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Siemens Automation Cooperates with Education (SCE) | 09/2015

PA Module P02-03

SIMATIC PCS 7 –
Archiving and Trend Reporting

Cooperates with Education

Automation

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ARCHIVING AND TREND REPORTING

TRAINING OBJECTIVE

After working through this module, the students know the basic requirements and objectives of archiving. They are able to apply different types of archiving to process data and messages. The students know how suitable cycles can be determined for time controlled archiving and they also know the criteria according to which event controlled data archiving is executed. They know the options that PCS 7 provides.

THEORY IN BRIEF

Archiving process values is an important resource for correct and optimized process management.

The archived data allows for the analysis of historical data to optimize the process, for tracking faults as well as for quality assurance.

However, not only process values are suitable for archiving, but also messages and events. Particularly in the case of fault states, the operator has to handle a large number of messages so that only after a return to normal operation or at a plant standstill is it possible to determine the exact cause. To this end, the messages and events in the archive can be resorted to, as well as the archived process values.

Process values are usually archived cyclically, messages and events event-controlled. In the case of process values, the exact cycle depends on the dynamics of the process it is based on. Selecting a cycle independent of the process has great disadvantages. A cycle that is too short requires a large amount of memory and under certain circumstances records the noise of the signal. A cycle that is too long leads to values that cannot be used since the development of the process value can no longer be reconstructed.

In the case of signals that are barely subject to fluctuations or not subject to them at all, the acquisition of almost identical values does not make sense; for that reason, it is possible to compress the data; for example, by setting a dead zone. Only when the process value exceeds or drops below the limit that was set is the value stored again in the archive.

Trend reporting provides the operator with an overview of process development up to the current time. From the course of the process value he can determine whether and perhaps how soon a fault state threatens to occur. Thus, countermeasures can be initiated before the protection mechanisms have to be activated.

THEORY

INTRODUCTION

Automating, safeguarding and monitoring processes are basic requirements for a process control system. Archiving the data that accrues offers the possibility of storing historical data and making it available for analysis.

There are many reasons for the necessity to analyze data. There are legal regulations on the one hand, safety oriented and performance related causes on the other.

The legal regulations include logging faults -for example, exceeding limits or the occurrence of an event. Another legal reason for archiving is the verification for certificates and for conditions such as emission limits. In connection with product liability and product safety, archiving of all process steps and materials used is required for the gapless tracking of the product. [1].

Product related reasons for archiving data are the statistical evaluation of production quantities statistical long term analysis to optimize the process, determining the performance, and reduction of production and material cost. The data is also very helpful to the subsequent analysis of faults regarding their effect and propagation as well as the assessment and possibly the revision of existing countermeasures. Thus, plant shutdowns can be avoided and the economic efficiency of the plant can be increased at the same time. Likewise, the data can be used to analyze normal operation and to locate optimization potential or identify possibilities to improve quality. The data is also interesting with respect to the optimization of the maintenance of production resources based on the existing data.

Safety-oriented reasons refer primarily to the adaptation of operating parameters; i.e., limits and response timing. When performing tests to check safety locks and EMERGENCY STOP functions, recorded data can be used to verify the provided functions. If the data should show safety deficiencies, the cause can be analyzed based on the data.

In addition, storing the data in archives retains the performance capability of the process database and provides for data safety. By storing data in an archive database, it is not necessary to maintain all process runs on paper.

Based on the reasons mentioned, archiving proves to be an important resource for correct and optimized process management. This results in different requirements for archiving. It includes that the data is stored completely uniform and structured. Likewise, access to the data has to be possible in a structured manner, and through filtering, for example, permit a selection of the criteria. This also requires, however, that the data is archived for different time spans or with different cycles, and at different locations.

In principle, two types of data can be distinguished: process data that occurs cyclically, and messages and events that occur acyclically. This topic is discussed in greater detail below.

PROCESS DATA

Process data refers to the analog and digital values that is determined by means of sensors and transmitted to the process control system. It is used to control and visualize the process.

Process data is transmitted cyclically to the process control system. In this case, the changes of the analog process values that take place in a certain interval are very different. The cause for this is the different process dynamics. For example, the process data of flow measurements usually has higher dynamics than temperature measurement; i.e., process data of flow measurement changes within or in fractions of seconds, while the process data for temperature measurement changes rather in time intervals of more than 10s.

Analog values should be archived ***time controlled***. It has to be noted in this case that process data of very dynamic processes has to be archived at a considerably higher rate than data of slow processes. One reason for this is that the size of the archive is not unnecessarily increased and the other that representing a slow process in intervals that are too short is inefficient or can contain a strong noise signal.

Binary signals can only switch between two states; they should be archived event controlled.

MESSAGES AND EVENTS

According to [3], ***messages*** are reports about the occurrence of an event; i.e., of a transition from a discrete state to another. According to [3] an ***event*** is the spontaneous occurrence of a defined state. Important information for an unambiguous and complete message is the state that occurred, the time and the location. Additional details regarding messages and events are provided in chapter P02-02.

Messages and events occur acyclically and can therefore not be archived at fixed intervals. Here it is necessary to select the relevant messages and events to ensure efficient archiving. One possibility would be, for example, to archive only safety-critical messages or messages with a certain priority.

Messages and events can only be archived ***event-controlled***.

DATA COMPRESSING

The data volume in plants is large; usually, only a limited amount can be archived over a certain interval. The amount of data archived depends largely on the cost for the memory medium and the data transmission rate. On the other hand, acceptable data loss has to be considered. The degree of compression results from weighing these two criteria.

When data is compressed, not only the quantity of the stored data changes but also statistical characteristics such as average and variance. For that reason, such values should be calculated from the original data and if needed, archived also. This should be done time controlled, analogously to the archived process data.

For data compression, direct and mapping methods can be used.

When the direct method is used, the data is archived in real time. There are rules that govern the archiving of individual measured values. The data is reconstructed by connected the data points.

When mapping methods are used, the data is not archived in real time since in the transformation the previous courses are included. The original data is mapped in another area. When this procedure is used it is possible to design the compression adaptively, since the algorithms often have a parameter that decides on the quality of the compression in dependence on the process.

TREND REPORTING

The term ***trend reporting*** refers to the representation of process values in trends; i.e. dependent on the time. The time interval for trend reporting includes the present and the recent past. It is important that the trend curves, in contrast to pure history curves, are updated [2].

By representing process values in curves, process values can be monitored, changes identified, actual values compared with setpoints, and faults analyzed. In distinction to the pure display of the process variable, curve diagrams provide information about amplitude, ascents, frequency and the course of a process variable.

ARCHIVING IN PCS 7

In the process control system PCS 7, different data can be archived that was generated during the process mode. These are: process values that are stored cyclically in two different types of system archive, and messages that are written event-controlled to the alarm log. This data is archived on the ***OS server*** by default for short term archiving as shown in Figure 1. If in addition a ***central archive server (CAS)*** is configured, OS logs and batch logs can also be archived in addition to the data mentioned above. The data archived on the CAS is used for long term archiving and can be transferred periodically to external media. ***Storage Plus*** is also available; it can be used to generate views to the archived data that can then be viewed using a Web browser [4, 5, 6].

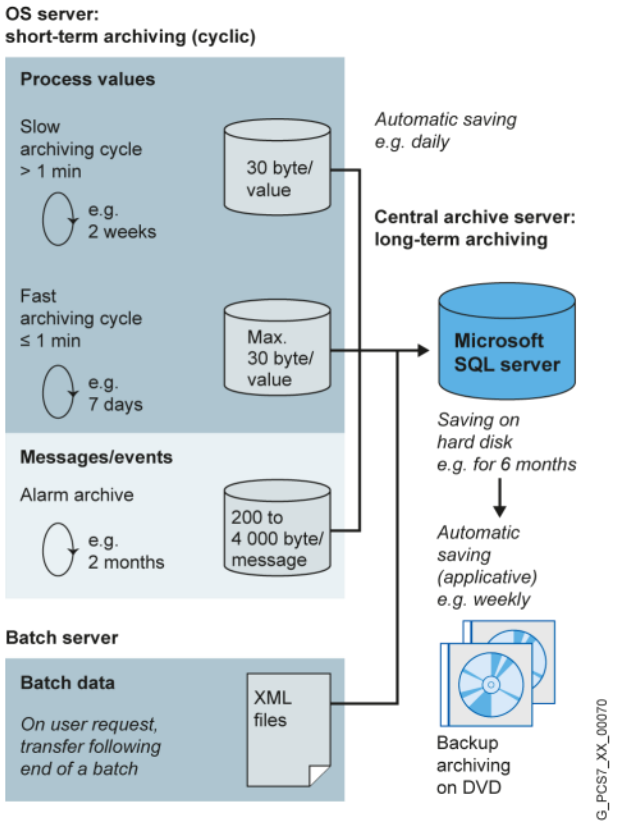


Figure 1: Overview short-term and long-term archiving [Siemens]

Archiving System on the OS Server

On the OS server, archives for process values and alarms/events can be set up.

As shown in Figure 2, these archives are organized as ***circular logs***. They consist of ***segments*** that are defined either through a time interval or by specifying physical memory. When one of these criteria is met, a segment is closed and a new one is started. If the memory of the server is exhausted, the segment that was set up first is overwritten according to the FIFO principle (First In First Out). In **Fehler! Verweisquelle konnte nicht gefunden werden.**, as an example, time spans are specified that the different archives can have for a cycle. The time specified also is an indication of the time relationships between the individual archives.

The process values are stored in the database compressed. They are compressed by setting a hysteresis. Depending on the signal change, a compression factor between 2 and 10 is reached. By selecting additional calculation functions, important statistical characteristic values can be retained despite compression.

To estimate the required memory for an archive, the average quantity of process values per second or the average quantity of alarms per second is needed. These averages are multiplied with the typical memory capacity for the data and with the desired archiving interval. The interval has to be specified once for one segment and once for all segments together. Typical memory capacity is between 6 and 16 bytes for process values and 4000 bytes for alarms. For reasons of performance, the number of individual segments should not exceed 200 [4].

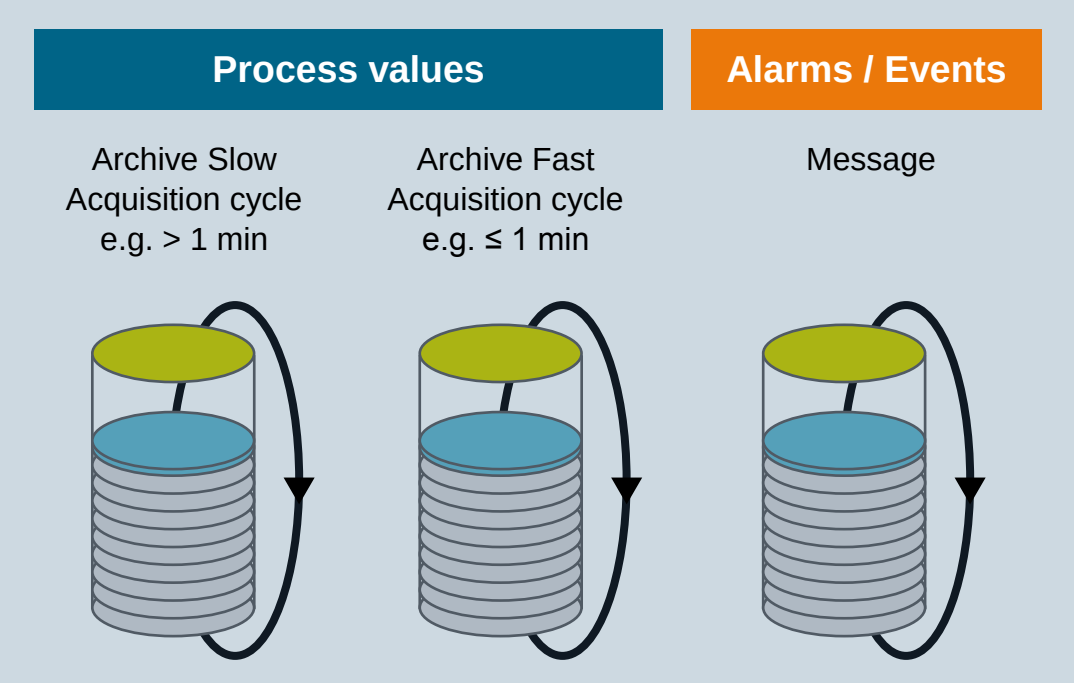


Figure 2: Circular logs for short-term archiving [4]

In addition to the archives for the processes, user archives can be set up. There, characteristics from other sources can be entered. The operator can use them to compare the actual course with desired course.

Central Archive Server (CAS)

The central archive server is located on the same level as the OS servers. In distinction to the OS servers, it is not connected to the plant bus, but exclusively to the terminal bus, as shown in Figure 3. By means of the terminal bus, the CAS receives the data designated for ***long term archiving*** from one or several OS servers and from the batch servers. The data is transmitted from the OS server to the CAS automatically after a segment is completed. The data from the batch server is directed by means of the Batch Control Center (BCC) for archiving. For archiving OS logs, a script can be implemented that transmits the cyclically stored OS logs to the central archive server. To increase data security, the CAS can be operated redundantly.

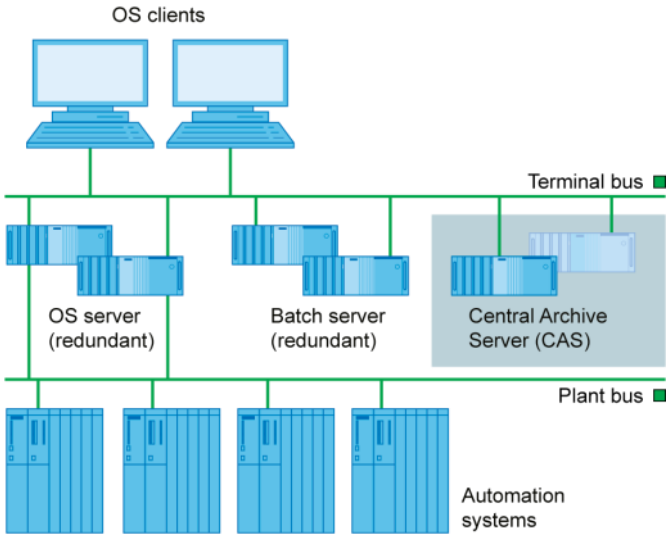


Figure 3: Classification of the Central Archive Server in the structure of the PCS [Siemens]

Fehler! Verweisquelle konnte nicht gefunden werden. shows the organization of the archives of the CAS. These archives also are designed as circular logs and work according to the FIFO principle. To save the data periodically, backup strategies can be configured that allow for the transfer of individual segments to an external medium; for example, DVD or network drive. For that reason, the size of the segments on the CAS has to be less than the external medium.

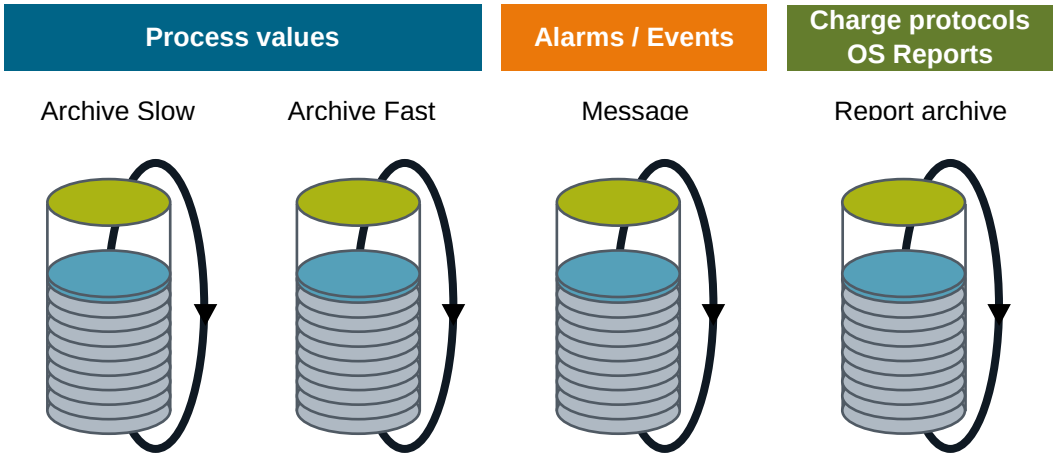


Figure 4: Archives of the Central Archive Server for long-term archiving [4]

Storage Plus

Storage Plus can be used alternatively or as a supplement to CAS. Storage Plus is always installed on a separate computer and is connected to the terminal bus (Figure 5). In contrast to the CAS, Storage Plus cannot be operated in the redundant mode, but makes possible the display and analysis of the data that is stored in the CAS, in the Storage Plus database or on external media; for example, the display of histories [2]. The archived data is displayed by means of views that filter the needed information from the totality of all data. The data is represented in tables, diagrams or reports [7].

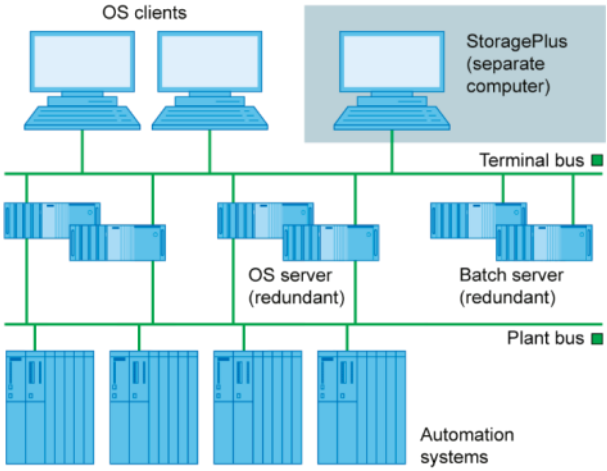


Figure 5: Classification of Storage Plus in the structure of the PCS [Siemens]

TREND REPORTING IN PCS 7

Below, the two possibilities for representing archived process values in PCS 7 are described. The OS servers are accessed exclusively in that case. This makes it possible to quickly trace the development of one or several process values, and a negative trend can be detected or obviated.

Curve Groups

Curve groups can be called using a button on the PCS 7 operator interface. They don't have to be configured; they are provided as a matter of standard. However, certain curve groups can be pre-configured that will then only have to be displayed at execution time. If curves are not pre-configured or if the process values needed at the moment are missing in these groups, a new group can be set up any time.

Online und Function Trend Control

Within process displays, the following ActiveX Controls can be used to represent process value characteristics. Additional information for designing operating screens with ActiveX Controls is provided in chapter P03-03.

– ***Online Trend Control*** represents one or several process values over time

– ***Function Trend Control*** represents a process value in dependence on another process value

Online Trend Control corresponds to the curve display (refer to section Trend reporting).

Function Trend Control can be used under certain conditions to display dependent process values in a trend: The process values to be represented have to be archived in the same cycle and the archive has to be located on the same OS server. To facilitate analysis, a setpoint curve can be displayed in addition to the actual curve. The data for the setpoint curve is configured and stored in a user archive [6].

SUMMARY

To archive process data, alarms and events, always an OS server has to be installed. The expanded archiving capabilities are based on it; the data for CAS and Storage Plus is read by the OS servers.

Table 1: Overview of Short Term and Long Term Archiving according to Servers

	Short Term	Long Term	Restrictions
OS Server	Yes	No	-
CAS	No	Yes	Display only by means of OpenPCS 7
Storage Plus	No	Yes	No redundancy

To display data that is located on the OS servers, curve groups and Online Trend Control can be used. Regarding Function Trend Control, only such value pairs can be displayed that are stored on the same OS server and with the same archiving cycle.

Storage Plus has a Web interface for displaying long term archived data.

Table 2: Overview of Short Term and Long Term Archiving

	Short Term	Long Term	Restrictions
Storage Plus	No	Yes	Additional computer, only from Storage Plus Server
Online Trend Control or Curve Groups	Yes	No	Only from OS servers
Function Trend Control	Yes	No	Value pair only from an OS server and with the same archiving cycle

LITERATURE

[1] TU Dresden: Vorlesung Prozessrechen- und –leittechnik, July 2010.

[2] VDI/VDE 3699, Teil 4: Prozessführung mit Bildschirmen-Kurven, August 1997.
(sheet 4: Process control using display screens – Curves)

[3] VDI/VDE 3699, Teil 5: Prozessführung mit Bildschirmen-Meldungen, Februar 1998.
(sheet 5: Process control using display screens - Alarms/messages)

[4] Siemen AG: Configuration Guidelines Compendium Part A, June 2009.

[5] Siemens AG: Configuration Manual Engineering System (V7.1), March 2009.

[6] Siemens AG: Configuration Manual Operator Station (V7.1), March 2009.

[7] Siemens AG: MDM - Storage Plus Information System, November 2008.

STEP BY STEP INSTRUCTIONS

TASK

This task deals with process value and message archives for the operator station (OS) and their variants and setting possibilities.

As an example, set up archiving of the level for reactor A1T2R001 and display the archived values in ***WinCC Runtime*** as a curve using curve groups, and as printout using the Report Designer for display.

TRAINING OBJECTIVE

In this chapter, the student is familiarized with the following:

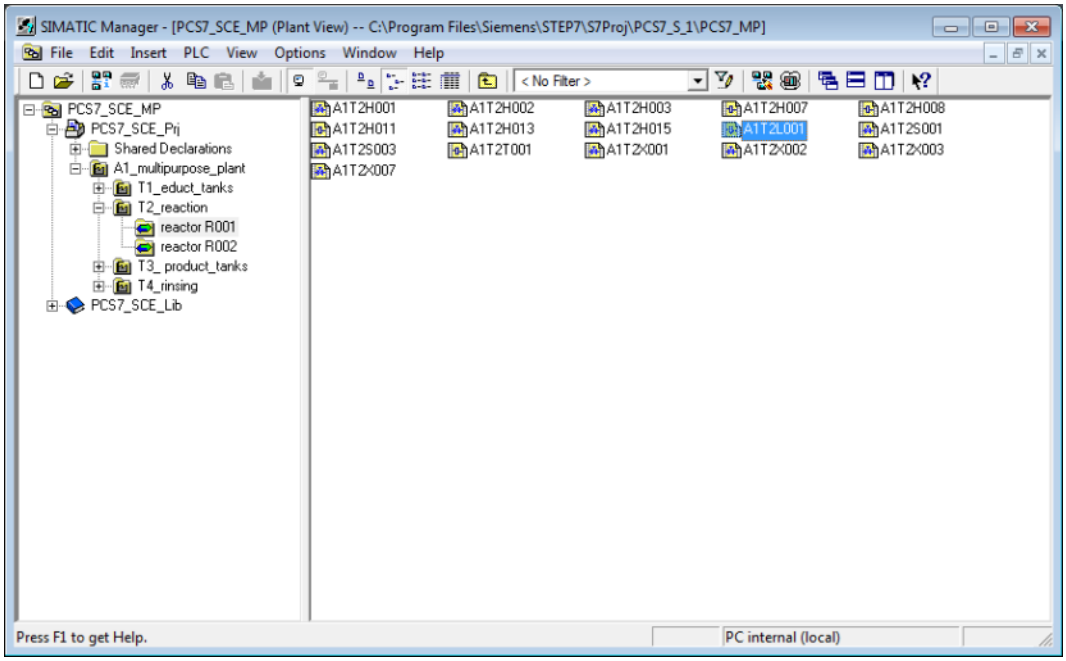
– Activating the archiving of process variables in CFCs
– The settings for alarm characteristics and alarm archiving in CFCs
– The process object view as tool for archive configuring
– Archive settings for messages in Alarm Logging of WinCC
– Archive settings for process variables in Tag Logging of WinCC
– Curve groups for displaying archive variables in WinCC runtime
– Report Designer for printing curves with archive variables

These instructions are based on ‘PCS7_SCE_0203_Ueb_R1505_en.zip‘.

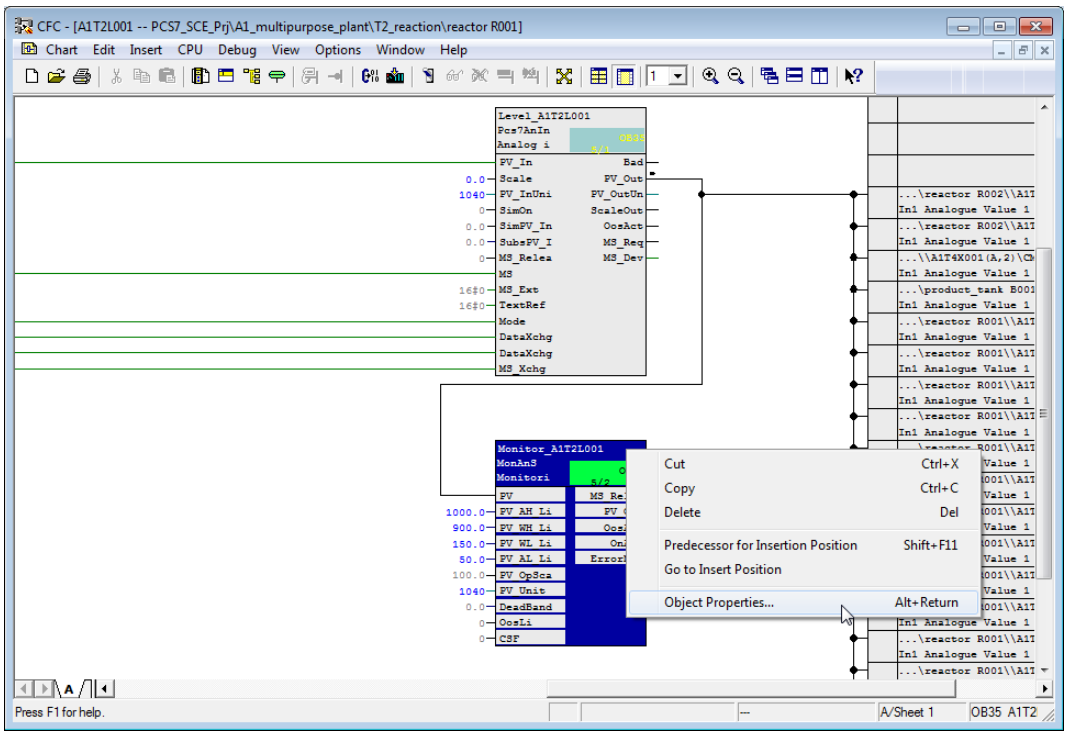
PROGRAMMING

1. To program the archiving of the process variable level of reactor A1T2R001 using level monitoring, first open the existing CFC A1T2L001.

   (→ A1_multipurpose_plant → T2_Reaction → A1T2L001)

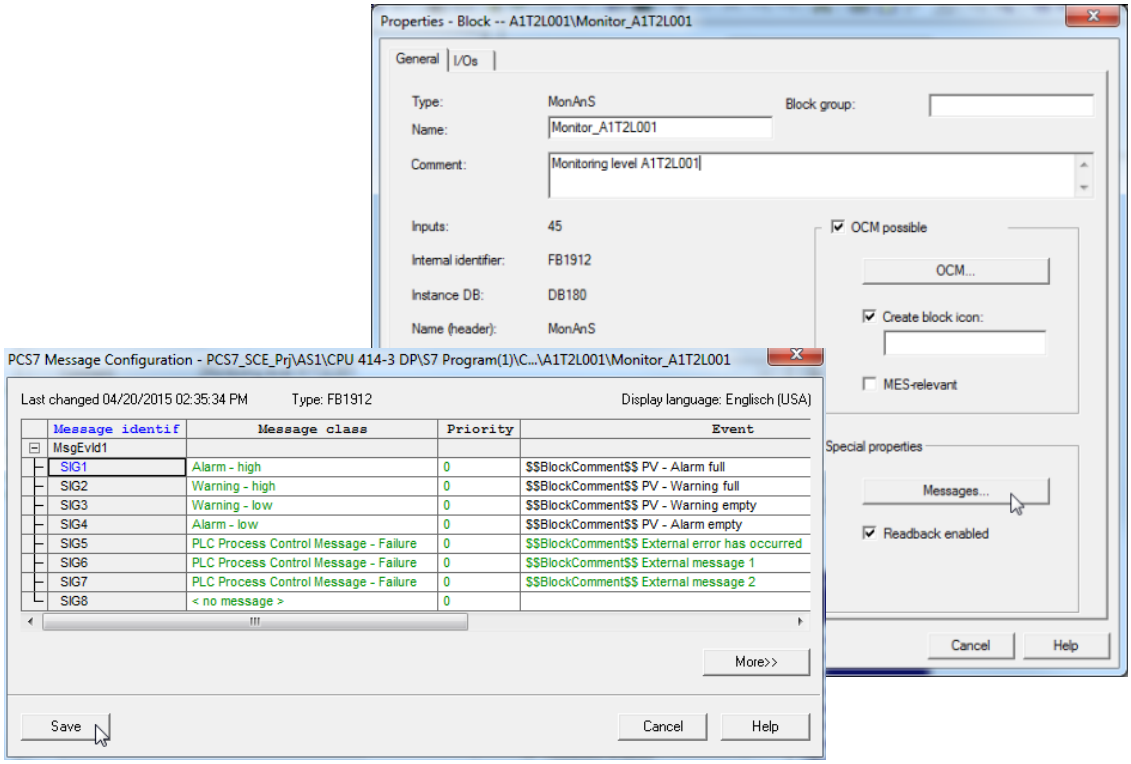


2. To adapt the properties, the object properties of monitor block ‘MonAnS’ are opened. (MonAnS → Object Properties)

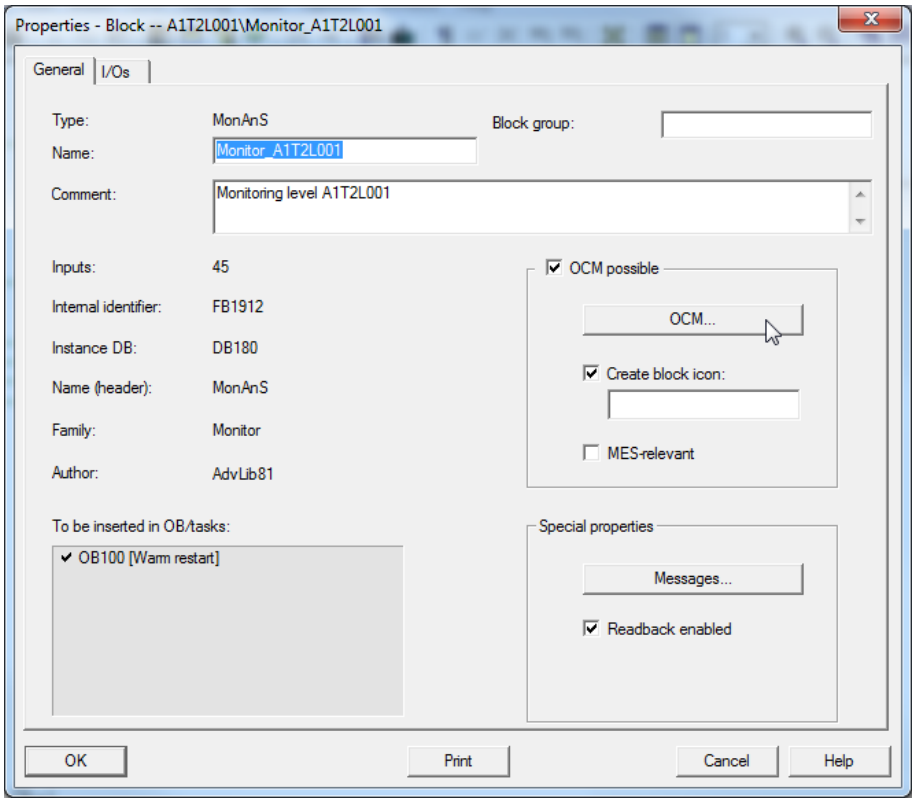


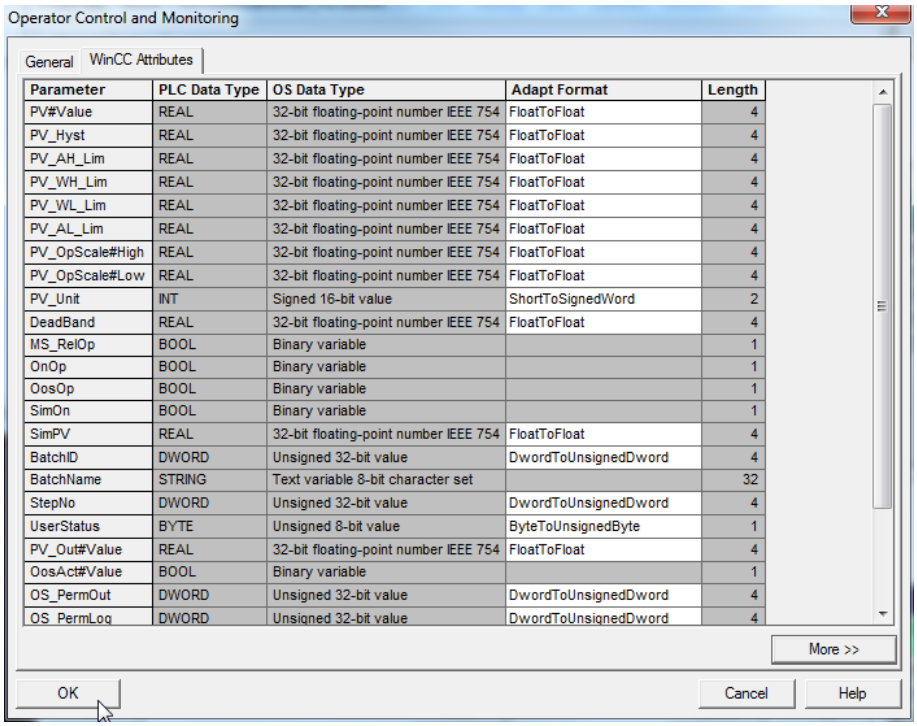
3. First, for the block MonAnS enter the comment Level monitoring A1T2L001. By clicking on the button ‘Messages’, we can perform the settings to configure the messages. These settings are retained. Here, we see the relationship of the text for Event through **key word + Text**, for example: **$$BlockComment$$ Alarm above**; after compilation of the OS, this becomes **Monitoring level A1T2L001 Alarm above.**

   (→ Comment→ “Monitoring level A1T2L001“→ Messages → Event → Save)



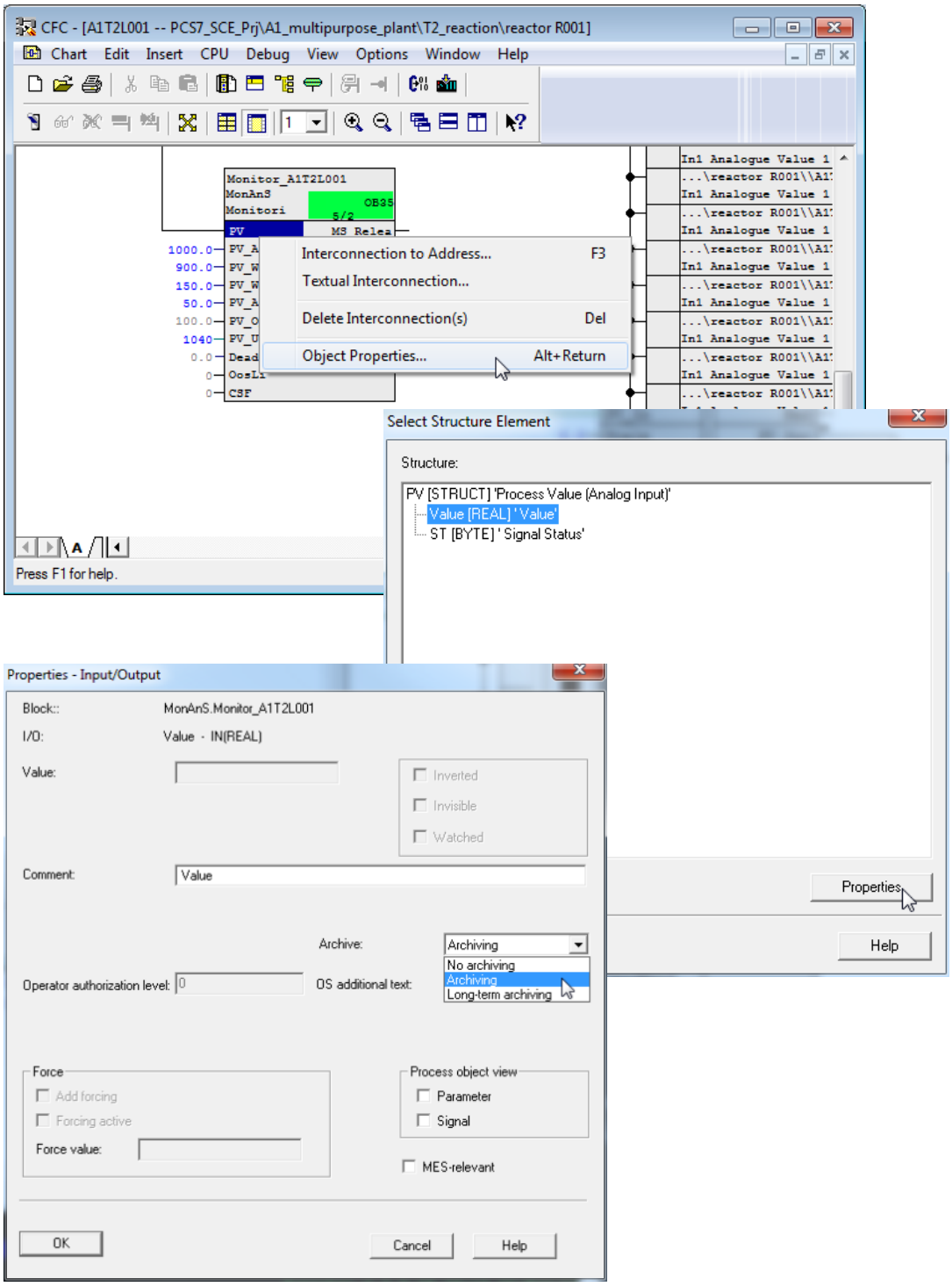
4. By clicking on the button ‘OCM’, the variables of the MonAnS block Monitor_A1T2L001 which are set up there during OS compilation are displayed as variables. Only such variables of a CFC block can be archived. (→ OCM → WinCC Attributes → OK)





5. Now, we specify in the block properties the archiving of analog input values PV. To this end, select the input PV and in its structure the connection ‘Value’. In the properties of ‘Value’ archiving is activated.

   (→ PV → Value → Archiving → OK → Close)

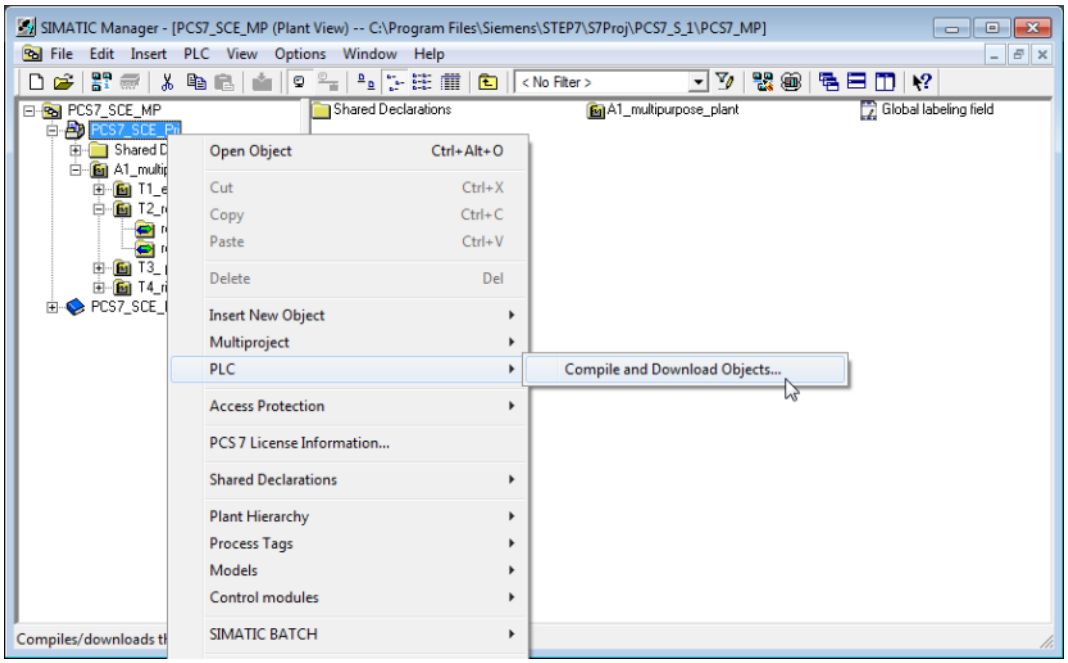


Note:

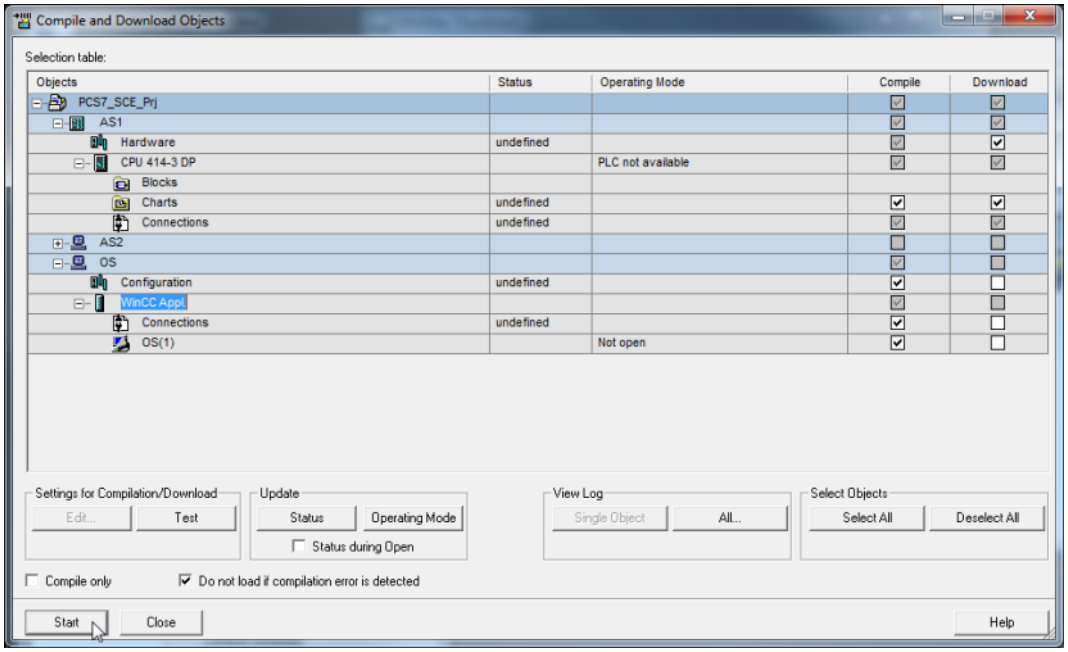
Here, we could also select a variable for long term archiving on the CAS.

6. To see and also further edit these changes also have to be compiled in the process object view, AS and OS. To do this and download the AS at the same time, highlight the project in the component view of the ***SIMATIC Manager***. Then select for the PLC ‘Compile and Download Objects‘.

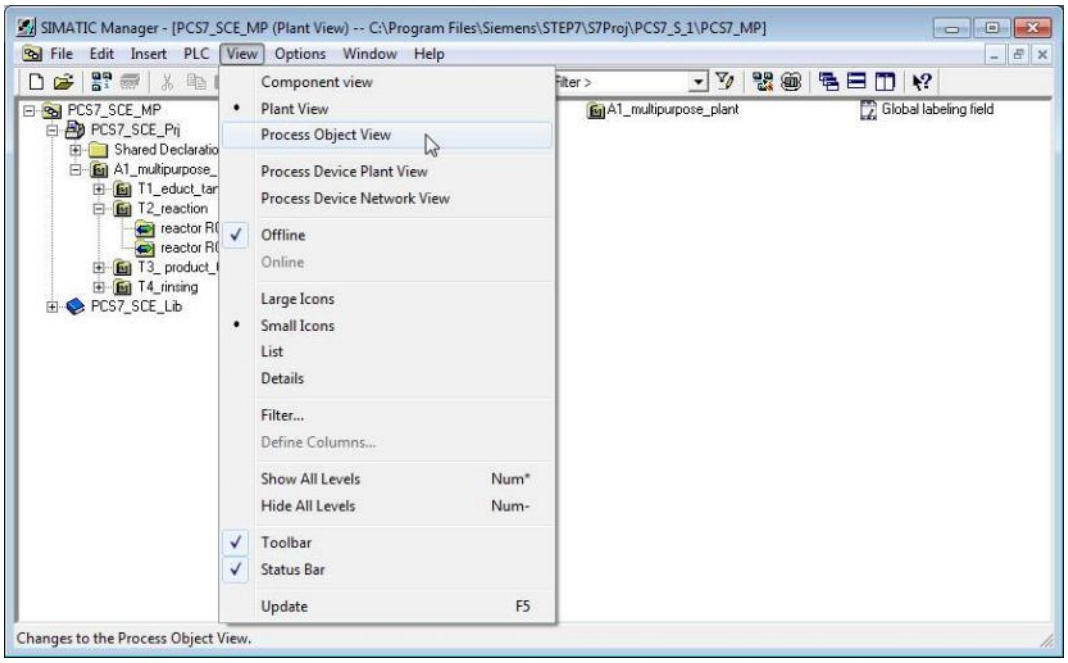
   (→ SCE_PCS7_MP → PLC → Compile and Download Objects)



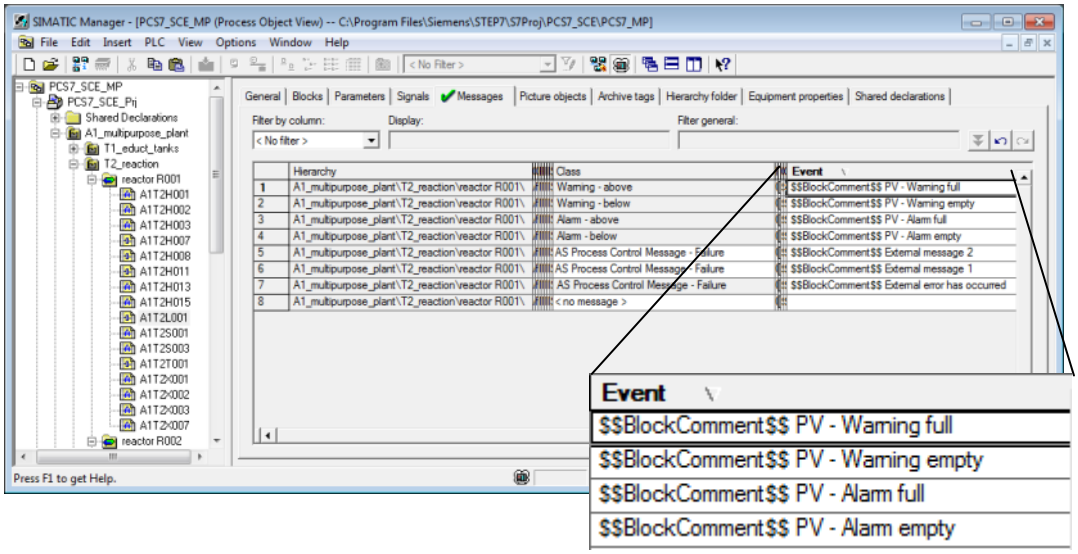
7. Next, select -as shown here- the objects to be compiled and start the process as you learned in previous chapters. (→ Start)



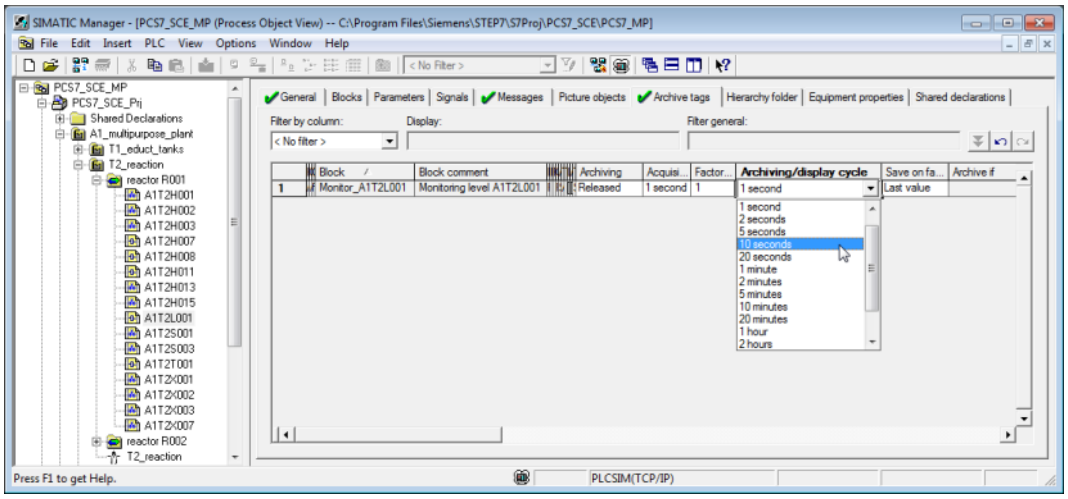
8. For performing several or even very many changes at the same time in one or different blocks, you have become acquainted with the **process object view**. Archive entries can be edited here, too. (→ View → Process Object View)



9. Next, in the process object view, select the CFC 'A1T2L001'. After you have selected the option 'Messages', change the entries for 'Event' as shown here. (→ CFC 'A1T2L001' → Messages → Event)

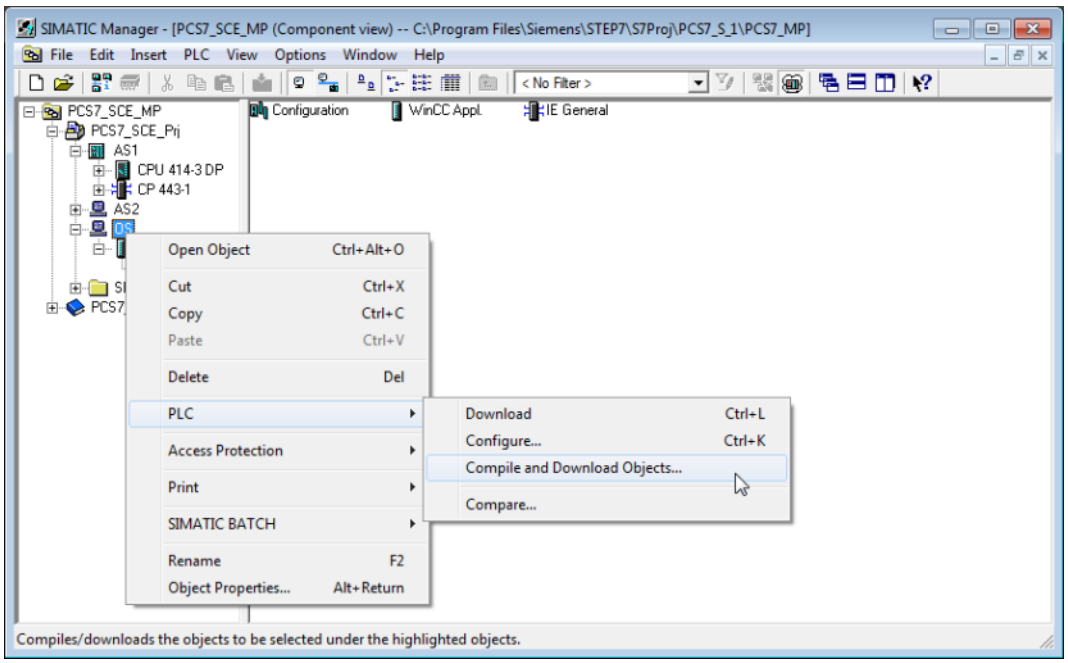


10. The settings for the archive tags can be made in the process object view also. Under the option ‘Archive tags’, change the ‘Archiving cycle’ to 10 seconds. (→ Archive tags → Archiving cycle → 10 seconds)

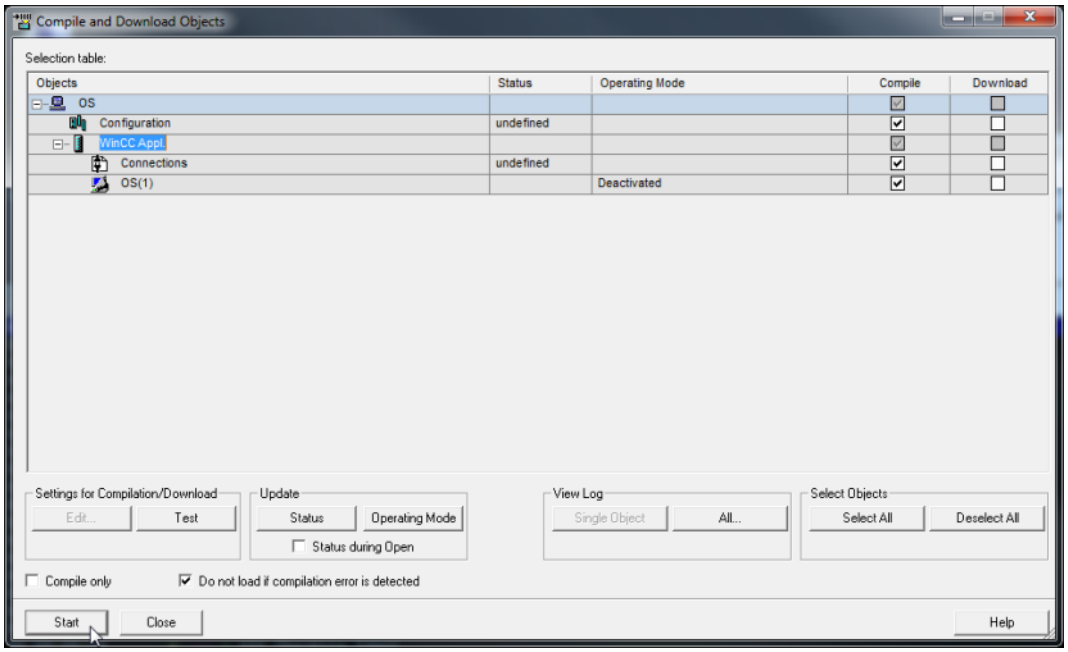


11. We accept these changes by only compiling the OS this time. To this end, highlight the ‘OS’ in the component view of the ***SIMATIC Manager***. Then, select for the PLC ‘Compile and Download Objects’.

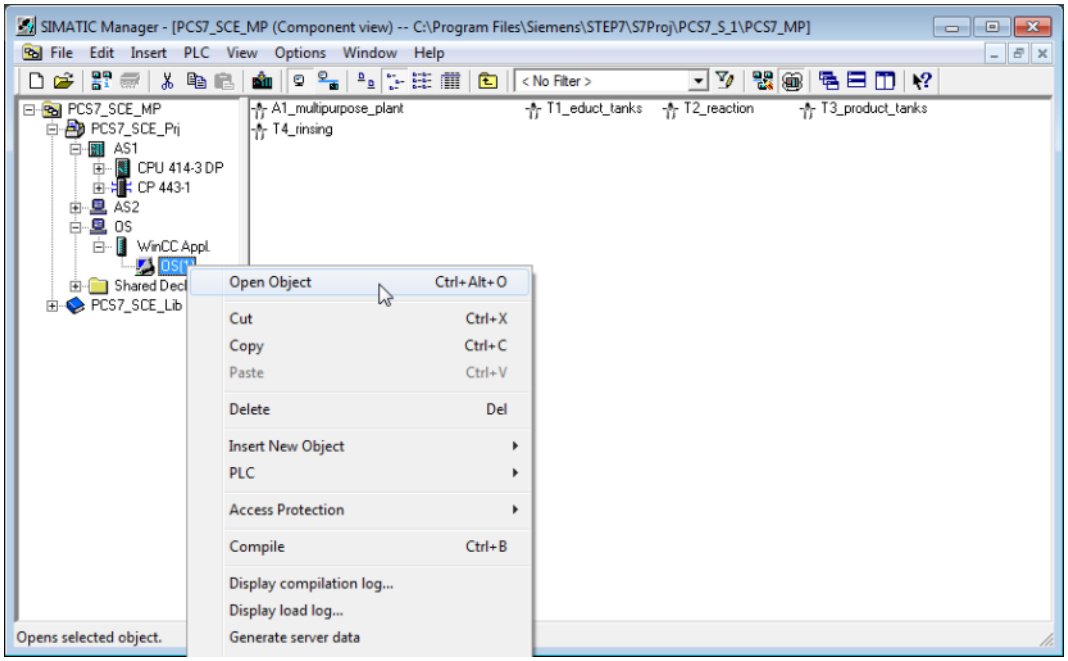
    (→ OS → PLC → Compile and Download Objects)



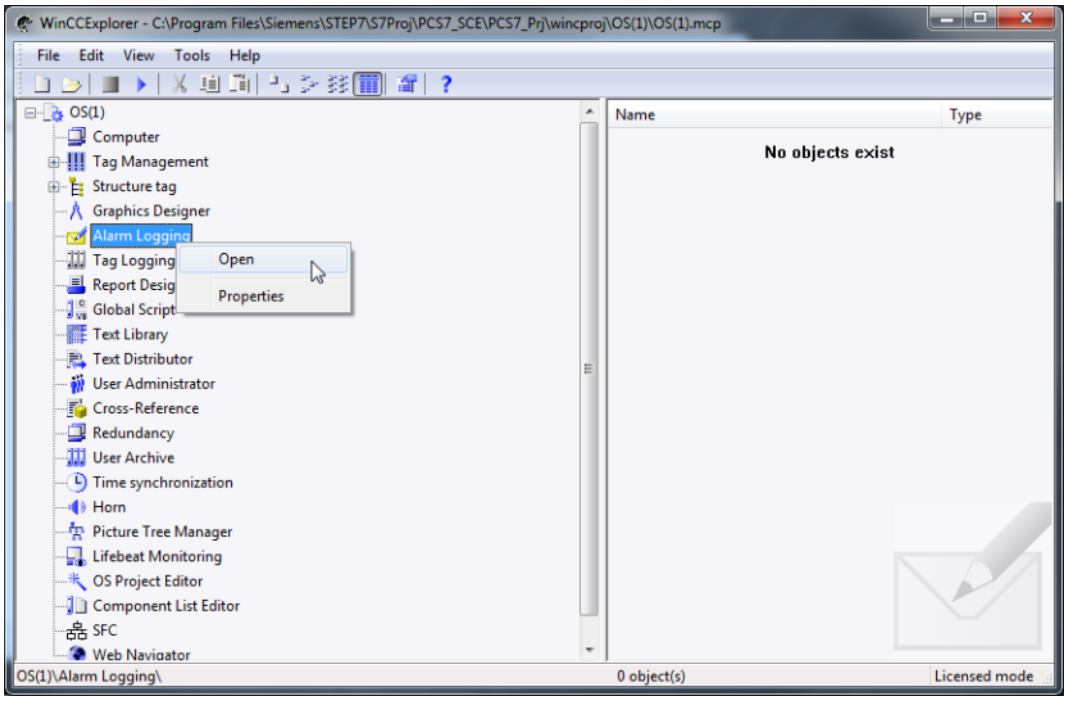
12. Next, select -as shown here- the objects to be compiled and start the process as you learned in the previous chapters. (→ Start)



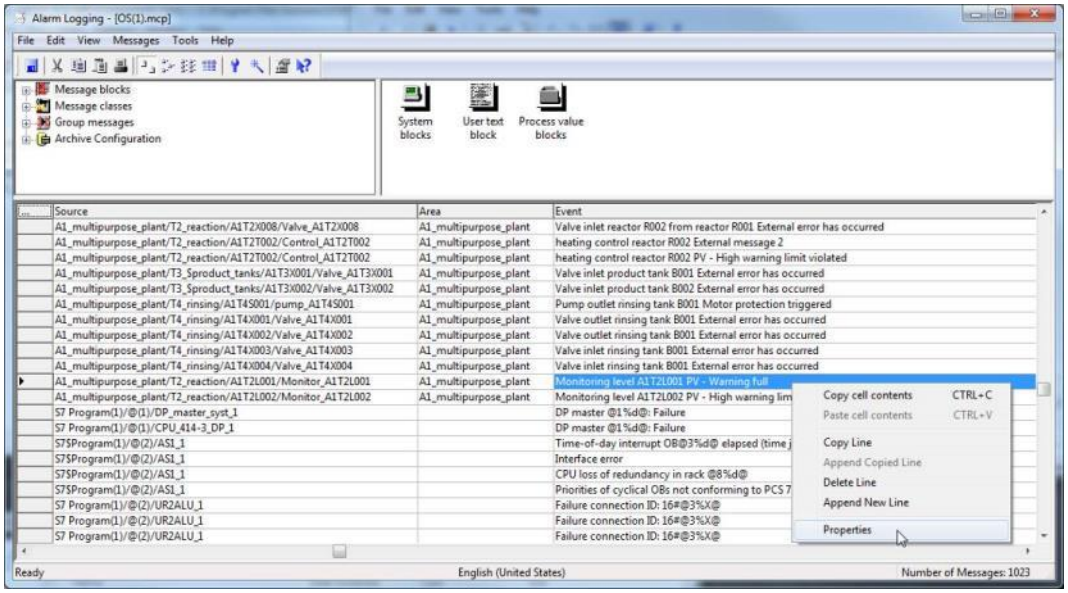
13. After the successful compilation, open the OS. (→ OS(1) → Open Object)



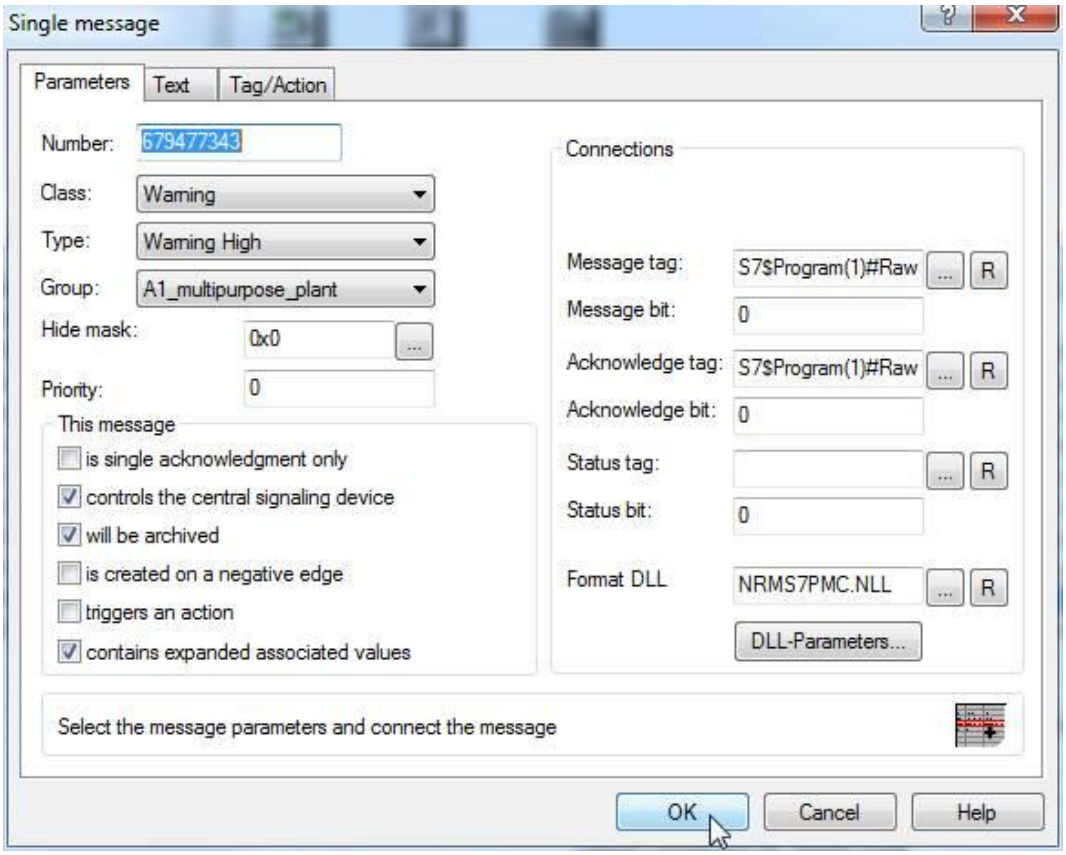
14. Then, in the WinCC Explorer, first open ‘Alarm Logging’ to configure the alarm system. (→ Alarm Logging)



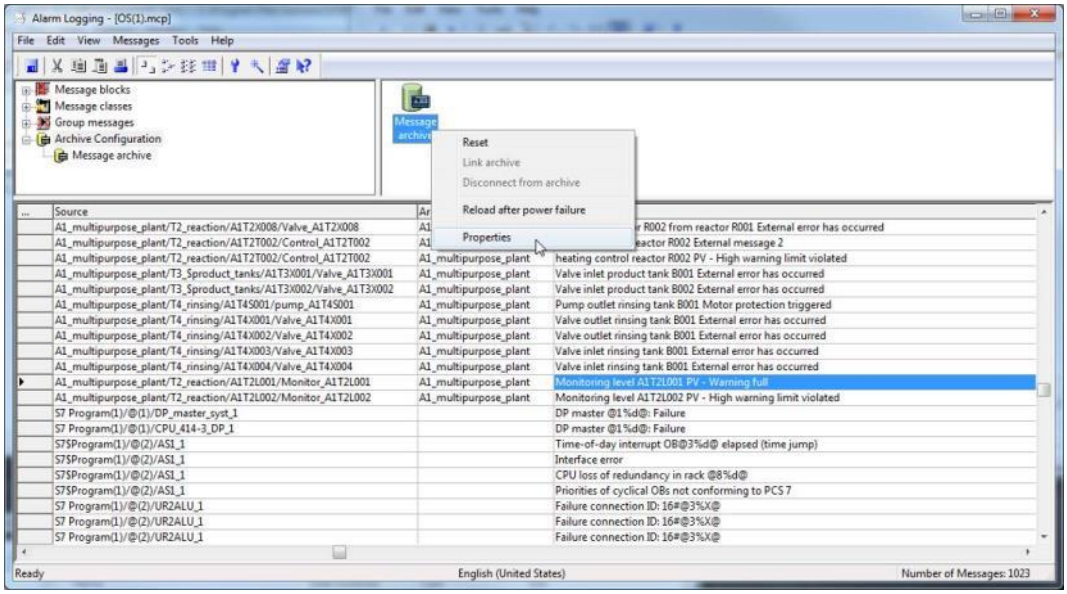
15. Select the AS messages. In the center window of Alarm Logging, you will find the individual messages and can edit their properties in the Properties area in the right margin. (→ AS Messages → PV – Warning full)



16. In the parameters we can select, for example, if we want to archive the corresponding message. (will be archived → OK)

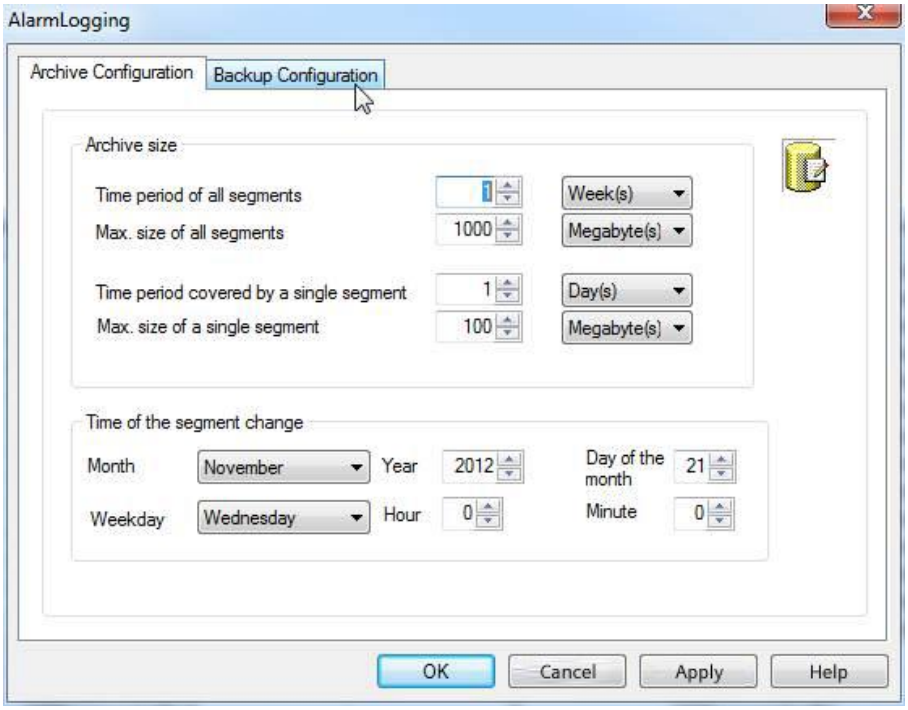


17. In the shortcut menu of the messages, under the item ‘Archive Configuration’, you can now select the ‘Properties’ of the ‘Message archive’ (→ Messages → Archive Configuration → Properties)



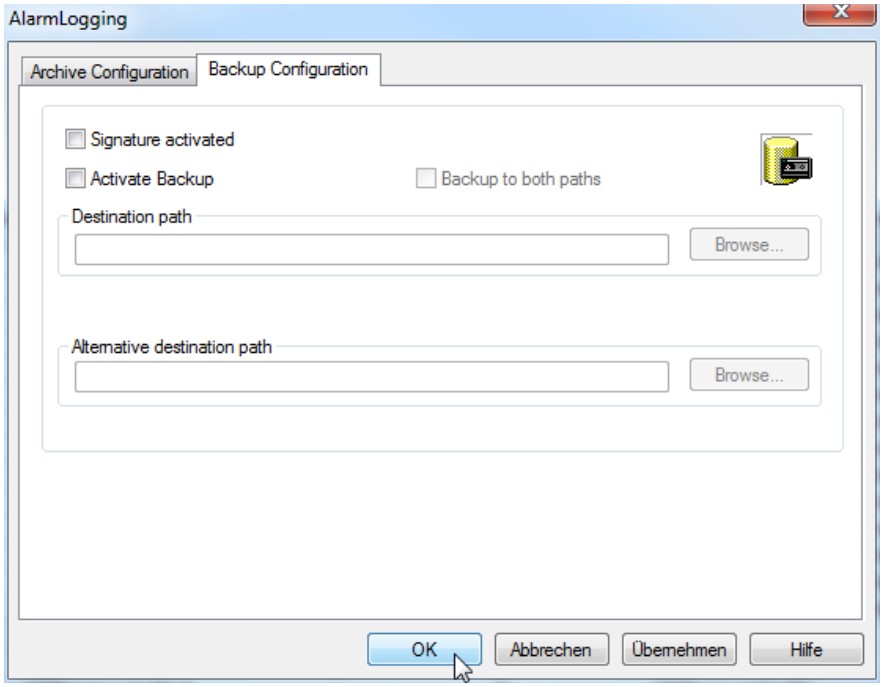
18. Under Archive Configuration, we can now parameterize the size of the entire archive and the distribution into the segments.

    (→ Archive Configuration → Archive size → Time of the segment change)

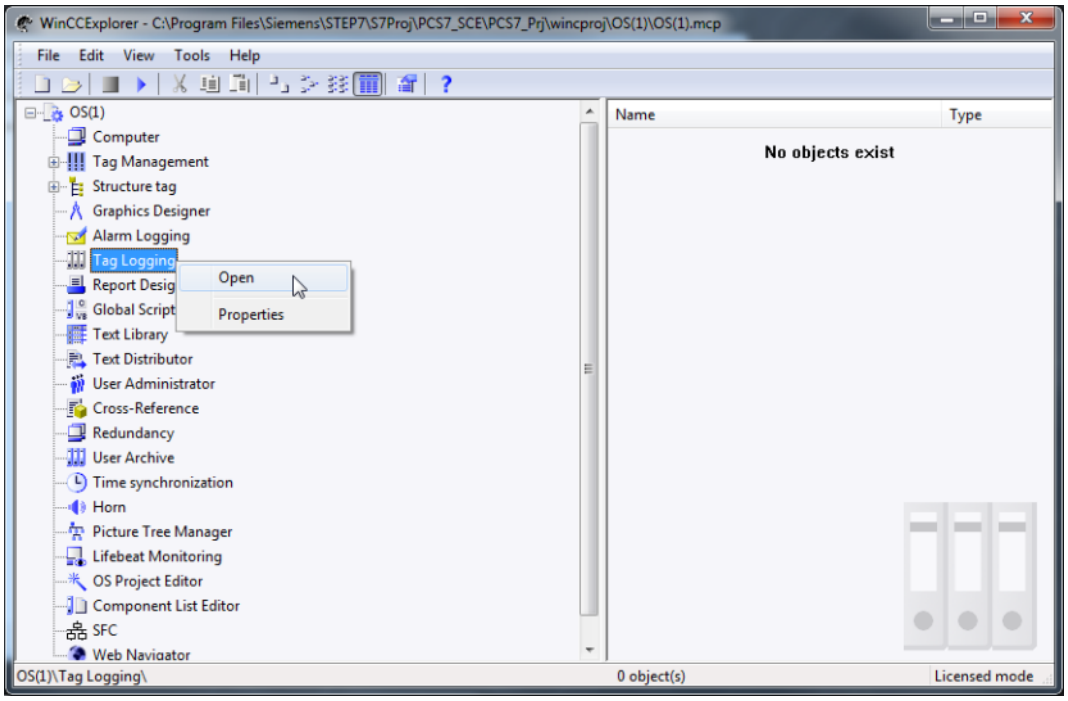


19. Under 'Backup Configuration' it is possible to activate storing the archive data in a destination path to ensure gapless process documentation. By default, backup is started after the first time related segment change. After the settings were applied with 'OK', exit Alarm Logging after the save .

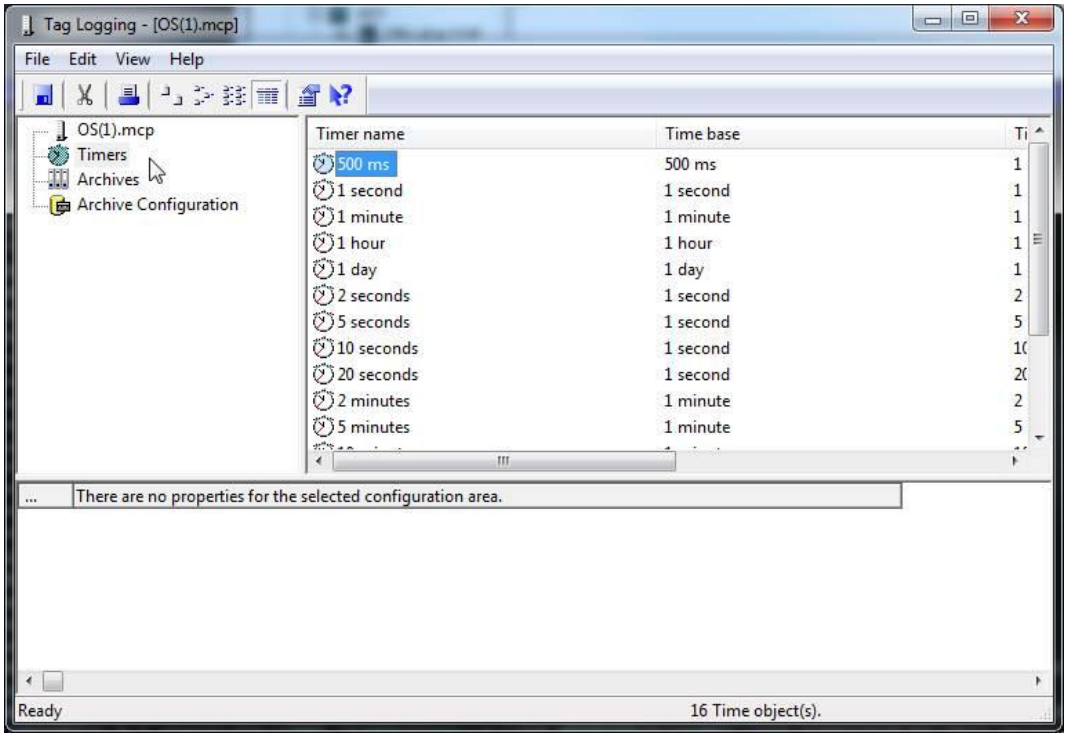
    (→ Backup Configuration → OK → →)



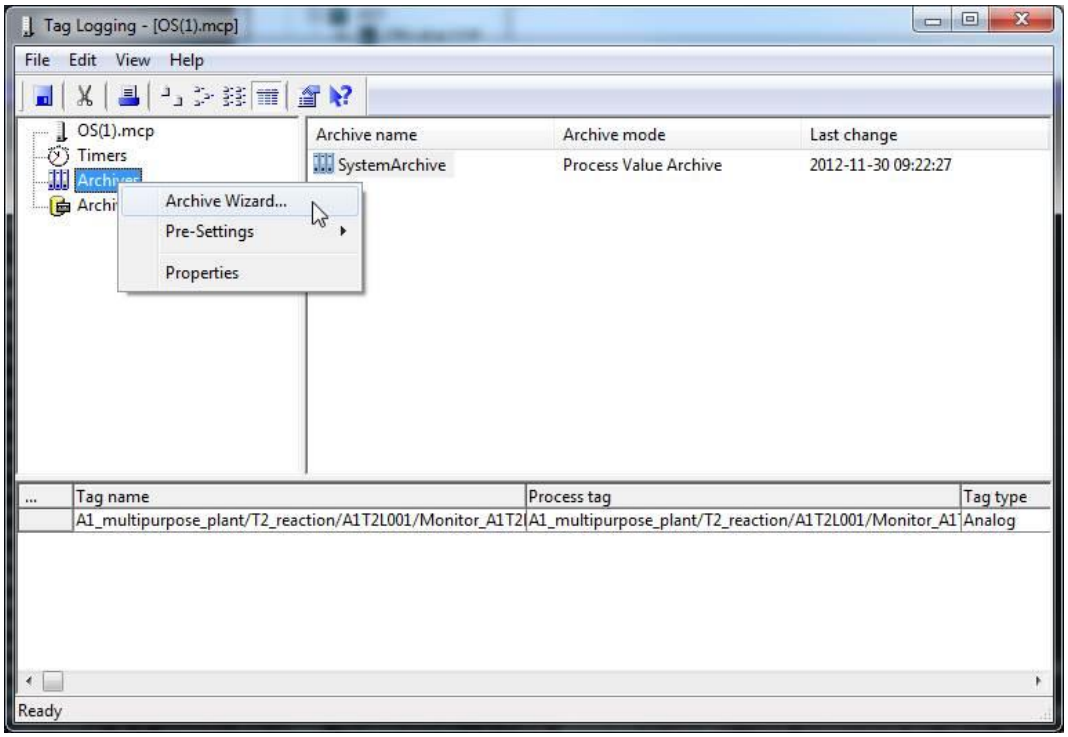
20. Now, in the WinCC Explorer open ‘Tag Logging’ for configuring the process value archives. (→ Tag Logging)



21. Process values can be archived according to different time patterns. This is important in order not to generate data volumes that are too large in the case of large archives. The shortest time is 500ms. (→ Timers → 500ms)

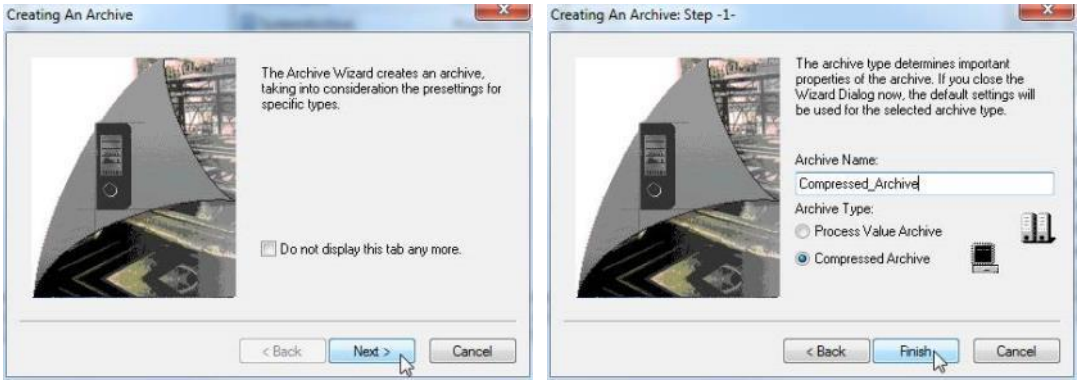


22. A ‘Process Value Archive’ called ‘SystemArchive’ is set up automatically for the PCS 7 project. Additional archives can be set up in the subitems ‘Process Value Archives’ and ‘Compressed Archives’. We are doing this now for a ‘Compressed Archives’. The differences between these two types of archive are described in the property dialogs in the pages below. (→ Archives → Archive Wizard)



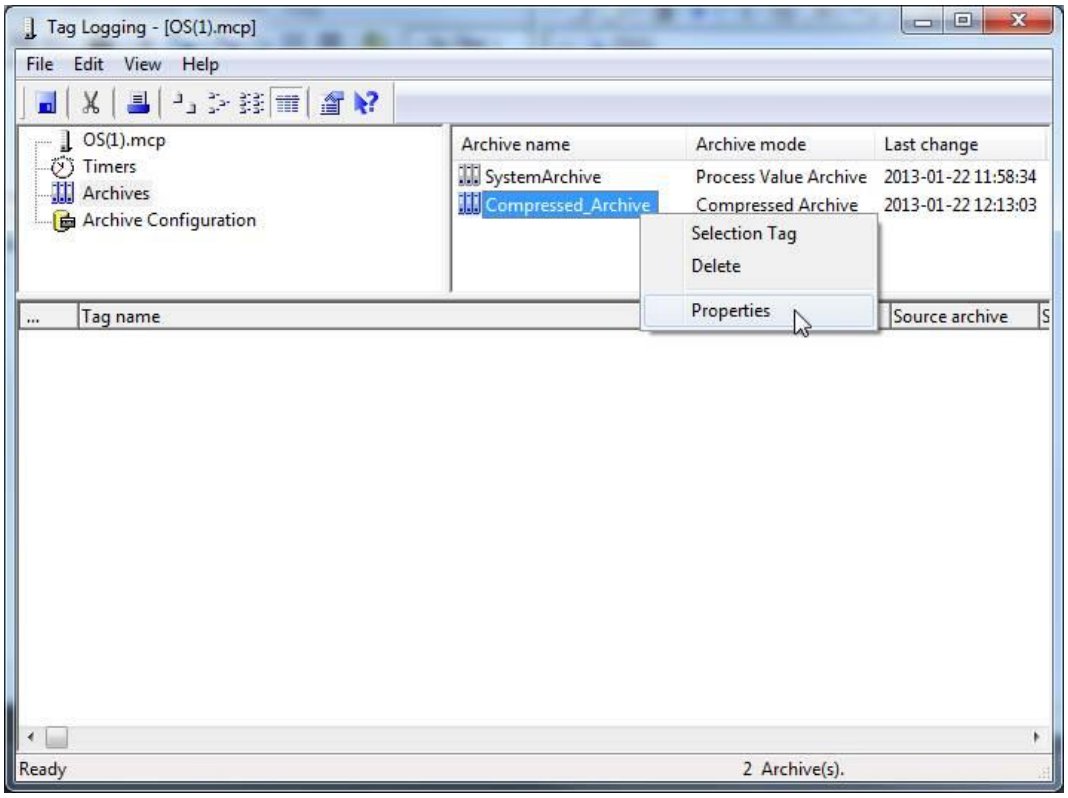
23. Then, assign a name to the ‘Compressed_Archive’.

(→ Next → Archive Name → Compressed_Archive → Finish)



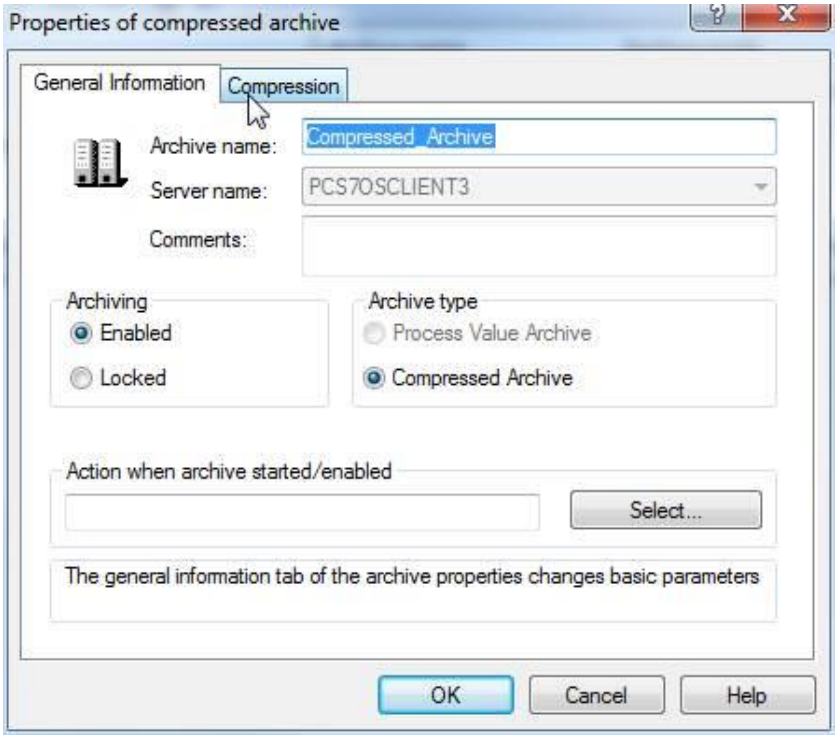
24. Now, look at the properties of such a ‘Compressed Archive’.

    (→ Compressed Archive→ Properties)



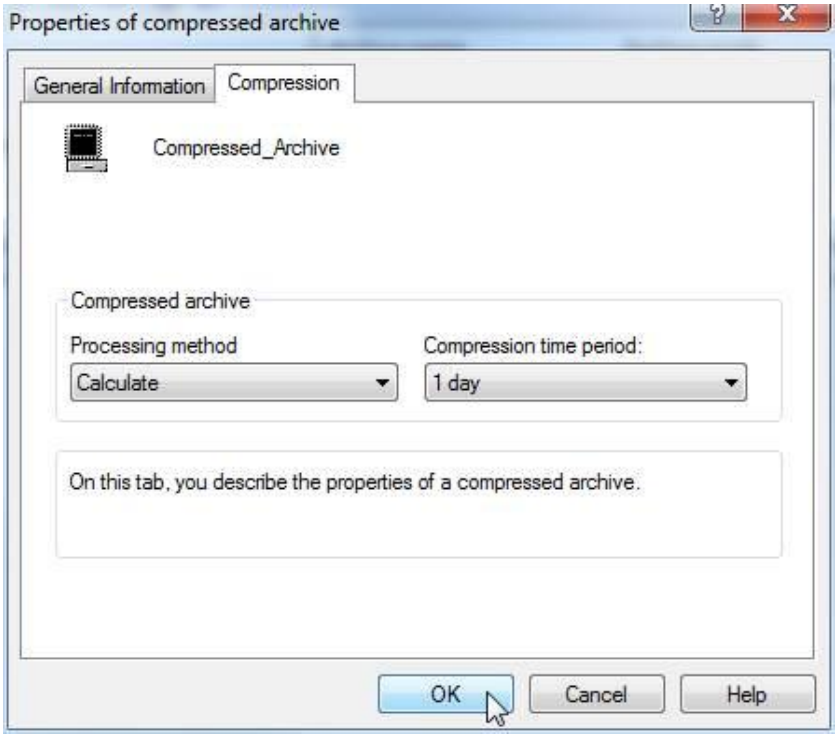
25. In the section ‘General Information’ you can specify if this archive is already enabled when WinCC is started (not locked) and archiving of the data is to start, or if this is to take place at a later time by means of a C script. You can also link an action under ‘General archive properties’ with the start/enable of the archive.

    (→ General Information → Enabled)

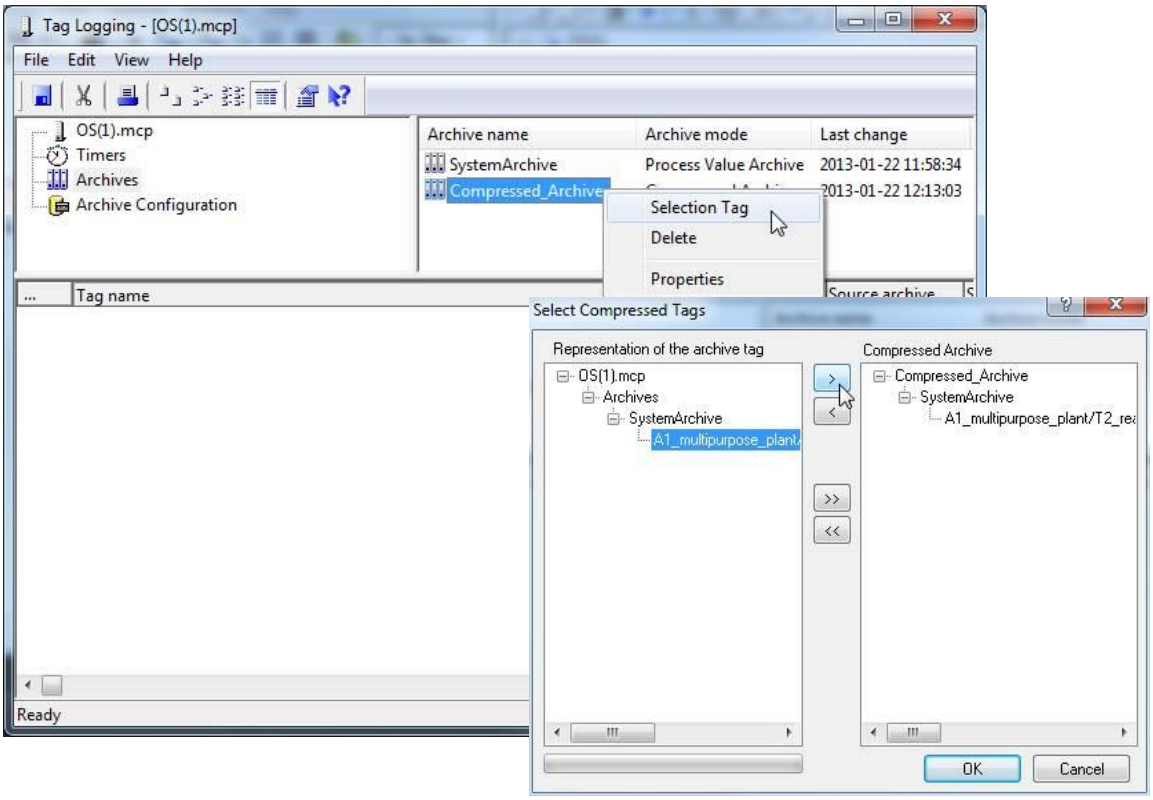


26. In the section ‘Compression’, the compression time period and the processing method are selected.

    (→ Processing method: Calculate → Compression time period: 1 day → OK)

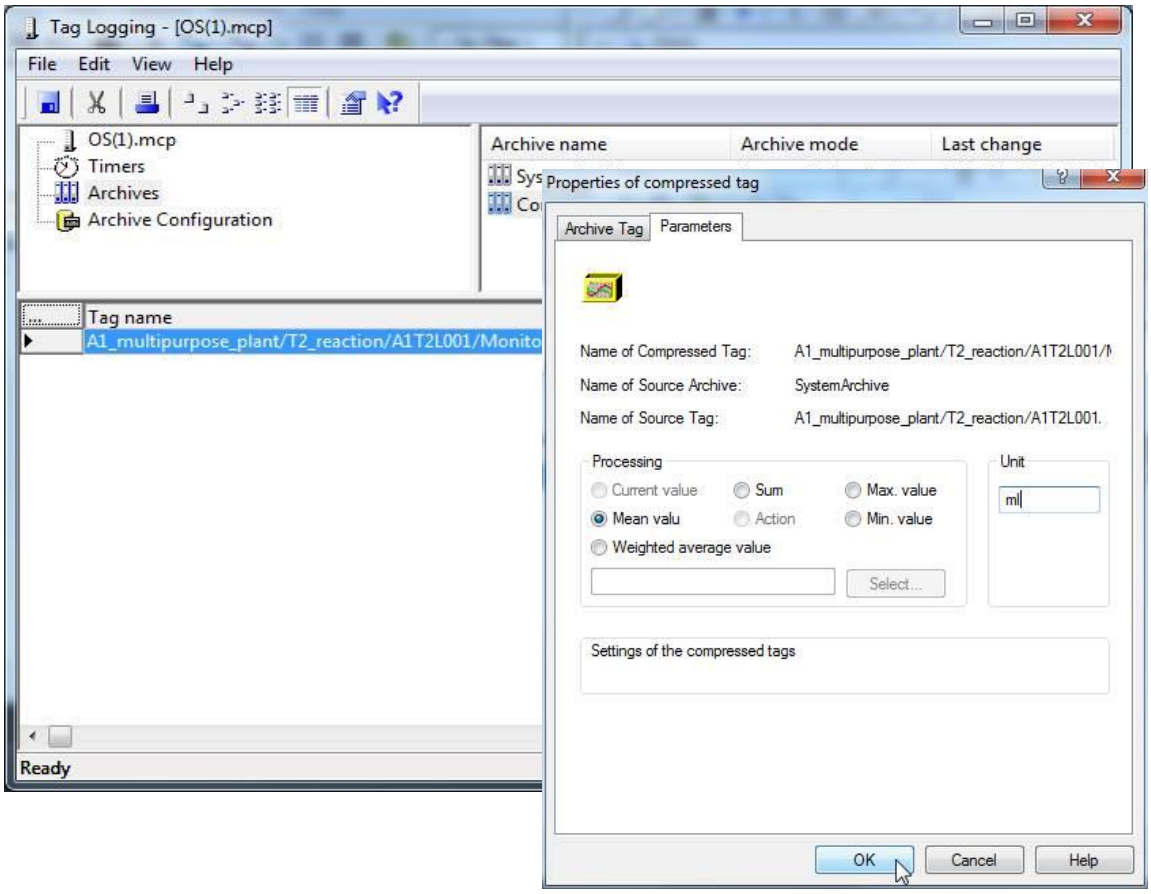


27. Tags are assigned to the compressed archives from the tags that were set up in the process value archives. (→ Compressed Archive → Selection Tag → SystemArchive → A1_multipurpose_plant → [›] → OK)

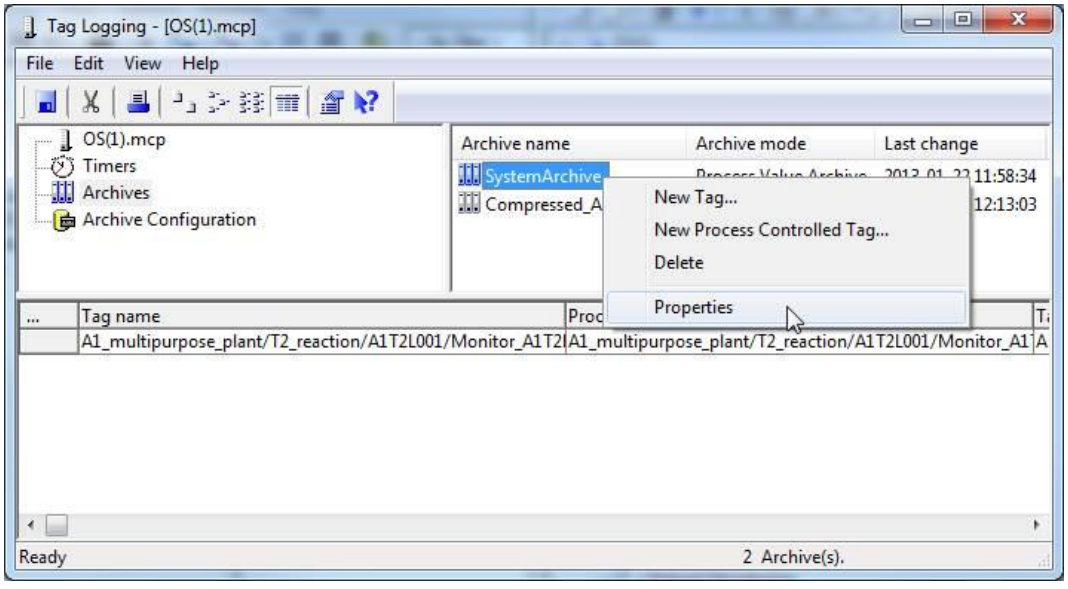


28. For the properties of the compressed tag archiving we want to display above all the parameters for editing or calculating the compression.

    (→ Compressed Archive → Tag name → Properties → Parameters → Processing: Mean value → Unit: ml → OK)

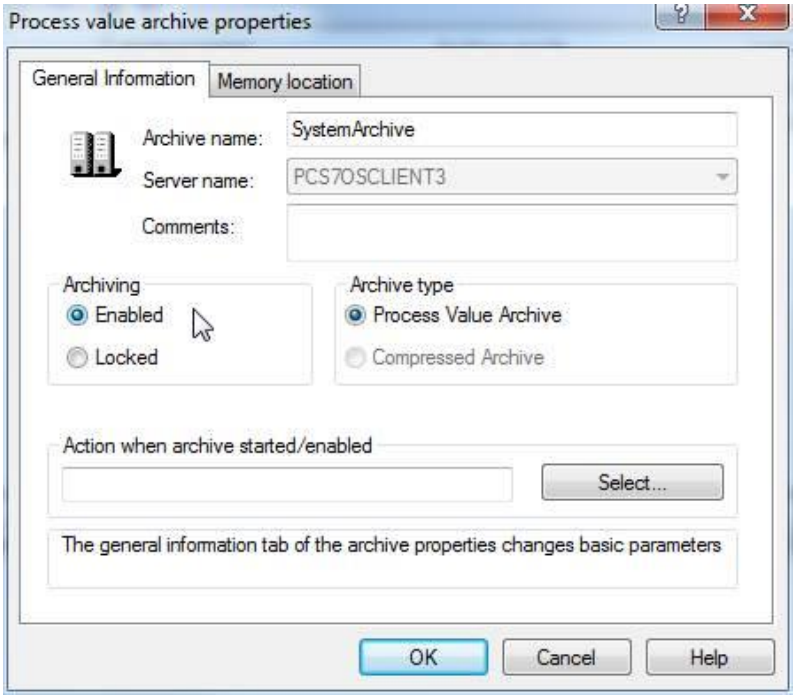


29. Now look at the properties of the process value archive. (→ Process value archives → SystemArchive → Properties)



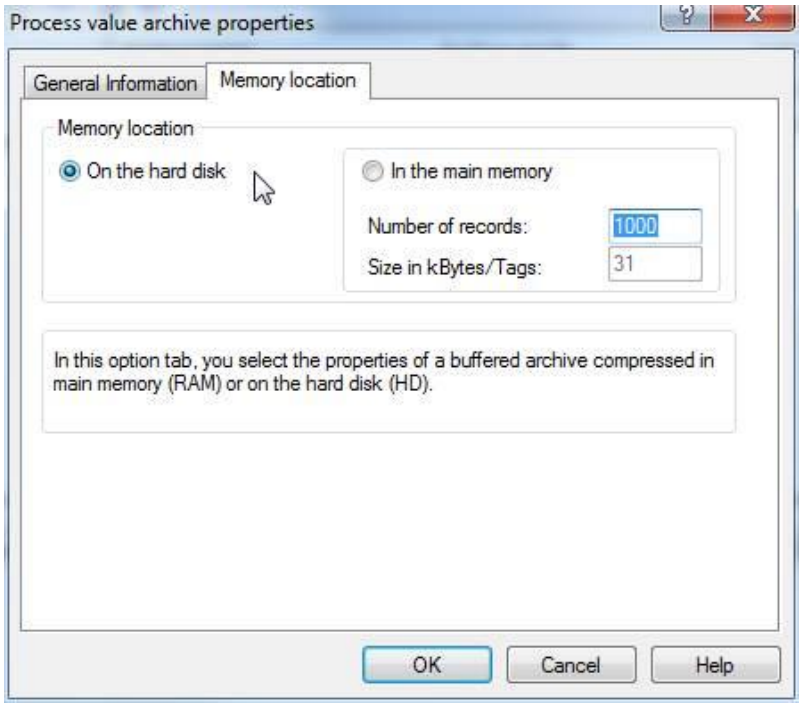
30. In the section ‘General’, again specify whether this archive is to be enabled when the OS is started, or whether an action is to be linked with the enable/start of the archive.

    (→ General Information → Enabled)



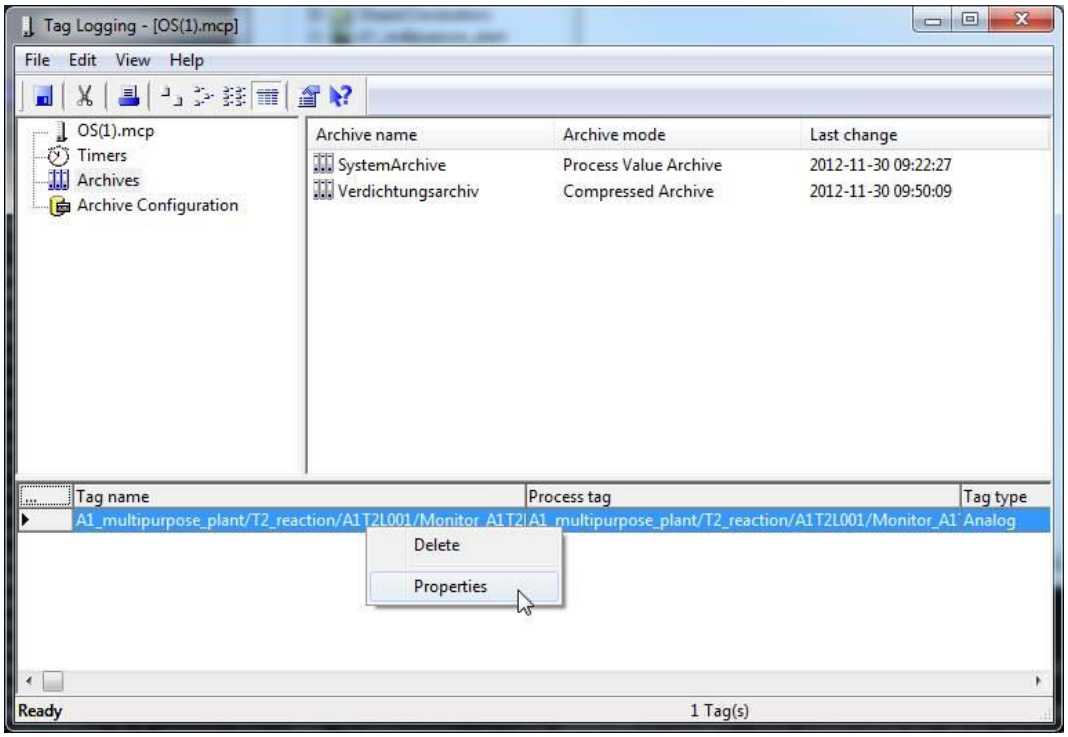
31. In the section ‘Memory location’, select where the archive is to be stored. If the main memory was selected, memory consumption has to be limited.

    (→ Memory location → On the hard disk → OK)



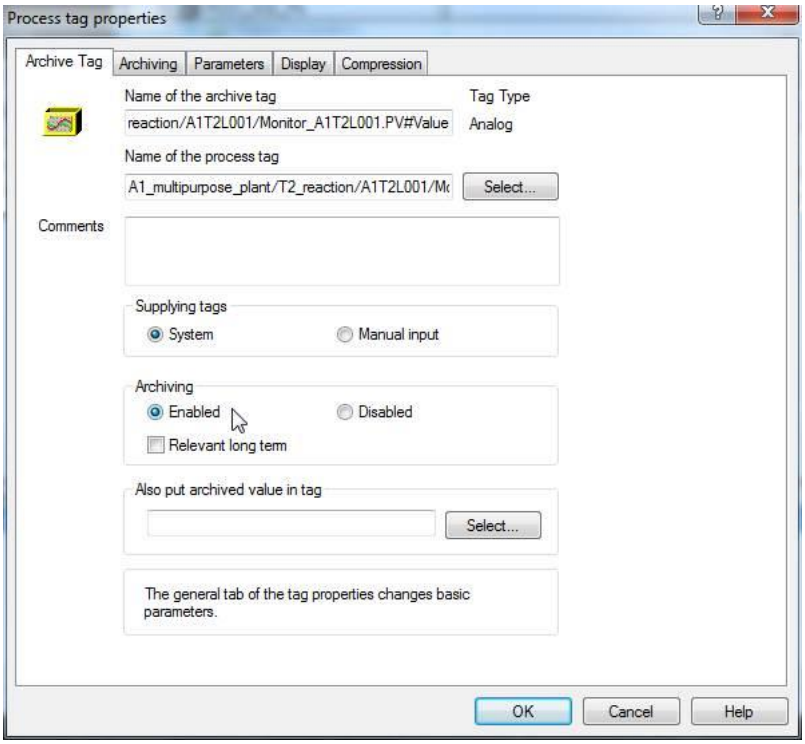
32. Now, look at the ‘Properties’ of the process tag that you set up previously in the CFC.

    (→ SystemArchive → Tag name → Properties)



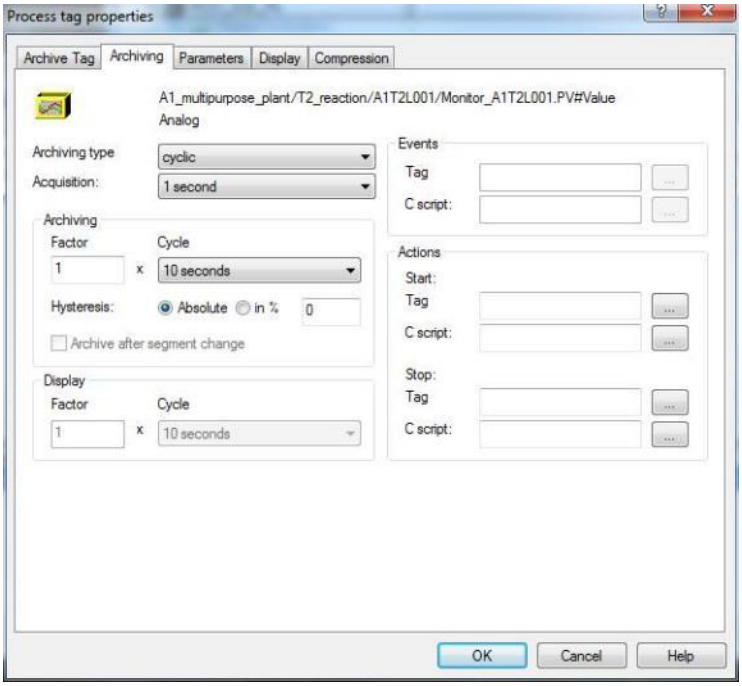
33. In the section ‘General’, basic settings have to be made for the ‘Archive Tag’, such as Supplying tags through WinCC and not through ‘Manual input’, or the possible assignment to a central archive server (CAS) via ‘Long term relevant’

    (→ Supplying tags: System → Archiving: Enabled)



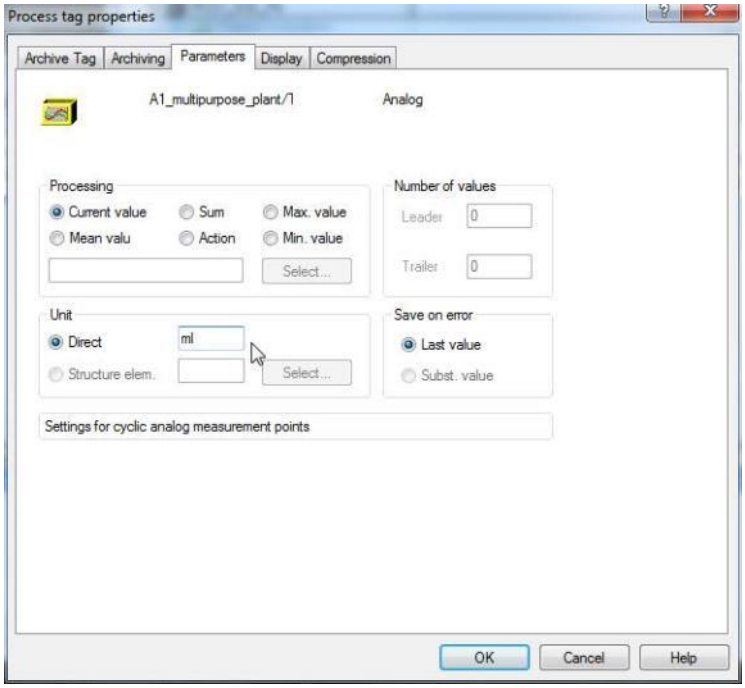
34. The archive tag is recorded according to a fixed data collection cycle. The following can be set: whether archiving follows an archiving cycle (acquisition cycle) also cyclically or whether it is to be acyclical (event controlled/if there is a change). In the field 'Hysteresis' we specify if only the process value is archived that is located absolute (abs.) or relative (in %) above or below the specified threshold.

    (→ Archiving → Archiving type: cyclic → Acquisition: 1 second → Archiving: 1 x 10 seconds)



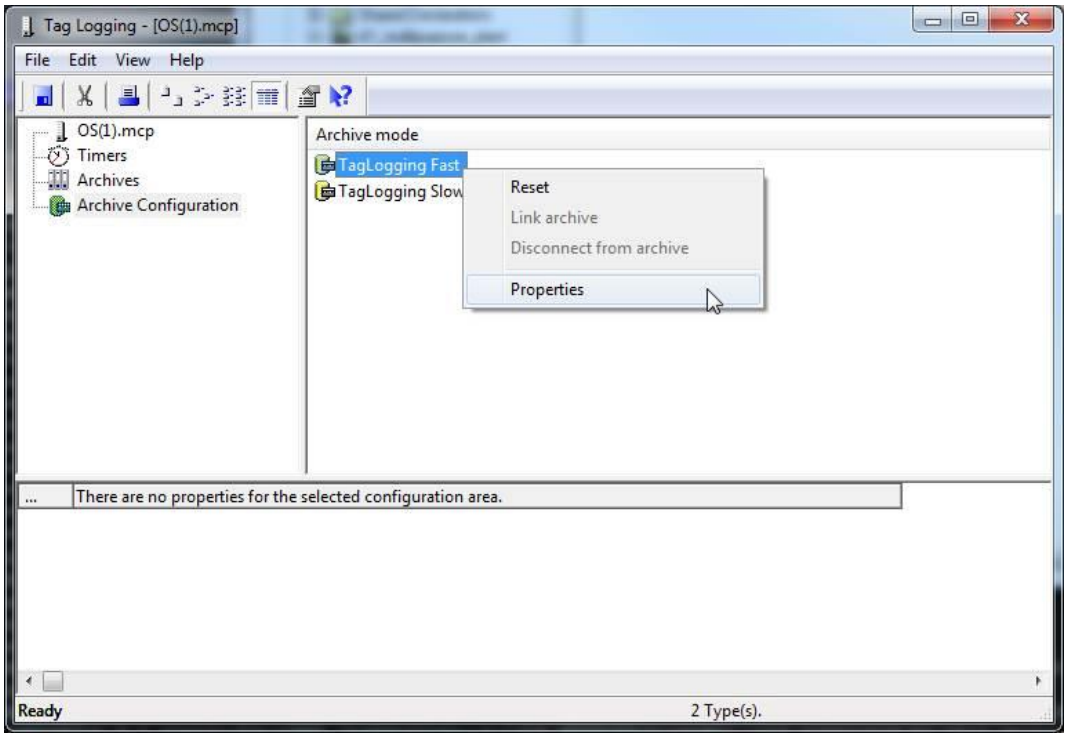
35. For the other parameters, functions can be specified that are to be calculated also during archiving. The unit of the respective value can be defined here also.

    (→ Parameters → Processing: Current value → Unit: ml → OK)



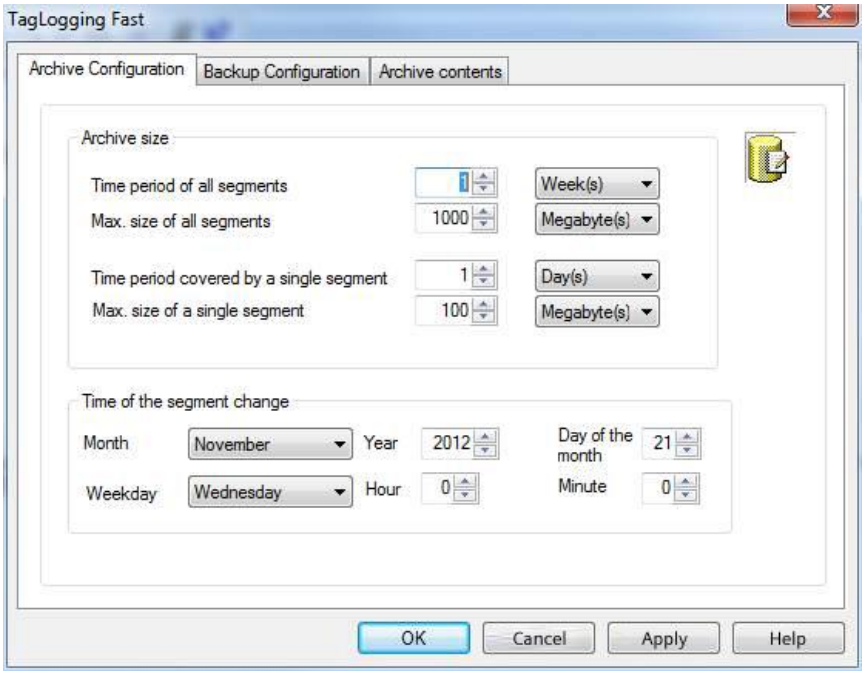
36. Now, we turn to the ‘Archive configuration’. At Tag Logging, there are two ‘Archive types’: ‘TagLogging Fast’ and ‘TagLogging Slow’. The differences become evident in the parameters. Here, first TagLogging Fast.

    (→ Archive mode → TagLogging Fast → Properties)

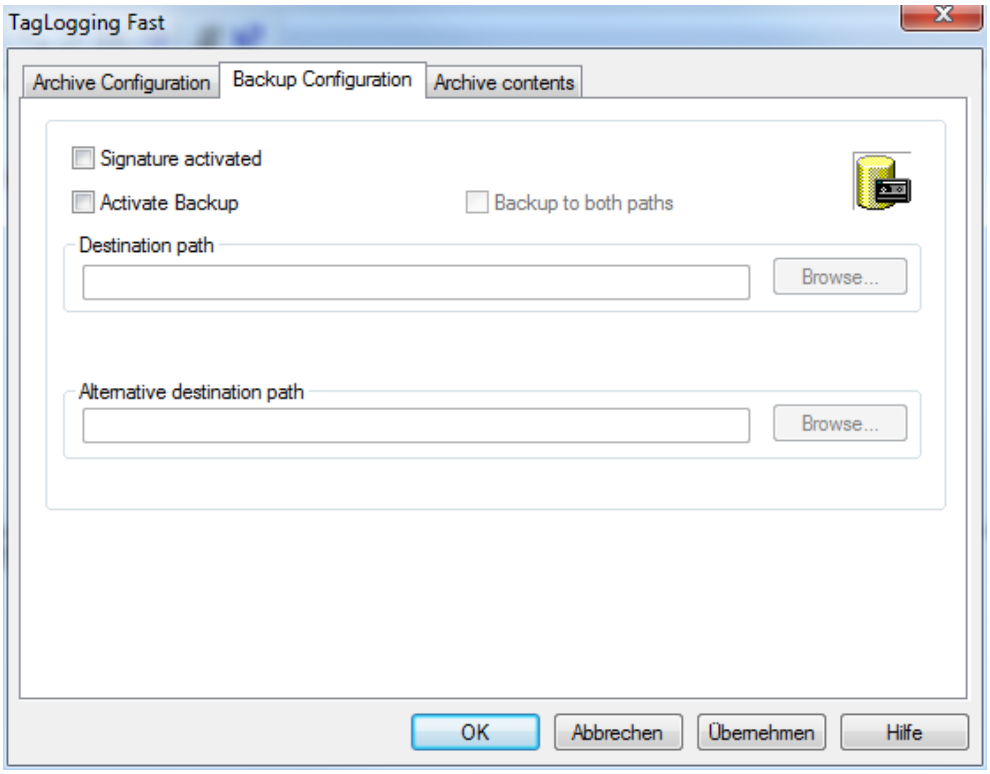


37. Under Archive Configuration, the size of the entire archive and the division into segments can be parameterized. For the archive type TagLogging Slow, this option looks like this.

    (→ Archive Configuration → Archive size → Time of the segment change)

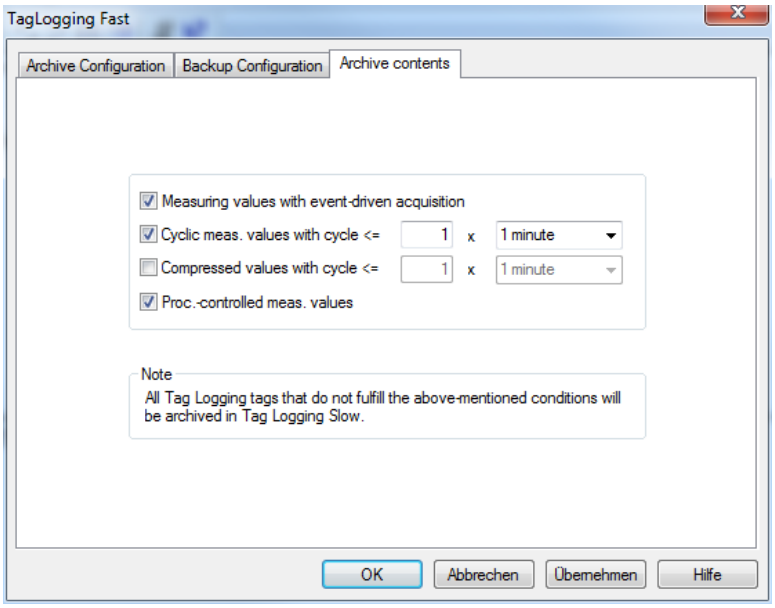


38. Under ‘Backup Configuration’, it is possible to activate archive data storage in a ‘Destination path’ to ensure gapless process documentation. The backup is started by default after the first time related segment change. (→ Backup Configuration)

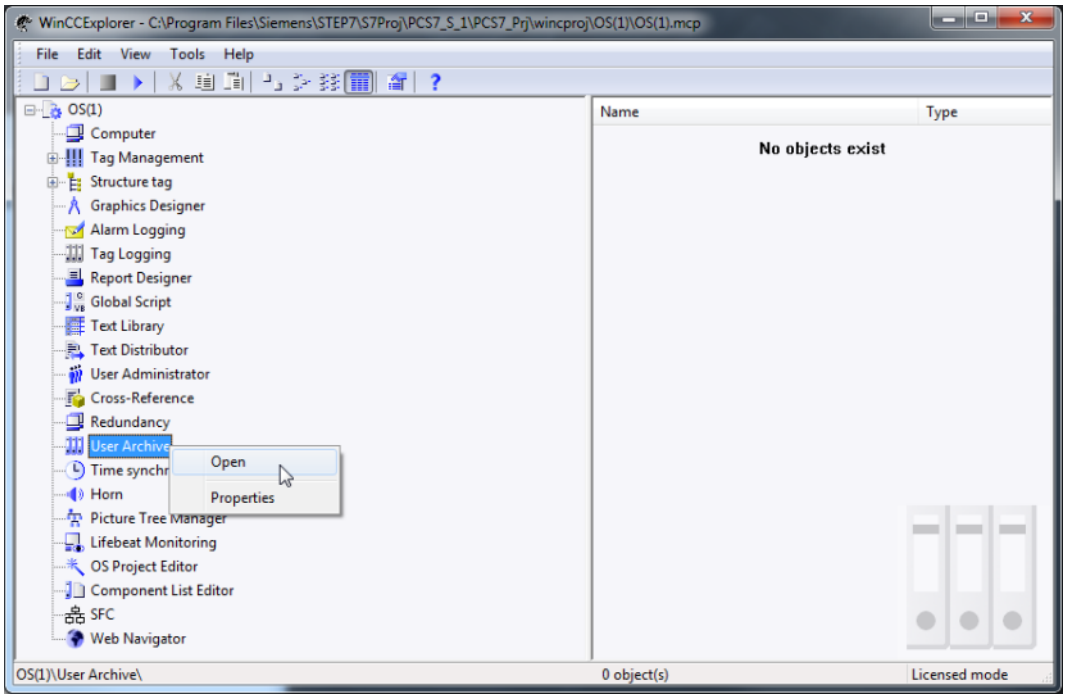


39. In the tab ‘Archive contents’ the difference regarding TagLogging Slow becomes evident. Here, the archiving criteria for TagLogging Fast are specified. The other tags with longer cycle time are located in TagLogging Slow. For the archive type TagLogging Slow this option does not exist. After accepting the settings with ‘OK’ close Tag Logging with  after the save  .

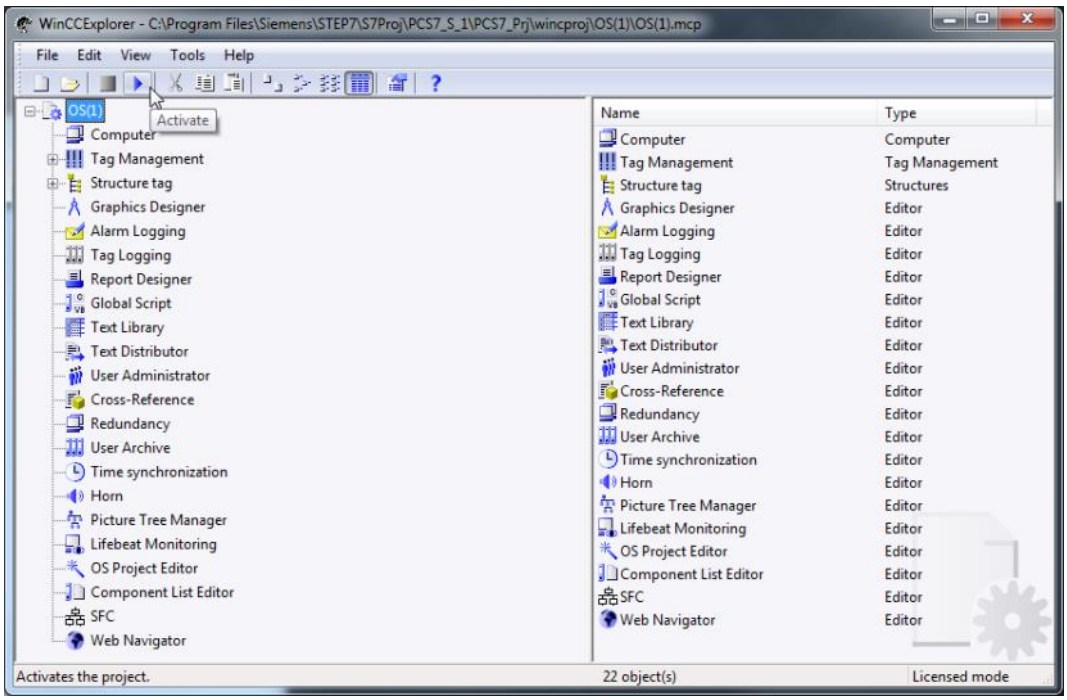
(→ Archive contents → OK →  → )



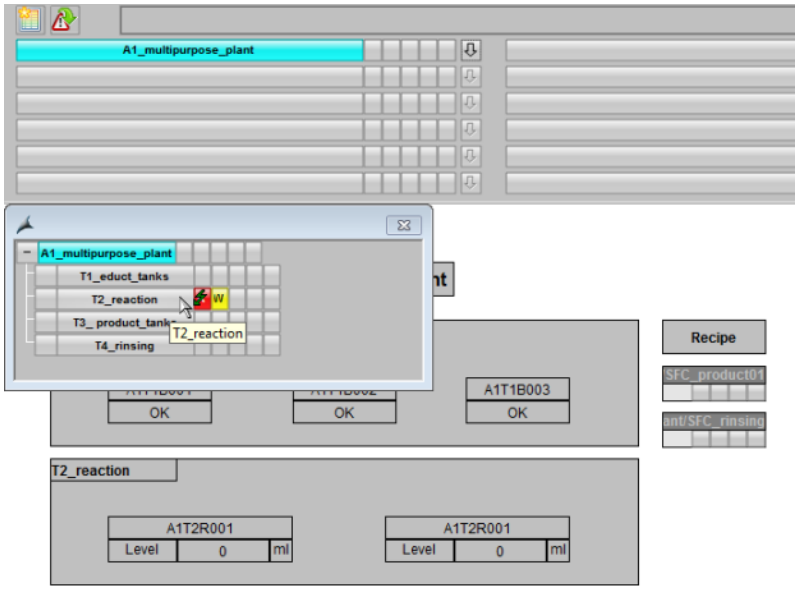
Note: An additional individual variant of archives are the user archives. User archives are database tables where users can set up their own data fields. User archives are used to store data and offer standardized access to this data according to SQL database description. However, this variant is not shown here, since generating it is very individual and complicated. (→ User Archive → Open → …)



40. To display the archive data, OS Runtime has to be started first, of course. (→ Activate OS runtime)

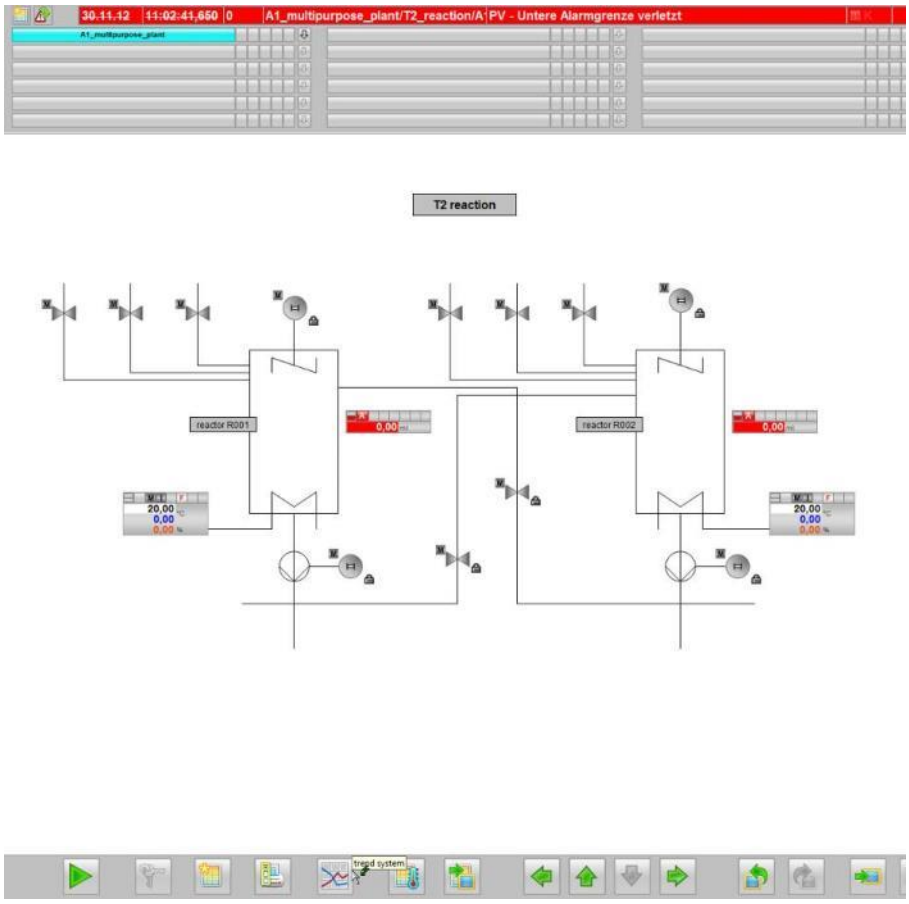


41. To display the plant, select the down arrow to the right of “A1_multipurpose_plant” and then “T2_Reaction”. (→ ⇓ → T2_Reaction)

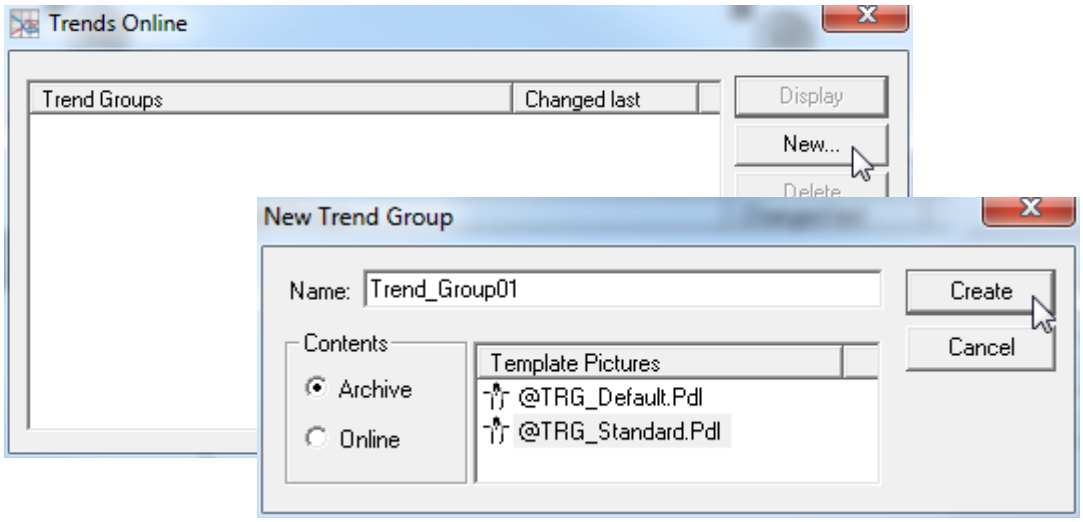


42. The simplest method to display archive data in curve form is by clicking on ‘Assemble groups/Call.

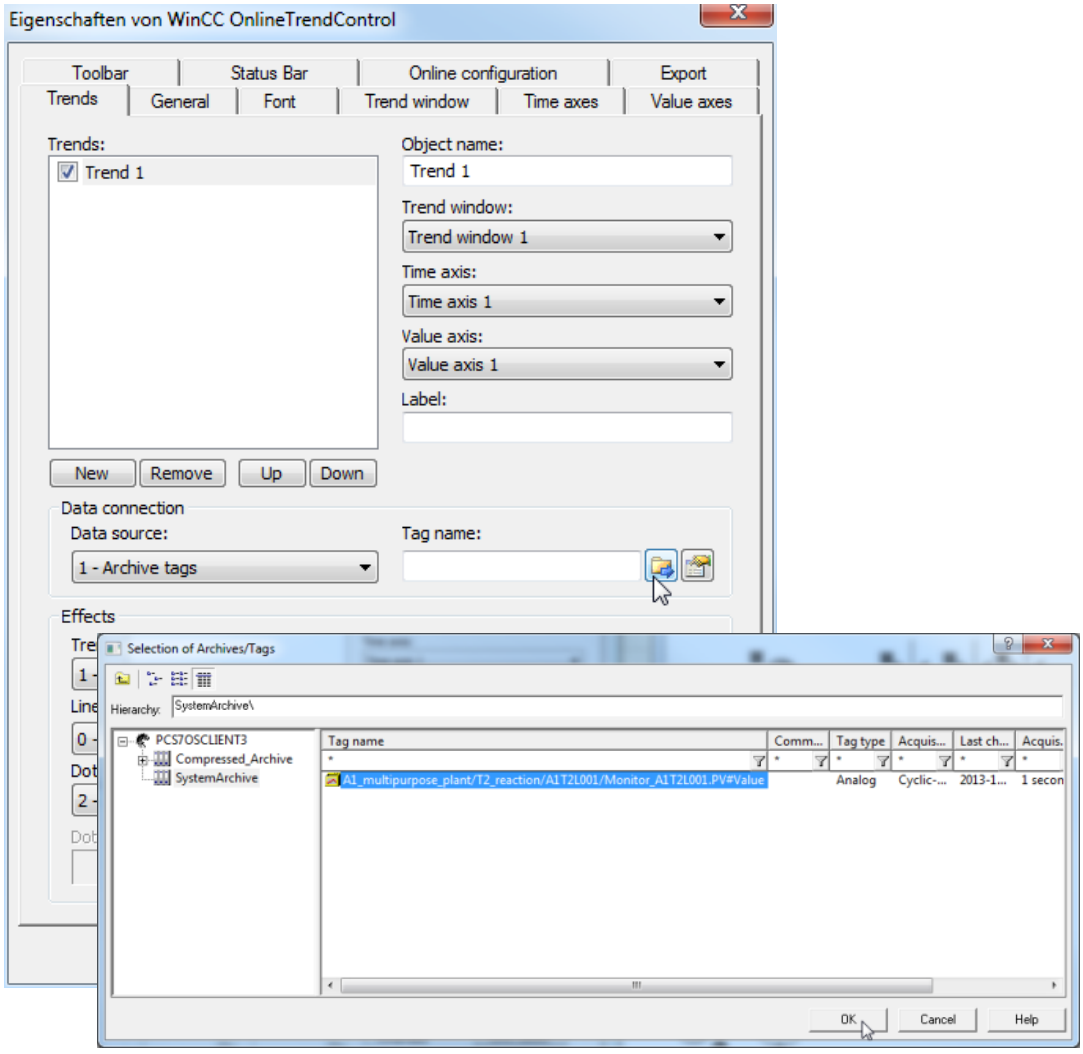
(→ Assemble Groups/Call)



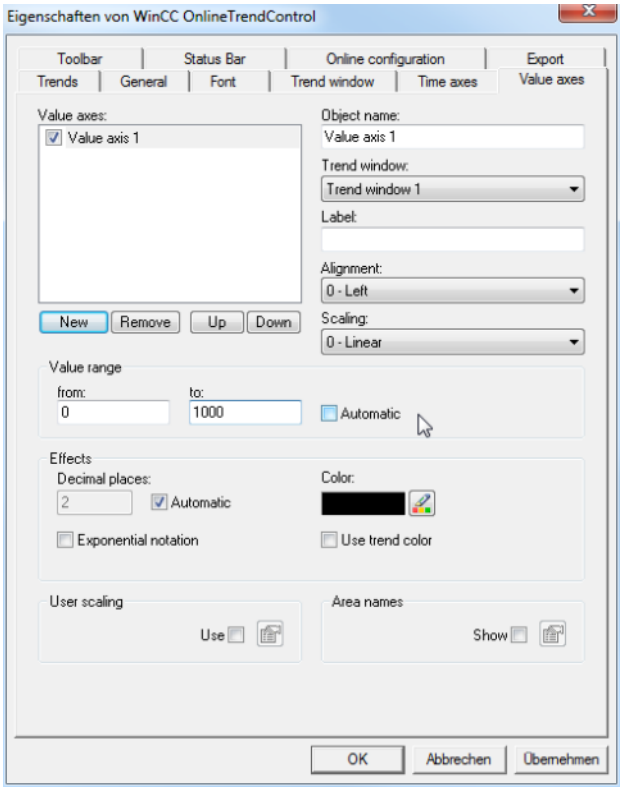
43. In the dialog below, assign a name to the ‘New Trend Group’ and select ‘Archive’ as content. That means: the displayed values come from an archive. As an alternative, all other online variables can be displayed directly. (→ New → Name:Trend_Group01 → Contents: Archive → Create)



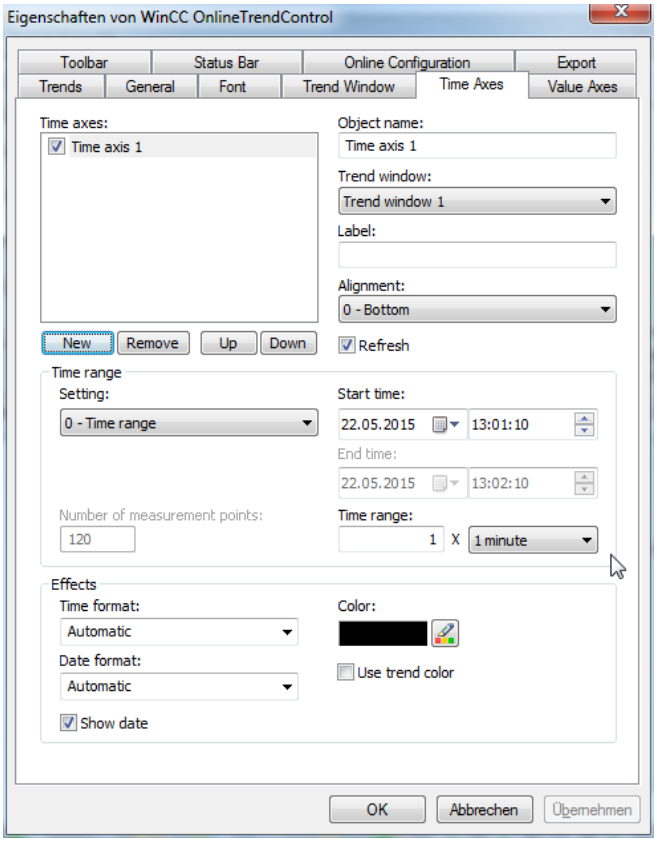
44. In the tab ‘Trends’ select at data connection – Tag name the folder icon and in the next dialog the tag A1_multipurpose_plant/…. (→ Tag name → SystemArchive → A1_multipurpose_plant/… → OK)



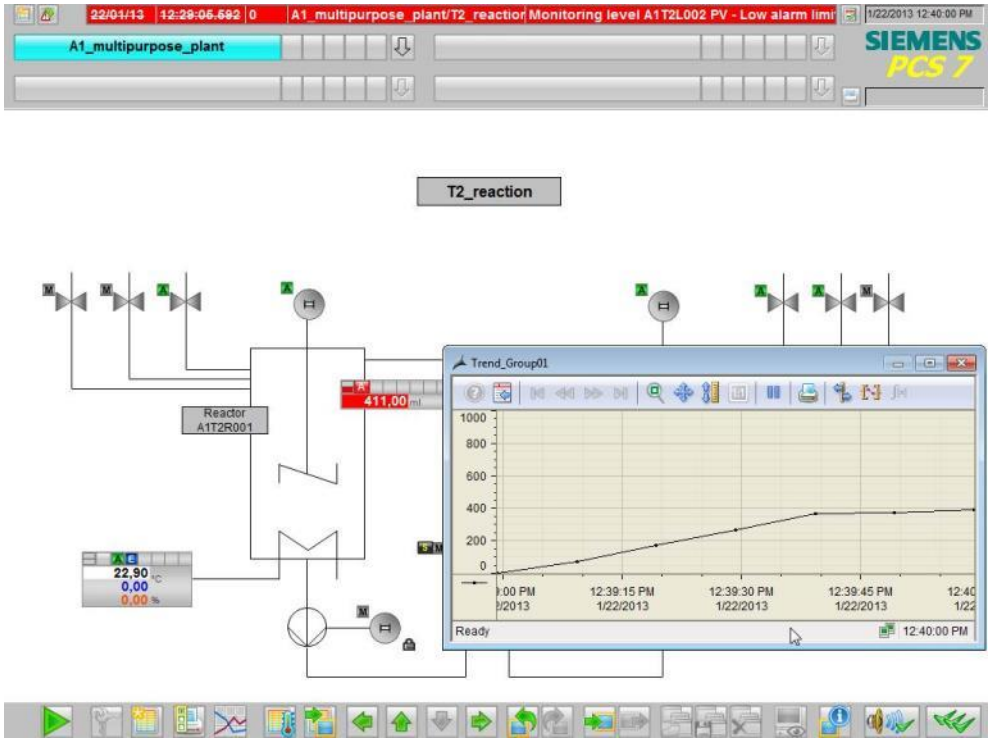
45. In the second tab ‘Value axes’ deselect ‘Automatic‘ and set the value range to 0 … 1000. (→ Value axes → deselect ‘Automatic‘→ Value range: 0 ... 1000)



46. In the tab ‘Time Axes’ select the time range 1 x 1 minute.
(→ Time Axes → Time range: 1 x 1 minute)

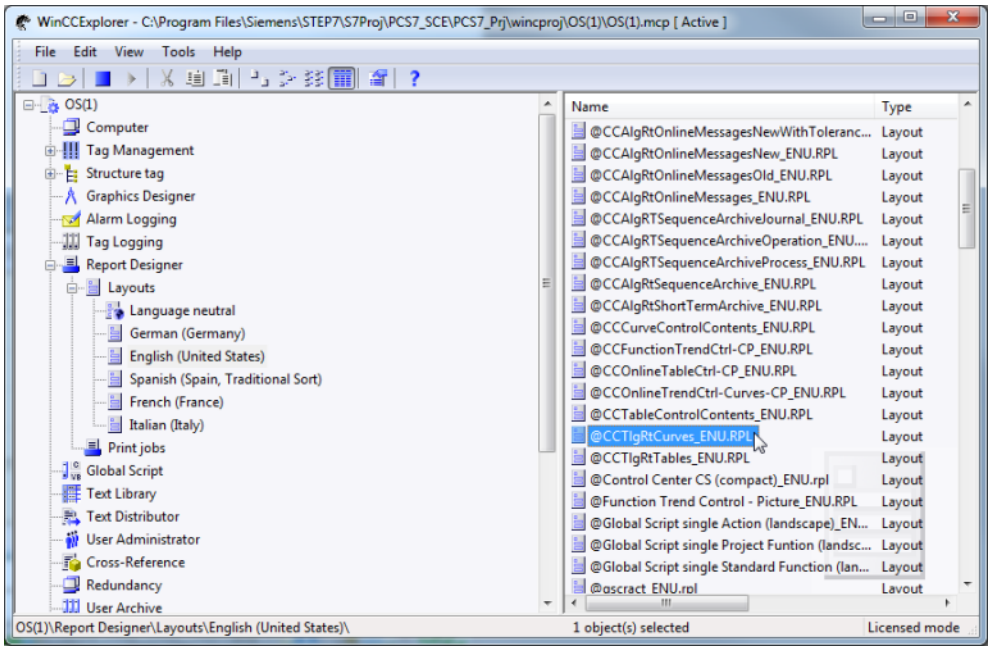


47. You now have a trend display for the archive tag that you can modify conveniently using the task bar in the window Trendgroup01 regarding range and segment. To display it, the corresponding SIMIT model as well as the simulation has to be started in PCS7.

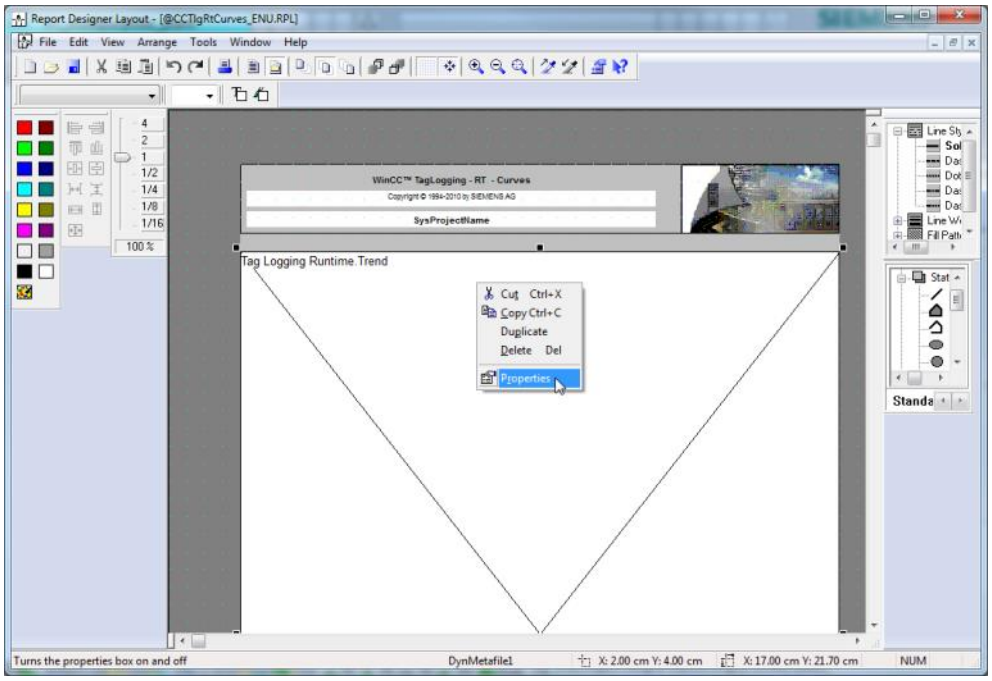


48. Another variant for displaying trends from the archives is using the 'Report Designer' as printout. Here it is important that WinCC remains started in runtime. In the Report Designer, print requests with the layout they contain can be started. For this reason, first select a layout '@CCTlgRTCurves_ENU.RPL' matching the archive data in order to adapt it.

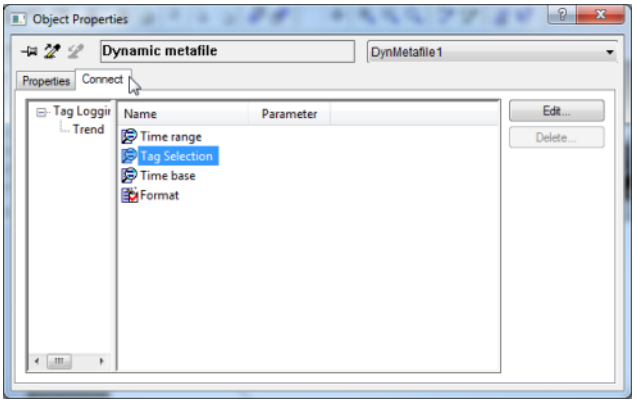
    (→ Report Designer → Layouts → English → @CCTlgRTCurves_ENU.RPL)



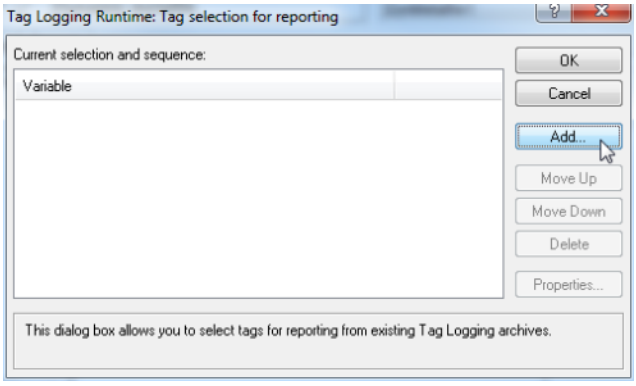
49. In the ‘Report Designer Layout’, the layout can now be edited as in the usual graphic tools. Here we show how the dynamic view of the tag trend has to be parameterized. (→ Tag Logging Runtime.Trend → Properties)



50. In the following dialog, select under ‘Connect’ the ‘Tag Selection’ for editing. Likewise, the time range, time base and the format can be specified here. (→ Connect → Tag Selection → Edit)

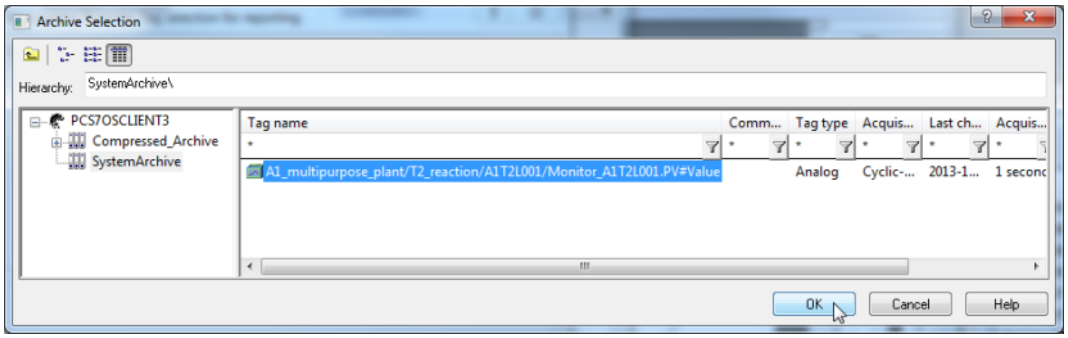


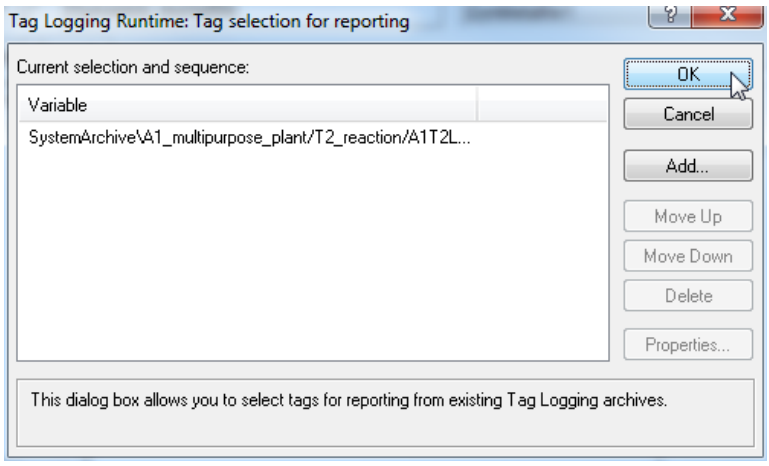
51. We still have to select a tag. Click on ‘Add’. (→ Add)



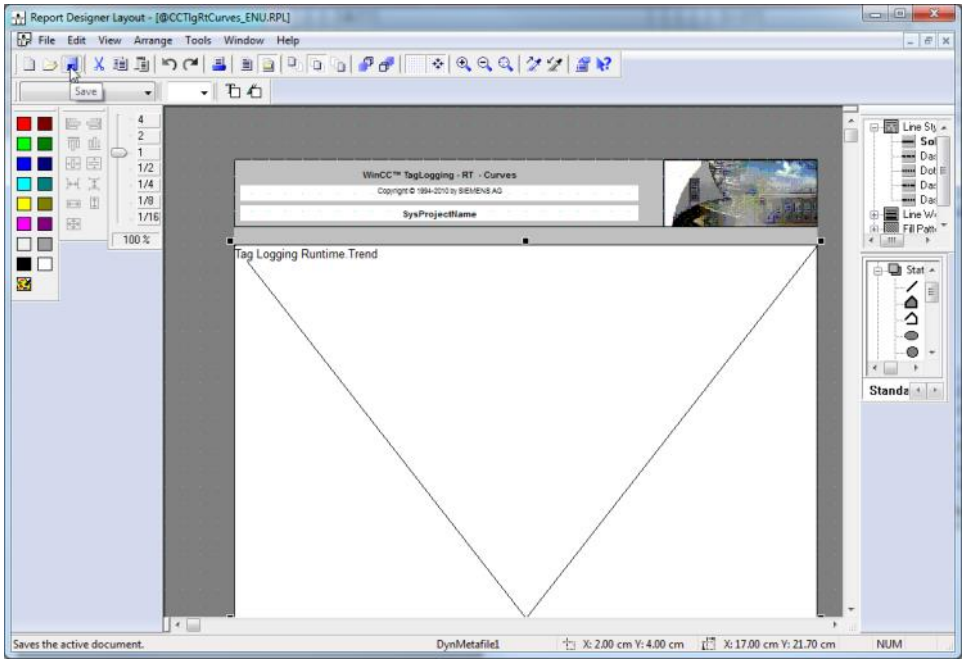
52. From the ‘SystemArchive‘: select ‘A1_multipurpose_plant as tag.

    (→ SystemArchive → A1_multipurpose_plant → OK → OK)



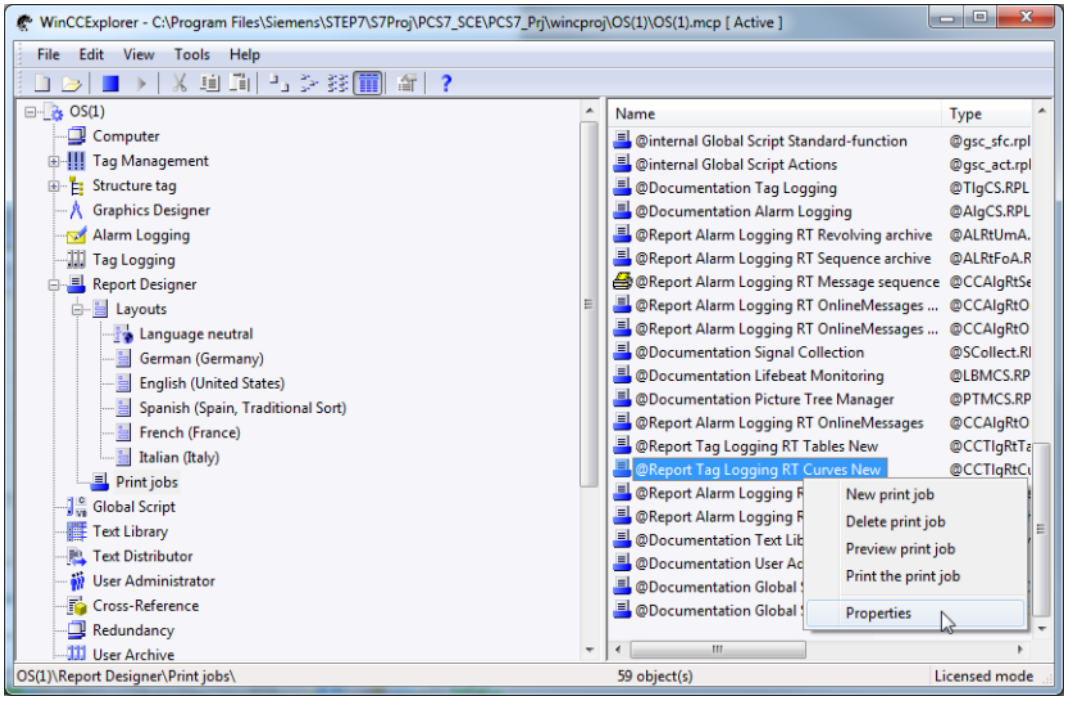


53. Close the Properties dialog and save the modified layout under the same or a different name. (→ Close → Save )

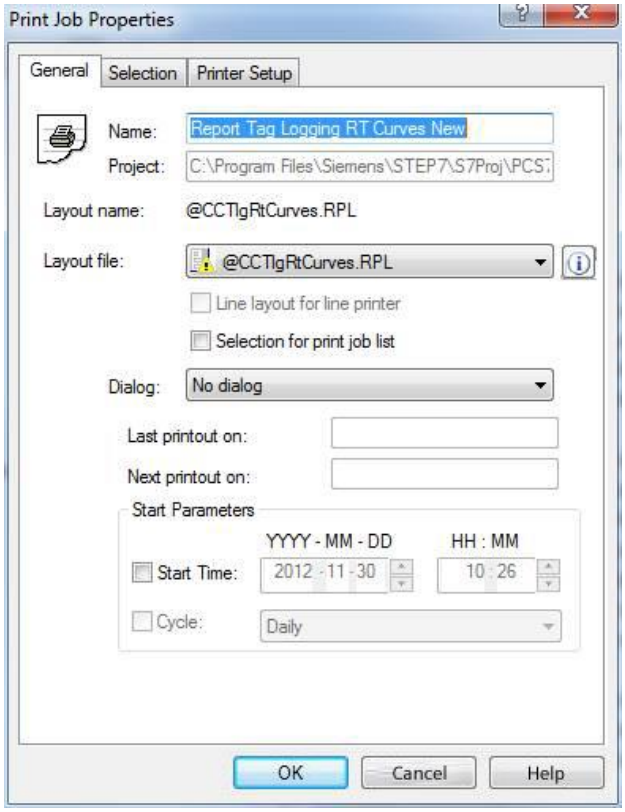


54. In the print request for online trends '@Report Tag Logging RT Curves New' the properties are now set.

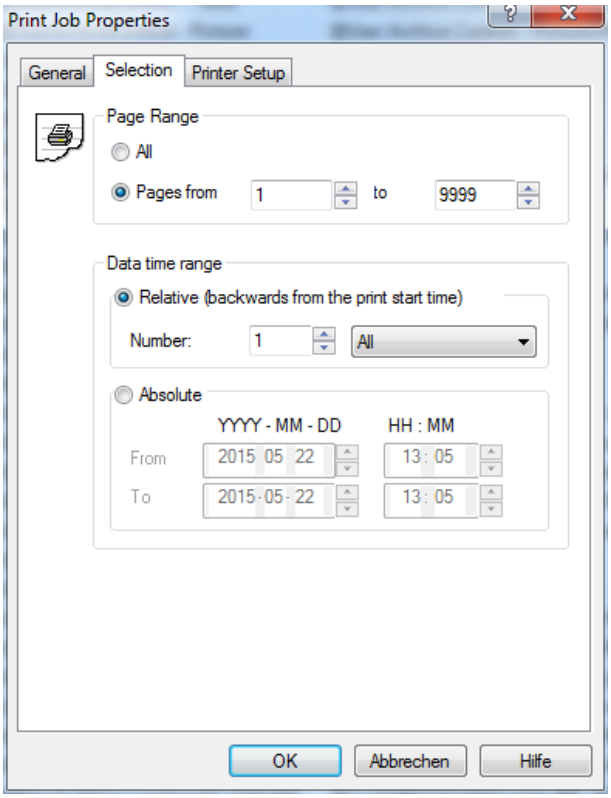
    (→ Report Designer → Print jobs → @Report Tag Logging RT Curves New → Properties)



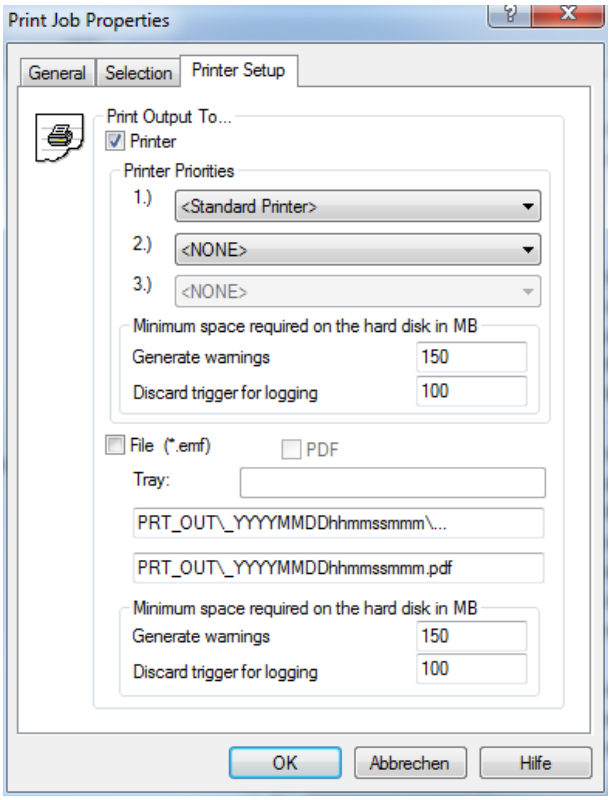
55. In the dialog 'General', a suitable 'Layout file: @CCTlgRTCurves.RPL' is displayed. If own layouts were created, they can be selected here also. (→ Layout file: @CCTlgRTCurves.RPL)



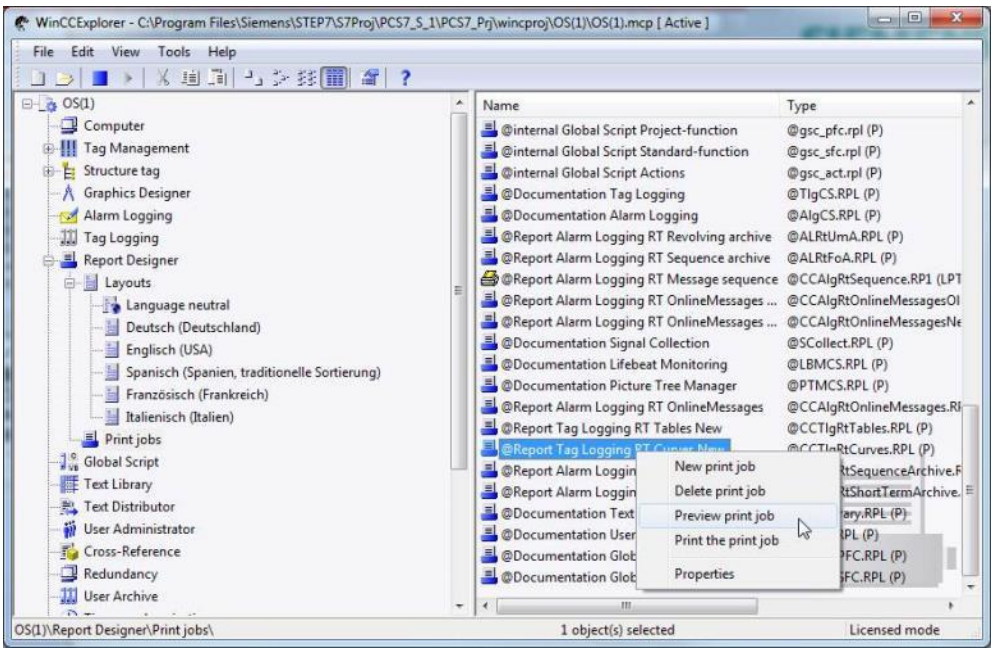
56. Under Selection of the print job properties, the pages and the time range are specified. (→ Selection → Page Range → Time range)

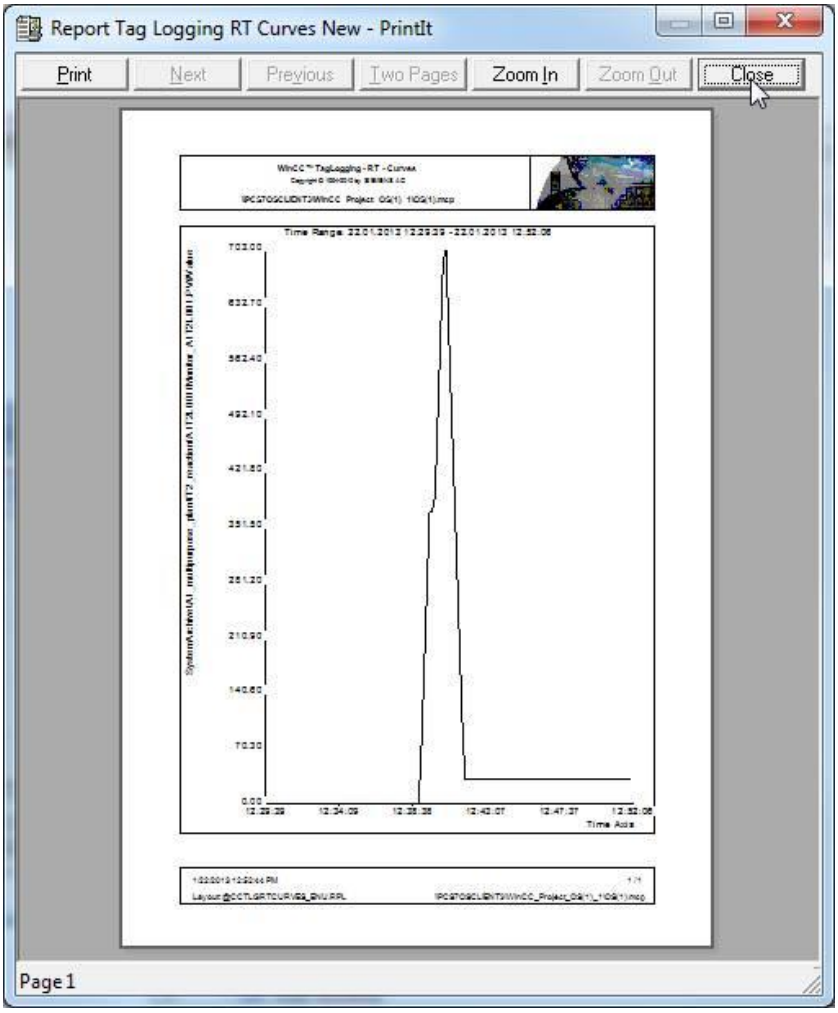


57. In 'Printer Setup', several printers can be specified sorted according to priority. (→ Printer Setup → OK)



58. Now, we are ready to print. To save paper, the print job can be previewed. (→ @Report Tag Logging RT Curves New → Preview print job)





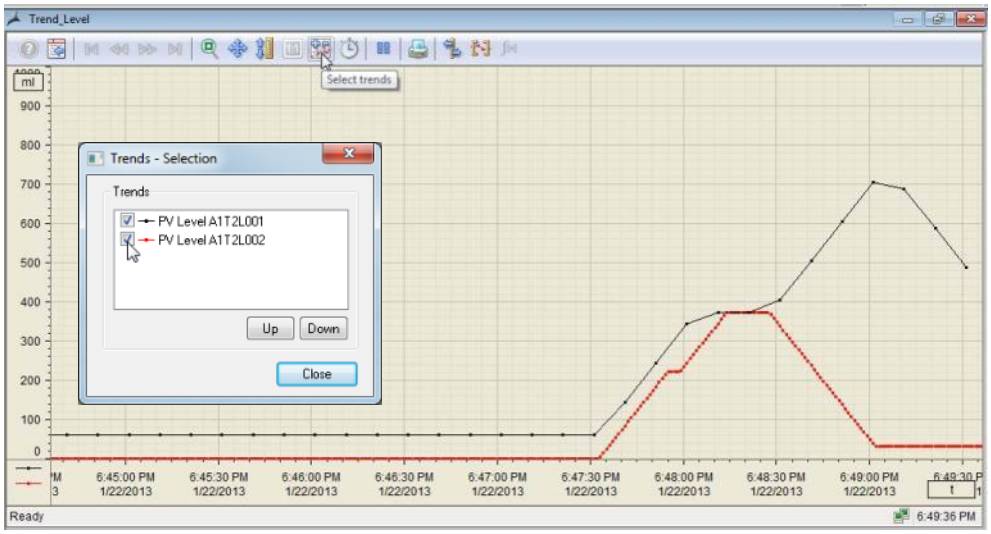
EXERCISES

In the exercises we apply what we learned in the Theory section and the Step by Step Instructions. The existing multi-project from the step by step instructions (PCS7_SCE_0203_R1305_en.zip) is used for this and expanded.

The objective of this exercise is this: to configure two trend groups that represent different archive values for the reactors. To this end, combine the temperature and controller relevant data in the first trend group and the level relevant data in the second trend group.

TASKS

1. Archive all values that are level, temperature and controller relevant. Edit the corresponding blocks in a way that these values are archived.
2. Now, define a trend group for reactor R001 that represents the values of the PID controller. Add all relevant archive tags. Do the same for reactor R002. Try different time and value axis settings.
3. Next, the level relevant data of the reactors is to be visualized together. Select them and display them.
4. Test different settings in the configuration dialog. Search for a function that can be used to select and deselect individual trends and trend groups.



The tasks below were not realized in the exercise project. However, they are typical for planning archive systems.

5. Which process values should be archived for an easy-to-follow and gapless representation? Develop a concept and implement it.
6. Calculate the memory needed for the tag “Tag Logging Fast“. As the number of process values, utilize the results from the first task. For the analog process values, once assume 6 bytes for each process value and once 16 bytes for each process value. One segment is to store the process values for 2 weeks and all segments at least half a year.
7. Now calculate the memory requirement for Alarm Logging by assuming 4 messages per minute. One message requires 4000 bytes memory.
8. Based on the results, distribute the assumed 10 GB memory to Archive Tag Logging Fast, Alarm Logging and Tag Logging Slow. Then set the properties of the archives in your project.