SIEMENS

SIMATIC

BRAUMAT/SISTAR Classic Applications based on S7

Operating Manual

BRAUMAT/SISTAR Classic V6.0 SP2

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Legal information

Warning notice system

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

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⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

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

NOTICE

indicates that property damage can result if proper precautions are not taken.

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Preface 1

1.1 Preface

Purpose of the manual

This manual covers the applications for diverse engineering jobs with BRAUMAT/SISTAR Classic V6.0 and gives you an overview of the following topics:

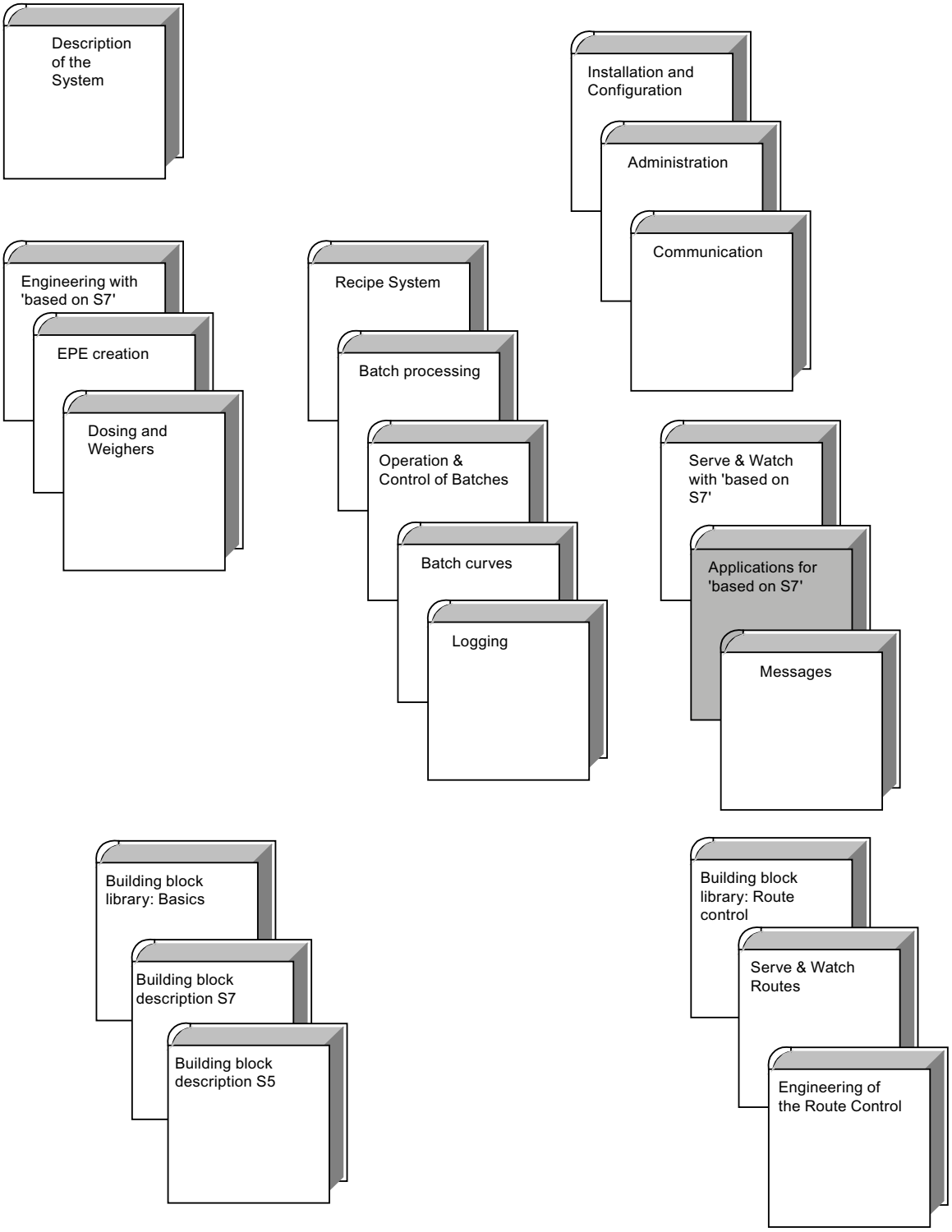
- DFM Overview
- Controller operation
- Final operating elements
- Message archive
- Curve input
- Special values
- Parameterization
- Combination view (dataconn)
- Text configuration
- Status
- Forcing
- DB editor
- Entity Definition
- Maintenance data

Scope of the manual

This manual is valid for the software package BRAUMAT/SISTAR *Classic* from version V6.0.

The offered electronic manual is most largely identical to the contents of the on-line help. Due to a technically necessary editorial deadline for the generation of electronic manuals, small deviations can occasionally occur in relation to the on-line helps. The statements in the on-line helps take priority over those of the manual.

Document structure



If this manual does not contain the answers to certain questions you may have about using the products described herein, contact your local Siemens representative.

You can locate your contact partner at:

http://www.siemens.com/automation/partner (http://www.siemens.com/automation/partner)

A guide providing details on the technical documentation available for the individual SIMATIC products and systems is available at:

http://www.siemens.com/simatic-tech-doku-portal (http://www.siemens.com/simatic-tech-doku-portal)

The online catalog and online ordering system are available at:

http://mall.automation.siemens.com/ (http://mall.automation.siemens.com/)

Training Centers

Siemens offers a number of training courses designed to familiarize you with the SIMATIC S7 automation system. Please contact your regional Training Center or the Central Training Center in D 90026 Nuremberg, Germany.

Internet: http://www.sitrain.com (http://www.sitrain.com)

Technical Support

Technical support for all A&D products can be accessed

- via the online Support Request form at
-

For additional information about our technical support service, please go to

Service & Support on the Internet

Our documentation portfolio is complemented by a comprehensive online knowledge base on the Internet.

http://www.siemens.com/automation/service&support (http://www.siemens.com/automation/service&support)

Here you will find:

- The newsletter that keeps you constantly up-to-date with the latest information about our products.
- The right documents via our Service & Support search facility
- A forum in which users and experts from all over the world exchange ideas and experiences.
- Your local Automation & Drives representative
- Information about local service, repairs, spare parts. The "Services" section offers even more options.

See also

http://www.siemens.com/automation/support-request (http://www.siemens.com/automation/support-request)

http://www.siemens.com/automation/service (http://www.siemens.com/automation/service)

General system operation 2

2.1 Overview

General structure of the user interface

Note:

In the text the word "application" is used frequently. This comes from the MS Windows linguistic usage and designates user programs under MS Windows.

Due to reasons of uniform linguistic usage with the "Windows world", this meaning should be maintained here.

In order to prevent misunderstandings: In the text, "applications" refer to the original "system components" (application programming is not necessary as a rule).

The general design elements described in this chapter are valid for all system applications. These design elements are explained by the example of the**Plant overview** application.

Standard operating elements

All system applications use the resources made available by the operating system for the application handling (e.g. maximize, minimize, system menu, title bar ....). Furthermore, there are the application-specific operating elements e.g. the action bar, the button bar and the status line.

Non-Client Area

The non-Client area designates all elements of the Windows application that aren't part of the Client area, i.e. belonging to the actual Client area.

Title bar

The title bar is represented by the upper line of the application window. It has the structure:

<System name> Application name - <Client area>

The client area is the symbolic name of the selected class. By positioning the mouse pointer on the title bar and clicking and holding the left mouse button you can reposition the application window by moving the mouse on the screen.

Application-specific operating elements

Menu bar

The menu bar is directly below the title bar and has the following menu items:

Program	Selection of applications
System	Subordinated selection of the control panel
or	
File	Jobs with files
Unit	
or	
Process	Process a file
Functions	Selection of application-specific functions
Options	Selection of application-specific options
Acknowledgment	Acknowledgment by the user
Help	Selection of the integrated on-line help system

Program

This menu item is used for the selection of other applications.

(see start menu application)

End Alt+F4

Data source

This menu item is used for the selection of the source and destination device for the edited data records (not available in all applications).

The menu contains the following menu items:

- Offline (IOS)
- Online (PCU)

System

This menu item is used for PCU for the adjustment of the connection IOS. Several menu items with the symbolic meanings of the PCUs follow. A maximum of 16 PCU connections can be configured. Every PCU connection is offered for selection by a menu item. The menu item for the existing PCU connection is blocked and colored gray.

File

Selection of file functions (not available in all applications) Open
Print ...

Process

Functions for processing files (different application-specific Edit functions) e.g. cut out, insert, copy...

Options

This menu item is used for the regulation of application-specific options. The state of the regulation is characterized with the check mark. The menu contains the following menu items:

Button bar	Select and deselect the button bar
Status indicator line	Select and deselect the status line

Function keys	Select and deselect the function key marking
Standard value	Adjust the window standard value

Acknowledgment

The user uses this menu item for the acknowledgment. The menu contains the following menu items:

Acknowledge ICM errors	F11
Acknowledge buzzer	F12

Reset password

Help

This menu item is used for the selection of the general on-line help system. The menu contains the following menu items:

System Alt+F1	Activating help for the system (System manual). In this general part the system is explained in detail. It corresponds to the structure and content of the system manual. This is used by the user for the general sense of the overall system.
System Index	Selection of the topic overview of the system online help
<Application name> F1	Activating the on-line help system for the respective application. In this application-specific part, working with the corresponding application is explained.
<Application name> Index	Selection of the topic overview of the on-line help system for the application.
Info ...	Activate the application mailbox

The mailbox contains the following information:	
Product name:	BRAUMAT
Application name:	e.g. start menu
Current version:	e.g. Version V 6.0 + SP1
Date of the version:	e.g. Jan 10 2012
Customer/system:	e.g. ABC - brewery/brewery
Registration number:	e.g. T461-054260 - 9601004

This number must be indicated in the case of all customer inquiries

Button bar

The button bar is set below the action bar. It has the task of activating functions by clicking icons. The button bar is available in all applications and is deselectable.

The button bar of all applications has the following functionality:

1. Icon 	EXIT	Close the application
2. Icon 	ICM	Acknowledge all ICM errors
3. Icon 	BUZZER	Acknowledge the signal buzzer
4. Icon 	PASSWORD	Reset validity of the password

Further icons can be available application-specifically. This is set to the right of the three standard icons. They are represented in the corresponding application descriptions.

Status indicator line

The status indicator line is set in the lower part of the main window. It has either one or two lines.

In the first line status information is indicated.

In the second line the currently valid function key allocation is indicated. By pressing the keys ALT, SHIFT or CTRL, texts are changed according to the function key assignment.

The representation of the function key allocation can be selected and deselected by the menu item **Function keys** of the menu **Options**.

The representations and contents of the application-specific status lines are represented in the corresponding application descriptions.

2.2 Structure of the manual

The following chapters describe the single applications according to the following aspects:

Functionality of the application

Summary description of the application.

Content of the Client area (Client area)

Description of the representations in the Client area of the main window

Working with the application

Description of the important menu functions and their use.

DFM Overview 3

3.1 Functionality

The **DFM overview** application is used for the representation and change of the data of a maximum of 30 DFMs of a selected unit.

3.2 Client area

For the selection of the PCU and unit, as well as for the input of a time setpoint, two lists and one input field are available in the header of the Client area. Below that the DFMs of the selected PCU and unit are represented:

3.3 Working with the application

Working with the **DFM overview** application contains the following activities:

Selection of the PCU

Menu:	**Functions** > **PCU**
Keyboard:	**F2**

After selecting the menu item **PCU** in the menu **Function** or clicking the selection list **PCU** in the header, the requested PCU can be selected by arrow keys.

Selection of the unit

Menu:	**Functions** > **Unit**
Keyboard:	**F3**

After selecting the **Unit** menu item in the menu **Function** or clicking the selection list **Unit** in the header, the requested unit can be selected by arrow keys.

Default of a setpoint

Menu:	**Functions** > **Setpoint**
Keyboard:	**F4**

After selecting the menu item **Setpoint** in the menu **Function** or clicking **Input field time** in the header, one time setpoint can be preset by the user.

In addition, all setpoints indicated in the main window can be changed directly by clicking the appropriate input field. In this case there are two different input possibilities for data entry:

- Direct input of a numerical value via the keyboard or
- Selecting a defined value from a list which is automatically faded

Displaying the plant overview

Menu:	**Program > Plant overview**
Keyboard:	**F7**

After selecting the menu item **Plant overview** in the menu **Program** or activating the function key **F7**, the system switches to the application **Plant overview**.

Displaying the unit process image

Menu:	**Program > Unit process image**
Keyboard:	**F8**

After selecting the menu item **Unit process image** in the **Program** menu or activating the function key **F8**, you will be forwarded to the application **Process diagrams**, which automatically loads and indicates the process image of the currently selected units as far as the corresponding input of the file kettbld.txt exists.

3.4 Configuration

In the \\WINDCS\PCU.xxx\RECIPE**SEQUENCE.ini** , it must be determined per unit which ones (up to 30) are indicated to DFMs in the **DFM overview** application. The 5 x 6 positions can be allocated freely, i.e. configurable gaps can be left.

With an ASCII editor in the **SEQUENCE.ini** an input "DFMLIST" must be added per unit.

Example:

DFM 0.1, unoccupied location, DFM 2.1 is to be displayed.

The following input is necessary:

- DFMLIST=0.1,0.0,2.1

In the file \\windcs\PCUxxx\Recipe\ **SEQUENCE.INI** , the numbers of the corresponding DFMs should be entered so that the DFMs in the **Plant overview** can be displayed even if the unit doesn't run (Step=0).
The data record is built up in the file **SEQUENCE.INI** as follows:

Meaning	Description
[SequenceNr]	Number of the unit (1 ... 64)
Comment	Comment
RecType	Recipe type (0 ... 99), 0 = no start possible

Meaning	Description
SetPoint	Numbers of the DFMs which are supposed to be updated by a non-running unit
DFMList	Numbers of the DFMs which are indicated by the DFM overview application.

Examples:

Meaning	Description
[PART01]	Unit 1
RecType=1	Recipe type = 1 (e.g. product)
SetPoint=1.12,1.14,0.23,1.113,2.45	DFMs which should be updated by a non-running unit.
	Specification of the Group no. DFM and DFM no.
Bzw.	
SetPoint=268,270,23,369,557	DFMs which should be updated by a non-running unit.
	Specification of the absolute DFM no.
DFMList=1.13,1.15,0.0,2.54	DFMs which are indicated in the DFM overview
[PART02]	Unit 2
RECType=1,4	Recipe type = 1 and 4 (for example product and CIP)
SetPoint=1.13,2.25,0.123	DFMs which should be updated by a non-running unit.
DFMList=1.13,1.15,0.0,2.54	DFMs which are indicated in the DFM overview

The recipe type in the Sequence.ini – significant if the unit is not started via the recipe control. By starting a unit from the plant overview the user is asked for the recipe type and the basic recipe. For the selection only the recipe types configured in the Sequence.ini with the master recipes assigned to the respective recipe type are offered.

RecType: 0: no start possible

1,2,... start with recipes of the recipe type 1 or 2 or ...

If the same DFMs are supposed to be indicated besides all steps per unit, in file \\WINDCS \SYS\teilanl.ini

```
[DFM]
;Ignore GOP number when creating DFM windows
IgnoreGop=1
```

must be set.

Controller operation 4

4.1 Functionality

The **Controller operation** application is used for the operation and the control of controllers.

4.2 Client area

The Client area contains up to 4 controller schematics. Depending on the type of controller each type includes the following displays and operating elements:

Name of the controller

Every controller gets an explicit meaning.

Scaling for X & W

For the process value and the setpoint, a scaling with maximum value, minimum value and unit is output.

X & W. as bar graph and/or numerical value

For the process value and the setpoint one bar graph and a numerical value is output.

Scaling for Y

For the manipulated variable a scaling with maximum value, minimum value and unit is output.

Y as bar graph and/or numerical value

For the manipulated variable a bar graph and a numerical value in percent is output.

Auto/Manual

Automatic system/Manual transfer; in the **manual** operating mode the input is possible for the manipulated variable Y.

External/Internal

External/internal transfer; with **External** the input of the setpoint W is possible.

KP part

P amplification

KP10 part *°

P amplification x 10

TV part *

Rate time

TN part *

Readjusting factor

On/Off **

On/Off operating for manual operation

STWE **

Manipulated variable in manual operation

M **

M = 1 for xd > TOB M = 0 for xd = 0

On/Off **

Controller On/Off, switchable

***** only for PID controllers

****** only for Three-point controllers

° only for S5

4.3 Working with the application

Working with the **Controller operation** application involves the following activities:

Selection of the operating elements

The user can select the controller by clicking the controller with the mouse and/or via the function keys of the operating elements of the controllers. In turn with the mouse and/or with the TAB key the single elements are jumped to and made operable. Some edit windows are protected by password.

Selection of the group

You can select the following options here:

Menu functions	Function key	Toolbar
Group	F2	

After the selection the configured group names are output in a list box. With a double-click on the names or with the OK key the program builds up a new overview with the corresponding controllers.

Selection of the controllers:

You can select the following options here:

Menu functions	Function key	Toolbar
PID control module	F3	
Three-position controller	F4	
Controller 1	F5	
Controller 2	F6	
Controller 3	F7	
Controller 4	F8	

By selecting the menu item **Settings** or by pressing the function keys the following can be adjusted.

Auto	**F9**	Automatic operation
Manual	**SHIFT+F9**	Manual operation
External	**F10**	External
Internal	**SHIFT+F10**	Internal
Setpoint W	**SHIFT+F3**	Input of the setpoint W
Setpoint Y	**SHIFT+F4**	Input of the setpoint Y
KP part	**SHIFT+F5**	P amplification
KP10 part *°	**SHIFT+F6**	P amplification x 10
TV part *	**SHIFT+F7**	Rate time
TN part *	**SHIFT+F8**	Readjusting factor
STWE **	**SHIFT+F1**	Manipulated variable in manual operation
Controller on **	**ALT+F5**	Controller on
Controller off **	**ALT+F6**	Controller off
Setting impulse open**	**ALT+F7**	Setting impulse open
Setting impulse close**	**ALT+F8**	Setting impulse close
* only for PID controllers ** only for three-point controllers ° only for S5		

Configuration of the group

You can select the following options here:

Options menu	Function key	Toolbar
Parameterization	-/-	

After the selection, the standard Windows editor with the corresponding group file is called. The user can change the corresponding parameters here and save the file afterwards.

The files have e.g. the following structure:

Meaning	Description
[Group001]	Identification for group start
Name="Lautering"	Group name (Default: e.g. GROUP001)
Controller=5,7,13,23	Data record numbers in the DB of the participating controllers (a maximum of 4) (Default: 1,2,3,4)
Dim="mbar,mm,l,%"	Dimensions for the participating controllers (a maximum of 4) (Default: "Dim1,Dim2,Dim3,Dim4")
Dep=2,1,0,3	Decimal point position for the participating controllers (a maximum of 4) (Default: 0,0,0,0)
[Group002]	Any further groups
Name=" "	
Controller=	

The following limiting values are defined in the program:

Group number ID:	min. 1	Max. 64
Name string length:		max.
Record number:	min. 1	Max. 64
Dimension string length :		max.
Decimal point position:	min.	max.

If the limiting value is exceeded, the limited value is assumed automatically.

If the files are not available, the default values are used (see table).

Final operating elements 5

5.1 Functionality

The application **Actuators** gives an overview of all actuator statuses, with the possibility to switch on and off actuators or acknowledge errors.

5.2 Client area

The client area can be split into these sections:

Overview line:

- Input field for ICM number
- Input field for ICM name

If an ICM name is entered and finished with the return key, this ICM will be searched for. If it is found, the area/group of this ICM is displayed in the overview picture and the detail image (actuator status) of this ICM is faded in at the same time.
If no ICM is found with the entered name, the old ICM number and the corresponding name remain in the overview line.

Column 1: No.

Continuous numbering for the single ICMs from 1 to 255.

Column 2: Name

Specification of the symbolic ICM name with a maximum of 16 ASCII characters. The ICM name is allocated by the text configuration.

Column 3: Status

Displaying the current operating state of the ICMs

1. Displaying green on or black off
   On = ICM is switched on
   Off = ICM is switched off
2. Displaying red **error** or blank
   Error = ICM error is in line

Horizontal scrollbar for block-by-block paging.

5.3 Working with the application

Working with the application **Actuators** involves the following activities:

Displaying ICM data

The display of the ICM data occurs PCU-related. In an area-crossed operation the requested PCU can be selected via the menu **Area**. Only all ICM data of a PCU are indicated. A mixed display of ICM data from several PCUs is not possible. The ICMs of the selected PCUs can be operated.
The display of the ICM data occurs continuously in two blocks. However, it is possible to scroll forth and back page by page using the cursor keys or the horizontal scrollbars. The corresponding selected ICM is marked by color. For this currently selected ICM the corresponding detailed image can be selected via Return. The selection of the ICMs can also occur by clicking the corresponding line with the mouse.

Selection of the area

For an area-crossed operation the area which should be operated can be selected via the menu **Area** (=PCU). The display and operation of ICMs refers to the selected section exclusively. A mixed operation and control of several ICMs of different areas (i.e. different PCUs) is not possible.

Selection of the ICMs

The colored background of number and ICM name shows the currently selected ICM.

The selection of the ICMs occurs in three different ways:

- Cursor keys
- Click the ICM names with the mouse
- Input of the ICM number in the input field ICM.

Selection of the ICM detailed image

The selection of the ICM detailed image can occur in three different types:

- Selection of the ICMs and activating Return and/or clicking with the mouse
- Double-click on the ICM names with the mouse
- Input of the ICM name in the overview line and activating Return

Displaying the ICM detailed image

The ICM detailed image includes the following information:

- Symbolic name of the selected area (= PCU)
- Current ICM group

ICM number and symbolic name of the current ICMs

Table 5-1 Representation of the interface signals

1	=	logical signal "1" is connected to the component	
0	=	logical signal "0" is connected to the component	
BA	=	Command Automatic	
		Control from procedure or user program	
		0 = automatic system command On	
		1 = automatic system command Off	
BV	=	Operation locking	
		1 = enable:	ICM can be switched on
		0 = barrier:	ICM is switched off automatically, a restart is not possible
RE	=	Response On	
		1 = response of ICM "On"	
RA	=	Response Off	
		1 = response of ICM "Off"	
HD	=	Manual operation	
		1 = manual operation is active	
		0 = automatic switching is active	
QL	=	Load output	
		1 = load output is controlled	
Status	=	as in overview (On/Off, error)	
TÜS	=	Monitoring time setpoint [s]	
TÜI	=	Monitoring time process value [s]	
TYPE	=	ICM type	
Zuo	=	ICM manual group assignment	
BSP	=	ICM command file room	
		1 = ICM is controlled, specified circuit state Automatic operation	
QSP	=	Error acknowledgment memory	
		1 = error is in line	

Operation of the ICM detailed image

Table 5-2 The operation of the ICM occurs with the following buttons/function keys:

Help	**F1**	Calling a help function
Close	**F3**	Closing the ICM detailed image
S**t**atus	**F4**	Calling the application **Status** with the display of the corresponding interlock program
Quit	**F5**	Acknowledgement of the ICM error in line
Off	**F6**	Switching off the final controlling element; the monitoring time is restarted if the ICM was on before and not disturbed.
On	**F7**	Switching on the final control element; the monitoring time is retriggered if the ICM was on before and not disturbed. Switching on is only possible, if BV = 1
Memo	**F10**	Opening a text editor for entering a memo by the user. A default text is offered which can be changed, added and filed by the user in any way. The text is also operable with the application **Message archive**.

Special properties:

ICMs of the type "Motor" turn off automatically in case of error; the error should be acknowledged and removed before the switch-on is possible again.

ICMs of the type "Valve" remain switched on also in the case of fault.

Message archive 6

6.1 Functionality

The **Message archive** application is used for archiving and displaying messages.

6.2 Client area

Column 1: Time

Time stamp of the message.

Column 2: Type

TYPE	Description
B	Operating message
S	System fault message
M	User status message
F	User fault message
P	IOS message
W	Warning
O	Operation request

Column 3: Recipe type	Name of the recipe type for which the message had been transmitted (e.g. product, CIP ...).
Column 4: Job	Job number for which the message had been transmitted.
Column 5: Batch	Batch number for which the message had been transmitted.
Column 6: PCU	PCU number which relocated the message
Column 7: TA	Unit number which relocated the message
Column 8: TaName:	Name of the unit that relocated the message
Column 9: Block	Name of the block which deposited the message (e.g. Unit, ICM ...)
Column 10: No.	Data set number (1 to 255)
Column 11: Name	Configured name of the data set (16 characters)
Column 12: Text	General message name. Freely configurable text (48 characters) for incoming and outgoing message in case of user messages
Column 13: K/G MELD	Additional text for incoming/outgoing message (used only in case of specific system messages)

6.3 Working with the application

Working with the **Message archive** application involves the following activities:

Reading messages

Messages can be written from several different IOSs by the PCUs and are always kept redundant. The assignment of the message archives to the single IOSs occurs via the application **System setting**. The send channels of the PCUs are adjusted via the configuration.

Archive selection

The selection of the message archive for specific data occurs via a dialog box. The message archives are organized according to calendar days. The dialog box is selected via:

Menu functions	Function key	Toolbar
Archive selection	F2	

Print messages

Messages can be printed out via

Menu functions	Function key	Toolbar
Printing	F4	

Drive setting

Via the function **Drive setting** in the menu **Functions** the export drive can be adjusted.

Switch on updating

Options menu	Function key	Toolbar
Updating On	F9	

User messages

By selecting the menu item **User messages** in the menu**Options** the display of the user messages can be switched on/off.

External data

By selecting the menu item **External data** in the menu **Options** external data can be read in.

Process archives

Backup archive:
The dialog box is selected via

Menu functions	Function key	Toolbar
Edit/backup archive	-/-	

First of all, the requested year and the requested month are selected. In the left list box **Available archive files**, an archive can be preselected. With the key **Add** or by a double-click, the selected archive is accepted in the right list box **Selected archive files** (List of the archives which have to be saved). After activating the button **All**, available archive files are accepted in the right list box.

If you would like to remove an archive file which has already been selected from the right list box you must activate the button **Extract** or double-click on the archive which should be removed. All selected archive files can be deleted with the button **Remove**.

Saving begins with the **OK** key.

Load archives:	
	Archive files which were paged out must be made available again via loading in order to process them on a floppy disk. The operation is analogous to saving.
Delete archives:	
	Old archives can be deleted from the disk. The operation is analogous to saving. The destination selection is inactive.

Message selection

It is possible to select only a part of the messages of an archive. There is a dialog box available for that. The dialog box is selected via

Menu functions	Function key	Toolbar
Selection	F3	

The dialog box allows you to select according to:

- Time
- Type
- Recipe type

- Job number
- Batch number
- PCU number
- Ta
- TaName:
- Block
- Block number
- Name
- Text

In an input field one search string can be entered for every element.

The strings become AND connected.

The search string can also be entered directly.

Here the following assignment operators are allowed: " =, !=, >, <, >=, <= ".

In addition, the connection operators " &, |. are allowed.

The following operands are authorized:

Equal	‘ = ‘, ‘ = = ‘
Unequal	‘ != ‘, ‘ < > ‘, ‘ > < ‘, ‘ # ‘
Smaller	‘ < ‘
Larger	‘ > ‘
Smaller equal	‘ < = ‘, ‘ = < ‘
Larger equal	‘ > = ‘, ‘ = > ‘

Call of a memo

The memo for the instance of the selected message is processed via the Windows editor.

The selection of a message memo occurs in three different ways:

- Return key on selected message
- Double-click on the requested message
- Selection of the message and call by the menu item **Memo** in the menu **Options**

Memo function:

Opening a text editor for entering a memo by the user. A default text is offered which can be changed, added and saved by the user in any way. There is a specific text file for each instance (e.g. for each ICM) which is operable via the application **Actuators** as well as by the application **Message archive**.

Curve input 7

7.1 Functionality

The **Curve input** application is used for the graphic or tabular input and display of curves

which enables the user to enter IOS setpoints as a graphic curve shape. The curve interpolation points are stored in a DB of the PCU (DB or DX). After the setpoint curve is triggered, a standard FB always calculates the current setpoint value (interpolation between the interpolation points) according to the set time base.

The current setpoint value can be output to a PID controller for further processing, for example.

Application example:

Preset of cooling curves for fermenting silos.

You can define several trigger points for the same curve. A flag is set in the PCU when the trigger condition is met.

You can trigger the curve recording in two ways:

- Internal trigger:
  Curve recording is triggered manually. Specify the curve group ID and the relative curve number in the curve dataset, and then trigger the recording by means of the start bit ‘Start from internal = 1’ of the dataset.
- External trigger:
  Curve recording is triggered externally by a sequence. The value of the curve number is defined in comma-separated decimal format, with two decimals.
  - External trigger:
    Curve group number
  - Decimal:
    Relative curve number in the group

  A setpoint SW = 0 must be preset in the recipe list after the curve is triggered, because otherwise the curve would be re-triggered after its expiration.

See ->Manual ‘Blocks S7’ -> KURVSW

See ->Manual ‘Blocks S5’ -> KURVSW

7.2 Client area

The curves can be entered and represented as graphics or in tabular form.

Setup of the Client area for graphics representation:

- Vertical scaling of the active curve (on the left next to the graphics)
- Vertical scaling of the inactive curves (on the right next to the graphics)
- Scaling of the time axis below the graphics
- Scrollbar for displacing the time window
- Scrollbar for vertical displacement
- Graphics window for the graph
- Displaying the trigger points

In the graphics field all opened curves (a maximum of 8) are represented. Only one curve is always active. For the active curve the curve shape can be edited with the mouse.

If the mouse pointer is in the graphics field, it is represented as a line cross. The coordinates of the indicator are output under the vertical axis in addition.

For the representation, the curve data are converted into the unit of time of the representation. If the represented time window is smaller, the curves are cut off at the edge of the graphics field. If the window is bigger, the curves end at the last interpolation point. The graphics field can be displaced (within a given time), stretched or compressed horizontally.

Structure of the Client area for table representation:

- Scrollbar for vertical displacement
- Scrollbar for horizontal displacement
- Table with the interpolation points of the curves

Column 1

Continuous numbering of the interpolation points

Column 2

- Time field:
  If there is a marking "Tr" before the time specification, it is a trigger point

Column 3-10

Interpolation points of the curves 1-8

7.3 Working with the application

Working with the **Curve entry** application involves the following activities:

Open, file and delete images

Up to 8 different curves can be loaded together. These can be saved together as an image. The advantage is that not every curve needs to be loaded but all can be called as image at once. The curve graphics are in the curve DB; the file …\windcs\sys\kurvein.ini contains only the references to the curves.

Example:

KURVEIN.INI	Description
[picture_dir]	
name0=test.kh	Imagename1
name1=empty	Imagename2
[test.kh]	Image1
curve0=1.01	Reference to curve
buffer0=0	0 is loaded into buffers
curve1=1.02	Reference to curve
buffer1=1	1 is loaded into buffers

Open images:

With the function **Open** in the menu **Images**, images can be opened.

After selecting the function, a dialog box appears for the selection of an image.

Delete images:

With the function **Delete** in the menu **Images**, images can be deleted. After selecting the function, a dialog box appears for the selection of an image.

Save images:

The settings for the curve input (which curves are opened, which time period, which colors, etc.) can be saved. The settings are saved in an "ini file" which is appropriate to the application.

With the function Save under ... in the menu, images can be filed under a new name. For the name no path specification is permissible.

Delete images:

With the function **Delete** in the menu **Images**, images can be deleted. After selecting the function, a dialog box for the selection of the image will appear. After selecting the requested curve and executing with the **OK** key, another dialog box comes with the interrogation: "Do you really want to delete "Curve - Name"?"

Information about a curve

Information about the curves which are in the main memory are displayed via the function **Information** in the menu **Images**.

For every curve the following is indicated:

Column 1:	Buffer
Column 2:	Number
Column 3:	Name
Column 4:	Vertical unit
Column 5:	Dec.pnt. Decimal point
Column 6:	Time base, e.g. (seconds)
Column 7:	No. int. pts. Number of interpolation points
Column 8:	Max.no. int.pts. maximum number of interpolation points

Open, file and delete curves

First the data blocks should be entered in the file KURVEIN.INI under [DB_List] in which locations of curves should be filed in order to preselect the setpoint curves at the IOS.

If more than one data block is needed, starting from the first data block always the next one for the curve default must be used.

Every group number is filed in a data block.

The number of the first data block for the location of the curves should be configured in the data record of the block KURVSW.

KURVEIN.INI	Description
[DB_List]	List of the data blocks
Groupx=PCU,DB,Type	Group No.= of PCU no., DB no., Data type*
Groupx=PCU,DB,Type	Group No.= of PCU no., DB no., Data type*
etc.	
	* Data type: short = 16 bit number, long = 32 bit number

Note

The data type long is not implemented in the standard system!

Example

The interpolation point of the setpoint curves of the PCU-1 should be filed in the DB 50 for the group 1 and in the DB 51 for the group 2 as 16-bit numbers.

KURVEIN.INI	Description
[DB_List]	
Group1=1,DB50,short	Group no. 1= PCU no. 1, DB no. 50, data type short=16 bit number
Group2=1,DB51,short	Group no. 2= PCU no. 1, DB no. 51, data type short=16 bit number

If several PCUs participate, use different groups and pass the required PCU.

Example

The Group1 curves are based on PCU 14, those of Group2 on PCU 1.

KURVEIN.INI	Description
[DB_List]	
Group1=14,DB50,short	Group no. 1= PCU no. 14, DB no. 50, data type short=16 bit number
Group2=1,DB50,short	Group no. 2= PCU no. 1, DB no. 50, data type short=16 bit number

After the data blocks have been determined, the curves can be created with the application curve input.

The curves are displayed in the form "a.mn" with a=curve group and mn=curve no.!

Open curves:

In order to be able to open trends in the earlier examples of trend diagrams, the following declarations must be made in KURVEIN.INI:

```
[curve_dir]
cu0=1.01
cu1=1.02
cu2=empty
cu3=empty
cu4=empty
cu5=empty
cu6=empty
cu7=empty

[curve1.01]
name=M1041_I
dim=A
color=0
min=0.0
max=350.0

[curve1.02]
name=M1042_I
```

```
dim=A
color=2
min=0.0
max=350.0
```

You can open and save the curves in one of the following ways:

Curves menu	Function key	Toolbar
Opening	F3	
Save	F2	

- After selecting the open function, a dialog box appears for the selection of an image.
- Using **Save as...** the curve data can be saved as a different target file.
- All selected curves are saved using **Save all**.

Delete curves:

With the function **Delete** in the menu **Curves**, curves can be deleted. After selecting the function, a dialog box for selecting a curve will appear. After selecting the requested curve and executing with the **OK** key, another dialog box comes with the interrogation: "Do you really want to delete "Curve - Name"?"

Removing curves:

With the function **Remove** in the menu **Curves**, one curve can be removed from the main memory.

Load curves

The following options are available for loading the current curve into the PCU:

Curves menu	Function key	Toolbar
In PCU	F4	

Insert line

Lines are inserted in the table via the menu **Curves** via the function **Insert line** or by pressing **Shift+Insert**. After pressing the keys one line is inserted in the table. The cursor is positioned in the time field.

Attach line

Lines are attached to the table via the menu **Curves**, via the function **Attach line**. After the selection one line is attached in the table.

Delete line

This function deletes all locations with the time value. After activating the function the interrogation appears:

"Do you really want to delete?"

Assignment

Here you can view the assignment of the current curve to the PCU DB. The DB number is shown in relation to DB50. The data are not selected or modified here.

Graphic input and display of curves

In the graphics field all opened curves (a maximum of 8) are represented. Only one curve is always active. The active curve is determined by clicking the corresponding icon in the button bar. For the active curve the curve shape can be edited with the mouse. For the representation, the curve data are converted into the unit of time of the representation. If the represented time window is smaller, the curves are cut off at the edge of the graphics field. If the window is bigger, the curves end at the last interpolation point. The graphics field can be moved, stretched or compressed horizontally (chronologically) and vertically.

Stretch/compress time view

The following options are available for stretching / compressing the time range displayed:

View menu	Function key	Toolbar
Stretch view	F8	
Last view/compress	-/-	

- When making a selection via the menu/function key the desired time range is provided in a dialog box (format for "from" / "to": hhh:mm:ss). If the format is not kept, the message "Unauthorized time" appears.
- All curves are initially deactivated when selecting with the mouse. In the graphics field a time interval can be selected with the mouse (hold right mouse button pressed, hold pressed, displace, enable, end of the stretching function)
- You can return to the last view via the Last view/compress function. If no last view is filed, the area will be compressed by the factor 1.5 (resolution becomes smaller, area becomes larger).

View Displace time

The represented time period can be displaced horizontally. After selecting the function **Displace time** in the menu **View**, a dialog box in which the "New start time value" (for example 12:30) can be preset.

The displacement can also be selected with the scrollbar below the graphics field.

Stretch/compress vertical view

The following options are available for stretching / compressing the time range displayed:

View menu	Function key	Toolbar
Stretch vertical	F7	
Vertical Last view/compress	-/-	

- When making a selection via the menu/function key the desired time range is provided in a dialog box ("from" / "to"). An error message appears if the measurement range is exceeded in the input.
- All curves are initially deactivated when selecting with the mouse. In the graphics field a time interval can be selected with the mouse (hold right mouse button pressed, hold pressed, displace, enable, end of the stretching function)
- You can return to the last view via the Last view/compress function. If no last view is filed, the area will be compressed by the factor 1.5 (resolution becomes smaller, area becomes larger).

Vertical view displace

The represented area can be displaced. After the selection of the **function Displace vertically** in the menu **View** a dialog box in which the "New minimum value" can be preset appears. The displacement can also be selected with the scrollbar to the right of the graphics field.

Time grid

With this function a time grid can be adjusted i.e. a grid enables only mouse inputs at equidistant times.

After selecting the function **Time grid catch** in the menu **View** a dialog box appears. The requested grid can be entered behind **Distance** in the form hh:mm:ss. The function becomes active when **Grid catch on** is crossed.

Grid

The graphics field can be coated with a grid network.

After selecting the function **Grid** in the menu **View** a dialog box appears. The requested distance can be entered for vertical and horizontal lines separately. In addition both lines can be hidden as well as shown separately. Or by selecting the icon:



Curve parameters

Curve parameters can be determined for every opened curve.

The selection of the dialog box occurs after the operation of the function **Curve parameter** in the menu **Curves**.

With new curves the parameters are preset (values in brackets).

The curve parameters are:

- Name (cuxxx.yy)
- Unit (unitxxx.yy)
- Decimal point (0)
- Minimum input value (0)
- Maximum input value (100)
- Time base (Seconds)

Note

The time base can be selected only at new, still empty curves. After setpoint values have been defined, the time base can no longer be changed.

Edit trigger points

With the function **Trigger points** in the menu **Curves** trigger points can be entered. A dialog box appears for the input.

In the graphic representation, trigger points can also be edited by clicking the following icon in the toolbar.



The trigger values are represented in the graphic representation as vertical lines at whose top end the setpoint is indicated.

In the tabular representation the trigger time is marked with a prefixed "Tr".

Trigger points are operating points. In this way operating activities can be executed e.g. by reaching the "trigger time", for example enabling one step of the step chain. A synchronization with the recipe system can be achieved.

Delete curves

In the graphic representation curve points can be removed by selecting the following icon.



Set-up auto

By selecting the function **Autosetup** in the menu **View** the original representation after compressing, stretching etc. is signed again.

Sign new

By selecting the function **Sign new** in the menu **View** the curve is signed new – after the curve shape has been changed (delete).

Table/graphics

You have the following options for showing the tabular view:

View menu	Function key	Toolbar
Table/graphics	F5	

Table type

By selecting the function **Table type** in the menu **View** you can branch out into different representation types.

Tabular input and display of curves

For the table representation there are two options:

Representation 1 (all interpolation points):

All interpolation points (all curves) are represented in ascending order within a given time. If there are no interpolation points for a point of time, there will be a linear interpolation between the interpolation points which are before or behind them. The interpolated values are labeled with *). It won't be interpolated over the last interpolation point (represented in the table with a line).

Representation 2 (interpolation points of a curve):

Interpolation points of a curve (Master) are used as "Trigger pulses". All interpolation points of the "master curve" are output. If there are no interpolation points for these time values, the

values will be interpolated in a linear fashion. It won't be interpolated over the last interpolation point.

There is a field cursor in the table. This can be positioned with the mouse or the cursor navigation keys. The field in which the cursor is located can be edited. If a time value is changed, the table is put in the right order and is indicated.

Printing

With the **Print table** function in the **Print** menu the curves can be output in tabular format on a printer. After the selection, a dialog box appears in which the table type - master form and/or all interpolation points of all curves - can be preselected.

Special values 8

8.1 Functionality

The application **Special values** is used for the representation of up to 511 special values. These special values can be represented in the formats channel lock-in facility (Fixed-point number) KH (Hexadecimal number), KT (Time value) or KZ (Count). The special values represent the content of the data block DB 709 of the selected area. The selected area corresponds exactly to a PCU. A mixed operation of special values via several PCUs is not possible.

8.2 Client area

Column 1: No.

Continuous numbering of the individual special values from 1 to 255

The insertion of blanks is not possible.

Column 2: Type

Specification of the special value type:

- CHANNEL LOCK-IN FACILITY = fixed-point number (Integer)
- KH = Hexadecimal representation
- KT = Representation as a time value
- KZ = Representation as count

Column 2 remains empty with not-configured special values.

Column 3: Name

User-defined comment for the special value with a maximum of 16 ASCII characters by the user. This name is edited with the **application Text configuration.**

Column 4: Comment

User-friendly or user definable comment for the special value with a maximum of 32 ASCII characters.

Column 5: Value

Value of the special value in the respective preset format. With a non-available configuration the value is indicated in the format KT.

Column 6: Dimension

User-friendly and definable name for the dimension of the special value with a maximum of 8 ASCII characters.

8.3 Working with the application

Working with the **Special value** application involves the following activities:

Displaying the values with data source "Offline IOS"

The special values currently filed on the hard disk are indicated. The reading and writing of special values refers exclusively to the special values which are filed on the hard disk

On the hard disk the special values of the single PCUs are filed in their own paths. The registers are built up as follows:

- \ WINDCS \ PCU.001 \ for symbolic PCU1 (e.g. tank farm)
- \ WINDCS \ PCU.nnn \ for symbolic PCUn (e.g. deflection) etc.

with the respective subdirectory:

- \ WINDCS \ PCU.nnn \ DB \

The special values are in the DB 709 and filed thus in the file db.709.

According to the valid PCU selection the special values are fetched from the assigned registers.

Display of the values with data source "Online PCU"

The current special values of the selected PCUs are indicated. The reading and writing of special values refer exclusively to the special values which are filed to the selected PCU in block 709.

Selection of the PCUs

For an area-crossed operation the PCU which has to be operated can be selected via the menu **Area**. The reading and writing of special values refer exclusively to the selected PCU. A mixed operation and control of several special values of different PCUs is not possible.

The PCU selection refers to the corresponding IOS subfolders or directly to the corresponding PCU.

Selection of a special value

You have the following options for selecting this function:

Menu functions	Function key	Toolbar
Special value	F2	

- After selecting this function a dialog box appears.
- The entered special value is selected and represented in the first line of the Client area.
- With the input of values outside the entered value area a message box with the note "Value too large!" or "Value too small!" will appear.

Parameterize a special value

The parameters of the special values (type, comment and dimension) are always saved on the hard disk and always relate to the special value selected.

You have the following options for selecting this function:

Menu functions	Function key	Toolbar
Parameterization	F3	

Or alternatively:

- double-click on the corresponding line in the Client area

The call of this function is protected by the password. After successful password request a dialog box which contains the following data appears:

- **Number** of the selected special value
- **Name** of the selected special value from the file:
  - ..\ PCU.xxx \ TEXTE \ SONDWERT.TXT
- **Type** of the selected special value from the file:
  ..\ PCU.xxx \ TEXTE \ SONDWERT.TYP

If the special value has no existing configuration yet, the **KT** format is offered as a default setting.

- **Comment**
  from the file... \ PCU.xxx \ TEXTE \ SONDWERT.NAM
- **Dimension**
  from the file... \ PCU.xxx \ TEXTE \ SONDWERT.DIM
- **Current value**
  - with Online PCU from the data block DB 709, DW data word (Special value no.) to the selected PCU
  - when offline - IOS from the file ... \ PCU.xxx \ DB \ DB.709 The current values are displayed in the formats KF, KH, KT and KZ.

The type can be selected via the option button and the comment and the dimension can be entered.

OK command button

The inputs are filed in the corresponding files:

- ... \ PCU.xxx \ TEXTE \ SONDWERT.TYP: Type
- ... \ PCU.xxx \ TEXTE \ SONDWERT.NAM: Comment
- ... \ PCU.xxx \ TEXTE \ SONDWERT.DIM: Dimension

The dialog box is closed.

Delete command button

The warning "Do you want to delete the special value?" appears. If the **Yes** button is pressed the value is set to 8000 H. The note box and the dialog box are closed.

Value input for special value

You have the following options for selecting this function:

Menu functions	Function key	Toolbar
Value entry	F4	

Or alternatively:

- Return key on the corresponding line in the Client area

The call of this function is protected by the password. After successful password request a type-dependent dialog box appears. The following data are indicated:

- **Number** of the selected special value
- **Type** of the selected special value from the file:
  - ... \ PCU.xxx \ TEXTE \ SONDWERT.TYP
- **Name** of the selected special value from the file:
  - ...\ PCU.xxx \ TEXTE \ SONDWERT.TXT
- **Comment** from the file ...
  - ... \ PCU.xxx \ TEXTE \ SONDWERT.NAM
- **Dimension** from the file:
  - ... \ PCU.xxx \ TEXTE \ SONDWERT.DIM

current value

- with Online PCU from the data block DB 709, DW data word (Special value no.) to the selected PCU
- when offline - IOS from the file ... \ PCU.xxx \ DB \ DB.709 The current value is only displayed in the configured format.

Representation of the input area with an example according to the configured format. According to the configured type, different dialog boxes appear for the value input:

Type KF:

- Input of integer numbers (whole numbers)
- Input area of KF -32768 to +32767

The input is limited to six characters (minus sign + 5 digits). The input of the "+" is not necessary. With inputs excluding the input area the note box "False input" appears. After their confirmation the note box and the dialog box are closed without a value transfer.

Note

The value -32768 is allowed and can also be entered. With BRAUMAT/SISTAR this numerical value is interpreted as parameter not set and/or deleted (Hex 8000). This is indicated in the table view as an empty box. The user can click the delete button in the dialog ‘Special values – parameterization’ for example or enter -32768 in the value field of the dialog ‘Special value – value entry KF’ in order to delete a parameter.

Type KH:

- Input of hexadecimal numbers
- Input area of KH 0000 H to FFFFH
- Only digits and letters A, B, C, D, E and F can be entered.
- The input is limited to four characters.

KT type:

- Input of time values
- Input area of KT 0.000 to 3.999

The input occurs in two areas:

- Time grid:
  - Only the numbers 0 for 10 msec, 1 for 100 msec, 2 for 1 sec
  - and 3 for 10 sec can be entered.
  - The input is limited to one character.
- Time value:
  - Only the digits 0 to 9 can be entered.
  - The input is limited to three characters.

KZ type:

- Input of count values
- Input area of KZ 000 to 999

- Only the digits 0 to 9 can be entered.
- The input is limited to three characters.

OK command button

- The entered value is saved.
- After storing, this special value is filed in the data block DB 209, DW data word (Special value no. - 1).
- With Online PCU the value is written into the data block in DB 709 of the PCU.
- With Offline IOS the value is written to the file ... \ PCU.xxx \ DB \ DB.709.
- Thus it should be considered that the contents of the saved DB 209 differ between IOS and PCU.

Selection of the memo

The selection of this function occurs in two different ways:

- Menu item **Memo** in the menu **Options**
- Function key **F10**
- A text editor is called.
- Texts can be set aside now for every special value.
- For each single data record there is the corresponding file:
  - ... \ PCU.xxx \ NOTETXT.y \ SONDWERT \ SONDWERT.nnn
    If there is no file for a special value, a default text will be offered from the file
  - ... \ PCU.xxx \ NOTETXT.y \ SONDWERT \ SONDWERT.TXT
    and copied in the corresponding file
  - ... \ SONDWERT.nnn .
    <y> symbolizes the adjusted language (0 = German, 1 = English, etc.).
    <nnn> represents the special value number.
    Fundamentally all memo texts of the special values can be called.

The editing is protected by a password. After a successful password query the text editor can be used. After pressing the **OK** button the file is saved and the dialog box is closed.

Parameterization 9

9.1 Functionality

The **Parameterization** application is used for the configuration and parameterization of PCU data objects. Further details are found in the manual '*Engineering based on S7* chapter 3 '*Configuration*'.

9.2 Working with the application

Working with the **Configuration** application involves the following activities:

Selection of the class file

You have the following options for selecting the class file:

File menu	Function key	Toolbar
Opening	F2	

In the dialog box **Open class file** the following possibilities for selection are:

- **Data source** Online (PCU) or offline (Hard Disk)
- **Area** PCU menu item with the symbolic meanings of the PCUs
- **Class** for example AIN, LINK, ICM etc.

Selection of a data set

In a list box all available data sets are listed with their data set names.

A data set is selected either via the **Select data set** function in the **Edit** menu or by clicking the following icon in the toolbar



Selection of next data set

The selection of the next data set occurs either via the function **Next data set**in the menu **Processing** or by activating the function key **F3**.

Selection of previous data set

The selection of the previous data set occurs either via the function **Previous data set** in the menu **Processing** or by activating the function key **F7**.

Update values

Switching values on and off is selected by the function **Update value** in the menu **Processing** or by activating the function key **SHIFT+F3**.

Edit data set name

After selecting the function **Data set name** in the menu **Processing** or by activating the function key **SHIFT+F5** the name of the current data set can be edited in a dialog box

Parameterize data sets

As soon as a data set is selected, its individual parameters/attributes are displayed as a table in the Client area of the application as follows:

Column	Meaning	Value/Range		
Name	Attribute name	System name – not editable		
D.Type	Data type	System type – not editable		
		I8	Integer value:	0-255
		I16	Analog value:	-32767 - +32767
		I32	Analog value:	-2 147 483 648 - +2 147 483 647
		B1	Data bit:	0 / 1
		Quell	source object (e.g. ICM,12,Stat)	
		Step	Bit operation (e.g. UM 100.0)	
		Note:	You can only use flag bits in the range from 0.0 to 2047.7 for source connection	
A.Type	Access type	System type – not editable "ENG" = configurable attribute "SYS" = system attribute "RT" = Runtime attribute		
Value	Attribute value	Value format according to "D.Type"; Editing only possible for A.type"ENG" D.type "Quell": after selection, a dialog pops up for selecting the source object which is collected from class, instance and attribute D.Type "Step": Input of Step STL operation "UM x.y"		
Comment	Attribute description	System description – not editable		
Address	Address in PCU	Data block / Data element offset		

Note

The value -32768 is allowed and can also be entered. With BRAUMAT/SISTAR this numerical value is interpreted as **parameter not set and/or deleted** (Hex 8000). This is indicated in the value column as a '#' character. For example the user can enter the '#' character or -32768 in Param.exe in order to delete a parameter.

Filter functions in the Icon bar

	Show/hide extended attributes
Via the menu item **Options Extended attributes** or with this button these attributes can be switched on/ off. This is also valid for the call in the Global Data.	
	Show/hide engineering attributes
	Show/hide system attributes
	Show/hide runtime attributes

Print configuration

You have the following options for printing the parameterization:

File menu	Function key	Toolbar
Print	F4	

The following can be printed:

- the entire class,
- the current data set or
- several data sets (from ... to).

Copying of data sets

Copying DS to target DS:	• The current data set can be copied into a dialable target data set. • The selection of the function occurs via Copy to ... in the menu processing or by activating the function key F8. A dialog box appears. • In a list box one can be selected from the available data sets.
Copying DS to target DS:	• You can copy from a selectable source data set in the current data set. • The selection of the function occurs via Copying from ... in the menu processing or by activating the function key Shift+F8. A dialog box appears. • In a list box one can be selected from the available data sets.

Generate data set

By calling the function **Generate data set** in the menu **Processing** or by activating the function key **F5** data sets can be generated new.

Text file

By calling the function **Text file** in the menu **Processing** you will be forwarded to the corresponding text configuration.

Configuration

The configuration is selected via the function **Data set number** in the menu item **Processing** or by the function key **F6.** A dialog box appears. The data set number can be preset with the configuration, increased or reduced. However, it should be indicated in the value area, otherwise the input with an error message is refused.

The configuring is only then permissible if during the opening of the class file the data source "Offline one (Hard Disk)" was selected.

Global data

The selection occurs via the **menu item Data set** in the menu **Processing**. A dialog box appears in which the **Global Data** should be activated.

The function **Global Data** causes the signal of class-specific data.

Memo function

The selection of the note field occurs via the function **Memo** in the menu **Options** or by activating the function key **F10**.

A text editor is called. Texts can be filed now for every data set. For each single data set there is the corresponding file:

- ...\PCU.xxx\NOTETXT.y\klasse\klasse.nnn

If there is no file for a data set yet, a new one is created.

<y>	symbolizes the adjusted language (0=German, 1=English, etc.)
<nnn>	represents the data set number.

The editing is protected by a password. After a successful password query the text editor can be used. After activating the button **OK**, the new file is filed and the dialog box is closed.

Text configuration 10

10.1 Functionality

The application **Text configuration** is used for configuring the user texts and for printing the text configuration.

Client area

In the Client area the content of the selected user text file via which the current line can be edited is represented line by line.

Column 1: Continuous numbering of the single lines

Column 2: User text

10.2 Working with the application

Working with the **Text configuration** application involves the following activities:

Open a text file

You have the following options for opening the text file:

File menu	Function key	Toolbar
Opening	F2	

A modal dialog box appears following selection. The following selection can be made in different list boxes:

Language:	Language with global or PCU-related texts,
PCU:	[Global] → Global texts '...\windcs\texte.x\...' PCUnnn → PCU-related texts
Type	Type with PCU-related texts • Instance → '...\windcs\pcu.nnn\texte.x\...' • Address → '...\windcs\pcu.nnn\Address.x\...' • Description → '...\windcs\pcu.nnn\Desc.x\...' • Location → '...\windcs\pcu.nnn\Location.x\...'
File name:	Text file '...\<Class>.txt'

Confirm with **OK** to load the selected text file.

Note

PCU-related text attribute

Additional text attributes of the objects can be configured in addition to the module instance names. These are displayed in the process image with opened faceplate of the module instance in the "About" tab.

On this see manual "15_Operator control and monitoring based on S7", "Runtime system / Faceplates".

With these attributes it is an additional object description for the operator using the following attributes

- Description → long text/explanation of the object
- Address → one or more pieces of address information on input / output signals or flag bits
- Location → describes the location of the installation
- In addition a note can be created and displayed for every object.

Saving a text file

After selecting the menu item **Save** in the menu **File**, the called text file is filed by activating the function key **F3** or clicking the **Save** icon.

Print the text parameters

You have the following options for printing:

File menu	Function key	Toolbar
Print	F4	

A modal dialog box appears following selection. The following can be printed:

- the current file
- the current area (= all text files of the selected area)

If you activate the button **Installation**, the dialog box **Printer setup** appears, where you can select a printer, change the size of paper, etc.

File parameter

After selecting **Parameter** in the menu **File** the formatting parameters of the current file can be changed. A dialog box appears:

Process the file

The following functions can be selected under the menu item **Processing** in the text configuration by activating the corresponding function keys or by selecting the icon in the button bar:

Back	CTRL+Bksp	
Cut out	F5	
Copy	F6	
Insert	F7	
Delete	F8	
Insert line	Shift+F7	
Delete line	Shift+F8	

Engineering language:

If you want to use more than one engineering language then the corresponding language-specific files need to be configured for the different types and text files for the engineering languages configured (selection via "Language" listbox).

10.3 Extract data from the Step 7 symbol table

Extract text attributes from the STEP 7 symbol table - basics

The text parameterization of the objects can be extracted using the "ZL_Synchronizer.exe" tool, partly from the exported symbol table "S7_sym.seq" of the SIMATIC Manager. Duplicate creation of the texts in two places therefore becomes unnecessary. Conversely certain information can also be written from the text parameterization back into the "S7_sym.seq" file.

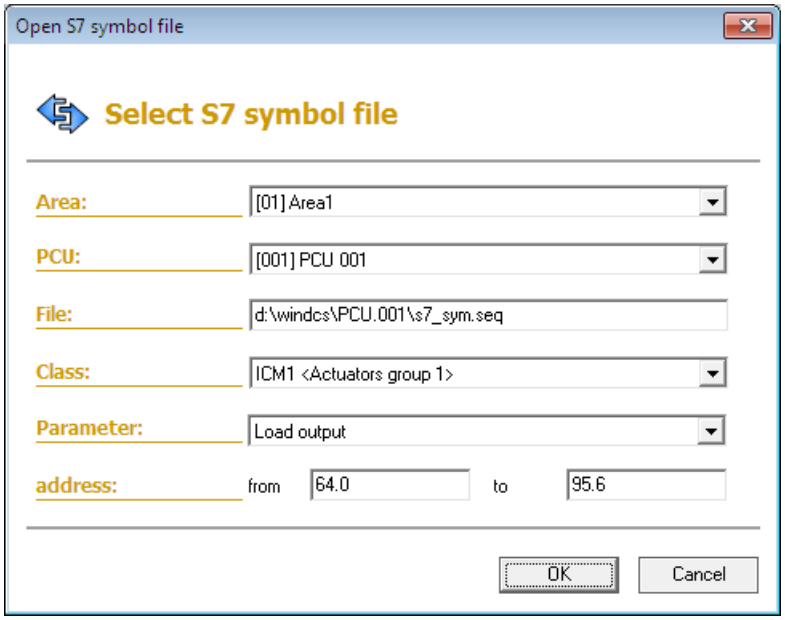
Requirements:

- For viewing symbolic information (allocation list), the PCU-specific allocation list "s7_sym.seq" is used. Following changes this must be exported again in each case in the STEP 7 Symbol Editor (format type "Allocation list (*.SEQ)). The Symbol table should be located in the following system folders:
  - In case of ‘Single Engineering Language’: '…\windcs\pcu.nnn\s7_sym.seq' or '…\windcs\pcu.nnn\texte\s7_sym.seq' – the system uses the relevant latest file
  - In case of ‘Multi-Engineering-Language’ '…\windcs\pcu.nnn\texte.x\s7_sym.seq'
- The language setting of the SIMATIC Manager must correspond with the current engineering language applicable in the BRAUMAT system (this is the current system language if the engineering language is not activated).
- The "ZL_Synchronizer.exe" tool is multi-client capable, i.e. the text parameterization of any PCU can be edited from an IOS station. For this the associated area IOS servers must be reachable via the network.

Accessing the application and selecting the symbol/text files

The "ZL_Synchronizer.exe" application is in the '...\windcs\sys\...' directory and it can be started directly by double-clicking on it.

First of all a selection dialog for the subsequent text comparison is opened via the 'File / Open' menu.



The inputs in the dialog window are saved using 'OK' and are thereby available again on the next opening. The following selection fields are available:

1. Area:
   Selecting the AREA in the listbox
2. PCU:
   Selecting the PCU in the listbox
3. File:
   The network path to the IOS directory, which must contain the STEP 7 symbol table, is specified by the application in accordance with the 'Engineering language' setting in the 'SiteCfg' configuration.
4. Class:
   Selecting the object class
5. Parameter:
   Selection of the "leading" object attribute in the symbol table. This alone is used as a reference for the comparison in both lists. For the ICM class this relates e.g. to the following attributes and type shortcuts:
   Command automatic = '-BA'
   Interlock = '-BV'
   Load output = '-QL'
   Reply Off = '-RA'
   Reply On = '-RE'
   The standard shortcuts specified upon system delivery can be adjusted to the abbreviations used in the project's symbol table where required.
6. Address:
   The address area of the selected parameter is displayed in the 'From' / 'To' fields. Initially these are the standard addresses of the relevant object attribute specified with system delivery. In the event that these have been changed in the project symbol table then the new addresses must be entered here.

Following confirmation by pressing OK the selection criteria selected are displayed in the main view. Based on this selection the corresponding texts from the symbol table as well as the BRAUMAT text parameterization for the selected object are set up in the table below.

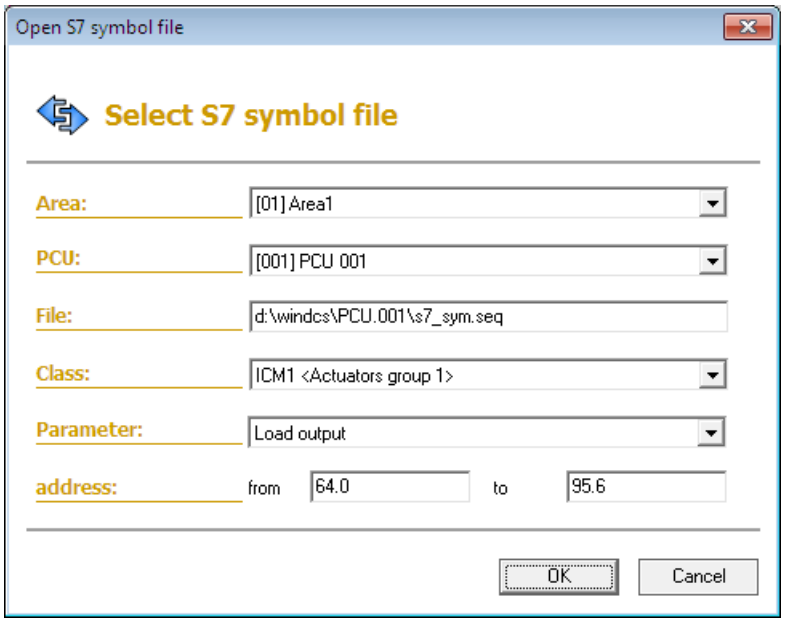


Table structure and allocation of the information columns:

Left table area **STEP 7 symbol table**	**Right table area** **BRAUMAT text parameterization**	**Associated** **BRAUMAT** **Text files**
Line no. of the symbol file	Instance address	'...\windcs\pcu.nnn\Address.x\...'
Type (E / A / M)		
Address (bit address)		
Symbol	Entity name	'...\windcs\pcu.nnn\texte.x\...'
Description	Instance description	'...\windcs\pcu.nnn\Desc.x\...'
-/-	Instance location	'...\windcs\pcu.nnn\Location.x\...'

- The 'identical' / 'different' column displays the results of the comparison between the STEP 7 symbol table and the BRAUMAT text parameterization. For this the symbol/instance names and the description/instance description columns are compared.
  - For this comparison the type shortcut in the symbol name (e.g. '-QL' ...) is **not** also taken into account. The type shortcut of the parameter selected currently can be adjusted in the subsequent selection dialog.
  - = → identical content in both columns
  - ≠ → difference in at least one column
- Font color red → marking of the differences
- Font color blue → Text change following input in text buffer or through manual editing

Sequence for table comparison and text transfer

- Marking of a line area in the table view which should be transferred with the subsequent synchronization command into the application's text buffer.
- With the menu commands 'Functions' / 'Synchronize right' ('Ctrl-R') or 'Synchronize left' ('Ctrl-L') a dialog appears for selecting the columns to be transferred.
- The following comparison functions are thereby available:

Symbol table	Transfer direction	Text parameterization	Max. string length
S7_Sym.seq (Symbol without type shortcut)	→	Entity name	16
S7_Sym.seq (Symbol)	←	Instance name + type shortcut	16 + type shortcuts (<= 24 characters)
S7_Sym.seq (Description)	→	Instance description	80
S7_Sym.seq (Description)	←	Instance description	80

- Following confirmation of the selection dialog the selected source texts are input into the text buffer of the table view and changes are marked in blue - but they are not saved yet.
- If any changes have been detected then the symbol "Save changes?" appears on the upper right.
  By clicking the mouse on this symbol the text marked in color is saved. This can also be done via the 'File / save' menu command or via 'Ctrl-S'.
- The following text fields can also be edited directly in the table view - changes are marked in blue:
  - STEP 7 Symbol table / Symbol
  - STEP 7 Symbol table / Description
  - Text parameterization / Instance name
  - Text parameterization / Instance description
  - Text parameterization / Instance location
- Text changes can only be made alternately in the right (text parameterization) or left (STEP 7 symbol table) table area; any change to the other page is only possible after 'Save' or 'Reject'.
- If any text changes (text color blue) are active on a page then the synchronization command is only enabled for this page; any change to the other page is only possible after 'Save' or 'Reject'.

Additional menu commands

- File / Print
  The Windows standard dialog 'Print' is opened. The comparison result in the page view can be printed out using this.
- File / Page view
  The comparison result is opened in the print view.
- File / Printer setup
  The Windows standard dialog 'Print settings' is opened.
- Function / Undo
  The last text change / synchronization is canceled
- Function / Restore
  The last text change / synchronization is repeated

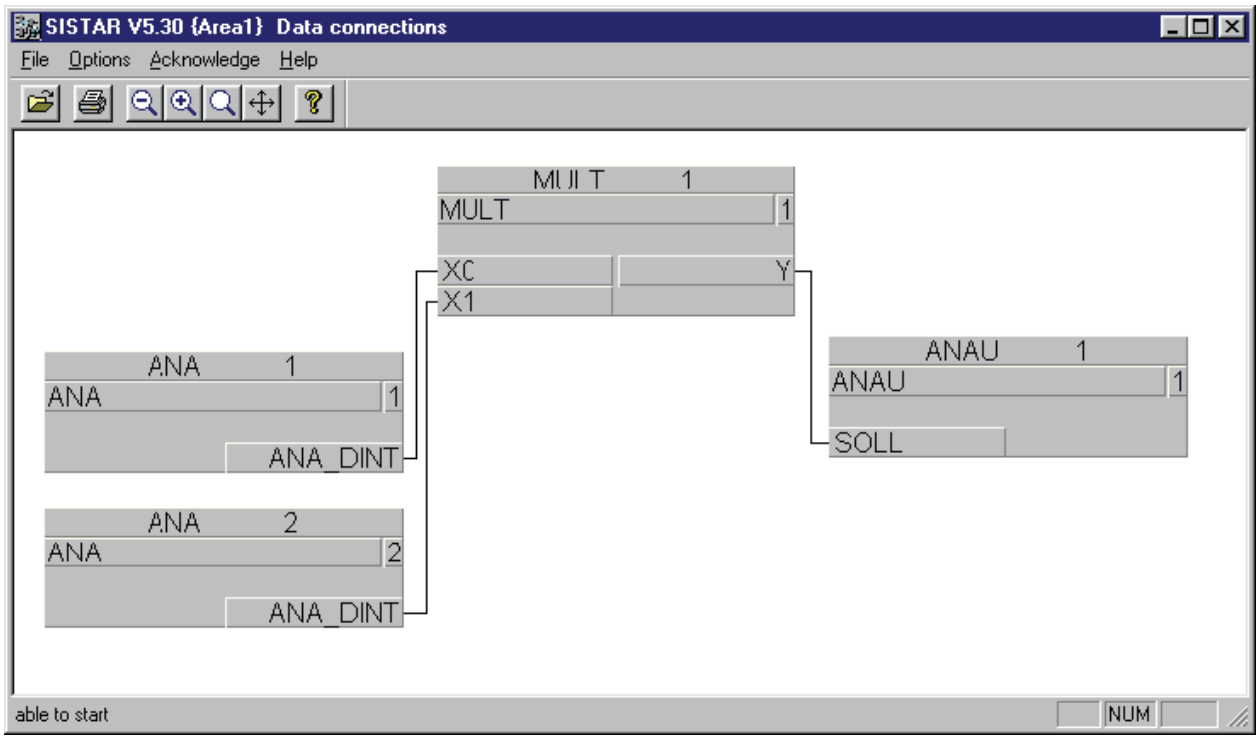
Graphical source view

11

11.1 Functionality

The function Data connection gives the user an overview of the interconnection of the blocks. The interconnections are represented via the application dataconn.exe. The application shows all interconnections starting from a block (e.g. MULT). The interconnections are continued recursively for other blocks which are referenced.

11.2 Client area



11.3 Working with the application

Open file

You have the following options for opening an existing data connection:

File menu	Function key	Toolbar
Opening	CTRL+O	

In the list fields you must select the PCU and the connection and click on OK. The graphic view of this instance is loaded into the working area.

Free selection

By calling the function **Free selection** in the **File** menu it can be searched for existing connection views.

- In the ‘Search’ tab an arbitrary block instance name can be searched for. In this case the options ‘Match case’, ‘Whole word only’ and ‘Search in ICMs only’ are selectable.
- In the ‘Browser’ tab any block instance may be selected

This block is the starting object. All connections starting from this block are displayed by pressing the ‘Goto Process image’ Button.

Organize

Via the menu item **File\organize** the connection views can be managed. Proceed as follows in order to create a connection view:

- You select the PCU via combo box PCU.
- With the button SEEK you arrive at the browser dialog.
- After having selected and confirmed the block, the name of the selected block appears in the edit section ‘title’
- Comment, creator and date can be entered for the selected connection view.
- The new connection view is accepted by the button Add.

The data is stored in the file '..\windcs\pcu.xxx\texte\dataconn.txt' of the selected PCU. There is one line per connection view in this file. Data are separated by a comma in this line.

In order to change the attributes of the available connection views it must be selected and the ‘Change’ box must be activated. After the change and pressing the 'Take over' button the new attributes are stored in dataconn.txt.

The selected connection view is deleted in the list by pressing the delete button.

Printing

You have the following options for printing an open data connection:

File menu	Function key	Toolbar
Print	CTRL+P	

First, the print function opens a dialog, via which the legend can either be entered or changed.

Page preview

The function **Page preview** in the menu **File** opens a dialog via which the legend can either be entered or changed. Then the preview window with the page/pages is shown.

Printer setup

The function **Printer setup** in the menu **File** opens the Standard printer setup.

Documentation

Via the function **Documentation** in the menu **File** a print function which prints all connection views can be activated.

Before printing you can determine via the dialog if all interconnections of a PCU or all interconnections of all PCUs should be printed.

Icon bar

With the following icons of the toolbar the represented connection view can be reduced, extended, zoomed value-wise or aligned in the image.



Additional attributes at the blocks

In addition, the attributes of the block can be displayed for each block. File paramX.ini contains the settings to determine which attributes should be displayed. The file is located in the … \windcs\pcu.x\texte.x\ folder and should be created with an editor first if these are not available.

Example: paramX.ini

```
 [MULT]
AID_MULT_ART=ENUM_MULT_ART
AID_MULT_K=VALUE
AID_MULT_M=SYS_MULT
```

```
[PID]
AID_PID_YNF=SYS_PID

[ENUM_MULT_ART]
Lenght=9
1=0;ASL
2=1;MIN
3=2;MAX
4=3;ADD
5=4;SUB
6=5;MUL
7=6;DIV
8=7;LI+
9=8;LI-
```

The creation of this file is based on windcs\param.pcu\paramS7.000, which contains the available blocks and corresponding attributes.

For a 'Mult' block, for example, you can find the following attributes which you can use in "paramx.ini"

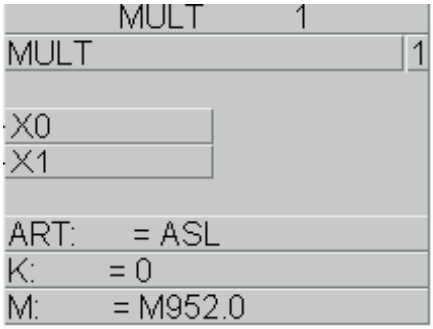
```
AID_MULT_Y
AID_MULT_X0
AID_MULT_X1
AID_MULT_ART
AID_MULT_K
AID_MULT_M
```

The file "paramX.ini" may contain one entry for each block. A block entry consists of the block name, e.g. [MULT], and the attribute, e.g. "AID_MULT_M" which is also to be displayed. This attribute value defines the displayed value.

The displayed value can be defined in three ways:

- Enumeration
  This means that a numeric value will be replaced by text. It is used for such attributes that can accept several values (e.g. DFM TYPE, MULT TYPE). For the enumeration the number (LENGTH=) of the parameters is defined. A value of the attributes and (separated by comma) the text is assigned to each parameter of the enumeration. For the definition there must be a definition block for the attribute.
  [ENUM_xxxxxxx] xxx=Attribute name without AID
  Length=
  n=value;Text n=continuous number
- Value (=VALUE)
  The current numeric value of the attribute is shown
- Address of the user interface (=SYS_MULT, =SYS_PID etc.),
  i.e. the attribute source is shown.
  Example: AID_MULT_M=SYS_MULT
  This is a control input of the Mult block,
  and is assigned a flag in SISTAR. Hence, M952.0. is shown for Mult1.
  (see manual *Blocks S7*)

Graphic view of the MULT block in the above example:



Status 12

12.1 General

Following the system installation (delivery state) the main menu tab "Program service tools" contains 2 icons with the names "Status S5" and "Status S7".

- "Status S5" is linked with the "Status.exe" Braumat application as standard.
  which lists only PCUs of type Simatic S5 in the file open dialog
- "Status S7" is linked with the Status_S7.exe Braumat application as standard, which provides its own status function and is able to call the KOP/FUP/AWL Editor of the Step 7 programming package, if this is installed and configured on the PC station.

12.2 Status for Simatic S5 via ‘Status.exe’ application

12.2.1 Functionality

The **Status** application enables status indicators of connection programs.

12.2.2 Client area

- **Column 1: Address**
  address rel. to the block start in hexadecimal code
- **Column 2: Code**
  Number of the data word
- **Column 3: Status**
  Status of the bit commands
- **Column 4: Name**
  Symbolic name from the assignment list
- **Column 5: Comment**
  Comment from the assignment list

12.2.3 Working with the application

Working with the application **Status** involves the following activities:

Status display

The current AS states of the indicated function blocks are represented.

The status is updated continuously.

Assignment list

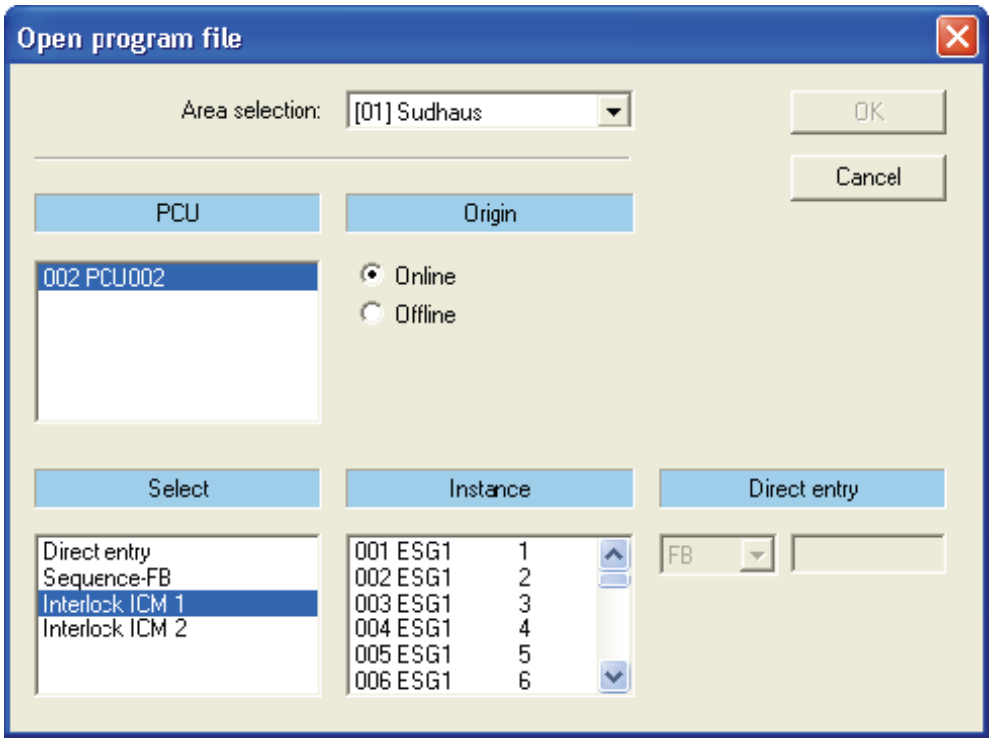
Comments are generated from the allocation list "…\windcs\PCU.nnn\texte\zuli.txt". For this the allocation list "*.seq" is saved as zuli.txt. This assignment list should be sorted.

Assignment list sorting:

After selecting the menu item **Assignment list** in the menu **Options**, a selection dialog pops up. After defining the corresponding AS, the contents of the file zuli.txt appear sorted in the new generated file zulisort.txt. Name and assignment for the program blocks are extracted from the sorted file.

Open file

After selecting the menu **FileOpen** or after clicking the **FILE** icon in the button bar the following dialog box appears:



- AREA selection
- PCU selection; (only PCUs of type Simatic S5 are listed)
- In the box 'Select' at first the selection method (direct entry or object class) is chosen; after that the corresponding block or object instance is selected

With the OK button the requested block is opened.

On the hard disk the blocks of the individual PCUs are filed in their own paths. The registers are built up as follows:

\ WINDCS \ PCU.001 \ for symbolic PCU1 (e.g. boiler house)
\ WINDCS \ PCU.nnn \ for symbolic PCUn (e.g. silo stock) etc.

with the respective subfolders:

- \ WINDCS \ PCU.nnn \ SB \
- \ WINDCS \ PCU.nnn \ PB \
- \ WINDCS \ PCU.nnn \ FB \
- \ WINDCS \ PCU.nnn \ OB \
- \ WINDCS \ PCU.nnn \ FX \

in accordance with the SIMATIC S5 name conventions.

Example: \windcs\pcu.002\pb\pb.005 contains program for PB 5 of the 2nd PCU.

Network selection

Direct network selection:
After selecting the menu item **Network** in the menu **Functions** or activating the function key **F4** a dialog box appears to activate the function key F4. The network number must be in the indicated range of values, otherwise the input with the message "Input error: Value too big/too small" is refused.

Select previous network:

After selecting the menu item **Net-1** in the menu **Functions** or activating the function key **F7** the previous network is selected.

Select next network:

After selection of the menu item **Net+1** in the menu **Functions** or activating the function key **F8** the subsequent network is selected.

Selection of address

After selecting the menu item **Address** in the menu **Functions** or activating the function key **F5** a dialog box appears in which the requested address can be indicated. The indicated address appears in the Client area after quitting.

The address must be in the indicated area of values, otherwise the input is rejected with the message "Input error: Value too big/too small".

Selection of the font

After selecting the menu item **Font** in the menu **Options** a dialog box appears in which the requested font can be preset.

The font is adjusted under **Font** The size of this font is adjusted under font size. A number can also be entered directly. In addition there is the possibility to adjust the font style (for example bold cursive).
In the field **Pattern** the adjusted font style is updated continuously. If an option is changed therefore, the effects become immediately visible.
After pressing **OK** the adjusted font is accepted.

Printing screen content

The screen content is printed out after selecting the **Print** menu item in the **File** menu or by clicking on the following icon in the toolbar.



12.3 Status for Simatic S7 via 'Status_S7.exe' application

Functionality

The application "Status_S7.exe" enables status displays of linked program in online operation to be displayed (directly and without using the SIMATIC Manager), but with the following limitations through the system:

- AWL-CALL calls are not currently decompiled.
- Global flags (e.g. HORN-S-FLAG, TUET, BEDA, ...) are not always updated correctly at the present time

Note

For viewing symbolic information (allocation list), this internal Status application uses the PCU-specific symbol file "s7_sym.seq". When the user wishes to see his/her project-specific changes (engineered with Step 7 Symbolic editor) in the status view, this file has to be exported again with the Step 7 Symbol Editor (format type "assignment list (*.SEQ)), where the address column should be sorted **in ascending order first**. Otherwise symbol information may not be viewed correctly in that application.

The Symbol table should be located in the following system folders:

- In case of 'Single Engineering Language':
  "…\windcs\pcu.nnn\s7_sym.seq" or "…\windcs\pcu.nnn\texte\s7_sym.seq" – the system uses the relevant later file
- In case of 'Multi-Engineering-Language'
  "…\windcs\pcu.nnn**texte.x**\s7_sym.seq"

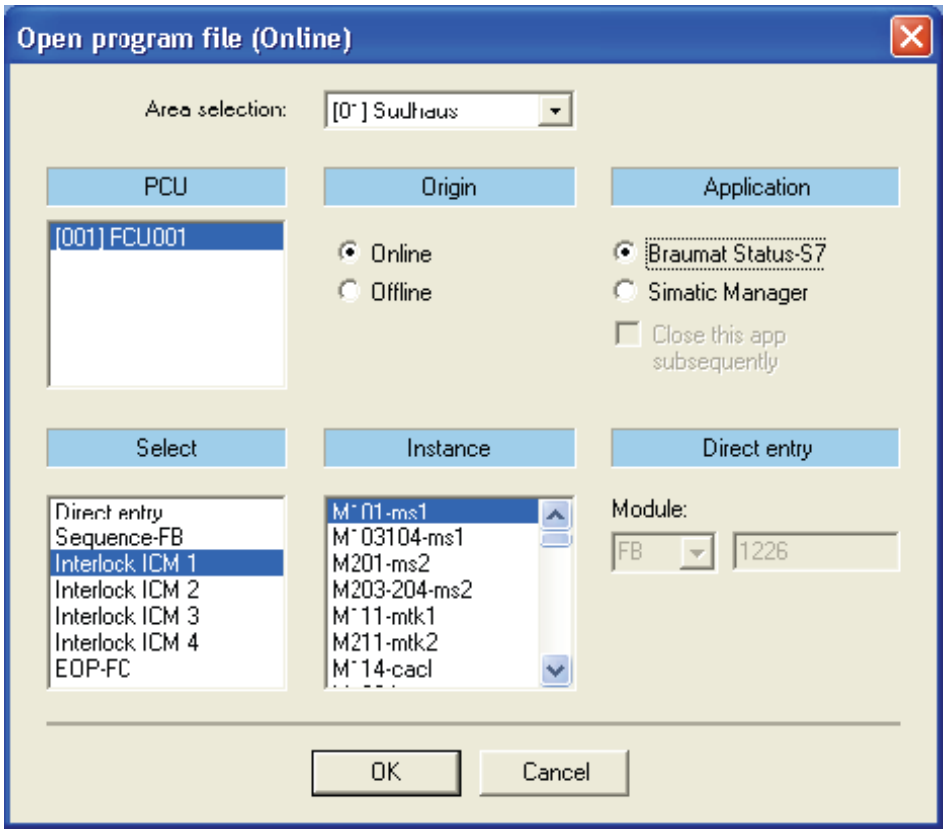
Client area

Display area

- Column 1: Address
  address rel. to the block start in hexadecimal code
- Column 2: Code
  Number of the data word
- Column 3: Status
  Status of the bit commands
- Column 4: Symbol
  Symbolic name from the assignment list
- Column 5: Comment
  Comment from the assignment list

Open file

After selecting the menu item **Open** in the menu **File** or after clicking the **FILE** icon in the button bar a dialog box "Open program file" for opening a file appears:



- AREA selection
- PCU selection; (only PCUs of type Simatic S7 are listed)
- In the box 'Select' at first the selection method (direct entry or object class) is chosen; after that the corresponding block or object instance is selected

With the OK button the requested block is opened.

On the hard disk the blocks of the individual PCUs are filed in their own paths. The registers are built up as follows:

- \ WINDCS \ PCU.001 \ für symbolisches PCU1 (e.g. boiler house)
- \ WINDCS \ PCU.nnn \ für symbolisches PCUn (e.g. silo store) etc.

with the respective subfolders:

- \ WINDCS \ PCU.nnn \ FB \
- \ WINDCS \ PCU.nnn \ FC \

Network selection

You have the following options for the network selection:

Menu functions	Function key	Toolbar
Network	F4	
Network - 1	F7	
Network + 1	F8	

- After selecting the network a dialog box appears.
- Via the check box **All Networks** the display mode can be selected, whether all networks or only one network is supposed to be indicated.
- The following functions are only selectable for a non-selected check box **'All networks'**.

Selection of address

After selecting the menu item **Address** in the menu **Functions** a dialog box appears in which a valid address can be entered. The entered address appears in the uppermost line of the Client area.

Representation of the Step 7 Mnemonics

Representation of the Step 7 Mnemonics can be switched between DE and EN via the corresponding buttons in the toolbar. This is independent of the Simatic Manager language set on exporting the '*.seq' file.

12.4 Status for Simatic S7 via "Status_S7.exe" and "STEP 7 KOP/FUP/AWL"

Functionality

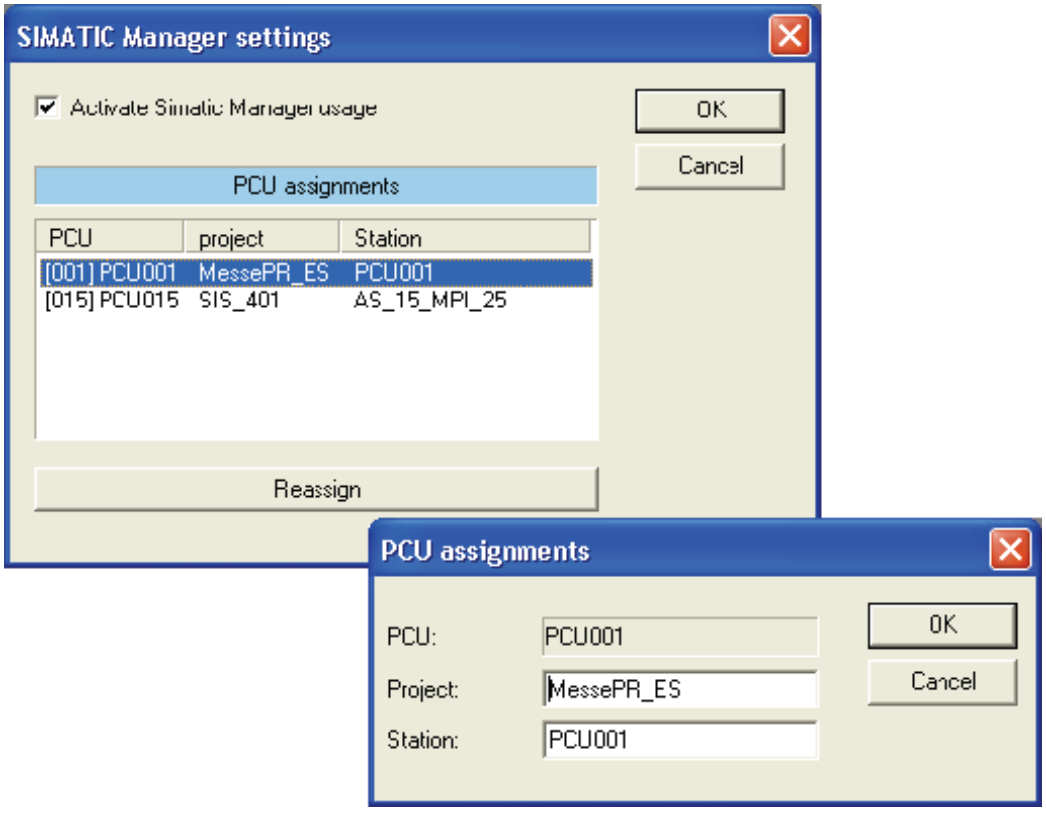
The status function for this variant is made available via the programming package STEP-7 for LAD/STL/FBD editor with the function "Control in the on-line mode". The operation of the editor is described in the corresponding manual instruction of the programming package STEP-7 and is not explained in more detail here.

Note!

This function is only available if the STEP-7 programming package was installed and authorized on the PC.

Activation:

Activation is performed via the following configuration dialog, which is called in the Status_S7 – menu item ‘Options → SIMATIC Manager settings’:



For each PCU the corresponding Simatic manager project and Station name entries are assigned with the ‘Reassign’ command button. The entries must exactly match the original Simatic Manager object names, otherwise the Step 7 Editor can not be initialized correctly.

These settings are stored in the configuration file ‘…\windcs\sys\status.ini’ in section ‘[S7]’ as follows:

```
[S7]
PCU1=MessePR_ES\PCU001

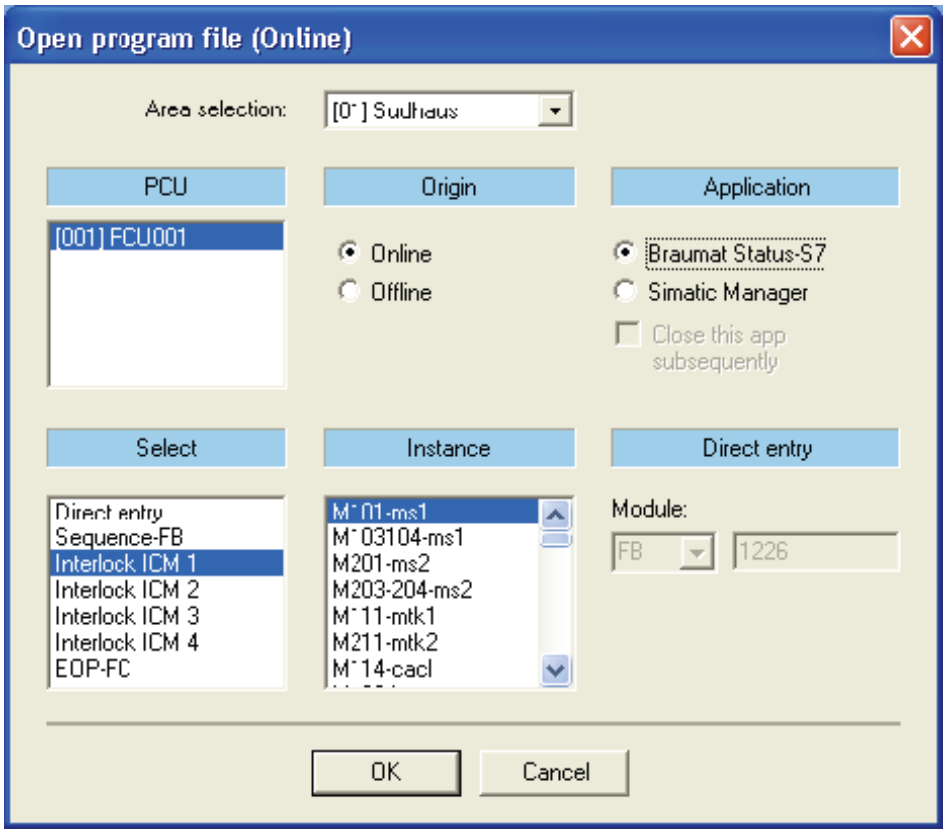
...

PCU15=SIS_401\AS_15_MPI_25

UseStep7App=1
```

If you work with the delivered Simatic projects, only the ‘Simatic Manager’ option is to be activated; the PCUs are already established correctly.

In the later ‘Open file’ dialog the options ‘Simatic Manager’ or ‘Braumat Status S7 Application’ may be selected. The last selection remains stored.



The other selections and options correspond to the pure Status_S7 application (see previous chapter).

Note

After the LAD/STL/FBD editor has started, you should change to ‘Monitoring mode’ for displaying status information.

More INI switches in file ‘…\windcs\sys\status.ini’:

```
[S7-Window]
```

```
;Set position automatic
SetPosition=0;
```
Set position and size of AWL-Editor by SISTAR If not, AWL-Editor starts with last settings
```
;Left border
Left=0
;Upper border
Top=0
;Window width
Width=800
;Window height
Height=600
;Set AWL-Editor 'topmost'
TopMost=0
```
Show AWL-Editor 'always on top'

Forcing 13

13.1 Functionality

The application '**Steuern.exe**' is used for changing and viewing the values in the PCU and saving the definition file and data on disk.

13.2 Client area

The Client area is subdivided into two areas:

- Table heading

Display and editing area:

- **Column 1: No.**
  Line number
- **Column 2: Variable**
  Description of the parameter which has to be indicated. The input of the parameter must read as follows:
  - <PCU no.>, <Operand1>, <Operand2>

Addresses	S5 range	Range of the S7 CPU 416-2	Range of the S7 CPU 417-4
DB	2...255	1...4095	1…8095
DX	0...255	-	
DW	0...4091	-	
DBB	-	0...32767	0...32767
DBW	-	0...32766	0...32766
DL, DR	0...4091		
MW	0...254	0…16382	0…16382
AW, EW	0...254	0…510	0…510 *)
MB	0...255	0…16383	0…16383
AB, EB	0...255	0…511	0…511 *)
SW	0...4094	-	
SY	0...4095	-	
T, Z	0...255	0…511	0…511
*) Note: The CPU 417-4 does not utilize all the I/O resources if EW/AW and EB/AB are used!			

- Input example.:
  - 1,DB124,DW5 or 1 DB124 DW5
  - 1,MW166 or 1 MW166
- **Column 3: KH**
  - Display of the data word content in the format KH
  - KH = four-digit, hexadecimal representation
  - Input area of KH 0000 H to FFFFH
    Example: "1CAB"
- **Column 4: KF**
  - Display of the data word content in the format KF
  - KF = up to five-digit fixed point representation (integer value)
  - Input area of KF -32768 to +32767
    Example: "7339"
- **Column 5: KY**
  - Display of the data word content in the KY format
  - KY = two-digit, byte-by-byte representation, separated by comma
    Example: "28.171"
- **Column 6: KC**
  - Display of the data word content in the format KC
  - KC = two-digit ASCII character representation
    Example: "1A"
- **Column 7: KM**
  - Display of the data word content in the format KM
  - KM = 16-digit, bit-by-bit representation
    Example: "00000101 01101010"

- **Column 8: KT**
  - Display of the data word content in the format KT = input of time values
  - Input area
  - h from KT 0.000 to 9993
    The input occurs in two areas:
  - **Time grid**: Only the numbers 0 for 100 msec, 1 for 10 msec, 2 for 1 s and 3 for 10 s can be entered. The input is limited to one character.
  - **Time value**: Only the digits 0 to 9 can be entered. The input is limited to three characters.
- **Column 9: KZ**
  - Display of the data word content in the KZ format
  - KZ = input of count values
  - Input area of KZ 000 to 999
  - Only the digits 0 to 9 can be entered.
  - The input is limited to three characters.

13.3 Working with the application

Working with the **Forcing** application involves the following activities:

Create new file

After selecting the **New** menu item in the **File** menu or clicking on the following icon in the toolbar a new display mask is created.



Open a file

After selecting the **Open** menu item in the **File** menu or clicking the following icon in the toolbar a modal dialog box appears.



A program is selected by clicking in the list box **File**; after pressing **OK** it is loaded.

Save

- After selecting the **Save** menu item in the Menu file or clicking the following icon in the toolbar the current control file is saved under the name which is displayed in the title bar.



- After activating the menu item **Save under** in the menu file a dialog box appears. The current control can be saved under a new name.

Data refresh

You have the following options for updating and for navigating in the current Client area:

Menu functions	Function key	Toolbar
Data refresh	F4	
Scroll forward	F6	
Scroll backward	F5	

DB editor

14

14.1 Functionality

The **DB editor** application is used for editing data blocks DB, DX in the PCU (Online) or on the hard disk of the IOS (Offline).

The length of the data blocks can be changed and data words are preset with editable values.

14.2 Client area

The Client area is subdivided into two areas:

- Table heading

Display and editing area:

- **Column 1: DW**
  Number of the data word
- **Column 2: KH**
  - Display of the data word content in the format KH
  - KH = four-digit, hexadecimal representation
  - Input area of KH 0000 H to FFFFH
    Example: "1CAB"
  - **Column 3: KF**
    Display of the data word content in the format KF
  - KF = up to five-digit, fixed point representation
  - (integer value)
  - Input area of KF -32768 to +32767
    Example: "7339"
- **Column 4: KY**
  - Display of the data word content in the KY format
  - KY = two-digit, byte-by-byte representation,
  - separated by a comma
    Example: "28.171"

- **Column 5: KC**
  - Display of the data word content in the format KC
  - KC = two-digit ASCII character representation
    Example: "1A"
- **Column 6: KM**
  - Display of the data word content in the format KM
  - KM = 16-digit, bit-by-bit representation
    Example: "00000101 01101010"

14.3 Working with the application

Working with the **DB editor** application involves the following activities:

Display for data source IOS

The data word contents currently filed on the hard disk of the IOS are indicated. The selection is made via the Offline IOS menu item in the data source menu or via the following icon.



The reading and writing of file contents refer exclusively to the data blocks which are set aside on the hard disk.

On the hard disk of the IOS the data blocks of the individual PCUs are filed in their own paths. The registers are built up as follows:

- \ WINDCS \ PCU.001 \ for symbolic PCU1 (e.g. boiler house)
- \ WINDCS \ PCU.nnn \ for symbolic PCUn (e.g. silo store) etc.

with the respective subfolders:

- \ WINDCS \ PCU.nnn \ DB \ and
  \ WINDCS \ PCU.nnn \ DX \ **(S5 only)**

The data blocks are in files with the meanings

- db.002 for DB 2 to db.255 for DBS 255 **(only S5)**
- dx.000 for DX 0 to dx.255 for DX 255 **(only S5)**
- db.001 for DB 1 to db.4095 for DB4095 **(only S7)**
  .

According to the valid PCU selection the data blocks are fetched from the assigned folders.

Display for data source PCU

The current data word contents of the selected PCU are indicated. The selection is made via the Online PCU menu item in the data source menu or via the following icon



The reading and writing of file contents refer exclusively to the data blocks which are filed to the selected PCU in the CPU.

The file contents are updated continuously.

Selection of the PCU

For an area-crossed operation the PCU which has to be operated can be selected via the menu **Area**. The selection occurs via the menu **Area**. The reading and writing of data word contents refer exclusively to the selected PCU. A mixed operation and control of several data words of different PCUs is not possible.

The PCU selection refers to the corresponding IOS subfolders or directly to the corresponding PCU.

The reading and writing of data word contents always refer only to a data block.

Data block selection

You have the following options for selecting the data module:

Menu functions	Function key	Toolbar
Data module	F2	

Following selection the modal dialog box **Module** appears.

- The input of **Data element type** and **Number** must occur (for example DB701). After closing the input with Return the data word contents of the new selected data block of the corresponding PCUs are fetched either from the hard disk or from the PCU and indicated.
- With a defective input (for example no DB or DX/S5), 'Values excluding the limits' or 'Data block does not exist', corresponding note boxes appear.

Data word selection

After selection of the **Data word** menu item in the menu **Functions** or activating the key **F3** a modal dialog box appears **Selection data word**.

- The input of the data word number must occur (for example 123). After closing the input with Return the uppermost line is formed by the selected data word.
- With inputs of values exceeding the range of values the note boxes appear "Value too small", "Value too large".

DB length default

After selecting the menu item **DB length** in the menu **Functions** or activating the function key **F4** a modal dialog box **Change DB length** appears.

- The default of the DB length is only possible if as a data target the IOS of the hard disk is selected **(in an offline way).** In the **online operation** this function is blocked.
- The length of the selected data block can be changed in any way. The maximum length in this case is 4091 (at S5) and 32000 (at S7) data words. For an increase of a data block, the new data words are preset with KH 0000. For a shortening of a data block, the contents of the data words which are cut off disappear.

Page forth and back

You have the following options for navigating in the selected module:

Menu functions	Function key	Toolbar
Scroll forward	F6	
Scroll backward	F5	

Maintenance data 15

15.1 Functionality

The application maintenance data is used for default, checking and acknowledging maintenance intervals.

The maintenance data are divided into two parts:

- Maintenance data for ICMs
- Maintenance data for user aggregates

Per ICM or user aggregate the switching cycle and the hours of operation are registered.

For the switching cycle and the hours of operation a maximum of 5 setpoints each can be registered. The exceeding of these setpoints is output as a message and should be acknowledged after the maintenance has occurred.

15.2 Client area

In the Client area the aggregates of the selected area are indicated with the process value and a maximum of 5 setpoints.

The Client area is divided as follows:

- **Column 1**: Number of the aggregate
- **Column 2**: Aggregate
  Name of the aggregate
- **Column 3**: Hour/switching clearance
  Process value in hours or switching cycles
- **Columns 4 - 8**: Setpoints 1- 5
  Setpoints in hours or switching cycles

15.3 Working with the application

Working with the application maintenance data involves the following activities:

Selection of the area

Menu:	**File → Open...**
Keyboard:	**F2**
Button bar:	

One group can be assigned to every PCU. The standard name for the Group 0 is ICM. For every group it can be decided whether hour or switching clearance meters are supposed to be indicated.

Display

After the selection the corresponding data are read in from the file **maintesg.dbf for the ICMs (Group00), or from maintusr.dbf for the user groups (Group01...)** and this is indicated in the work window.

The number of lines is determined by the number of the DS in the DB182/184 at the S5 and DB 682/684 at the S7.

If the **required DBase** file is smaller or not there at all, a database with the required length is manufactured (with message). The database is not shortened.

During the generation the setpoints and texts are preset. The Aggr.No, Aggr.Name, process value and the setpoint are indicated.

Process value with power-on time meter in the format hh:mm.

If the process value exceeds a setpoint, the representation color of the corresponding setpoint is changed. The colors can be determined in the file **wardat.ini.**

Determine parameters

Menu:	**File → Parameter**

For every one of the maximum 5 setpoints of an aggregate the following parameters can be determined:

- **Value:** The setpoint can be selected by clicking and overwritten by the input of a new value. This is also possible in the Client area.
- **Short text:** For fast information; the selected setpoint is indicated in the status indicator line.
- **Long text:** For longer remarks a text file can be entered which can be inspected via the command button editing and/or processed.

The input data are stored in **maintesg.dbf or maintusr.dbf**.

Group definition

Menu:	**File → Group definition**

For every PCU several (max. 10) groups can be defined.

The group 0 (Def. ICM DB 682) can not be deleted or redefined.

For user data further groups are available. For this data block DB 684 is generated and must be supplied with data by the user.

Printing

Menu:	**File -> Print**
Button bar:	

For the printing of maintenance data the following settings can be filed:

Sheet content: Selection of the requested information.

Filter:

no filter	= all setpoints
queuing jobs	= setpoints which were exceeded and not acknowledged.
completed jobs	= setpoints which were exceeded and acknowledged.

Data records: All, or a reduced number.

Reset process value

Menu:	**Acknowledgment →Reset counter/hours**
Keyboard:	**F9**

The resetting of the process value can be documented by a dialog box correspondingly and is registered in the message archive.

Acknowledgment

Menu:	**Acknowledgment → Acknowledge maintenance**
Keyboard:	**F10**
Icon bar	

The acknowledgement of maintenance can also be documented correspondingly and is registered in the message archive.

If the process value exceeds the setpoint either for the switching cycles or for the hours of operation, this value is marked in color (default value red). The regulation of the colors can be carried out in the file Wartdat.ini (see chapter "INI files (Page 92)", Wartdat.ini).

For these marked aggregates a maintenance has to be performed.

After the execution of the jobs every setpoint of the aggregate which is exceeded can be acknowledged. During this acknowledgement a dialog is opened in which the operator, the date and a comment can be entered. This acknowledgement is saved in a database quitt.dbf.

The acknowledgement is filed in the data block of the PCU. An exceeded but acknowledged setpoint is characterized in color (default value green).

Message at acknowledgment

During acknowledgement a message is output, which appears at the message-enabled IOSs in the PCU server and is saved in the message archive.

Table 15-1 The columns of the message are allocated as follows:

Column	Function
Time	
Type	M
Recipe type	Type ("switching cycles" or "hours") 0 = hour; 1 = switching clearance
JobNo	GroupID
BatchNo	"Reset" or setpoint number
PCU	PCU number
Block	"MAINT"
BlockNo	Aggregate number
Name	Aggregate name
Text	"Group: " group name

The meters for the switching clearance or the operating hours can be reset. During the resetting all jobs are also reset automatically for the setpoints.

During the resetting of the meters a dialog is also opened, in which the operator, the date and a comment can be entered. This resetting is also saved in a database quitt.dbf.

15.4 Engineering

The function of the maintenance data is already in the delivery condition for the ICMs and is merged for the user data in the SIMATIC S7.

The user should allocate the states in the data block DB 618. The allocation of the data block is the same as in data block DB 605 for the ICMs.

The Standard DBs are:	MAINT_DB =	DB682
	MAINT_USR_DB =	DB684

Structure of the maintenance database

A database exists for the maintenance data of the System ICMs (maintesg.dbf) and is a database which is user-defined for the user aggregates (maintusr.dbf). The structure is identical.

In the maintenance database, five setpoints are saved per ICM for the switching cycles and the hours of operation. Next to the setpoint a short text can be filed, as well as a file name for long texts.

- Name of the files: maintesg.dbf for the ICM maintenance data
  maintusr.dbf for the user maintenance data
- Path: windcs\pcu.xxx\maint

The database is manufactured according to the definition maint.def.

Structure of the file 'maintICM.dbf' and/or 'maintusr.dbf':

	Offset:	0	
	Record length:	861	
001	SSP_SOLL1	CINT	10
011	SSP_FILE1	CHAR	12
023	SSP_KTEXT1	CHAR	64
087	SSP_SOLL2	CINT	10
097	SSP_FILE2	CHAR	12
109	SSP_KTEXT2	CHAR	64
173	SSP_SOLL3	CINT	10
183	SSP_FILE3	CHAR	12
195	SSP_KTEXT3	CHAR	64
259	SSP_SOLL4	CINT	10
269	SSP_FILE4	CHAR	12
281	SSP_KTEXT4	CHAR	64
345	SSP_SOLL5	CINT	10
355	SSP_FILE5	CHAR	12
367	SSP_KTEXT5	CHAR	64
431	STD_SOLL1	CINT	10
441	STD_FILE1	CHAR	12
453	STD_KTEXT1	CHAR	64
517	STD_SOLL2	CINT	10
527	STD_FILE2	CHAR	12
539	STD_KTEXT2	CHAR	64
603	STD_SOLL3	CINT	10
613	STD_FILE3	CHAR	12
625	STD_KTEXT3	CHAR	64
689	STD_SOLL4	CINT	10
699	STD_FILE4	CHAR	12
711	STD_KTEXT4	CHAR	64
775	STD_SOLL5	CINT	10
785	STD_FILE5	CHAR	12
797	STD_KTEXT5	CHAR	64

Structure of the file quitt.dbf

The acknowledgements are written into the database quitt.dbf if this is unlocked in the file Wartdat.ini (see chapter "INI files (Page 92)", Wartdat.ini).

Thus the data in the database can later be evaluated with dBase or for example MS Access.

The database is saved in the catalog of the PCU in which the ICMs or user aggregates are defined.

- Name of the file: quitt.dbf
- Path: windcs\pcu.xxx\maint

The database is manufactured according to the definition Quitt.def.

Structure of the file 'quitt.dbf' :

Column	Type	Function
PCU	CINT 7	PCU number
GROUP	CINT 7	GroupID
TYPE	CHAR 4	Type "Time" or "Cnt"
AGGR_NO	CINT 7	Aggregate number
AGGR_NAME	CHAR 16	Aggregate name
SETP	CHAR 1	Setpoint
NAME	CHAR 20	Operator (asked in dialog)
DATE	CHAR 10	Date (asked in dialog)
COMMENT	CHAR 64	Comment (asked in dialog)

The writing of the acknowledgements into the database can be enabled or locked via a switch in the files Wartdat.ini.

15.5 INI files

Two INI files are available in order to adjust settings for the maintenance data.

These are the files:

- Wartdat.ini
  In these files settings for the application can be adjusted.
  It is saved in the register 'windcs\sys'.
- Maint.ini
  In this file the maintenance group is described.
  It is saved in the folder 'windcs\pcu.xxx\maint'.

WARTDAT.INI:

The application maintenance data settings are adjusted in the file Wartdat.ini .

Path: windcs\sys

Wartdat.ini	Description
[Settings]	
Actualize=60	Update time in seconds

Wartdat.ini	Description
ActualizeShow=0	Time until the next update occurs; display in the status indicator line
ShowAggrNumber=1	Fading in column with aggregate number
ColorTextSp=255,0,0	Exceeded and not acknowledged color for setpoint. Colors red, green, blue (every value between 0 and 255)
ColorBkSp=-1	Background exceeded for setpoint and not acknowledged. Background red, green, blue or -1 for transparent
ColorTextSpOk=0,255,0	Exceeded and acknowledged color for setpoint. Colors red, green, blue (every value between 0 and 255)
ColorBkSpOk=-1	Background exceeded for setpoint and not acknowledged. Background red, green, blue or -1 for transparent
AutoStart=0	opening to last setting after start of the application
StoreQuitt=1	Setting up database for acknowledgements
QuittMessage=1	Input into the message archive
PCU=3	last selected PCU number
Group=0	last selected group
Type=1	Type of last selection (1=operations counter, 2=operating hours meter)
MenuAppl=bed	Maintenance data belong to the operation or to the system (bed/sys)

MAINT.INI:

The settings for the maintenance groups are made in the file maint.ini.

The group 0 is reserved for the ICMs and already defined in the file maint.ini. For this no further configuration is necessary.

For every further maintenance group which is supposed to be defined a section [Groupyy] is to be drawn up in this file (yy=Group number). This should have the structure described below.

Path: windcs\pcu.xxx\maint

maint.ini	Description
[Groupyy]	
Name=ICM1_ICM1023	Description of the group yy Group name
Type=0	Group type: 0=ICM, 1=User
FromDS=1	first data record
ToDS=1023	last data record

maint.ini	Description
MaxDS=1023	maximum number of data records
TextFileName=	Name of the text file for the aggregate meanings (only with user groups, with ICM groups ICM1.txt is used always to ICM4.txt!) **Note:** **The path name and extension (*.txt) may not be specified in the file name.** Example: TextFileName=MaintUsr ; file used:" windcs\Pcu.xxx\texte\MaintUsr.txt"

15.6 Miniport for generating maintenance messages

15.6.1 Miniport for generating maintenance messages

The setpoints for switching cycle and/or hour of operation can also be monitored by the system itself over the Miniport DLL "MAINTSUPV.DLL". If the respective actual value crosses a projected value, a message is generated into the BRAUMAT message archive. Additionally an entry into a report (text) file can occur. Different report files are generated for each day (see below). Details on the activation of the Miniport DLL are found in the manual "*Installation and Configuration*" in chapter 6 - "*PCU-Server-Miniports*".

15.6.2 Configuring the function

Necessary settings in

.../Windcs/SYS/MaintSupv.ini:

```
[Settings]
;Startup delay in seconds
StartupDelay=20

;Cycle time for checks in minutes
CycleTime=15

;Enable (1) or disable (0) trace messages (PCU Server trace window only)
Trace=0

[TextSources]
```

```
;Language of message texts is fixed; specify them here:
SwitchingCycle=Switching cycle
Hours=Hours
SetpointReached=Setpoint reached
Unit=Unit
ICMGroupName=ICM1_ICM1024

;Text files containing ICM names
ICM1File=ESG1.txt
ICM2File=ESG2.txt
ICM3File=ESG3.txt
ICM4File=ESG4.txt
```

15.6.3 Report files

Maintenance reports are generated and stored in the following files:

.../Windcs/pcu.xxx/MAINT/maint_YYYY_MM/maint_YYYY_MM_DD.TXT

Structure:

(Example):

Time	Type	PCU	No.	Aggregate	Group	Message	ActVal	Setp	Shorttext
13:18:56	Switching cycles	16	1	ICM1 1	ICM1_ICM1024	Setpoint reached	2	5	Unit 0001 / Setpoint 2
13:18:56	Hours	16	1	ICM1 1	ICM1_ICM1024	Setpoint reached	1:00	2:46	Unit 0001 / Setpoint 1

These reports are stored in the message archive, too.

Configuring the ‘Pipe Entity’ 16

16.1 Overview

A ‘Pipe entity’ is an object which serves for secure closing ‘Route sections’ for maintenance jobs. The ‘Pipe entity’ uses the ICM functionality ABM/M (Affected By Maintenance/ Maintenance).

All ICMs which are part of this Route section are to be in safe conditions if one ICM should be switched to maintenance (it must be impossible to open valves, motors and pumps must not run, etc.) This switch-over should be guaranteed by the PCU Server.

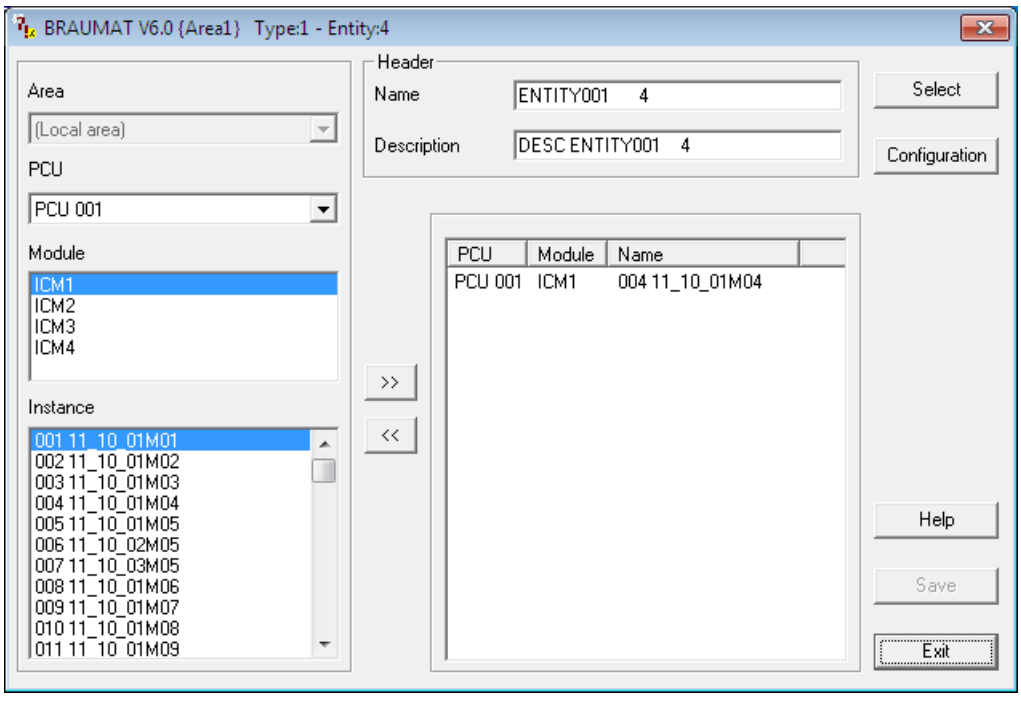
The assignment of ICMs to individual entities can occur via the tool 'EntityDefinition' (Braumat menu 'Engineering Tools'), as described in the following chapter. ICMs are stored within the Entity in relation to the PCU.

16.2 Working with the application

Note:

This tool can only be called if the following text file exists. (It can be created by the programmer with no content, if factory settings were deleted or modified):

" ...\windcs\entities\pcu00x.txt" where "x" represents the number of the desired PCU.



- Via the command button **Select** you reach a selection window via which the entity type and the entity can be selected.
- Via the command button **Configuration** new entities can be created.
- After an entity has been selected, the individual ICMs (Area → PCU → Module → Instance) may be assigned and/or removed again via the following buttons.





- Via the command button **Save** the configuration is stored.

Appendix 17

17.1 USERSTART.EXE

17.1.1 Functionality

The application makes it possible to start any application with call parameters on any IOS through a PCU event, for example modification of a data word.

As a main use case the call of process images in accordance with a PCU variable is described here - although other use cases are possible of course.

Here a PCU data word is assigned to the IOS application "LZSYS.EXE". During the setting of this data word through a PCU user block the application changes into the related picture. The allocation of the value of variables to the process diagrams occurs via INI file.

This function can be individually activated for every IOS (Client or Server).

17.1.2 Configuration

17.1.2.1 Configuration file "userstart.ini"

The file is located in the "…\windcs\sys" system folder.

Example:

Process images on IOS 102 should be called automatically, dependent on the value change of a Data-TAG in PCU 1, DB709 (Special values), Data word 2.

Contents of file ‘USERSTART.INI’:

```
[IOS102]
DataSource = 1,0,709,2
StartApplication = LZSYS.EXE
StartList = userstart_ios102.img.txt
beenden = 1
ErrorHandling = 1
Default = 2
```

Parameters	Description
[IOSx]	Beginning of IOSx Section x is IOS Number. Several sections are possible in the INI file, so all participating IOS stations may share identical files, which, however, must be copied manually after changing Note: In case of incorrect IOS number assignment the complete section is ignored
DataSource=PCU,DBType,DBNo,DWNo	Data TAG Address – comma-separated, serving as an index for the text file with command line parameters at runtime Possible values for DBType are: 0: DB = Data block 1: DX = Data block extended (for Simatic S5 only)
StartApplication=	Application to be started by value change of the data word
StartList=	Text file which contains the calling parameters (see example file below) Folder '…windcs\sys'
End=	Activating (=1) or deactivating (=0) the Application 'Close button'
ErrorHandling=	Behavior when the TAG value is outside the range of available text line numbers 0 = nothing happens, 1 = MsgBox, 2 = Default Line index is used (as defined)
Default=	Default Line index, if variable value is outside the range of available text line numbers

17.1.2.2 Text file for calling parameters

The file is located in the "…\windcs\sys" system folder.

Example

Call process images via "LZSYS.EXE" application (see above)

Structure of the configuration file with the 'LZSYS' call parameter 'image name'.

Line No.	Content of 'userstart_ios102.img.txt'	Assigned TAG value
1	<..blank line..>	0
2	Sudhaus\CIP.BIK	1
3	Sudhaus\LT.BIK	2
4	Sudhaus\MALT-1.BIK	3
5	Sudhaus\MALT-2.BIK	4
6	Sudhaus\MALT-6.BIK	5
7	Sudhaus\MST.BIK	6
8	Sudhaus\MTK.BIK	7

Line No.	Content of 'userstart_ios102.img.txt'	Assigned TAG value
9	Sudhaus\PRT.BIK	8
10	Sudhaus\WATER.BIK	9
11	Sudhaus\WHP.BIK	10
12	Filtration\KEG.BIK	11
13	Filtration\PALFILT.BIK	12
14	Filtration\PASTEUR1.BIK	13
15	Filtration\TFF-CIP.BIK	14

17.1.3 Starting and Closing the Application

The application should be auto-started at system startup which is achieved via the appropriate entry in the '…\windcs\sys\prosched.ini' configuration file (see manual '*Administration*' chapter 7 '*Scheduler*' for this).

Example of the entries within Prosched.ini:

```
[Global]
Processes=...,Userstart,...
...
...
[userstart]
Application=d:\windcs\sys\userstart.exe
;Window caption to identify mainwindow
Window=userstart
;Start this application if not running and check for running
Type=PERMANENT
;At own shutdown, shutdown although this application
ShutDown=1
```

The application UserStart.exe may be closed in the following ways:

- Application 'Close button' (if enabled)
- By closing the scheduler ProSched.exe (if configured)
- By closing the PCU server process