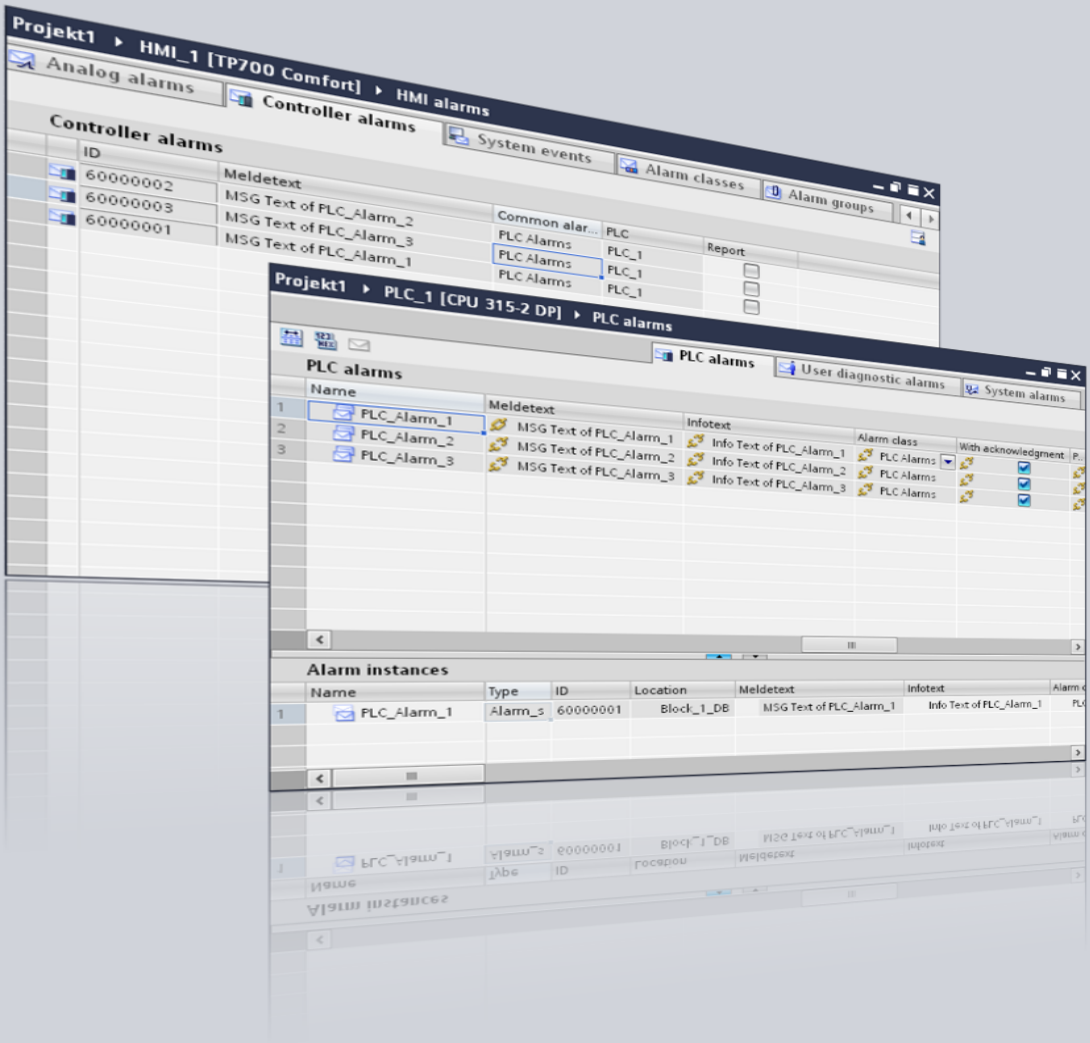
Configuration of Messages and Alarms in WinCC (TIA Portal)

WinCC (TIA Portal)

Application description • December 2012



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SIMATIC
Messages in WinCC (TIA Portal)

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1 Preface

1.1 Content

Introduction

In the running process of a system, it is indispensable to output information about operating states, errors and individual processes visually at a HMI control panel. The WinCC (TIA Portal) message system offers a message procedure for each piece of information.

This application provides you with:

- an overview of the different message procedures in WinCC
- support in selecting the adequate message procedure for your application and the hardware you have
- detailed configuration instructions for the different kinds of messages in WinCC and STEP 7 Professional.

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1.2 Hardware and software components used

The application was set up with the following components:

Hardware components

Table 1-1

Component	No.	MLFB/order number	Note
SIMATIC CPU 317-2 PN/DP	1	6ES7317-2EK14-0AB0	
SIMATIC CPU 416-3 PN/DP	1	6ES7416-3ER05-0AB0	
SIMATIC HMI TP900 Comfort	1	6AV2124-0JC01-0AX0	

Standard software components

Table 1-2

Component	No.	MLFB/order number	Note
SIMATIC STEP 7 Professional V11 SP2	1	6ES7822-1AA01-0YA5	
SIMATIC WinCC Comfort V11 SP2	1	6AV2101-0AA01-0AA5	
SIMATIC WinCC Professional V11 SP2	1	6AV2103-0DA01-0AA5	

2 The message system in WinCC (TIA Portal)

The transmission of a piece of information or of a notice is called a message. In WinCC (TIA Portal) messages indicate events or operating states.

The WinCC message system and the various message procedures are described in the following chapters.

2.1 Overview of the message procedures

Introduction

The message system in WinCC (TIA Portal) makes it possible to display and record operating states and errors which are pending or can occur in a system or a control panel.

Overview of the message system

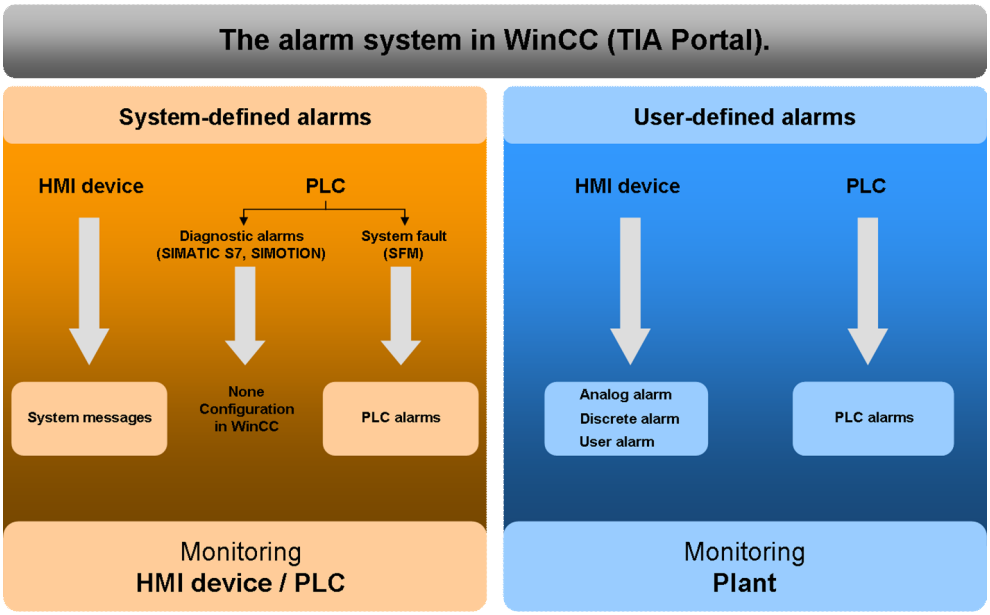
The message system processes different message procedures of the control panel and the PLC. The message procedures are subdivided in system-defined and user-defined messages:

- user-defined messages are for monitoring the system.
- system-defined messages are for monitoring the control panel and the PLC.

The identified message events are displayed in the control panel. A specific access to the messages and supplementary information to the individual messages, ensure a rapid localization of errors. Downtimes are reduced or avoided.

The following figure shows the structure of the message system in WinCC (TIA Portal):

Figure 2-1



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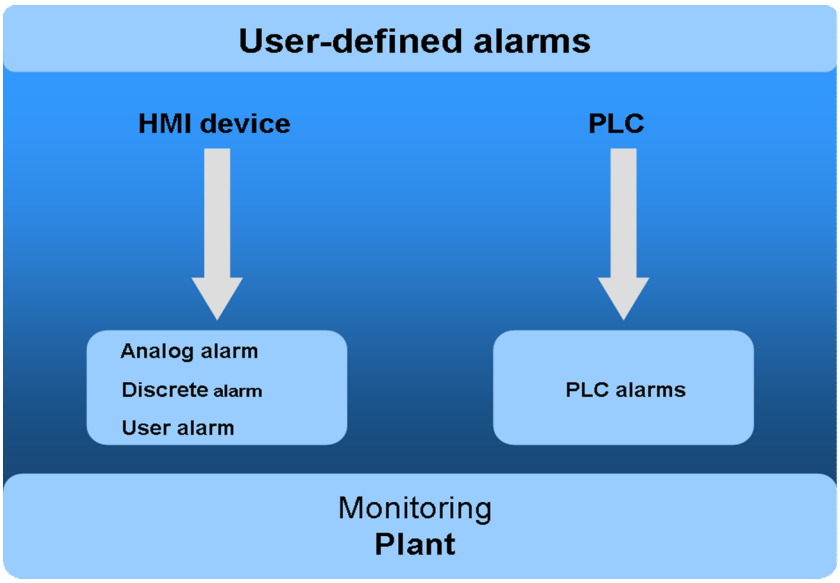
2.2 User-defined message procedure

The user-defined message procedures are for monitoring the system processes. The message procedures are classified by the type of information required for triggering the message.

User-defined message procedures consist of the following messages:

- analog alarms
- discrete alarms
- PLC alarms
- user alarms

Figure 2-2



Note The configured control panel must support PLC alarms and user messages.

Analog alarms

An analog alarm indicates limit value violations during operation. Such an analog alarm is triggered when a previously defined value of a variable is not reached or is exceeded.

Example:
If the speed of a motor falls below a certain value, an analog alarm is sent. It contains the following message text: “Motor speed is too low."

Discrete alarms messages

A discrete alarm indicates changes of status during operation. A discrete alarm is triggered at a defined value (bit) of a variable.

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Example:
The status of a valve is to be monitored during operation. The status of the valve can be “open” or “closed”. In this case a discrete alarm is configured for every status of the valve. When the status of the valve changes, a discrete alarm will be sent. It contains the following message text: “Valve closed”.

PLC alarms

A PLC alarm indicates the status value of the PLC during operation.

Example:
When the mode switch in the PLC is switched to “Stop”, a PLC alarm is displayed at the control panel. It contains the following message text: “CPU mode switch to Stop”.

User messages

A user message monitors the operating actions in the WinCC Runtime Professional during operation. User messages are triggered by triggering the message number. A user message can contain the following information:

- type and content of the acknowledged message
- time of the acknowledgement
- operator
- date

Example:
During the operation of WinCC Runtime Professional, a message of the alarm class “Errors” is displayed. The operator removes the cause for the error in the system and then acknowledges the message in the message display of the Runtime. In order to monitor which operator removed the error at what time, a user message to the respective button in the message display is configured.

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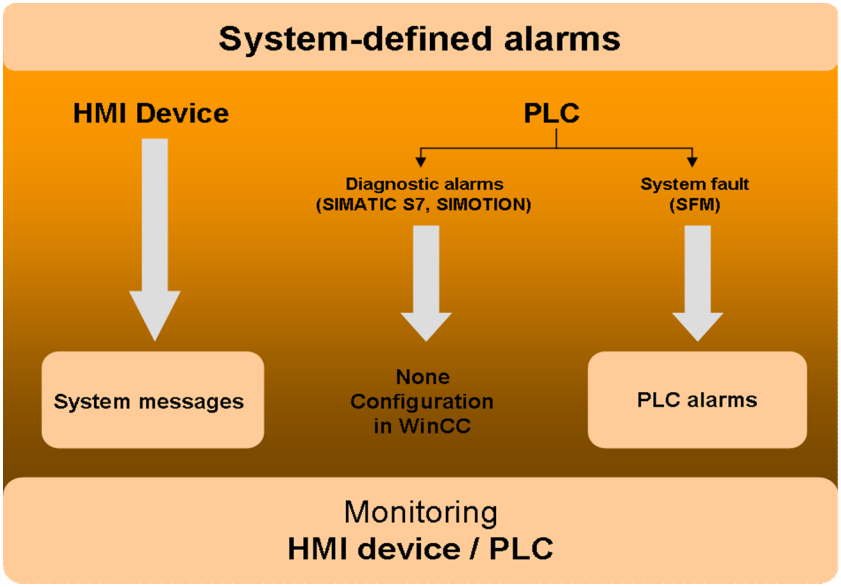
2.3 System-defined message procedures

The system-defined message procedures are for monitoring the control panel or the PLC.

System-defined message procedures consist of the following messages:

- system-defined PLC alarms
- system alarms

Figure 2-3



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Note System-defined PLC alarms must be supported by the configured control panel. In Chapter 2.4 you will find an overview of the availability of message blocks / message procedures.

System-defined PLC alarms

A system-defined PLC alarms is for monitoring states and events of a SIMATIC S7 PLC. Diagnose messages and system failures (SFM) of a SIMATIC S7 PLC can be displayed in a control panel.

Supported message blocks:

- Alarm
- Alarm_8
- Alarm_8P
- Alarm_S
- Alarm_SQ
- Alarm_D
- Alarm_DQ

- Notify
- Notify_8P

System alarms

A system alarm is put out at the control panel and is for monitoring internal states of a control panel or a PLC during operation. System alarms inform the operator about the status of the system indicate communication errors between the control panel and a PLC.

Example:
If the password for a configured user is entered incorrectly three times in a row, the control panel shows the following system alarm: „You tried to log in with a wrong password three times in a row. You will be blocked and assigned to group no. 0."

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2.4 Availability of message procedures

In this chapter, you will find the various overviews about the availability of message procedures.

Overview control panels and supported types of messages

The following table shows the availability of the various types of messages depending on the control panel used.

Table 2-1

Control panel	Analog alarms	Discrete alarms	PLC alarms	User alarms	User-defined messages (diagnostic messages)	System alarms
Basic Panel	X	X	--	--	--	X
OP73, OP77A, TP177A	X	X	--	--	--	X
OP77B, TP177B, OP177B	X	X	X	--	X	X
TP277, OP277	X	X	X	--	X	X
MP177, MP277, MP377	X	X	X	--	X	X
Comfort Panels	X	X	X	--	X	X
WinCC RT Advanced	X	X	X	--	X	X
WinCC RT Professional	X	X	X	X	X	X

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Overview message blocks

The following table gives an overview of the message blocks for PLC alarms.

Table 2-2

Message block	SFB / SFC	S7 – CPU	Acknow-ledgement	Channels (signals to be moni-tored)	Associated values	WinCC Advanced	WinCC Profes-sional
ALARM_S	SFC 18	S7–300/ 400	--	1	1	X	X
ALARM_SQ	SFC 17	S7–300/ 400	X	1	1	X	X
ALARM_D	SFC 108	S7–300/ 400	--	1	1	X	X
ALARM_DQ	SFC 107	S7–300/ 400	X	1	1	X	X
ALARM	SFB 33	S7–400	X	1	up to 10	--	X
ALARM_8	SFB 34	S7–400	X	8	--	--	X
ALARM_8P	SFB 35	S7–400	X	8	up to 10	--	X
NOTIFY	SFB 36	S7–400	--	1	up to 10	--	X
NOTIFY_8P	SFB 31	S7–400	--	8	up to 10	--	X

Note The number of configurable message blocks depends on the SIMATIC PLC used.
You will find this information in the device manuals of the respective SIMATIC PLC.

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Overview control panels / message blocks

The following table shows the availability of the various message blocks depending on the control panel used.

Table 2-3

Control panel	ALARM_S	ALARM_SQ	ALARM_D	ALARM_DQ	ALARM	ALARM_8	ALARM_8P	NOTIFY	NOTIFY_8P
Basic Panel	--	--	--	--	--	--	--	--	--
OP73, OP77A, TP177A	--	--	--	--	--	--	--	--	--
OP77B, TP177B, OP177B	X	X	X	X	--	--	--	--	--
TP277, OP277	X	X	X	X	--	--	--	--	--
MP177, MP277, MP377	X	X	X	X	--	--	--	--	--
Comfort Panels	X	X	X	X	--	--	--	--	--
WinCC RT Advanced	X	X	X	X	--	--	--	--	--
WinCC RT Professional	X	X	X	X	X	X	X	X	X

3 Configuration of messages in WinCC Basic / Comfort / Advanced

In the following, the configuration of user-defined and system-defined messages will be explained on the basis of a TP900 Comfort and a WinCC Runtime Advanced.

Required software components

- WinCC Basic / Comfort / Advanced
- STEP 7 Professional

Requirements

- A WinCC (TIA Portal) project with configured connections to a S7-300/400 PLC has been created.

The required knowledge and the procedure for the configuration of a connection between a control panel in WinCC (TIA Portal) and an S7-300/400 PLC in STEP 7 Professional are not a part of this Application.

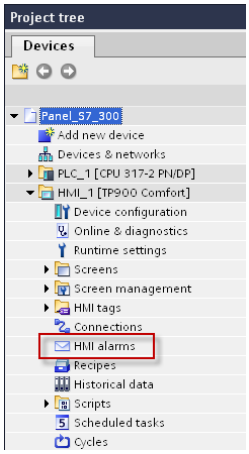
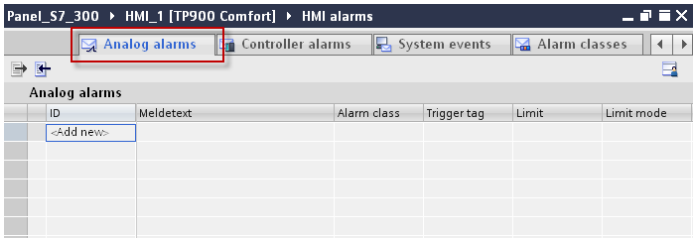
3.1 Configuration of user-defined messages

3.1.1 Configuration of analog alarms

General configuration of analog alarms

For the configuration of analog alarms in WinCC Basic / Comfort / Advanced, please proceed as follows:

Table 3-1

No.	Action	Screens
1.	In the project navigation under the folder of the control panel you created, open the “HMI alarms”. 	
2.	Open the tab “Analog alarms”. 	

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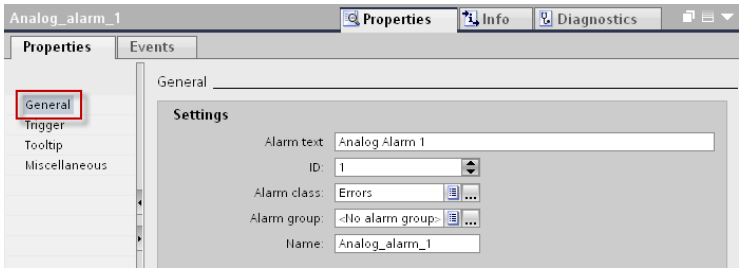
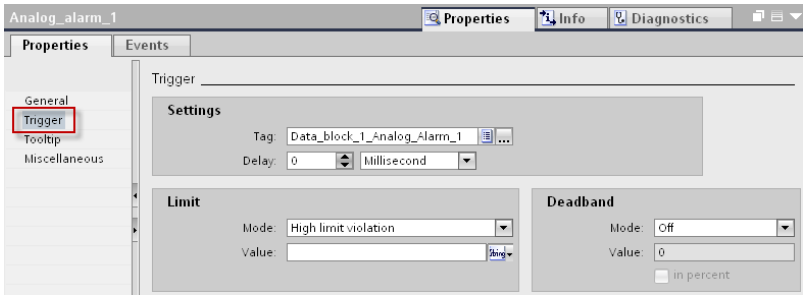
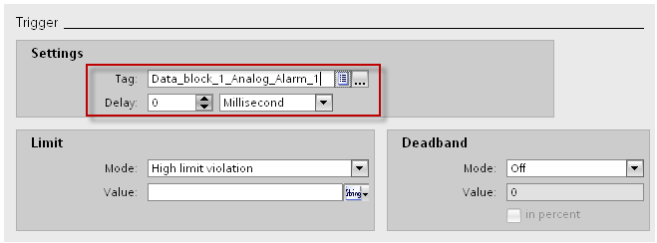
No.	Action	Screens
3.	In the table, double-click on “<Add new>” to create an analog alarm.	
4.	Select the analog alarm you just created and in the inspector window open the tab “Properties > Properties > General".  • Under “Alarm text”, please enter the message text in the analog alarm, for example “Analog Alarm 1” • Under “ID”, please select an alarm number for the identification of this alarm. • Under “Alarm class”, please select an alarm class for the analog alarm. In Chapter 3.4 you will find more detailed information about alarm classes. • If required, please choose an alarm group under “Alarm group” to which the analog alarm will be assigned. In Chapter 3.5 you will find more detailed information about alarm groups. **Note** Message texts depend on the language, and depending on your configuration, they can contain up to 255 characters.	
5.	In the inspector window, please open the tab “Properties > Properties > Trigger”.  	
6.	Under “tag”, please create a new tag or choose an existing tag for triggering the analog alarm.  Under “delay” you can set the time basis after which the analog alarm is to be triggered. **Supported types of data for the trigger tag** • Byte, Char, Word, DWord, Int, DInt, Real, Timer **Note** Only use the tag for triggering the alarm for triggering this alarm.	

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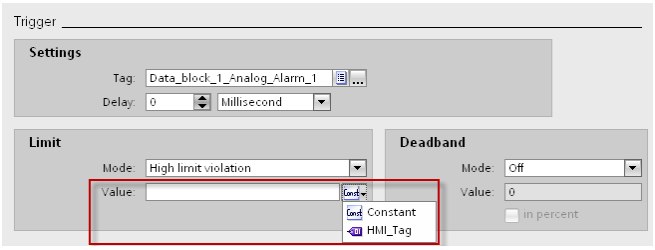
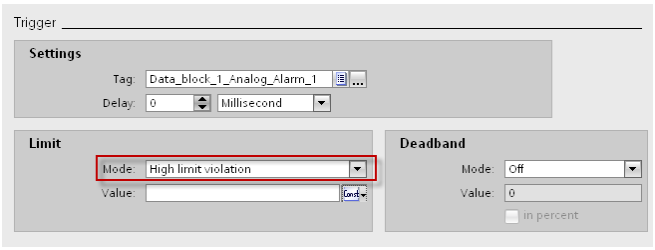
No.	Action	Screens
7.	Open the drop-down list under “Limit > Value”  • If you want to use a constant as the limit value, select “Constant” and then enter the constant in the “Value” box. • If you want to use a tag as the limit value, select “HMI_Tag”. Then select the tag or set a new tag.	
8.	Limit “Value > Mode” set the trigger mode of the limit.  • “High limit violation”: The alarm will be triggered in case of a violation of the high limit. • “Low limit violation”: The alarm will be triggered in case of a violation of the low limit.	
9.	The configuration of the analog alarm is now complete.	

Display of the analog alarm in Runtime on the control panel

If you want to display the analog alarm, an alarm display must have been configured in your project. In this alarm display, the alarm class “Warnings” must be activated for the display of the analog alarm.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

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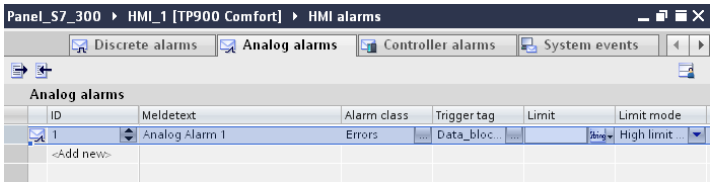
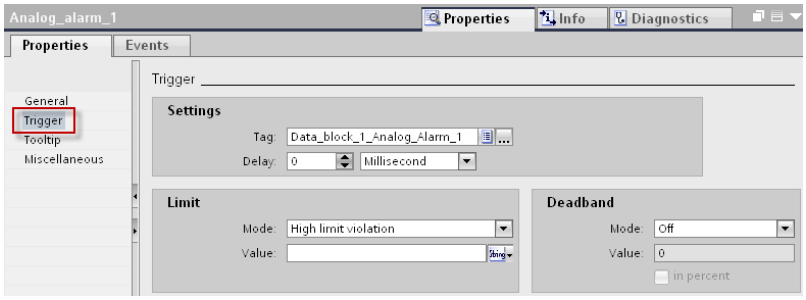
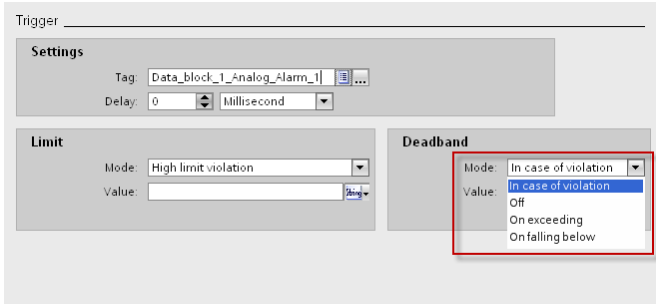
Optional settings for analog alarms

Activating the deadband

The deadband prevents that an analog alarm is triggered several times of a process value fluctuates around the limit value.

Table 3-2

No.	Action	Screens
1.	Open the analog alarms in the tab “Analog alarms”. 	
2.	In the inspector window, please open the tab “Properties > Properties > Trigger”. 	
3.	In the drop-down list under “Deadband > Mode” set for which change of alarm status the deadband is to be applied. 	
4.	Under “Value”, please enter a constant that is to be applied or activate the option “in percent” if the value is to be applied in percent of the limit value.	

Creating a tooltip

With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.

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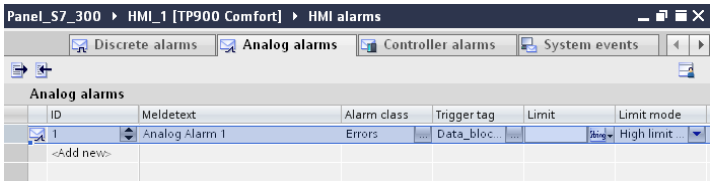
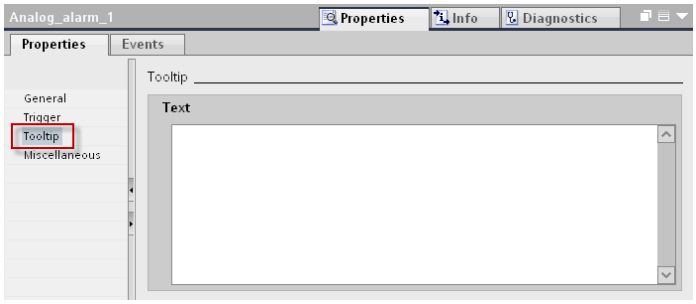
Table 3-3

No.	Action	Screens
1.	Open the analog alarms in the tab “Analog alarms”. 	
2.	In the inspector window, please open the tab “Properties > Properties > Tooltip”.  Under “Text”, please enter the text which is to appear as a tooltip to this analog alarm. If you want to display a tooltip during operation, a button with the function “ShowHelptext” must be configured for control panels with a touch-front. For control panels with a keyboard, the tooltip is displayed when you press the “HELP” button. **Note** The tooltip must not be longer than max. 320 characters.	
3.	The configuration of the tooltip is now complete.	

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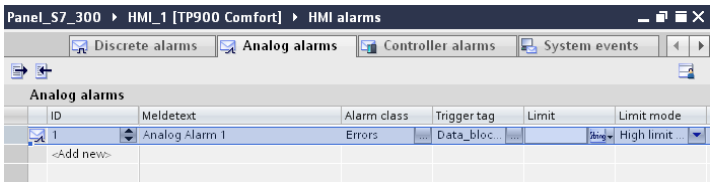
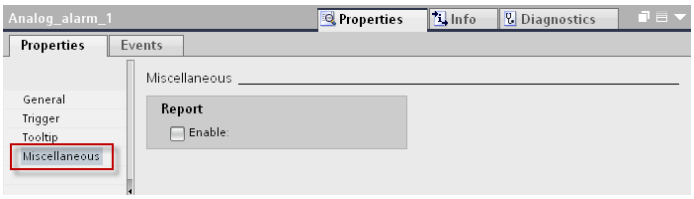
Configuring a report

If a report is enabled, every alarm and its change of status in runtime will be continuously displayed at the control panel.

Table 3-4

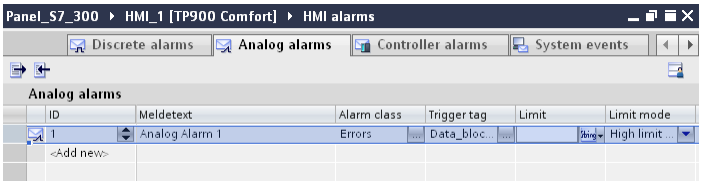
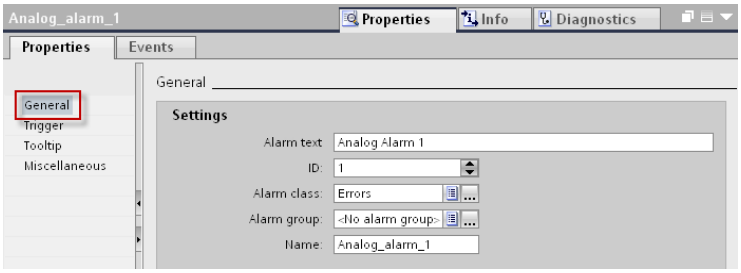
No.	Action	Screens
1.	Open the analog alarms in the tab “Analog alarms”. 	

2.	In the inspector window, please open the tab “Properties > Properties > Miscellaneous”.  Under “Report”, activate the option box “enable” **Note** Alarms will only be reported, if “Report” is also activated in the “Runtime Properties” concerning the alarms.

Output of dynamic parameters in the alarm text

It is possible to have a process value or an entry from a textlist displayed in the alarm text when an analog alarm comes.

Table 3-5

No.	Action	Screens
1.	Open the analog alarms in the tab “Analog alarms”. 	
2.	In the inspector window, please open the tab “Properties > Properties > General”.  Click the right mouse button in the entry box “Alarm text” or place the cursor in the alarm text and click on the right mouse button. Then the context menu will open up.	

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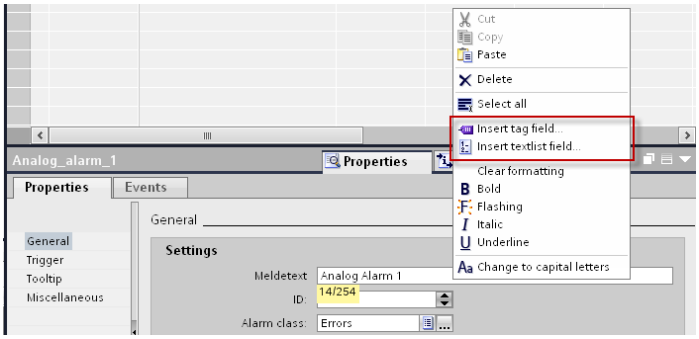
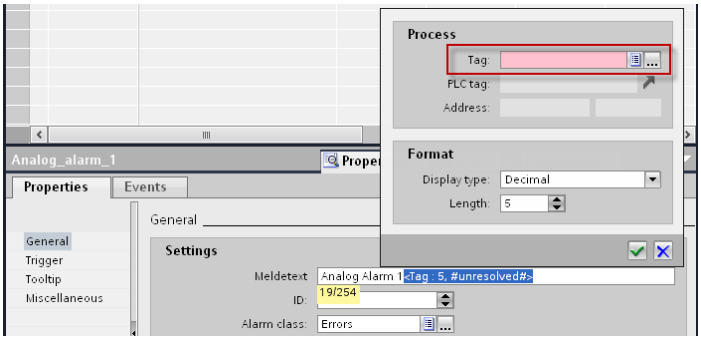
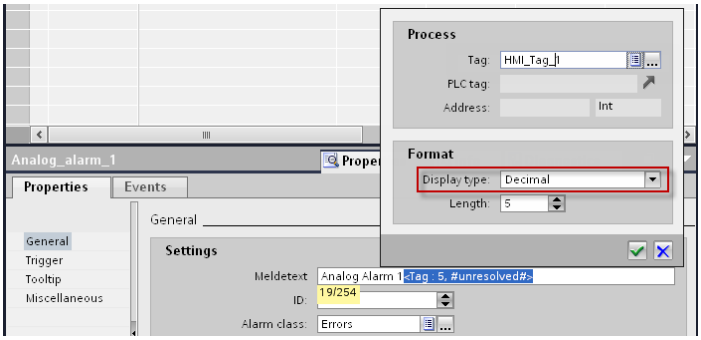
No.	Action	Screens
3.	Select “Insert tag field” or “Insert textlist field” in the context menu. Then a dialog for the further configuration of the dynamic parameter (tag) opens up. Please continue with the section on the chosen tag. 	

Dynamic parameters (tags)

No.	Action	Screens
4.	**Add dynamic parameters (tags)** Under “Process > Tag”, please create a new tag or choose an existing tag, which is to be displayed in the alarm text. **Note**: If you use a process tag, the acquisition mode for this tag must be set to “cyclic continuous”. 	
5.	Open the drop-down menu under “Format – Display type” and select the display format for the process tag. **Note:** The display format must be supported by the data type of the process tag. 	

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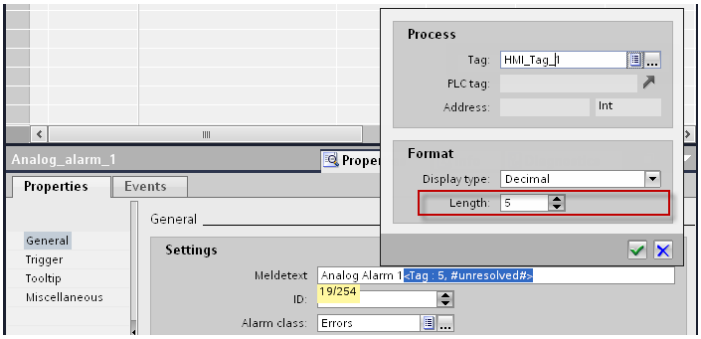
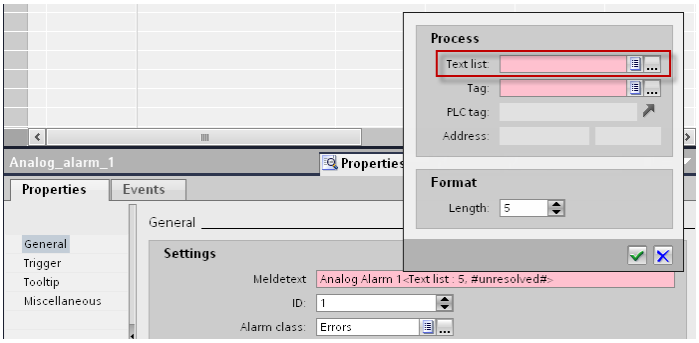
No.	Action	Screens
6.	Under “Format > Length”, please enter the number of characters for the display of the tag. **Note:** Choose the length in such a way that all the required characters of the tag entry can be displayed. 	
7.	Confirm the setting by clicking on the symbol.	
8.	The configuration of the dynamic parameter (tag) is now complete.	

Dynamic parameters (tags)

No.	Action	Screens
9.	**Add dynamic parameters (textlist)**  Under “Process > Textlist”, please create a new textlist or choose an existing textlist, which is to be displayed in the alarm text.	

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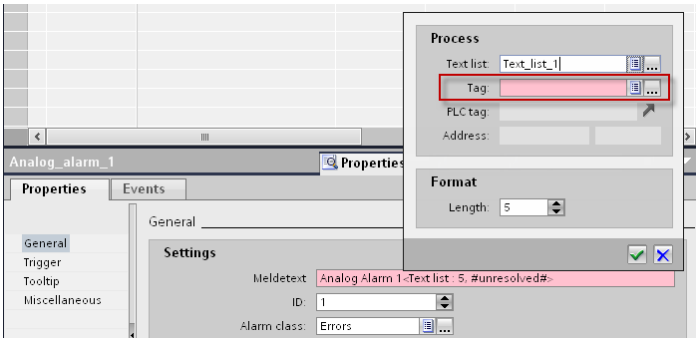
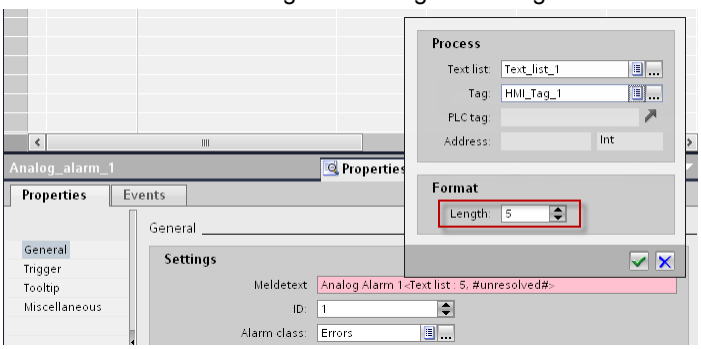
No.	Action	Screens
10.	Under “Process > Tag”, please create a new tag or select an existing tag as an index tag for the text list. The tag defines an element / entry of the textlist. **Note:** If you use a process tag as an index tag, the acquisition mode for this tag of this process tag must be set to “cyclic continuous”. 	
11.	Under “Format > Length”, please enter the number of characters for the display of the textlist entry. **Note:** Make sure to enter the length according to the longest textlist entry. 	
12.	Confirm the setting by clicking on the symbol.	
13.	The configuration of the dynamic parameter (textlist) is now complete.	

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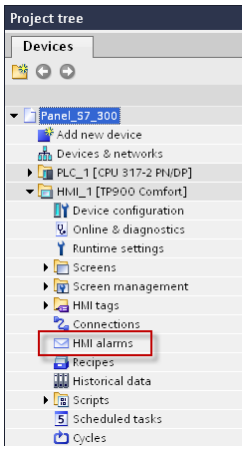
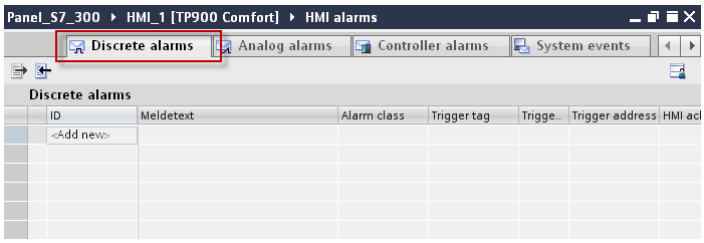
3.1.2 Configuration of discrete alarms

General configuration of discrete alarms

For the configuration of discrete alarms in WinCC Basic / Comfort / Advanced, please proceed as follows:

Table 3-6

No.	Action	Screens
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms” 	
2.	Open the tab “Discrete alarms”. 	
3.	In the table, double-click on “<Add new>” to create a discrete alarm.	

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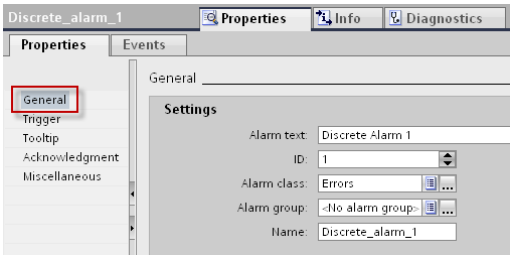
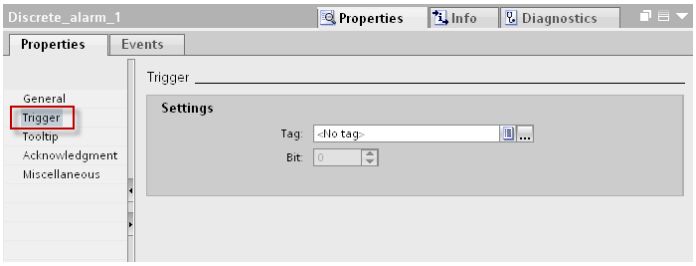
<table>
<tr><th>No.</th><th>Action</th><th>Screens</th></tr>
<tr><td>4.</td><td>Select the discrete alarm you just created and in the inspector window open the tab “Properties > Properties > General”.
 

• Under “Alarm text”, please enter the message text in the discrete alarm, for example “Discrete Alarm 1”
• Under “ID”, please select an alarm number for the identification of this alarm.
• Under “Alarm class”, please select an alarm class for the discrete alarm.
In Chapter 3.4 you will find more detailed information about alarm classes.
• If required, please choose an alarm group under “alarm group” to which the discrete alarm will be assigned.
In Chapter 3.5 you will find more detailed information about alarm groups.
Note
Alarm texts depend on the language, and depending on your configuration, they can contain up to 255 characters.</td><td></td></tr>
<tr><td>5.</td><td>In the inspector window, please open the tab “Properties > Properties > Trigger”.
 

Under “tag”, please create a new tag or choose an existing tag for triggering the discrete alarm.

Supported types of data for the trigger tag
• Internal tags as trigger tags Int, UInt
• Control tag als trigger tag: Int, Word
Note
Only use the tag for triggering the alarm for triggering this alarm.</td><td></td></tr>
<tr><td>6.</td><td>The configuration of the discrete alarm is now complete.</td><td></td></tr>
</table>

Display of the discrete alarm in Runtime on the control panel

If you want to display the discrete alarm, an alarm display must have been configured in your project. In this alarm display, the alarm class “Errors” must be activated for the display of the discrete alarm.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

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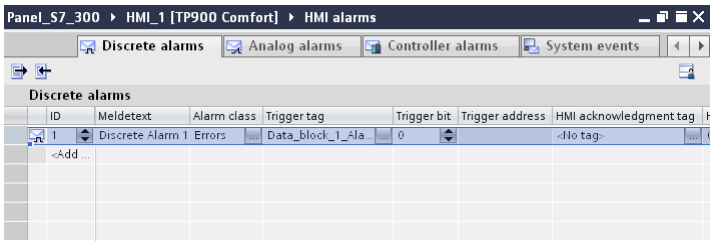
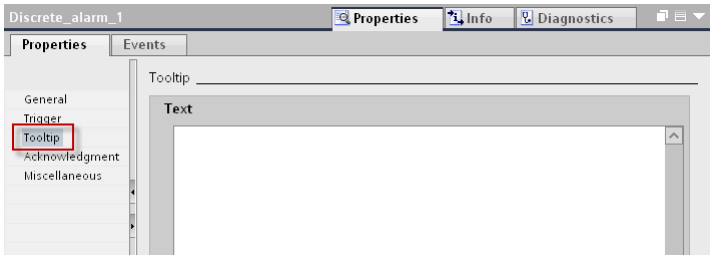
Optional settings for discrete alarms

Creating a tooltip

With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.

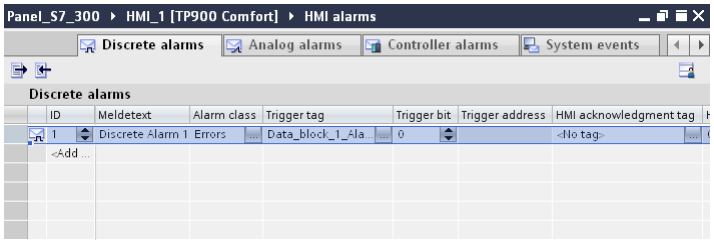
Table 3-7

No.	Action	Screens
1.	Open the discrete alarms in the tab “Analog alarms”. 	
2.	In the inspector window, please open the tab “Properties > Properties > Tooltip”.  Under “Text”, please enter the text which is to appear as a tooltip to this discrete alarm. **Note** The tooltip must not be longer than max. 320 characters.	
3.	The configuration of the tooltip is now complete.	

Evaluating the acknowledgement of the discrete alarm in the PLC

The acknowledgement of the discrete alarm can be polled by a tag in the PLC.

Table 3-8

No.	Action	Screens
1.	Open the discrete alarms in the tab “Discrete alarms”. 	

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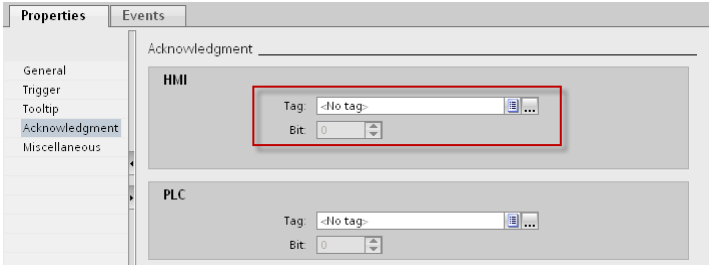
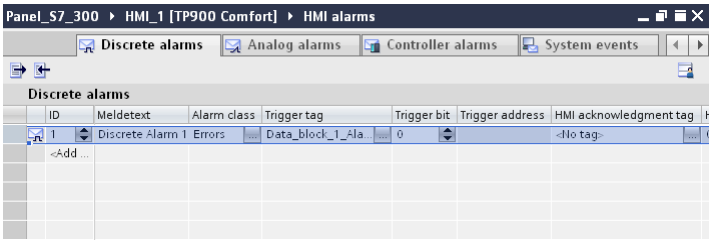
2.	In the inspector window, please open the tab “Properties > Properties > Acknowledgement”.  • Under “HMI > Tag”, please choose an existing tag or create a new tag, where the information can be stored that the discrete alarm has been acknowledged. • Under “HMI > Bit”, please select the bit that will be set in the selected tag if a discrete alarm has been acknowledged. **Note** The control panel and the PLC have only read access to the storage area of the acknowledgement tag.
3.	The configuration of the acknowledgement poll is now complete.

You will find more detailed information concerning the acknowledgement concept in WinCC Basic / Comfort / Advanced in Chapter 3.6.

Configuring the acknowledgement by the PLC

The acknowledgement will be automatic by the PLC without any further operating action.

Table 3-9

No.	Action	Screens
1.	Open the discrete alarms in the tab “Discrete alarms”.  	

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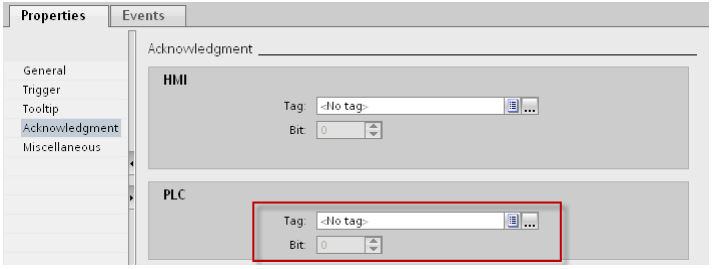
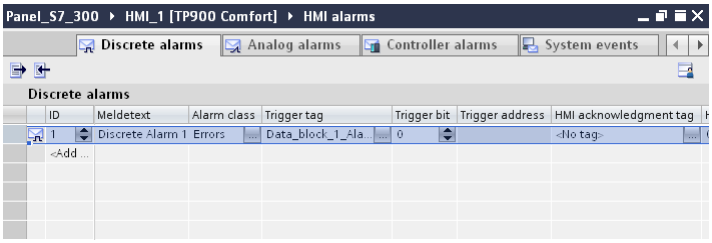
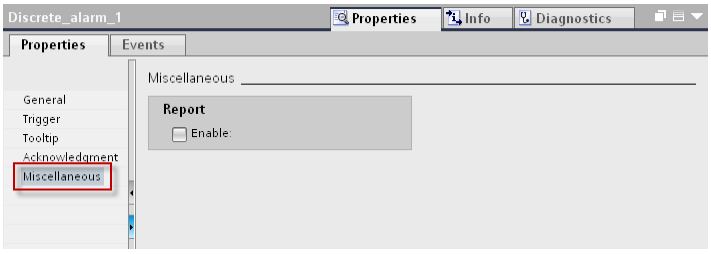
2.	In the inspector window, please open the tab “Properties > Properties > Acknowledgement”.  • Under “PLC > Tag”, select a tag or add a new tag to acknowledge the discrete alarm by the PLC. • Under “PLC > Bit” select the bit that with which the PLC is to acknowledge the discrete alarm. **Note** The control panel and the PLC have only read access to the storage area of the acknowledgement tag.
3.	The configuration of the acknowledgement by the PLC is now complete.

You will find more detailed information concerning the acknowledgement concept in WinCC Basic / Comfort / Advanced in Chapter 3.6.

Configuring a report

If a report is enabled, every alarm and its change of status in runtime will be continuously displayed at the control panel.

Table 3-10

No.	Action	Screens
1.	Open the discrete alarms in the tab “Discrete alarms”.  	
2.	In the inspector window, please open the tab “Properties > Properties > Miscellaneous”.  Under “Report”, activate the option box “enable”	
3.	The configuration of the report is now complete.	

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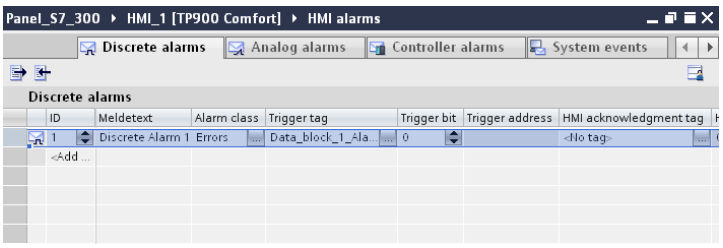
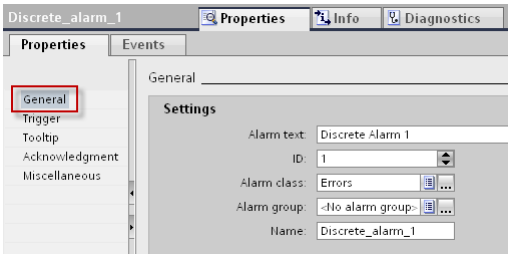
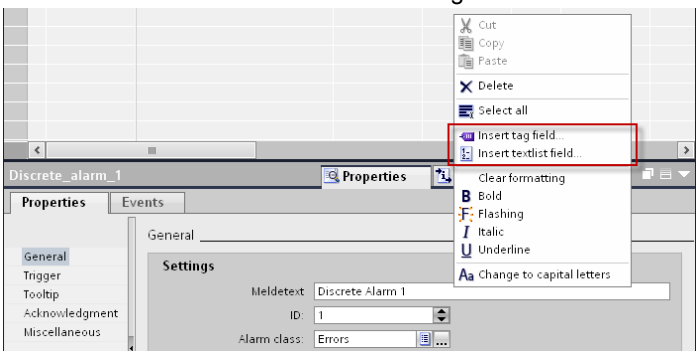
Output of a dynamic parameter in the alarm text

It is possible to have a process value or an entry from a textlist displayed in the alarm text when a discrete alarm comes.

Table 3-11

No.	Action	Screens
1.	Open the discrete alarms in the tab “Discrete alarms”. 	
2.	In the inspector window, please open the tab “Properties > Properties > General”.  Click the right mouse button in the entry box “Alarm text” or place the cursor in the alarm text and click on the right mouse button. Then the context menu will open up.	
3.	Select “Insert tag field” or “Insert textlist field” in the context menu. Then a dialog for the further configuration of the dynamic parameter (tag) opens up. Please continue with the section on the chosen tag. 	

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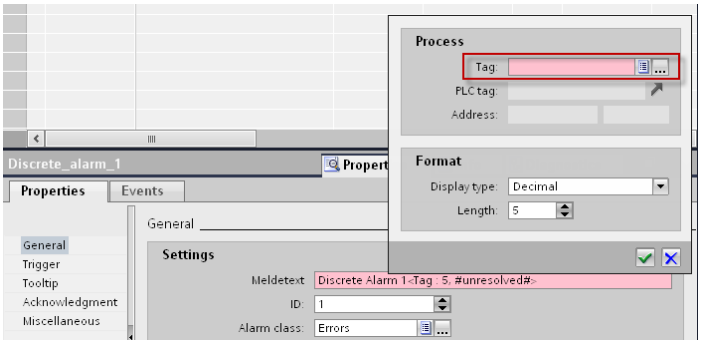
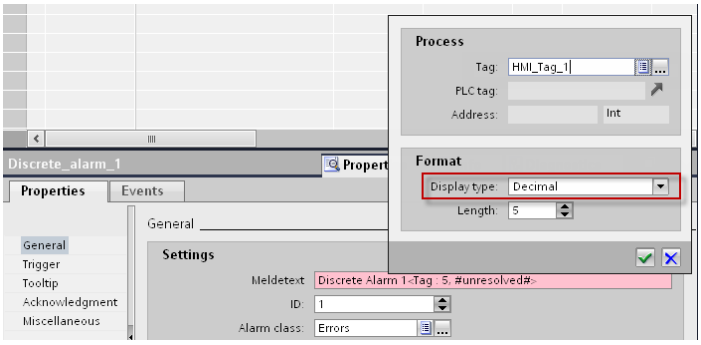
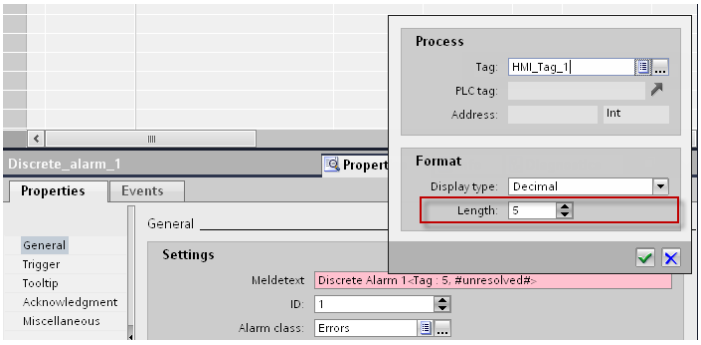
Dynamic parameters (tags)

No.	Action	Screens
4.	**Add dynamic parameters (tags)** Under “Process > Tag”, please create a new tag or choose an existing tag, which is to be displayed in the alarm text. **Note:** If you use a process tag, the acquisition mode for this tag must be set to “cyclic continuous”. 	
5.	Open the drop-down menu under “Format – Display type” and select the display format for the process tag. **Note:** The display format must be supported by the data type of the process tag. 	
6.	Under “Format > Length”, please enter the number of characters for the display of the tag. **Note:** Choose the length in such a way that all the required characters of the tag entry can be displayed. 	
7.	Confirm the setting by clicking on the symbol.	
8.	The configuration of the dynamic parameter (tag) is now complete.	

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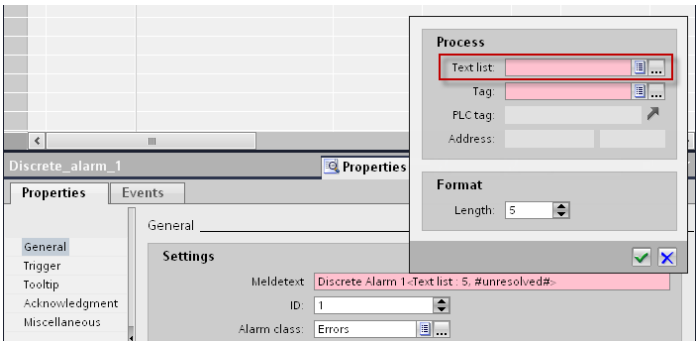
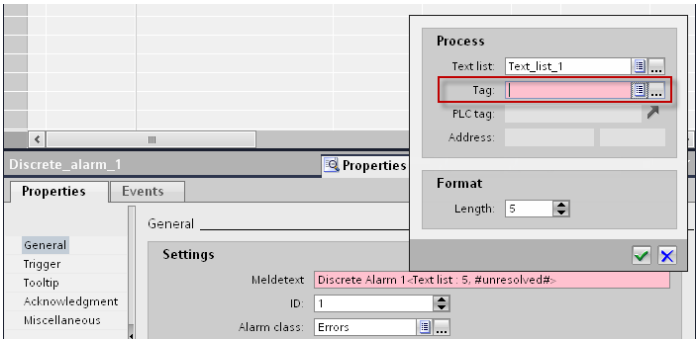
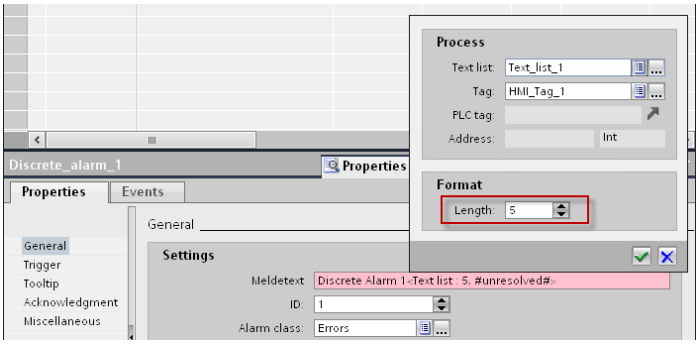
Dynamic parameters (tags)

No.	Action	Screens
9.	**Add dynamic parameters (textlist)** Under “Process > Textlist”, please create a new textlist or choose an existing textlist, which is to be displayed in the alarm text. 	
10.	Under “Process > Tag”, create a new tag or select an existing tag as an index tag for the text list. The tag defines an element / entry of the textlist. **Note:** If you use a process tag as an index tag, the acquisition mode for this tag of this process tag must be set to “cyclic continuous”. 	
11.	Under “Format > Length”, please enter the number of characters for the display of the textlist entry. **Note:** Make sure to enter the length according to the longest textlist entry. 	
12.	Confirm the setting by clicking on the symbol. 	
13.	The configuration of the dynamic parameter (textlist) is now complete.	

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3.2 Configuration of system-defined alarms

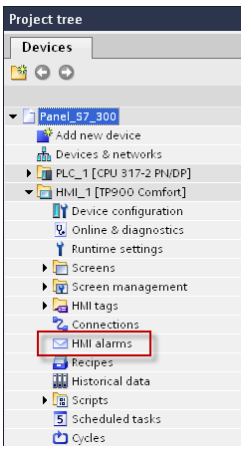
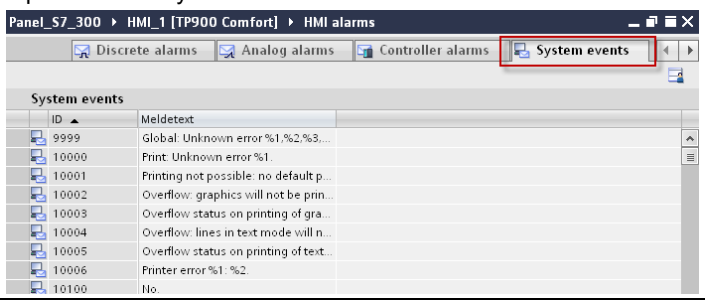
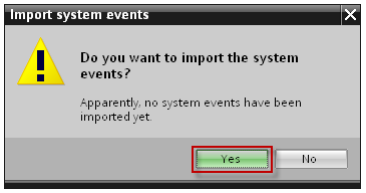
3.2.1 Configuration of system alarms

For the configuration of system alarms in WinCC Basic / Comfort / Advanced, please proceed as follows:

Importing system alarms

Importing system alarms is only necessary for projects that were newly created, or where the system alarms have not been imported.

Table 3-12

No.	Action	Screens
1.	In the project navigation under the folder of the control panel you created, open the “HMI alarms”. 	
2.	Open the tab “System alarms”. 	
3.	Confirm the dialog that appears with “OK”.  The system alarms are then imported into your project.	
4.	The configuration of the system alarm is now complete.	

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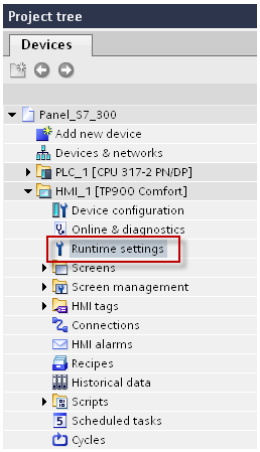
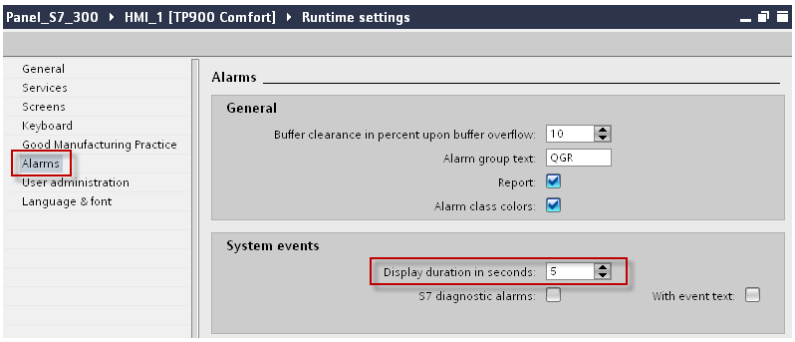
Display of the system alarms on the control panel in runtime

If you want to display the system alarms, an alarm display must have been configured in your project. In this alarm display, the alarm class “System” must be activated for the display of the system alarm.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

Defining the duration of the display of system alarms

Table 3-13

No.	Action	Screens
1.	In the project navigation under the folder of the control panel you created open the “Runtime settings” 	
2.	Open the menu “Alarms”:  Under „System events > Display duration in seconds“, enter the duration of the display for system alarms in the control panel. Input in seconds. **Note** If you want the system alarms to be permanent, set the display duration to “0”.	
3.	The setting of the duration of the display of system alarms is now complete.	

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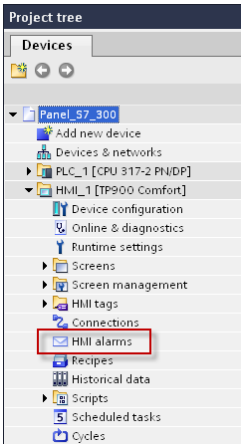
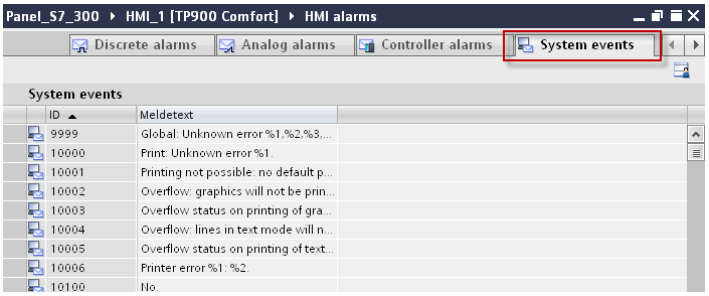
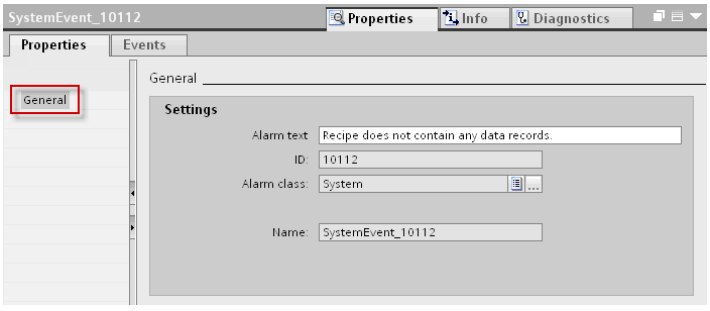
Change message texts for system alarms

The message texts of the system alarms can be adapted or changed if required. The respective message numbers cannot be changed.

Table 3-14

No.	Action	Screens
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms”. 	
2.	Open the tab “System alarms”.  Select the system alarm for which you want to change the message text.	
3.	In the inspector window, please open the tab “Properties > Properties > General”.  Please change the message text of the system alarm under “Alarm text”. **Note** When you change the message text, the number of wildcards must not be modified. A wildcard example would be: %1.	
4.	The changing of the message text for the system alarm is now complete.	

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3.2.2 Configuration of CPU system diagnostic alarms

The following chapter describes the configuration of the display of system diagnostic alarms of a CPU on an HMI control panel using the following components:

- CPU 317-2 PN/DP
- Diagnostic status DB 127 (RSE_DIAGNOSTIC_STATUS_DB)
- Comfort Panel TP900

System diagnostic data blocks

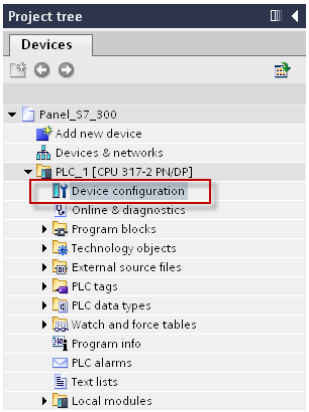
You will find more information about the diagnostic blocks under the name of the respective block in the Online Help for STEP 7 Professional.

Table 3-15

Block	Block name	Block number	Functional scope
Diagnostic status DB	RSE_DIAGNOSTIC_STATUS_DB	127	Display the system status of a configured component and the subordinate components.
PROFINET IO-DB	RSE_PROFINET_IO_DB	126	Display the status of all the configured IO devices, optionally: display exact status of a device.
PROFIBUS DP-DB	RSE_PROFIBUS_DP_DB	125	Display the status of all configured stations of the current DP master system and the status of the DP slave.

Settings in STEP 7 Professional

Table 3-16

No.	Action	Screens
1.	In the project navigation under the folder of the CPU you created, open the “Device configuration”. 	
2.	In the graphic view of the device, mark the CPU on the module carrier.	

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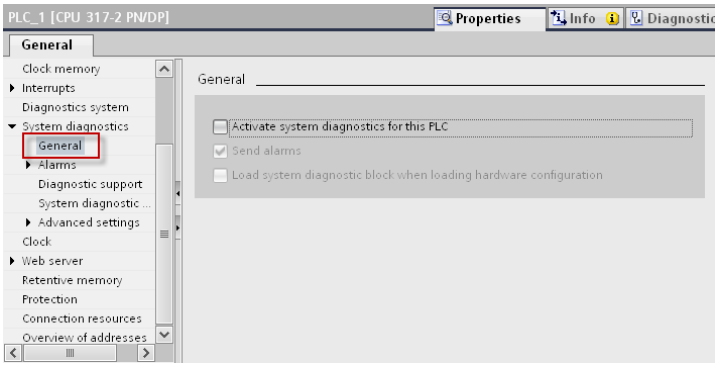
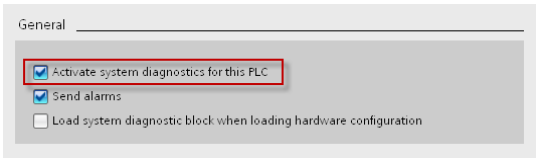
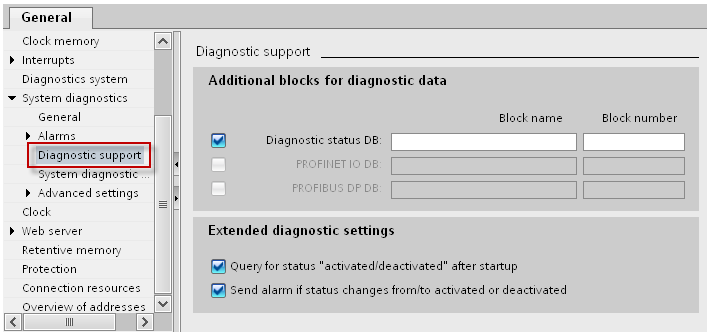
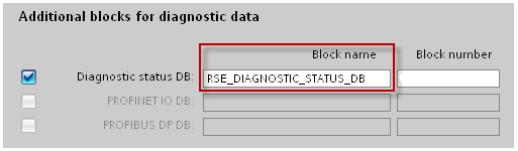
No.	Action	Screens
3.	In the inspector window, please open the tab “Properties > Properties > System diagnostics” > “General”. 	
4.	Activate the option box “Activate system diagnostics for this PLC”. The option box “Send alarms” is activated by default. If this option is deactivated, it must be activated  The option box “Load system diagnostic block when loading hardware configuration” cannot be activated, since it is already activated by default.	
5.	In the inspector window, please open the tab “Properties > Properties > System diagnostics” > “Diagnostic support”.  Check whether the option box “Diagnostic status DB” is activated. If the option box is deactivated, active the option box.	
6.	In the entry box “Block name“, enter the name of the status DB you want to use for the diagnostic function.  You can also assign a different name for the block, if the name is not being used. **Note** The status DBs “PROFINET IO-DB” and “PROFIBUS DP-DB” only have a limited diagnostic functionality. Therefore, the “Diagnostic status DB” is to be preferred.	

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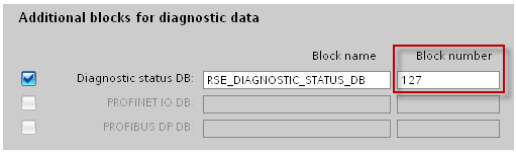
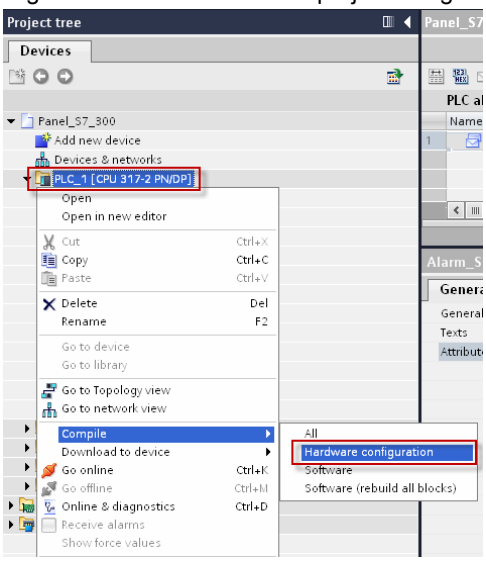
No.	Action	Screens
7.	In the entry box “Block number”, enter the respective data block number of the status DB. You can also assign a different number for the block, if the number is not being used. 	
8.	Right-click on the CPU in the project navigation.  Select “Compile > Hardware configuration” in the context menu. **Note** After the compilation of the hardware, the following system blocks are created: • system diagnostics (in this example the DB 127) • diagnostic FB (pre-set: FB 49) • Instance DB for the diagnostic FB (pre-set: DB 49) • Global DB (pre-set: DB 50) • diagnostic FC (pre-set: FC 49	
9.	Transfer the configuration into the PLC. The necessary settings in the STEP 7 Professional are now complete.	

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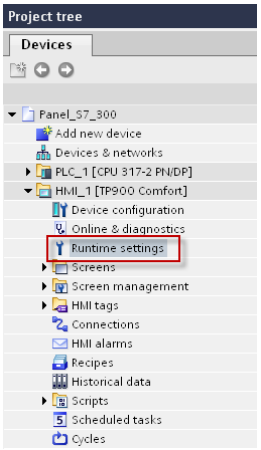
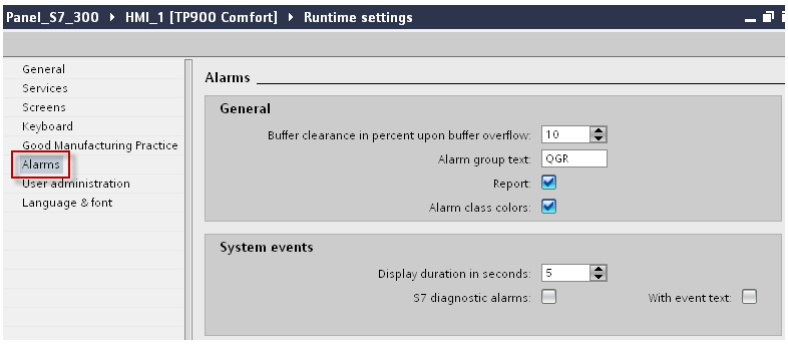
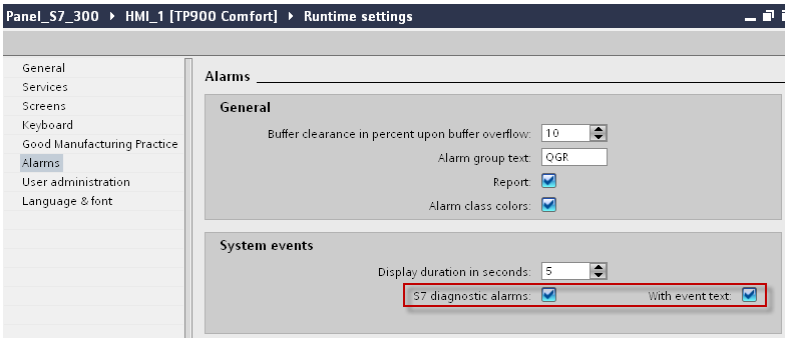
Settings in WinCC Basic / Comfort / Advanced

Table 3-17

No.	Action	Screens
1.	In the project navigation under the folder of the control panel you created open the “Runtime settings”. 	
2.	Open the menu “Alarms”: 	
3.	Under “System events”, activate the option box “S7 diagnostic alarms”  If you want to display the message text next to the message number, the option box “With event text” must also be activated.	

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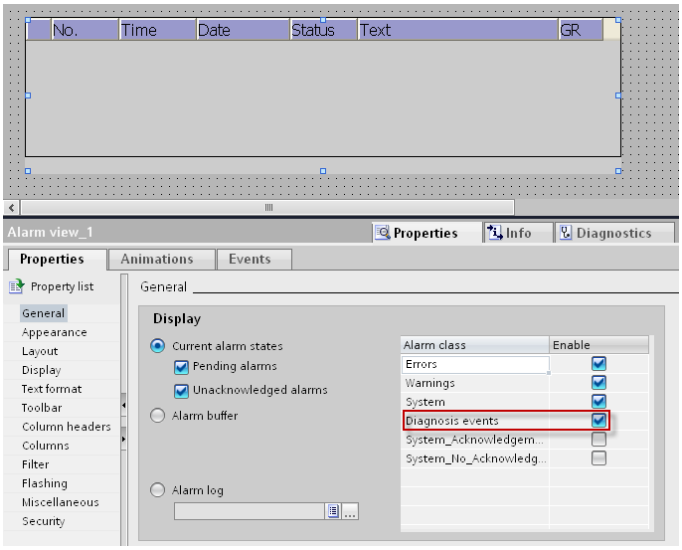
No.	Action	Screens
4.	The display of the system diagnostic message in WinCC is then in the alarm class “Diagnosis events”.  You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.	
5.	Transfer the configuration into the control panel. The necessary settings in WinCC are now complete.	

Display of the CPU system alarm on the control panel in runtime

If you want to display the CPU system alarm, an alarm display must have been configured in your project. In this alarm display, the alarm class “Diagnosis events” must be activated for the display of the CPU system alarm.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

Note

The diagnostic buffer of a Simatic CPU with integrated web server can also be displayed directly on a SIMATIC Panel.
Please find further information on this topic in the entry:

http://support.automation.siemens.com/WW/view/en/59601288

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3.3 Configuration of PLC alarms

Message blocks

The following table shows all the message blocks supported by WinCC Basic / Comfort / Advanced.

Note The use of the message blocks depends on the control panel used. In Chapter 2.4 you will find an overview of the availability of message blocks / message procedures.

Table 3-18

Message block	SFB / SFC	Data type	Properties	Characteristic Features
ALARM_S	SFC 18	C_Alarm_s	1 signal, no acknowledgement, up to 1 associated value	Every call and signal change to the previous block call, creates an alarm.
ALARM_SQ	SFC 17	C_Alarm_s	1 signal, acknowledgement possible, up to 1 associated value	like ALARM_S
ALARM_D	SFC 108	C_Alarm_s	1 signal, no acknowledgement possible, up to 1 associated value	like ALARM_S
ALARM_DQ	SFC 107	C_Alarm_s	1 signal, acknowledgement possible, up to 1 associated value	like ALARM_S

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3.3.1 Configuration of ALARM_S messages

An ALARM_S is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_S which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_S message block imply an acknowledgement. A subsequent acknowledgement is not necessary.

Parameters of the ALARM_S message block

The following table shows all the parameters of the ALARM_S message block.

Table 3-19

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)

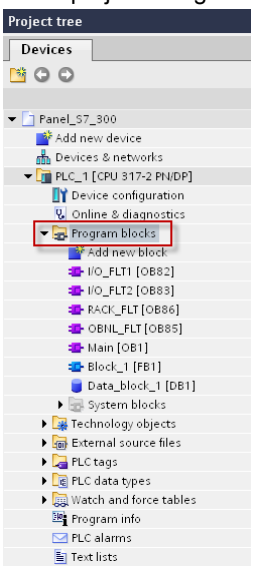
Para-meters	Declaration	Data type	Memory area	Description
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

Configuration in STEP 7 Professional

For the configuration of an ALARM_S message STEP 7 Professional, proceed as follows:

Creating a function block

Table 3-20

No.	Action	Screens
1.	In the project navigation under the folder of the CPU you created, open the “Program blocks”. 	
2.	Open a function block with a double click (e.g. FB1) in which you would like to configure the ALARM_S message or create a new function block and open it.	

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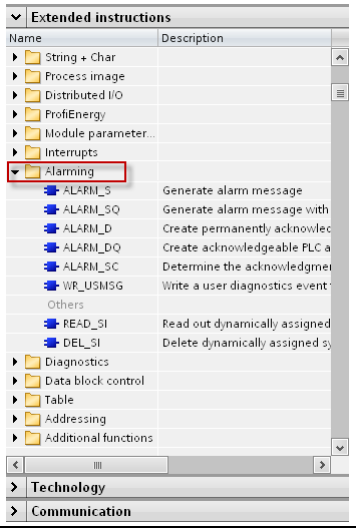
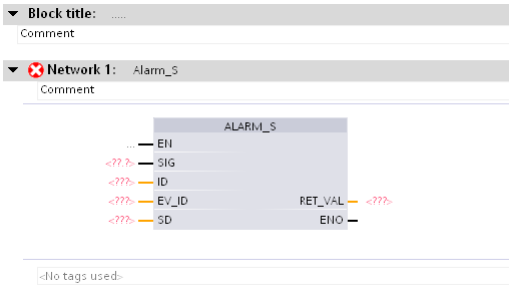
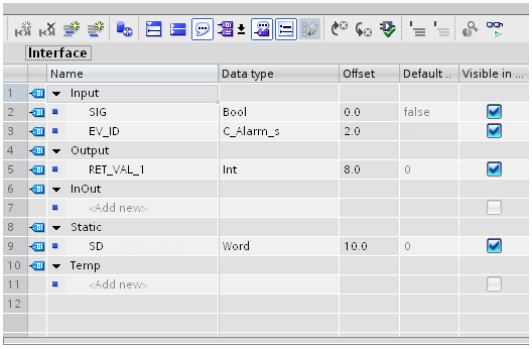
No.	Action	Screens
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 	
4.	Drag & drop the message block “ALARM_S” into an empty network of your function block. 	
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter ”Parameters in the ALARM_S message block”.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.	

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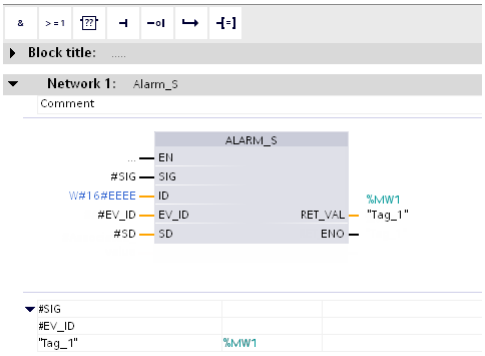
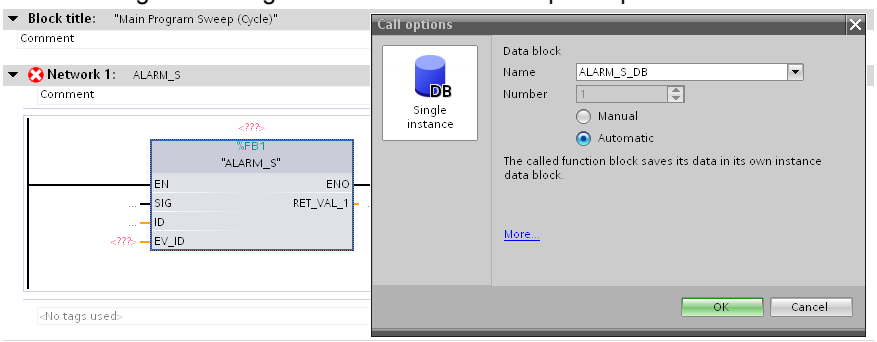
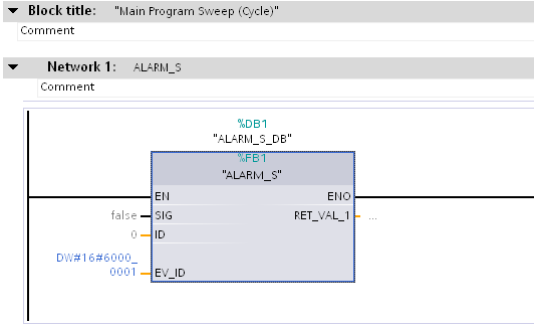
No.	Action	Screens
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.	
7.	The configuration of the ALARM_S message in the function block is now complete.	

Creating an instance data block

No.	Action	Screens
8.	Open an organization block (e.g. OB1) in your project.	
9.	Call the function block where you configured the ALARM_S message block in this organization block (e.g. OB1). Then a dialog for creating the instance data block opens up.  	
10.	Click on **“OK”** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input “EV_ID” automatically.  	
11.	The instance data block is now created and is called by the organization block.	

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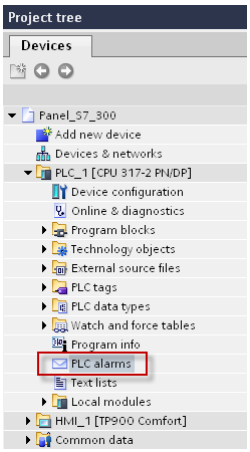
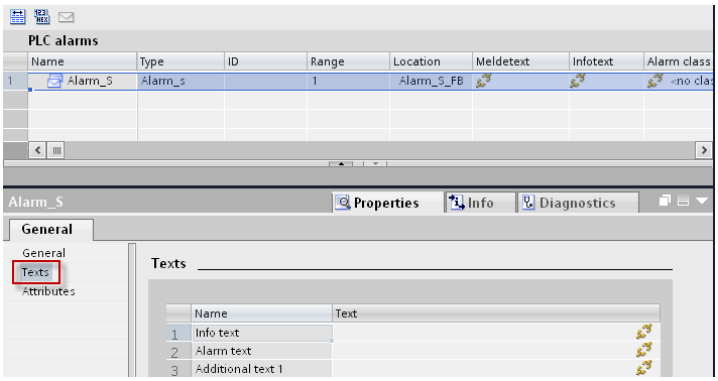
Configuring the message text of the ALARM_S message

No.	Action	Screens
12.	In the project navigation under the folder of the CPU you created, open the “PLC alarms”. 	
13.	Select the ALARM_S message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.	

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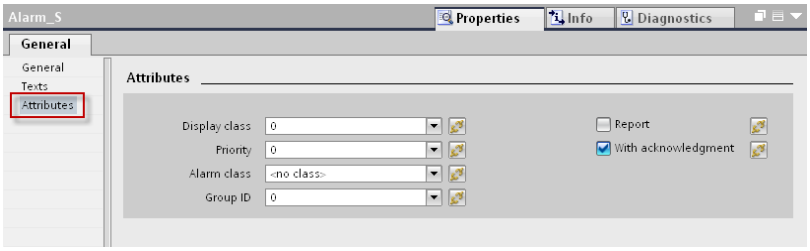
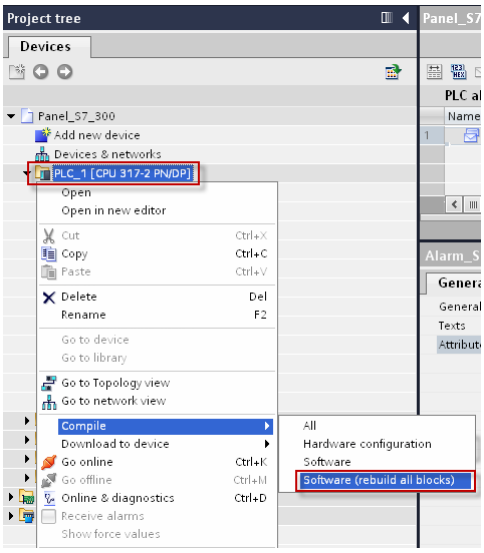
No.	Action	Screens
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4 you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_S.” • Under “Priority”, choose a priority for the display of the ALARM_S.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_S. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.	
15.	Right-click on the CPU in the project navigation.	
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 	
17.	Transfer the configuration into the PLC. The configuration of the ALARM_S is now complete.	

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Display of the Alarm_S on the control panel in Runtime

If you want to display the Alarm_S, an alarm display must have been configured in your project. In this alarm display, the alarm class “System_Acknowledgement” must be activated for the ALARM_S.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

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3.3.2 Configuration of ALARM_SQ messages

An ALARM_SQ is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_SQ which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_SQ message block imply an acknowledgement. The alarm can be acknowledged on the control panel.

Parameters of the ALARM_SQ message block

The following table shows all the parameters of the ALARM_SQ message block.

Table 3-21

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

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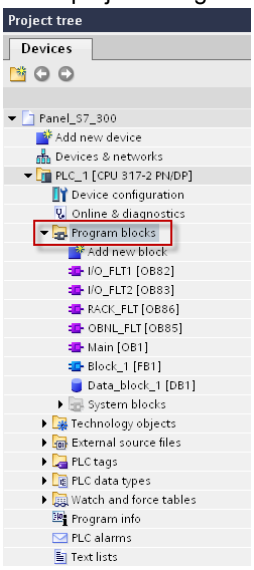
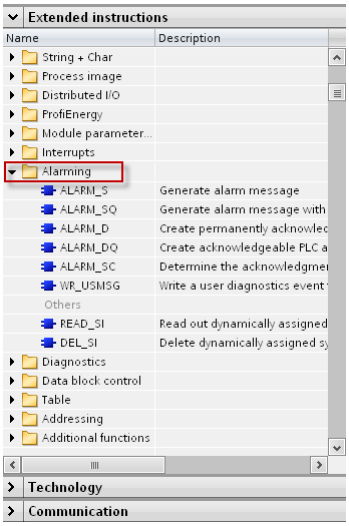
Configuration in STEP 7 Professional

For the configuration of an ALARM_SQ message STEP 7 Professional, proceed as follows:

Creating a function block

Table 3-22

No.	Action	Screens
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 	
2.	Open a function block with a double click in which you would like to configure the ALARM_SQ message or create a new function block and open it.	
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 	

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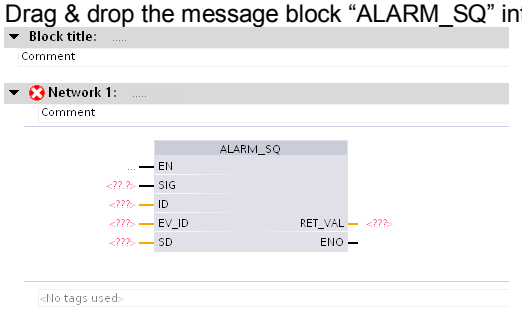
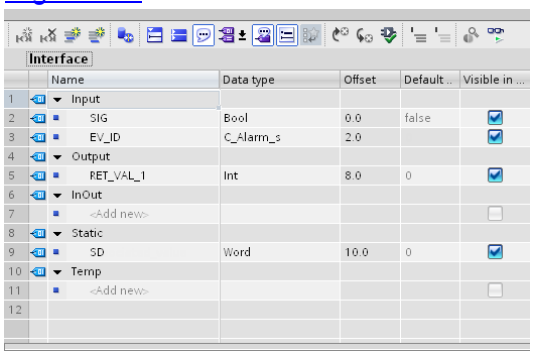
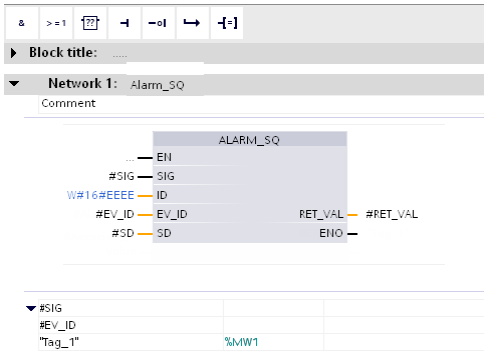
No.	Action	Screens
4.	Drag & drop the message block “ALARM_SQ” into an empty network of your FB. 	
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the ALARM_SQ message block“.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.	
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.	
7.	The configuration of the ALARM_SQ message in the function block is now complete.	

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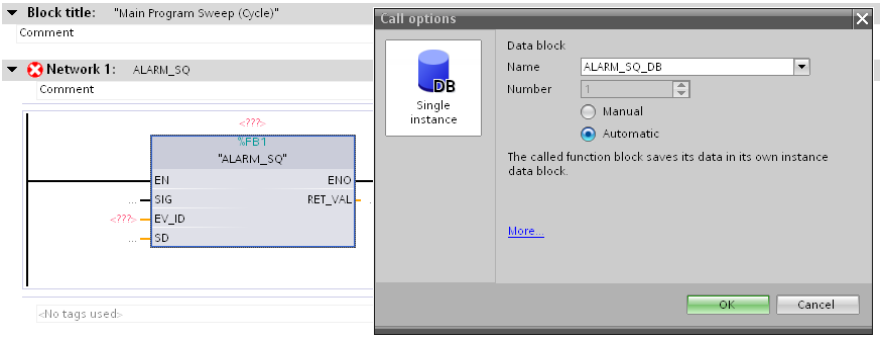
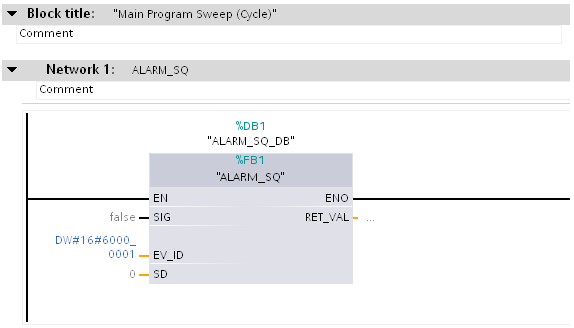
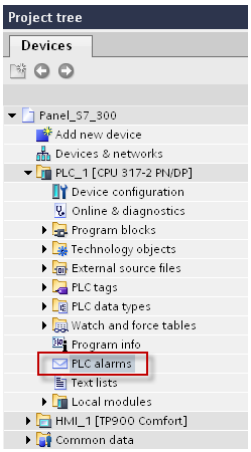
Creating an instance data block

No.	Action	Screens
8.	Open an organization block (e.g. OB1) in your project.	
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 	
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 	
11.	The instance data block is now created and is called by the organization block.	

Configuring the message text of the ALARM_SQ message

No.	Action	Screens
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 	

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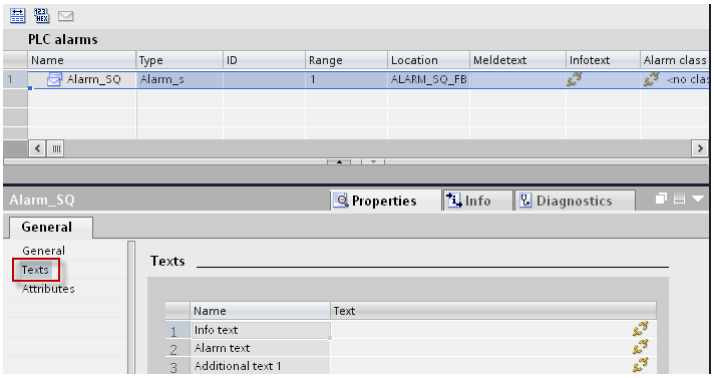
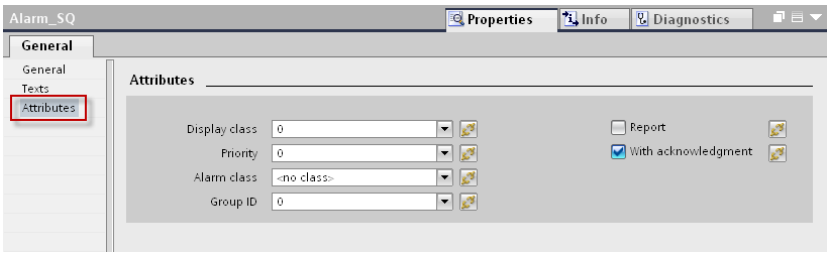
No.	Action	Screens
13.	Select the ALARM_SQ message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.	
14.	In the inspector window, please open the tab “Properties > General > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4 you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_SQ.” • Under “Priority”, choose a priority for the display of the ALARM_SQ.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_SQ. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.	
15.	Right-click on the CPU in the project navigation.	

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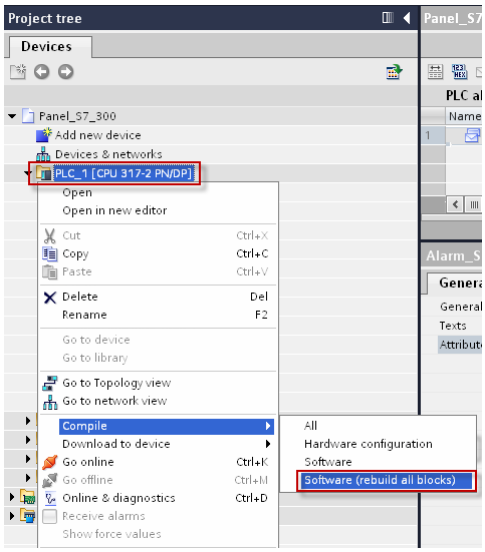
No.	Action	Screens
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 	
17.	Transfer the configuration into the PLC. The configuration of the ALARM_SQ is now complete.	

Display of the Alarm_SQ on the control panel in Runtime

If you want to display the Alarm_SQ, an alarm display must have been configured in your project. In this alarm display, the alarm class “System_Acknowledgement” must be activated for the ALARM_SQ.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

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3.3.3 Configuration of ALARM_D messages

An ALARM_D is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_D which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_D message block imply an acknowledgement. A subsequent acknowledgement is not necessary.

Parameters of the ALARM_D message block

The following table shows all the parameters of the ALARM_D message block.

Table 3-23

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
CMP_ID	Input	DWORD	E, A, M, D, L or constant	ID for the subsystem to which the message is assigned **(not allowed: 0)** Recommended values: • low word: 1 to 65535 • high word: 0
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

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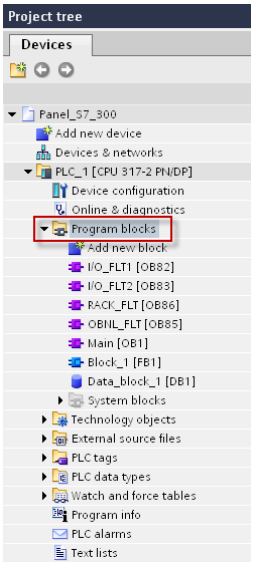
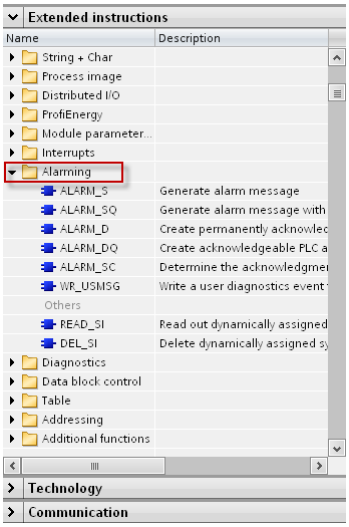
Configuration in STEP 7 Professional

For the configuration of an ALARM_D message STEP 7 Professional, proceed as follows:

Creating a function block

Table 3-24

No.	Action	Screens
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 	
2.	Open a function block with a double click in which you would like to configure the ALARM_D message or create a new function block and open it.	
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 	

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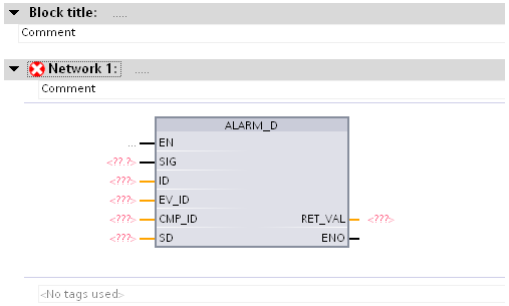
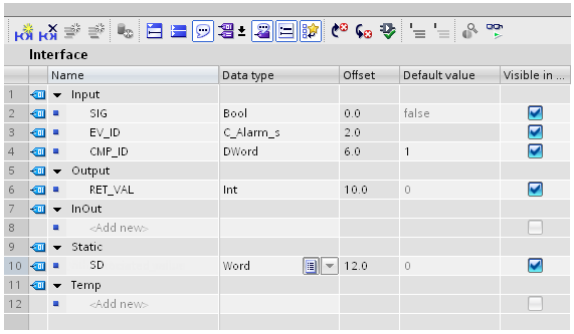
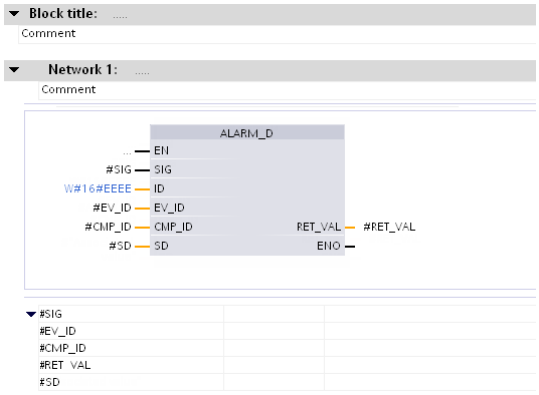
No.	Action	Screens
4.	Drag & drop the message block “ALARM_D” into an empty network of your FB. 	
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the ALARM_D message block“.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.	
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.	
7.	The configuration of the ALARM_D message in the function block is now complete.	

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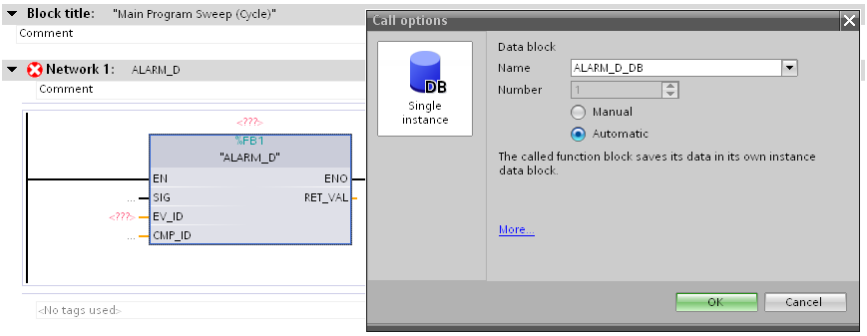
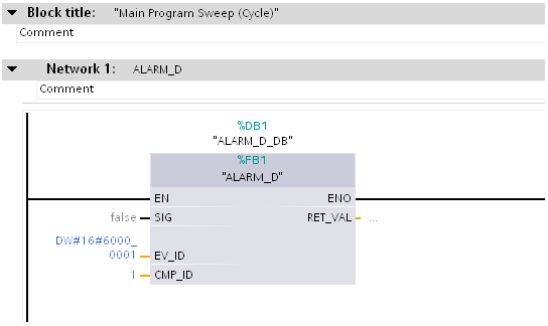
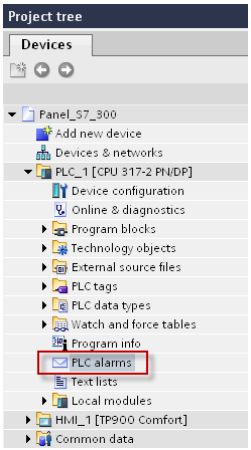
Creating an instance data block

No.	Action	Screens
8.	Open an organization block (e.g. OB1) in your project.	
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 	
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 	
11.	The instance data block is now created and is called by the organization block.	

Configuring the message text of the ALARM_D message

No.	Action	Screens
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 	

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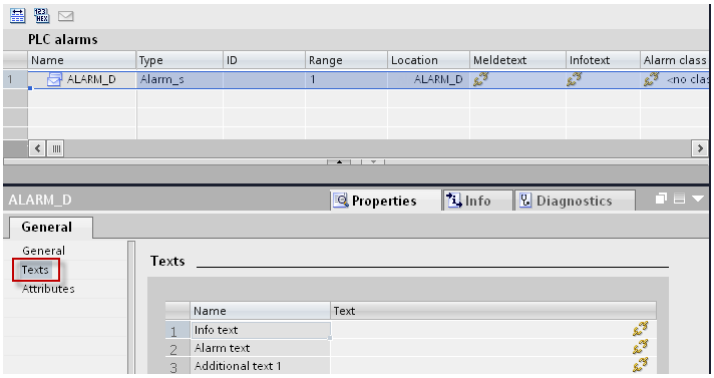
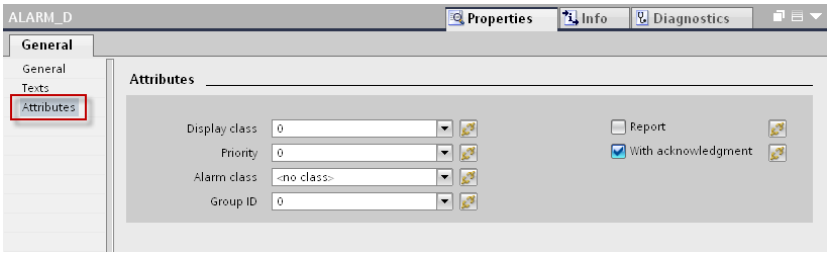
No.	Action	Screens
13.	Select the ALARM_D message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_D. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.	
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4 you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_D.” • Under “Priority”, choose a priority for the display of the ALARM_D.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_D. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.	
15.	Right-click on the CPU in the project navigation.	

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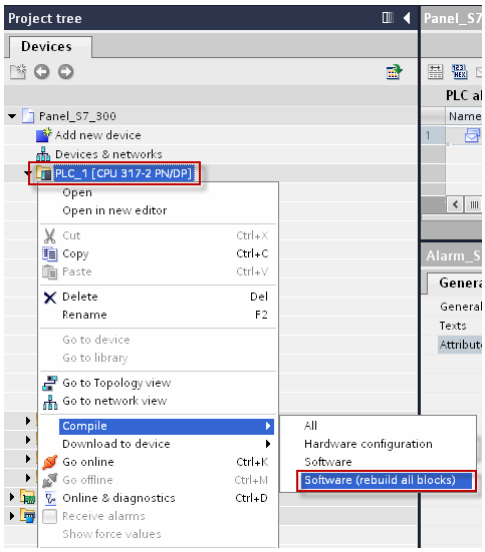
No.	Action	Screens
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 	
17.	Transfer the configuration into the PLC. The configuration of the ALARM_D is now complete.	

Display of the Alarm_D on the control panel in Runtime

If you want to display the Alarm_D, an alarm display must have been configured in your project. In this alarm display, the alarm class “System_Acknowledgement” must be activated for the ALARM_D.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

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3.3.4 Configuration of ALARM_DQ messages

An ALARM_DQ is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_DQ which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_DQ message block imply an acknowledgement. The alarm can be acknowledged on the control panel.

Parameters of the ALARM_DQ message block

The following table shows all the parameters of the ALARM_DQ message block.

Table 3-25

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
CMP_ID	Input	DWORD	E, A, M, D, L or constant	ID for the subsystem to which the message is assigned **(not allowed: 0)** Recommended values: • low word: 1 to 65535 • high word: 0
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

Configuration in STEP 7 Professional

For the configuration of an ALARM_DQ message STEP 7 Professional, proceed as follows:

Creating a function block

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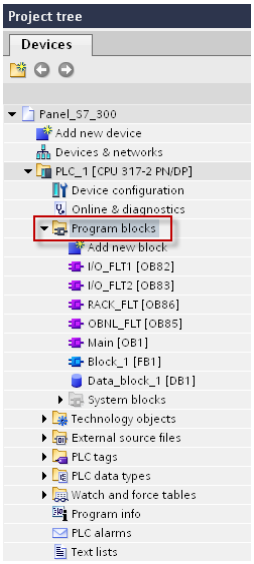
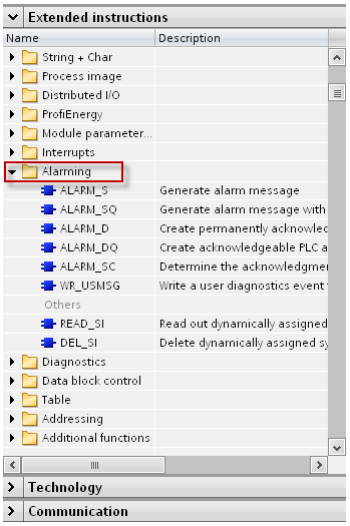
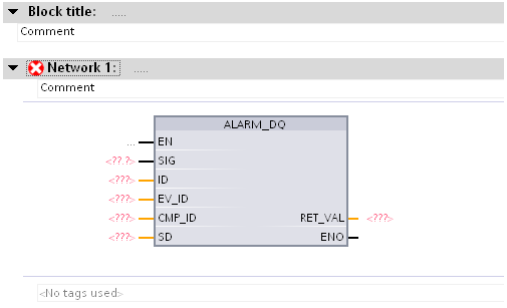
Table 3-26

No.	Action	Screens
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 	
2.	Open a function block with a double click in which you would like to configure the ALARM_DQ message or create a new function block and open it.	
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 	
4.	Drag & drop the message block “ALARM_DQ” into an empty network of your FB. 	

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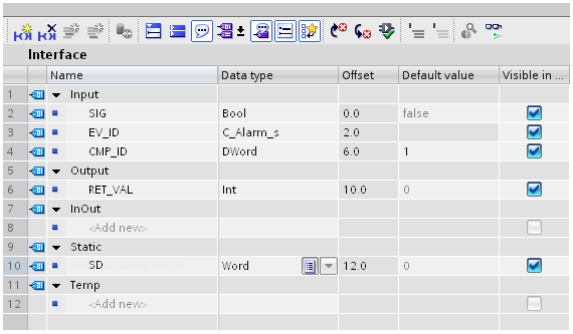
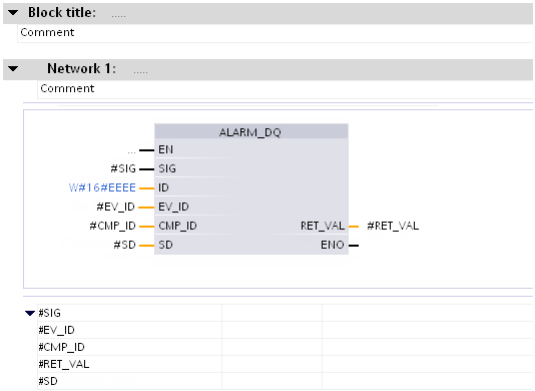
No.	Action	Screens
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter "Parameters of the ALARM_DQ message block".  **Note on the input "ID"** The input "ID" for the data channel of the alarm messages must be assigned with the value "W#16#EEEE". In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input "ID", enter the value "W#16#EEEE" as the default value of the variable.	
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value "W#16#EEEE" at the input "ID" of the message block.  **Note** In this sample configuration, the input "ID" is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.	
7.	The configuration of the ALARM_DQ message in the function block is now complete.	

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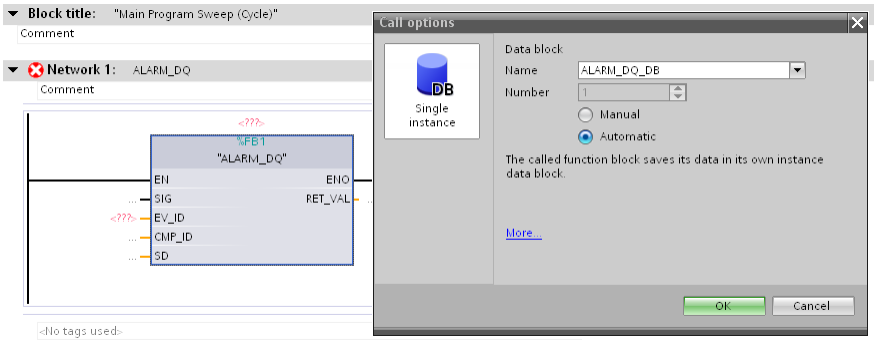
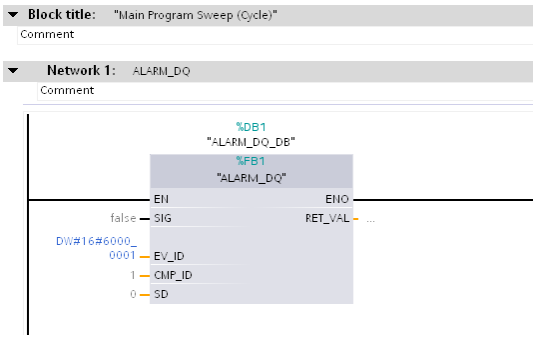
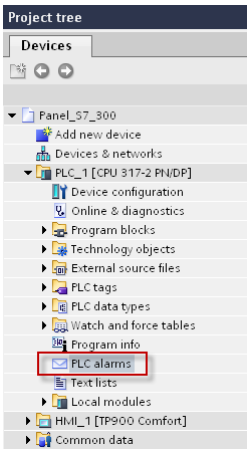
Creating an instance data block

No.	Action	Screens
8.	Open an organization block (e.g. OB1) in your project.	
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 	
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 	
11.	The instance data block is now created and is called by the organization block.	

Configuring the message text of the ALARM_DQ message

No.	Action	Screens
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 	

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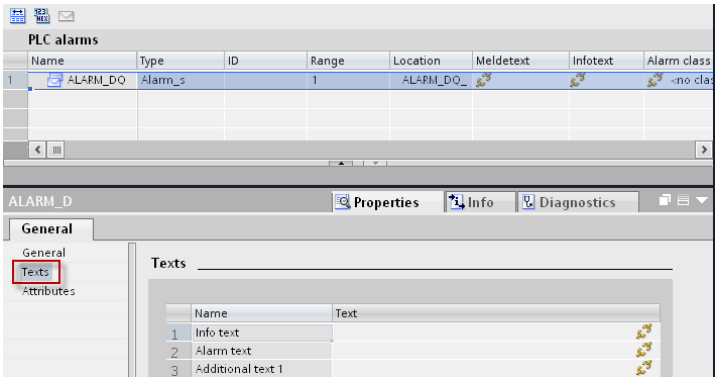
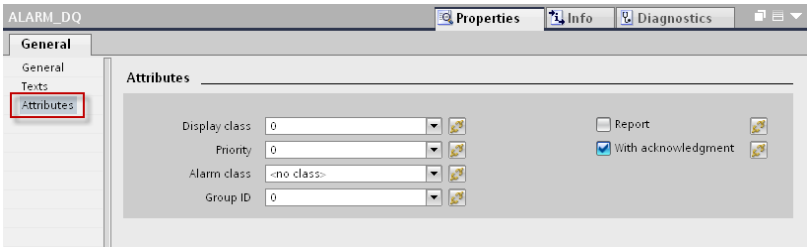
No.	Action	Screens
13.	Select the ALARM_DQ message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.	
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4 you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_DQ.” • Under “Priority”, choose a priority for the display of the ALARM_DQ.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_DQ. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.	
15.	Right-click on the CPU in the project navigation.	

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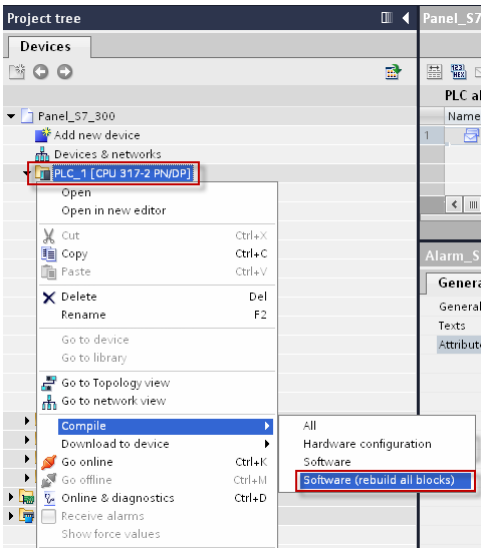
No.	Action	Screens
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 	
17.	Transfer the configuration into the PLC. The configuration of the ALARM_DQ is now complete.	

Display of the Alarm_DQ on the control panel in Runtime

If you want to display the Alarm_DQ, an alarm display must have been configured in your project. In this alarm display, the alarm class “System_Acknowledgement” must be activated for the ALARM_DQ.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Basic / Comfort / Advanced under system manual, under the title “Configure alarm display”.

3.3.5 Configuration of Simotion alarms

The configuration of Simotion alarms will be available with a later version of WinCC (TIA portal).

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3.4 Using alarm classes

During the operation of the system, alarms of various priorities occur. These messages are categorized in different alarm classes depending on their importance.

The system operator can see which messages have a higher priority and importance and must be handled first.

Function of the alarm classes

When new messages are created, every message must be assigned to an alarm class.

The alarm class defines the following aspects of the message assigned to this alarm class:

- the display
- the acknowledgement concept
- the storage

Note The scope of functions of the alarm classes depends on the configured control panel used.

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Types of messages classes

WinCC (TIA Portal) provides the following types of alarm classes.

- **Pre-defined alarm classes**

You will find pre-defined alarm classes on the tab “Alarm classes” under “HMI alarms” in the project tree. The alarm classes cannot be deleted and can only be edited in part.

- **User-defined alarm classes**

For every control panel, you can add more alarm classes on the tab “Alarm classes” under “HMI alarms” in the project tree. In these alarm classes the display and the acknowledgement concept of the respective message can be configured individually.

3.5 Using alarm groups

During system operation, messages concerning different processes and sections occur. In order to organize these message to get a better overview (for example depending on the sector of the system), you can classify these messages in alarm groups.

Function scope of alarm groups in WinCC Basic / Comfort / Advanced

In WinCC Basic / Comfort / Advanced you can monitor certain sectors of the system separately by means of alarm groups and you can acknowledge the respective alarms together, if required. Only alarms that need to be acknowledged can be grouped in alarm groups, irrespective of the alarm class used.

Example
If several alarms requiring an acknowledgement are assigned to an alarm group, and if you acknowledge one of these alarms, all the alarms in this alarm group are acknowledged at the same time.

Usage

We recommend using alarms groups for the following messages:

- error alarms with the same cause.
- similar messages.
- alarms from one sector of the plant (e.g. Press_1).
- messages that are part of a process (e.g. temperature monitoring)

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3.6 The acknowledgement concept in WinCC Basic / Compact / Advanced

Define the acknowledgement concept for an alarm class. All the messages that are part of this alarm class will then be acknowledged according to the same concept.

In WinCC Basic / Compact / advanced, there are the following acknowledgement concepts:

- Message with acknowledgement
- Message with a single acknowledgement

In the following chapter, the acknowledgement concepts are explained in greater detail.

3.6.1 Message with acknowledgement

After a message without acknowledgement, the operator does not necessarily have to react to the message. The message comes and goes without an acknowledgement being necessary.

3.6.2 Message with a single acknowledgement

During the operation of the system, messages can occur that the operator obviously must take notice of. If an acknowledgement has been configured this means that the message will remain pending until the operator has acknowledged it.

Note Alarms concerning critical and dangerous states in a process must always be configured as needing acknowledgement.

General definition

If a message needing acknowledgement is acknowledged by an operator, the operator confirms that he has treated or removed the event that caused the alarm.

If required, the acknowledgement can be recorded and saved.

Note It depends on the control panel in how far the message can be recorded and saved.

Possibilities of an acknowledgement

There are the following possibilities of acknowledging a message in runtime:

- manual acknowledgement by an authorized operator at the control panel
- automatic acknowledgement by the system without any action from the operator by:
  - variables
  - PLC
  - system functions in function lists
  - system functions in scripts

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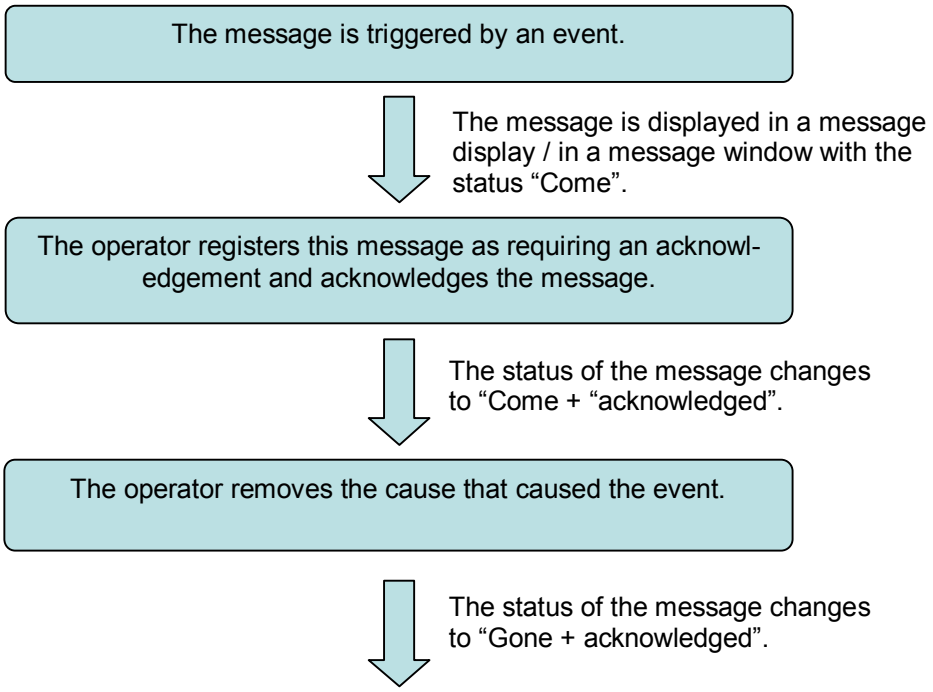
Acknowledgement by the operator at the control panel



Depending on the configuration, the operator can acknowledge a message in the following way in runtime:

- by means of the “acknowledgement” button in the message

Note The button has to be activated before: under Properties of the Message displays -> Toolbar -> Buttons.

- by means of the function keys and configured buttons with a configured function “MessageDisplayAcknowledgeMessage” in images.
- by means of the <ACK> button on a control panel with a keyboard.

Note Critical alarms should only be acknowledged by authorized operators. Therefore you should add the respective authorization to all the operating and display objects for the acknowledgement of alarms.

Acknowledgement by the PLC

In addition to the acknowledgement of messages on the control panel, they can also be acknowledged by the control program. Then the message is acknowledged by means of the PLC acknowledgement variable, which can be configured for every message requiring an acknowledgement. In the chapter “Configuration of discrete alarms”, you will find more detailed information about alarm classes.

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Acknowledgement of several messages at one time

If you want to acknowledge several alarms at one time, these alarms must be assigned to the same alarm group. This means that if one alarm from this alarm group is acknowledged, all the other alarms from this alarm group will also be acknowledged. Therefore it is no longer necessary to acknowledge each alarm separately.

In the chapter “Using alarm groups”, you will find more detailed information about alarm groups.

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3.7 Associated values in messages

Associated values are process values / text list entries that are displayed as additional information with the message text.

The number of associated values that can be configured depends on the message block used.

3.7.1 Structure of an associated value

Associated values are integrated into the message as a block.

The block consists of the number, the element type and the format instruction of the associated value.

@<No. of the AssociatedValue><ElementType><Format>@.

Number of the associated value

For message blocks with only one possible associated value, the number “1” is used for the associated value.

For message blocks with several possible associated values, the respective number where an associated value is configured is used e.g. Input SD_” = associated value “2”.

Element type

The element type defines the data type of the associated value.

Table 3-27

Element type	Data type
Y	BYTE
W	WORD
X	DWORD
I	INT
D	DINT
B	BOOL
C	CHAR
R	REAL

Format

With the format you define the output format fin the control panel or the associated value. The character “%” precedes the format instruction.

The following fixed format instructions are applicable for message texts:

Table 3-28

Format	Description
%**[i]**x	Hexadecimal number with “i” digits
%**[i]**u	Unsigned decimal number with “i” digits
%**[i]**d	Signed decimal number with “i” digits
%**[i]**b	binary number with “i” digits

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Format	Description
%[**i**][.**y**]f	Fixed point number Signed value of the form dddd: one or several numbers with “y” digits after the decimal point and “i” total digits
%[**i**]s	Character string (ANSI string) with “i” digits Characters are printed up to the first 0 byte (00Hex).
%t#<Name of the text library>	Access to text library.

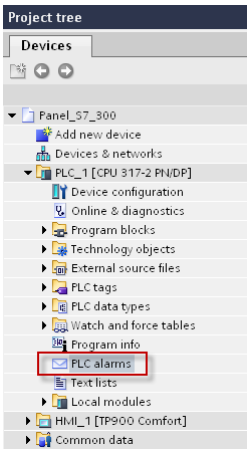
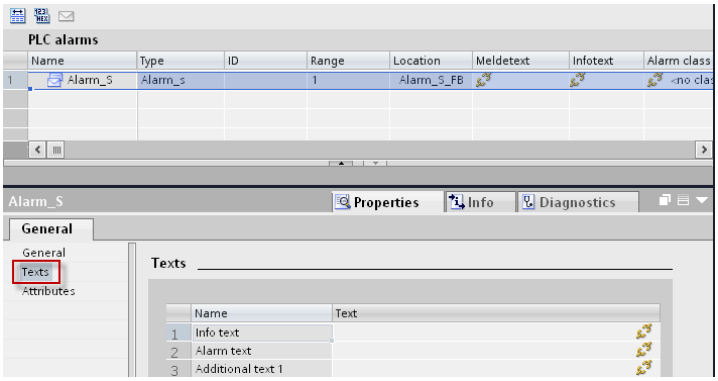
3.7.2 Configuration of an associated value

In the following the configuration of an associated value in a message text will be explained.

Displaying the associated value in a message

The further procedure requires a PLC alarm that has already been configured (e.g. an ALARM_S message)

Table 3-29

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “PLC alarms”. 
2.	In the tab “PLC alarms”, select the message, in which the associated value is to be integrated.
3.	In the inspector window, please open the tab “Properties > Properties > Texts”. 

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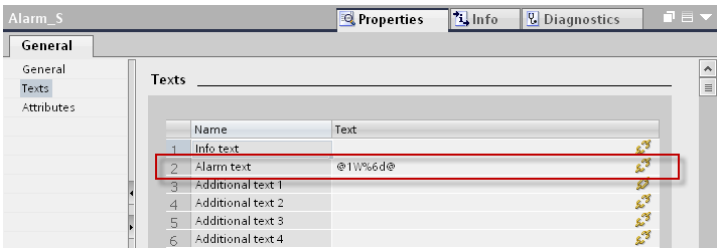
No.	Action
4.	Under “Alarm text”, please add the block of the associated value in the alarm text, for example Pump failed @1W%6d@. **Note** If you change the alarm text in the tab “Alarm instances” for the message, you might have to reset the instance value to the type value. Click on the type symbol displayed next to the alarm text to do so. 
5.	The configuration of the associated value is now complete.

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Displaying the text list entry in a message

When text list entries are put out in PLC alarms, the associated value automatically references the index in the text list. Depending on the value of the associated value the respective text list entry will be displayed.

A textlist is put out by the following block format of an associated value:

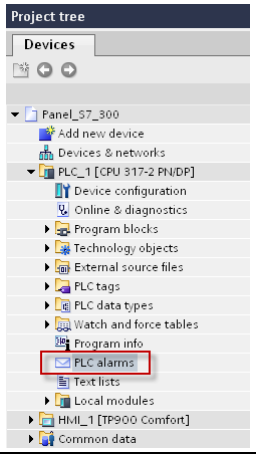
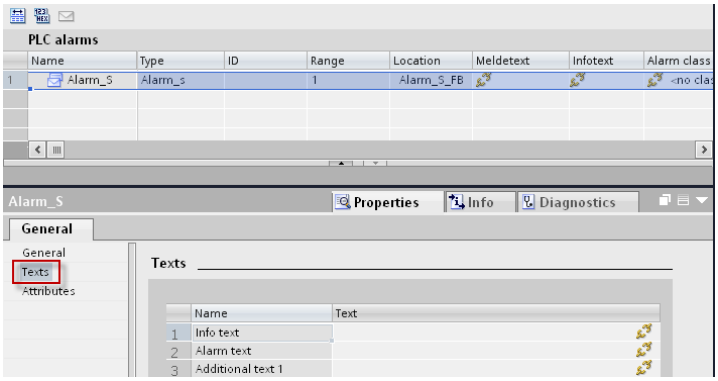
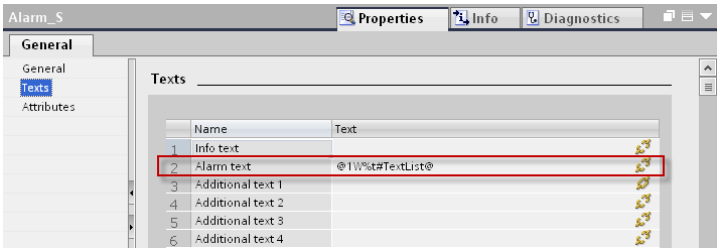
- @<No. of the AssociatedValue><ElementType><Format><Name of the Text Libaray>@.

Example for a block which puts out the content of a text list:

- @1W%t#TextList@ - associated value 1 of the data type WORD is the index, with which the text to be integrated is references in the text library TextList.

The further procedure requires a PLC alarm (e.g. an ALARM_S message) and a text list in STEP 7 that have already been configured.

Table 3-30

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “PLC alarms”. 
2.	In the tab “PLC alarms”, select the message, in which the text list entry is to be integrated.
3.	In the inspector window, please open the tab “Properties > Properties > Texts”. 
4.	Under „Alarm text“, please add the block of the associated value in the alarm text, for example Pump in system sector @1W%t#TextList@ failed.  **Note** If you change the alarm text in the tab “Alarm instances” for the message, you might have to reset the instance value to the type value. Click on the type symbol displayed next to the alarm text to do so.
5.	The configuration of the associated value is now complete.

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4 Configuration of messages in WinCC Professional

In the following, the configuration of user-defined and system-defined messages with WinCC Runtime Professional will be explained.

Required software components

- WinCC Professional
- STEP 7 Professional

Requirements

- A WinCC Runtime Professional project with configured connections to a S7-300/400 PLC has been created.

The required knowledge and the procedure for the configuration of a connection between a control panel in WinCC (TIA Portal) and an S7-300/400 PLC in STEP 7 Professional are not a part of this Application.

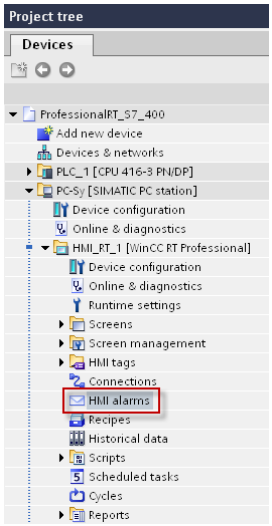
4.1 Configuration of user-defined messages

4.1.1 Configuration of analog alarms

General configuration of analog alarms

For the configuration of analog alarms in WinCC Professional, please proceed as follows:

Table 4-1

No.	Action
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms” 

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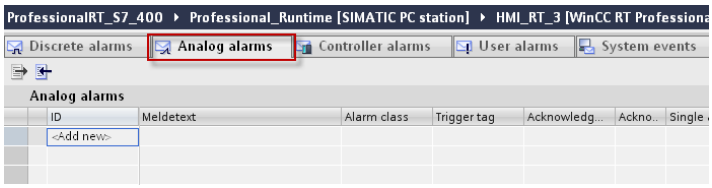
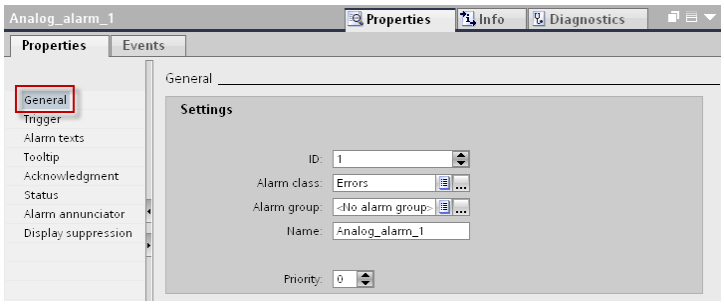
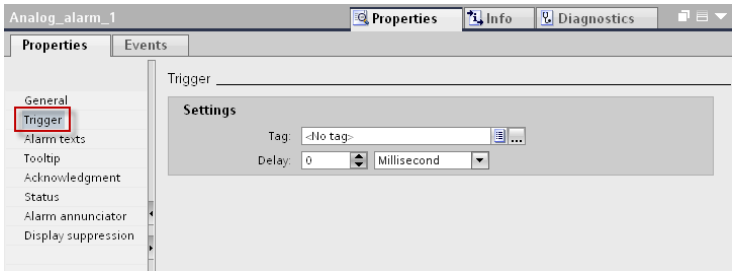
2.	Open the tab “Analog alarms”.  In the table, double-click on “<Add new>” to create an analog alarm.
3.	Select the analog alarm you just created and in the inspector window open the tab “Properties > Properties > General".  • Under “ID”, please select an alarm number for the identification of this alarm. • Under “Alarm class”, please select an alarm class for the analog alarm. In Chapter 4.4 you will find more detailed information about alarm classes. • If required, please choose an alarm group under “Alarm group” to which the analog alarm will be assigned. In Chapter 4.5 you will find more detailed information about alarm groups. • Under “Priority”, choose a priority for the display of the alarm. The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. **Note** If you assign different priorities, the analog alarms will be sorted according to the priority and not the date.
4.	In the inspector window, please open the tab “Properties > Properties > Trigger”.  • Under “tag”, please create a new tag or choose an existing tag for triggering the analog alarm. • Under “delay” you can set the time basis after which the analog alarm is to be triggered when the limit value was violated. **Note** Only use the tag for triggering the alarm for triggering this alarm.

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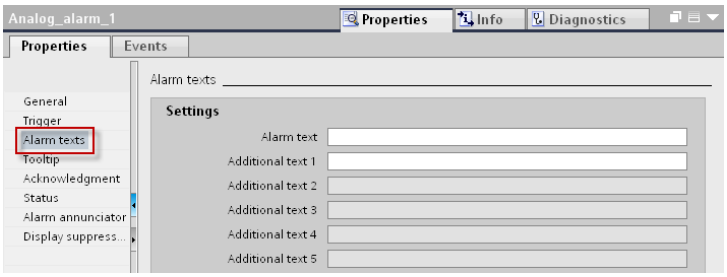
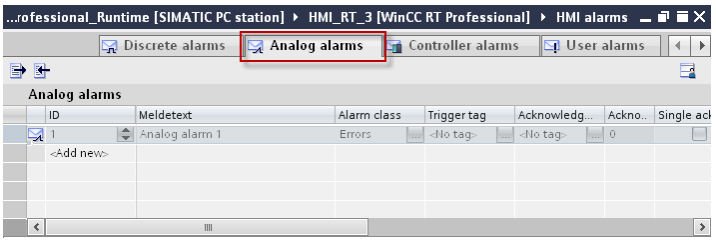
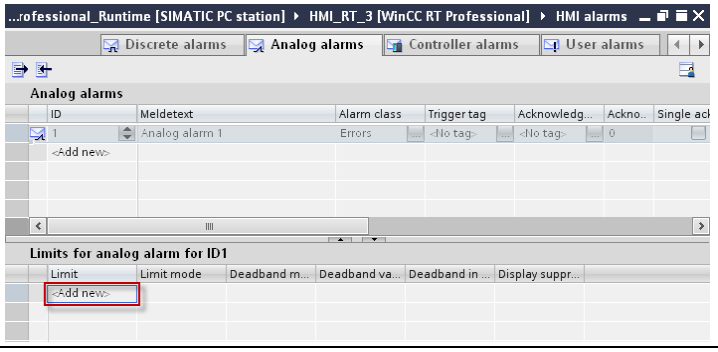
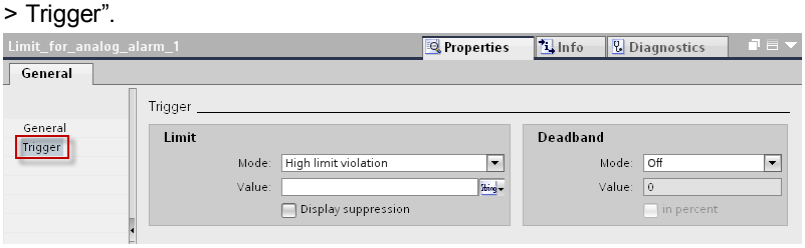
5.	In the inspector window, please open the tab “Properties > Properties > Alarm texts”.  • Under “Alarm text” please enter the message text in the analog alarm, for example “Analog Alarm 1” • Optionally, you can enter more texts for the analog alarm under “Additional text”. The additional texts can be displayed in a separate column in an alarm. **Note** Message texts depend on the language, and depending on your configuration, they can contain up to 255 characters.
6.	**Assigning the limit value** Open the tab “Analog alarms” again.  Select the analog alarm which you have already created under number 2 of the table.
7.	In the lower sector of the window, click on “Add new”> under “Limits for analog alarms” to add a new limit for the analog alarm. 
8.	Select the limit you just created and in the inspector window open the tab “Properties > General > Trigger”. 

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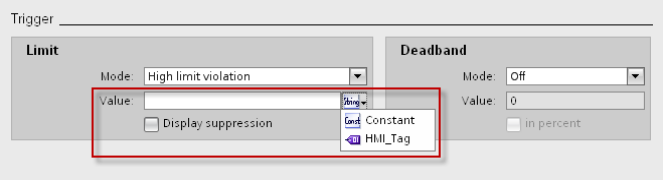
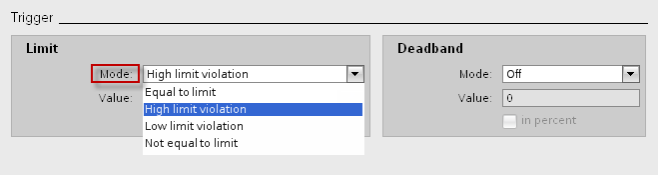
9.	Open the drop-down list under “Limit > Value”  • If you want to use a **constant as the limit** value, select “Constant” and then enter the constant in the “Value” box. • If you want to use a **tag as the limit** value, select “HMI_Tag”. Then select the tag or set a new tag.
10.	Open the drop-down list under “Mode” and select a trigger mode.  • **“Equal to limit”:** When the value is equal to the limit value, the alarm is triggered. • **“Not equal to limit”:** When the value is not equal to the limit value, the alarm is triggered. • **“High limit violation”:** When the value exceeds the limit value, the alarm is triggered. • **“Low limit violation”:** When the value falls below the limit value, the alarm is triggered.
11.	The configuration of the analog alarm is now complete. The analog alarm will now be triggered by the trigger tag depending on the limit you set.

Display of the analog alarm in runtime

If you want to display the analog alarm, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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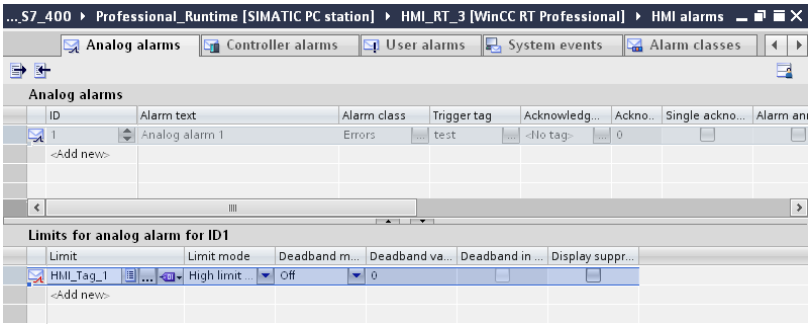
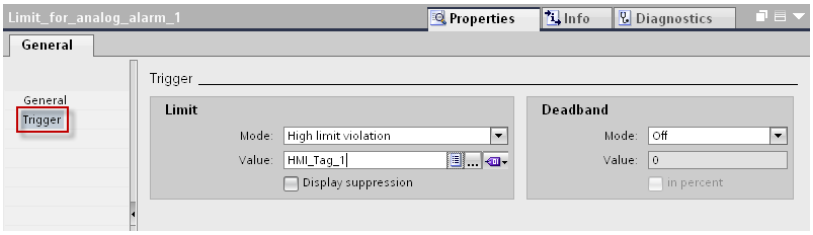
Optional settings for analog alarms

Activating the deadband

The deadband prevents that an analog alarm is triggered several times of a process value fluctuates around the limit value.

Table 4-2

No.	Action
1.	In the tab “Analog alarms”, select the analog alarm and then, in the lower window, the limit you created. 
2.	In the inspector window, please open the tab “Properties > Properties > Trigger”. 
3.	In the drop-down list under “Deadband > Mode” set for which change of alarm status the deadband is to be applied.
4.	Under “Value”, please enter a constant that is to be applied or activate the option “in percent” if the value is to be applied in percent of the limit value.
5.	The configuration of the deadband for the analog alarm is now complete.

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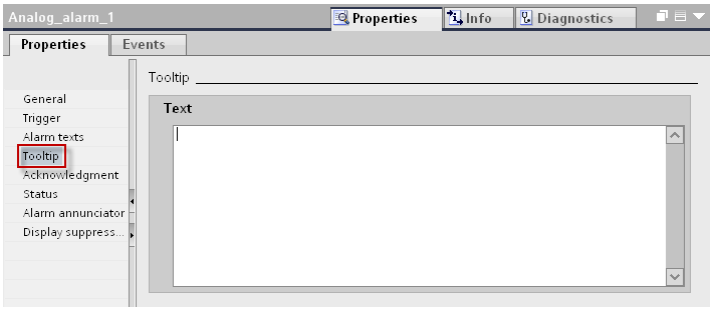
Creating a tooltip

With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.

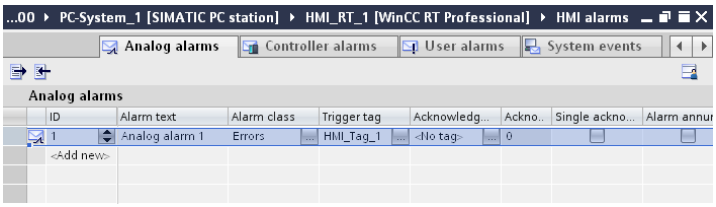
Table 4-3

No.	Action
1.	Open the analog alarms in the tab “Analog alarms”.
2.	In the inspector window, please open the tab “Properties > Properties > Tooltip”.  • Under “Text”, please enter the text which is to appear as a tooltip to this analog alarm. By means of the respective button in the message display, you can call the tooltip to this message. **Note** The tooltip must not be longer than max. 320 characters.
3.	The configuration of the tooltip for the analog alarm is now complete.

Evaluating the acknowledgement of the analog alarm in the PLC

The acknowledgement of the analog alarm can be polled by a tag in the PLC.

Table 4-4

No.	Action
1.	Open the analog alarms in the tab “Analog alarms”. 

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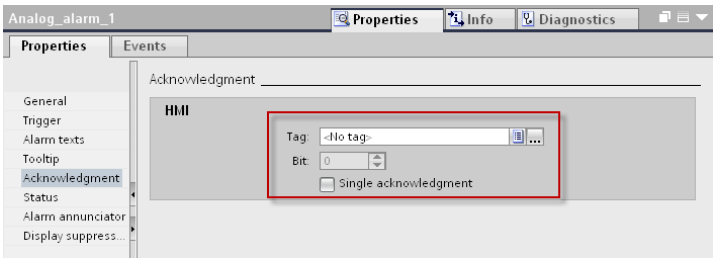
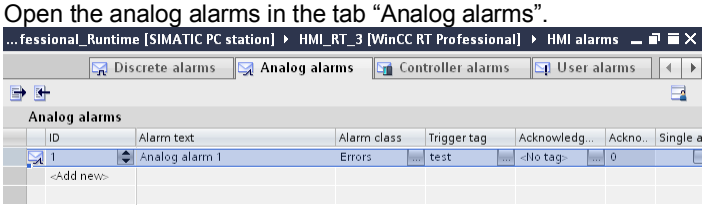
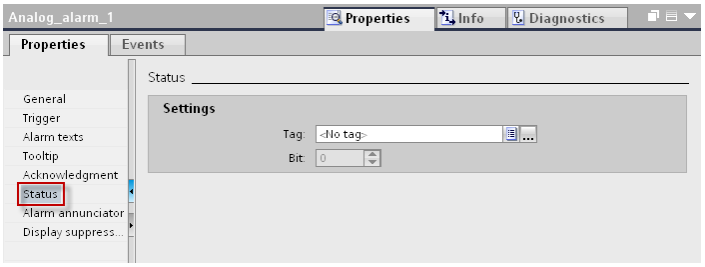
2.	In the inspector window, please open the tab “Properties > Properties > Acknowledgement”.  • Under “HMI > Tag”, please choose an existing tag or create a new tag, where the information can be stored that the discrete alarm has been acknowledged. • Under “HMI > Bit”, please select the bit that will be set in the selected tag if a discrete alarm has been acknowledged. • If required, activate the option box “Singe acknowledgement” **Note** The control panel and the PLC have only read access to the storage area of the acknowledgement tag.
3.	The configuration of the acknowledgement poll is now complete.

You will find more detailed information concerning the acknowledgement concept in WinCC Professional in Chapter 4.6.

Query the status

Under “Status” the status of an alarm can be saved in a status tag.

Table 4-5

No.	Action
1.	Open the analog alarms in the tab “Analog alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Status”.  • Under “Tag”, select a tag and the respective bit, or create a new tag where the status of the alarm/alarm group is to be saved.
3.	The configuration of the status tag for analog alarms is now complete.

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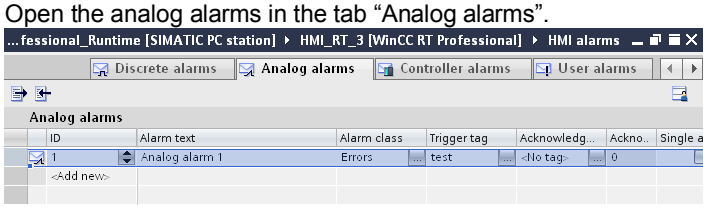
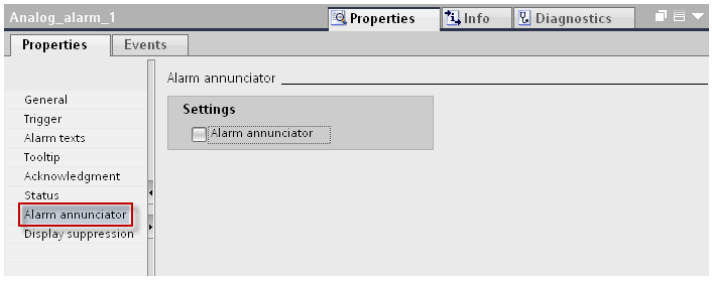
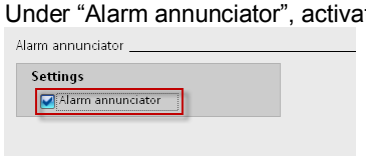
Alarm annunciator

By activating the “Alarm annunciator” an alarm can be annunciated by optical or acoustic signals in addition to the alarm display.

Table 4-6

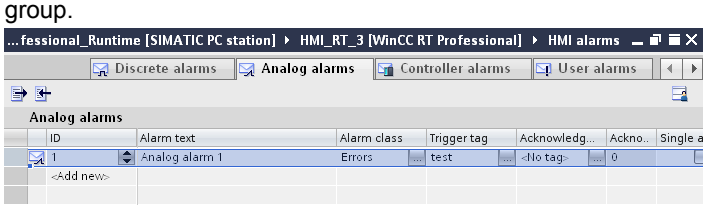
No.	Action
1.	Open the analog alarms in the tab “Analog alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm annunciator”. 
3.	Under “Alarm annunciator”, activate the option box “Alarm annunciator” 
4.	The configuration of the alarm annunciator for the analog alarm is now complete.

You will find more detailed information on the Alarm annunciator in Chapter 4.6.4.

Suppressing the display

By activating the Display suppression, it is possible to suppress alarms depending on the states of the system.

Table 4-7

No.	Action
1.	Open the analog alarms in the tab “Analog alarms”. **Note** If you want to use the display suppression, the respective alarm must be assigned to an alarm group. 

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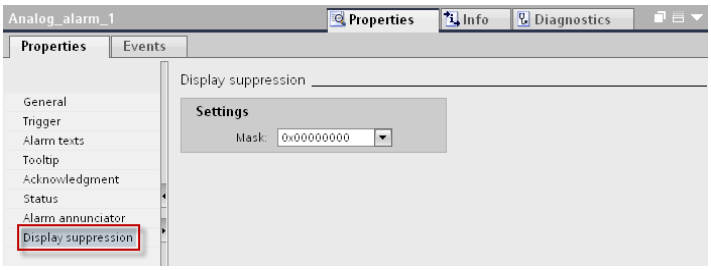
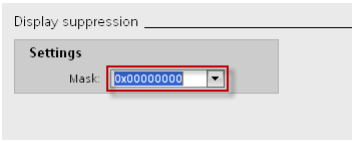
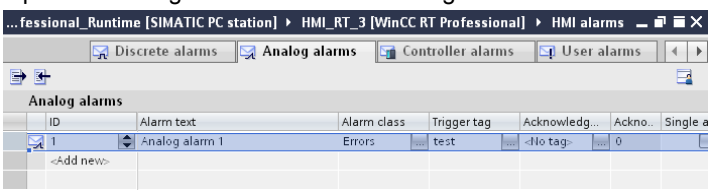
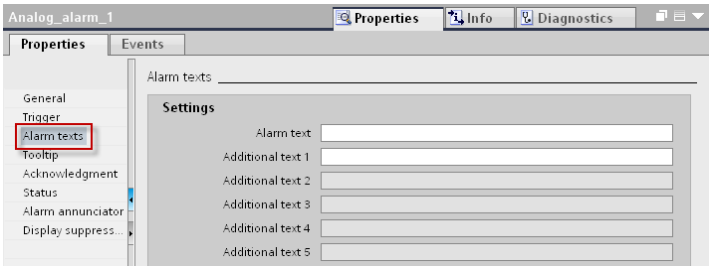
2.	In the inspector window, please open the tab “Properties > Properties > Display suppression”. 
3.	Under “Mask”, please select a status from the drop-down list for which you want to suppress the display. 
4.	The configuration of the display suppression for the analog alarm is now complete.

Output of a dynamic parameter in the alarm text

When an analog alarm comes, it is possible to display alarm parameters within the alarm text in an output box.

Table 4-8

No.	Action
1.	Open the analog alarms in the tab “Analog alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm text”.  • Click the right mouse button in the entry box “Alarm text” or place the cursor in the alarm text and click on the right mouse button. Then the context menu will open up.

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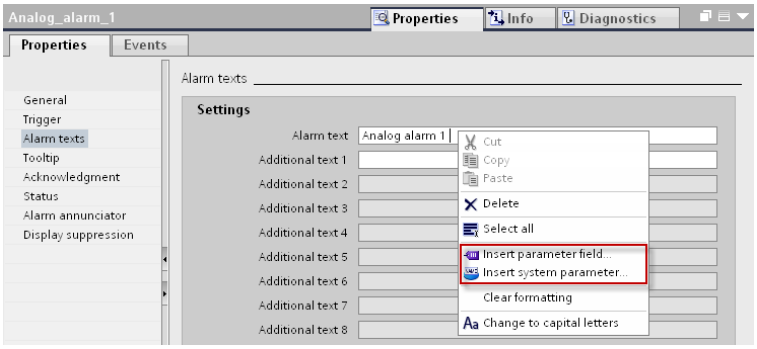
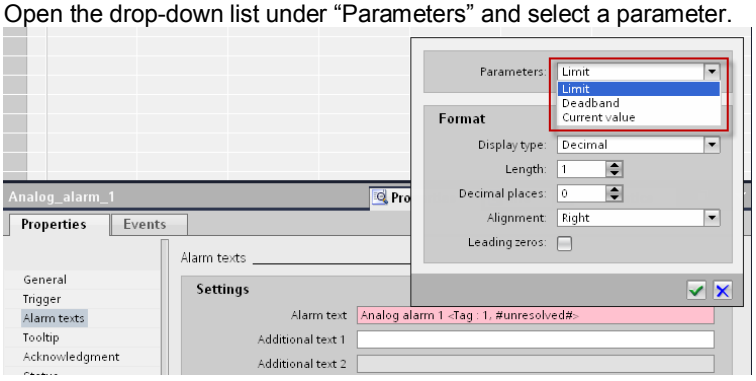
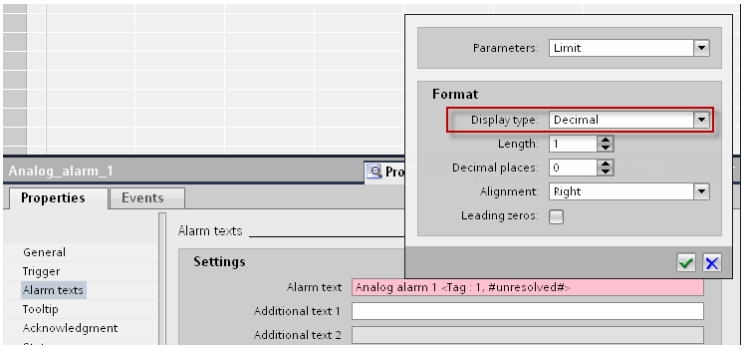
No.	Action
3.	Select “Insert parameter field” or “Insert system parameter” from the context menu.  Then a dialog for the further configuration of the dynamic parameter (tag) opens up. Please continue with the section on the chosen tag.

Parameter field (limit, deadband, current value)

No.	Action
4.	Inserting a parameter field Open the drop-down list under “Parameters” and select a parameter.  • Limit • Deadband • Current value
5.	Select a display type under “Format > Display type” for the parameter you selected. 

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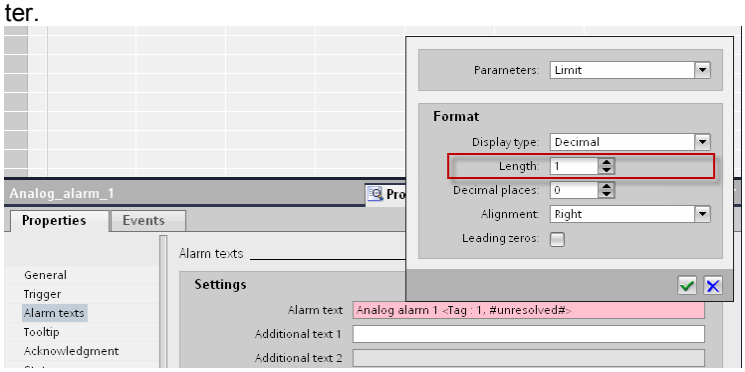
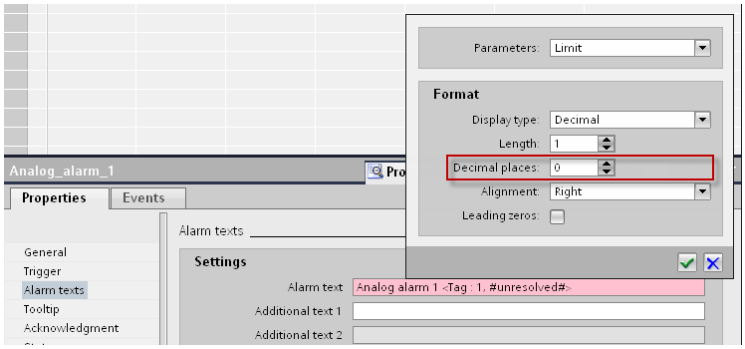
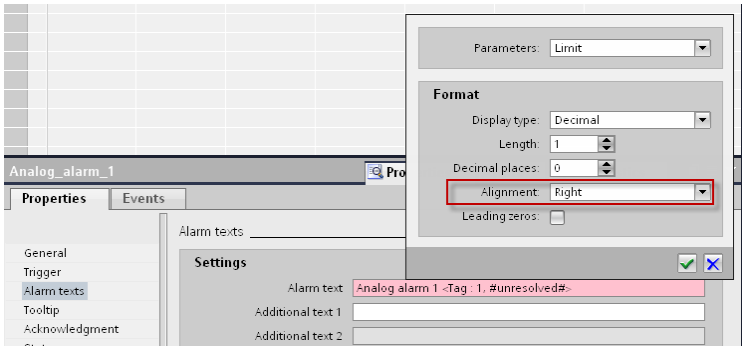
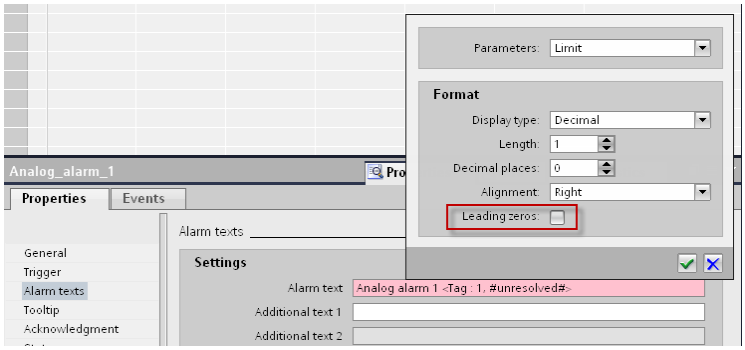
No.	Action
6.	Under “Format > Length”, please select the number of characters for the display of the parameter.  **Note** Choose the length in such a way that all the required characters of the parameters can be displayed.
7.	Under "Format > Decimal places”, select the number of decimal places for the parameter. 
8.	Under “Format > Alignment”, set the alignment of the output box. 
9.	Optionally, you can activate "Format > Leading zeros”. 

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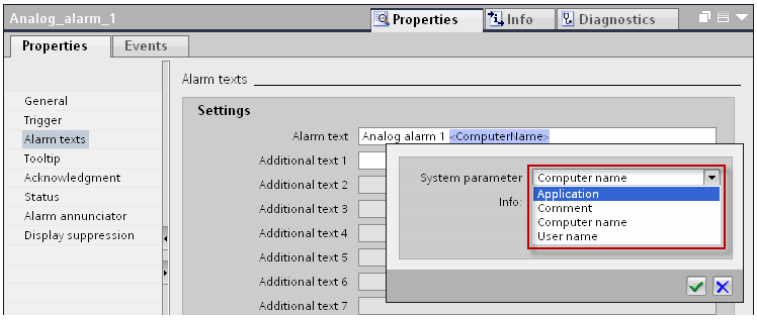
No.	Action
10.	Confirm the setting by clicking on the symbol.
11.	The configuration of the parameter field for analog alarms is now complete.

System parameters (application, user name, computer name, comment)

No.	Action
12.	**Inserting system parameters** Open the drop-down list under “Parameters” and select a parameter.  • **“Application”:** Application – Application that triggers the alarm. • **“User name:”** Name of the logged on user. • **“Computer name:”** Name of the computer used by the user. • **“Comment:”** The comment to an alarm entered by the user.
13.	Confirm the setting by clicking on the symbol.
14.	The configuration of the parameter field for analog alarms is now complete.

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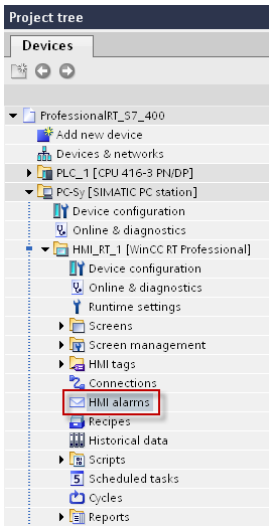
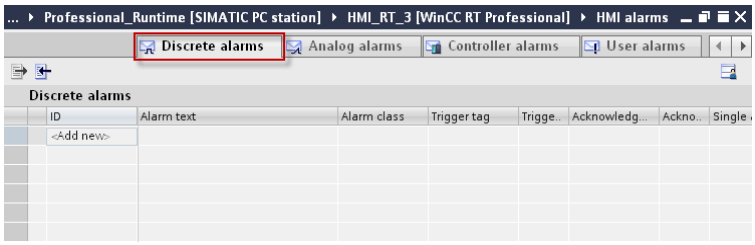
4.1.2 Configuration of discrete alarms

General configuration of discrete alarms

For the configuration of discrete alarms in WinCC Professional, please proceed as follows:

Table 4-9

No.	Action
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms” 
2.	Open the tab “Discrete alarms”.  In the table, double-click on “<Add new>” to create a discrete alarm.

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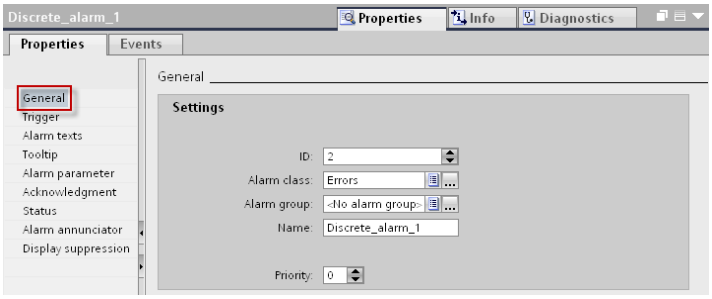
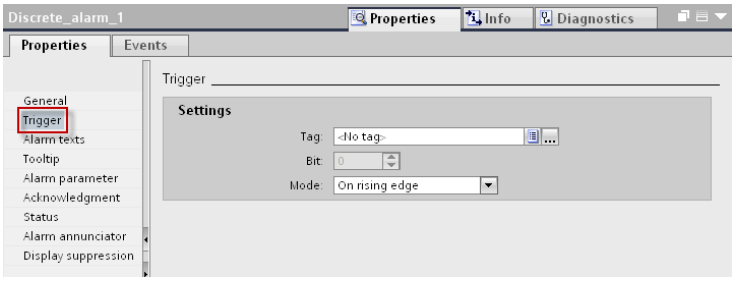
No.	Action
3.	Select the discrete alarm you just created and in the inspector window open the tab “Properties > Properties > General”.  • Under “ID”, please select an alarm number for the identification of this alarm. • Under “Alarm class”, please select an alarm class for the discrete alarm. In Chapter 4.4 you will find more detailed information about alarm classes. • If required, please choose an alarm group under “Alarm group” to which the discrete alarm will be assigned. In Chapter 4.5 you will find more detailed information about alarm groups. • Under “Priority”, choose a priority for the display of the alarm. The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. **Note** If you assign different priorities, the analog alarms will be sorted according to the priority and not the date.
4.	In the inspector window, please open the tab “Properties > Properties > Trigger”.  • Under “tag”, please create a new tag or choose an existing tag for triggering the discrete alarm. • Under “Mode”, select the trigger mode when the discrete alarm is to be triggered. - **“On rising edge”:** The trigger bit changes from 0 to 1. - **“On falling edge”:** The trigger bit changes from 1 to 0. **Note on trigger tags** • Use the data types “Bool”, “USInt” or “UDInt” for the trigger tags. • Only use the tag for triggering the alarm for triggering this alarm. • Use every bit of a trigger tag for only one alarm.

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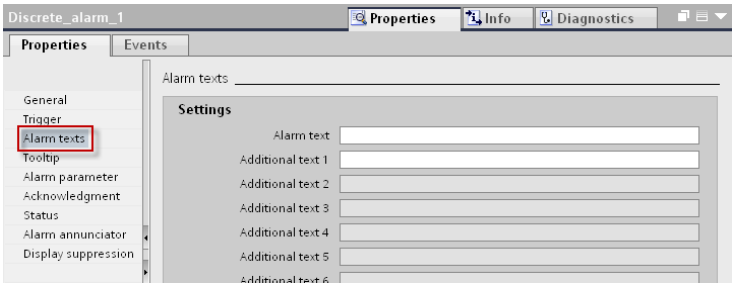
No.	Action
5.	In the inspector window, please open the tab “Properties > Properties > Alarm text”.  • Under “Alarm text” please enter the message text in the discrete alarm, for example “Discrete Alarm 1” • Optionally, you can enter more texts for the discrete alarm under “Additional text”. The additional texts can be displayed in a separate column in an alarm. **Note** Message texts depend on the language, and depending on your configuration, they can contain up to 255 characters.
6.	The configuration of the discrete alarm is now complete. The alarm will now be triggered after a change of signals of the trigger tag.

Display of the discrete alarm in runtime

If you want to display the discrete alarm, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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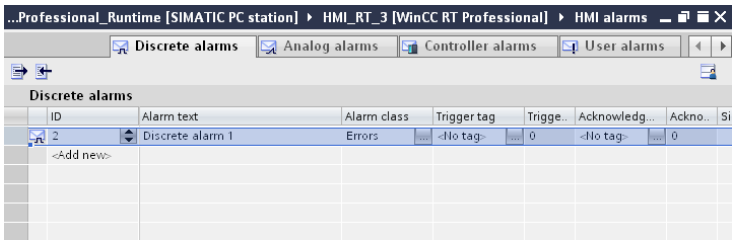
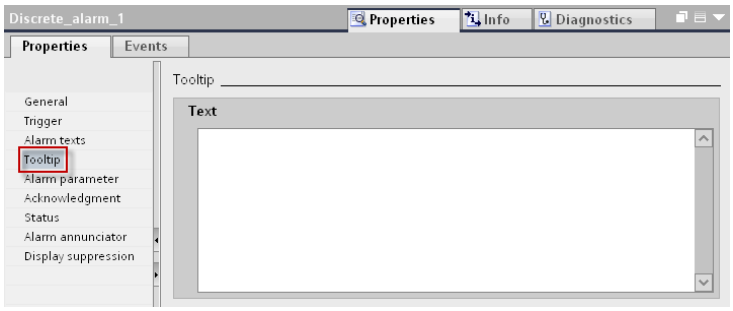
Optional settings for discrete alarms

Creating a tooltip

With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.

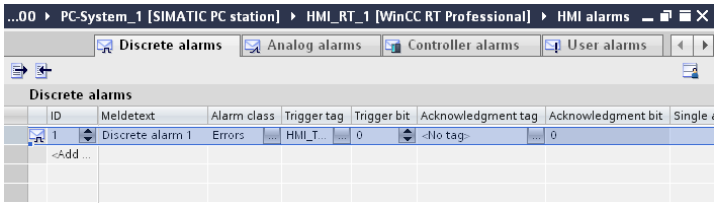
Table 4-10

No.	Action
1.	Open the discrete alarms in the tab “Discrete alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Tooltip”.  • Under “Text”, please enter the text which is to appear as a tooltip to this discrete alarm. By means of the respective button in the message display, you can call the tooltip to this message. **Note** The tooltip must not be longer than max. 320 characters.
3.	The configuration of the tooltip for discrete alarm is now complete.

Evaluating the acknowledgement of the discrete alarm in the PLC

The acknowledgement of the discrete alarm can be polled by a tag in the PLC.

Table 4-11

No.	Action
1.	Open the discrete alarms in the tab “Discrete alarms”. 

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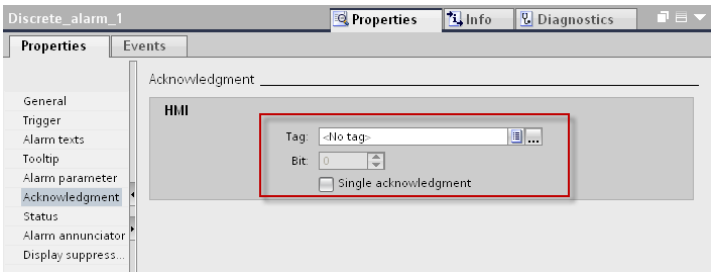
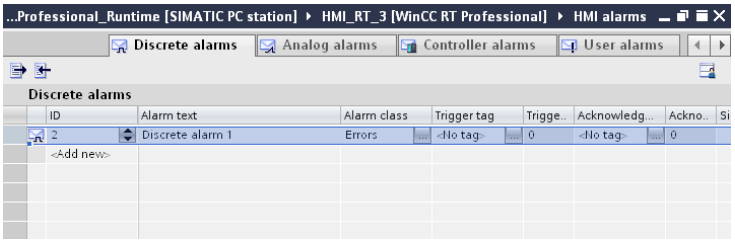
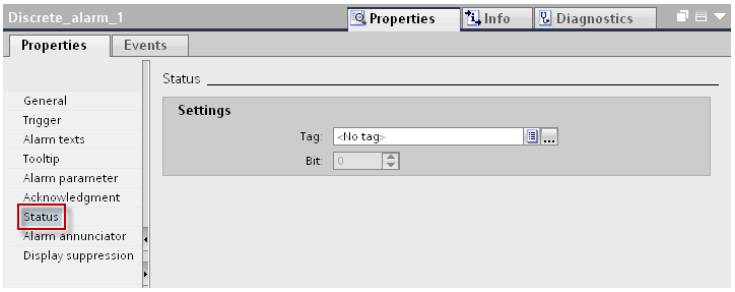
2.	In the inspector window, please open the tab “Properties > Properties > Acknowledgement”.  • Under “HMI > Tag”, please choose an existing tag or create a new tag, where the information can be stored that the discrete alarm has been acknowledged. • Under “HMI > Bit”, please select the bit that will be set in the selected tag if a discrete alarm has been acknowledged. • If required, activate the option box “Singe acknowledgement” **Note** The control panel and the PLC have only read access to the storage area of the acknowledgement tag.
3.	The configuration of the acknowledgement poll is now complete.

You will find more detailed information concerning the acknowledgement concept in WinCC Professional in Chapter 4.6.

Query the status

Under “Status” the status of an alarm can be saved in a status tag.

Table 4-12

No.	Action
1.	Open the discrete alarms in the tab “Discrete alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Status”.  • Under “Tag”, select a tag and the respective bit, or create a new tag where the status of the alarm/alarm group is to be saved.

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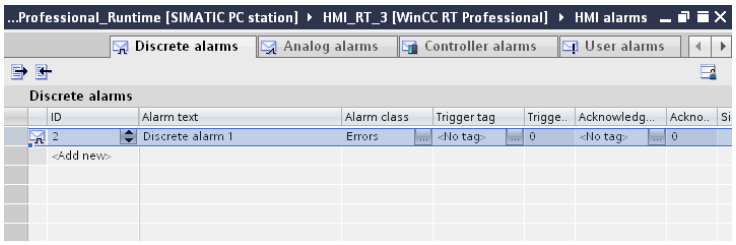
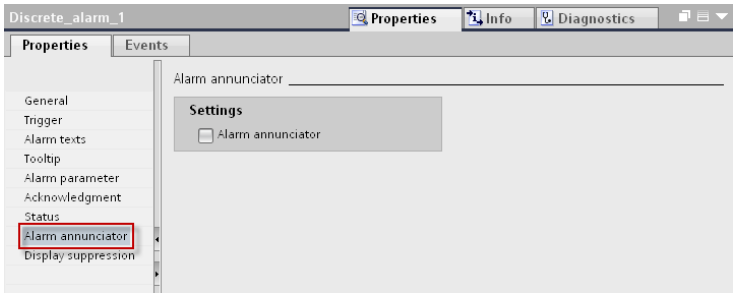
No.	Action
3.	The configuration of the status tag for the discrete alarm is now complete.

Alarm annunciator

By activating the “Alarm annunciator” an alarm can be annunciated by optical or acoustic signals in addition to the alarm display.

Table 4-13

No.	Action
1.	Open the discrete alarms in the tab “Discrete alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm annunciator”.  • Under “Alarm annunciator”, activate the option box “Alarm annunciator”
3.	The configuration of the alarm annunciator for the discrete alarm is now complete.

You will find more detailed information on the Alarm annunciator in Chapter 4.6.4.

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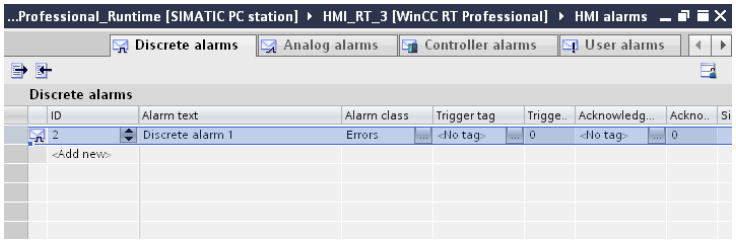
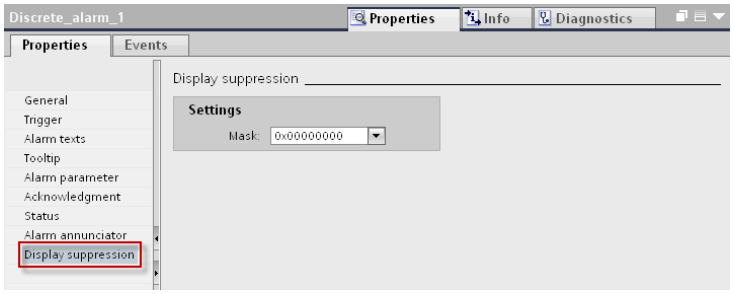
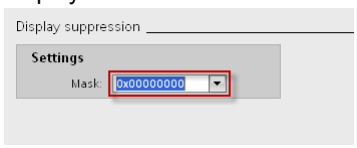
Suppressing the display

By activating the Display suppression, it is possible to suppress alarms depending on the status of the system.

Table 4-14

No.	Action
1.	Open the discrete alarms in the tab “Discrete alarms”.  **Note** If you want to use the display suppression, the respective alarm must be assigned to an alarm group.
2.	In the inspector window, please open the tab “Properties > Properties > Display suppression”. 
3.	Under “Mask”, please select a status from the drop-down list for which you want to suppress the display. 
4.	The configuration of the display suppression for the discrete alarm is now complete.

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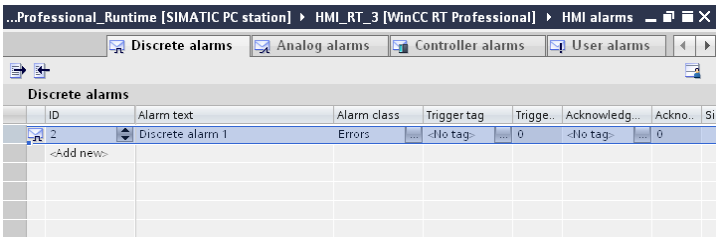
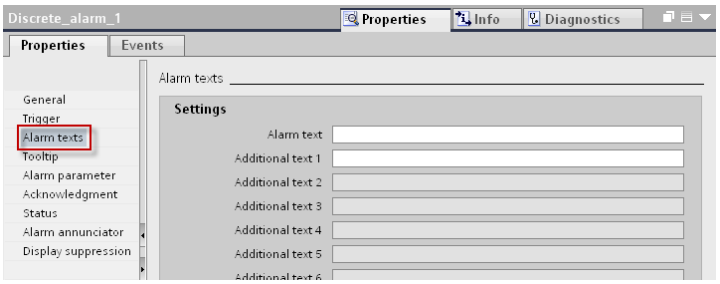
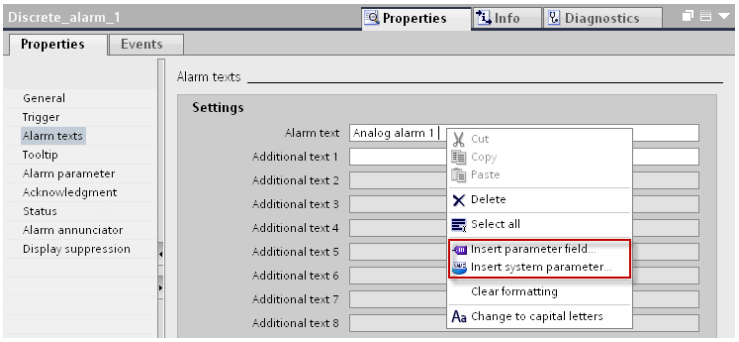
Output of a dynamic parameter in the alarm text

When a discrete alarm comes, it is possible to display process values and system parameters in the output box.

Table 4-15

No.	Action
1.	Open the discrete alarms in the tab “Discrete alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm text”.  • Click the right mouse button in the entry box “Alarm text” or place the cursor in the alarm text and click on the right mouse button. Then the context menu will open up.
3.	Select “Insert parameter field” or “insert system parameter” from the context menu.  • Then a dialog for the further configuration of the dynamic parameter (tag) opens up. Please continue with the section on the chosen tag.

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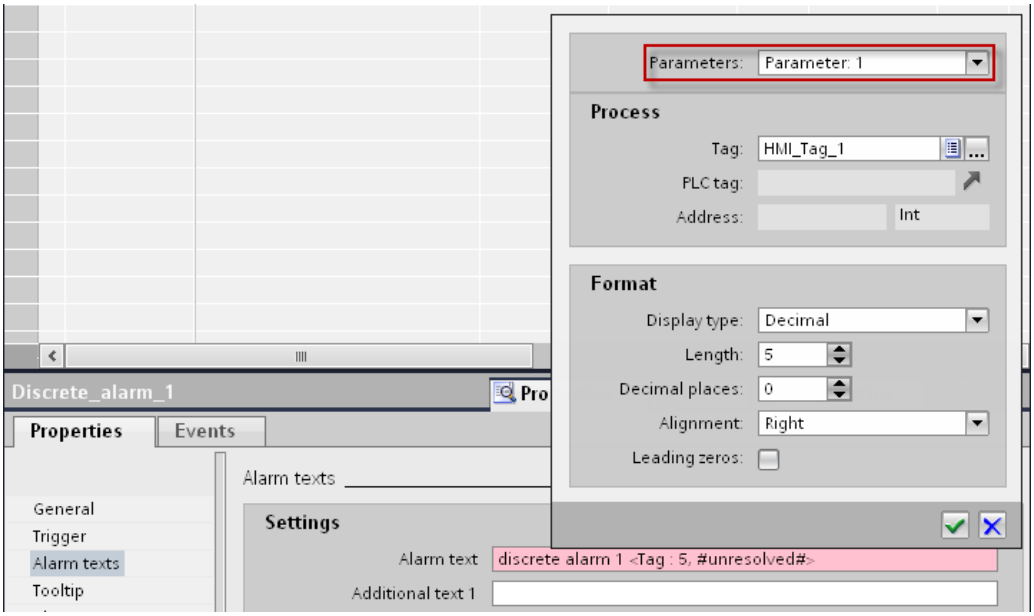
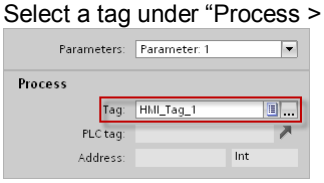
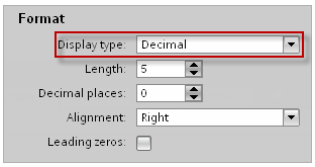
Parameter field (tag)

No.	Action
4.	**Inserting a parameter field (tag)** Open the drop-down list under “Parameters” and select a parameter (for example Parameter 1).  **Note** Alternatively, you can assign tags to parameters beforehand under “Properties > Properties -> Alarm parameters”.
5.	Select a tag under “Process > Tag” or create a new tag.  **Note** Alternatively, you can assign tags to parameters beforehand under “Properties > Properties -> Alarm parameters”.
6.	Select a display type under “Format > Display type” for the parameter you selected. 

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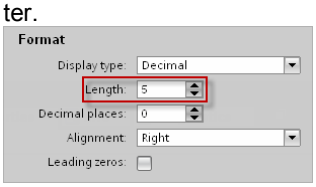
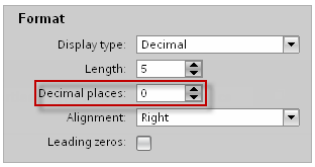
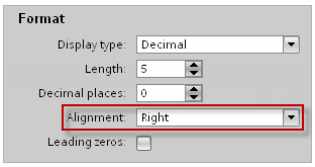
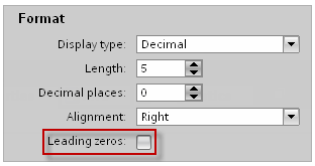
No.	Action
7.	Under “Format > Length”, please select the number of characters for the display of the parameter.  **Note** Choose the length in such a way that all the required characters of the parameters can be displayed.
8.	Under "Format > Decimal places”, select the number of decimal places for the parameter. 
9.	Under “Format > Alignment”, set the alignment of the output box. 
10.	Optionally, you can activate "Format > Leading zeros”. 
11.	Confirm the setting by clicking on the symbol.
12.	The configuration of the parameter field for discrete alarms is now complete.

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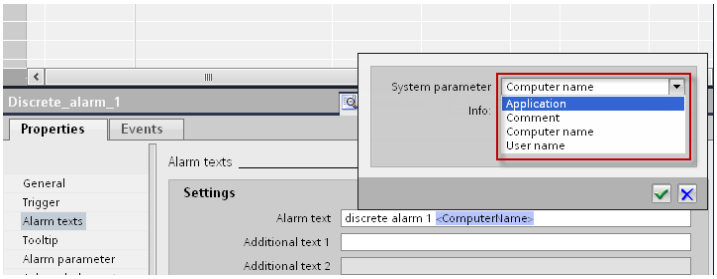
System parameters

No.	Action
13.	**Inserting system parameters** Open the drop-down list under “Parameters” and select a parameter.  • “Application”: Application – Application that triggers the alarm. • “User name:” Name of the logged on user. • “Computer name:” Name of the computer used by the user. • “Comment:” The comment to an alarm entered by the user.
14.	Confirm the setting by clicking on the symbol.
15.	The configuration of the system parameter for discrete alarms is now complete.

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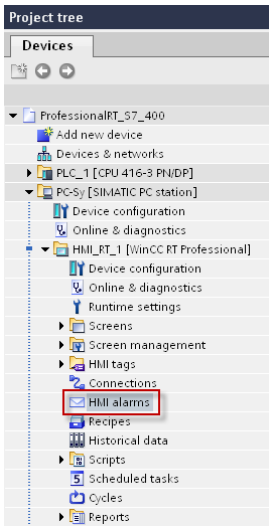
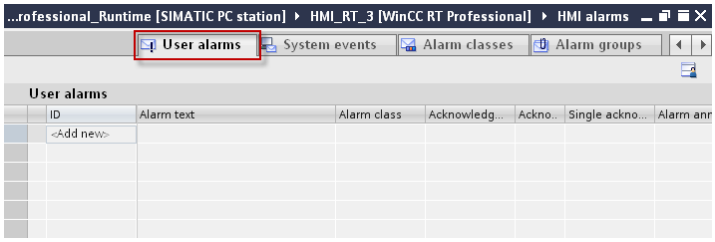
4.1.3 Configuration of user alarms

General configuration of user alarms

For the configuration of user alarms in WinCC Professional, please proceed as follows:

Table 4-16

No.	Action
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms” 
2.	Open the tab “User alarms”.  In the table, double-click on “<Add new>” to create a user alarm.

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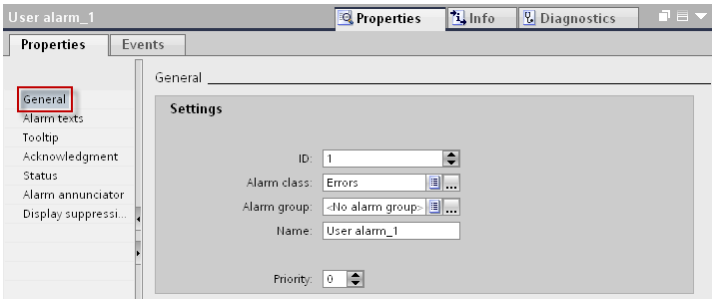
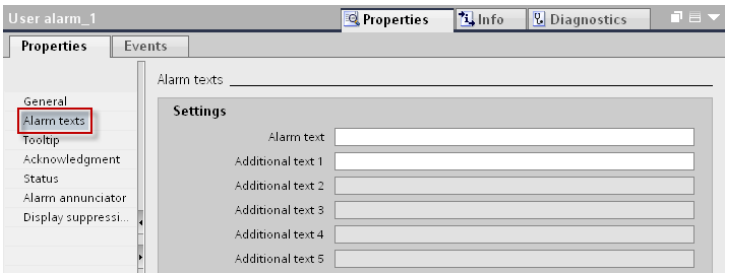
No.	Action
3.	Select the user alarm you just created and in the inspector window open the tab “Properties > Properties > General".  • Under “ID”, please select an alarm number for the identification of this alarm. • Under “Alarm class”, please select an alarm class for the user alarm. In Chapter 4.4 you will find more detailed information about alarm classes. • If required, please choose an alarm group under “Alarm group” to which the user alarm will be assigned. In Chapter 4.5 you will find more detailed information about alarm groups. • Under “Priority”, choose a priority for the display of the alarm. The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. **Note** If you assign different priorities, the user alarms will be sorted according to the priority and not the date.
4.	In the inspector window, please open the tab “Properties > Properties > Alarm texts”.  • Under “Alarm text” please enter the alarm text in the user alarm, for example “User Alarm 1” • Optionally, you can enter more texts for the user alarm under “Additional text”. The additional texts can be displayed in a separate column in an alarm. **Note** Message texts depend on the language, and depending on your configuration, they can contain up to 255 characters.
5.	The configuration of the user alarm is now complete.

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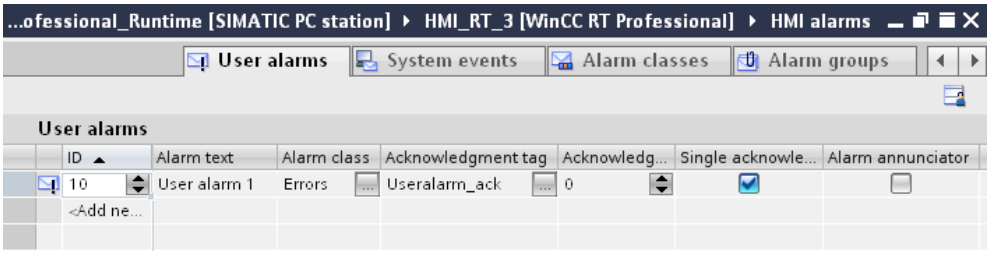
Triggering a user alarm

A user alarm is triggered by means of a script and the respective ID belonging to the user alarm.
The following table describes the procedure with a user alarm that has already been created.

Prerequisite:

- a user alarm must already have been created

Figure 4-1



- a button created in any image if the WinCC Professional project

Table 4-17

No.	Action
1.	Open the image where the button is configured.
2.	Click on the button and hen open the tab “Properties > Events”.

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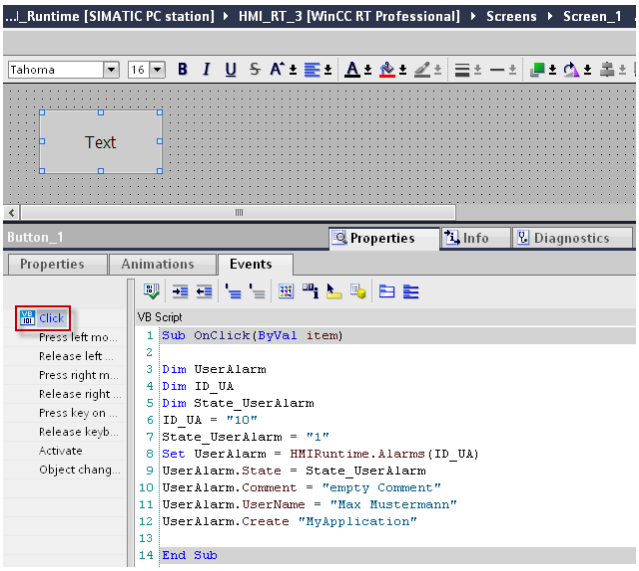
No.	Action
3.	Configure the following VB script to the event “Click”.  Sub OnClick(ByVal item) Dim UserAlarm Dim ID_UA Dim State_UserAlarm ID_UA = "10" State_UserAlarm = "1" Set UserAlarm = HMIRuntime.Alarms(ID_UA) UserAlarm.State = State_UserAlarm UserAlarm.Comment = "empty Comment" UserAlarm.UserName = "Max Mustermann" UserAlarm.Create "MyApplication" End Sub • The user alarm used has the ID “10” in this example. See prerequisite > a user alarm must already have been created.
4.	The configuration for triggering the user alarm is now complete. The alarm will be triggered in runtime by clicking on the button.

Display of the user alarm in runtime

If you want to display the user alarms, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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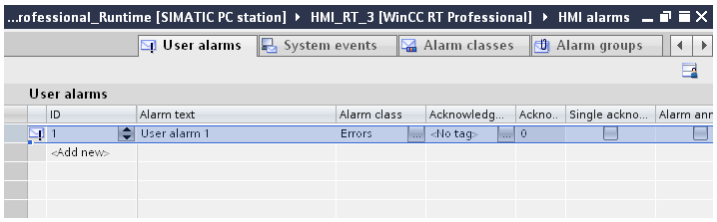
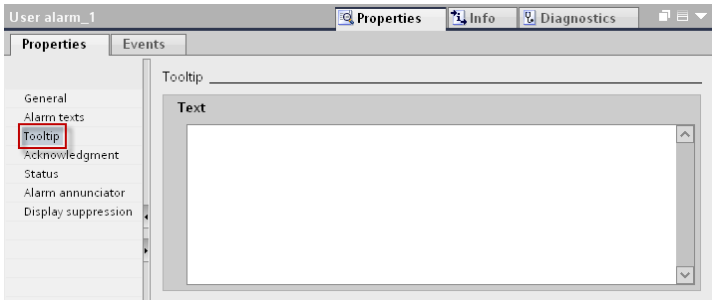
Optional settings for user alarms

Creating a tooltip

With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.

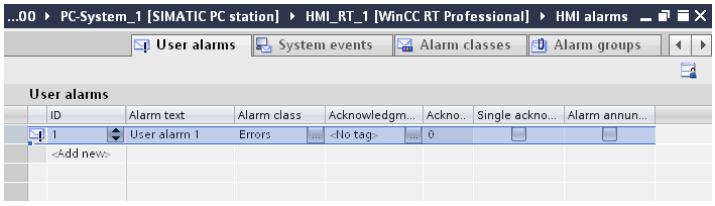
Table 4-18

No.	Action	Screens
1.	Open the user alarms in the tab “User alarms”.	
2.	In the inspector window, please open the tab “Properties > Properties > Tooltip”.	
	• Under “Text”, please enter the text which is to appear as a tooltip to this user alarm. By means of the respective button in the message display, you can call the tooltip to this message. **Note** The tooltip must not be longer than max. 320 characters.	
3.	The configuration of the tooltip for the user alarm is now complete.	

Evaluating the acknowledgement of the user alarm in the PLC

The acknowledgement of the user alarm can be polled by a tag in the PLC.

Table 4-19

No.	Action
1.	Open the discrete alarms in the tab “User alarms”. 

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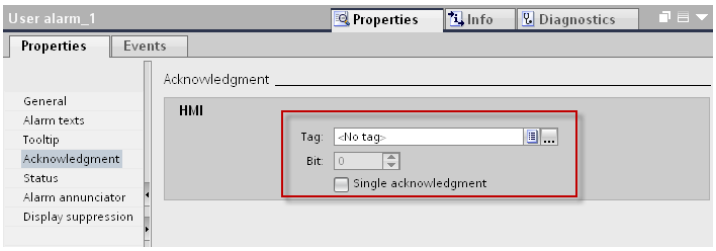
2.	In the inspector window, please open the tab “Properties > Properties > Acknowledgement”.  • Under “HMI > Tag”, please choose an existing tag or create a new tag, where the information can be stored that the discrete alarm has been acknowledged. • Under “HMI > Bit”, please select the bit that will be set in the selected tag if a discrete alarm has been acknowledged. • If required, activate the option box “Singe acknowledgement” **Note** The control panel and the PLC have only read access to the storage area of the acknowledgement tag.
3.	The configuration of the acknowledgement poll is now complete.

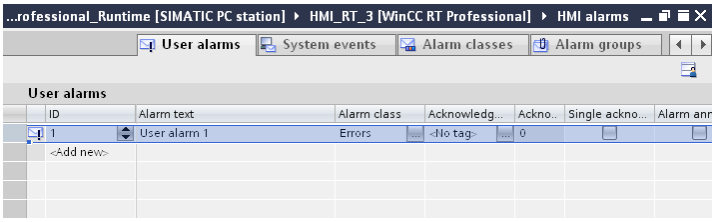
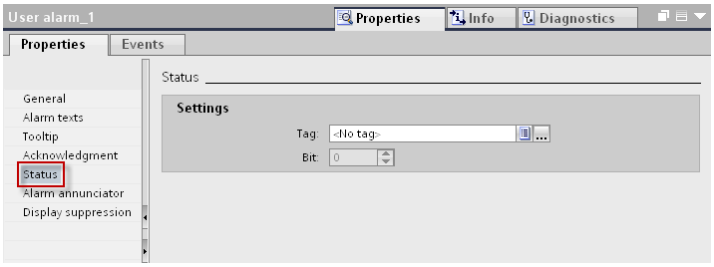
You will find more detailed information concerning the acknowledgement concept in WinCC Professional in Chapter 4.6.

Query the status

Under “Status” the status of an alarm can be saved in a status tag.

Under “Status” the status of an alarm can be saved in a status tag.

Table 4-20

No.	Action
1.	Open the user alarms in the tab “User alarm”. 
2.	In the inspector window, please open the tab “Properties > Properties > Status”.  • Under “Tag”, select a tag and the respective bit, or create a new tag where the status of the alarm/alarm group is to be saved.
3.	The configuration of the status tag for the user alarm is now complete.

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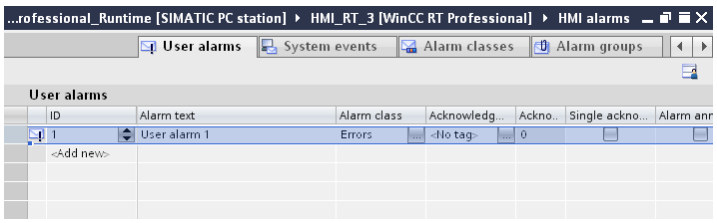
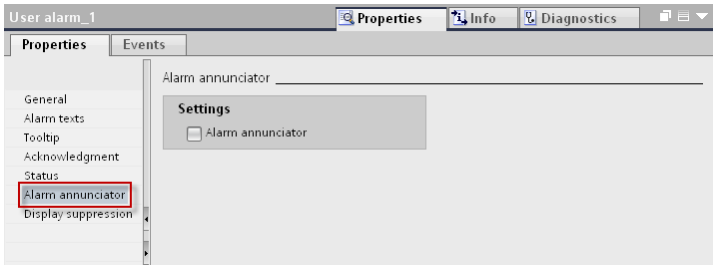
Alarm annunciator

By activating the “Alarm annunciator” an alarm can be annunciated by optical or acoustic signals in addition to the alarm display.

Table 4-21

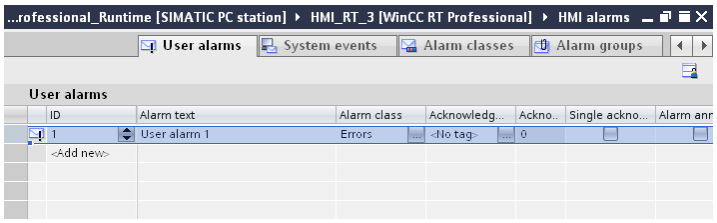
No.	Action
1.	Open the user alarms in the tab “User alarm”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm annunciator”.  • Under “Alarm annunciator”, activate the option box “Alarm annunciator”
3.	The configuration of the alarm annunciator for the user alarm is now complete.

You will find more detailed information on the Alarm annunciator in Chapter 4.6.4.

Suppressing the display

By activating the Display suppression, it is possible to suppress alarms depending on the status of the system.

Table 4-22

No.	Action
1.	Open the user alarms in the tab “User alarm”.  **Note** If you want to use the display suppression, the respective alarm must be assigned to an alarm group.

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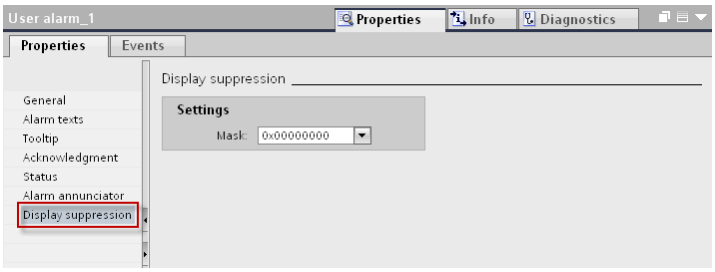
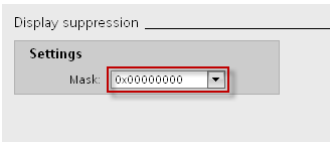
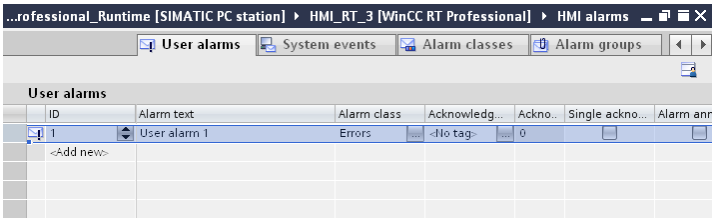
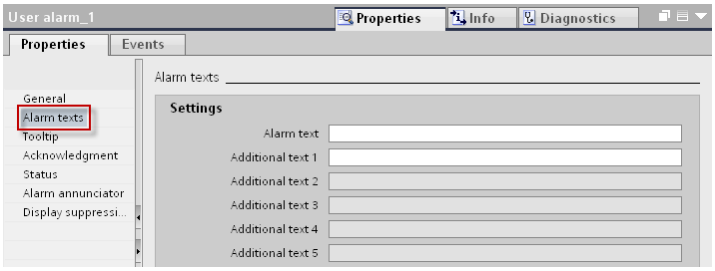
2.	In the inspector window, please open the tab “Properties > Properties > Display suppression”. 
3.	Under “Mask”, please select a status from the drop-down list for which you want to suppress the display. 
4.	The configuration of the display suppression for the user alarm is now complete.

Output of system parameters in the alarm text

When a user alarm comes, it is possible to display system parameters within the alarm text in an output box.

Table 4-23

No.	Action
1.	Open the discrete alarms in the tab “User alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm text”.  • Click the right mouse button in the entry box “Alarm text” or place the cursor in the alarm text and click on the right mouse button. Then the context menu will open up.

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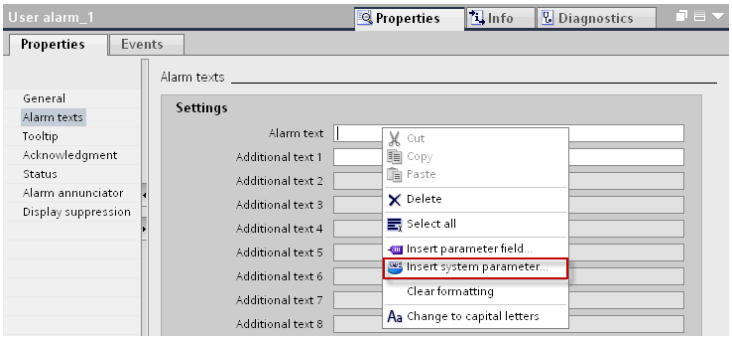
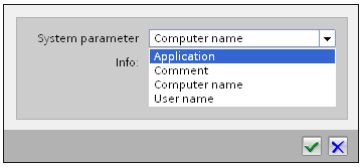
No.	Action
3.	Select “Insert system parameter” from the context menu.  • Then a dialog for the further configuration of the dynamic parameter (tag) opens up.
4.	Open the drop-down list under “Parameters” and select a parameter.  • “**Application**”: Application – Application that triggers the alarm. • “**User name**:” Name of the logged on user. • “**Computer name**:” Name of the computer used by the user. • “**Comment**:” The comment to an alarm entered by the user.
5.	Confirm the setting by clicking on the symbol.
6.	The configuration of the system parameter for a user alarm is now complete.

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4.2 Configuration of system-defined alarms

4.2.1 Configuration of system alarms

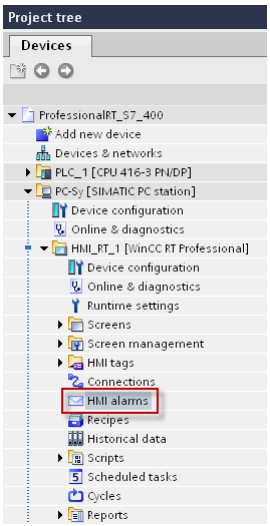
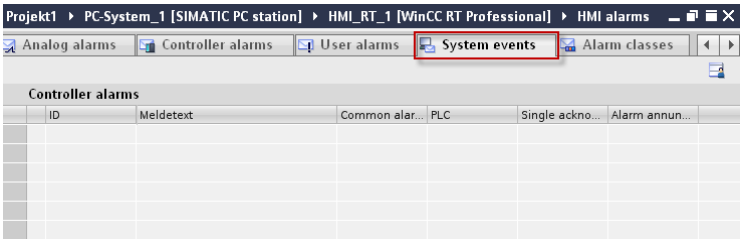
The following chapter describes how to do the following in WinCC professional:

- importing the system alarms
- changing message texts of the system alarms and inserting additional texts
- adding tooltips to the system alarms
- configuring the alarm annunciator for a system alarm

Importing system alarms

Importing system alarms is only necessary for projects that were newly created, or where the system alarms have not been imported.

Table 4-24

No.	Action
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms” 
2.	Open the tab “System alarms”. 

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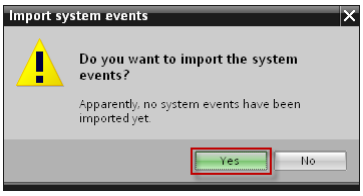
No.	Action
3.	Confirm the dialog (see figure) that appears with “OK”.  • The system alarms are then imported into your project.
4.	The system alarms are now imported into your project.

Display of the analog alarm in runtime

If you want to display the system alarms, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

Changing message texts of the system alarms

The message texts of the system alarms can be adapted or changed if required. The respective message numbers cannot be changed.

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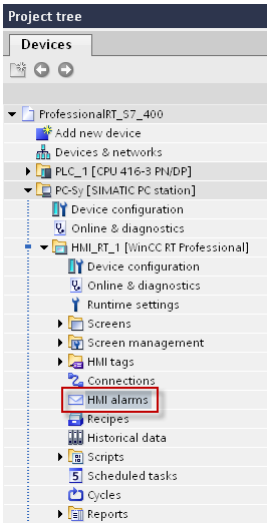
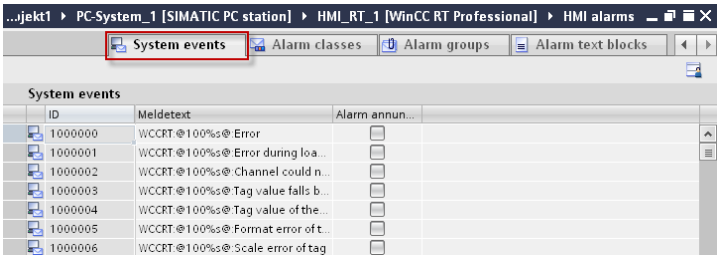
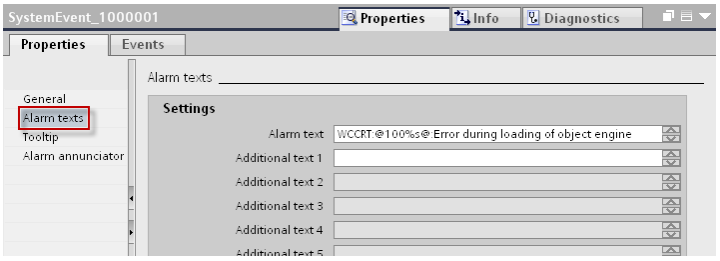
Table 4-25

No.	Action
1.	In the project navigation under the folder of the control panel you created open the “HMI alarms” 
2.	Open the tab “System alarms”.  • Select the system alarm for which you want to change the message text.
3.	In the inspector window, please open the tab “Properties > Properties > Alarm text”.  • Please change the message text of the system alarm under “Alarm text”. • Optionally, you can add more texts concerning the system alarm under “Additional texts”. **Note** Never delete the wildcards (for example @100%s@ in the system alarms).
4.	The changing of the message text for the system alarm is now complete.

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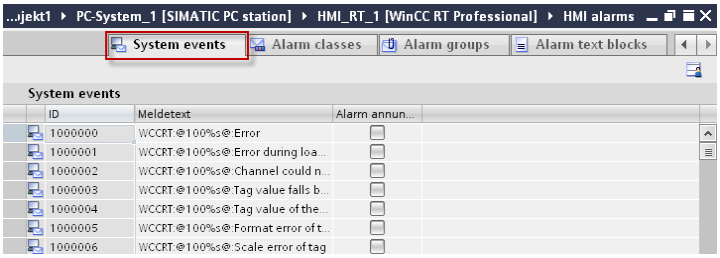
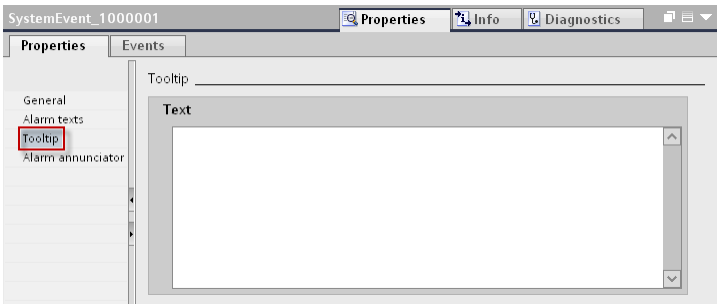
Adding tooltips

With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.

Table 4-26

No.	Action
1.	Open the system alarms in the tab “System alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Tooltip”.  • Under “Text”, please enter the text which is to appear as a tooltip to this system alarm. By means of the respective button in the message display, you can call the tooltip to this message. **Note** The tooltip must not be longer than max. 320 characters.
3.	The configuration of the tooltip for the system alarm is now complete.

Alarm annunciator

By activating the “Alarm annunciator” an alarm can be annunciated by optical or acoustic signals in addition to the alarm display.

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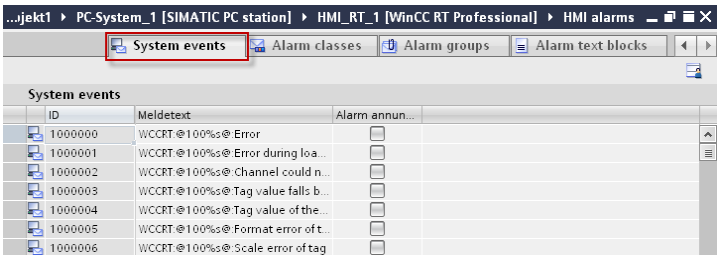
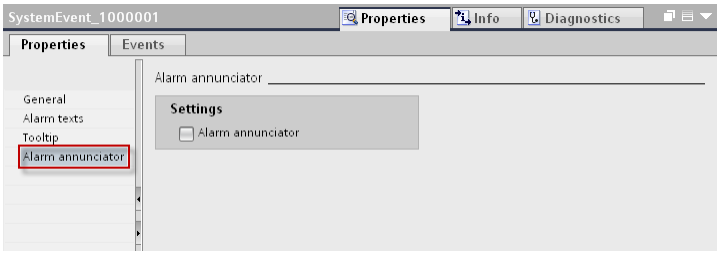
Table 4-27

No.	Action
1.	Open the system alarms in the tab “System alarms”. 
2.	In the inspector window, please open the tab “Properties > Properties > Alarm annunciator”.  • Under “Alarm annunciator”, activate the option box “Alarm annunciator”
3.	The configuration of the alarm annunciator for the system alarm is now complete.

You will find more detailed information on the Alarm annunciator in Chapter 4.6.4.

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4.2.2 Configuration of CPU system diagnostic alarms

The following chapter describes the configuration of the display of system diagnostic alarms of a CPU in WinCC Runtime Professional using the following components:

- CPU 416-3 PN/DP
- Diagnostic status DB 127 (RSE_DIAGNOSTIC_STATUS_DB)
- WinCC Runtime Professional (PC station)

System diagnostic data blocks

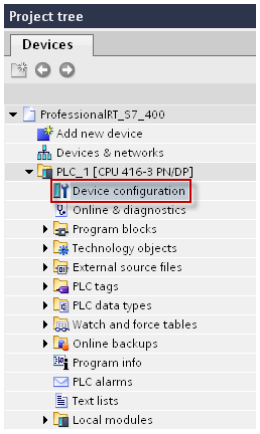
You will find more detailed information concerning the diagnostic blocks in the Online help for STEP 7 Professional.

Table 4-28

Block	Block name	Block number	Functional scope
Diagnostic status DB	RSE_DIAGNOSTIC_STATUS_DB	127	Display the system status of a configured component and the subordinate components.
PROFINET IO-DB	RSE_PROFINET_IO_DB	126	Display the status of all the configured IO devices, optionally: display exact status of a device
PROFIBUS DP-DB	RSE_PROFIBUS_DP_DB	125	Display the status of all configured stations of the current DP master system and the status of the DP slave.

Settings in STEP 7 Professional

Table 4-29

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Device configuration”. 
2.	In the graphic view of the device, mark the CPU on the module carrier.

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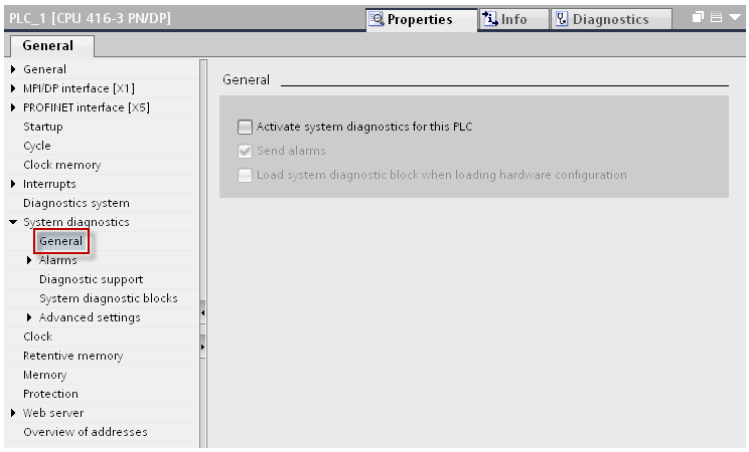
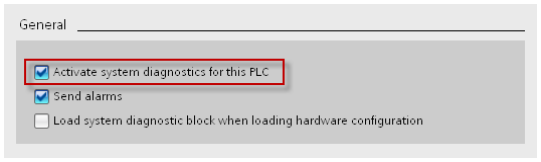
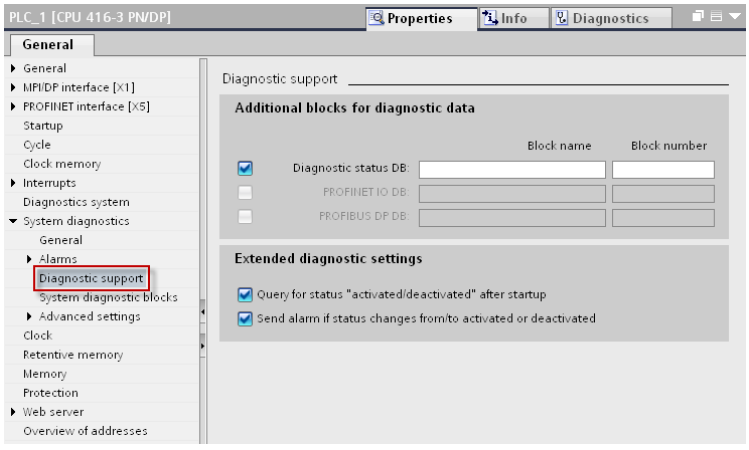
No.	Action
3.	In the inspector window, please open the tab “Properties > Properties > System diagnostics” > “General”. 
4.	Activate the option box “Activate system diagnostics for this PLC”. The option box “Send alarms” is activated by default. If this option is deactivated, it must be activated  **Note** The option box “Load system diagnostic block when loading hardware configuration” cannot be activated, since it is already activated by default.
5.	In the inspector window, please open the tab “Properties > Properties > System diagnostics” > “Diagnostic support”.  • Check whether the option box “Diagnostic status DB” is activated. If the option box is deactivated, active the option box.

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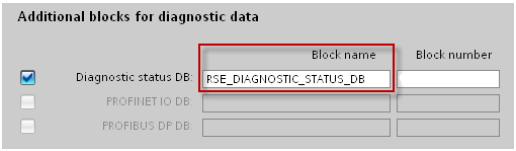
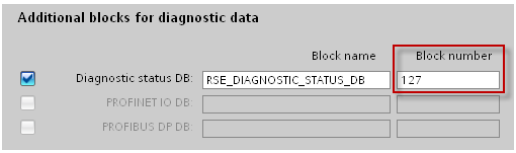
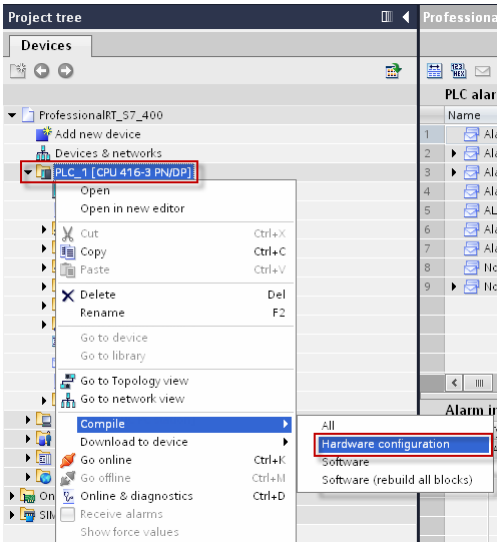
No.	Action
6.	In the entry box „Block name“, enter the name of the status DB you want to use for the diagnostic function.  **Note** You can also assign a different name for the block, if the name is not being used. The status DBs “PROFINET IO-DB” and “PROFIBUS DP-DB” only have a limited diagnostic functionality. Therefore, the “Diagnostic status DB” is to be preferred.
7.	In the entry box “Block number”, enter the respective data block number of the status DB.  **Note** You can also assign a different number for the block, if the number is not being used.
8.	Right-click on the CPU in the project navigation.  • Select “Compile > Hardware configuration” in the context menu. After the compilation of the hardware, the following system blocks are created: • system diagnostics (in this example the DB 127) • diagnostic FB (pre-set: FB 49) • Instance DB for the diagnostic FB (pre-set: DB 49) • global DB (pre-set: DB 50) • diagnostic FB (pre-set: FC 49
9.	Transfer the configuration into the PLC. The necessary settings in the STEP 7 Professional are now complete.

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Display of the CPU system diagnostic alarms in runtime

If you want to display the CPU system alarm, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3 Configuration of PLC alarms

Message blocks

The following table shows all the message blocks supported by WinCC Basic / Comfort / Advanced.

Note The use of the message blocks depends on the control panel used. In Chapter 2.4 you will find an overview of the availability of message blocks / message procedures.

Table 4-30

Message block	SFB / SFC	Data type	Properties	Characteristic Features
ALARM_S	SFC 18	C_Alarm_s	1 channel, no acknowledgement, up to 1 associated value	Every call and signal change to the previous block call, creates an alarm
ALARM_SQ	SFC 17	C_Alarm_s	1 channel, acknowledgement possible, up to 1 associated value	like ALARM_S
ALARM_D	SFC 108	C_Alarm_s	1 channel, no acknowledgement possible, up to 1 associated value	like ALARM_S
ALARM_DQ	SFC 107	C_Alarm_s	1 channel, acknowledgement possible, up to 1 associated value	like ALARM_S
ALARM	SFB 33	C_Alarm	1 channel, acknowledgement possible, up to 10 associated values	Sends one message at each coming or going edge
ALARM_8	SFB 34	C_Alarm_8	8 channels, acknowledgement possible, no associated values	Sends one message or more messages at each coming or going edge
ALARM_8P	SFB 35	C_Alarm_8p	8 channels, acknowledgement possible, up to 10 associated values	Like ALARM.
NOTIFY	SFB 36	C_Notify	1 channel, no acknowledgement possible, up to 10 associated values	Like ALARM.
NOTIFY_8P	SFB 31	C_Notify_8p	8 channels, no acknowledgement possible, up to 10 associated values	Like ALARM.

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4.3.1 Configuration of ALARM_S alarms

An ALARM_S is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_S which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_S message block imply an acknowledgement. A subsequent acknowledgement is not necessary.

Parameters of the ALARM_S message block

The following table shows all the parameters of the ALARM_S message block.

Table 4-31

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

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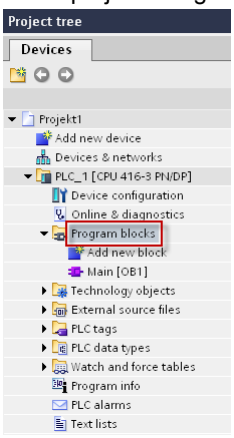
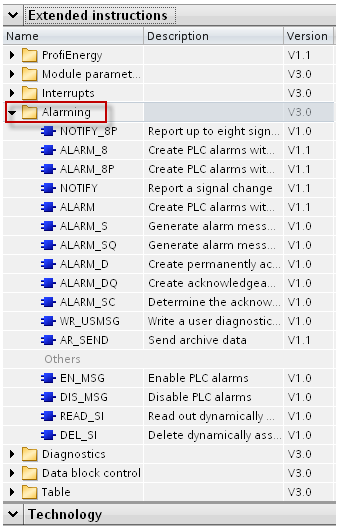
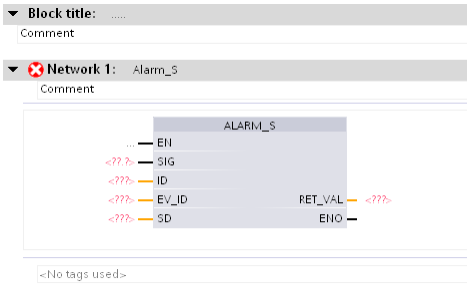
Configuration in STEP 7 Professional

For the configuration of an ALARM_S message STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-32

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM_S message or create a new function block and open it.
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 
4.	Drag & drop the message block “ALARM_S” into an empty network of your FB. 

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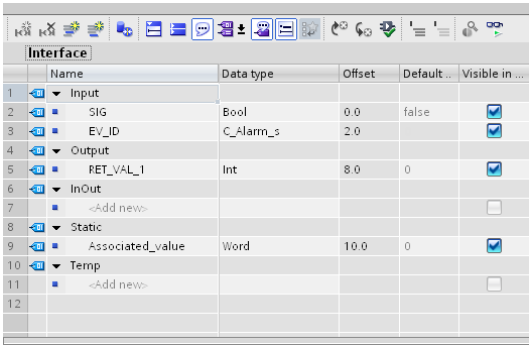
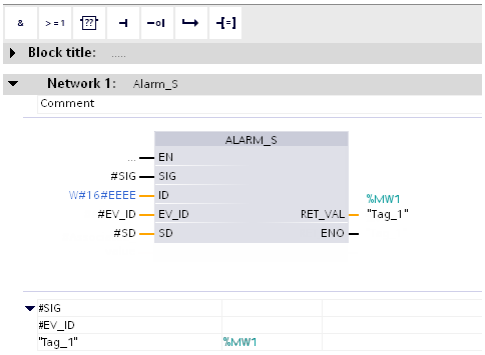
No.	Action
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter ”Parameters of the ALARM_S message block“.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM_S message in the function block is now complete.

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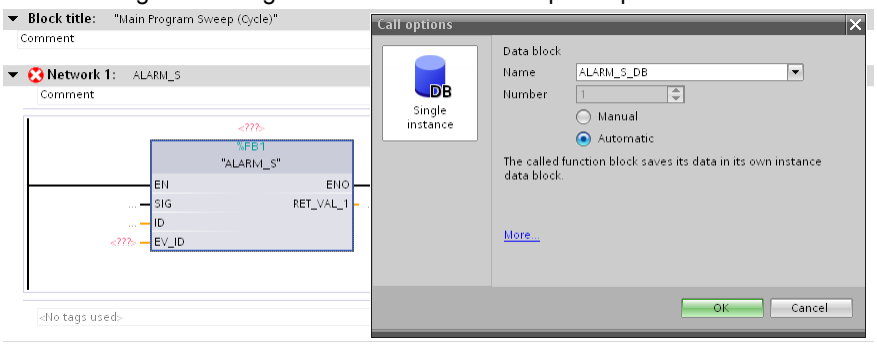
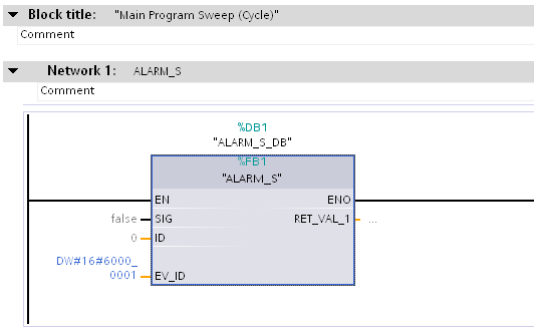
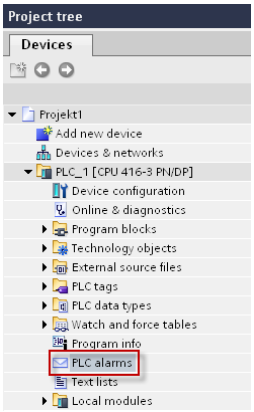
Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the function block where you configured the ALARM_S message block in this organization block (e.g. OB1). Then a dialog for creating the instance data block opens up. 
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the ALARM_S message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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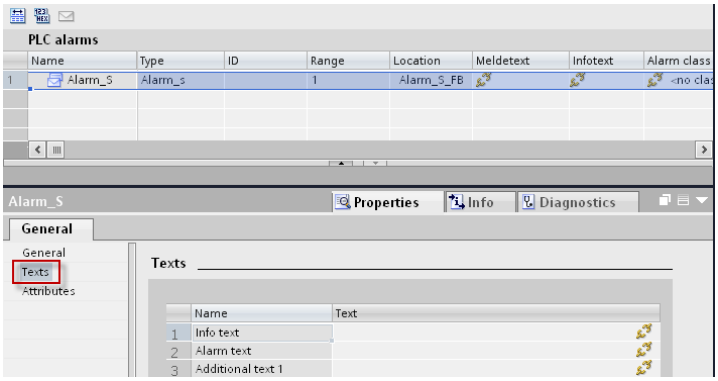
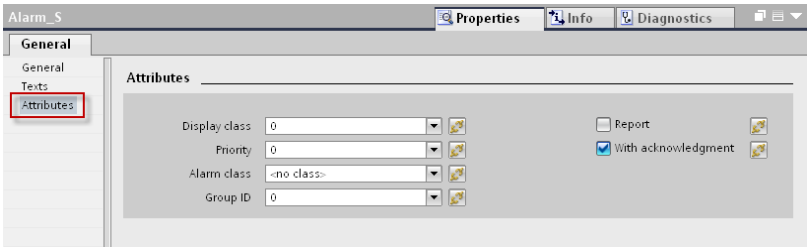
No.	Action
13.	Select the ALARM_S message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_S.” • Under “Priority”, choose a priority for the display of the ALARM_S.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_S. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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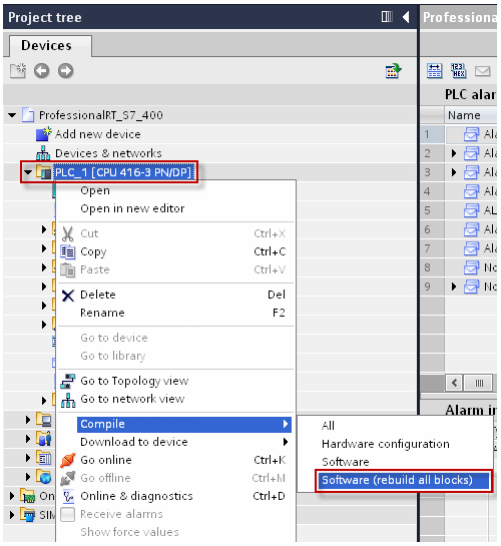
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the ALARM_S is now complete.

Displaying the Alarm_S in runtime

If you want to display the Alarm_S, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.2 Configuration of ALARM_SQ messages

An ALARM_SQ is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_SQ which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_SQ message block imply an acknowledgement. The alarm can be acknowledged on the control panel.

Parameters of the ALARM_SQ message block

The following table shows all the parameters of the ALARM_SQ message block.

Table 4-33

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

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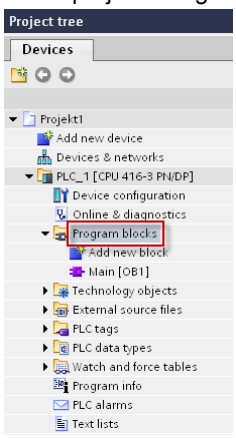
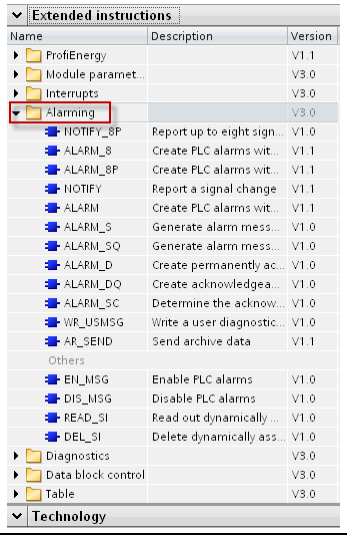
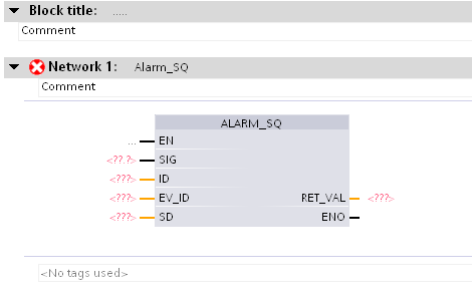
Configuration in STEP 7 Professional

For the configuration of an ALARM_SQ message STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-34

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM_SQ message or create a new function block and open it.
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 
4.	Drag & drop the message block “ALARM_SQ” into an empty network of your FB. 

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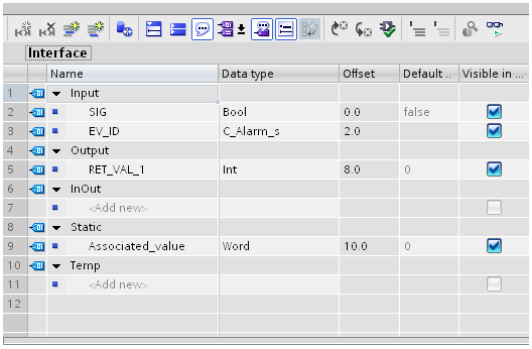
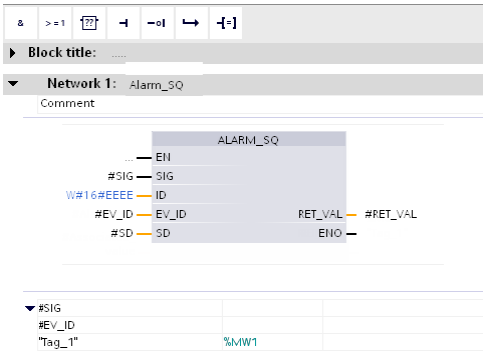
No.	Action
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter "Parameters of the ALARM_SQ message block".  Interface Name | Data type | Offset | Default .. | Visible in ... 1 Input 2 SIG | Bool | 0.0 | false 3 EV_ID | C_Alarm_s | 2.0 4 Output 5 RET_VAL_I | Int | 8.0 | 0 6 InOut 7 <Add new> 8 Static 9 Associated_value | Word | 10.0 | 0 10 Temp 11 <Add new> 12 **Note on the input "ID"** The input "ID" for the data channel of the alarm messages must be assigned with the value "W#16#EEEE". In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input "ID", enter the value "W#16#EEEE" as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value "W#16#EEEE" at the input "ID" of the message block.  Block title: Network 1: Alarm_SQ Comment ALARM_SQ EN #SIG — SIG W#16#EEEE — ID #EV_ID — EV_ID — RET_VAL — #RET_VAL #SD — SD — ENO #SIG #EV_ID "Tag_1" %MW1 **Note** In this sample configuration, the input "ID" is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM_SQ message in the function block is now complete.

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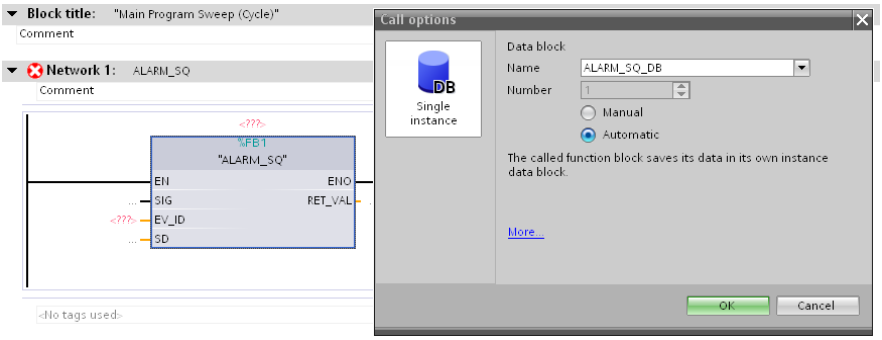
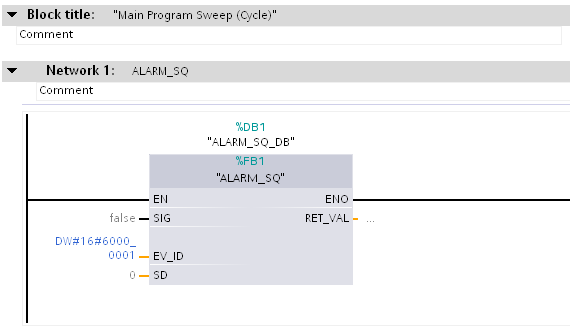
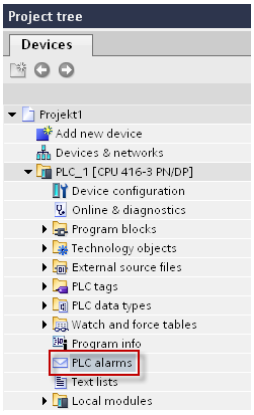
Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the ALARM_SQ message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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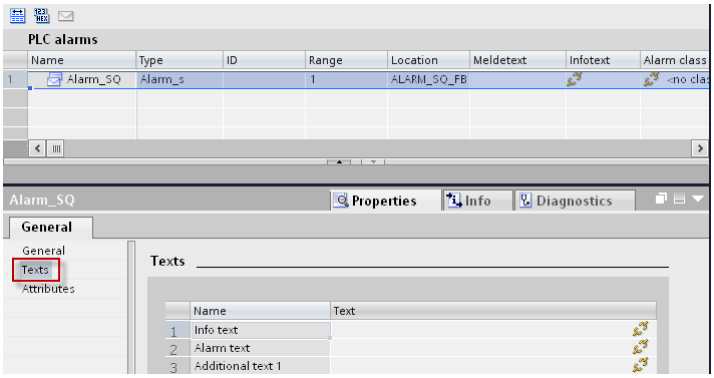
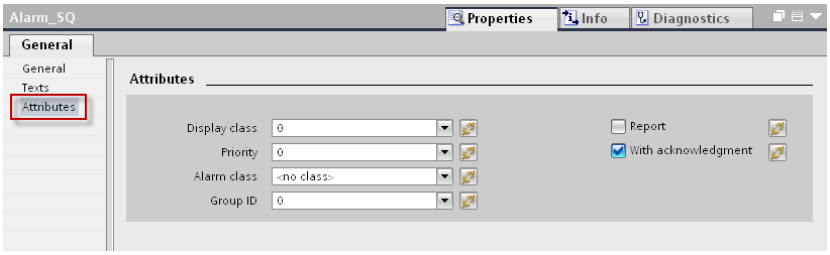
No.	Action
13.	Select the ALARM_SQ message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_SQ. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4 you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_SQ.” • Under “Priority”, choose a priority for the display of the ALARM_SQ.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_SQ. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.

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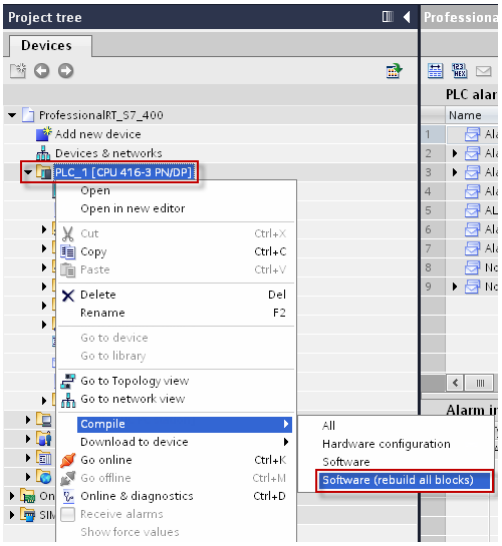
15.	Right-click on the CPU in the project navigation.
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the ALARM_SQ is now complete.

Displaying the Alarm_SQ in runtime

If you want to display the Alarm_SQ, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.3 Configuration of ALARM_D messages

An ALARM_D is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_D which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_D message block imply an acknowledgement. A subsequent acknowledgement is not necessary.

Parameters of the ALARM_D message block

The following table shows all the parameters of the ALARM_D message block.

Table 4-35

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
CMP_ID	Input	DWORD	E, A, M, D, L or constant	ID for the subsystem to which the message is assigned **(not allowed: 0)**. Recommended values: • low word: 1 to 65535 • high word: 0
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

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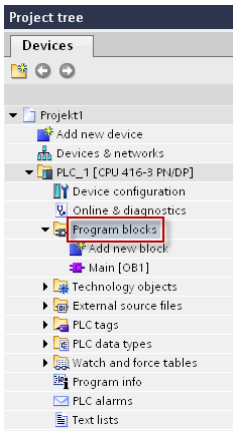
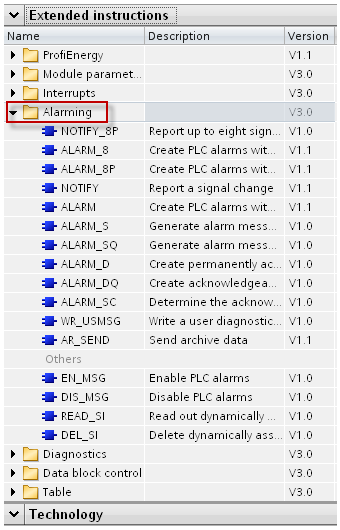
Configuration in STEP 7 Professional

For the configuration of an ALARM_D message STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-36

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM_D message or create a new function block and open it.
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 

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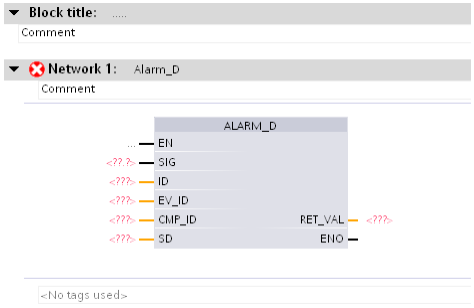
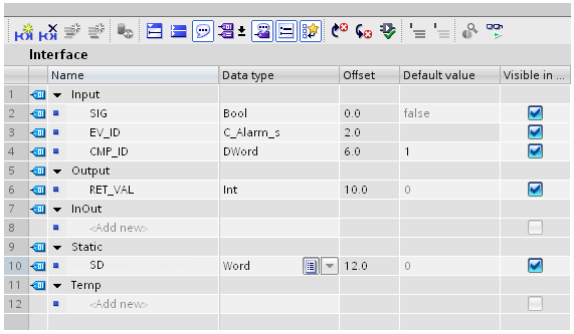
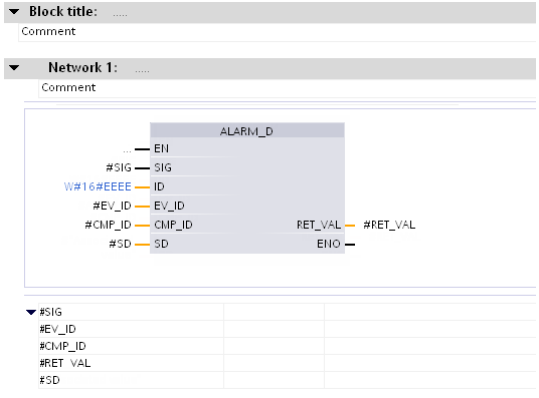
No.	Action
4.	Drag & drop the message block “ALARM_D” into an empty network of your FB. 
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the ALARM_D message block”.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM_D message in the function block is now complete.

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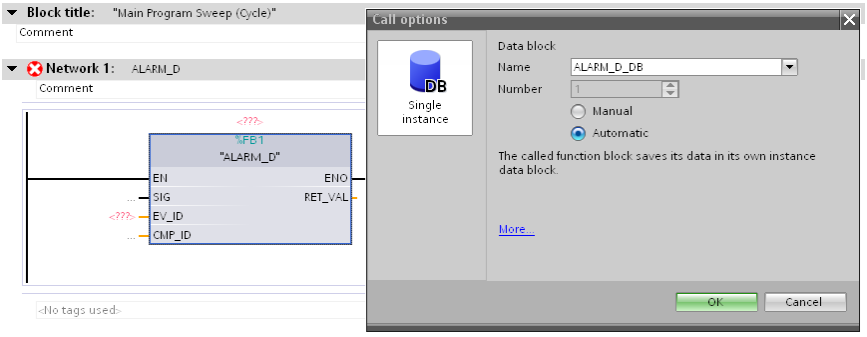
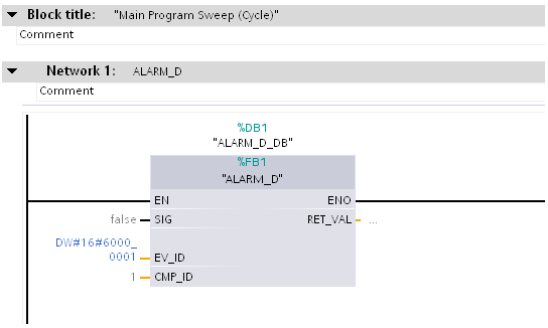
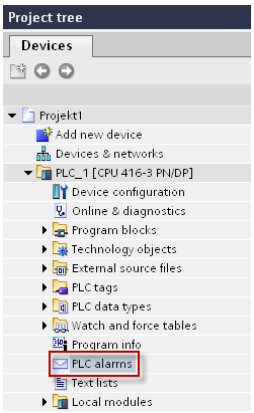
Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the ALARM_D message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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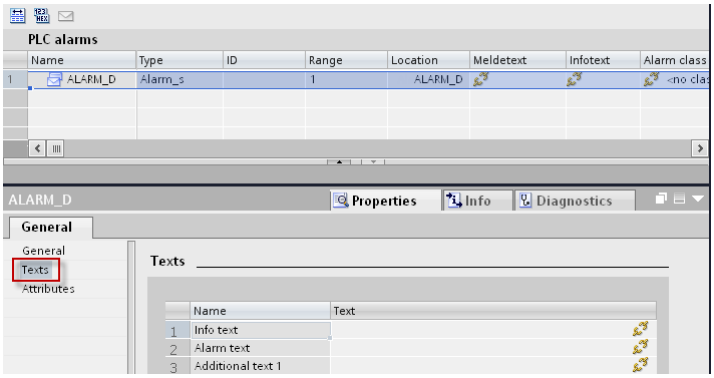
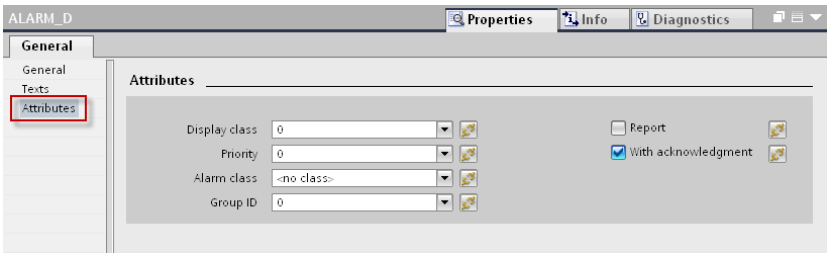
No.	Action
13.	Select the ALARM_D message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_D.” • Under “Priority”, choose a priority for the display of the ALARM_D.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_D. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.
16.	Select “Compile > Software (rebuild all blocks)” in the context menu.

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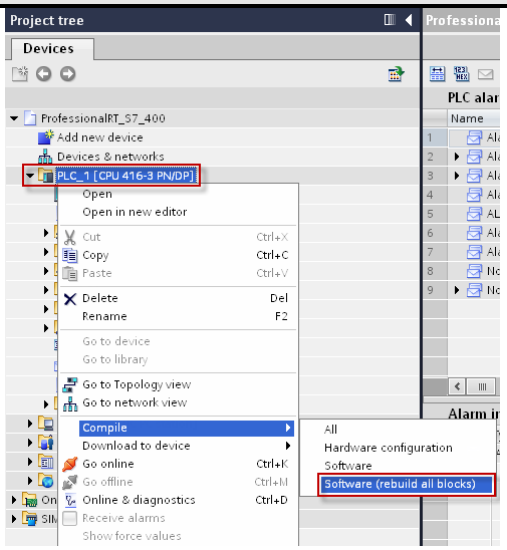
No.	Action
	
17.	Transfer the configuration into the PLC. The configuration of the ALARM_D is now complete.

Displaying the Alarm_D in runtime

If you want to display the Alarm_D, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.4 Configuration of ALARM_DQ messages

An ALARM_DQ is a PLC alarm that generates a message after a signal change (rising edge) and sends it to all the participants in the message procedure.
An associated value can be configured to an ALARM_DQ which will be displayed in addition to the message text.

All the alarms that are sent via the ALARM_DQ message block imply an acknowledgement. The alarm can be acknowledged on the control panel.

Parameters of the ALARM_DQ message block

The following table shows all the parameters of the ALARM_DQ message block.

Table 4-37

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal that triggers an alarm.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_Alarm_S	E, A, M, D, L or constant	Message number of the alarm (no “0” allowed)
CMP_ID	Input	DWORD	E, A, M, D, L or constant	ID for the subsystem to which the message is assigned **(not allowed: 0)**. Recommended values: • low word: 1 to 65535 • high word: 0
SD	Input	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	Associated value max. length 12 bytes
RET_VAL	Output	INT	E, A, M, D, L	Error code output.

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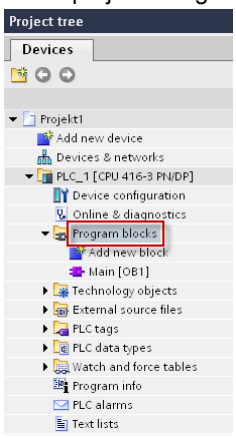
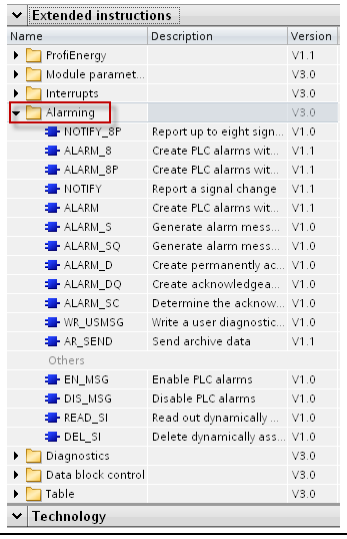
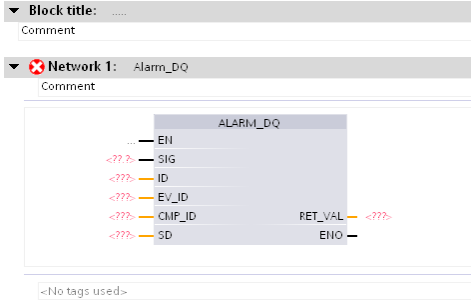
Configuration in STEP 7 Professional

For the configuration of an ALARM_DQ message STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-38

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM_DQ message or create a new function block and open it.
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 
4.	Drag & drop the message block “ALARM_DQ” into an empty network of your FB. 

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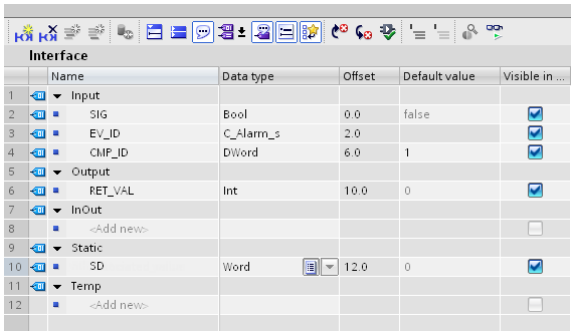
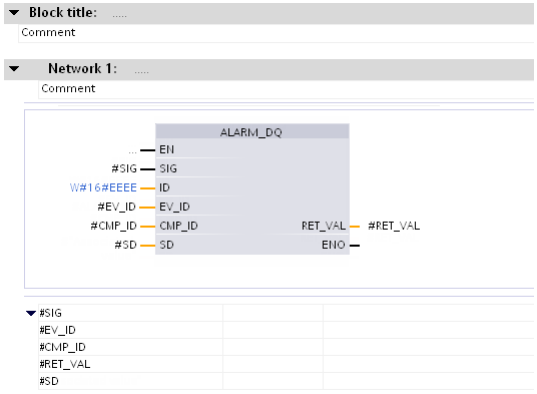
No.	Action
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter Parameters of the ALARM_DQ message block.  **Note on the input "ID"** The input "ID" for the data channel of the alarm messages must be assigned with the value "W#16#EEEE". In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input "ID", enter the value "W#16#EEEE" as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value "W#16#EEEE" at the input "ID" of the message block.  **Note** In this sample configuration, the input "ID" is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM_DQ message in the function block is now complete.

Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up.

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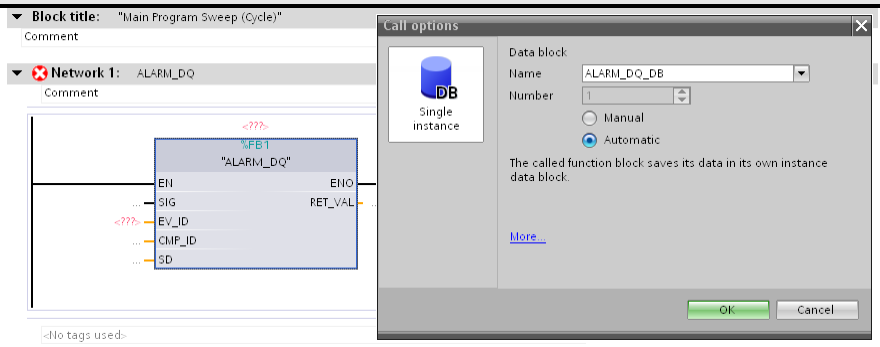
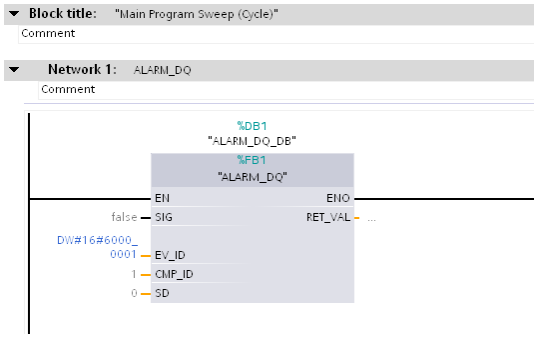
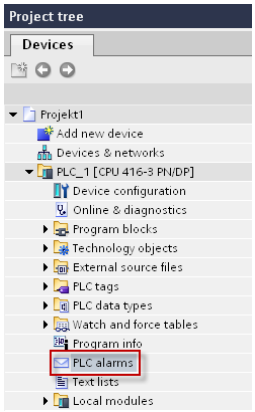
No.	Action
	
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the ALARM_DQ message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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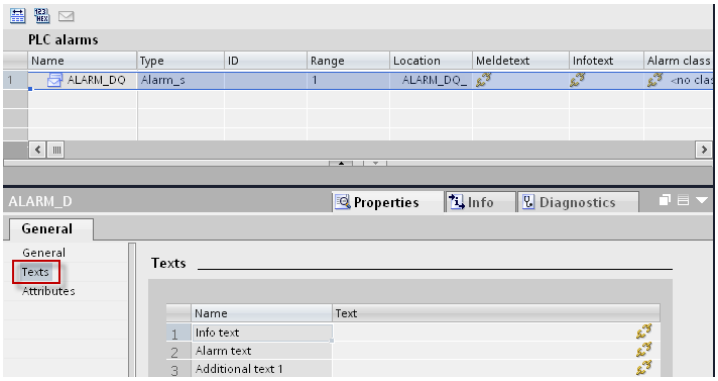
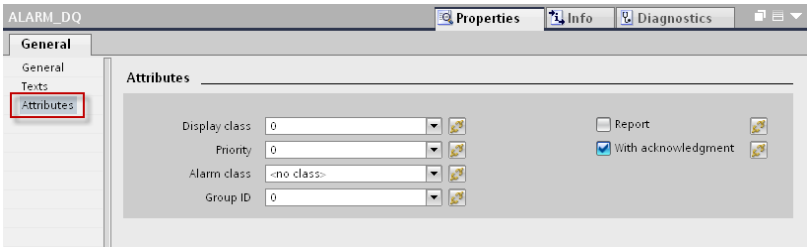
No.	Action
13.	Select the ALARM_DQ message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_DQ.” • Under “Priority”, choose a priority for the display of the ALARM_DQ.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_DQ. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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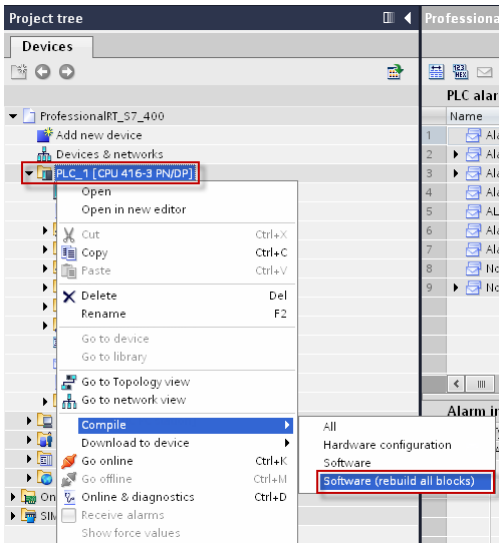
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the ALARM_DQ is now complete.

Displaying the Alarm_DQ in runtime

If you want to display the Alarm_DQ, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.5 Configuration of alarm messages

An ALARM message is a PLC alarm that generates two messages after a signal change (rising edge and falling edge) and sends them to all the participants in the message procedure.
An associated value can be configured to an ALARM message which will be displayed in addition to the alarm text.

Parameters of the ALARM message block

The following table shows all the parameters of the ALARM message block.

Table 4-39

Parameters	Declaration	Data type	Memory area	Description
EN_R	Input	BOOL	E, A, M, D, L or constant	Control parameter enabled to receive causes the outputs ACK_UP and ACK_DN to be updated when the message block is called (EN_R=1) or not updated (EN_R=0). EN_R=0 means that the output parameters ACK_UP and ACK_DN remain unchanged.
SIG	Input	BOOL	E, A, M, D, L	The signal to be controlled.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: **W#16#EEEE**
EV_ID	Input	C_ALARM (DWORD)	E, A, M, D, L or constant	Message number (not allowed: 0) EV_ID is only evaluated at the first call. Afterwards, the message number used for the first call is applicable for every call of “ALARM” with the respective instance DB. The message number is assigned automatically. This ensures the consistence of the message numbers. The message number must be unique within the user program.
SEVERITY	Input	WORD	E, A, M, D, L or constant	Weight of the event. Possible values: 0 to 127 (value 0 means the highest weight) This parameter is not relevant for processing the alarm.
DONE	Output	BOOL	E, A, M, D, L or constant	Status parameter DONE: Message generation completed.
ERROR	Output	BOOL	E, A, M, D, L	Status parameter: ERROR ERROR=TRUE means that an error occurred during editing. See "STATUS" parameter for details.
STATUS	Output	WORD	E, A, M, D, L	Status parameter STATUS: Display error information
ACK_DN	Output	BOOL	E, A, M, D, L	Event gone was acknowledged on a display device. Initialization status: 1

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Parame-ters	Declaration	Data type	Memory area	Description
ACK_UP	Output	BOOL	E, A, M, D, L	Event come was acknowledged on a display device. Initialization status: 1
SD_i, 1≤ i ≤10	Output	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME.	E, A, M, D, T, Z	i-th associated value Note: When ANY-pointer accesses a DB, the DB must always be specified. (e.g.: P# DB10.DBX5.0 Byte 10)

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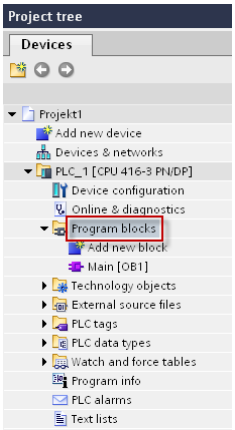
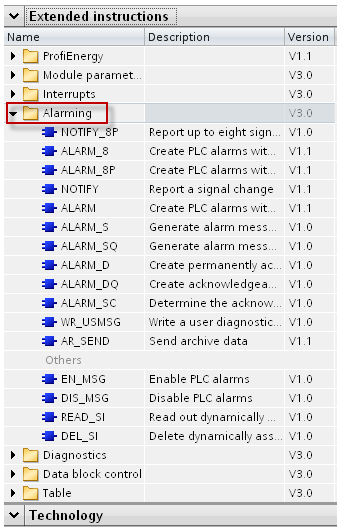
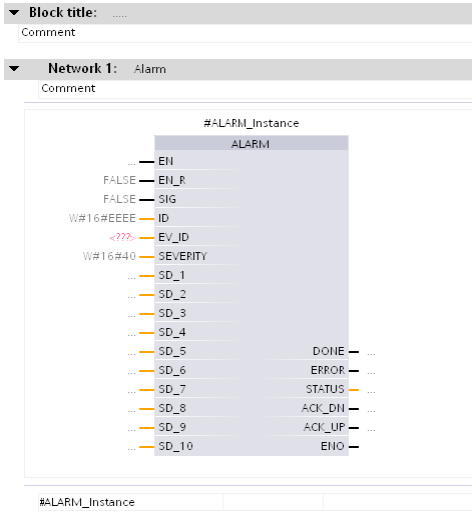
Configuration in STEP 7 Professional

For the configuration of an ALARM message in STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-40

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM message or create a new function block and open it.

No.	Action
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 
4.	Drag & drop the message block “ALARM” into an empty network of your FB. 

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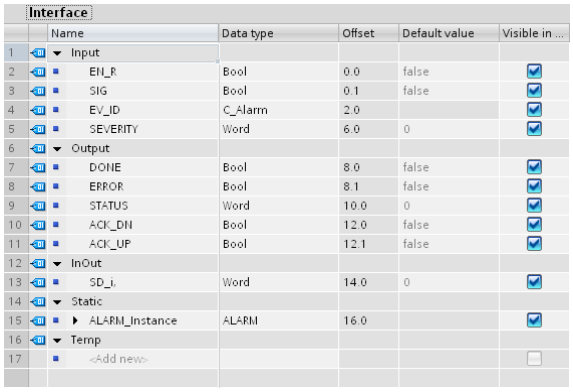
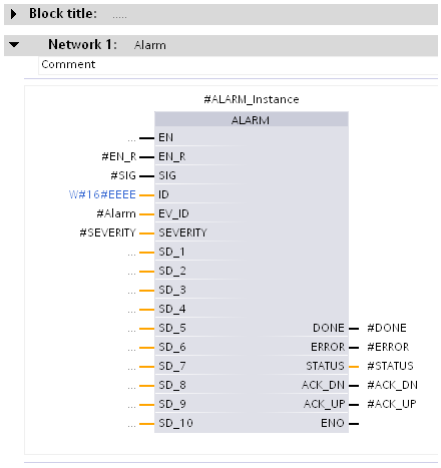
No.	Action
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the ALARM message block.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM message in the function block is now complete.

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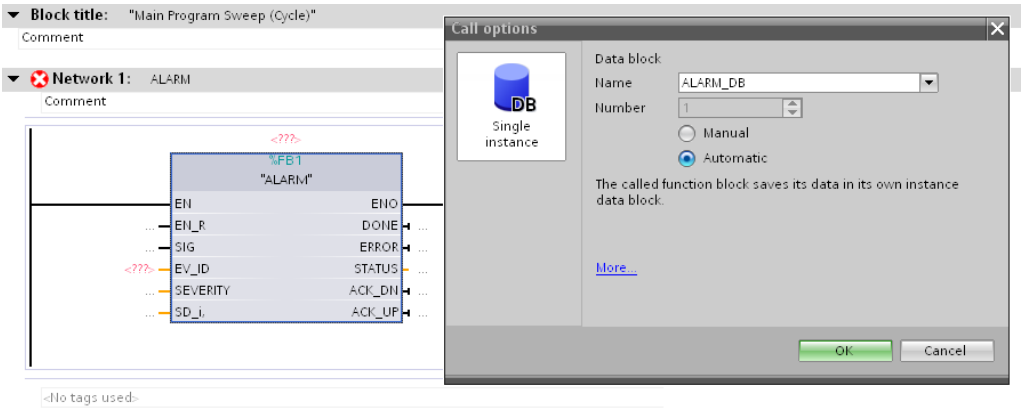
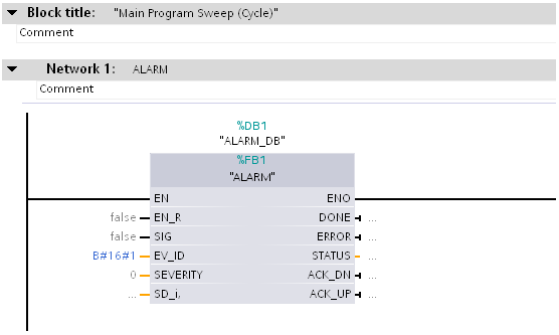
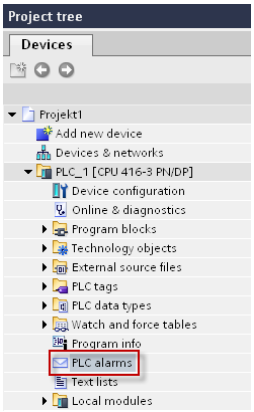
Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	

Configuring the message text of the ALARM message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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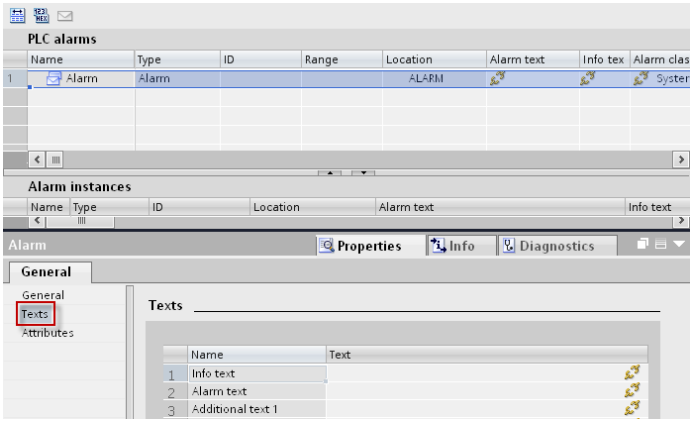
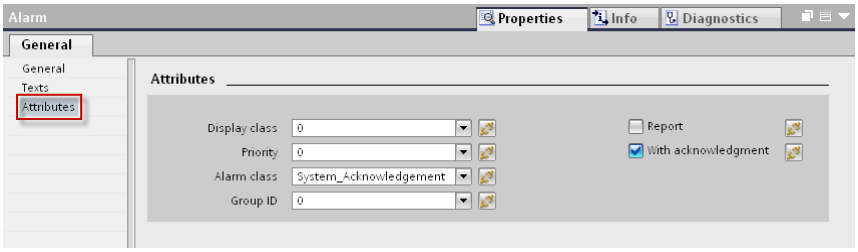
No.	Action
13.	Select the ALARM message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM message. • Under “Priority”, choose a priority for the display of the ALARM message. The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM message. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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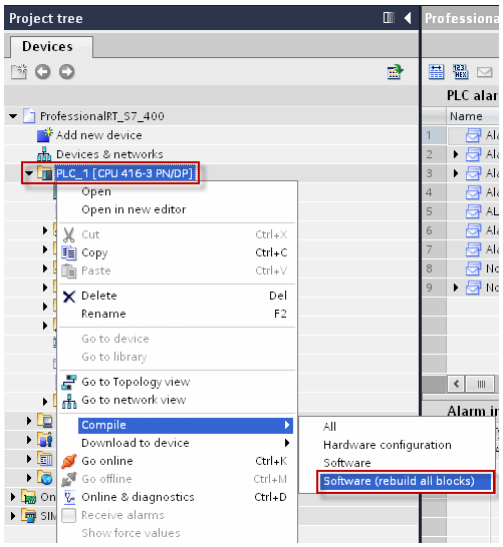
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the ALARM message is now complete.

Display of the alarm message in runtime

If you want to display the Alarm message, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.6 Configuration of ALARM_8 messages

With an ALARM_8 message block, up to 8 signals can be monitored. Every single signal can generate a partial message. After a signal change of at least one of the 8 signals (rising edge and falling edge), two partial messages are created for every signal and they are sent to all the participants in the message procedure.

Parameters of the ALARM_8 message block

The following table shows all the parameters of the ALARM_8 message block.

Table 4-41

Parameters	Declaration	Data type	Memory area	Description
EN_R	Input	BOOL	E, A, M, D, L or constant	Control parameter enabled to receive causes the output ACK_STATE to be updated when the message block is called (EN_R=1) or not updated (EN_R=0).
SIG_i, 1≤ i ≤8	Input	BOOL	E, A, M, D, L	i-th signal to be monitored
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: W#16#EEEE ID is only evaluated at the first call.
EV_ID	Input	C_ALARM_8 (DWORD)	E, A, M, D, L or constant	Message number (not allowed: 0) EV_ID is only evaluated at the first call. Afterwards, the message number used for the first call is applicable for every call of “ALARM_8” with the respective instance DB. The message number is assigned automatically. This ensures the consistence of the message numbers. The message number must be unique within the user program.
SEVERITY	Input	WORD	E, A, M, D, L or constant	Weight of the event. Possible values: 0 to 127 (value 0 means the highest weight) This parameter is not relevant for processing the alarm.
DONE	Output	BOOL	E, A, M, D, L	Status parameter DONE: Message generation completed.
ERROR	Output	BOOL	E, A, M, D, L	Status parameter: ERROR: ERROR=TRUE means that an error occurred during editing. See "STATUS" parameter for details.
STATUS	Output	WORD	E, A, M, D, L	Status parameter STATUS: Display error information

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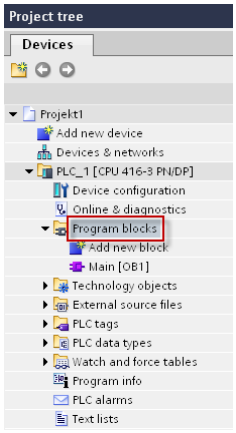
Parame-ters	Declaration	Data type	Memory area	Description
ACK_STATE	Output	WORD	E, A, M, D, L	Bitfield with the current acknowl-edgement status of all 8 messages (1: event acknowledged, 0: event not acknowledge): Bit 0 to 7 is represented on the event come at SIG_1 to SIG_8. Bit 8 to 15 is represented on the event gone at SIG_1 to SIG_8. Initialization status: W#16#FFFF, i.e. all the coming and going events are acknowledged.

Configuration in STEP 7 Professional

For the configuration of an ALARM message in STEP 7 Professional and WinCC Professional, proceed as follows:

Creating a function block

Table 4-42

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM_8 message or create a new function block and open it.

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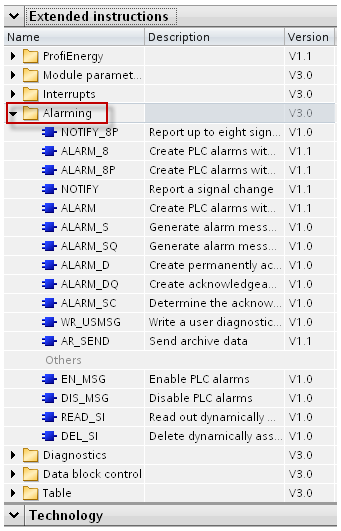
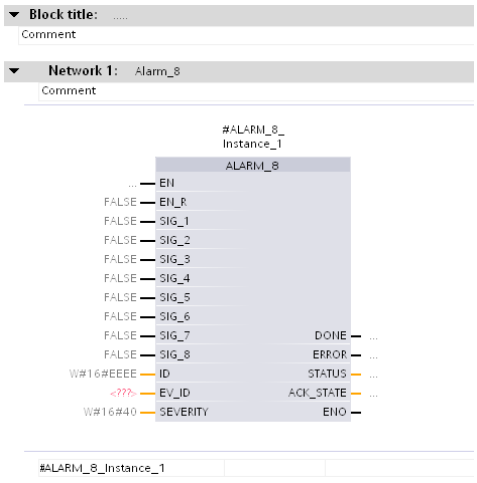
No.	Action
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 
4.	Drag & drop the message block “ALARM_8” into an empty network of your FB. 

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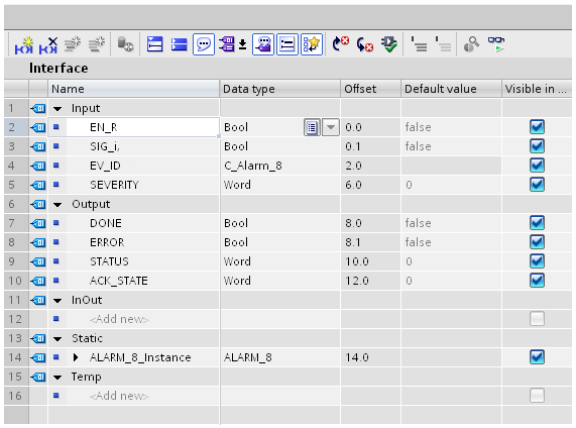
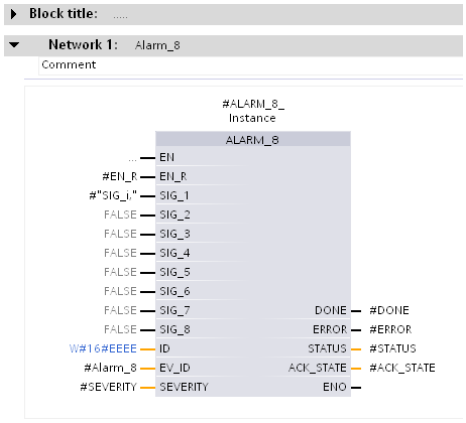
No.	Action
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the section "Parameters of the ALARM_8 message block".  Interface Name / Data type / Offset / Default value / Visible in ... 1 Input 2 EN_R — Bool — 0.0 — false 3 SIG_i — Bool — 0.1 — false 4 EV_ID — C_Alarm_8 — 2.0 5 SEVERITY — Word — 6.0 — 0 6 Output 7 DONE — Bool — 8.0 — false 8 ERROR — Bool — 8.1 — false 9 STATUS — Word — 10.0 — 0 10 ACK_STATE — Word — 12.0 — 0 11 InOut 12 <Add new> 13 Static 14 ALARM_8_Instance — ALARM_8 — 14.0 15 Temp 16 <Add new> **Note on the input "ID"** The input "ID" for the data channel of the alarm messages must be assigned with the value "W#16#EEEE". In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input "ID", enter the value "W#16#EEEE" as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value "W#16#EEEE" at the input "ID" of the message block.  Block title: Network 1: Alarm_8 Comment #ALARM_8_Instance ALARM_8 EN #EN_R — EN_R #"SIG_i." — SIG_1 FALSE — SIG_2 FALSE — SIG_3 FALSE — SIG_4 FALSE — SIG_5 FALSE — SIG_6 FALSE — SIG_7 FALSE — SIG_8 W#16#EEEE — ID #Alarm_8 — EV_ID #SEVERITY — SEVERITY DONE — #DONE ERROR — #ERROR STATUS — #STATUS ACK_STATE — #ACK_STATE ENO **Note** In this sample configuration, the input "ID" is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM_8 message in the function block is now complete.

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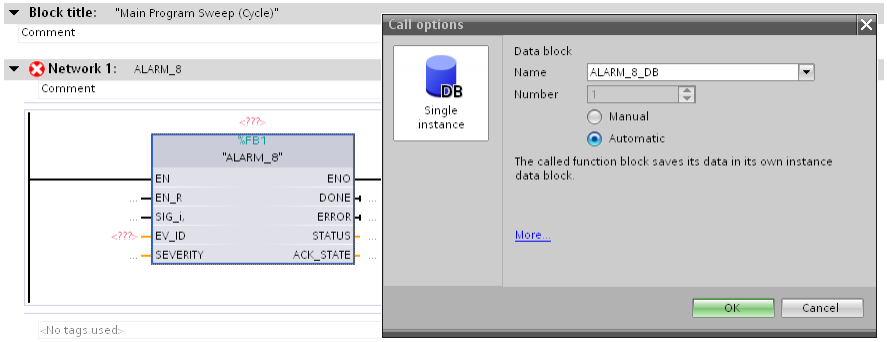
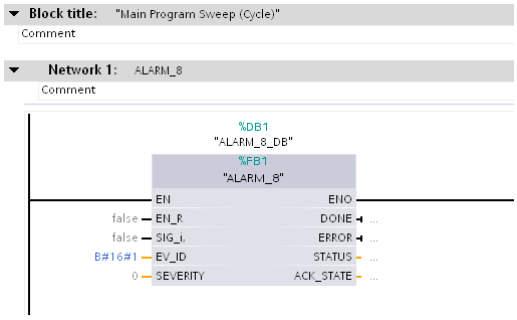
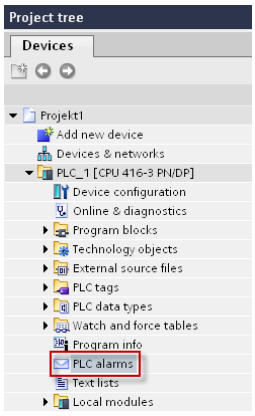
Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 
10.	
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the ALARM_8 message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the “PLC alarms”. 

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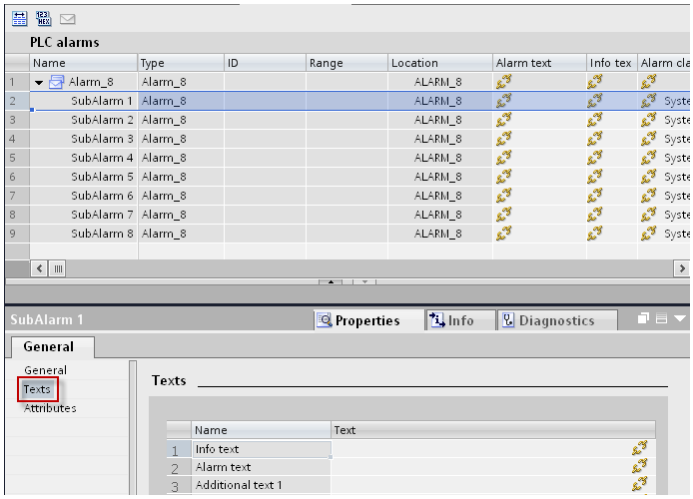
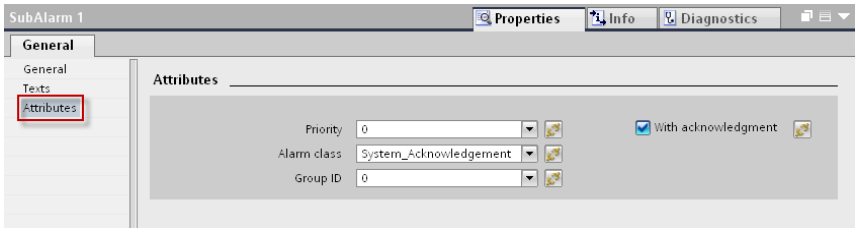
No.	Action
13.	Select the ALARM_8 message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text. **Note** Makes sure that every signal in an ALARM_8 block has a separate message text.
14.	In the inspector window, please open the tab “Properties > General > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4 you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_8.” • Under “Priority”, choose a priority for the display of the ALARM_8.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_8. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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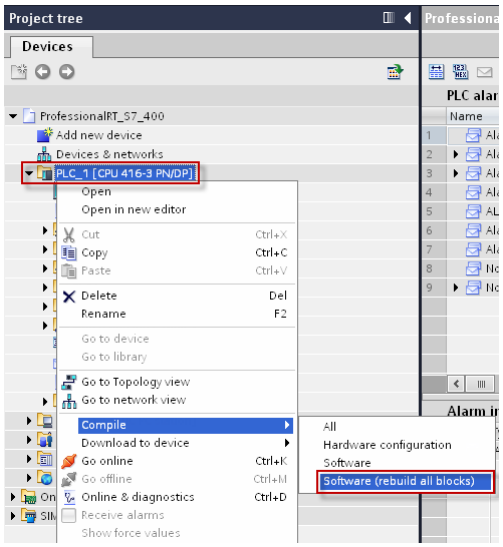
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the ALARM_8 is now complete.

Displaying the Alarm_8 in runtime

If you want to display the Alarm_8, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.7 Configuration of ALARM_8P messages

With an ALARM_8P message block, up to 8 signals can be monitored. Every single signal can generate a partial message.
After a signal change of at least one of the 8 signals (rising edge and falling edge), two partial messages are created for every signal and they are sent to all the participants in the message procedure.
An associated value can be configured to an ALARM_8P message which will be displayed in addition to the alarm text.

Parameters of the ALARM_8P message block

The following table shows all the parameters of the ALARM_8P message block.

Table 4-43

Parameters	Declaration	Data type	Memory area	Description
EN_R	Input	BOOL	E, A, M, D, L or constant	Control parameter enabled to receive causes the output ACK_STATE to be updated when the message block is called (EN_R=1) or not updated (EN_R=0).
SIG_i, 1≤ i ≤8	Input	BOOL	E, A, M, D, L	i-th signal to be monitored
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: W#16#EEEE ID is only evaluated at the first call.
EV_ID	Input	C_ALARM_8P (DWORD)	E, A, M, D, L or constant	Message number (not allowed: 0) EV_ID is only evaluated at the first call. Afterwards, the message number used for the first call is applicable for every call of “ALARM_8” with the respective instance DB. The message number is assigned automatically. This ensures the consistence of the message numbers. The message number must be unique within the user program.
SEVERITY	Input	WORD	E, A, M, D, L or constant	Weight of the event. Possible values: 0 to 127 (value 0 means the highest weight) This parameter is not relevant for processing the alarm.
DONE	Output	BOOL	E, A, M, D, L	Status parameter DONE: Message generation completed.

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Parame-ters	Declaration	Data type	Memory area	Description
ERROR	Output	BOOL	E, A, M, D, L	Status parameter: ERROR: ERROR=TRUE means that an error occurred during editing. See "STATUS" parameter for details.
STATUS	Output	WORD	E, A, M, D, L	Status parameter STATUS: Display error information
ACK_STATE	Output	WORD	E, A, M, D, L	Bitfield with the current acknowledgement status of all 8 messages (1: event acknowledged, 0: event not acknowledge): Bit 0 to 7 is represented on the event come at SIG_1 to SIG_8. Bit 8 to 15 is represented on the event gone at SIG_1 to SIG_8. Initialization status: W#16#FFFF, i.e. all the coming and going events are acknowledged.
SD_j, 1≤ j ≤8	Input/Output:	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, L	j-th associated value The associated values are applicable for all messages. Note: When ANY-pointer accesses a DB, the DB must always be specified (e.g.: P# DB10.DBX5.0 Byte 10).

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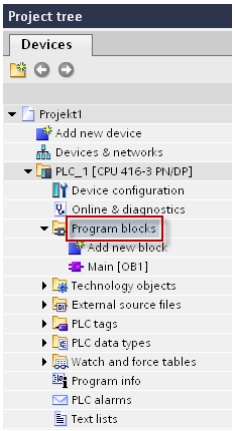
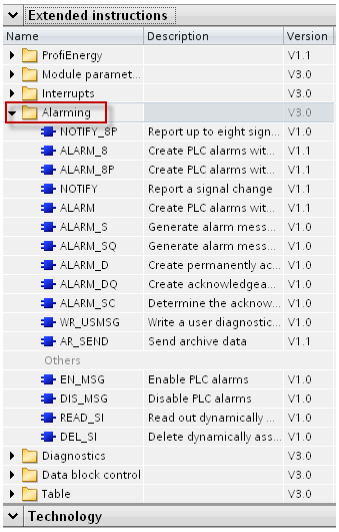
Configuration in STEP 7 Professional

For the configuration of an ALARM_8P message STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-44

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the ALARM_8P message or create a new function block and open it.
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 

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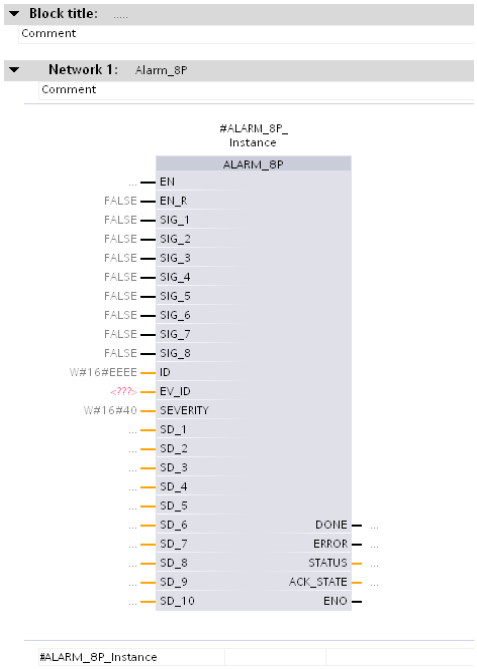
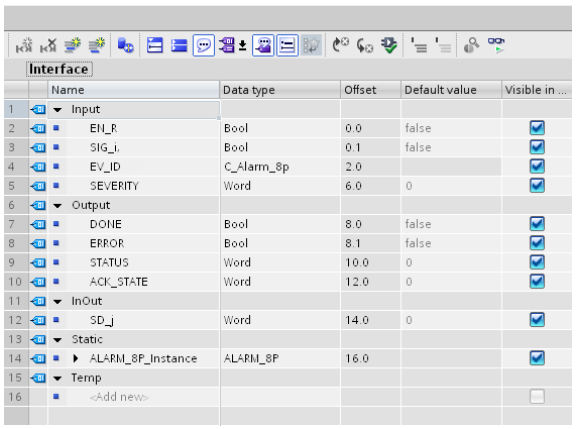
No.	Action
4.	Drag & drop the message block “ALARM_8P” into an empty network of your FB. 
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the ALARM_8P message block.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.

Interface

	Name	Data type	Offset	Default value	Visible in ...
1	Input				
2	EN_R	Bool	0.0	false	☑
3	SIG_i	Bool	0.1	false	☑
4	EV_ID	C_Alarm_8p	2.0		☑
5	SEVERITY	Word	6.0	0	☑
6	Output				
7	DONE	Bool	8.0	false	☑
8	ERROR	Bool	8.1	false	☑
9	STATUS	Word	10.0	0	☑
10	ACK_STATE	Word	12.0	0	☑
11	InOut				
12	SD_j	Word	14.0	0	☑
13	Static				
14	ALARM_8P_Instance	ALARM_8P	16.0		☑
15	Temp				
16	<Add new>				☐

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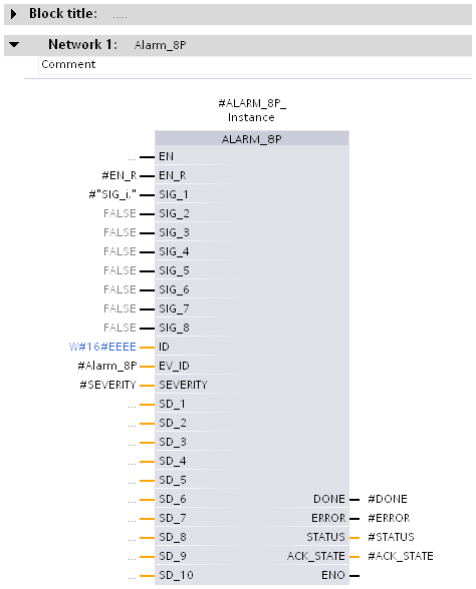
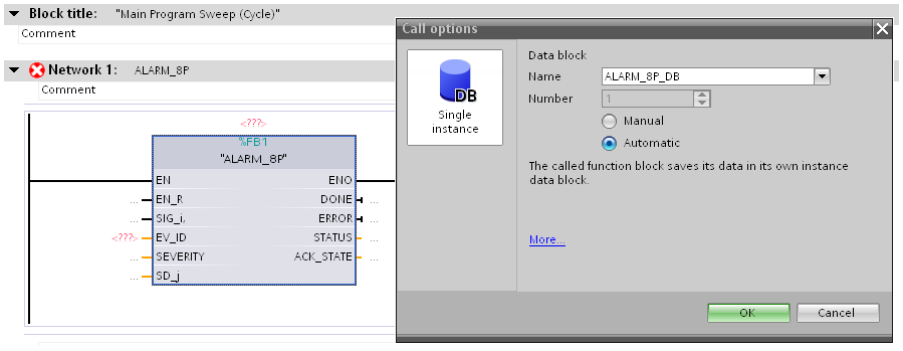
No.	Action
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the ALARM_8P message in the function block is now complete.

Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 

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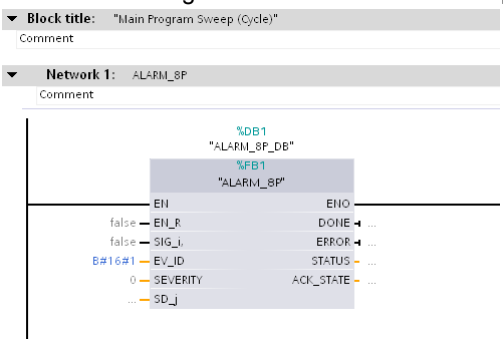
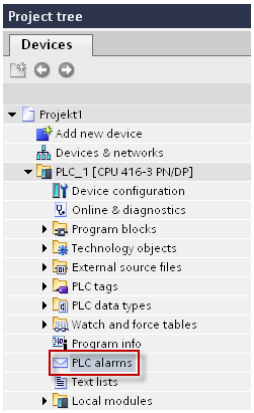
No.	Action
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the ALARM_8P message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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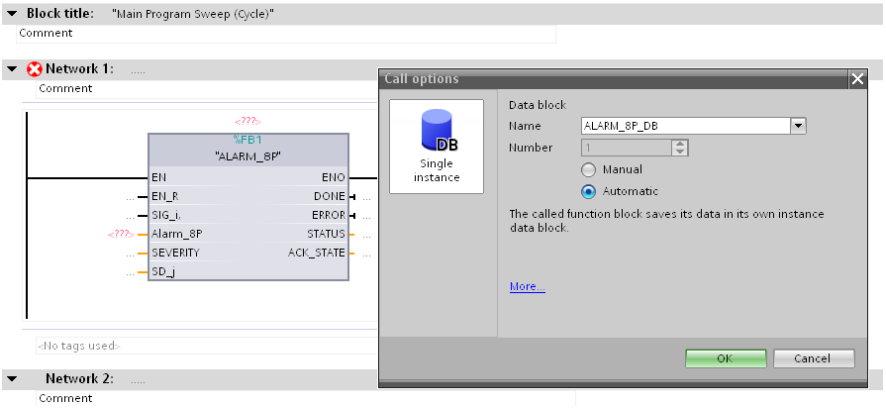
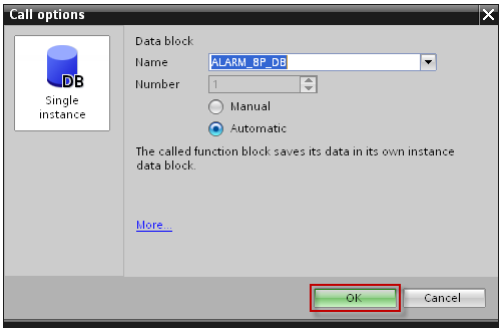
No.	Action
13.	Select the ALARM_8P message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text. **Note** Makes sure that every signal in an ALARM_8P block has a separate message text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the ALARM_8P.” • Under “Priority”, choose a priority for the display of the ALARM_8P.” The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the ALARM_8P. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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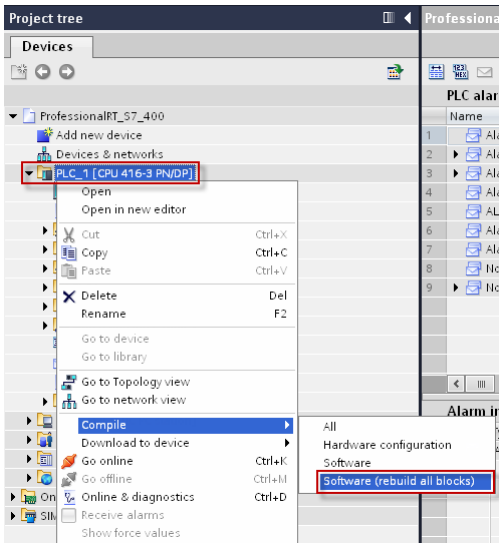
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the ALARM_8P is now complete.

Displaying the Alarm_8P in runtime

If you want to display the Alarm_8P, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.8 Configuration of NOTIFY messages

A NOTIFY message is a PLC alarm that generates two messages after a signal change (rising edge and falling edge) and sends them to all the participants in the message procedure.
An associated value can be configured to a NOTIFY message which will be displayed in addition to the message text.

Parameters of the NOTIFY message block

The following table shows all the parameters of the NOTIFY message block.

Table 4-45

Parameters	Declaration	Data type	Memory area	Description
SIG	Input	BOOL	E, A, M, D, L	The signal to be controlled.
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: W#16#EEEE ID is only evaluated at the first call.
EV_ID	Input	C_NOTIFY (DWORD)	E, A, M, D, L or constant	Message number (not allowed: 0) EV_ID is only evaluated at the first call. Afterwards, the message number used for the first call is applicable for every call of “NOTIFY” with the respective instance DB. The message number is assigned automatically. This ensures the consistence of the message numbers. The message number must be unique within the user program.
SEVERITY	Input	WORD	E, A, M, D, L or constant	Weight of the event. Possible values: 0 to 127 (value 0 means the highest weight) This parameter is not relevant for processing the alarm.
DONE	Output	BOOL	E, A, M, D, L	Status parameter DONE: Message generation completed.
ERROR	Output	BOOL	E, A, M, D, L	Status parameter ERROR=TRUE means that an error occurred during editing. See "STATUS" parameter for details.
STATUS	Output	WORD	E, A, M, D, L	Status parameter STATUS: Display error information

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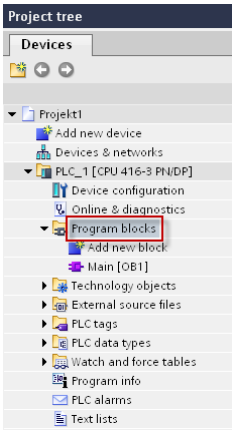
Parame-ters	Declaration	Data type	Memory area	Description
SD_i, 1≤ i ≤10	Input/Output:	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME.	E, A, M, D, T, Z	i-th associated value Note: When ANY-pointer accesses a DB, the DB must always be specified. (e.g.: P# DB10.DBX5.0 Byte 10)

Configuration in STEP 7 Professional

For the configuration of an NOTIFY message in STEP 7 Professional, proceed as follows:

Creating a function block

Table 4-46

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the NOTIFY message or create a new function block and open it.

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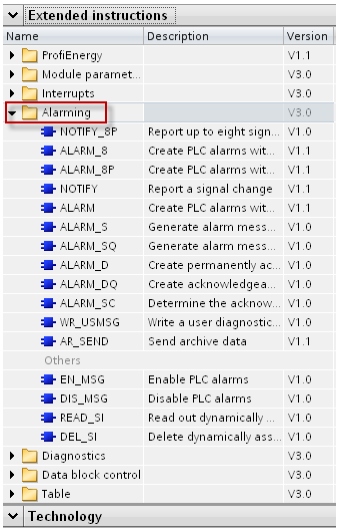
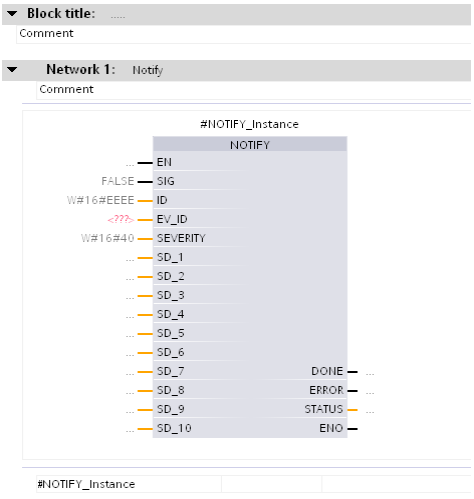
No.	Action
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 
4.	Drag & drop the message block “NOTIFY” into an empty network of your FB. 

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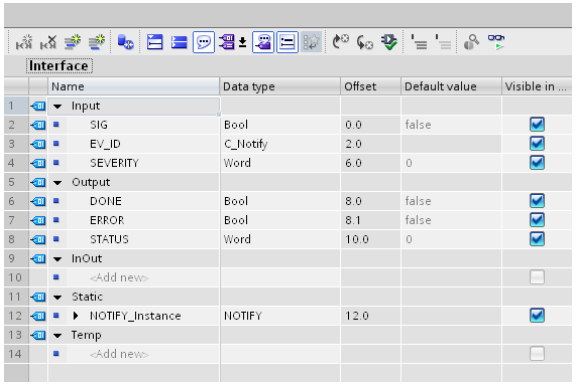
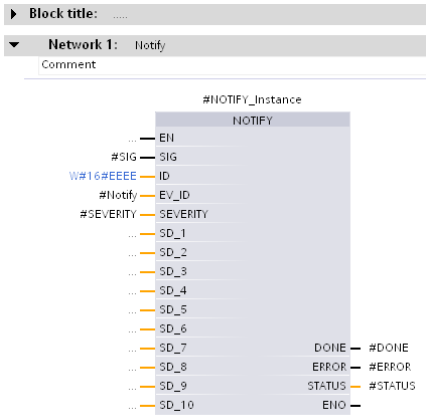
No.	Action
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the NOTIFY message block“.  Interface Name | Data type | Offset | Default value | Visible in ... 1 Input 2 SIG | Bool | 0.0 | false 3 EV_ID | C_Notify | 2.0 4 SEVERITY | Word | 6.0 | 0 5 Output 6 DONE | Bool | 8.0 | false 7 ERROR | Bool | 8.1 | false 8 STATUS | Word | 10.0 | 0 9 InOut 10 <Add new> 11 Static 12 NOTIFY_Instance | NOTIFY | 12.0 13 Temp 14 <Add new> **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  Block title: Network 1: Notify Comment #NOTIFY_Instance NOTIFY EN #SIG — SIG W#16#EEEE — ID #Notify — EV_ID #SEVERITY — SEVERITY SD_1 SD_2 SD_3 SD_4 SD_5 SD_6 SD_7 — DONE — #DONE SD_8 — ERROR — #ERROR SD_9 — STATUS — #STATUS SD_10 — ENO **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the NOTIFY message in the function block is now complete.

Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.

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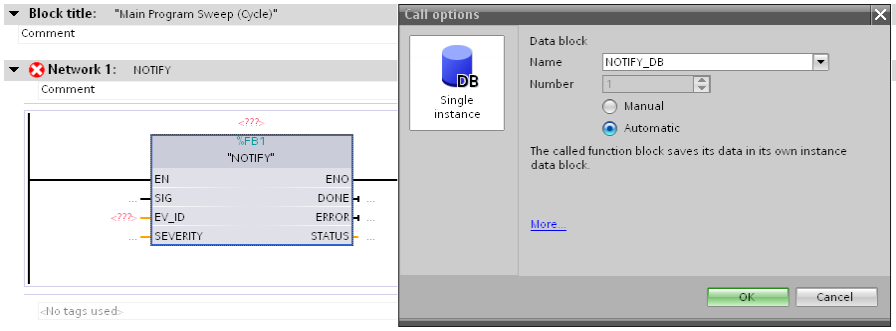
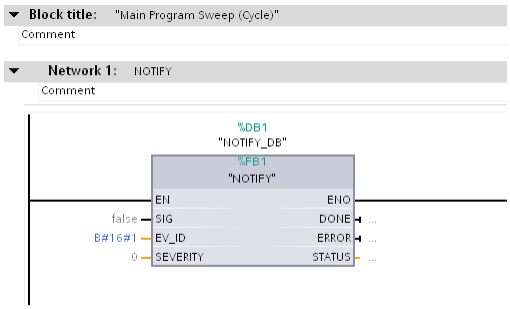
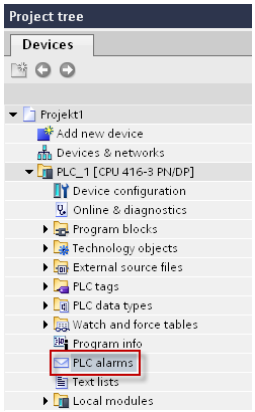
No.	Action
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the NOTIFY message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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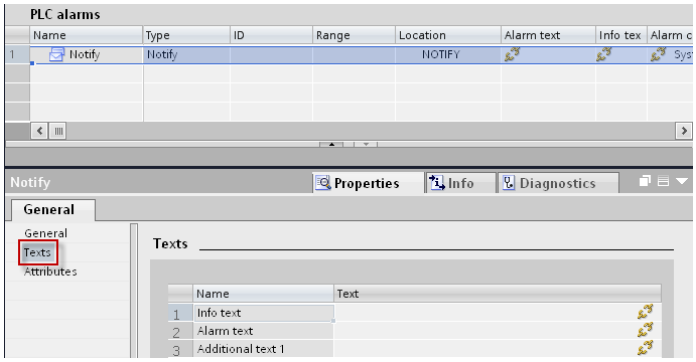
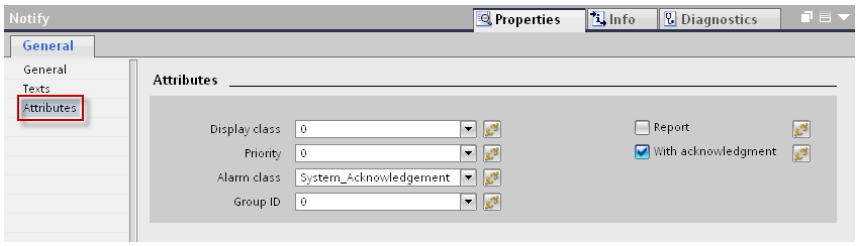
No.	Action
13.	Select the NOTIFY message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text.
14.	In the inspector window, please open the tab “Properties > Properties > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the NOTIFY message. • Under “Priority”, choose a priority for the display of the NOTIFY message. The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the NOTIFY message. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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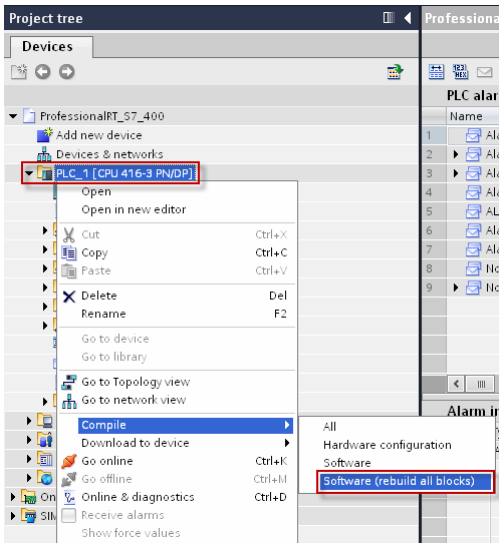
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the NOTIFY message is now complete.

Display of the NOTIFY message in runtime

If you want to display the NOTIFY message, a message display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

4.3.9 Configuration of NOTIFY_8P messages

With a NOTIFY_8P message block, up to 8 signals can be monitored. Every single signal can generate a partial message.
After a signal change of at least one of the 8 signals (rising edge and falling edge), two partial messages are created for every signal and they are sent to all the participants in the message procedure.
An associated value can be configured to an NOTIFY_8P message which will be displayed in addition to the alarm text.

Parameters of the NOTIFY_8P message block

The following table shows all the parameters of the NOTIFY_8P message block.

Table 4-47

Parameters	Declaration	Data type	Memory area	Description
SIG_i, 1 ≤ i ≤ 8	Input	BOOL	E, A, M, D, L	i-th signal to be monitored
ID	Input	WORD	E, A, M, D, L or constant	Data channel for the messages: W#16#EEEE ID is only evaluated at the first call.
EV_ID	Input	C_NOTIFY_8P	E, A, M, D, L or	Message number (not

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Parame-ters	Declaration	Data type	Memory area	Description
		(DWORD)	constant	allowed: 0) EV_ID is only evaluated at the first call. Afterwards, the message number used for the first call is applicable for every call of "NOTIFY_8P" with the respective instance DB. The message number is assigned automatically. This ensures the consistence of the message numbers. The message number must be unique within the user program.
SEVERITY	Input	WORD	E, A, M, D, L or constant	Weight of the event. Possible values: 0 to 127 (value 0 means the highest weight) This parameter is not relevant for processing the alarm.
DONE	Output	BOOL	E, A, M, D, L	Status parameter DONE: Message generation completed.
ERROR	Output	BOOL	E, A, M, D, L	Status parameter ERROR=TRUE means that an error occurred during editing. See "STATUS" parameter for details.
STATUS	Output	WORD	E, A, M, D, L	Status parameter STATUS: Display error information
SD_i, 1≤ i ≤10	Input/Output:	BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME BOOL (not allowed: Bitfield), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME	E, A, M, D, T, Z	i-th associated value Note: When ANY-pointer accesses a DB, the DB must always be specified. (e.g.: P# DB10.DBX5.0 Byte 10)

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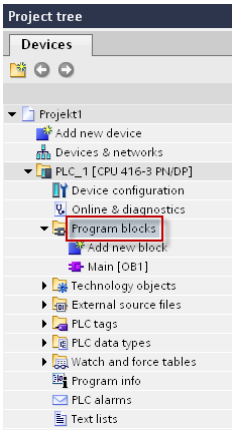
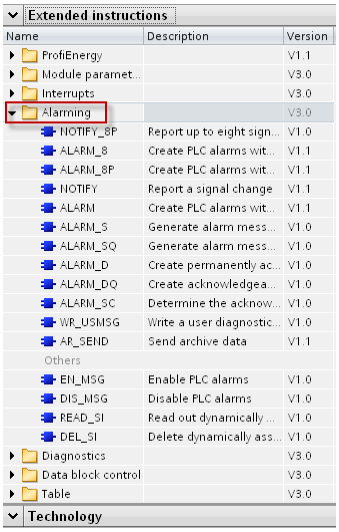
Configuration in STEP 7 Professional

For the configuration of an NOTIFY_8P message in STEP 7 Professional and WinCC Professional, proceed as follows:

Creating a function block

Table 4-48

No.	Action
1.	In the project navigation under the folder of the CPU you created, open the “Project blocks”. 
2.	Open a function block with a double click in which you would like to configure the NOTIFY_8P message or create a new function block and open it.
3.	Under the task card “Instructions > Extended Instructions”, open the folder “Alarming”. 

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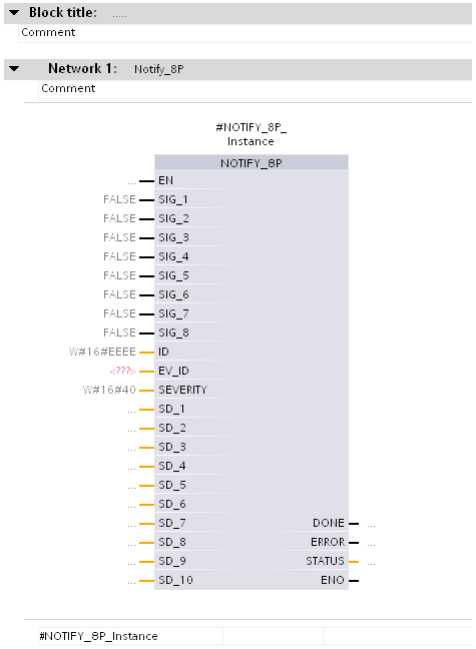
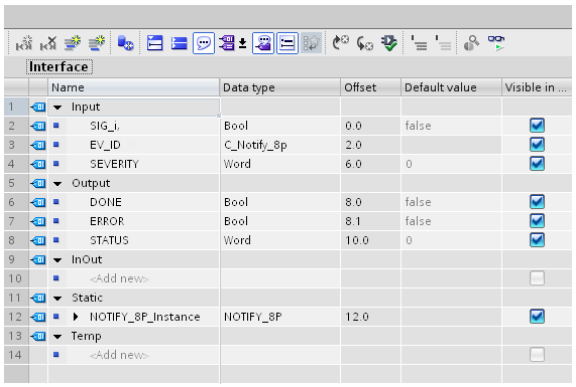
No.	Action
4.	Drag & drop the message block “NOTIFY_8P” into an empty network of your FB. 
5.	In the block interface of the function block, declare the static variables the parameters of the message block. Please find the required parameters in the chapter “Parameters of the NOTIFY_8P message block.  **Note on the input “ID”** The input “ID” for the data channel of the alarm messages must be assigned with the value “W#16#EEEE”. In this sample configuration the value is directly written at the input without using an additional variable. If you have set a static variable for the input “ID”, enter the value “W#16#EEEE” as the default value of the variable.

Interface

	Name	Data type	Offset	Default value	Visible in ...
1	Input				
2	SIG_1	Bool	0.0	false	☑
3	EV_ID	C_Notify_8p	2.0		☑
4	SEVERITY	Word	6.0	0	☑
5	Output				
6	DONE	Bool	8.0	false	☑
7	ERROR	Bool	8.1	false	☑
8	STATUS	Word	10.0	0	☑
9	InOut				
10	<Add new>				☐
11	Static				
12	NOTIFY_8P_Instance	NOTIFY_8P	12.0		☑
13	Temp				
14	<Add new>				☐

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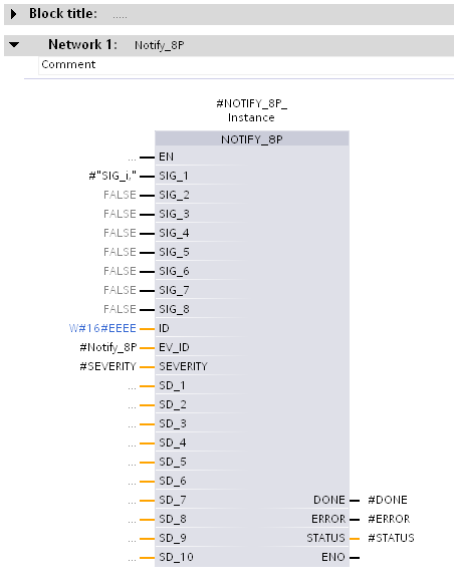
No.	Action
6.	Connect the variable you set with the inputs and outputs of the message block. Then enter the value “W#16#EEEE” at the input “ID” of the message block.  **Note** In this sample configuration, the input “ID” is directly filled with the value of the data channel for the alarm message. Please also take the note under number 5 of the table into account.
7.	The configuration of the NOTIFY_8P message in the function block is now complete.

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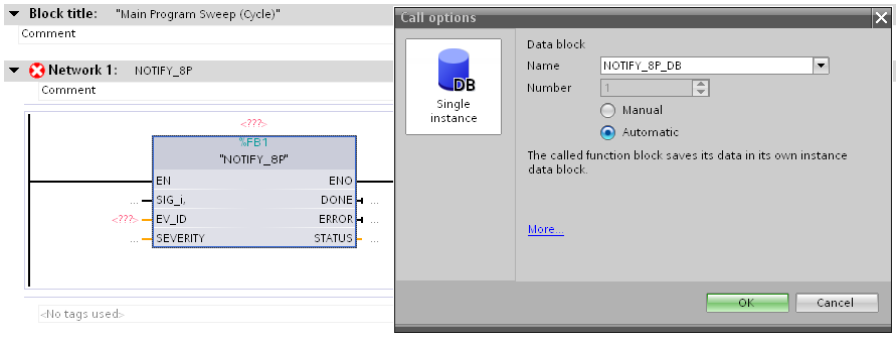
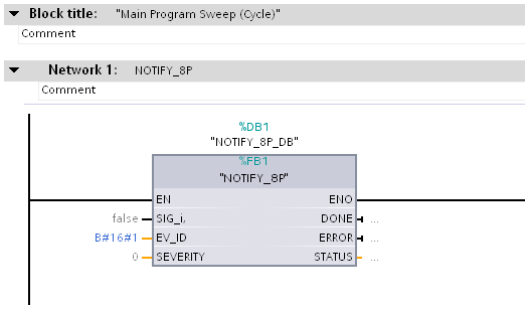
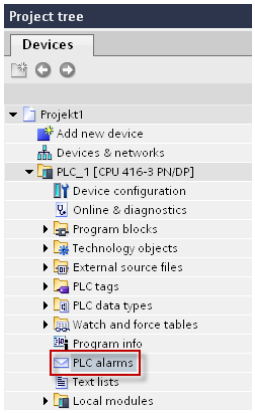
Creating an instance data block

No.	Action
8.	Open an organization block (e.g. OB1) in your project.
9.	Call the FB in your application program, for example in the OB1. Then a dialog for creating the instance data block opens up. 
10.	Click on **"OK"** to confirm. Now, all the required parameters are automatically connected and a message number is created. The message number is entered at the input "EV_ID" automatically. 
11.	The instance data block is now created and is called by the organization block.

Configuring the message text of the NOTIFY_8P message

No.	Action
12.	In the project navigation under the folder of the CPU you created, open the "PLC alarms". 

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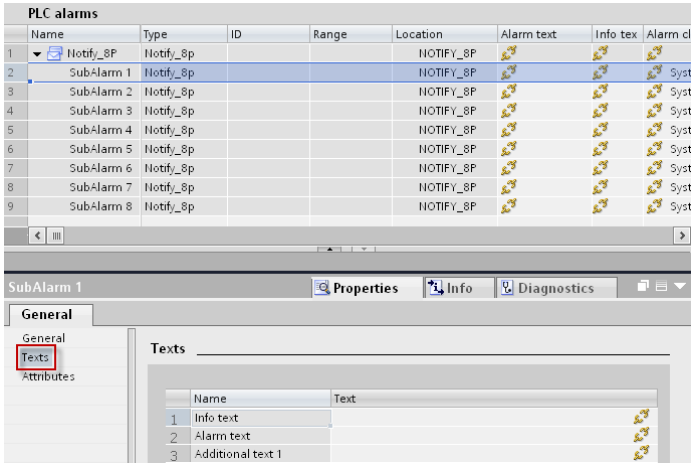
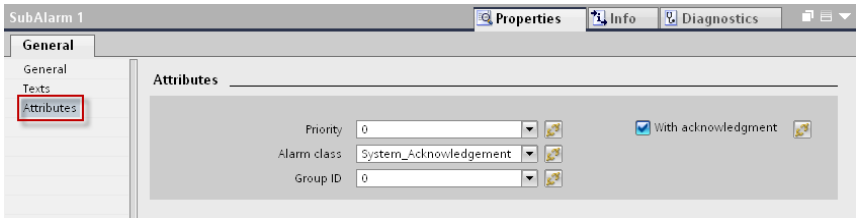
No.	Action
13.	Select the NOTIFY_8P message you created, under the tab “PLC alarms” and in the inspector window, open the tab “Properties > General > Texts”.  • Under “Alarm texts” please enter the message text for the ALARM_S. • Optionally, you a "Tooltip” to this message can be configured under “Info text”. With a tooltip you can provide the system operator with further information and instructions in addition to the alarm text. **Note** Makes sure that every signal in an NOTIFY_8P block has a separate message text.
14.	In the inspector window, please open the tab “Properties > General > Attributes”.  • Under “Alarm class”, please select “System_Acknowledgement”. In Chapter 3.4, you will find more detailed information about alarm classes. • Under “Display class”, choose a display class for the display of the NOTIFY-8P message. • Under “Priority”, choose a priority for the display of the NOTIFY_8P. The priority influences the display of the message in an alarm display. Alarms with a high priority come before alarms with a low priority. • Under “Group ID”, choose an ID for the assignment of the NOTIFY_8P. Alarms that belong to the same ID can be acknowledged together. • If you want to print the alarm on a standard printer, please activate the option “Report”. When the alarm comes, it will then be output on the standard printer of the control panel **Note on the option “with acknowledgement"** Deactivating the acknowledgement only influences message blocks where an acknowledgement is possible. If you use alarm blocks without the possibility of an acknowledgement, this option has not function.
15.	Right-click on the CPU in the project navigation.

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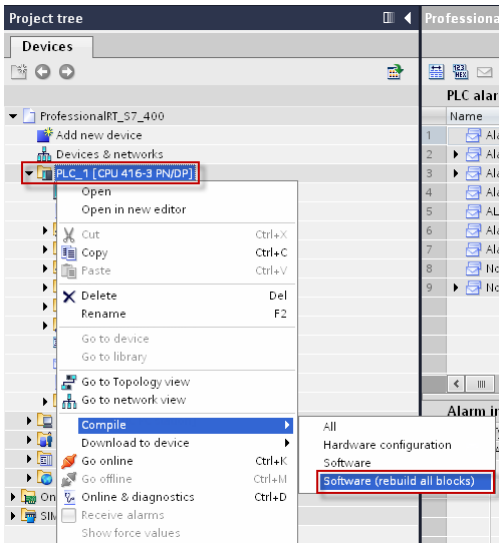
No.	Action
16.	Select “Compile > Software (rebuild all blocks)” in the context menu. 
17.	Transfer the configuration into the PLC. The configuration of the NOTIFY_8P message is now complete.

Display of the NOTIFY_8P message in runtime.

If you want to display the NTIFY_8P message, an alarm display must have been configured in your project.

You will find all the information concerning the configuration and setting of an alarm display in the WinCC Professional under system manual, under the title “Configure alarm display”.

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4.3.10 Additional information concerning PLC alarms

In this chapter, you will find more detailed information about the configuration of PLC alarms.

Triggering PLC alarms

A PLC alarm (for example an ALARM_S message) is triggered by the signal of the tag that was configured at the input “SIG” of the message block.

Once the signal is set, the next call of the message block in the user program triggers the respective PLC message.

If you use a message block with several possible signal sources (e.g. an ALARM_8 message block), one of these signals is sufficient to trigger the alarm.

Acknowledgement of a PLC alarm

A PLC alarm (e.g. ALARM_SQ message) is acknowledged directly in the control panel. If a PLC message that needs to be acknowledged is pending at the control panel, it has to be acknowledged by means of the acknowledgement button in the message display.

The information concerning the acknowledgement is only sent to the PLC which triggered the alarm. Then the PLC sends the information about the acknowledgement to all the participants in the message procedure.

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4.4 Using alarm classes in WinCC Professional

During the operation of the system, alarms of various priorities occur. These messages are categorized in different alarm classes depending on their importance.

The system operator can see which messages have a higher priority and importance and must be handled first.

Function of the alarm classes

When new messages are created, every message must be assigned to an alarm class.

The alarm class defines

- the display
- the acknowledgement concept (single acknowledgement, double acknowledgement, alarm annunciator)
- the storage

of a message assigned to an alarm class

Note The scope of functions of the alarm classes depends on the configured control panel used.

Types of messages classes

WinCC (TIA Portal) provides the following types of alarm classes.

- **Pre-defined alarm classes**

You will find pre-defined alarm classes on the tab “Alarm classes” under “HMI alarms” in the project tree. The alarm classes cannot be deleted and can only be edited in part.

- **User-defined alarm classes**

For every control panel, you can add more alarm classes on the tab “Alarm classes” under “HMI alarms” in the project tree. In these alarm classes the display and the acknowledgement concept of the respective message can be configured individually.

- **Project-wide alarm classes**

Project-wide alarm classes can be used on all the control panels in the whole project. These alarm classes are displayed in the project tree under “Common Data” > “Alarm classes” and new project-wide alarm classes are configured there.

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4.5 Using alarm groups in WinCC Professional

During system operation, messages concerning different processes and sections occur. In order to organize these message to get a better overview (for example depending on the sector of the system), you can classify these messages in alarm groups.

Types of alarm groups

WinCC (TIA Portal) provides the following types of alarm groups.

- **User-defined alarm groups**

User-defined alarm groups are created when needed. These alarm groups contain messages that need to be acknowledged and can contain further alarm sub-groups. Alarm sub-groups can be organized hierarchically with up to five sub-groups.

- **Alarm groups from alarm classes**

For every pre-defined alarm class, an alarm group has been created in WinCC Professional. These alarm groups are called class groups. All the alarms of these alarm classes are also contained in the respective class groups.

Scope of functions of alarm groups in WinCC Professional

In WinCC Professional, an alarm group contains several tags. These tags address the features of all messages assigned to this alarm group. If settings are made in an alarm class, the settings in the respective alarm group are automatically updated.

Purpose

The use of alarm groups is recommended for:

- combining alarms with the same cause.
- combining similar messages.
- monitoring and sorting alarms from one section of the system.
- monitoring and sorting alarms that are part of a process.
- handling alarms from one part of the system together (e.g. acknowledgement, blocking, display suppression).
- visualizing states of system sections.
- preventing the processes of the system (e.g. by acknowledging the alarm).

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4.6 The acknowledgement concepts in WinCC Professional

Define the acknowledgement concept for an alarm class. All the messages that are part of this alarm class will then be acknowledged according to the same concept.

In WinCC Professional there are the following acknowledgement concepts, distributed in more sub-concepts.

- message with acknowledgement
- message with a single acknowledgement
- message with double acknowledgement

In the following chapter, the acknowledgement concepts are explained in greater detail.

4.6.1 Message with acknowledgement

After a message without acknowledgement, the operator does not necessarily have to react to the message. The message comes and goes without an acknowledgement being necessary.

Alarm without status “gone” without acknowledgement

As long as the event that triggered the alarm is pending, the alarm remains pending. If the event that triggered the alarm is gone, the alarm will not be displayed any more. The alarm will be archived and does not have to be acknowledged.

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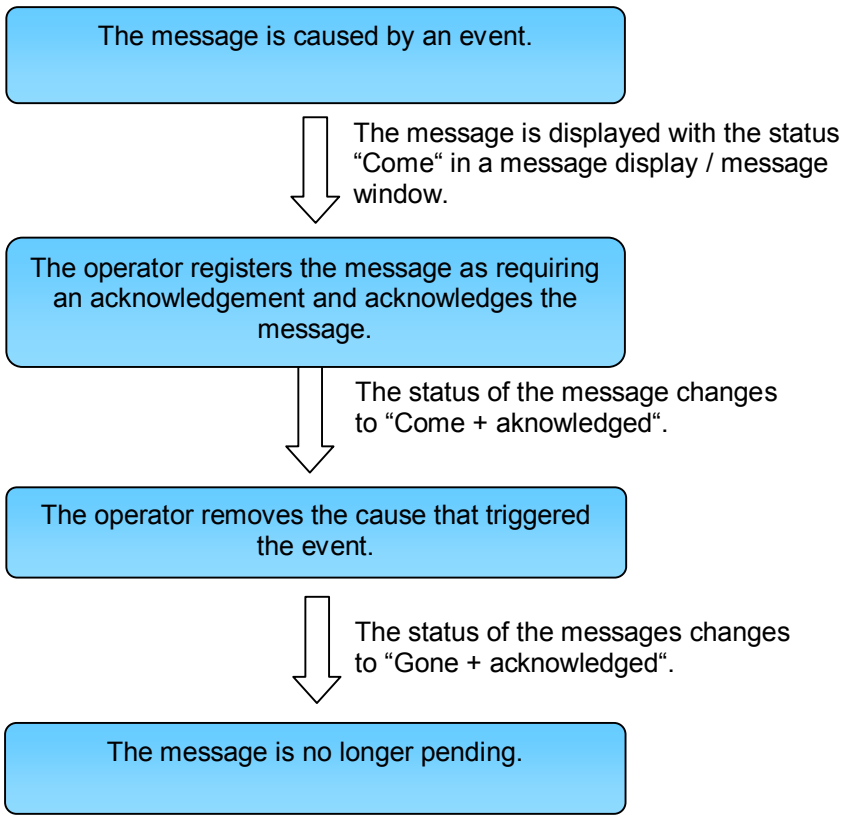
4.6.2 Message with a single acknowledgement



An alarm with a single acknowledgement requires an acknowledgement as soon as the event that triggered the alarm occurs. The alarm remains pending until the operator acknowledges the alarm.

Alarm without status “gone” with acknowledgement

The alarm remains pending as long as the event that triggered the alarm is pending and the alarm has not been acknowledged. If the event that triggered the alarm is gone and the alarm is acknowledged, the alarm will not be displayed any more. The message is archived.

Initial value alarm - flashing and single acknowledgement

An initial value message is a message within an alarm class. The alarm of which the status has first changed after the last acknowledgement is highlighted by a flashing in the alarm window. This alarm is called initial value alarm.

New value alarm - flashing and single acknowledgement

New value alarms are alarms within an alarm class. The alarms of which the states have changed after the last acknowledgement are highlighted by a flashing in the alarm window.

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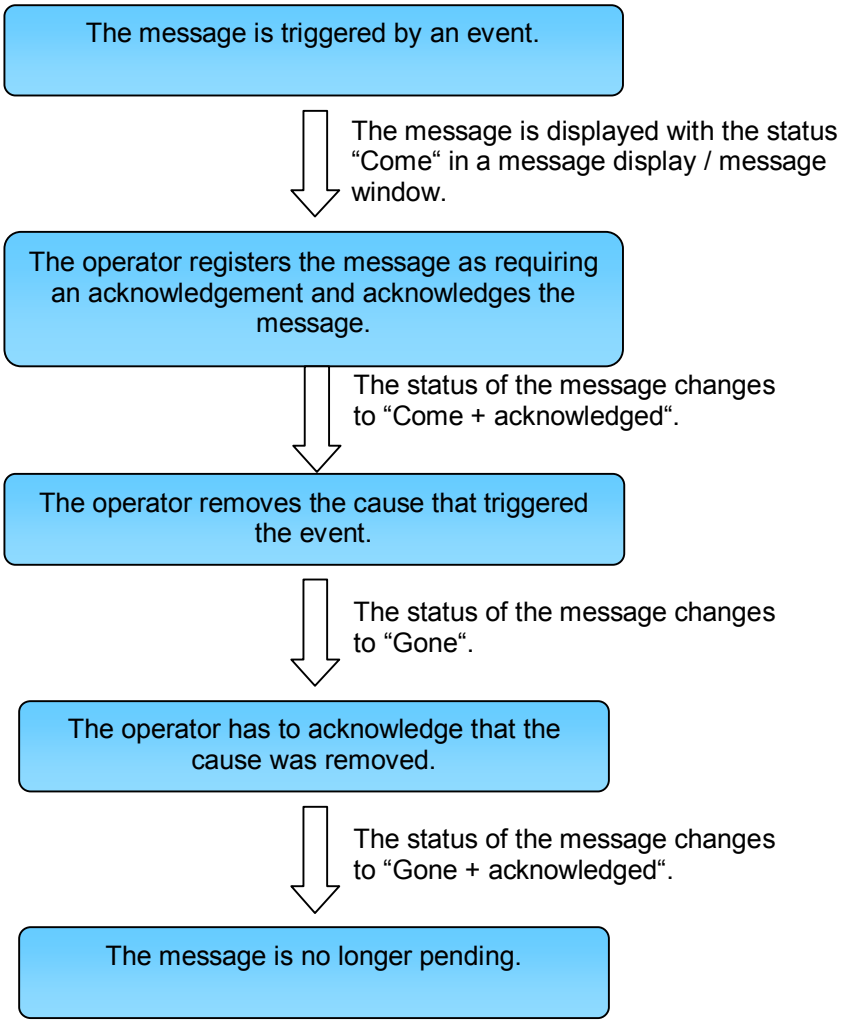
4.6.3 Message with double acknowledgement



A message with a double acknowledgement requires an acknowledgement as soon as the event that triggered the alarm occurs and an additional acknowledgement when the event is no longer pending. The alarm remains pending until the operator has acknowledged the alarm twice.

New value alarm - flashing and double acknowledgement

New value alarms are alarms within an alarm class. The alarms of which the states have changed after the last acknowledgement are highlighted by a flashing in the alarm window. These alarms must be acknowledged with the states “coming” and “going”.

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4.6.4 General Information on acknowledgement concepts

Acknowledgement of several messages at one time

The acknowledgement of several alarms at one time can be made by a group acknowledgement of an alarm group.

- **Group acknowledgement in the message display**
  All the visible, pending alarms that require acknowledgement can be acknowledged in one time with the button “Group acknowledgement” in a message display.

  Note Alarms with activated for which a single acknowledgement has been activated, cannot be acknowledged by group acknowledgement.

- **Acknowledgement with alarm groups**
  If you want to acknowledge several alarms at one time, these alarms must be assigned to the same alarm group. This means that if one alarm from this alarm group is acknowledged, all the other alarms from this alarm group will also be acknowledged. Therefore it is no longer necessary to acknowledge each alarm separately.

You will find further information on the alarm groups under Chapter 4.5.

Alarm annunciator

When an alarm annunciator was configured for an alarm requiring acknowledgement, there are the following possibilities of acknowledging the alarm annunciator.

- The operator acknowledges the alarm annunciator together with the alarm requiring acknowledgement.
- The operator acknowledges the alarm annunciator with the button “Acknowledgement alarm annunciator” in an alarm display.
- The alarm annunciator is acknowledged by a tag.

The settings for the acknowledgement of the alarm annunciator are made in the settings for the alarm class. These settings are applicable separately for every alarm class requiring acknowledgement.

Emergency acknowledgement

With the button “Emergency acknowledgement” of an alarm display, alarms requiring acknowledgement can be directly acknowledged with the alarm number in case of emergency.

NOTICE **The acknowledgement bit is also sent to the PLC, if the alarm with the respective alarm number is not pending.**

Only use the emergency acknowledgement in case of emergency.

Note You will find further information concerning the acknowledgement of alarms in WinCC Professional at the following link:

http://support.automation.siemens.com/WW/view/en/55622122

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5 Links & Literature

Internet links

The following list is by no means complete and only provides a selection of appropriate information.

Table 5-1

	Topic	Title
\1\	Reference to the document	http://support.automation.siemens.com/WW/view/en/62121503
\2\	Siemens Industry Online Support	http://support.automation.siemens.com
\3\	System Manual WinCC Advanced V11.0 SP2	http://support.automation.siemens.com/WW/view/en/57358923
\4\	System Manual WinCC Professional V11.0 SP2	http://support.automation.siemens.com/WW/view/en/57341024
\5\	System Manual STEP 7 Professional V11.0 SP2	http://support.automation.siemens.com/WW/view/en/57185407
\6\	SIMATIC HMI control panels Comfort Panels	http://support.automation.siemens.com/WW/view/en/49313233

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6 History

Table 6-1

Version	Date	Change
V1.0	09/2012	First issue