of the device.

Basics

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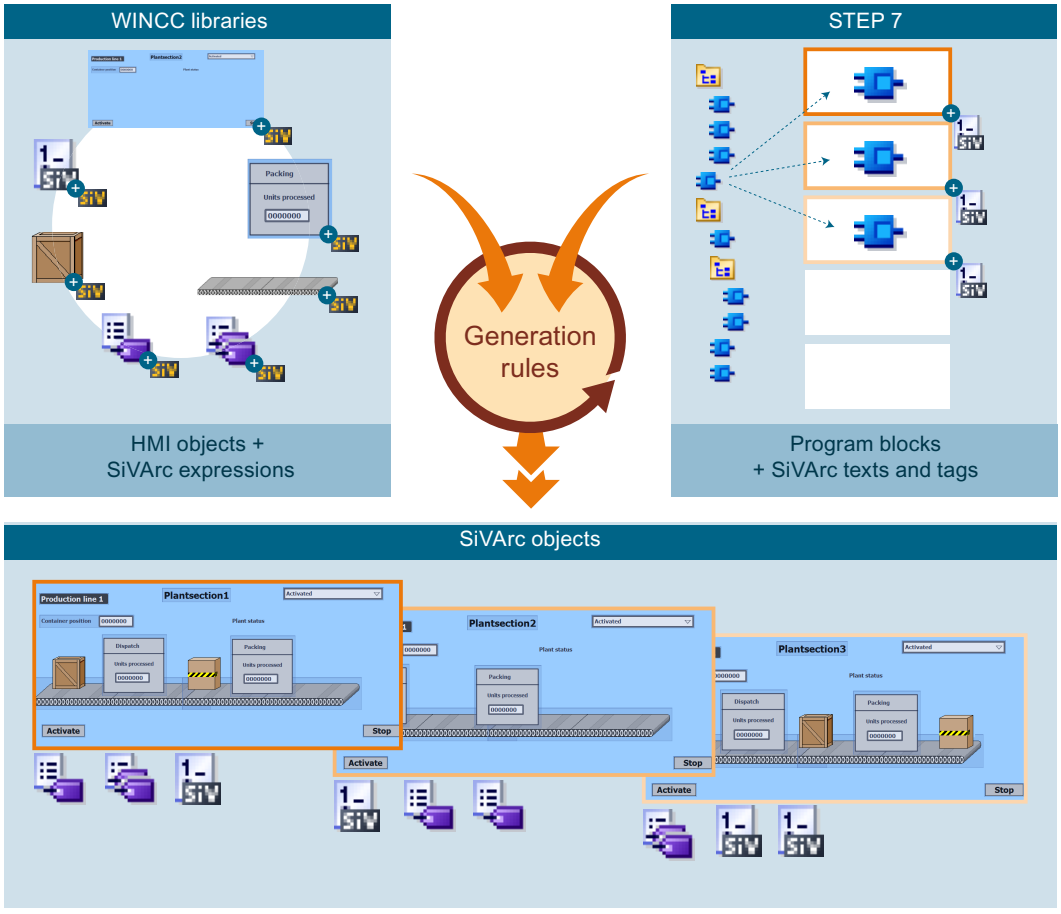
2.1 Introduction

What is SiVArc?

SiVArc (SIMATIC WinCC Visualization Architect) is an option package in the TIA Portal.

With SiVArc you generate the visualization for multiple HMI devices and PLCs from program blocks and generation templates.

You use generation rules to specify which HMI objects are generated for which blocks and devices.



Functional scope

You can generate the following HMI objects from controller data with SiVArc:

- Screens, faceplates and a selection of display and operating objects
- External tags
- HMI text lists

Without reference to the control program, you can generate a selection of objects from your WinCC project library with SiVArc to your project or use them as instance.

Use generation templates from the project library or global library for the generation.

SiVArc can simultaneously generate the visualization for multiple HMI devices, multiple PLCs and device proxies. While generating the visualization with SiVArc, you can continue working with TIA Portal in a second instance. With SiVArc and the TIA Portal option "TIA Portal Multiuser", you can also have different users work on a SiVArc project.

See also

Supported objects in the user program (Page 83)

Configuring an HMI solution with SiVArc (Page 22)

Overview of SiVArc expressions (Page 86)

Creation of generation templates (Page 74)

2.2 Applications

Overview

You use SiVArc for automation solutions with a high degree of standardization.

SiVArc supports the configuration engineer during engineering with the following tasks:

- Automatic generation of the visualization including process connection
- Uniform layout of user interfaces
- Consistent naming of operating elements
- Structured storage of configuration data

SiVArc also offers support during the operating phase:

- Commissioning
  SiVArc helps during the commissioning, because a commissioning engineer can perform changes in the project at short notice using a generation matrix even without SiVArc expertise.
- Adaptations
  To apply changes to an entire project, you only have to adapt central templates with SiVArc.
- Plant maintenance
  The generation of specific individual devices, means for example that it is easy to exchange HMI devices.

SiVArc is also suitable to promote standardization in your project and continuously optimize your projects.

Advantages compared to standard configuration with WinCC

The fundamental added value of SiVArc compared to conventional configuration of visualization stems from the following SiVArc principles:

- The generated visualization contains the reference to the SiVArc project. Adaptations and optimizations with SiVArc ensure a high-performance and clearly structured database.
- The visualization is linked directly to the user program. Changes in the user program cause only minimum adaptations in the HMI project.
- Layout, design and the consistent designation in the display is centrally controlled across STEP 7 and WinCC.

Requirements on the configuration engineer

The following prior knowledge is required to use SiVArc:

- You have configuration experience in STEP 7 and WinCC.
- You have a basic knowledge of Visual Basic Script (VBS).

2.3 Basics on working with SiVArc

Introduction

A project engineer uses SiVArc to work on multiple PLCs and HMI devices at the same time. In addition, SiVArc creates an additional configuration level in the TIA Portal using SiVArc generation rules and templates.

Structure and naming concepts

When you are working with SiVArc, you first design a concept across multiple structure levels:

- Call hierarchy of the program blocks in the user program
- Management of the screen rules
- Storage structure of generated objects in the WinCC editors

This structure concept also creates the naming concept for the generated HMI objects. Depending on your project, you generate the names and labels of the generated objects from the block properties and interfaces.

For a consistent structure, you map the plant sections and their functional units, for example, in the structure of your user program. You then emulate this structure in the storage structure of the generated objects in WinCC and in the management of your SiVArc rules. SiVArc provides SiVArc expressions for the structured storage of screens and tags.

Programming and configuration levels of SiVArc

With SiVArc, you work on multiple programming and configuration levels:

- User program (STEP 7)
- SiVArc generation rules and templates (SiVArc)
- SiVArc generation with manual supplements (WinCC)

Scope of a SiVArc project

A SiVArc project consists of the following objects:

- TIA project
  - PLCs
  - User program
  - HMI devices
- SiVArc generation specifications
  - SiVArc rules
  - Generation templates
  - SiVArc texts
  - SiVArc tags
- SiVArc generation
  - Generated HMI objects with SiVArc reference
  - Manually created HMI objects

References of the generated objects

Generated HMI objects have a permanent reference to the SiVArc rules from which they were derived. This reference has the following results with each new generation:

- Objects that no longer have a reference to the specifications for generation (rule was deleted) are removed.
- Objects whose specifications for generation were changed are updated.
- Manual changes to the generated objects are undone.

Note

Exception: Manually overwritten text list entries

When the user overwrites generated text list entries, the changed text list entry is retained during the next generation only for the default text of the master copy.

If the text for the text list is generated from the network text definition in STEP 7 or the symbol tables and you change this text, the changes are overwritten by the next generation.

Note

Subsequent name changes of generated SiVArc objects

If the name of a generated HMI object has been changed, the object is created and interconnected again at the next SiVArc generation.

Change the names of generated SiVArc objects only in the user program.

Objects with reference to SiVArc are marked:

- In the project tree
  Generated HMI objects
- In the library
  Types and master copies that are used as generation templates

Manually created HMI objects

Manually created HMI objects are not included in the SiVArc generation, except in case of naming conflicts.

Priority of the generated objects in case of naming conflicts

In case of naming conflicts, SiVArc sets the following priorities during a generation:

1. Generated objects from screen, tag and text list rules
2. Generated objects from copy rules
   SiVArc objects generated from the copy rules are treated the same as manually created objects. They are created first during the generation. If there are naming conflicts with objects that are generated later, objects are renamed according to copy rules with the extension "_renamed".
3. Manually created objects
   If the names of manually created objects and generated objects are the same, the manually created objects are renamed.

Adjustments after the first generation

You generate in several stages with SiVArc. Except for changes to SiVArc rules and generation templates, the following adjustments apply to all subsequent generations:

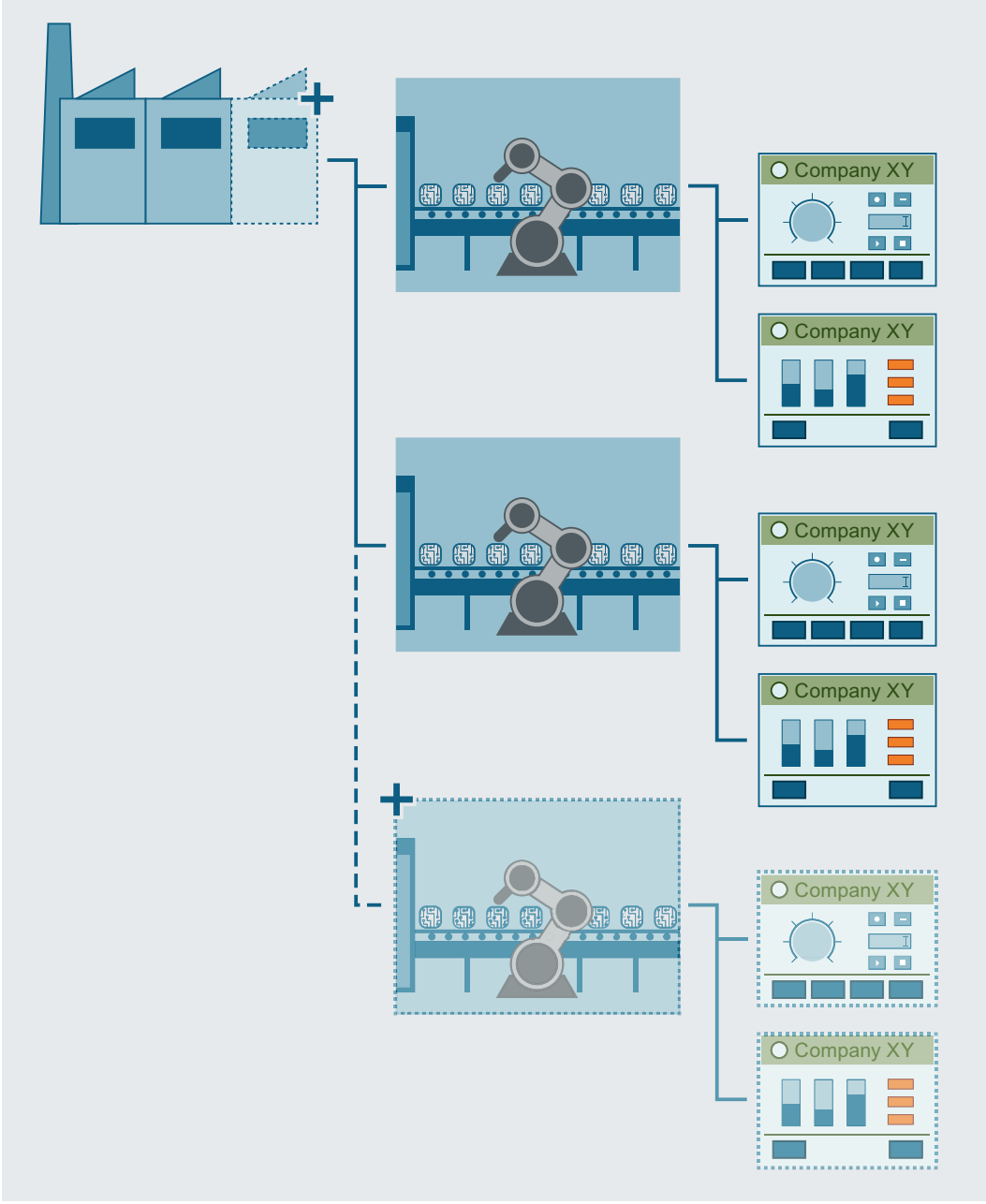
- The first new positioning of generated objects remains in effect for all additional generations.
- You use the generation matrix to generate objects to other screens.
- You use the generation matrix to generate screens to other devices.

2.4 Example: Using SiVArc to generate the visualization

Example scenario

An existing plant for printed circuit boards is to be expanded with a third production line. The company commissioned an external engineering office for the visualization of the expansion based on the existing control program and the existing visualization design. The engineers working on the project must meet the following requirements:

- The customer is new. There is no previous project.
- The new corporate design of the customer is to be incorporated into the visualization.
- The customer wants to optimize standardization within the company.



Designing a parameterization solution

The engineering firm decides to adapt an existing SiVArc sample project for implementation of the task. To achieve this, they assign a PLC programmer and a visualization expert the task of analyzing the user program and the visualization design.

Together, they define the following:

- Number of layout templates depending on the HMI devices used
- Required external tags

- Naming conventions for naming external tags
- Text sources in the user program which are used in the visualization
- Assignment of program blocks to generation templates
- Structure of SiVArc expressions in the generation templates
- Storage structures in the SiVArc project

Then the visualization expert determines the number and type of required generation templates, SiVArc rules and SiVArc tags.

Implementation of parameterization solution

The PLC programmer adapts the user program to the design solution:

- Set PLC tags to "Accessible from HMI"
- Check the text sources in STEP 7 and make them consistent, if necessary
- Optimize the storage of the program blocks in the project tree
- Expand existing libraries

The visualization expert implements the CI of the customer for several HMI devices on screen templates.

Based on the screen templates, a positioning scheme is created for each device.

The generation templates of the example project for standard objects are adapted to the visualization design.

The generation templates and function blocks are linked to the screen rules.

Result

A new, customer-specific and agile SiVArc project was created based on a SiVArc sample project. Further expansions of the plant and the user program now only require minimal interventions in the SiVArc project.

2.5 Example: Using SiVArc to generate tags

Example scenario

Plant builders often experience unplanned delays during commissioning. Analyses have revealed that existing naming conventions for tags are not consistently implemented. Recreating the tags places a heavy load on the storage volume of the HMI devices.

The company turns to an engineering firm to standardize the tag names and re-link them.

The downtime should be minimized and free space made available on the HMI devices.

Solution concept

The engineering firm analyzes the user program and sets the required tags to "Accessible from HMI".

Depending on the type of PLC tags, UDT or arrays used, the engineer configures the synchronization of the tag names.

SiVArc starts the generation of the tags. SiVArc only generates the tags necessary for visualization.

The desired tag names are generated via SiVArc expressions based on the naming concept for tags.

Note

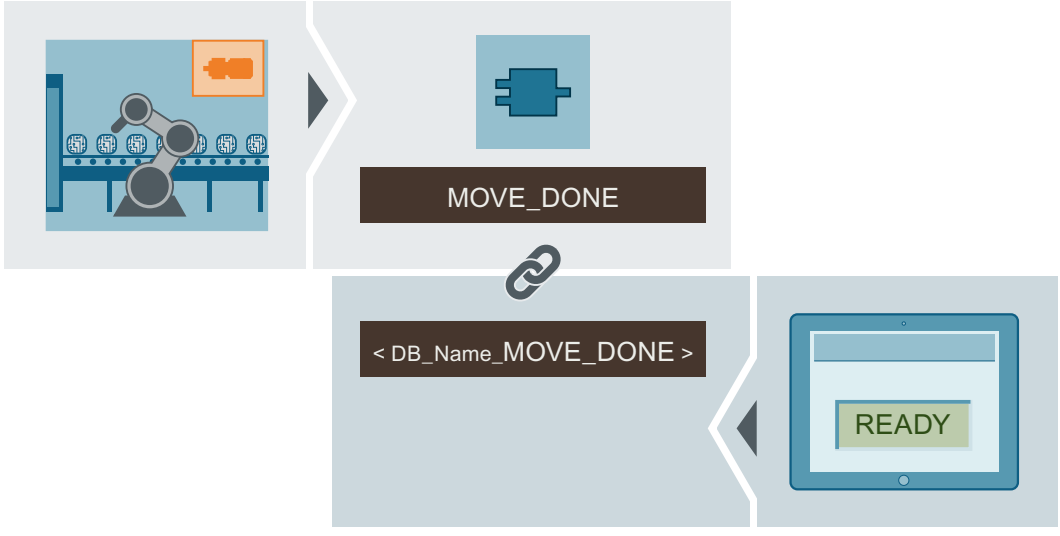
Tag names

WinCC supports fewer characters than STEP 7. If you use a character in the PLC tag name that is not supported by WinCC, this character is deleted when the name of the external tag is generated. This can result in duplicate tag names, which are not created and which generate an error.

Only use characters supported by WinCC when assigning names for PLC tags.

Result

The required tags have been uniformly named. The reference to the PLC tags can be read at the point of interconnection in the WinCC project.



Only the genuinely necessary tags are included in the WinCC project. Further processing and continuous adaptation of the tags is possible with SiVArc.

2.6 Configuring an HMI solution with SiVArc

Introduction

Configuring HMI solutions with SiVArc requires a standardized project. The more standardized a project, the easier and more effective the use of SiVArc to create the visualization.

Requirement

- The plant is a standard facility.
- The structured user program is created.
- A visualization and operating concept is created.
- Standard blocks in the user program are accessible via libraries.
- Faceplates for standard applications are accessible via libraries.
- The project is standardized and transferable.

Procedure

To generate HMI solutions with SiVArc, follow these steps:

1. Design the layout.
   - Which HMI devices are in use?
   - How is the CI implemented in the screen?
   - How many generation templates for screens are required?
   - How many positioning schemes are required?
2. Define which external tags are generated by SiVArc.
3. Create the generation templates for HMI objects and store them in the library.
4. Create the positioning schemes for screens and store them in the library.
5. You create screen rules to link the generation templates with the FBs.
6. You create tag rules to control the storage of generated tags.
7. You create copy rules to copy collected HMI objects from the library into the project.
8. Define the text list entries.
9. Generate the full visualization or only for selected devices.

Result

The generated HMI objects are created in the project tree and marked as SiVArc objects.

The generated screen objects are arranged according to your positioning schemes in the generated screens.

Further processing

Note

Subsequent name changes of generated SiVArc objects

If the name of a generated HMI object has been changed, the object is created and interconnected again at the next SiVArc generation. The renamed object remains available.

Change the names of generated SiVArc objects only in the user program.

Restart the generation after each change to the SiVArc project or the user program.

SiVArc processes the changed information and replaces the existing generation and generates additional HMI objects, if necessary.

See also

Generating external tags (Page 53)

Creation of generation templates (Page 74)

Generating and editing HMI screen objects (Page 131)

Installation 3

3.1 Installing SiVArc

Introduction

The setup program of the "SiVArc" add-on package starts once the installation medium has been inserted into the respective drive.

You need a valid license to install SiVArc. Use the "Automation License Manager" to manage your license keys.

Note

Version compatibility

Your SiVArc version is only compatible with the corresponding version of STEP 7 and WinCC Professional or WinCC Advanced.

To upgrade your version of the TIA Portal, you must also upgrade your version of SiVArc and vice versa. If you uninstall WinCC or STEP 7, SiVArc is also uninstalled.

Select a side-by-side installation to work with different versions of the TIA Portal.

Note

Windows 10 system requirements

In order to be able to use the complete functionality of SiVArc in Windows 10, you need to install Windows 10 Enterprise Version 1607.

You can find additional information on the topic of "System requirements" in the online help of the TIA Portal.

Requirement

- STEP7 Professional V14 SP1 is installed.
- SIMATIC WinCC Professional V14 SP1 or SIMATIC WinCC Advanced V14 SP1 is installed.

Procedure

To install the "SiVArc" add-on package, follow these steps:

1. Place the installation data medium in the drive.
   To start Setup manually, double-click the "Start.exe" file in the Explorer.
2. Select an installation language and click "Next."
3. Select the product you want and click "Next."

4. To continue the installation, read and accept all license agreements and click "Next".
   If the TIA Portal security and permission settings prevent installation, the security settings dialog opens.
5. To continue the installation, accept the changes to the security and permission settings.
6. Check the selected installation settings in the overview.
7. Change your settings as required and then click "Install".
   Installation is started.
   The completion of the installation is displayed.
8. Reboot your PC if required or exit Setup.

Result

The "SiVArc" add-on package is installed on your PC.

How to handle existing SiVArc projects

With a basic installation, existing SiVArc projects can be opened in the TIA Portal, even without a SiVArc installation.

If you then open the project with SiVArc, all SiVArc functions are active again.

To upgrade a SiVArc project, you require a SiVArc installation.

A basic installation consists of the following software packages:

- STEP7 Professional
- SIMATIC WinCC Professional
  or
- SIMATIC WinCC Advanced

To remove the reference to SiVArc in your project, delete all SiVArc configurations from your project. When you open the project with a basic installation, information about the missing SiVArc-installation will no longer be output.

Elements and basic settings

4

4.1 SiVArc editors

4.1.1 "Screen rules" editor

Description

In the "Screen rules" editor, you define the screen rules according to which SiVArc HMI objects are generated in screens for various devices. A rule is made up as follows:

- Name
  Unique name of the screen rule
- Program block
  FB or FC that is invoked at any position in the user program.
- Screen object
  Master copy or type of the HMI object that is generated. The master copy or type must be stored in a library.
- Screen
  Generation template of the screen on which the HMI object is generated. The generation template must be stored in a library.
- Layout field
  Layout field that is included in the positioning scheme of the screen. Use the layout field to specify the positioning of the HMI object to be generated.
- Condition (optional)
  SiVArc expression that is evaluated when processing this screen rule. If no condition is specified, the screen rule is always executed. The condition applies collectively for a rule group. You can refine the condition for individual rules of the rule group.
- Comment (optional)
  Individual comment for screen rule

Display the following columns as required via the icons in the toolbar:

- PLC
  The screen rule is executed for the selected controllers. If you do not select any controller, the rule applies to all controllers in your project.
- HMI device
  The screen rule is executed for the selected HMI devices. If you select no HMI device, the rule applies to all HMI devices in your project.
- HMI device type
  If multiple HMI devices of the same type are available in your project, you can also select types of HMI devices. During generation it is checked and indicated whether a rule can be applied to an HMI device or to a controller.

If you want to generate a screen without a screen object for a program block, leave the "Screen object" field blank.

Access to the "Screen rules" editor

To open a SiVArc editor, double click the relevant entry in "Common data > SiVArc" in the project tree.

If you select "Plug-Ins > SiVArc" in STEP 7 in the Inspector window of a program block, the configured screen rules are displayed.

All screen and text list rules which are created for the selected program block are directly accessible at the program block. The scope of the displayed rules depends on the controller.

You create and edit the SiVArc rules in STEP 7 like in the actual SiVArc editor.

Processing of the screen rules

SiVArc basically processes all screen rules that contain the program block currently being evaluated.

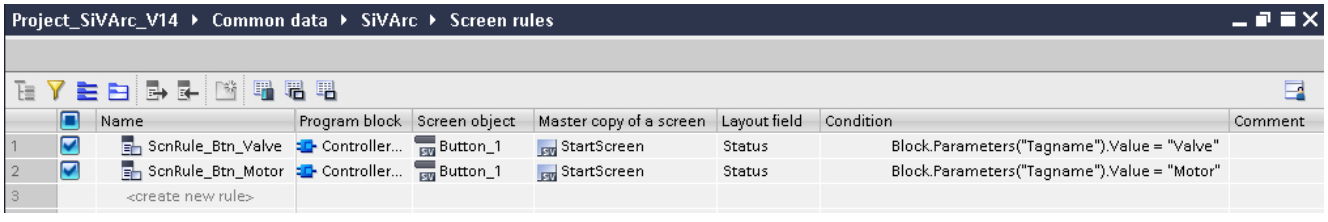
The following rules apply to screen rules:

- You must define a screen rule for each screen object to be generated.
- If you want to generate different screen objects from a program block, you must define a screen rule with a condition for each screen object. You specify the screen object to be generated in the condition.
- If the screen for a screen object to be generated does not exist yet, the screen is created during generation.
- If a block is contained in multiple screen rules in the "Screen Rules" editor, the objects are created in the order of the screen rules.

Example

You can use a program block to control a valve or motor. A button labeled "Open valve" or "Start engine" is to be generated depending on the use of the program block.

You need a screen rule for the valve symbol and for the motor symbol.



When the program block is processed by SiVArc during generation of the HMI objects, SiVArc evaluates the condition of each screen rule. In this example, the use of the program block is defined by an input, for example `Block.Parameters("Tag name").Value = "Valve"`. In this case, the condition of the first screen rule applies, which then generates the button labeled "Open valve".

See also

SiVArc tags (Page 87)

Editing the view in the SiVArc editors (Page 39)

Exporting and importing SiVArc rules (Page 129)

Editing and managing SiVArc rules (Page 126)

4.1.2 "Tag rules" editor

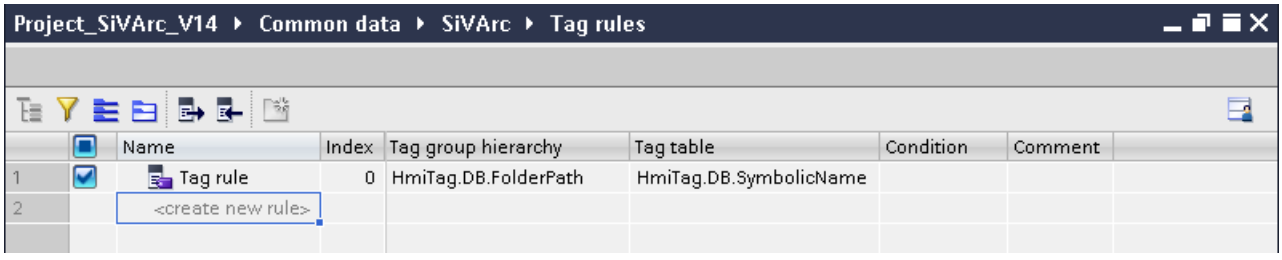
Description

In the "Tag rules" editor, you define tag rules according to which the external tags generated by SiVArc are stored in structured form.

Double-click "Common data > SiVArc > tag rules" in the project tree to open the "Tag rules" editor.

A tag rule is contains the following elements:

- Name
  Unique name of the tag rule
- Index
  Specifies the order in which the rules are executed. You change the index using drag-and-drop in the table rows.
- Tag group
  Name of the tag group in which the external tag is generated
- Tag table
  Name of the tag table in which the external tag is generated
- Condition (optional)
  SiVArc expression that is evaluated when processing this tag rule
- Comment (optional)
  Individual comment for tag rule



Processing of the tag rules by SiVArc

The order of tag rules is relevant for the storage of external HMI tags. If necessary, change the order using drag-and-drop.

For each external tag to be generated, SiVArc runs through the tag rules from top to bottom and evaluates the associated condition. As soon as a condition is true, the rule is applied. The subsequent tag rules are no longer processed by SiVArc if all tags have been generated. Otherwise, SiVArc continues with the generation of the next set of tag rules.

If none of the tag rules apply to an external tag to be generated, this external tag is stored in the default tag table.

Depending on the setting under "Options > Settings > SiVArc", SiVArc generates only external tags which are also interconnected in the generated SiVArc project.

During generation, SiVArc processes the settings for tags in the Runtime settings of the HMI device. The generated name of the external tags represent the symbolic address of the tags in the data block in accordance with the tag synchronization of WinCC.

Generating external tags

You specify the external tags to be generated in the respective data block or function block interface with the "Accessible from HMI" entry.

The external tags are generated during "Generation of the visualization".

Generating internal tags

To generate internal tags, follow these steps:

1. Create a tag table.
2. Configure the internal tags in this tag table.
3. Store the tag table as master copy in the project library.
4. Create a copy rule (Page 32) which copies the master copy of the tag table to the specified HMI device.

Default settings for tag names

The following default settings are set for generated tag names in the TIA portal:

- The separator is always "_"
- Square brackets "[" and "]" are replaced with "{" and "}"

When necessary, use SiVArc object properties in SiVArc expressions that process these settings. You can find additional information in the reference in the SiVArc object properties (Page 164) section

Note

Separators in structured tags

The hierarchy levels are always separated by "." in structured tags.

See also

Editing the view in the SiVArc editors (Page 39)

Exporting and importing SiVArc rules (Page 129)

Editing and managing SiVArc rules (Page 126)

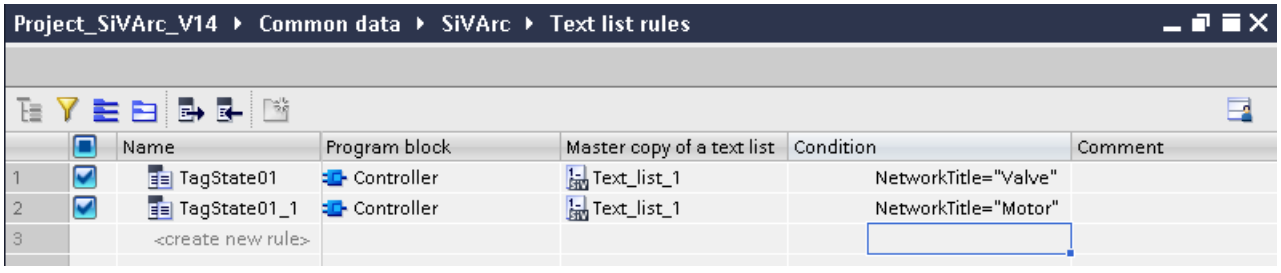
Tag generation (Page 51)

4.1.3 "Text List Rules" editor

Description

In the "Text list rules" editor, you define SiVArc rules according to which text lists are generated for various devices. A text list rule is made up as follows:

- Name
  Unique name of the text list rule
- Program block
  FB or FC that is invoked at any position in the user program.
- Text list
  Master copies of text lists are saved in the "Text and Graphic Lists" editor during generation.
- Condition (optional)
  SiVArc expression that is evaluated when processing this text list rule. If no condition is specified, the text list rule is always executed.
- Comment (optional)
  Individual comment for text list rule



Access to the "Text list rules" editor

To open a SiVArc editor, double click the relevant entry in "Common data > SiVArc" in the project tree.

If you select "Plug-Ins > SiVArc" in STEP 7 in the Inspector window of a program block, the configured text list rules are displayed.

All screen and text list rules which are created for the selected program block are directly accessible at the program block. The scope of the displayed rules depends on the controller.

You create and edit the SiVArc rules in STEP 7 like in the actual SiVArc editor.

Processing of the text list rules by SiVArc

The order of the text list rules is not relevant, because the use of the text list rules is defined by the call hierarchy of the program blocks in the user program. SiVArc always processes all text list rules that contain the program block currently being evaluated by SiVArc.

See also

Editing the view in the SiVArc editors (Page 39)

Exporting and importing SiVArc rules (Page 129)

Editing and managing SiVArc rules (Page 126)

4.1.4 "Copy Rules" editor

Introduction

In the "Library rules" editor, you define the rules according to which objects are generated for various HMI devices:

- Screens
- Scripts
  - C scripts
  - VB scripts
- Text lists
- Graphic lists
- Tag tables

These are based on master copies or types in the project library.

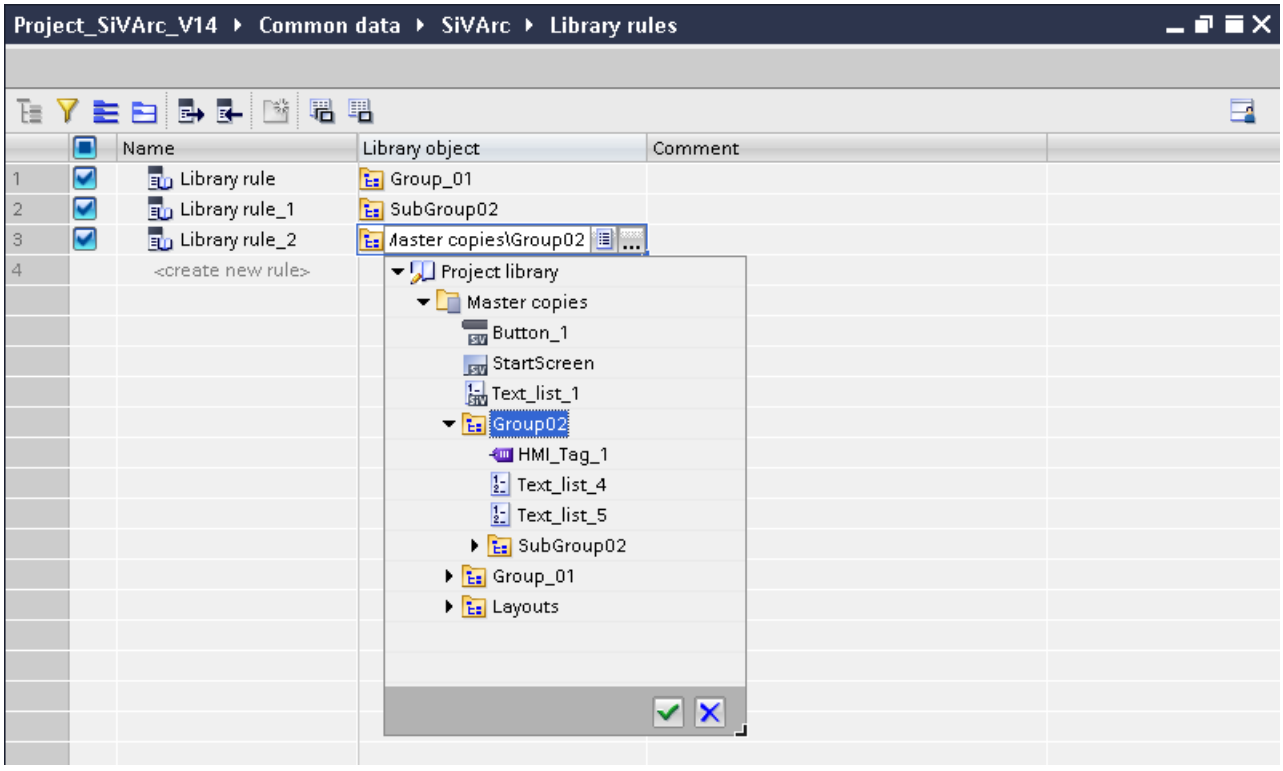
Description

A copy rule differs from a screen rule as follows:

- Independent of the user program
- Does not support any SiVArc expressions or conditions

A rule is made up as follows:

- Name
  Unique name of copy rule
- Library object
  Master copy or type of an object that is generated or a library folder that contains library objects. The master copy or the type must be contained in the project library.
- Comment (optional)
  Individual comment for the copy rule



You show the following columns, when necessary, using the icons in the toolbar:

- HMI device
  The copy rule is executed for the selected HMI devices. If you select no HMI device, the rule applies to all HMI devices in your project.
- HMI device type
  If multiple HMI devices of the same type are available in your project, you can also select types of HMI devices. During generation it is checked and indicated whether a rule can be applied to an HMI device or to a controller.

See also

"Tag rules" editor (Page 29)

4.1.5 "Generation matrix" editor

Description

The generated screens and screen objects for an HMI device or an HMI device type are displayed in the "Generation matrix" editor after each generation.

In addition, you can adjust the assignment of the following generated objects:

- Generate screen object in another screen
- Generate screen in another HMI device

Changed assignments become effective at the next generation. Depending on your settings, the screen navigation is adjusted at the same time.

Note

How to use the "Generation matrix" editor

Subsequent changes to the assignment of generated objects are aimed at commissioners that have to perform short-term adjustments in the project.

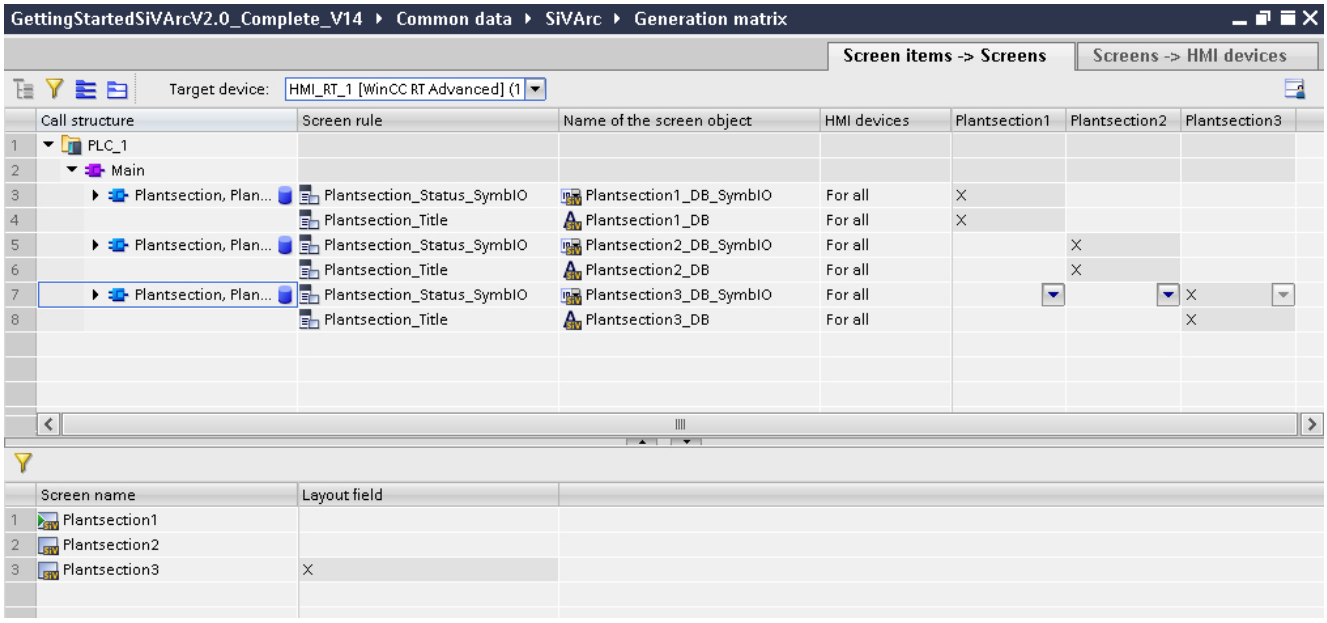
If possible, use screen rules only to generate screens and screen objects during the configuration.

Tab "Screen objects -> Screens"

In the toolbar of the editor, you select the HMI device for which the matrix is to be displayed under "Target device". SiVArc also displays the device type for all devices.

In this tab, assign a generated screen object to another screen. The tab contains the following columns:

- Call structure
  Shows for each line the block instances that are called in the user program and used for generating screen objects.
- Screen rule
  Shows the screen rules that were executed for each block instance.
- Name of the screen object
  Shows the generated screen object.
- HMI devices
  Lists for each screen object the HMI devices for which the screen object was generated.
- Screen columns
  A separate column is displayed for each screen. The columns are sorted alphabetically.
  - "X": Screen object is not positioned in a layout field.
  - "<Name of the layout field>": Screen object is contained in the specified layout field.

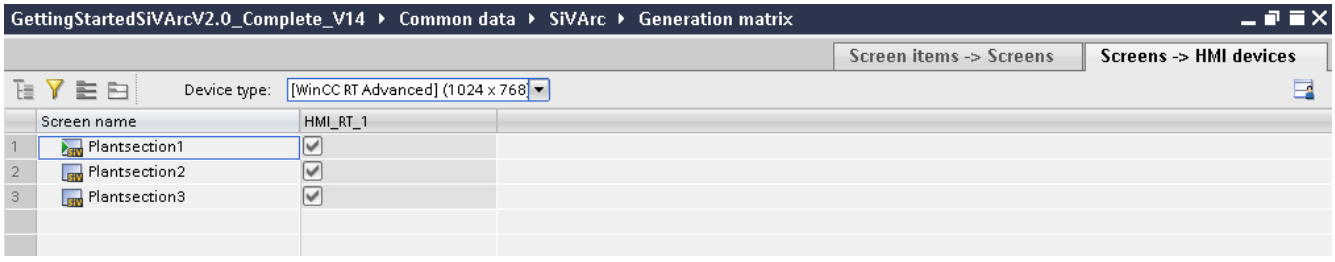


"Screens -> HMI devices" tab

In the toolbar of the editor, you select the HMI device type for which the matrix is to be displayed under "Device type". The editor then displays the screens of all HMI devices of this type.

On this tab, assign a generated screen to another HMI device. The tab contains the following columns:

- Screen
  Shows the generated screens.
- HMI devices
  Shows the HMI devices. A separate column is shown for each HMI device. The columns are sorted alphabetically.



Adjust assignment of generated screen objects and screens

1. To change the assignment of a screen object, select the layout field or "X" in the corresponding cell in the "Screen objects -> Screens" tab.
2. To change the assignment of a screen, select the check box in the corresponding cell in the "Screens -> HMI devices" tab.
3. Generate the visualization.

Adapting navigation buttons for screens

Navigation buttons leading to a screen that is newly generated with the matrix are generated again according to the screen hierarchy.

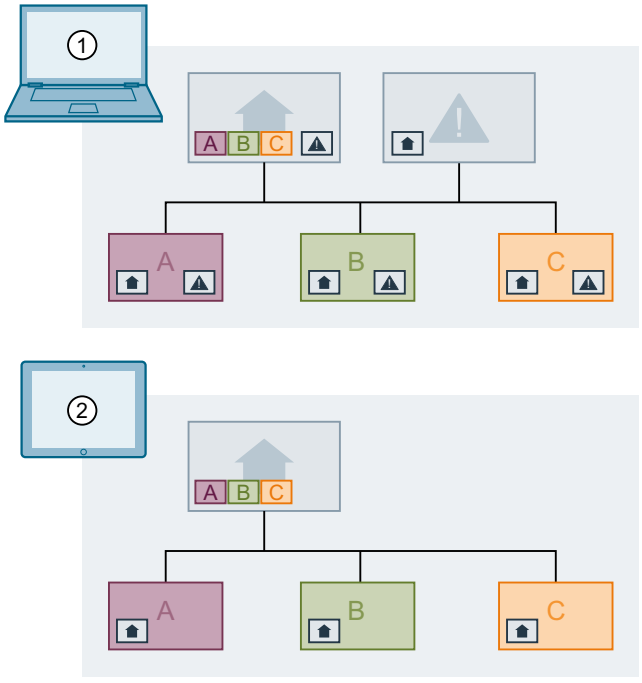
1. Activate the "SiVArc > SiVArc settings > Matrix settings > Generate navigation objects" option.
2. Reassign the screens.
3. Generate the visualization.

The screens and navigation buttons leading to this screen have been generated again.

Example: Moving screens with navigation to other devices with the generation matrix

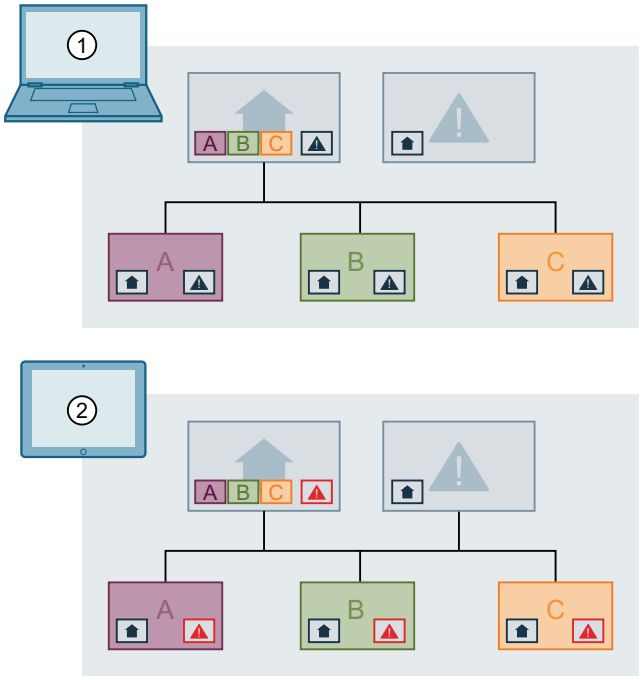
You have generated a start screen, a diagnostic screen and lower-level screens on HMI device 1. The start screen and the diagnostic screen can be displayed from each lower-level screen with the help of navigation buttons.

A diagnostic screen was not generated on HMI device 2.



① HMI device 1
② HMI device 2

When you move the diagnostic screen to HMI device 2 with the generation matrix, the navigation buttons are adapted accordingly.



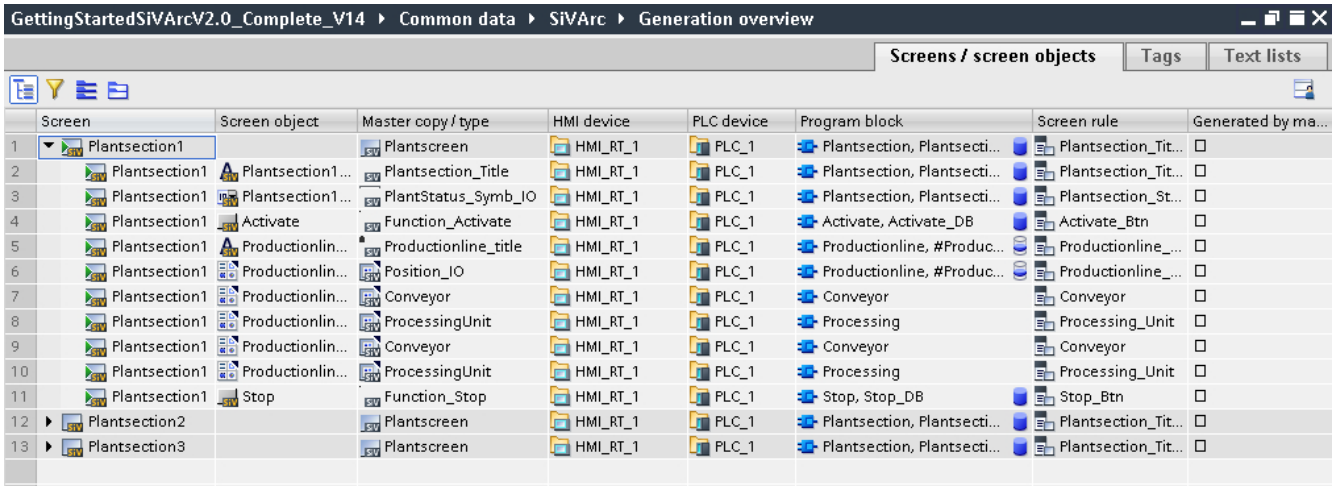
① HMI device 1
② HMI device 2

4.1.6 Generation overview

Description

After the initial generation of the visualization, all generated screen objects are listed in the generation overview. The SiVArc objects are divided into the tabs "Screens/Screen objects", "Tags" and "Text lists".

The generation overview also displays, using various views, the relations between screen rules and generated SiVArc objects after the generation. With the help of the generation overview, you plan and configure subsequent changes for an additional generation.



The contents of the generation overview are made up as follows:

"Screens/screen object" tab	"Tags" tab	"Text lists" tab
Name of the screen/screen object Unique name of the SiVArc object	Name Name of generated tag table/generated tags	Text list/text list entry Name of the text list and its text list entries
Master copy/type Name of the generation template of the SiVArc object	Data type Data type of the generated tags. The name of the UDT data type is shown for the "UDT" data type (PLC data type).	Master copy/type Name of the generation template for the text list
HMI device Name of the HMI device, for which the SiVArc object was generated	HMI device Name of the HMI device for which the external tags were generated	HMI device Name of the HMI device for which the text list was generated
PLC device Name of PLC for which the SiVArc object was generated	PLC device Name of the controller for which the tags were generated.	PLC device Name of the controller for which the text list was generated
Program block FB or FC for which the SiVArc object was generated	Program block DB for which the tag was generated	Text Text that contains the text list entry
Screen rule Screen rule which defined the generation of the SiVArc object	PLC tag Name of the PLC tag for which the external tag was generated.	Rule name Name of the text list rule which specified the generation of the text list
Date Time stamp on which the SiVArc object was generated.	Tag table Name of the tag table in which the tags were generated	Network Name of the network which was evaluated during the generation
Generated by matrix Object was created in a downstream generation using the generation matrix.	Tag folder Name of the folder in the project tree in which the tag tables and tags were generated	Program block FB or FC for which the text list was generated

"Screens/screen object" tab	"Tags" tab	"Text lists" tab
Layout field If the object was generated in a layout field, the name of the field is displayed here.	Tag rule Tag rule which specified the storage structure of the generated tags	Call structure Call path in the cycle OB "Main1", which specified the generation of the text list
Call structure Path of the evaluated block in the call hierarchy in the user program (OB1)	---	---

Use generation overview

To open the generation overview, double click "Common data > SiVArc > Generation overview" in the project tree. You can also open the generation overview from the completion message to generate the visualization in the Inspector window.

To identify blocks, screen rules or SiVArc objects in the project listed in the generation overview, select the shortcut menu command "Go to referenced object".

4.1.7 Editing the view in the SiVArc editors

Introduction

You can filter and sort SiVArc rules in the editor or in the generation overview without affecting the order of generation. If necessary, store the new layout until the next start of the TIA Portal. You can also group the view by columns in all SiVArc editors. The filter functions are deactivated in this case.

While the list is being filtered or sorted, you can continue editing the SiVArc rules or create new rules. The active filter criteria are applied to new and edited rules.

Note

New rules in the filtered editor

If you create a new rule in the filtered editor, the new rule is a copy of the rule displayed at the lowest position. If the list is filtered by the name of the SiVArc rules, the new SiVArc rule is not displayed.

Filtering contents of editors for the view

When the "Group" button is deactivated, you can filter the contents of the editors.

To filter SiVArc rules in the editor, follow these steps:

1. Click the "Filter" button in the toolbar of the editor.
   A filter line is displayed below the header of the editor.
2. Open the selection dialog in the filter cell of the required column.
3. In the selection dialog, select the objects that you want to display in the editor.
   The rules are filtered according to your selection.

To hide the filter line, click the "Filter" button again.

Sorting contents of the editors for the view

When the "Group" button is deactivated, you can sort the contents of the editors.

You can also re-sort SiVArc rules while the list is displayed filtered and vice versa.

To sort SiVArc rules in the editor, follow these steps:

- Click the column header according to which you want to sort the display.
  The display is sorted by the selected column in descending alphabetical order. When the rule editor contains subfolders, the rules within the folder are also sorted according to this column.

Saving sorting and filter

To retain the filter or the sorting of the rules until the next start of the TIA Portal, follow these steps:

- Click the "Save window settings" button in the toolbar of the editor.
  When the TIA Portal is opened the next time, the SiVArc rules are arranged and filtered as they were the last time.

Regrouping the display

When the display is opened for the first time, the contents are shown grouped according to the first column.

To regroup the contents in the editor, follow these steps:

1. To activate the grouping function, click the "Group" button.
   The "Group" button is displayed pressed.
2. Click the column heading for whose content you want to group the display.
   All SiVArc rules or SiVArc objects are grouped according to the content of the selected column in the display.

Changing the arrangement of tag rules

You arrange the tag rules using drag-and-drop or via the shortcut menu commands. This functionality is only available when the columns of the "Tag rules" editor are neither sorted nor filtered. Use the shortcut menu to also re-sort "Tag rules" in the filtered editor.

To change the arrangement of the tag rules using drag-and-drop, follow these steps:

1. Select the first cell of the rule.
2. Drag the rule to the required position in the editor.

4.2 SiVArc in the WinCC editors

4.2.1 "SiVArc properties" tab

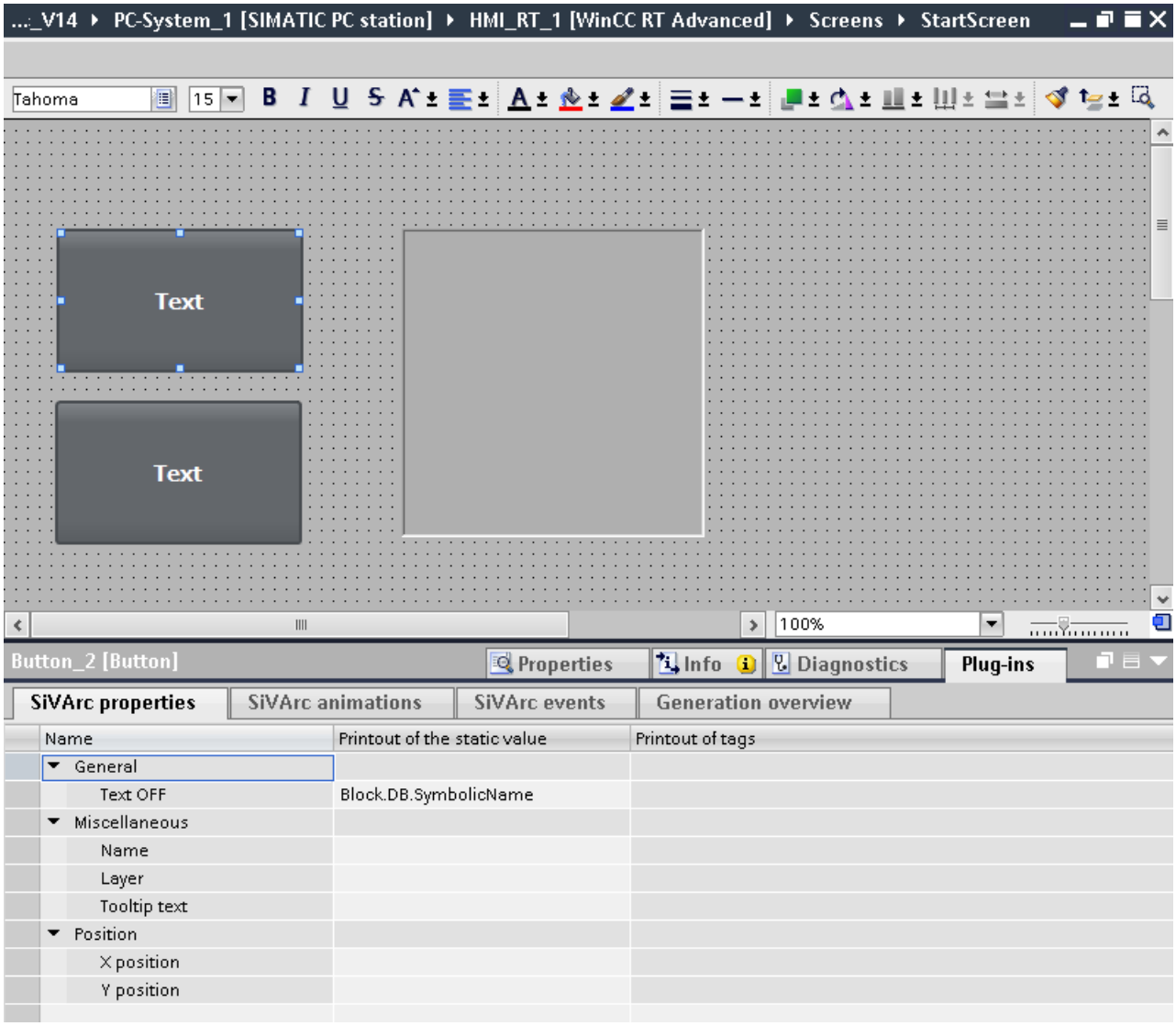
Definition

Description

A SiVArc property is an object property that you configure either statically or dynamically with a SiVArc expression.

In the "SiVArc properties" tab, you can configure the properties of a text list, a screen or a screen object with SiVArc expressions. You then store the configured object in the project library. The SiVArc expressions are evaluated during generation of the visualization.

The "SiVArc properties" tab is only available for objects supported by SiVArc.



Layout

The tab contains the three columns:

- Name
  This column lists the available properties.
- Expression of the static value
  In this column, you assign a property with a fixed value or a SiVArc expression that returns a string or a number.
  Fixed values are entered in every instance of this master copy when generating the visualization. Pay attention, for example, with the "Name" property that the uniqueness of the object name is ensured when it is used multiple times in an screen.
- Expression of the tag
  In this column, you assign a property with a tag name or a SiVArc expression that returns a tag name.

4.2.2 "SiVArc events" tab

Introduction

SiVArc supports the configuration of system functions and scripts with SiVArc expressions at all events of screens and screen objects. You configure the events in the "SiVArc event" tab. SiVArc supports system functions from the following categories:

- Calculation
- Bit processing
- Screens

Note

Device dependency

The number and type of events in a display and operating object depends on the configured HMI device.

Additional information on device dependency of events is available in the online help of the TIA Portal in the section "Working with system functions and Runtime scripting" in the reference.

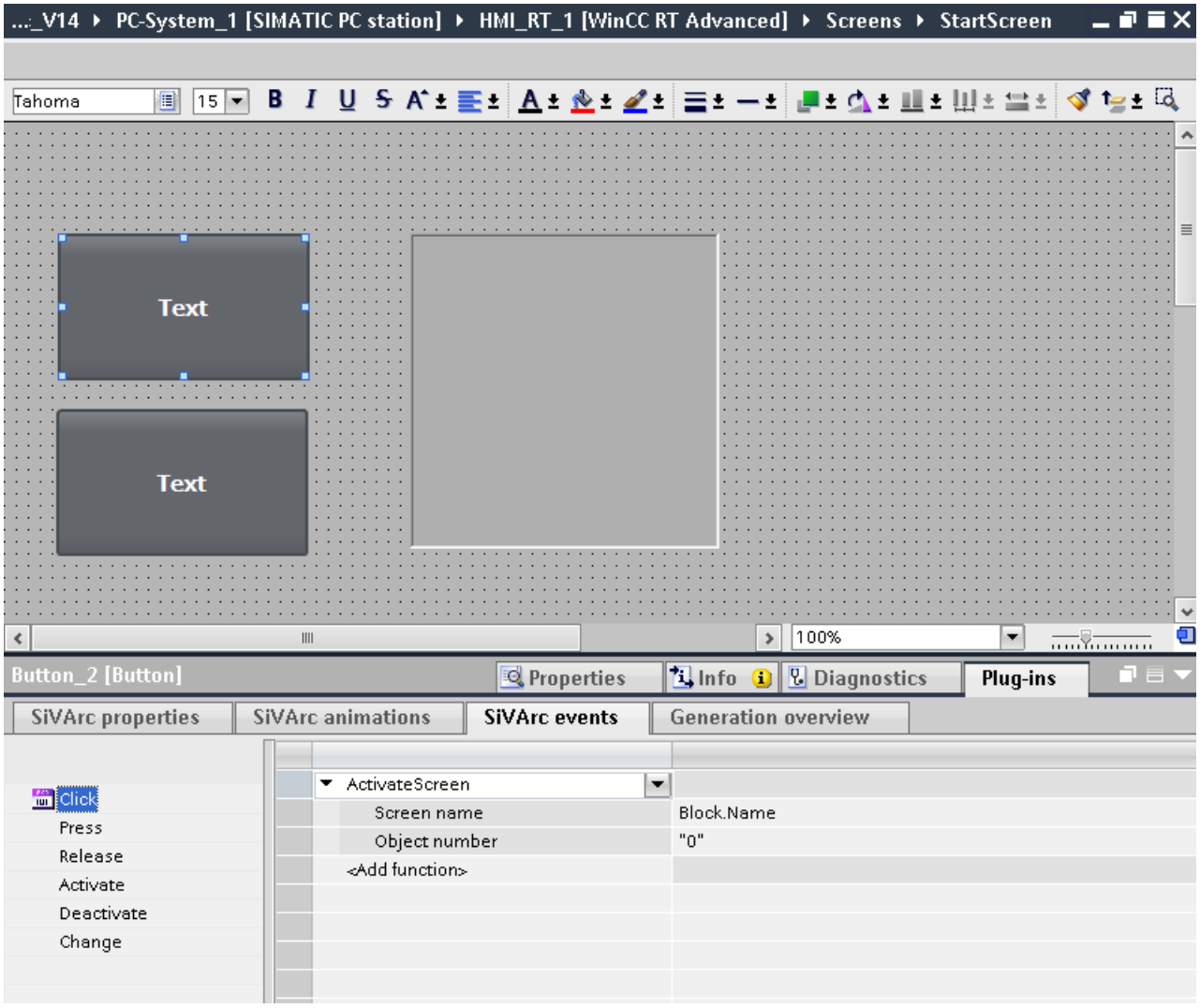
Events and system functions in faceplates

SiVArc supports a limited selection of SiVArc events and system functions for faceplates. You can find an overview of the supported system functions in the section "Reference".

Description

In the "SiVArc events" tab, you can configure a function list to an event of a generation template of a screen or screen object. You add system functions or a script to the function list.

You can configure the parameters of the system function or script with SiVArc expressions.



Layout

Column 1: Select the function or script in column 1.

Column 2: Enter a SiVArc expression in column 2.

Column 3: Once you have selected a script, select a data type in column 3.

Using scripts

When you connect scripts to events, these scripts must exist on each target device. If the configured script does not exist in the "Scripts" editor on the target device, the display and operating object is generated without this script connection.

4.2.3 "SiVArc animations" tab

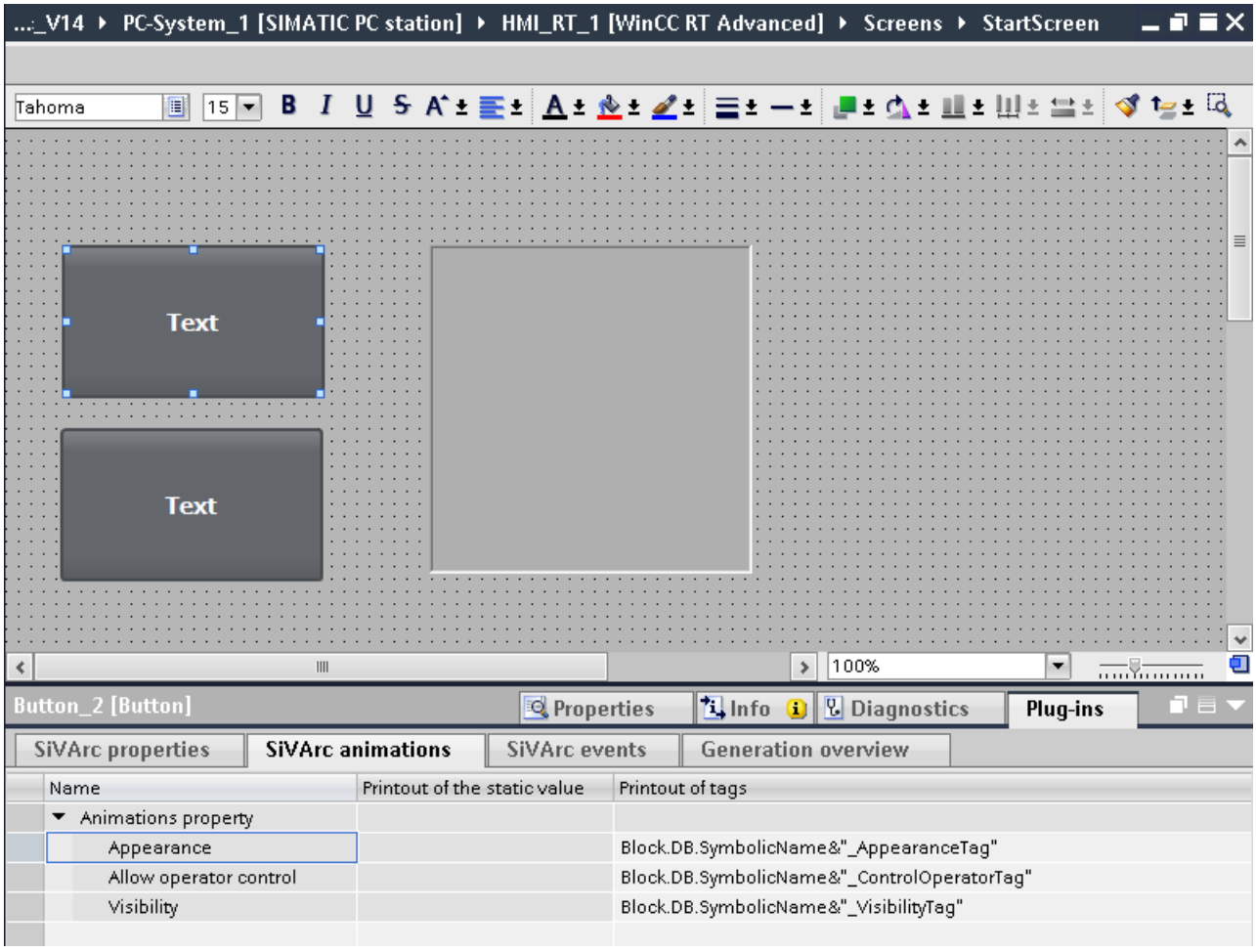
Description

Animations configured on the screen object are listed in the "SiVArc animations" tab. SiVArc supports the following types of animation:

- Animation with tag connection (only available in WinCC Runtime Professional for S7-GRAPH overview)
- Animations of the "Display" category

For these animations, you use a SiVArc expression to define the process tags which trigger the animation in Runtime.

The "SiVArc animations" tab is only available for HMI objects supported by SiVArc.



Layout

The "SiVArc animations" tab contains the following columns:

- Name
  The animations configured under "Properties > Animations" are listed in this column.
- Expression of the static value
  This column cannot be edited for animations.
- Expression of the tag
  In this column, you configure the process tags for the animation with a SiVArc expression. The SiVArc expression must return a tag name.

Editing expressions

You can change expressions already created by selecting the expression and using commands from the shortcut menu.

You can copy or cut one or more expressions and paste them to the "SiVArc animations" tab of another HMI object.

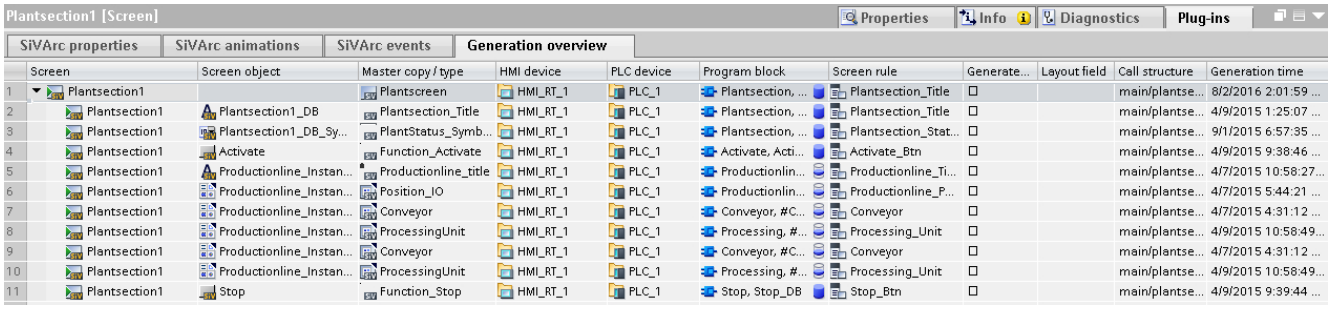
4.2.4 "Generation overview" tab

Description

After the first generation, the "Generation overview" tab is displayed in the Inspector window of a generated screen. The number of displayed objects is limited to the display and operating objects generated in the selected screen.

With the following exceptions, the "Generation overview" tab contains the same editing options as the "Generation overview" SiVArc editor:

- Filter function
- Sorting function
- "Open all" and "Expand all" buttons



	Screen	Screen object	Master copy / type	HMI device	PLC device	Program block	Screen rule	Generate...	Layout field	Call structure	Generation time
1	Plantsection1		Plantscreen	HMI_RT_1	PLC_1	Plantsection, ...	Plantsection_Title	☐		main/plantse...	8/2/2016 2:01:59 ...
2	Plantsection1	Plantsection1_DB	Plantsection_Title	HMI_RT_1	PLC_1	Plantsection, ...	Plantsection_Title	☐		main/plantse...	4/9/2015 1:25:07 ...
3	Plantsection1	Plantsection1_DB_Sy...	PlantStatus_Symb...	HMI_RT_1	PLC_1	Plantsection, ...	Plantsection_Stat...	☐		main/plantse...	9/1/2015 6:57:35 ...
4	Plantsection1	Activate	Function_Activate	HMI_RT_1	PLC_1	Activate, Acti...	Activate_Btn	☐		main/plantse...	4/9/2015 9:38:46 ...
5	Plantsection1	Productionline_Instan...	Productionline_title	HMI_RT_1	PLC_1	Productionlin...	Productionline_Ti...	☐		main/plantse...	4/7/2015 10:58:27...
6	Plantsection1	Productionline_Instan...	Position_IO	HMI_RT_1	PLC_1	Productionlin...	Productionline_P...	☐		main/plantse...	4/7/2015 5:44:21 ...
7	Plantsection1	Productionline_Instan...	Conveyor	HMI_RT_1	PLC_1	Conveyor, #C...	Conveyor	☐		main/plantse...	4/7/2015 4:31:12 ...
8	Plantsection1	Productionline_Instan...	ProcessingUnit	HMI_RT_1	PLC_1	Processing, #...	Processing_Unit	☐		main/plantse...	4/9/2015 10:58:49...
9	Plantsection1	Productionline_Instan...	Conveyor	HMI_RT_1	PLC_1	Conveyor, #C...	Conveyor	☐		main/plantse...	4/7/2015 4:31:12 ...
10	Plantsection1	Productionline_Instan...	ProcessingUnit	HMI_RT_1	PLC_1	Processing, #...	Processing_Unit	☐		main/plantse...	4/9/2015 10:58:49...
11	Plantsection1	Stop	Function_Stop	HMI_RT_1	PLC_1	Stop, Stop_DB	Stop_Btn	☐		main/plantse...	4/9/2015 9:39:44 ...

4.3 SiVArcin STEP 7

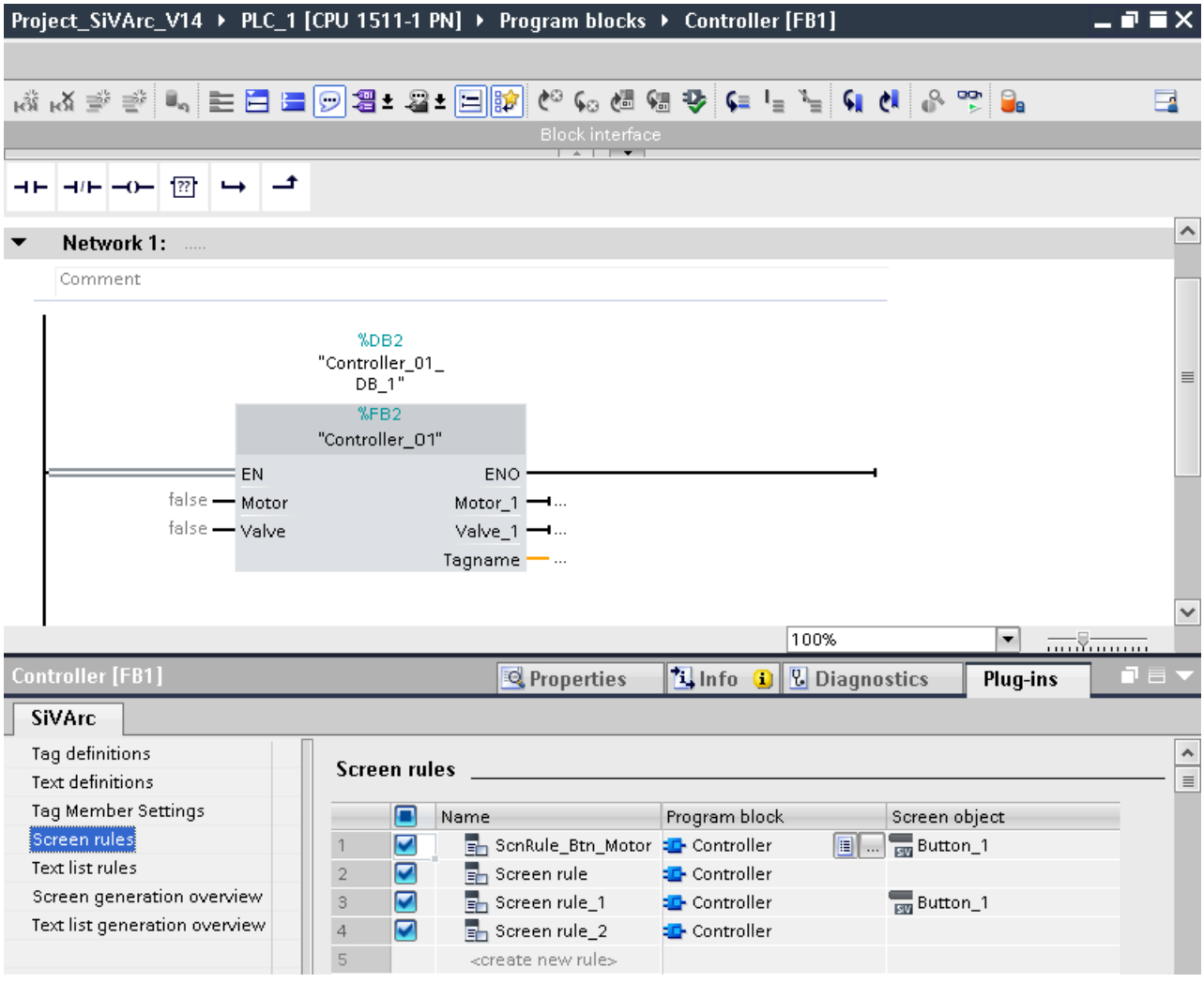
4.3.1 Screen and text list rules in STEP 7

Introduction

To obtain an overview of the configured rules for the current program block, you select "Plug-Ins > SiVArc" in STEP 7 in the Inspector window of a program block. You can define all screen and text list rules directly at the program block.

SiVArc editors "Screen rules" and "Text list rules" in STEP 7

The scope of the displayed rules depends on the controller.



Except for Import/Export, you create and edit the SiVArc rules in STEP 7 like in the actual SiVArc editor. There is no toolbar in the Inspector window.

You only remove the know-how protection of SiVArc rules in STEP 7 with the commands in the shortcut menu in the project tree under "Common data > SiVArc".

The "Screen generation overview" and the "Text list generation overview" displays are additionally available in the Inspector window under "Plug-ins > SiVArc" after the first generation.

4.3.2 SiVArc texts and SiVArc tags

Introduction

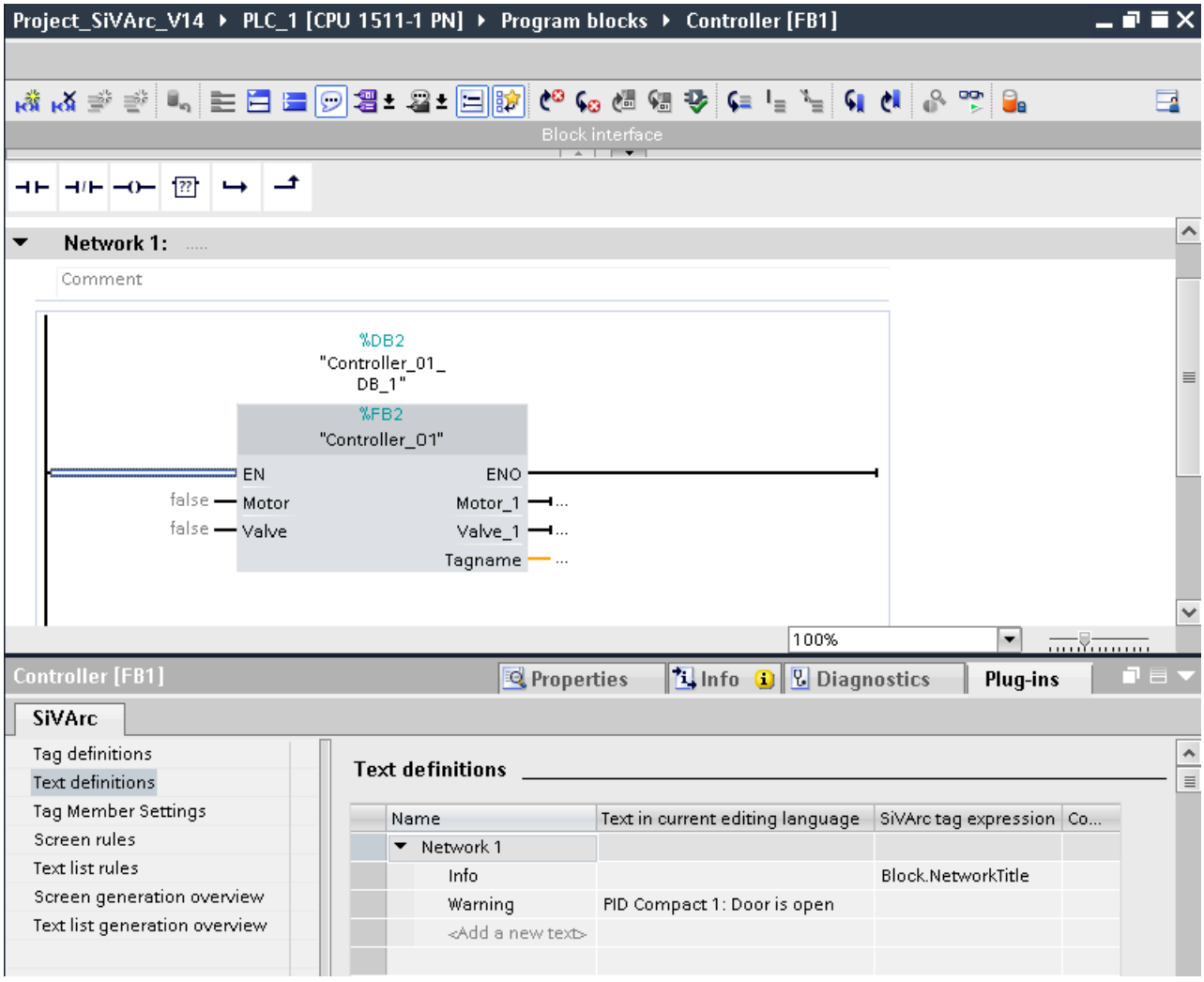
With SiVArc you can define texts as text list entries and tags for the generation of your visualization. This functionality is integrated in the user program in STEP 7 and is available in any network title and block title.

To define SiVArc texts or SiVArc tags, select the "Plug-ins" tab in the Inspector window of the required network title or block title.

SiVArc texts

SiVArc texts are generated as text list entries. Text definition and text list entry are linked by means of the name.

When the program block is used in a text list rule, the SiVArc texts are generated as text list entries in a text list.



You can specify SiVArc texts statically or dynamically:

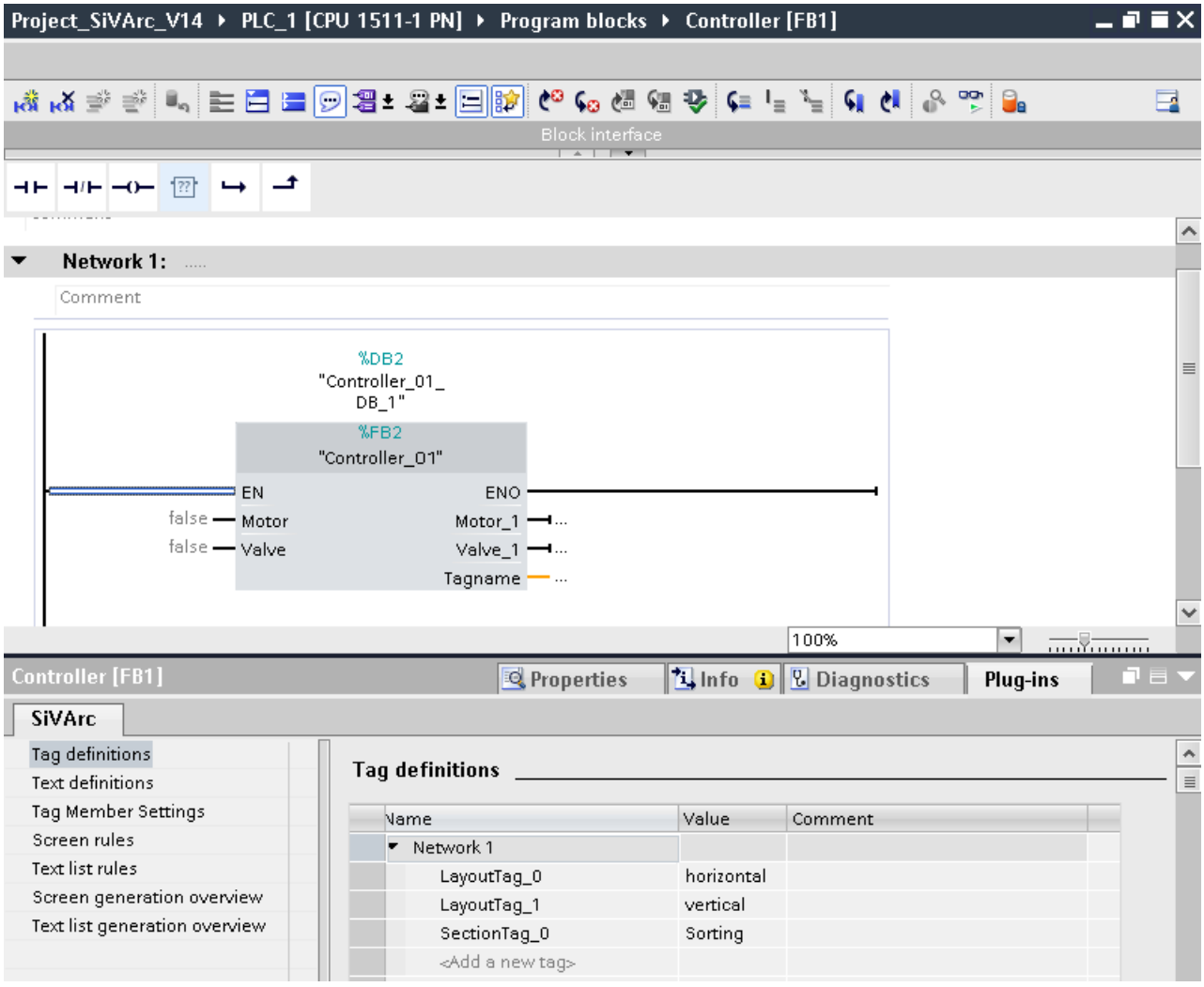
- Static: Assign a text as text definition. You can also configure this text in multiple languages.
- Dynamic: Specify a SiVArc expression as text definition.

When you specify a text and a SiVArc expression, the SiVArc expression is used.

SiVArc tags

SiVArc tags are user-defined tags. You can create multiple tags for the organization block "Main (OB1)" and for each network.

You define the tag name and the required value.



At the block title or block comment, all SiVArc tags defined at the block are displayed in the Inspector window under "Plug-Ins > SiVArc".

Only the SiVArc tags created in this network are displayed at the network title or network comment.

See also

SiVArc tags (Page 87)

Working with SiVArc

5

5.1 Tag generation

5.1.1 Tag generation settings

Overview

The following settings are taken into consideration when external tags are generated:

- Scope of the tag generation
  You specify the scope of tag generation project-wide.
- Update cycle and acquisition type
  You specify the update cycle and the acquisition type of the contained tags in the data block or project-wide.
- Naming conventions for tags
  You define the names of external tags in the Runtime settings of the HMI device.

Scope of the tag generation

If you want to generate only external tags with SiVArc that are used in the SiVArc project, select the required option for your project from "Options > Settings > SiVArc". If you have already started the generation, check the setting for this option in the dialog for generating the visualization.

If you only select this setting after the first generation, the existing external tags are processed according to the rules for SiVArc objects:

- Unused external tags in the SiVArc project are deleted.
- Manually edited tags are retained and, if necessary, renamed.

Setting up the update cycle and acquisition type

If necessary, you can set the update cycle and the acquisition type of external tags generated by SiVArc in multiple steps:

- For individual program blocks
  You define the update cycle and the acquisition type of tags for a program block with the "Use Common Configuration" option in the Inspector window of a data block under "Plug-Ins > SiVArc > HMI tag settings". This setting deactivates the settings for individual tags.
- For individual tags
  When the "Use Common Configuration" option is disabled, configure each tag individually in the data block.
- Project-wide
  In the SiVArc settings under "Common data > SiVArc > SiVArc settings > Tag generation settings", you configure all external tags of the project that are generated. This setting is only evaluated if no other setting for tag generation is defined.

User data types only support the cyclic acquisition types. If you set the "On demand" acquisition type for the entire project or for one program block, the standard cycle 1 s is set with the "Cyclic in operation" acquisition type for user data types.

The cycle 500 ms is automatically set for HMI devices which do not support setting the acquisition type and update cycle.

Note

Copy program block with tag configuration

You make the settings on the update cycle and acquisition type again for each program block. Even if you copy a completely configured program block, configure its settings for tag generation again.

Naming conventions for tags

During generation, SiVArc takes into account the settings for tags in the runtime settings of the HMI device. SiVArc names the generated external tags according to the naming conventions set there.

If you change the settings for tags after the first SiVArc generation, SiVArc generates all tags in accordance with the new settings. Existing SiVArc tags are renamed.

Configure the settings for tags once before the first SiVArc generation.

Spaces in tag names

SiVArc does not take into consideration spaces when generating tags. Even if, for example, a function block that is supplied with tags via SiVArc has a space in its name.

SiVArc ignores this space. In this case errors can occur during the interconnection.

Example

A DB instance name of a function block contains a space: "TT5684 Temperature", because it is used as message text. If you do not remove the space from the name of the function block,

the block is created and the interface property is highlighted in red with the non-existing tag "TT5684Temperature" (without space).

Delete the space in the tag name of the function block. In this way you adapt the SiVArc expression to the tag name as it is created from the tag rule.

5.1.2 Generating external tags

Introduction

SiVArc can automatically create external tags from the elements of a data block. Depending on your settings, SiVArc generates all external tags or only those tags that are relevant to the SiVArc project.

The follows data blocks are supported:

- Instance data block (IDB)
- Global data block (GDB)

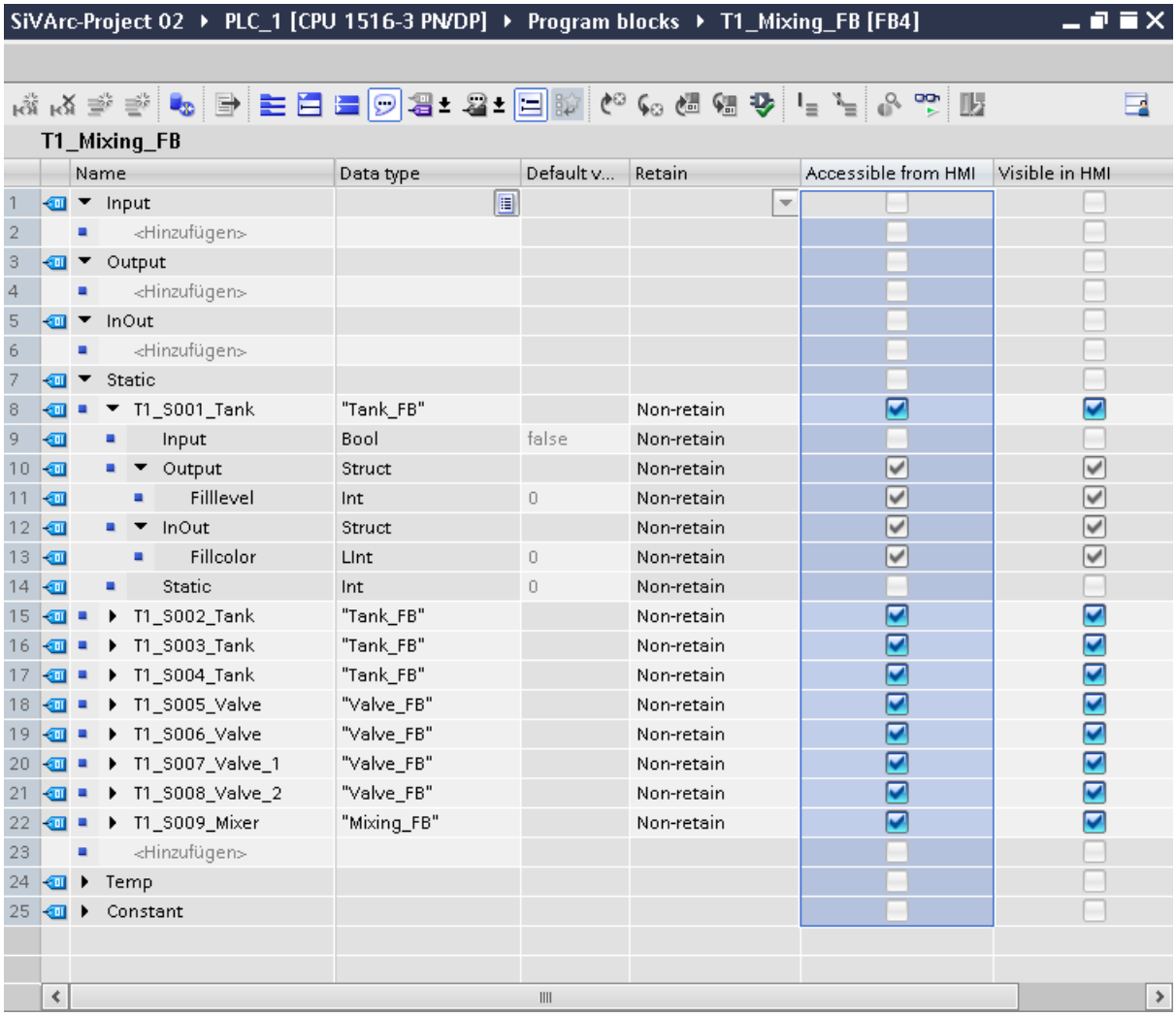
Requirement

- A function block with IDB or a GDB is created.
- The settings for tags are initially set.

Procedure

Example: Function block with IDB

1. Open the desired FB.
2. Under "Accessible from HMI" in the block interface, activate the block parameters from which SiVArc is to generate external tags.



	Name	Data type	Default v...	Retain	Accessible from HMI	Visible in HMI
1	Input				☐	☐
2	<Hinzufügen>				☐	☐
3	Output				☐	☐
4	<Hinzufügen>				☐	☐
5	InOut				☐	☐
6	<Hinzufügen>				☐	☐
7	Static				☐	☐
8	T1_S001_Tank	"Tank_FB"		Non-retain	☑	☑
9	Input	Bool	false	Non-retain	☐	☐
10	Output	Struct		Non-retain	☑	☑
11	Filllevel	Int	0	Non-retain	☑	☑
12	InOut	Struct		Non-retain	☑	☑
13	Fillcolor	LInt	0	Non-retain	☑	☑
14	Static	Int	0	Non-retain	☐	☐
15	T1_S002_Tank	"Tank_FB"		Non-retain	☑	☑
16	T1_S003_Tank	"Tank_FB"		Non-retain	☑	☑
17	T1_S004_Tank	"Tank_FB"		Non-retain	☑	☑
18	T1_S005_Valve	"Valve_FB"		Non-retain	☑	☑
19	T1_S006_Valve	"Valve_FB"		Non-retain	☑	☑
20	T1_S007_Valve_1	"Valve_FB"		Non-retain	☑	☑
21	T1_S008_Valve_2	"Valve_FB"		Non-retain	☑	☑
22	T1_S009_Mixer	"Mixing_FB"		Non-retain	☑	☑
23	<Hinzufügen>				☐	☐
24	Temp				☐	☐
25	Constant				☐	☐

3. To structurally store the external tags to be generated, define the relevant rules in the "Tag rules" editor.

Result

The external tags are automatically generated during "Generation of the visualization". The generated external tags are named according to the settings for tags.

Depending on the selected project setting, all external tags were generated or only the tags required in the project.

Note

Subsequent name changes of generated SiVArc objects

If the name of a generated HMI object has been changed, the object is created and interconnected again at the next SiVArc generation. The renamed object remains available.

Change the names of generated SiVArc objects only at the source object, for example, at a block output.

Note

Duplicate tag names

If a tag name has already been manually assigned in the project, SiVArc changes this name during generation and creates a new tag with this name.

Avoid duplicate tag names in your project.

See also

Generating visualization (Page 133)

"Tag rules" editor (Page 29)

5.2 Creating HMI objects

Introduction

In addition to display and operating objects for the process visualization, other HMI objects without controller connection are required for an operator control and monitoring solution, for example

- Internal tags
- Text lists
- Screens
- Scripts

In a standardized operator control and monitoring solution, these HMI objects are often created centrally and distributed as global libraries to the configuration engineers. You can use copy rules to generate these HMI objects for each HMI device in your project.

Requirement

- Project is open.
- Global library with types and master copies.

- Tag rules have been created.
- Screen rules have been created.
- Optional: The HMI objects to be generated are stored in a separate folder in the library.

Procedure

To generate HMI objects with SiVArc, follow these steps:

1. Open the global library with the master copies and types.
2. Synchronize the content of the opened global library with the project library.
3. Create a copy rule for each HMI object to be generated.
   Or
4. Use a library folder as library element in a copy rule.
5. Generate the visualization.

Result

The HMI object was stored in the respective folder of the project tree. The HMI object was created for each of the HMI devices specified in the rule.

If you are using a library folder in the rule, all objects that can be generated were created accordingly in the project tree.

5.3 Setting up the layout

5.3.1 Basics for setting up the layout of generated screens

Introduction

With SiVArc, you create the appropriate layout for your process screens in several steps:

- You specify the graphic design of your process screens in the generation templates of the screens, such as background color, company logo, general labels etc.
- You define the appearance and size of the display and operating objects in the generation templates of the objects.
  You specify the positioning of the generated display and operating objects in the screen.

Overview of the positioning methods

SiVArc provides the following versions for the positioning of display and operating objects:

- User-defined positioning scheme from the library
  You use your own positioning schemes to control and manage the arrangement of the generated objects for various HMI devices. The object arrangement can be automatically assigned to the screens.
  Use your own positioning scheme if your project requires a pixel-precise and standardized positioning of the display and operating objects.
- SiVArc standard positioning scheme of the screen
  Specify individual requirements once for each screen or display and operating object. The SiVArc positioning scheme is suitable for test purposes and for debugging.
- Object-specific fixed positioning for each display and operating object within the generation template
  You can, for example, assign a fixed position to standard objects. The fixed positioning depends on the screen resolution.

Priority of the positioning methods

If a separate positioning scheme was stored for a display and operating object in the screen rules, all other specifications on the position are ignored during generation.

If you do not save a separate positioning scheme, the generated display and operating objects are arranged according to the fixed positioning or the SiVArc positioning scheme.

Display and operating objects already existing at a configured position are covered by a generated SiVArc- object with the fixed positioning or by a positioning scheme.

This means SiVArc processes the individual positioning methods with the following priority:

1. Positioning scheme
2. Fixed positioning (SiVArc)
3. Fixed positioning (WinCC)
4. SiVArc standard positioning scheme

Fixed positioning for individual display and operating objects

Select a fixed position if you want to always anchor specific objects at the same position in the screen.

Define the coordination of the object individually and independently of the positioning scheme in the SiVArc properties of a generation template for a display and operating object.

Note

Changing the fixed positioning of screen objects

For screen objects with fixed positioning, a manual change of the position is ignored at the next generation.

Nesting depth

You set the nesting depth of the objects to be generated in the SiVArc master copy by means of the layer hierarchy. This setting is retained during generation.

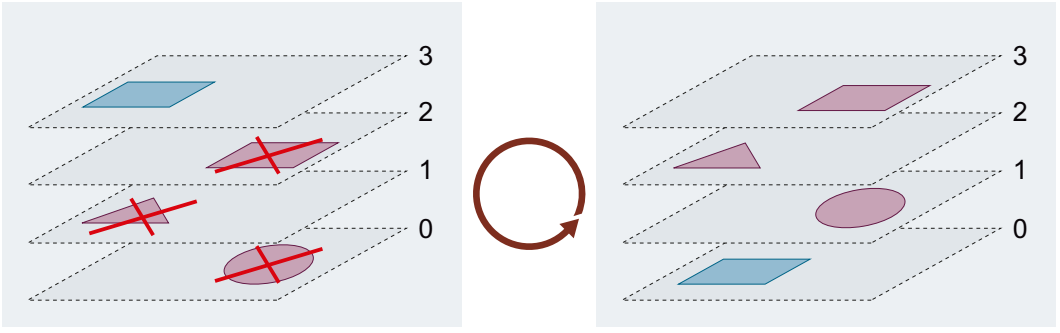
Note

Changing the layer

If you change the layer of a generated SiVArc- object or a manually inserted object in the generated screen in the project, the change is retained even during the next generation.

The following applies within the same layer in the generated screen:

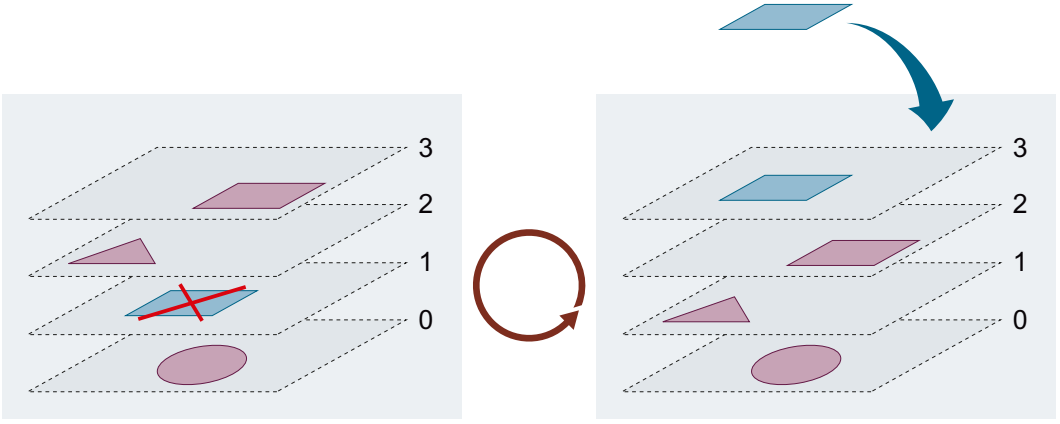
- When you delete the generated SiVArc objects and then manually insert objects, the SiVArc objects are generated over the manually inserted objects in the nesting depth during the next generation.



Generated display and operating object

Display and operating object manually inserted into the generated screen

- If you arrange a manually inserted object in the generated screen at a specific depth and then delete it, this previous arrangement is not relevant for SiVArc. During the next generation, the screen objects are arranged in the lowest position in the layer. If you insert the deleted object once again manually, it is located in the highest position.



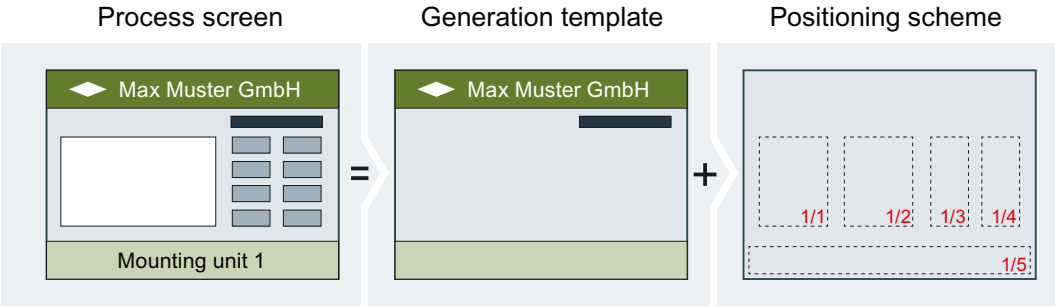
Generated display and operating object

Display and operating object manually inserted into the generated screen

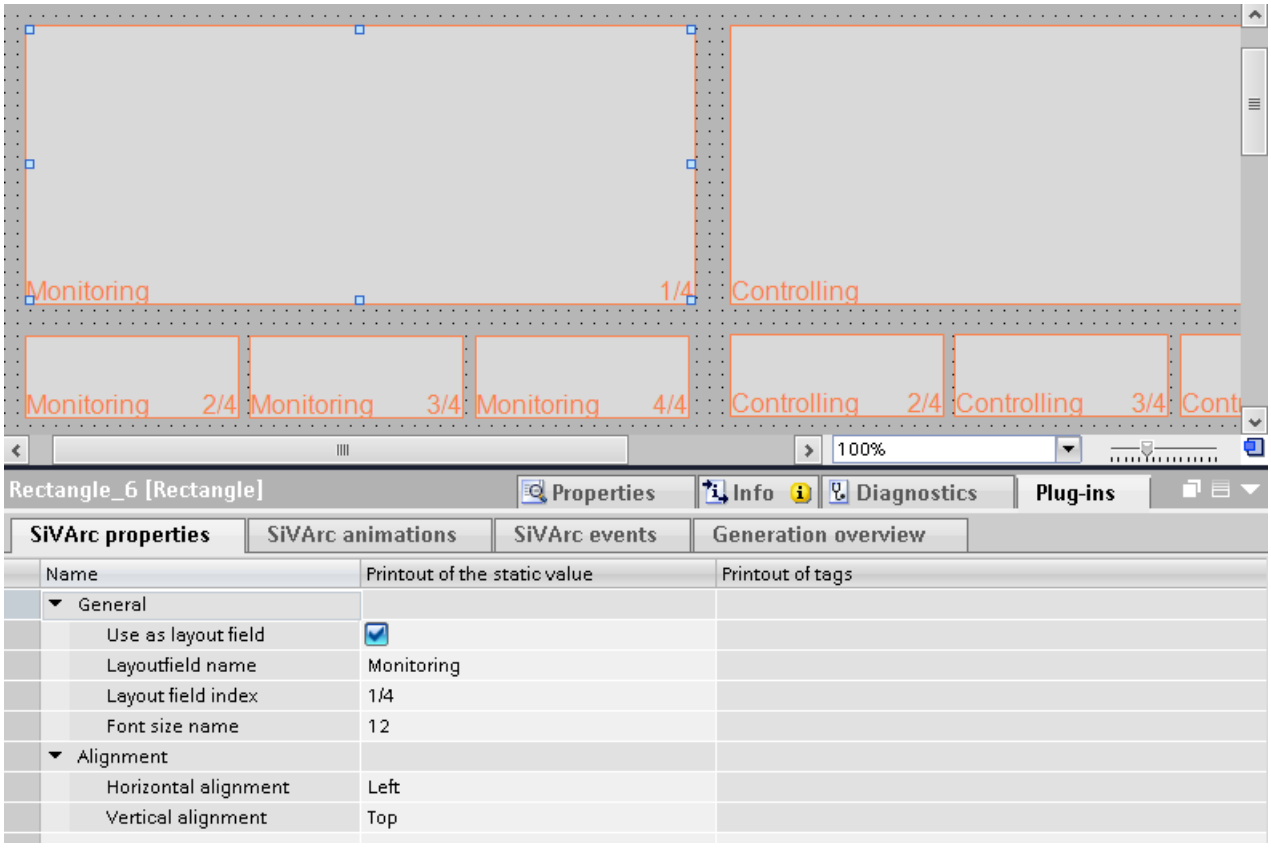
5.3.2 User-defined positioning scheme

Overview

A user-defined positioning scheme consists of a screen that contains layout fields for generated display and operating objects. You assign the positioning scheme to a generation template and thus create a process screen.



By giving the layout fields identical names, you group those layout fields into a logical unit. Layout fields are filled in the order of the index within a logical unit.



This method has the following advantages:

- Central control of layouts for multiple generation templates for screens
- Preview of the positioning
- Positioning can be planned before the first generation
- Low error susceptibility
- Central availability of layout versions

Use of own positioning scheme

In the screen rules, you define which display and operating object is generated in which layout field of a positioning scheme.

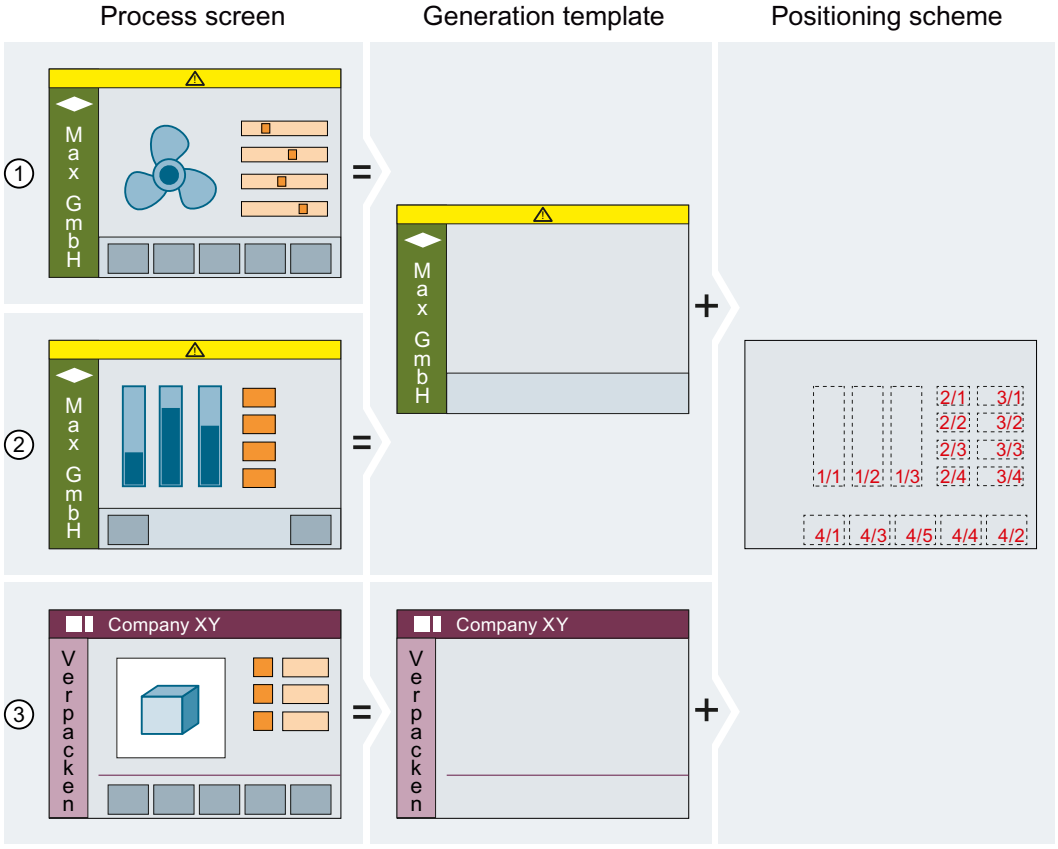
Note

Positioning scheme of a pop-up screen

A positioning scheme that was created for a pop-up screen cannot be used for any other display and operating object.

There are two ways in which you can use your own positioning scheme:

- As layout reference in a generation template of a screen
  In this way, you control the positioning of the display and operating objects centrally for multiple generation templates.

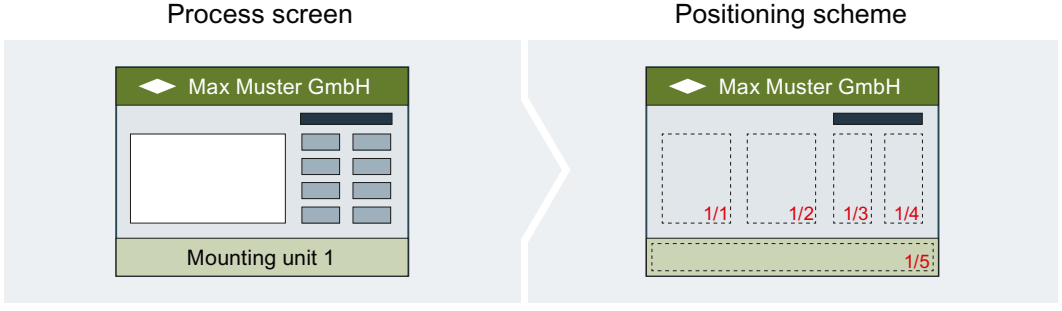


① Example: Process screen for operation on the basis of the generation template A and positioning scheme A

② Example: Process screen for status display on the basis of the generation template A and positioning scheme A

③ Example: Process screen on the basis of the generation template B and positioning scheme A

- As generation template of a screen
  For this purpose, configure the positioning scheme as generation template of the screen in a screen rule.



Subsequent changes

If you manually change the position of a generated display and operating object, this change is retained at the next generation. This is true even if the position has been defined with its own positioning scheme. Even if you change the positioning scheme, the manually configured position is retained after the next generation.

5.3.3 Use user-defined positioning scheme

Requirement

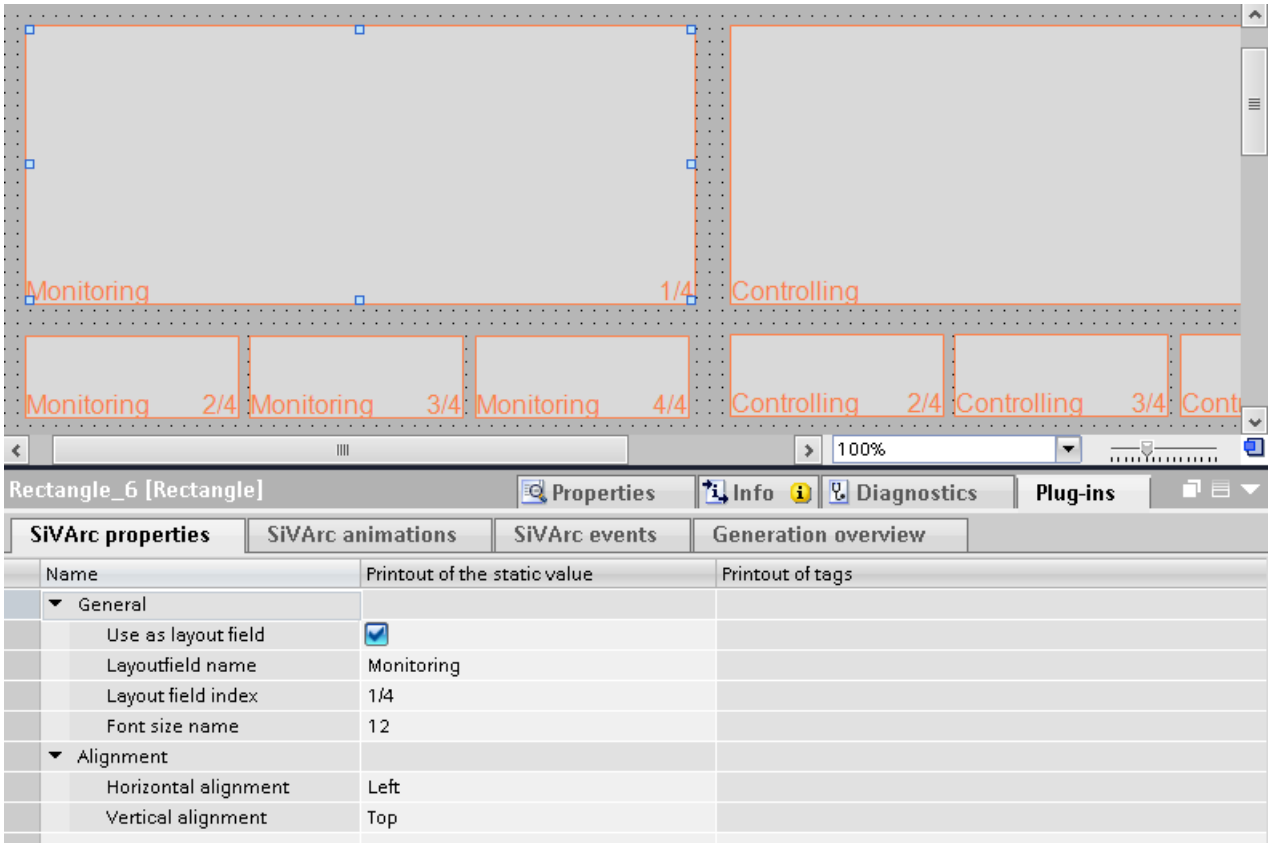
- The "Screens" editor is open.
- The "Overview" screen is created.

Create positioning scheme

To create a positioning scheme, follow these steps:

1. From the "Basic objects" group in the toolbox window, add multiple rectangles to the screen. Make sure that the rectangles for the generated display and operating objects are sufficiently large; otherwise, the HMI objects overlap in the generated screen.
2. In the SiVArc properties of the rectangles, select "SiVArc properties > General > Use as layout field".

3. Define areas in the screen.
   - Give the same name to layout fields that belong to a logical unit, for example, "Monitoring" and "Controlling".
   - To do this, change the name of the layout field under "General > Layout field name".
   - Set up the font size under "General > Font size name".
   - Specify the border and font color of the layout fields in the WinCC properties under "Properties > Properties > Appearance".



4. If necessary, change the order of filling the fields under "General > Layout field index". The layout fields are shown with name and index.
5. Store the "Overview" screen as master copy in the library.
6. Delete the "Overview" screen in the project tree.

Index order

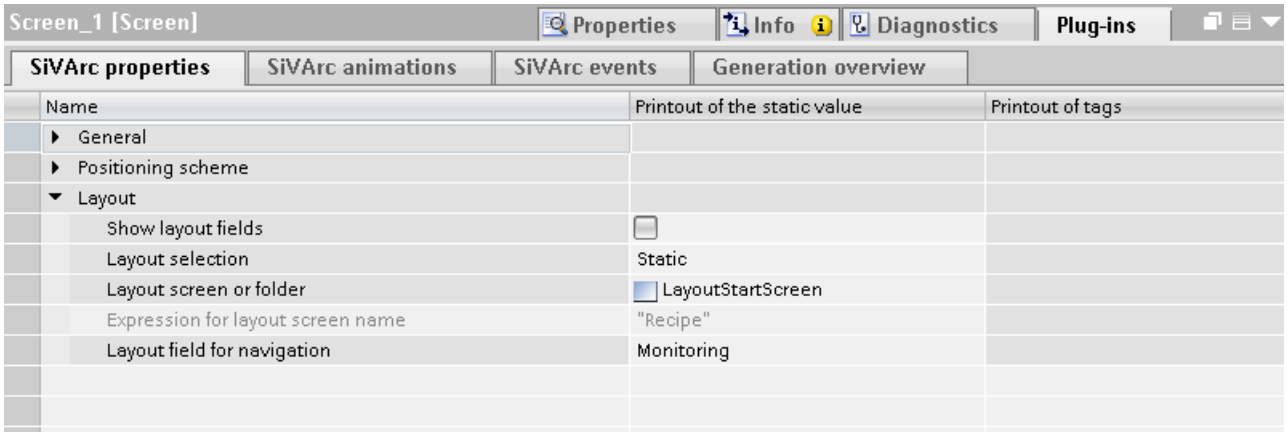
The index assignment follows the time sequence in which you edit the indexes. If you subsequently assign a layout field to another logical unit, for example, the field gets the last index number of this unit regardless of the arrangement in the screen.

The index order automatically readjusts itself after each change.

Assign positioning scheme to a generation template permanently

To use a positioning scheme in a generation template, follow these steps:

1. Generate a new screen from the generation template in which you want to store the new positioning scheme.
2. Select the "Static" option under "Layout selection".
3. Under "Layout screen or folder", select the required positioning scheme.



4. Delete the generation template in the library.
5. Store the edited screen as generation template in the library.
6. Delete the screen in the project tree.

When you use the generation template in a screen rule, you also specify the layout field in the screen rule. SiVArc generates the screen object into this layout field in the field with index 1. The next generated object is generated into the field with index 2, and so on.

Note

Layer assignment

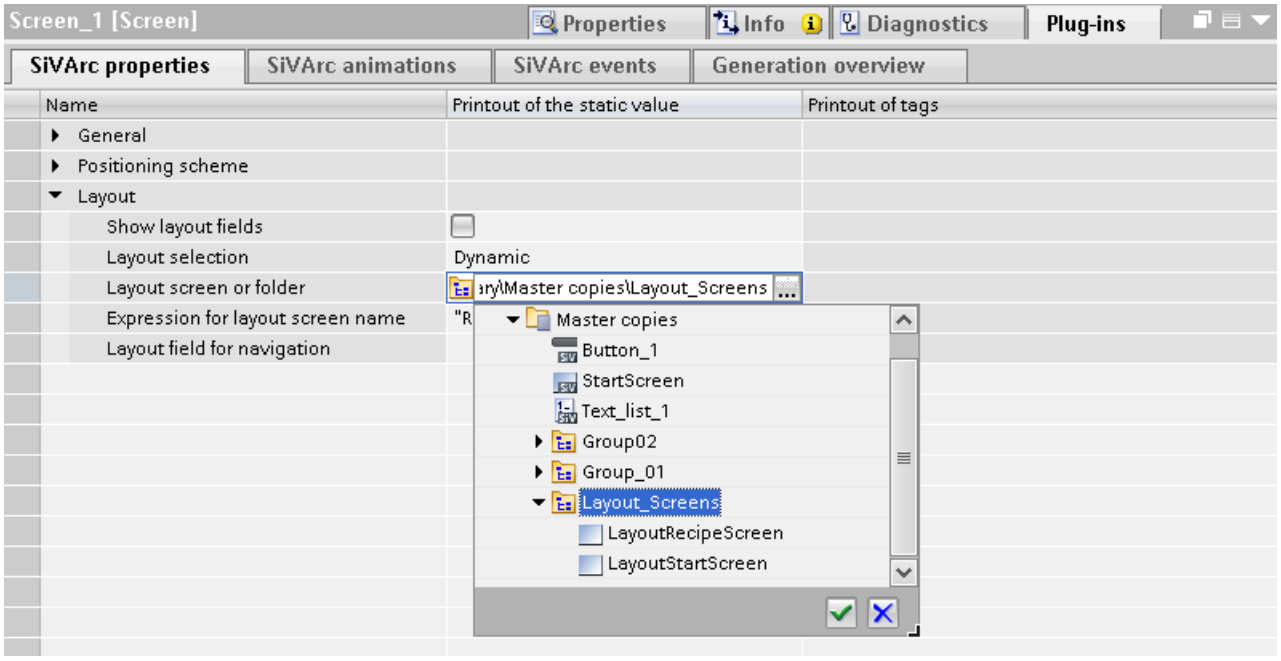
When you have assigned a fixed layer to a master copy and have used your own positioning scheme during generation, the HMI object is generated in the layer that was specified in the positioning scheme.

Assign positioning scheme to a generation template dynamically

If you want to assign a positioning scheme to a screen depending on specific conditions, assign a folder with positioning schemes to the generation template. Then you assign a SiVArc expression that returns the name of a positioning scheme contained in the selected folder.

1. Create multiple positioning schemes in a library folder.
2. Name the folder "Layout_Screens", for example.
3. Open the generation template of the screen in which you want to store a positioning scheme dynamically.
4. Under "Layout selection" select the "Dynamic" mode in the SiVArc properties.

5. Under "Layout screen or folder", select the folder "Layout_Screens."



6. Configure a SiVArc expression under "Expression for layout screen name" that returns the name of a layout screen contained in the selected folder.
   You can define a SiVArc tag, for example, in the user program and use it as condition. You then assign the name of the positioning scheme required for this program block to the tag.
7. Store the edited screen as generation template in the library.
8. Delete the screen in the project tree.

Note

If you select the "Dynamic" mode for layout selection to generate multiple screen elements of a screen, not all dynamically assigned layout fields are displayed.

Even if you enable "SiVArc Properties > Layout > Show layout fields" in the SiVArc properties of the screen, only the layout field for the first generated screen element is displayed.

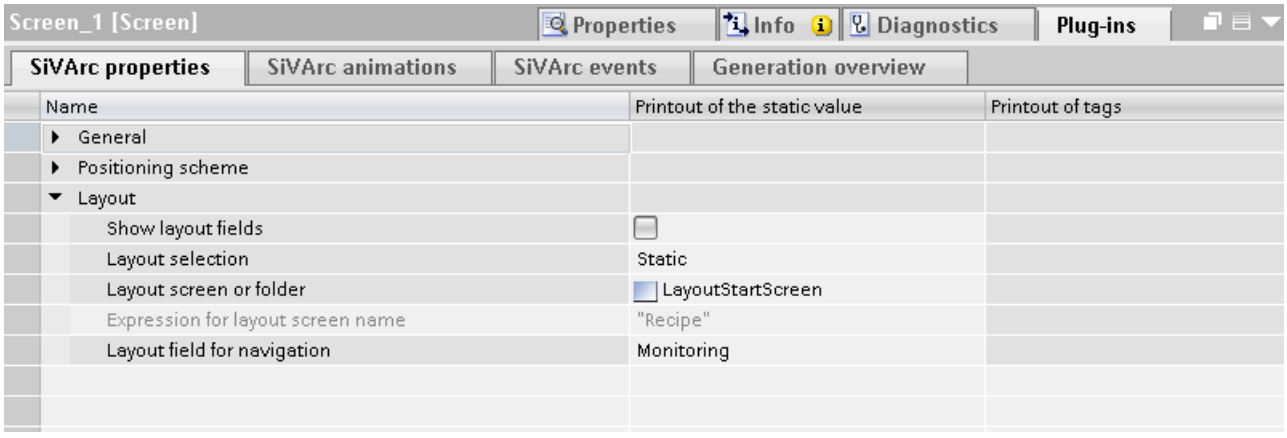
Using a layout field for navigation buttons

When a layout field was used for navigation buttons, you can no longer use this layout field for other display and operating objects.

You can combine this method with automatically generated navigation buttons to overflow screens.

To use a layout field for screen navigation, follow these steps:

1. Generate a new screen from the generation template in which the navigation buttons are to be displayed.
2. In the SiVArc properties of the screen, select the layout field for navigation buttons, e.g. "Monitoring", under "SiVArc properties > Layout >Layout field for navigation".



3. Store the edited screen again as generation template in the library.
4. Delete the screen and the previous generation template.

If overflow screens occur with this generation template during generation, the navigation buttons are placed in the "Monitoring" layout field.

Displaying layout fields in the generated screen

To display the layout fields in the generated screen, select "SiVArc properties > Layout > Show layout fields" in the SiVArc properties of the screen.

See also

Defining a screen rule for generating a screen object (Page 124)

5.3.4 SiVArc positioning scheme of the screen

Overview

A grid is stored on the generated screen and used to arrange the screen objects during generation. The grid can be configured.

During initial generation, the objects are generated in the grid on the screen. You then arrange the generated objects individually. The new layout is retained for each subsequent generation.

This method has the following advantages:

- It is not necessary to plan the layout extensively beforehand.
- After each generation, you can further adjust the layout and add more definitions.
- The layout develops together with the SiVArc project.

This procedure is very suitable for smaller individual and development projects. When the project becomes larger, the post-editing requirements increase.

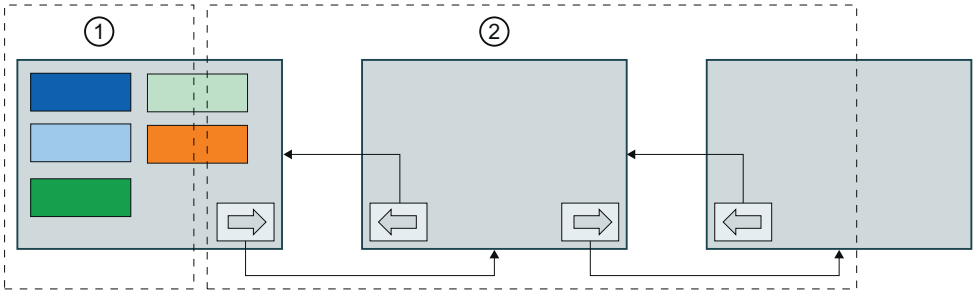
Structure and filling of the positioning scheme

You configure the positioning scheme of the objects in the SiVArc properties of the screen.

After the initial generation, the HMI objects are positioned depending on the positioning scheme. The positioning scheme is based on the start position of the first object and the distances in the x and y position.

If no screen objects are assigned to overflow screens, the screen objects are arranged by default in the base screen after initial generation of the visualization.

The figure below shows the default arrangement of the screen objects in the base screen.



① The generated screen objects are positioned column-by-column in each screen from top to bottom and left to right. The screen objects always have the same distance to each other.

② If overflow screens have been generated for a screen, SiVArc automatically inserts navigation buttons with configured screen changes.

See also

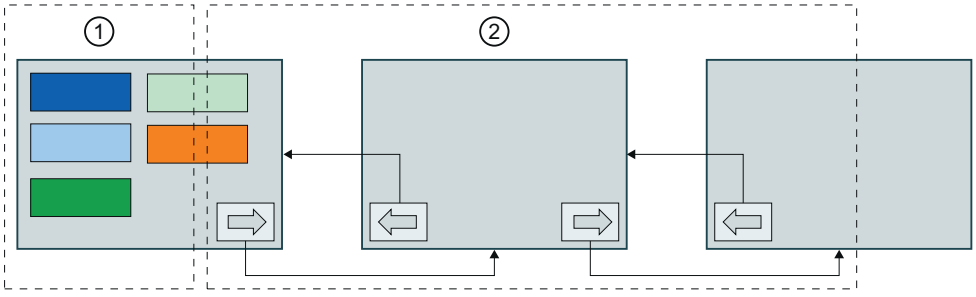
Generating visualization (Page 133)

5.3.5 Configuring overflow screens

Overflow screens and positioning schemes

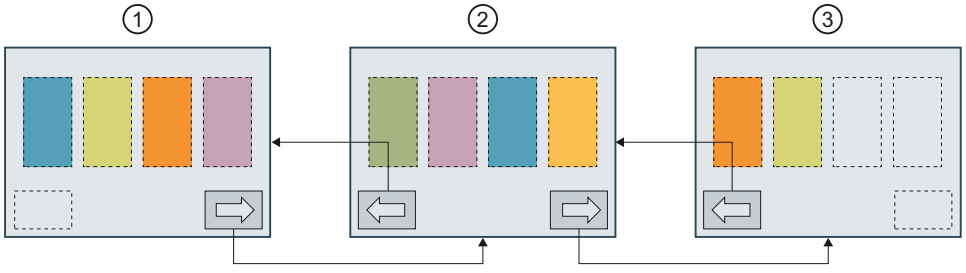
Overflow screens are screens generated when there is insufficient space on a screen for the number of generated screen objects. Depending on the positioning scheme used, overflow screens are generated as follows:

- SiVArc standard positioning scheme
  If the display size of an HMI device is not sufficient for the generated screen objects, you can configure overflow screens. The original screen of the master copy is then generated as base screen which is connected with the first overflow screen by means of a navigation button. You configure these overflow screens in different ways.



① Generated screen of the master copy (base screen)
② First overflow screen with automatically generated navigation buttons with configured screen changes

- Own positioning scheme
  If more screen objects are generated for a logical unit of layout fields than contained in the scheme, overflow screens are created for the extra screen objects based on the positioning scheme. These overflow screens are generated automatically.



① Base screen
② First overflow screen with positioning scheme of the base screen
③ Second overflow screen with positioning scheme of the base screen

Overview for configuring overflow screens

You have several options for configuring overflow screens:

- Configuring bit mask for overflow screens as a number
- Configuring bit mask for overflow screens as tag
- Configuring overflow screens without screen objects

Note

Pop-up screens

Overflow screens are not generated for pop-up screens. An error message is output when more display and operating objects are generated than can be positioned. Display and operating objects that no longer fit on the pop-up screen are not generated.

The overflow screens are generated for each instance of a generation template.

Navigation buttons

If SiVArc generates overflow screens, navigation buttons for moving to the previous screen and the next screen are automatically generated.

In order to dispense with navigation buttons, you can disable the "Navigation buttons" selection in the generation template of the screen.

Note

You can store master copies in the library for the navigation buttons.

For more information, refer to the section "Auto-Hotspot"

Overflow screens in the user-defined positioning scheme

If the configured layout fields are not sufficient for all generated display and operating objects, overflow screens are generated on the basis of the positioning scheme.

Arrangement of screen objects on the overflow screens

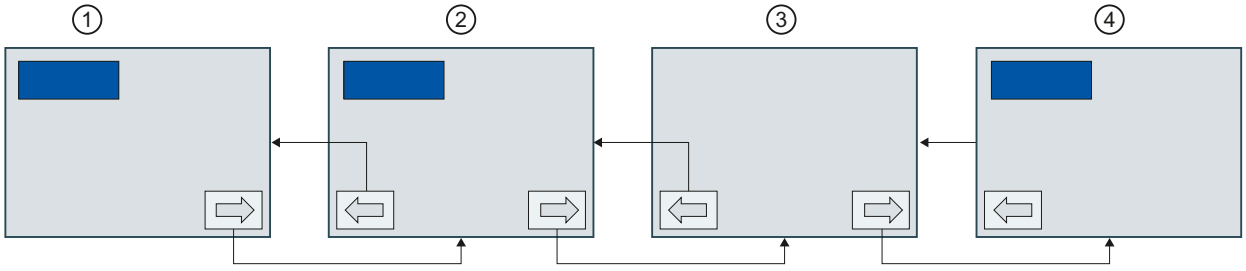
You have the following options to arrange screen objects on overflow screens:

- Generating screen objects in overflow screens
  If you specify the number of overflow screens as bit mask, the screen objects are also arranged in the overflow screens.
  You use the bit mask to define the number of overflow screens. You also specify the overflow screens in which screen objects are generated.
- Manually arranging screen objects in the generate
  If you specify the number of overflow screens as a number in the SiVArc properties of the screen, the screen objects are only arranged in the base screen.
  After the first generation, you move the screen objects to the required positions in the overflow screens. The modified positions of the screen objects are retained for each additional generation.

Generating screen objects in overflow screens

Use a bit mask to generate screen objects in overflow screens. You define the following with the bit mask:

- Number of overflow screens
  The number of bit positions in the bit mask defines the number of overflow screens. The first position in the bit mask corresponds to the screen of the master copy. The second position corresponds to the first overflow screen, the third position to the second overflow screen, etc. The bit mask is limited to 31 overflow screens. An overflow screen is not generated when you use bit mask 2#0.
- Overflow screens with screen objects
  If the screen object of the used screen rule is to be generated to an overflow screen, set the corresponding bit in the bit mask to 1.
  Example: You are using bit mask 2#1011. Three overflow screens are created during generation. The screen object of the used screen rule is generated as follows:



① 2#101**1** Base screen with generated screen object
② 2#10**1**1 First overflow screen
③ 2#1**0**11 Second overflow screen
④ 2#**1**011 Third overflow screen

You define the bit mask at the program block or in the generation template of the screen. To do so, use a static value or a tag.

Note

Copying or moving objects to an overflow screen

Note the following when you configure overflow screens with a bit mask:

When you copy or move generated objects between a base screen and an overflow screen, these screen objects are treated as manually created screen objects in case of a new generation. This behavior also applies when you copy generated objects within overflow screens.

Requirement

- Master copy or type for a screen is opened.
- Bit mask for overflow screens is set at a block input (optional), for example, under `Block.Parameters("OVERFLOW_PIC").Value`
  or
- Bit mask is created as tag definition (optional), for example, as "`SiVArcVariable`"

Configuring bit mask for overflow screens as a number

To configure overflow screens with bit mask, follow these steps:

1. Enter the required bit mask, for example, 11 (2#1011), for "Number of overflow screens" in the Inspector window under "Plug-Ins > SiVArc properties > General".
   or
   In the Inspector window under "Plug-Ins > SiVArc properties > General" for "Number of overflow screens", select the block input at which the bit mask for overflow screens is set, for example, `Block.Parameters("OVERFLOW_PIC").Value`.
2. Enable the option "Evaluate number of overflow screens as bit mask".
3. If necessary, enable the generation of navigation buttons.
4. Define one or more screen rules.
5. Start the generation.

If you have entered a bit mask as number, three overflow screens are generated during generation in this example. The screen object of the used screen rule was generated in the first and third overflow screens and in the base screen.

If you have selected the block input, the value is processed at the parameter. If no valid value is set, the screen object of the used screen rule is only generated in the base screen and an error message is output.

Configuring bit mask for overflow screens as tag

To configure overflow screens with a bit mask which is saved in a tag, follow these steps:

1. In the Inspector window under "Plug-ins > SiVArc properties > General", for "Number of overflow screens", enter the name of the SiVArc tag which was defined for the bit mask for overflow screens, for example, "`SiVArcVariable`".
2. Enable the option "Evaluate number of overflow screens as bit mask".
3. If necessary, enable the generation of navigation buttons.
4. Define one or more screen rules.
5. Start the generation.

The current value of the selected tag is processed during generation. If no tag is created, SiVArc generates the screen object of the used screen rule in the base screen.

Configuring overflow screens without screen objects

To configure overflow screens without screen objects, follow these steps:

1. Enter the required number of screens in the Inspector window under "Plug-Ins > SiVArc properties > General" for "Number of overflow screens".

   Note

   The overflow screens are generated for each instance of this master copy.

   To limit the generation of overflow screens, formulate a condition under the "Number of overflow screens".

2. Disable the option "Evaluate number of overflow screens as bit mask".
3. If necessary, enable the generation of navigation buttons.
4. Define one or more screen rules.
5. Start the generation.

SiVArc generates all screen objects into the generated base screen. After the first generation, you can move the generated screen objects to the required positions in the overflow screens. The modified positions of the screen objects are retained for each additional generation.

Note

Copying generated display and operating objects to an overflow screen

Note the following when you define the number of overflow screens as decimal number:

When you manually copy objects generated with SiVArc from a base screen to an overflow screen, this change is retained for a renewed generation. The copy is then treated together with the HMI object on the base screen like an object generated by SiVArc and has a reference to SiVArc.

Requirement: The name of the copy must match the name of the original.

5.3.6 Positioning of the display and operating objects in overflow screens

Moving generated display and operating objects to an overflow screen

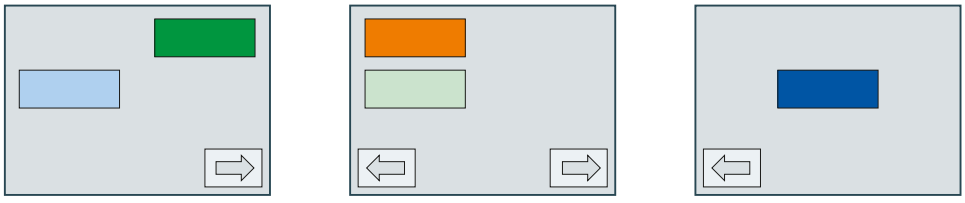
- When you configure overflow screens with bit mask, the bit mask defines the position of the generated display and operating objects.

  Note

  SiVArc relevance

  When you move or copy an object arranged via bit mask to another overflow screen or the base screen, the object loses its reference to SiVArc and is ignored during the next generation. The display and operating object is created again during the next generation process.

- When you configure overflow screens without bit mask, the display and operating objects are arranged by default in the base screen according to the SiVArc positioning scheme. After the first generation, you can move the generated objects to the desired positions:



  The modified positions of the display and operating objects are retained for each additional generation.

5.3.7 Supported devices

Overview

SiVArc can be used with the following devices:

- PLCs
  - SIMATIC S7-1200
  - SIMATIC S7-1500
  - SIMATIC S7-1500 software controller
  - ET 200SP CPU
- Device proxies
  Device proxies are only used to generate external tags.
- HMI devices
  - HMI devices with WinCC RT Professional
  - HMI devices with WinCC RT Advanced
  - Comfort Panels
  - Mobile Panels 2nd Generation
  - Basic Panels

5.4 Creation of generation templates

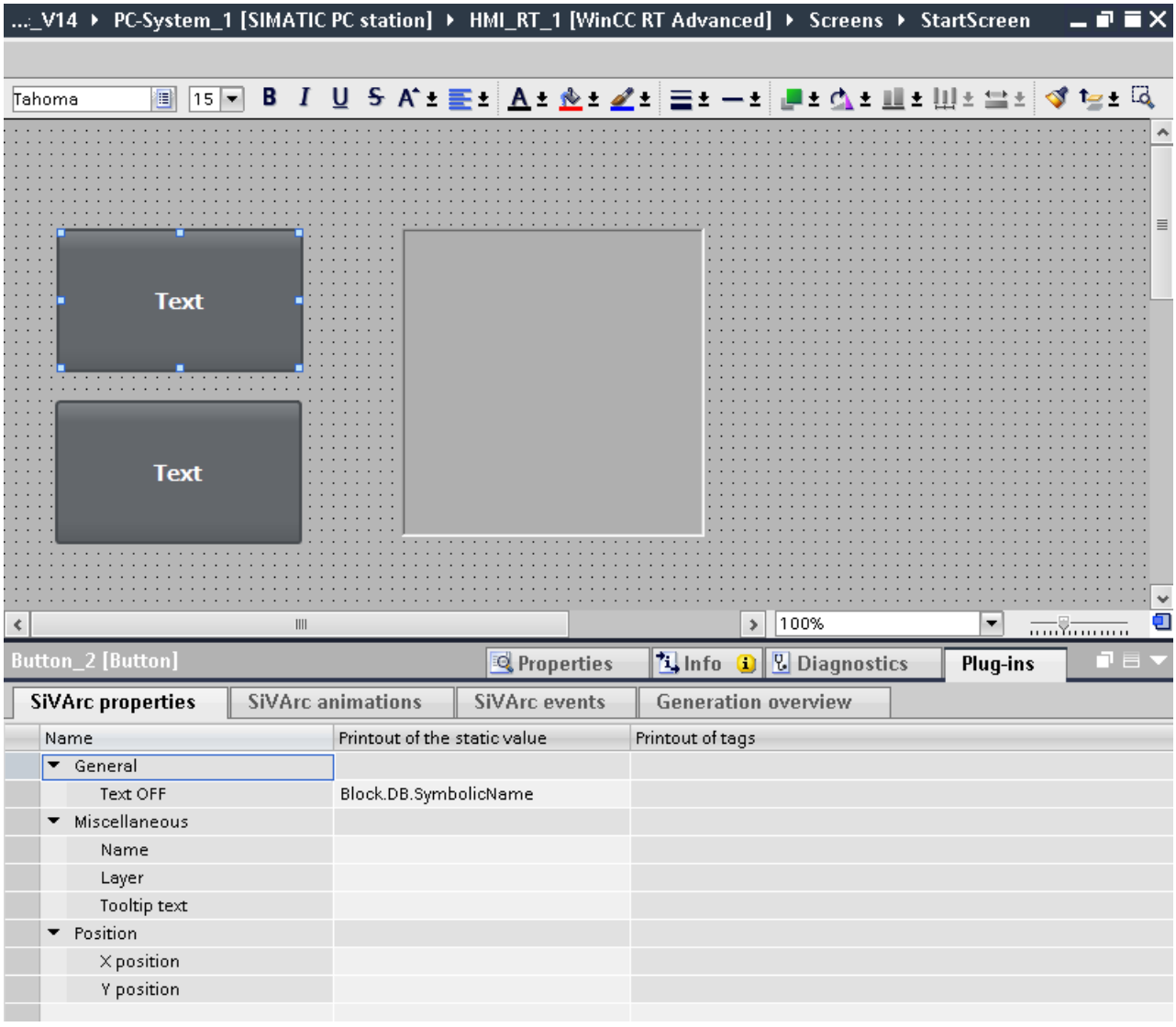
5.4.1 Generation templates in SiVArc

Definition

Generation templates are HMI objects from the library which are not only configured with fixed defined WinCC properties but also with SiVArc properties. A SiVArc property is an object property, which is first assigned as tag/expression. According to SiVArc mechanism, the SiVArc properties are only filled with texts, such as the object name, labels or a tag designation during the generation.

Operating principle

SiVArc properties can be static or dynamic. In the "SiVArc properties" tab, you can configure the properties of a generation template.



The tab contains the three columns:

- Name
  This column lists the available properties.
- Expression for the static value
  In this column, you assign a property with a fixed value or a SiVArc expression that returns a string or a number.
  Fixed values are entered in every instance of this master copy when generating the visualization. Pay attention, for example, with the "Name" property that the uniqueness of the object name is ensured when it is used multiple times in an screen.
- Tag expression
  In this column, you assign a property with a tag name or a SiVArc expression that returns a tag name.

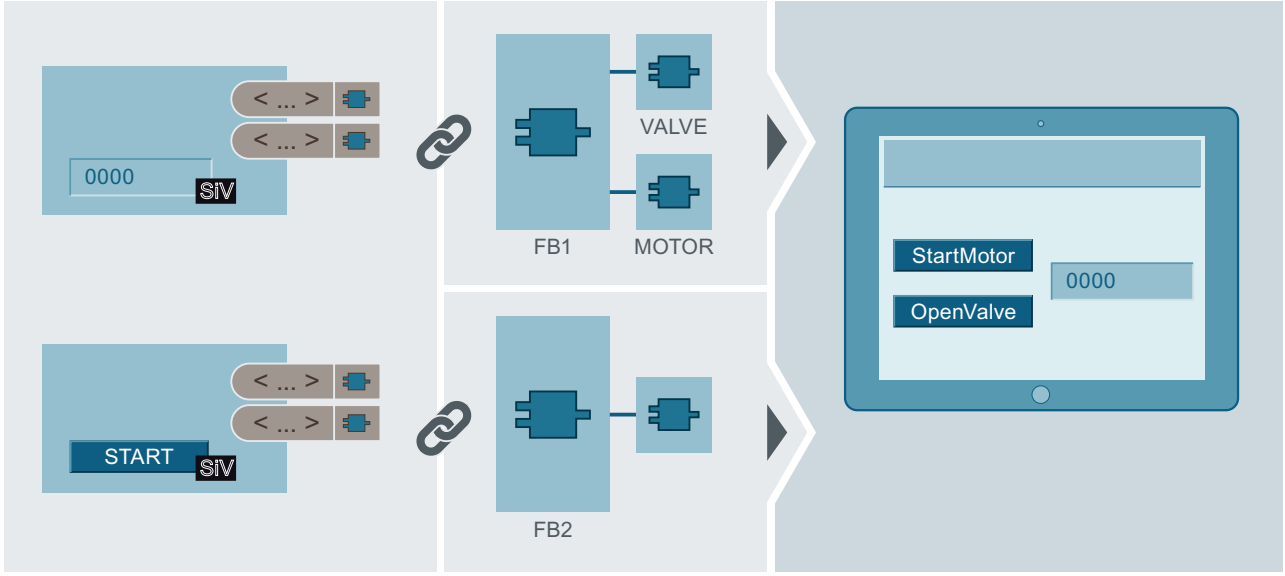
You then store the configured generation template in the project library and interconnect it later to a function block. You create a separate interconnection for each generation template. The SiVArc properties are evaluated during the generation of the visualization.

Generation templates for screens and screen objects

You generate one generation template per HMI object.

The "SiVArc properties" tab is only available for objects supported by SiVArc.

The following figure shows in schematic form the generation of screen objects from generation templates that refer to an instruction from STEP 7. The SiVArc properties are evaluated when the HMI objects are generated. Object properties, such as "Label" or "Name", are generated.



Using types as generation template

Note the following when generating screen type instances and faceplate instances:

- If you use screen types for the SiVArc generation, all instances in the project are updated, even those not created by SiVArc.
- If you remove the connection of a generated instance to a screen type and change the screen, the change is still overwritten with a new instance of the screen type during the next generation.
- If you use screen types of the global library for the SiVArc generation, the screen type is added to the project library.
- SiVArc updates the screen type used to the latest type version in the project and in the libraries during generation.

Note

Using screen types as generation template

You use a screen type in the "Screen rules" editor only as a screen object. The screen type is therefore always displayed in a screen window.

Generation templates for text lists

With SiVArc, you create multilingual text list entries directly in the user program, for example, status texts for function blocks or interface descriptions for block parameters. During generation, you interconnect the texts with the corresponding display and operating objects. This allows you to generate descriptive texts for your project.

You can store text list entries in multilingual format at the block or derive these from a symbol table of a block parameter:

- Text list entries at the block
  You create the text list entries in the network or program block. To select the correct network, click a program block in any area of the network in the Inspector window. You can also use SiVArc expressions for the text list entries.
  Text definition and text list entry are linked in the text list master copy by identical names.
- Text list entries at the block parameter
  For individual parameters in the symbol table, you create a comment which is processed by SiVArc for the text list entry.

  Note

  Using text sources from STEP 7

  Only one text source is processed within a text list. Therefore, use either texts from the block **or** texts from a symbol table for a text list.

Generation templates for automatically generated objects

The following objects are generated automatically with SiVArc:

- Screen window for displaying a screen within a screen
- Navigation buttons for overflow screens

You can customize the automatically generated objects using generation templates.

To do this, save the customized objects under "Master copies" in the project library.

Observe the following guidelines when storing the custom objects:

- The generation template for the screen window must be stored with the name "DefaultScreenWindowControl".
- The generation templates for the navigation buttons must be stored in a library with the names "NextButton" and "PrevButton". You can configure these buttons individually.

If you do not customize the generation templates, the default templates from the toolbox are used for generation.

Generation templates for positioning schemes

To specify the placement of screen objects in the generated screen, you specify a layout field group which you assign to the screen object in the screen rules.

5.4.2 Supported HMI objects

HMI objects that can be generated with control data

SiVArc generates the following HMI objects, depending on the HMI device for which they are generated:

HMI object	Basic Panels	Comfort Panels/ Mobile Panels 2nd Generation RT Advanced	RT Professional
External tag[1]	x	x	x
Following master copies in a library:			
Bar	x	x	x
Screen[1]	x	x	x
Screen window	---	---	x
I/O field	x	x	x
Graphic I/O field	x	x	x
GRAPH overview	---	x	x
PLC code view	x	x	x
Pop-up screen[1]	---	x	---
ProDiag overview	x	x	x

HMI object	Basic Panels	Comfort Panels/ Mobile Panels 2nd Generation RT Advanced	RT Professional
Round button	---	---	x
Switch	---	x	---
Button	x	x	x
Slider	---	x	x
Symbolic I/O field	x	x	x
Text field	x	x	x
Text lists	x	x	x
Gauge	---	x	x
Following types in a library:			
Screen as screen window[1]	---	---	x
Faceplates	---	x	x

[1]: Structured storage possible

HMI objects that can be generated without control data

SiVArc generates or instantiates the following objects from types or master copies of a library:

HMI object	Basic Panels	Comfort Panels/ Mobile Panels 2nd Generation RT Advanced	RT Professional
Screen	x	x	x
Tags			
Internal tag	x	x	x
Tag table	x	x	x
Scripts			
C script	---	---	x
VB script	x	x	x
Text list	x	x	x

Properties with device dependent maximum values

The maximum values for individual properties are limited when generating the visualization for the following HMI devices:

Property	Basic Panels	Comfort Panels	Mobile Panels 2nd Generation
Text Off (length)	320	500	500
ToolTip (length)	320	1000	1000
Text field (text)	320	32767	32767
Text list entry (text)	320	320	320

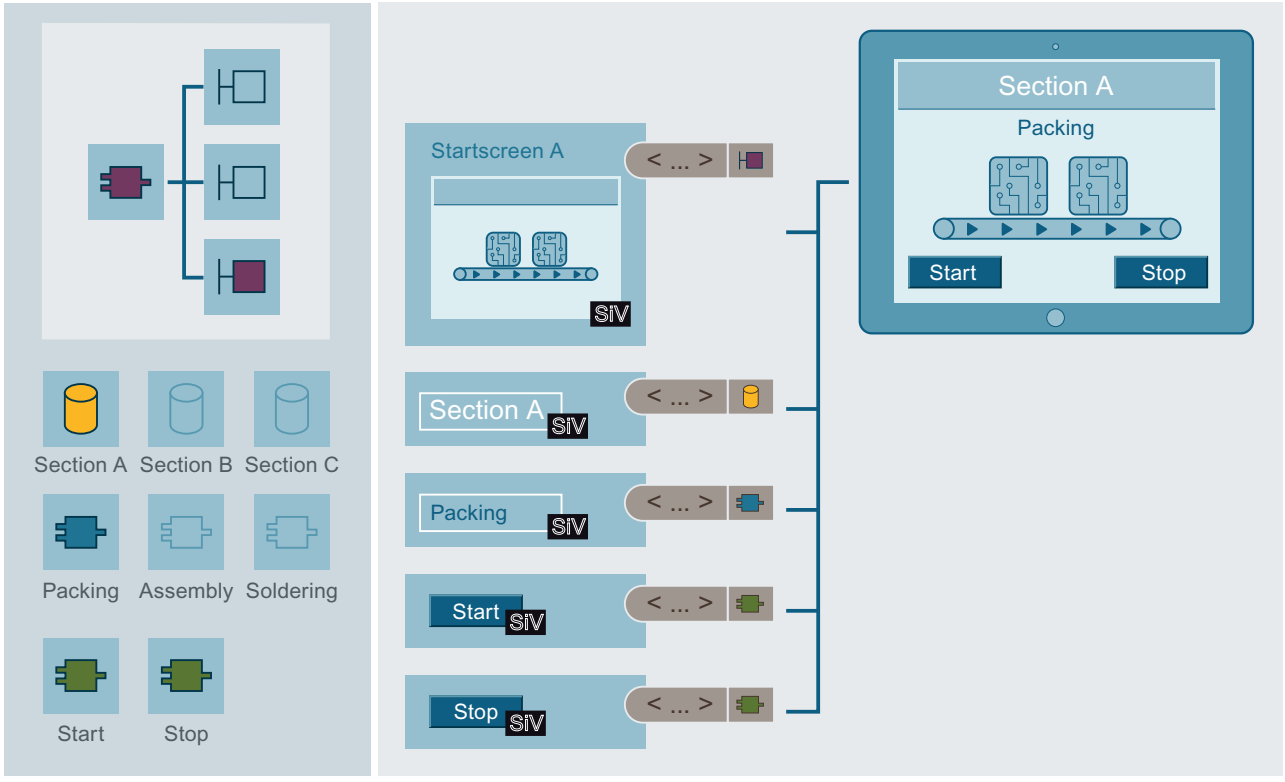
5.4.3 Sources for texts

Definition

With SiVArc you access texts from STEP 7 and other TIA Portal editors for the visualization. Unlike the conventional WinCC configuration, the controller programmer creates these texts. Use these texts multiple times in the visualization using SiVArc.

The following screen shows how a screen is structured using SiVArc:

- Various text sources are available in STEP 7, for example, networks, data blocks or function blocks.
- A screen is made up of several generation templates. The SiVArc properties of the generation templates access text sources.
- During generation, SiVArc process the referenced text sources and fills the SiVArc properties of the HMI objects.



SiV	SiVArc generation template
< ... >	SiVArc property with referenced text source
	Main [OB1]
	Network in the user program
	Data block
	Process block
	Standard block

Advantages

Various texts are generated by SiVArc depending on which function block you link to a generation template. Therefore, a generation template can be used at various locations. Adaptations in the HMI project require only minimal effort. The consistency of the texts is transferred from the user program in the visualization.

String functions

To maximize the reusability of generation templates or to optimize texts for the display, SiVArc provides various string functions, such as "Split", "Contains" oder "Trim".

Text sources from STEP 7

A SiVArc property can refer to the following texts from STEP 7:

- Network
  - SiVArc texts and SiVArc tags
  - Network title
  - Network comment
- Data block
  - Symbolic name
  - Storage path in the project tree
  - Comment
  - Block number
  - TagPrefix
  - Type (IDB, MDB)
- Function block
  - Comment
  - Parameter value
  - Storage path in the project tree
  - Block number
  - Title
  - Type version of a library type

Text sources from hardware data

A SiVArc property can access the following properties of a HMI device:

- Runtime software
  - Name
  - Type
- HMI device
  - Name
  - Type

Text sources from libraries

A SiVArc property can access the following properties of library objects:

- Name
- Storage path in the library

5.4.4 Supported objects in the user program

Program blocks

SiVArc supports the following program blocks:

- Function block (FB)
- Function (FC)
- Data block (DB)
  - Global DBs
  - Instance DBs

FBs and FCs are called in the user program. Only FBs and FCs are used in screen rules. You can also use FBs and FCs as master copies and types from the library.

Languages for program blocks

SiVArc supports the following programming languages for program blocks:

- STL
- FBD
- LAD
- SCL

Technology objects

SiVArc supports the following technology objects:

- PID Control:
  - Compact PID
  - PID basic functions

See also

Supported data types for PLC tags (Page 180)

5.4.5 SiVArc scripting

Definition

SiVArc scripting is a scripting language derived from VBS that is used exclusively in the TIA Portal with the SiVArc option.

SiVArc scripting can address text sources in the TIA Portal. By doing so, SiVArc scripting links the user program and visualization in the TIA Portal.

You use SiVArc scripting to build SiVArc expressions in the generation templates. During generation, SiVArc evaluates all SiVArc expressions. Numerous consistent HMI objects are created from a template in this way.

"SiVArc expressions" editor

When you click in a table row of a SiVArc editor to program a SiVArc expression, a multi-line editor opens. The "SiVArc expressions" editor supports you with various functionalities:

- Autocomplete
  If you enter a letter or a character, the "SiVArc expressions" editor suggests potential operators, SiVArc object properties, properties and functions that begin with this letter or are compatible with this character.
- Syntax highlighting
  Keywords in the "SiVArc expressions" editor are highlighted using different colors. Unknown words are marked as such. The table shows the preset colors for the most important entries. You can change the default settings under "Options > General > Script / text editors".

Color	Meaning	Example
Blue	Operators And, Or, Xor, Not Boolean If function	And True If
Black	Other operators Character Other functions	+ , TrailNum
Dark cyan	String	"SG_NR"
Red	Unknown elements	$

- Error display
  The "SiVArc Expressions" editor highlights errors in the script and displays the causes of errors as tooltips.

You can change SiVArc expressions already created by selecting the expression and using commands from the shortcut menu.

You can copy or cut one or more expressions and paste them to the "SiVArc properties" tab of another HMI object.

Formulation rules

Note the following rules for the formulation of SiVArc expressions:

- An empty SiVArc expression returns an empty string.
- Mark string constants with quotation marks
- All characters are generally allowed in string constants. Also, pay attention to any other naming rules for the target object.
- If you are using a string in quotes or backslashes, place a backslash in front as an the escape character:
  `\"`
  `\\.`
- A line break within a string constant is declared with `\n`.
- Only the following keywords (SiVArc objects) are allowed for the absolute call of a program block.
  - `Block`
  - `StructureBlock`
  - `ModuleBlock`
  - `SubModuleBlock`

  To address properties of the program block, link a SiVArc object through a point with SiVArc object properties, e.g. `ModuleBlock.SymbolicName` for addressing the symbolic name.

Input of data as binary code

To input data in binary code, use the prefix "2#", e.g. 2#00000101, to show that Bit 0 and Bit 2 of a tag are set.

If you use binary codes, observe the following:

- When necessary, you use all operators with the binary code, e.g. `2#1010 + 2#1111` = 25
- When necessary. you use binary code and SiVArc tags within an expression, e.g. `VAR_1 Or 2#11100` = 29
- When necessary, you use binary code and other constant values, e.g. `25 * 2#11100` = 700
- A binary code can contain up to 32 bits.
- You can also specify binary formatting using the "Format" function. To do this, use "`b`" as second operand.

Additional information

You can find detailed information about the structure of SiVArc expressions in the reference.

5.4.6 SiVArc expression

5.4.6.1 Overview of SiVArc expressions

Definition

A SiVArc expression is a function that returns a text. The selected properties of generated HMI objects are filled with these texts.

The SiVArc expression accesses text sources via SiVArc objects. The SiVArc objects address blocks in the program call in STEP 7, HMI device or library data.

In contrast to the ES or runtime scripting, the SiVArc expression permanently links data and structures from other editors of the TIA Portal to the WinCC configuration. Changes and adaptations in the user program, the library or HMI devices directly effect the visualization.

Syntax elements of a SiVArc expression

The SiVArc expression is formed based on SiVArc scripting.

The following syntax elements are possible in a SiVArc expression:

- SiVArc objects
- SiVArc object properties
- SiVArc tags
- Boolean values `True` / `False`
- Strings
- Numbers
- Operators
- Predefined functions
- If conditions

Configurations with SiVArc expressions

SiVArc expressions are use for the following configurations:

- Formulate conditions for generating HMI objects

  Note

  Pay attention to the correct spelling of names in the formulation and addressing conditions.

  An error message is output only during the generation.

- Dynamic generation of properties, events and animations for the visualization
- Configure storage location and storage structure of external tags
- Configure storage structures of generated HMI objects

See also

SiVArc tags (Page 87)

SiVArc object properties (Page 164)

"Format" function (Page 167)

5.4.6.2 SiVArc tags

Definition

You use a SiVArc tag to store instance-specific information about a program block in the user program. You use SiVArc tags in SiVArc expressions and conditions.

Note

Using SiVArc tags in screen rules

If you use SiVArc tags in screen rules to evaluate instance-specific information, use the `IsDefined("Variablenname")` function. In this way, you query whether a SiVArc tag is present. This avoids generation errors due to a non-existent tag.

Creating and using a SiVArc tag

You create a SiVArc tag in the network or program block. To select the correct network, click a program block in any area of the network in the Inspector window.

Based on the display in the Inspector window, you decide whether the tag should be created in this network.

You use SiVArc tags as follows:

- On network comment or caption
  The tag definition is valid in this network.
- On program block comment and caption
  The tag definition is valid in all networks in this program block. Through the tags, you address all program blocks that are called from the corresponding program block.
  If you use SiVArc tags in a program block, the SiVArc tag must be located in the calling block.
  Example:
  A SiVArc tag is defined in FB1. FB1 calls FB2. To enable access to the SiVArc tag, define a screen rule for FB2.

Note

Prioritizing SiVArc tags

If you use multiple SiVArc tags with the same name, the entry used is the one SiVArc found most recently. For example, if a SiVArc tag has the same name for a network and for a program block comment, SiVArc uses the tag value from the network comment.

See also

Overview of SiVArc expressions (Page 86)

"Screen rules" editor (Page 27)

SiVArc texts and SiVArc tags (Page 48)

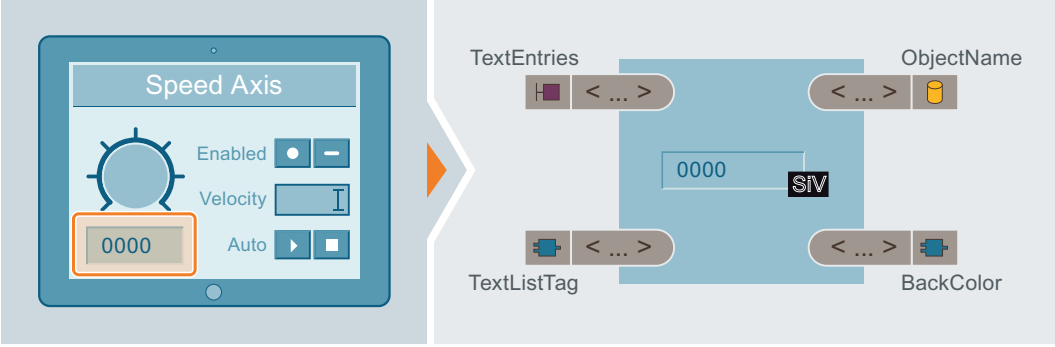
5.4.7 Requirements for a generation template

Optimized reusability

The most important requirement for a generation template is high reusability. You achieve the best reusability by using the type-instance concept from the library.

If blocks in the user program are made available and used throughout the company via the library, for example, it is practical to already assign a set of generation templates to the block type from the library.

You can then configure these generation templates with SiVArc properties so that each instance in the user program and each instance of the library type in the project tree can be visualized with this set of generation templates. There should as many variations as possible.



Generation templates as types

Individual generation templates can even be created as a type and thus retain their direct relationship with the generated HMI objects.

As HMI objects generated from types are type instances, further rules apply:

Note

Type version

SiVArc always uses only the latest version of a type. If instances of the FC or FB type are not up-to-date in the project, SiVArc aborts the generation.

Update all types in your project before each SiVArc generation.

If you use types as generation templates, you assess the specific task and the type of application of an HMI object. Master copies are better suited for navigation buttons, for example.

Rules for using types in screen rules

If you use types, the following rules apply:

- If a type from the global library is used, SiVArc generates a copy of the type in the project library with the generation.
- As soon as SiVArc expressions are edited at the type, a new SiVArc generation is required.
- Other changes to the type are automatically updated in the instances used, even in instances of the type of generated by SiVArc .

Note

Simultaneous use of types and instances

If you define screen rules yourself for an instance of a type in the project and for the type itself, SiVArc processes the type twice.

Ensure that SiVArc processes either the instance or the type.

Device dependency

The availability of screen objects and display sizes depends on the HMI device. When creating generation templates, be aware of the devices for which the generation template can be used. You create different positioning schemes that you link to your generation template to control the arrangement of the generated HMI objects for different HMI devices.

By setting up overflow pictures, you have another option for handling different display sizes on the HMI device in the generation template.

Parameterization of generation templates

To use a generation template as often as possible, they need to be consistently structured in the naming and labeling. As many properties as possible should be linked to the suitable places of use in the user program.

In addition, a generation template ideally takes into account the storage structures in the project and the multilingualism of a project. To achieve this, you use structured SiVArc object properties such as "`<Object>.FolderPath`" and expressions that are configurable as multilingual such as "`DB.Comment`".

Advantages

The maintenance and optimization of generation templates helps you to work efficiently with SiVArc. Your SiVArc project remains agile and easily adaptable to other STEP 7 user programs that work with standardized structures and naming conventions.

In this way, for example, you already set up your SiVArc project while creating the user program. The standardization in your company can be established and maintained with SiVArc, even for multilingual projects.

Nevertheless, generation templates are individually adaptable enough to implement even less standardized projects with SiVArc project.

5.4.8 Parameterization concept

Introduction

To automatically generate as many HMI objects as possible with SiVArc, there are different approaches and options.

Example scenario

An engineering firm is tasked with deriving generation templates based on a completed user program. The project is very extensive and has a high degree of standardization.

After analysis of the project, the engineers decide to derive as many texts from the modular user program for visualization as possible and work with SiVArc to minimize customization and expansion work.

Because the user program is modularly structured and standardized, the number of SiVArc configurations can be minimized:

- Minimum number of generation templates
- Minimum number of SiVArc rules

When the next expansion of the project is pending, the engineering firm can generate the expanded visualization with a few adaptations in the SiVArc project.

Assignment of instructions to HMI objects

The standardization of the user program can be mapped in the SiVArc configuration. The better the user program is formed in terms of structure, modularity and standardization, the higher the application quality of the SiVArc configuration.

The optimum basic relation between HMI object and a function module is derived from the modules of the user program.

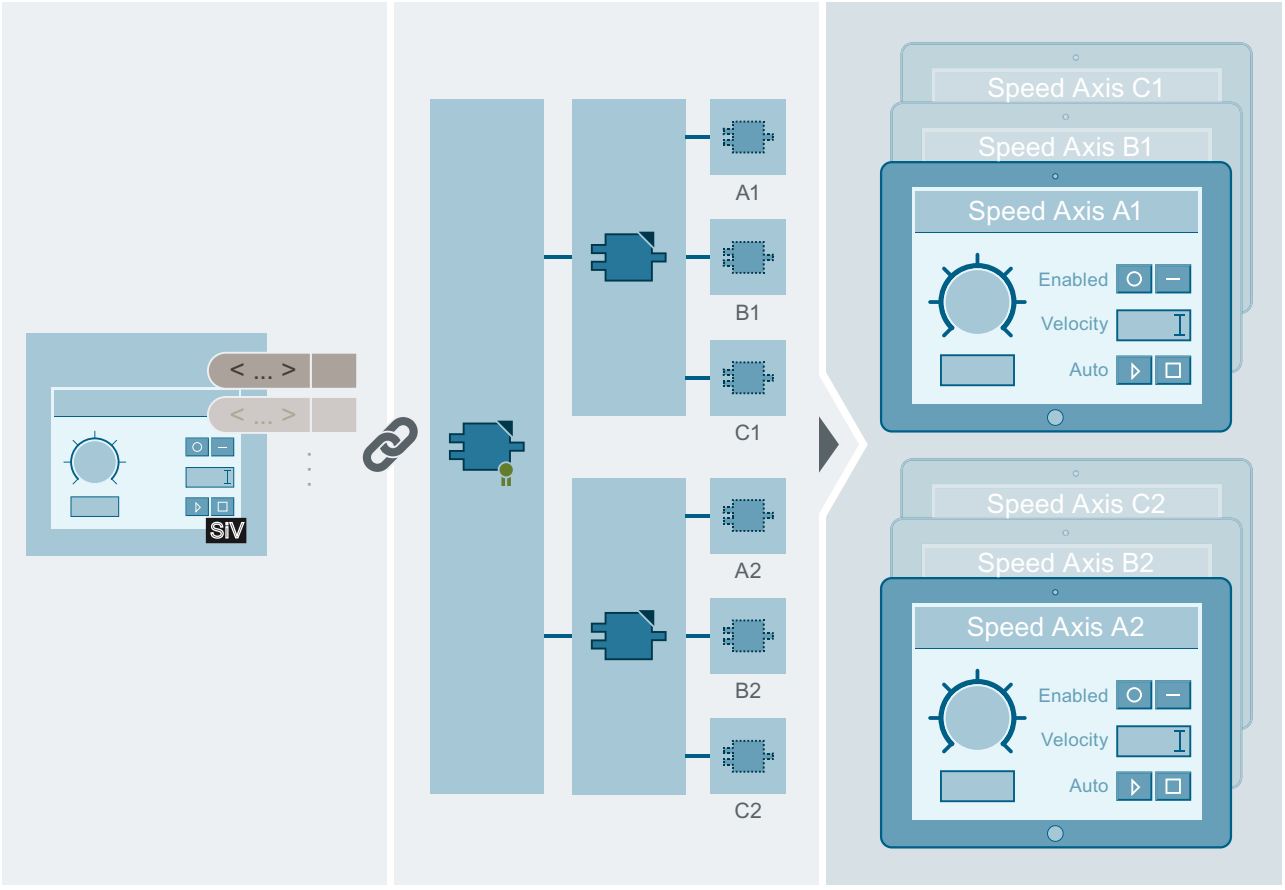
Example

The user program uses the same instruction to control all virtual speed axes. This instruction is stored as a type in the library. Two type instances are used in STEP 7 and instantiated in the user program.

SiVArc concept

- The control of the speed-controlled axis is mapped in a faceplate.
- This faceplate is configured as a generation template for SiVArc.
  Names and interconnections are configured with the help of SiVArc properties.
- The SiVArc properties access texts that are only defined at the respective place of use in the user program, for example, the name of the speed-controlled axis in the network title.

- The screen rule links the library type of the instructions to the faceplate generation template.
- During generation, SiVArc runs through all instances of the block type and all its instantiated calls in the user program.



SiV SiVArc generation template

Library type of the instruction

Instance of the library type in STEP 7

Instantiated type instance in a network in the Main OB

Result

A faceplate is generated with the texts from the user program for each call of a library type instance.

All speed axes can be visualized in the project with just one screen rule and one generation template. The relationship between HMI object and structure of the user program is optimally implemented.

Concept of the SiVArc expressions in WinCC

To ensure uniqueness and clarity in the HMI project, you use SiVArc expressions to access, for example, the data blocks of the instruction instances or the network titles. This means you should keep in mind uniqueness and consistency when naming data blocks and network titles.

The following table shows you, for example, how to use the symbolic name "SG01_FB" of a function block in the generated HMI object with SiVArc expressions.

SiVArc expression	Result
`"MyBlock"`	MyBlock
`"My\"Block"`	My"Block
`Block.SymbolicName`	SG01_FB
`"MyBlock_"&Block.SymbolicName`	MyBlock_SG01_FB
`"MyBlock_"&Block.SymbolicName&"_An"`	MyBlock_SG01_FB_An

Example: Unique HMI object names

To uniquely identify process displays within the call, they are referred to by the path call.

To do this, use SiVArc objects (keywords) in the SiVArc expression that address an instruction of the first three call levels in the call hierarchy.

Naming rules for each level of the call hierarchy are defined in the user program. Different HMI objects are provided for each process display.

SiVArc object	Function type	Name of the instruction	Symbol Name of the data block	Name of the generation template
StructureBlock	Main function	"Plantsection"	"Plantsection_1_Instanz_1_DB"	Label 01
ModuleBlock	Support function	"ProductionLine"	"ProductionLine_Instanz_1_DB"	Label 02
SubModuleBlock	Standard function	"DispatchUnit"	"DispatchUnit_Instance_1_DB"	Label 03
Block	Referenced instruction	"Initialize"	"Initialize_Instance_1_DB"	Button

- Principle of SiVArc expression for the object name of a generated text field

  ```
  ModuleBlock.DB.SymbolicName&"_"&SubModuleBlock.DB.SymbolicName&"_<
  Name_Generiervorlage>
  ```

- Generated object name
  ProductionLine_Instance_1_DispatchUnit_Instance_1_Label_03

- Generated label:
  DispatchUnit
- SiVArc expression for the label
  `Split("SubModuleBlock.DB.SymbolicName","_" (1)`

Example: Unique trigger tags

To interconnect trigger tags uniquely in the HMI object, make sure that names of the PLC tags and the runtime settings for synchronizing the tags are consistent.

The tag name from the symbolic name of the DB and the name of the PLC tag is formed in WinCC:

- PLC tag name in the DB of the second call level
  Activate
- Symbolic name of the DB
  Plantsection01
- Generated HMI tag name
  Plantsection01_Activate

The relevant instruction is located on the second call level.

- SiVArc expression of the tag name
  `StructureBlock.DB.SymbolicName&_Activate`

Example for labels

- If uniqueness is not required in a label, keep the instruction name short and concise so that it can be displayed on a button, for example:
  - Stop
  - Activate

  In the SiVArc expression in the generation template you assign the label directly via the name of the instruction:
  - SiVArc expression: `Block.Title`
- When a short and concise name is not possible, use string functions:
  - Name of the relevant data block: Plantsection1_DB
  - SiVArc expression: `Split(StructureBlock.DB.SymbolicName,"_",0)`
  - Generated label: "Plantsection1"

Advantages

A clear and transparent HMI project is created by the structured formulation of the expressions and consistent assignment of instructions and HMI objects. Changes in the plant or in the user program can be implemented quickly and reliably. SiVArc simplifies recurring tasks in this way. Errors can be avoided in this way.

Furthermore, you can implement corporate standards more easily.

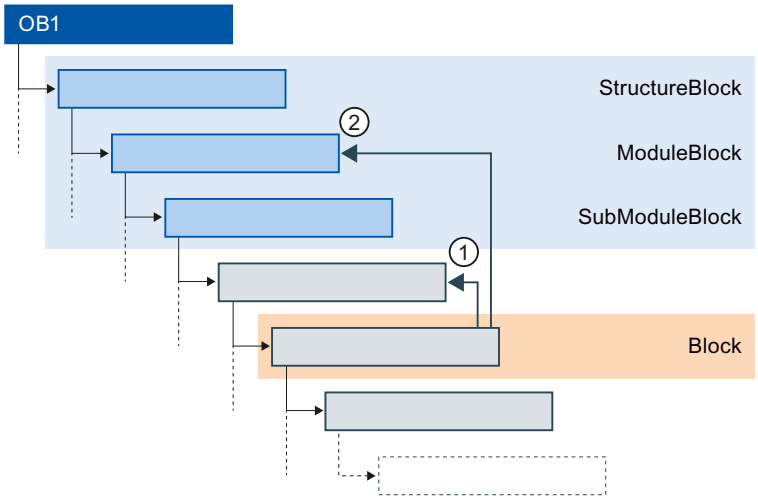
5.4.9 Influence of the user program on a generation template

Introduction

When you generate HMI objects with SiVArc, SiVArc evaluates all calls of program blocks in the user program. The user program is executed from top to bottom. If other program blocks are called in a program block, SiVArc executes the program blocks of the lower hierarchy levels first.

Addressing program block properties

The following figure shows the relationship between the call hierarchy of program blocks and the access to the properties of program blocks:



The blocks of the first three priority levels are mapped via SiVArc objects. Use the SiVArc objects for absolute addressing of these blocks.

The SiVArc object `Block` always shows the program block that is currently being executed by SiVArc, regardless of its position within the call hierarchy.

From a lower hierarchy level, you can address program blocks from each level above this. The addressing method depends on the current position in the call hierarchy. In this figure, SiVArc is currently executing a program block in the fifth level of the hierarchy.

① You can reach a higher-level block without a SiVArc object only through its relative addressing.

Beginning at the block currently being evaluated by SiVArc, enter a dot "." before each hierarchy level:

In this example, you address the name of the higher-level block as follows:

```
.Name
```

② You can reach a higher-level block with SiVArc object either through its relative or absolute addressing:

In this example, you address the block of the second hierarch level as follows:

- Relative: `...Name`
- Absolute: `ModuleBlock.Name`

Note

Working in the "SiVArc expressions" editor

Relative addressing is not supported by "SiVArc expressions" editor. To address a block relatively, enter the address directly in the input field of the SiVArc property.

Example

In an 8-level call hierarchy, you address hierarchy level 8 from an FB as follows:

- Address blocks from priority levels 1 - 3 with a SiVArc object or relatively, e.g. `StructureBlock.Version`or `.......Version`
- Address blocks from call levels 4 - 7 relatively, e.g. `...Version` (hierarchy level 5)

Use SiVArc object properties to address the properties of a program block.

Examples for access to program blocks

The following examples show how the properties of a program block are addressed in the respective call hierarchy:

Example	Standard call	Relative access to the calling block	Absolute access to the higher-level block on call level 1
Access to block names	`Block.Name`	`.Name`	`StructureBlock.Name`
Access to symbolic name of the DB	`Block.DB.SymbolicName`	`.DB.SymbolicName`	`StructureBlock.DB.SymbolicName`
Access to the value of a block parameter	`Block.Parameters("<Name Parameter>").Value`	`.Parameters("<Name Parameter>").Value`	`StructureBlock.Parameters("<Name Parameter>").Value`
Access to the comment of a tag that is assigned to the block parameter.	`Block.Parameters(<Name Parameter>).AssignedTag.Comment`	`.Parameters(<Name Parameter>).AssignedTag.Comment`	`StructureBlock.Parameters(<Name Parameter>).AssignedTag.Comment`
Access to the path of the addressed block	`Block.FolderPath` `ModuleBlock.FolderPath`	`.FolderPath` Maps the call hierarchy	`StructureBlock.FolderPath`
Access to the path of the instance DB of the addressed block The instance DB can be a single instance or multi-instance.	`Block.DB.FolderPath` Note: With `DB.FolderPath` , you only reference blocks that have a DB.	`.DB.FolderPath`	`StructureBlock.DB.FolderPathTagNaming.SeparatorChar`

If you use the standard call with the SiVArc object `Block`, the program block that is currently being executed in a SiVArc expression is addressed.

See also

SiVArc object properties (Page 164)

5.4.10 Influence of multilingualism on a generation template

Project languages and Runtime languages

You can optimize and efficiently implemented the multilingual configuration of the SiVArc functionality even down to the generation template.

If you configure multilingual properties with multilingual SiVArc properties in a generation template, for example, the string is generated for each runtime language.

The language settings of the TIA Portal and generation template with multilingual SiVArc objects define which multilingual texts are generated in the generated objects.

Language settings of the TIA Portal

You can generate a SiVArc project in all project languages. To do so, activate the required project languages as Runtime languages.

SiVArc uses the default generation language when multilingual SiVArc object properties are set at a monolingual property. The default generation language depends on the HMI device:

- HMI device with RT Advanced
  Runtime language at top of the list under "Runtime settings > Language & font > Runtime language and font selection"
- HMI device with RT Professional
  Runtime language that is set as "Runtime language for single-language objects" under "Runtime settings > Language & font > Runtime language and font selection"

If a project language is not set as Runtime language, the multilingual properties in the project are generated with the value from the master copy for this project language. The SiVArc expression for this property is not evaluated in this project language.

If a value is not set in a multilingual tag, the empty string is generated as property value for this language.

Multilingual SiVArc objects

You work with the following SiVArc objects when you configure a multilingual SiVArc project:

- Multilingual properties
- Multilingual SiVArc object properties
- SiVArc texts for text list entries

Multilingual WinCC properties

SiVArc supports the following multilingual properties.

The expressions of these properties are evaluated individually by SiVArc for each Runtime language. If an expression includes multilingual SiVArc object properties, the evaluation results in different values for the respective Runtime languages.

HMI object	Property
Bar	Title Tooltip Unit
Screen	Display name
Screen window	Title
Text field	Text
I/O field	Info text
Graphic I/O field	Tooltip
Switch	Title TextOFF TextON Tooltip
Round button	Text Tooltip
Button	TextOFF
Gauge	Title Unit

The expression is evaluated in the default generation language for all other properties for which you can use a SiVArc expression.

Multilingual SiVArc object properties

The following SiVArc object properties are configurable in multiple languages:

- `Title`
- `SymbolComment`
- `DB.Comment`
- `NetworkTitle`
- `NetworkComment`

Using SiVArc expressions in multilingual context

You use multilingual and monolingual SiVArc object properties in SiVArc expressions. The reference describes which SiVArc object properties are multilingual. You use SiVArc object properties in multilingual and monolingual SiVArc properties. The SiVArc expressions are evaluated as follows in this context:

	Monolingual SiVArc object properties	Multilingual SiVArc object properties
Monolingual property	The same character string is generated for each Runtime language.	The tag is evaluated in the default generation language. You specify the default generation language in the Runtime settings of the HMI device.
Multilingual property	The same character string is generated for each Runtime language.	The tag is evaluated for all configured Runtime languages. The configured character string is generated for each Runtime language.

5.4.11 Storage strategies for generated objects

Overview

SiVArc offers options for screens and tags to control the storage structure of generated objects by means of SiVArc expressions in the screen rules or in the generation template.

There are various storage strategies for this:

- Mapping of the storage structure in the project tree in STEP 7
- Mapping of the storage structure in the project library
- Individual storage structure

The SiVArc storage strategies are based on the generated HMI objects in the project tree below the HMI devices in the areas of screens and tags.

The structured storage of SiVArc rules provides you with the functions of SiVArc editors.

Application example

The blocks are stored in the project tree, for example, according to function. This storage form can be created automatically for the associated screens. In the generation templates of screens, configure a SiVArc expression that references the path of the blocks in the project tree.

Advantage

The SiVArc storage strategies increase the consistency and standardization of your visualization project. If another storage strategy is required, you can restructure your project with little effort.

Controlling the storage of generated tags

The following strategies are possible for the storage of tags:

- Mapping of the storage structure in the project tree in STEP 7
  You can use the SiVArc expressions `HmiTag.DB.SymbolicName` and `HmiTag.DB.FolderPath` for the "Tag rules" editor to structure the tag tables based on the control program using only one tag rule.
  The project is only structured once at the controller end.
- Individual storage structure
  You define the target folder and the tag tables individually using the "Tag group" and "Tag table" columns.

Double-click "Common data > SiVArc > tag rules" in the project tree to open the "Tag rules" editor.

A tag rule contains the following elements:

- Name
  Unique name of the tag rule
- Index
  Specifies the order in which the rules are executed. You change the index using drag-and-drop in the table rows.
- Tag group
  Name of the tag group in which the external tag is generated
- Tag table
  Name of the tag table in which the external tag is generated
- Condition (optional)
  SiVArc expression that is evaluated when processing this tag rule
- Comment (optional)
  Individual comment for tag rule

Controlling the storage of generated screens

The following strategies are possible for the storage of screens:

- Mapping of the storage structure in the project tree in STEP 7
- Mapping of the storage structure in the project library
- Individual

You control the storage of screens in the project tree with the "Name" and "Screen group" properties in the generation template of a screen. If you specify a text string under "Screen

group", a group is created in the project tree with this name. The screens created based on the generation template are then stored therein.

You can synchronize the storage structure and naming of the SiVArc objects with the library in the generation template of a screen type.

To do this, use the SiVArc expressions "`LibraryObject.FolderPath`" and "`LibraryObject.Name`"

SiVArc object property	Referenced object	SiVArc property
`LibraryObject.FolderPath`	Storage path of the screen type in the library	Screen group: The storage path from the library is generated in the project tree. Name*: The generated screen is named after the folder in which the screen type is stored.
`LibraryObject.Name`	Name of the screen type of the library	Name: The screen is named after the screen type. Screen group: The screen is stored in a folder with the name of the screen type in the project tree.

*) Use `LibraryObject.FolderPath` for the SiVArc property "Name" only if the screen type in the library is stored in one hierarchy level only. If you want to use a multi-level storage hierarchy, you can substitute the expression and `LibraryObject.FolderPath` for the backslash.

Alternatively, you can define the storage folder and screen name individually.

5.4.12 Example: Achieving high flexibility

Example scenario

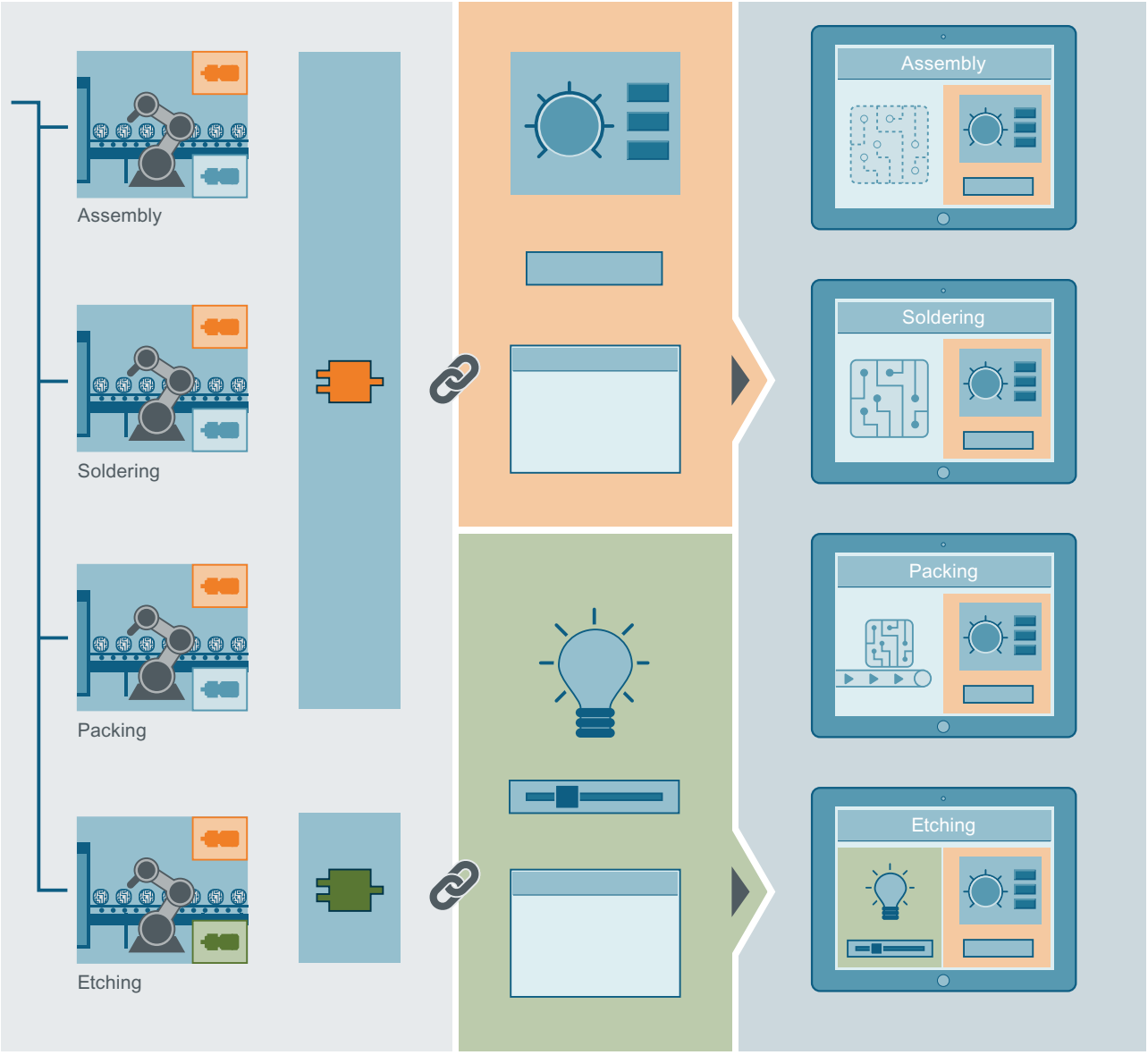
A printed circuit board factory has the plant sections "Fitting", "Soldering" and "Packing". A new type of circuit boards requires the planning and completion of an additional stage, "Etching". The plant largely consists of standard blocks.

Once the new plant section is created, the modules are tested and optimized for operation.

Implementation concept

Much of the functionality of the "Soldering" plant section is reused for the "Etching" plant section and therefore generates no additional SiVArc configurations.

The additional functions required for the "Etching" plant section are standard functions which were already assigned generation templates in screen rules. The engineer forms a group for the additional rules required for the "Etching" production stage and enables the relevant HMI devices.



To test the plant, the project engineer collectively enables a screen rule group and disables modules not needed for the test. The visualization engineer tests the user interface generated from this. Based on the test result, generation templates and rules are optimized by using conditions of or modifying the SiVArc properties.

5.4.13 Example: Achieving high reusability

Example scenario

An engineering firm receives a contract from a new customer to configure a standard plant for the manufacture of printed circuit boards.

The firm already has an optimized SiVArc project for PCB production and wants to reuse it for the new customer.

The plan is to ensure the greatest possible consistency for the operation and visualization of the same functions including, for example, the following functions:

- ON/OFF
- Travel to basic position
- Display status

Implementation solution

Because the function blocks are to be rolled out in the standardized user program as standard functions and system blocks through library types, the engineering firm can set up a full, existing set of generation templates for each standard function.

The existing generation templates for standard functions access the text sources directly on the standard block via SiVArc expressions. The call hierarchy is not taken into consideration. The trigger tags are uniquely referenced through the name of the data block of the system block. Each reuse of the type produces the associated operating elements in the visualization based on the same set of generation templates. Adaptations are therefore not necessary.

Color and forms of the generation templates are adapted to the operating concept and made available from a project-specific library.

The new CI for the operating screens is connected to the generation templates via positioning schemes.

5.4.14 Example: Create generation template for screen windows

Example scenario

For training purposes, several existing HMI devices are to be duplicated at a redundantly designed workplace.

Objective

Various screen windows with the corresponding start screens are to be generated on the redundant operator station. The name of the screen window indicates the program block that is visualized in it.

Screen windows in SiVArc

Screen windows are not generated directly as screen objects. A screen window is implicitly created when a screen is specified as screen object.

If there is a "DefaultScreenWindowControl" generation template in the project, SiVArc generates screen windows based on this template. If this template is not available, SiVArc creates a copy of the screen window from the toolbox.

Requirement

- A blank operator screen of the redundant workplace is stored as a generation template for the screen window named "Screen_Training".
  The SiVArc property "Name" of the generation template is configured with the SiVArc expression"`Block.DB.SymbolicName&"_SWC`".
- The "Plantsection_Soldering" program block is contained in the user program and is called repeatedly in OB1.

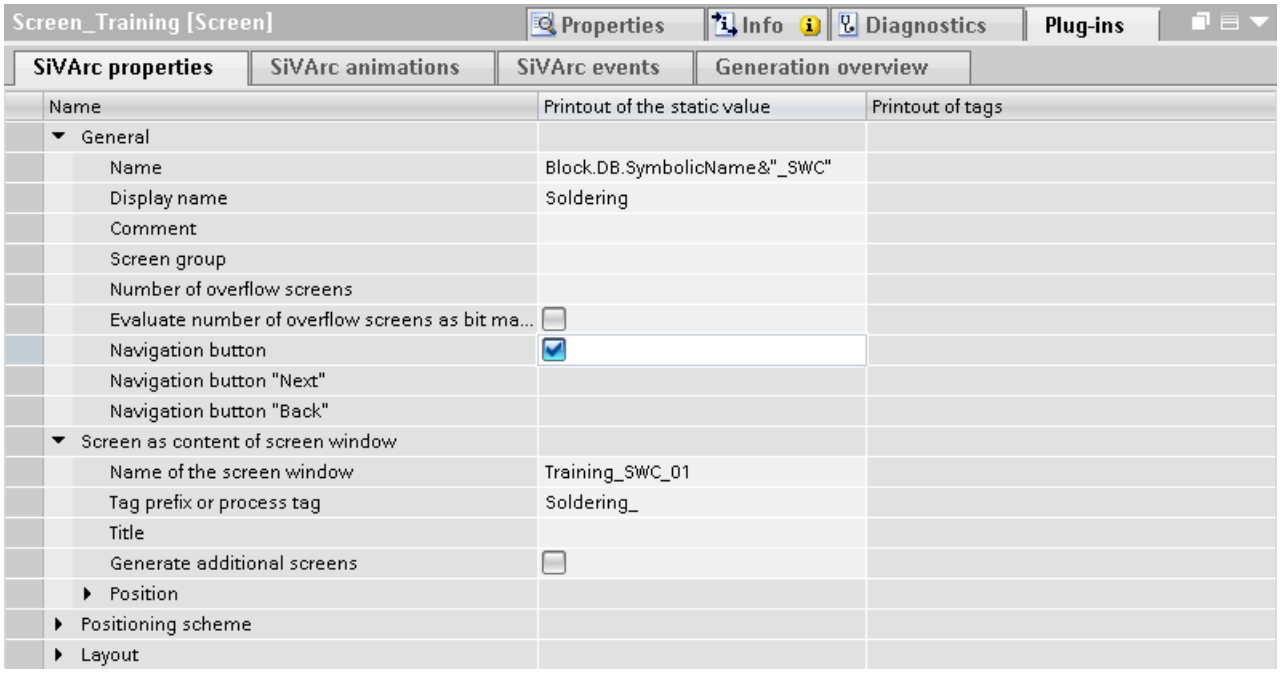
Procedure

To create a generation template copy for a screen window, follow these steps:

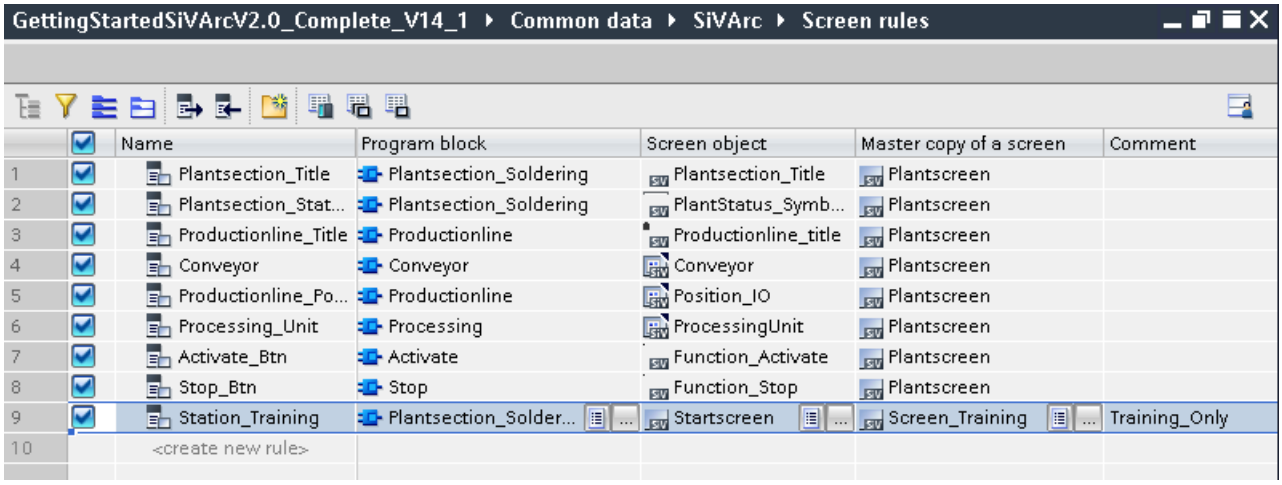
1. Open the generation template "Screen_Training" from the library.
2. Under "Plug-ins > SiVArc properties", configure the name of the screen window with the SiVArc expression "`Block.DB.SymbolicName&"_SWC`".
   The `Block.DB.SymbolicName` part references one of the following names depending on the type of block call:
   - Global: Symbolic name of the Instance DB
   - Local: Name of the block instance

   The `&"-SWC"` part adds the suffix to the name for "Screen Window Control".

3. Under "Plug-ins > SiVArc properties > Screen as content of screen window" in the Inspector window, configure desired properties:
   - Under "Name of the screen window", enter a unique name or a SiVArc expression for the screen window to be generated on the target screen.
   - Under "Tag prefix", enter the name of the tag that uses a user data type. If necessary, use a SiVArc expression.



4. Enter a new screen rule with the name "Station_Training".
5. Enter a "For training purposes only" comment.
6. Select the central program block "Plantsection_Soldering".
7. Under "Screen object", select the "Startscreen" generation template.
8. Under "Screen", select the "Screen_Training" generation template.



Result

A "Screen_Training" screen" is generated with a screen window for each call of the "Plantsection_Soldering" program block. The start screen of the "Soldering" plant is included in the screen window.

The name of the screen window contains a reference to the program block visualized in it and the suffix -SWC, for example, "Plantsection_Soldering_Instance01_SWC".

Screen windows for multiple screens

To display other screens in a generated screen window, for example, diagnostic screens, place the desired generation templates in the same library folder, for example, "Training_Screens". Also configure the following SiVArc properties:

- In the screen you have selected as the "Screen object", configure the SiVArc property "Generate additional screens".
- In the screen you have selected as the "Screen object", configure the SiVArc property "Screen in screen window".

Result

When you generate the visualization, the screen window is generated in the specified screen. The screen generated from the generation template specified under "Screen object" is displayed in the screen window.

The other screens from the same folder, for example "Diagnostics", are also generated in the visualization.

Select another screen for display in the screen window as required. This setting is retained for a follow-up generation.

5.4.15 Example: Create generation template with animation

Example scenario

If a robot moves to the basic position, the robot screen should always flash with changing colors.

Objective

The generation template for the robot screen is a graphic I/O field that is configured with a design animation. The status specifications follow a SiVArc expression.

SiVArc animations

SiVArc supports the following types of animation:

- Animation with tag connection (only available in WinCC Runtime Professional for S7-GRAPH overview)
- Animations of the "Display" category

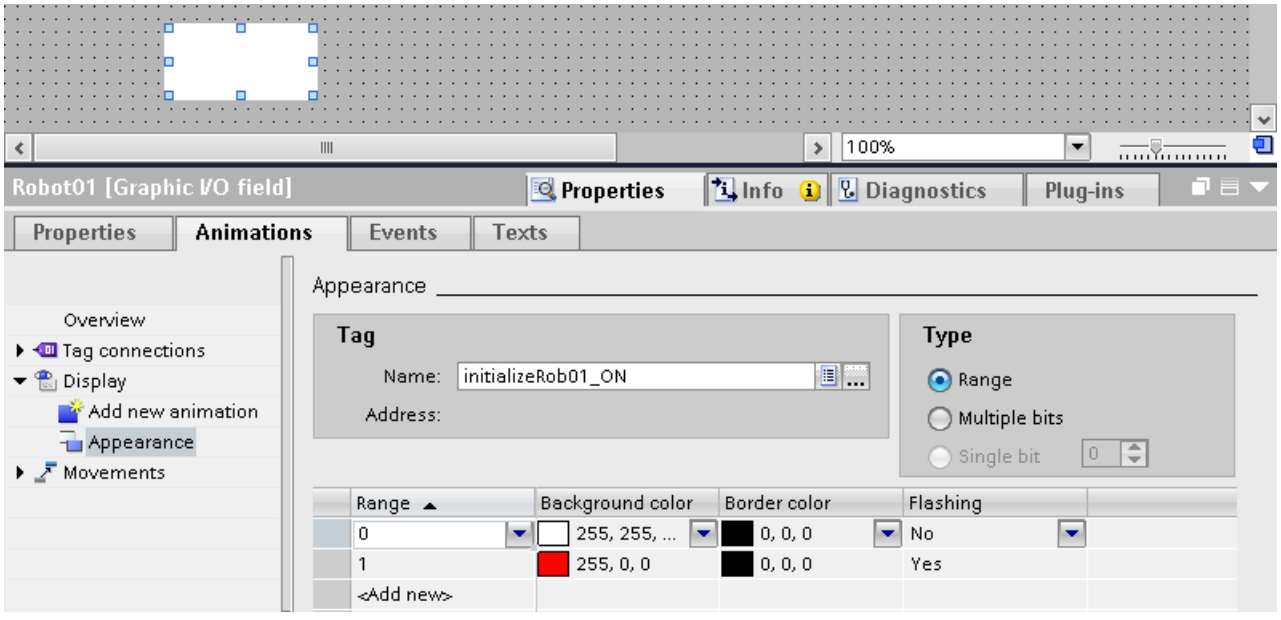
For these animations, you use a SiVArc expression to define the process tags which trigger the animation in Runtime.

Requirement

- A "Robot01" graphic I/O field is configured as generation template for the robot screen.
- The PLC tags are synchronized with the HMI tags.
- The "initializeRob01_ON" tag contains the status information of the travel to the basic position and is connected to the external tag "`Soldering_Instance_01_initializePosRob01`".
- The "Rob01" program block is contained in the user program.
- A screen rule is created that links the robot screen to the program block "Rob01".

Procedure

1. Open the generation template of the graphic I/O field.
2. Configure a design animation.



   – Select the "Area" type.
   – For the "1" area, select red as the background color and enable the "Flashing" option.
3. Open the "SiVArc animations" tab under "Properties > Plug-ins".

4. For the "Appearance" animation under the "Tag expression", configure the SiVArc expression "`StructureBlock.DB.SymbolicName&"_initialPosRob01"`"
5. Overwrite the existing generation template in the library.

Result

The generation creates the "Robot01" graphic I/O field for each instance of the "Rob01" program block. The animation was configured for each graphic I/O field. When the robot moves to the basic position in runtime, the robot screen flashes in red.

5.4.16 Example: Create generation template with event configuration

Example scenario

The "Activate" button should trigger the drive to the basic position of the milling/soldering or positioning robot.

Objective

In the generation template of the "Activate" button, the "Click" event is configured with the SetBit" system function.

The unique "Tag" parameter for the system function is composed of the text sources from STEP 7 during generation.

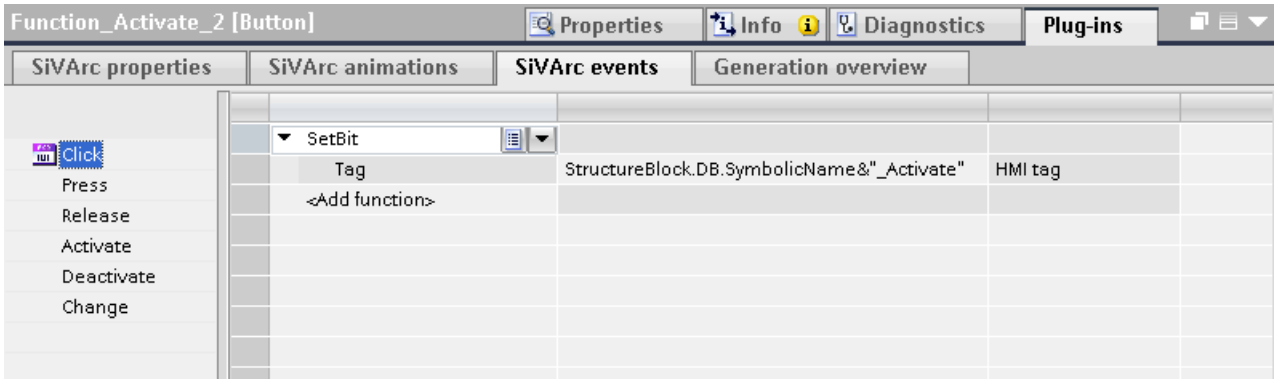
Requirement

- The generation template of the "Activate" button is configured with the "SetBit" system function.
- An screen rule is created in which the "Activate" generation template is linked to the relevant function block.
  The function block in our example is located on the second level of the call hierarchy and is addressed with the SiVArc object "`StructureBlock`".

Procedure

To create a generation template with event configuration, follow these steps:

1. Open the generation template "Activate" button in WinCC.
2. In the Inspector window under "Plug-ins > SiVArc events > Click", configure the SiVArc expression "`StructureBlock.DB.SymbolicName&"_Activate"`" as a tag.



3. Overwrite the existing generation template in the library.

Result

A button that can trigger and exit the function is generated for each call of the relevant function block. The tags are already interconnected for all instances.

5.4.17 Example: Create generation template with script configuration

Example scenario

In a SiVArc sample project, temperature readings should always be output in degrees Celsius in addition to the values in Fahrenheit.

Implementation concept

To switch an additional display object, a button with the appropriate script is generated in each project.

If there is no need for conversion in a project, the SiVArc configuration engineer disables the respective screen rule in the next generation or limits the screen rule to a selection of HMI devices.

Availability of system functions and scripts

When you connect scripts to events, these scripts must exist on each target device. If the configured script does not exist in the "Scripts" editor on the target device, the display and operating object is generated without this script connection.

SiVArc supports the configuration of system functions and scripts with SiVArc expressions at all events of screens and screen objects. SiVArc supports system functions from the following categories:

- Calculation
- Bit processing
- Screens

SiVArc supports a limited selection of SiVArc events and system functions for faceplates. You can find an overview of the supported system functions in the section "Reference".

Note

Device dependency

The number and type of events in a display and operating object depends on the configured HMI device.

Additional information on device dependency of events is available in the online help of the TIA Portal in the section "Working with system functions and Runtime scripting" in the reference.

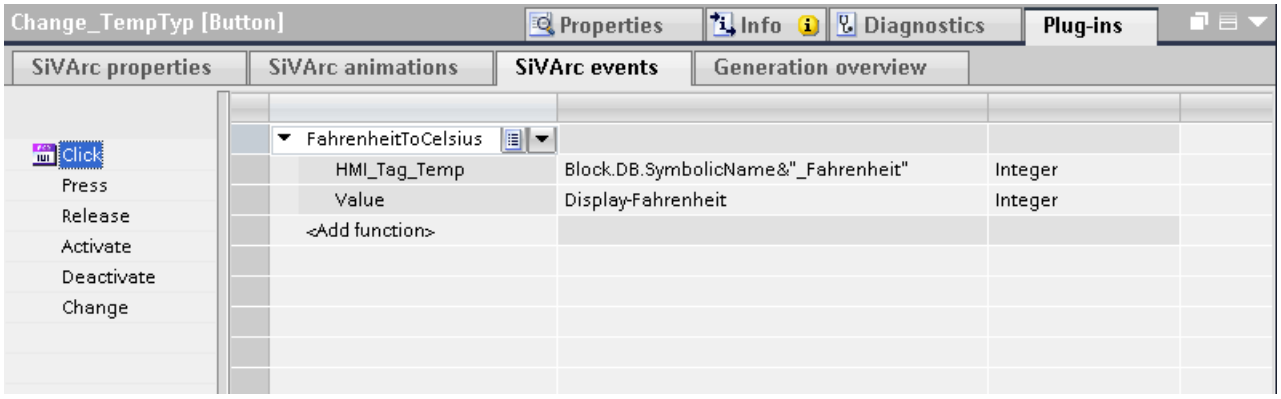
Requirement

- A "FahrenheitToCelsius" script is programmed, which converts degrees Fahrenheit to degrees Celsius and outputs the result in an I/O field.
- The script has the parameters "HMI_Tag_Temp" and "Value".
- The script is created on all target devices.
- A button is created as a "Change_TempTyp" generation template and linked to the relevant function for temperature measurement with a screen rule.

Procedure

1. Open the generation template of the "Change_TempTyp" button in WinCC.
2. Configure the "FahrenheitToCelsius" script for the "Click" event in the Inspector window under "Plug-ins > SiVArc events" .
3. Configure the "HMI_Tag_Temp" parameter with the SiVArc expression "`Block.DB.SymbolicName&"_Fahrenheit"`".

4. Configure the "Value" parameter with the name of the output field "Display_Fahrenheit".



5. Overwrite the existing "Change_TempTyp" generation template in the library.
6. Create a screen rule for the "Display_Fahrenheit" I/O field.

Result

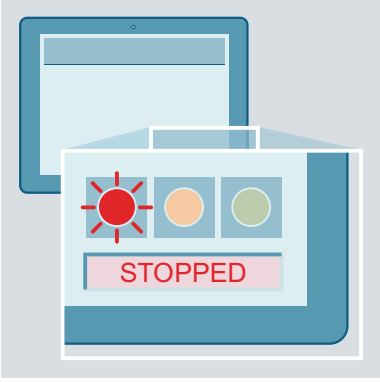
When the visualization is generated, the "Change_TempTyp" button and the "Display_Fahrenheit" I/O field are created for each call of the relevant function block.

The "FahrenheitToCelsius" script is linked to the "Change_TempTyp" button. The converted value from the respective "Fahrenheit" tag of each instance of the function is displayed in the "Display_Fahrenheit" I/O field in runtime.

5.4.18 Example: Creating generation templates for text lists

Example scenario

A traffic light indicates the plant status. Each color is assigned a status text that is displayed in a symbolic I/O field beside the traffic light.



Objective

A generation template for a text list is provided from the library. The required text definitions are to be maintained in the user program on the network.

The generation template for the text list is assigned the dynamic trigger tag. The data block for the relevant function is called "Plantsection1_DB". The name of the text list should refer to the first part of the symbolic name of the block: "Plantsection1_Textlist". With the "Split" function, the "_DB" is shortened in a SiVArc expression for the text list name.

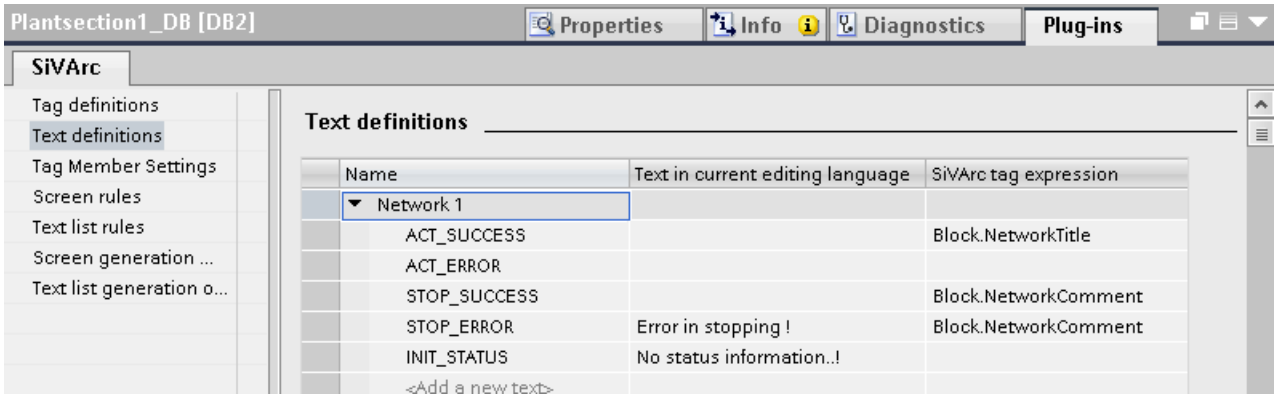
Requirement

- The "Textlist_State" generation template has been stored in the library.
- A text list rule is created linking the "Textlist_State" generation template to the "Plantsection" function block.

Define text list entries

To create text definitions, follow these steps:

1. Select the desired network in the user program for which the text list entries should be defined.
2. Select the "Text definitions" category under "Plug-ins > SiVArc".
   The following text definitions are defined in the user program on the network of the first instance of "Plantsection":

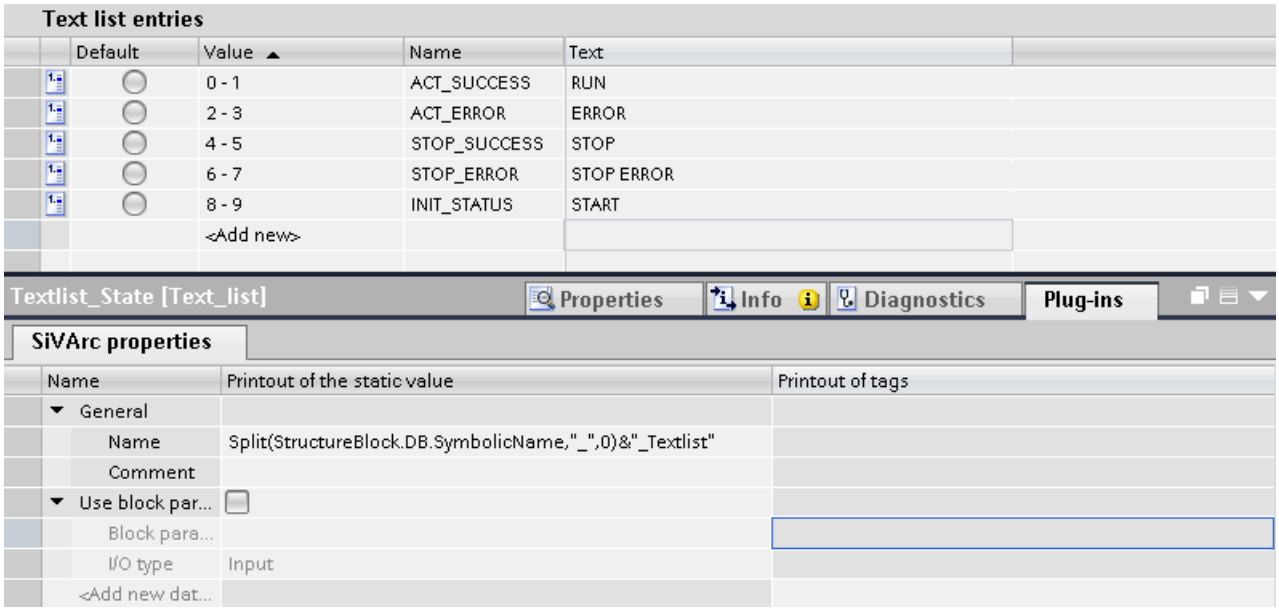


3. Enter the name for the text list entries under "Name > Network".
4. Enter a static text list entry under "Text in current editing language".
   If no dynamic text is specified, SiVArc generates the static text.
5. Under "Expression of the SiVArc tag", enter a SiVArc expression to assign a text list entry dynamically. During the generation in the example,
   SiVArc uses the network title (`Block.NetworkTitle`) and the network comment (`Block.NetworkComment`) of the function block linked in the text list rule.

Procedure

To create a generation template for a text lists, follow these steps:

1. Open the "Textlist_State" generation template from the library.
2. Select the "Area" text list type.
3. Open the text list entries for the text list.
4. Copy the name of the text definitions from the user program to the sequential values in the "Name" column.
5. Enter default text list entries.
6. Under "Plug-ins > SiVArc properties" in the Inspector window, configure the name of the text list with the SiVArc expression "Split(StructureBlock.DB.SymbolicName,"_", 0)&"_Textlist".



7. Overwrite the existing generation template in the library.

Result

During generation, the text list for the first instance of the "Plantsection" function block created. The "Plantsection1_Textlist" text list name is generated using the "Split" function and the name of the data block.

To also generate the text list for all other uses of the block, enter the text definitions at all points of use of the block in the user program.

If the entries cannot be evaluated, a text list is created based on the SiVArc master copy.

If several identical names are detected for SiVArc texts during the generation, SiVArc uses the most recently created SiVArc text.

5.4.19 Example: Create generation template for a text list for block parameters

Example scenario

The plant status of a conveyor belt is to be continuously output in the operator screen.

Objective

SiVArc is to generate an I/O field which is interconnected with a text list that takes its entries from the "State_A" block output of the "Conveyor" function block.

Requirement

- The "Textlist_Parameter" generation template has been stored in the library.
- A text list rule is created which interconnects the "Textlist_Parameter" generation template with the "Conveyor" function block.
- The conveyor belt status is contained in the comments of the tags at the "State_A" block output:
  - OFF
  - ERROR
  - STOP
  - RUN

Procedure

To create a generation template for a text list for a block parameter, follow these steps:

1. Open the "Textlist_Parameter" generation template from the library.
2. Activate "Use block parameters and relevant PLC tags" in the SiVArc properties.
3. Enter the parameter name "State_A" and I/O type "Output".
   To select several parameters, use a regular expression with asterisks. The system then evaluates all parameters with names that include the string as specified.
4. Select the "BOOL" data type and "4" as the number of tags that are to be used for the text list generation.
   If, for example, you select the number "17", the first 17 tags are processed. If there are only 15, only the first 15 are processed.
5. Overwrite the existing generation template in the library.

Result

The tags of the configured data type are recorded and evaluated by the generation. A text list entry is created in each case for four of these tags as shown below:

- The text list entries correspond to the respective comment of the tag.
- The names of the text list entries are composed of the parameter name, the data type of the parameter and a sequential number, for example, State_A_Bit _1, State_A_Bit _2, etc.

If the tag name is not contained in the symbol table, the configured number of text list entries is created with value assignment and name. The names of the text entries are then derived from the parameter. In this case, you can supplement the desired text list entries in the comments of tags and generate a second time. If you enter the text entries manually, the texts are only retained until the next generation.

5.4.20 Example: Generating pop-up screens and their use

Example scenario

On an operator screen there is just enough space for all display and operating elements required for the process control. Therefore, the dialog for language switching is swapped out to a pop-up screen.

Implementation concept

The call of a pop-up screen is configured on a button which contains the settings for the language switch.

Using pop-up screens in SiVArc

You use pop-up screens with SiVArc as you would other WinCC screens. To apply a separate positioning scheme to a pop-up screen, use positioning schemes that are created based on a pop-up screen.

To generate display and operating objects in a pop-up screen, use the pop-up screen as "master copy of a screen" in a screen rule.

Requirement

- The following generation templates have been stored in the library:
  - Pop-up screen "PopUp_ChangeLang"
  - Button "Button_PopUp_ChangeLang"
  - Start screen "StartScreen"
- A pop-up screen has been created in the library as the "PopUp_Pos_ChangeLang" positioning scheme.
- Screen rules are created for the following HMI objects:
  - Button "Button_PopUp_ChangeLang"
  - Pop-up screen "Button_PopUp_ChangeLang"

Create generation template for the pop-up screen

To create a generation template for calling a pop-up screen, follow these steps:

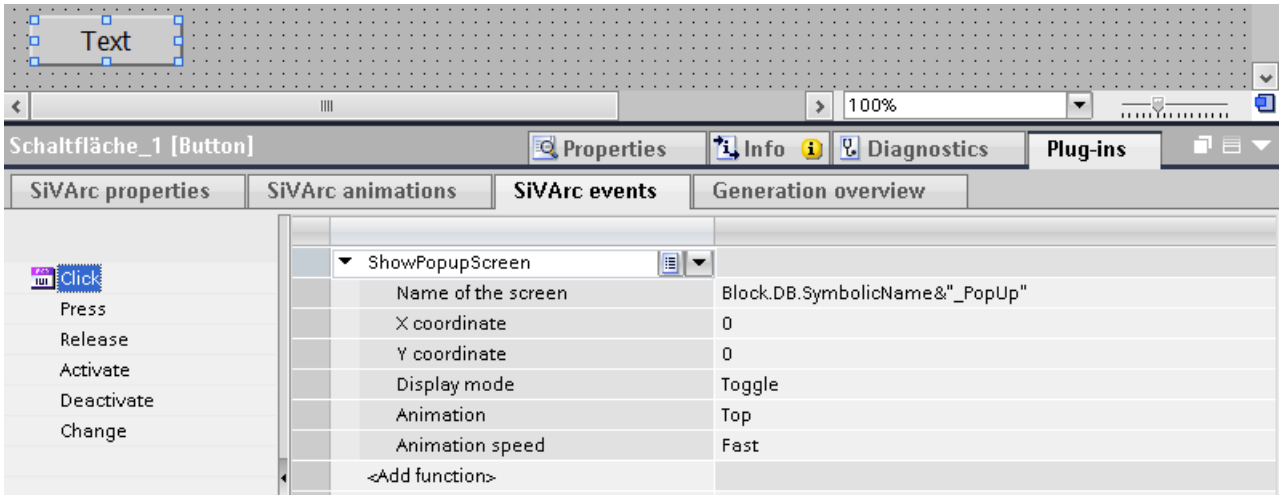
1. Open the generation template of the pop-up screen "PopUp_ChangeLang" from the library.
2. Under "Plug-ins > SiVArc properties > General" in the Inspector window, configure the following SiVArc properties:
   - To generate a unique screen name, enter a SiVArc expression or a string under "Name". Integrate the name of the called program block with "`Block.DB.SymbolicName&"_PopUp`", for example, as the name of the pop-up screen.
   - If the generated screen should be stored in a group or in the plant structure, enter a SiVArc expression under "Screen group".
   - Select the "Fixed" as mode of the positioning scheme and the "PopUp_Pos_ChangeLang" positioning scheme.
3. Overwrite the existing generation template in the library.

Create generation template for the calling button

To create a generation template for calling a pop-up screen, follow these steps:

1. Open the generation template of the calling button "Button_PopUp_ChangeLang" from the library.
2. Under "Plug-ins >SiVArc properties" in the Inspector window, configure the desired SiVArc properties. Integrate the name of the called program block with "`Block.SymbolicName&"_ButtonPopUp`", for example, as the name of the button.

3. Under "Plug-ins >SiVArc events" in the Inspector window, configure the system function "ShowPopupScreen" for the "Click" event, for example.
   - For the "Name of the screen" parameter, assign the SiVArc expression you have configured in the generation template of the pop-up screen under "Plug-ins > SiVArc Properties > General > Name": "`Block.DB.SymbolicName&"_PopUp"`"
   - Configure the coordination for the display position of the pop-up screen with an integer value.
   - Select the display values.



4. Overwrite the existing generation template in the library.

Result

The start screen of the plant, the button for the language switch, the pop-up screen and the central function module are linked in the screen rules. After generating, an additional button is generated in the start screen of the plant section which calls a pop-up window for the language switch.

5.4.21 Example: Generating faceplates with animations

Example scenario

An assembly line of a manufacturing plant is designed for heavy-duty loads and is used only for special packaging formats. The speed control of the two axes should therefore be displayed on the plant screen only when the production line is in operation.

Implementation concept

The visualization of the speed control is prepared in a faceplate. The faceplate is used in the project as a generation template for controlling all speed-controlled axes. The visualization engineer creates a new generation template with a visibility animation based on the faceplate.

In the screen rules, it uses conditions to control when a faceplate with animation is generated.

Animated faceplates in SiVArc

SiVArc supports the following animations for faceplates:

- Visibility
- Allow operator control
- Appearance

To generate animations for faceplates with SiVArc, configure dynamic properties for the animation in the faceplate type that serves as generation template.

Requirement

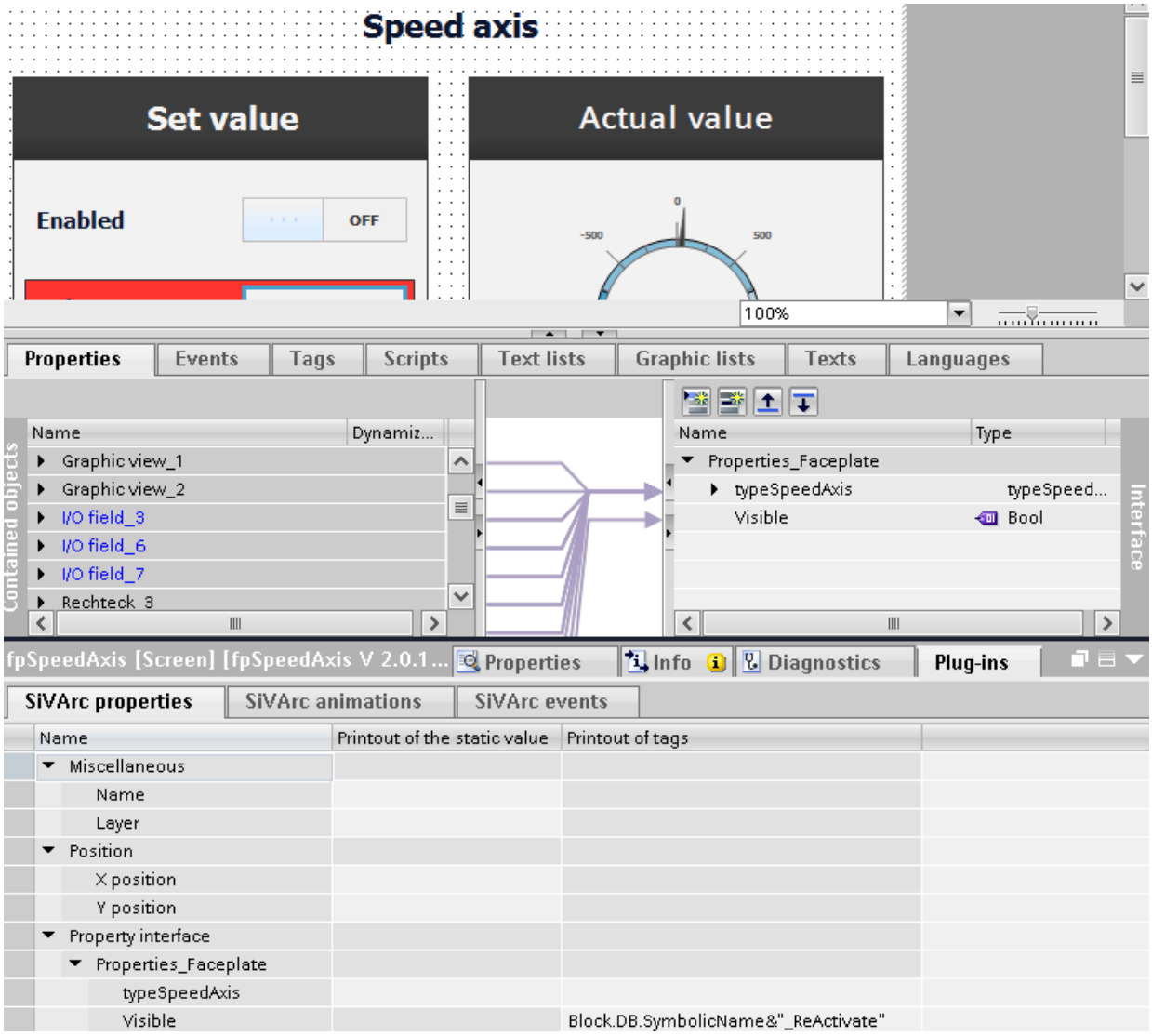
- The "fpSpeedAxis" generation template of the faceplate type is stored in the library.
- The "Conveyor_HeavyLoad_Instance01_ReActivate" tag is contained in the block interface of the relevant function block.
- A tag with the "_ReActivate" ending is only used for heavy-duty operation.

Procedure

To generate faceplates with animations, follow these steps:

1. Open the generation template of the faceplate type "fpSpeedAxis".
2. In the "Interface" list for the faceplate type, create a property with the name "Visible" of the BOOL data type.
3. Configure the "Visible" animation in the WinCC animations of all objects contained in the faceplate type. Use the "Visible" interface property as a process tag in each case when doing this.

4. In the SiVArc properties of the faceplate type, configure the "Visible" interface property with a SiVArc expression "`Block.DB.SymbolicName&"_ReActivate"`".



5. Create a new faceplate type version as a generation template.
6. Use the faceplate type and the relevant program block in a screen rule.

Result

When you have created a screen rule with this generation template, the SiVArc expression is evaluated during generation. An external tag generated by SiVArc is assigned to the property of each generated instance of the faceplate type.

In the example, the animation is only interconnected on the faceplate for the heavy-duty conveyor belt, because a tag with the "_ReActivate" ending is only present there.

5.4.22 Example: Generating "Position" animation for faceplates

Example scenario

In a printed circuit board panel factory, the manufactured circuit boards are packaged in boxes in the "Packaging" plant unit and transferred to a trolley. This process is to be displayed animated on the HMI device.

Implementation concept

The packed boxes are stored as faceplate generation templates in the library. To represent the horizontal movement of the finished packaged box on a trolley, the faceplates are configured with the "Position" animation. The position values for the horizontal movement are provided to the faceplate by the controller.

"Position" animation for faceplates in SiVArc

Faceplates support the "Position" animation for RT Professional.

To generate animations for faceplates with SiVArc, configure dynamic properties for the animation in the faceplate type that serves as generation template.

Requirement

- The generation template of the "Plate_Box_Ready" faceplate type is stored in the library.
- The "Packaging" function block contains the "XPosition" input parameter of the INT data type.
- The values of the "XPosition" parameter are stored in the associated data block.
- The target HMI devices for generating the visualization of the packaging plant have the same screen resolution.

Procedure

To generate a "Position" animation for a faceplate, follow these steps:

1. Open the faceplate type "Plate_Box_Ready" from the library.
2. In the "Interface" list for the faceplate type, create a "IFace_XPosition" property of the INT data type for a horizontal animation.
3. Configure a new tag connection in the WinCC animations of all objects contained in the faceplate type. Connect the tag to the "X position" property.
4. Configure the tag connected to the "X position" property with the interface property "IFace_XPosition".
5. In the SiVArc properties of the faceplate type, configure the "IFace_XPosition" interface property with the SiVArc expression "Block.DB.SymbolicName&"_XPosition".
6. Create a new faceplate type version.
7. Use the faceplate type and the relevant program block in a screen rule.

Result

After the generation, all generated instances of the "Plate_Box_Ready" faceplate type are configured with an animation. In runtime, the position of the faceplate follows the position value of the interconnected tag, for example, "Block_1_DB_XPosition".

5.4.23 Creating a generation template for a screen

Requirement

- A WinCC project is open.

Procedure

To create a generation template copy for a screen, follow these steps:

1. Create a new screen.

   Note

   Assign a meaningful name. A unique name facilitates later work because the screen name is used as the name for the generation template.

2. Configure the properties of the screen and add the required screen objects as necessary.
3. Configure the desired properties in the Inspector window under "Plug-ins > SiVArc properties > General":
   - To generate a unique screen name, enter a SiVArc expression or a string under "Name".
   - If the generated screen should be stored in a group or in the plant structure, enter a SiVArc expression under "Screen group".
   - Configure overflow screens, if required.
4. To create a master copy, store the screen in a library under "Master copies".
5. To create a screen type, store the screen in a library under "Types" and assign the type name.

   Note

   SiVArc properties of a screen type

   Fewer SiVArc properties are available in the screen type than in the master copy of a screen.

Result

The generation template has been created for a screen.

See also

Defining a screen rule for generating a screen object (Page 124)

Generating visualization (Page 133)

Updating generation templates (Page 140)

SiVArc object properties (Page 164)

Configuring overflow screens (Page 68)

5.5 Defining and managing SiVArc rules

5.5.1 SiVArc rules

Definition

SiVArc rules define how HMI objects are processed during generation.

The various SiVArc rules define different generation tasks:

- Screen and text list rules link generation templates and control instructions.
- Tag rules control the storage structure of the HMI tags generated by SiVArc.
- Copy rules trigger the generation of the following HMI objects based on the master copies or types:
  - Screens
  - C and VB scripts
  - Text lists
  - Tag tables

SiVArc rules are a key functionality of SiVArc and have a direct relationship to the user program. You can therefore assign SiVArc rules with know-how protection just like instructions.

Differences to the configuration without SiVArc rules

Unlike conventional WinCC configuration, the relationship between a SiVArc rule and a generated HMI object is maintained in a SiVArc project.

When you change a SiVArc rule, generated objects based on this rule are overwritten. When you delete a rule, generated objects associated with this rule are automatically removed during the next generation.

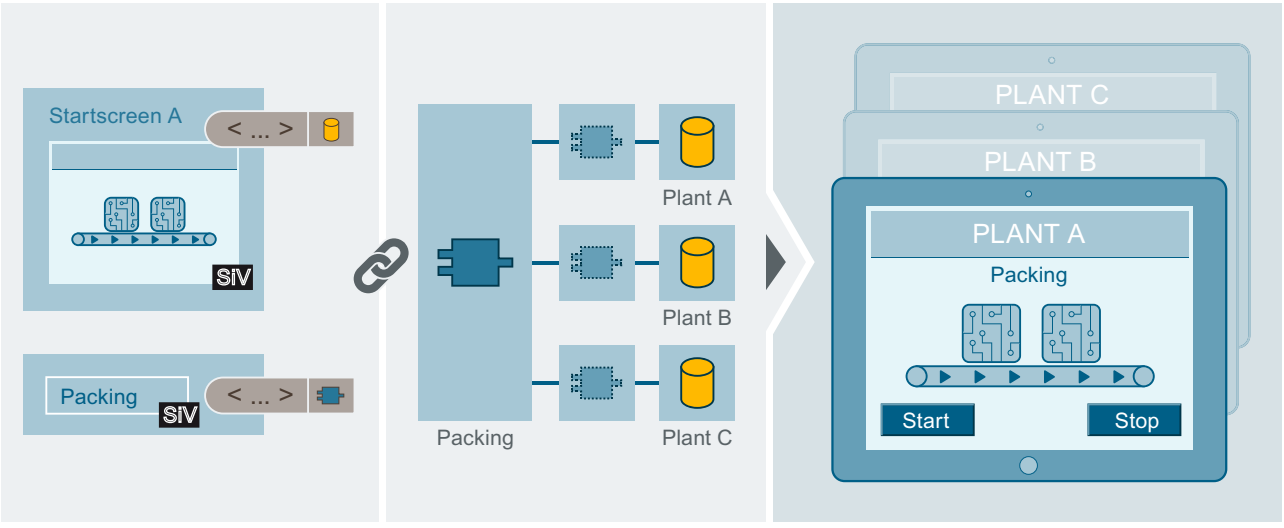
You can also create the visualization separately for individual devices using the SiVArc rules.

Purpose and benefits of SiVArc rules

You can use the SiVArc rules to centrally control the HMI objects with a direct relationship to the control program individually for each HMI device. Changes can therefore be implemented centrally and throughout the project. Design and development of SiVArc rules provides a high degree of added value in terms of controllability and efficiency of an HMI project.

Example: How screen rules work

The following example shows in abstract form how to integrate texts from data blocks in an HMI screen using generation templates:



SiV SiVArc generation template

< ... > SiVArc property with referenced text source

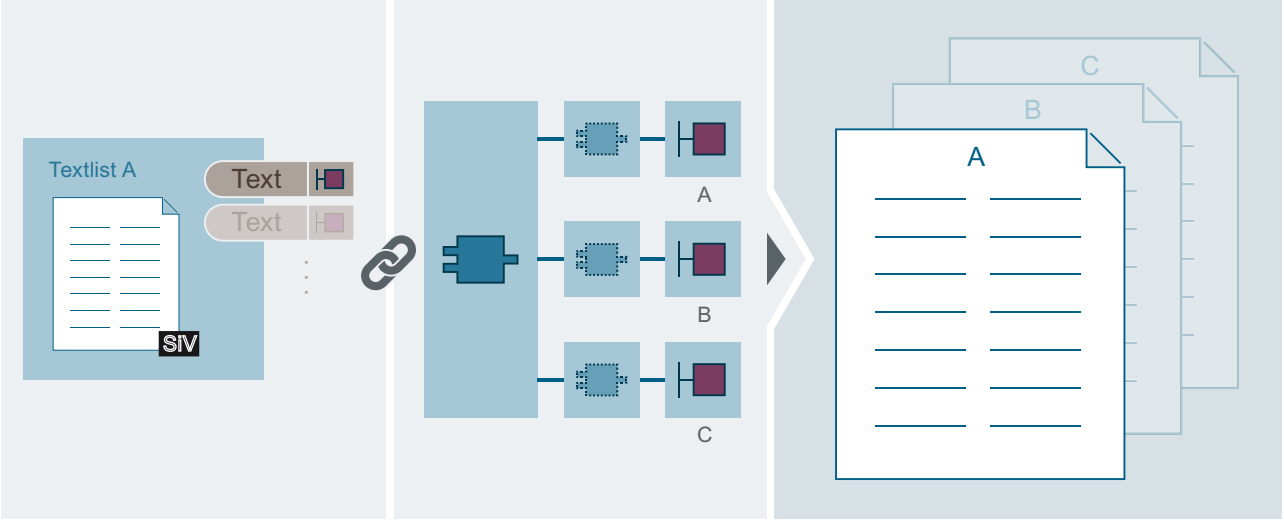
Process instruction

Instance of an instruction in Main OB

Data block

Example: How text list rules work

The following example shows in abstract form how to generate text lists with texts from a network:



SiV SiVArc generation template

< ... > SiVArc property with referenced text source

Instruction

Instance of an instruction in Main OB

Network

5.5.2 Defining screen rules for generating pop-up screens

Requirement

- The user program has been created.
- The generation template of the pop-up screen has been created.
- The generation template for the calling operating object for the pop-up screen has been created.
- The "Screen rules" editor is open.

Procedure

To define screen rules for generating pop-up screens, follow these steps:

1. Insert a new screen rule for generating the pop-up screens.
   - Enter a unique name for the screen rule.
   - Select the program block for which the pop-up screen is generated, for example, "RoboArm_1_DB".
   - Under "Screen", select the generation template of the pop-up screen.
   - Configure the positioning mode and the corresponding parameters.
2. Insert an additional screen rule for generating the operating objects that call the pop-up screen.
   - Enter a unique name for the screen rule.
   - Select the program block for which the calling operating object is generated, for example, "RoboArm_1_DB".
   - Under "Screen object", select the generation template of the operating object which calls the pop-up screen.
   - Under "Screen", select the generation template of the screen in which the pop-up screen is to be called, for example, the generation template for the start screen.
   - Configure the positioning mode and the corresponding parameters.

Result

When you generate the visualization, the following is generated in the respective HMI device for each call of the "RoboArm_1_DB" program block in the project tree:

- A pop-up screen in the project tree under "Screen management > Pop-up screens".
- An operating object in the start screen that calls a pop-up screen.

5.5.3 Defining a screen rule for generating a screen object

Requirement

- The user program has been created.
- The generation template of the HMI object is created.
- The generation template or the generation template type of the screen is created.
- Optional: A positioning scheme is stored in the library.
- Optional: Faceplates and screen types are stored as types in the library.
- The "Screen rules" editor is open.

Procedure

To define a screen rule for generating an HMI object, follow these steps:

1. Add a new screen rule.
2. Enter a unique name for the screen rule.
   Optional: Enter a comment.
3. Under "PLC", select the controllers for which the screen rule is to apply.
   If you select no controller, the screen rule applies to all controllers in the project.
4. Select the program block for which the HMI object is generated.
5. Under "Screen object", select the generation template of the object.
6. Under "Screen", select the generation template of the screen in which the object is generated.
   If a positioning scheme is stored for the generation template, select the positioning area under "Layout field group". If you have not specified any layout field group, the generated HMI object is positioned in the screen according to the SiVArc positioning scheme.
7. Under "HMI device", select the HMI devices for which the screen rule is to apply.
   If you select no HMI device, the screen rule applies to all HMI devices that are connected to the selected controller.
   Optional: Enter a condition.

You can also add the program blocks and templates from the library using a drag-and-drop operation.

Result

When you generate the visualization, the object is generated in the specified screen.

If you have selected a layout field group in the screen rule, the HMI object is positioned within this layout field group instead of a layout field. The layout field that is used depends on the order of generation of the screen rules and the index of the layout field.

See also

Generating visualization (Page 133)

Supported objects in the user program (Page 83)

Use user-defined positioning scheme (Page 62)

5.5.4 Define a rule for the generating text lists

Requirement

- The user program has been created.
- A master copy of the text list is stored in a library in the appropriate folder.

Procedure

To define a text list rule for generating a text list, follow these steps:

1. Open the "Text List Rules" editor.
2. Add a new text list rule.
3. Enter a unique name for the text list rule.
   You can optionally enter a comment.
4. Select the desired program block.
5. Select the required generation template of a text list.
6. If necessary, enter a condition.

You can add the program blocks or master copies using drag-and-drop.

Result

When you generate the visualization, the text list is created in the "Text and Graphic Lists" editor.

5.5.5 Editing and managing SiVArc rules

Introduction

In complex SiVArc projects, there is a large number of SiVArc rules. You should therefore sort and structure your SiVArc rules clearly and make the rules available in the library.

Several functions are available to display the rules clearly organized:

- Filter function
- Grouping and sorting function
- Shortcut menus
- Drag-and-drop

To analyze the rules, navigate between the SiVArc editors, the user program and the generation templates via the "Go to..." commands of the shortcut menu.

Creating a SiVArc rule

1. Click "Add rule".
   A new row is created in the table editor.
2. Assign a unique name to the rule.
3. Insert the program blocks and generation templates from the library with drag-and-drop.

Alternatively, enter the first letters of the object that you want to reference. SiVArc shows a list of objects that can be referenced and that contain this sequence of letters in the referenced path.

When you insert a program block under "Name" with drag-and-drop, a new rule is created with the selected program block.

Grouping SiVArc rules

If you group SiVArc rules according to your own criteria, you obtain a better overview of your SiVArc project:

- You activate and deactivate rules contained in rule groups together.
- Conditions for one rule group apply to all rules within the group. You set up special cases via operands.
- You can move and arrange individual rules as you wish within and outside groups.
- When moving rules from group to group, the options that are set for the current group are applied.

Proceed as follows to create a rule group:

1. Select the rules for which a group is required.
2. Select "Add new rule group" in the shortcut menu.
   The selected rules are moved to a new folder.
3. Name the rule group.

To create a subgroup, edit the required rules in exactly the same way within a group.

To open or close all rule folders at once, click the "Expand all" or "Collapse all" button.

Note

Filtering using rule groups

If a filter condition only corresponds to a single rule within the group and not the group, the individual rule is also hidden by the filter.

Hierarchical grouping of SiVArc rules

Conditions can be set for a rule group. You use rule groups to sort your SiVArc rules as needed, for example, according to the plant structure, screen structure or by WinCC topics.

Application example for rule groups

All screen rules are sorted in groups in a SiVArc project according to the following screen types:

- Start screens
- Diagnostic screens
- Recipe screens

This makes it possible for you to assign the SiVArc configuration, for example, to the configuration engineers of a department according to specific topics.

You use group conditions to specify, for example, which tags must be included in a program block so that the respective rule group is included in the generation.

You generate a large variety of screens depending on the parameters included by using the condition operands of a rule within a group. In this way, you visualize many plant areas with a SiVArc project and a few rules.

Editing SiVArc rules later

You can change rules already created by selecting the rule and using commands from the shortcut menu. If you change the name and storage paths of objects in the project, the affected rules are updated accordingly.

Change the name and storage paths of objects only in the project or in the project library. Changes to global libraries or the path information for referenced objects are not supported by SiVArc.

Using SiVArc rules in a library

To update SiVArc rules centrally and consistently across projects, store SiVArc rules or rule groups as a master copy in a library. If a SiVArc rule with the same name already exists in the project, you can overwrite the rule or create a new rule.

If you overwrite a rule with a rule from the library, SiVArc responds as if you were changing the rule manually:

- SiVArc detects the relevant SiVArc objects from a previous generation process and includes these HMI objects in the generation.
- Manual changes to the relevant SiVArc objects are overwritten.

Changing the names of SiVArc rule master copies

Proceed as follows to create a link between a renamed screen rule in the library and the screen rule based on it in the project:

1. Change the screen rules in the project manually in accordance with the new names of the master copies in the library.
2. Now copy the renamed master copies to your project. Overwrite the existing, newly named screen rules in the project.

Editing references of a SiVArc rule

If you edit referenced HMI objects or program blocks in the project or project library, the SiVArc rule is automatically adjusted.

If you change referenced objects in the global library, the corresponding SiVArc rules become invalid.

See also

Editing the view in the SiVArc editors (Page 39)

5.5.6 Exporting and importing SiVArc rules

Introduction

SiVArc rules and rule groups can be exported to MS Excel and imported from MS Excel.

Export and import are possible for each SiVArc editor or for the entire project.

You can also copy individual rules outside groups with copy and paste directly from the MS Excel worksheet into a SiVArc editor and vice versa.

Note

Exporting and copying rules

When you export rules, all columns of the rule editor are exported, even hidden columns. With copy & paste, only the visible columns are copied.

When copying rules between an MS Excel worksheet and a SiVArc editor, always make sure that all columns are displayed.

Exporting SiVArc rules of a SiVArc editor

1. Open the required SiVArc editor.
2. Click the "Export" button in the toolbar of the editor.
   A dialog opens.
3. Select the required storage location and name of the export file.
4. Click "OK".

The export file is created.

Exporting SiVArc rules of a project

1. Select "Common data > SiVArc" in the project tree.
2. In the shortcut menu, select "Export all rules".
   A dialog opens.
3. Select the required storage location and name of the export file.
4. Click "OK".

The export file is created.

Export file structure

A spreadsheet with the exported SiVArc rules is created in the workbook for each SiVArc editor. The spreadsheets have the following titles:

- ScreenRules
- TagRules

- TextlistRules
- LibraryRules

Rules on importing

Note the following when you import the SiVArc rules into one individual SiVArc editor:

- The import file must have the "*.xlsx" format.
- If an import file has only one spreadsheet, this spreadsheet is imported regardless of its name.
- Only when spreadsheets of an import file have been renamed or deleted, select the required spreadsheets using a dialog.
  - To import a renamed spreadsheet, confirm the import separately in a dialog.
  - To exclude a spreadsheet from the import, skip the spreadsheet in the dialog. If you deleted it prior to the import, you still have to skip an empty view in the dialog.

Note

During import, make sure that the set configuration language of your project and the language used in the import file are the same.

Import options

The following options are available for importing SiVArc rules.

- Overwriting existing rules through importing
  Rules and rule groups with the same name are updated. All other rules are retained.
- Renaming rules to be imported if rule name already exists
  In case of naming conflicts, the imported rules and rule groups are given a consecutive number.
- Deleting all existing rules prior to the import
  After the import, the rule editor only includes the rules from the import file.

Importing rule groups

When a rule group cannot be specifically assigned, it is added in the first hierarchy level of the editor, for example, when the import file includes a circular reference or when the higher-level group is missing in the import file.

If existing rules are not renamed during the import, a rule group that is included in the import file multiple times is overwritten by the rule group listed at the bottom of the import file in each case.

Importing SiVArc rules to a SiVArc editor

1. Open the required SiVArc editor.
2. Click the "Import" button in the toolbar of the editor.
   A dialog opens.
3. Select the required import file and import option.
   A dialog opens if the import file contains multiple spreadsheets.
4. Select the required spreadsheet.
5. Click "OK".

Importing SiVArc rules into a project

1. Select "Common data > SiVArc" in the project tree.
2. In the shortcut menu, select "Import all rules".
   A dialog opens.
3. Select the required import file and import option.
4. Click "OK".

Result

The SiVArc rules are created in the SiVArc editors. The completion message includes a link to the log file. Alternatively, the import log is available under "Common data > Logs".

5.6 Generating and editing HMI screen objects

5.6.1 Basics for generating the visualization

Introduction

When generating the visualization, you generate HMI screens and screen objects as well as external tags. If you have not created any SiVArc rules, SiVArc only generates external tags.

Generation with station selection

If your project contains several HMI devices or connected PLCs, SiVArc generates the visualization for HMI devices and PLCs you have selected.

A dialog for station selection is displayed the first time generation is started in a project. There you select the relevant devices for the generation.

SiVArc generates the visualization device by device. If a device cannot be generated, SiVArc continues with the next device. If you cancel the generation, the visualization of already completely visualized devices remains.

Note

HMI device runtime settings

When tags with multiple PLCs are generated, the "PLC prefix" option from the runtime settings of the HMI device is evaluated.

Ensure that the "PLC prefix" option is enabled in the runtime settings for each PLC. Otherwise, SiVArc generation will be cancelled.

Renewed generation with station selection

Note the following for each additional generation of the visualization with station selection:

- If you do not enable a device for the next generation in the dialog for station selection again, the generated SiVArc objects and the manual changes are retained in the project.

  Note

  To remove generated objects of a PLC that is no longer enabled during the next generation, delete the connection between the PLC and HMI device.

- If you delete a PLC with which you have already generated a visualization, all SiVArc objects generated with this PLC are deleted during the next generation.
- If you delete a block call in the user program and generate it once again, the SiVArc objects generated for this block call are deleted.

Station selection settings

The dialog for station selection is always displayed with the initial generation in a project.

The station selection dialog does not appear again the next time generation is started. SiVArc then generates the same HMIs and PLCs as during the previous generation. To change the settings, select the project or the device and then select "Generate the visualization > Generate with station selection" in the shortcut menu of Runtime in the project tree or press the key combination <ALT + Shift + G>.

Reaction to duplicate names

To ensure the consistency of the generated data, objects newly generated by SiVArc are always stored under the generated name when naming conflicts occur.

If a manually created HMI object with a name to be generated by SiVArc already exists, the existing object is given the suffix "_renamed". If this name is already taken as well, the name is automatically incremented.

If naming conflicts occur during generation with multiple connected PLCs, SiVArc only generates the HMI object captured by the generation and outputs an error message.

Note

Exception

For screens and text lists, the behavior in the case of identical names differs as follows:

If generated screens or text lists with the same name already exist, SiVArc generates these screens or text lists again despite the naming conflict. Keep in mind that an error message is output for text lists but not for screens.

5.6.2 Generating visualization

Requirements

- User program and hardware were compiled without errors.
- Screen rules have been defined.
- The master copies and faceplate types used in the screen rules are stored in the project library or global library.
- Tags have been defined.
- Text list rules are defined.
- All used instances of types are updated to the latest version.

Note

Changes

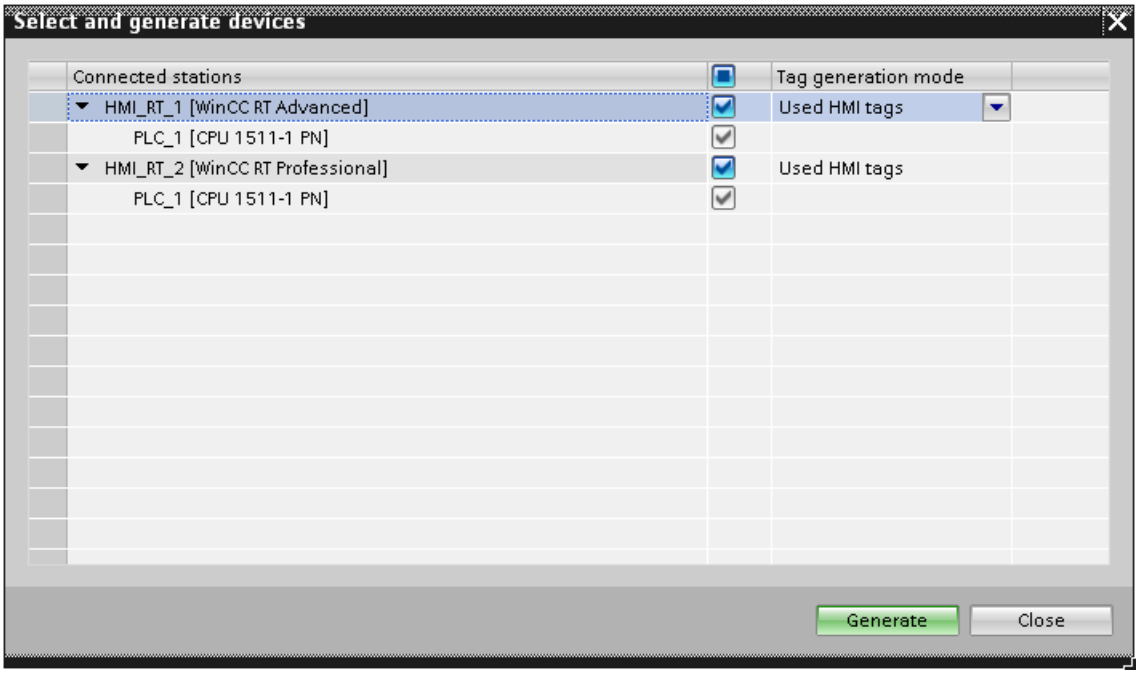
Changes in the user program or in the hardware configuration must be compiled before you generate the visualization.

Generation without station selection

- Click "Generation of visualization > Generate" in the shortcut menu of Runtime n the project tree.

Generation with station selection

1. Ensure that the "PLC prefix" option is enabled in the runtime settings of the HMI device for all PLCs.
2. Click "Generation of visualization > Generate with station selection" in the shortcut menu of the project in the project tree.
   The dialog "Select and generate stations" is opened.



3. Activate the HMI devices and PLCs for which a visualization is generated.
   To generate the visualization for all devices, activate the option in the header.
4. Click "Generate".

Result of the first generation

SiVArc generates the HMI objects based on the SiVArc rules and saves them according to the configuration. A log of the generation is displayed in the project tree under "Common data > Logs". The generation overview is created or updated under "Common data > SiVArc".

If an existing connection between the HMI device and controller is deleted. a warning is issued in the dialog for the station selection. When a connection is deleted, all associated generated objects are removed with the next generation.

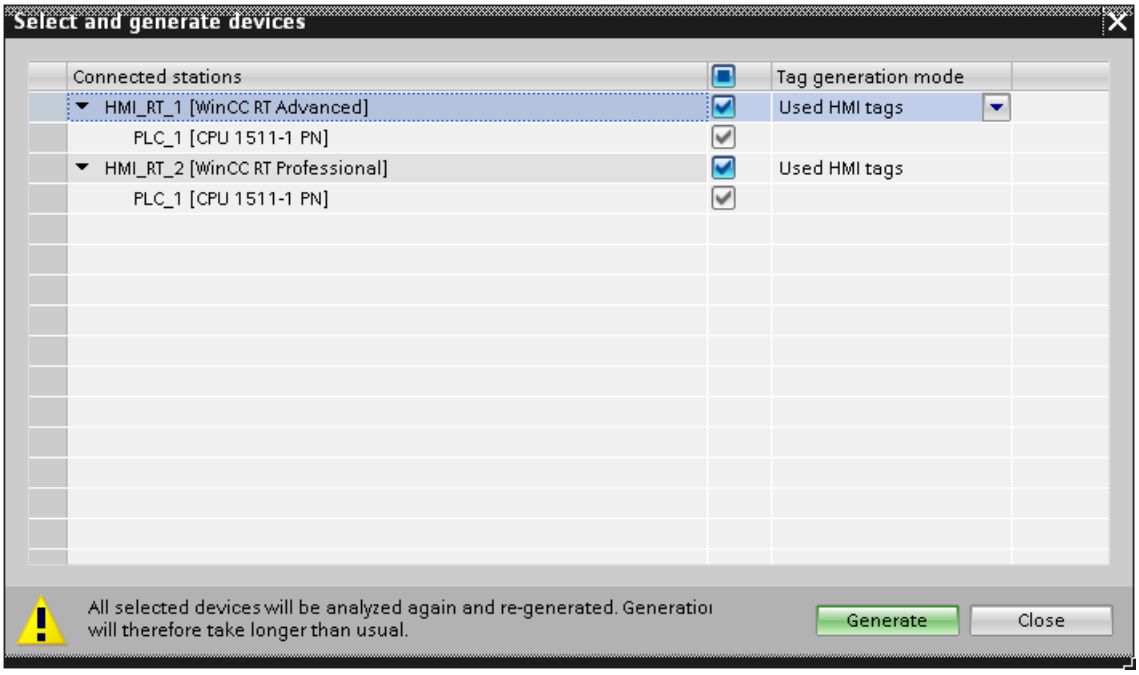
The available selection of stations is frozen after the first generation. Every following generation is based on this selection.

Restart overall generation

When you restart the overall generation, the complete content of the user program is analyzed and read. The renewed overall generation runs through the entire user program, even if nothing in it has changed.

The selection of the connected stations remains the same as in the first generation and cannot be modified.

You start the overall generation by selecting the project or the device and using the shortcut <Alt>+<Shift>+<F>.



Evaluation of the screen rules

SiVArc executes the user program through the call hierarchy of all OBs of the selected PLCs. SiVArc evaluates the screen rules for each program block called.

For each applicable screen rule, the corresponding HMI screen object is generated in the specified screen on the basis of the generation template. The SiVArc expressions in the SiVArc properties, events and animations of the HMI screen objects are evaluated during generation. The assignment changes from the generation matrix are then evaluated and generated screen objects and/or screens are moved accordingly.

Evaluation of the tag rules

SiVArc executes all data blocks of all PLCs that were enabled in the station selection dialog. Depending on your default settings, SiVArc generates an external tag for each tag of the data block.

For each external tag to be generated, SiVArc runs through the tag rules from top to bottom and evaluates the associated condition. As soon as a condition is true, the rule is applied and the external tag is stored correspondingly in the project tree. The subsequent tag rules are no longer processed. Instead, SiVArc continues with the next external tag to be generated.

If none of the tag rules apply to an external tag to be generated, this external tag is stored in the default tag table.

Evaluation of copy rules

SiVArc processes the copy rules. For each copy rule, the corresponding HMI object per specified HMI device is created in the project tree.

Evaluation of the text list rules

SiVArc processes the text list rules. A text list is created for each call of a contained program block. The SiVArc properties of the text list are evaluated thereby. When the text list has been generated, the text list is expanded with the new entries and existing, identical entries are overwritten.

The text list is stored in the HMI device for which the generation was triggered.

SiVArc then generates the values for the text list entries configured in the user program for each called program block. In the process, SiVArc executes the user program according to the call hierarchy of all OBs of the selected PLCs.

See also

Generating external tags (Page 53)

5.6.3 Generating text lists

Result after generation

The generated text lists are stored in the project tree of the HMI device for which the SiVArc generation was triggered. The generated text lists are marked as SiVArc objects.

A text list of the referenced SiVArc master copy is created for each instance of the referenced block. The properties of the text list are created according to the SiVArc rules and the SiVArc properties.

SiVArc then generates the values for the text list entries configured in the user program for each called program block.

Generation for multiple PLCs

When generating text list entries for multiple PLCs, name conflicts can occur because there may be a program block in several PLCs. Depending on which text source that you use from STEP 7, the generation of text list entries reacts differently in these conflict situations:

- Symbol table
  Additional text list entries are generated with a suffix.
- Network or block title
  Text list entries are created only for the first PLC evaluated. Text list entries to be generated for all subsequent PLCs are ignored. The error appears in an alarm and in the log.

Regenerating the visualization

If a text list has already been generated, SiVArc updates the text list entries according to the changes as compared to the previous generation.

Note

Manually overwritten text list entries

When the user overwrites generated text list entries, the changed text list entry is retained during the next generation only for the default text of the master copy.

If the text for the text list is generated from the network text definition in STEP 7 or the symbol tables and you change this text, the changes are overwritten by the next generation.

The example below illustrates the different system characteristics when text list entries are changes:

The text list contains two entries: "Entry_1" and "Entry_2". "Eintry_1" contains a text generated by SiVArc. "Entry_2" contains a text, which has been copied from the master copy of the text list.

- Change "Entry_2" and start the SiVArc generation. After generation, your changes are in the "Entry_2".
- Change "Entry_1" and start the SiVArc generation. After generation, your changes are overwritten at the "Entry_1" by the text generated by SiVArc.
- Change "Entry_1" and "Entry_2" and start the SiVArc generation. After generation, your changes are overwritten at the "Entry_1" by the text generated by SiVArc. Your changes to "Entry_2" are overwritten by the text from the master copy of the text list.

5.6.4 Generation across devices

Introduction

In case of many changes in projects with many PLCs and multiple operator panels, it is better to generate the visualization for individual devices. The generation and download times are reduced accordingly. HMI objects can therefore be generated with a screen rule or a screen rule group for multiple HMI devices.

In this way, you update and optimize the visualization of your plant in a large SiVArc project for all devices or device types, also individually. The following functions will help you to do this:

- Hiding and showing device-specific columns in the SiVArc editors using the toolbar
- Distributing individual rules to connected devices and controllers
- Display of inch sizes of the device types in the screen rules for easier assignment of the matching positioning schemes.
- Display of the device types in the Inspector window of the screen rules depending on the PLC

Implementation in SiVArc

The device-specific distribution of screen rules is taken into consideration in the following areas of SiVArc:

- "Screen rules" editor
- "Copy Rules" editor
- Generation matrix
- Generation overview
- Generation dialog

In this way, you view and edit your project in a device-specific manner from the time of configuration all the way to analysis of the generation.

Device display

Devices that exist in the project but are not connected are not shown in the SiVArc editors.

Note

IPI devices

Controllers and devices that are connected via IPI with the project are not displayed in the selection window.

5.6.5 Editing generated SiVArc objects

Supported editing options

In addition to changing the position and layer, SiVArc supports the following changes to objects generated by SiVArc:

- Screens
  Creation of additional HMI screen objects
- Screen objects
  Changing the size and rotation angle (not with faceplates or screen windows)
- Changing the screen window screen displayed
- Text lists
  Changing text list entries
  Manually changed text list entries are retained after a subsequent generation.

Reusing screen objects and creating them new

If you reuse screen objects by copying and pasting them into your project, these objects are retained during the next SiVArc generation. Other manually created screen objects are also never deleted by SiVArc. This rule applies even if no more screen objects are generated in a screen generated by SiVArc due to a modified screen rule.

Note

Generated screen objects from the master copy of a screen

If you want to reuse screen objects by copying and pasting them, only use screen objects outside a generation from a master copy of a screen.

Changes after the SiVArc generation

Note

Subsequent name changes of generated SiVArc objects

An object continues to be created with the appropriate name according to the screen rule when a new generation is performed. The object with the changed name is also included in the project.

Recommendation: Change the name only within the control program and the project library and not on the generated HMI objects.

Note

Resizing of screen windows, faceplates and text fields

Always change the size of screen windows, faceplates and text fields manually.

Although dynamic resizing is supported by SiVArc, it can lead to undesirable effects, for example, overlapping of the screen objects.

Positioning of screen objects in generated screens

Note

Changing the fixed positioning of screen objects

For screen objects with fixed positioning, a manual change in the position is reset to the fixed positioning saved upon the next generation process.

Requirement

A screen has been generated.

Procedure

1. Open the generated screen.
2. If necessary, change the properties of screen objects based on the list above.

   Note

   Change the properties of a screen object only in the "Properties > Properties" tab in the Inspector window.

3. Save the changes.

Result

The changes will be included in the next generation.

Changes to objects made after the SiVArc generation are retained by the next generation.

5.6.6 Updating generation templates

Introduction

Screens, including the screen objects, are always generated on the basis of master copies from the library.

For changes or optimizations of a generation templates to be applied during next generation, you have to transfer the changed generation template back to the library. The names of the generation templates are referenced in the screen rules. An updated generation template must therefore be stored in the library using the same name as the original generation template. Otherwise, the associated screen rule is invalid.

Requirement

The generation template to be updated has been stored in the project library.

Procedure

To update an existing generation template for a screen object, follow these steps:

1. Generate a visualization based on the existing generation template.
2. Change/optimize one of the screen objects generated from the generation template. To do this, change the SiVArc expression in a SiVArc property, for example.
3. Delete the existing generation template from the library.
4. Save the updated screen object to the library.
5. Rename the updated generation template to match the original generation template.
6. Generate new visualization based on the changed screen objects.
7. If necessary, find and remedy the errors that are displayed during generation.

See also

Generating visualization (Page 133)

5.6.7 Labeling of SiVArc objects

SiVArc objects in the project

To distinguish SiVArc objects from other objects in the project, objects that are relevant or can be used for SiVArc are identified in the following way:

Location	Icon/Label	Object
Project tree		Relevant SiVArc object (HMI screen)
Project library or Global library		Master copy with configured SiVArc properties, events or animations
		Type with configured SiVArc properties, events or animations
		Type version with configured SiVArc properties, events or animations

You specify the identification for generated screen objects in the "Screens" editor under "Options > Settings > SiVArc".

Relevant SiVArc object

A relevant SiVArc object is generated again and overwritten in the next generation process. Before the next generation process, the objects with a matching name from the previous generation are recorded.

If you change the name of a generated SiVArc object, it will no longer be relevant for SiVArc.

Note

Copying SiVArc objects to other projects

If you copy SiVArc objects to other projects with or without SiVArc, the labeling is retained.

Identification in the "Screens" editor

The identification in the "Screens" editor is optional. You enable the identifications and specify the required colors for border and background in the TIA Portal settings under "Options > Settings > SiVArc".

5.7 Analyzing SiVArc generation

Introduction

Comprehensive SiVArc projects require additional analysis and optimization after the first generation. SiVArc provides different functions and editors for this purpose. This document provides an overview of the options for analysis and post-processing of a SiVArc project.

"Generation overview" editor

This editor gives you an overview of all generated objects. Many functions for filtering and sorting the editor make it easier to get an overview from different perspectives.

The generation overview is available at several places in the SiVArc project:

- WinCC
  Inspector window of a generated screen
  All generated display and screen objects of the selected screen are displayed in the "Generation overview" tab.
- STEP 7
  Inspector window of a block
  The "Screen generation overview" and the "Text list generation overview" displays show all screens generated from the selected program block, the associated screen objects and text lists.

Switching individual rules or rule groups on and off

- You can switch rules on and off as a group.
- When you deactivate a rule after the generation, all associated SiVArc objects are removed from the generation.
- Enabling and disabling rules overwrites the condition of a rule. When a rule has the "TRUE" condition, for example, it is only applied when the rule is enabled. When a rule has the condition "FALSE", it is not included in the generation even if the rule is active.
- When you activate the rules again for the next generation, the associated SiVArc objects are generated once again.

Generation matrix

You use the generation matrix to implement final changes without having to analyze and change the SiVArc rules.

See also

Editing the view in the SiVArc editors (Page 39)

"Generation matrix" editor (Page 33)

Generation overview (Page 37)

5.8 Setting up know-how protection for a SiVArc project

Introduction

Your SiVArc project includes SiVArc generation specifications individually created with the SiVArc scripting functionality. To protect SiVArc expressions in the entire project, activate the know-how protection for your project.

Know-how protection only covers the SiVArc editors, not the settings of SiVArc. The library and the SiVArc tabs in the Inspector window, as well as generated objects, are not affected.

Password

Assign a password for know-how protection. The password must be at least 8 characters long and include the following character types:

- Upper- and lower-case letters
- Special characters
- Numbers

Setting up know-how protection

1. Select "Common data > SiVArc" in the project tree.
2. Select "Know-how protection > Activate" in the shortcut menu.
   A dialog opens.
3. Specify the password.
4. Save the project.

You also use the shortcut menu to edit your password and to remove know-how protection.

Result

Know-how protection is activated for all SiVArc editors. If you want to open a SiVArc editor in the project tree, in STEP 7 or by jumping to it from the other editors, you will be prompted for a password. Know-how protection is also activated for the import and export of SiVArc rules.

Reference

6

6.1 SiVArc objects

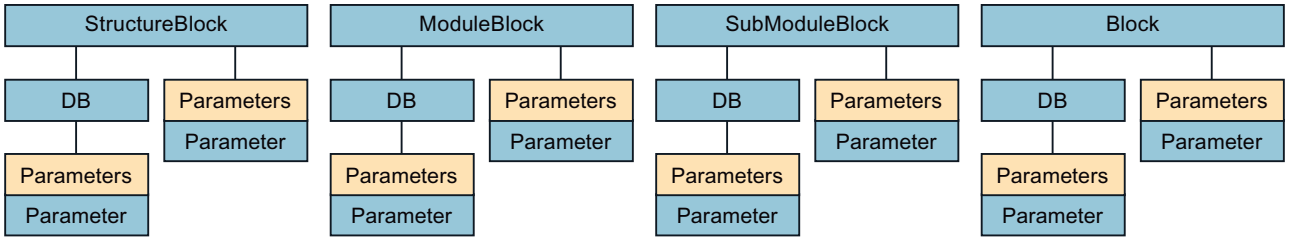
6.1.1 Object hierarchy

Introduction

You can use SiVArc expressions to directly address data from different areas of the TIA Portal.

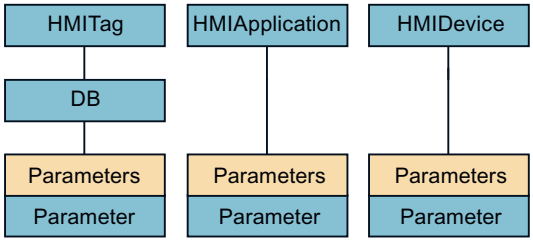
Program call in STEP 7

You can use keywords to access the blocks in the user program, the associated data blocks and their parameters.



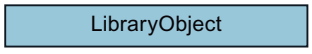
WinCC data

You can use the following key words to access external tags, devices and applications of the visualization.



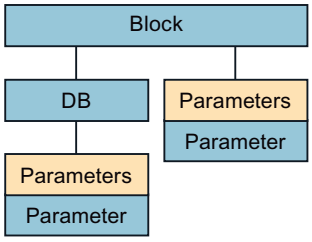
Library data

You can use the `LibraryObject` keyword to access the storage location of a generation template in the library.



6.1.2 Block

Description



Represents the program block that is currently being executed by SiVArc regardless of its position within the call hierarchy.

Use

Use the "Block" object as follows:

- "FolderPath" object property
  `Block.FolderPath`
  Accesses the path of the block in the project tree within the "Program blocks" folder, e.g. "Plant\Plantsection\Productionline"
- "Name" object property
  `Block.Name`
  Accesses the internal name of the block, e.g. "FB1".
- "SymbolicName" object property
  `Block.SymbolicName`
  Accesses the user-defined name of the block.
- "NetworkComment" object property
  `Block.NetworkComment`
  Accesses the comment entered in the network of the block.
- "NetworkTitle" object property
  `Block.NetworkTitle`
  Accesses the title of the network in which the block is instanced.
- "Number" object property
  `ModuleBlock.DB.Number`
  Accesses the block number in the block properties.

- "Parameters" list
  `ModuleBlock.Parameters("Activate").Value`
  Accesses a block parameter.
- "SymbolComment" object property
  `Block.SymbolComment`
  Accesses the user-defined comment in the block properties.
- "Title" object property
  `Block.Title`
  Accesses the header of the block in the block properties.
- "Version" object property
  `Block.Version`
  If the block is an instance of a block type, this expression accesses the type version of the block type in the library.
- "Parameters" list
  `Block.Parameters(<Name Parameter>).AssignedTag.Comment`
  Accesses the comment of a tag that is assigned to the block parameter.

6.1.3 DB

Description

Represents the data block of a block. The DB object is a SiVArc object of the second hierarchy level. A block from the call hierarchy or `HMITag` object always precedes the DB object.

Use

Use the "DB" object as follows:

- "Comment" object property
  `ModuleBlock.DB.Comment`
  Accesses the comment in the block properties.
- "FolderPath" object property
  `HMITag.DB.FolderPath`
  Accesses the path of the block in the project tree within the "Program blocks" folder, e.g. "DBs\Plant"
- "Number" object property
  `SubModuleBlock.DB.Number`
  Accesses the block number in the block properties.
- "SymbolicAddress" object property
  `StructureBlock.DB.SymbolicAddress`
  Accesses the user-defined name of the data block.
  If the data block is a multi-instance, the symbolic address of the block is returned.

- "TagPrefix" object property
  `StructureBlock.DB.TagPrefix`
  Accesses the user-defined name of the data block.
  If the data block is a multi-instance, the symbolic address in HMI format is returned. Instead of ".", "_" is used as the delimiter between the name of the data block and the name of the tag.
- "SymbolicName" object property
  `HMITag.DB.SymbolicName`
  Accesses the user-defined name of the data block.
- "Type" object property
  `ModuleBlock.DB.Type`
  Accesses the type of data block: Single instance (IDB) or multi-instance (MDB).

6.1.4 HMIApplication

Description

Represents the Runtime software on an HMI device.

Use

You can use the HMIApplication object to access a Runtime application of an HMI device.

Use the "HMIApplication" object as follows:

- "Name" object property
  `HMIApplication.Name`
  Accesses the user-defined name of the Runtime software for an HMI device, e.g. RT_HMI_1.
- "Type" object property
  `HMIApplication.Type`
  Accesses the type of Runtime software, e.g. WinCC RT Advanced.

Note

If your HMI device is a panel, the HMIDevice and HMIApplication objects are the same.

6.1.5 HMIDevice

Description

Represents the HMI device in the project.

Use

You can use the HMIDevice object to access an HMI device in the project.

Use the "HMIDevice" object as follows:

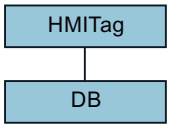
- "Name" object property
  `HMIDevice.Name`
  Accesses the user-defined name of an HMI device, e.g. HMI_1.
- "Type" object property
  `HMIDevice.Type`
  Accesses the type of HMI device, e.g. KTP400.

Note

If your HMI device is a panel, the HMIDevice and HMIApplication objects are the same.

6.1.6 HMITag

Description



Represents the external tag.

Use

You can use the HMITag object to store generated external tags in the project tree in structured form.

Note

Possible applications

You use the HMITag object exclusively in the "Tag rules" editor.

Use the "HMITag" object as follows:

- "FolderPath" object property
  `HMITag.DB.FolderPath`
  Accesses the path of the block in the project tree within the "Program blocks" folder, e.g. "Plant\Plantsection\Productionline"
- "SymbolicName" object property
  `HMITag.DB.SymbolicName`
  Accesses the user-defined name of the data block.

6.1.7 LibraryObject

Description

Represents the screen type in the project library.

Use

You use the LibraryObject object exclusively in the SiVArc properties "Name" and "Screen group" of a generation template for a screen.

- "FolderPath" object property
  `LibraryObject.FolderPath`
  References the path of the screen type in the library If you use the SiVArc expression in the SiVArc property "Screen group", the storage path is created from the library in the project tree. If you use the SiVArc expression in the "Name" property, the generated screen is named after the folder in which the screen type is stored.

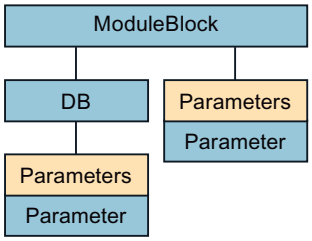
  Note

  You can only use this expression under "Name" in reference to a one-level hierarchy in the library. If you would like to you use a multi-level storage hierarchy, you can use the expression `LibraryObject.FolderPath` as substitute for the backslash.

- "Name" object property
  `LibraryObject.Name`
  References the name of the screen type of the library If you use the SiVArc property "Screen group" in the SiVArc expression, the screen is stored in a folder with the name of the screen type in the project tree. If you use the SiVArc expression in the SiVArc property "Name", the screen is named after the screen type.

6.1.8 ModuleBlock

Description



Represents the program block of the second level of the call hierarchy. You can use the ModuleBlock object for absolute addressing of the block of the second level.

Use

You can use the ModuleBlock object to access various properties of the block and the associated data block.

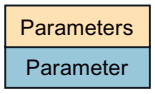
Use the "ModuleBlock" object as follows:

- "FolderPath" object property
  `ModuleBlock.FolderPath`
  Accesses the path of the block in the project tree within the "Program blocks" folder, e.g. "Plant\Plantsection\Productionline"
- "Name" object property
  `ModuleBlock.Name`
  Accesses the internal name of the block, e.g. "FB1".
- "NetworkComment" object property
  `ModuleBlock.NetworkComment`
  Accesses the comment entered in the network of the block.
- "NetworkTitle" object property
  `ModuleBlock.NetworkTitle`
  Accesses the title of the network in which the block is instanced.
- "Number" object property
  `ModuleBlock.DB.Number`
  Accesses the block number in the block properties.
- "Parameters" list
  `ModuleBlock.Parameters("Activate").Value`
  Accesses a block parameter.
- "SymbolComment" object property
  `ModuleBlock.SymbolComment`
  Accesses the user-defined comment in the block properties.
- "SymbolicName" object property
  `ModuleBlock.SymbolicName`
  Accesses the user-defined name of the block.

- "Title" object property
  `ModuleBlock.Title`
  Accesses the header of the block in the block properties.
- "Version" object property
  `ModuleBlock.Version`
  If the block is an instance of a block type, this expression accesses the type version of the block type in the library.

6.1.9 Parameters

Description



The Parameters object is a list of all parameters at the block. The Parameter-Objekt represents a parameter in the specified data block or block.

Use

You can use the Parameters object to access a specific parameter value in the block.

Use the "Parameters" object as follows:

- "Assigned" object property
  `StructureBlock.Parameters("<Name Parameter>").Value`
  Returns TRUE if the parameter is assigned.
- "Comment" object property
  `Parameters("<Name Parameter>").Comment`
  Accesses the comment of the parameter.
- "InitialValue" object property
  `Parameters("<Name Parameter>").InitialValue`
  Accesses the default value of the parameter.
- "Value" object property
  `Parameters("<Name Parameter>").Value`
  Accesses the value of the parameter.

6.1.10 S7Control

Description

Represents the PLC in the project.

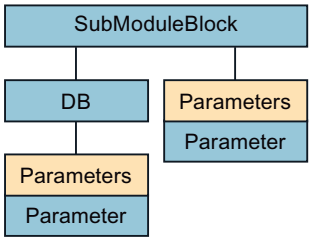
Use

You use the S7Control object to access the name of a PLC:

- "Name" object property
  `S7Control.Name`

6.1.11 SubModuleBlock

Description



Represents the program block of the third level of the call hierarchy. You can use the SubModuleBlock object for absolute addressing of the block of the third level.

Use

You can use the SubModuleBlock object to access various properties of the block and its data block.

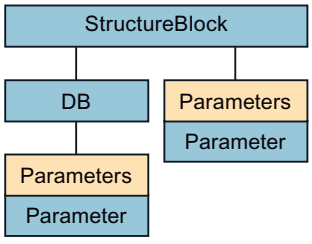
Use the "SubModuleBlock" object as follows:

- "FolderPath" object property
  `SubModuleBlock.FolderPath`
  Accesses the path of the block in the project tree within the "Program blocks" folder, e.g. "Plant\Plantsection\Productionline"
- "Name" object property
  `SubModuleBlock.Name`
  Accesses the internal name of the block, e.g. "FB1".
- "NetworkComment" object property
  `SubModuleBlock.NetworkComment`
  Accesses the comment entered in the network of the block.
- "NetworkTitle" object property
  `SubModuleBlock.NetworkTitle`
  Accesses the title of the network in which the block is instanced.
- "Number" object property
  `SubModuleBlock.DB.Number`
  Accesses the block number in the block properties.
- "Parameters" list
  `SubModuleBlock.Parameters("Activate").Value`
  Accesses a block parameter.

- "SymbolComment" object property
  `SubModuleBlock.SymbolComment`
  Accesses the user-defined comment in the block properties.
- "SymbolicName" object property
  `SubModuleBlock.SymbolicName`
  Accesses the user-defined name of the block.
- "Title" object property
  `SubModuleBlock.Title`
  Accesses the header of the block in the block properties.
- "Version" object property
  `SubModuleBlock.Version`
  If the block is an instance of a block type, this expression accesses the type version of the block type in the library.

6.1.12 StructureBlock

Description



Represents the program block of the first level of the call hierarchy. You can use the StructureBlock object for absolute addressing of the block of the first level.

Use

You can use the StructureBlock object to access various properties of the block and its data block.

Use the "StructureBlock" object as follows:

- "FolderPath" object property
  `SubModuleBlock.FolderPath`
  Accesses the path of the block in the project tree within the "Program blocks" folder, e.g. "Plant\Plantsection\Productionline"
- "Name" object property
  `SubModuleBlock.Name`
  Accesses the internal name of the block, e.g. "FB1".
- "NetworkComment" object property
  `SubModuleBlock.NetworkComment`
  Accesses the comment entered in the network of the block.

- "NetworkTitle" object property
  `SubModuleBlock.NetworkTitle`
  Accesses the title of the network in which the block is instanced.
- "Number" object property
  `SubModuleBlock.DB.Number`
  Accesses the block number in the block properties.
- "Parameters" list
  `SubModuleBlock.Parameters("Activate").Value`
  Accesses a block parameter.
- "SymbolComment" object property
  `SubModuleBlock.SymbolComment`
  Accesses the user-defined comment in the block properties.
- "SymbolicName" object property
  `SubModuleBlock.SymbolicName`
  Accesses the user-defined name of the block.
- "Title" object property
  `SubModuleBlock.Title`
  Accesses the header of the block in the block properties.
- "Version" object property
  `SubModuleBlock.Version`
  If the block is an instance of a block type, this expression accesses the type version of the block type in the library.

6.1.13 TagNaming

Description

Represents the Runtime settings for tags.

Use

You can use the TagNaming object to access the selected replacement delimiter in the Runtime settings for tags for the lower levels of the path of the PLC tag.

Use the "TagNaming" object as follows:

- "SeparatorChar" object property
  `TagNaming.SeparatorChar`
- "IndexStartChar" object property
  `TagNaming.IndexStartChar`
- "IndexEndChar" object property
  `TagNaming.IndexEndChar`

Return values

The "PLC1" controller contains the structured data block "DB1". The "Db1.a[1].b.c[3]" data block element is used in a picture. Depending on your settings, the TagNaming object returns the following values:

Return values	WinCC tag name	Selected Runtime setting
`TagNaming.SeparatorChar` = "." `TagNaming.IndexStartChar` = "[" `TagNaming.IndexEndChar` = "]"	Db1_a[1].b.c[3]	Compatibility mode
	Plc1.Db1.a[1].b.c[3]	PLC prefix
	Db1.a[1].b.c[3]	Delimiter replaced without character selection The tag name is enclosed in quotation marks at the point of use in the screen: "Db1.a[1].b.c[3]"
`TagNaming.SeparatorChar` = ; `TagNaming.IndexStartChar` = "(" `TagNaming.IndexEndChar` = ")"	Db1;a(1);b;c(3)	Replace the period and bracket with ; ( )
`TagNaming.SeparatorChar` = "_" `TagNaming.IndexStartChar` = "{" `TagNaming.IndexEndChar` = "}"	Plc1_Db1_a{10}_b_c{3}	Replace the period and bracket with _ { } PLC prefix

6.2 SiVArc object properties

6.2.1 Assigned

Description

Returns TRUE if there is an assignment at the specified block parameter.

Syntax

<`Object`**>**`.Assigned`

Object

- Parameter

6.2.2 Comment

Description

Returns the entered comments.

Syntax

<Object>.Comment

Object

- Parameter
- DB

Comment

If you query the comment of a data block, the comment from the block properties is returned.

If you query the comment of a parameter, the comment from the symbol table is returned.

Multiple languages

The SiVArc expression "DB.Comment" can be configured in multiple languages.

6.2.3 FolderPath

Description

Returns the path.

Syntax

<Object>.FolderPath

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block
- DB
- LibraryObject

Comment

If you query the storage path of a program block, the storage path within the "Program blocks" folder is returned.

If you query the storage path of a library object, the storage path within the "Master copies" or "Types" folder is returned.

A "\" is returned as a separator between the folder hierarchy.

6.2.4 HMITagPrefix

Description

Returns the value of the "TagPrefix" property for a screen window.

The "TagPrefix" property, for example, is the name of the associated data block of the program block that SiVArc is currently evaluating.

Syntax

<Object>.HMITagPrefix

Object

- DB

6.2.5 IndexEndChar

Description

Returns the closing bracket set in the Runtime settings when structuring external tags.

Syntax

<Object>.IndexEndChar

Object

- TagNaming

6.2.6 IndexStartChar

Description

Returns the opening bracket set in the Runtime settings when structuring external tags.

Syntax

<Object>.IndexStartChar

Object

- TagNaming

6.2.7 InitialValue

Description

Returns the default value of a parameter.

Syntax

<Object>.InitialValue

Object

- Parameter

6.2.8 Name

Description

Returns the internal name, e.g. "FB1"

Syntax

<Object>.Name

Object

- S7Control
- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block
- HMIApplication
- HMIDevice

6.2.9 NetworkComment

Description

Returns the network comment.

Syntax

<Object>.NetworkComment

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block

Multiple languages

The "NetworkComment" object property can be configured in multiple languages.

6.2.10 NetworkTitle

Description

Returns the network title.

Syntax

<`Object`**>**`.NetworkTitle`

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block

Multiple languages

The "NetworkTitle" object property can be configured in multiple languages.

6.2.11 Number

Description

Returns the block number.

Syntax

<`Object`**>**`.Number`

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block
- DB

6.2.12 SeparatorChar

Description

Returns the separator character specified in the Runtime settings.

The separator is placed between the lower levels of the path of the PLC tag that are included in the synchronized name of the external tag.

Syntax

<Object>.SeparatorChar

Object

- TagNaming

6.2.13 SymbolComment

Description

Returns the user-defined comment in the block properties.

Syntax

<Object>.SymbolComment

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block
- DB

Multiple languages

The "SymbolComment" object property can be configured in multiple languages.

6.2.14 SymbolicName

Description

Returns the user-defined name of a block or tag.

Syntax

<Object>.SymbolicName

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block
- DB
- HMITag

Comments

If you query the user-defined name of a data block that is called as a multi-instance (MDB), the name of the block stored in the block interface is called. The block name for MDBs is stored under the static local data.

6.2.15 Title

Description

Returns the block title.

Syntax

<Object>.Title

Object

- StructureBlock
- ModuleBlock

- SubModuleBlock
- Block

Multiple languages

The "Title" object property can be configured in multiple languages.

6.2.16 Type

Description

Returns the type.

Syntax

```
<Object>.Type
```

Object

- DB
- HMIApplication
- HMIDevice

Comment

If you query the type of a data block, the type "MDB" (multiple-instance block) or "IDB" (instance block) is returned as a string.

If you query the type of HMI device, the device type is returned as a string, for example, "KTP400".

If you query the type of Runtime software, the type of software is returned as a string, for example, "WinCC RT Advanced".

6.2.17 Value

Description

Returns the value.

Syntax

```
<Object>.Value
```

Object

- Parameter

6.2.18 Version

Description

Returns the version of a block type.

Syntax

`<Object>.Version`

Object

- StructureBlock
- ModuleBlock
- SubModuleBlock
- Block

Comment

The property is only evaluated when the block SiVArc is currently evaluating is an instance of a block type in the library.

6.3 SiVArc object properties

Access to HMI devices

Using the following tags, you access HMI devices within the project tree.

SiVArc object property	Addressed property
`HmiDevice.Name`	Name of the HMI device in the project tree For example, "HMI_1", "PC_system_1"
`HmiDevice.Type`	Type of HMI device in the project tree For example, "KTP700 Mobile", "SIMATIC PC station"
`HmiApplication.Name`	Name of application For example, "HMI_1", "HMI_RT_40
`HmiApplication.Type`	Type of application For example, "WinCC RT Advanced", "WinCC RT Professional"

If the HMI device is a panel, `HmiDevice` and `HmiApplication` are identical.

SiVArc object properties for the name of the controller and external tags

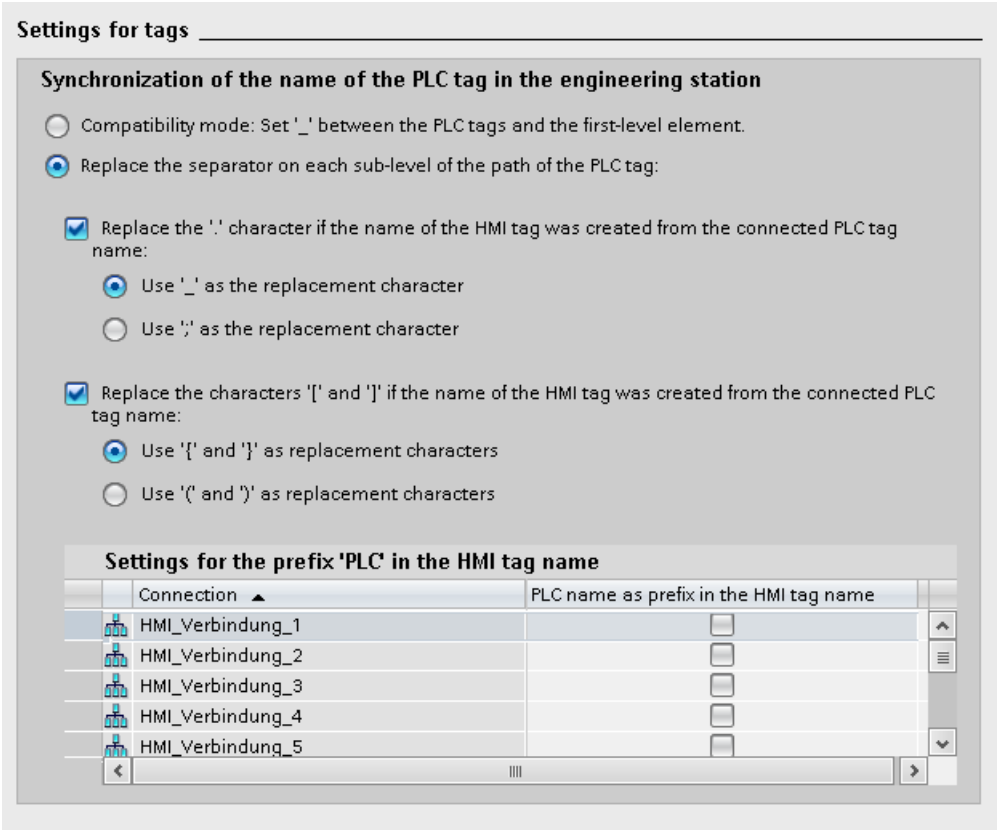
You use the SiVArc object properties `Name` and `SymbolicName` to reference the name of the S7 controller or to generate external tags:

You can only use the SiVArc expressions `HmiTag.SymbolicName` and `HmiTag.DB.SymbolicName` in the "Tag rules" editor.

SiVArc object property	Referenced object	Formulation in the SiVArc expression
`Name`	Name of the S7 PLC	`S7Control.Name`
`SymbolicName`	Name of the external tag (tag name)	`HmiTag.SymbolicName`
`DB.SymbolicName`	Name of the DB	`HmiTag.DB.SymbolicName`
`DB.FolderPath`	Path of the DBs	`HmiTag.DB.FolderPath`

SiVArc object properties for name synchronization of external tags

You define how the names of PLC tags and external tags are to be synchronized in the Runtime settings of the HMI device:



To synchronize the names of external tags according to the settings for tags in the TIA Portal with SiVArc, use `TagNaming` tags.

SiVArc object property	Referenced object	Formulation in the SiVArc expression
`SeparatorChar`	The following separators on each sublevel of the PLC tag path: "." "_" ";"	`TagNaming.SeparatorChar`
`IndexStartChar`	The following separators on each sublevel of the PLC tag path: "[" "(" "{"	`TagNaming.IndexStartChar`
`IndexEndChar`	The following separators on each sublevel of the PLC tag path: "]" ")" "}"	`TagNaming.IndexEndChar`

See also

"Tag rules" editor (Page 29)

6.4 Functions

6.4.1 Functions in SiVArc

In SiVArc the functions listed in the following section are defined.

You can use functions in SiVArc expressions. You cannot change the function names.

6.4.2 "Contains" function

`Contains` function

The `Contains` function determines whether character string is contained in another string. The function is case sensitive and space sensitive.

Function	Result
`Contains("ButtonText", "Text")`	True
`Contains("ButtonText", "ttonT")`	True
`Contains("ButtonText", "butt")`	False
`Contains("ButtonText", "txeT")`	False
`Contains("ButtonText", "Text")`	False
`Contains("ButtonText", "Text ")`	False
`Contains("ButtonText", "Te xt")`	False
`Contains("ButtonText", "on")`	False
`Contains("ButtonText 1", "ButtonText 2")`	False

6.4.3 "EndsWith" function

`EndsWith` function

The `EndsWith` function determines whether the end of a character string matches a specified character string. The function is case sensitive and space sensitive.

Function	Result
`EndsWith("ButtonText", "Text")`	True
`EndsWith("ButtonText", "ButtonText")`	True
`EndsWith("ButtonText", "butt")`	False
`EndsWith("ButtonText", "Butt")`	False
`EndsWith("ButtonText", "Text")`	False
`EndsWith("ButtonText", "Text ")`	False
`EndsWith("ButtonText", "Te xt")`	False
`EndsWith("ButtonText", "t")`	True
`EndsWith("ButtonText", "T")`	False
`EndsWith("ButtonText ", "Text")`	False
`EndsWith("ButtonText 1", "ButtonText 2")`	False

6.4.4 "Format" function

`Format` function

The `Format` function returns a formatted string. Statements within a format string specify the form in which the string is returned.

The function has two function parameters:

- String that is returned formatted.
- Format string that specifies the formatting of the string.
  Use the format string "b" to display the result as binary code. If the result of an expression is a floating-point number, the result is displayed rounded in binary format.

Function	Result
`Format(5,"0.00")`	5.00
`Format((VAR_1 Or 2#11100), "b")`	2#11101

You can find more information on the format string by searching for "Strings.Format method" in the Microsoft Developer Network.

6.4.5 "FormatNumber" function

`FormatNumber` function

The `FormatNumber` function returns a string formatted as a number.

The function has five function parameters:

Position	Parameters	Description	Notes
1	Expression	String that is returned formatted as a number	If the string cannot be formatted as a number (e.g. "hello world"), an error is displayed.
2	NumberofDigitsAfterDecimalPoint	Number that specifies how many decimal places are displayed to the right of the decimal separator. `FormatNumber("12,4", 3,-2,-2,-2) ("12 comma 4")` = 12,400	The default value -1 specifies that the country settings of the computer are used.
3	ApplyLeadingNumber	Number that specifies whether or not a leading 0 is displayed for fractions. `FormatNumber("0,4", 3,-1,-2,-1)` = 0,400	The possible settings are listed under "List of constants".
4	UseHigherLevelAsNegativeNumbers	Number that specifies whether or not negative values are displayed in brackets. `FormatNumber("-12",1,-2,-1,0)` = (12,0)	If the number is displayed in brackets, the minus sign is not shown. The possible settings are listed under "List of constants".
5	GroupNumbers	Number that specifies whether or not high numbers are grouped with the thousands separator. `FormatNumber("1288,4", 3,-2,-2,0)` = 1288,400	The form of the thousands separator (e.g. point, comma or space) is defined in the country settings of the computer. The possible settings are listed under "List of constants".

List of constants

Table 6-1 ApplyLeadingNumber

ApplyLeadingNumber	Value	
TRUE	-1	Display leading 0.
FALSE	0	Do not display leading 0.
UseDefault	-2	Use country settings of the computer.

Table 6-2 UseHigherLevelAsNegativeNumbers

ApplyLeadingNumber	Value	
TRUE	-1	Display negative values in brackets. The minus sign is not shown.
FALSE	0	Output negative values without brackets. The minus sign is shown.
UseDefault	-2	Use country settings of the computer.

Table 6-3 UseHigherLevelAsNegativeNumbers

ApplyLeadingNumber	Value	
TRUE	-1	Group numbers with thousands separator.
FALSE	0	Do not group numbers with thousands separator.
UseDefault	-2	Use country settings of the computer.

Examples

The table below applies to settings for Germany. The thousands separator for Germany is the point and the decimal separator is the comma.

Function	Result
`FormatNumber("12,4",3,-2,-2,-2) ("12 comma 4")`	12.400
`FormatNumber("12.4",3,-2,-2,-2) ("12 point 4")`	124.000
`FormatNumber("1288,4",3,-2,-2,-1)`	1.288,400
`FormatNumber("1288,4",3,-2,-2,0)`	1288.400
`FormatNumber("-12",1,-2,-2,0)`	-12.0
`FormatNumber("-12",1,-2,-1.0)`	(12.0)

6.4.6 Function "InStr"

Function `InStr`

The `InStr` function checks whether a string is completely contained in another string. This is case sensitive. The function returns a Boolean value ("True" or "False").

The function has two function parameters:

- String in which the check is performed.
- String that contains the compared text.

The following examples show the values that the `InStr` function produces:

Function	Result
`InStr("Hello","Hello")`	True
`InStr("Hello","hello")`	False

Function	Result
`InStr("Hello","el")`	True
`InStr("12345",3)`	True
`InStr("12345","6")`	False

6.4.7 Function "IsDefined"

`IsDefined` function

Using a string as a parameter, the `IsDefined` function checks whether there is a tag with a name matching the specified string.

You can use this function for the following syntax elements:

- SiVArc tags
- SiVArc object property
- Arrays of "String" data type

Example: You have created the following user-defined tag:

`ButtonText "Cycle_time"`

Function	Result
`IsDefined("ButtonText")`	True
`IsDefined("ButtonText[0]")`	True
`IsDefined("ButtonText[1]")`	True
`IsDefined("ButtonText[2]")`	False

6.4.8 Function "LBound"

`LBound` function

The `LBound` functions expects an array as a parameter and returns the smallest possible index.

Function	Result
`LBound(Split("SG19_FG97_ST090", "_"))`	0
`LBound(Split("SG19_FG97", "_"))`	0

6.4.9 Function "Left"

`Left` function

The `Left` function returns a string containing a specified number of characters from the leftmost characters of a string.

The function has two function parameters:

- String from which a substring is returned.
- Number indicating the character length of the substring
  If the number is 0, an empty string is returned.
  If the number is greater than the number of characters in the specified string, an error is displayed.

Function	Result
`Left("ButtonText", 6)`	"Button"
`Left("ButtonText", 0)`	"" (Empty string)
`Left("ButtonText", "10")`	"ButtonText"
`Left("ButtonText", 11)`	Error (Number is greater than the number of characters in the string)

6.4.10 Function "Len"

`Len` function

The `Len` function returns the number of characters in a string. The function expects a string as a function parameter.

Function	Result
`Len("ButtonText")`	10
`Len("")`	0
`Left("ButtonText", Len("ButtonText"))`	"ButtonText"

6.4.11 Function "LTrim""

`LTrim` function

The `LTrim` function removes leading spaces from a string. The function expects a string as a function parameter.

Function	Result
`LTrim ("  ButtonText")`	"ButtonText"
`LTrim ("ButtonText")`	"ButtonText"

6.4.12 Function "Max""

`Max` function

The `Max` function expects two numbers as a parameter and returns the higher of the two.

Function	Result
`Max(12, 3)`	12
`Max(3, 123)`	123

6.4.13 Function "Mid"

`Mid` function

The `Mid` function returns a substring within a string from a specified position.

The function has three function parameters:

- String from which the substring is copied.
- Number indicating the starting position in the string.
  If the starting position is greater than the number of characters in the string, an error is displayed.
- Number indicating the length of the substring from the starting position.
  If the specified length is greater than the longest possible substring length from the starting position in the string, an error is displayed.

Function	Result
`Mid("ButtonText", 5,3)`	"nTe"
`Mid("ButtonText", 0, 10)`	"ButtonText"

Function	Result
`Mid("ButtonText", 10, 3)`	Error (Starting position is greater than the number of characters in the string)
`Mid("ButtonText", 7, 10)`	Error (Specified length is greater than the longest possible substring from position 7)

6.4.14 Function "Min"

`Min` function

The `Min` function expects two numbers as a parameter and returns the smaller of the two.

Function	Result
`Min(12, 3)`	3
`Min(3, 123)`	3

6.4.15 Function "Replace"

`Replace` function

The `Replace` function searches a string from left to right for a substring and replaces the substring with another substring. The search function is case sensitive. The changed string is returned.

The function has three function parameters:

- String in which a substring is found and replaced.
- String indicating the substring to be found.
  If the substring to be found is an empty string, the string first transferred is returned unchanged.
- String inserted in place of the substring found.

The find and replace function continues after the new substring.

Function	Result
`Replace("ButtonText", "Text", "Button")`	"ButtonButton"
`Replace("ButtonText", "ButtonText", "Hello World")`	"Hello World"
`Replace("aaa", "aa", "bb")`	"bba"
`Replace("a", "a", "a")`	"a"

Function	Result
`Replace("a", "", "b")`	"a"
`Replace("aA", "a", "b")`	"bA"

6.4.16 "Right" function

`Right` function

The `Right` function outputs a substring from the rightmost character of a string. The number of characters is specified when the function is called.

The function has two function parameters:

- String from which a substring is generated and returned.
- Number specifying the number of rightmost characters that is returned.
  If the number is 0, an empty string is returned.
  If the number is greater than the number of characters in the string, an error is displayed.

Function	Result
`Right("ButtonText", 4)`	"Text"
`Right("ButtonText", 0)`	"" (Empty string)
`Right("ButtonText", 10)`	"ButtonText"
`Right("ButtonText", 11)`	Error (Number is greater than the number of characters in the string)

6.4.17 Function "RTrim"

`RTrim` function

The `RTrim` function removes spaces from the end of a string. The resulting string is returned.

If there are no spaces at the end of the string, the string is returned unchanged.

Function	Result
`RTrim("ButtonText  ")`	"ButtonText"
`RTrim("ButtonText  ")`	"ButtonText"

6.4.18 "Split" function

`Split` function

The `Split` function splits a string. The delimiter required for this is freely definable.

The function has two function parameters:

- String
- Delimiters

Depending on the syntax, a substring is returned or the number of contained substrings:

- Substring as a return value
  `Split("<String>","<Separator>")(<Index>)`
  You reference the substring through an index that starts with zero.
- Number of contained substrings as the return value
  `Split("<String>","<Separator>").Length`

The following examples show the numerical values that the `Split` function produces:

Function	Result
`Split("SG19_FG97_ST090","_")(0)`	SG19
`Split("SG19.FG97.ST090",".")(1)`	FG97
`Split("42",".")(0)`	42
`Split(".",".")(0)`	"" (Empty string)

The following examples show the number of substrings that the `Split` function produces:

Function	Result
`Split("SG19_FG97_ST090", "_").Length`	3
`Split("SG19.FG97.ST090", ".").Length`	3

6.4.19 "StartsWith" function

`StartsWith` function

The `StartsWith` function determines whether the start of a character string matches a specified character string. The function is case sensitive and space sensitive.

Function	Result
`StartsWith("ButtonText", "Butt")`	True
`StartsWith("ButtonText", "butt")`	False
`StartsWith("ButtonText", "Text")`	False
`StartsWith("ButtonText", "ButtonText")`	True
`StartsWith("ButtonText", " Butt")`	False
`StartsWith("ButtonText", "Butt ")`	False

Function	Result
StartsWith("ButtonText", "Bu tt")	False
StartsWith("ButtonText", "B")	True
StartsWith("ButtonText", "b")	False
StartsWith(" ButtonText", "Butt")	False
StartsWith("B uttonText", "Butt")	False
StartsWith("ButtonText 1", "ButtonText 2")	False

6.4.20 "StrComp" function

`StrComp` function

The `StrComp` function compares two strings. The function sorts the string alphanumerically starting with the first character, and is case-sensitive. A number is returned on the basis of the sorting of the strings.

The following cases are possible:

- The first string is placed before the second string. The return value is -1.
  `StrComp("ABCD", "Abcd")` = -1
  `StrComp("A", "a")` = -1 ("A" comes before "a" in the alphabet)
- The second string is placed before the first string. The return value is 1.
  `StrComp("ABCD", "AAcd")` = 1
- The two strings are identical. The return value is 0.
  `StrComp("Abcd", "Abcd")` = 0

6.4.21 "TrailNum" function

`TrailNum` function

The `TrailNum` function returns the last positive numerical value from a string, for example, the number in the name of a program block.

The following examples show the numerical values that the `TrailNum` function produces:

Function	Result
TrailNum("42")	42
TrailNum("Number42")	42
TrailNum("Number0042")	42
TrailNum("Number-42")	42
TrailNum("Minimum42_Maximum84")	84

The following examples show the use of the `TrailNum` function in a SiVArc expression.

A function block with the symbolic name "SG19_FG97_ST090+IR001_FB" is programmed in the TIA Portal.

SiVArc expression	Result
`"MyBlock_"&TrailNum(ModuleBlock.SymbolicName)`	"MyBlock_1"
`"MyBlock_"&TrailNum(ModuleBlock.SymbolicName[0])`	"MyBlock_19"

If you do not specify string indexing, the last number in the string value is output.

6.4.22 "Trim" function

`Trim` function

The `Trim` function removes all spaces from the start and end of a string. The resulting string is returned.

If there are no spaces either at the start or at the end of the string, the string is returned unchanged.

Function	Result
`Trim("ButtonText")`	"ButtonText"
`Trim("ButtonText")`	"ButtonText"
`Trim("ButtonText")`	"ButtonText"
`Trim("ButtonText")`	"ButtonText"

6.4.23 "UBound" function

`UBound` function

The `UBound` functions expects an array as a parameter and returns the largest possible index.

Function	Result
`UBound(Split("SG19_FG97_ST090", "_"))`	2
`UBound(Split("SG19_FG97, "_"))`	1
`UBound(Split("", "."))`	0

6.5 Operators

You can use the following operators in SiVArc expressions.

Note that operators are case-sensitive. On the one hand, this relates to the operators themselves with logical and bitwise operators. On the other hand, you must consider the case of strings set in the relation with comparison operators, for example, when you compare two strings to check for identical names.

Arithmetic operators

Arithmetic operator	Example	Result
+	4+2	6
-	4-2 -4+2	2 -2
*	4*2	8
/	4/2	2

Relational operators

Relational operators	Example	Result
=	4=4 4=2	True False
<> ("different than")	4<>4 4<>2	False True
>	4>2 2>4	True False
>=	4>=2 4>=4	True True
<	4<2 2<4	False True
<=	4<=2 4<=4	False True

Logic operators

Logic operators	Example	Result
And	True And True True And False False And False	True False False
Or	True Or True True Or False False Or False	True True False
Not	Not True Not False	False True

Bit-by-bit operators

Bit-by-bit operators	Example	Result
And	16 And 16	16
Or	8 Or 4	12
Xor	3 Xor 1	2

Operators for string sequences

Concatenation operator	Example	Result
`&`	`"Tool"&"Bar"`	ToolBar

Priority of the operators

The following table indicates the priority with which operators are processed when you use multiple operators in a SiVArc expression. 1 has the highest priority.

Operator	`Not`
	- (unary)
		`*`, `/`	`+`, `-`	`&`	`=`, `<>`
					`>`, `>=`
					`<`, `<=`
						`And`	`Or`	`Xor`

Priority	1	2	3	4	5	6	7	8

Use parentheses to change the processing order.

6.6 String indexing

Use

Substrings with a string are separated by the _ character. To access a substring, use the indexing operator `[]`.

The counting of the substring starts at `0`. You can access the substring via the number in the indexing operator.

Example

The "FB_Name" tag is defined with the value "SG19_FG97_ST090+IR001_FB" in the TIA Portal.

String indexing in the SiVArc expression	Result
`FB_Name[0]`	SG19
`FB_Name[1]`	FG97
`FB_Name[2]`	ST090+IR001
`FB_Name[3]`	FB

6.7 If conditions

You formulate logical conditions in SiVArc expressions with the If operator.

If operator

The If operator has the following syntax:

```
If(<condition>, <thenExpression>, <elseExpression>)
```

`<condition>`	Boolean or integer
`<thenExpression>`	is produced when `<condition>` is either `True` or an integer value other than `0`
`<elseExpression>`	is produced when `<condition>` is either `False` or `0`

You can also nest the conditions and use an If condition in another If condition.

Examples

If condition	Result
`If(True, "On", "Off")`	On
`If(0, "On", "Off")`	Off
`If(42, "On", "Off")`	On
`If(4>2, If(False, 4, 2), 42)`	2

6.8 Supported data types for PLC tags

SiVArc supports all basic data types that can be displayed on the HMI device by the PLC in WinCC V13.1.

SiVArc also supports the structured data types ARRAY, STRUCT and UDT.

Basic data types

Name	Data type
BOOL	Boolean value
BYTE	Binary and hexadecimal numbers with 8 bits
CHAR	ASCII character
DINT	Double integer, integer with sign
DTL	Date and time (Year-Month-Day-Hour:Minute:Second.Nanoseconds)
DWORD	Binary and hexadecimal numbers with 32 bits
DATE	IEC date in increments of 1 day
DATE_AND_TIME	Date and time (Year-Month-Day-Hour:Minute:Second; Fixed point number)
INT	Integer, integer with sign
LDT	Date and time (Year-Month-Day-Hour:Minute:Second)
LINT	
LREAL	
LTIME	
LTIME_OF_DAY	

Name	Data type
LWORD	
REAL	Real numbers (IEEE floating-point number)
S5TIME	Time period in S5T# format, Step7 time in increments of 10 ms
SINT	
STRING	Character string
TIME	Time period in IEC format, IEC time in increments of 1 s, integer with sign
TIME_OF_DAY	Time of day in increments of 1 ms
UDINT	
UINT	
ULINT	
USINT	
WORD	Binary and hexadecimal numbers with 16 bits
WString	Unicode character string with variable length
WChar	Unicode characters with 16 bits

Structured data types

SiVArc supports structured PLC tags and all associated elements that have been released for WinCC. During the generation, SiVArc creates structured external tags and elements according to the PLC tag. Tags and elements are automatically connected to the PLC tags and their elements.

Name	Data type
ARRAY	Array
ARRAY DBs	
ARRAY DB STRUCT	
STRUCT	Structure
UDT	User Defined Data Type (PLC data type)

Note

Condition for PLC data types (UDTs)

If a PLC data type is an array of a structured data type (STRUCT or UDT), SiVArc breaks down the array into individual tags of this data type in WinCC. If a PLC data type contains arrays of structured data types as elements, these are shown as structured elements in the "HMI tags" editor.

6.9 Supported system functions for faceplates

System functions

Depending on the HMI device for which it is generated, use the following system functions at SiVArc events:

System function	RT Advanced	RT Professional
ActivateScreen	x	x
DecreaseTag	x	x
IncreaseTag	x	x
InvertBit	x	x
InvertBitInTag	x	x
SetBit	x	x
SetBitInTag	x	x
SetTag	x	x
ResetBit	x	x
ResetBitInTag	x	x
ActivateScreenInScreenWindow	---	x
ActivatePreviousScreen	x	---
ShiftAndMask	x	---

Messages_SiVArc 7

7.1 Reference to alarms

7.1.1 Critical errors

7.1.1.1 CriticalError_ObsoleteFbTypeVersionFound

ID	CriticalError_ObsoleteFbTypeVersionFound
Cause	The version of the program block in the rule does not correspond to that of the block in the STEP 7 program.
Solution	Check the version number of the called program block.

7.1.1.2 CriticalError_ScreenMastercopyUsedAsScreenTypeAndObject

ID	CriticalError_ScreenMastercopyUsedAsScreenTypeAndObject
Cause	The utilized master copy of the screen is used as screen type as well as screen object in the screen rules.
Solution	Make sure that a master copy of a screen which is to be used as screen object is not used as screen type in any rule.

7.1.1.3 CriticalError_VersionforTiaTypeLibraryTypeInWork

ID	CriticalError_VersionforTiaTypeLibraryTypeInWork
Cause	The library type used by SiVArc is being edited.
Solution	Open the respective library type and release the current version or discard it.

7.1.2 Error

7.1.2.1 Error_CanNotParseOverflowScreenCount

ID	Error_CanNotParseOverflowScreenCount
Cause	The value of the expression in the SiVArc property "Number of overflow screens" is not valid. For example, "one" instead of "1".
Solution	1. Correct the expression in the SiVArc property "Number of overflow screens" for the relevant screen template. 2. The expression must return a positive integer.

7.1.2.2 Error_CanNotResolveOverflowScreenCount

ID	Error_CanNotResolveOverflowScreenCount
Cause	The value of the expression in the SiVArc property "Number of overflow screens" is not valid. For example, "-1" instead of "1".
Solution	1. Correct the expression in the SiVArc property "Number of overflow screens" for the relevant screen template. 2. The expression must return a positive integer.

7.1.2.3 Error_ConflictCopyRule

ID	Error_ConflictCopyRule
Cause	This object has been modified by another editor in SiVArc, for example, by the "Screen rules", "Tag rules" or "Text list rules" editor. That is why this object cannot be modified by the "Library rules" editor.
Solution	Disable or remove the respective rule that is causing the conflict from the affected editor.

7.1.2.4 Error_ConflictsBetweenFaceplatesInLibraries

ID	Error_ConflictsBetweenFaceplatesInLibraries
Cause	In the SiVArc screen rule editor, a faceplate type from a global library is referenced in a SiVArc screen rule which is also contained in a directory in the project library.
Solution	If a faceplate type is present in both the global and the project library, it must be stored with same path in both libraries. Drag the faceplate type either into the project library or the global library so that both have the same path.

7.1.2.5 Error_ContentScreenCannotGenerate

ID	Error_ContentScreenCannotGenerate
Cause	One of the master copies is used for a screen, the other is used as a reference for a screen window. In this case, the screen referenced by the screen window is not generated.
Solution	In the "Screen objects" column, do not use a screen the name of which is identical to another screen name during the generation.

7.1.2.6 Error_DifferencScriptSignature

ID	Error_DifferencScriptSignature
Cause	The referenced script of the screen object has invalid parameters.
Solution	1. Check the signature of the script called. 2. For the correct script signature, see the script definition in the HMI project under "Scripts".

7.1.2.7 Error_DuplicatedScreenItemFoundFromMultiPlc

ID	Error_DuplicatedScreenItemFoundFromMultiPlc
Cause	A screen object with the same name already exists due to the generation of another controller in the same screen. The screen object cannot be created again in the same screen.
Solution	1. Check your screen rules. 2. Make sure that different controllers do not generate the same screen objects on the same screens. 3. Correct either the screen rules or the SiVArc property "Name" of the screen objects. Alternative procedure 1. Disable the controller prior to generation.

7.1.2.8 Error_DuplicatedTextListEntryFoundFromMultiPLC

ID	Error_DuplicatedTextListEntryFoundFromMultiPLC
Cause	A text list entry with the same name already exists due to the generation of another controller in the text list. The text list entry cannot be created again in the text list.
Solution	1. Check the text definitions for the faulty text list entries in the STEP 7 program. 2. Make sure that different controllers do not generate the same text list entries in the same text lists.

7.1.2.9 Error_DuplicateCopyRule

ID	Error_DuplicateCopyRule
Cause	The values that have been set in the respective columns for copy rules are identical to the values of another rule. The duplications in the "Comment" column are ignored by this check.
Solution	Open the "Copy rules" editor in SiVArc and delete the rules assigned twice because these rules are otherwise ignored for the generation.

7.1.2.10 Error_DuplicateScreenRule

ID	Error_DuplicateScreenRule
Cause	The values that have been set in the respective columns for screen rules are identical to the values of another rule. The duplications in the "Comment" column are ignored by this check.
Solution	Open the "Screen rules" editor in SiVArc and delete the rules assigned twice because these rules are otherwise ignored for the generation.

7.1.2.11 Error_DuplicateTextlistRule

ID	Error_DuplicateTextlistRule
Cause	The values that have been set in the respective columns for text list rules are identical to the values of another rule. The duplications in the "Comment" column are ignored by this check.
Solution	Open the "Text list rules" editor in SiVArc and delete the rules assigned twice because these rules are otherwise ignored for the generation.

7.1.2.12 Error_EventCreationFailedDueToErrorInExpression

ID	Error_EventCreationFailedDueToErrorInExpression
Cause	The master copy of a screen object has an error in the expression of the configured parameters. The function is ignored during the SiVArc generation.
Solution	Ensure that the expressions for the event parameters are correct.

7.1.2.13 Error_EventCreationFailedDueToVariableNotDef

ID	Error_EventCreationFailedDueToVariableNotDef
Cause	The master copy of the screen object was configured with an undefined SiVArc tag as an expression for the system function or user script parameters. The function is ignored during the SiVArc generation.
Solution	Ensure that the configured SiVArc tags have been defined in the SiVArc STEP 7 plug-in editor before you use them as function parameters for SiVArc events.

7.1.2.14 Error_EventExceedsMaxFunctionCalls

ID	Error_EventExceedsMaxFunctionCalls
Cause	An event is assigned with multiple function calls in the master copy of a screen object. The number of function calls exceeds the maximum permitted number of generated functions in the higher-level device.
Solution	The number of function calls in an event is not allowed to exceed the number of supported function calls in the higher-level device. The same number or fewer function calls are permitted on the higher-level device. All panels support 16 function calls in a screen object.

7.1.2.15 Error_EventNotSupported

ID	Error_EventNotSupported
Cause	The configured event for the master copy of the screen object was configured on a device of another device series. The configured event is not supported for the screen object on the device on which it was generated. For example, the "Press left mouse button" event for the "Button" screen object is only available in Professional RT, but not in RT Advanced. If the master copy of the button in RT Professional is assigned the "Press left mouse button" event and this master copy was used in RT Advanced, this error message is output by SiVArc.
Solution	If you are planning cross-device generation, configure only the events for the master copies of the screen objects that are supported by all devices.

7.1.2.16 Error_ExceptionMessage_Debug

ID	Error_ExceptionMessage_Debug
Cause	A SiVArc internal error has occurred.
Solution	Please contact Support.

7.1.2.17 Error_FaceplateCanNotCreate

ID	Error_FaceplateCanNotCreate
Cause	A general error occurred during creation of the faceplate type. Possible causes: • Error updating the project library with a faceplate type from the global library. • Error during instantiation of the faceplate type
Solution	1. Delete the faceplate type in the respective library. 2. Create a new faceplate type.

7.1.2.18 Error_FailedToExportHmiOmToCoreBlob

ID	Error_FailedToExportHmiOmToCoreBlob
Cause	An internal SiVArc error occurred during serialization/export of the HMI object model.
Solution	1. Close the project without saving. 2. Open the project again. Notice: All unsaved changes will be lost and must be made again.

7.1.2.19 Error_FbLibraryTypeNotFound

ID	Error_FbLibraryTypeNotFound
Cause	In the rule editor, a SiVArc rule references a PLC program block type from a library which does not exist.
Solution	In the rule editor, select an existing PLC program block type from the project library or global library for the SiVArc rule.

7.1.2.20 Error_FolderPathTooLong

ID	Error_FolderPathTooLong
Cause	The overall length of the path of the specified group exceeds 128 characters. The requested screen is created in the main folder.
Solution	Reduce the path length in the SiVArc "Screen group" property of the screen to a maximum of 128 characters to create the screen in the required group.

7.1.2.21 Error_FolderPathTooLong_Tag

ID	Error_FolderPathTooLong_Tag
Cause	The total length of the path of the specified group exceeds 128 characters. The desired HMI tag is therefore created in the main folder.
Solution	Decrease the entry in the "Tag group hierarchy" column in the tag rules so that the resulting path length has max. 128 characters.

7.1.2.22 Error_FunctionFailed

ID	Error_FunctionFailed
Cause	The function called in the event does not exist or there are errors in its definition. For example, user-defined script
Solution	Define a new function. Correct the faulty definition.

7.1.2.23 Error_FunctionIsNotAllowed

ID	Error_FunctionIsNotAllowed
Cause	The function called is not valid for the screen object in question.
Solution	Change the called function in the "SiVArc events" editor.

7.1.2.24 Error_FunctionIsNotAllowedSystemFunction

ID	Error_FunctionIsNotAllowedSystemFunction
Cause	The called system function is not supported for the respective screen object in the utilized HMI device. The "ActivateScreenInScreenWindow" system function, for example, is not supported in HMI devices of the type WinCC RT Advanced.
Solution	Correct the function or enter a valid function for the screen object.

7.1.2.25 Error_FunctionNameInvalid

ID	Error_FunctionNameInvalid
Cause	• The function name is not supported. • The name is empty.
Solution	Check the function name and enter a new name.

7.1.2.26 Error_GroupGenerationFailed

ID	Error_GroupGenerationFailed
Cause	The desired tag group was not generated during generation of tags. This can be caused by internal problems in the TIA Portal. In this case, the TIA Portal cannot provide the desired objects or the required service to SiVArc.
Solution	Try to generate it again, or add a tag group manually.

7.1.2.27 Error_HierarchicalLayoutScreen_EmptyValue

ID	Error_HierarchicalLayoutScreen_EmptyValue
Cause	The positioning scheme is configured with reference to another positioning scheme, but one of the positioning scheme properties is not set or empty. Therefore, the rule is not applied.
Solution	1. Open the editor of the affected master copy of the positioning scheme in SiVArc. 2. Configure valid properties for the positioning scheme: – If "Static" mode is set under "Layout selection", select the "Layout screen or folder" option by selecting the master copy that is available in one of the libraries. – If "Dynamic" mode is set under "Layout selection", select the "Layout screen or folder" option by selecting the library folder that contains the master copies of the positioning scheme and is available in one of the libraries. Assign to the SiVArc expression the property "Expression for layout screen name" which can lead to one of the names of the master copies of the layout screen contained in the folder. All available screens and folders are displayed when you click the object selection under "Layout screen or folder".

7.1.2.28 Error_HmiDeviceTypeToChangeNotSupported

ID	Error_HmiDeviceTypeToChangeNotSupported
Cause	In its current version, SiVArc does not support switching the HMI device type.
Solution	Reset the original HMI device type.

7.1.2.29 Error_InconsistentCopyRuleNoLibraryItem

ID	Error_InconsistentCopyRuleNoLibraryItem
Cause	The definition of the copy rule is invalid. The column with the library entries is empty.
Solution	Correct the invalid entry. Define an entry for the generation of the copy rule.

7.1.2.30 Error_InconsistentScreenruleNoFbType

ID	Error_InconsistentScreenruleNoFbType
Cause	The program block in the SiVArc rule does not exist in the STEP7 program.
Solution	1. Enter a block that was created in the project in the "Program block" column. 2. Double-click the "Program block" column to display the available blocks. All available blocks are displayed.

7.1.2.31 Error_InconsistentScreenRuleNoScreenType

ID	Error_InconsistentScreenRuleNoScreenType
Cause	The "Master copy of a screen" in the SiVArc screen rule does not exist in the project library or a global library.
Solution	1. Double-click the row of the "Master copy of a screen" column. All available screen templates are displayed. Proceed as follows to create a new screen in the project library: 1. Create a new screen. 2. Copy the created screen. 3. Paste the copied screen into the "Master copies" folder in the project library.

7.1.2.32 Error_InconsistentTagManagementRule

ID	Error_InconsistentTagManagementRule
Cause	The expression in the "Tag table" column in the SiVARc "Tag rules" editor is invalid.
Solution	Check the expression in the "Tag table" column in the "Tag rules" editor. Ensure that there is a valid expression.

7.1.2.33 Error_InconsistentTextListRuleNoFbType

ID	Error_InconsistentTextListRuleNoFbType
Cause	The "Program block" in the SiVArc text list rule does not exist in the STEP 7 program.
Solution	1. Open the "Text list rules" SiVArc editor. 2. In the relevant row of the "Master copy of a text list" column, select a text list that was created in one of the libraries. 3. Double-click the "Master copy of a text list" column. All available text lists are displayed.

7.1.2.34 Error_InconsistentTextListRuleNoTextListType

ID	Error_InconsistentTextListRuleNoTextListType
Cause	The "Master copy of a text list" in the SiVArc text list rule does not exist in the project library or a global library.
Solution	1. Open the "Text list rules" SiVArc editor. 2. In the relevant row of the "Master copy of a screen" column, select a screen object that was created in one of the libraries. 3. Double-click the "Master copy of a screen" column. All available screens are displayed.

7.1.2.35 Error_IncorrectRuntimeSingleObjectCulture

ID	Error_IncorrectRuntimeSingleObjectCulture
Cause	In the HMI Runtime settings the Runtime language for non-multilingual objects is not available in the Runtime languages activated below these objects.
Solution	1. Open the "Runtime settings" in the HMI device. 2. Select the "Language & Font" settings. 3. Select a valid Runtime language in "Runtime language for single-language objects". This language must exist in the enabled Runtime languages.

7.1.2.36 Error_InitialCoordOutsideOfScreen

ID	Error_InitialCoordOutsideOfScreen
Cause	The value of the SiVArc property "Positioning scheme" is outside the screen. Example: The "Y position" value of a screen object is greater than the value of the corresponding screen.
Solution	1. Check the defined value in the "Positioning scheme" property. The value entered must not exceed the coordinates of the screen.

7.1.2.37 Error_InProjectLibrary

ID	Error_InProjectLibrary
Cause	The described error occurred in the project library.
Solution	Check the project library and remove the described error or contact Support.

7.1.2.38 Error_InvalidLayerValue

ID	Error_InvalidLayerValue
Cause	The configured value or the result of SiVArc expression leads to an invalid value of the layer property for the generated screen object.
Solution	Configure the appropriate value or the result of the SiVArc expression in the range between 0 - 31.

7.1.2.39 Error_InvalidOverflowScreenGeneration

ID	Error_InvalidOverflowScreenGeneration
Cause	The number of screen objects to be generated with the respective program block exceeds the number of available layout fields. Overflow screens cannot be generated for pop-up screens. The screen objects that exceed the number of available layout fields are not generated.
Solution	SiVArc generates the screen objects in the layout fields of pop-up screens only if the number of the screen objects to be generated is lower than or equal to the number of available layout fields. Ensure that all screen objects to be generated can be placed in the layout field.

7.1.2.40 Error_InvalidScreenItemName

ID	Error_InvalidScreenItemName
Cause	In RT Professional, a screen object and a screen in which the screen object is used are not permitted to have identical names. If a screen object and a screen that contains the screen object have identical names, the screen object is not generated in RT Professional.
Solution	Ensure that the name of the screen object and the screen are not the same.

7.1.2.41 Error_ItemAddedToScreenType

ID	Error_ItemAddedToScreenType
Cause	No objects can be created on a screen type.
Solution	Correct the screen rule which creates the screen object accordingly. Either use a master copy as the screen or delete the screen object from the rule.

7.1.2.42 Error_ItemHasNoName

ID	Error_ItemHasNoName
Cause	The screen object generated does not have a set name. This error occurs due to an expression that does not return a value.
Solution	1. Check the master copy of the screen object in the library. 2. Modify the SiVArc "Name" property: • No entry • At least one character

7.1.2.43 Error_Layout_ScreenItemTooBig

ID	Error_Layout_ScreenItemTooBig
Cause	The width or height of the screen object is greater than the associated screen template.
Solution	1. Check the width and height of the screen object. The value may not be greater than the value of the target object or screen.

7.1.2.44 Error_LayoutField_DoesNotExist

ID	Error_LayoutField_DoesNotExist
Cause	The layout field group used in the respective rule is not available in the positioning scheme that is referenced by the rule of the screen master copy. Therefore, the rule is not applied.
Solution	Ensure that the layout field group is configured in the correct positioning scheme and referenced by the correct screen master copy of the rule. As an alternative, use one of the existing layout field groups that are contained in the rule.

7.1.2.45 Error_LayoutField_DoesNotExistOnScreenMasterCopy

ID	Error_LayoutField_DoesNotExistOnScreenMasterCopy
Cause	The layout field group used in the screen rule is not usually contained in the screen master copy. Therefore, the rule is not applied.
Solution	Ensure that the layout field group is configured in the screen master copy of the rule. As an alternative, use one of the existing layout field groups that are contained in the rule.

7.1.2.46 Error_LayoutFieldDifferentScreenMasterCopies

ID	Error_LayoutFieldDifferentScreenMasterCopies
Cause	Two screen master copies have been configured with a SiVArc expression that contains the same screen name. These screen master copies are configured in different positioning schemes. Conflicts therefore arise when selecting layout fields. The screen object is not generated.
Solution	1. Open the "Screen rules" editor in SiVArc. 2. Open the screen master copy of the rule involved and go to "Properties". 3. Compare the properties of the two screen master copies and configure the same positioning scheme for both screen master copies.

7.1.2.47 Error_LayoutScreen_EmptyValue

ID	Error_LayoutScreen_EmptyValue
Cause	The master copy of the screen used in the screen rule is configured with reference to another positioning scheme, but one of the positioning scheme properties is not set or empty. Therefore, the rule is not applied.
Solution	1. Open the "Screen rules" SiVArc editor. 2. Open the master copy for the affected rule. 3. Configure valid properties for the positioning scheme: – If "Static" mode is set under "Layout selection", select the "Layout screen or folder" option by selecting the master copy that is available in one of the libraries. – When "Dynamic" mode is set under "Layout selection": Select the "Layout screen or folder" option by selecting the library folder that contains the master copies of the positioning scheme and is available in one of the libraries. Assign to the SiVArc expression the property "Expression for layout screen name" which can lead to one of the names of the master copies of the layout screen contained in the folder. All available screens and folders are displayed when you click the object selection under "Layout screen or folder".

7.1.2.48 Error_LayoutScreenAsMasterCopyGroupNotSupported

ID	Error_LayoutScreenAsMasterCopyGroupNotSupported
Cause	The master copy of the positioning scheme is available in a group of master copies in the library, but this is not permitted. Therefore, the rule is not applied.
Solution	Objects that are in a group of master copies in the library are not supported by SiVArc. Remove the positioning scheme from the master copy group and save it as a single master copy. Note: You create groups of master copies in the library by copying multiple objects and paste them as a single master copy into a library folder.

7.1.2.49 Error_LayoutScreenNotFound

ID	Error_LayoutScreenNotFound
Cause	The positioning scheme referenced by a master copy does not exist in the project library or a global library.
Solution	1. Open the "Screen rules" SiVArc editor. 2. Open the screen master copy of the rule involved and go to "Properties". 3. Configure valid properties for the positioning scheme: – If "Static" mode is set under "Layout selection", select the "Layout screen or folder" option by selecting the master copy that is available in one of the libraries. – When "Dynamic" mode is set under "Layout selection": Select the "Layout screen or folder" option by selecting the library folder that contains the master copies of the positioning scheme and is available in one of the libraries. Assign to the SiVArc expression the property "Expression for layout screen name" which can lead to one of the names of the master copies of the layout screen contained in the folder. All available screens and folders are displayed when you click the object selection under "Layout screen or folder".

7.1.2.50 Error_LibObjAsMasterCopyGroupNotSupported

ID	Error_LibObjAsMasterCopyGroupNotSupported
Cause	The library object is included in a group of several master copies; the rule is therefore not executed.
Solution	Objects that are in a group of master copies in the library are not supported by SiVArc. Save the library object as a single master copy.

7.1.2.51 Error_LibObjTypeNotSupported

ID	Error_LibObjTypeNotSupported
Cause	The copy rule contains an object that is not supported by the generation.
Solution	The object is not supported by the generation. Delete the rule or select another object that supports this rule.

7.1.2.52 Error_LibraryObjectExists

ID	Error_LibraryObjectExists
Cause	This project already contains an object of this type.
Solution	Perform one of the following actions: • Delete the object from the project. • Rename the object. • Delete the rule.

7.1.2.53 Error_MasterCopyOfInstanceScreenTypeNotSupported

ID	Error_MasterCopyOfInstanceScreenTypeNotSupported
Cause	The master copy is an instance of a screen type.
Solution	Ensure that a master copy of a screen is not an instance of a screen type.

7.1.2.54 Error_MasterCopyOfScreenCanNotBeFound

ID	Error_MasterCopyOfScreenCanNotBeFound
Cause	The "Master copy of a screen" in the SiVArc screen rule does not exist in the project library or a global library.
Solution	1. Open the "Screen rules" SiVArc editor. 2. In the relevant row of the "Master copy of a screen" column, select a screen object that was created in one of the libraries. 3. Double-click the "Master copy of a screen" column. All available screens are displayed.

7.1.2.55 Error_MasterCopyOfScreenCanNotBeMoved

ID	Error_MasterCopyOfScreenCanNotBeMoved
Cause	An error occurred during generation of a screen instance in the HMI device.
Solution	Check if the screen in the master copies is faulty or if it cannot be used in the HMI device type due to other restrictions. If necessary, replace the faulty screen with a correct screen or a newly created screen.

7.1.2.56 Error_Matrix_InvalidLayoutFieldGroup

ID	Error_Matrix_InvalidLayoutFieldGroup
Cause	The layout field group of the navigation buttons is used to generate a screen object, but this is not permitted. The screen object is not generated.
Solution	1. Open the "Generation matrix" SiVArc editor. 2. Navigate to the assignment of the corresponding screen object and select a different layout field group as the group that is used for the navigation buttons.

7.1.2.57 Error_Matrix_InvalidScreenItemMasterCopy

ID	Error_Matrix_InvalidScreenItemMasterCopy
Cause	The screen object master copy used in the generation of the screen object is inconsistent. For example, the screen object is not supported or it does not exist in the library.
Solution	1. Open the "Generation matrix" SiVArc editor. 2. Navigate to the assignment of the corresponding screen object. 3. Navigate to the screen rule and correct the problem with the screen object that is referenced in the "Screen object" column.

7.1.2.58 Error_Matrix_InvalidScreenMasterCopy

ID	Error_Matrix_InvalidScreenMasterCopy
Cause	The screen master copy used for generating the screen is inconsistent. For example, the screen is not supported or it does not exist in the library.
Solution	1. Open the "Generation matrix" SiVArc editor. 2. Navigate to the assignment of the corresponding screen. 3. Navigate to the screen rule and correct the problem with the screen master copy that is referenced in the "Master copy of a screen" column.

7.1.2.59 Error_Matrix_LayoutFieldGroupDoesnotExist

ID	Error_Matrix_LayoutFieldGroupDoesnotExist
Cause	The layout field group selected for the assignment of the screen object in the generation matrix does not exist in the screen master copy that is used to generate the target screen.
Solution	1. Open the "Generation matrix" SiVArc editor. 2. Navigate to the assignment of the corresponding screen object. 3. Select one of the two options: – Select one of the layout fields from the list box for assigning the screen object. – Create the required layout fields in the screen master copy of the rule from which the assigned screen object is generated.

7.1.2.60 Error_MaxTagCountReached

ID	Error_MaxTagCountReached
Cause	More than 500,000 HMI tags are to be created in the current generation. This number exceeds the maximum permitted number of tags to be generated.
Solution	Reduce the number of tags to be generated. You do this by either resetting a station selection or by resetting the "Visible for HMI" flag of a tag in the PLC program.

7.1.2.61 Error_MergeTextLists

ID	Error_MergeTextLists
Cause	Two or more SiVArc text list rules result in the generation of text lists with the same name. In this case, the text lists are merged into one list if the text list master copies are identical. However, the test list master copies are not identical here.
Solution	• Set the same master copy in the SiVArc "Text list rules" editor for rules that result in the generation of text lists with the same name. • In the SiVArc Properties editor, enter expressions for "Name" that will result in different values for the respective master copies.

7.1.2.62 Error_MissingScript

ID	Error_MissingScript
Cause	The script called in the screen object does not exist.
Solution	Select an available script in the "SiVArc events" editor of the screen object.

7.1.2.63 Error_NameTooLong

ID	Error_NameTooLong
Cause	The name of the generated object cannot be generated with the original name due to the naming conventions of WinCC. The name was abbreviated.
Solution	Open the relevant master copy of the library object and adapt the expression for the "Name" property in order to abbreviate the "Name" string generated by SiVArc.

7.1.2.64 Error_NotSupportedLayoutScreen

ID	Error_NotSupportedLayoutScreen
Cause	The referenced master copy of the positioning scheme is not supported. Example: "Button" has been referenced instead of "Screen".
Solution	1. Open the "Screen rules" SiVArc editor. 2. Open the screen master copy for the affected rule. 3. Configure valid properties for the positioning scheme: – If "Static" mode is set under "Layout selection", select the "Layout screen or folder" option by selecting the master copy that is available in one of the libraries. – When "Dynamic" mode is set under "Layout selection": Select the "Layout screen or folder" option by selecting the library folder that contains the master copies of the positioning scheme and is available in one of the libraries. Assign to the SiVArc expression the property "Expression for layout screen name" which can lead to one of the names of the master copies of the layout screen contained in the folder. All available screens and folders are displayed when you click the object selection under "Layout screen or folder".

7.1.2.65 Error_NotSupportedPopupScreenType

ID	Error_NotSupportedPopupScreenType
Cause	In RT Professional or on a Basic Panel, a pop-up screen is generated as a screen master copy in a screen rule.
Solution	Pop-up screens are not supported on RT Professional and Basic Panels. Delete the rule or select another object that supports this rule.

7.1.2.66 Error_NotSupportedScreenObject

ID	Error_NotSupportedScreenObject
Cause	The screen object called in the screen rule is not supported. Example: The screen object is a "Screen window"
Solution	1. In the "Screen object" column, select a screen object that is available in the project library. 2. Double-click the "Screen object" column. 3. The available screen objects are displayed. Proceed as follows to create a new screen in the project library: 1. Create a new screen. Copy the created screen. 2. Paste the copied screen into the "Master copies" folder in the project library.

7.1.2.67 Error_NotSupportedScreenType

ID	Error_NotSupportedScreenType
Cause	The called screen template is not supported. Example: A "Button" has been called instead of a "Screen".
Solution	1. Under "Master copy of a screen", select a screen from the project library. 2. Double-click a "Screen object". 3. All available screen templates are displayed. Alternative procedure: 1. Create a new screen. 2. Save the newly created screen in the project library.

7.1.2.68 Error_NoValidLicense

ID	Error_NoValidLicense
Cause	No valid SiVArc license available.
Solution	Install a valid SiVArc license on the computer.

7.1.2.69 Error_ObjectCreationFailedDueToErrorInExpression

ID	Error_ObjectCreationFailedDueToErrorInExpression
Cause	An error occurred when triggering the expression. Possible causes: Syntax error in the expression or missing tags.
Solution	Correct the expression in the corresponding "SiVArc property".

7.1.2.70 Error_ObjectCreationFailedDueToErrorInExpressionInMultilingualContext

ID	Error_ObjectCreationFailedDueToErrorInExpressionInMultilingualContext
Cause	An error occurred when resolving an expression. This alarm is usually caused by a syntax error in the expression or by undefined or faulty tags. Keep in mind that this is a property which supports multiple languages. This means that the expression is resolved for each SiVArc-relevant language, and the result can be different for each language. The error may only occur in one language. The error occurred in the displayed language.
Solution	1. Open the "SiVArc properties" editor. 2. Check the expression of the corresponding SiVArc property and the definitions of the tags used in it. These tags may also support multilingualism and must be checked for the faulty language. 3. Adapt the expression of the corresponding SiVArc property or the definitions of the utilized tags correspondingly. The "Alarms for expressions" help offers additional information on the displayed type of error.

7.1.2.71 Error_ObjectCreationFailedDueToVariableNotDef

ID	Error_ObjectCreationFailedDueToVariableNotDef
Cause	The expression entered for the specified property of the object causing the error includes an undefined tag.
Solution	Check the expression in the property of the object causing the error. Either correct the expression or define the tag.

7.1.2.72 Error_ObjectCreationFailedDueToVariableNotDefInMultilingualContext

ID	Error_ObjectCreationFailedDueToVariableNotDefInMultilingualContext
Cause	An undefined tag is used in an expression. Note that this is a multilingual expression. It is resolved for each SiVArc-relevant language. If this expression includes a multilingual, predefined tag, the result can be different for each language. If the predefined, multilingual tags contain different values, the result may be different error messages.
Solution	You must check for each SiVArc-relevant language whether the expression is faulty. This is necessary because predefined, multilingual tags included in the expression can assume different values for each language. The result may be different error messages for each language.

7.1.2.73 Error_ObjectGenerationFailed_InvalidName

ID	Error_ObjectGenerationFailed_InvalidName
Cause	The name of the generated object is invalid for the current HMI device.
Solution	1. Open the "SiVArc properties" editor. 2. Correct the "Name" property so that the expression results in a valid name.

7.1.2.74 Error_ObjectGenerationFailed_IsInvalidOnCurrentDevice_Screen

ID	Error_ObjectGenerationFailed_IsInvalidOnCurrentDevice_Screen
Cause	The requested screen cannot be generated in the current HMI device. Either the type is not supported or the master copy was created in an HMI device that is not supported.
Solution	1. Open the "Screen rules" SiVArc editor. 2. In the relevant row of the "Master copy of a screen" column, select a screen that is available in the project library and is supported by the target HMI device. The available screens are shown when you double-click the corresponding row in the "Master copy of a screen" column. Because the "Screen rules" SiVArc editor includes the rules for all HMI devices, you may see some screens that are not supported by a specific HMI device.

7.1.2.75 Error_ObjectGenerationFailed_IsInvalidOnCurrentDevice_ScreenItem

ID	Error_ObjectGenerationFailed_IsInvalidOnCurrentDevice_ScreenItem
Cause	The screen object you want to generate is not supported by the utilized HMI device. The called screen object may be a "Screen Window Control", for example, which is not supported by WinCC Advanced devices.
Solution	1. Open the "Screen rules" SiVArc editor. 2. In the relevant row of the "Screen object" column, select a screen object that is available in the project library and is supported by the target HMI device. The available screen objects are shown when you double-click the corresponding row in the "Screen object" column. Because the "Screen rules" SiVArc editor includes the rules for all HMI devices, you may see some screen objects that are not supported by a specific HMI device.

7.1.2.76 Error_ObjectGenerationFailedBecauseInvalid

ID	Error_ObjectGenerationFailedBecauseInvalid
Cause	An error occurred during generation of an HMI tag.
Solution	Check whether the PLC tag is valid.

7.1.2.77 Error_ObjectGenerationFailedBecauseInvalidTable

ID	Error_ObjectGenerationFailedBecauseInvalidTable
Cause	The respective HMI tag table is unavailable.
Solution	Correct the name of the tag table or specify a valid tag table.

7.1.2.78 Error_ObjectGenerationFailedBecauseLibraryIdInvalid

ID	Error_ObjectGenerationFailedBecauseLibraryIdInvalid
Cause	The corresponding object is not available in the library.
Solution	Correct the object in the library or select a suitable screen object in the "Screen rules" SiVArc editor.

7.1.2.79 Error_OverflowScreenCount_VarNotDef

ID	Error_OverflowScreenCount_VarNotDef
Cause	The expression entered for the number of overflow screens includes an undefined tag.
Solution	1. Open the SiVArc properties editor for the master copy that is causing the error. 2. Check the "Number of overflow screens" property. 3. Either correct the expression or define a suitable tag so that the resolved expression results in a positive integer smaller than 33.

7.1.2.80 Error_OverflowScreenCountWrongValue

ID	Error_OverflowScreenCountWrongValue
Cause	The value entered or resulting from the resolved expression for the number of overflow screens is either less than 0 or greater than 32, which means it is located outside the permitted range.
Solution	1. Open the SiVArc properties editor for the master copy that is causing the error. 2. Check the "Number of overflow screens" property. 3. Either correct the expression or define a suitable tag so that the resolved expression results in a positive integer smaller than 33.

7.1.2.81 Error_ParentScreenCanNotBeFound

ID	Error_ParentScreenCanNotBeFound
Cause	It is not possible to generate the screen object from the screen rules or at a screen that does not exist in the HMI device. Each screen object that is generated in an HMI device must be assigned to a screen.
Solution	Before generating the screen object, make sure that the parent screen exists in the HMI device. The screen on which the screen objects are located must be created using screen rules and before the application of the rules for the screen object.

7.1.2.82 Error_PlcDeviceIsInvalidIpiProxy

ID	Error_PlcDeviceIsInvalidIpiProxy
Cause	The corresponding proxy was not initialized or an error occurred during initialization, or the proxy was initialized without data blocks.
Solution	Update the corresponding proxy or disable the generation of this proxy before the SiVArc generation is started again.

7.1.2.83 Error_PlcDeviceNeedsCompile

ID	Error_PlcDeviceNeedsCompile
Cause	The STEP7 program includes changes that have not yet been compiled.
Solution	Compile the STEP7 program.

7.1.2.84 Error_PlcPrefixNotSet

ID	Error_PlcPrefixNotSet
Cause	Conflict of tag names.
Solution	1. Open the "Runtime settings" of the HMI device. 2. Click "Settings for tags". 3. Enable the option "PLC name as prefix in the HMI tag name"

7.1.2.85 Error_ReadUICulture

ID	Error_ReadUICulture
Cause	Could not determine the set language of the user interface.
Solution	Please contact Support.

7.1.2.86 Error_ReleasedVersionforFbLibraryTypeNotFound

ID	Error_ReleasedVersionforFbLibraryTypeNotFound
Cause	A rule references a PLC program block type in the "Screen rules" or "Text list rules" SiVArc editor that is still in progress and does not contain a released version.
Solution	Release the version for the corresponding PLC program block type or discard the version in progress.

7.1.2.87 Error_RuleImport_Workbook

ID	Error_RuleImport_Workbook
Cause	The XLS file to be imported does not contain a worksheet which matches the specification. The import file is empty or the included worksheets do not contain the correct column names.
Solution	Check the content of the import file. There must be a worksheet with correct column names that correspond to the rule properties.

7.1.2.88 Error_ScreenAsMasterCopyGroupNotSupported

ID	Error_ScreenAsMasterCopyGroupNotSupported
Cause	An invalid library element is referenced in the 'Master copy of a screen' column in the screen rule. It is not a master copy for an individual screen, but a group of several master copies/screens . Such groups are not supported as a 'master copy of a screen'.
Solution	Copy the screen that you want to select in the screen rule as a single element into the master copies folder in the library.

7.1.2.89 Error_ScreenItemCanNotCreatedOnScreenInstance

ID	Error_ScreenItemCanNotCreatedOnScreenInstance
Cause	The screen is an instance of a screen type.
Solution	Ensure that a master copy of a screen is not an instance of a screen type.

7.1.2.90 Error_ScreenItemGenerationFailedBecauseLibraryIdInvalid

ID	Error_ScreenItemGenerationFailedBecauseLibraryIdInvalid
Cause	The master copy of a screen object is not available in the library.
Solution	Open the "Screen rules" SiVArc editor and select a suitable object in the "Screen object" column.

7.1.2.91 Error_ScreenItemNameIsEmpty

ID	Error_ScreenItemNameIsEmpty
Cause	The resolved expression of the SiVArc property "Name" results in an empty value.
Solution	Correct the SiVArc name property of the utilized screen object so that the name is resolved into a valid value.

7.1.2.92 Error_ScreenModuleReleasedVersionNotFound

ID	Error_ScreenModuleReleasedVersionNotFound
Cause	There is no released version of the faceplate called.
Solution	Release the called faceplate in the project library: 1. Select "Release version" from the shortcut menu of the faceplate.

7.1.2.93 Error_ScreenNameInvalid

ID	Error_ScreenNameInvalid
Cause	The resolved expression of the SiVArc property "Name" results in an invalid value. Different HMI device types have different restrictions for the valid screen names.
Solution	Correct the "Name" property of the used screen in the "SiVArc properties" editor so that the name is resolved into a valid value.

7.1.2.94 Error_ScreenNameIsEmpty

ID	Error_ScreenNameIsEmpty
Cause	The resolved expression of the SiVArc property "Name" results in an empty value.
Solution	Correct the "Name" property of the utilized screen in the "SiVArc properties" editor so that the name is resolved into a valid value.

7.1.2.95 Error_ScreenObjectAsMasterCopyGroupNotSupported

ID	Error_ScreenObjectAsMasterCopyGroupNotSupported
Cause	An invalid library element is referenced in the 'Screen object' column in the screen rule. It is a group of several master copies/screens rather than a master copy for an individual screen object. Such groups are not supported as a 'screen elements'.
Solution	Copy the screen object that you want to select in the screen rule as a single element into the master copies folder in the library.

7.1.2.96 Error_ScreenObjectNotFound

ID	Error_ScreenObjectNotFound
Cause	The name of the screen object has been changed in the project library.
Solution	1. Select a screen element in the "Screen object" column. 2. Double-click the "Screen object" column. All available screen objects are displayed. Proceed as follows to create a new picture element in the project library: 1. Open an available screen. 2. Move a screen object to the screen using drag-and-drop. 3. Assign parameters to the screen object. 4. Copy the screen object. 5. Paste the screen object into the "Master copies" folder of the project library.

7.1.2.97 Error_ScreenRuleNoScreenInstanceAsScreenType

ID	Error_ScreenRuleNoScreenInstanceAsScreenType
Cause	The master copy is an instance of a screen type.
Solution	Ensure that a master copy of a screen is not an instance of a screen type.

7.1.2.98 Error_ScreenTypeNotFound

ID	Error_ScreenTypeNotFound
Cause	The name of the screen template has been changed in the project library.
Solution	Make sure that the name of the screen template has not been unintentionally changed in the screen rules editor.

7.1.2.99 Error_SivarcRuleConditionError

ID	Error_SivarcRuleConditionError
Cause	The expression in the screen rule condition contains a syntax error. A required tag could not be found.
Solution	1. Check the expression in the condition.

7.1.2.100 Error_SivarcRuleConditionError2

ID	Error_SivarcRuleConditionError2
Cause	The tag which that was defined in the expression does not exist.
Solution	1. Check the names of the tags in the expression. 2. Navigate to the network of the specific program block. 3. Enter a valid tag definition under "Tag definition".

7.1.2.101 Error_SivarcRuleConditionWrongType

ID	Error_SivarcRuleConditionWrongType
Cause	The expression in the screen rule under "Condition" has not been resolved into True or False.
Solution	1. Resolve the expression under "Condition" into True or False.

7.1.2.102 Error_TagExists

ID	Error_TagExists
Cause	An HMI tag with the same name has already been generated.
Solution	Check the STEP 7 programs used and make sure that no HMI tags will be created with the same name.

7.1.2.103 Error_TagGen_UnsupportedDataType

ID	Error_TagGen_UnsupportedDataType
Cause	The data type in the block is not supported.
Solution	Disable the "Accessible from HMI" option.

7.1.2.104 Error_TagRuleError

ID	Error_TagRuleError
Cause	An expression in the tag editor contains a syntax error.
Solution	Check the expression in the column specified.

7.1.2.105 Error_TagRuleError_VarNotDef

ID	Error_TagRuleError_VarNotDef
Cause	Could not execute the tag rule because it uses an expression with a user-defined tag.
Solution	Open the "Tag rules" editor and correct the faulty expression in the rule. In tag rules, only predefined tags may be used in expressions.

7.1.2.106 Error_TagTableCanNotCreate

ID	Error_TagTableCanNotCreate
Cause	The resolved name of the tag table is invalid. Different HMI device types can have different restrictions for the valid names.
Solution	Open the "Tag rules" editor and adapt the entry in the "Tag table" column.

7.1.2.107 Error_TextEntryAlreadyExists

ID	Error_TextEntryAlreadyExists
Cause	The configuration of text lists in the master copy results in the generation of multiple entries with the same name. The names of the text list entries must be unique.
Solution	Ensure there are no multiple text list entries with the same name in the call structure of the PLC.

7.1.2.108 Error_TextListAsMasterCopyGroupNotSupported

ID	Error_TextListAsMasterCopyGroupNotSupported
Cause	An invalid text list element is referenced in the 'Master copy of a text list' column in the screen rule. It is not a master copy of an individual text list, but a group of several master copies/text lists. Such groups are not supported as a 'master copy of a text list'.
Solution	Copy the text lists that you want to select in the text list rule as a single element into the master copies folder in the library.

7.1.2.109 Error_TextListCreationFailedDueToErrorInExpressionInMultilingualContext

ID	Error_TextListCreationFailedDueToErrorInExpressionInMultilingualContext
Cause	An error occurred when resolving an expression. This alarm is usually caused by a syntax error in the expression or by undefined or faulty tags. Keep in mind that this is a property which supports multiple languages. This means that the expression is resolved for each SiVArc-relevant language, and the result can be different for each language. The error may only occur in one language. The error occurred in the displayed language.
Solution	1. In the STEP 7 program, open the program block that includes the function call initiating the text list generation. 2. Click the block comment, and check the SiVArc text definitions for the faulty text list entry in the "Plug-Ins". Check the entries in the "SiVArc tag expression" column in particular. Keep in mind that predefined tags can also support multiple languages and must be checked for the faulty language. 3. Correct the faulty expression or the definitions of the utilized tags accordingly. 4. The "Alarms for expressions" help offers additional information on the displayed type of error.

7.1.2.110 Error_TextlistCreationFailedDueToNoGenerationlevelTagsMatched

ID	Error_TextlistCreationFailedDueToNoGenerationlevelTagsMatched
Cause	The tags that are synchronized with a regular expression in the master copy do not match the generation levels of the master copy.
Solution	The operand type of the synchronized tags must match at least one generation level configured in the master copy. If the generation levels match, the tag address is used as a starting point for the text list generation.

7.1.2.111 Error_TextlistCreationFailedDueToNoMatchingProgramblockVariables

ID	Error_TextlistCreationFailedDueToNoMatchingProgramblockVariables
Cause	The regular expression in the text list master copy cannot be resolved for any program block tag of the function block.
Solution	Check whether the regular expression configured in the master copy can be resolved for a valid program block tag of the function block. The regular expression can be a simple string or an expression with an asterisk. • The error occurs when the regular expression has been configured as "Text*" with an asterisk and the program block tags are named "FirstVar1", "SecondVar1". In this case, configure the tags in the following format: "TextFirstVar1", "TextSecondVar1". • If the regular expression has been configured without an asterisk, for example "FirstVar1", the function block tag must contain the exact name ("FirstVar1"). Other names will be ignored for the generation.

7.1.2.112 Error_TextListCreationFailedDuetoNonMatchingDataBlockCallers

ID	Error_TextListCreationFailedDuetoNonMatchingDataBlockCallers
Cause	You have configured a regular expression in the text list master copy. However, the expression cannot be resolved for any valid program block tags which are used for generating the tags of the PLC tag table.
Solution	The values of the synchronized program block tags based on a regular expression of a master copy must be valid tags from the PLC symbol table. These tags cannot contain any default values or data types unknown to the PLC.

7.1.2.113 Error_TextlistCreationFailedDueToNoRegularExpression

ID	Error_TextlistCreationFailedDueToNoRegularExpression
Cause	The "Block parameter name" property in the text list master copy is empty.
Solution	The "Block parameter name" property in the text list master copy must contain either a simple string or a regular expression. The regular expression must be based on the program block tags of the text list control that are used for the text list generation.

7.1.2.114 Error_TextListCreationFailedDueToVariableNotDefInMultilingualContext

ID	Error_TextListCreationFailedDueToVariableNotDefInMultilingualContext
Cause	An undefined tag is used in an expression. As a result, an error occurred when resolving the expression. Keep in mind that this is a multilingual expression. It is resolved for each SiVArc-relevant language. If this expression includes a multilingual, predefined tag, the result can be different for each language. If the predefined, multilingual tags contain different values, the result may be different error messages.
Solution	1. In the STEP 7 program, open the program block that includes the function call initiating the text list generation. 2. Click the block comment, and check the SiVArc text definitions for the faulty text list entry in the "Plug-Ins". In particular, check the entries in the "SiVArc tag expression" column and make sure that an undefined tag is not used. Keep in mind that predefined tags can also support multiple languages and must be checked for the faulty language.

7.1.2.115 Error_TextListTypeNotFound

ID	Error_TextListTypeNotFound
Cause	A text list was entered in the "Master copy of a text list" column in a SiVArc text list rule which does not exist in the project.
Solution	1. Open the "Text list rules" SiVArc editor. 2. Select a master copy of a text list which exists in a library for the corresponding, faulty SiVArc text list rule.

7.1.2.116 Error_TextListTypeNotSupported

ID	Error_TextListTypeNotSupported
Cause	The master copy that you have configured in the text list rules is not the "HmiTextList" type. To generate a text list in an HMI device, the master copy must have the text list type.
Solution	Verify that the master copy used in the text list rules has the text list type.

7.1.2.117 Error_UICultureNotSupported

ID	Error_UICultureNotSupported
Cause	The user interface of the TIA Portal is not set to English.
Solution	Set the user interface of the TIA Portal to English.

7.1.2.118 Error_WriteableLibraryLayoutScreen

ID	Error_WriteableLibraryLayoutScreen
Cause	The positioning scheme referenced by the screen master copy of the rule is located in a global library opened for writing.
Solution	Close the library and open it again with write protection.

7.1.2.119 Error_WriteableLibraryLibObjType

ID	Error_WriteableLibraryLibObjType
Cause	The library object referenced in the rule is located in a global library opened for writing.
Solution	Close the library and open it again with write protection.

7.1.2.120 Error_WriteableLibraryScreenObject

ID	Error_WriteableLibraryScreenObject
Cause	A screen object is referenced in a SiVArc screen rule and this object is located in a global library opened for writing.
Solution	Close the global library opened for writing. Open the library as read-only.

7.1.2.121 Error_WriteableLibraryScreenType

ID	Error_WriteableLibraryScreenType
Cause	A required global library is open without write protection.
Solution	Close the library and open it again with write protection.

7.1.2.122 Error_WriteableLibraryTextListType

ID	Error_WriteableLibraryTextListType
Cause	A text list is referenced in a rule in the "Text list rules" SiVArc editor and this list is located in a global library opened for writing.
Solution	Close the global library opened for writing. Open the library as read-only.

7.1.3 Warnings

7.1.3.1 LogWarning_TextEntryCouldNotBeResolved

ID	LogWarning_TextEntryCouldNotBeResolved
Cause	No corresponding text definition could be found in the PLC program for the name of the text list entry in the master copy.
Solution	The text definitions of all entries in the master copy must also be defined in the PLC program. Multilingual entries are generated in the newly created text lists for all matching text definitions.

7.1.3.2 Warning_AdditionalContentScreeninMasterCopryGroup

ID	Warning_AdditionalContentScreeninMasterCopryGroup
Cause	An attempt was made to generate additional screens in a library folder and this folder contains a group of master copies which also include master copies of screens. These could not be generated as additional screens because SiVArc master copy groups are not supported.
Solution	Copy the master copies of the screens that are contained in the master copy group as single elements into the library folder from which additional screens should be generated.

7.1.3.3 Warning_AnimationHasInvalidTag

ID	Warning_AnimationHasInvalidTag
Cause	The specified HMI tag to be connected does not exist or is not accessible for the HMI device.
Solution	1. Enable the "Accessible in HMI" option at the PLC tag.

7.1.3.4 Warning_BaseScreenInOtherFolder

ID	Warning_BaseScreenInOtherFolder
Cause	A generated screen with the same name already exists in another folder.
Solution	1. Adapt the "Master copy" screen object in the library. 2. Correct either the SiVArc property "Name" or the SiVArc property "Folder".

7.1.3.5 Warning_DeleteObjectInUse

ID	Warning_DeleteObjectInUse
Cause	• To prevent undesirable loss of data, the screen is not deleted. • The screen is no longer generated by SiVArc and is to be deleted, even though it still contains objects.
Solution	Delete the screen manually.

7.1.3.6 Warning_DeleteObjectInUseTagFolder

ID	Warning_DeleteObjectInUseTagFolder
Cause	A tag group is no longer generated by SiVArc and is to be deleted, although it still contains objects that were generated by the user.
Solution	Delete the tag group manually.

7.1.3.7 Warning_DeleteTagtInUse

ID	Warning_DeleteTagtInUse
Cause	A tag is no longer generated by SiVArc and is to be deleted, although objects created by the user still access this tag.
Solution	Delete the tag manually if you no longer need it.

7.1.3.8 Warning_EndlessCallLoopDetected

ID	Warning_EndlessCallLoopDetected
Cause	An infinite loop was detected in the call hierarchy of the specified PLC block.
Solution	Check the Step 7 program and remove the infinite loop.

7.1.3.9 Warning_EventHasInvalidPropertyName

ID	Warning_EventHasInvalidPropertyName
Cause	The required screen object property for the system function parameter is not available during SiVArc generation. Example: The "SetPropertyByTag" system function has the "Property name" parameter. This warning is issued if the specified property name for the screen object that you specified in the "Screen object" parameter is not available.
Solution	Assign the correct language-specific property name in the "Property name" parameter.

7.1.3.10 Warning_EventHasInvalidScreen

ID	Warning_EventHasInvalidScreen
Cause	The screen expected by a system function parameter is not available during SiVArc generation. Example: The "SetPropertyByTag" system function has the "Screen name" parameter. If the value specified for a screen is resolved but the screen does not exist on the HMI device, this warning is issued.
Solution	Ensure that the screen with the specified name is available on the HMI device.

7.1.3.11 Warning_EventHasInvalidScreenItem

ID	Warning_EventHasInvalidScreenItem
Cause	The expected screen object is not available for assignment to a system function parameter during SiVArc generation. Example: The "SetPropertyByTag" system function has the "Screen object" parameter. If the value specified is resolved into a screen object that does not exist in the specified screen, this warning is issued.
Solution	Ensure that the corresponding screen and screen object are available with the specified name.

7.1.3.12 Warning_EventHasInvalidTagType

ID	Warning_EventHasInvalidTagType
Cause	The tag specified in the parameter has a different type than the one expected for this parameter. Example: The tag in the "SetBit" function must be a BOOL type. Another type, e.g. INT, is not allowed.
Solution	Ensure that the tag for the parameter has the correct type.

7.1.3.13 Warning_FunctionHasInvalidTag

ID	Warning_FunctionHasInvalidTag
Cause	The HMI tag to be connected does not exist.
Solution	Check the name of the HMI tag which creates the tag name in the screen object in the master copy of the library.

7.1.3.14 Warning_FunctionListCanNotAdd

ID	Warning_FunctionListCanNotAdd
Cause	An error occurred when adding the function to the screen object.
Solution	1. Check the settings under "SiVArc events" of the screen object in the master copy of the library. 2. If the function is a user-defined script, check that the script exists in the project. 3. Check that the functions of the parameters are valid.

7.1.3.15 Warning_FunctionParameterInvalidValueSetDefault

ID	Warning_FunctionParameterInvalidValueSetDefault
Cause	An expression for an Enum parameter of a system function is resolved to an unexpected value. Example: The "Layout" parameter of the "ShowPopupScreen" system function expects the values "Switch", "On" or "Off". Any other value is ignored and the parameter is automatically set to the default value.
Solution	For the parameters, enter only values or SiVArc expressions that are resolved to valid values.

7.1.3.16 Warning_FunctionParameterValueIsInvalid

ID	Error_FunctionParameterValueIsInvalid
Cause	• One or more parameters of the called function have an invalid data type. • The resolved value of an expression results in an invalid data type.
Solution	• Make sure that the defined data types are valid for the function called. • The resolved expression must create a valid value. Valid data types: – hmitag – string – double – int32.

7.1.3.17 Warning_FunctionParameterValueLengthIsInvalid

ID	Warning_FunctionParameterValueLengthIsInvalid
Cause	The values for the integer function parameters are outside the permitted range. Example: An integer value must be entered in the "Object number" parameter of the "ActivateScreen" system function. If the specified value is not within the permitted range, the warning is issued.
Solution	For the parameters, enter only values or SiVArc expressions that are resolved within the permitted range.

7.1.3.18 Warning_InstanceOfScreenTypeInTest

ID	Warning_InstanceOfScreenTypeInTest
Cause	It is not possible to change a write-protected screen instance of a screen type.
Solution	Enable the relevant screen type.

7.1.3.19 Warning_InvalidProperty

ID	Warning_InvalidProperty
Cause	The configured or resolved value of the expression results in a text or graphic list that does not exist.
Solution	Enter only the names of the text or graphic lists that already exist when configuring the text or graphic list properties of screen objects in the SiVArc plug-in.

7.1.3.20 Warning_InvalidTRefProperty

ID	Warning_InvalidTRefProperty
Cause	The SiVArc expression configured for a faceplate property was resolved with an invalid value. The value specified is either not supported on the referenced HMI device or does not exist. Example: A graphic or text list that is referenced by a faceplate property does not exist on the HMI device.
Solution	Open the corresponding faceplate type and enter the valid expression in the property that can be resolved to a valid value.

7.1.3.21 Warning_LayoutFieldForNavButtonNotFound

ID	Warning_LayoutFieldForNavButtonNotFound
Cause	The problem can have two causes: 1. The layout field group for navigation that was configured in the screen master copy does not exist. 2. The layout field group for navigation only contains one layout field. In this case, the second navigation button is created without positioning.
Solution	1. Open the "Screen rules" editor in SiVArc. 2. Open the screen master copy of the rule involved and go to "Properties". 3. Set the "Layout field for navigation" property by selecting a layout field from the list box. As an alternative, you can create a new layout field with the same name as the name you have set in the "Layout field for navigation" property. Ensure that the layout field group for generating the navigation buttons has two layout fields.

7.1.3.22 Warning_Matrix_NavigationItemHasInvalidActivateScreenReference

ID	Warning_Matrix_NavigationItemHasInvalidActivateScreenReference
Cause	The "ActivateScreen" system function references a screen that is not available on the HMI device. The system function is not generated for the navigation object based on the screen assignments of the matrix.
Solution	1. Open the "Generation matrix" editor in SiVArc and open the corresponding assignment. 2. Go to the row with the screen name that is referenced in the deleted "ActivateScreen" system function. 3. If the screen is also used for the target device, select the check box of the target device and generate again. If the screen for the target device is not relevant, navigation to a non-existent screen through the deleted function is not possible.

7.1.3.23 Warning_Matrix_ScreenDoesNotExist

ID	Warning_Matrix_ScreenDoesNotExist
Cause	The screen does not exist on the HMI device and the navigation object based on the screen assignments of the matrix cannot be generated.
Solution	The screen assigned to the navigation object that exists in the source device in the generation matrix must be available all target devices. Ensure that the rule that generates screens for navigation objects for the source devices is also executed for the target devices.

7.1.3.24 Warning_NameTooLong_Tag

ID	Warning_NameTooLong_Tag
Cause	The name of an HMI tag is longer than 128 characters. A tag name has a direct effect on the depth of a structure that is used in a PLC program.
Solution	Names for HMI tags should not exceed 128 characters. Reprogram the structure in such a way that it avoids deep nesting. Disable the "Accessible from HMI" option.

7.1.3.25 Warning_NameTooLong_TagTable

ID	Warning_NameTooLong_TagTable
Cause	The name of an "HMI tag table" is longer than 128 characters.
Solution	The name of an "HMI tag table" must not exceed 128 characters. 1. Check the text or expression in the "Tag table" in the tag rule column. 2. Correct the name.

7.1.3.26 Warning_NavigationItemNotFound

ID	Warning_NavigationItemNotFound
Cause	User-defined buttons do not exist for the overflow screens. Standard buttons are used instead.
Solution	In the library, save user-defined buttons for the overflow screens: • Button for previous screen: Master copy\PreviousButton • Button for next screen: Master copy\NextButton

7.1.3.27 Warning_NavigationItemNotSupported

ID	Warning_NavigationItemNotSupported
Cause	The project library contains user-defined screen objects which are to serve as navigation buttons for the overflow screen navigation. However, these are not buttons. A text field was named NextButton or PrevButton, for example, and copied to the master copies of the project library.
Solution	Save buttons as user-defined buttons in the library for use in the overflow screen navigation: • Storage location of the utilized navigation buttons for previous screen: "MasterCopy\PrevButton". • Storage location of the utilized navigation buttons for next screen: "MasterCopy\NextButton"

7.1.3.28 Warning_NoDeviceSelectedInAllScreenRules

ID	Warning_NoDeviceSelectedInAllScreenRules
Cause	No device (PLC, HMI, HMI device type) is selected for any rule in the screen rule editor.
Solution	Check the information about the devices (PLC, HMI, HMI device type) in the screen rule editor.

7.1.3.29 Warning_NoHmiDevicesSelectedForGeneration

ID	Warning_NoHmiDevicesSelectedForGeneration
Cause	No HMI device is selected in the SiVArc device selection dialog.
Solution	To perform a SiVArc generation, you must select at least one HMI device in the device selection dialog.

7.1.3.30 Warning_NoSelectedPlcDevices

ID	warning_NoSelectedPlcDevices
Cause	A PLC was not selected for generation in the SiVArc PLC station selection dialog.
Solution	Start SiVArc generation again and select at least one PLC for the generation in the station selection dialog.

7.1.3.31 Warning_NoTextEntriesCouldBeResolved

ID	Warning_NoTextEntriesCouldBeResolved
Cause	SiVArc has generated a text list for which not even a single text could be generated for a text entry. This occurs if no associated text definitions were found in the PLC program.
Solution	Navigate to the location where the program block was called that has initiated the corresponding text list generation. Now take a look at all networks above up to the block title or the program block that initiated the last text list generation. Navigate to the SiVArc Plugin editor of each network and check in the "Text definitions" category if there is a text definition with an ID (= entry in "Name" column) that matches at least one name in the text list entries of the corresponding text list.

7.1.3.32 Warning_NotSupportedAnimation

ID	Warning_NotSupportedAnimation
Cause	An unsupported animation is used at a screen object. For example, the "Control enable" animation can be configured at the "GRAPH overview" object for Runtime Professional. Runtime Advanced does not support this animation for this object.
Solution	Make sure to only use animations that are supported by the desired device.

7.1.3.33 Warning_OverflowScreenCountMismatch

ID	Warning_OverflowScreenCountMismatch
Cause	There are several SiVArc screen master copies that define the same screen. The SiVArc screen types have defined different values for the SiVArc property "Number of overflow screens".
Solution	In the library, modify the SiVArc property "Number of overflow screens" in the various master copies so that they all request the same number of overflow screens.

7.1.3.34 Warning_PropertyCanNotSet

ID	Warning_PropertyCanNotSet
Cause	An error occurred when setting a property of a faceplate or a screen object: The value at which the property is to be set is invalid for the property. This is the case, for example, when the value has an incorrect data type.
Solution	Check the value or expression in the SiVArc faceplate properties/SiVArc properties of the screen object in the library. Ensure that the resulting value matches the faceplate interface data type (for example, a string is used for an interface object with the "String" type).

7.1.3.35 Warning_PropertyCanNotSetReadOnly

ID	Warning_PropertyCanNotSetReadOnly
Cause	An error occurred when setting a property of a faceplate or a screen object: The property that is to be set is write-protected in the utilized HMI device or is not supported by it. The restrictions depend on the type of HMI device, which means they are different for WinCC Professional and WinCC Advanced HMI devices.
Solution	Avoid the use of screen objects that are not supported by the HMI device.

7.1.3.36 Warning_PropertyCanNotSetReadOnlyDynamicValue

ID	Warning_PropertyCanNotSetReadOnlyDynamicValue
Cause	An error occurred when setting a dynamization of a property of a faceplate or a screen object: The property that is to be set is write-protected in the utilized HMI device or is not supported by it. The restrictions depend on the type of HMI device, which means they are different for WinCC Professional and WinCC Advanced HMI devices, for example.
Solution	Avoid the use of screen objects that are not supported by the HMI device.

7.1.3.37 Warning_PropertyCanNotSetReadOnlyStaticValue

ID	Warning_PropertyCanNotSetReadOnlyStaticValue
Cause	An error occurred when setting a static value of a property of a faceplate or a screen object: The property that is to be set is write-protected in the utilized HMI device or is not supported by it. The restrictions depend on the type of HMI device, which means they are different for WinCC Professional and WinCC Advanced HMI devices, for example.
Solution	Avoid the use of screen objects that are not supported by the HMI device.

7.1.3.38 Warning_PropertyHasInvalidTag

ID	Warning_PropertyHasInvalidTag
Cause	The specified HMI tag to be interconnected with the property of a screen object does not exist, has the wrong version or has the wrong type.
Solution	Check the SiVArc properties of the incorrect screen object in the library: Check the expression used by SiVArc to create the name of the HMI tag to be linked. Example: In case of a bad I/O field: Check the expression in the SiVArc property "Process value" in the "Printout of tags" column for the master copy used in the library.

7.1.3.39 Warning_Renamed

ID	Warning_Renamed
Cause	Naming conflict between a tag created by the user and a tag generated by SiVArc. Name conflict between a user-created screen and a screen generated by SiVArc. To avoid the loss of data, the object created by the user has been renamed.
Solution	Resolve the naming conflict either by deleting the renamed object or by giving it a different name.

7.1.3.40 Warning_RenamedInstanceOfScreenType

ID	Warning_RenamedInstanceOfScreenType
Cause	There was a name conflict between a user-created instance of a screen type and a SiVArc-generated instance of the screen type. To avoid the loss of data, the user-generated object has been renamed.
Solution	Resolve the naming conflict either by deleting the renamed object or by giving it a different name.

7.1.3.41 Warning_RenamedScreenItem

ID	Warning_RenamedScreenItem
Cause	Naming conflict between a screen object that was created by the user and a screen object generated by SiVArc. To avoid the loss of data, the object created by the user has been renamed.
Solution	Resolve the naming conflict either by deleting the renamed object or by giving it a different name.

7.1.3.42 Warning_RuleImport_CyclicReferenceFoundForGroup

ID	Warning_RuleImport_CyclicReferenceFoundForGroup
Cause	The parent-child relationship between rule groups is not correct in the Excel worksheet.
Solution	Check and correct the relationships of the rule groups in Excel or move the rules and rule groups in the rule editor.

7.1.3.43 Warning_RuleImport_InvalidDeviceTypeValue

ID	Warning_RuleImport_InvalidDeviceTypeValue
Cause	The "Device type" column of the Excel worksheet contains values other than TRUE or FALSE.
Solution	Check and correct the information in the "Device type" column in Excel or change the data in the rule editor.

7.1.3.44 Warning_RuleImport_InvalidDeviceValue

ID	Warning_RuleImport_InvalidDeviceValue
Cause	The "Devices" column of the Excel worksheet contains values other than TRUE or FALSE.
Solution	Check and correct the information in the "Devices" column in Excel or change the data in the rule editor.

7.1.3.45 Warning_RuleImport_NoValidWorksheetFound

ID	Warning_RuleImport_NoValidWorksheetFound
Cause	The format of the Excel worksheets is invalid or the worksheets are not available.
Solution	Verify that the Excel worksheets have the correct names and conform to the correct format.

7.1.3.46 Warning_RuleImport_ObsoleteColumnsFound

ID	Warning_RuleImport_ObsoleteColumnsFound
Cause	The Excel worksheet contains one or more columns that are not present in the rule editor and cannot be imported.
Solution	Create the missing columns in the rule editor before the next import or ignore the alarm

7.1.3.47 Warning_RuleImport_ParentGroupNotFoundForGroup

ID	Warning_RuleImport_ParentGroupNotFoundForGroup
Cause	It is not possible to import a rule group from Excel because the parent rule group does not exist in the rule editor.
Solution	Create the rule group and move the rule group into this group or correct the data in Excel.

7.1.3.48 Warning_RuleImport_ParentGroupNotFoundForRule

ID	Warning_RuleImport_ParentGroupNotFoundForRule
Cause	It is not possible to import a rule from Excel because the parent rule group does not exist in the rule editor.
Solution	Create the rule group and move the rule into this group or correct the data in Excel.

7.1.3.49 Warning_ScreenItemAlreadyExistsInLinkedScreen

ID	Warning_ScreenItemAlreadyExistsInLinkedScreen
Cause	Two objects generated by SiVArc have the same name. The screen object created by a positioning scheme cannot be created if there is a screen object with an identical name in the same screen or in the overflow screens.
Solution	Check the SiVArc "Name" property of the screen objects. One possible solution would be to supplement the "Name" property with an additional SiVArc expression in order to generate unique names.

7.1.3.50 Warning_ScreenItemAlreadyExistsInScreen_2

ID	Warning_ScreenItemAlreadyExistsInScreen_2
Cause	Two objects generated by SiVArc have the same name.
Solution	Check the SiVArc property "Name" of the screen objects.

7.1.3.51 Warning_ScreenItemCanNotCreatedByLib

ID	Warning_ScreenItemCanNotCreatedByLib
Cause	An assigned name for a library has been allocated to an unexpected screen object type. For example, a button has been saved in the master copy with the name "DefaultScreenWindowControl".
Solution	Rename the screen object in the library.

7.1.3.52 Warning_ScreenItemDoesNotFit

ID	Warning_ScreenItemDoesNotFit
Cause	A screen object for which fixed positioning is set in the SiVArc properties editor does not fit or fits only partially on the screen.
Solution	Check the defined values in the "Position" category for the corresponding master copy in the SiVArc properties editor. The registered coordinates plus width or height of the screen object may not exceed the area of the target window. Alternatively, the size of the target window can be increased as appropriate.

7.1.3.53 Warning_ScreenItemIsNotVisibleFromLib

ID	Warning_ScreenItemIsNotVisibleFromLib
Cause	A screen object is to be generated in an HMI device, but the screen object is not supported by the HMI device type used. For example, no screen objects of the S7 Graph Overview type may be used in HMI devices of the WinCC Advanced type.
Solution	Correct the screen object in the screen rule or enter a screen object supported by the HMI device.

7.1.3.54 Warning_ScreenItemNameTooLong

ID	Warning_ScreenItemNameTooLong
Cause	The name of the generated screen object is longer than 128 characters.
Solution	Names for screen objects may not exceed 128 characters. Check the SiVArc "Name" property in the corresponding screen object in the master copy library.

7.1.3.55 Warning_ScreenItemsCanNotMove

ID	Warning_ScreenItemsCanNotMove
Cause	A screen object generated by the user cannot be restored.
Solution	You must create the screen object again after the SiVArc generation.

7.1.3.56 Warning_ScreenSizeChangeForRtAdvanced

ID	Warning_ScreenSizeChangeForRtAdvanced
Cause	When generating a screen for an HMI device of the "WinCC RT Advanced" type, the size of the screen was adjusted automatically. The screen size in HMI devices of the "WinCC RT Advanced" type is fixed at 1024 x 768 pixels.
Solution	Use a master copy in the appropriate size of 1024 x 768 pixels for WinCC RT Advanced.

7.1.3.57 Warning_ScreenWindowControlNotFound

ID	Warning_ScreenWindowControlNotFound
Cause	No user-defined standard ScreenWindowControl was found in the library. Instead, a ScreenWindowControl from the toolbox is used.
Solution	Create a user-defined, standard ScreenWindowControl under the path "Master copy\DefaultScreenWindowControl" in the library.

7.1.3.58 Warning_TagSettingsForProfessionalDevice

ID	Warning_TagSettingsForProfessionalDevice
Cause	SiVArc tag settings were configured in the project. These are ignored for Runtime Professional.
Solution	--

7.1.3.59 Warning_TagTableNameExists

ID	Warning_TagTableNameExists
Cause	A tag table with the same name already exists in another folder. The generated HMI tag is added to the existing tag table.
Solution	Check the "Tag table" column in the tag rules. Modify the text or the expression to create a unique name for the tag table.

7.1.3.60 Warning_TextEntryTooLong

ID	Warning_TextEntryTooLong
Cause	The text of a text list entry could not be generated for a particular language because the text to be placed has too many characters.
Solution	In the PLC program, navigate to the corresponding SiVArc plug-in editor and abbreviate the text in the corresponding text definition to the permitted length.

7.1.3.61 Warning_TextlistCreationIncompleteDueToNoMatchingTagForMatchedFunctionBlockVariables

ID	Warning_TextlistCreationIncompleteDueToNoMatchingTagForMatchedFunctionBlockVariables
Cause	The corresponding tag from the PLC symbol table could not be found for the synchronized program block tags based on a regular expression in the text list master copy.
Solution	All values of the synchronized program block tags must match the values in the PLC symbol table. If you configure tags of different types, make sure that the corresponding tags in the PLC tag table are configured as well for the program block tags.

7.1.3.62 Warning_TextlistCreationIncompleteDueToNonMatchingDataBlockCallers

ID	Warning_TextlistCreationIncompleteDueToNonMatchingDataBlockCallers
Cause	The regular expression configured in the text list master copy is resolved to at least one tag of the function block. However, the synchronized program block tags have zero or default values.
Solution	The values of the synchronized program block tags based on a text list master copy must contain valid tags of the PLC symbol table. Ensure that the values do not contain default values or values of an invalid type.

7.1.3.63 Warning_TextlistCreationIncompleteDueToNonMatchingSymbolTableTags

ID	Warning_TextlistCreationIncompleteDueToNonMatchingSymbolTableTags
Cause	There is at least one valid value that cannot be found in the PLC symbol table for the synchronized program block tags based on a regular expression in the text list master copy.
Solution	Ensure that there are no values in the program block tags for which there are no corresponding tags in the PLC symbol table.

7.1.3.64 Warning_UndefinedCycleTime

ID	Warning_UndefinedCycleTime
Cause	The data type of the program block is configured with an acquisition cycle, which is not available on the generated HMI device.
Solution	Before the SiVArc generation, make sure that the acquisition cycles used are configured on the target device.

7.1.3.65 Warning_UndefinedCycleTimeForBlock

ID	Warning_UndefinedCycleTimeForBlock
Cause	The program block is configured with an acquisition cycle, which is not available on the generated HMI device. This can occur when the "Use Common Configuration" option is selected.
Solution	Before the SiVArc generation, make sure that the acquisition cycles used are configured on the target device.

SiVArc Readme

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8.1 Security information

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement (and continuously maintain) a comprehensive, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the Internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, visit

http://www.siemens.com/industrialsecurity (http://www.industry.siemens.com/topics/global/en/industrial-security/Pages/Default.aspx)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

http://www.siemens.com/industrialsecurity. (http://www.industry.siemens.com/topics/global/en/industrial-security/Pages/Default.aspx)

Network drive

Ensure that network drives are protected from unauthorized access in your network infrastructure and computers.

Communication via Ethernet

In Ethernet-based communication, end users themselves are responsible for the security of their data network. Proper functioning of the device cannot be guaranteed in all circumstances; targeted attacks, for example, can lead to overload of the device.

8.2 Notes on use

Contents

Information that could no longer be included in the online help and important information about product features.

Restoring the missing assignment of the HMI device

When you copy, paste and rename a device within a project, the device retains the Runtime name. The textual cross-reference to this Runtime name cannot be removed after the renaming.

1. You can expand the entry for the HMI device in question under "Devices and networks > Network view > Network overview > Device".
2. Adapt the Runtime device name accordingly.

Your assignment will be in place again after the subsequent generation.

Suppressing check of PLC compilation

You can suppress the check of the PLC compilation using the "SivarcDisableCompileClean" file. In this case, the SiVArc generation can be run even if the PLC compilation is not error free.

Create an empty file with the name "SivarcDisableCompileClean" in the SiVArc installation directory that contains the "Siemens.Simatic.Sivarc.dll" file.

Note

If the "SivarcDisableCompileClean" file is not contained in the SiVArc installation directory and the PLC compilation contains errors, the SiVArc generation is canceled.

If the "SivarcDisableCompileClean" file is contained in the SiVArc installation directory and the PLC compilation is free of errors, the SiVArc generation is run.

Configuring overflow screens

As soon as a layout field is configured in the screen, the "Number of overflow screens" and "Evaluate number of overflow screens as bit mask" properties no longer have a function.

SiVArc object properties

The SiVArc object property "LayoutField.Index" can be used in SiVArc expressions. The resolved value of the "LayoutField.Index" expression for a referenced object is the index of a layout field within a layout field group.

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