

# **SIEMENS**

## **WinCC**

### **Process Control Runtime**

#### **Manual**

**6ES7652-0XX01-8BB0**  
C79000-G8276-C130-01

**Edition August 1997**

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(We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.)

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## Preface

### **Purpose of the Manual**

This manual introduces you to the functions of each software component and their operation in a reference manual format. You can find the information you need quickly by using the table of contents or the index. Naturally, the information is also available to you in the on-line help in either a context-sensitive fashion or in the on-line help contents.

### **Total Overview and Configuration Example**

The "Getting Started" manual, which is part of the WinCC package, contains a total overview of WinCC and a configuration example in which the most significant functions of the individual components are followed through in a practical application.

### **Additional Support**

If you have technical questions, please address them to your Siemens contact partner, located in the businesses responsible for your location. You can find the addresses in the attachment entitled Siemens Worldwide, in "S7-300 Automation System Structure in an S7-300," in catalogs, and on CompuServe (go.autforum). In addition, you may call our Hotline at 011-49-911-895-7000 (Fax 7001).

You can find additional information on the Internet under the address [www.aut.siemens.de/coros/html\\_00/coros.htm](http://www.aut.siemens.de/coros/html_00/coros.htm).

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- \* To address the mailbox, use a modem with up to V.34 (28.8 kBaud), which parameters must be set as follows: 8, N, 1, ANSI, or dial up through ISDN (x.75, 64 kBit).

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# 1 Product Overview

## Notes about the Manual

The operating manual provides the operations personnel with guidelines for operating and monitoring a process. It provides information about the system structure and describes possible operations.

In addition, WinCC offers the opportunity to create user-specific operations by means of configuration. These operations are not described in this manual.

Due to the large number of options available during the picture configuration phase, the pictures or parts of pictures used for your system can look completely different. Therefore, the operations were described as examples using the available base data.

All of the pictures in this manual of the interface elements (menus, windows, boxes) can differ – depending on varying screen resolution and/or further development or changes to the run-time system – in their display (contents, scale, etc) from the pictures displayed on the screen. They are intended only as examples and do not guarantee consistency with the original nor completeness.

The release of the additional *Libraries* product contains some complex operator elements of conventional technology, like closed-loop controllers, motors, valves, display elements, and operator elements. This package is intended for use with SIMATIC S7 components.

## Assumption

The functions described in this user manual assume that you used the Basic Process Control option package for configuring your system. Additionally described functions are based on the use of the Advanced Process Control, Chip Card, Storage, and Video option packages.

## Implementation

The run-time system monitors and controls automatic processes.

The fully graphic and visually complete interface with Windows technology provides the user with a quick overview of the entire system down to the details. A functionally correct operation and a broad scope of help functions supports you in this overview.

Group displays for the alarm and warning functions in the different system areas as well as the Loop in Alarm function with the messages allow you a quick reaction and targeted intervention.

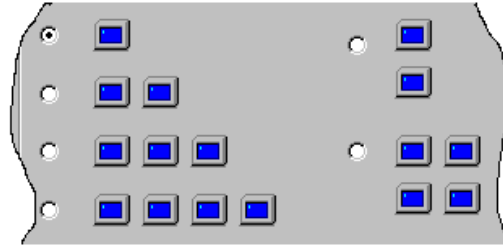
## 1.1 System Construction

### Overview

The WinCC run-time system is an operator system for central operation and monitoring as the following:

- Single-user system with one screen
- Multi-user system with up to four screens

The following screen arrangements are provided for selection:



The screen arrangement that is valid for the project is configured by the Split Screen Wizard.

The user manual describes the operation in the upper range of performance instance. The exceptions for the lower range of performance are described in a separate chapter of this user manual.

### Project

The term "project" describes the configured amount of data that belongs together and on which the entire run-time system is executed.

### Upper Range of Performance

Version of the user interface using the screen resolution of 1024 x 768 or 1280 x 1024. The operation is executed primarily by means of menu operations.

### Lower Range of Performance

Version of the user interface using the screen resolution of 640 x 480 (see configuration of Split Screen Wizard, Alarm Logging Wizard). The operation is also possible without a connected mouse. This instance is primarily implemented on an operator panel.



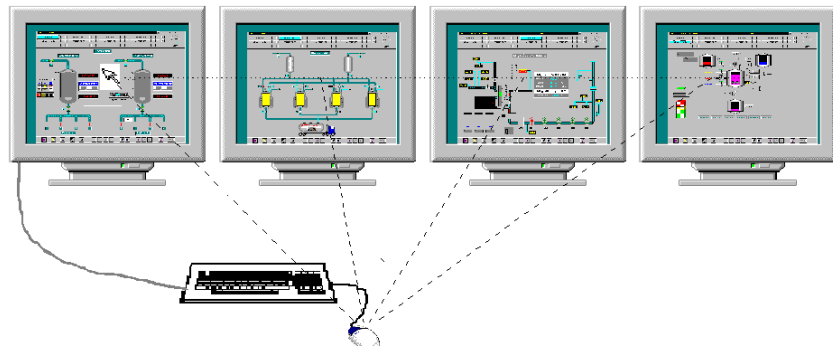
### Working with a Mouse and a Keyboard

How to Work with Mouse and Keyboard:

- Place the cursor on any screen and move it out of the range of the screen. The direction of the cursor movement allowed depends on the screen arrangement (left/right, up/down, diagonal).  
The cursor reappears on the next screen.
- On the screen you select this way, you can use the mouse to activate all of the functions that you activate on any of the connected screens. All entries are possible by means of the keyboard on every screen.

### Example

This example displays the arrangement of four screens that are arranged in a row. You can move the cursor in any direction from right to left or left to right.





## 2 Setting Up and Loading a Project

### **What You Should Know About This Chapter**

This chapter describes how to select, set up, and finally load (activate) a new project for the run-time system.

If you have already done this for the project you want to activate, you can skip Chapter 2.

### **Overview**

After you have created a project and you want to connect it to the run-time system, use the following steps:

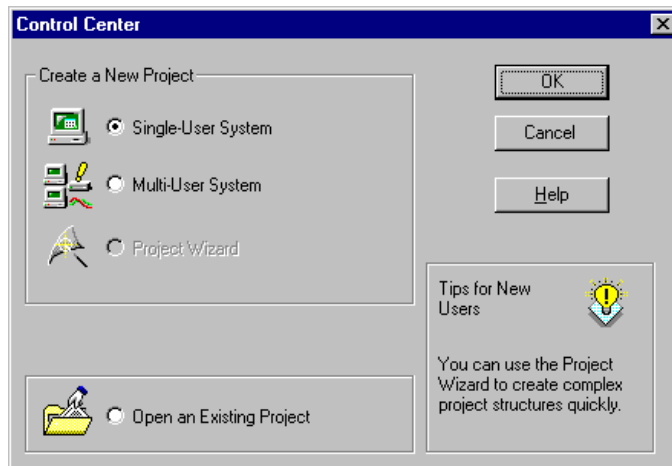
1. Select a project.
2. Assign a computer to the project.
3. Use the Split Screen Wizard to configure and initialize the picture setting.
4. Use the Alarm Logging Wizard to set up the message system with fixed default settings.

## 2.1 Selecting a Project

### Overview

If you are starting WinCC for the first time or if you want to load a new project, execute the following dialog:

1. After your first start, the following picture is displayed:



2. Click on "Open an Existing Project" and then on "OK." This selection displays a window (see example below) in which you can set the path on which the project is located.
3. Click on the <Name>.mcp file to display the Control Center window.

### Setting a Computer

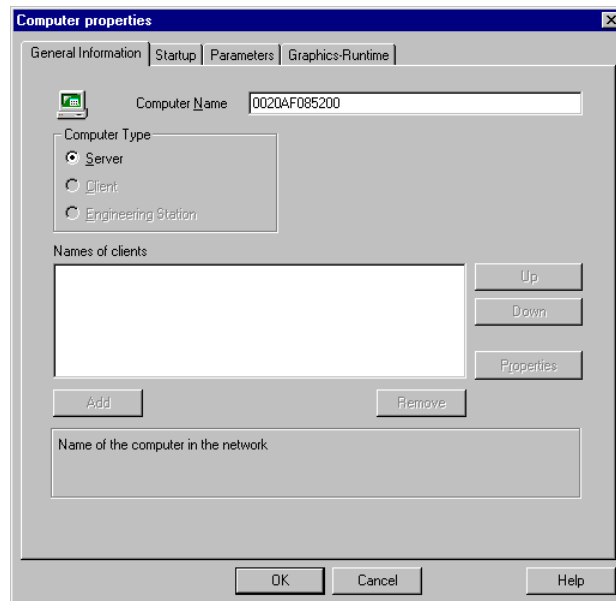
If the computer is not in the computer list of the open project, you must make the setting before you can activate the run-time operation.

- Single-user system  
Click on the computer in the Control Center and open the "Properties" dialog. Enter the name of your computer.
- Multi-user system  
Change a configured computer or accept your own computer as an additional operator station.

If you need to set the properties of the computer on which the project is to be run, you must open the window for these entries.

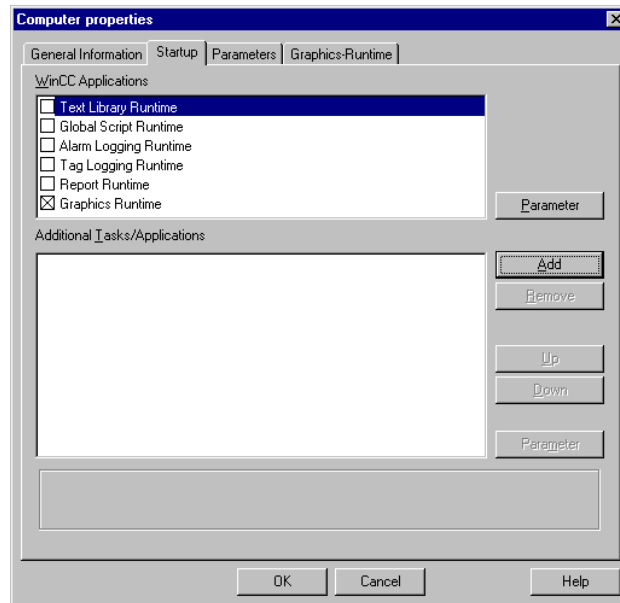
How to open and operate the following Windows:

1. Click on "Computer" in the Control Center and the following window appears in the display area:



Execute your settings for your computer configuration.

2. Click on "Startup".  
The following window is displayed:



The system makes the entries displayed above in "Additional Tasks/Applications" (prerequisite is the implementation of the option package).

**Note:** The prerequisite for the Basic Process Control option package to function in run time is to activate the Text Library run time and Alarm Logging run time applications.  
Tag Logging run time must be active to implement the trend package.

## 2.2 Activating a Project for the RUNTIME Mode

### Overview

After you have completed all the preparations, activate the project

1. Click on "File" in the Control Center.
2. Click on "Activate."

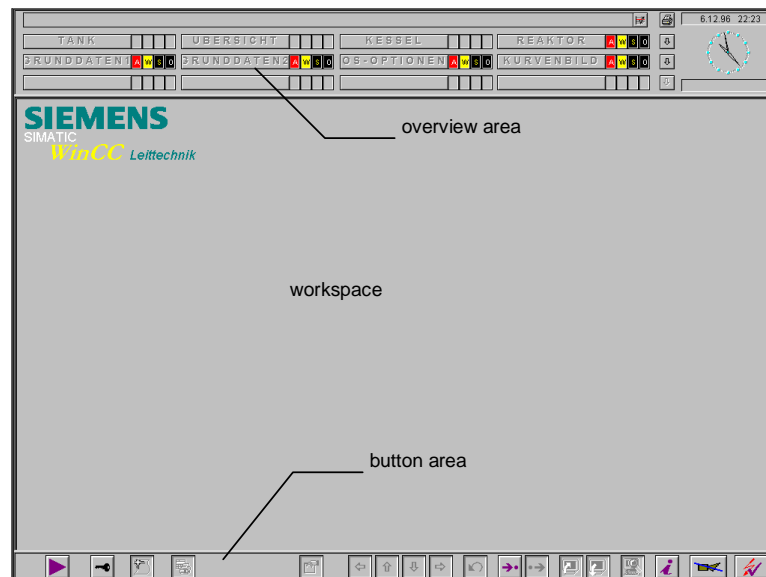
This selection triggers the start process for the run -time system.

## 3 User Interface

### Overview

This chapter explains the division of the user interface and the basic conditions for the run-time system. The use of the Basic Process Control option package during configuration is a prerequisite.

**The Run-Time System** A project from chemistry was implemented as an example. After you activate the project, the screen displays the following start interface:



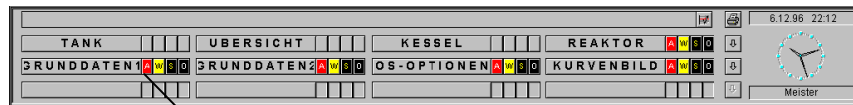
### Screen Division

The output area is divided into three areas (see picture).

- Overview area
- Workspace. The pictures of the individual system areas are displayed here.
- Button area (keysets)

### 3.1 Overview Area

The overview area is a picture that is always displayed and provides an overview of the entire system. Each system area (maximum 12) is represented by an area selection button in the overview area. Use the button to select the top process picture (area picture) in the picture hierarchy.




This example of the overview area contains the following elements:

Functionality	Button
<i>Message Line:</i> Always displays the most recently entered message	
<i>Message Acknowledged Button:</i> Button for acknowledging the currently displayed message	
<i>Area Selection Button:</i> Displays the area picture in the workspace. The name of the button corresponds to the container name of the picture configured in the Picture Tree Manager on the top layer.	
<i>Loop in Alarm (Picture Selection Alarm Source):</i> Displays the picture with the alarm source.	
<i>Group Display:</i>	
<i>Display of the System Overview:</i> Changes the display of the overview picture.	
<i>Current Date and Time:</i> Displays the date and time in a digital format.	
<i>Analog Time:</i> Displays the current time of the computer precisely to the second.	
<i>Login:</i> Displays the name of the current user.	
<i>Screen Hardcopy:</i> Prints the active screen contents to the default printer of the computer.	

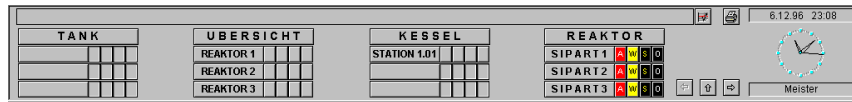





## Changing the Overview Display

You can change the display of the areas in the overview area in the following ways:

- Click on the  button to display the four areas to the left of this button in a detailed area picture together with up to three plant sections.

The following is displayed:



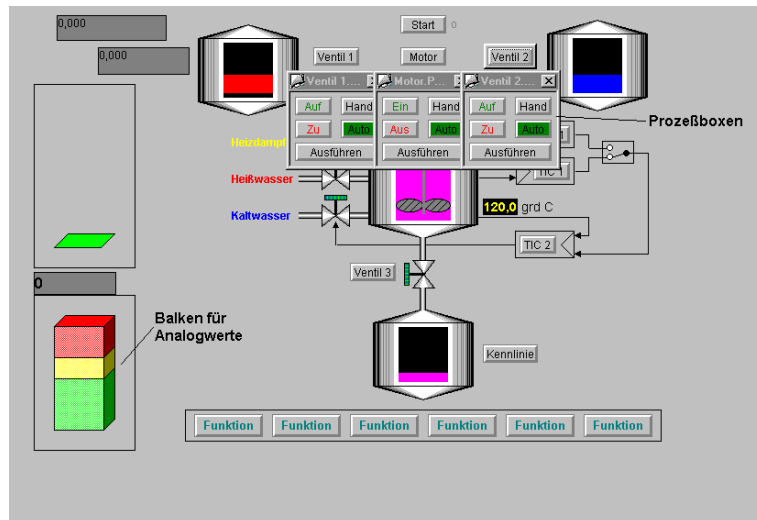
- Select neighboring areas by clicking on  or .
- Reset the total display by clicking on .

## 3.2 Workspace

### Overview

The workspace displays the individual pictures of the different areas of a system. This is where the process is displayed, controlled, and operated.

The pictures in the workspace are displayed by means of selection in the overview area, navigation buttons through the picture hierarchy, picture selection dialogs, and configured direct picture selection functions.



### 3.3 Button Area (Keysets)

**Overview** The button area displays all of the buttons that trigger operations. Two keysets are set in the run-time system.

#### Keysets:

##### Keypad 1



##### Keypad 2





#### Colored Button Display

There are two colored displays for the individual buttons;

- No color (gray):  
The buttons are not active. You cannot operate these buttons.
- Color:  
The buttons are active. You can operate these buttons. The colored display occurs only if you can select a function.

#### Changing the Keysets

You can change between these two keysets by means of the  and  buttons.

Position the mouse pointer on a button and click the right mouse button to view a text box next to the button. This text box identifies the function of the button. The box remains in view as long as you hold down the right mouse button. Click on the left mouse button to execute the corresponding function.



## 4 System Operations

### Overview

This chapter describes the functions that have no direct relation to the process. For example:

- Login for the run-time system: Use the chip card or password to log on to the system.
- Cursor, buttons, picture information: General explanation
- Exiting the run -time system
- Switching languages
- Displaying the video picture
- Displaying the system picture (Lifebeat Monitoring)
- Selecting an area
- Saving and redisplaying a picture composition
- Displaying report jobs
- Selecting the User Administrator

### 4.1 Login of the Run-Time System



#### Overview

You have two ways to log on to the run-time system:

- Use a chip card if a chip card reader is connected.
- Enter login and the corresponding password if it was generated.

If no password was generated, the run-time system is available to everyone.

#### Procedure


How to Enter These Data:


1. Click on the  button. The following input possibilities are displayed:


2. Enter your LOGIN and the password. Now you can operate the run-time system.

## 4.2 Cursor, Button Function, Picture Information

The following list contains the basic operations:


Function	Button	Explanation
Cursor in the run-time system		As soon as the cursor is displayed this way, you can activate a function (button or input) or make process entries. If a lightning bolt icon is not displayed, you cannot make any entries.

Button Functionality		<p>The functionality of the button is displayed</p> <p><b>How to view this display:</b></p> <ul style="list-style-type: none"> <li>• Position the cursor on the appropriate button.</li> <li>• Click the right mouse button and hold it down.</li> </ul>
----------------------	---	--

Picture Information		<p>You can receive information about the picture that is currently displayed. If the full screen changes while the picture information is displayed, this is shown in the picture information immediately.</p>
---------------------	--	--

**How to view this display:**

Click on the button shown. The following is an example of the picture information displayed:



picture information	
picture name	@Welcome.PDL
container name	
member of area	
last change	05.12.96
width	350
height	250
operation	yes
password	...
operation report	no
cycle rate	2 Seconds
cursor mode	...
<hr/>	
WinCC version	3.x
computername	0020AF085200
project file	C:\PROJECTS\test1\test1.MCP

## 4.3 Exiting the Run-Time System



### Overview

You must exit the run-time system in a defined manner. There is an appropriate end routine for this function.

### Procedure

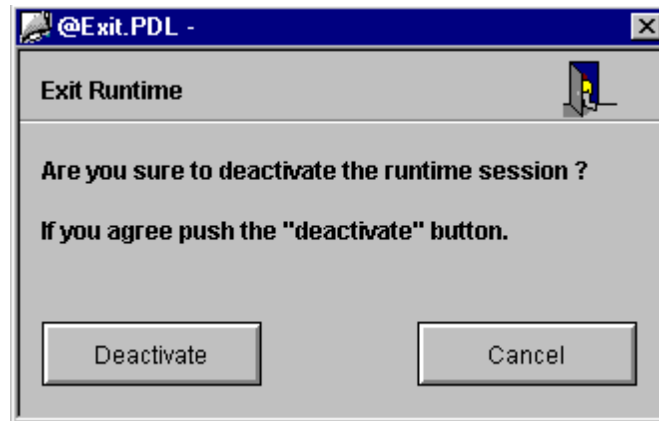
Use the following steps to exit the run-time system:

1. Switch to this keyset (if it is not already set):



2.  Click on this button.

A defined exit is displayed:



3. Click on "Deactivate."

The run-time system ends.

## 4.4 Language Switch



### Overview

From the run-time system, you can change the language that is currently set for the process operation as well as for all of the run-time functions. The switch to another language is executed immediately.

### Procedure

How to Switch the Language Setting:



Click on this button (Keyset 2).

A window is displayed in which you can set the desired language.





## 4.5 Display Video Picture (Windows 95 Only)



### Overview

In the run-time system, you can display a picture that was recorded by a video camera if the appropriate video card (WinCC option) was installed. If there is no video connection available, the system displays an empty window. This display is only possible on the screen on which the video card was installed as hardware.

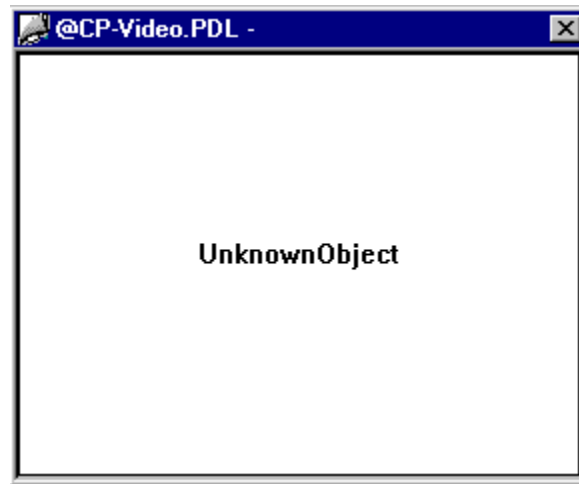
### Procedure

How to Turn On the Video Picture:



Click on this button (Keyset 2).

A window is shown with the video picture or the "UnknownObject" display if the system cannot display the video picture.



## 4.6 Displaying the System Configuration Picture (Lifebeat Monitoring)



### Overview

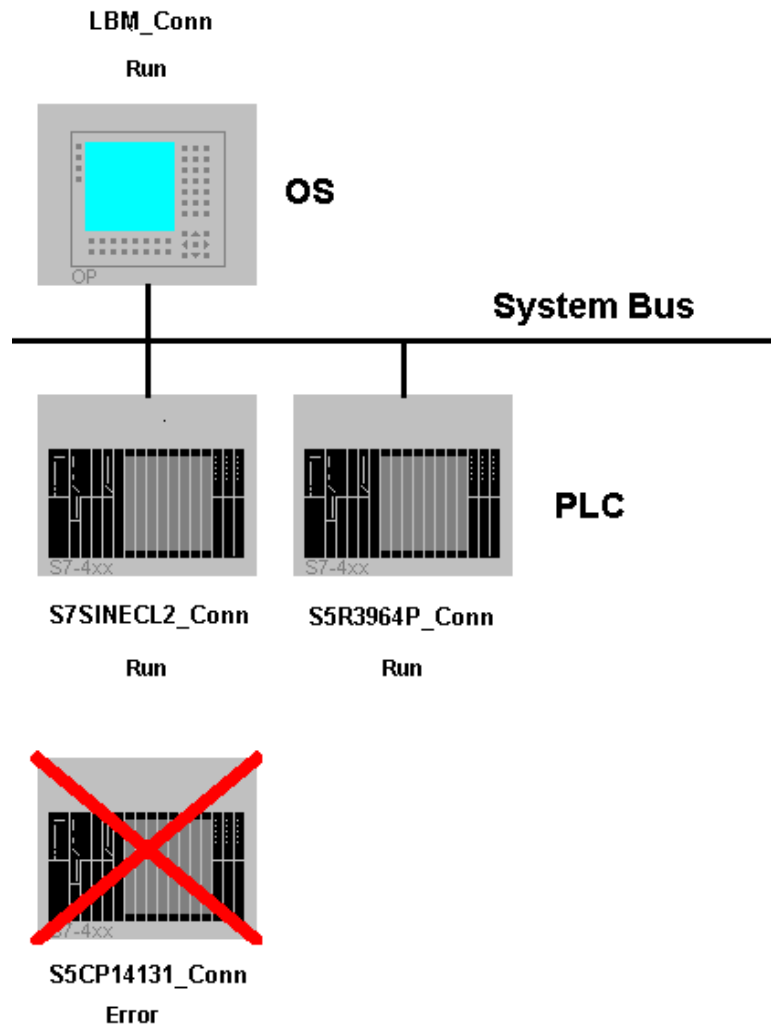
Lifebeat Monitoring is responsible for the permanent monitoring of the individual systems (operator stations and PLCs) and generates the process control system messages. The horn is triggered if the horn was configured during the process control system message and a signal module was installed.

The monitoring is started automatically after a restart for the configured components and is executed cyclically. If a node does not respond repeatedly, a message is created.

### Structure of the System Picture



In the run-time system, all of the components to be monitored are displayed in a graphic form. The components that are currently not functional (due to an error, for example) are stricken through in the graphic.

Example of a System Display:



### Displaying a System Picture

How to Display a System Picture:

1.  Click on this button.  
The current system picture is displayed (Example: picture above).
2.  Click on this button to exit the system picture.

## 4.7 Selecting an Area

### Overview

The pictures of the individual plant section areas are displayed in the workspace. You can select them in the overview area.

### Button Display

There are three colored displays of the area buttons.

- No color (gray):  
The button is not active. You cannot select any pictures. This is the case if the user that is logged on does not have any "Enable for User" authorization.
- Black font on a gray background:  
The buttons are active and you can select the area picture with them.
- Black font on cyan-colored background:  
The picture displayed in the workspace is located in the system area (within the area picture in the hierarchy tree) that is represented by the button.

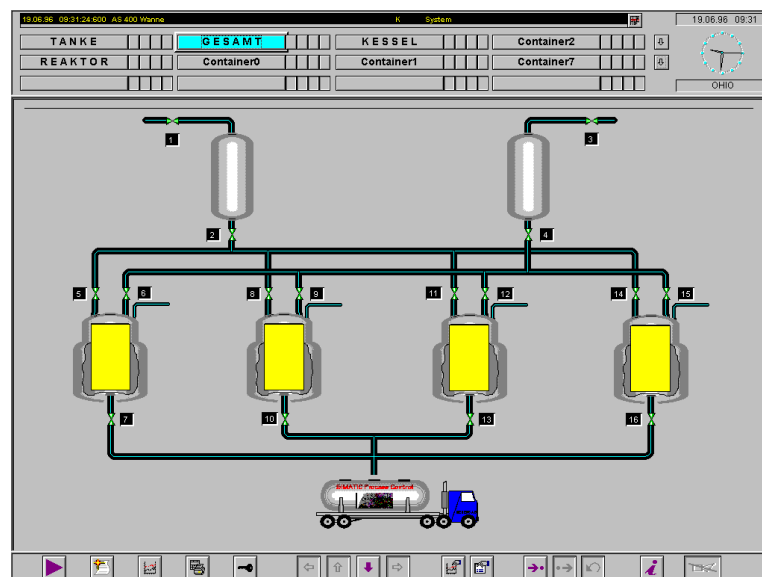
### Selecting an Area

Select an area by clicking on the appropriate button.

#### Example:

Click on .

The corresponding system picture is displayed.



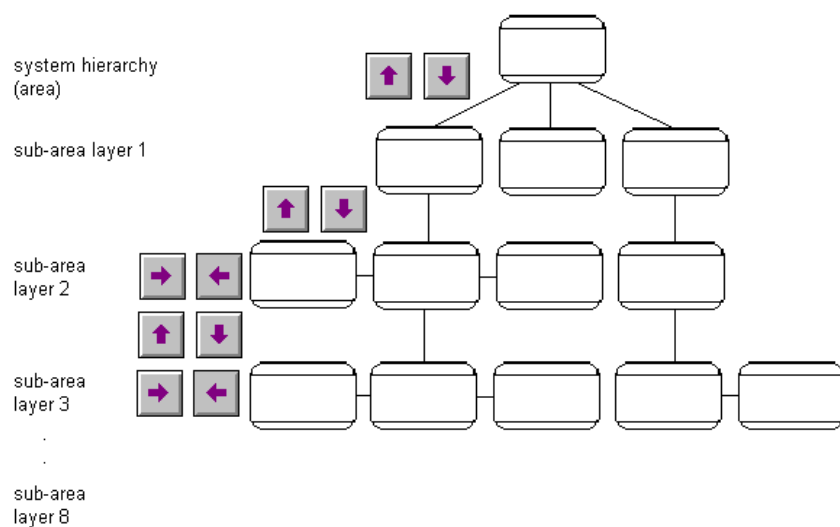
### 4.7.1 Navigation through the Picture Hierarchy





**Selecting Sub-Areas:** If the selected area has additional sub-areas, you can select these. The coloration of the arrows shows if there are additional sub-areas available. The buttons (in keyset 1) displayed above are responsible for this.

**Moving in the Picture Hierarchy** An area and its sub-areas has a structure that you select. You can move within this system hierarchy.

The picture below shows the system hierarchy to show how you can move in the system hierarchy in the run-time system.



-  Switch from one area or sub-area layer to another (for example, from sub-area layer 1 to sub-area layer 2).
-  Move within a sub-area layer (you do not leave the layer) (for example from sub-area layer 1 picture 1 to picture 2 and back).

## 4.8 Saving and Redisplaying a Picture Composition



### Overview

You can save the system view currently displayed for all of the screens that belong to a project in a picture composition. Once you save the system view in this way, you can display it again any time you need to during a session and also after you restart the run-time system.

### Saving a Picture Composition

How to Save a Picture Composition:



1. Use this button to select the function.

The following window is displayed:



2. Enter a name for the picture composition or select an existing picture composition and write over it.
3. Use "Save" to exit the window.

All of the pictures currently displayed on the screen are saved.

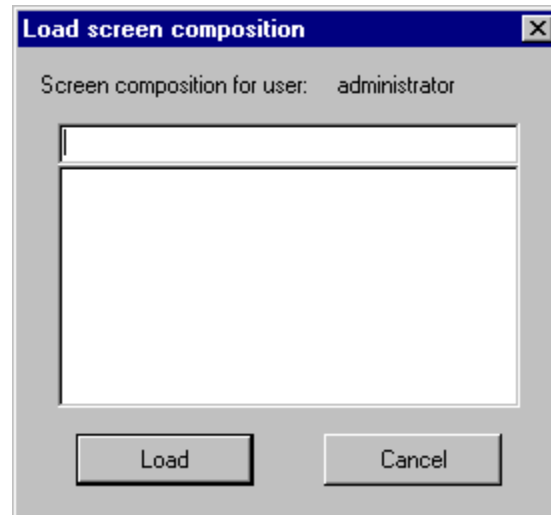
## Loading a Picture Composition

How to Load (display again) a Picture Composition:



1. Use this button to select the function.

The following window is displayed:



2. Select one of the displayed picture compositions.
3. Click on "Display" to exit the window.

The pictures that were saved are displayed again on all of the screens.

## 4.9 Displaying Report Jobs



### Overview

An overview is displayed of all of the report jobs that belong to a project that is currently started.

### Procedure

How to Display Report Jobs:



1. Click on this button.

The following window is displayed:

Name	Layout	Next print time	Status	Printer
Alarmlog	@alrtmf.rpl			\\0020af085200L...
Documentation ...	@AlgCS.RPL			\\0020af085200L...
Documentation ...	@MCPCS.RPL			\\0020af085200L...
Documentation ...	@GSC_RACT.RPL			\\0020af085200L...
Documentation ...	@GSC_RPFC.RPL			\\0020af085200L...
Documentation ...	@GSC_RSFC.RPL			\\0020af085200L...
Documentation ...	@pdlpic.rpl			\\0020af085200L...
Documentation L...	@LBMCS.RPL			\\0020af085200L...

2. Exit the display by means of the usual acknowledgement.

## 4.10 Selecting the User Administrator



### Overview

The User Administrator distributes and controls access authorizations of Users. The main task of the User Administrator in the run-time system is to monitor the system logons and access authorizations. This applies on the configuration layer as well as the run-time layer.

If you do not set any user authorization in your project (no user is configured), all operation possibilities are available to you at all times. If you have set up a user in the project, then secured operations are only possible if the user is logged on with the appropriate authorizations.

### Authorization

Only the user that is enabled for the "User Management" layer has the authorization to display the User Administrators.

All changes to user authorizations affect the run-time system immediately as soon as you have saved the changes.

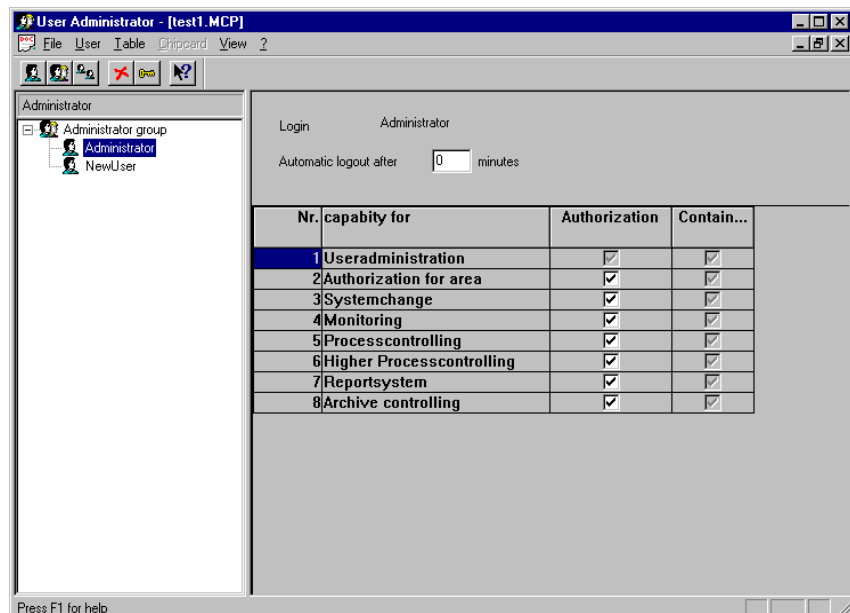
### Procedure

How to Activate the User Administrator:



1. Click on this button.

The following window with an example in the "Administrator Group" is displayed.



### Operating the User Administrator

The operation of the User Administrator is described in the *WinCC Manual Control Center + Global Scripts + User Administrator*.



## 5 Message System (Alarm Logging)

### Overview

This chapter describes the possibilities that are available in the run -time system to display and edit messages.

### Function of the Message System

The WinCC system gets messages from the PLC and enters them chronologically into the message journal. The messages can then be displayed in the message window in the form of different message lists. The message lists each contain a selection of all of the messages entered.

The following types of messages exist:

- **Process Messages**

These report process events of the automated process. This includes the limit violations of measurement values and operating messages.

- **Process Control System Messages**

These are error messages that are caused or recognized by components belonging to the SIMATIC PCS 7. Such things as the failure of one of the components to a broken-wire message from a connected I/O signal are reported in this manner.

- **Operator Input Messages**

These are created during the operation of process variables. This can occur when switching operating modes of a controller, for example.

- **System Messages**

These are created by WinCC.

## 5.1 Messages

### Structure of a Message

A message consists of system information and different parameters that are displayed in the form of columns in a table. If these identifiers (names) contain the appropriate values and units, they are called message blocks.

The message blocks can be divided into the following three areas:

- **System Blocks**

These contain system data that is assigned by Alarm Logging. The data include date, time, identifier for reporting, etc.

- **Process Value Blocks**

These contain the values provided by the process, for example, critical fill levels, and temperatures.

- **User Text Blocks**

These are texts that contribute to the general information and understandability, for example, explanations of messages, error location, and message cause.

While system blocks are attached to the message permanently, the user can assign process value blocks and user text blocks to a message. Selections with system blocks affect only their display, not their method of reporting.

During configuration in the Alarm Logging configuration system each individual message is configured in a line.

### Example of a Message Line

Datum	Zeit	Herkunft	Ereignis	Status	Type	Quartier	Info	Oc
26.06.96	14:57:10.303	AS 400 Wanne		R	System		X	

### Status of a Message

There is a difference between the status of the message cause (process value 0/1) and the acknowledgement status (not acknowledged/acknowledged). The message status is derived from a combination of the status of the message cause and the acknowledgement status.

Depending on the acknowledgement concept, a message recognizes up to four states:

- Came in
- Came in, acknowledged
- Came in, went out, not acknowledged
- Came in, went out, acknowledged

The current status of the message is displayed by means of the following:

- Color/flash display of the elements
- Clear text in text elements
- Time entries in the message line

### Messages and Their Acknowledgement

The following list displays the acknowledgeability of the available message classes:

Message Class	Message Type	Acknowledgement
Alarm	AH, AL	Came in, flashing on
Warning	WH, WL	Came in, flashing on
Tolerance	TH, TL	No acknowledgement, no flashing
PLC error PLC box	S, F	Came in, flashing
<b>Process control system messages</b>		On
Operator station process control system messages (OS-internal process control system message, Batch flex process control system message)	S	Came in, flashing on, went out without status
Preventive maintenance	M	Came in, flashing on
Process message	PM	Came in, flashing on
Operating message	PM	No acknowledgement, no flashing
Request for operator input	OR	No acknowledgement, no flashing
Operator input message	OM	No acknowledgement, no flashing
		Went out without status

## 5.2 Message Window



### Overview

The display of the messages occurs in the run-time system in message windows. They contain all of the queued messages in the form of a table. Once a message is no longer queued, it is not displayed. You can use filters that you define yourself to adapt the message window to each part of the process and system.

Use configurable buttons to move around within the table in the message window or to trigger actions. You can call up a picture that displays the message cause (Loop in Alarm) for each message.

The message archive makes long-term archiving of the messages possible in their own large memory area (for example, on the hard disk).

### Selecting messages

In the run-time system, you can display lists with messages and edit them. The messages displayed in the list relate exclusively to the current project.

### Message Selection

You can display the following selections:

- **New List.** All of the message that have not been acknowledged.
- **Old List.** All of the acknowledged messages that have not gone out yet.
- **Went Out List.** All of the messages that have gone out.
- **Process Control System List.** All of the process control system messages.
- **Operator List.** All of the operator input messages.
- **Journal List.** All of the messages.

While the new list, old list, and went out list display selections from the message list (current messages), the journal list, process control system list, and operator list access the message archive.

### Note:

If multiple messages come in and go out behind each other several times without being acknowledged, the older messages are constantly removed from the new list. The journal list (archive), however, contains all of the messages.








### Procedure

How to Display Message Lists:




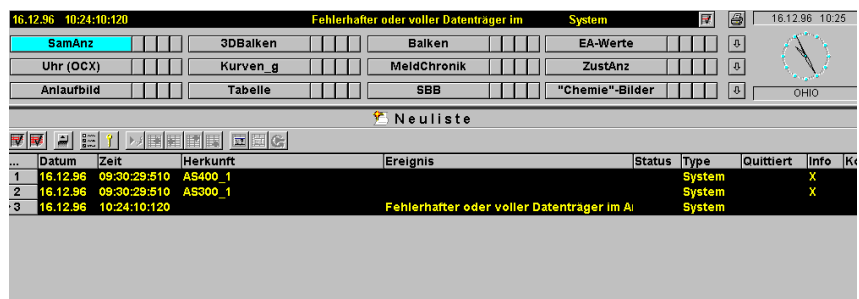
Use this button (keyset 1) to select the function.

First the new list is displayed. A new keyset is displayed. Use these buttons to select the individual lists:

Button	Message List
	New list
	Old list
	Went out list
	Process control system list
	Operator list
	Journal list
	Exit the function and return to keyset 1.

### Example

After you select the  function, a window similar to the following is displayed:



...	Datum	Zeit	Herkunft	Ereignis	Status	Type	Quittiert	Info	K
1	16.12.96	09:30:29.510	AS400_1			System		X	
2	16.12.96	09:30:29.510	AS300_1			System		X	
3	16.12.96	10:24:10:120		Fehlerhafter oder voller Datenträger im Ai		System			















**Contents of the Message Line**






The following list explains the meaning of the individual columns in a message line:

<b>Terms</b>	<b>Explanation</b>
Date	Date for came in, went out, and acknowledged.
Time	Each time the message status changes, the assigned time element is displayed (time stamp of the status change).
Source	Technological assignment of the message source: system identifier consisting of the hierarchy, plan name, and block name, input as wildcard.
	Location identifier for driver blocks.
Event	In technological blocks, this contains a message text that you can define yourself.
	In driver blocks, this contains a message text with integrated collateral values for chain/rack/slot or error identifier/block number/relative address.
Duration of Message	Duration of time in which a message was queued.
Status	Status of the acknowledgement (for example, came in, went out, acknowledged, came in-went out)
Type	Message class like Alarm High, Tolerance High.
Acknowledged	
Info	You can have an additional configured information text for each message.
Comments	
Charge Name	Contains static text (4 lines), charge name (16 lines) and charge text number (5 lines) entered by means of collateral values.
Range	Range identifier

## Operations in the Message Lists

The following list explains how you can move in the message lists and edit the individual messages

Function	Icon	Explanation
Display process message window		Displays the contents of the current message window.
Display short-term archive		Displays the contents of the short-term archive
Display sequence archive		Displays the contents of the sequence archive
Horn acknowledgement		Acknowledges an optic or accoustic signal
Single acknowledgement		Acknowledges a single message
Group acknowledgement		Acknowledges all existing, <b>visible</b> messages that require acknowledgement in the message picture as long as they do not require single acknowledgement.
Auto-scroll on/off		Turns the automatic scrolling on or off. With automatic scrolling, the current message appears on the lower border of the window. The old messages are shifted up. Functions for editing the messages apply only to the currently queued messages. Manual scrolling is turned off.
Selection		Sets selection criteria. All of the messages that do not meet these criteria are not displayed (but are archived). Opens a dialog for selecting messages that should be selected.
Set lock		Sets selection criteria. All of the messages that do not meet these criteria are not registered (and therefore not archived). Opens a dialog for selecting messages that are to be locked.
Report functions		Function for creating paper documentation. Presently not available!
City call functions		Presently not available!
Reset		Acknowledges a message that requires acknowledgement.
Start of the list		Display the start of the list. The cursor jumps to the first list element. You must turn auto -scroll off.
End of the list		Display the end of the list. The cursor jumps to the last list element. You must turn auto -scroll off.
Next message		The cursor moves to the next list element. You

		must turn auto-scroll off.
Previous message		The cursor moves to the previous list element. You must turn auto-scroll off.
Info text		Opens a dialog in which you can enter info text.
Comments		Opens a text editor in which you can enter comments.
Loop in Alarm		Displays a picture for the selected message or triggers a script.
Switch language		Changes the language



## 6 Trend System

### 6.1 Creating Trends Online



#### General Information about Creating Trends Online:

The tags and range assignments that you created by means of the "Tag Editor" are linked in the run-time module "Create Trends Online" with a trend template created by means of the "Trend Wizard."

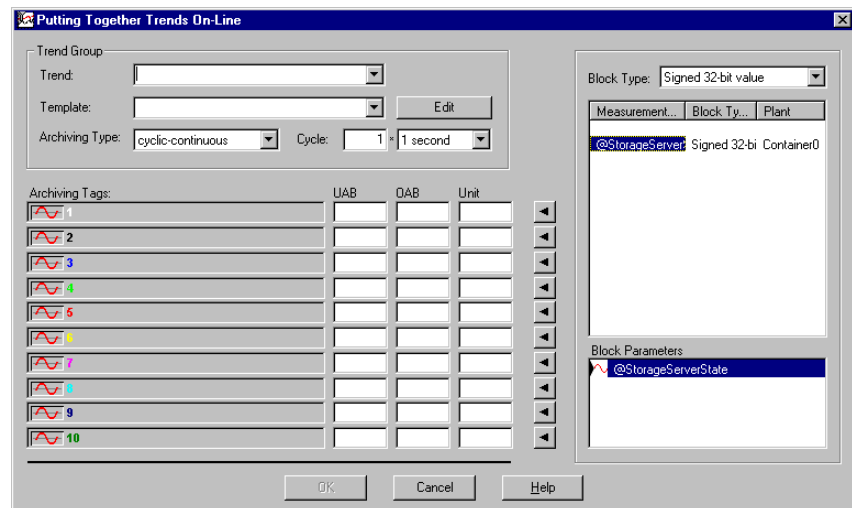
**Note:** The "Create Trends Online" dialog is available only in



RUNTIME mode. Click on the button ("Display/Create Trend Group") in keyset 1 in RUNTIME to open the "Create Trends Online" dialog. Use the "Edit" button in this dialog to open the Trend Wizard for creating/editing a trend template.

#### ► Structure of the "Create Trends Online" Dialog Window:

Within this dialog, the available input fields and buttons have the following meaning:



#### ► Trend Group

The structure of the trend as well as the archiving type is set within this group.

**► Trend:**

Use this list box to assign a name to the configured trend or to select and open a trend. You can also select a trend from the list box and use the "Delete" button to delete the selected trend.

---

**Note:** Once you have made all of the settings and click the "OK" button, the system creates a file with the following name:  
"@CONLn\_x.pdl"  
**n** = 1 = Full screen (10 trends)  
          2 = Half screen (5 trends)  
          3 = Quarter screen (3 trends)  
**x** = Trend name

---

**► Template:**

Use this list box to select an existing template and use it as a reference for the new trend. To create or edit a configured template, use the "Edit" button. The "Edit" button starts the Trend Wizard.

**► Archiving Type:**

Use this list box to set the type of archiving. You can select from the following three archiving types:

- **Cyclic-continuous:** Cyclic-continuous archiving monitors tags/measurement values.
- **Cyclic-selective:** Cyclic-selective archiving links the event control with the archiving that is controlled by the cycles.
- **Acyclic:** Acyclic archiving accepts the current value when the corresponding configured event occurs.

**► Cycle:**

Different time cycles are set up for acquisition and archiving. They are the basis for data acquisition in digital systems. During input, the period length or the time between two scans is provided. The minimum period length you can set is 500 ms. All of the time bases that can be set are integer multiples of this period length. You must enter a value  $\geq 1$  in this input field. If you enter a value  $\leq 0$ , the cycle is set to 1 as a default.

---

**Note:** The precise time frame for the update is derived from the formula:

$$(\text{Update cycle} = \text{cycle} * \text{time cycle})$$

The time cycle is found in the list box and can have the following values:

**500 milliseconds**

**1 second**

**1 minute**

**1 hour**

**1 day**

For example, if you select a value of 2 in the "Cycle" box and select a time cycle of "500 ms" from the list box, the following update cycle results:

$$2 * 500 = 1000 \text{ ms} = 1 \text{ second}$$


---

► **Tags To Be Archived:**

This group displays the number of tags (maximum of 10) and the trend type (**analog** or **binary**) that you selected in the Trend Wizard.

► **Trend Display:**

These icons identify the display type of the trend.



= **Analog trend**



= **Binary trend**

► **UAB and OAB:**

Accept or overwrite the limit values of the tags, as long as they were configured, in these boxes. These entries apply only for the display and can differ from the configured limit values.

UAB = **Low Display Area**

OAB = **High Display Area**

You can find information about *Limits/Reporting* of a tag in the Control Center manual.

► **Unit:**


Use this box to edit the unit of size of the selected tag. This box can contain the following:

**cm, mm, ms, liter, or m<sup>3</sup>.**


There are two ways to set the unit of size:

- Make the entry directly in this box.
- In the Control Center, create a text tag with the same name as the tag and the extension "#UNIT" to be monitored.

**Example:**

The tag "S5Var1" of the "Unsigned 16-bit value" data type is to be monitored. You must create a new tag with the name "S5Var1#UNIT" and the data type "Text tag 8-bit character set" in the Control Center and activate the "Start Value" and "Replacement Value" check boxes in the "Limits/Reporting" tab and enter each desired unit of size, for example, "cm." Select the tag "S5Var1" in the "Create Trends Online" dialog and click the  button to display the value (for example, "cm") in the "Unit" box.

---


**Note:** Use the  "Set Parameters" button in the "Create Trends Online" dialog, "Y Axis" tab under the "Title" input field to set the unit of size for the measurement scale in RUNTIME mode.

---

▶  **Button:**

Use this button to transfer the selected tag to the "Tags to be archived" column. This button is enabled only when the data type of the tags corresponds to the selected trend type. This means that if you want to display a binary tag with an analog trend, for example, the button is NOT active but is displayed in gray.

---

**Note:** To delete an entry in the "Tags to be archived" proceed as follows:  
In the measurement points list, under the "Block Type" list box, there is an empty entry in the first space. Select this entry and use the  button.

---

▶ **Block Type:**

Use this list box to select the block type. The system displays all of the available measurement points of this type in the measurement point list. The "Block Parameters" selection window lists all of the tags of this type.

---

**Note:** Only the block types of the measurement points that were created by means of the Tag Editor are displayed.

---

▶ **Block Parameters:**

Use this selection window to select the tag to be transferred to the list of "Tags to be archived."

## 6.1.1 Trend Wizard



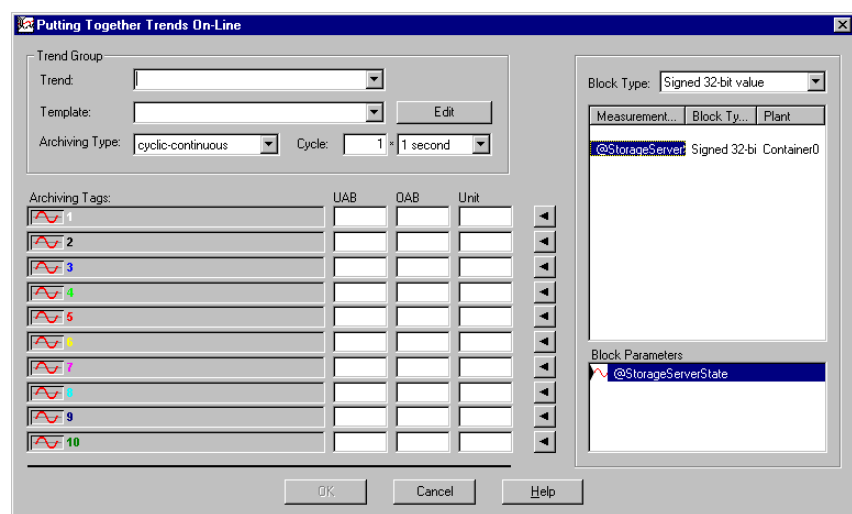
### General Information about the Trend Wizard:

The Trend Wizard creates trend templates in a specific set format in three different sizes. To display trends, use the "Create Trends Online" function to connect these templates to the tags to be displayed.

**Note:** The Trend-Wizard is available only in RUNTIME mode. Click





on the button ("Display/Create Trend Group") in keyset 1 in RUNTIME to open the "Create Trends Online" dialog. Use the "Edit" button in this dialog to open the Trend Wizard.



The individual boxes have the following meaning:

Name	Description
<b>Template</b>	Enter the name of the trend template. <b>Note:</b> Once you have made all the settings and click the "Save" button, the system creates a file with the following name: "@KWIZn_x.pdl" n = 1 = Full screen (10 trends) 2 = Half screen (5 trends) 3 = Quarter screen (3 trends) x = Template name
<b>Picture Size</b>	Depending on the picture size selected, different templates can be created: Full screen with 10 trends Half screen with 5 trends Quarter screen with 3 trends

<b>Save</b>	Save the trend template under its displayed name.
<b>Delete</b>	Delete the trend template with the name displayed.
<b>Help</b>	Activate on-line help.
	Assign analog or binary behavior to a trend (value discrete).
	Determine the trend color.
<b>Background Color</b>	Determine the background color of a picture.
<b>Font</b>	Set the font used for the axis labels.
<b>Exit</b>	Exit the Trend Wizard. If you made changes that have not been saved, a dialog box reminds you of this.

## 6.1.2 Tag Editor



### General Information about the Tag Editor:

In the Tag Editor, you set tags and range assignments that are linked with a trend template by means of the "Create trends online" function.

Within the Tag Editor you can prepare WinCC tags as measurement points for the following run-time functions:

- Picture selection by means of measurement points
- Creating trends online

---

**Note:** To make the range assignments, a container and a picture hierarchy must be created in the "Picture Tree Manager."

---

### ► How to Open the "Tag Editor":

1. In the Project Navigation Window, double click on the "Editor" project component to view a list of all of the installed editors.
2. Double click on the "Base Data" editor.
3. Click the right mouse button on "Tag Editor."
4. In the pop-up menu that appears, select the "Open" menu item.
5. The "Measurement Points List" dialog opens and you can create or change the desired configuration.

► **Structure of the "Measurement Points List" Dialog Window:**

The "Measurement Points List" dialog window consists of one tab ("Measurement point"). This dialog window contains a selection box that is divided into three columns ("Measurement Point," "Type," and "Range"). All of the configured measurement points are listed in this selection box.

The buttons available in the "Measurement Point" tab have the following meaning:

<b>Button</b>	<b>Meaning</b>
<i>New</i>	Use this button to open the "Measurement Point" dialog window. In this dialog, use the "Measurement Point" selection box to select a configured WinCC tag. Use the "Range" list box to select a configured container from the "Picture Tree Manager." The "Type" box serves only to display the data type of the selected tag. You cannot edit the box.
<i>Modify</i>	If you select a measurement point within the measurement points list and then use the "Modify" button, the "Measurement Point" dialog window opens. Use this dialog to view or edit the current settings.
<i>Delete</i>	If you select a measurement point within the measurement points list and then use the "Delete" button, a dialog window appears and asks if you want to delete the selected measurement point.





## 7 Group Display

### Overview

You can combine all of the displays in a class into a group display. You can trigger group displays by means of one tag that provides the message status. Use this tag in the other WinCC components if you want to display the status of group displays there.

### Group Display for Process and Process Control System

A group display is displayed as follows in the overview area:



They only apply for the area in which they are displayed.

#### Process Alarms

- A Alarm (white on red) flashing
- W Warning (black on yellow) flashing
- T Tolerance (black on yellow) flashing
- P General process alarm (white on black ) not flashing

#### Process Control System Alarms

- S Process control system error (yellow on black) flashing
- F Error in box (yellow on black) flashing
- M Preventive maintenance (yellow on black) flashing

#### Operator Displays

- O Request for operator input (white on gray) not flashing

The following generally applies:

- The group displays in the area overview are derived with a logical OR from the sum of all of the group displays that are located in the underlying pictures that belong to the area.
- The assignment of block-specific error messages to the corresponding message classes is set and cannot be changed in the run-time system.
- A, W, and S require acknowledgement. These classes also trigger the audible indicators.

## 7.1 Displaying the Alarm Source



### Alarm Source

When an alarm occurs, it is displayed in a box of the group display. You can view the location (graphic picture) of this alarm.

### Procedure

How to Access the Picture with the Alarm Source:



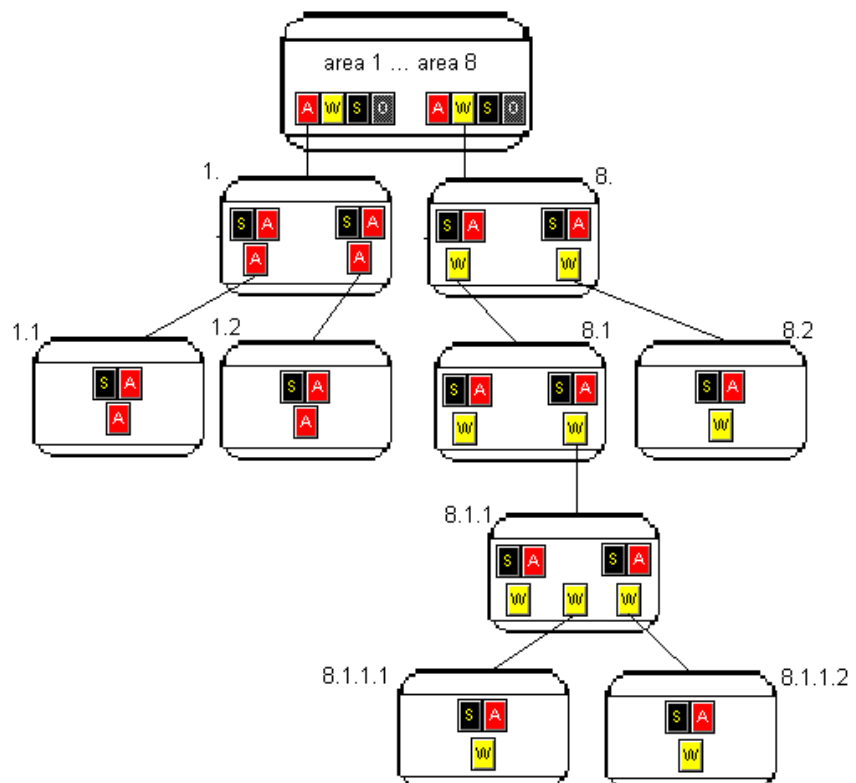
Click on the button that displays the alarm whose source you want to see.

The picture with the alarm source is displayed. If the system cannot determine the source precisely because the same event is present in multiple sources, the first picture in the search sequence is displayed.

### Hierarchy of the Group Display


The group display generally consists of multiple single displays that occurred in the area or sub-area. This creates a type of hierarchy for group displays. When you select the alarm source, the picture in the bottom layer in which an assignment to a specific alarm is still possible is always displayed.

The picture below shows an example of a possible hierarchy of the group messages:



**Explanation of the Displayed Hierarchy of the Group Displays**

Using the picture displayed here, you can see how the alarm source for a warning is displayed by clicking on the group display.

- A warning is displayed in area 8. We are looking at the warning for area 8.1.
- The warning comes from area 8.1.1.1 and 8.1.1.2.
- The warning is selected in area 8 (click on ).

The alarm source is displayed in area 8.1.1.

Reason: The subordinate area to which the warning belongs cannot be clearly specified in area 8.1.1.

- For example, if there were no warning in area 8.1.1.2, the picture of area 8.1.1.1 would be displayed.



## 8 Process Operation, Graphic Pictures

### Overview

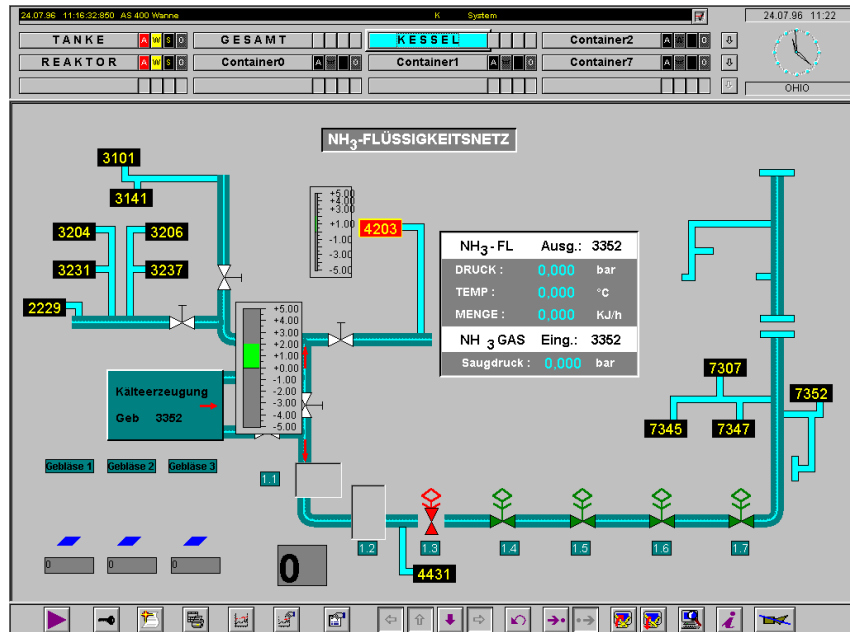
The configured graphic system is used to execute the process and to operate and monitor the process. The process execution takes place in the workspace. The following are tasks of the graphic system:

- Display the system in a system overview.
- Display process pictures in the workspace.
- Operate the process and the system.

## 8.1 Graphic Pictures

### Graphic Pictures

Graphic pictures are freely configured pictures that generally display systems or parts of systems and that allow operation of the process. The graphic pictures are displayed in the workspace and can be moved within this area. They consist of a static and a dynamic picture area. Both the static and the dynamic picture elements can be operated (depending on the configuration).



### Elements in Graphic Pictures

There are two instances of picture areas:

- **Static picture area:** This includes all of the picture elements that do not change in their display.
- **Dynamic picture area:** This includes all picture elements that display process values or states. This includes:
  - Digital values
  - Bars
  - Output and input text
  - Status displays

Process Values	Explanation
----------------	-------------

**Digital Value** Digital values from the process are displayed in the form of a digital output. Usually, a measurement unit is next to the digital value. The digital value input is used for the default of target values or digit sizes.

Digital values are differentiated by their display format:

- Integer (whole numbers of 2 through 9 places)
- Fixed-point values (fixed position of the decimal point, 2 through 9 before and 0 through 5 places after the decimal point)
- Floating-point values (variable position of the decimal point, depending on the size of the value, 2 through 8 before and 1 through 7 after the decimal point)
- Exponential number

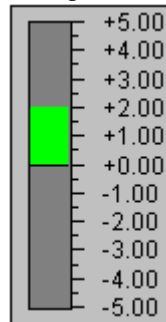
By changing the color or pattern of the background surface, you can display limit value violations, for example.

Example:

<b>NH<sub>3</sub> - FL</b>	<b>Ausg.:</b>	<b>3352</b>
DRUCK :	0,000	bar
TEMP :	0,000	°C
MENGE :	0,000	KJ/h
<b>NH<sub>3</sub> GAS</b>	<b>Eing.:</b>	<b>3352</b>
Saugdruck :	0,000	bar

**Bars** Bars display process values in an analog form. The current value is displayed by either a pointer or a surface. Pointers and surfaces are output on a background surface of a different color. Bars can be created horizontally or vertically. You can use color changes to display limit value violations.

Example:



**Input Text** Input texts are dynamic text that you input into a field of preset length (number of characters). If the field is only partially filled, the rest is filled up with wildcards set by the person responsible for configuration. Characters that are not allowed in configuration are not displayed on the screen.

**Output Text** Output texts are dynamic text that are output in a field of preset length (number of characters). For example, you can display process states in the form of clear text or situation-dependent requests for operator input. You can configure text with multiple lines.

**Trends** The trend output allows you to observe the chronological development of current or archived processes.

## Status Display

Status displays are small graphics (icons) that can be displayed in pictures. They allow you to follow the status of the process or the system. An example of a status display is a valve icon that changes its color and location depending on the status of the valve.

Status displays can be made up of different icons or the same icon in different colors/patterns.



## 8.2 Using Names to Select Graphic Pictures



### Overview

In addition to the possibility of making a picture exchange, you can select and display graphic pictures by means of their names. From a list of all of the graphic pictures that belong to the current project and are provided in the Picture Tree Manager, you can select from the following display possibilities for the graphic picture:

- The picture is displayed as a full screen instead of the previous picture in the **workspace**. The selected graphic picture completely replaces the previous picture.
- The picture is included in the current full screen as a **process window**. The selected graphic picture is laid over the previous picture. You can display a maximum of 8 process windows on each screen.

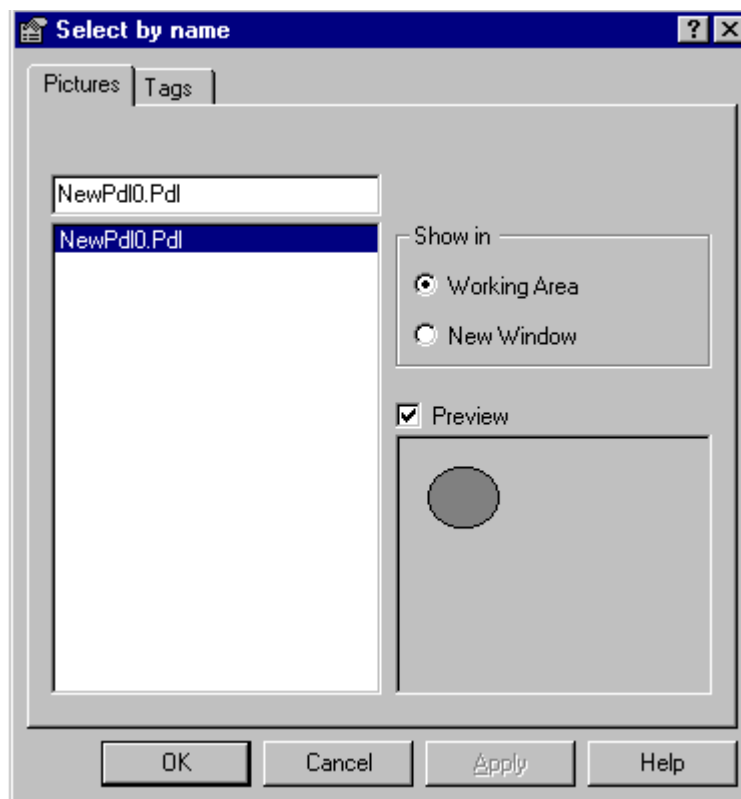
### Procedure

How to Use a Name to Display a Graphic Picture:



1. Click on this button (keyset 1)

The following window is displayed:

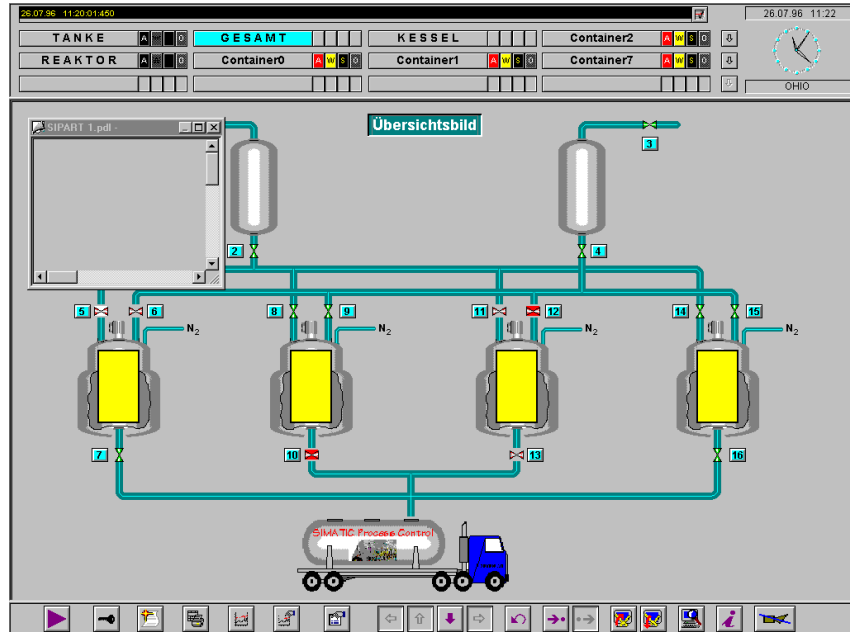


2. Select the display type.

3. Select **Preview**. The selected graphic picture is displayed in the window under Preview.
4. Select the name of a graphic picture and exit the window.

### Example

The example shows the selected picture in a process window. You can enlarge the selected picture in the usual way.



## 8.3 Using a Measurement Point to Select Graphic Pictures

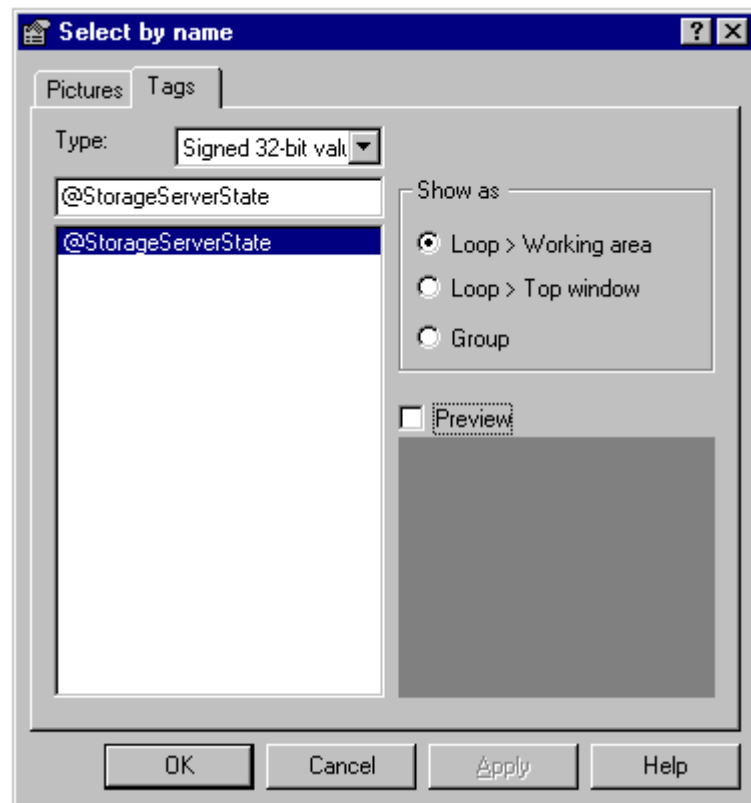
**Note** This functionality is only available to you if you installed the "Libraries" software package.

**Procedure** How to Use Measurement Points to Display Graphic Pictures:



1. Click on this button (keyset 1).
2. Switch to the "Measurement Points" tab.

The following window is displayed:



3. Select the type of display.
4. Select **Preview**. The selected graphic picture is displayed in the window under Preview.
5. Select the name of a graphic picture and exit the window.

## 8.4 Selecting Graphic Pictures Directly



**Selection Possibilities** You can select graphic pictures in different ways:

### Selecting Graphic Pictures

The following list explains how to select graphic pictures directly:



Display the **previously displayed graphic picture**. As long as there is a previous picture, the button is displayed in color. You can display up to 16 previous pictures.



The currently displayed **graphic picture is marked** for display later.



Display the **marked graphic picture**. This can occur from any system view.

## 8.5 Operations in Graphic Pictures

### Overview

Generally, operations and inputs can occur only where the cursor takes on this



form .

You can distinguish the following two types of operations:

- **System operations** change the display in the graphic window. They do not affect the process. They work only internally within an operator station and allow the handling of pictures and boxes.

System operations include:

- Selecting additional pictures/dialog boxes
- Moving the pictures in their window

- **Process operations** affect the underlying control. They move values (for example, target values, valve settings in the automation system).

## 9 SFC-Visualization

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### Note:

The "SFC-Visualization" options package is a unit that is ordered separately and is not included with the "WinCC Basic Process Control" or "WinCC Advanced Process Control" option packages.

---

### What is SFC?

SFC (Sequential Function Chart) is a sequential control system that is implemented for the control-flow oriented control of processes. A sequential control system is a control with a compulsory step-by-step sequence that moves from one status to the next status depending on conditions.

### What does the engineering system offer for SFC?

In the engineering system, you can create and compile SFC plans and load them into the target system, test them, and implement them.

In order to use the SFC plans in the runtime system, you must use the "PLC-OS Engineering" software package to transfer them from the engineering system into the runtime system. This transfers the SFC plans along with their OS comments and the messages that were configured for the plans. In addition, mechanisms are loaded for the messages so that you can select the SFC plan that is found in the message directly.

You can find additional information in the "*SFC Sequential Function Chart*" manual as well as in the "*SIMATIC STEP 7 User Manual*".

### What Does the Runtime System Offer for SFC?

In the runtime system, you can:

- Call SFC plans and display their current status.
- Monitor any number of SFC plans at the same time.
- Set the display of SFC plans.

### Preparation for Visualization

To assign a SFC standard picture to a SFC plan, the dynamic wizard must be expanded by the "SFC" tab. The following steps must be carried out for each WinCC project:

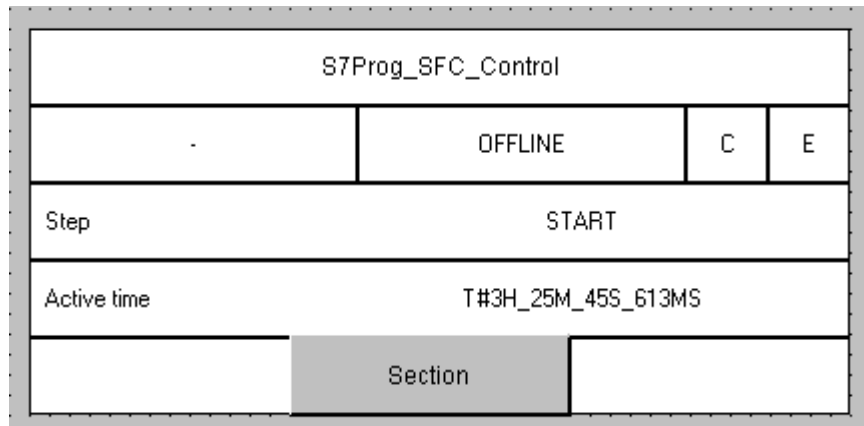
- Start the dynamic wizard editor from the BIN folder of the WinCC installation folder (e.g. F:\SIEMENS\WINCC\BIN\DYNWIZEDIT.EXE).
- Set the current language in the radio box (e.g. German)
- Select the command "Read Wizard Script" from the "Dynamic Wizard" menu. In the opened dialog box, double click on the line "SfcScript.wnf". The script will be read.
- Exit the editor (click on "Exit" in the "File" menu).

In the Graphics Designer window, an additional tab with the title "SFC" will be displayed in the dynamic wizard.

## 9.1 SFC Default Picture

### SFC Default Picture (SFC\_Control)

You can display the states of an SFC plan in a graphic picture by means of an SFC default picture assigned to the plan. You must place this default picture in the WinCC Graphics Designer in a graphic picture and configure it as described below. You can see the result in the following figure:



*Figure: SFC Default Picture for SFC Plan "SFC\_Control"*

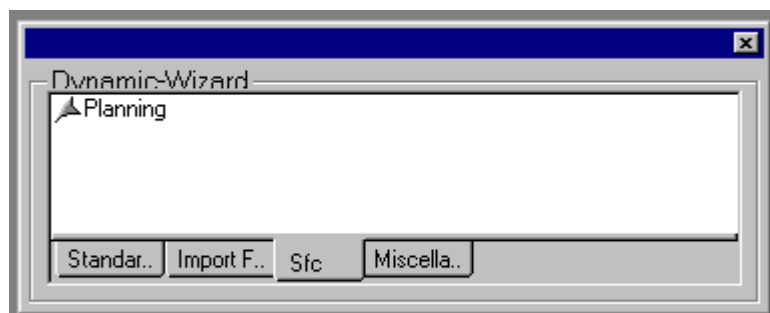
#### 1. Placing the SFC default picture in a graphic picture

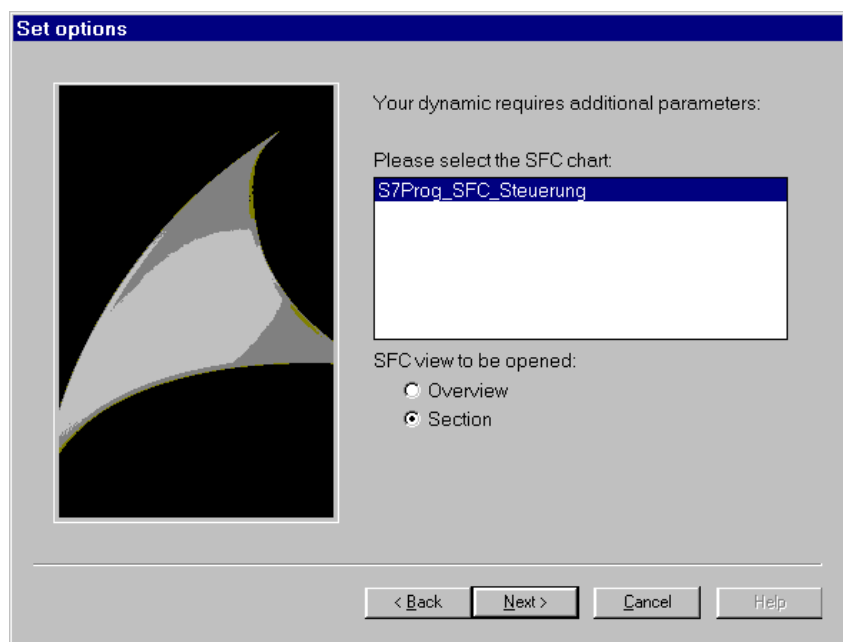
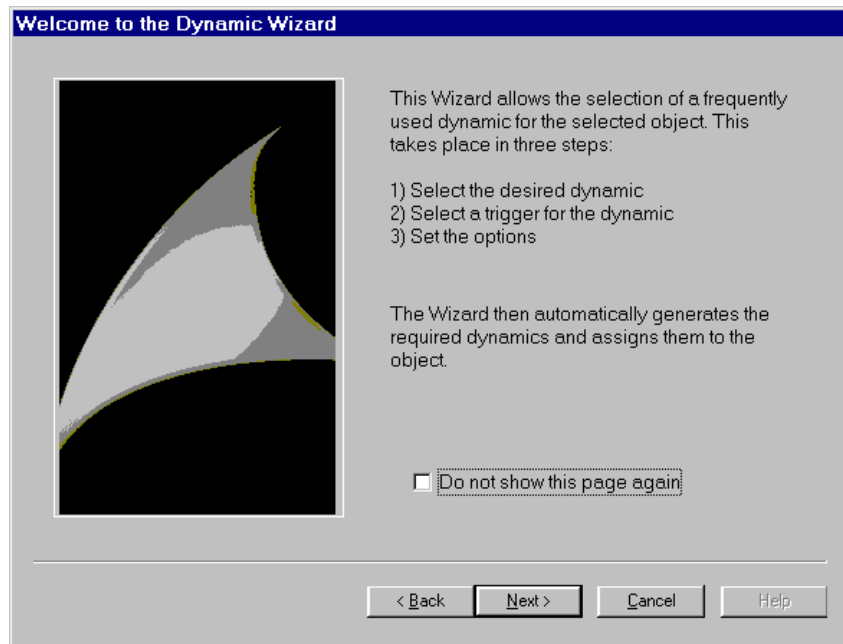
From the "Smart Objects" tool palette, select the OLE control entry and drag a frame in the graphic picture for the object to be placed there. The selection list of all of the installed OLE controls is displayed. Select the SFC default picture "SFC\_Control."

#### 2. Executing the Dynamic Wizard for the SFC default picture

Select the placed SFC default picture to set its parameter by means of the Dynamic Wizard.

In the dynamic wizard window, select the "SFC" tab and click on "Configuration".

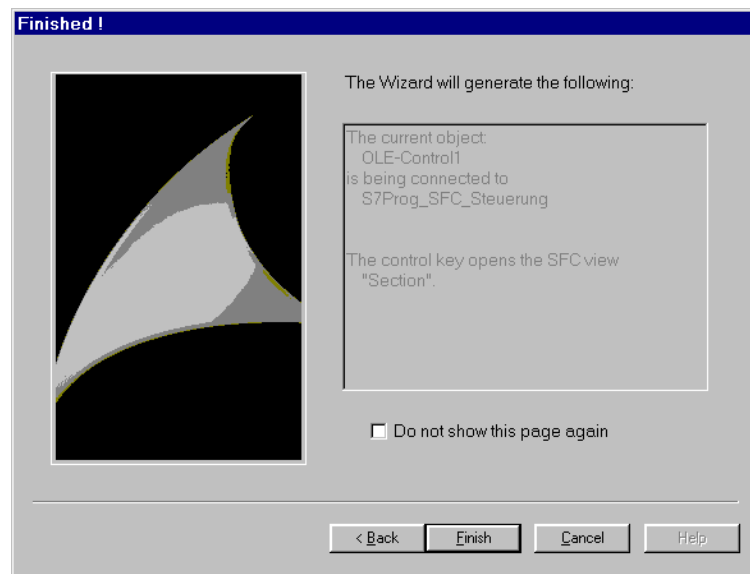




Finally, from the dialog pictured above, select the name of the SFC plan (here "SFC\_Control") to be assigned to the SFC default picture. Click the "Next" button again.

By selecting the window to be opened for the SFC plan (overview or zoom area), you determine in which view the SFC plan is to be displayed when the button is used in the SFC default picture. If you do not enter anything, the zoom window for the operator button is loaded in the SFC default picture. The selected setting is visible as a zoom area on the button.

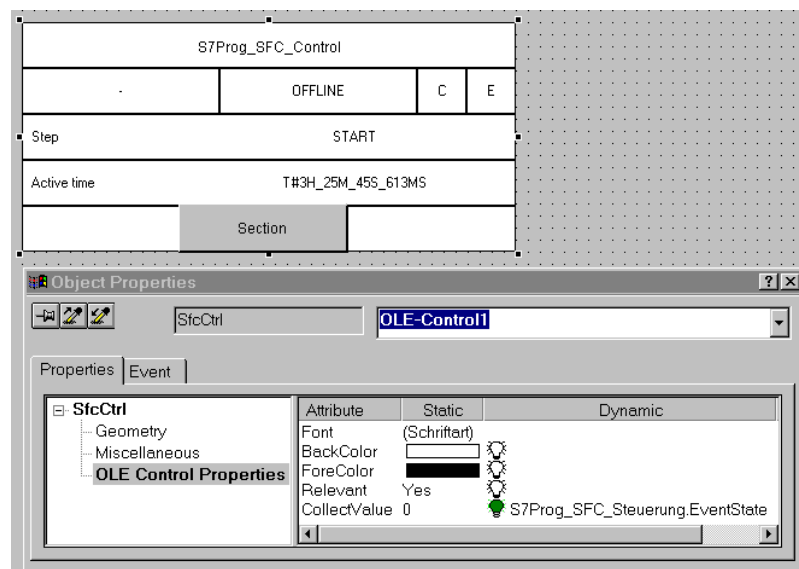
In conclusion, let the system complete the configured SFC default picture by clicking on the "Complete" button.



**Figure: Dynamic Wizard**

For the finished SFC default picture, you can now set some additional object properties optionally. From the pop-up menu (right mouse button), select the "Properties" entry. In the dialog, you can modify the foreground and background color of the object and the font for the text, as well as the window to be displayed when you substitute the SFC plan.

However, the assignment of the SFC plan to the SFC default picture can only be made by means of the Dynamic Wizard.



**Figure: SFC Default Picture with Object Properties**



## 9.2 SFC Plan Default Settings

### Settings in the Control Center

In the WinCC Control Center, you can make general settings for the display of the SFC plans in the runtime system. These changes can be global for all of the plans displayed or can relate to individual plans.

### Global Settings

The global settings for displaying the plans affect the plan topology and the colors used.

For the plan topology, you can set the size of the objects as well as the distance between the objects. Make the settings for the width and height in pixels.

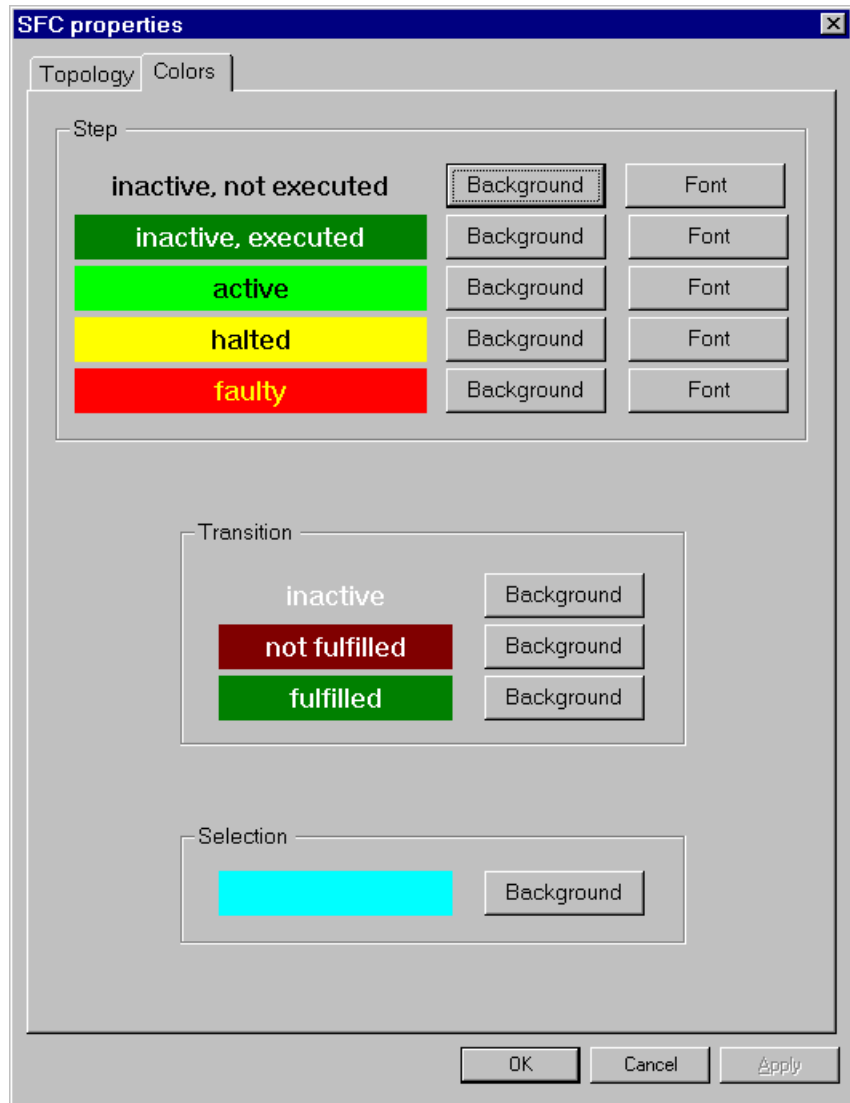
Section	Width	Height
Step	60	30
Transition	28	12
Status symbol step	24	24
Operating/Fault key	16	16
Distance step/transition		10
Margin	6	
Space	6	

Overview	Width	Height
Step	13	8
Transition	7	
Distance step/transition		16
Margin	6	

*Figure: Topology Properties for SFC Plans*

For the colors, you can select the colored display of the states of steps and transitions as well as the selection of objects.

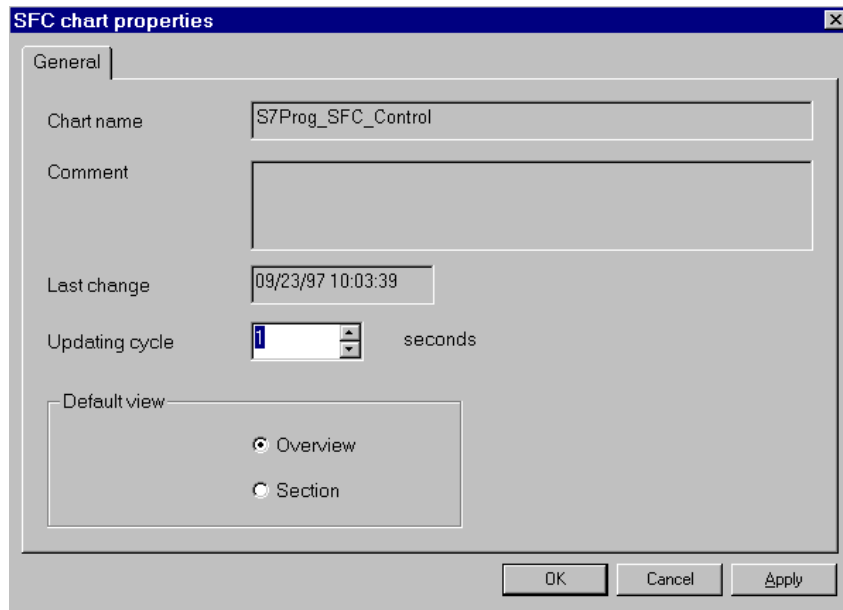


*Figure: Color Properties for SFC Plans*

**Plan-Related Settings** You can set the following for each SFC plan individually:

- The update cycle of the plan
- The window with which the plan is opened (overview or zoom window)

You can access these operations in the WinCC Control Center by means of the pop-up menu for the individual SFC plans. The operations are possible as shown in the dialog box displayed below.



The screenshot shows a dialog box titled "SFC chart properties" with a "General" tab. The dialog contains the following fields and options:

- Chart name:** S7Prog\_SFC\_Control
- Comment:** (Empty text area)
- Last change:** 09/23/97 10:03:39
- Updating cycle:** 1 seconds (with a spin button)
- Default view:**  Overview,  Section

At the bottom right, there are three buttons: OK, Cancel, and Apply.

If necessary, you can delete SFC plans that you do not need.

### 9.3 Calling and Setting an SFC Plan

#### Calling an SFC Default Picture

By selecting a graphic picture with a default picture that you configured for the SFC plan to be called, you can use the default picture to get an overview of the status of the SFC plan.

S7Prog_SFC_Control			
SCTAC	ACTIVE	C	
Step	Counter+1		
Active time	T#4M_20S_0MS		
	Section		

*Figure: SFC Default Picture for Plan "SFC\_Control"*

By using the "Zoom" button, you can switch to the zoom area view of the SFC plan "SFC\_Control".

Alternatively, you can also use the following procedure to call and edit any given SFC plan.

#### Calling an SFC Plan

You can also call and edit the status of an SFC plan in the runtime system as described in the following. Your access possibilities are dependent on authorization levels.

There are three levels of authorization:

Monitor

Monitor and execute process operations

Monitor and execute process operations as well as higher value process operations (enable or lock command output)

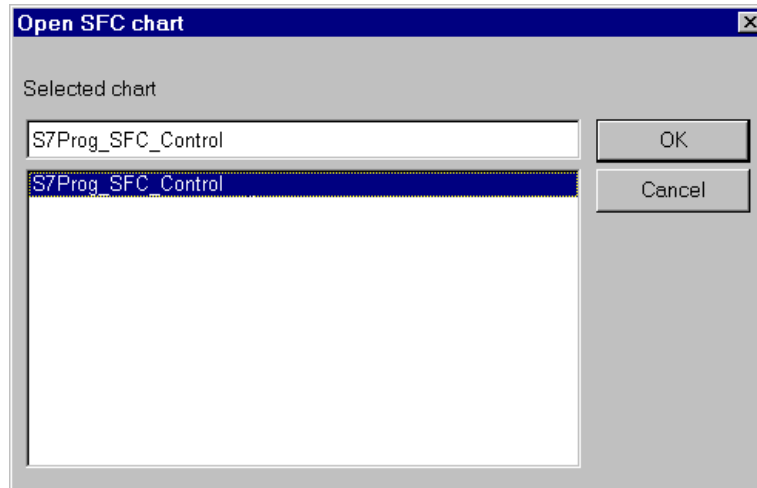
Use the User Administrator to configure the authorization for the user.

How to View and Operate an SFC Plan:



1. Click on this button (keyset 2).

The following window is displayed:

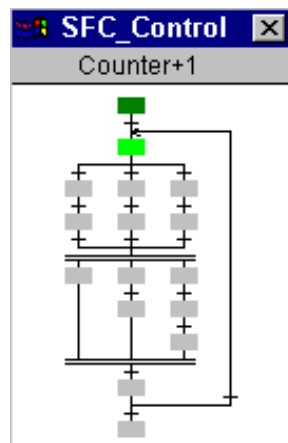


*Figure: Selecting an SFC Plan*

You can select a plan from the list of SFC plans offered. Use the "OK" button to call it.

2. Click on **SFC\_Control**

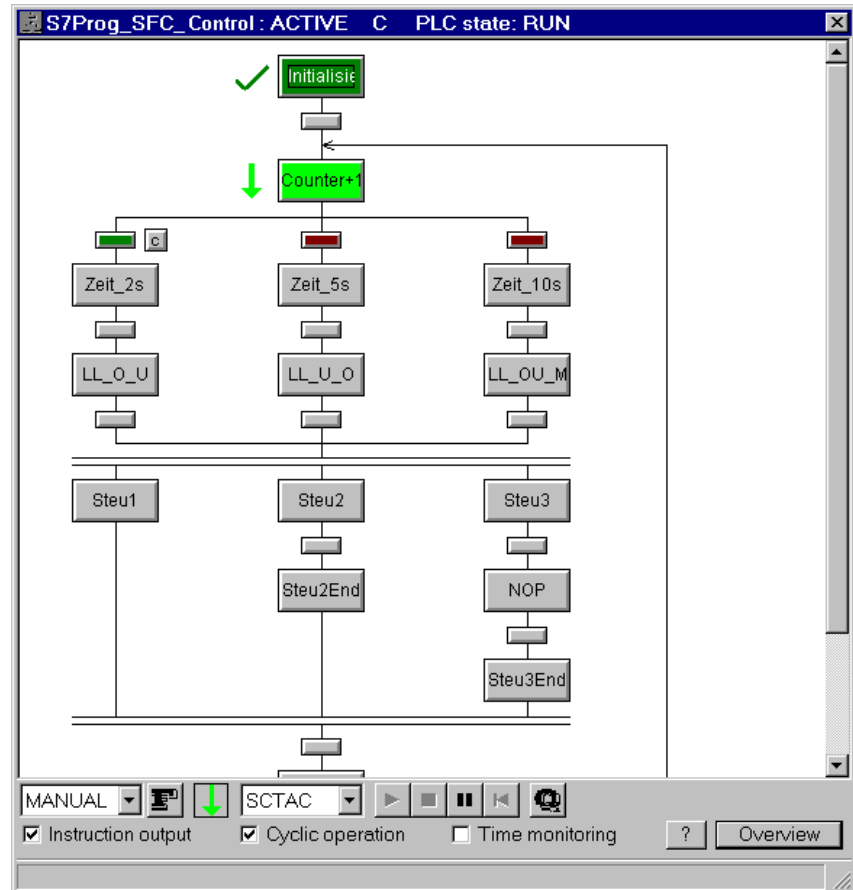
Depending on the setting in the Control Center, the selected SFC plan is displayed in an overview or zoom window. In this example, the display is in an overview window. The entire plan is always displayed in an overview.



*Figure: Overview of SFC Plan*

If the overview window is open, the current status of the SFC plan is displayed in color. You can configure the assignment of the colors to each status. This is done in the Control Center globally for all plans.

- You receive a zoom area view of the SFC plan by clicking in the overview window on the desired position. The zoom window displays the area around the position of the click. You can change this zoom area by changing the size of the zoom window.



*Figure: Zoom Area of an SFC Plan*

The SFC windows are displayed in the workspace and are always located in the foreground.

The title bar of the zoom window is structured as follows:

<Plan name> : <Plan status> PLC status : <PLC status>.

The individual parts of the title bar are created according to individual circumstances.

## Plan Status

Status	Meaning
<b>ACTIVE</b>	The plan is running
<b>OFF</b>	The plan is turned off
<b>HOLD</b>	The plan is stopped.
<b>OFFLINE</b>	The plan is not being updated
<b>ERROR</b>	At least one step is in an error status (time violation)

PLC Status	Status	Meaning
	<b>ERROR</b>	The connection to the PLC is broken
	<b>STOP</b>	The PLC is in STOP mode. The connection to the PLC is OK
	<b>RUNNING</b>	The PLC is running, the connection to the PLC is OK, and the data in the plan are being updated.

### Operations in the Zoom Window

You can execute the following operations when the zoom window is displayed:

- Set operating mode
- Set operating status
- Set switch mode
- Set sequence options
- Acknowledge operator input requests and text errors
- Open incremental zoom
- Open transitional zoom

These operation possibilities will be described in more detail.

### Setting the Operating Mode

The operating mode determines, how the sequence of the SFC plan is controlled.



The SFC recognizes the following operating modes:

- AUTO (process mode): The sequence is controlled automatically.
- MANUAL (operating mode): The sequence is controlled by the operator.

The following table displays the possible combinations for the operating mode switching:

Oper. Mode before	Enable AUTO [F]	Switching MANUAL	Switching AUTO	Oper. Mode after
MANUAL	1	0	x	AUTO
MANUAL	1	0	1	AUTO
AUTO	x	x	0	MANUAL
AUTO	x	1	0	MANUAL
AUTO	x	1	0	MANUAL





*x = any (0 or 1)*

**Setting the Operating Status** Use the commands in the operator bar to set the operating status of an SFC or to change it.



*Figure: Operator Bar of the Zoom Window*

The operations described in the following can only be executed if a user is logged on and has the authorization for the operation.

Key for Command	Meaning
	<p><b>Start:</b> The sequential control system is switched from the OFF to the ACTIVE operating status. This means that the SFC plan is processed immediately. The start step is activated automatically, its actions are processed, and the results of the sequence transitions of the start step are evaluated.</p> <p><b>Continue:</b> The sequential control system is switched from the PAUSE to the ACTIVE operating status. This means that the SFC plan continues, transition results are evaluated, and actions are executed. The system switches according to the set switch mode.</p>
	<p><b>Stop:</b> The sequential control system is switched from the PAUSE to the OFF operating status. The active steps are deactivated and the end step is activated and processed. This allows the system to create a defined status of the sequential control system.</p>
	<p><b>Pause:</b> The sequential control system is switched from the ACTIVE to the PAUSE operating status. This means that the SFC plan stops and the transition results are not evaluated. An operation (command) is needed for further processing.</p>
	<p><b>Restart:</b> The sequential control system is switched from the PAUSE to the ACTIVE operating status. The active steps are deactivated and the start step is activated and its actions processed.</p>




## Setting the Switch Mode

The switch mode determines the switch behavior of the sequential control system. It therefore determines the **operating mode** of the sequential control system. The switch mode changes the behavior of prepared or completed transitions.

In all switch modes except for SCT a button for an existing operator input request is displayed if necessary as long as the user has the operating authorization.

You can change the switch mode in all operating states.

Set the following switch modes in this switch box :

Switch Mode	Meaning
SCT	<i>Step Control with Transitions:</i> The sequential control system runs as controlled by the process (automatically). With a completed transition condition, the system continues. Preceding steps are deactivated and the next sequence steps are activated.
SCC	<i>Step Control with Confirmation:</i> The sequential control system is controlled by the operator. The transition conditions do not need to be completed. A request for operator input is set for all of the sequence transitions of all of the active steps. The request is transmitted according to the successful operations.
SCTAC	<i>Step Control with Transition And Confirmation:</i> The sequential control system is controlled by the process and the operator. With a sequence transition of an active step whose condition has been met, a request for operator input is set and the system continues after the operator input.
SCTOC	<i>Step Control with Transition Or Confirmation:</i> The sequential control system is controlled by the process or the user. For each sequence transition of an active step, a request for operator input is set and the system continues after the operator input. If the transition condition is met before the operator input occurs, the system continues without operator input.
SGC	<p><i>Step Group Control:</i></p> <ul style="list-style-type: none"> <li>– The sequential control system is controlled by the process in the case of steps without step group control identification (this corresponds to the SCT switch mode). Each sequence transition of an active step without SGC identification whose condition is met continues without operator input.</li> </ul> <p>The sequential control system is controlled by the user in the case of steps with step group control identification (this corresponds to the SCTAC switch mode). For a sequence transition of an active step with SGC identification whose condition is met, a request for operator input is set and the system continues after the operator input.</p>

**Note to the Minimum Runtime:** In the switch modes SCC and SCTOC, the minimum runtime of the step can be passed via a confirmation.

### Setting the Flow Options

The flow options give you additional opportunities to influence the behavior of the sequential control system. The individual flow options can be combined with each other. In the runtime system, you can set the following flow options:

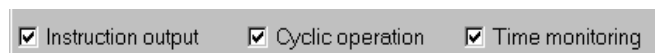



Figure: Section of the Operator Bar

Flow Option	Meaning
Instruction output	<p>If <i>Instruction output</i> is <i>enabled</i>, the actions of the active steps are processed.</p> <p>If <i>Instruction output</i> is <i>locked</i>, the actions of the active steps are not processed.</p> <p>You can only change these flow options if you are authorized to execute "high value process operations".</p>
Cyclic operation	<p>If <i>Cyclic operation</i> is <i>on</i>, the starting step is reactivated after the end step of the SFC plan is deactivated and the sequence begins again.</p> <p>If <i>Cyclic operation</i> is <i>off</i>, the sequence control system is turned OFF after the end step of the SFC plan, this means that no more steps are active and no actions and transitions are being processed.</p>
Time monitoring	<p>If <i>Time monitoring</i> is <i>on</i>, each time a step is processed, its active time is compared to the maximum run time and if the time runs over, a step error is reported to WinCC. In addition, a button for acknowledging the step error is displayed in the SFC plan.</p> <p>If <i>Time monitoring</i> is <i>off</i>, there is no comparison of the active time with the minimum/maximum run time.</p>

### Acknowledged

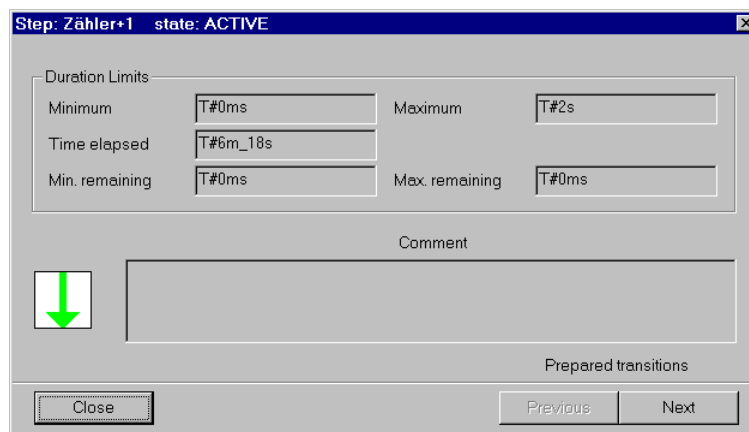
Use the  (group acknowledgment) button to acknowledge all of the existing operator input requests and step errors without having to execute individual operations.

## 9.4 Opening the Incremental Zoom

**Overview** The incremental zoom is a detail view of a step in an SFC plan. It displays specific information about the selected step.

**Procedure** Use the steps described above to activate the zoom window for the SFC plan in which you want to display an incremental zoom.

To open the incremental zoom, click on the step you want to view. A window is displayed in which you can view the status of the step.



*Figure: Incremental Zoom*

The step status is displayed as text in the title bar of the incremental zoom and is also displayed in the incremental zoom by means of an appropriate icon.

### Step Status

Status	Meaning
<b>INACTIVE</b> , <b>not completed</b>	The step has not been processed yet
<b>INACTIVE</b> , <b>completed</b>	The step will not be processed anymore
<b>ACTIVE</b>	The step is being processed
<b>HOLD</b>	The step is stopped
<b>ERROR</b>	The step is in an error status (time -out)

### Operations in the Incremental Zoom

You can make the following operations while the incremental zoom is displayed:

- Close the incremental zoom: Use the "Close" button.
- Acknowledge a step error: Use the "E" button.
- Display transitions: Use the "Previous/Next" button.

## 9.5 Opening the Transitional Zoom

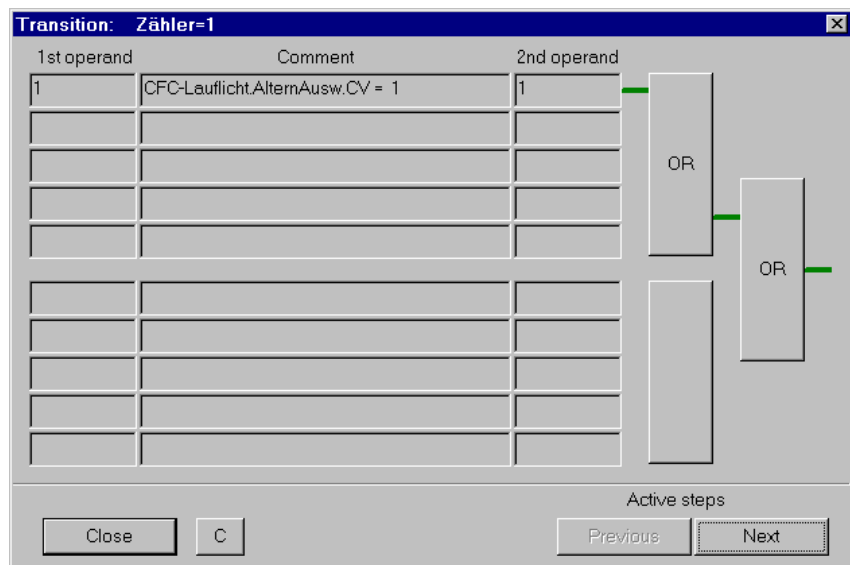
### Overview

The transitional zoom is a detailed display of a transition in an SFC plan. It displays specific information about the selected transition.

### Procedure

Use the steps described above to activate the zoom window for the SFC plan in which you want to display a transitional zoom.

To open the transitional zoom, click on the desired transition. A window is displayed in which you can view the status of the transition. This is determined by the current results of the partial expressions that are displayed as colored connecting lines. The colors correspond to the current results.



*Figure: Transitional Zoom*

### Transition Status

Status	Meaning	
<b>INACTIVE</b>	The transition is not being processed	Gray
<b>NOT COMPLETED</b>	The transition condition has not been completed	Dark red
<b>COMPLETED</b>	The transition condition has been completed.	Dark green

### Operations in the Transitional Zoom

You can make the following operations when the transitional zoom is displayed:

- Close transitional zoom: Use the "Close" button.
- *Acknowledge operator input request*: Use the "C" button.

#### *Confirmation?*

- Display steps: Use the "Previous/Next" button.

## 9.6 Messages

### General

When an SFC plan is running on a PLC, messages for operator input requests during transitions and for step errors are triggered.

### Generating the Process Messages

The messages are created generically via the “PLC-OS Engineering” software package. In addition to the messages, mechanisms are loaded that allow you to select the SFC plan affected by the message directly.

When an SFC default picture is included in a process picture, the messages of the corresponding SFC plan are incorporated into the hierarchy of the group display.

### Process Messages in the Runtime System

The messages for operator input requests in transitions and step errors are displayed and archived by the WinCC message system (Alarm Logging). The Alarm Logging system can open the overview or zoom window of the corresponding SFC plan for an SFC message depending on the setting selected in the WinCC Control Center.

### Operator Messages in the Runtime System

When a process operation is executed for an SFC plan, an operator message is created and transferred to the operator list.

## 9.7 Multi-User System (Client/Server)

### Requirements

The SFC-Visualization option package must be installed on each operator station on which the SFC plans are to be displayed. Each of these stations must have a connection to all of the PLCs on which the SFC plans are running.

Transfer of the SFC plans to the OS by means of „PLC-OS Engineering“ must be executed for each OS on which the SFC plans are to be called.

### Procedure

The WinCC project, created as a multi-user system, must be stored on the WinCC server.

The WinCC clients must be assigned to the WinCC server.

The option package “SFC-Visualization” must be installed on all clients, on which SFC plans are to be visualized.













Afterward, the SFC plans can be transferred from the OS to the WinCC server.



## 10 Appendix

### 10.1 Overview of the Button Functions of the Run-Time System






The following table lists all of the buttons available in the run-time system along with their functionality:

Functionality	Button	Explanation
<b>Keysets</b>		
Keyset 1		The figure below is keyset 1.
Switch to keyset 2.		Keyset 2 is displayed.
		
Switch to keyset 1.		Keyset 1 is displayed.
<b>System Operations</b>		
Password		Select LOGIN-input dialog.
Exit run time.		Exit the run-time system in a defined manner.
Language switch		Switch to another language.
CP video		Display video picture.
Display system picture.		Lifebeat Monitoring
Save the screen configuration.		The pictures currently displayed on all of the screens are saved.
Display screen configuration.		The saved pictures are displayed.
Reports		Overview of all report tasks
Activate BATCH		???

---

**System Operations**








---

User authorization		Select User Administrator.
Call SFC		Call and set up or change SFC plans.
Archive		Activate the dialog for setting the parameters of the archiving function.
Acknowledgement for horn		Acknowledge the horn.
Group acknowledgement		All group events connected to single events are acknowledged.

---

**Overview Area**






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Area selection button		Select an area. The area shown on the button is displayed.
Group display		OR all of the messages in an area.
Select alarm source (open picture)		Display the picture with the alarm source when an alarm exists and you click one of the 4 buttons.
Display the system overview.		Switch the display.
Additional areas		Set up additional areas.
Previous display		Set up the previous display again.
Screen hardcopy (Print screen)		Output the contents of the screen to the default printer that is set up.












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**Moving in the Picture Hierarchy**


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Detail picture		Move from the area layer or area section layer to the next lower layer.
Picture up		Move to the next higher area layer or area section layer.
Picture left		Move to the next area section in the current layer.
Picture right		Move to the next area section in the current layer.



<b>Messages/Alarms</b>		
Acknowledge message		Acknowledge the message displayed in the message line.
Message system New list		Display the message system with the corresponding keyset. The new list is displayed immediately.
Old list		Display the old list.
Went out list		Display the went out list.
Process control system list		Display the process control system list.
Operator list		Display the operator list.
Journal list		Display the journal list.
Previous picture		Exit the message system.
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