zenon manual

Industrial Maintenance Manager (IMM)

v.7.00
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1. Welcome to COPA-DATA help

GENERAL HELP

If you miss any information in this help chapter or have any suggestions for additions, please feel free to contact us via e-mail: documentation@copadata.com (mailto:documentation@copadata.com).

PROJECT SUPPORT

If you have concrete questions relating to your project, please feel free to contact the support team via e-mail: support@copadata.com (mailto:support@copadata.com)

LICENSES AND MODULES

If you realize that you need additional licenses or modules, please feel free to contact the sales team via e-mail: sales@copadata.com (mailto:sales@copadata.com)

2. Industrial Maintenance Manager (IMM)

The Industrial Maintenance Manager (IMM) administers machine and maintenance data. Service intervals can comfortably be planned and administered. 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.
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. On the other hand, "final" deleting: 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 database 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
Preparatory works

Database name

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

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

5.2 Configuration

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 has to be one of the following: a-z, A-Z, underscore
- After that, the following characters can be used: a-z, A-Z, decimal numbers, underscore
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:
Preparatory works

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. Creating a screen of the type IMM

To create a screen of type IMM:

1. create a new screen

2. as screen type select Industrial Maintenance Manager (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 27) in order to be able to call up the screen in Runtime
## Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add template</td>
<td>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 dragged onto the screen. Elements can be moved on the screen and arranged individually.</td>
</tr>
<tr>
<td>List</td>
<td>List (on page 16) of processes which are displayed in the Runtime.</td>
</tr>
<tr>
<td>New equipment identifier</td>
<td>Creates a new equipment identifier.</td>
</tr>
<tr>
<td>Delete equipment identifier</td>
<td>Deletes selected equipment identifier.</td>
</tr>
<tr>
<td>New device</td>
<td>Adds a new device.</td>
</tr>
<tr>
<td>Edit device</td>
<td>Makes it possible to edit the selected device.</td>
</tr>
<tr>
<td>Device inactive</td>
<td>Switches device to inactive.</td>
</tr>
<tr>
<td>Delete device</td>
<td>Deletes device.</td>
</tr>
<tr>
<td>Device exchange</td>
<td>Carries out device exchange.</td>
</tr>
<tr>
<td>Counter exchange</td>
<td>Carries out counter exchange.</td>
</tr>
<tr>
<td>Copy</td>
<td>Copies selected element to the clipboard.</td>
</tr>
<tr>
<td>Paste</td>
<td>Pastes the selected element from the clipboard.</td>
</tr>
<tr>
<td>Edit maintenance</td>
<td>Makes it possible to edit a maintenance.</td>
</tr>
<tr>
<td>Execute maintenance</td>
<td>Switches to carry out maintenance.</td>
</tr>
<tr>
<td>Execute repair</td>
<td>Switches to carry out repair..</td>
</tr>
<tr>
<td>Print list</td>
<td>Prints out list.</td>
</tr>
<tr>
<td>Print details</td>
<td>Prints out details.</td>
</tr>
<tr>
<td>Filter</td>
<td>Applies filter.</td>
</tr>
<tr>
<td>Refresh</td>
<td>Refreshes view.</td>
</tr>
<tr>
<td>Filter profiles</td>
<td>Management of the filter profiles.</td>
</tr>
</tbody>
</table>
6.1 Display during Runtime

If you call up (on page 27) a screen of type IMM (on page 13) during Runtime, it is displayed divided in two areas.

6.1.1 Left side: Tree

<table>
<thead>
<tr>
<th>Profile selection</th>
<th>Selection of a filter from the drop-down list.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save</td>
<td>Saves selected filter.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes selected filter.</td>
</tr>
</tbody>
</table>
## Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master data</td>
<td>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.</td>
</tr>
<tr>
<td>History</td>
<td>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.</td>
</tr>
<tr>
<td>Maintenance tasks</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 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:**
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New device</strong></td>
<td>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 <strong>Maintenance tasks</strong> 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.</td>
</tr>
<tr>
<td><strong>Edit device</strong></td>
<td>Similar to 'New device' with the only difference, that the fields are filled with the existing data. A device has to be selected.</td>
</tr>
<tr>
<td><strong>Device exchange</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Counter exchange</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Delete device</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>
Creating a screen of the type IMM
Note: You can create a line break via shortcut Ctrl+Return.

The following access to files is supported:

<table>
<thead>
<tr>
<th>Local drives</th>
<th>Local harddisk</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNC path</td>
<td>e.g. \Server name\release name</td>
</tr>
<tr>
<td>Connected drives</td>
<td>Released harddisk of a network computer</td>
</tr>
</tbody>
</table>

⚠️ **Attention**

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

Device exchange
Counter exchange

![Counter change dialog box]

Selection maintenance tasks

![Maintenance task selection dialog box]

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 an XML file as it is and displayed in an 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.

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

7. Maintenance task

Calculating due maintenances is the core function of the IMM. A maintenance task can have three different maintenance intervals:

- a time span in days

- an hours counter or

- an operations couner.

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 interval, 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:

<table>
<thead>
<tr>
<th>Period of time</th>
<th>Here you can select the period for which you want to determine due maintenances (see IMM).</th>
</tr>
</thead>
</table>

### 7.1 Period of time

In the maintenance task data a time interval in days can be entered. Additionally a pre-warning time can be defined meaning: so many days before the end of the time interval the maintenance task should be evaluated as a 'current' maintenance task. (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 29)
- 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**

![Image of the software interface showing columns and their parameters.](image)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Column type</strong></td>
<td>Definition via check box which columns should be displayed during Runtime. Label cannot be edited.</td>
</tr>
<tr>
<td>Active: Column is displayed in the Runtime.</td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Defines the header of the respective column. You can configure it as language switchable. The value can be edited.</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>Defines the width of the column in pixels.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Move selected entry up</strong></td>
<td>Moves the selected column up. You can also move the columns with drag&amp;drop.</td>
</tr>
<tr>
<td><strong>Move selected entry down</strong></td>
<td>Moves the selected column down. You can also move the columns with drag&amp;drop.</td>
</tr>
<tr>
<td><strong>Field with horizontal display of the column names</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column type</td>
<td>Definition via check box which columns should be displayed during Runtime. Label cannot be edited. Active: Column is displayed in the Runtime.</td>
</tr>
<tr>
<td>Description</td>
<td>Defines the header of the respective column. You can configure it as language switchable. The value can be edited.</td>
</tr>
<tr>
<td>Width</td>
<td>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.</td>
</tr>
<tr>
<td>Move selected entry up</td>
<td>Moves the selected column up. You can also move the columns with drag&amp;drop.</td>
</tr>
<tr>
<td>Move selected entry down</td>
<td>Moves the selected column down. You can also move the columns with drag&amp;drop.</td>
</tr>
<tr>
<td>Field with horizontal display of the column names</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 11.1.3 History

Configuration of the history to be displayed:

- Equipment identifier
- Users
- Description
- Date
- Device
- Comment
- Maintenance task
- Counter reading at maintenance

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column type</td>
<td>Definition via check box which columns should be displayed during Runtime. Label cannot be edited.</td>
</tr>
<tr>
<td></td>
<td><strong>Active</strong>: Column is displayed in the Runtime.</td>
</tr>
<tr>
<td>Description</td>
<td>Defines the header of the respective column. You can configure it as language switchable. The value can be edited.</td>
</tr>
<tr>
<td>Width</td>
<td>Defines the width of the column in pixels.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Move selected entry up</td>
<td>Moves the selected column up. You can also move the columns with drag&amp;drop.</td>
</tr>
<tr>
<td>Move selected entry down</td>
<td>Moves the selected column down. You can also move the columns with drag&amp;drop.</td>
</tr>
<tr>
<td>Field with horizontal display of</td>
<td>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.</td>
</tr>
<tr>
<td>the column names</td>
<td></td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period of time</td>
<td>Period of time for which the pending maintenance was determined</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Time is saved as local time. For details see chapter Handling of</td>
</tr>
<tr>
<td></td>
<td>date and time in chapter Runtime.</td>
</tr>
<tr>
<td>Equipment label</td>
<td>Enter the equipment label which should be allocated to a status variable.</td>
</tr>
<tr>
<td></td>
<td>Form: Equipment label are separated by comma and entered as lists.</td>
</tr>
<tr>
<td></td>
<td>Equipment label may contain wildcards. (Wildcards are only allowed as prefix</td>
</tr>
<tr>
<td></td>
<td>or suffix; e.g. <em>xxx or xxx</em>.</td>
</tr>
<tr>
<td>Status variable</td>
<td>A numerical variable that contains the number of open maintenances of the</td>
</tr>
<tr>
<td></td>
<td>equipment entered under <strong>Equipment identifier</strong> as a set value.</td>
</tr>
<tr>
<td>Allocation</td>
<td>List of allocations of equipment labels to status variables.</td>
</tr>
<tr>
<td>Add</td>
<td>Adds an allocation line.</td>
</tr>
<tr>
<td>Remove</td>
<td>Deletes the selected allocation.</td>
</tr>
</tbody>
</table>

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