Molecular Kinetics, Inc.

Distributor of Bio-Logic Stopped-flow & Quench flow mixers, Stopped-flow & Spectroscopy optics, and Electrophysiology instruments

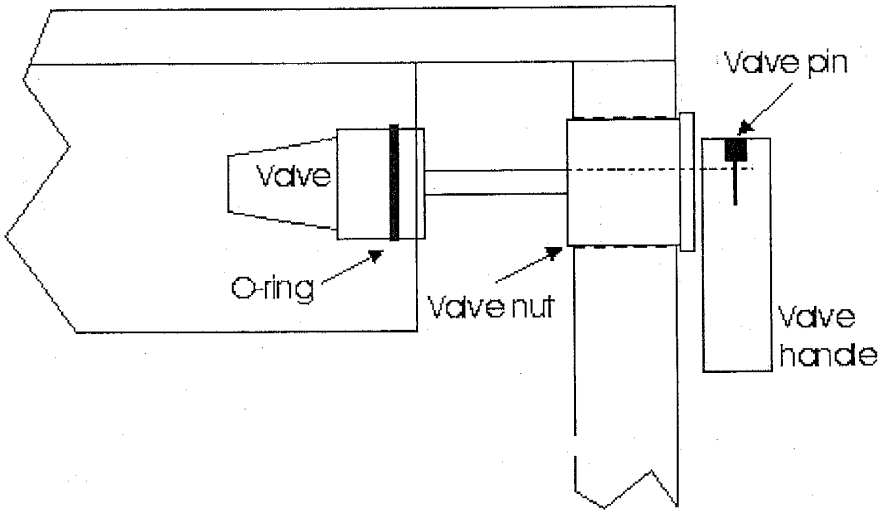
I think the valves are dirty. How do I clean them?

Removing and cleaning the syringe valves:

As part of the regular cleaning schedule of the instrument, it is necessary to remove and clean the valves. This is important to check for and remove blockages or dirt, and to make sure the valves are undamaged and seated correctly, providing a good seal.
Refer to the attached figure while following these directions.

1. Unscrew and remove the *valve pin* from the *valve handle* (found on the "curved" edge of the handle).
2. Remove the valve handle from the shaft of the *valve*.
3. Using the flat wrench, unscrew the *valve nut* from the wall of the SFM. This usually leaves the valve in place.
4. Replace the handle, lining up the valve pin hole with the hole through the end of the valve shaft.
5. Place the valve pin into the handle and through the valve shaft. It is not necessary to screw it back in at this point.
6. Using the handle, twist the valve to break the seal.
7. Gently pull the valve all the way out of the instrument. Use a rocking motion to work it through the SFM wall. Be careful not to cut the *o-ring* (on the valve) with the screw threads in the hole of the wall (where the valve nut screws in). *DO NOT* twist the valve to pull it through the SFM wall.
8. Check the valve for damage and dirt. Clean if necessary. Check the hole through the valve for blockage and clean if necessary.
9. Clean the socket where the valve sits. Q-tips are handy for this. Make sure not to leave any cotton fibers behind. A flashlight helps.
10. Note the notch in the metal portion of the valve. Note the pin projecting into the top of the socket where the valve sits, inside the instrument.
11. Insert the valve back into the instrument, lining the notch up with that pin. Again be careful not to cut the o-ring.
12. Use the handle to push the valve firmly into the hole, twisting slightly to reseat the valve.

13. Remove the valve pin and handle.
14. Replace the valve nut and tighten.
15. Replace the valve handle and valve pin. Screw the valve pin back into the handle.



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Loading the SFM or QFM and purging air from the internal lines

These instructions assume that you are just starting the day's use of the instrument.

First, some definitions:

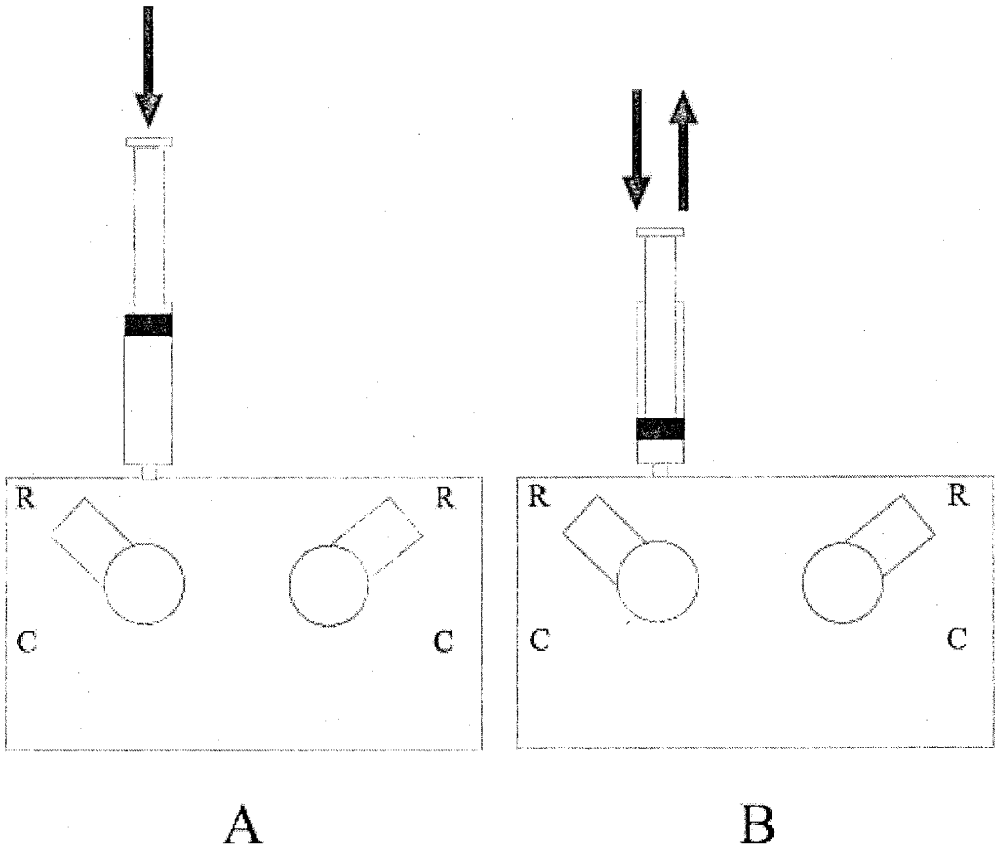
Reservoir syringe
The SFM's or QFM's own syringe, inside the instrument.

Loading syringe
The disposable plastic syringe attached to the loading port.

Loading port
On top of the SFM or QFM, the well or nib where the tip of a plastic syringe (loading syringe) is inserted to put solution into the reservoir syringe, labeled R1 through R5, as necessary.

1. Set all valves to R.
2. Raise all the reservoir syringes to their topmost positions.
3. Start the MPS Driver software and open communication with the MPS unit by Syringes Command / Load.
4. Zero all the syringes (click the Zero All button).
5. Mount the loading syringe with its solution.
6. While gently pushing on the piston of the loading syringe, push the Down button of the MPS unit to pull solution into the instrument.
   - See part A of the figure, below.
   - Applying pressure on the loading syringe piston is necessary to keep positive pressure in the solution being loaded. If this is not done, then cavitation can occur leading to air bubbles in the solution.

7. Let go of the loading syringe piston and push the Up button of the MPS unit to move about 2-3 mL back into the loading syringe.
    - Several bubbles of air will be forced into the loading syringe as well
8. Load this solution back into the reservoir syringe
9. Repeat steps 6 - 8 several times, until no more bubbles emerge into the loading syringe
    - See part B of the figure, below.
10. Turn the valve to C and tap the Up button of the MPS a couple of times to remove air bubbles from the internal lines of the instrument.
    - The air inside the instrument must be removed.
    - Improper or incomplete removal of air inside the internal lines can lead to several effects, including:
        a. Air bubbles are picked up by the flowing liquid, leading to:
            - Air bubbles through the cuvette in stopped-flow, completely disrupting the data
            - Air bubbles through the mixers, interfering with proper mixing
            - Possible trapping of air bubbles in corners, leading to "spring" effect described below
        b. "Spring" effect where a trapped air bubble is compressed during the flow and relaxes (expands to full size) when the flow stops. This expansion disturbs the contents of the lines and can end up disturbing solution in the cuvette.



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