

Inserting and Connecting Parts

Contents

[Overview](#)

[Inserting and connecting parts](#)

[Re-inserting a previous part](#)

[Manipulating parts in 3D
\(translation and rotation\)](#)

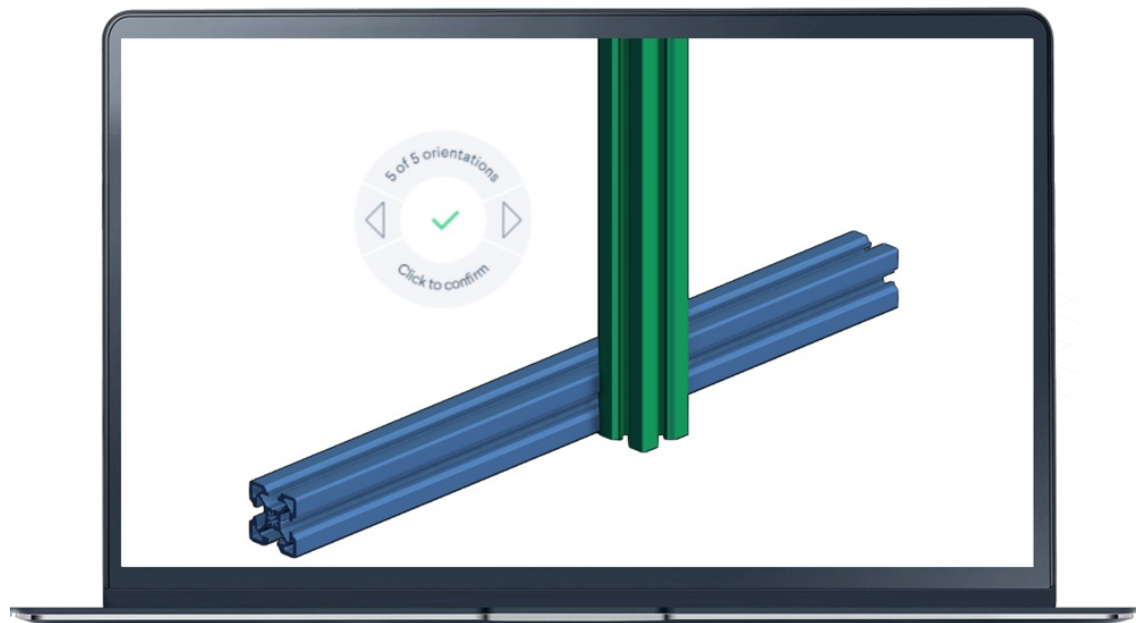
[Discovering compatible parts](#)

[Identifying connected parts](#)

[Connecting an explicit pair of
parts](#)

[Disconnecting parts](#)

[In Conclusion](#)



Overview

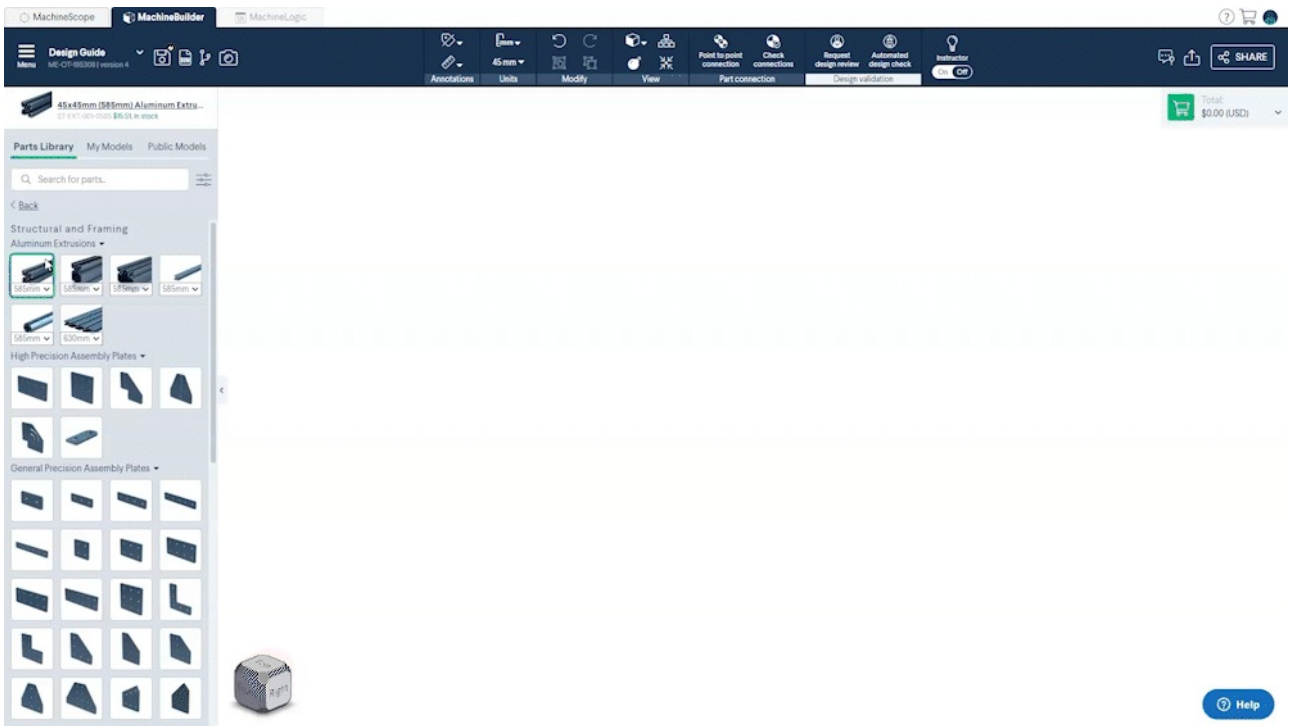
Vention cloud-based MachineBuilder offers an intuitive 3D environment to quickly assemble industrial equipment. Unlike a traditional CAD, Vention's approach to "assembly constraints" does not rely on connections between faces and edges of selected parts. Instead, Vention's assembly constraints are based on "automatic connection," with each connector defining all degrees of freedom of a given part. In most cases, this means that each new part can be added and constrained to an assembly in a single mouse click. This means that a user who masters the guide below can design industrial equipment in literally minutes, instead of hours or days.

In this how-to guide, we will cover basic, as well as more advanced, part insertion and connection functionalities of the Vention MachineBuilder platform.

Inserting and connecting parts

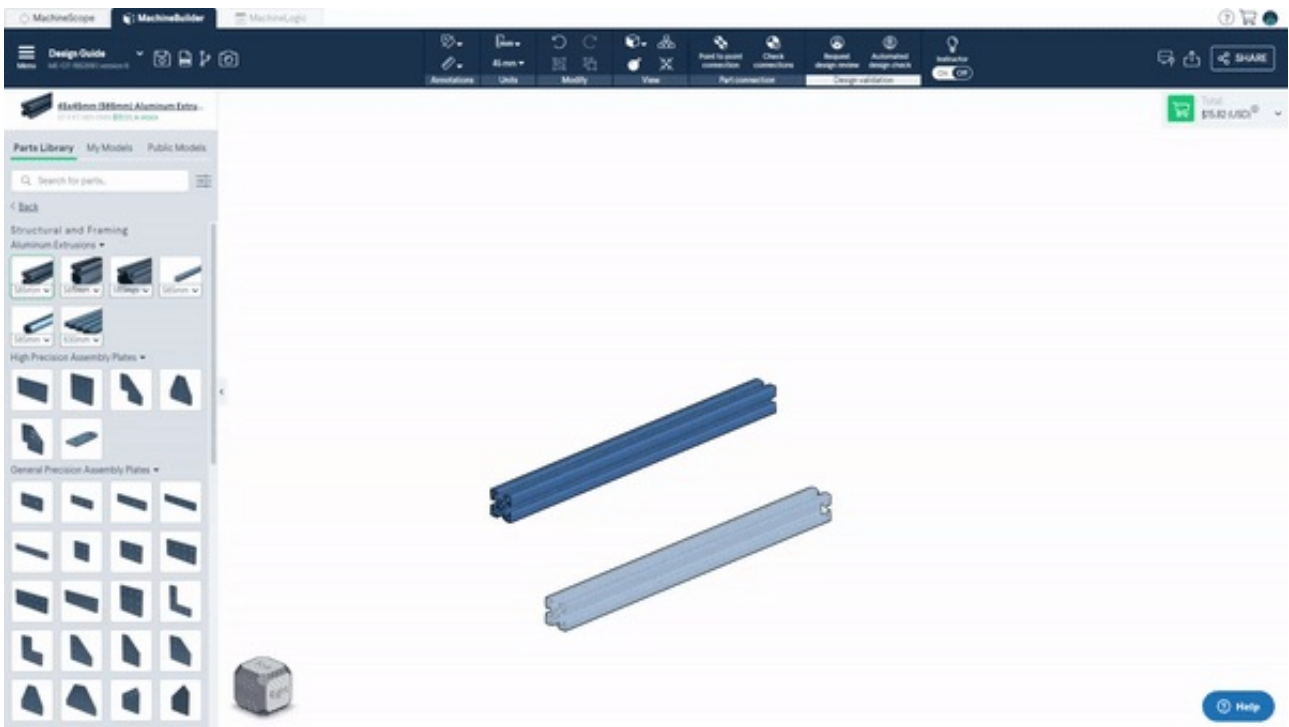
Unlike traditional CAD software, Vention's cloud-based MachineBuilder does not require users to insert parts into the 3D workspace before they can be constrained to other parts of an assembly. Those two operations (i.e., part insertion and part connection) are done in the same single step.

To insert a part, select one from the "Parts Library" on the left by clicking on it once. From here, drag your cursor over to the design space. The part will follow the cursor and will remain transparent until its position is confirmed. Prior to this, you can change the orientation of the part by using the left and right arrow keys on your keyboard. Once the part is in the desired orientation, left click or press "Enter" on your keyboard to confirm its placement. At this point the part will become opaque.



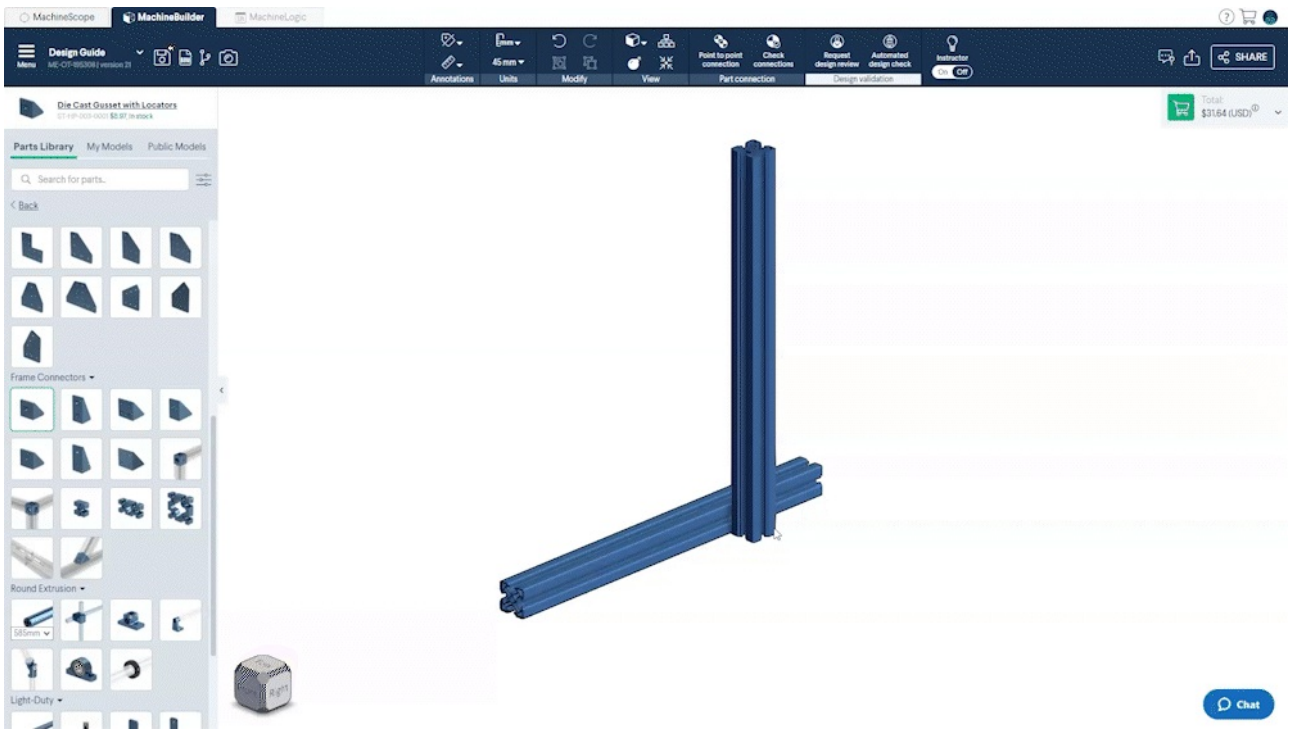
Part connection in Vention works with “automatic connections.” Automatic connection options are proposed to the user a newly selected part is brought close to a previously inserted part. To confirm a proposed connection, a left mouse click is required.

As long as the part’s position has not been confirmed, its orientation can be changed by pressing the left and right arrow keys or by pressing on the left and right arrows on the “Navigation Compass”. Note that some parts will present more connection possibilities than others. The number of the current orientation shown can be seen in the “Navigation Compass”.



Re-inserting a previous part

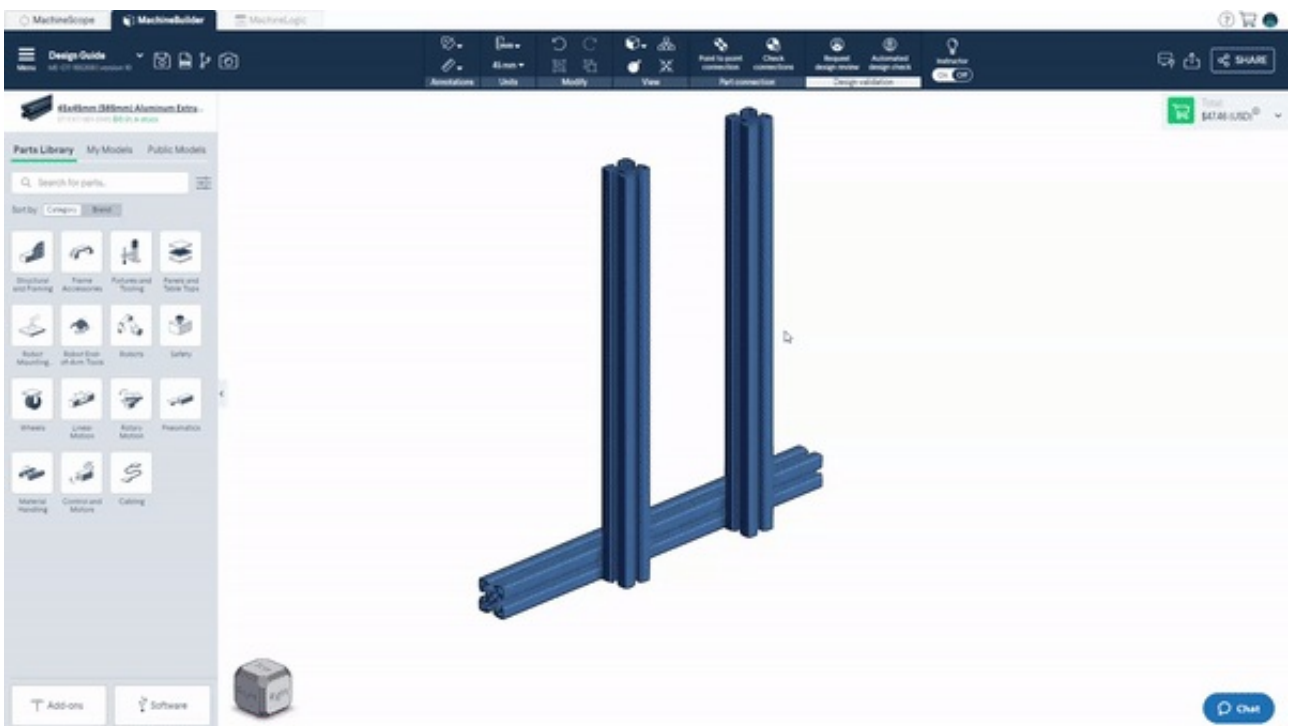
Vention provides an intuitive way to quickly re-insert a previously inserted part. By pressing the “i” or “insert” key on the keyboard, the last inserted part will reappear at the mouse cursor and can be placed as normal. Similarly, by first selecting a part in the assembly and pressing the “i” key, the selected part will reappear at the mouse cursor and can be inserted or connected as usual.



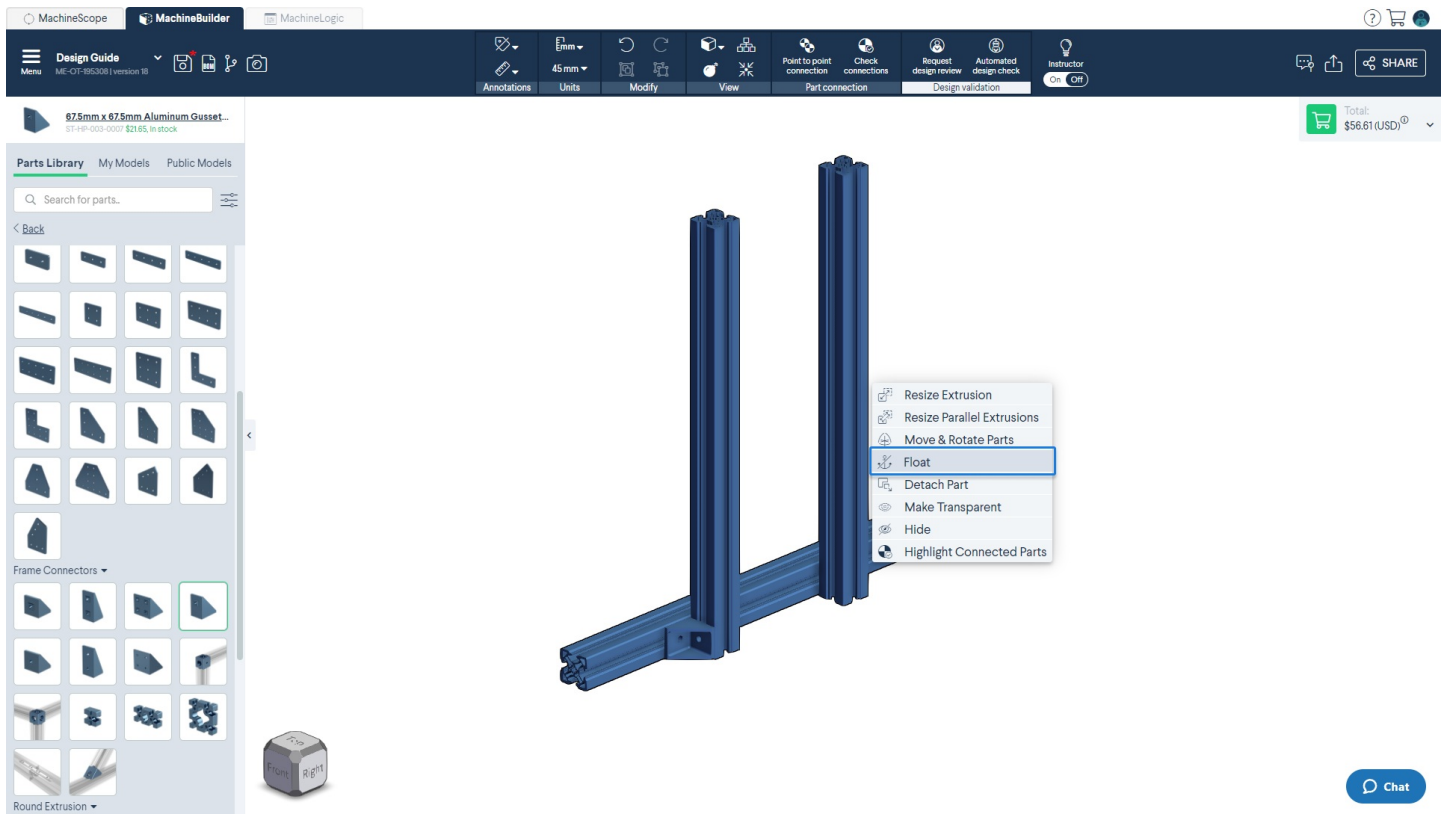
Manipulating parts in 3D (translation and rotation)

Once a part has been inserted into the design, the user has the option to manipulate it by using the “Triad”. The “Triad” allows a user to move or rotate a part or subassembly one degree of freedom at a time as well as translate it on a plane along any of its major axes.

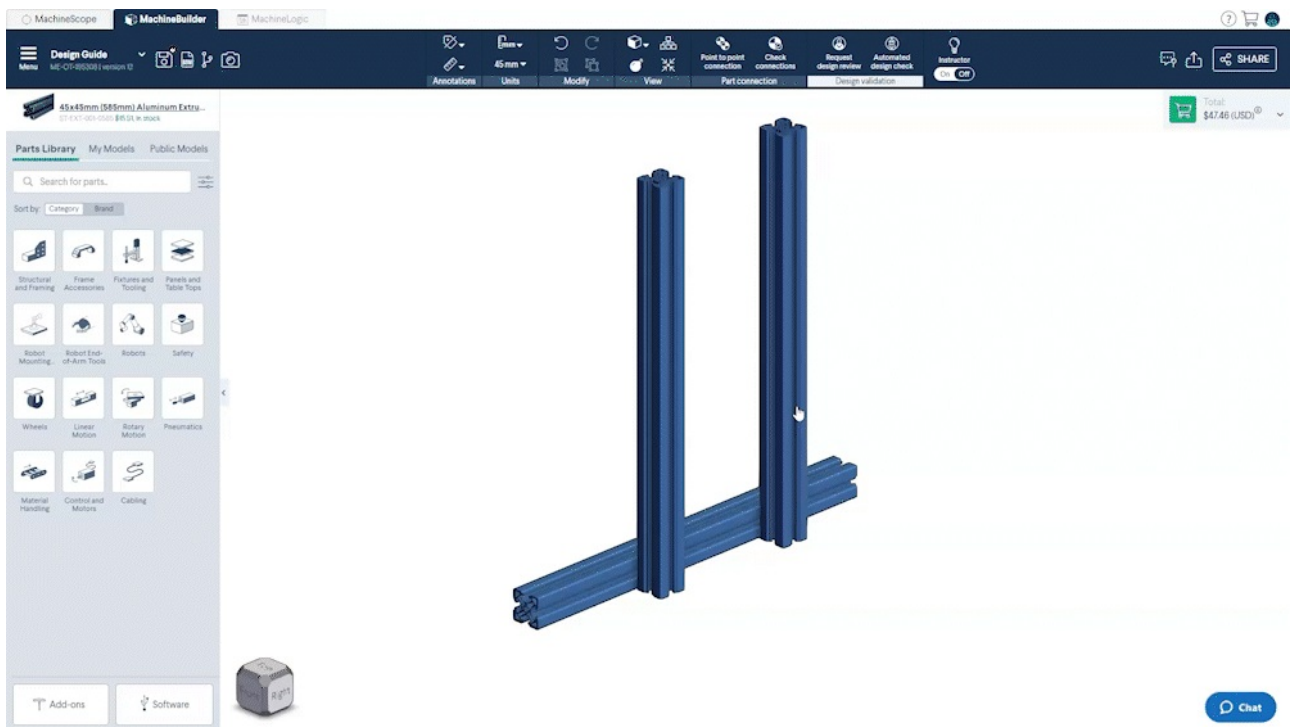
To activate the tool, left-click on the part or subassembly and select the “Triad” icon from the “Navigation Compass” or right-click on the part or subassembly and select it from the menu.



Note that the first part inserted into the 3D workspace is by default “fixed” and cannot be manipulated without removing the fixed connection. In order a float a part, the user may left-click on a part to make the “Navigation Compass” appear and then select the float icon, alternatively the user may right click and select the same action from the menu.



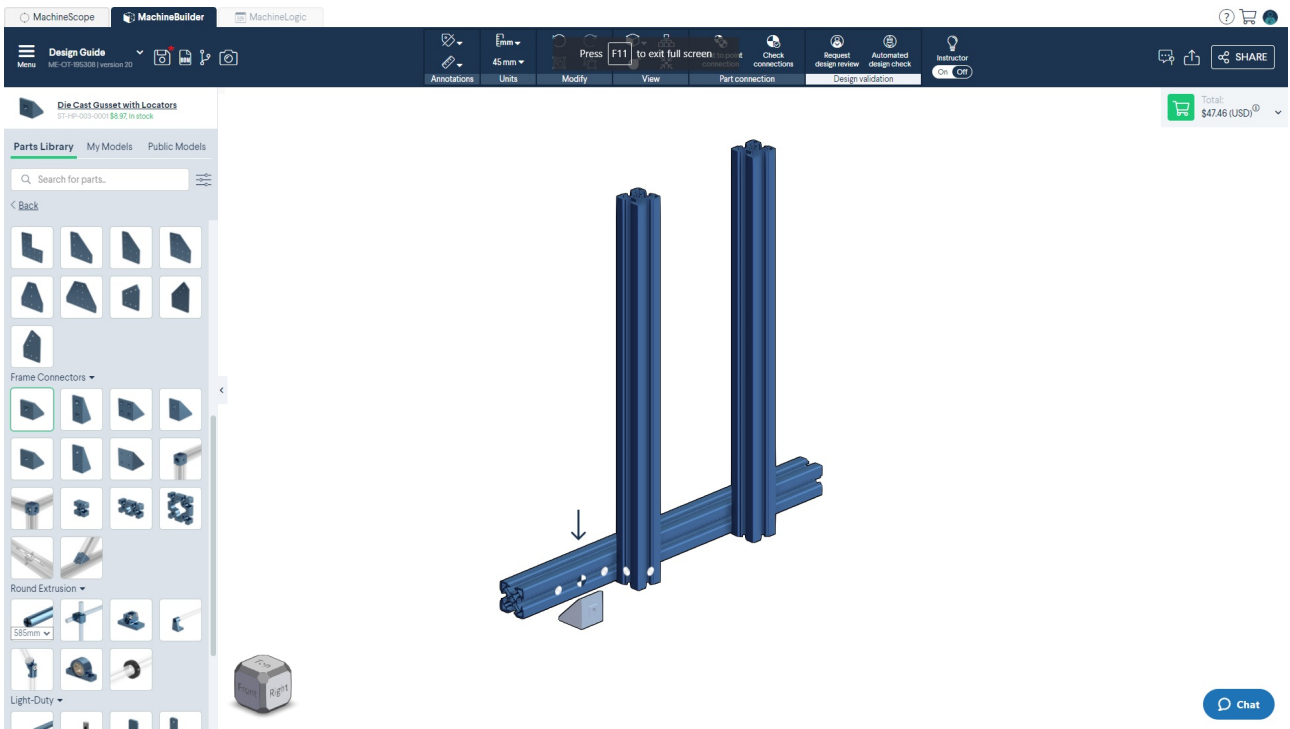
Note that at all times, a single part, or a group of connected parts, can be moved around in the 3D workspace by left-clicking and dragging them along.



Discovering compatible parts

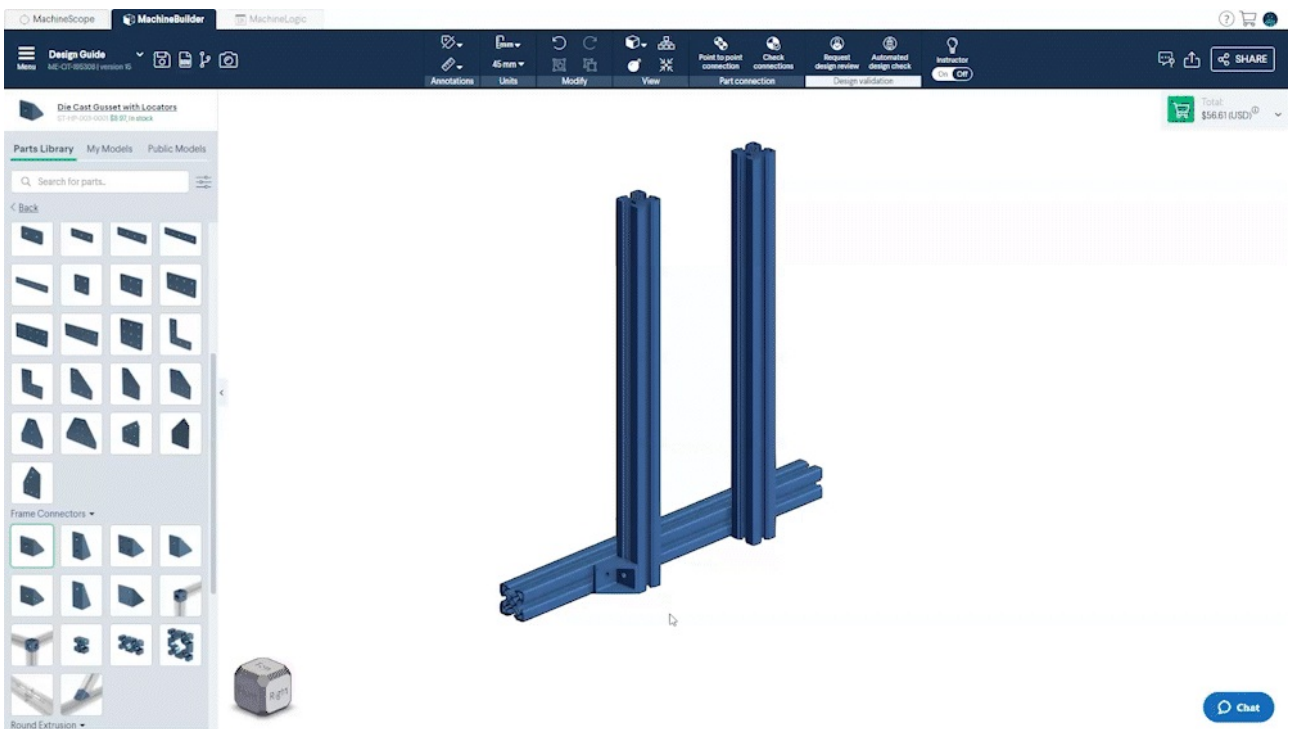
Learning the various parts available on the Vention platform, as well as their intended compatibility, is a key step in significantly accelerating the design process. Several tools are available within the MachineBuilder environment to ease this task.

Simply by moving two parts next to one another inside the MachineBuilder, white dots will appear, assuming the parts are compatible. Each dot represents a possible connection point. If white dots do not appear, it simply means that the selected parts are not compatible.



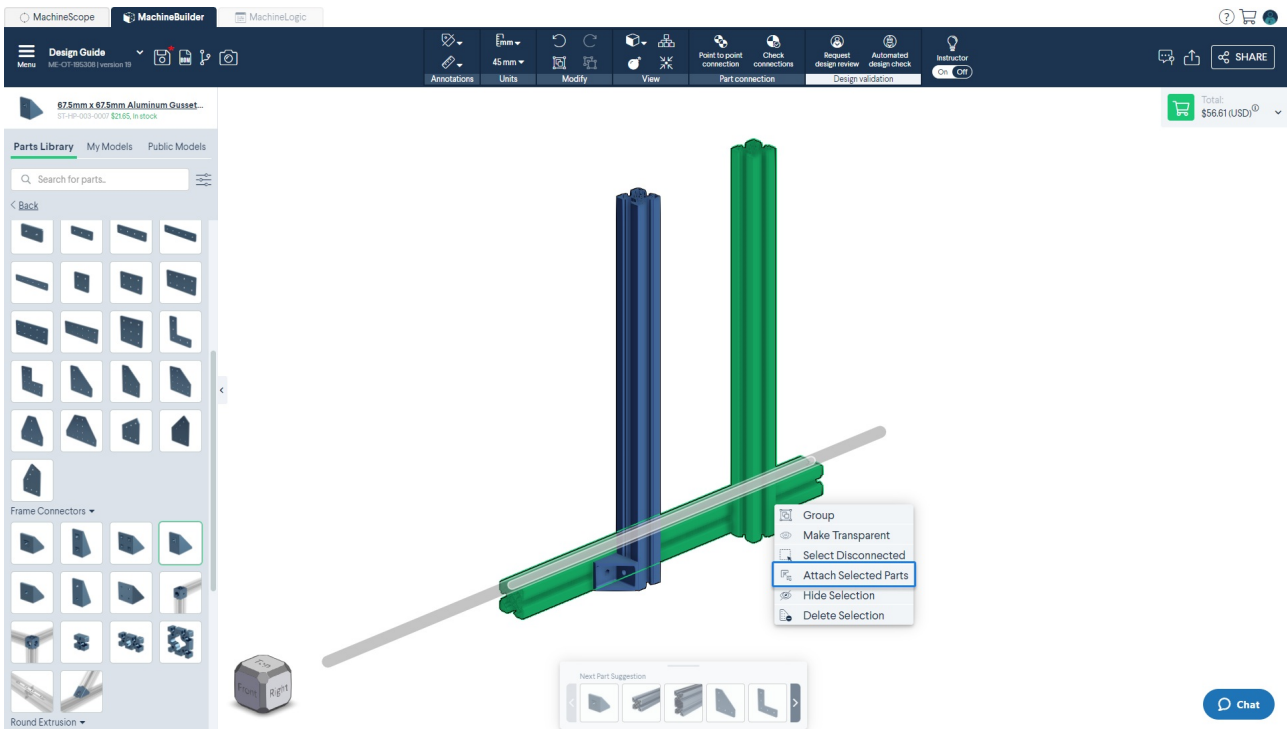
Identifying connected parts

Connected parts can be easily manipulated as a group. To see how parts are connected to one another, users can right-click the part in question and select “Highlight Connected Parts” from the menu. The chosen part, as well as its neighboring connected parts, will appear in white. Any non-connected part will remain its actual color.



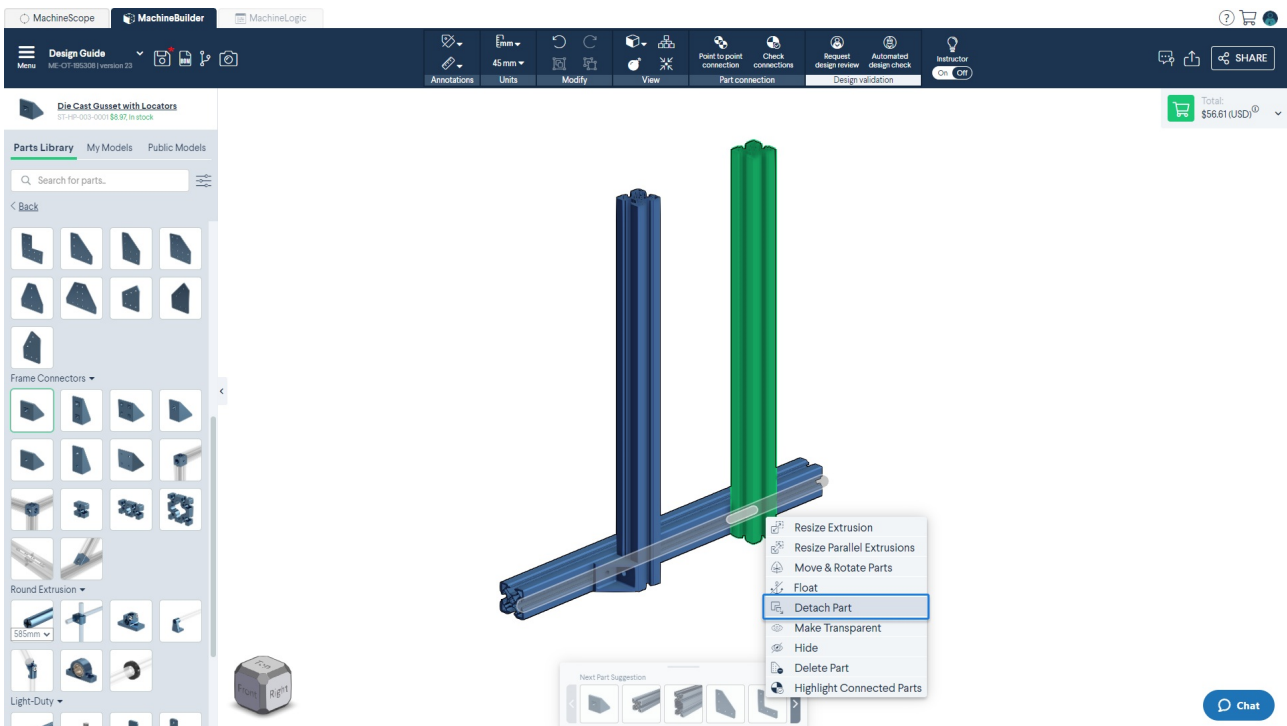
Connecting an explicit pair of parts

Non-connected parts that should be connected to one another can easily be connected using the “Attach Selected Parts” feature available in the right-click menu. This feature allows users to connect two selected parts in their current location, assuming connections are possible. This feature is particularly helpful when repairing broken or missing connections in a given assembly.



Disconnecting parts

Any connected part can be detached from an assembly using the “detach” feature located in the Navigation Compass and right-click menu. This feature breaks all connections from the selected part. However, there are occasions where only certain connections should be broken, while others are preserved. Part disconnection in such a context can be done by selecting two or more parts and selecting “Detach Part” in the right-click menu. All connections at the junction of the selected parts will be broken, while other surrounding connections will be maintained. The detached parts can then be freely manipulated according to their remaining degrees of freedom.



In Conclusion

The Vention MachineBuilder simplifies the 3D assembly process by leveraging automatic connection, which departs from traditional approaches used by most CAD software. The platform allows users to easily insert new parts, visualize connections, connect and disconnect explicit pairs of parts, manipulate groups of parts, and more. This toolset, combined with the rich pre-configured connectors on Vention parts, allows for an intuitive, playful and powerful assembly experience.

