SIEMENS

COMOS

**Operations
Inspection**

Operating Manual

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the relevant information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Trademarks

Registered trademark: COMOS®

Introduction

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2.1   Overview

Maintenance is a comprehensive, integrated system for the planning and organization of maintenance and inspection tasks.

Application range of Maintenance

Your work with Maintenance begins after you have planned the unit with the relevant COMOS modules. COMOS has an integrative structure that allows you to perform all the necessary tasks on the same database. The entire technical information on all aspects of the industrial unit can be collected together and edited in a central information system. If the unit is reconfigured or maintenance work is necessary, the data can be updated and remains available for the entire life cycle of the unit.

It is also possible to include maintenance aspects even in the planning phase.

Generally, even the engineering, inspection and maintenance tasks of a unit that was not planned with COMOS can also be controlled with Maintenance.

Unit structure

This manual describes how structures can be built up in Maintenance. This involves a suggestion for a possible unit structure that can be considered as ideal from a maintenance perspective.

2.2   Prerequisites

With the Maintenance module, you can plan and process various types of maintenance. You need to be familiar with the basics of the COMOS software and need to know how to work with typical resources. All examples and explanations are based on the COMOSDB supplied with the installation CD and the sample project "COMOS_MA Maintenance".

Before you start to work with Maintenance, you will need to have the appropriate licenses for the various modules. To be able to use the planning sequence on which the following description is based, you should already have unit structures and corresponding objects in COMOS that will now be extended by maintenance information.

You can find additional information on this topic in the manual "COMOS Platform Getting Started".

2.3 Making the basic settings

Before you can work with Maintenance, you will need to make a couple of settings. Generally, this is the responsibility of the administrator.

Procedure

1. Open the "COMOS_MA Maintenance" project.

2. Open the project properties.

3. Select the "Options > Maintenance" tab.

   – Activate the "Is maintenance project" option.

   – Activate the "Use EventManager" option.

   – Activate the "Structural mode" option.

   – Enter the name of the company project in the "Company DB" field, for example, "USERS" or "COMOS_MA_CSM".

4. Save your settings.

2.4 User interface

The user interface in Maintenance is the normal COMOS user interface; a modified user interface is only used for the "Direct" plugin and the user-defined menu configuration. The settings for the various user interfaces are made by the responsible administrator.

Planning and processing of maintenance is partially done in the familiar COMOS Navigator and partially using plugins.

You enter maintenance information for scheduled recurring work packages in the maintenance plan. You have the option of creating the maintenance plan below various objects, such as equipment, a functional location, or a unit. The maintenance plan is visible not only in the Navigator, it can also be displayed in other interactive reports such as the P&ID, isometry, or 3D model.

Working with the "Inspection" plugin

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3.1 "Inspection" plugin

The "Inspection" plugin is used to check pressure devices which require monitoring, such as pipes, apparatus, and vessels. The plugin covers the following:

- Scheduling
- Execution
- Evaluation of non-destructive material tests (NDT)

You monitor pressure devices with the help of inspection plans (checkpoints, inspection object). You create inspection plans directly underneath the pressure device.

See also

Opening the "Inspection" plugin (Page 9)

Evaluating the conformity of a pressure device (Page 10)

Selecting a symbol (Page 10)

Creating an individual check work package (Page 12)

Creating a single test using the "Inspection" plugin (Page 12)

Performing an individual check (Page 13)

3.2 Opening the "Inspection" plugin

Procedure

1. Click on "Plugins" in the menu bar.
2. Select "Maintenance > Inspection > Inspection".

Result

The "Inspection" plugin opens.

See also

"Inspection" plugin (Page 9)

Creating a single test using the "Inspection" plugin (Page 12)

Tab of the "Inspection" plugin (Page 21)

3.3 Evaluating the conformity of a pressure device

You use the conformity assessment to decide whether or how a pressure device is to be inspected.

Procedure

1. Create a maintenance plan of the type "Inspection" underneath the object whose conformity you want to assess.

2. Open the properties of the maintenance plan.

3. Select the "Attributes" tab.

4. Select the "Inspection data" tab at the subordinate level.

5. Select one of the following options:

   – Enter the data of the object you want to evaluate.

     The "DN", "PN" and "Volume" boxes must be completed for the conformity check.

   – Link the required data, for example, using GetDisplayValue.

     Contact the responsible administrator for help.

   You can find additional information on this topic in the "COMOS Administration" manual, keyword ""Data" tab for inspection".

6. Select the "Inspection schedule" tab at the subordinate level.

7. Enter the defined information.

8. Click the "Calculate" button.

Result

The conformity of the pressure device is calculated. The result is displayed graphically.

See also

"Inspection" plugin (Page 9)

"Inspection plan" tab (Page 17)

3.4 Selecting a symbol

You use the symbol to define how many measurement loops and associated measurement points the pressure device inspection is to include.

Requirement

At least one symbol is defined. You can find additional information on this topic in the "COMOS Administration" manual, keyword "Definition of a symbol".

Procedure

1. Open the properties of the required "Inspection" type maintenance plan.

2. Select the "Attributes > Non-destructive testing" tab.

3. Click the "Select a Symbol" button.

4. For the configuration, valid symbols are shown in a selection dialog.

5. Select the required symbol.

Result

The required symbol is displayed. The number of measurement loops along with the corresponding measurement points is displayed in the "Measurement loops" table below the symbol link.

You can only select symbols that have been evaluated as valid based on the settings for the pressure device and on the "Inspection data" tab.

The following image shows the selection dialog:
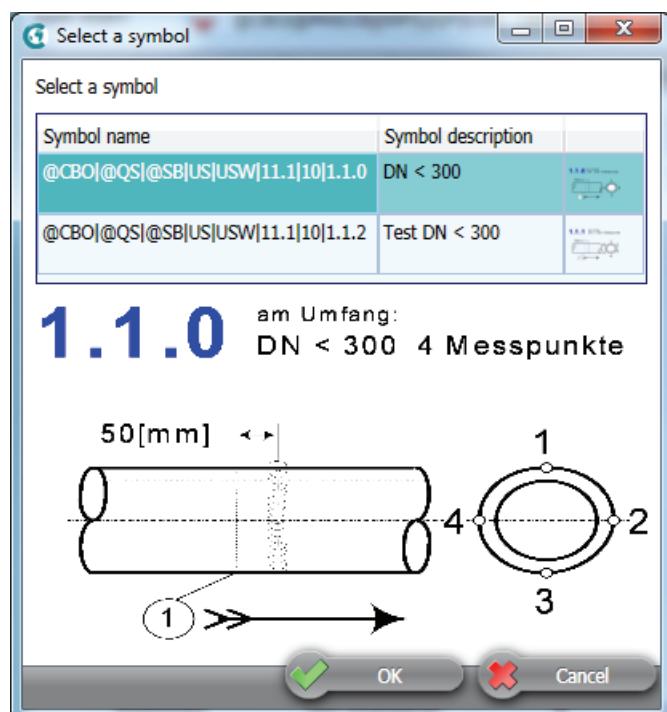
See also

"Inspection" plugin (Page 9)

3.5 Creating an individual check work package

Once you have made the necessary default settings, and the conformity of the pressure device has been checked, this is displayed on the "Non-destructive testing" tab. The "Creation configured" option is activated and the status of the inspection in the "Overall result" control group changes to "Single test possible".

Procedure

1. Right-click on the fully defined maintenance plan.
2. Select the "Maintenance > New work package > As defined on symbol" command from the context menu.

Result

The "Individual check" work package is created. One activity per measurement loop is created underneath the work package. A measurement series object is created underneath the activity.

See also

"Inspection" plugin (Page 9)

Creating a single test using the "Inspection" plugin (Page 12)

Performing an individual check (Page 13)

3.6 Creating a single test using the "Inspection" plugin

Requirement

To enable you to create an individual check using the "Inspection" plugin, the "Attributes > Non-destructive testing" tab must exist in the properties of the maintenance plan. The "Creation configured" option on the "Non-destructive testing" tab also needs to be active. The "Individual check possible" status is displayed in the "Overall result" control group.

Procedure

1. Open the "Inspection" plugin.
2. Drag&drop the required object, a pipe, for example, to the "Start object(s)" field.

   The evaluation starts automatically. The "Filter" tab opens and is displayed underneath the Navigator by default.
3. Select the required search setting in the menu bar of the plugin to define the displayed objects.

   The lists on the "Filter" tab change accordingly.

4. Select one of the following options:

   – If you want to create the individual checks of a specific maintenance plan, select the relevant maintenance plan from the "Inspection object" list on the "Filter" tab. Click the "Generate single check" button in the menu bar of the plugin.

   – If you want to create all individual checks that can be created, click the "Generate single check" in the menu bar of the plugin.

5. If you want to define details for the single check, click the "Creation with detail configuration" button in the menu bar of the plugin before you create the single test and enter the required information.

Result

The individual check is created.

See also

"Inspection" plugin (Page 9)

Opening the "Inspection" plugin (Page 9)

Creating an individual check work package (Page 12)

Performing an individual check (Page 13)

3.7 Performing an individual check

Procedure

1. Open the properties of a measurement series object that was created with the individual check.

2. Select the "Attributes > Measurement data" tab.

3. Enter the values from the measuring points in the "Reading value" column.

   The status of the measurement series changes to "Measuring in progress". As soon as all measured values have been entered, the status of the measurement series changes to "Measuring finished". The activity is reported as finished.

   The desired values and threshold values of the measurement series are entered on the "Non-destructive testing" tab of the maintenance plan.

4. Repeat steps one to three for all measurement series objects of the individual check.

Result

- The evaluation of the individual check is entered automatically on the "Measured value data" tab of the individual check, based on the entered measured values.

- As data acquisition progresses, the status of the individual check on the "Work package" tab changes.

- The status of the maintenance plan is based on the status of the corresponding individual checks.

- The result of the individual check that is evaluated as the poorest and that is assigned to an inspection plan is entered on the "Non-destructive testing" tab of the maintenance plan.

- After the second completed individual check, the calculated critical date will be entered in the control group on the "Non-destructive testing" "Overall result" tab.

    The critical date indicates when the specified minimum value of the wall thickness is expected to be reached at a measuring point. The calculation, if one is possible, takes place according to a selected assessment method.

See also

"Inspection" plugin (Page 9)

Creating an individual check work package (Page 12)

Creating a single test using the "Inspection" plugin (Page 12)

Working with the "Inspection Diagram" plugin

<div style="text-align: right; font-size: 3em; font-weight: bold;">4</div>

4.1 "Inspection diagram" plugin

Using the "Inspection diagram" plugin, you can display the evaluation of the inspection maintenance plan graphically.

See also

Opening the "Inspection diagram" plugin (Page 15)

Displaying measurement series data in the "Inspection diagram" plugin (Page 16)

4.2 Opening the "Inspection diagram" plugin

Procedure

1. Click on "Plugins" in the menu bar.

2. Select the "Maintenance > Inspection > Inspection diagram" command.

Result

The "Inspection Diagram" plugin opens.

See also

Tab of the "Inspection diagram" plugin (Page 19)

"Inspection diagram" plugin (Page 15)

Displaying measurement series data in the "Inspection diagram" plugin (Page 16)

4.3 Displaying measurement series data in the "Inspection diagram" plugin

Procedure

1. Open the "Inspection diagram" plugin.

2. Drag&drop the inspection maintenance plan underneath which the required measurement series objects are located to the top field of the plugin.

Result

The evaluation starts automatically. The measurement series data is displayed graphically.

- To the right of the diagram, you can select which measurement loops and measuring points will be displayed in the diagram by activating or deactivating options.

- Underneath the diagram, you can select the various colors for the graphical display.

- You use the context menu to enable or disable various display options on the diagram.

From the menu bar of the plugin, you can reload the evaluation, redraw the diagram or display the content of the query on which the diagram is based in the form of a table.

See also

"Inspection diagram" plugin (Page 15)

Opening the "Inspection diagram" plugin (Page 15)

User interface reference   5

5.1   "Inspection plan" tab

The "Inspection plan" tab of the inspection type maintenance plan displays information regarding the conformity of the pressure device.

Control element	Description
"Inspection object" list	You select the type of the inspection object from this list.
"Inspection regulation" list	In this list, you select the inspection regulation according to which the pressure device will be inspected.
"Inspection scope" list	You select the scope of the inspection in percentage.
"Heater" list	in this list you select whether the pressure device is lit and/or heated.

Control element	Description
"Overheating risk" option	If this option is activated, this indicates that there is a risk of the pressure device overheating.
"Steam/hotwater creation" list	You select an entry from this list to indicate whether the pressure device is used to create steam or hot water.
"Fluid Group" list	You select the fluid group of the pressure device from this list.
"Steam/vapours w. vapour pressure TS > 0.5 above atm" option	If this option is activated, it indicates that the pressure device contains gases or liquids with vapor pressure TS > 0.5 above atm.
"Calculate" button	Via this button, you start the calculation of the conformity.
"Folder (ISV-Excel DGRL)" field	This field displays the linked folder.
"Ordner (ISV-Excel BSV_DG)" field	This field displays the linked folder.
"Diagram" list	This list displays the type of the calculated pressure device diagram.
"Category/Modul" list	This list displays the category or the module.
"Result" section	These boxes display the result of the inspection.
"Category" list	This list displays the category of the result.

See also

Evaluating the conformity of a pressure device (Page 10)

5.2 Tab of the "Inspection diagram" plugin
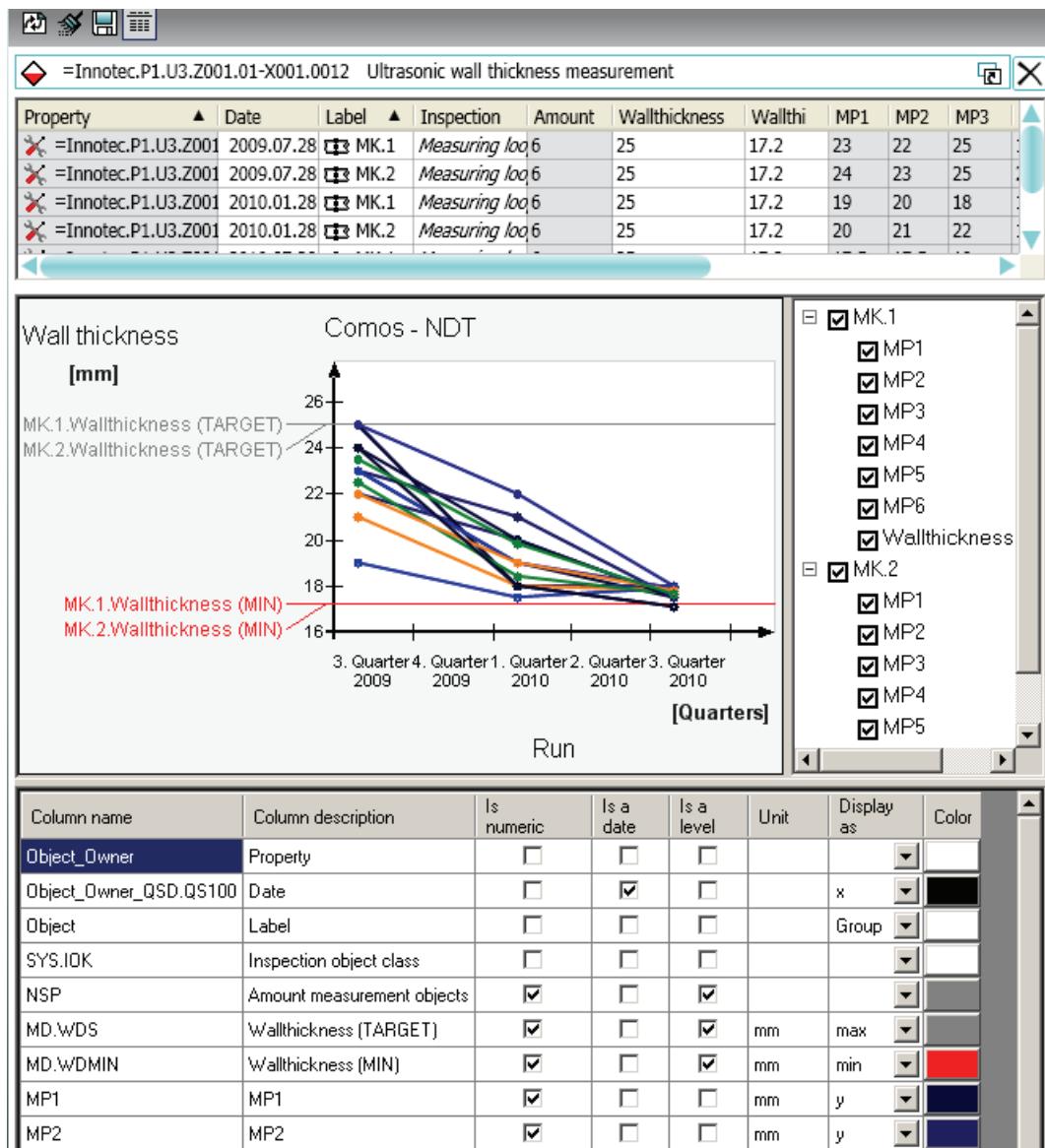
Control element	Description
"Reload query" button	With this button, you reload the query.
"Redraw diagram" button	With this button, you redraw the diagram.
"Save diagram in file" button	This button opens the "Save as" window.
"Display diagram data" button	This button opens a table with the data on which the diagram is based.

Diagram data (upper area)

With the "Display diagram data" button, you can display the data of the measurements carried out on which the diagram is based.

Diagram configuration (lower area)

Each column of the diagram data is displayed as a row in the diagram configuration. Analysis information is displayed in the columns "Column name, "Column description", "Is numeric", "Is a date" and "Is level". The columns with options have a direct influence on the display of the graphs. In the "Display as" column, you select whether numerical or date values are applied to the X or Y axis and whether constants ("Is a level") are to be displayed as the threshold value line (min or max). You define the color of the graphs in the "Color" column.

The configuration set here is saved either when you close the plugin or prior to the evaluation of a different inspection maintenance plan.

Display of the measurement loops / measurement points (central right-hand area)

You configure which measurement loops and measuring points a graph will be drawn for by activating or deactivating this option.

The configuration set here is saved either when you close the plugin or prior to the evaluation of a different inspection maintenance plan.

Diagram (left mid area)

The graphs are displayed here as configured. The following options are available in the context menu:

- "Display subsidiary line"
- "Display the critical point"
- "Display values"
- "Display resulting lines"
- "Expand to intersection point"

See also

Opening the "Inspection diagram" plugin (Page 15)

5.3 Tab of the "Inspection" plugin
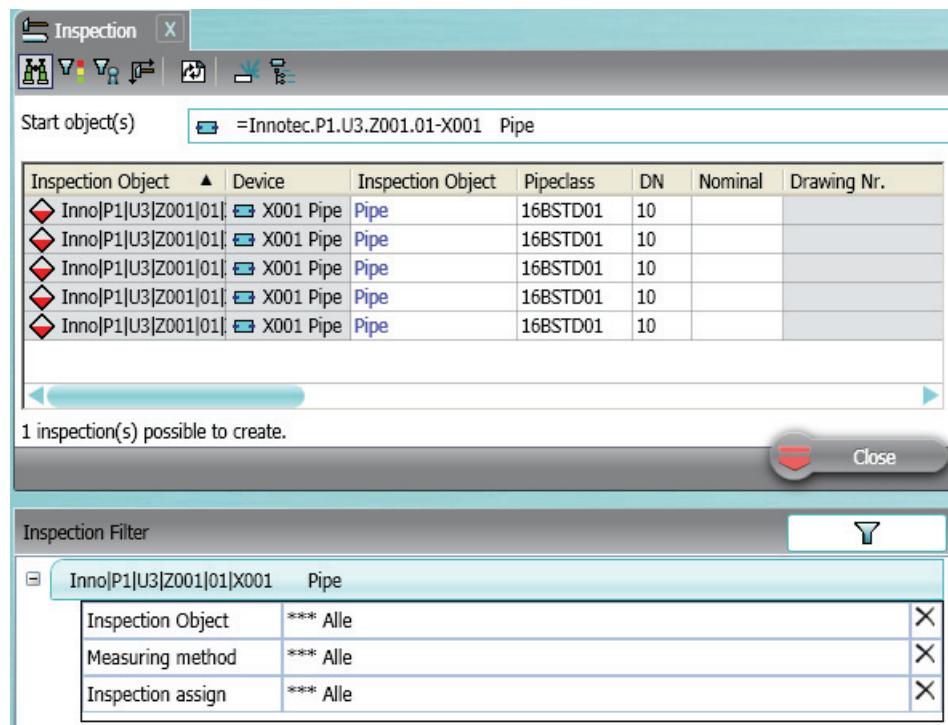
Control element	Description
"Inspection plan" button	Via this button, you change the search setting and the filter options on the "Filter" tab in the Navigator.
"Status query" button	Via this button, you change the search setting and the filter options on the "Filter" tab in the Navigator.
"Inspection orders" button	Via this button, you change the search setting and the filter options on the "Filter" tab in the Navigator.
"Data import, Data export" button	Via this button, you change the search setting and the filter options on the "Filter" tab in the Navigator. The "XML import" and "XML export" buttons are added to the menu bar.
"Reload query" button	With this button, you reload the query.
"Generate single check" button	With this button, you create the selected individual check(s).
"Creation with detail configuration" button	With this button, you open the input area for the detail configuration for creating individual checks. If this setting is selected, individual checks are created with the defined configuration.

See also

Opening the "Inspection" plugin (Page 9)