ENCY Hyper User Manual

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Application area:

Application Area

ENCY Hyper is a hybrid platform for programming industrial robots. It combines offline program development and testing in a digital twin with online robot control.

Offline mode lets you verify programs before running them on the physical robot, reducing on-site trial and error. Online mode provides real-time feedback for debugging and adjustment, monitors execution, and supports stopping the robot when an anomaly is detected.

Optimized for Pick and Place, ENCY Hyper helps reduce idle time and manual intervention while improving production efficiency and consistency. Other applications include assembly, palletizing, sorting, quality inspection, milling, grinding, polishing, painting, and welding.

This manual introduces the platform's functions and workflow. Before deployment, review the supported hardware, available functions, and programming concepts.

Workflow

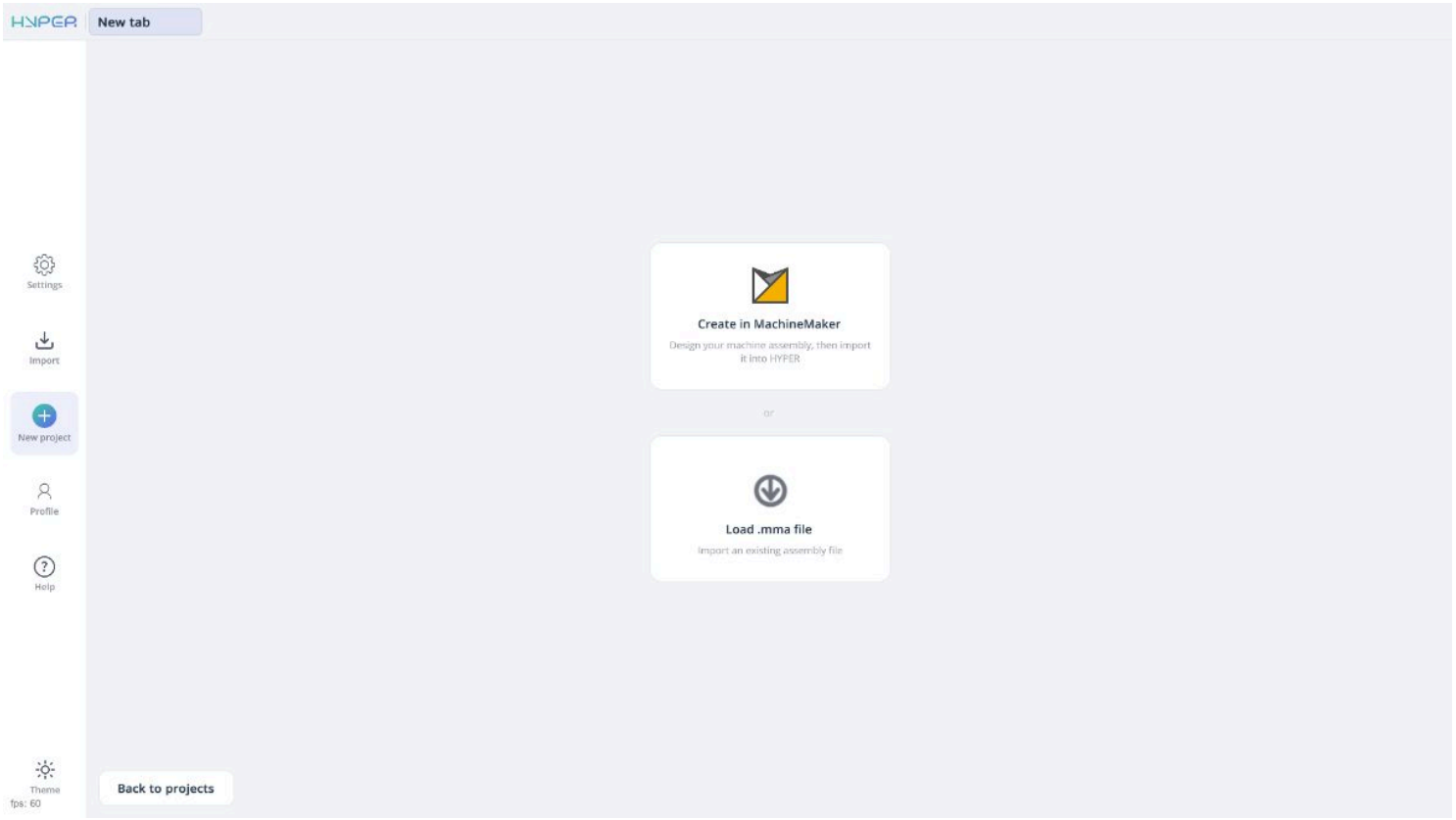
1. Prepare the cell. Create a .mma cell file in MachineMaker or obtain one from your dealer, then load it from the Home page.
2. Open the project. Double-click its card on the Home page.
3. Configure the cell. Define trays and part attachment points in Cell mode.
4. Define parts. Import models or create primitives and specify their pick points in Parts mode.
5. Build the program. Add command blocks and calculate the trajectory in Programming Mode.
6. Run and monitor. Simulate the program in Run Mode and monitor actual operation when a robot is connected.

Pick and place (transfer from table to table).

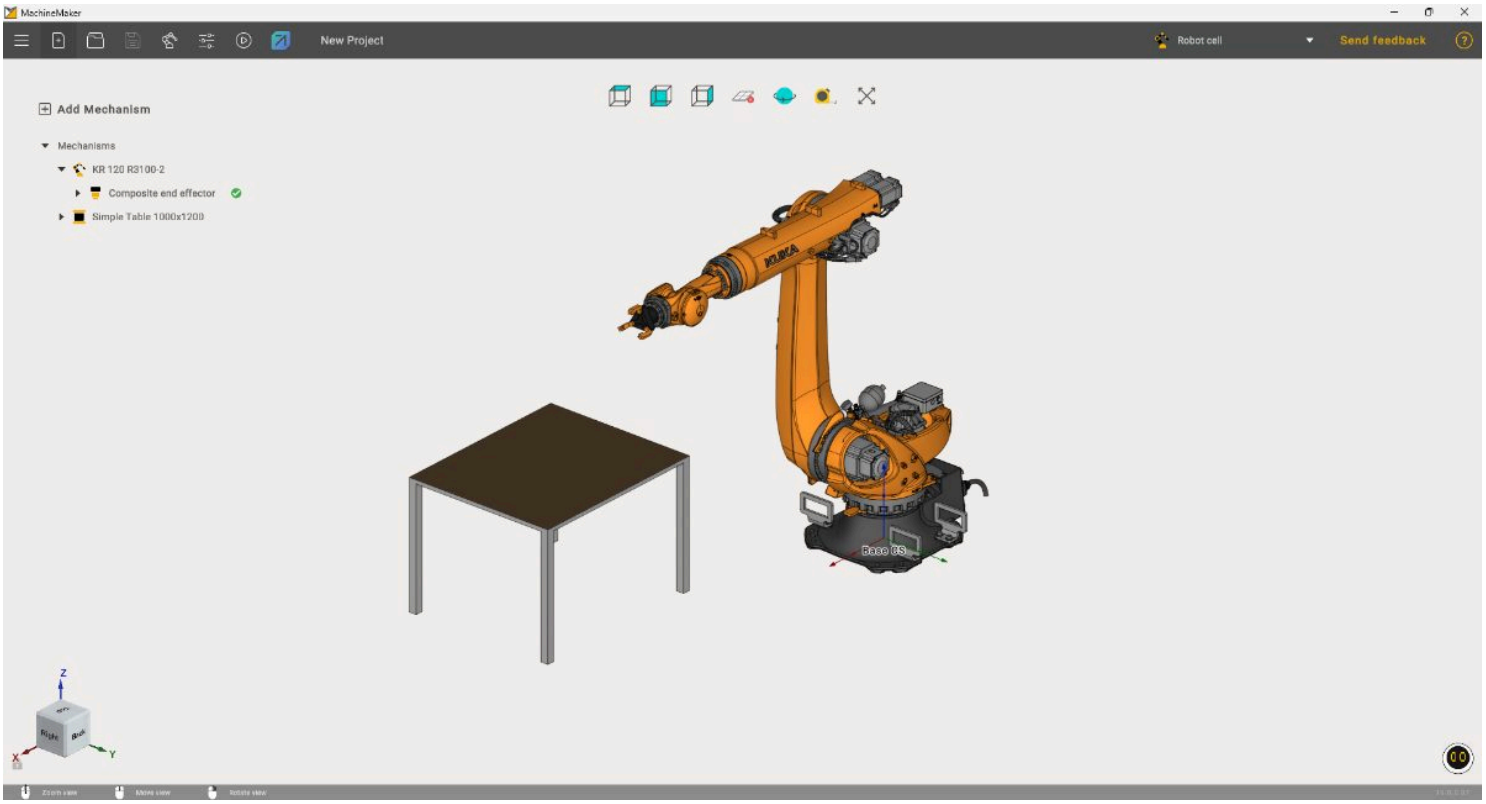
The example shows simple transfer of a part from one table to another.

1. Create a project and assemble the cell

On the ENCY Hyper home page, select New project > Create in MachineMaker to create your own robotic cell.

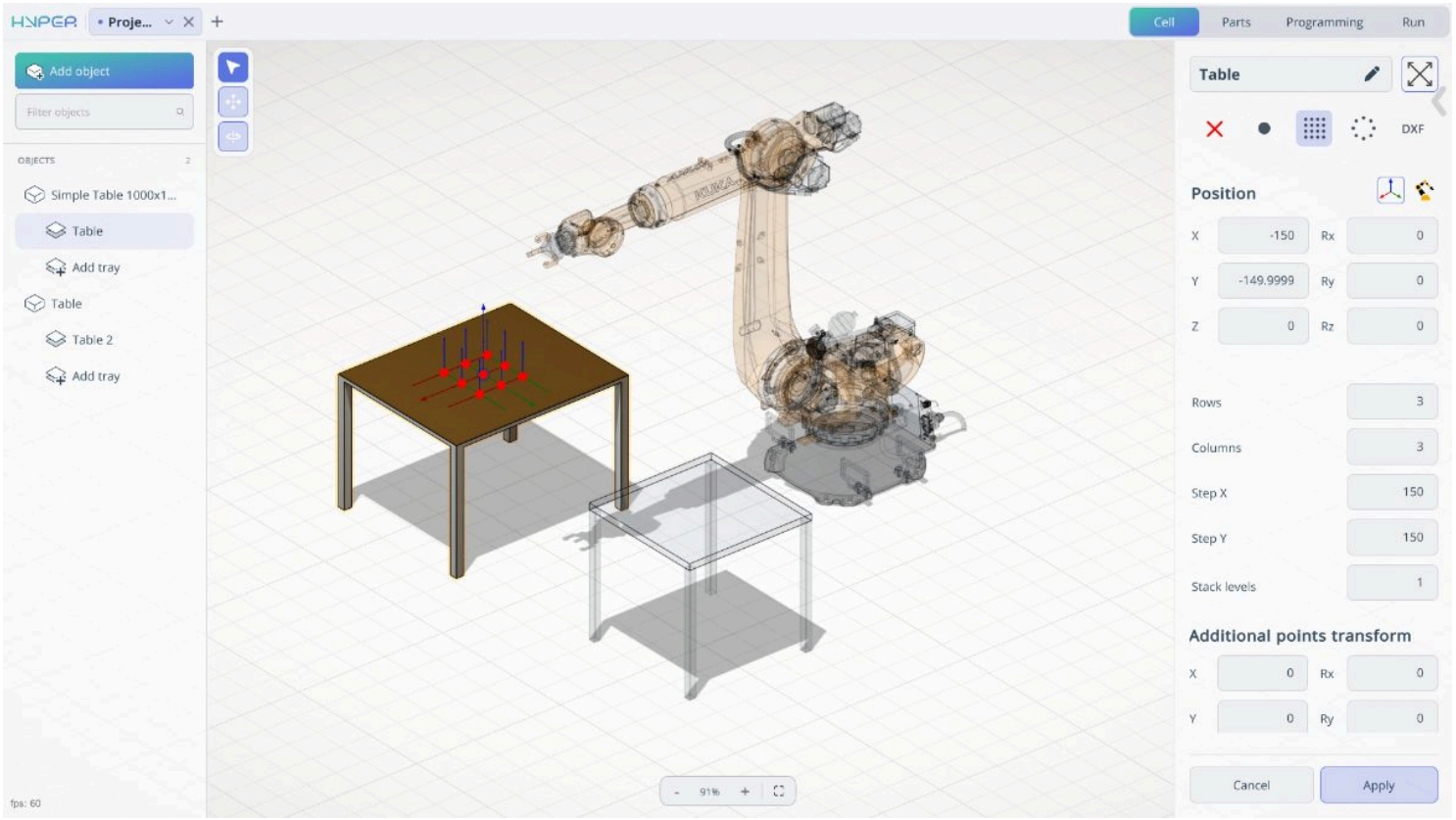


In MachineMaker, assemble the cell using the mechanisms required for your task. This example uses a robot, a gripper, and a table. Export the completed cell to ENCY Hyper.



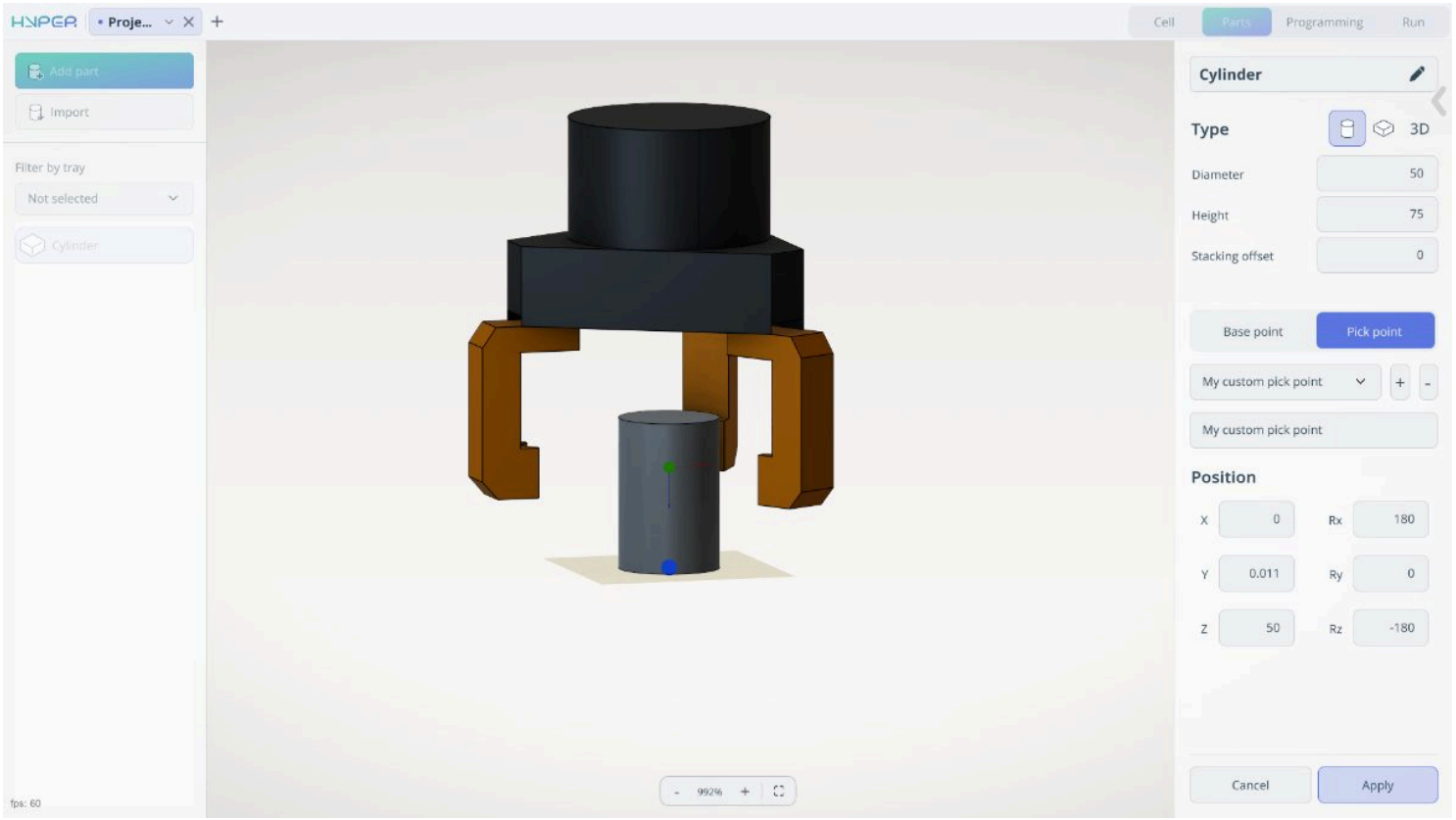
2. Add objects and trays in Cell mode

The project opens on the Cell tab. Here you can add objects and define trays with points for locating parts on tables or at other positions in the cell. Add a tray with 3 rows and 3 columns to the table imported from MachineMaker. Then add a second table directly in ENCY Hyper and give it another nine-point tray. One tray will hold the parts to be picked; the other will receive them. See Cell Mode for details.

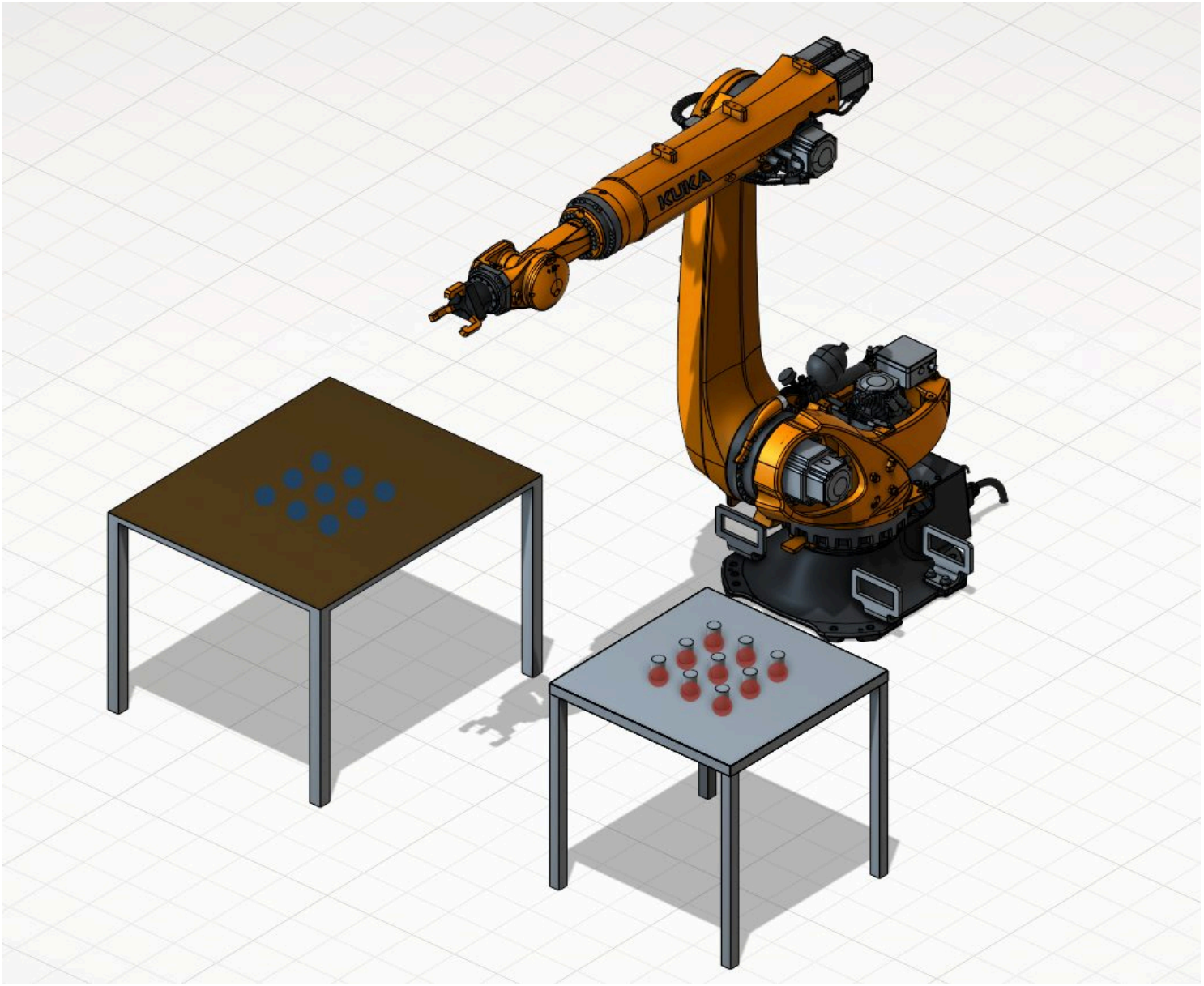


3. Define and place the parts

On the Parts tab, use Add part to create a box or cylinder, or use Import to load your own 3D model. Configure the gripping settings for each part: Pick point defines how the tool grips it, while Base point defines the reference point used to position it on a tray. This example uses a cylinder.

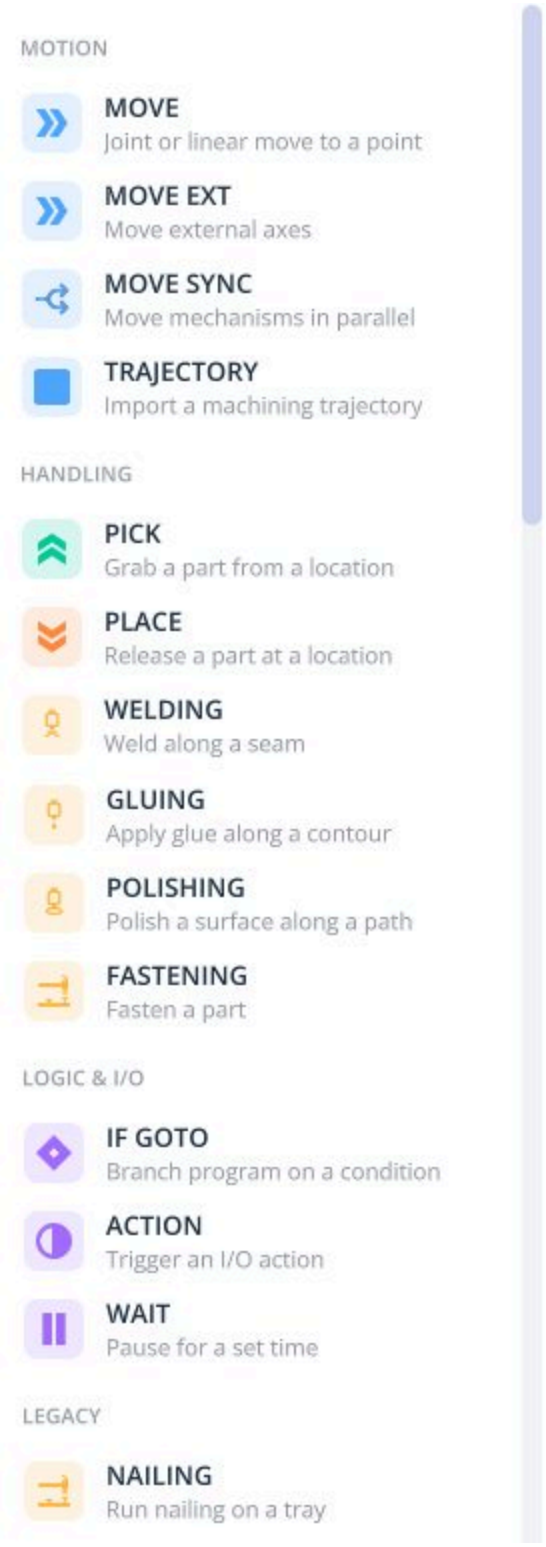


After creating the part, place it at a tray point with the left mouse button. To fill the entire tray, press and hold the left mouse button on a point in that tray, then select Yes in the confirmation dialog. Fill the source tray and leave the destination tray empty.



4. Build the program

Switch to Programming, the main workspace for defining and checking the robot program. Click the + button to open the command list.

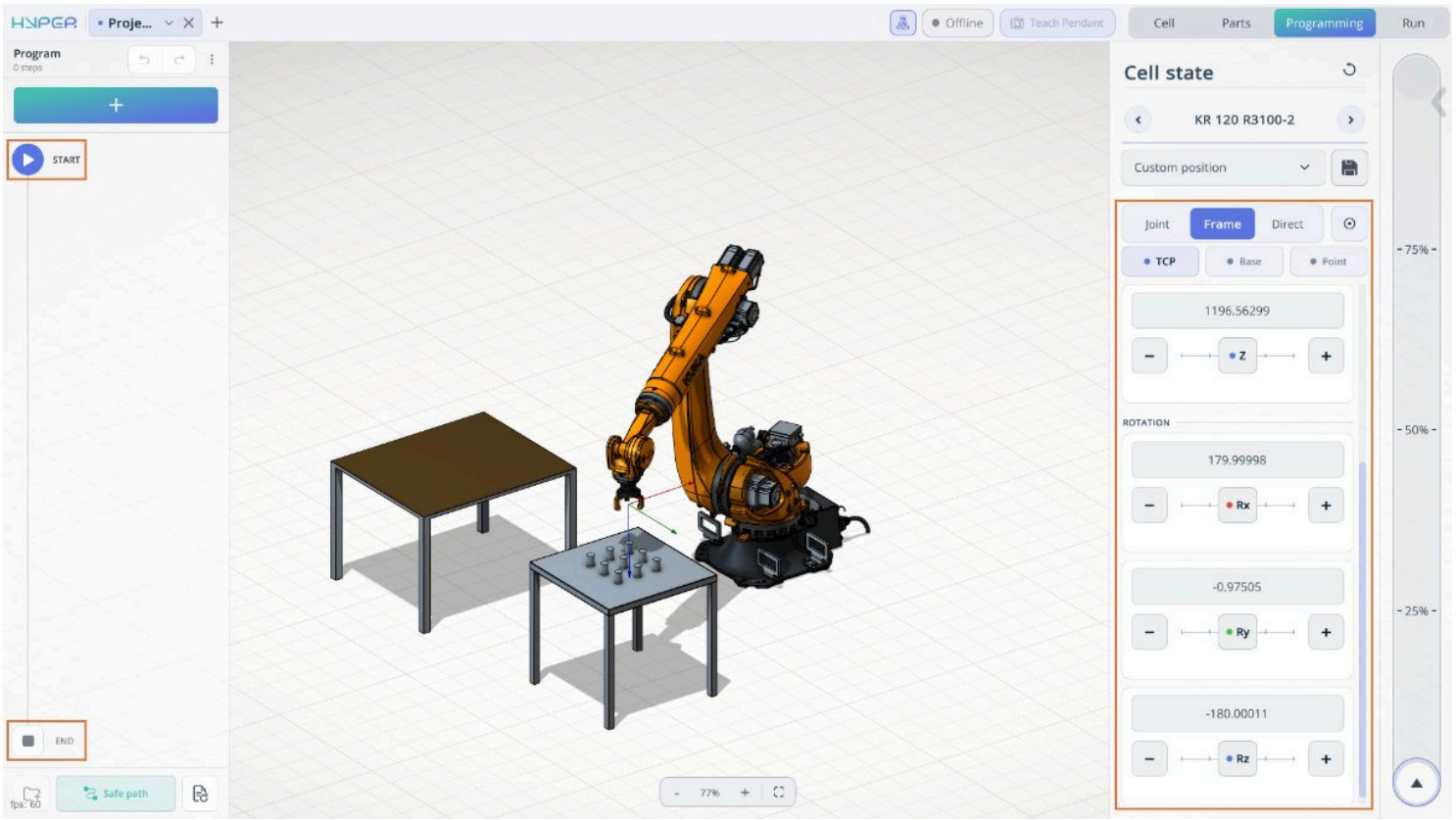


- MOVE — moves the robot to a point using joint or linear motion.
- MOVE EXT — moves external axes.
- MOVE SYNC — moves mechanisms in parallel.
- TRAJECTORY — imports a machining trajectory from a CAM system.
- PICK — picks up a part from a selected location.
- PLACE — releases a part at a selected location.
- WELDING — performs a welding operation.
- GLUING — applies adhesive along the specified path.

- POLISHING — polishes a surface along a path.
- FASTENING — fastens a part.
- IF GOTO — branches to another program step when a condition is met.
- ACTION — triggers an input/output action.
- WAIT — pauses execution for a specified time.
- NAILING — performs a nailing operation; listed under Legacy.

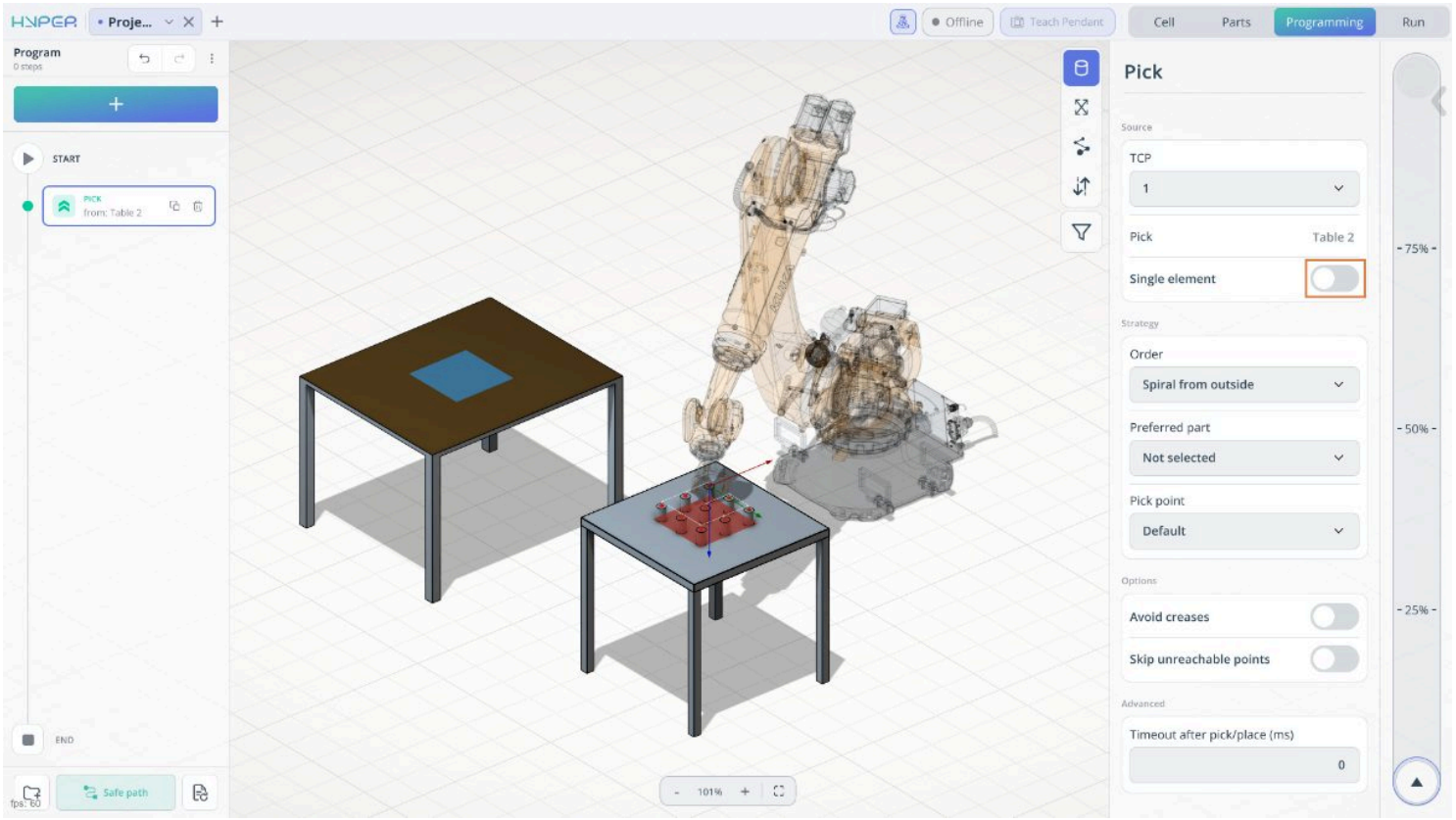
Set the initial and final robot positions

Begin with MOVE, which can also be configured within the START and END steps to define the robot's initial and final positions. Select the corresponding step and use the robot movement controls on the right to set the required position. The screenshot highlights START, END, and the robot movement controls.



5. Configure the Pick operation

Add a PICK operation and select the source tray. Use Single element to choose whether the operation handles one part or the whole tray. Turn it off to work with all parts in the selected tray; turn it on to pick a single part. For this example, leave it off.

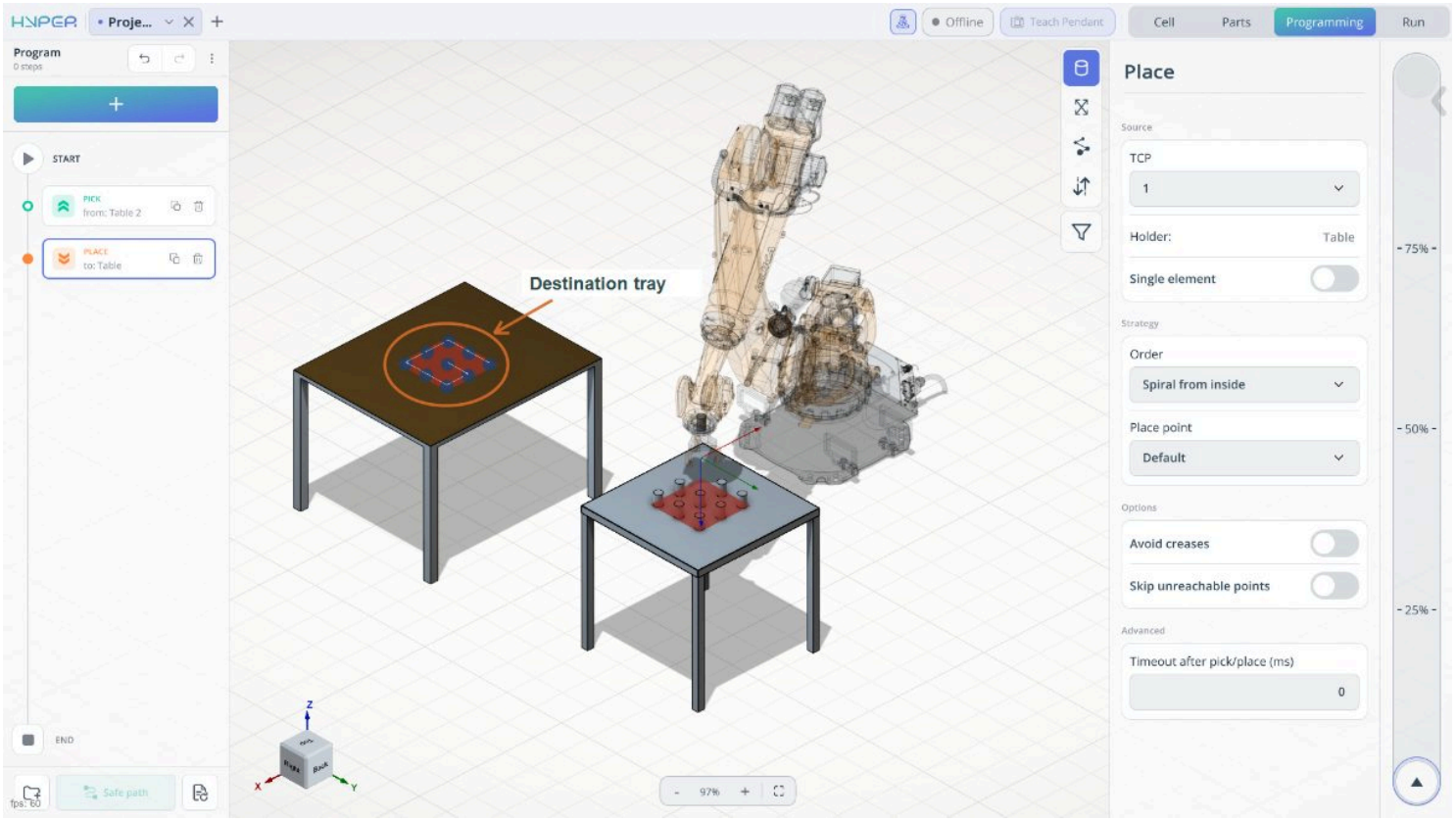


The Pick operation provides settings for part selection, gripping, robot configuration, and approach and retract movements:

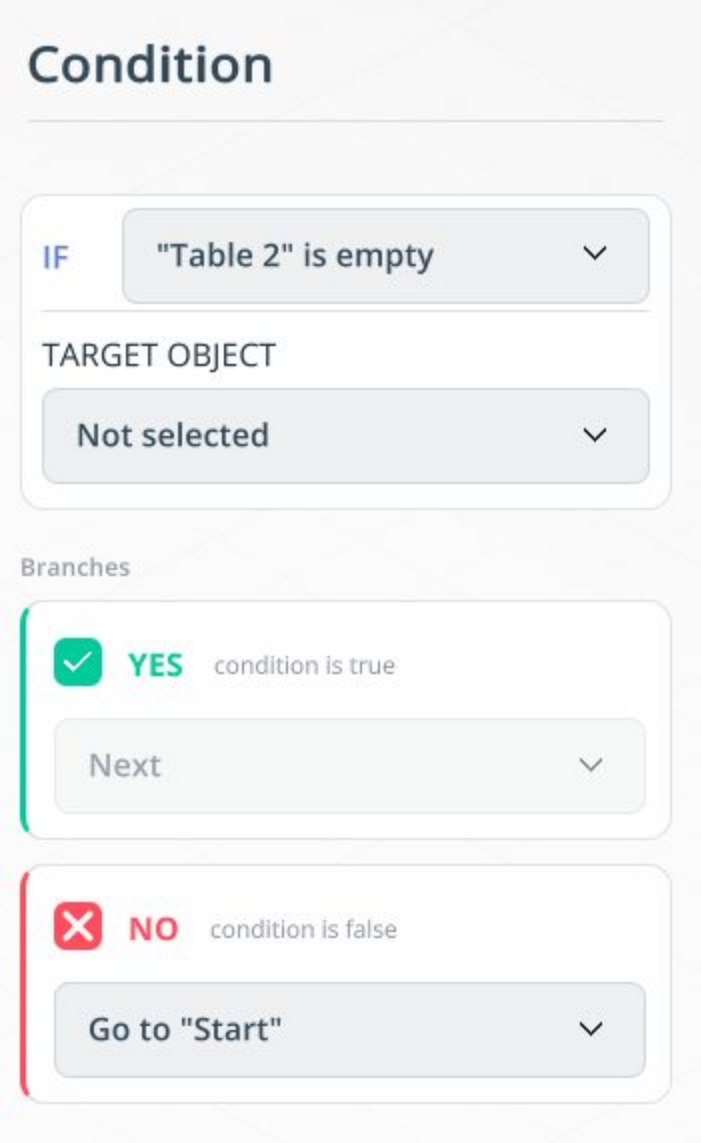
- Main Pick settings. Select the tool's TCP and the source tray. Set Order to choose the picking sequence, Preferred part to select a part type when needed, and Pick point to choose the gripping point defined for the part.
- Pick position adjustment. Use the Pick position controls to adjust the robot pose manually and refine how the tool approaches the part.
- Fix. Use this option in the robot configuration settings to correct an unsuitable joint configuration when the robot's axes fold into an undesirable pose.
- Avoid collisions. Enable this option for the relevant movement segments so that trajectory calculation plans a path around obstacles. Use Safe Path to calculate movements with collision avoidance enabled.
- Safe move distance. Set the clearance distance for the robot's approach to and withdrawal from the pick point. Adjust the safe move direction and speed as needed for the part and surrounding objects.

For detailed command settings, see Programming Mode.

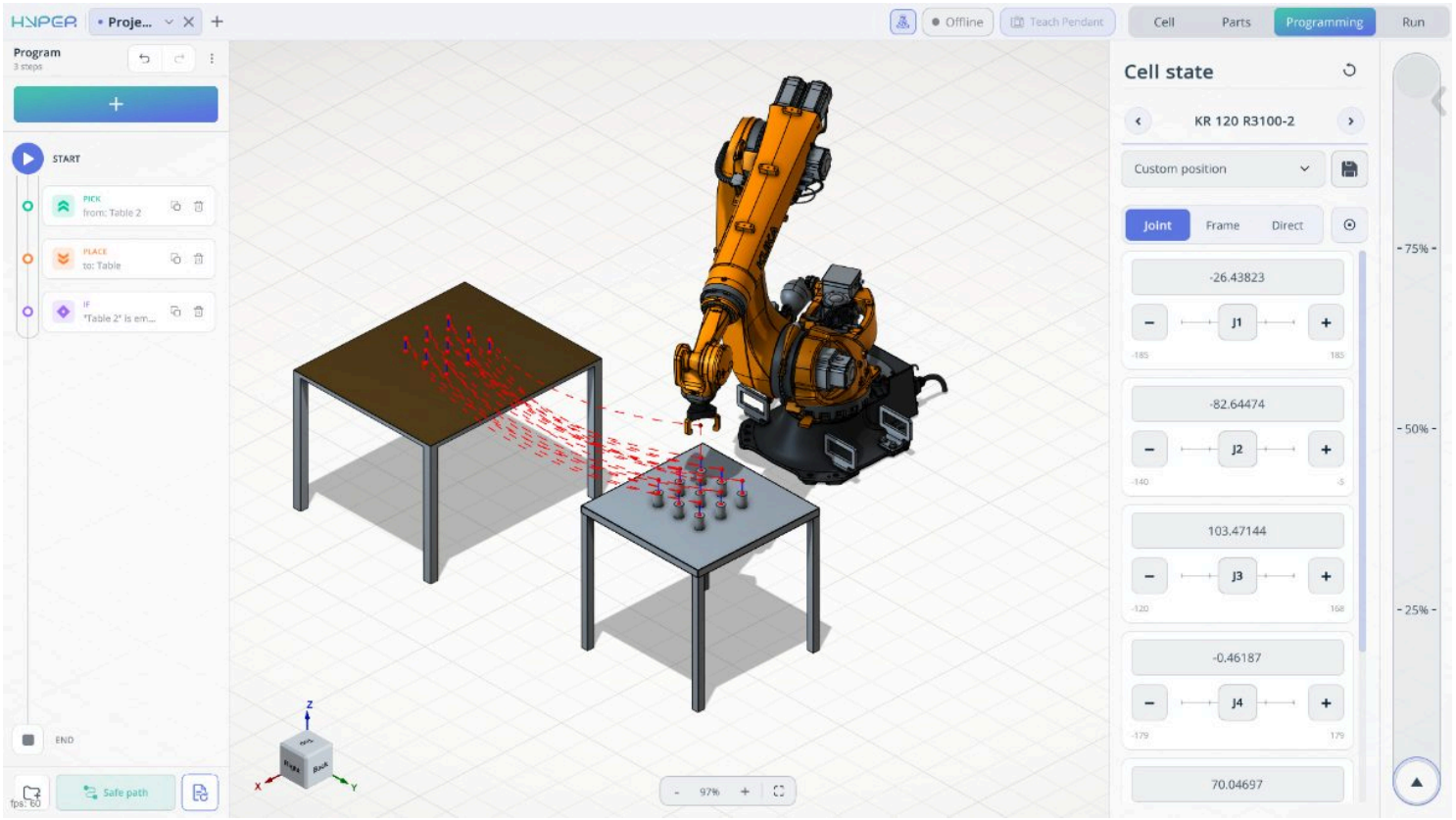
For the Place command, simply select the target cell using the left mouse button where the parts will be placed.



The IF command allows the program to loop the preceding commands and properly terminate them. In this case, we specify that if all parts have been removed from the table, the robot returns to its Home position.

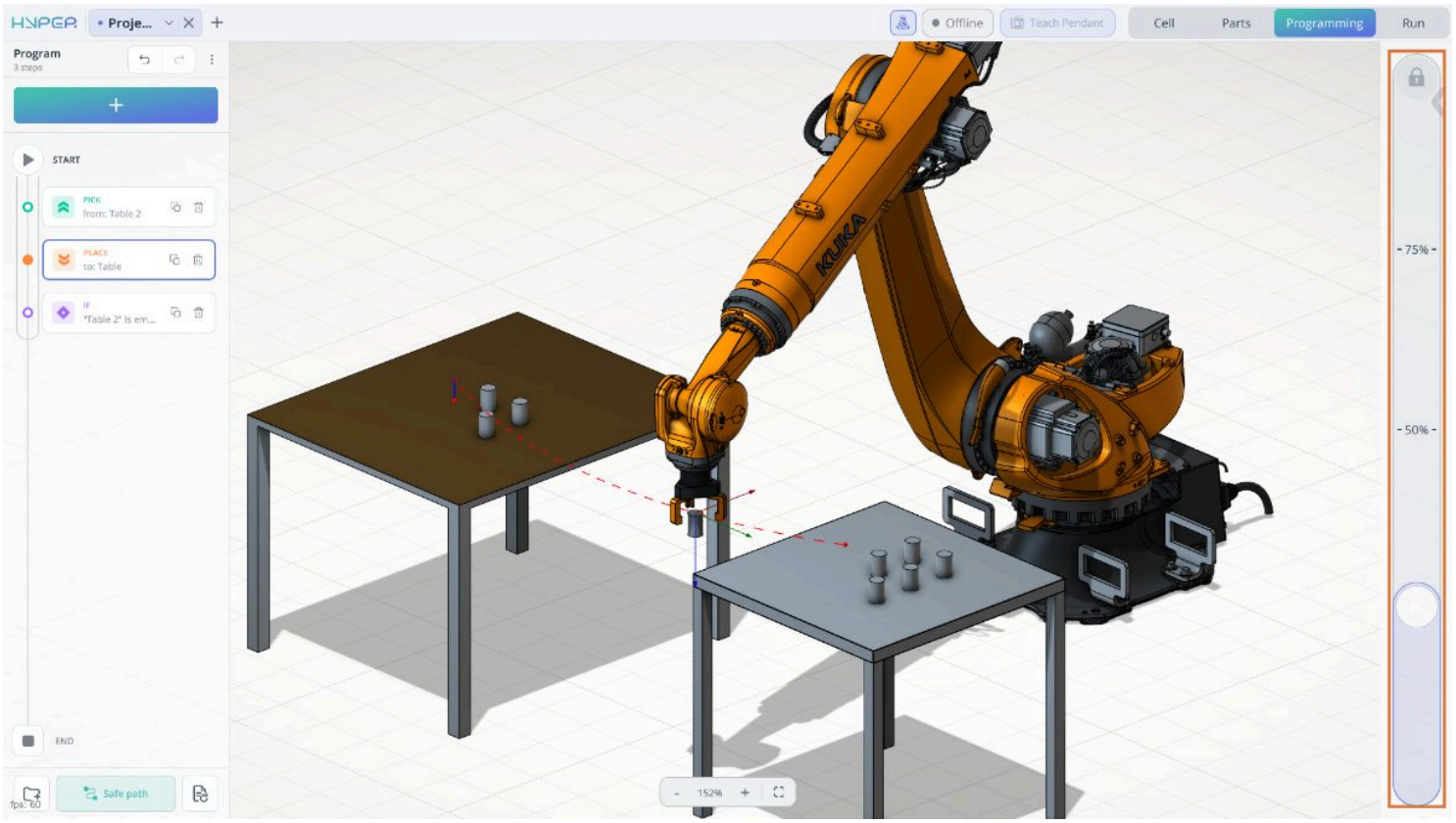


When your program is ready, you need to calculate it before starting the simulation. Use the Recalculate button for this. You will visually see the trajectory along which your robot will move the parts.



6. Simulate the program and check the gripper

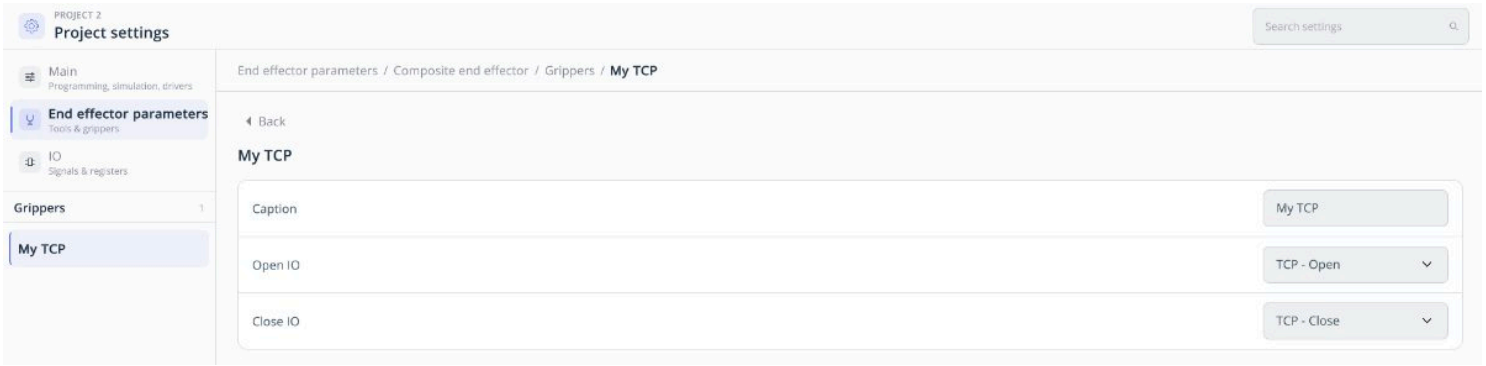
Use the simulation slider on the right side of the screen to start the simulation and adjust its speed. The percentage markings indicate the simulation speed.



During simulation, you can see that the gripper jaws do not close around the part. To correct this, configure the gripper's opening and closing actions in Project settings.

Assign the opening and closing actions

Open Project settings > End effector parameters, select your tool, and open its gripper settings. In this example, the path is Composite end effector > Grippers > My TCP. Assign TCP - Open to Open IO and TCP - Close to Close IO.



Configure the IO signals and linked gripper axis

Go to Project settings > IO and select TCP - Open. Open its Input and Output sections and use Add to create an item in each. Configure the signal and the associated gripper axis:

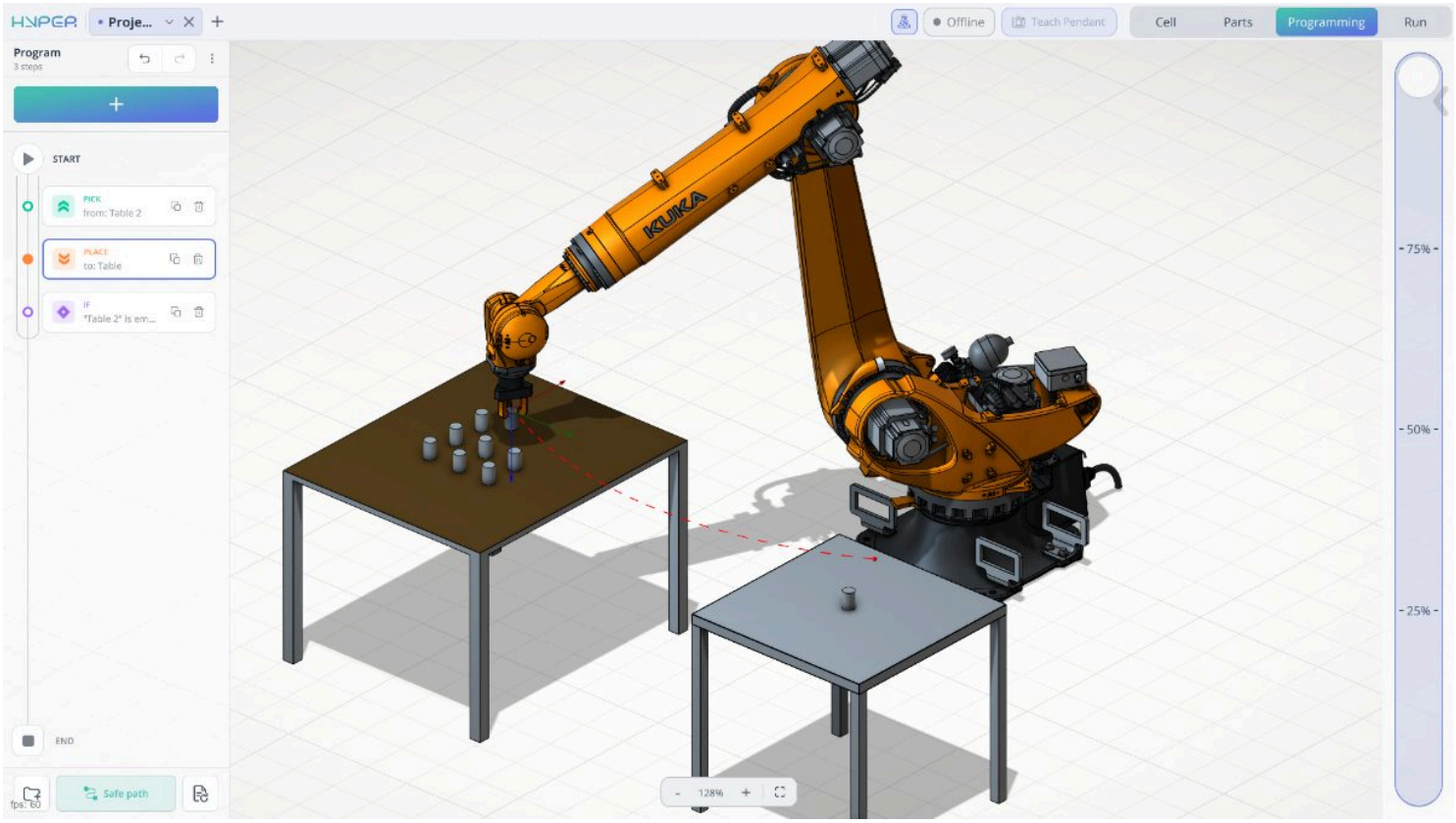
- Input number / Output number — the input or output signal number used by the action.
- Value — the expected input value or the value sent to the output.
- Linked axis — the tool axis associated with the signal.
- Linked axis value — the axis value corresponding to the required gripper position.

The combined illustration shows the Input settings above and the Output settings below. In this example, both use signal number 0, signal value 1, and linked axis value 50 for the open position. The IO signal and linked axis values shown here are illustrative only. Actual production equipment may require different values. Configure them to match the signals and gripper positions used by your robot and tool.



Repeat the same procedure for TCP - Close: add and configure its Input and Output items, specifying the signal parameters and the linked axis value for the closed gripping position. Click Apply to save the settings.

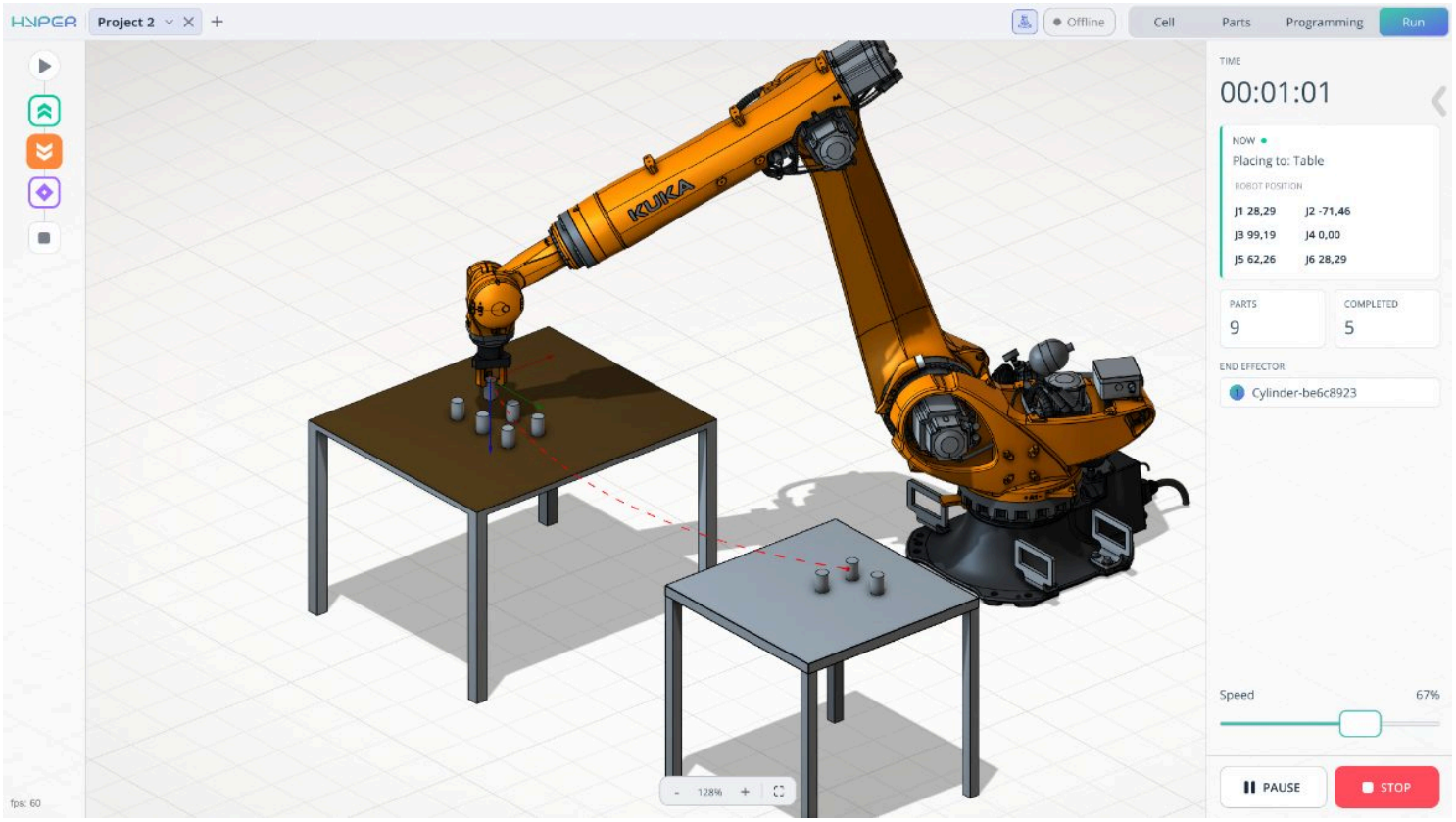
Run the simulation again. The gripper now responds to the opening and closing signals, moving its fingers to grip and release the parts during the Pick and Place sequence.



7. Connect to the robot in Run mode

Switch to the Run tab to connect to the physical robot. Before connecting, open Project settings > Main > Robot driver settings and set the robot's IP address to match your robot controller.

Return to Run and click Offline at the top of the screen to establish the connection. Once the robot is connected, the button changes to Online.

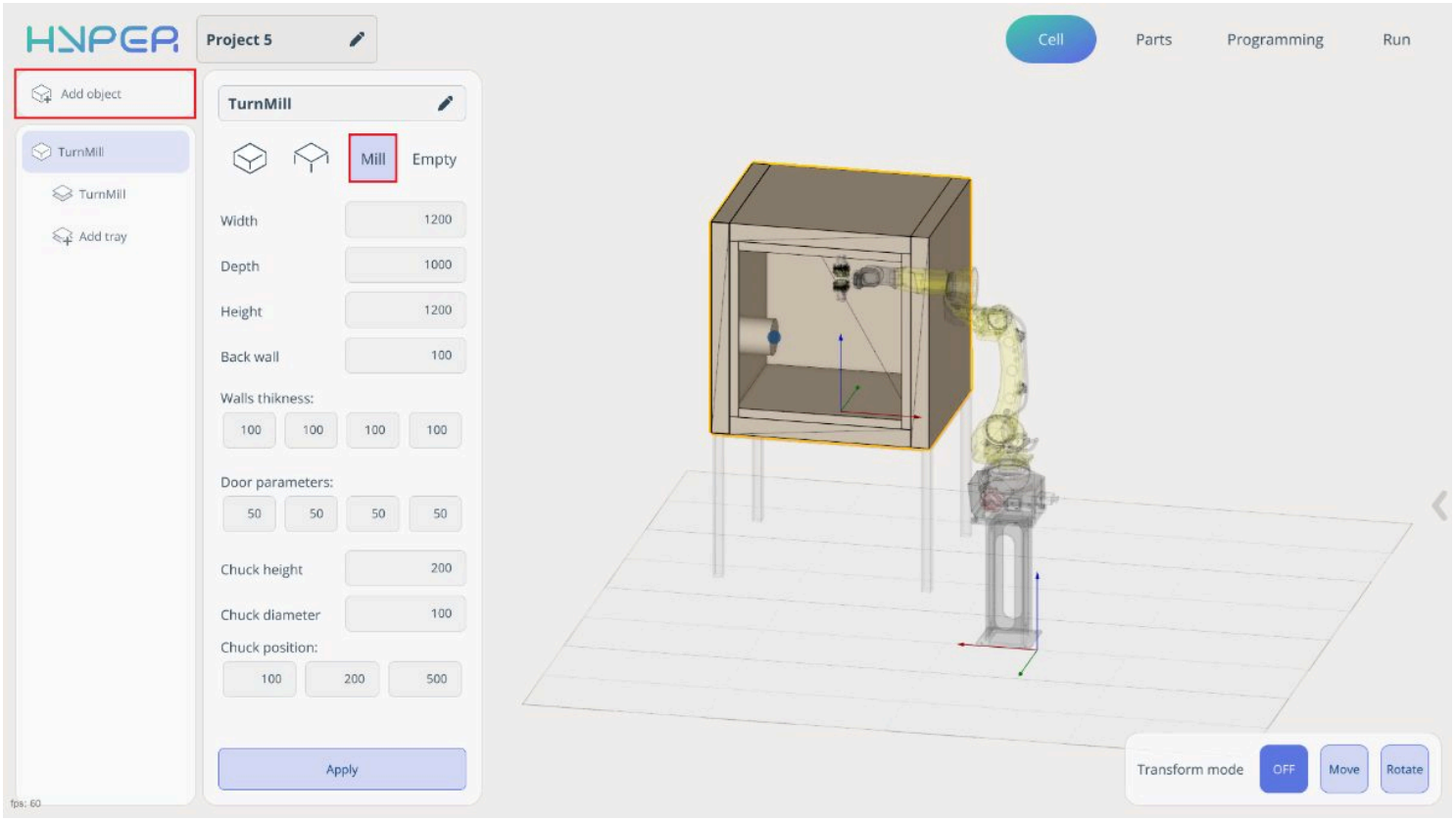


Pick and place (transfer of the part from the workbench to the machine and back.).

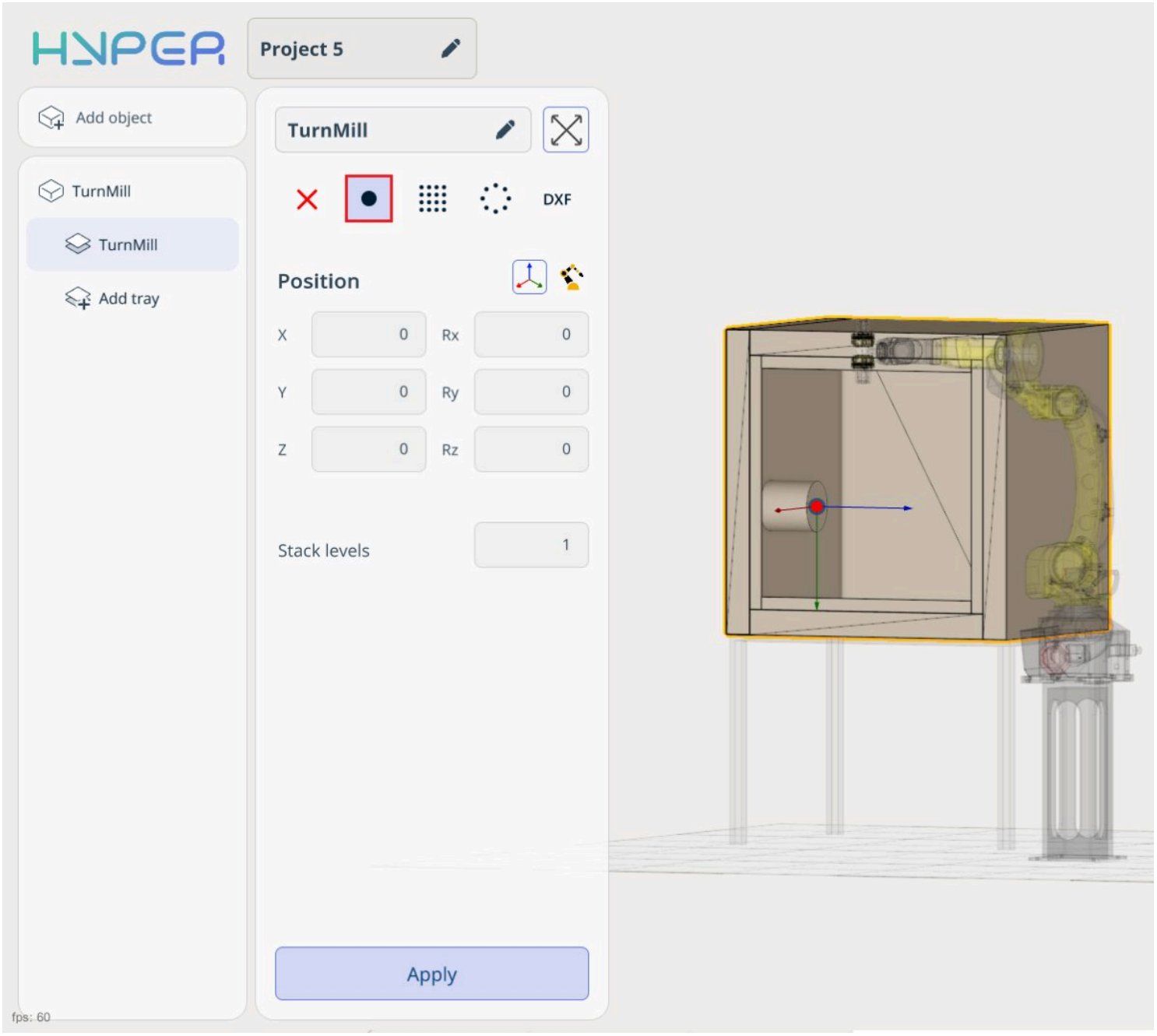
Example of part loading/unloading onto machine.

First, import the project on the Start Page. See more

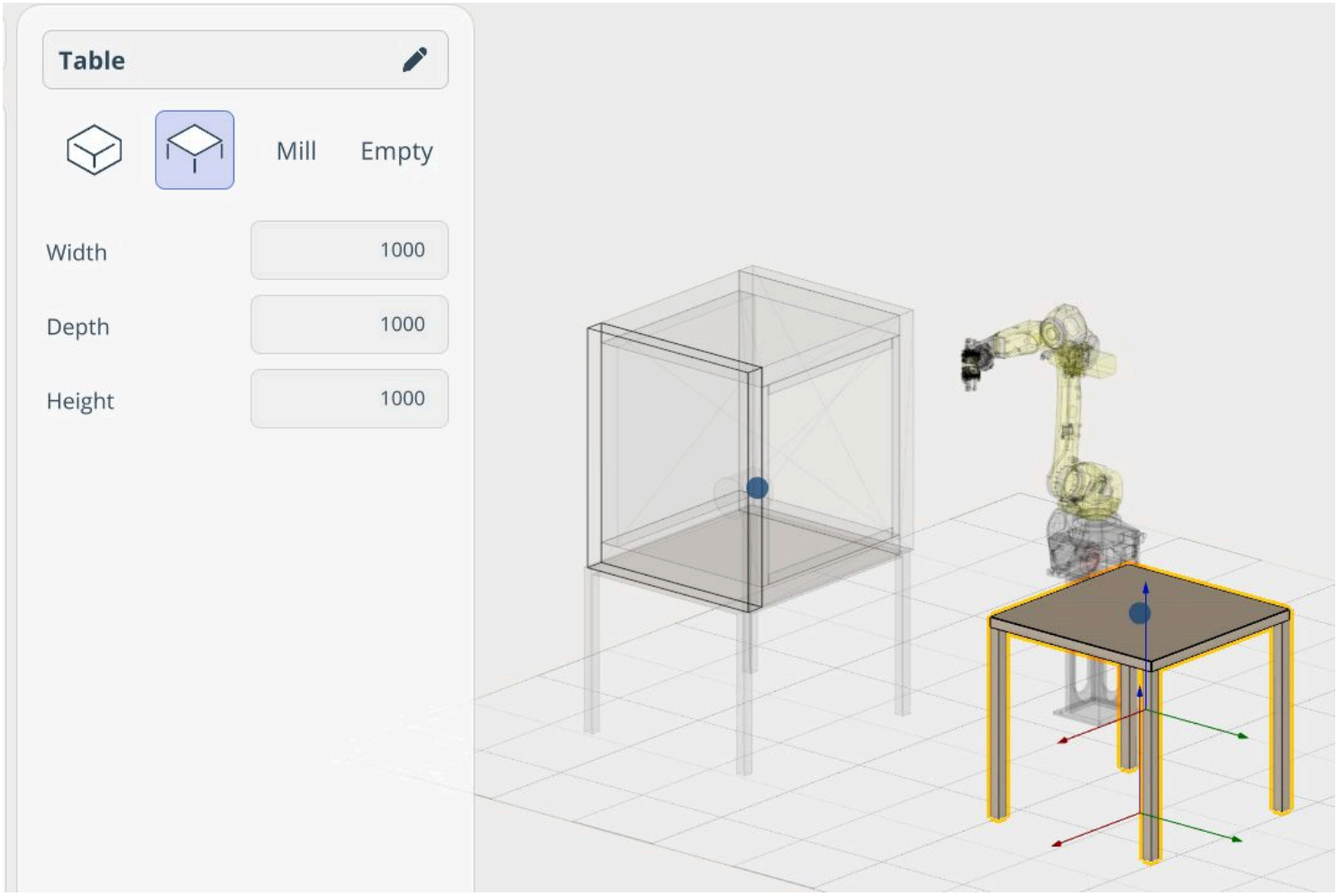
After loading the project, open it and add an object representing a CNC machine.



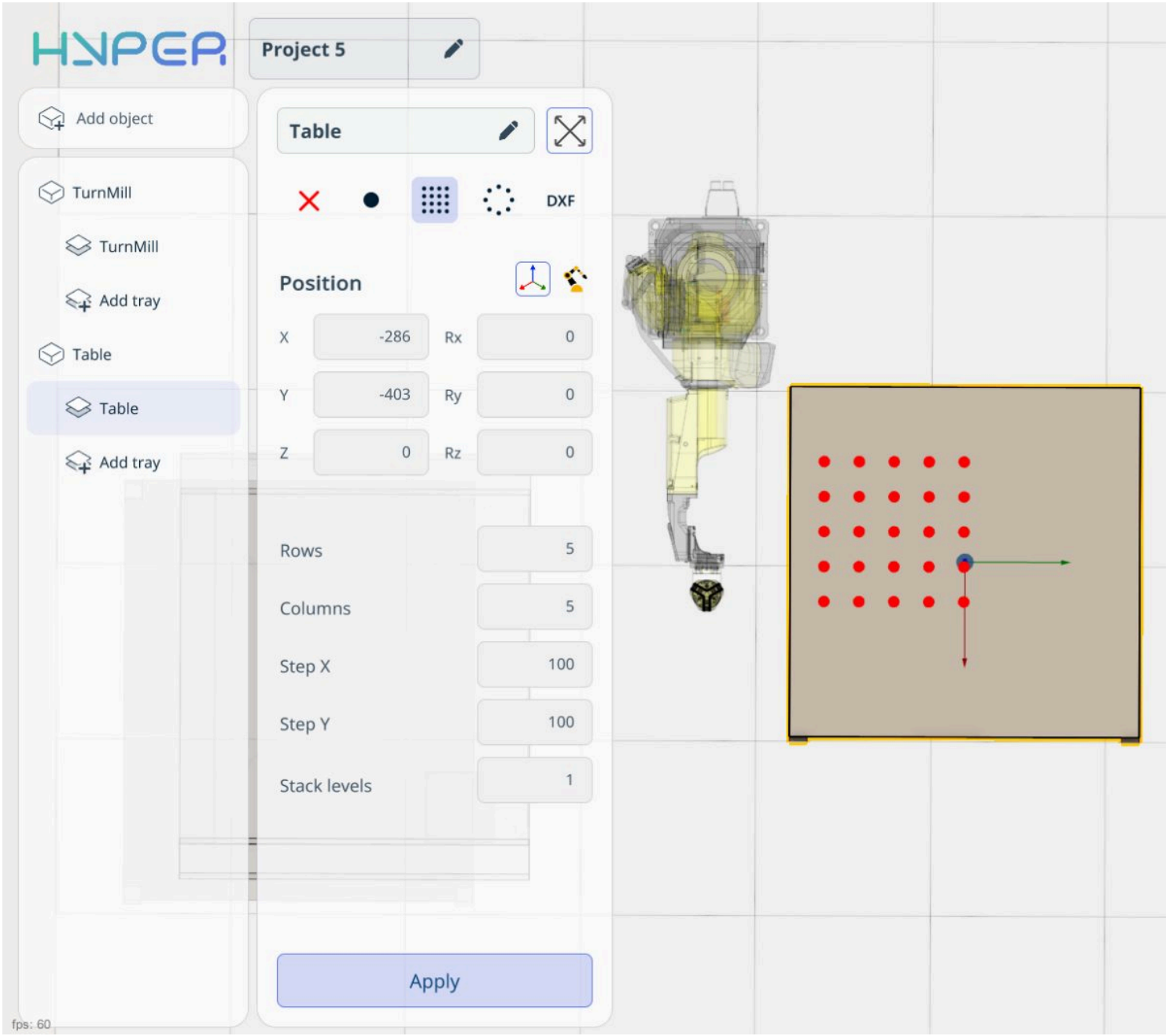
Add a cell for part processing on the machine surface.



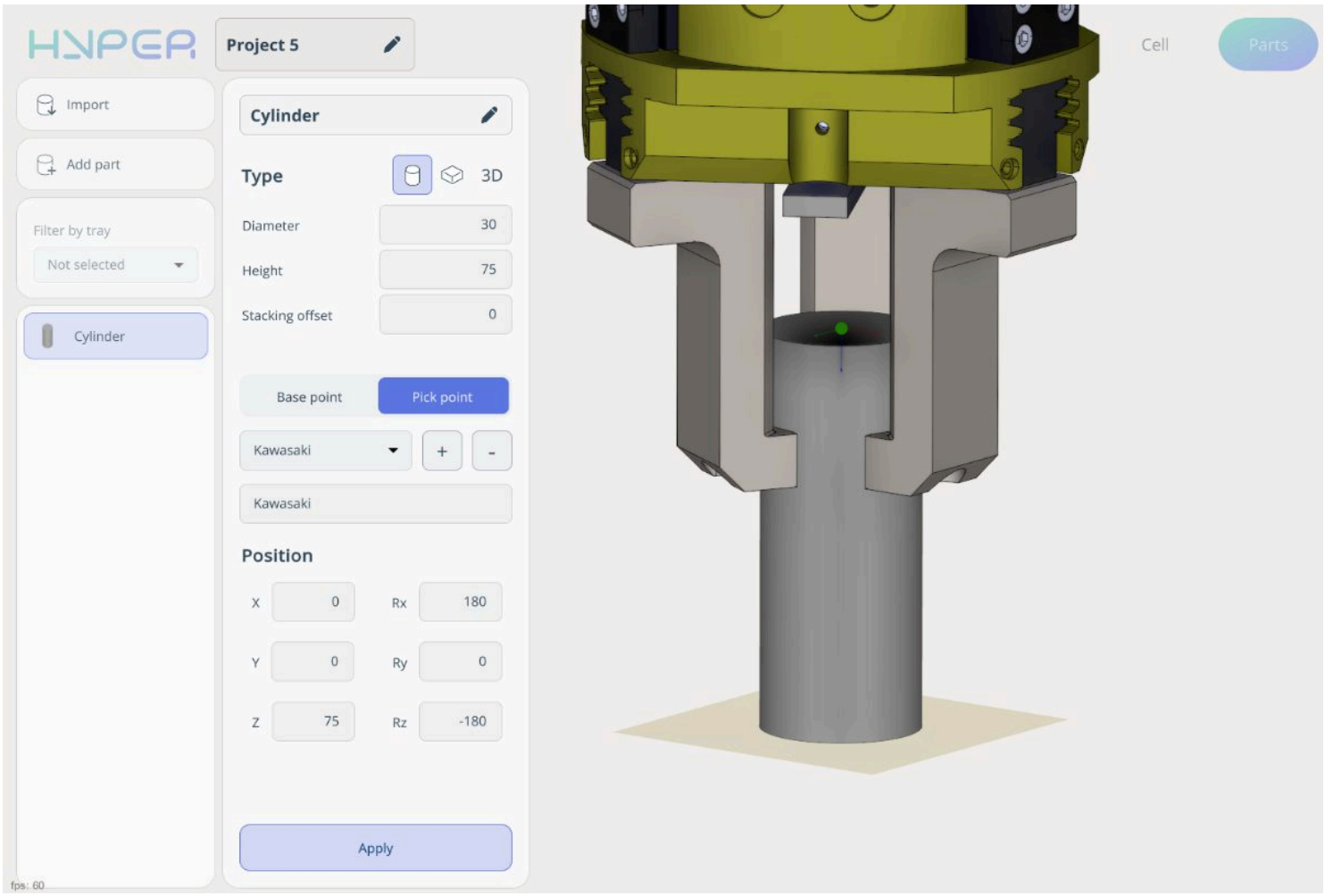
Add a table where the parts will be stored. Add and configure the cell parameters for the table.



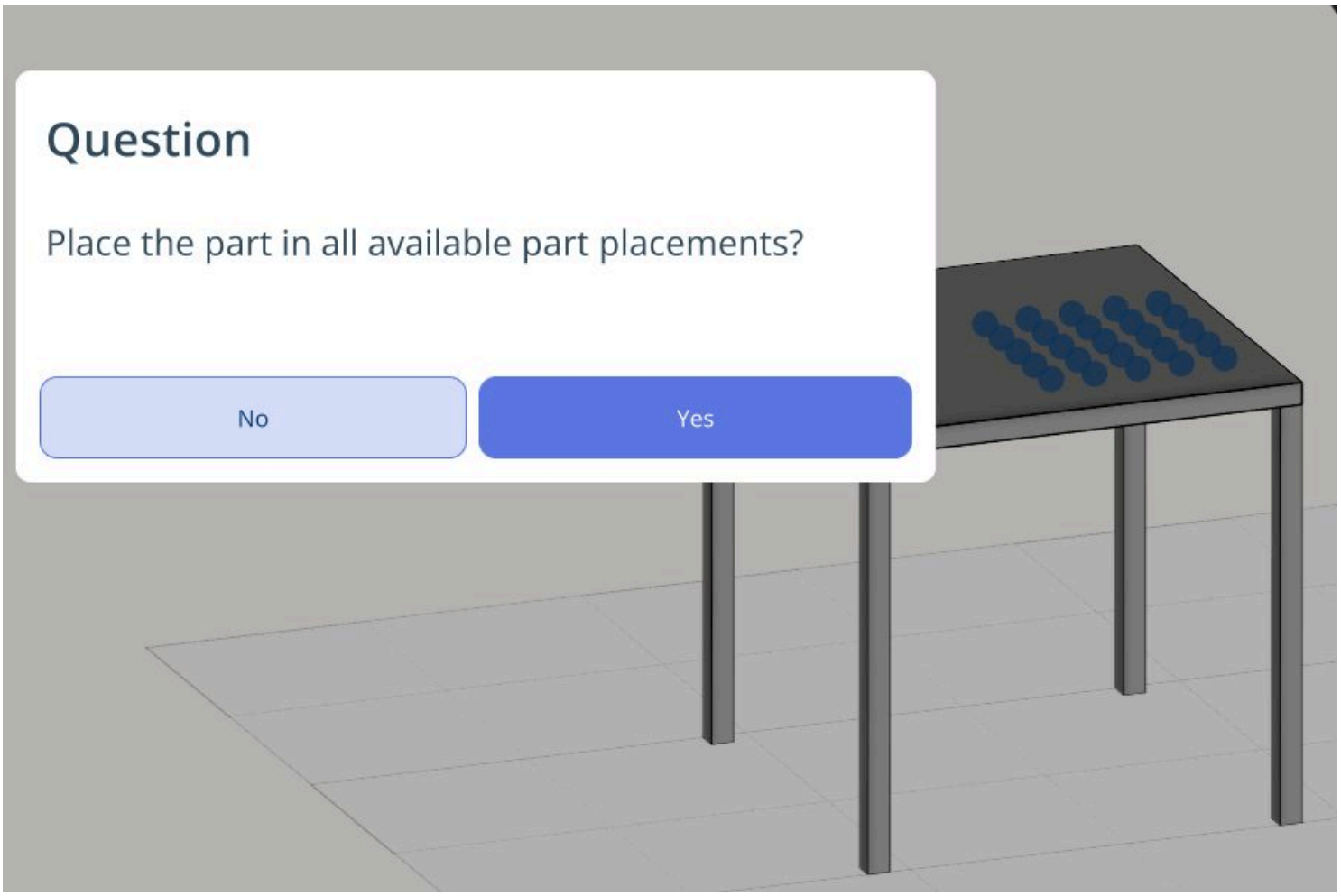
Add a table where the parts will be stored. Add and configure the cell parameters for the table.



On the Parts tab, create a cylinder and define its Pick Point. Leave the Base Point set to default.

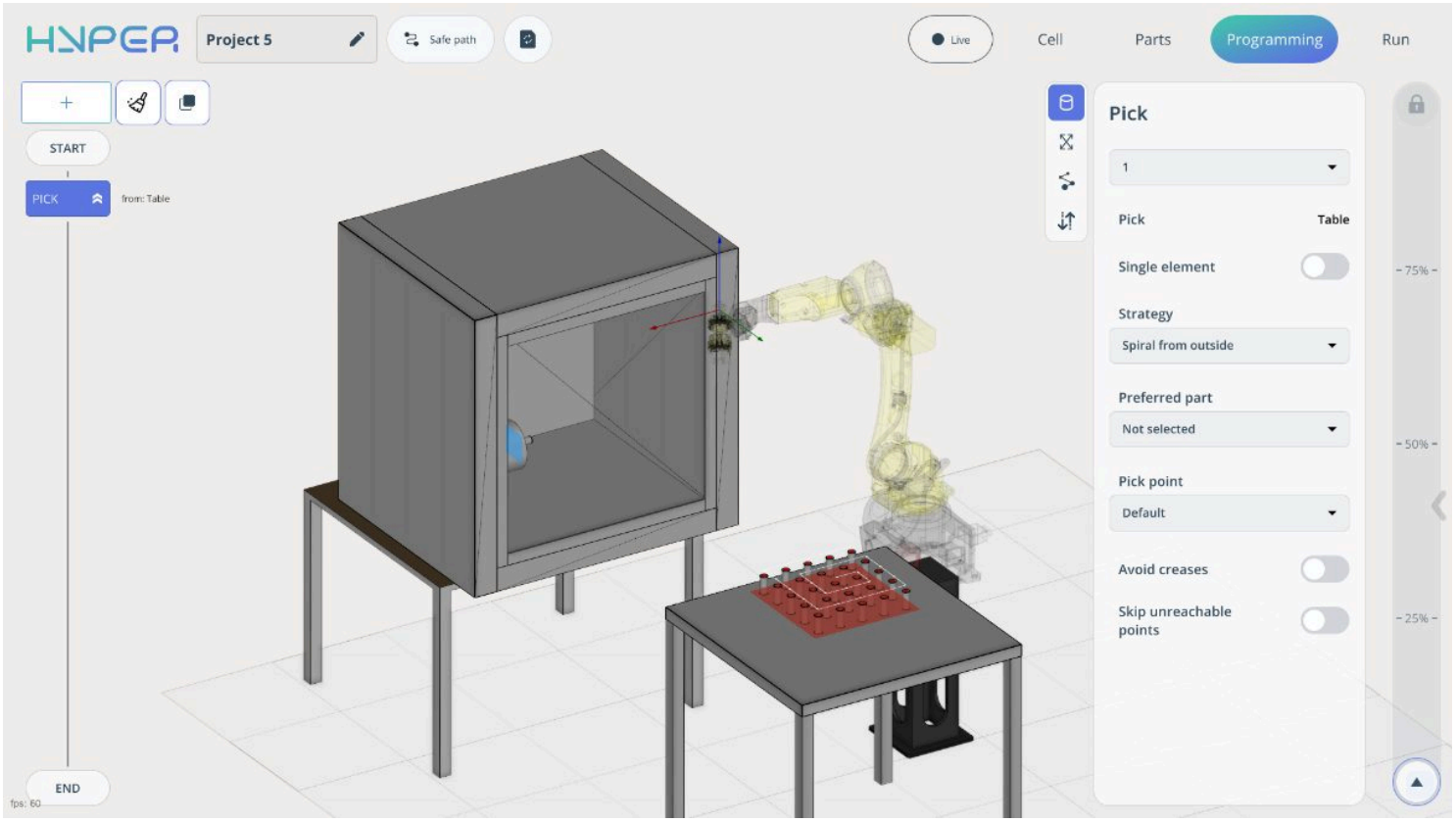


Place the cylinders across the entire cell by holding the left mouse button.



The next step is to build the correct program that enables the robot to transfer parts to the machine for processing.

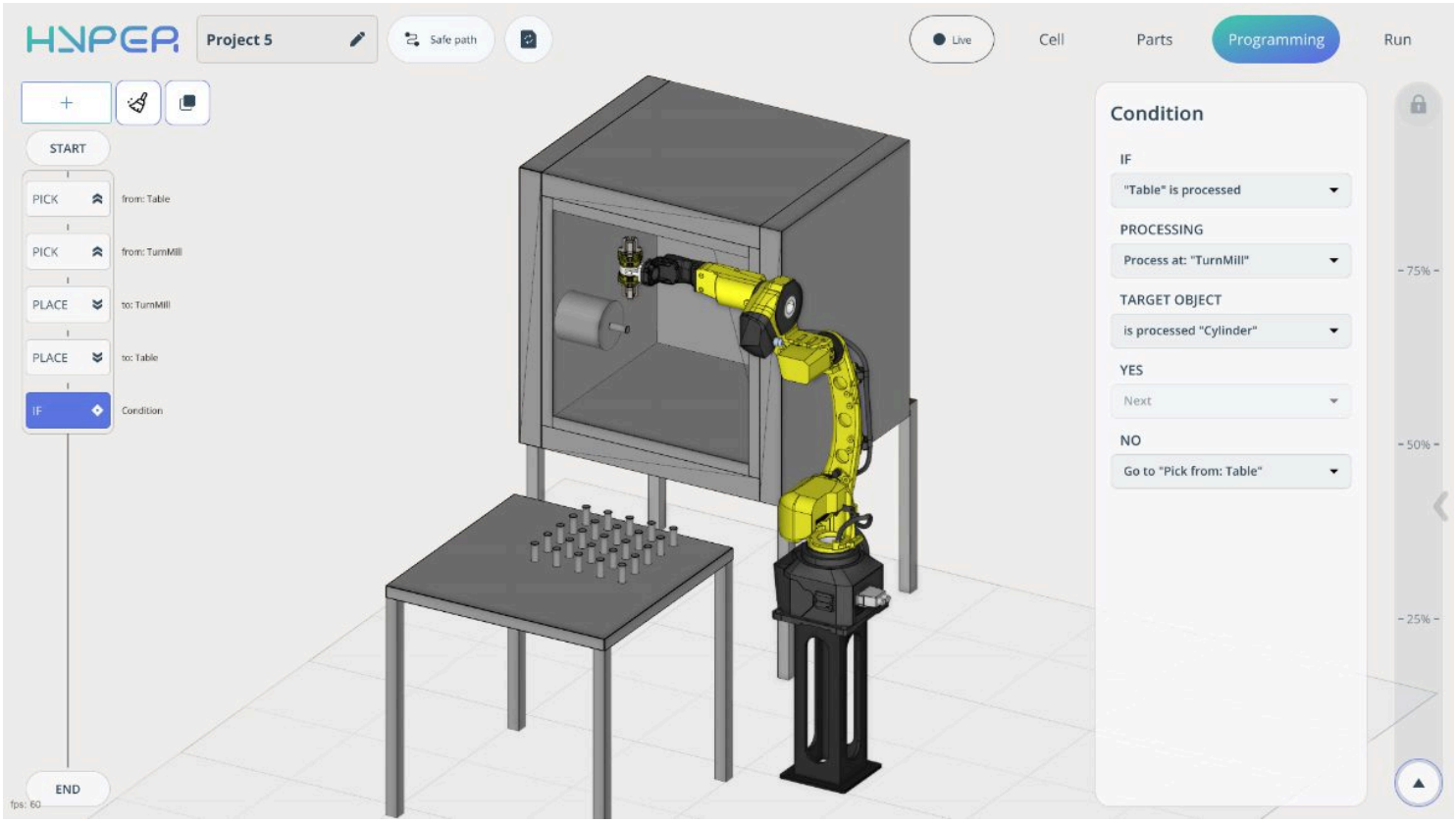
This robot is equipped with a tool that has two grippers. The logic of our program is to pick up a part and load it into the machine for processing, then place the processed part back onto the table.
To ensure that all parts from the table are used, disable the Single element slider. Also place one part into the machine cell.



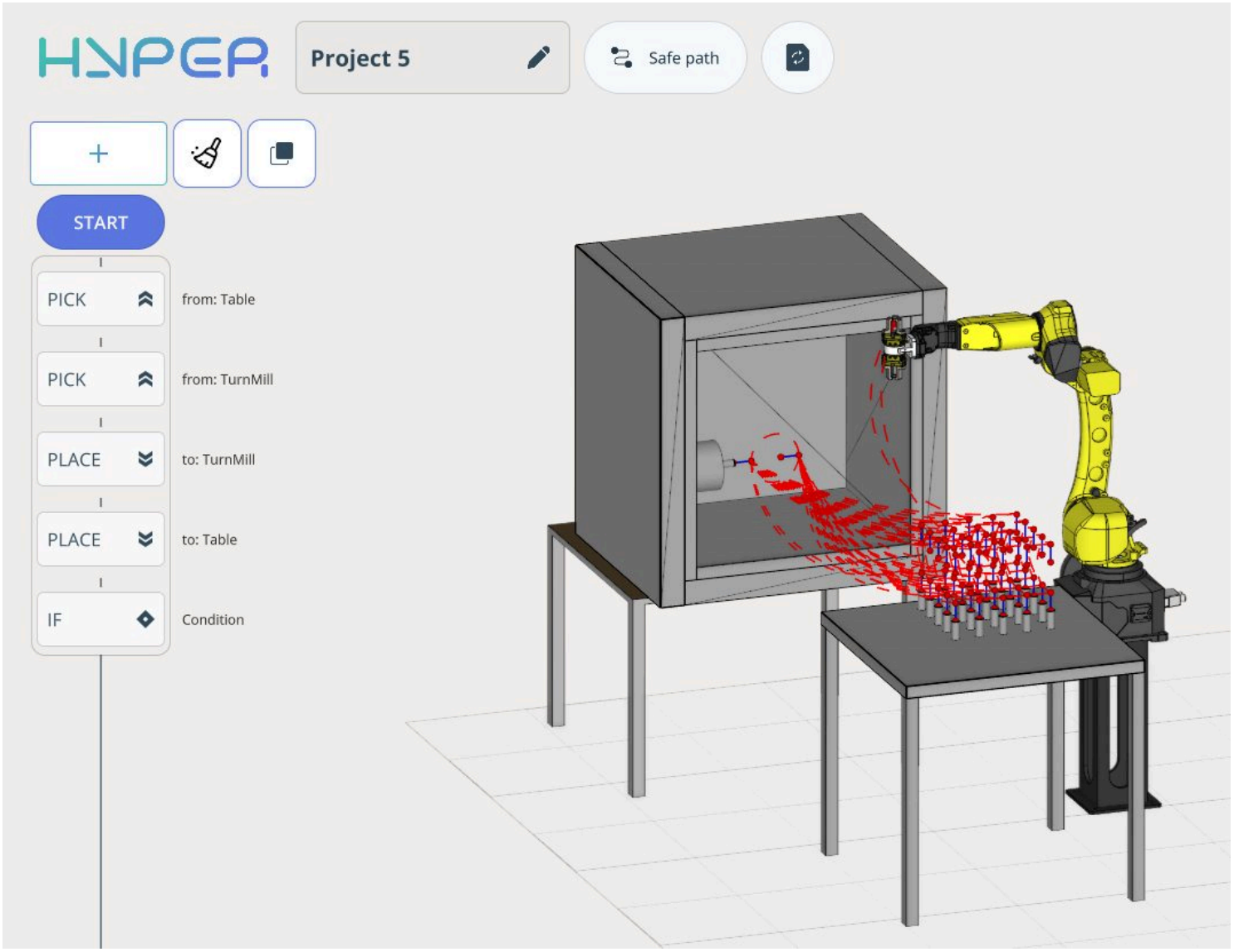
As a result, the robot picks up an unprocessed part from the table, then removes the processed part from the machine and replaces it.



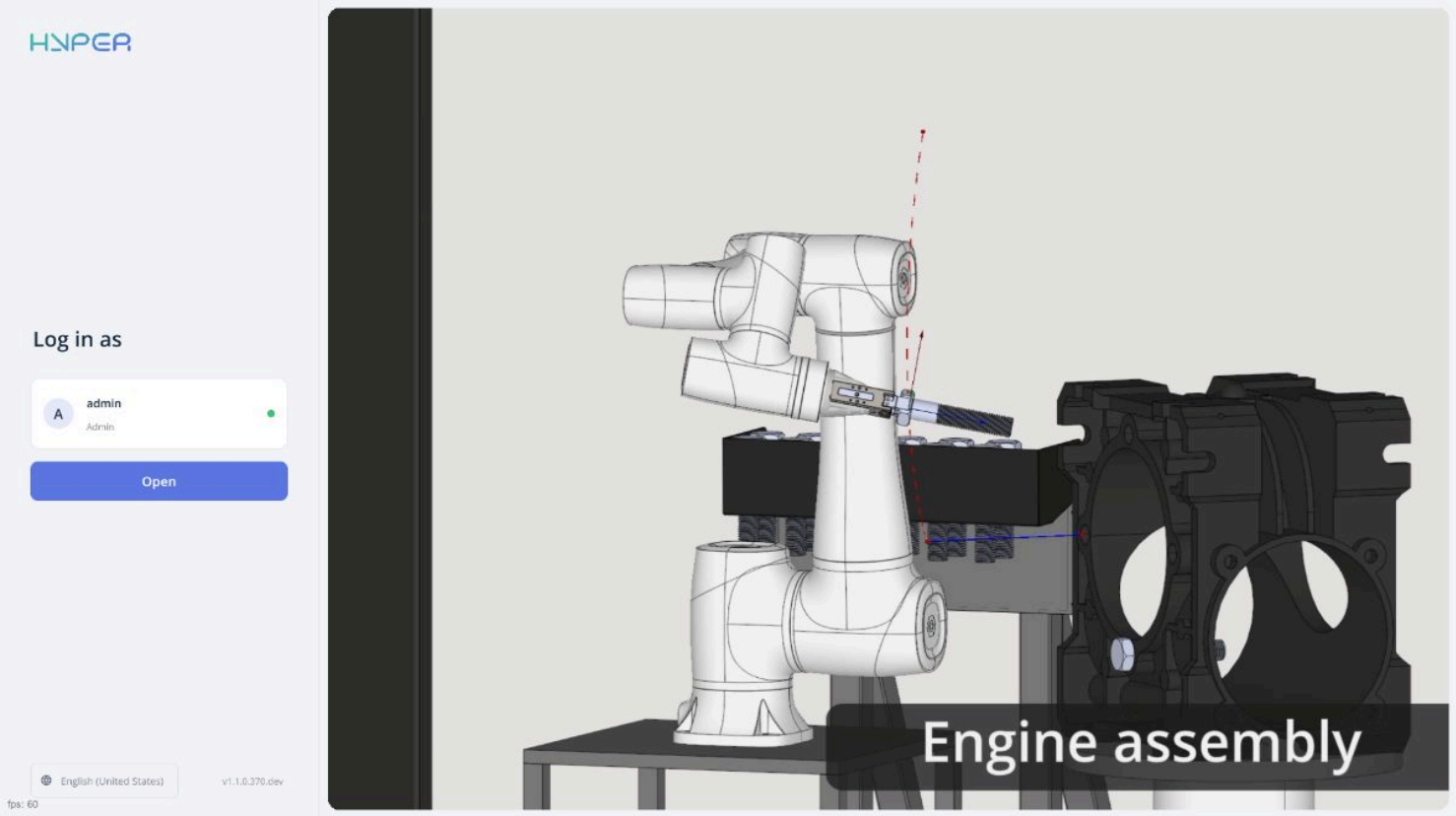
Since we are using multiple parts from the table, the program needs to be looped. To do this, add an IF command and set the parameters required to loop the part transfer and processing workflow.



After recalculating all commands, the trajectory will appear. You can use the speed slider on the right to observe the program execution. The robot should transfer all parts to the machine and return them to the table.

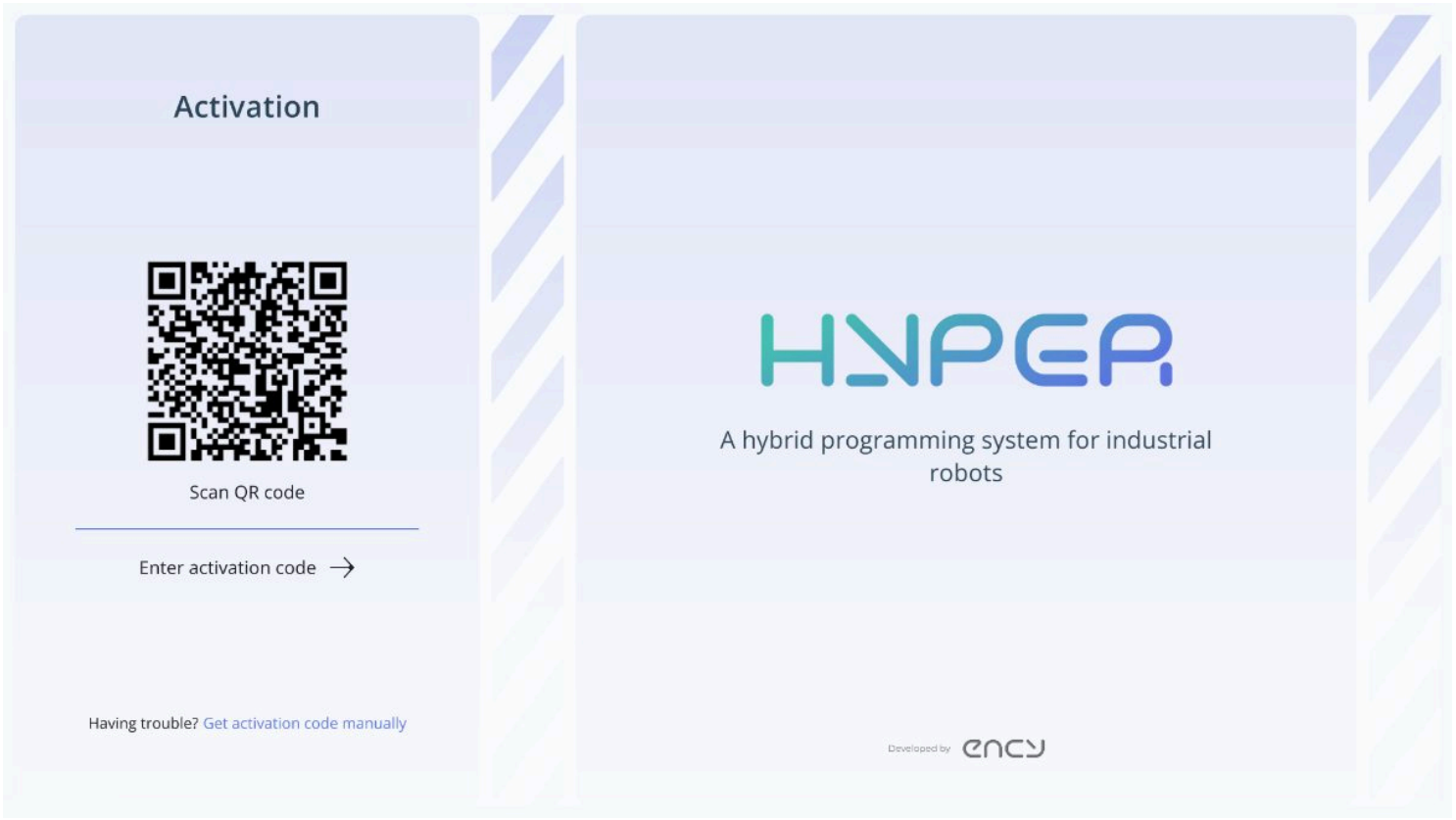

HYPER
Project 5
Safe path
START
PICK
from: Table
PICK
from: TurnMill
PLACE
to: TurnMill
PLACE
to: Table
IF
Condition

License activation



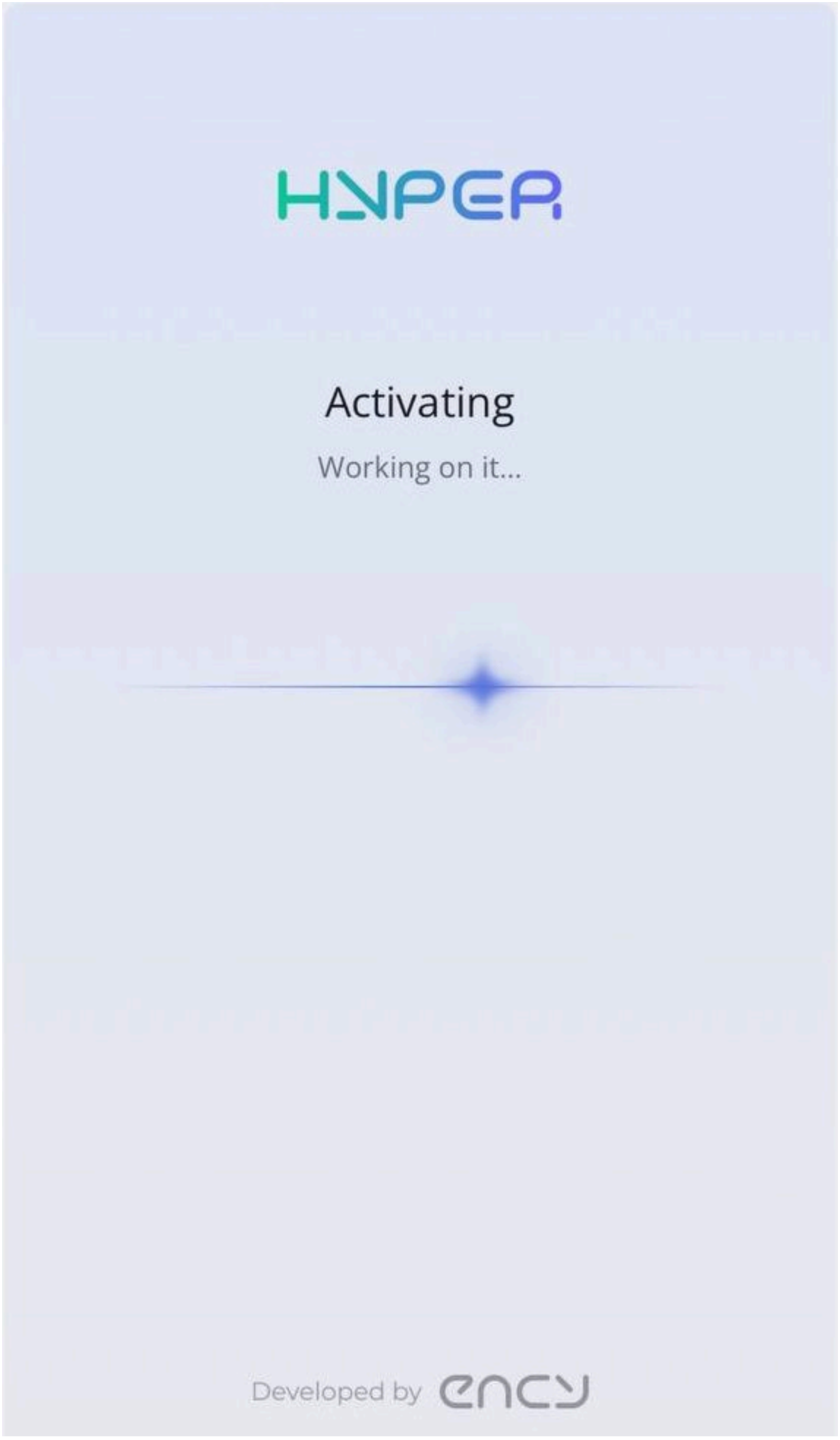
On the login screen, check the user profile shown under Log in as (admin in this example), then click Open to log in.

ENCY Hyper will detect that you don’t have a license and redirect you to the license activation page. You will need a phone with a camera for this process.



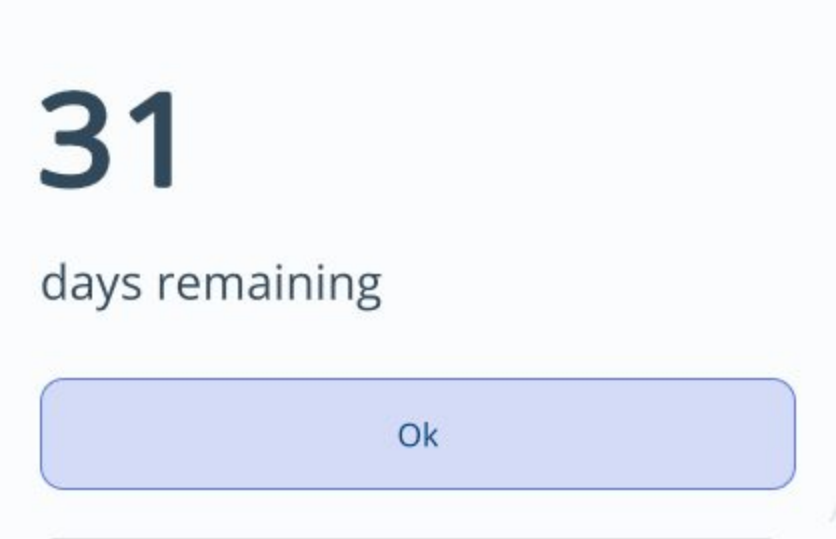
Once you scan the QR code, you will be redirected to the login page. If you don’t have an account, you can create one there.

After logging in, the license activation will start automatically. If your computer is not connected to the internet, you will need to manually enter the received CM code using the Get activation code manually button.

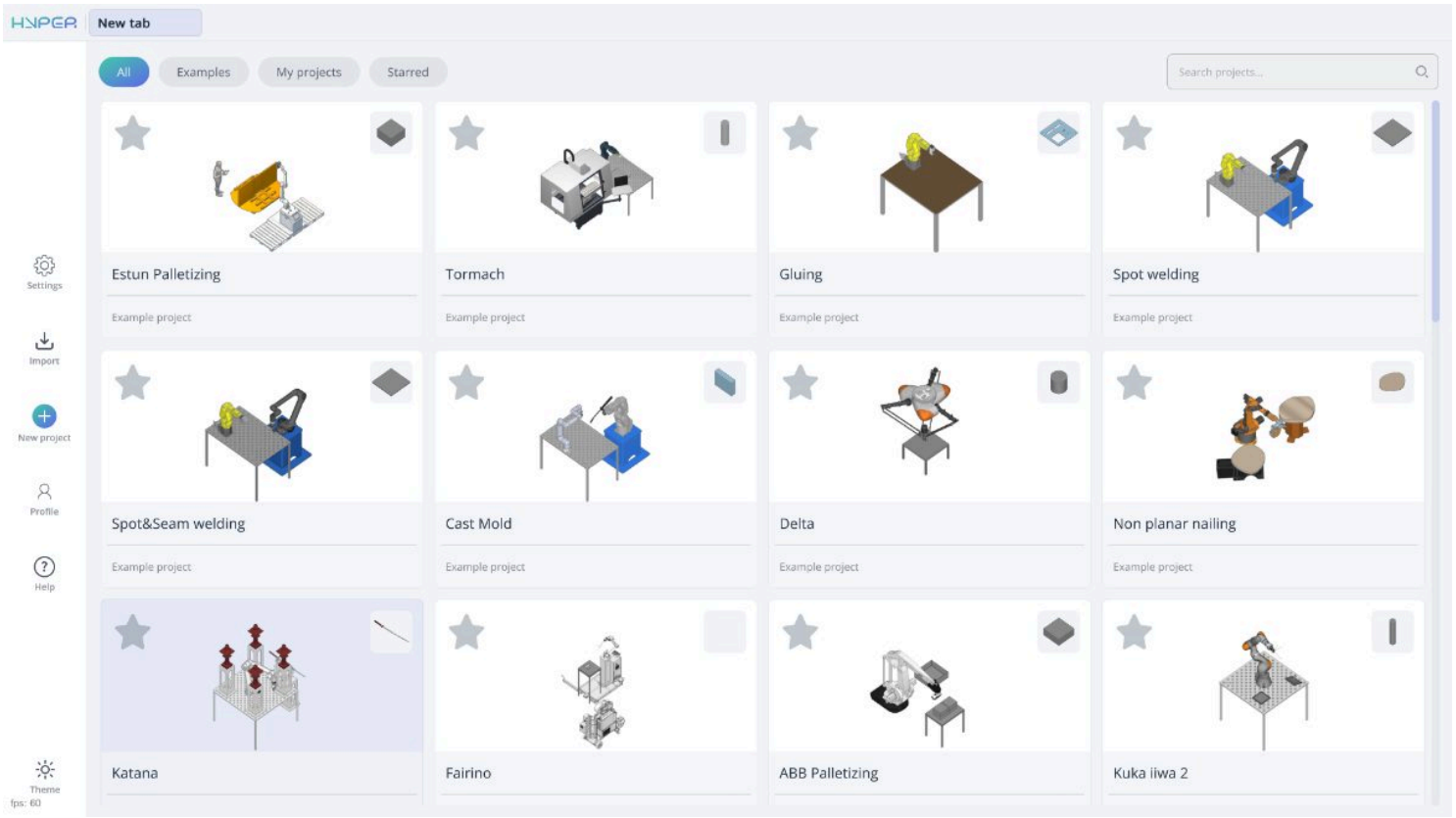

HYPER
Activating
Working on it...
Developed by ency


Success!
HYPER
Activation successful
Activation code
CF9GK A3SCZ 3MU8FD 4AGR QG1M
Developed by ency

The license should activate successfully. After clicking the OK button, the main ENCY Hyper window will launch.



Home page



Application Area:

The home page provides the following functionalities:

- project library management;
- access to standard example projects;
- creation of new projects;
- import of existing projects;
- access to the system’s basic settings and user profile;
- access to tutorials and documentation;
- switching between light and dark themes.

The project library occupies the main area of the home page. The All, Examples, My projects, and Starred filters are located above the project cards. The Search projects... field is in the upper-right corner. For details about the library, see Project library.

Buttons on the left navigation panel.

The main buttons are arranged vertically on the left side of the screen, from top to bottom:

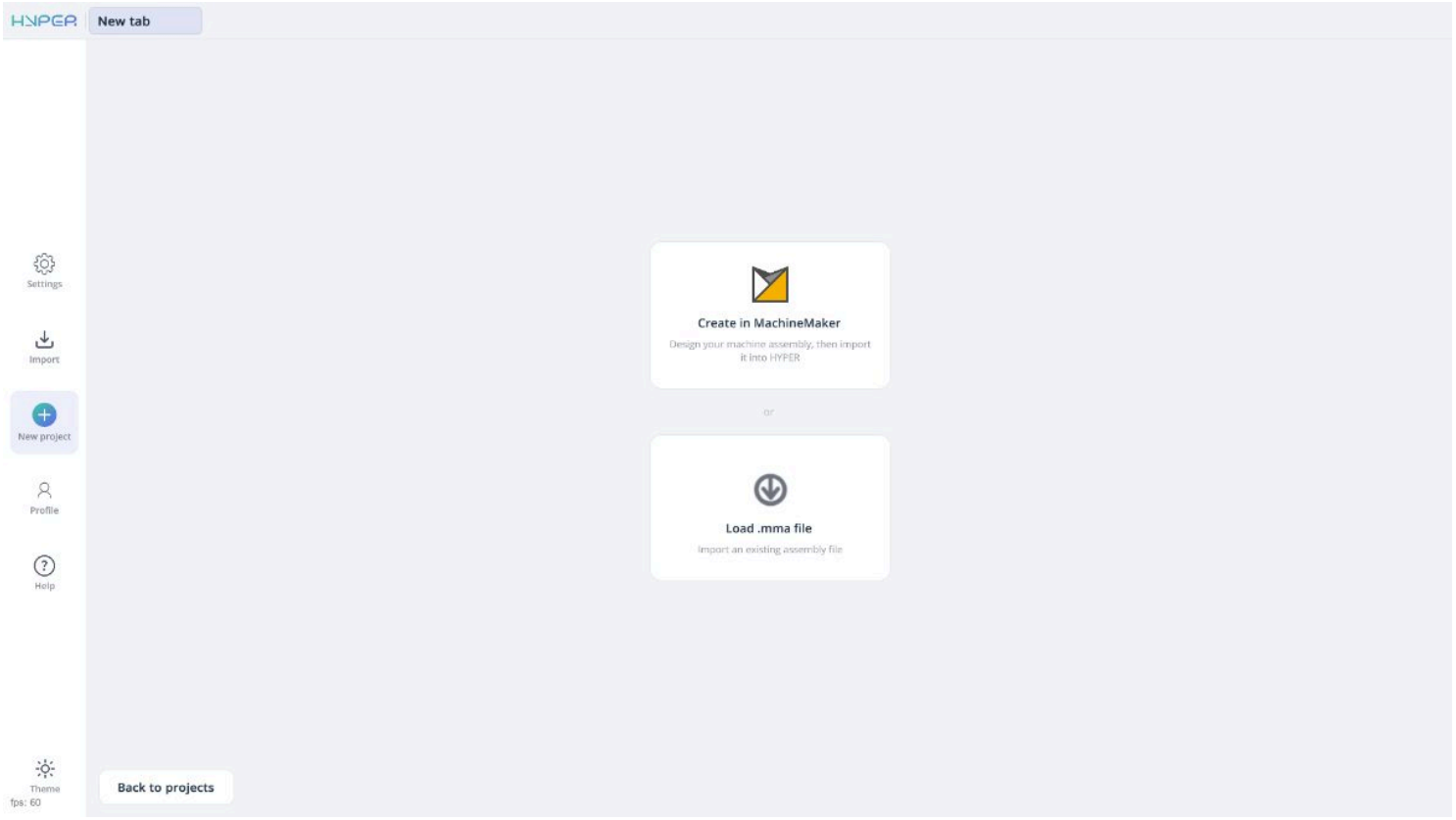
Settings. Allows you to access the system’s basic settings.

Import. Allows you to open an existing project.

New project. Opens a page with two options for creating a project:

- Create in MachineMaker. Launches MachineMaker, where you can prepare the machine assembly and then import it into ENCY Hyper.
- Load .mma file. Allows you to select an existing assembly file in .mma format. The file can be prepared by the supplier or created in MachineMaker. See more

In MachineMaker, use «Save assembly to file» to save the assembly.

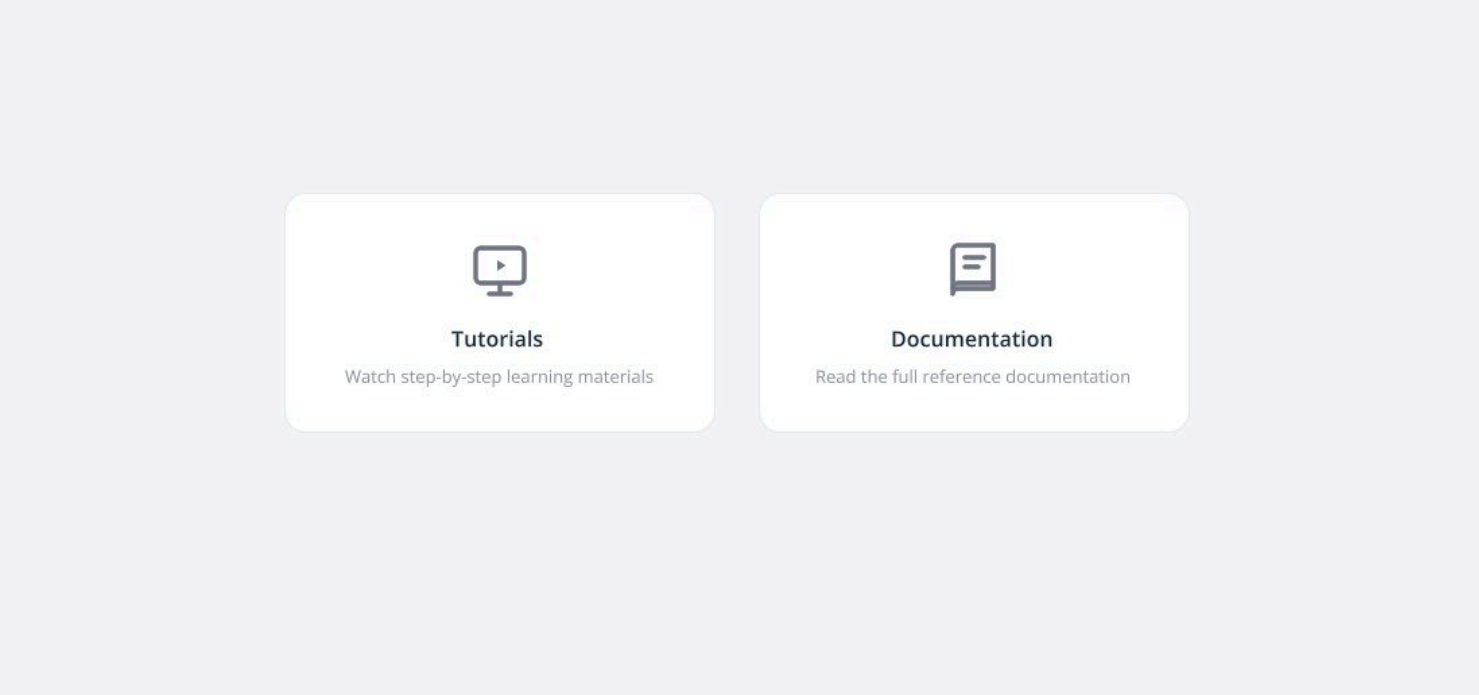


The Back to projects button in the lower-left corner of the main area returns you to the project library.

Profile. Opens the user profile. Depending on the system configuration, some features may be unavailable to certain user roles. If a feature is grayed out or missing, your user role may not have the required permissions.

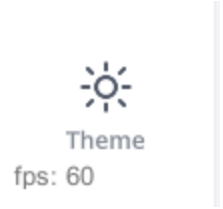
Help. Opens a page with two options:

- Tutorials. Opens the page with ENCY Hyper training videos.
- Documentation. Opens the reference documentation.



Button at the bottom of the left navigation panel.

Theme. Switches the interface between light and dark themes.

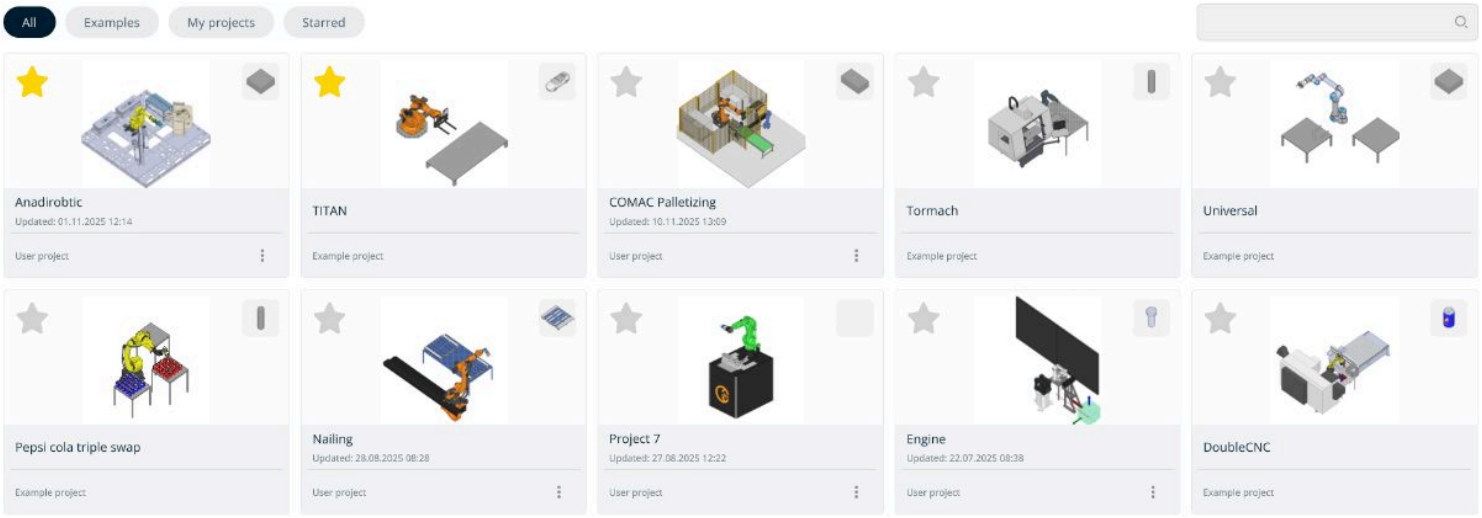


License and version information.

License information. Displays the remaining number of days on your license.

Version info. This information may be useful when demonstrating the app’s capabilities to others or when contacting technical support.

Project library



Application Area:

Project library for storing and accessing projects.

Buttons located at the top of the screen:

All. Displays all projects combined.
Examples. Contains all default projects preinstalled with the application.
My Projects. Includes all user-created or imported projects.
Starred. Shows favorite projects marked with a star.

Navigating the Project Library.

The image located at the top-right corner of the project window displays the workpiece being processed.

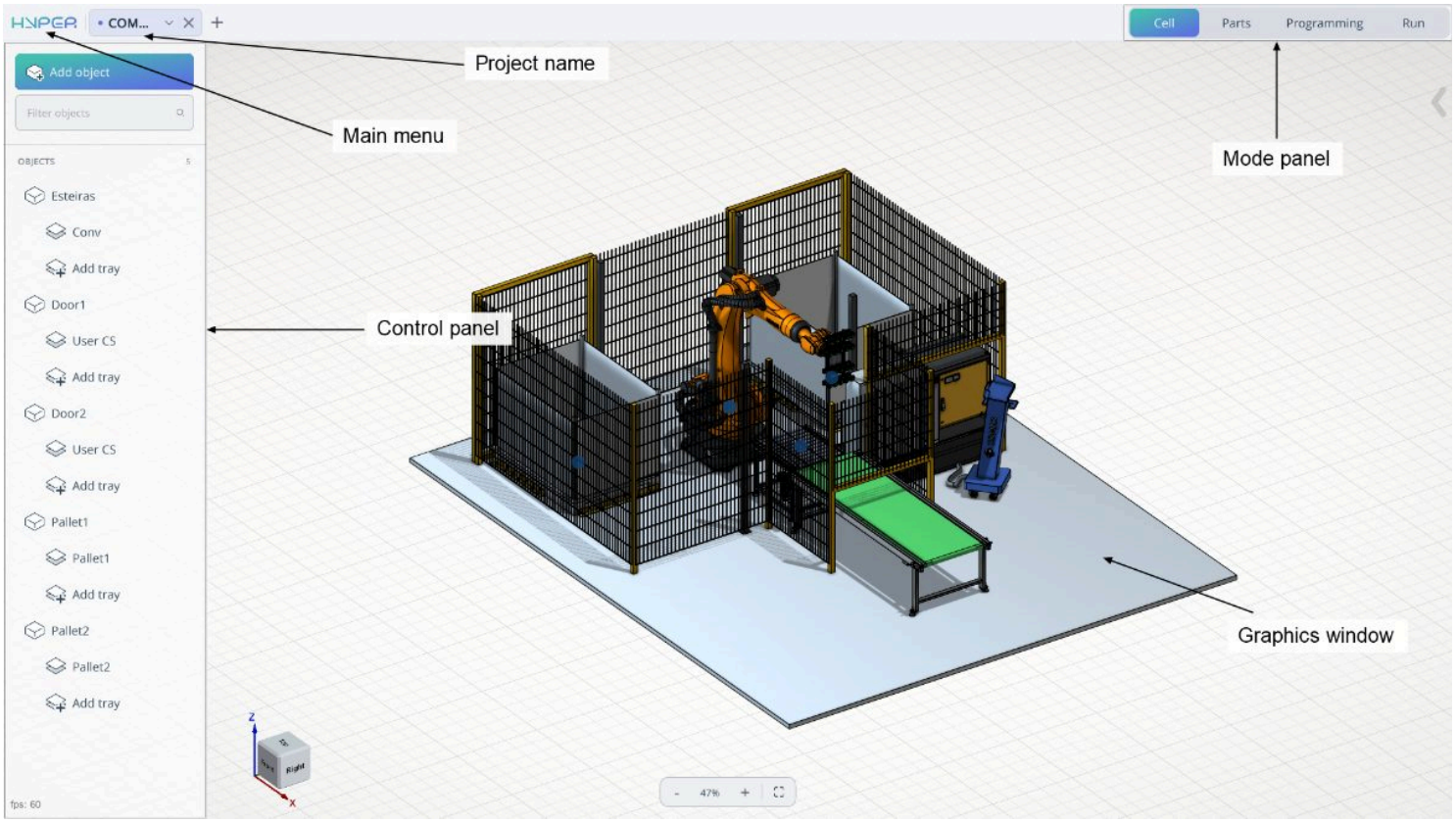


User projects have a three-dot menu for:

- Edit the project name;
- Duplicate the project;
- Delete the project.



System's main window



The system's main window has the following view:

Mode panel. The mode panel is necessary for step-by-step switching between various solutions, from loading the equipment scheme to executing the task on the robotic cell. Mode: Cell, Parts, Programming, Run. See more

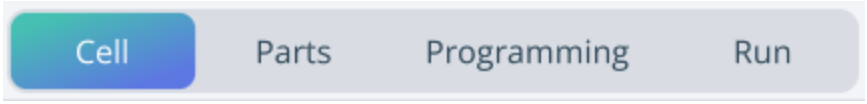
Control panel. The control panel will change depending on the operating mode. It can be presented as a tree of mechanisms, a list of models, or a list of robot movements.

Main menu. The main menu allows you to open a list that includes project opening, project submission, license menu, and other options. See more

Project name. The project name field allows you to enter the project name using the provided keyboard.

Graphics windows. The graphics window shows the main components, including the cell, parts, trajectory, etc.

Mode panel



Application Area:

The mode panel is necessary for step-by-step switching between various solutions, from loading the equipment scheme to executing the task on the robotic cell.

Cell Mode



Application Area:

This module enables editing of the digital twin of the robotic cell, including the addition and spatial arrangement of mechanisms in a 3D environment.

Add object.

At the top-left position of the interface, you will locate the Add Object button. This functionality serves as the primary creation tool, enabling the user to incorporate various mechanisms into the workspace. These may include, but are not limited to: tables, boxes, machines, or any other entities with which the robot is designed to interact.

Work with mechanisms:

Name. Mechanism name.

Width. Allows you to change the width of the mechanism.

Depth. Allows you to change the depth of the mechanism.

Height. Allows you to change the height of the mechanism.

The component creation window will change depending on what you are trying to create.

Type of mechanism. Types of mechanisms for product placement.

Box. The mechanism is presented in the form of a box/tray.

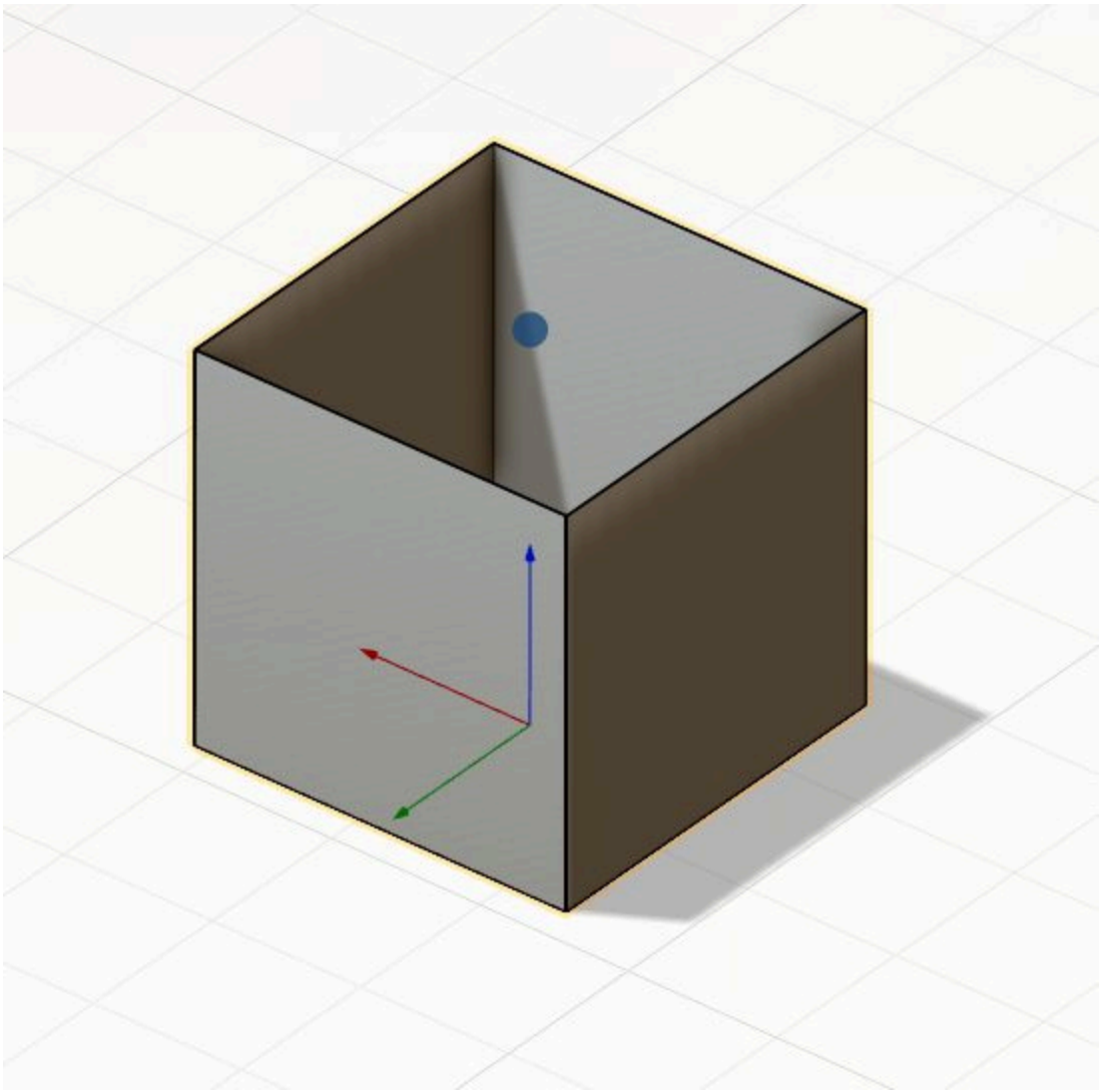
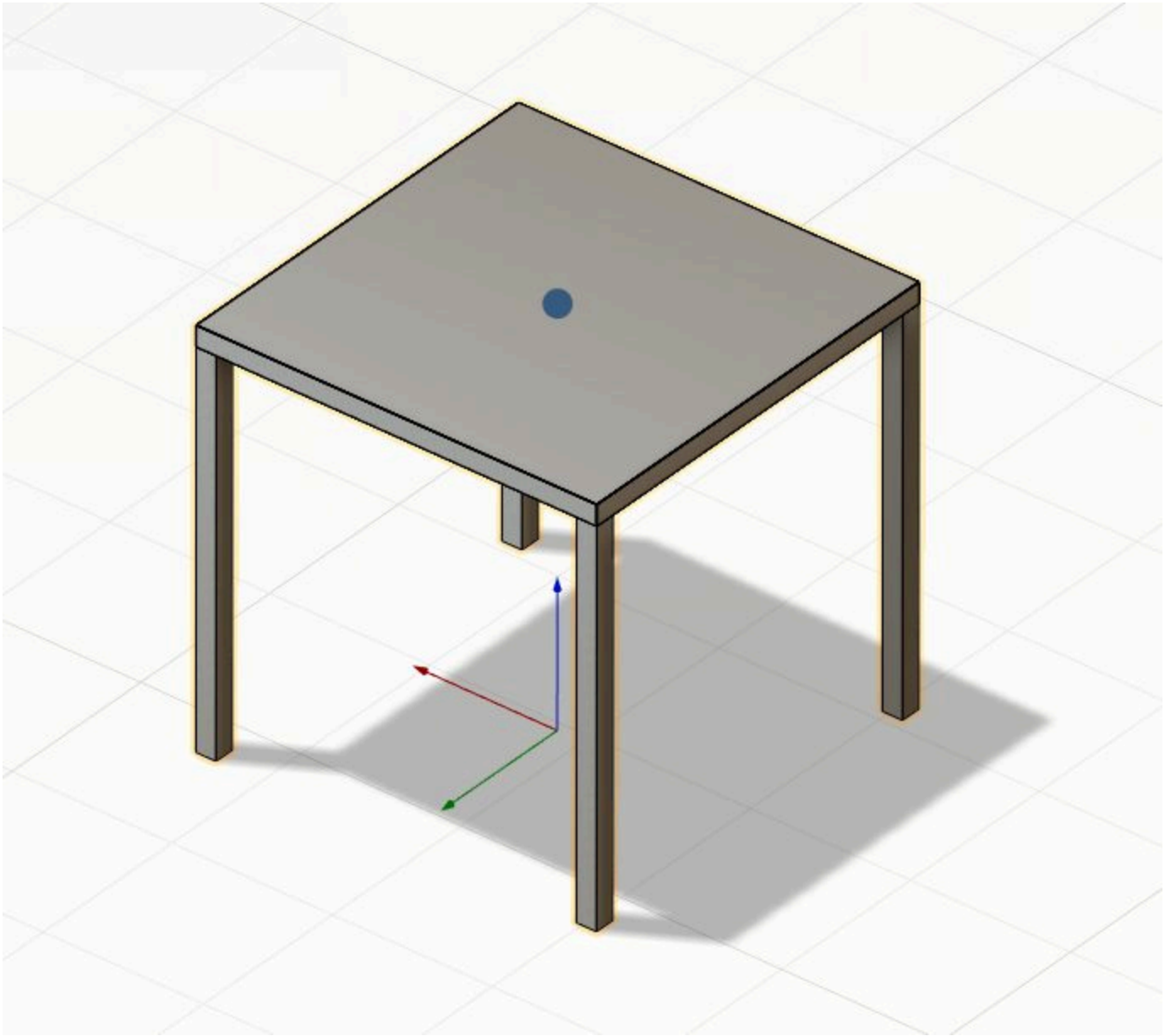
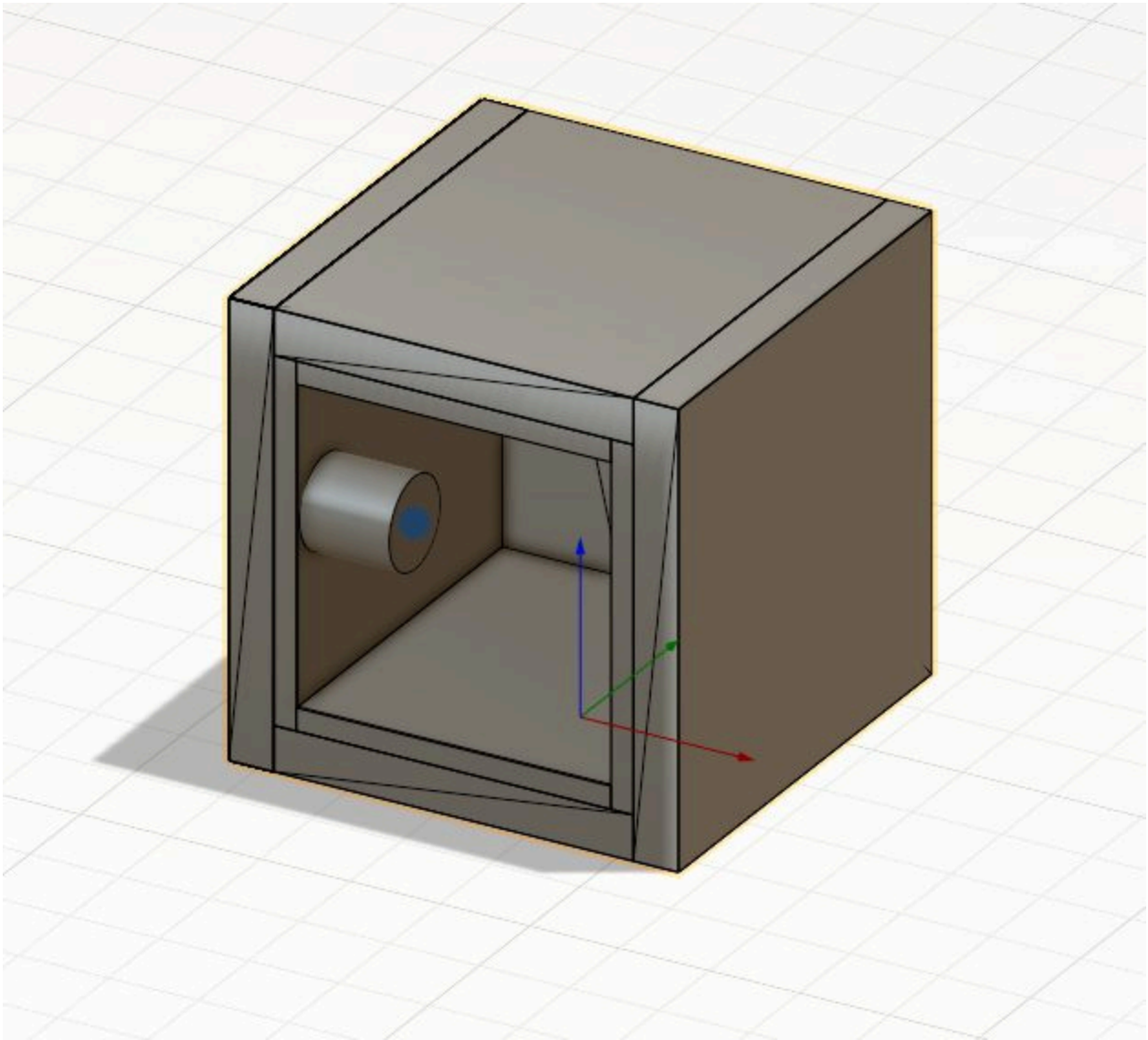


Table. The mechanism is presented in the form of a table for placing products.



Mill. The mechanism is presented in the form of a simplified model of a machine for placing products.



Back wall. Rear structural panel.

Wall thikness. Thickness of enclosure walls.

Door parameters. Specifications of access door.

Chuck height. Vertical dimension of the chuck.

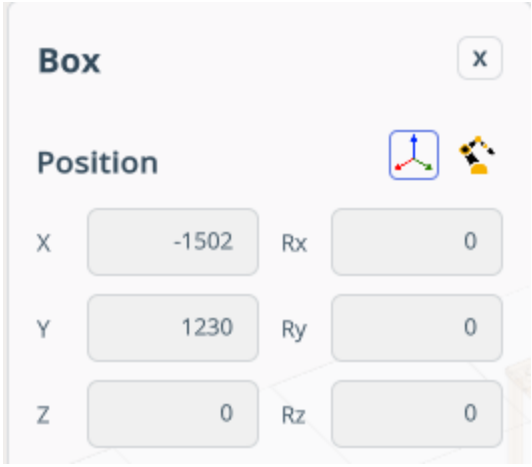
Chuck diameter. Outer diameter of the chuck.

Chuck positions. Available mounting/operating positions of the chuck.

Empty. The mechanism does not have a 3D component

When the Apply button is clicked, the mechanism is added to the component tree, and a second menu opens to edit its position in space. In the component tree, placement positions (tray) also appear.





The menu includes the following items:

Name. Mechanism name.

Position. Modify the component’s position with respect to either the world coordinate system or the robot’s BaseCS.

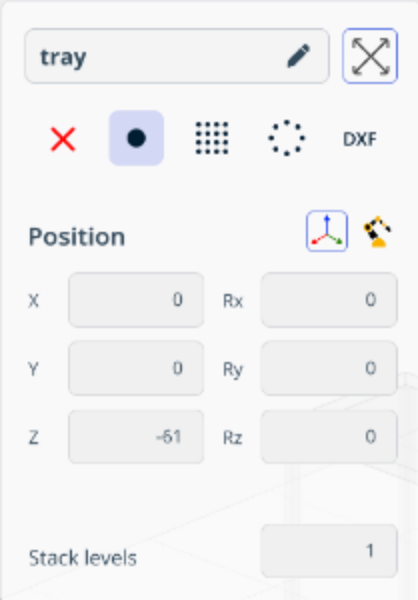
X,Y,Z,Rx,Ry,Rz,A,B,C - Fields for spatial orientation of the mechanism.

In the lower-right part of the screen, the component navigation mechanism appears. Allows interactive spatial manipulation of the mechanism.

In this window, you can also delete the mechanism or close the window to continue working on the project.

Work with Tray.

Item location. Each mechanism has at least one drawer.

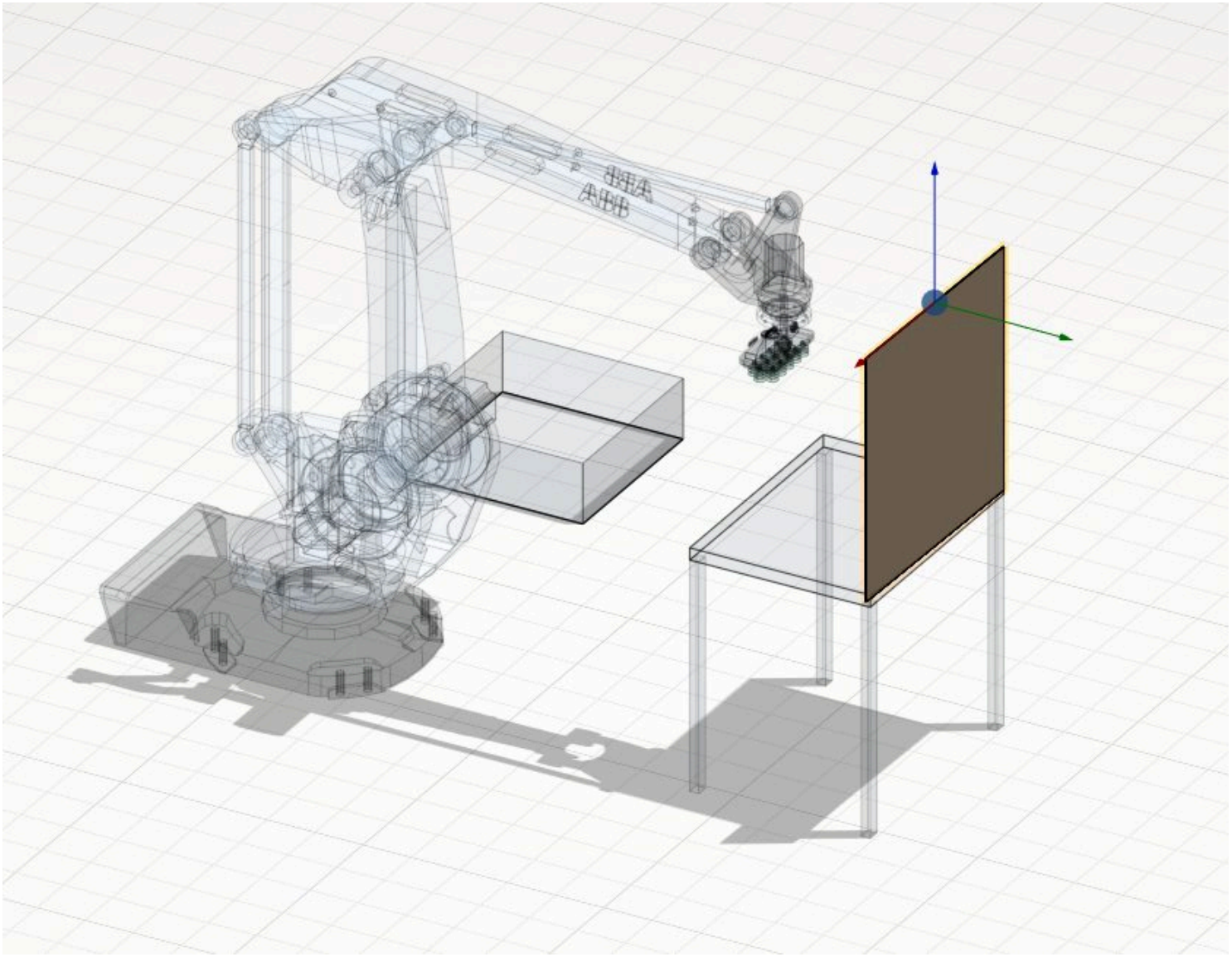


Name. Tray name.

Zoom extents. It scales the view so that all objects (Tray) fit entirely within the viewing window.

Pick or Place point. Allows setting attachment points for the product.

None. In No-Point mode, no point needs to be set. Useful for creating collision-control mechanisms (e.g., fences, barriers).



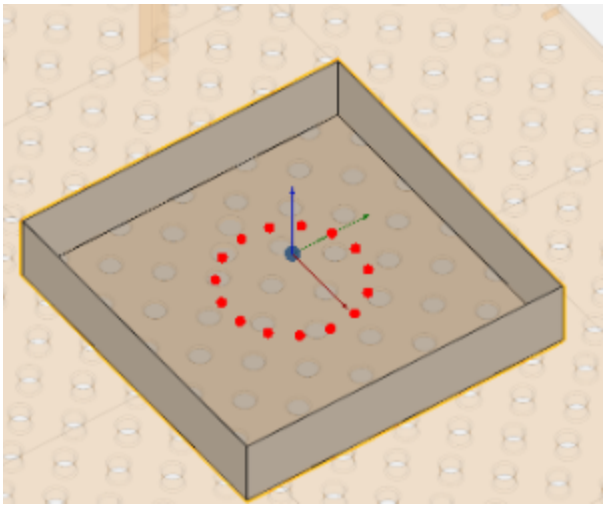
Single Point. It allows you to specify one mounting point.

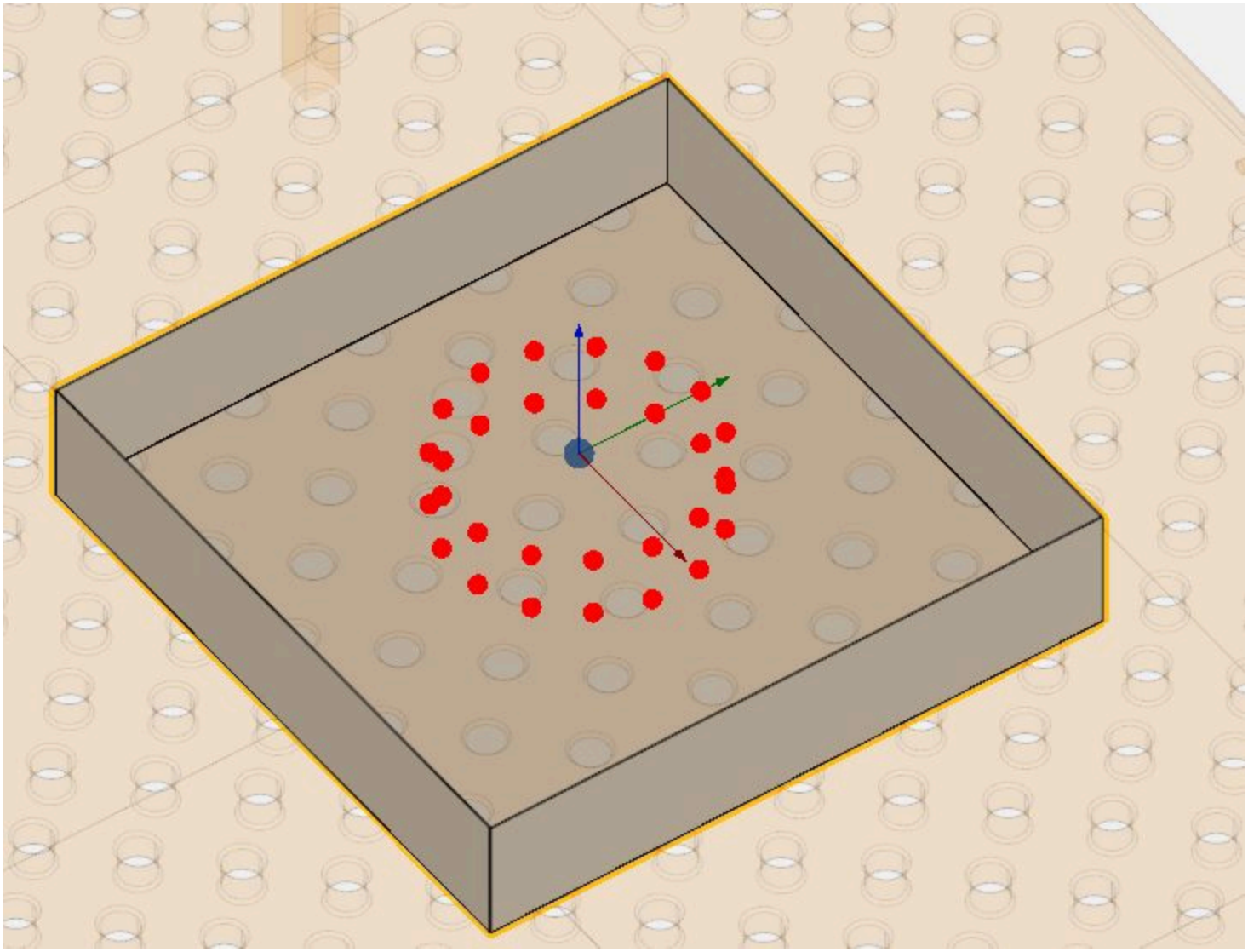
Position. Modify the component’s position with respect to either the world coordinate system or the robot’s BaseCS. This position is typically calibrated on a physical robot, and the point(s) are then transferred via coordinates into the system while the Position - Robot’s BaseCS is enabled.

Transform parent. This function works only in Position — Robot’s BaseCS mode. When enabled, changing the Tray position also adjusts the mechanism’s position. When disabled, only the Tray position changes.

X,Y,Z,Rx,Ry,Rz,A,B,C - Fields for spatial orientation of the tray.

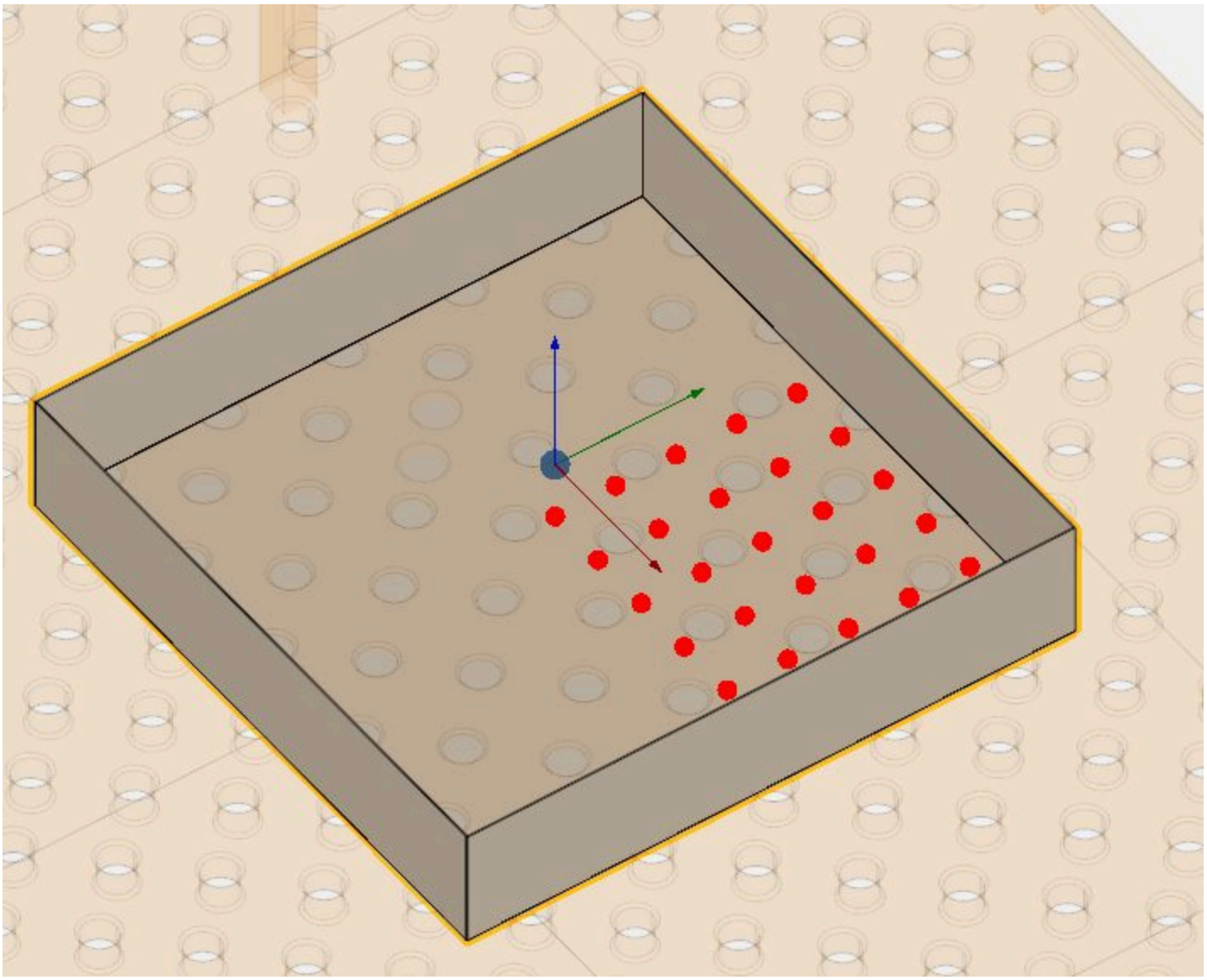
Stack levels. It allows you to create an array of points along the height axis.





In the lower-right part of the screen, the component navigation mechanism appears. Allows interactive spatial manipulation of the mechanism.

Two dimensional array. It allows you to create a two-dimensional array. In this template, some parameters are identical to those in Single Point.



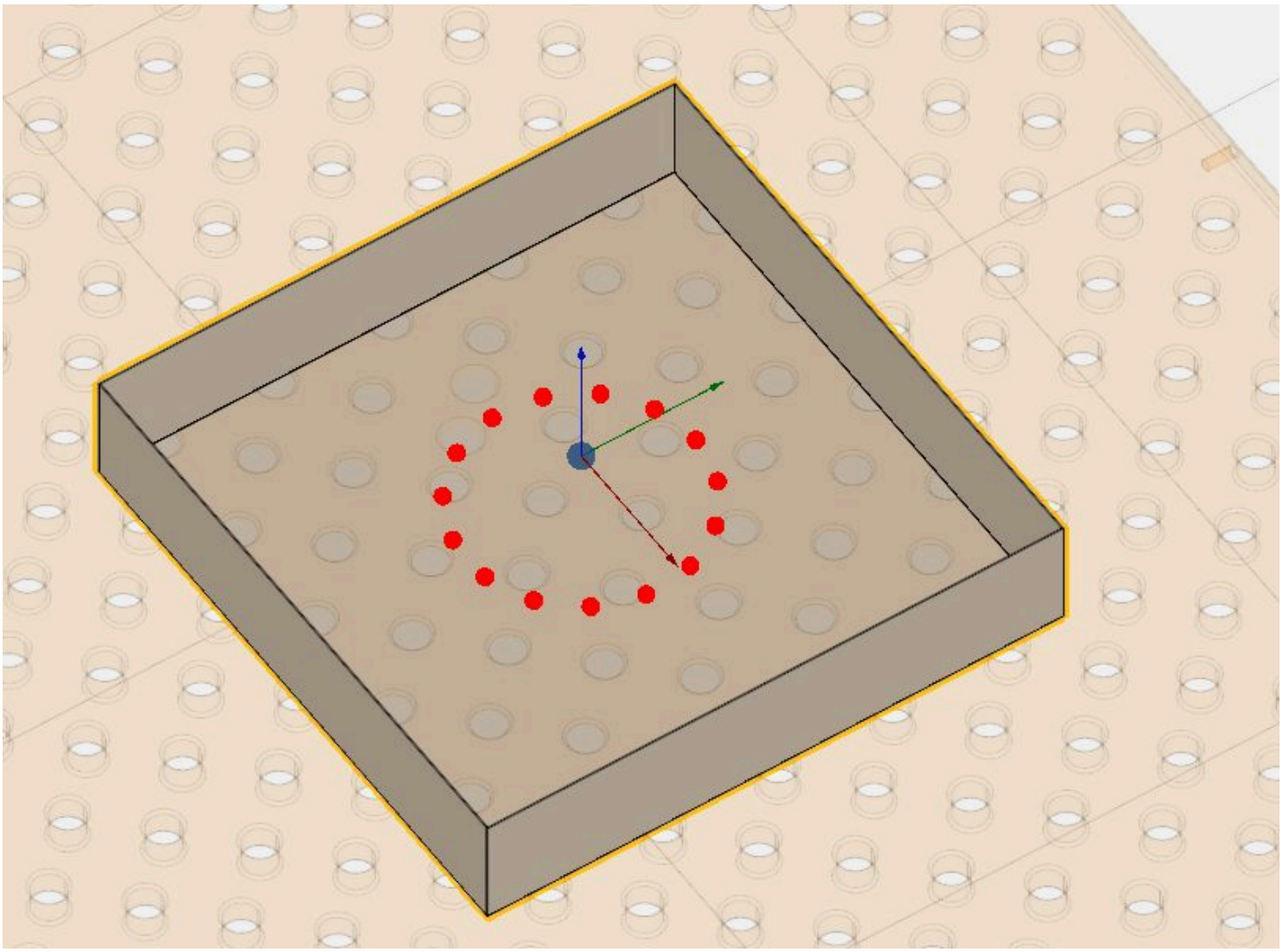
Rows. Number of horizontal rows in the array

Columns. Number of vertical columns in the array

Step X. Horizontal spacing (distance between column centers).

Step Y. Vertical spacing (distance between row centers).

Round array. It allows you to create a circular array. In this template, some parameters are identical to those in Single Point.

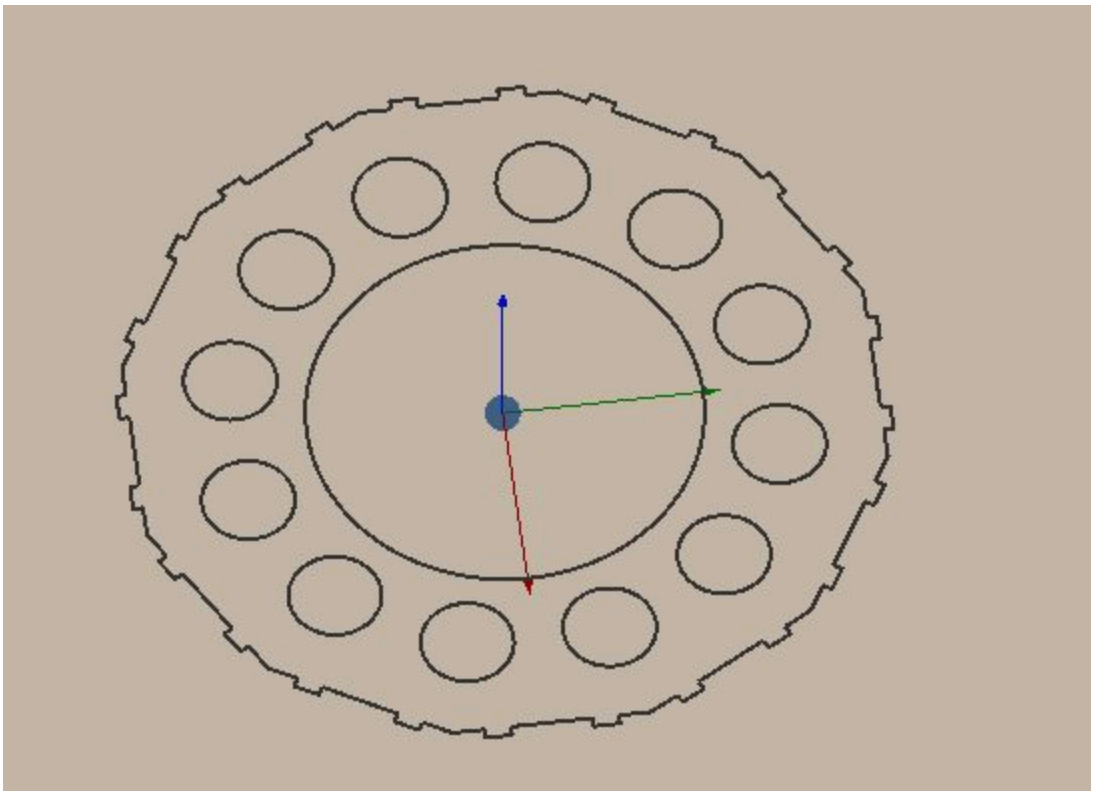


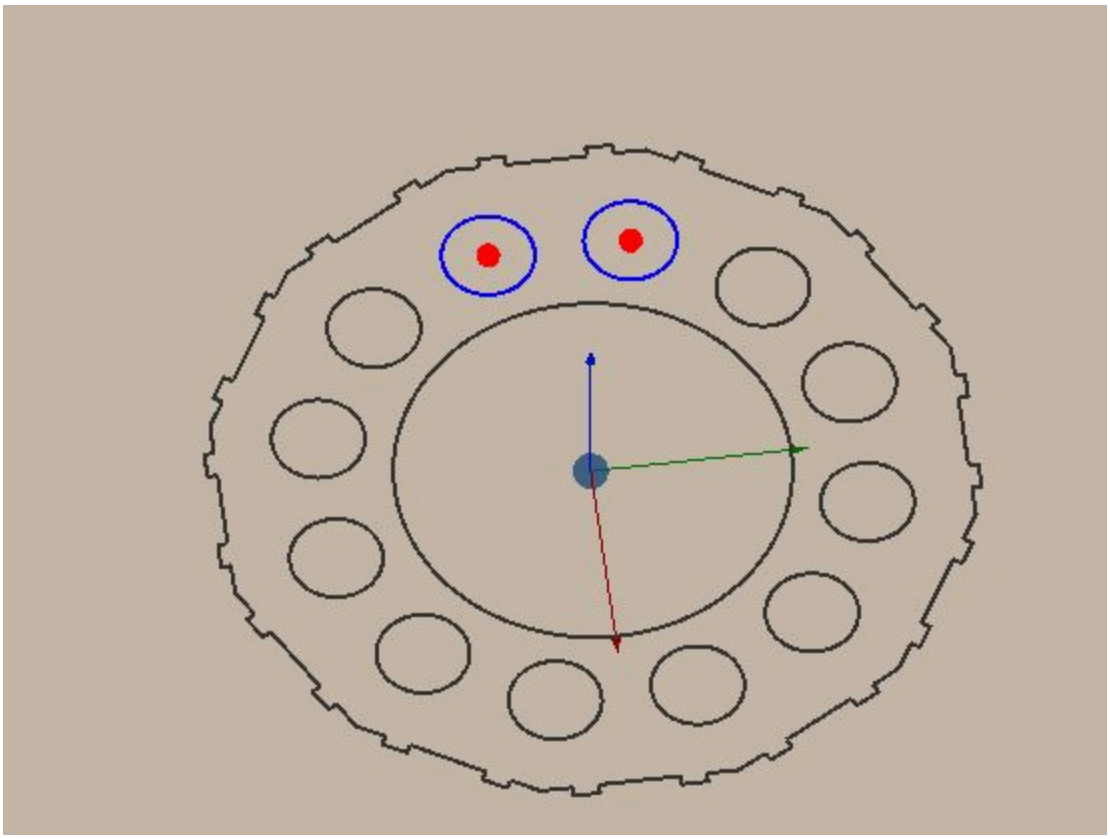
Points. Number of points around the circle.

Radius. Distance from center to each point.

DXF. It allows you to import DXF-format drawings. The point can be placed within a closed contour, which will serve as a workpiece holder.

In this template, some parameters are identical to those in Single Point.





Custom file. It allows you to reselect the model.

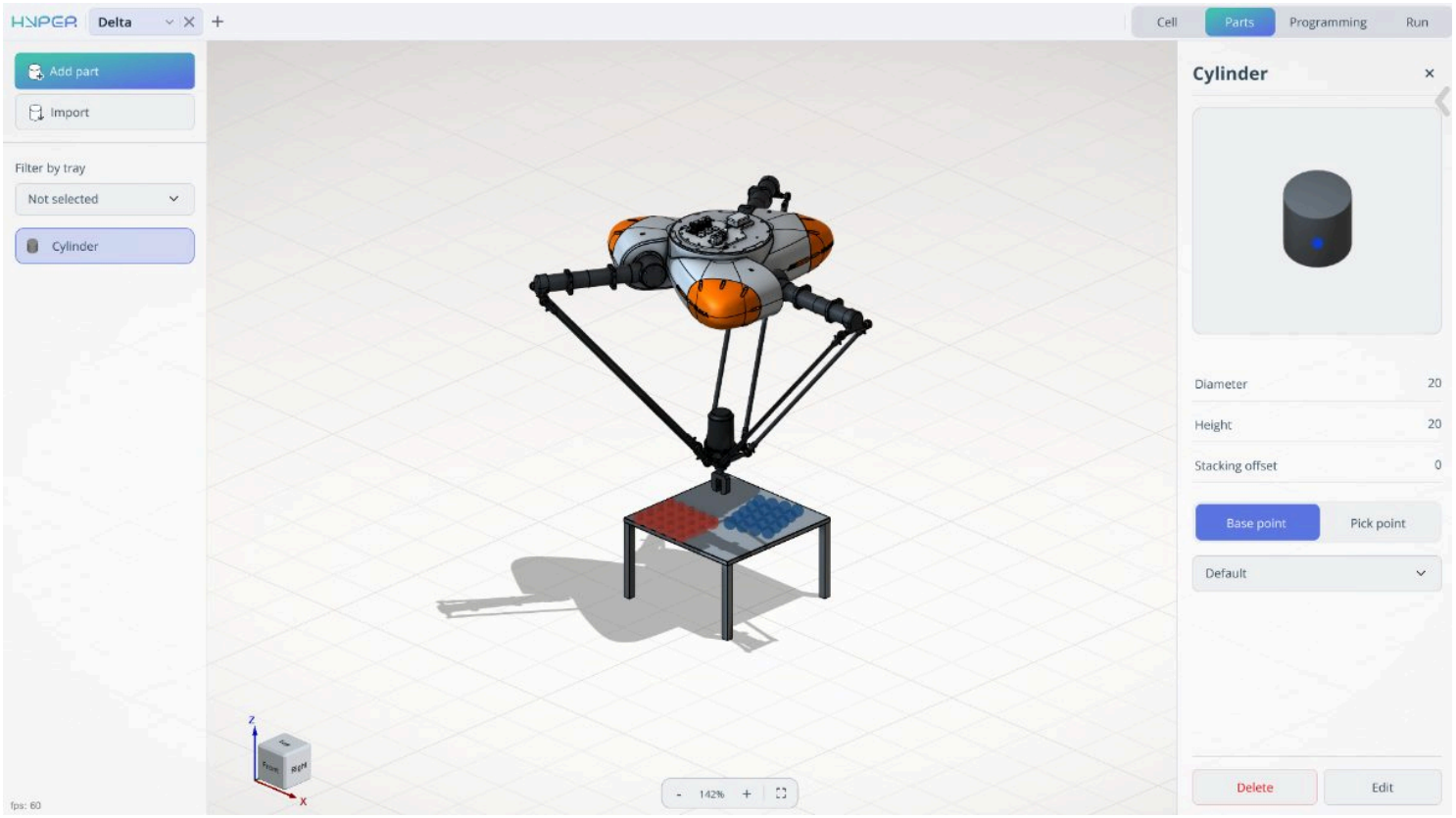
Tree of Mechanisms.

Structured list of all elements in your cell.

1. Each mechanism is assigned a unique name, which may be renamed unless the mechanism is locked.
2. All mechanisms include tray by default; these may be disregarded if not required for the current task.
3. Mechanisms and tray originate from one of two sources:

- predefined entries in the .mma cell file (supplied by the vendor);
- user-generated entries created manually.

Parts Mode



Application Area:

The Part mode allows you to add a model or create it from primitives, as well as place them in the tray.

Import.

It allows you to load a 3D model of the product.

Type. Cylinder, Box, or 3D model.

ustom file. It allows you to reselect the model.

Stacking offset. The parameter determines the vertical alignment relationship between stacked components.

Value = 0: parts are positioned directly atop one another without overlap.

Value > 0: defines the insertion depth for mating parts (e.g., in LEGO-like interlocking mechanisms, this would equal the height of the connecting cylinder).

Base point/ Pick point. The reference point for placement / The gripping point on the part.

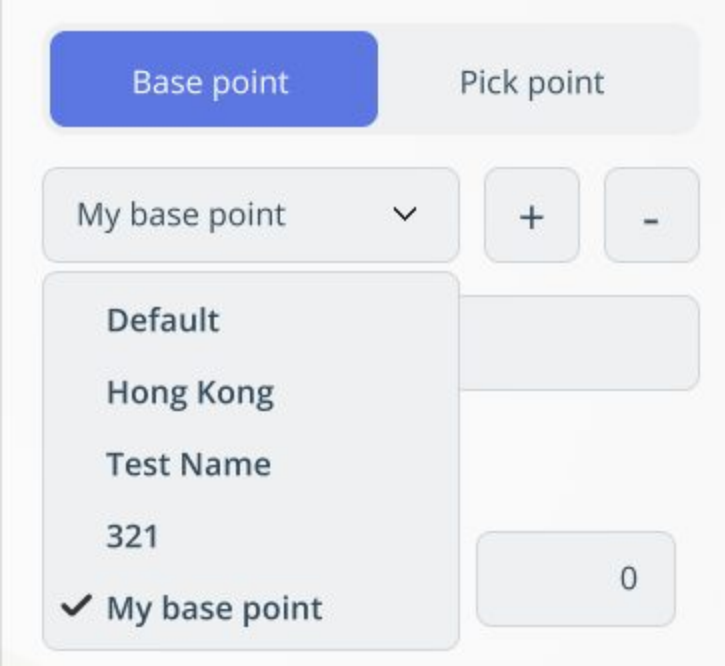
- Unlimited pick and base points can be created.
- Each point supports editing, deletion, and renaming.

- Coordinates can be input manually or selected via model interaction.
- A gripper visualization aids pick point definition, showing the robot's actual gripping posture.

Name pont. Assigns a name to an existing point

Add/Delete a point. Allows you to create/delete a point that is added to the list of points.

List of points. View point names



X,Y,Z,Rx,Ry,Rz,A,B,C - Fields for spatial orientation of the point.

Add part.

It allows you to create a model from primitives. In this template, some parameters are identical to those in Import - 3D model.

Cylinder.

Diameter. Distance across the circular base, through the center

Height. Distance between the two bases along the axis

Box.

Width. Defines the width

Depth. Defines the depth

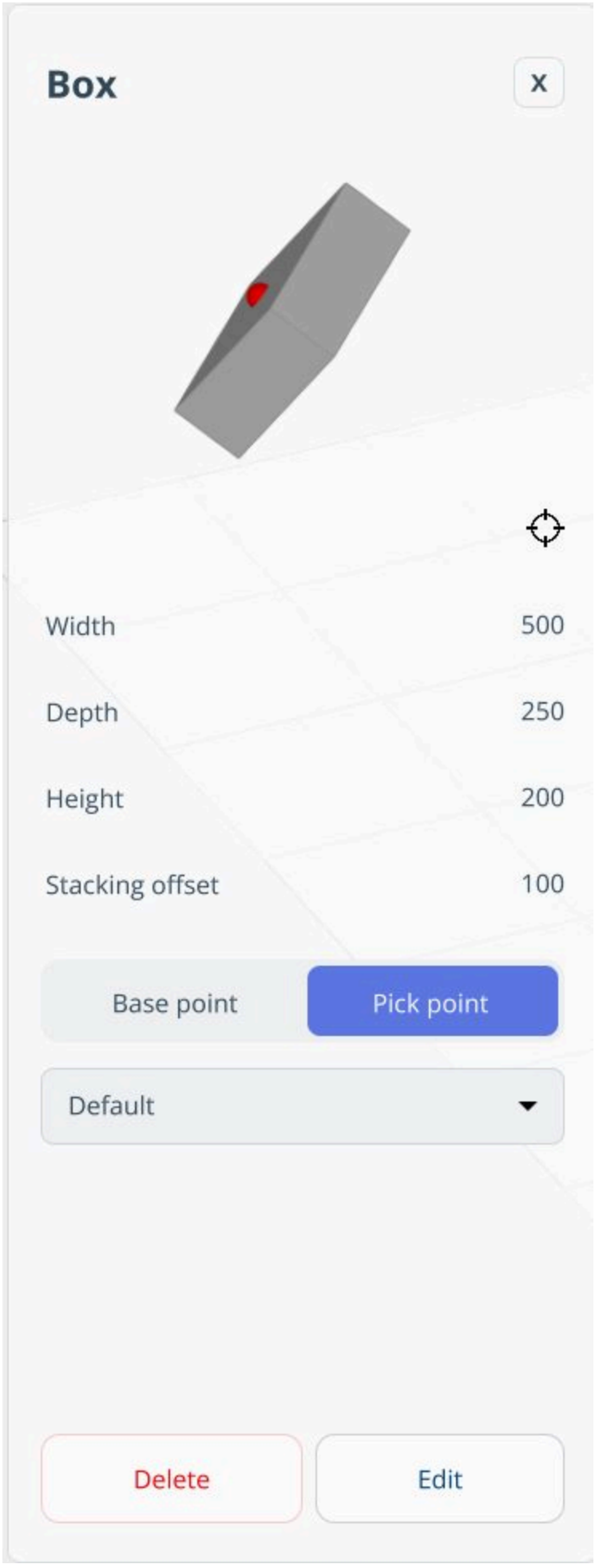
Height. Defines the height

Filter by tray.

It allows you to select a specific tray for work.

List of parts

It displays a list of parts for moving and allows you to edit them.


Box
X
Width
500
Depth
250
Height
200
Stacking offset
100
Base point
Pick point
Default
Delete
Edit

Clicking the part opens a window where you can:

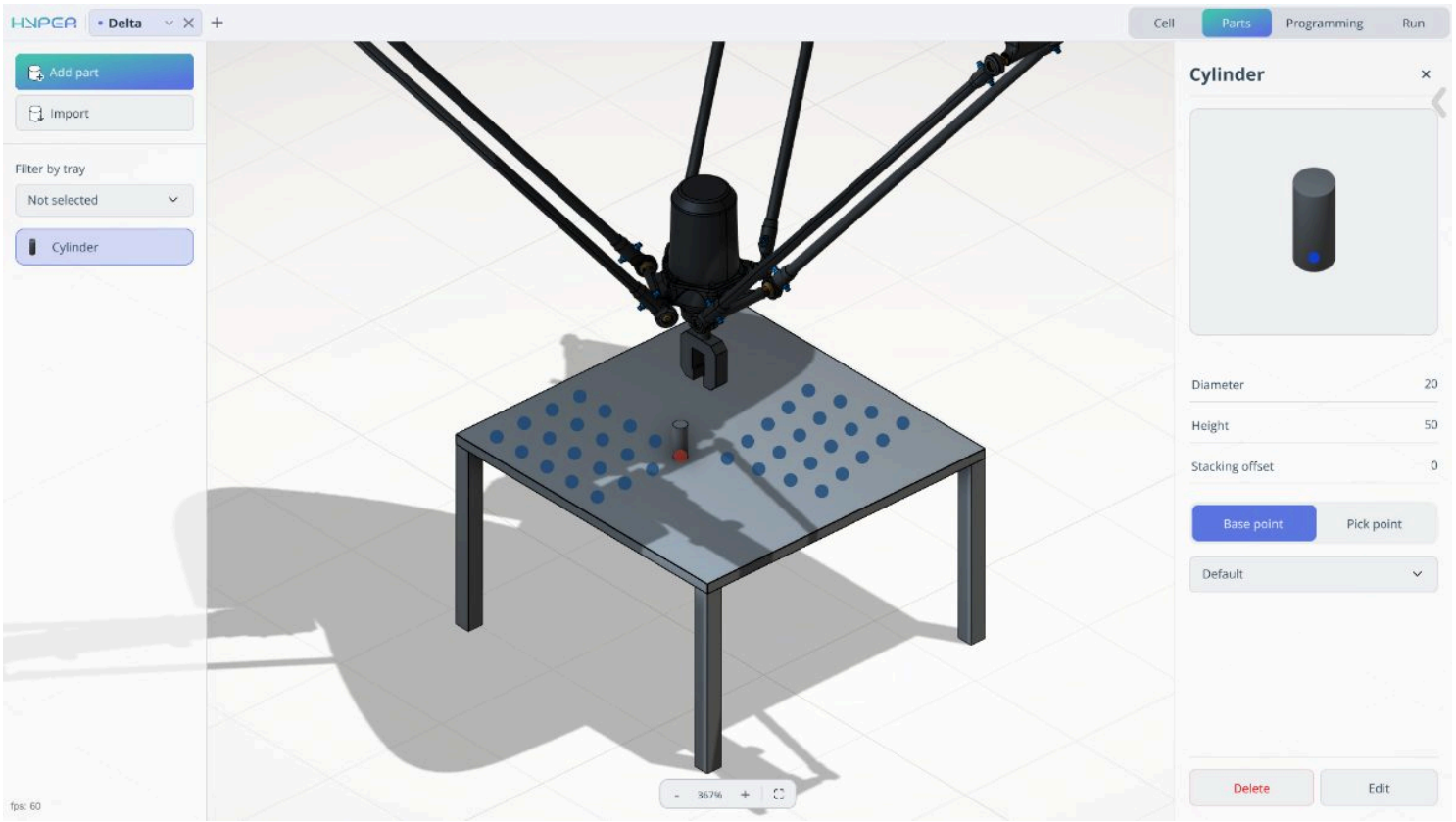
1. View model name
2. Edit model
3. Delete model
4. Show base and pick points
5. Rotate model (preview)

Work specifics

In this mode, place the parts in their initial positions.

To position the parts in the tray:

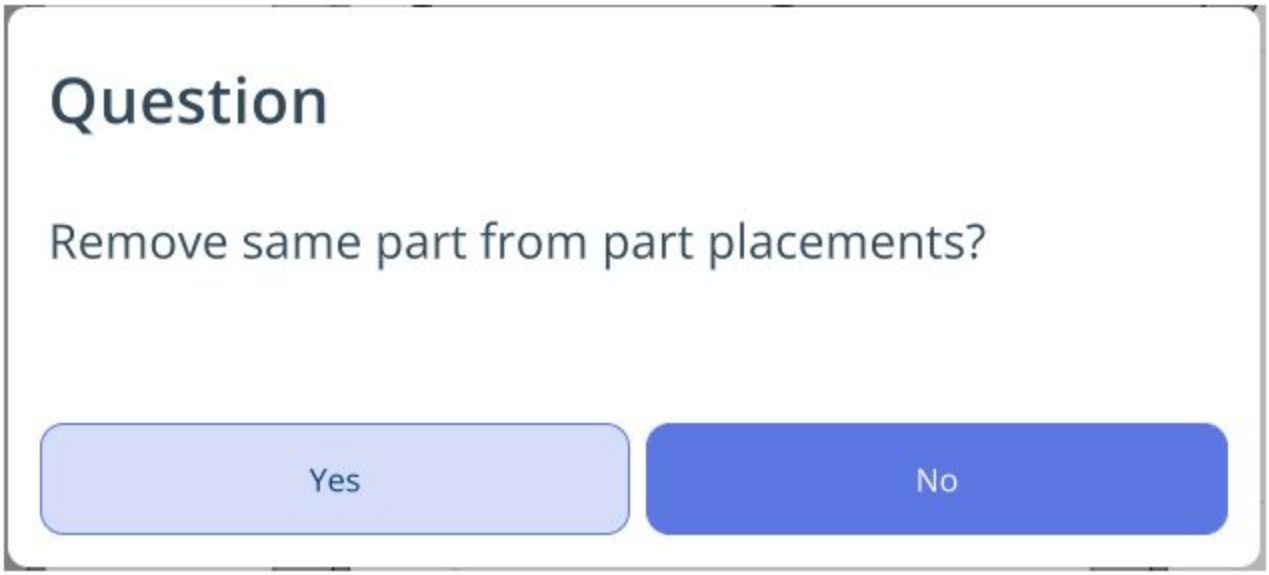
- Select the required part in the parts tree.
- In the graphics window, choose the attachment point.
- The selected part will appear in this position.

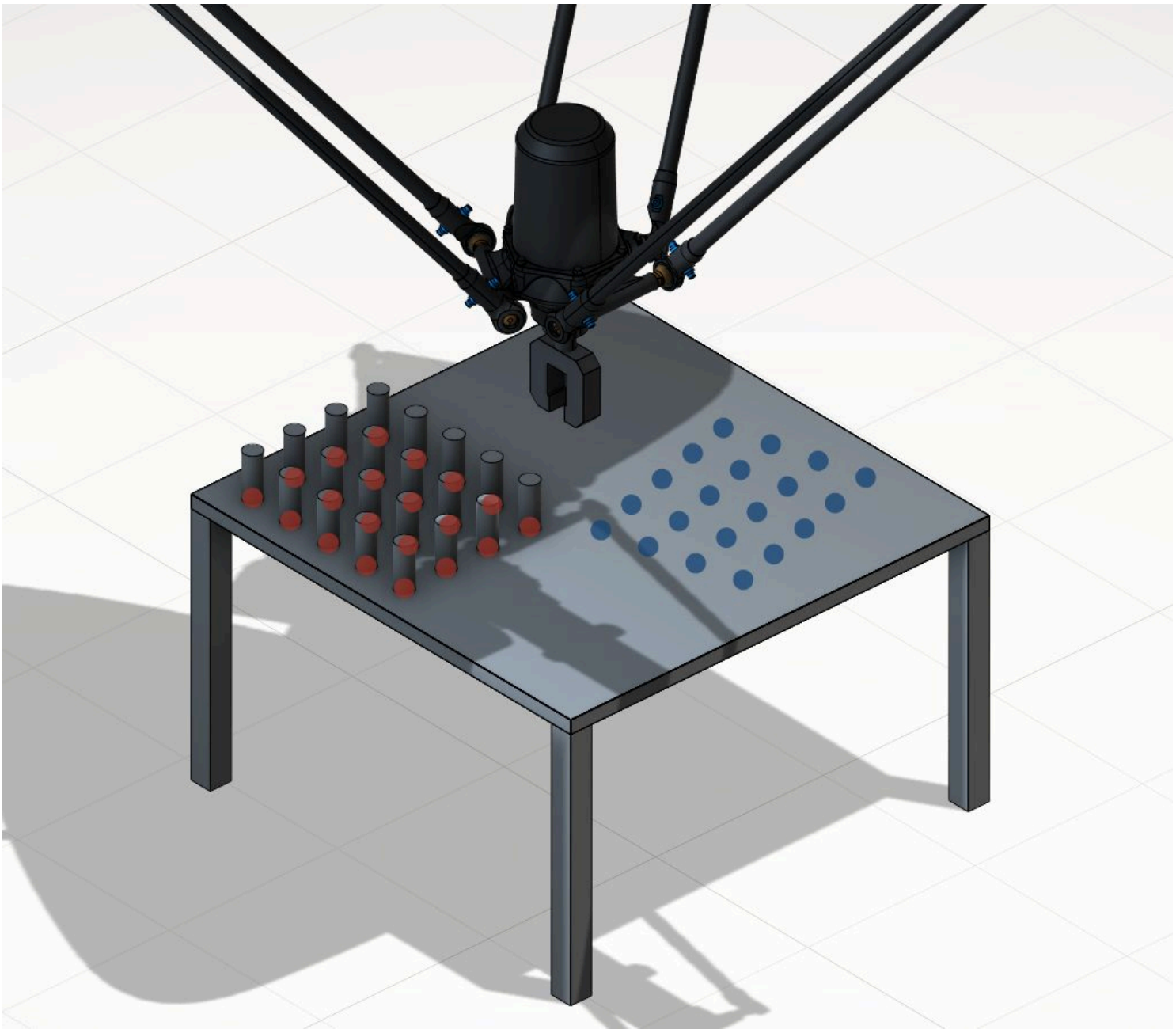


The position where a part is already installed (attachment point) changes its color to indicate that the slot is occupied.

To remove a part from its position, simply click on the attachment point where the part is located.

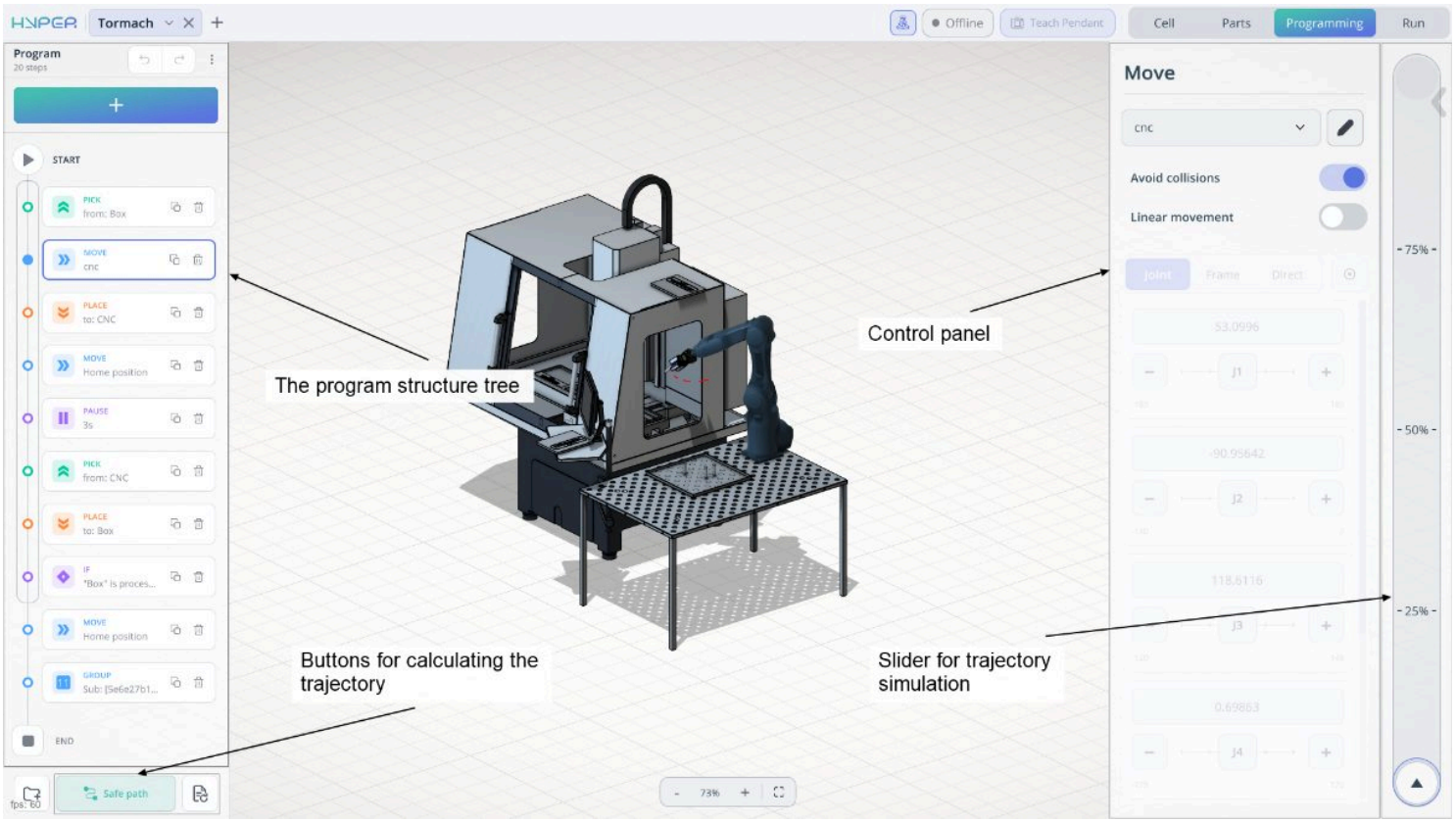
To add multiple parts at once, press and hold the left mouse button. A dialog box will then appear, prompting you to add this part to the entire tray.


Question
Remove same part from part placements?
Yes
No



The same mechanism applies to removing parts from the tray.

Programming Mode



Application Area:

Programming Mode represents the pivotal operational environment in which theoretical plans are executed and robotic systems become operational. It functions as a multifaceted control center—a dedicated workspace for automation management and system configuration.

In Programming Mode, the Control Panel shifts to the right side of the screen and the Program Structure Tree is added.

Buttons for calculate the trajectory.

Quick calculation button. Calculates the trajectory without considering the checkboxes in collision avoidance commands.

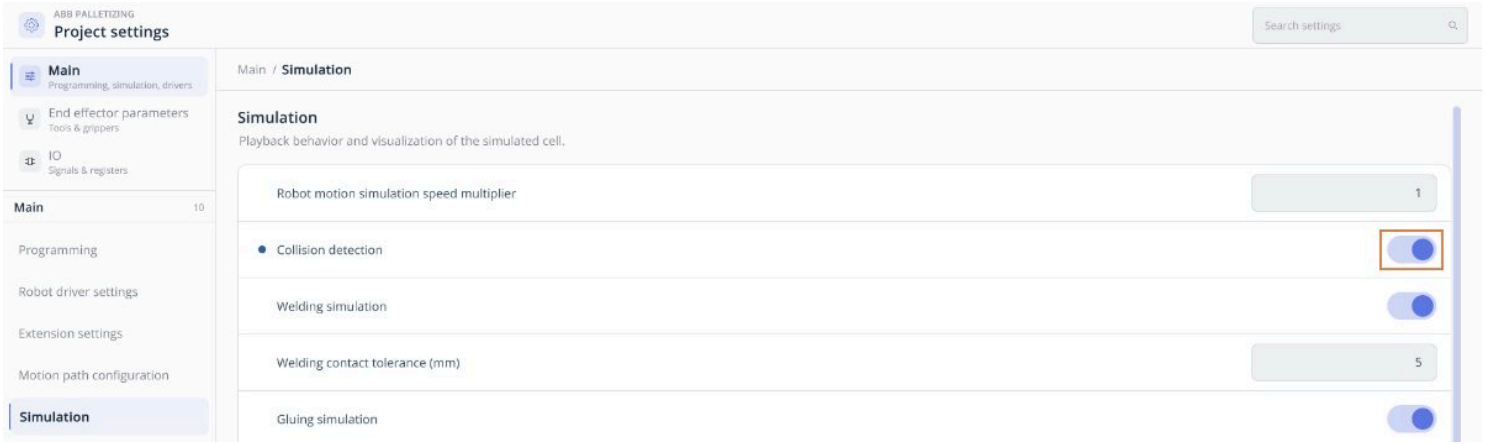
Safe Path button. Computes trajectory with collision avoidance — only for commands where the flag is enabled.

Slider for simulation.

Simulate trajectory (speed controlled by slider).

Collision detection

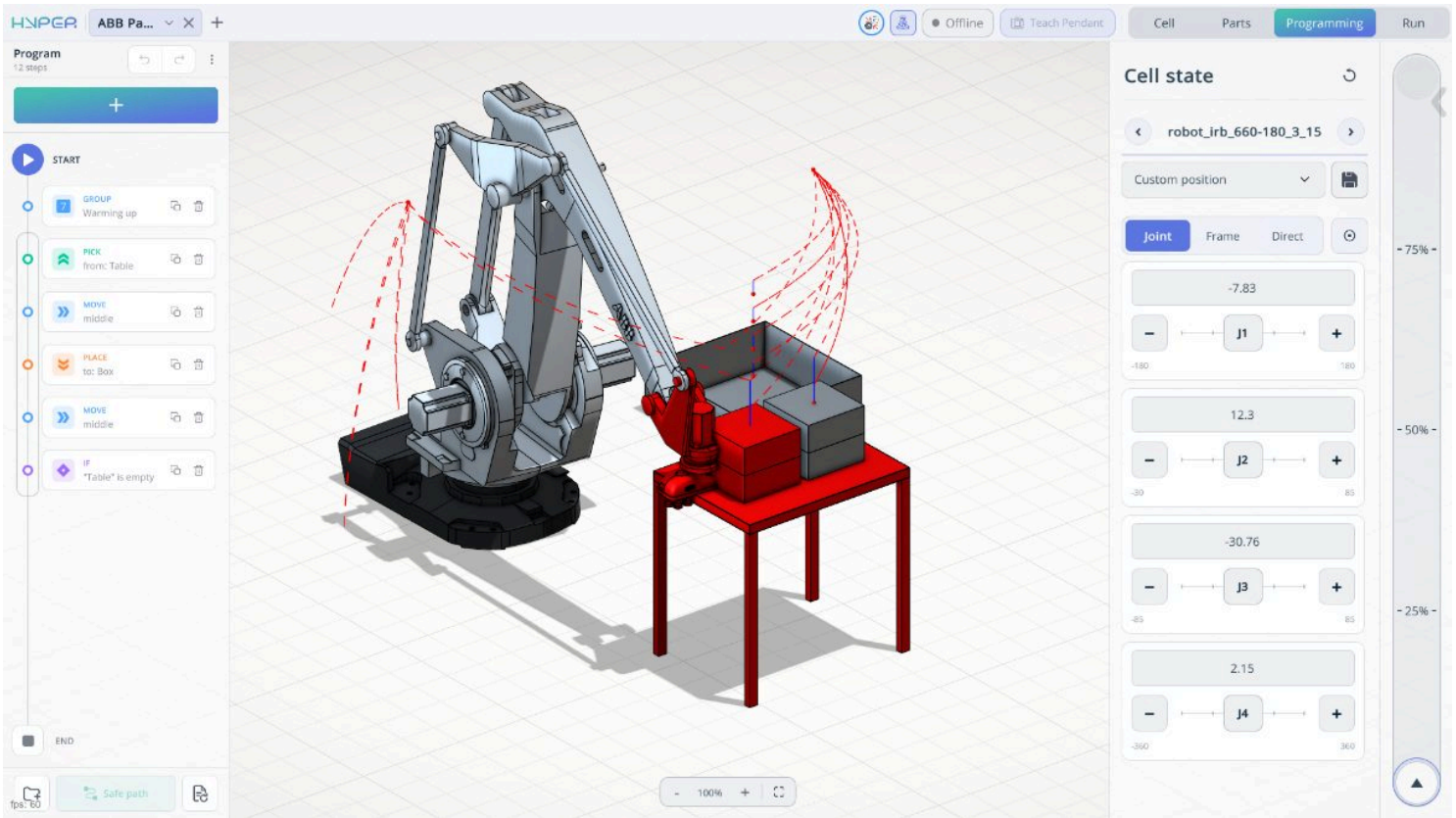
Collision detection helps identify collisions between mechanisms and objects in your project. To enable it, open Project settings > Main > Simulation and turn on the Collision detection toggle.



After you enable this option, ENCY Hyper builds a collision model for your project. A progress indicator appears at the top of the screen. Wait for the model to finish building before checking for collisions.



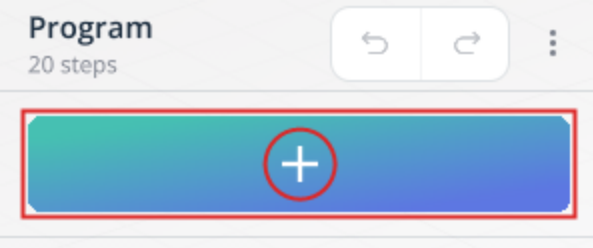
Once the model is ready, simulate the robot movements to check where collisions may occur between mechanisms and objects. Colliding components are highlighted in red in the graphics window, as shown below.



The Program Structure Tree consists of:

Buttons:

Add a command. Allows you to add basic commands.



Clear. To clear all commands and restart from the initial state.



Creates a Group. Commands can be organized into groups. Once created, a group can be copied, and the tray assignments for all commands in the group can be modified collectively. Efficient handling of repetitive tasks across multiple trays. 

Commands:

Start . Set robot initial position. The Control Panel features navigation for robot movement in space. See more

End . Set robot final position. The Control Panel features navigation for robot movement in space. See more

MOVE . Place robot at target position.

Consists of:

List of Robot Positions. Remembers the robot's position. You can assign a name to this position to use it again. The assigned name will be displayed in the robot's programming tree structure.

To add a new position, select Custom Positions and move the robot, then save the setting.



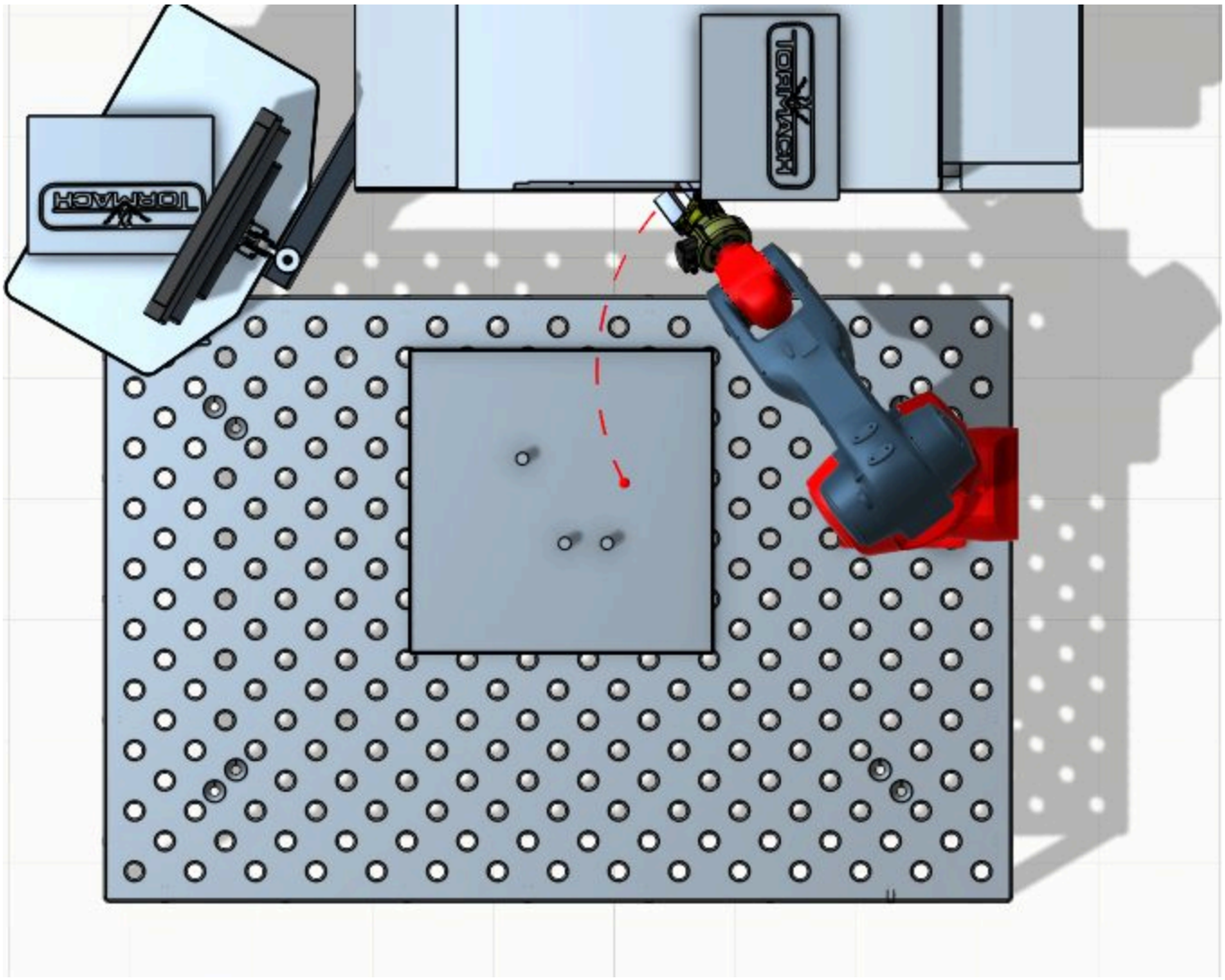
Avoid collisions. Allows calculating a safe trajectory for this movement.

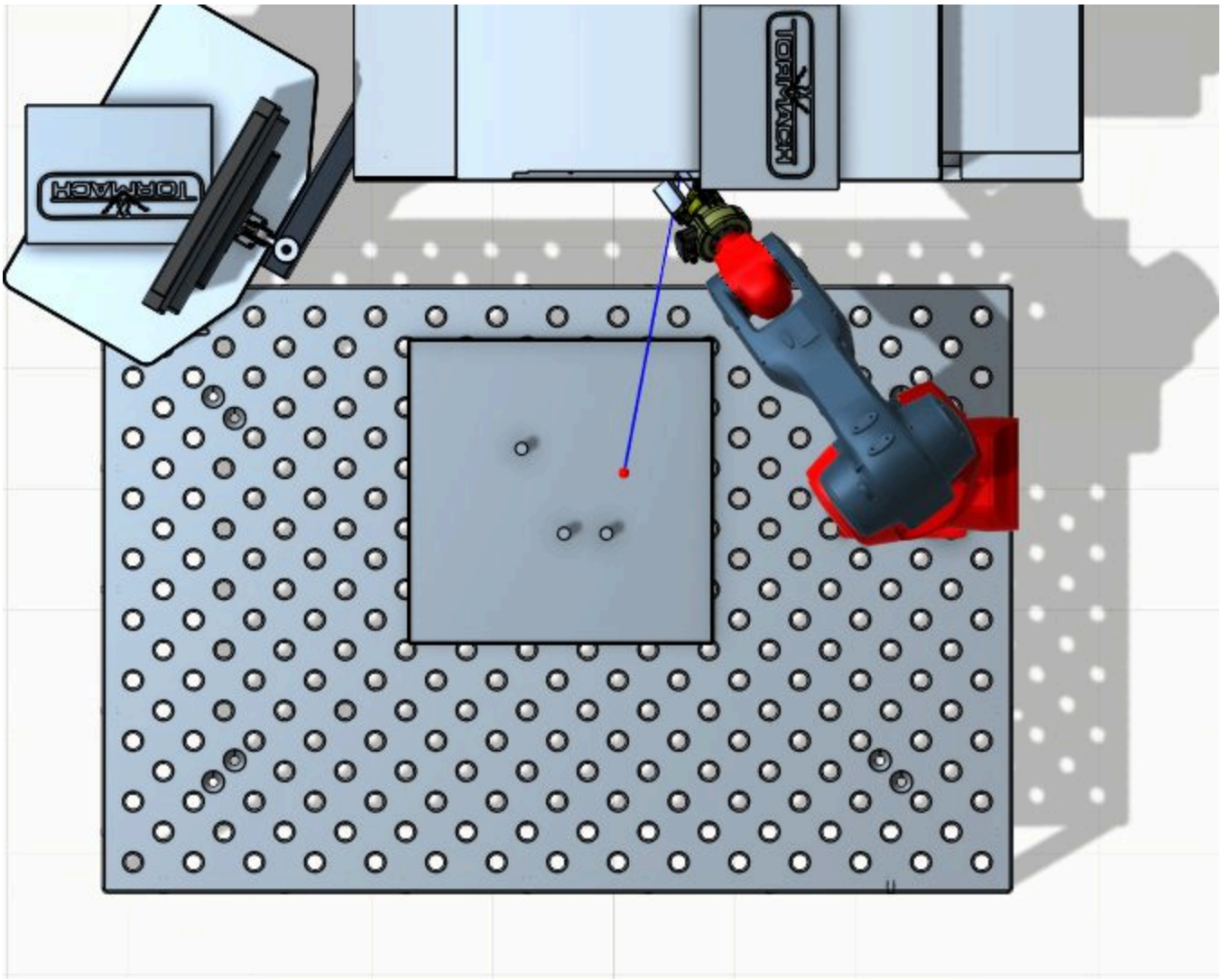
If you run the project using the quick calculation button, this checkbox will be ignored.

When using the Safe Path button, it automatically calculates a collision-avoidant trajectory if this option is enabled for the specific movement. The trajectory calculation will take longer.



Linear movement. Allows linear movement of the robot.



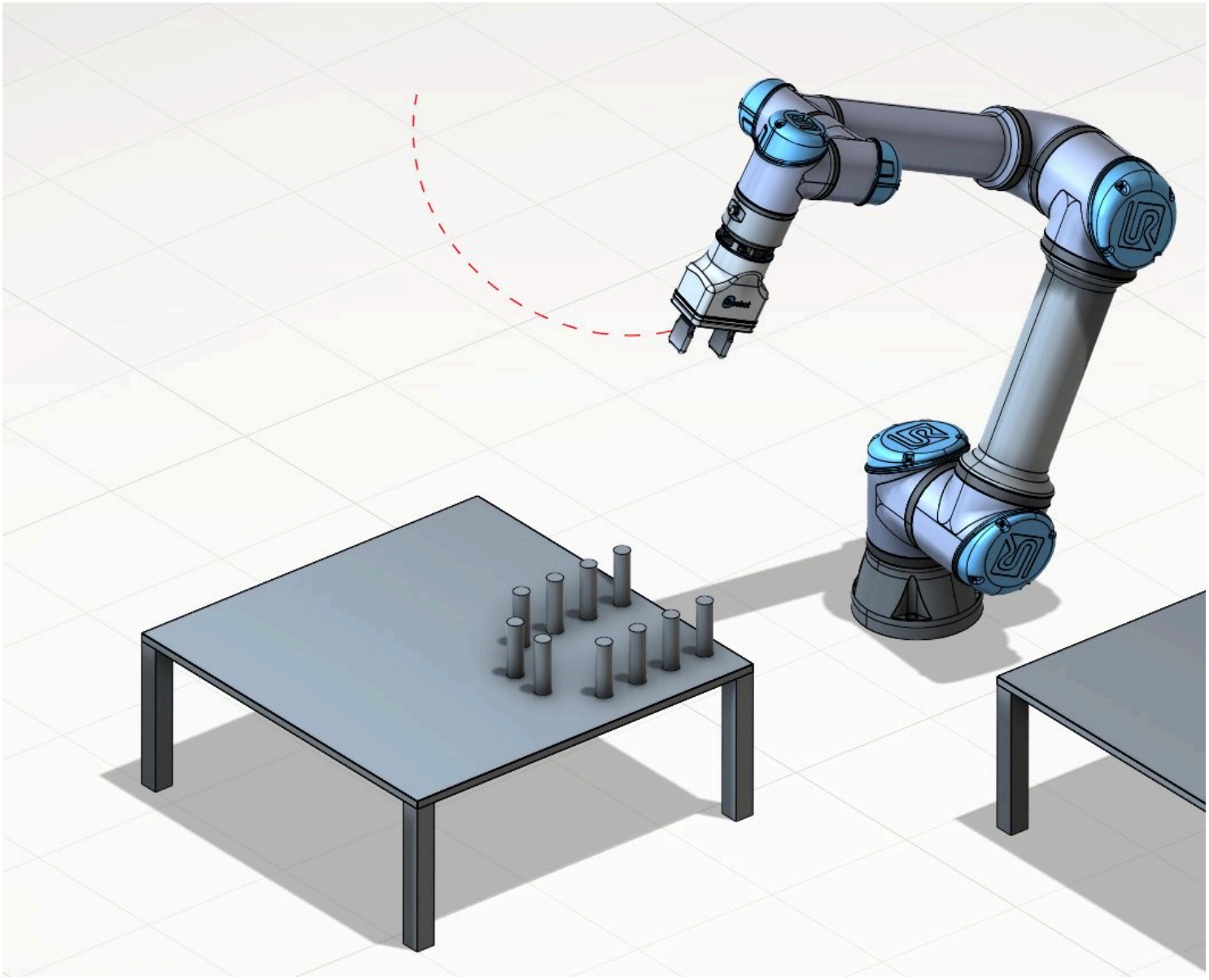


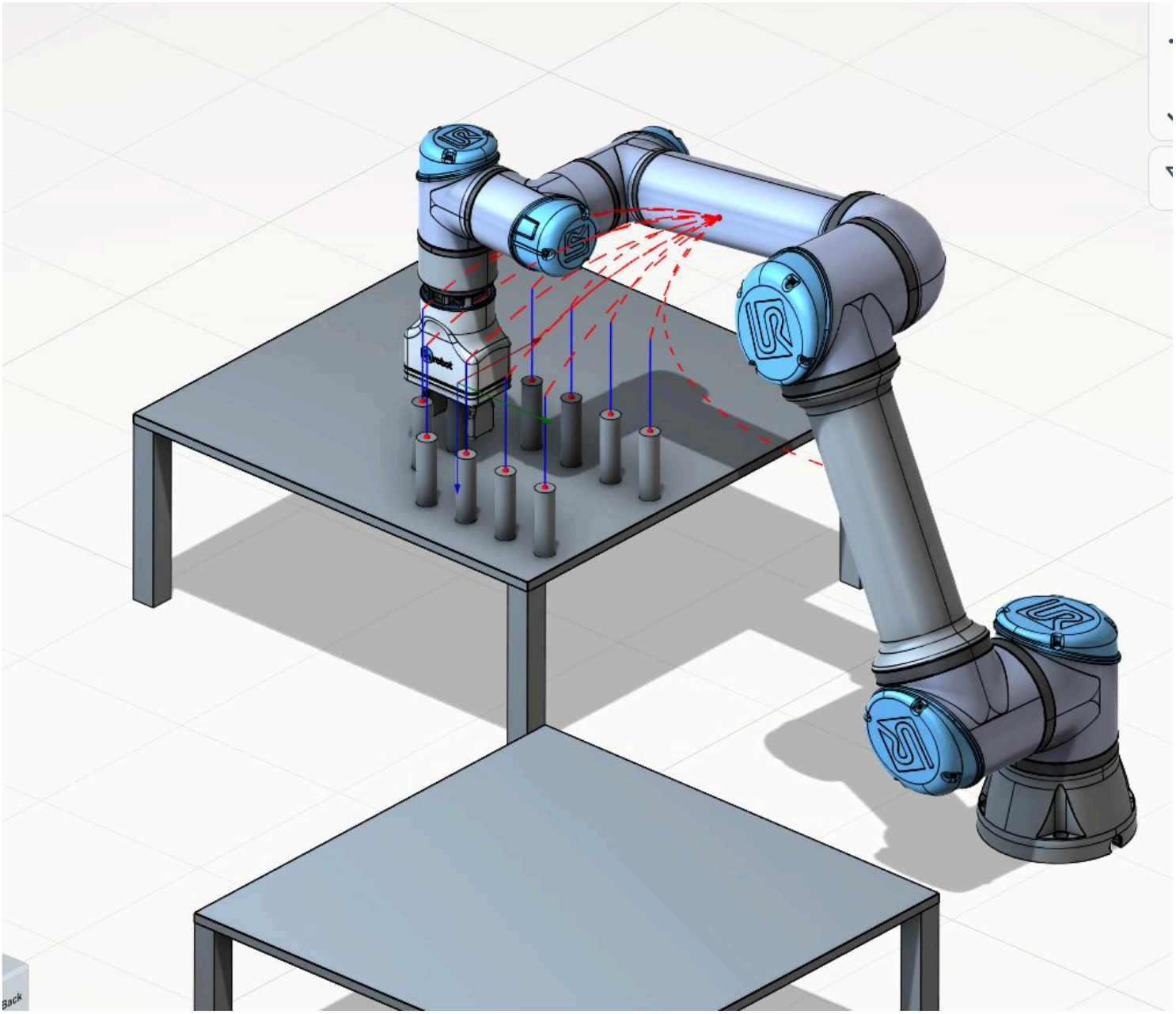
Navigation for robot movement in space. Allows moving the robot in space in various ways. See more

PICK/PLACE. Enables the robot to pick up/place a part.

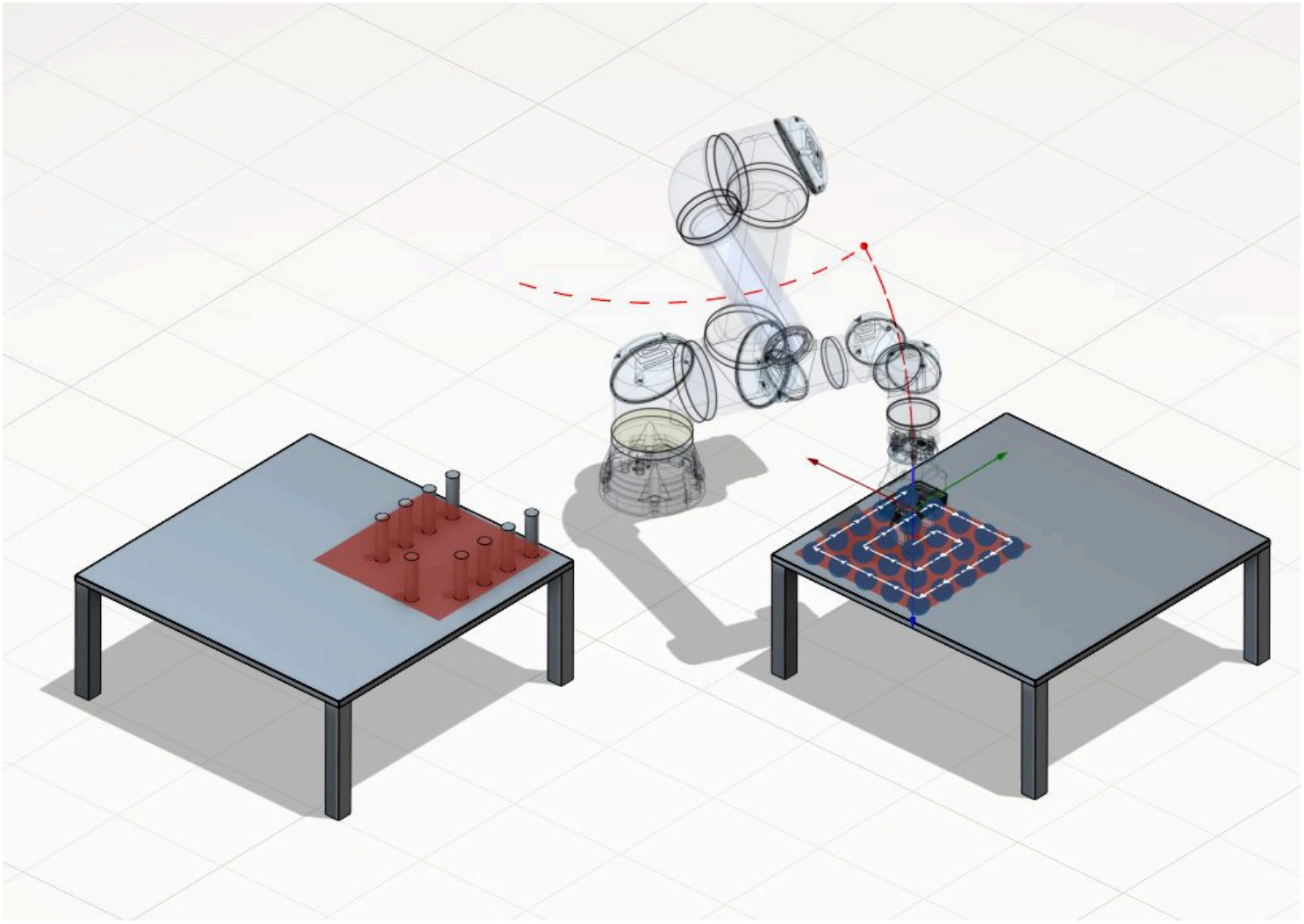
Working principles:

To pick a part, you need to perform a press action on it. The gripper moves to the part's pickup point. This point was previously defined in the Part mode .





To place a part, you need to click on the attachment point in the tray.

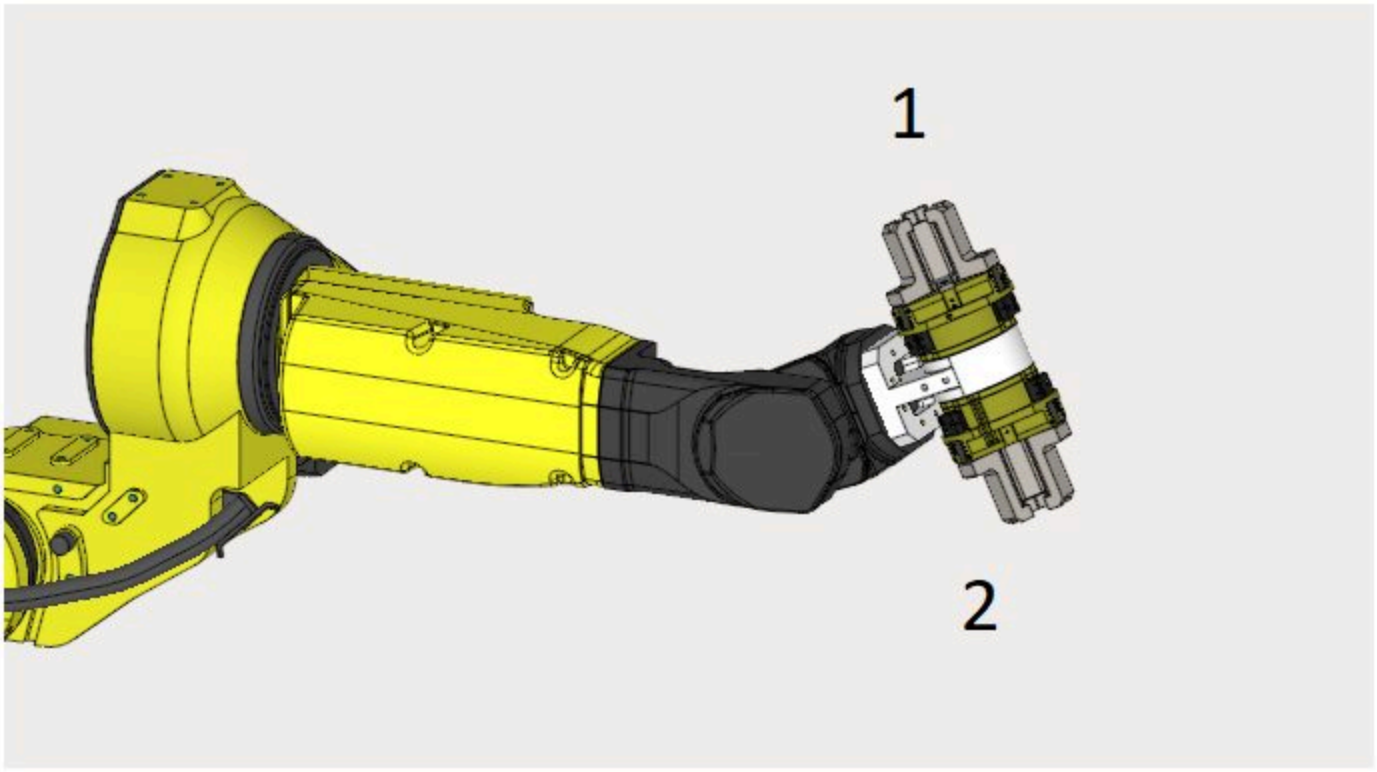


Consists of:

The control panel will change depending on the selected mode.

1. Pick options. This tab contains the main settings for gripping.

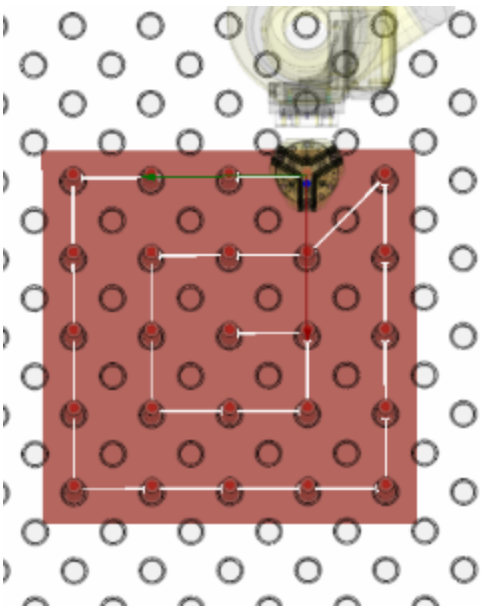
List of points for end effectors. Allows selecting a grip point on the end effector.



Pick/Holder. Robot’s position during gripping / Robot position during part placement.

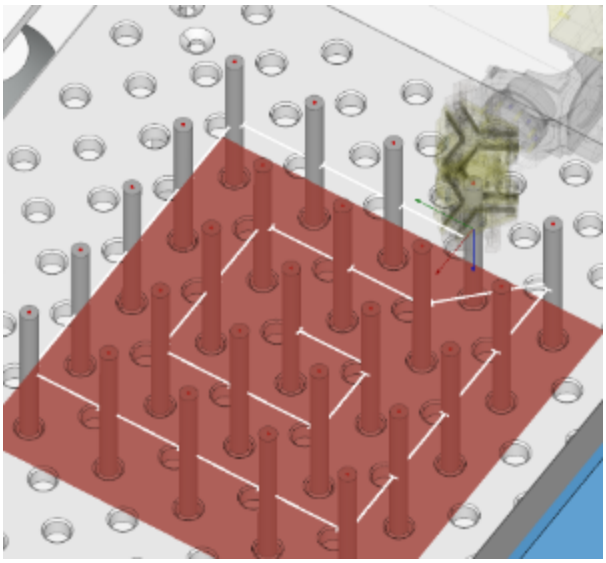
Single element. Allows to take either one part or all parts from the tray.

If you select the entire tray, you will see a template of the sequence for transferring parts from this tray in advance.

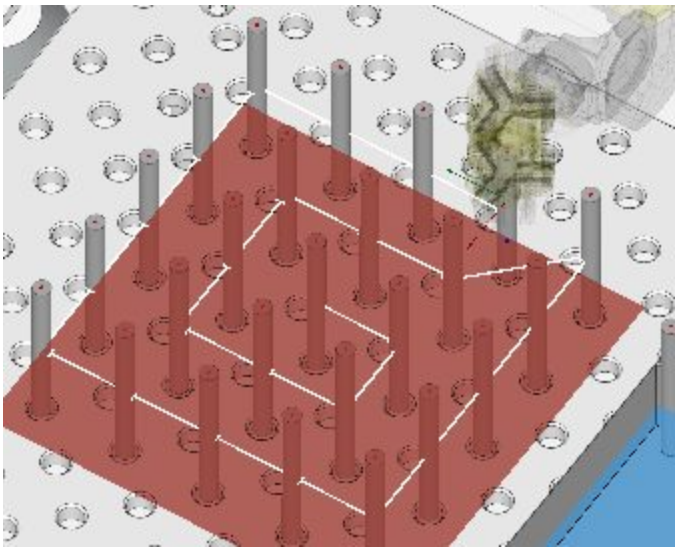


Strategy. Allows selecting a template for the sequence of part transfer from the tray.

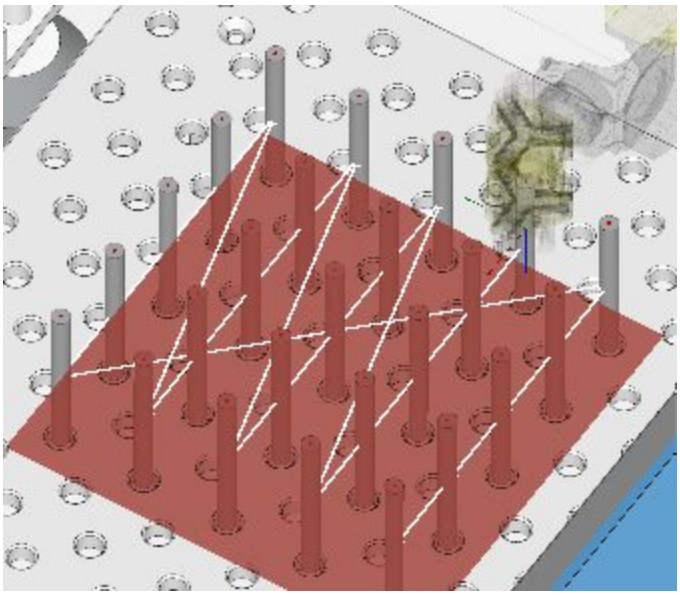
Spiral from outside.



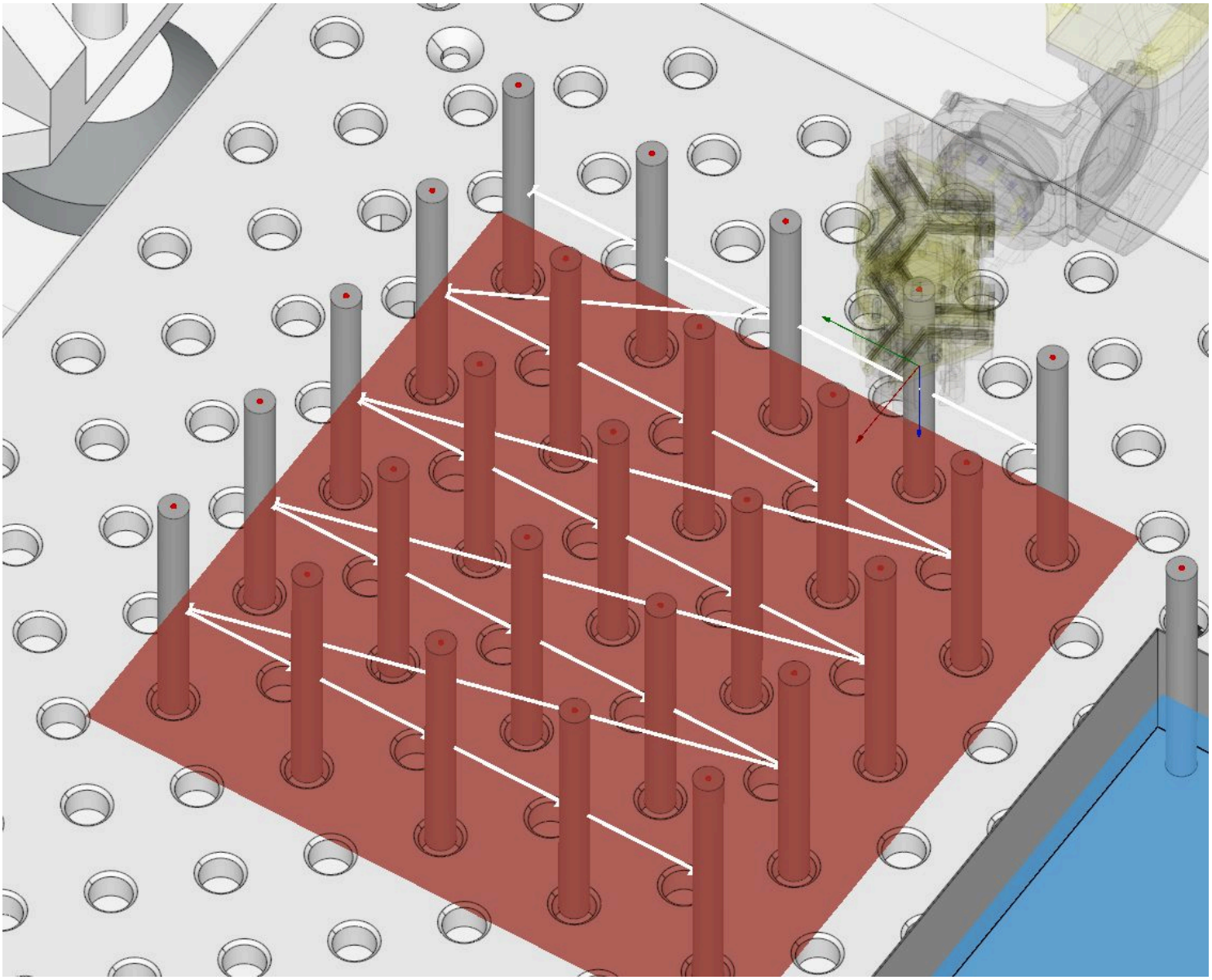
Spiral from inside.



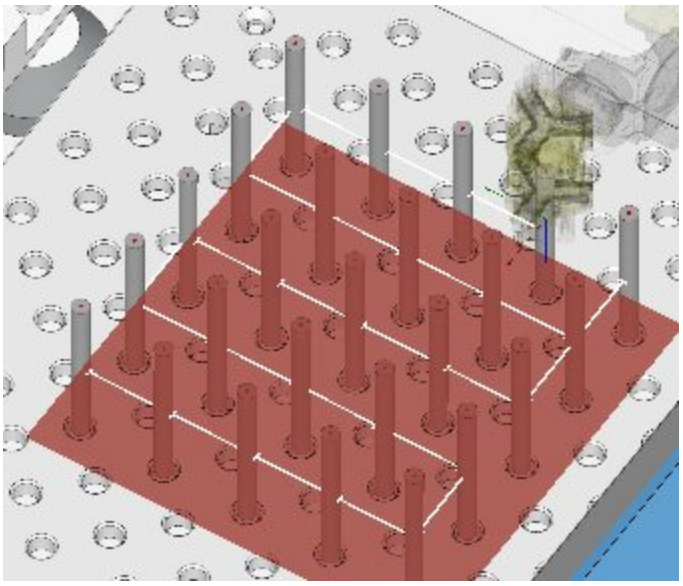
Row.



Column.



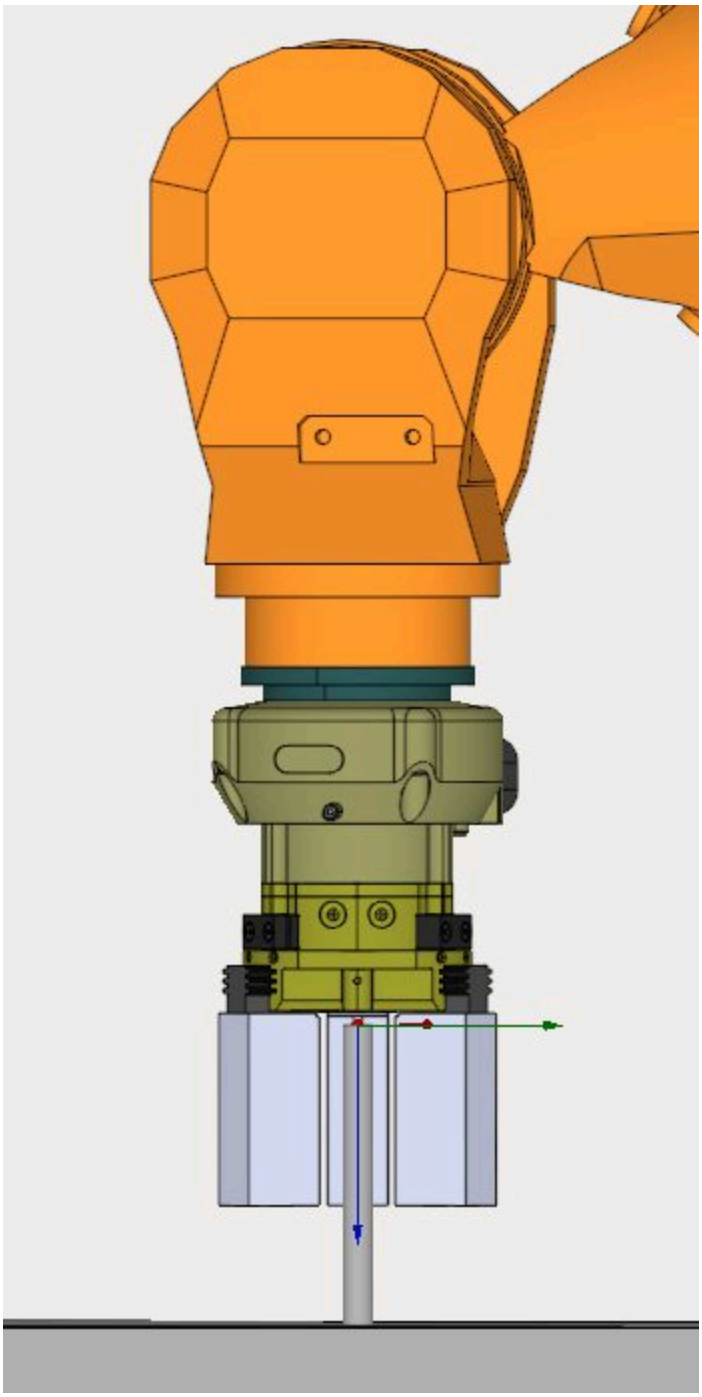
Optimal.

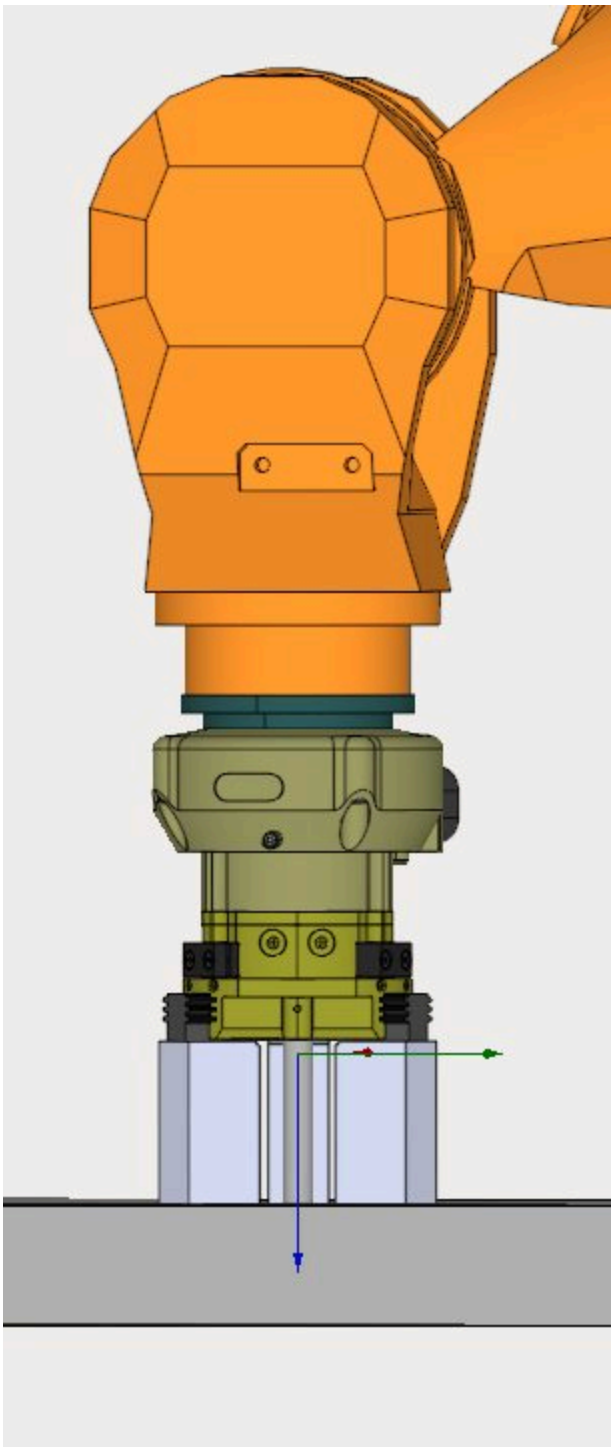


Custom. Set pickup/drop-off order for parts.

Preferred part. If the tray contains different types of parts (which we have defined in Part mode), this option allows you to specify exactly which ones to take.

Pick point /Place point. List of hold points. Pick points are defined in Parts mode when specifying a part. You can edit them at any time either in this mode or in Parts mode.





Avoid creases. Prevents axis twisting (robot joint overrotation).

Skip unreachable points. When this option is activated, the robot will only pick up parts that it can reach. If this option is not activated and the robot cannot reach a part, the program will display an error and wait for the operator.

2. Reference Point Editor. Allows editing the part's grip point (if gripping with a gap is required).

The Control Panel features navigation for robot movement in space. See more

3. Additional points for collision avoidance. Allows defining additional points or collision-avoidance strategies between the pick, place, and clearance points.

Pick.

Avoid collisions. Handles collision avoidance up to the clearance point.

Checks. A check is required to verify the sensor. For example, to confirm that the tray has extended. In this case, the program will wait until the sensor sends a signal.

Reference point

Before. Allows moving to a specific point prior to part pick/place.

Avoid collisions. Handles movement from the clearance point to the pick/place point.

After. Allows moving to a specific point after part pick/place.

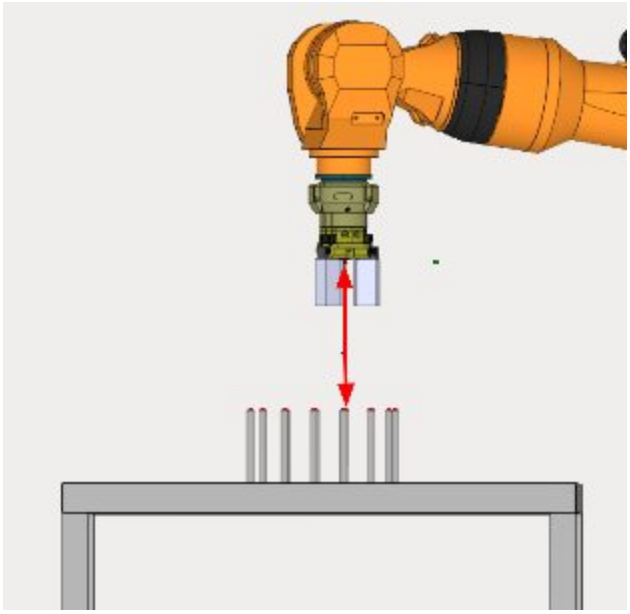
Avoid collisions. Handles movement from the pick/place point to the clearance point.

Edit. Allows setting a new robot position or editing the existing one.

4. Clearance. The position the robot moves to prior to gripping the part.

Simple. Allows creating a simple approach to the grip point.

Save move distance. The position the robot moves to prior to gripping the part.



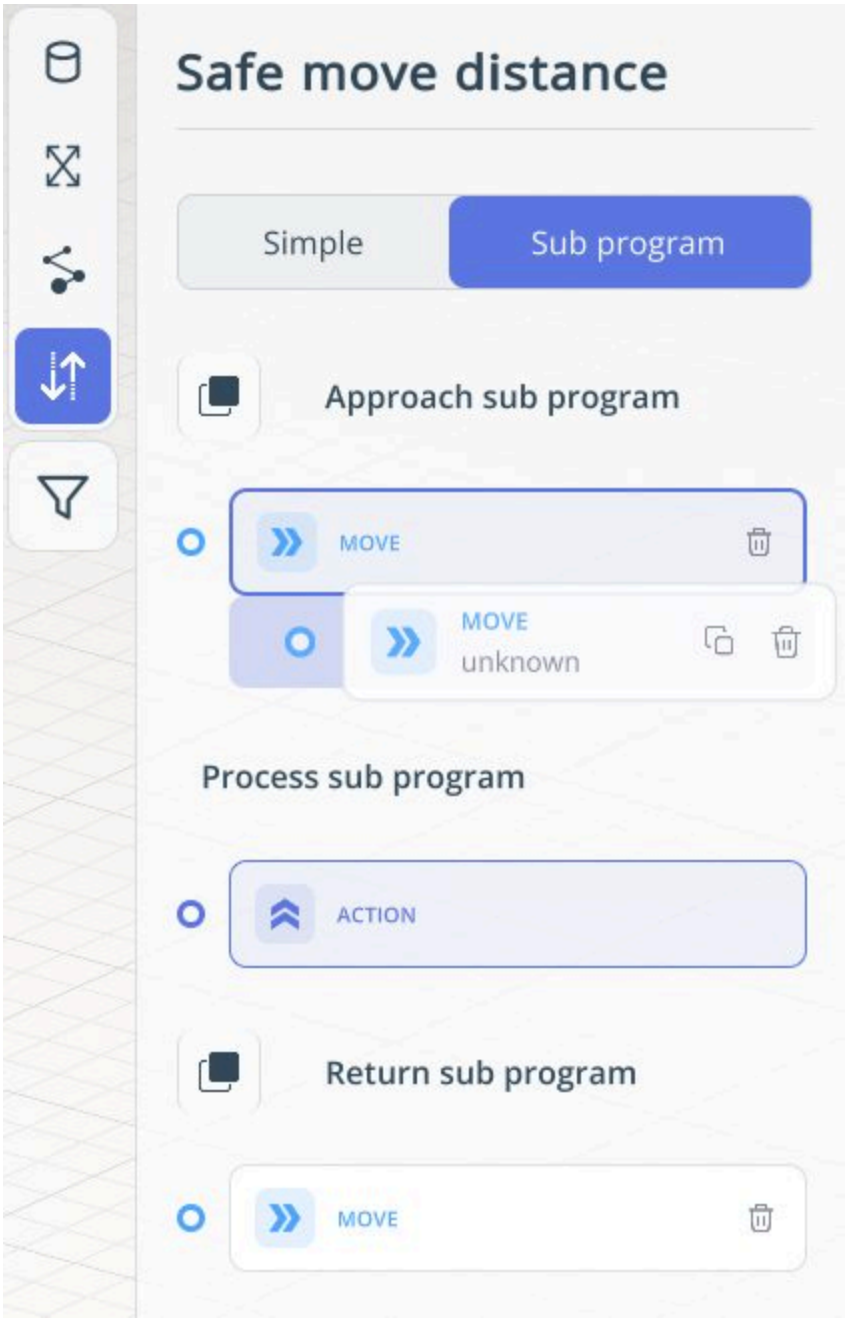
Safe move direction. Allows specifying the axis along which to approach the grip point. (X+,X- and etc)

Safe move speed. Allows slowing down the feed rate when approaching the grip point.

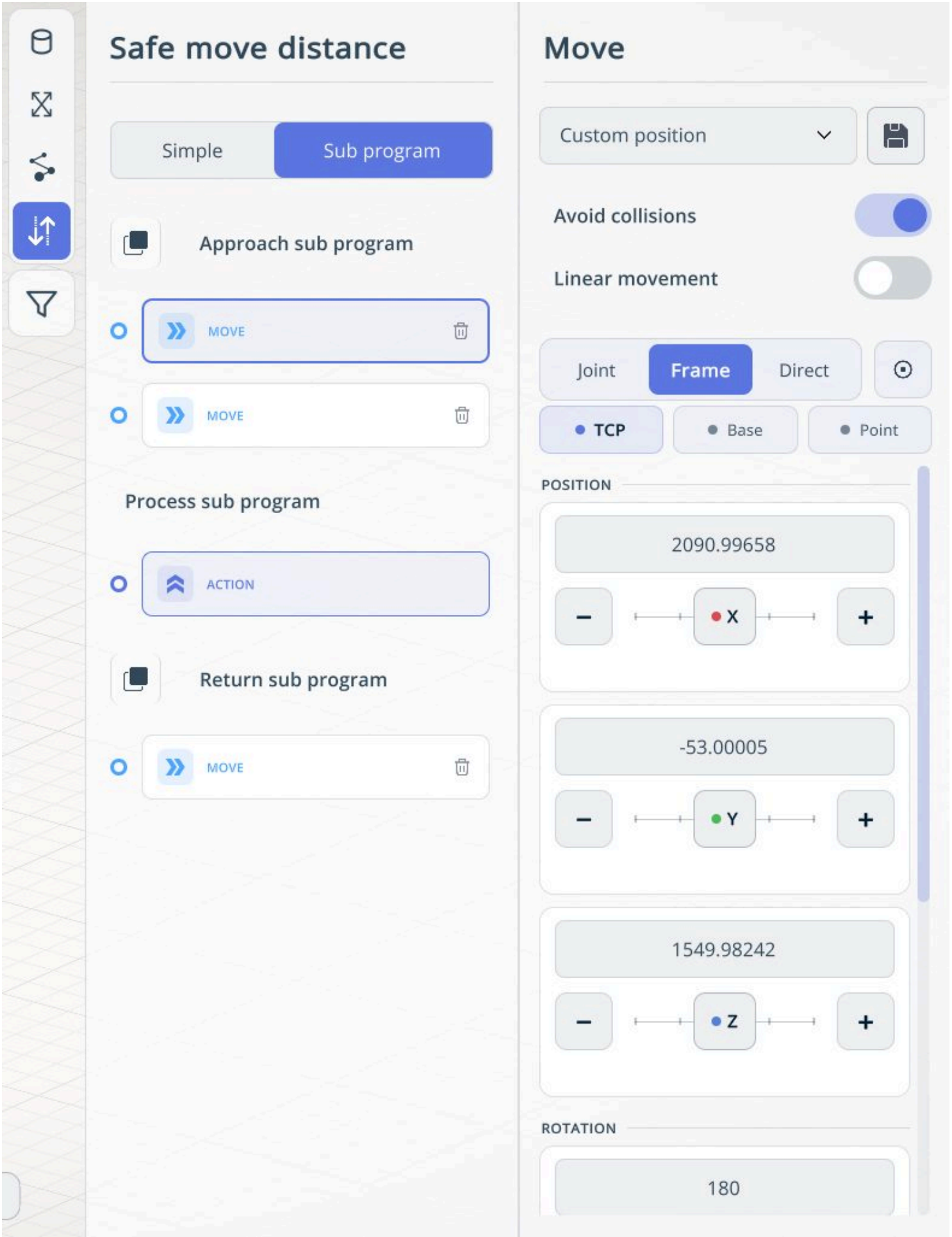
Sub program. Allows creating a complex approach to the grip point (e.g., when the robot needs to retrieve a part from a machine, move to a chip-blow-off station, and then place the part).

In this mode, you can create subroutines consisting of multiple steps (similar to a program tree). To do this, create a command using the «Add a command» button and drag the command not into the main tree, but into the subroutine.

You can add commands such as MOVE or IO.



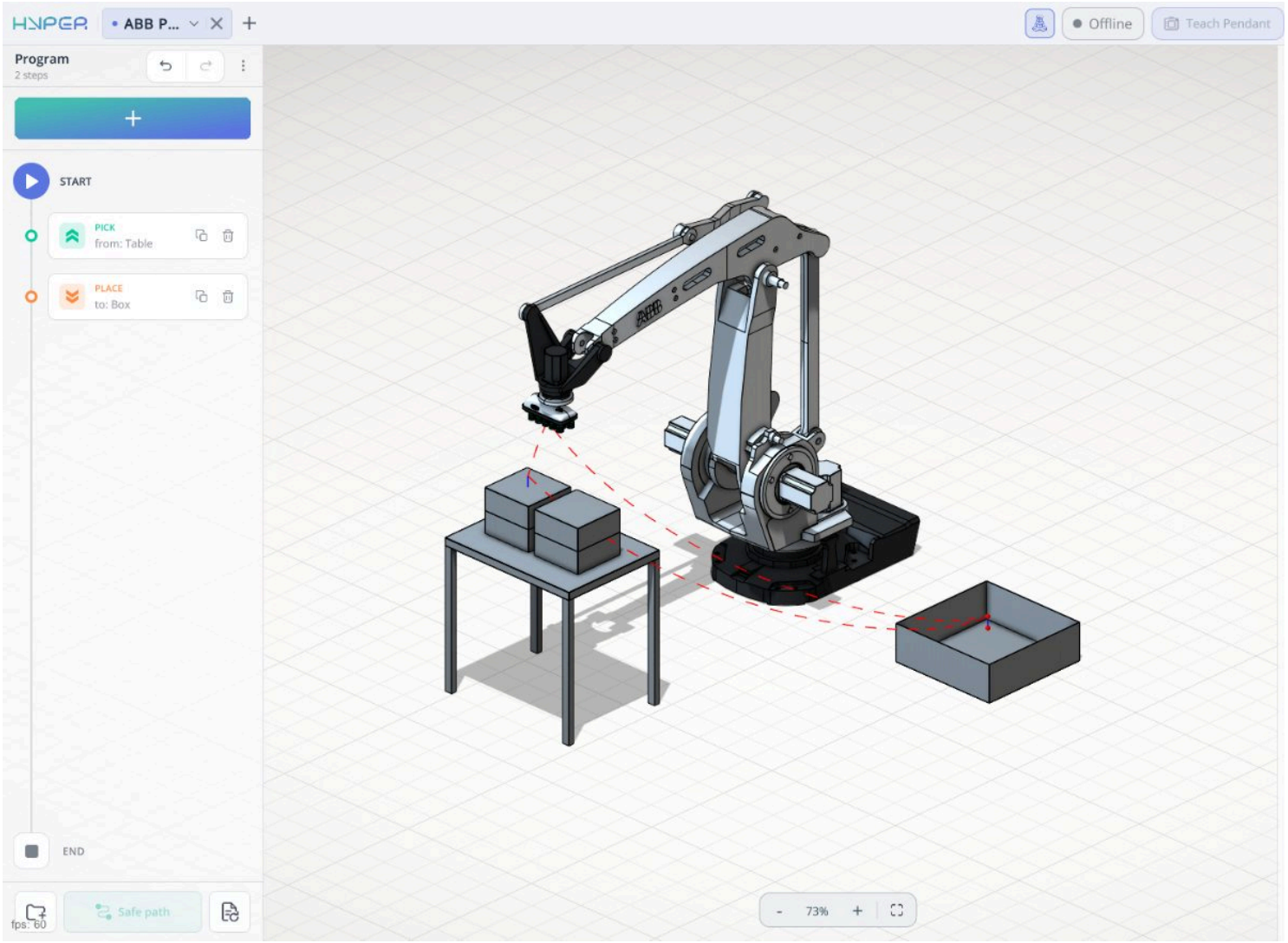
For MOVE commands, an option to move the robot in space is available. See more


Safe move distance
Simple
Sub program
Approach sub program
MOVE
MOVE
Process sub program
ACTION
Return sub program
MOVE
Move
Custom position
Avoid collisions
Linear movement
Joint
Frame
Direct
TCP
Base
Point
POSITION
2090.99658
X
-53.00005
Y
1549.98242
Z
ROTATION
180

IF. Allows looping the program.

Working principles:

If the program doesn't have an IF statement, pick/place is performed for only one part.



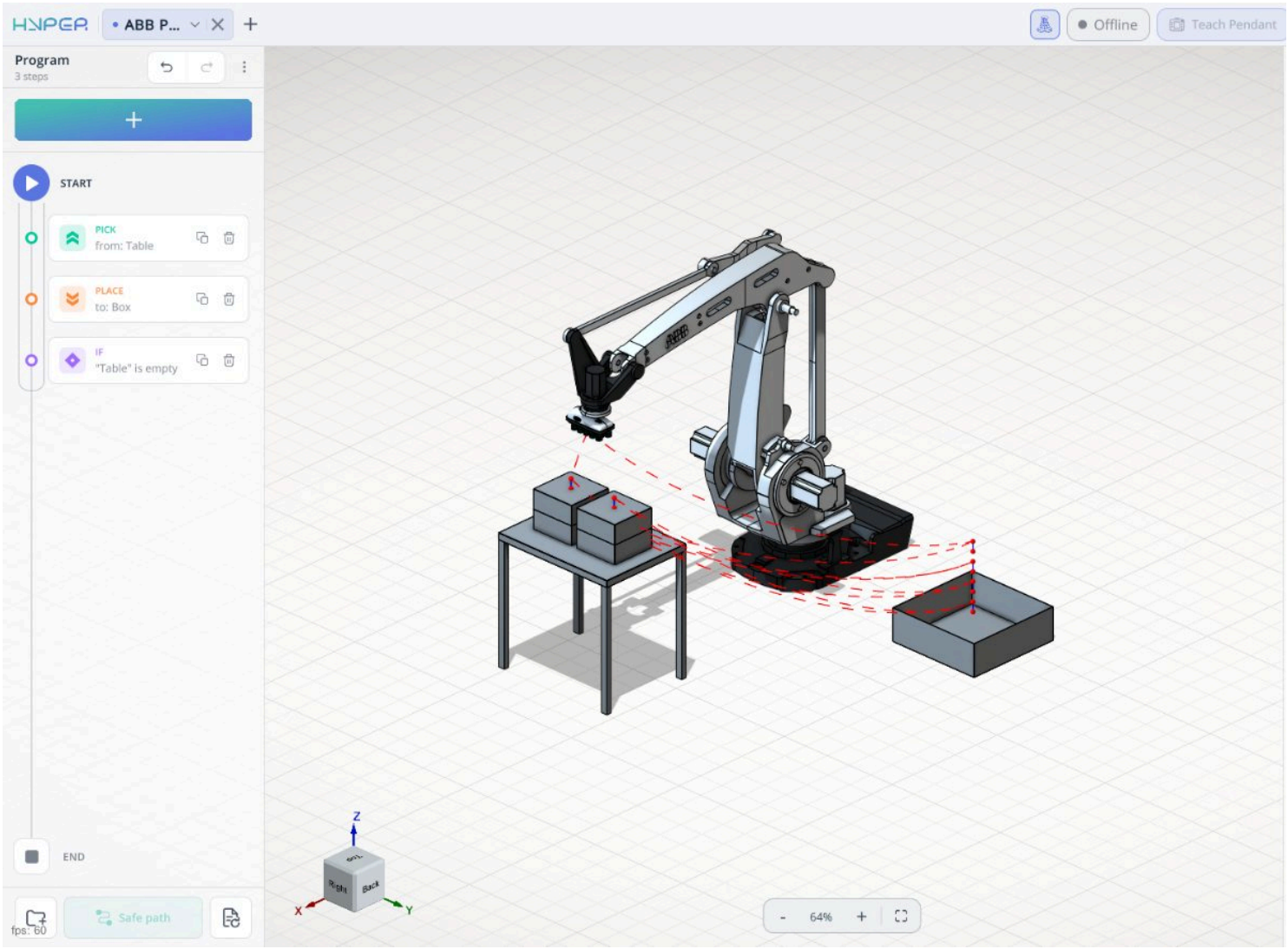
If you use an IF statement, it will loop the program. Meanwhile, the program tree shows which blocks the IF command works with (all commands fit into a single block).

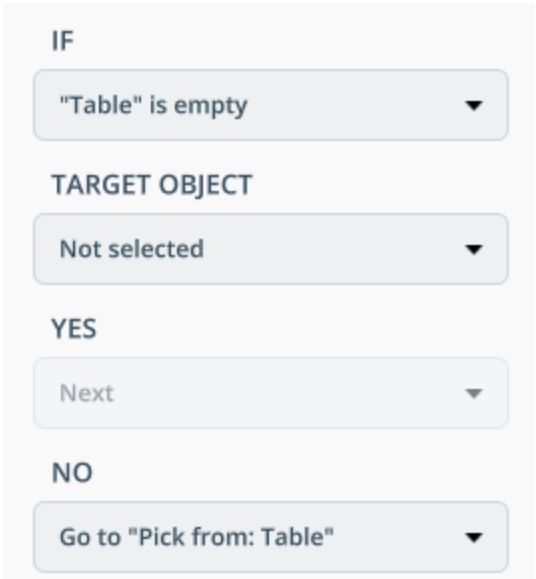
The program works in blocks. In this example, there are 3 blocks.

Block 1 - PICK: In this case, it looks at the tray and checks whether there is a part inside. Then it picks up the part.

Block 2 - PLACE: It looks at the second tray and searches for a place to put the part.

Block 3: - IF: It checks whether the table is empty, and depending on the answer, performs an action for YES or NO.





Consists of:

IF. The main condition under which the loop executes. This could be a condition such as Table empty or Table is processed.

TARGET OBJECT. The condition applies only to a specific part.

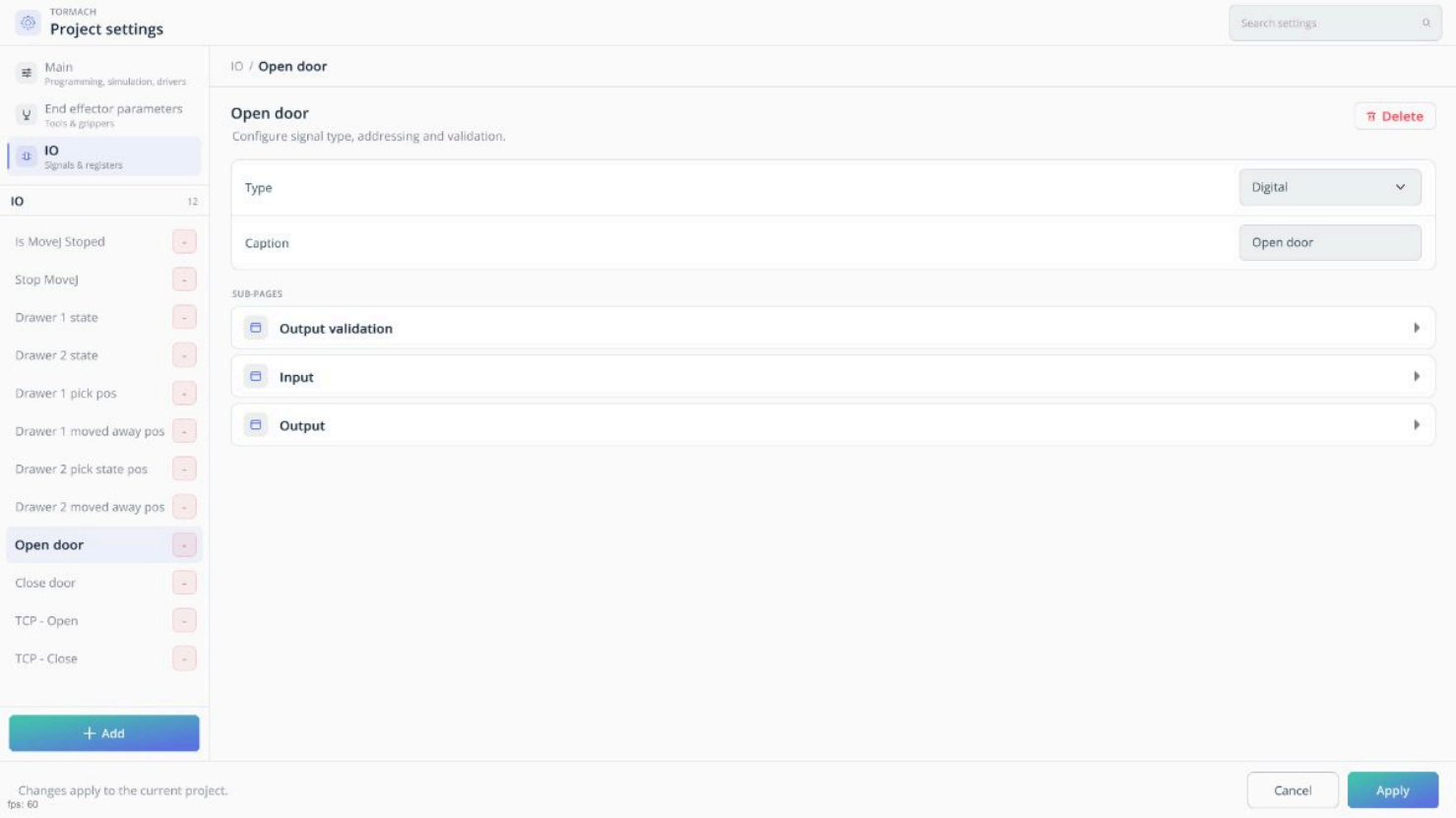
YES. What should be done if the condition is true?

NO. What should be done if the condition is false?

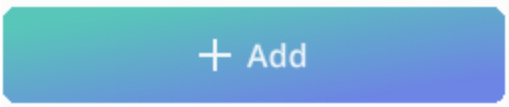
IO. This is required for managing inputs/outputs (external axes of machines and robots — machine doors, rails, etc.). IO is configured in Project Settings. See more

Working principles:

Open Project settings and select IO in the left panel. The settings already contain predefined IO entries. Select an entry, such as Open door, and edit its settings to match your equipment.

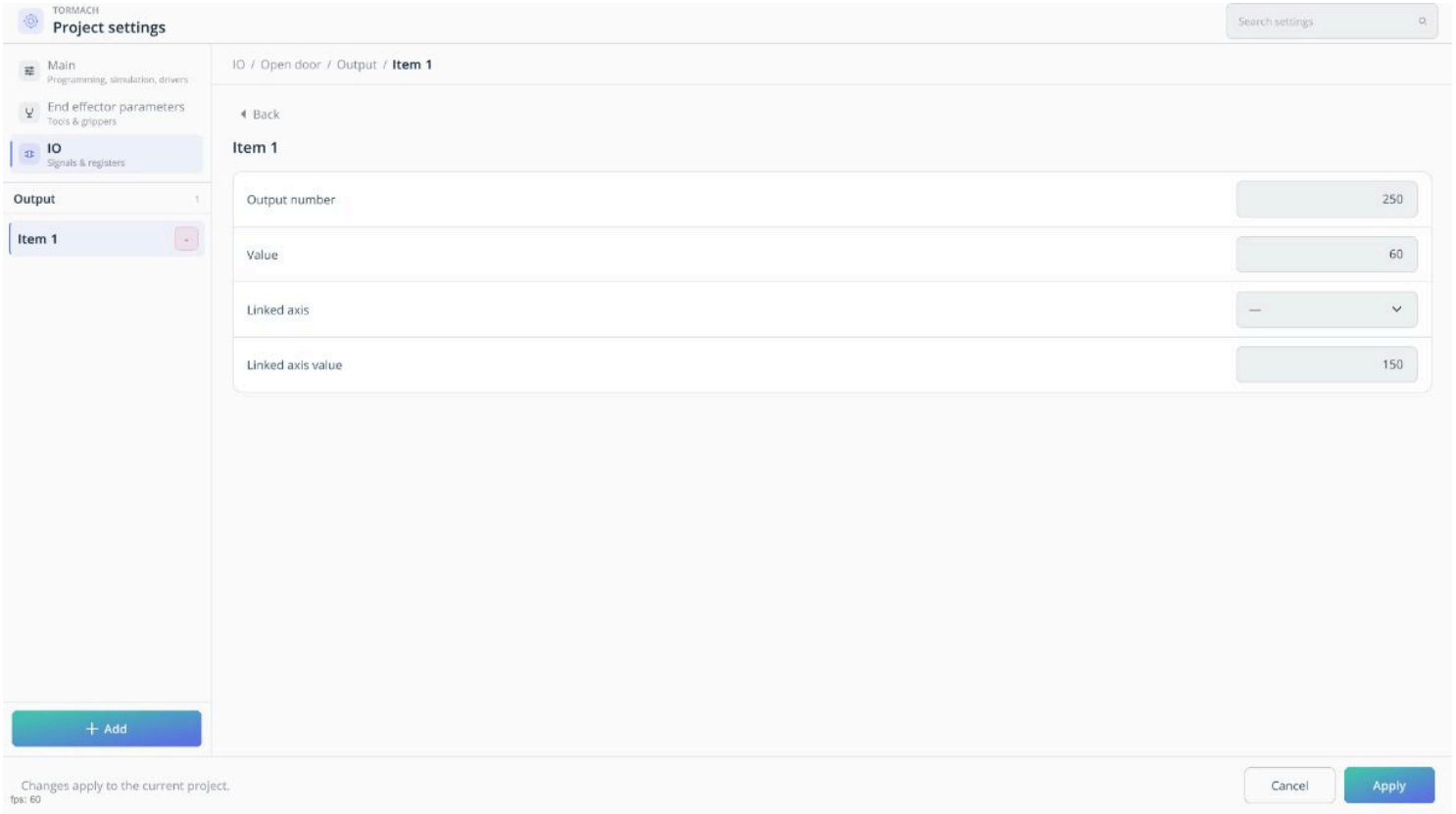


You can also create your own IO entry. Click Add at the bottom of the IO list on the left, then configure the new entry.

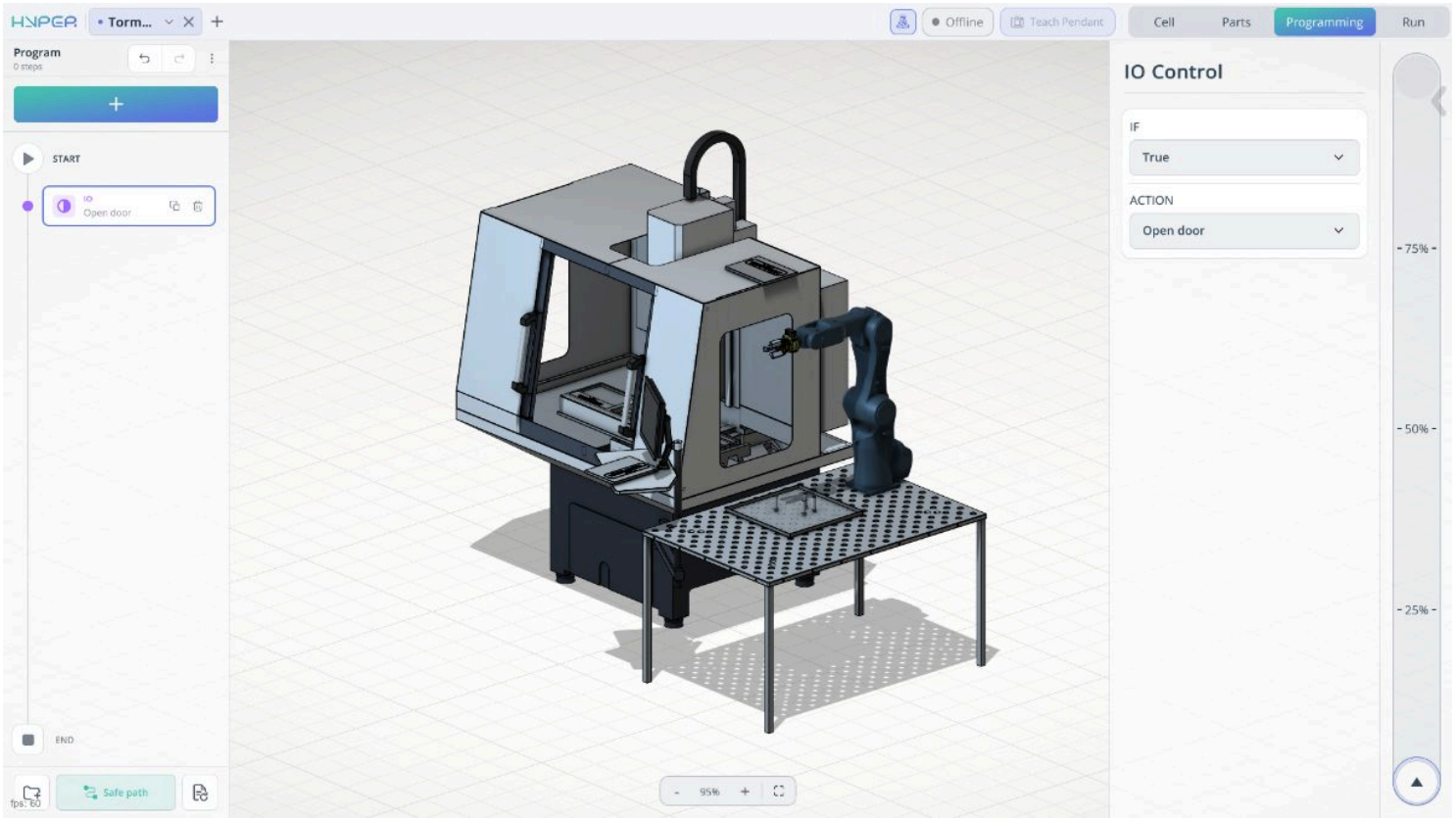


For example, let’s create an Open door cnc command in the settings.

You can configure any input and output signals. For example, let’s set output 250 to value 60. You also need to select the linked axis from the list and assign a value to it.



In the IO window, you can select this action.



Consists of:

IF. It also allows checking a sensor before executing any IO action (e.g., open the machine door if the sensor indicates the machine is not in operation).

By default, you can trigger IO actions without conditions (True).

ACTION. It allows you to run the macro event that was configured in the project settings.

PAUSE. It allows you to set a delay between actions.

Consists of:

WAIT UNTIL. It allows you to set a delay that waits for a specific event. If a sensor is set to be waited for, the Time field changes its value to reflect the polling interval of that sensor.

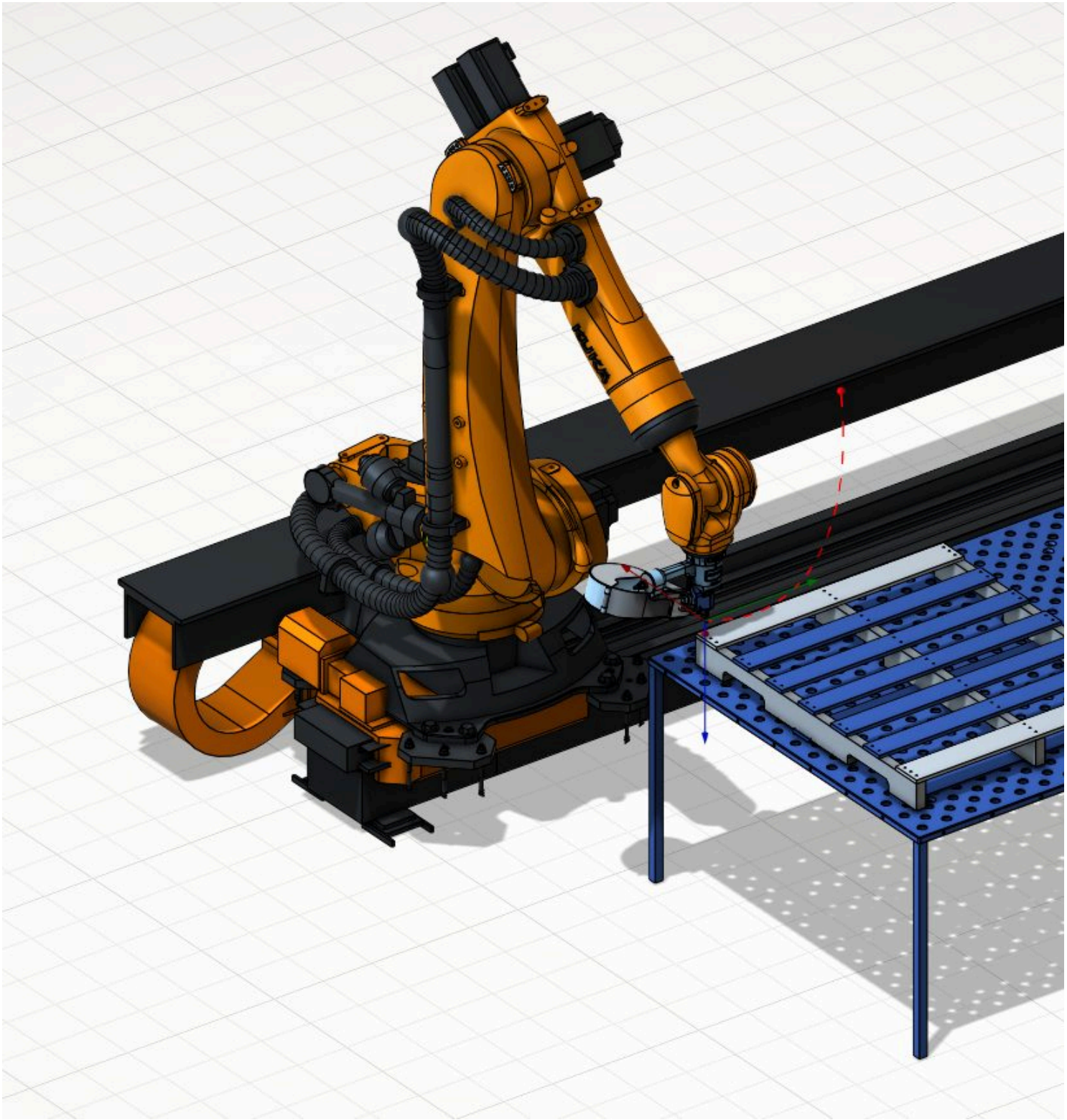
By default without conditions (True).

TIME(sec). It specifies how many seconds to wait.

NAILING. The functionality is designed for nail driving.

Working principles:

The robot approaches the point, sends a signal to the end effector, which pushes the nail and turns it off.



Consists of:

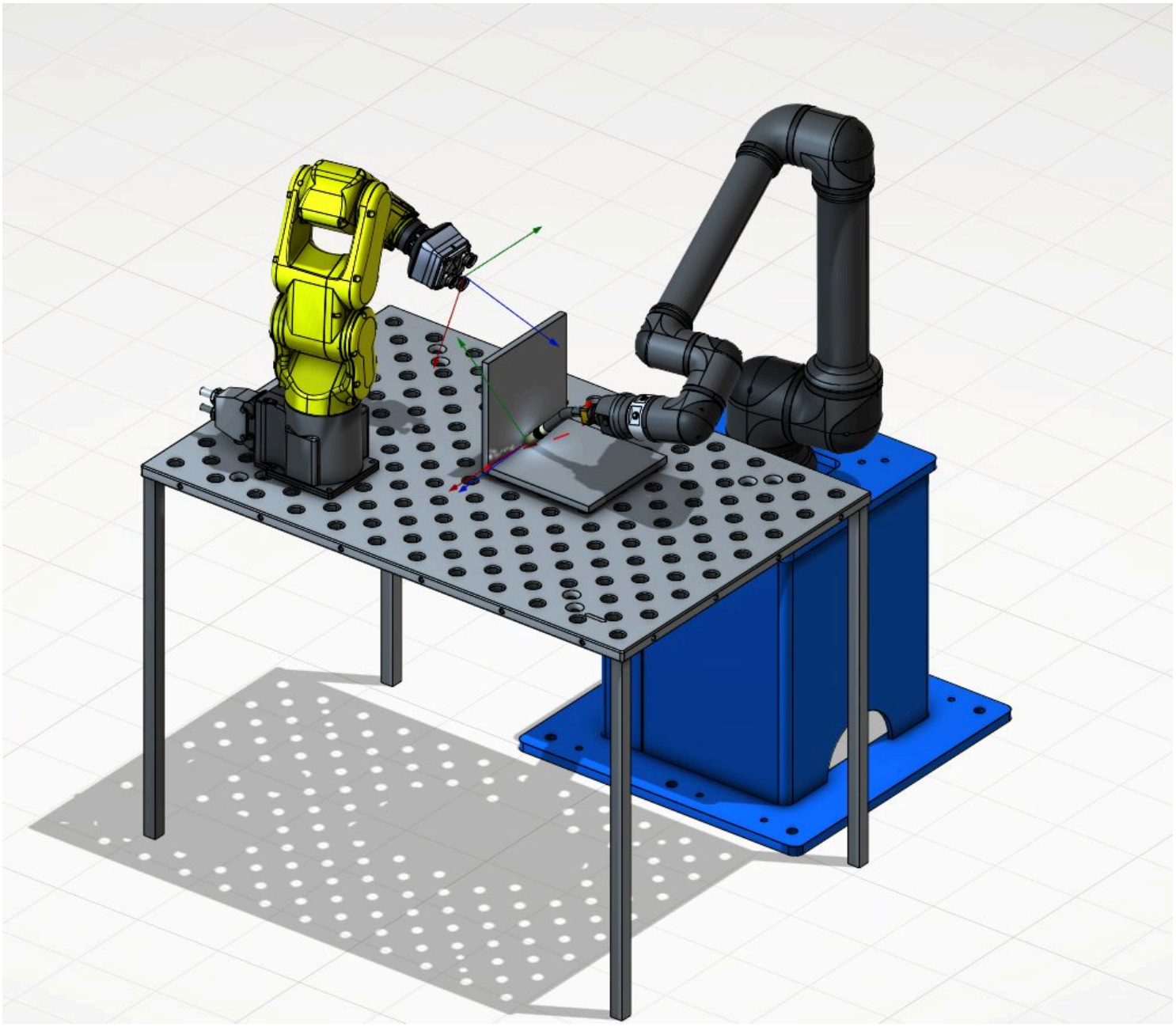
Processing action. It allows you to define an IO event (to send a signal to the end effector for driving nails).

The parameters are the same as in the PICK operation.

WELDING. Joins parts using spot welding or continuous seam welding.

Working principles:

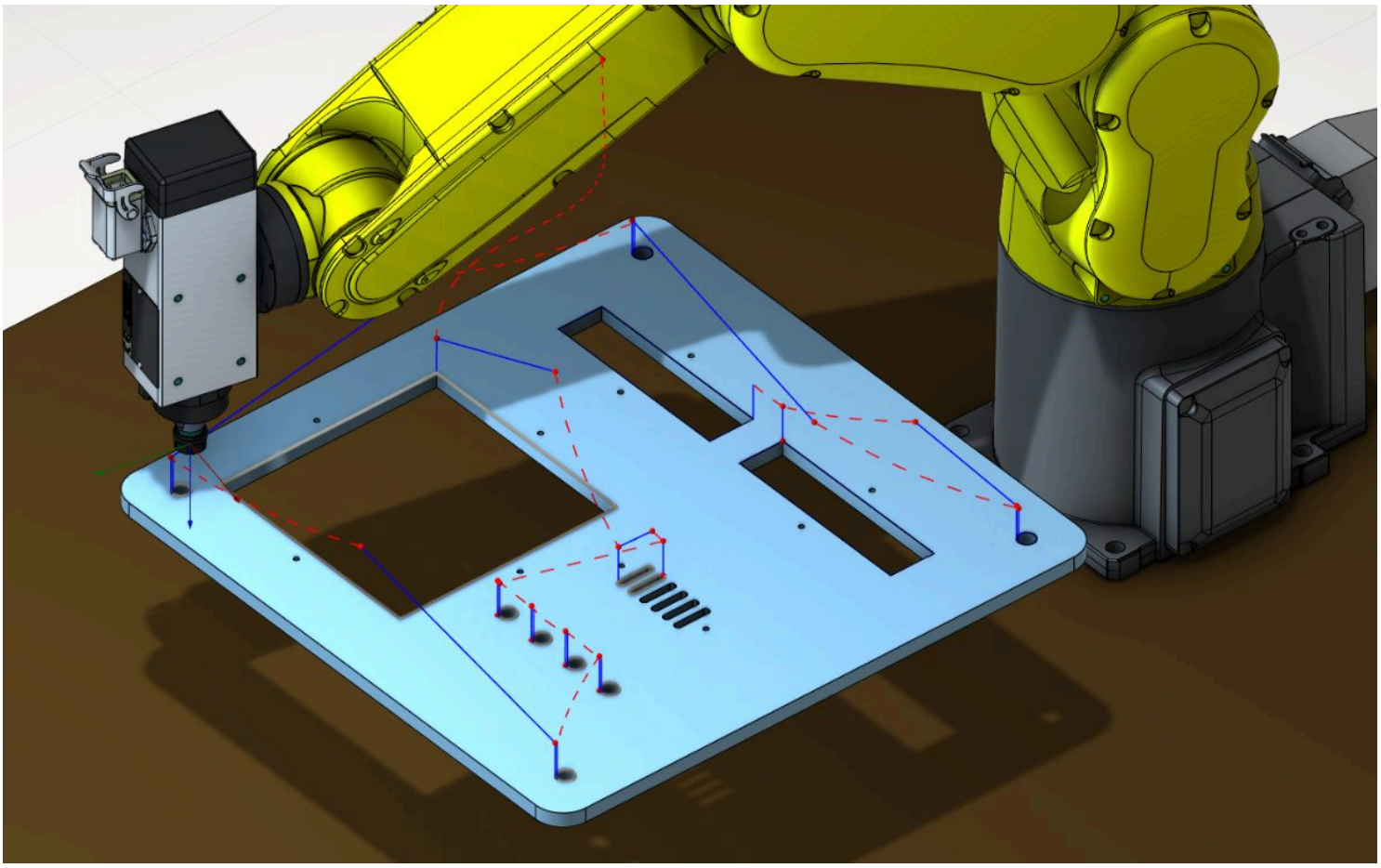
For spot welding, the robot positions the welding tool at each specified point and performs a weld. For seam welding, the robot moves the tool continuously along the specified seam while welding.



GLUING. Applies adhesive to bond parts together.

Working principles:

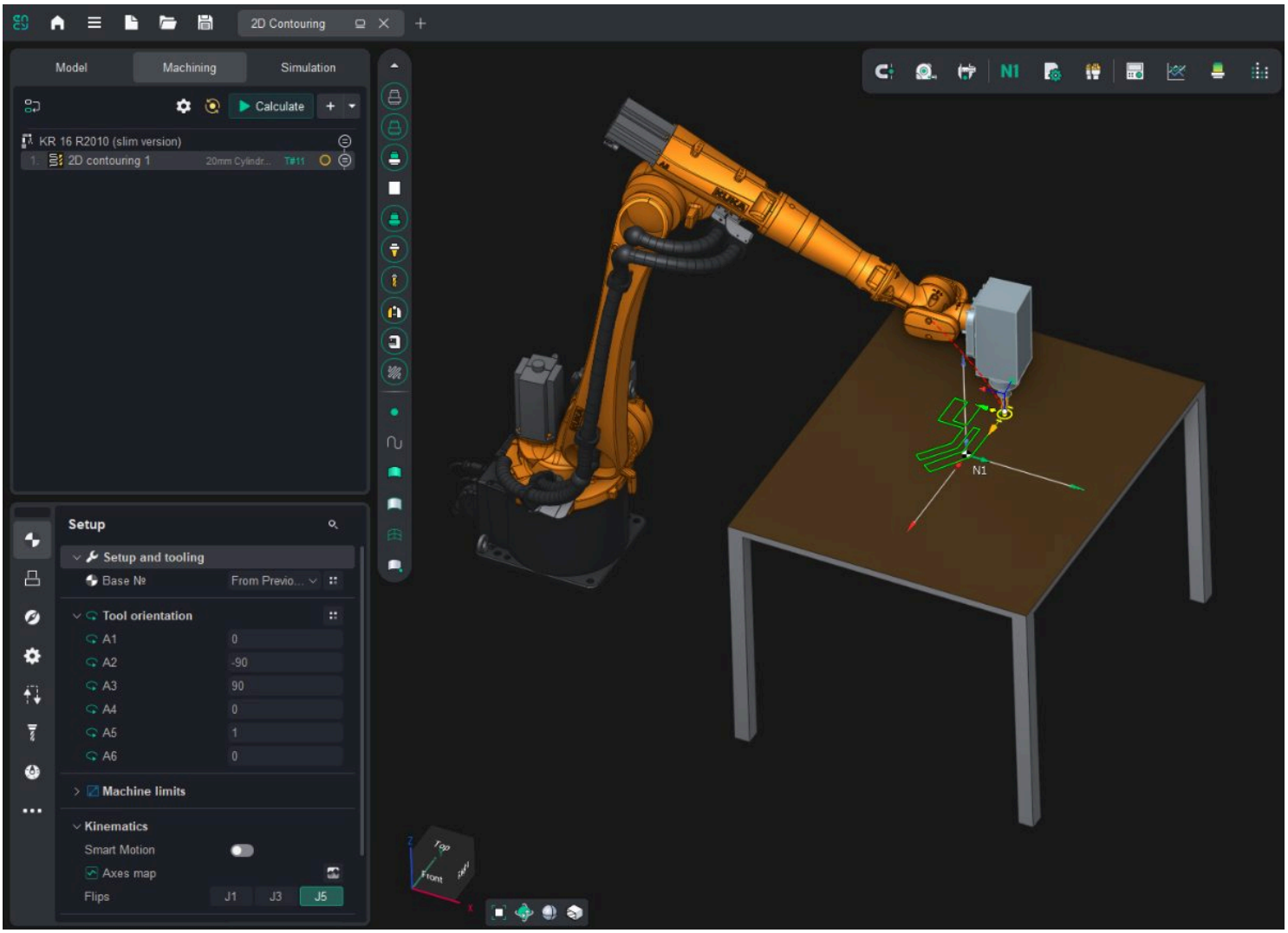
The operation follows the same point-based or continuous-path approach as welding. The robot positions the dispensing tool at specified points or moves it along a specified path while dispensing adhesive. The adhesive is applied to the bonding surfaces to join the parts.



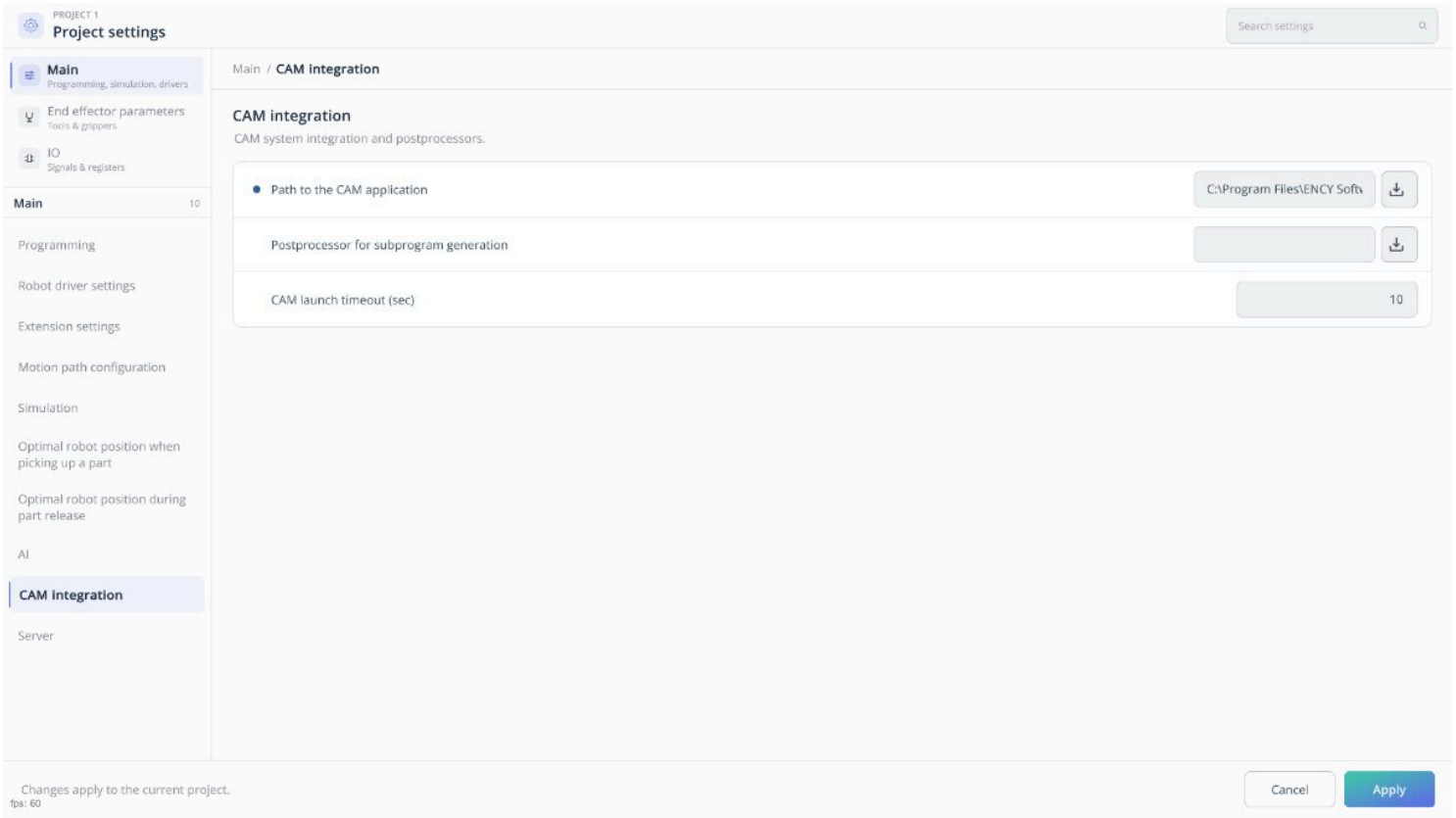
POLISHING. Performs a continuous polishing pass along a specified seam. The robot guides the polishing tool along the seam to finish its surface.

TRAJECTORY. Imports a trajectory from a CAM system into ENCY Hyper. A simple way to do this is to import a saved CAM project, starting with a cell created in MachineMaker.

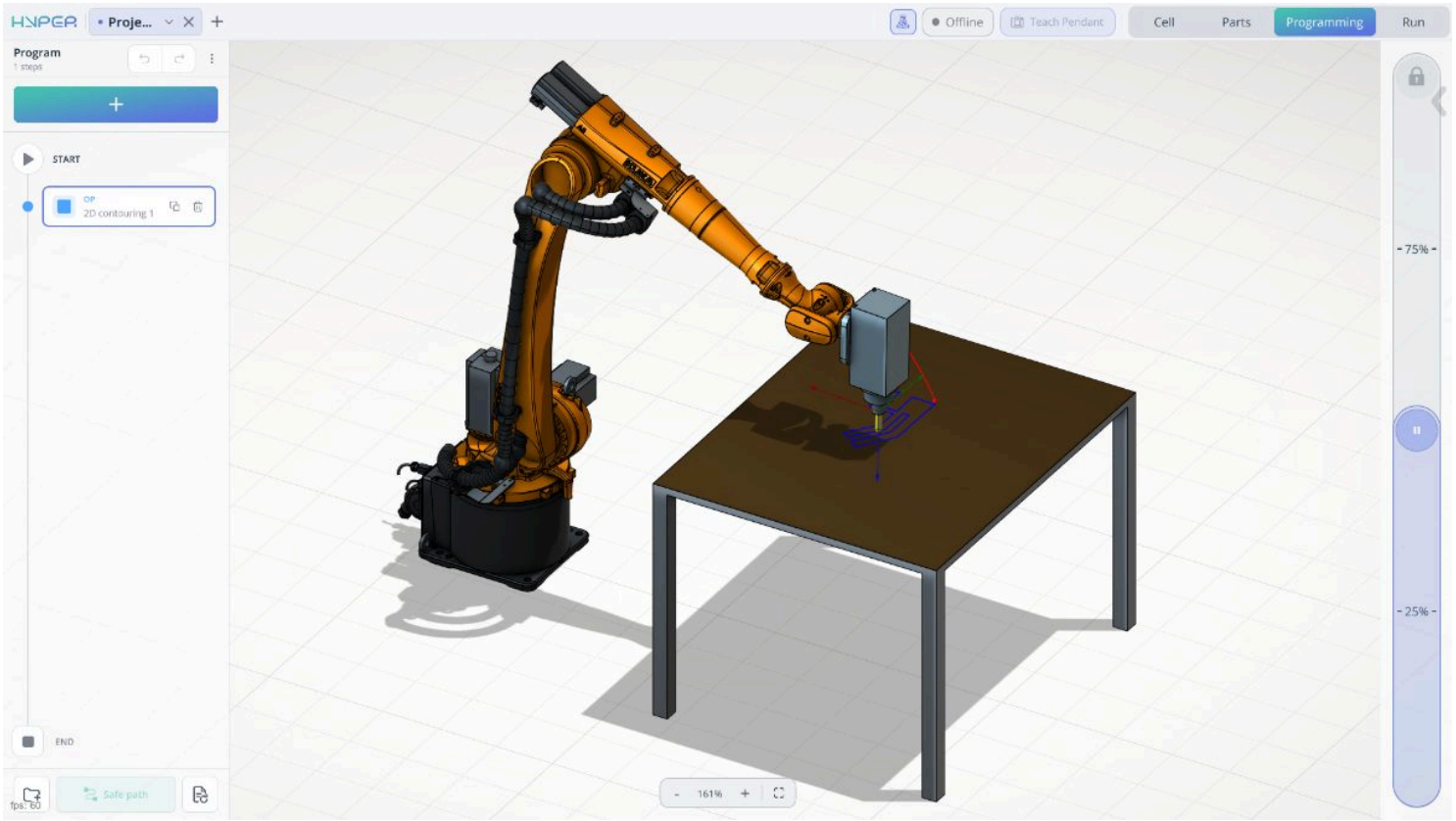
1. Prepare the cell and CAM operation. Create the cell in MachineMaker, save the project in .mma format, and click the button to export it to the CAM system. In the CAM system, create the machining operations. This example uses a simple 2D contouring operation.



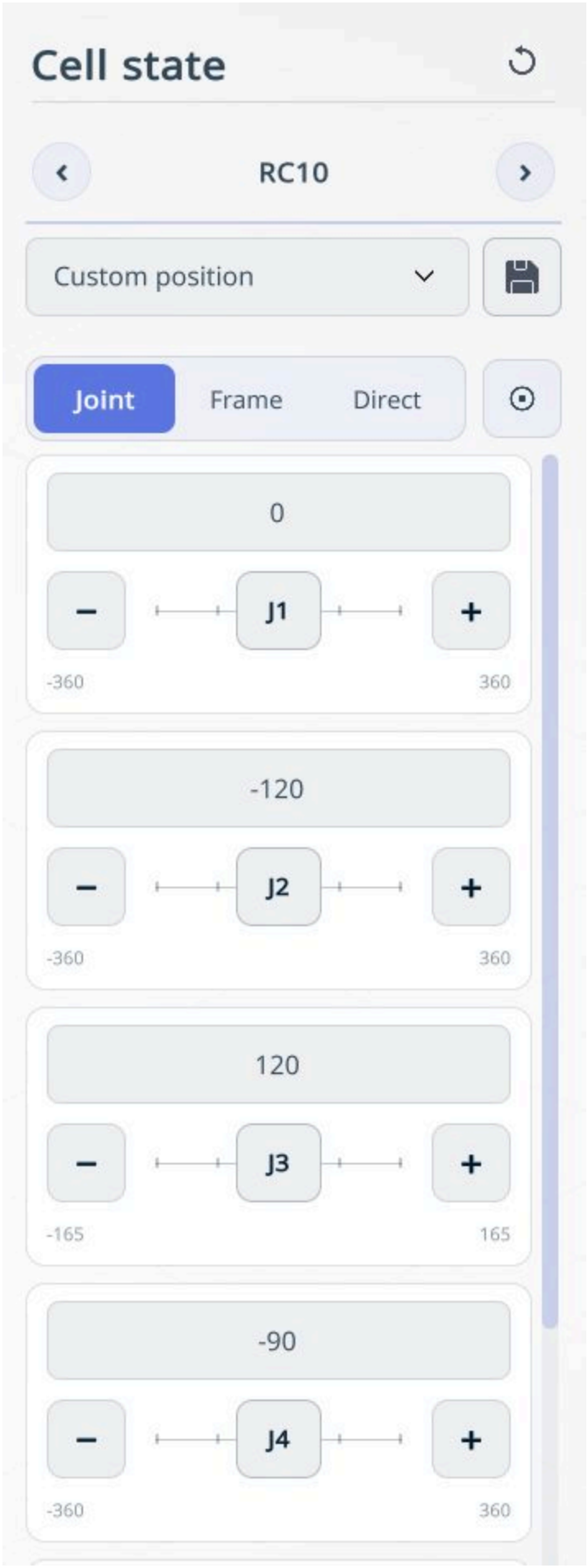
2. Save the CAM project and configure the application path. Save the project in the CAM system. In ENCY Hyper, open Project settings > Main > CAM integration. In Path to the CAM application, specify the path to your CAM application shortcut and click Apply.



3. Import the trajectory. In Programming Mode, create a Trajectory operation and select the saved CAM project in the file browser. ENCY Hyper launches the CAM system and retrieves the trajectory from the operation you created. The imported trajectory then appears in ENCY Hyper, as shown below.



The navigation for robot movement in space


Cell state
RC10
Custom position
Joint
Frame
Direct
0
J1
-360
360
-120
J2
-360
360
120
J3
-165
165
-90
J4
-360
360

Application Area:

Allows moving the robot in space in various ways.

Joint Mode.

Allows moving the robot by controlling individual axes.

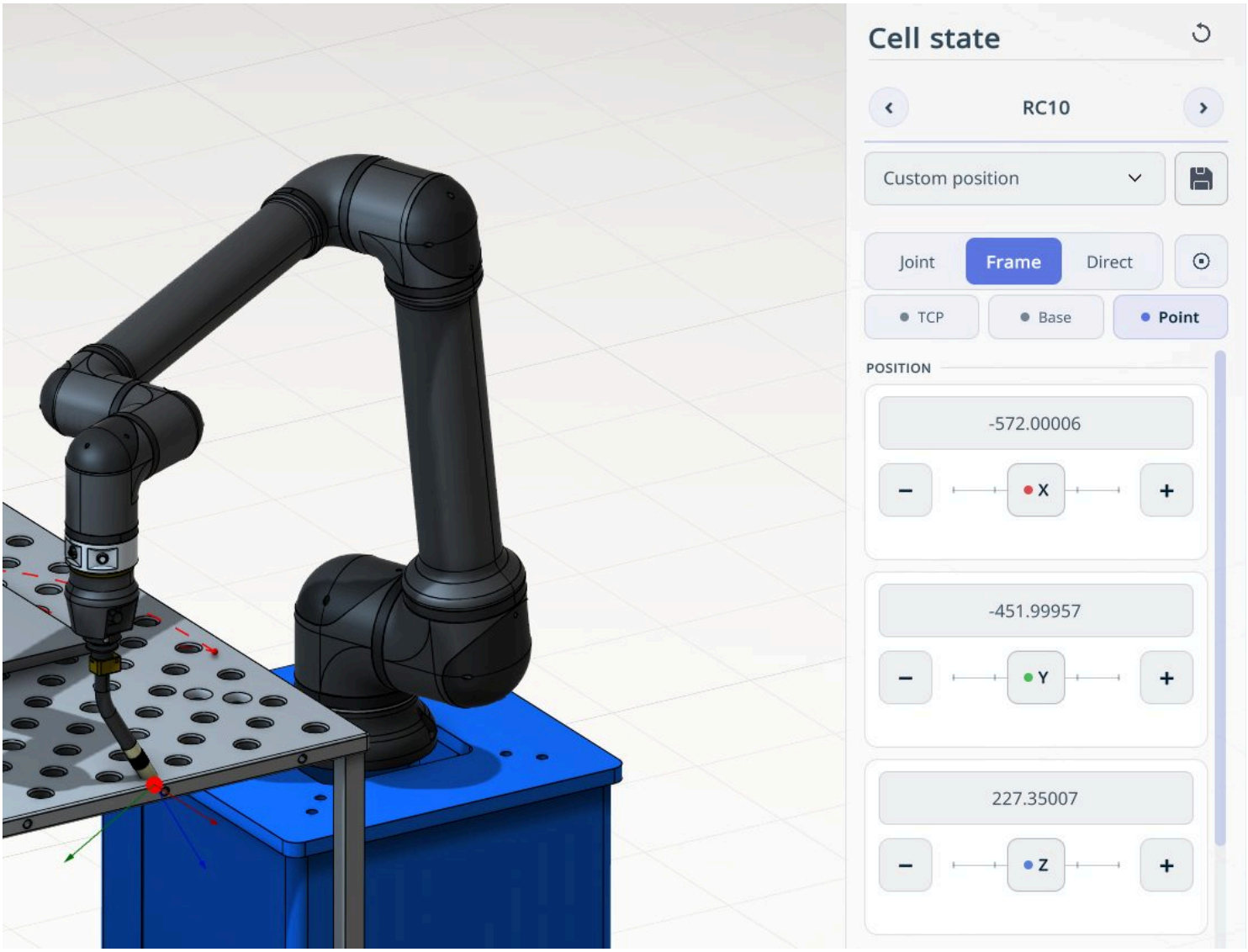
Frame.

Frame mode provides three submodes for positioning the robot: TCP, Base, and Point.

TCP. Moves the robot relative to the Tool Center Point (TCP) coordinate system.

Base. Moves the robot relative to the robot base coordinate system.

Point. Moves the robot to a point selected in the graphics window. Click a point within the robot's reachable workspace to move the robot to that point.



Direct Mode.

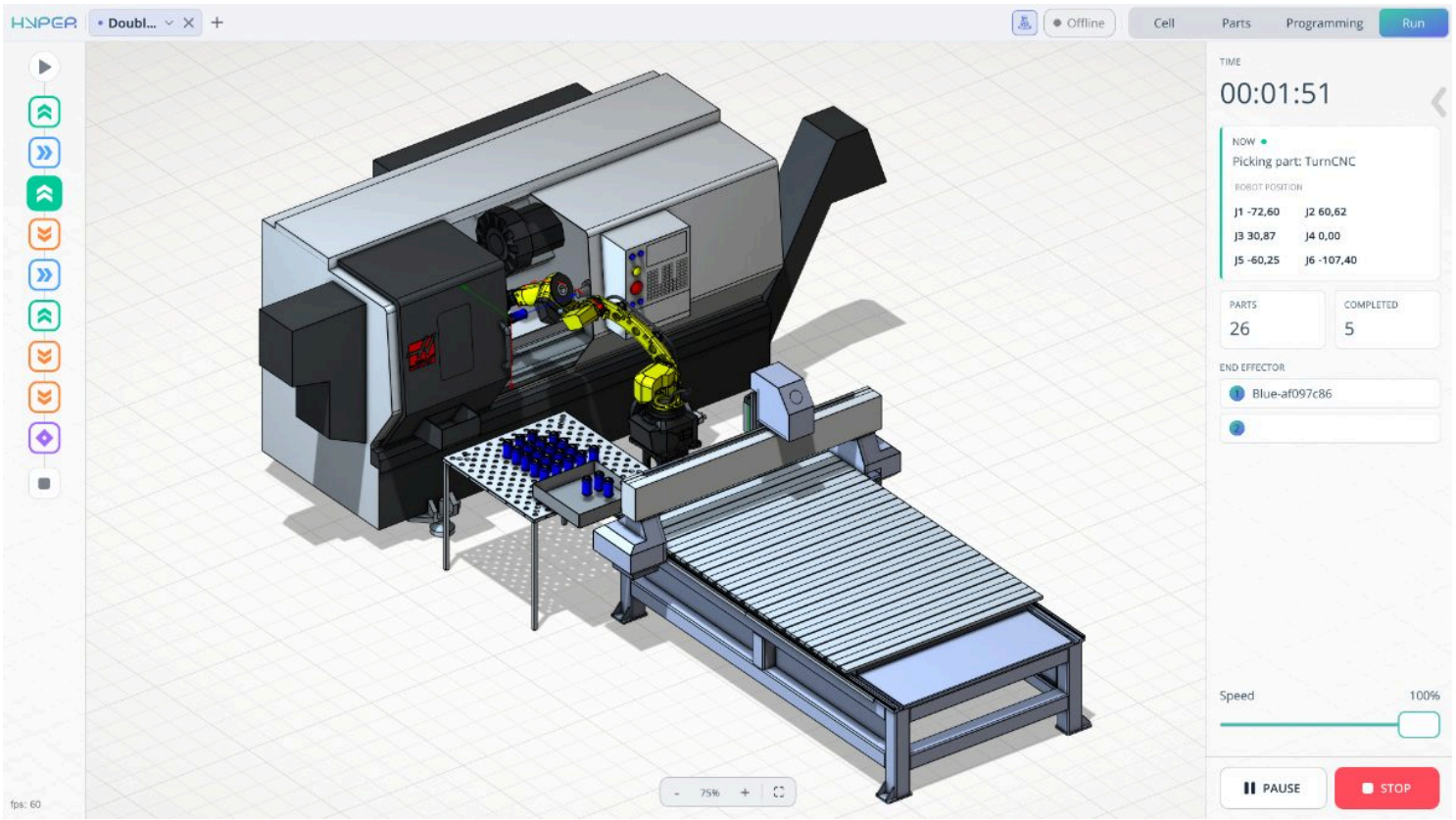
Operates only when the robot is connected in real-time mode. The robot can be moved either via remote control or manually.

Precision mode

Can be enabled for all operating modes. This reduces the movement step to prevent the robot from colliding with obstacles. 

The movement step is set at the bottom as a slider.

Run Mode



Application Area:

The Run tab is responsible for launching the already generated robot program.

Time. Indicates the total execution time of the program.

Information window. Displays what is currently being executed in your program.

Parts information window. This window displays information about the number of parts and how many of them have been processed.

Speed slider. When starting the program using the large Start button, the speed must be adjusted using this slider. It affects the movement speed of the mechanisms.

The Start, End, and other icons at the bottom indicate which command is currently being executed when the program is running.

Program control buttons.

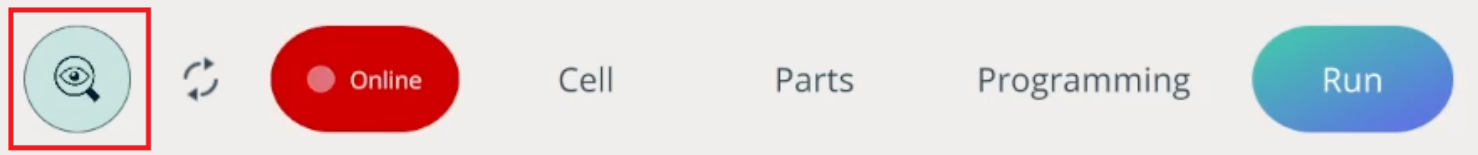
Start. Launches the program you created on the Programming tab.

Pause. Pauses the program.

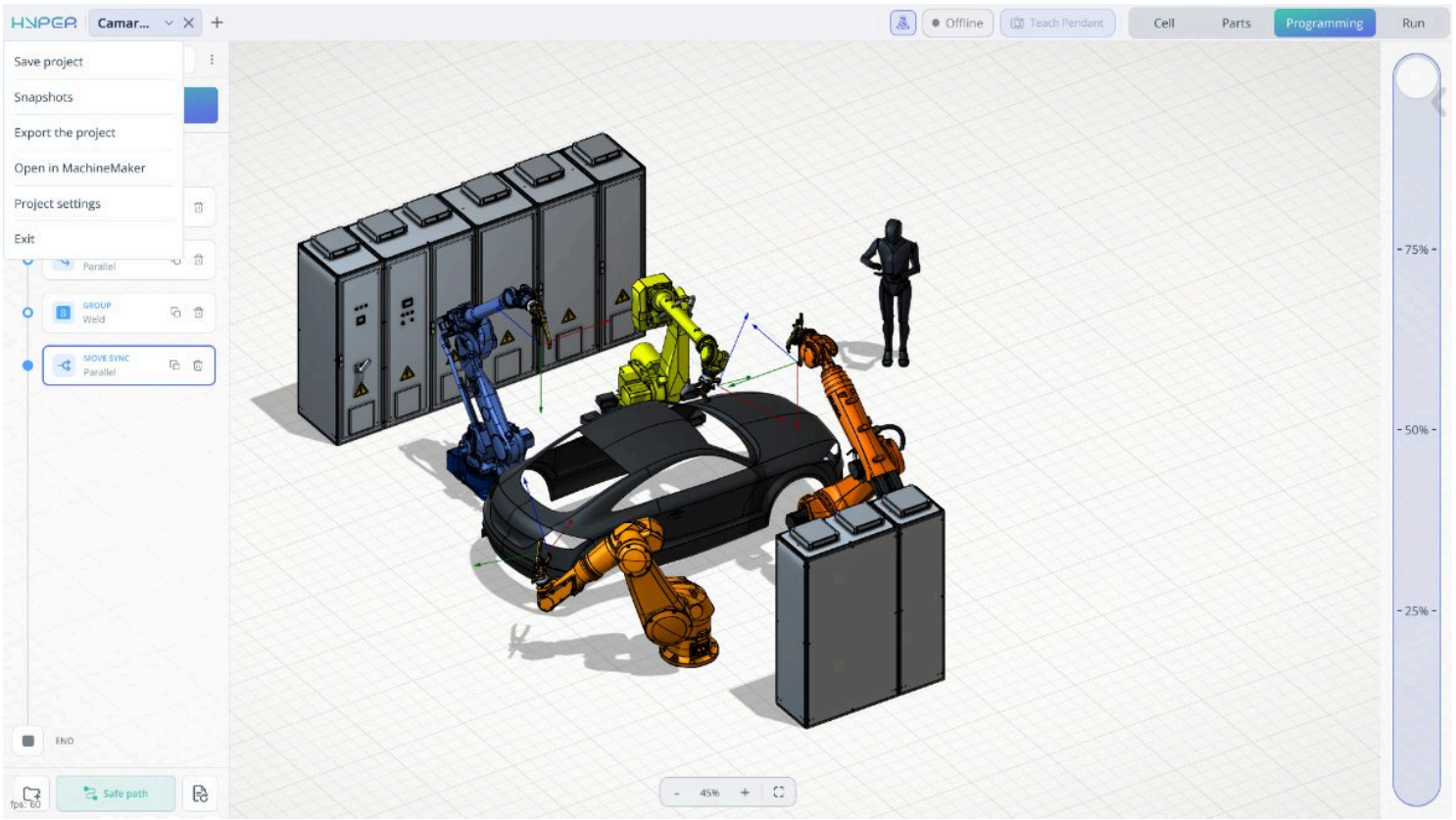
Resume. Resumes the program.

Stop. Completely stops the program and resets it to the initial position.

Monitoring mode. This mode hides interface elements and allows you to manually adjust the robot and see the changes on your screen. It is enabled when you are already connected to your robot and online.



Main menu



Application Area

The main menu provides commands for saving and restoring the current project, transferring it to another computer, editing the robotic cell in MachineMaker, and configuring project settings.

Save project. Saves the changes made to the current project so that you can retain your work and continue from the saved state later.

Snapshots. Allows you to restore the project to a previously captured state. Use a snapshot to recover an earlier project state after a failure.

Export the project. Exports the current project as a .zip archive. You can transfer the archive to another computer and import the project into ENCY Hyper to continue working on it.

Open in MachineMaker. Opens the current project in MachineMaker, where you can extend the robotic cell by adding objects, robots, and other mechanisms.

Project settings. Opens the settings associated with the current project, allowing you to configure its parameters.

Exit. Closes the application.

Project settings

Main

These settings configure programming, robot connections, motion, simulation, part handling, and integration services for the current project.

Programming

Open Project settings > Main > Programming to configure collision avoidance, tray processing, calculation time limits, and inverse kinematics for the current project.

Avoid collisions calculation request timeout (ms). Sets the time limit for waiting for a response to a collision-avoidance calculation request. Increase this limit if a valid request requires more time to complete. This setting controls the request timeout; the calculation itself has a separate timeout below.

Stack trays strategy. Selects the strategy used to process trays containing stacked parts. The selected strategy determines the processing order for the stacks and their levels. Use this setting to match the handling sequence to the arrangement of parts in the tray. Available options:

- Stacks. Processes one stack completely before moving to the next stack.
- Levels. Processes one level across all stacks before moving to the next level.

Place the part in the same location in the process tray mode. Controls where a part is returned when processing a tray. When enabled, the part is returned to the location from which it was picked. When disabled, the part may be returned to a different location in the tray.

Avoid collisions calculation timeout (ms). Sets the time limit for calculating a path with collision avoidance. A longer timeout allows more time to solve complex movements around obstacles. Increasing the timeout does not guarantee that a collision-free path exists or can be found.

Avoid collisions safe distance. Specifies the clearance used when calculating a collision-avoidance path. A larger value requests more separation between the moving robot or tool and surrounding geometry, but can restrict the available paths in confined areas. This parameter affects path calculation, not the robot's programmed movement speed.

Program interpretation timeout (ms). Sets the time limit for interpreting the program commands as part of program preparation. Increase this value if a valid, complex program requires more time for interpretation. This setting applies to interpretation, rather than to the duration of physical robot execution.

Program calculation timeout (ms). Sets the time limit for program calculation, including the calculation of the robot movements defined by the commands. Increase it when a valid program cannot finish calculating within the current limit. This setting does not specify how long the robot is allowed to run the program.

Additional verification of the inverse kinematics solution. Enables additional checks of calculated inverse kinematics (IK) solutions. An IK solution defines the joint positions required to achieve a requested tool

position and orientation. Additional verification checks the calculated solution and may increase calculation time.

Robot joints flip mode (A1, A3, A5). Selects how the inverse kinematics calculation handles alternative robot configurations associated with joints A1, A3, and A5. Different joint configurations can achieve the same tool position and orientation. This setting governs configuration selection during calculation. Available options: Explicit, geometrichint, and proximitysearch.

Cache calculated IK solutions to reduce computation time. Stores calculated inverse kinematics solutions for reuse when the same calculation is needed again. This can reduce calculation time for repeated positions or movements by avoiding redundant IK calculations.

Robot driver settings

Configures communication between ENCY Hyper and the robot controller. Select a robot in the project to configure its connection, control driver, network address, and driver-specific parameters.

Extension settings

Configures the dedicated scanner used to inspect the working area and detect parts. These settings support scanner-based functions such as determining how many parts are present in the working area.

Motion path configuration

Configures robot motion speed for simulation and the representation of linear and circular movements.

Robot general speed multiplier. Scales the robot motion speed used in the application. Use it to adjust how quickly the robot moves during simulation.

Linear robot motion accuracy (mm). Sets the accuracy used to represent linear robot movements.

Arc robot motion accuracy (degree). Sets the angular accuracy used to represent circular robot movements.

Speed settings during runtime. Groups the motion speed settings used across the application's operating workflows.

Simulation

Controls playback behavior and the visualization of the simulated cell.

Robot motion simulation speed multiplier. Scales the playback speed of simulated robot movements. A value of 1 uses the nominal simulation speed; larger values speed up playback, and smaller positive values slow it down.

Collision detection. Enables collision checking during simulation using the collision geometry available in the project. Use it to identify interference between components while reviewing the simulated motion.

Welding simulation. Enables the simulation of the welding process when welding operations are played back.

Welding contact tolerance (mm). Sets the distance tolerance used to determine contact between the welding tool and the workpiece during welding simulation. A larger value allows a greater separation to be treated as contact.

Gluing simulation. Enables the simulation of adhesive application when gluing operations are played back.

Polishing simulation. Enables the simulation of the polishing process when polishing operations are played back.

Fastening simulation. Enables the simulation of the fastening process when fastening operations are played back.

Fastening contact tolerance (mm). Sets the distance tolerance used to determine contact during fastening simulation. A larger value allows a greater separation between the tool and the workpiece to be treated as contact.

Trajectory visualization. Selects the level of detail used to display the robot trajectory. Use this setting to balance visual detail and rendering performance.

Maximum number of rendered path elements. Limits the number of trajectory elements drawn in the graphics window. A lower limit reduces the amount of path geometry displayed; a higher limit allows more elements to be shown.

Step for drawing the robots work area. Sets the spacing used to draw the robot's work area. A smaller step produces a denser representation; a larger step produces a coarser representation.

Speeds and accelerations by mechanism. Opens a subpage containing simulation speed and acceleration settings organized by mechanism.

Optimal robot position when picking up a part

Configures the selection of the robot pose used to pick up a part.

TCP CS maximum rotation along the Z-axis. Limits the rotation of the Tool Center Point coordinate system about its Z-axis when determining the picking pose. This controls how much the tool orientation may be adjusted around that axis.

Avoiding joint creases. Opens a subpage with settings for avoiding excessive joint twisting when selecting the picking pose.

Optimal robot position during part release

Configures the selection of the robot pose used to place and release a part.

TCP CS maximum rotation along the Z-axis. Limits the rotation of the Tool Center Point coordinate system about its Z-axis when determining the placement pose. This controls how much the tool orientation may be adjusted around that axis.

Avoiding joint creases. Opens a subpage with settings for avoiding excessive joint twisting when selecting the placement pose.

AI

Configures part detection and recognition using a webcam or manually selected images.

Part detector enabled. Enables part recognition and makes the Placed Part Detection window available on the Parts tab. Connect a webcam to recognize the parts in the working area.

WebCam device index number. Selects the webcam used for image capture by its device index. Use this parameter to choose the required camera when multiple webcams are connected.

Delay before capturing a photo from a webcam. Sets the waiting period before the webcam captures an image for recognition.

Manual selection of images for recognition. Allows you to select existing images manually for part recognition.

CAM Integration

Stores the file paths required for integration with the CAM system. These paths can be configured manually.

Server

Contains the IP address and port settings required for communication between the robot driver and ENCY Hyper.

End effector parameters

Configures the operating parameters of the tools mounted on the robots in the current project. A project can contain multiple robots, each equipped with a different tool. This section allows you to configure each tool individually.

For grippers, these parameters define how the jaws open and close. Use them to match the tool configuration to the installed end effector and the parts it handles. The available parameters depend on the tool.

IO

Configures the input and output signals used to control end effectors and other equipment in the robotic cell. These settings support tool operation as well as communication with machines and peripheral devices.

Outputs can trigger actions such as opening or closing gripper jaws or machine doors. Inputs can provide feedback about equipment status, allowing the program to coordinate robot movements with external operations.

For example, configure an output signal to open or close a machine door automatically, then use the configured action in an IO command in the robot program. An input signal can be used to check the door status before the next operation. Signal assignments and values must match the connected equipment.