


Univert (Uniaxial loading)

Note: Before testing, check the load capacity of the installed load cell.

Connections:

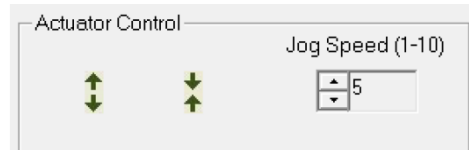
1. Select the appropriate load cell, and connect data cable from the load cell to the controller.
2. Plug the two USB connections (actuator and camera) in the computer.
3. Switch on the controller box, and double click the icon  on the desktop.



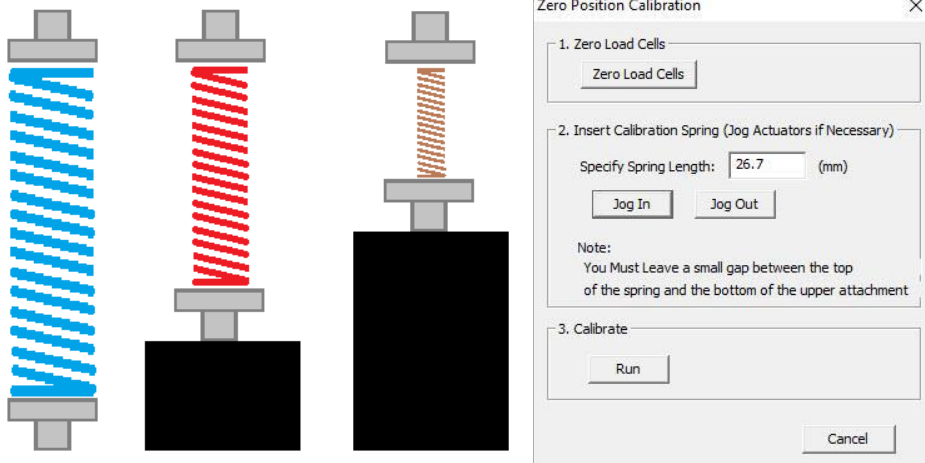
4. If you want to do image tracking, **don't forget to speckle the sample to get contrast pattern on the sample surface.**

Running test:

1. File—Collect New: on the pop up window, select Template (if you are new, select demo)
2. Ignore the calibration for the load cell.
3. Settings—Test Mode—select expected tension or compression.
4. Use the “Actuator Control” to adjust the position of the actuator. (Note: avoid Jog speed of 8, this cause wired oscillation)
5. Calibrate the zero position: (don't need to do it necessarily for every test)



Tools—Zero position calibration, in the pop up window input the spring length (depend on the selected types of spring), then Jog in the actuator until a small gap. Last, Run.



Post analysis:

1. File—Analyze And Review Images (Refer to Page 28). In the pop out window, find .tst file

Details can be referred to Page 9 in the Manual.

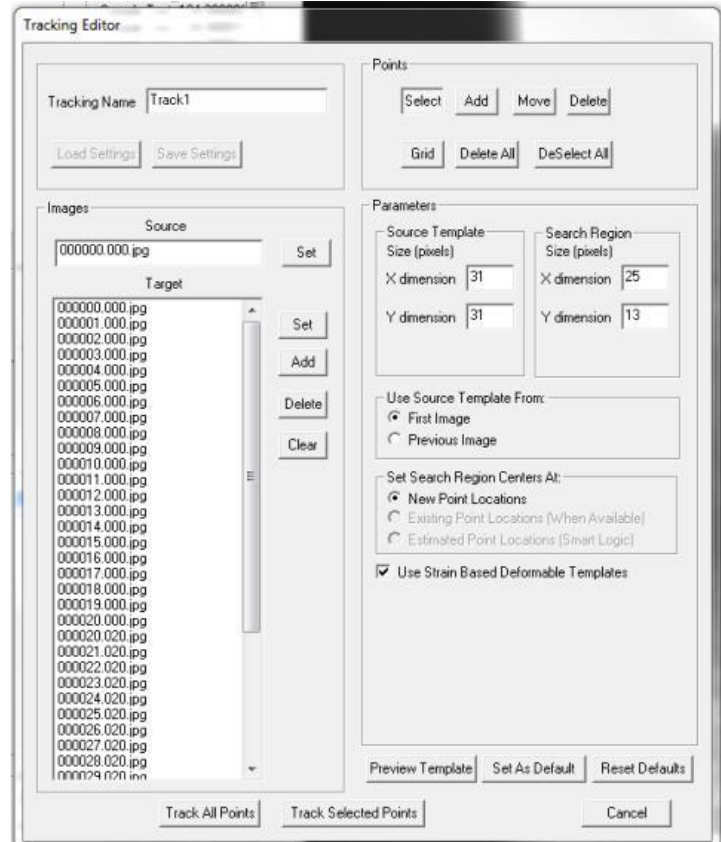
2. Imaging tracking analysis:

A: Under Tracking, click “Create”, then in the pop up window, input Name, in the “Source”, select the first picture as the reference, and click “set”. In the Target, Select all the pictures you want, and click “Set”.

B: Click the first picture. In “Points”, directly draw rectangular using mouse on the sample surface, and then click Grid”.

C: In the “Parameters”, assign the X and Y facet size. If you make a nice pattern using spray, 15 and 12 pixels are recommended for the source template and search region. But, if the pattern is very poor, use the default value.

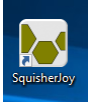
D: Click Track All points for calculation.



Microsquisher

Note: the quality of the force measurement is not guaranteed currently.

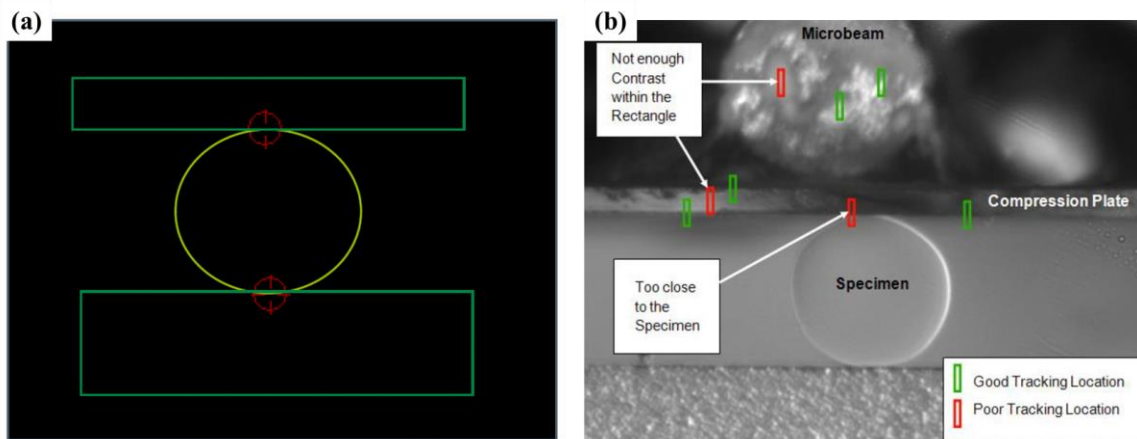
Connections and Testing Preparation:

1. Plug the three USB connections in the computer.
2. Switch on the Temperature controller and the power.
3. Turn on software,  then File—collect new to open the interface.
4. Position the sample, and adjust the camera zoom number marked on the tube and focus the sample by using the knob under the camera.
5. Take the sample away, and click 'Backward' to create room for the "Optics Calibration Target". Stand the "Target" in the initial sample position for the purpose of optic calibration.



Note: when doing optic calibration, record the zoom number of the mask on the camera, and the Zoom number on the screen should be the same with that on the camera.

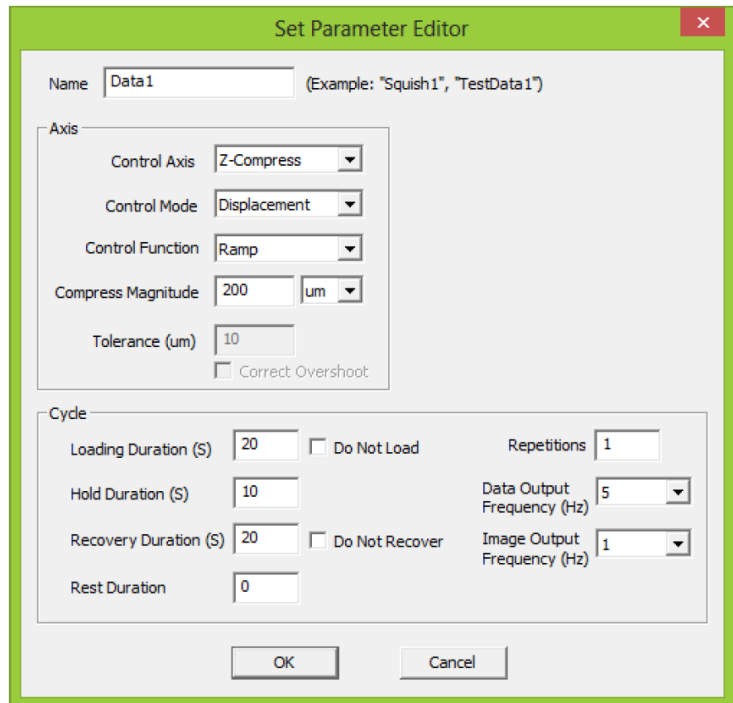
6. Click Tools—Advanced—Optics Calibration. (Here, the operation of 'focus' is recommended) Put the two cross circles on the edge of the white and black grating. Make sure the two circles are aligned exactly vertically or laterally (depend on the orientation of the target). Then count the number of white and black pairs. (Note: the width of the 5 pairs of black and white is 1000um). Then input the value in the pop up window (optics calibration), then remove the target and click 'Forward' to move back the compression plate to the position where the optic calibration is conducted.



7. Install sample between the anvil and the compression plate. Then adjust the zoom ring on the camera and the zoom number in the software and make sure the two zoom number the SAME.

8. Before editing the control parameters in the 'Edit Set', place the two track circles on the top and bottom of the sample, and then right click on the screen to create the track box, which is means bad potion. green color. If it is in red rectangular, that bad position. (Refer to the picture, in the above).

9. Edit the control parameters. Click 'Edit set'. In the 'set Parameter Editor', under 'Cycle': Loading Duration means the times reaching the compress magnitude;
The Hold duration means the time holding the final compress magnitude constant;
The Recovery Duration means the times recovering back from the compress magnitude to the initial position;
The repetitions means the number of cycles of the event (loading-hold-recovery).



Others: After installing the micro-beam, the distance between the wall and the front edge of the compression plate needs to be measured.

Biotester (Biaxial Extension)

Note:

A: For the load cell, when installing tap adapter, the shoulder side will be threaded into the load cell.

B: Install the load cell on the “L” frame firstly, then, install the “L” frame on the actuator.

C: Don't ‘Snap Image’ (Tools-Snap Image) a picture with a known distance on one object. A flat object with a known distance marker on the surface is recommended.

C: Image tracking, don't forget to set the first image as the reference.

Testing Preparation:

1. Switch on ‘Main’ on the machine. If no need heating, don't switch on ‘Heater’. Then the LED is on.

2. Connect the 2 USB on the laptop. (Only two USB)

3. Turn on software,  then File—collect new to open the interface.

4. In the software, click File-Collect New, and in the pop up window, select the template. If first time, select ‘demo’, when finishing experiment, save as the current file as a template.


5. Center position calibration. **This is the most important step.**

First of all, look at the picture and learn the functions of the actuators (The explanation in this step is mainly using this function a lot):

A: ‘Reset Actuators’ means withdraw all the arms back to ‘zero’ position (away from the center)

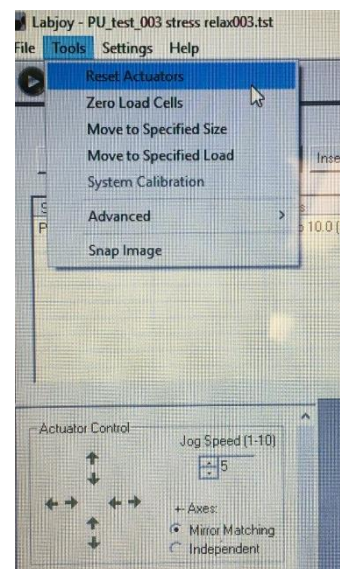
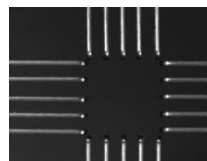
B: For the actuator control, adjust Jog speed to select the moving speed when clicking the ‘eight’ -direction arrows. ‘Mirror matching’ means a pair of the arms moving together; ‘Independent’ means individual arm moves independently.

Center Position Calibration:

5.1: Click Tools-Reset actuators; or click the logo: 

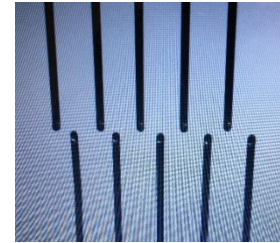
5.2: Put all the four BioRakes on the arms. Tricks: make sure the BioRakes can be adjustable in its magnet position.

5.3: Control the ‘actuator control’ to move the BioRakes in the center position (**not exactly**). This step needs ‘mirror matching’ and ‘independent’. **Then click Tools-Advanced-Center position calibration**, and then click ‘Yes’.



5.4: Click 'Reset actuators'.

5.5: Click **Tools-Advanced-Move to center**. **Before clicking 'Yes', remove all the four Rakes.**



5.6: Place one pair of Rakes on the arms in Y directions. Then in 'Mirror matching' mode, click Y direction to get the overlap position. Tricks: Adjust one Rakes in on direction a little bit for avoiding hitting. **Note: When this step is finishing, don't run the Y-direction actuator.**

5.7: Remove the Rakes in the Y direction, and plate the other pair of Rakes on the arms in X-direction. Repeat step 5.6.

5.8: Click **tools-advanced-Center position calibration**. Then click 'Yes'.

5.9: Reset actuators

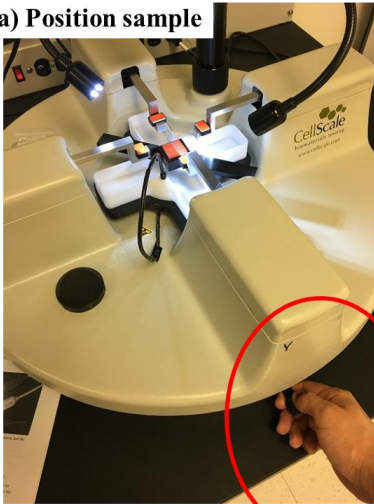
5.10: This is the last step: Place all the Rakes on the arms. Depending on the types of the Rakes, the value under the 'Specified Size' is determined by the equation:

$$\text{Specified size} = \text{Tine spacing} \times 5 + \text{Tine diameter} \times (5-1).$$

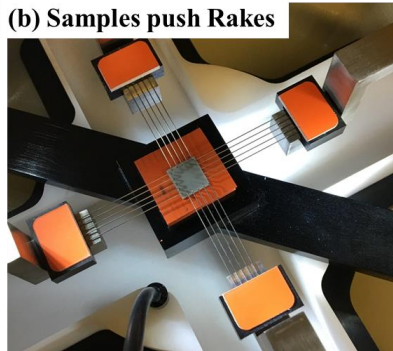
Enter the calculated value, and click Tools-'Move to Specified size'. Now, the square size is: 8020×8020 um.

6. The next step is to install sample. Just look at the picture. Tricks: when adjusting the knob the adjust the height of the sample, lift up the sample until the sample surface touches the Rakes a little bit for the **purpose of compressing the Rakes into the sample**.

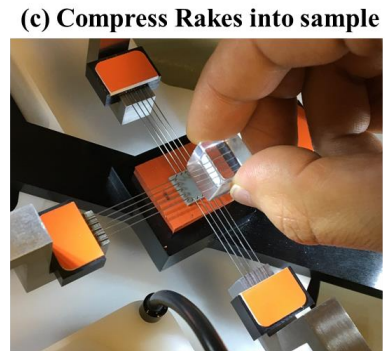
(a) Position sample



(b) Samples push Rakes



(c) Compress Rakes into sample



Knob for adjusting, usage: lift up firstly and then pull out. Once in the expected position, lift down for locking.

7. 'Edit set' to set up control parameters.

8. Before executing, click Settings-Hardware, in the window, click Temperature and remove warnings.