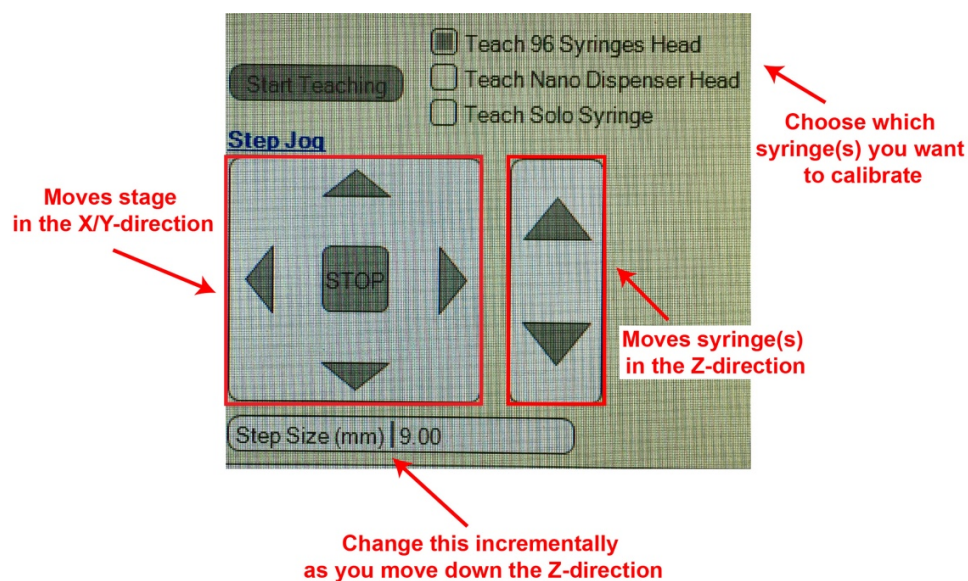


## Calibrating the stage for the Gryphon LCP crystallography workstation

1. Before calibration clean the stage with ethanol to remove any residual buffer/salts.
2. Load an empty syringe with an attached needle (no plunger needed) into the solo syringe spot. Make sure the needle is straight and not bent to one side. Also check to make sure that the needle is not easily displaced from its metal base (i.e. gently push on it to see if it moves).
3. On the computer click **“Disconnect.”**
4. Go to the Configuration window and select **“calibrate stage.”** A new window will pop up and this is the window you will use for the rest of the protocol.
5. Click **“connect”** in the lower left corner of the window. Wait a bit until the robot is done connecting.
6. From the list in the center of the window, choose which portion of the stage that you want to calibrate.
  - a. Choose stage position 1 for the 96-well syringes
  - b. Choose stage position 5 for the solo syringe to be used with LCP glass plates
  - c. Choose stage position 2 for the solo syringe to be used for vapor diffusion INTELLI-PLATES
  - d. Choose stage position 6 for the solo syringe in the pre-dispense position
7. Under the teaching section of the window, click **“start teaching”** and then choose which syringe(s) you want to calibrate.
8. You're now in the teaching mode. Next, click **“Go to above position.”** This will move the stage to the proper location where it's to be calibrated.

**NOTE: NEVER CLICK “GO TO Z-LEVEL.”** This will lower the syringe(s) down to the Z-level that it's currently set to and this could crash the needles into the stage!

In the teaching window there are two ways to move the stage (pictured below):



9. Now you will move the syringe(s) down toward the stage in incremental steps. Be conservative in your step size and be patient, you don't want to break an expensive instrument because you simply can't click a button a few extra times.
  - a. First start with the 9 mm step size (see picture above) and click the Z-direction down until you think there isn't enough space to move another 9 mm.
  - b. Then change the step size to 4.5 mm and click the Z-direction down until you think there isn't enough space to move another 4.5 mm
  - c. Then change the step size to 2 mm and repeat
  - d. Then change to 1 mm and repeat
  - e. Then change to 0.5 mm and repeat
  - f. Keep going until you're about 1-2 mm away from the stage
10. Once the syringe is close enough to the stage (approx. 1-2 mm away), look at the small dot on the stage. You want the needle to be directly lined up with it. If the needle is not, then click to move the X/Y directions until they are perfectly lined up.
11. Once the needle is in the correct X/Y position, take out the feeler gauge (aka feeler stock) from the cardboard box located underneath the instrument. The feeler gauge is covered in a sleeve and is essentially just a long thin piece of metal that is exactly 0.05 mm thick.
12. Place the feeler gauge in between the stage and the syringe. Next, **set the step size to 0.05 mm** and move the Z-direction down and wiggle the feeler gauge to see if you feel any resistance. Repeat this process incrementally until the feeler gauge no longer moves (i.e. move the stage, wiggle the feeler gauge, move the stage again, wiggle again, and repeat until the feeler gauge doesn't move anymore).
13. The syringe is now flush with the feeler gauge and is therefore 0.05 mm away from the stage. Next, move the syringe up one step in the Z-direction so that you are now a total of 1 mm away from the stage ( $0.05 + 0.05 \text{ mm} = 1 \text{ mm}$ ).
14. Remove the feeler gauge and move the syringe **two x 0.05 mm steps downward** so that you are now flush with the stage.
15. Next, click "**Update X/Y tray position**" and then click "**Update Z position.**" The numbers in the top right of the window should change to reflect the new calibration.
16. Click "**save**" and then click "**stop teaching.**"
17. Now you can exit the window if you are done calibrating. Otherwise you can now calibrate a different position of the stage if you want.
18. Once you're done calibrating, click "**save and close.**"
19. Lastly, remember to click "**Connect**" in the main window of the software and wait to make sure the instrument successfully connects to the Computer. Now the robot is calibrated and ready to use!