

BEST PRACTICES

- VISION + SCREWDRIVER + GRIPPER -

QUICKLINKS



[VIDEO](#)



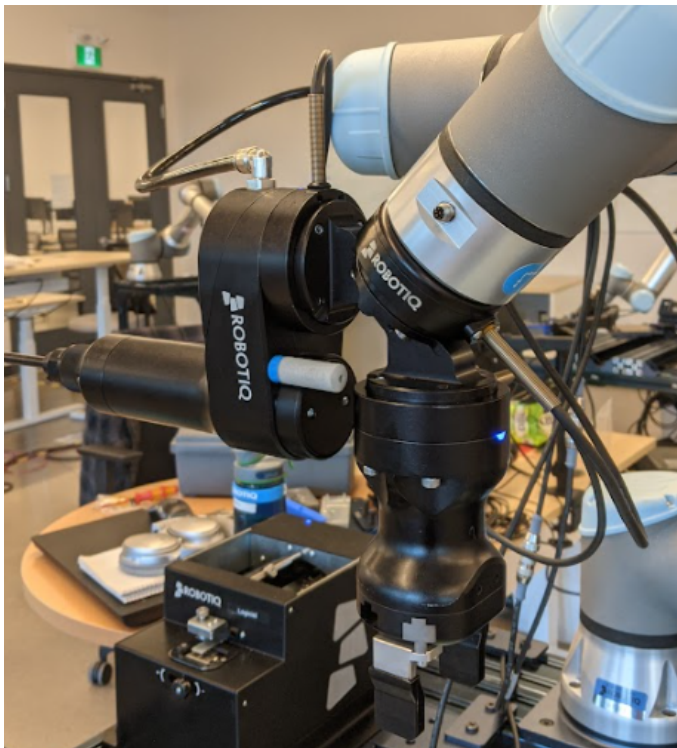
[PROGRAM](#)



[FOLDER](#)

Set-up of robot

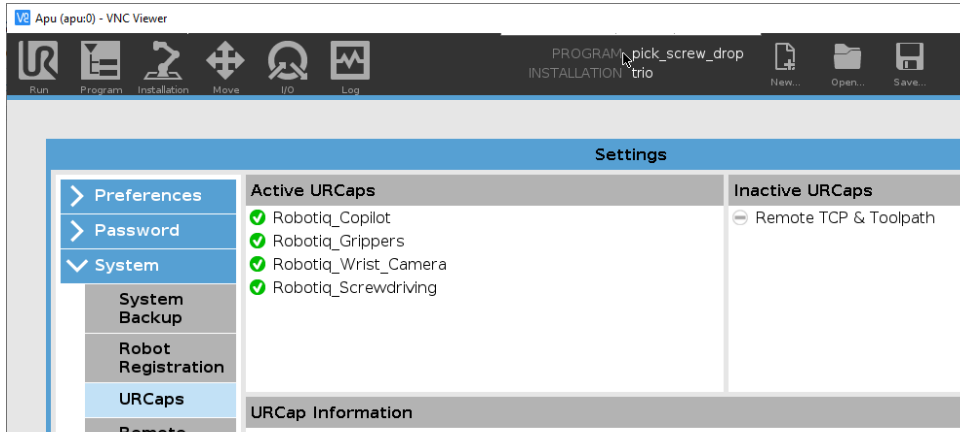
- Calibrate camera before adding anything else to the robot
- Use a coupling for the screwdriver and for the gripper
- The connection of the gripper through the wrist creates communication problems with the screwdriver



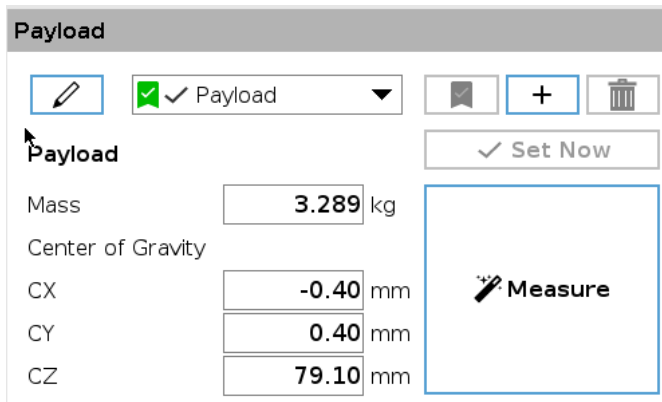
START PRODUCTION FASTER

Installation

- Remove all the unused URCaps to prevent controller reboot from overloading the RAM
- For this program, you need the four following URCaps:

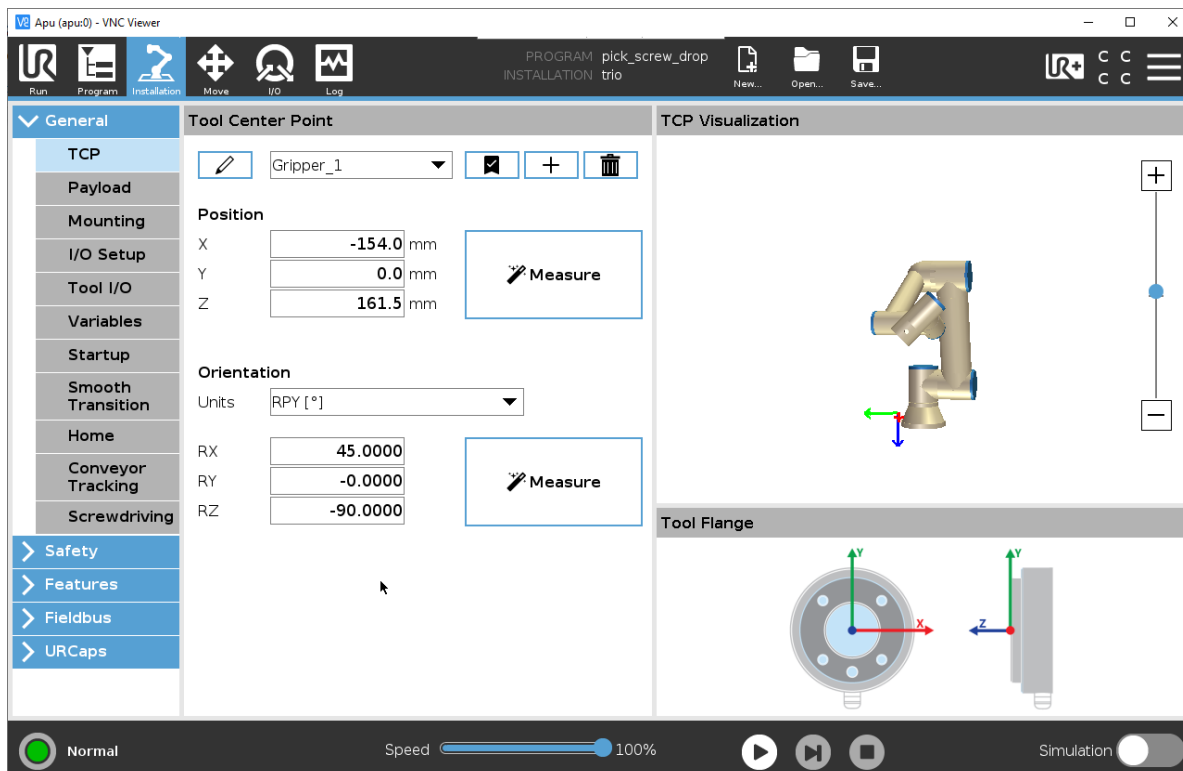
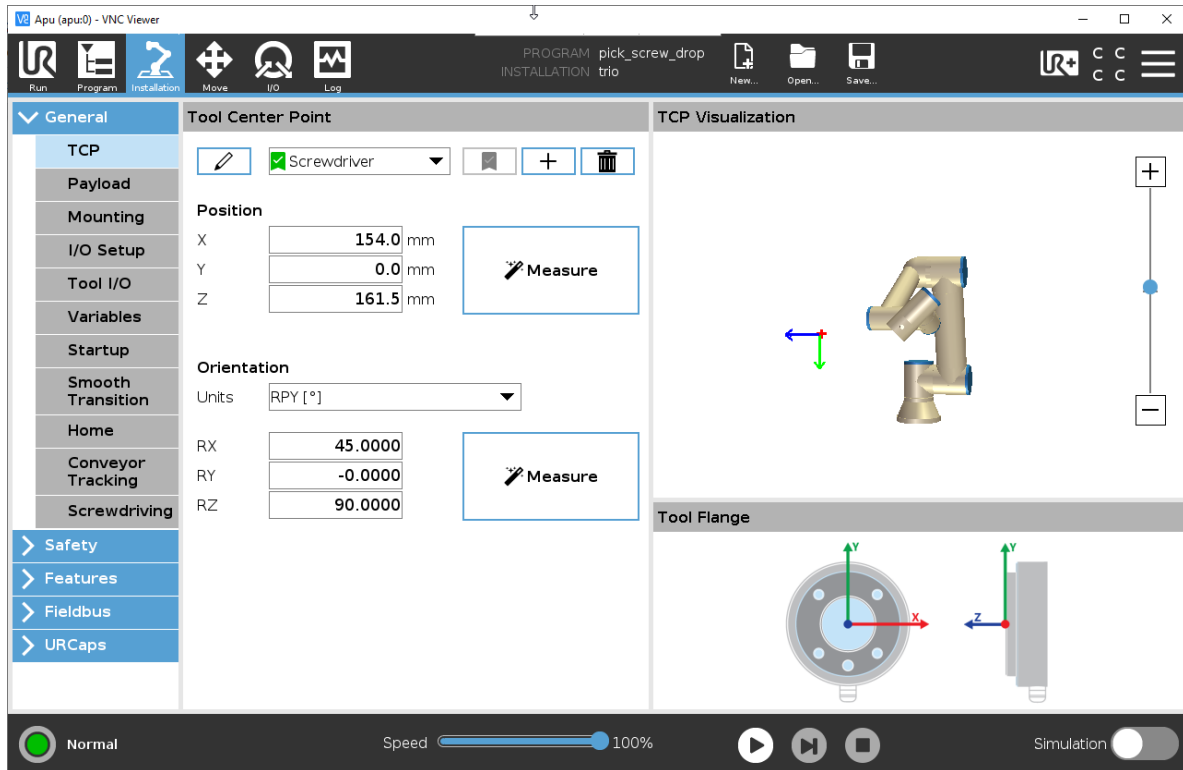


- The payload I used for camera + gripper + screwdriver + couplings + Y bracket. It's an approximation from the Y-bracket + 2x grippers payload. The exact number and center of gravity would have to be calculated for a proper application.



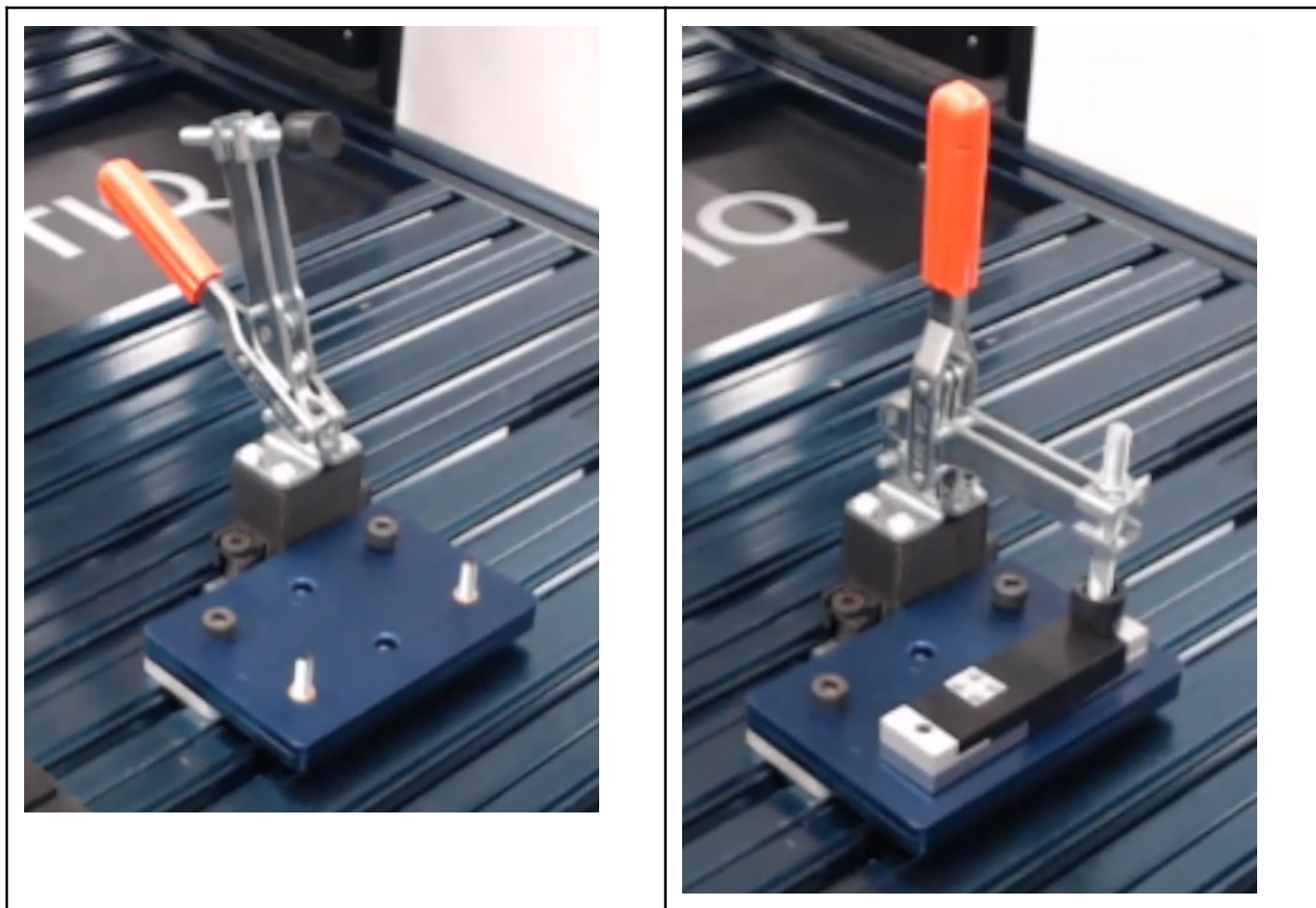
- I recommend having 2 TCP, one for the gripper and another one for the screwdriver.
- Set the Screwdriver as the TCP by default if you want the Screwdriving nodes to work properly.
- The screwdriving TCP is an approximation. The exact number would have to be calculated for a proper application.
- I would recommend using a 90° bracket instead of the Y-bracket because it allows you to take advantage of the reorient feature of the Active Drive. With the Y-bracket, in order to be perpendicular to your surface, you have to be comfortable changing the tool and the reference when moving the robot.

TCP for Y-bracket



Secure your part

- You should secure your part when screwing



- A manual press or a pneumatic gripper could be used

Set-up of program

- Remember to save your program frequently in case of controller reboot
- Be aware to set the right TCP for each Move node

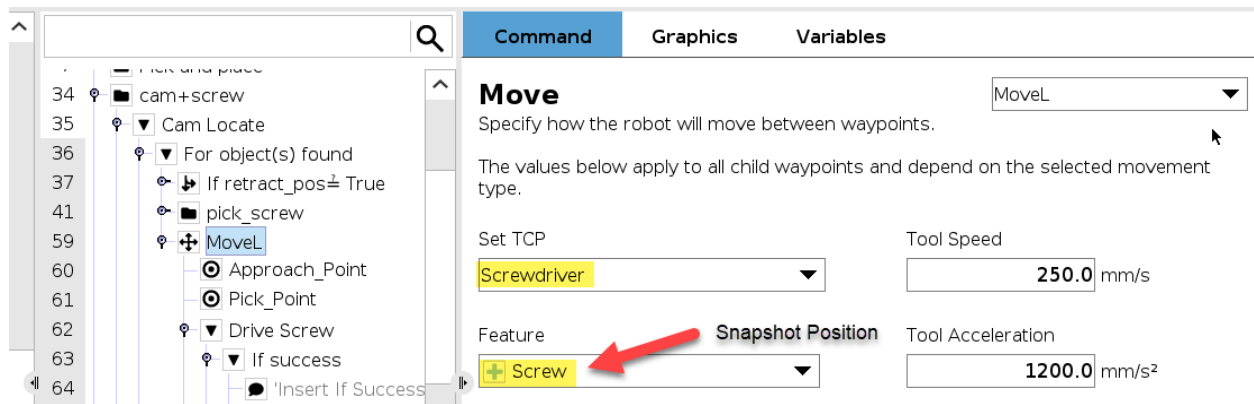
When using the gripper :

The screenshot shows the 'Command' tab in the software interface. On the left, a tree view lists the program steps: 1. Init Variables, 2. BeforeStart (containing 'rq_screw_activate()'), 4. Robot Program (containing 'MoveJ', 'app_jig', 'Pick and place', 'MoveL', 'app_pick', 'pick_pos', and 'Gripper Close (2)'). The 'MoveL' node is selected. The main panel displays the 'Move' command configuration. The movement type is set to 'MoveL'. The description states: 'Specify how the robot will move between waypoints. The values below apply to all child waypoints and depend on the selected movement type.' The 'Set TCP' is configured to 'Gripper_1'. The 'Tool Speed' is set to '250.0 mm/s'. The 'Feature' is set to 'Base'. The 'Tool Acceleration' is set to '1200.0 mm/s²'.

When picking a screw

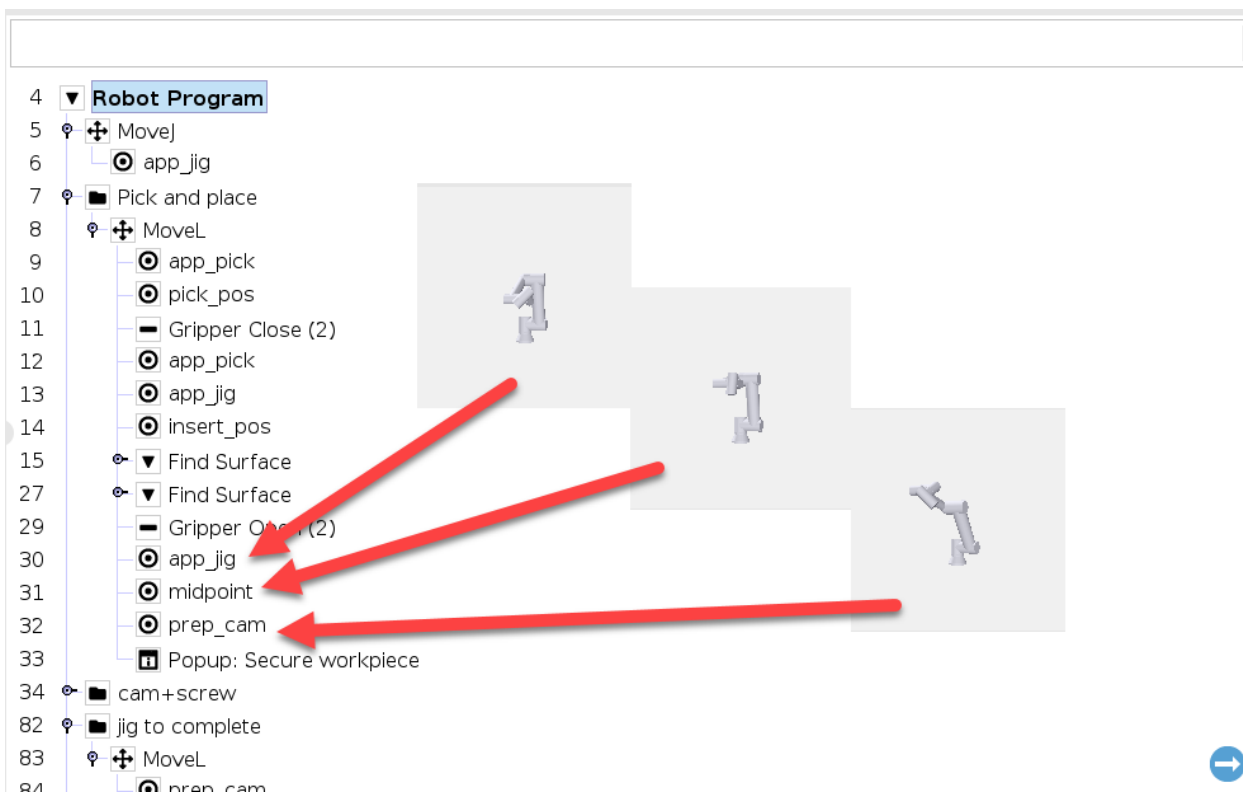
The screenshot shows the 'Command' tab in the software interface. On the left, a tree view lists the program steps: 34. Pick and place (containing 'cam+screw'), 35. Cam Locate (containing 'For object(s) found'), 37. If retract_pos = True (containing 'MoveJ' and 'retract'), 39. retract_pos = False (containing 'pick_screw'), 42. pick_screw (containing 'MoveJ', 'app_feeder', 'Pick Screw', and 'app_feeder'). The 'MoveJ' node under 'pick_screw' is selected. The main panel displays the 'Move' command configuration. The movement type is set to 'MoveJ'. The description states: 'Specify how the robot will move between waypoints. The values below apply to all child waypoints and depend on the selected movement type.' The 'Set TCP' is configured to 'Screwdriver'. The 'Joint Speed' is set to '60.0 °/s'. The 'Feature' is set to 'Base'. The 'Joint Acceleration' is set to '80.0 °/s²'.

When fastening into the detected hole



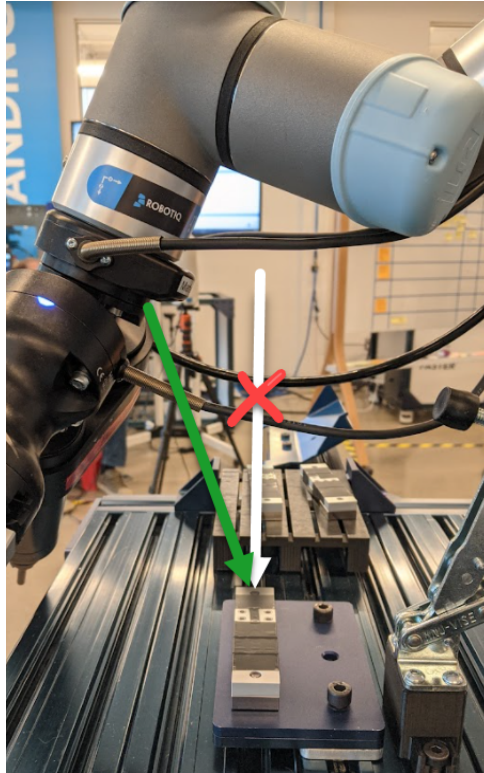
Transition between gripper and screwdriver

- To make sure the robot uses the right path to move from gripper to screwdriver, it's important to add an extra waypoint between the 2 positions



Camera

For optimal detection of holes, you want the camera to be positioned at an angle to create as much shadow in the holes as possible. That's what is going to create a good detection.



The key parameters to adjust to have the holes in shadow are :

Reducing the exposure

Increasing the LED intensity

Setting a manual focus

