PCS 7 in Practice - Plant Asset Management

SIMATIC PCS 7 V7.x

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SIMATIC PCS 7

Plant Asset Management

Application Example

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1 New functions in V7.0

User Diagnostics Structure (Condition Monitoring)

It is often necessary to consider certain process, chemical and mechanical conditions in the context of a maintenance concept for a plant. To practically apply Condition Monitoring (e.g. operating points of pumps, monitoring of motor bearings) the user must be automatically notified of conditions before they become critical.

As of PCS 7 V7.0, Asset Management allows you to integrate user-specific, maintenance-relevant process parameters or characteristics into the existing diagnostics structure with the addition of an “ASSETMON” function block. PCS 7 V7.0 provides the adequate interfaces to the maintenance station accordingly to the Asset Management philosophy.

Controller Performance Data

As of PCS 7 V7.0, Asset Management monitors the controller load (firmware sensitive) by means of a new function block, which also contains integrated functions for new cycle overload behavior. The functionality is integrated automatically (module drivers) into the system and requires no configuration.

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Overall Export of Assets Identification Data

As of PCS 7 V7.0, it is possible to export the identification data of all assets. This interface allows you to provide the data to MES or ERP systems. The export is performed on the MS Client.

Component Comment in Ident View

In the Ident View, a new field displays the comment on the component concerned, which has been entered with the HW Config or SIMATIC Manager.

Display of the “CONEC“ Block

As of PCS 7 V7.0, the “CONEC” block is displayed by a diagnostics icon and a faceplate in Asset Management. The “CONEC“ block monitors connections configured with Netpro in the AS.

Generating Diagnostics Screens in the Dialog “Compile and Download Objects”

If you compile the MS Server with the dialog “Compile and Download Objects”, the diagnostic screens will be automatically generated.

Recording Parameter Modifications in Assets

Changes to parameters are often made on devices directly in the field. To ensure the program is kept up to date, Asset Management indicates any possible parameter modifications of a device on the MS Client. You will see whether the program data still corresponds to the parameters in the device via monitoring. With this information the user immediately knows for which field device data records must be uploaded to the PG.

Time-Controlled Query for Diagnostic States of Assets

As of PCS 7 V7.0, Asset Management includes an option allowing you to cyclically (daily cycle) read the diagnostic information of EDD-based field devices via SIMATIC PDM.

Passivation/Depassivation of Redundant Modules

As of PCS 7 V7.0, passivation and depassivation of redundant modules for channel-specific redundancy are supported and displayed/operated in Asset Management.

Lock/Unlock Messages for Diagnostics Area

As of PCS 7 V7.0, you can lock messages for specific devices in the diagnostics area.

New Feature for Network Objects

PCS 7 V7.0 allows you to integrate Scalance X200 devices.

New Functions in PDM V6.0 SP2

As of PDM V6.0 SP2, the Document Manager allows you to assign up to 10 documents (image, sound, text, film) to the devices.

As of PDM V6.0 SP2, you can use additional step 1 EDD enhancements. These will be described here in brief using the example of SITRANS LR200.

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1.1 User Diagnostics Structure with the Block "ASSETMON"

1.1.1 Introduction

It is often necessary to consider certain process, chemical and mechanical conditions in the context of a maintenance concept for a plant. To practically apply Condition Monitoring (e.g. operating points of pumps, monitoring of motor bearings) the user must be automatically notified of conditions before they become critical.

As of PCS 7 V7.0, Asset Management allows you to integrate user-specific, maintenance-relevant process parameters or characteristics into the existing diagnostics structure with the addition of an “ASSETMON” function block. PCS 7 V7.0 provides the adequate interfaces to the maintenance station accordingly to the Asset Management philosophy.

1.1.2 Overview of the Diagnostics Structure

Interrelation between Diagnostics Structure and Plant Hierarchy.

The Diagnostics Structure is derived from the Plant Hierarchy. Consequently, the folder “Diagnostics” is assigned an individual OS area in the Plant Hierarchy and is assigned to the MS server.

The folder „Diagnostics“ contains the folders “AS Objects”, “Network Objects” and “PC Stations”.

As an option, you may extend the folder „Diagnostics” by a user-specific folder.

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Table 1-1

Plant Hierarchy			
	Diagnostics Structure		
First Hierarchy Level	**Second Hierarchy Level**	**Third Hierarchy Level**	**Fourth Hierarchy Level**
Project	Diagnostics	Overview Screen “Overview“	
		AS Objects	Overview Screen “AS Objects”
		Network Objects	Overview Screen “Network Objects”
		PC Stations	Overview Screen “PC Stations”
		Optional: User-Specific Objects	Overview Screen „User-Specific Objects“

1.1.3 User Diagnostics Structure

In the Plant Hierarchy under the “Diagnostics” folder you can create a plant-specific diagnostics structure.

You can insert user created diagnostic screens into the user diagnostics structure, and configure the diagnostics functions with the help of the „ASSETMON” block from the PCS 7 Library V7.0. The following objects and conditions can be monitored:

- Values, defined by rules or calculations
- Objects, which do not support diagnostics (e.g. non-intelligent field devices)
- Plant areas
- Groups of units
- Package units

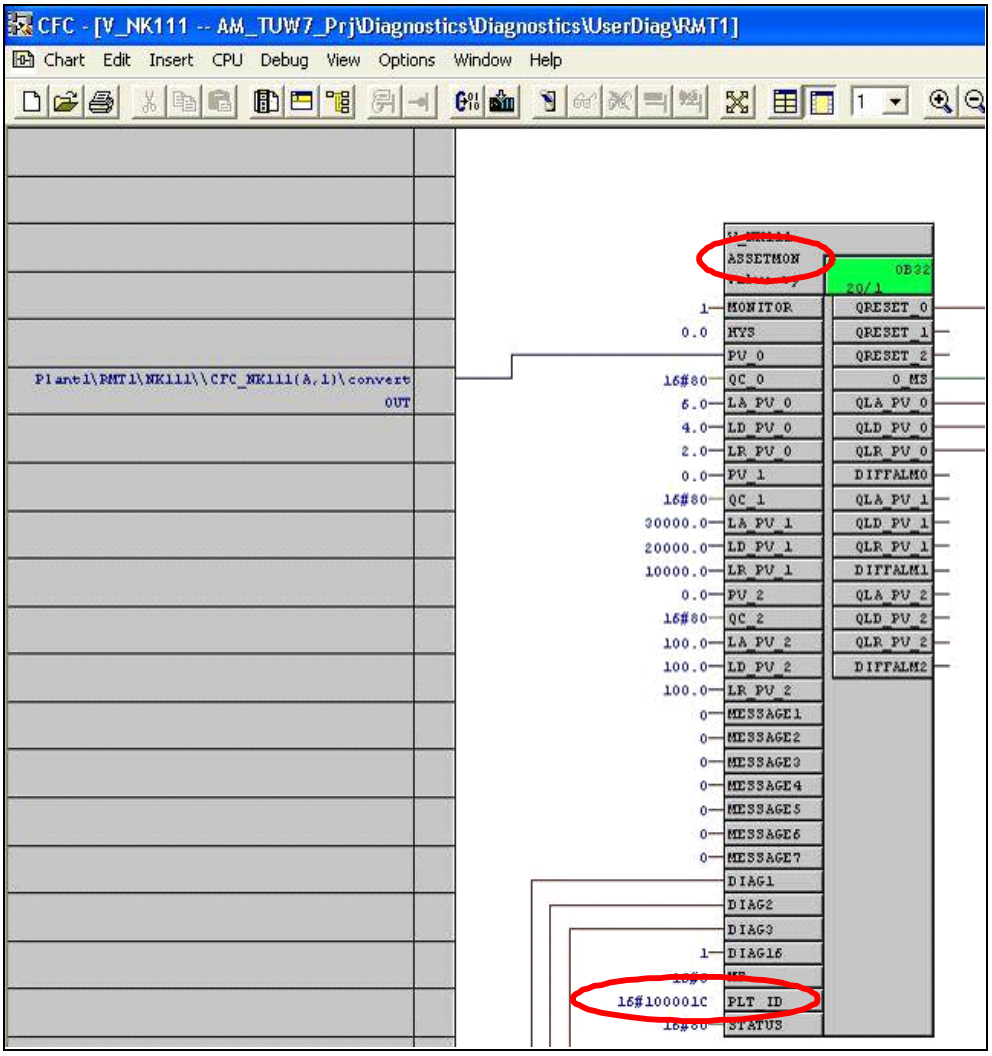
1.1.4 Diagnostics Function with the “ASSETMON“ Block

The „ASSETMON“ block serves to monitor up to three analog process values/parameters each with up to three limits. The „ASSETMON“ block signals the maintenance status of process parameters in the following events:

- Exceeds of a limit
- Activation of binary signal inputs
- Change of a device-related quality code.

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Figure 1-1 ASSETMON“ Block in CFC



1.1.5 Configuration Steps in User Diagnostics Structure

To edit the user diagnostics structure, the diagnostics function in the plant hierarchy settings for the multiproject must be activated.

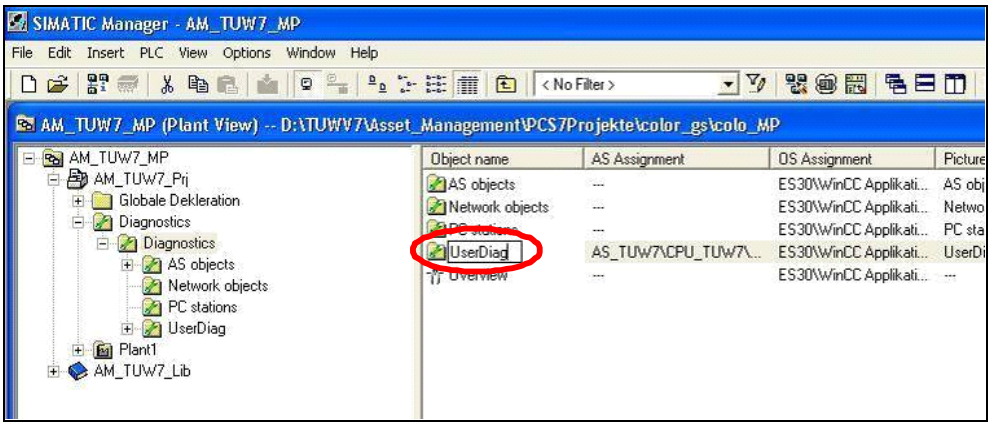
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1.1.6 Creating the User Diagnostics Folder with CFC Charts and Screens

Create a new hierarchy folder under the Diagnostics area on the same hierarchy level as AS, PC and Network objects. You may rename this hierarchy folder as you like.

You can also arrange the hierarchy of the user diagnostics structure in any way you want. The same procedure as for the Plant hierarchy is to be applied. For each hierarchy folder you can create one user diagnostic screen.

Figure 1-2 Creating a User Diagnostics Folder



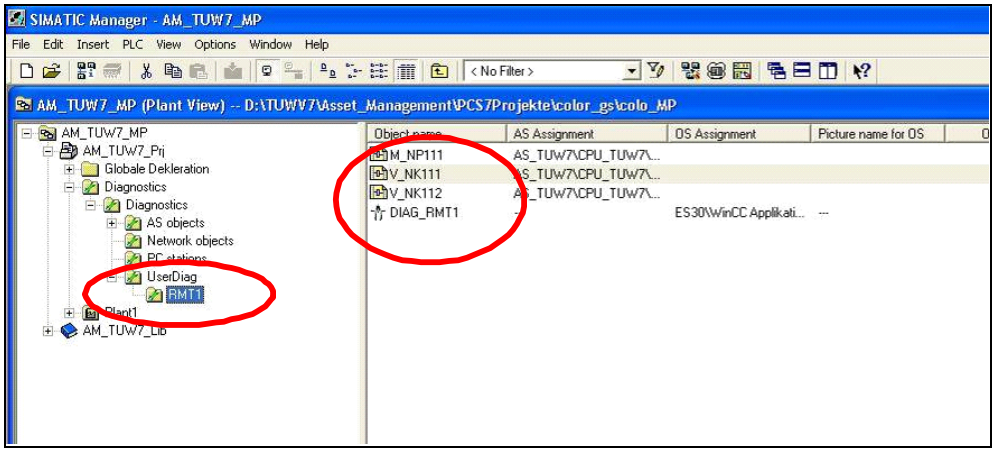
Note You may create only one user diagnostics folder directly under the Diagnostics area. Under the user diagnostic folder you can create any hierarchy structure.

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The “ASSETMON“ block is used in a CFC under the User Diagnostics folder. The diagnostic icons of “ASSETMON” are generated onto the screen of the same hierarchy folder where the CFC charts are included.

Insert screens in the same way as into the Plant hierarchy. To derive the diagnostic icons for the screens, the check mark must be set to “Derive Block Icons from Plant Hierarchy”. When inserting new screens, this check mark is set automatically.

Figure 1-3 Creating CFC Charts and User Diagnostic Screens



Note

If you deactivate the Diagnostics function, the user diagnostic screens will be deleted. The CFCs created will not be deleted, but will lose their plant assignment.

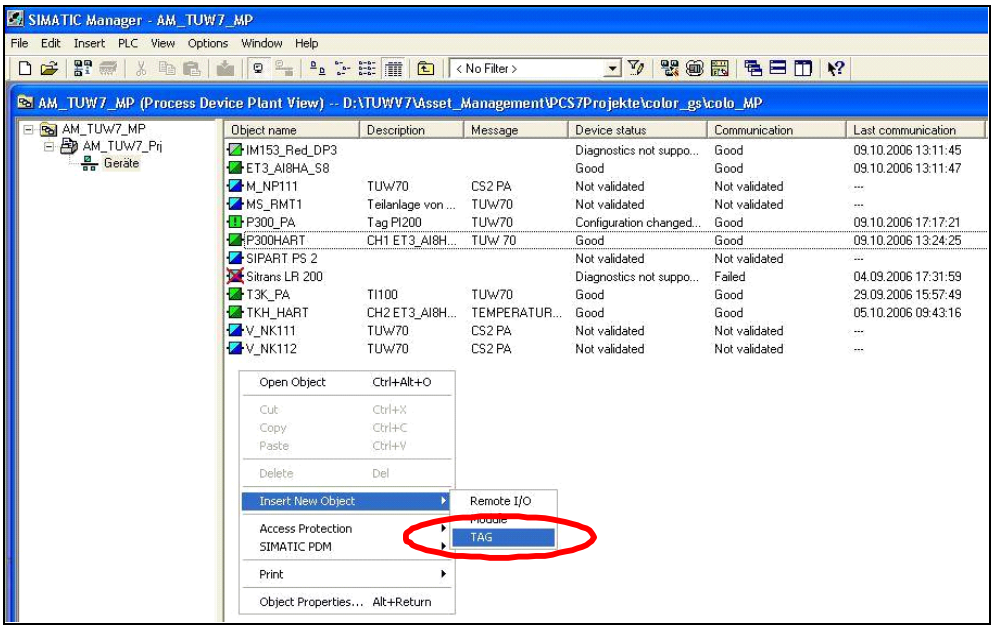
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1.1.7 Configuring the “ASSETMON“ Block

Having placed the „ASSETMON“ block in the CFC, the process values to be monitored will be interconnected with the plant charts. In addition, you can set limits to be monitored. There are 3 process values available for each “ASSETMON” block. The “Monitoring” view of the „ASSETMON“ block shows the value and limits to be monitored and the labeling. The texts are configured in PDM, see Figure 1-7.

To provide ident data, labeling and detailed information (diagnostics, documents) for the monitored object/values in runtime, a PDM object with an “ASSETMON”-specific EDD has been introduced. You can edit this information in PDM in the same way as any other PDM object.

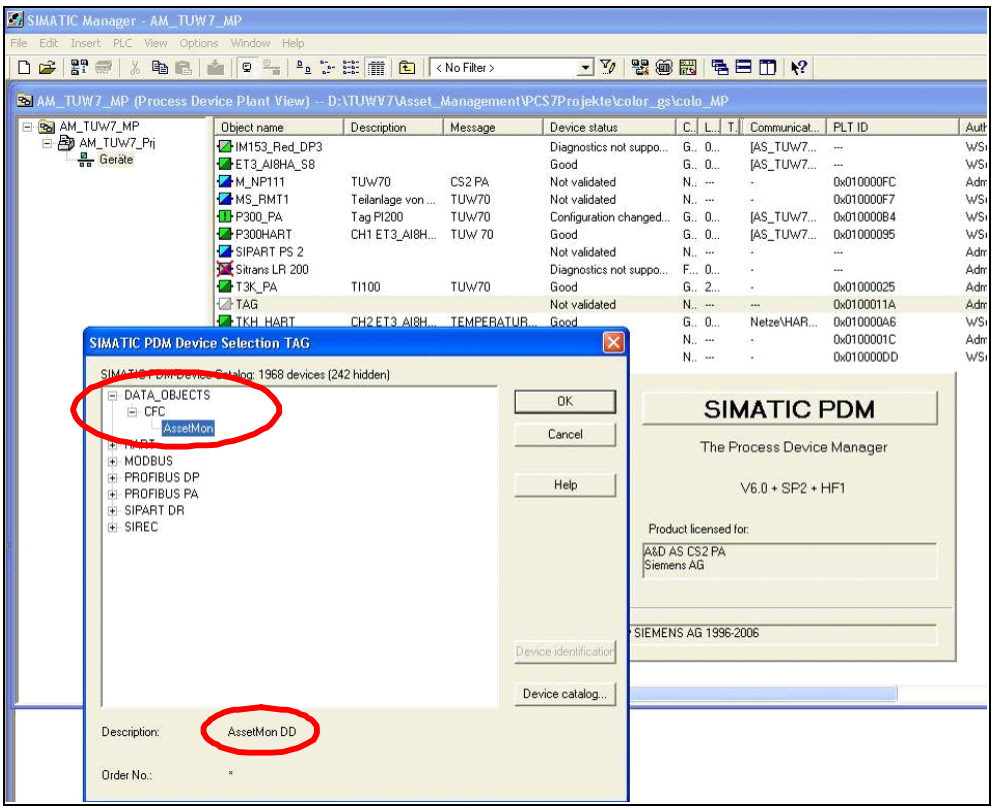
Figure 1-4 Creating PDM Tag for “ASSETMON“



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Assign this PDM tag to the “Device” “ASSETMON” in the PDM selection dialog. In PDM you can configure the data for the objects/parameters to be monitored.

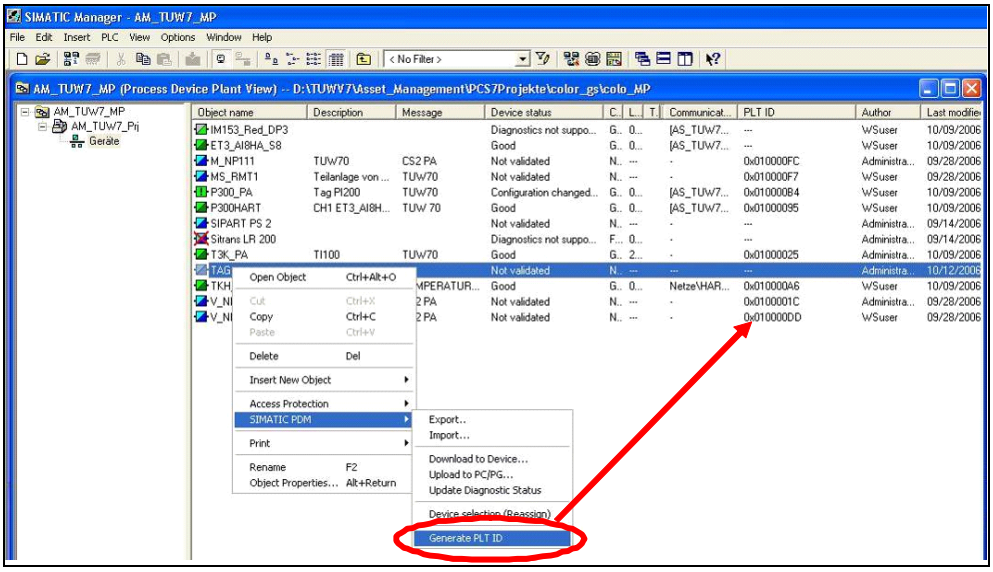
Figure 1-5 Assigning “ASSETMON“ EDD with PDM



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Now a PLT ID must be generated. The PLT ID is the interconnecting parameter between a PDM object (parameter data in form of EDD) and the faceplate “ASSETMON” in the Maintenance Station (MS Client). The PLT ID is tied to the PDM object and is generated in the Process Device Plant View. Each PDM object has a PLT ID.

Figure 1-6 Generating PLT ID

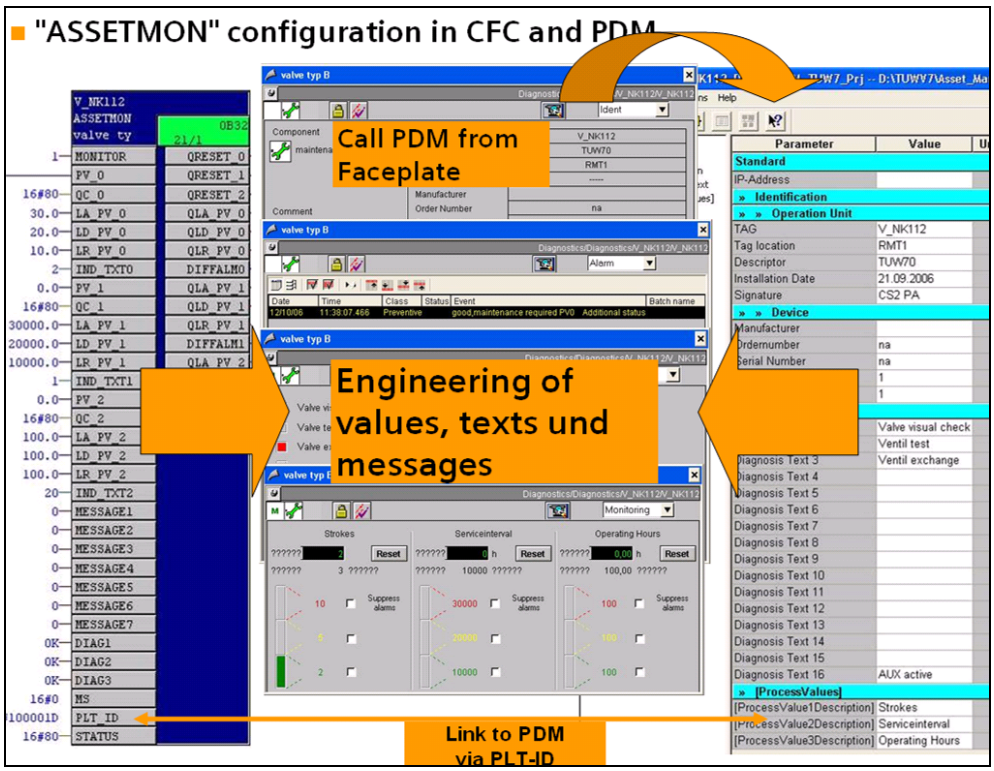


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The PLT ID is only displayed in the Process Device Plant View (detailed view). The user must parameterize the PLT ID manually at the “PLT_ID” parameter of the “ASSETMON” block (see Figure 1-1). Now PDM can be called up from the faceplate on the MS client.

Figure 1-7 shows the interrelations of configuration for labeling texts, limits, diagnostics texts and PLT ID. The values in parameter block “Operation Unit” and “Device” are displayed in the Ident view. Diagnostic texts entered in PDM are displayed in the Diagnostic view. The labels for the monitored values are entered in parameter block “Process values”. The labels must be entered for enabling the selection of the monitoring view in OS Runtime.

Figure 1-7 Configuration “ASSETMON“ in CFC and in PDM



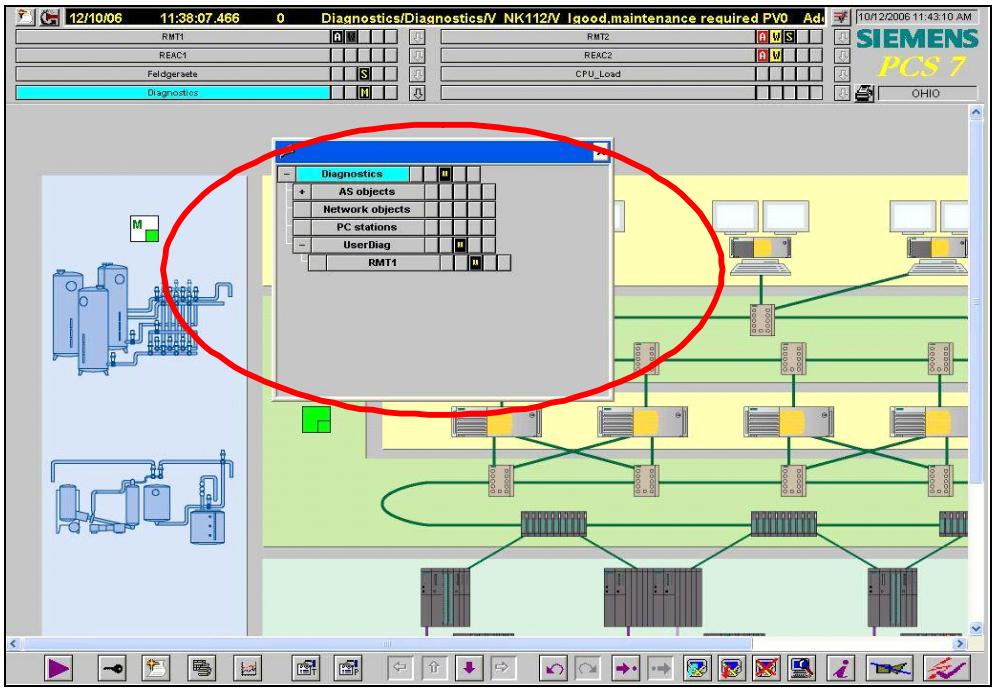
With Create/Update diagnostic screens in the plant hierarchy you can create the associated diagnostic icons of the “ASSETMON” type in the screens. After compilation of the AS program and the OS, the basic configuration of “ASSETMON” is completed.

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1.1.8 Diagnostics Overview Screen and "ASSETMON" in Runtime

The left area of the diagnostics overview screen shows the group view for the user diagnostics structure.

Figure 1-8 Diagnostics Overview Screen



Taking the example of counting the strokes of a solenoid valve, we shall explain the faceplates. In Figure 1-9 an „ASSETMON" for monitoring the strokes of the valve (NK112) has been configured. The strokes are monitored with regard to the following limits:

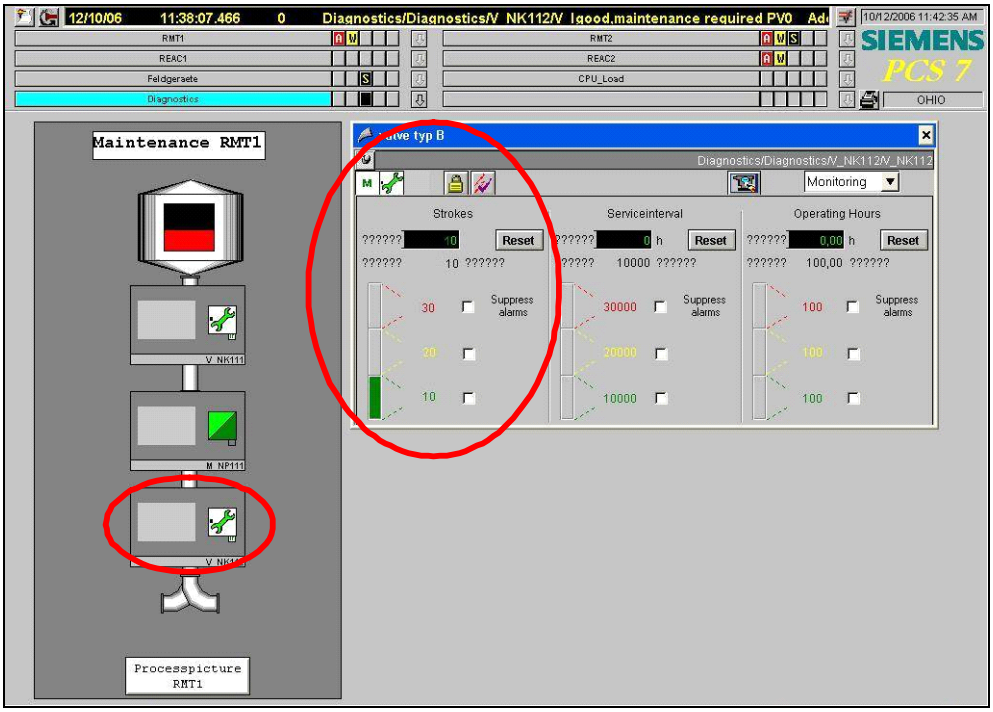
Table 1-2 Limits of Stroke Monitoring

Number of Switching Strokes	Maintenance Status
10	Maintenance request
20	Maintenance demand
30	Maintenance alarm

After 10 strokes the message Maintenance request is triggered. You can also suppress or lock messages via the faceplate. You can reset the strokes by means of the RESET button Figure 1-9. In this example, the RESET function has been linked to the counter block (COUNT_P) of the strokes.

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Figure 1-9 Monitoring Switching Strokes



The associated value of the message indicates if there is another status available. This status is displayed in the Diagnostics view. The related diagnostics texts are configured in PDM. If one of the Boolean inputs DIAG1 to DIAG16 is set to 1, the associated value will be stated in the message and the status will be displayed in front of the respective text in the Diagnostics view (radio button).

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1.1.9 Other Functionalities of “ASSETMON“

The Maintenance view allows the user to generate maintenance requests as usual.

Apart from monitoring limits, quality codes of the individual process parameters are analyzed. The device-specific quality code of a process value triggers a particular message, which is also used for limit monitoring.

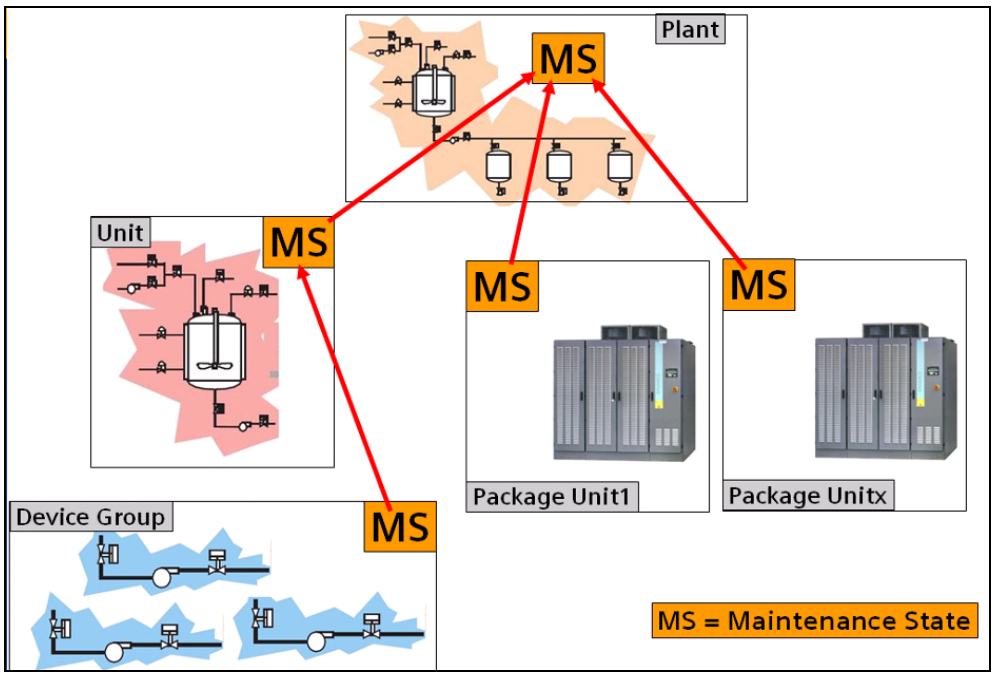
In addition, seven message inputs (MESSAGE1,..., MESSAGE7) are available, generating a message if the status = 1 is set.

The online Help of “ASSETMON“ describes how to create the quality code and the assignment of the message inputs.

1.1.10 Diagnostics of Entire Plants, Units, Package Units, Device Groups

"ASSETMON" allows you also to monitor the states of entire plants. For example, you can monitor individual units, package units or device groups with regard to maintenance-relevant conditions with the help of one "ASSETMON". Then you can interconnect the maintenance states of the "ASSETMONs" of these units hierarchically via "MS_MUX", another Asset Management block of the PCS 7 Library V7.0.

Figure 1-10 Diagnostic States of Entire Plants, Units, Package Units and Device Groups



"MS_MUX" determines the maintenance status (MS) from several existing functional units by selecting the worst of the individual states. This maintenance status is forwarded to the "ASSETMON" which is next in hierarchy.

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Figure 1-11 MS_MUX" for hierarchical interconnection of "ASSETMON"

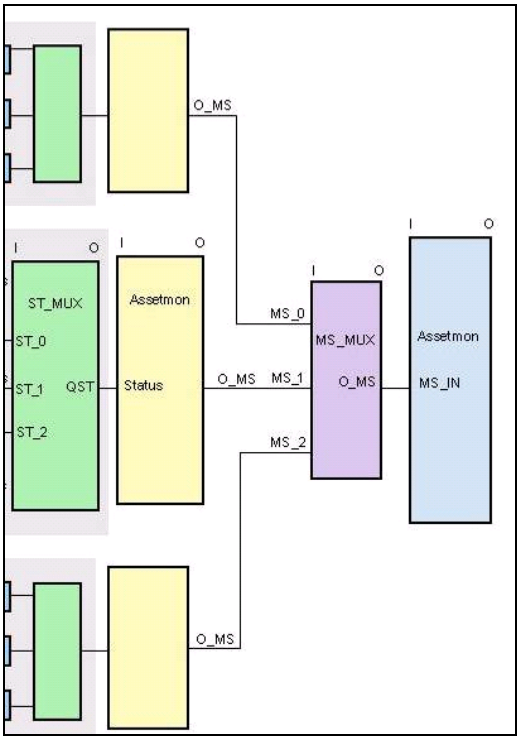
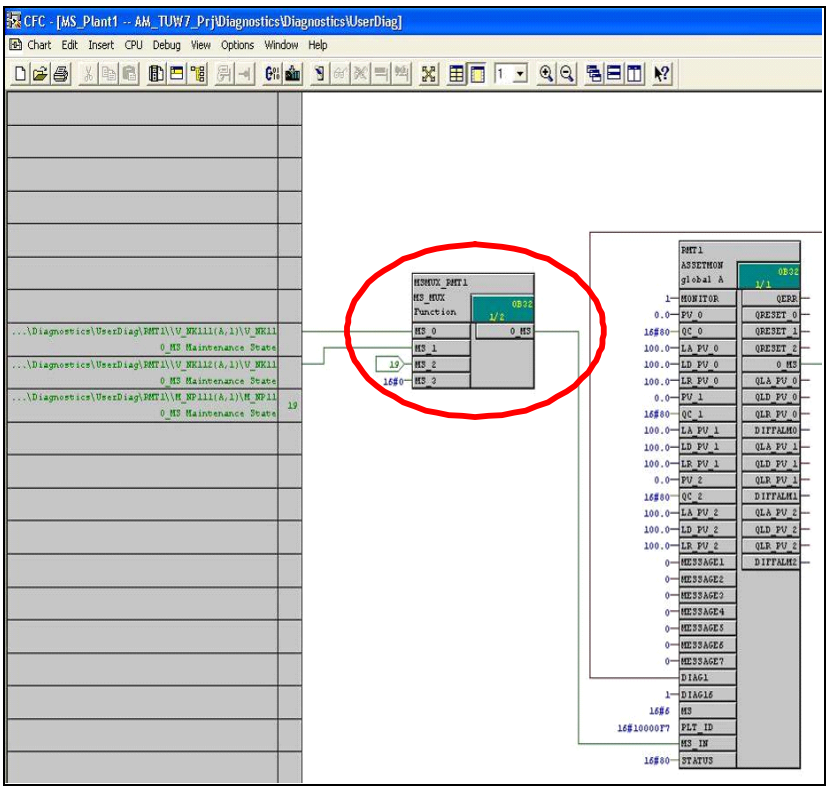


Figure 1-12 Interconnection of "MS_MUX" in CFC



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1.2 Function Block “CPU_RT” - Performance Data and New Overload Behavior

1.2.1 Introduction

A controller in an automation system has two primary tasks. It will automate the process and the controller has to evaluate and pass on all operator inputs and displayed data. The controller processes all these tasks sequentially (one after the other). To ensure a reasonable processing time, the SIMATIC controllers provide basic cycle monitoring (OB1) for a max. of 6 seconds. Therefore, in addition to the memory capacity, there is also a time limit for the application. If the cycle checkpoint is not reached within 6 seconds, OB 80 [time error] will be called, triggering a system alarm. If the cycle checkpoint also cannot be reached after another 6 seconds have elapsed, the controller will switch to STOP due to cycle overload.

For process automation PCS 7 V7.0 now provides the ability to react to temporary and persistent cycle overload by controlled automatic load shedding with the help of the function block "CPU_RT". The "CPU_RT" block combines two functions there:

1. Preventing overload by analysis of performance data in the Asset Management.
2. Maintaining operatability with new cycle overload behavior (emergency operation) through multi-stage reduction of cyclic load.

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The following applications have been considered:

- The major risk of overload arises from applications with little time reserves. Plants with a too high controller cycle load (> 90%) may easily suffer from overload due to a defective component. A typical case is a defective measuring circuit producing an alarm surge (chattering alarm). Apart from determining the pure net runtime of the OB, the "CPU_RT" block allows you also to read the gross runtime (with interruptions caused by higher-priority run levels (OBs)) during commissioning and normal operation. An early load reduction of time-critical OBs is a good protection against controller overload.
- Another application is the modification and extension of the application program if the cycle load is already high. A modification/extension of the application program causes a controller overload after loading to the AS. Thanks to the "CPU_RT" block, the STOP of the controller after cycle overload will be prevented. Run levels/OBs involving a very high load will be reduced temporarily (load shedding - emergency load) until the temporary overload has subsided. This ensures the operatability of the plant. The user has the option to undo the modification during operation or restructure the application program accordingly (e.g. by load reduction through shifting of program parts into slower OBs) in order to return to normal operation again.
- As in the case of application program modification, the same may also occur if you add communication connections. The "CPU_RT" allows you to undo the modification in the "emergency" operation mode.

- If an overload occurs during operation without obvious reason, you can localize the cause with the help of the detailed performance data of the "CPU_RT" block. Especially the net times (pure OB runtime without interruptions) should give a clue as to where additional time losses have occurred. Thanks to the new overload behavior, this is possible in normal operation.

1.2.2 Scope of Application

The function of the "CPU_RT" block to determine the performance data requires a controller firmware version supporting the system function SFC 78. For standard controllers this is currently firmware V5.0. For H controllers a firmware version with SFC 78 is in preparation.

Note "CPU_RT" block is always generated with the module driver wizard, regardless of the controller used and controller firmware. If your controller does not support SFC78, you will not get the performance data displayed. Then new cycle overload behavior will be executed with all controllers, though.

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1.2.3 Performance Data

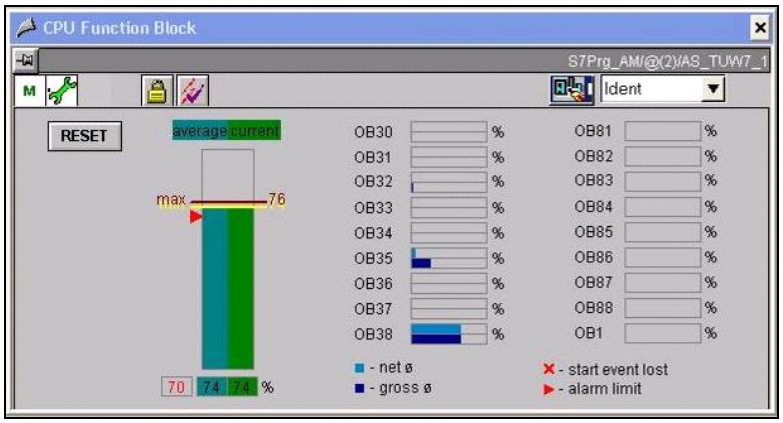
The "CPU_RT" block is integrated automatically by the CFC (module driver wizard) into OB 100, OB 1, all OB 3x and OB 8x, if the application program uses them. "CPU_RT" determines the runtime of the individual OBs and their share in the cycle time (performance data). The performance data help with the structuring of the controller program already in the phase of configuration. This allows you to concretely plan reserves for extensions, use the individual run levels homogenously and avoid controller overload at a later point of time.

Note The display on the OS is with Asset Management (faceplate of AS station, OB_BEGIN block)

1.2.4 Display of Utilization and Cycle Times of OBs

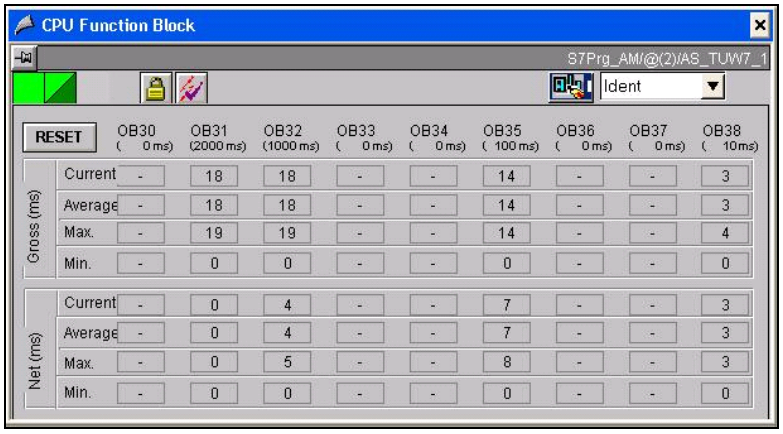
View of the overall utilization of a controller.

Figure 1-13 Controller Utilization



View of the cycle times measured.

Figure 1-14 Cycle Times of OBs



Net runtime is the runtime required for the computation of the code placed in OB3x if it would not be interrupted by higher-priority OBs.

Gross runtime is the runtime required for the computation of the code placed in OB3x if it is interrupted by higher-priority OBs.

The vertical bar of the overall utilization in % (overall cycle time of controller), see Figure 1-13, is the sum of all net runtimes (cycle times) of all OB3x, OB8x and the OB1 and is the most important information for the user/project engineer. Based on the overall utilization you can read the reserves of the controller. A typical overall utilization of a single controller should not exceed 70-75% after commissioning. Assuming that 20 % of the cycle time is used for communication and acyclic

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events, 5-10 % remains available as reserve for future program extensions or additional communication jobs.

Example

Assumption 1: The net runtime of OB38 is 5 ms. At a scan time of 10 ms this means an overall utilization share of 50 %. In this case, gross and net runtimes of OB38 are nearly identical, unless it is interrupted by higher-priority OBs.

Assumption 2: The net runtime of OB35 is 45 ms. At a scan time of 100 ms this means an overall utilization share of 45 %. Under this assumption, the gross runtime is clearly higher than the net runtime. The reason is that OB35 is interrupted by OB38.

The overall utilization (sum of net runtimes) of 95 % is clearly too high. The user sees that the controller is working close to its limit. From the gross time of the OB35 one can realize that this OB is just about to get an OB request error. In the case of acyclic events or high communication load, a controller overload may occur in the above example. The programmer of the controller program can tell from the overall utilization and the gross runtime of OB35 that the program structure must be done differently. Program extensions in OB35 or even faster OBs would probably lead to overload. Here, the consequence would be: the user would have to insert/shift existing or newly added program parts into slower OBs.

Conclusion

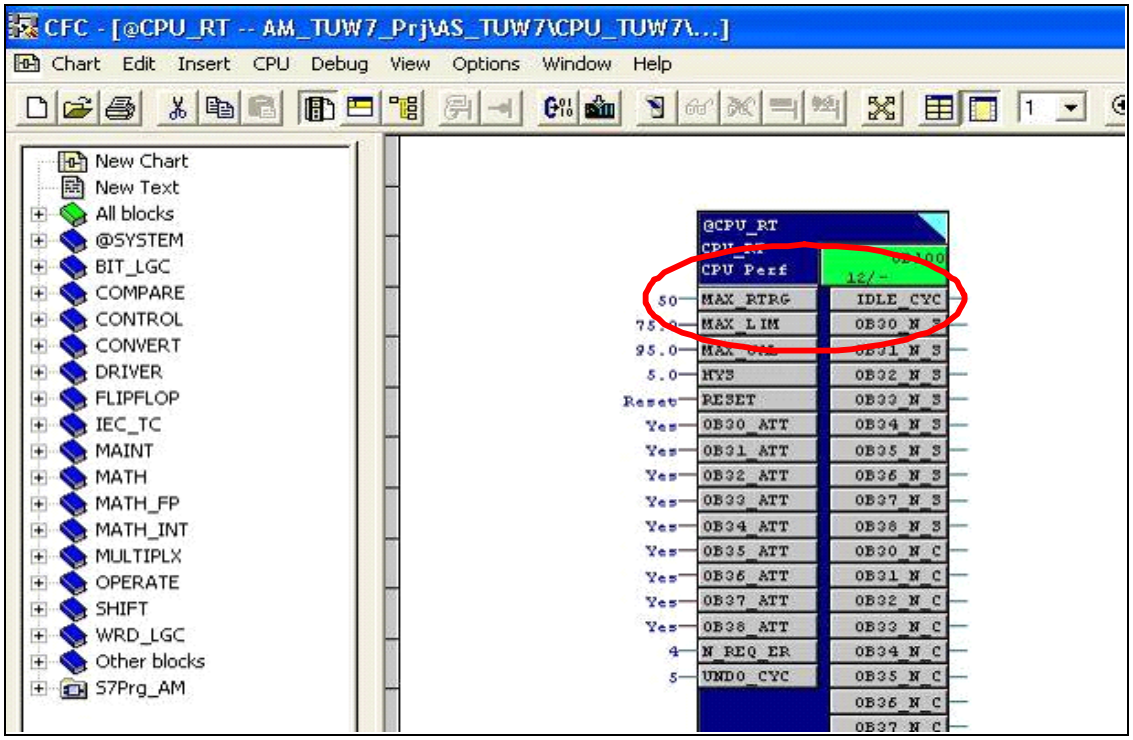
With the help of this information the user can distribute the program between the individual run levels (OBs) properly during the engineering and commissioning stages. So it is typical to place the program logic and processing for slower process signals, e.g. temperatures, into slower OBs, while more dynamic process values, e.g. pressure, are processed in fast OBs. This preventive measure is the decisive action to avoid controller cycle overload later on.

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1.2.5 Usage in CFC

When compiling the CFC with "Generate Module Drivers", a chart called "@CPU_RT" will automatically be created. This chart contains the "CPU_RT" block.

Figure 1-15“CPU_RT“ Block



1.2.6 Behavior under high controller cycle load

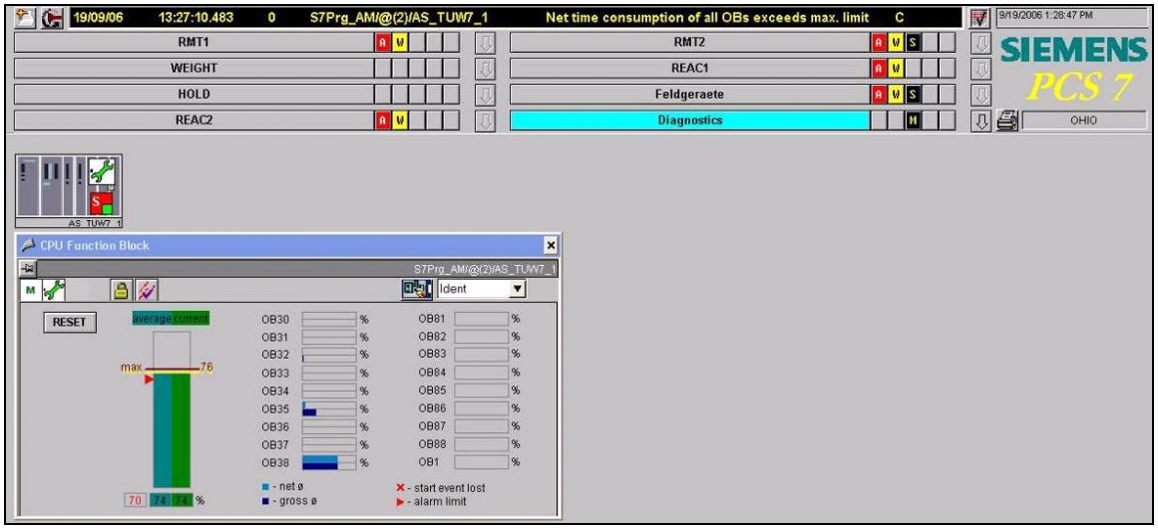
"CPU_RT" performs appropriate actions (configurable by user) to ensure operatability of controller if cycle overload occurs. This situation is called emergency operation and will be clearly indicated by a control system message. In addition, buffered start events (OB 3x still being processed) are also identified and displayed. The loss of start events is indicated as an error.

If the overall utilization, the sum of the average values of all net runtimes (in % of OB3x, OB8x + OB1) exceeds the “Overall Utilization Alarm Limit” (see Figure 1-20), the message “Net Time Consumption of All OBs Exceeds Max. Limit” will be output in OB_BEGIN. The maintenance status MS is set to “Maintenance demand” in OB_BEGIN.

This message is a preventive maintenance message and allows the user to adapt/distribute the controller program to avoid a controller overload. This message corresponds to the first maintenance level in Asset Management. There, the user can take preventive action to avoid controller cycle overload.

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Figure 1-16 Net Time Consumption of all OBs Exceeds Max. Limit



NOTE Controllers without SFC 78 support will not signal the excess of the net time consumption.

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1.2.7 Behavior in case of OB Request Error

The detection of OB request errors corresponds to the second maintenance level in the Asset Management, see Figure 1-17.

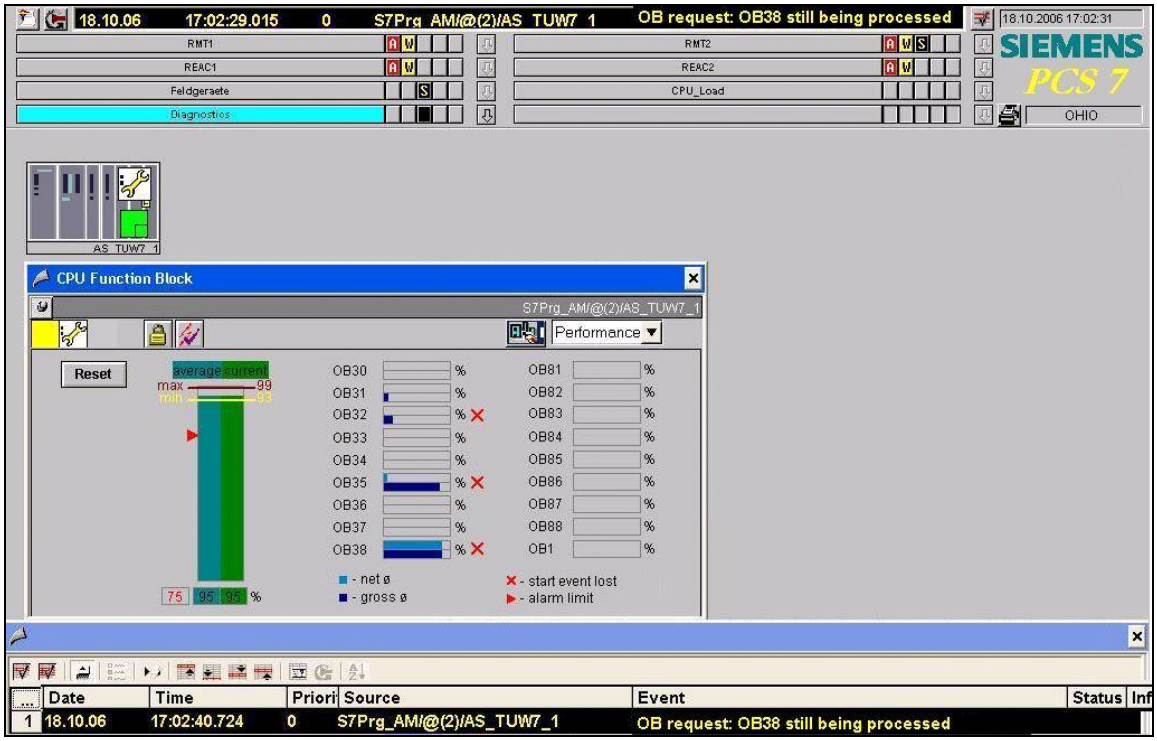
If the overall utilization reaches the 100 % limit, OB request errors may occur. I.e., cyclic OBs will sporadically not be calculated for one cycle because they are interrupted by acyclic OBs, for example. The request error is identified in form of a start event loss of the particular cyclic OB.

If a configurable number ("Message since request error" see Figure 1-20) of OB 3x events is exceeded or the OB 1 event is detected although no OB 1 event was processed (cycle checkpoint no longer reached), the message "OB 3x request error" (x = 0...8) will be output in OB_BEGIN. The maintenance status MS is set to “Uncertain maintenance request” in OB_BEGIN.

If OB 1 is executed subsequently again (cycle checkpoint reached), the Maintenance State will be reset and this control system message will be marked as "going out".

In the faceplate of the OB_BEGIN there is a display of the request errors for each OB 3x. It is displayed the lost start event of the particular OB, see Figure 1-17.

Figure 1-17 OB Request Error



Note Also Controllers without SFC 78 support will signal "OB 3x request error" (x=0...8).

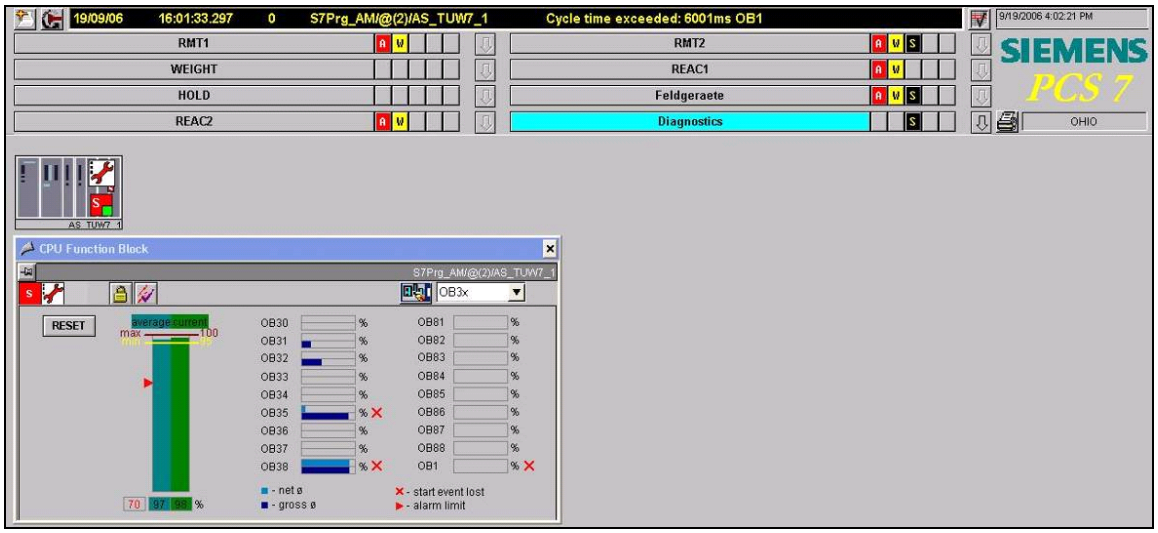
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1.2.8 Behavior in case of Maximum Cycle Time Excess

The detection of the maximum cycle time excess corresponds to the third maintenance level in the Asset Management. Now, only corrective action will be taken for maintenance.

Upon excess of the defined scan cycle monitoring time (PCS 7 default 6,000 ms), e.g. due to too high communication load, frequent alarm events, frequent acyclic fault events (chatter alarms) or accidentally adding new program parts in wrong time interrupts, the message "Cycle time exceeded: @1d@ OB@2d@" will be output. The maintenance status MS is set to “Bad or maintenance alarm” in OB_BEGIN.

Figure 1-18 Cycle Time Excess



Note Also Controllers without SFC 78 support will signal the excess of the maximum cycle time.

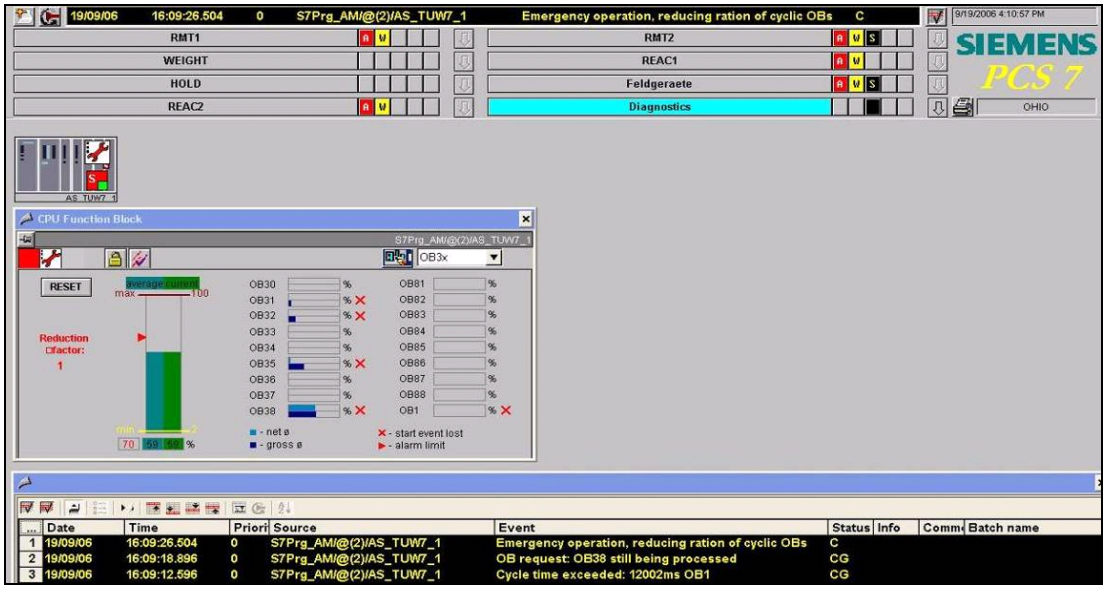
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1.2.9 New Cycle Overload Behavior

If the cycle time has been exceeded twice, i.e. the OB 1 has not been processed for 12,002 ms or the cycle checkpoint has not been reached for 12 s, this will lead to emergency operation with new cycle overload behavior. The control system message "Emergency operation, reducing ration of cyclic OBs" is output.

The maintenance status MS is set to “Bad or maintenance alarm”.

Figure 1-19 Emergency Operation of Controller



Note Also Controllers without SFC 78 support will signal "Emergency operation, reducing ration of cyclic OBs".

1.2.10 Measures in Case of Controller Cycle Overload

The measures in case of cycle overload also correspond to the third maintenance level (maintenance alarm) in Asset Management. They are to be understood as corrective and no longer as preventive action.

In the event of a controller overload, controlled load shedding can prevent the controller from becoming inoperable. Measures in case of controller cycle overload are taken to maintain the operatability of the AS and bring under control temporary overloads caused, e.g. by an excessive number of acyclic events. Load shedding is achieved by skipping the cyclic run levels, which is an emergency operation whose cause must be eliminated.

In emergency operation the controller does not work in exactly the same way as it does in normal operation (reduction of the application program may lead to modified scan times).

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In emergency operation, the blocks are skipped X times as defined by the reduction factor. For the application, this means a clear "slow-down" of all affected blocks and, hence, all functions. This has an effect especially on all time-critical applications, such as function blocks and controllers.

Two escalation stages can be configured:

1. Stage 1: The scan cycle monitoring time has elapsed twice (approx. 12,002 ms). All OB 3x used will not be processed for one cycle unless the user has excluded them ("CPT_RT" input: OB3x_ATTN = FALSE). If the OB 3x causing the overload has been reduced in stage 1, leading to a stabilization of the controller (OB 1 is processed again), the OBs 3x excluded from reduction will be processed "normally". For the reduced OBs, reduction means an interruption of processing (e.g. scan times for control operations are no longer correct).
2. Stage 2: The scan cycle monitoring time has elapsed three times (approx. 18,003 ms). All OB 3x excluded so far will not be processed for one cycle. If no stabilization is achieved, all OB 3x will be skipped once more after each processing. This means, OB 1 and possibly large parts of the program have now not been processed several times.

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To eliminate the causes, the controller is kept in operator-controllable condition in order to perform analyses. The emergency operation should not be considered to be a permanent override of the controller overload. The emergency operation serves to cope with temporary overloads. You should respond to the emergency operation as quickly as possible, e.g. by restructuring the program, undoing or shifting of loaded modifications, etc. This is also the reason why the emergency operation will be signalled as a maintenance alarm in the Asset Management.

1.2.11 Cancelling Measures Taken in Case of Cycle Overload

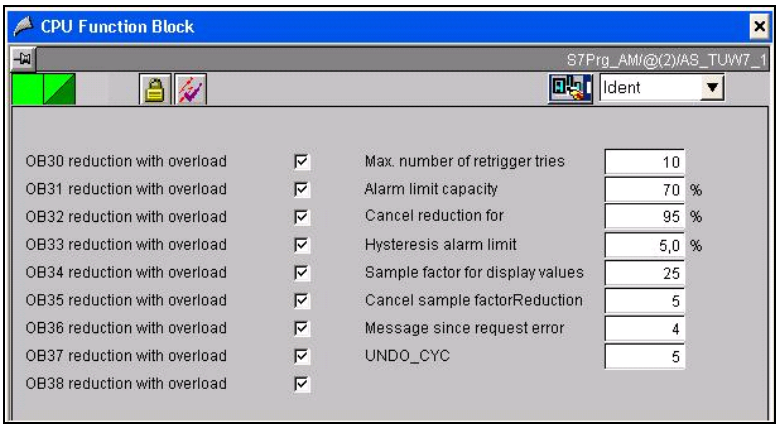
To initiate a cancellation, the theoretically calculated overall utilization of the controller (sum of the net runtimes of the cyclic OBs) recalculated for a lower reduction level must be smaller than the full controller utilization (see Figure 1-20).

Note For cancellation of the measures taken in case of cycle overload, SFC78 is used to calculate the appropriate point of time. If SFC78 is not available, the cancellation will be controlled via the slowest cyclic OB3x.

1.2.12 Parameterization

Configuration changes are performed in the Parameter view of OB_BEGIN. A prerequisite is user authorization to higher-priority process control operations.

Figure 1-20 Parameterization of "CPU_RT"



Note The "@CPU_RT" is a system chart. If you delete it, you will lose the set parameters.

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1.2.13 Overview of Display and Configuration Depending on Controller Firmware and Asset Management

Depending on the controller/FW used and whether or not Asset Management is implemented, the functions of “CPU_RT” will be displayed and configured as follows:

Table 1-3

Configuration / Function	Case 1 CPU FW with SFC78 and Asset Management	Case 2 CPU FW without SFC78 and Asset Management	Case 3 CPU FW without SFC78 and no Asset Management
Calculation of performance data	YES	NO	NO
Display of performance data on OS	YES	NO	NO
Display of performance data in CFC	YES	NO	NO
Messages	YES	YES *	YES *
Configuration via faceplate	YES	YES	NO (in V7.0 via CFC)
New cycle overload behavior	YES	YES	YES

* No message "Net time consumption of all OBs exceeds max. limit", as performance data are not calculated.

1.2.14 Summary

If you use the PCS 7 V7.0 Library, the "CPU_RT" block will always be installed by the driver wizard. The installation will be performed independently of the use of Asset Management, the CPU firmware and the "user decision". This means that the measures taken in case of cycle overload (default configuration of "CPU_RT") will be carried out for every controller. Thus, after upgrading driver blocks of older projects to PCS 7 V7.0 the controller will show a different behavior in the event of overload.

NOTE If you prefer the previous controller overload behavior, you can disable the function of the “CPU_RT” block by means of the block parameter Max_RTRG (max. number of retrigger trials) value = 0.

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In emergency operation of the controller, the ration of cyclic OBs will be reduced, i.e. with reduction = 1 they will be processed for every second time only. This behavior must be taken into consideration for integral calculations, quick switch-off or control operations. Here you have to decide whether controller STOP or controller emergency operation is the "safe/defined" operation. For example, you can set "Max_RTRG" = 1. In this case, only stage 1 of the measures taken in case of cycle overload will be initiated. OBs performing time-critical, process or safety-relevant calculations may be excluded from stage 1 and, thus, will still be calculated correctly. If load shedding on stage 1 should not be sufficient, the controller would switch to STOP at "Max_RTRG"=1 and stage 2 would not be initiated. If "Max_RTRG" = 2, stage 2 would be initiated. All OBs will now be skipped once. If this load shedding were not sufficient either, the controller would switch to STOP. Hence, the user may set his desired behavior.

Bearing in mind that a controller overload usually happens after misconfiguration or the occurrence of acyclic events (OB8x), the new overload behavior is favored and, therefore, preset by the system by default. The operatability of the AS and the opportunity of fault diagnostics and elimination are of higher priority in such temporary overload situations.

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1.3 Overall Export of Assets Identification Data

Button "Export Ident Data" in the Diagnostics Overview Screen.

Figure 1-21 Button "Export Ident Data"



1.3.1 Required Authorization

Autorization for Diagnostics area (process controlling).

1.3.2 Function

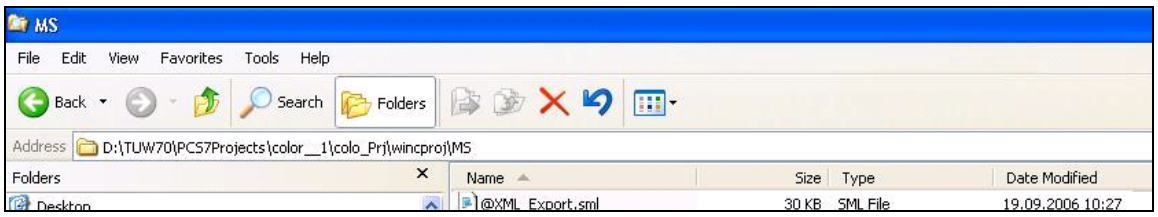
Provides information (ident data) of objects with diagnostic capability (e.g. field devices, PCs, network components).

1.3.3 Application

Use this function to export assets identification data (e.g. field devices, PCs, network components. This function is only available on the MS client.

The data are stored by default in the project directory in the file "@XML_Export.sml". In addition you can define a variable for any UNC path. In case of a redundant MS server you will find the file on the master server.

Figure 1-22 @XML_Export.sml in the Project Path



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1.3.4 Exported Data

The data serves as a source of information for higher-level systems (MES).

Figure 1-23 Example of an "@XML_Export.sml"

@XML_Export.sml - Notepad

File Edit Format View Help

```
<?xml version="1.0" encoding="UTF-8" ?>
<Document xmlns="http://www.siemens.com/automation/2005/SimaticML">
        <DocumentInfo Created="2006-09-19 10:27:24" FormatVersion="1.0" UserName="WSuser" ComputerName="ES31"
        <ObjectList>
                <Object Name="S7Prg_AM/@(1)/CPU_TUW7_1"  Type="AssetIdent">
                        <AttributeList>
                                <Attribute Name="Tag" Type="String">
                                        <Label lang="en">Tag</Label>
                                        <Value lang="en">CPU_TUW7_1</Value>
                                </Attribute>
                                <Attribute Name="HWDescription" Type="String">
                                        <Label lang="en">HWDescription</Label>
                                        <Value lang="en">CPU_TUW7</Value>
                                </Attribute>
                                <Attribute Name="HWVendor" Type="String">
                                        <Label lang="en">HWVendor</Label>
                                        <Value lang="en"></Value>
                                </Attribute>
                                <Attribute Name="HWType" Type="String">
                                        <Label lang="en">HWType</Label>
                                        <Value lang="en"></Value>
                                </Attribute>
                                <Attribute Name="HWOrderNo" Type="String">
                                        <Label lang="en">HWOrderNo</Label>
                                        <Value lang="en">6ES7 416-3XL04-0AB0</Value>
                                </Attribute>
                                <Attribute Name="HWComment" Type="String">
                                        <Label lang="en">HWComment</Label>
                                        <Value lang="en">V4.0</Value>
                                </Attribute>
                                <Attribute Name="HWSWVersion" Type="String">
                                        <Label lang="en">HWSWVersion</Label>
                                        <Value lang="en">LID: Lab\r\nOKZ: Labor</Value>
                                </Attribute>
                                <Attribute Name="Link" Type="String">
                                        <Label lang="en">Link</Label>
                                        <Value lang="en">S7Prg_AM/@(1)/CPU_TUW7_1</Value>
                                </Attribute>
                        </AttributeList>
                </Object>
                <Object Name="S7Prg_AM/@(1)/DP-Mastersyste_1"  Type="AssetIdent">
                        <AttributeList>
                                <Attribute Name="Tag" Type="String">
                                        <Label lang="en">Tag</Label>
                                        <Value lang="en">DP-Mastersyste_1</Value>
                                </Attribute>
                                <Attribute Name="HWDescription" Type="String">
                                        <Label lang="en">HWDescription</Label>
                                        <Value lang="en">DP-Mastersystem</Value>
                                </Attribute>
                                <Attribute Name="HWVendor" Type="String">
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                                        <Value lang="en"></Value>
                                </Attribute>
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                                </Attribute>
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                                        <Value lang="en"></Value>
                                </Attribute>
                                <Attribute Name="HWSWVersion" Type="String">
                                        <Label lang="en">HWSWVersion</Label>
                                        <Value lang="en"></Value>
                                </Attribute>
```

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1.4 Message Correction for Asset Messages

Button "Message Corrector"

Figure 1-24 Button "Message Corrector"



1.4.1 Required Authorization

Authorization for Diagnostics area (higher-priority process controlling).

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1.4.2 Function

Changes the status from "Coming in" to "Going out" of messages whose relation to the project has been deleted. Refers to messages of network objects and PCs, which are no longer included in the project.

1.4.3 Application

Use this function e.g. if you have removed hardware from the plant while the message was active.

1.5 Component Comment in Ident View

In the Ident View, a new field displays the comment on the component concerned, which has been entered with the HW Config or SIMATIC Manager.

Figure 1-25 Comment of CPU in HW Config.

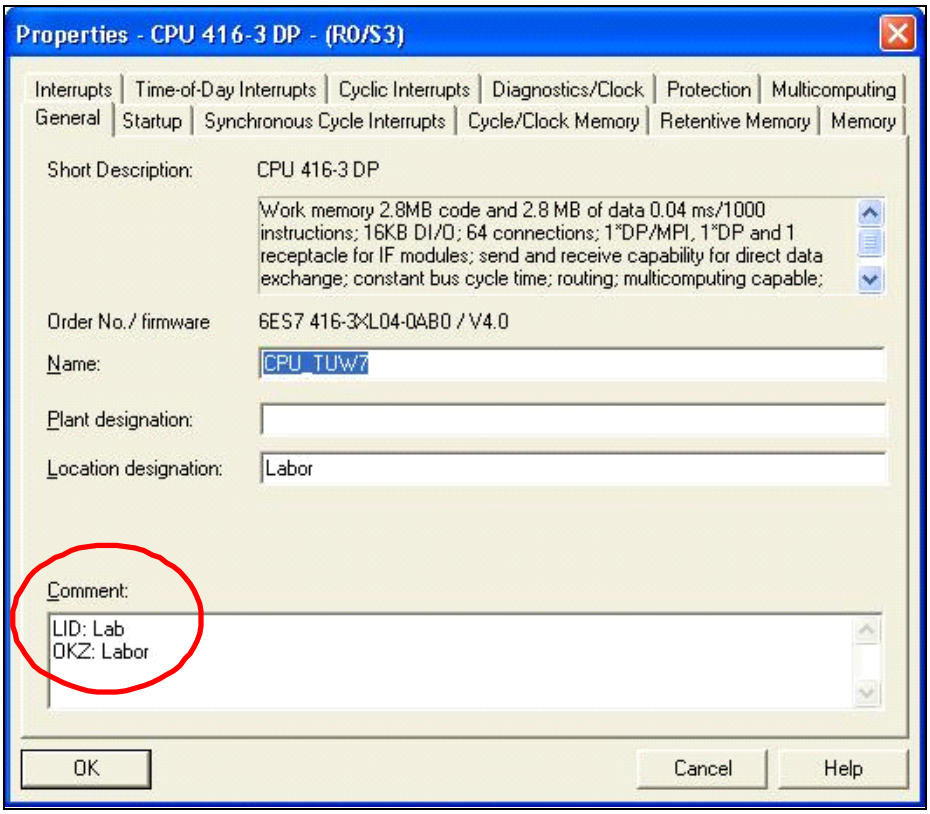
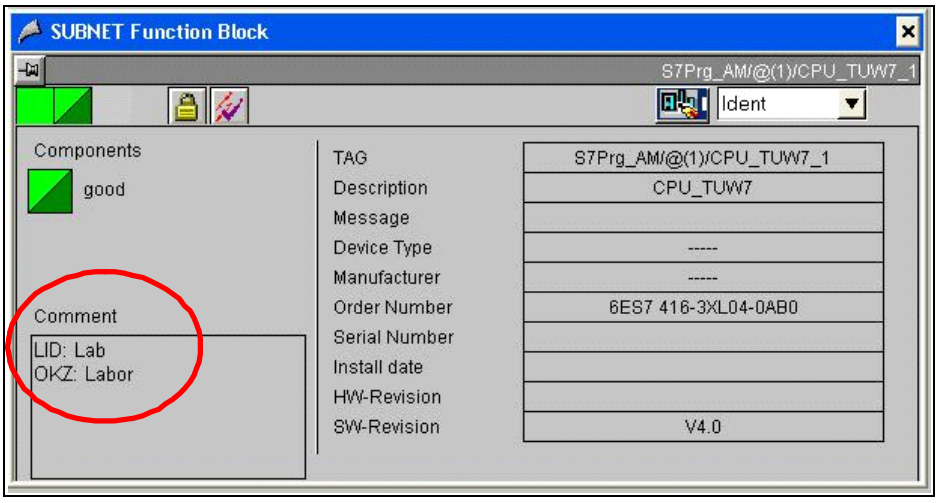


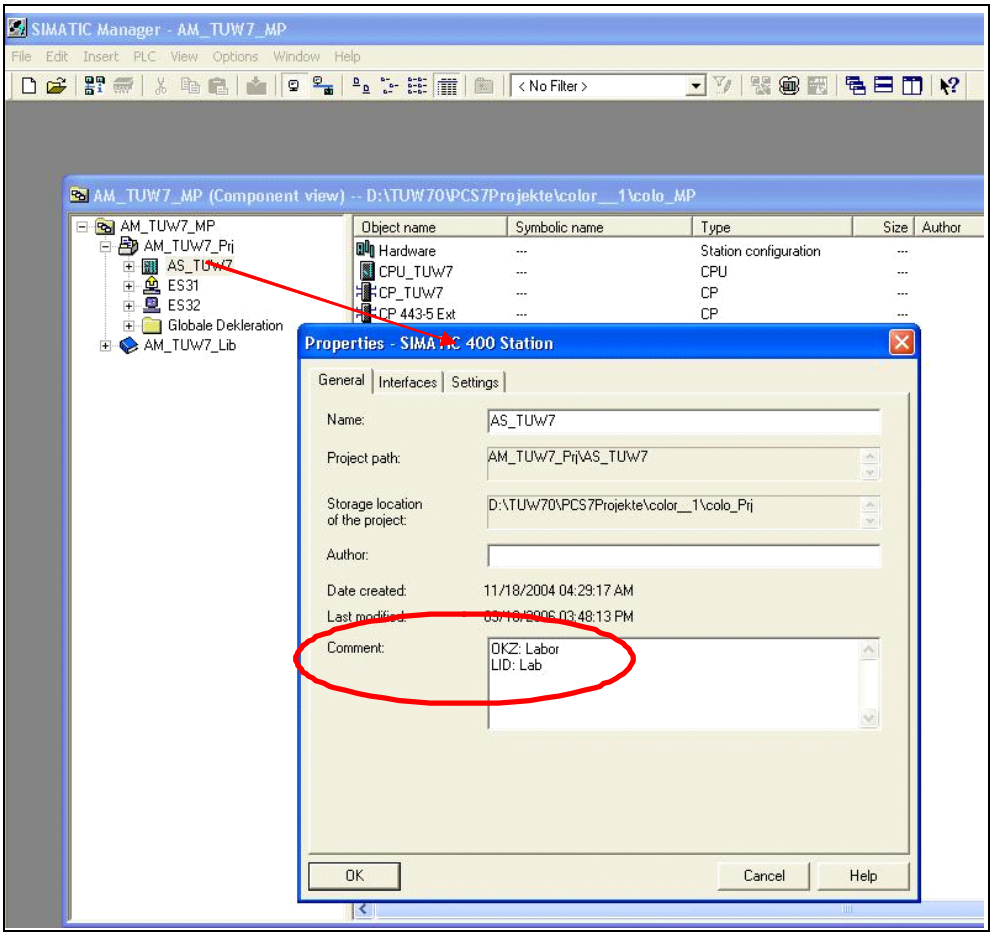
Figure 1-26 Comment of CPU in Faceplate



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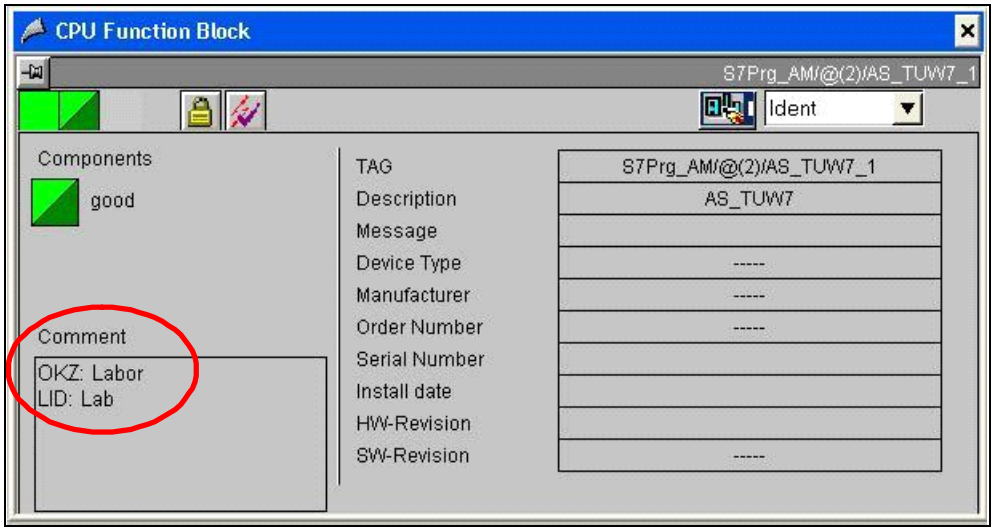
For the AS, the comment can be edited in the SIMATIC Manager.

Figure 1-27 Comment of the AS in the SIMATIC Manager



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Figure 1-28 Comment of the AS in the Faceplate



NOTE The faceplate of the CONEC block shows the comment of the RACK block for the CPU RACK.

For PC stations you can also assign a comment in the SIMATIC Manager.

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Figure 1-29 Comment of a PC Station in the SIMATIC Manager

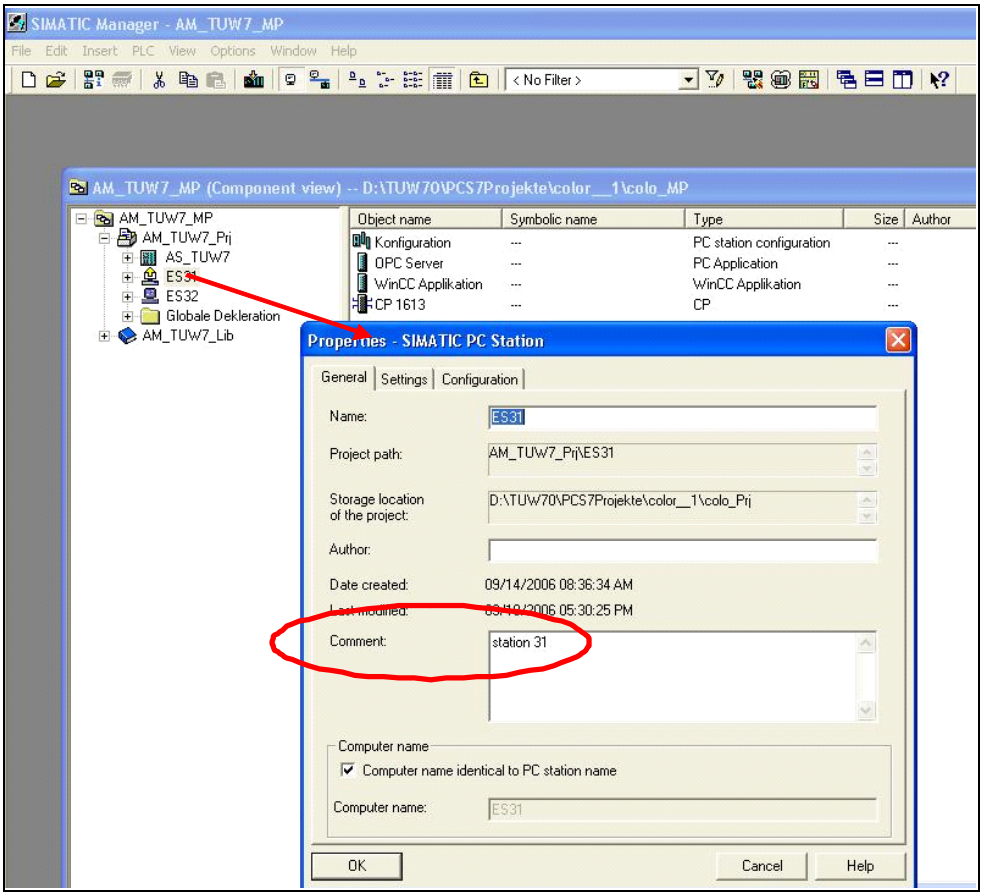
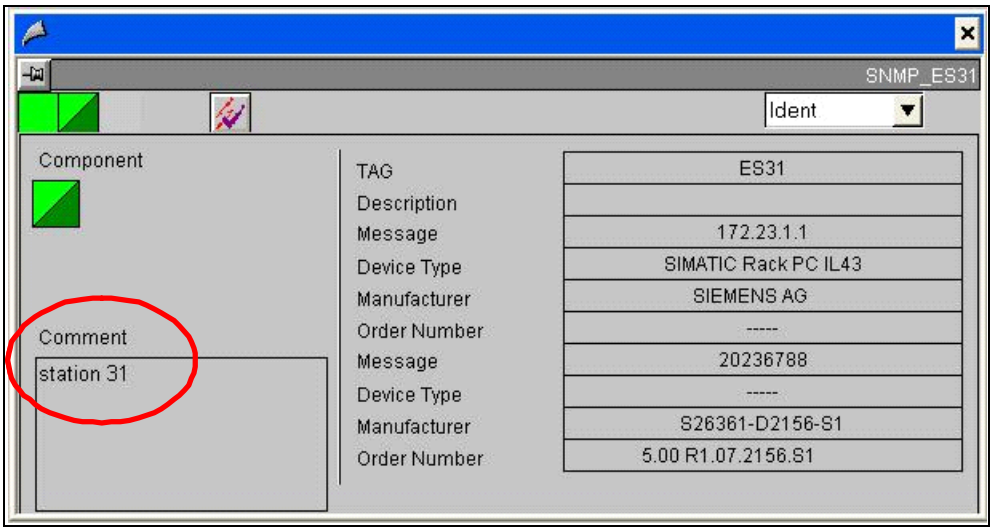


Figure 1-30 Comment of an IPC Station in the Faceplate



For network objects enter the comments during the OPC server configuration.

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Figure 1-31

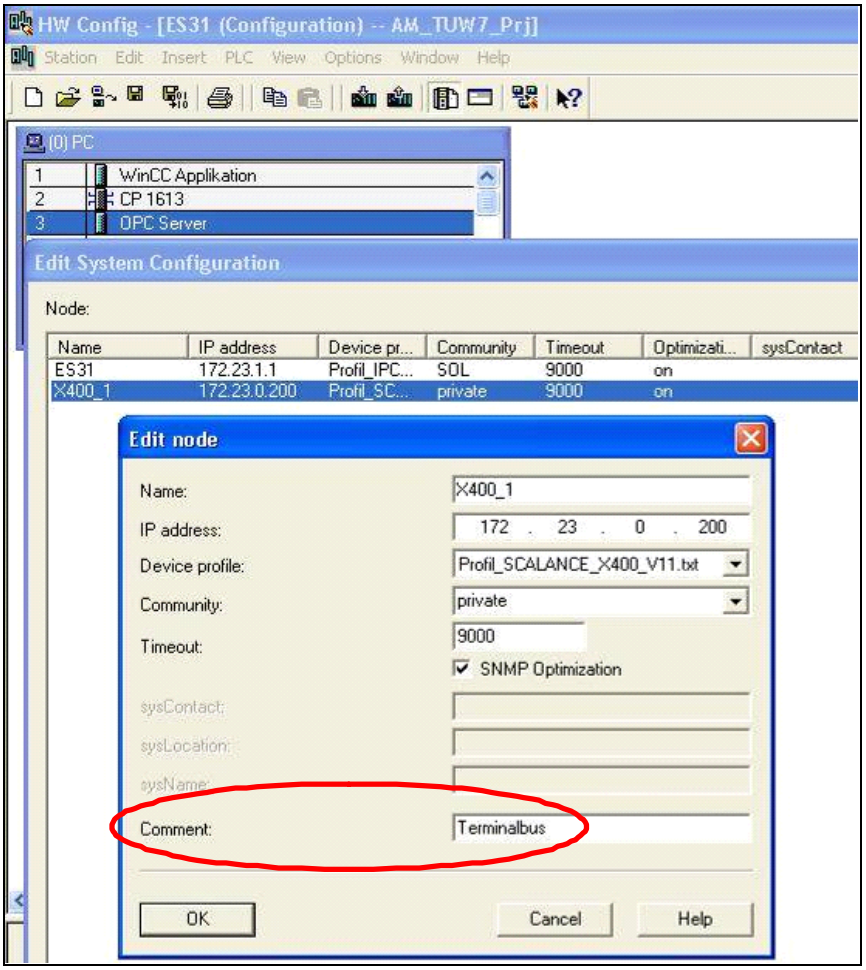
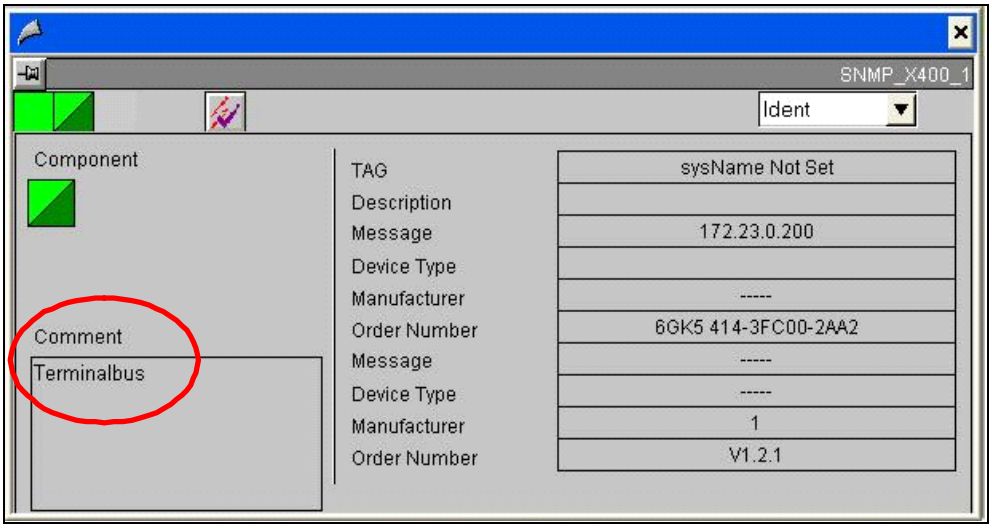


Figure 1-32 Comment of a Network Object in the Faceplate



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1.6 Display of the “CONEC“ Block

As of PCS 7 V7.0, the “CONEC” block is displayed by a diagnostics icon and a faceplate in Asset Management. The “CONEC“ block monitors connections configured with Netpro in the AS. The diagnostics icon of the "CONEC" block is placed on the third level next to the diagnostics icon for the rack. The tag name of the diagnostics icon is the same as that of the AS rack. The Ident view shows the comment of the rack from the HW Config.

Figure 1-33 Diagnostics Icon of the “CONEC“ Block

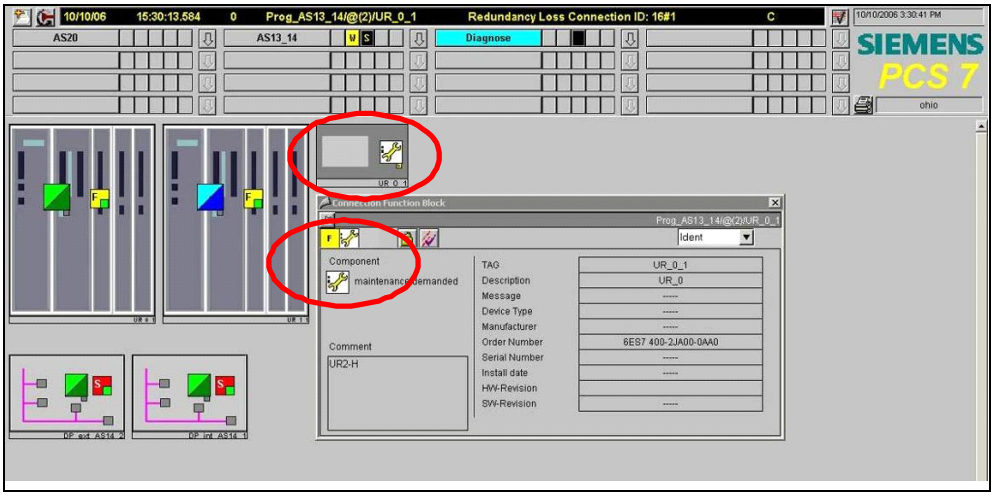
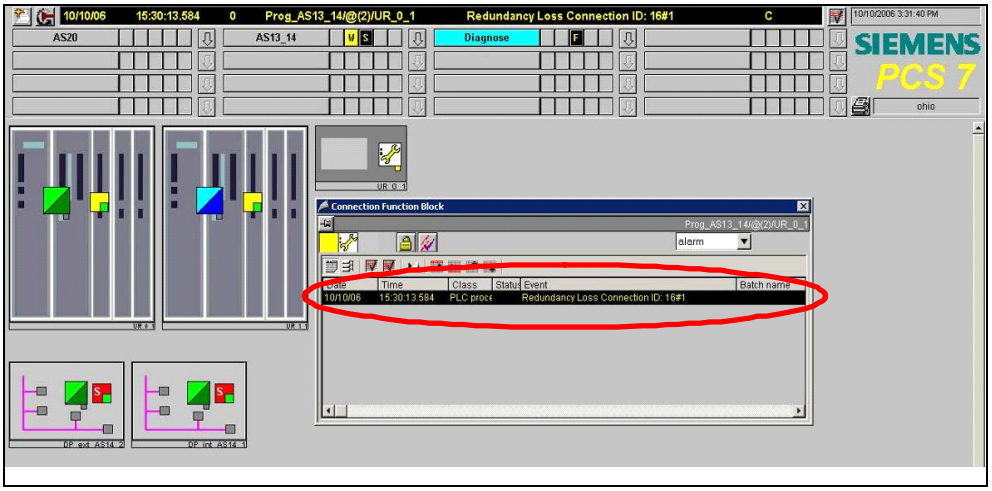


Figure 1-34 Message of the “CONEC“ Block



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Formation of the Maintenance Status MS for the CONEC Block

If any connection in the "CONEC" block is identified as failed, then the Maintenance Status "Maintenance: Alarm" will be output.

If any connection in the "CONEC" block is identified as redundancy loss, then the Maintenance Status "Maintenance: demanded" will be output.

If the messages in the "CONEC" block are locked via the parameter "EN_MSG", then the Maintenance Status "Unchecked / unknown" will be output.

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1.7 Generating Diagnostics Screens with “Compile and Download Objects”

If you compile the MS Server with the dialog “Compile and Download Objects”, the diagnostics screens will be automatically generated.

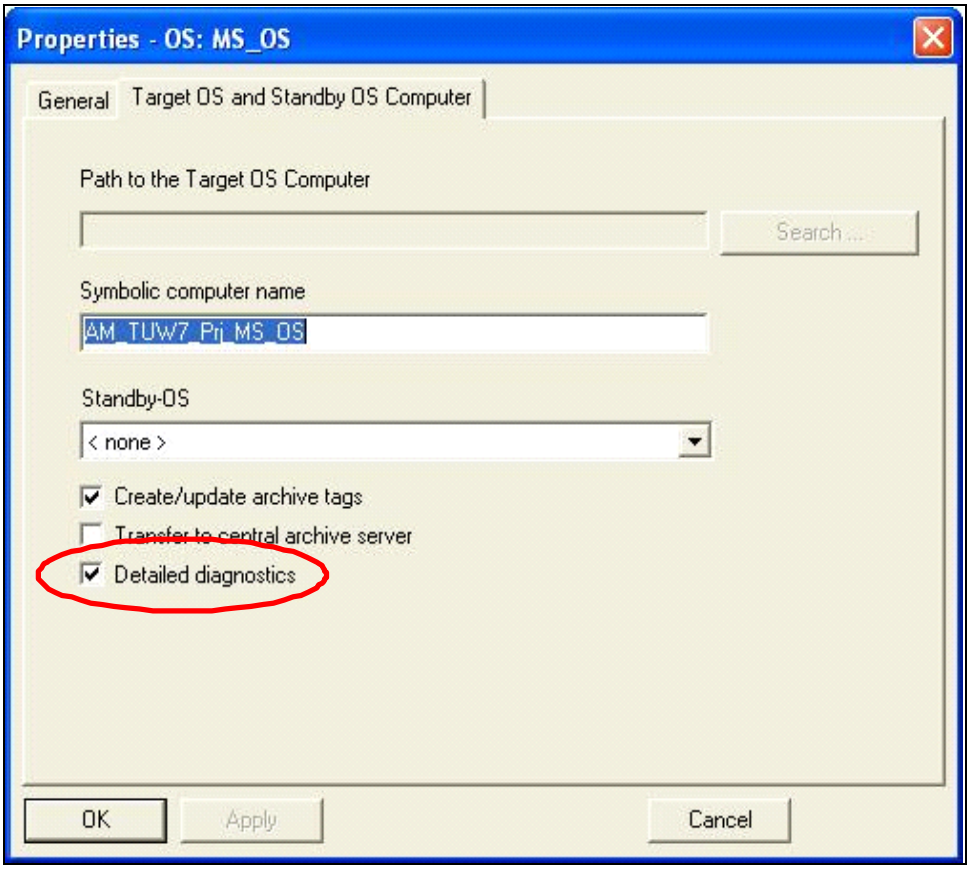
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1.8 Recording Parameter Changes in Field Devices

Changes to parameters are often made on devices directly in the field. To ensure that the program is kept up to date, Asset Management indicates/logs any possible parameter modifications of a device on the MS Client. With this information the user knows immediately for which field devices the data records must be uploaded to the PG (programming device).

To record parameter modifications, activate "Detailed diagnostics" for the MS client. The function "Detailed diagnostics" is part of the advanced process control options in PCS 7 OS.

Figure 1-35 Activating the Function "Detailed Diagnostics"



A Precondition for recording parameter modifications is that the field device triggers a corresponding diagnostic alarm in the Controller. For HART devices, this is performed via status bit 6 in the second HART status byte. For PA devices, changes are tracked by means of the revision counter. PA field devices have function blocks in the PDM (EDD) and device, to which static revision counters have been assigned. These are counted up online in the device and offline in the central data storage system of PDM. If a device is parameterized for such a function block separately, the revision counter will change online but not offline in the PDM data storage system. Thus, the system is able to recognize whether a parameter modification has occurred or not.

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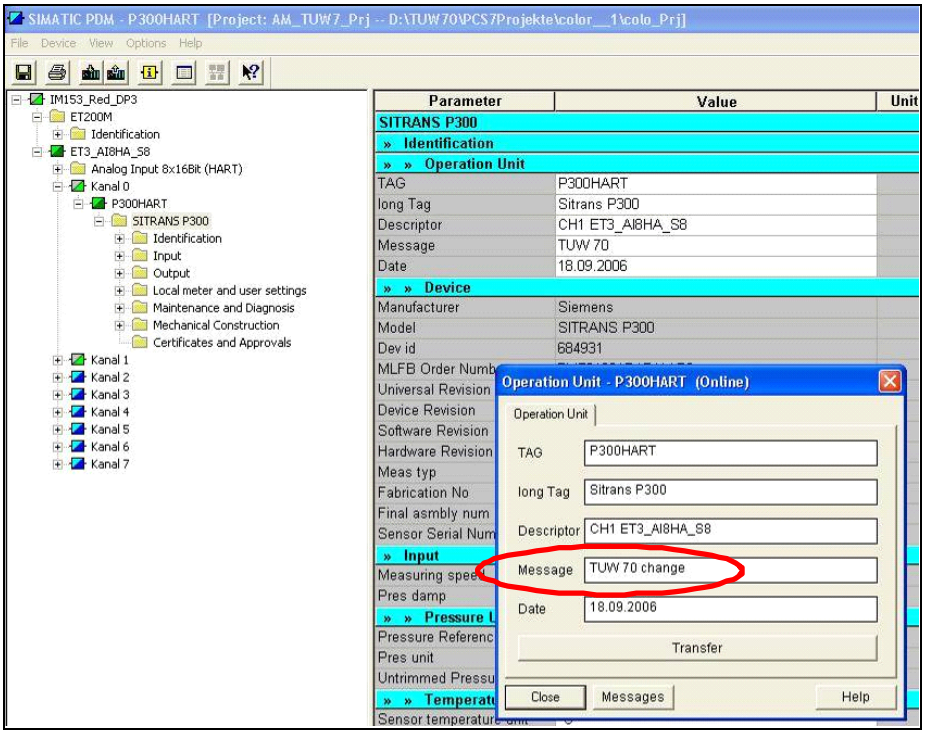
A parameter modification will be identified and indicated in the following steps:

- Parameter modification at the device
- Sending the diagnostics entry "Parameter modification detected"
- Calling up the driver block in the Controller and sending an AS status message
- Calling up "Detailed diagnostics" on the MS client
- Updating the diagnostics data and setting the MS to "Configuration changed"

The following is a more detailed description of the above steps using the example of a HART field device.

The PDM online dialog allows you to perform a parameter modification on the field device. Optionally, you can use another PG or a handheld computer.

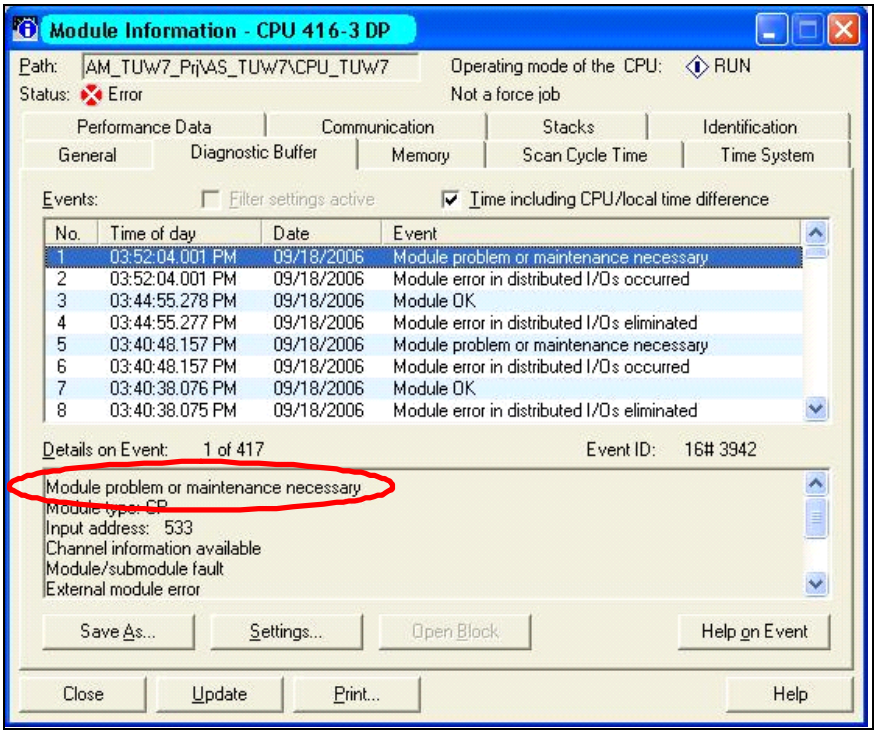
Figure 1-36 Parameter Modification on HART Field Device



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After the modification, a diagnostics entry is made in the Controller "Module problem or maintenance necessary".

Figure 1-37 Diagnostics Entry in the Controller



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The diagnostics entry triggers an OB82 call. The driver block MOD_HA acyclically analyzes the diagnostics data, i.e. the HART status bytes, and then sends an AS status message "Parameter modification" to the OS. This message need not be acknowledged.

Figure 1-38 Status Message "Parameter Modification"

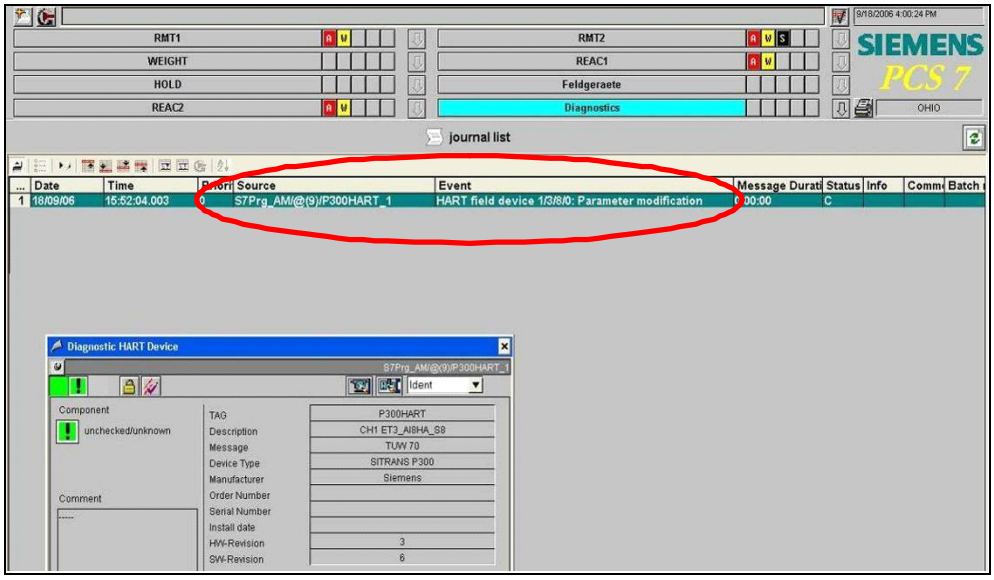
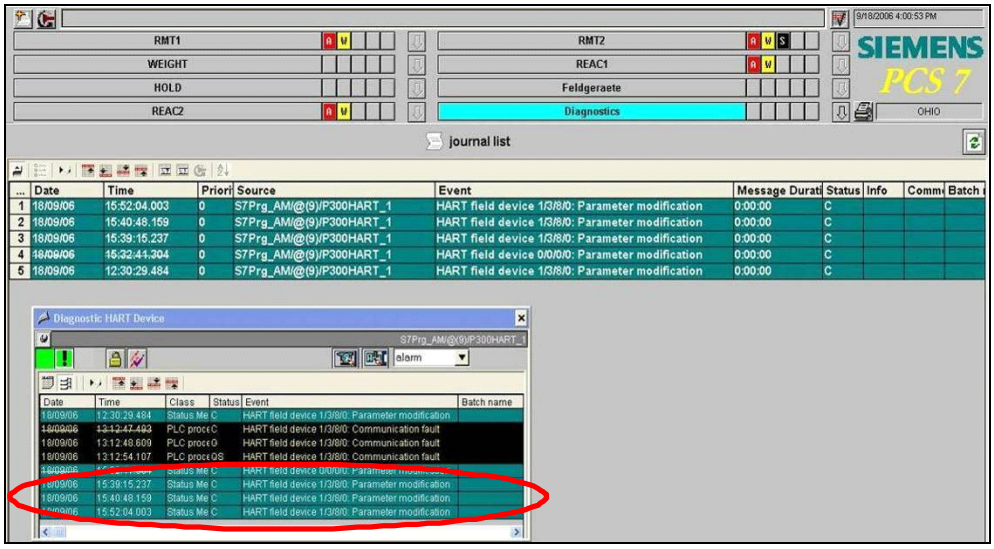


Figure 1-39 Status Message "Parameter Modification"



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Upon the AS status message "Parameter modification", the function "Detailed diagnostics" will be triggered. This function performs "Update diagnostic status" for the device and sets the maintenance status for the device to "Configuration changed" in MOD_HA.

Figure 1-40 MS for the Device in MOD_HA

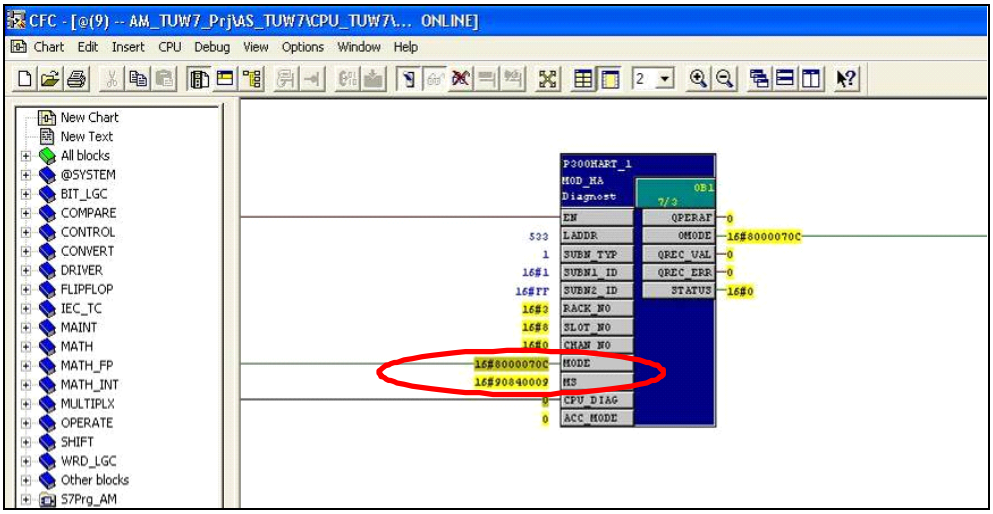
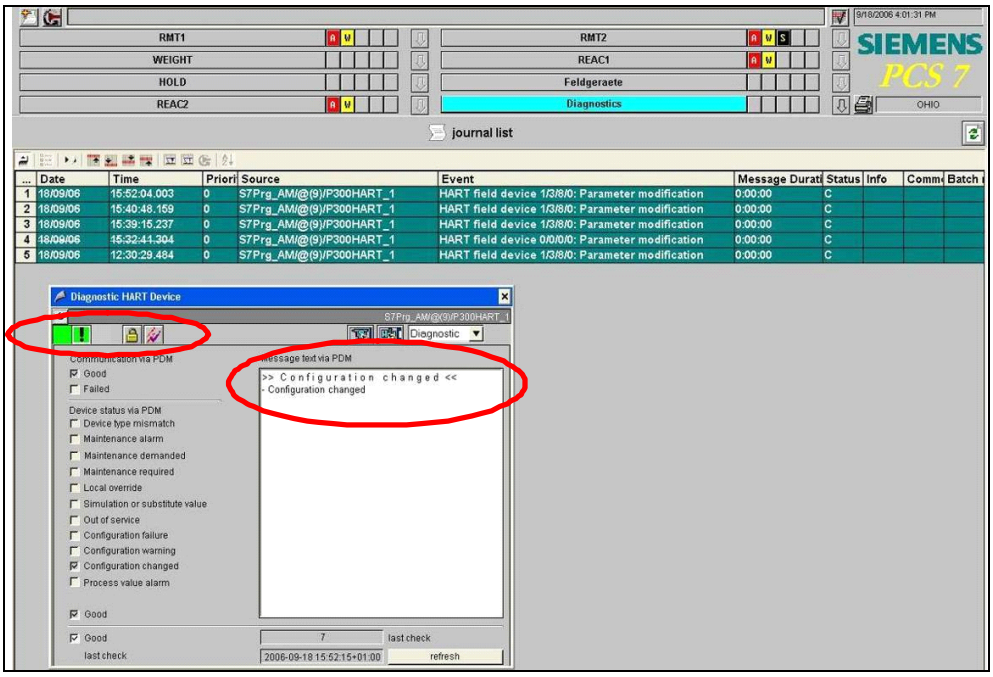
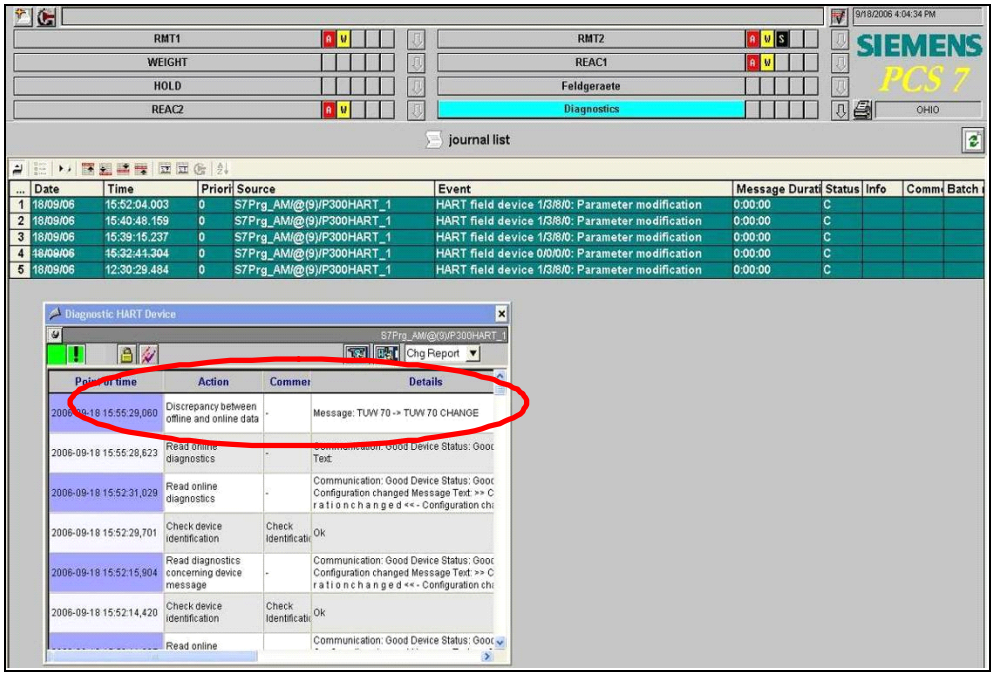


Figure 1-41 "Configuration changed" in OS runtime



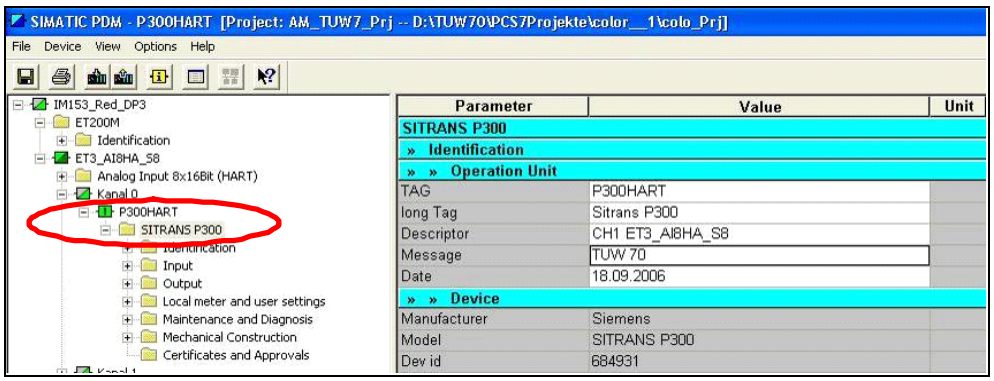
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Figure 1-42 Display changes in OS runtime



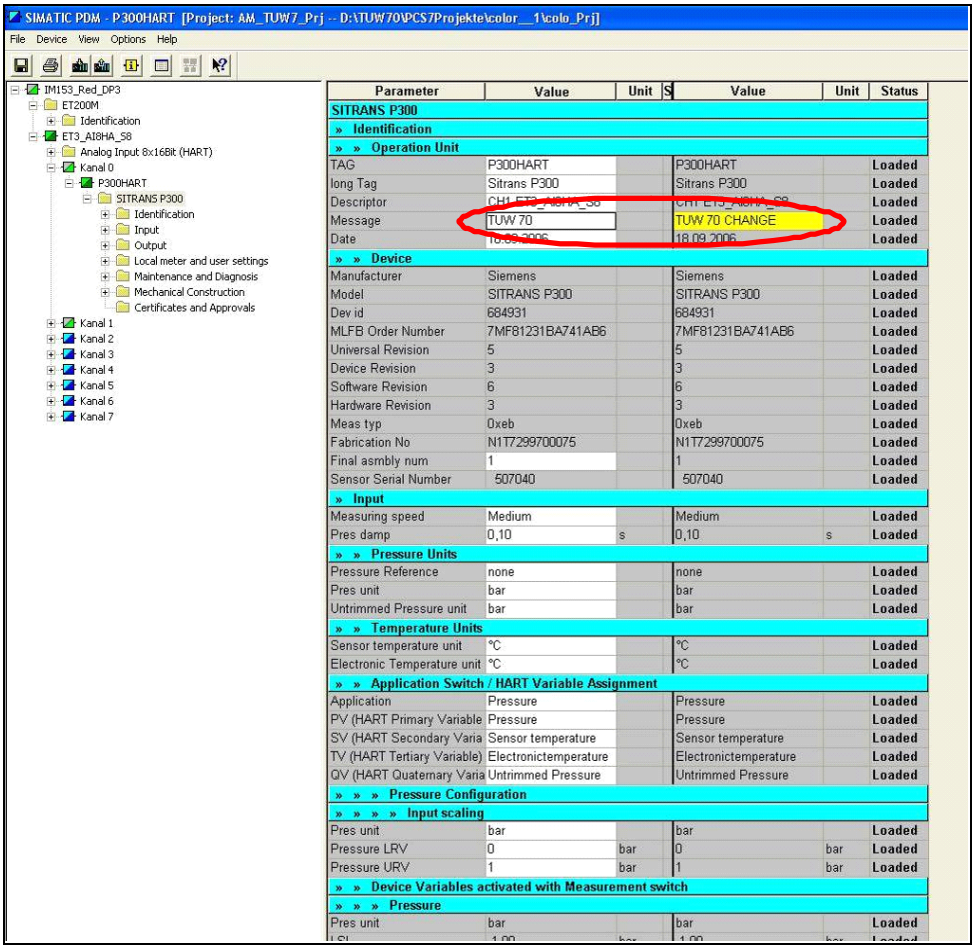
Now you can open the device in PDM via the MS client. Also the change in configuration is displayed in PDM. By comparison of the values (online/offline) it is possible now to find out which of the parameters in the device have been modified.

Figure 1-43"Configuration changed" in PDM



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Figure 1-44 Comparing the Values in PDM



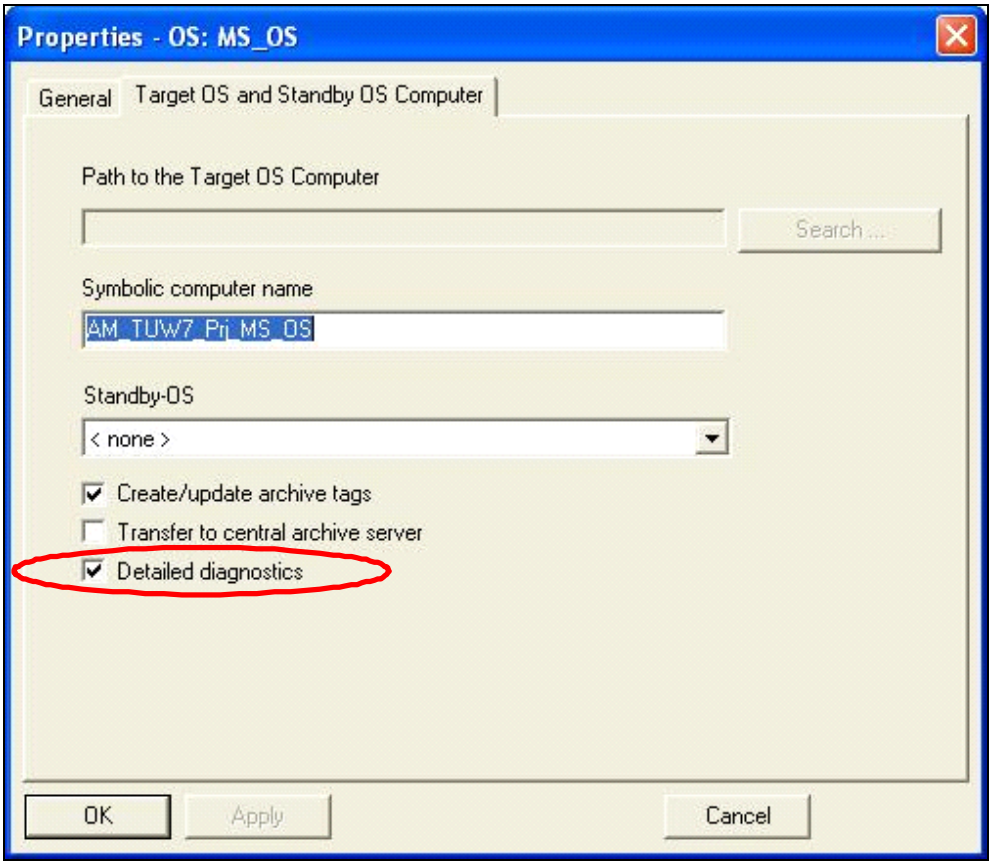
Uploading the parameters from the device into the PG will reset the status "Configuration changed " again. The status "Configuration changed" in the faceplate will be reset by updating the diagnostic status in the faceplate again.

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1.9 Time-Controlled Query for Diagnostic States of Assets

As of PCS 7 V7.0, you can activate PDM-integrated assets for time-controlled queries for their diagnostic states on the MS client. Thus, in addition to the cyclic monitoring by the driver blocks, the detailed diagnoses of the PDM devices on the OS will also be updated cyclically. To do this, activate "Detailed diagnostics" for the MS client. The function "Detailed diagnostics" is part of the advanced process control options.

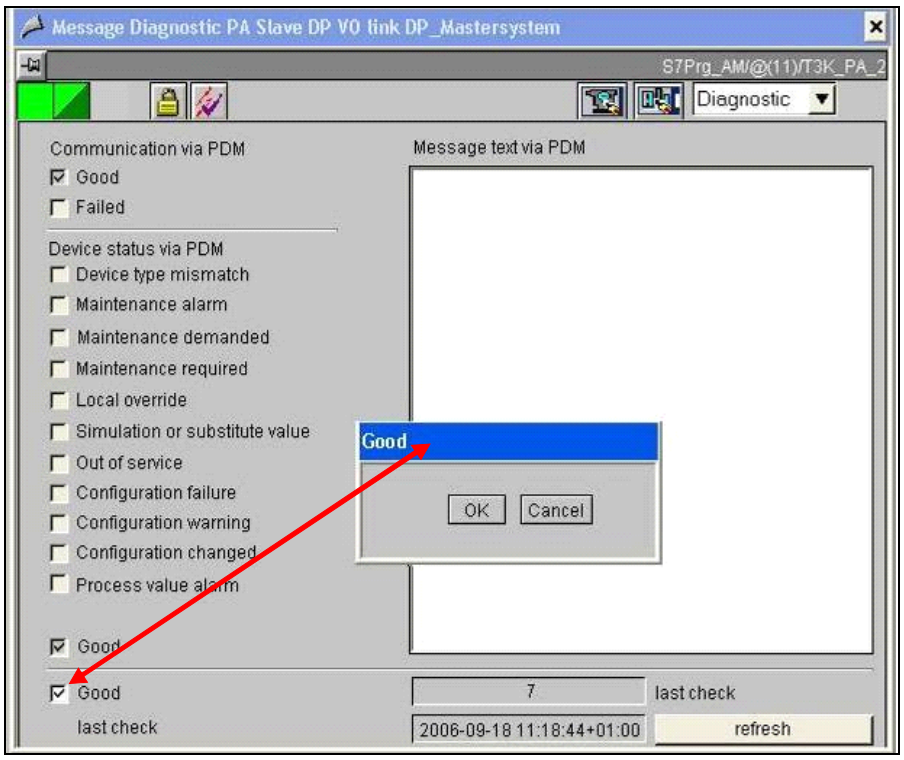
Figure 1-45 Activating "Detailed Diagnostics"



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The cyclic update is activated in the faceplate of the corresponding PDM device on the MS client.

Figure 1-46 Activating the Cyclic Update



The time-controlled query will be performed for all activated PDM devices in a sequence over a period of 7 days. This means that at the latest after every 7 days each device has been queried at least once for its diagnostic status. Thus, a communication overload on the PROFIBUS is avoided.

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1.10 Passivation/Depassivation of Redundant Modules

As of PCS 7 V7.0, channel-specific passivation and depassivation of redundant modules are supported and displayed in the Asset Management.

Module-Specific Redundancy and Channel-Specific Redundancy

You can define whether you operate redundant modules with module-specific redundancy or channel-specific redundancy. For this purpose, there are two block libraries "Functional Peripheral Redundancy".

The Principle of Module-Specific Redundancy

Redundancy always applies to entire modules, not to individual channels. If an error occurs on one channel of the first redundant module, the entire module will be passivated with all of its channels. If an error occurs on another channel of the second module before the first error is eliminated and the first module is depassivated, this second error will not be controlled. The module will keep on running in the normal way in single operation with corresponding channel diagnosis if a partner has failed.

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The Principle of Channel-Specific Redundancy

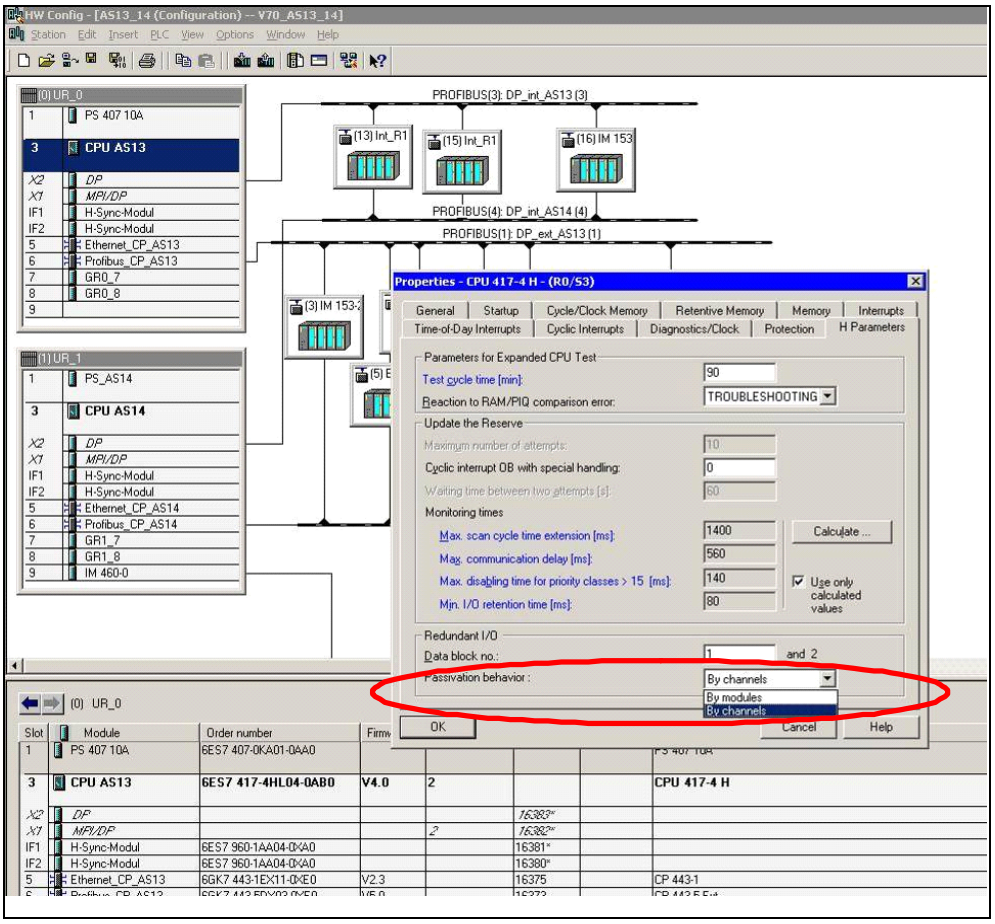
Channel errors due to discrepancy or diagnostic alarm (OB82) will not lead to a passivation of the entire module. Only the affected channel will be passivated instead. A depassivation (AS wide) reactivates the affected channel again as well as the modules passivated due to modular errors. Channel-specific passivation increases the availability in the following cases:

- Relatively frequent encoder failures
- Long repair times
- Several channel errors on one module
- Security

1.10.1 Setting Passivation Behavior of Modules for an Automation System

As of STEP 7 V5.4 you can set the passivation behavior; only visible with PCS 7 projects.

Figure 1-47 Configuring Passivation Behavior CPU



Channel Specific

The CPU uses the driver library "Redundant IO CGP" to passivate the channel, which is affected by a channel error or channel failure of a module. The other channels of the module are not affected by this channel error. This behavior increases the availability, especially in cases of frequent failures of individual encoders or long repair times.

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Module Specific

The CPU uses the driver library "Redundant IO (V1)" to passivate the entire module, which is affected by module errors and channel errors or failure of a channel.

A description of the passivation behavior is given in the Help on Redundant Systems.

Note

If you select channel-specific passivation behavior, you may use only the following modules within the entire automation system:

DI16	321-7BH01
DO16	322-8BH01
AI8	331-7NF00
AO4	332-5HF00
DO10	326-2BF01

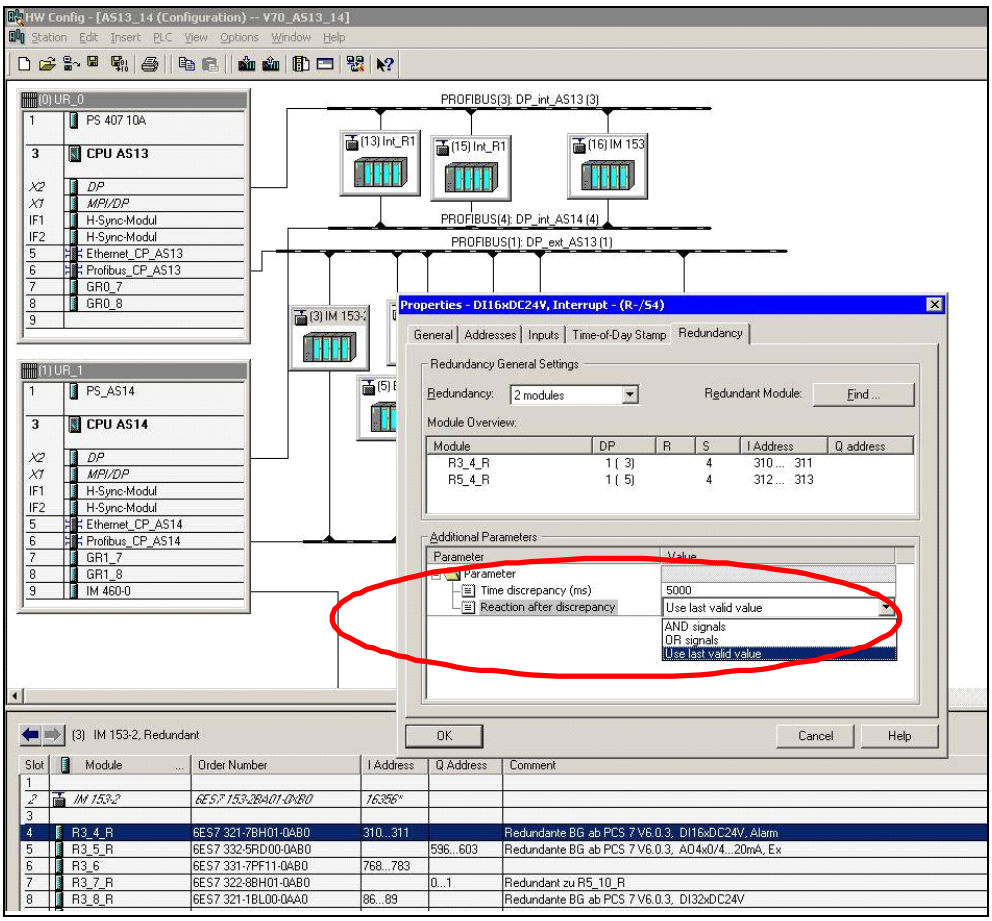
If you use any other modules, the module driver will abort with an error. It is not possible to mix channel-specific and module-specific behaviors within one automation system.

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Discrepancy

For digital and analog input modules you can also configure the discrepancy.

Figure 1-48 Configuring Passivation Behavior of Digital Input Module



1.10.2 Parameters for Digital Input Modules

Discrepancy Time

Maximum permitted time during which the redundant input signals may be different. If any discrepancy of the input values is prevailing after the configured discrepancy time has elapsed, an error will occur.

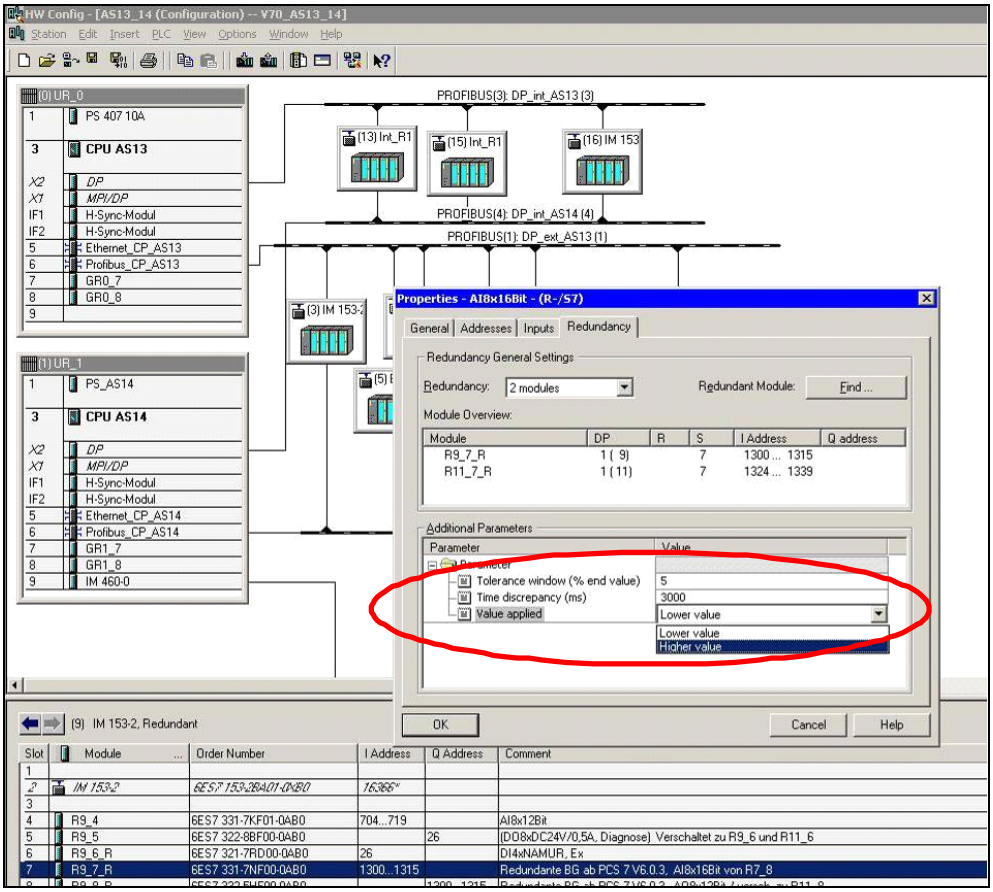
Reaction to Discrepancy

The last matching value of the pair of modules is written into the process image of the module with the lower address. Until the next signal change neither of the modules is passivated, only an entry is made to the diagnostic buffer.

In all cases: If another signal change takes place, the module where this signal change occurred is the intact module and the other module will be passivated.

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Figure 1-49 Configuring Passivation Behavior of Analog Input Module



Parameters for Analog Input Modules

The tolerance window is configured in percentages of the upper limit of the measuring range. Two analog values are considered matching if they are within the tolerance window.

If any discrepancy of the input values is prevailing after the configured discrepancy time has elapsed, an error will occur. The configured value (see Figure 1-49) is the one which is transferred into the application program.

Modules will be passivated in the following events: Module/channel error and discrepancy between two redundant channels.

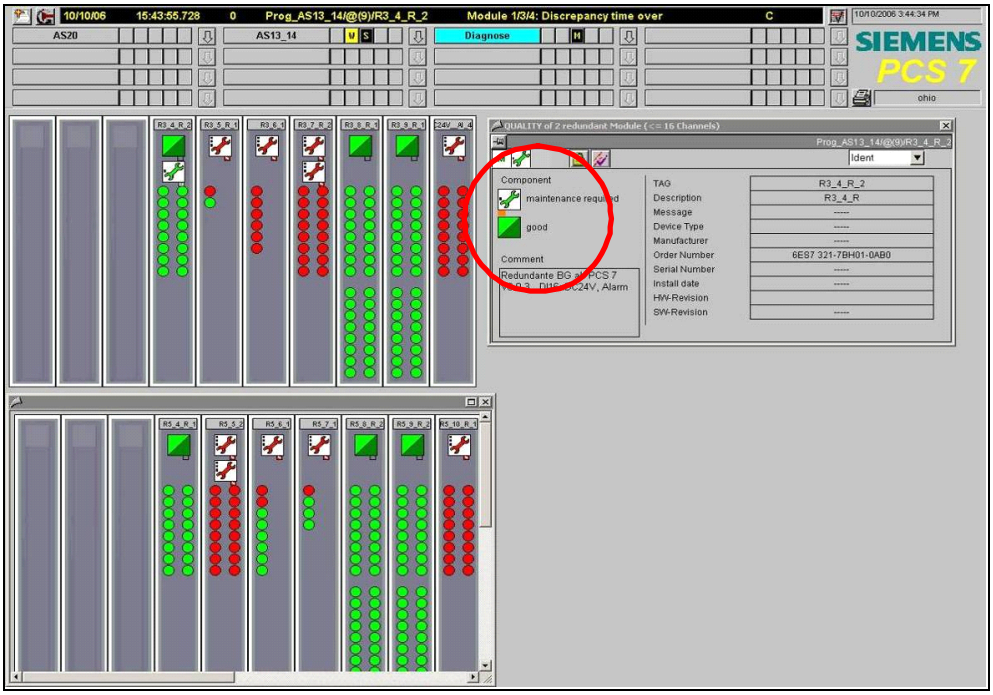
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Passivation upon Discrepancy Error

If any discrepancy is detected, causing passivation of a channel, you will get a corresponding alarm and the maintenance status of the OR (comparison) block in Asset Management. The OR block is always displayed in the diagnostics icon of the module with the lower I/O address.

The following illustrates the redundancy loss due to the discrepancy for a redundant digital channel: Asset Management displays that the discrepancy time is up, the event of passivating the channel and, hence, the redundancy loss. The discrepancy time-out is a maintenance demand. The redundancy loss is a maintenance request.

Figure 1-50 Discrepancy Time-Out



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Figure 1-51 Discrepancy Time-Out Message

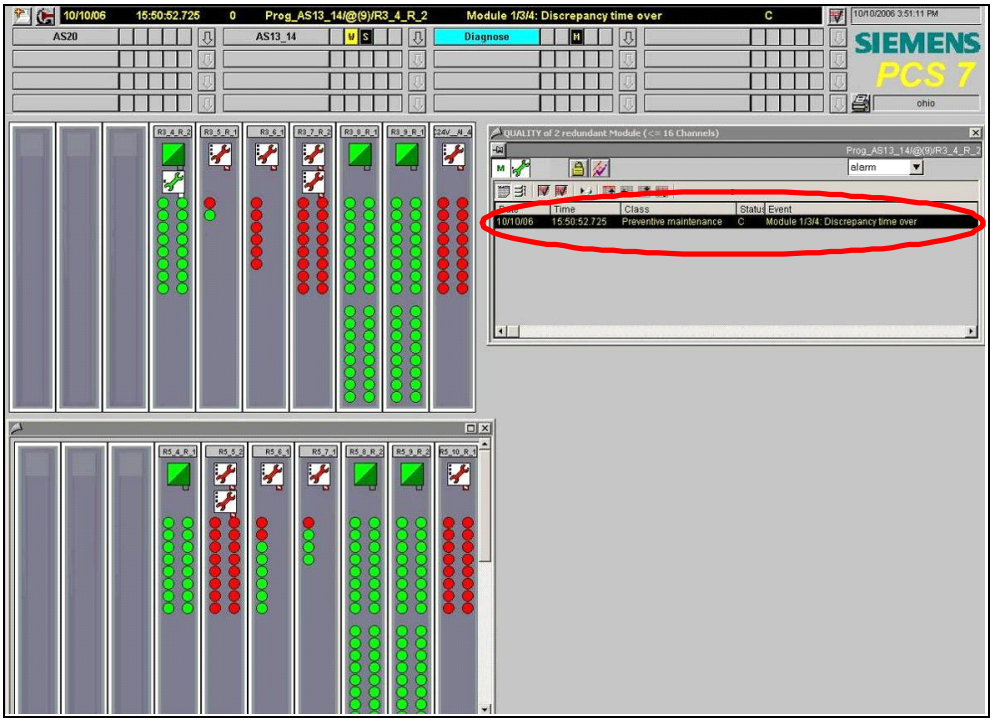
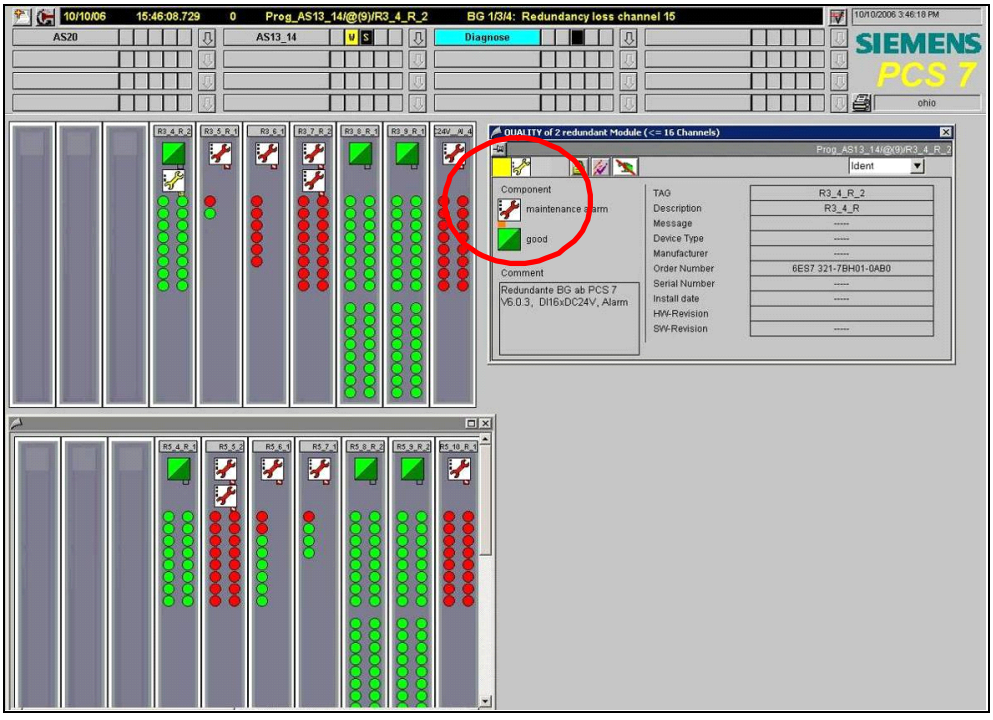
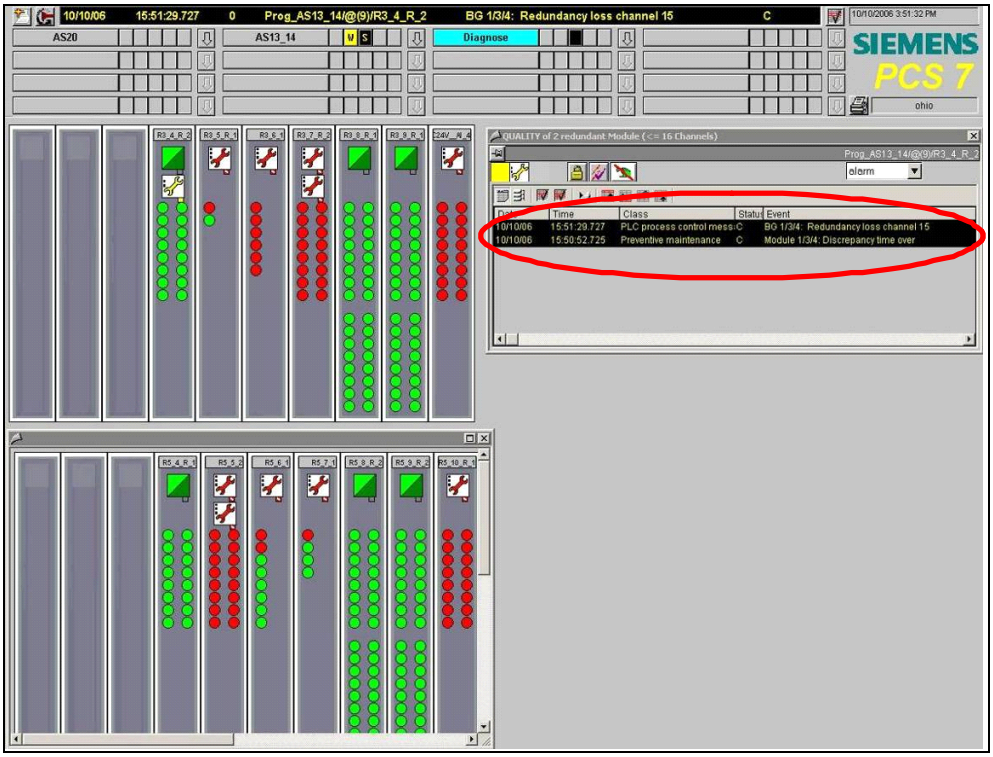


Figure 1-52 Redundancy Loss of Channel



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Figure 1-53 Redundancy Loss of Channel Message



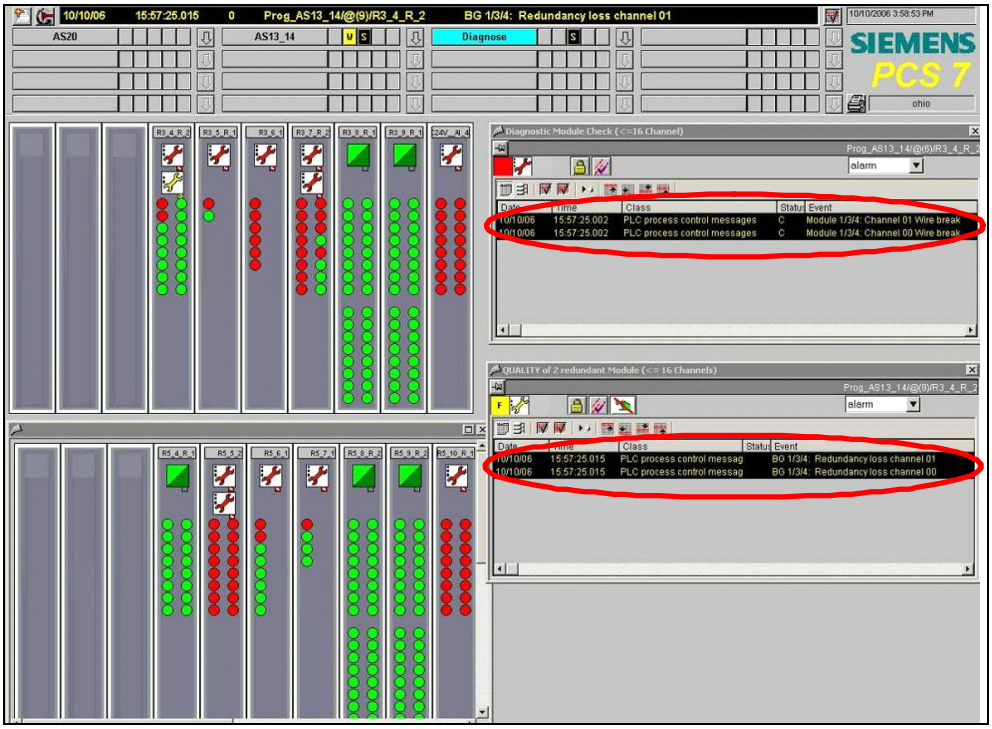
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Passivation upon Channel or Module Error

If a module or channel error occurs, this error and the passivation of the related channel will be signaled and displayed.

The following illustrates the redundancy loss due to a channel error (wire break) for a redundant digital channel: Asset Management displays the channel error, the event of passivating the channel and, hence, the redundancy loss.

Figure 1-54 Wire Break and Redundancy Loss of Channel Message



Depassivation of Modules and Channels

Passivated modules will be depassivated again in the following events:

- When the H system starts up
- When the H system switches to the "Redundant" mode
- After a plant modification in runtime
- If you call up FC 451 "RED_DEPA" and at least one redundant channel or one redundant module is passivated.

After one of these events has occurred, depassivation will be executed in FB 450 "RED_IN". When the depassivation has been completed for all modules, an entry is made into the diagnostic buffer.

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The Asset Management faceplate of the OR block allows you to depassivate a channel/module. This is realized via the FC 451 "RED_DEPA" of the RED lib.

Figure 1-55 Depassivation via Asset Management Faceplate

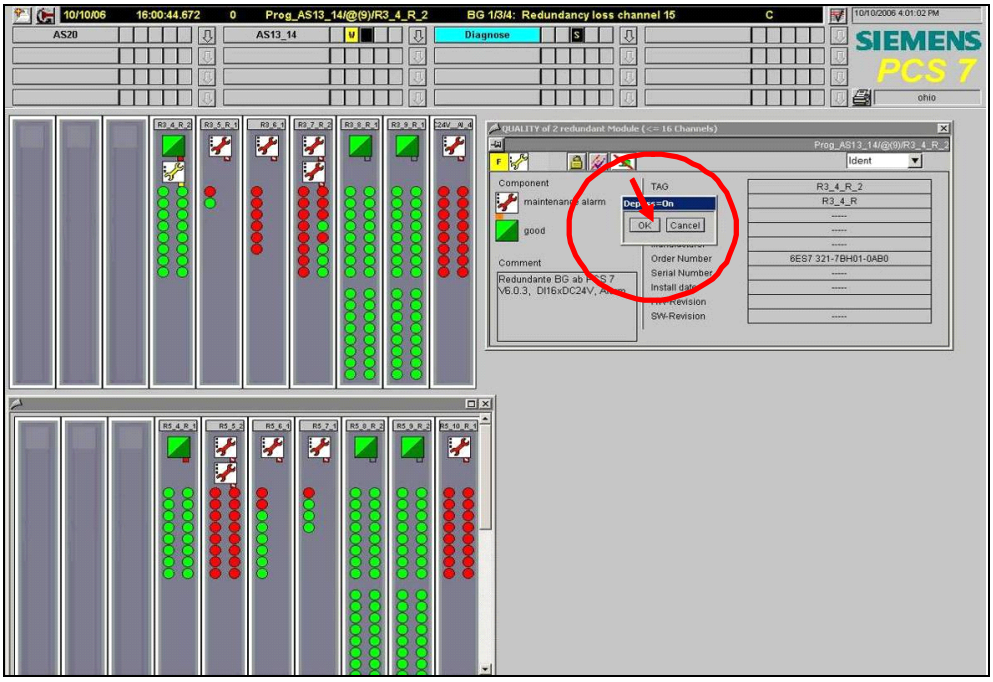
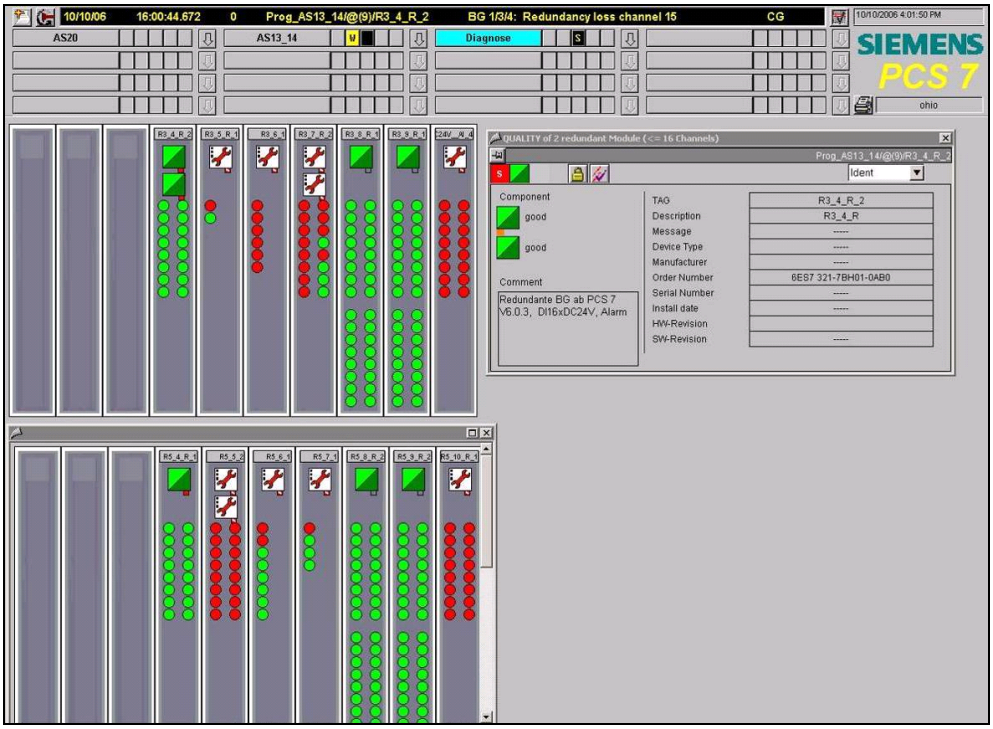


Figure 1-56 Depassivated Module (Redundancy Error Going Out)



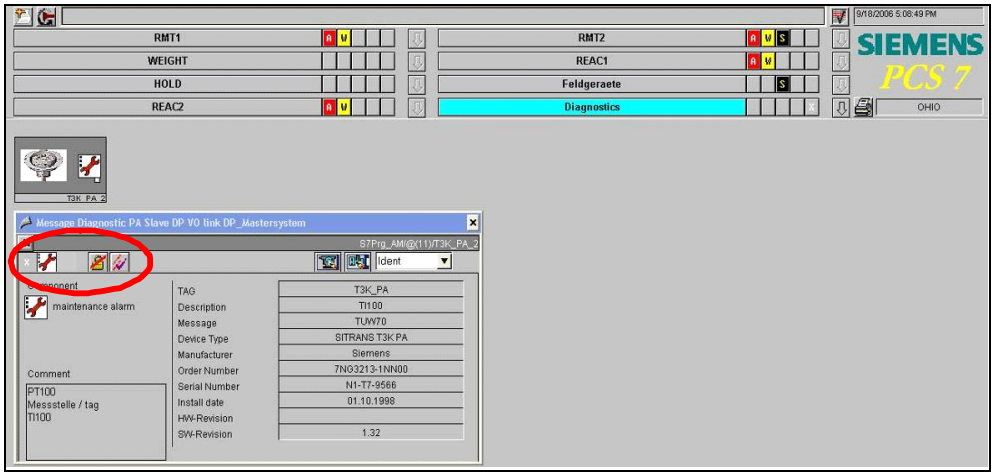
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1.11 Lock/Unlock Messages for Diagnostics Area

As of PCS 7 V7.0, you can lock messages for AS objects in the Diagnostics area. You cannot lock messages for network objects and PC objects. Locked messages are displayed in the group display by an X for the actual object and for lower-level objects in the diagnostic icons of the higher-level objects. Locked messages are also displayed in the group display of the Diagnostics area. The mechanism for locking messages works identically to that for the technological blocks.

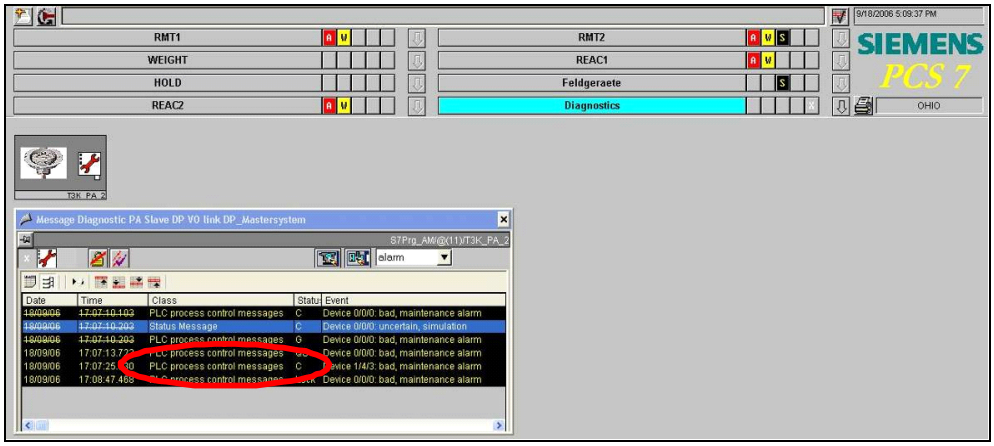
Example of locking of messages of a PA field device. Locking is performed via the button in the faceplate.

Figure 1-57 Locked Message for PA Device



The locked messages for the object are marked in the message view of the faceplate.

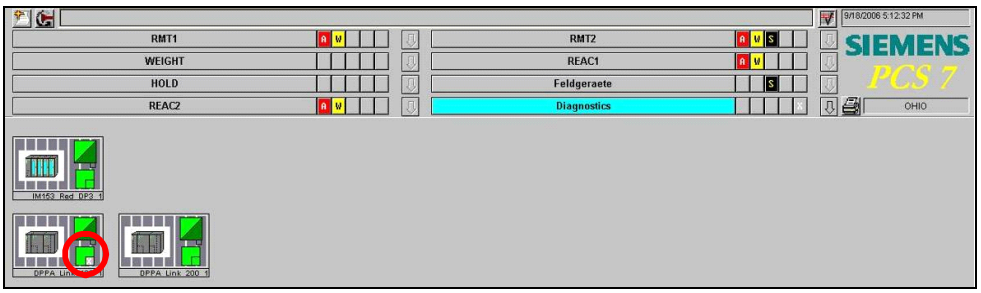
Figure 1-58 Marking of Locked Message



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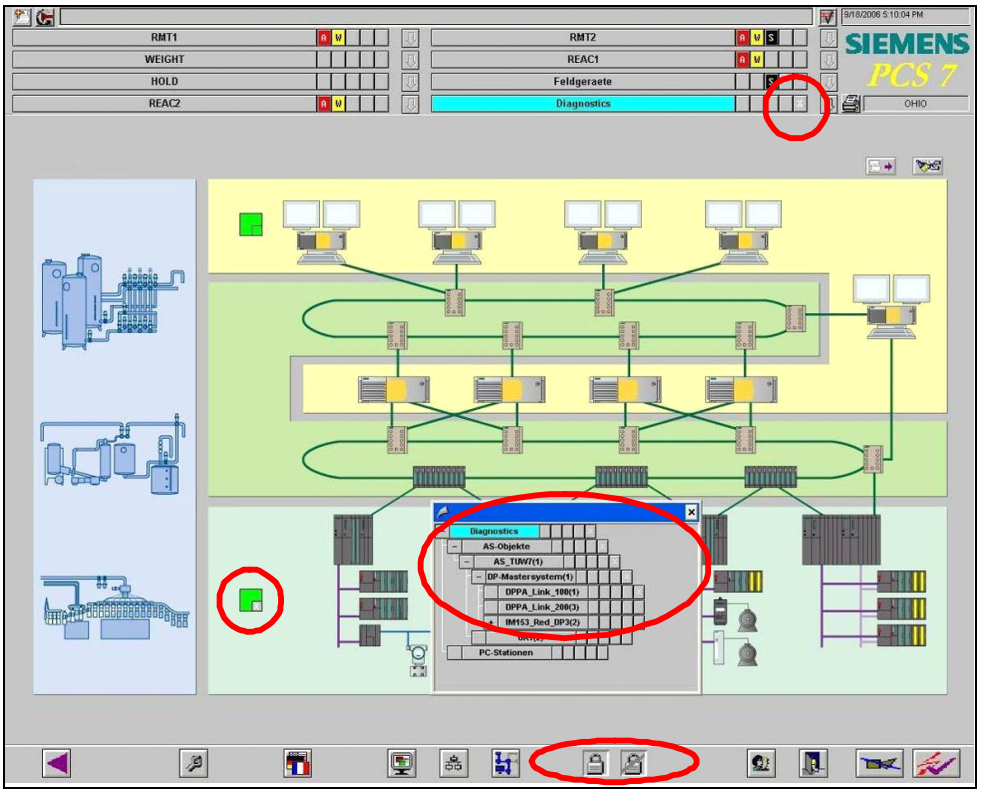
Locked messages for lower-level objects are displayed in the group display in the little square located in the lower right corner. Figure 1-59 shows the message lock on DP/PA Link 100 from the lower-level PA device of Figure 1-57.

Figure 1-59 Locked Message Lower-Level Object



In the overview screen, locked messages are displayed by the group display of the AS objects and the group display of the Diagnostics area.

Figure 1-60 Locked Message in Overview Screen



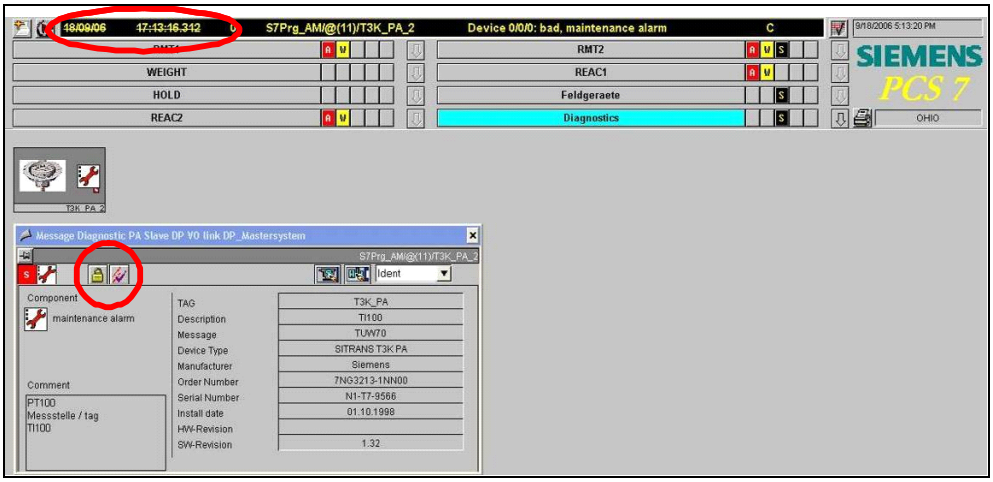
Note

Messages in the Diagnostics area may only be locked in the associated faceplate of the object. The global buttons (button set 2) for locking/unlocking are deactivated in the Diagnostics area.

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Locked messages are unlocked via the faceplate of the object.

Figure 1-61 Enabled Message



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1.12 Network Objects and PC Stations

Configuration

All network objects and PCs, except for Scalance X400, X200, OSM and SIMATIC IPCs, which support the DiagMonitor, are configured with the standard MIB 2 profile. Hence, basic information for 3rd party devices is available.

Extended Information

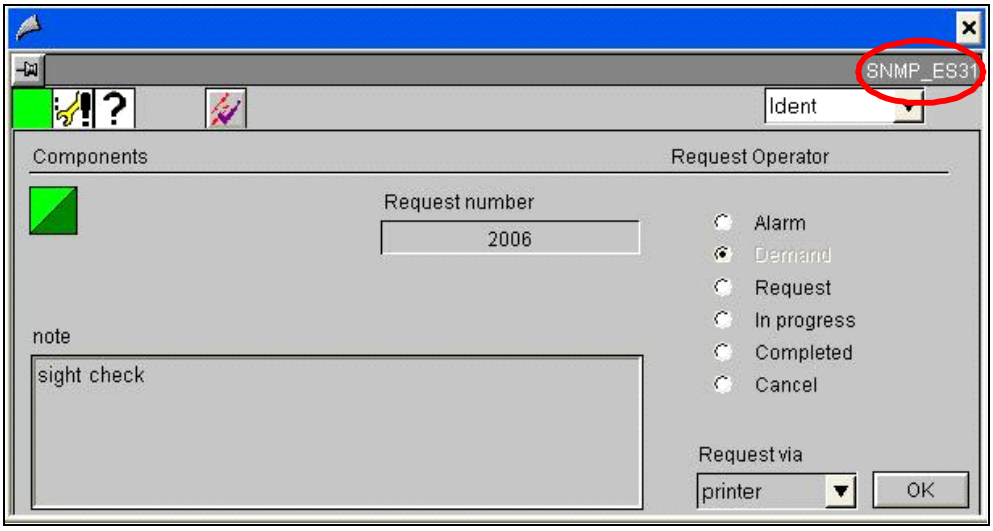
Computers and network objects generally provide more information than in PCS 7 V6.1 SP1. The contents of information depend on the device type and configuration. For industrial PCs DiagMonitor V3.0 is used.

Enabling Maintenance View

From PCS 7 V7.0, the operator can generate maintenance requests for network objects and PC objects.

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Figure 1-62 Generating a Maintenance Request

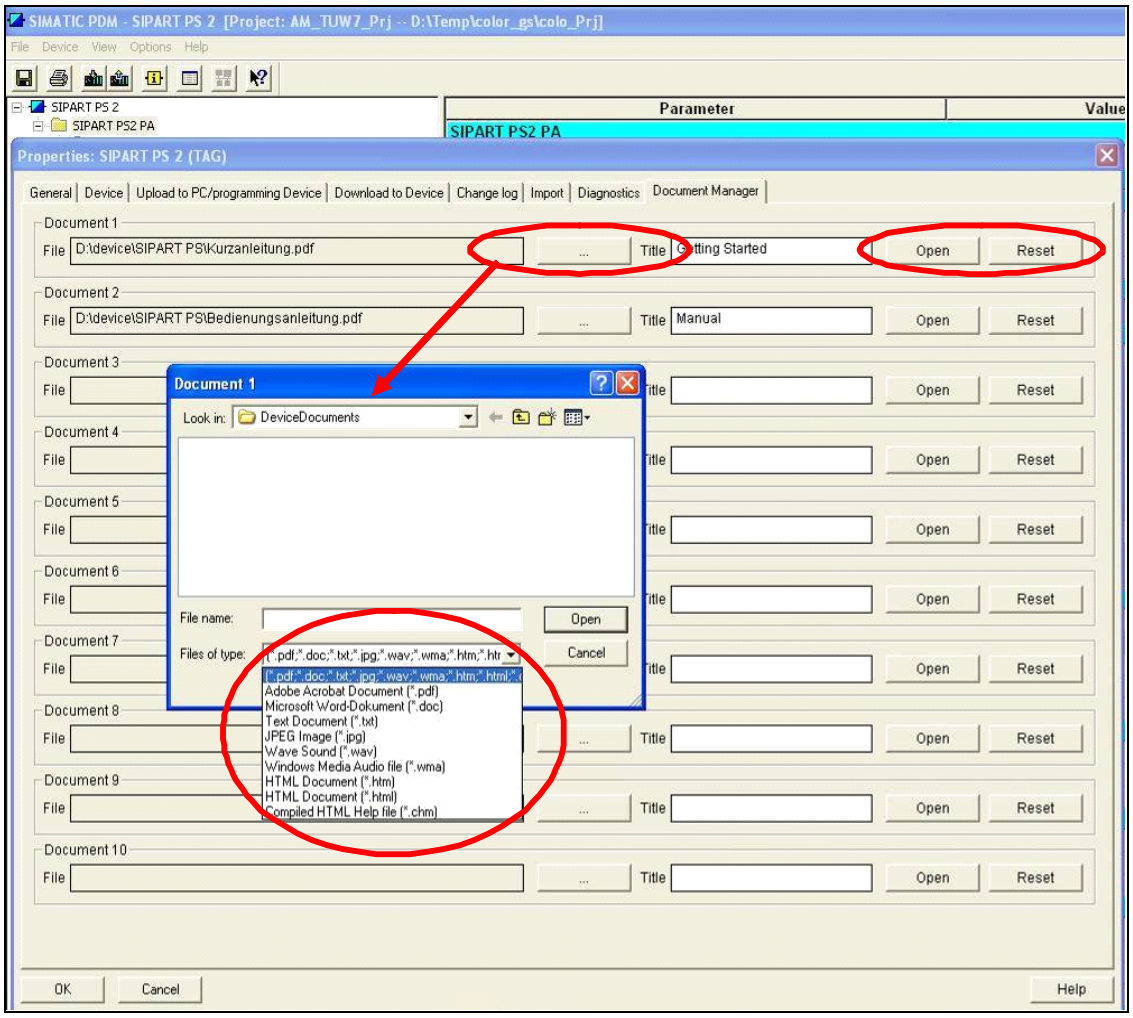


1.13 New Functions in PDM V6.0 SP2

Document Manager

From PDM V6.0 SP2, the Document Manager allows you to assign up to 10 documents (image, sound, text, film) to the devices. You can assign or open documents or reset the assignment.

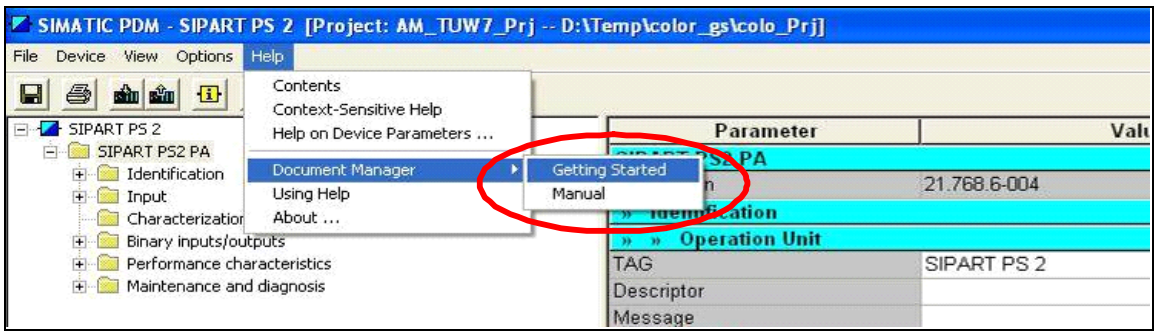
Figure 1-63 Assigning Documents to PDM Objects



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The menu "Help" → "Document Manager" shows the documents assigned to the PDM object. To open the document, select the desired document with the mouse.

Figure 1-64 Showing Assigned Documents



EDD Enhancements Using the Example of SITRANS LR 200

Figure 1-65 shows a list of the general EDD enhancements (step 1) and their realization in PDM.

Figure 1-65 EDD Enhancements Step 1

- EDD Enhancements – Overview (Step1)

→Realization in Simatic PDM V6.0 SP1
→Realization in Simatic PDM V6.0 SP2

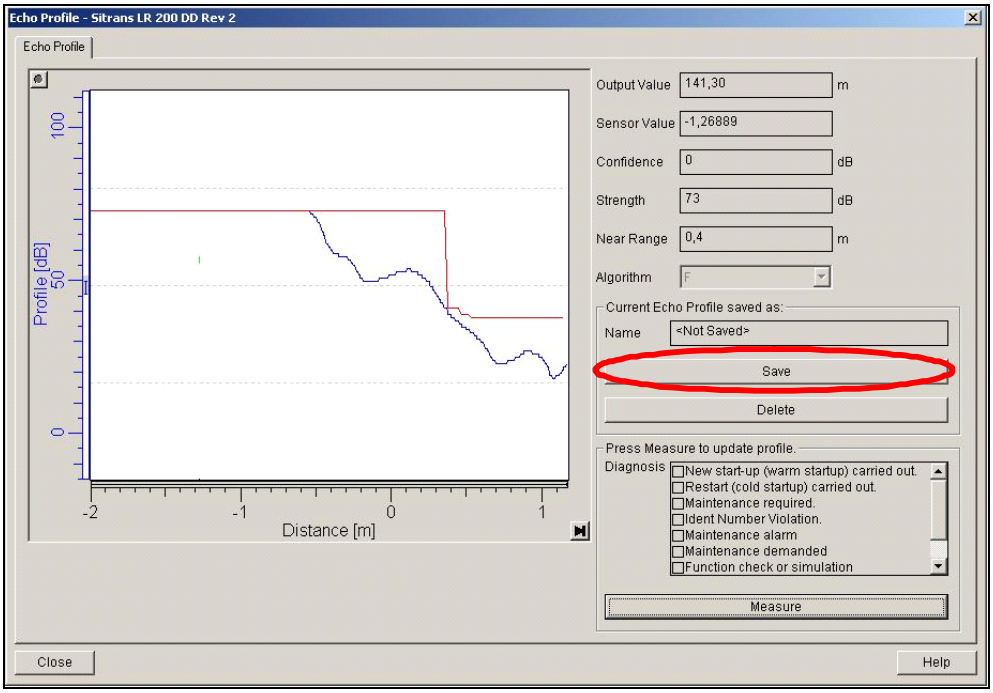
- IMAGE – Pictures to illustrate parameters
- Static Text –Description of parameters
- Bar Displays – Vertical and horizontal
- Gauge
- Curve Display – Simplified syntax, new display
- Layout – Extended options for layout control
- Menu – In dialogs and windows
- Entry Points – New starting points for dialogs, roles
- LIST – Curve points
- FILE – Explicitly persistent storage

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Using the example of SITRANS LR 200 in combination with PDM V6.0 SP2, the enhancements can be demonstrated.

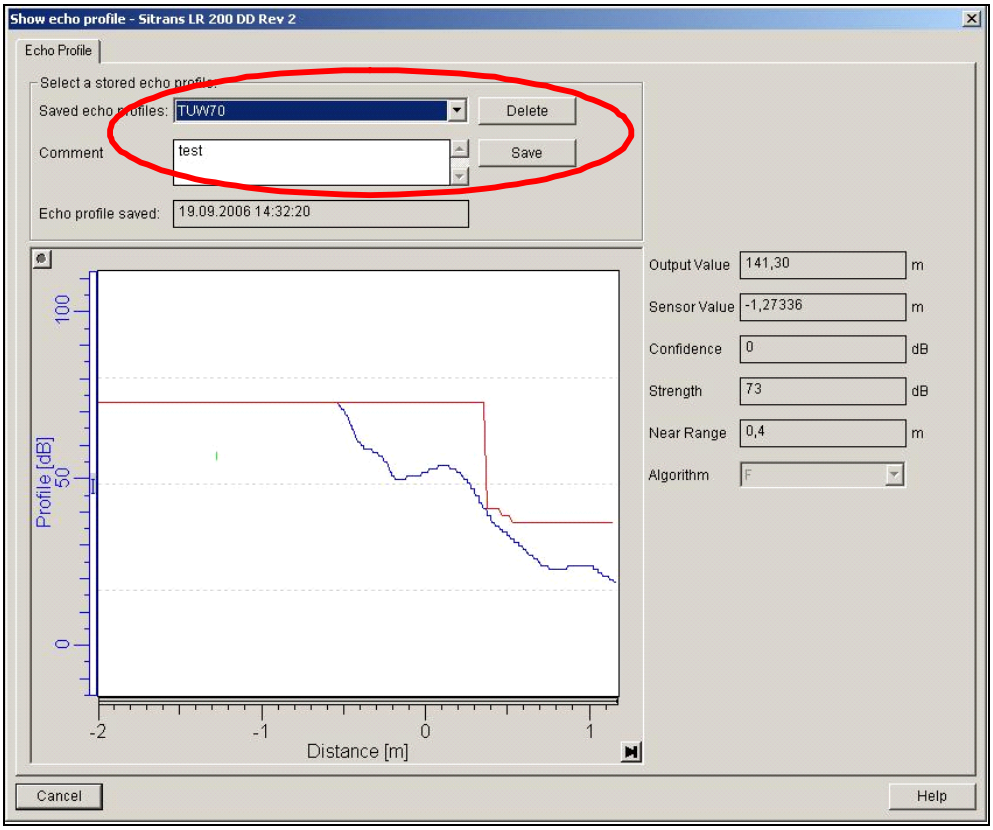
During commissioning, echo profiles are recorded for a level radar sensor. Based on the echo profiles you can assess and adjust the quality of the echo/measured value with regard to geometry and built-in components of the device. SITRANS LR 200 allows you now to save these echo profiles directly in PDM in order to possibly compare them to other profiles recorded at a later time. Figure 1-66 and Figure 1-67 illustrate the general procedure.

Figure 1-66 Recording and Saving the Echo Profile



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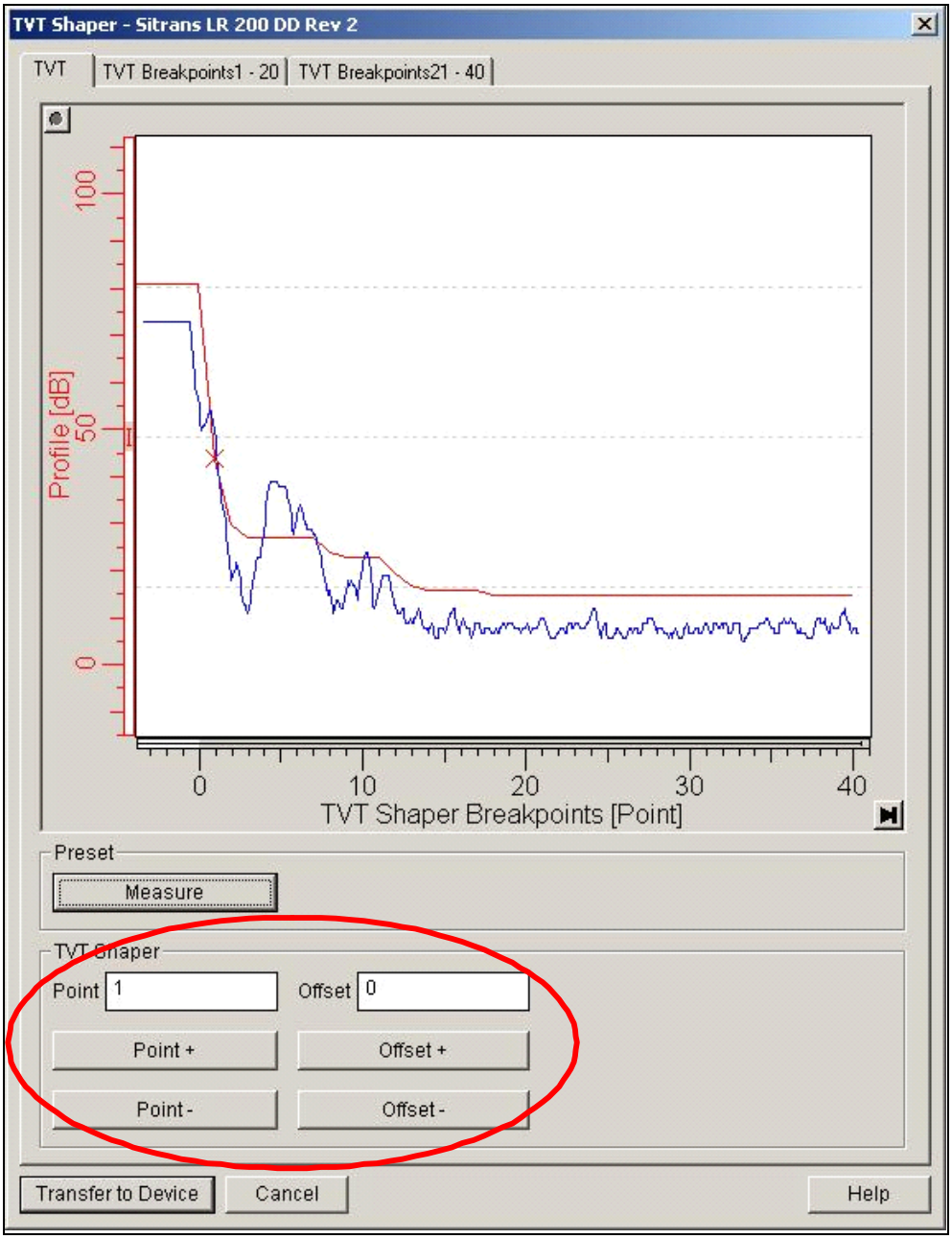
Figure 1-67 Displaying a Stored Echo Profile



During a measurement false echoes may occur. They are often caused by internal obstacles in devices and vessels. For this purpose SITRANS LR 200 allows you to parameterize a time varying threshold (TVT) curve. Thus, SITRANS LR 200 ignores false echoes. The graphical adaptation of the TVT curve substitutes here the former configuration in table format. Figure 1-68 and Figure 1-69 illustrate the general procedure.

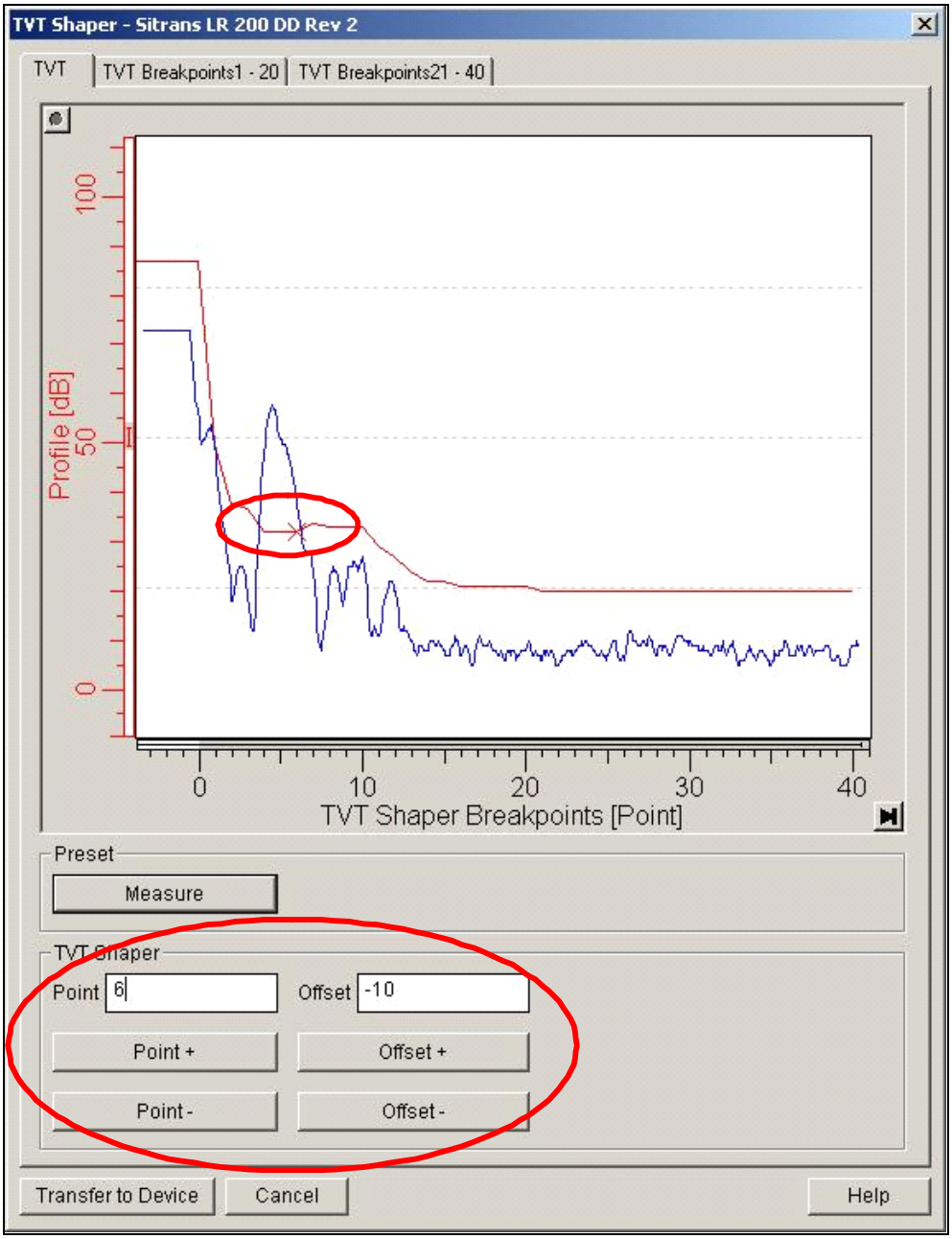
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Figure 1-68 Time Varying Threshold and Echo Curves in the TVT Shaper



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Figure 1-69 Adapted Time Varying Threshold Curve in the TVT Shaper



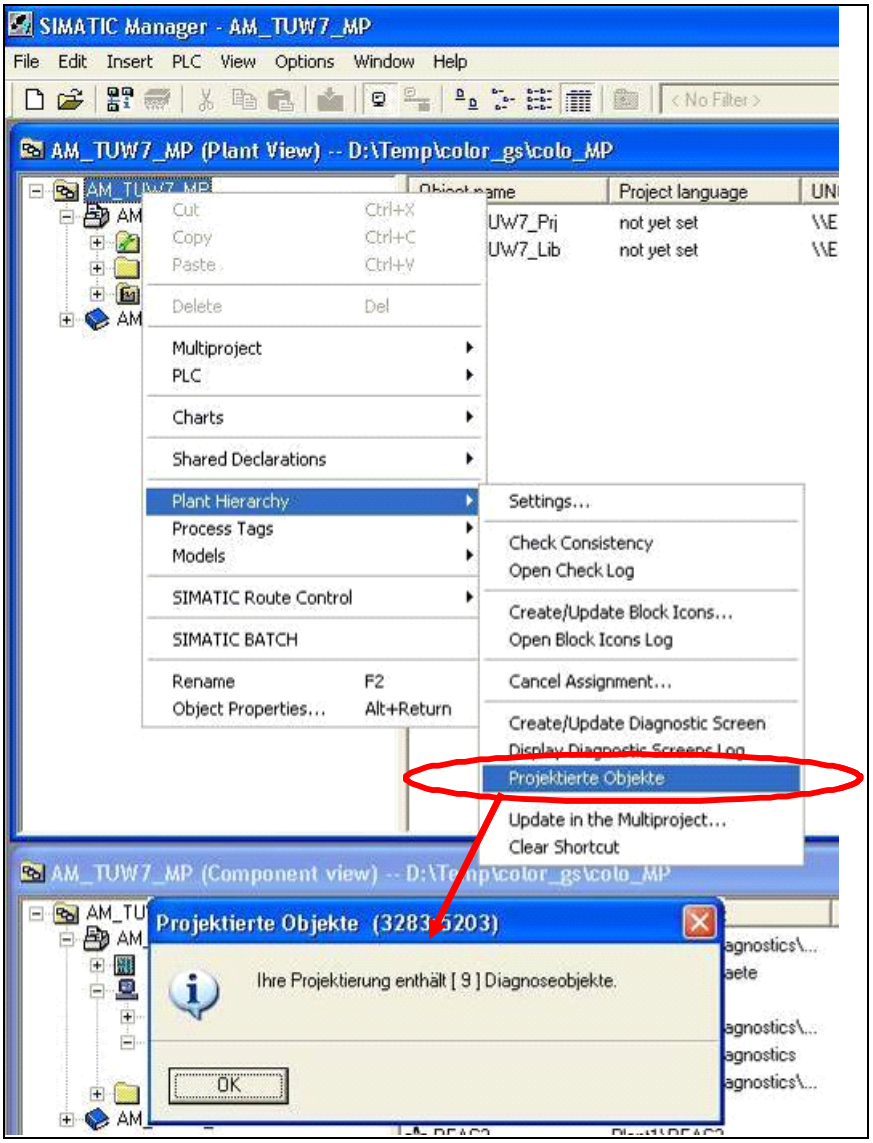
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2 Differences to PCS 7 V6.1 SP1

2.1 License Concept

All objects in the diagnostic screens, except for modules, are counted as asset tags (identical in PCS 7 V6.1 and V7.0). This means, one ET200 M is one asset. From PCS 7 V7.0, you can call up the current asset tag counter state as shown in Figure 2-1.

Figure 2-1 Counting Asset Tags



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2.2 General Configuration

The screens are not generated immediately upon activation of the diagnosis. Only by means of the command "Create/update diagnostic screens" will you generate all necessary screens. If, for example, no network objects have been configured, no screen will be generated for them.

SNMP Objects - Handling of Third-Party Devices

Third-party devices are integrated via the MIB II profile. Here it is differentiated between network objects and computers. Both must support the standard MIB II profile and provide basic information. Computers which have been configured in the OPC server and designed as PC stations must be generated in the screen for PC stations. All other devices must be generated in the screen for network objects, including e.g. printers.

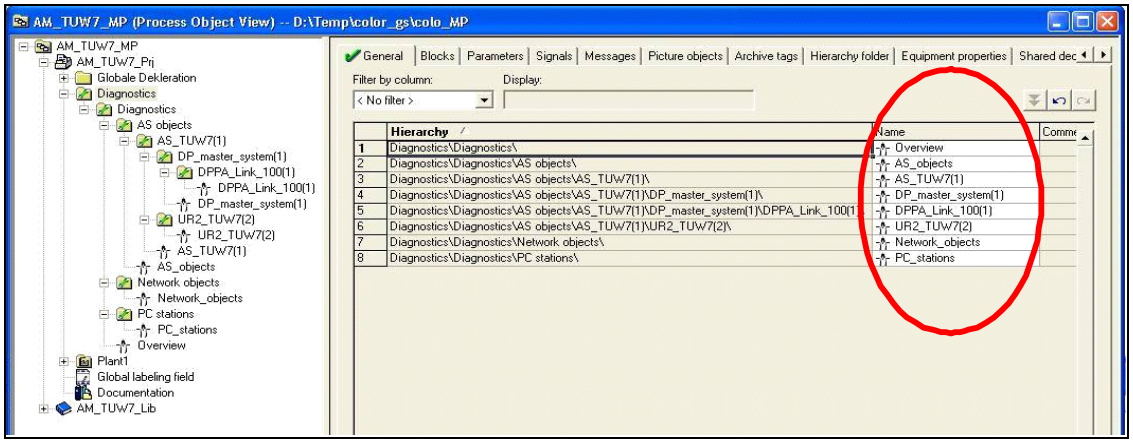
Check Mark "Detailed Diagnostics"

The check mark "Detailed Diagnostics" in the Object Properties of the single-user OS and the MS client was not activated in version PCS 7 V6.1 SP1. As of PCS 7 V7.0, this feature is activated for the MS client.

Naming the Diagnostic Screens

In PCS 7 V7.0 the screens are no longer serially numbered. The screen names are derived from the HW Config.

Figure 2-2 Naming the Diagnostic Screens



Placing Diagnostic Icons

In PCS 7 V7.0 the placing of all diagnostic icons in all diagnostic screens has been maintained.

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Duplicating OS Control System Messages

OS control system messages are no longer duplicated in version 7.0. The application OSLTMDupl.exe is no longer entered into the start-up list of the OS project.

Repeated Actuation of the Call Buttons SIMATIC PDM and HW Config on the MS Client

The repeated call from the asset faceplate of a device, which has already been opened with PDM, will bring this device to the front in PCS 7 V 7.0.

Simultaneous Opening of a PDM Device from HW Config and via the Asset Faceplate

The repeated call from the asset faceplate of a device, which has already been opened with PDM, will bring this device to the front in PCS 7 V 7.0.

Export of SNMP Variables

After a complete compilation with general reset of the MS server, the SNMP variables need not be exported again to the MS server.

Table of Maintenance State

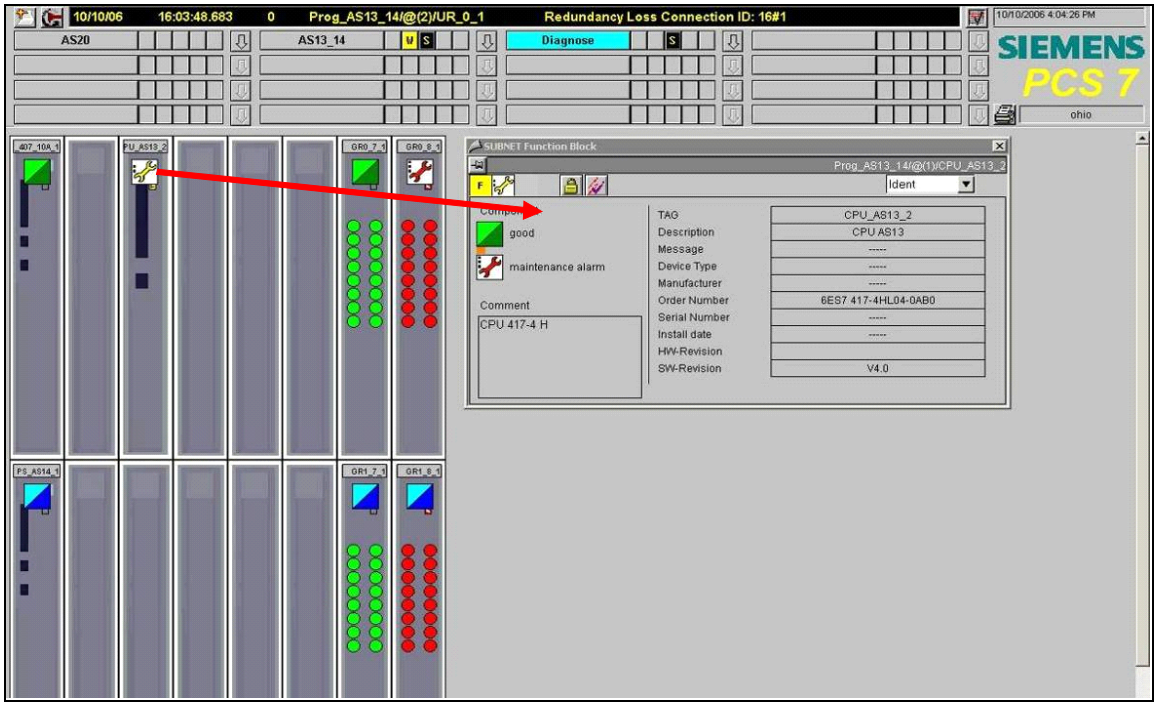
In Readme of the PCS 7 V7.0 Library you will find an Excel table showing the interrelation between quality and maintenance state for the driver blocks.

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3 Appendix

Display of redundant system failures in Asset Management (CPU, PROFIBUS DP network, interface module ET200M, redundant module)

Figure 3-1 CPU Redundancy Loss



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Figure 3-2 Message: CPU Redundancy Loss

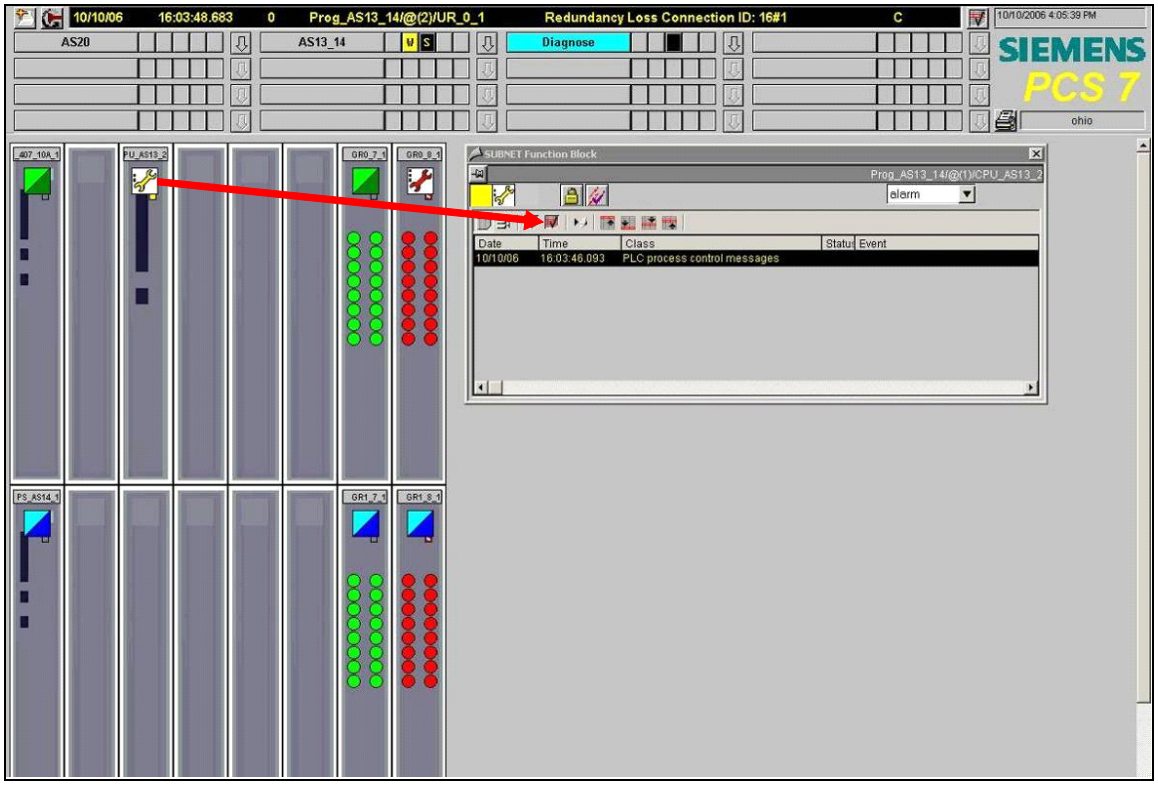
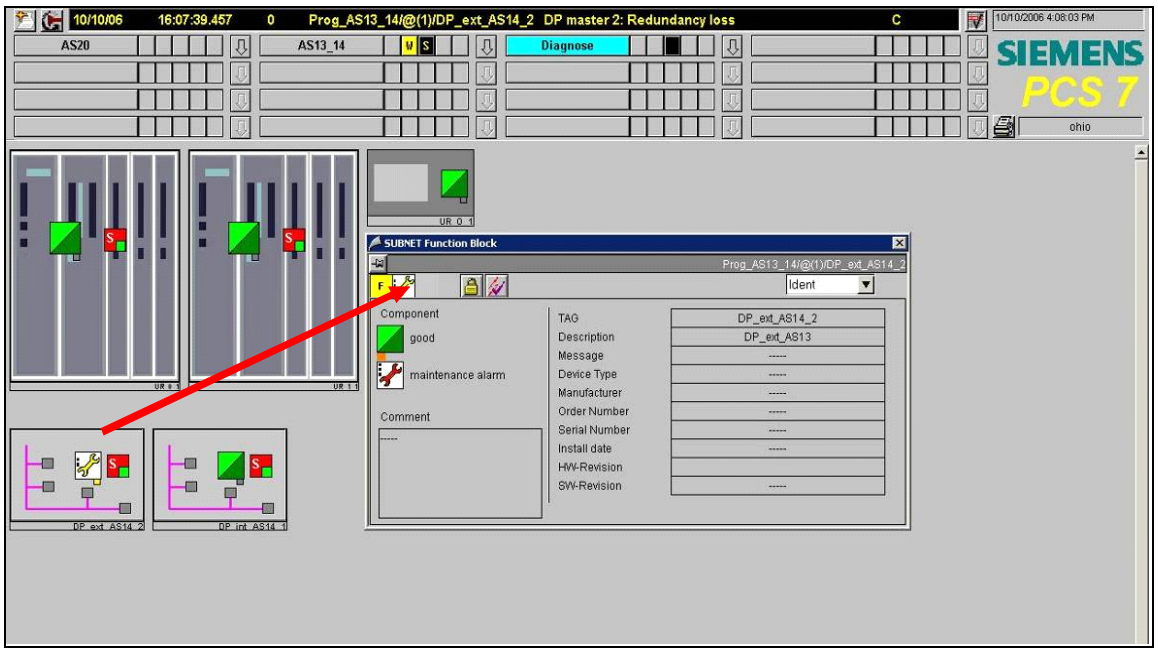


Figure 3-3 Redundancy Loss DP Master System



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Figure 3-4 Message: Redundancy Loss DP Master System

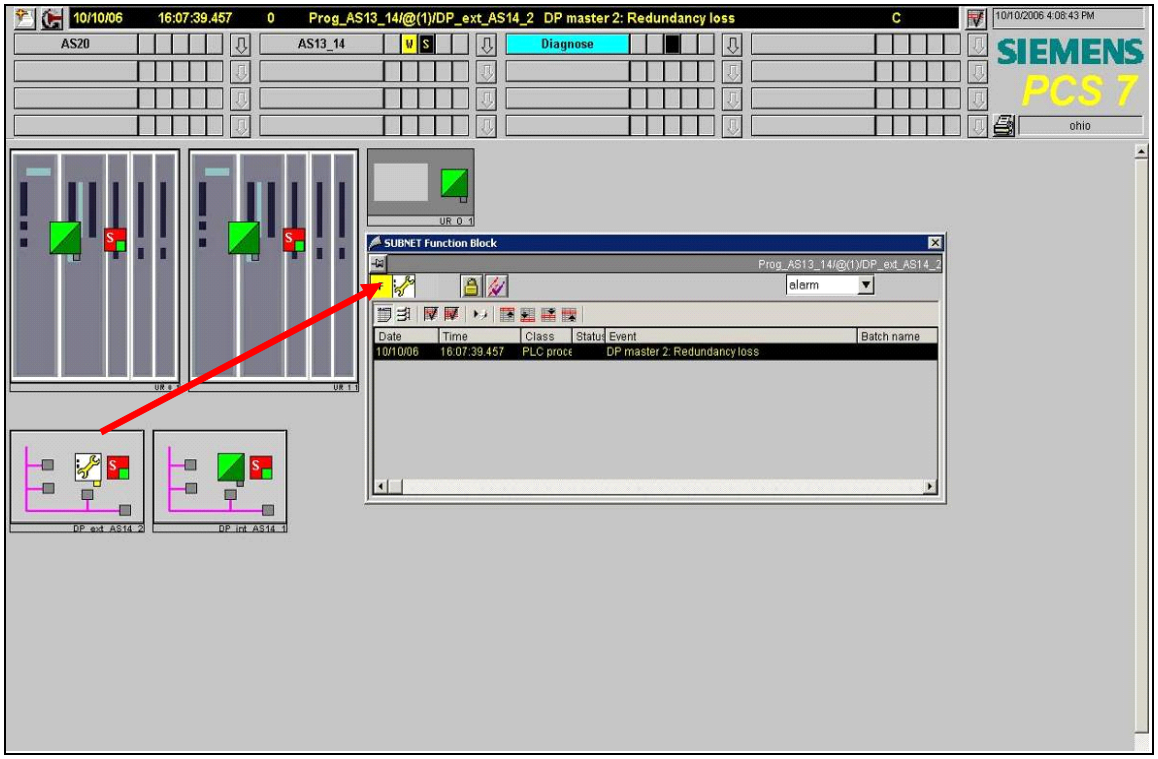
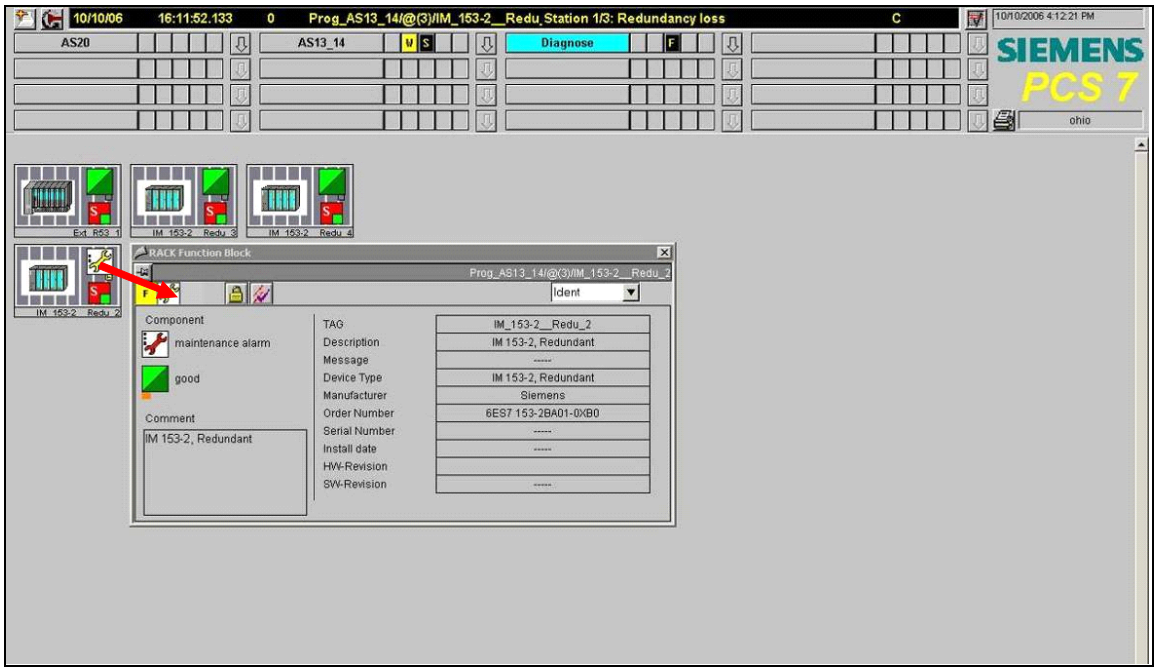


Figure 3-5 Redundancy Loss ET200M Interface Module



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Figure 3-6 Message: Redundancy Loss ET200M Interface Module

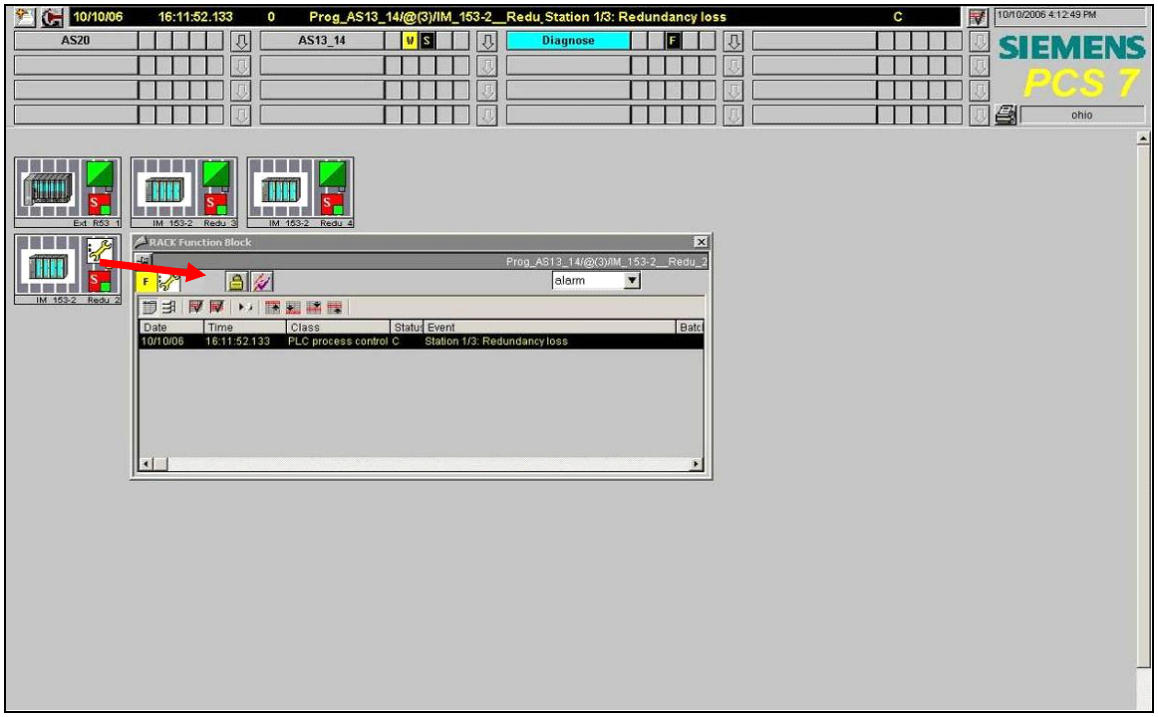
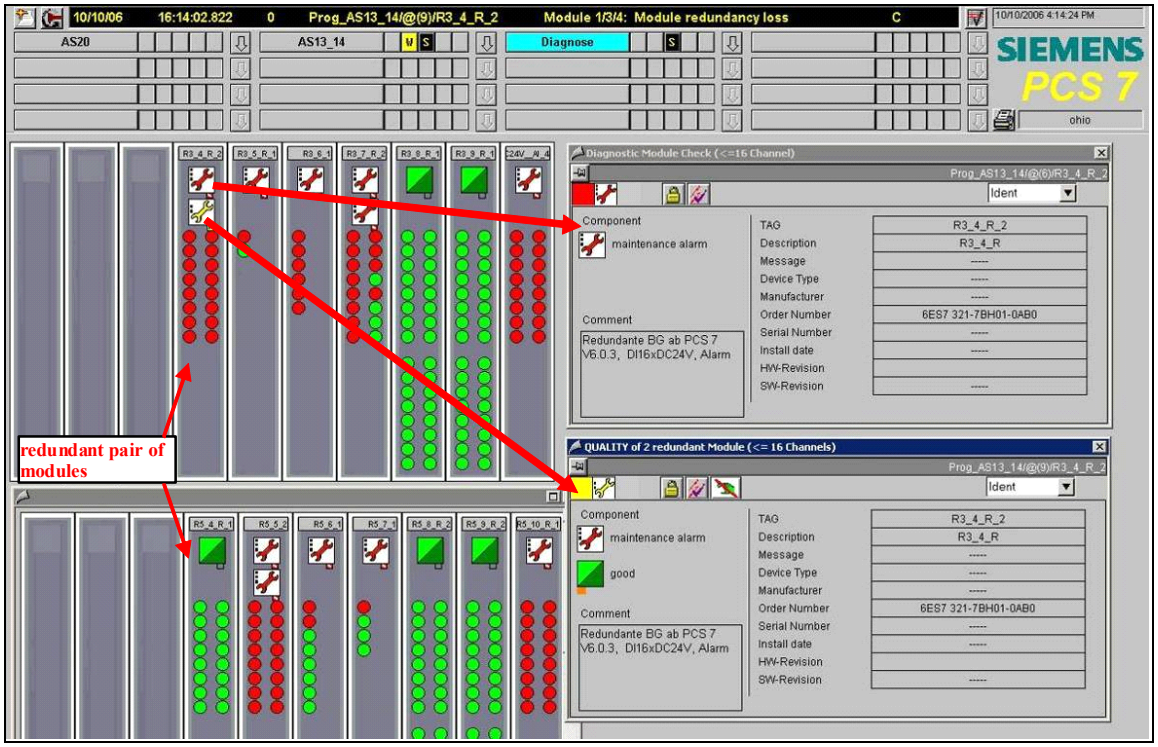


Figure 3-7 Module Redundancy Loss



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Figure 3-8 Module Redundancy Loss Message

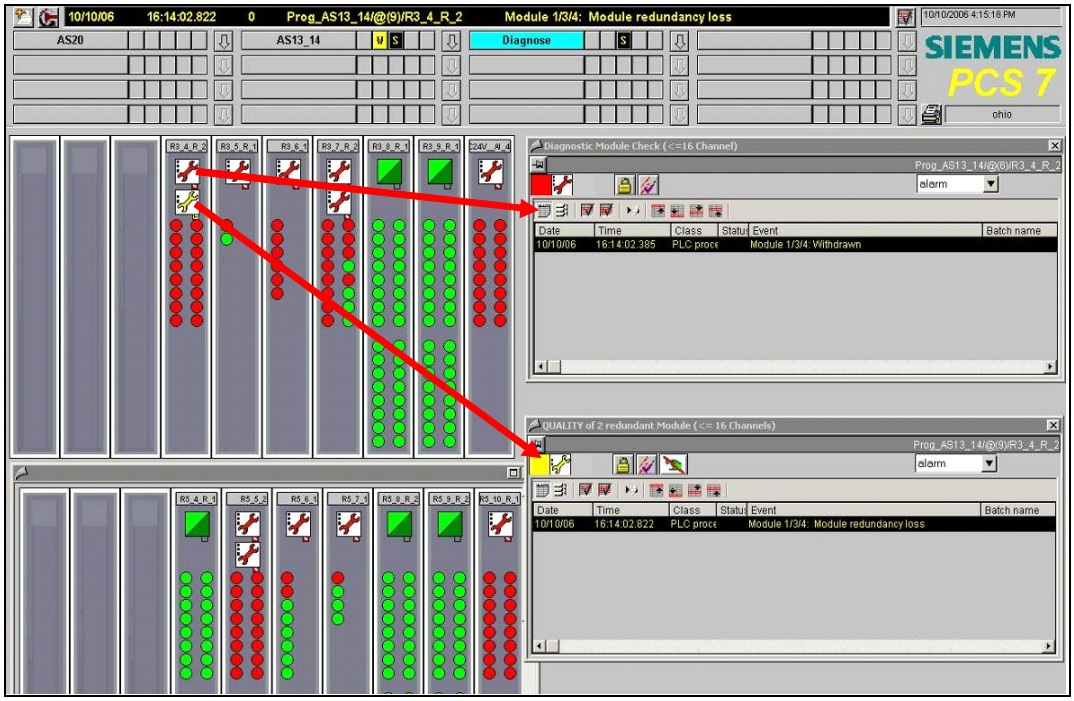
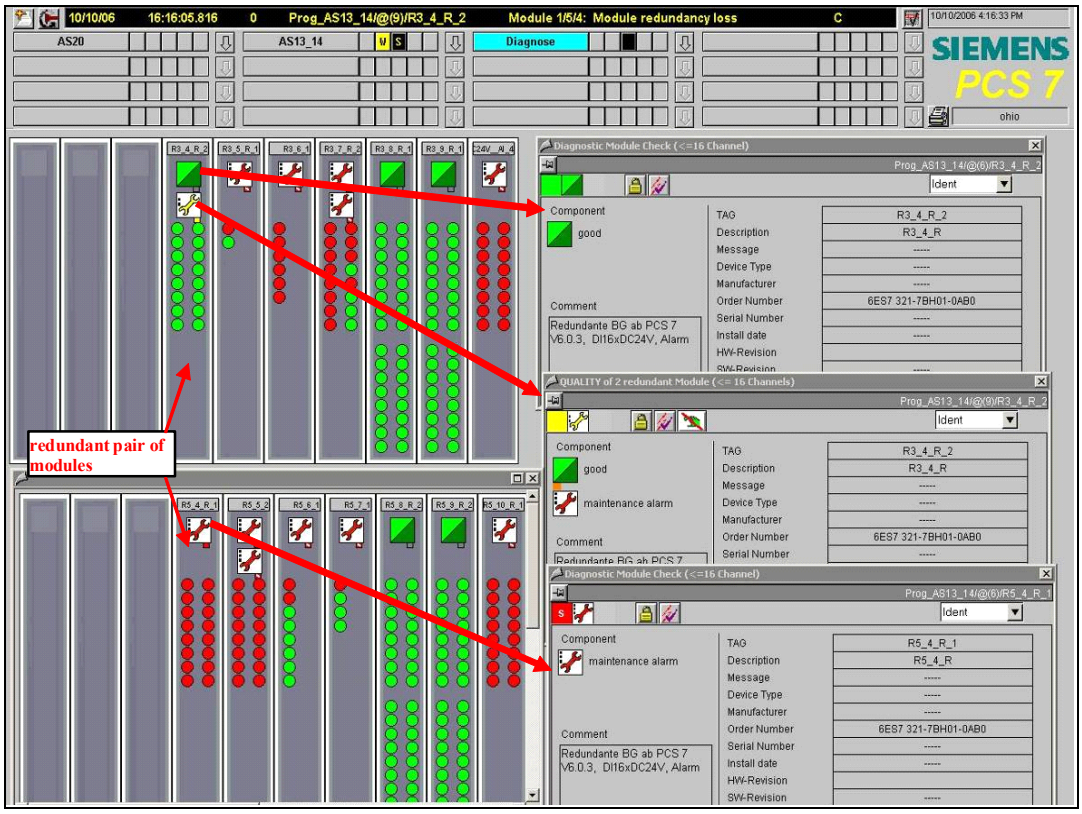
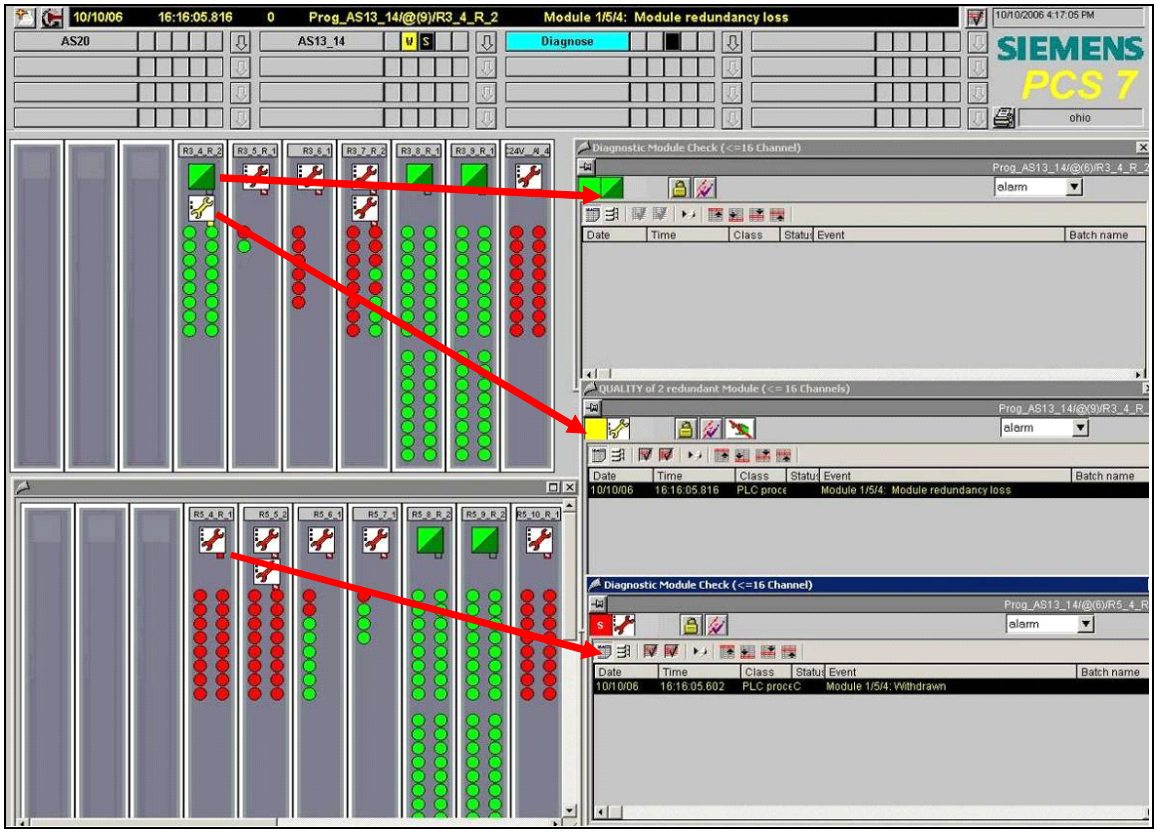


Figure 3-9 Redundancy Loss of Stand-by Module



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Figure 3-10 Message: Redundancy Loss of Stand-by Module



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4 Internet Link Specification

This list is not complete and only represents a selection of relevant information.

Table 4-1 Internet Links

	Topic	Link
\1\	Reference to the entry	http://support.automation.siemens.com/WW/view/en/56285991
\2\	Siemens Industry Online Support	http://support.automation.siemens.com
\3\	Integration of SIMATIC PCS 7 Asset Management into existing projects	http://support.automation.siemens.com/WW/view/en/27833758
\4\	SIMATIC Process Control System PCS 7 V7.0 PCS 7 - Service Support and Diagnostics	http://support.automation.siemens.com/WW/view/en/27002500
\5\	Process Control System PCS 7 Service support and diagnostics (V7.1)	http://support.automation.siemens.com/WW/view/en/36195904
\6\	SIMATIC Process Control System PCS 7 Maintenance Station (valid for V8.0 or higher)	http://support.automation.siemens.com/WW/view/en/57347315

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5 History

Table 5-1 History

Version	Date	Modifications
V1.0	12.01.2007	First version on the DVD PCS 7 V7.0
V2.0	13.03.2012	Layout adjustent for the publishing in the Siemens Industry Online Support

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