USER MANUAL

PC-DMIS – RESULT CONVERTER VERSION 4.XXXX.YZZZ

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1. General information

1.1. User Manual

The aim of this manual is to support you in dealing with the software "PC-DMIS - Result Converter" (referred to below as "Result Converter").

We have tried to describe all options of this software as best as possible and in a way that is understandable. However, we ask for your understanding that all features may possibly not be described. This may be due among other things to technical innovations, new options or similar influences.

We point out by way of precaution that this manual cannot replace training. Should you be interested in a course in this respect, we look forward to hearing from you. You can find the corresponding data at the end of this text.

Even after careful examination, it cannot be ruled out that this manual is free of errors.

For this reason, we reserve the right to make typographical errors and mistakes.

Irrespective of this, we are thankful for suggestions, tips and proposals for improvements resulting from daily dealings with the software "Q-DAS Converter".

If you need assistance, please contact your local Hexagon support.

1.2. Software objectives

This software has been developed with the aim of providing an automated interface for measurement results obtained with the PC-DMIS software version from 2015 to Microsoft® Excel or ASCII files.

The converter allows the manual (OFFLINE) or automatic (ONLINE) transfer of data from the measuring routine.

1.3. Software requirements

The software may only be installed on a **64-bit computer** with **Windows 10 or higher** and a **compatible version of PC-DMIS**. For compatibility notes please refer to the document " EN PCDERKON Installation.pdf" in the section: " Compatibility of PC-DMIS with PC-DMIS Ergebniskonverter " (link to the document: ftp://ftp.hexmet.de/PC-DMIS/PC-DMIS_Ergebnis_Konverter/Docs/). No software tests have been performed under other operating systems. If this software is installed under other operating systems, no guarantee can be given for the full functionality of the software.

In addition, a Microsoft® Excel version suitable for the operating system must be installed on the same computer.

1.4. Software licence agreement

The use of the software is subject to acceptance of all provisions contained in the software license agreement. For details, refer to the document "EN_EULA.pdf", which you will find in the same folder in which the user manual is located.

1.5. License structure

Hexagon Metrology GmbH provides the following license structure:

Type of license	Description	License Availability
Demo license	License to try the software. This license is a free one-off offer	maximum of 3 months
Single-user license	License for one PC (workstation). Not transferable to another PC.	unlimited
Factory license	License for ten (10) PCs in a separate plant or one business division within the plant.	unlimited

2. Software configuration

Before the software is used for the first time, it must be adapted to your environment. This first step requires administrator rights.

2.1. Language settings

After the software has been installed and the license on your computer has been enabled, the language can now be selected. After the software has been started, the language can be selected under the "File" menu option.
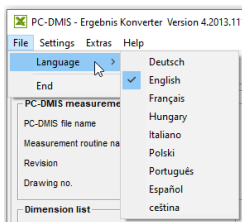
Select your desired language here. If a language is desired and is not available for selection, please contact the software supplier or manufacturer.

2.2. Registry settings

Now open the dialog for the configuration of the output file. You will find it under the menu option: "Settings" → "Output file".
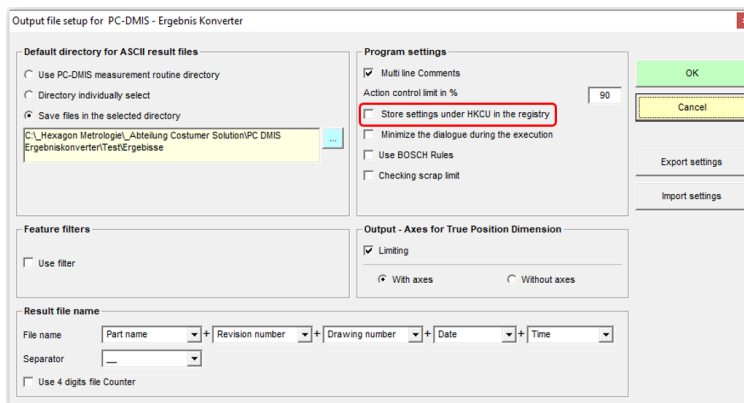
Here you can define where the settings in the registry of the computer are to be saved. By default, they are stored in the area:

"HKEY_LOCAL_MACHINE\SOFTWARE\DEAGERMANY\PCDMIS_Ergebnis _KONVERTER"

As this is based on the availability of administrator rights during the use of software, the key can also be changed to:

"HKEY_CURRENT_USER\SOFTWARE\DEAGERMANY\PCDMIS_Ergebnis _KONVERTER"

now. This has the disadvantage that every user under Windows has to repeat the same settings again himself. However, this procedure has the advantage that user rights are sufficient to work with the software.

2.3. Converter position and display on the screen

The main window of the software can be moved to any position on the screen. You can move the window with the mouse. To avoid having to repeat this operation each time the software is restarted, the current position can be saved in the registry of your computer. The dialog "Configuration main position" is used for this purpose. You can reach this dialog via the menu: "Settings" → "Window position".
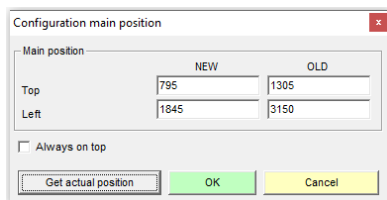

Use the button Get actual position to accept the current values. After you exit the dialog with the OK button, these settings are saved in the computer registry. Now this position will be set automatically the next time the software is restarted.

Note: Different screen resolutions or modifications of the resolution may cause the window to be positioned outside the screen. Therefore, you must set the position of the main window so that it appears in the upper left corner of your screen before changing the screen resolution.

By activating the checkbox "Always on top" the converter is always displayed in the foreground. If the checkbox is deactivated, the converter can be covered by other applications.

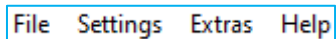# 3. How to use the software

3.1. User interface of the software (GUI)
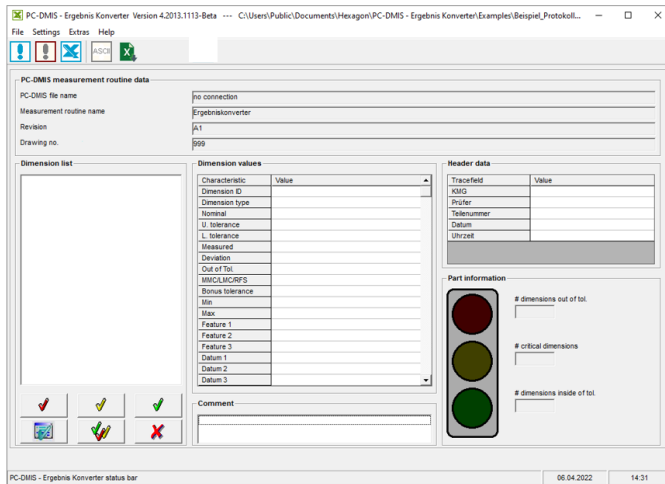
The user interface of the software can be divided into the following segments:
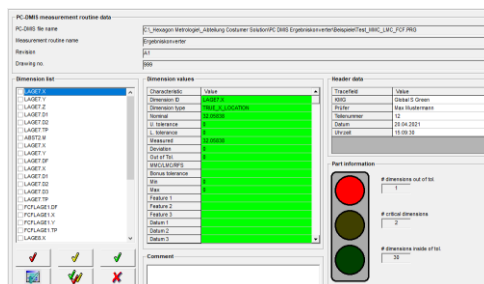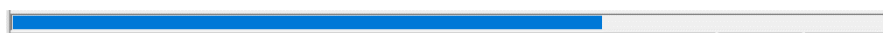
a)   Menu bar

b)   Toolbar

c)   Data area

d)   Progress bar

e)   Status bar

The data area in turn is subdivided into the following sections:

- PC-DMIS™ measuring routine data
- Dimension list
- Dimensional values
- Header data
- Comment
- Part information

3.2. Menu structure

The "File" menu option includes the "Language" menu item for selecting the language of the software (for further information, see chapter 2.1). The "Exit" menu item can be used to close the software.
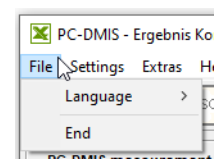
The "Settings" menu includes the menu option "Output file", "ASCII setup", "Report design" and "Window position". These menu items can be used to customize the converter to meet your output requirements. Please refer to chapter 2.3 for further information on the "Window position" menu item.
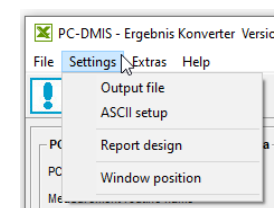
The "Extras" menu item includes the possibility to create batch files that allow you to start the transfer of data from PC-DMIS™ measuring routines to an Excel sheet.
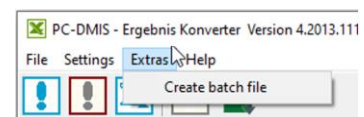
The "Help" menu contains the menu option "Manual", "License Information" and "Info about ...". In this section you can find out the current status of your license rights and information about the software.
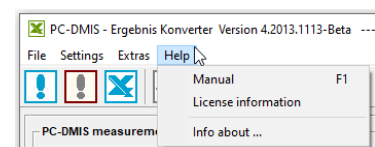
The menu option "Manual" opens the operator manual. Alternatively, this can be opened with the function key "F1" at any point of the operator interface.

4. Reading data

4.1. Supported data

The converter supports various data of the PC-DMIS™ measuring routine.

- ## Data from the PC-DMIS™ measuring routine

  The header data of the PC-DMIS™ measuring routine are read in. They are an essential element in the definition of the output file name.

- ## Trace fields as header data

  Trace fields transmit additional information for statistical evaluation in PC-DMIS™ as standard. In conjunction with the PC-DMIS – Result Converter, it is now possible to also use them for transferring header data to inspection reports.

- ## Dimensional data

  All features in PC-DMIS™ format are read by the converter and can be processed further. This also includes the dimensional settings in the header of each dimension (e.g. output format, feature name, dimension ID, etc.).

- ## Comments

  Comments can be used to provide additional information or better descriptions to the feature data. Some rules must be observed as comments in PC-DMIS™ can be used for a variety of purposes.

- ## Additional data provided by the converter

  In addition to the data retrieved from the PC-DMIS™ measuring routine, the converter also calculates an action control limit for each dimension. The action control limit is defined as percentage value in addition to the tolerance limit.

4.2. The PC-DMIS™ measuring routine data

The PC-DMIS™ measuring routines data are automatically taken over from the active PC-DMIS™ measuring routine during the reading of the data.

- The PC-DMIS file name shows the complete path of the active PC-DMIS™ measuring routine.
- The name of the measuring routine is taken from the header data of the active PC-DMIS™ measuring routine (PART NAME).
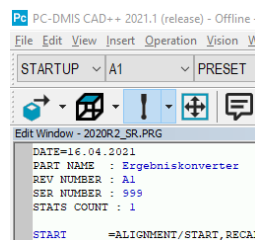
- The change status is also taken from the header data of the active PC-DMIS™ measuring routine (REV NUMBER)
- This also applies to the drawing number (SER NUMBER).
- <u>TIP</u>:   The values for "PART NAME", "REV NUMBER" and "SER NUMBER" can simply be overwritten in the measuring routine.

4.3. Header data (trace fields)

- Trace fields in the measuring routine

The management of header data is also offered as an option. As this is a specific setting which can vary completely from customer to customer, this area of the software was designed to have a high degree of flexibility. However, some rules with respect to the data format cannot be ignored.

To enable recognition of these data by the converter, they must be entered in the trace field of the measuring routine. A trace field consists of two important components:

- the trace field name

- the trace field value

In the above excerpt from the PC-DMIS™ measuring routine you can see two examples of trace fields. The first trace field is not displayed at runtime. The input comes from a variable (C1.INPUT), which was previously recorded in the measuring routine. The second trace field is displayed at runtime. The operator can make an input directly at runtime.

The name of the trace field in our first example is "Inspector". The related value corresponds to the variable "C1.INPUT". The name of the trace field in the second example is "Part number". The related value is "12".

TIP: Monitoring fields are generally not displayed in the measurement log, but are used to transmit additional data to a connected statistic or, in our case, to a converter that records this command type.

TIP: If date and time are to be set during the measurement, this can also be done via header data. The following example shows a section of a sample measuring routine:

```
ASSIGN/DATE=SYSTEMDATE("dd'.'MM'.'yyyy")

TRACEFIELD/DISPLAY=NO,REPORT=YES,DISPLAY MESSAGE=Date ; date : DATE

ASSIGN/TIME=SYSTEMTIME("HH':'mm':'ss")

TRACEFIELD/DISPLAY=NO,REPORT=NO,DISPLAY MESSAGE=Time ; time : TIME
```

- Configuration of header data
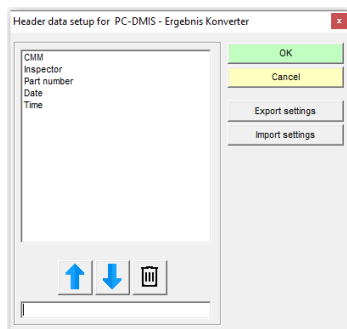
You can create the field description for your header data under the menu option "Settings → Report design → Setup Header data". The setup identifiers are stored in a file named "HeaderData.cfg". Depending on the version of the Result Converter, this file is stored in the installation directory or under: "C:\Users\Public\Documents\Hexagon\PC-DMIS – Ergebnis Konverter".

The settings can be saved using the Export settings button. The "HeaderSettings.cfg" file can also be transferred to a second computer where it can be read in with the Import settings button.

To make the settings:

- Enter the desired description in the text field in the lower part of the window. Please note that the notation must correspond exactly to the notation of your trace field name. The order of the list must correspond to the desired output sequence, and not necessarily to the sequence of your measuring routine.

- "Shift" the name into the list box with the arrow key ⬆

- Repeat the procedure for all desired values.

- If you want to remove a value from the list, select this value in the list and then use the arrow key ⬇ to delete it from the list.

- The whole list can be deleted by pressing the 🗑 button.

- Exit the header data– setup with the OK button.

After you have finished the configuration, your desired designations must be displayed in the header data list in the main window.

Tracefield	Value
CMM	Global S Green
Inspector	John Doe
Part number	12
Date	16.04.2021
Time	15:37:06

4.4. Dimensional data

- Dimension list

    The term "dimension" characterizes a parameter of the component you have measured. Sometimes PC-DMIS™ uses also the term "feature" (this applies to older versions in particular).

    After the converter has been started offline 🔴 or online 🔵 , all dimension data are retrieved from your PC-DMIS™ measuring routine. Now you can display the individua dimensions by selecting the d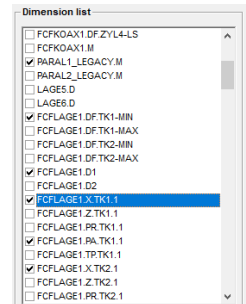esired dimension description in the dimension list. There is a checkbox in front of each dimension description in the list. Only dimensions for which the checkbox is activated are taken into account in the output. The selection can be activated or deactivated by clicking on the checkbox.

    Some buttons were added to the list to simplify the search for dimensions that violate the tolerance limits.

    The 🟢 button activates all the checkboxes of the list. The ✓ button only activates those checkboxes where the tolerance limits have not been exceeded. The ✓ button activates all dimensions that exceed the action control limit. The action control limit can be defined under the menu option "Setting" → "Output file". The ✓ button selects all dimensions that exceed the tolerance limit.
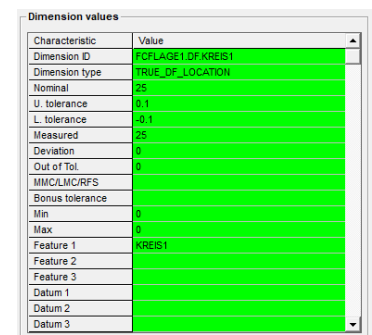
    If the button is changed, there is a query whether the previously set markers should be deleted or not. This allows, for example, a combination of dimensions that violate the tolerance limit and dimensions that are critical to be marked for output.
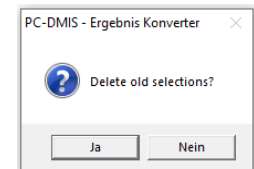
    The ❌ button disables all checkboxes. The 🖼 button marks all dimensions, which were marked in the PC-DMIS™ measuring routine and thus may be called valid, since they were calculated during the execution of the measuring routine.

- Dimension values

    The values of the related dimension currently active in the list are displayed in the area of the dimension values.

4.5. Comments

Comments can be used for additional explanation of each dimension. The related comment is specifically linked to a particular dimension. Some rules must be observed in the PC-DMIS™ measuring routine to achieve this effect.

Whether a comment is used or not depends on the type of comment and its position in the measuring routine.

- The comment must be a report comment.
- The comment must directly precede the dimension.
- Multi line comments of up to 20 lines are considered. If more than 20 lines are used, the remaining lines are ignored.

In addition, there is a setting in the Output file – Setup of the software. This dialog is accessed via the menu option "Settings" → "Output file".
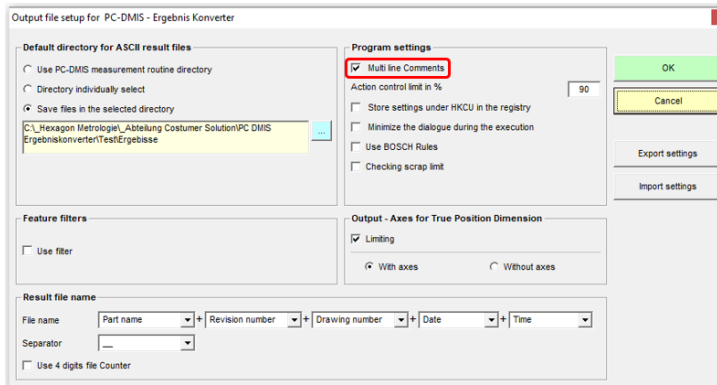
Depending on the status of the "Multi line Comments" checkbox, you will obtain different interpretations of PC-DMIS multi-line report comments.

Please see the following two examples for a more detailed explanation:

Example 1:

```
COMMENT/REPT,
        Comment for X-Axis
        Comment for Y-Axis
        Comment for Z-Axis
        Comment for Diameter
        MOVE/CLEARPLANE
DIM LOC1= LOCATION OF CIRCLE CIR2  UNITS=MM ,$
```

This comment is not used because the "MOVE/CLEARPLANE" command is located between the comment and the dimension.

Example 2:

```
COMMENT/REPT,
        POS X-Axis
        POS Y-Axis
        POS Z-Axis
        Diameter
        Form
DIM LOC1= LOCATION OF CIRCLE CIR2  UNITS=MM ,$
```

This comment is used because there is no command located between the comment and the dimension.

The output result depends on the status of the "Multi line Comments" checkbox. If this checkbox is enabled, one comment line is used for each dimension line. The assignment is done in the order of the comment lines, so the first comment line is assigned to the first line of the dimension, the second comment line to the second line and so on. This would mean:

Dimension	Comment
LOC1.X	POS X-Axis
LOC1.Y	POS Y-Axis
LOC1.Z	POS Z-Axis
LOC1.D	Diameter
LOC1.RN	Form

If the "Multi line Comments" checkbox is disabled, the following output would result:
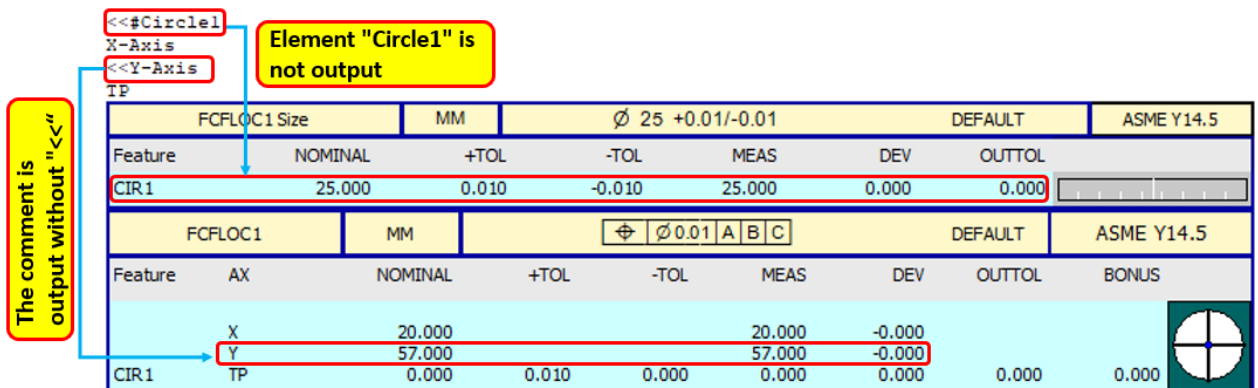
Dimension	Comment
LOC1.X	POS X-AxisPOS Y-AxisPOS Z-AxisDiameterForm
LOC1.Y	POS X-AxisPOS Y-AxisPOS Z-AxisDiameterForm
LOC1.Z	POS X-AxisPOS Y-AxisPOS Z-AxisDiameterForm
LOC1.D	POS X-AxisPOS Y-AxisPOS Z-AxisDiameterForm
LOC.RN	POS X-AxisPOS Y-AxisPOS Z-AxisDiameterForm

This does not appear very useful in the example shown above, but can be quite practical for a different comment structure.

By means of different strings, both the feature output and the comment output can be influenced.
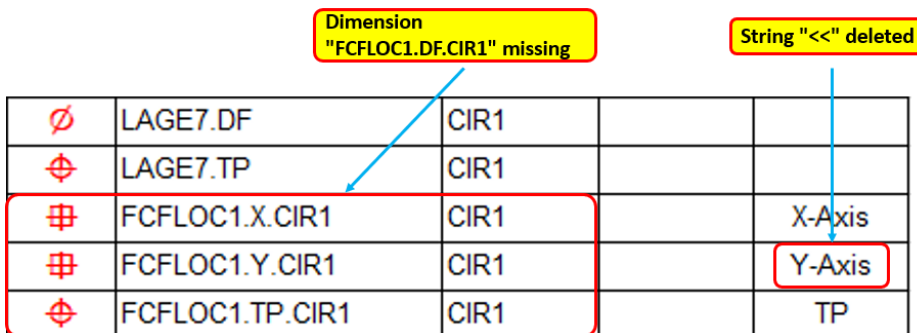
- Comment line starts with: <<#

  The dimension assigned to the comment is not output (see example below).

- Comment line starts with: <<

  The string "<<" is deleted. All subsequent characters are output (see example below).

Example output in the measurement report:
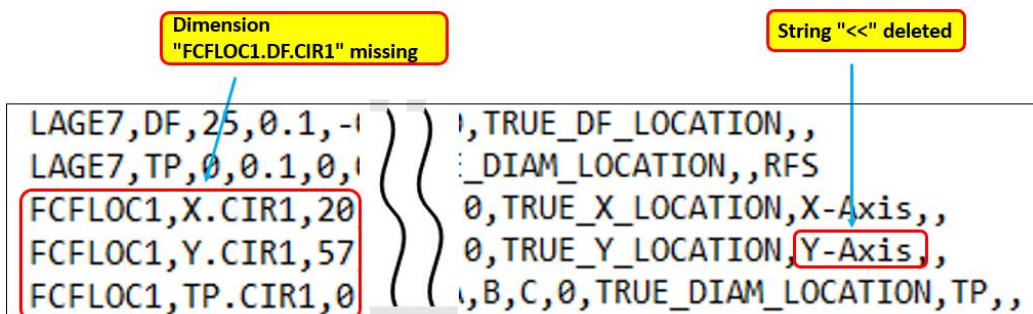
Example output to Excel:

Example output to ASCII file:

In the user interface all features and comments (with "<<" or "<<#") are displayed.

4.6. Action control limit

The action control limit allows the converter to restrict the percentage of the tolerance limit. If, for example, a tolerance of ±0.1 mm is set and a control limit of 80% is defined, dimensions with deviations of more than ±0.08 mm are considered to be critical. Thus, they can be selected for output using the filter property of the converter (see chapter 4.4, section: Dimension list).

The action control limit is defined in the "Program settings" area. You can reach this area via the menu option: "Settings" → "Output file".
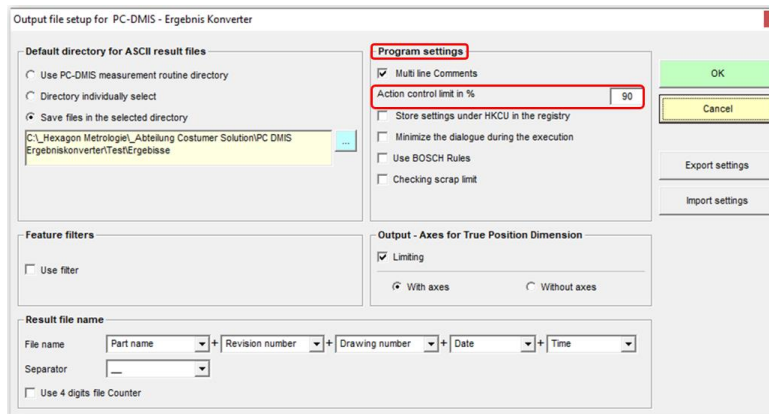
4.7. Starting the input process

- Difference Online - Offline conversion

Online conversion means that the converter receives the dimensions during the measuring routine run time. The converter must be started at the *beginning* of the measuring routine (or *before* the features) for this purpose. This can be carried out manually via the user interface as well as by an external command from the measuring routine.

Example (path to the EXE may differ):

EXTERNALCOMMAND/NO_DISPLAY, NO_WAIT ; C:\PROGRAM FILES (X86)\PC-DMIS - ERGEBNIS KONVERTER\PCDMIS_ERGEBNIS_KONVERTER.EXE /o

After calling the result converter, it is recommended to insert a pause of 2-3 seconds. This ensures that the result converter is completely started before receiving the data. If there are several (possibly longer) measurements between the start of the result converter and the first features, this pause can be shortened or omitted if necessary.

Offline conversion takes places when the measuring routine has already been processed and the converter reads in the dimensions subsequently. To do this, the converter is started at the _end_ of the measuring routine (or _after_ the features). This can also be carried out manually via the user interface of the converter or by a command from the measuring routine.

Example (path to the EXE may differ):

EXTERNALCOMMAND/NO_DISPLAY, WAIT ; C:\PROGRAM FILES (X86)\PC-DMIS - ERGEBNIS KONVERTER\PCDMIS_ERGEBNIS_KONVERTER.EXE /o

4.8. Use BOSCH Rules

If this option is enabled, dimension IDs without axes and only the data of a position (no axes) will be evaluated.

Nominal values and results are written with absolute values only.
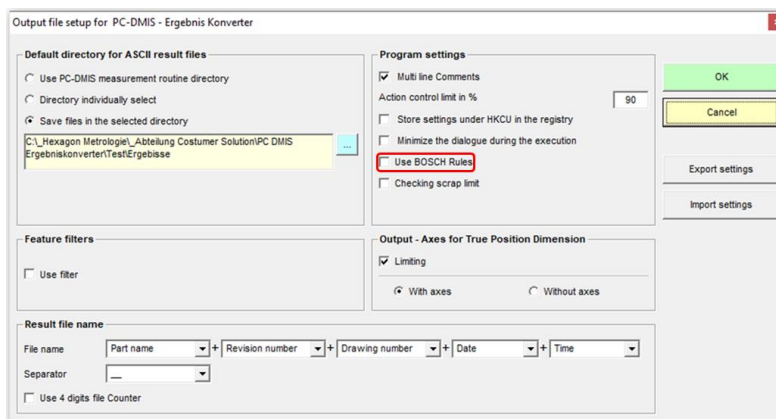
- Axes output with positional data evaluation

    In the past we have seen various methods of reporting and evaluating positional data.

    Axes are either output or not.

    To make the result converter more flexible at this point, the function "Output - Axes for True Position Dimension" has been developed, which can be found in the menu option "Settings" → "Output file".

    If this option is not enabled, all positional evaluations are processed like in the previous version (FCF or GeoTol without, V3.7 Compatible position evaluation with axes).

By activating the "Limiting" checkbox, you can select whether positions are to be output with or without axes.
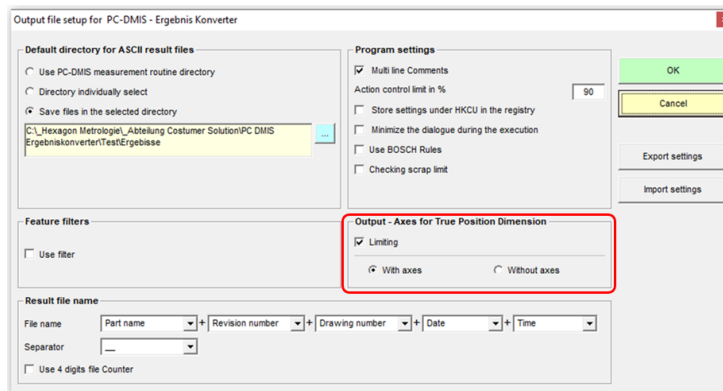
- Starting the input process manually

  Starts the input process online

  First, open the PC-DMIS™ measuring routine. Then, start the converter to receive the data online.
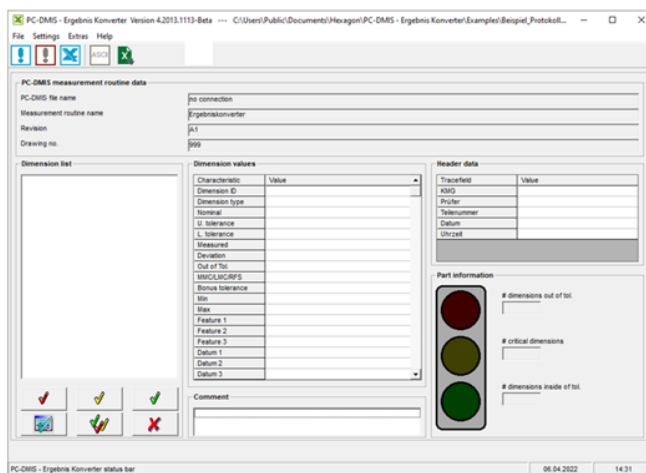
Finally, start the execution of the measuring routine. The connection will be terminated automatically at the end of the measuring routine.
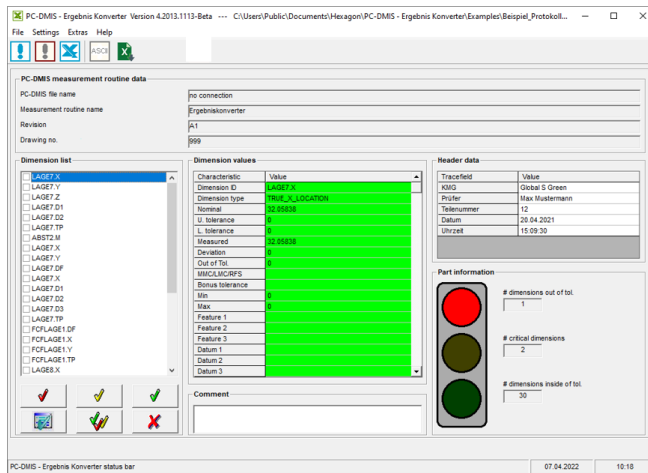
![icon] Starts the input process offline

Run your measuring routine as usual or open a measuring routine that already contains measurement values. Then start the input process with the button shown above on the toolbar of the converter.

The progress of the read-in process is shown in the progress bar at the bottom of the converter window.
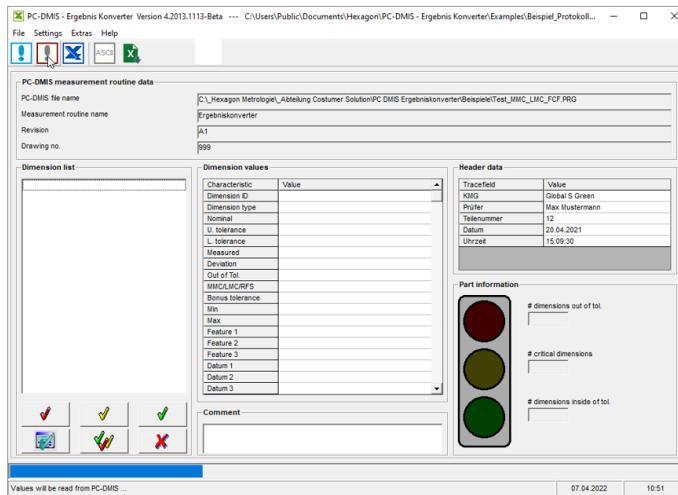
- Starting the input process from the measuring routine

The entire process of transferring measurement results, system files and header data can be started as an external object directly from the measuring routine. As a rule, the output is defined at the same time as the automatic start of the converter. For this reason, the process is described in greater detail in chapter 4.

5. Data output

Various procedures are available for the output of data:

5.1. Output to an ASCII file

Before the data is output to an ASCII file, the settings for the file name, the destination directory and the definition of which values and dimensions are to be output must be carried out.

- Settings for the destination directory, the output features and the file name
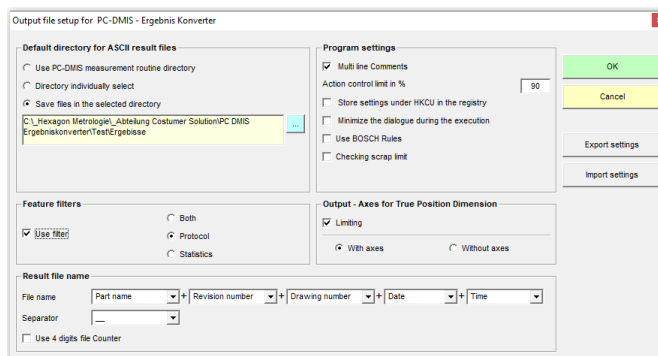
This setup dialog can be divided into four areas:

- the destination directory of the result file (area: Default directory for ASCII result files)
- The output features (Area: Features filter)
- the file name of the result file (area: Result file name)
- the program settings (area: Program settings)

The following settings are possible for the destination directory using the three option buttons:

- The result files are saved in the PC-DMIS™ measuring routines folder (Use PC-DMIS measuring routine directory).
- The user selects an individual directory at every measurement cycle (Directory individually select).
- All result files are saved in a destination directory (default directory) (Save files in the selected directory). Only with this setting can the destination folder be determined directly by means of the button 🔲 in this dialog.

In the "Feature filter" area, you can define which features are output. The state of the "Use filter" checkbox has the following influence:

- Checkbox deactivated:

  All characteristics are output for which "BOTH" and "REPORT" were selected as output in the measurement routine.

- Checkbox activated and radio button "Both" selected:

  All characteristics are output for which "BOTH" and "REPORT" were selected as output in the measurement routine.

- Checkbox activated and radio button "Protocol" selected:

  All characteristics are output for which "BOTH" and "REPORT" were selected as output in the measurement routine.

- Checkbox activated and radio button "Statistics" selected:

  All characteristics are output for which "BOTH" and "STATS" were selected as output in the measurement routine.

The result file name can be a combination of up to 6 components. The description, revision and drawing number are taken from the standard header data of a PC-DMIS™ measuring routine. The date and time are generated during run time. A separator is inserted between the respective components. A four-digit file counter is often used instead of the date and time. The first free number is always used.

The program settings are explained in the relevant chapters.

- ASCII Setup

  The ASCII setup deals with the question which information should be included in the file.

All values with enabled checkboxes are included in the output. The field-specific sequence is determined by the order of selection (version 1.3.1 and higher) and is shown on the left of the checkbox. The ⎹Mark all⎸ and ⎹All markings delete⎸ buttons are auxiliary functions provided to conveniently enable or disable all checkboxes. In this input form, you can also define the type of separator to be used between the individual values in the ASCII file. Often a comma or a semicolon is used for this. The choice of file type is restricted by the file name extension. It has no effect on the format itself.

Your settings can be saved with the ⎹Export Settings⎸ and ⎹Import Settings⎸ buttons. The default setting is for the converter to save the settings in the registry of your computer. This takes place on exiting the dialog with the ⎹OK⎸ button. However, for reasons of data safety and possible plans to use the same settings on several computers, we recommend that you export the settings. Then they can be imported again at a later point in time or to another computer.

The destination folder and name of the file can be freely chosen.
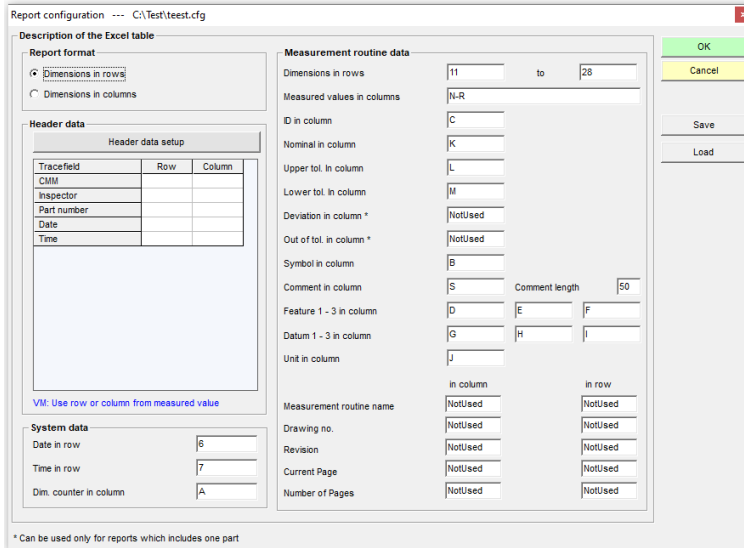
- Selecting dimensions for the output

    The selection of the dimensions for the output can be carried out manually by highlighting the dimensions in the dimension list. Filter functions can also be applied (see chapter 4.4., section: Dimension list).

    In the "Feature filter" area, you can define which features are output. The state of the "Use filter" checkbox has the following influence:

    - Checkbox deactivated:

        All characteristics are output for which "BOTH", "REPORT" and "STATS" were selected as output in the measurement routine.

    - Checkbox activated and radio button "Both" selected:

        All characteristics are output for which "BOTH", "REPORT" and "STATS" were selected as output in the measurement routine.

    - Checkbox activated and radio button "Protocol" selected:
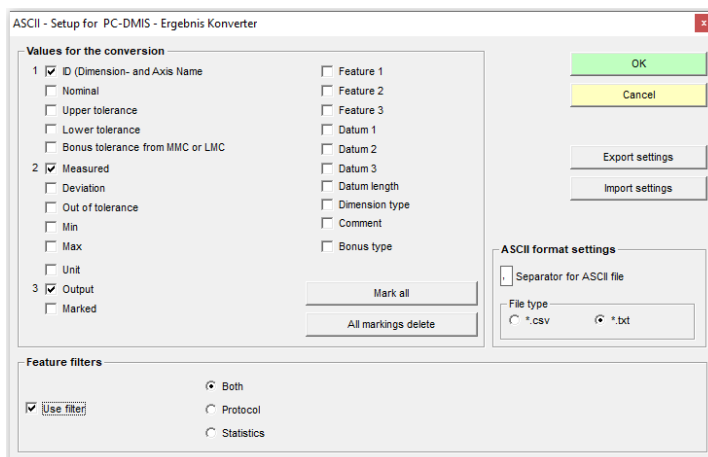
        All characteristics are output for which "BOTH" and "REPORT" were selected as output in the measurement routine.

    - Checkbox activated and radio button "Statistics" selected:

        All characteristics are output for which "BOTH" and "STATS" were selected as output in the measurement routine.

- Starting the converter from the measuring routine

  If you want to start the converter from the measuring routine and create an ASCII file, insert the following command in the measuring routine:

  EXTERNAL_COMMAND/NO_DISPLAY, NO_WAIT; C:\PROGRAM FILES (X86)\PC-DMIS – RESULT CONVERTER\PCDMIS_ERGEBNIS_KONVERTER.EXE /A

5.2. Output to an Excel sheet

If you want to transfer the values to a pre-defined Excel sheet, its layout must already be known. As different table layouts are possible, they can be saved in separate files.

5.3. How to create the report

Start an inspection report in Excel. The table to be used as the chart template for your report must be called "master".

Save this table under whatever name and path you like.

Now you must configure the converter in such a way that the output values you require appear in the related column/line after the conversion. This is carried out via the menu option "Settings" → "Report design".

The following areas are available:

Report format:

In the Report format area, you can select whether the single dimensions of the PC-DMIS™ measuring routine should be written one below the other (rows) or side by side (columns). Depending on the setting selected, the label in the system and measuring routine data area is adjusted accordingly.

Header data:

Data can be transferred to the converter using trace fields (see chapter 4.3). They now can be transferred to the clearly defined fields of an Excel spreadsheet. If the output of one value per measurement is required, the line or the column can be labeled as VM. This means that the respective column or line of the value currently measured will then be used automatically. If the dimensions are in lines, the column must be labeled as VM. If the dimensions are in columns, the line must be labeled as VM. Otherwise, lines are entered as integers and columns as character(s).

System data:

The date and time are defined while the measured values are being transferred from the converter into the Excel spreadsheet. They are output for each measurement. The Sequence Number is a counter of all output dimensions. Dimensions that are not marked for output but are part of the dimension list are not taken into account.

Measuring routine data:

This area allows the definition of the fields in which the individual data are to be entered in the Excel spreadsheet. The field labels depend on the selected report format. In the entry "Dimension in column", you can enter a number of consecutive columns. You can specify these with a hyphen (F-N) or through separation with a comma (F,G,H,I,J,K,L,M,N). A combination of the two options is also possible (F,H-N,P). All other fields are filled with numbers (for the lines) or characters (for the columns). Only one value per field is allowed.

| Save | Load |

You can save different report configurations with the | Save | button. Later, they can be recalled at any time with the | Load | button.

| OK | Cancel |

If the dialog is exited using the OK button, the current settings are saved in the computer registry or ini file (see chapter: Software configuration, Section: Registry settings). When leaving the dialog by means of the Cancel button, all changes are reset.

5.4. Data transfer

After you have configured your report, you can start the data transfer. First, read the data into the PC-DMIS™ - Result Converter as usual. Select all the dimensions you would like to output in the dimension list. Start the output by clicking the button 📊 on the toolbar. Subsequently, you will be asked for the desired test report by means of the browser window. After you have selected it, it will be opened and filled in automatically.
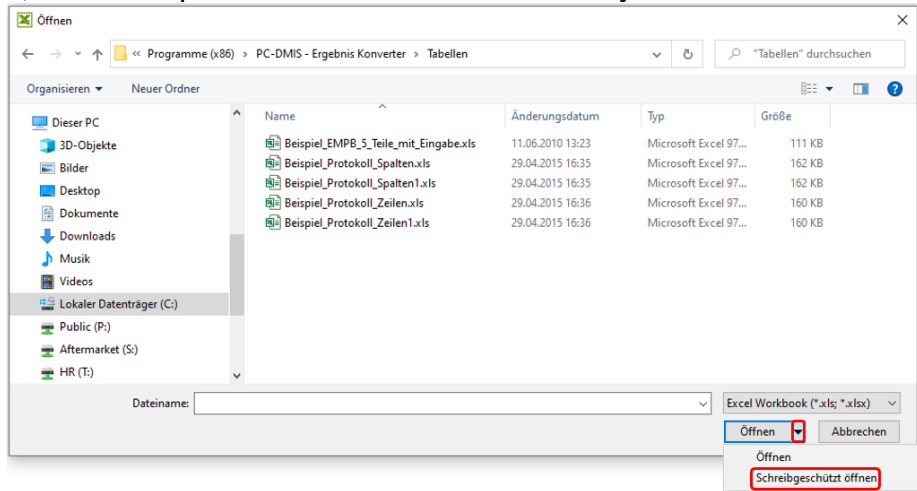
If the checkbox for "Read-only access" is enabled, you are prompted to save it under another name after the report has been filled.

Alternatively, a drop-down list can be opened by clicking on the "▼" icon. If "Open read-only" is selected, a prompt to save the report under a different name will appear after the report has been filled in.

Possible sources of error:

a) The inspection report is already open.

b) Another version of Excel is installed on your computer.

c) The Inspection report was started twice without the converter being closed in the meantime.

5.5. Starting the conversion for Excel reports from the measuring routine

The entire process of transferring measurement results, system files and header data can be started as an external object directly from the measuring routine. For this purpose, you can select the type of output via the start options.

To start the transfer of data to an Excel spreadsheet, the following steps are required:

a) Start the converter

b) Read out dimensions and header data

c) Load a report configuration

d) Open the Excel spreadsheet

e) Data transfer

f) Close the converter

If you want to run the whole process automatically from the measuring routine, proceed as follows:

First, create a batch file. The batch file is created in the dialog that is accessed via the menu option "Extras" → "Create batch file".

In the "Feature filter" area, you can define which features are output. The state of the "Use filter" checkbox has the following influence:

- Checkbox deactivated:

  All characteristics are output for which "BOTH" and "REPORT" were selected as output in the measurement routine.

- Checkbox activated and radio button "Both" selected:

  All characteristics are output for which "BOTH", "REPORT" and "STATS" were selected as output in the measurement routine.

- Checkbox activated and radio button "Protocol" selected:

  All characteristics are output for which "BOTH" and "REPORT" were selected as output in the measurement routine.

- Checkbox activated and radio button "Statistics" selected:

  All characteristics are output for which "BOTH" and "STATS" were selected as output in the measurement routine.

The batch file is created automatically in the same directory in which the Excel spreadsheet was selected. The file name also corresponds to the name of the Excel Spreadsheet 1. It is recommended not to use blanks in the file names of Excel spreadsheets.

Start the batch file from the measurement routine using the external command. Depending on whether the files are received online or offline (see: [Difference Online - Offline conversion](#) above), the result converter is called at the beginning or at the end of the measuring routine (or before or after the characteristics).

Example (call of the result converter at the beginning of the measuring routine or before the characteristics):

EXTERNAL_COMMAND/NO_DISPLAY, NO WAIT; {Path and name of batch file)

Example of the contents of a batch file:

"C:\ Program Files (x86)\PC-DMIS - Ergebnis Konverter\PCDMIS_Ergebnis_Konverter.exe" /o /C:\Program files\PC-DMIS - result converter \Example_Complete.xls /C:\Program files\PC-DMIS – result converter\Example.cfg /ALO /C:\Program files\PC-DMIS - Ergebnis Konverter\Example_OOT.xls

Segment of command line	Explanation
"C:\Program files\PC-DMIS – result converter\PCDMIS_Ergebnis_Konverter.exe"	Path and file name of the PC-DMIS™ Result Converter. It is important that this entry is enclosed in "" (quotation marks).
/o	Defines the mode used to launch the converter (see below).
"C:\Program files\PC-DMIS – result converter\Example_Complete.exe"	Path and file name of the Excel workbook where the complete report is to be filed.
"C:\Program files\PC-DMIS – result converter\Example.cfg	The configuration file to be loaded for the form layout.
/ALO	Defines which characteristics are to be written to the tables (see below).
"C:\Program files\PC-DMIS – result converter\Example_OOT.xls	Defines which characteristics are to be written to the table (see below).

/a	Reads and transmits all dimensions to an output file.
/m	Only transmits the dimensions selected in the measuring routine to the output file.
/o	Launches the converter in ON-LINE mode and closes it automatically after the data transfer.
/ALO	Two Excel spreadsheets are written. One contains all the dimensions; the other contains only those dimensions in the critical zone or outside the tolerance limits. The second spreadsheet is copied and the related date and time of the measurement is included in the file name. The second spreadsheet must have the same format as the first.
/OOT	Only one Excel spreadsheet is written which includes the dimensions in the critical zone or outside the tolerance limits.
/ALL	Only one Excel spreadsheet is written which includes all dimensions.

5.6. Transfer of measuring routines with automatic start of the converter

When transferring measuring routines with integrated call up of the converter, the following steps must be observed:

a) Necessary files:

- {Name of Excel spreadsheet}.cfg
- {Name of Excel spreadsheet}.bat
- HeaderData.cfg

b) First, import the HeaderData.cfg file to the "secondary" system using the menu option "Settings" → "Report design".

c) It is important that all file paths are fully specified in the batch file. Therefore, the secondary computer must have the same folder structure, or a new batch file must be created.

6. Scrap limits

As is so often the case, not everything which is out of tolerance needs to be scrapped immediately.

Parts will perform their function that are poor according to the drawing, but still 100% functional and usable.

The dimensions that are monitored in this way are defined as scrap limits in the result converter.

6.1. Enabling the Scrap Limit Check
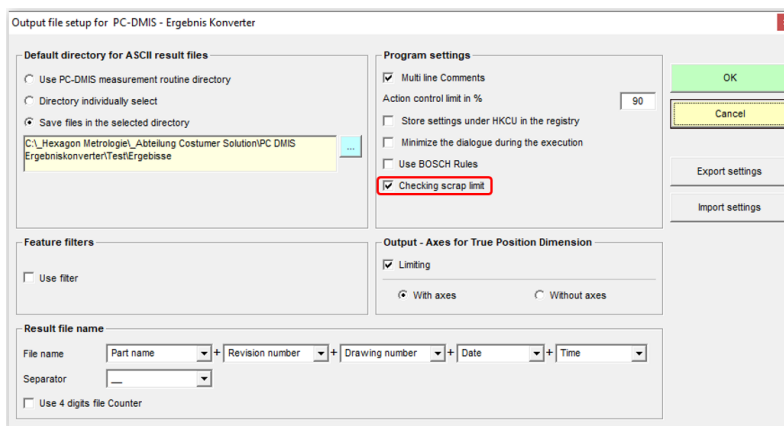
In order for the scrap limits to be monitored during the execution of the measuring routine, the checkbox for "Checking scrap limits" must be activated in the mask under menu option "Settings" → "Output file" (see picture above).

After the option has been activated, the "Scrap limit(s)" function is enabled in the "Settings" area, with the help of which the scrap limits can be viewed or created.
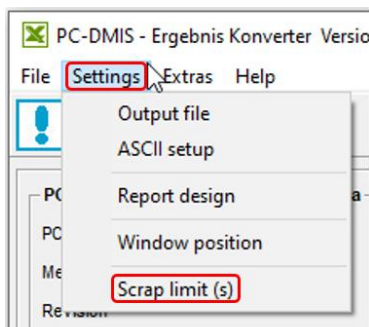
6.2. How to view and create Scrap limits

If scrap limits are to be displayed or newly created, a measuring routine must be active in PC-DMIS for which the scrap limits have been (or are to be) defined.

After selecting the "Scrap limit(s)" function, a list of scrap limits calculated according to nominal values and tolerances is displayed, i.e. Upper scrap limit = Nominal value + Upper tolerance and Lower tolerance = Nominal value + Lower tolerance (if Lower tolerance is displayed as negative in PC-DMIS).

If scrap limits have already been created for the active measuring routine, they are read from an .xml file where they are always stored.

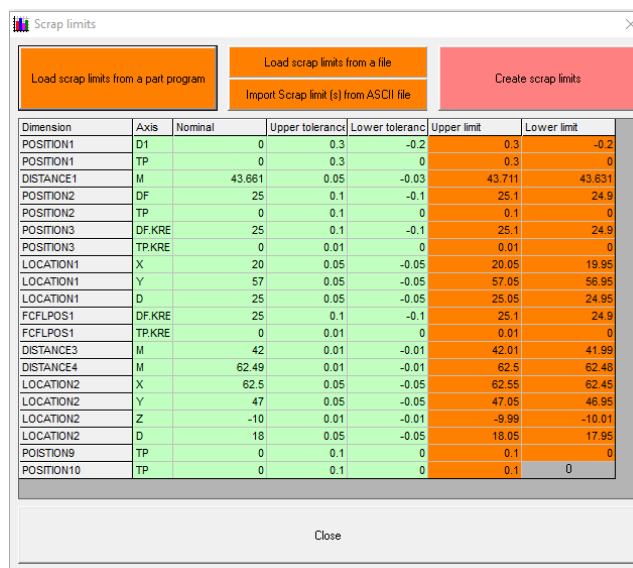After data has been loaded from a measuring routine or a file, it can be edited and saved again.

Scrap limits can be assigned to each measuring routine.

The files are saved under the name of the measuring routine (extension: .xml) and in the folder of the measuring routine.

Dimension	Axis	Nominal	Upper tolerance	Lower tolerance	Upper limit	Lower limit
POSITION1	D1	0	0.3	-0.2	0.3	-0.2
POSITION1	TP	0	0.3	0	0.3	0
DISTANCE1	M	43.661	0.05	-0.03	43.711	43.631
POSITION2	DF	25	0.1	-0.1	25.1	24.9
POSITION2	TP	0	0.1	0	0.1	0
POSITION3	DF.KRE	25	0.1	-0.1	25.1	24.9
POSITION3	TP.KRE	0	0.01	0	0.01	0
LOCATION1	X	20	0.05	-0.05	20.05	19.95
LOCATION1	Y	57	0.05	-0.05	57.05	56.95
LOCATION1	D	25	0.05	-0.05	25.05	24.95
FCFLPOS1	DF.KRE	25	0.1	-0.1	25.1	24.9
FCFLPOS1	TP.KRE	0	0.01	0	0.01	0
DISTANCE3	M	42	0.01	-0.01	42.01	41.99
DISTANCE4	M	62.49	0.01	-0.01	62.5	62.48
LOCATION2	X	62.5	0.05	-0.05	62.55	62.45
LOCATION2	Y	47	0.05	-0.05	47.05	46.95
LOCATION2	Z	-10	0.01	-0.01	-9.99	-10.01
LOCATION2	D	18	0.05	-0.05	18.05	17.95
POISTION9	TP	0	0.1	0	0.1	0
POSITION10	TP	0	0.1	0	0.1	0

6.3. Import scrap limits from a file

If you already have an existing ASCII file with defined scrap limits, you can import and apply them as current scrap limits by using the "Import Scrap limit (s) from ASCII file" function.

The application only needs a pattern telling it where and from which line onward the relevant information is to be read.

You can define this information by accessing the " Import Scrap limit (s) from ASCII file" function.

When the "Import from an ASCII file" menu has been opened, the same ASCII character that was used as delimiter in the file can be defined as delimiter.

After having chosen the "ASCII file selection" option, you have to select the file to be read in.

The data is loaded from the file and displayed in a spreadsheet.
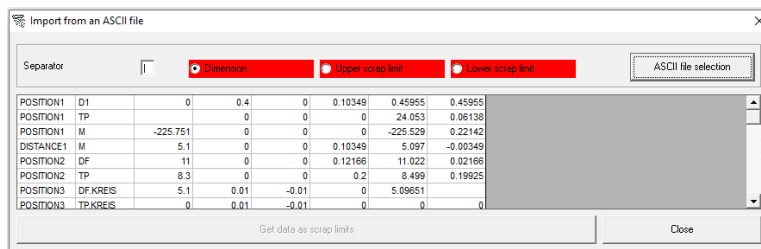
Now you have to define references for the data transfer of three parameters (Dimension, Upper scrap limit, Lower scrap limit). Before any definition takes place, the background color is red.

Double click the cell that includes the first value of the selected parameter. Its coordinates will then be used as the basis for the data transfer. After this, the parameter background will be displayed in green.

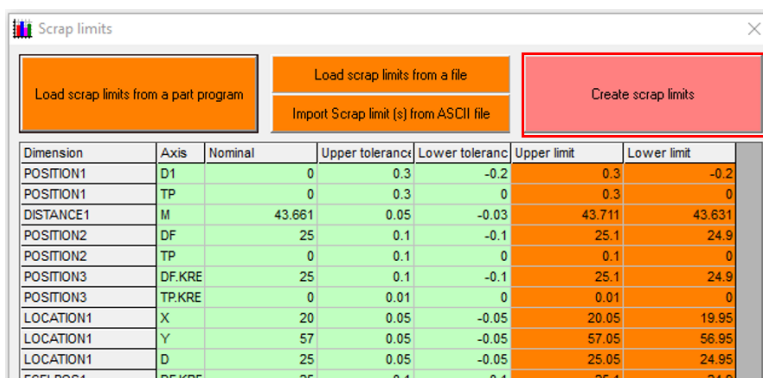By double clicking, you can define the currently check marked parameter (by radio button).

After having set the coordinates for all parameters (meaning that each background is green), the scrap limits derived from the file can be applied. The appropriate Apply button below the spreadsheet will be enabled automatically.

The converter searches for feature names in the scrap limit spreadsheet and replaces already existing scrap limits by those loaded from the ASCII file.

If several features with identical feature names are identified in an ASCII file, the scrap limits of the first feature in the file are assigned to the feature that is displayed first.

In this case it is necessary that the order of features in the file is the same as in measuring routine. The number of features has no relevance here, because converter runs the search for the feature name as first step.

After having applied the data, converter jumps back to the "Scrap limit(s)" dialog box where the loaded values can be viewed and, if required, edited.
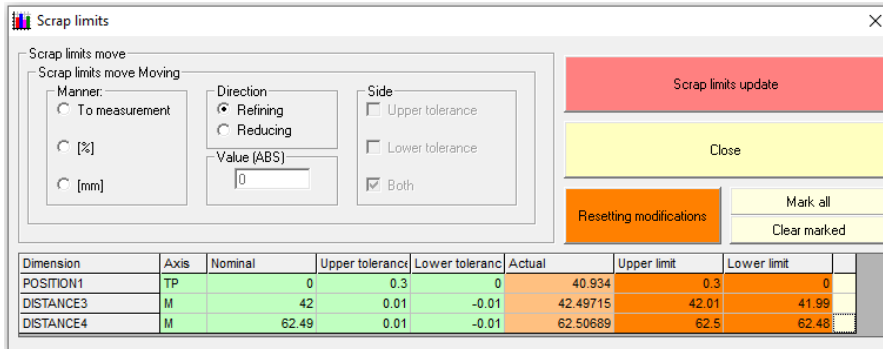

The changed values are written to the .xml file with the "Create scrap limits" button. This is saved under the name of the measuring routine and in the folder of the measuring routine.

6.4. Displaying violated scrap limits after the data transfer

With the "Check scrap limits" function enabled and after having completed the transfer of the measurement data to the target file, the actual measured values are compared with the scrap limits.

Values that are out of scrap limit are shown in a dialog box.

At this point, the operator is able to move the scrap limits:

- To translate on measurement value.
- Decrease or increase by percentage on one side.
- Decrease or increase by percentage on both sides.
- Decrease or increase by value on one side
- Decrease or increase by value on both sides

The listed functions are applied only to the rows marked in the last column.

If you want to move the limits by another value, you can do it directly in the table.

Changes that are to be applied must be confirmed with the "Update scrap limits" button.

7. Special functions of the converter

In addition to the conversion functions described above, the converter also includes two other functions that are often used in practice, which will be described in this chapter.

7.1. Excel Online

7.2. Function

Parallel to the PC-DMIS™ measuring routine or during manual measuring with PC-DMIS™, Excel can be switched in parallel. This function is provided by the converter. All retrieved dimensions are written directly (online) into the open excel spreadsheet.

7.3. Supported Excel version

The function was tested with the following Excel version under Windows XP:

- Office 2003 (Format xls)
- Office 2007 (Format xls, xlsx)

If problems occur with other Excel versions, please notify your software supplier.

7.4. Starting the connection

- Do not open Excel.
- Start the PC-DMIS™ - Result Converter.
- Click the Excel button ⊠ on the converter toolbar
- The user interface of the result converter is hidden and the "Get values online" window (see below) is opened.

The connection has been enabled. The actual-size view is divided in a 2:1 ratio between PC-DMIS™ and Excel.

7.5. How to work with Excel Online

Now, you should see the following screen view:
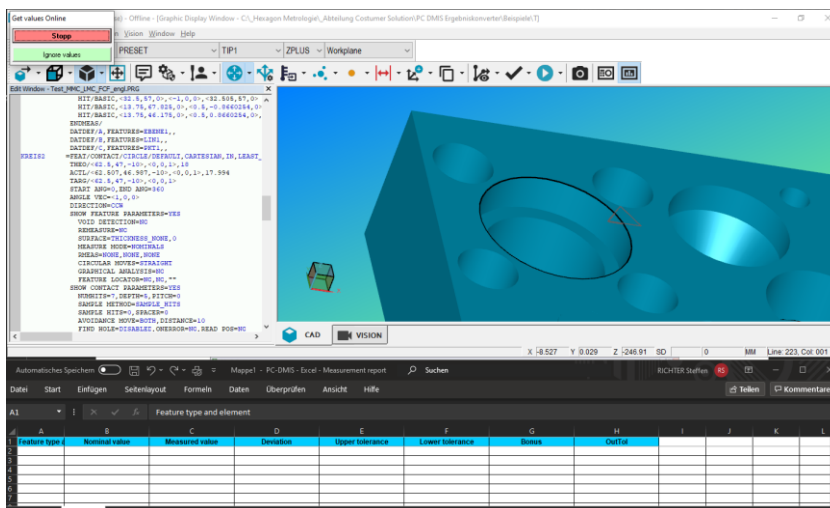
The following functions can be selected by pressing the respective button in the "Get values online" window located at the top left:

- Stop

  The window is closed and the user interface of the r esult converter is opened. The Excel table remains open and can be closed manually if necessary.

- Ignore values

  No values are transferred during the execution of the measuring routine.

  To make it clear that this function is active , the background color and the designation of the button change.
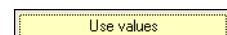
  After starting the connection (see above) this function is not active.

If the "Ignore values" function (see above) is deactivated, the dimensions are transferred to the open Excel table one after the other after the start of the measuring routine.

Subroutines are also supported by this online function as they are processed during run time.

7.6. Working with result converter in a loop

- Call at the beginning of the loop::

    In the PC-DMIS measurement routine, a *.BAT file must be called after the start of the loop, which is set up in such a way that the data is transferred _online_ (example see: Difference Online - Offline conversion) from PC-DMIS. After calling the result converter, it is recommended to insert a pause of 2-3 seconds. This ensures that the result converter is completely started before receiving the data. If there are several (possibly longer) measurements between the start and the first features, this pause can be shortened or omitted if necessary.

    A protocol comment for documentation with the content "EEK" must be inserted before the end of the loop. This causes the converter to send data to the Excel table and the converter to be closed. A pause of 1-2 seconds must be inserted after this comment. This ensures that the result converter is completely closed before it is started again. If the pause is missing and the result converter is not closed, the data of the next measurement cannot be taken over.

    Example:

```
V1          =LOOP/START,ID=YES,NUMBER=5,START=1,SKIP=,
              OFFSET:XAXIS=0,YAXIS=0,ZAXIS=0,ANGLE=0
            EXTERNALCOMMAND/NO DISPLAY, NO WAIT ; C:\FACTORY\Loop.BAT
            COMMENT/OPER,NO,FULL SCREEN=NO,AUTO-CONTINUE=YES,TIME DELAY=3,OVC=NO,
              Result converter will be started
CIR1        =FEAT/CONTACT/CIRCLE/DEFAULT,CARTESIAN,IN,LEAST_SQR
              THEO/<20,57,-6>,<0,0,1>,25
              ACTL/<20,57,-6>,<0,0,1>,25
              TARG/<20,57,-6>,<0,0,1>
              START ANG=0,END ANG=360
              ANGLE VEC=<1,0,0>
              DIRECTION=CCW
              SHOW FEATURE PARAMETERS=NO
              SHOW CONTACT PARAMETERS=NO
FCFCIRTY1   =GEOMETRIC_TOLERANCE/STANDARD=ASME Y14.5,SHOWEXPANDED=NO,
              SIZE/NOMINAL=25,UPPER TOLERANCE=0.01,LOWER TOLERANCE=0.01,
              SEGMENT_1,CIRCULARITY,0.01,TOL_ZONE_MATH=DEFAULT,
              FEATURES/CIR1,,
$$ NO,
              EEK
            COMMENT/OPER,NO,FULL SCREEN=NO,AUTO-CONTINUE=YES,TIME DELAY=1,OVC=NO,
              Result converter will be closed
            LOOP/END
```

- Call at the end of the loop:

    In the PC-DMIS measurement routine, a *.BAT file must be called after the start of the loop, which is set up in such a way that the data is transferred *online* (example see: [Difference Online - Offline conversion](#)) from PC-DMIS.

    A protocol comment for documentation with the content "EEK" must be inserted before the end of the loop. This causes the converter to send data to the Excel table and the converter to be closed. A pause of 1-2 seconds must be inserted after this comment. This ensures that the result converter is completely closed before it is started again. If the pause is missing and the result converter is not closed, the data of the next measurement cannot be taken.

    Example:

```
V1          =LOOP/START,ID=YES,NUMBER=5,START=1,SKIP=,
             OFFSET:XAXIS=0,YAXIS=0,ZAXIS=0,ANGLE=0
CIR1        =FEAT/CONTACT/CIRCLE/DEFAULT,CARTESIAN,IN,LEAST_SQR
             THEO/<20,57,-6>,<0,0,1>,25
             ACTL/<20,57,-6>,<0,0,1>,25
             TARG/<20,57,-6>,<0,0,1>
             START ANG=0,END ANG=360
             ANGLE VEC=<1,0,0>
             DIRECTION=CCW
             SHOW FEATURE PARAMETERS=NC
             SHOW CONTACT PARAMETERS=NC
FCFCIRTY1   =GEOMETRIC_TOLERANCE/STANDARD=ASME Y14.5,SHOWEXPANDED=NC,
             SIZE/NOMINAL=25,UPPER TOLERANCE=0.01,LOWER TOLERANCE=0.01,
             SEGMENT_1,CIRCULARITY,0.01,TOL_ZONE_MATH=DEFAULT,
             FEATURES/CIR1,,
             EXTERNALCOMMAND/NO_DISPLAY, WAIT ; C:\FACTORY\Loop.BAT
$$ NC,
             EEK
             COMMENT/OPER,NC,FULL SCREEN=NC,AUTO-CONTINUE=YES,TIME DELAY=1,OVC=NC,
             Result converter will be closed
          LOOP/END
```

8. About Hexagon

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety,and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

Learn more about Hexagon (Nasdaq Stockholm: HEXA B) at hexagon.com and follow us @HexagonAB.