

1 Robot arm safety

1. Unlock the key-rest switch and all other emergency stop
2. Go to **Installation** to confirm **mounting** angle and direction
3. Adjust **TCP** according to the tool you mounted to the robot arm, in most case, the TCP should be at the end of your tool, for example, if your extension arm is 200 mm long, TCP should be set as X: 0, Y: 0 and Z:200, Save your payload with your initial in the front, for example, if you are Dr. Good Student, your TCP should be called "GS_tool_date"
4. Go to **Payload** to **Measure** the payload and center of gravity. This step is really **important** as a incorrect payload will cause the robot arm move itself can leads to unpredictable damage to the load cell, robot arm and workbench, making it a 60,000 Dollar mistake. Save your payload with your initial in the front, for example, if you are a good student, your payload should be called "GS_exp_date"
5. Inspect the safety plane (WB stand for workbench, Labelled on the bench already)
 1. WB_prox -- optional
 2. WB_distal -- Must turn on
 3. WB_ground -- Must turned on for experiments on the table
 4. WB_right -- optional
6. Important step! Adjust your tool size in **Installation -- Tool position**. You do not have to make a perfect match but try to make it as close as possible. The radius should be the maximize radius of your tool and location should the distal point of your virtual tool. For example, If you install the following: Millbar 150 extension arm (150 mm height, h_1 , 35 mm radius, r_1), ATI-delta load cell (90 mm height, h_2 , radius 90 mm, r_2) and a custom attachment (230 mm height, h_3 ,

max radius 90 mm, r_3). The tool direction should be calculated as following (Consult dongting if you are not sure):

1. Radius: $\max\{r_1, r_2, r_3\}$
 2. location: $h_1 + h_2 + h_3 - \max\{r_1, r_2, r_3\}$
7. When you are done:
1. home the robot arm via **Installation -- Home**;
 2. Power off the load cell
 3. Detach the load cell and safely place it in the waterproof case;
 4. lock the case;
 5. clean off the table -- clean means, make everything exactly like the original condition or even better
 6. push the key-reset e-stop to prevent unauthorized access

2 Load cell safety

1. Connect the load cell to the DAQ box
2. Power on the load cell by plugging in the ethernet cable to the POE switch, no additional power supply is required
3. Go to the load cell configuration page, 192.168.0.121
 1. Confirm if the system is healthy
 2. Confirm the following settings
 1. Sampling rate
 2. Transformation matrix
 3. Low pass filter