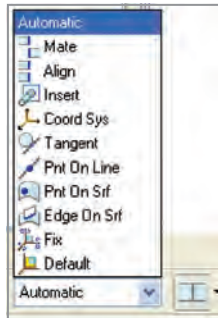


There are several ways that you can initiate assembling components together. The most common constraints that are used are the **Mate** and the **Align** constraints. If you place the palms of your hands together, you have applied a Mate constraint to your palms. If you place the palms of your hands on a table, you have applied an Align constraint to the palms of your hands.

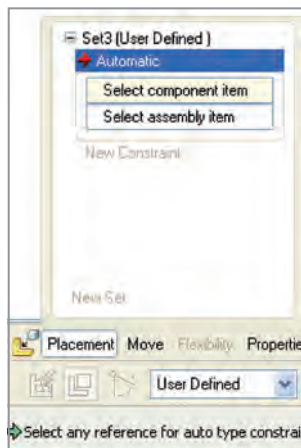
There are several other constraint types as shown to the right.



The typical goal in assembling components is to prevent the component from moving in any of the three directions, X, Y, and Z, or rotating about any of the same directions. If you want a component to move, use joint constraints instead of regular assembly constraints.

Under the placement tab you can see what constraints you have defined and what geometry has been selected for the assembly reference as well as the component reference. Currently nothing has been selected.

If you need to reselect a component reference, hold down the right mouse button in "Select component item" or "Select assembly item" then Remove, followed by selecting a new reference.

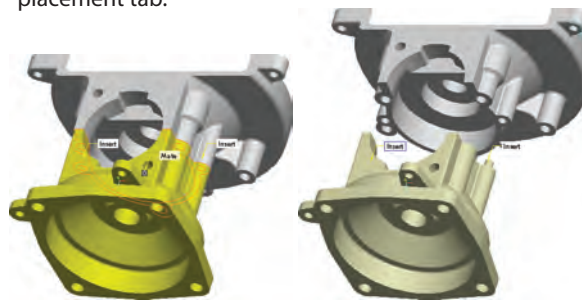


Before you finish constraining any component, you should check the placement status. When you initially add a component to an assembly, the status will say "No Constraints." When you have defined enough constraints to locate the component, the status will say "Fully Constrained".

A "component" can be a single piece-part or even a large sub-assembly. Both are called components when doing assembly work.

The basic assembly procedure is to select a component to assemble and then move it into the approximate location. This can be done by holding down the CTRL+ ALT keys while right-clicking. You can also rotate just the component by holding down the CTRL+ ALT keys, while using the middle mouse button. Note, these options are only available while assembling components. To move the whole assembly and the component at the same time, use SHIFT and the middle mouse button. To rotate the entire assembly and component, just hold down the middle mouse button.

After a component has been moved into position, geometry can be selected on the component and on the assembly. The component that is being assembled will be displayed in either of the two preview colors as shown depending on partially constrained or fully constrained placement status. A constraint type will be chosen based on the type of geometry selected. If an incorrect constraint is selected, simply change or delete the constraint by holding down the right mouse button over the constraint tag in the working window or in the placement tab.



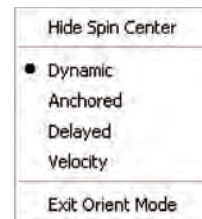
Fully Constrained

Partially Constrained

To add a new constraint, select "new constraint" from the right mouse button or from the placement tab. To assemble a component, you need at least two constraints. But typically you will want three or more to fully locate the component. If you have two constraints defined, then Pro/ENGINEER may be able to make assumptions about constraining the model. The assumption will result in the model being considered fully constrained. If you do not want assumptions to be made then continue to add constraints.

While assembling components, use the **drag packaged component icon** to move any components that are not fully constrained. This may be done to assemble a component into an area that is difficult to access.

You can also use the **Orient Mode** option in order to more accurately control the movement of components. Once selected, you can move just the component by holding down the right mouse button and selecting the **Orient Object** option. This will then allow control of the movement of the component being assembled.



Advanced orientation options **Dynamic, Anchored, Delayed,** and **Velocity** provide a handy way to manipulate the component as it is assembled.

Orient Mode can also be accessed and turned off by holding down the CTRL+ SHIFT keys and clicking the middle mouse button.

