Introduction

Content

Introduction **1**

General 2
Documentation structure....3
Guide....5

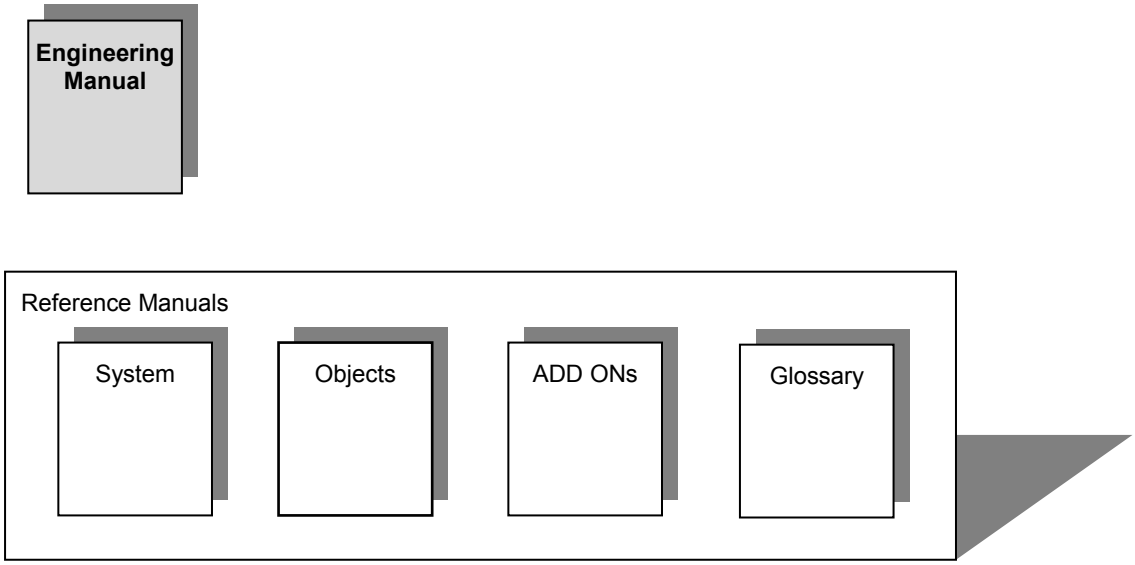
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Edition: 03/11
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General

You have here the *Engineering Manual* for CEMAT V8.0. This manual should support you in performing the work required to configure your plant.

The *Engineering Manual* is part of a comprehensive CEMAT V8.0 complete documentation. In the current version V8.0, this consists of the volumes listed below.



After the installation of CEMAT V8.0 the CEMAT documentation is available as PDL in directory D:\CEMAT_CS\Docu

On the following pages you will find the content of each manual.

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Documentation structure

The manuals contain the following chapters:

	Engineering Manual
1	Introduction
2	Preparations
3	Installation of a PCS 7 Project
4	Assignments
5	Engineering Examples
6	PLC Engineering
7	AS-AS Coupling
8	OS Engineering
9.	Engineering Tools
10	Engineering Check List
11	Project Administration
12	free
13	Graphic Templates
14	Tips&Tricks
15	Update Information

	Reference - System
1	Introduction
2	Cemat System Architecture
3	
4	
5	
6	

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	Reference - Objects
1	Introduction
2	General
3	Unidirectional Drive
4	Bi-Directional Drive
5	Damper
6	Valve
7	
8	Adapt to Simocode
9	Adapt
10	Annunciation Module
11	Annunciation Module with 7 Alarms
12	Measuring Value
13	Process Feedback block
14	
15	Group Module
16	Route Module
17	Selection
18	Interlock
19	Interlock 5
20	Object Data Acquisition
21	
22	
23	
24	
25	
26	Related Objects
27	Analog Value Selection
28	Storage
29	Storage Multichamber
30	

	Reference – ADD ONs
1	Introduction
2	Robicon
3	Synamics
4	Parameter Management

	Reference - Glossary
1	Introduction
2	Definitions and Instructions

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Guide

The current manual is divided into the topic areas: Installation, Engineering and Project Administration.

The engineering of CEMAT plants is done with the Engineering Tool PCS 7. With PCS 7 the following steps are carried out.

- Configuring the hardware
- Creation of the PLC programs, including logic diagram (CFC) and documentation
- Transferring the PLC/OS Connection data
- Engineering of the Operator Interface in WinCC

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Preparations

Content

Preparations **1**

General 2
Order Information 2
Project Standards 3
Main classification of the Project standards 4
Project language 11
Designation rules for Cemat 12
Naming conventions for PCS 7 12
Naming conventions for CEMAT 12
Typicals (Template charts) 15
Engineering Rules 16
Verification of the received documents 17
Project Structure 17
Assignment of the Objects to the AS 17
Determine the number of AS required 17
Structure of the plant from different views 17
Planning the Process Control Interface 18
Configuration Guidelines 18
What is shown WHERE and HOW? 19
Check list 20

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General

This document contains rules and thoughts you have to consider before you start with the Engineering of a Cemat Project.

Please also consider the check list at the end of the document. You should be able to answer all Questions before you start with the Engineering.

Order Information

When you read this document you probably have ordered Cemat already.

Nevertheless we want to mention that for any doubt you can ask the Competence Center for Order Information.

Based on the Plant Configuration and the number of plant objects the Hardware and Software requirements and the necessary Licenses can be calculated. Configuration Examples will help you in the plant design.

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Project Standards

During the installation of Cemat you have to select the correct project key dependent on the desired project standard.

000 = CEMAT Standard
001 = CEMAT Minerals
004 = Holcim
006 = Dyckerhoff
007 = Heidelberger Zement
023 = Vigier
024 = Bushehr
025 = Caima
026 = Alsen
027 = Lafarge
028 = Rossi

The main difference between the project standards are the change of operation mode and the evaluation of the local switch. Make sure that the selected project standard fits to the requirements of the plant (MCC / Plausibility, Local switch, Operation modes).

With Cemat V8.0 a new project standard was added: **001 = CEMAT Minerals**. The project standard 001 comprises all requirements from Cement and Mining industry.



Caution: The migration from existing project standards to project standard 001 is **not** possible because the block interfaces are completely different!

With project standard 001 the change of operation mode and the local switch function can be adapted to the requirements of the plant. Via Feature bits and OS Permissions nearly all variants of the existing project standard can be parameterized.



Exception: The functions of the Holcim Standard (004) and the Lafarge Standard (027) can not completely be realized with project standard 001!

The name of the project standard is often derived from the Company or Group for which the project version was designed. In some cases it is just the name of the first plant where it was used.



Important: Please consider that in case of a Project standard for a Group this does not automatically mean that each plant of this group uses this version. Some plants were bought by a group when there were already running Cemat installation. For the sake of compatibility it may be better to continue with the existing Cemat Version.



Caution: In some occasions, additional adaptations may be needed for the evaluation of the signals. These adaptations have to be achieved through a specific logic in the application program.

On the following pages you find a description of the project standards with its main distinguishing characteristics.

If you furthermore have questions regarding project versions, please don't hesitate to ask in the Competence Center.

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Main classification of the Project standards

Classification by Operating Mode

Code	Standard	Main Characteristics
000 007 023 024 025 028	„CEMAT Standard” Heidelberger Zement Vigier Bushehr Caima Rossi	Enable for single-start mode and local mode from group faceplate
004 006 026	Holcim Dyckerhoff Alsen	Single start mode and local mode can be enabled individually for each drive
027	Lafarge *)	Only Sequential mode and Local mode. Change of Operation mode individually per Object.

***)** Lafarge has a completely different operating philosophy and different block names and can not be compared with other project standards.

Classification by Local Switch

Code	Standard	Main Characteristics
000 024 028	„CEMAT Standard” Bushehr Rossi	Local/Automatic switch Signal “EVO”
004 006 007 023 025 026	Holcim Dyckerhoff Heidelberger Zement Vigier Caima Alsen	Local mode is enabled through Operator Station (Faceplate buttons)
027	Lafarge *)	Local mode is enabled through Operator station.

***)** Lafarge has a completely different operating philosophy and different block names and can not be compared with other project standards.

With Project Standard 001 all variants of operation mode change and local switch functions can be realized.

An additional manual exists.

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Project key	Main characteristic and description	Object types involved
000 normal	Operation modes - Automatic mode, Single-start-mode and Local mode can be switched only group-wise - Local/Remote-switch xVO must be "1" in automatic mode and "0" in local mode. - Local Start via xSR, Local Stop via xSP. - In Automatic mode and in Single-start-mode the Local stop signal xSP is by default not effective (can be configured). - In Automatic mode and in Single-start-mode all interlocks are effective. - In Local mode only the protection interlock xSVG is effective.	
001 Minerals	Operation modes - Operation mode can be changed individually or via superordinated group. Can be parameterized via feature bits and OS Permissions - Manual modes (Single-start-mode) with different interlocking grades (for reduced interlocks) - Via feature bits different versions of local switches can be configured. - Additional mode: Out of Service Additional functions - all block parameters are in English - Adaptation to the functions of the APL. Group functions - "Group not empty" indication - Interlocks can be by-passed - Group-Drive communication between PLCs Drive functions - Essential interlocks (effective also in local mode) - Separate block for Process feedback supervision - Contactor feedback supervision for damper and valve possible. - Calibration function for the damper - Limit switch simulation for the valve - Emergency stop via faceplate possible. - Annunciation blocks and measuring values can be assigned directly to the drives. for details see Manuals for CEMAT Minerals	All blocks!

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Project key	Main characteristic and description	Object types involved
006 Dyckerhoff	Operating modes - Dyckerhoff Standard has an automatic mode, a single-start-mode and a so-called manual mode. - In the single-start-mode all interlocks are effective and it is used for individual start/stop from the operator faceplate. - The manual mode is a non-interlocked operation and it is mainly use for local operation. In some exceptions it is also used for start/stop via operator faceplate (special rights required). - All drives can be switched individually into the respective modes The group only indicates that at least one drive is switched to single-start mode or to manual mode. - It is also possible to switch all drives group-wise back into automatic mode. Running drives continue to run after switching back to automatic mode. - In local mode Start-Button must remain pressed to run the drive. - Local mode is seen as a test mode (only for commissioning and repair works). Speed monitor must be acknowledged from local - additional acknowledge signal EVQD required Different Parameter names and additional interface flags - ESB=ESB, EBM=MSB, ESD=DWS etc. - The parameter names are used for FB and OS	C_DRV_1D C_DRV_2D C_DAMPER C_VALVE C_ROUTE C_GROUP

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Project key	Main characteristic and description	Object types involved
007 HZ	Operating modes - The operating modes Automatic mode, Single-start-mode and Local mode are enabled by the group. Local mode for the drives is by default enabled. If the group signal is not connected the drive is always enabled for the local mode. - Motor, Damper, Valve: Local start with push-button xVT - With EVO = 0-Signal the drives will be stopped. EVO must be "1" in all operating modes. Additional interface ENOT for Emergency Stop - ENOT = 0-Signal will stop the drives in all modes The measured values can be switched into service mode - In the service mode the actual value of the measure is still displayed but the measure will not give any alarms and all Module outputs for limit violation are switched to "0". Additional mode non-interlocked individual start - In this mode the drives can be started/stopped via operator faceplate without evaluation of the interlock conditions for EBVG and EEVG. ESVG is still effective. - The non-interlocked individual mode needs a special release (different rights). - The symbol color turns to orange (orange flashing for running objects).	C_DRV_1D C_DRV_2D C_DAMPER C_VALVE C_MEASUR
026 Alsen	Operating modes - Local mode or Single start mode for Drive, Damper and Valve can be released individually for each object (at the drive faceplate). - But via group faceplate it is also possible to switch all objects of the group into local mode or back to automatic mode. - The group symbol has a summarizing indication that at least one object has been switched to local mode. - Switching from local mode to automatic mode already started drives continue to run as long as all operating conditions and interlocks are fulfilled. Characteristics for Local Switch Signals xVO and xSP - xVO must always have 1-Signal. 0-Signal at xVO will stop the drive in all modes - Local stop xSP is effective also in automatic mode. Holderbank Code - The Holderbank code HAC is not used for function block parameter names. The normal abbreviations ERM, EVO, ESB are used.	C_DRV_1D C_DRV_2D C_DAMPER C_VALVE C_VAL_2D C_GROUP

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Project key	Main characteristic and description	Object types involved
004 Holcim	The main differences between Normal Standard and Holcim Version are the Parameter Names for Hardware signals (HAC code is used), the Operating modes and the representation of the plant objects in the pictures. HAC Code - Block parameters for Hardware Signals (MCC and Field) are changed to HAC code Operating modes - Each drive/damper/valve can individually be switched to single or local mode. - Switching to local mode and single mode is only possible if the drive is not running. - Local stop is also active in automatic mode (Alarm LST). - Through a button in the group faceplate all drives of a group can be switched to local or back to AUTO mode simultaneously. With the start command of the group all drives are automatically switched back to AUTO mode. Drives which were previously started in single start mode or in local mode will continue to run. Block icons - In Holcim standard no additional motor symbols are shown beside the equipment. The equipment itself is green if it is running and grey/white if it is not in operation. Next to the equipment there is the Tagname which is the block icon. The faceplates will be opened by clicking on the tagname. The tagname shows red background if there is a fault, yellow background in case of a warning and violet background in case the object is not available. Additional indications beside the tagname show the operating mode (blue for single and white for local) and active simulations or bypass functions (orange) Alarms - The non-essential drives can be configured as “warning drives”. If these drives have a fault, a yellow warning message is given. The group start is not interrupted by warning drives. Interlocks - In Single mode the Start Interlock and the Operating Interlock are not active. - Two Protection Interlocks PINT1 and PINT2, where PINT1 is always active and PINT2 can be by-passed in local mode (Inching mode). Process Feedback - Additional block C_PROFB can be used for supervision of process Feedback (Speed Monitor or Pressure). C_PROFB has to be linked to the drive block. Special Training for Holcim - The Engineering for Holcim Standard is different from the normal Standard. Therefore a separate Training is available. HDRS Engineering Tool - An engineering Tool (Excel Macros) is available. With this tool, based on the HDRS data base from Holcim, Basic CFCs can be created using Process Tag Types (IEA Assistant)	C_DRV_1D C_DRV_2D C_DAMPER C_VALVE C_ANNUNC C_ANNUN8 C_PROFB C_ROUTE C_GROUP C_SILOP C_ADAPT

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Project key	Main characteristic and description	Object types involved
024 Bushehr	Different Local switch with only 2 Signals - Instead of using 3 Signals for xVO = Local/Remote Switch, xSR = Local Start and xSP = Local Stop, the same information is built internally in the function block, using only two signals which have to be seen in combination. - The Signal names are K0 and KX (KY) and they must always be seen together. - Signal coding for the local switch of the drive: K0 KX 1 0 Auto 0 0 Local Stop 0 1 Local 1 1 Local Start - Signal coding for the local switch of the damper: K0 KY KX 0 1 1 Auto 0 0 0 Local Stop 1 1 0 Local Start Di2 0 1 0 Di2 1 0 1 Local Start Di1 0 0 1 Di1	C_DRV_1D C_DRV_2D C_D_REV C_DAMPER C_VALVE
025 Caima	Different Local switch with only 2 Signals - Instead of using 3 Signals for xVO = Local/Remote Switch, xSR = Local Start and xSP = Local Stop, the same information is built internally in the function block, using only two signals which have to be seen in combination. - The Signal names are xSR and xVO like in normal Standard but the signals must always be seen together. - Signal coding for the local switch of the drive: EVO ESR 1 0 Auto 0 0 Local Stop 1 1 Local Start - Signal coding for the local switch of the damper: KVO KOP KCL 1 0 0 Auto 0 0 0 Local Stop 1 1 0 Local Start Di2 1 0 1 Local Start Di1 - After the local start the local switch goes back to position Automatic. The drive is then running in local mode. In order to Stop the drive the local stop must be pressed. This position is latched. - Local Stop is also effective in Automatic mode. The drive stops then with Alarm "LST".	C_DRV_1D C_DRV_2D C_DAMPER C_VALVE

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Project key	Main characteristic and description	Object types involved
023 Vigier	Different Parameter names: G = Local Start S = Local Stop K = Motor Protection R = Feedback etc. no Signals for sSB and xVO	C_DRV_1D C_DRV_2D C_DAMPER C_VALVE C_GROUP
027 Lafarge	Different Module types for all Control functions - C_M2B (to be used for unidirectional and bi-directional drives) - C_DAB (to be used for Valves with one output and two limit switches, no local switch) - C_DABMAB (to be used for valves with two outputs (DAB) and motorized actuators without positioning mode(MAB)) - C_AAB (to be used for damper positioners) - C_DIB (to be used for annunciations of any binary signal) - C_AIB (to be used for analog inputs for measuring values) - C_SSB (to be used for sequences) - C_SSDB (to be used for Sequential Stop including stop delays) - C_BPB (to be used for subcontrols or "black boxes") Different operation concept and control philosophy - Sequences replace the CEMAT Group function, but group status call and group object list are available as in normal CEMAT standard. - No route modules used. C_SELECT can be used for selections. - Plant section (sequence) turns into "sleep mode", if it is not in use. - Before start of a Sequence, it must be checked for availability through button AV. - Pressing AV does a wake-up. If all drives are available (all essential interlocks ok), the sequence can be started via RUN. - Normal Stop (single click on STOP) and Quick-Stop (double-click on STOP) possible. Stop sequence and stop delays are programmed with SSDB block. - Lafarge Standard has a variety of different interfaces for individual interlock signals. - No single-start-mode via operator faceplate Special engineering manual - Different engineering rules for Installation of a PCS7 Project, AS Engineering, OS Engineering. Special Training Course - As Lafarge Standard is so much different from normal CEMAT, a special Course is available for Lafarge.	C_M2B C_DAB C_DABMAB C_AAB C_DIB C_AIB C_SSB C_SSDB C_BPB
028 Rossi	Waiting time for single start-up-warning - In single-start-mode, the drives are switched on after the horn is off and the waiting time has elapsed (as it is in the group). Alarms for xBM and xSB in local mode - In the normal standard, in local mode no alarm will be generated for xBM and xSB. In Rossi Standard, alarms will be generated also in local mode.	C_DRV_1D C_DRV_2D

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Project language

At the beginning of the engineering you have to decide which language is going to be used for the engineering and which display language(s) are required.

We recommend you to carry out the engineering in the main display language.

The following list shows you, which project standard is available in which language as per standard. At this we distinguish between Display language and language of the documentation:
(In some project versions the display language can be switched into French but the French documentation is not available.)

Project version	Software (Display Language)	Documentation
000 = CEMAT	German + English (USA) + French + Italian + Spanish (traditional)	German + English
001 = CEMAT Minerals	English (USA)	English
004 = Holcim	German + English (USA) + French + Italian + Spanish (traditional)	English
006 = Dyckerhoff	German + English (USA) + French + Italian + Spanish (traditional)	German + English
007 = Heidelberger Zement	German + English (USA) + French + Italian + Spanish (traditional)	German + English
023 = Vigier	German + English (USA) + French	German
024 = Bushehr	German + English (USA) + French + Italian + Spanish (traditional)	English
025 = Caima	German + English (USA) + French + Italian + Spanish (traditional)	English
026 = Alsen	German + English (USA) + French + Italian + Spanish (traditional)	German + English
027 = Lafarge	English (USA) + French + Spanish (traditional)	English
028 = Rossi	German + English (USA) + French + Italian + Spanish (traditional)	English

Additional languages can be realized as well. In this case the Texts in the Faceplates have to be completed. To simplify this work, a text library with the faceplate text is available. The file Language_V01.xls you find on the Cemat CD under Additional Information\Language. (Please also ask in the Competence Center Cement for the latest version of this file). '
The translations are carried out in the text library and can than be imported into the Faceplates with the Text Distributor.

Beside the Faceplate texts, for additional languages adaptations of the blocks (messages) and in the Config files may be required.
See also under "Text definitions" in Chapter AS Engineering.

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Designation rules for Cemat

Naming conventions for PCS 7

Depending on the language and PCS7 components, only certain characters are permitted in names. Make sure that you don't use illegal characters in your PCS7 Project (e. g. for Computer names, chart names, block types and instance names, parameter names and comments, global variables……)

The restrictions for the names of the PCS7 components you find in the Help function of the WinCC Explorer. Use *Help → Contents and Index* and search for "Illegal characters". There you will find a list of characters which are not allowed for the individual components.

Naming conventions for CEMAT

Name of the PC Station

For the computer name follow the restrictions of PCS7 V7!

In the PCS7 Manual "PCS7 PC – Configuration and Authorization" you find the following note:
Use only letters and numbers for the computer names.

Additional notes you find in the Online help of WinCC. Special characters are not allowed in the PC Name.

The following characters <u>are not allowed</u> in PCS7 and Cemat:

. , ; : ! ? " ' ^ ´ ` ~ - + = / \ ¦ @ * # $ % & § ° ( ) [ ] { } < > _
blanks
only uppercase relevant

The first character must be a letter!

Example for a valid Designation system:

Station name	Info bus: TCP/IP	Plant bus: MAC	Plant bus: TCP/IP *)
ENG01	192.168.1.10	Address marked on card	192.168.2.10
ENG02	192.168.1.11	Address marked on card	192.168.2.11
SERVER1A	192.168.1.20	Address marked on card	192.168.2.20
SERVER1B	192.168.1.21	Address marked on card	192.168.2.21
SERVER2A	192.168.1.22	Address marked on card	192.168.2.22
SERVER2B	192.168.1.23	Address marked on card	192.168.2.23
.....			
OSC01	192.168.1.101		
OSC02	192.168.1.102		
OSC03	192.168.1.103		
OSC04	192.168.1.104		
....			

*) TCP/IP should be deactivated in case of Softnet CPs.

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Tagnames

The tagnames are plant wide unique designations for the plant objects. With this name the plant object can be identified unequivocally.

A meaningful tagname contains the designation of the plant section, the designation of the equipment, the object type and a serial number.

e. g.:	Plant Section:	Clinker transport:	CT01
	Equipment:	Bucket Elevator 3	BE03
	Object type:	Motor	M
	Serial Number :	01	01

In PCS7 this name is built by the chart name and the instance name (=block name), separated by a Slash (/). Optionally the hierarchy folder names can be used as a prefix. (This is not recommended for Cemat because in this case the tagnames get too long.

If the Plant Section and the Equipment Name is used as chart name and the Object type plus Serial Number as Instance name, the example above will result in the following tagname:

CT01_BE03/M01

The tagname is used in the facaplates and in the message system. The maximum length is 20 characters. As special characters only the underscore should be used!



Note: The name of the motors, dampers, valves, groups, routes, selections and controllers should not be more than **13** characters.
Names for Annunciations and measuring values can reach a length of **20** characters (if a separator and an extension of max. **6** characters is added to the name of the main module).

Example for the Tagname of a Belt drift switch:

	CT01_BC01/M01_DS01	(If the Signal is assigned to the motor)
or	CT01_BC01/DS01	(If the Signal is assigned to the equipment)



Note: The above description is only an example. Of course you have to consider the Tagging rules for particular companies.

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Comment

The block comment is used for the description of the plant object. This can be for Example:

Bucket Elevator Main Drive

The block Comment is used in the Faceplates and (by copying) in the message system.
In most of the Cemat Faceplates there are two lines of 20 characters each, which means the maximum length of the comment can be 40 characters.



Note: For the facaplate display an automatic word wrap is used. If possible the system avoids cutting in the middle of a word but in case of long words this may still happen sometimes!

Message texts (Event texts in WinCC)

In most of the Cemat Objects the message texts are standard and they are defined at the function block and in the config files. The maximum text length is 20 characters.

For the Annunciation blocks C_ANNUNC and C_ANNUN8 the Message text must be defined per Instance. For technical reasons the text length must not exceed 16 characters.

Signal names

The maximum length for global symbols in PCS 7 is 24 characters. The signal names for the inputs and outputs of the CEMAT modules should be derived from the module tags.

The maximum length of the signal comments is 80 characters.

Example:

123_BE1/M01_ERM	Bucket Elevator Main Drive Contactor Feedback
<------24 characters---->	<----------80 characters---------->

Plant view

One of the most important decisions at the beginning of the engineering of a Cemat Project is the structure of the plant view. From the plant view the process control interface is derived.

The hierarchy level which is defined as "OS Area", is relevant for the Selection Buttons in the Overview Range and for the assignation of Access Right.

Example:

The first hierarchy folder was selected as “OS Area” and it contains the Hierarchy folders Crusher, RawMill, Kiln, CementMill and Packing.

In the Overview Area of the Runtime System you will see the buttons: Crusher, RawMill, Kiln, CementMill and Packing for direct Picture calls.

If an Operator has only the Authorization for the areas Crusher and Raw Mill, he is only permitted to watch and to operate these areas.

The Messages in the Alarm line and the acknowledgement function is filtered in the same way via the OS Area.



Caution: Because of the filter functions in the CEMAT Message system the maximum number of Areas buttons is restricted to 30.

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Typicals (Template charts)

The Cemat Library 'Minerals' is delivered with three sets of template charts, which can be used as 'Typicals' for creating control module types or process tag types:

Typicals_Set1 has template charts with basic settings which can be used in case of Field switches with Repair switch function:

- Operation mode can be changed individually per drive
- Field switch Signal AutModLo is used as Repair switch
- Manual mode is interlocked (all interlocking conditions effective)
- Out of Service mode does not exist

Typicals_Set2 has template charts with extended settings, which can also be used for Field switches with Repair switch function:

- Operation mode can be changed individually per drive
- Field switch Signal AutModLo is used as Repair switch
- Manual modes with different interlocking grades available
- Out of Service mode exists
- Power Management function enabled

Typicals_Set3 has template charts with basic settings which can be used in case of Field switches with Selector for Local/Automatic.

- Operation mode can be changed individually per drive
- Field switch signal AutModLo is used as Selector between Local and Automatic
- Manual mode is interlocked (all interlocking conditions effective)
- Out of Service mode does not exist

The Typicals are only examples and must be adapted to the plant requirement. The following examples exist:

MOT_1D	Standard Unidirectional drive with speed monitor
MOT_1D_MEAS	Standard Unidirectional drive with speed monitor and current measurement
MOT_2D	Standard Bi-directional drive with speed monitor
MOD_2D_MEAS	Standard Bi-directional drive with speed monitor and current measurement
DAMPER	Standard damper block
DAMPER_POSI	Damper Positioner Function
VALVE	Standard Valve
BC	Belt conveyor with speed monitor, two rope switches, two drift switches and current measurement.
BC_REV	Reversible belt conveyor with speed monitor, two rope switches, two drift switches and current measurement.
BE	Bucket elevator with and main and auxiliary drive

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Engineering Rules

Per plant the responsible engineering department must determine the project definitions. Henceforth these unique definitions are valid for all AS of the plant.

Especially if the engineering is done at different locations and for supplementary plant extensions it has to be insured that the original project definitions are used.

Definitions for the Engineering:

- Name of the PC Stations
- Definition of AS Numbers
- Addressing of the AS and PC Stations (MAC Addresses, TCP/IP Addresses, Profibus)
- Definition of the Project Standard and Version
- The designation system of the plant tags (charts, modules, signals)
- Definition of the message texts (Event)
- Variable names
- Names of the WinCC pictures
- Rules for the generation of scripts and actions
- Engineering rules (Customer standards, Teamwork)
- Definitions for the documentation of a project

Definitions for the Runtime-Project:

- The operation surface (Division of the screen, Font style and –size, Language in Runtime, Representation of the objects)
- The operation concept (Picture hierarchy, operating philosophy, user rights, permitted keys)
- The color definition for the annunciations, Limit values, Status, Font etc.
- The communication (Communication type, Actualization cycles)
- The volume of project data (Quantity of alarms, Archive values, Curves, Clients etc.)
- Message and archiving procedure (Archive size and Export Concept)
- Archive names per Area

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Verification of the received documents

The received documents for the project must be examined, verified and if necessary completed. These are:

- Object list (List of drives, measures, groups, etc.)
- Signal list (with or without absolute addresses)
- Plant Topology (Building, Location)
- Process view (Plant, Unit, Function)
- Electrical view (MCC, Panel, Feeder, Bimetal, Fuse Rating)
- Panel Structure (I/O-Panels, Rack, Slot, Card, Address)
- Group/ Route/ Drive assignments

Project Structure

Assignment of the Objects to the AS

- Sensible (technological) division of the objects
- Communicate as little data as possible between the individual AS
- If possible, do not separate groups

Determine the number of AS required

- Maximum number of objects per AS
- Maximum number of signals per AS
- Make allowance for reserves
- See table for module data in the reference manual, objects, chapter 1, General.

Structure of the plant from different views

- Plant topology (Locations)
- Process view (Technological structure)
- Control system view (Control systems, AS, I/O-Panels etc.)
- Electrical View (MCC)

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Planning the Process Control Interface

Configuration Guidelines

Summary of the steps required to create the process control interface:

	Description of the action	Executor
1	Determine which plant sections of the process are to appear on the screen.	Customer / project management
2	Divide the complete plant into sub-processes that are to appear together in a diagram.	Customer / project management
3	Determine the general rules for the process diagram creation.	Project management
4	Process diagram assignment for the menu entries.	Refer to the next pages
5	Determination of the general representation rules for the plant.	Customer / project management
6	Determination of the color assignment, blinking, font size and form.	Customer / project management refer to the default picture
7	Determination of the operation philosophy.	Customer / project management CEMAT standard
8	Determination of the representation of the block icons	Customer / project management CEMAT standard
9	Determination of the representation for typical process-relevant elements.	Customer / project management CEMAT standard
10	Design the process diagram layout on paper or drawing program or directly using Visual Basic.	Customer / project management
11	Determination of the directories / file names for process diagrams, key assignments, graphical modules, etc.	CEMAT standard

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What is shown WHERE and HOW?

Complete plant overview

Representation:	Schematic representation of the complete plant
Content:	Overview of the production plant with global status display from the running plant sections
Operation:	Selection of a production section / a sub-plant

System monitoring, plant configuration diagrams

Representation:	Schematic representation of the complete control system
Content:	Overview of the network connection of the individual control system devices with global status display of the individual components.
Operation:	Selection of an individual component for detailed analysis

Plant sections:

Representation:	Material flow of a complete production plant without secondary aggregates and details
Content:	Display of all physical variables relevant for the process control.
Operation:	Start and stop of the plant Specification of set points Assignment of recipes Invoke overviews for flow diagrams, measured values, closed-loop controllers, curves Tabular measured value listing

Process Pictures:

Representation:	Representation of the plant sections with all aggregates
Content:	Display of the operational modes, measured values, states, curves, filling levels
Operation:	Selection, operation of individual aggregates and diagnosis, information and object parameter invocations

Detail Pictures:

Representation:	Representation of the individual aggregates
Content:	Display of the operational modes, measured values, states
Operation:	Selection, operation of individual aggregates and diagnosis, information and object parameter invocations

Help:

Representation:	User's guide for the CEMAT system User's guide for the plant User key assignment
Content:	Explanations and examples of the system handling.
Operation:	Complete table of contents and search key control

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Check list

Step	Process	Status
0	**Verifying the received documents**	
0.1	Object list	
0.2	Signal list (with or without absolute addresses)	
0.3	Plant Topology (Building, Location)	
0.4	Process Overview (Plant, Unit, Function)	
0.5	Electrical view (MCC, Panel, Feeder, Bimetal, Fuse Rating)	
0.6	MCC Types	
0.7	Group-, Route-, Drive Assignment	
0.8		
1	**Definition of the Project structure**	
1.1	Structuring the plant based on technological functions	
1.2	Definition of plant sections	
1.3	Assigning the plant objects to the plant sections	
1.4	Locations (AS, OS, MCC, Periphery)	
1.5	Assigning the plant objects to the locations	
1.6		
2	**Calculation of the required Hardware and Software**	
2.1	Variable calculation	
2.2	Definition of the ES	
2.3	Definition of the AS (CPU Type)	
2.4	Definition of the Periphery	
2.5	Definition of the OS (Server, Clients, CAS, WebServer)	
2.6	Definition of the Bus Components	
2.7		
3	**Ordering Hardware and Software, including Licenses**	
3.1	Ordering the Hardware	
3.2	Ordering the Software for PCS7	
3.3	Ordering the Software for Cemat	
3.4	Miscellaneous	
3.5		
4	**Names and Addresses in the System**	
4.1	Definition of the MAC Addresses	
4.2	Definition of the TCP/IP Addresses	
4.3	Definition of the Profibus Addresses	
4.4	Definition of the AS Numbers	
4.5	Designation of the PC Stations	
4.6	Designation of the AS	
4.7	Designation of the Periphery	

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Step	Process	Status

5	**Decision for the Project standard**	
5.1	Evaluation for the Cemat Project Version to be used in the Project.	
5.2	Additional adaptations required in the User Program to adapt the Program to the MCC/Local Switch Signal?	
5.3	Are additional messages required (e. g. SIMOCODE, DRIVE_ES or Subcontrols)?	

6	**Project language**	
6.1	Definition of the Project language	
6.2	Definition of the Display language	
6.3		

7	**Tagging System**	
7.1	Tagging system available from the customer?	
7.2	Any special demands for Tagnames from the Machinery supplier?	
7.3	Plant Update or Migration: How can the existing Tagging System be converted into PCS7 Tagnames?	
7.4	Are the Standard fault texts OK or is a modification of the texts required?	
7.5	Definition of the fault texts for C_ANNUNC and C_ANNUN8	
7.6	Definition names for the WinCC Pictures	

8	**Project specific modifications of the Standard**	
8.1	Adaptations of the Blocks (e. g. fort he message system)	
8.2	Adaptations in the Config Files	
8.3	Adaptations of the Faceplate (e. g. for an additional language)	
8.4	All Modifications must be saved and restored in case of a Cemat update!!!	

9	**Definition of the Process Control Interface**	
9.1	Definition of the plant sections "Areas" for the Overview	
9.2	Determine which plant sections of the process are to appear on the screen.	
9.3	How many levels should be used?	
9.4	Definition of the Process pictures and Detail Pictures.	
9.5	Assigning the process pictures to the area	
9.6	Design of the process pictures.	
9.7	Definition of the Operating Philosophy	
9.8	Definition of the block icons (how shall the plant objects be displayed)?	
9.9	Definitions, how to display typical technological element.	

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Step	Process	Status
10	**Structuring the PCS7 Project**	
10.1	Creating a Guideline with engineering rules (especially for bigger projects).	
10.2	Technological Hierarchy (Plant View)	
10.2.1	Definition of the Hierarchy structure (all levels)	
10.2.2	Definition of the Hierarchy folder names	
10.3	AS	
10.3.1	Definition of the plant names	
10.3.2	Definition of the Instance names (block names)	
10.3.3	Definition of the signal names	
10.3.4	Definition of Object types (Process Tag Types)	
10.3.5	Definition of rules for additional Texts (C_ANNUNC and C_ANNUN8)	
10.4	OS	
10.4.1	General rules for the process picture design.	
10.4.2	General rules for the representation of the plant	
10.4.3	Definition of colors, blinking, font size and shape	

11	**Creating a PCS7 MultiProject according to the Plant Configuration**	
11.1	Creating a MultiProject with partial projects	
11.2	Creating an ES	
11.3	Creating a Project Library	
11.4	Definition of Software Types	
11.4.1	Creating Process Tag Types for the IEA	
11.5	Creating the Template Pictures for the automatic generation of block icon.	
11.6	Creating the AS Stations	
11.7	Creating the OS Stations - (Server, Clients, CAS)	

12	**Project backup**	
12.1	Define backup medium	
12.2	Define backup directory	
12.3	Name of the backup file(s)	
12.3	Define Backup cycles	

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Installation of a PCS7 Project

Content

Installation of a PCS7 Project 1

General 3
General engineering rules 6
Installation of PCS7 8
Installation of the CEMAT Software 10
File Structure 11
Adaptation in PCS7 for CEMAT 13
Create a new PCS7 Project 14
Hardware Configuration for a CEMAT AS 19
Configuration of a SIMATIC PC Station 26
Configuration of the Network Connections 30
Download for HW Configuration and Network Connections 35
Plant Structure definition 37
Create a Project library 40
AS Configuration 41
Preparations for programming with the CFC 41
Copy Standard Symbols and blocks into the PCS7 Project 42
Compile and Download CFC 45
OS Compile 45
OS Configuration (Single-User System) 46
Project Properties 46
OS Project Editor 47
Computer properties 50
Tag Management 52
General changes in the alarm logging 54
Tag logging 57
User Archives 58
Add User rights 62
Selection of area specific rights 63
Horn configuration 64
Update the WinCC Project with Cemat Functions 66
Generation of the Template Pictures 68
OS Configuration (Server) 69
Project Properties 69
OS Project Editor 70
Computer properties 72
Tag Management 74
General changes in the alarm logging 77
Tag logging 80
User Archives 81

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Edition: 01/10
N:\Cemat\DOKU\V80\English\Engineering\001_Minerals\03_PCS7_Project_009.doc

Add User rights 85
Update the WinCC Project with Cemat Functions 86
Generation of the Template Pictures 88
Redundancy Settings in the Server-Project 89
OS Configuration (Standby-Server) 91
Standby-Server-Project 91
OS Configuration (Client) 92
Project Properties 92
OS Project Editor 93
Computer properties 96
Tag Management 97
Add User rights 98
Update the WinCC Project with Cemat Functions 99
Generating and loading of the Server Data 101
Loading of the Server Data in a Client Project 101
Selection of a Preferred Server 102
Selection of area specific rights 103
Horn configuration 104
Archiving 107
Tag Logging 108
Central Archive Server (CAS) 109
Configuring an Archive Server 109
Integrated Asset Management 110
Time Synchronization 111
Time Synchronization AS 111
Time Synchronization Server 111
Time Synchronization OS Client 112
How to create a PDL Cache 113

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General

This chapter describes the installation of a PCS7 project on the Engineering Station (ES) and covers all the required settings for CEMAT based on PCS7 V8.0.

For general questions regarding PCS7 Engineering we refer to the Engineering Manual for PCS7 V8.0. These items are not included in the Engineering Manual for CEMAT.

As the project structure will be different from Project to Project (depending on project size, number of objects, number of AS, Servers, OS Clients etc) this description can only be an example for one of many possible solutions.

The description was made based on an Example-Project with the following configuration:

3 AS
1 Engineering Station
1 redundant Server-Pair
2 OS Clients.

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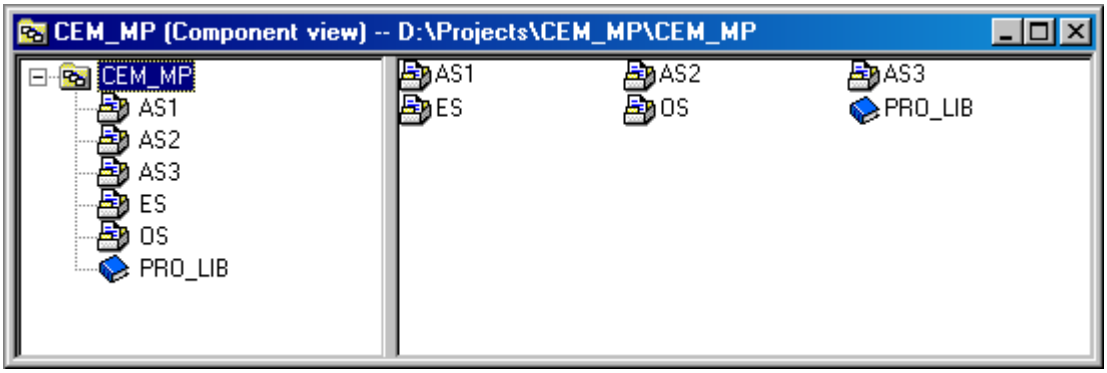
The following example describes the engineering of a Multiproject **CEM_MP** with 6 Projects and a Library:

To enable independent Engineering for the different AS, individual PCS7-Projects have been created for each AS.

AS1 for first AS
AS2 for second AS
AS3 for third AS
ES for the Engineering Station
OS for the OS Servers and OS Clients
PRO_LIB for the Project Library



Caution: Avoid Underscore in the in the Name of the partial project for OS Server and Clients and also not in the name of the OS-Project for the Server because the package name is build of those two parts and the underscore is used as a separator in the package name, e. g. OS_OSSRV.
If you want to use the Cemat V6.0 Message Selection Function in the Alarm line, the underscore is absolutely forbidden.

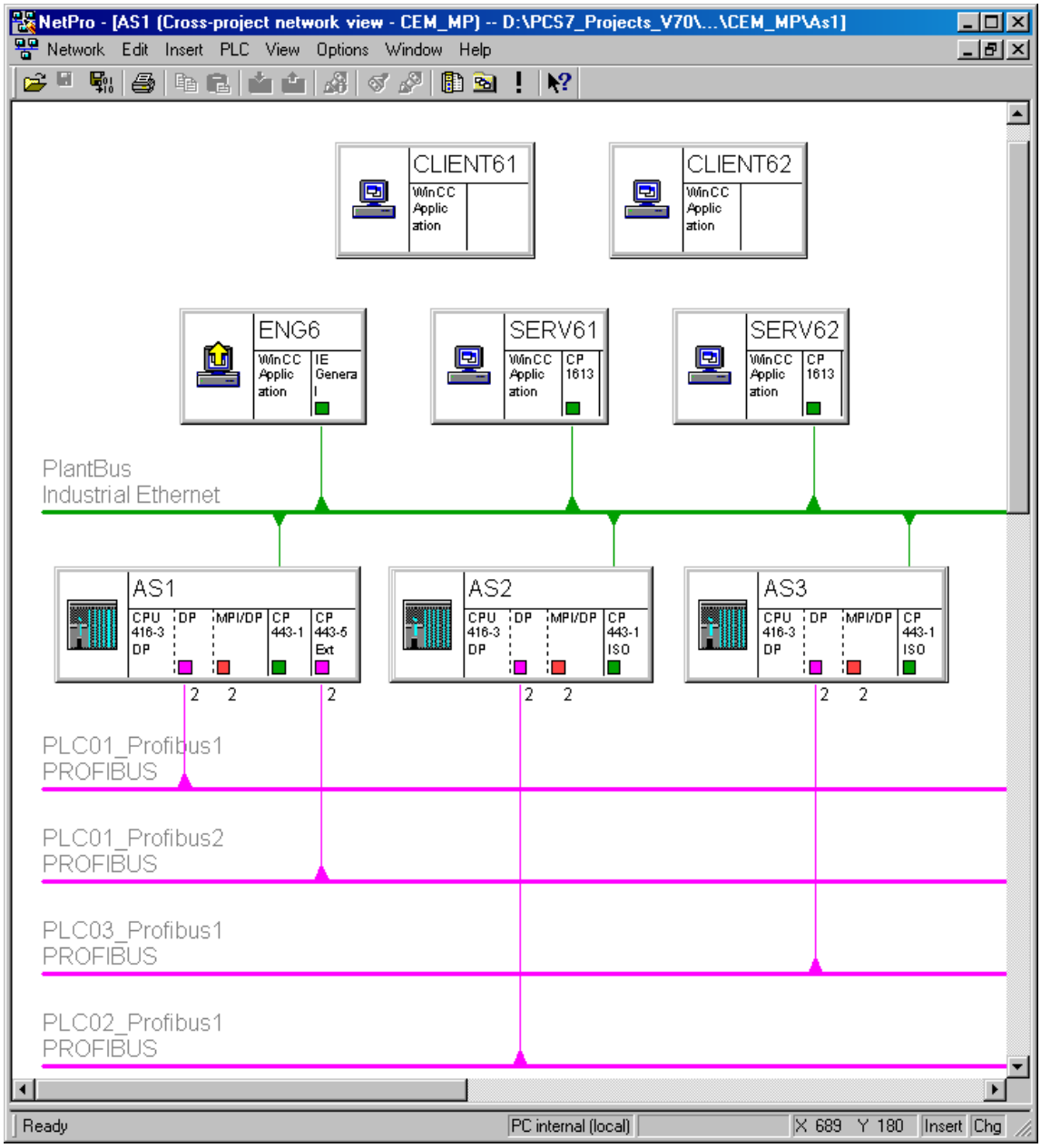


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The following screen shots show the Network Configuration of the Example Project.

Caution: The Terminal bus and the corresponding CPs can not be displayed in the Network Configuration. Otherwise there will be errors during download to the Configuration Editor.

Network Configuration for the complete Multiproject (Cross-Project Network View)



Note: In our Example the Engineering Station has two Network Cards (1 internal CP and one 3COM) but no CP1613. In the Hardware Configuration of the PC only one Network Card for the connection to the Plant Bus can be configured!

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General engineering rules

Before you start creating your own PCS7 Project please get familiar with the most important engineering rules in order to avoid double work:

- The PC Names, OS Project Names and the Addresses (MAC Addresses, TCP/IP Addresses, PROFIBUS Addresses) used in the description have to be replaced by your PC Names etc.
- All variable names and function name must be used exactly as it is mentioned in the description (including Capital/small letters).
- In PCS7 V8.0 the complete Engineering has to be done on the Engineering Station before the OS-Project is downloaded to the PCs. Don't carry out any engineering step on the Server or OS Client itself.
- Never activate the OS-Project for Server on the Engineering Station if the Redundancy is already activated. On the Engineering Station the OS-Project can be activated in Simulation Mode with "Start OS Simulation". In this case the OS-Project is duplicated and the Copy is activated.
- Don't forget to take a backup of the complete Project (or MultiProject) once in a while, especially before you carry out extensive "Cut" and "Paste" functions and also if more than one person is working on the project.
- Don't forget to save the modifications you made in the CEMAT Standard part. (Function blocks, Config Files, Standard Pictures). In case of a CEMAT Update these data will be overwritten.
- Create a common Library for the project (based on the CEMAT Library) and make sure that everybody working for this project is using the same blocks.
- The time synchronization is essential for the Alarm logging and Tag logging system. Make sure that there is only one (redundant) time Server in the system and that all the Stations (OS and AS) get the correct time. In PCS7 V8.0 the AS has always GMT!!

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The following engineering manual explains all steps for the installation and configuration of the PCS7 Project, including AS, Engineering Station, Single Station, OS Server and OS Client:

For the Installation of PCS7 V8.0
→ see “Installation of PCS7” and the Engineering Manual of PCS7 V8.0

For the Installation of CEMAT
→ see “Installation of the CEMAT Software”

For the location of the CEMAT Software on your PC
→ see “File Structure”

For the additional settings on your PC which are required after the Installation of CEMAT
→ see “Adaptations in PCS7 for CEMAT”

For the creation of a PCS7 Project with AS and OS Stations (including Hardware Configuration and Network Configuration)
→ see “Create a new PCS7 Project”

For the definition of the plant structure
→ see” Plant structure definition (Plant view and Process Object view)”

For all the required settings in a CEMAT AS
→ see” AS Configuration”

For the Configuration of a Single Station
→ see “OS Configuration (Single Station)”

For the Configuration of an OS Server
→ see “OS Configuration (Server)”

For the Configuration of a Standby-Server
→ see “OS Configuration (Standby-Server)”

For the Configuration of an OS Client
→ see “OS Configuration (OS Client)”

For the creation of the Server Data
→ see “Generating and loading of the Server Data”

For the Project Download to the OS Stations
→ see “Project Download”

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Installation of PCS7

For each PC Station (ES, Server, Standby-Server and OS Client) the appropriate startup procedure must be carried out. Please follow the instructions in PCS7 V8.0 description and the readme file which is delivered with the PCS7 CDs.

Only a few additional remarks for the installation:

Language of the Operation System

Make sure that all PC Stations are installed with the same operation system language (normally English or German).

Regional Settings

Make sure that the regional settings of your PC are correct for the language you want to work with.

Computer Name

For the computer name follow the restrictions of PCS7 V8.0!

In the PCS7 Manual "PCS7 PC – Configuration and Authorization you find the following note:
Use only letters and numbers for the computer names.

Additional notes you find in the Online help of WinCC. Special characters are not allowed in the PC Name.

The following characters <u>are not allowed</u> in PCS7 and Cemat:

. , ; : ! ? " ' ^ ´ ` ~ - + = / \ ¦ @ * # $ % & § ° ( ) [ ] { } < > _
blanks
only uppercase relevant

The first character must be a letter!

Screen Resolution

The recommended screen resolution for the CEMAT Faceplates and Pictures is 1920x1080. Four more screen resolutions are possible: 1280x1024, 1600x1200, 1680x1050 and 1920x1200. In this case a few standard pictures have to be exchanged.
Less than 1280x1024 is not possible; otherwise the Cemat Faceplate can not be displayed.

Power Options

Switch off the Power saving system (for all Devices like Hard Disk, Monitor etc.) in BIOS and in the Control Panel

Domain controller

The installation of a Domain controller is **not** released for Cemat!

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Installation of the software for PCS7

Please, always use the actual installation instructions, which are delivered with the PCS7 installation CD. As installation language please select the language in which the system is finally delivered. (Some system messages are only displayed in the installation language!) The installation is described in the document „PCS7 PC Configuration and Authorization“.

Hardware definition with Commissioning Wizard

When you start your PC the first time after installation of PCS7 the Commissioning Wizard will be started automatically in order to ask you for the Settings of the PC Station. Enter these settings according to the Hardware of your PC.

The configuration can be checked under:

Start → Simatic → SIMAITC NET → Settings → Configuration Console.

For detail information refer to the PCS7 Manual “PC Configuration and Authorization”

Configuration Editor

In the Configuration Editor add the WinCC Application according to the Station Type and give the correct Station Name.

User rights for Cemat

The installation of Cemat requires Administrator rights.

During the runtime Cemat requires the rights for 'Siemens TIA Engineer', 'SIMATIC HMI' and 'SIMATIC NET'. The user must have write permissions for folder CEMAT_CS and all subfolders.

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Installation of the CEMAT Software

The following procedure has to be carried out on all PC Stations (ES, Single Stations, Server and OS Client):

Start the delivered Setup Programs from the CD and follow the instructions on the screen.

- Select the installation language (English and German is possible).
- Accept the license agreement
- The Destination Folder for CEMAT is D:\CEMAT_CS.
  Don't modify the destination directory from the default. To ensure that all CEMAT functions working correctly CEMAT must be installed under D:\CEMAT_CS!
- Select the correct Setup-Type:

ENGINEERINGSTATION	for an Engineering Station
OS SERVER /CLIENT	for a Single Station, Server, Standby-Server or OS Client

- The list of Installation keys for the different project standards appears (the correct key must be entered later):

  000 = CEMAT Standardl
  001 = CEMAT Minerals
  004 = Holcim
  006 = Dyckerhoff
  007 = Heidelberg Cement
  023 = Vigier
  024 = Bushehr
  025 = Caima
  026 = Alsen
  027 = Lafarge
  028 = Rossi

- Now enter the project key and start the installation.

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File Structure

After running the Setup the CEMAT specific files are located in drive D, directory CEMAT_CS.

D:\CEMAT_CS

\BIN	CEMAT IndustrialX Controls
\BITMAPS	CEMAT Bitmaps (zip-file)
\CONFIG	Configuration Files
\DOCU	Documentation in PDF format
\HARDCOPY	For Print Screen functions (print faceplates)
\HOTFIX	Hotfix Location (Data and Tools)
\MULTIMEDIA	Documents for Info-Dialog:
\AS	AS Cabinet drawings
\ELECTRICAL_DIAGRAM	Electrical schematic drawings
\IO	I/O cabinet drawings
\LOOP_DIAGRAM	Software Interlocking diagrams
\MANUAL	General function descriptions
\MCC	MCC cabinet drawings
\OPERATING_PROCEDURES	Operating descriptions
\PERIPHERY	I/O information from HW Config
\SOUND	Sound replay
\VIDEO	Video description for trouble-shooting
\SIMOCODE	SIMOCODE files for 3UF70
\SOUNDS	Sound files for alarms
\TOOLS	Software Tools for CEMAT
\UA	User Archive structure and macros
\WinCC	WinCC files:
\GraCS	CEMAT Standard pictures and bitmaps
\Library	WinCC Project Functions for CEMAT (C-Scripts)
\PRT	WinCC Report layout
\WScripts	WinCC Scripts for CEMAT

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After the installation with Installation key 001 the libraries 'ILS_CEM' and 'Minerals' are installed in the PCS7 system directory and will be found after the installation under

C:\Program Files (x86)\SIEMENS\STEP7\S7LIBS (Windows 7)
or
C:\Program Files\SIEMENS\STEP7\S7LIBS (Windows XP)

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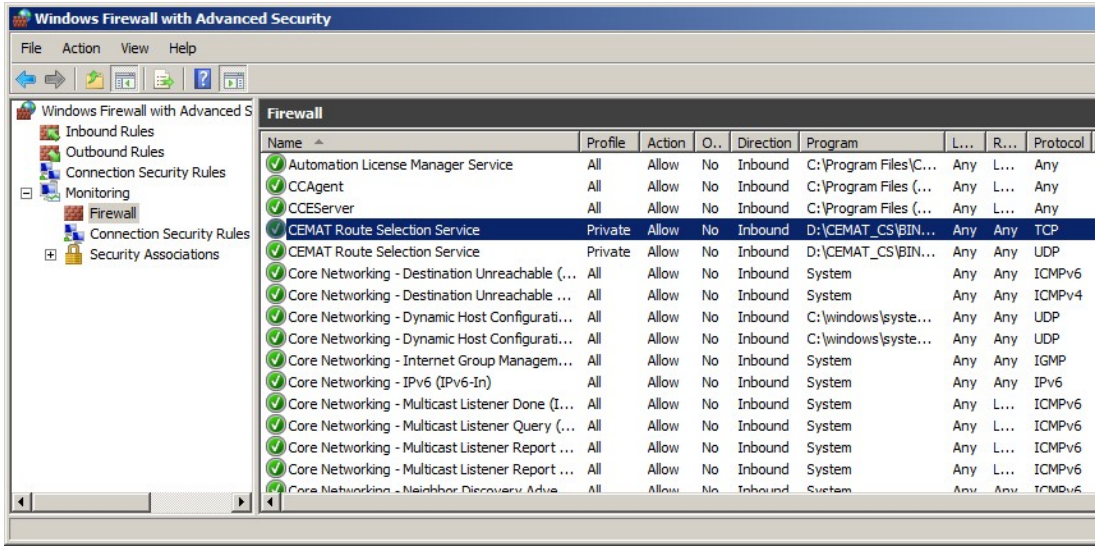
Adaptation in PCS7 for CEMAT

1. In the configuration files under D:\CEMAT_CS\Config the system can be adapted to the project requirements.
   The main configuration file **C_CONFIG.CFG** contains the settings for the Multimedia Server.
   If you don't want to save the Multimedia files on every Client, you have to enter name of the PC where the Multimedia files are located under "MServer=……..".

   [MultimediaServer]
   ;for Example
   ;MServer=CLIENT62 --> The name of the CEMAT Multimedia Server is CLIENT62
   ;MServer=@RM_SERVER_NAME --> The actual server for this client with the redundancy functionality
   ;List here the name of the multimedia server or the redundancy functionality
   MServer=

2. If the Windows Firewall is activated, the following Settings have to be carried out on each Server Station under *Start → Control Panel → Windows Firewall*:

   Select "Allow a program or feature…" and chose "CEMAT Route Selection".
   After that you should see the file in window "Advanced Settings".



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Create a new PCS7 Project

Define a directory where all the PCS7 projects will be stored in the future. We don't recommend using the default directories under D:\SIEMENS\STEP7\S7Proj. We recommend creating a separate directory on D drive.

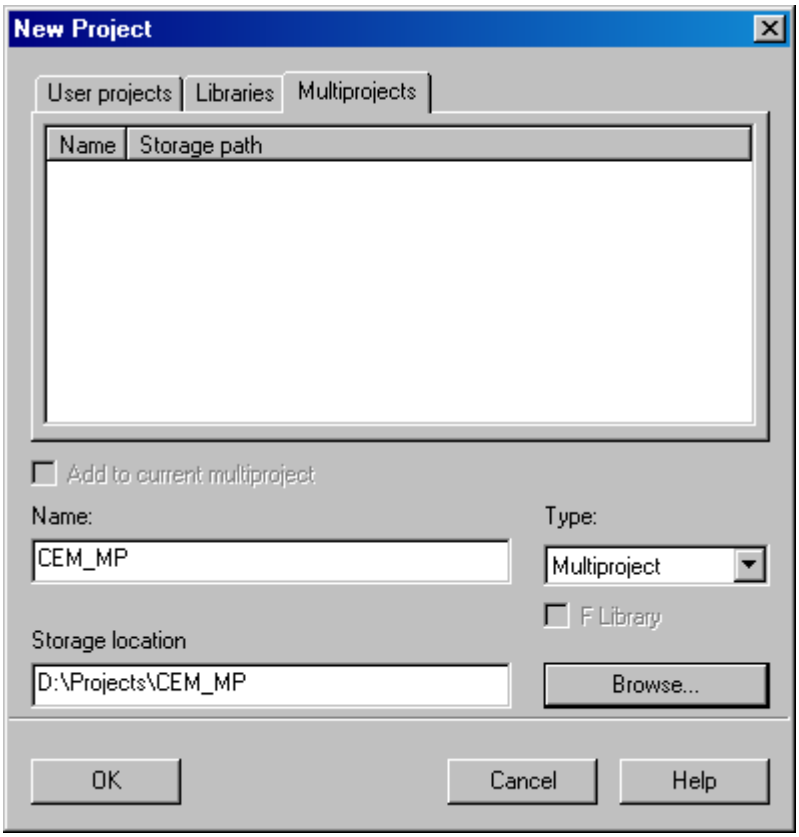
Use *Options -> Customize* to select the new directory under 'Storage location for projects'. Use directory D:\PROJECTS to save your PCS7 projects. If you use Multiprojects, create a Subfolder as Storage location for the Multiproject, e. g. CEM_MP

You can use the Wizard to create a new Project or Multiproject or you can create the Project or Multiproject manually. The wizard will create a Project Structure with Plant Hierarchy which you can modify or delete.

In the following description the project is created manually:

In the SIMATIC Manager create a new project using *File -> New.*

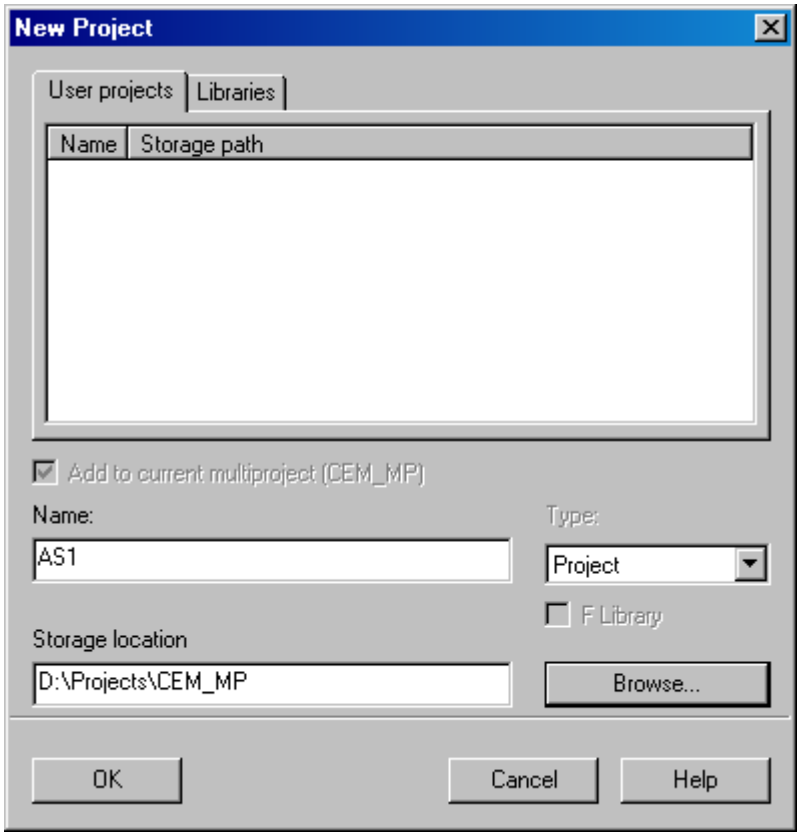
Select Type *Multiproject* and define the Project *name*. Check the *Storage location* (it should be the Multiproject directory).



Confirm with OK

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Select the Multiproject in the SIMATIC Manager and use *Multiproject -> Create in Multiproject* to create the first Project within the Multiproject.

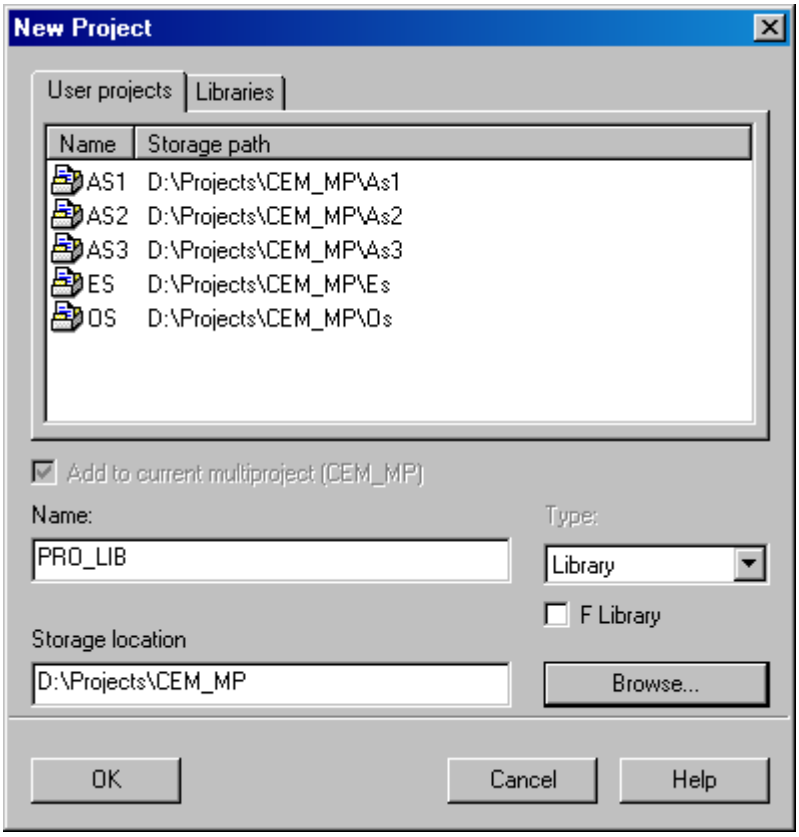


Confirm with OK.

Repeat this step for all your Projects.

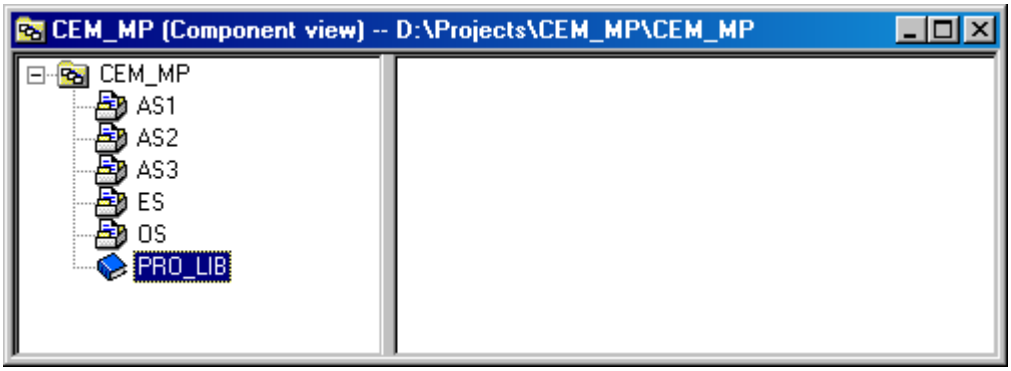
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Create the Project Library using the same method. For the storage location the Folder of the Multiproject Folder is used.



This library will be the Master Data Library for the Project. It should contain all Blocks and Typicals used in the Project (in the CFCs of each AS-Program).

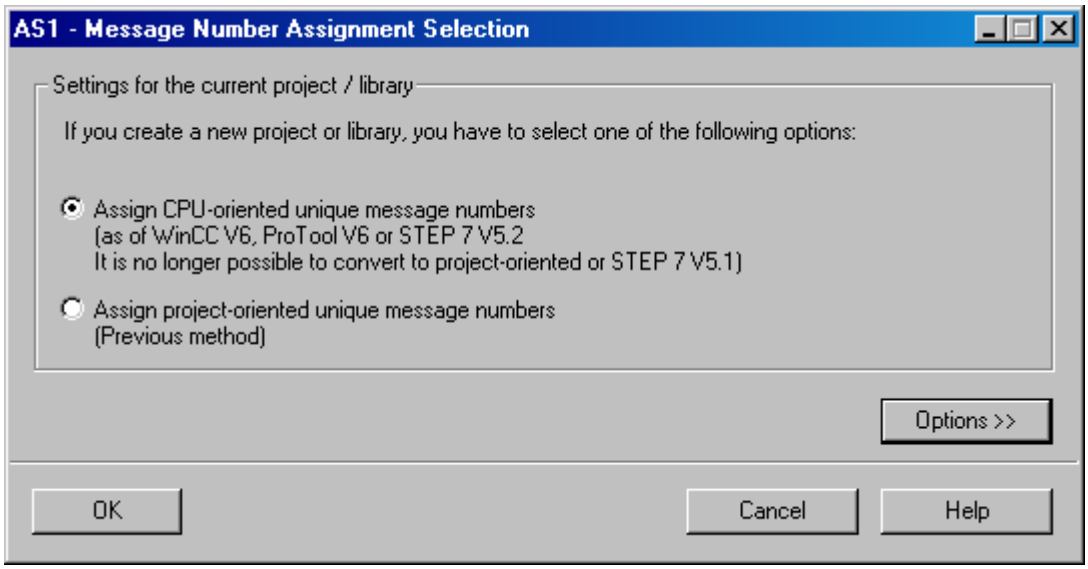
To select the library as “Master” use *Multiproject -> Set as Master Data Library*.



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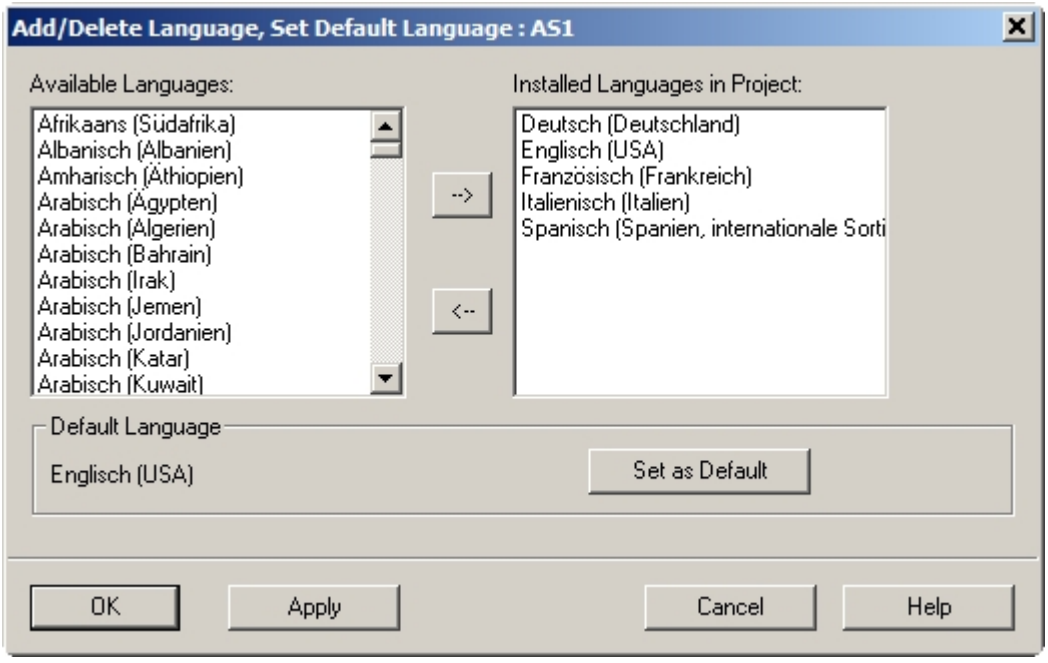
For each partial Project select the display language. Select *Options → Language for Display Devices.*

The first time a window will pop up for Message Number Assignment Selection.



Assign CPU-oriented unique message numbers.

Choose the installed languages in the project and select the default language.



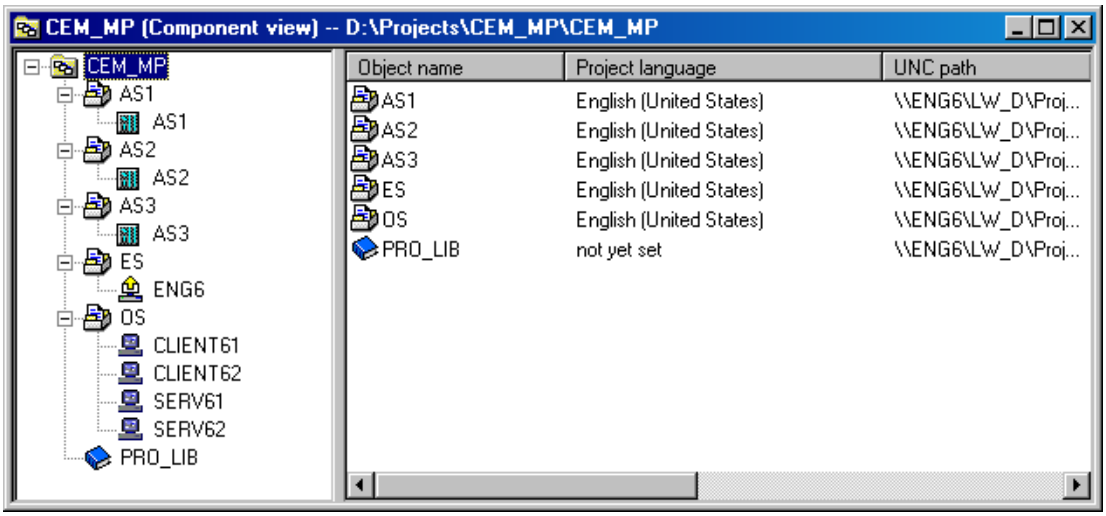
The display language must be similar in all partial projects.



Caution: For English and Spanish you have to select **English (United States)** and **Spanish (International Sort)** as these languages are used in the Cemat Standard blocks and Faceplates.

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Once the Projects are created and the display language is selected, you have to create the AS and the OS Stations according to the Hardware Configuration of your plant. New AS/OS can be created either in the Component View of the SIMATIC Manager using right mouse button to *Insert New Object* or in the Network Configuration.



Change name of the OS Stations to the real Station name (e.g. CLIENT62, SERV61). For the AS give a meaningful and unique name (e. g. AS1 or KILN1).

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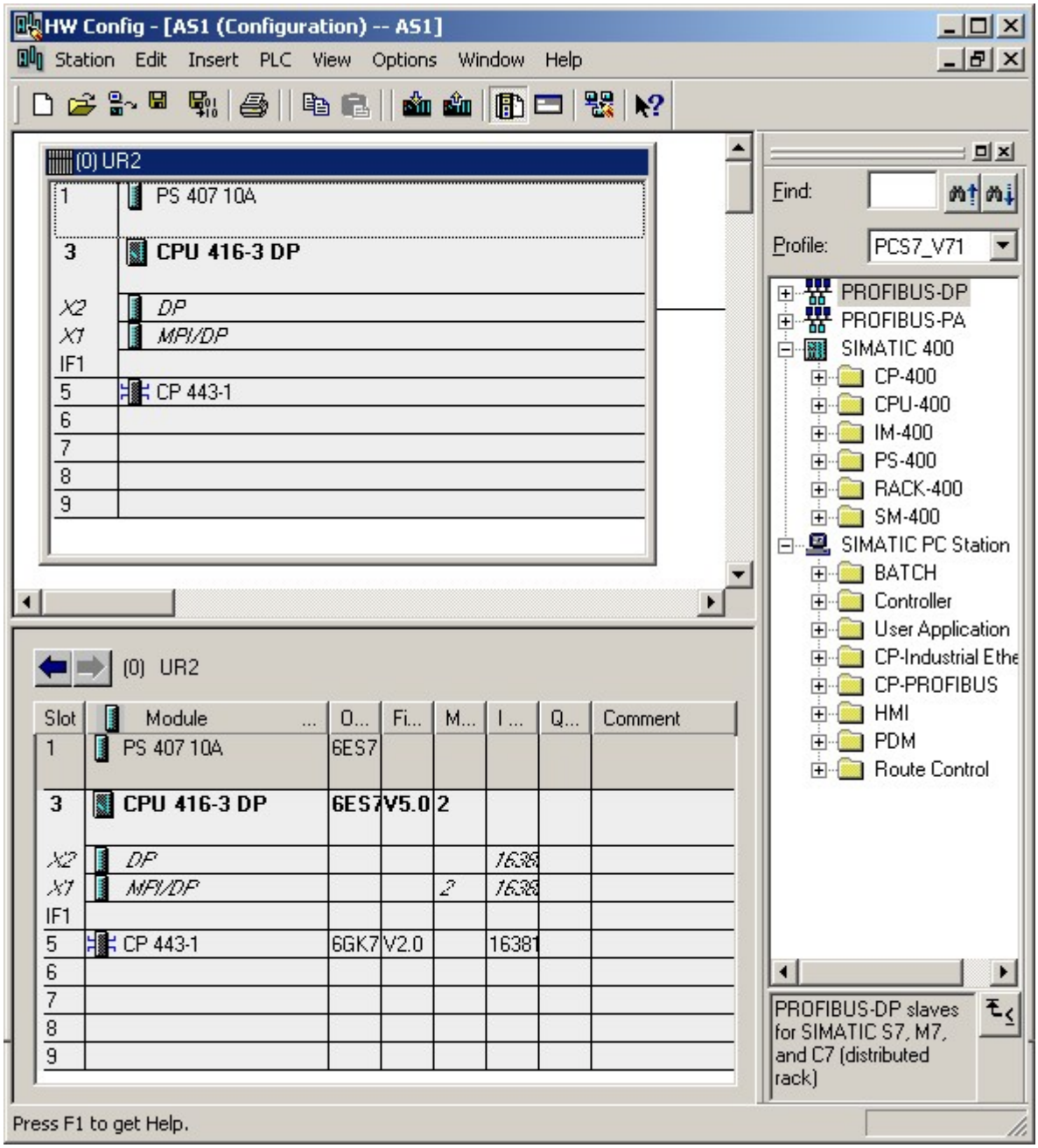
Hardware Configuration for a CEMAT AS

The following pages show the settings in the Hardware Configuration for a CEMAT AS.

The Screenshots in this description show the Properties of a CPU 416-3 DP and a CP443-1 in order to explain the required settings for CEMAT.
Other CPUs or CPs may have slightly different Property windows. To avoid misunderstanding the most important CEMAT settings are mentioned below each screen shot.

Define AS Hardware

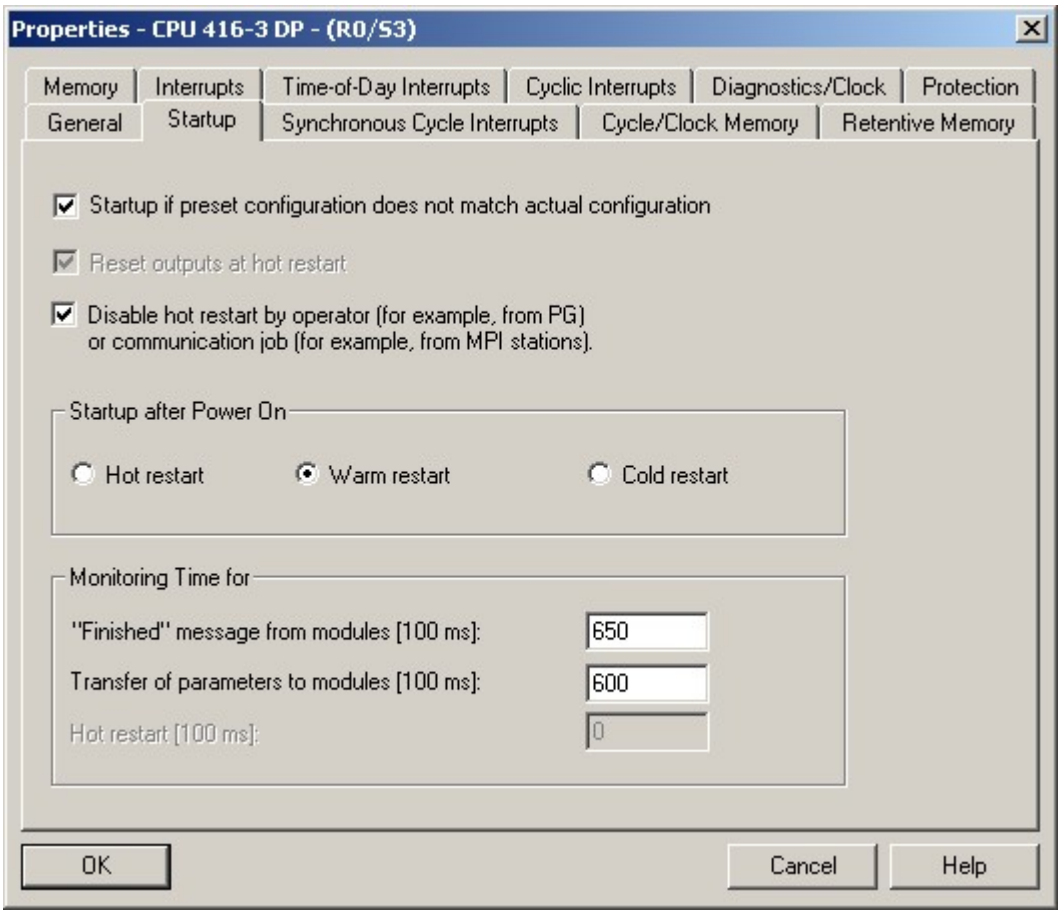
Select from *Hardware Catalog -> SIMATIC 400 -> RACK-400* the Rack you want to use for your AS and drop it to the sheet. Select a power supply, CPU and a CP according to your hardware configuration.



When dropping the CPU create a new PROFIBUS and connect it.

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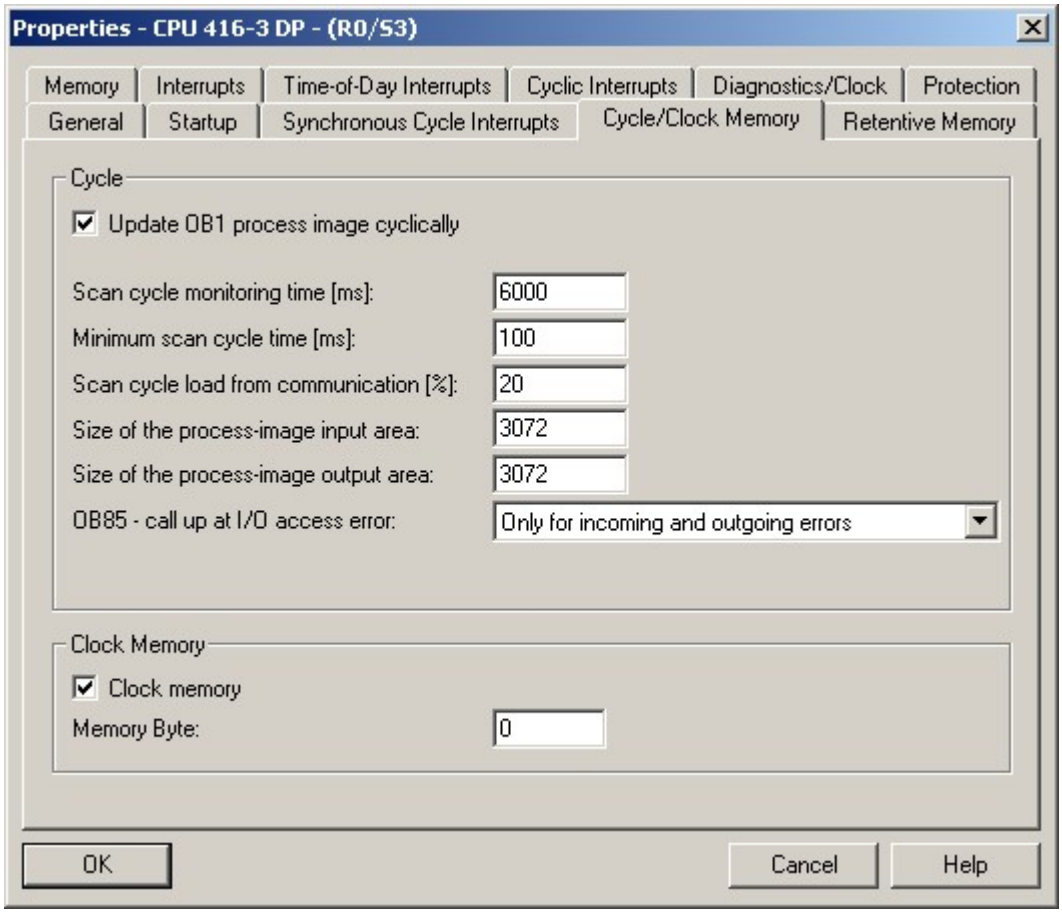
Settings in tab Start-up:



Under “Start-up after Power ON” **Warm Restart** must be selected

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Settings in tab Cycle/Clock Memory:



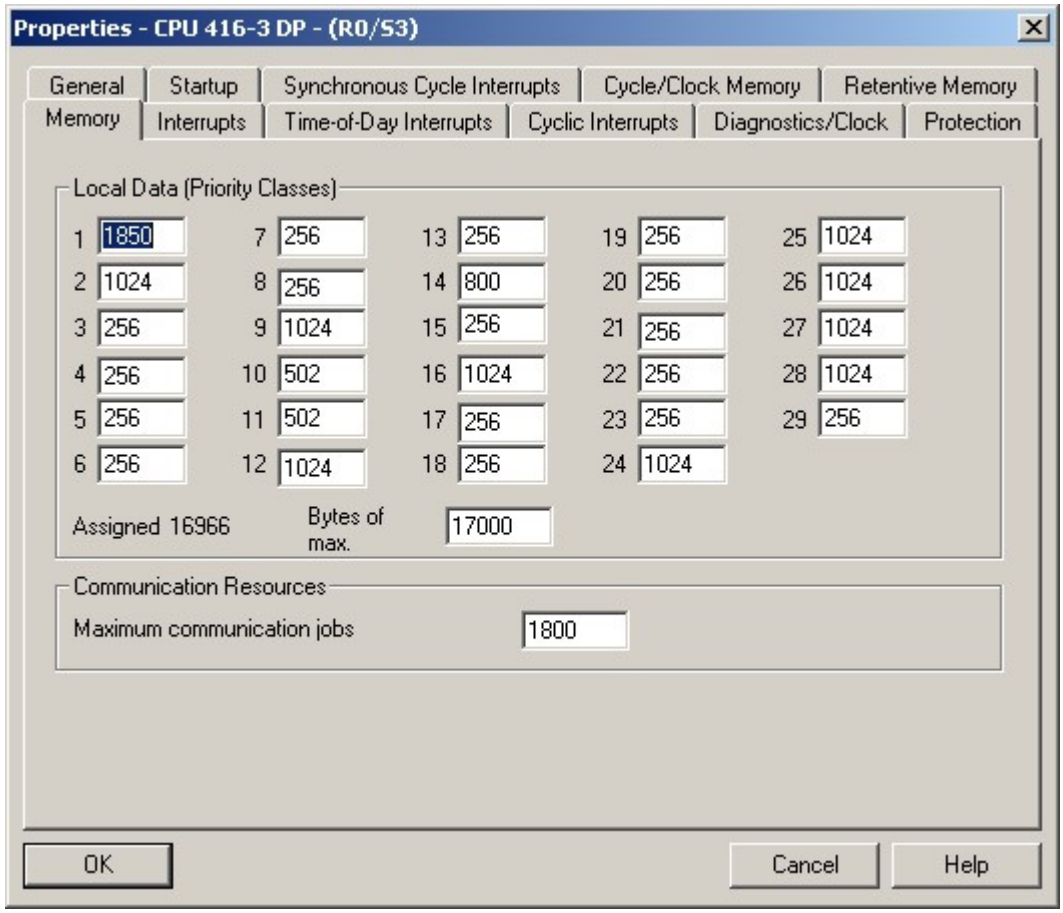
Enter the Scan Cycle Monitoring Time.

Enter the Minimum Scan Cycle Time of 100ms

Select Clock Memory. The memory Byte must be 0

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Settings in tab Memory:



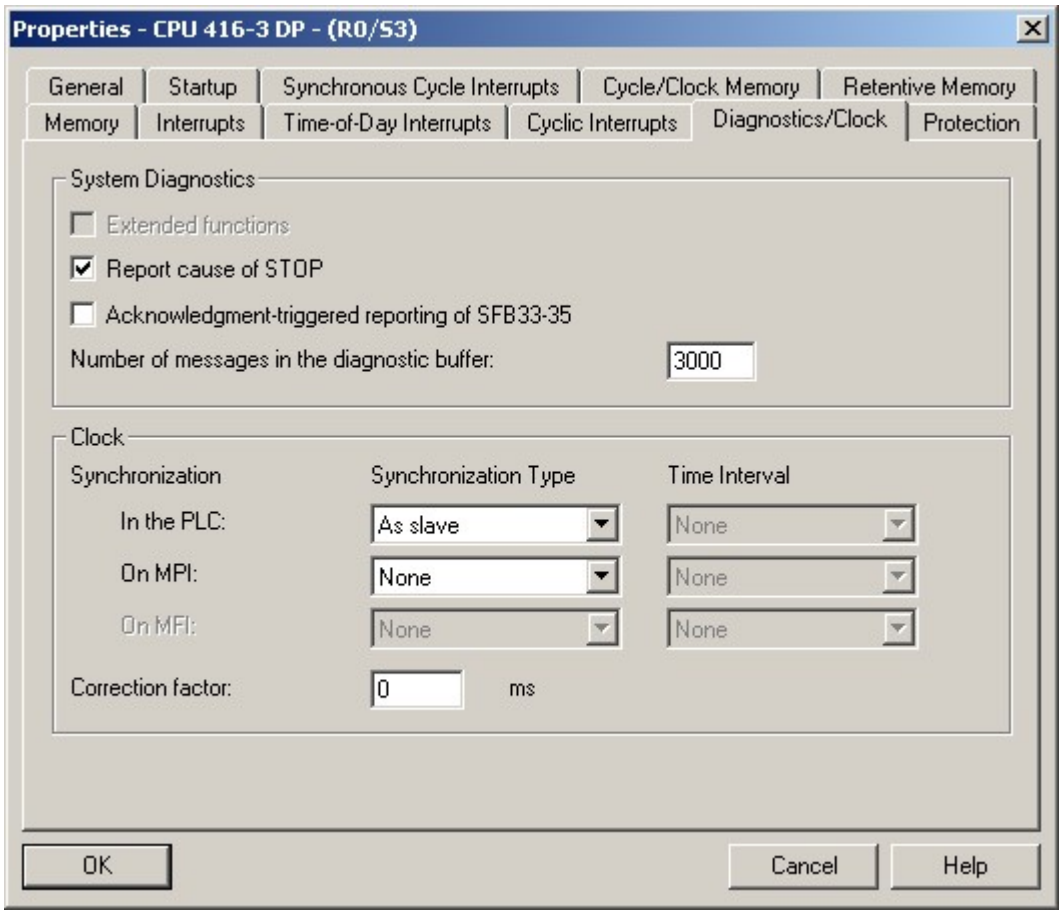
These are the minimum values for Local Data per each priority class. You have to check the required local data after completing the user program and modify the local data values if necessary.

Bigger CPUs probably have more memory for local data.

Please set the maximum Communication Jobs to 4000 if the type of CPU allows this.

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Settings in tab Diagnostics/Clock:

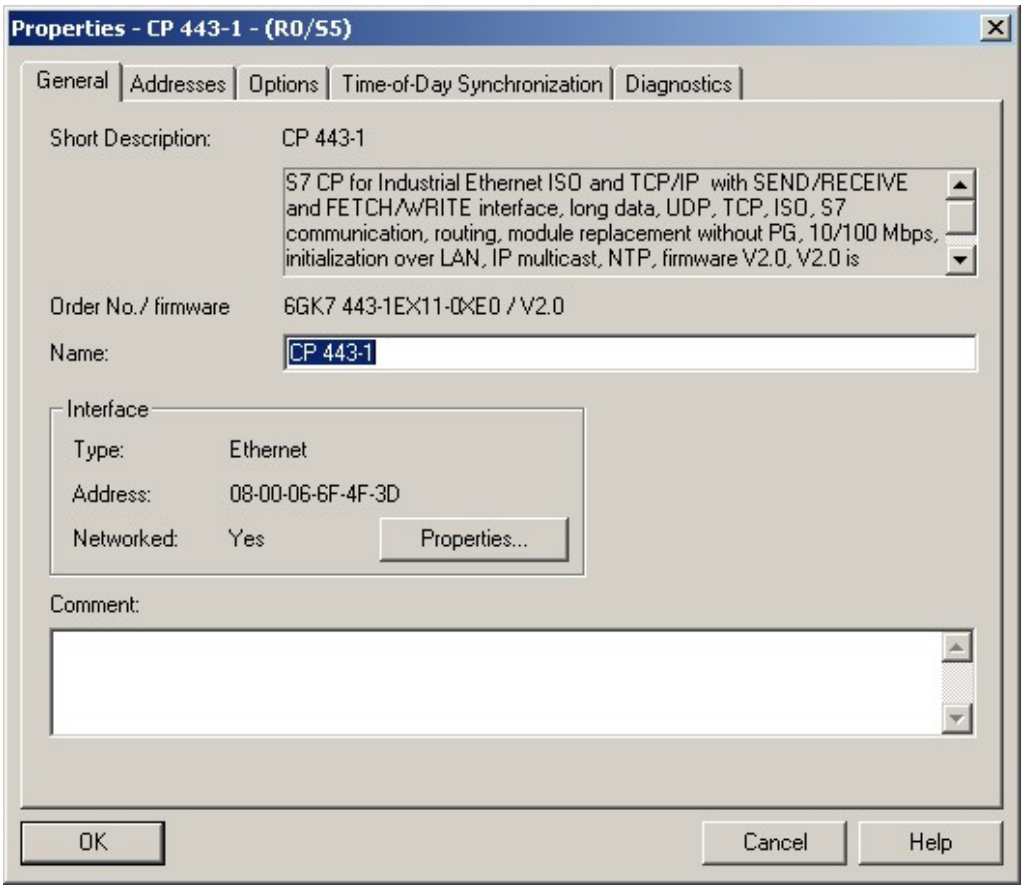


The AS synchronization type should be “As Slave”

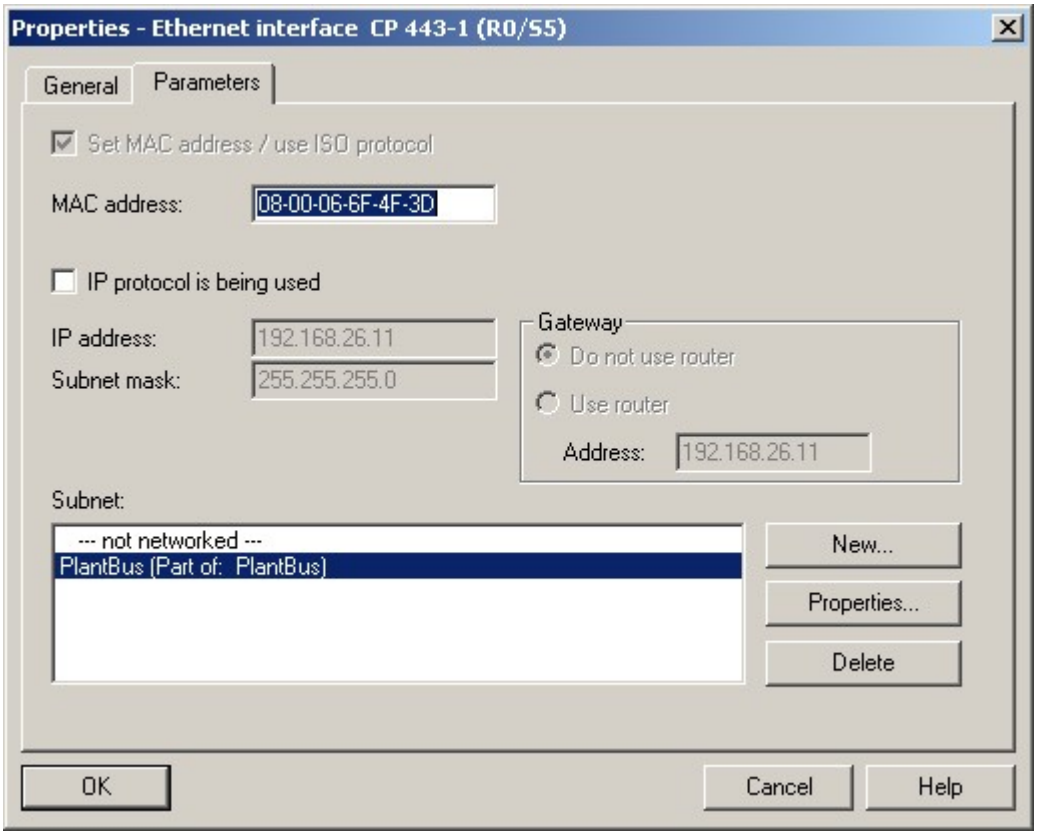
Note: In PCS7 V8.0 the AS always work with GMT.

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When dropping the CP443 connect the same to the Ethernet bus. If no Ethernet bus exists, create a new Ethernet bus and connect it to the CP443. Define the Ethernet Address for the AS, e. g. 08.00.06.6F.4F.3D (MAC Address).

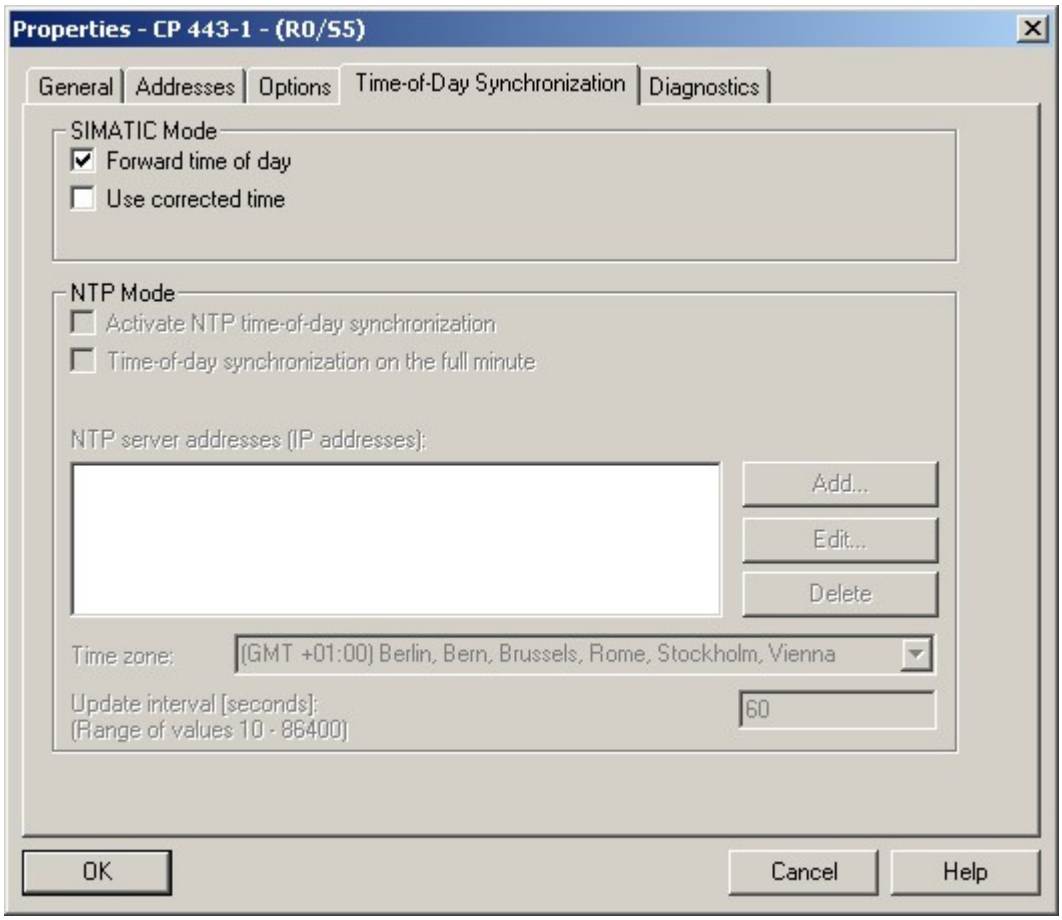


Properties for Ethernet interface:



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Under Options you have to activate the time-of-day synchronization:



Note: In PCS7 V8.0 the AS always work with GMT.

Define the I/O Periphery according to the plant configuration.

Save and Compile the hardware definitions and load it to the AS.

Rename S7-Program

Back in the SIMATIC Manager you see the elements of the Hardware Configuration (CPU, CP) under each AS Station. Below this you find the Program Container for the elements. For better identification we recommend to rename the S7 Program Container for the CPU (e. g. P_AS1).

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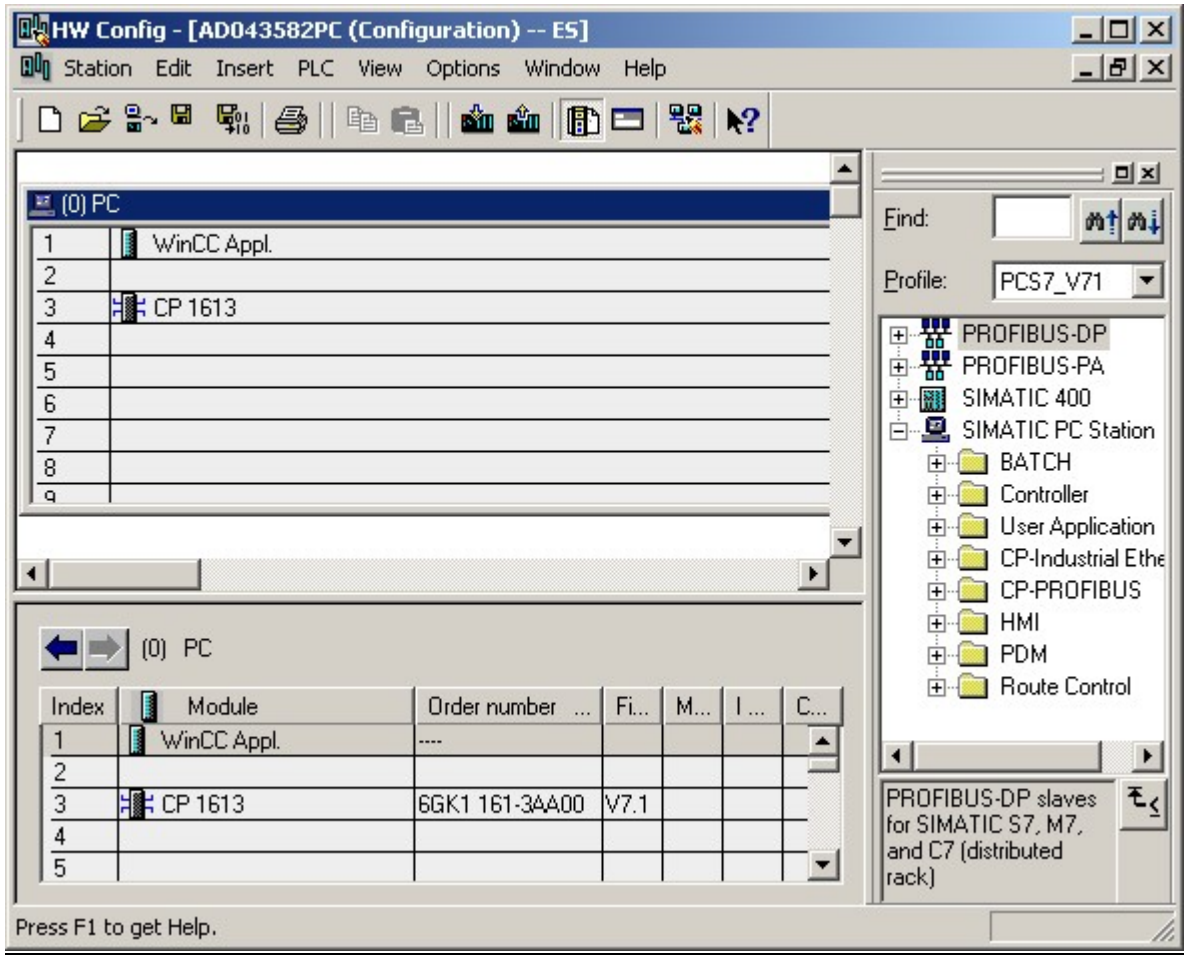
Configuration of a SIMATIC PC Station

The SIMATIC PC Stations (Single Station, Server, Standby-Server and Clients) have to be configured according to the Hardware of the PC.

Select the appropriate WinCC Application. Select the CP Industrial Ethernet for the Plant Bus communication according to the Hardware of your PC (CP1613 or IE General) The Index must be the same as the Index in the Configuration Editor. In the Properties for each CP configure the right addresses (MAC Address; IP Address).

Note: It is important to use exactly the same Configuration as it is defined with the commissioning wizard.

Example for the Configuration of the Engineering Station:

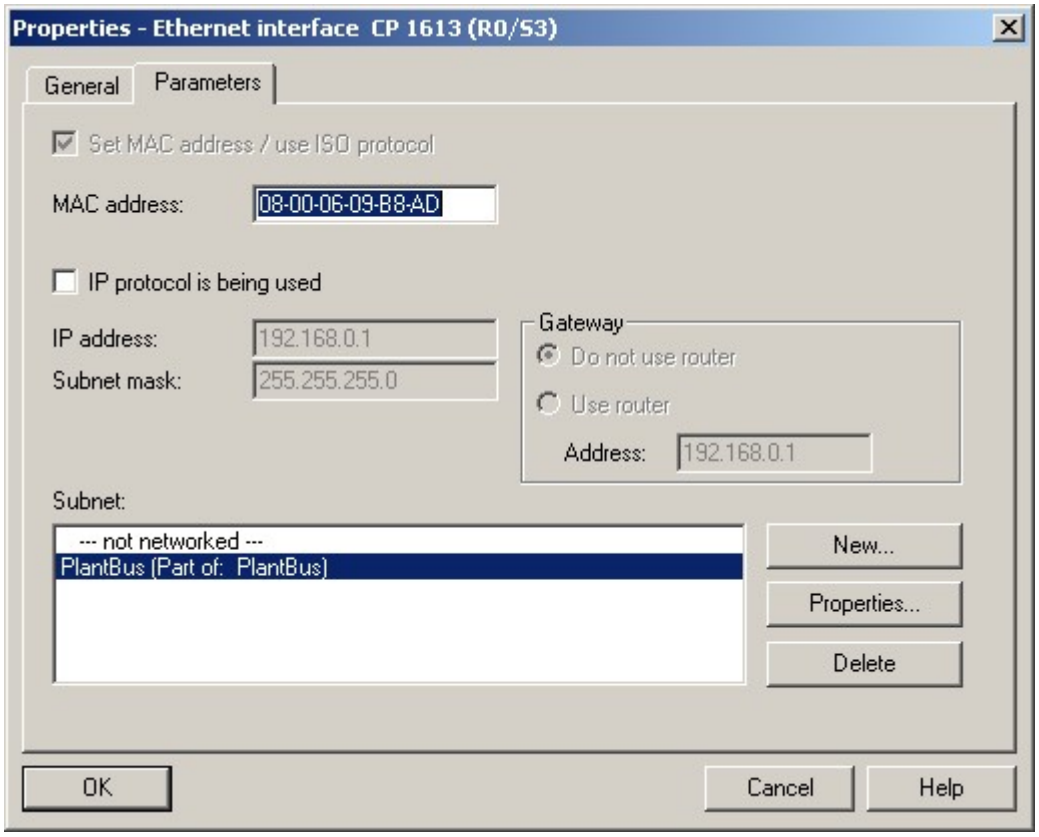


In some plants the Engineering Station has two CPs (one internal CP and one 3COM) but no CP1613. Instead of the CP1613 the 3COM is used for the communication to the Plant Bus.

In this case insert a CP "IE General" instead of CP1613 for the communication to the Plant bus. The CP for the communication to the Terminal bus must not be inserted in the Hardware Configuration.

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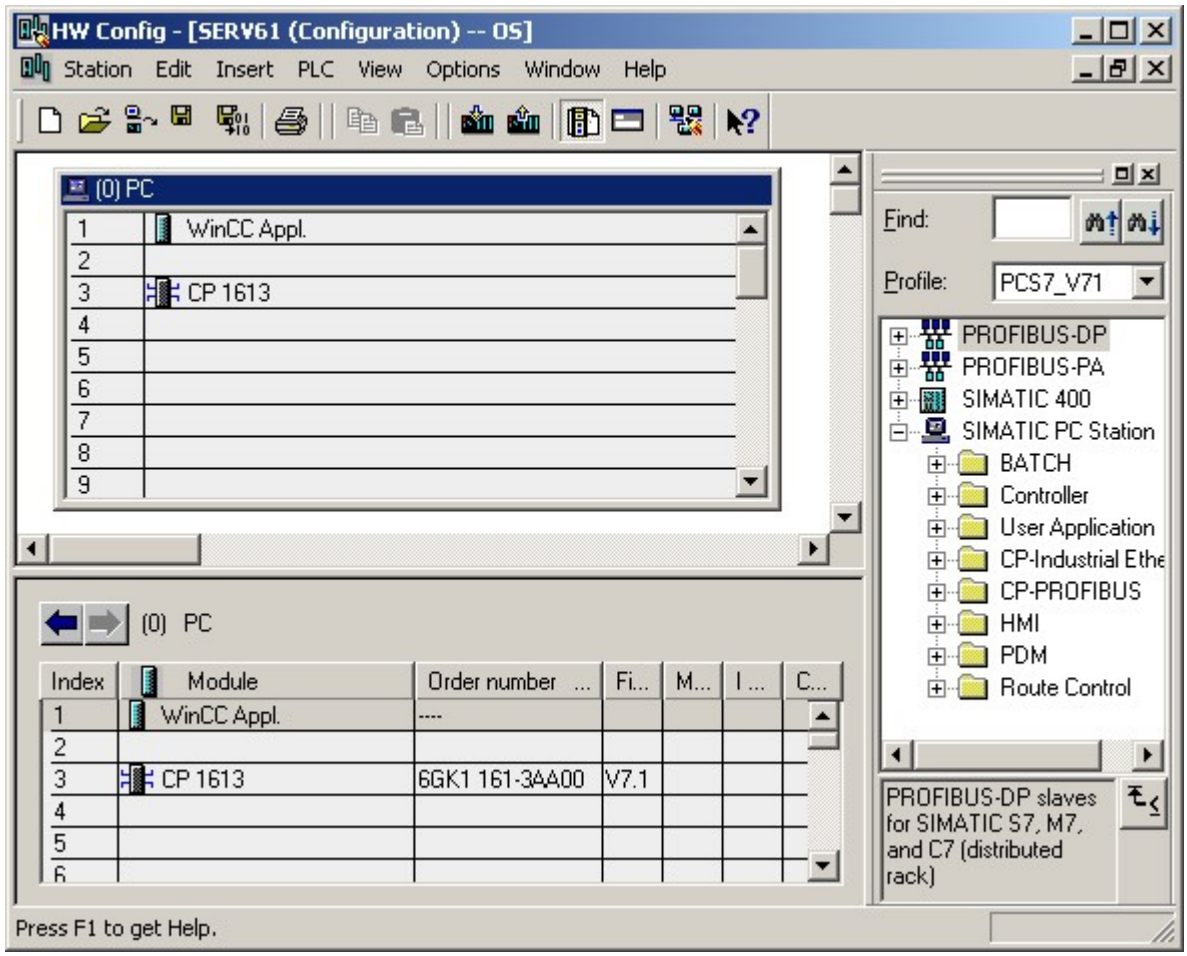
Select the *Object Properties* for the CP in order to enter the MAC address and connect it to the Plant Bus.



When saving the HW Configuration the OS-Project for the Engineering Station is created. Change the OS Project name (e.g. ES). Die OS Project name must be unique within the complete MultiProject.

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Example for the Configuration of a Single-User Station or a Server:



Select the *Object Properties* for the CP1613 in order to enter the MAC address and to connect it to the Plant Bus.

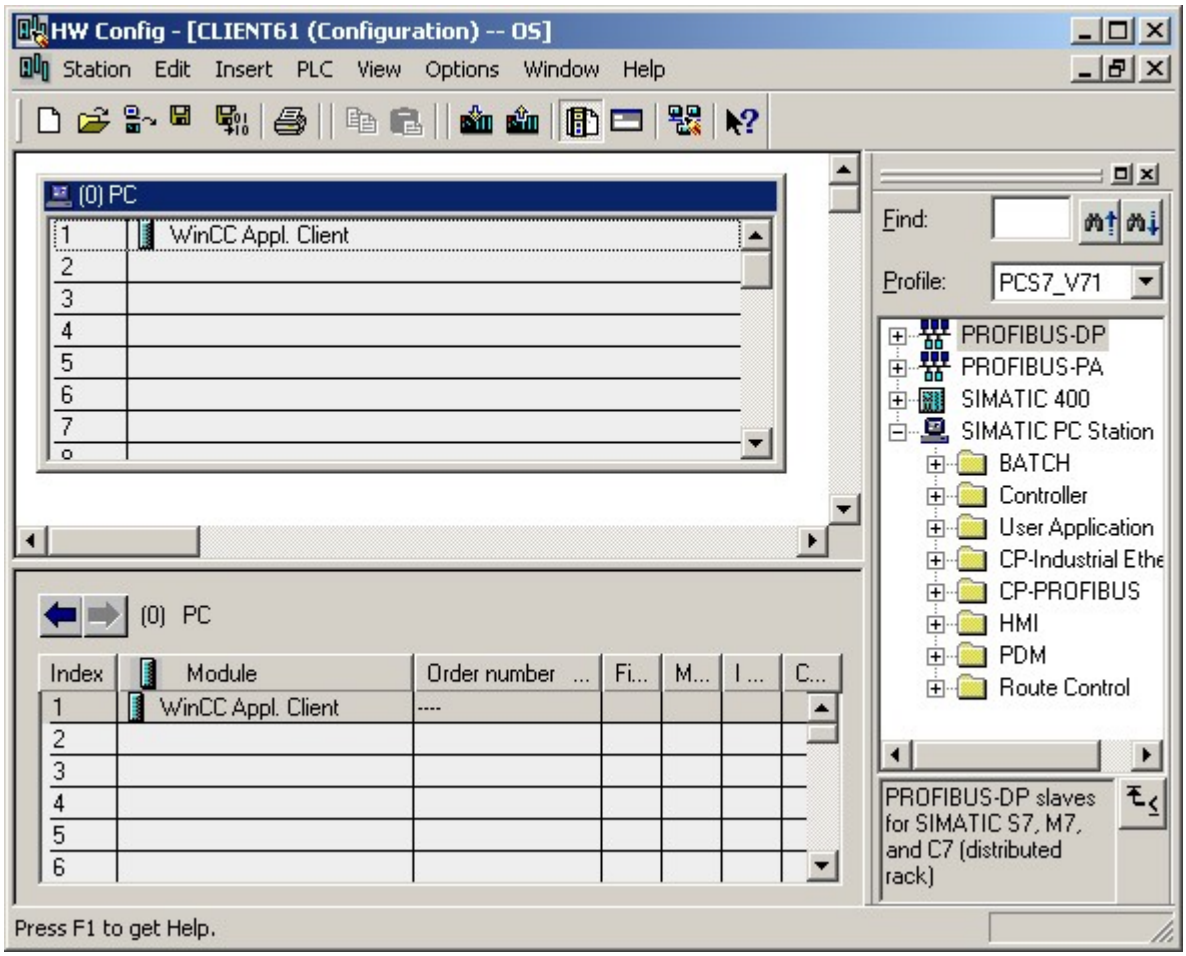
When saving the HW Configuration the OS-Project for the station is created.

Change the OS Project name (e.g. OSSRV). Die OS Project name must be unique within the complete MultiProject.

For the Standby-Server use WinCC Application (stby) instead of WinCC Application. The rest is identical to the Server Configuration.

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Example for the Configuration of an OS Client:



When saving the HW Configuration the OS-Project for the Client is created.

Change the OS Project name (e.g. OSC61). Die OS Project name must be unique within the complete MultiProject.

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Configuration of the Network Connections

After all the Stations are defined you have to configure the Network Connections for the Communication between the OS Stations and the AS Stations and for the Communication between AS.

The settings for the Network Connections between the AS are not part of this description.

This description only refers to the communication between the AS und OS Stations. For each Connection between AS and OS Station an S7-Connection must be configured.

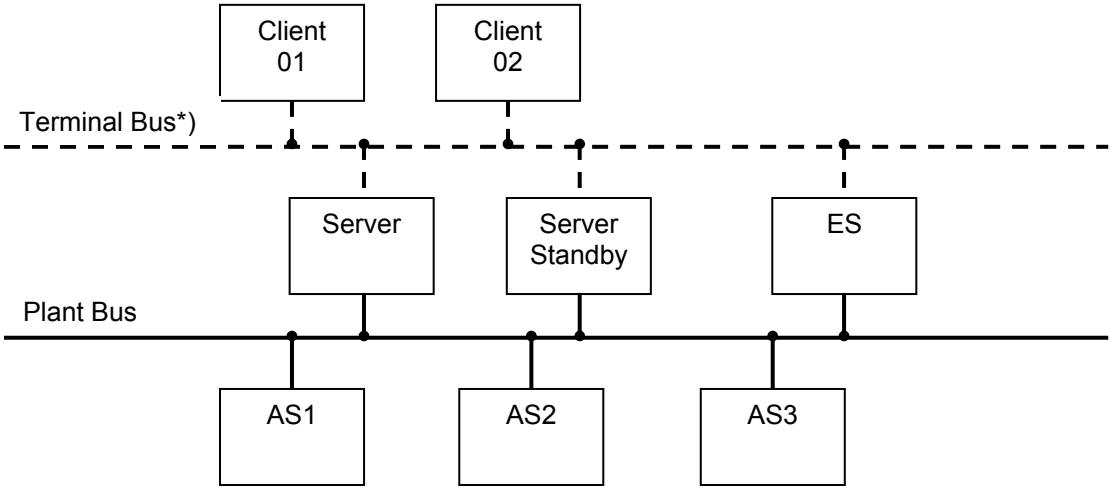
To define the connection, the CPs of the different Stations must be linked to an Ethernet Bus.

The CP of the AS is linked via “Plant Bus” or "Process Bus" to the Server Stations. For the Process Communication normally ISO Protocol is used.

The OS Clients are linked via “Terminal bus” to the Server Stations. In this Network usually TCP/IP Protocol is used.

In a complete Network this would look as follows:

Example with 3 AS, 1 redundant Server-Pair, 1 ES and 2 OS Clients:





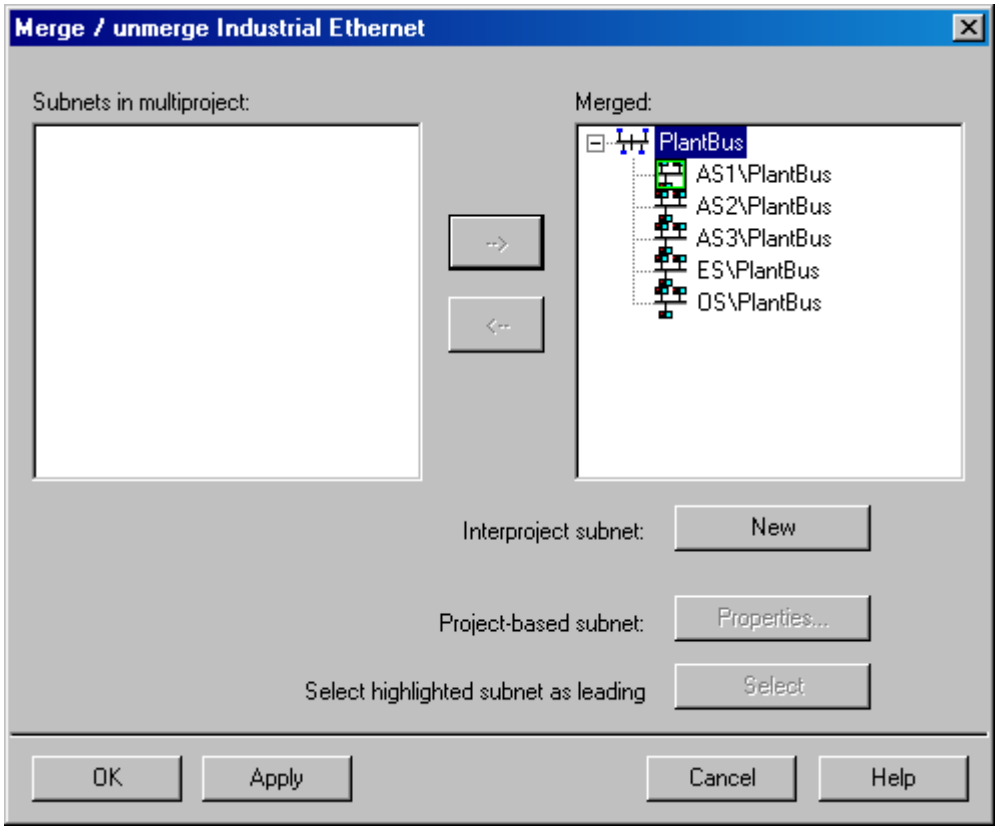
*) The CPs for the Terminal bus communication can not be displayed in the Network Configuration of PCS7, otherwise the Hardware cannot be downloaded to the PC Stations. For the communication to the Terminal bus no configuration in Netpro is needed.

In a Multiproject the Stations are often located in different Projects. Each Project has its Network Configuration which contains Ethernet Connections to Plant Bus or Terminal bus.

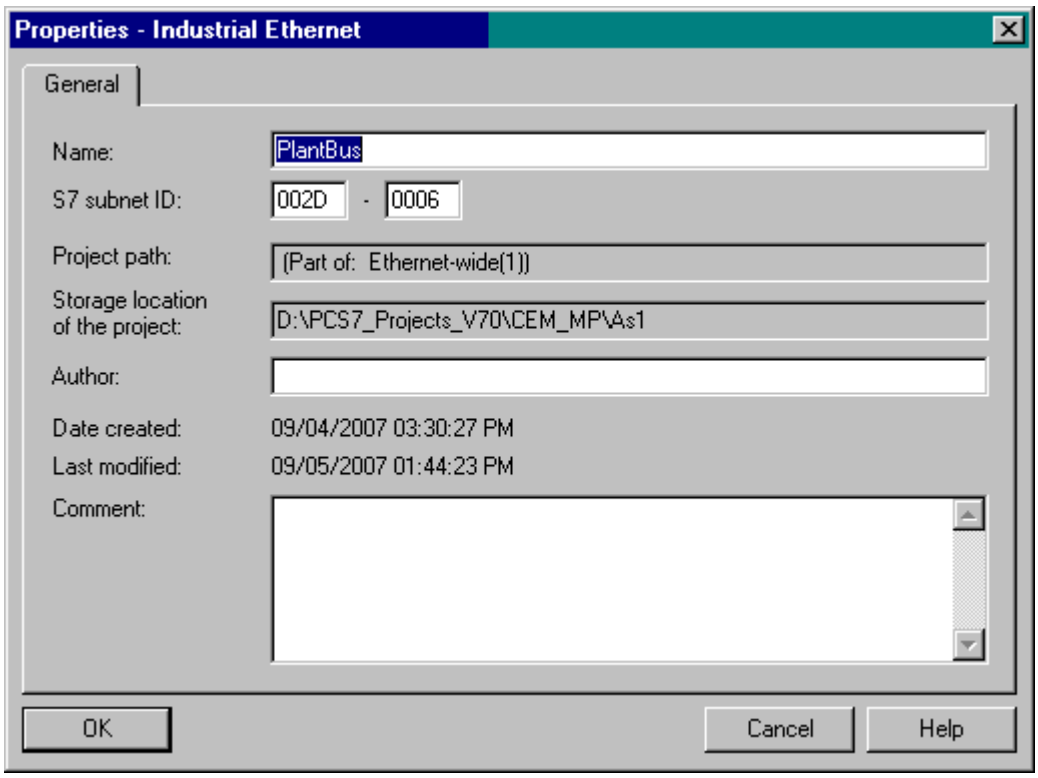
To enable a Network Connections between different Network Configurations the Buses must be merged. In the SIMATIC Manager you will find the merge function if you select the Multiproject and use right mouse button option *Multiproject → Adjust Projects*.

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Select Ethernet and press Execute and the Window for Industrial Ethernet merge/unmerge will open and allow you to combine the Ethernet buses from different Networks.

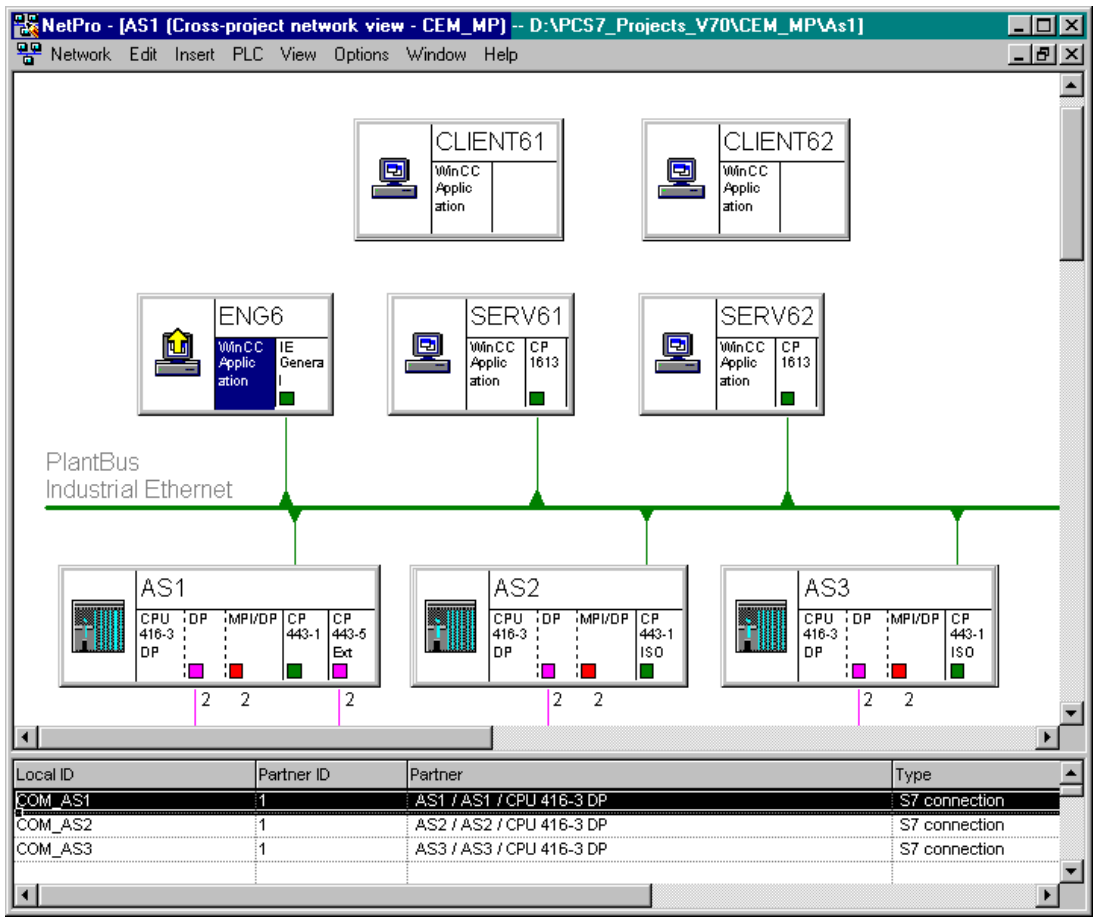


The highlighted subnet determines the global properties for the common Network. Under Properties you will find the S7 Subnet ID:



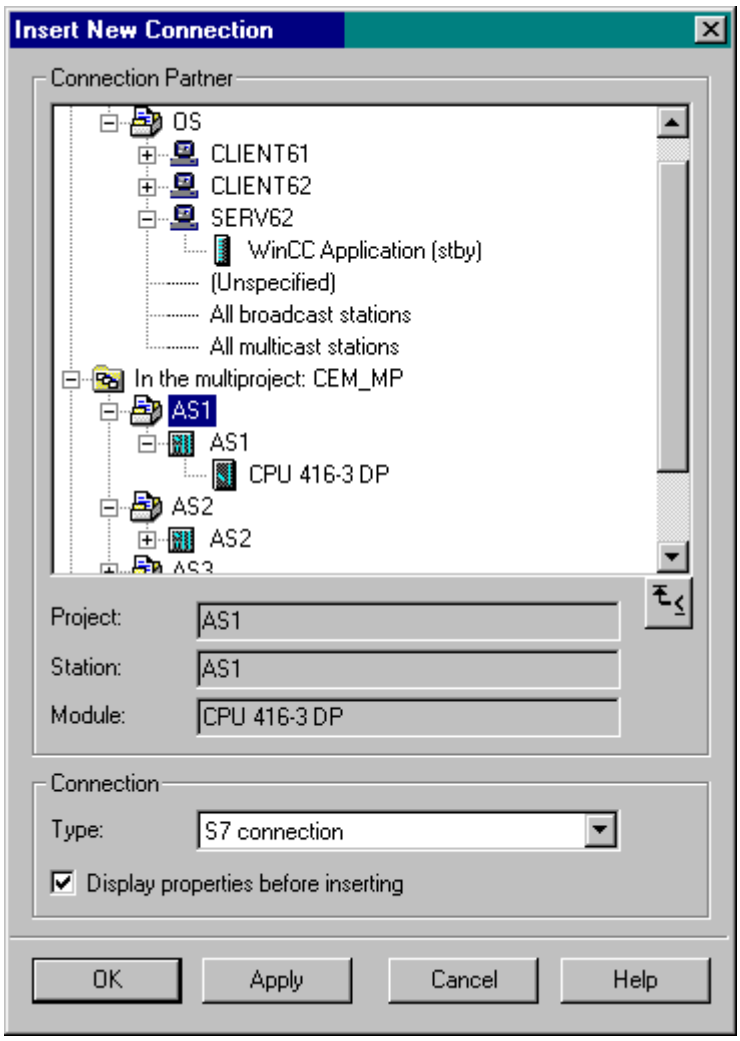
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After the Network is merged the Network Connections between OS Stations and the AS Stations can be defined.



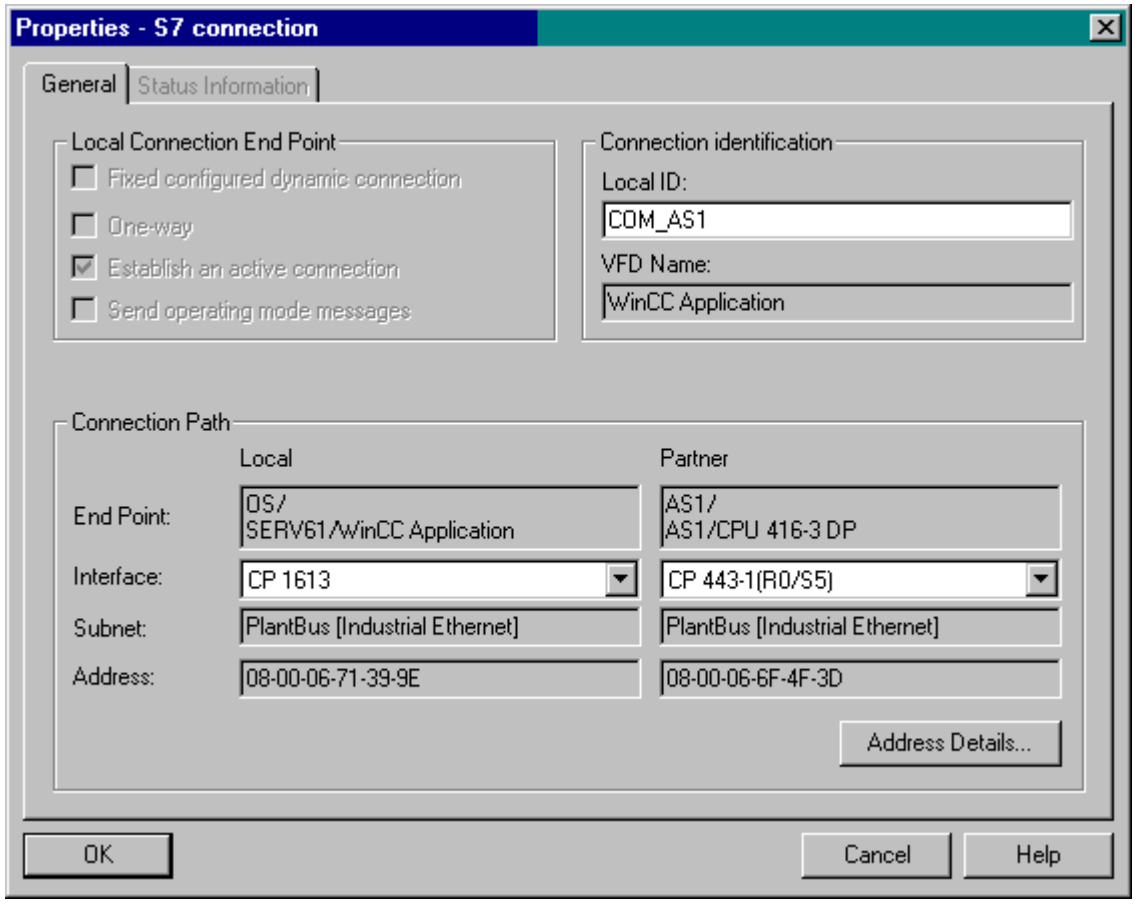
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To add the S7 connection, select the WinCC Application of the OS-Project or the CPU of the AS and use right mouse button for selection of “Insert New Connection”.



Select the AS (or the WinCC Application of the OS) and press Apply. Save with ok.

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We recommend to change the Connection identification for Local ID from S7 connection_1 into a more meaningful name, e. g. COM_AS1.

Note: The Connection identification for Local ID must be identical for the connection of all OS-Projects to this AS.
Example:
COM_AS1 for the Communication to AS1
COM_AS2 for the Communication to AS2
COM_AS3 for the Communication to AS3
etc.
The name will be used as Connection Name in the OS Compile for “Named Connections”.

Confirm the Settings with OK.

Enter the Network Connections between all the OS Stations (Server, Standby-Server and Single Station) and the AS.

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Download for HW Configuration and Network Connections

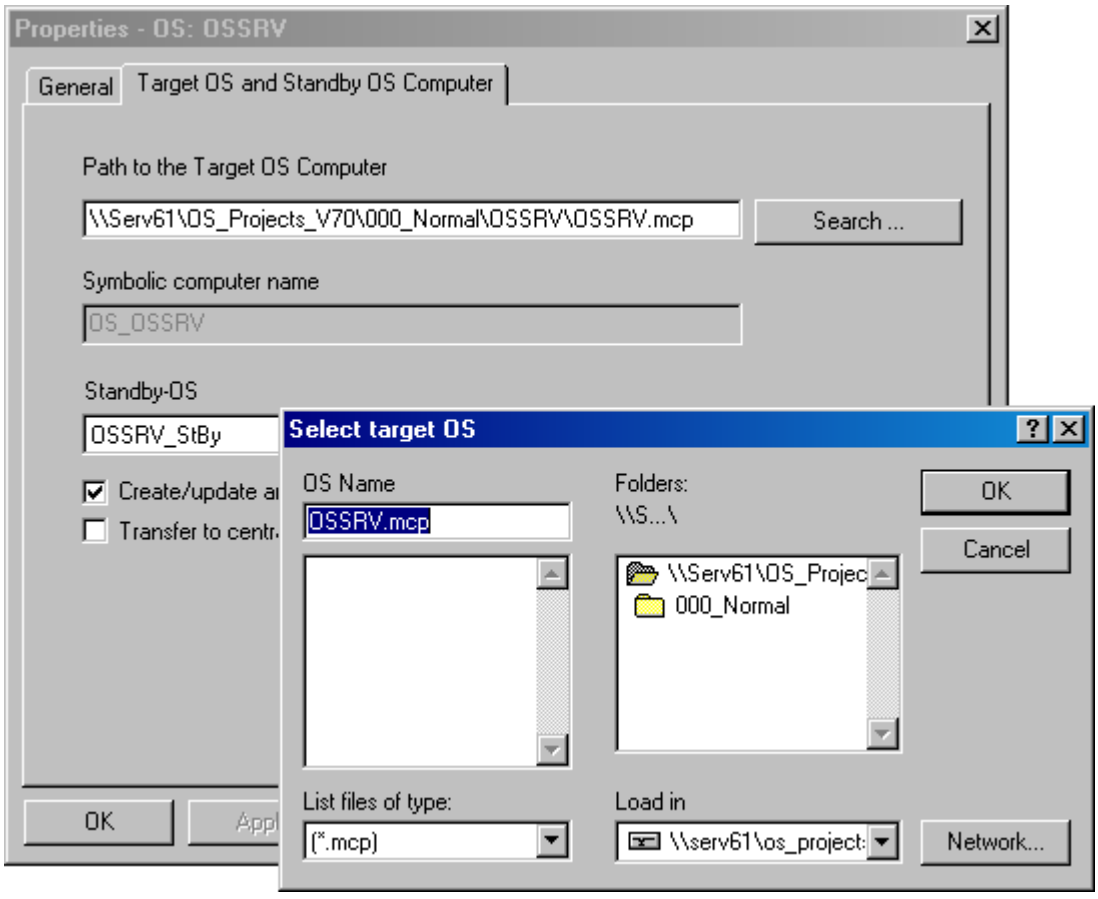
After the Station Configuration is finished and the Network Connections are complete the Configuration Data has to be transferred to the AS Stations and to the OS Stations.

Before this can be done, a few preparations are required:

In the SIMATIC Manager select the OS-Project for each Station and go to Object Properties

- For the Server
  select the Path to the Target OS Computer
  select the Standby-OS
- For the Standby-Server
  select the Path to the Target OS Computer
  the Primary Server is already selected
- For the Single Stations and OS Clients
  select the Path to the Target OS Computer

Example for selection of the target OS:



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Download

1. Before you can download the configuration you have to select the Access Path to PC internal (local).
2. For the Download to the Stations always start with the Engineering Station. The Network Configuration for the Engineering Station has to be exact in order to enable the Download to the AS Stations and to the other PC Stations.

   Check the Configuration Editor to be sure that everything is configured correctly!
3. Download the Hardware Configuration to the AS.
4. Download the Network Configuration to the AS
5. Download the Hardware Configuration for each PC Station (Single Station, Server, Standby-Server) and double-check the Configuration Editor on each Target Station in order to make sure that the configuration is correct.
6. The OS Clients don't have a Configuration Editor and the Connection via Terminal bus is not configured at all. For this reason the Hardware Configuration must not be downloaded to the OS Clients!

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Plant Structure definition

In the component view of the SIMATIC Manager the Stations were inserted and the plant configuration was defined. Now you have to use the plant view or the process object view of the SIMATIC Manager to structure the plant according to technological criteria.

In the plant view the plant is structured technologically into plant sections (AREA), as in the example into Raw Mill, Kiln, Cement Mill. Coincidentally we have only one Area per AS but there could be several areas as well.

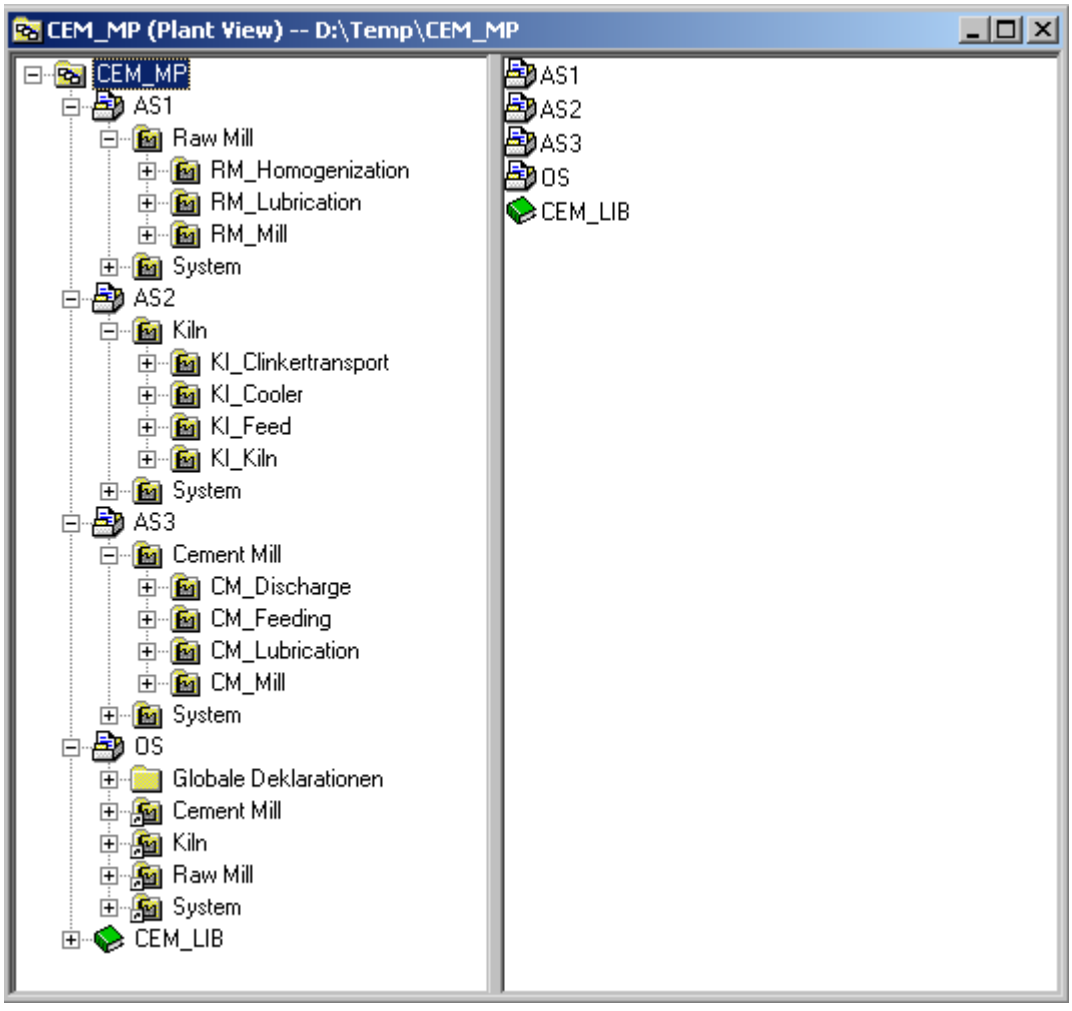
Typically the first hierarchy folder is defined as AREA (there are other options in PCS7 but they are less useful).



Caution: The plant structure is later on used in the overview area of the OS system. Therefore it is extremely important to consider the picture hierarchy from the very beginning. The areas are shown in the selections buttons of the overview area and user rights can be given per area. Also the messages are filtered per area.

Below the areas there can be units, to which you may assign detail pictures. Please make sure that the CFCs area assigned to the correct units, otherwise the summarizing indication in the overview area will not work.

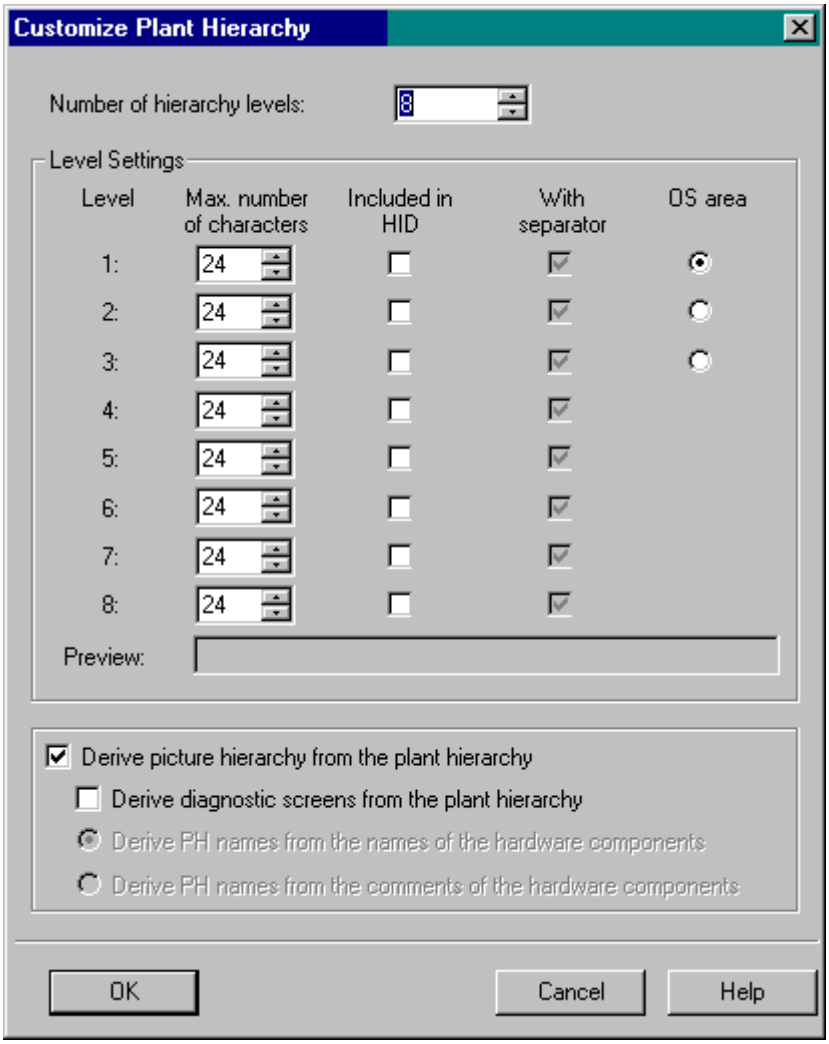
Example:



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The names of the hierarchy folders can be limited for maximum number of characters. The names can be included completely or partly for the designation system.

The settings for max. number of hierarchy folders, max. number of characters, include in designation you will find if you select a hierarchy folder with the right mouse button and use *Options -> Plant Hierarchy -> Customize.*



For a Cement plant 3 hierarchy folders should be (more than) enough. For the diagnostic of the hardware up to 8 hierarchy levels are required. If you want to derive the diagnostic screens from the plant hierarchy, you have to select the function "Derive diagnostic screens from the plant hierarchy".

With the OS Area you specify which Hierarchy level is used the Selection Buttons in the Overview Area. Also the Operator right can later on be specified per Area.

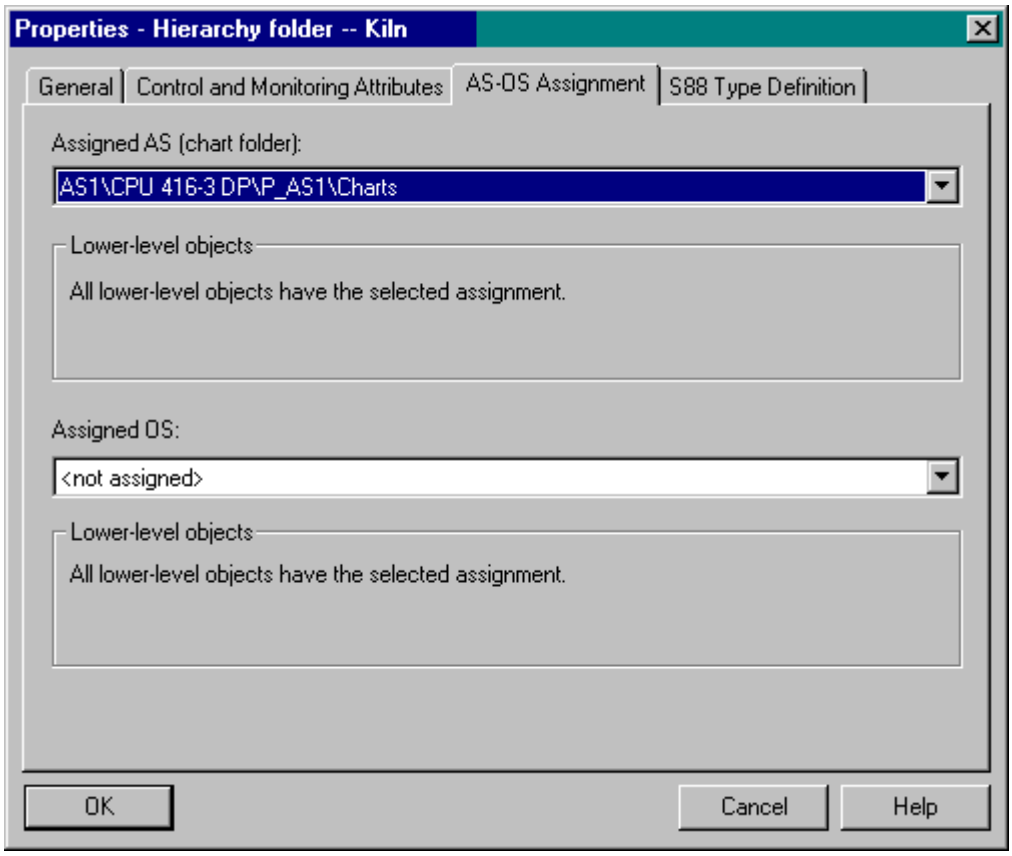
The picture hierarchy must be derived from the plant hierarchy. Otherwise some functions can not be guaranteed any more. During OS Compile the WinCC Picture tree is then generated automatically.

We don't recommend including the Hierarchy folder name in the Tagging system because the tagnames would be too long.

Note: If you insist to include the Hierarchy folder name in the tagging system you have to deselect this option for the System Chart. This is done in the Properties of the Hierarchy folder under "Control and Monitoring Attributes".

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Before a CFC or SFC can be inserted in the Plant View or the Process Object View the Hierarchy folder has to be assigned to a chart folder in a AS. Before Pictures can be inserted in the Plant View the OS assignment is required.
Select the hierarchy folder and open the object properties. Use tab *AS and OS assignment* to select the chart folder for the assigned AS and the assigned OS.



All Elements you add to this hierarchy folder will be assigned to this AS/OS. If you pass the Selected Assignments to the Lower-level Objects, the subordinated hierarchy folders get the same AS/OS Assignment.



Important: Always use the Plant view or Process Object view for creating new elements (CFC, SFC, Pictures). If you create the elements in the component view, the plant assignation will be missing.
Exception: Pictures which shall not appear in the overview must be assigned directly to the OS-Project (in the component view).

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Create a Project library

Before you start with the configuration of the individual AS, you have to create a project library, which must contain the latest version of all standard symbols, blocks and template charts (control module types or process tag types) which are used later on in the program.

The project library contains at all symbols, blocks and charts from the CEMAT library. It may also contain additional blocks and template charts.

During the installation of CEMAT the CEMAT libraries were installed in directory C:\….\SIEMENS\STEP7\S7LIBS:

The CEMAT library 'Minerals' contains the S7-Program 'Minerals_Cemat' with the standard symbols, blocks and charts for the Minerals library.

The CEMAT library 'ILS_CEM' contains the S7-Program 'CEM_ALL', with standard symbols, blocks and charts for Normal Cemat (Basic version).

In order to create the project library proceed as follows:

At the moment the project library does not contain an S7 program or it contains an empty S7 program folder (in case the wizard was used to generate the project). In the second case you have to delete the S7 program folder.

Then copy the complete S7 program folder 'Minerals_Cemat' of the library 'Minerals' (including all symbols, blocks and charts) into your project library.

The program folder of the Project library can be renamed, e. g. to P_LIB.

If you need further blocks from other libraries, e. g. from 'ILS_CEM' or from 'PCS7_AP_Library_V80', you must also copy these blocks into the project library.

After this you have to create the template charts for your project. Three sets of template charts are available with the Cemat delivery:

Typicals_Set1: Basic settings with Field switch with Repair switch function

Typicals_Set2: Extended settings with Field switch with Repair switch function

Typicals_Set3: Basic settings with Field switch as Selector Local/Automatic mode



For further information regarding template charts see chapter AS_Engineering under 'Creating Master Library'.

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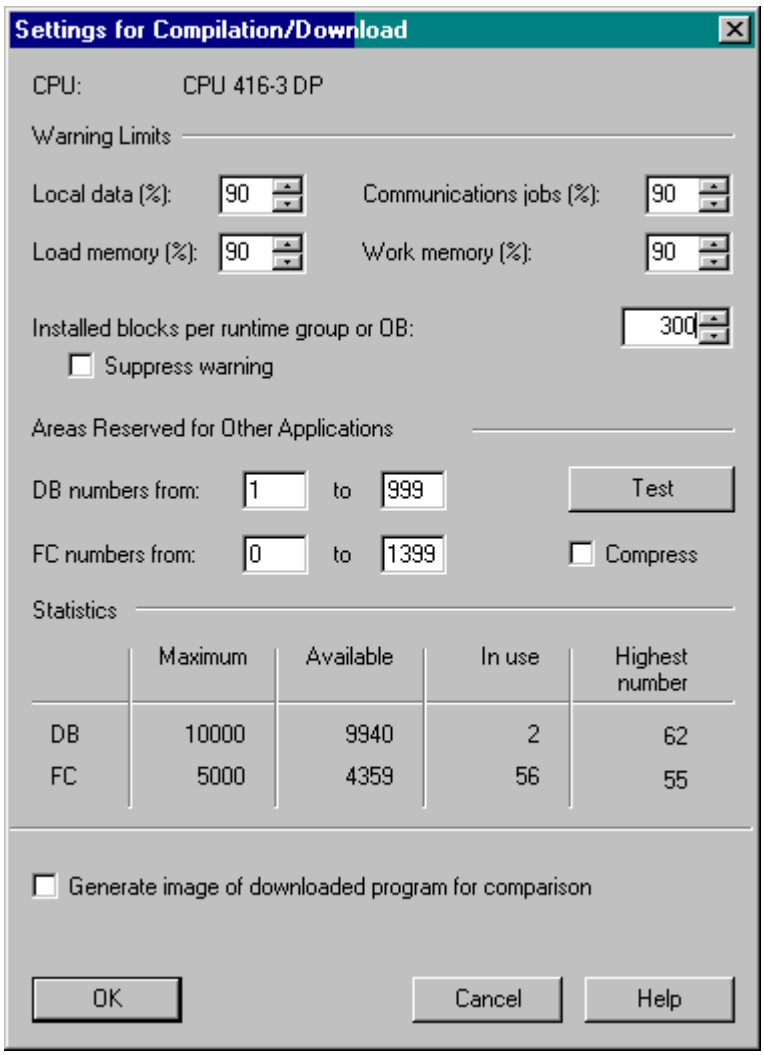
AS Configuration

Preparations for programming with the CFC

The following settings have to be carried out in the CFC Editor. This is only possible if a CFC exists. Therefore in the component view open the chart folder of your AS and create a new (Dummy-)CFC. With a double-click on the CFC the CFC editor will open.

Define illegal Ranges for CFC blocks:

Under *Options -> Customize -> Compilation/Download* you have to define the illegal ranges:



DB 1 to 999
FC 0 to 1399

The default value for Installed blocks per runtime group is 50. This leads to warnings during the compilation of the CFC. You can increase this number (e.g. to 300).

Confirm with ok. A window appears which tells you that the CFC is already using the area which is reserved for other applications. Confirm this as well in order to accept the changes.

The (Dummy-)CFC which you have created in the component view was only needed in order to make the settings in the CFC-Editor. You can delete it now.

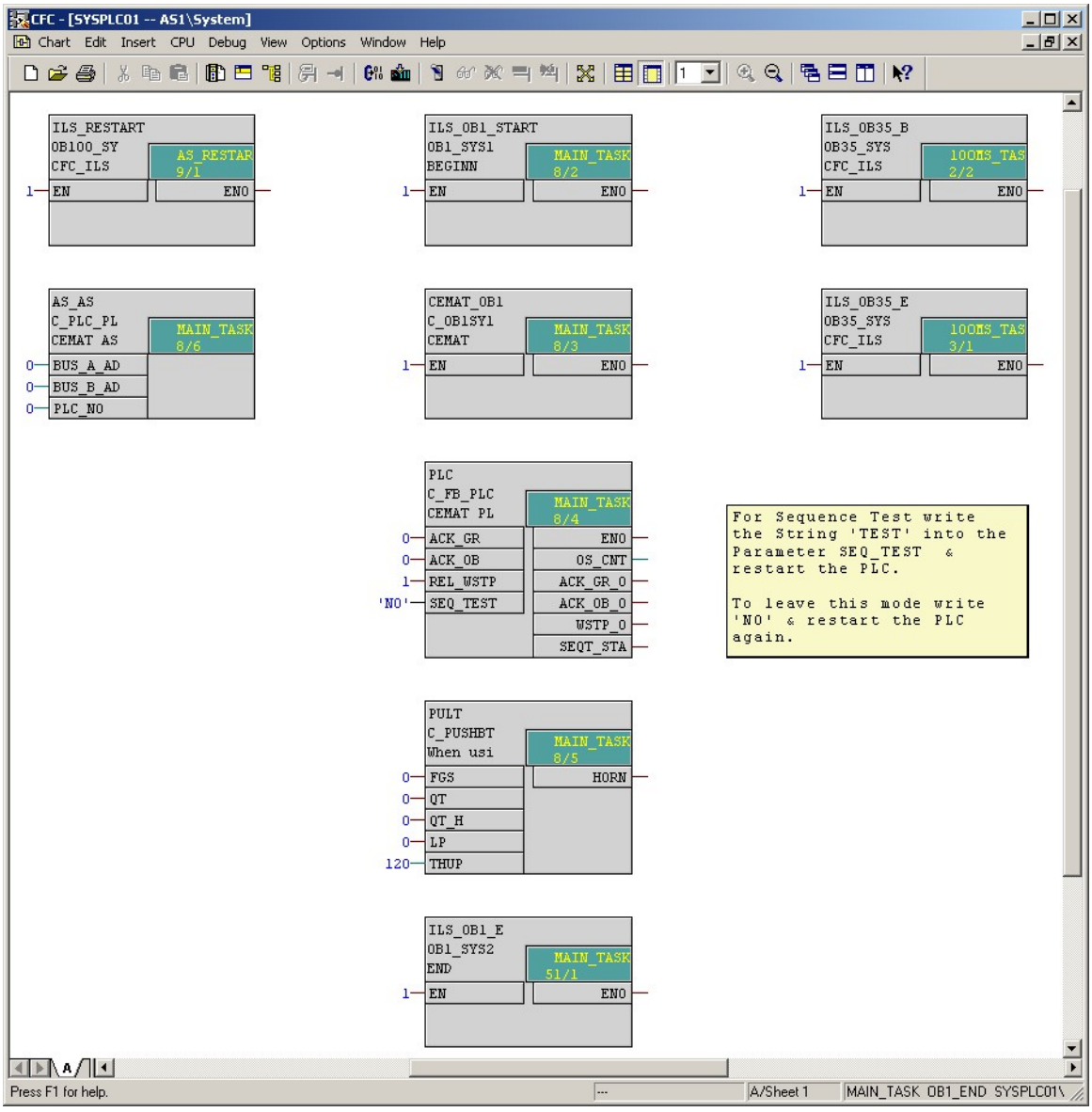
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Copy Standard Symbols and blocks into the PCS7 Project

After the project library was created which contains all symbols, blocks and charts for CEMAT, you can copy this to the AS.

1. Copy first the symbols from the project library into the S7 Program Container of your AS. As the AS does not contain any symbols, you can copy the complete SYMBOLS from the program folder of the project library into the program folder of the AS.
2. Copy all blocks from the project library into the block Container of your AS.
3. Copy the system chart into the AS. The chart must be copied in the plant view!

   In the chart folder of your project library you will find the system chart SYSPLC00. This system chart is required once in each AS.



First define in the plant view a hierarchy folder for the system chart. Then copy the system chart from the library into this hierarchy folder. Change the name of the system chart according to the AS number (e. g. SYSPLC02).

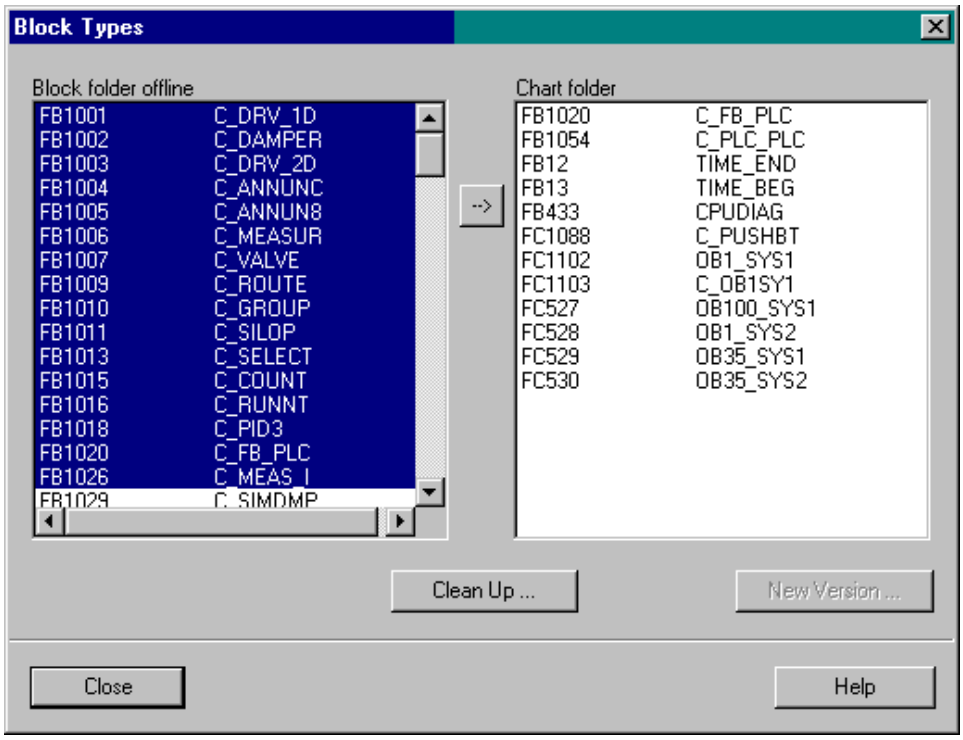
HOLCIM Standard: Parameter REL_WSTP at block C_FB_PLC must be set to 0-Signal. Otherwise the group start will be interrupted in case of a warning:

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Caution: Block C_PLC_PLC must only be configured if the CEMAT AS-AS-Coupling is used (for communications to older CEMAT systems, e.g. CEMAT V4). **Only in this case** change Parameter PLC_NO into the PLC-NO of the own AS. The CP-Address of the CP443 for Bus A and Bus B (e. g. 16372 and 16376) must then be entered into the parameters BUS_A_AD and BUS_B_AD.
The function block is called once in the restart (PLC_RESTART) and once in OB1 (MAIN_TASK). For detailed description see chapter AS-AS-Coupling.

4. With the following procedure all Cemat blocks which are used in the CFC later on will be copied to the chart folder. After this you will find them in the CFC Editor under Katalog CEMAT:

   In the CFC-Editor go to *Options -> Block types*. Select the blocks from the offline block folder and copy it into the chart folder:



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5. List of blocks, which have to be copied into the chart folder:

Absolute	Symbol	Task
FB1001	C_DRV_1D	OB1
FB1002	C_DAMPER	OB1
FB1003	C_DRV_2D	OB1
FB1004	C_ANNUNC	OB1
FB1005	C_ANNUN8	OB1
FB1006	C_MEASUR	OB1
FB1007	C_VALVE	OB1
FB1008	C_PROFB	OB1
FB1009	C_ROUTE	OB1
FB1010	C_GROUP	OB1
FB1013	C_SELECT	OB1
FB1021	C_MAX_CYC	
FB1034	C_SIMOS	OB1

Absolute	Symbol	Task
FB1036	C_STO_MA	OB1
FB1037	C_STORAG	OB1
FB1038	C_ANA_SEL	OB1
FB1039	C_POLY3	OB1
FB1055	C_SEND_G	OB1
FB1056	C_RECV_G	OB1
FB1060	C_ODA	OB1
FB1075	C_INTERL	OB1
FB1076	C_INTER5	OB1
FB1077	C_RelMod	OB1
FC1017	C_MUX	OB1
FC1018	C_ADAPT	OB1

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Compile and Download CFC

Once the configuration settings have been made in the system chart the AS Program is loadable and executable.



Warning: To start the AS with the Programmer only **Warm Restart** is allowed!

After these steps you can start with the AS Engineering. In chapter 6 of this manual “AS Engineering” you find some additional advises.

You may also continue with the configuration of the OS System. To enable the OS compile, the compile of the CFC must be carried out before. For the first time a complete compile is required.

OS Compile

Compile the OS (for all Servers and Single User Systems). With the OS Compile, in the Tag Management of the OS the driver SIMATIC S7 PROTOCOL SUITE is added. Under “Named connections” you will find the variables of the group instance list and of the System chart.

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OS Configuration (Single-User System)

The WinCC Project (OS-Project) for the Single-User System was already defined with the SIMATIC Manager or Network Configuration. The following settings have to be carried out in the OS-Project, which means you have to open WinCC. This can be done directly from the SIMATIC Manager through selection of the OS with right mouse button and *Open Object* of from the Start Menu under *Start -> Simatic -> WinCC -> WinCC Explorer*.



Important: The following steps must be carried out from the beginning in the engineering language, which is used for the project. If you change the language afterwards the language dependent setting must be repeated.
The language settings in SIMATIC Manager are not consistent with the settings for WinCC!!

Project Properties

Adaptations for the Project itself can be carried out under Properties.

Folder “General” contains the Project Type.
Generating a new OS-Project of type “WinCC Application“ automatically a “Multi-User Project” is created. As in a Single User System no Server License is available you have to select the Project type Single-User Project.



Note: Don’t delete the startup list!

In Folder “Update Cycles” the time values for the Update cycles are defined. The CEMAT Symbols generally use “User Cycle 1”. The default value of this is 2000ms. You have to adapt this value according to your requirement, e.g. 1000ms.

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OS Project Editor

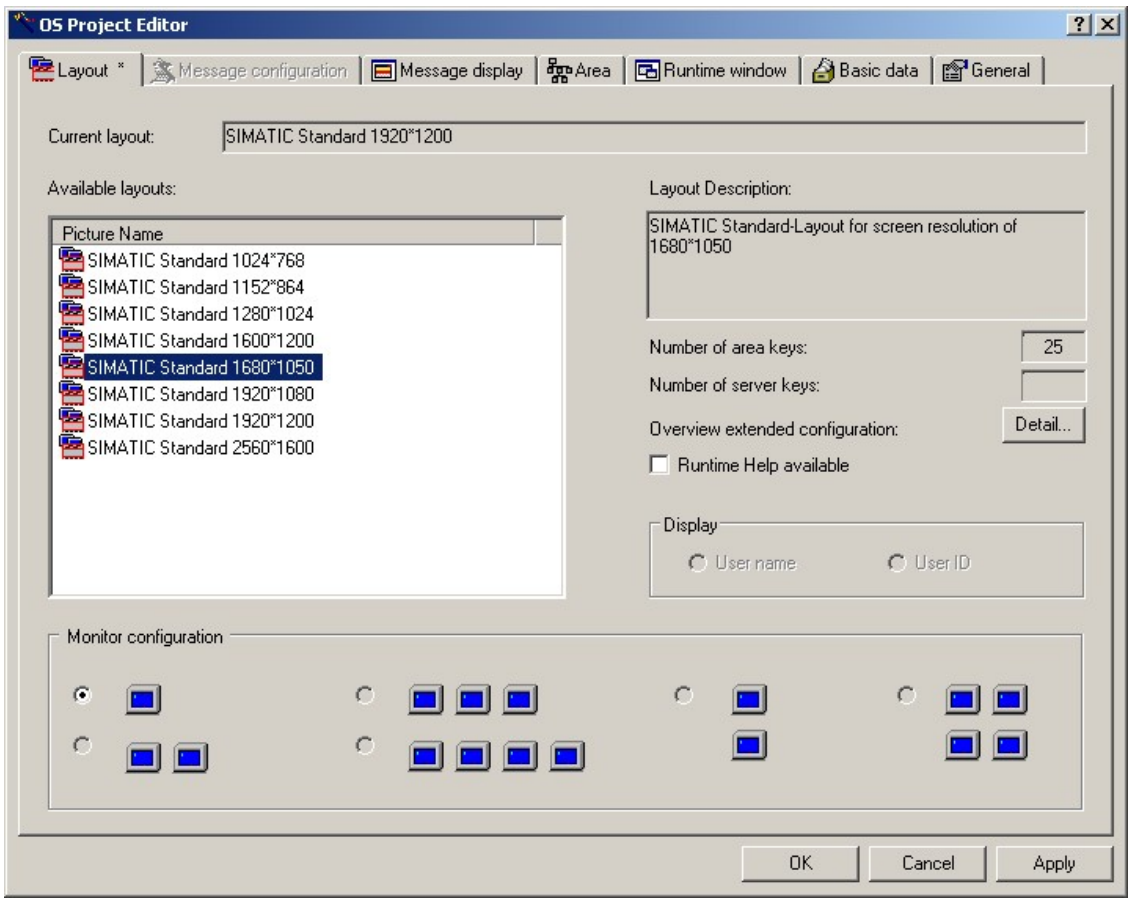
Settings for the user interface used by the plant operator for monitoring and controlling the plant during process operation In the OS Project Editor.

A detailed description to this item you find in the PCS7 Configuration Manual Operator Station. The following pages describe only the settings relevant for CEMAT.

In Tab Layout choose the screen resolution according to your Monitor. In Cemat V8.0 the default resolution is 1920x1080, but the Cemat Standard pictures are also available for 1280x1024, 1600x1200, 1680x1050 and 1920x1200.

Also select the Number of horizontal and vertical area keys under Detail (Picture Tree) and the Monitor Configuration of your PC.

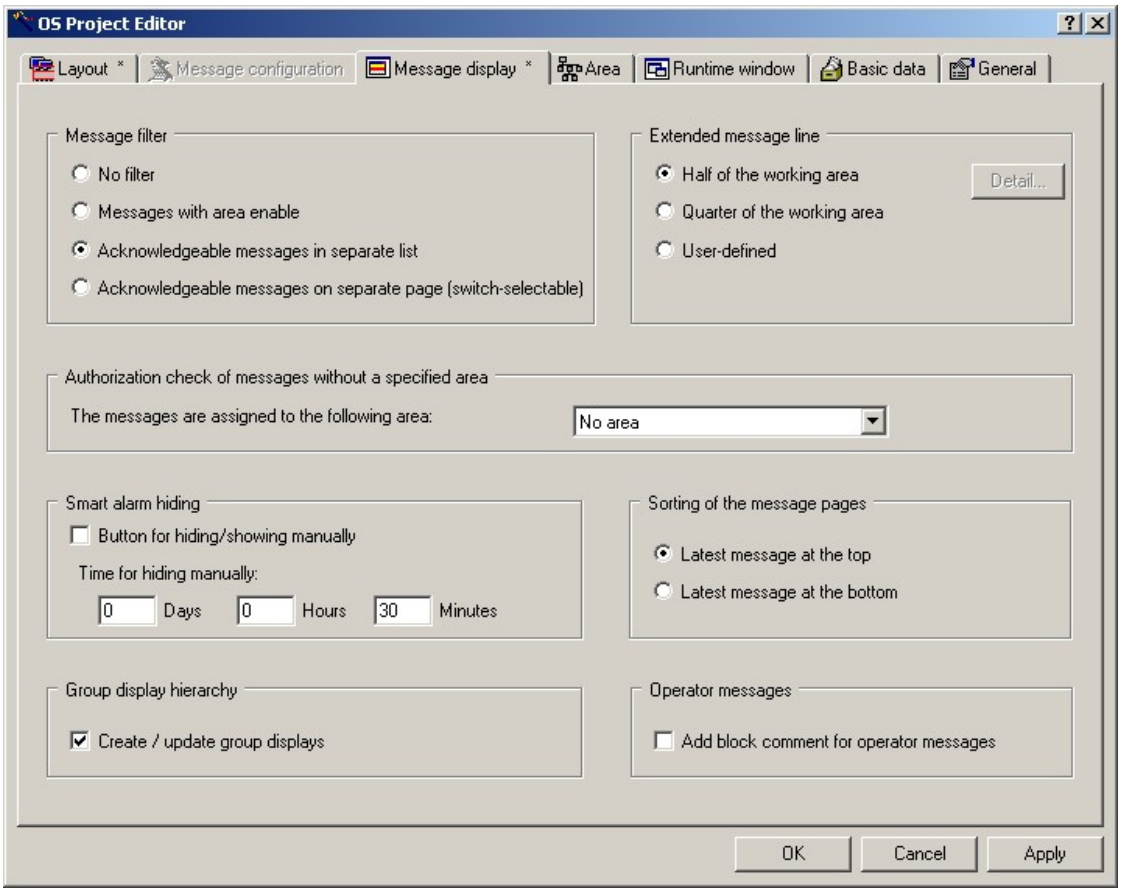
Example for the Layout of a Single Station:



Note: If you select a different screen resolution (1280x1024, 1600x1200, 1680x1050 or 1920x1200), the standard pictures @AlarmOneLine.pdl, @TopAlarmNew.pdl, @C_AlarmListing_Cemat.pdl, @AlarmEmergency.pdl, @AlarmEmergencyOP.pdl and @Overview1.pdl have to be exchanged.

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Message display for a Single Station:



The Message filter has to be set to “Acknowledgeable messages in separate list”.

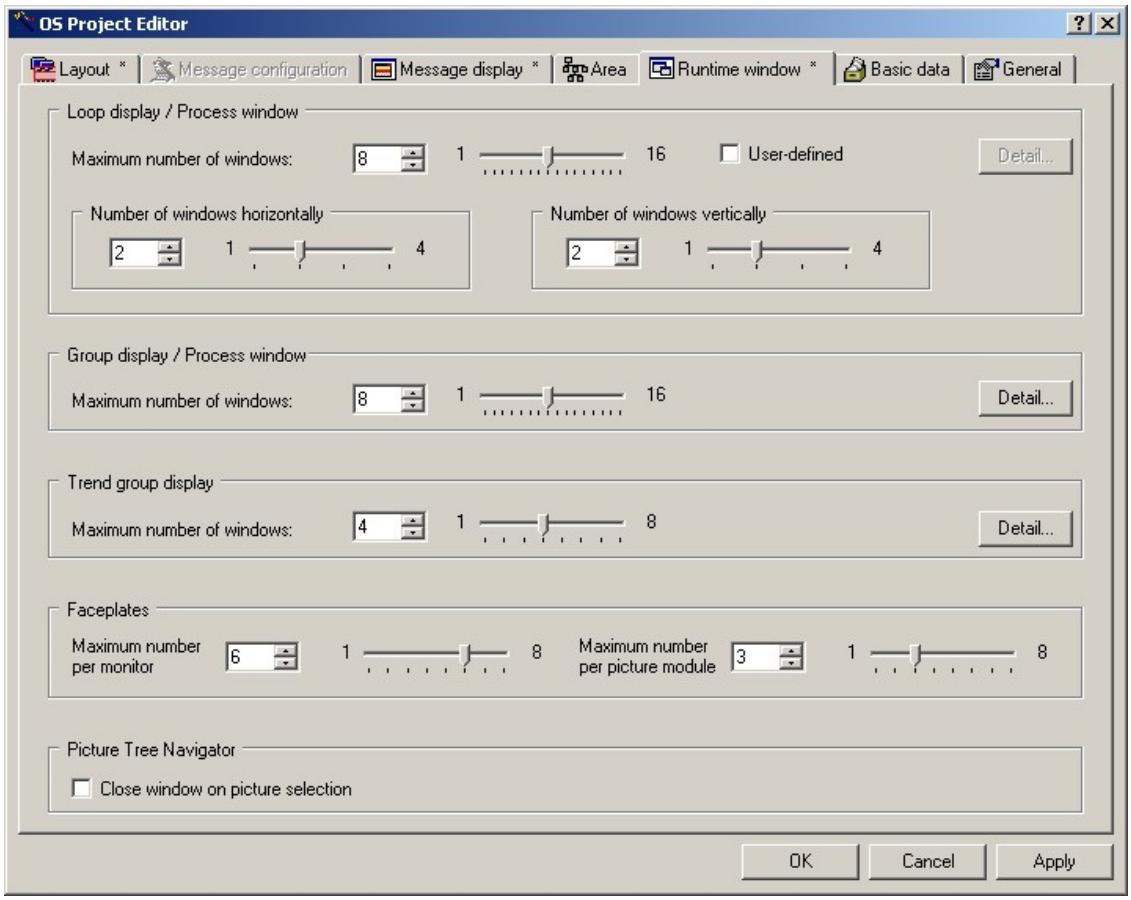
The group display should be created and updated automatically.



Note: The sorting of the message pages is only used for the Standard WinCC Alarm list, and not relevant for the Cemat Alarm list.
In the Cemat Alarm list the default sorting is "Latest message at the bottom". This setting can be changed under D:\Cemat_CS_Config in file C_Messages.cfg (see chapter Tips and Tricks).

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Runtime-Window for a Single Station



Define the maximum number of windows that can be opened when faceplates and curves are called as well as the maximum number of faceplates that can be opened on a monitor.

Set the maximum number of picture modules per monitor to 6 and the maximum number per picture module to 3.

The rest of the settings in the OS Project Editor can remain as per default or can be adapted later.

With “OK” all settings are carried out.



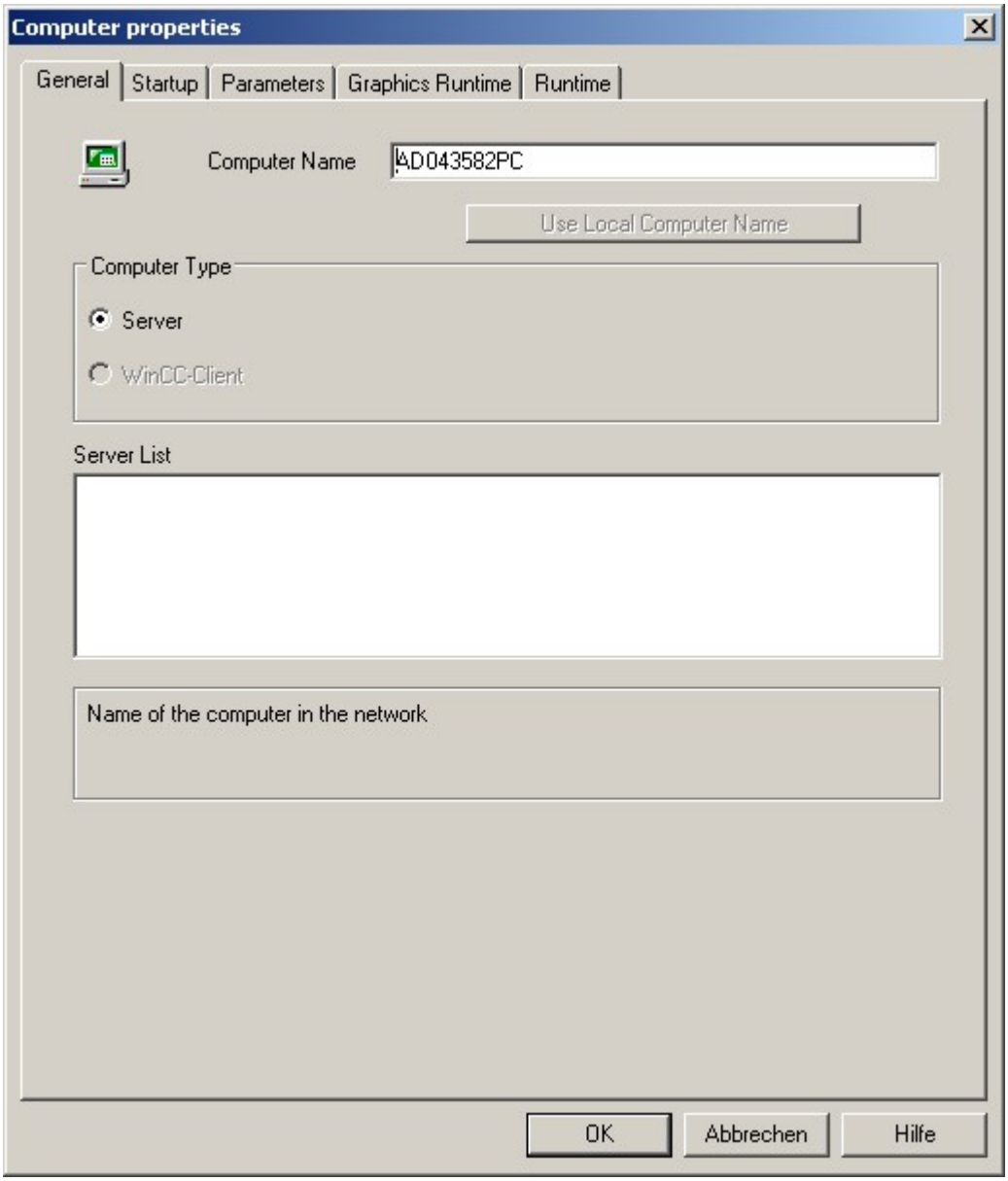
Caution: If for any reason you have to run the OS-Project Editor again, make sure that all files mentioned under CEMAT Specific Preparations are deselected in Folder “Base Data”. Otherwise the CEMAT Settings are overwritten with the delivery state of PCS7.
→ See chapter CEMAT Specific Preparations!

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Computer properties

The computer properties must be checked and adapted to the requirements of the plant. Most of the settings can probably not be entered at the beginning of the engineering and must be adapted later (sometimes after commissioning).

Folder General shows the Computer Name and the Computer Type



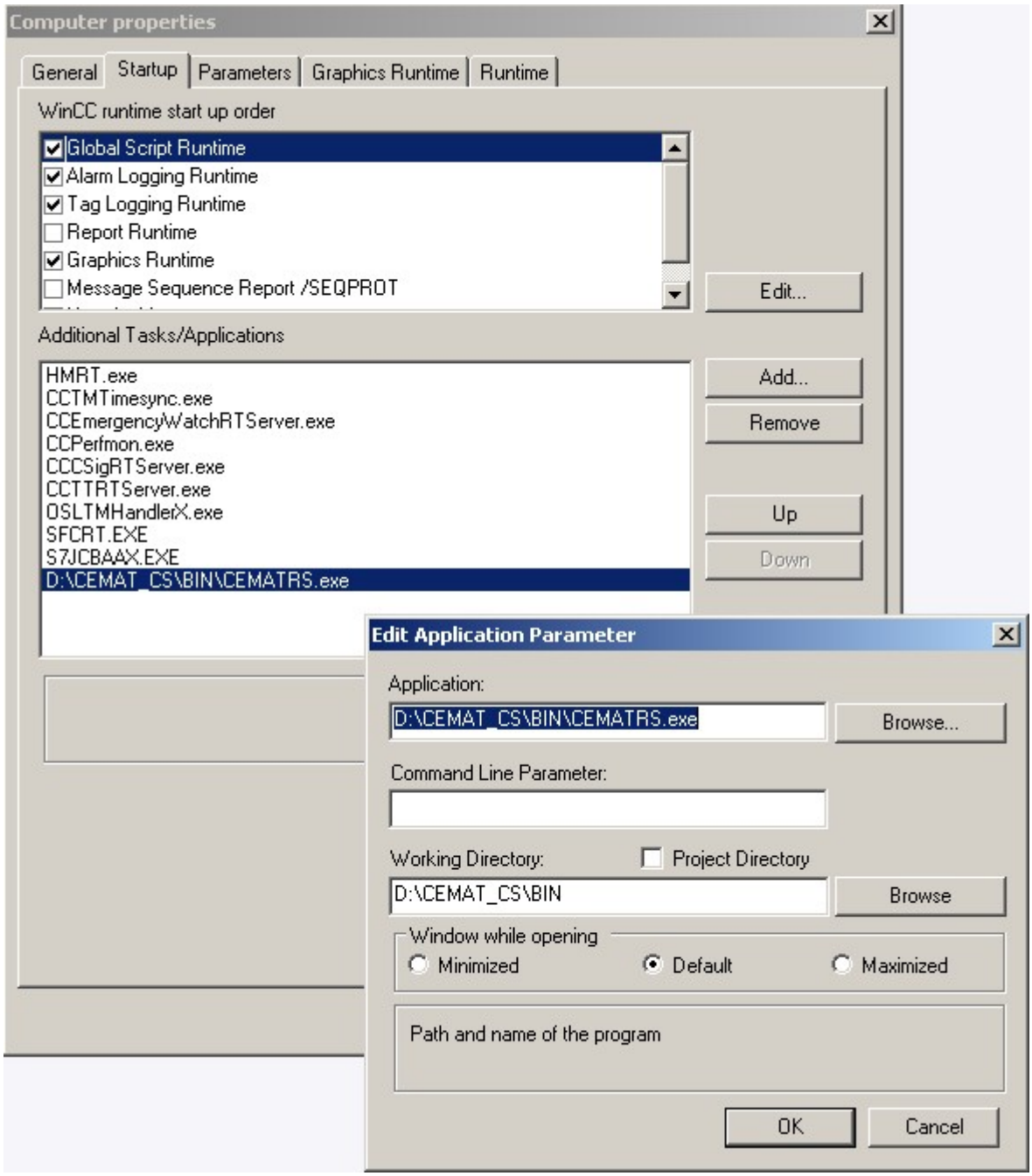
Caution: The Computer Name for all OS Projects is the name of the Engineering Station. During the download of the OS-Project to the individual PCs the name is automatically replaced by the Name of the PC Station.

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Folder Startup shows the applications which are started after Activation of the Runtime System

Under Additional Tasks/Applications you have to add the CEMATRS.exe to the Startup list. The application is located in Directory D:\CEMAT_CS\BIN.

CEMATRS.exe should be called at the end.



Insert both, the Application and the working Directory and save with ok. Move the application to the last position.

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Tag Management

Cemat Tags

Cemat needs a number of internal variables. Unfortunately the automatic generation of these variables during the activation of the runtime is not possible, because in this case the variables are created only on the destination station and this inhibits the download of changes.

Open the Tag Management and add the internal variables for CEMAT:

Add new Group “CEMAT”

Within this group add the following variables:

Name	Data Type	update
C_ServerName	Text tag 16bit character set	Computer-local
C_Empty	Text tag 16bit character set	Computer-local
C_AlarmNavigation	Text tag 16bit character set	Project-wide
C_ALM	Unsigned 16-bit value	Project-wide

Add new Group “CematValues”

Within this group add the following variables:

Name	Data Type	update
Curve1	Unsigned 8-bit value	Project-wide
Curve2	Unsigned 8-bit value	Project-wide
Curve3	Unsigned 8-bit value	Project-wide
Curve4	Unsigned 8-bit value	Project-wide
Curve5	Unsigned 8-bit value	Project-wide
Curve6	Unsigned 8-bit value	Project-wide
Curve7	Unsigned 8-bit value	Project-wide
Curve8	Unsigned 8-bit value	Project-wide
Curve9	Unsigned 8-bit value	Project-wide

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Redundancy Tags

CEMAT needs the Redundancy tags in any case, even if this is a Single User Station. The easiest way to create the Redundancy tags is to activate the Redundancy temporarily (and to deactivate afterwards).

After activating the redundancy the following internal variables have been added in group „Redundancy“:

@RM_MASTER
@RM_MASTER_NAME
@RM_SERVER_NAME
@RM_OFFLINE_UA_NAME



Note: In case of a Single User Station you have to deactivate the redundancy!

Horn Tags

During the horn configuration additional tags are automatically created. You will find these variables in group “Horn”.

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General changes in the alarm logging

The text length is specified in the alarm pictures.

Select the „Alarm Logging“ in the WinCC Explorer and use right mouse button to open the alarm logging editor.

Click on the plus symbol in front of **Message blocks**

Select **System blocks**

- Use right mouse button to click on „Date“, and select properties
  (The date corresponds to regional settings in the Op. System)
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Time“, and select properties
  (The time corresponds to regional settings in the Op. System)
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Status“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Comment“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Info“, and select properties
- Change the following settings:

Flashing = off

Select **User text block**

- Use right mouse button to click on „Source“, and select properties
- Change the following settings:
  Change „Source“ to „Tagname“ Flashing = off

- Use right mouse button to click on „Area“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Event“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Free 1“ and select properties
- Change the following settings:
  Change „Free 1“ to „Tag Comment“ Flashing = off

- Use right mouse button to click on „Free 2“ and select properties
- Change the following settings:
  Change „Free 2“ to „FCL“ (Fault class) Flashing = off

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Message classes and message types

Click on the plus symbol in front of **Message classes**

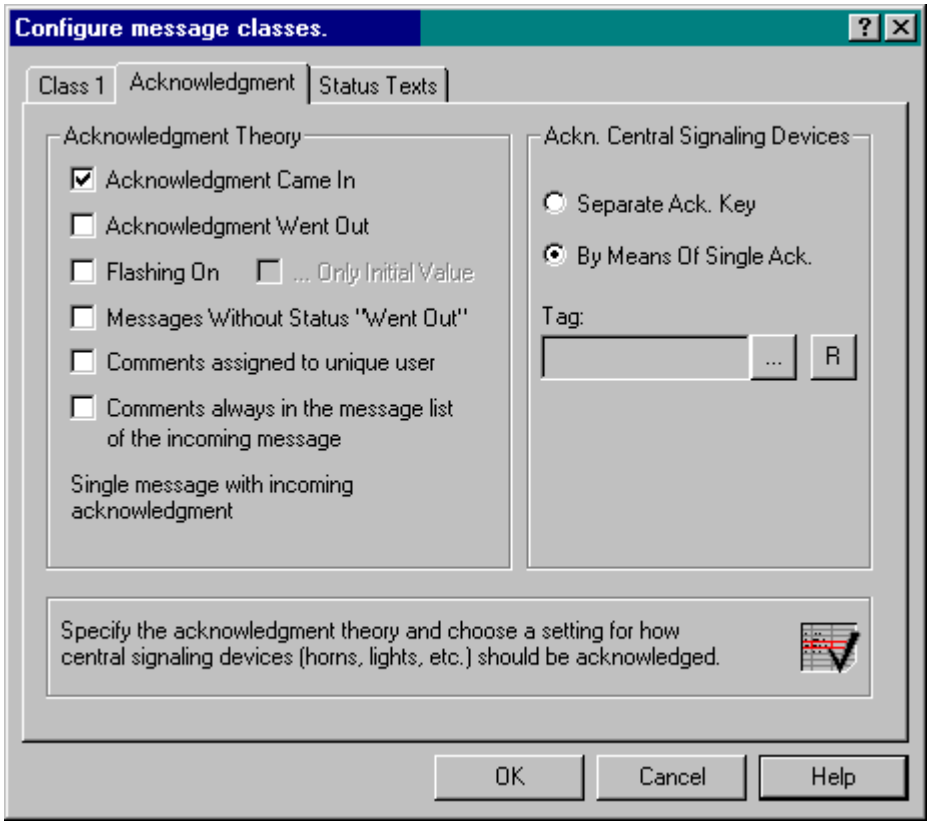
Change the settings for „Alarm“, „Warning“, „PLC Process Control System Messages“, „Process Message“, „Operator Input Messages“ according to the following table.

- Use right mouse button to click on „Alarm“ and select properties
  Go to folder „General Information“ and select „Properties“ button to change the colors.
  Go to folder „Acknowledgement“ to change the acknowledge parameters.

The colors and message types have to be changes as follows:

Message class	Message Type	Came in		Went out		Acknowledged				
		Text color	Back-ground color	Text color	Back-ground color	Text color	Back-ground color	Must be ackn.	Come in must be acknowl.	Flashing
Alarm	H L	white	red	black	green	black	pink	yes	yes	off
Warning	H L	black	yellow	black	green	black	light yellow	yes	yes	off
Process Message	Process	white	red	black	green	black	pink	yes	yes	off
PLC Control System M.	Failure	white	red	black	green	black	pink	yes	yes	off
Operator Input Message		black	cyan					no	no	off

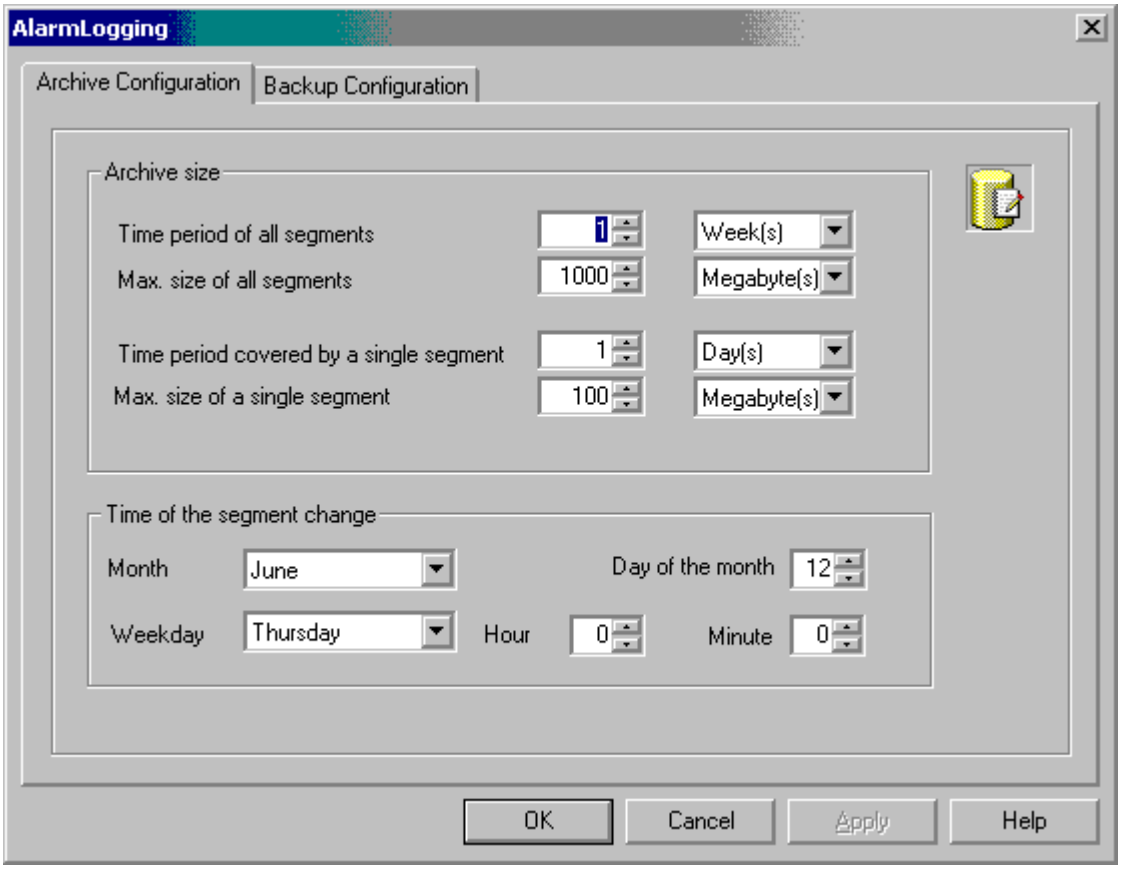
The acknowledge philosophy for the message classes „Alarm“, „Warning“, „Process message“ and "PLC Control System Messages" has to be configured as follows:



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Archive Configuration

Under “Archive Configuration” -> “Message Archive” -> “Properties” you have to configure the archive according to the requirements of your project:



Exit the alarm logging editor and save the changes.

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Tag logging

For the archiving of the measuring values, a process value archive must be created which contains an archive tag for each measure which is archived.

As default, archiving is performed locally on the OS server. If you use a central archive server, the archiving routines are performed centrally on this archive server.

As an additional tool for archiving data from PCS 7, you can also use Storage Plus. This software package requires a separate license.

More information about archiving possibilities you find under “Archiving” in the same manual.

Required settings for CEMAT

The direct call of the archive curve from the faceplate of the measure is only possible if you follow the CEMAT rules:

The name of the archive tag exactly corresponds to the name of the process tag.



Caution: If the archive name of the name of the archive tag differs from the above mentioned rules, the CEMAT Faceplate will not be able to find the Archive data and the archive curve of the measure will not be shown.
Make sure that the Tag name of the measure does not contain any illegal characters for archive variables!

The Name of the process value archive depends, whether you want to create only one Archive which contains all Archive Variables or you want to create different Archives (e. g. for each area).

- If you create the process value archive with the WinCC Explorer the default name is **ProcessValueArchive**. This is also the Archive name which Cemat uses in case no further engineering is carried out in the CFC or in the block icon.
- If the archive variables are created during the OS Compile (setting in the CFC) the system created a process value archive with the name **SystemArchive**. This name is entered into the automatically created internal variable @TagArchiveName and can be modified later on.
  Cemat checks for Variable @TagArchiveName and, if available, the archive name is picked from there.
- Archive splitting:
  An option for creating different archives (e. g. one archive per Area) does not exist in case of automatic generation of the archive variables.
  If this is requested, the archives and the archive tags must be created manually in WinCC and additional programming is needed in the CFC. (The Archive name must be entered at Structure variable PV_Out.Value under 'Identifier'.)

The priority for the determination of the archive name is as follows:

Prio1: Checking the entry in the internal variable measure.PV_Out#Value#Shortcut
Prio2: Entry in Variable @TagArchiveName (if existing)
Prio3: Default setting "ProcessValueArchive"

See also 14_Tips_Tricks_009.pdf – Process Value Archive.

At this step only the pre-settings of the Process Archive can be configured and the Archive configuration can be made (Archive size, Time of the segment change, archiving duration, etc.) For description see PCS7 Manuals.

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User Archives

There are 4 user archives for CEMAT Functions.

The user archive **C_DriveList** contains the Group-Object-Lists (list of objects associated to a route or group).

The user archive **C_INFO** contains the object information (Info Database).

The user Archive **C_POLY3** is only required if the Function Polygon is used.

The user Archive **C_CURVE** is used to save the Cemat curve groups.

How to create the user archive for the Group-Object-List

In directory D:\CEMAT_CS\ua you will find the default user archive for the Group-Object-List.

File DriveList.uap contains the structure of the Group-Object-List. The data for Group-Object-List are entered in runtime mode.

Import the structure of the C_DriveList and save:

1. Open the User-Archive
2. Import the structure of the Object list database from C_DriveList.uap
3. Save the structure.

Through the import the Group-Object-List is created with the following structure:

GroupTAG	String	24
HasSubRoute	Number (integer)	
HierachyLevel	Number (integer)	
ObjectComment	String	50
ObjectTAG	String	24
ObjectType	String	15
OrderNo	Number (integer)	
ParentTAG	String	24

You must not enter any data into the user archive Group-Object-List. The data will be entered during runtime.

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How to create the user archive for the Info Database

In directory D:\CEMAT_CS\ua you will find the default files for the Info Database.

File C_INFO.uap contains the structure of the Info Database.

Import the structure of the C_INFO and save:

1. Open the User-Archive
2. Import the structure of the Info Database from C_INFO.uap
3. Save the structure.

Through the import the Info Database is created with the following structure:

C_TAG	String	24
GL_Complex	String	40
GL_Equipment	String	40
GL_LocationObject	String	40
GL_Location_LS	String	40
GL_Plant	String	40
GL_Plant_zone	String	40
G_DOC_Name_1	String	40
G_DRAW_POS	String	40
G_Infotext	String	250
G_LoopA	String	40
G_Sound_1	String	40
G_Sound_2	String	40
G_Spare	String	40
G_Spare_1	String	40
G_Video_Name	String	40
H_Area	String	40
H_Building	String	40
H_Cabinet	String	40
H_Instanc_DB_N0	Number (integer)	
H_Location	String	40
H_PLC_Name	String	20
H_Rack	String	40
I_Area	String	40
I_Building	String	40
I_Cabinet	String	40
I_Location	String	40
I_Rack_I	String	40
I_Rack_Q	String	40
I_Slot_I	String	20
I_Slot_Q	String	20

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M_Area		String	40
M_Bimetall		String	20
M_Building		String	40
M_Cabinet		String	40
M_DOC	Documentation file	String	50
M_DT	Device type	String	30
M_ET	End Time	String	30
M_Feeder		String	40
M_Fuse		String	20
M_HWR	Hardware Revision	String	30
M_IND	Installation Date	String	30
M_INF1	Information 1	String	100
M_INF2	Information 2	String	100
M_INF3	Information 3	String	100
M_INS	Instruction	String	50
M_Interval	Intervall	Number (integer)	
M_LMT	Last Maint. Time	String	30
M_LMT_START	Last Main Time Started	String	30
M_Location		String	40
M_MA	Manufacturer	String	30
M_MES	Message	String	100
M_ON	Order Number	String	30
M_SER	Serial Number	String	30
M_SW	Software Revision	String	30
M_US	User/Operator	String	30
Obj_ID		Number (double)	

The Info Database must be filled by the user. The easiest way is to use an Excel Tool which is described in chapter OS Engineering.



Attention: You must create at least one line of runtime data into the Info Database. You can either import file C_INFO.csv from folder D:\Cemat_CS\ua or create the dummy entry manually. (Select the input mode, in the first line enter in column C_TAG the string „Dummy“ and press Return.)

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How to create the user archive for Polygon function

In directory D:\CEMAT_CS\ua you will find the default user archive for the Polygon C_POLY3.

File C_POLY3.uap contains the structure of the Polygon Archive. The data for the Polygon archive is entered in runtime mode.

Import the structure of the C_POLY3 and save:

1. Open the User-Archive
2. Import the structure of the Polygon database from C_POLY3.uap
3. Save the structure.



Attention: You must create at least one line of runtime data into the Info Database. We recommend importing the example file C_POLY3.csv.

How to create the user archive for Cemat curve groups

In directory D:\CEMAT_CS\ua you will find the default user archive C_CURVE for saving the Cemat curve groups.

File C_CURVE.uap contains the structure of the Cemat Curve group Archive. The curve groups are written in runtime mode.

Import the structure of the C_CURVE and save:

1. Open the User-Archive
2. Import the structure of the Polygon database from C_CURVE.uap
3. Save the structure.



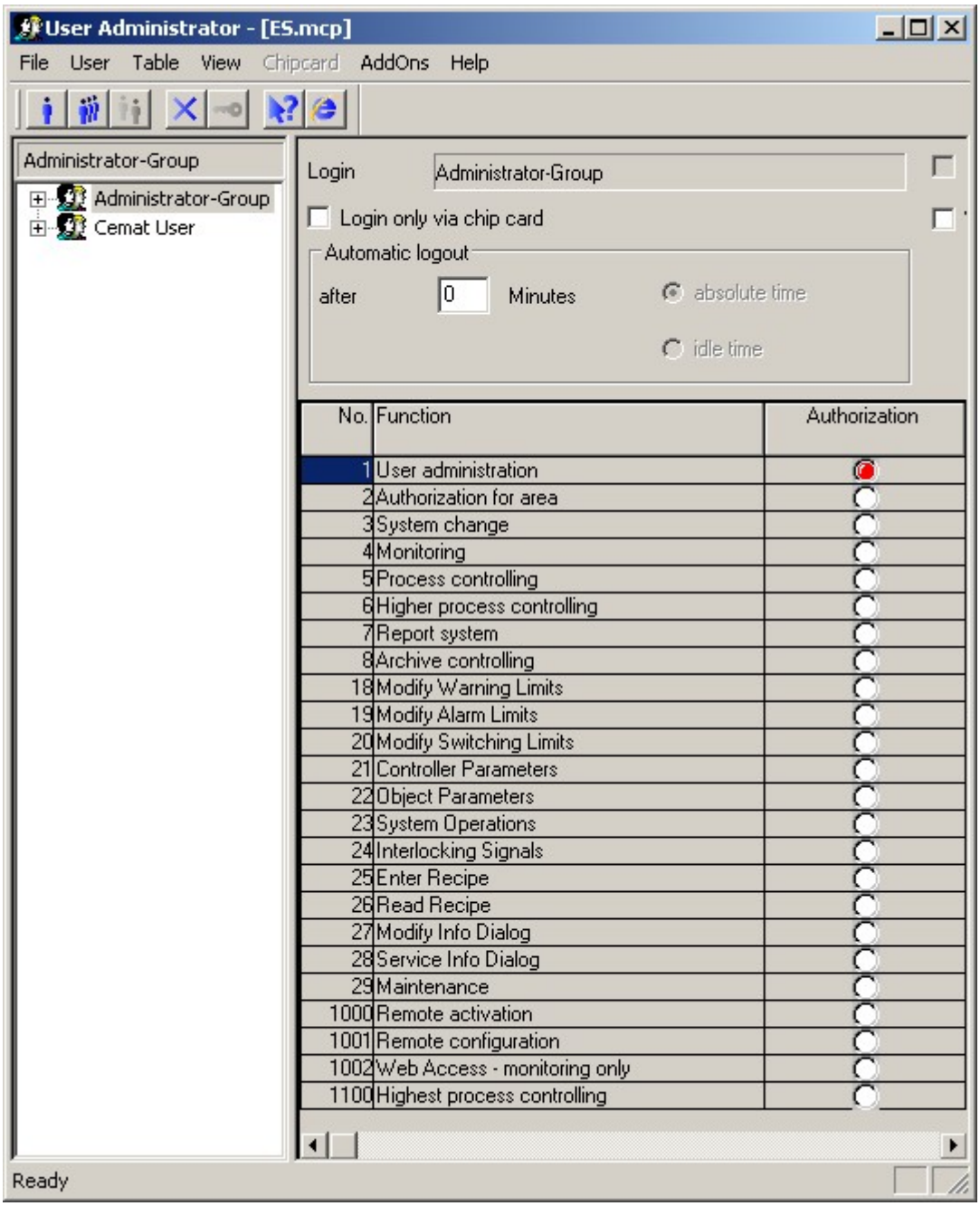
Attention: You must create at least one line of runtime data into the Info Database. You can either import file C_CURVE.csv from folder D:\Cemat_CS\ua or create the dummy entry manually. (Select the input mode, in the first line enter in column C_TAG the string „Dummy“ and press Return.)

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Add User rights

Via WinCC User Administration, additional Operation levels must be defined for Cemat. Each operator gets the permission to operate certain levels in certain areas and is then allowed to carry out any operation belonging to this level.

In the WinCC Explorer click open the **User Administrator** and add the rights from No. 18 to No. 29 according to the following list:



If operations shall be permitted to restricted personal only, additional user rights can be defined.

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Selection of area specific rights

After the definition of the additional user rights for CEMAT you must define the user groups and the users and in order to specify the rights for each user.

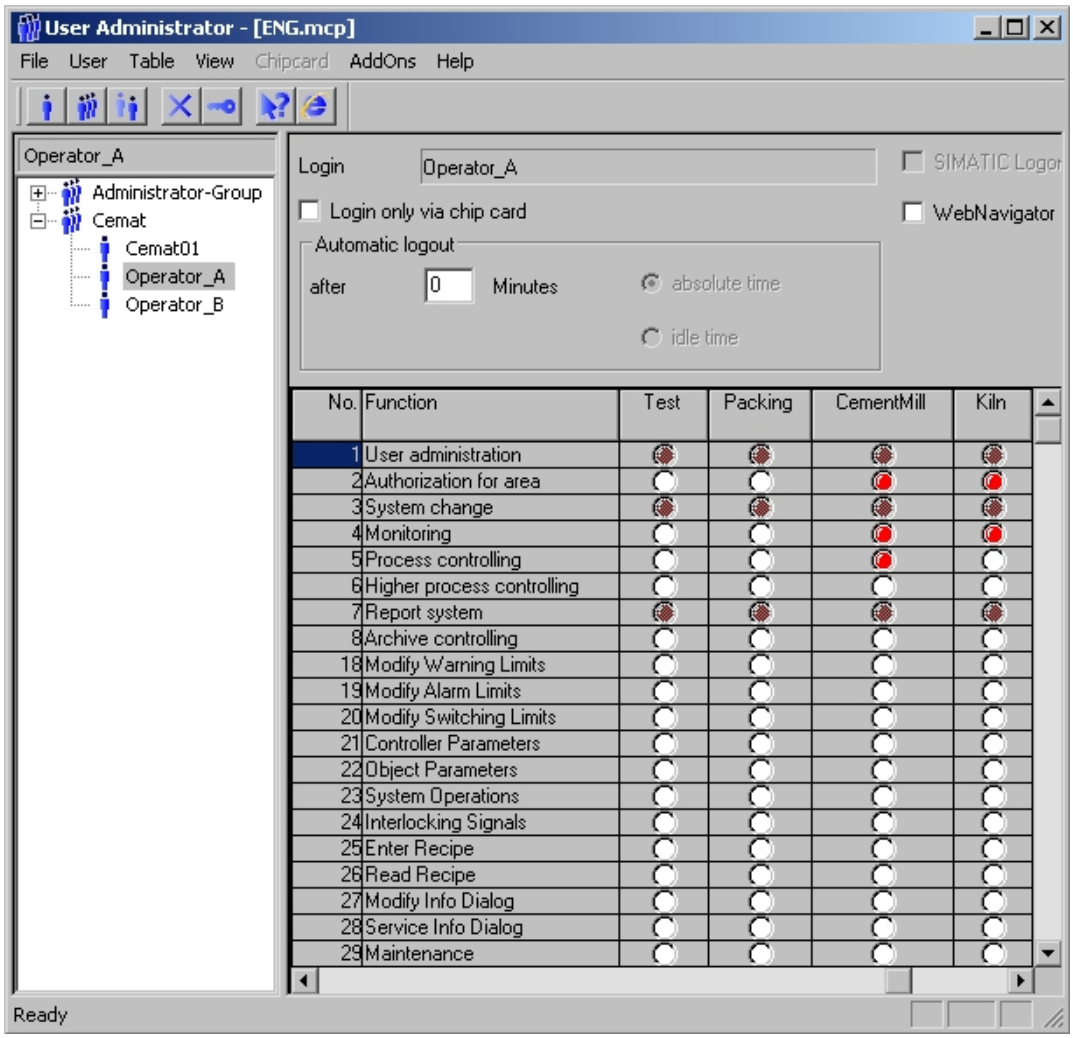
You can e.g. enable a complete area or only certain operations within an area.

With the right 2 “Authorization for area” it is defined which area is released for the user.

With the right 4 "Monitoring" is defined whether the area can be monitored.

With the right 5 „Process controlling“, it is defined whether a user is allowed to operate the area. He will then also get the messages from this area and the horn is activated.

Example:



The user „Operator_A“ is allowed to:

open, watch	→ **Cement Mill, Kiln**
operate	→ **Cement Mill,**

The areas **Test** and **Packing** are disabled for Operator_A.

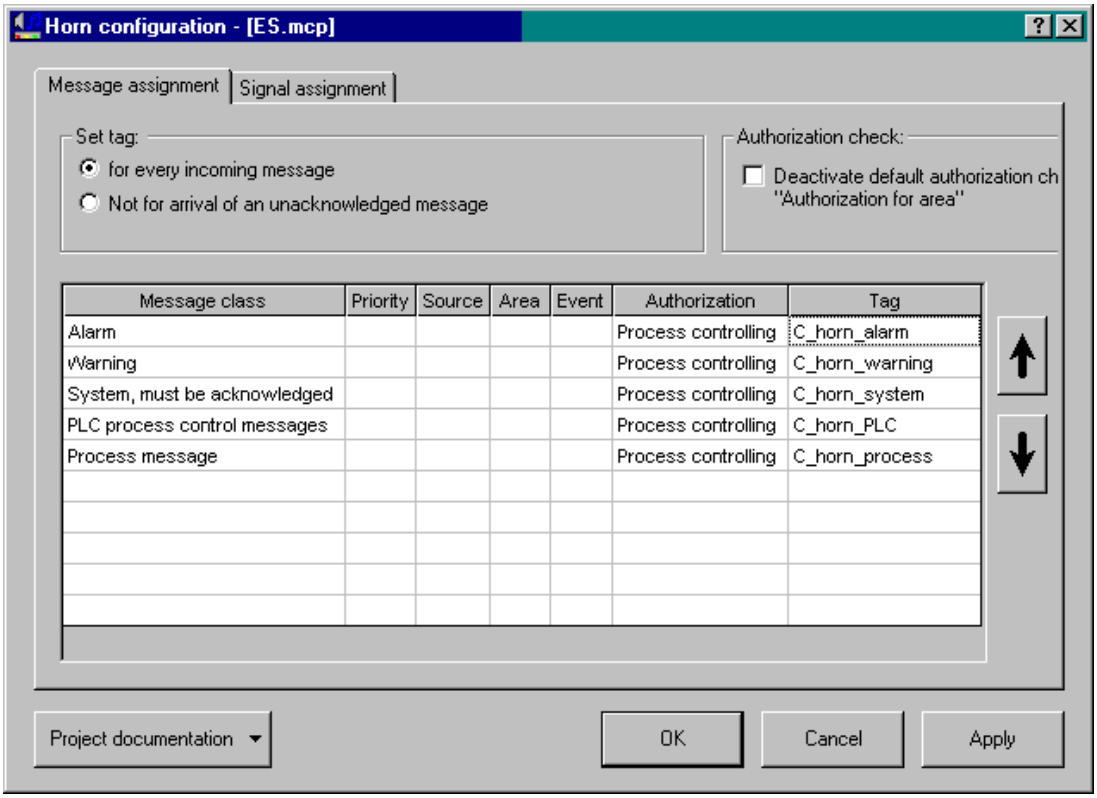
Messages are only shown for areas which are enabled for operation. Operator_A will get only the messages from the Cement Mill area and he can acknowledge only these messages.

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Horn configuration

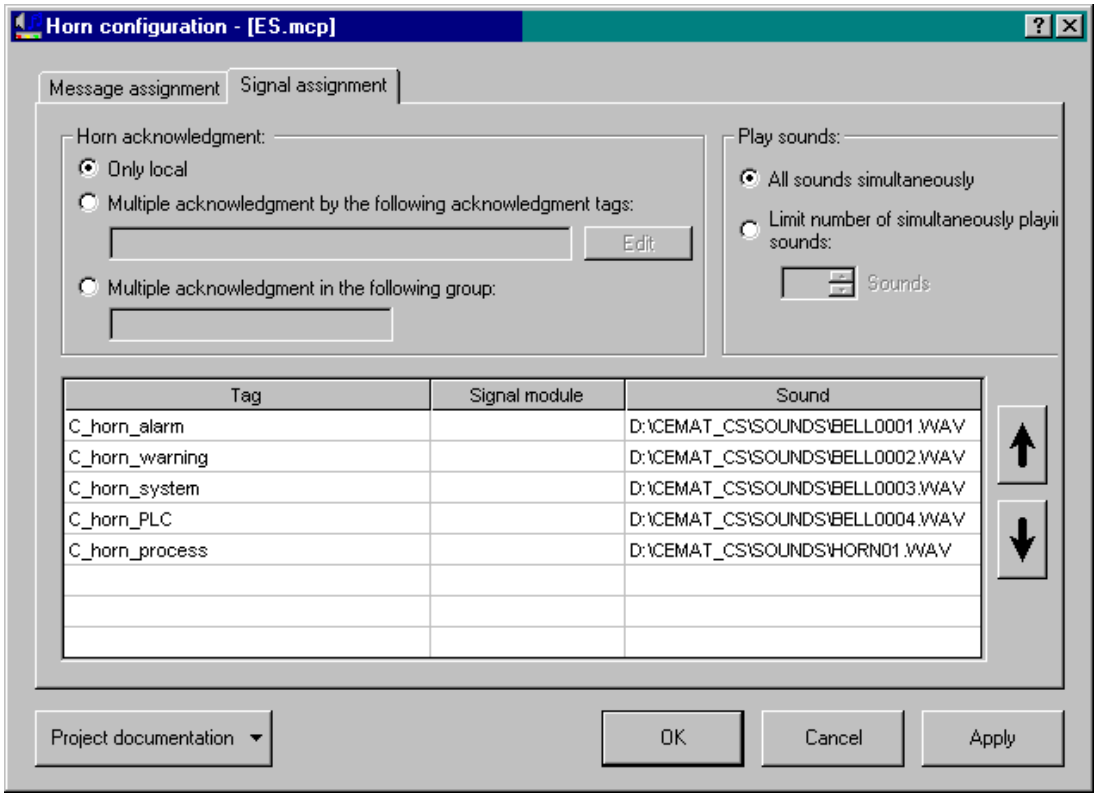
From CEMAT V6.1 you can define a separate Sound for each Message class. The horn must be configured as follows:

1. First define in tab “Message assignments” all message classes which should create a sound. These are Alarms, Warnings, System messages which require acknowledgement, PLC Process control message and Process messages. If you use other message classes with alarms in your project you have to define these as well.
2. Assign the Authorization „Process controlling“. (With this the Authorization is enabled per Area).
3. Per message class, define an internal variable with computer local actualization. Insert the variable name. With “Apply” the variable is automatically created in the tag management.
4. The definition can also be carried out per Area.



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5. In tab “Signal assignment” you can define for each variable an individual sound. A sample of different sounds you find in directory D:\CEMAT_CS\Sounds.



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Update the WinCC Project with Cemat Functions

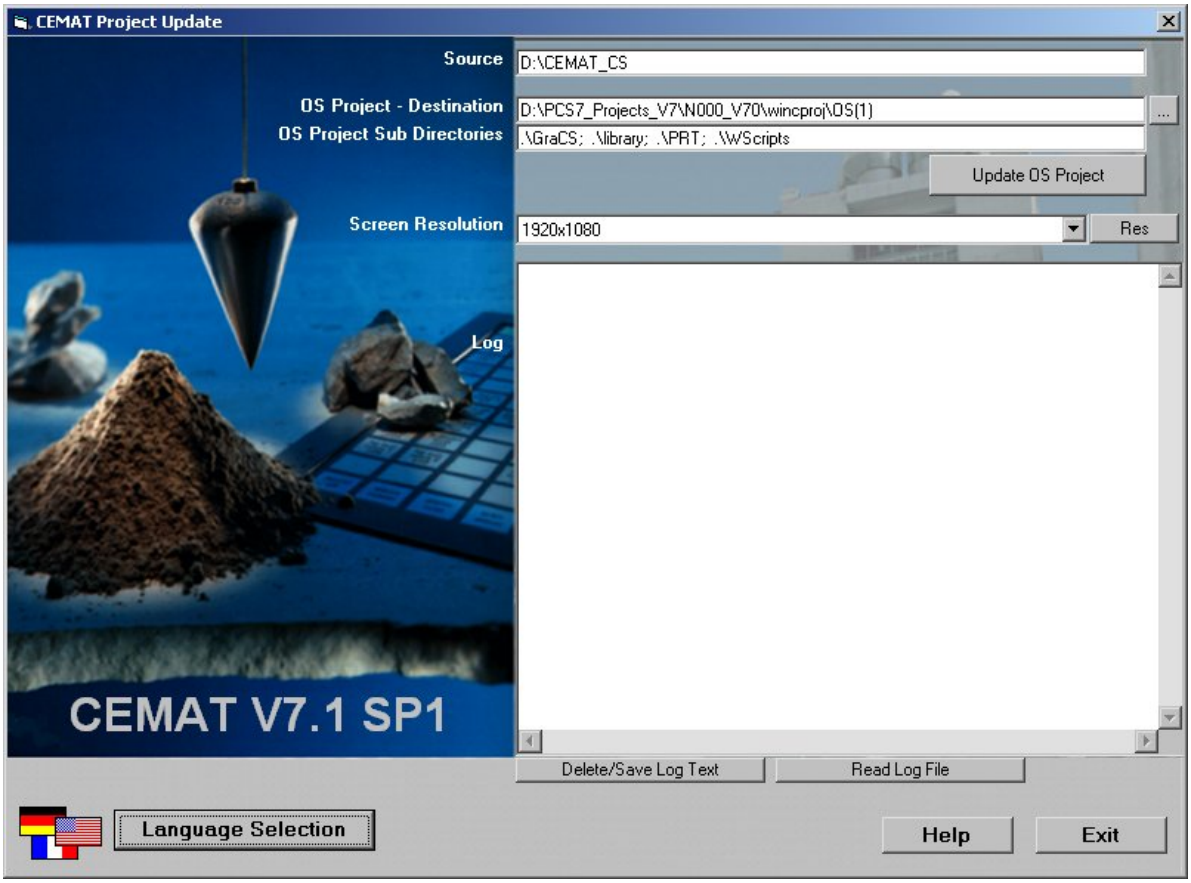
In the following step the WinCC Project gets updated with the Cemat functions. During the Cemat installation the Cemat WinCC files are copied into folder D:\CEMAT_CS\WinCC under GraCS, Libray, PRT and Wscipts. These files must now be copied to the equivalent folders of the OS Project.

Additionally, some PDLs are available in different Screen resolutions (1280x1024, 1600x1200, 1680x1050, 1920x1080 or 1920x1200) and must be exchanged.

GraCS-Files for which different Screen Resolutions exist:

	1280x1024	1600x1200	1680x1050	**1920x1080**	1920x1200
@AlarmEmergency.pdl	x	x	**x**		
@AlarmEmergencyOP.pdl	x	x	**x**		
@AlarmOneLine.pdl	x	x	x	**x**	
@C_AlarmListing.pdl	x	x	x	**x**	x
@Overview1.pdl	x	x	x	**x**	
@TopAlarmNew.pdl	x	x	**x**		

In order to update the WinCC Project, please go to D:\CEMAT_CS and start 'CematProjectUpdate.exe'.



The **Source** must be D:\CEMAT_CS

Under **OS Project - Destination** you have to enter destination (Directory of the OS Project)

Under **OS Project Sub Directories** you find the Subfolders which get copied during the update (cannot be modified).

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Select the desired **Screen Resolution** for your Project (1280x1024, 1600x1200, 1680x1050, 1920x1080 or 1920x1200). Via an option, during the OS Project Update the above listed Standard pictures are exchanged according to the screen resolution.

Press button '**Update OS Project'** and the files will be copied to the corresponding directories.

One by one the directories GraCS, Library, PRT and WScripts are copied into your OS Project and after this the PDLs are exchanged by the proper Screen Resolution. You have to acknowledge each step with OK and everything is entered into a LOG file.

During the update procedure the following GraCS files are overwritten by Cemat files.

@AlarmEmergency.pdl	Extended Alarm line
@AlarmEmergencyOP.pdl	Extended Alarm line
@AlarmOneLine.pdl	Alarm line
@Buttons11.pdl	Button keys1
@Buttons12.pdl	Button keys 2
@Language.pdl	Language Selection
@Logo.pdl	Cemat Logo
@Overview1.pdl	Overview Range
@TopAlarmNew.pdl	Alarm lines
@PG_Intlk02_Standard.pdl	Interlock faceplate
@PG_Intlk04_Standard.pdl	Interlock faceplate
@PG_Intlk08_Standard.pdl	Interlock faceplate
@PG_Intlk16_Screen2.pdl	Interlock faceplate
@PG_Intlk16_Standard.pdl	Interlock faceplate



Caution: If for any reason you have to run the OS-Project Editor again, make sure that the above mentioned PDLs are deselected in Folder “Base Data”. Otherwise the CEMAT Settings are overwritten with the delivery state of PCS7.
@TopAlarmNew.pdl and @Overview1.pdl can not be deselected and must be copied from D:\CEMAT_CS\WinCC\GraCS again after running the OS-Project Editor.

If you have to exchange the Screen Resolution later on, you can also use program 'CematProjectUpdate.exe' to carry out this function (Button **Pixel)**.

After the update of the WinCC Project, proceed as follows:

- Open the WinCC Project.
- Open 'Global Script' selecting C-Editor and regenerate Header. (Menu Options -> Regenerate Header)

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Generation of the Template Pictures

During the Update the WinCC Project with Cemat Functions a template picture is copied into the GraCS folder of the OS Project which contains predefined symbols (block icons) for CEMAT Objects:

C_@PCS7Typicals_CemV8_001.pdl

The picture C_@PCS7Typicals_CemV8_001.pdl contains the default symbols for automatic generation of block icons from SIMATIC Manager.

During the automatic generation of block icons PCS7 V8 is looking for a template picture with the name @PCS7Typicals.pdl. Multiple template pictures are possible (@PCS7Typical1.pdl, @PCS7Typical2.pdl). The pictures are used in ascending order.

Before you can start with the engineering of your project, you have to create a template picture @PCS7Typicals.pdl according to the examples in C_@PCS7Typicals_CemV8_001.pdl.

You can either copy C_@PCS7Typicals_CemV8_001.pdl and save it under the name @PCS7Typicals.pdl or copy only the block icons you need. You may also create your own block icons, following the engineering rules.



See Engineering Manual 08_OS_Engineering



Important: In your GraCS folder you additionally find the CEMAT template picture for the Cemat Basic Library (Project Standard 000): C_@PCS7Typicals_CemV7.pdl.
This template picture must not be used in case of Project Standard 001, but if a function of the basic library is required, the corresponding block icon can be copied into your template picture.

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OS Configuration (Server)

The WinCC Project (OS-Project) for the Server was already defined with the SIMATIC Manager or Network Configuration. The following settings have to be carried out in the OS-Project, which means you have to open WinCC. This can be done directly from the SIMATIC Manager through selection of the OS with right mouse button and *Open Object* of from the Start Menu under *Start -> Simatic -> WinCC -> WinCC Explorer*



Important: The following steps must be carried out from the beginning in the engineering language, which is used for the project. If you change the language afterwards the language dependent settings must be repeated.
The language settings in SIMATIC Manager are not consistent with the settings for WinCC!!

Project Properties

Adaptations for the Project itself can be carried out under Properties.

Folder “General” contains the Project Type.
A Server must be a “Multi-User Project”. This is the default setting and must not be changed.

In Folder “Update Cycles” the time values for the Update cycles are defined. The CEMAT Symbols generally use “User Cycle 1”. The default value of this is 2000ms. You have to adapt this value according to your requirement, e.g. 1000ms.

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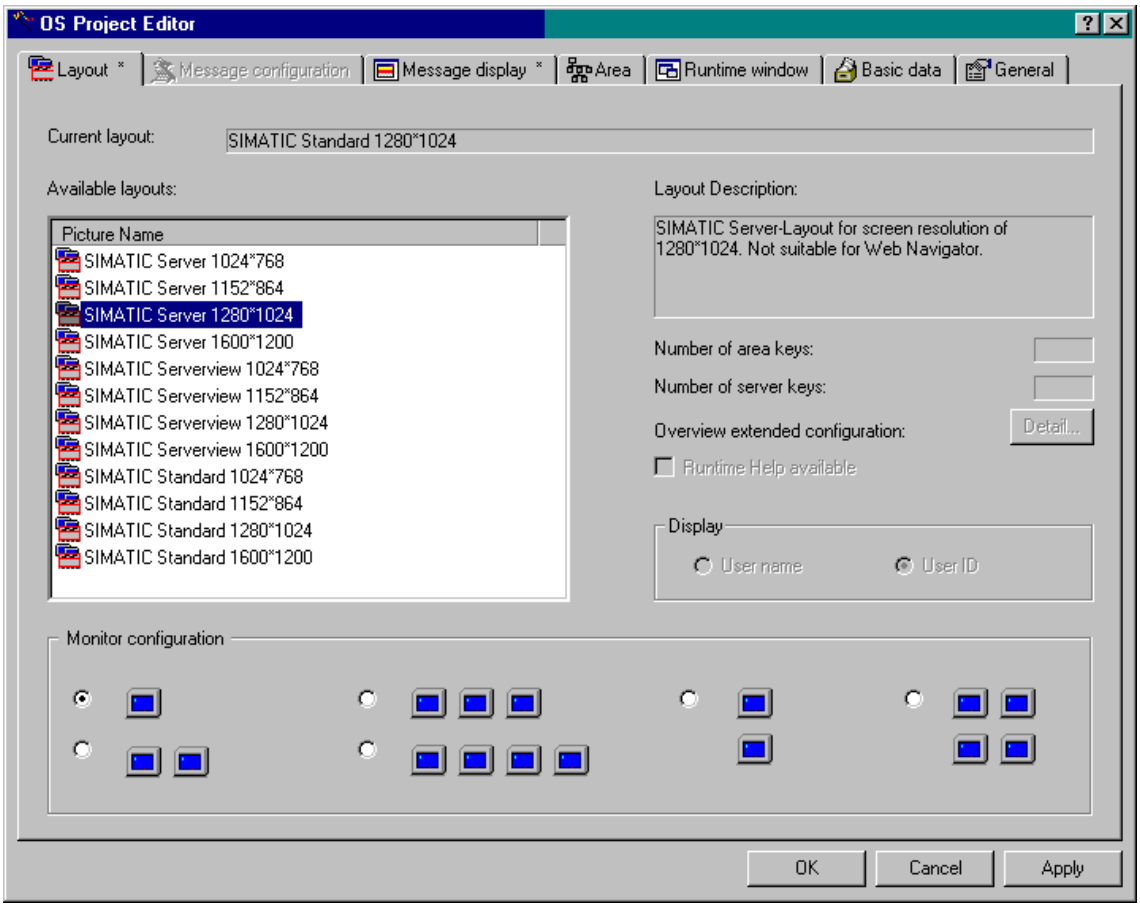
OS Project Editor

Settings for the user interface used by the plant operator for monitoring and controlling the plant during process operation In the OS Project Editor.

A detailed description to this item you find in the PCS7 Configuration Manual Operator Station. The following pages describe only the settings relevant for CEMAT.

In Tab Layout choose the screen resolution according to your Monitor. In Cemat V8.0 the default resolution is 1920x1080, but the Cemat Standard pictures are also available for 1280x1024, 1600x1200, 1680x1050 and 1920x1200.

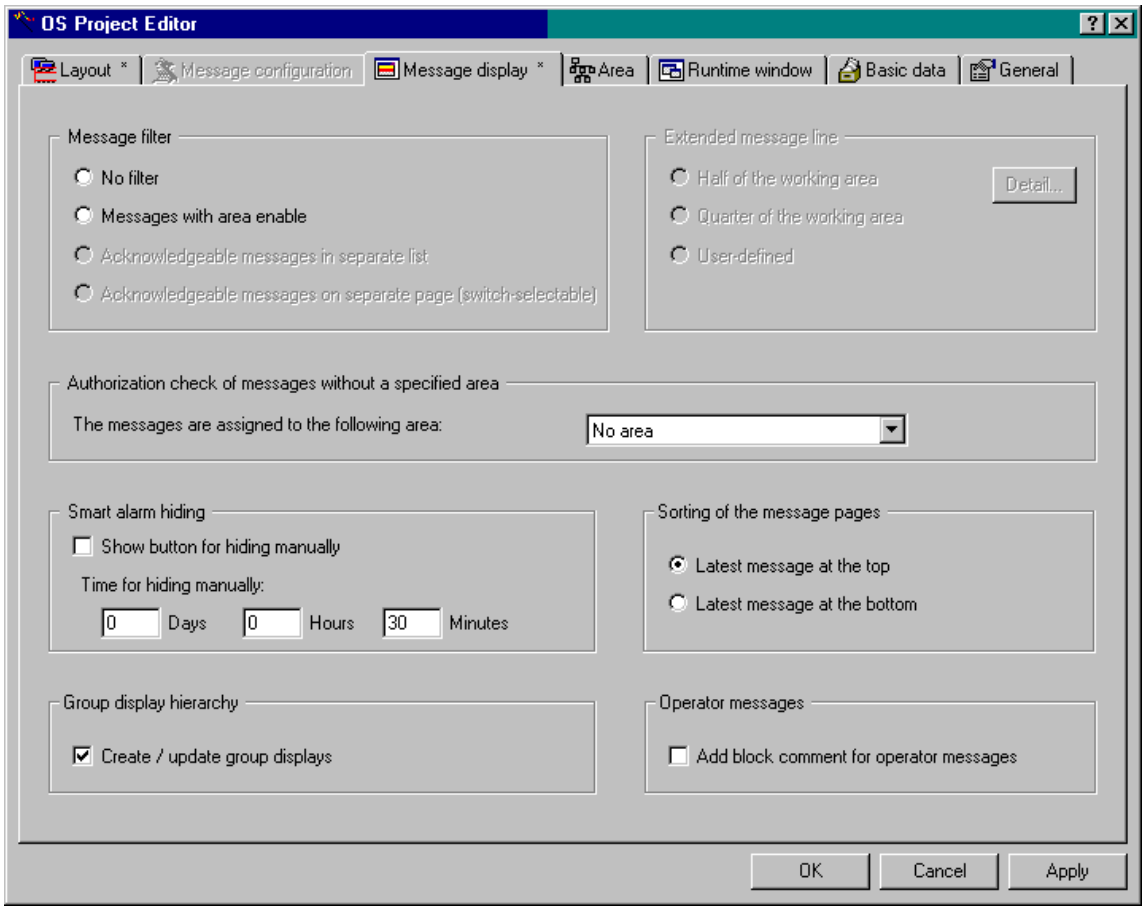
Example for the Layout of a Server:



The recommended screen resolution for CEMAT is 1920x1080. Sometimes smaller monitors are used for the servers which may not allow this screen resolution. Select the appropriate screen resolution for your monitor.

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Message display for a Server:



The group display should be created and updated automatically.

Note: The sorting of the message pages is only used for the Standard WinCC Alarm list, and not relevant for the Cemat Alarm list.
In the Cemat Alarm list the default sorting is "Latest message at the bottom". This setting can be changed under D:\Cemat_CS_Config in file C_Messages.cfg (see chapter Tips and Tricks).

The rest of the settings in the OS Project Editor can remain as per default or can be adapted later.

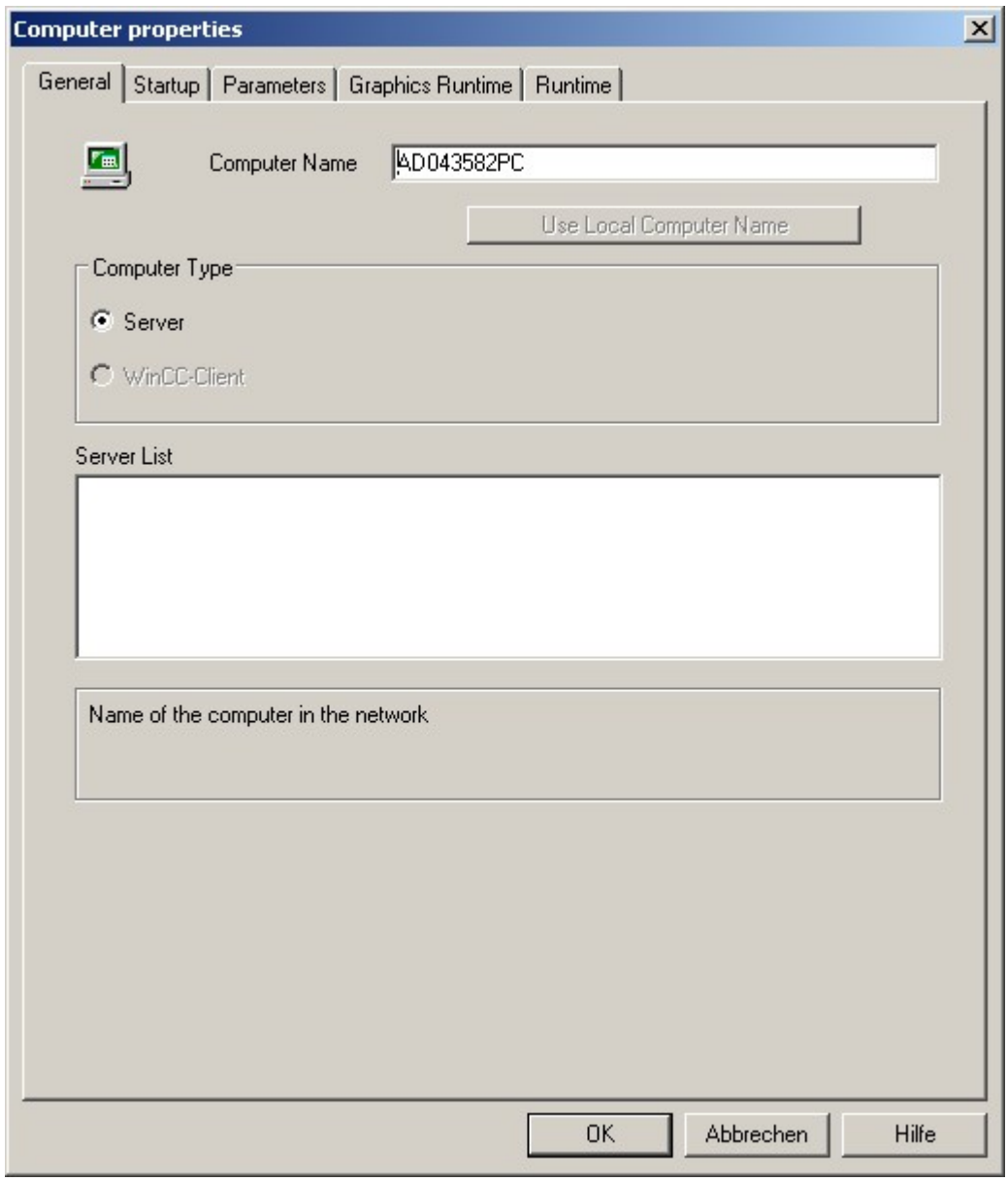
With “OK” all settings are carried out.

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Computer properties

The computer properties must be checked and adapted to the requirements of the plant. Most of the settings can probably not be entered at the beginning of the engineering and must be adapted later (sometimes after commissioning).

Folder General shows the Computer Name and the Computer Type



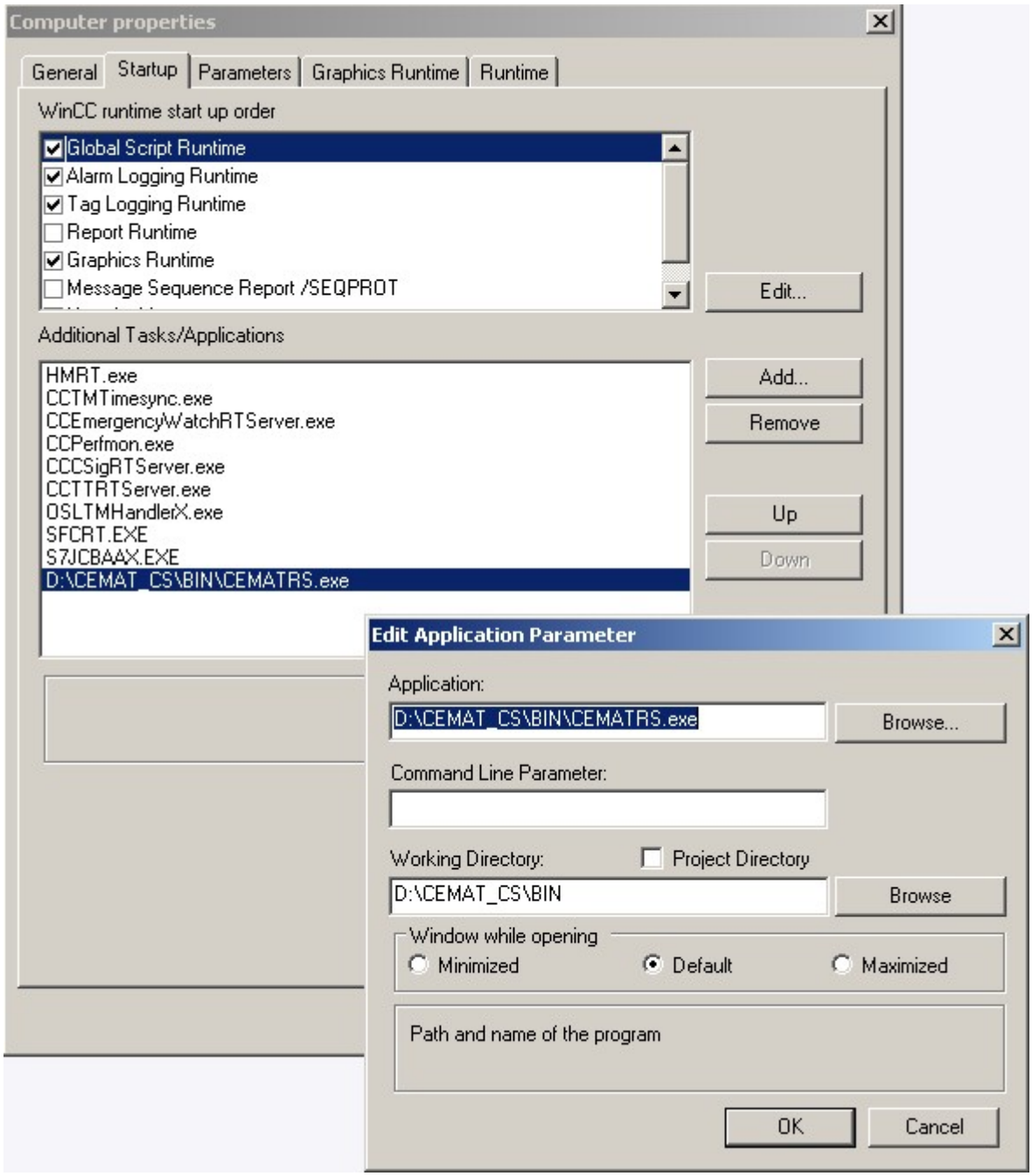
Caution: The Computer Name for all OS Projects is the name of the Engineering Station. During the download of the OS-Project to the individual PCs the name is automatically replaced by the Name of the PC Station.

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Folder Startup shows the applications which are started after Activation of the Runtime System

Under Additional Tasks/Applications you have to add the CEMATRS.exe to the Startup list. The application is located in Directory D:\CEMAT_CS\BIN.

CEMATRS.exe should be called at the end.



Insert both, the Application and the working Directory and save with ok. Move the application to the last position.

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Tag Management

Cemat Tags

Cemat needs a number of internal variables. Unfortunately the automatic generation of these variables during the activation of the runtime is not possible, because in this case the variables are created only on the destination station and this inhibits the download of changes.

Open the Tag Management and add the internal variables for CEMAT:

Add new Group “CEMAT”

Within this group add the following variables:

Name	Data Type	update
C_ServerName	Text tag 16bit character set	Computer-local
C_Empty	Text tag 16bit character set	Computer-local
C_AlarmNavigation	Text tag 16bit character set	Project-wide
C_ALM	Unsigned 16-bit value	Project-wide

Add new Group “CematValues”

Within this group add the following variables:

Name	Data Type	update
Curve1	Unsigned 8-bit value	Project-wide
Curve2	Unsigned 8-bit value	Project-wide
Curve3	Unsigned 8-bit value	Project-wide
Curve4	Unsigned 8-bit value	Project-wide
Curve5	Unsigned 8-bit value	Project-wide
Curve6	Unsigned 8-bit value	Project-wide
Curve7	Unsigned 8-bit value	Project-wide
Curve8	Unsigned 8-bit value	Project-wide
Curve9	Unsigned 8-bit value	Project-wide

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Horn Tags

From CEMAT V6.1 you can define a separate Sound for each Message class. The horn must be configured correspondingly. The horn configuration is carried out in the Client Project.

The following configuration in the tag management of the server depends on whether you want to acknowledge the Horn on each Client independently or you want to acknowledge the Horn for different Clients at the same time.

The first solution may be useful if each WinCC Client is located in a different Room. If the Clients are located close to each other and if the same plant section can be operated and controlled by different Clients at the same time, the WinCC clients should act in unison.

More about Horn configuration you can read in the online-help of WinCC.

In case of WinCC clients with signaling devices acting in unison you have to create one or more reset tags on the Server. If the Horn is acknowledged on one client the variable on the server will be reset. This leads to an Acknowledgement for all Clients which use the same reset variable.

Create a reset variable in the Group „Horn“

Name	**Data Type**	**update**
HornResetMC	binary	Project-wide

This variable must be selected in the Horn Configuration of the Client.

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Redundancy Tags

CEMAT always needs the Redundancy tags, even if you may not have a redundant Server at the moment. The following Redundancy tags get automatically created when activating the Redundancy and will be found as internal variables in group „Redundancy“:

@RM_MASTER
@RM_MASTER_NAME
@RM_SERVER_NAME
@RM_OFFLINE_UA_NAME



Note: If no redundant Server is available (yet), the Redundancy must afterwards be deactivated again!

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General changes in the alarm logging

The text length is specified in the alarm pictures.

Select the „Alarm Logging“ in the WinCC Explorer and use right mouse button to open the alarm logging editor.

Click on the plus symbol in front of **Message blocks**

Select **System blocks**

- Use right mouse button to click on „Date“, and select properties
  (The date corresponds to regional settings in the Op. System)
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Time“, and select properties
  (The time corresponds to regional settings in the Op. System)
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Status“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Comment“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Info“, and select properties
- Change the following settings:

Flashing = off

Select **User text block**

- Use right mouse button to click on „Source“, and select properties
- Change the following settings:
  Change „Source“ to „Tagname“ Flashing = off

- Use right mouse button to click on „Area“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Event“, and select properties
- Change the following settings:

Flashing = off

- Use right mouse button to click on „Free 1“ and select properties
- Change the following settings:
  Change „Free 1“ to „Tag Comment“ Flashing = off

- Use right mouse button to click on „Free 2“ and select properties
- Change the following settings:
  Change „Free 2“ to „FCL“ (Fault class) Flashing = off

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Message classes and message types

Click on the plus symbol in front of **Message classes**

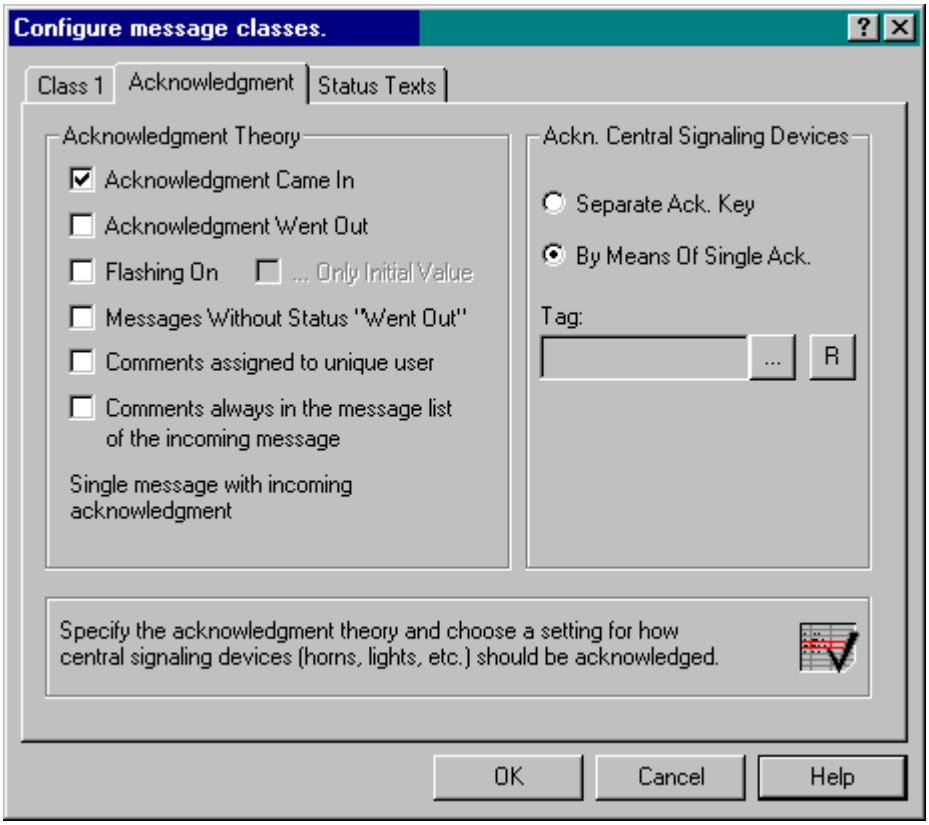
Change the settings for „Alarm“, „Warning“, „AS Process Control System Messages“, „Process Message“, „Operator Input Messages“ according to the following table.

- Use right mouse button to click on „Alarm“ and select properties
  Go to folder „General Information“ and select „Properties“ button to change the colors.
  Go to folder „Acknowledgement“ to change the acknowledge parameters.

The colors and message types have to be changes as follows:

Message class	Message Type	Came in		Went out		Acknowledged				
		Text color	Back-ground color	Text color	Back-ground color	Text color	Back-ground color	Must be ackn.	Come in must be acknowl.	Flashing
Alarm	H L	white	red	black	green	black	pink	yes	yes	off
Warning	H L	black	yellow	black	green	black	light yellow	yes	yes	off
Process Message	Process	white	red	black	green	black	pink	yes	yes	off
PLC Control System M.	Failure	white	red	black	green	black	pink	yes	yes	off
Operator Input Message		black	cyan					no	no	off

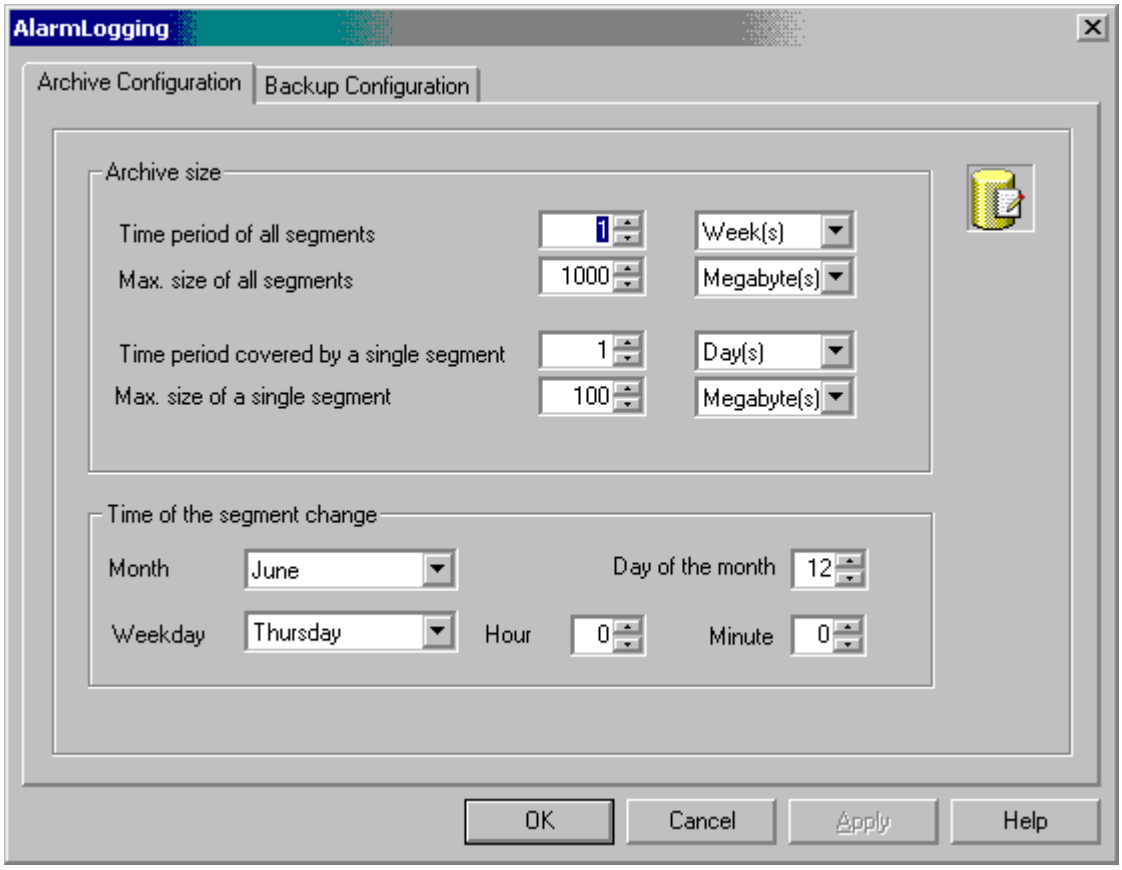
The acknowledge philosophy for the message classes „Alarm“, „Warning“, „Process message“ and "PLC Control System Messages" has to be configured as follows:



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Archive Configuration

Under “Archive Configuration” -> “Message Archive” -> “Properties” you have to configure the archive according to the requirements of your project:



Exit the alarm logging editor and save the changes.

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Tag logging

For the archiving of the measuring values, a process value archive must be created which contains an archive tag for each measure which is archived.

As default, archiving is performed locally on the OS server. If you use a central archive server, the archiving routines are performed centrally on this archive server.

As an additional tool for archiving data from PCS 7, you can also use Storage Plus. This software package requires a separate license.

More information about archiving possibilities you find under “Archiving” in the same manual.

Required settings for CEMAT

The direct call of the archive curve from the faceplate of the measure is only possible if you follow the CEMAT rules:

The name of the archive tag exactly corresponds to the name of the process tag.



Caution: If the archive name of the name of the archive tag differs from the above mentioned rules, the CEMAT Faceplate will not be able to find the Archive data and the archive curve of the measure will not be shown.
Make sure that the Tag name of the measure does not contain any illegal characters for archive variables!

The Name of the process value archive depends, whether you want to create only one Archive which contains all Archive Variables or you want to create different Archives (e. g. for each area).

- If you create the process value archive with the WinCC Explorer the default name is **ProcessValueArchive**. This is also the Archive name which Cemat uses in case no further engineering is carried out in the CFC or in the block icon.
- If the archive variables are created during the OS Compile (setting in the CFC) the system created a process value archive with the name **SystemArchive**. This name is entered into the automatically created internal variable @TagArchiveName and can be modified later on.
  Cemat checks for Variable @TagArchiveName and, if available, the archive name is picked from there.
- Archive splitting:
  An option for creating different archives (e. g. one archive per Area) does not exist in case of automatic generation of the archive variables.
  If this is requested, the archives and the archive tags must be created manually in WinCC and additional programming is needed in the CFC. (The Archive name must be entered at Structure variable PV_Out.Value under 'Identifier'.)

The priority for the determination of the archive name is as follows:

Prio1: Checking the entry in the internal variable measure.PV_Out#Value#Shortcut
Prio2: Entry in Variable @TagArchiveName (if existing)
Prio3: Default setting "ProcessValueArchive"

See also 14_Tips_Tricks_009.pdf – Process Value Archive.

At this step only the pre-settings of the Process Archive can be configured and the Archive configuration can be made (Archive size, Time of the segment change, archiving duration, etc.) For description see PCS7 Manuals.

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User Archives

There are 4 user archives for CEMAT Functions.

The user archive **C_DriveList** contains the Group-Object-Lists (list of objects associated to a route or group).

The user archive **C_INFO** contains the object information (Info Database).

The user Archive **C_POLY3** is only required if the Function Polygon is used.

The user Archive **C_CURVE** is used to save the Cemat curve groups.

How to create the user archive for the Group-Object-List

In directory D:\CEMAT_CS\ua you will find the default user archive for the Group-Object-List.

File DriveList.uap contains the structure of the Group-Object-List. The data for Group-Object-List are entered in runtime mode.

Import the structure of the C_DriveList and save:

4. Open the User-Archive
5. Import the structure of the Object list database from C_DriveList.uap
6. Save the structure.

Through the import the Group-Object-List is created with the following structure:

GroupTAG	String	24
HasSubRoute	Number (integer)	
HierachyLevel	Number (integer)	
ObjectComment	String	50
ObjectTAG	String	24
ObjectType	String	15
OrderNo	Number (integer)	
ParentTAG	String	24

You must not enter any data into the user archive Group-Object-List. The data will be entered during runtime.

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How to create the user archive for the Info Database

In directory D:\CEMAT_CS\ua you will find the default files for the Info Database.

File C_INFO.uap contains the structure of the Info Database.

Import the structure of the C_INFO and save:

4. Open the User-Archive
5. Import the structure of the Info Database from C_INFO.uap
6. Save the structure.

Through the import the Info Database is created with the following structure:

C_TAG	String	24
GL_Complex	String	40
GL_Equipment	String	40
GL_LocationObject	String	40
GL_Location_LS	String	40
GL_Plant	String	40
GL_Plant_zone	String	40
G_DOC_Name_1	String	40
G_DRAW_POS	String	40
G_Infotext	String	250
G_LoopA	String	40
G_Sound_1	String	40
G_Sound_2	String	40
G_Spare	String	40
G_Spare_1	String	40
G_Video_Name	String	40
H_Area	String	40
H_Building	String	40
H_Cabinet	String	40
H_Instanc_DB_N0	Number (integer)	
H_Location	String	40
H_PLC_Name	String	20
H_Rack	String	40
I_Area	String	40
I_Building	String	40
I_Cabinet	String	40
I_Location	String	40
I_Rack_I	String	40
I_Rack_Q	String	40
I_Slot_I	String	20
I_Slot_Q	String	20

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M_Area		String	40
M_Bimetall		String	20
M_Building		String	40
M_Cabinet		String	40
M_DOC	Documentation file	String	50
M_DT	Device type	String	30
M_ET	End Time	String	30
M_Feeder		String	40
M_Fuse		String	20
M_HWR	Hardware Revision	String	30
M_IND	Installation Date	String	30
M_INF1	Information 1	String	100
M_INF2	Information 2	String	100
M_INF3	Information 3	String	100
M_INS	Instruction	String	50
M_Interval	Intervall	Number (integer)	
M_LMT	Last Maint. Time	String	30
M_LMT_START	Last Main Time Started	String	30
M_Location		String	40
M_MA	Manufacturer	String	30
M_MES	Message	String	100
M_ON	Order Number	String	30
M_SER	Serial Number	String	30
M_SW	Software Revision	String	30
M_US	User/Operator	String	30
Obj_ID		Number (double)	

The Info Database must be filled by the user. The easiest way is to use an Excel Tool which is described in chapter OS Engineering.



Attention: You must create at least one line of runtime data into the Info Database. You can either import file C_INFO.csv from folder D:\Cemat_CS\ua or create the dummy entry manually. (Select the input mode, in the first line enter in column C_TAG the string „Dummy“ and press Return.)

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How to create the user archive for Polygon function

In directory D:\CEMAT_CS\ua you will find the default user archive for the Polygon C_POLY3.

File C_POLY3.uap contains the structure of the Polygon Archive. The data for the Polygon archive is entered in runtime mode.

Import the structure of the C_POLY3 and save:

4. Open the User-Archive
5. Import the structure of the Polygon database from C_POLY3.uap
6. Save the structure.



Attention: You must create at least one line of runtime data into the Info Database. We recommend importing the example file C_POLY3.csv.

How to create the user archive for Cemat curve groups

In directory D:\CEMAT_CS\ua you will find the default user archive C_CURVE for saving the Cemat curve groups.

File C_CURVE.uap contains the structure of the Cemat Curve group Archive. The curve groups are written in runtime mode.

Import the structure of the C_CURVE and save:

4. Open the User-Archive
5. Import the structure of the Polygon database from C_CURVE.uap
6. Save the structure.



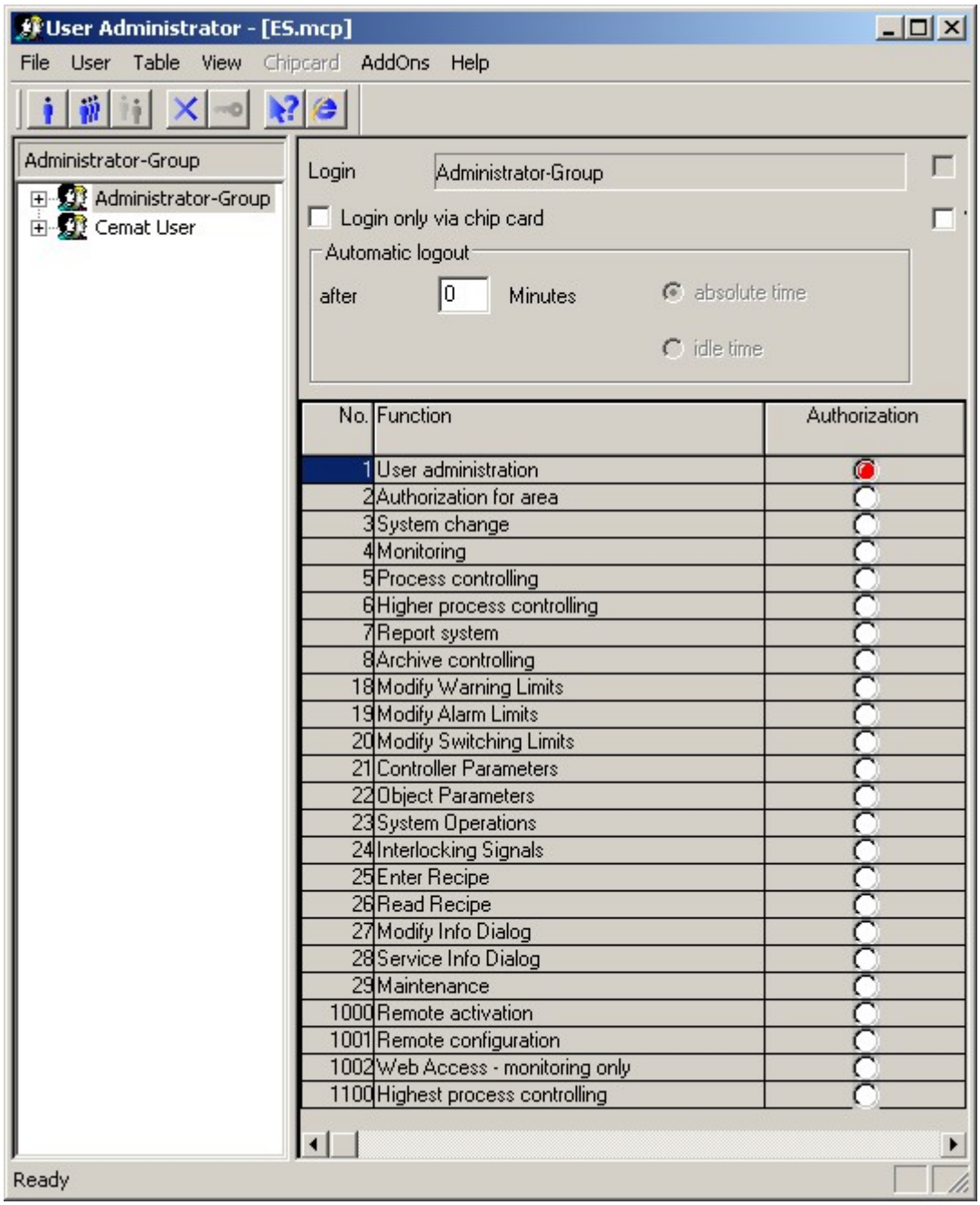
Attention: You must create at least one line of runtime data into the Info Database. You can either import file C_CURVE.csv from folder D:\Cemat_CS\ua or create the dummy entry manually. (Select the input mode, in the first line enter in column C_TAG the string „Dummy“ and press Return.)

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Add User rights

Via WinCC User Administration, additional Operation levels must be defined for Cemat. Each operator gets the permission to operate certain levels in certain areas and is then allowed to carry out any operation belonging to this level.

In the WinCC Explorer click open the **User Administrator** and add the rights from No. 18 to No. 29 according to the following list:



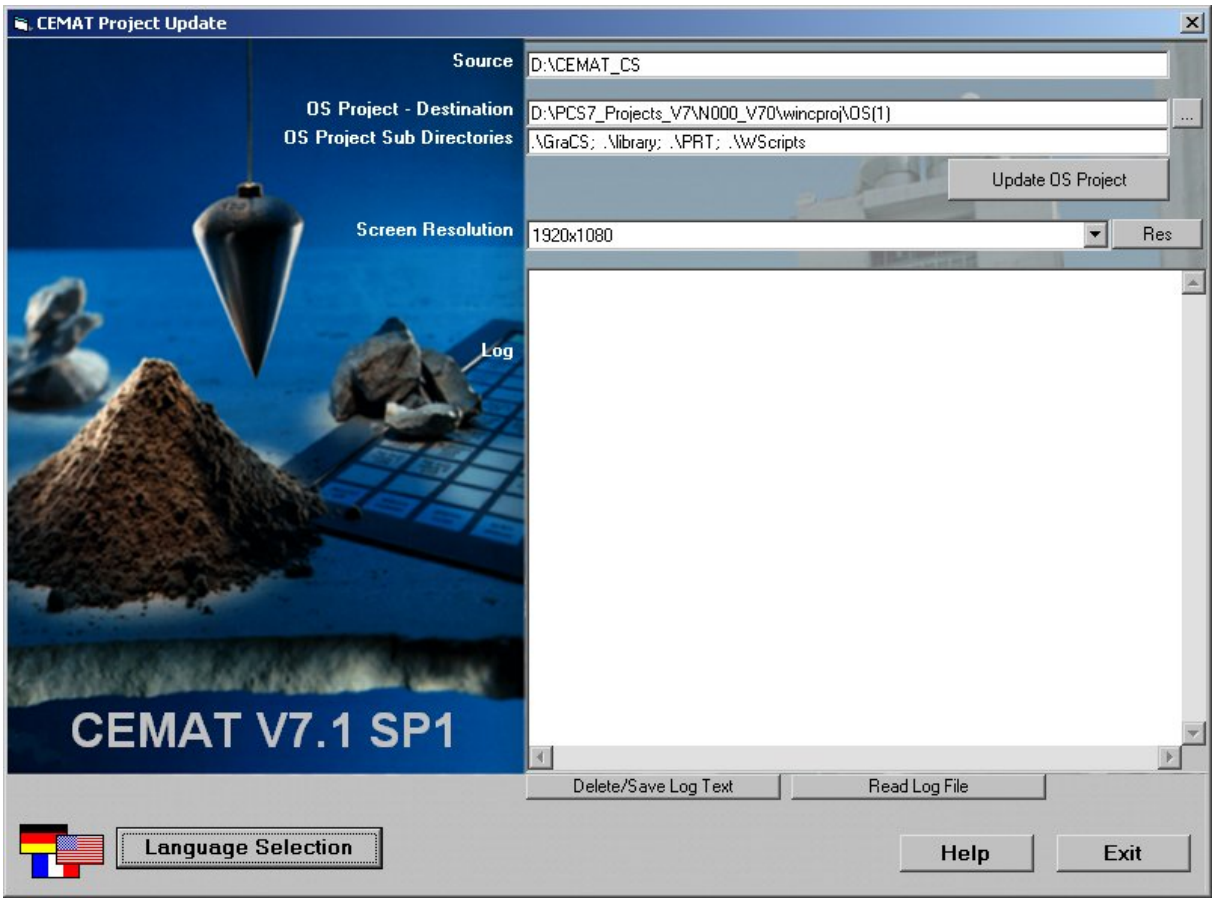
If operations shall be permitted to restricted personal only, additional user rights can be defined.

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Update the WinCC Project with Cemat Functions

In the following step the WinCC Project gets updated with the Cemat functions. During the Cemat installation the Cemat WinCC files are copied into folder D:\CEMAT_CS\WinCC under GraCS, Libray, PRT and WScipts. These files must now be copied to the equivalent folders of the OS Project.

In order to update the WinCC Project, please go to D:\CEMAT_CS and start 'CematProjectUpdate.exe'.



The **Source** must be D:\CEMAT_CS

Under **OS Project - Destination** you have to enter destination (Directory of the OS Project)

Under **OS Project Sub Directories** you find the Subfolders which get copied during the update (cannot be modified).

The **Screen Resolution** (1280x1024, 1600x1200, 1680x1050, 1920x1080 or 1920x1200) is only important for OS Projects with Operation Interface. Via an option, during the OS Project Update the Standard pictures @AlarmEmergency.pdl, @AlarmEmergencyOP.pdl, @AlarmOneLine.pdl, @C_AlarmListing.pdl, @Overview1.pdl and @TopAlarmNew.pdl are exchanged according to the screen resolution.

Press button '**Update OS Project'** and the files will be copied to the corresponding directories.

One by one the directories GraCS, Library, PRT and WScripts are copied into your OS Project and after this the PDLs are exchanged by the proper Screen Resolution. You have to acknowledge each step with OK and everything is entered into a LOG file.

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During the update procedure the following GraCS files are overwritten by Cemat files.

@AlarmEmergency.pdl	Extended Alarm line
@AlarmEmergencyOP.pdl	Extended Alarm line
@AlarmOneLine.pdl	Alarm line
@Buttons11.pdl	Button keys1
@Buttons12.pdl	Button keys 2
@Language.pdl	Language Selection
@Logo.pdl	Cemat Logo
@Overview1.pdl	Overview Range
@TopAlarmNew.pdl	Alarm lines
@PG_Intlk02_Standard.pdl	Interlock faceplate
@PG_Intlk04_Standard.pdl	Interlock faceplate
@PG_Intlk08_Standard.pdl	Interlock faceplate
@PG_Intlk16_Screen2.pdl	Interlock faceplate
@PG_Intlk16_Standard.pdl	Interlock faceplate

During the Cemat project update the above listed standard PDLs, such as Overview1.pdl are overwritten by the Cemat pictures. This is not correct for a Server because normally a Server does not have a user interface.

After the Update the WinCC Project, proceed as follows:

- Open the WinCC Project
- Run the OS Project Editor again in order to overwrite the Standard Pictures with the original pictures from PCS7.
- Open 'Global Script' selecting C-Editor and regenerate Header. (Menu Options -> Regenerate Header)

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Generation of the Template Pictures

During the Update the WinCC Project with Cemat Functions a template picture is copied into the GraCS folder of the OS Project which contains predefined symbols (block icons) for CEMAT Objects:

C_@PCS7Typicals_CemV8_001.pdl

The picture C_@PCS7Typicals_CemV8_001.pdl contains the default symbols for automatic generation of block icons from SIMATIC Manager.

During the automatic generation of block icons PCS7 V8 is looking for a template picture with the name @PCS7Typicals.pdl. Multiple template pictures are possible (@PCS7Typical1.pdl, @PCS7Typical2.pdl). The pictures are used in ascending order.

Before you can start with the engineering of your project, you have to create a template picture @PCS7Typicals.pdl according to the examples in C_@PCS7Typicals_CemV8_001.pdl.

You can either copy C_@PCS7Typicals_CemV8_001.pdl and save it under the name @PCS7Typicals.pdl or copy only the block icons you need. You may also create your own block icons, following the engineering rules.



See Engineering Manual 08_OS_Engineering



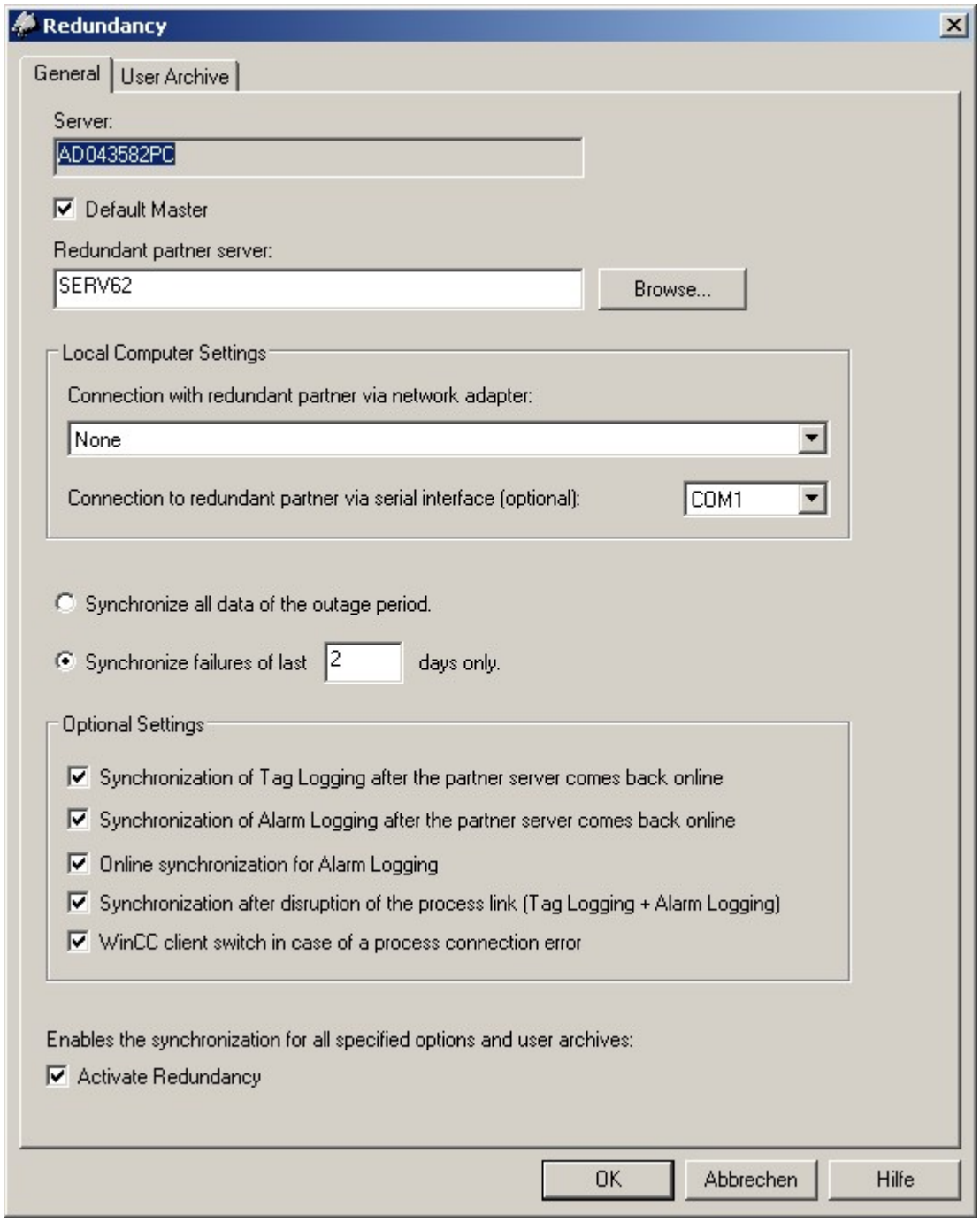
Important: In your GraCS folder you additionally find the CEMAT template picture for the Cemat Basic Library (Project Standard 000): C_@PCS7Typicals_CemV7.pdl.
This template picture must not be used in case of Project Standard 001, but if a function of the basic library is required, the corresponding block icon can be copied into your template picture.

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Redundancy Settings in the Server-Project

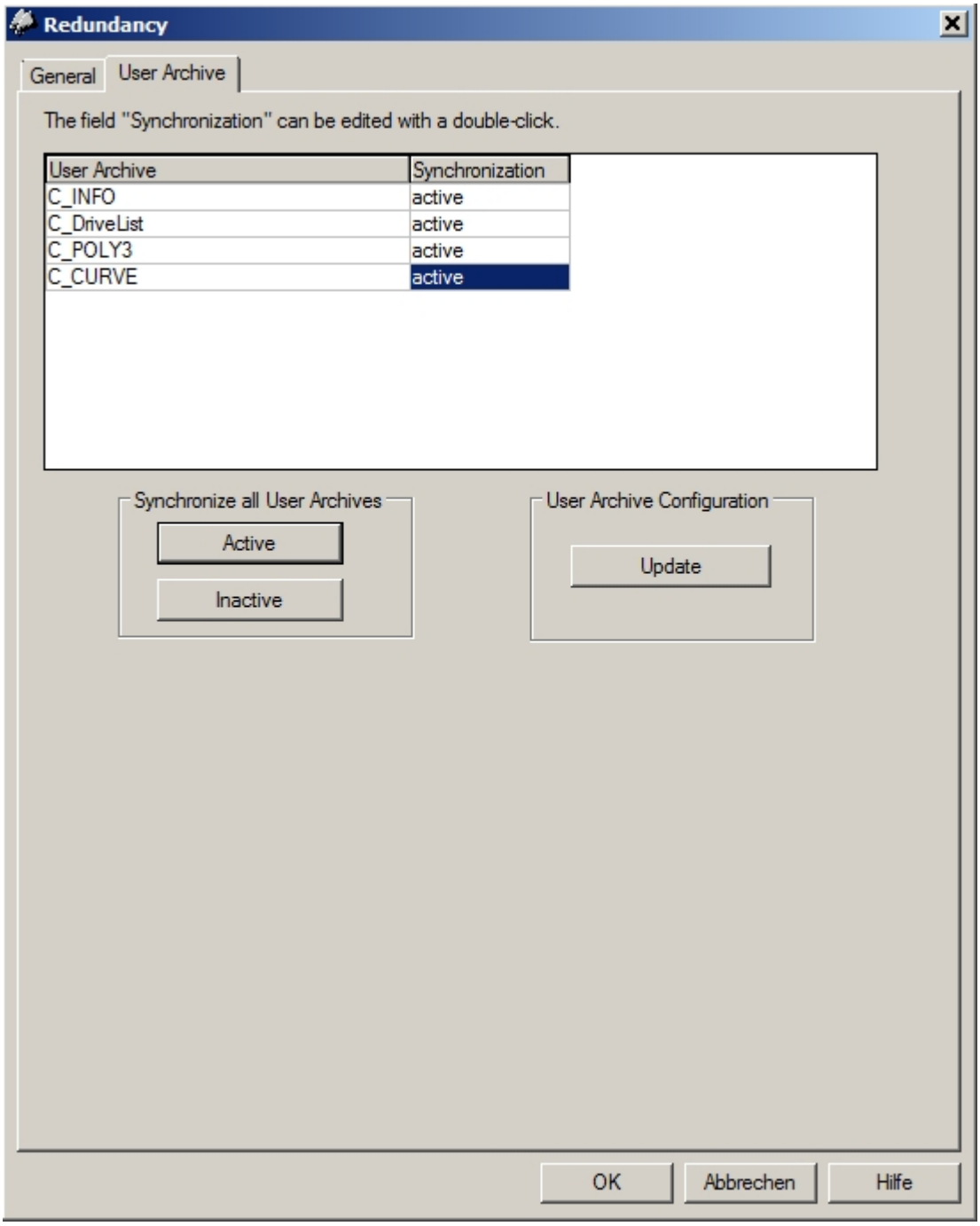
After the Server-Project and the Standby-Server-Project are configured, in the Server-Project the corresponding Standby-Server-Project must be selected and the redundancy settings have to be performed.

1. Select the Server-Project in the SIMATIC Manager and select in the Properties under Target OS and Standby-OS the corresponding Standby-OS.
2. Open the Server-Project and carry out the redundancy settings:
   - Activate Redundancy
   - Select the Redundant Partner Server.
   - Select the options according to your requirement.



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3. Activate the redundancy also for the user archives C_INFO, C_DriveList, C_POLY3 and C_CURVE.



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OS Configuration (Standby-Server)

Standby-Server-Project

The Standby-Server-Project doesn't contain any data. There is only a reference to the Master- Server-Project. No additional Settings required.

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OS Configuration (Client)

The following settings have to be performed in the OS-Project of each Client.



Important: The following steps must be performed from the beginning in the engineering language, which is used for the project. If you change the language afterwards the language dependent setting have to be performed again.
The language settings in SIMATIC Manager are not consistent with the settings for WinCC!!

Project Properties

Adaptations for the Project itself can be carried out under Properties.

Folder “General” contains the Project Type.
An OS Client is of type “Client Project”. This is the default setting and must not be changed.

In Folder “Update Cycles” the time values for the Update cycles are defined. The CEMAT Symbols generally use “User Cycle 1”. The default value of this is 2000ms. You have to adapt this value according to your requirement, e.g. 1000ms.

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OS Project Editor

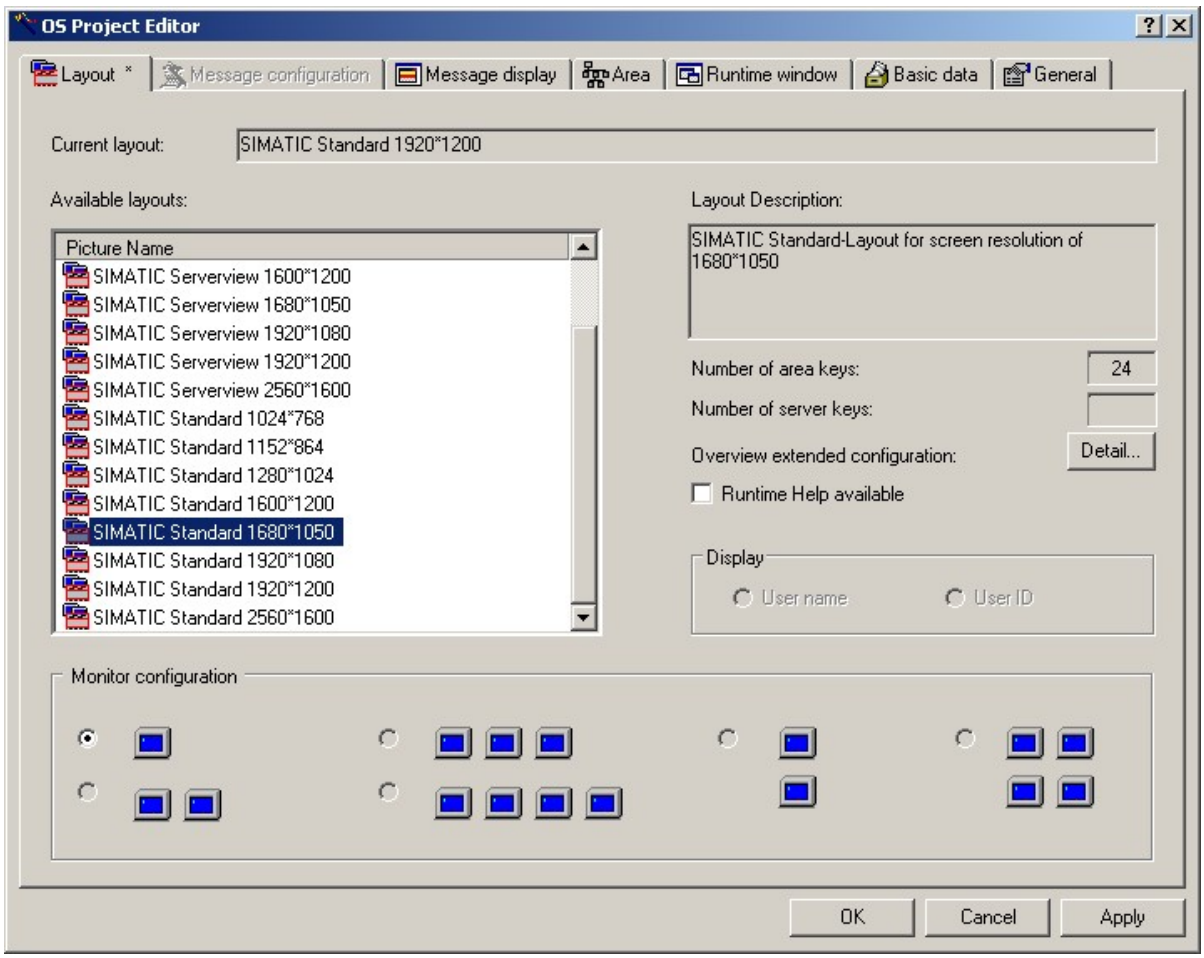
Settings for the user interface used by the plant operator for monitoring and controlling the plant during process operation In the OS Project Editor.

A detailed description to this item you find in the PCS7 Configuration Manual Operator Station. The following pages describe only the settings relevant for CEMAT.

In Tab Layout choose the screen resolution according to your Monitor. In Cemat V8.0 the default resolution is 1920x1080, but the Cemat Standard pictures are also available for 1280x1024, 1600x1200, 1680x1050 and 1920x1200.

Also select the Number of horizontal and vertical area keys and the number of Servers under Detail (Picture Tree) and the Monitor Configuration of your PC.

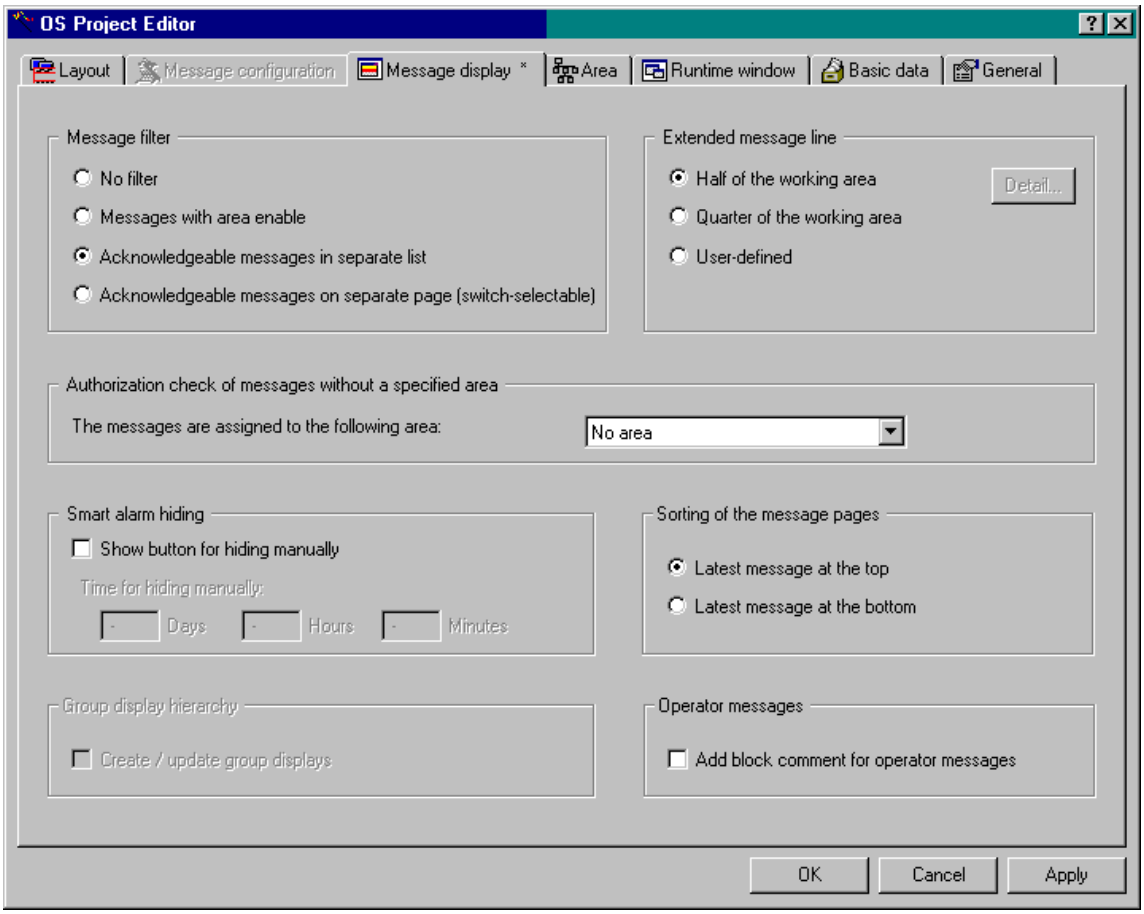
Example for the Layout of an OS Client:



Note: If you select a different screen resolution (1280x1024, 1600x1200, 1680x1050 or 1920x1200), the standard pictures @AlarmOneLine.pdl, @TopAlarmNew.pdl, @C_AlarmListing_Cemat.pdl, @AlarmEmergency.pdl, @AlarmEmergencyOP.pdl and @Overview1.pdl have to be exchanged.

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Message display for a Client Station:



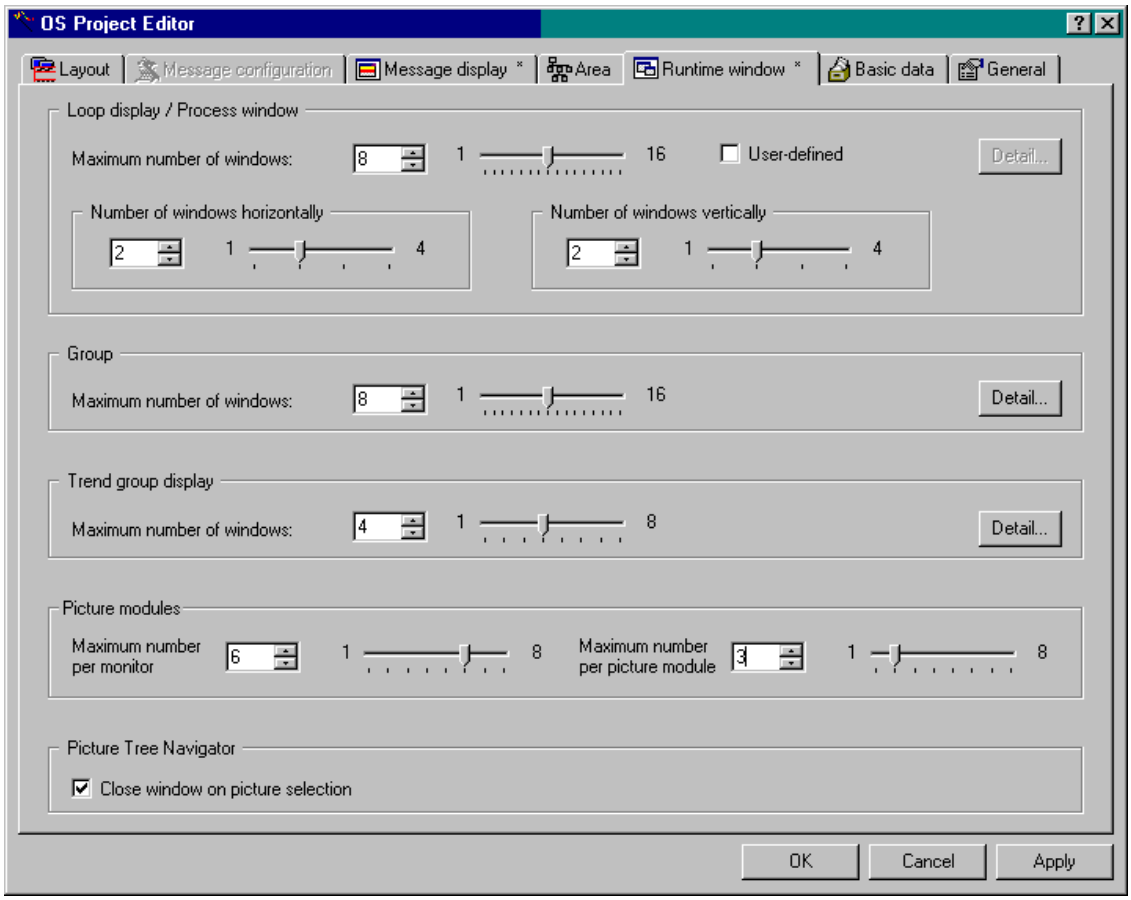
The Message filter has to be set to “Acknowledgeable messages in separate list”.

The group display should be created and updated automatically.

Note: The sorting of the message pages is only used for the Standard WinCC Alarm list, and not relevant for the Cemat Alarm list.
In the Cemat Alarm list the default sorting is "Latest message at the bottom". This setting can be changed under D:\Cemat_CS_Config in file C_Messages.cfg (see chapter Tips and Tricks).

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Runtime Window for an OS Client:



Define the maximum number of windows that can be opened when faceplates and curves are called as well as the maximum number of faceplates that can be opened on a monitor.

Set the maximum number of picture modules per monitor to 6 and the maximum number per picture module to 3.

The rest of the settings in the OS Project Editor can remain as per default or can be adapted later.

With “OK” all settings are carried out.



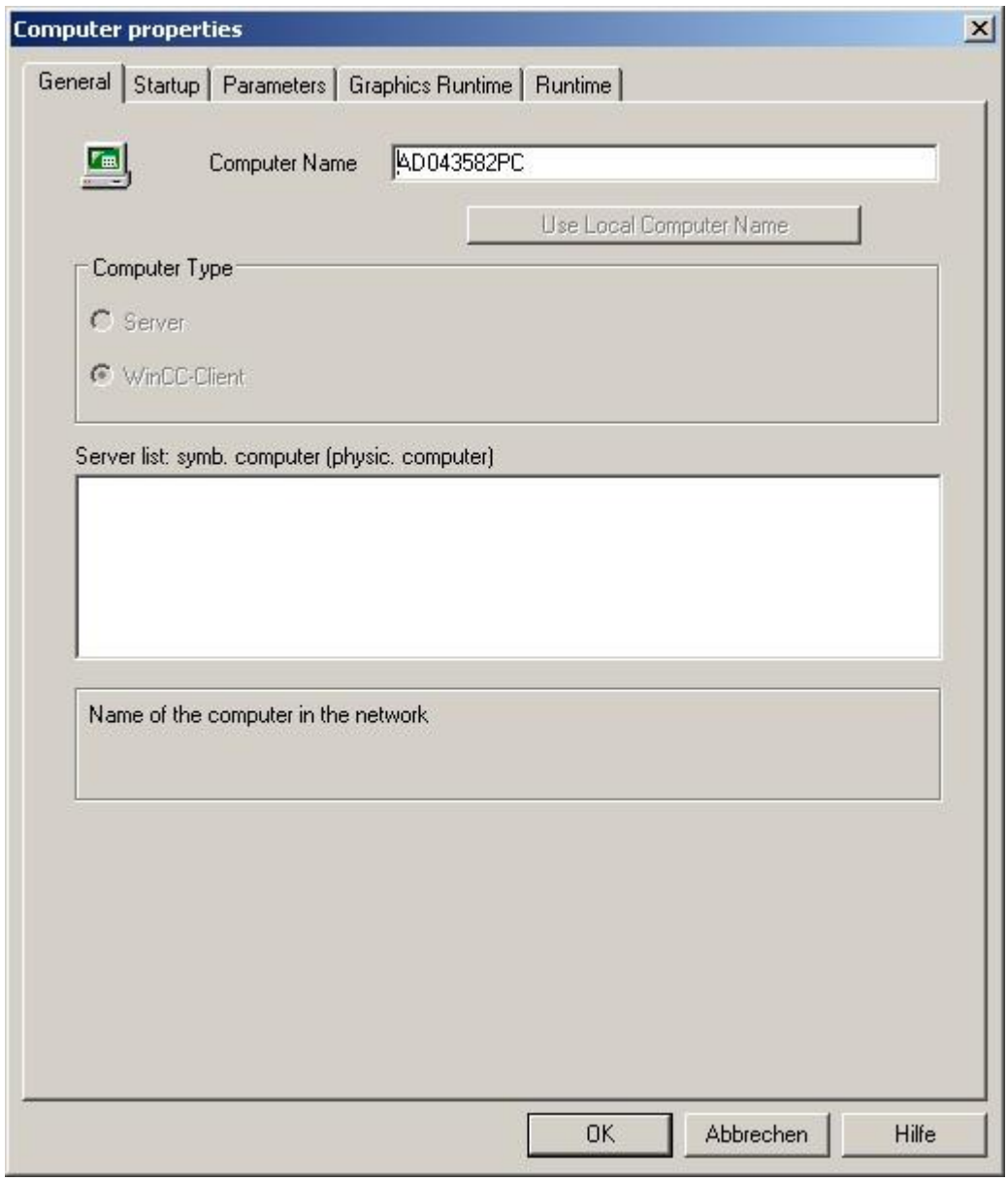
Caution: If for any reason you have to run the OS-Project Editor again, make sure that all files mentioned under CEMAT Specific Preparations are deselected in Folder “Base Data”. Otherwise the CEMAT Settings are overwritten with the delivery state of PCS7.
→ See chapter CEMAT Specific Preparations!

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Computer properties

The computer properties must be checked and adapted to the requirements of the plant. Most of the settings can probably not be entered at the beginning of the engineering and must be adapted later (sometimes after commissioning).

Folder General shows the Computer Name and the Computer Type



Caution: The Computer Name for all OS Projects is the name of the Engineering Station. During the download of the OS-Project to the individual PCs the name is automatically replaced by the Name of the PC Station.

The additional application CEMATRS.exe must not be added for a Cemat Client (not required).

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Tag Management

Cemat Tags

Cemat needs a number of internal variables. From Cemat V7.0 SP1, during the start of the runtime system these variables are created automatically in folder CEMAT. You don't have to create the Cemat Tags manually any more.

Horn Tags

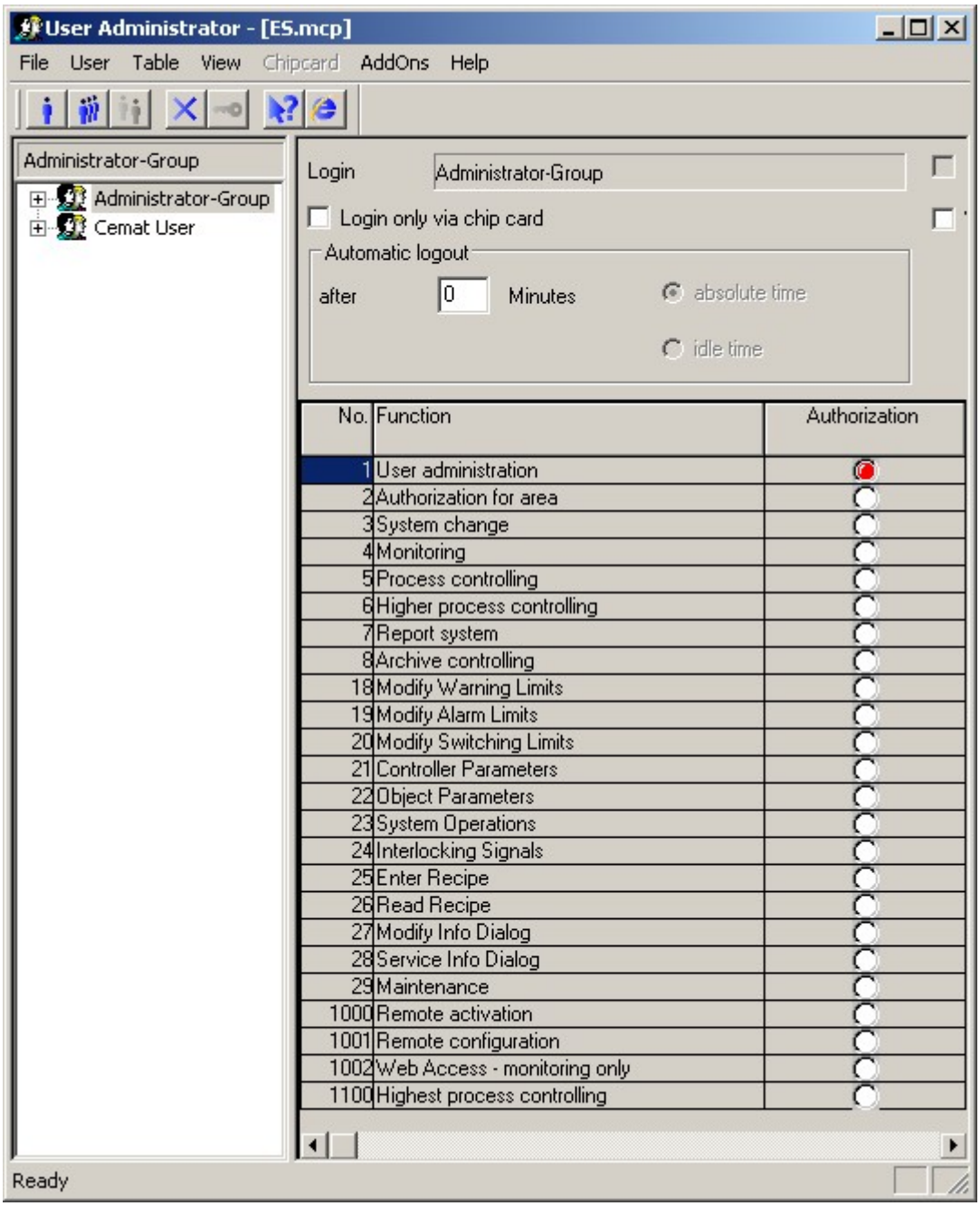
During the horn configuration additional tags are automatically created. You will find these variables in group “Horn”.

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Add User rights

Via WinCC User Administration, additional Operation levels must be defined for Cemat. Each operator gets the permission to operate certain levels in certain areas and is then allowed to carry out any operation belonging to this level.

In the WinCC Explorer click open the **User Administrator** and add the rights from No. 18 to No. 29 according to the following list:



If operations shall be permitted to restricted personal only, additional user rights can be defined.

Later you have to define user groups and users to which you select specific authorizations. However the user rights related to specific areas can only be configured after the package is loaded.

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Update the WinCC Project with Cemat Functions

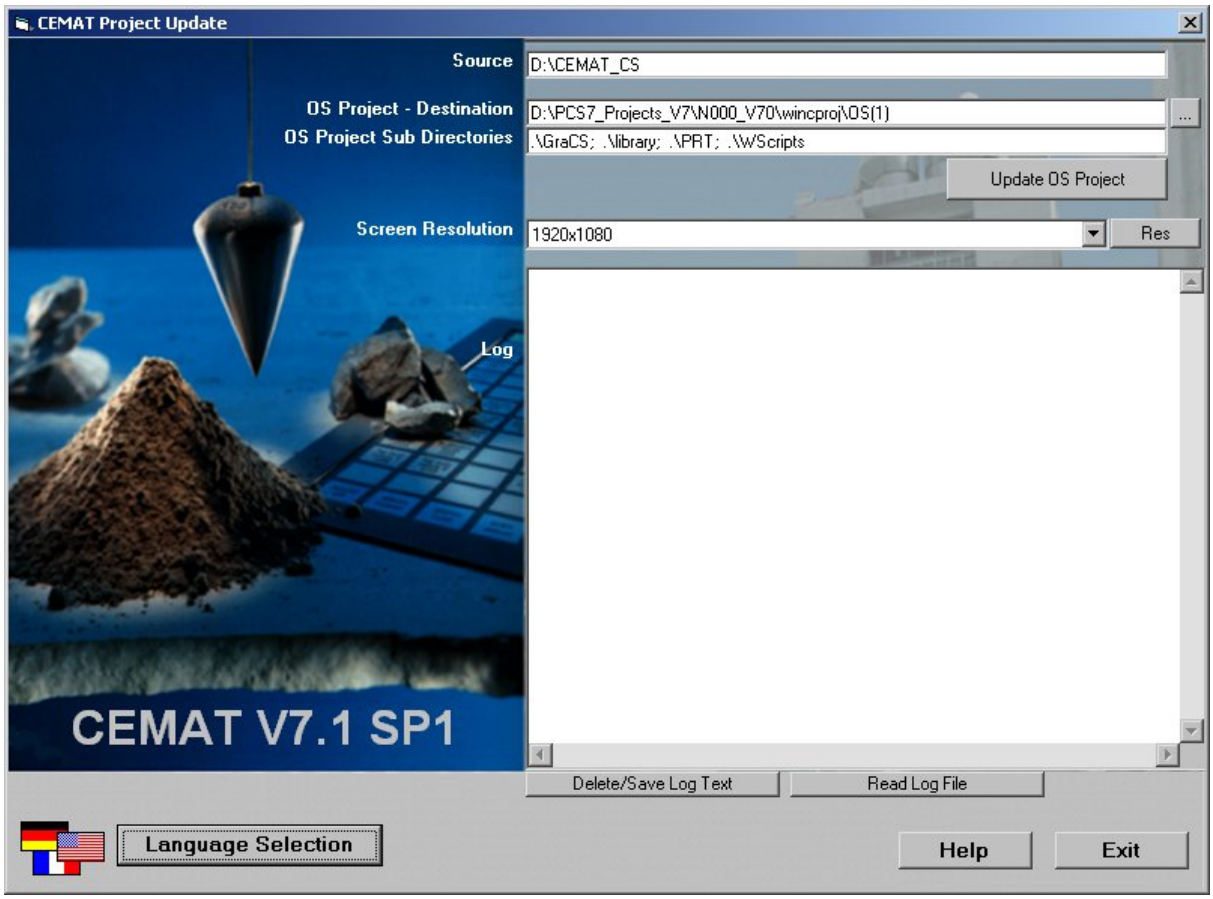
In the following step the WinCC Project gets updated with the Cemat functions. During the Cemat installation the Cemat WinCC files are copied into folder D:\CEMAT_CS\WinCC under GraCS, Libray, PRT and WScipts. These files must now be copied to the equivalent folders of the OS Project.

Additionally, some PDLs are available in different Screen resolutions (1280x1024, 1600x1200, 1680x1050, 1920x1080 or 1920x1200) and must be exchanged.

GraCS-Files for which different Screen Resolutions exist:

	1280x1024	1600x1200	1680x1050	**1920x1080**	1920x1200
@AlarmEmergency.pdl	x	x	**x**		
@AlarmEmergencyOP.pdl	x	x	**x**		
@AlarmOneLine.pdl	x	x	x	**x**	
@C_AlarmListing.pdl	x	x	x	**x**	x
@Overview1.pdl	x	x	x	**x**	
@TopAlarmNew.pdl	x	x	**x**		

In order to update the WinCC Project, please go to D:\CEMAT_CS and start 'CematProjectUpdate.exe'.



The **Source** must be D:\CEMAT_CS

Under **OS Project - Destination** you have to enter destination (Directory of the OS Project)

Under **OS Project Sub Directories** you find the Subfolders which get copied during the update (cannot be modified).

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Select the desired **Screen Resolution** for your Project (1280x1024, 1600x1200, 1680x1050, 1920x1080 or 1920x1200). Via an option, during the OS Project Update the above listed Standard pictures are exchanged according to the screen resolution.

Press button '**Update OS Project'** and the files will be copied to the corresponding directories.

One by one the directories GraCS, Library, PRT and WScripts are copied into your OS Project and after this the PDLs are exchanged by the proper Screen Resolution. You have to acknowledge each step with OK and everything is entered into a LOG file.

During the update procedure the following GraCS files are overwritten by Cemat files.

@AlarmEmergency.pdl	Extended Alarm line
@AlarmEmergencyOP.pdl	Extended Alarm line
@AlarmOneLine.pdl	Alarm line
@Buttons11.pdl	Button keys1
@Buttons12.pdl	Button keys 2
@Language.pdl	Language Selection
@Logo.pdl	Cemat Logo
@Overview1.pdl	Overview Range
@TopAlarmNew.pdl	Alarm lines
@PG_Intlk02_Standard.pdl	Interlock faceplate
@PG_Intlk04_Standard.pdl	Interlock faceplate
@PG_Intlk08_Standard.pdl	Interlock faceplate
@PG_Intlk16_Screen2.pdl	Interlock faceplate
@PG_Intlk16_Standard.pdl	Interlock faceplate



Caution: If for any reason you have to run the OS-Project Editor again, make sure that the above mentioned PDLs are deselected in Folder “Base Data”. Otherwise the CEMAT Settings are overwritten with the delivery state of PCS7.
@TopAlarmNew.pdl and @Overview1.pdl can not be deselected and must be copied from D:\CEMAT_CS\WinCC\GraCS again after running the OS-Project Editor.

If you have to exchange the Screen Resolution later on, you can also use program 'CematProjectUpdate.exe' to carry out this function (Button **Pixel)**.

After the update of the WinCC Project, proceed as follows:

- Open the WinCC Project.
- Open 'Global Script' selecting C-Editor and regenerate Header. (Menu Options -> Regenerate Header)

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Generating and loading of the Server Data

To make the Server data available for the Client, a so-called package must be created for the Server-Project and loaded in the Client-Project. This is carried out in the SIMATIC Manager. Proceed as follows:

- Select the OS-Project of the Server with the right Mouse Button and choose Option “Generate Server Data…”.
  The same function you will also find under Options → OS → Generate Server Data.
- After that select the OS-Project of the OS Client with the right mouse button and choose option “Assign OS Server…”. Select the Server Data and press OK.
  The same function you will also find under Options → OS → Assign OS Server.

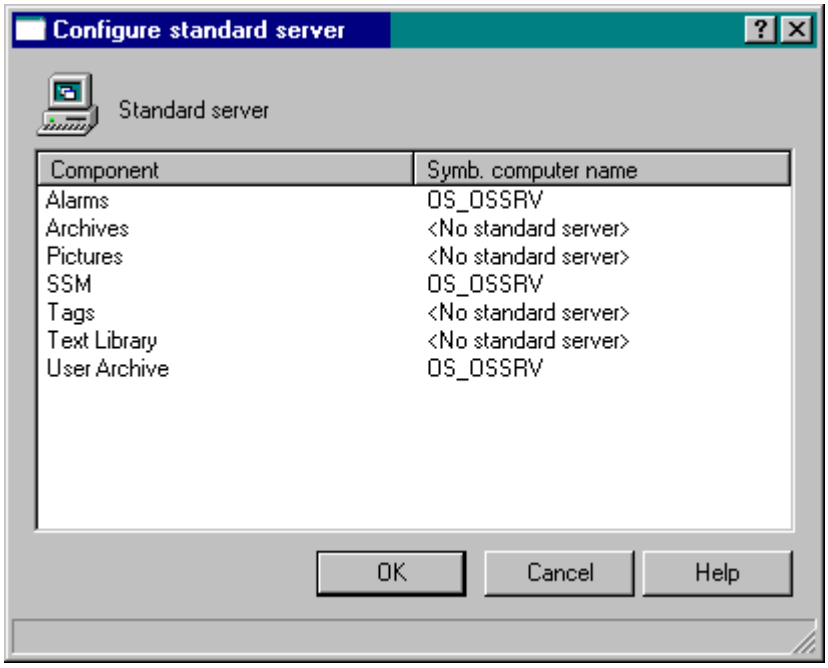
Once the Server data is loaded the package gets automatically updated during compilation of the OS-Data.

Now open the OS Client Project. The configuration of the standard server and the selection of the preferred server are carried out under WinCC.

Loading of the Server Data in a Client Project

To select the standard server, use context menu of Server data and select menu option Standard server...

- Select the standard server for the components Alarms, SSM and User Archive.



SSM = Split Screen Manager (e. g. the curve selection will be stored on the here selected Server).

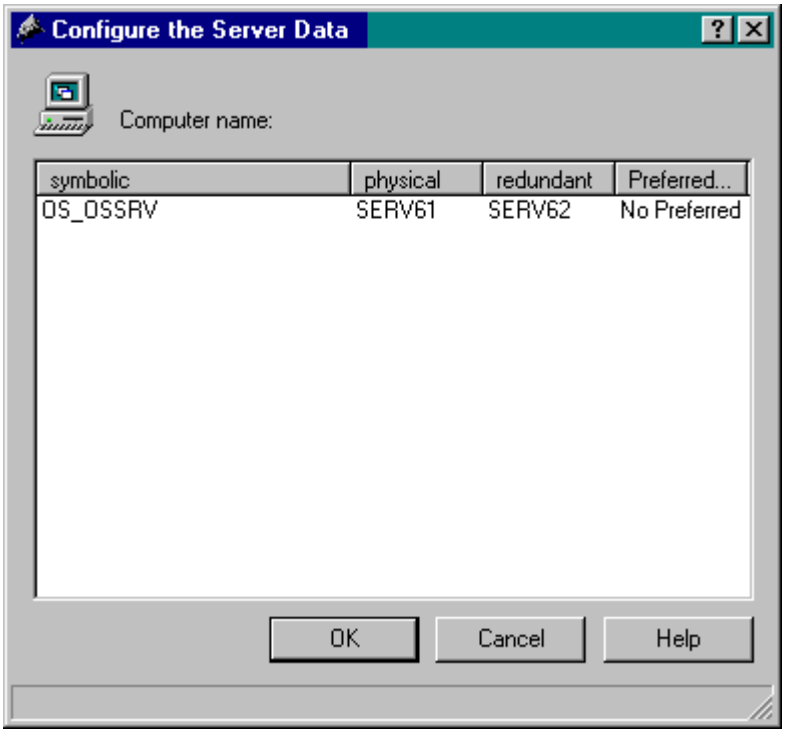
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Selection of a Preferred Server

To distribute the load for the servers uniformly it is useful to connect a part of the Clients to one Server and the other part to the Standby-Server.

Therefore a Preferred Server must be configured under Serverdata -> Configure ...

Example:



If the preferred Server is stopped the Client automatically switches to the Partner-Server. Once the preferred Server runs again, the Client automatically switches back to the preferred Server.

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Selection of area specific rights

After the package is loaded the user groups and the users can be defined and their rights can be defined area specific.

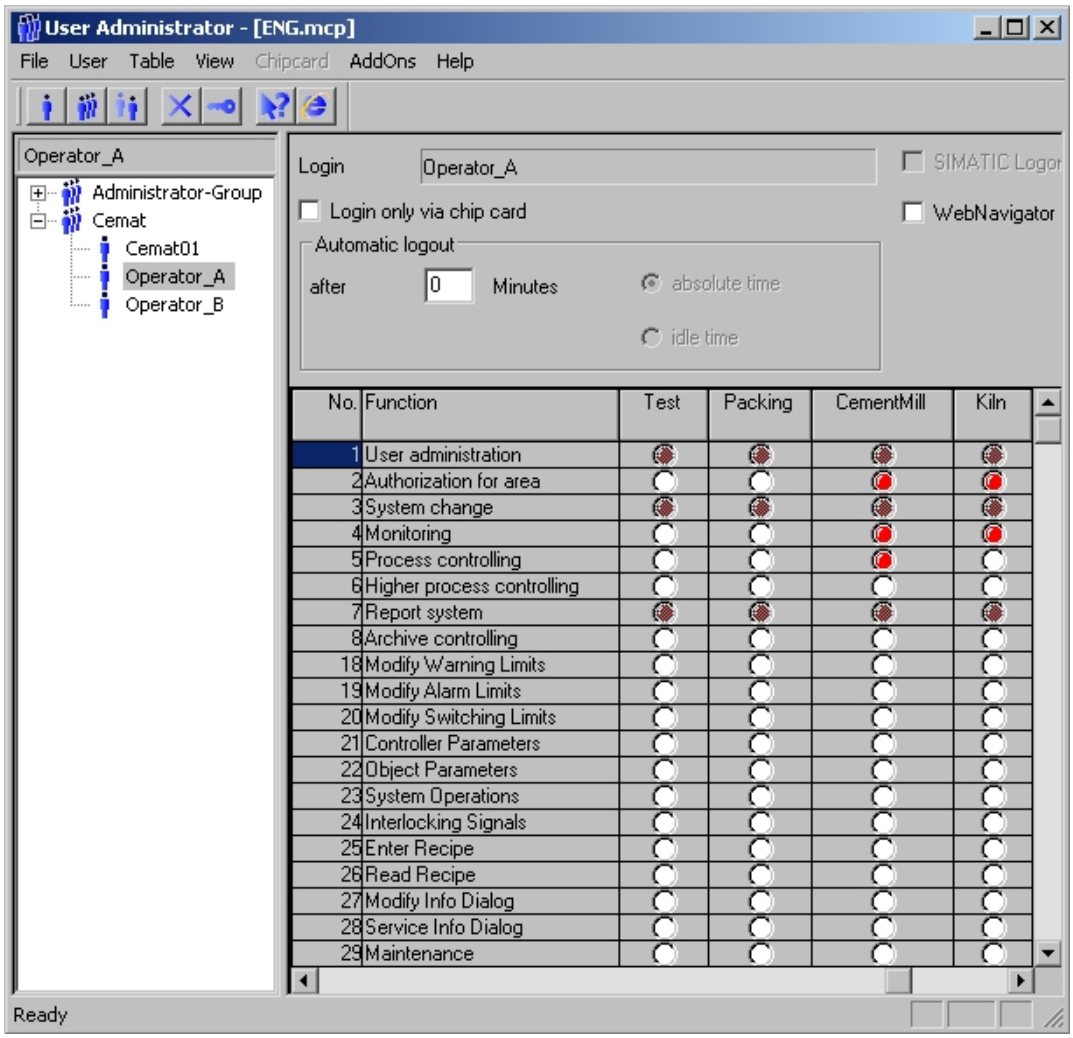
You can e.g. enable a complete area or only certain operations within an area.

With the right 2 “Authorization for area” it is defined which area is released for the user.

With the right 4 "Monitoring" is defined whether the area can be monitored.

With the right 5 „Process controlling“, it is defined whether a user is allowed to operate the area. He will then also get the messages from this area and the horn is activated.

Example:



The user „Operator_A“ is allowed to:

open, watch	→ **Cement Mill, Kiln**
operate	→ **Cement Mill,**

The areas **Test** and **Packing** are disabled for Operator_A.

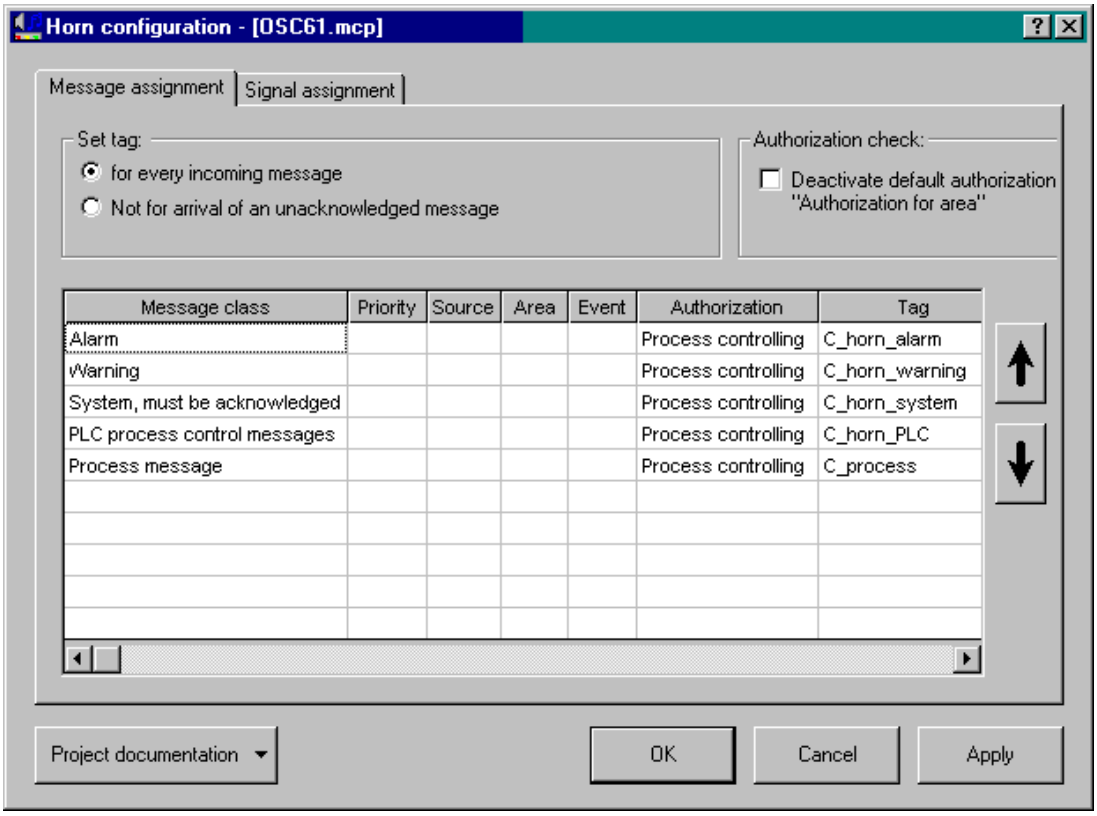
Messages are only shown for areas which are enabled for operation. Operator_A will get only the messages from the Cement Mill area and he can acknowledge only these messages.

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Horn configuration

From CEMAT V6.1 you can define a separate Sound for each Message class. The horn must be configured as follows:

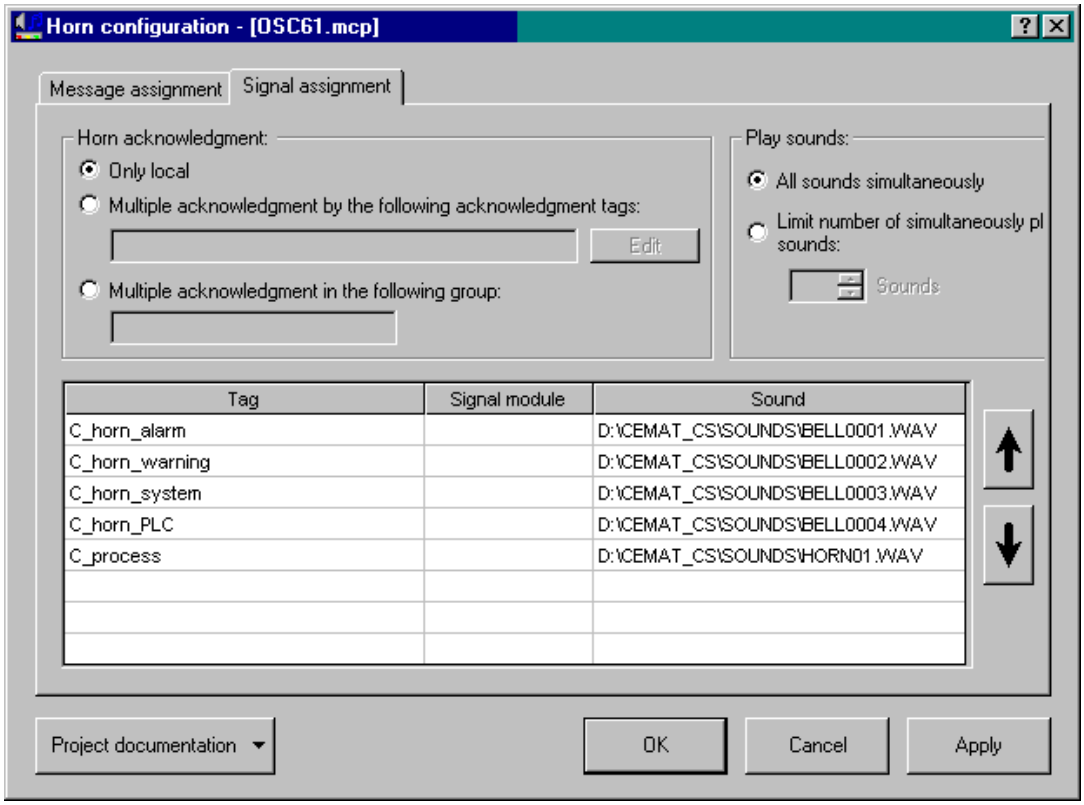
1. First define in tab “Message assignments” all message classes which should create a sound. These are Alarms, Warnings, System messages which require acknowledgement, AS Process control message and Process messages. If you use other message classes with alarms in your project you have to define these as well.
2. Assign the Authorization „Process controlling“ (with this the Authorization is enabled per Area).
3. Per message class, define an internal variable with computer local actualization. Insert the variable name. With “Apply” the variable is automatically created in the tag management.
4. The definition can also be carried out per Area.



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5. In tab “Signal assignment” you can define for each variable an individual sound. A sample of different sounds you find in directory D:\CEMAT_CS\Sounds.
   The following configuration depends on whether you want to acknowledge the Horn on each Client independently or you want to acknowledge the Horn for different Clients at the same time.

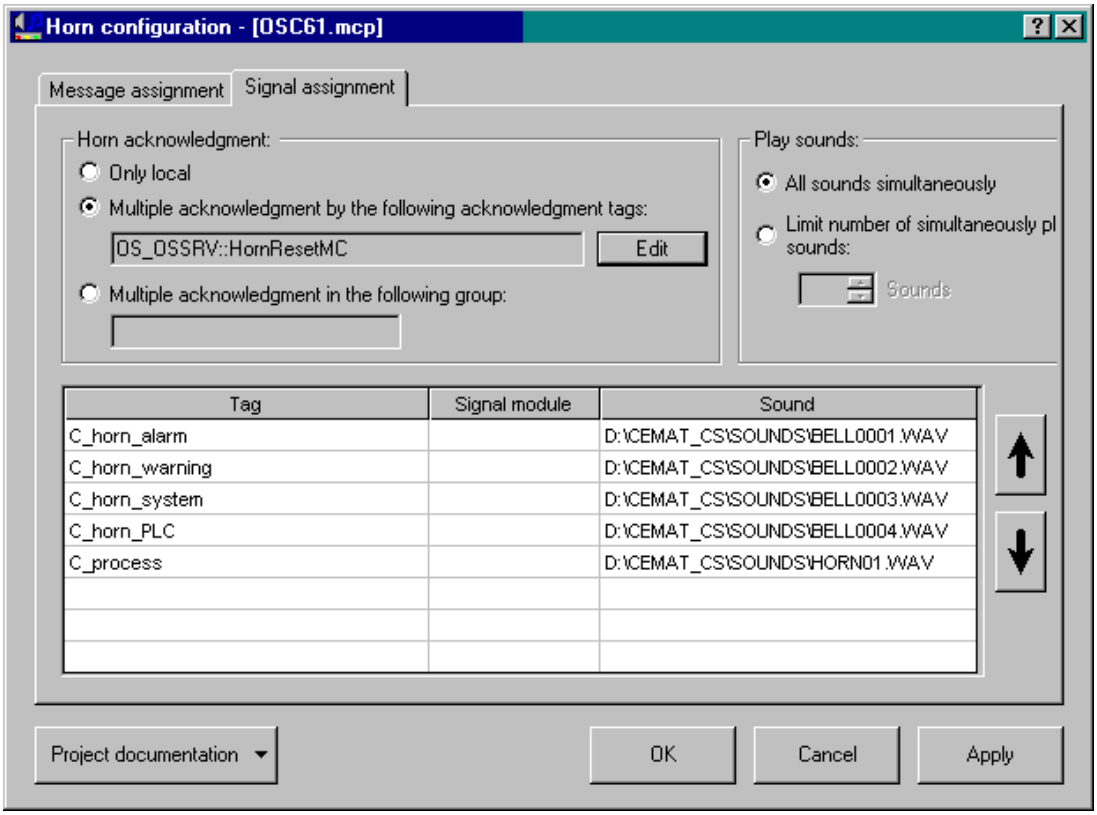
   For Stand-alone WinCC Clients the Horn acknowledgement is “Only local”. Here you only have to select a sound file for each tag.



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For WinCC Clients with signal devices acting in unison a Reset Variable must exist on in the Tag Management of the Server. This tag you have already created during the Server Configuration.

In this case select the Horn acknowledgement option „Multiple acknowledgement by the following acknowledgement tags“ and after that select the reset variable from the internal variables of the Server.
Select a sound file for each tag.



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Archiving

In a PCS 7 system, you can archive various types of data that accumulates during process mode. This data includes process values such as measured values, messages and alarms.

PCS 7 allows you to create archive tags for process values designated for this purpose.

For each measure you want to archive, you have to create an archive variable. Select the proper archiving cycle according to the function of the measure:

- Quick archiving for currents, pressures etc.
- Slow archiving for temperatures etc.

As default, archiving is performed locally on the various OS servers. If you also use a central archive server, further archiving routines are performed centrally on this archive server.

As an additional tool for archiving data from PCS 7, you can also use Storage Plus. This software package requires a separate license.

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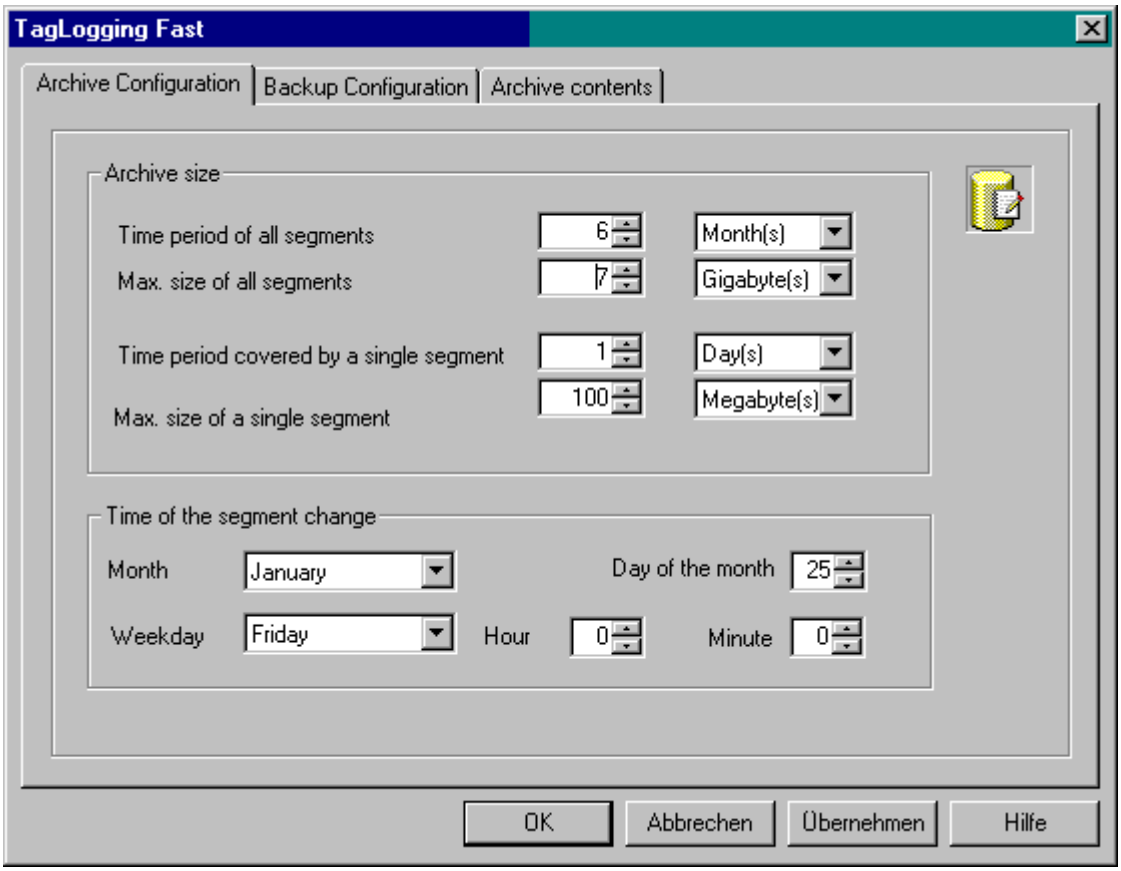
Tag Logging

Archiving process values is done by the tool “Tag Logging”. Curves are archived over a time range of 6 months.

The following Archive configuration has to be set up in "Tag Logging" and is typical for a cement plant.

Tag Logging Fast and Slow:

1. Archive size: Timeframe over all segments: 6 months.
2. Maximum size over all segments: 7 Gbyte.



The Process Value Archive contains stored values of variables that have been created in the Process Value Archive.

The Process Value Archive is configured as a cyclic archive. Storage location is the hard drive.

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Central Archive Server (CAS)

The central archive server is used for long-term archiving diverse plant data from PCS 7 in a central database. The central archive server enables you to manage swapped-out measured values and messages from the OS archives and OS reports. These data are provided regardless of the PCS 7 runtime system.



Note: You need to install additional Microsoft components for the central archive server. These components are on the PCS 7 Toolset DVD in the folder Microsoft\MS_for_CAS. Install the appropriate language version for the installed operating system.

Configuring an Archive Server



For the configuration of the Central Archive Server refer to the PCS7 Configuration Manual Operator Station.

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Integrated Asset Management



For detailed information regarding configuration of a Maintenance Station refer to PCS7 Configuration Manual Engineering System.

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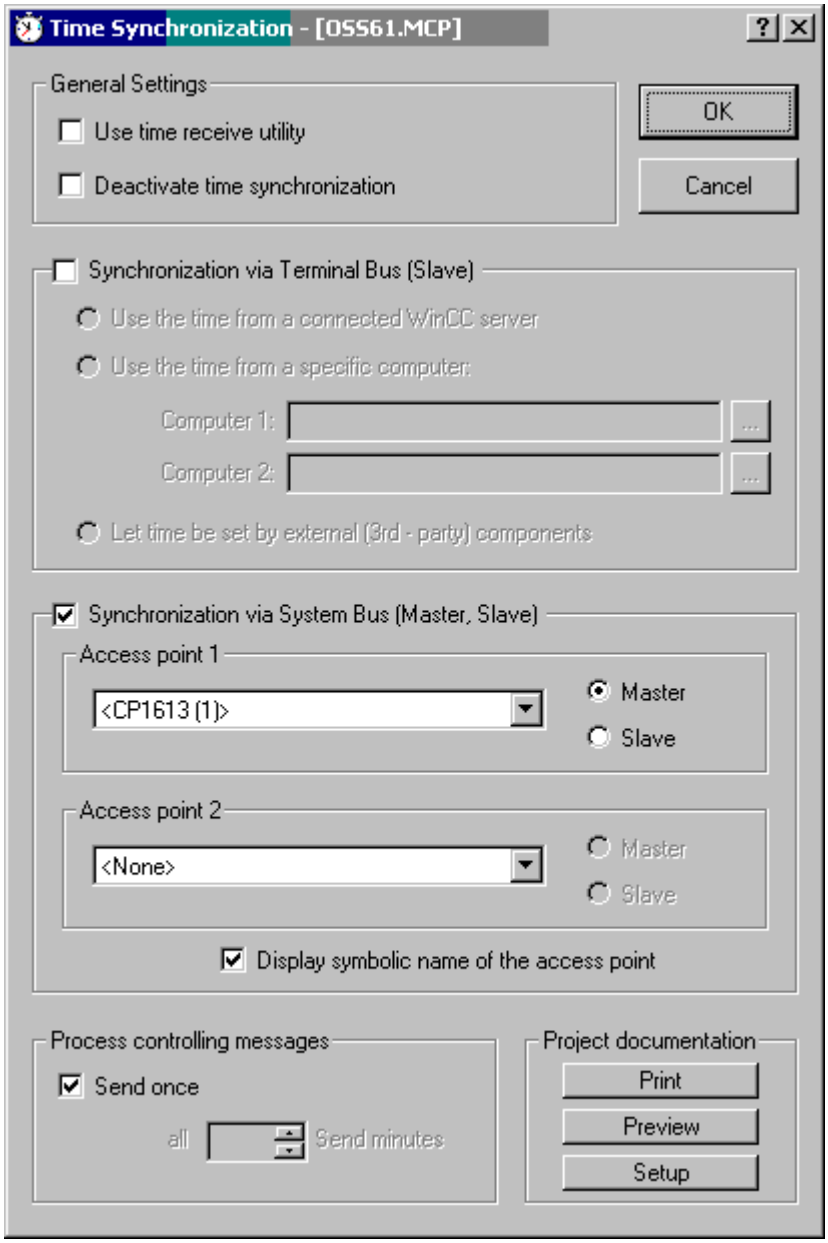
Time Synchronization

Time Synchronization AS

With the settings under “Hardware Configuration for a CEMAT AS” the AS is already configured for the time synchronization “As Slave”.

Time Synchronization Server

The following picture shows the settings for the time synchronization. In this example the Server PCs (Primary and Standby) will be the time Master:

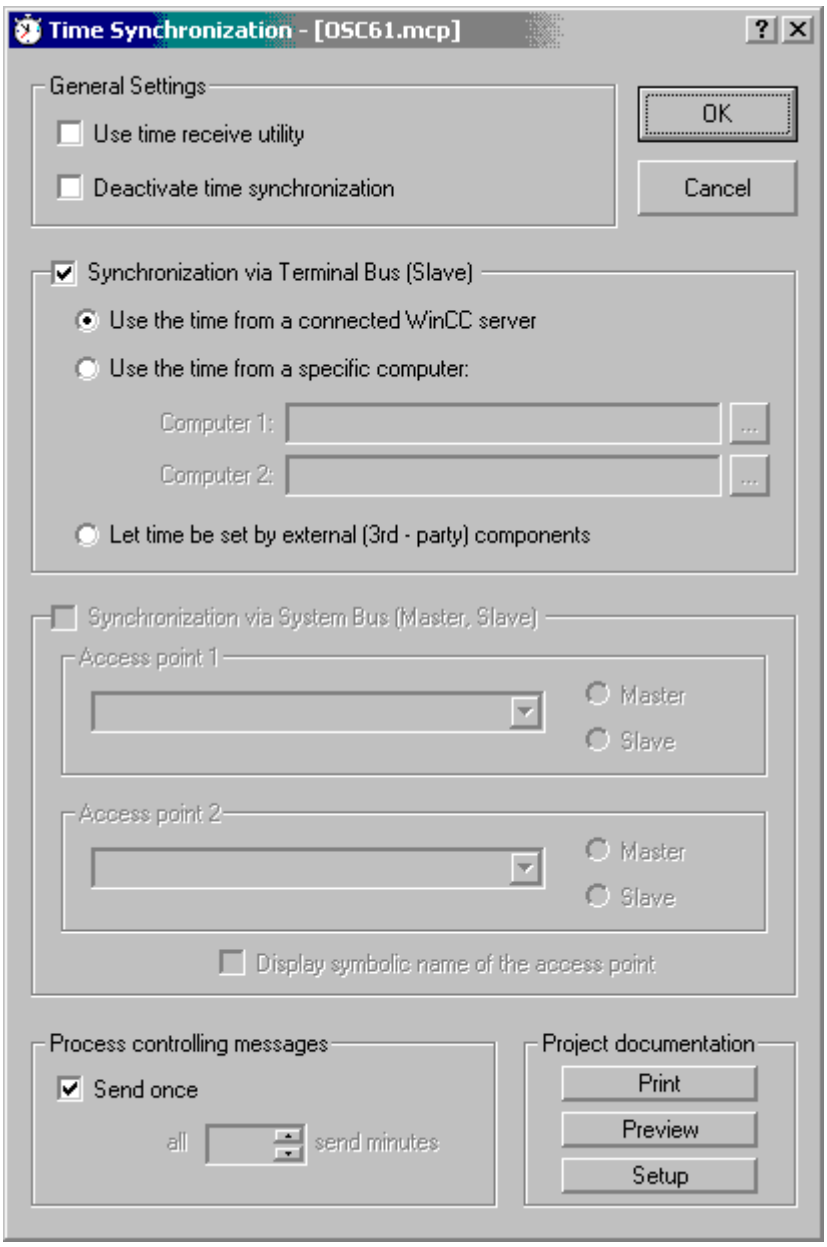


Note: If the Engineering Station has no CP1613 the access point can not directly be selected. In this case select the option “Display symbolic name of the access point” and select the CP1613 from the list.

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Time Synchronization OS Client

The OS Client PC gets the time via Terminal Bus from the Time Master. In this example the Time Master is the Server:



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How to create a PDL Cache

To display the runtime pictures, WinCC normally accesses the corresponding WinCC Server and Retrieves the current pictures form it. Using the Picture Cache, it is possible to store the WinCC pictures locally for display in runtime. When a Picture Cache is used, the WinCC Client does not need to reload the pictures continually. Thus, shorter picture change times can be achieved.

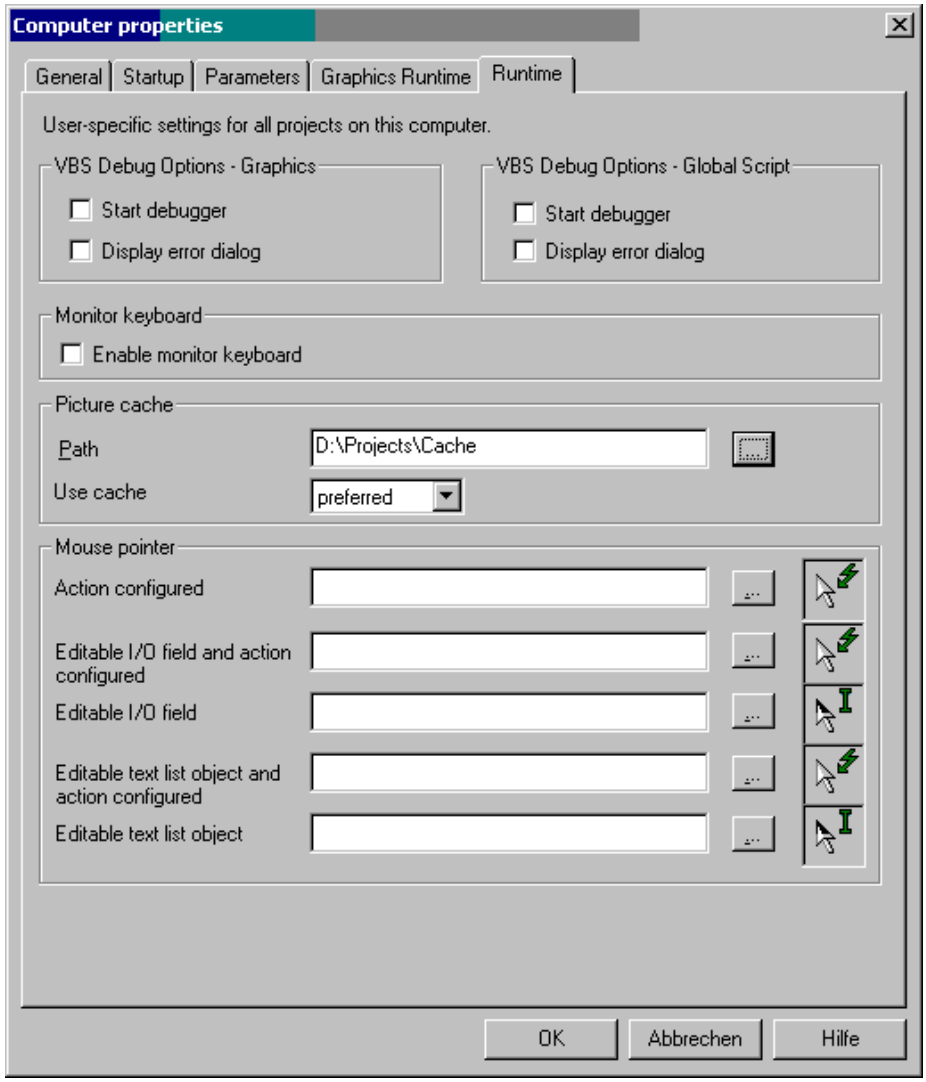
The required pictures must be manually saved on the computer which should use the Picture Cache. To do this, create a folder on the computer in the standard directory C:\…..\Siemens\WinCC\Bin\PDLCache. The name of the folder must be the symbolic computer name of the package stored on the server, e. g. OS_OSSRV

The settings for the PDL Cache are carried out under Computer Properties, Register Runtime. There you can select the following options for reading the Cache.

not	The Picture Cache will not be used
Preferred	Modified pictures will be read from Server, unchanged pictures will be read from the Picture Cache.
Always	The pictures will always be read from the Picture Cache.

Under “Path” you have the possibility to choose a different Location where the pictures are stored. The Path specification must only be entered up to the directory in which the PDLCache folder is located. If the standard directory is used, the path doesn’t need to be specified.

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Assignments

Content

Assignments **1**

Assignments FB, FC, DB 2
Memory, Timer, Counter 3

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Assignments FB, FC, DB

FB

000	PCS7
499	
1000	CEMAT
1199	
1200	User
1799	
1800	AP Library PCS7
2047	

FC

001	PCS7
400	
1000	CEMAT
1199	
1200	User
1399	
1400	CFC-Tasks
2047 *	

DB

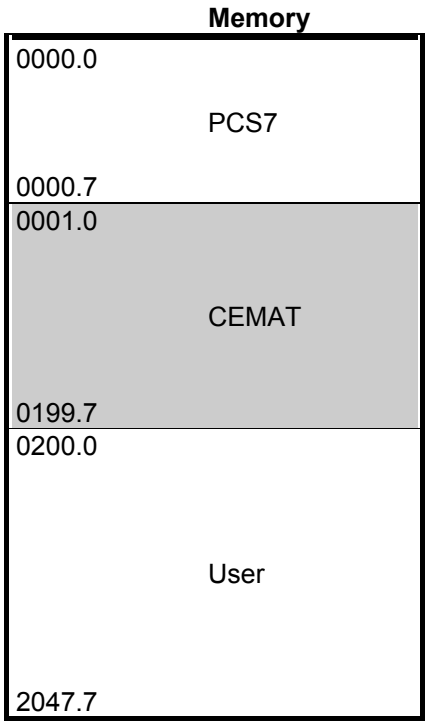
001	PCS7
399	
400	User
599	
600	CEMAT
999	
1000	CFC-Instances
4095	

UDT

001	CEMAT
1499	
1500	User
4095	

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Memory, Timer, Counter



The biggest memory address depends on the selected CPU Type.

CEMAT Minerals Standards don‘t use Timers and Counters

Please consider that the quantity differs from CPU type to CPU type. The above mentioned numbers refer to CPU 416-2.

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Engineering Basics

Content

Engineering Basics **i**

General 2
Basic Rules 2
Connection rules and recommendations 3
Message enabled 3
Impulse Processing 4
Functions are shown in the Eng.-Video 5
Group 5
Drive functions 5
Annunciation blocks 6
Measured value 6
Route functions 6
Engineering Examples for additional blocks 6

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General

This description should provide support in the solution of control tasks using the CEMAT software.

Please adhere to these recommendations that have proved themselves in practice.

Basic Rules

It is **essential to** conform to the following basic rules.

Limit Switches

The break contacts from these switches should be connected directly in the contactor control circuit. Connect the make contact elements to the AS inputs.

Binary Special Signals

Signals such as belt drift switch, pull-rope switch, silo full must always be connected to an annunciation module. The module flag of the annunciation module (OutSig or MAU) should then be used for the further use in the program.

Start/Operation Interlock of the Group

In order to display also the interlocking conditions in the status call-up of the group, the interlock signals (also internal flags) should be connected to annunciation modules.

Damper Directions

The following definition applies for the end position of the damper:
direction 1 = closed
direction 2 = open

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Connection rules and recommendations

Selection and Route Module

We provide two module types for selections:

- selection module
- route module

The selection module is particularly suitable for smaller branches, standby circuits.

Advantage:

- reduced configuration effort
- reduced program run-time

The classical route module is particularly suitable for (long) transport routes that use different drives.

Advantage:

- Through assignment of the objects to a route ‘partial groups’ are defined.
- Only the status of the objects belonging to a selected route will be forwarded to the group.
- Status call and object list call can be carried out for the individual route, which permits the diagnostic function per destination

The question whether a selection module, a route module or various groups should be used must be decided individually.

Message enabled

In all Cemat blocks through plausibility logic it is assured that in case of several simultaneous faults only the "perpetrator" creates an alarm message.
For example, in case of a protection interlock of a motor, no alarm is created by the motor block, it is created by the associated annunciation module.

In order not to create an alarm flush in case of loss of control power, each Cemat block has an interface "Message enabled" (MsgEn), which has to be connected with the control power signal.

In case of a periphery failure (such as bus failure, card failure, MCC failure) this signal must get "0". At this moment the Cemat block does not create further messages (no incoming, no outgoing messages).

For the annunciation of the control power failure itself an additional annunciation block has to be programmed.

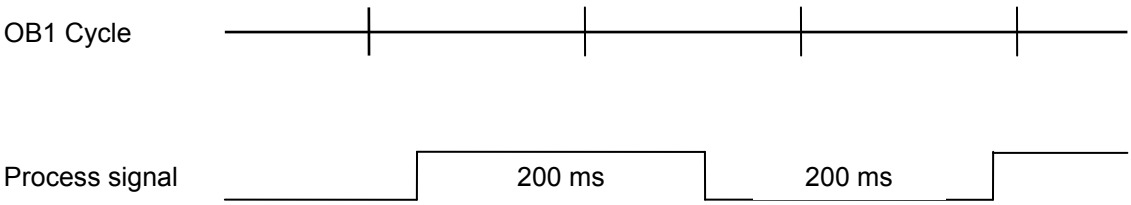


The annunciation release is one of the most important interfaces in order to achieve a smooth operation. The project engineer must assure that only the perpetrators of a fault create alarm messages.

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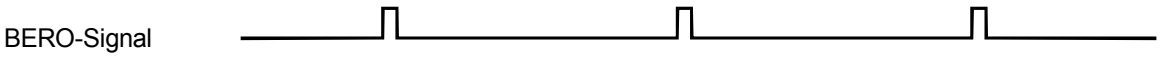
Impulse Processing

Both the pulse length and pause length must be longer than the OB1-cycle for signals that are to be recorded from the cyclical program (OB1). As guidance value, it should be longer than 200ms.



If the signals are recorded in the 100ms-OB cycle (time-controlled alarm processing), the pulse times and the pause times of the signal must both be longer than 150 ms.

There are signals that are created with a flag attached to the drive shaft and a BERO switch. Such signals, for example, have a short pulse and a long pause.



Such signals must not be wired **directly** to an input module.

The signals must be converted with C1-technic hardware circuits or with series-connected mini programmable controllers (binary converter) so that the programs can record them reliably.

Such signals can occur in silo pilots or speed monitors.

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Functions are shown in the Eng.-Video

Group

- Group Start and Stop via operator faceplate
- Group start and stop through the program
- Start-up-warning
- Group start interlock
- Group operation interlock
- Group switch-off interlock
- Start and Stop of the drives
- Feedback ON (all drives running)
- Feedback OFF (all drives stopped)
- Quick stop
- Not empty
- Group Links
- Acknowledgement mode

Drive functions

- Change of operation mode
- Start and Stop in Automatic mode
- Start and Stop in Manual mode
- Start and Stop in Local mode
- Variants of Local switches
- Start-up warning in Manual mode (and Local mode)
- Sporadic mode
- Drive in Standby (Alarm message also for non-running device)
- Protection interlocks
- Always active protection interlocks
- Protections only active in Automatic mode and Manual mode
- Process feedback supervision
- Set point input
- Display of an analog value in % (e. g. Motor current)
- Display analog value
- Star-Delta Starting; Slip ring Rotor with Starter Motor
- Limit positions of the Damper
- Operation modes and control of the damper
- Analog actuators
- Damper with middle position
- Damper with torque switch

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- Wagging function
- Fan and Damper
- Valve with simulated Position switches
- Drive, Damper, Valve with SIMOCODE
- Drives with Subcontrol function
-

Annunciation blocks

- Release supervision
- Drive fault annunciations
- Warning messages
- Alarm interlocking for the annunciation block
- Interlocking annunciation (Silo levels)
- Two-level alarm (first warning then switch-off)
- Annunciation for Status call
- Engineering of an ANNUN8 block

Measured value

- Release limit supervision
- Read in a measured value
- Measured values, Calculated Values
- Measured values, Limit Value Supervision
- Alarm interlocking for the Measured Value block
- Using limit violation bits as interlocking condition
- Block Measured value, Bypass, Service mode
- Pressure control

Route functions

- Feedback ON (all drives running)
- Feedback OFF (all drives stopped)
- Uninterrupted route change-over
- Automatic Route change

Engineering Examples for additional blocks

- Display of interlocking conditions with interlock blocks
- Query for Simulated Objects within the AS
- Analog Value Selection

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AS Engineering

Content

AS Engineering 1

CEMAT Objects 2
Creating Master Library 3
Feature bit settings and OS Permissions, what to consider? 4
Signal list (Symbols) 8
Creating the AS Program with CFC 9
How to add a new chart and insert a block 9
Block Properties 10
How to connect and parameterize blocks 11
Variable texts for the Cemat Faceplates 19
Instance specific Authorizations 22
Message enabled 27
Definition of the run sequence 28
Conventional control desks 30
Acknowledgement mode 31
Warning mode 32
PLC Number 32
Sequence-Test 33
Using driver blocks with CEMAT 34
Function block CPU_RT 41
Compile CFC 42
Download to the AS 43
OS Compile 44
Project-Download 47
Integrated Asset Management 50

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CEMAT Objects

Drive functions

C_DRV_1D	Unidirectional drive
C_DRV_2D	Bi-directional
C_DAMPER	Damper
C_VALVE	Valve
C_SIMOS	Adapter for SIMOCODE (with Curve Display)

Annunciation functions

C_ANNUNC	Annunciation module
C_ANNUN8	Annunciation module with 8 Alarms
C_PROFB	Process feedback block
C_MEASUR	Measuring value
C_ANASEL	Analog value selection
C_STORAG	Storage module
C_STO_MA	Storage module (Master for Multi chamber)

Control/Supervision

C_GROUP	Group module
C_MUX	Additional block for group/route
C_ROUTE	Route module
C_SELECT	Selection module

Special functions

C_ADAPT	Adapter block to include non-CEMAT modules into group supervision.
C_PUSHB	Parameterization of a conventional Control Desk with Push Buttons and Lamps
C_SIMU_L	Entry into Cemat list simulated Objects

The detailed description of the CEMAT Objects you find in the object description an in the online help. Blocks for other PCS7 libraries such as standard library or APL library can be used as well.

Each function block is pre-configured according to the default settings, described in the object descriptions, and can be adapted according to the plant requirements. The main parameters for adaptations are the **Feature bits** and the **OS Permissions**, which have to be adjusted before AS Engineering work starts.

You have to create a master library with process tag types or control module types for the plant. Three versions for template charts (typicals) with different settings are delivered with Cemat. These are only examples and must be adapted.

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Creating Master Library

During creation of a new PCS7 Project for Cemat a master Library has been created. Beside the blocks and the Symbols the master library must contain control module types or process tag types, which have been adapted to the plant requirements. The adaptations are mainly the **Feature bits** and the **OS Permissions** but as well standard connections for certain functions.



Caution: If an Engineering Tool is used, control module types or process tag types are anyway a must, but also for manual Engineering it is highly recommended to use template charts, otherwise the same project settings have to be carried out for each instance of the block.

Three preconfigured sets of template charts for Cemat can be downloaded from the Network:

Typicals_Set1: "Basic":

- Operation mode can be changed individually per object or via the group-module
- Signal AutModLo classifies the field switch as being of type "Repair switch"
- In Manual mode the interlocks are valid (all interlocking conditions are effective)
- Out of Service mode does not exist

Typicals_Set2: "Extended":

- Operation mode can be changed individually per object or via the group-module
- Signal AutModLo classifies the field switch as being of type "Repair switch"
- Manual modes with different interlocking grades available
- Out of Service mode exists
- Power Management functions enabled

Typicals_Set3: "Standard":

- Operation mode can be changed individually per object or via the group-module
- Field switch signal AutModLo is used as Selector between Local and Automatic
- In Manual mode the interlocks are valid (all interlocking conditions are effective)
- Out of Service mode does not exist

Choose the set which is closest to your requirements and adapt the template charts according to the plant requirements. Further modifications must be carried out via **Feature bit settings** and **OS permissions**. Make sure that the settings are consistent; otherwise the blocks will not perform well.

On the next pages you find a few questions which may help you to make the settings correctly:

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Feature bit settings and OS Permissions, what to consider?

The following pages will help you to choose proper feature bit settings. (For details refer also to the corresponding object description).



Caution: Please keep in mind that not all combinations are permitted. Dangerous settings will lead to an engineering error and the block will be switched to 'Out of Service' mode

Feature bit settings for drive functions (C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE):

Type	Function	Feature bits
Operating mode	Change of operating mode possible?	Feature bit 23
	Which operating modes exist?	Feature bit 0, 13, 20, 21
	Interlocking level for the manual mode?	Feature bit 16, 17, 18, 27
	Mode change possible via interface or only via Operator Station?	Feature bit 1, 2, 14, 15
Local switch	LOCAL mode characteristics: - Selector Switch/Repair switch - only inching - LOCAL switch matrix for Signal evaluation - LOCAL start/stop command always active - with/without start-up-warning - with/without interrupt when switching to AUTO - Forcing to LOCAL via field switch signal - Force to AUTO via command “automatic start”	 Feature bit 8 Feature bit 5 Feature bit 9, 10, 12 Feature bit 3, 4 Feature bit 6 Feature bit 7 Feature bit 11 Feature bit 19
MCC/Field signals	Contactor feedback supervision for **DAMPER**?	Feature bit 27
	Limit switches for **DAMPER** NO/NC?	Feature bit 29, 30
	Contactor feedback supervision for **VALVE**?	Feature bit 17
Operation	Emergency Stop exists?	Feature bit 30 (DAMPER: 17)
	VALVE has simulation function for limit positions?	Feature bit 31
OP Station	Local authorization active (OPStation available)?	Feature bit 24
CFC Program	Using GR_LINK interfaces for mode change, drive feedback or feedback 'not empty'?	Feature bit 25, 26, 28
Display	Evaluation of ST_Worst?	Feature bit 22
Individual settings	Setpoint exists (**VSD drive**)?	Feature bit 29
	Use calibrated position value for **DAMPER**?	Feature bit 31
	Normally open **VALVE**?	Feature bit 29

Via **OS Permissions** it can be decided which operator action is permitted.

Each Operator action is linked to an authorization level. The authorization level can be adjusted at the block interfaces. (See Instance specific Authorizations).

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Feature bit settings for annunciation and measures (C_ANNUNC, C_ANNUN8 and C_PROFB):

Type	Function	Feature bits
Operating mode	Change of operating mode possible?	Feature bit 23
	Which operating modes exist?	Feature bit 20, 21
MCC/Field signals	**Process feedback** signal delivers pulses?	Feature bit 27
	Process feedback signal is an analog value?	Feature bit 15
Operation	Output ProFB = 1 if **process feedback** signal = 1?	Feature bit 31
	Memorize **process feedback** fault up to new startup of drive?	Feature bit 14
	Acknowledgement only via interface Ack for C_ANNUNC and C_ANNUN8?	Feature bit 19
OP Station	Local authorization active (OPStation available	Feature bit 24
CFC Program	Using GR_LINK interfaces for mode feedback	Feature bit 26
	Using O_LINK for Message trigger in C_ANNUNC or C_ANNUN8?	Feature bit 16
	Using O_LINK for Warning activation in C_ANNUNC?	Feature bit 17
	Using O_LINK for Supervision enable in C_ANNUNC or C_ANNUN8?	Feature bit 18
	Using O_LINK for or Message enable in C_PROFB?	Feature bit 16
Display	Evaluation of ST_Worst?	Feature bit 22
Individual settings	Off delay monitoring for **process feedback** signal?	Feature bit 30
	Simulation value for C_ANNUNC and C_ANNUN8?	Feature bit 28
	Warning mode for C_ANNUNC and C_ANNUN8?	Feature bit 29 (ANNUN8: 0-6)

Via **OS Permissions** it can be decided which operator action is permitted.

Each operator action is linked to an authorization level. The authorization level can be adjusted at the block interfaces in the CFC directly. (See Instance specific Authorizations)

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Feature bit settings for annunciation and measures (C_ANNUNC, C_ANNUN8, C_PROFB, C_MEASUR):

Type	Function	Feature bits
Operating mode	Change of operating mode possible?	Feature bit 23
	Which operating modes exist?	Feature bit 20, 21
OP Station	Local authorization active (OPStation available	Feature bit 24
CFC Program	Using GR_LINK interfaces for mode feedback	Feature bit 26
Display	Evaluation of ST_Worst?	Feature bit 22
Individual settings	Force outputs of **C_MEASUR** to '0' if supervision enable = '0'?	Feature bit 17
	C_MEASUR has bypass / service function?	Feature bit 0
	C_MEASUR has gradient supervision?	Feature bit 1
	C_MEASUR with root extraction function?	Feature bit 2
	C_MEASUR with smoothing function?	Feature bit 3
	C_MEASUR with spike suppression?	Feature bit 4
	C_MEASUR with square function?	Feature bit 5
	C_MEASUR used for suction measurement?	Feature bit 7

Via **OS Permissions** it can be decided which operator action is permitted.

Each operator action is linked to an authorization level. The authorization level can be adjusted at the block interfaces in the CFC directly. (See Instance specific Authorizations)

Feature bit settings for storage function (C_STORAG):

Type	Function	Feature bits
Operating mode	Change of operating mode possible?	Feature bit 23
	Which operating modes exist?	Feature bit 20, 21
OP Station	Local authorization active (OPStation available)?	Feature bit 24
CFC Program	Using GR_LINK interfaces for mode feedback?	Feature bit 26
Display	Evaluation of ST_Worst?	Feature bit 22
Individual settings	Enable storage locked?	Feature bit 0

Via **OS Permissions** it can be decided which operator action is permitted.

Each Operator action is linked to an authorization level. The authorization level can be adjusted at the block interfaces in the CFC directly. (See Instance specific Authorizations)

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Feature bit settings for control functions (C_GROUP, C_ROUTE, C_SELECT):

Type	Function	Feature bits
Operating mode	Change of operating mode possible?	Feature bit 23
	Which operating modes exist?	Feature bit 0, 13, 21
OP Station	Local authorization active (OPStation available)?	Feature bit 24
Operation	'Interlock bypass' exists for **GROUP**?	Feature bit 14
	GROUP not empty reset' exists?	Feature bit 15
	'Immediate Stop' exists for **GROUP**?	Feature bit 16
	GROUP Acknowledgement mode?	Feature bit 19
	Each **GROUP**-start retriggers start-up-warning?	Feature bit 29
CFC Program	Using GR_LINK interfaces for mode signal transfer?	Feature bit 25
Display	Evaluation of ST_Worst?	Feature bit 22
	Enable operation messages?	Feature bit 26, 27

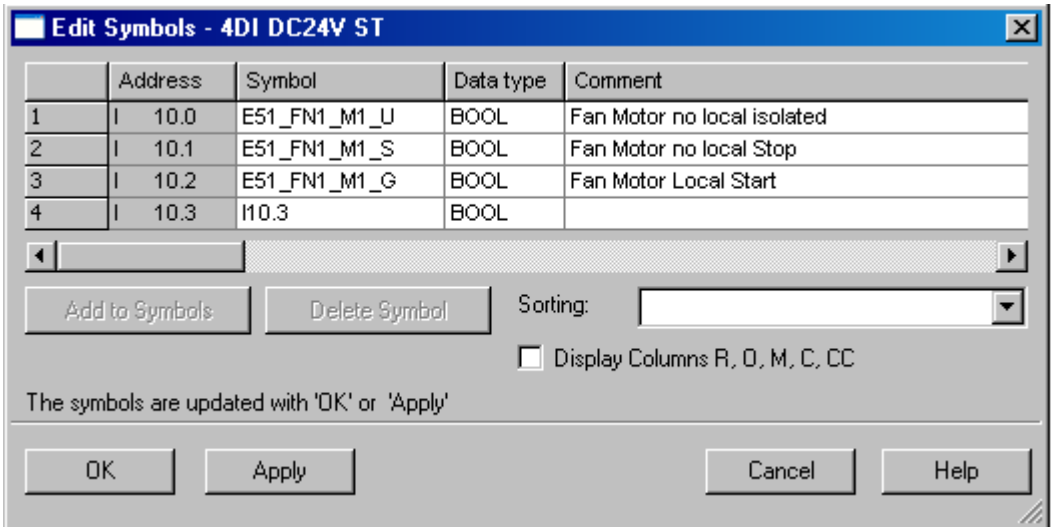
Via **OS Permissions** it can be decided which operator action is permitted.

Each Operator action is linked to an authorization level. The authorization level can be adjusted at the block interfaces in the CFC directly. (See Instance specific Authorizations)

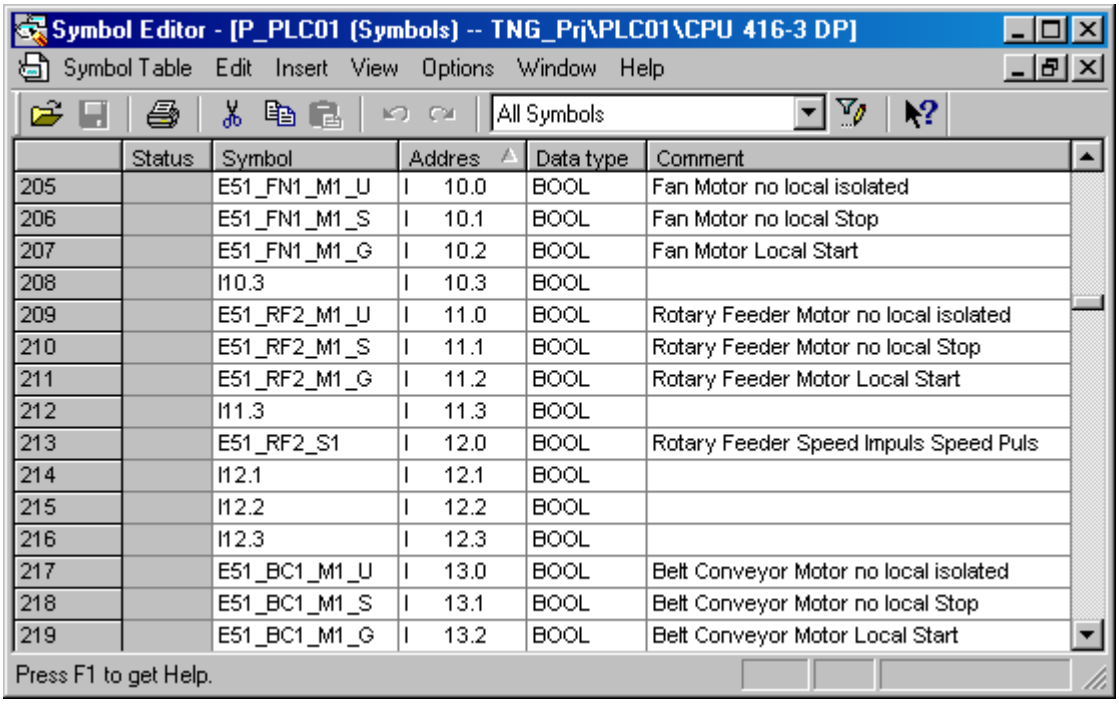
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Signal list (Symbols)

The hardware signals can be entered directly in the hardware configuration.



They will be added to the Symbols list and can further on be used in CFC.



There is also the possibility to import the hardware signal list from an excel file.

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Creating the AS Program with CFC

How to add a new chart and insert a block

The program logic is written in the Continuous Function Charts (CFC). New CFCs can either be created manually or generated via engineering tools like IEA or Advanced Engineering.

Here only the manual creation is described:

- To insert new charts use Plant view or Process object view. Later the charts can be edited from all views of the SIMATIC Manager.
- The easiest way to create a new chart is to *copy* one of the template charts from the master library and paste it to the proper position in the plant hierarchy. After this you have to rename this chart according to your tagging system. The chart name (e.g. 345_BC1) is the first part of the tagname.

  Advantage when copying: all blocks already have the correct default settings for feature bits and OS permissions. You just have to delete the blocks you don't need and modify the functions according to your functional descriptions
- You may also create a chart by yourself and rename this chart according to your tagging system. In this case you have to copy / insert just the blocks which you need and to make all the required links manually.



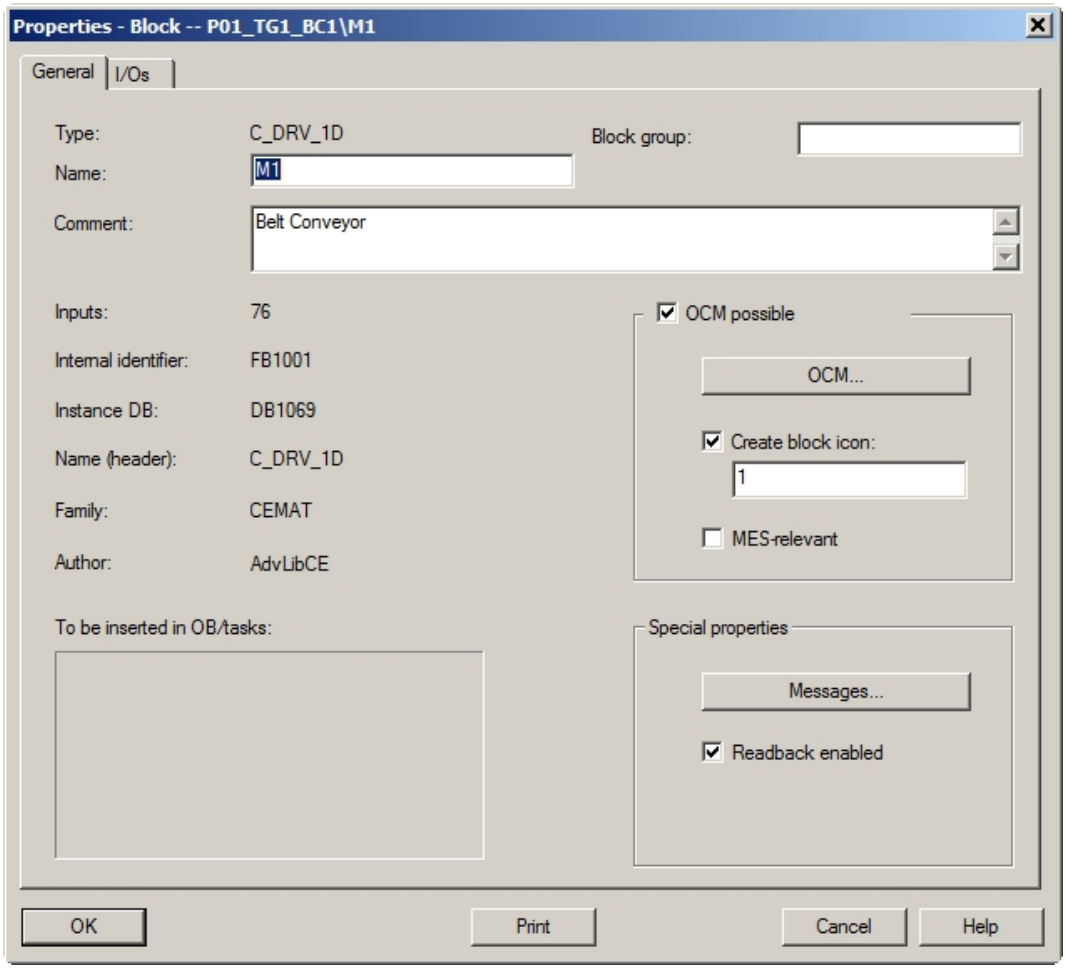
Caution: Never insert the blocks from the block folder of your PLC directly! The blocks won't have the correct settings for feature bits and OS Permissions and you have to configure it manually.
You better copy your blocks from one of the template charts (where the settings for feature bits and OS permissions are already done).

After this complete the function according to your functional descriptions.

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Block Properties

Double-click on the block in order to open the properties dialog.



Carry out the following settings in the property window:

Name:
The name (instance name, e.g. M1) is the second part of the tagname of the motor. If the hierarchy folder name is not part of the tagname (project setting), the tagname of the motor consists only of the chart name and the instance name. In the above mentioned example this would be 345_BC1/M1.
Make sure that the complete tagname does not exceed 20 characters.

Comment:
The comment contains an explanation of the motor, e. g. “Belt Conveyor”. This text is later on available in WinCC as internal variable #comment and will be displayed in the e. g. in the faceplate of the motor.
The maximum length of the comment is 40 characters.

Under “OCM possible” you find the settings regarding WinCC:

Create Block Icon:
Select the option “Create block icon” if the block icon should be created automatically. In this case the block icon which corresponds to the index entered below will be chosen from your template picture (i.e. @PCS7TypicalsCemV8_001.pdl).

Save the Object Properties with OK.

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How to connect and parameterize blocks

Each block has a list of input and output parameters, which can be connected either with a signal (from the symbols file or an output of another block) or parameterized with a value. Due to its utilization the inputs and outputs have different attributes which can be seen in the object properties in tab "I/Os".

In Cemat Object description we distinguish between different parameter types:

Hardware inputs

These inputs are connected to the inputs of the periphery, such as contactor feedback, electrical availability, overload, contactor on command of the motor. Normally a signal from the symbols file is assigned to this interface.
The Hardware inputs and outputs are of type "Signal". The assignment of the periphery signal can either be carried out in the CFC or in the process object view in tab "Signals".

Input interfaces

Under input interfaces you find a description for different kind of block inputs.

- Interlocks:
  These structure inputs must be connected with the interlocking condition for the block, e. g. with the running signal of the previous block. All interlocks are of type "Parameter". The linking to the interlocks can either be done in the CFC or in the process object view in tab "Parameters".
- Mode change commands:
  The operation mode can be changed via these block inputs, e. g. through connection of a mode change command from a superordinated block. All mode change commands are of type "Parameter". The linking to the mode change commands can either be done in the CFC or in the process object view in tab "Parameters".
- Enable signals
  Inputs which can be used to enable/disable functions via static value or via a process condition. All enable signals are of type "Parameter". The linking to the enable signals can either be done in the CFC or in the process object view in tab "Parameters".
- Reset or acknowledgement signals
  All reset or acknowledgement signals are of type "Parameter". The linking to the reset or acknowledgement signals can either be done in the CFC of in the process object view in tab "Parameters".
- Start/Stop commands:
  To be connected with the start stop command of the superordinated block. All start/stop commands are of type "Parameter". The linking to the start/stop commands can either be done in the CFC of in the process object view in tab "Parameters".
- Display functions:
  The information connected to these inputs has no influence in the function of the block and is only used for display in the block faceplate. All display functions are of type "Parameter". The linking to the display functions can either be done in the CFC of in the process object view in tab "Parameters".
- Feedback signals:
  Via these inputs the feedback from a subordinated block (object belonging to a group, Subcontrol of a drive, SIMOCODE, Drive measurement, etc.) is transferred. It may be the run feedback as well as a feedback of the operation mode. All feedback signals are of type "Parameter". The linking to the feedback can either be done in the CFC of in the process object view in tab "Parameters".

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- Internal information:
  These inputs are invisible and not to be used for any kind of connections. They are needed for the display of block information at the OS.
- Process parameters:
  Process parameters such as limit values, supervision or delay times already contain default values but must be adapted for the application according to the functional description. All process parameters are of type "Parameter". The parameterization can be carried out in the CFC or in the process object view in tab "Parameters". Later on these values can be adjusted from the Operator Station.
- OS Permissions and Feature bits:
  Via Feature bits and OS Permissions, functions and operator actions can be enabled and disabled. These are inputs of type “structure” and the most important structure variables are of type "Parameter". The parameterization can be carried out in the CFC or in the process object view in tab "Parameters".



Caution: It is not allowed to connect any logic to the feature word or to the OS Permission word. Online changes of Feature bits and OS Permissions are not permitted!

- Group and Object links:
  Each drive, annunciation block and measure must be connected to the group via the so-called group link interface. The blocks can directly be connected to the group or indirectly via route module.
  The Annunciation blocks C_ANNUNC or C_ANNUN8 and the measuring value block C_MEASUR *can* also be linked to a drive (if the annunciation or measurement belongs to the same equipment), the C_PROFB *has* to be connected to it´s drive. This is done via O_LINK connection.
  The links are of type "Parameter" and can be connected in the CFC or in the process object view in tab "Parameters".
  For links between objects of one AS to a group in a different AS additional send and receive blocks are needed.

Input/Output interfaces

Interfaces of type I/O contain the result of calculations within the blocks, like counter values, runtime values, or maintenance information. The values are available for read back function.

Output Interfaces

- The most important information of the blocks are transferred to block outputs and therefore available for the connection to other blocks.
- Other output interfaces are only used internally (for display function) and are set to invisible.

Hardware Outputs

These outputs are connected directly to the outputs of the periphery, such as contactor on command of the motor. Normally a signal from the symbols file is assigned to this interface. The hardware outputs are of type "Signal". The assignment of the periphery signal can either be carried out in the CFC or in the process object view in tab "Signals".

Engineering errors

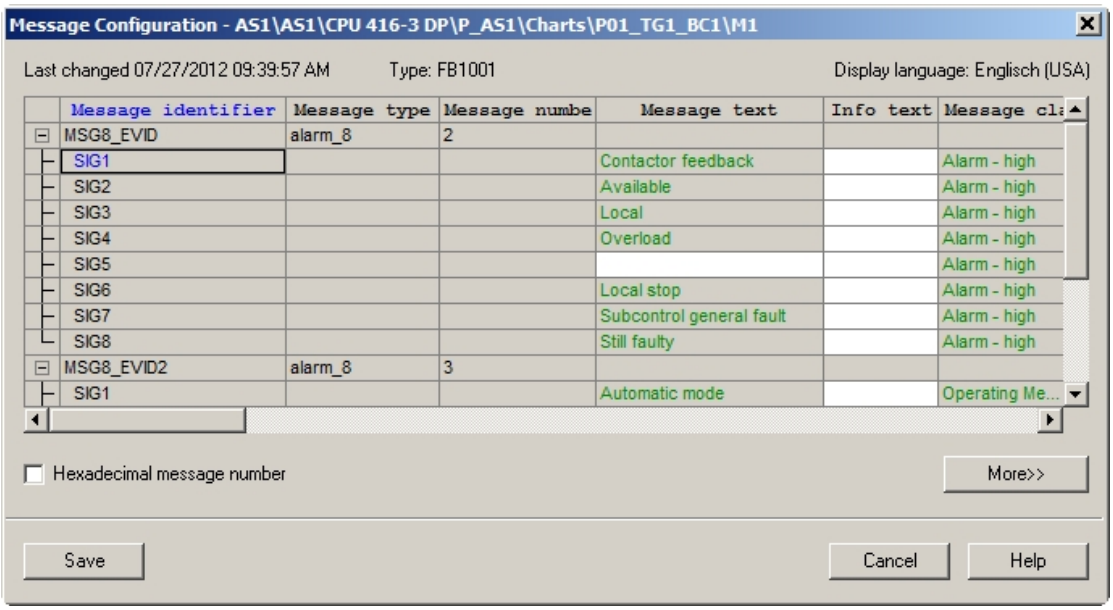
In case of a wrong parameterization the block output ErrorNum contains a number different from zero (in online-mode) and the block is switched to “Out of Service”. You have to check the object description and correct the fault before your proceed. Only one error per instance can be displayed at a time.

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Message Programming

Each Cemat block uses one or more ALARM_8 or ALARM_8P blocks, whose signals SIG1 to SIG8 are assigned to particular functions. The message texts (Event texts in WinCC) and the Message classes are standard for the most blocks and therefore locked in the function block. An adaptation per instance is not required.



Note: The message texts are defined at the function block and can be modified at the function block itself. For any modification please note the following:

1. If you carry out an update for the blocks the message definitions get overwritten. In this case you have to define the message texts again.
2. For the status call the message texts are defined in the object specific Config files, section [Fault].
   Make sure that you use similar texts in the message definition and in the Config files.
   Take a backup of the Config files because they also get overwritten in case of an update.

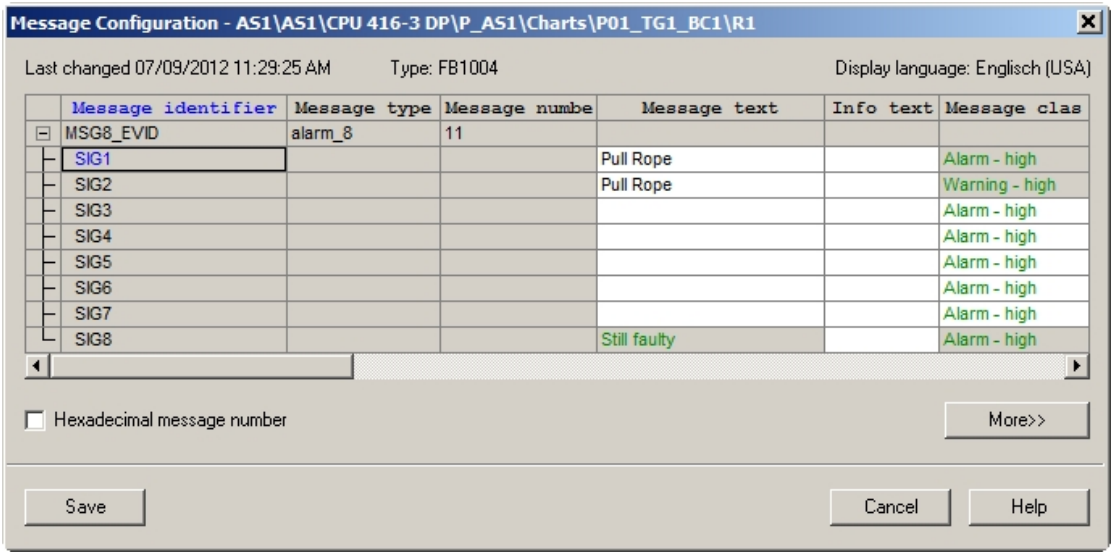
Example: Message text definition in the config file of a Unidirectional Drive:

```
[Fault]
;Visible, Attribut,Comment,Bit,Fault Class
1,ESS,Feedback,9,M
1,ESB,Available,10,E
1,EVO,Local,11,P
1,EBM,Overload,12,M
1,LST,Local stop,15,E
1,SCW,Simocode Warning,30,E
1,SCF,Simocode Fault,31,E
1,SUB,Subcontrol general fault,32,E
```


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In case of the annunciation blocks C_ANNUNC, C_ANNUN8 and C_PROFB there is no particular message text definition. The user must insert an individual text (max. 16 characters).

Message text definition in block C_ANNUNC:



Note: You need to configure either the message text for the Warning (Warning – above) or the text for the Error message (Alarm – above) according of Parameter WMOD of the annunciation block.
In case of a two-level alarm you have to use similar texts for Warning and Error Message.

For each annunciation block C_ANNUNC individual message texts can be defined.

You have two options:

1. Display of an individual fault text in the status call:

   In this case a wild card "**?**" must be entered in the Config file (default setting). The individual message text must then be defined in the CFC at block parameter *InSig.Value*.

   Settings in the Config File of the annunciation block C_ANNUNC:

```
[Fault]
;Visible, Attribut,Comment,Bit,Fault Class
1,MS0,?,26,P
```

   To enter the message text for C_ANNUNC in the CFC, go to the object properties of parameter *InSig*, structure variable *Value* and via 'Properties' enter the text into 'Text 0' and 'Text 1'. (max. 16 characters).
   After the OS Compile this text is available as an internal variable in the tag management of the OS.

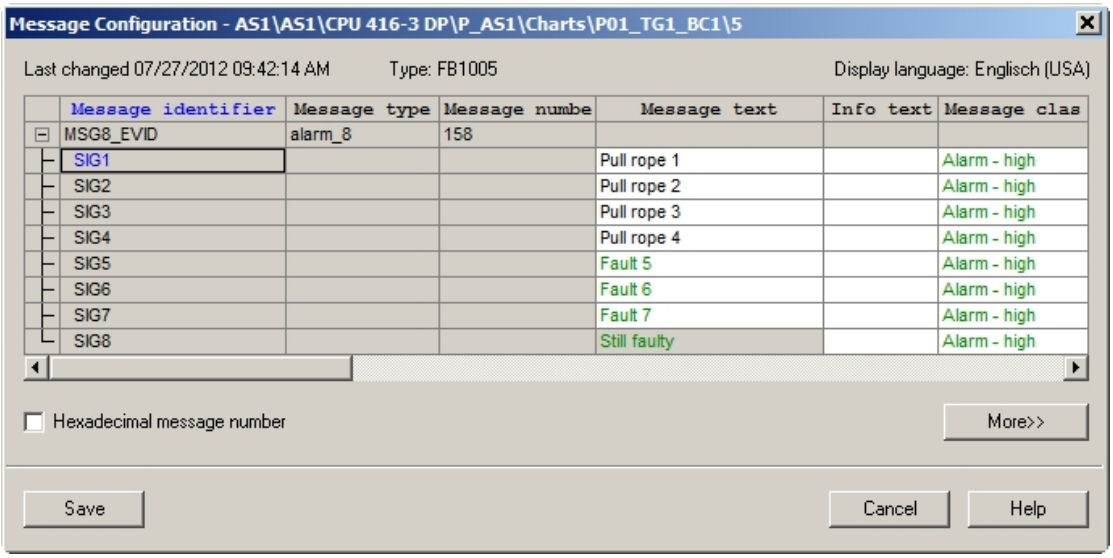
2. Display of a standard fault text in the status call (identical for all annunciation blocks):

   In this case the (fix) text must be entered in the config file:

```
[Fault]
;Visible, Attribut,Comment,Bit,Fault Class
1,MS0,Fault,26,P
```

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Message text definition in block C_ANNUN8:



For each annunciation block C_ANNUN8 individual message texts can be defined.

You have two options:

1. Display of an individual fault text in the status call:

   In this case a wild card "**?**" must be entered in the config file (default setting). The individual message text must be defined in the CFC at block parameter *InSig1.Value*.

   Settings in the config file of the annunciation block C_ANNUN8:

```
[Fault]
;Number, Attribut,Comment,Bit,Fault Class
1,MS1,?,1,P
2,MS2,?,2,P
3,MS3,?,3,P
4,MS4,?,4,P
5,MS5,?,5,P
6,MS6,?,6,P
7,MS7,?,7,P
```

   To enter the message text for C_ANNUN8 in the CFC, go to the object properties of parameter *InSig1 – InSig7*, structure variable *Value* and via 'Properties' enter the text into 'Text 0' and 'Text 1'. (max. 16 characters).
   After the OS Compile these texts are available as internal variables in the tag management of the OS.

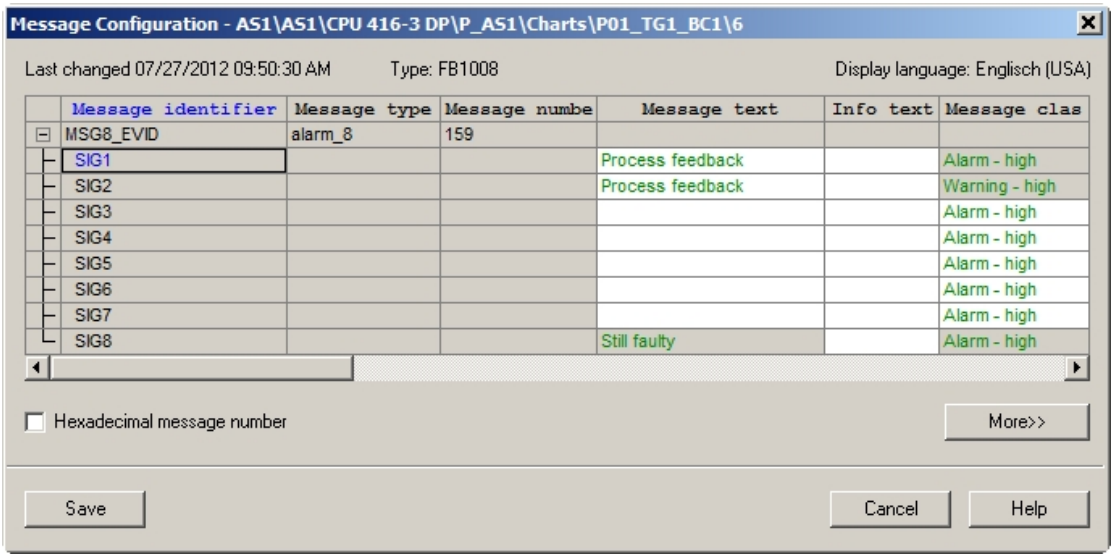
2. Display of a standard fault text in the status call (identical for all annunciation blocks):

   In this case the (fix) text must be entered in the config file:

```
[Fault]
;Number, Attribut,Comment,Bit,Fault Class
1,MS1,Fault 1,1,P
2,MS2,Fault 2,2,P
3,MS3,Fault 3,3,P
4,MS4,Fault 4,4,P
5,MS5,Fault 5,5,P
6,MS6,Fault 6,6,P
7,MS7,Fault 7,7,P
```


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Message text definition in block C_PROFB:



For each process feedback block C_PROFB individual message texts can be defined.

You have two options:

3. Display of an individual fault text in the status call:

   In this case a wild card "**?**" must be entered in the config file (default setting). The individual message text must be defined in the CFC at block parameter *InSig.Value*.

   Settings in the config File of the annunciation block C_ANNUN8:

   ```
   [Fault]
   ;Number, Attribut,Comment,Bit,Fault Class
   1,MS0,?,26,M
   ```

   To enter the message text for C_PROFB in the CFC, go to the object properties of parameter *InSig*, structure variable *Value* and via 'Properties' enter the text into 'Text 0' and 'Text 1'. (max. 16 characters).
   After the OS Compile this texts are available as internal variables in the tag management of the OS.

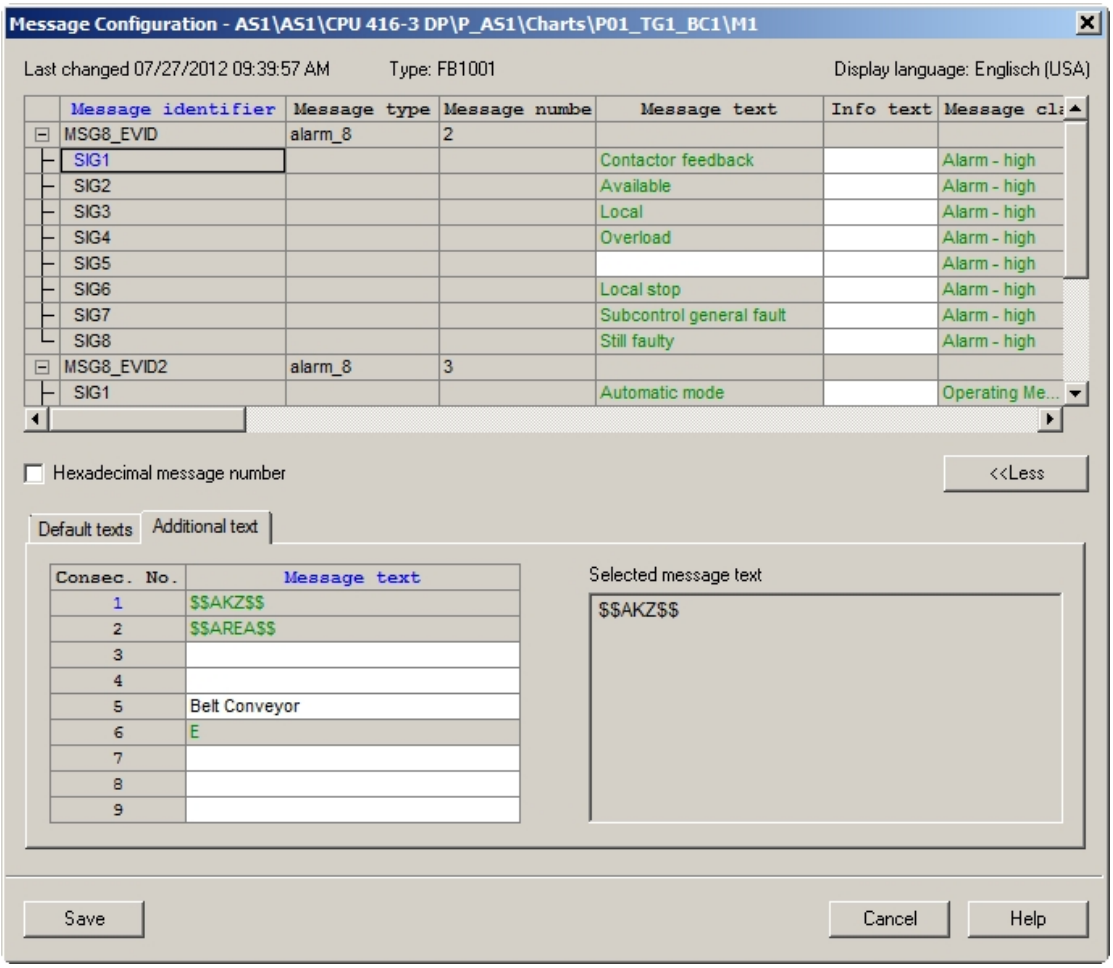
4. Display of a standard fault text in the status call (identical for all PROFB blocks):

   In this case the (fix) text must be entered in the Config file:

   ```
   [Fault]
   ;Number, Attribut,Comment,Bit,Fault Class
   1,MS0,Pocess Feedback,26,P
   ```

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Another special characteristic in Cemat is the representation of the block comment as a separate text field in the message line. To enable this you must provide Additional text 5 (in WinCC this is "Free Text 1") with the block comment.



This can be carried out in the CFC (under Object properties → Special properties → Messages… → More → Tab "Additional Texts" and there Consec. No. 5) or you may use the Process Object View, tab "Messages" and copy the content of column "Block comment" into column "Free Text 1".

Caution: If the Process Object View, tab "Messages" does not contain the column "Free Text 1", you have to change the settings to make it visible.
In the SIMATIC Manager under Options → Customize.... → Columns → Process Object view → Messages, select the corresponding column.

You will find a detailed description in the Reference Manual. Each object type is described in a separate chapter.

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Variable texts for the Cemat Faceplates

For better adaptation of the Operator System to the customer's requirements, some texts in the OS are transmitted via text variables.
The adaptation must be carried out in the CFC and will only be available in the OS after an OS compilation

In the following table you find a list all functions with variable texts, together with the name of the variable where it can be modified in CFC and the OS variable name which is used for the display.

Variable texts for drive functions:

OS Function	C_DRV_1D	C_DRV_2D	C_DAMPER	C_VALVE	Variable name	Property in CFC	OS Variable	Default value
Current or Power indication	x	x			AV_Perc.Value	Identifier	S7_Shortcut	I =
Unit for Position Value			x		PosVal.Value	Identifier	S7_Shortcut	%
Unit for Input Signal	x				PV.Value	Identifier	S7_Shortcut	rpm
Unit for Setpoint from OS	x				SP_Os	Unit	S7_Unit	rpm
Button text for start/stop buttons	x	x	x	x	ManModOn	Text 0	S7_string_0	Off
						Text 1	S7_string_1	On

Variable texts for Group, Route and Selection functions:

OS Function	C_GROUP	C_ROUTE	C_SELECT		Variable name	Property in CFC	OS Variable	Default value
Button text for Selection On button			x		SelOn	Text 1	S7_string_1	Sel.
Button text for Selection On button			x		SelOff	Text 1	S7_string_1	Desel.

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Variable texts for annunciation blocks, process feedback block and SIMOCODE Adapter:

OS Function	C_ANNUNC	C_PROFB	C_ANNUN8	C_SIMOS	Variable name	Property in CFC	OS Variable	Default value
Unit for Input Signal		x			PV.Value	Identifier	S7_Shortcut	rpm
Event text for status call Display in the faceplate	x	x			InSig.Value	Text 0	S7_xstring_0	InSig 0
						Text 1	S7_xstring_1	InSig 1
Short description (+L, +P, etc.) in Symbol + Faceplate	x	x			OutSig.Value	Text 1	S7_xstring_1	
Event text for status call Display in Diagnosis			x		InSig1.Value	Text 0	S7_xstring_0	InSig1 0
						Text 1	S7_xstring_1	InSig1 1
Event text for status call Display in Diagnosis			x		InSig2.Value	Text 0	S7_xstring_0	InSig2 0
						Text 1	S7_xstring_1	InSig2 1
Event text for status call Display in Diagnosis			x		InSig3.Value	Text 0	S7_xstring_0	InSig3 0
						Text 1	S7_xstring_1	InSig3 1
Event text for status call Display in Diagnosis			x		InSig4.Value	Text 0	S7_xstring_0	InSig4 0
						Text 1	S7_xstring_1	InSig1 1
Event text for status call Display in Diagnosis			x		InSig5.Value	Text 0	S7_xstring_0	InSig5 0
						Text 1	S7_xstring_1	InSig5 1
Event text for status call Display in Diagnosis			x		InSig6.Value	Text 0	S7_xstring_0	InSig6 0
						Text 1	S7_xstring_1	InSig6 1
Event text for status call Display in Diagnosis			x		InSig7.Value	Text 0	S7_xstring_0	InSig7 0
						Text 1	S7_xstring_1	InSig7 1
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig1.Value	Text 1	S7_xstring_1	
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig2.Value	Text 1	S7_xstring_1	
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig3.Value	Text 1	S7_xstring_1	
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig4.Value	Text 1	S7_xstring_1	
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig5.Value	Text 1	S7_xstring_1	
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig6.Value	Text 1	S7_xstring_1	
Short description (+L, +P, etc.) in Symbol + Faceplate			x		OutSig7.Value	Text 1	S7_xstring_1	
Display in the Faceplate				x	Input1Q	Text 0	S7_string_0	BU Input 1
Display in the Faceplate				x	Input2Q	Text 0	S7_string_0	BU Input 2
Display in the Faceplate				x	Input3Q	Text 0	S7_string_0	BU Input 3
Display in the Faceplate				x	Input4Q	Text 0	S7_string_0	BU Input 4

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Variable texts for measured value, storage and polygon function:

OS Function	C_MEASUR	C_STORAG	C_STO_MA	C_POLY3	Variable name	Property in CFC	OS Variable	Default value
Archive name (for archive splitting per Area)	x	x	x		PV_Out	Identifier	S7_Shortcut	
Tooltip text for HH limit	x	x			HH_Lim	Identifier	S7_Shortcut	Value HH limit
Tooltip text for H limit	x	x			H_Lim	Identifier	S7_Shortcut	Value H limit
Tooltip text for L limit	x	x			L_Lim	Identifier	S7_Shortcut	Value L limit
Tooltip text for LL limit	x	x			LL_Lim	Identifier	S7_Shortcut	Value LL limit
Tooltip text for SHH limit	x				SHH_Lim	Identifier	S7_Shortcut	Value SHH limit
Tooltip text for SH limit	x				SH_Lim	Identifier	S7_Shortcut	Value SH limit
Tooltip text for SL limit	x				SL_Lim	Identifier	S7_Shortcut	Value SL limit
Tooltip text for SLL limit	x				SLL_Lim	Identifier	S7_Shortcut	Value SLL limit
Process value 1				x	Out1	Identifier	S7_Shortcut	
Process value 2				x	Out2	Identifier	S7_Shortcut	
Process value 3				x	Out3	Identifier	S7_Shortcut	
Speed				x	Speed	Identifier	S7_Shortcut	

Variable texts for interlock functions:

OS Function	C_INTER5	C_INTERL	Intlk02		Variable name	Property in CFC	OS Variable	Default value
Signal description		x			I1_1	Text 1	S7_string_1	In_1.1
Signal description		x			I1_2	Text 1	S7_string_1	In_1.2
Signal description		x			I1_3	Text 1	S7_string_1	In_1.3
Signal description		x			I1_4	Text 1	S7_string_1	In_1.4
Signal description		x			I1_5	Text 1	S7_string_1	In_1.5
Signal description		x			I2_1	Text 1	S7_string_1	In_2.1
Signal description		x			I2_2	Text 1	S7_string_1	In_2.2
Signal description		x			I2_3	Text 1	S7_string_1	In_2.3
Signal description		x			I2_4	Text 1	S7_string_1	In_2.4
Signal description		x			I2_5	Text 1	S7_string_1	In_2.5
Signal description			x		In01.Value	Text 0	S7_xstring_0	
						Text 1	S7_xstring_1	
Signal description			x		In02.Value	Text 0	S7_xstring_0	
						Text 1	S7_xstring_1	

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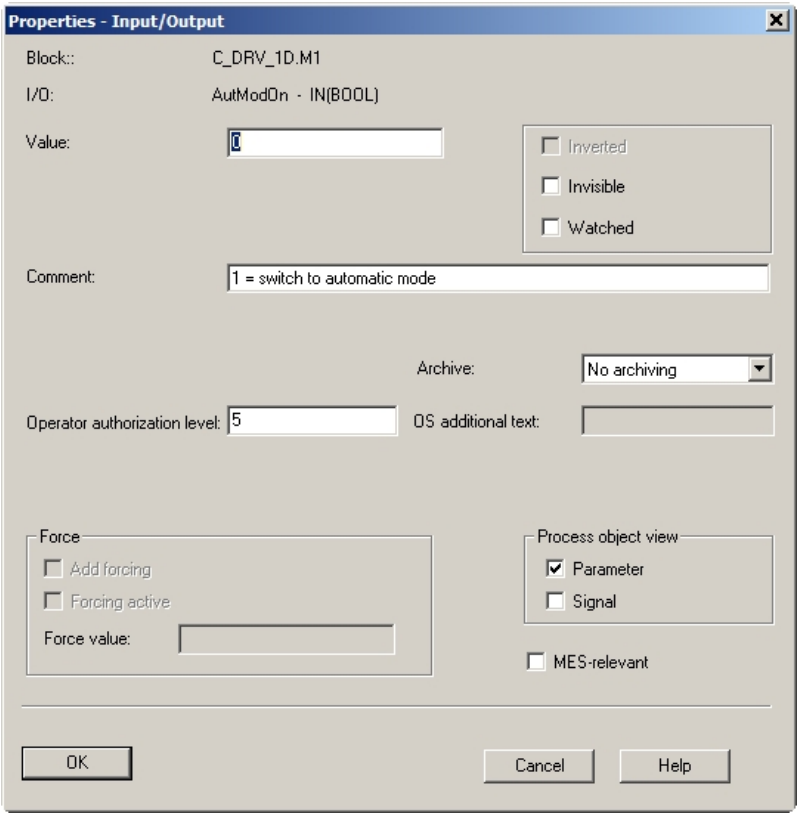
Instance specific Authorizations

Operator commands are restricted by the following criteria:

1. **Feature bit** settings:
   Via feature bits the complete function can be enabled or disabled.
2. **OS PermissionLog**:
   Via OS Permission bits it can be decided to allow or not to allow an operator action. (Some functions may be enabled via feature bit setting, but can only be managed by program). The OS Permission bits are read by the object and then the objects releases – depending on the actual status of the object- the operator´s input
   (e.g. for an already completely running group, the start command can not be given again, the button “start” is not released).
3. **Operation levels**
   Via WinCC User Administration operation levels are defined. Each user gets the permission to operate certain levels in certain areas.
   The currently logged in user can carry out operations belonging to his level.
4. Certain operation levels for each instance of an object can be modified at the **block parameters** in the CFC. This allows modular (instance specific) adjustments for individual operator commands.
   If additional user rights are defined in WinCC, operation can be granted to selected operators only.

The following tables show the operator functions for each block, together with the block parameter where the operator authorization level can be configured.

For modifications of the operator authorization level, select the corresponding block parameter and open the 'Object Properties'.



Caution: Please consider that the authorisation level is valid for all Operator actions linked to the same parameter.

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Operation levels and OS Permissions for **control functions**:

	OS Commands	C_GROUP	C_ROUTE	C_SELECT		Feature Bit	OS_PermissionLog	Op_Level	Block Parameter
Mode Change	Switch to automatic mode	x	x	x		21	2	5	AutModOn
	Switch to local mode	x	x			0	0	5	LocModOn
	Force to Out of Service mode			x		20	3	23	OsSModOn
	Switch to manual mode	x	x			13	1	5	ManModOn
	Bypass interlocks	x				14	14	24	COMMAND
Start/Stop/Select	Start	x					10	5	AutModOn
	Stop	x					11	5	AutModOn
	Interrupt	x					12	5	AutModOn
	Select		x				10	5	AutModOn
	Deselect		x				11	5	AutModOn
	Select			x			10	5	COMMAND
	Deselect			x			11	5	COMMAND
	Release Power Management	x					4	5	PMinvol
	Group not empty	x					15	5	AutModOn
	OsS	x					16	5	AutModOn
	Group / AS Acknowledge	x						5	AutModOn
Process Parameter	Time for startup warning	x					31	22	WarnTi
	Waiting time for manual start	x					31	22	WaitTi
	Start up command release time	x					31	22	CoURelTi
	Shut down release time	x					31	22	CoDRelTi

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Operation levels and OS Permissions for **drive functions**:

	OS Commands	C_DRV_1D	C_DRV_2D	C_DAMPER	C_VALVE	Feature Bit	OS_PermissionLog	Op_Level	Block Parameter
Mode Change	Switch to automatic mode	x	x	x	x	21	2	5	AutModOn
	Emergency stop	x	x	x	x	30	30	5	
	Switch to local mode	x	x	x	x	0	0	5	LocModOn
	Force to Out of Service mode	x	x	x	x	20	3	23	OoSModOn
	Switch to manual mode	x	x	x	x	13	1	5	ManModOn
	Manual mode: non interlocked	x	x	x	x	16	5	23	COMMAND
	Manual mode: only protection	x	x	x		17	7	23	COMMAND
	Manual mode: reduced interlocks	x	x	x	x	18	6	23	COMMAND
	Simulation of active position				x	31	27	23	OoSModOn
	Simulation of idle position				x	31	28	23	OoSModOn
Start/Stop/Select	Start, Start D1	x	x	x	x		10	5	ManModOn
	Start D2		x	x			12	5	ManModOn
	Stop	x	x	x	x		11	5	ManModOn
	Inching more			x			10	5	AutModOn
	Inching less			x			10	5	AutModOn
	Release Power Management	x	x				4	5	PMinvol
	Start calibration			x			30	23	COMMAND
Setpoint	Setpoint	x		x		29	28	5	SP_Os
	Setpoint low limit	x		x			20	19	SP_LoLim
	Setpoint high limit	x		x			20	19	SP_HiLim
Process Parameter	Start delay time	x	x		x		31	22	StaDelTi
	Stop delay time	x	x		x		31	22	StpDelTi
	Direction change delay time		x				31	22	DirChaTi
	Time for feedback monitoring	x	x	x	x		31	22	FbkMonTi
	Time for startup warning	x	x	x	x		31	22	WarnTi
	Monitoring time from pos1 to pos2			x	x		31	22	MovMonTi
	Time Limit switch delay			x	x		31	22	LSDelTi
	Minimum pulse length			x			31	22	MinPulTi
	Actuator run time			x			31	22	MovActTi
	No. of wagging operations			x			31	22	WaggNo
	Hysteresis resp. threshold			x			31	22	DeadzoH
	Hysteresis drop. threshold			x			31	22	DeadzoL
Maintenance	Reset statistic values	x	x	x	x		29	23	RelTimOS
	Start Maintenance	x	x	x	x		16	29	MaiInt

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Operation levels and OS Permissions for **annunciations and measurements**:

	OS Commands	C_ANNUNC	C_PROFB	C_ANNUN8	C_MEASUR	Feature Bit	OS_PermissionLog	Op_Level	Block Parameter
Mode Change	Switch to automatic mode	x	x	x	x	21	2	5	AutModOn
	Force to Out of Service mode	x	x	x	x	20	3	23	OoSModOn
	Simulation	x	x	x		23	15	24	InSig
	Simulation				x	23	15	24	SimPV
	Bypass measuring channel				x	0	14	24	PV
Analog values	Value HH limit				x		20	19	HH_Lim
	Value H limit				x		21	18	H_Lim
	Value L limit				x		26	18	L_Lim
	Value LL limit				x		27	19	LL_Lim
	Value HH switching limit				x		22	20	SHH_Lim
	Value H switching limit				x		23	20	SH_Lim
	Value L switching limit				x		24	20	SL_Lim
	Value LL switching limit				x		25	20	SLL_Lim
	Startup OK limit		x				21	20	StUpLim
	Shut down OK limit		x				26	20	ShDoLim
Process Parameter	Substitute value				x		31	22	SubValOs
	Time smoothing				x		31	22	SmooTi
	Time spike suppression delay				x		31	22	SpSupTi
	Time delay live zero				x		31	22	LZDelTi
	Hysteresis				x		31	22	Hysteres
	Gradient negative				x		31	22	GradNeg
	Gradient positive				x		31	22	GradPos
	Gradient delay time				x		31	22	GradDTi
	Tolerance speed monitor		x				31	22	ProFbTol
	Out Signal on delay time [s]		x				31	22	PFOnDTi
	Out Signal off delay time [s]		x				31	22	PFOfDTi
	Out Signal on delay time [s]	x		x			31	22	OutOnDTi(1-7)
	Out Signal off delay time [s]	x					31	22	OutOfDTi
	Supervision delay time [s] for rising edges (0 – 1)	x		x	x		31	22	SupOnTi(1-7)
	Annunciation repeat time	x					31	22	RepTi
	Delay between warning and fault message	x					31	22	WaDelTi

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Operation levels and OS Permissions for **special functions**:

	OS Commands	C_SIMOS	C_STORAG			Feature Bit	OS_PermissionLog	Op_Level	Block Parameter
Mode Change	Switch to automatic mode	x	x			21	2	5	AutModOn
	Force to Out of Service mode	x	x			20	3	23	OoSModOn
	Simulation		x			23	15	24	SimPV
	Locked		x				0	24	StoLocked
Analog values	Value HH limit		x				20	19	HH_Lim
	Value H limit		x				21	18	H_Lim
	Value L limit		x				26	18	L_Lim
	Value LL limit		x				27	19	LL_Lim
	Startup OK limit		x				21	20	StUpLim
	Shut down OK limit		x				26	20	ShDoLim
Process Parameter	Time delay live zero		x				31	22	LZDelTi
	Delay for Dedusting		x				31	22	DedDelTi
	Material Quantity charge		x				31	22	MQ_IN
	Material Quantity discharge		x				31	22	MQ_Out
	Height		x				31	22	Height
	Width		x				31	22	StoWidth
	Length		x				31	22	Length
	StoDiam		x				31	22	StoDiam
	Capacity		x				31	22	Capacity
	Assigned Storage Material		x				31	22	Material
	Actual charge Material		x				31	22	ChargMat
	Material quality		x				31	22	MQ_Out
	Batch name		x				31	22	Batchname
	Batch ID		x				31	22	BatchID

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Message enabled

All Cemat blocks assure through an internal plausibility logic that in case of several similar faults only the "perpetrator" is creating an alarm message.

In order not to create an alarm flush in case of loss of the control power, each Cemat block has an interface "Message enabled" MsgEn.
The availability of the control power itself is monitored by an extra annunciation module.
By linking the two modules in the program it can be achieved, that in case of a power loss *only one* alarm is generated (by the annunciation module), thus clearly indicating the problem.
All the other devices -which also will trip because of the loss of the control power-, keep silent due to the lost annunciation release (which was -by the user-program- linked to the control power availability).



The annunciation release is one of the most helpful interfaces in order to achieve proper alarming and thus a smooth operation. Proper engineering assures that only the first fault creates an alarm message, not also all the other ones, which are triggered by the first fault.

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Definition of the run sequence

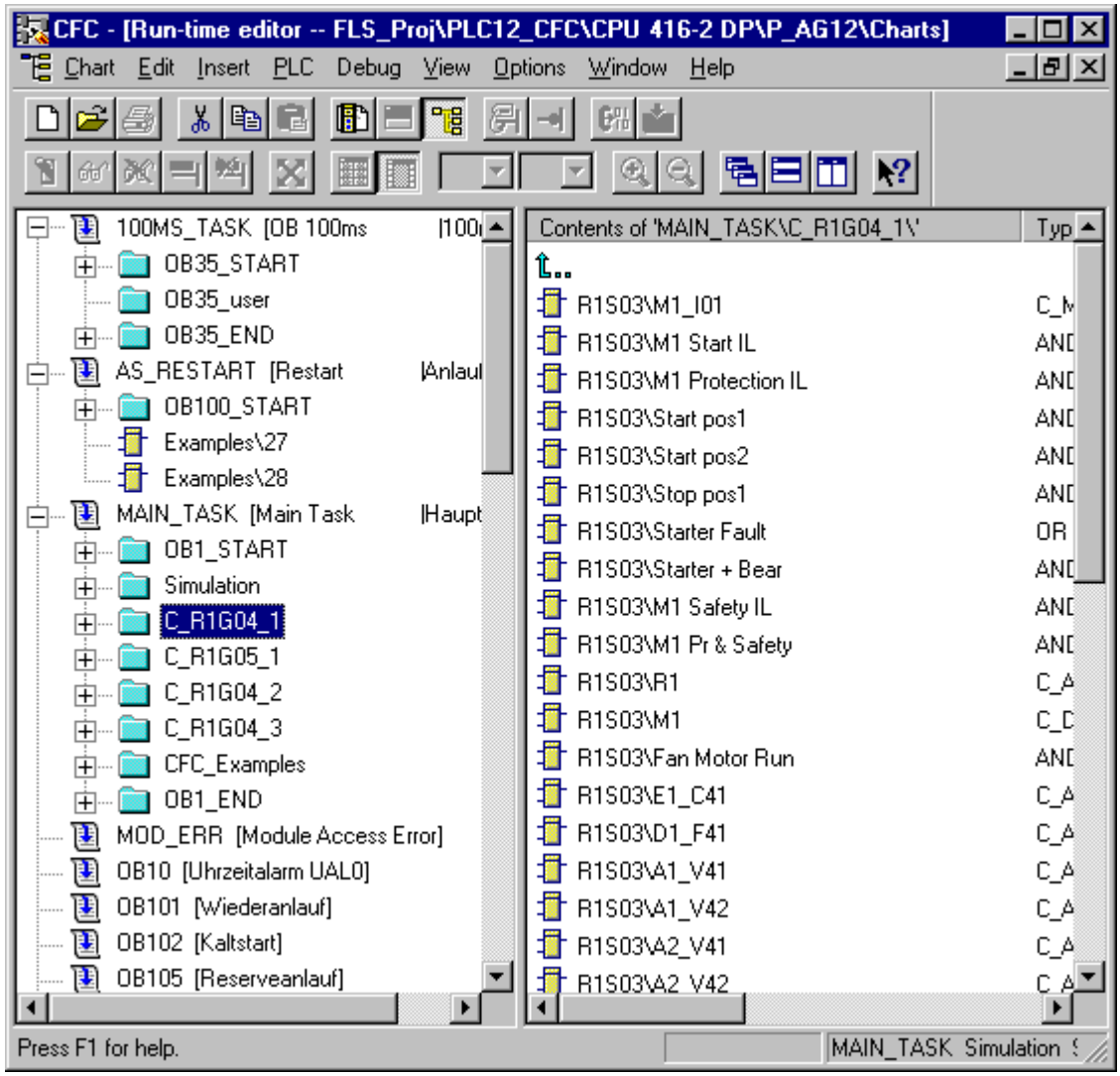
Make sure that the blocks are called at the right order in the runtime sequence (see object descriptions).

The CEMAT blocks **must be called** in (OB1 = MAIN_TASK) between the runtime groups OB1_START and OB1_END.

The Runtime Sequence is:
1. first : MUX
2. then : Annunciations and Drives
3. next : Corresponding Routes
4. finally : Corresponding Groups

All modules in the CFC will be assigned to a (default) OB. The module which was defined last will automatically be the predecessor for the installation of the next module.

The so-called run-time editor allows the definition of Run-time groups and the modification of the run sequence according to the desired structure of the program.



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Note: The runtime sequence is especially important in case of C_MUX modules and in case of cascaded C_MUX, or if one C_MUX is programmed and used for different Cemat blocks (e. g. for a drive and all allocated Annunciations and Measures).
It must be assured that between the call of the C_MUX and the Cemat Objects where it is connected to, no other C_MUX block is called!

Check of the run sequence and the group / route links

With the Excel tool "CEMAT CHECK TOOL.XLS" you can check your Group links and your runtime sequence. E. g. you call a drive block before his related C_MUX or you call a drive block after his related C_GROUP block. The Excel tool will detect this engineering fault and show this kind of engineering faults in a list.

The Excel tool "CEMAT CHECK TOOL.XLS" you will find in the directory D:\Cemat_CS\Tools.

The user manual for the tool you will find in the chapter 10_Checkliste_009.pdf.

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Conventional control desks

Some clients still like to use conventional control desks for certain applications. In this case the block C_PUSHB must be called. C_PUSHB has input parameters for Release, Fault Acknowledgement, Horn Acknowledgement and Lamp Test, as well as an output which can be connected to a horn.



Note: The inputs and outputs connected to C_PUSHB are always effective for the entire AS. If Fault Acknowledgement, Lamp Test or Release Functions should work only for specific CEMAT objects, the interfaces of the C_PUSHB can not be used. You have to connect the signals to the *Ack, LampTest* and *ConDeEn* interface of the CEMAT Object itself.

Module Parameters of C_PUSHB

Input parameters

FGS **Release Button** **Basic State: 0-Signal**

Format BOOL

The Release Button must be pressed together with Group Start, Group Stop, Route Selection etc. (2-Hand-Operation).

QT **Acknowledge Faults** **Basic State: 0-Signal**

Format BOOL

With a positive Edge on *QT* all dynamic faults in the AS are acknowledged.

QT_H **Acknowledge Horn** **Basic State: 0-Signal**

Format BOOL

With a positive Edge on *QT_H* the horn gets switched off.

LP **Lamp Test** **Basic State: 0-Signal**

Format BOOL

Parameter *LP* is used to parameterize a Lamp Test button for Running/Fault Lamps of the drives, Annunciation lamps, Group status indications and Route selection lamps.

THUP **Horn time in Seconds** **Basic State: 120**

Format INTEGER

After this time the horn is switched off.

Output Parameters

HORN **Horn**

Format BOOL

The output can be used for an acoustical alarm.

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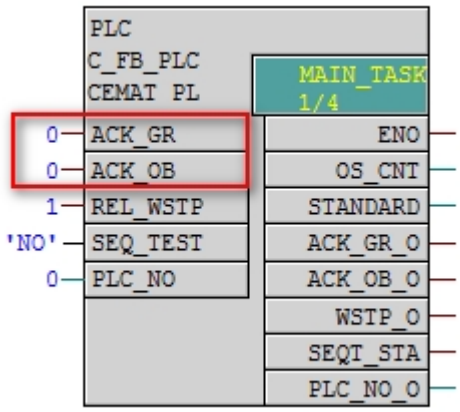
Acknowledgement mode

Since CEMAT V7.1 three acknowledgement modes exist:
Fault acknowledgment can be done
1. either for the complete AS or
2. group-wise or
3. per object

A mixture of the modes in *not* possible. (See Reference Manual, System).

PLC-wide acknowledgement

By default the fault acknowledgement is carried out per AS.



If the fault acknowledgement shall not be carried out per PLC a modification in the system chart as well as some additional programming for each Cemat object are required:

Group-wise acknowledgement

If the fault acknowledgement shall be carried out per Cemat Group the parameter *ACK_GR* of the block C_FB_PLC in the system chart SYSPLCnn has to be set to 1-signal.

Additionally, in the user program, you have to link the output *AckGr* of the Group modules with the interfaces *Ack* of all the objects belonging to a group.

Note: A link from output *AckGr* of the Group back to the Group (as to GQIT in former versions) is not needed any more as the Group Acknowledgment is linked internally now.

Object-wise acknowledgement

If the fault acknowledgement shall be carried out per Cemat object the parameter *ACK_OB* of the block C_FB_PLC in the system chart SYSPLCnn has to be set to 1-signal.
Object-wise acknowledgement acknowledges the alarm in the alarm line and the fault at the object at the same time.

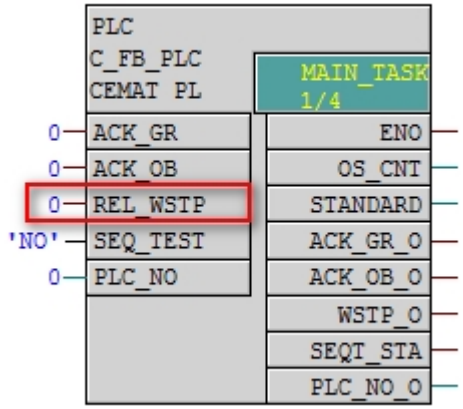
Caution: In case of protection interlock of a drive, the message is created not by the drive itself but by an annunciation block or measure. In this constellation the acknowledgement of the alarm line does *not* acknowledge the drive fault. Therefore the drive faceplate must be opened and Acknowledge button must be pressed at the drive's faceplate.

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Warning mode

As a default the C_FB_PLC in the system chart SYSPLCnn is configured to automatically interrupt the start-up of a Group (start command is reset) when a warning occurs.

Since Cemat V7.1 the option exists, to disable this Group start-up interrupt.
The block C_FB_PLC in the system chart SYSPLCnn has a parameter *REL_WSTP*, which must then be changed to 0-Signal.



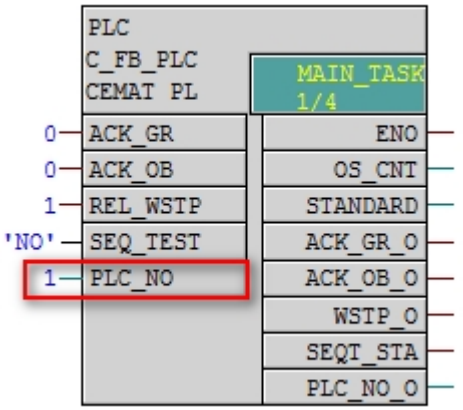
PLC Number

Parameter PLC_NO of block C_FB_PLC is only needed in case of object links to a group in a different AS (see object description of C_GROUP).

In this case parameter *PLC_NO* must be set to the same number as the System chart:

Example:

In the chart SYSPLC01 set a "1" on PLC_NO.
In the chart SYSPLC02 set a "2" on PLC_NO.
In the chart SYSPLC03 set a "3" on PLC_NO.
etc.

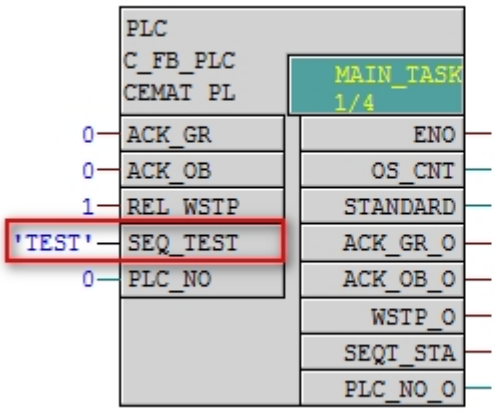


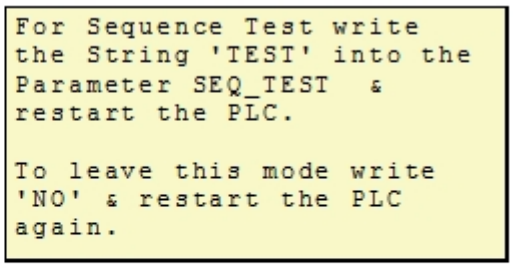
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Sequence-Test

In the sequence test mode the program can be tested without hardware inputs and outputs. It is a pure simulation mode and can only be activated or deactivated with a restart of the AS.

The sequence test mode is enabled by changing the settings at the C_FB_PLC in the system chart:





To start the sequence test mode, the string ‘TEST’ on parameter *SEQ_TEST* has to be entered and the AS has to be restarted.

With the AS restart all C_MEASUR, C_ANNUNC and C_ANNU8 blocks are switched automatically to “Simulation” mode, the other objects to “Testmode AS”.

During sequence test mode various hardware signals are generated object internally: The electrical availability signal is simulated, the thermal relay signal is set to “ok”, “proper” local switch signals are emulated, in case of the motor, the feedback of the contactor is simulated and for damper and valve the limit switches are generated.

All further hardware inputs are still active and must be simulated via test program at the beginning of the OB1 Cycle.

Sequence test mode is indicated by the blocks through the output *SimActQ* = 1.

To leave the sequence test mode, enter the string ‘NO’ at the parameter SEQ_TEST and restart the AS. By this the simulation mode of all blocks is reset.

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Using driver blocks with CEMAT

In Cemat projects using driver blocks is recommended for analog signals, is an option in case of binary signals.

Using driver blocks the signal status (quality) of the periphery signals can be evaluated and the reaction in case of bad quality can be configured: In case of a card failure the driver block will provide the Bad value, the Substitute value or the Last valid value, depending on its configuration.
In case of analog values the driver block additionally converts the card value into the physical value, considering the hardware configuration for the calculation.



Note: The Cemat blocks do not evaluate the signal status (quality code) from the driver blocks. The information is only used as an indication in the faceplate and in the block icon (optional).

If no driver blocks are used, the links from "non-structured" I/Os to "structured" block inputs or outputs need a signal conversion (especially in case of C_MEASUR, C_ANNUNC, C_ANNUN8 and C_PROFB).
Therefore the converter blocks from the PCS7 AP Library V80, family “Convert” can be used.

If driver blocks are used in your project, please pay attention to the following engineering rules:

Driver functions and Annunciation blocks

The parameterization of the driver bocks can exclusively be carried out in CFC, at the driver block itself:

- The behavior in case of fault (Bad value, Substitute value or Hold last value) has to be adjusted via feature bit settings.
- The Simulation value is entered via input *SimPV_In* (not needed in Cemat).
- The Substitution value is entered via input *SubsPV_In*.

Simulation:

Blocks C_ANNUNC and C_ANNUN8 already include a simulation function, which can be enabled via the operator station. The simulation value must be configured with Feature Bit 28. If the block is switched to simulation, the status is displayed in the block icon and in the faceplate, and additionally the block is listed the Cemat Object Browser (list of simulated objects).
Changing the AS into Sequence test mode automatically switches all annunciation blocks into simulation.

As the simulation of a channel driver block can not be enabled via faceplate and as there is in case of a simulation no entry in the list of simulated objects (at the Cemat Object Browser), we recommend to only using the simulation of the annunciation block (rather than a simulation at the driver block).

Driver status indication:

The quality code of the driver signal is displayed in the Diagnosis picture of the Annunciation block under “Signal Status”.

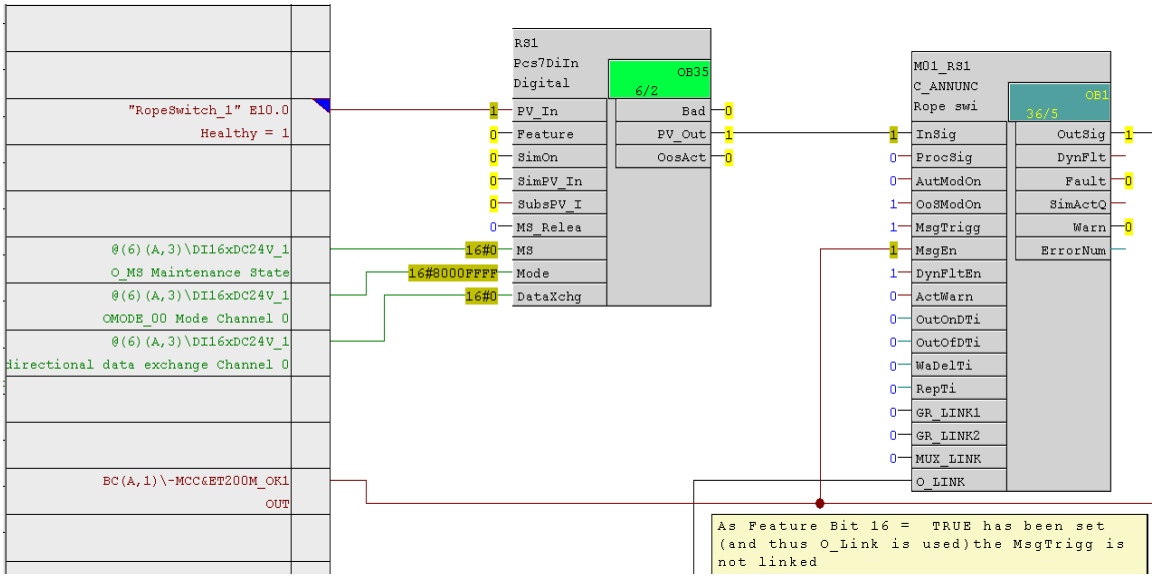
In order to show the signal status in the block icon as well, Feature bit 22 of the Annunciation block C_ANNUNC or C_ANNUN8 must be set to TRUE (write Quality Code 'ST_Worst' to Module Output) and a proper icon type must be selected. (See chapter OS Engineering).

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The following connection between C_ANNUNC of C_ANNUN8 and driver block is required:

The output *PV_Out* of the driver block Pcs7DiIn has to be connected to input *InSig* of C_ANNUNC or to input *InSig1* – *InSig7* of C_ANNUN8.

Example:



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Driver functions and measuring values

The parameterization of the driver bocks is carried out in CFC, at the driver block itself:

- The behavior in case of fault (Bad value, Substitute value or Hold last value) has to be adjusted via feature bit settings.
- The Simulation value is entered via input *SimPV_In* (not needed in Cemat).
- The Substitution value is entered via input *SubsPV_In*.
  This value will be automatically be used, when the driver receives a faulty value *PV_In* (and Feature Bit 29 is set).
- The range of the process value is entered via structure input *Scale.*

Simulation:

Block C_MEASUR already includes a simulation function, which can be enabled via the operator station. The simulation value is configured at input *SimVal* of C_MEASUR and can be modified through operator faceplate.

If the C_MEASUR is switched to simulation this value is output as “measured value”, the status is displayed in the block icon and in the faceplate, and additionally the block is listed the Cemat Object Browser (list of simulated objects).
Changing the AS into Sequence test mode automatically switches all C_MEASUR blocks into simulation.

As the simulation of a channel driver block can not be enabled via faceplate and as there is in case of a simulation no entry in the list of simulated objects (at the Cemat Object Browser), we recommend to only using the simulation of the C_MEASUR block (rather than a simulation at the driver block).

Driver status indication:

The quality code of the driver signal is displayed in the Diagnosis picture of the C_MEASUR block under “Signal Status”.

In order to show the signal status in the block icon as well, Feature bit 22 of the measured value block C_MEASUR must be set to TRUE (write Quality Code 'ST_Worst' to Module Output) and a proper icon type must be selected. (See chapter OS Engineering).

Accordingly the following connections between C_MEASUR and driver block are required:

The output *PV_Out* of the driver block Pcs7AnIn has to be connected to input *PV* of the C_MEASUR.

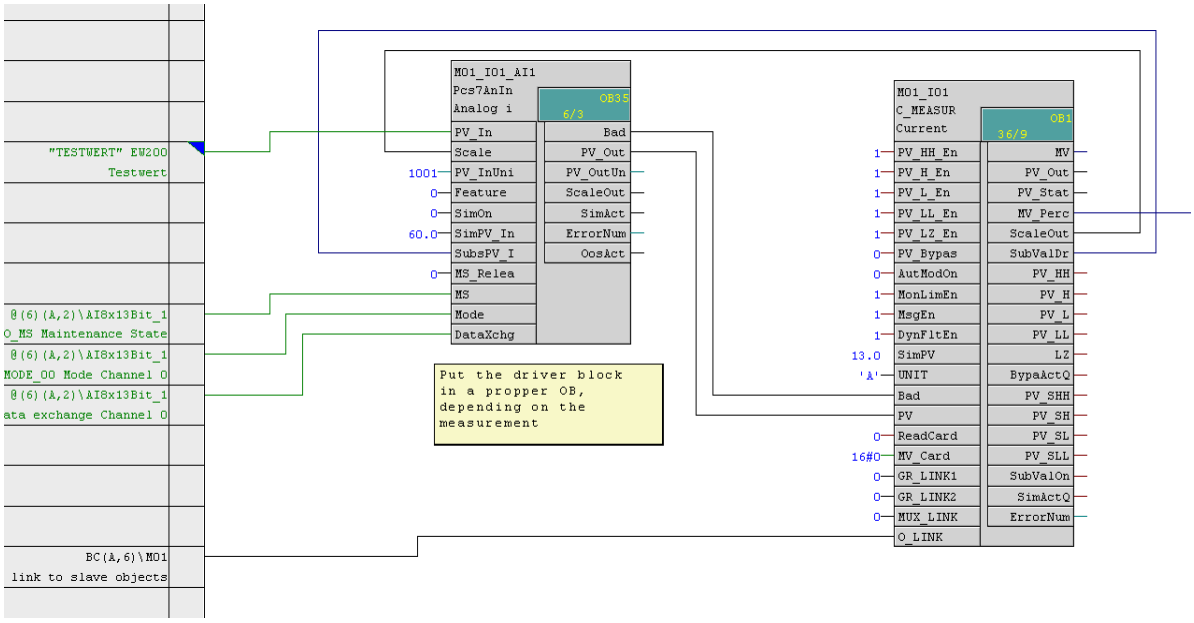
The output *Bad* of the driver block Pcs7AnIn has to be connected to input *Bad* of the measuring value bock if the Feature Bit28 of the driver is not set to “1”. Thus the module status “Bad Quality” and “Simulation” can be distinguished properly and displayed in the block icon and in the faceplate of the C_MEASUR.

In order to enter the range of process value only once, the output *ScaleOut* of the C_MEASUR must be connected to the input *Scale* of the driver block.

In order to enter the Substitution value only once (and in order to allow modification of the substitution value from the faceplate of C_MEASUR), the output *SubValDr* of C_MEASUR block must be connected to the input *SubsPV_In* of the driver block Pcs7AnIn.

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Example:



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Driver functions and drive blocks (not recommended)

The parameterization of the driver bocks can exclusively be carried out in CFC, at the driver block itself:

- The behavior in case of fault (Bad value, Substitute value or Hold last value) has to be adjusted via feature bit settings.
- The Simulation value is entered via input *SimPV_In*.
- The Substitution value is entered via input *SubsPV_In*.

Simulation:

The drive blocks C_DRV_1D, C_DRV_2D, C_DAMPER and C_VALVE don't have any simulation function, except the Sequence test mode, where the standard signals of the drives are assumed to be "good" and not evaluated any more.

Driver status indication:

If the driver block recognizes a fault the output *Bad* is set. If the driver block is switched to simulation the output *SimAct* will be set. A summarizing indication for the quality code of the driver signals can be given in the Diagnosis picture of the drive block under “Signal Status”.

In order to show the signal status in the block icon as well, Feature bit 22 of the drive block must be set to TRUE (write Quality Code 'ST_Worst' to Module Output) and a proper icon type must be selected. (See chapter OS Engineering).



Note: Please consider the "side effect" of Feature bit 22: If the Quality code is transmitted to the Module Output, the information is forwarded to the next drive in the sequence, etc. This means, if one drive in a sequence has bad quality, all proceeding drives will indicate bad quality as well.

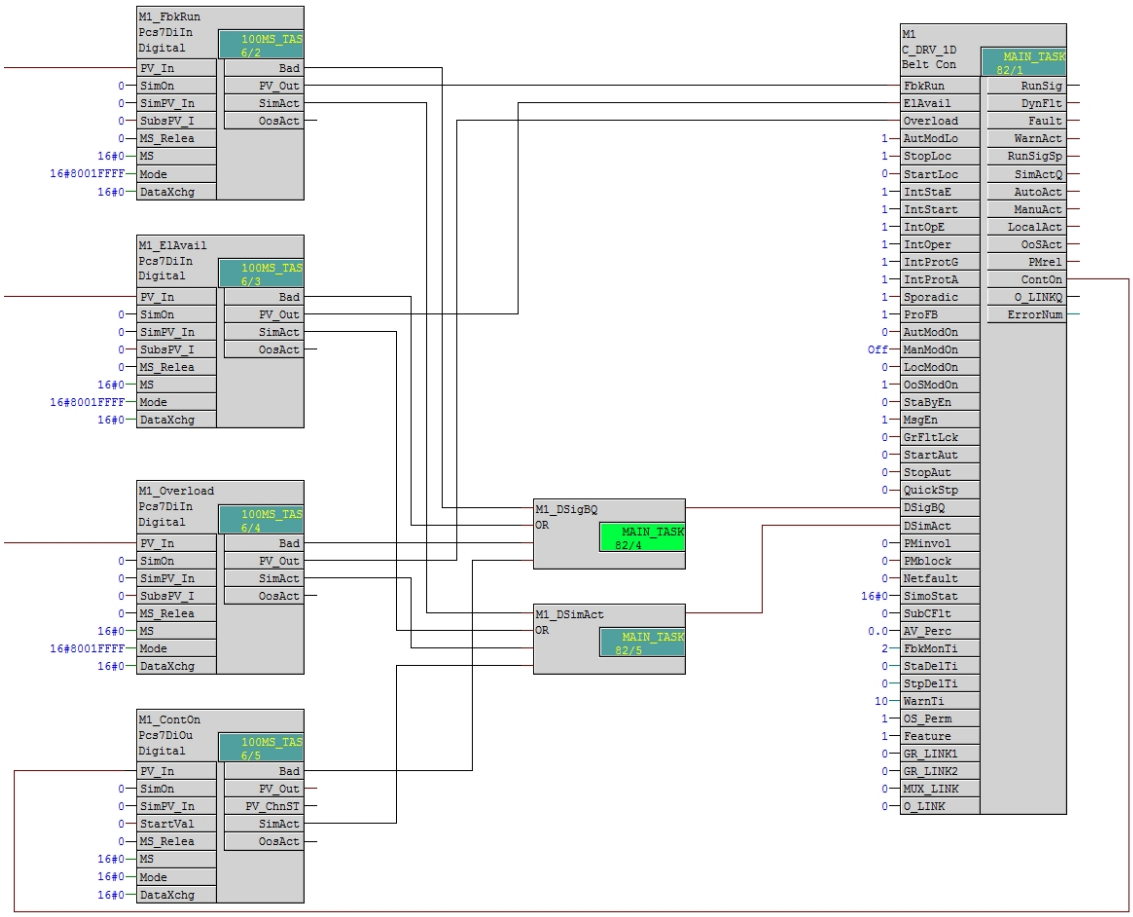
The following connections between the driver blocks and Cemat drive blocks are required:

In order to indicate the bad quality status in the drive block icon and faceplate, you have to connect the output *Bad* of all related driver blocks via an OR to the interface *DSigBQ* of the Cemat drive module.

In order to indicate the simulation status at the drive block icon and faceplate, you have to connect output *SimAct* of all related driver blocks with an OR to interface *DSimAct* of the Cemat drive module.

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Example:



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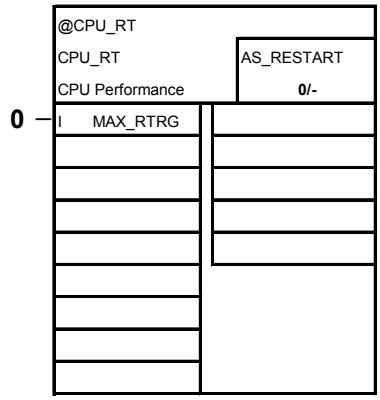
Function block CPU_RT

During the generation of the driver blocks, independent on CPU and the FW of the CPU, automatically the chart @CPU_RT is generated. This chart contains the block CPU_RT "Performance data and Stop Avoidance" which is called in OB100, OB1, and in all OB3x as well as OB8x.

The CPU_RT determines the runtime of the individual OBs and their participation in the cycle time. It leads to stop avoidance if the CPU is overloaded (OB80, Cycle time exceeded). Through "load shedding" the CPU can be prevented from becoming inoperable. The load shedding is achieved by interrupting the cyclic levels and is an emergency operation.



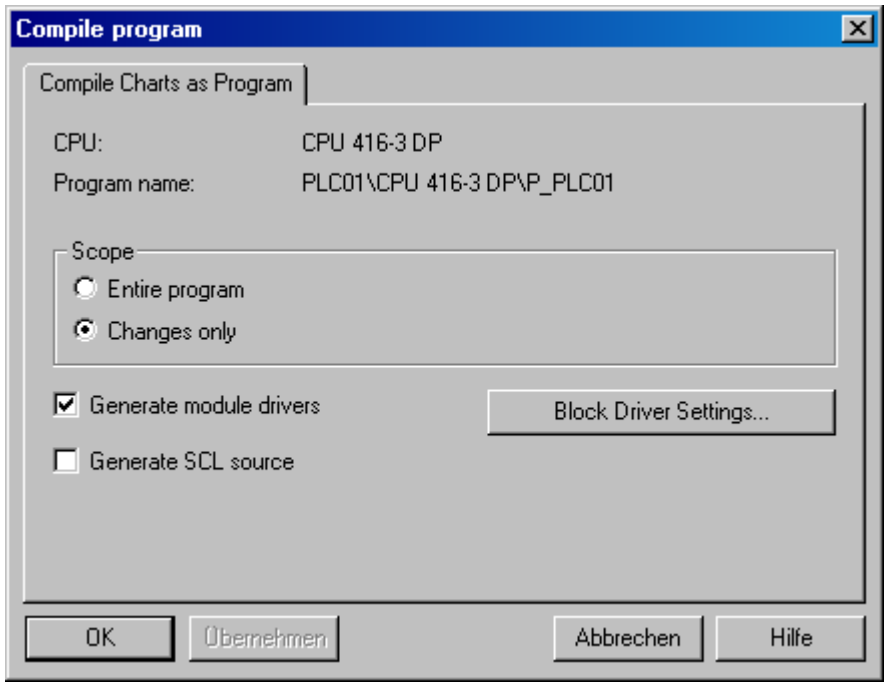
Caution: For Cemat this behavior is not desirable! Therefore parameter MAX_RTRG has to be changed to "0", in order to **switch off** the function "Fault avoidance in case of overload".



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Compile CFC

Before you can download the program into the AS it must be compiled. It will be transferred into machine language SCL. During compilation the program will be checked for errors and warnings. You can compile the complete program or only the changes.





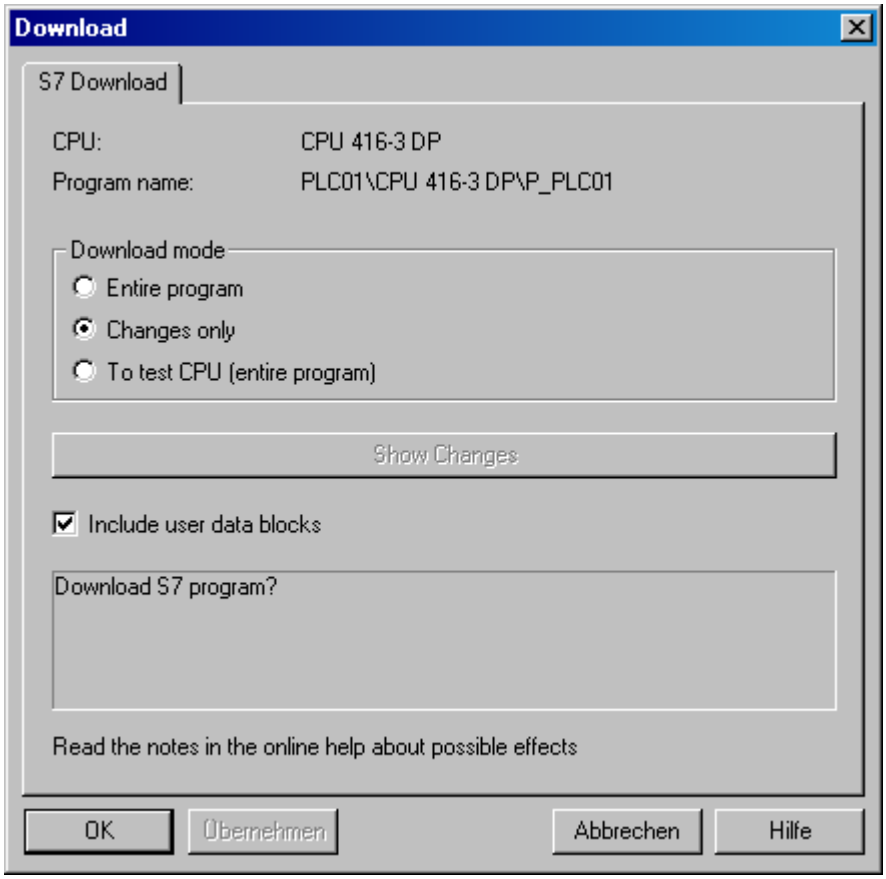
During the generation of the driver blocks the chart @CPU_RT with block CPU_RT is generated.
The first time the parameter MAX_RTRG of block CPU_RT is preset with value "50" and it has to be changed to "0"!

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Download to the AS

First the hardware definitions and the network configuration have to be downloaded into the AS once (if this was not done before).

The S7 program has to be downloaded from the CFC. PCS 7 takes care of the right order of the loading procedure. Do not download blocks or any object bypassing the CFC! You will be asked for a complete download or to download only the changes. Changes in the interfaces of a function or function block will require a download of the complete program. This is only possible with an AS stop.



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OS Compile

With the OS Compile the following steps are carried out:

- From the CFC blocks all variables with attribute 'Operator Control and Monitoring' are transferred into the Tag Management of WinCC. The messages, defined in the CFC blocks, are transferred to the Alarm Logging.

  In the background the Block Icons are generated and/or actualized. In order to prevent the automatic generation you have to deselect the option in the Object properties of the process picture.

  Also in the background the archive variables are generated (if any of the Block parameters is selected for "archiving").



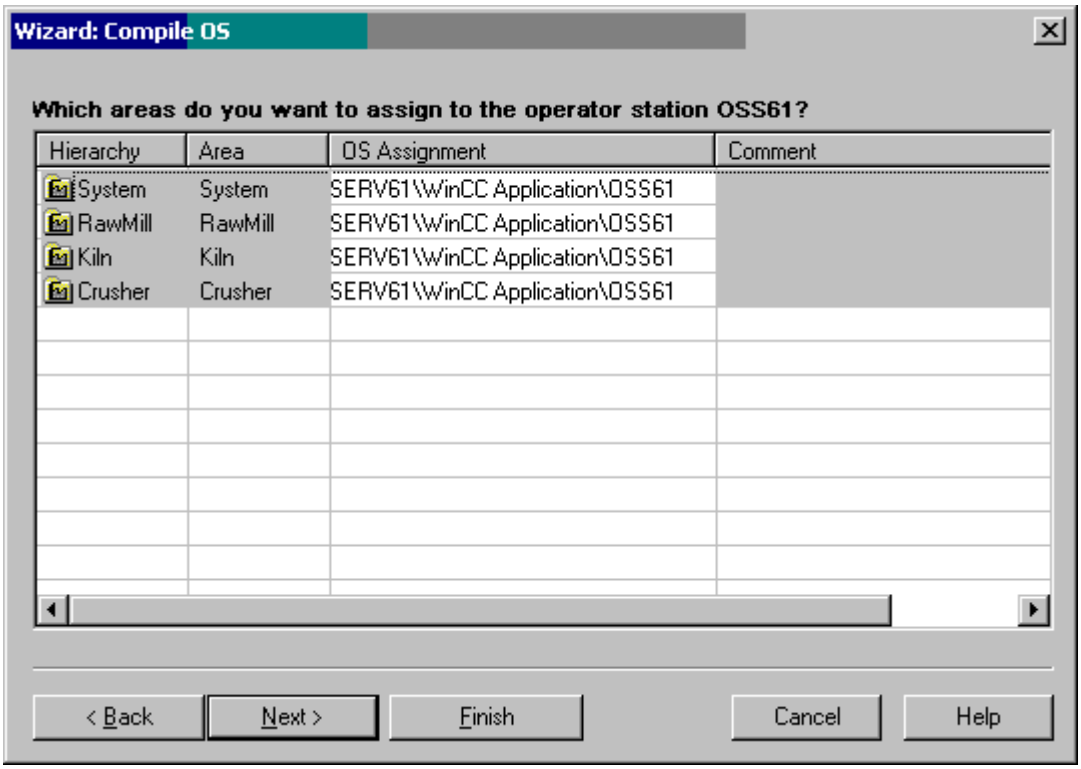
Caution: In case of automatic archive creation, all archive tags are created in the so-called "SystemArchive". Archive splitting (creating area specific archives) is not possible in this case!
See OS Engineering under "Adding an archive tag to Process Value Archive).

- The SFC Visualization is generated. (This is not needed within Cemat.)
- Based on the Plant view of the SIMATIC Manager the Picture Tree is created and/or actualized. This is essential because in this step also the Group Displays get actualized.

Start the OS Compile from the SIMATIC through selection of the OS with right mouse button and option '*Compile'*.

In the Introduction Window say '*Next >'*

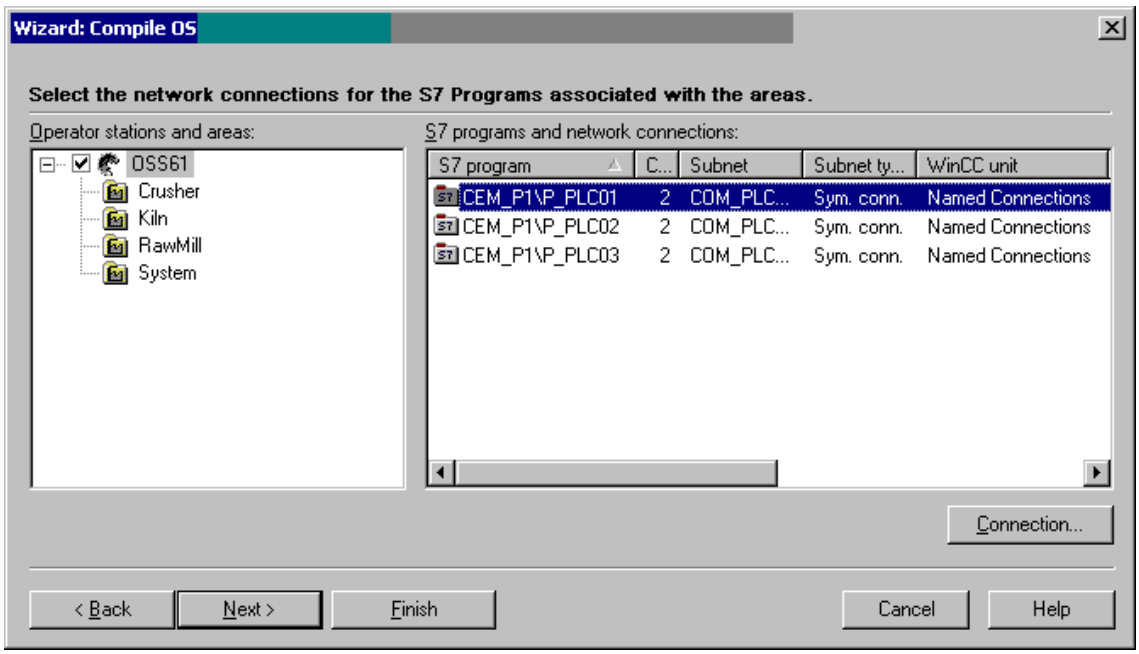
In the following window you see the assignment of the areas to the operation station:



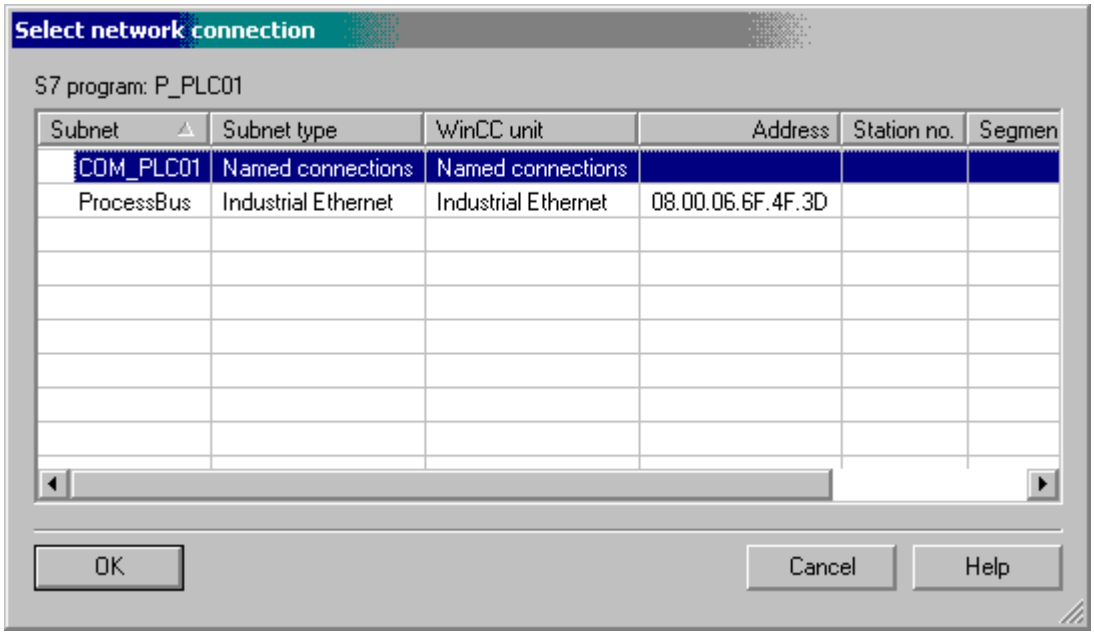
Continue with '*Next >'*

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In the following window you can select the network connections for the S7-Programs associated with the areas.



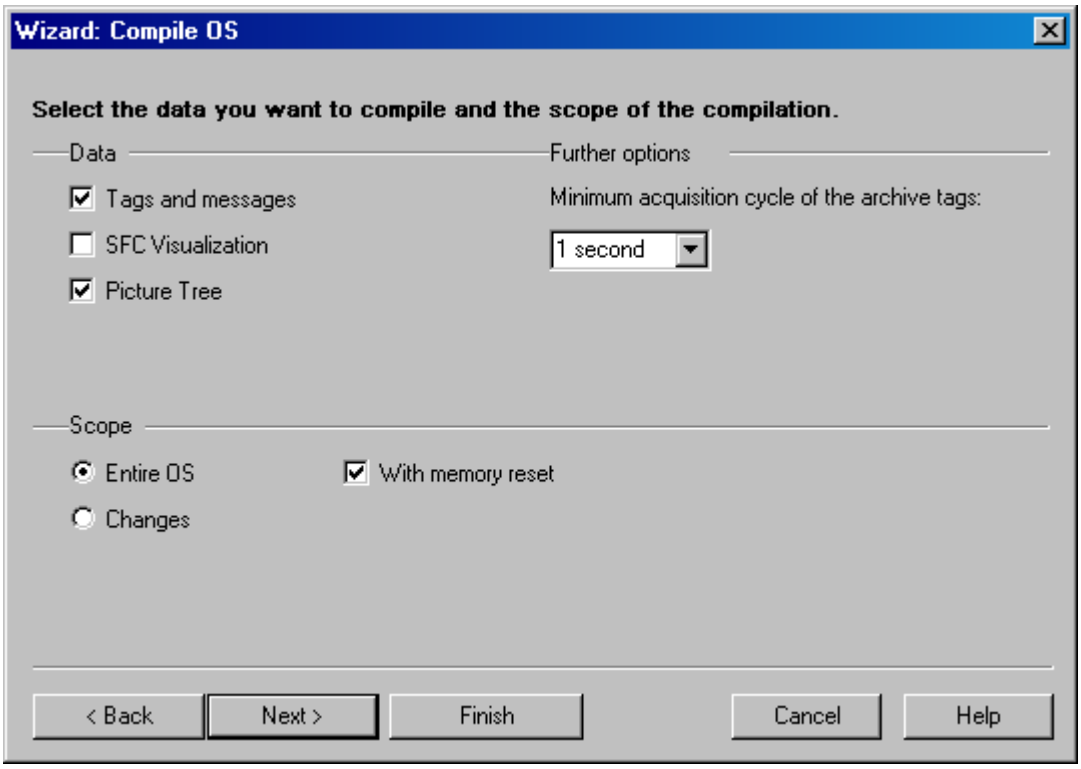
Select each AS and press '*Connection…*'



Select the network connection you want to use for the communication to WinCC.
In PCS7 V7 for a real AS always use *'Named connections'.* In case of PLCSIM you have to use 'Industrial Ethernet'.

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Finally select the transfer data and the scope of compilation:



Now press *'Finish'* to start the transfer.

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Project-Download

After new plant objects or pictures were added the OS-Servers and the Clients have to be updated as well. This requires a Project Download to the OS PCs.

If there was no structural change and as long as an OS Compile for changes is possible the OS Stations can remain in Runtime mode during the Project Download. After a complete OS compilation the destination Project has to be deactivated during the Download procedure.



Note: The modifications in the OS-Projects for the Server, Standby-Server, and Terminals are never carried out directly on the OS Stations. Any modification has to be carried out on the Engineering station and then be downloaded to the different OS Stations.

The update procedure can be performed manually (step by step) or automatically using the “Compile and Download Objects” Dialog in the SIMATIC Manager.

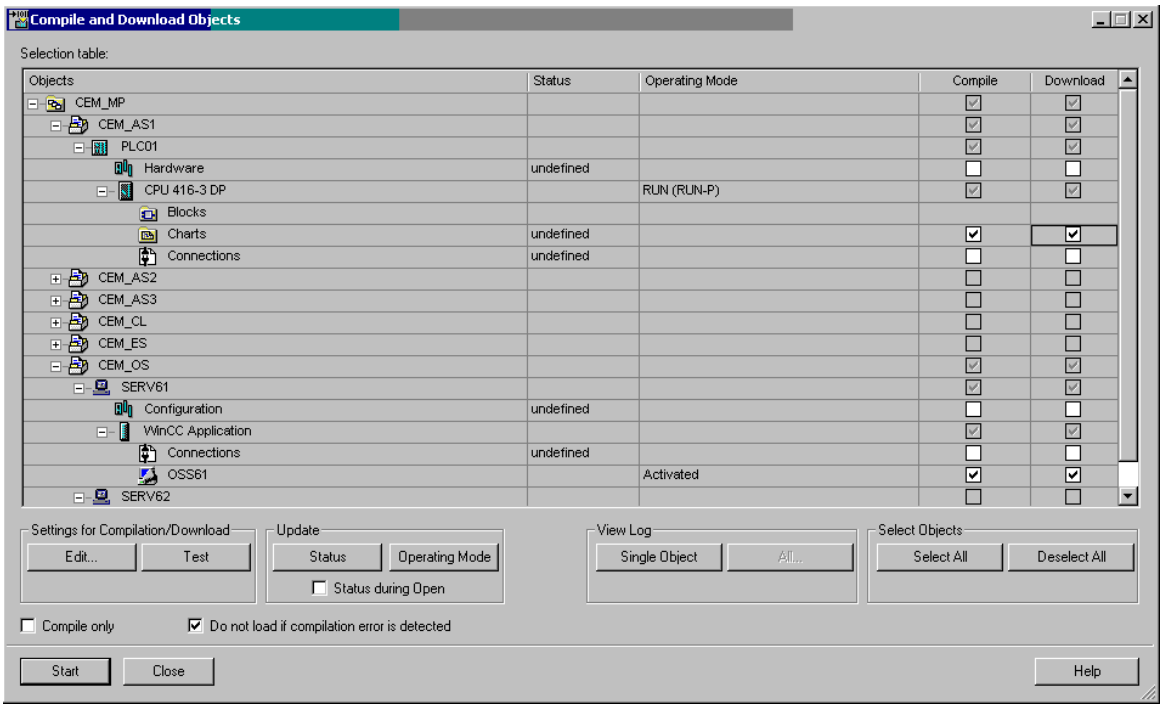
Manual update procedure for changes (The AS is running and both OS-Servers are activated):

1. Compilation for changes of the AS-Program (from CFC)
2. Download changes of the CFC to the AS
3. Compile the OS Project(s)
   The compilation of the OS must be carried out for each OS-Server and single station.
   At the end of the OS Compile procedure the Server Data is automatically updated by the system and the updated package is automatically loaded to the Client Projects.
4. For the Download of changes in a Server Project, select the OS in the SIMATIC Manager and press the Download Button. The download of changes is carried out first to the Standby-OS-Server. The 'Successful completed' message must be confirmed. After that the download is carried out to the primary OS-Server. The Clients get automatically actualized as well (the new package is loaded).
5. For the download into the Single User Station use the same procedure.

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The Function "Compile and Download Objects" allows to select the above mentioned steps and to start it with a single click only.

Compile and Download Objects:





Note: Even if only the project for the OS-Server is selected for Compilation and Download, the Standby-OS-Server gets updated as well. A separate update of the Clients is not required.

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Structural changes (e. g. the format of a variable was modified for an existing object or a new variable was added) lead to an interface conflict and require the stop of the runtime system for the project download. This is no problem because of OS-Servers being redundant.
The download procedure is like this:

1. To actualize the Tag Management an OS Compile has to be performed.
   The OS Compile must be carried out into the OS-Projects of ES and Server.
   At the end of the OS Compile procedure the Server Data is automatically updated by the system and the updated package is automatically loaded into the Client Projects.
2. After that you must close the OS-Project on the primary OS-Server. First close the WinCC Explorer (if it is not already closed) and second the Runtime.
   The Standby-OS-Server will become MASTER, the Clients will be switched to the Standby-Server.



Important: After closing the WinCC Project on the Server Station, you have to wait for at least 2 minutes. During this time the project is still “used”.

3. Now you can carry out the Project-Download from the Engineering Station to the primary Server Station. The Server-Project on the Engineering Station must remain closed. The download is carried out from the SIMATIC Manager.
4. Wait for the “Download successfully completed” – message before you restart the WinCC runtime of the primary OS-Server.
5. After both OS-Servers are running again, the Redundancy Manager starts actualizing the archive data. (This may take a while as it is a low priority task). Wait until the procedure is finished (indicated by the system message
   ‘‘REDRT:Archivabgleich beendet’’, or "REDRT: Synchronisation finished’’).
6. Now you can close the OS-Project on the Standby OS-Server. First close the WinCC Explorer (if it is not already closed) and second the Runtime.
   The primary Server will be MASTER, the Clients will be switched to the primary Server.



Important: After closing the WinCC Project on the Server Station, you have to wait for at least 2 minutes. During this time the project is still “used”.

7. Now you can carry out the Project-Download from the Engineering Station to the Standby-Server Station. The Download is carried out from the SIMATIC Manager.
8. After the “Download successfully completed” – Message the Project Download is finished!
9. If it is necessary to update the Clients as well (may not always be required), use the same procedure for each Client.



Note: for PCS7 engineering and handling details you may also check the Siemens FAQ, **ID:**63046571 :Kompendium Teil A – Projektierungsleitfaden, Bedienhandbuch, 08/2012, A5E02779219-01

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Integrated Asset Management

SIMATIC PCS 7 with the diagnostic and maintenance functions provides the monitoring of the various components of a PCS 7 plant, and display of the status in the process mode. This status is shown with defined symbols, which are the basis for the NAMUR/PNO definition.

When diagnostic and maintenance functions are used, a Maintenance Station must be created.



For detailed information regarding configuration of a Maintenance Station refer to the PCS7 Configuration Manual Engineering System and to the PCS7 Configuration Manual Operator Station.

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AS-AS Coupling

Content

AS-AS Coupling 1

AS-AS Coupling with PCS7 blocks 2
General 2
Send with SEND_BO 3
Receive with REC_BO 4
Send with SEND_R 5
Receive with REC_R 6
Send with BSEND 7
Receive with BRCV 9
Function block adjustments 11

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AS-AS Coupling with PCS7 blocks

General

For the AS-AS coupling to another PCS7 AS please use only the blocks from the Standard Library and from the PCS7 V8.0 Library.

Caution: The blocks C_PLC_SEND and C_PLC_RECEIVE from the CEMAT Library are foreseen for the communication to an AS from older CEMAT Versions (V2, V3 and V4). As with this communication only ISO Transport connection and no S7 Connection is possible, these blocks can not be recommended the communication to another PCS7 AS.

Caution: Since PCS7 V7.1 you have the possibility to create with CFC AS-wide interconnections. Please use this possibility very carefully and check with the online help the limits of this kind of communication. Otherwise you could cause performance problems. If you create your communication with PCS7 blocks listed in the following, then you control how many data are sent and when the telegrams are sent.

Caution: All blocks listed in the following uses the addressing parameters ID and R_ID (TEL_ID). The addressing parameters ID and R ID are evaluated only at the first call of the block (the actual parameters or the predefined values from the instance). The first call therefore specifies the communication relation (connection) with the remote partner until the next warm or cold restart. If you make an engineering fault for a running AS, please remove the blocks with the wrong ID and TEL_ID and create them new! Otherwise you need an AS restart!!!!!!!

For the AS – AS communication the following blocks are available:

USEND, URCV, BSEND, BRCV from the Standard Library

or

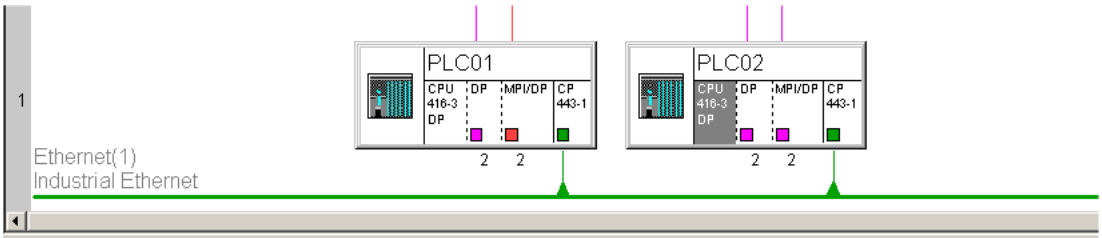
SEND_BO, REC_BO, SEND_R, REC_R from the PCS7 V8.0 Library.

These blocks use as link a S7 connection.

A S7 connection could be used for different telegrams between two AS. The parameter R_ID is for the determination of the different telegrams, which are transported via the same S7 connection.

Project settings in NETPRO:

S7 connection: E.g. the ID "A2" is in AS PLC01 and e. g. the ID "A1" is in AS PLC02.



Local ID	Partner ID	Partner	Type	Active connection partner	Subnet
A1	A2	PLC01 / CPU 416-3 DP	S7 connection	No	Ethernet(1) [IE]

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Send with SEND_BO

With block SEND_BO up to 128 BOOL values can be sent. If more than 128 BOOL values are needed, the block can be called multiple times. The different orders are identified by Parameter R_ID. In the destination AS a block REC_BO must be called which has the same R_ID as in the corresponding send call.

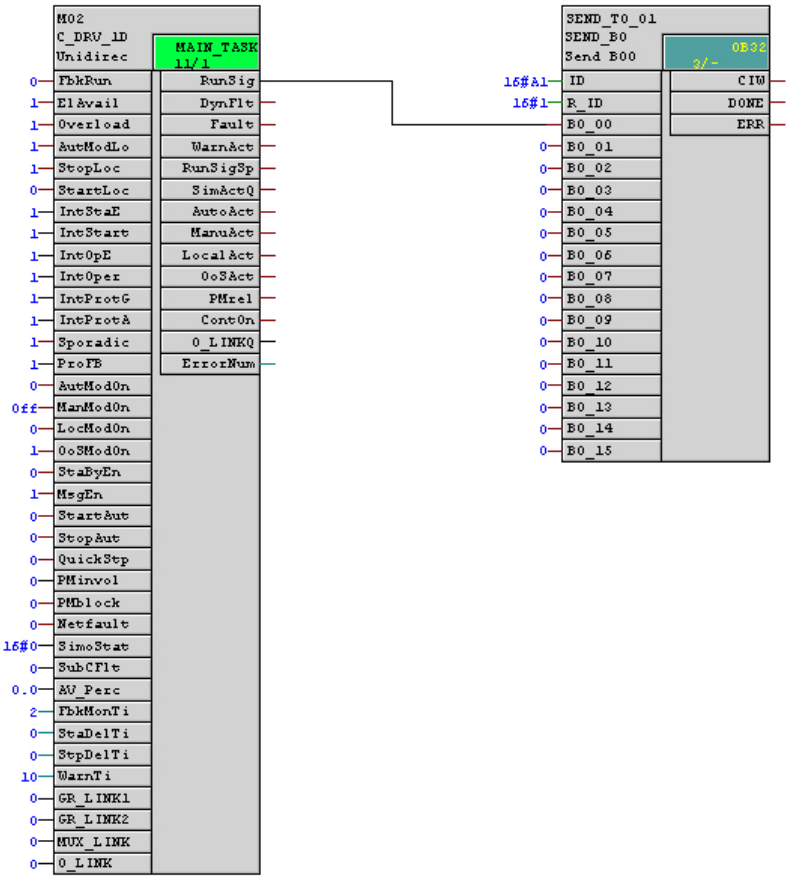
The ID of the S7 connection you find in the connection programming in NETPRO.

Example: PLC02 sends data to PLC01:
According to the NETPRO connections above the Send call in the AS PLC02 must have the ID "A1". The corresponding Receive call in the AS PLC01 must have the ID "A2".

The send job will be triggered by the (invisible) parameter "COM". To trigger the send job each second then there are two possibilities:

1. Keep the parameter "COM" at default value "1" and call the block SEND_BO in OB32 (each second).
2. Change parameter "COM" to "visible" and connect it to a pulse (one pulse each second). The block SEND_BO must be called at least every second (corresponding OB).

See the help function of SEND_BO.



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Receive with REC_BO

With block REC_BO up to 128 BOOL values can be received. If more than 128 BOOL values are needed, the block can be called multiple times. The different orders are identified by Parameter R_ID. On the send side a block SEND_BO must be called which has the same R_ID as in the corresponding receive call.

The ID of the S7 connection you find in the connection programming in NETPRO.

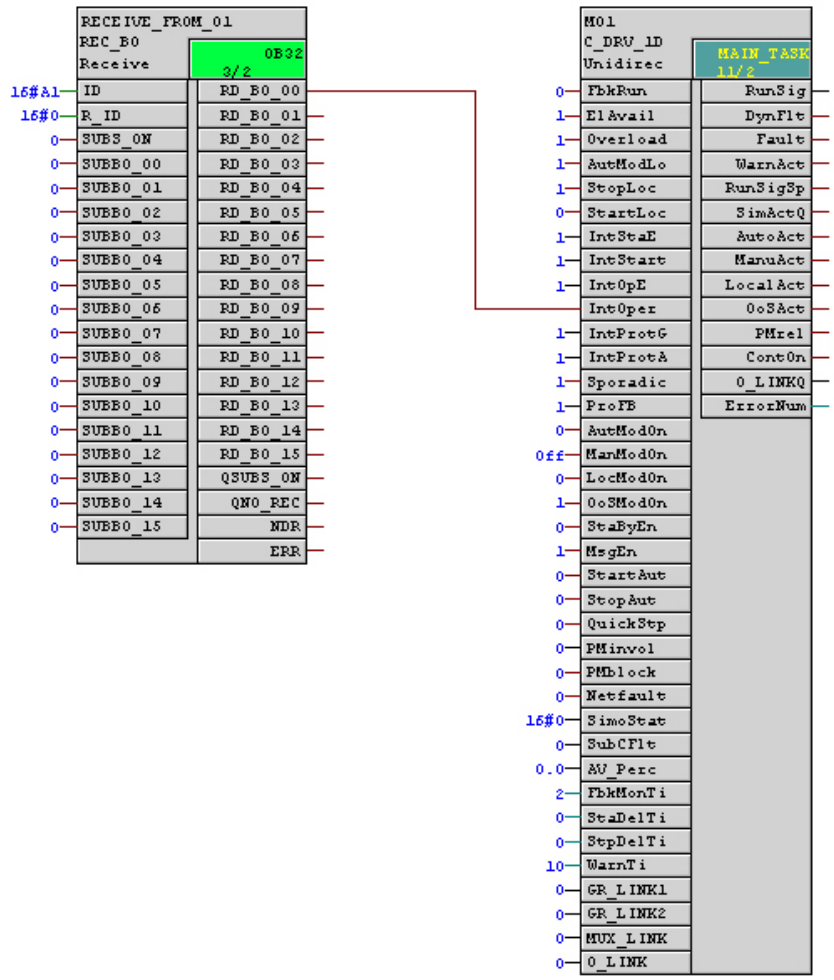
Example: PLC02 receives data from PLC01.
According to the NETPRO connections above the Receive call in the AS PLC02 must have the ID "A1". The corresponding Send call in the AS PLC01 must have the ID "A2".

To receive the data correctly two calls of the REC_BO are necessary. That means if you call the REC_BO every second you will receive data only every 2 seconds. If you need the data every second, then you should call the block REC_BO in the 500 ms OB.

The monitoring can be parameterized through the (invisible) parameter REC_MON. The default value is 3 cycles (calls). If a longer monitoring time is needed, then the value on parameter REC_MON must be increased.

If after the predefined number of block calls no telegram is received, then there is a fault and all values can be overwritten by substitution values.
For each of the 128 BOOL variables a substitution value can be defined. With parameter SUBS_ON you can decide if you want to use substitute values or not.

See the help function of REC_BO.



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Send with SEND_R

With block SEND_R up to 32 BOOL values and 32 REAL values can be sent. If more than 32 BOOL values or more than 32 REAL values are needed, the block can be called multiple times. The different orders are identified by Parameter R_ID. In the destination AS a block REC_R must be called which has the same R_ID as in the corresponding send call.

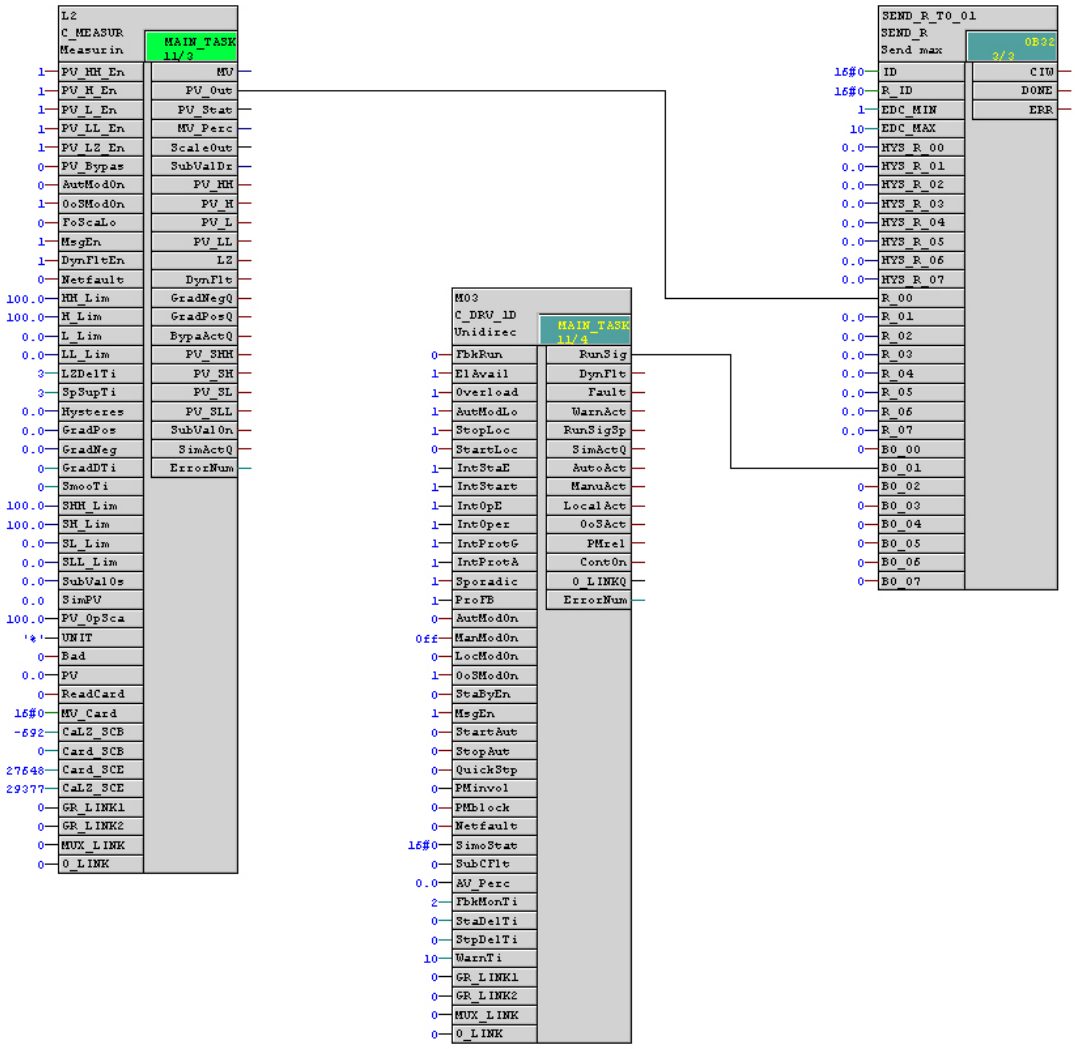
The ID of the S7 connection you find in the connection programming in NETPRO.

Example: PLC02 sends data to PLC01:
According to the NETPRO connections above the Send call in the AS PLC02 must have the ID "A1". The corresponding Receive call in the AS PLC01 must have the ID "A2".

The send job will be triggered by the (invisible) parameter "COM". To trigger the send job each second then there are two possibilities:

1. Keep the parameter "COM" at default value "1" and call the block SEND_R in OB32 (each second).
2. Change parameter "COM" to "visible" and connect it to a pulse (one pulse each second). The block SEND_R must be called at least every second (corresponding OB).

See the help function of SEND_R.



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Receive with REC_R

With block REC_R up to 32 BOOL values and 32 REAL values can be received. If more than 32 BOOL values and 32 REAL values are needed, the block can be called multiple times. The different orders are identified by Parameter R_ID. On the send side a block SEND_R must be called which has the same R_ID as in the corresponding receive call.

The ID of the S7 connection you find in the connection programming in NETPRO.

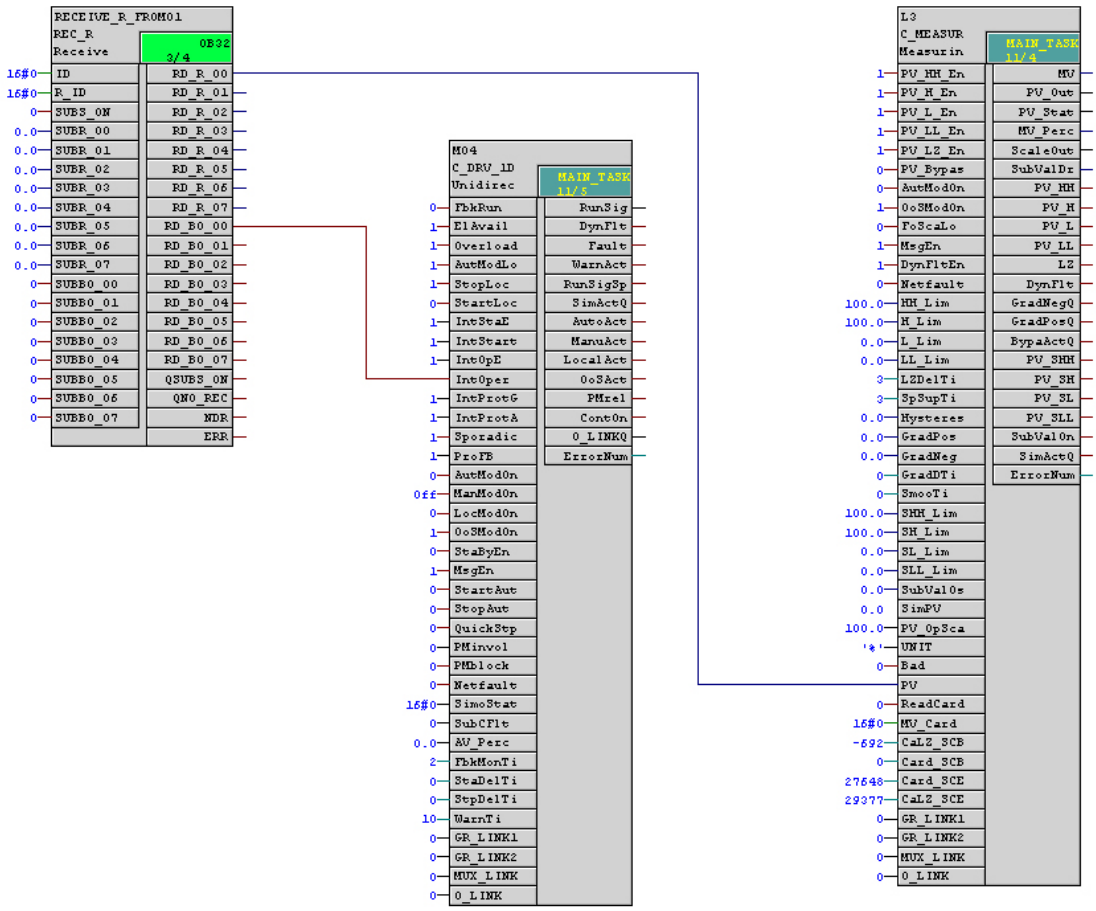
Example: PLC02 receives data from PLC01.
According to the NETPRO connections above the Receive call in the AS PLC02 must have the ID "A1". The corresponding Send call in the AS PLC01 must have the ID "A2".

To receive the data correctly two calls of the REC_R are necessary. That means if you call the REC_R every second you will receive data only every 2 seconds. If you need the data every second, then you should call the block REC_R in the 500 ms OB.

The monitoring can be parameterized through the (invisible) parameter REC_MON. The default value is 3 cycles (calls). If a longer monitoring time is needed, then the value on parameter REC_MON must be increased.

If after the predefined number of block calls no telegram is received, then there is a fault and all values can be overwritten by substitution values.
For each of the 32 BOOL variables and the 32 REAL values a substitution value can be defined. With parameter SUBS_ON you can decide if you want to use substitute values or not.

See the help function of REC_R.



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Send with BSEND

How to create your own function block with input parameters of different formats, which are sent using BSEND block.

The Cemat Library contains the two function blocks SEND_CFC_EXAMPLE (FB 1601) and BSEND_CALL (FB 1603). These blocks are an example for the send of any CFC parameters.

Based on the SEND_CFC_EXAMPLE you have to create "your" SEND_TO_AS02 as required: E. g. 20 Boolean, 5 Integer and 8 Real values have to be sent from AS01 to AS02. In this case you have to create a function block with at least 20 Boolean, 5 Integer and 8 Real values as input parameters.
Additionally the block needs two output parameters of the type integer (I_DB and LENGTH) and the following 4 local variables:

```
VAR_TEMP
  DBNR : WORD ;
  RET_VALUE : INT ;
  DBLENGTH : WORD ;
  NO_WRITE : BOOL ;
END_VAR
```

We recommend to creating some spare variables of each type. In this case you can easily send some more data without an interface change (AS stop). Renaming of the parameters later on is no problem (no interface change). Beside these individual input parameters and the two output parameters there should be no further parameter. The function block needs the following STL code:

```
      L     DINO;
      T     #I_DB;                  //SEND-DB into variable typ WORD
      T     #DBNR;
      CALL  "TEST_DB" (
            DB_NUMBER         := #DBNR,
            RET_VAL           := #RET_VALUE,
            DB_LENGTH         := #DBLENGTH,
            WRITE_PROT        := #NO_WRITE);
      L     #DBLENGTH;
      +     -4;                     //- I_DB and LENGHT
      T     #LENGHT;
      BE    ;
```

See example function block FB SEND_CFC_EXAMPLE (FB 1601)!

For each SEND_CFC_EXAMPLE you have to create the appropriate function block RECEIVE_CFC_EXAMPLE for receiving the data with exactly the same parameters. But on the receive side these are output parameters. See chapter with RECEIVE_CFC_EXAMPLE.

The function block BSEND_CALL (FB 1603) is a simple call of the system function block SFB12 BSEND. Up to 65534 byte could be send with the function block BSEND.

Attention: Max. 400 bytes can be transferred in one telegram as a consistent data block. If you have to transfer more data and the consistency is important you have to take care of this at the receive side. See consistency at the receiving!

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Block connection

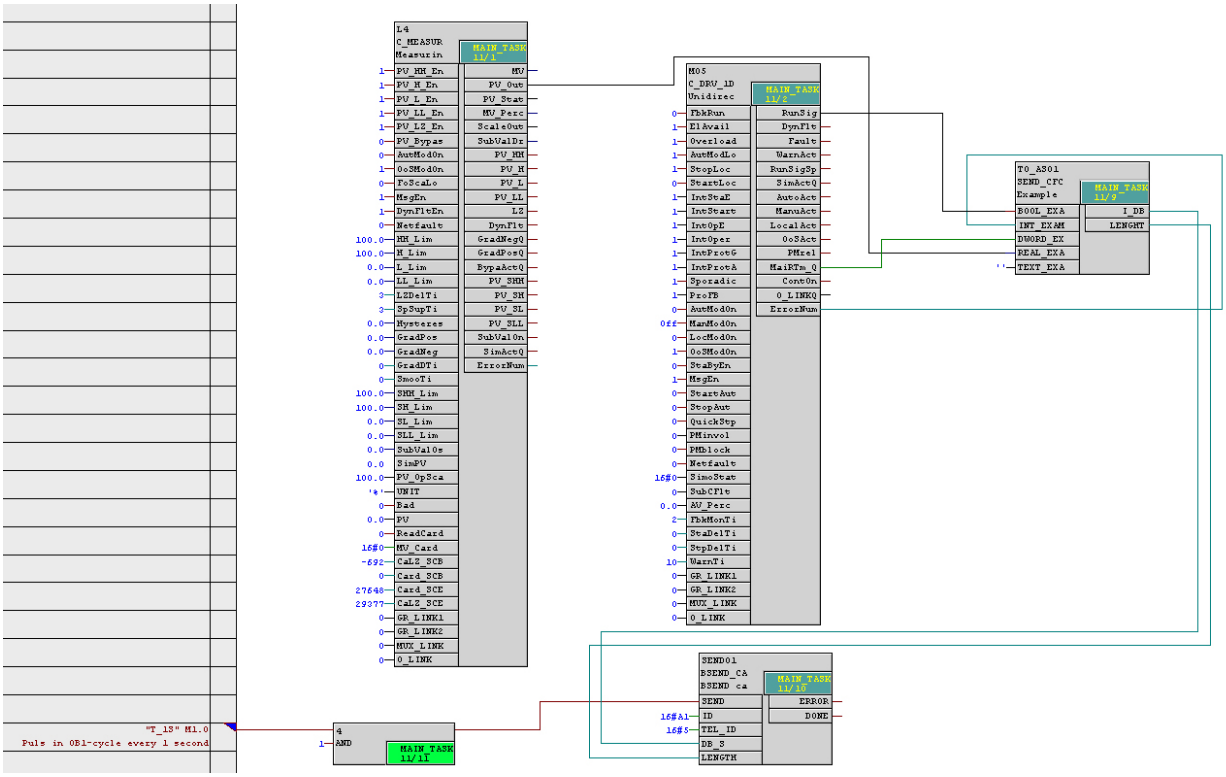
Connect in CFC the parameter I_DB (SEND_CFC_EXAMPLE) with DB_S (BSEND_CALL) and the parameter LENGTH (SEND_CFC_EXAMPLE) with LENGTH (BSEND_CALL). Parameter ID must contain the local ID of the S7 Connection. The Parameter TEL_ID corresponds to the Parameter R_ID of the blocks BSEND, SEND_BO or SEND_R. Thus multiple telegrams for the same S7 connection can be distinguished.

The send order is triggered via the parameter "SEND". If the program has to be sent every second, the parameter "SEND" must be connected accordingly (every second a pulse).

The status and the fault of BSEND can be seen in the output parameters ERROR, DONE and STAT. If more detailed information is required the Example function block BSEND_CALL has to be modified.

See the help function of BSEND.

Example for connections between SEND_CFC_EXAMPLE and BSEND_CALL



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Receive with BRCV

How to create your own receive block, using BRCV block, in order to Receive CFC-Parameters of different formats.

The Cemat Library contains the two function blocks RECEIVE_CFC_EXAMPLE (FB 1602) and BRCV_CALL (FB 1604). These blocks are an example for receiving any desired CFC parameters.

Example:
AS02 shall receive 20 Boolean, 5 Integer and 8 Real values from AS01. In this case create based on the REICEIVE_CFC_EXAMPLE (and equivalent to the "SEND_TO_AS02" of the source AS) a function block "REICEIVE_FROM_AS01" with at least 20 Boolean, 5 Integer and 8 Real values as output parameters. Additionally the block needs two output parameters of the type integer (I_DB and LENGTH) and the following local variables:

```
VAR_TEMP
  DBNR : WORD ;
  RET_VALUE : INT ;
  DBLENGTH : WORD ;
  NO_WRITE : BOOL ;
END_VAR
```

We recommend to creating some spare variables of each type. In this case you can easily send some more data without an interface change (AS stop). Renaming of the parameters later on is no problem (no interface change). Beside these individual output parameters and the two output parameters there should be no further parameter. The function block needs the following STL code:

```
L     DINO;
T     #I_DB;                  //RECEIVE-DB into variable typ WORD
T     #DBNR;
CALL  "TEST_DB" (
      DB_NUMBER         := #DBNR,
      RET_VAL           := #RET_VALUE,
      DB_LENGTH         := #DBLENGTH,
      WRITE_PROT        := #NO_WRITE);
L     #DBLENGTH;
+     -4;                     //- I_DB and LENGHT
T     #LENGHT;
BE    ;
```

See Example function block RECEIVE_CFC_EXAMPLE!

The function block BRCV_CALL (FB 1604) is a simple call of the system function block SFB13 BRCV. Up to 65534 byte could be send with the function block BSEND.

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Attention: Max. 400 bytes can be transferred in one telegram as a consistent data block. If you have to transfer more data and the consistency is important you have to take care of this after receiving. In this case the function block BRCF_CALL (FB1604) must be modified in order to write the data in a receive buffer and to copy the data only after the transfer is successfully completed.
If you don't have enough programming knowledge of STL to write the function yourself, please contact a system integrator.

Block connection

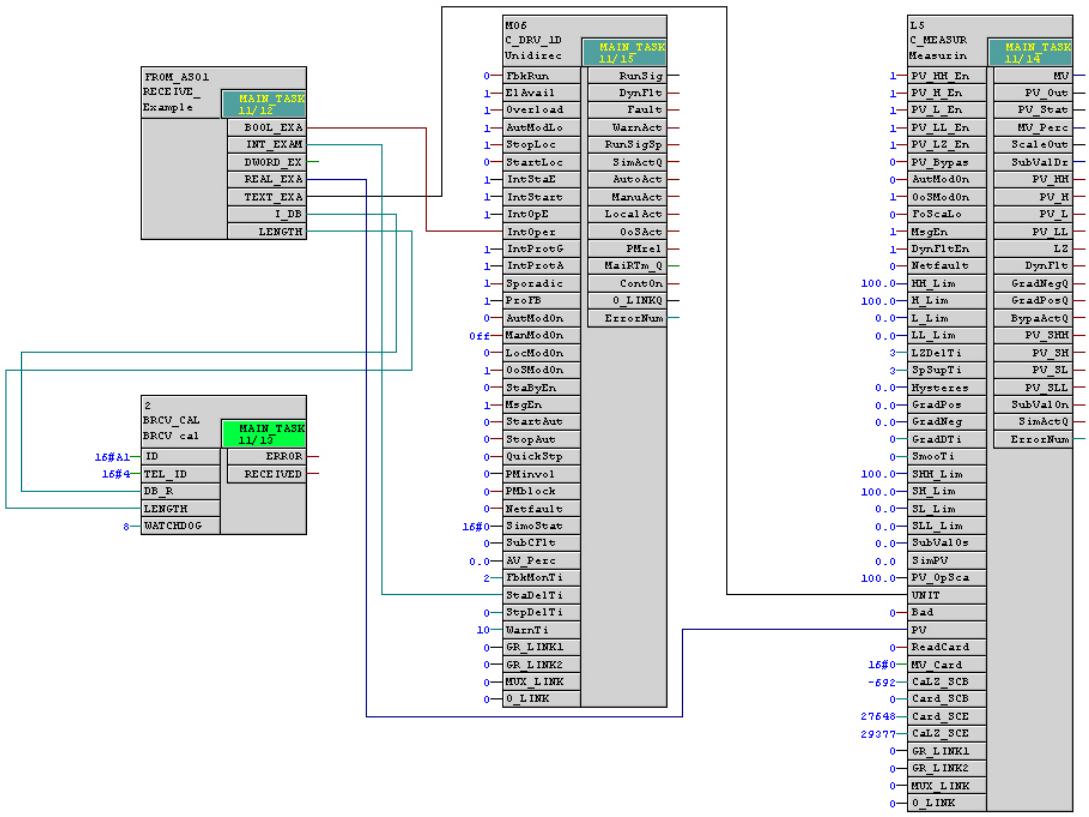
Connect in CFC the parameter I_DB (RECEIVE_CFC_EXAMPLE) with DB_R (BRCV_CALL) and the parameter LENGTH (RECEIVE_CFC_EXAMPLE) with LENGTH (BRCV_CALL). Parameter ID must contain the local ID of the S7 Connection. The Parameter TEL_ID corresponds to the Parameter R_ID of the blocks BRCV, REC_BO or REC_R. Thus multiple telegrams for the same S7 connection can be distinguished.

Through parameter WATCHDOG_SET a supervision time can be set. The default for WATCHDOG_SET is 8 seconds. This means, if after 8 seconds no telegram has been received, the receive data are overwritten with 0. If a different supervision time is required, the value for WATCHDOG-SET must be adapted. .

The status and the fault of BRCV can be seen in the output parameters ERROR, DONE and STAT. If more detailed information is required the Example function block BRCV_CALL has to be modified.

See the help function of BRCV.

Example for connections between RECEIVE_CFC_EXAMPLE and BRCV_CALL



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Function block adjustments

The blocks SEND_CFC_EXAMPLE, BSEND_CALL, RECEIVE_CFC_EXAMPLE and BRCV_CALL are only programming examples. The blocks are not know how protected and could be changed for your own requirements. You must consider that on each Cemat-Update the blocks are overwritten. Therefore use for your modified blocks different function block numbers. For each transport connection there must be exist a pair of the blocks SEND_CFC_EXAMPLE and RECEIVE_CFC_EXAMPLE.

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OS Engineering

Content

OS Engineering 1

General 2
Generation of Process Pictures 3
Templates 3
Properties of the Block Icons for CEMAT 6
Name definitions 7
C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE 8
C_ANNUNC, C_ANNUN8 and C_PROFB 16
C_GROUP, C_ROUTE and C_SELECT 20
C_MEASUR 26
Extended Status Display 30
Window Position of the Faceplates 31
Color change of Status information in Symbols or Faceplates Text fields 32
Instance specific Authorizations 38
General Cemat Functions 39
Open curve group on full screen (optional) 40
Message archive 41
Tag logging 41
User Archives 42
Structure of the Info data base 42
Generation of the Info data 43
Import into the user archive 43
Multimedia Interface 45
Configuration of Print functions 51
Configuration of C_Config.cfg 52
Hardcopy to default printer 52
Display mode of the object list 52
Use of PDF Reader 53
WEB 54

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General

The project settings which have to be carried out during the installation of a new PCS7 project are no longer described here. These steps you can find in chapter 3 of this manual (PCS7-Project_009.pdf).

Chapter OS-Engineering contains all steps which are carried out during the engineering of the WinCC Project.

Basically this comprises the generation of the process pictures and archives.

Even before you start with the process pictures design you have to decide how the Process Objects shall be displayed and how you want to operate. The following aspects have to be considered:

- Size of the block icons
- Which additional information shall be displayed (Tagname, Mark, Quality, etc.)
- Which symbols shall be used?
- Do you have additional functions in your project which have to be enabled through parameterization at the block icons?
- Who can operate (User rights)?
- Positioning of the Faceplates
- Do you want to use any superordinated function and from where do you want to call it?
  - Display of simulated Objects in the AS
  - Buttons to open overview pictures (e. g. for INFO or MAINTENANCE)
  - Button to close all open windows
  - Buttons to open curve groups

We recommend creating a template picture for the project. The template picture C_@PCS7Typicals_CemV8_001.pdl, which has been copied during the Cemat installation, contains a lot of examples. You have to decide yourself how the process objects shall be presented in your project.

For the archiving the time period and the type of archiving has to be considered.

Regarding the user archive you have to decide which information you want provide. The corresponding options in the Config files must be set.
The data for the user archive can be created in Excel and then imported (see engineering tools).

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Generation of Process Pictures

All process pictures for direct access from Overview Window (picture tree) have to be created in the process object view or plant view of the SIMATIC Manager.

Pictures which are not included in the picture tree (because they are called from other pictures) have to be created in the component view of the SIMATIC Manager (directly assign to the OS-Project).

Templates

During the Installation procedure, a template picture has been copied into the GraCS folder of the OS Project, which contains predefined symbols (block icons) for CEMAT Objects:

C_@PCS7Typicals_CemV8_001.pdl

The block icons in this picture are examples and have to be adapted according to the requirements of the project.

The picture **C_@PCS7Typicals_CemV8_001.pdl** contains the default symbols for automatic generation of block icons from SIMATIC Manager.

During the automatic generation of block icons PCS7 V8 is looking for a template picture with the name @PCS7Typicals.pdl. Multiple template pictures are possible (@PCS7Typical**1**.pdl, @PCS7Typical**2**.pdl). The pictures are used in ascending order.

Before you can start with the engineering of your project, you have to create a template picture **@PCS7Typicals.pdl** according to the examples in **C_@PCS7Typicals_CemV8_001.pdl**. Your template picture should only contain the symbols which are really used. (If your template picture contains many “unused” block icons, the generation of the block icons takes unnecessarily long because always the complete picture is scanned!)

In the following description you can find the attributes, which are important for CEMAT.

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Automatic generation of block icons

Using the ‘automatic generation of block icons’ the symbols in the process pictures are automatically created and linked to the corresponding variables. The template picture @PCS7Typicals.pdl (or @PCS7Typicals1.pdl, @PCS7Typicals2.pdl) must contain all the symbols used for automatic generation in the project.

The different block icons for the same block type distinguish in the Index, which is entered in the block icon properties under System - type (e. g. @C_DRV_1D/3).
In the CEMAT template picture **C_@PCS7Typicals_CemV8_001.pdl** the index is written below each symbol in order to facilitate the searching.

In order to generate the block icons automatically, in the CFC in the Object properties of the block you have to select the option “Generate block icon” and to enter the corresponding index.

In PCS7 V8 the function for the automatic generation of block icons is automatically carried out with the OS Compile. It can also be carried out in the Plant View or Process Object View of the SIMATIC Manager under Options -> Plant Hierarchy -> Create/Update Block Icons.

After the automatic generation the symbols are located in the upper left corner of the picture and must be moved to the correct position.

After that you can make further adaptations directly at the generated block icon, as e. g. for ToolTipText, Formats (FontSize, FontBold), window position (leftPos, topPos, defaultPos) when opening the faceplate.

In order not to overwrite the modifications in case of a repetition of the generation of block icons, the affected attributes must be listed in the configurations file @PCS7Typicals.cfg. The file @PCS7Typicals.cfg was already copied into the OS-Project folder under WScripts.

Manual symbol generation

Beside the automatic generation of block icons you can also link the block icons manually, using the wizard. In order to do this you can create a template picture @Template.pdl (or @Template1.pdl, @Template2.pdl, …) with symbols without Index or you take the normal Block Icons (from @PCS7Typicals.pdl) and delete the Index after copying.



Note: If the block icon has an Index, during the next automatic generation it will be "actualized" and eventually the block icon will be deleted.

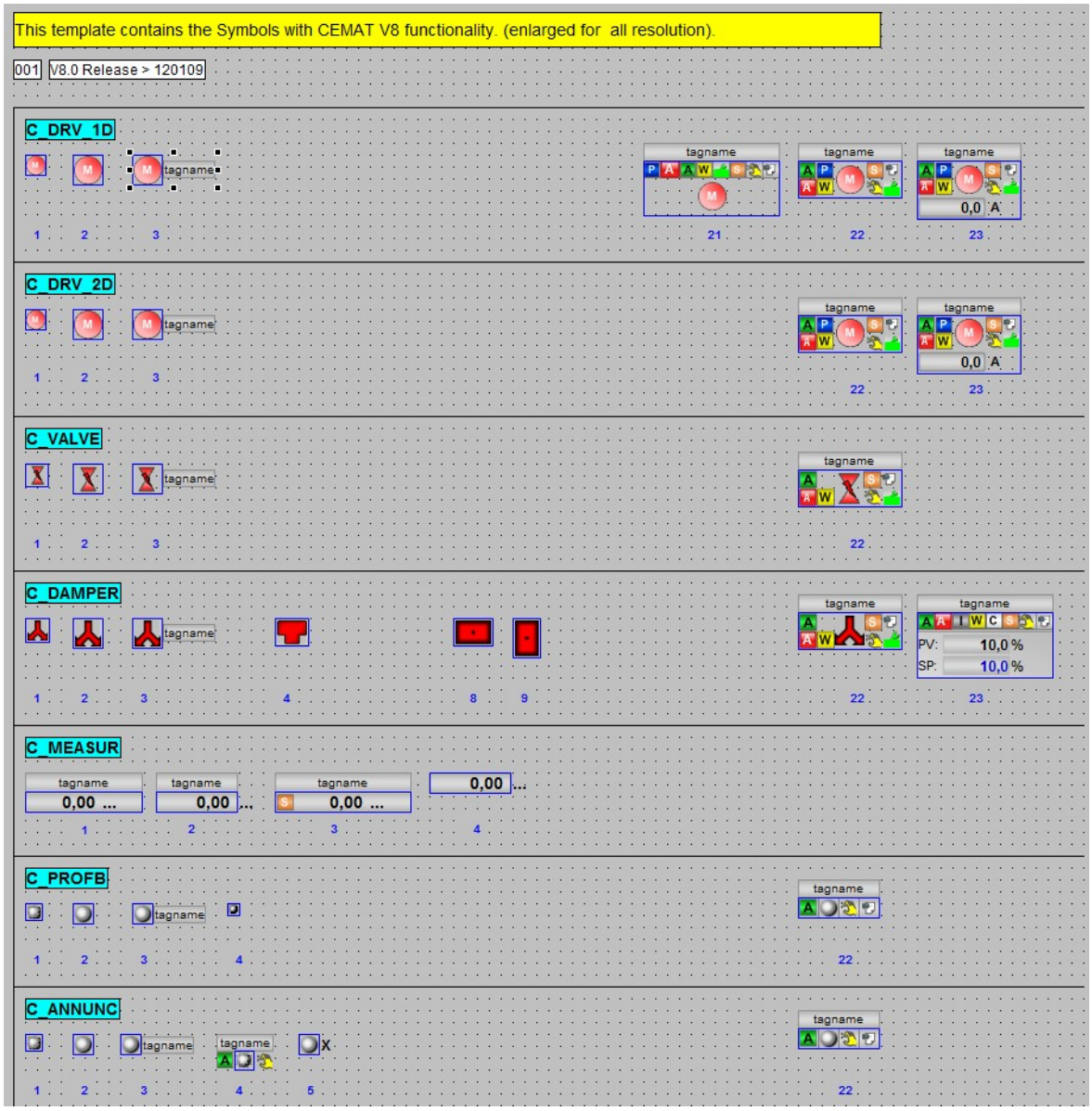
After that, as mentioned above you can adapt the symbol properties (e.g. ToolTipText, Formats, faceplate position).

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C_@PCS7Typicals_CemV8_001.pdl

The template picture C_@PCS7Typicals_CemV8_001.pdl contains the block icons for automatic generation of CEMAT Objects.

Extract of the template picture:



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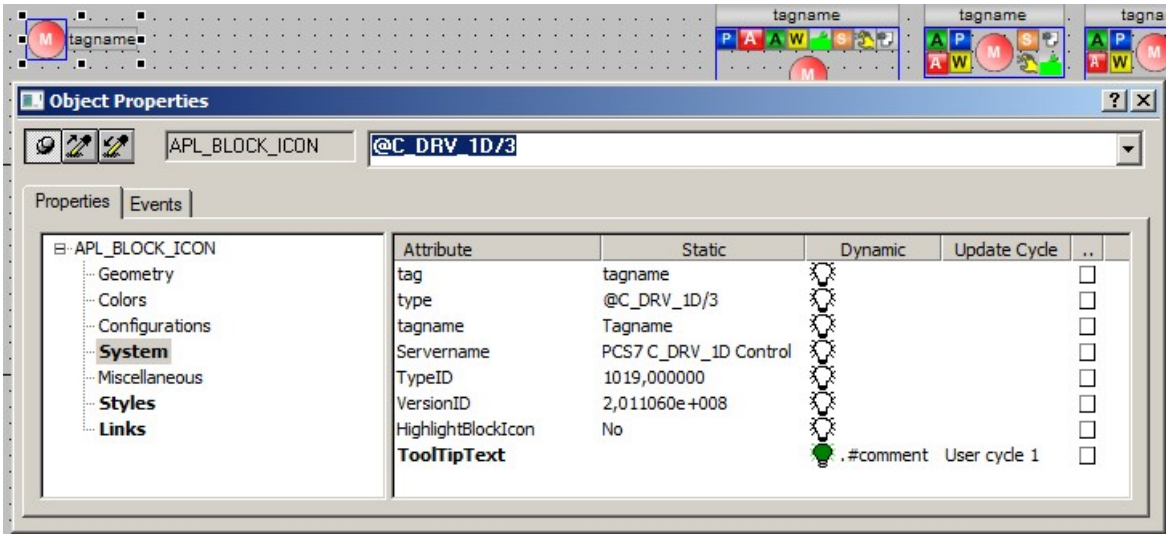
Properties of the Block Icons for CEMAT

All CEMAT objects are available as customized object. They can be generated automatically using template picture @PCS7Typicals.pdl or linked manually.

The following description explains the most important properties of each block type:

- In property **Configurations** you find the attributes regarding faceplate position (leftPos, rightPos, defaultPos) and user button text.
  'OperationLevel1_backup', 'OperationLevel2_backup' and 'OperationLevel3_backup' are not used by CEMAT (CEMAT gets the operation level from the function block).
  'UserButtonText1' and 'UserButtonText2' are not used by CEMAT and are available for individual adaptations in the faceplate.
  AnalogValueFormat1 (AnalogValueFormat2) contains the output formats for analog values.
- In property **Colors** you find here the color definition for highlighting the object in case the picture is opened via loop-in-alarm function.
- In property **System** the main attributes for the object are defined, such as 'tagname', 'type', 'tag', 'Servername', 'VersionID' and the 'ToolTipText'.
  'tag' and 'tagname' will be replaced by the object tag during automatic generation of block icons.
  The Tooltip-Text is connected to #comment variable.

  The attribute 'type' has a special function regarding the automatic generation of block icons. The entry consists of @Blocktype and an index (e. g. @C_DRV_1D/3 for Index = 3).



  In the template picture C_@PCS7Typicals_CemV8_001.pdl the index range is linked to a certain functionality, which means it is possible to estimate the function by index number:

  from 01 - 19 simple status display
  20 - 40 status display with symbols for mode, status, alarm test, bad quality, …

  For your own block icons you should use an index number outside of the default range (e. g. > 100 or starting with a letter).
- In property **Styles** the symbol is connected to @local::APLShowTag. The tagname will be switched on / off with shift + left Mouse click or with the button ‘Display/Hide Tag’ in the button area.
- In property **Links** the symbol is connected to numerous variables of each object. The connection is carried out automatically during automatic generation of block icons.
- In property **User Text** (for groups, routes and selections) a text can be defined which will be displayed in the symbol instead of the tagname.

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Creating new block icons

For creating new block icons you have to consider that not all Objects of a block Icon are visible and some objects are moved to the background or hidden.

Example:

The status display for a unidirectional drive C_DRV_1D consists of 3 objects: 'SymbolFault', 'SymbolStartUp' and 'SymbolOff' plus two additional objects to indicate selections 'Selected1' and 'Selected2'.

For the correct visualization of these 'overlapping' objects the order is important. The order (front to back) in case of C_DRV_1D is a follows:

- Selected1 marker for the function “related Objects”
- Selected2 Operation of the symbol (mouse click)
- SymbolFault Fault indication of the symbol
- SymbolStartUp Display started/running
- SymbolOff Display off/not ready

The correct order can also be seen in the Cemat block icons, e. g. @C_DRV_1D/2.

Name definitions

Picture Names

For the picture names there are no fixed rules. The maximum length is 24 characters.

Object names

The object names are created in the Engineering of the CFC. In the OS only selection of existing objects is possible.

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C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE

In the process pictures the blocks C_DRV_1D, C_DRV_2D, C_DAMPER and C_VALVE are represented by a drive symbol, which contains the status display (drive stopped, running, faulty and eventually the operation mode).



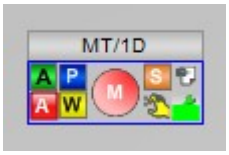
In this case, all further objects, belonging to the customized object are hidden behind the status display or invisible by default.

However there are block icons with additional indications and block icons with attributes which are evaluated in the faceplate itself.

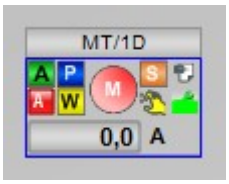
Example 1: With tagname



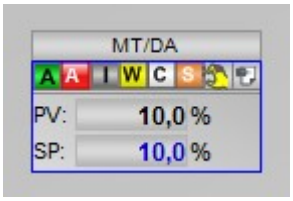
Example 2: With tagname and symbols for mode, status, alarm test, bad quality



Example 3: Motor symbol with related measuring value



Example 4: Damper positioner



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Function overview for the different block icons:

C_DRV_1D:

Index 1- 2	only status display
Index 3	status display and tagname
Index 21 – 22	status display and symbols for mode, status, alarm test, bad quality
Index 23	status display and symbols and measuring display

C_DRV_2D:

Index 1- 2	only status display
Index 3	status display and tagname
Index 22	status display and symbols for mode, status, alarm test, bad quality
Index 23	status display and symbols and measure value

C_DAMPER:

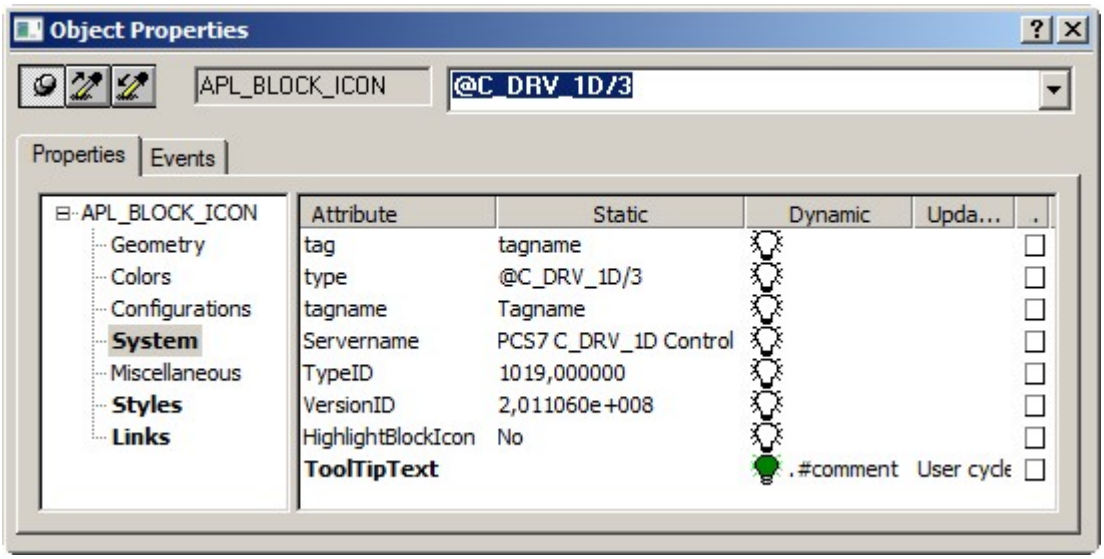
Index 1- 2	only status display
Index 3	status display and tagname
Index 4, 8, 9	only status display (with alternative symbols)
Index 22	status display and symbols for mode, status, alarm test, bad quality
Index 23	status display and symbols and measuring value

C_VALVE:

Index 1- 2	only status display
Index 3	status display and tagname
Index 22	status display and symbols for mode, status, alarm test, bad quality

Property System

Property **System** of object type C_DRV_1D:



Caution: The screen shot of the object properties shows the property General in template picture C_@PCS7Typicals_CemV8_001.pdl.
Attribute 'type' is used for the automatic generation of block icons via OS compile and must therefore consist of an @-sign, the block type and an index.
For the manual link you should replace attribute 'type' by 'C_DRV_1D' (removing @-sign and index), in order not to overwrite the data in the next OS compile.

The attribute **ToolTipText** is connected to the block comment.

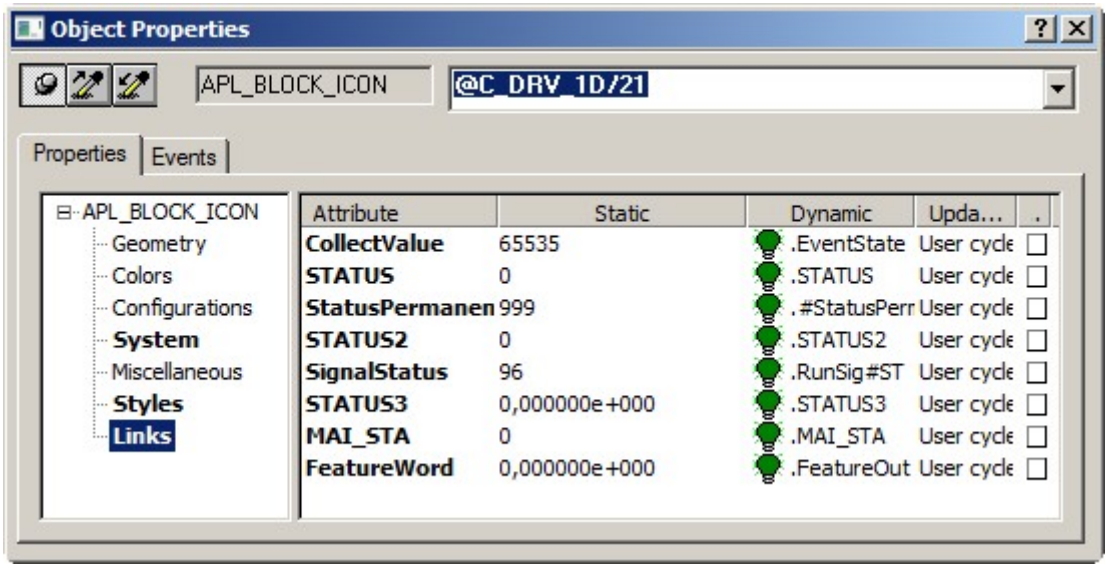
The standard functions are using TypeID and VersionID in order to get the faceplate version. Don't change this!

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Property Links

In property **Links** all attributes must be connected as follows to the variables of the corresponding object. (They will be connected automatically in case of generation of Block Icons):

Property **Links** of object type C_DRV_1D:



Link attributes of the drives:

STATUS	to	.STATUS	for the status display fault
STATUS2	to	.STATUS2	for the status display off / startup / on
STATUS3	to	.STATUS3	marking the object (Function related. Objects)
FeatureWord	to	.FeatureOut	feature word (Emergency stop released?)

Additional link attributes for indication of mode, status, alarm, test, bad quality (Index 21 – 23)

CollectValue	to	.EventState	for the group display (it is normally not shown at the object itself)
STATUS	to	.STATUS	for the status display fault, warning, test, manual mode and power management
StatusPermanent		.#StatusPermanent	for the display of memo
SignalStatus	to	.RunSig#ST	for the display of bad quality
MAI_STA	to	.MAI_STA	for the display of maintenance status

Additional link attributes for measure display (Index 23)

BlockName	to	.AV#Jump	for the tagname of the measure
LeftHandText			for the tool-tip (tagname of the measure + comment)
StatusAlarm	to	.AV_Stat#STATUS	for the limit indications
OutputValue	to	.AV#Value	for the display of the measure
UnitText	to	.AV_Stat#UNIT	for the unit of the measure
UnitFontBold			unit text is (not) displayed in bold face

Additional link attributes for damper positioner (only for C_DAMPER, Index 23):

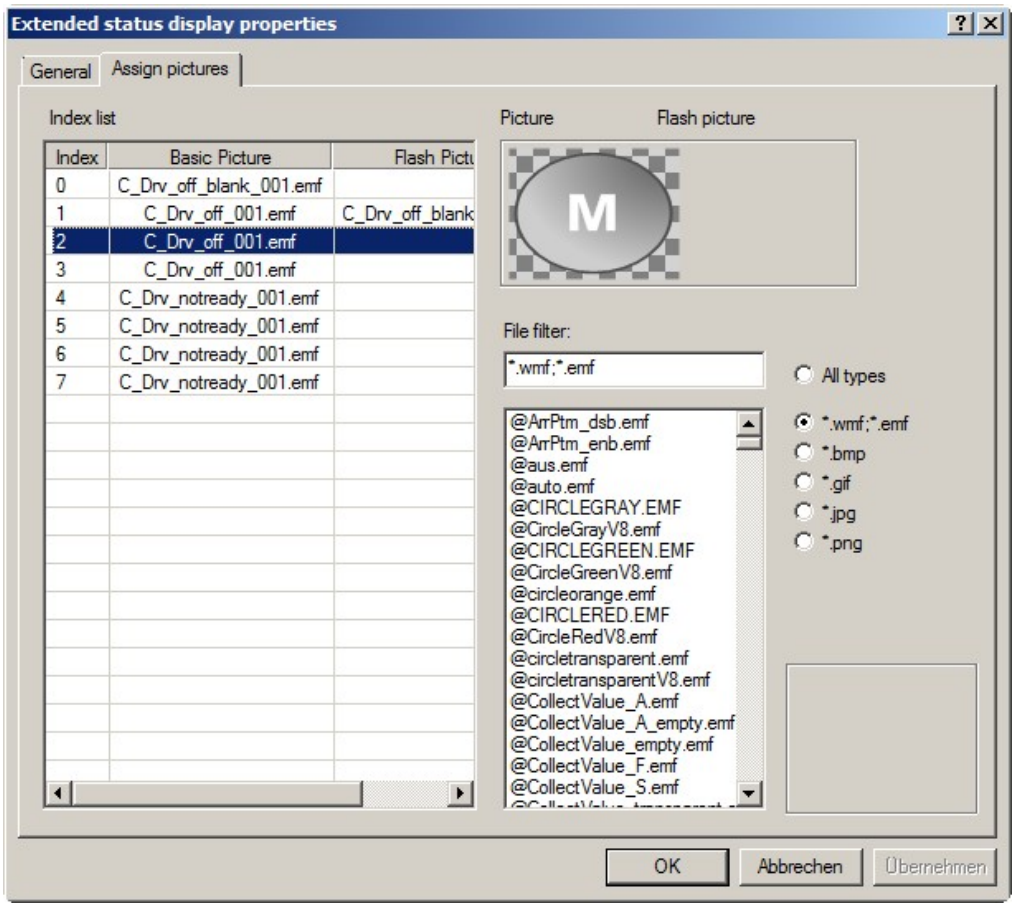
WValue	to	.SP_Int	set point
WUnit	to	.UNIT	set point unit
XValue	to	. X_Pos_OS#Value	actual value
XUnit		%	no connection, actual value is always in %
ExternalSP	to	. INTFC_OS	display external set point

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Status Display function is used to define the representation of the block icon the different states (running, off, faulty...). The possible states of each object are documented in the object description of the corresponding object type (Variable STATUS and STATUS2).

The following picture shows the states object type C_DRV_1D:

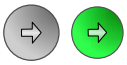


Status Display C_DRV_1D

Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
SymbolFault	STATUS	26	fault not acknowledged	red flashing	M	C_Drv_err_001.emf / C_Drv_off_blank_001.emf
	STATUS	25	fault	red	M	C_Drv_err_001.emf
SymbolStartup	STATUS2	6	Start up	green flashing	M	C_Drv_off_blank_001.emf C_Drv_on_001.emf
	STATUS2	7	running	green	M	C_Drv_on_001.emf
SymbolOff	STATUS2	16	Shut down	grey flashing	M	C_Drv_off_001.emf / C_Drv_off_blank_001.emf
	STATUS2	17	Stopped with permission to start	grey	M	C_Drv_off_001.emf
	STATUS2	18	Stopped without permis. to start or not ready	magenta		C_Drv_notready_001.emf

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Status Display C_DRV_2D

Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
SymbolFault	STATUS	26	fault not acknowledged	red flashing		C_Drv_err_001.emf / C_Drv_off_blank_001.emf
	STATUS	25	fault	red		C_Drv_err_001.emf
SymbolStartup D1	STATUS2	8	Start up D1	green flashing		C_Drv2_off_left_001.emf / C_Drv_2_on_left_001.emf
	STATUS1	19	running D1	green		C_Drv2_on_left_001.emf
SymbolStartup D2	STATUS2	9	Start up D2	green flashing		C_Drv2_off_right_001.emf / C_Drv2_on_right_001.emf
	STATUS2	20	running D2	green		C_Drv2_on_right_001.emf
SymbolOffD1	STATUS2	10	Shut down	gray flashing		C_Drv_off_001.emf / C_Drv_off_blank_001.emf
	STATUS2	11	Stopped with permission to start	grey		C_Drv_off_001.emf
	STATUS2	12	Stopped without permis. to start or not ready	magenta		C_Drv_notready_001.emf
SymbolOffD2	STATUS2	10	Shut down	gray flashing		C_Drv_off_001.emf / C_Drv_off_blank_001.emf
	STATUS2	21	Stopped with permission to start	grey		C_Drv_off_001.emf
	STATUS2	22	Stopped without permis. to start or not ready	magenta		C_Drv_notready_001.emf
SymbolOos	STATUS2	0	Undefined status “off”	grey		C_Drv_off_blank_001.emf

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Status Display C_DAMPER

Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
SymbolFault	STATUS	26	fault not acknowledged	red flashing		C_Damper_err_001.bmp / C_Damper_middle_001.bmp
	STATUS	25	fault	red		C_Damper_err_001.bmpf
SymbolStartup	STATUS2	8	Start up D1 closing	green flashing		C_Damper_left_001.bmp / C_Damper_middle_001.bmp
	STATUS	9	Start up D2 / opening	green flashing		C_Damper_left_001.bmp / C_Damper_middle_001.bmp
SymbolEndPos	STATUS2	0	Position D1	green		C_Damper_left_001.bmp
	STATUS2	1	Position D2	green		C_Damper_right_001.bmp
	STATUS2	17	Stopped without permis. to start or not ready	magenta		C_Damper_notready_001.emf

Status Display C_VALVE

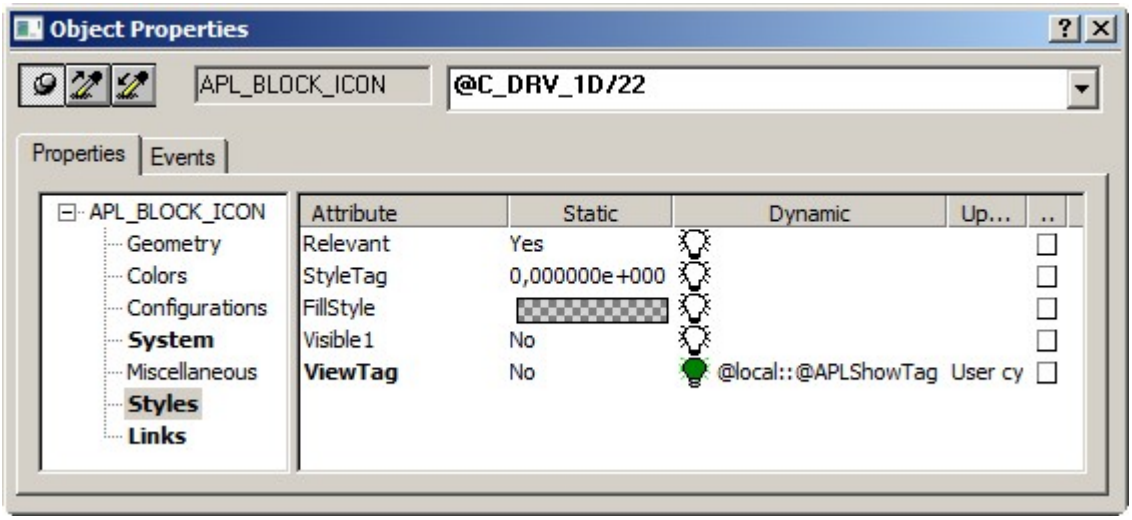
Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
SymbolFault	STATUS	26	fault not acknowledged	red flashing		C_Valve_err_90_001.emf / C_Valve_closed_90_001.emf
	STATUS	25	fault	red		C_Valve_err_001.emf
SymbolSim	STATUS2	13 14	simulation	brown		V_Valve_simu_90_001.emf
SymbolStartup R1	STATUS2	8	closing	green flashing		C_Valve_closing_90_001.emf / C_Valve_closed_90_001.emf
	STATUS2	11	closed	grey		C_Valve_closed_90_001.emf
	STATUS2	9	opening	green flashing		C_Valve_opening_90_001.emf / C_Valve_open_90_001.emf
	STATUS2	10	open	green		C_Valve_open_90_001.emf
SymbolOos	STATUS2	12	stopped	green flashing		C_Valve_stopped_90_001.emf
	STATUS2	12	Stopped without permis. to start or not ready	magenta		C_Valver_notready_001.emf

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Property Styles

In Property **Styles** the appearance of the symbol or the faceplate can be modified.

Property **Styles** of object type C_DRV_1D:



Style attributes for the drives:

Relevant	Yes	for Group display (no connection)
StyleTag	0	not used
FillStyle		fill pattern attribute of the tagname
Visible1		no connection (shows ‘related objects’)
View_Tag	@local::APLShowTag	tagname will be switched to 'visible' / ‘not visible’ switch on / off with shift + left Mouseclick or button ‘Display/Hide TAG’ in button area.

Property Configurations

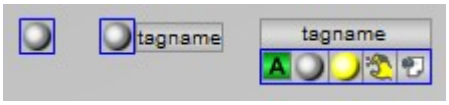
Configuration attributes of damper positioner only (C_DAMPER, Index 23):

AnalogValueFormat1	Output format of the PV value
AnalogValueFormat2	Output format of the SP value.

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C_ANNUNC, C_ANNUN8 and C_PROFB

In the process pictures the blocks C_ANNUNC, C_ANNUN8 and C_PROFB are represented by a status display only (Signal ok, Warning, Fault).



In this case, all further objects, belonging to the customized object are hidden behind the status display or invisible by default.

However there are block icons with additional indications, as e. g. tagname or signal status.

Function overview for the different block icons:

C_ANNUNC:

Index 1- 2	only status display
Index 3	status display and tagname
Index 22	status display and symbols for mode, status, bad quality

C_ANNUN8:

Index 1- 2	only status display
Index 3	status display and tagname
Index 22	status display and symbols for mode, status, bad quality

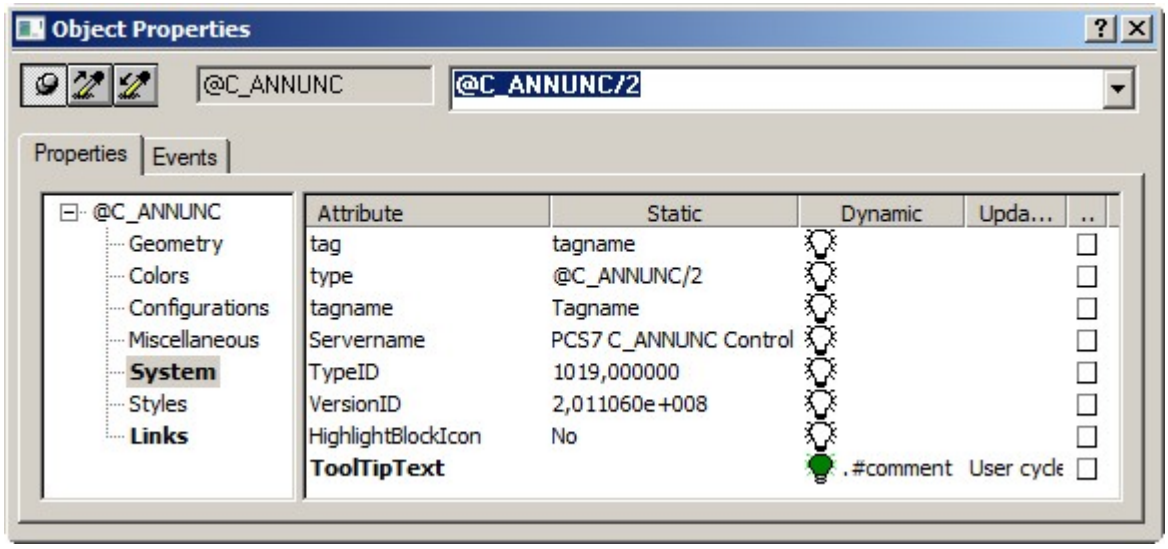
C_PROFB:

Index 1- 2	only status display
Index 3	status display and tagname
Index 22	status display and symbols for mode, status, bad quality

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Property System

Property **System** of object type C_ANNUNC:



Caution: The screen shot of the object properties shows the property System in template picture C_@PCS7Typicals_CemV8_001.pdl.
Attribute 'type' is used for the automatic generation of block icons via OS compile and must therefore consist of an @-sign, the block type and an index.
For the manual link you should replace attribute 'type' e.g. by 'C_ANNUNC' (removing @-sign and index), in order not to overwrite the data in the next OS compile.

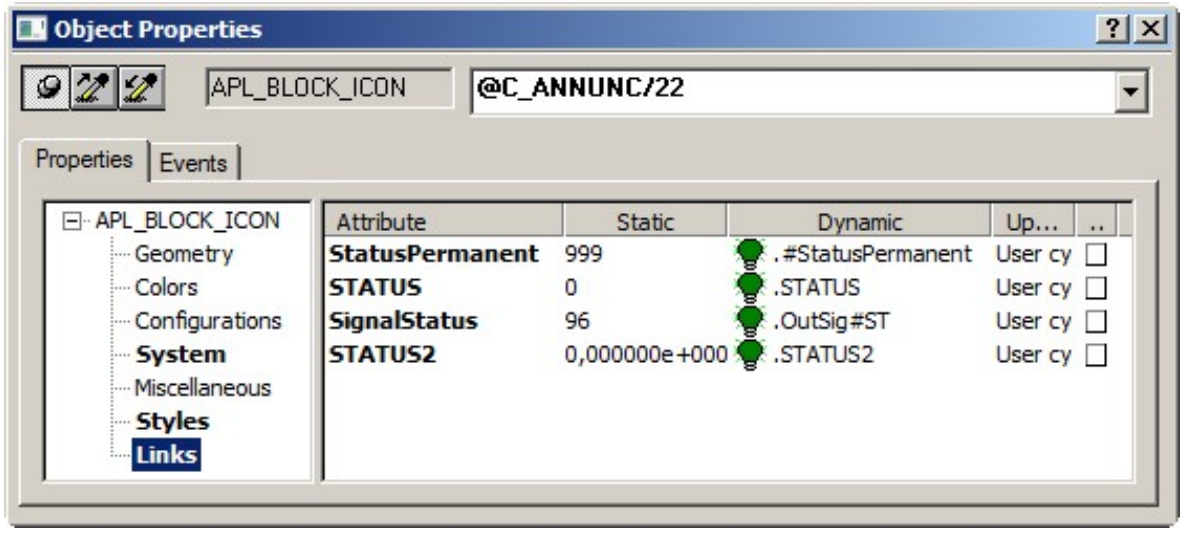
The attribute **ToolTipText** is connected to the block comment.

The standard functions are using TypeID and VersionID in order to get the faceplate version. Don't change this!

Property Links

In property **Links** all attributes must be connected as follows to the variables of the corresponding object. (They will be connected automatically in case of automatic generation of Block Icons):

Property **Links** of object type C_ANNUNC:



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Link attributes of the annunciation blocks:

CollectValue	to	.EventState	for Group Display in the overview Range (the group display is normally not shown at the object itself)
STATUS2	to	.STATUS2	marking the object (Function related. Objects)
STATUS	to	.STATUS	for the status display on, off, fault

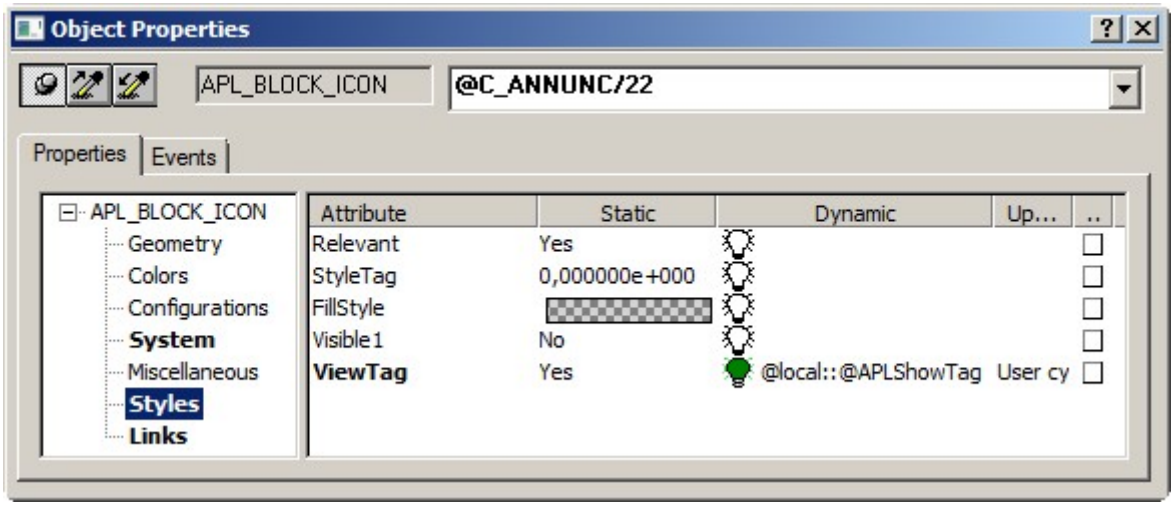
Additional link attributes for indication of mode, status, alarm, test, bad quality (Index 21)

StatusPermanent		.#StatusPermanent	for the display of memo
STATUS	to	.STATUS	for the status display and mode
SignalStatus	to	.RunSig#ST	for the display of bad quality

Property Styles

In Property **Styles** the appearance of the symbol or the faceplate can be modified.

Property **Styles** of object type C_ANNUNC:



Style Attributes for the annunciation blocks:

Relevant	Yes	for Group display (no connection)
StyleTag	0	not used
FillStyle		fill pattern attribute of the tagname
Visible1		no connection (shows ‘related objects’)
View_Tag	@local::APLShowTag	tagname will be switched to 'visible' / ‘not visible’ switch on / off with shift + left Mouseclick or button ‘Display/Hide TAG’ in button area.

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Status Display C_ANNUNC

Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
AnnuncSymbol	STATUS	25	fault	red		C_Annu_err_001.emf
	STATUS	26	fault not acknowledged	red flashing		C_Annu_err_001.emf / C_Annu_off_001.emf
	STATUS	2	on	green		C_Annu_on_001.emf
	STATUS	24	off	grey		C_Annu_off_001.emf
	STATUS	x	warning	yellow		C_Annu_warn_001.emf
	STATUS	x	dynamic warning	yellow flashing		C_Annu_warn_001.emf / C_Annu_off_001.emf

Status Display C_ANNUN8

Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
AnnuncSymbolErr	STATUS	26	fault not acknowledged	red flashing		C_Annu_err_001.emf / C_Annu_off_001.emf
	STATUS	25	fault	red		C_Annu_err_001.emf
AnnuncSymbolErr	STATUS2	28	dynamic warning	yellow flashing		C_Annu_warn_001.emf / C_Annu_off_001.emf
	STATUS2	27	warning	yellow		C_Annu_warn_001.emf
	STATUS2	x	off	grey		C_Annu_off_001.emf

Status Display C_PROFB

Symbol Name	Variable	Bit	Description	Display	Symbol	Basic Picture / Flash Picture
AnnuncSymbol	STATUS	25	fault	red		C_Annu_err_001.emf
	STATUS	26	fault not acknowledged	red flashing		C_Annu_err_001.emf / C_Annu_off_001.emf
	STATUS	24	on	green		C_Annu_on_001.emf
	STATUS	3	off	grey		C_Annu_off_001.emf
	STATUS	x	warning	yellow		C_Annu_warn_001.emf
	STATUS	x	dynamic warning	yellow flashing		C_Annu_warn_001.emf / C_Annu_off_001.emf

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C_GROUP, C_ROUTE and C_SELECT

In the process picture the blocks C_GROUP, C_ROUTE, and C_SELECT are represented by a symbol in order to display the actual status (operation status, operation mode, summarizing fault, summarizing warning, interlocks and selections).



In this case, all further objects, belonging to the customized object are hidden behind the status display or invisible by default.

In the template picture you find various block icons in different sizes and attributes. The block icons are multilingual. They adapt automatically to the operating language.

Example 1: Single line representation without tagname:



Function overview for the different block icons:

C_GROUP:

Index 1	big symbol with user text
Index 2	small symbol, tagname can be hidden
Index 3	small symbol

C_ROUTE:

Index 1	big symbol with user text
Index 2	small symbol, tagname can be hidden

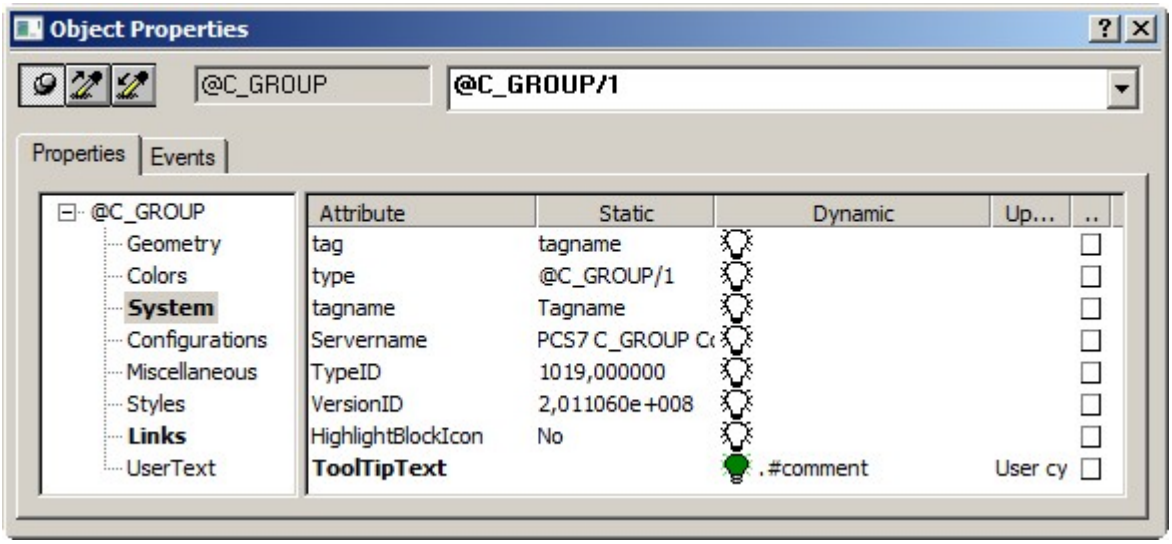
C_SELECT:

Index 1	big symbol with user text
Index 2	small symbol, tagname can be hidden
Index 3	small Symbol without tagname

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Property System

The following picture shows the **System** properties of object type C_GROUP:



Caution: The screen shot of the object properties shows the property System in template picture C_@PCS7Typicals_CemV8_001.pdl.
Attribute 'type' is used for the automatic generation of block icons via OS compile and must therefore consist of an @-sign, the block type and an index.
For the manual link you should replace attribute 'type' e.g. by 'C_GROUP' (removing @-sign and index), in order not to overwrite the data in the next OS compile.

The attribute **ToolTipText** is connected to the comment of the tag.

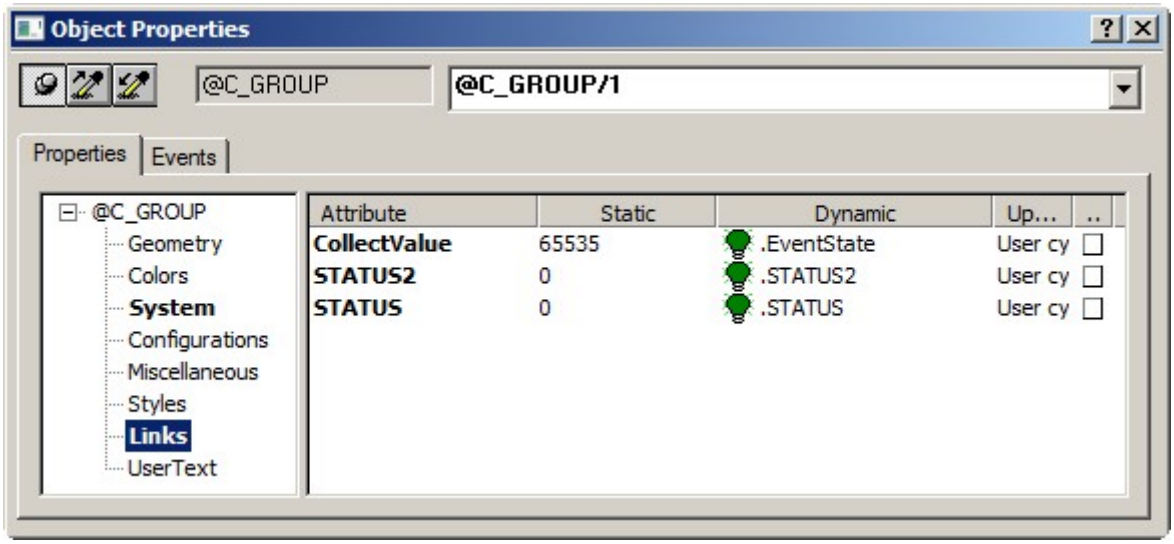
The standard functions are using TypeID and VersionID in order to get the faceplate version. Don't change this!

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Property Links

For each group in property **Links** all attributes must be connected as follows to the variables of the corresponding object. (They will be connected automatically in case of automatic generation of Block Icons):

Property **Links** of object type C_GROUP:



Links attributes of the group:

CollectValue	to	.EventState	for Group Display in the overview Range (the group display is normally not shown at the object itself).
STATUS2	to	.STATUS2	for the display of operation status and interlocking
STATUS	to	.STATUS	for the display of operation mode, fault and warning

Link Attributes or the route and the selection block:

CollectValue	to	.EventState	for Group Display in the overview Range (the group display is normally not shown at the object itself)
STATUS	to	.STATUS	for the display of locked, selection, fault, warning and interlocking

Status Display C_Group

Group Status	Variable	Bit	Description	Symbol	Apl Basic Picture / Cemat Picture
Mode	STATUS2	1	local mode	L	apl_bi_local.emf
	STATUS2	2	manual mode	M	apl_bi_manual.emf
	STATUS2	0	manual mode	A	apl_bi_automatic.emf
Operation	STATUS	13	startup green / flashing		C_bi_up_green_001.emf
	STATUS	14	startup white / flashing		C_bi_up_white_001.emf
	STATUS	13+14+15	operation	O	apl_bi_on.emf
	STATUS	14+15	shut down / flashing		C_bi_down_green_001.emf

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Fault	STATUS	8	static fault	A	apl_bi_alarm
	STATUS	9	dynamic fault / flashing	A	apl_bi_alarm
Warning	STATUS	10	warning	W	C_bi_warning.emf
	STATUS	11	dynamic warn/ flashing	W	C_bi_warning.emf
Interlock	STATUS2	12	blocked	P	C_bi_PM_blocked.emf
	STATUS2	9	stopped by interl. / flashing	I	C_bi_interlocked.emf
	STATUS2	8	interlocking	I	C_bi_interlocked.emf

Status Display Route

Route Status	Variable	Bit	Description	Symbol	Apl Basic Picture / Cemat Picture
Locked	STATUS	5	locked	L	C_bi_locked_cyan.emf
Operation	STATUS	0	deselected	D	C_bi_deselected_white.emf
	STATUS	1	preselected	P	C_bi_preselected_green.emf
	STATUS	2	Selected and not preselected	S	C_bi_selected_white.emf
	STATUS	1+2	selected	S	C_bi_selected_green.emf
	STATUS	3	operation	O	apl_bi_on.emf
Fault	STATUS	8	static fault	A	apl_bi_alarm
	STATUS	9	dynamic fault / flashing	A	apl_bi_alarm
Warning	STATUS	10	warning	W	C_bi_warning.emf
	STATUS	11	dynamic warn/ flashing	W	C_bi_warning.emf
Interlock	STATUS	4	interlocked	I	C_bi_interlocked.emf

Status Display Select

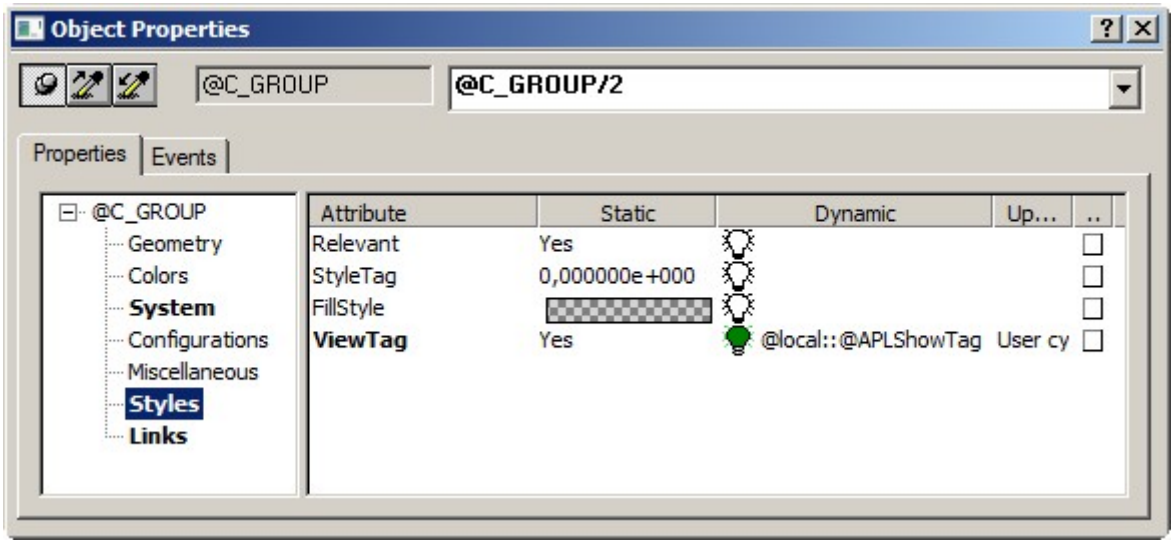
Route Status	Variable	Bit	Description	Symbol	Apl Basic Picture / Cemat Picture
Operation	STATUS	0	deselected	D	C_bi_deselected_white.emf
	STATUS	0	selected	S	C_bi_selected_green.emf
Interlock	STATUS	1	interlocked	I	C_bi_interlocked.emf

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Property Style

In property **Styles** the appearance of the symbol or the faceplate can be modified.

Property **Styles** of object type C_GROUP:



Styles attributes of the group, route and selection bloc:

Relevant	Yes	for Group display (no connection)
StyleTag	0	not used
FillStyle		fill pattern attribute of the tagname
View_Tag	@local::APLShowTag	tagname will be switched to 'visible' / ‘not visible’ switch on / off with shift + left Mouseclick or button ‘Display/Hide TAG’ in button area.

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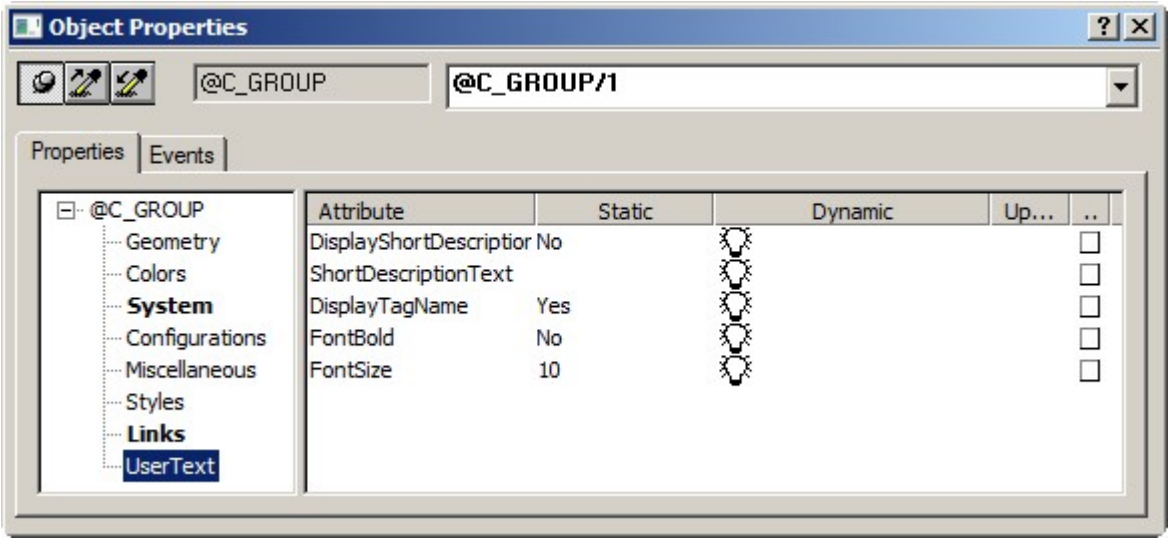
Property UserText

Normally the symbol with Index 1 shows the tagname of the group, route or selection.



If a different description should be displayed in the object symbol, the property **User Text** can be used.

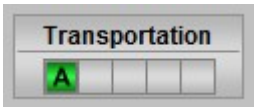
Property **UserText** of object type C_GROUP:



UserText attributes of the group, route and selection bloc:

DisplayShortDescription	No	No: the object tagname is displayed in runtime mode Yes: ShortDescriptionText is displayed in runtime mode
ShortDescriptionText		a user defined text
DisplayTagName	Yes	display the tagname
FontBold	No	for tagname and ShortDescriptonText
FontSize	10	for tagname and ShortDescriptonText

Example for display of a group with UserText:



DisplayShortDescription	Yes
ShortDescriptionText	Transportation
DisplayTagName	No
FontBold	Yes
FontSize	12

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C_MEASUR

The block icon for C_MEASUR shows the actual measuring value, the dimension and eventual limit violations (color change).



In this case, all further objects, belonging to the customized object are hidden behind the status display or invisible by default.

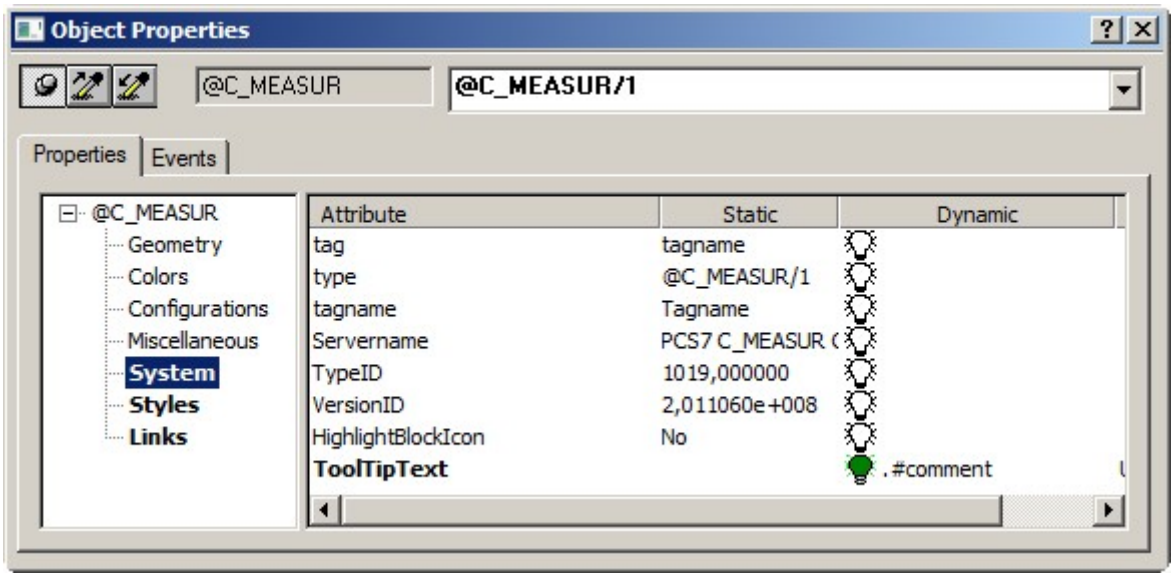
Function overview for the different block icons:

C_MEASUR:

Index 1	measured value with tagname and unit
Index 2	measured value with tagname and variable size of unit
Index 3	measured value with tagname, unit and symbols for mode / bad quality
Index 4	measured value with variable size of unit

Property System

Property **System** of object type C_MEASUR:



Caution: The screen shot of the object properties shows the property System in template picture C_@PCS7Typicals_CemV8_001.pdl.
Attribute 'type' is used for the automatic generation of block icons via OS compile and must therefore consist of an @-sign, the block type and an index.
For the manual link you should replace attribute 'type' by 'C_MEASUR' (removing @-sign and index), in order not to overwrite the data in the next OS compile.

The attribute **ToolTipText** is connected to the comment of the tag.

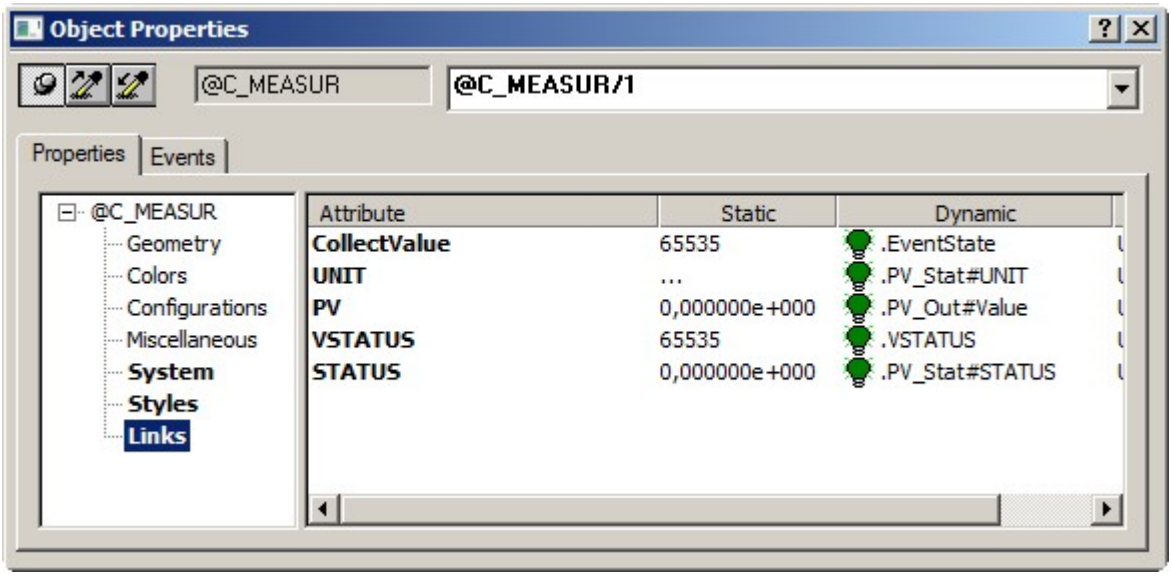
The standard functions are using TypeID and VersionID in order to get the faceplate version. Don't change this!

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Property Links

In property **Links** all attributes must be connected as follows to the variables of the corresponding object. (They will be connected automatically in case of automatic generation of Block Icons):

Property **Links** of object type C_MEASUR:



Link Attribute of the measured value block:

CollectValue	to	.EventState	for Group Display in the overview Range (the group display is normally not shown at the object itself).
UNIT	to	.PV_Stat#UNIT	for the display of the unit
PV	to	.PV_Out#Value	for the display of the process value
VSTATUS	to	.VSTATUS	for the colors
STATUS	to	.PV_Stat#STATUS	marking the object (Function related. Objects)

Additional link attributes for indication of simulation mode (Index 3)

STATUS2	to	.STATUS	for indication of simulation and substitution value

Property Configurations

Configuration Attribute of the measured value block:

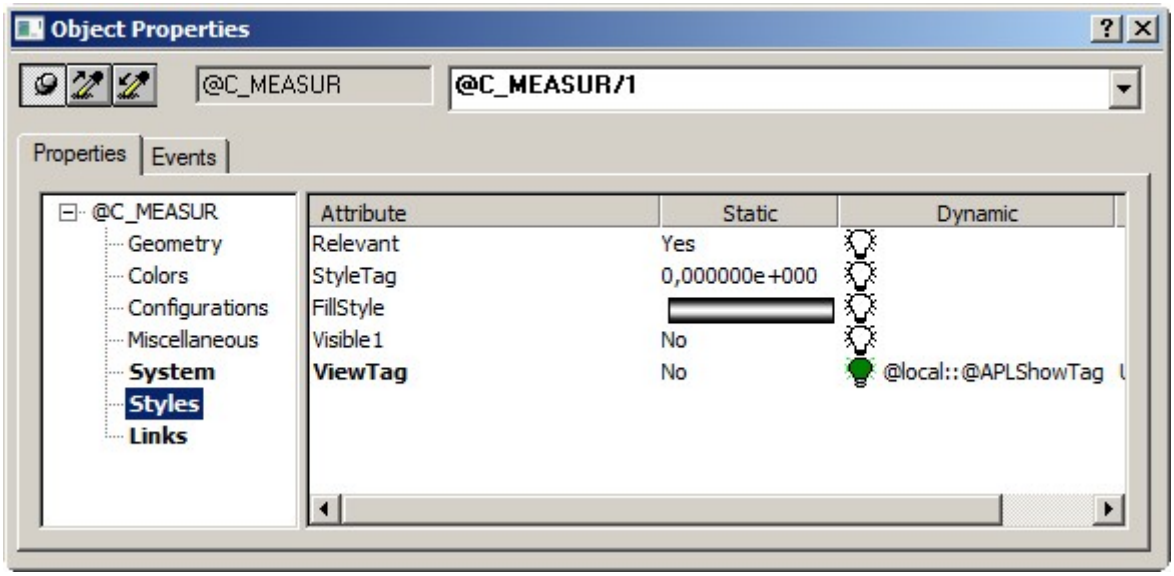
AnalogValueFormat1	Output format of the measured value.

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Property Styles

In Property **Styles** the appearance of the symbol or the faceplate can be modified.

Property **Styles** of object type C_MEASUR:



Style attribute of the measured value block:

Relevant	Yes	for Group display (no connection)
StyleTag	0	not used
FillStyle		fill pattern attribute of the tagname
Visible1		no connection (shows ‘related objects’)
View_Tag	@local::APLShowTag	tagname will be switched to 'visible' / ‘not visible’ switch on / off with shift + left Mouseclick or button ‘Display/Hide TAG’ in button area.

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Adding an archive tag to Process Value Archive

By opening the faceplate of the measured value the trend curve is shown. If an archive tag is available for the measure, the archive curve can be displayed via button “Curve”.

In the Engineering for the Process Value Archive, certain rules have to be followed, in order to enable the call-up of the Archive curve.

1. The archive tag name must be derived from the tag name of the measure. This implies the following:
   a) The object tag of the measure must not contain any special character, because the in the archive tag name, special characters are not allowed and will be removed by the system.
   b) The archive tag name, automatically given by the System must not be modified.
2. The name of the process value archive mainly depends on the decision, whether only a single archive shall be created or whether you prefer to define various archives (e. g. for each plant section).

   - If you create a process value archive with the WinCC Explorer, the default name is **ProcessValueArchive**. This is also the default name which is used in Cemat, if no additional programming in the CFC or in the block icon is done.

   - If the archive tag is generated during the OS Compile (through settings in the CFC) a process value archive with the name **SystemArchive** gets created. This name is entered into the automatically generated internal variable @TagArchiveName and can be modified later on.
     Cemat checks for Variable @TagArchiveName and, if available, the archive name is picked from there.

   - Archive splitting:
     An option for creating different archives (e. g. one archive per Area) does not exist in case of automatic generation of the archive variables.
     If this is requested, the archives and the archive tags must be created manually in WinCC and additional programming is needed in the CFC. (The Archive name must be entered at Structure variable PV_Out.Value under 'Identifier'.)

   The priority for the determination of the archive name is as follows:

   Prio1: Checking the entry in the internal variable *measure.*PV_Out#Value#Shortcut
   Prio2: Entry in Variable @TagArchiveName (if existing)
   Prio3: Default setting "ProcessValueArchive"

See also 14_Tips_Tricks_009.pdf – Process Value Archive.

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Extended Status Display

Symbol Name	Variable	Bit	Description	Display	Symbol	Apl Basic Picture / Cemat Picture
Mode	STATUS2	29	automatic mode	green		apl_bi_automatic.emf
	STATUS2	24	local mode	white		apl_bi_local.emf /
	STATUS2	25	manual mode	blue		apl_bi_manual.emf
	STATUS2	30	maintenace mode / out of service	grey		apl_bi_out_of_service.emf
Lock	STATUS2	26	manual non Interlocked	blue		C_bi_manual_non_interlock_Bl.emf
	STATUS2	27	manual redused Interlocks	blue		C_bi_manual_non_remov_interl_Bl.emf
	STATUS2	28	manual only protection Interlocks	blue		C_bi_manual_only_prot_interl_Bl.emf
Power Managment	STATUS2	13	involved	blue		C_bi_PM_selected.emf
	STATUS2	15	released	blue		C_bi_PM_released.emf
	STATUS2	14	blocked			C_bi_PM_blocked.emf
Forced	STATUS	2	automatic mode			apl_bi_forced.emf / C_bi_simulation.emf
	STATUS2	23	local mode	red		C_bi_ermergency.emf
Warning	STATUS	28	warning	yellow		C_bi_warning.emf
	STATUS	27	network fault	red		C_bi_networkfault.emf
Memo	StatusPermanent	0	memo existing			apl_fp_header_memo.emf
Q_State	RunSig#ST	-	e.g. 96: QC = simulation			apl_fp_st_xxxxxx.emf
Maintenance	MAI_STA	10	warning			apl_bi_ms_release_op.emf
	MAI_STA	9	network fault			apl_fp_st_bad_device.emf

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Window Position of the Faceplates

In Property **Configurations** via the Attributes leftPos, topPos and defaultPos it can be defined at which screen position the faceplate appears when it is opened via click on the block icon.

For the Positioning the following possibilities exist:

a) The Faceplate appears at the Default Position

leftPos = irrelevant
ltopPos = irrelevant
defaultPos = yes

b) The Faceplate appears at the set Position for

leftPos = Value > 0
topPos = Value > 0
defaultPos = no

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Color change of Status information in Symbols or Faceplates Text fields

Color change of Symbols:

If the Color for the “run” or “fault” Symbols must be changed it is only necessary to rename the existing “*.emf” files.

Example: C_DRV_1D

Symbol Name	Description	Display	Symbol	Basic Picture / Flash Picture
SymbolFault	fault not acknowledged	red flashing		C_Drv_err_001.emf / C_Drv_off_blank_001.emf
	fault	red		C_Drv_err_001.emf
SymbolStartup	Start up	green flashing		C_Drv_off_blank_001.emf C_Drv_on_001.emf
	running	green		C_Drv_on_001.emf
SymbolOff	Shut down	grey flashing		C_Drv_off_001.emf / C_Drv_off_blank_001.emf
	Stopped with permission to start	grey		C_Drv_off_001.emf
	Stopped without permis. to start or not ready	magenta		C_Drv_notready_001.emf

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Standard Symbols for additional Object Information and Objects like C_GROUP, C_ROUTE, C_SELECT, C_DAMPER are shown in the table below.

In column “Org_CEM_EMF” are shown all Cemat Symbols
In column “Org_APL_EMF” the Symbols which used from the APL Faceplates
In column “G” the common Symbols are marked

That means, if after the Cemat Installation the “OS Project Editor” was running
it could be necessary to copy again all Symbols from “Org_CEM_EMF” in to the GraCS.

In case the Symbols for “Local” and “Manual” mode should shown in APL Style the two Symbols apl_bi_local.emf and apl_bi_manual.emf from “Org_APL_EMF” must be copied in to GraCS.

Org_CEM_EMF	Org_APL_EMF	G	Standard Symbol Name
		x	apl_bi_automatic.emf
			apl_bi_local.emf
			apl_bi_manual.emf
			c_bi_manual_non_interlock_BI.emf
			c_bi_manual_non_removable_interlock_ BI.emf
			c_bi_manual_only_prot_interlock_BI.emf
		x	apl_bi_out_of_service.emf
			c_bi_simulation.emf
			C_bi_emergency.emf
			C_bi_up_green.emf
			C_bi_up_white.emf
		x	apl_bi_on.emf
			C_bi_down_green.emf
		x	apl_bi_alarm.emf
			c_bi_Warning.emf
			C_bi_interlocked.emf
			C_bi_PM_selected.emf

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R			C_bi_PM_released.emf
P			C_bi_PM_blocked.emf
L			C_bi_locked_cyan.emf
D			C_bi_deselected_white.emf
P			C_bi_preselected_green.emf
S			C_bi_selected_white.emf
S			C_bi_selected_green.emf
	T		apl_bi_tracking.emf
T			C_bi_tracking.emf
C			C_bi_controlled.emf
I			C_bi_inching.emf
P			C_bi_posi.emf
	E		apl_bi_external.emf
	I		apl_bi_internal.emf
		x	apl_bi_ms_release_op.emf
		x	apl_fp_st_bad_device.emf
F			c_bi_forced.emf
L			C_bi_locked_violett.emf
NR			C_bi_notready.emf
NF			c_bi_Network_fault.emf

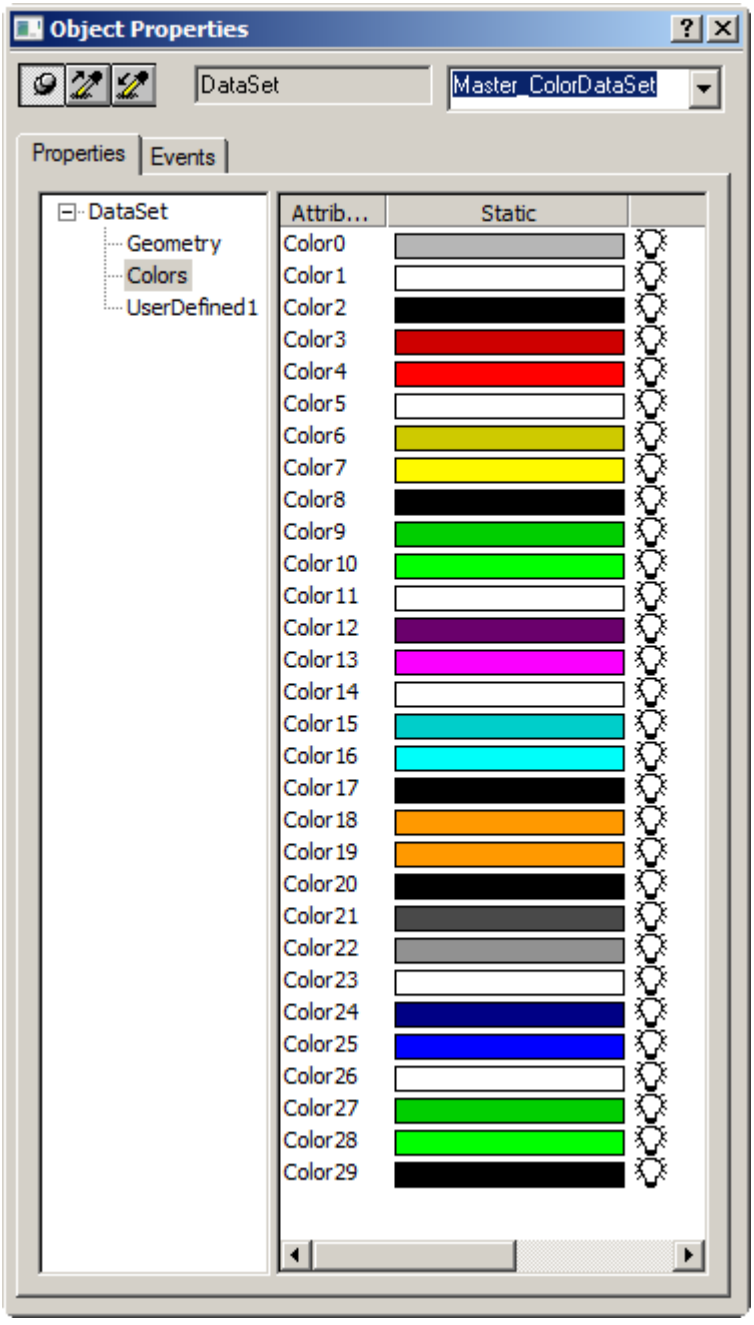
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Color change of Text information:

Inside of Overview1.pdl the general color definition is done with the “MasterColorData” Object.

This complete color definition for text will be loaded in every Cemat object Dialog and used then in the variable Text objects like “Mode” or “Status” indication.

The Picture below shows “MasterColorData” structure:



If a color should be changed, please do it in the Master_ColorDataSet.

Always tree Color definitions are used for one Text.
for example:
Color0 = “BackColor”
Color1 = “FillColor”
Color2 = “FontColor”

Where the color definition is used will be shown on the next pages.

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Color Status line for:,

C_DRV_1D, C_DRV_2D
C_MEASUR, C_PROFB

(csoVisu)

off	0-1-2
fault not acknow.	3-4-5
fault	3-4-5
startup	27-28-29
running	27-28-29
shut down/1	0-1-2
startup D2	27-28-29
running D2	27-28-29
shut down D2	0-1-2
stopped with permission to start	0-1-2
stopped without perm. to start	12-13-14
Network fault	3-4-5
limit pos.2 with permission to start	27-28-29
limit pos.1 with permission to start	27-28-29
moving to limit position 2	27-28-29
moving to limit position 1	0-1-2
moving to limit position 1	27-28-29
no limit position	0-1-2
fault limit position 1	3-4-5
fault limit position 2	3-4-5
limit pos.2 without perm. to start	12-13-14
limit pos.1 without perm. to start	12-13-14
D1 act, position 1	27-28-29
D1 act, moving to limit position 1	27-28-29
D1 act, limit pos.2 with perm. to start	27-28-29
D1 act, moving to limit position 2	0-1-2
D1 act, limit pos.2 without perm. to start	12-13-14

Color Status line for,

C_ANNUNC, C_ANNUN8,
C_DAMPER, C_VALVE

off	0-1-2
fault not acknow.	3-4-5
fault	3-4-5
warning not acknow.	6-7-8
warning	6-7-8
no fault	0-1-2
no warning	0-1-2
live Zero / Bad Quality	3-4-5
gradient negativ exceeded	0-1-2
gradient positive exceeded	0-1-2
Last valid value Substitude Value	18-19-20
Network fault	3-4-5

Group status (csoVisu)

Group not in operation	0-1-2
Start up in automatic mode	27-28-29
Start command on	27-28-29
Completely running	27-28-29
not completely started	0-1-2
does not run completely anmore	0-1-2
shut down in automatic mode	27-28-29
stopped without permission to start	12-13-14

C_SIMOS Status

General fault	3-4-5
General warning	6-7-8
Simocode running	0-1-2

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Mode Text line for C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE, C_MEASUR
C_STORAGE, C_SIMOS

(csoMode)

Automatic	9-10-11
Manual	15-16-17
M: non interlocked	15-16-17
M: redused interl.	15-16-17
M:only prot. Interl.	15-16-17
Local	0-1-2
Out of Service	21-22-23
Simulation	18-19-20
Measure channel bypassed	24-25-26
Locked	12-13-14
Emerg. Start enabled	24-25-26

Mode Text for extern Objects:

Group/Route Obj.
Group/Route Obj.
Group/Route Obj.
Group/Route Obj.
Group/Route Obj.
Group/Route Obj.
Group/Route Obj.
Group FP.
Group FP.

Route

Automatic	27-28-29
Manual	15-16-17
Local	0-1-2
Out of Service	21-22-23
Simulation	18-19-20
Emergency Stop	3-4-5
Interl. Bypassed	18-19-20
Group not empty	0-1-2
Completly running	27-28-29

1D,2D,DA,V

1D,2D,DA,V

Bitmaps

The bitmaps for the symbols are stored on all clients and servers in the standard directory (D:\CEMAT_CS\bitmap\).
Symbols used for the project must be copied into the <WinCC-Project directory>\GraCS, otherwise they cannot be used in the OS Engineering. The master for the bitmaps is the Server. The distribution can be done with a batch file.

For Drives and Valves all bitmaps must exist, which are theoretically foreseen for the Symbol, even if the status is never used in Runtime. WinCC will give an error message if any of the bitmaps does not exist.

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Instance specific Authorizations

During the set up of the PCS7 Project (following the instructions of Engineering Manual, chapter 3) the authorizations 18 – 29 have been defined in order to create different operation levels.

If additional operation levels are needed (e. g. in order to permit certain operations only to specific personal), these User rights must be defined in WinCC User Administrator as well.

The assignment of the operation level to the operator action is done in the CFC.

See Object description of the specific block under "Operator commands".

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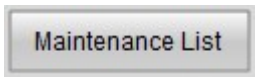
General Cemat Functions

The template picture @PCS7ElementsCEM.pdl contains general Cemat Functions. The buttons can be inserted in any process picture (e. g. in the system overview) in order to call superordinated functions.

The examples must be adapted and labeled accordingly.

Call of the Maintenance Overview

Via button "C_BtMaintenanceList" the Maintenance Overview will open:



Adaptations are not required.

Call of the Info Overview

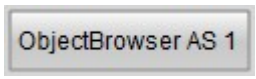
Via button "C_BtInfo" a window will open which shows the last entry into the user archive. From there you can browse back or change to a spreadsheet format.



Adaptations are not required.

Query of the Object Browser

Via button "C_BtObjBrowser1" the operator will open the CEMAT Object Browser and will get a list of objects within an AS.

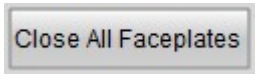


The function for left mouse click must be adapted (enter number of the AS):

long lPlcNo = 1; //The number of the PLC (e.g.: 1 ➔ SYSPLC01; 12 ➔ SYSPLC12;…)

Close all open windows

Button "C_BtCloseAllFaceplates" closes all the open faceplates at a time.



Adaptations are not required.

Open Curve Group on Full Screen

The button “C_BtOpenCurveGroup” opens the curve group on full screen (optional).



The function for left mouse click can be adapted (enter the name of the curve picture) default = C_Curve_Group1.pdl

See chapter '**Open curve group on full screen (optional)**'.

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Open curve group on full screen (optional)

This option allows the display of pre-configured curve groups in full screen mode, which means, when opening the curve group the complete screen is used as working area. There is no alarm line, no overview range (picture tree) and not button line.

Caution: The full screen representation of curve groups is only possible for OS with only one screen. Multiscreen does not work.

On the Cemat installation CD under Cemat_AddOn\Full_Screen\WinCC\GraCS you find the required PDLs which you have to copy into your OS, if the function is required:

@screen.pdl	Screen organization default (1920x1080)
@screen_CEM_1280.pdl	Screen organization (1280x1024)
@screen_CEM_1680.pdl	Screen organization (1680x1050)
@screen_CEM_1920.pdl	Screen organization (1920x1200)
@screen_CEM_1920x1080.pdl	Screen organization (1920x1080)
C_Curve_Group1.pdl	Example 1 Curve groups default (1680x1050)
C_Curve_Group1_1280.pdl	Example 1 Curve groups (11280x1024)
C_Curve_Group1_1680.pdl	Example 1 Curve groups (1680x1050)
C_Curve_Group1_1920.pdl	Example 1 Curve groups (1920x1200)
C_Curve_Group1_1920x1080.Pdl	Example 1 Curve groups (1920x1080)
C_Curve_Group2.pdl	Example 2 Curve groups default (1680x1050)
C_Curve_Group2_1280.pdl	Example 2 Curve groups (11280x1024)
C_Curve_Group2_1680.pdl	Example 2 Curve groups (1680x1050)
C_Curve_Group2_1920.pdl	Example 2 Curve groups (1920x1200)
C_Curve_Group2_1920x1080.Pdl	Example 2 Curve groups (1920x1080)
C_Curve_Group3.pdl	Example 3 Curve groups default (1680x1050)
C_Curve_Group3_1280.pdl	Example 3 Curve groups (11280x1024)
C_Curve_Group3_1680.pdl	Example 3 Curve groups (1680x1050)
C_Curve_Group3_1920.pdl	Example 3 Curve groups (1920x1200)
C_Curve_Group3_1920x1080.Pdl	Example 3 Curve groups (1920x1080)

File @screen.pdl must be copied into the OS project in the required screen resolution.

The rest of the pictures contain examples for the display of curve groups, also in different screen resolutions, which you can use as template. Just copy it into a new file name and make the adaptations according to the process values you want to show.

For the call of the curve groups in full screen mode you have to use the button function from template picture @PCS7ElementsCEM.pdl.



Copy this into your process picture and adapt the function for Mouse Action, by entering the name of the curve group:

```
#include "apdefap.h"
void OnClick(char* lpszPictureName, char* lpszObjectName, char* lpszPropertyName)
{
        TCHAR szPictureName[] = "C_Curve_Group1.pdl";       //Name of the Curve Group


        SetPropChar( "@screen", "CemCurve", "PictureName", szPictureName);

        SetPropWord("@screen", "CemCurve", "Top", 0);
        SetPropWord("@screen", "CemCurve", "Left", 0);
        SetVisible("@screen", "CemCurve", TRUE);
}
```


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Message archive

The message system under PCS7 is generated by the OS Project Editor. After running the OS Project Editor a few adaptations have to be performed (see Chapter „PCS7 Project“).

Tag logging

For each measure which needs to be archived, in the process value archive an archive tag has to be created. Select the proper archiving cycle according to the function of the measure.

- Quick archiving for currents, pressures etc.
- Slow archiving for temperatures etc.

Example of typical configuration for cement plant:

Process value Type	Cycle Time in Sec.	Archiving Time in Sec.
Temperature	30	30
Level	10	30
Pressure	2	10
Flow	5	10

How to create a process value archive and the archive tags is described in the engineering manual of PCS7 and not part of this description.

You can also use the “WinCC ArchiveConfigurationTool” for fast and easy TagLogging definition.

The direct call of the archive curve from the faceplate of the measure is only possible if you follow the CEMAT rules:

- The name of the archive tag exactly corresponds to the name of the process tag.
- The default name of the process value archive is **ProcessValueArchive**. If the archive tags are created automatically, PCS7 creates the archive tags in an archive with the name **SystemArchive**.
- If more than one process value archive is used (e. g. per plant section) you have to carry out adaptations in the CFC at parameter PV_Out.Value of the C_MEASUR.

  In this case archive tags can not be generated automatically, because PCS7 supports only one process value archive.

See also in chapter '**Adding an archive tag to Process Value Archive'**.

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User Archives

During the installation of the Project (chapter 3) four user archives have been created. Through the import of the files DriveList.uap, C_INFO.uap, C_CURVE.uap and C_POLY3.uap the data base structure was already created in the correct format.

The group instance list **C_DriveList** and does not need any further engineering. The data will be provided online.

The User Archive **C_INFO** is empty and must be filled with data, in order to provide it for the Info Dialog of the Objects.

- At least one line of runtime data must exist. You can either import file C_INFO.csv from folder D:\Cemat_CS\ua or create the dummy entry manually.
- We recommend to create the Info-Data with Excel (CSV-File) and to import it afterwards into the user archive. See 09_Engineering_Tools_009.pdf.

For the Cemat curve group function the user archive **C_CURVE** must contain at least one line of runtime data. You can either import file C_CURVE.csv or create the dummy entry manually.

For polygon function the user archive **C_POLY3** must contain at least one line of runtime data. We recommend importing the example file C_POLY3.csv.

Structure of the Info data base

The structure of the Info data base is already explained in chapter 2. Subsequently you find some additional remarks regarding the particular data fields:

- The content of fields ID, Obj_ID and C_TAG must be unique. ID and Obj_ID contain a consecutive number and C_TAG contains the tagname of the object.
- The rest of the fields are grouped by subject under whom you will find the information later on in the Information Dialog. You can identify the subject on its prefix.

  GL_ = General Locations
  G_ = Register Service
  I_ = Register Input/Output
  M_ = Register MCC Data
  H_ = AS Hardware / Software
- The fields LastUser and LastAccess can remain empty. They are used by the system itself.
- The entry in field G_LoopA serves as a reference to the process picture to be opened if the loop-in-Alarm Button is pressed.
  If this field remains empty, the system looks into the 'Component list Editor' of WinCC in order to open the 'Entry point picture'.
- By entering the file name for manuals and video files, these documents can be opened from the Info-Dialog by additional buttons.

Important notes for the import:

1. ID and Obj_ID must be numbered consecutively.
2. Via Import function only **new** records can be imported, i. e. if you want to modify existing data records you have to export these records, and to delete it before you can import it again.

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Generation of the Info data

An Engineering Tool (Excel Macro) is available, which can be used to create the Info Data from the PCS7 Engineering Data (Hardware Configuration, Process Object view). The Excel Macro generates a file C_INFO.csv, which can be imported into the User Archive.

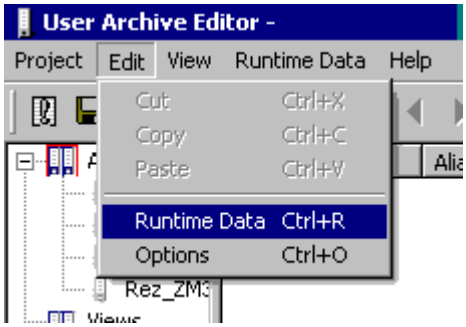
A detailed description of the Excel Macros you will find in chapter 09_Engineering_Tools.

The Engineering Tool does not generate the complete Info Data, which means if you want to store additional information such as filenames for Sound, Map, Video or Manual, you have to add this manually in Excel, before you import the file into the User Archive.

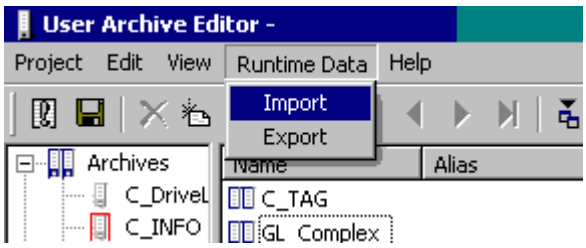
Import into the user archive

Import the runtime data into the user archive

1. Open the User Archive and select C_INFO
2. Deselect in the User Archive Editor the menu item „Edit -> Runtime Data“.

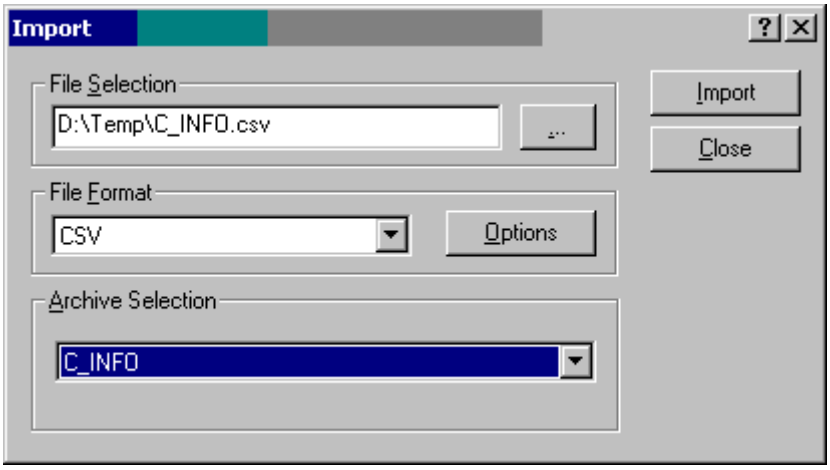


3. Select in menu „Runtime Data -> Import“.



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4. Select the file C_INFO.CSV, which was created by the Excel macro. Select the Archive „C_INFO“. If there are already runtime data in the archive, this data records must be deleted before the import. If you like to keep some data from the already existing records, please export the runtime data and copy them into the import file C_INFO.CSV.



If you import data records with an already existing ID, you will get an error message. The import will be then aborted.

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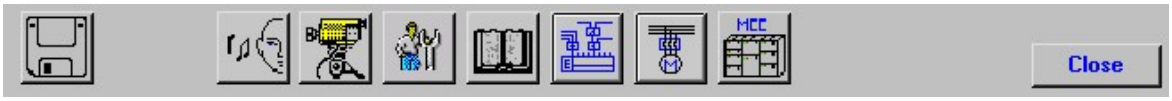
Multimedia Interface

From the Info Dialog object specific Documents can be opened. As these documents are not always available it can be configured for each object type, which means for each object type it is possible to decide which additional Buttons should be visible in the Info Dialog. The settings are carried out in directory D:\CEMAT_CS\CONFIG in the Configuration file of the particular object type.

In the Folders "Input/Output", "MCC Data" and "AS Hardware and Software" a button will open respective drawings:

 **Folder 'Input/output'**	Assignment of the input/output cards (cabinet assignment)
 **Folder 'MCC data'**	Assignment of the MCC cabinet (cabinet assignment)
 **Folder 'AS hardware'**	Construction of the cabinet in which the AS is installed which this object belongs to (cabinet assignment).

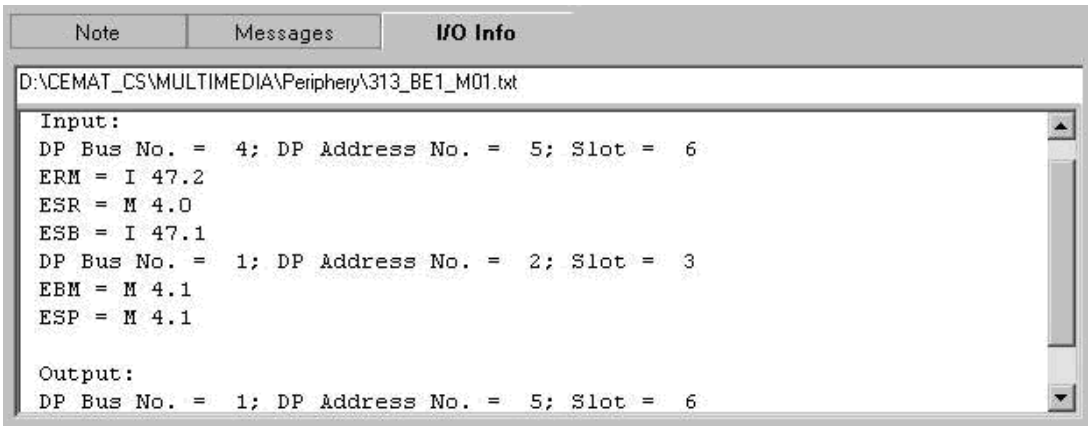
The additional Buttons at the bottom of the information dialog can be used to open a Sound file, a Video, a Operation procedure, a Function description, a Loop diagram, an Electrical schematic or a MCC Data.



Sound 	Sound replay (USER)
Video guide 	Video description for trouble-shooting (USER)
Operation procedures 	Descriptions how to operate (USER) as doc, pdf, xls
General function desc. 	Descriptions of general functions for this object (USER) as doc, pdf, xls
Loop diagrams 	Process engineering- and Software interlock as CAD drawing
Electrical schematic 	Electrical schematic Drawings as CAD drawing
MCC data 	MCC cabinet drawings, settings as CAD drawing

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In Folder I/O Info Text files with Input/ Output Information can be displayed.



The Text files for I/O Info can be created with an Excel Macro based on the data from the HW-Configuration and the Process object view. Refer to chapter 09_Engineering_Tools.

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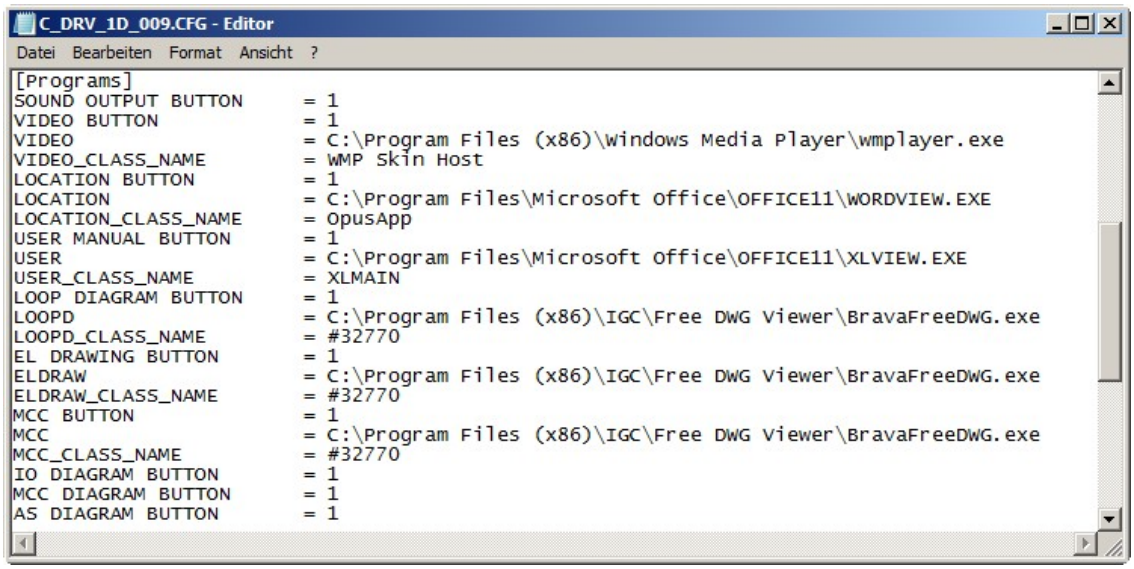
Enable the Multimedia Functions

In order to enable the user program neutral interfaces for multimedia applications, open in the directory D:\CEMAT_CS\CONFIG the module specific to file, e.g., C_DRV_1D_009.cfg and edit the area [Programs] as follows:

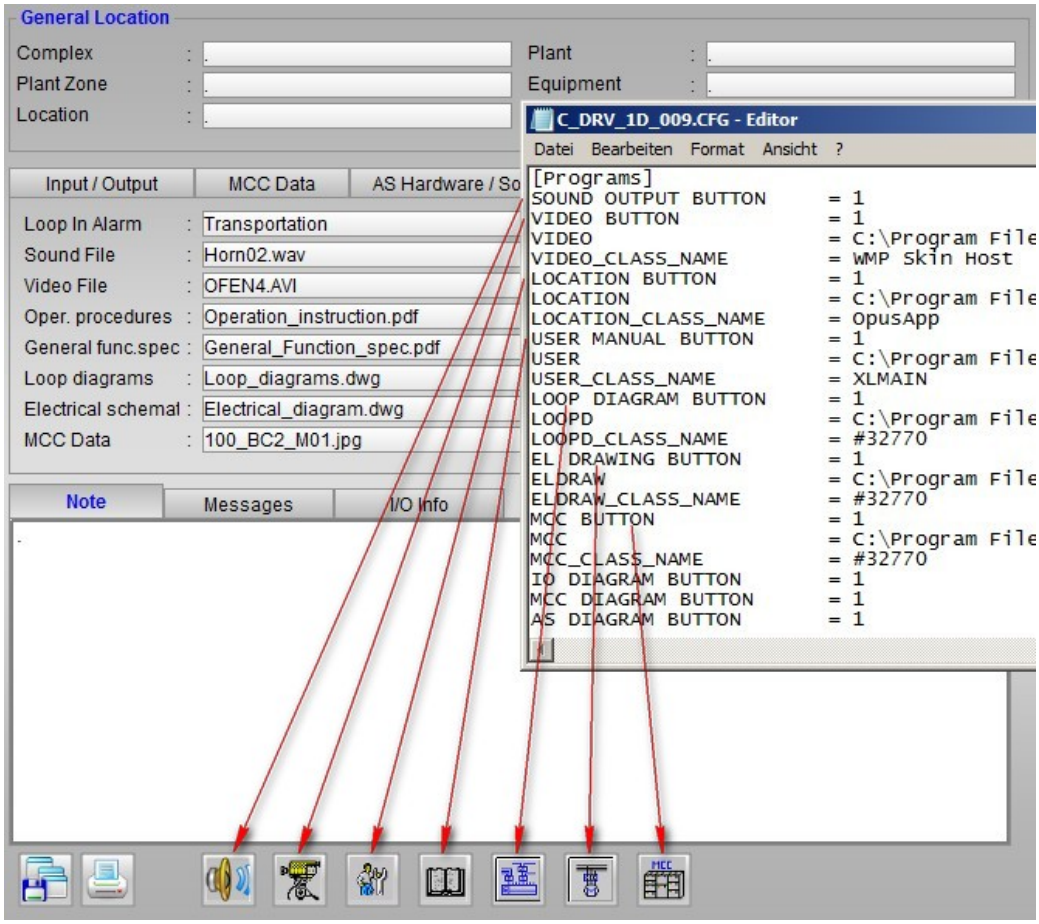
In the following example the Video Function and the Service Manual shall be enabled.

1. Switch buttons visible by place the parameter xxxxxBUTTON = 1

2. Write Path and Program name of the Viewer into “XXXXX”
   - write xxxx_Class_Name (see define Window-Class-Name)



assignment of button to cfg Line

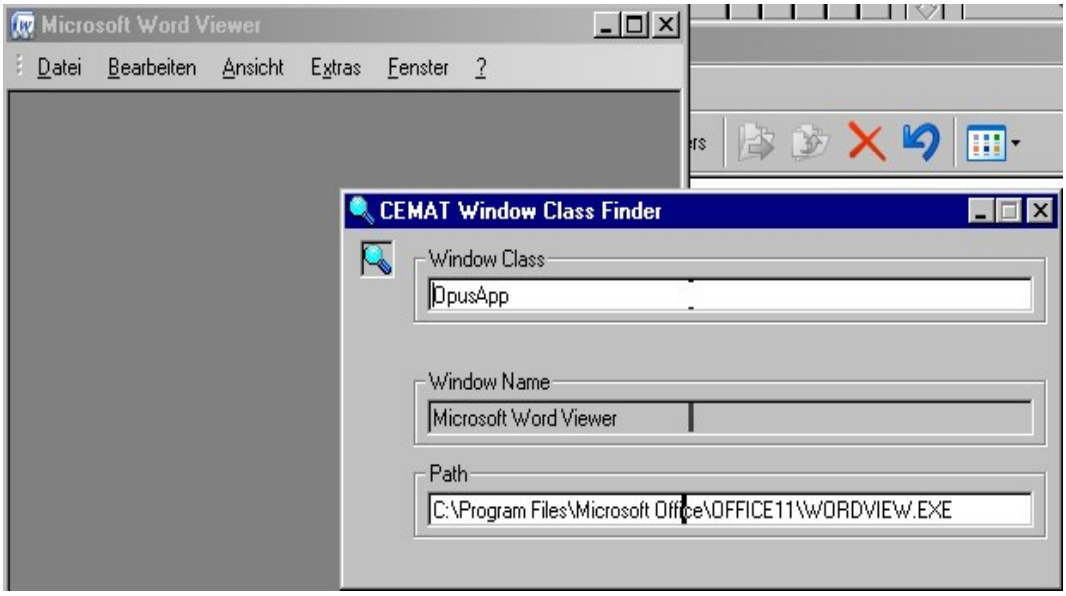


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Define Window-Class-Name

To view the external program „modal“, it is necessary to know the Window-Class-Name. Please follow the steps:

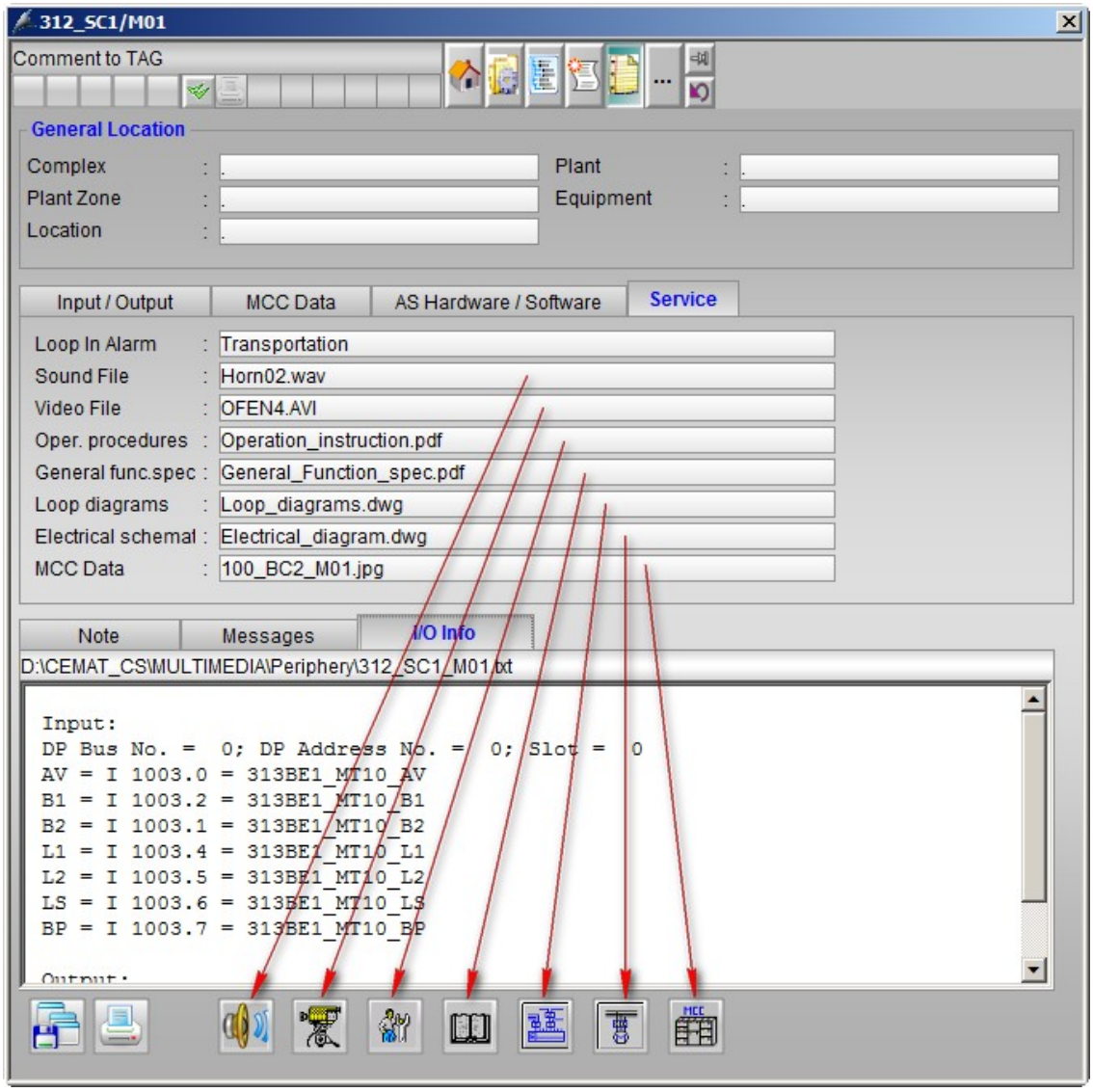
1. Start the desired program (Word viewer)
2. Start then from „D:\CEMAT_CS\BIN“ the program „CematClassFinder.exe“
3. Use the magnifier from „ClassFinder“ and move them over the Frame of the external program .
   - it will be shown the „WindowClaasName“ and the
   - Path (incl. programname)
4. Copy both into the corresponding lines of CFG-file.



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Enter Filenames in the INFO Dialog

The names for a Video, a Operation procedure, a Function description, a Loop diagram, an Electrical schematic or an MCC Datasheet are to entered for each object in the register 'service' without path.



Storage Location of the Multimedia Files

During the Cemat installation the multimedia directory is automatically created under D:\CEMAT_CS.

\Multimedia	
\AS	CAD Pictures of AS objects
\ELECTRICAL_DIAGRAM	CAD pictures of electrical drawings (free name)
\IO	CAD Pictures input/output of the objects
\LOOP_DIAGRAM	Loop Diagrams CAD (free name)
\Manual	general function description (free name)
\Map	not used anymore
\MCC	CAD Pictures form the MCC
\OPERATING_PROCEDURES	Description of operating procedures (free name)
\Periphery	I/O Information from HW Config
\Sound	Sound files for info dialog
\Video	place of deposit of the video-files

The user files have to be located in the respective subfolders.

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Naming conventions for the user files

The images for 'AS', 'IO', 'MCC' are always derived from the Tagname. In addition the following rule has to be considered:

- Special characters in the Tagname have to be substituted by "_"
- File endings must be .jpg or .tif (.bmp is not allowed).

The text files under 'Periphery' are always derived from the Tagname. In addition the following rule has to be considered:

- Special characters in the Tagname have to be substituted by "_"
- The file ending must be .txt

The file names for Video, Operation procedure, Function description, Loop diagram, Electrical schematic and MCC Datasheet are freely eligible.

- The corresponding file endings are .pdf, .doc, .xls, .wav, .avi, .dwg



Note: The Names are case sensitive! Don’t use blank in the name.

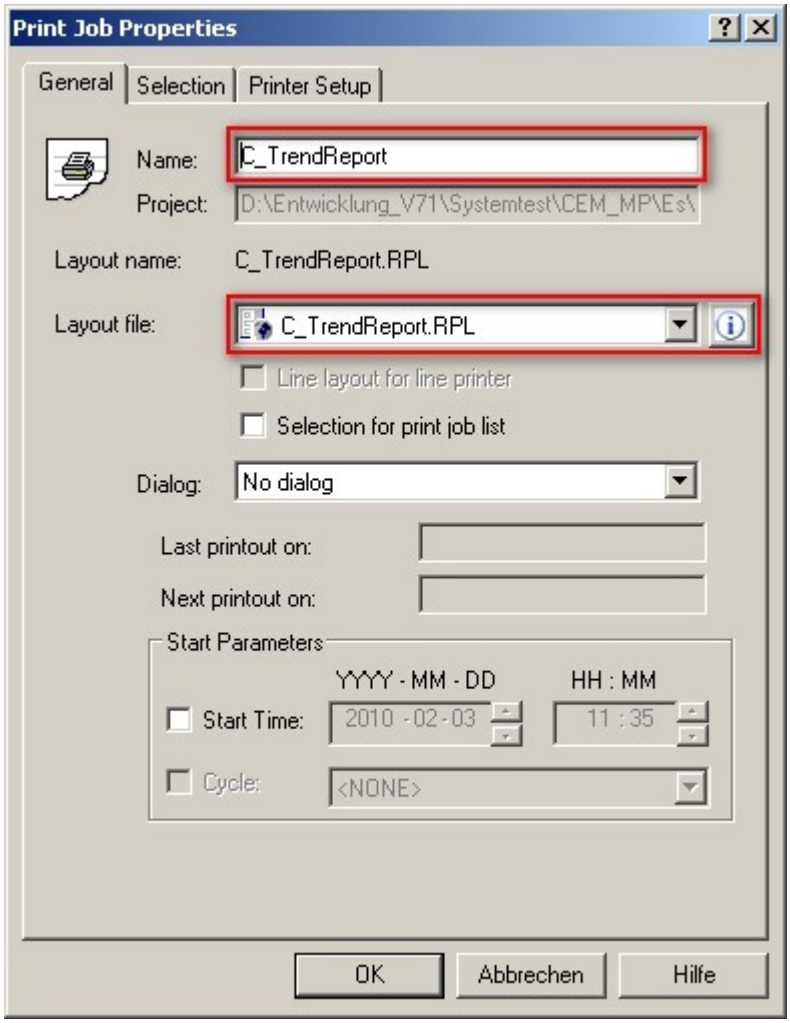
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Configuration of Print functions

For the printing of trend curves, with the Cemat delivery you received the Layout C_TrendReport.RPL, which has been copied into your OS Projects already during the setup of your PCS7 Project.

After this the layout is available in the WinCC Project under Report Designer → Layouts → Language neutral.

For the configuration of the print functions you have to create a print job. Rename the print job into C_TrendReport and as Layout file select the Cemat Layout C_TrendReport.RPL.



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Configuration of C_Config.cfg

Hardcopy to default printer

With Button “Print” the actual Faceplate can be printed at the standard printer.

If no printer is configured, the print jobs go to the print queue as for example „Microsoft Office Document Image Writer“. From there they are never used if no printer is connected.

In case a printer is configured for the station, the print function can be enabled under D:\CEMAT_CS\Config\C_CONFIG.cfg.

Proceed as follows:

- Open file C_Config.cfg (under D:\Cemat_CS\Config).

- There you find the lines:

```
  [CematSettings]
..;
  ;
...;No Hard copy of the actual faceplate to the default printer…
...HardCopyToDefaultPrinter=0
```

- Change the last line into `HardCopyToDefaultPrinter=1`
  (Print button can be operated in Runtime)

Display mode of the object list

Via group object list function all elements which are linked to the group are displayed in a tree structure. By default the group only shows the objects which are directly linked to the group. In case of routes, it also shows the objects which are directly linked to the route.

In order to display the annunciations and measurements linked via O_LINK to the drive, the structure can be expanded via mouse-click on the '+' Button.

The default setting can be changed to direct expansion via setting in D:\CEMAT_CS\Config\C_CONFIG.cfg.

Proceed as follows:

- Open file C_Config.cfg (under D:\Cemat_CS\Config).

- There you find the lines:

```
[CematSettings]
..;
  ;
;Object List: Subobjects not expanded
ObjListExpanded=0
```

- Change the last line into `ObjListExpanded=1`
  (Expand Object list while opening)

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Use of PDF Reader

In order to display the “PDF” Online Help files with an external PDF Reader you have to check or modify the settings in the “C_CONFIG.cfg” file. (The default is done with Adobe Reader V9.0).

The default setting can be changed to direct expansion via setting in D:\CEMAT_CS\Config\C_CONFIG.cfg.

Proceed as follows:
- Open file C_Config.cfg (under D:\Cemat_CS\Config).
- There you find the lines:

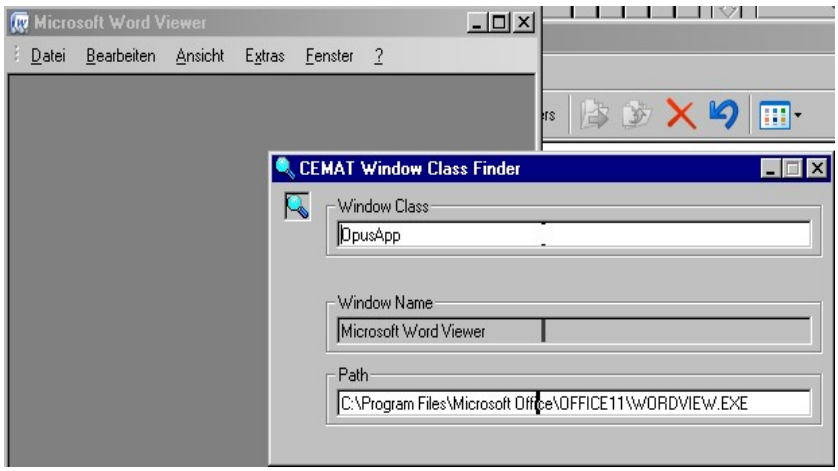
```
[CematSettings]
..;
  ;
;USE_PDF_READER …..
USE_PDF_READER=1
READER_PATH=C:\Program Files (x86)\Adobe\Reader 9.0\Reader\AcroR32.exe
READER_CLASS_NAME=AcrobatSDIWindow
```

1. with “USE_PDF_READER” = 1 the external PDF Reader in the next line will be executed.
   = 0 it is not possible to start a PDF Reader
2. write the complete path and program name to “ READER_PATH”
3. define the Class-Name as it is descript below and write the Class-Name to “READER_CLASS_NAME”

Define Window-Class-Name

To view the external program „modal“, it is necessary to know the Window-Class-Name. Please follow the steps:

5. Start the desired program (Word viewer)
6. Start then from „D:\CEMAT_CS\BIN“ the program „CematClassFinder.exe“
7. Use the magnifier from „ClassFinder“ and move them over the Frame of the external program .
   - it will be shown the „WindowClaasName“ and the
   - Path (incl. programname)
8. Copy both into the corresponding lines of CFG-file.



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WEB

For information regarding CEMAT WEB see directory Cemat_AddOn\CEMAT_WEB on the Cemat installation DVD.

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Engineering Tools

Content

Engineering Tools **1**

User Archive C_INFO 2
Generation of the user archive C_INFO 2
Overview 3
Export of the hardware configuration of the PLCs 4
Export of the symbols file 5
Export from the process object view 6
Import into Excel 9
Edit and / or convert the User Archive C_INFO 11
Cemat CFC Engineering Tool 12

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User Archive C_INFO

With CEMAT V8 an Excel Macro is available, which can be used to create the Info Data from the PCS7 Engineering Data (Hardware Configuration, Process Object view). The Excel Macro generates a file C_INFO.csv, which can be imported into the User Archive.

The procedure how to generate the Info-Data is described in the following chapter.

Generation of the user archive C_INFO

This chapter describes the generation of the user archives C_INFO from the data of the PCS7 Project. For this purpose necessary excel file C_INFO_V80.xls are available in the directory D:\CEMAT_CS\ua.

For the generation of the User Archive C_INFO from the process object view and the hardware configuration of the PLCs the following requirements must be met:

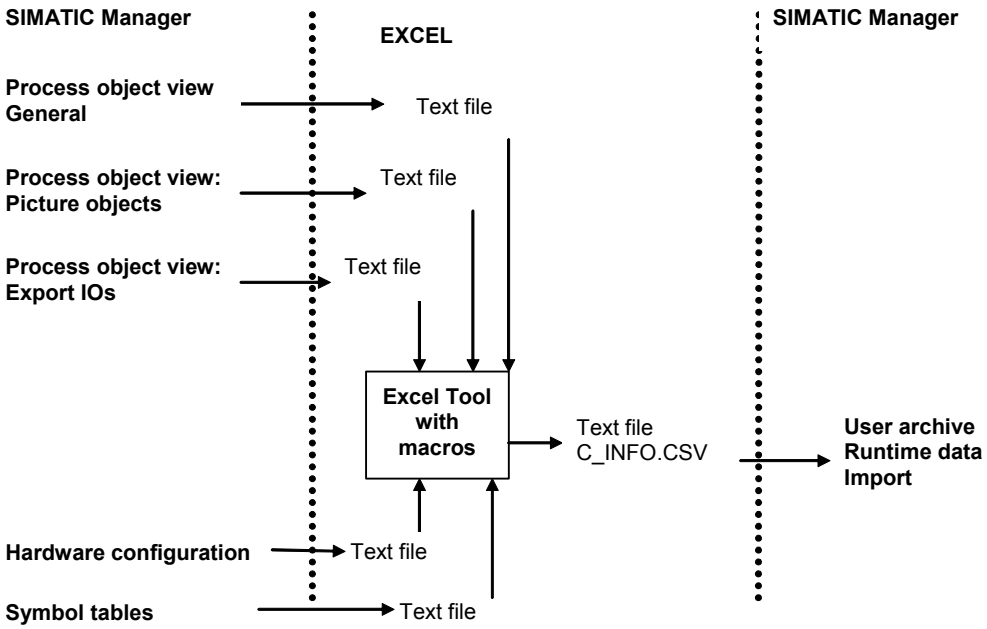
- The hardware configuration of each PLC must be exported as CFG files.
- The symbol tables of each PLC must be exported as SDF files.
- The content of the process objects views „General“ and „Picture objects“ must be copied into text files.
- All I/Os of the process objects view must be exported into text files.

The following columns are filled during this procedure:

- ID -> will be numbered continuously.
- C_TAG = TAG
- GL_Complex = Complex = Manual input = identically for all objects.
- GL_Plant = Project = Manual input = identically for all objects.
- GL_Plant_zone = Plant zone = 1. Hierarchy folder.
- G_LoopA = Process mimic = from process object view „picture objects“.
- H_PLC_Name = PLC = from process object view “General” or hardware configuration.

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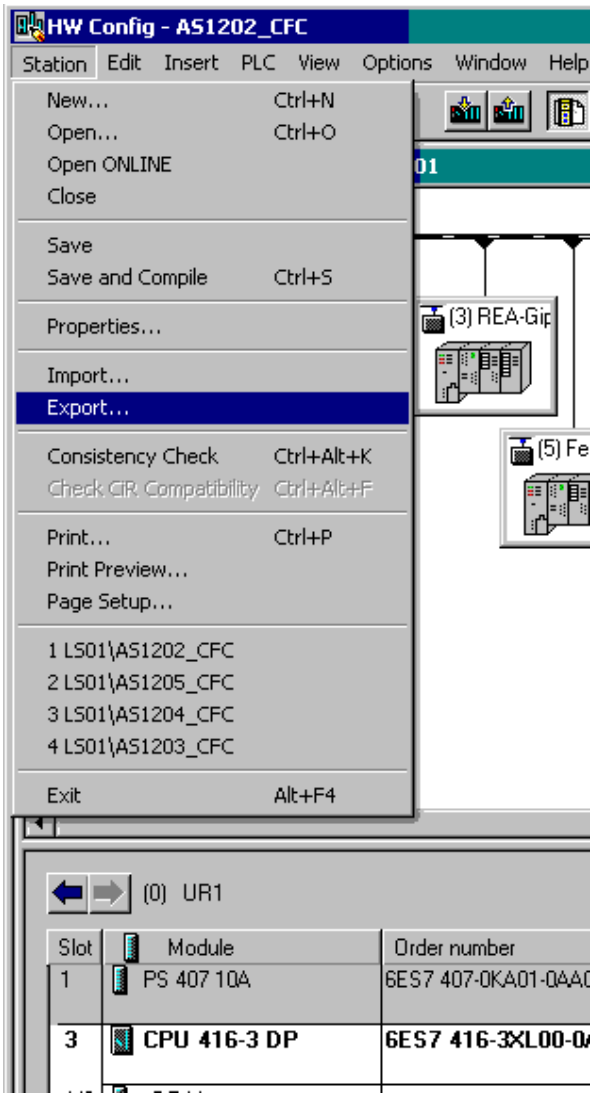
Overview

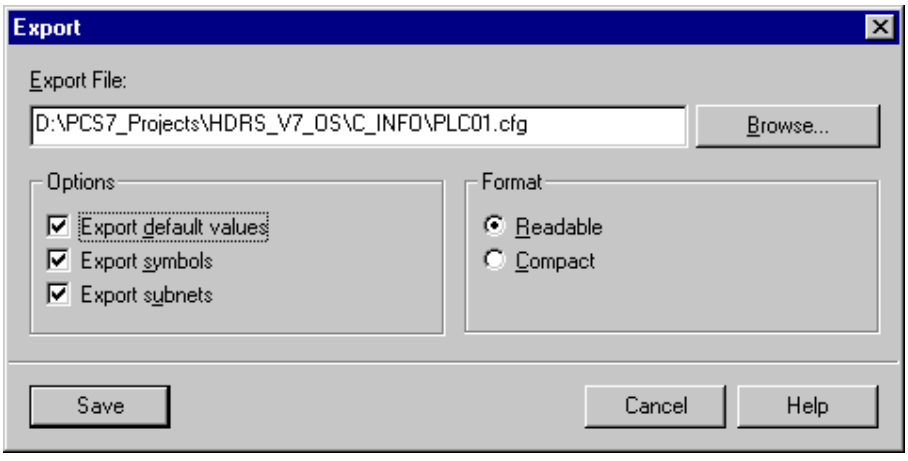


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Export of the hardware configuration of the PLCs

1. Open the hardware configuration of the 1. PLC.
2. Select menu „Station -> Export“.
3. Enter export file, e. g. 1202_cfc.cfg and „Save“.



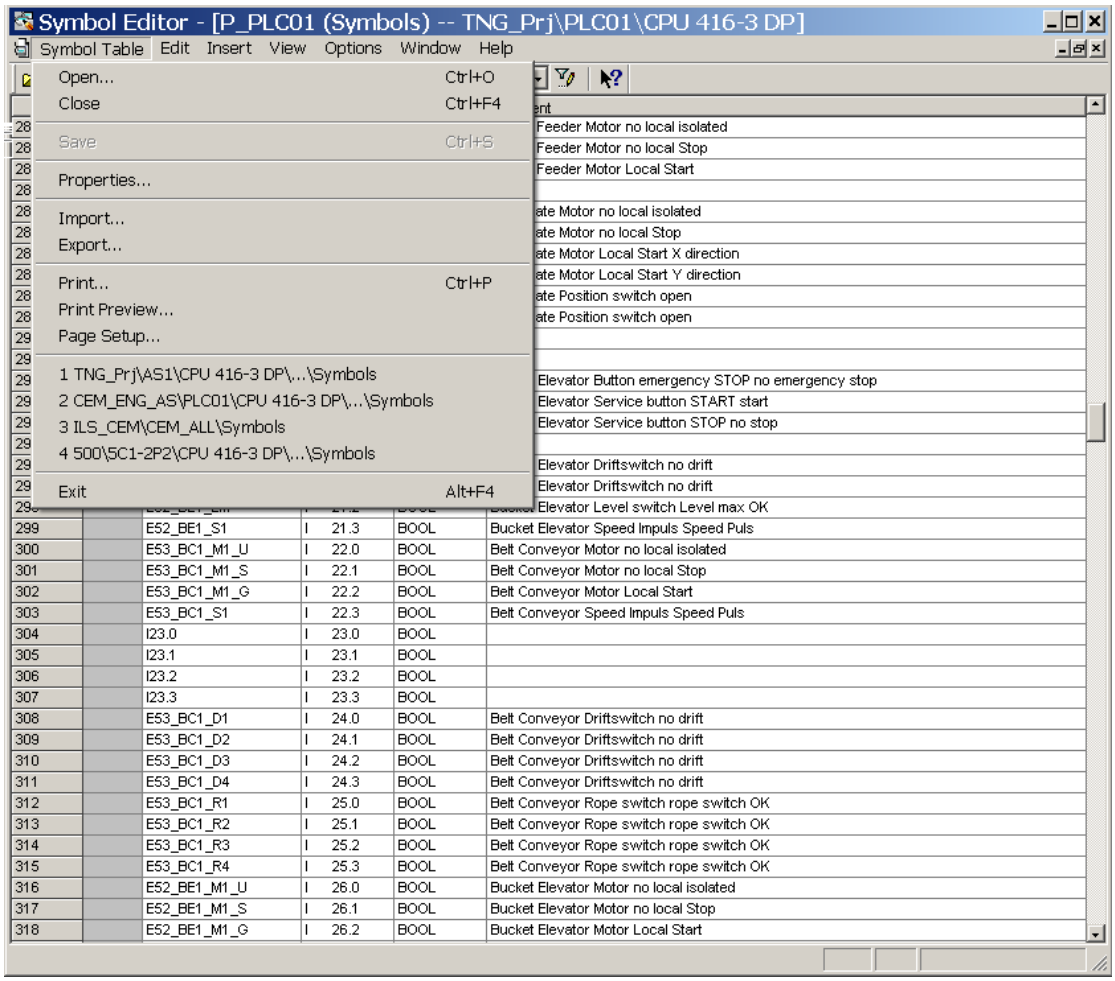


Repeat Step 1 to 3 for each PLC.

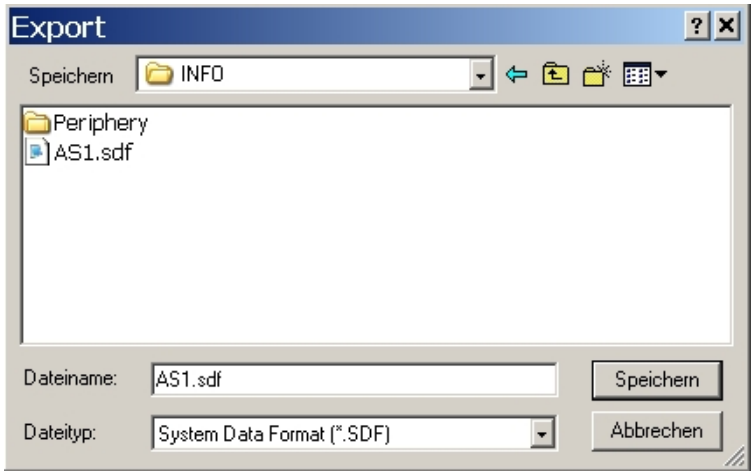
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Export of the symbols file

Open the symbols table and select Symbol Table → Export…



Export the symbols in System Data Format (*.SDF)



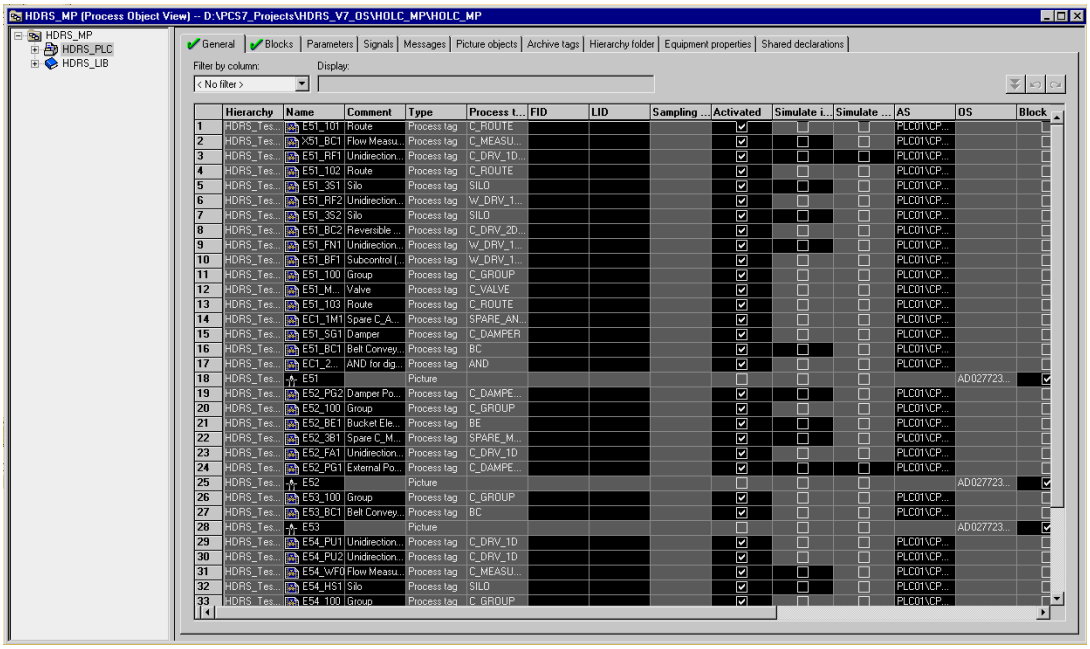
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Export from the process object view

Process object view „General“

Copy the process object view „General“ as a text file, e.g. as GENERAL PO.txt.

1. Select process object view.
2. Select the topmost hierarchy folder
   (from the project with the PLCs, not the multi project folder).
3. Refresh the view (F5).
4. Select in all lines all fields, except the line numbers.
5. Copy with CTRL-C all lines into the clipboard.
6. Start the text editor (notepad) and insert all lines with CTRL-V.
7. Save the text file, e.g. as GENERAL PO.txt.



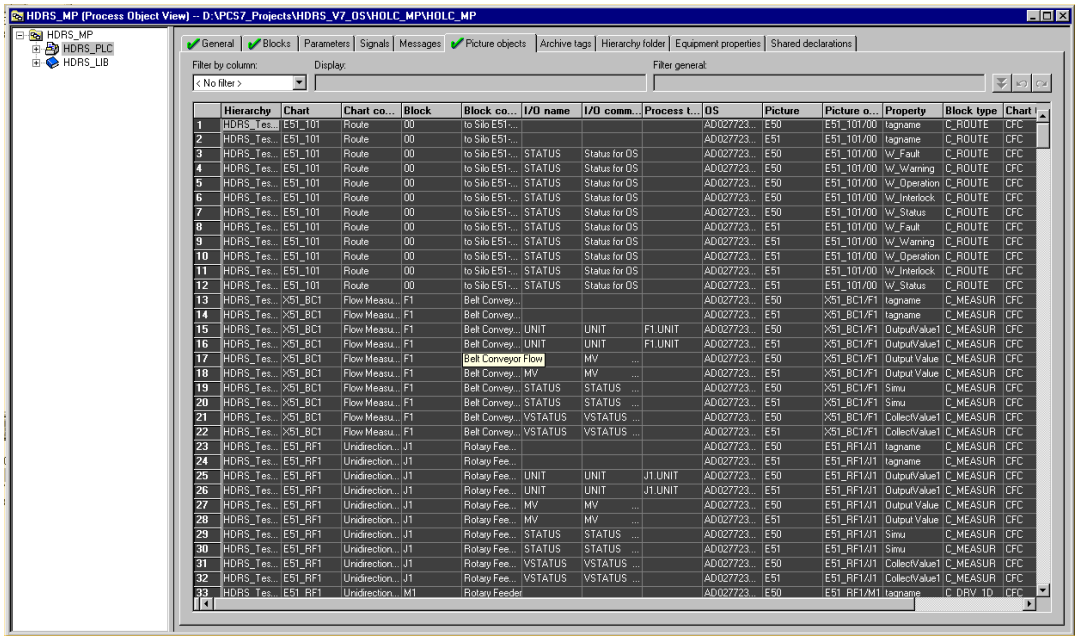
If the AS devices are stored in different single projects of a multi project, then you have to select each single project and copy the “General” view of each single project into files, e. g. GENERAL PO.txt. The specific file names must be entered in the sheet “Presettings” of the Excel tool.

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Process object view „Picture objects“

Copy the process object view „picture objects“ as a text file, e.g. as PO picture.txt.

1. Select process object view “Picture objects”.
2. Select the topmost hierarchy folder
   (from the project with the PLCs, not the multi project folder).
3. Refresh the view (F5).
4. Select all lines.
5. Copy with CTRL-C all lines into the clipboard.
6. Start the text editor (notepad) and insert all lines with CTRL-V.
7. Save the text file, e.g. as PO picture.txt.



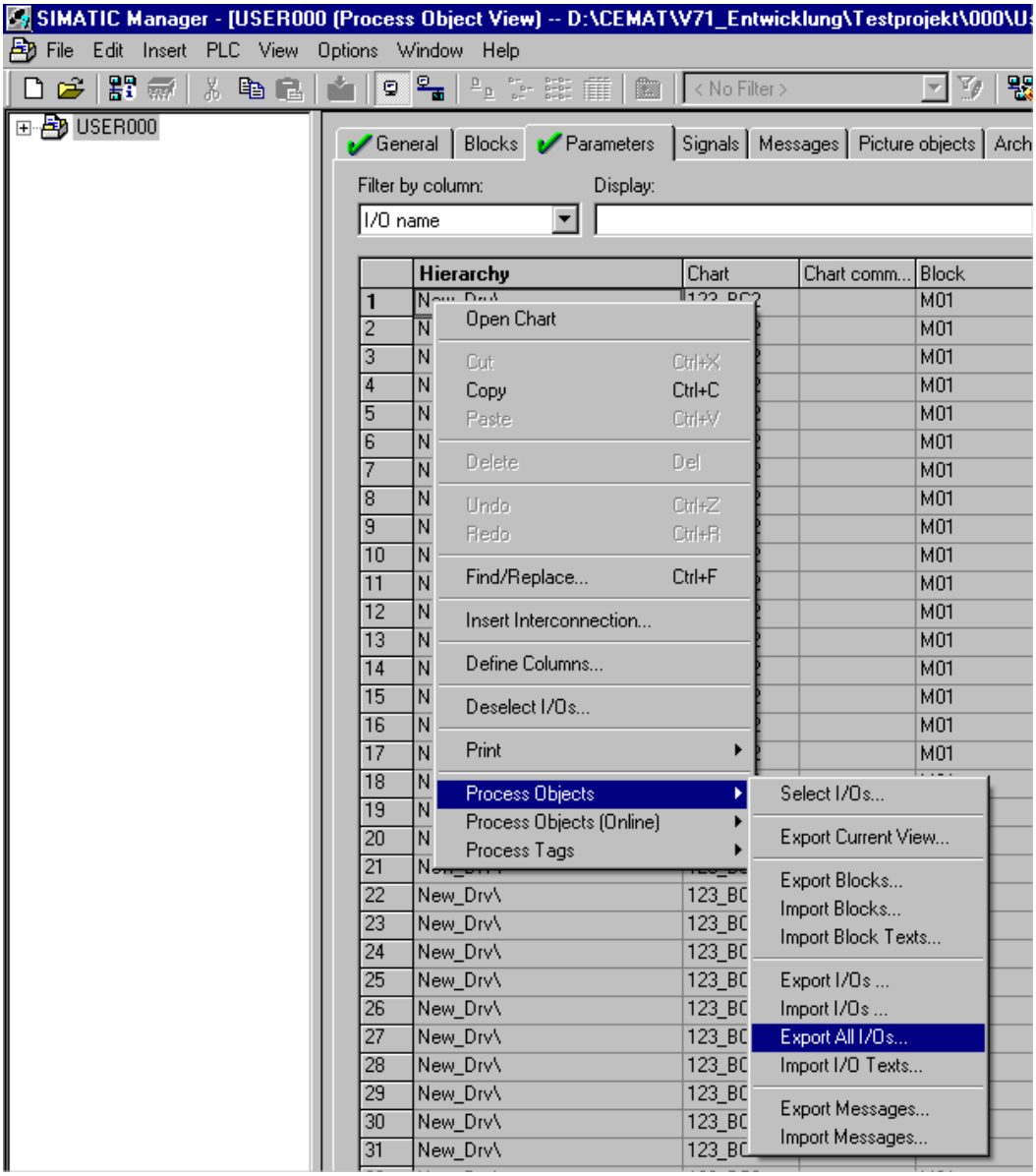
If the AS devices are stored in different single projects of a multi project, then you have to select each single project and copy the process object view “Picture objects” of each single project into files, e. g. PO_picture.txt. The specific file names must be entered in the sheet “Presettings” of the Excel tool.

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Process objects view „Export I/Os“

Export the block I/Os into a text file, e.g. into LS01_PS.csv.

1. Select process object view “Parameters.
2. Select the topmost hierarchy folder
   (from the project with the PLCs, not the multi project folder).
3. Refresh the view (F5).
4. Select with the right mouse button the menu “Process objects -> Export All I/Os”.
5. Save the export file, e.g. as LS01_PS.csv.



If the AS devices are stored in different single projects of a multi project, then you have to select each single project and the process object view “Parameter” of each single project must be stored in a separate file. The specific file names must be entered in the sheet “Presettings” of the Excel tool.

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Import into Excel

Open the file C_INFO_V80.xls and do in the table “Presettings” the following presettings:

PO general = name of the text file with the process object view „General“.

PO export files with parameter = name of the text files with the I/O export from the object process view “Parameter”.

Names of the files with hardware config = export files with the hardware configuration of each PLC.

Files with symbol list = export files with the symbol tables of each PLC.

ID start number = start number for the data records

List separator = list separator for the CSV files „;“ for German MS Windows or „,“ for English MS Windows (refer to regional settings in control panel).

Language = D or E.

Complex = same for all objects.

Project = same for all objects

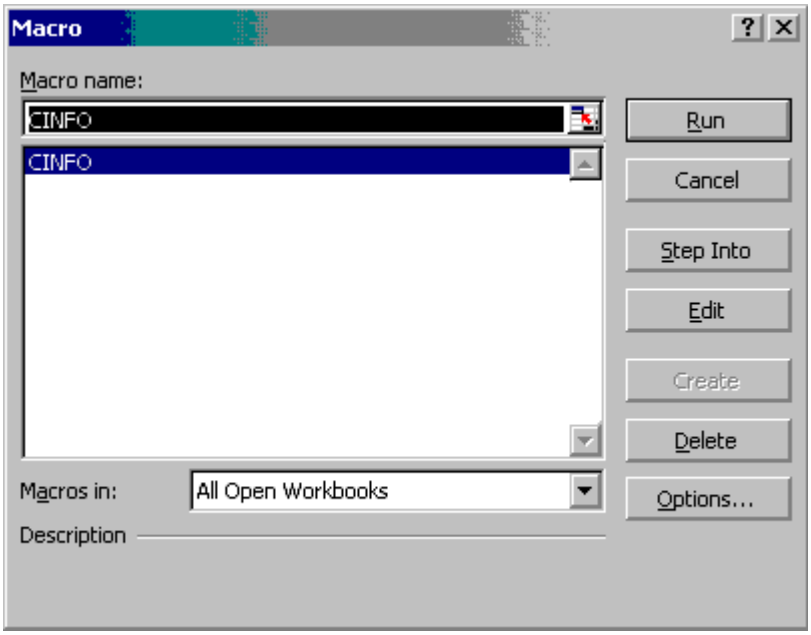
PO picture objects = name of the text file with the process object view „picture objects“.

PO general	GE_1202_PO.txt	GE_1203_PO.txt	GE_1204_PO.txt	GE_1205_PO.txt
PO export files with parameter	AS1202_PS.txt	AS1203_PS.txt	AS1204_PS.txt	AS1205_PS.txt
files with hardware config	as1202.cfg	as1203.cfg	as1204.cfg	as1205.cfg
files with symbol list	as1202.sdf	as1203.sdf	as1204.sdf	as1205.sdf
ID start number	1			
List separator	;			
language	E			
Complex	XXXX			
Project	Line 1			
PO picture objects	PO_pict1202.txt	PO_pict1203.txt	PO_pict1204.txt	PO_pict1205.txt

Copy all export files into the same directory like the Excel file C_INFO_V71.xls.

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If all necessary files are present, you can start the Excel macro „CINFO“.



Wait until "Ready" appears again in the status bar of Excel. 

For a complete line the macro could run very long., maybe up to one hour runtime.
"Excel 2003" is limited to 65535 rows. If there are many objects in your project, it could be that the Excel macro stops by a fault because of this limit. In this case we recommend to use "Excel 2010". Store the XLS file as XLSM file. **Don't** run the file in the "compatibility mode". In the "compatibility mode" there is still the limit of 65535 rows!

Check:

- The file „C_INFO.CSV“ should be created by the macro. Attention: An existing file C_INFO.CSV will be overwritten without a query. Import this file as runtime data with the user archive editor from WinCC. A detailed description of the Runtime data import you will find in chapter 08_OS_Engineering.
- For every tag there should be created a text file in the subdirectory “Periphery”. These text files contain the I/O information of the tag. Also these files will be overwritten without a query.
  Copy these files to D:\CEMAT_CS\MULTIMEDIA\Periphery\. In this case, the I/O information will be shown in the object faceplate “Info” -> I/O Info”.

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Edit and / or convert the User Archive C_INFO

To edit the user archive you can also use the Excel tool C_INFO_V80.xls.

Export the Runtime data into a CSV file.

Open the file C_INFO_V80.xls and do in the table “Presettings” the following presettings:

Import file V6 for edit = name of the file with the user archive data V6 for edit or convert.

Export file V6 after edit = name of the file with the user archive data V6 for saving after editing.

Import file V7 for edit = name of the file with the user archive data V7 for edit or convert.

Export file V7 after edit = name of the file with the user archive data V7 for saving after editing.

Import file V6 for edit	IMPORT_V6_UA.csv
Export file V6 after edit	EXPORT_V6_UA.csv
Import file V7 for edit	IMPORT_V7_UA.csv
Export file V7 after edit	EXPORT_V7_UA.csv

Copy all runtime data files into the same directory like the Excel file C_INFO_V80.xls.

Run the macro "READ_UA_V7" -> A sheet "UA" will be created (an existing sheet "UA" will be deleted). As import file the file name from "B15" = "Import file V7 for edit" will be used. Wait until "Ready" appears again in the status bar of Excel. 

The user archive "C_INFO" could now be edited in the sheet "UA".

Run the macro "SAVE_UA_V7" -> the sheet "UA" will be saved into the file listed in "B16" = "Export file V7 for edit". Wait until "Ready" appears again in the status bar of Excel.



If the file already exists, the file will be overwritten without a query.

With this tool you can also convert or edit the user archive "C_INFO" with the version 6 structure. For editing use the macros "READ_UA_V6" and "SAVE_UA_V6". For converting to the V7 structure use the macros "READ_UA_V6" and "SAVE_UA_V7".

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Cemat CFC Engineering Tool

An Engineering tool for CFC engineering does not exist at the moment.

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Check list

Content

Check list **1**

General 2
Hardware definition 1
Project Settings (according to Engineering Manual Chapter 3) 4
AS Engineering 7
OS Engineering....14
Function Test 15

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General

This document contains check lists for

- Plant configuration
- Project Settings
- AS Engineering
- OS Engineering
- Function test

If you follow these lists you can avoid general mistakes in each phase of the engineering.



We recommend to work through the check list before the FAT, in order to avoid deviciencies in advance.

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Project Name:	
Location:	
Customer:	

PCS7 Version:	
Cemat Version:	
Project Standard:	

Engineering (Company):	
Location:	
responsible Engineer:	

inspected by:	
Date of inspection:	
Date of Report:	

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Hardware definition

PC Stations:

Station Type	Computer Name *)	WORK-GROUP	Infobus TCP/IP Address	Plant Bus MAC Address	MS Login	Password	WinCC Project Name	WinCC Login	Password
Engineering Station 1	*ENG01*								
Engineering Station 2	*ENG02*								
Server1	*SERVER1A*								
Server1 (Standby)	*SERVER1B*								
Server2	*SERVER2A*								
Server2 (Standby)	*SERVER2B*								
CAS	*CAS01*								
CAS (Standby)	*CAS02*								
Web Server	*WEBSRV01*								
Open PCS7	*OPCSRV01*								

*) Only Letters and Numbers are allowed for Computer names (no special characters)

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Station Type	Computer Name	WORK-GROUP	Infobus TCP/IP Address	Plant Bus MAC Address	MS Login	Password	WinCC Project Name	WinCC Login	Password
OS Client 1	*OSC01*			---					
OS Client 2	*OSC02*			---					
OS Client 3	*OSC03*			---					
OS Client 4	*OSC04*			---					
OS Client 5	*OSC05*			---					
OS Client 6	*OSC06*			---					
OS Client 7	*OSC07*			---					
OS Client 8	*OSC08*			---					
OS Client 9	*OSC09*			---					
OS Client 10	*OSC10*			---					
OS Client 11	*OSC11*			---					
OS Client 12	*OSC12*			---					
OS Client 13	*OSC13*			---					
OS Client 14	*OSC14*			---					
OS Client 15	*OSC15*			---					
OS Client 16	*OSC16*			---					

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AS Stations:

Station Name	Function	Plant Section (AREA)	AS Number (for SYSPLCxx)	CPU Type	CP143 MAC Address	S7 Program Name
			01			
			02			
			03			
			04			
			05			
			06			
			07			
			08			
			09			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			
			21			
			22			

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Project Settings (according to Engineering Manual Chapter 3)

Designations:

Item	Remark	Status
Name of the Multiproject	Should discribe the complete Plant	
Name of the Project(s)	The project name for the OS (Servers) must not have an Underscore (because of Server Prefix)	
Station Name of the AS	has to be unique in the complete MP e. g. AS01	
AS Program Folder	has to be unique in the complete MP e. g. P_PLC01	
Station Name OS PC	Following the rules of the PCS7 Readme and the WinCC Help the Computer name should not contain any special Character. Unterscore is also not allowed for Servers!!! **Caution:** Once WinCC (and SQL Server) has been started, the modification of the station name requires a new installation of the Operating System, PCS7 ……..	
Station Name of the OS (as used in the PCS7 Project and in Station Configuration Editor)	Should match with the real Station name.	
OS Project name	has to be unique in the complete MP	
Name of the System Chart	Must be e. g. SYSPLC01 has to be unique in the complete Control System	

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Cemat Installation:

Item	Remark	Status
Cemat Version	The actual version is Cemat V8.0 (+ Hotfix?)	
Screen Resolution	Possible settings: 1680x1050, 1280x1024, 1600x1200, 1920 x1080 or 1920x1200	
Windows Appearance	must be Classic view (not XP)	
Character Size	must be small (normal) characters	
Firewall	On the Servers the CEMATRS.exe must be listet under "Exceptions".	

Hardware Configuration:

Item	Remark	Status
CPU Setting	Settings according to Installation Manual?	
CP Setting	Settings according to Installation Manual?	

Hardware Configuration:

Item	Remark	Status
Network connections	Settings according to Installation Manual?	

Blocks:

Item	Remark	Status
Cemat Library	The actual Version is Cemat V8.0 Hotfix required?	

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CFC Settings:

Item	Remark	Status
Settings for Chart compilation	Settings according to Installation Manual? Installed block per OB had to be changed to >=300	

OS Configuration (WinCC Project):

Item	Remark	Status
OS Project Editor	Screen Resolution = 1920x1080? → 1680x1050, 1280x1024, 1600x1200 or 1920x1200 require exchange of some Cemat standard pictures Settings for Message display and Runtime Window correct? How many area selection buttons? Areas sorted?	
Computer Settings	Additional Application 'CEMATRS.exe' added.	
Tag Management, internal Tags	Cemat Variables must be created for Single Stations and Servers Redundancy Tags existing (Even if it is only a Single Station the Redundancy Tags are needed for Cemat.)	
Alarm logging	Definition of the Text blocks? Color and Acknowledgement settings? Configuration of the message archive (default: 1 week)	
Tag logging	Archive variable must have the same name as the process variable. Acquisition time < Archiving/Display time?	
User Archive	User Archives C_INFO and C_CURVE and DriveList available? Data for C_INFO available? Has the Excel Macro been used? Hardware Information for Inputs and Outputs available?	
Horn Configuration	Sounds file defined for each used message class?	
Time Synchronisaton	Time Synchronisation is crucial. Normally: Server = Master; Clients and AS = Slaves Make sure that there is only 1 (redundant) time master.	

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AS Engineering

AS Engineering:

Item	Remark	Status
SYSPLC01	Naming correct? Is the System chart assigned to a Hierarchy folder in the plant view? Are the blocks of the system chart inserted at the right position in runtime group? Check with the tool "CEMAT CHECK TOOL.XLS"	
Message configuration	Message texts complete for all blocks? The message text for block comment can be edited in the Process object view. Copy column "Block comment" to "Free Text 1"	
Group link	All objects which are not connected to a “O_Link” (C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE, C_ANNUNC, C_ANNUN8, C_MEASUR and C_ADAPT must be linked to the group or route via GR_LINK1 or GR_LINK2 (or using C_MUX) Check with the tool "CEMAT CHECK TOOL.XLS"	
Object link	The objects C_ANNUNC, C_ANNUN8, C_MEASUR and C_PROFB can be linked to C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE,	
ErrorNum	Check with the Process object view, that the Output “ErrorNum” is “0”. Otherways check the reason of Error in the object document.	
Manual-Start enabled	If the Manual-start-mode is enabled group-wise the output “ManModOn” of the Group must be connected to all Signals “ManModOn”of the Drives or the FW functions must be enabled.	
Local enabled	If the local mode is enabled group-wise the output “LocModOn” of the Group must be connected to all Signals “LocModOn” of the Drives or the FW functions must be enabled.	
Start command	No continuous Signal used for StartAut, StrtAut1, StrtAut2,. Only group/route commands (no RunSig)	
Stop command	From group or route. Make sure that the feeding drive has been stopped before	

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Quick Stop	Quick Stop is used? Connection of output “QuicStpQ” of the group to the “QuickStp”of the drives? Button in the group faceplate visible?	
Start-up-warnig	Connect the “WarnLAct” from the group and the “WarnAct” output of all drives belonging to this group to an OR-Gate. Connect the “WarnHAct”from the group and the “WarnAct”output of all drives belonging to this group to an OR-Gate.	
Group Feedback	Connection of FbObjOn and FbObjOff complete? In case of routes the inverted “OffSig” has to be used for the FbObjOff.	
Annunciation blocks for Drive fault annunciations	For each signal which is used as protection interlock for a motor an annunciation module must exist. Alarm Activation is essential (MsgTrigg) it can be set via Input or O_Link with FW settings.	
Annunciation blocks for group status call	Annunication blocks existing for the indication of interlocking conditions of groups and routes (in the status call).	
Annunciation blocks for Interlocking Signals	In the annunciation blocks for interlocking signal (as e. g. Silo Levels) the interface GrFltLck must be set to 1-Signal in order not to show the summarizing indication in the group display.	
Annunciation blocks, Message configuration	For each annunciation block the 'Event text' (max. 16 characters) and the 'Free text 1' (max. 40 characters) must be configured.	
Annunciation blocks, Event text for status call function	The text under “InSig” Property "Text0" will generate an internal variable in the Tag management of WinCC. This text (max. 16 characters) will be used for the status call function. Must be equal to Event Text in the Message System.	
Programming order Runtime sequence	Check (especially after updates) if OB_START and OB_END is at the correct position. Cemat blocks must be called in OB1. Controllers, Timers and other PCS7 blocks using SAMPLE_T must be called in a time interrupt OB. Check with the tool "CEMAT CHECK TOOL.XLS"	

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Item	Remark	Status
Stop delay for the drives	"Previous drive stopped" included in “StopAut” This makes the configuration of the stop delay easier. The operator only has to configure the delay between one and the next drive.	
Interlock blocks	In general the Interlock blocks can be used with any interface if the Cemat blocks. However the most useful application is together with Interlocking conditions (e. g. IntStaE, IntStart, IntOpE, IntOper, IntProtA and IntProtG).	
Chanel driver	The driver blocks are necessary in Cemat for all structured Intputs but not for MCC Signals or Field switch signals. It has to be considered that the driver wizard creates a lot of blocks (expecially when using ET200S) which cost addigional resources (PBK).	
CPU_RT	In order to disable Load Shedding, connect "0" to parameter MAX_RTRG	
Messages enabled	In case of loss of control power of e.g. Profibus fault we do not want to give alarms for the effected drives. Therefore the Messages enabled Interface MsgEn, must be connected with a signal "Control Power ok". 0-Signal at “MsgEn”” will freeze the alarm generation for the Cemat blocks.	
Cycle time	Check the actual Cycle time	

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With the Excel tool "CEMAT CHECK TOOL.XLS" you can check your Group links and your runtime sequence. E. g. you call a drive block before his related C_MUX or you call a drive block after his related C_GROUP block. The Excel tool will detect this engineering fault and show this kind of engineering faults in a list. Additionally you can check the settings in the hardware configuration of the CPU (e. g. the Clock Memory Byte = MB0, etc.). As option you can check some important interconnections of the Cemat blocks (e. g. is something connected to the annunciation release or not?). "Excel 2003" is limited to 65535 rows. If there are many objects in your project, it could be that the Excel macro stops by a fault because of this limit. In this case we recommend to use "Excel 2010". Store the XLS file as XLSM file. **Don't** run the file in the "compatibility mode". In the "compatibility mode" there is still the limit of 65535 rows!

Carry out the following Steps for each AS:

1. In the Process Object view, select the complete AS and actualize the data with F5. After this export the data as follows:

   Carry out the function *Process Objects → Export All IOs*…. As file name choose e. g. AS1_PS.csv.



Caution: If you carry out only the function *Process Objects → Export IOs*… then it could be, that the diagnostic function is executed wrong! E.g if you have a project and some parameters GR_LINK1 to GR_LINK5, MUX_LINK, MUX_IN and G_LINK are not defined as parameters for the Process Object View and you can not see them in the Process Object View. Or, e. g. sometimes PCS7 exports the parameters of a block not in a sequence. In this case you have double objects in your list.

   Choose the view "Blocks" in the Process Object View. Carry out the function *Process Objects → **Export Current View***… As file name choose e. g. AS1_C_csv.
   Do not choose the function *Process Objects → Export Blocks*…Otherwise you do not get the instance DB numbers!

2. Open the CFC editor by opening any chart.
3. Open with *Options → Chart Reference Data* the reference data of your AS. Choose the view "Run Sequence". Carry out the function *Reference Data → Create Export File...* Save the export in a CSV file e. g. AS1_SEQUENCE.CSV.
4. Open the hardware configuration of your CPU → „Station -> Export“ and choose in the export menu the option ""Export default values". Save the export in a CFG file e. g. AS1.CFG.
5. For the next step you need the Excel tool "CEMAT CHECK TOOL.XLS" which you find in the directory D:\Cemat_CS\Tools. Copy the Excel tool into the same directory with the exported files AS1_PS.csv, AS1_C_csv, AS1_SEQUENCE.CSV, AS1.CFG.
   Open the file "CEMAT CHECK TOOL.XLS" and enter under "Presettings" the file names.
   Enter also the OB name for Cemat (e. g. OB1) and enter also the used list separator (e. g. ";").
   If the OB100 (AS_RESTART), the OB1 (MAIN_TASK) and the OB35 (100MS_TASK) do not have the symbol name from the S7 library ILS_CEM, then enter the symbol names in the cells "G8" to "G18".
   Select as Cemat Project Standard "001 Minerals & Cemat" and start the macro via the button " Check Cemat Project Settings". Wait until the macro is finished and in the status bar of Excel again is displayed "Ready".

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6. Open the sheet "General Faults". There you will find a list of common fault. Please check each individual case!
7. Fault list "General Faults":

In the hardware configuration of the CPU is as startup after Power On not the Warm restart selected!
In the hardware configuration of the CPU is the Clock Memory not switched on!
In the hardware configuration of the CPU is the Clock Memory Byte not byte 0!
In the hardware configuration of the CPU is as clock synchronization type not As slave selected!
In the hardware configuration of the CP443 is the flag Forward time of day not selected!
The Cemat System Chart is not in a hierarchy folder!
The Cemat System Chart name does not start with SYSPLC!
The Cemat System Chart name has not 8 characters!
The Cemat System Chart number is not within the range of 1 to 50!
Some of the Cemat System Chart blocks are not in the Cemat System Chart Hierarchy
There is more than one Cemat System chart
The system block xxxxx has a wrong name!
The system block xxxxx is called more than once!
The system block xxxxx is called in the wrong OB!
The system chart is not complete. The block xxxxx is not called in the system chart!
The runtime sequence in the system chart is wrong. The block xxxxx is called after the block yyyyy!
Fault in the runtime sequence. The instance chart\block is called before the Cemat system chart (Runtime Group OB1_START)!
Fault in the runtime sequence. The instance chart\block is called after the Cemat system chart (Runtime Group OB1_END)!

8. Open the sheets "Blocks", "C_MUX", "C_ROUTE" and "C_GROUP". In these sheets you will find all Cemat blocks with group / route links, all C_MUX blocks, all C_ROUTE blocks and all C_GROUP blocks. The lines with a block call and a problem are marked red. The lines with blocks and a missing interconnection (warning number 41 to 57), e. g. a missing annuncation release, are marked yellow. In the column "Fault" you will find a fault number. Please check each individual case!
   Regarding the interconnection check we recommend to select only one interconnection type (e. g. only the Annunciation Release MsgEn) and start the macro. Check the sheet "Blocks" and column "fault". Afterwards select another interconnection type (e. g. ManModOn manual mode link or LocModOn local mode link) and start the macro again. Check again the sheet "Blocks".
9. The macro creates also a sheet of each route and group instance. In these sheets you will find a list of all related Cemat block instances. This list should be later displayed in the WinCC runtime if you choose in the group or route faceplate the function "Objects".

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10. Fault list column "Fault":

fault 1	wrong MUX_IN interconnection
fault 2	wrong GR_LINK1 interconnection
fault 3	wrong GR_LINK2 interconnection
fault 4	wrong GR_LINK3 interconnection
fault 5	wrong GR_LINK4 interconnection
fault 6	wrong GR_LINK5 interconnection
fault 7	wrong O_LINK interconnection
fault 8	O_LINK and GR_LINK interconnection
fault 9	wrong OB
fault 10	C_MUX block is called after Cemat block
fault 11	C_ROUTE block is called before Cemat block
fault 12	C_GROUP block is called before Cemat block
fault 13	C_MUX call up sequence is wrong for cascaded C_MUX
fault 14	C_GROUP block is called before C_ROUTE
fault 15	Multiple use of a C_MUX: the connected Cemat blocks have different GR_LINK1/2 parameters
fault 16	Cemat block is not connected to any C_GROUP
fault 17	C_ROUTE block is not connected to any C_GROUP
fault 18	wrong SSD interconnection (Lafarge)
fault 19	C_SSDB block: SSD Parameter Is Not Connected (Lafarge)
fault 20	C_SSDB block is called before C_SBD or previous C_SSDB (Lafarge)
fault 21	O_LINK drive is not connected to C_SEND_G
fault 22	O_LINK C_PROFB is not connected to a drive
fault 23	"Position switch / KXK0 / LOC_010 / Caima"" more than one possibility is selected
fault 24	"Always Local Start"" and ""Position switch / KXK0 / LOC_010"" is not possible
fault 25	"No stop from local to auto"" and ""Position switch / KXK0 / LOC_010"" is not possible
fault 26	"Local stop active"" and ""Inching"" is not possible
fault 27	"AutModLo forces to Local mode"" needs a ""Position switch"
fault 28	"Inching"" and ""KXK0 / LOC_010 / Caima"" is not possible
fault 29	"Always Auto Start"" and ""Position switch / KXK0 / LOC_010"" is not possible
fault 30	Drive has different settings for local switch
fault 31	No mode released or only ""Out of Service"
fault 32	Parameter ProFB is not or wrong connected
fault 33	C_PROFB: Keep fault status and warning mode is not possible

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fault 34	C_ANNUNC / C_ANNUN8: ""Message activation"" and ""Supervision enable"" by O_LINK is not possible
fault 35	C_ADAPT: wrong interconnection or different objects on fault and warning
fault 36	C_SIMOS: Basis type is not 1 or 2
fault 37	C_SIMOS: I/O address is less than 1
fault 38	C_SEND_G / C_RECV_G: send cyle is to small
fault 39	C_SEND_G / C_RECV_G: watchdog time is to small
fault 40	C_SEND_G / C_RECV_G: S7 connection ID is wrong
warning 41	No Quick Stop link
warning 42	Annunciation Release is not linked
warning 43	No GES / ManModOn link
warning 44	No GLO / LocModOn link
warning 45	No GAU / WAU / AutModOn link (Minerals/Dyckerhoff)
warning 46	No ENLM / GVE link (Holcim/Alsen)
warning 47	No DILM / GVA link (Holcim/Alsen)
warning 48	No GR_STP link (Holcim)
warning 49	OS_Permission modes are not the same like Feature Bit modes
warning 50	OS_Permissions or Feature Bits are linked
warning 51	No fault text on parameter IN_DEL
warning 52	Fault text on parameter InSig is not changed
warning 53	Fault text on parameter OutSig is not changed
warning 54	Unit text on parameter SP_Os is not changed
warning 55	Information text on parameter AV_Perc is not changed
warning 56	Information text on parameter PV is not changed
warning 57	No archive name on parameter PV_Out

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OS Engineering

OS Engineering:

Item	Remark	Status
Simocode block icon	Has a block icon for the SIMOCODE Adapter been generated? (If the block icon is missing, the group display in the overview range will not be updated.) The block icon can be hidden behind the motor symbol as it is only needed for the group display function.	
User rights	User Groups and Users defined?	
LoopInAlarm	The Entry of the Picture name in the User Archive C_INFO is not absolutely necessary. As a default, Cemat uses the Picture from Component List Editor. (The entry in C_INFO can still be used; e. g. if the object is in more than on picture and a specific picture should be opened).	

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Function Test

General Functions:

Item	Remark	Status
Help Functions	Help files can be opened via Cemat Faceplates?	
Diagnosis Pictures	Can, for Modules with Interlock function, the blue dots be seen in the diagnosis window? Can the interlock faceplate be opened?	
Info Dialog	Object Information available? I/O information has been generated with Excel Macro? Can the operator comments be saved for the Objects? Additional button functions used, such as Sound, Manual, Video, Map? Can the additional files be opened?	
Annunciation Release	In case of a power supply failure, only one message must come!	

Message System:

Item	Remark	Status
Alarm line	Are the alarms in the alarm line displayed correctly (for the areas for which the operator has the permission)?	
Alarm line, Loop in Alarm function	Alarm picture is opened using loop-in-alarm button in message line?	
Alarm line, Info function	The faceplate of the object in the alarm line will open?	
Alarm line, Acknowledge	With acknowledge button in the alarm, for the AS which produced the alarm all faults are acknowledged?	
Cemat Alarm list	Selections possible? Selections can be saved?	
Object Alarmwindow	Alarms and Operation annunciation are shown correctly in the Alarm window of the Cemat Objects.	

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Group (Route) Functions:

Item	Remark	Status
Status Call	Status call function shows all existing faults within the group/route? The fault text is shown correctly, also for annunciation blocks and non-Cemat blocks?	
Instance List on - Group - Route - Drive Objects	The instance list shows all objects in the group, route or objects. The status of the object is shown correctly (also for non-cemat blocks)? With double-click on the object the faceplate will open? Sorting correct? → Through a respective call-up order in the runtime-editor the objects automatically appear in a correct sequence and must not be sorted manually).	
Assigned group/route to the Object	Instance list saved? → The function "show groups/routes for the selected object" only works if the Instance list has been saved before.	
Open assigned Gruppe/Weg	Via button "G" in the route faceplate, the group which is connected via GR_LINK1 will be opened.	
Show related Objects	Via button "O" in the route or group faceplate, all related objects in the process picture are marked.	
User Object	Via button "U" the faceplate of a user object can be opened.	

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Object Functions:

Item	Remark	Status
Open assigned group/route	For drives, measures and annunciation modules: via button "G" the faceplate of the group (or route), which is connected via GR_LINK1 will be opened.	
User Object	For drives, measures and annunciation modules: Via button "U" the faceplate of a user object can be opened.	
Display of a measure (current or power) in %	Measuer for motor current (or power) can be displayed in the drive faceplate (C_DRV_1D und C_DRV_2D). Percentage value correct? (High limit = 100%)	
Display of a measure	Display of an additional measure in the drive faceplate (for C_DRV_1D, C_DRV_2D and C_DAMPER). Can the Measure faceplate be opened directly from the drive faceplate? Display of Archive possible? (See naming conventions for Measuring value archives and Archive variables in Engineering Manual Chapter 3).	
SIMOCODE	The faceplate for Simocode Adapter can be called from drive faceplate (C_DRV_1D, C_DRV_2D, C_DAMPER or C_VALVE)? Does the group display also work for SIMOCODE faults (block icon for SIMOCODE adapter block exist)?	
SUBCONTROL	The Subcontrol faceplate can be called from drive faceplate of C_DRV_1D?	
Setpoint input	Setpoint input and display of the actual value directly from faceplate of C_DRV_1D.	

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Project administration

Content

Project administration **1**

Distributed Engineering....2
Saving the PCS 7 project....2
Read back process values....2
Archiving the project....2
PCS7 Servicing and diagnostics functions....3

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N:\Cemat\DOKU\V80\English\Engineering\001_Minerals\11_Project_Administration_009.doc

Distributed Engineering

A PCS 7 project can be edited by more than one user. Since PCS7 V7 it is even possible that more than one user can make modifications in the same S7-Program (z. B. in order to make modifications in different charts). However, some steps like the compilation of the AS or the OS can not be carried out simultaniously by more than one user. In this case the system blocks the function.
Nevertheless, working with more than one user in the same AS requires a cirtain discipline.

The WinCC Projects can only be opened on one station at a time.

If the situation demands that a project is created at different times or at different locations, you can break down a master project (Multiproject) into subsections (partial projects). You can, for example, assign a station or a program to each person involved. The procedure is analogous for distributing work on several operator stations.

See PCS 7 - Configuration Manual Engineering Station, Chapter 5, Basic Concepts of Engineering.

Saving the PCS 7 project

Read back process values

Process values can be changed during operation through HMI. In this case the values are saved in the AS but not in the Offline CFC. As long as you only download for changed, the actual process values are not overwritten. But in case you have to carry out a complete download for any reason, the offline data will be loaded into the AS.

For this reason it is important to read back the process parameters regularly – and especially before you take a backup of project.

For each AS open a CFC and carry out the function Chart → Read back…
You have to read back "All parameters".

Archiving the project

Archiving of the Multiproject must be carried out on the Engineering Station via function "Archive…" of the SIMATIC Manager. Via this procedure the Multiproject is copressed with the Archiving program "PKZip", "WinZip" or "Arj", selected in the SIMATIC Manager.



Never save the Multiproject directly under Windows. Always use Archive function of the SIMATIC Manager!

All WinCC Projects must be closed before archiving. Make sure that the complete Multiproject with all partial projects and libraries is archived. The easiest way to insure this is to open the Multiproject and to select the upper most folder (the Multiproject itself) before selecting the Archive function.



Do not only save the Archive file on the Engineering Station. Copy the file additionally to a different location. Add the date (and time) to the file name and for security reason, keep the last few archives.

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PCS7 Servicing and diagnostics functions

In the PCS7 – Configuration Manual Engineering system you find further information regarding Servicing and diagnostics with PCS7 V8.

We especially refer to chapter 13.5 Archiving/Versioning and Documenting and to the add-on package "Version Trail" which offers the following options:

- You can archive objects (such as libraries, multiprojects and single projects) at a time of your choice. The saved objects is assigned versioning when it is entered into the version archive. The versioning is the unique ID for this object
- Retrieve and re-use versioned project data
- Automatic archiving
- Automatic readback
- Comparison of an archived version with an existing project or with a second arcived version. You start the Version Cross Manager (VXM) to perform the comparison.

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Graphic Templates

Content

Graphic Templates **1**

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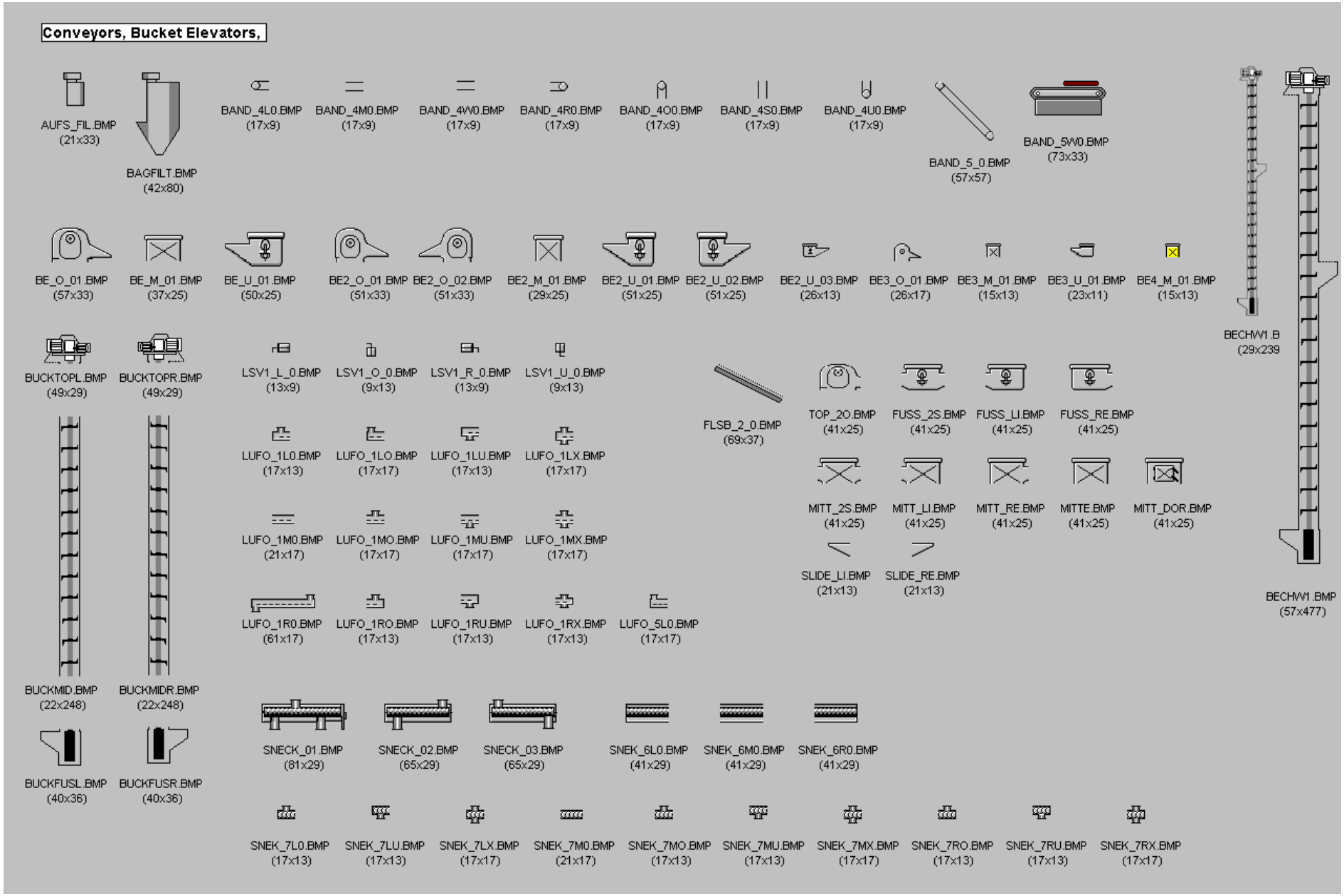
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With the Installation of Cemat V8.0 file Bitmaps.zip is copied to D:\CEMAT_CS\Bitmaps. This file contains a collection of bitmap samples from former projects, which you can your for the Generation of your process pictures.

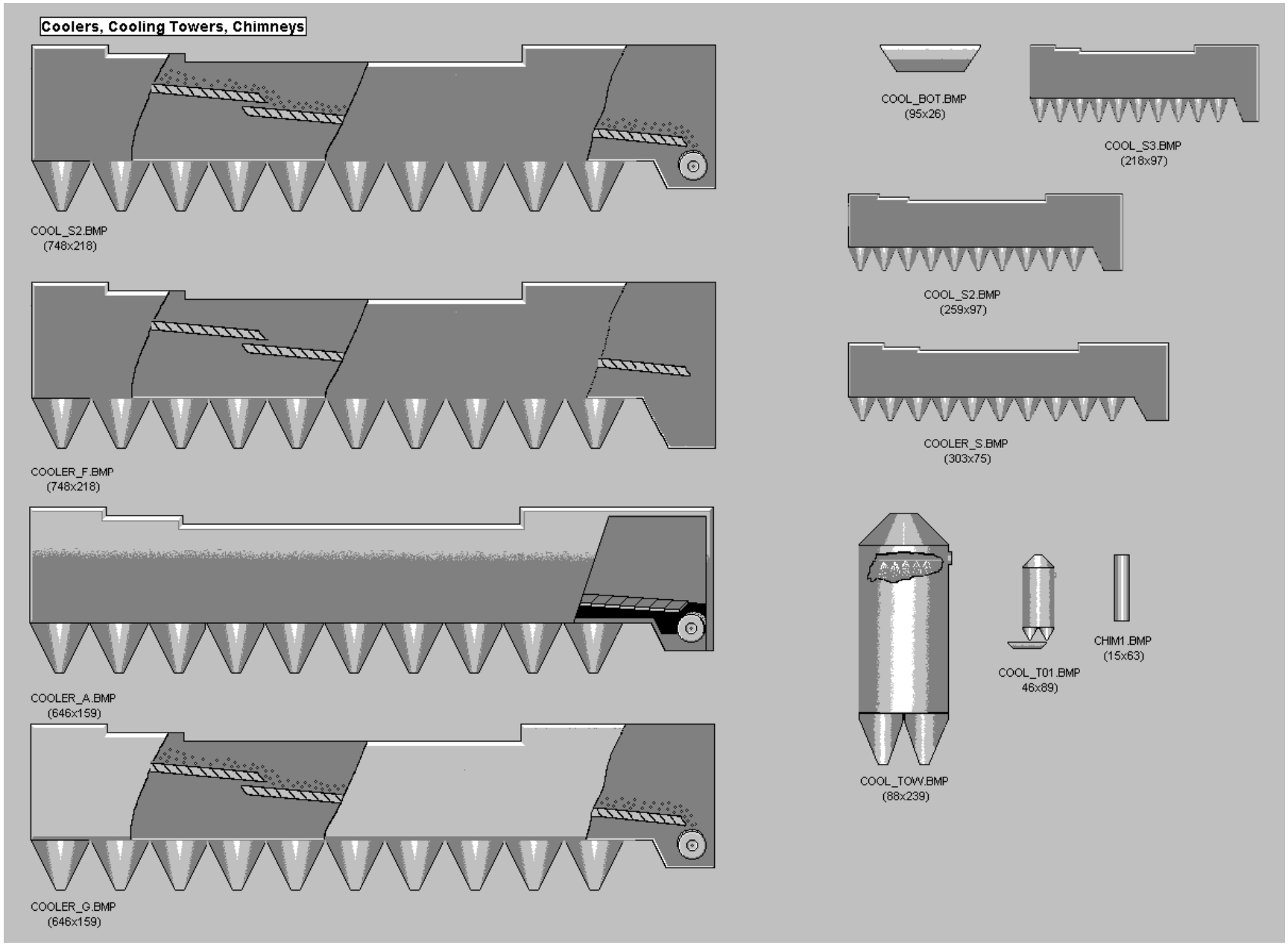
All Bitmaps which are used in the Cemat block icons and Faceplates are already copied into directory D:\CEMAT_CS\WinCC\GraCS. However from Cemat V8.0 only the symbols which are used in the template picture C_@PCS7Typicals_CemV8_001.PDL are copied to this directory.

On the following pages you find the illustration of frequently used bitmap samples from directory D:\CEMAT_CS\Bitmaps.

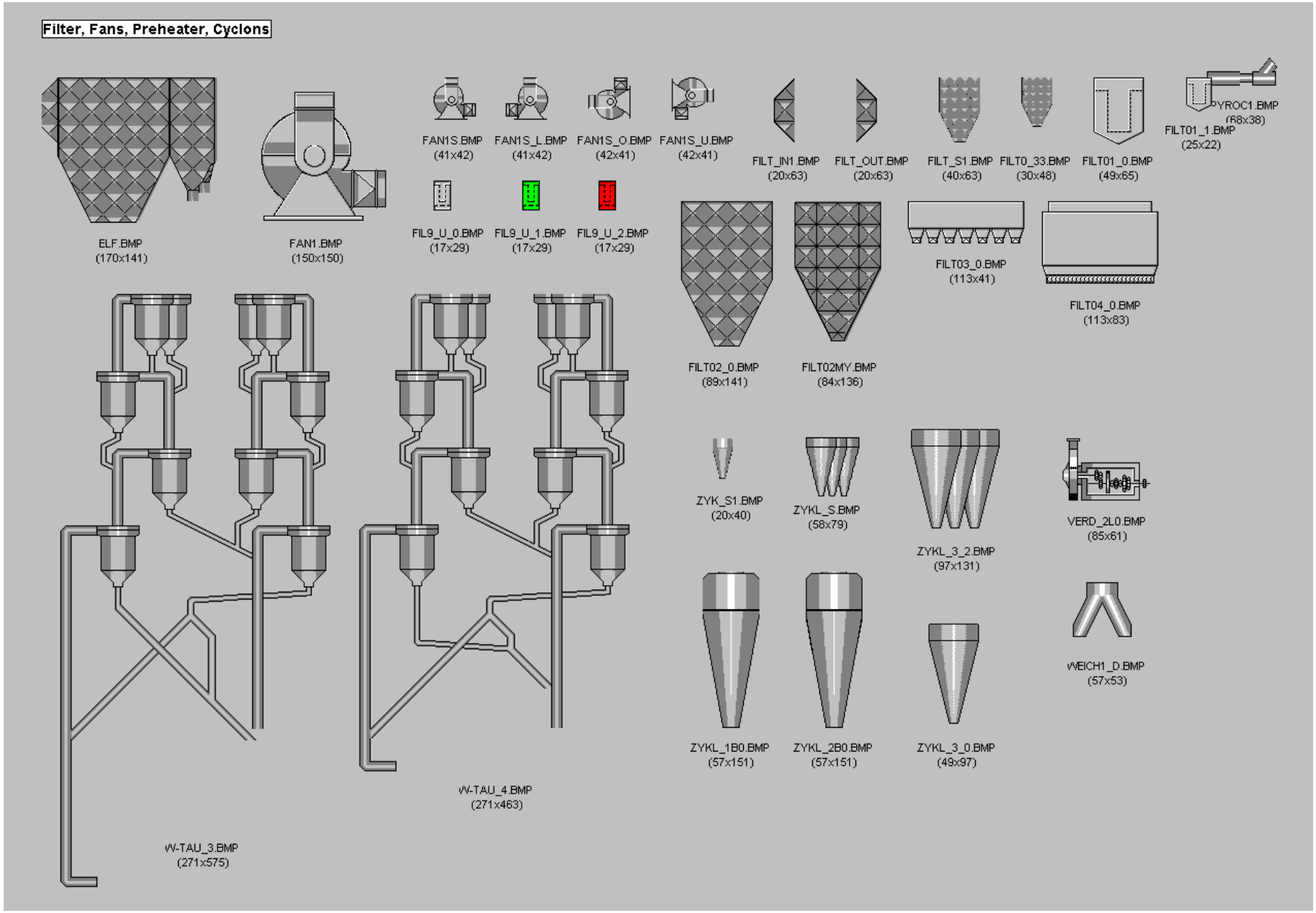
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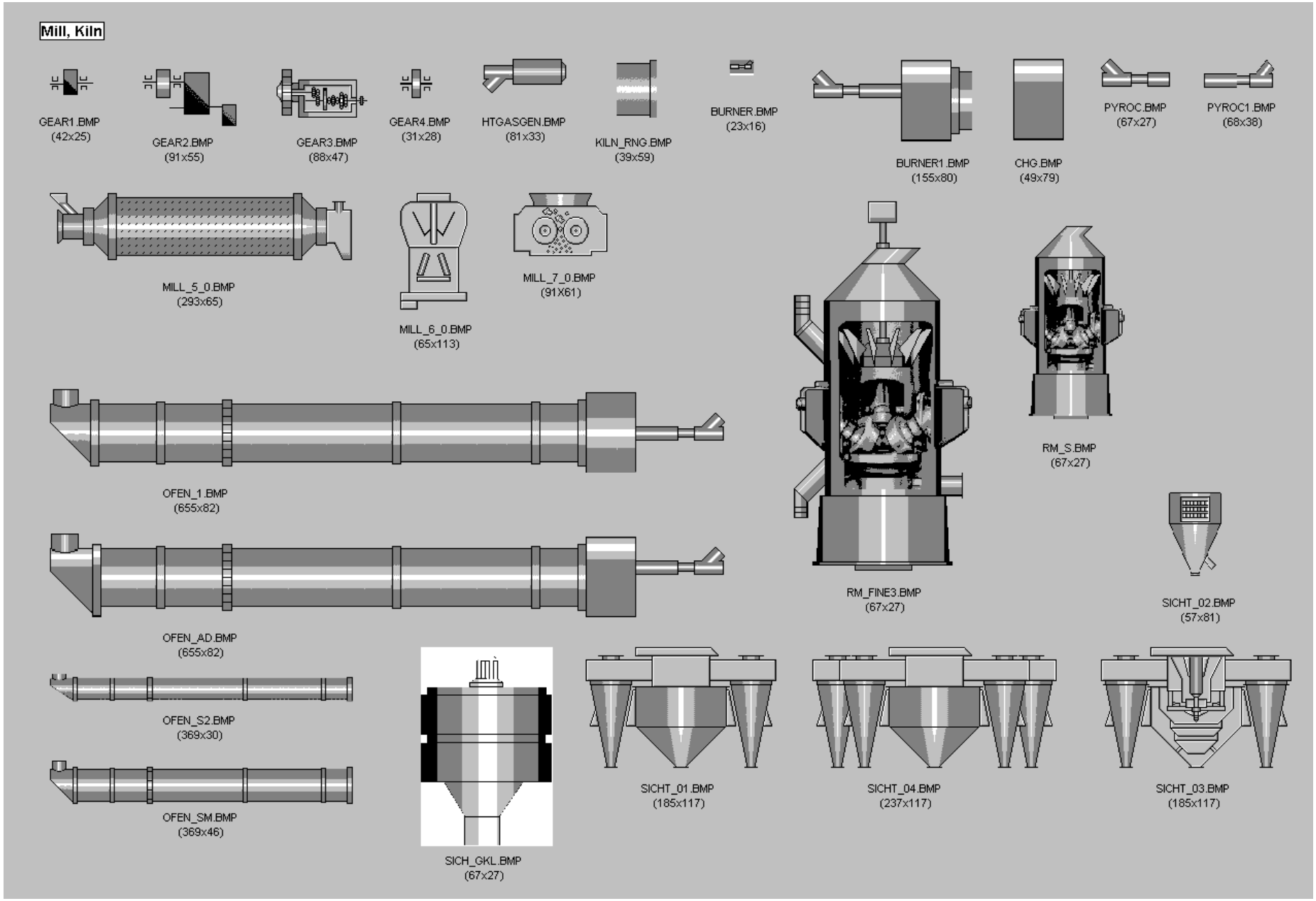
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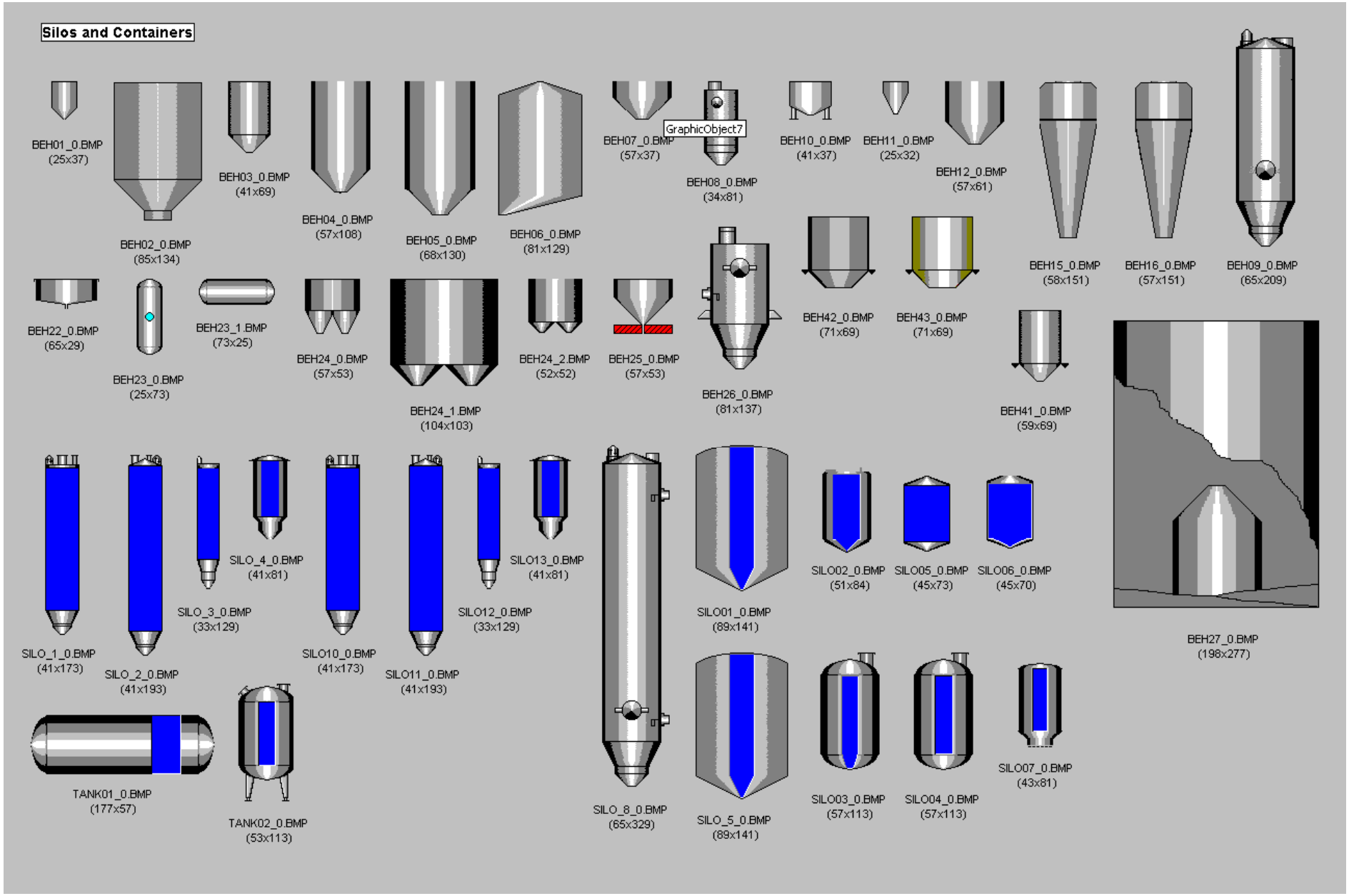
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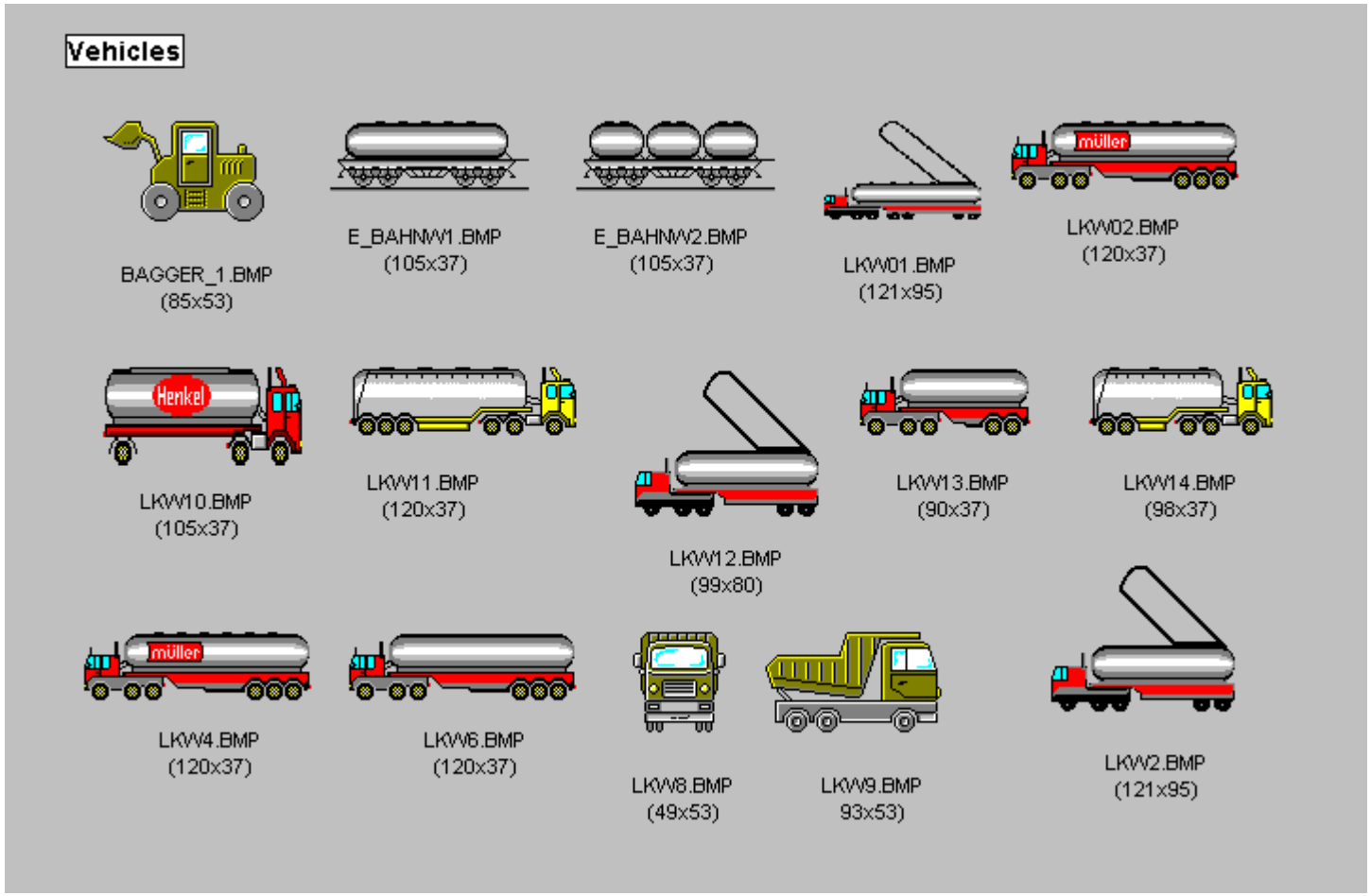
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Tips&Tricks

Table of Contents

Tips&Tricks 1

Notes and Tips for the Use of WinCC / PCS7 V8.0 2
Time synchronization 2
CEMAT Functions 3
CEMAT Message System 3
Engineering of the Messages in CFC 4
Message System 4
Process Value Archive 5
Detect and store the maximum runtime of the Cyclic Interrupt OBs 6
Run CEMAT blocks in a cyclic interrupt OB 9

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N:\Cemat\DOKU\V80\English\Engineering\001_Minerals\14_Tips_Tricks_009.doc

Notes and Tips for the Use of WinCC / PCS7 V8.0

The following notes and tips for the use of WinCC/PCS7 V8.0 do not directly refer to CEMAT. This is just a collection of information, which may be useful for engineering and/or commissioning.

Further Information can be found in the PCS7 V8.0 Manuals
- PCS7 Readme
- PCS7 PC Configuration and Authorization
and in the FAQ.

Time synchronization

A time synchronization of the OS Servers and the connected AS components is necessary for a correct annunciation processing (archiving, display, redundancy balancing).

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CEMAT Functions

CEMAT Message System

Remember Filter options

The CEMAT Message System provides multiple filter options. Closing the CEMAT Message Window stores the actual selected filter options and after a picture change (when opening the message window again) the previously defined settings are available.

If the filter settings inthe CEMAT Message System shall not be remembered, this can be parameterized accordingly through a modification in the configuration file D:\CEMAT_CS\Config\C_Messages.cfg under `[MsgInit]`.

With Parameter `MsgReset = 1` the settings are not stored any more and when the CEMAT Message System is opened no filter is active.

```
[MsgInit]
;0 = Save actual filter settings
;1 = Reset filter settings
MsgReset=0
```

Changing Sorting Order

The sorting order in the CEMAT Message System can be changed in the configuration file D:\CEMAT_CS\Config\C_Messages.cfg. One can decide whether one wants to see the oldest message above or below in the list.

With Parameter `MsgSort=1` the oldest message is shown at the bottom.

```
[MsgInit]
;0 = Sortorder up -> default (oldest message at the top)
;1 = Sortorder down (oldest message at the bottom)
MsgSort=0
```

Display period

In the CEMAT Message System as standard the annunciations of the last 24 hours are displayed. If this time is too short the value can be changed in the configuration file D:\CEMAT_CS\Config\C_Messages.cfg under `[MsgProperty]`.

The default value `MinusSec=86400` corresponds to 86400 seconds = 24 hours.

```
[MsgProperty]
;MinusSec Valud is subtracted from actual date and time
;e. g.: 86400 = 1 day; 28800 = 8 hours; 3600 = 1 hour
MinusSec=86400
```

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Engineering of the Messages in CFC

The Message class “Operating Message” is not available when in the column “with acknowledgement” the box is selected.

For example:

When your project has been migrated to version 6 please check all messages of CEMAT Groups in the CFC. There is a new message “Quick Stop”. Deselect in the column “With acknowledgement” all boxes.

After that in CFC, select Options → Block Types. Select FB1010 and press 'New Version'.

After that check the messages of one Group again. The messages must have the message class “Operating Messages – Standard".

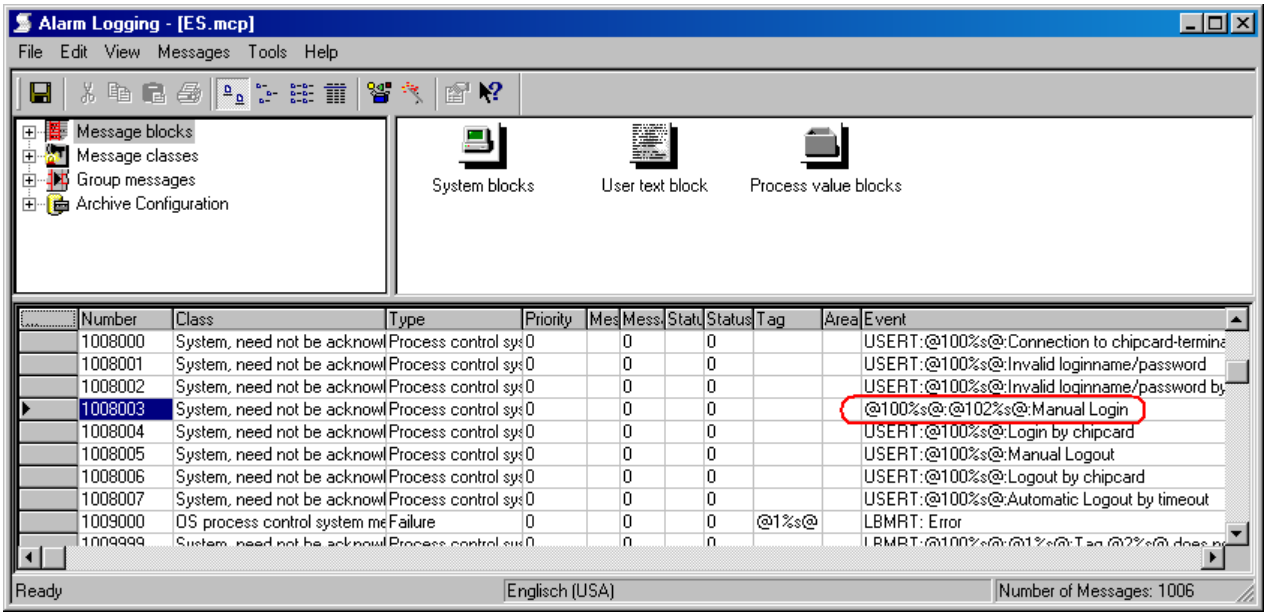
Message System

System Message for Manual Login

The WinCC System Message for Manual Login normally does not contain the User Name. In order to show the user name, the Event text of Message Number 1008003 has to be modified

from **USERT:@100%s@:Manual Login**

to **@100%s@:@102%s@:Manual Login**



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Process Value Archive

If the Archive Curve is called from the Faceplate of C_MEASUR the Archive name is determined as follows:

Prio1: Checking the entry in the internal variable *measure*.PV_Out#Value#Shortcut
Prio2: Entry in Variable @TagArchiveName (if existing)
Prio3: Default setting "ProcessValueArchive"

In some projects it happened that a process value archive with name ProcessValueArchive existed already and after this through OS Compile the system has generated a second archive (e. g. with name SystemArchive. In this case the variable @TagArchiveName has been created which contains the name "SystemArchive".
As a consequence, the old Archives located under ProcessValueArchive are not found any more.

Neither the variable @TagArchiveName nor the SystemArchive itself can be deleted (WinCC refuses this persistently!) this step can not be revoked.

There are two solutions to solve this problem:

- Create all Archive Variables from the ProcessValueArchive in the SystemArchive again and after that delete the old ProcessValueArchive. But in this case all the historic values are lost.
- By forcing the system to ignore the entry in Variable @TagArchiveName and to skip step "Prio2" in the Archive detection.

  For the second option proceed as follows:

  - Open file C_Config.cfg (under D:\Cemat_CS\Config).

  - There you find the lines:

```
[CematSettings]
;Individual Settings for Cemat Objects (0=No, 1=Yes)
;C_MEASUR
SkipTagArchiveName=0
```

  - Change the last line into `SkipTagArchiveName=1`
    (Step "Prio2" will be skipped)

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Detect and store the maximum runtime of the Cyclic Interrupt OBs

With the block C_MAX_CYC = FB1021 you can detect and store the maximum runtime of OB1 and of the Cyclic Interrupt Organization Blocks (OB30 to OB38). C_MAX_CYC must be called in OB1 (MAIN_TASK).

The gross OB1 runtime is determined internally and provided at output OB1_MAXT. This time considers the cycle time stabilization as well as the interrupts through cyclic interrupt OBs.

The net OB1 runtime and the runtime of the Cyclic Interrupt OBs (OB30 to OB38) have to be 'collected' via interconnection from the chart "@CPU_RT" from block "@CPU_RT" = FB128.

Via 1-Signal at parameter "RESET", all maximum runtime values of the OBs are reset. The reset time and the moment of the occurrence of the maximum runtime of each OB are stored.

Chart "@CPU_RT" with the block "@CPU_RT" is created during CFC compiling, if the option "Generate module drivers" is selected.

Input interfaces:

Reset BOOL

Via 1-Signal at parameter "RESET", the present maximum values of the OBs will be reset.

NET01CUR REAL

Actual runtime of OB1. This parameter has to be interconnected with the parameter NET01CUR of FB @CPU_RT.

NET30CUR to NET38CUR REAL

Actual runtime of the Cyclic Interrupt OBxx. This parameter has to be interconnected with the parameter NETxxCUR from FB @CPU_RT.

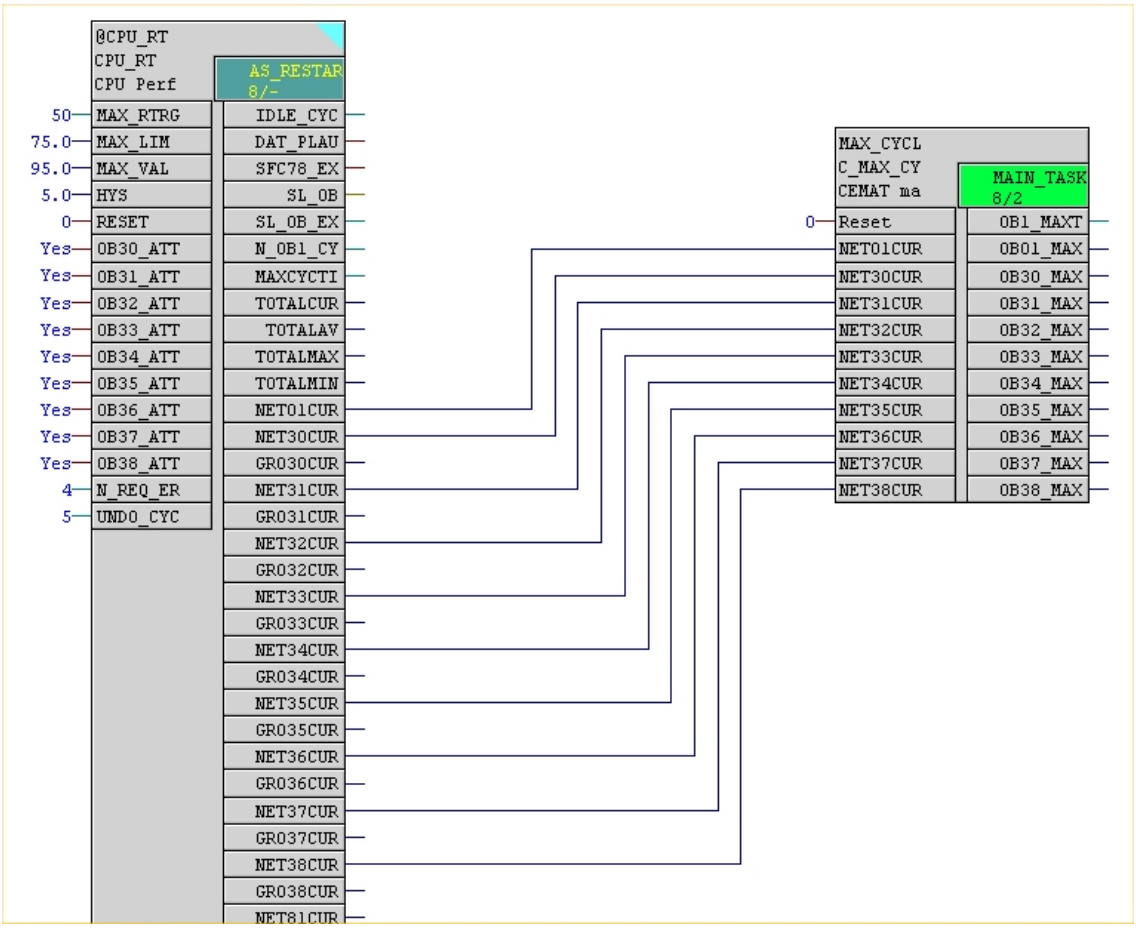
If you like to detect the maximum runtime of OB36 (50 ms), OB37 (20 ms) or OB38 (10 ms), then the OB1 runtime must be shorter than runtime of the cyclic interrupt OB, whose time you want to determine.

If the runtime of OB1 is longer than the runtime of the cyclic interrupt OB, then you have to make sure that the maximum runtime of the cyclic interrupt OB is still available at parameter NETxxCUR of block MAX_CYCL, when this is called in OB1.

In a small user program, you have to compare the actual detected Value from output NETxxCUR of @CPU_RT with the old maximum value and save the new maximum value until it is reset. The new maximum value must be connected to input NETxxCUR of MAX_CYCL. Of course the small user program has to run in the cyclic interrupt OB.

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Connection between @CPU_RT and MAX_CYCL



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Output interfaces:

RES_TIM1	DWORD	Date of reset (year, month, day)
RES_TIM2	DWORD	Time of reset (hour, minute, second, millisecond)
OB1_ACT	INT	Last actual runtime of OB1. The runtime is inclusive the time of the cyclic interrupt OB's, which has interrupted the OB1. The runtime is identified by the SFC 6 (RD_SINFO).
OB1_MAXT	INT	Maximum OB1 runtime since last reset. The runtime is inclusive the time of the cyclic interrupt OB's, which has interrupted the OB1. The runtime is identified by the SFC 6 (RD_SINFO).
MAXT_T1	DWORD	Time of OB1_MAXT (year, month, day)
MAXT_T2	DWORD	Time of OB1_MAXT (hour, minute, second, millisecond)
OB01_MAX	REAL	Maximum OB1 runtime since last reset. The actual runtime of the OB1 has to be connected to parameter NET01CUR.
MAX01_T1	DWORD	Time of OB01_MAX (year, month, day)
MAX01_T2	DWORD	Time of OB01_MAX (hour, minute, second, millisecond).
OB30_MAX	REAL	Maximum OB30 runtime since last reset. The actual runtime of the OB30 has to be connected to parameter NET30CUR.
MAX30_T1	DWORD	Time of OB30_MAX (year, month, day)
MAX30_T2	DWORD	Time of OB30_MAX (hour, minute, second, millisecond).
OB31_MAX	REAL	Maximum OB31 runtime since last reset. The actual runtime of the OB31 has to be connected to parameter NET31CUR.
MAX31_T1	DWORD	Time of OB31_MAX (year, month, day)
MAX31_T2	DWORD	Time of OB31_MAX (hour, minute, second, millisecond).
OB32_MAX	REAL	Maximum OB32 runtime since last reset. The actual runtime of the OB32 has to be connected to parameter NET32CUR.
MAX32_T1	DWORD	Time of OB32_MAX (year, month, day)
MAX32_T2	DWORD	Time of OB32_MAX (hour, minute, second, millisecond).
OB33_MAX	REAL	Maximum OB33 runtime since last reset. The actual runtime of the OB33 has to be connected to parameter NET33CUR.
MAX33_T1	DWORD	Time of OB33_MAX (year, month, day)
MAX33_T2	DWORD	Time of OB33_MAX (hour, minute, second, millisecond).
OB34_MAX	REAL	Maximum OB34 runtime since last reset. The actual runtime of the OB34 has to be connected to parameter NET34CUR.
MAX34_T1	DWORD	Time of OB34_MAX (year, month, day)
MAX34_T2	DWORD	Time of OB34_MAX (hour, minute, second, millisecond).
OB35_MAX	REAL	Maximum OB35 runtime since last reset. The actual runtime of the OB35 has to be connected to parameter NET35CUR.
MAX35_T1	DWORD	Time of OB35_MAX (year, month, day)
MAX35_T2	DWORD	Time of OB35_MAX (hour, minute, second, millisecond).
OB36_MAX	REAL	Maximum OB36 runtime since last reset. The actual runtime of the OB36 has to be connected to parameter NET36CUR.
MAX36_T1	DWORD	Time of OB36_MAX (year, month, day)
MAX36_T2	DWORD	Time of OB36_MAX (hour, minute, second, millisecond).
OB37_MAX	REAL	Maximum OB37 runtime since last reset. The actual runtime of the OB37 has to be connected to parameter NET37CUR.
MAX37_T1	DWORD	Time of OB37_MAX (year, month, day)
MAX37_T2	DWORD	Time of OB37_MAX (hour, minute, second, millisecond).
OB38_MAX	REAL	Maximum OB38 runtime since last reset. The actual runtime of the OB38 has to be connected to parameter NET38CUR.
MAX38_T1	DWORD	Time of OB38_MAX (year, month, day)
MAX38_T2	DWORD	Time of OB38_MAX (hour, minute, second, millisecond).

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Run CEMAT blocks in a cyclic interrupt OB

One of the programming rules for Cemat blocks is that they have to be called in OB1 = MAIN_TASK, between the two run time groups OB1_START and OB1_END.

This has the following reasons:

- OB1 processes the blocks as fast as possible. The program can "respire", which means if in case of process faults of a lot of operation demand the program needs a little more time for some OB cycles, this does not matter at all.
- Certain functions like "Group status call", "Group instance list", "Show related Objects", "Show objects with Simulations", require the execution if the block within the same cycle.
- Also the acknowledgement of the faults only works if the programming order is followed and if the complete user program is called in the same cycle.

If you still want to call the Cemat Blocks in a cyclic interrupt OB (e.g. 100 ms task or 200 ms task), this only works properly if all Cemat blocks are called in the same cycle.



If you split the call-up of the Cemat blocks into different cyclic interrupt OBs or OB1, then the above mentioned functions are no longer guarantied.



When moving the user program to a cyclic interrupt OB you also have to move some parts from runtime group OB1_START and OB1_END to the beginning and to the end of this cyclic interrupt OB.



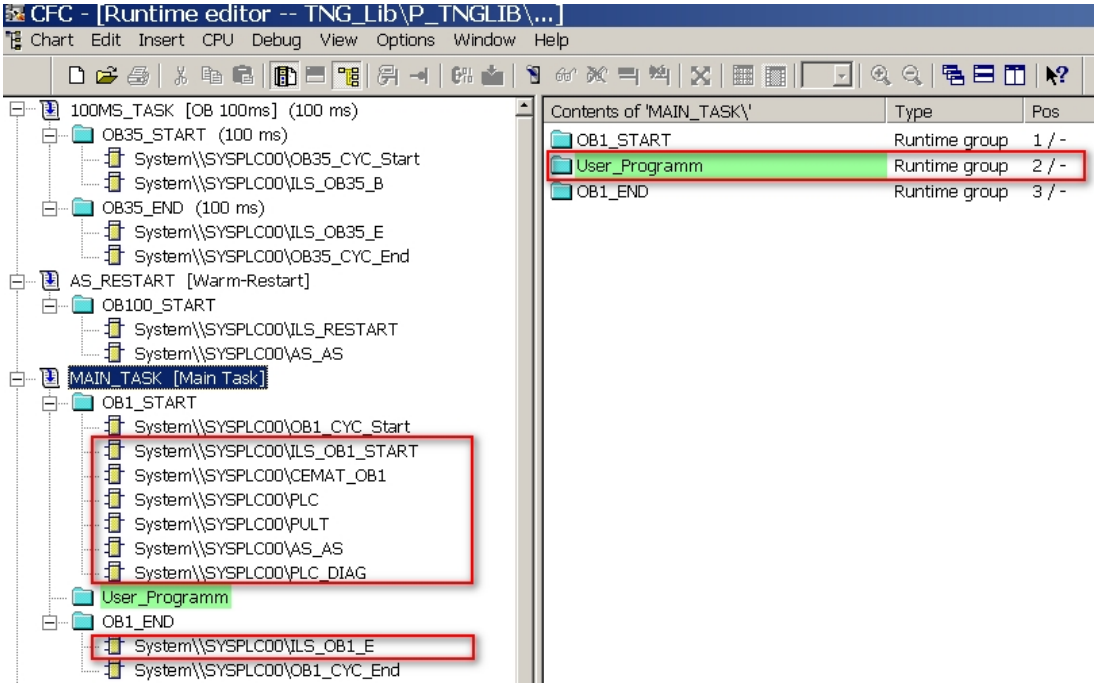
You must make sure that the runtime of the User Program does not exceed the acquisition time of the cyclic interrupt OB, which means you have to insert it into the proper interrupt OB and to actualize the process image accordingly.

We think that it is not required to move the Cemat User program into a cyclic interrupt OB. If you still want to do this, please consider the following pages.

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Runtime sequence if everything remains in OB1:



When moving the program into a cyclic interrupt OB, please proceed as follows:

The red marked program parts under OB1_START and OB1_END (left side) must be moved to the cyclic interrupt OB.

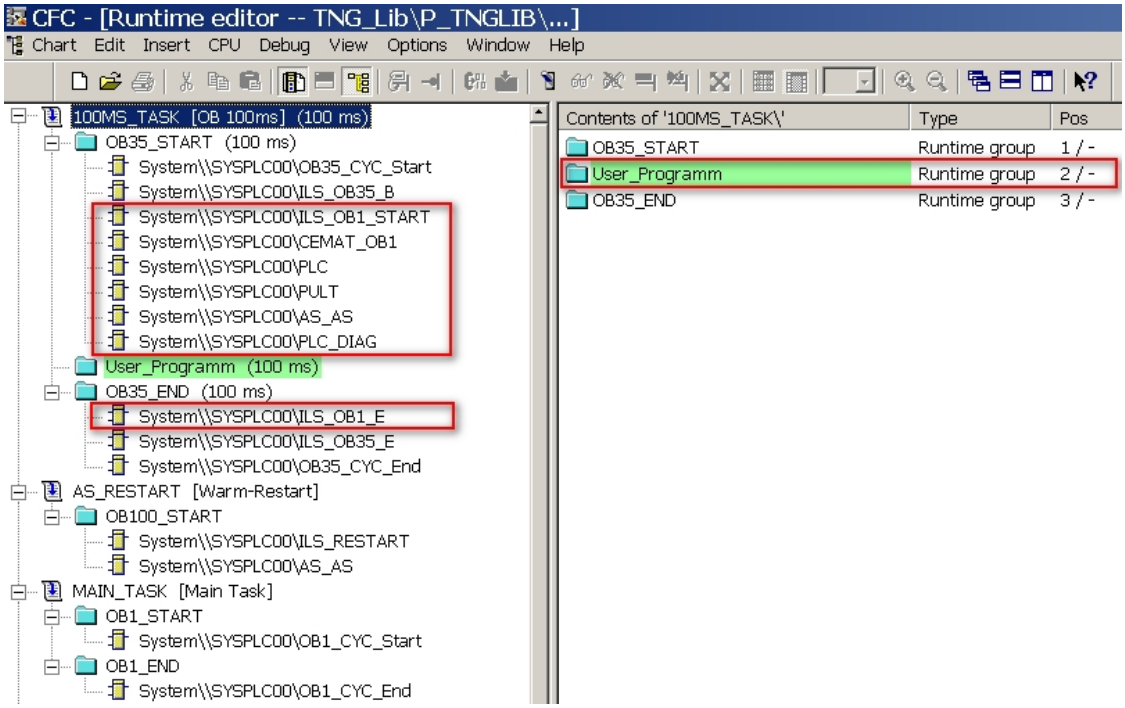
The blocks OB1_CYC_Start and OB1_CYC_End are used for cycle time calculation and must remain in OB1.

The runtime group "User Programm" stands for the runtime groups of the application program which must be moved to the same cyclic interrupt OB (between START and END).

Follow always the Cemat Runtime Sequence:
1. possibly C_MUX blocks
2. Annunciations and Drives
3. Corresponding Routes
4. Corresponding Group

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Runtime sequence after moving to OB35 (100ms):



The red marked program parts have been moved from OB1 into OB35.

The blocks OB1_CYC_Start and OB1_CYC_End are used for cycle time calculation and must remain in OB1.

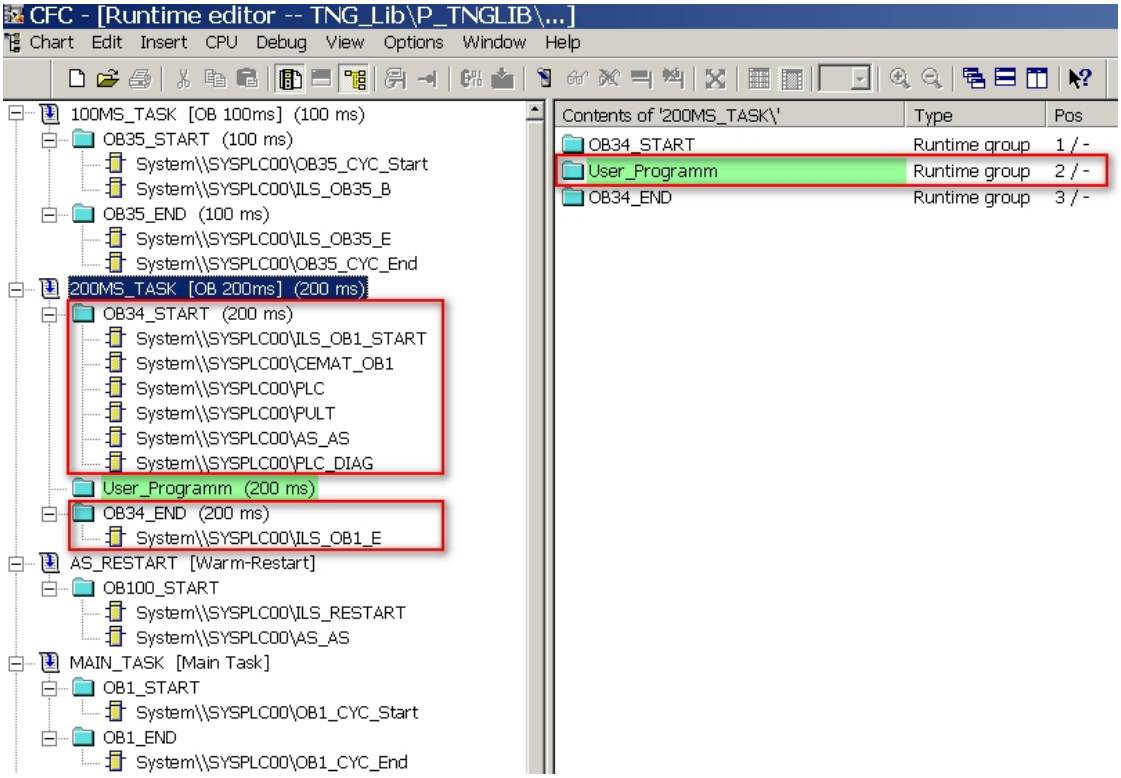
The runtime group "User Programm" stands for the runtime groups of the application program which must now be inserted between OB35_START and OB35_END.

Follow always the Cemat Runtime Sequence:
1. possibly C_MUX blocks
2. Annunciations and Drives
3. Corresponding Routes
4. Corresponding Group

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Runtime sequence after moving to OB34 (200ms):



The red marked program parts have been moved from OB1 into OB34.

The blocks OB1_CYC_Start and OB1_CYC_End are used for cycle time calculation and must remain in OB1.

The runtime group "User Programm" stands for the runtime groups of the application program which must now be inserted between OB34_START and OB34_END.

Follow always the Cemat Runtime Sequence:
1. possibly C_MUX blocks
2. Annunciations and Drives
3. Corresponding Routes
4. Corresponding Group

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Update Information

Contents

Update Information **1**

Update from former Cemat Versions to Cemat V8.0 2

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Update from former Cemat Versions to Cemat V8.0

No former Cemat Version for Project Standard 001 exists, and therefore no update procedure.

Migration from a different Project standard to Project standard 001 is not possible.

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CEMAT WEB

Content

CEMAT WEB **1**

General 2
Installation 2
Engineering 2
Product Information 3
Publish from WinCC to process pictures 3
Restrictions of the CEMAT OS WEB Client 3

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N:\Cemat\DOKU\V80\English\Engineering\001_Minerals\CEMAT WEB V8_009.doc

General

In addition to manual *PCS 7 - OS Web Option* this file contains information about the CEMAT WEB options for 001 Minerals.

Installation

CEMAT WEB for 001 Minerals can be used on the WEB Clients without additional installation.

Engineering

In order to enable opening the interlock faceplates on the CEMAT WEB Clients, you have to add the following tags in the tag management of **all os web servers**.

Open the Tag Management and add the internal variables for CEMAT_WEB:

Add new Group “CEMAT_WEB”

Within this group add the following variables:

C_< COMPUTERNAME >_WEBInfo1 - Text tag 8-bit character set - Computer-local
C_< COMPUTERNAME >_WEBInfo2 - Text tag 8-bit character set - Computer-local
C_< COMPUTERNAME >_WEBInfo3 - Text tag 8-bit character set - Computer-local

Replace < COMPUTERNAME > with the WEB client name, e. g. C_EF34930C_WEBInfo1. (COMPUTERNAME in capital letters)

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Product Information

Publish from WinCC to process pictures

Library - function **CematUserAdmin\C_EnumUsersCallback.fct** may not be published.
Callback functions cannot be published.

Restrictions of the CEMAT OS WEB Client

The following functions are not supported by the CEMAT OS WEB Client:

Close, Help
The close keys and help keys in all Faceplates are locked.

Status
The group state call is not supported.

Objects
The instance list is not supported.

Object Browser
The object list is not supported.

Alarm line info
The Info - button isn't available.

Alarm line LoopInAlarm
The CEMAT-LoopInAlarm – function isn't available.

CEMAT Reporting system
The CEMAT reporting system isn't available.

Maintenance
Some operations in the maintenance picture are disabled.

Print Faceplate
The function *Print Faceplate* is disabled.

Quick View / Quick Trend
The functions *Quick View* and *Quick Trend* of measured values are disabled.

The following functionality is limited:

The individual faceplate positioning is switched off.

Some individual background colors in the faceplates are not available (e.g. operation mode).

Info
The operation in the info picture is limited.

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