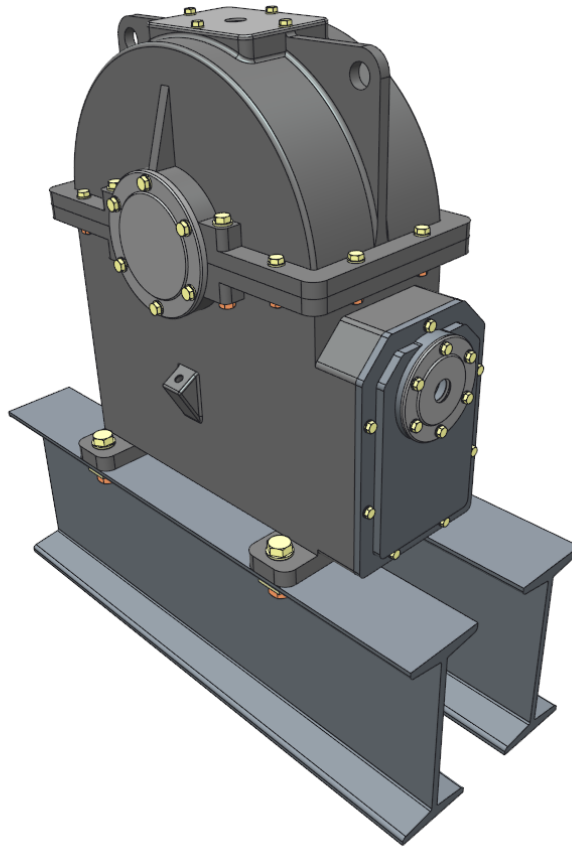


# **Intelligent Fastener Extension 3.0**



## **Trainings-Guide**

### **IFX 3.0**

#### **Part 2:**

## **Advanced Training & Customizing (Full Version)**

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## 1 Introduction


### 1.1 Objective of this document

The objective of this document is to enable you to create fasteners with the new **Intelligent Fastener Extension (IFX)**.

It is assumed, that you are familiar with the basic functions of Creo and already completed the first part of this tutorial (**IFX Lite Version**).

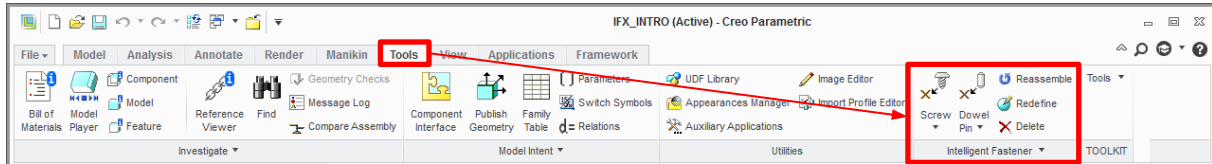
### 1.2 Conventions

This Training-Guide uses the following conventions:
















 Assemble by mouse click	An Icon with text shows you, that you will have to select the shown command in the ribbon or in a dialog
<b>Example</b>	Bold font indicates important information
MMB	Middle mouse button
IFX	Intelligent Fastener Extension

## 2 General overview

With this release of Creo you will find the Intelligent Fastener features in the ribbon. To use them you need an opened assembly. The new features can be found in the **Tools** ribbon.



The Following options are available:

 Assemble on point or axis	Assemble a Fastener on a point or an axis
 Assemble by mouse click	Assemble a Fastener by mouse click
 Assemble on point or axis	Assemble a dowel pin on a point or an axis <b>(Full version only!)</b>
 Assemble by mouse click	Assemble a dowel pin by mouse click <b>(Full version only!)</b>
 Reassemble	Reassemble an existing fastener
 Redefine	Redefine an existing fastener
 Delete	Delete an existing fastener. Also deletes holes created by IFX
 Check screw fasteners	Verify screw fasteners <b>(Full version only!)</b>
 Update holes	Update holes <b>(Full version only!)</b>
 Suppress	Suppress all fasteners in the current assembly
 Resume	Resume all fasteners in the current assembly
 Options	Change IFX options <b>(Full version only!)</b>
 User guide	Open the user guide
 Instance Creator	Create all instances of a fastener
 About intelligent fastener	Open the version dialog. Shows detailed version info

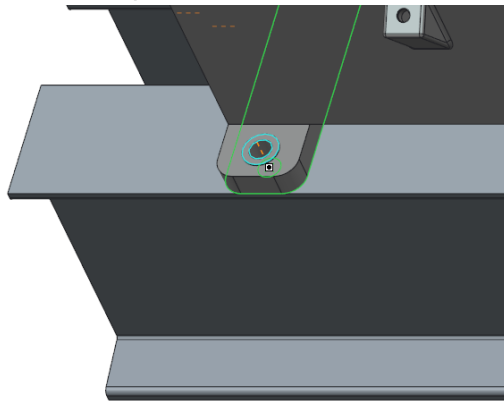
### 3 Assemble Fasteners


The *IFX full version* allows you to do even more complex fastener actions. It is possible to give screws an **orientation** (e.g. placement surfaces are not parallel) or to **assemble on all instances** (e.g. pattern that affects multiple parts).

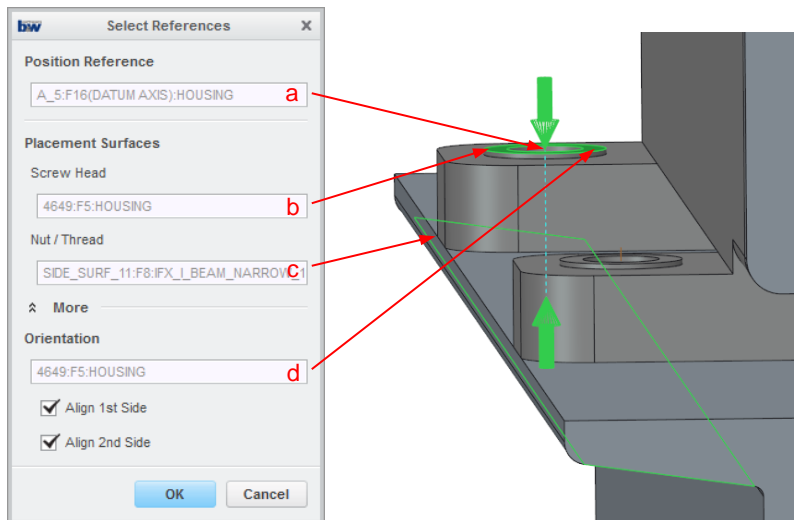
#### 3.1 Assemble fastener with orientation

To assemble fasteners with orientation perform the following steps:

1. Open the assembly you want to add fasteners to.
2. Create a datum point or axis where a fastener should be assembled.



3. Select  Assemble on point or axis in the **Tools** tab of the ribbon.
4. Afterwards the **Select References** dialog shows up. You have to select four references:

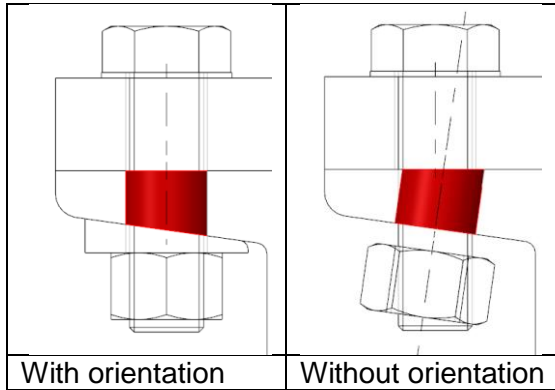


- a. Select an **axis/point** or **hole** as **Position Reference**.
- b. Select the surface for the **Screw Head** placement.
- c. Select the surface for the **Nut / Thread** placement.
- d. Select the **Orientation** surface to define the fastener orientation.

5. Finish the definition of the fastener and use a **square taper washer for I-sections** on the **Nut** side.

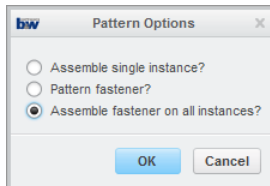
**Note:**

Without the orientation plane the hole will not have the correct orientation and the taper square washer will not be assembled.

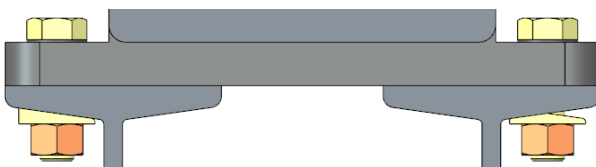


**Optionally:**

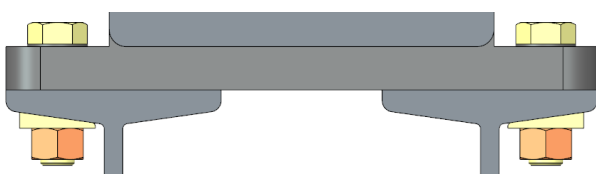
If you selected the patterned axis as reference for the fastener connection you will be asked if you want to **“Pattern fastener?”**, **“Assemble single instance?”** or **“Assemble fastener on all instances?”**.



In this case you need to **“Assemble fastener on all instances?”**, because the taper orientation is rotated by 180° on the right side. If you choose the **“Pattern fastener?”** option the taper will not have the correct orientation.




Result when patterned.

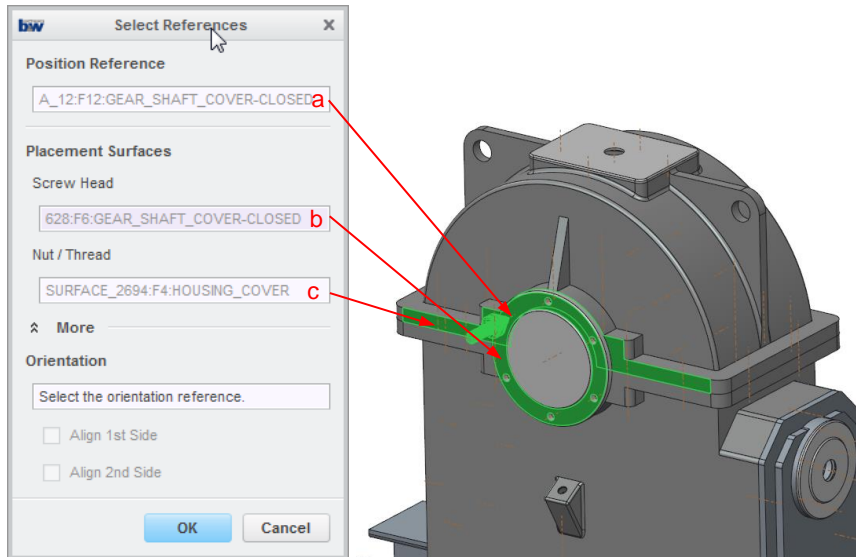


Result when assembled on all instances.

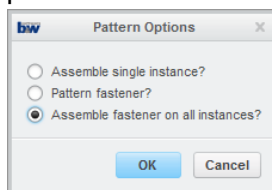
### 3.2 Assemble fasteners on all instances

To assemble fasteners on all instances perform the following steps:

1. Open the assembly you want to add fasteners to.
2. Select  Assemble on point or axis in the **Tools** tab of the ribbon.
3. Afterwards the **Select References** dialog shows up. You have to select four references:



- a. Select a patterned axis as **Position Reference**.
  - b. Select the surface for the **Screw Head** placement.
  - c. Select the surface for the **Thread** placement.
4. Configure the screw connection in the next dialog.
  5. After the definition is done you will be asked whether you want to **“Pattern fastener?”**, **“Assemble single instance?”** or **“Assemble fastener on all instances?”**. Select **“Assemble fastener on all instances?”** to complete the process.




**Note:**

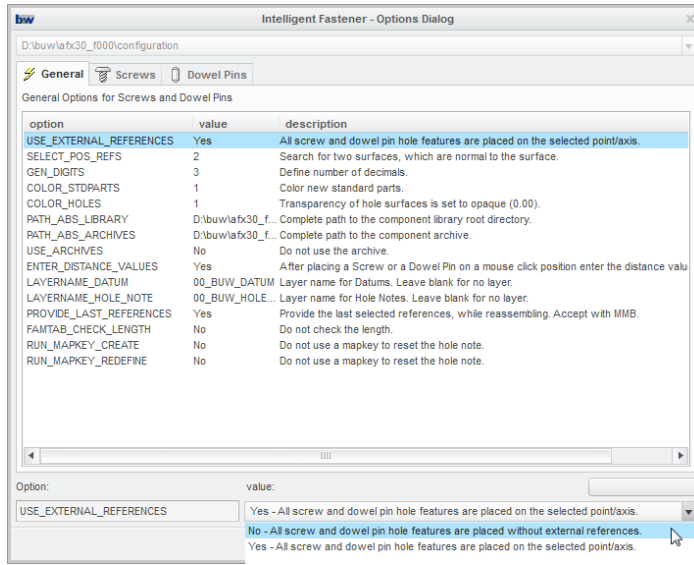
The fastener definition is now complete and the required holes were created. If you had selected **“Pattern fastener?”** the holes would have been only created in the part you selected as **Thread** reference.

### 3.3 Create Fasteners without external references

The default setting of IFX is to use external references for fastener placement. Depending on your company guidelines you may want to change that setting and work without external references.

To do so perform the following tasks:

1. Open the IFX **Options** dialog with the  Options function in the ribbon.
2. In the dialog set the entry **USE\_EXTERNAL\_REFERENCES** to **NO**.

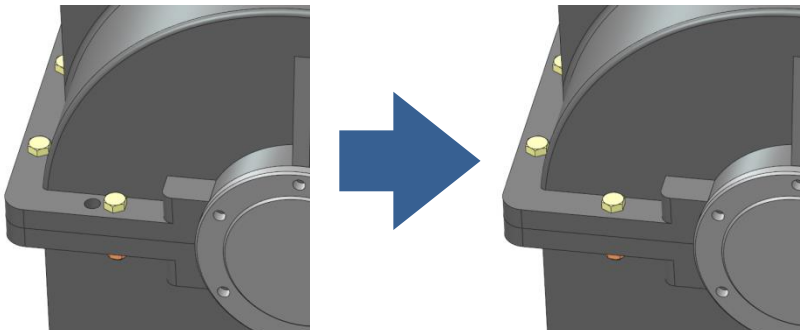


3. Confirm with **OK**.

Your default configuration has now been changed. Whenever you assembly fasteners now the external references will not be used.

Changing this option also brings a disadvantage. When the position of screws or pins is changed, the holes will not be arranged automatically. Therefore there is a command in the ribbon to update the holes. Another disadvantage is that you can no longer use the pattern option as this can only work with external references.

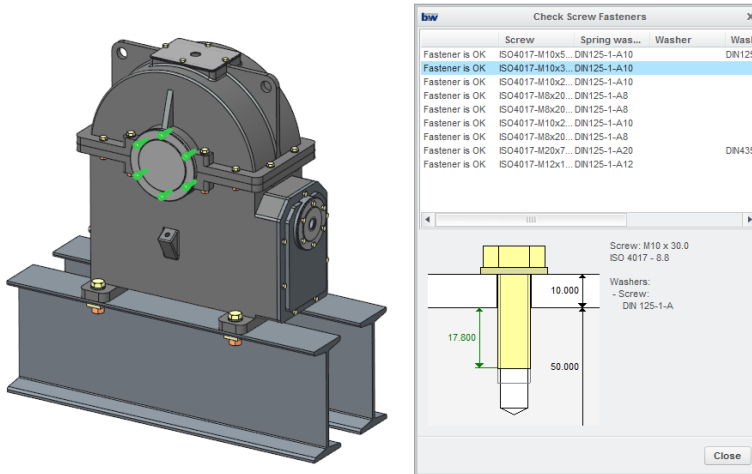
Simply press Update holes in the ribbon after changes were made.





### 3.4 Verify screw connections


During the development process there are always changes in your models. If you assembled fasteners in an earlier stage of the development it is recommended to verify all screw connections. Luckily the Intelligent Fastener Extension has a function for that.

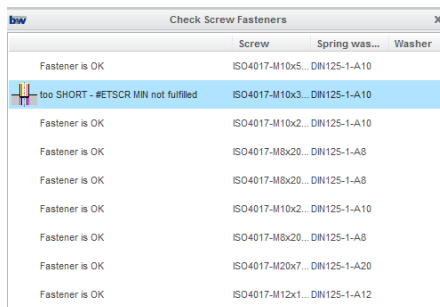



To verify your screw connections perform the following actions:

1. Open the assembly you want to check.
2. Select Check Screw Fasteners in the **Tools** tab of the ribbon.
3. The dialog opens. Within the dialog you get:
  - a. A List of all assembled **screw fasteners**.
  - b. A preview of the assembled screw with detailed information.
  - c. The possibility to jump into the definition of a screw with double click on the screw.

Example:

1. Change the thickness of the  GEAR\_SHAFT\_COVER-CLOSED.PRT from 10 to 20.
2. Open the **Check Screw Fasteners** dialog.
3. The screw connection will be now indicated as **“too SHORT”**.




4. Enter definition via double click.
5. In the dialog press  to set the length automatically and confirm with **OK**.
6. Now all fasteners are OK again.

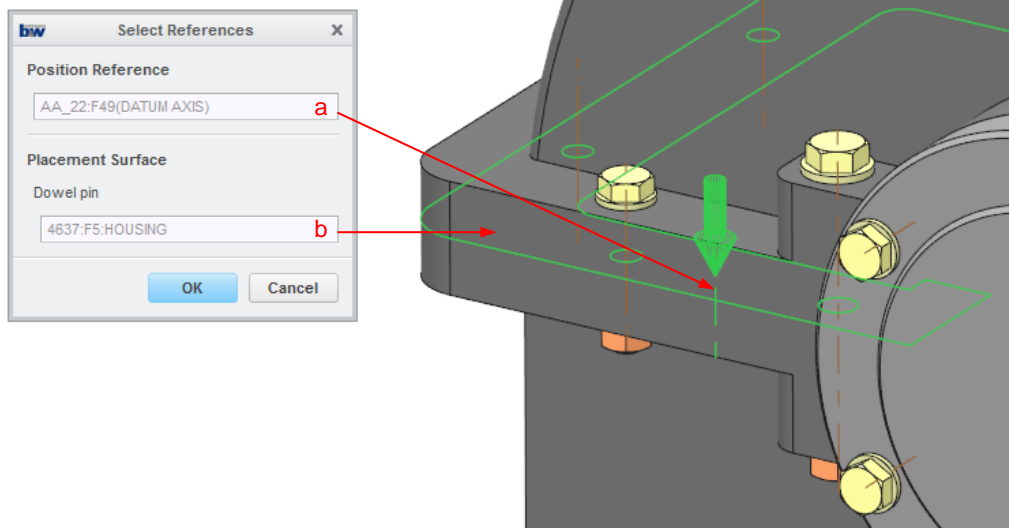
## 4 Assemble dowel pins

With the full version of IFX it is also possible to assemble **Dowel Pins**. The functionality is almost the same then the assemble screws function. It is also possible to assemble **Dowel Pins** on Points/Axis/Holes or via mouse click.

### 4.1 Assemble dowel pins on Points/Axis/Holes

To assemble dowel pins on the above mentioned references proceed as follows:

1. Open the assembly you want to add dowel pins to.
2. Select  Assemble on point or axis in the **Tools** tab of the ribbon.
3. Afterwards the Select References dialog shows up. The dialog only needs two references:




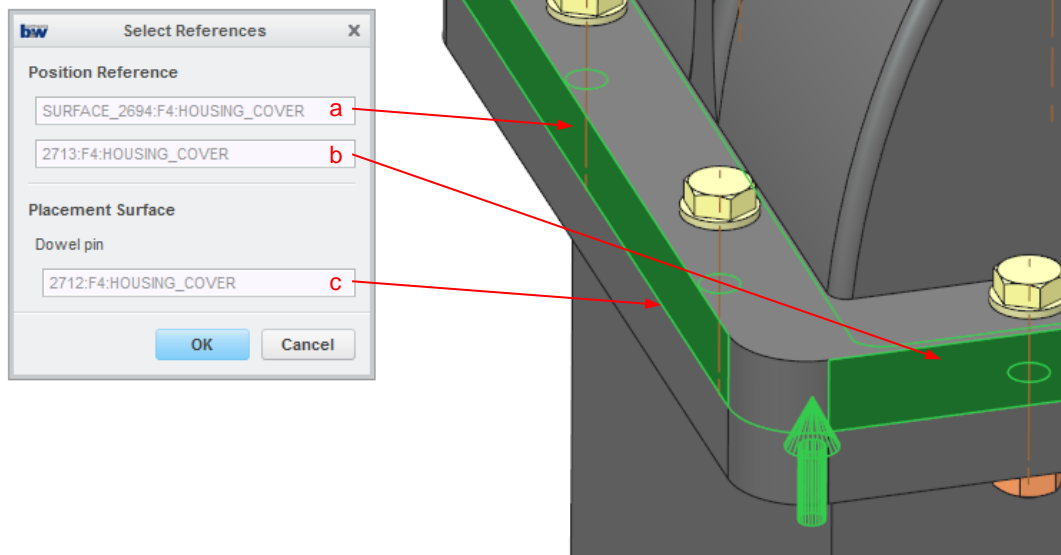
- a. Select an **axis/point** or **hole** as **Position Reference**.
- b. Select a **Placement Surface** between the two parts.

To finish the dowel pin connection see chapter [Definition Dowel Pin Fastener](#)

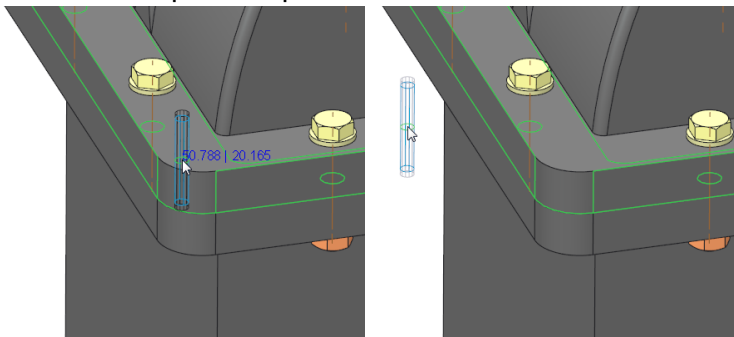
## 4.2 Assemble Dowel Pin by mouse click

To assemble dowel pins by mouse click proceed as follows:

1. Open the assembly you want to add dowel pins to.
2. Select  Assemble by mouse click in the **Tools** tab of the ribbon.
3. Afterwards the Select References dialog shows up.



- a. Select a **surface** as offset **Position Reference 1**.
- b. Select a second **surface** (not parallel to the first!) as offset **Position Reference 2**.
- c. Select a **Placement Surface** between the two parts.
4. Configure the Dowel Pin in the next dialog. See also chapter [Definition Dowel Pin Fastener](#).
5. After the definition is complete you will see the desired **Dowel Pin** is snapped to the mouse cursor.
6. To assemble a **Dowel Pin** simply click on the desired location. The **Dowel Pin** will be assembled and the required holes will be created.
7. To cancel the process press MMB.



### Note:

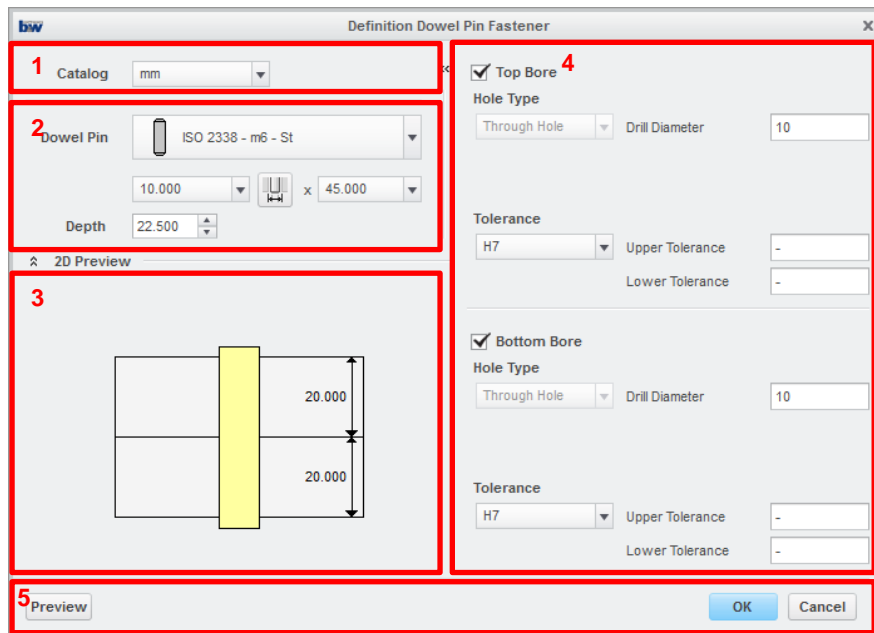
The numbers on the cursor show the dimensions relative to the selections made for positioning. If you leave a valid position the numbers disappear and the preview connection will be greyed out.

## 5 Definition Dowel Pin Fastener

The Definition Dowel Pin Fastener dialog gives you many different options to configure your fastener.

The dialog itself is split into different areas:

1. [Catalog definition](#) (mm/inch)
2. [Dowel pin definition](#)
3. [2D Preview](#)
4. [Hole definition](#)
5. [3D Preview, OK, Cancel](#)



### 5.1 Catalog definition

In the **catalog definition** area you can choose between **mm** and **inch** standard parts.

### 5.2 Dowel Pin definition

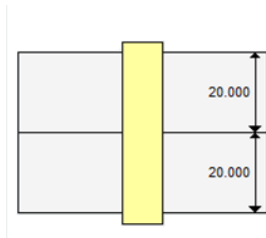
The **connection definition** is the most important area of the dialog. Here you have several options to define the dowel pin connection you need.



1. Select a standard.
2. Select the Diameter, Measure the diameter in the model and the length of the dowel pin.
3. .Set the Depth of the dowel pin

### 5.3 2D Preview

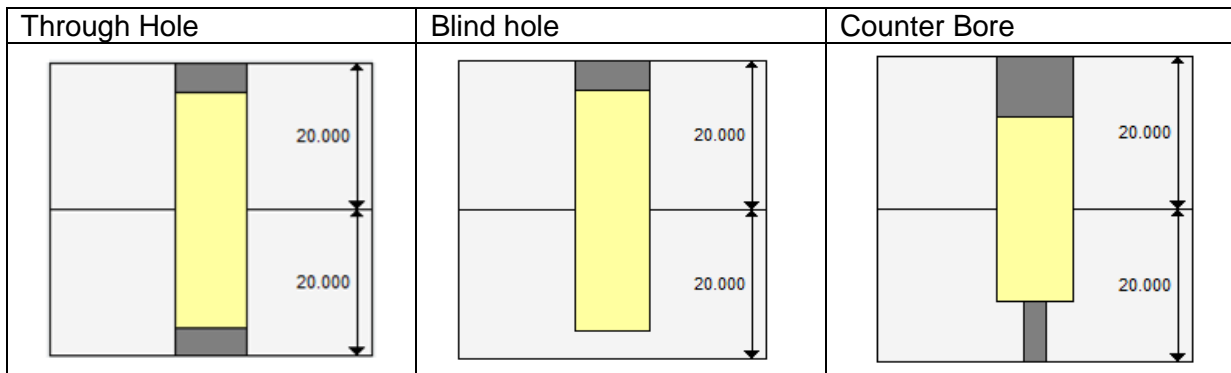
The **2D preview** always shows you the actual fastener configuration. Also the **selected references** will be measured and **dimensions** to the selected parts will be shown.



### 5.4 Hole definition

The Hole Definition area gives you different possibilities to configure the holes.

You can choose between three hole types:

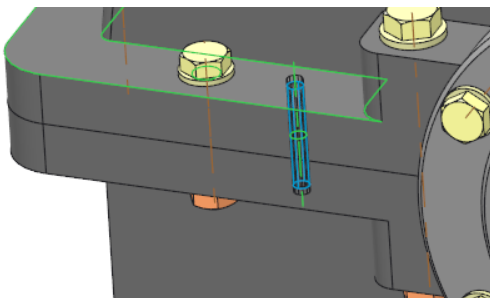


Depending on the hole type you chose, you will see different input panels to control values for **depth** and **diameter**.

It is also possible to define **tolerances** of the holes. Some of them are predefined like **H7** or **±0.01**. This can also be extended by the user.

### 5.5 3D Preview, OK, Cancel

This is the last area of the dialog. You can **confirm** or **abort** the current operation in this area. You also have the possibility to generate a **3D Preview** to validate your fastener connection in the graphics area of Creo.



## **6 Customizing parts**

One of the features of the full version is also the possibility to customize the existing parts, add new parts or even include your own parts into the library of IFX.

### **6.1 Customizing general information**

## **8 Impressum**

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