SIEMENS

TELEPERM M

PCS 7/TM-OS with SIMATIC BATCH

Technical Description

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with SIMATIC BATCH

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C79000-T8076-C742-08

Safety Notes

This description contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual triangle and are shown as follows according to the level of danger:

Danger
indicates that death, severe personal injury or substantial property damage **will** result if proper precautions are not taken.

Warning
indicates that death, severe personal injury or substantial property damage **can** result if proper precautions are not taken.

Caution
indicates that minor personal injury or property damage can result if proper precautions are not taken.

Note
draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

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Disclaimer of Liability

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

Contents

1 Introduction

Using the PCS 7/TM-OS interface to SIMATIC BATCH requires knowledge of SIMATIC BATCH /1/ and the basic functions /2/, /3/.

This documentation describes the following:

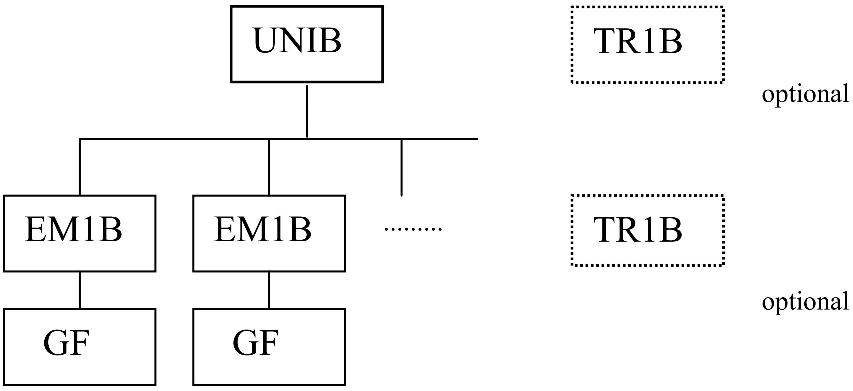
- All the necessary steps in configuration in the SIMATIC MANAGER and in the
- TM Manager
- The AS function blocks EM1B, UNIB, and the optional TR1B

The system software required on the OS is listed in the actual product information of PCS 7/TM-OS.

The system software required on the AS is listed in /2/.

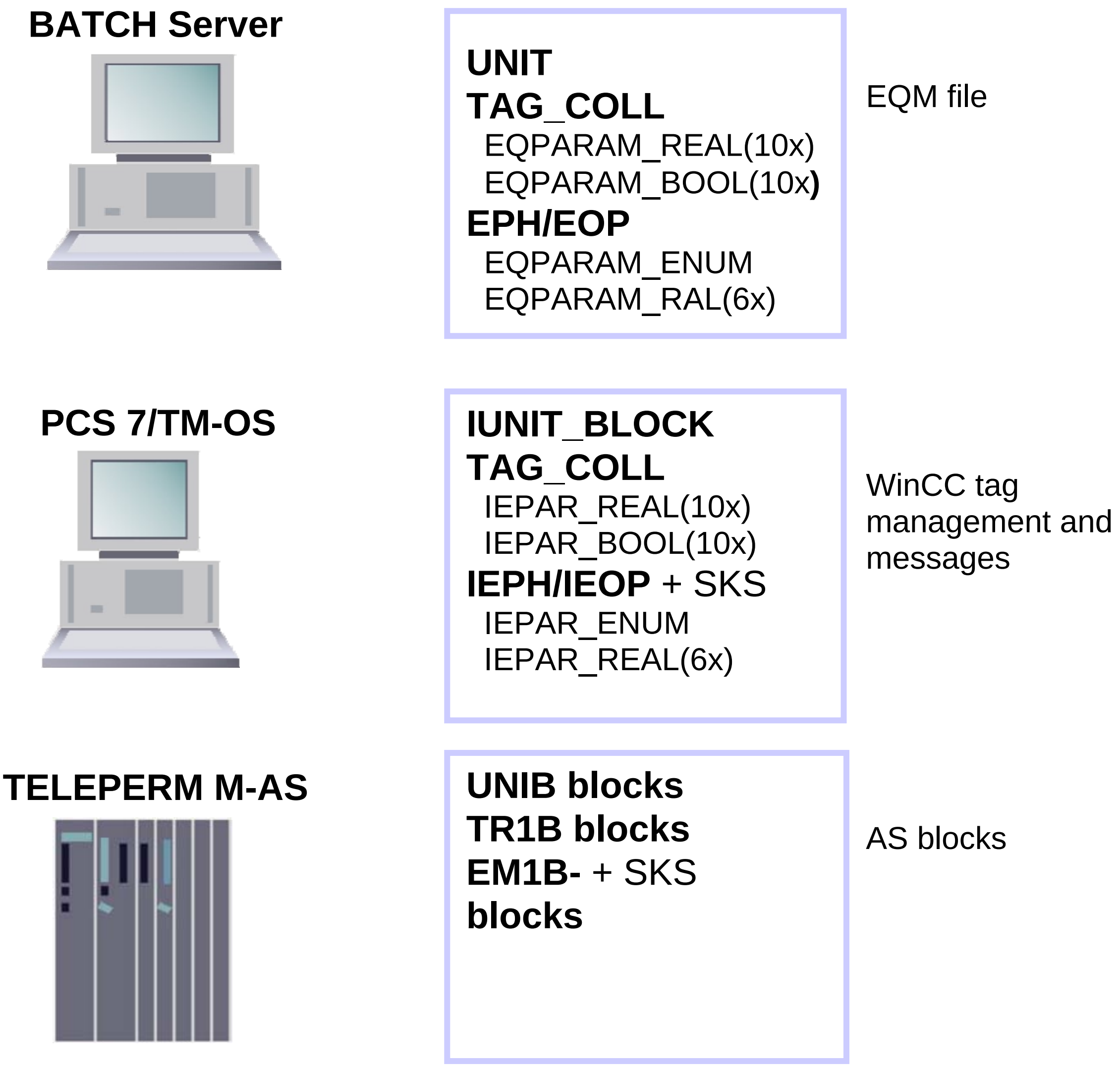
2 General Information

2.1 Block Structure on the AS



The schematic shows the basic structure of the blocks required on the AS for use with SIMATIC BATCH.

2.2 Interfacing BATCH – PCS 7/TM-OS – TELEPERM M-AS



BATCH Server

UNIT
TAG_COLL
EQPARAM_REAL(10x)
EQPARAM_BOOL(10x)
EPH/EOP
EQPARAM_ENUM
EQPARAM_RAL(6x)

EQM file

PCS 7/TM-OS

IUNIT_BLOCK
TAG_COLL
IEPAR_REAL(10x)
IEPAR_BOOL(10x)
IEPH/IEOP + SKS
IEPAR_ENUM
IEPAR_REAL(6x)

WinCC tag management and messages

TELEPERM M-AS

UNIB blocks
TR1B blocks
EM1B- + SKS
blocks

AS blocks

The schematic shows the data exchange between SIMATIC BATCH, WinCC tag management and AS function blocks.

Block instances of SIMATIC BATCH blocks are created in the WinCC tag management for the TM_BATCH interface blocks EM1B, TR1B, and UNIB as shown below:

Function Block on the AS	Block Instance in WinCC	Notes
EM1B	1 x IEPH or IEOP 1 x SKS 1 x IEPAR_ENUM 6 x IEPAR_REAL	The decision IEPH or IEOP is made via the IEOP (3 PB) input of the EM1B block.
TR1B	1 x TAG_COLL 10 x IEPAR_BOOL 10 x IEPAR_REAL	
UNIB	IUNIT_BLOCK	

The block instance names are assigned according to a fixed convention (see Section 4) as can be seen in the following example:

Function Block Name on the AS	Block Instance Name in WinCC	Notes
EM1B, 0210	IEPH or IEOP , 0210 SKS , 0210 IEPAR_ENUM , 0211 IEPAR_REAL , 0212 ... 0217	
TR1B, 0220	TAG_COLL , 0220 IEPAR_REAL , 022B ... 022K IEPAR_BOOL , 0221 ... 022A	
UNIB, 0200	IUNIT_BLOCK , 0200	

3 Steps in Configuration

3.1 Requirements

The configuration of the WinCC tag management is based on the corresponding PROGRAF AS+ files (export files, library files BEL.DAT, ...) /4/.
If the parameters FTYP, ENR1, LOR2...LORD, UPR2...UPRD and ANSW of the EM1B blocks should be used, a corresponding configuration of the AS is necessary.
For more notes concerning the configuration see chapter 4 of this document.

Note:
For configuration the RAM image has to be done in resting state, i.e. no recipe is active. Afterwards in PROGRAF all limit values must be set to the correct values.

3.2 General Procedure

To create the entire WinCC tag management (structure definitions, block instances) and to configure the SIMATIC BATCH messages in WinCC Alarm Logging for use in SIMATIC BATCH, a temporary SIMATIC AS project is created for TELEPERM M applications using the SIMATIC Manager configuration tool. This temporary SIMATIC AS project is used among other things to create the required SIMATIC BATCH block structures used by the TM Manager to create block instances.
On completion of block import by the TM Manager, the temporary SIMATIC AS block instances are removed again as the last activity in configuration step 3 (Section 3.4).

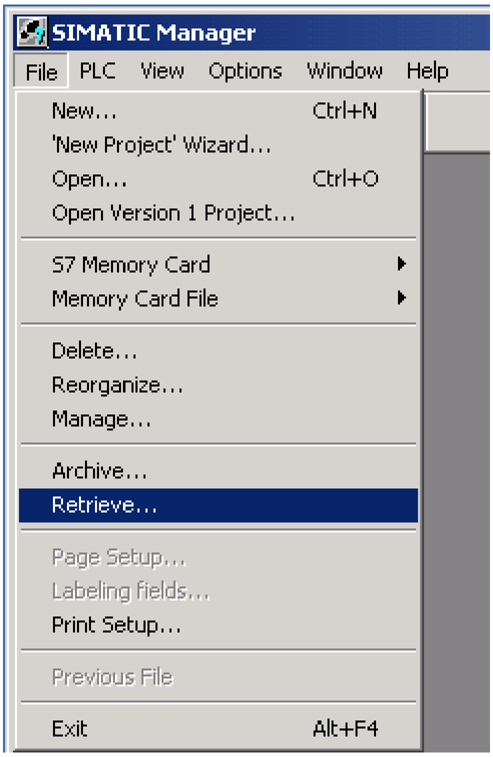
The following configuration steps are documented in the main with screenshots. Pictures illustrating obvious or self-explanatory situations were omitted. Obvious instructions such clicking on the "Next" button have also been left out.
Within the further development of the software involved, there may possibly be differences between the dialogs etc. appearing on your screen and those shown in this description. So it may be necessary to consult other documentations like the online help of SIMATIC BATCH and adapt them.

Note:
For information on configuring the AS function blocks, see Section 4.

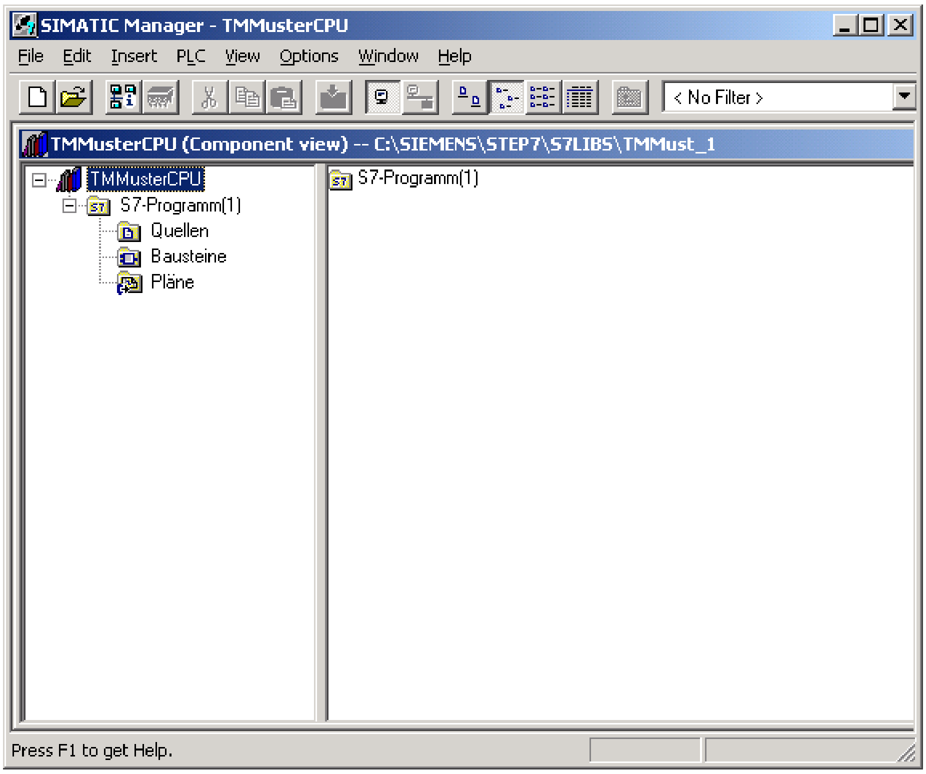
3.3 Configuration Step 1: SIMATIC Manager

- Start the SIMATIC Manager and select **File** > **Retrieve ...** master library TmsbmusterCPU.zip or TmsbmusterPRO.zip from the <...>\Siemens\TM_Werkzeuge\Batch folder and unpack it to the <..>\Siemens\Step7\S7LIBS folder.

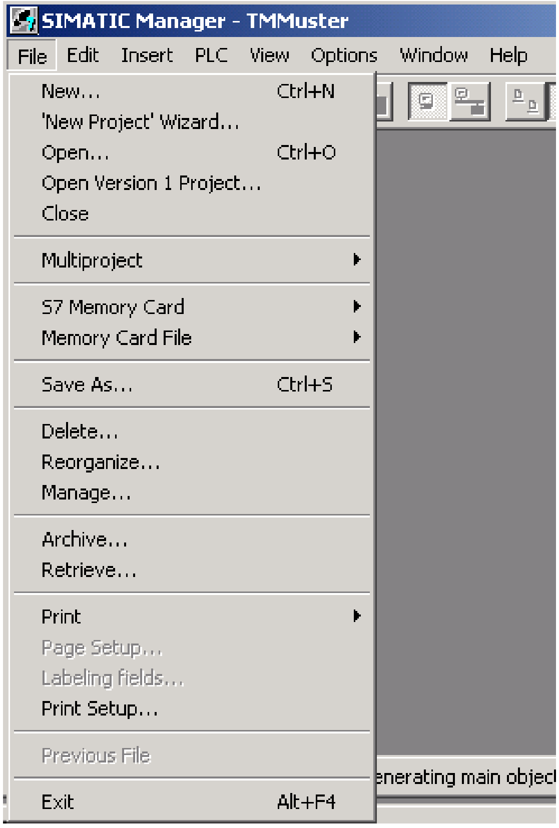
  There are two alternative ways of creating the SIMATIC project that affect the configuration of messages: Unique message numbers either only within a CPU or within a project. Select either TmsbmusterCPU.zip (within a CPU) or TmsbmusterPRO.zip (within the project).



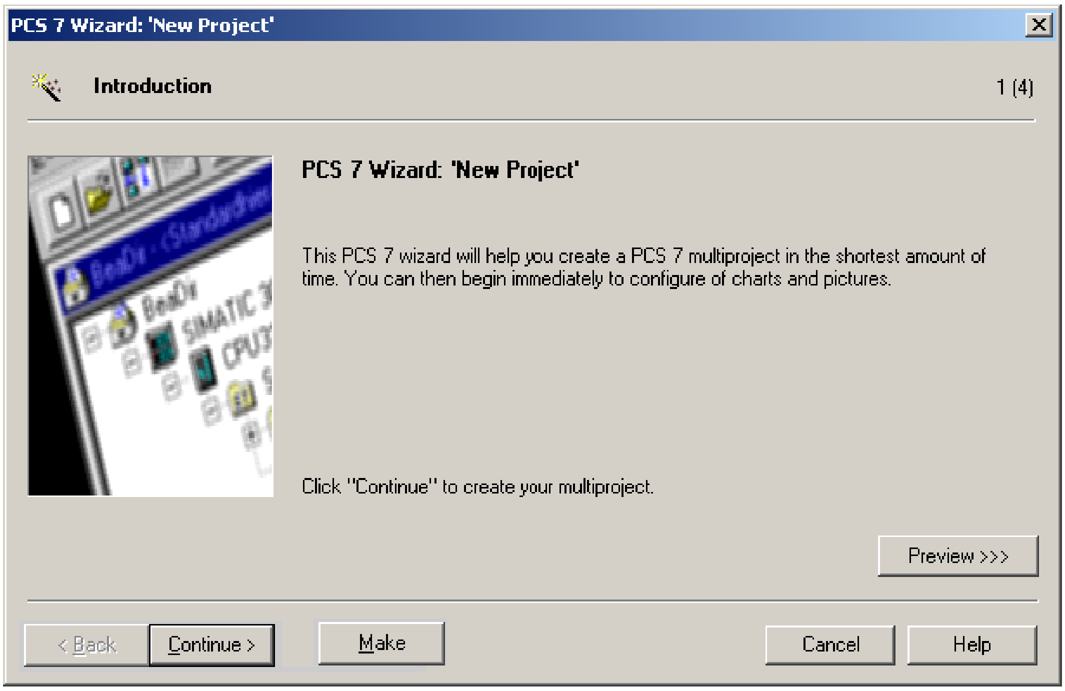
After the file has been unpacked, the sample project is opened:


SIMATIC Manager - TMMusterCPU
File Edit Insert PLC View Options Window Help
< No Filter >
TMMusterCPU (Component view) -- C:\SIEMENS\STEP7\S7LIBS\TMMust_1
TMMusterCPU
S7-Programm(1)
Quellen
Bausteine
Pläne
S7-Programm(1)
Press F1 to get Help.

- Create a new PCS 7 project with **File** > **'New Project' Wizard...** with the options WinCC application and BATCH application:



As the project type, select "Single Project" for example:

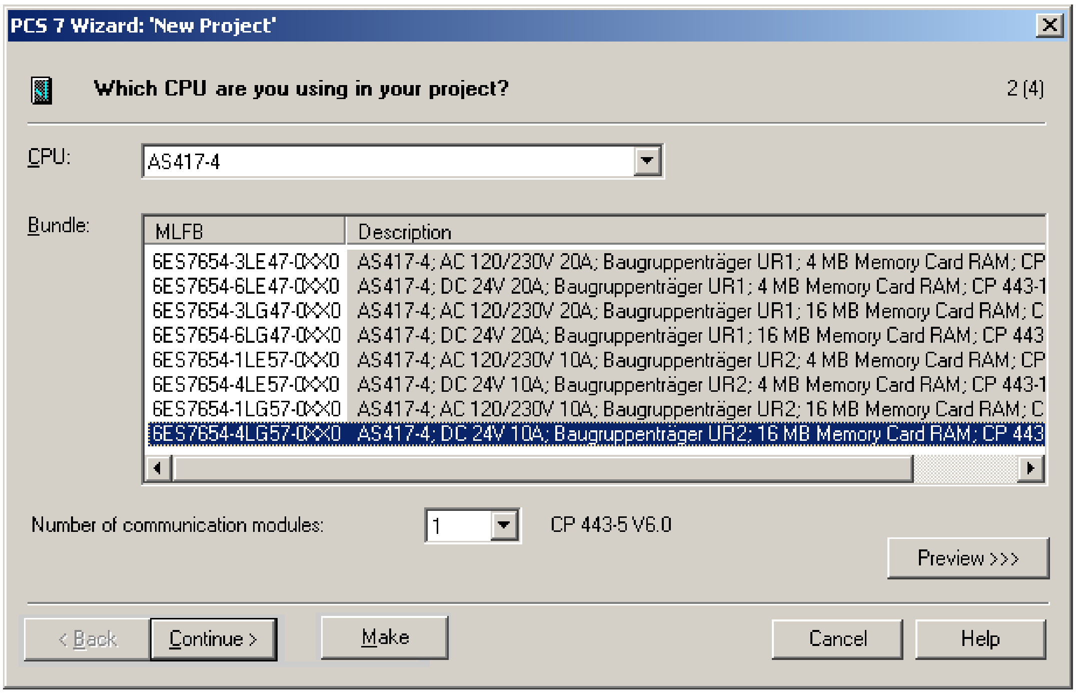


PCS 7 Wizard: 'New Project'

This PCS 7 wizard will help you create a PCS 7 multiproject in the shortest amount of time. You can then begin immediately to configure of charts and pictures.

Click "Continue" to create your multiproject.

For the CPU, please select the CPU 417-4:


PCS 7 Wizard: 'New Project'
Which CPU are you using in your project?
2 (4)
Preview >>>
< Back
Continue >
Make
Cancel
Help

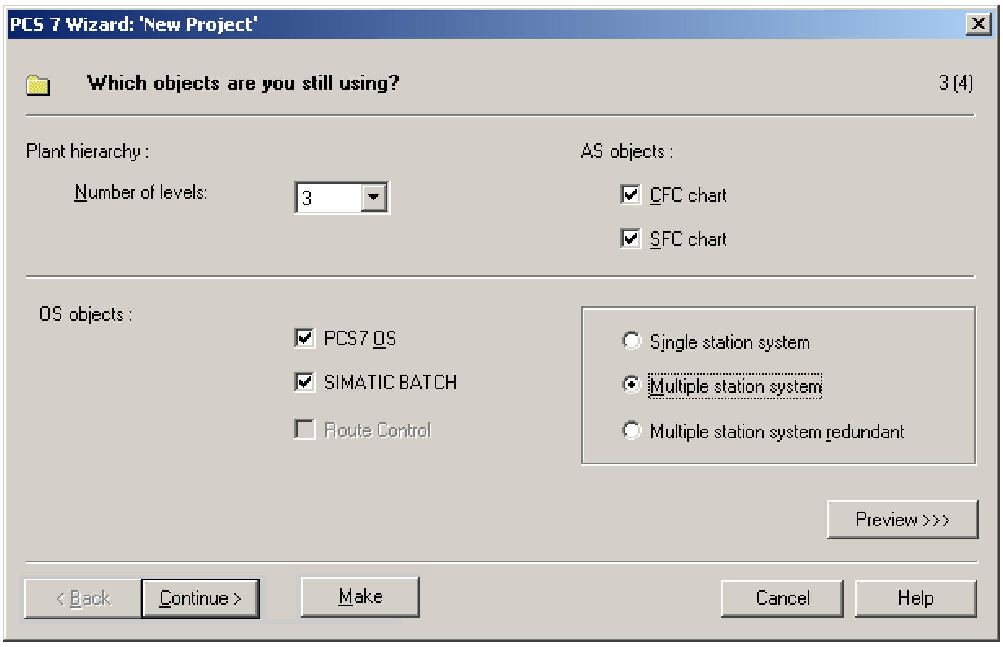
CPU: AS417-4

Bundle:

MLFB	Description
6ES7654-3LE47-0XX0	AS417-4; AC 120/230V 20A; Baugruppenträger UR1; 4 MB Memory Card RAM; CP
6ES7654-6LE47-0XX0	AS417-4; DC 24V 20A; Baugruppenträger UR1; 4 MB Memory Card RAM; CP 443-1
6ES7654-3LG47-0XX0	AS417-4; AC 120/230V 20A; Baugruppenträger UR1; 16 MB Memory Card RAM; C
6ES7654-6LG47-0XX0	AS417-4; DC 24V 20A; Baugruppenträger UR1; 16 MB Memory Card RAM; CP 443
6ES7654-1LE57-0XX0	AS417-4; AC 120/230V 10A; Baugruppenträger UR2; 4 MB Memory Card RAM; CP
6ES7654-4LE57-0XX0	AS417-4; DC 24V 10A; Baugruppenträger UR2; 4 MB Memory Card RAM; CP 443-1
6ES7654-1LG57-0XX0	AS417-4; AC 120/230V 10A; Baugruppenträger UR2; 16 MB Memory Card RAM; C
6ES7654-4LG57-0XX0	AS417-4; DC 24V 10A; Baugruppenträger UR2; 16 MB Memory Card RAM; CP 443

Number of communication modules: 1 CP 443-5 V6.0

Under "OS Objects", select the options "PCS 7 OS" and "SIMATIC BATCH" as well as “Multi-user system”:



PCS 7 Wizard: 'New Project'

Which objects are you still using? 3 (4)

Plant hierarchy :

Number of levels: 3

AS objects :

☑ CFC chart

☑ SFC chart

OS objects :

☑ PCS7 OS

☑ SIMATIC BATCH

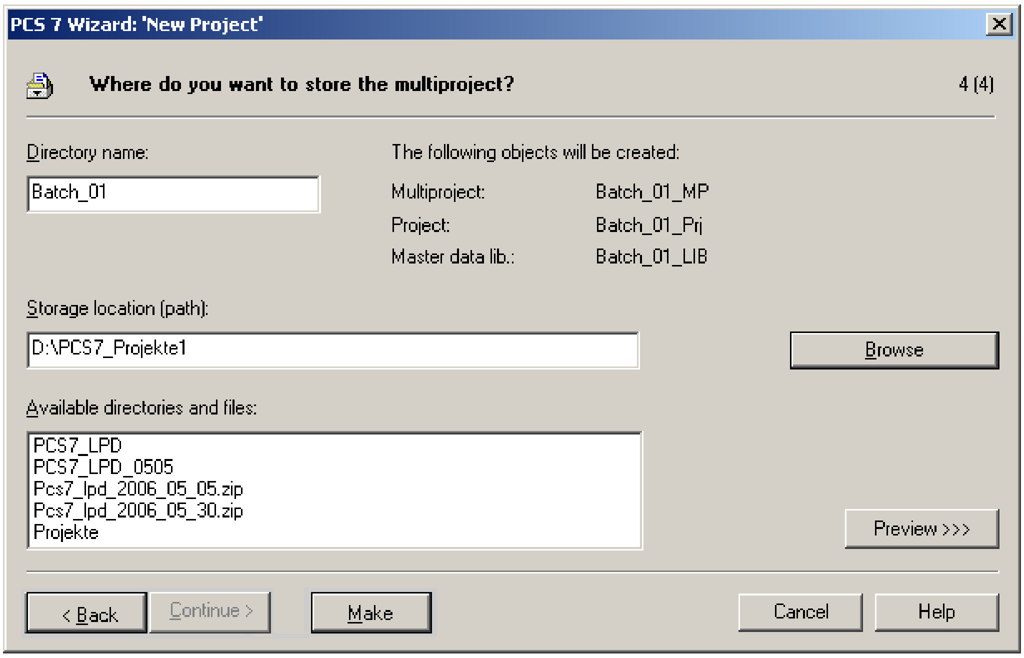
□ Route Control

○ Single station system

● Multiple station system

○ Multiple station system redundant

You can specify any folder name and any storage location. In the sample, the default has been changed and the folder is called BATCH_01 and the path is D:\PCS7_Projekte.



PCS 7 Wizard: 'New Project'

Where do you want to store the multiproject? 4 (4)

Directory name: Batch_01

The following objects will be created:

Multiproject:	Batch_01_MP
Project:	Batch_01_Prj
Master data lib.:	Batch_01_LIB

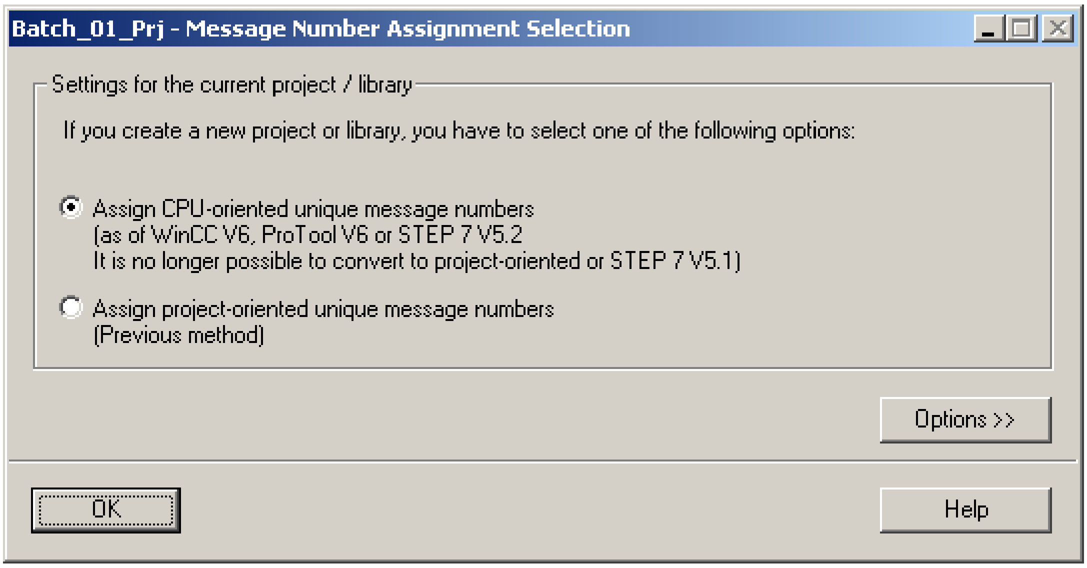
Storage location (path): D:\PCS7_Projekte1

Available directories and files:

PCS7_LPD
PCS7_LPD_0505
Pcs7_lpd_2006_05_05.zip
Pcs7_lpd_2006_05_30.zip
Projekte

Here, you also specify unique message number assignment for the CPU or unique message number assignment for the project. Select the option to meet your requirements.

Concerning the message configuration a SIMATIC project can be created in two different alternatives: CPU-oriented (default setting) or project-oriented message numbers.



Batch_01_Prj - Message Number Assignment Selection

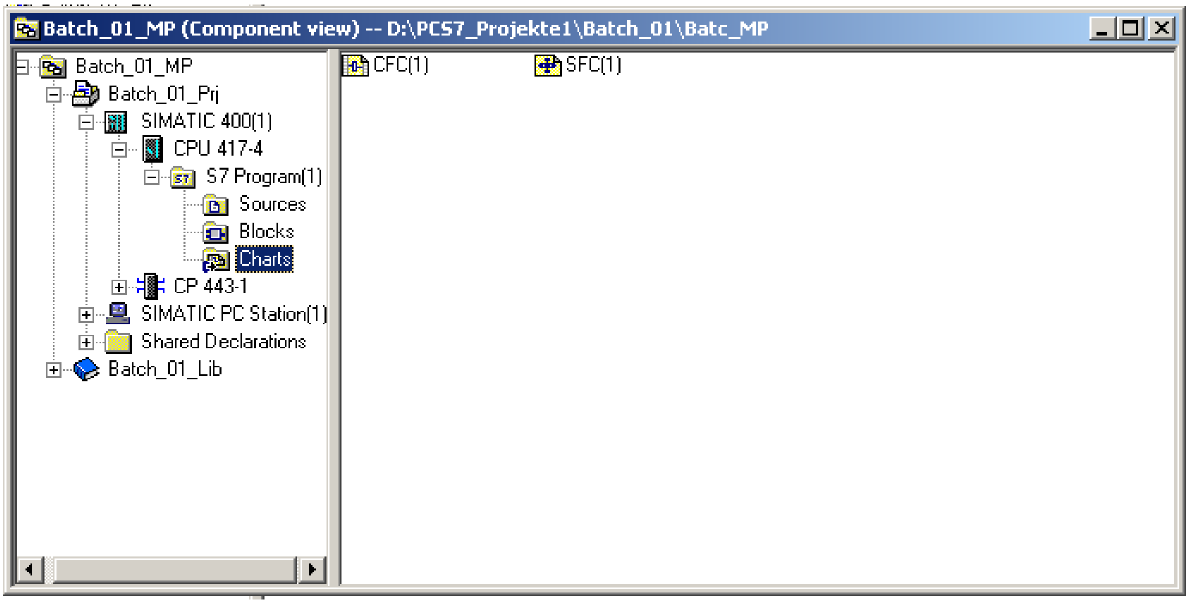
Settings for the current project / library

If you create a new project or library, you have to select one of the following options:

● Assign CPU-oriented unique message numbers
(as of WinCC V6, ProTool V6 or STEP 7 V5.2
It is no longer possible to convert to project-oriented or STEP 7 V5.1)

○ Assign project-oriented unique message numbers
(Previous method)

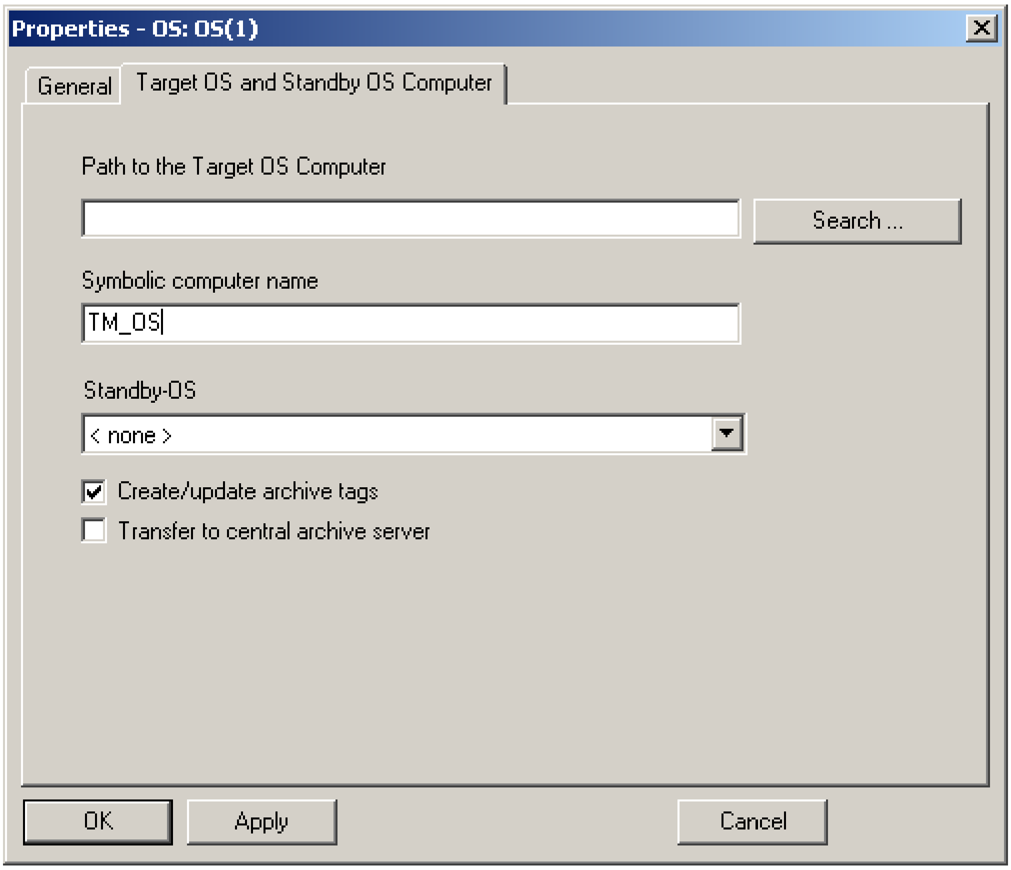
After clicking "OK", the basic structure of the project is created:



Batch_01_MP (Component view) -- D:\PCS7_Projekte1\Batch_01\Batc_MP

Note:
You can modify the names of the individual objects (for example, OS(1) under WinCC Application) using SIMATIC Manager tools (here already done).

The OS name must be identical with the symbolic computer name, the default name has to be changed:



Properties - OS: OS(1)

General | Target OS and Standby OS Computer

Path to the Target OS Computer

Symbolic computer name: TM_OS

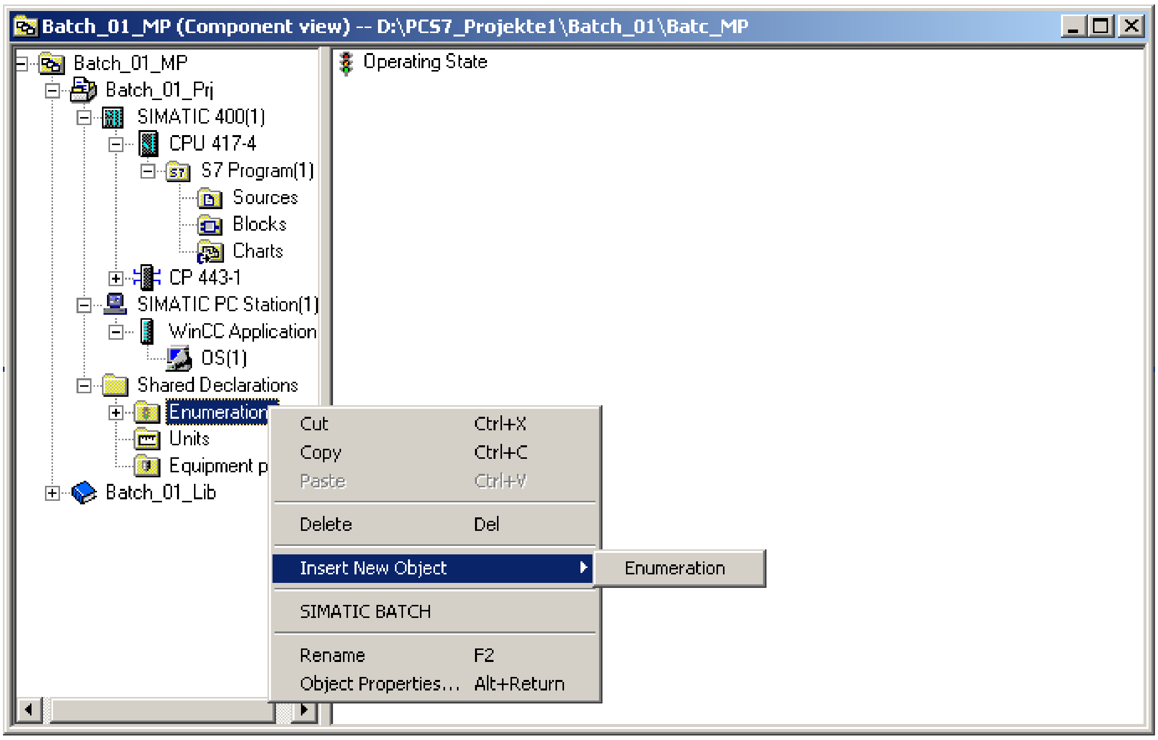
Standby-OS: < none >

☑ Create/update archive tags

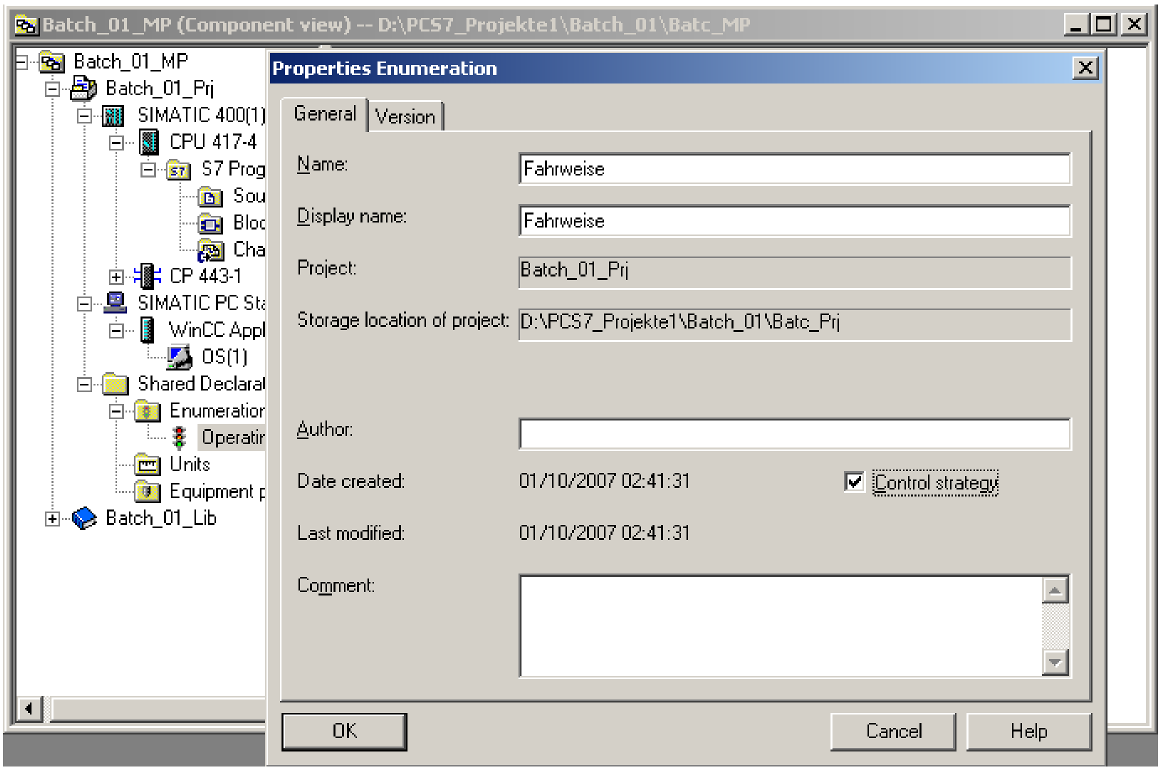
□ Transfer to central archive server

- Keep both projects open in the SIMATIC Manager (the unpacked sample TMMuster project and the project you have created).

- Via **Shared Declarations** > **Enumerations** > **Insert New Object** > insert enumeration and rename is “Fahrweise” (in German!):



- Mark “Fahrweise” and click Object Properties. Activate there “Control strategy”:



Name: Fahrweise

Display name: Fahrweise

Project: Batch_01_Prj

Storage location of project: D:\PCS7_Projekte1\Batch_01\Batc_Prj

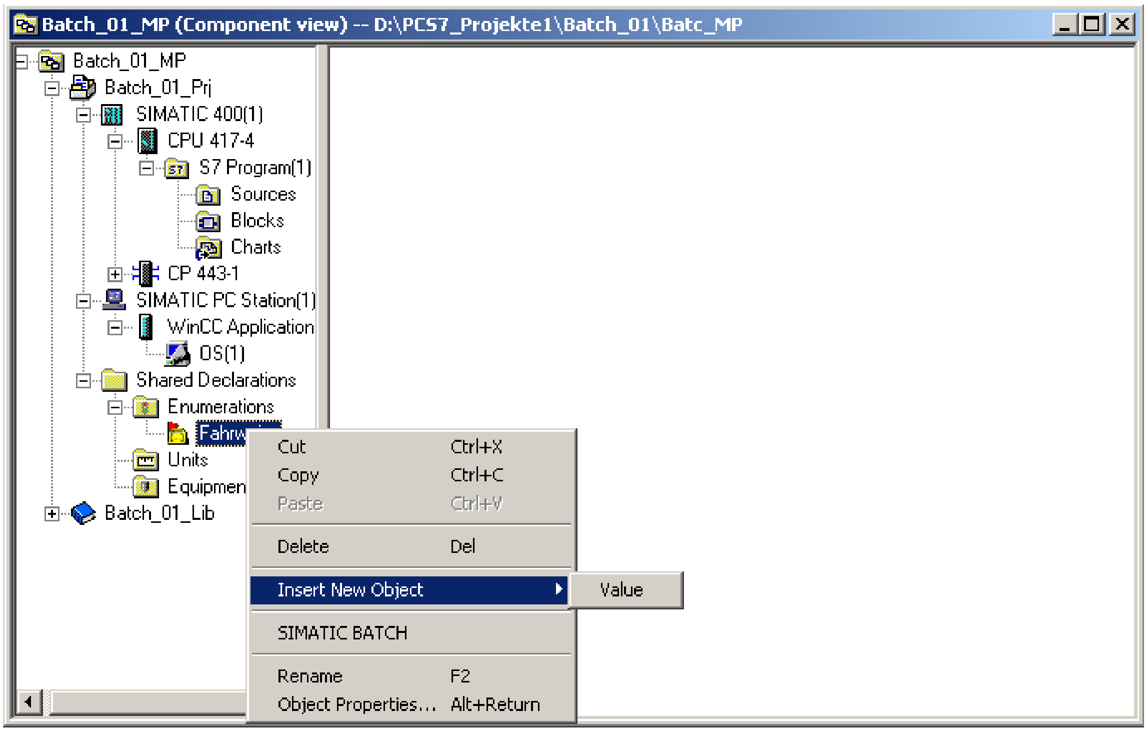
Author:

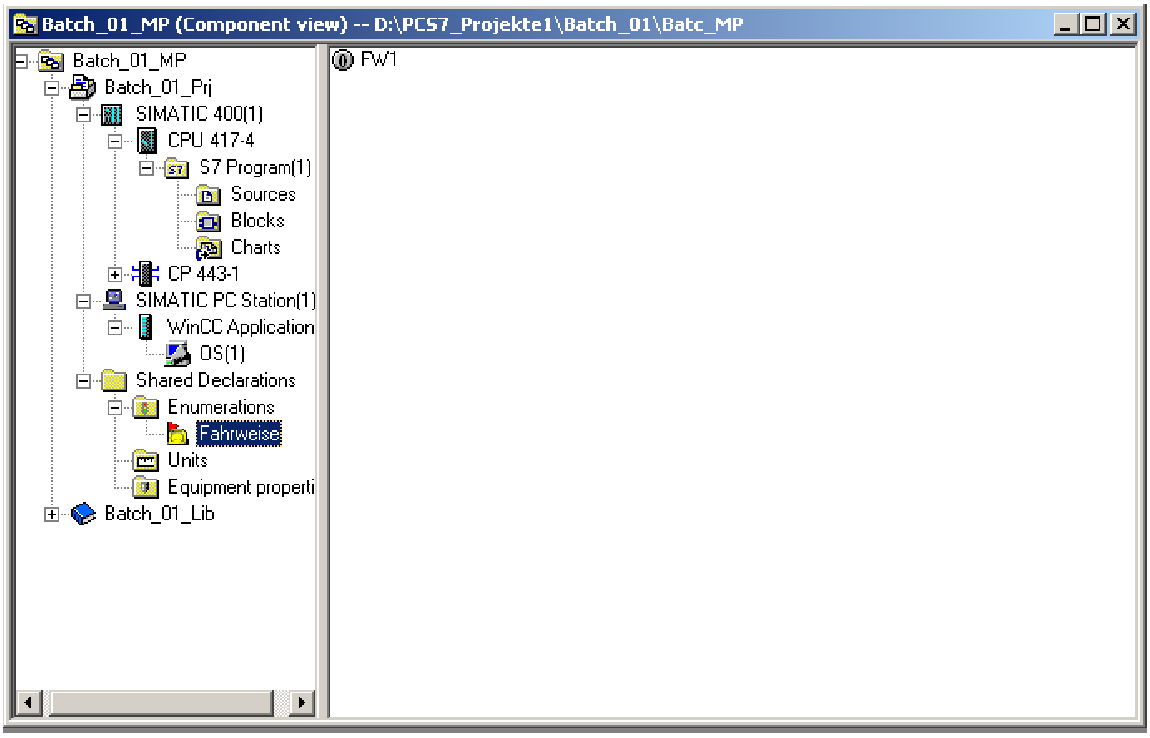
Date created: 01/10/2007 02:41:31 ☑ Control strategy

Last modified: 01/10/2007 02:41:31

Comment:

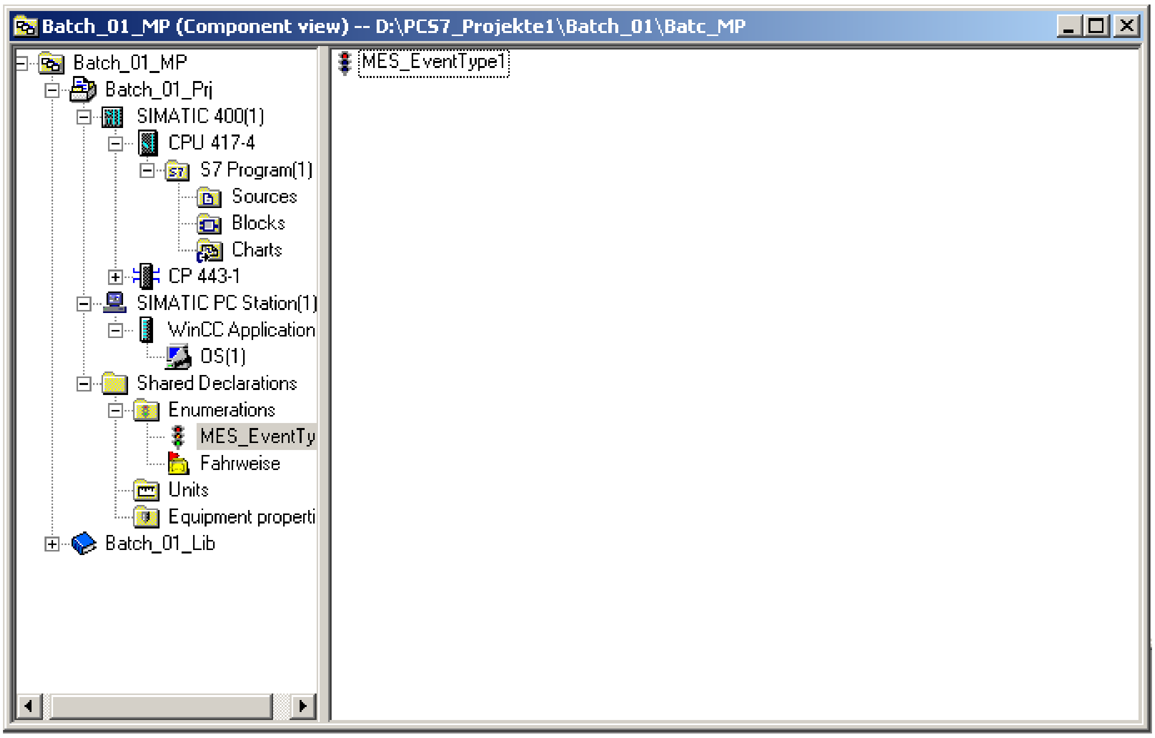
- Via **Fahrweise** > **Insert New Object** > **Value** insert value and rename it FW1:



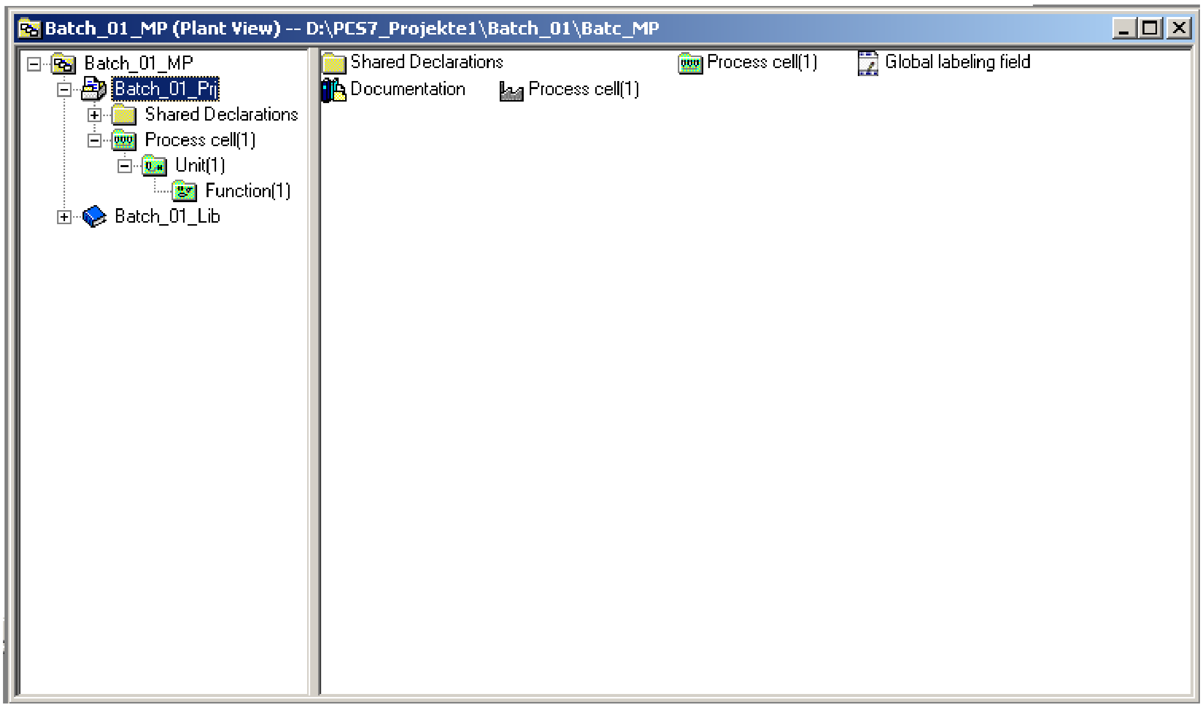


Via “Properties” FW1 enter value 1. Configure the same way for FW2 … FW6 (value = 2 … 6).

- In analogous manner configure the data type MES_EventType, define via “Properties” MES_EventType1 and give it the value = 1.

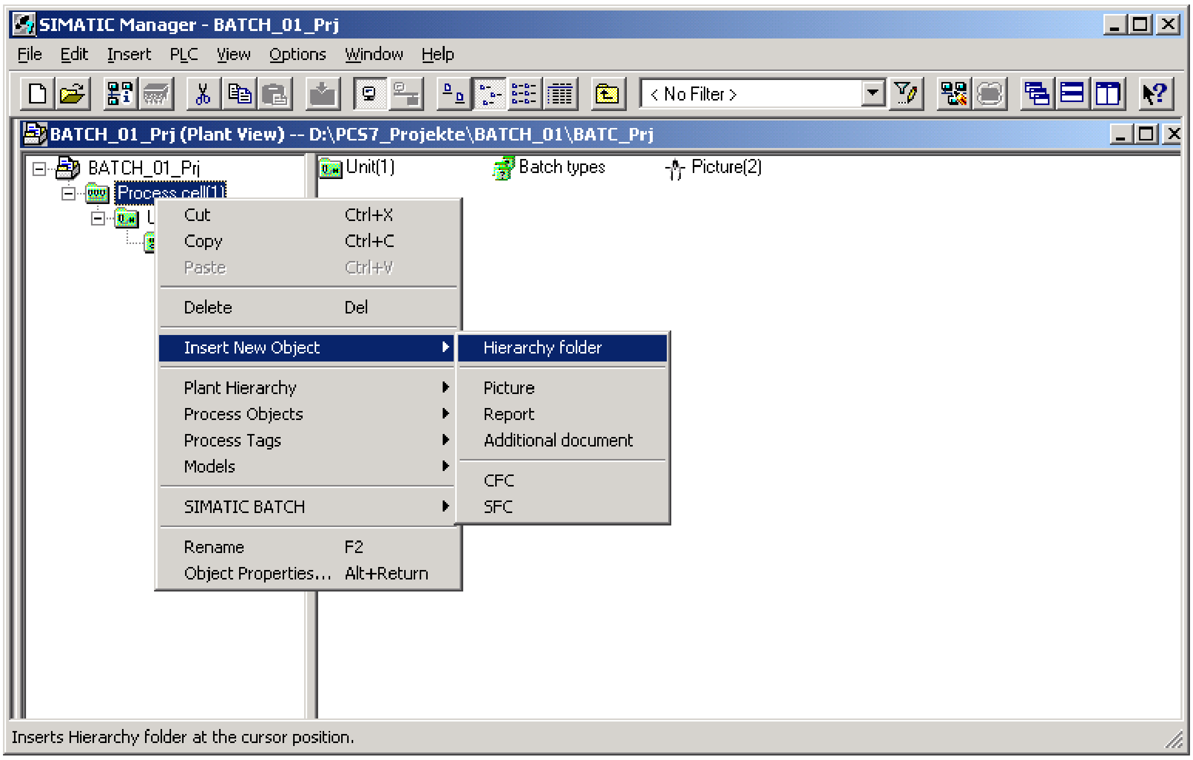


- Open Plant View:



Note:
Here, you should rename the default names Process cell(1) and Unit(1) to suit your particular project. The name of the unit may have up to 16 characters only.

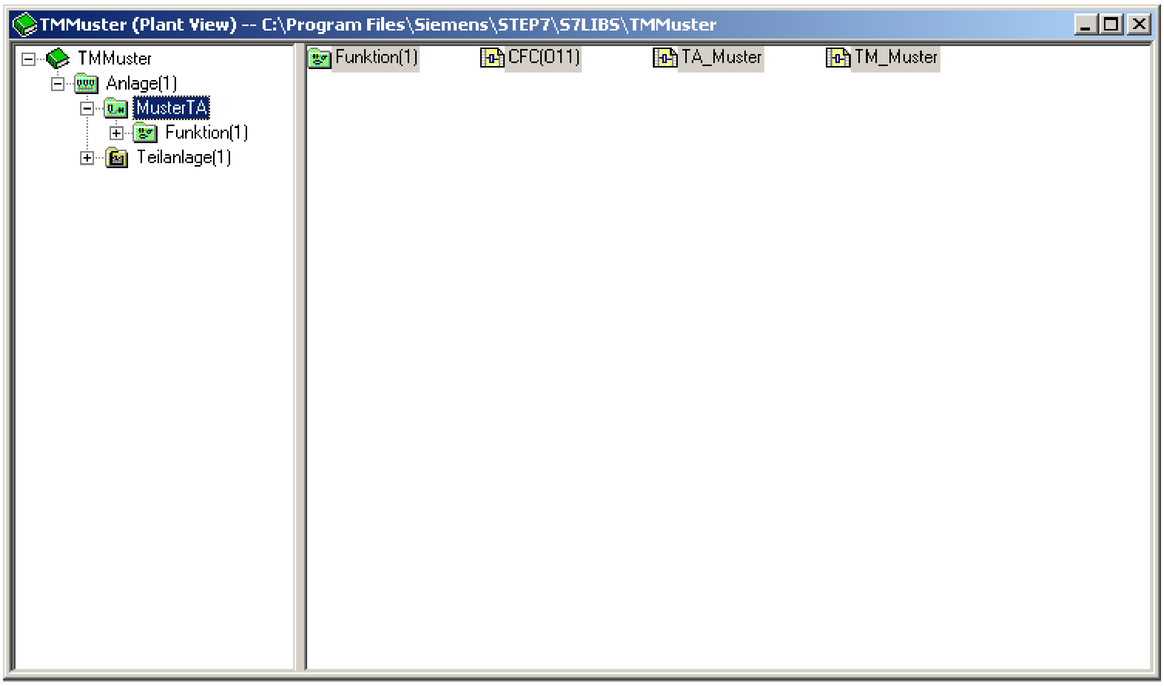
- Mark Process cell(1) or modified name and right-click > **Insert New Object > Hierarchy folder**:

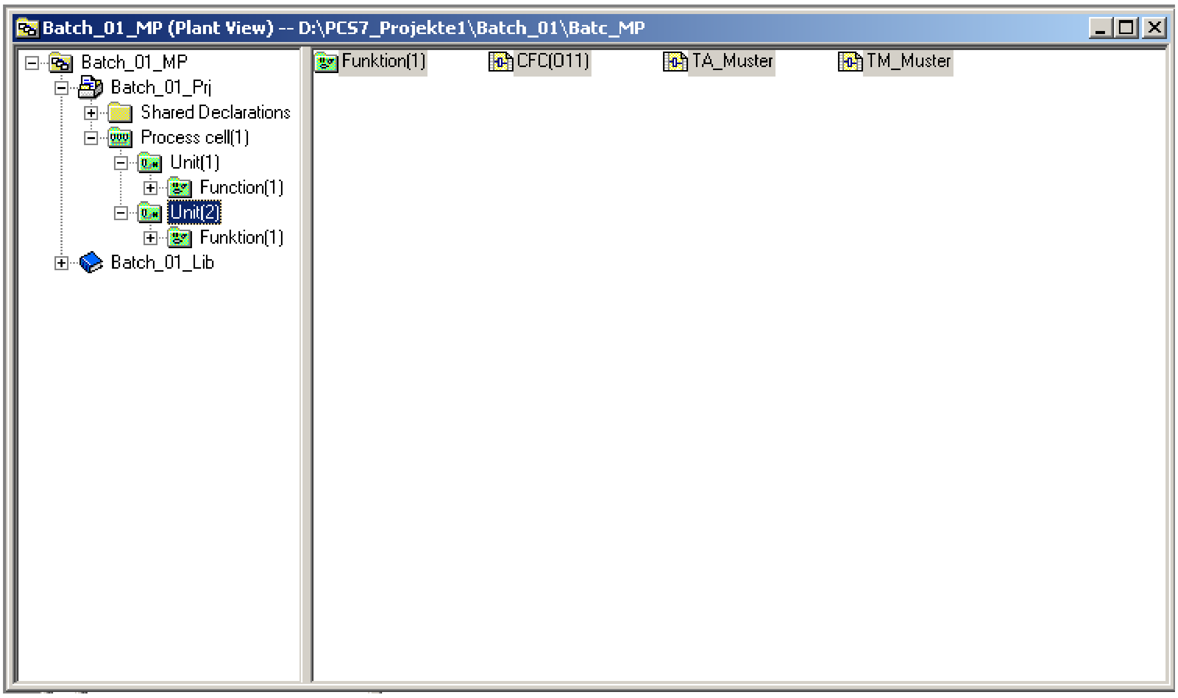


Inserts Hierarchy folder at the cursor position.

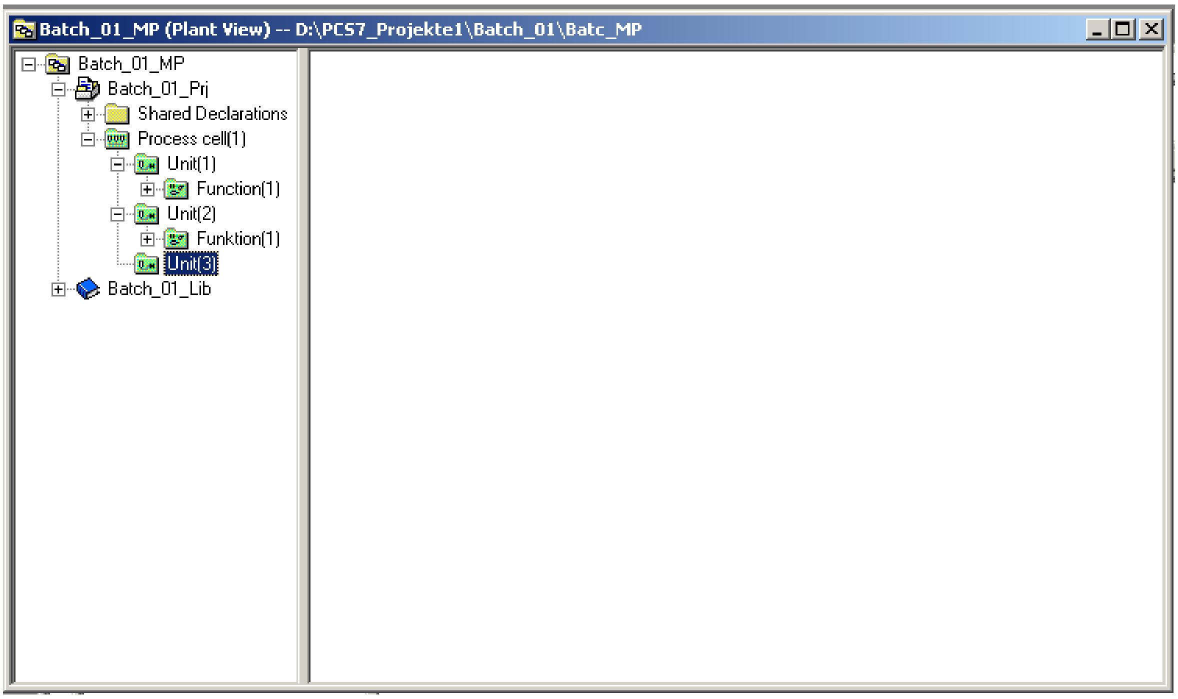
A new folder named "Unit(2)" will be created. It is the sample folder for TELEPERM M.

- Mark in the sample project the 4 objects Funktion(1), CFC(011), TA_Muster and TMMusterCPU (or TMMusterPRO), copy and insert them into the new project under "Unit(2):



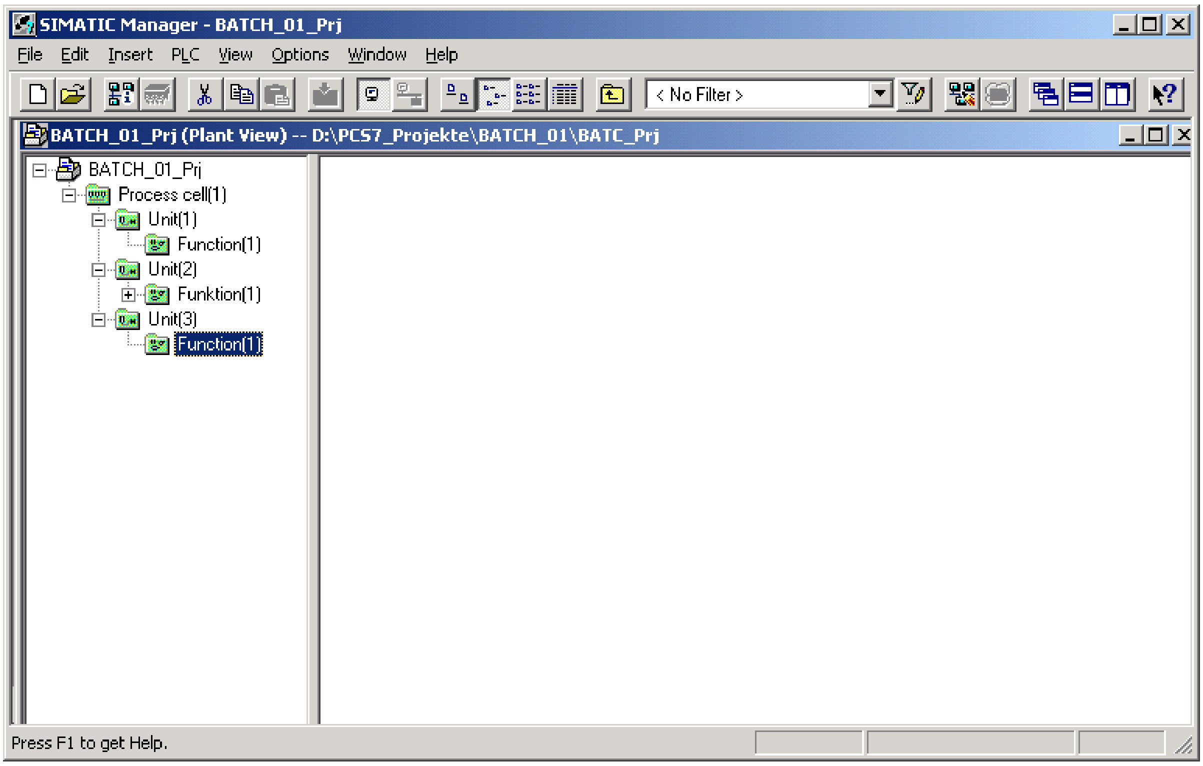


- Mark Process cell(1) (or modified name) and right-click > **Insert New Object > Hierarchy folder**:



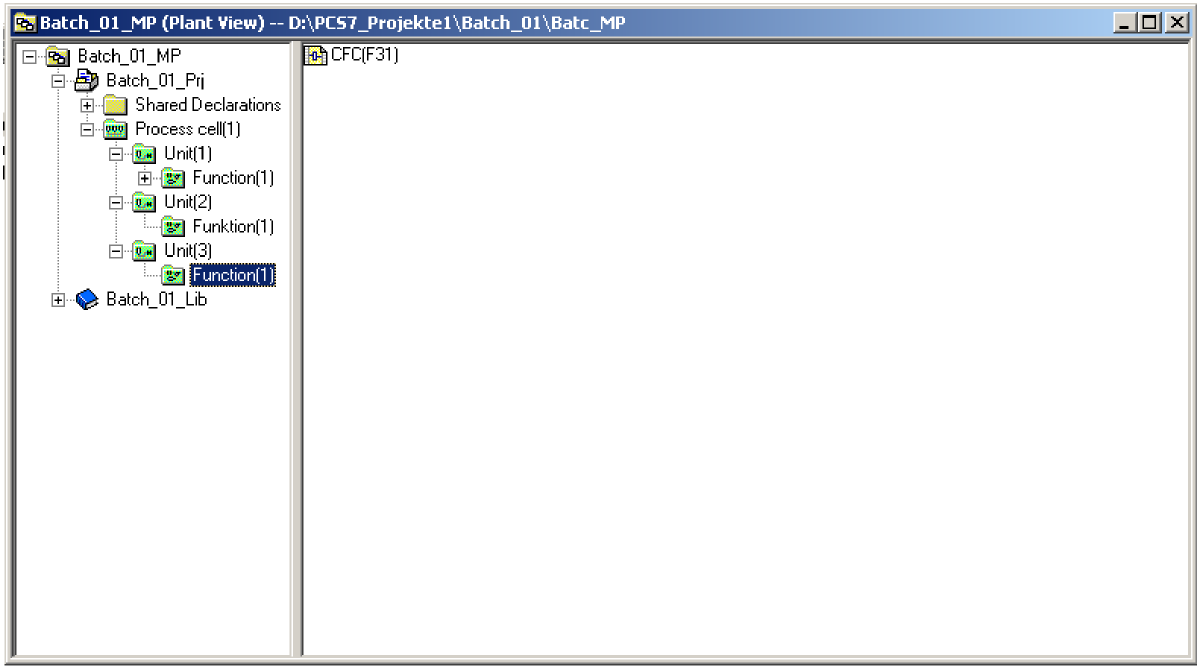
A new folder named "Unit(3)" is created. It is a real process cell. This step is necessary in order to define the batch types. The name "Unit(3)" may be modified, it does not have any effect on the ongoing configuration. The name of the unit may have up to 16 characters only.

- Mark Unit(3) (or modified name) and right-click > **Insert New Object** > **Hierarchy folder**:

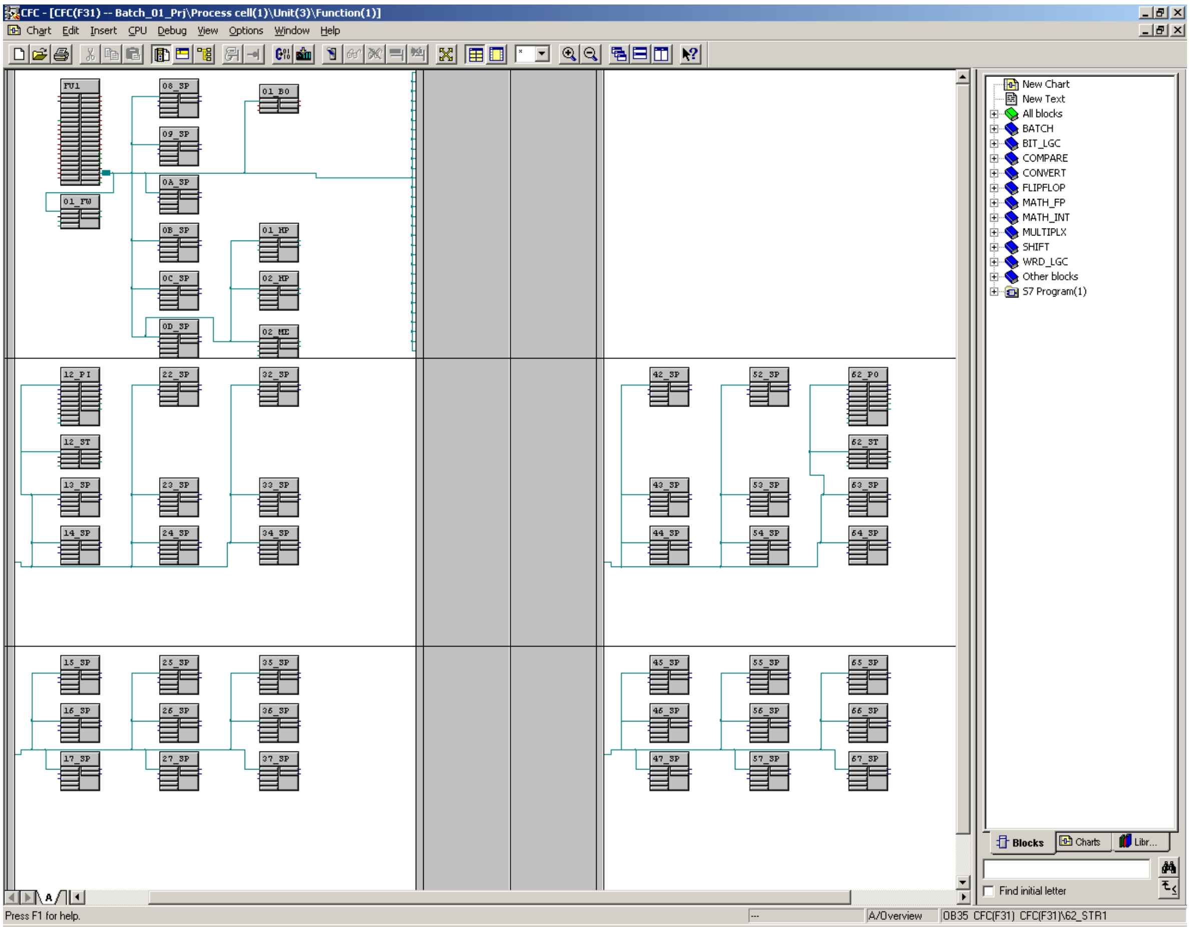

SIMATIC Manager - BATCH_01_Prj
File Edit Insert PLC View Options Window Help
< No Filter >
BATCH_01_Prj (Plant View) -- D:\PCS7_Projekte\BATCH_01\BATC_Prj
BATCH_01_Prj
Process cell(1)
Unit(1)
Function(1)
Unit(2)
Funktion(1)
Unit(3)
Function(1)
Press F1 to get Help.

Function (1) is created. Modify name of the created function if you wish.

- Copy CFC(F11) under Unit(2)/ Function(1) and insert it into Unit(3)/ Function(1) and rename it:



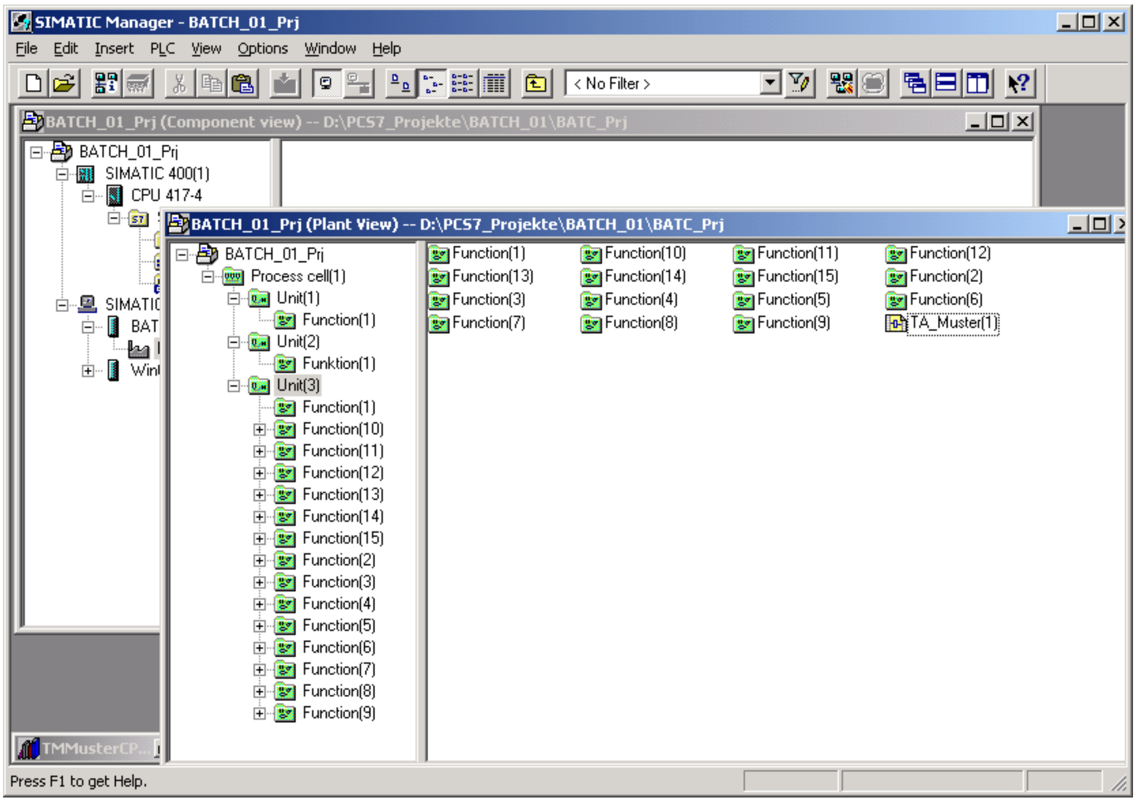
- Open CFC (in example above CFC(F31))



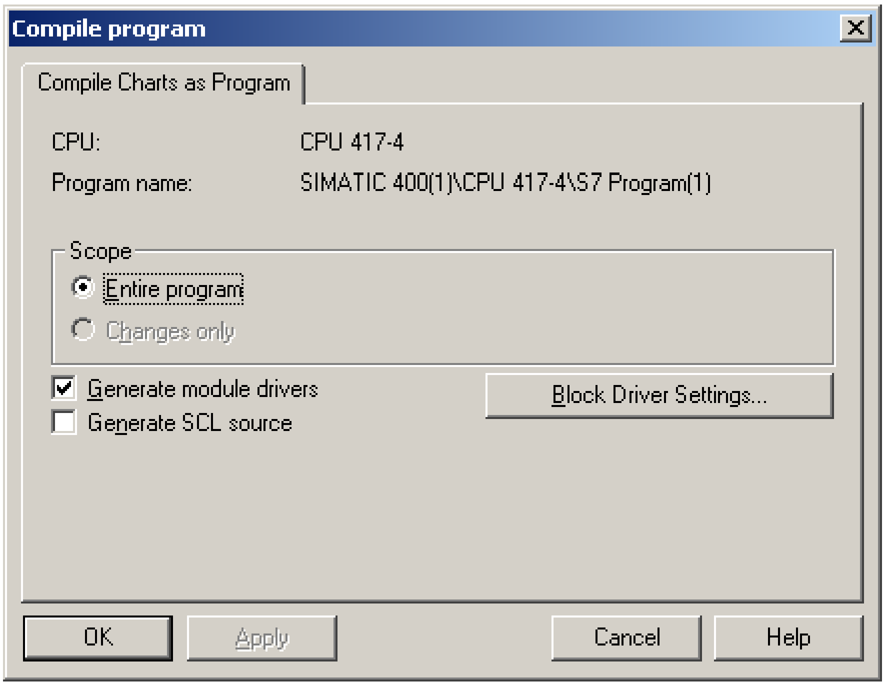
The opened CFC contains a sample phase of maximal structure, i.e. 6 control strategies with each 6 setpoints which are specific concerning control strategy and which are independent concerning control strategy. Furthermore it contains 1 PI and 1 PO inclusive string. PI is the first parameter of control strategy 1, PO is the first parameter of control strategy 6. The other parameters are REAL values. These values must me adapted to the concrete batch type, and the batch type (f.e. "Stir1") has to be configured in the IEPH block.

The other units are configured in the same way.

- Copy the object TM_Muster in Unit(2) and paste it in Unit(1) and Unit(3) as well as in all those units you have configured and rename them. Afterwards rename the unit names of the renamed TA_Muster in CFC.



- Select the **Chart** > **Compile** > Charts as Program menu command and close CFC:



Compile program

Compile Charts as Program

CPU: CPU 417-4

Program name: SIMATIC 400(1)\CPU 417-4\S7 Program(1)

Scope

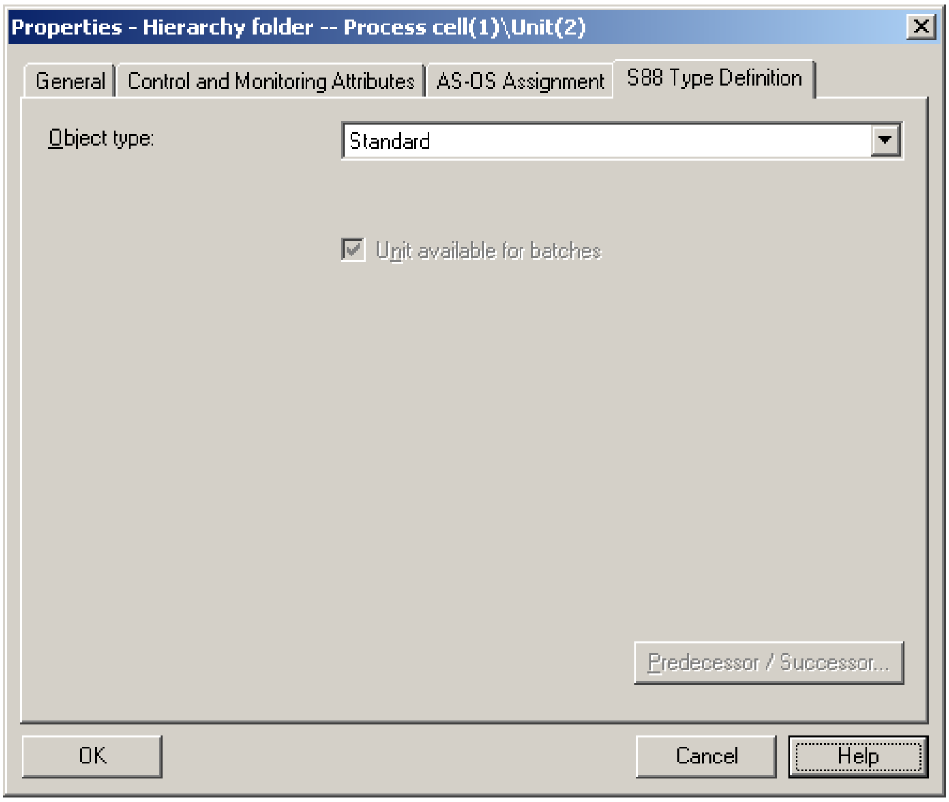
● Entire program

○ Changes only

☑ Generate module drivers

☐ Generate SCL source

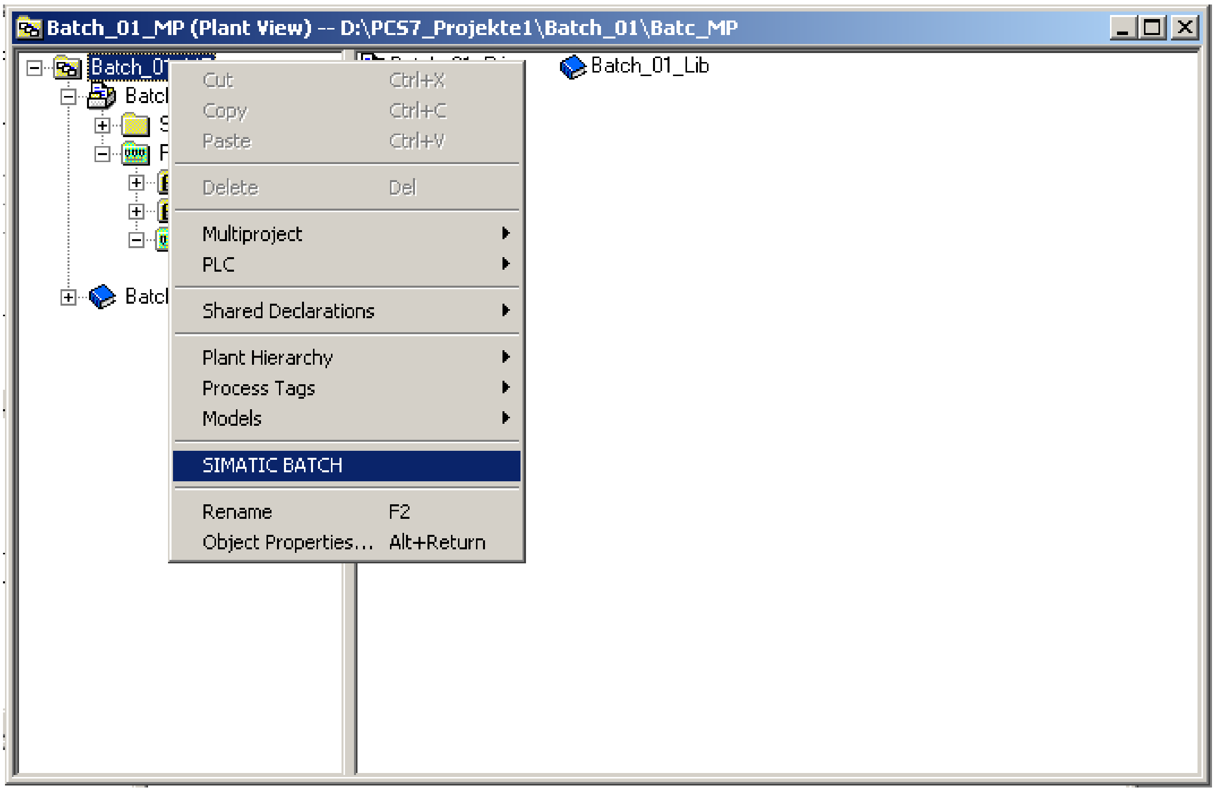
- Mark Unit(1) and Unit(2) and right-click > **Object properties > S88 Type Definition.** Set the object type <Standard> and click the OK button:


Properties - Hierarchy folder -- Process cell(1)\Unit(2)

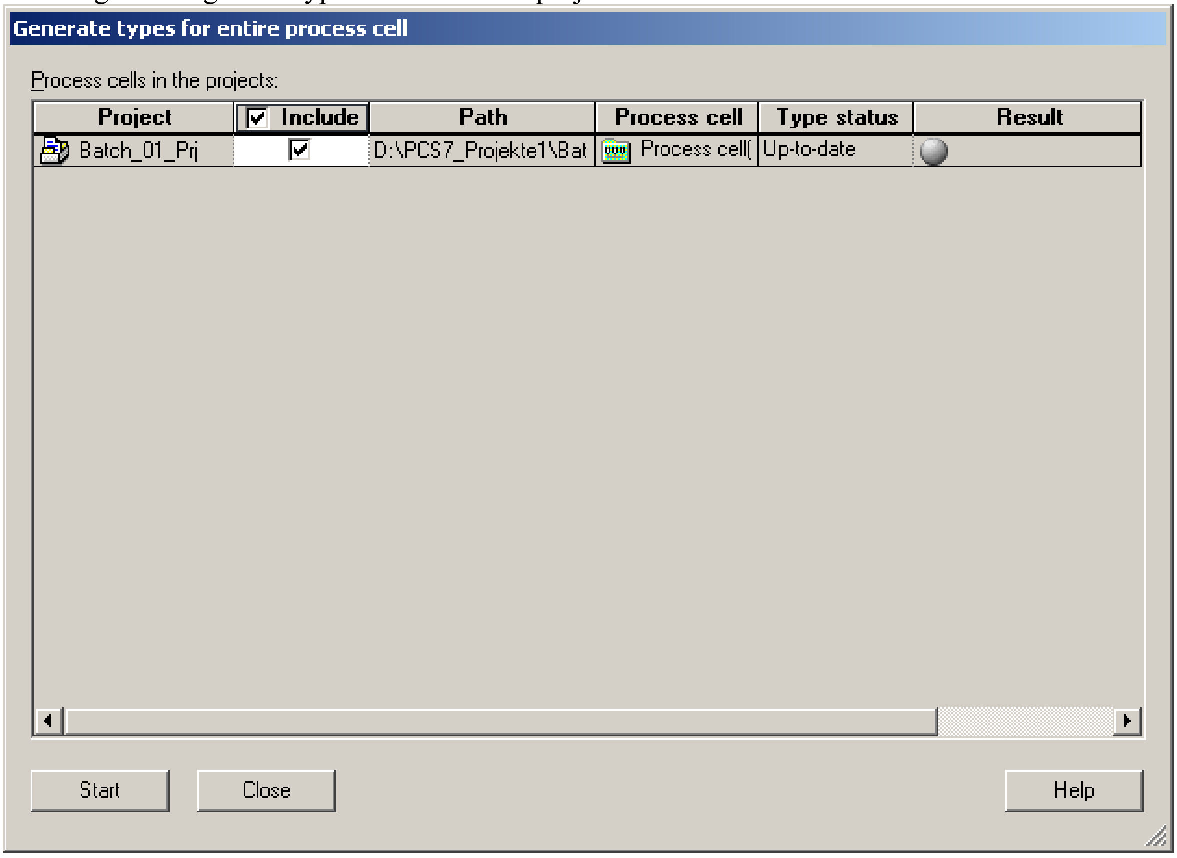
Object type: Standard

☑ Unit available for batches

- Mark Multiproject name with right mouse click > **SIMATIC BATCH**, mark Batch types and click button "Generate".


Batch_01_MP (Plant View) -- D:\PCS7_Projekte1\Batch_01\Batc_MP

- Start generating batch types of all selected projects:

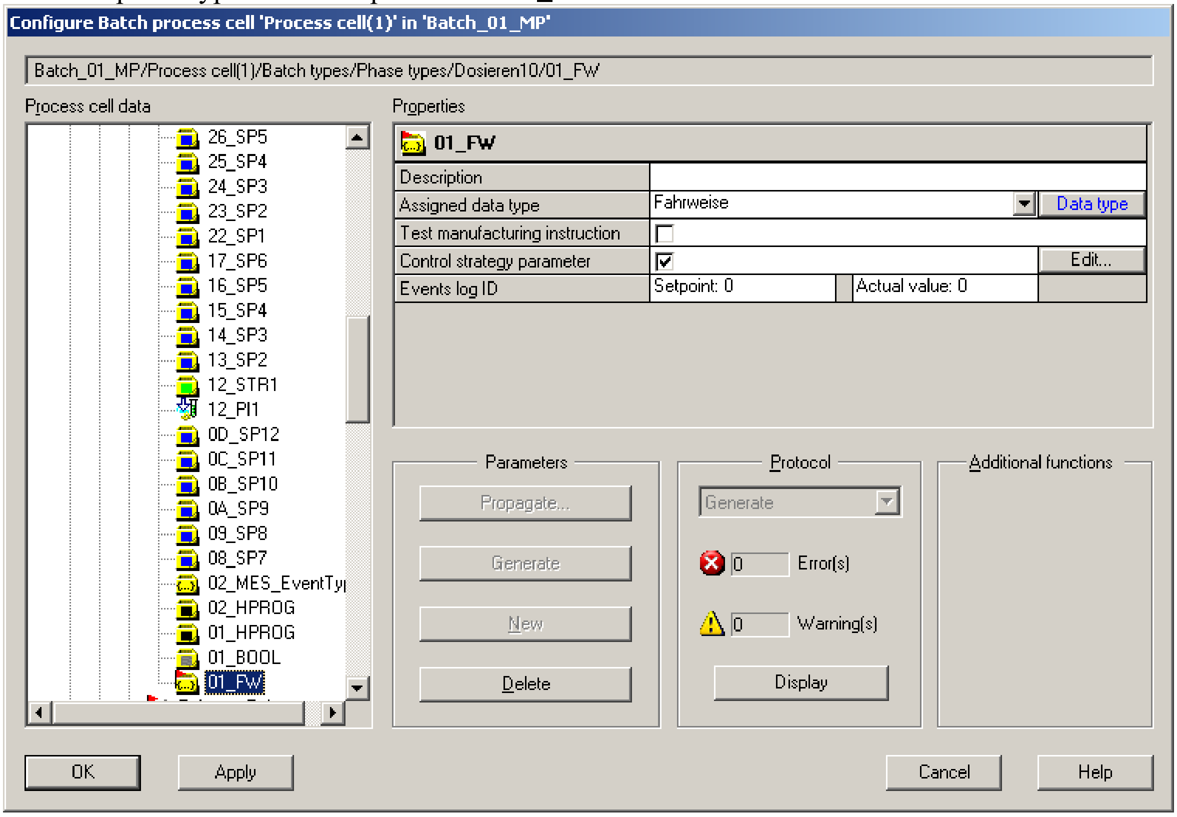


Generate types for entire process cell

Process cells in the projects:

Project	☑ Include	Path	Process cell	Type status	Result
Batch_01_Prj	☑	D:\PCS7_Projekte1\Bat	Process cell(	Up-to-date	●

- For all phase types mark the parameter “**01_FW**”:



Configure Batch process cell 'Process cell(1)' in 'Batch_01_MP'

Batch_01_MP/Process cell(1)/Batch types/Phase types/Dosieren10/01_FW

Process cell data

Properties

01_FW

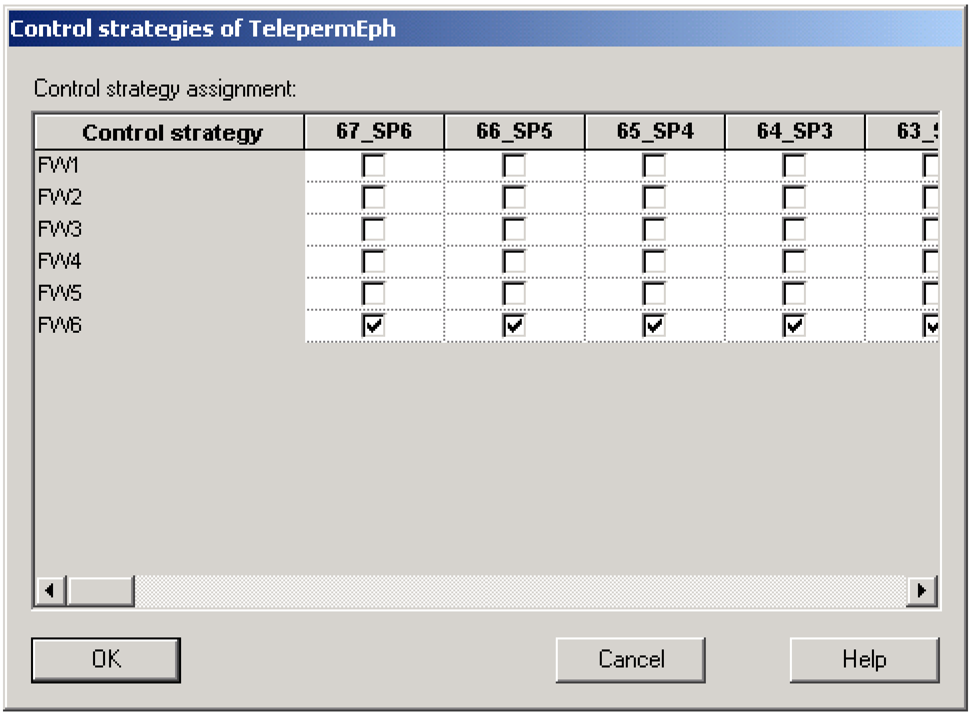
Description		
Assigned data type	Fahrweise	Data type
Test manufacturing instruction	□	
Control strategy parameter	☑	Edit...
Events log ID	Setpoint: 0	Actual value: 0

Protocol: Generate

0 Error(s)

0 Warning(s)

- With phase types, you can decide for each control strategy which parameters (SP1 ... 6) will be displayed during recipe creation so that they can have values assigned to them. Point to "**01_FW**", select "**Properties**" and then click the "Edit" button:



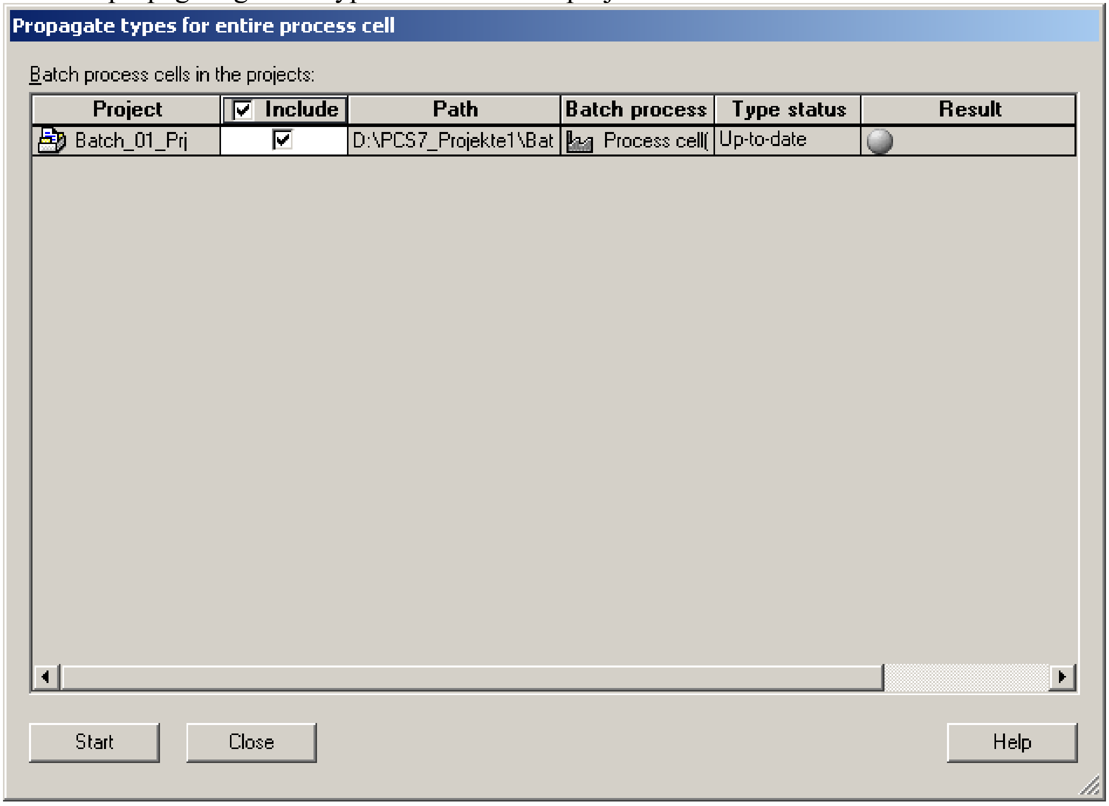
Control strategies of TelepermEph

Control strategy assignment:

Control strategy	67_SP6	66_SP5	65_SP4	64_SP3	63_S
FW1	□	□	□	□	□
FW2	□	□	□	□	□
FW3	□	□	□	□	□
FW4	□	□	□	□	□
FW5	□	□	□	□	□
FW6	☑	☑	☑	☑	☑

- Complete the type definition with the "Generate" button and then close the dialog with OK.

- Start propagating batch types of all selected projects:

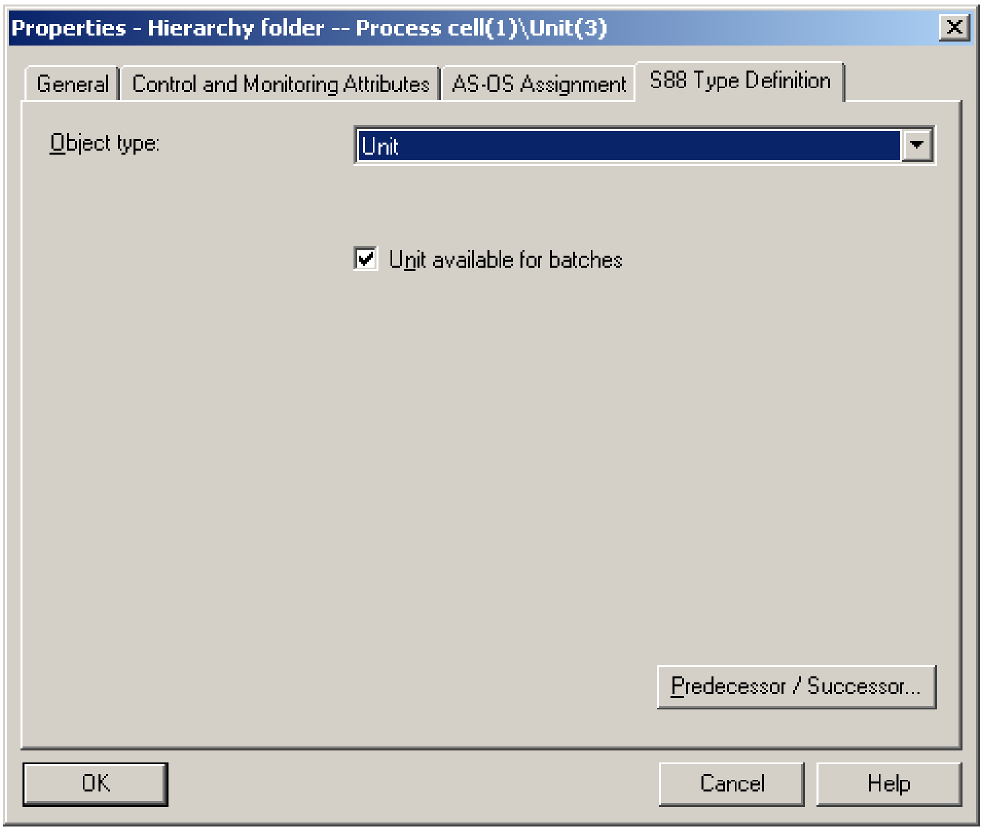


Propagate types for entire process cell

Batch process cells in the projects:

Project	☑ Include	Path	Batch process	Type status	Result
Batch_01_Prj	☑	D:\PCS7_Projekte1\Bat	Process cell(	Up-to-date	●

- In the plant view select Unit > **Object Properties** > **S88 Type Definition** and assign the object type "Unit"; this is to do for all existing units:



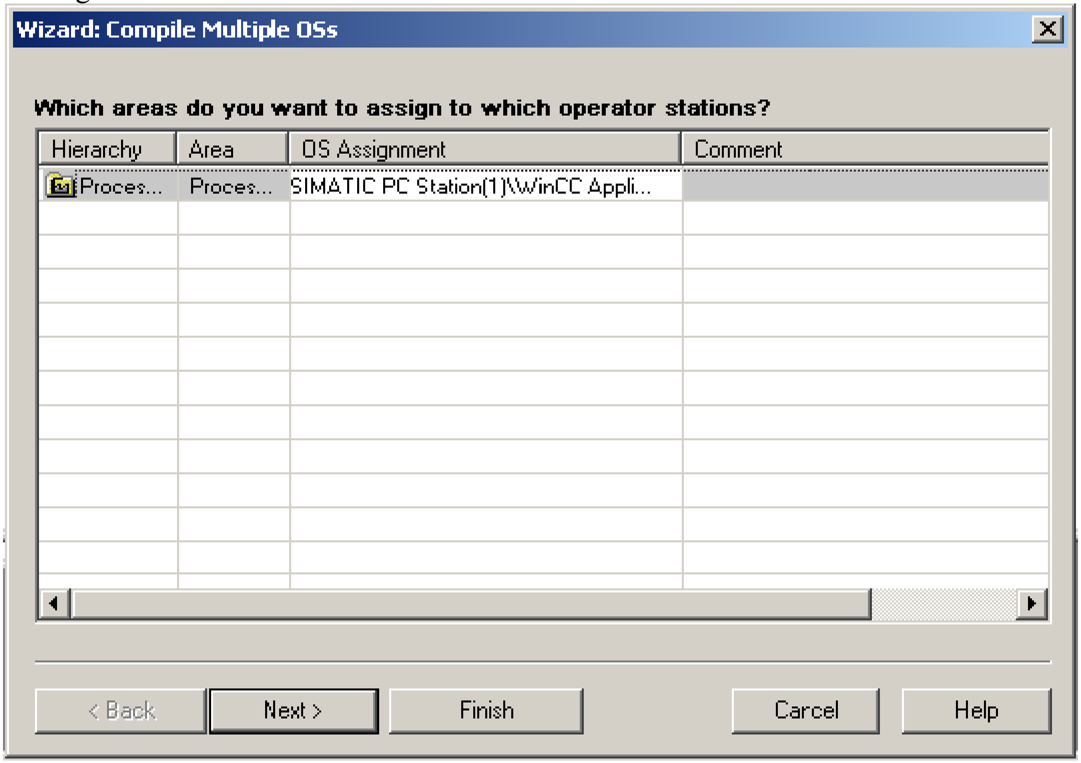
Properties - Hierarchy folder -- Process cell(1)\Unit(3)

General | Control and Monitoring Attributes | AS-OS Assignment | S88 Type Definition

Object type: Unit

☑ Unit available for batches

- Via menu **Options** > **‚Compile Multiple OSs' Wizard** is started. For that at first the areas are assigned to the OSs:

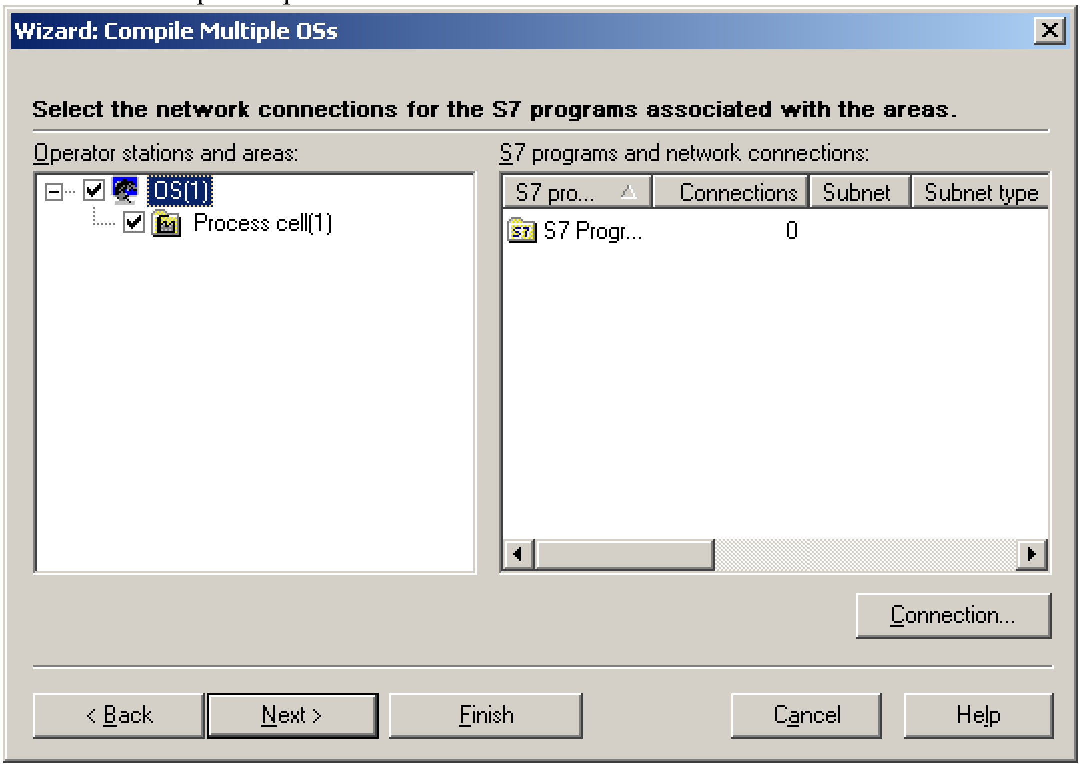


Wizard: Compile Multiple OSs

Which areas do you want to assign to which operator stations?

Hierarchy	Area	OS Assignment	Comment
Proces...	Proces...	SIMATIC PC Station(1)\WinCC Appli...	

- In the next step the Operator Stations and the associated areas are selected:



Wizard: Compile Multiple OSs

Select the network connections for the S7 programs associated with the areas.

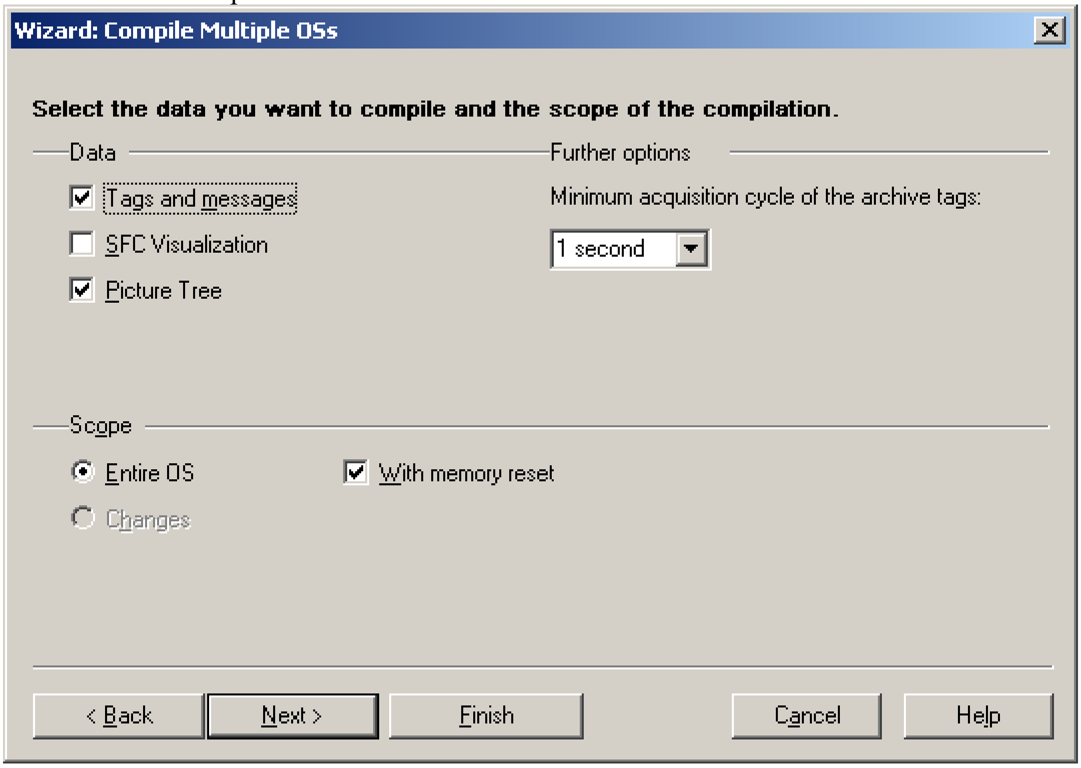
Operator stations and areas:

- ☑ OS(1)
  - ☑ Process cell(1)

S7 programs and network connections:

S7 pro...	Connections	Subnet	Subnet type
S7 Progr...	0		

- In the next dialog box the options "Entire OS" and "With memory reset" (select "Picture Tree" only at first run or if you wish to construct the picture hierarchy completely new) are selected, and after it the compilation is started:



Wizard: Compile Multiple OSs

Select the data you want to compile and the scope of the compilation.

Data

☑ Tags and messages

☐ SFC Visualization

☑ Picture Tree

Further options

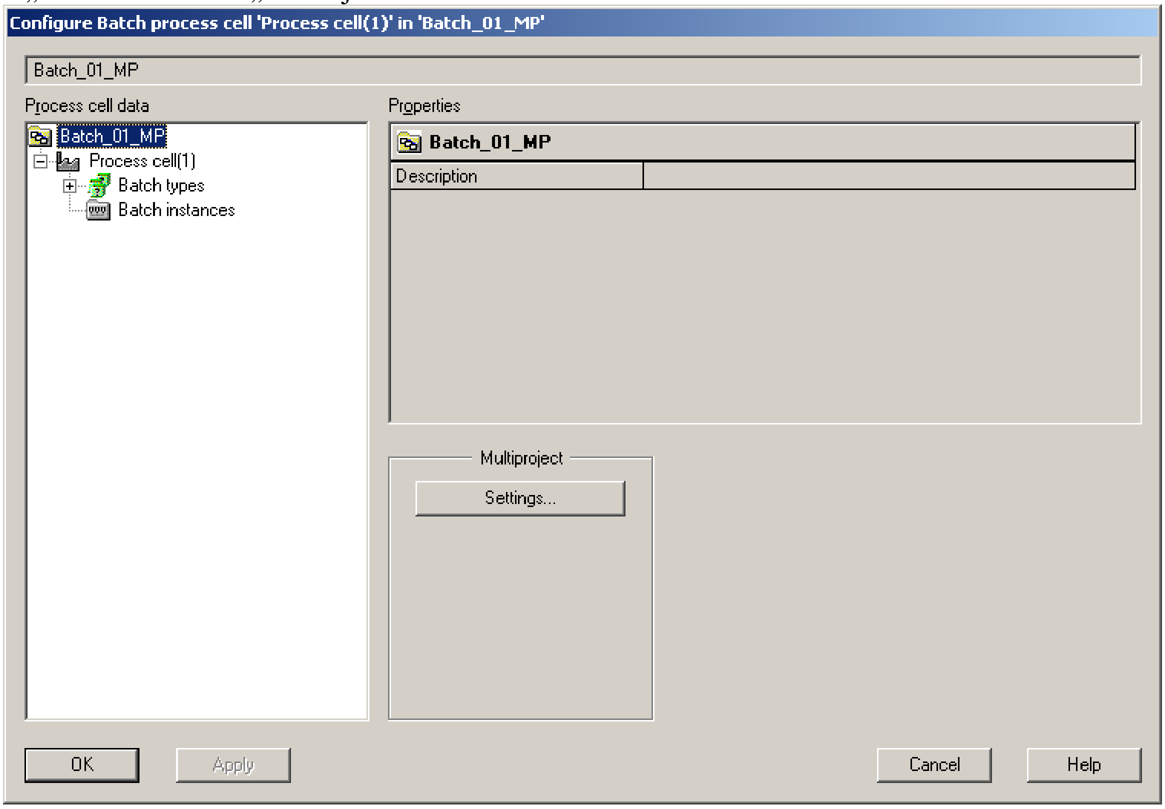
Minimum acquisition cycle of the archive tags: 1 second

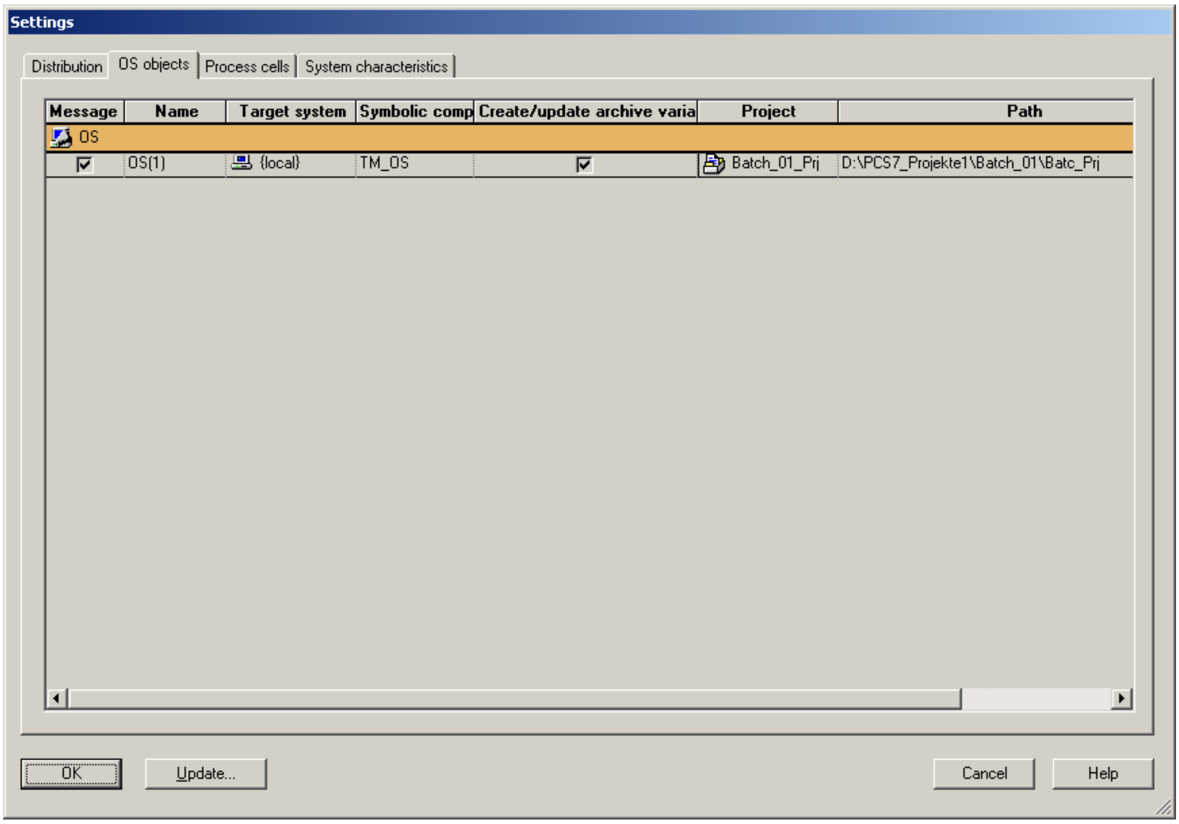
Scope

● Entire OS ☑ With memory reset

○ Changes

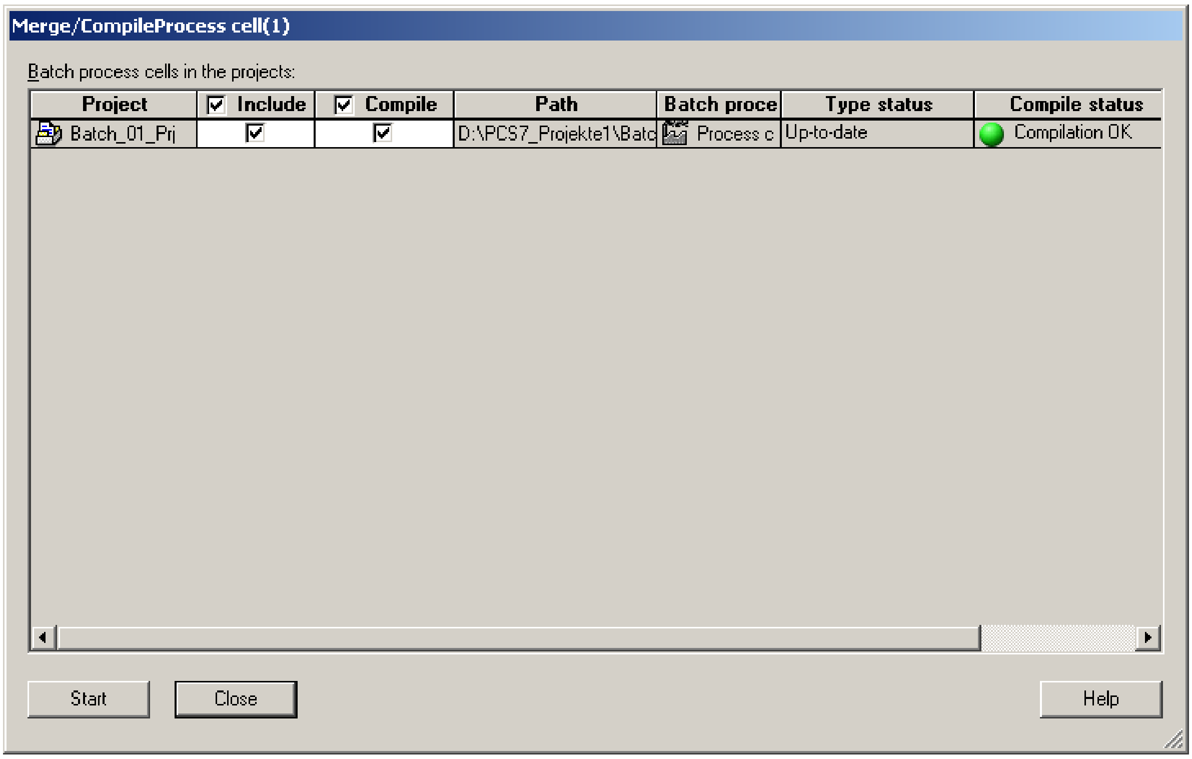
- Mark Multiproject, navigate in menu **SIMATIC BATCH** > **Multiproject** > **Settings** and update „Distribution“ and „OS Objects“:





Message	Name	Target system	Symbolic comp	Create/update archive varia	Project	Path
OS						
☑	OS(1)	{local}	TM_OS	☑	Batch_01_Prj	D:\PCS7_Projekte1\Batch_01\Batc_Prj

- Mark Multiproject and use **SIMATIC BATCH** > **Batch instances** > **Merge** to merge and compile BATCH instances: Set the option “Compile”, select the associated projects and press the button “Start”:

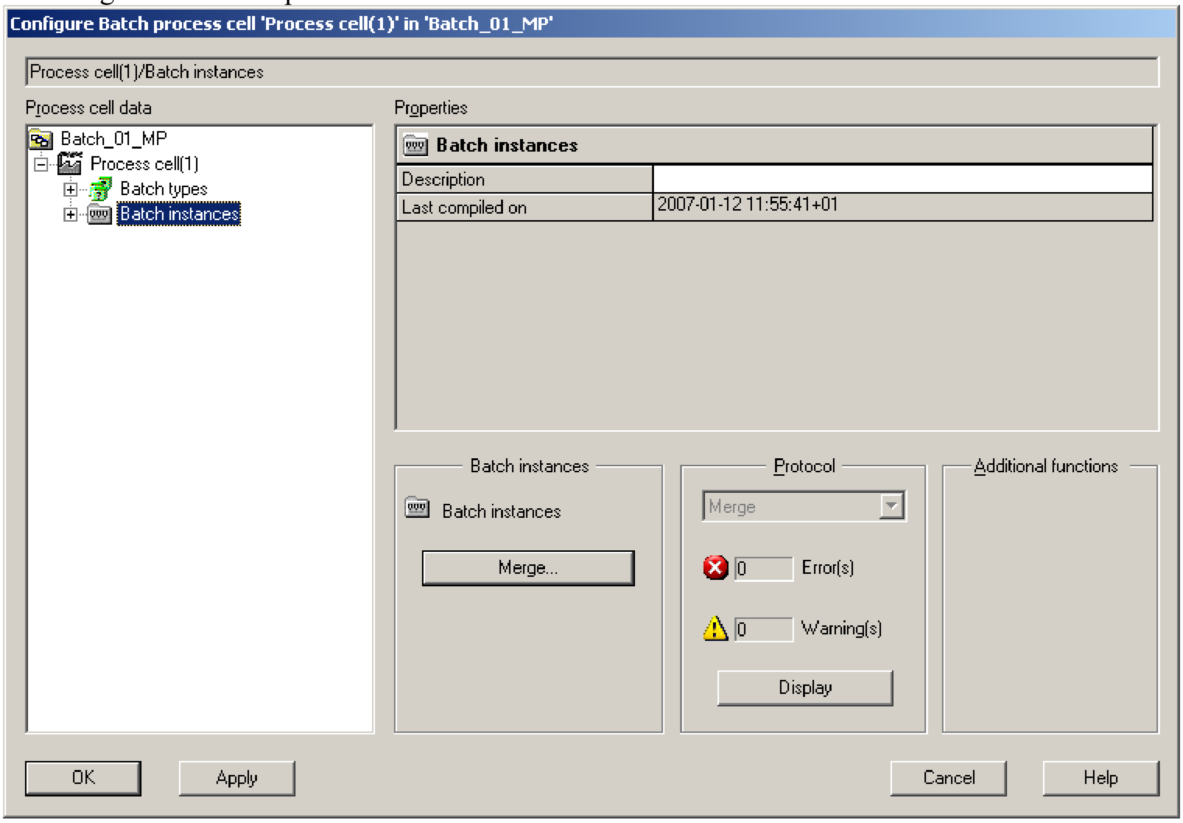


Merge/CompileProcess cell(1)

Batch process cells in the projects:

Project	☑ Include	☑ Compile	Path	Batch proce	Type status	Compile status
Batch_01_Prj	☑	☑	D:\PCS7_Projekte1\Batc	Process c	Up-to-date	● Compilation OK

- Dialog box after compilation:



Configure Batch process cell 'Process cell(1)' in 'Batch_01_MP'

Process cell(1)/Batch instances

Process cell data

- Batch_01_MP
  - Process cell(1)
    - Batch types
    - Batch instances

Properties

Batch instances

Description	
Last compiled on	2007-01-12 11:55:41+01

Batch instances: Batch instances

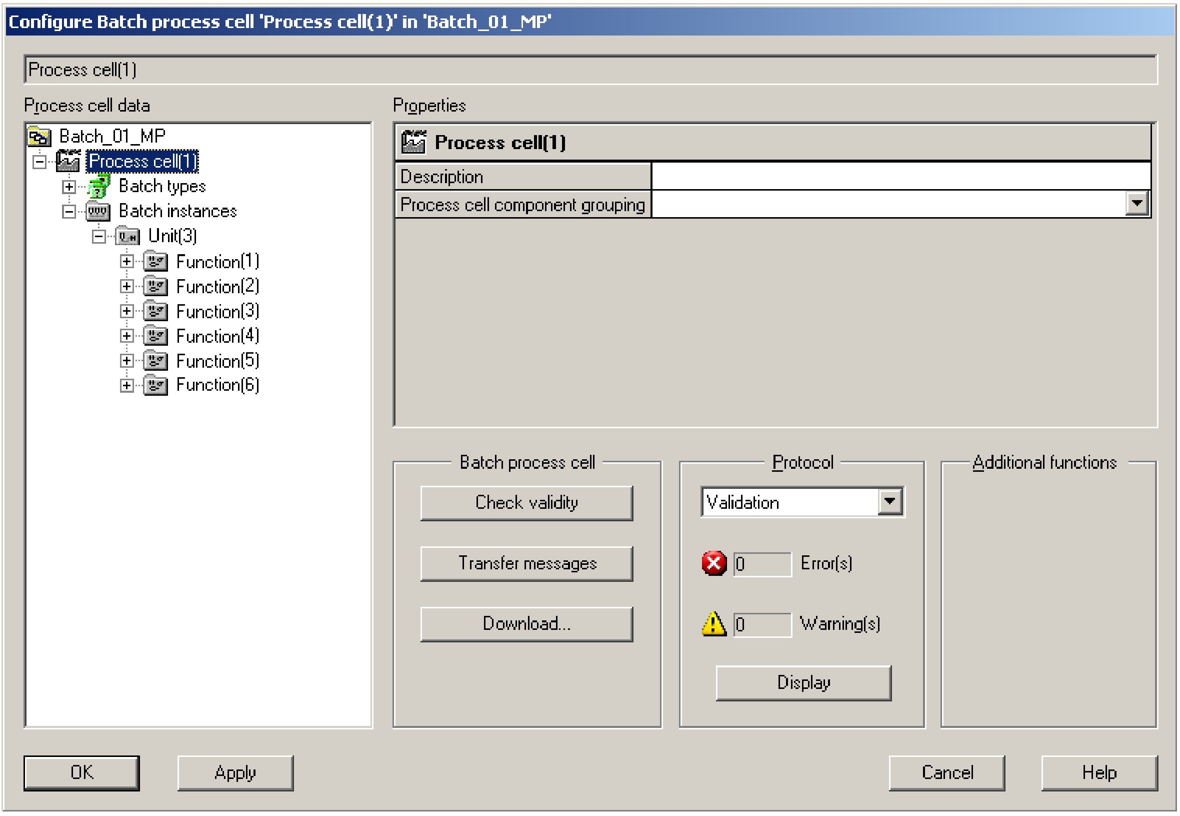
Protocol: Merge

0 Error(s)

0 Warning(s)

Additional functions

- Via menu **SIMATIC BATCH** > **Process cell** > **Transfer messages** the Batch-relevant messages are transferred to OS:



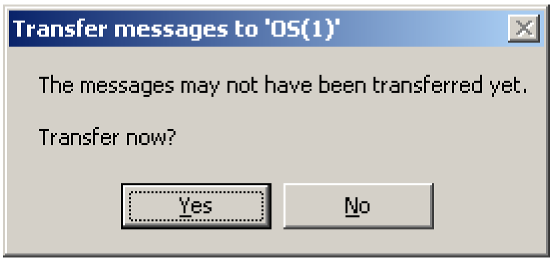
Configure Batch process cell 'Process cell(1)' in 'Batch_01_MP'

Process cell(1)

Validation

0 Error(s)

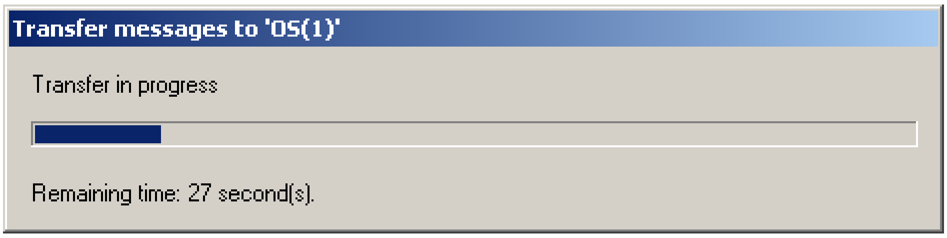
0 Warning(s)



Transfer messages to 'OS(1)'

The messages may not have been transferred yet.

Transfer now?

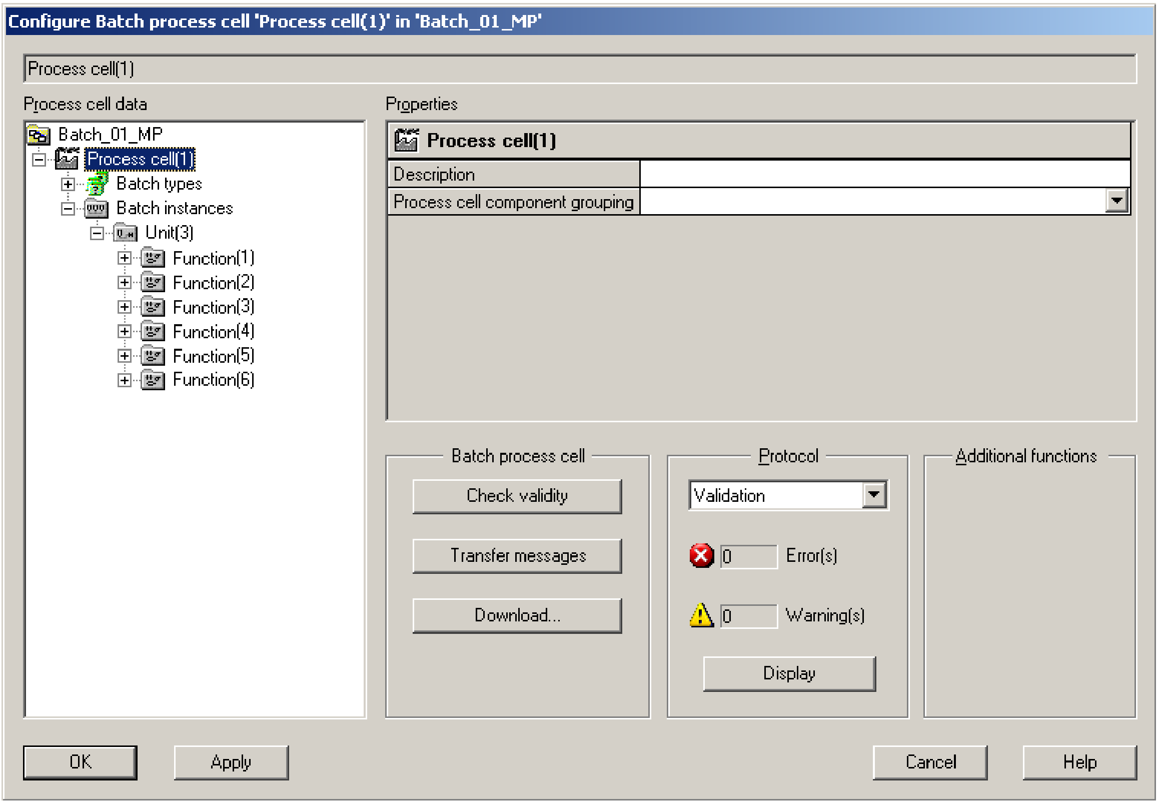


Transfer messages to 'OS(1)'

Transfer in progress

Remaining time: 27 second(s).

- Via **SIMATIC BATCH > Process cell > Download** download Batch Process cell:



Configure Batch process cell 'Process cell(1)' in 'Batch_01_MP'

Process cell(1)

Process cell data

- Batch_01_MP
  - Process cell(1)
    - Batch types
    - Batch instances
      - Unit(3)
        - Function(1)
        - Function(2)
        - Function(3)
        - Function(4)
        - Function(5)
        - Function(6)

Properties

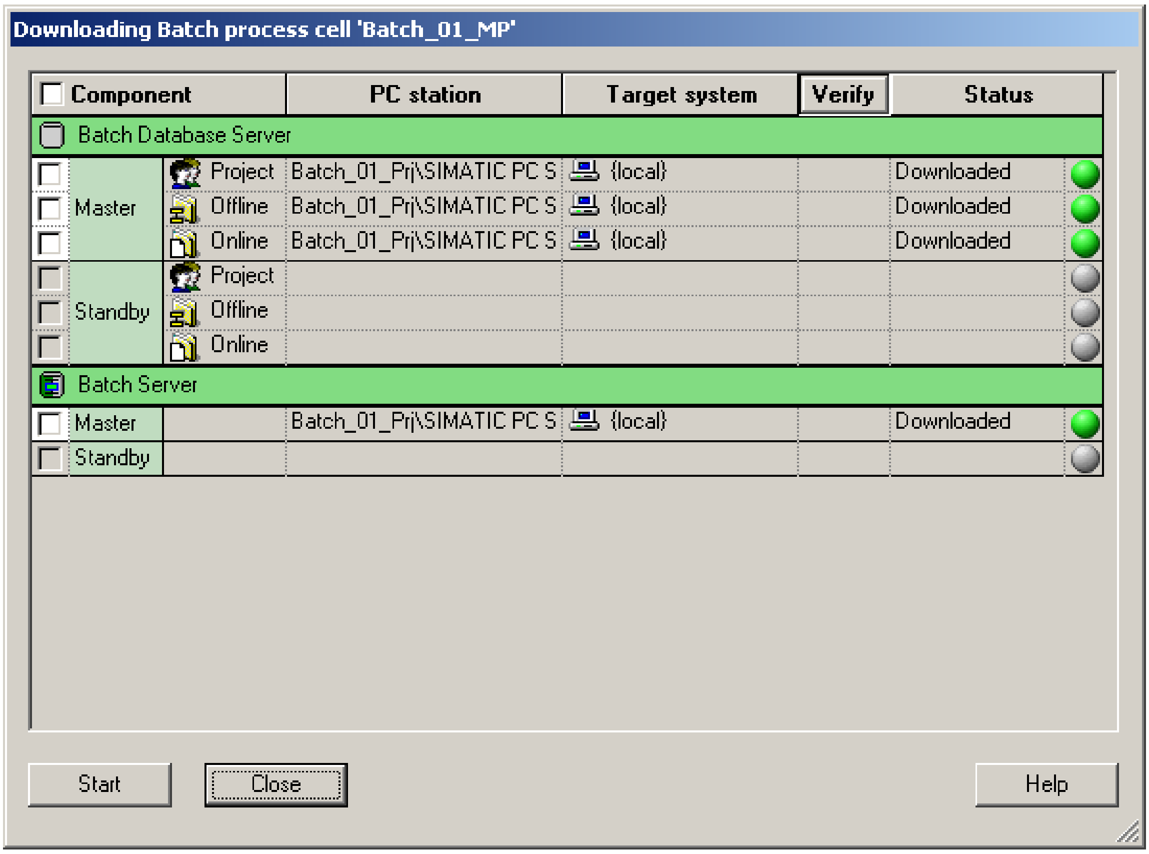
Process cell(1)

Description	
Process cell component grouping	

Protocol: Validation

0 Error(s)

0 Warning(s)



Downloading Batch process cell 'Batch_01_MP'

□ Component		PC station	Target system	Verify	Status	
Batch Database Server						
□ Master	Project	Batch_01_Prj\SIMATIC PC S	{local}		Downloaded	●
□	Offline	Batch_01_Prj\SIMATIC PC S	{local}		Downloaded	●
□	Online	Batch_01_Prj\SIMATIC PC S	{local}		Downloaded	●
□ Standby	Project					●
□	Offline					●
□	Online					●
Batch Server						
□ Master		Batch_01_Prj\SIMATIC PC S	{local}		Downloaded	●
□ Standby						●

Configuration Status:

After this step, all the SIMATIC BATCH block structures and messages have been created in the WinCC tag management. One (temporary) SIMATIC S7 PROTOCOL SUITE with block instances also exists under the connection type MPI.

Note:

If the Batch types are modified again later, the steps must be repeated starting from "**Options > SIMATIC BATCH > Batch types > Generate**".

3.4 Configuration Step 2: TM Manager

See description of PCS 7/TM, Chapter 3

- Open the WinCC application and insert a TELEPERM M channel.
- Keep the SIMATIC Manager and the project open.
- Create block structures – without TM_BATCH interface blocks - in the WinCC tag management using ORPA Import.

Note:

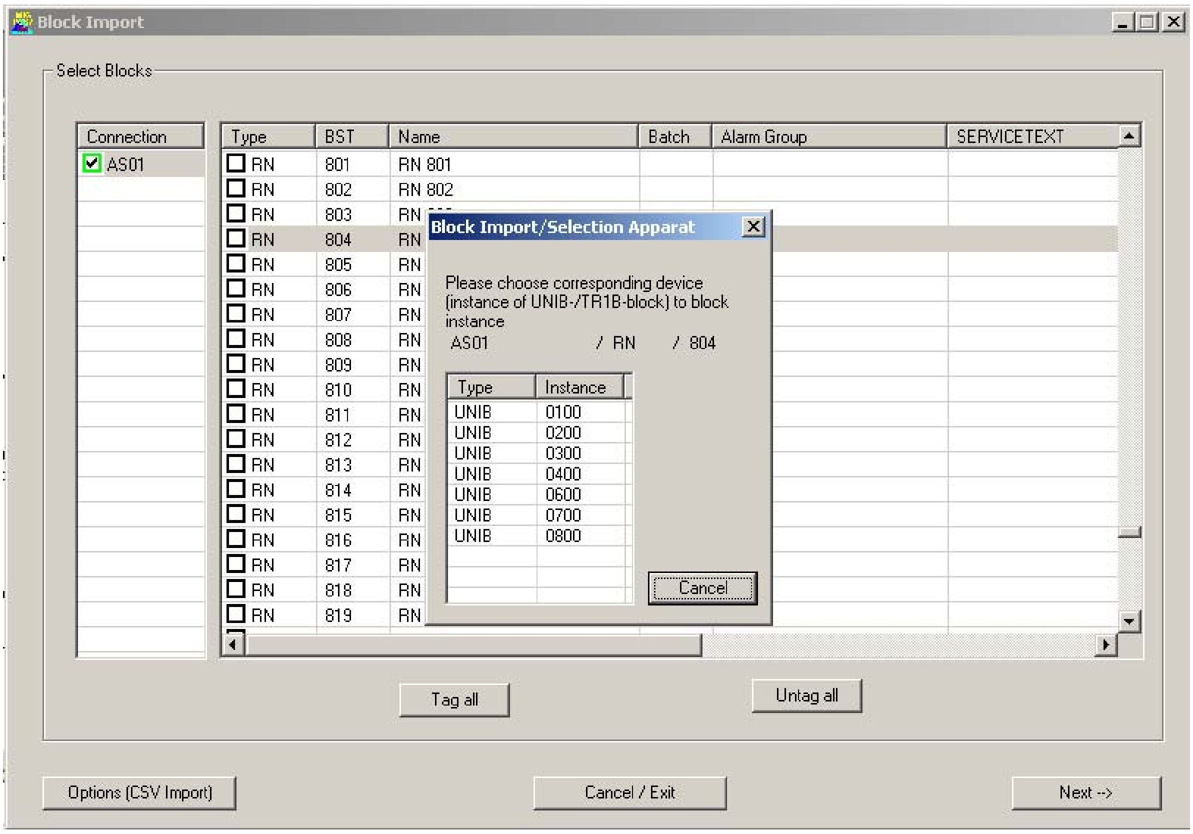
With reference to Section 2.2, no structure definitions are created for the function blocks EM1B, TR1B, and UNIB.

- Create connections and block instances in the WinCC tag management using Block Import. At the same time, the assignment of the technological function blocks to the UNIB block instances must be configured by left-clicking on the "Batch" column for the relevant block instances:

Notes:

Under a connection (AS) up to 128 EM1B instances only may be defined.

The AS internal block number of EM1B may not exceed 190.



Block Import

Select Blocks

Connection
☑ AS01

Type	BST	Name	Batch	Alarm Group	SERVICETEXT
□ RN	801	RN 801			
□ RN	802	RN 802			
□ RN	803	RN			
□ RN	804	RN			
□ RN	805	RN			
□ RN	806	RN			
□ RN	807	RN			
□ RN	808	RN			
□ RN	809	RN			
□ RN	810	RN			
□ RN	811	RN			
□ RN	812	RN			
□ RN	813	RN			
□ RN	814	RN			
□ RN	815	RN			
□ RN	816	RN			
□ RN	817	RN			
□ RN	818	RN			
□ RN	819	RN			

Block Import/Selection Apparat

Please choose corresponding device (instance of UNIB-/TR1B-block) to block instance

AS01 / RN / 804

Type	Instance
UNIB	0100
UNIB	0200
UNIB	0300
UNIB	0400
UNIB	0600
UNIB	0700
UNIB	0800

The block instances of the EM1B blocks already have an assignment to the UNIB blocks. An incorrect entry can be removed by selecting the entry and exiting the open box with "Cancel".

Note:

If the BATCH block EM1B or TR1B has been created incompletely into the WinCC tag management (at least one parameter variable missing, or has already been defined), this block is nevertheless marked as "created in the WinCC tag management" in the block filter list. In order to characterise this incompleteness of a EM1B/ TR1B block, the type name is shown as "EM1B??" or "TR1B??" respectively in the filter an delete dialog. Internally a EM1B or TR1B block is still existing.

If the check mark of an incomplete EM1B is reset the existing parameter variables are deleted during block import.

If the check mark of an incomplete EM1B is set the missing parameter variables are defined.

Please note:

This assignment must be configured as otherwise the configuration of Alarm Logging will be incomplete.

Note:

The .EventState variables of the SKS blocks created implicitly during SIMATIC BATCH configuration must not be used to link tags to WinCC pictures etc.

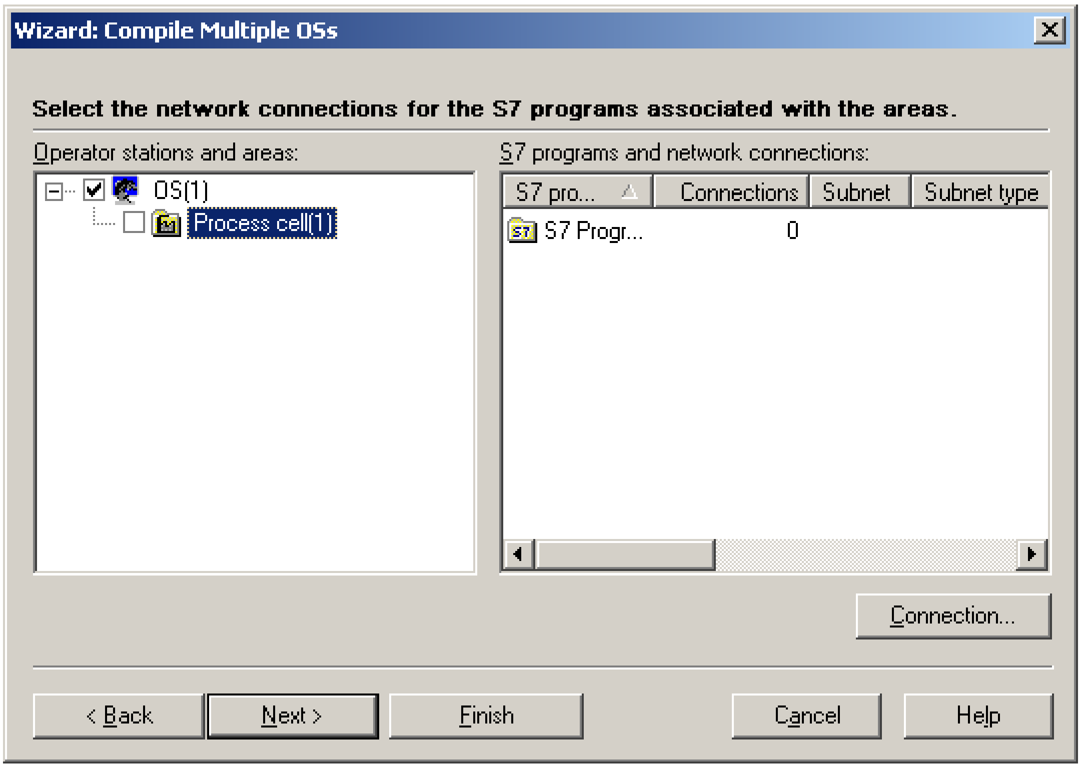
- Create messages in WinCC Alarm Logging using the import message function.

Configuration Status:

After this step, all the TELEPERM M connections, the entire tag management with all structure definitions and block instances, and the messages have been created. SIMATIC S7 PROTOCOL SUITE and its block instances still exist.

3.5 Configuration Step 3: WinCC, SIMATIC Manager

- Create Measured Value Archives in WinCC Tag Logging if desired
- Close the WinCC project
- Compile the OS once more; deselect the S7 program/Process cell, entire OS with memory reset. Ignore warnings about undeleted structures:



Wizard: Compile Multiple OSs

Select the network connections for the S7 programs associated with the areas.

Operator stations and areas:

- ☑ OS(1)
  - □ Process cell(1)

S7 programs and network connections:

S7 pro...	Connections	Subnet	Subnet type
S7 Progr...	0		

Configuration Status:

After this step, all the TELEPERM M connections, the entire tag management with all structure definitions and block instances, and the messages have been created. The measured value archive has also been created. The SIMATIC S7 PROTOCOL block instances are removed again.

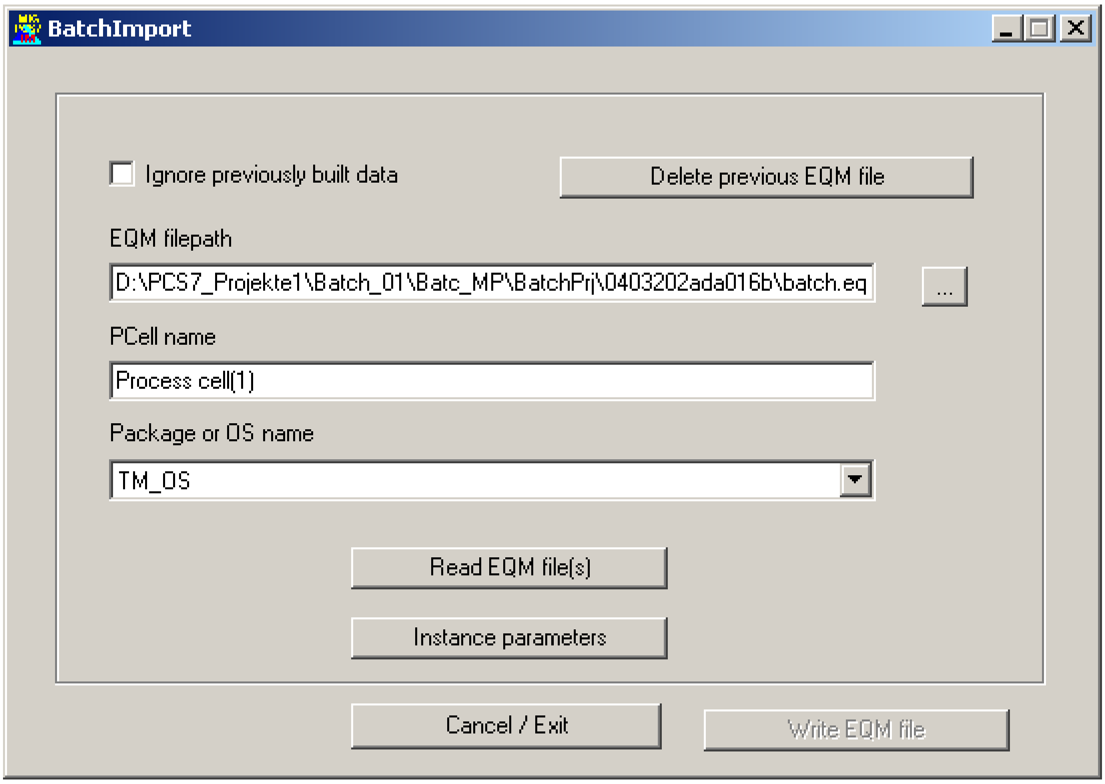
3.6 Configuration Step 4: TM Manager/ BATCH Import

- Open the WinCC application, start BATCH Import and using the "..." button, find the EQM file. This is located in the project folder \BatchPrj\<generated folder name>\. If the Batch instances are distributed over several WinCC applications Batch import has to be done for all OS stations one after another in order to read all Batch instances and types.
  Note: In multiprojects the EQM file has to be selected from the Batch folder of the multiproject and not from the Batch folder of the individual projects.

- Assign the name of the process cell of the BATCH application as the process cell name (in this example, this is "Process cell(1)".)
  The "Ignore previously built data" check box specifies whether or not an EQM file from an earlier configuration session should be taken into account. If the Batch instances are stored in several WinCC applications the "ignore" button is only valid for the present WinCC station. The parameters of the other WinCC stations are furthermore assumed into the EQM file.

  The "Delete previous EQM-File" button deletes the EQM file contained in the part of the configuration specific to TELEPERM M. Only the part configured in the SIMATIC Manager will then be mapped to SIMATIC BATCH.

- With the selection „Package or OS name“ the package is determined if there are defined several OS servers in the project. If the button is clicked then a selection list is offered; it contains the existing packages and the OS name. Then the selected name is used as prefix in the runtime names of the BATCH blocks.



☐ Ignore previously built data

EQM filepath

D:\PCS7_Projekte1\Batch_01\Batc_MP\BatchPrj\0403202ada016b\batch.eq

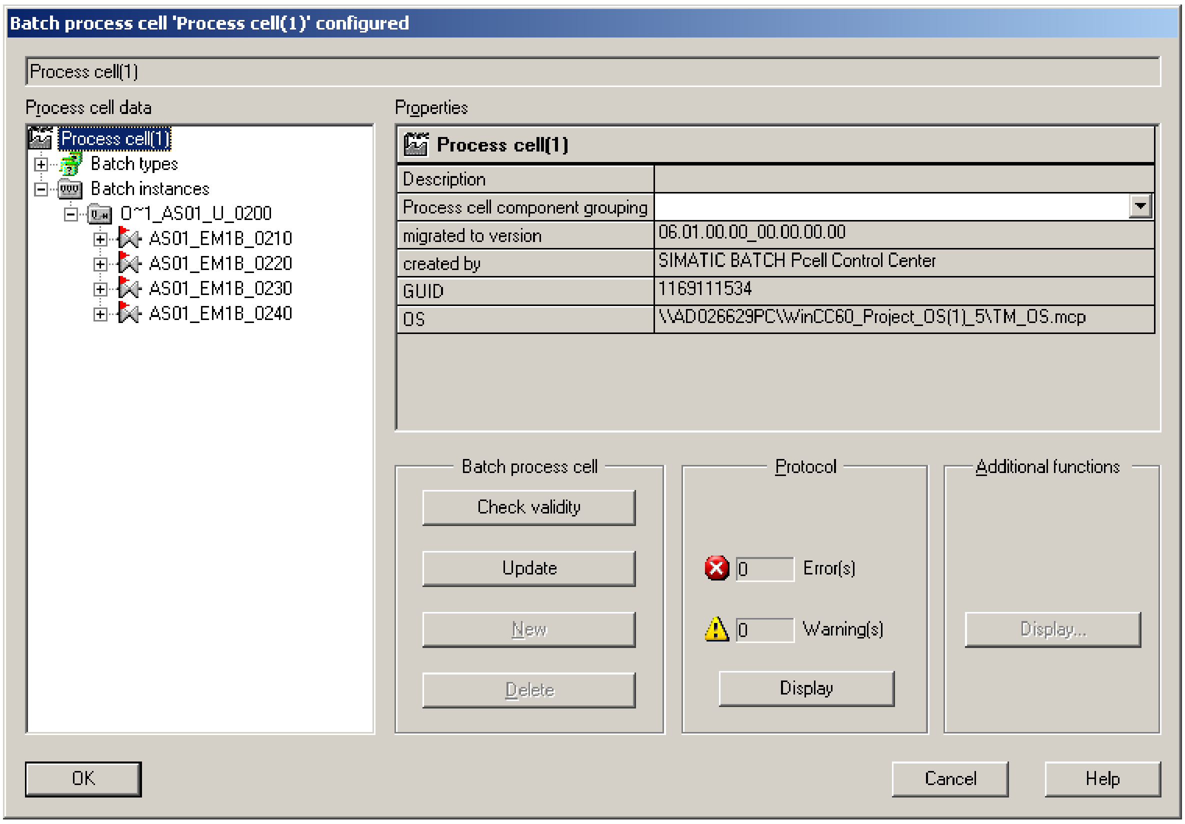
PCell name

Process cell(1)

Package or OS name

TM_OS

- After reading the file by clicking on the appropriately labelled button, the instances are then re-edited:



Batch process cell 'Process cell(1)' configured

Process cell(1)

Process cell data

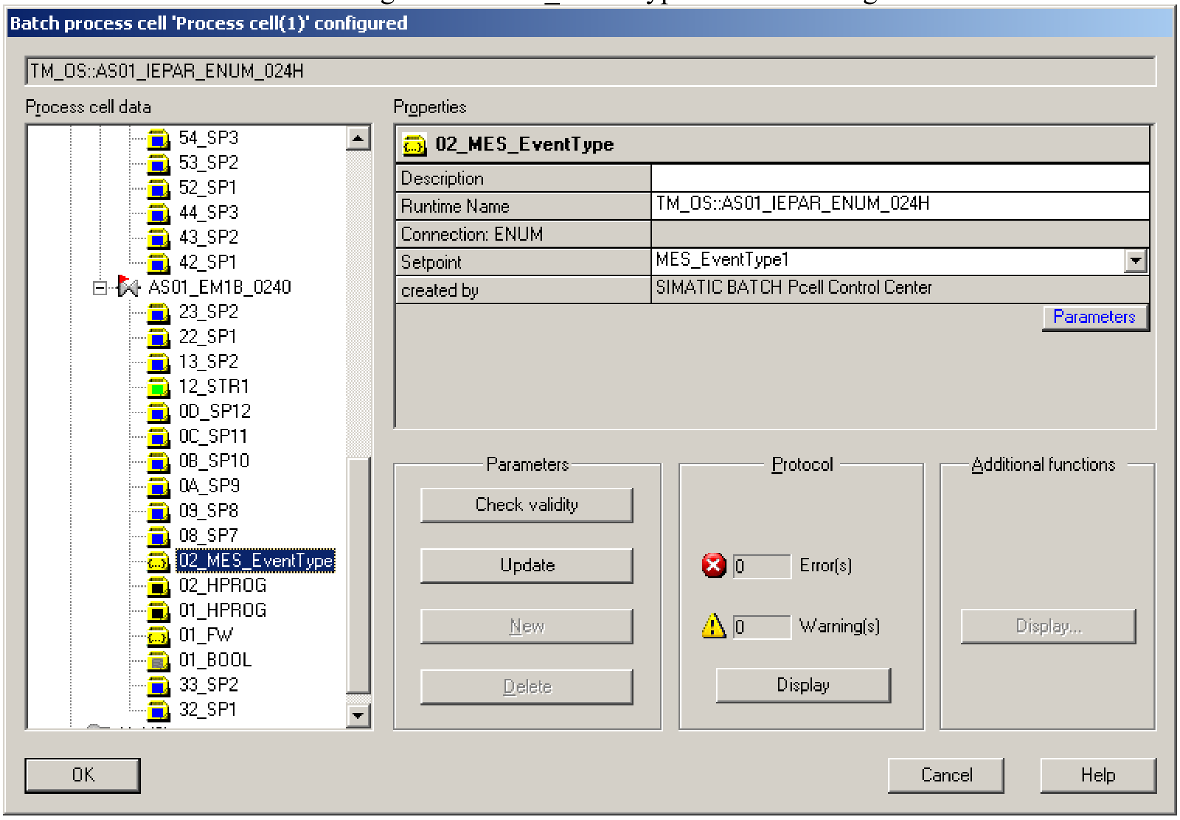
Properties

Process cell(1)

Description	
Process cell component grouping	
migrated to version	06.01.00.00_00.00.00.00
created by	SIMATIC BATCH Pcell Control Center
GUID	1169111534
OS	\\AD026629PC\WinCC60_Project_OS(1)_5\TM_OS.mcp

Protocol: 0 Error(s), 0 Warning(s)

For the several Control Strategies and MES_EventType it must be assigned a value:



Batch process cell 'Process cell(1)' configured

TM_OS::AS01_IEPAR_ENUM_024H

Process cell data

Properties

02_MES_EventType

Description	
Runtime Name	TM_OS::AS01_IEPAR_ENUM_024H
Connection: ENUM	
Setpoint	MES_EventType1
created by	SIMATIC BATCH Pcell Control Center

Protocol: 0 Error(s), 0 Warning(s)

Modifications may be done here if necessary.

Note:

Any configuration of limits will not be transferred into the AS. They have to be configured in the EM1B blocks themselves.

Functions of the buttons:

Update:

Synchronizes instances and types. This step is necessary only if you change the assignment of instances to different classes or types, or if you modify classes and types when instances already exist. The function is not used in TELEPERM M.

New/ Delete:

Create new instances or delete instances. The 'New' function has no practical purpose in conjunction with TELEPERM M and is therefore deactivated.

Check validity:

A structural analysis of the instances is run. Results will be entered in a log file.

Display Log:

Problems detected in the validation are entered in the log file. You can open and display this log.

- Check validity
- If the validation is error-free, you can exit with the OK button.
- Click the **Write EQM-file** button and close BATCH Import with the "Cancel / Exit" button

By clicking the **Write EQM-file** button, the result of the configuration is entered in the PCC_BATCH.eqm file. If there are still validation errors at this time, the result is saved in the temporary file PCC_BATCH.EQM_TMP, so that it is available for further work when the tool is opened again. The program then closes.

Note concerning reconfigurations:

Method 1:

After having added parameters to a batch type the affected batch instances are corrected manually: Runtime-name "not mapped" has to be overwritten with the related WinCC variable name (f.e.: OS(1): AS3_IEPAR_REAL_0236). In case of only few batch instances to be modified, and if the configurator knows the name convention of WinCC variables this method is the easiest way.

In all other cases it may be done like modifying block types.

Method 2:

Step a) BlockImport: Delete the block instances which use the modified batch type.

Step b) BatchImport: Create new EQM file with the deleted batch types.

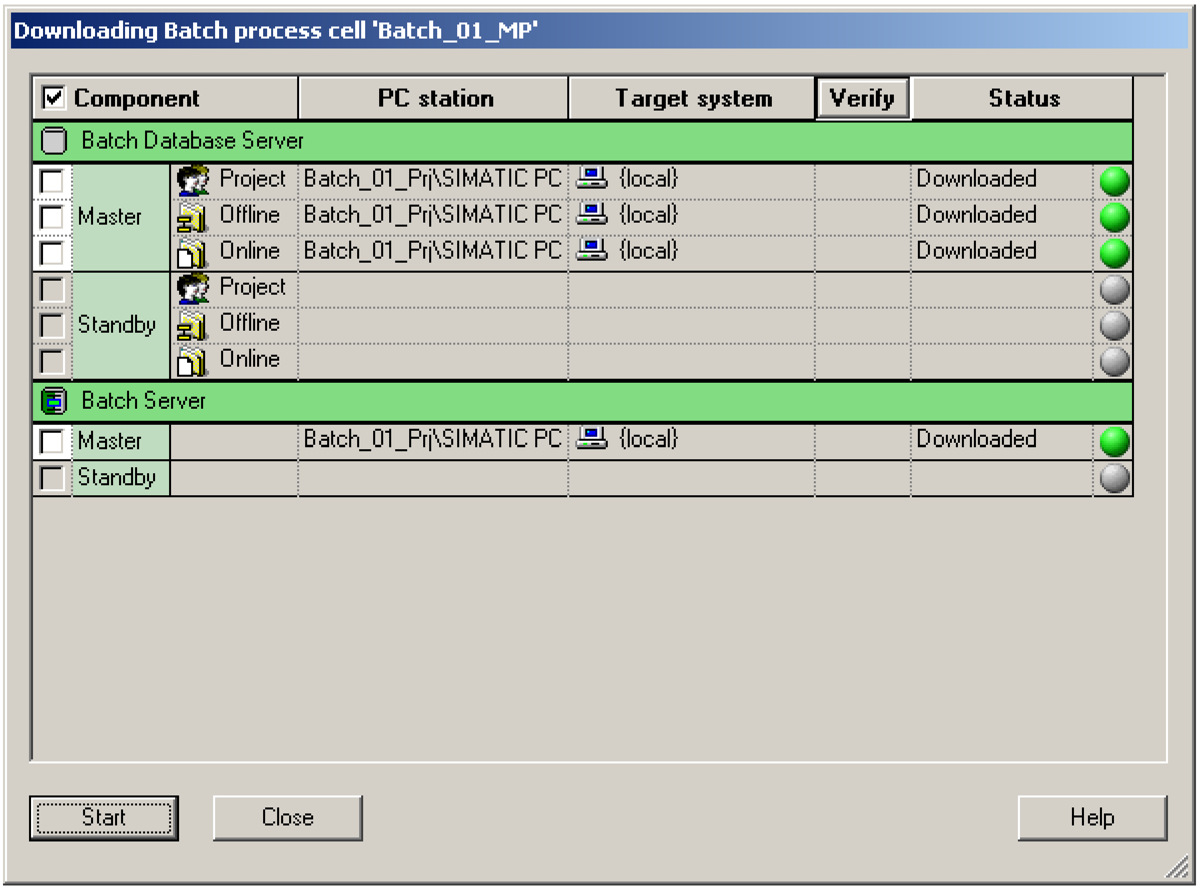
Step c) BlockImport: Re-insert the block instances which use the modified batch types.

Step d) BatchImport: Create new EQM file with the added batch types.

After step d) the resulting EQM file contains the batch instances of the modified batch type.

3.7 Configuration Step 5: SIMATIC Manager

- Mark Multiproject and use **SIMATIC BATCH** > **Batch instances** > **Process cell** > **Download** download Batch Process cell:



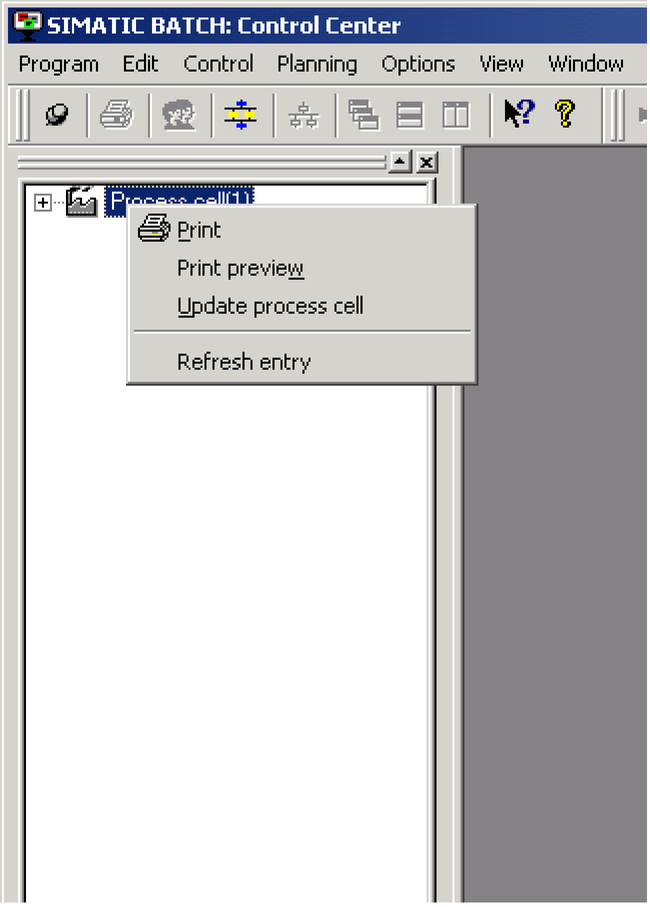
Downloading Batch process cell 'Batch_01_MP'

☑ Component			PC station	Target system	Verify	Status	
Batch Database Server							
□	Master	Project	Batch_01_Prj\SIMATIC PC	{local}		Downloaded	🟢
□		Offline	Batch_01_Prj\SIMATIC PC	{local}		Downloaded	🟢
□		Online	Batch_01_Prj\SIMATIC PC	{local}		Downloaded	🟢
□	Standby	Project					⚪
□		Offline					⚪
□		Online					⚪
Batch Server							
□	Master		Batch_01_Prj\SIMATIC PC	{local}		Downloaded	🟢
□	Standby						⚪

Configuration Status:
After this step, the created EQM file has been transferred to the BATCH server.

3.8 Configuration Step 6: BATCH Control Center

- Right click on **Update process cell**:



Configuration Status:
After this step, the units of the TELEPERM M AS are added to the BATCH Service Center.

4 Guidelines for Configuring AS Function Blocks

During the installation of PCS 7/TM, a compressed PROGRAF AS library with the name BatchSSB.zip is transferred to the <...>\Siemens\TM_Werkzeuge\Batch folder and can be used to configure interface blocks.

How to Use BatchSSB.zip

1. Transferring Batch interface block types

The interface blocks are supplied in the BATCHSSB.zip file. After unpacking the file, start PROGRAF AS+ and select the automation system.

a) whether
Libraries/Import->Transfer
Select *Libraries:* BatchSSB.235
Element types: Select Importbatch
Library elements:select MUST_BV6
and then ->Transfer.
EXIT.

The AFB types EM1B, OP1B, TR1B and UNIB as well as the corresponding PROBLEMS EM1B and EM1E are imported. The instance OP1B.EM1B is created.

The other PROBLEMs may be used on demand as substitute für L999 (LGR9) or GAB, as well as the PROBLEM.EM1C for manual mode of the GF block.

b) or

Libraries/Import->Transfer
Select *Libraries:* BatchSSB.235
Element types: Select AFB TYP, then as displayed in *Library elements:*
OP1B
EM1B
TR1B
UNIB
one after the other and then ->Transfer.

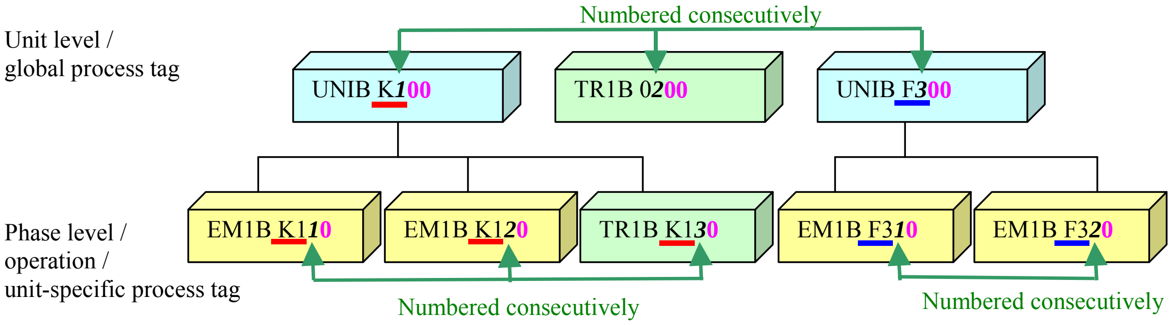
Element types: Select PROBLEM, then as displayed in *Library elements*:
EM1B
EM1E
EM1C
LGR9
GAB
one after the other and then ->Transfer.
EXIT.

2. Transferring Model Blocks

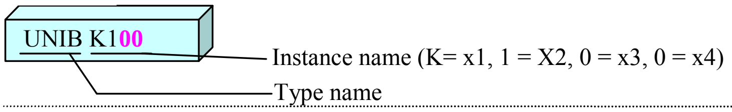
In the CSF Editor: Create a chart (e.g. model chart)
Library ->Transfer
Libraries: select BATCHSSB.235
Library elements: select MUSTERBV6
Transfer.
Check the log and ignore lines with "...Visibility identifier identical..".
NEXT
Place interface blocks in the chart.
The UNIB, EM1B, SKS and TR1B interface blocks are now available for configuration.

Naming Convention (see picture)

The import of the data necessary for SIMATIC BATCH is done by the BatchImport module that is started from the taskbar. You only need to specify the path of the .eqm file.
The function blocks for SIMATIC BATCH receive a name with 4 characters ($x_1x_2x_3x_4$) as their instance names.



Legend:



🟥 🟦	Unique for interface blocks of a unit
2 Numbered consecutively	Unit level: Should be numbered consecutively; range of values from 1 through 8 and then continuing with A through Z. Phase level: Should be numbered consecutively within a unit; range of values 1 through 9 and then continuing with A through Z
0 or 00	Must always be 0.

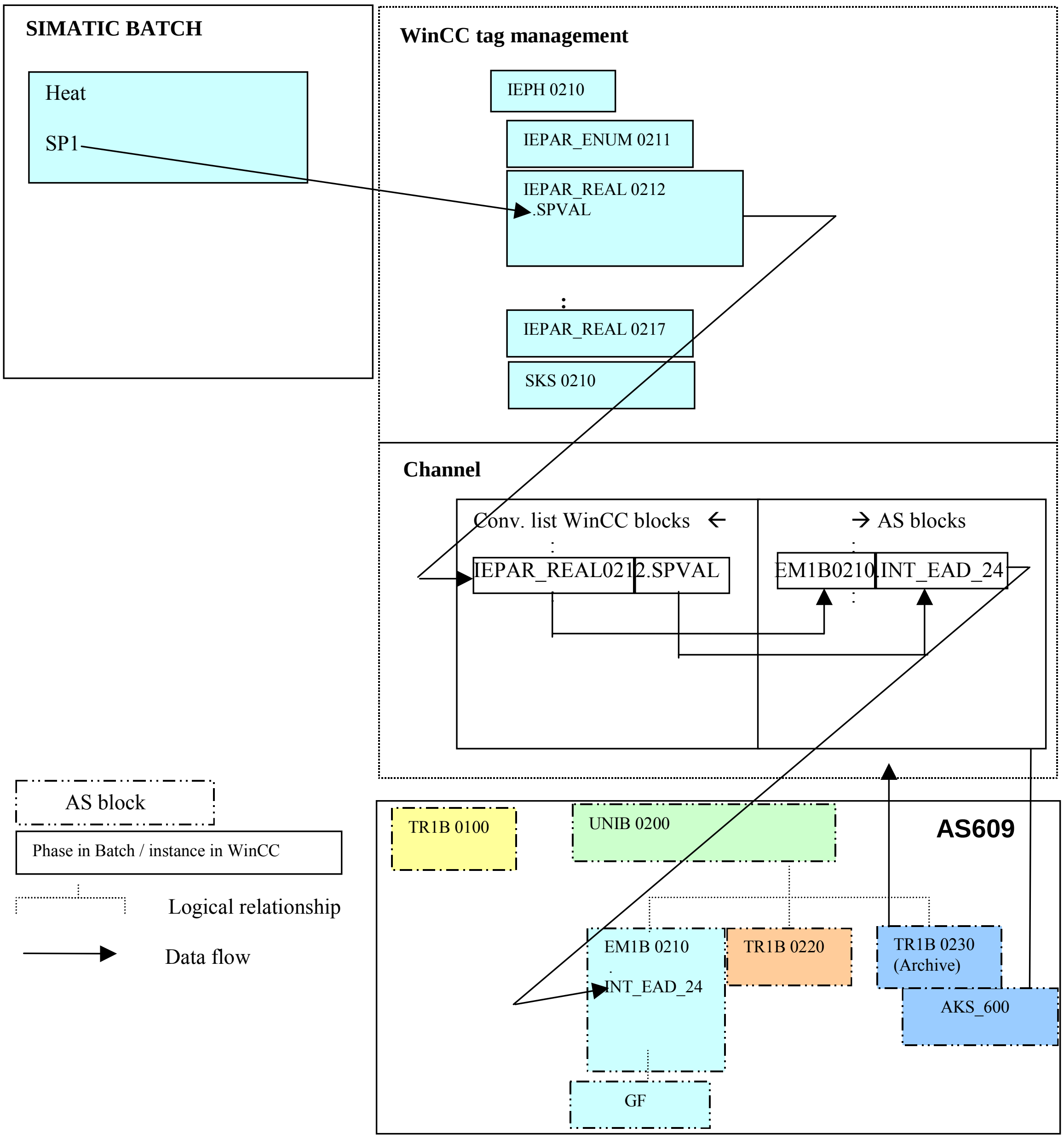
x_1:is free for the customer *)
x_2:[1-9], [A-Z] identifies the unit or global process tag *)
UNIB (IUNIT_BLOCK) (unit), TR1B (TAG_COLL)(process tag)
x_3:[0-9], [A-Z] identifies the phase or the unit-specific process tag. 0 is possible only at the higher level
TR1B (TAG_COLL), EM1B (IEPH or IEOP).
x_4: [0] mandatory, required for the lower-level parameter blocks (IEPAR_BOOL, IEPAR_REAL and IEPAR_ENUM).

*) The x2 character must be assigned uniquely to a unit or process tag on the AS. The x1 character can be different per unit or process tag on the AS, however all components of this unit or process tag use the same x1 character.

Block instances with the same instance names must not occur. Example: UNIB,0200 and TR1B,0200 or UNIB,0200 and TR1B,A200 are not permitted.

The SKS blocks assigned to the EM1B blocks have identical block names. The SKS blocks serve as extension of the status bits to the EM1B blocks.

Note:
This naming convention must be adhered to!



This figure shows how the channel works based on the example of a write job for the first setpoint of the "Heat" function. At the same time, the naming convention is illustrated in a practical situation.

Processing Cycles

The values of the EM1B block relevant for SIMATIC BATCH are read in a 1 second cycle. It is therefore necessary for the EM1B blocks to be processed in a 1 second cycle. The lower-level GF blocks can be configured in higher processing cycles. Since an EM1B block is processed more often than its lower-level GF block, it is unavoidable that commands to this GF block are active until it has adopted the new status (ZUCD) and has signalled this to the EM1B block.

Interconnection with other Blocks

The inputs of the EM1B blocks must not be interconnected with other function blocks.

5 EM1B Block

5.1 Function

The EM1B user function block represents the interface between SIMATIC BATCH V6.00, on one hand, and the GF block (version ≤ V1.3 see description in /2/) in the AS 235 or AS 488/ TM on the other. Each EM1B block requires an SKS block. The SKS block must not be installed in a cycle!
The OP1B block serves as interface to SIMATIC BATCH. An instance named EM1B of this block must exist.

5.2 Configuration

Before installation in the processing sequence, the following inputs of the EM1B block and SKS block must have parameter values assigned and be interconnected to the assigned GF block and SKS block:

The inputs 1, 2, 4, 6, 8, 10, 12, 16 and 18 of the SKS block must have the value 0 assigned. This step can be omitted if these blocks were created as copies from the model chart within PROGRAF AS+.

Input 44 EA of the EM1B block must be interconnected with the GF block (header interconnection):

```
          A,EM1B,aaaa;
          Q,44,GF,bbbb,0;          bbbb = block name of the corresponding GF block.
```

Input 45 EA of the EM1B block must be interconnected with the SKS block (header interconnection):

```
          A,EM1B,aaaa;
          Q,45,SKS,aaaa,0;
```

Input 1 EB (BAEN) must have the value 1 assigned to operate with SIMATIC BATCH.

At input 3 you select the mapping as IEPH (set 0) or IEOP (set 1).

The parameters 4, 5, 8, 9, 11, 23 ,26 to 62 must be assigned the value 0 after definition of a block instance. This step can be omitted if these blocks were created as copies from the model chart within PROGRAF AS+.

You can use inputs 68 through 71 for your own use to interconnect a GA, GB, GM or GT block.

All necessary parameter links with the GF block are made internally in the program in EM1B and do not require additional interconnection.

The SPR1 parameter (input 23) contains the control strategy.

With the SIMU parameter (input 43), you can switch over between normal mode (=0) and simulation mode (=1). In simulation mode, no signals are forwarded to the GF.

5.3 Modes

5.3.1 Normal Mode (SIMU = 0)

The EM1B block reads the status of the GF block (ZUCD) cyclically and converts it according to the SIMATIC BATCH standard as follows:

State	Status of GF block, parameter ZUCD (4 ID)	EM1B block (SIMATIC BATCH), internal parameter STA2 (51 ID)
Off	0	1
>Run	1	
Run +.RDY = 0B	2	2
Run + .RDY = 1B	2	32
>Hold	3	
Held	4	8
>End	5	
End	6	4 when completed or 16 when aborted or 64 when stopped

Note: The intermediate states >Run, >Hold and >End are signalled in the internal STA3 variable. The .RDY parameter of EM1B must be set or deleted to signal the READY state.

State	Status of GF block, parameter ZUCD (4 ID)	EM1B block (SIMATIC BATCH), internal parameter STA3 (52 ID)
Off	0	
>Run	1	2 if started or 4 if resuming
Run	2	
>Hold	3	16
Halt	4	
>End	5	8 when completed or 32 when aborted or 64 when stopped
End	6	

The block state is entered in the status word QSTA (output 1) and is formed from the internal variables listed above STA2, STA3 and STA4.
The automatic identifier corresponds to the BAEN (BATCH enable) status.
SIMATIC BATCH reads the value of the block status cyclically.

Depending on the status, EM1B reads the following inputs that can be set by SIMATIC BATCH and forwards them to the GF block and resets them:

Status (to GF standard)	Input:	Reaction
0 (OFF)	OCCU = 1	GF.BLAU = 1
	OCCU = 0	GF.BLAU = 0
	BAEN = 1	GF.AUEX = 1
	BAEN = 0	GF.AUEX = 0
	RST	= 0
	PARA	Set control strategy, set setpoints, = 0
	ABRT	= 0
	If STRT= 1	GF.AUEX = 1
	-then control strategy SPR1	GF.FWEX = SPR1
		Start command to GF: STEX = 1
	-then ABEX	= 0
1 (>RUN)		Process values of last run are reset

	ABRT	GF.ABEX= ABRT
		GF.STOP= ABRT

	STOP	GF.STOP = STOP
2 (RUN) + RDY = 0B	HOLD	GF.HTEX = HOLD

	ABRT	GF.ABEX= ABRT
		GF.STOP= ABRT

	STOP	GF.STOP = STOP
		GF.STEX = 0
		GFF.FOEX = 0
	PARA	Set control strategy, set setpoints, = 0
2 (RUN) + RDY = 1B	HOLD	GF.HTEX = HOLD

	ABRT	GF.ABEX= ABRT
		GF.STOP= ABRT

	STOP	GF.STOP = STOP
		GF.STEX = 0
		GFF, FOEX = 0
	CONT	Call PROB.EM1B
	CONT + STRT	Call PROB.EM1B
	TERM	Call PROB.EM1B
	PARA	Set control strategy, set setpoints, = 0
3 (>HOLD)	STOP	GF.STOP = STOP

	ABRT	GF.ABEX= ABRT
		GF.STOP= ABRT

Status (to GF standard)	Input:	Reaction
4 (HOLD)	HOLD	= 0
	STRT	GF.FOEX = STRT

	ABRT	GF.ABEX= ABRT
		GF.STOP= ABRT

	STOP	GF.STOP = STOP
		GF.STEX = 0
		GF.HTEX = 0
5 (>END)	STOP	GF.STOP = STOP

	ABRT	GF.ABEX= ABRT
		GF.STOP= ABRT

6 (END)	If GF.ABEX = 0	STA2 = 4 (COMPLETED)
	If GF.ABEX = 1	STA2 = 16 (ABORTED)
	If STOP = 1 and GF.ABEX = 0	STA2 = 64 (STOPPED)
		GF.ABEX = 0
	ABRT	= 0
	HOLD	= 0
	If RST = 1	GF.ABEX = 1

Explanation of the Abbreviations

1. EM1B Block

STRT	12 PB	Start
HOLD	13 PB	Hold
STOP	14 PB	Stop
ABRT	15 PB	Abort
RST	16 PB	Reset
TERM	17 PB	Terminate
RDY	18 PB	Ready
CONT	19 PB	Resume
PARA	20 PB	Set control strategy, set setpoints,
STA2	66 ID	Internal status (basic status)
STA3	67 ID	Internal status (intermediate)

2. GF Block

AUEX	32 EB	Automatic external
HTEX	33 EB	Hold external
STEX	35 EB	Start external
FOEX	34 EB	Resume external
ABEX	36 EB	Abort external
FWEX	38 EA	Control strategy external

5.3.2 User Interface

Two user programs PROB.EM1B and PROB.EM1E belong to the EM1B block. Both programs can be extended by the user when necessary. The PROB.EM1B program is used to check the commands and setpoints and may need to be adapted by the user. It is called when a command is applied.

Below, there is an excerpt from the parameter transfer for **PROB.EM1B**:

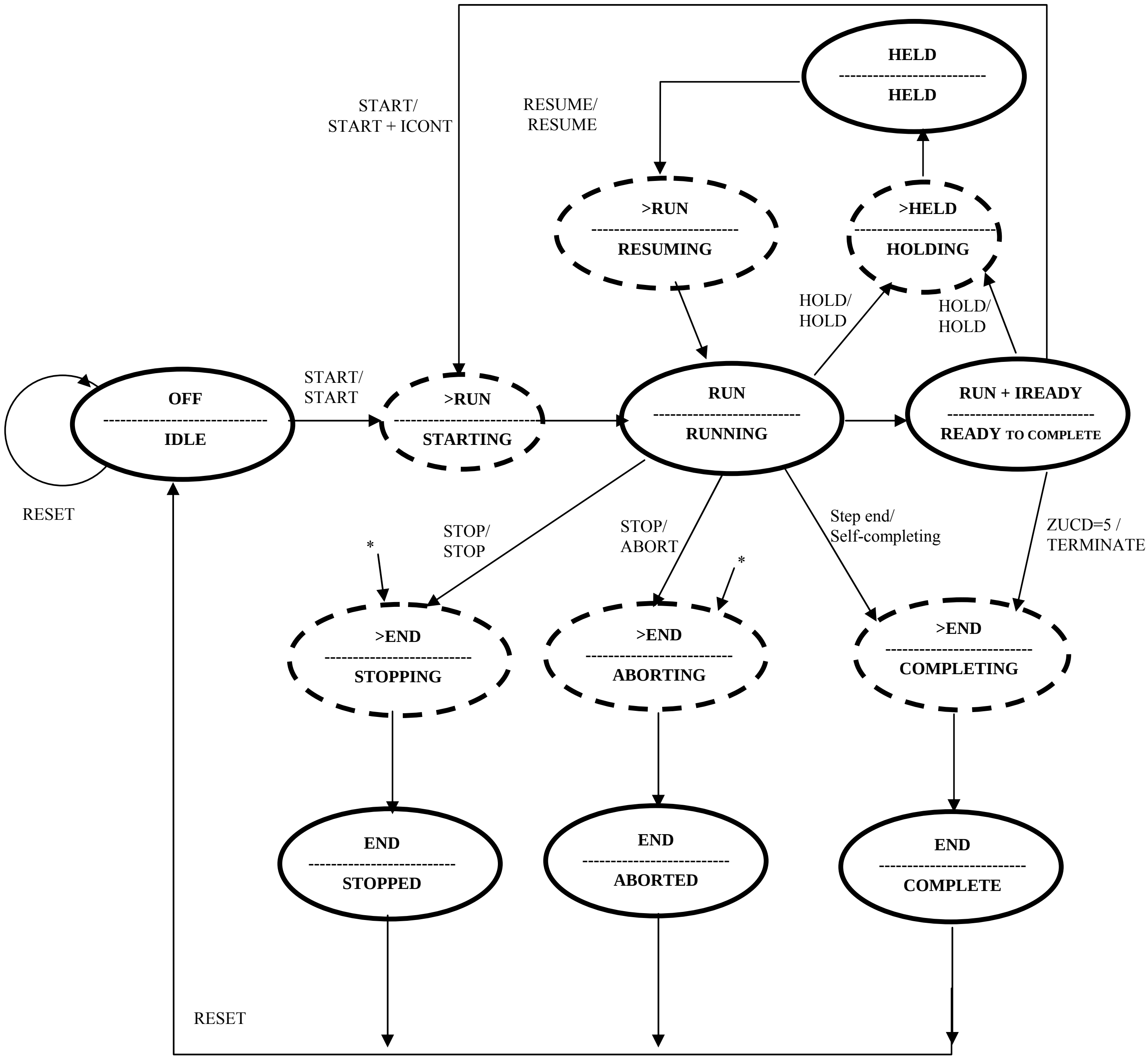
```
/** ANSCHLUSS ZU EM1B,PRUEFEN DER KOMMANDOS**/;
/**   V1. 06  02.09.03  A&D AS RD53        **/;
/* LA0 = ADRESSE EM1B-BAUSTEIN */;
/* LA1 = ADRESSE GF  -BAUSTEIN */;
/* LA2 = AUFTRAG VON EM1B-BST. */;
/* LB0 = 0B OK, 1B = FEHLER    */;
/* BESCHREIBUNG AUFTRAG LA2              */;
/* 1: BEFEHL .PARA: FAHRWEISE,SOLLWERTE  */;
/*    BEI LOCK = 1B                      */;
/* 2: STARTEN     .STRT                  */;
/* 3: FORTSETZEN  .STRT -> .FOEX         */;
/* 4: ANHALTEN    .HOLD                  */;
/* 5: BELEGEN     .OCCU = 1B             */;
/* 6: FREIGEBEN   .OCCU = 0B             */;
/* 7: FAHRWEISE EINSTELLEN .SPR1         */;
/*    SOLLWERTE,GRENZEN IN GF UEBERTRAGEN*/;
/*    EINHEITEN,GRENZWERTE IN EM1B BEI BAEN = 0B */;
/* 8:                                    */;
/* 9: BEFEHL      .STOP = 1B             */;
/* 10:BEFEHL      .ABRT = 1B             */;
/* 11:RUECKSETZEN .RST -> GF...ABEX = 1B */;
/* 12:BEFEHL .TERM= 1B -> GF..??.(RDY =1B) */;
/* 13:BEFEHL .STRT= 1B -> GF..??.(RDY =1B) */;
/* 14:BEFEHL .CONT:                      */;
/* 15:BEFEHL .ITAK: FAHRWEISE,SOLLWERTE  */;
/*    IN RUNTIME                         */;
/* 16:STEX FOEX LOESCHEN                 */;
/* 17:FAHRWEISE LOESCHEN                 */;
/*    SOLLWERTE LOESCHEN                 */;
```

The PROB.EM1E program is used for cyclic processing to form the status word and can, for example, write the Ready status to input 18 RDY.

Below, there is an excerpt from the parameter transfer for **PROB.EM1E**:

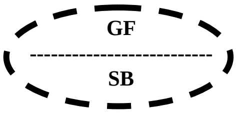
```
A,PROBLEM,EM1E;
/** ANSCHLUSS ZU EM1B,ANWENDER-ERWEITERUNG **/;
/**   V1. 05  03.07.03  A&D AS RD53        **/;
/* LA0 = ADRESSE EM1B-BAUSTEIN */;
/* LA1 = ADRESSE GF  -BAUSTEIN */;
/* LB0 = 0B OK, 1B = FEHLER    */;
DE;;
```

State Transition Diagram for GF including Interface Blocks



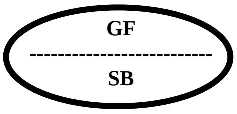
Legend:

Intermediate status:



* : Can be reached from all states and intermediate states (except END and OFF).

Status:



Command: GF/
SB

The intermediate statuses relate to the GF (GF block) but are not indicated in the SB (interface block).

5.3.3 Simulation Mode (SIMU = 1) or Control Strategy 90 / 91

In the simulation mode, no GF block is addressed.
The time for RUNNING is set in seconds using the STP parameter (input 11).
The SPR1 parameter (control strategy) specifies whether or not the phase changes to the "COMPLETE" status (SPR1=90) or the "READY" status (SPR1=91) after the simulation. During the "RUNNING" status, the parameters SPR3 through SPR7, are increased by 0.157, as long as # 0, and applied to the outputs QAR3 to QAR7.
The SPR2 parameter specifies how long the program waits in an intermediate state in seconds.

5.3.4 Manual Mode

When the GF block operates in manual mode, setpoints and control strategy can be changed directly. In order to inform EM1B about these changes the user programm PROB.EM1C may be used.
To use the subroutine PROBLEM.EM1C a small addition has to be inserted in the program GF.CHECK:

1. The program EM1C may be called either from the GF.CHECK routine or in the online part (on demand, not cyclically).

2. Condition of the GF block is that the block name is the same as the one of the EM1B block.. (The EM1B block will be searched). In order to check if a EM1B block with the same name exists, the last lines of PROBLEM.EM1C may be activated. In an error case a process control system message with error number S 324 will be generated.

```
/* ELSE  */;
/*    LA0 UND 0 =: LA2 */;
/*    CALL SYSTEM.SFE */;
/*    GIVE -32444,LA2,LA0 */;
/* KEIN EM1B-BAUSTEIN MIT DEM GLEICHEN NAMEN VORHANDEN */;
```

3. In GF.CHECK or in the attached PROBLEM the following call has to be inserted at the end of the corresponding STEP (STEP 150, 157, 162, 167, 172, 177 and 182) for each operating alternative of FW, W1 till W6

```
CALL PROBLEM.EM1C;
GIVE LAx,order;
```

LAx = data record, order = concerning the below mentioned order number.

4. The current GF data record and an order number is transferred as parameter to the program:

order = 0 : (on change of setpoint, STEP 157, 162, 167, 172, 177 and 182 in GF.CHECK) the set-points (W1 till W6) and the control strategy (FW) are pasted in the variables of the EM1B block and the flag RFSH in EM1B block will be set.

order = 1 : (on change of control strategy, STEP 150 in GF.CHECK) the upper and lower limits , the units, the setpoints (W1 till W6) and the control strategy(FW) are pasted in the variables of the EM1B block and the flag RFSH in EM1B block will be set..

The EM1B block transfers RFSH via the status word to SIMATIC BATCH and deletes RFSH.

Following an excerpt of the parameter transfer to **PROB.EM1C**:

```
A,PROBLEM,EM1C;
TAKE LA0,LA1;
/**   V1.  0  09.10.03  A&D AS RD53          **/;
/* WERTE BEI HANDBEDIENUNG VON GF IN EM1B KOPIEREN */;
/* LA0 = DATENSATZ VON GF-BAUSTEIN            */;
/* LA1 = 0: FAHRWEISE,SOLLWERTE               */;
/* LA1 = 1: FAHRWEISE,SOLLWERTE,GRENZEN,TEXTE */;
/* ZUR KONTROLLE OB EM1B-BAUSTEIN VORHANDEN IST, */;
/* KANN ELSE-ZWEIG AM PROGRAMMENDE AKTIVIERT WERDEN */;
```

5.4 Fault Causes if EM1B Block sets ERROR in QSTA Output

The indication of QSTA is negative (Bit 31 =1), in SIMATIC BATCH a flash symbol is shown, Additionally a error number is written to the output .RAA4 (only relevant if in column ERROR "*")

Cause				
Command is refused		**ERROR**	**RAA4**	**Extension**
				After a command from SIMATIC BATCH the PROBLEM.EM1B is called, the error number is the same as the STEP number; the error case may be defined by the user (e.g. wrong control strategy)
				command
		*	**1**	PARA, check control strategy, setpoints
		*	**2**	STRT
		*	**3**	resume
		*	**4**	HOLD, hold
		*	**5**	OCCU = 1, occupy
		*	**6**	OCCU = 0, free
		*	**7**	control strategy
		*	**9**	STOP
		*	**10**	ABRT, abort
		*	**11**	RST, reset
		*	**12**	TERM, terminate
		*	**13**	STRT at RDY = 1 (flying change of control strategy)
		*	**14**	CONT = 1
		*	**105 (15)**	Take control strategy/ setpoints at RUNNING
		*	**16**	Delete STEX / FOEX
		*	**17**	Delete setpoints
Condition error GF and EM1B block				
				GF block has an improper state:
		*	**100**	OCCU = 1 but GF .ACE = 0
		-	101	GF after occupying not in OFF or >RUNNING
		-	102	GF changes from >RUNNING to OFF, >HALT, HALT
		*	**103**	GF on Abort out of LAUF not in AUS,>ENDE or ENDE
		*	**104**	GF on Stop out of LAUF not in AUS,>ENDE or ENDE
			105	-
		-	106	GF changes from LAUF to >LAUF or AUS
		-	107	GF changes after Terminate from LAUF + RDY to >LAUF,LAUF, >HALT or HALT
		-	108	GF changes from >HALT nach AUS, >LAUF,LAUF

		-	109	GF changes from >ENDE a out of LAUF to >LAUF,LAUF,>HALT,HALT (Abort)
		-	110	GF changes from >ENDE out of LAUF to >LAUF,LAUF,>HALT,HALT (Stop)
		-	111	GF changes from ENDE to >LAUF,LAUF,>HALT,HALT,>ENDE
		-	112	GF changes from HALT to >HALT
		-	113	GF changes on Fortsetzen from HALT to AUS,>HALT or HALT
		-	114	GF changes on Abbrechen from HALT to >LAUF,LAUF,>HALT or HALT
		-	115	GF changes on Stoppen from HALT to >LAUF,LAUF,>HALT or HALT
		-	116	GF changes from ENDE to >LAUF,LAUF,>HALT,HALT,>ENDE
		-	117	GF changes from LAUF + RDY to AUS, HALT
		-	118	GF changes from Anhalten in LAUF + RDY to AUS, >LAUF, LAUF
		-	121	EM1B in READY + RESUMING
		-	122	EM1B in STOPPED and GF not in AUS or ENDE
		-	123	EM1B in IDLE , internal state
		-	124	EM1B in RUNNING , internal state
		-	125	EM1B in HELD , internal state
		*	**126**	GF in >ENDE without STOP or ABRT
		*	**127**	GF in ENDE without STOP or ABRT
		*	**128**	GF in HALT, EM1B in HOLD mit ERROR
		*	**129**	GF changes from >RUNNING to >ENDE
		*	**130**	GF in >HALT with ERROR (.SAST)
Feedback PROBLEM.EM1E		*	**120**	Free of use for the user
Feedback GF block variable SAST		*	**119**	GF block sets the variable .SAST

5.5 Number of EM1B Block Instances under a Connection

The number of EM1B block instances under a connection (AS) may not exceed 128.
The AS-internal block number may not exceed 190.

Addional configuration notes:

- If EM1B blocks are existing in an AS, the CS 275 bus load is optimized by means of the OP1B block (OP1B.name = EM1B.name).
  Per AS 4 parameters are read each second. The CS 275 bus load produced by that amounts about 0.4% per AS. If more than 17 EM1B blocks have been altered since the last read-in, all EM1B blocks have to be read.

- In the latter case 4 parameters will be read per EM1B block. The CS 275 bus load produced by that amounts about 0.3% per block.

- At system start also a complete read-in of all EM1B blocks will be made.

In worst case an additional CS 275 bus load will be engendered by reading all EM1B blocks which should not be neglected.
For estimating this CS 275 bus load following formular may be used:
additional CS 275 bus load = sum of all EM1B blocks within the system * 0.3%

Example: 5 AS with 60 EM1B blocks each and 1 AS with 180 EM1B blocks
→ Additional CS 275 bus load = 480 * 0.3 % = 144%.
With a cyclically CS 275 bus load of 60% for example, the additionally 144% would be dispersed on (144% / 40%) s = 3.6 s. During this time the CS 275 bus will be used to capacity (100%). After 3.6 s the CS 275 bus load will return to 60%.

Please check whether this short-time 100% peak load of the CS 275 bus can be tolerated from system view.

6 TR1B Block

6.1 Function

The TR1B block has no logic. It is used to make 10 binary and 10 analog parameters available for the transition conditions to be formulated in SIMATIC BATCH.

6.2 Configuration

Parameters 3 to 23 must be interconnected after a block instance is defined. The data is supplied by the blocks created to allow the transition conditions to be formulated in SIMATIC BATCH.

7 UNIB Block

7.1 Function

Batch control coordinates the allocation of individual units to the batches using the UNIB block. A UNIB block must exist for every unit (in other words, an instance in one of the charts of the hierarchy folder).

7.2 Configuration

Input 1 EB (BAEN) must have the value 1 assigned to operate with SIMATIC BATCH. This step can be omitted if they were created as copies from the model chart within PROGRAF AS+.

The parameters 2, 3, 4, 16, 17, 19, 21, 22 and 23 must be assigned the value 0 after definition of a block instance. This step can be omitted if they were created as copies from the model chart within PROGRAF AS+.

7.3 How the Block Works

Allocate/Release

To allocate a unit, batch control sets OCCUPIED(OCCU) identifier to 1. It also enters the following allocation information:

Batch name, batch ID (UBA_NAME(BAN1), UBA_ID(BAID))

Recipe name, recipe version, formula category (URP_NAME(RPN1), URP_REL(RPR1), FORMULA(FOR1)) are listed in the WinCC database and in the channel.

The material name and material code (MAT_NAME(MAT1), MAT_SP(MASP)) of the product to be produced in the batch are listed in the WinCC database and in the channel.

The block is occupied only when it is released for SIMATIC BATCH (BA_EN(BAEN) = 1) and there is no group error (status word bit 31 = 0).
When it is released again, the OCCUPIED(OCCU) is simply set to 0. The allocation information is retained until it is deleted by SIMATIC BATCH and can be used in the user program and in the planning of further batches. For example, if the same product is planned, no cleaning batch is necessary between production batches.

Status word:

The state of the UNIB block is available in the status word Q_STATUS(QSTA) and is monitored by SIMATIC BATCH.

User status word:

The USER_STATUS(USTA) parameter is a status word that can be set by other PC applications and is available on the OS as QUSER_STATUS(QUST). It can then be queried on the OS by the relevant applications. The status word must not be used by a user program.

Block status word:

The UNIB block contains a TELEPERM M status word. This generates state messages according to the PCS 7 implementation of IUNIT_BLOCK.

Sign-of-life monitoring:

At intervals that can be set in SIMATIC BATCH, batch control sends a "lifebeat" to all occupied UNIB blocks to signal to the block that the AS-OS connection still exists and that batch control is working.

If the "Lifebeat" is not received within the interval set in SIMATIC BATCH, the UNIB sets AS_OS_ERR(OERR) to 0. This allows the user program to react to the missing connection to Batch Control. If the connection is reactivated ("Lifebeat" received again), the AS_OS_ERR(OERR) output is set to 1 again.

SP_COUNT(SPCT) = 0: deactivated / VA_COUNT(VACT) constant 1

SP_COUNT(SPCT) > 0: VA_COUNT(VACT) is decremented at 1 second intervals starting from SPCT.
If VA_COUNT(VACT) = 0, the monitoring time has elapsed, in other words, no contact to the OS or batch control.
If LIFE(LIFE) = TRUE, the monitoring with SP_COUNT(SPCT) is restarted.

AS_OS_ERR(OERR) constant 1, if connection is OK or SP_COUNT(SPCT) = 0
AS_OS_ERR(OERR) constant 0, if SP_COUNT(SPCT) <> 0 and VA_COUNT(VACT) = 0

Deactivating a Unit

The UNIB allows specific units to be deactivated (locked) preventing them from being used by batch control. The PEND_OOS(POOS) (pending out of service) input sets an internal trigger. If the unit is not occupied, BA_EN(BAEN) is set to 0 immediately. If the unit is allocated to a batch (OCCUPIED(OCCU) = 1), the UNIB waits until batch control cancels the allocation and then sets BA_EN(BAEN) to 0.

8 Special Points to Note

8.1 Tips

- If you want to view the recipe data in the interface blocks of the AS, it is advisable to formulated the recipe data such as recipe name, batch name, material code, and material name only in upper-case letters.

- The BATCH launch coordinator must only be started after initiating WinCC runtime.

- When creating recipes, avoid configurations in which the same recipe phases of the same unit (UNIB) run at the same time.

9 Appendix

9.1 Operator Control and Monitoring

SIMATIC BATCH provides a tool with which you can configure user objects with the OCX technology for TELEPERM M-specific interface blocks.

9.2 ORPA Filter

The ORPA filter for the EM1B, OP1B, SKS, TR1B, and UNIB function blocks is as follows:

EM1B:
I = 1 - 255
S = STATUS

OP1B:
I = 1 - 13

SKS:
E = 27
S = STATUS

TR1B:
I = 1 - 255

UNIB:
I = 1 - 255
S = STATUS

Note:
If the SKS standard function block is also used with applications external to SIMATIC BATCH, you can, of course, add any extra parameters you require.

9.3 EM1B Block Data Record

```
   1 AAD QSTA  0.0000           #          Status word           12
   2 AAD STPT  0.0000           #          Step execution time   13
   3 AAD QSR1  0.0000           #          Copy of contr strat   26
   4 AAD QAR1  0.0000           #          Proc val cont strat   27
   5 AAD QSR2  0.0000           #          Copy of setpoint 1    31
   6 AAD QAR2  0.0000           #          Process value 1       32
   7 AAD QSR3  0.0000           #          Copy of setpoint 2    36
   8 AAD QAR3  0.0000           #          Process value 2       37
   9 AAD QSR4  0.0000           #          Copy of setpoint 3    41
  10 AAD QAR4  0.0000           #          Process value 3       42
  11 AAD QSR5  0.0000           #          Copy of setpoint 4    46
  12 AAD QAR5  0.0000           #          Process value 4       47
  13 AAD QSR6  0.0000           #          Copy of setpoint 5    51
  14 AAD QAR6  0.0000           #          Process value 5       52
  15 AAD QSR7  0.0000           #          Copy of setpoint 6    56
  16 AAD QAR7  0.0000           #          Process value 6       57
  17 AAD QSR8  0.0000           #                                61
  18 AAD QAR8  0.0000           #                                62
  19 AAD QSR9  0.0000           #                                66
  20 AAD QAR9  0.0000           #                                67
  21 AAD QSRA  0.0000           #                                71
  22 AAD QARA  0.0000           #                                72
  23 AAD QSRB  0.0000           #                                76
  24 AAD QARB  0.0000           #                                77
  25 AAD QSRC  0.0000           #                                81
  26 AAD QARC  0.0000           #                                82
  27 AAD QSRD  0.0000           #                                86
  28 AAD QARD  0.0000           #                                87
  29 AB  QSRE  0                #                                91
  30 AB  QARE  0                #                                92
  31 AB  QTAK  0                #                                95
  32 AB  RAB0  0                #                               132
  33 AB  RAB1  0                #                               133
  34 AB  RAB2  0                #                               134
  35 AB  RAB3  0                #                               135
  36 AB  RAB4  0                #                               136
  37 AAD RAA0  0.0000           #                               137
  38 AAD RAA1  0.0000           #                               138
  39 AAD RAA2  0.0000           #                               139
  40 AAD RAA3  0.0000           #                               140
  41 AAD RAA4  0.0000           #                               141
   1 EB  BAEN  0                #  P       Batch enable            1
   2 S16 FTYP  F_TYPE                 16   Type name               2
   3 PB  IEOP  0                           Identifier              3
   4 EAD STNO  0.0000           #  P       Step number      4
   5 EAD BAID  0.0000           #  P       Batch ID         5
   6 S16 NAM1  UBA_NAME               16   Batch name       6
   7 S16 NAM2                         16                           7
   8 EAD CTRL  0.0000           #  P       Control word            8
   9 EB  OCCU  0                #  P       Allocated ID            9
  10 ID  LOP       0                       No. step activations  10
  11 EAD STP   0.0000           #  P       Setpoint step exec    11
  12 PB  STRT  0                           Start command         14
  13 PB  HOLD  0                           Hold command          15
  14 PB  STOP  0                           Stop command          16
  15 PB  ABRT  0                           Abort command         17
  16 PB  RST   0                           Reset command         18
  17 PB  TERM  0                           Terminate command     19
  18 PB  RDY   0                           Sets status word      20
  19 PB  CONT  0                           Sets status word      21
  20 PB  PARA  0                           New parameter rec     22
  21 PB  LOCK  0                           Sets status word      23
  22 PB  RFSH  0                           Sets status word      24
```

```
23 EAD SPR1  0.0000           #  P       Contr strat           25
24 S16 ENR1  ENUM                   16                         28
25 ID  CHST      0                                   N         29
26 EAD SPR2  0.0000           #  P       Setpoint 1            30
27 EAD LOR2  0.0000           #  P       High limit            33
28 EAD UPR2  0.0000           #  P       Low limit             34
29 EAD SPR3  0.0000           #  P       Setpoint 2            35
30 EAD LOR3  0.0000           #  P       High limit            38
31 EAD UPR3  0.0000           #  P        Low limit            39
32 EAD SPR4  0.0000           #  P       Setpoint 3            40
33 EAD LOR4  0.0000           #  P       High limit            43
34 EAD UPR4  0.0000           #  P       Low limit       44
35 EAD SPR5  0.0000           #  P       Setpoint 4            45
36 EAD LOR5  0.0000           #  P       High limit            48
37 EAD UPR5  0.0000           #  P       Low limit       49
38 EAD SPR6  0.0000           #  P       Setpoint 5            50
39 EAD LOR6  0.0000           #  P       High limit            53
40 EAD UPR6  0.0000           #  P       Low limit       54
41 EAD SPR7  0.0000           #  P       Setpoint 6            55
42 EAD LOR7  0.0000           #  P       High limit            58
43 EAD UPR7  0.0000           #  P       Low limit       59
44 EAD SPR8  0.0000           #  P     C                       60
44 EAD LOR8  0.0000           #  P                             63
46 EAD UPR8  0.0000           #  P                             64
47 EAD SPR9  0.0000           #  P     C                       65
48 EAD LOR9  0.0000           #  P                             68
49 EAD UPR9  0.0000           #  P                             69
50 EAD SPRA  0.0000           #  P     C                       70
51 EAD LORA  0.0000           #  P                             73
52 EAD UPRA  0.0000           #  P                             74
53 EAD SPRB  0.0000           #  P     C                       75
54 EAD LORB  0.0000           #  P                             78
55 EAD UPRB  0.0000           #  P                             79
56 EAD SPRC  0.0000           #  P     C                       80
57 EAD LORC  0.0000           #  P                             83
58 EAD UPRC  0.0000           #  P                             84
59 EAD SPRD  0.0000           #  P     C                       85
60 EAD LORD  0.0000           #  P                             88
61 EAD UPRD  0.0000           #  P                             89
62 EB  SPRE  0                   P                             90
63 ID  ANSW      6                       Number Setpoints      93
64 PB  ITAK  0                         C                       94
65 EAD SIMU  0.0000              P       Simulation            96
66 EA  GF    0.0000              P       GF block   C  Q       97
67 EA  SKS   0.0000              P       SKS block  C  Q       98
68 EA  GAX   0.0000              P       GA block   C  Q       99
69 EB  GBX   0.0000              P       GB block   C  Q       100
70 EB  GMX   0.0000              P       GM block   C  Q       101
71 EA  GTX   0.0000              P       GT block   C  Q       103
73 S16 TUN1                         16 Unit Setp. 1            104
74 S16 TUN2                         16 Unit Setp. 2            105
75 S16 TUN3                         16 Unit Setp. 3            106
76 S16 TUN4                         16 Unit Setp. 4            107
77 S16 TUN5                         16 Unit Setp. 5            108
78 S16 TUN6                         16 Unit Setp. 6            109
79 S16 AT    *TECHNOLOG. NAME       16                         160
```

CTRL Assignment:

Bit	Meaning
0	ISTART
1	IHOLD
2	IABORT
3	IRESET
4	ITERM
5	reserved
6	ISTOP
7	reserved
8	ICONT
9	IPARAM

CTRL contains all the control inputs that are written by SIMATIC BATCH.

IREADY, ILOCK, and IREFRESH are used by the user program and are therefore not included in ICTRL.

Assignment of Status Words USTAT_L and QUSTAT_L:

Bit	Meaning	Comment	Set when
0	IDLE	static status inactive	
1	RUNNING	static status running	
2	COMPLETED	static status completed	
3	HELD	static status held	
4	ABORTED	static status aborted	
5	READY	static status ready to complete	IREADY = 1
6	STOPPED	static status stopped	
7	free		
8	free		
9	STARTING	intermediate status starting	
10	RESUMING	intermediate status resuming	
11	COMPLETING	intermediate status completing	
12	HOLDING	intermediate status holding	
13	ABORTING	intermediate status aborting	
14	STOPPING	intermediate status stopping	
15	free		
16	reserved	(for SFC: manual/automatic requested)	
17	QCMOD	manual/automatic ID (1 = automatic)	
18	BA_EN	SIMATIC BATCH enable ID (1 = enabled)	BA_EN = 1
19	STEP_RT	Runtime exceeded ID	Q_STEP_T > STEP_T
20	reserved	(for SFC: operator request transition)	
21	REFRESH	Trigger for reading setpoints/proc. Values	IREFRESH = 1
22	LOCK	Start lock ID (1 = locked)	ILOCK = 1
23	CONTINUOUS	Continuous operation ID	ICONT = 1
24	OCCUPIED	SIMATIIC BATCH allocation ID (1 = allocated)	OCCUPIED = 1
25	PROC_ERR	(for SFC: process error)	
26	reserved	(for SFC: execution error)	
27	reserved	(for SFC: step execution time error)	
28	reserved	(for SFC: configuration error)	
29	reserved	(for SFC: operator error)	
30	reserved	(for SFC: external error)	
31	ERROR	Group error	PROC_ERR = 1

9.4 TR1B Block Data Record

```
 1 AAD EPEC  0.0000           #  P                        23
 1 S16 FTYP  F_TYPE                 16   Type name         1
 2 S16 UNIT  UNIT_NAME              16   Unit name         2
 3 EB  QAB1  0                #  P       Binary value 1    3
 4 EB  QAB2  0                #  P       Binary value 2    4
 5 EB  QAB3  0                #  P       Binary value 3    5
 6 EB  QAB4  0                #  P       Binary value 4    6
 7 EB  QAB5  0                #  P       Binary value 5    7
 8 EB  QAB6  0                #  P       Binary value 6    8
 9 EB  QAB7  0                #  P       Binary value 7    9
10 EB  QAB8  0                #  P       Binary value 8   10
11 EB  QAB9  0                #  P       Binary value 9   11
12 EB  QABA  0                #  P       Binary value 10  12
13 EAD QAR1  0.0000           #  P       Analog value 1   13
14 EAD QAR2  0.0000           #  P       Analog value 2   14
15 EAD QAR3  0.0000           #  P       Analog value 3   15
16 EAD QAR4  0.0000           #  P       Analog value 4   16
17 EAD QAR5  0.0000           #  P       Analog value 5   17
18 EAD QAR6  0.0000           #  P       Analog value 6   18
19 EAD QAR7  0.0000           #  P       Analog value 7   19
20 EAD QAR8  0.0000           #  P       Analog value 8   20
21 EAD QAR9  0.0000           #  P       Analog value 9   21
22 EAD QARA  0.0000           #  P       Analog value 10  22
23 S16 AT    *TECHNOLOG. NAME       16                    30
```

9.5 UNIB Block Data Record

```
   1 AAD QSTA  0.0000           #          Status word     20
   2 AAD QUST  0.0000           #          User status           21
   3 AAD VACT  0.0000           #          Lifebeat actual value 22
   4 AB  OERR  0                #          Lifebeat monitoring   23
   5 AB  MOR   0                #          Process value TMOR    25
   6 AT  LZTI  0.0000           #          Timer                 46
   1 EB  BAEN  0                   P       Batch enable           1
   2 EB  OCCU  0                   P       Allocated ID           2
   3 EB  POOS  0                   P       Pending out of service 3
   4 EAD BAID  0.0000              P       Batch ID         4
   5 S16 BAN1  UBA_NAME               16   Batch name       5
   6 S16 BAN2                         16                          6
   7 S16 FOR1  FORMULA                16   Formula                7
   8 S16 FOR2                         16                          8
   9 S16 MAT1  MAT_NAME               16   Material name          9
  10 S16 MAT2                         16                         10
  11 S16 UNIT  UNIT_NAME              16   Unit name             11
  12 S16 RPN1  URP_NAME               16   Recipe name           12
  13 S16 RPN2                         16                         13
  14 S16 RPR1  URP_REL                16   Recipe version        14
  15 S16 RPR2                         16                         15
  16 EAD USTA  0.0000              P       User status           16
  17 EAD SPCT  0.0000           #  P       Lifebeat interval     17
  18 S16 MASP  MAT_SP                 16   Material code         18
  19 EB  LIFE  0                   P       Lifebeat              19
  20 PB  TMOR  0                           Operator prompt 24
  21 EA  STPM  0.0000              P       Sets status word      26
  22 EA  RUST  0.0000              P       Sets status word      27
  23 EA  CTRL  0.0000              P       Sets status word      28
  24 S16 AT    *TECHNOLOG. NAME       16                         48
```

9.6 Restoring the Initial Status

You can restore the EM1B block to its initial state by setting the RST parameter to 1. The corresponding GF block must be in automatic mode and correspond to the "OFF" state.

9.7 References

/1/ SIMATIC BATCH
Online Help

/2/ TELEPERM M
GRUNDFUNKTIONEN
Automatisieren von funktionellen Verfahrensbereichen mit einem AS-System
Beschreibung
Order number 6DS5 305-8AA14
August 1989
Edition 2

/3/ TELEPERM M
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Automatisieren von funktionellen Verfahrensbereichen mit einem AS-System
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/4/ PROGRAF AS+
Instructions
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