1. Turn on the computer controller.
2. Always make sure that the air supply is turned on to the rheometer.
3. Remove the black bearing lock by holding it in place while turning the draw rod knob at the top in a counter-clockwise direction. Once the bearing lock is removed, make sure that the spindle rotates freely.
   **NOTE:** When using the AR2000, please ensure that the drive-shaft slide lock is pulled-out.
4. Turn on the power to the instrument and, if present, the ETC controller.
   **NOTE:** If step 4 is performed before step 3, an alarm will sound and the instrument controller display will read ‘optical init. fail’. At this point just follow step 3 and the alarm will stop.
5. Please ensure that the water supply is turned on.
6. When instrument has finished the system check, turn on the instrument control software.
7. Go to the Instrument Status Page to make certain that communication has been established between the computer and the instrument.
8. **Instrument Inertia:** Determine the instrument inertia by selecting Options>Instrument>Inertia and run the ‘calibrate’ wizard.
9. **Bearing Friction Correction:** Select Options>Instrument>Miscellaneous and make sure that the bearing friction correction box has a value and the bearing friction correction is activated.
   a. If there is no value, perform the bearing friction correction procedure via the wizard, (Rheology Advantage 3.0), or using the Help>Index under the phrase ‘friction: calibration>determining bearing friction correction’. When using a version of software less than version 3.0, uncheck the bearing friction correction box located within Options>Instrument>Miscellaneous before running the calibration procedure.
10. **Geometry:** Attach test geometry by holding it in place while turning the draw rod knob at the top in a counter-clockwise direction. Choose the appropriate geometry, if the file already exists (Geometry>Open…), or create a new geometry by selecting Geometry>New, and follow the guide.
11. **Geometry Inertia:** Calibrate the geometry inertia by following the wizard that is found in the Geometry Page >Settings>Inertia: Calibrate.
12. **Mapping:** Perform a mapping on the geometry by using the icon or use Instrument>Mapping. Select either the number of iterations or mapping type within the icon dialog window (Rheology Advantage 3.0)
or under *Options>*Settings>*Mapping* and *Options>*Instrument>*Miscellaneous: Mapping Type*, respectively.

a. Mapping only needs to be performed when using a flow procedure and when the lower two decades of torque is necessary for data acquisition.

b. The number of iterations should be set greater than one when testing a very low viscosity material. When performing a Creep procedure the number of iterations should be set to 4, if the Recovery step is set to zero. Otherwise, setting the number of iterations greater than three has diminishing returns in the mapping performance.

c. The mapping type can be set to fast, standard or precision. It is recommend that ‘standard’ should be selected for most materials, but for more critical measurements, ‘precision’ mapping is more suited.

13. **Temperature System Selection:** Select the temperature system and attach the appropriate bottom assembly.

a. For AR1000/500/QCR instruments, the temperature read and control must be set to the appropriate temperature system. This is accomplished by choosing *Options>*Instrument>*Temperature: Temperature Read* and *Temperature Control* setting both to ‘Peltier’, if using the Peltier Plate, or ‘Temperature System’ if any other system is being used.

b. This selection is not necessary for the AR2000.

14. **Zero Gap:** Zero the gap by choosing the zero gap icon or by selecting *Instrument>*Gap>*Zero Gap* and follow the directions on screen.

a. If equipped with normal force, there are two options that one can used to zero the gap, deceleration or normal force. Generally, the normal force method is recommended. This choice is made in the *Options>*Instrument>*Gap>*Gap Zero Mode: Normal Force*. Set the value equal to 1 N.

**NOTE:** The upper geometry should be at the testing temperature before zeroing the gap. This will account for the change in dimensions due to the coefficient of thermal expansion of the testing geometry/system.

15. **Gap Compensation:** If you have the normal force option, you can obtain the gap compensation value by using the gap compensation wizard located in the *Geometry Page>*Settings (Rheology Advantage 3.0) or by performing an oscillation temperature ramp (torque of 0.1 µNm @ a frequency of 1 Hz conducted at a ramp rate of 2°C/min) under global normal force control (1N +/- 0.1, 1000 µm up/down, compression, set initial value) with a conditioning step temperature equal to the starting value of the temperature range of the experiment with an equilibration time equal to 5 minutes. Plot the data and then fit a straight line to the graph of Gap vs. Temperature. The slope must be then entered in the *Options>*Instrument>*Temperature: Temperature Calibration* region within the cell located to the right of the appropriate temperature system. The gap compensation check box should be activated, which is located within the *Options>*Instrument>*Temperature* dialog window. If the normal force option is unavailable, then predetermined values
must be entered.  
**NOTE:** The gap compensation value must be set to zero before this step is performed.  
**NOTE:** If controlling normal force throughout an experiment, the gap compensation value is recommended to be activated.  
**NOTE:** Gap Compensation needs only to be used when testing over a temperature range.  
**NOTE:** Zero the normal force before running the gap compensation test.

16. **Procedure:** Set up procedure by selecting the appropriate file, if previously created, by choosing Procedure>Open or create a new procedure by selecting Procedure>New. The procedure can be adapted in the Procedure Page.

17. **Notes:** Enter sample information within the Notes Page or by selecting Notes>New.

18. **Sample Loading:** Load sample, lower geometry to appropriate gap and trim if applicable (for additional help, go to Help>Video Clips: Loading and Trimming a Sample).
   a. The gap can be set by three different methods.
      i. Manually enter the desired gap by selecting the enter gap icon or by selecting Instrument>Gap>Enter Gap…
      ii. Automatically have the instrument go to the gap value entered in the Geometry Page>Dimensions by using the go to gap icon or select Instrument>Gap>Go To Geometry Gap.
      iii. Manually raise or lower the gap by using the icons. **NOTE:** These icons are only available when in the Instrument Status Page.

19. **Run Test:** Run test by selecting the run experiment icon.
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