ToolBase UR programming.

Quick start manual

Rename I/O

There are two quick couplings on the tool base. One coupling has a black colored bayonet, the other is light colored (white).

The UR robot TOOL I/O has 2 digital outputs and 2 digital inputs.

The ToolBase uses 1 input and 1 output to control tool.

It is recommended to name TOOL I/O according bayonet colors.

Rename tool_out[0]	to	oWhite
Rename tool_out[1]	to	oBlack
Rename tool_in[0]	to	iWhite
Rename tool_in[1]	to	iBlack

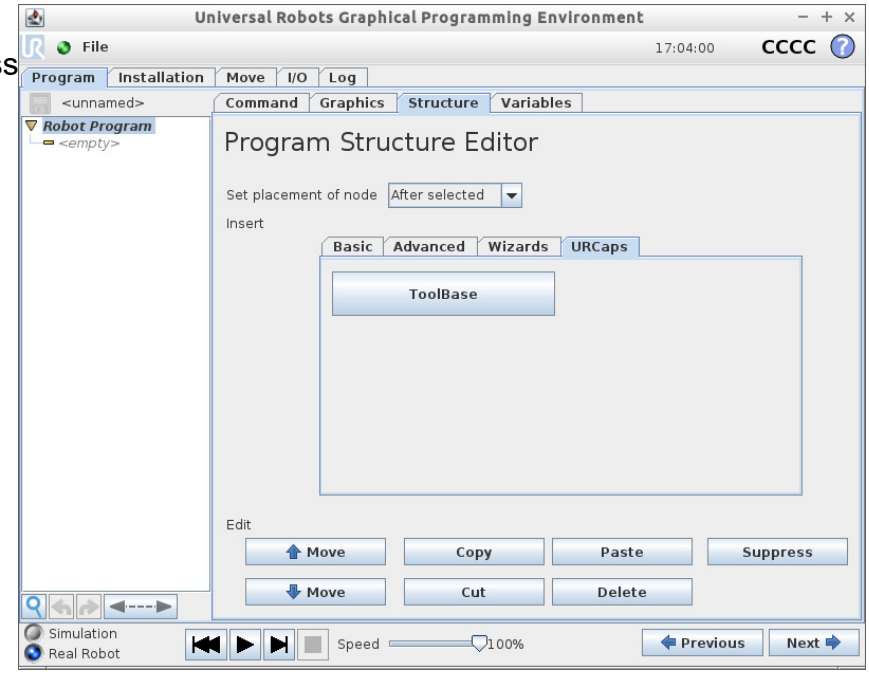
Set tool voltage to 24V

URcap

From robot SW Version 3.3 an URcap can be installed to activate the ToolBase in polyscope however it is not recommended as the ToolBase use of IO is generic simple (see renaming of IO)

Download latest version of ToolBase Urcap from www.setuprobotics.com (direct link at toolbase product page) and install into polyscope.

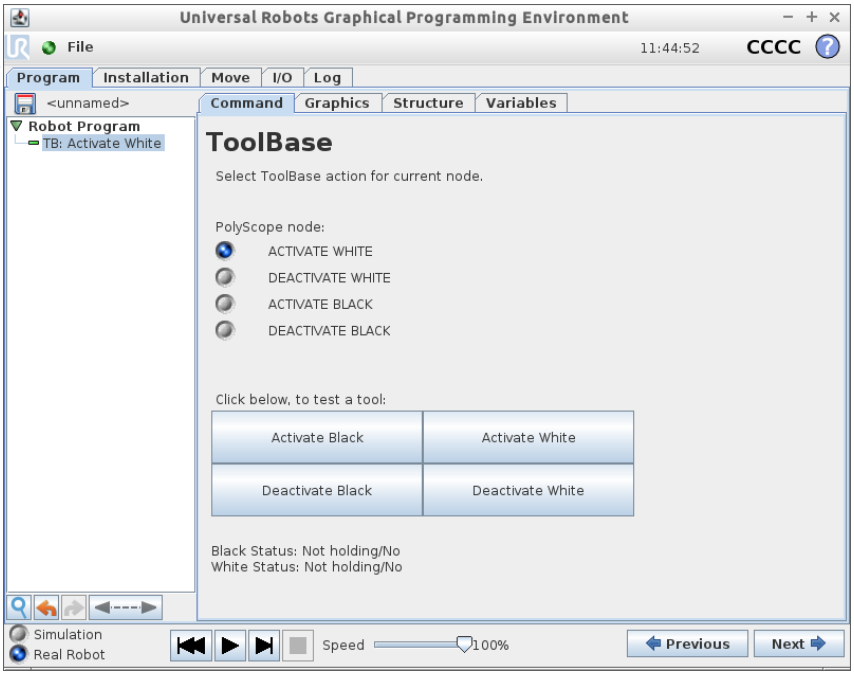
To make a program node press the “ToolBase” button at the URCaps tab.



Select a radio buttons to select activation / deactivation of white or black tool coupling.

4 push buttons provides access for easy testing of connected tools.

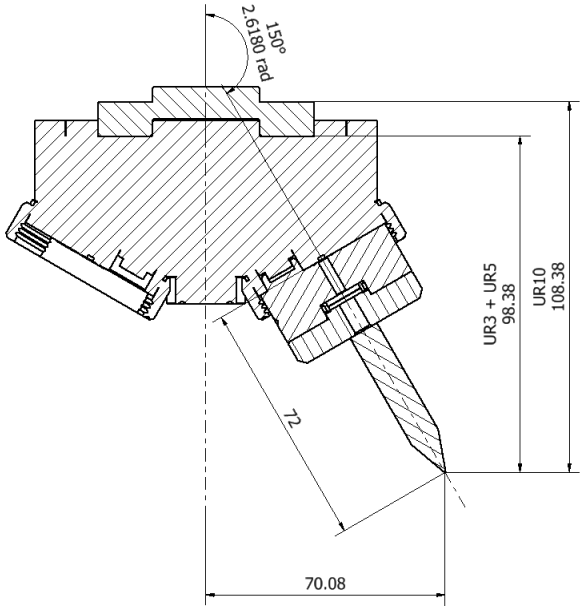
Tool status can be read below buttons.

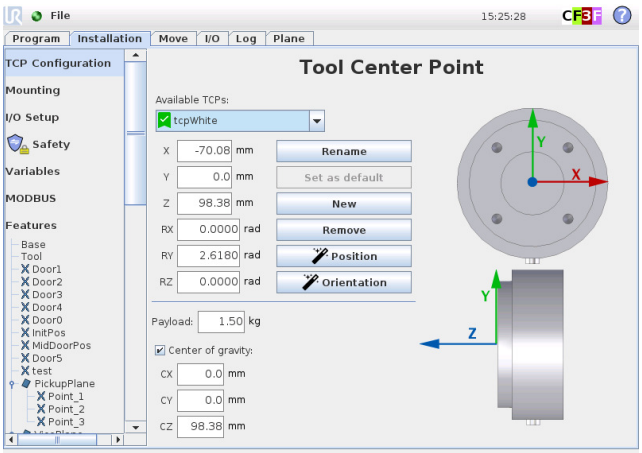


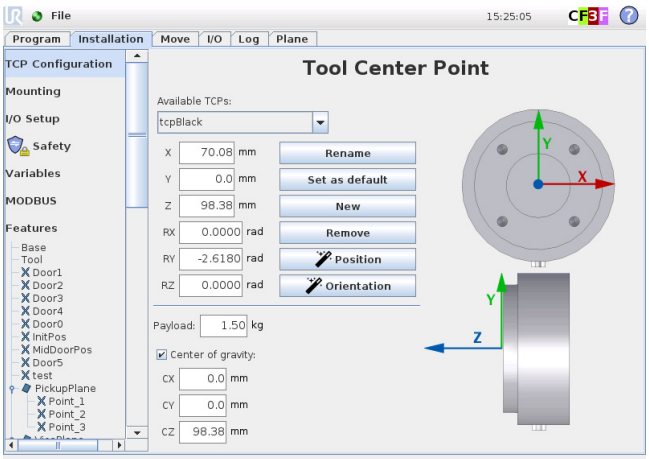
UR programming.

Programming the robot can be done in many ways. Here an examples on how to position tools mounted in ToolBase to positions in a cartesian coordinate system.

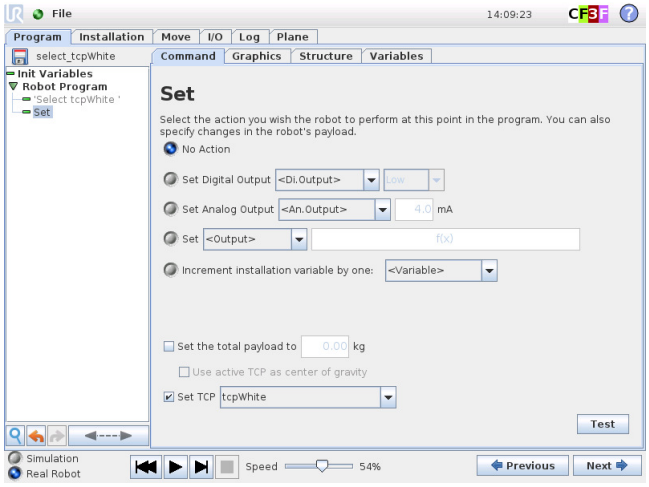
First define TCP's for the digitizer in the white and black tool position. Name them tcpWhite and tcpBlack.





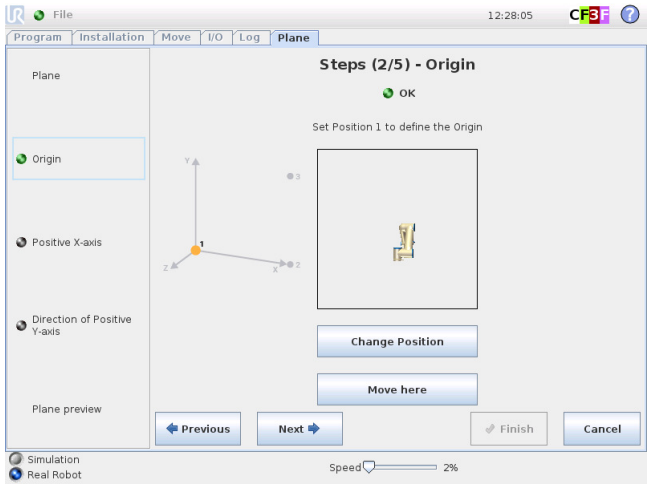


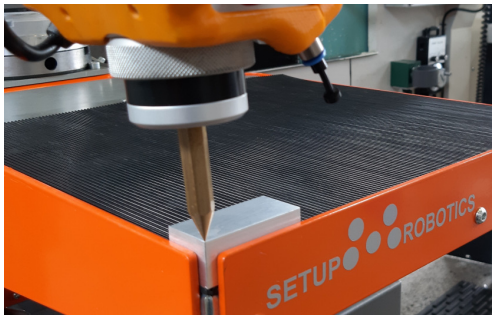
Make a program selecting tcpWhite and run it. (the default selection is not always working)



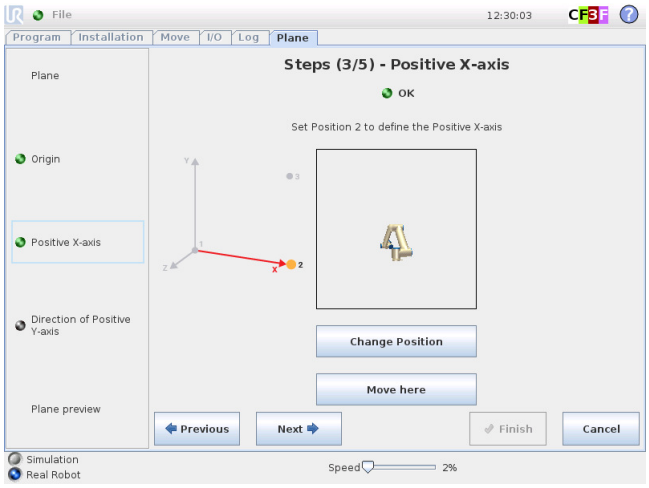
Create feature plane using the digitizer tool. A feature is a coordinate system where the robot can position XYZ and angles. As it is not easy to position the digitizer tip inside many real features a small block is placed at the the desired point to be measured. As demo is used the SetupRobotics Robot stand table RM-TB.

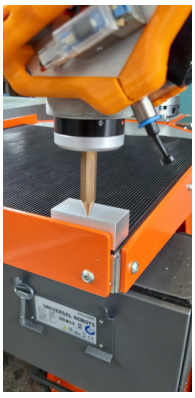
Origon:



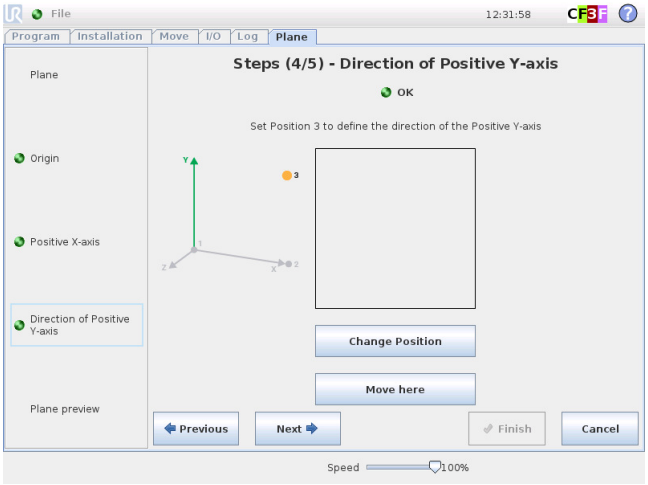


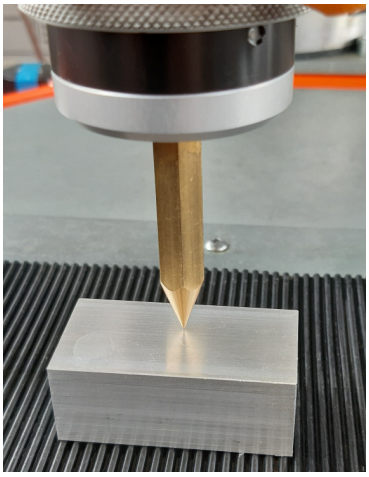
X-axis:



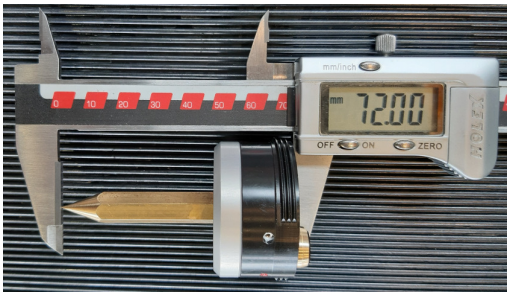


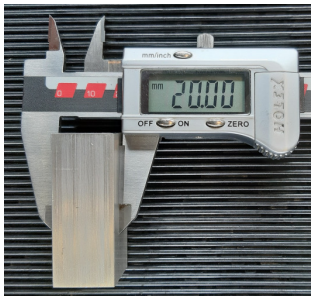
Plane:

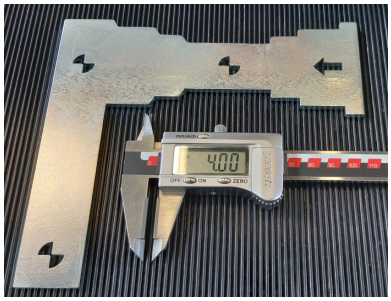


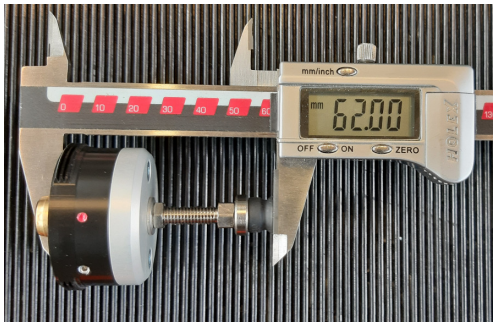


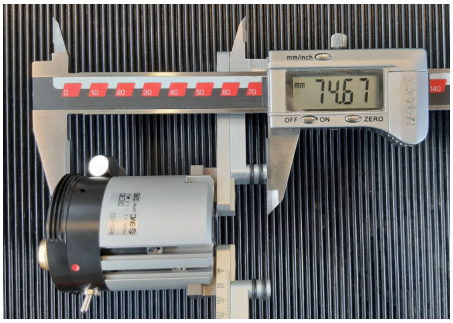
Create variables holding the lengths of: digitizer, block (used when digitizing) length of tools etc. The LANG laser cut digitizer plater is for center digitizing of LANG vices.







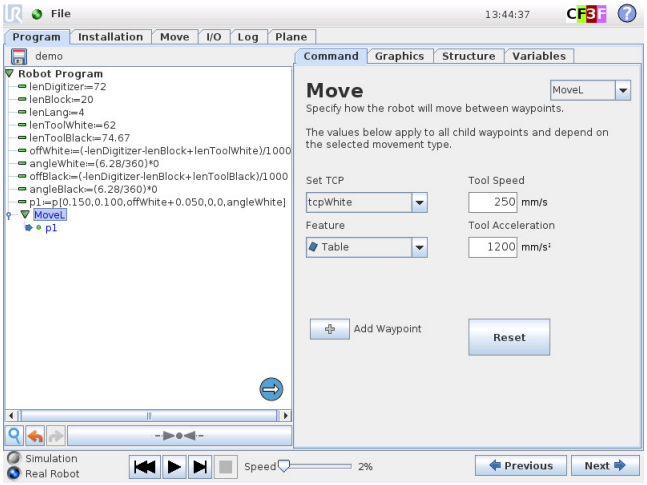


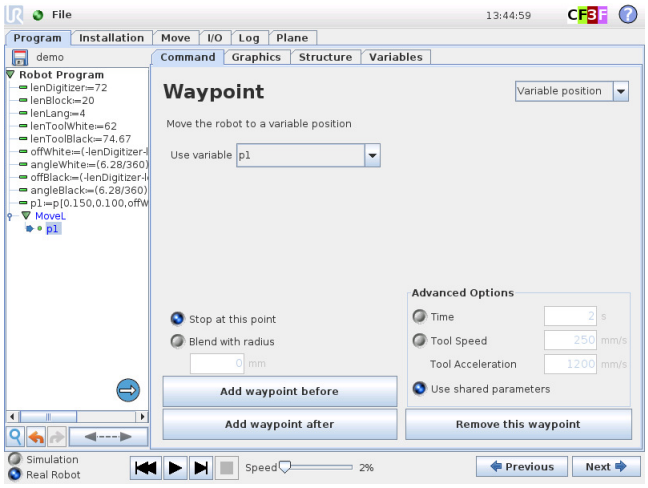


Calculate offset as -lenDigitize-lenBlock+lenTool. Calculate angle as (2 x π / 360) x angle.

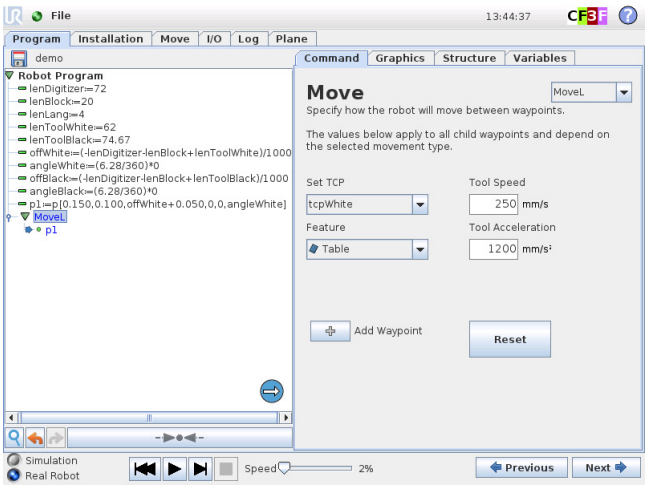
Now it is possible to position the tools mounted in the ToolBase robot in respect to the defined features. Assign desired position to a variable. Below p1 parameters (meter, radian). Select p1 in the dropdown dialog for a moveL or moveP command.

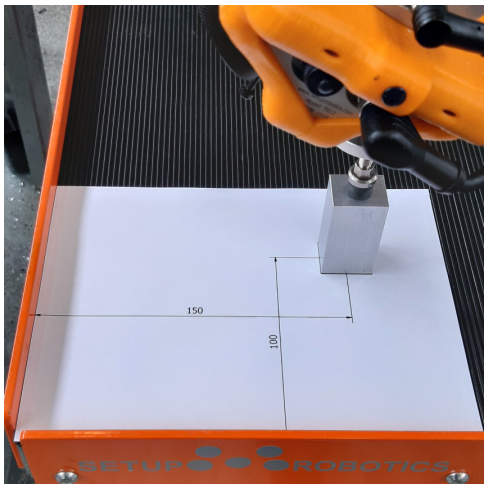
Move white tool to p1 on feature Table:


File
13:44:37
Program
Installation
Move
I/O
Log
Plane
demo
Robot Program
lenDigitizer=72
lenBlock=20
lenLang=4
lenToolWhite=62
lenToolBlack=74.67
offWhite=(-lenDigitizer-lenBlock+lenToolWhite)/1000
angleWhite=(6.28/360)*0
offBlack=(-lenDigitizer-lenBlock+lenToolBlack)/1000
angleBlack=(6.28/360)*0
p1=p[0.150,0.100,offWhite+0.050,0.0,angleWhite]
MoveL
p1
Command
Graphics
Structure
Variables
Move
MoveL
Specify how the robot will move between waypoints.
The values below apply to all child waypoints and depend on the selected movement type.
Set TCP
tcpWhite
Tool Speed
250
mm/s
Feature
Table
Tool Acceleration
1200
mm/s²
Add Waypoint
Reset
Simulation
Real Robot
Speed
2%
Previous
Next

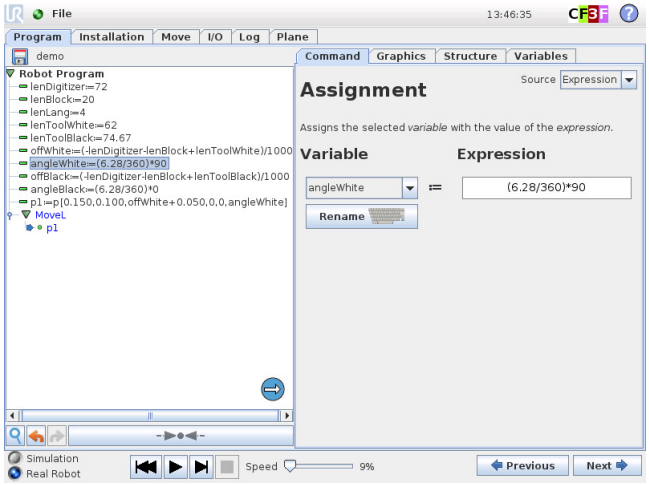

File
13:44:59
Program
Installation
Move
I/O
Log
Plane
demo
Robot Program
lenDigitizer=72
lenBlock=20
lenLang=4
lenToolWhite=62
lenToolBlack=74.67
MoveL
p1
Command
Graphics
Structure
Variables
Waypoint
Variable position
Move the robot to a variable position
Use variable
p1
Advanced Options
Stop at this point
Blend with radius
Time
Tool Speed
250
mm/s
Tool Acceleration
1200
mm/s
Use shared parameters
Add waypoint before
Add waypoint after
Remove this waypoint
Simulation
Real Robot
Speed
2%
Previous
Next

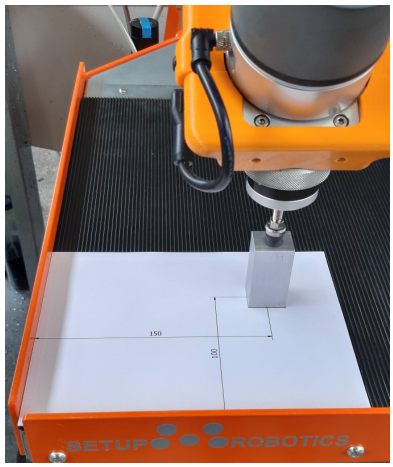
White tool, X150 Y100 Z50 A0:



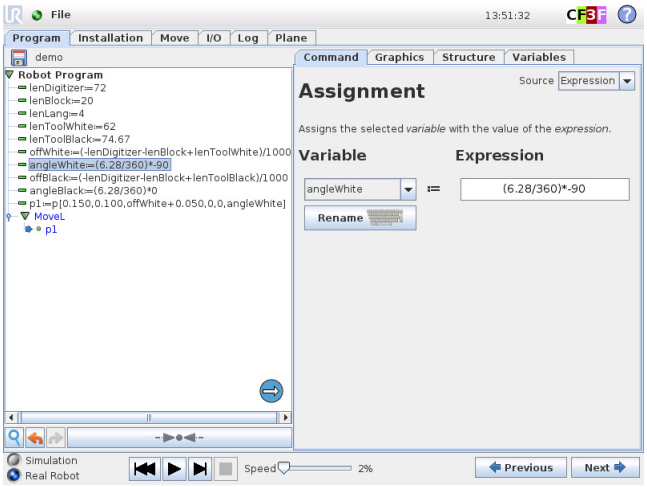


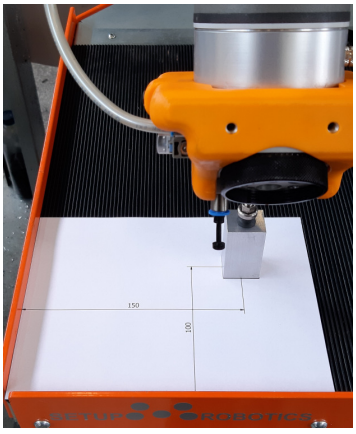
White tool, X150 Y100 Z50 A90:



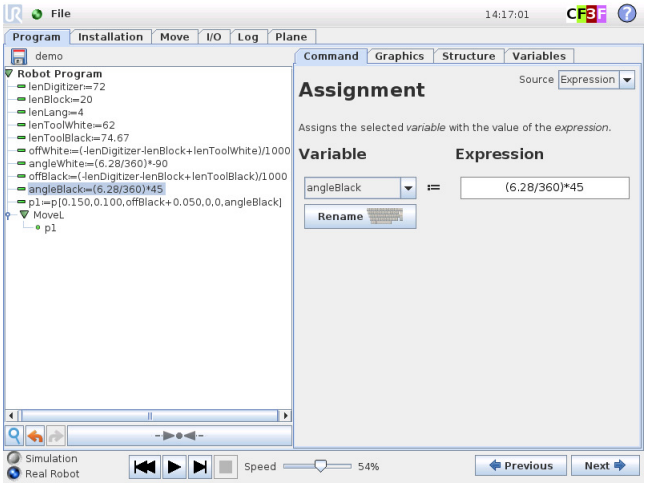


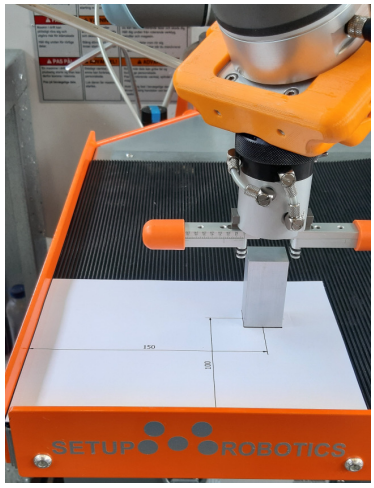
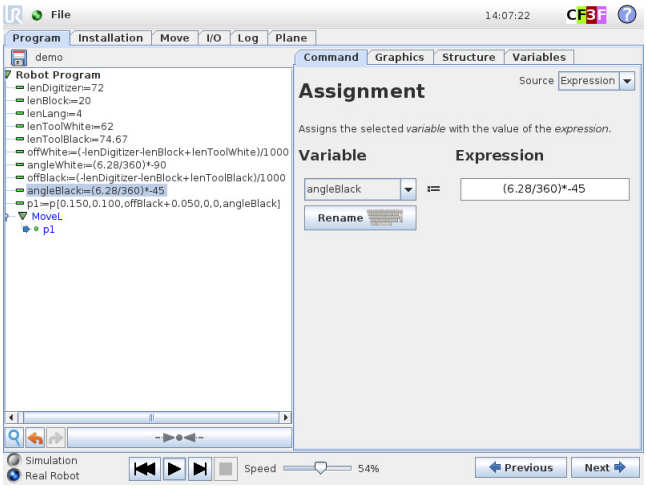
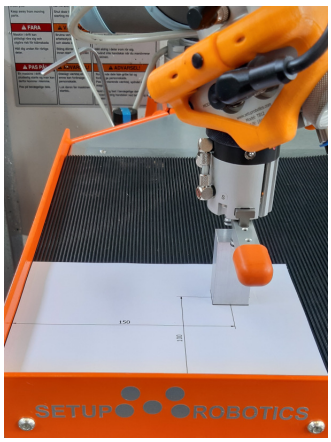
White tool, X150 Y100 Z50 A-90:





Black tool, X150 Y100 Z50 A45:





Black tool, X150 Y100 Z50 A-45: