

SIEMENS

SINUMERIK

SINUMERIK 840D sl SINUMERIK Operate WinCC TIA Portal V11

Configuration Manual

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Valid for

SINUMERIK 840D sl / 840DE sl control

Software	version
CNC software for 840D sl / 840DE sl	2.7 / 4.4
TIA Portal V11	


02/2011


Available on CD as a PDF


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Preface

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- General documentation
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This publication is aimed at planning and application engineers.

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The Configuration Manual enables the target group to apply the rules and guidelines to be observed when configuring products and systems. It helps you select products and functions.

The Configuration Manual helps the target group to create a system or plant configuration.

Standard scope

This documentation only describes the functionality of the standard version. Additions or revisions made by the machine tool manufacturer are documented by the machine tool manufacturer.

Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

For the sake of simplicity, this documentation does not contain all detailed information about all types of the product and cannot cover every conceivable case of installation, operation, or maintenance.

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Introduction

1.1 Basic information on the content of this description

Note

The description of the "SINUMERIK Operate WinCC" option explains the configuring possibilities when using the SINUMERIK Operate WinCC package.

The configuring options that are included as standard in the WinCC TIA portal V11 configuring tool are described in detail using the WinCC TIA portal V11.

1.2 Functional scope of SINUMERIK Operate WinCC

Introduction

The tables below compare the range of functions of these configuration software packages:

- SINUMERIK HMI configuration software WinCC flexible 2008

References:

Configuration Manual "SINUMERIK HMI configuration software WinCC flexible 2008"

- SINUMERIK TIA portal

This manual describes the functions.

Functionality of PC-based HMI devices (integration in NC and PLC)

SINUMERIK HMI configuration software WinCC flexible 2008	SINUMERIK TIA portal
Ethernet communication with SINUMERIK 840D sl	Ethernet communication with SINUMERIK 840D sl
MPI communication with SINUMERIK 840D sl	MPI communication with SINUMERIK 840D sl
MPI communication with SINUMERIK 840D pl	Not relevant
Visualization of OPI variables	Visualization of OPI variables
Visualization of GUD variables	Visualization of GUD variables
Visualization of machine and setting data	Visualization of machine and setting data
NC alarms, PLC alarms, DB2 alarms, Alarm_S	NC alarms, PLC alarms

SINUMERIK HMI configuration software WinCC flexible 2008	SINUMERIK TIA portal
Integration into the m:n concept of SINUMERIK HMI Advanced (up to 8 NCUs)	Is not supported.
Controls for HMI data management and NC editor	Is not supported.
Input controls of SINUMERIK HMI Advanced	Is not supported.
Is not supported.	Control for activating part programs
Triggering specific PI services (for example, NC restart, setting a password)	Triggering specific PI services (for example, NC restart, setting a password)
Triggering a general PI service (using the "General PI service" function)	Triggering a general PI service (using the "General PI service" function)
Coordinated change of language SINUMERIK HMI - WinCC flexible Runtime	Coordinated change of language SINUMERIK HMI - WinCC Runtime
Symbolic addressing of the PLC element in STEP 7 integration	Planned for the next version
Example projects	Example projects

Functionality of CE panel (integration in NC)

SINUMERIK HMI configuration software WinCC flexible 2008	SINUMERIK TIA portal
Ethernet communication with SINUMERIK 840D sl	Ethernet communication with SINUMERIK 840D sl
MPI communication with SINUMERIK 840D sl	MPI communication with SINUMERIK 840D sl
MPI communication with SINUMERIK 840D pl	Is not supported.
Visualization of OPI variables	Visualization of OPI variables
Visualization of GUD variables	Visualization of GUD variables
Visualization of machine and setting data	Visualization of machine and setting data
NC alarms and NC messages	NC alarms and NC messages
Control for activating part programs	Control for activating part programs
Triggering specific PI services (for example, NC restart, setting a password)	Triggering specific PI services (for example, NC restart, setting a password)
Triggering a general PI service (using the "General PI service" function)	Triggering a general PI service (using the "General PI service" function)
Example project	Example project

1.2.1 Supported HMI devices

Supported HMI devices

When selecting a device you have the following option:

- "HMI"
CE HMI devices -> HMI devices of SIMATIC
- "PC systems"
PC-based HMI devices -> HMI devices of SINUMERIK and SIMATIC

CE HMI devices

In WinCC, when selecting the devices, the following SIMATIC panel are available:

- SIMATIC Comfort Panel (e.g. KP400 Comfort)
- SIMATIC Multi Panel (e.g. MP 177 6" Touch)
- SIMATIC Mobile Panel (e.g. Mobile Panel 177 6" DP)

PC-based HMI devices

In WinCC, when selecting devices, SIMATIC Panel PCs and SINUMERIK PCs are available.

1.2.2 Supported runtime

Runtime that PC-based HMI devices support

If you have selected a PC-based HMI device, then you should subsequently define the runtime for this device on which the configuration should run.

The following diagram shows a configuration of a PC-based HMI device.

The configurable runtime systems are listed in the hardware catalog (on the right in the diagram).

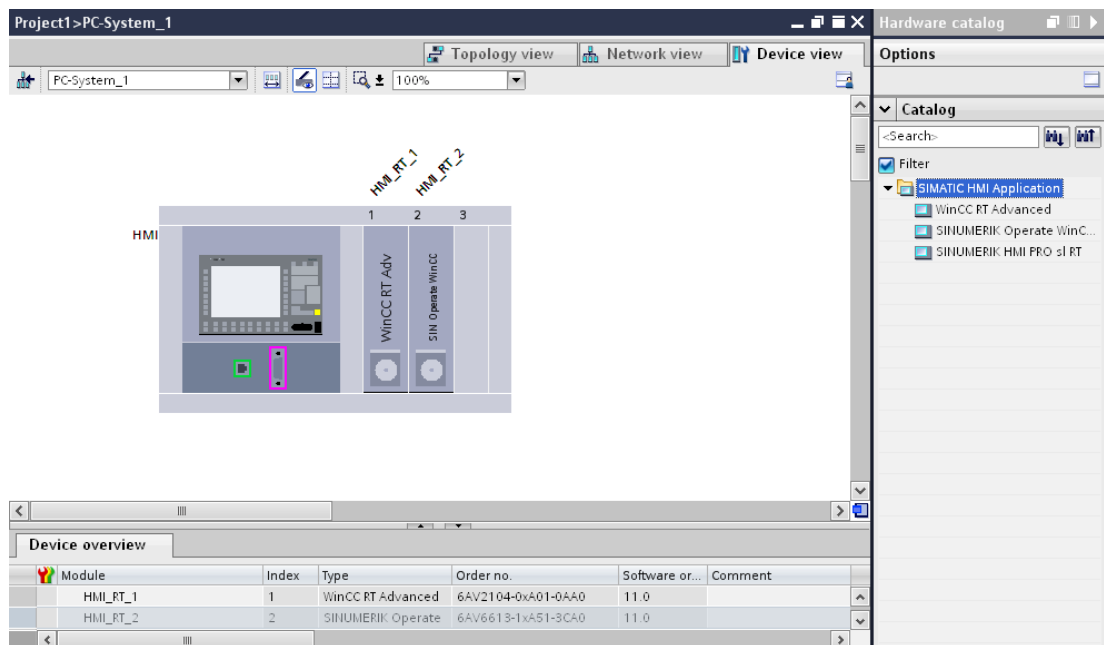


Figure 1-1 Device view with hardware catalog

In so doing, a differentiation is made between the following runtime systems:

- WinCC RT Advanced (Page 18)
- SINUMERIK Operate WinCC RT (Page 60)

WinCC RT Advanced

Suitable for supplementing a SINUMERIK Operate user interface with an operating area.

SINUMERIK Operate WinCC RT

Suitable for supplementing a SINUMERIK Operate user interface with individual integrated screens.

Note

The runtime is already integrated for CE HMI devices.

See also

Supplementing SINUMERIK Operate user interfaces by an operating area (Page 17)

Supplementing the SINUMERIK Operate user interfaces with individual/integrated screens (Page 59)

Supplementing SIMATIC CE HMI devices with SINUMERIK functionality (Page 67)

1.3 Communications principle

Overview

Internally, the SINUMERIK control system consists of the following control components (in very simple terms)

- A **program control component** (S7-300 control component), which, in terms of data communication, behaves in exactly the same way as an S7-300 control
- A **numeric controller component** (NC controller component), which requires special variable descriptions and specific services.

Depending on the runtime, the supported target systems can be connected via the following interfaces:

- PCU 50 with SINUMERIK Operate and WinCC RT Advanced
 - Ethernet
- PCU 50 with SINUMERIK Operate and SINUMERIK Operate WinCC RT
 - Ethernet
- CE HMI devices with integrated RT
 - MPI
 - Ethernet

Principles (see screen below)

In SIMATIC WinCC, the following communication drivers can be selected:

HMI device	Runtime	Interface	Communication driver	
			Program control component	Numeric control component
PCU 50 with SINUMERIK Operate	WinCC RT Advanced	Ethernet	SIMATIC S7 300/400	SINUMERIK NC
	SINUMERIK Operate WinCC RT	Ethernet	SINUMERIK PLC	SINUMERIK NC
CE HMI device (e.g. Mobile Panel 170)	Integrated RT	MPI	SIMATIC S7 300/400	SINUMERIK NC
		Ethernet	SIMATIC S7 300/400	SINUMERIK NC

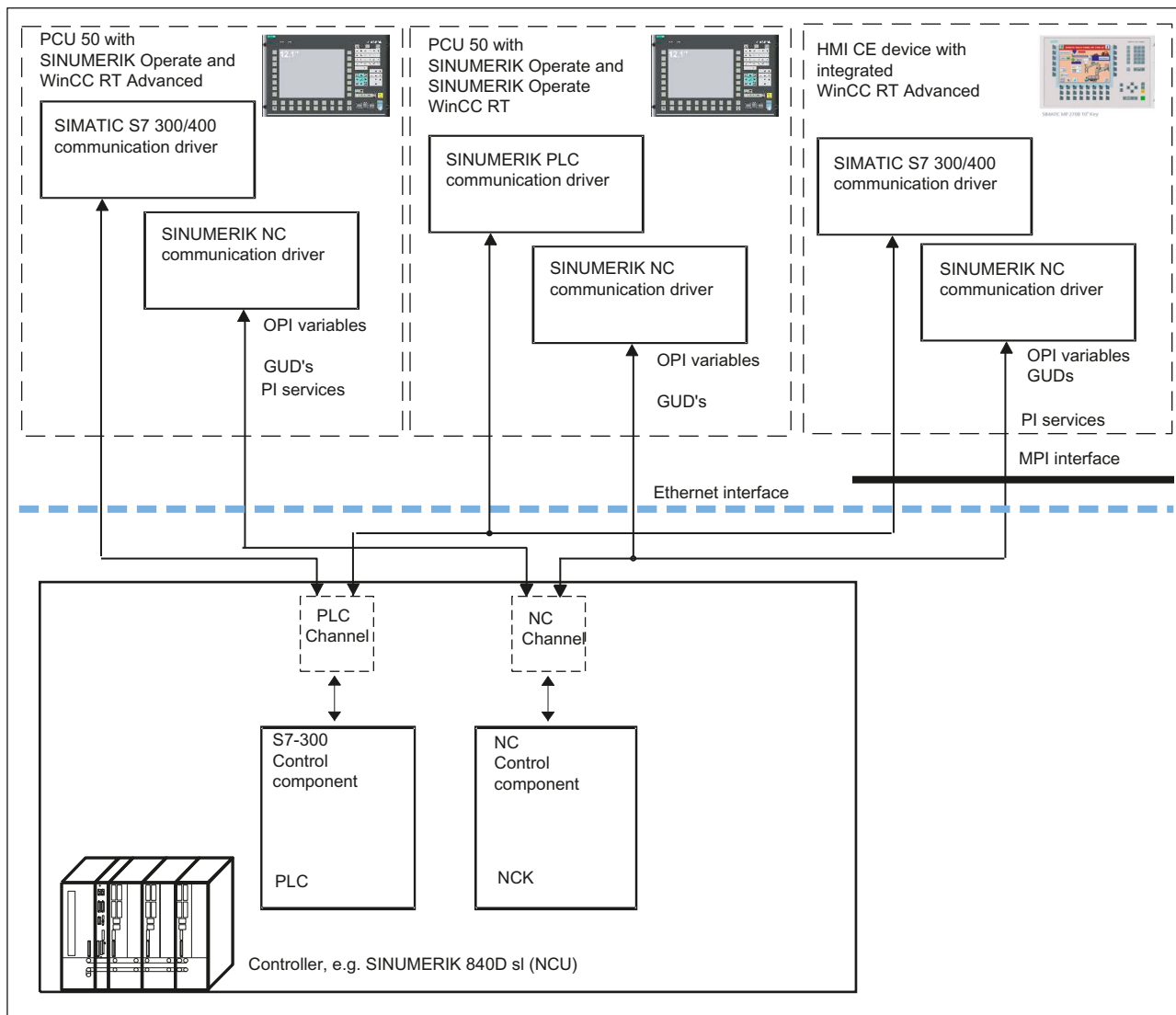


Figure 1-2 Communication principle

Note

The communication driver "SINUMERIK NC" allows you to read/write OPI variables and GUDs as well as to call up PI services (PI services are not possible for SINUMERIK Operate WinCC RT).

1.4 Example projects

General

The examples are provided under the following installation directory:

- Automation\Portal V11\Data\HMI\sinumerik\samples

Example NCSecurity.ap11

"NCSecurity.ap11" shows how, by using the NC variable "Access Level", the visibility and operability of an IO field can be controlled.

The most important settings are to be found in the properties dialog box of the IO field in the area "Animation" > "Display".

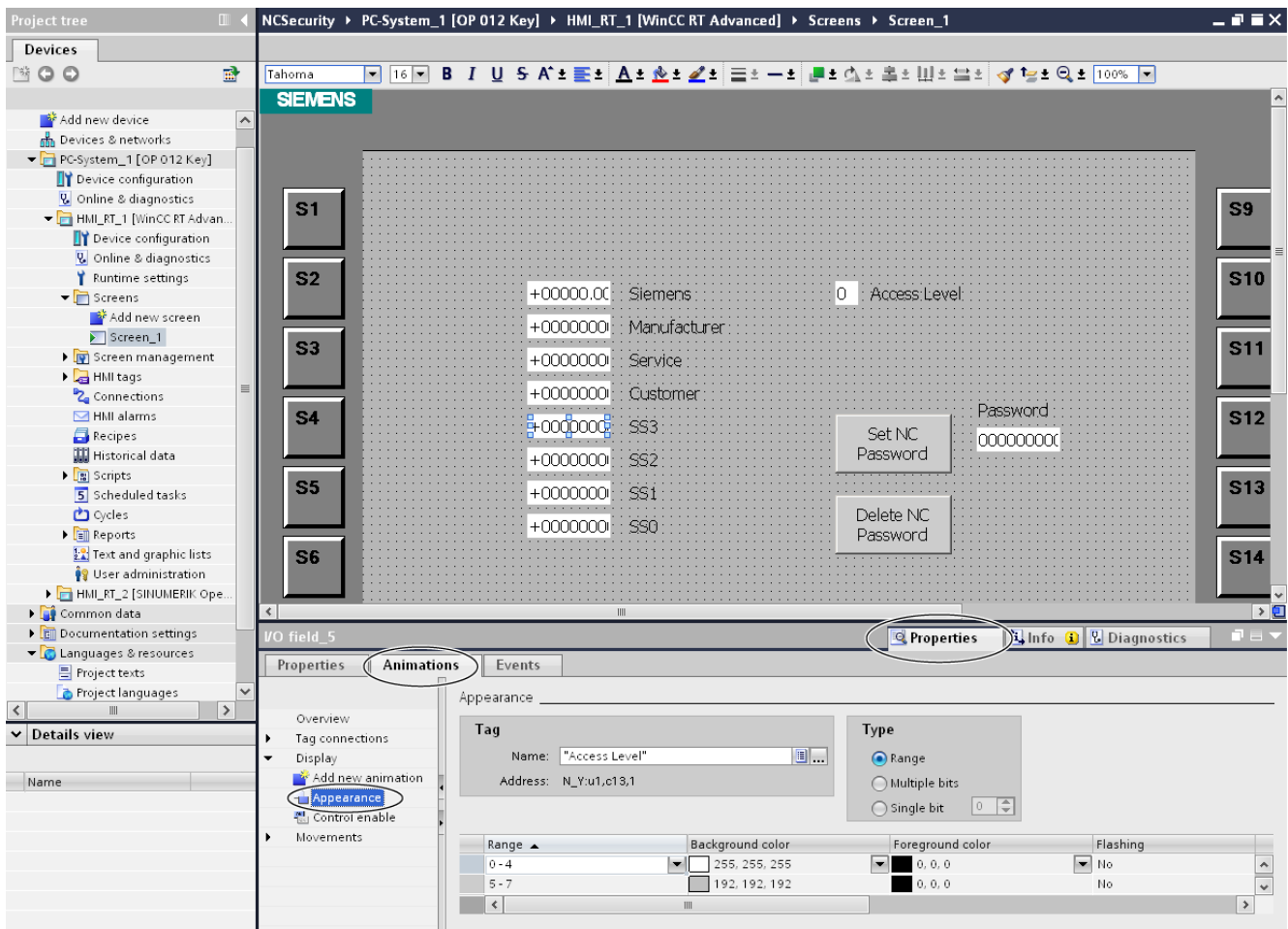


Figure 1-3 Example "NCSecurity.ap11"

Migrating projects

Note

The procedure for migrating WinCC flexible projects is described in detail in the help of the WinCC TIA Portal V11.

This chapter discusses the special features when migrating SINUMERIK projects from the WinCC flexible environment.

Special features for SINUMERIK projects

The following HMI devices with SINUMERIK components can be migrated:

- SINUMERIK PCs and SIMATIC Panel PCs
- CE HMI devices

SINUMERIK PCs and SIMATIC Panel PCs

The following must be observed when migrating SINUMERIK projects:

- The HMI input controls are not transferred.
- The HMI controls for file management and NC editor are not supported.
- Integration in the m:n concept is not supported.
- Automatic display of DB2 alarms is no longer supported (Workaround, as for the CE panel: Configuration corresponding to discrete alarms in WinCC)
- The communication driver for the PLC-channel SINUMERIK PLC is switched over to the SIMATIC S7 300/400 communication driver.

CE HMI devices

The projects are migrated 1:1.

Note

Projects integrated into STEP 7 cannot be migrated.

If a WinCCflex project is integrated in STEP 7, then in WinCCflex ES you can select under Project--> Copy from STEP 7. After selecting an archive location, a copy of the integrated STEP 7 project is saved there. This autonomous WinCC project can then be migrated into the TIA portal.

The connection of the symbols in STEP 7 is lost in the process.

It must also be taken into account that only WinCCflex projects, Version WinCCflex 2008 SP2 can be migrated.

Supplementing SINUMERIK Operate user interfaces by an operating area

3

3.1 General (WinCC RT Advanced)

Configurable user interface

For PC HMI devices with WinCC RT Advanced, the complete user interface is available to configure screens for an additional operating area of a SINUMERIK Operate user. There are no restrictions.

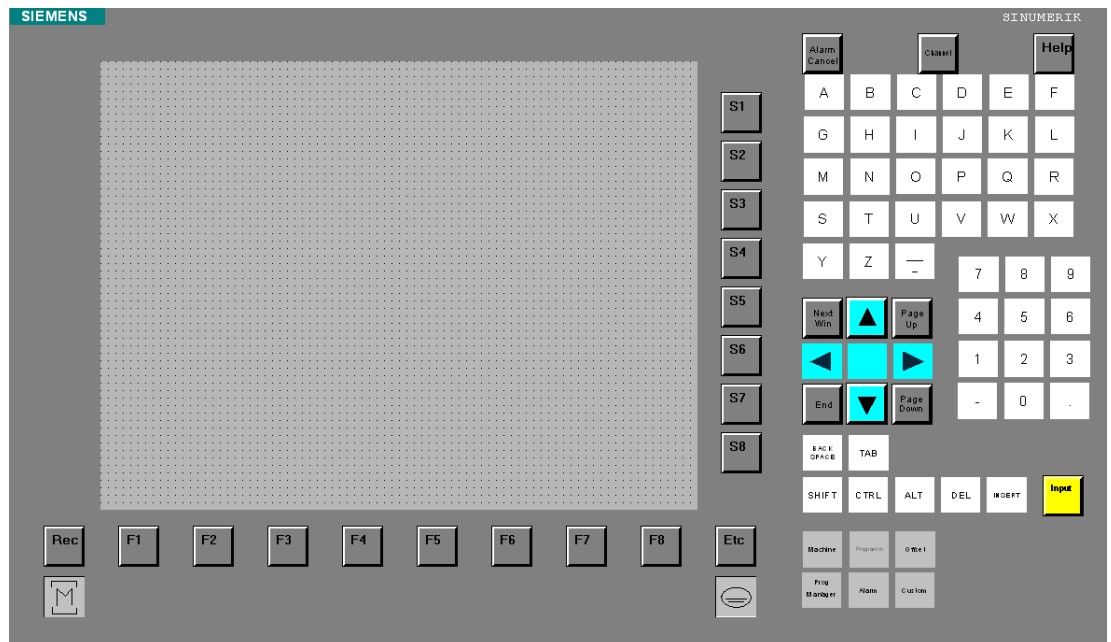


Figure 3-1 OP010 for WinCC RT Advanced user interface

See also

Integrating in SINUMERIK Operate (Page 46)

3.2 Creating a project and configuring a device

The following components in WinCC allow an operating area to be configured for a SINUMERIK Operate user interface:

- SINUMERIK PC-based HMI device
- WinCC RT Advanced

Procedure

To create a project, proceed as follows:

1. This is how you create a new project.
2. You insert a new device.

In this dialog, under "PC systems" > "SINUMERIK PC", you select an HMI device (e.g. "OP 012 Key") and assign a device name (e.g. "HMI_1").

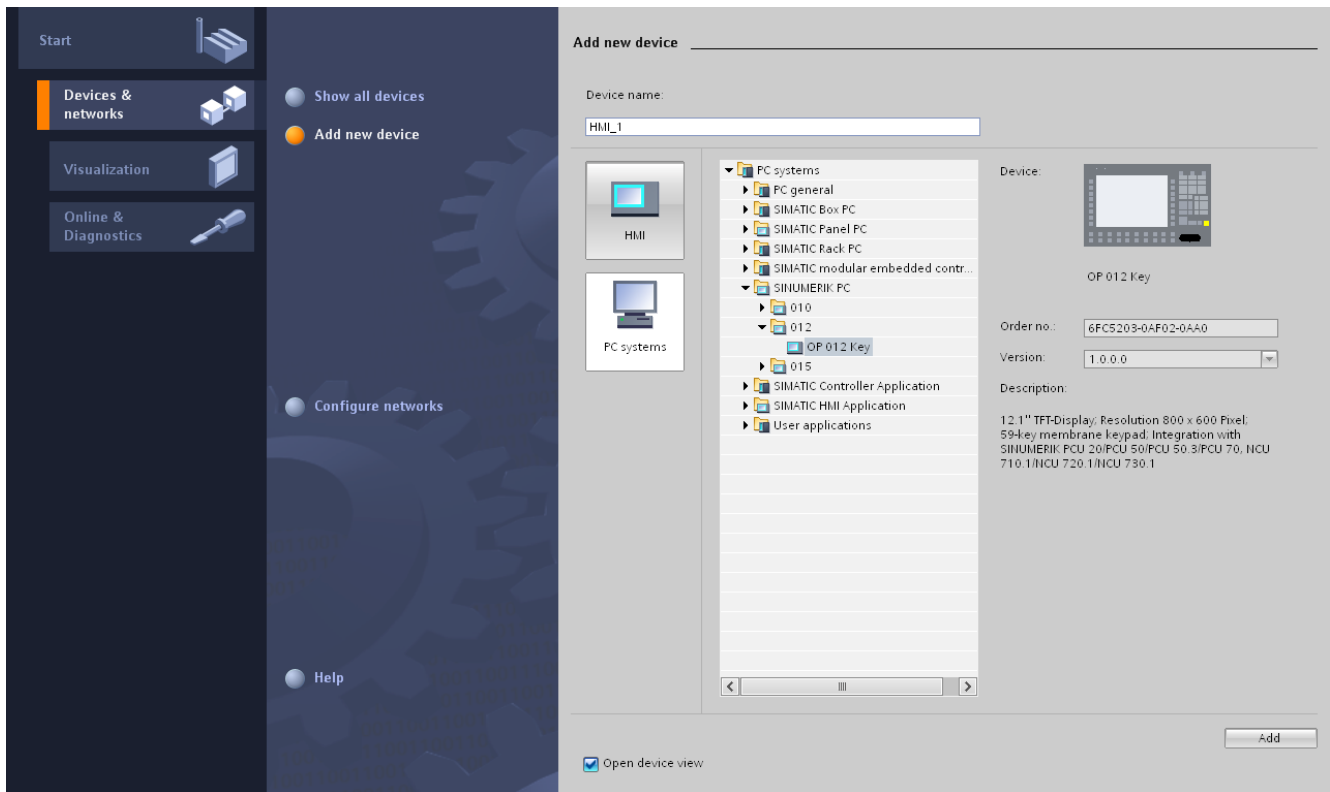


Figure 3-2 Adding a new SINUMERIK device

3. In the project view, in the hardware catalog under "SIMATIC HMI application" > "WinCC RT Advanced", select the runtime software and drag it to a free slot of the device in the "Device view".

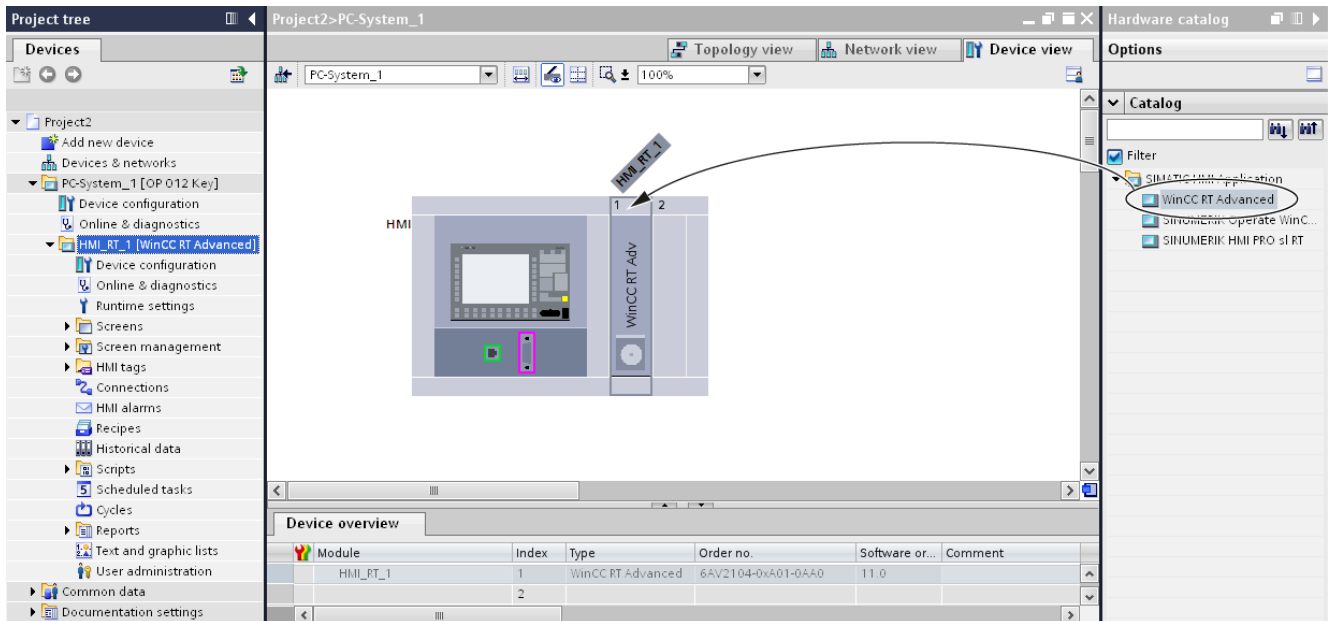


Figure 3-3 Placing the WinCC RT Advanced software

4. In the "Project navigation" window, the configured runtime (e.g. "HMI_RT_1 [WinCC RT Advanced]") is added to the created device (e.g. "HMI_1") .

In this view, among others, the following editors used for configuring are available:

- "Connections" (Page 20)
- "HMI variables" (Page 21)
- "HMI messages" (Page 26)
- "Screens" (Page 29)

3.3 Configuring connections

General

For PC-based HMI devices with WinCC RT Advanced, the connection channel "SINUMERIK NC" is intended for communication with the numeric component of the SINUMERIK. The connection channel "SIMATIC S7 300/400", is intended for communication with the PLC component.

Procedure

1. Select a device in the project view in the project navigation window.
2. Open the editor for connections by double-clicking on it.

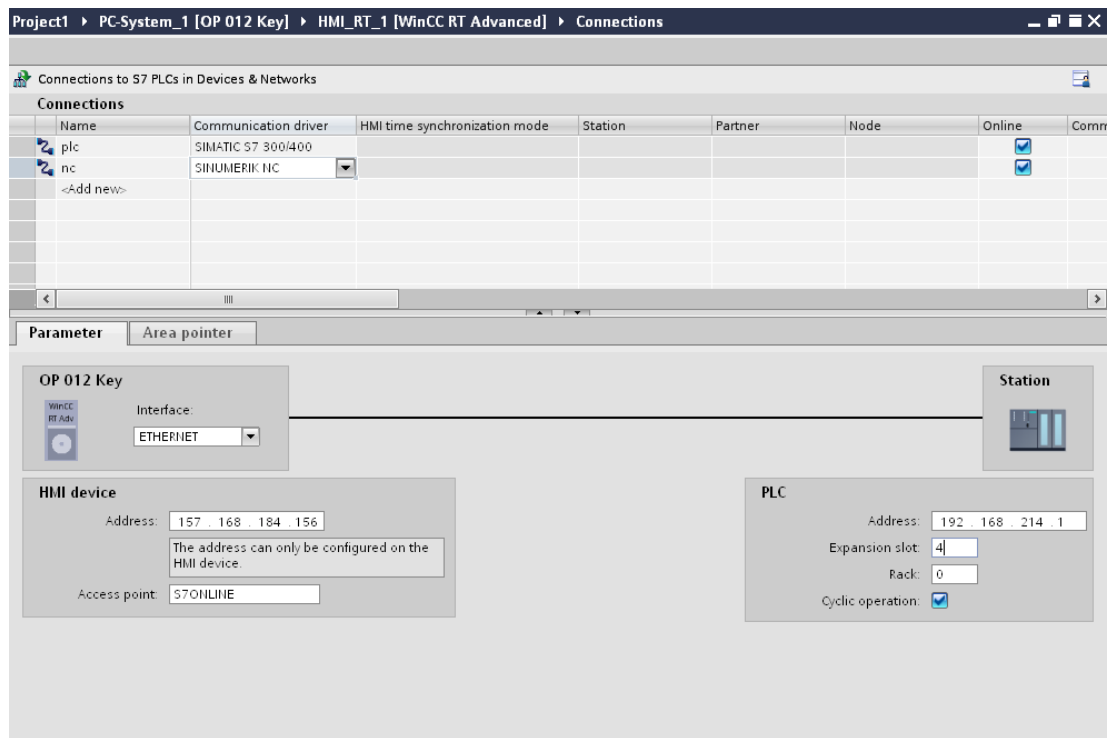


Figure 3-4 Example, connection parameters, PC-based HMI devices Ethernet interface

3. In the work area, create the connections to the NC (SINUMERIK NC) and to the PLC (SIMATIC S7 300/400).
4. The correct IP address must be entered for the HMI device and control.

On the HMI device side, e.g. OP012, the IP address corresponds to the default address of the PCU50; on the control side, the default address of an 840D sl is entered.

These two IP addresses must be transferred into the SIMATIC S7 300/400 controller.

Note slot 2 for the PLC and expansion slot 4 for the NC.

If the PCU50 is not in the system network, but is operated in a company network, then the IP address allocated via the DHCP server must be entered for the HMI device.

3.4 Configuring variables

Overview

Control variables of the relevant format can be defined for the communication channel set (= connection selected for variables).

For the "SINUMERIK NC" communication channel, the following control variables can be used:

- All variables of the operator panel interface (OPI variables)
- All general, channel-specific and axis-specific machine and setting data
- User-defined control variables (GUD)

These variables can be configured using their symbolic name.

For the "SIMATIC S7 300/400" communication channel, the scope of variables that can be used corresponds to the S7 300/400 channel.

3.4.1 Configuring OPI variables (variables of the operator panel interface)

Introduction

Under 'connections', as communication driver select "SINUMERIK NC"; you can then configure the variables of the NCK operator panel interface.

Editors

The Editor for the "Address" column offers a selection of control variables that are available.

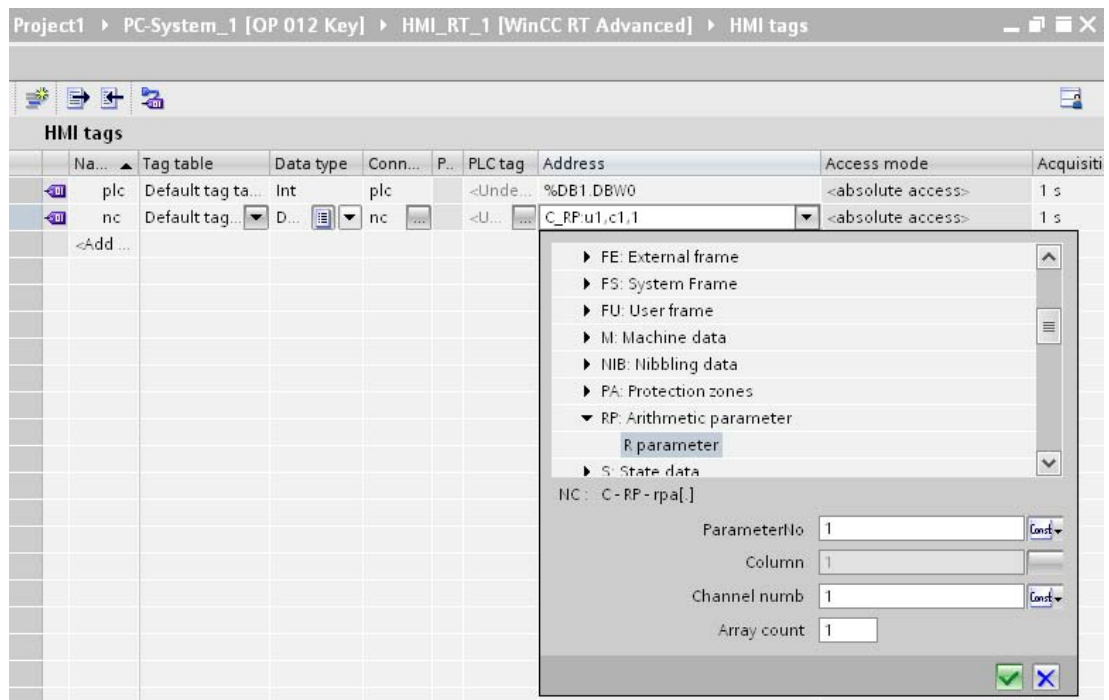


Figure 3-5 Selection of the control variables

One you have selected a variable, then the address is displayed in the "Address" column.

3.4.2 Configuring GUD tags

3.4.2.1 GUD variable

Making user data available

The user data (GUDs) are made available to the engineering system of WinCC in the following way; the user data are packed in a user database using the GUD_Tool supplied and stored in the corresponding TIA project.

The address editor in the variable area then recognizes the user data saved and offers them for selection.

Please read Chapter Create user database (GUD_tool) (Page 75) to find out how to use the GUD_Tool provided.

3.4.2.2 WinCC configuration of GUD arrays

Definition

GUD arrays consist of rows and columns:

Row 1/Column 1	Row 1/Column 2..	..	Row 1/Column n
Row 2/Column 1	Row 2/Column 2..	..	Row 2/Column n
..
Row n/Column 1	Row n/Column 2..	..	Row n/Column n

The table below shows the definition of the GUD arrays in the controller:

GUD definition	Example
DEF {NCK CHAN} type Name[number of lines, number of columns]	DEF NCK REAL REALNGUD[2,3]
	DEF CHAN REAL REALCGUD[2,3]
DEF {NCK CHAN} STRING[number of characters] Name[number of strings]	DEF NCK STRING[8] NTEXT[5]

Where:

NCK	=	Global controller variable
CHAN	=	Channel-specific variable
Type	=	Variable type (BOOL, CHAR, INT, REAL, STRING)
Name	=	Variable name
Rows	=	Number of rows
Columns	=	Number of columns

The table below shows the addressing of the array elements. Please note that addressing starts at 0 in the controller and at 1 in WinCC.

3.4 Configuring variables

GUD definition

Syntax: DEF NCK|CHAN <type> <variable>[<rows>,<columns>]

Example: DEF CHAN REAL REALGUD[2,3]

Example

Controller	WinCC configuration
<variable>[<row>,<column>]	C_GD4:u1,c<column>,<row>
REALGUD[0,0]	C_GD4:u1,c1,1
REALGUD[0,1]	C_GD4:u1,c2,1
REALGUD[0,2]	C_GD4:u1,c3,1
REALGUD[1,0]	C_GD4:u1,c1,2
REALGUD[1,1]	C_GD4:u1,c2,2
REALGUD[1,2]	C_GD4:u1,c3,2

3.4.3 Configuring a tag for address multiplexing

Introduction

Using address multiplexing, you can use a single variable to access a multitude of memory locations within the PLC's address range. You read and write to the addresses without defining a variable for each individual address. This efficient method allows you to process a large amount of data.

Example of a procedure using R parameters as a basis

1. Create a local "index" variable.
2. Create a variable with a connection to a control, and in area C and in the RP block, select the R parameter variable.
3. You can make a selection from the operator control to the right next to the input for the parameter number.
4. Select HMI_variable followed by the "index" variable.

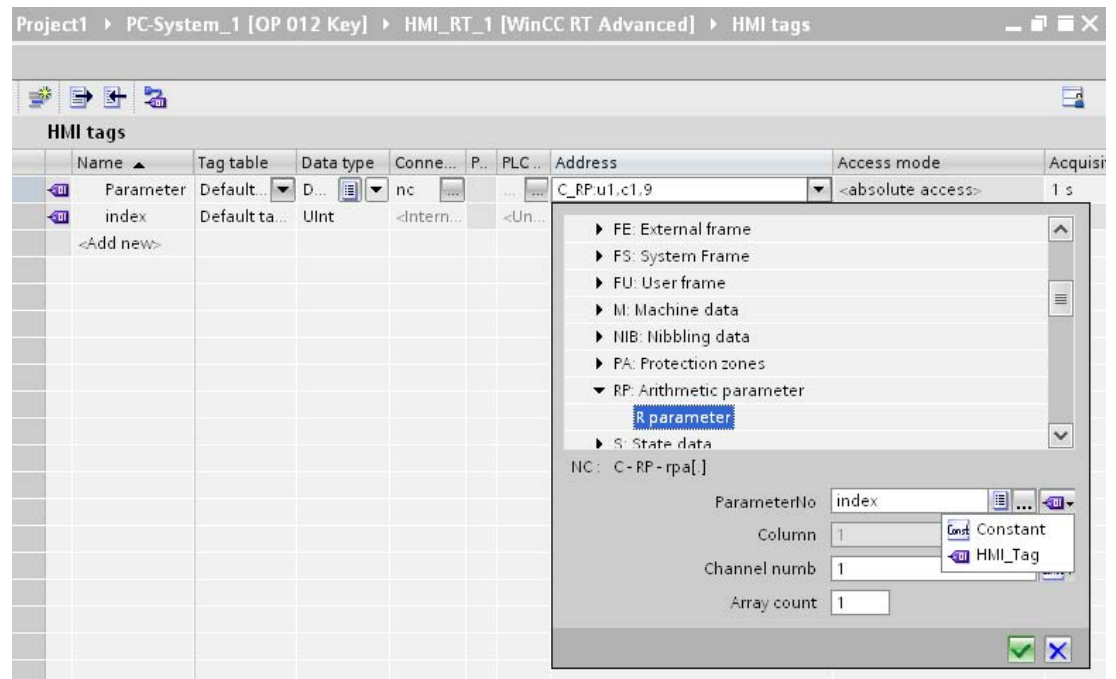


Figure 3-6 Address multiplexing

Result

By changing the "index" variable during the runtime, another R parameter is accessed.

3.5 Configuring alarms

NC alarms

NC alarms are displayed in the WinCC AlarmView, if:

- A SINUMERIK connection is configured
- The SINUMERIK message classes are activated

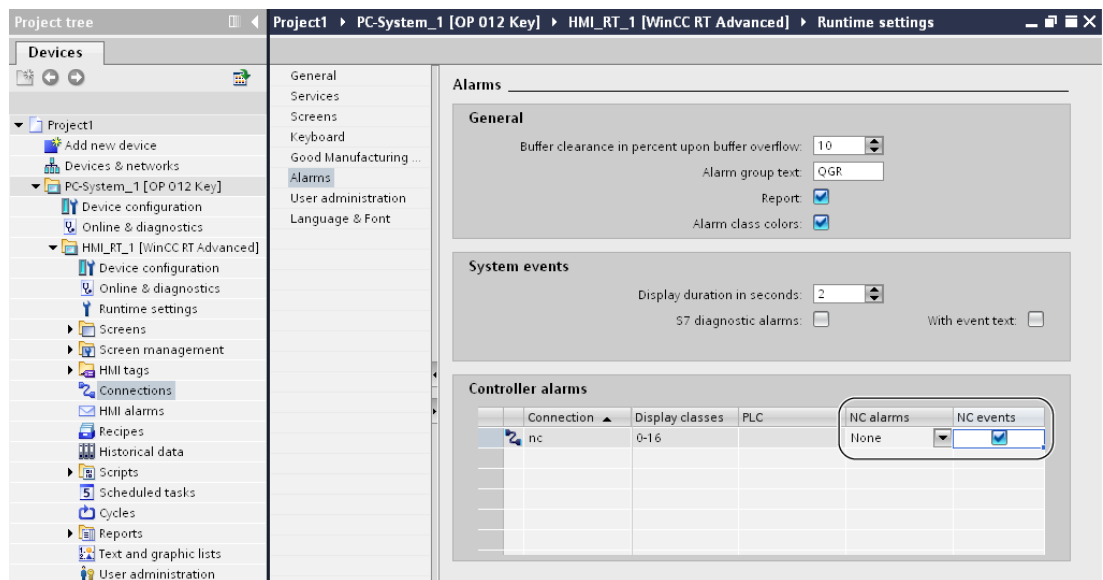


Figure 3-7 NC alarms

- SINUMERIK message classes are selected in the message view

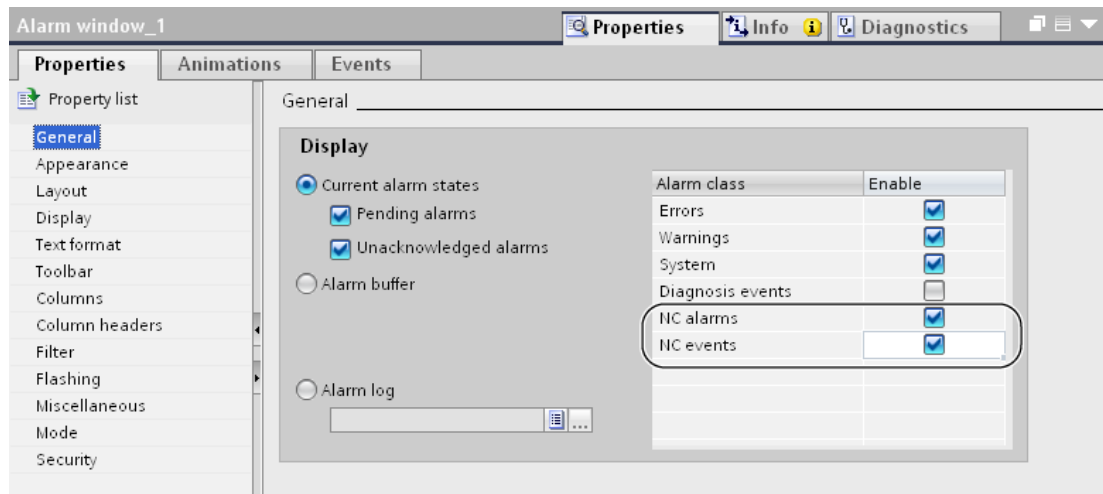


Figure 3-8 Message classes

PLC alarms (of the NCK-PLC interface)

PLC alarms are displayed in the WinCC AlarmView, if:

- A SINUMERIK connection is configured
- The SINUMERIK message classes are activated
- SINUMERIK message classes are selected in the message view

HMI alarms (defined in WinCC)

HMI alarms are always shown in the WinCC AlarmView.

HMI alarms can also be additionally displayed in the SINUMERIK diagnostics if the alarms:

- are configured as discrete alarms in WinCC – and these discrete alarms are synchronized with the DB2 user message mechanism.

To achieve this, HMI alarms must be configured in WinCC as discrete alarms with the trigger variables DB2.DBW180.

Each bit in DB2 corresponds to a possible alarm. Up to byte 179 is a range reserved for SINUMERIK – that is also used. These alarms also have to be subsequently configured.

The range for user alarms starts at byte 180 in DB2. These must be configured in SINUMERIK Operate and also in the WinCC project if they are both to be visible.

In SINUMERIK HMI, the same alarms must be defined as the PLC user alarms. For instance, in SINUMERIK Operate this task can be performed under "Commissioning" > "HMI" > "Alarm texts" > "Manufacturer PLC alarm texts".

DB2 alarms

DB2 alarms are displayed in the WinCC AlarmView, if:

- The discrete alarms corresponding to DB2 alarms have been subsequently configured in WinCC.

ID	Event text	Alarm class	Trigger tag	Trigge...	Trigger address	HMI acknowl...	HMI a
1	PLC Alarms 700000	Errors	DB2	0	0	-No tag-	0
2	PLC Alarms 700001	Errors	DB2	1	1	-No tag-	0
3	PLC Alarms 700002	Errors	DB2	2	2	-No tag-	0
<Add new>							

Figure 3-9 DB2 alarms

Changing NC alarm texts

NC alarm texts are saved in the engineering system under the following directory:

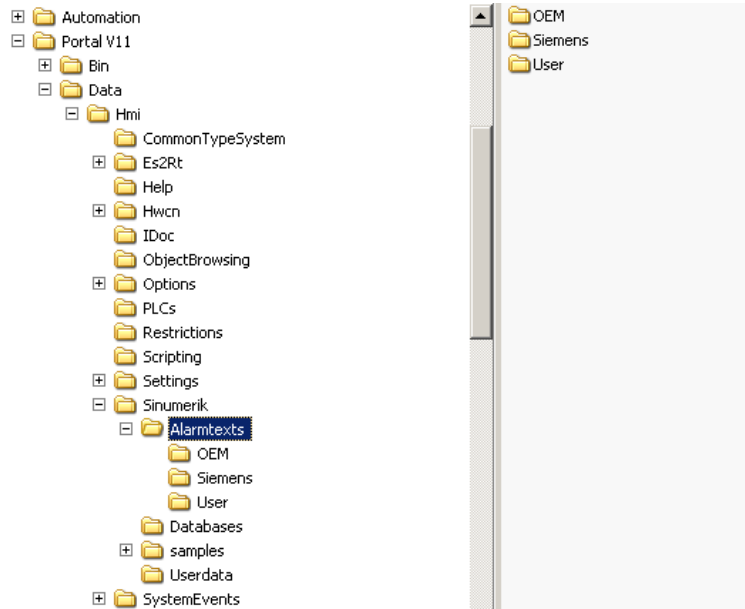


Figure 3-10 SINUMERIK directory for alarms

The user has the option of changing existing texts.

The SINUMERIK alarm texts saved in the installation directory cannot be changed and should not be changed.

If you want to change texts, copy the alarm directory under

"Automation\Portal V11\Data\HMI\Sinumerik" into the respective TIA project in the following directory:

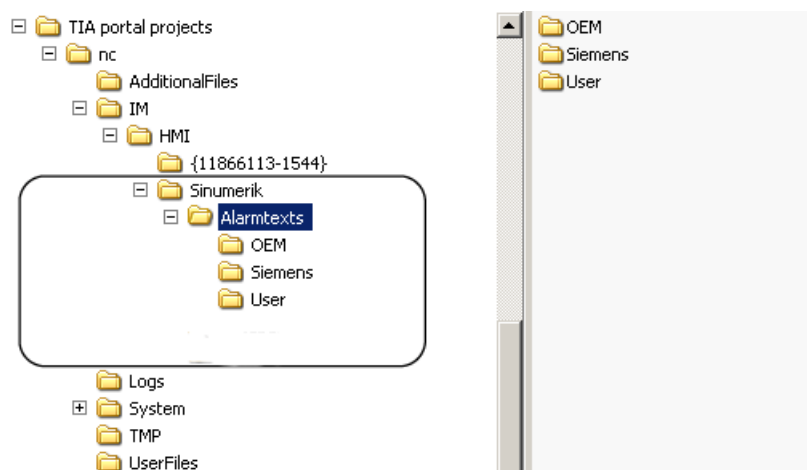


Figure 3-11 Target directory for alarms

At this point in the project, alarm texts can now be changed.

We recommend that the original texts are kept in the "Siemens" directory and changes are only made in a copy located in the "OEM" or "User" directories.

3.6 Configuring screen objects

3.6.1 Screen object "NC part program"

Introduction

With the screen object "NC part program", during the runtime you have the option to display and select part programs, subprograms or workpieces as overview.

When configuring, you can specify, for example, which font the image object will have.

NC parts program

The following diagram shows the screen object "NC part program" during configuration.

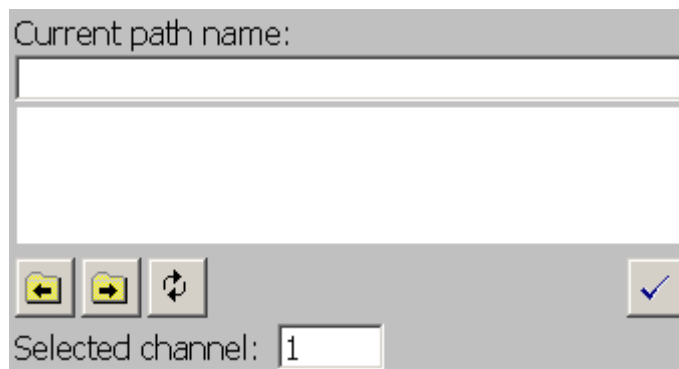


Figure 3-12 NC part program




User interface

The upper line "Actual path name:" shows the open directory (e.g. MPF, SPF, ...). In the list below, a directory to be opened or the required program/workpiece can be selected.

The part program names or the directories are displayed line-by-line in the list.

During the runtime, command buttons can be used to:

Table 3- 1 Command buttons for the display object

Button	Function
	Navigating and selecting in the list directory
	The selected part program/workpiece is selected on the NC for editing/processing.
	Update directories in the list box
Click/touch	When the directory name is selected, the value is transferred to the current path name field and the corresponding subdirectory is displayed in the list.

To make the part program overview functionally complete, you can configure function keys or configured command buttons with NC part program functions (e.g., navigating and selecting in the list directory).

3.6.2 Screen object "NC part program" properties

Screen editor

The screen editor provides the following options for configuring the screen object "NC part program":

"General"

Under "General", you can make the following settings for part program selection:

- "Connections"
In the selection box "Connections", select the NC control using its symbolic name.
- "Path"
In the "Path" input field, a specified path name (max. 29 Characters).
For example, WKS_DIR, MPF_DIR, SPF_DIR, CST_DIR, CUS_DIR or CMA_DIR (in upper case letters)
- Path "Variable"
In the selection box path "Variable" select the path variable to be connected.
- "Channel"
In the input field "Channel", a specified channel (1 to max. 10).
- Channel "variable"
In the selection box channel "Variable" select the channel variable to be connected.
- "Editable"
By selecting the field "Editable" it is possible to set the paths or channels to not editable/editable.

"Design", "Layout", "Display", "Text", "Flashing", "Miscellaneous"

Under "Design", "Layout", "Display", "Text", "Flashing", "Miscellaneous", you can completely display the "NC part program" screen object.

- "Layout"
Under "Layout", you can select which buttons etc. are to be displayed in the screen object.

Note

In order to also be able to operate the "NC part program" externally or, depending on the functionality, to allocate an appropriate authorization, command buttons can be hidden in the display object during the configuration period and the required functions can be triggered via softkeys with varying authorization levels.

The functions can then be selected under "Events" -> "SINUMERIK".

"Events"

Under Events, you can react to events with functions.

Table 3- 2 Events for the "NC part program" display object

Event	Meaning
Enable	On selection, the display object is activated.
Deactivation	On deselection, the display object is deactivated.

3.6.3 Changing the display object using script**Changing the display object using script**

You can even change the properties of a display element during runtime using scripts. This provides a means, for example, of changing the colors or the part program path dynamically.

Script example

```
Dim view
Set view = HmiRuntime.Screens("Screen_1").ScreenItems("NC Part Program_1")
view.Channel=1
view.BackgroundColor=RGB(0, 255, 0)
view.GridlineColor=RGB(0, 0, 255)
view.Path="MPF_DIR"
```

3.7 Configuring PI services/system functions

Purpose

In WinCC, you can link events (e.g. "Key pressed") with predefined functions. If an event should occur during operation, the function triggers a certain action on the HMI device or in the controller.

General procedure

In general, you can use the functions for the following:

- Establish the configuration on a process-for-process basis (e.g. branch from one screen to another).
- Control the process (e.g. set control parameters).
- Carry out the system settings online at the HMI device (e.g. changing interface parameters).

As a rule, functions and events are linked to a certain object. For example, a function with event "Press key" is not triggered by every key, but only by one specific key.

Objects, which can be linked to functions, include:

- Function keys and command buttons
- Fields
- Figures
- Variables

The number of functions offered is, therefore, dependent on the HMI device and on the situation.

SINUMERIK functions

For configuring with SINUMERIK Operate WinCC, in addition to the functions available in WinCC, SINUMERIK-specific functions (PI services) are also provided.

These are the following functions:

- Functions for the "NC part program" display object (Page 33)
- Functions for execution in the NCK (Page 35)
- Function for the current block display (Page 41)
- Function to start and stop the PLC (Page 43)

3.7.1 Functions for the "NC part program" display object

Introduction

In order to also be able to operate the "NC part program" externally or, depending on the functionality, to allocate an appropriate authorization, command buttons can be hidden in the display object during the configuration period and the required functions can be triggered via softkeys with varying authorization levels.

Functions

The following functions influence the "NC part program" display object:

Table 3- 3 Functions for the NC part program display object

Function	Meaning
ScreenObjectCursorDown	
ScreenObjectCursorUp	
ScreenObjectPageUp	
ScreenObjectPageDown	
PartProgramListDirDown	Navigating and selecting in the list directory
PartProgramListDirUp	Navigating and selecting in the list directory
PartProgrammListRefresh	Update directories in the list box
PartProgrammListSelectNCPartProgramm	The selected part program/workpiece is selected on the NC for editing/processing.

Procedure

Select the functions in the screen editor under "Events" > "Add functions" >

- "Keyboard operation for display objects"

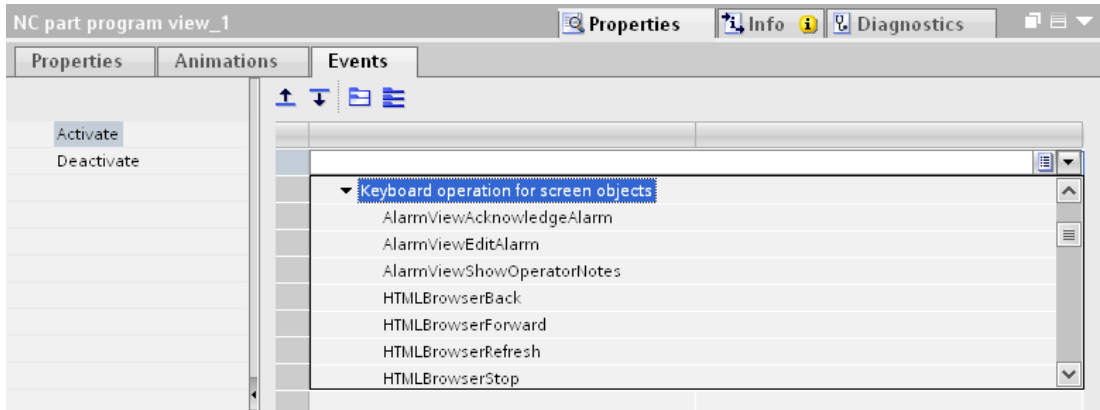


Figure 3-13 "Keyboard operation for display objects" functions

- "SINUMERIK"

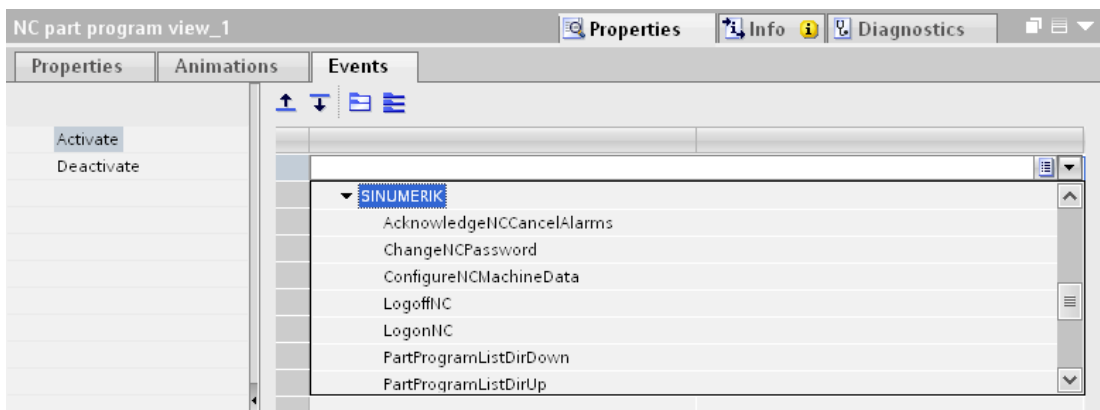


Figure 3-14 "SINUMERIK" functions

3.7.2 Functions for execution in the NCK

Procedure

Select the functions in the screen editor under "Events" > "Add functions" > "SINUMERIK"

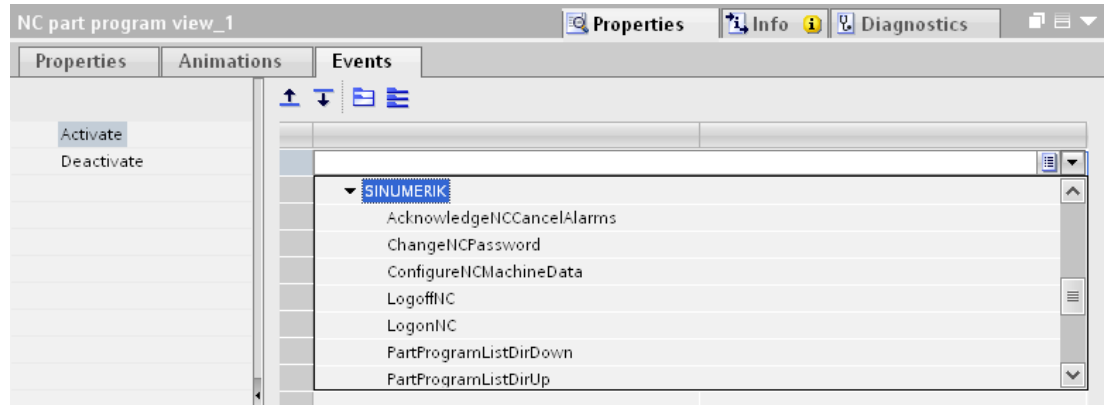


Figure 3-15 "SINUMERIK" functions

Functions

The following functions are available:

- **AcknowledgeNCCancelAlarms (NC: Acknowledge cancel alarms)**
This function acknowledges all pending cancel alarms on the specified NC at once.

Table 3- 4 Alarm acknowledgment parameters

Parameters	Meaning
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.

Note

Assign the NC: General PI service function to a key a variable. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the function parameter.

- ChangeNCPassword (NC: New password)**
 A password is transferred to the NC. The existing password for this NC level is overwritten.

Table 3- 5 New password parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	The currently valid NC password is overwritten by the new password. The user must be logged on to the NC with a suitable level.
Password	New controller password (max. 8 characters) (constant or variable)	
Level	Password level of the NC (constant or variable): 0 = system 1 = manufacturer 2 = service 3 = user	

Note

Assign the NC: General PI service function to a key a variable. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the first function parameter. Enter the new password and its NC level as further parameters.

The password and level parameters can be configured as local variables or as constants.

- ConfigureNCMachineData (NC: Configure machine data)**
 This function activates all machine data of the NEW_CONF classification.
 The CLASS parameter allows for a more exact classification. Currently, however, only value 1 is supported.

Table 3- 6 Configure machine data parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	A corresponding PI service is transmitted to the NC from the currently valid parameters.
Class	Classification of the machine data being activated (variable or constant): 1 - 3	

Note

Assign the NC: General PI service function to a key a variable. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the first function parameter. Specify the class of the machine data to be activated in the NC as a further parameter. The parameters can be configured as variables or constants.

- **LogoffNC (NC: Logout)**

The NC password is cleared with this function. Following this, the keylock switch is in control.

Table 3- 7 Logout parameters

Parameters	Meaning
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.

Note

Assign the NC: General PI service function to a key a variable. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the function parameter.

- **LogonNC (NC: Login)**

A password is transferred to the NC. The passwords for the HMI device and the NC are independent of one another.

Table 3- 8 Login parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	After activating the function, the specified password is used to attempt to log on to the NC.
Password	Password authorizing NC logon (variable or constant)	

Note

Assign the NC: General PI service function to a key a variable. Then select the symbolic name of the NC from the controller list as the first function parameter. Specify the password to be transferred as the second function parameter.

The password parameter can be configured as a local variable or a constant.

- SetNCUserFrame (NC: Set user frame (activate zero offset))**
 Data for zero offsets are activated for a channel. This affects all NC variables of the block type FU. On entry, these variables are initially stored in a temporary memory on the NC. The new values entered are activated entirely via the NC: Set user frame function and can subsequently be read.

Table 3-9 Activate zero offset parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	After the HMI device user has entered the data for the zero offsets into the HMI device and pressed the configured key, the zero offset data is activated for the specified channel.
Channel	Channel to be activated (constant or variable): 1 - max 10	

Note

Assign the NC: Cold restart function to Set user frame function to a key. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the first function parameter. Enter the channel for the zero offset data as the second parameter.

The channel parameter can be configured as a variable or a constant.

- **SelectNCPartProgram (NC: Select part program)**

As well as using the part program overview display element for operation, additional functions for the selection of the NC part programs are implemented, which can be selected for all part programs from the SINUMERIK controller using domain services. For example, special screens can be created for permanently-defined part programs. These screens can then support a simplified selection process, using command buttons.

Table 3- 10 Select part program parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	The specified part program is selected on the NC for editing.
Channel	Channel, for which the program is selected: 1 – max. 10 (variable or constant)	
Path name	Absolute path specification of the program directory (variable or constant); without prefix _N_ compatible with OP7/17	
Program name	Name of the program or the workpiece to be processed (variable or constant) without prefix _N_ compatible with OP7/17	

Note

Together, the path name and program name parameters must indicate the part program path.

Assign the "NC: Select part program" function to a screen key and specify the corresponding NC, the channel, path names, and program names as parameters.

Enter only the absolute program or path name.

Path name examples:

- MPF_DIR for main directory
- SPF_DIR for subdirectory
- WKS_DIR for workpiece program directory

The path name and program name parameters can be configured as variables or constants.

- **StartNCPIService (NC: General PI service)**

This function can be used to send any PI service to the NC. This must be described by a parameter string in accordance with the OPI documentation. This parameter string must include the full command and not merely the parameters of the PI Service, for example,

NCK reset

Parameter string: PI_START(/NC,K00,0,_N_IBN_SS)

Table 3- 11 General PI service parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	A corresponding PI service is transmitted to the NC from the currently valid PI parameter string.
PI parameter string	Specification of the PI service to be executed (constant or variable)	
Result	When a function is activated, a return value is reported in this parameter asynchronously after termination.	

Note

Assign the NC: General PI service function to a key or a variable. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the first function parameter. Specify the PI parameter string as a further parameter.

The PI parameter string parameter can be configured as a variable or a string type constant.

- **ResetNC (NC: Cold restart (NCK reset))**
This function triggers a cold restart on the NC.

Table 3- 12 NCK reset parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	A cold restart is executed on the NC.

Note

Assign the NC: Cold restart function to a key. Then select the symbolic name of the NC, for which the function is to be executed, from the controller list as the function parameter.

3.7.3 Function for the current block display

Procedure

Select the function in the screen editor for "Select screen" (the screen is selected) in the "SINUMERIK" directory under "Events" > "Structured" > "Add functions".

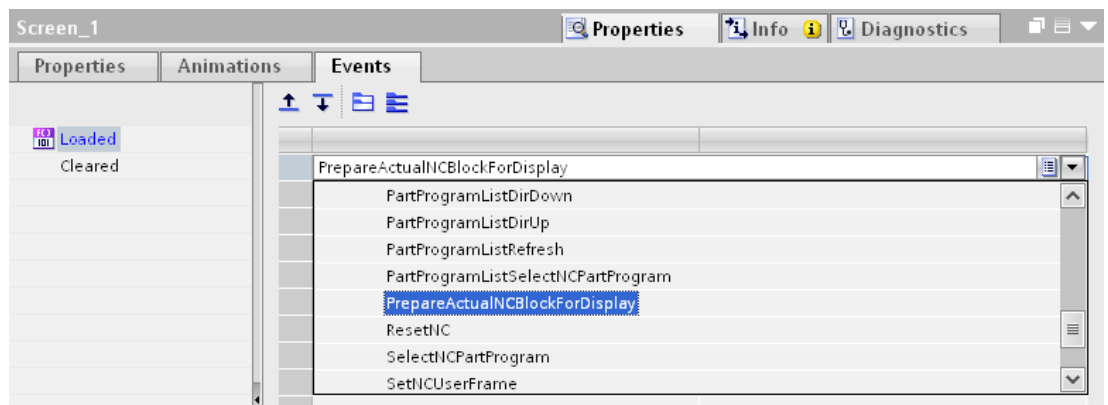


Figure 3-16 Current block display

- **PrepareActualNCBlockForDisplay**
This function takes the current, previous and subsequent traversing block of an NC part program, which is currently being processed in a channel, from the NC and stores them in local variables.

Table 3- 13 Display part program block parameters

Parameters	Meaning	Procedure on HMI device
PLC name	Symbolic name of the NC, which you entered under the "Properties" of the controller.	Destination: You wish to monitor execution of the traversing blocks of an NC traversing program on the control device. The Display NC part program block function is loaded when opening screens. A non-configured OPI variable block is activated with the configured cycle. On each cyclic reading operation of the OPI variable block, the variable block is divided into three parts and stored in the local variables of the previous, current and subsequent blocks. The local variables can be displayed on the screen as outputs.
Channel	Channel, from which the program is to be read (variable or constant) 1 - max. 10	
Cycle	Update time as a multiple of 100 ms (constant only): 1 – 600 (equal to 100 milliseconds – 1 minute)	
Previous block	Local variable for the traversing block, which precedes the current traversing block (STRING data type)	
Current block	Local variable for the current traversing block (STRING data type)	
Subsequent block	Local variable for the block following the current traversing block (STRING data type)	

Note

Specify three local variables of type String of length 66. Within a screen, create three output fields each with one of these variables. As an open screen trigger, now configure the NC: Display part program block function for this screen. Next, specify the corresponding NC, the channel from which the current block is to be read, the cycle, and the three local STRING variables as parameters for this function.

The channel parameter can be configured as a variable or a constant.

3.7.4 Function to start and stop the PLC

Procedure

Select the function in the screen editor under "Events" > "Add functions" > "Settings"

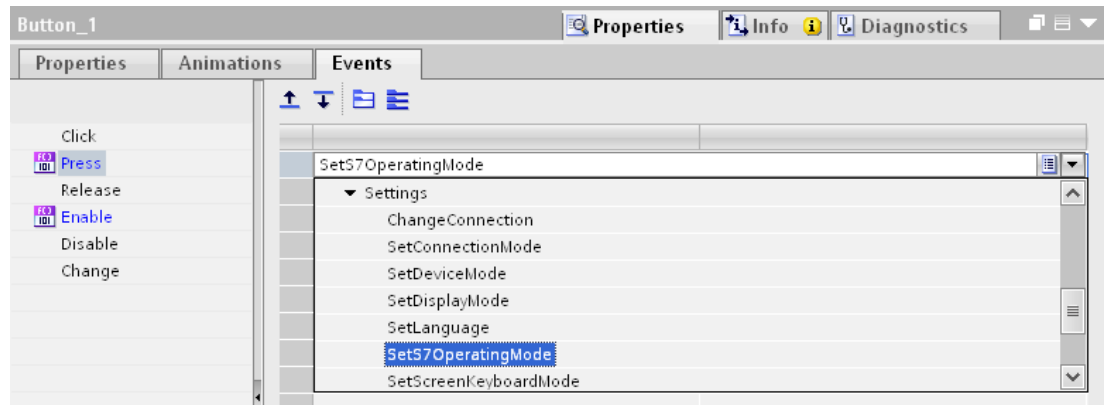


Figure 3-17 S7 change operating status

- SetS7OperatingMode (Change S7 operating state)**
 This function is used to select the operating state of a S7 CPU, from: RUN or STOP.

Table 3- 14 Change S7 operating state parameters

Parameters	Meaning
PLC name	Symbolic name of the S7-CPU, which you entered under the "Properties" of the controller.
Operating state	Operating state of the S7 CPU (variable or constant): 0 = RUN 1 = STOP

Note

Assign a screen key to the S7 change operating state function. As parameter, specify the corresponding control and the operating state.

The operating state parameter can be configured as a variable or a constant.

3.8 Loading a project file to PCU50

Introduction

After generating, the generated project files must be transferred to the target device.

The following options are available:

- Project files outside the TIA portal should be transferred via mechanisms, e.g. transfer via network (if the PCU50 is connected to a network) or USB stick.
- Using project files with the TIA portal download mechanism.

Preparations and procedure when using the download mechanism of the TIA portal

1. Make sure that the PCU50 is available in the Windows network.
2. Share the target directory on the PCU50 under Windows (e.g. F:\hmisl\addon\sinumerik\hmi\proj)
3. Click on the specified proj directory in the Explorer, then right-click and select "Sharing and Security".
4. Activate "Share this folder" and under "Permissions", place a checkmark next to Allow Full Control.
5. Press "OK" to complete. This directory can now be written to from the configuring computer.
6. On the configuring PC, a drive must be connected to this shared directory of the PCU50 via "Connect network drive".

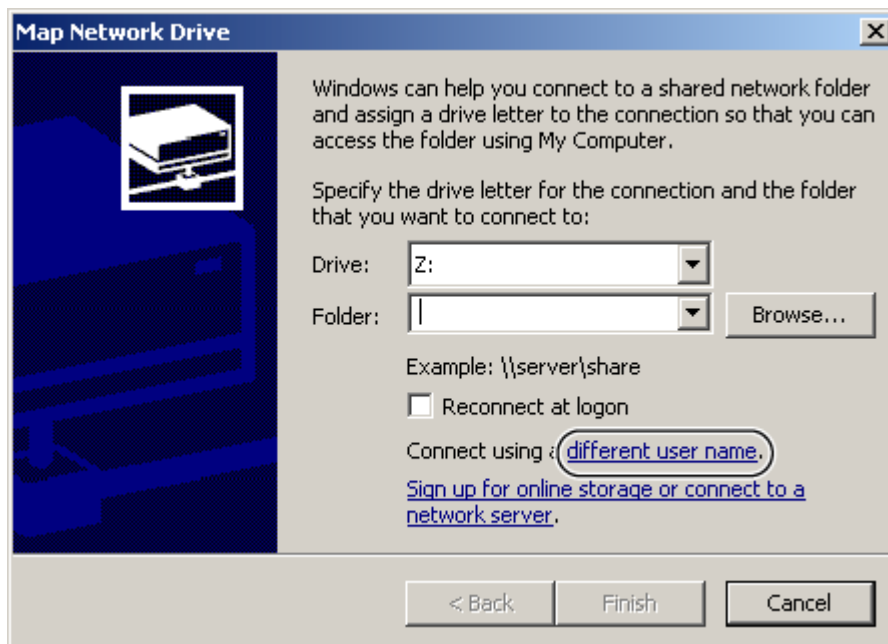


Figure 3-18 Dialog window "Connect network drive"

7. In the Windows Explorer, under tools, select-->Map Network Drive. Enter e.g. G:\xxx.xxx.xxx.xxx \proj enter as directory, whereby xxx.xxx.xxx.xxx is the IP address of the PCU50.
8. As user, enter "auduser" with the known manufacturers password.
9. With "OK", the new drive G: should be connected to the network.
On the engineering PC, you then have a drive that is connected with the target directory on the PCU50.
10. Select this directory as a target for the load dialog in WinCC – and as type of PG/PC interface, set "File" (see the diagram below).

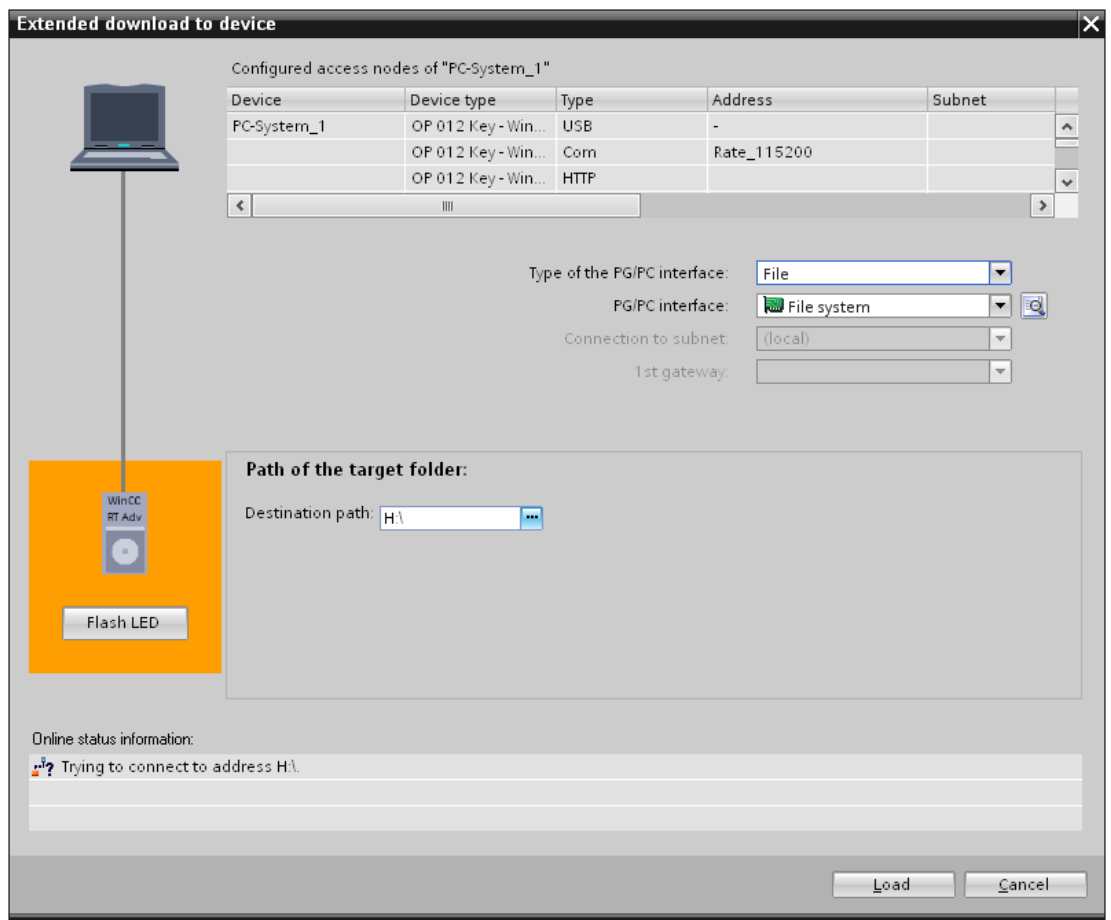


Figure 3-19 Loading on the PCU50

3.9 Integrating in SINUMERIK Operate

3.9.1 Integrating an OEMFrame application into HMI sl

Introduction

The screens configured for WinCC RT Advanced, are integrated into SINUMERIK Operate as OEMFrame application.

In order to prevent scrollbars being displayed, in the TIA portal project navigator (PNV) under "Runtime settings" -> "General", the full-screen mode must be activated.

Integrating the OEMFrame application

In order to integrate an OEMFrame application into SINUMERIK Operate, the following files must be adapted or generated:

- Configuration file "systemconfiguration.ini (Page 47)"

The "systemconfiguration.ini" configuration file defines from which operating areas SINUMERIK Operate is configured.

- Configuring the start softkey

In order to start an OEMFrame application within SINUMERIK Operate, configure a softkey on the expanded menu of the operating areas.

- "slamconfig.ini (Page 50)" configuration file

In order to configure the softkey position with text and/or symbol for the OEMFrame application, generate the "slamconfig.ini" file.

- Save a language-dependent text for a softkey in a ts file (Page 52).
- "oemframe.ini (Page 52)" file for application-specific settings.

Support by the setup

The following should be observed after completing the setup on a PCU50.x:

- Setup saves the necessary files on a PCU50 as default in directory E:\Program Files\Siemens\Automation\WinCC RT Advanced\Sinumerik\OEMFRAME.
- There, start the "copyWinCCRTcfg.bat", script to copy the files into the correct directories.
- The OEMFrame is then subsequently configured so that a small WinCC application is provided in the main menu.

Note

The descriptions provided under Section Creating configuration files (Page 47), are used to obtain an understanding of the settings required.

3.9.2 Creating configuration files

3.9.2.1 "systemconfiguration.ini" file

"systemconfiguration.ini" file

In order to integrate an OEMFrame application into the operating software, copy the "systemconfiguration.ini" configuration file and place it in one of the following directories:

<Installation path>hmis**user**\sinumerik\hmi\cfg

<Installation path>hmis**oem**\sinumerik\hmi\cfg

<Installation path>hmis**addon**\sinumerik\hmi\cfg

Note

For WinCC RT, it is recommended that the data is stored in the "addon" directory.

The "systemconfiguration.ini" configuration file defines from which operating areas SINUMERIK Operate is configured. The relevant sections of the "systemconfiguration.ini" file for integrating OEMFrame applications are described in the following.

Section [processes]

All of the processes to be managed by the system manager, as well as the applications which are integrated as OEMFrame applications, are located in the section **[processes]** .

Value	Meaning
process	Symbolic name of the OEMFrame application. This is required to configure the operating areas.
cmdline	Command line which is transferred to the "oemframe.exe" process when starting.
oemframe	For OEMFrame applications, always set to "true".
deferred	true: OEMFrame application is not started when SINUMERIK Operate powers up, but only when selected for the first time.
gimmekeys	Release mask for keys of the system configuration that are to be handled by the OEMFrame application. The parameterization is performed in the form of a bit mask.
disablekeys	Parameterization for the behavior of the keyboard filter. The parameterization is performed in the form of a bit mask. (see example 2)

Example

In the following example, the WinCC RT Advanced "HMIRTM.exe" is configured as OEMFrame application, which is started when first selected. The configuration to be started is located in the "pdata.fwc" file and is specified as call parameter.

```
[processes]

PROC600= process:=MyWinCC,cmdline:="E:\Program Files\Siemens\Automation\WinCC RT
Advanced\HmiRTM.exe F:\hmis1\addon\sinumerik\hmi\proj\pdata.fwc", oemframe:=true,
deferred:=true, classname:="HmiRTM,gimmekeys:=0x3F, disablekeys:=0x300FF"
```

Note

For path data for call parameters (e.g. pdata.fwc), there must be no spaces in the directory name (e.g. E:\Program Files\).

Section [areas]

The SINUMERIK Operate operating areas are configured in this section.

Value	Meaning
name	Symbolic name for the operating area.
process	Name of the OEMFrame application according to section [processes].

Note

Permissible number range

In the "processes" and "areas" sections, the number range 500-999 is reserved for OEM customers. If you use numbers less than 500, then it is possible that Siemens basis components will be overwritten!

Example

```
[areas]

AREA600= name:=AreaWinCC, process:=MyWinCC
```

Section [miscellaneous]

You can make various settings in this section. Generally, only the start operating area is changed.

Key	Value
startuparea	Name of the start operating area

Example

```
[miscellaneous]
startuparea = AreaWinCC
```

Example of "systemconfiguration.ini"

```
[processes]
PROC600= process:=MyWinCC, cmdline:="E:\Program Files\Siemens\Automation\WinCC RT
Advanced\HmiRTm.exe F:\hmisl\addon\sinumerik\hmi\proj\pdata.fwc", oemframe:=true,
deferred:=true, classname:="HmiRTm,gimmekeys:=0x3F, disablekeys:=0x300FF"

[areas]
AREA600= name:=AreaWinCC, process:=MyWinCC

[miscellaneous]
startuparea = AreaWinCC
```

Configuring additional settings

In order to configure the following settings, you require the "slamconfig.ini (Page 50)" configuration file:

- Assigning a softkey position to a specific operating area.
- Creating a language-dependent text for the softkey.
- Displaying a symbol for the operating area on the softkey.
- Name of the ts files.

See also

Integrating an OEMFrame application into HMI sl (Page 46)

Passing through keys (Page 56)

3.9.2.2 "slamconfig.ini" file

Creating the "slamconfig.ini" configuration file

Copy the "slamconfig.ini" and place the file in the same directory in which the "systemconfiguration.ini" file is located:

<Installation path>hmis**user**\sinumerik\hmi\cfg

<Installation path>hmis**oem**\sinumerik\hmi\cfg

<Installation path>hmis**addon**\sinumerik\hmi\cfg

Note

For WinCC RT, it is recommended that the data is stored in the "addon" directory.

file "slamconfig.ini"

In the "slamconfig.ini" configuration file, for every operating area, you can create a section that was configured in the "systemconfiguration.ini" file. The section must bear the configured name of the appropriate operating area, e.g. AreaWinCC.

Value	Meaning
TextId	Text ID for a foreign-language text which will be displayed as the softkey label.
TextContext	Context of the foreign-language text.
TextFile	Name of the text file which includes the context and the foreign-language text.
Picture	Name of an image file which will be used as an icon for the softkey.
SoftkeyPosition	Fixed softkey position of the area softkey. In this case, softkey positions 1 to 8 are located on the 1st horizontal bar and softkey positions 9 to 16 on the 2nd horizontal bar, etc.
AccessLevel	Access level from which the softkey will be displayed. If this value is not specified, then the access rights: Protection level 7 (key switch, position 0) is set.

Note

Short information about the SINUMERIK access levels

Siemens = 0

Manufacturer = 1

Service = 2

Customer = 3

Keyswitch setting3 = 4

Keyswitch setting2 = 5

Schlüsselschalterstellung1 = 6

Keyswitch setting0 = 7

Example

The softkey for the "AreaWinCC" operating area with the following properties is configured in the following example:

- The softkey shows the text, which was saved in the text file "wincc_<lng>.ts" (Page 52), in the context under "wincc" with the text ID "WinCC_AREA".
- The "winccpicture.png" symbol is displayed on the softkey.
- The softkey is located at position 7 in the operating area menu.
- The softkey is visible with access authorization: Protection level 5 (key switch, position 2).

```
[AreaWinCC]
; Text-ID of a language dependent text
TextId = WinCC_AREA
; File name of the text file which contains the Text-ID
TextFile = wincc
; Context in the text file to which the Text-ID is assigned to
TextContext = wincc
; File name of an icon shown on the area softkey
Picture = winccpicture.png
; Position of the area softkey on area menu,
; If no position is specified, an empty position is searched
SoftkeyPosition = 7
; Access level of the area softkey
AccessLevel = 5
```

Note

Operating area position 7 is reserved for OEM customers.

Note

Softkey 10 is reserved from SIEMENS (eps). It cannot be used for OEM customers. If it is configured, then the SK10 is not integrated, but instead, the next free softkey.

See also

Integrating an OEMFrame application into HMI sl (Page 46)

"systemconfiguration.ini" file (Page 47)

ts language-dependent textresource file (Page 52)

3.9.2.3 File "oemframe.ini"

The "oemframe.ini" file is required in the f:\hmis\compat\add_on directory.

In this file, you can save certain settings for each of the applications to be started via the OEMFrame.

Note

All of the default settings required for the WinCC application are included in the installed "oemframe.ini".

3.9.2.4 ts language-dependent textresource file

Labeling text for the softkey in the " wincc_<lng>.ts" file

In the "wincc_<lng>.ts" files, you can you create your own texts in a particular language. Whereby, a dedicated file must be created for each language.

The file names differ by the language code. For "<lng>", enter the corresponding language code (see table "Supported languages").

Storage path:

<Installation path>hmis\user\sinumerik\hmi\lng

<Installation path>hmis\oem\sinumerik\hmi\lng

<Installation path>hmis\addon\sinumerik\hmi\lng

The XML identifiers have the following meanings:

Attribute	Description
context	Context within the text file. Each file must have at least one context.
name	Name of the context.
message	Text translation. There must be at least one message per context.
source	Text identifier, as defined in "slamconfig.ini".
translation	Text, which is displayed on the user interface. You can enter single and multi-line texts. "%n" is used to indicate a line break.
remark	Own comments – are not displayed.
chars	Maximum text length, can be omitted and is used rather as information for the translation into different languages.
lines	Number of lines, can be omitted and is used rather as information for the translation into different languages.
languageIndependent	Provides the translator with a note that the text needs to be translated (false) or must not be translated must (true); can be omitted and is used rather as information for the translation into different languages.

Procedure for creating the "wincc_<lng>.ts" file

Copy the sample file wincc_lng.ts " from the following directory:

..\Automation\Portal V11\WinCC RT Advanced\Sinumerik\OemFrame

1. Save the file in the directory hmis\oem\sinumerik\hmi\lng or hmis\user\sinumerik\hmi\lng
2. Change the file name according to the text file entry and the selected language code (see table "Supported languages") to e.g. "wincc_deu.ts ".

Note

If you wish to create texts for additional languages, then a separate file must be created for each language.

3. Save the file with the appropriate language code in the file name (refer below).
4. Open the file and define the texts in the <message> and </message> areas.
5. Restart the PCU.

Note

The file must still be converted into a binary format in order that the texts are displayed during the program runtime. This data is only converted during power up.

Example with double-line text and full syntax

Structure of the language-dependent ts file that contains the labeling text for the softkey:

```
wincc_deu.ts
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE TS>
<TS>
  <context>
    <name>wincc</name>
    <message>
      <source>WinCC_AREA</source>
      <translation>WinCC%nArea</translation>
      <remark>The text ID WinCC_AREA contains the text "WinCC%nArea". As a result
of the %n, the text is displayed on the softkey on two lines. "WinCC" in the first
line and "Area" in the second line. By specifying "charts" and "lines", we provide
information that the space on which the text is to be displayed is limited. It is up
to the translator to decide whether the text is displayed on one or two lines.
</remark>
      <chars>10</chars>
      <lines>2</lines>
    </message>
  </context>
</TS>
<languageIndependent>>false</languageIndependent>
```

```

wincc_deu.ts
    </context>
</TS>
    
```

The same example optimized

```

wincc_deu.ts
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE TS>
<TS>
  <context>
    <name>wincc</name>
    <message>
      <source>WinCC_AREA</source>
      <translation>WinCC%nArea</translation>
      <remark></remark>
      <chars>10</chars>
      <lines>2</lines>
    </message>
  </context>
</TS>
    
```

Table 3- 15 Supported languages

Language	Language code	Default language
Chinese (simplified)	chs	X
Chinese (traditional)	cht	
Danish	dan	
German	deu	X
English	eng	X
Finnish	fin	
French	fra	X
Italian	ita	X
Japanese	jpn	
Korean	kor	
Dutch	nld	
Polish	plk	
Portuguese	ptb	
Rumanian	rom	
Russian	rus	

Language	Language code	Default language
Swedish	sve	
Slovakian	sky	
Spanish	esp	X
Czech	csy	
Turkish	trk	
Hungarian	hun	

See also

Integrating an OEMFrame application into HMI sl (Page 46)
"slamconfig.ini" file (Page 50)

3.9.3 Further settings

3.9.3.1 Displaying the SINUMERIK header

Procedure

If the SINUMERIK Operate header is to be displayed in the WinCC application, then the "panel" attribute must be set.

```
[areas]
AREA600= name:=AreaWinCC, process:=MyWinCC, panel := SlHdStHeaderPanel
```

3.9.3.2 Defining WinCC as an application that must become active after power up

Procedure

If the WinCC application should become active after power-up, then the "startuparea" entry must be set accordingly.

```
[miscellaneous]
startuparea = AreaWinCC
```

3.9.3.3 Passing through keys

Procedure

The "GIMMEKEYS" attribute can be used to control which system keys are passed on to the OEM application.

The Gimmekey bit mask is set to 0xF as default setting. However, with this default setting, the keys RECALL and ETC are still not transferred to the OEM application. Therefore, the parameter GIMMEKEYS:=0x3F must be used.

If additional keys are to be processed by the OEM application, then the corresponding bits must be set in the Gimmekey bit mask.

The key for the channel changeover and the "Acknowledge alarms" key can also be passed on to the WinCC application.

However, these keys are then no longer processed by the system. The WinCC configuration engineer is now responsible for this.

Gimmekeys

- Channel switchover -> 0x13F
- Acknowledge alarms -> 0x103F
- Channel switchover + acknowledge alarms -> 0x113F

See also

"systemconfiguration.ini" file (Page 47)

3.9.3.4 Expanding the keyboard filter

Procedure

The "DisableKeys" attribute can be used to configure the behavior of the keyboard filter. The value is set to 0x3FFFF as default setting.

Using this attribute, it is possible to transfer the softkeys of the left and the second lower softkey bar to the application.

DisableKeys

If the WinCC application should also manage the lower horizontal and the left-hand vertical softkey bar, then the DisableKeys-bit mask must be set to 0x300FF.

3.9.4 Going online with the WinCC RT application

Procedure

To ensure that WinCC RT can read data from the NCU, the PG/PC interface must be switched over from MPI to TCP/IP..

To do this, use the "Set PG/PC interface" tool, which is available in the service mode via the control panel.

3.10 Licensing

The following licenses are required:

- Engineering System
Basic WinCC license
- Runtime
SINUMERIK Operate WinCC RT Advanced
6FC5800-0AP61-0YB0

Note

This license includes the "SINUMERIK Operate WinCC RT" license.

Supplementing the SINUMERIK Operate user interfaces with individual/integrated screens

4

4.1 General information (SINUMERIK Operate WinCC RT)

Configurable user interface

For PC-based HMI devices with SINUMERIK Operate WinCC RT, there is a limited area to configure additional screens for SINUMERIK Operate.

The display of header and horizontal softkeys is taken from the standard user interface of SINUMERIK Operate and cannot be configured.

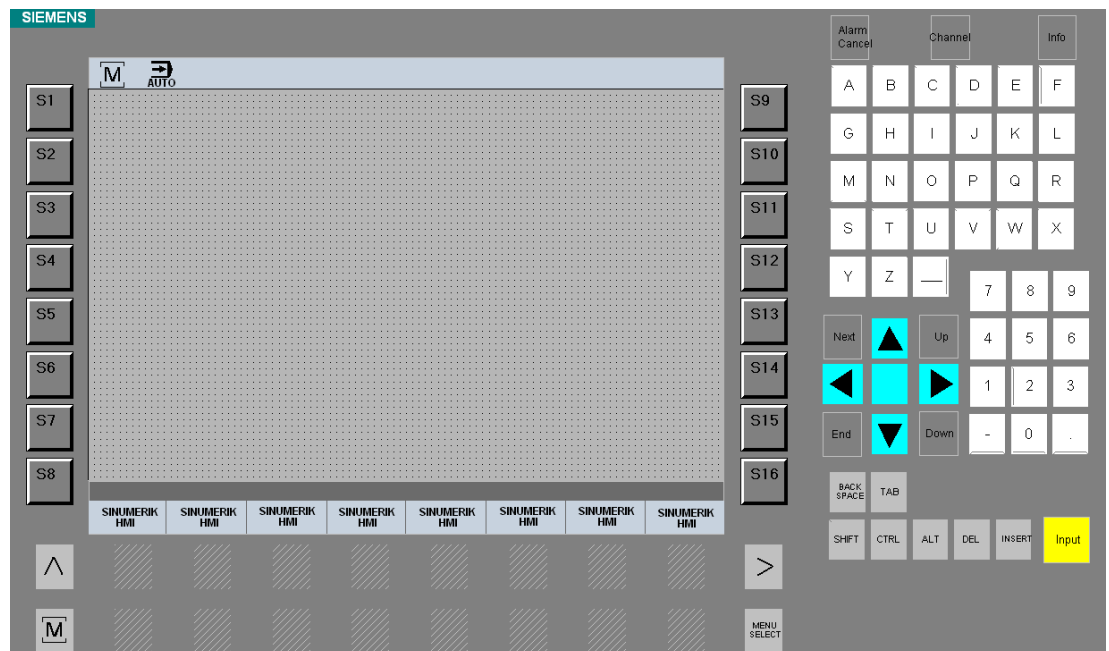


Figure 4-1 User interface for SINUMERIK Operate WinCC RT

Properties of SINUMERIK Operate WinCC RT

If SINUMERIK Operate is supplemented by screens from SINUMERIK Operate WinCC RT, then the configuration is adapted, so that these screens can be started in an existing operating area (for example diagnostics or commissioning) at horizontal softkeys, which up until now, were free.

4.2 Creating a project and configuring a device

The following components in WinCC enable the configuration of individual/integrated screens for a SINUMERIK Operate user interface:

- SINUMERIK PC-based HMI device
- SINUMERIK Operate WinCC RT

Procedure

To create a project, proceed as follows:

1. This is how you create a new project.
2. You insert a new device.

In this dialog, under "PC systems" > "SINUMERIK PC", you select an HMI device (e.g. "OP 012 Key") and assign a device name (e.g. "HMI_1").

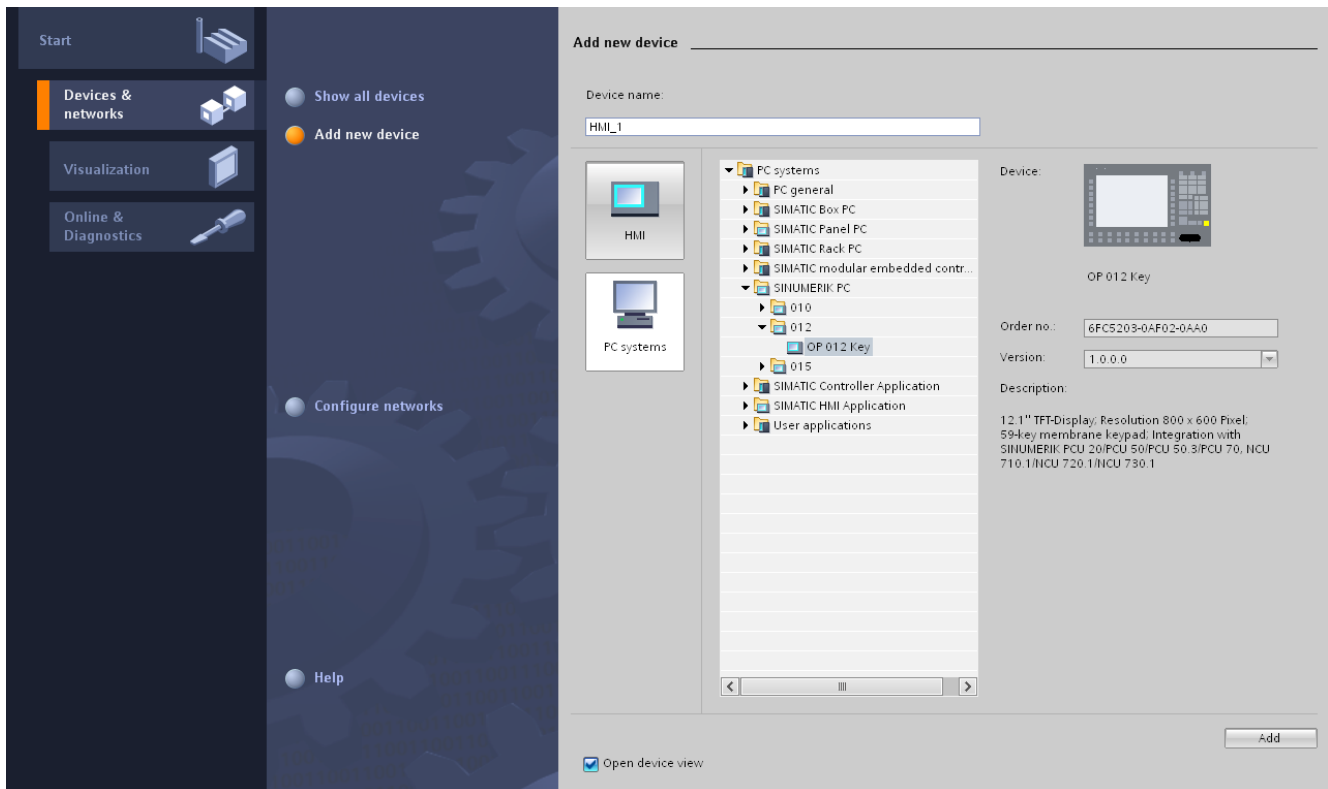


Figure 4-2 Adding a new SINUMERIK device

3. In the project view, select the runtime software in the hardware catalog under "SIMATIC HMI application" > "SINUMERIK Operate WinCC RT" and drag it to the device in the "Device view".

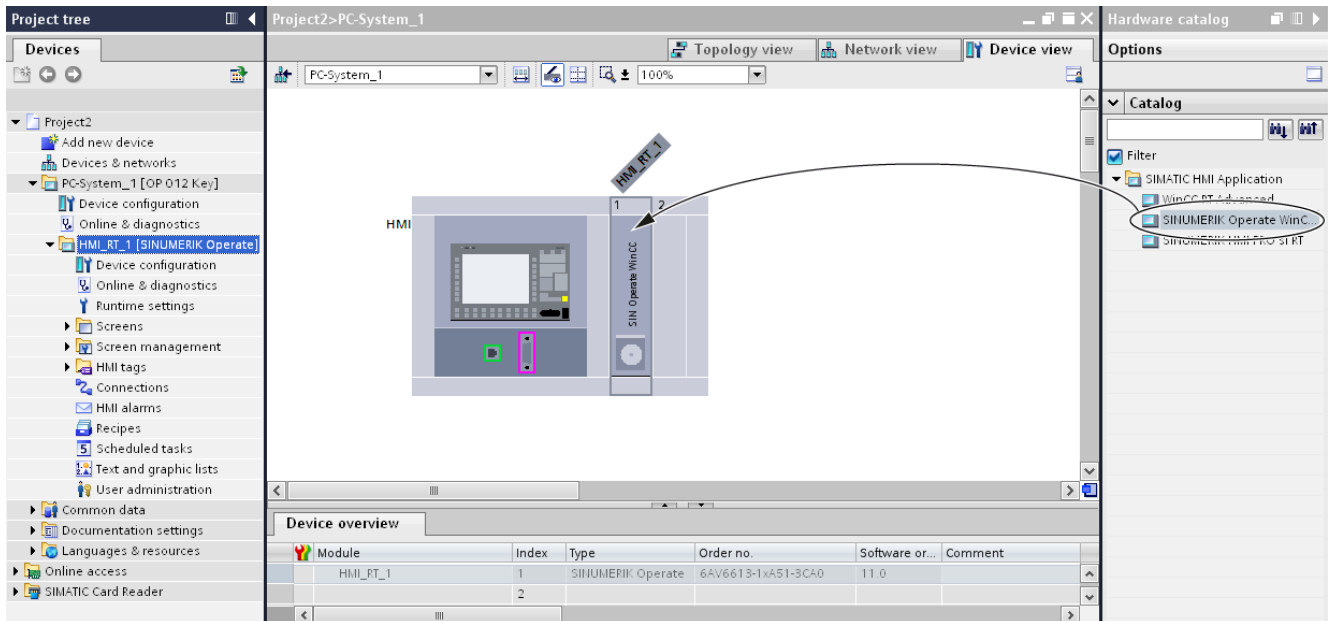


Figure 4-3 Placing the runtime software SINUMERIK Operate WinCC RT

4. In the "Project navigation" window, the configured runtime (e.g. "HMI_RT_1 [SINUMERIK Operate]") is added to the created device (e.g. "HMI_1").

In this runtime directory, among others, the following editors used for configuring are available:

- "Connections" (Page 62)
- "HMI variables" (Page 63)
- "HMI messages" (Page 64)
- "Screens" (Page 64)

4.3 Configuring connections

General

For PC-based HMI devices, the "SINUMERIK NC" connection channel is provided for communication to the numeric component of SINUMERIK; the "SINUMERIK PLC" connection channel, for communication to the PLC component.

Communication is parameterized in the configuration files of the SINUMERIK Operate interface. The installation ensures that the correct settings are made.

Procedure

1. Select a device in the project view in the project navigation window.
2. Open the editor for connections by double-clicking on it.

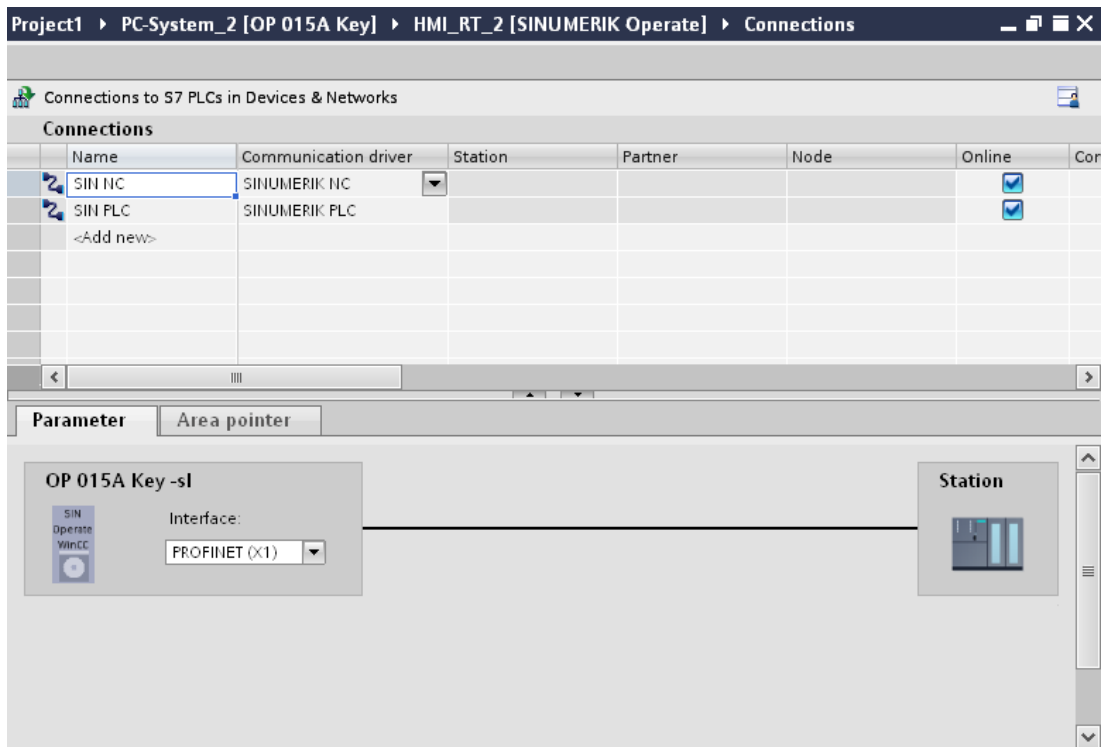


Figure 4-4 Example, connection parameters PC-based HMI devices, PROFINET interface

3. In the work area, create the connections to the NCK and the PLC.
4. Data do not have to be configured for a SINUMERIK_NC/SINUMERIK_PLC connection.

4.4 Configuring variables

Overview

Control variables of the relevant format can be defined for the communication channel set (= connection selected for variables).

For the "SINUMERIK NC" communication channel, the following control variables can be used:

- All variables of the operator panel interface
- All general, channel-specific and axis-specific machine and setting data
- User-defined control variables (GUD)

These variables can be configured using their symbolic name.

For the communication channel "SINUMERIK PLC", the scope of variables can be used corresponding to that of the S7 300/400 channel.

Configuring OPI variables, machine and setting data

These data are available as default settings in the engineering system.

See also

Configuring variables (Page 21)

4.5 Configuring alarms

NC alarms

NC alarms are:

- Always displayed in the SINUMERIK diagnostics
- Not displayed in the WinCC AlarmView

PLC alarms

PLC alarms are:

- Always displayed in the SINUMERIK diagnostics
- Not displayed in the WinCC AlarmView

HMI alarms (defined in WinCC)

HMI alarms are:

- Always displayed in the SINUMERIK diagnostics
- Not displayed in the WinCC AlarmView

DB2 alarms

DB2 alarms are:

- Always displayed in the SINUMERIK diagnostics
- Not displayed in the WinCC AlarmView

4.6 Configuring screen objects

General

Standard WinCC screen objects are provided for SINUMERIK Operate WinCC RT.

For SINUMERIK Operate WinCC RT there are no specific SINUMERIK screen objects.

4.7 Licensing

The following licenses are required:

- Engineering System
Basic WinCC license
- Runtime
SINUMERIK Operate WinCC RT
6FC5800-0AP68-0YB0

Note

This license is covered by the license "SINUMERIK Operate WinCC RT Advanced".

Supplementing SIMATIC CE HMI devices with SINUMERIK functionality

5

5.1 General information (WinCC RT Advanced integrated)

Overview, Windows CE HMI device

An HMI CE device communicates with a SINUMERIK controller via the communication drivers "SINUMERIK NC" and "SIMATIC S7 300/400".

SINUMERIK NC

For "SINUMERIK NC", the following configuration options are available with SINUMERIK Operate WinCC:

- Reading/writing of OPI and GUD variables
- Screen object "NC part program"
With the screen object "NC part program" you have the option of displaying and selecting part programs as an overview
- Functions
 - For the screen object "NC part program" (e.g. navigating and selecting in the list directory)
 - For a selection of PI services, to be executed in the NCK
 - For the current block display
- SINUMERIK NC messages for NCK alarms and messages.

SIMATIC S7 300/400

For "SIMATIC S7 300/400", the following additional configuration options are available with SINUMERIK Operate WinCC:

- Start PI service and stop PLC

5.2 Creating a project and configuring a device

The following components are required in WinCC, in order to use the SINUMERIK functionality on a SIMATIC CE HMI device:

- Suitable SIMATIC Panel/Comfort Panel/Multi Panel

Procedure

To create a project, proceed as follows:

1. This is how you create a new project.
2. You insert a new device.

In this dialog, under "HMI" select a SIMATIC Panel (e.g. "MP 177 6" mono DP") and assign a device name (e.g. "HMI_SIMATIC_Panel").

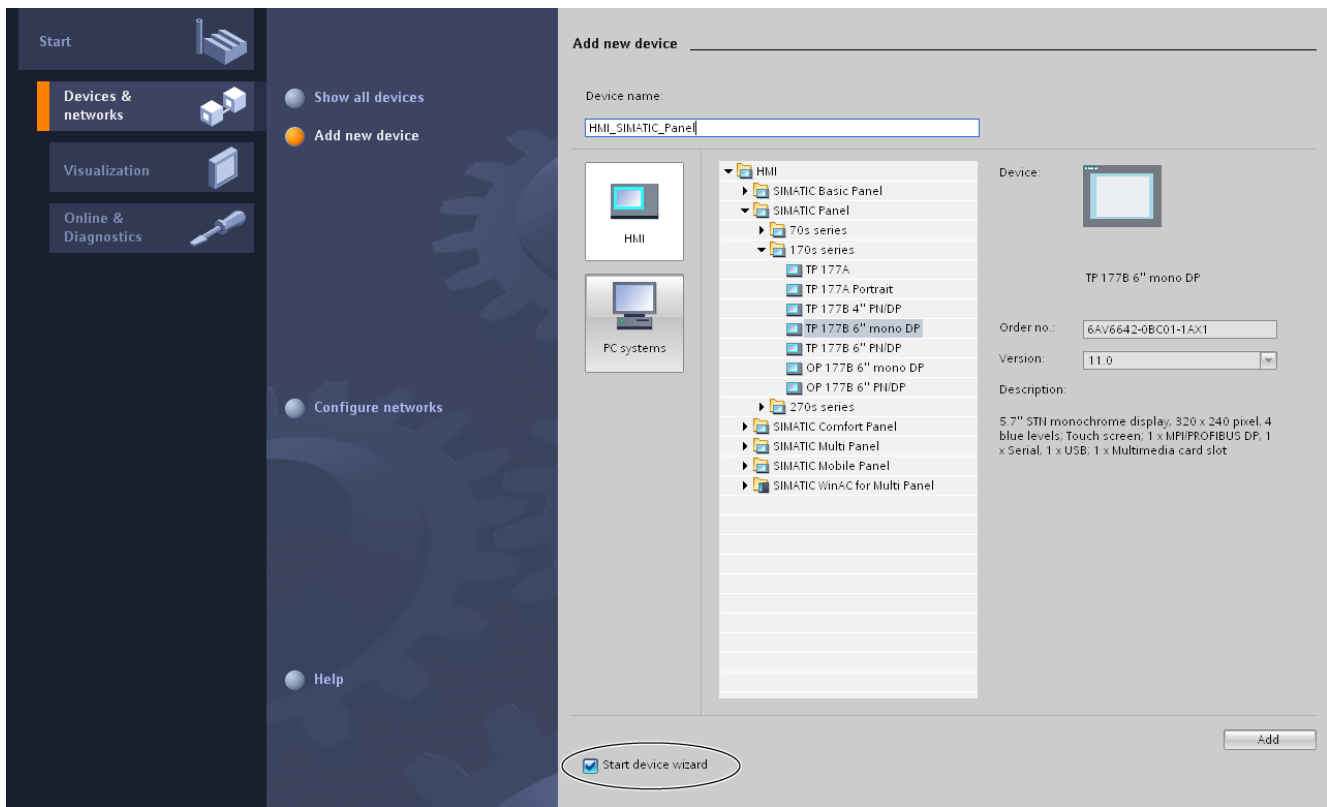


Figure 5-1 Adding a new SIMATIC device

Note

Select the "Call device wizard" to start the HMI device wizard.

The HMI device wizard guides you step-by-step through the individual dialogs and supports you when creating a device. With HMI devices wizards, you define basic settings for your HMI device, e.g. the graphic display or the connection to your PLC.

3. The runtime is already integrated for SIMATIC CE HMI devices.

The runtime software (e.g. "HMI_SIMATIC_Panel [MP 177 6" mono DP]") is added in the "Project navigation" window.

In this runtime directory, among others, the following editors used for configuring are available:

- "Connections" (Page 69)
- "HMI variables" (Page 70)
- "HMI messages" (Page 71)
- "Screens" (Page 74)

5.3 Configuring connections

General

For HMI devices, classes Mobile Panel, Panel and Multi Panel, the connection channel "SINUMERIK NC" is intended for communication with the numeric component of the SINUMERIK. The connection channel "SIMATIC S7 300/400", is intended for communication with the PLC component.

Depending on the interface available, communication can be handled via the MPI/DP or Ethernet connection.

The communication parameters must be set in the engineering system. Expansion slot 4 must be selected for the communication driver SINUMERIK NC.

Procedure

1. Select a device in the project view in the project navigation window.

5.4 Configuring variables

2. Open the editor for connections by double-clicking on it.

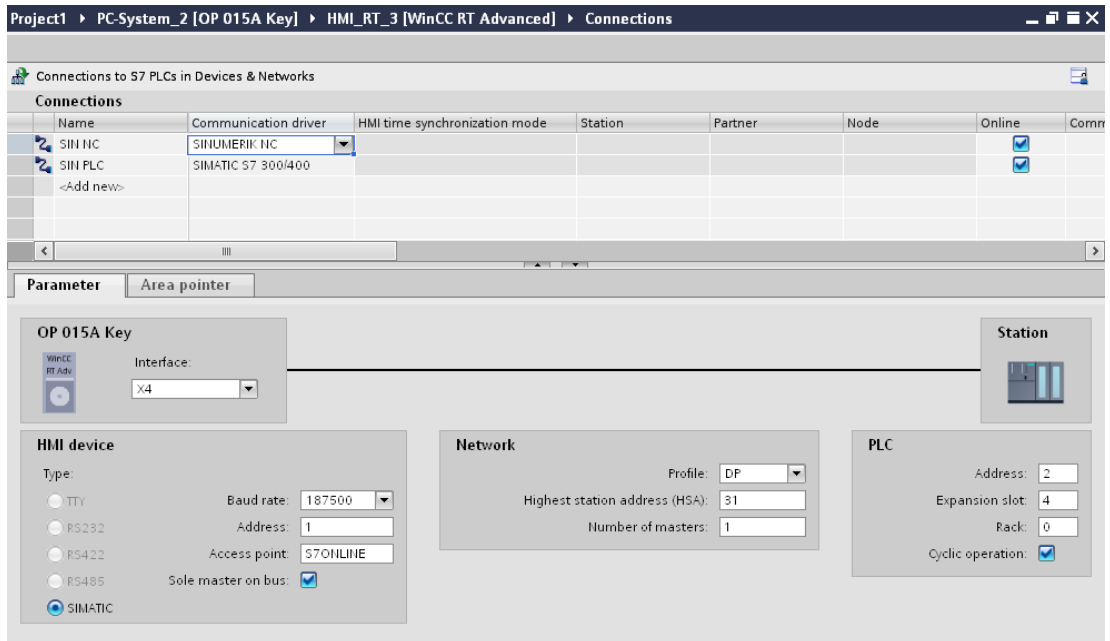


Figure 5-2 Example, connection parameters for CE HMI devices DP interface

- 3. In the work area, create the connections to the NCK and the PLC.
- 4. Please enter the correct data for addressing the MPI or Ethernet interface.

5.4 Configuring variables

Reference

See Configuring variables (Page 21)

5.5 Configuring alarms

NC alarms

NC alarms are displayed in the WinCC AlarmView, if:

- A SINUMERIK connection is configured
- The SINUMERIK message classes are activated

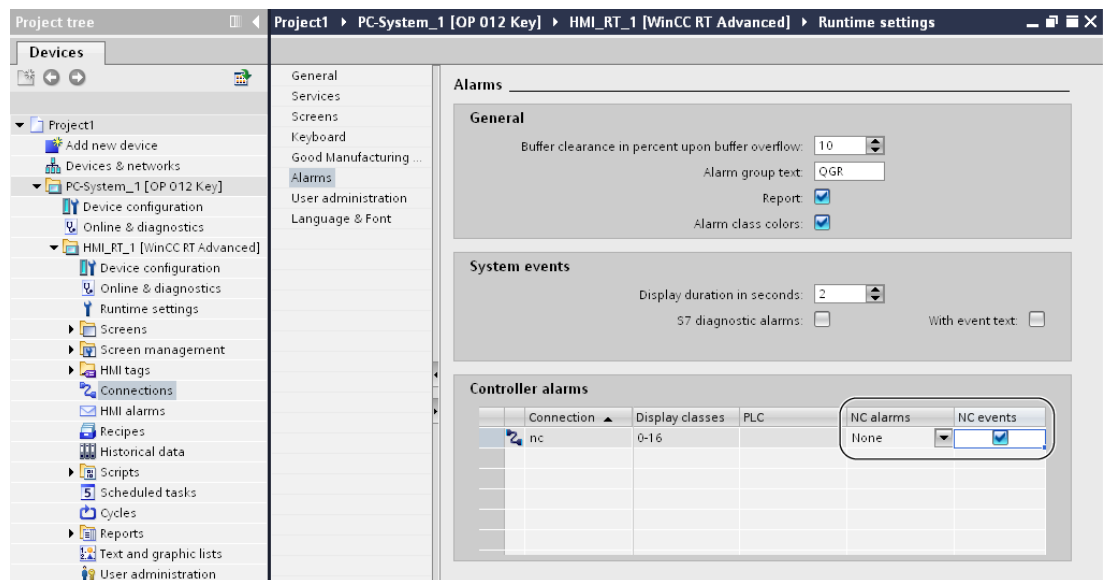


Figure 5-3 NC alarms

- SINUMERIK message classes are selected in the message view

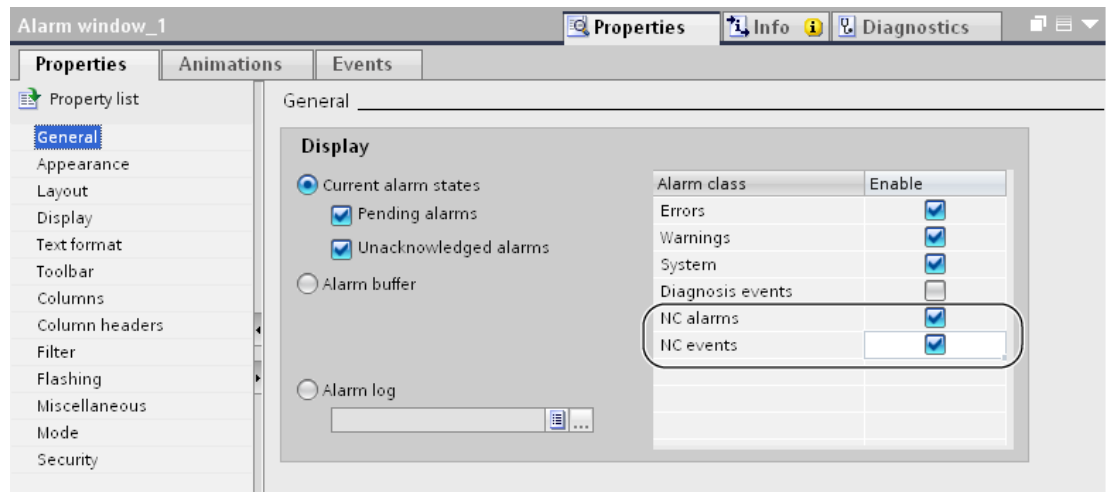


Figure 5-4 Message classes

PLC alarms (of the NCK-PLC interface)

PLC alarms are displayed in the WinCC AlarmView, if:

- A SINUMERIK connection is configured
- The SINUMERIK message classes are activated
- SINUMERIK message classes are selected in the message view

HMI alarms (defined in WinCC)

HMI alarms are always shown in the WinCC AlarmView.

DB2 alarms

DB2 alarms are displayed in the WinCC AlarmView, if:

- The discrete alarms corresponding to DB2 alarms have been subsequently configured in WinCC.

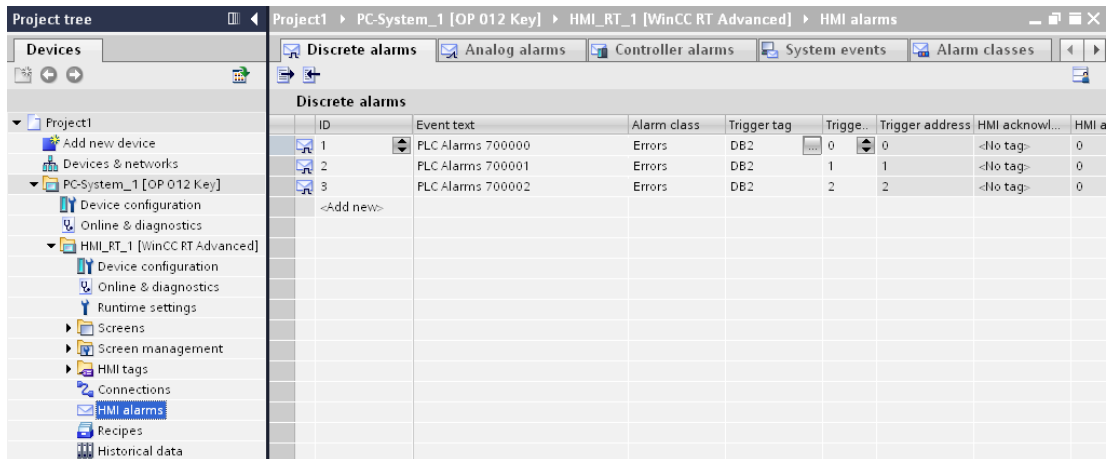


Figure 5-5 DB2 alarms

Changing NC alarm texts

NC alarm texts are saved in the engineering system under the following directory:

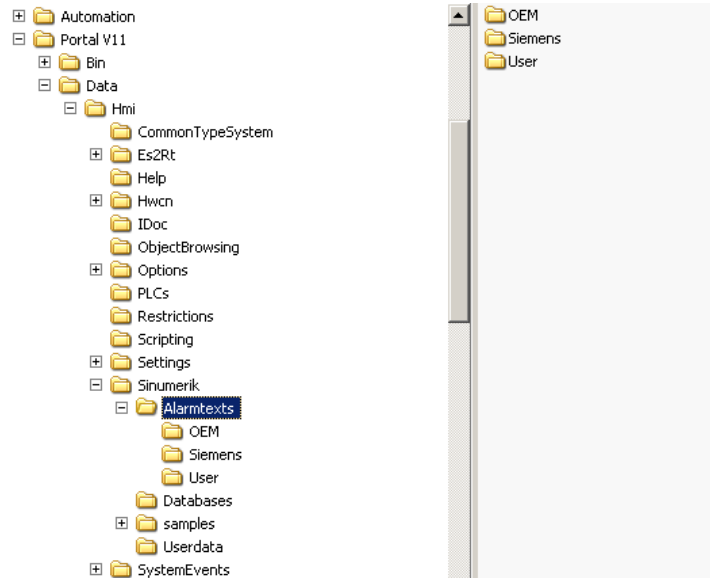


Figure 5-6 SINUMERIK directory for alarms

The user has the option of changing existing texts.

The SINUMERIK alarm texts saved in the installation directory cannot be changed and should not be changed.

If you want to change texts, copy the alarm directory under

"Automation\Portal V11\Data\HMI\Sinumerik" into the respective TIA project in the following directory:

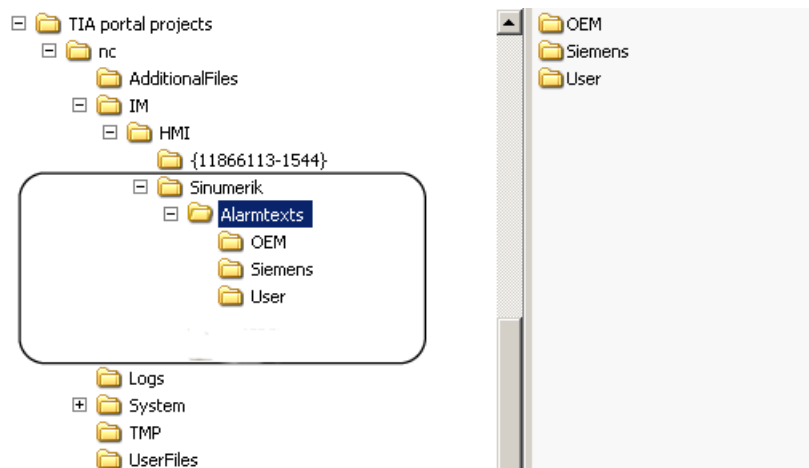


Figure 5-7 Target directory for alarms

At this point, the specified alarm texts can now be changed.

We recommend that the original texts are kept in the "Siemens" directory and changes are only made in a copy located in the "OEM" or "User" directories.

5.6 Configuring screen objects

Note

For HMI CE HMI devices, specifically for SINUMERIK, the screen object "NC part program" (Page 29) can be configured.

5.7 Configuring PI services/system functions

Introduction

With HMI CE devices, you can use specific SINUMERIK functions with SINUMERIK Operate WinCC.

These are the following functions:

- Functions for the "NC part program" display object (Page 33)
- Functions for execution in the NCK (Page 35)
- Function for the current block display (Page 41)
- Function to start and stop the PLC (Page 43)

See also

SINUMERIK events, which trigger HMI CE device functions (Page 79)

5.8 Licensing

The following licenses are required:

- Engineering System
Basic WinCC license
- Runtime
SINUMERIK WinCC RT CE
6FC5800-0AP03-0YB0

Tools supplied

Overview

The following tool is supplied with SINUMERIK Operate WinCC:

- Create user database (GUD_TOOL)

6.1 Create user database (GUD_tool)

Introduction

GUDs are Global User Data that users can define themselves and can then be subsequently used in the NC. WinCC offers the possibility of configuring these GUDs.

A GUD database must first have been created using the GUD_TOOL.

The actual GUD can no longer be directly read out of the control system (up to WinCC flexible 2008 this was still possible). Data must be provided to the GUD_TOOL in the form of .def files.

These .def files can be already created in advance on the engineering PC – or GUDs existing on an NC can be copied with a SINUMERIK Operate onto a USB flash drive.

If .def files are already available, then using the GUD_TOOL a database can be created and the GUDs can then be configured in WinCC as a variable.

Installation

The GUD_TOOL (GUD_TOOL.exe) is installed by the SINUMERIK setup in the installation directory of WinCC TIA-Portal V11 of the engineering PC.

Using this GUD_TOOL, a user database (Userdata.mdb) is generated from the definition files of the dynamic user data (MGUD.DEF, UGUD.DEF etc.).

Definition files of the dynamic user data - <file name>.def

The dynamic user data are communicated to the NCK using these definition files.

These files are required during the runtime on the control.

These files for the GUD_TOOL are required on the engineering PC.

File of the user database - Userdata.mdb

The file of the user database is required to display user data within WinCC TIA-Portal V11 during the engineering time when configuring the variables.

See also

Subsequently changing definition files (Page 78)

6.1.1 Generating a user database for dynamic user data

Procedure

1. Start the GUD_TOOL via the Windows start menu "Start" > "Program" > "Siemens Automation" > "TIA Portal V11 SINUMERIK" > "GUD_TOOL".

The GUD_TOOL is started.

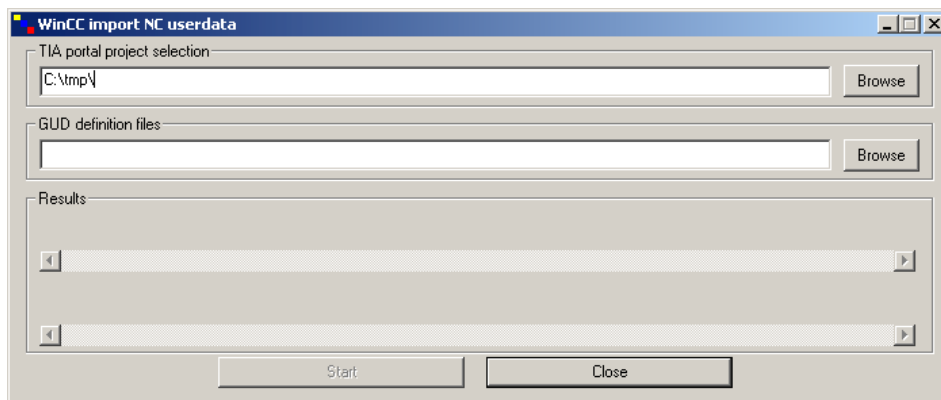


Figure 6-1 GUD_TOOL

2. In the input field "TIA portal project selection", select the project (ap11 file), in which the user database generated by the GUD_TOOL and GUD user definition files should be saved.
3. In the input field "GUD definition files", select the directory of the GUD user definition files (MGUD.DEF , UGUD.DEF , GUD4.DEF , GUD5.DEF etc.).
For example, this could be a USB flash drive with the copied DEF files of the NC control.
4. Press "Start".

The GUD tool performs the following steps:

- Creates a "Userdata.mdb " in the directory "<project>\IM\HMI\Sinumerik\Databases".
- Copies the GUD user definition files into the directory "<Project>\IM\HMI\Sinumerik\Userdata".

6.1.2 Providing GUD user definition files to the project

Introduction

The following procedures are described for the GUD user definition files:

- Sources of the files come from the NCU and should be made available to the engineering system on the PC.
- Sources of the files come from the engineering system and should be made available on the NCU.

Procedure for source NCU - target engineering system

1. From the SINUMERIK Operate user interface, in the operating area "Commissioning" > "System data" > "NC data", select the "Definitions" directory and press the "Copy" softkey. This means that all DEF files of the directory are copied to the clipboard.
2. A USB stick previously inserted in the panel, is visible at the lower edge of the Explorer.
3. In Explorer, select the USB stick. Using the Paste softkey, all DEF files of the control system are copied into a DEF directory on the USB stick.
4. On the engineering PC, start the GUD_Tool.
5. Select the project directory as target – and as source, the USB stick directory with the DEF files.
6. Press "Start".
7. The files are copied to the project and a user database is created.

Procedure for source engineering system – target NCU

1. At the PC, provide the actual GUD user definition files.
2. Start the GUD tool.
3. As target, select a TIA Portal project directory and as the source, the directory of the GUD user definition files.
4. Press "Start".
5. The user database is created and the definition files are saved in the project directory.
6. In the SINUMERIK Operate user interface, in the operating area "Commissioning" > "System data" > "NC data", copy the files from the USB flash drive into the "Definitions" directory.
7. Activate the files using ""Define and activate user files (GUD)".

6.1.3 Subsequently changing definition files

If definition files are changed, then the database must be re-created using the GUD_TOOL.

If a new data item must be included in a definition file, then we recommend that this data item is attached to the end of the file. The addressing of the previous data item therefore remains unchanged. The already existing HMI tags remain correctly addressed.

If a data item must be inserted between existing GUDs, then this changes the addressing of the subsequent data. As a consequence, the runtime would access incorrect data. To prevent this, already configured HMI tags must be configured to the data "shifted" into the definition file using the variable editor.

If existing data are changed, after updating the database, the modified data must be opened in the WinCC variable editor using the GUD_tool and possibly corrected.

The use of modified variables, e.g. data type in the I/O field, should also be checked.

Appendix

A.1 SINUMERIK events, which trigger HMI CE device functions

Introduction

The following tables list the functions for the relevant WinCC objects and associated events that apply in the case of SINUMERIK with HMI CE devices. These functions are indicated by a **crpss** in the table.

In the following five tables, these are the WinCC objects

- Variables
- Function keys
- Buttons
- Screen
- Messages
- OCX
- Script
- Scheduler

SINUMERIK events, which trigger HMI CE device functions, part 1

Object	Variables			Softkey			
				Global		Local	
Event	Value changed	Upper limit exceeded	Lower limit exceeded	Release	Press	Release	Press
Functions							
SetS7OperatingMode	X	X	X	X	X	X	X
AcknowledgeNCCancelAlarms	X	X	X	X	X	X	X
LogonNC	X	X	X	X	X	X	X
LogoffNC	X	X	X	X	X	X	X
ChangeNCPassword	X	X	X	X	X	X	X
SetNCUserFrame	X	X	X	X	X	X	X
SelectNCPartProgram	X	X	X	X	X	X	X
PrepareActualNCBlockForDisplay							
StartNCPIService	X	X	X	X	X	X	X
ResetNC	X	X	X	X	X	X	X

A.1 SINUMERIK events, which trigger HMI CE device functions

Object	Variables			Softkey			
				Global		Local	
Event	Value changed	Upper limit exceeded	Lower limit exceeded	Release	Press	Release	Press
Functions							
ConfigureNCMachineData	X	X	X	X	X	X	X
ScreenObjectCursorUp				X	X	X	X
ScreenObjectCursorDown				X	X	X	X
ScreenObjectPageUp				X	X	X	X
ScreenObjectPageDown				X	X	X	X
PartProgramListSelectNCPartProgram				X	X	X	X
PartProgramListDirUp				X	X	X	X
PartProgramListDirDown				X	X	X	X
PartProgramListRefresh				X	X	X	X

SINUMERIK events, which trigger HMI CE device functions, part 2

Object	Command buttons			
	Global		Local	
Event	Release	Press	Release	Press
Function				
SetS7OperatingMode	X	X	X	X
AcknowledgeNCCancelAlarms	X	X	X	X
LogonNC	X	X	X	X
LogoffNC	X	X	X	X
ChangeNCPasssword	X	X	X	X
SetNCUserFrame	X	X	X	X
SelectNCPartProgram	X	X	X	X
StartNCPIService	X	X	X	X
ResetNC	X	X	X	X
ConfigureNCMachineData	X	X	X	X

SINUMERIK events, which trigger HMI CE device functions, part 3

Object	Screen		Messages						
			Alarm				Event		
Events	Loaded	Cleared	Activate	Clear	Acknowledge	Edit	Activate	Clear	Edit
Functions									
LogonNC	X	X							
LogoffNC	X	X							
ChangeNCPassw	X	X							
SetNCUserFrame	X	X	X	X	X	X	X	X	X
SelectNCPartProgram	X	X	X	X	X	X	X	X	X
PrepareActualNCBlockForDisplay	X								
StartNCPIService	X	X	X	X	X	X	X	X	X
ResetNC	X	X	X	X	X	X	X	X	X
ConfigureNCMachineData	X	X	X	X	X	X	X	X	X
ScreenObjectCursorUp	X	X							
ScreenObjectCursorDown	X	X							
ScreenObjectPageUp	X	X							
ScreenObjectPageDown	X	X							
PartProgramListSelectNCPartProgram	X	X							
PartProgramListDirUp	X	X							
PartProgramListDirDown	X	X							
PartProgramListRefresh	X	X							

SINUMERIK events, which trigger HMI CE device functions, part 4

Objects	OCX			Script
	OCX (ScreenItem)			InScripts
Event	Press, Release, Click, Change (or Toggle when used on a Switch), SwitchOn, SwitchOff	Activate	Deactivate	
Functions				
SetS7OperatingMode	X	X	X	X
AcknowledgeNCCancelAlarms	X	X	X	X
LogonNC	X	X	X	X
LogoffNC	X	X	X	X
ChangeNCPassWord	X	X	X	X
SetNCUserFrame	X	X	X	X
SelectNCPartProgram	X	X	X	X
PrepareActualNCBlockForDisplay				
StartNCPIService	X	X	X	X
ResetNC	X	X	X	X
ConfigureNCMachineData	X	X	X	X
ScreenObjectCursorUp	X	X	X	
ScreenObjectCursorDown	X	X	X	
ScreenObjectPageUp	X	X	X	
ScreenObjectPageDown	X	X	X	
PartProgramListSelectNCPartProgram	X	X	X	
PartProgramListDirUp	X	X	X	
PartProgramListDirDown	X	X	X	
PartProgramListRefresh	X	X	X	

SINUMERIK events, which trigger HMI CE device functions, part 5

Object	Scheduler					
Event	ExpireTime	ScreenChange	ChangeUser	AlarmOverflowBuffer	StartUp	ShutDown
Function						
LogoffNC			X			X

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