CAD/CAQ-Interface

AHP's focus is always on solutions for realizing saving potentials. However, it is rarely possible to reduce efforts from hours to a few minutes! But our CAD/CAQ-Interface accomplishes this objective anyway. The technical basis is the technical drawing created by CAD software. It contains all relevant quality data required for manufacturing the product such as measurements with tolerance specifications. A typical area of serial production is the initial sampling inspection. Here, every measurement is verified exactly.

Workflow

The CAD/CAQ-Interface module supports every CAD system that can be used to produce a 2D IGES or a 2D DXF file. A drawing provided by the engineering department can be utilized in iQ-BASIS by simply opening the file in our inspection planning module for each kind of inspection. If tolerances are not contained in the drawing they could be determined automatically by selecting the corresponding technical standard. After the preparations have been finished the inspection plan is generated and contains one inspection characteristic for each measurement. The graphical representation of a measurement is done using a drop-shaped stamp with the number of the characteristic inside.
The initial sampling inspection makes the maximum use of this feature because it usually involves the largest number of inspections. By creating a total inspection plan the pre-settings for manufacturing can be addressed in one step, too. The possibility to print the drawing including the integrated stamps or to use the inspection plan in one of our inspection modules in combination with measuring devices or machines completes the bandwidth of options.
A change within a drawing would require a restart of the entire process. To overcome this we have invented a comparison mechanism that automatically displays differences between drawings graphically, prompts you to confirm them, and copies unchanged inspection characteristics into a new revision of the inspection plan that can then be used immediately.

Important Features at a Glance

<u>The drawing as an information carrier</u>

- Vector formats as the 2D-IGES or the 2D-DXF format completely supports data exchange between CAD and CAQ independently of the CAD system.
- Our Q layer contains any additionally added Q data.
- An included viewer specifically developed for IGES/DXF display saves further costs at the inspection workplaces that were otherwise required for a CAD viewer program.
- Drawings in bitmap format such as TIF, JPG, or PDF can also be included for manual stamping (with OCR support).

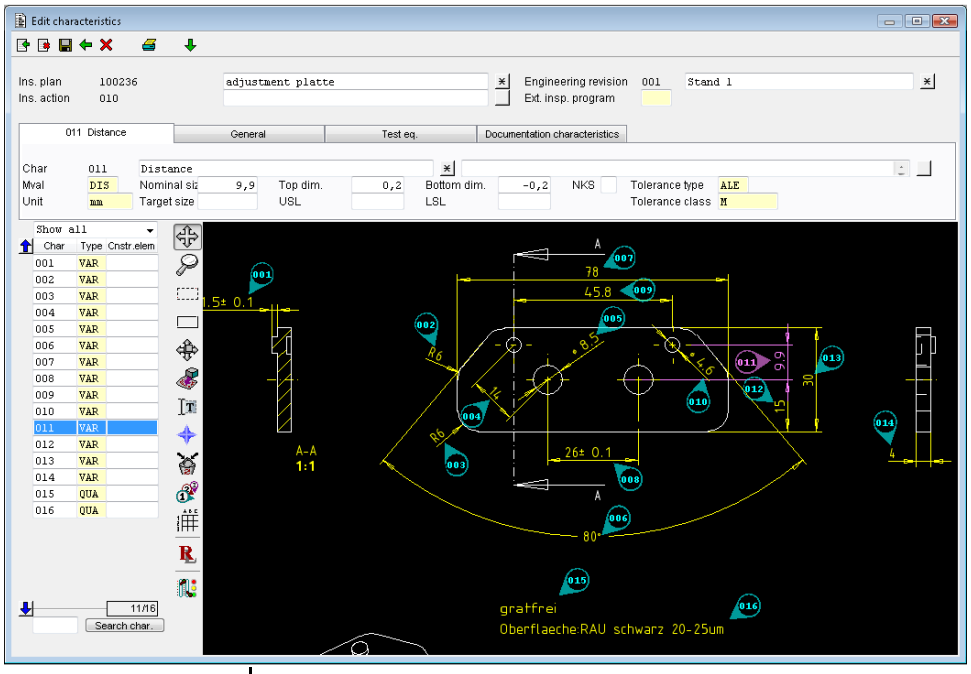
<u>CAD based inspection planning</u>

Preparation

- Complete integration into the *iQ-PLAN* module.
- When invoking the drawing for each measurement within the drawing an inspection characteristic (a consecutive number with a blue stamp) is defined and inserted into the drawing.
- Before generating the inspection plan additional parameters can be added such as the required standard, the number of digits in a stamp or restrictions on the insertion of stamps.

The drawing based inspection plan

- The characteristics taken from the drawing into the inspection plan are listed on the left side of the form.
- If a characteristic is selected in the list its position in the drawing will be made to the center of the pane and it will be highlighted by colored dimensions and lines.



- If a characteristic is selected (clicked) in the drawing it will also be selected in the list.
- Additional information describing the characteristic (grouped by topic) can be viewed and edited on the tabs located above the drawing. For

example, here you can find any data required for planning the measuring process (such as sampling data, action and warning limits, measuring devices and so on).

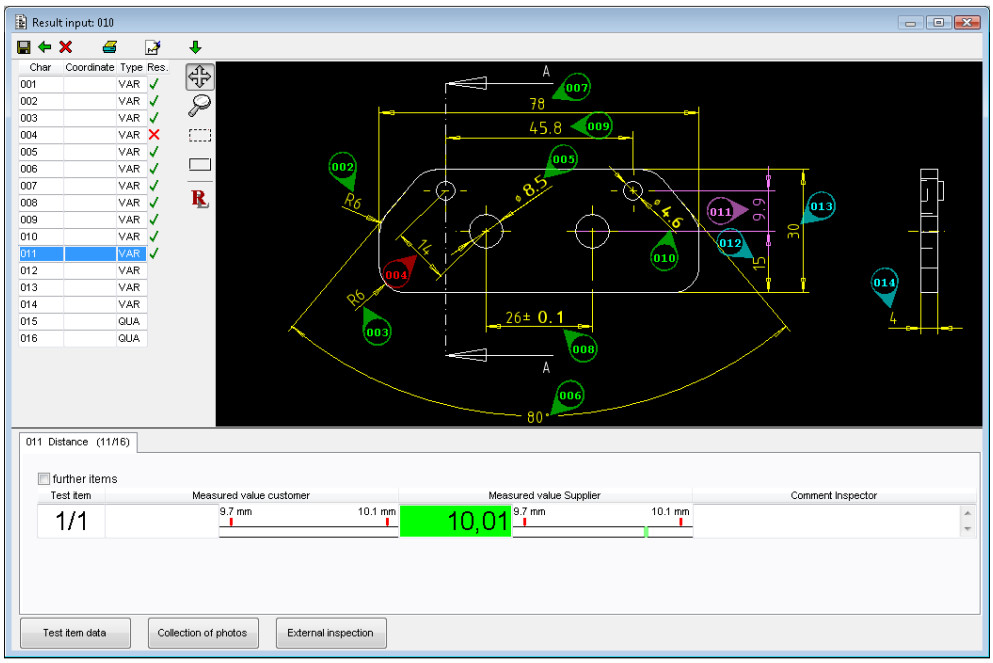
- Support of a number of tolerance tables for determining the tolerances in case of missing specifications within the drawing.
- Deleting and adding a new characteristic (stamp).
- Renumbering on automatically identified views.
- Marking a construction element including the option to assign several characteristics to it.
- Copying a construction element including assigned characteristics. In case of identical construction elements (such as multiple identical diameters) this will generate duplicates of characteristics.

Multiple different measuring devices / inspection plans

- Usually a complex part cannot be measured by using a single device. And often there are multiple measuring workplaces where several characteristics to a single inspection operation are combined.
- Easy assignment of a measuring device and transfer to other characteristics.
- Separation into multiple inspection places or groups of inspection places that afterwards will get an own inspection plan.

Inspection within a drawing

- The drawing with its graphical user dialogue makes inspection much easier. For example the characteristic that should be measured next is highlighted in purple and can therefore be identified very quickly.
- Entry of a measurement can be done using the keyboard or a connected measuring device. The result will be displayed graphically as a bar.
- After a characteristic has been measured the program automatically activates the next one. Alternatively it is possible to choose manually, too.
- Highlighting of the characteristic in green or red (tolerance exceeded). Characteristics that are shown in blue have (still) not been inspected.



- Entering the results for attributive characteristics is done using the error code table.
- In case of initial sampling inspection either the supplier or the recipient can perform the inspection.
- Measurements can be edited until the form is left.

General features of the viewer

- Moving, enlarging, and minimizing the drawing.
- Moving and rotating stamps to make overlaid information visible.
- Printing of the drawing.

Interfaces to third-party software

For further processing of the inspection plan or inspection order data these can be exported to a third-party system in different formats:

- DFQ (Q-DAS)
- XLS (Excel)
- XML
- SAP

Interface to Calypso (Zeiss)

iQ-CAD-Interface provides data from the inspection plan to Calypso using the DFQ format. Therefore it is available for developing a measuring program to control a coordinate measuring device. Required customizations of the interface between Calypso and iQ-BASIS to reflect improvements in both systems will be specified and integrated together by both companies to satisfy the needs of their customers.

Interfaces to Other iQ-BASIS Modules

- *iQ-PLAN* as basis for creating and managing inspection specifications from drawings
- *iQ-PAUF* as basis for applying the different kinds of inspections (such as iQ-EMP) by capturing the measurements – either by hand or by taking values from a machine