I. **Machine set-up**

a) Before turning the polarimeter on, make sure the sample chamber is secured tightly into the holder (including the Velcro strap) and the two plugs are in the chamber.

b) Make sure that the sample cell has been cleaned thoroughly, both inside and out - with NO fingerprints on the outside or on the ends (because the ends are where the light shines through) - with soapy water and acetone. Similarly, the sample chamber should have been dried thoroughly with no water or acetone remaining inside.

c) After placing the chamber into the holder and securely closing the lid of the polarimeter, turn the machine on. The on/off switch is in the back of the machine. The polarimeter will take approximately 15 minutes to initialize/setup (including to warm the lamp), so make sure not to disturb the machine during this time.

d) If you are doing a temperature controlled experiment, turn the water bath on at the same time to begin heating the sample chamber.

II. **Details**

a) If you are doing an experiment where the controls (sample integration time, etc.) are not detrimental to the result, ignore this section.

b) Otherwise, the polarimeter is set to the following controls:
   
i.  [Auto measurement] ~ off ... therefore, you must press the **START key to take measurements**

   ii. To get your data result, press the **CAL** key to display results.

   iii. The [Aperture] should he set to 3mm and don't change this number ...

   iv. The wavelength is set to 589 run. Don't change this number either.

c) When ready, zero the optical rotation by pressing the **ZERO** buttons. You are zeroing the clean sample chamber with no liquid in it whatsoever.

d) *If you* want to zero the solvent, so you are only observing the solute optical rotation, carefully place the solvent into the sample chamber by use of a pipette.
   
i. **IMPORTANT**: make sure you do not SPILL the solvent down the side of the sample Chamber, or make any fingerprints on the chamber. These mistakes will skew your data!

   ii. **IMPORT ANTI**: make sure you have *absolutely* no air bubbles in the sample chamber. Like the sample spillage, air bubbles will skew your data.

   iii. Once the solvent is inside the chamber, place the plugs into the chamber and close the lid. Allow the Polarimeter to equilibrate for a few minutes (if using temperature control) and take temperature measurements of the sample chamber by using the thermistor which is plugged into the digital thermometer which is located next to the polarimeter. If taking measurements at a high temperature, wait until readings are stable.

   iv. Once the optical rotation numbers have finished fluctuating, press the **ZERO button to zero to the solvent**.
Once the solvent has been zeroed, remove it out of the sample chamber and clean the sample chamber with soapy water and acetone, and then dry it.

III. Taking measurements

a. Make sure the sample chamber is clean and dry. Then, pipette your sample into the sample chamber, again taking care that none spills, no fingerprints are made, and no air bubbles exist.
b. Fill the sample chamber to the same level the zeroed solvent was filled to, and place the plugs in. If using temperature control, place the end of the clean thermistor into the sample chamber and wait until the correct temperature is reached.
   i. NOTE: the thermistor CAN be left in the sample chamber. .. If you notice, the wire is bent so it can rest comfortably in the chamber while the polarimeter lid is closed.
   ii. However, if you decide to leave the thermistor inside the sample chamber, please make sure that the light diffraction is not affected. To do this, take a piece of white paper and stick it in the space between the right end of the sample chamber and the wall of the holder space (about a 2-3 inch space). Observe the pattern of light. Then, insert the thermistor and make sure the pattern of light has not been affected at all.
c. After completion of these steps, close the lid and allow the polarimeter to equilibrate and show stable readings. (Depending on whether you are using temperature control or not, this time can vary).
d. Once the readings become stable, press the START key to take measurements. The integration time is set to 15 seconds. Once the measurement has been taken, you can access your data by pressing the CAL key.
   i. Usually, an average of 3 measurements is taken at a particular temperature/sample, because the numbers can fluctuate slightly.
e. Once you are satisfied with your data, you can delete the results by pressing EDIT in the data screen and then press ALL DELETE and START.
   i. NOTE: if you turn the polarimeter off, you lose the data from previous experiments.
f. If more measurements are desired, clean out the sample chamber in the same manner as above and make sure it is clean and dry before placing the new sample inside.
   i. UNCERTAINTY: The measurements all have an uncertainty of ± 0.002 (per Jasco manual)

IV. Cleaning up

a. Once you are done your measurements, clean out the sample chamber thoroughly and make sure it is dry. MAKE SURE you do not leave sample in the chamber when you are done! Clean it!
b. Then, shut off the polarimeter.