



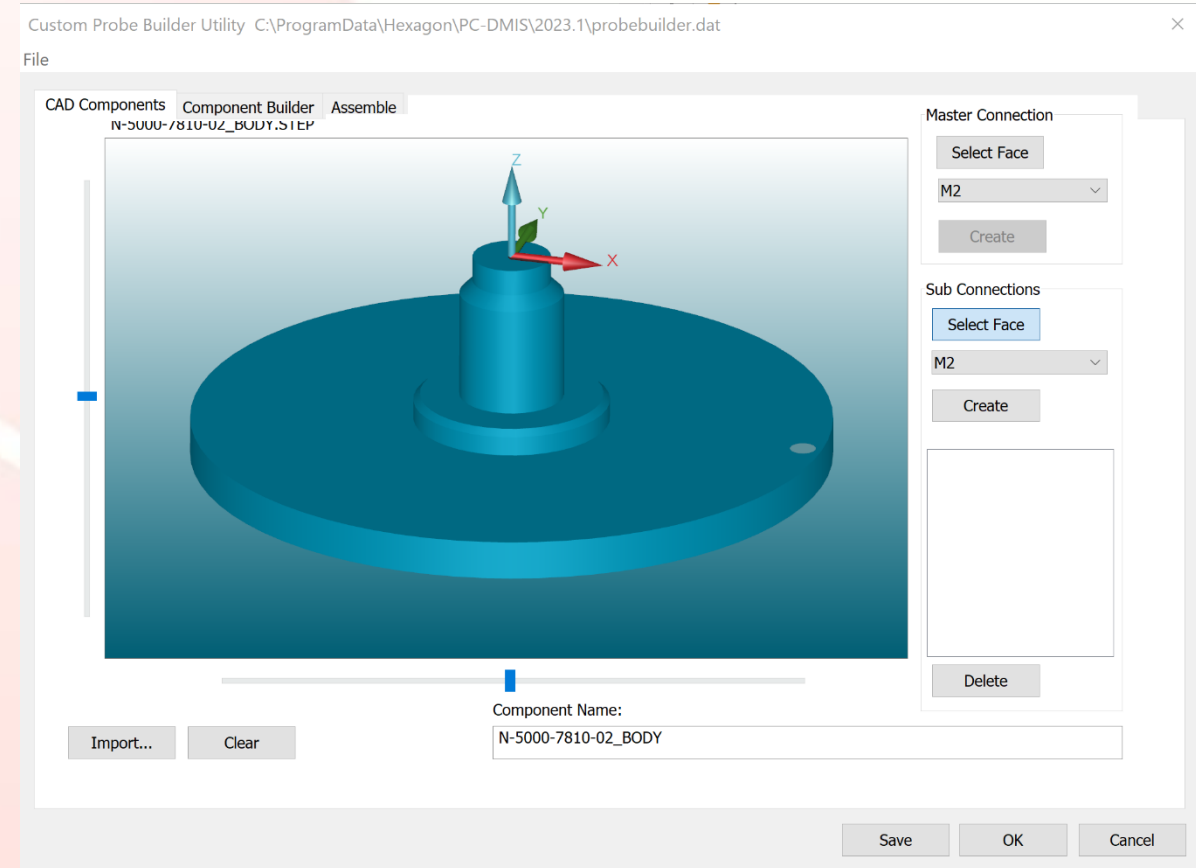
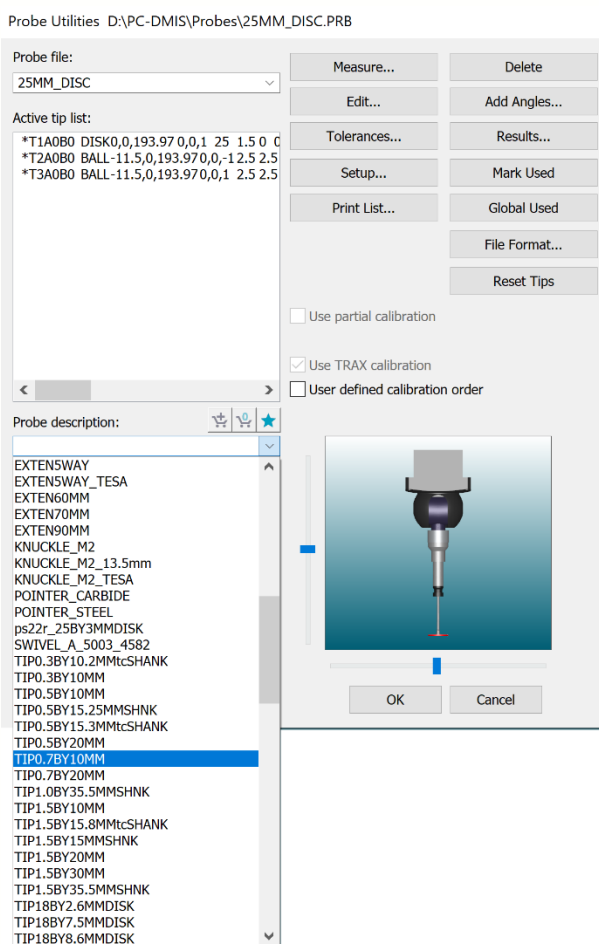
# PC-DMIS

CUSTOM PROBE BUILDER  
DISC PROBE EXAMPLES

## What is the Custom Probe Builder?

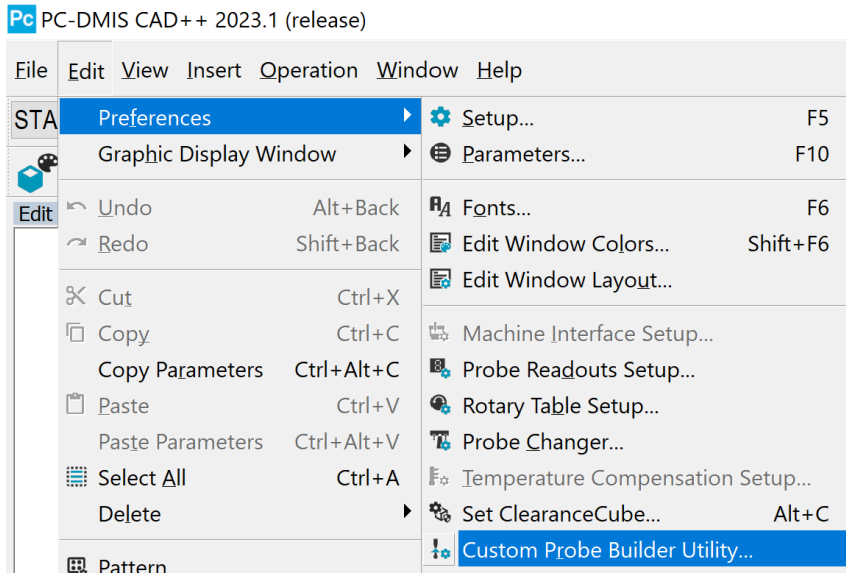
When configuring a new probe, sometimes the inbuilt library of Hexagon and Renishaw Components does not contain a component you wish to use.

PC-DMIS includes a custom probe builder that provides the ability to create components



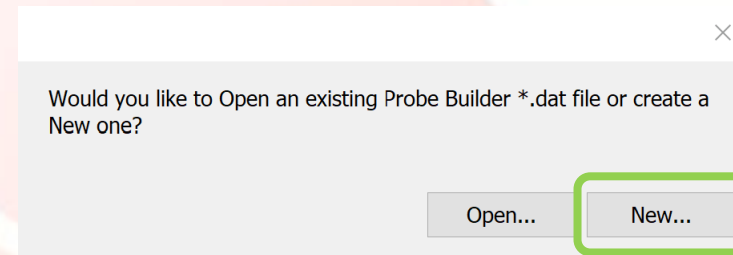
PC-DMIS standard install Probe.dat library of components:  
C:\Program Files\Hexagon\PC-DMIS 2023.1 64-bit\PROBE.DAT

## Accessing the Custom Probe Builder



The Custom Probe builder can be found under the following menus:  
*Edit -> Preferences -> Custom Probe Builder*

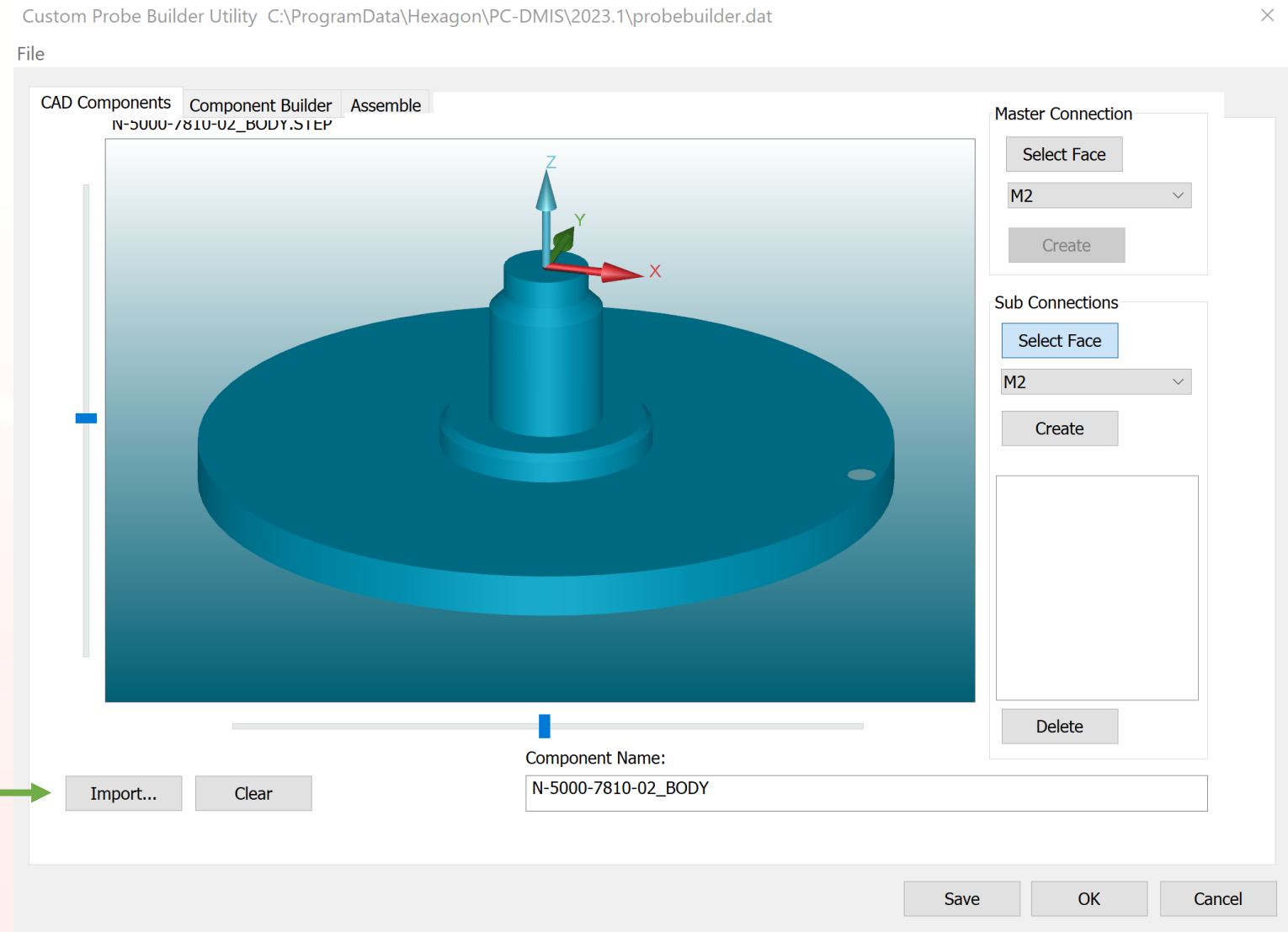
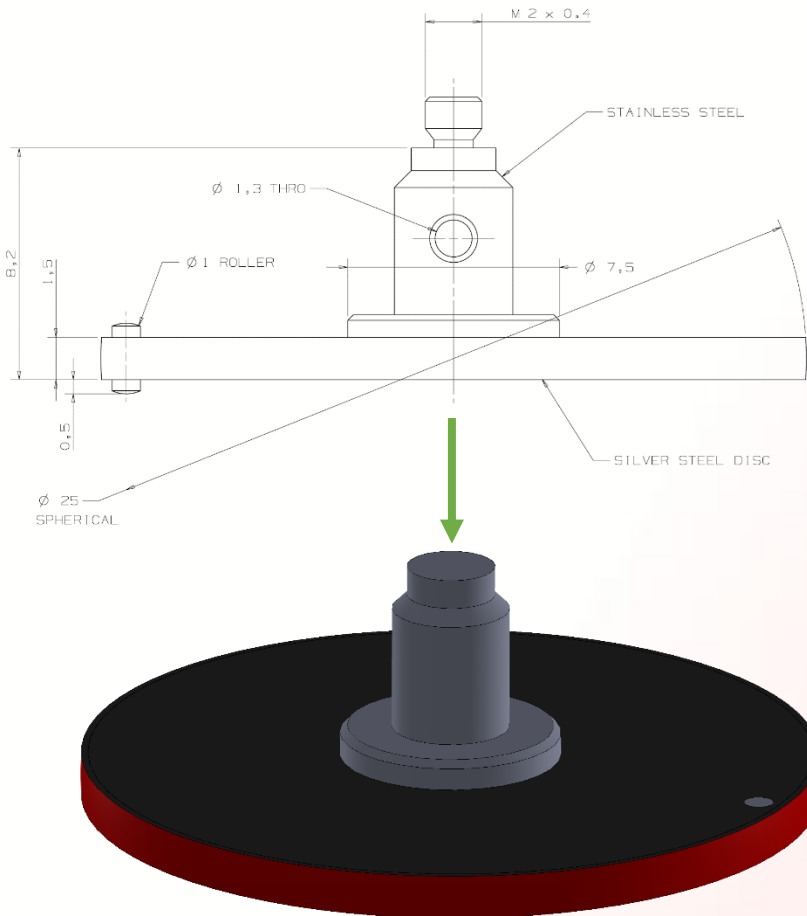
When launching the custom probe builder, you have the option to open an existing probebuilder.dat file or create a new file. If it is the first time using the builder, select New... and a blank probebuilder.dat file will be created.



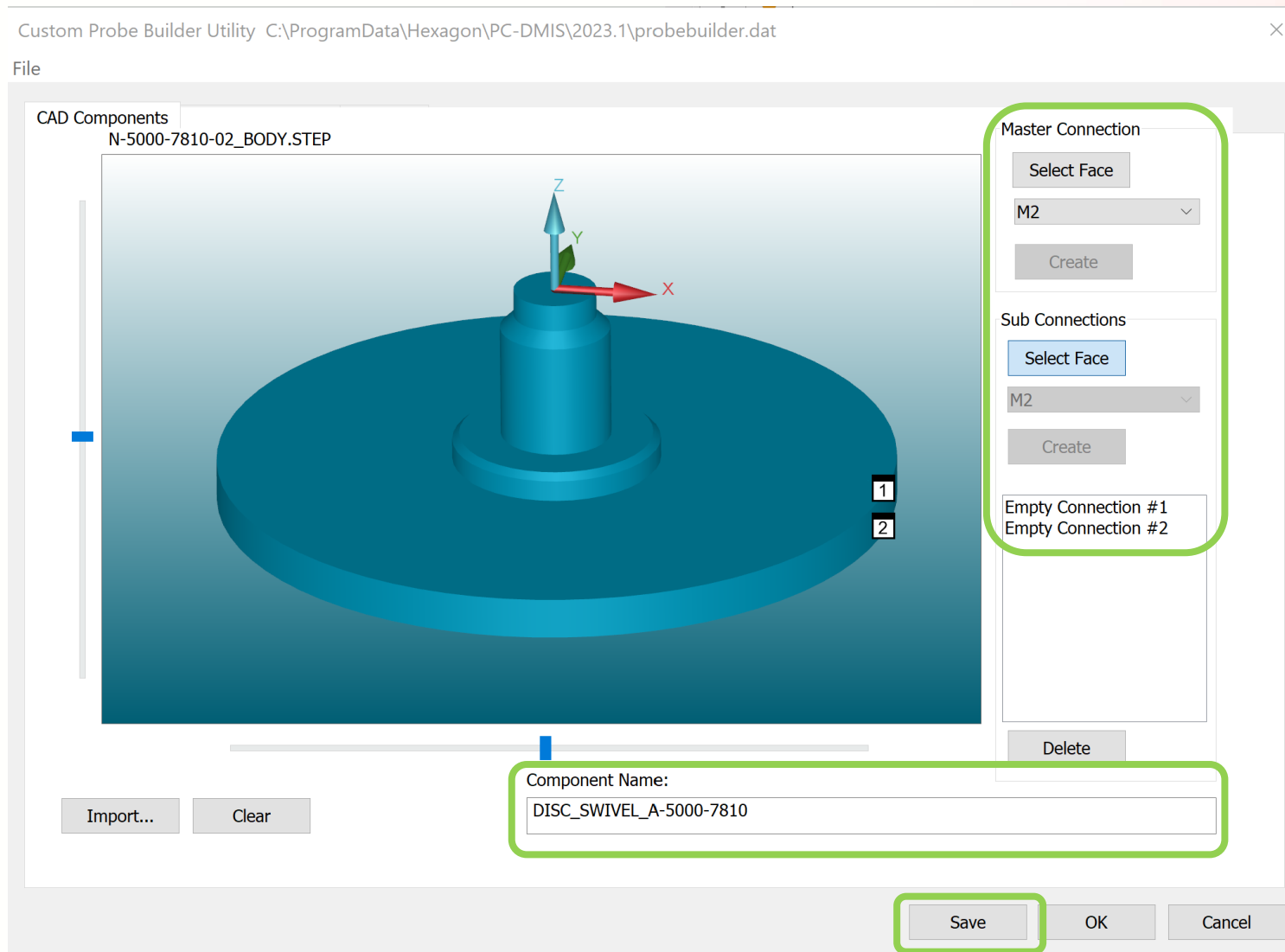
PC-DMIS standard location of probebuilder.dat  
 C:\ProgramData\Hexagon\PC-DMIS\[PC-DMIS Version]\probebuilder.dat

## Importing CAD Components

Model the component in separate CAD software from manufacturers drawings:



## Importing CAD Components – Defining connections



Once the model is imported, you then must establish the type and location of connections.

The master connection is where the custom component will connect to the previous component in the final probe build.

When completed, the trihedron will indicate the center of the connection. Sometimes the trihedron will not snap to the desired location. This must be manually corrected in steps that follow.

If the component has additional sub connections, ensure the correct adapter joint is selected and create the connection. You can more than one sub connection.

Name and save the probe.

## Importing CAD Components – Probebuilder.dat

probuilder.dat - Notepad

File Edit Format View Help

```
ITEM:DISC_SWIVEL_A-5000-7810 M2
cageom 0.000 0.000 0.000 1.000 0.000 -0.000 0.000 1.000 0.000 0.000 -0.000 1.000 -1 N-5000-7810-02_BODY.draw
connect 11.500 0.000 -6.699 -0.000 -0.000 -1.000 M2
connect 11.500 0.000 -8.201 0.000 0.000 1.000 M2
```

The first set of characters following the colon "ITEM:" is the name that appears in the Probe Utilities dialog box when you construct a probe setup. This must be a unique name that is not used in any of the probe.dat files

The second set of characters, "M2" in the above example, defines the type of thread or connection type this item has.

cageom X Y Z II JJ JK KI KJ KK Level FileName

Defines the CAD geometry transformation movements for a specific CAD file.

X, Y, Z - The coordinate location start point. Moves the origin of the CAD file to the start point of the drawing for the probe file.

II - JJ - JK - KI - KJ - KK - The set of three transformation matrices to rotate the CAD csy to the probe csy. If no changes are required, the nominal values would be: cageom X Y Z 1 0 0 0 1 0 0 0 1 Level FileName

Level - The CAD level number as assigned from within PC-DMIS. If no CAD level exists or if there are multiple levels, you may need to create a new level inside PC-DMIS.

FileName - A .draw file which is nothing more than a renamed .cad file.

The location of the .draw file can be found here: C:\ProgramData\Hexagon\PC-DMIS\[PC-DMIS Version]\\*.draw

## Importing CAD Components – Probebuilder.dat

probuilder.dat - Notepad

File Edit Format View Help

```
ITEM:DISC_SWIVEL_A-5000-7810 M2
cageom 0.000 0.000 0.000 1.000 0.000 -0.000 0.000 1.000 0.000 0.000 -0.000 1.000 -1 N-5000-7810-02_BODY.draw
connect 11.500 0.000 -6.699 -0.000 -0.000 -1.000 M2
connect 11.500 0.000 -8.201 0.000 0.000 1.000 M2
```

connect x1 y1 z1 i1 j1 k1 take

Defines a connection point.

x1, y1, z1 - The location of a connection point on the probe system.

i1, j1, k1 - The vector of the connection based on its orientation to the current coordinate system of the probe system. It always points toward the center.

take - The type of thread or connection type that the connect point is compatible with.

## Importing CAD Components – Probebuilder.dat

probuilder.dat - Notepad

File Edit Format View Help

```
ITEM:DISC_SWIVEL_A-5000-7810 M2
cageom 0.000 0.000 0.000 1.000 0.000 -0.000 0.000 1.000 0.000 0.000 -0.000 1.000 -1 N-5000-7810-02_BODY.draw
connect 11.500 0.000 -6.699 -0.000 -0.000 -1.000 M2
connect 11.500 0.000 -8.201 0.000 0.000 1.000 M2
```

"connect" defines any location where another item can be added to the current item.

Each connection must include a Connection Identifier to define the type of item it can take.

Connection Identifier Listing:

M2 - Specifies that it can connect a M2 threaded device.

M3 - Specifies that it can connect a M3 threaded device.

M4 - Specifies that it can connect a M4 threaded device.

M5 - Specifies that it can connect a M5 threaded device.

M8 - Specifies that it can connect a M8 threaded device.

QC - Specifies that it can connect a Quick Connect device.

ARM - Specifies that it connects directly to the machine arm.

TKJ - Specifies that it is a Tesa Kinematic Joint.

LEITZ1 - Specifies that it can connect a Leitz M5 threaded device.

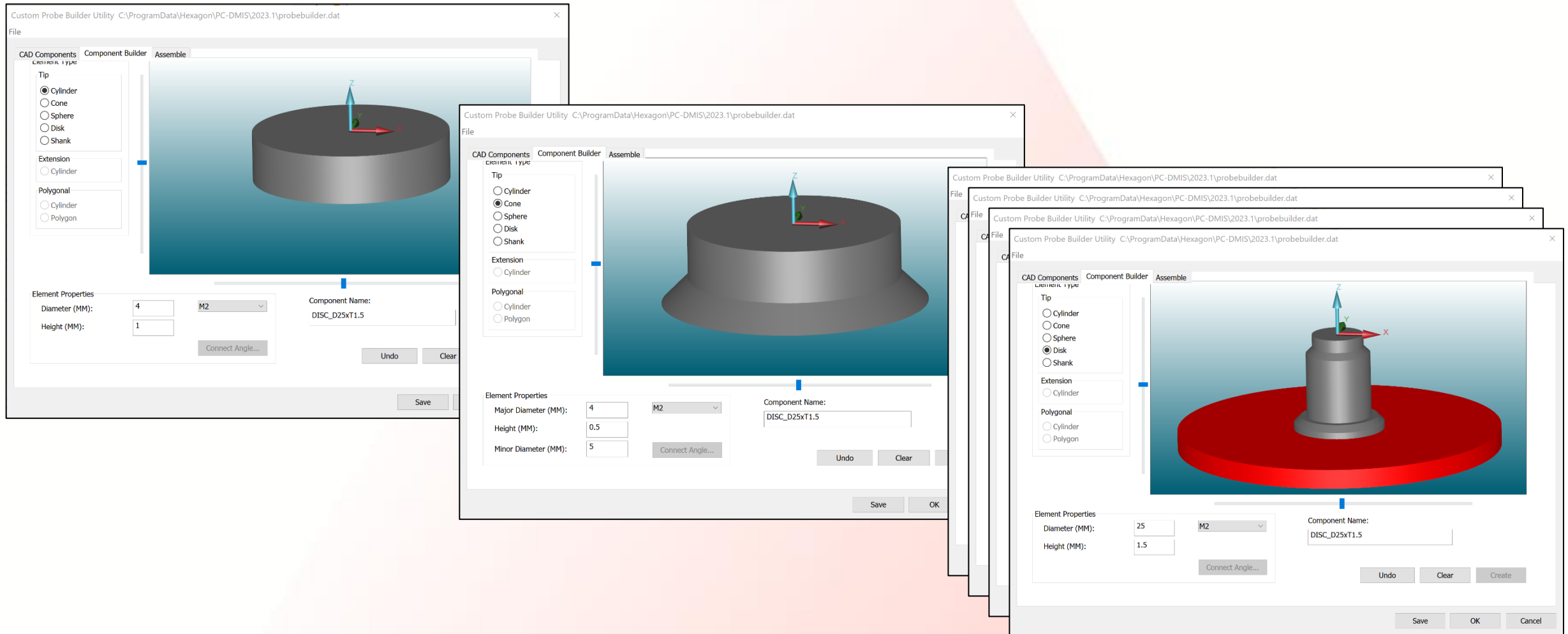
LEITZ1ANALOG - Specifies that it can connect a Leitz M5 threaded device on an analog probe head.

More examples can be found in the PC-DMIS offline help files.



## Component Builder – Probe Tips

Starting from the master connection, probe tips can be constructed step by step using generic features, e.g. cylinders, cones and spheres etc.



## Component Builder – Probe Tips

begintip - The start of a tip definition.

ribcount N - The number of lines seen in a circular feature. This is an integer from 2 to 1000, inclusive.

color – Defines the color the feature is rendered with e.g. 255 0 0 = Bright Red

cylinder x1 y1 z1 x2 y2 z2 d - Defines a cylinder feature.

x1, y1, z1 - The coordinate location of the top of the cylinder.

x2, y2, z2 - The coordinate location of the bottom of the cylinder.

d - The diameter of the cylinder.

cone x1 y1 z1 d1 x2 y2 z2 d2 - Defines a cone feature

x1, y1, z1 - The coordinate location of the top of the cone.

x2, y2, z2 - The coordinate location of the bottom of the cone.

d1 - The diameter at the top of the cone.

d2 - The diameter at the bottom of the cone.

hotspot x1 y1 z1 i1 j1 k1 d1 t1 type - Defines a hotspot command.

x1, y1, z1 - The coordinate location of the center of the probe tip.

i1, j1, k1 - The vector of the probe tip, usually 0,0,1.

d1 - The diameter of the tip.

t1 - The thickness of the tip (for disk probe).

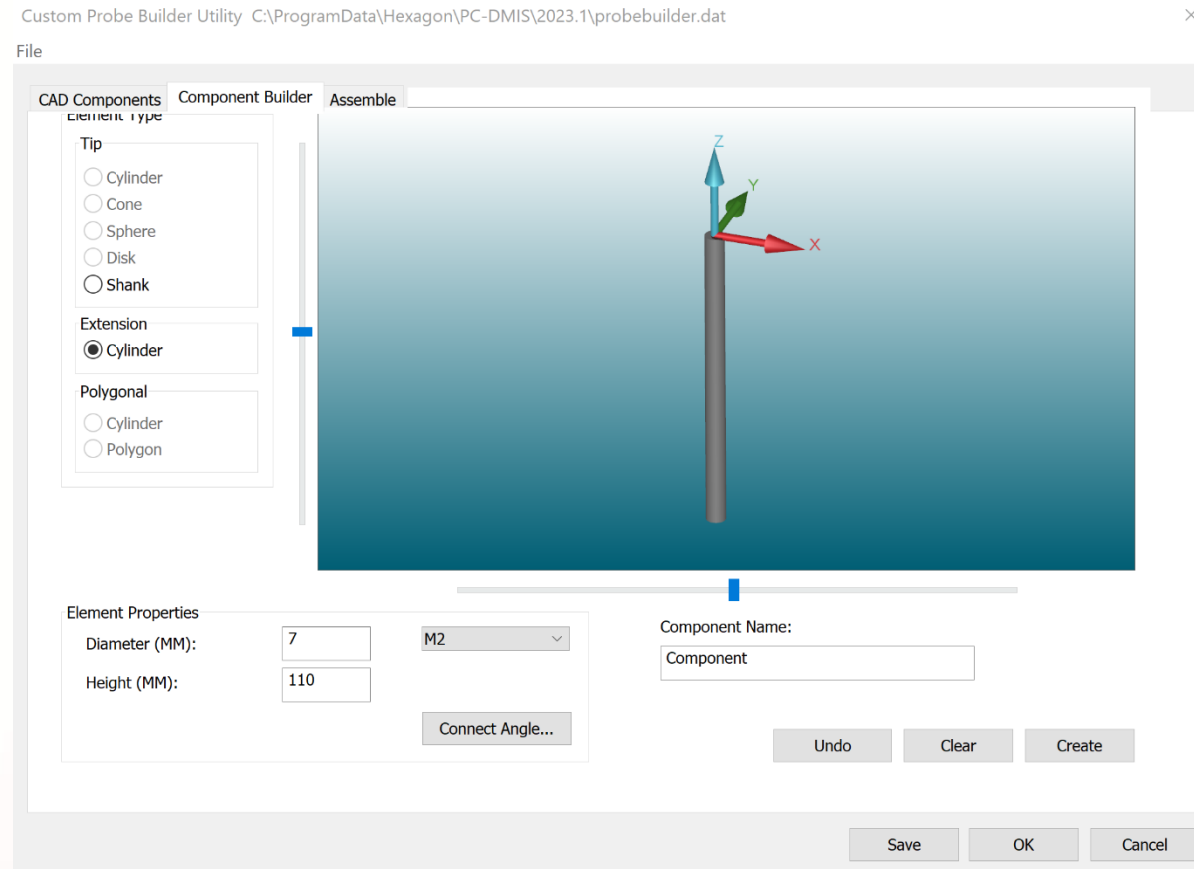
type - The type of probe (ball, shank, disk, and so on).

endtip - The end of a tip definition.

```
ITEM:DISC_D25xT1.5 M2
begintip
ribcount 20
color 128 128 128
cylinder 0 0 0 0 0 -1 3
cone 0 0 -1 3 0 0 -1.71 4
cylinder 0 0 -1.71 0 0 -5.91 4
cone 0 0 -5.91 7 0 0 -6.25 7.5
cylinder 0 0 -6.25 0 0 -8.5 7.5
color 255 0 0
cylinder 0 0 0.000 0 0 -1.500 25.000
hotspot 0 0 -0.750 0 0 1 25.000 1.500 disk
endtip
```

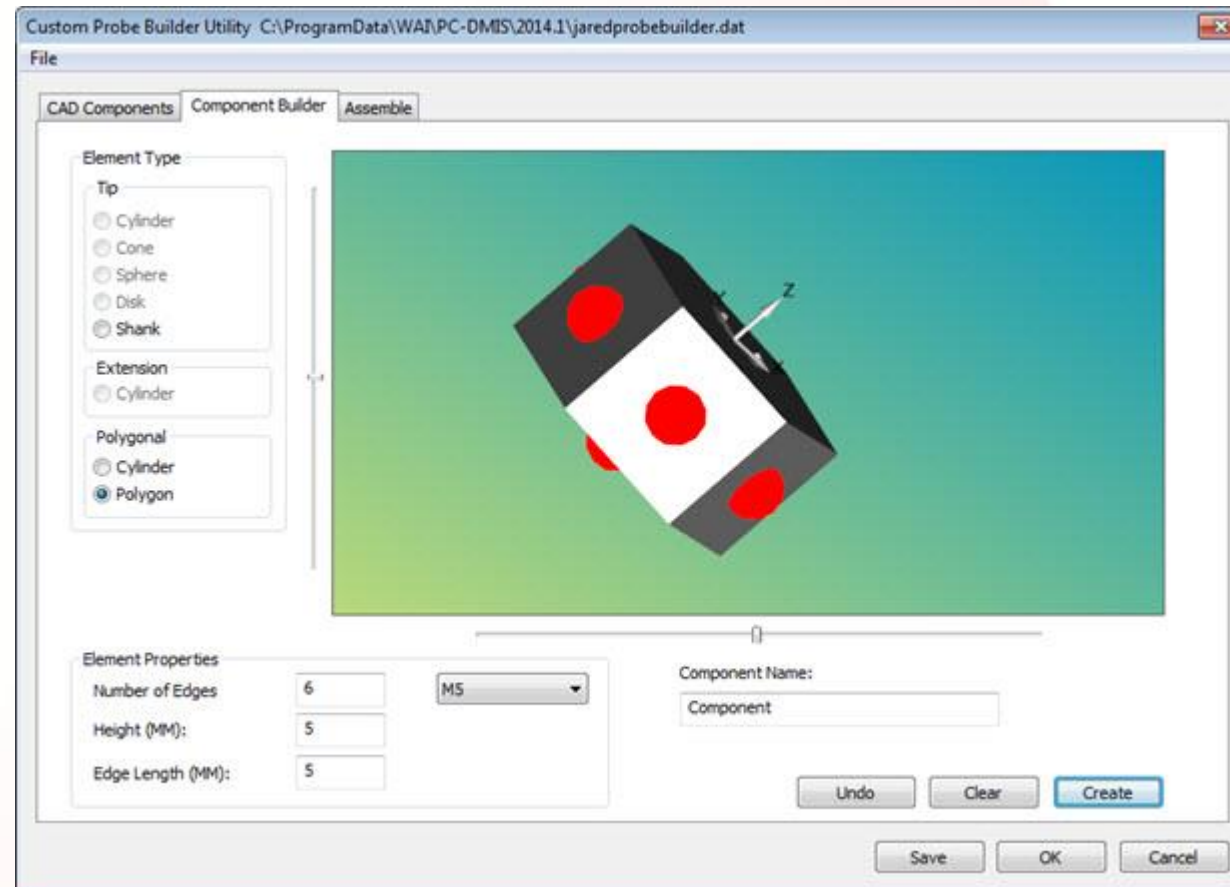
## Component Builder – Extensions

Starting from the master connection, probe extensions can be constructed step by step using generic features, e.g. cylinders.



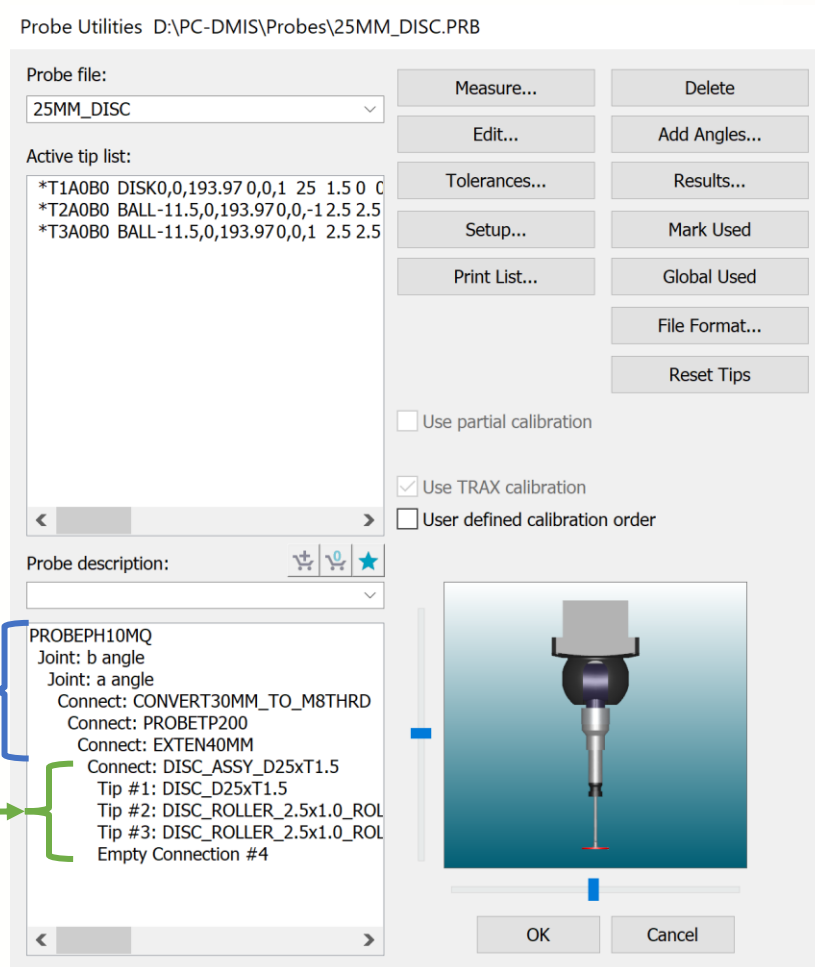
## Component Builder – Polygonal

Starting from the master connection, items with multiple connections can be created for example star probe joints.



## Probe Utility Dialog – Building Probes with Custom Items

Constructing a probe using standard and custom probe builder components



Standard Components

Custom Probe Assembly

