COPA-DATA
do it your way

zenon manual

Industrial Maintenance Manager (IMM)

v.7.11

Contents

1. Welcome to COPA-DATA help

GENERAL HELP

If you cannot find any information you require in this help chapter or can think of anything that you would like added, please send an email to documentation@copadata.com (mailto:documentation@copadata.com).

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You can receive support for any real project you may have from our Support Team, who you can contact via email at support@copadata.com (mailto:support@copadata.com).

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2. Industrial Maintenance Manager (IMM)

The Industrial Maintenance Manager (IMM) administers machine and maintenance data. Service intervals can comfortably be planned and administered. You can see at a glance which device, equipment, machine, etc. has to be maintained today / this week / next month etc. Additionally service work done in the past is logged.

License information

Must be licensed for Editor and Runtime (single-user, Server, Standby and Client).

3. Functionalities

- Devices can be copied and pasted; a consecutive number is added to the device name.
- The list view can be adjusted in the screen filter. Column selection, column width, column name and their order can be modified.
- Every list view can be displayed and printed as an HTML file via Stylesheet.
- The equipment identifier can only be created via the context menu in the tree.
- Multi-hierarchic equipment identifiers
- Devices can be created via the context menu in the tree or in the list, provided that an equipment was selected in the tree. This equipment is then automatically inserted in the device as equipment identifier.
- By clicking on the column button, the elements are sorted alphabetically.
- Multi-project capable
- Server-Client
- Deleting devices is subject to a userlevel, which allows to ways of deleting. On the one hand, deleting in the sense that data is retained in the database and history entries are not lost. For this method, the flag ACTIVE in the database is set to 0. Alternatively, a complete and final deletion: all data from the database, including the maintenance tasks and the history, are deleted.
- The checkboxes in the tree view for the equipment identifiers are a filter. If they are set, only devices, history entries and maintenance tasks belonging to this equipment identifier are displayed.

4. Limitations

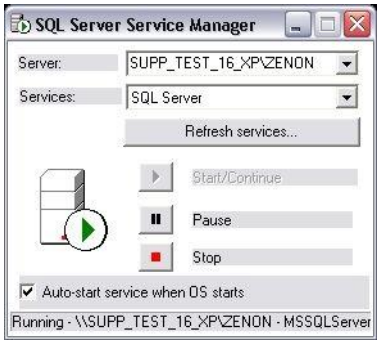
The module stores all data in a Microsoft SQL Server database (SQL Server 2000 and higher). The MS SQL Server is not included in zenon. However, you can use the SQL Server Express Edition which is installed with the zenon Editor.

Other SQL servers like Oracle are not supported.

5. Preparatory works

5.1 Database

Creating an own database.



Start a new instance of the command prompt (cmd.exe).

Start the service program `osql.exe`.

`osql.exe` -E -S computer name / instance name

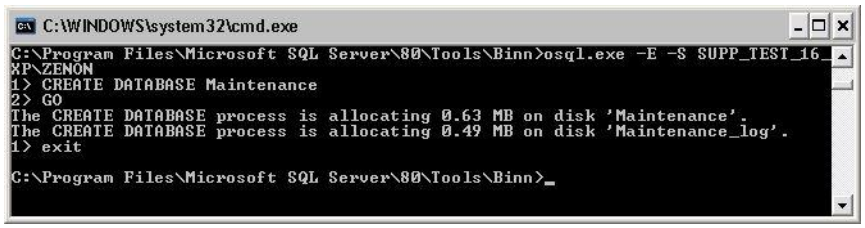
Instructions for creating a database

1> CREATE DATABASE database name

2> GO

Database name	any name for the database. e.g.: Maintenance

Close the service program `osql.exe` with 'exit'.



5.2 Engineering

Four tables are created in the database. The names of the tables can be chosen freely.

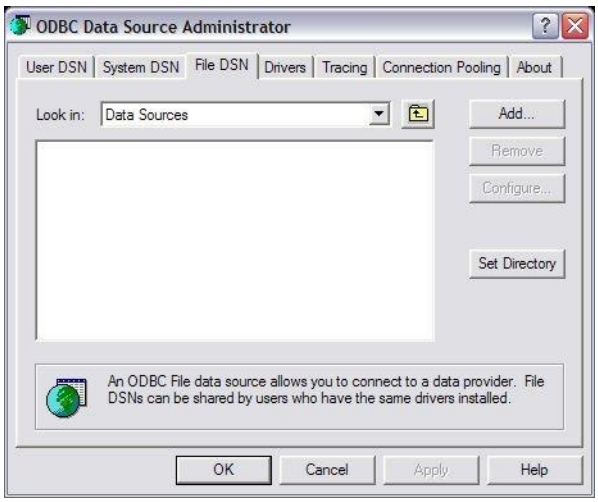
Attention

Table name: maximum 128 characters,
The first character must be one of the following: a-z, A-Z, underscore character
After this, the following characters can be used: a-z, A-Z, decimal figures, underscore character

Maintenance log database:	
Master data:	
Maintenance task:	
History:	
Documents:	

DATABASE CONNECTION

In the project properties under "Industrial Maintenance Manager" you can enter the ODBC string manually in the text field next to "Database.". If you activate the button for the project properties, the following dialog appears:

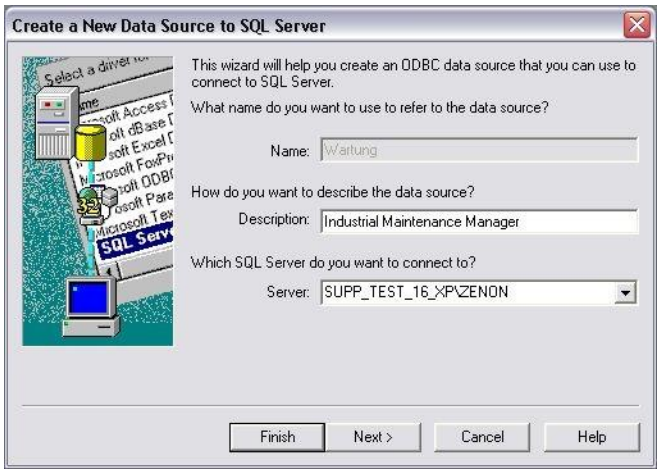


New...	Click on this button to add a new file data source.

In the dialog field 'Create new data source' select the driver **SQL Server** and click on **Next** in order to enter the name or the storage place of the new DSN file.

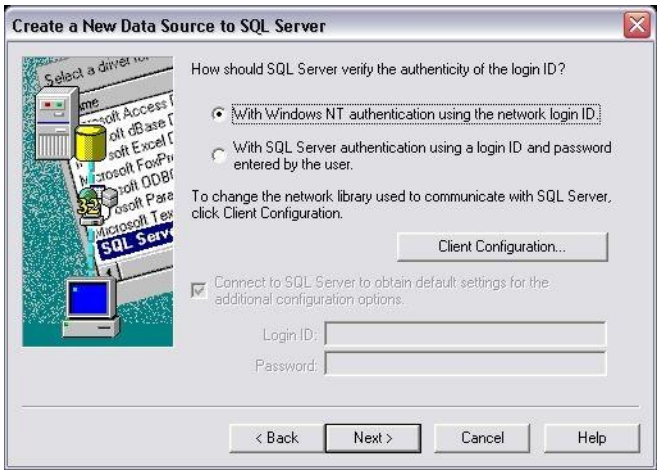
Again, click on **Next**'to display a summary of the new information.

Click on **Finish** to open the driver specific setup dialog.

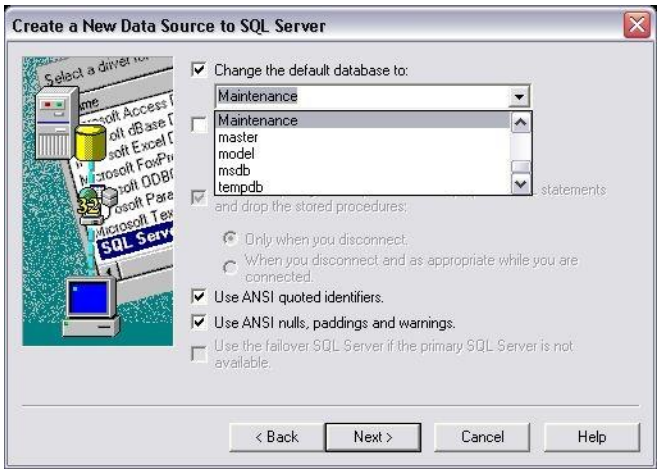


If you select a server name from the list, no further configuration settings are necessary.

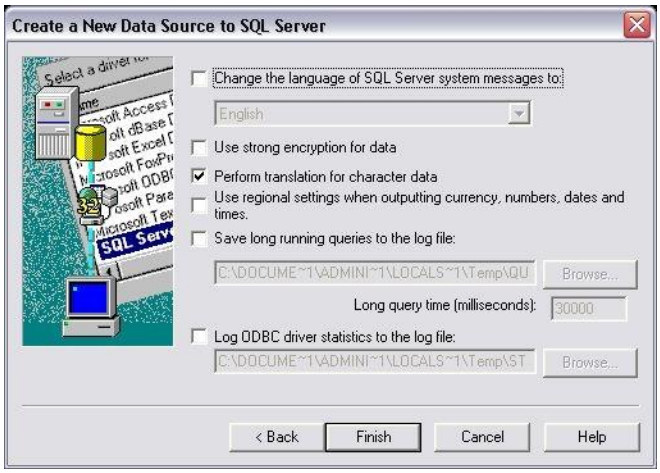
Again click on **Next.**



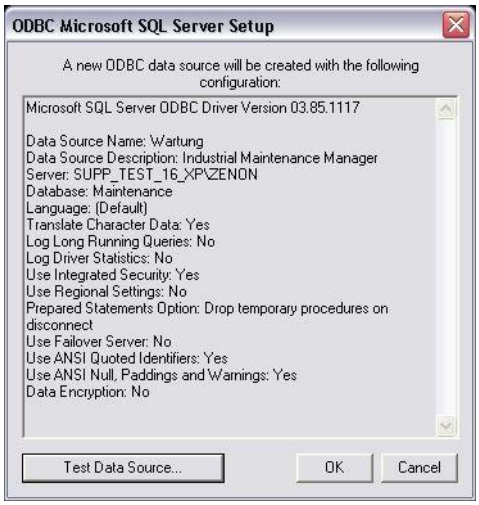
Again click on **Next**.



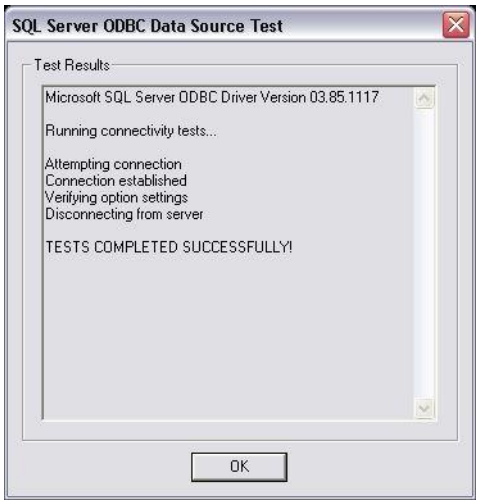
Now you can select the previously created database.

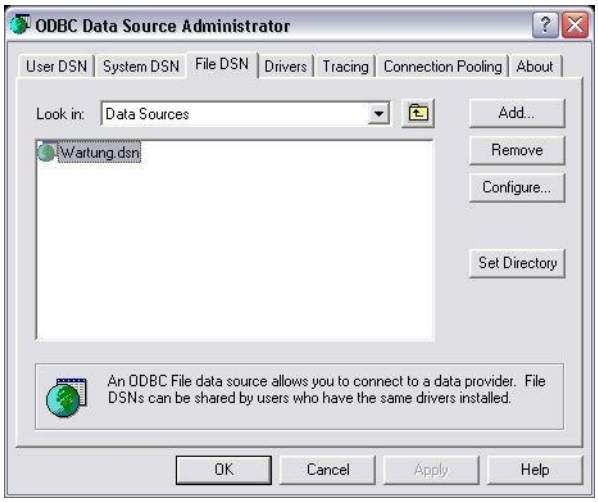


Click on **Finish.**



Now you can test the selected connection.





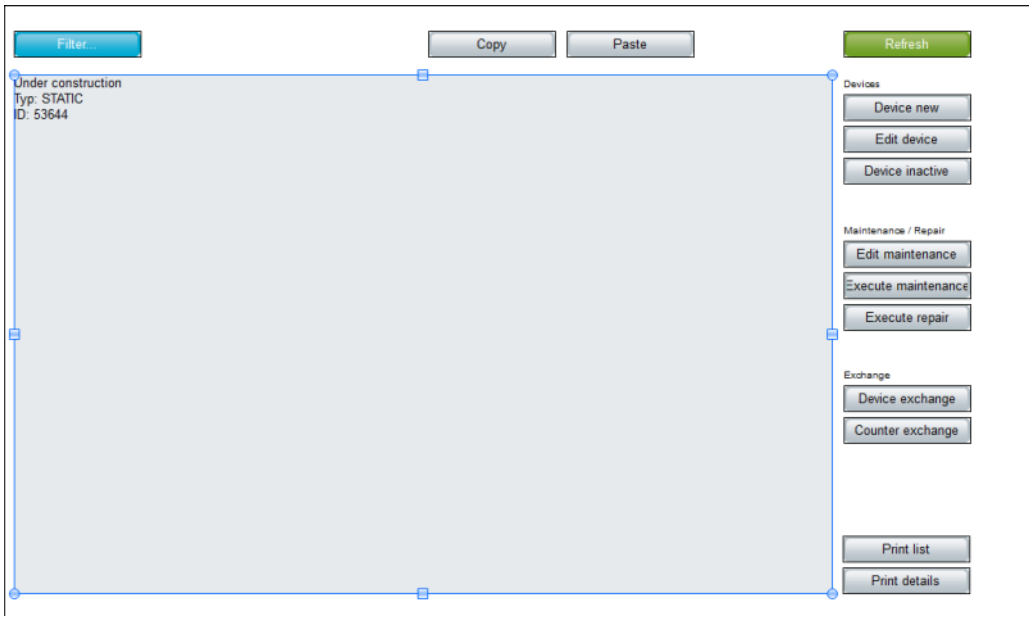
6. Create screen of type IMM

In order to create an IMM screen:

1. create a new screen
2. as screen type select Industrial Maintenance Manger (IMM) from the drop-down list
3. Select **`Add template`** in the **`Control element`** menu.
4. The standard elements are inserted

5. Select additional elements as required and insert them into the desired place on the screen

6. Create a screen switch function (on page 26) in order to be able to call up the screen in Runtime

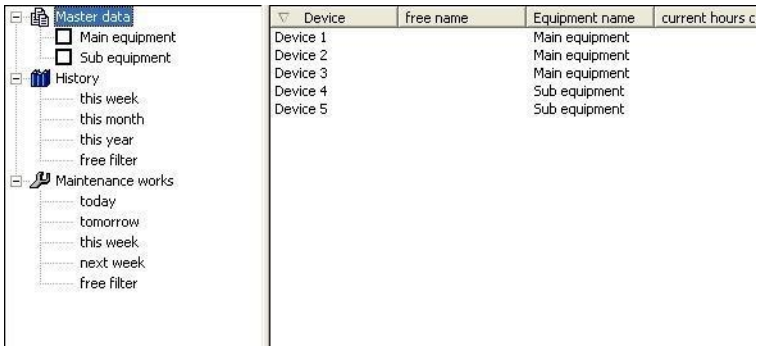


Parameters	Description
Insert template	Opens the dialog for selecting a template for the screen type. Templates are shipped together with zenon and can also be created by the user. Templates add pre-defined control elements to pre-defined locations in the screen. Elements that are not necessary can also be removed individually once they have been created. Additional elements are selected from the drop-down list and palced in the screen. Elements can be moved in the screen and placed individually.
List	List (on page 16) of processes which are displayed in the Runtime.
List functions	Control elements to control the list.
Filter	Applies filter.
New equipment identifier	Creates a new equipment identifier.
Delete equipment identifier	Deletes selected equipment identifier.
Device	Control elements for devices.
▸ **New**	Adds a new device.

Edit	Makes it possible to edit the selected device.
Delete	Deletes device.
Mark as inactive	Switches device to inactive.
Replace	Carries out a device exchange.
Copy	Copies selected element to the clipboard.
Paste	Pastes the selected element from the clipboard.
Change counter	Carries out a counter exchange.
Edit maintenance	Makes it possible to edit a maintenance.
Execute maintenance	Switches to execute maintenance.
Execute repair	Switches to execute repair.
Print list	Prints list.
Print details	Prints details.
Refresh	Refreshes the display.
Filter profiles	Buttons for filter settings in Runtime.
Profile selection	Select profile from list.
Save	Saves current setting as a profile.
Delete	Deletes selected profile.
Import	Imports filter profiles from export file.
Export	Exports filter profiles in the file.

6.1 Display during Runtime

If you call up (on page 26) a screen of type IMM (on page 13) during Runtime, it is displayed divided in two areas.



6.1.1 Left side: Tree

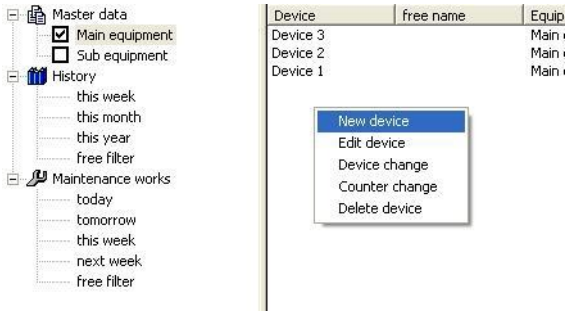
Parameters	Description
Master data	The equipment identifications are used as nodes. These nodes have a checkbox to limit the selection. This selection defines the output in the list. In the master data, the maintenance tasks and the history only data belonging to the selected equipments are displayed.
History	Here the history data is filtered on periods of time. With **free filter** a dialog for the selection of any period of time is opened.
Maintenance tasks	Here the 'current' maintenance tasks are filtered on periods of time. With **free filter** a dialog for the selection of any period of time is opened.

6.1.2 Right side: List

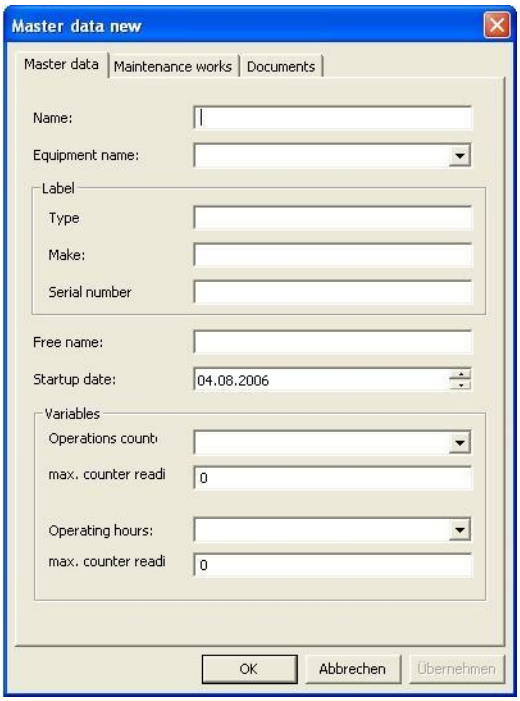
Here the selection from the tree view is displayed as a list. The list can be sorted ascending or descending on any column.

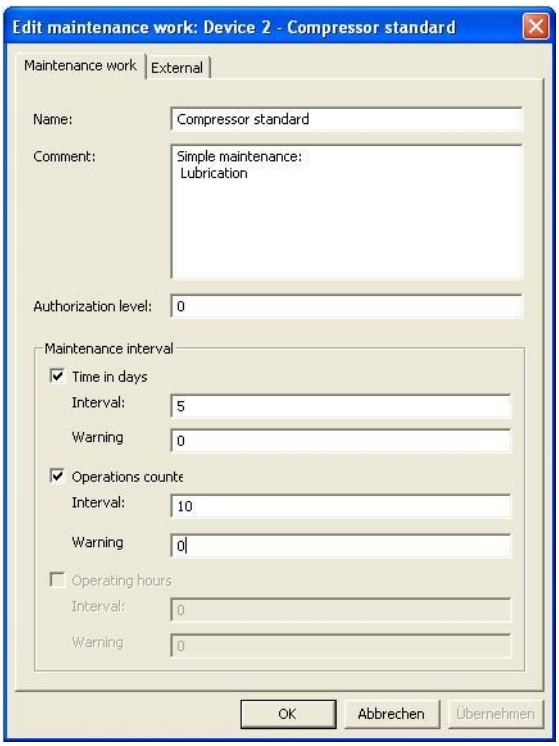
Additionally there is a context menu in this view, which offers different functions depending on the selection in the tree view.

Selection master data:

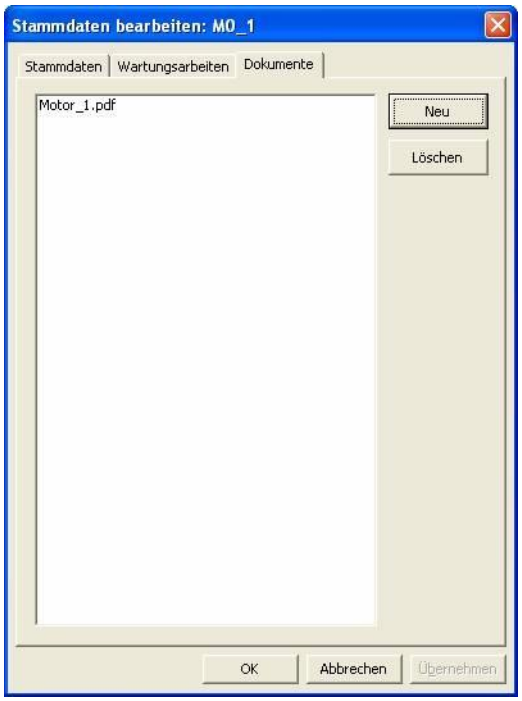


Command	Description
New device	Under 'New device' new master data can be created. The definition is done in a dialog with three property pages. On the first page the data for the device is entered. On the page '**Maintenance tasks**' any number of maintenance tasks for this device can be created. For an overview the titles of the maintenance tasks are displayed in a list on this page. On the last page any number of documents can be assigned to the device. For an overview these are displayed in a list similar to the maintenance tasks. On doubleclicking a document the according document is opened, if the according program is installed.
Edit device	Similar to 'New device' with the only difference, that the fields are filled with the existing data. A device has to be selected.
Device exchange	The variables for operations and hours counters are changed here! The calculation for scheduling maintenances is based on these variables. If a device exchange is performed, a history entry is made. Additionally, the maintenance interval is reset and the new variable values are used as the initial values for the calculation of maintenances. The device data stays the same, only the linked variables are exchanged. These have to be entered in a dialog. If the variable does not exist, a warning is displayed, that in the moment no valid variables are linked with the device.
Counter exchange	If a counter is exchanged, the variable stays the same, but the counter reading (variable value) is changed. If a counter is exchanged, a history entry is made. You can choose whether the maintenance interval should be reset or not. A new start value for the exchanged device can be entered.
Delete device	The selected device can be deleted. All associated data (maintenance tasks, history data and documents) are deleted. For security reasons the user is asked again, if the data should really be deleted.


Master data new
Master data
Maintenance works
Documents
Name:
Equipment name:
Label
Type
Make:
Serial number
Free name:
Startup date:
04.08.2006
Variables
Operations count
max. counter readi
0
Operating hours:
max. counter readi
0
OK
Abbrechen
Übernehmen


Edit maintenance work: Device 2 - Compressor standard
Maintenance work
External
Name:
Compressor standard
Comment:
Simple maintenance:
Lubrication
Authorization level:
0
Maintenance interval
Time in days
Interval:
5
Warning
0
Operations counte
Interval:
10
Warning
0
Operating hours
Interval:
0
Warning
0
OK
Abbrechen
Übernehmen

Note: You can create a line break via shortcut `Ctrl+Return`.



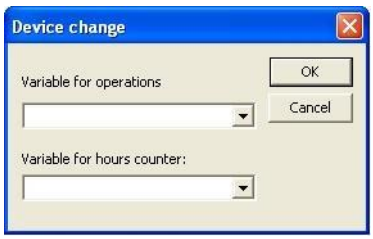
The following access to files is supported:

Local drives	Local harddisk
UNC path	e. g. `\\Server name\release name`
Connected drives	Released harddisk of a network computer

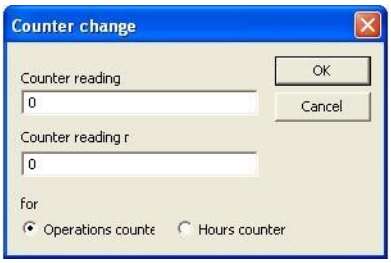
Attention

Requirement: To be able to display the documents, you must install an apropriated viewer. e.g. Adobe Acrobat Reader for .pdf files.

Device exchange



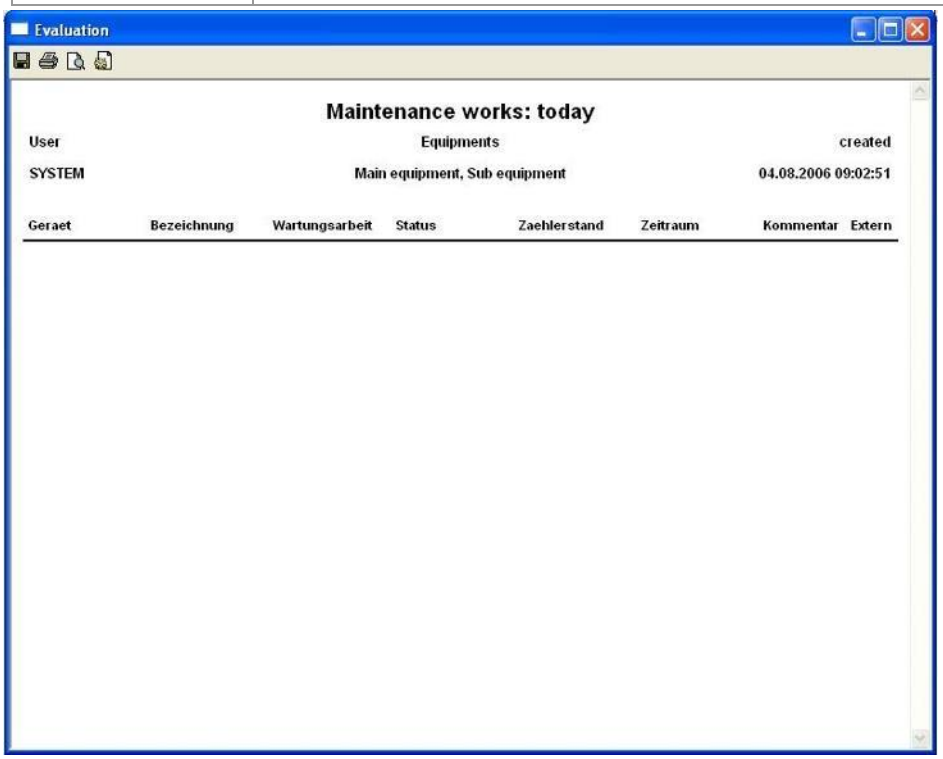
Counter exchange



Selection maintenance tasks

By doubleclicking a maintenance task the data of this maintenance task are displayed. But the data cannot be changed.

Execute repair	If a repair is performed, a history entry is made. The maintenance task remains in the queue, because it is not considered as performed. An entry in the history is created. Similar to 'Execute maintenance' with the only difference, that the counter can be updated.
Print list	



The displayed list is written to am XML file as it is and displayed in a HTML browser with a stylesheet. This HTML file then can be saved or directly printed.

Print details	The data for the selected maintenance task are output.
Edit maintenance	Here the data of the selected maintenance task can be edited.
Execute maintenance	If a maintenance is executed, the counters are updated and a history entry is generated. Additionally, the maintenance task is considered as done for this interval, and so it is removed from the queue. Under 'Documents' the linked documents are displayed in a list. With doubleclicking a file it is opened, if an according program is installed.

Selection history	Here there is only one menu entry **Print list**. Same procedure as under maintenance task - **Print list**.

7. Maintenance task

The calculation of pending maintenance is the main task of IMM. Maintenance tasks can have three different maintenance intervals:

- a time span in days

- an hours counter or

- an operations counter.

The due date of the maintenances is calculated from these intervals.

If a maintenance comes into the warning zone, it shows up in the list for due maintenances, including a notice that it has reached the warning level . If it reaches the maintenance intervall, the maintenance is set to due, which also shows up in the list of maintenances.

THE FUNCTION 'DETERMINE MAINTENANCES'

With the function `Determine maintenances`, the list of all due maintenances in the selected time span is retrieved from the IMM. These due maintenances are then used to determine the equipment-specific status values as configured.

Numerical set values equalling the total number of due maintenances for equipment matching the selected filter criteria are sent to the according status variables.

If you create a new function `Determine maintenances` in the Editor, the following configuration dialog appears:

Period	Here you can select the period for which you want to determine due maintenances (see IMM).

7.1 Period

In the maintenance task data a time interval in days can be entered. In addition, an period of advance notice can be set, which means: the maintenance task should be evaluated as a 'current' maintenance task this many days before the end of the time interval. (message 'Maintenance due in xx days'.)

If the period of time or the counter value of the maintenance interval is reached, the maintenance is entered with the text 'Maintenance interval exceeded'.

The date of the last maintenance is updated for each execution. On creating the maintenance task this date is set to the current date.

7.2 Hours and operations counter

For the calculation of a 'current' maintenance the difference between the 'old' counter value at the last maintenance and the current one is divided by the number of the passed days since the last maintenance and added to the 'old' one. If this is higher than allowed, the maintenance is evaluated as 'current' and is displayed in the list.

If a variable has a lower value than at the last maintenance, a message is displayed.

8. Data input

The variable values are only entered in the maintenance data, if the maintenance task is newly created. Otherwise the old values stay.

If a device is created and no variables are linked, the initial value stays in the maintenance task. Also in this constellation the variable values in the maintenance task are not overwritten, if the variable is entered later. A message is displayed, if the variable needed for the maintenance calculation still has the initial value. The variable value only can be changed by executing a repair, a device exchange or a maintenance task.

9. Integration in the process

- Message about the success of maintenance tasks An Integer variable can be assigned to the device. You also have to define the return value of this variable in the maintenance task. If maintenance tasks need not be distinguished, you can always enter the same value here. If no value is entered, no value is set for the variable.
- Response in the process: A variable indicating the status of the maintenance can be assigned to every maintenance task. (Status Ok : 0 and Status due : 1)

10. Operating during Runtime

The following functions are available:

- **`New device`**: Create a new device. An equipment identifier must be selected.
- **`Edit device`**: Edit a device. A device has to be selected.
- **`Device inactive`**: Switch a device to inactive, i.e. data is no longer displayed but remains in the database.
- **`Execute maintenance`**: A maintenance must be selected to perform this.
- **`Refresh`**: The data from the database and the variables are refreshed.
- **`Filters`**: Loads the screen filter dialog to modify columns.
- **`Print`**: Generates an HTML file with the desired list view. The current view is captured as it is. The history and the upcoming maintenances can be printed.
- **`Print details`**: View the details of a maintenance task in HTML. A maintenance task must be selected.

11. Functions

11.1 Screen switch

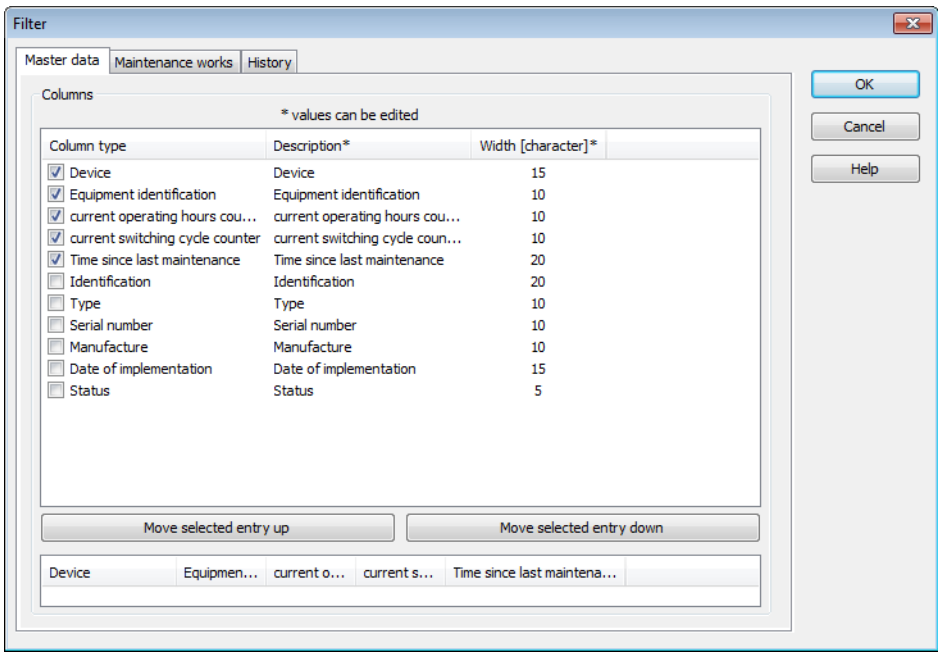
When creating an IMM type screen switching function, the dialog to configure the column settings is shown. These can be configured separately for:

- Master data (on page 27)
- Maintenance tasks (on page 28)
- History (on page 30)

11.1.1 Master data

Configuration of the history to be displayed:

- current operating hours counter
- current switching cycle counter
- Equipment identifier
- Description
- Brand
- Device
- Activation date
- Serial Number
- Status
- Type
- Time period since last maintenance



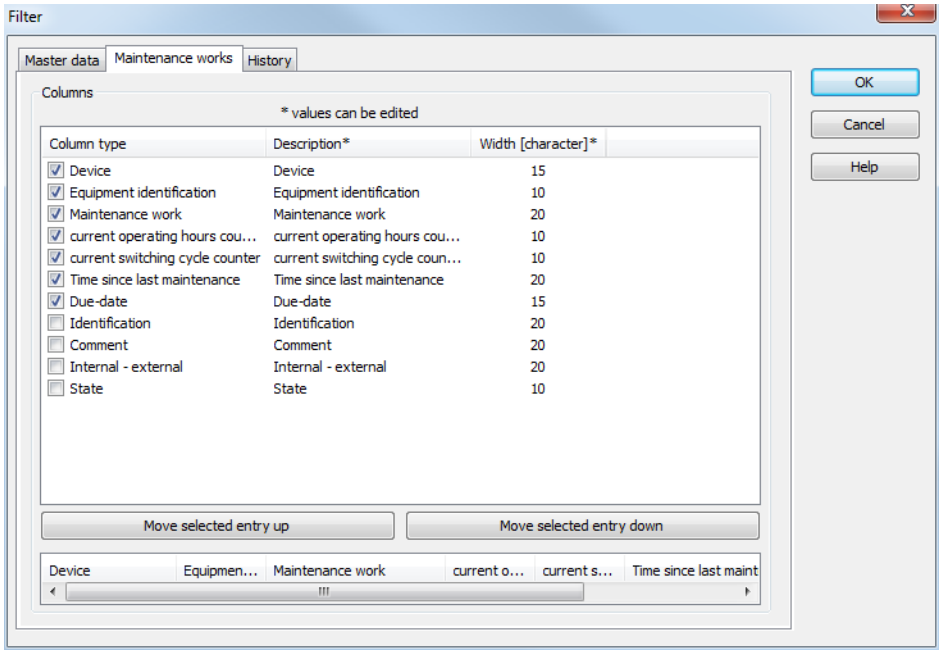
Parameters	Description
Column type	Definition via check box which columns should be displayed during Runtime. Label cannot be edited. Active: Column is displayed in the Runtime.
Description	Defines the header of the respective column. You can configure it as language switchable. The value can be edited.
Width	Defines the width of the column in pixels. You can also define the width of the column by clicking and dragging the column with the mouse in the list with the horizontal display of the column names. The value can be edited.
Move selected entry up	Moves the selected column up. You can also move the columns with drag&drop.
Move selected entry down	Moves the selected column down. You can also move the columns with drag&drop.
Field with horizontal display of the column names	Shows the columns which are active in the list. You can define the size of the columns by clicking and dragging the column borders with the mouse.

11.1.2 Maintenance tasks

Configuration of the maintenance work to be displayed:

- current operating hours counter
- current switching cycle counter
- Equipment identifier
- Description
- Due date
- Device
- Internal - external
- Comment

- Status
- Maintenance task
- Time period since last maintenance



Parameters	Description
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Description	Defines the header of the respective column. You can configure it as language switchable. The value can be edited.
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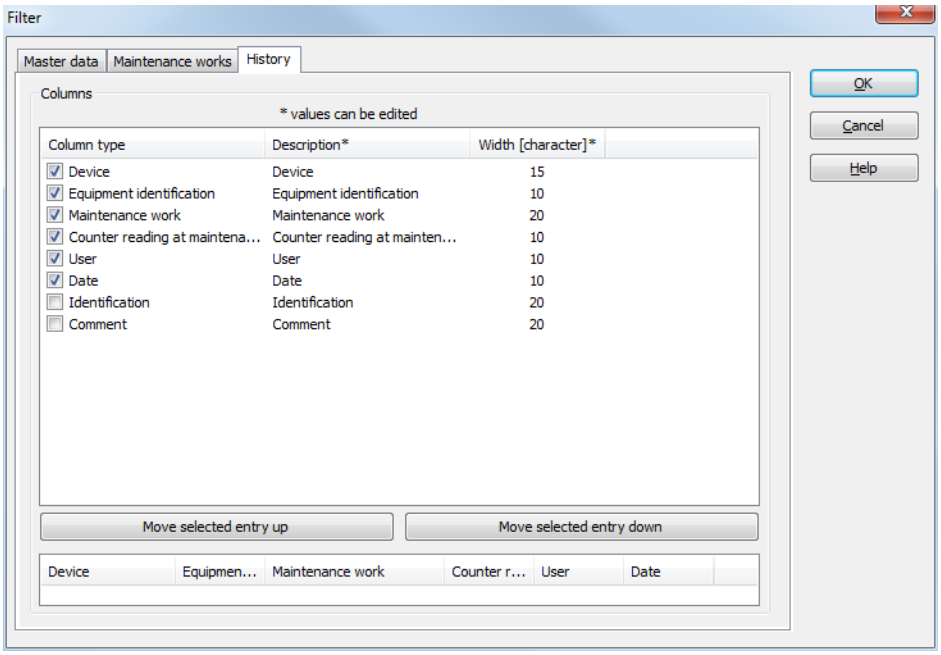
Field with horizontal display of the column names	Shows the columns which are active in the list. You can define the size of the columns by clicking and dragging the column borders with the mouse.

11.1.3 History

Configuration of the history to be displayed:

- Equipment identifier
- Users
- Description
- Date
- Device
- Comment
- Maintenance task

- Counter reading at maintenance



Parameters	Description
Column type	Definition via check box which columns should be displayed during Runtime. Label cannot be edited. Active: Column is displayed in the Runtime.
Description	Defines the header of the respective column. You can configure it as language switchable. The value can be edited.
Width	Defines the width of the column in pixels. You can also define the width of the column by clicking and dragging the column with the mouse in the list with the horizontal display of the column names. The value can be edited.
Move selected entry up	Moves the selected column up. You can also move the columns with drag&drop.
Move selected entry down	Moves the selected column down. You can also move the columns with drag&drop.
Field with horizontal display of the column names	Shows the columns which are active in the list. You can define the size of the columns by clicking and dragging the column borders with the mouse.

11.2 Determine open maintenances

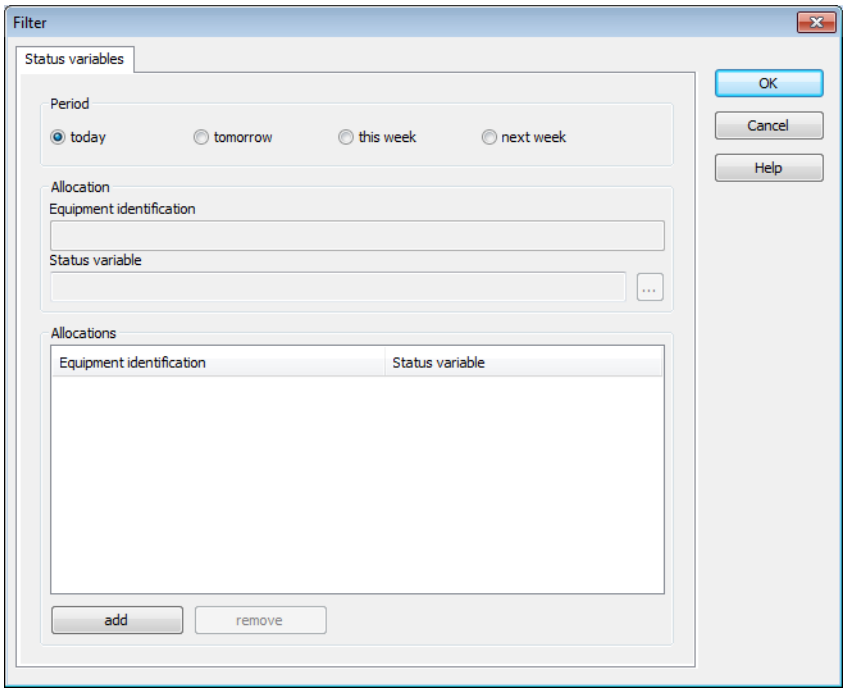
Function **`Determine open maintenances`** fetches the list of all pending maintenances from the IMM for a certain period of time. These are used to determine the equipment-specific status values as configured.

When carrying out the function:

- numeric set values are written to the corresponding status variables; these set values match the total of the pending maintenances which are in the equipment and which match the allocation of equipment IDs to status variables
- the status variables engineered at the device and at the maintenances are updated

To configure the function:

- Select **`New function...`**
- open branch **`Application`**
- select **`Determine open maintenance`**
- The dialog for configuring the function opens



Parameters	Description
Period	Period of time for which the pending maintenance was determined **Note:** Time is saved as local time. For details see chapter Handling of date and time in chapter Runtime.
Equipment label	Enter the equipment label which should be allocated to a status variable. Form: Equipment label are separated by comma and entered as lists. Equipment label may contain wildcards. (Wildcards are only allowed as prefix or suffix; e.g. *xxx or xxx*.)
Status variable	A numerical variable that contains the number of open maintenances of the equipment entered under **Equipment identifier** as a set value.
Allocations	List of allocations of equipment labels to status variables.
Add	Adds an allocation line.
Delete	Deletes the selected allocation.

Example

2 maintenances are active in Equipment1 and 1 maintenance is active in Equipment2.
Equipment1 and Equipment2 are the only equipments in this example.
The function is engineered similar to the displayed screenshot.

The status variables contain the following set values:

Maintenances_today_all = 3

Maintenances_today_all2 = 3

Maintenances_today_equipment1_2 = 3

Maintenances_today_equipment1 = 2

Maintenances_today_equipment2 = 1

Information

In network operation, the function is always executed on the server.