11   Gecko Effectiveness on Different Materials

Stiffness	Roughness	Example of material / substrate	Preload - 140N Payload					Preload - 90N Payload					Preload - 40N Payload				
			100g	500g	1kg	2kg	4kg	100g	500g	1kg	2kg	4kg	100g	500g	1kg	2kg	4kg
1	1	Mylar															
5	1	Transparency sheet															
10	1	Polished mirror-like steel, solar panel															
1	5	Cling film, ziploc bags															
5	5	Glossy carboard (cereal box)															
10	5	Printed circuit board															
1	10	Laminating plastic / film															
5	10	Corrugated cardboard															
10	10	Sandblasted aluminum															

This matrix that shows the capability of the gecko gripper to pick up different materials with varying stiffness and roughness, at three different preload values (low 40N, medium 90N, high 140N). Green shading indicates that the gripper can pick up the material, yellow shading shows that the gripper can pick up the material in some cases (requires caution and testing to verify), and red shading indicates the gripper cannot pick up this type of material.

NOTE: This table is to be utilized as a guide to better understand the payload capacity and substrate type for the Gecko Gripper. The Gecko Gripper is best suited for smooth, low surface roughness substrates that are generally flat, stiff, and rigid. Testing and caution are highly recommended if attempting to pick up items in the yellow shading.

Refer to Section 7.4 of the User Manual for more information.

Gecko Gripper
# Quick Start Guide for Universal Robots

1   Mount Gripper
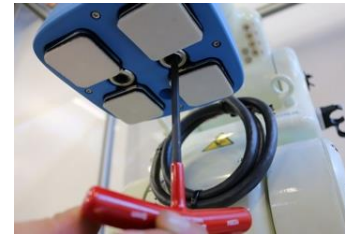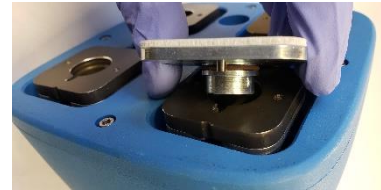
1. Insert the 4 Gecko pads by aligning the tab with the notch in the mounting plate.

2. Align two mounting holes between the gripper and robot. Insert the 2 mounting screws and tighten to 8 N-m with a 5mm hex key.

> **CAUTION: Do not touch the Gecko pads directly with fingers or skin grease. Take caution and/or use protective latex gloves when installing the Gecko pads.**
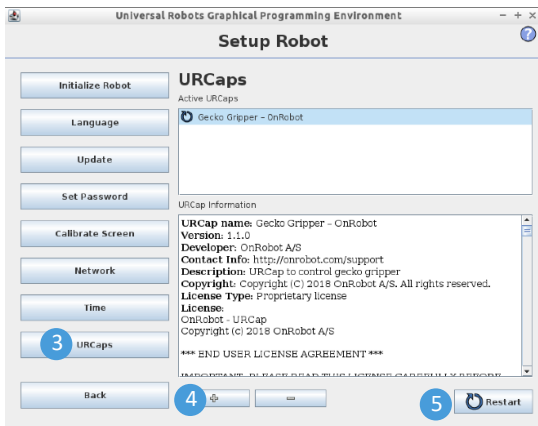
2   Connect Power and Comms
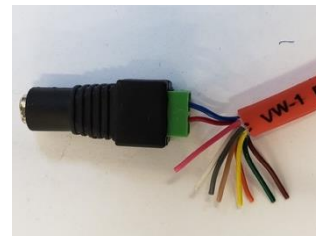
1. Plug in 10-pin power (24V via I/O cable) and connect 8-pin Ethernet cable.

2. If using Digital I/O communication, wire flying leads to appropriate ports. If using Ethernet communication (required for URCap), plug in cable to appropriate port.

3. Pin 10 of the IO cable is Earth Ground – this must be properly grounded to ensure proper operation and EMI protection
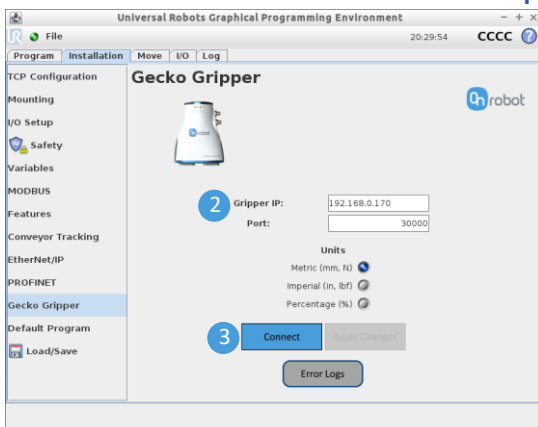
3   Install Software
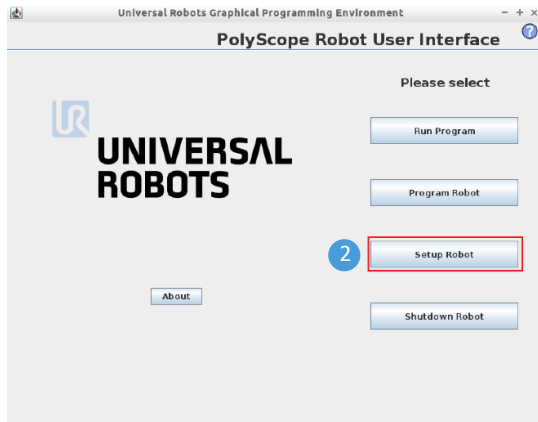
1. Plug in the OnRobot USB flash drive to the teach pendant.

2. Press "Setup Robot"

3. Press "URCaps"

4. Press "+"

5. Select the URCap file from the USB stick and restart the system to complete installation.
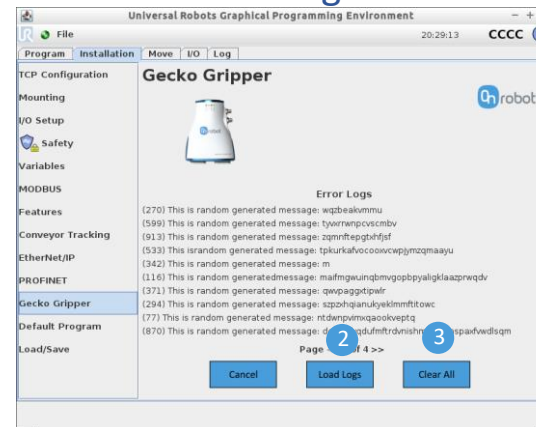

4   Connect to Gecko Gripper

1. Go to "Setup Robot" and set up network with Static IP Address 192.168.0.100 and Subnet mask 255.255.255.0 *(see Section 9.1.2.2 of User Manual for more info)*

2. The Gecko Gripper's IP address can be changed in the "Installation" tab.

3. Connect and wait for the message "Gecko Gripper has connected successfully!"

9   Error Logs

1. Retrieve Error Logs from the "Installation" tab by clicking on "Error Logs."

2. Click "Load Logs" to update the error logs.

3. Select "Clear All," you clear all error logs.

10   Pad Maintenance
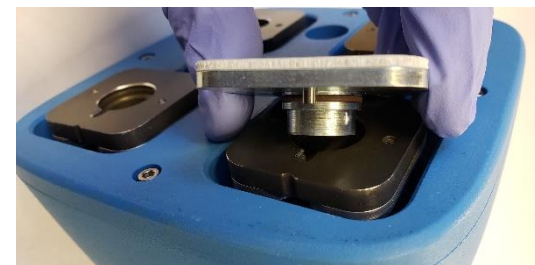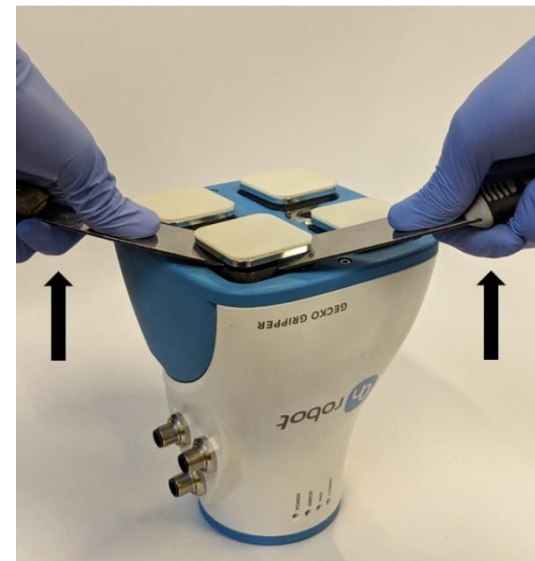
1. Insert the edge of the pad removal tool between the shiny silver plate of the pads and the dull backing plate.

2. Leverage the pad removal tool against the gripper housing to pry off the used pad. Repeat for all pads.

3. To install new replacement pads, align the notch of the pad with the tab in the mounting hole. Push the pad into the gripper until there are no gaps between the shiny silver pad plate and backing plate.
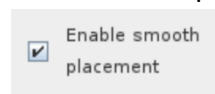
7 Programming Gecko Gripper Place
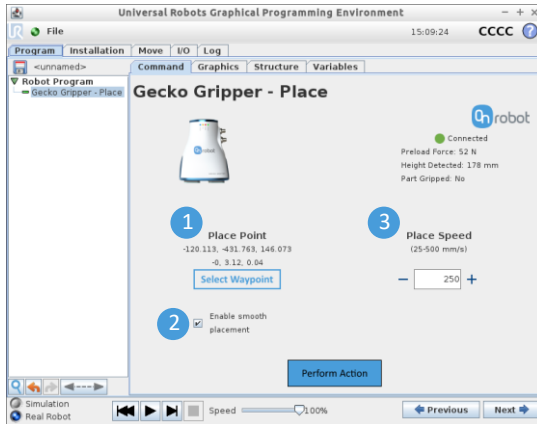
Place command controls the Gecko Gripper and UR to place the part at a specific waypoint.
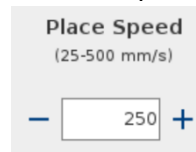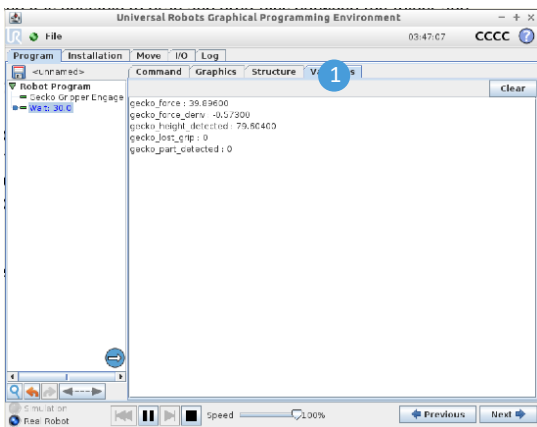
1. Set the place point for the part
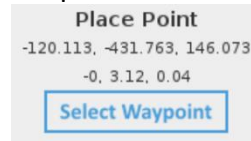
2. Enable smooth placement for smooth release of the part


3. Set robot place speed

8 URCap Feedback Variables

1. Use the gecko gripper feedback variables in your robot program
   a) *gecko_force*: preload force
   b) *gecko_force_deriv*
   c) *gecko_height_detected*: ultrasonic distance to part
   d) *gecko_grip_detected*
   e) *gecko_lost_grip*

NOTE: The ultrasonic sensor has a 500 msec response time. Account for this delay when robot programming or use the Gecko Height Detection command.
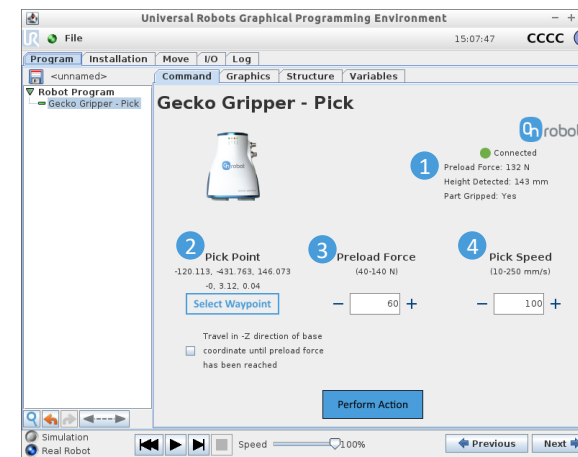
5 Add a Gecko Gripper Node (Pick, Place, Height Detection)
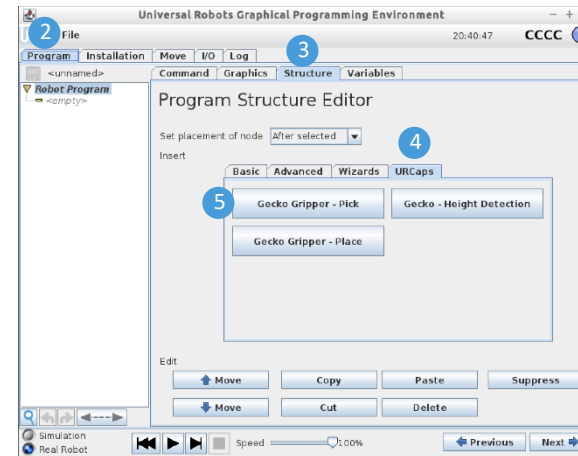
1. Create a new program
2. Press "Program"
3. Press "Structure"
4. Press "URCaps"
5. Select a gecko gripper command node (Pick, Place, Height Detection)

6 Programming Gecko Gripper Pick

To set up the proper pick point, take into consideration the following:

➢ Gecko Gripper's picking motion requires that the gripper pads and workpiece surface are aligned (i.e. parallel).

➢ The gripper will travel to the pick point until it reaches the specified preload force, at which point the robot will continue onto the next command.

1. See the live sensor data
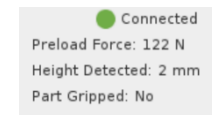
2. Set the pick point for the part
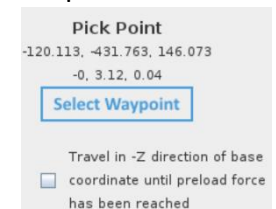
3. Set preload force

4. Set robot pick speed