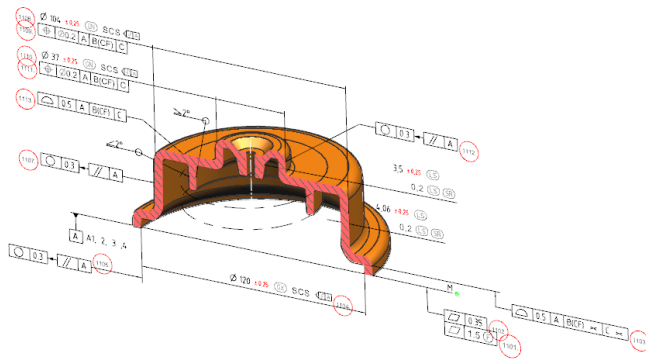


Handling of BSH 3D-Product Specification



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Scope

At BSH Home Appliances Group and its subsidiaries, new CAD designs are gradually changing the CAD methods for dimensioning, drawing derivation and display formats.

BSH's goal is a model-based enterprise strategy, or MBE strategy for short. The claim is to improve the efficiency, quality and flexibility of business processes by seamlessly exchanging digital models and information between the various departments, processes and systems of BSH and its suppliers.

But what does this mean for BSH suppliers?

In step 1, this means the usage of 3D CAD models as the central element for product data communication and process management, according to ISO 16792. The information contained in these models includes all relevant information about a product, including design, manufacture, maintenance, repair and disposal. Also called MBD (Model Based Definition) or 3D-PMI (Product Manufacturing Information).

As a supplier, you will therefore no longer receive a 2D drawing in future, but an interactive drawing based on the 3D CAD model. BSH uses the "JT" format, according to ISO 14306, as a legally binding communication format for this purpose. In addition, BSH also provides the 3D PDF format as an alternative.

Unfortunately we can't provide STEP242 right now, as we detected some translation issues.

Furthermore, in combination with MBD, the increased use of ISO GPS, shall ensure an interpretation free and semantic communication for human and machine.

Step 2 and beyond is about deeper integration of supplier quality data and its visualization, as well as automated programming, measurement, verification and so on.

View structure

At BSH Home Appliances Group and its subsidiaries, a harmonized model view structure has been established. This structure follows the ISO-GPS (Geometrical Product Specifications) and functional tolerance approach, ensuring that each functional feature is described with at least one model view.

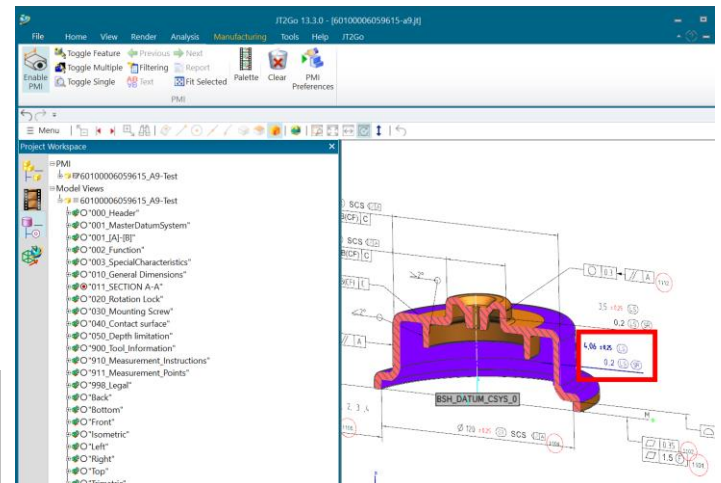
In this view structure, the initial standard views are organized within the first 10 sort IDs, ranging from 000 to 009.

The first feature view is then assigned the sort ID 010. Subsequent features are assigned a new range of 10 views, meaning that the second feature starts at sort ID 020. This pattern continues for each additional feature. This approach ensures a systematic and consistent representation of functional characteristics through the use of model views.

000_Header	This View is meant for Title block Information, Additional fields,...
001_MasterDatumSystem	ISO 5459 (GPS - Geometric tolerances - Reference points and reference systems)
002_Functions	This Views are meant for more detailed Information about Functions, Features, Interfaces and Contact Faces which will be specified in the following views of Range 010 - 899
003_SpecialCharacteristics	Product and process characteristics that have influence on safety, functional capability, esthetics or further workability
004-009_<Assembly Views>	These Views are meant for special assembly views, like explosion, variant overview, mounting sequence
010-899_<FEATURE>	At least one Model View for each Function of a Feature, according 002_Functions
900-997_<Additional Views>	This Views are meant for more detailed title block Information and Part like measurement, surface and tooling information
998_Legal	As MDB has no title block and drawing frame anymore, the legal information is placed in a separate view.

Associated Geometry

To ensure clear and unambiguous readability of every tolerance and dimension, users have the ability to highlight the associated faces and edges by selecting the corresponding object in the viewer. This feature enhances the interpretation and understanding of the displayed information.



How to open a "JT" file?

The "JT" format, which stands for "Jupiter Tessellation", is widely recognized for its efficient representation of complex 3D geometry while maintaining a relatively small file size. This makes it ideal for sharing and exchanging 3D models across various platforms and applications. If your product data management system does not support "JT" files, there are non-commercial JT file viewers available that allow users to view and interact with JT files without the need for commercial CAD software.

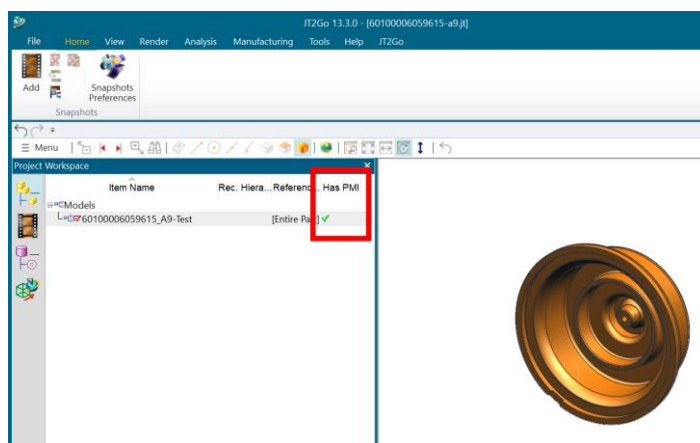
Two popular non-commercial JT viewers are JT2Go, a lightweight viewer provided by Siemens PLM Software, and Glovius, a free JT viewer offered by Geometric Solutions. These viewers enable users to open, rotate, zoom, and inspect JT files, providing a convenient way to visualize and review 3D models in the JT format. It's important to note that, currently, only the JT2Go viewer has been evaluated by BSH. Therefore, the following instructions were created based on the JT2Go viewer (version 13.3.0.20211108.01).

To download the JT2Go viewer, please click on the following link:

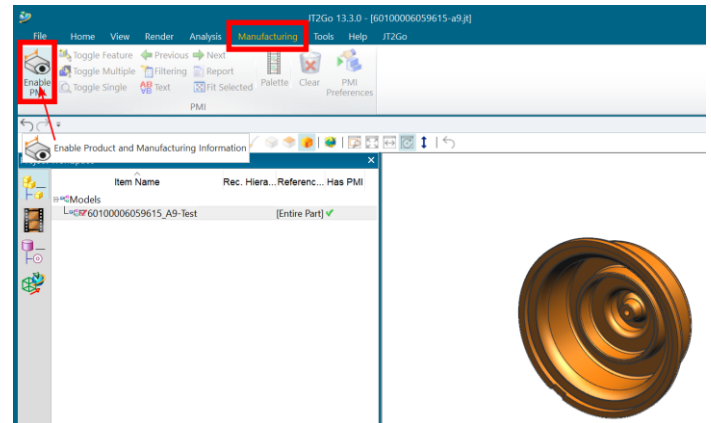
<https://www.plm.automation.siemens.com/global/en/products/plm-components/jt2go.html>

HOW TO VIEW 3D-PMIS WITH JT2GO?

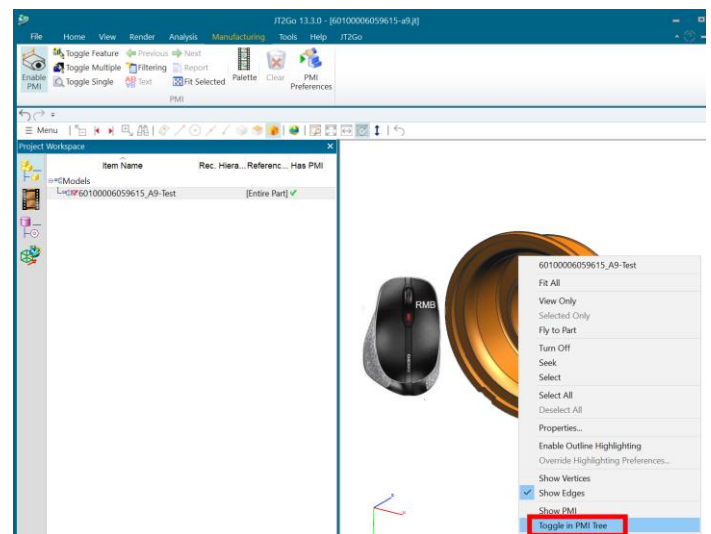
To verify the availability of PMI data in the JT file before visualizing more than just the geometry, you can check the green checkbox symbol in the Assembly Navigator. This checkbox is located in the "Has PMI" column. If the column is not visible, you can right-click on the header line and select the option to activate the "Has PMI" column.



Furthermore, please ensure that the application PMI is enabled in the ribbon "Manufacturing". Fortunately, this is a necessary one-time action.

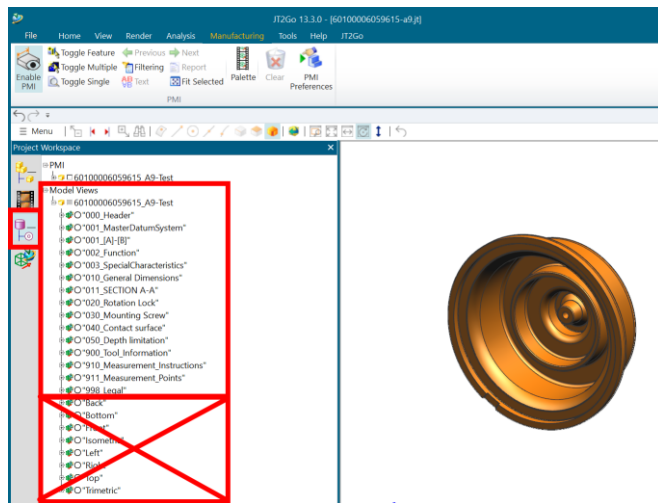


There are multiple ways available to display the PMIs, which are organized in specific model views. The suggested approach for single part involves right-clicking on the geometry to access the desired information.

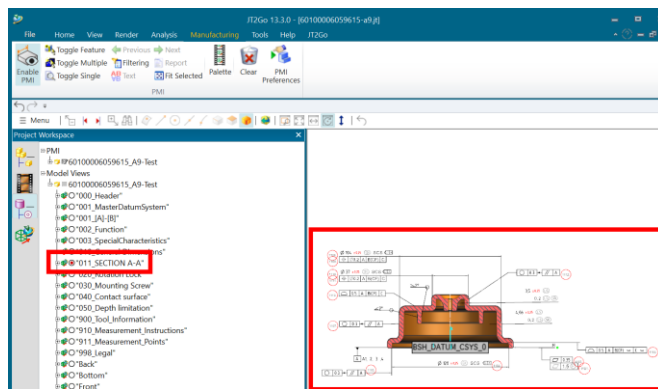


By left-clicking on the "Toggle in PMI Tree" option, the PMI and Model Views groups will be displayed in the "PMI" tab of the Project Workspace.

You can expand the Model Views group and the component node to view all the model views. Please note that only views starting with a 3-digit number are considered relevant:

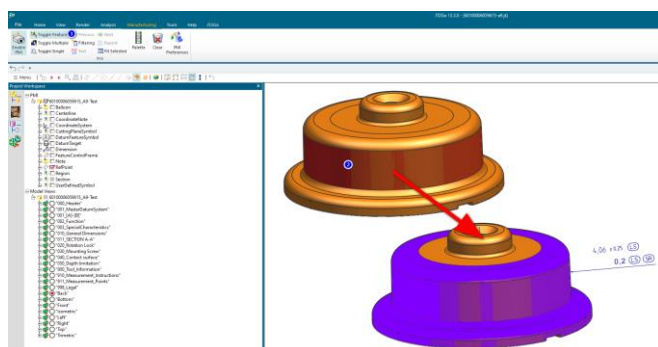


By selecting a specific model view, users can now access the prepared dynamic PMI model views. The interaction is facilitated through standard mouse functions.



PMI FOR SPECIFIC GEOMETRY

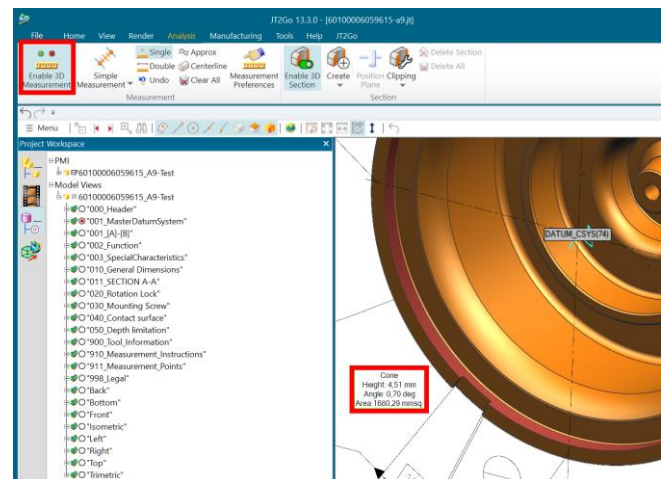
To view specific geometry and its associated PMIs, you can utilize the "Toggle Feature" option located in the "Manufacturing" ribbon. By left-clicking on the desired geometry, all relevant PMIs will be displayed.



To reset the selection, simply click on the "Clear" option. This will clear the current selection.

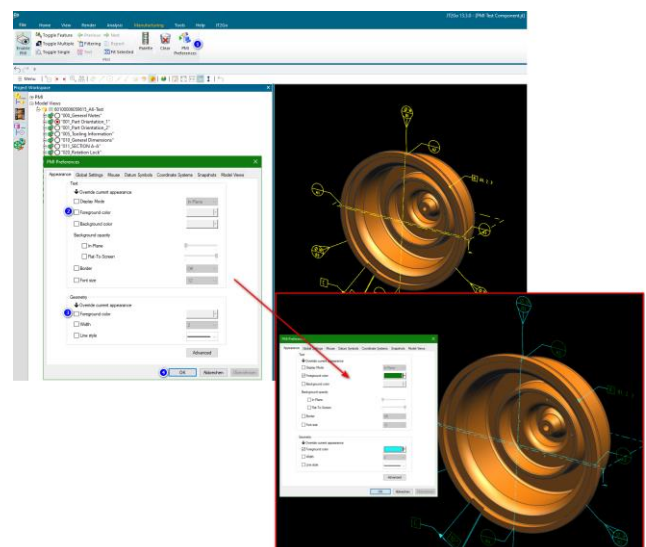
MEASURE

By enabling the "3D Measurement" application in the "Analysis" ribbon, users can access and utilize the measurement tool. This tool allows users to perform various measurements on the displayed models, including line measurements, distance measurements, angle measurements, and area measurements.



IS PRINTING POSSIBLE?

Generally, it is not recommended to use these documents for 2D printouts, as they may not fully capture all aspects of a view, dimension or tolerance. In case the PMI coloring needs to be adjusted, please open the "PMI Preferences":



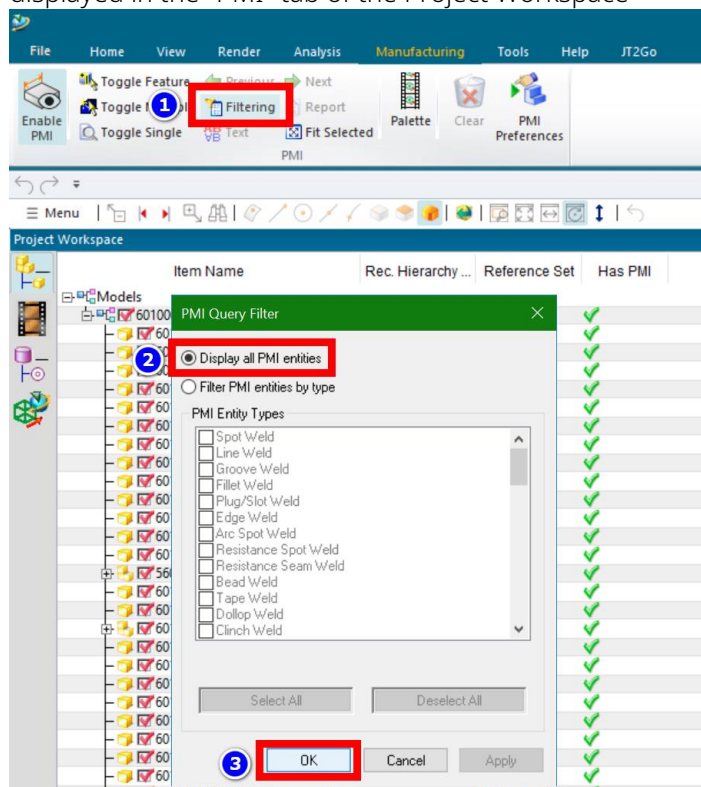
By Change of the "Foreground" color of both the "Text" and the "Geometry" the PMI coloring will be changed.

ASSEMBLIES

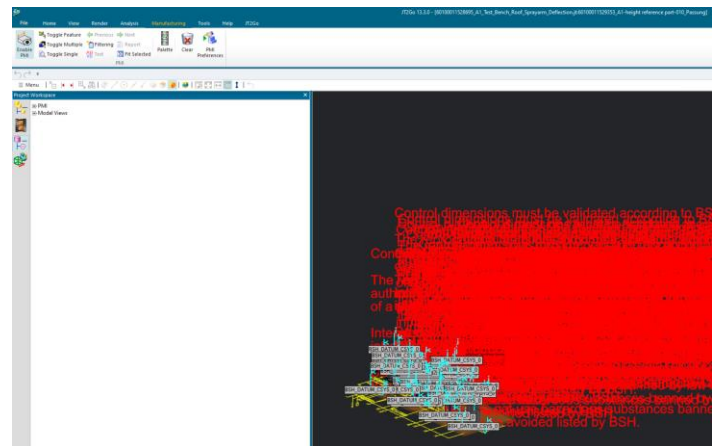
BSH provides assembly data in the Mono-JT format, which includes not only the data of the main assembly node but also the data of its sub-components and assemblies. This means that the Mono-JT format contains all the necessary information regarding the geometry and specification of the entire assembly. By expanding the assembly structure, you can easily access the specifications of the sub-components and assemblies within the Mono-JT file.

Unfortunately for Assemblies another approach than for single parts is necessary. It involves left-clicking on the “Filtering” function in the “Manufacturing” ribbon to access the desired information.

Normally no action is required in the appearing "PMI Query Filter" dialog, if checkbox "Display all PMI entities" is enabled. By left-clicking on the "OK" button, all the PMI and Model Views groups of the whole assembly will be displayed in the "PMI" tab of the Project Workspace

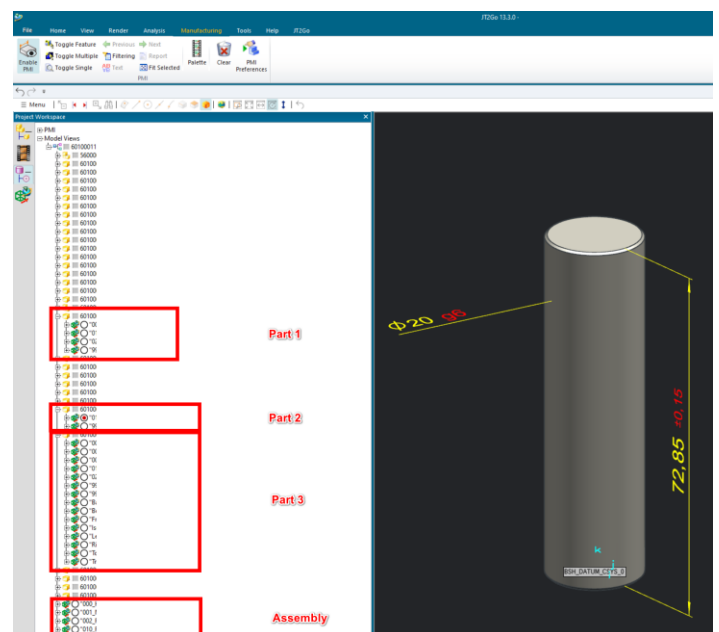


Now you can see why a different approach is recommended for single parts. In the graphic window, an opaque clump appears. This clump will disappear as soon as a specific model view is selected.



However, also using this approach, the "PMI tree" with the PMI and model view groups is displayed in the "PMI" tab of the project workspace. The difference is that all subcomponents and subassemblies are also listed at the top of the Model views group. Nevertheless this approach can also be used for single parts.

You can now expand the Model views group and the assembly node to display all model views of any subcomponent and subassembly.

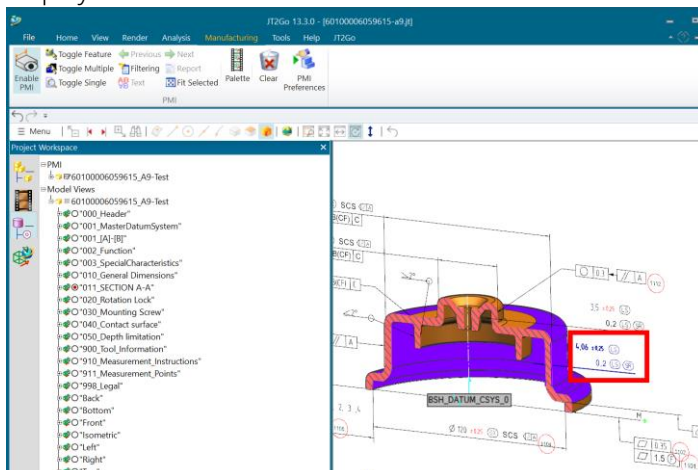


JT viewer handout VIEW STRUCTURE

000_Header	This View is meant for Title block Information, Additional fields,...
001_MasterDatumSystem	ISO 5459 (GPS - Geometric tolerances - Reference points and reference systems)
002_Functions	This Views are meant for more detailed Information about Functions, Features, Interfaces and Contact Faces which will be specified in the following views of Range 010 - 899
003_SpecialCharacteristics	Product and process characteristics that have influence on safety, functional capability, esthetics or further workability
004-009_<Assembly Views>	These Views are meant for special assembly views, like explosion, variant overview, mounting sequence
010-899_<FEATURE>	At least one Model View for each Function of a Feature, according 002_Functions
900-997_<Additional Views>	This Views are meant for more detailed title block Information and Part like measurement, surface and tooling information
998_Legal	As MDB has no title block and drawing frame anymore, the legal information is placed in a separate view.

ASSOCIATED GEOMETRY

To ensure clear and unambiguous readability of every tolerance and dimension, users have the ability to highlight the associated faces and edges by selecting the corresponding object in the viewer. This feature enhances the interpretation and understanding of the displayed information.

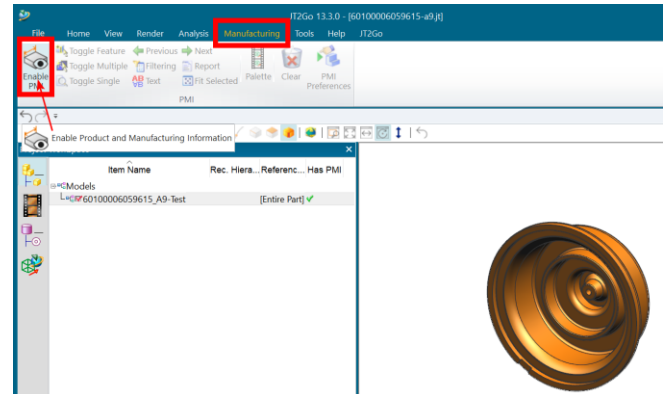


HOW TO VIEW 3D-PMI IN JT

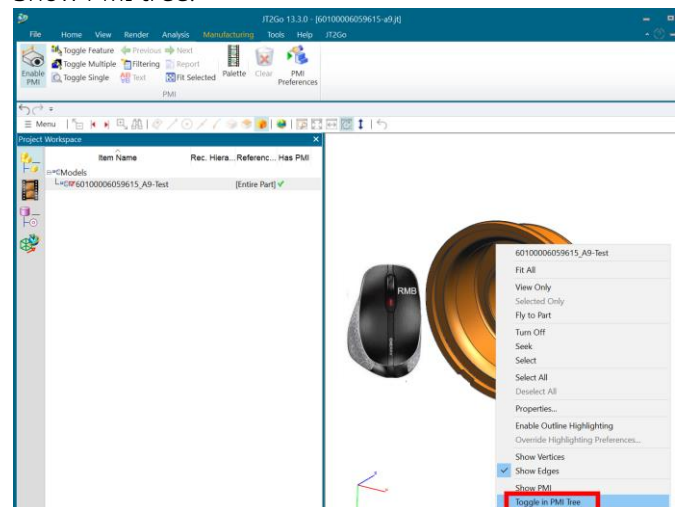
To download the JT2Go viewer, please click on the following link:

<https://www.plm.automation.siemens.com/global/en/products/plm-components/jt2go.html>

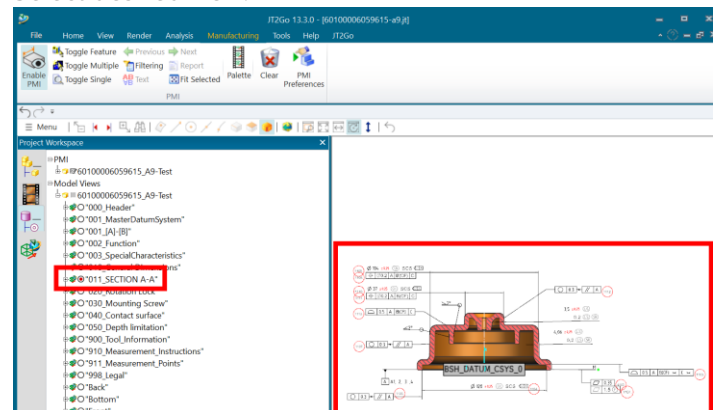
Ensure PMI module is enabled:



Show PMI tree:



Select desired view:



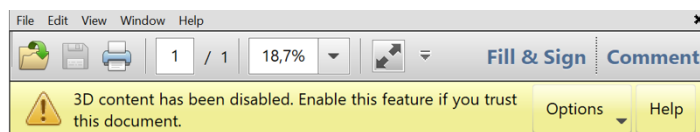
How to open a "3D-PDF" file?

A 3D-PDF is a file format that allows for the embedding of 3D models, animations, and other interactive content within a PDF document.

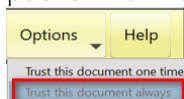
Please be informed that for BSH Home Appliances Group and its subsidiaries, the JT format is the officially recognized and legally binding communication format. This is because the 3D model available in the 3DPDF format is not an exact representation of the geometry in NX. The geometry in the 3DPDF is tessellated and compressed. If you require precise geometry for your process, we strongly recommend using the JT file format. As non-commercial 3D-PDF viewer, BSH recommends Adobe Acrobat Reader DC (32-bit version). To download the Adobe Acrobat Reader DC (32-bit version), please click on the following link:

<https://get.adobe.com/de/reader/>

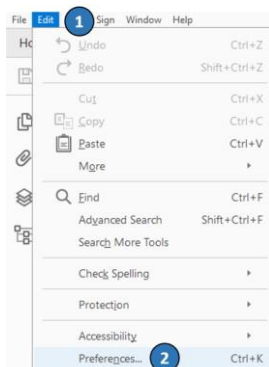
Without making any changes to the settings of Adobe Acrobat Reader DC, you will see the following warning message displayed at the top of the graphical window:



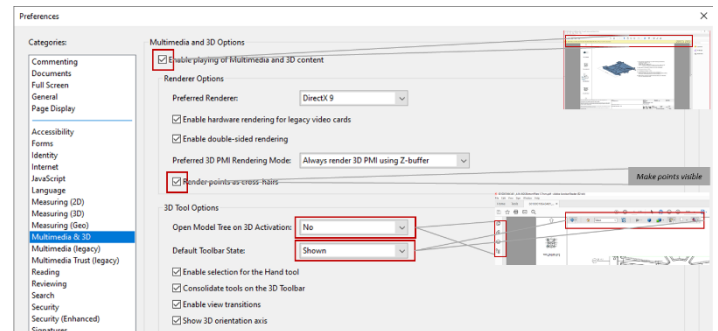
As a security measure, 3D content is disabled by default due to potential risks associated with data from non-trusted sources. To enable the document and its content, you can find the option to trust it in the dropdown menu labeled "Options" within the warning message.



However, it is necessary to enable this feature again each time a 3D PDF is opened or when the release is made once in the general program settings.

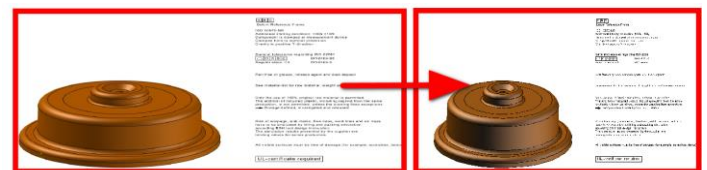


Beside enabling 3D-content some additional settings are recommended:

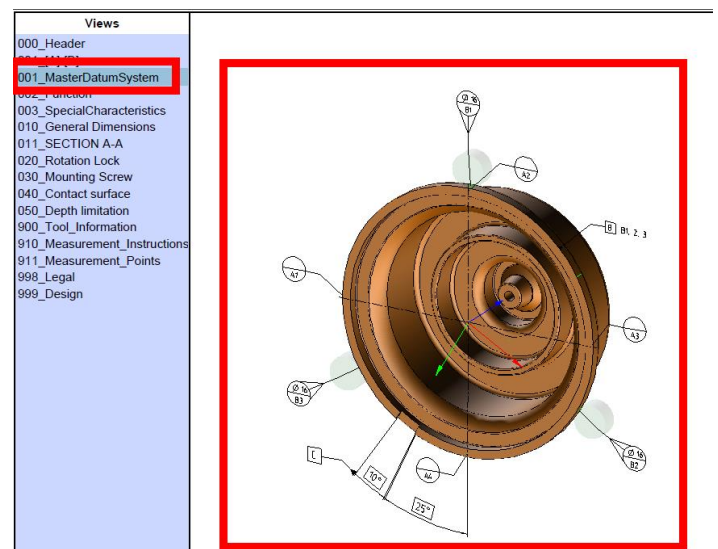


HOW TO VIEW 3D-PMIS WITH 3D-PDF?

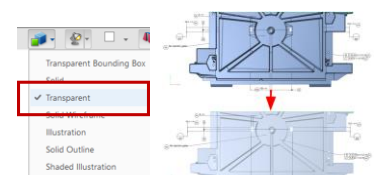
Once the 3D content is enabled, it may be necessary to perform a left-click within the graphical window to release the dynamic PMI model views:



By selecting a specific model view, users can now access the prepared dynamic PMI model views. The interaction is facilitated through standard mouse functions.



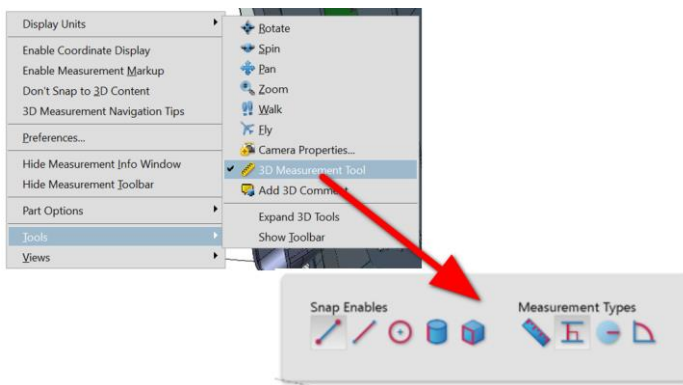
If extension lines of PMIs are hidden by geometry, switching the model render mode to "Transparent" could be helpful.



MEASURE

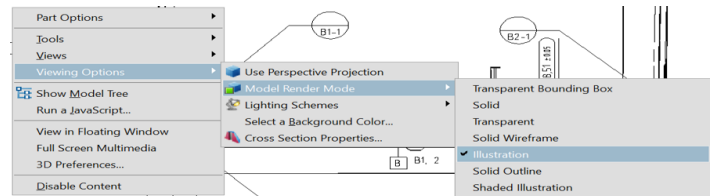
For exact measures, please use the JT format. This is because the 3D model available in the 3DPDF format is not an exact representation of the geometry in NX. The geometry in the 3DPDF is tessellated and compressed. If you require precise geometry for your process, we strongly recommend using the JT file format.

By enabling the "3D Measurement Tool" in the right-click menu of the graphical window, users can access and utilize the measurement tool. This tool allows users to perform various measurements on the displayed models, including line measurements, distance measurements, angle measurements, and area measurements.

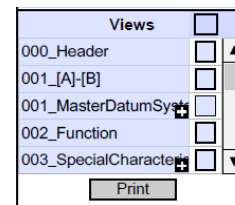


IS PRINTING POSSIBLE?

Generally, it is not recommended to use these documents for 2D printouts, as they may not fully capture all aspects of a view, dimension, or tolerance. However, if printouts are necessary, it is recommended to use the "Illustration" model render mode.



Furthermore on the left bottom corner BSH 3D-PDF provides an additional field to print selected views:



Please be aware, that your standard printer will be used and any selected view will result in one piece of paper.

ASSOCIATED GEOMETRY

In case a situation encounters where selecting PMI does not highlight the associated geometry, please check the Adobe Reader preferences. Ensure that the option "Enable Protected Mode at startup" is turned off. Additionally, in the Multimedia & 3D section of the preferences, verify that the Preferred Renderer is set to DirectX 9. These settings can help resolve any issues with highlighting the associated geometry when selecting PMI. In some cases, a restart of Adobe Reader may be necessary.

