



*Dependable Products From People You Trust*



# Shear History Simulator

Part No. 700-200-60

## Instruction Manual

Updated 05/27/2015

Ver. 1.0

**OFI Testing Equipment, Inc.**

11302 Steeplecrest Dr. · Houston, Texas · 77065 · U.S.A.  
Tele: 832.320.7300 · Fax: 713.880.9886 · [www.ofite.com](http://www.ofite.com)

©Copyright OFITE 2015

# Table of Contents

<b>Intro</b> .....	<b>2</b>
<b>Features</b> .....	<b>3</b>
<b>Specifications</b> .....	<b>3</b>
<b>Requirements</b> .....	<b>3</b>
<b>Components</b> .....	<b>4</b>
<b>Setup</b> .....	<b>5</b>
<i>Pumps and Reservoirs</i> .....	6
<i>Rear Panel Connections</i> .....	7
<i>Computer</i> .....	8
<b>Software</b> .....	<b>9</b>
<i>Main Screen</i> .....	9
<i>Accumulators</i> .....	13
<i>Manual Pump Control</i> .....	14
<i>Test Setup</i> .....	15
<b>Operation</b> .....	<b>16</b>
<i>Filling Accumulator 1</i> .....	16
<i>Filling Accumulator 2</i> .....	17
<i>Running Accumulator 1 Through 1 Loop</i> .....	18
<i>Running Accumulator 2 Through 1 Loop</i> .....	19
<i>Running Accumulator 1 Through 2 Loops</i> .....	20
<i>Running Accumulator 2 Through 2 Loops</i> .....	21
<i>Running Accumulator 1 Through 3 Loops</i> .....	22
<i>Running Accumulator 2 Through 3 Loops</i> .....	23
<i>Running Accumulator 1 Through No Loops</i> .....	24
<i>Running Accumulator 2 Through No Loops</i> .....	25
<i>Flushing Lines After a Test</i> .....	26
<i>Emptying Accumulators</i> .....	27
<b>Appendix</b> .....	<b>28</b>
<i>Troubleshooting</i> .....	28
<b>Maintenance</b> .....	<b>31</b>
<i>Fuses</i> .....	31
<b>Warranty and Return Policy</b> .....	<b>32</b>

## ***Intro***

The rheology of a fracturing fluid is highly dependent upon the composition/ concentration of the polymer and crosslinker, temperature, pH, the magnitude of a shear, and the duration of shear. To minimize parasitic frictional pressure losses, an optimal fracturing fluid would have only sufficient viscosity to fully transport the proppant from the well head, through the tubulars and perforations, and into the formation. Achieving an optimal fluid design is difficult due to down hole fluid temperature changes and the variability of the magnitude and duration of the shear stresses the fluid is exposed to. Fortunately, the use of delayed crosslinkers makes it possible to control the rheology of a fracturing fluid as a function of a time, temperature, and/ or shear. Under ideal circumstances, the polymer would fully crosslink just before entering the perforations of the well. The increase in viscosity allows the fluid to effectively transport the proppant through the perforations and into the formation. OFITE's Shear History Simulator makes it possible to analyze the effects of shear and temperature upon a fracturing fluid and serves as an invaluable tool in the optimization of a fluid design.

## ***Description***

The polymer is mixed and pumped into one of the accumulators of the apparatus. Water, which is used to displace the test fluid, is pumped into the other accumulator. The syringe pump is filled with the crosslinker and the flow rate is adjusted accordingly. The temperature baths on each of the capillary coils are adjusted to set point and allowed to reach temperature. The flow rate of the polymer delivery pump is adjusted to achieve the same rate of shear as that anticipated during the actual fracturing treatment. The fluid delivery pump and crosslinker pump are started simultaneously and the fluids are blended via an inline static mixer. Once the fluid is homogenized, it is pumped through either one, two, or three of the capillary coils depending upon the anticipated shear the fluid will be exposed to during the of the fracturing operation. Differential pressure and temperature of each coil is documented on a computer. The sheared fluid may then be directly injected into the rotor of an HTHP Viscometer for further studies.

## ***Features***

- 3,000 PSI Operating Pressure (20.7 mPa) - pressurized environment
- 225 ft Capillary Tubing - maximum shear length
- 0 – 40 mL/min Circulation Pump
- 0.002 – 2.5 mL/min Injection Pump - precise control of cross linker injection
- Transfer under pressure to the OFITE 1100 Viscometer

## ***Specifications***

Operating Conditions: Ambient room temperature – 150°F (65.5°C)  
Maximum Operating Pressure: 3,000 PSI (20.7 mPa)  
Pressure Relief Settings: 3,000 PSI (20.7 mPa)  
Capillaries (3): 0.125" ID (3.175 mm) / 75' (22.86 m) long each, 316 SS  
Gel Pump: 0-40 mL/min  
Additive Pump: 0.002 – 2.5 mL/min  
Materials: Pump, Fittings and Reservoir; 316-SS. All pressurized wetted parts, 316 SS

Dimensions: 39.6"W × 22" H × 24" D (101 × 56 × 61 cm)  
Shipping Dimensions: 48" W × 52" H × 48" D (122 × 132 × 122 cm)  
Net Weight: 420 lb (190.5 kg)  
Shipping Weight: 705 lb (320 kg) approximate

## ***Requirements***

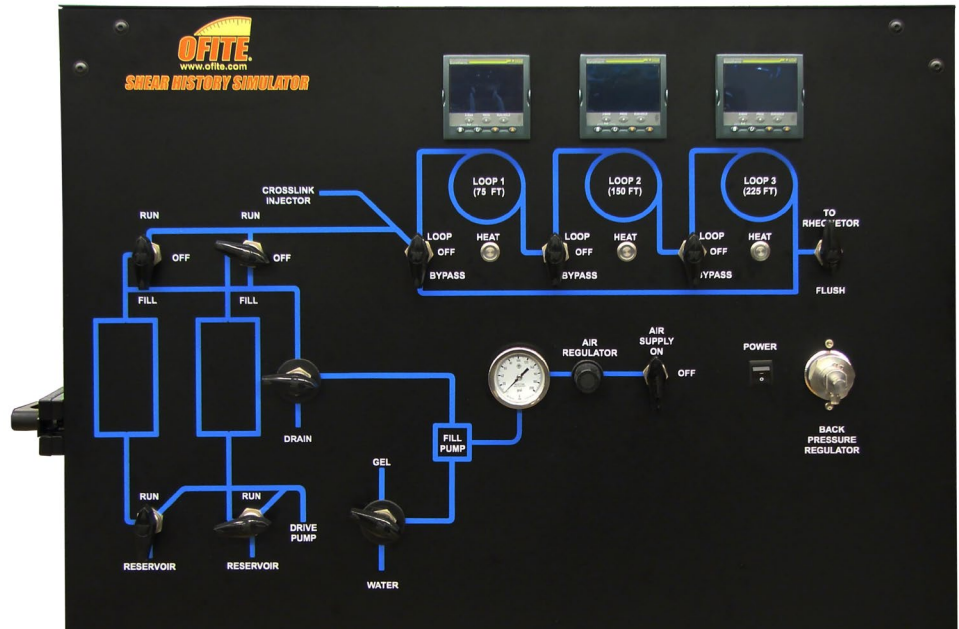
Input Voltage: 230 VAC; 50/60 HZ Single Phase  
Input Air: Only 100 PSI is required. Can withstand up to 200 PSI  
Water Source: 40 PSI, 10 GPM

# Components

## Spare Parts

#127-00-205	Accumulator Cap and Piston; Qty. 16
#700-200-60-001	Steel Coil, 80', SS; Qty. 2
#700-200-60-003	1/8" FMPT 3 Way Valve; Qty. 2
#700-200-60-012	In Line Mixer, 12-316 SS
#700-200-60-022	DP 55 Diaphragms (0-1,250 PSI); Qty. 3
#700-200-60-023	DP 55 Diaphragms (0-2,000 PSI); Qty. 3

# Setup



To operate the Shear History Simulator, the user will need to know a series of twelve different valve configurations so that fluids can be directed to flow properly throughout the system.



Efforts to maintain fluidity of implemented liquids are paramount. Fluids added and not flushed properly will harden inside the tubing, which will cause components to clog.

Make sure all components are connected properly.

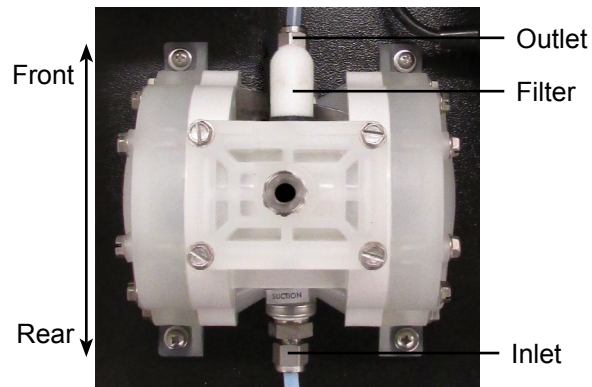
# Setup

## Pumps and Reservoirs

Install a series of pumps and reservoirs to the internal components of the SHS. There are eight M8 × 1.25" screws (#700-410-079) used to secure the rear panel. Use a 16 mm hex wrench to remove the screws and panel.



1. Install the 2.5 Gal. reservoir (#127-70-036) on the middle shelf with the front panel facing the side door. See page 30 for orientation.
2. Install the air operated pump (#700-200-60-009) on the middle shelf as shown below. Mount the pump with the provided #2 × 6-32 screws, washers on both sides and nuts.



3. Install the Eldex 1LM metering pump (#700-200-60-007) on the middle shelf with the interface display facing the side door.
4. Install the low profile reservoir (#127-70-036) above the 1LM metering pump as shown above.
5. Install the two Eldex 1HM metering pumps (#700-200-60-006) on the bottom level with the front panels facing each other as shown above.

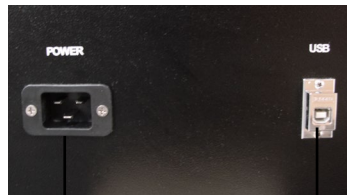
# Setup

## Rear Panel Connections

1. On the back panel, locate the three ¼" (6.35mm) NPT fittings. Connect a water source (15 – 30 PSI / 104 – 208 kPa), air source, and drain tubing (as exiting fluid is hot) to the appropriate fittings.

Connect drain to a visible reservoir.

2. Connect the computer to the USB port in the back of the SHS and place it in a stable and dry location. Connect the computer to a power source.
3. Make sure the “Power” switch is in the off position. Plug the power cord into an AC power source.



Power

USB



Air

Water In

Drain



# Setup

## Computer



Note

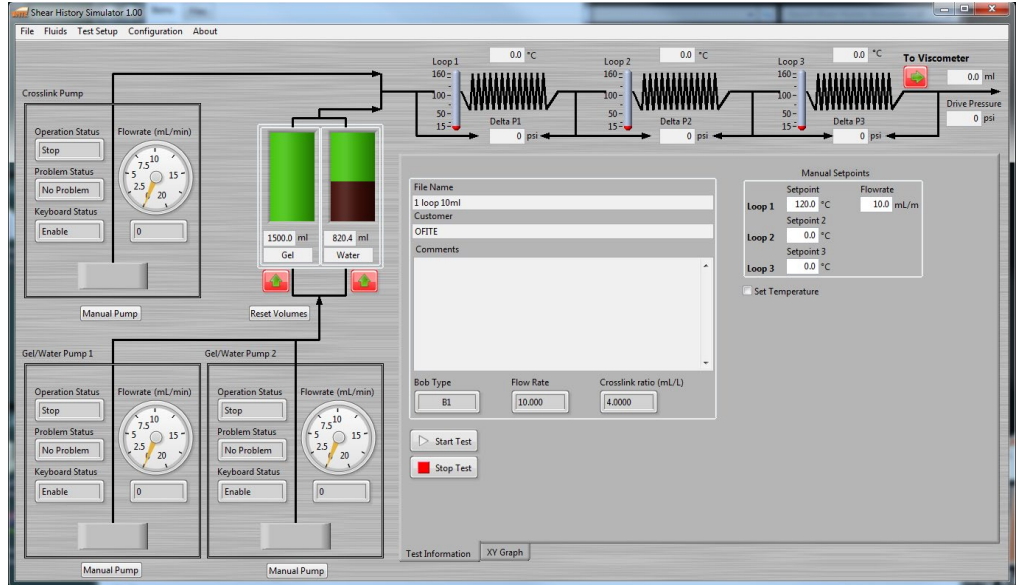
1. First, check that the computer's AC power setting matches the available power in your region. This switch is typically found on the bottom of the computer and will be either 115V or 230V.
2. Connect the computer to an AC power outlet. The computer was shipped with the appropriate power cords.

**Your Shear History Simulator was supplied with a laptop computer. Simply open the laptop and turn the power on. The AC power cord can be used to prevent the battery from draining completely during operation. Remember to periodically charge the battery by leaving the AC power cord plugged in overnight.**

3. Turn the computer on. After the computer has booted up completely, check for the OFITE software icon on the desktop.

# Software

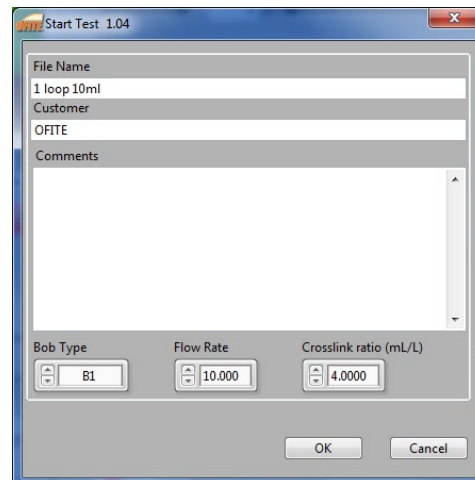
## Main Screen



The software main screen has Two tabs. Each tab offers different data.  
**Test Information** - Shows real time test data.

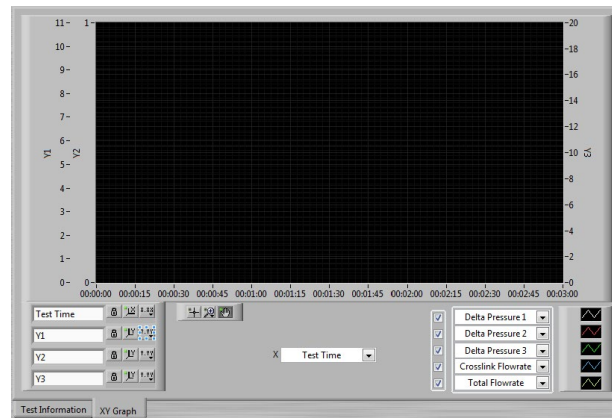
**Start Test** - Begins collecting data. It will open a screen to input:

1. Enter a file name and the customer name.
2. Add comments if needed.
3. Select Bob Type, Flow Rate, and Crosslink Ratio (mL/L).
4. Click "OK".



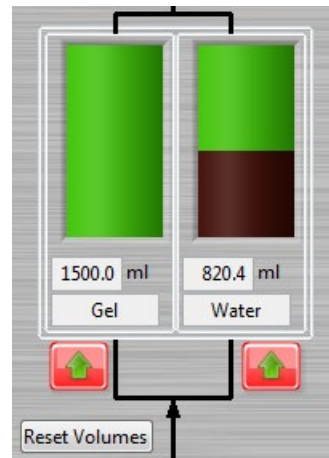
**Stop Test** - Stops collecting data

**XY Graph** - A customizable graph with up to 5 lines. Choose a variable for the X axis. Then choose variables for each line on the Y axis. No data will display unless a test is running.



**Accumulators** - In the diagram shown on page 9, below each accumulator is the volume (mL) and name of the fluid.

**Reset Volumes** - Click this button to manually set the volume of one or both accumulators. The maximum volume is (1,500 mL).



**Pump/Crosslink Status** - Below the diagram of the accumulators is a set of diagrams showing the status of both ISCO pumps. To the left of the accumulators is a diagram showing the status of the crosslink pump.

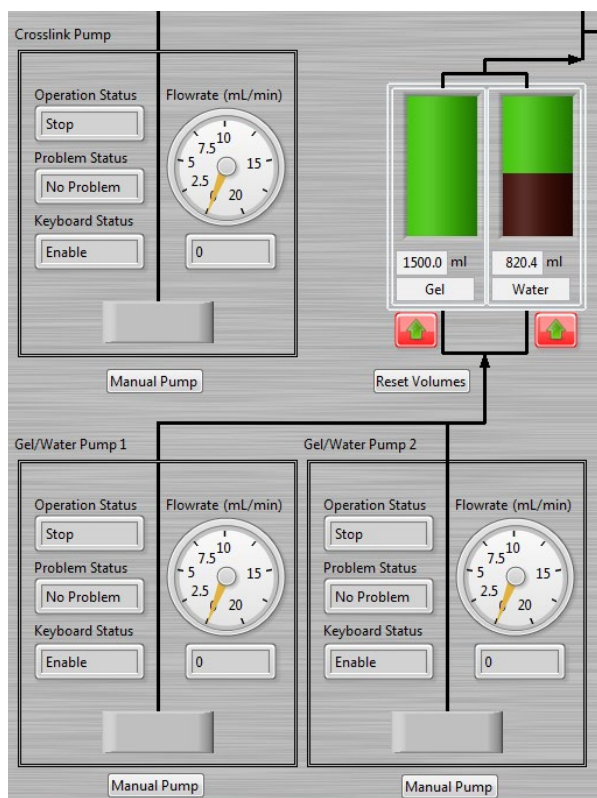
**Operation Status** - Stop/Run

**Problem Status** - No Problem, Motor Failure, High Pressure, and Low Pressure

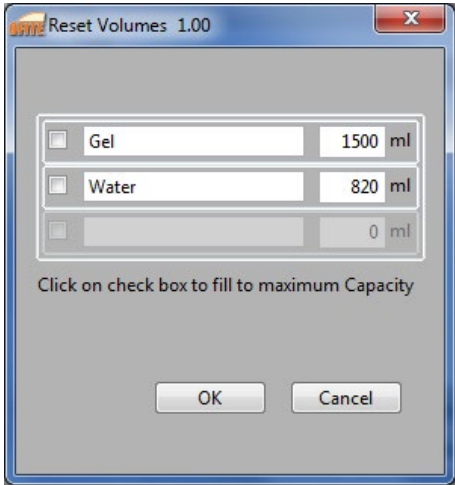
**Keyboard Status** - Enable/Disable

**Flowrate** - The flowrate (mL/min) currently being applied by the pump.

**Manual Pump** - Click the button to access the full set of pump controls. See page 14 for more details.



**Resetting the Volumes** - Press the “Reset Volumes” button underneath the accumulator displays to open the window below. This will allow the user to control the desired amount of gel or water to be implemented into the system. Click the check boxes if you want to fill the accumulators to their maximum capacities.



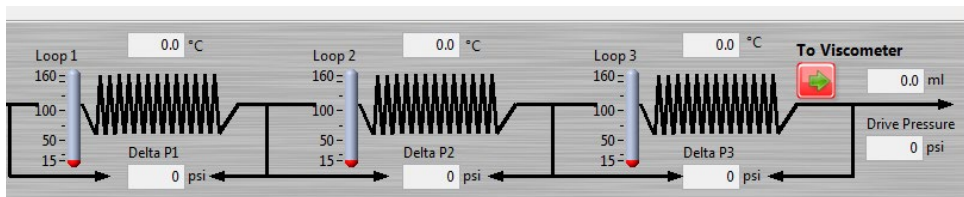
**Loop 1 / Loop 2 / Loop 3** - These fields show the temperature (C°) and pressure (PSI) of each of the three loops.

**To Viscometer** - Shows the volume (mL) and the pressure (PSI) of the liquid exiting the system.

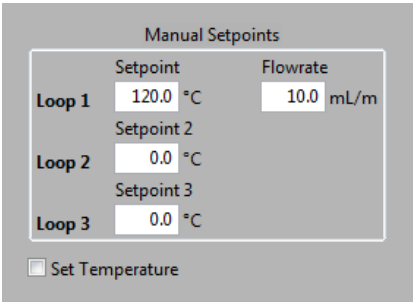


**Note**

The units of measure can not be changed.



**Manual Setpoints** - In the main screen, below the Delta P3 (Loop 3) diagram is the Manual Setpoints sections which controls where setpoints will be applied on the graph. For each loop, enter the desired temperature setpoint and check the “Set Temperature” box to save the value for that setpoint.



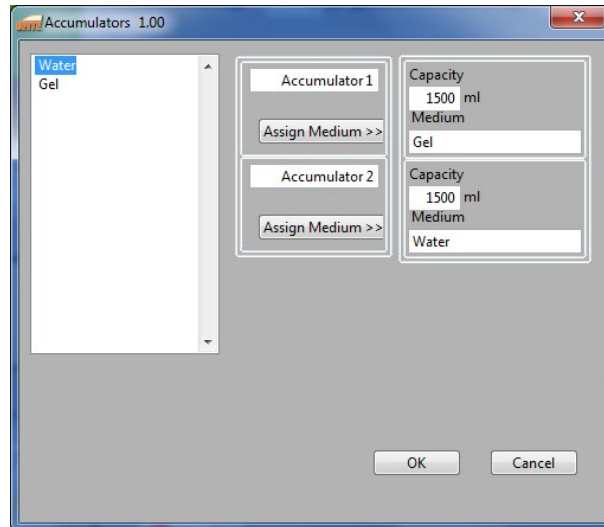
# Software

## Accumulators

The fluids must be assigned to the accumulators. This tells the software the amount of fluid that is being tested in each accumulator.

On the Fluids menu, select “Accumulators”.

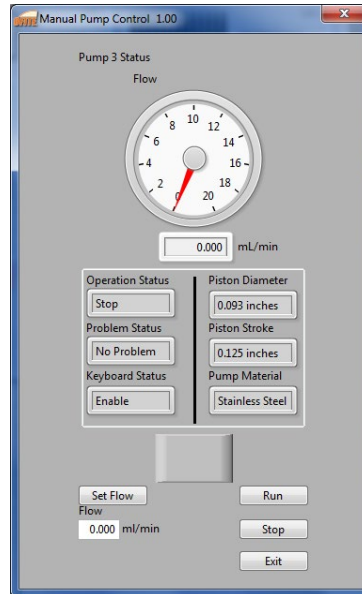
1. Choose a fluid in the list on the left.
2. Click the “Assign Medium” button to assign the selected fluid to an accumulator.
3. Make sure the capacity of the accumulator is correct. If it is not, enter the correct value in the Capacity field.
4. Repeat this step if the other accumulator will be used in the test.
5. Click OK.



# Software

## Manual Pump Control

To access the manual controls for the ISCO pumps, click the “Manual Pump” button.



**Set Flow** - Enter a flowrate (mL/min) in the Flow field and click the Set Flow button.

**Run** - Runs the pump. Be sure to select either Constant Flow or Constant Pressure and set a flow or pressure.

**Stop** - Stops the pump.

**Exit** - Stops the pump motor and sets the pressure and flow rate to 0.

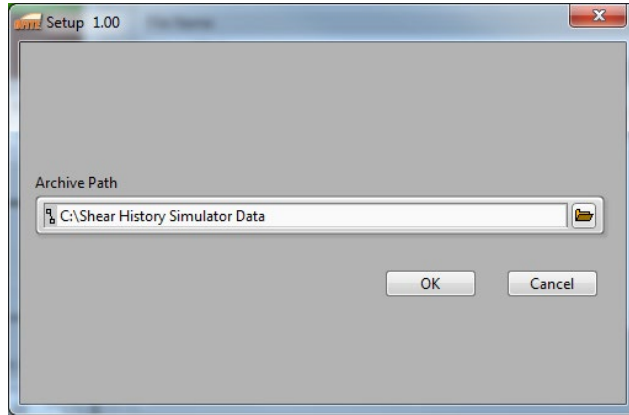
# Software

## Test Setup

### Load Test Info

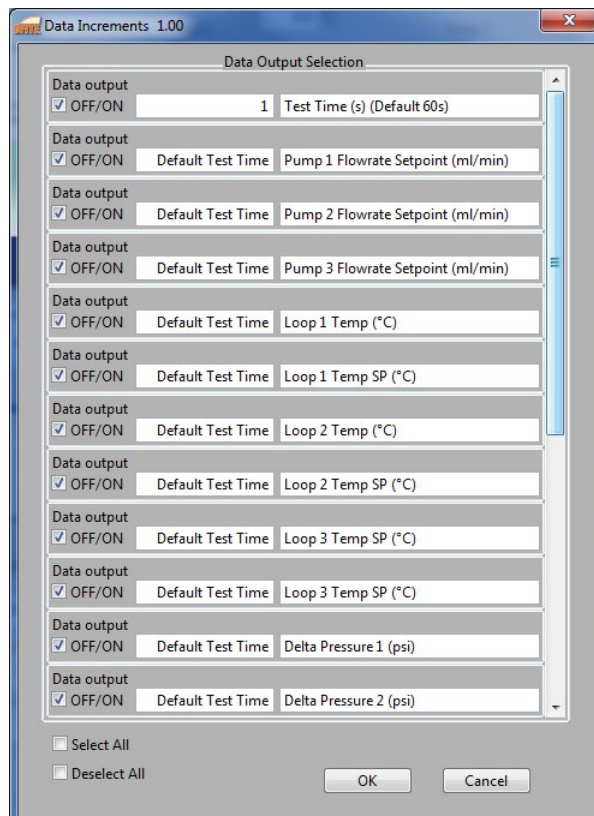
Use this screen to specify the desired location of saved data. Select “Load Test Info” from the Test Setup menu.

**Archive Path** - Choose a folder to save test information.



### Data Increments

Select “Data Output Selection” from the Test Setup menu to set up timed increments of how often data will be saved.



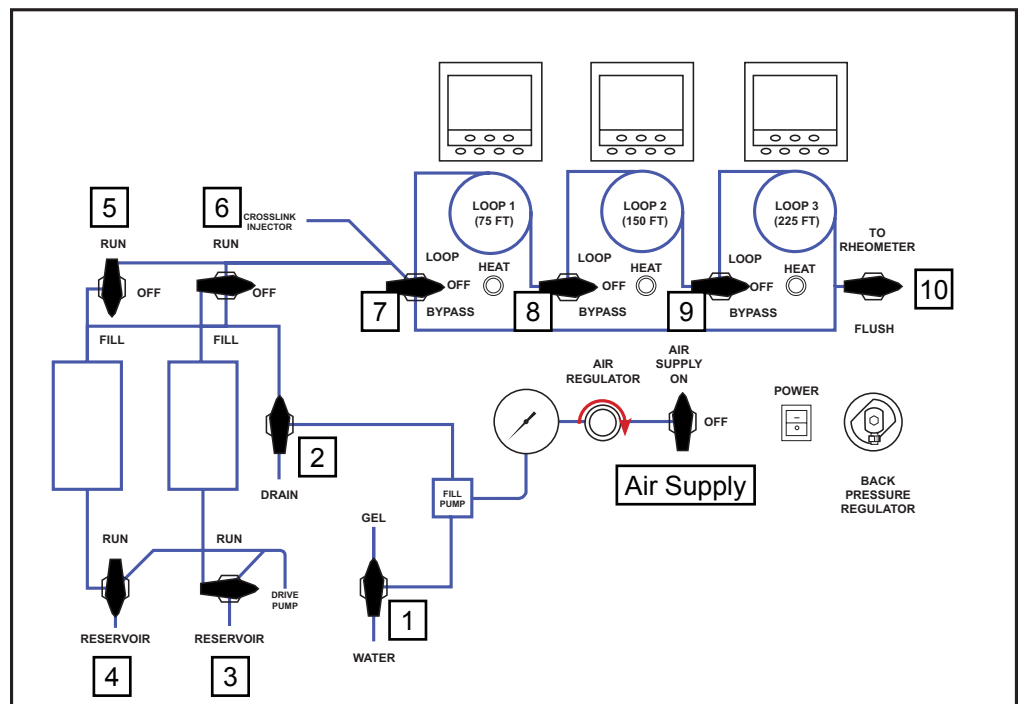


# Operation

## Filling Accumulator 1

To fill Accumulator 1:

1. Turn valve 1 to the GEL position.
2. Turn valve 2 to the Up position.
3. Turn valve 3 to the right (OFF position).
4. Turn valve 4 to the RESERVOIR position.
5. Turn valve 5 to the FILL position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the OFF position.
8. Turn valve 8 to the OFF position.
9. Turn valve 9 to the OFF position.
10. Turn valve 10 to the OFF position.
11. Turn the AIR SUPPLY ON.
12. Apply air to the Regulator by turning the knob to the right.

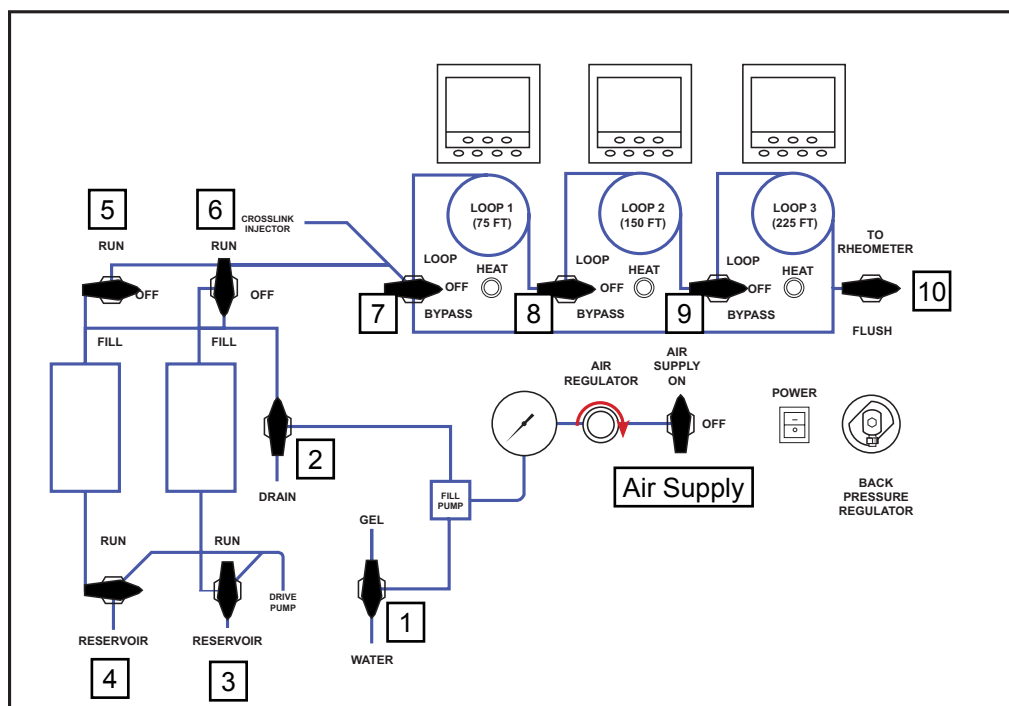


# Operation

## Filling Accumulator 2

To fill Accumulator 2:

1. Turn valve 1 to the WATER position.
2. Turn valve 2 to the Up position.
3. Turn valve 3 to the RESERVOIR position.
4. Turn valve 4 to the OFF position.
5. Turn valve 5 to the OFF position.
6. Turn valve 6 to the FILL position.
7. Turn valve 7 to the OFF position.
8. Turn valve 8 to the OFF position.
9. Turn valve 9 to the OFF position.
10. Turn valve 10 to the OFF position.
11. Turn the AIR SUPPLY ON.
12. Apply air to the Regulator by turning the knob to the right.



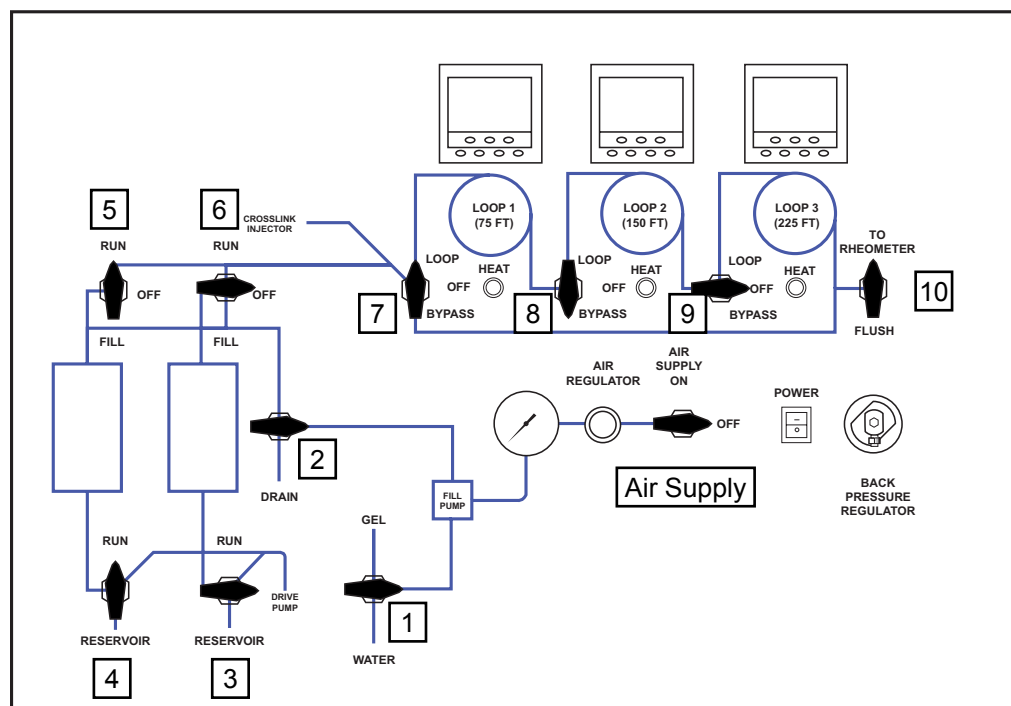
# Operation

## Running Accumulator 1 Through 1 Loop

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 1 Through 1 Loop:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the OFF position.
4. Turn valve 4 to the RUN position.
5. Turn valve 5 to the RUN position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the BYPASS position.
9. Turn valve 9 to the OFF position.
10. Turn valve 10 to the to FLUSH position and wait for fluids to exit to a desired viscosity.
11. Once the exiting fluids are ready, turn valve 10 to the TO RHEOMETER position.



# Operation

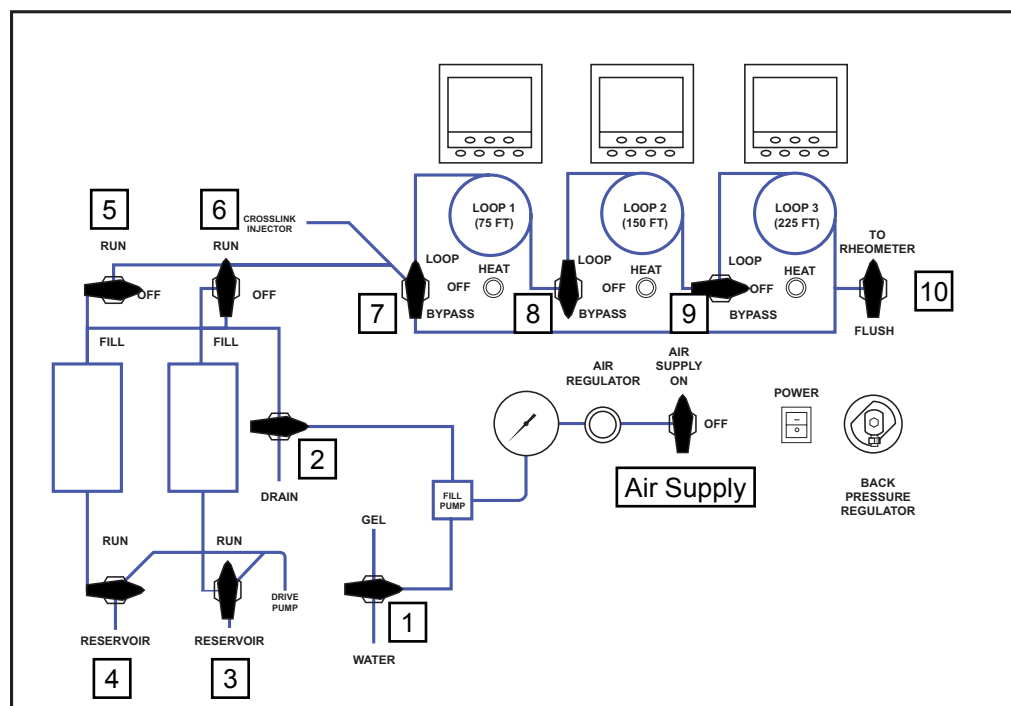
## Running Accumulator 2 Through 1 Loop

### Through 1 Loop

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 2 Through 1 Loop:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the RUN position.
4. Turn valve 4 to the RUN position.
5. Turn valve 5 to the RUN position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the BYPASS position.
9. Turn valve 9 to the OFF position.
10. Once the exiting fluids are ready, turn valve 10 to the TO RHEOMETER position.



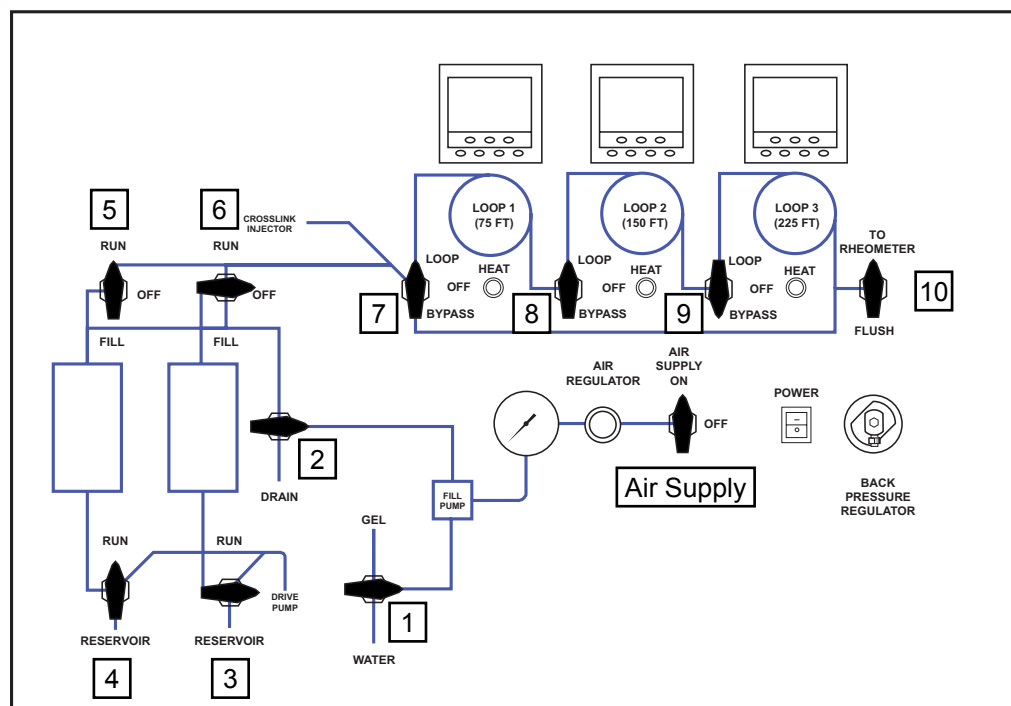
# Operation

## Running Accumulator 1 Through 2 Loops

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 1 Through 2 Loops:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the OFF position.
4. Turn valve 4 to the RUN position.
5. Turn valve 5 to the RUN position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the LOOP position.
9. Turn valve 9 to the BYPASS position.
10. Turn valve 10 to the TO RHEOMETER position.



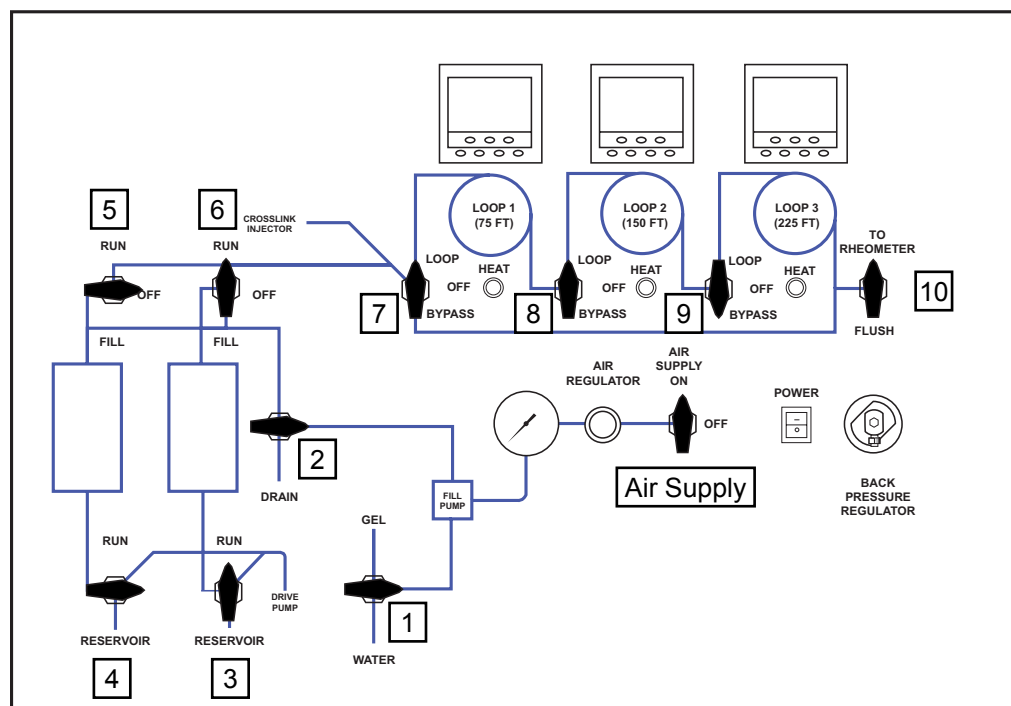
# Operation

## Running Accumulator 2 Through 2 Loops

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 2 Through 2 Loops:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the RUN position.
4. Turn valve 4 to the OFF position.
5. Turn valve 5 to the OFF position.
6. Turn valve 6 to the RUN position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the LOOP position.
9. Turn valve 9 to the BYPASS position.
10. Turn valve 10 to the TO RHEOMETER position.



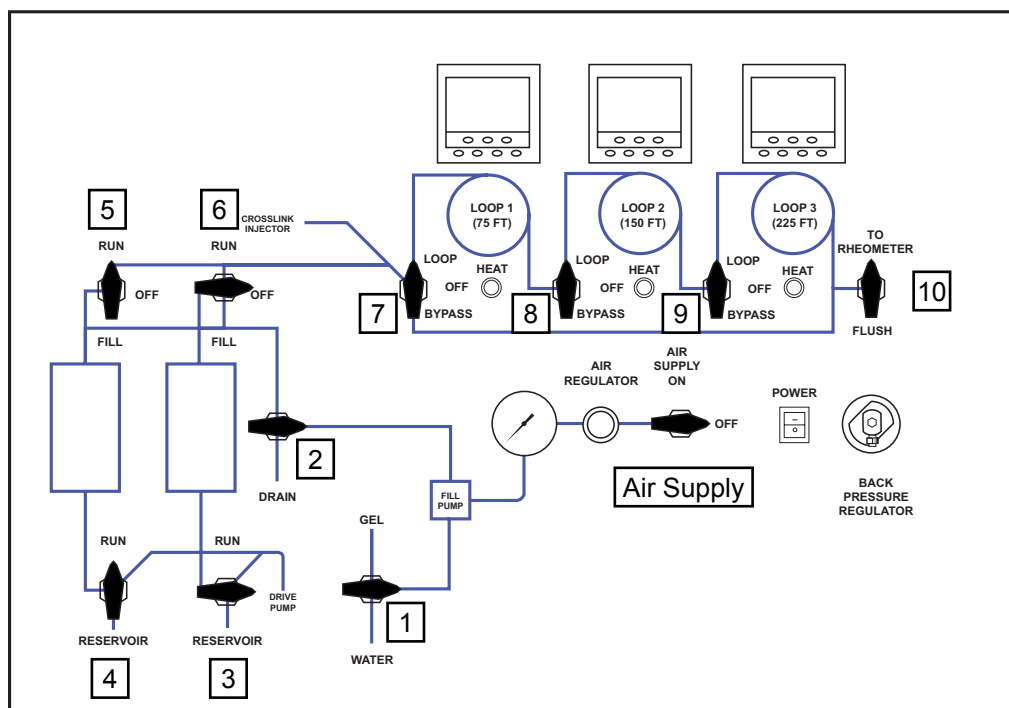
# Operation

## Running Accumulator 1 Through 3 Loops

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 1 Through 3 Loops:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the OFF position.
4. Turn valve 4 to the RUN position.
5. Turn valve 5 to the RUN position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the LOOP position.
9. Turn valve 9 to the LOOP position.
10. Turn valve 10 to the TO RHEOMETER position.



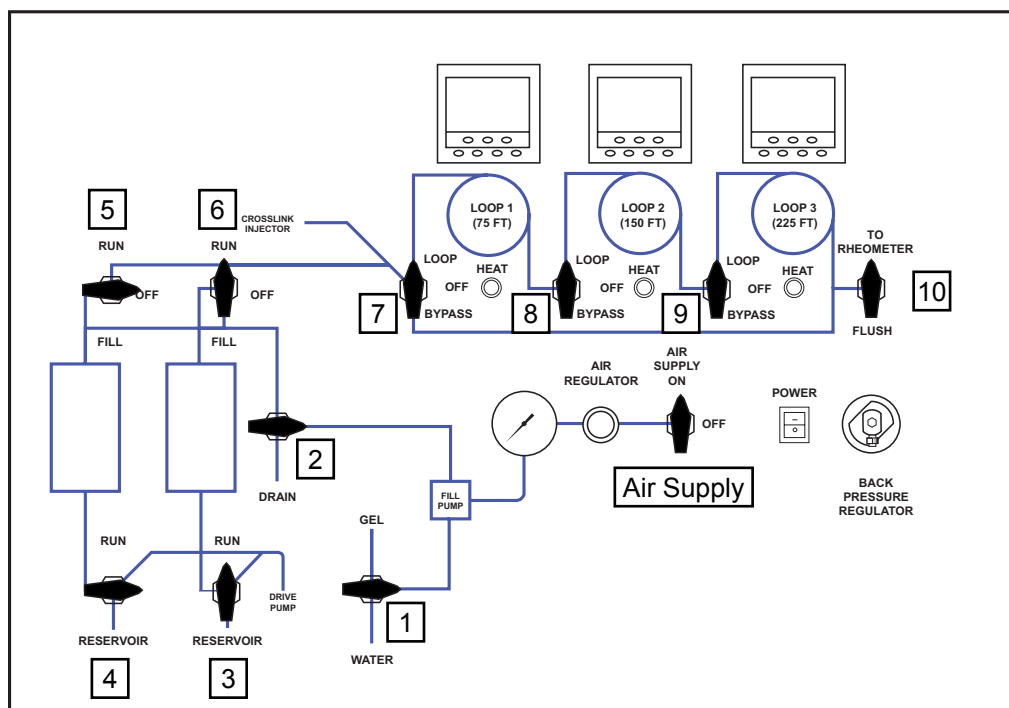
# Operation

## Running Accumulator 2 Through 3 Loops

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 2 Through 3 Loops:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the RUN position.
4. Turn valve 4 to the OFF position.
5. Turn valve 5 to the OFF position.
6. Turn valve 6 to the RUN position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the LOOP position.
9. Turn valve 9 to the LOOP position.
10. Turn valve 10 to the TO RHEOMETER position.





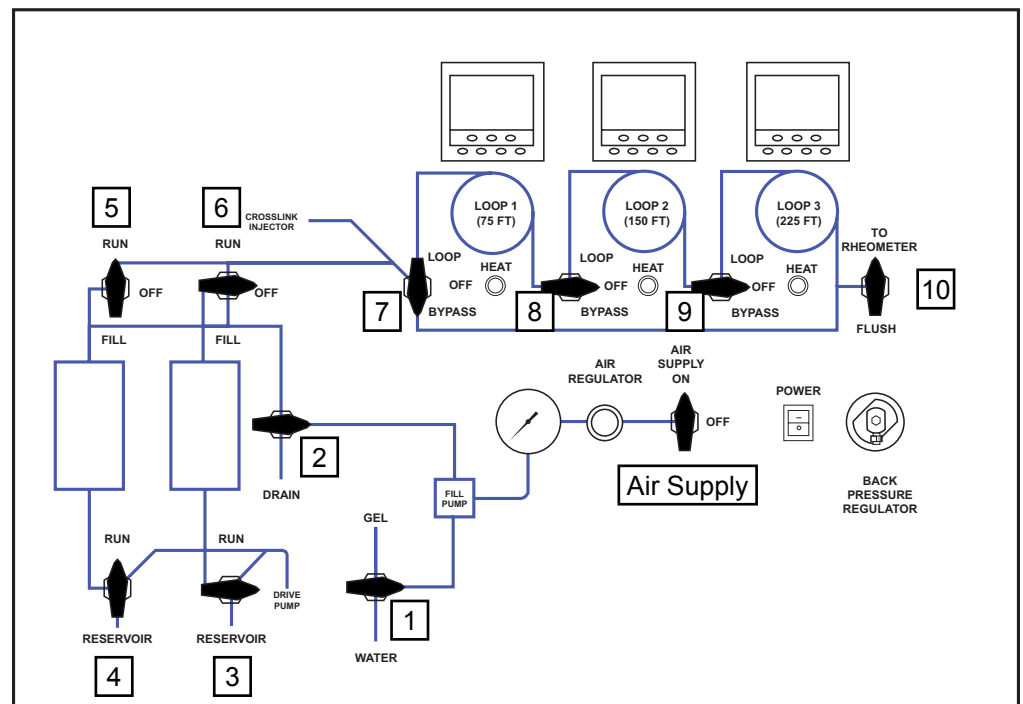
# Operation

## Running Accumulator 1 Through No Loops

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 1 Through No Loops:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the OFF position.
4. Turn valve 4 to the RUN position.
5. Turn valve 5 to the RUN position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the BYPASS position.
8. Turn valve 8 to the OFF position.
9. Turn valve 9 to the OFF position.
10. Turn valve 10 to the TO RHEOMETER position.



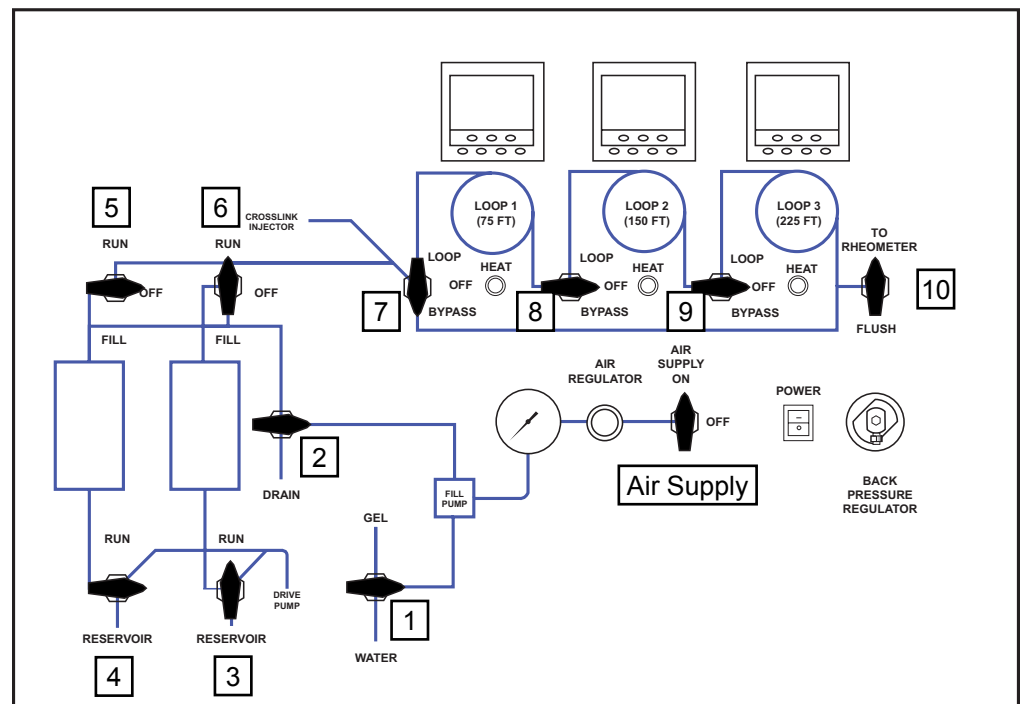
# Operation

## Running Accumulator 2 Through No Loops

Make sure the transfer tube is connected from the SHS to the Rheometer before liquids are transferred.

To run Accumulator 2 Through No Loops:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the RUN position.
4. Turn valve 4 to the OFF position.
5. Turn valve 5 to the OFF position.
6. Turn valve 6 to the RUN position.
7. Turn valve 7 to the BYPASS position.
8. Turn valve 8 to the OFF position.
9. Turn valve 9 to the OFF position.
10. Turn valve 10 to the TO RHEOMETER position.



# Operation

## Flushing Lines

### After a Test

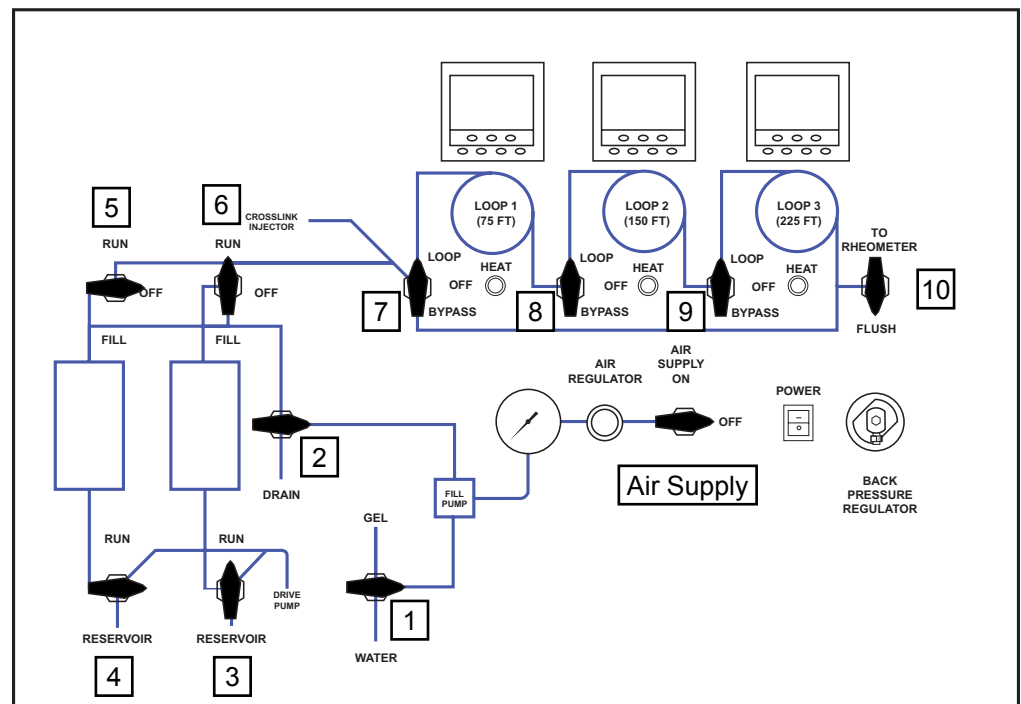
To flush the lines after a test, fill the accumulators with water and proceed with the following steps:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the OFF position.
3. Turn valve 3 to the RUN position.
4. Turn valve 4 to the OFF position.
5. Turn valve 5 to the OFF position.
6. Turn valve 6 to the OFF position.
7. Turn valve 7 to the LOOP position.
8. Turn valve 8 to the LOOP position.
9. Turn valve 9 to the LOOP position.
10. Turn valve 10 to the FLUSH position.



Note

The flush should take approximately 8 – 10 minutes depending on the flowrate.

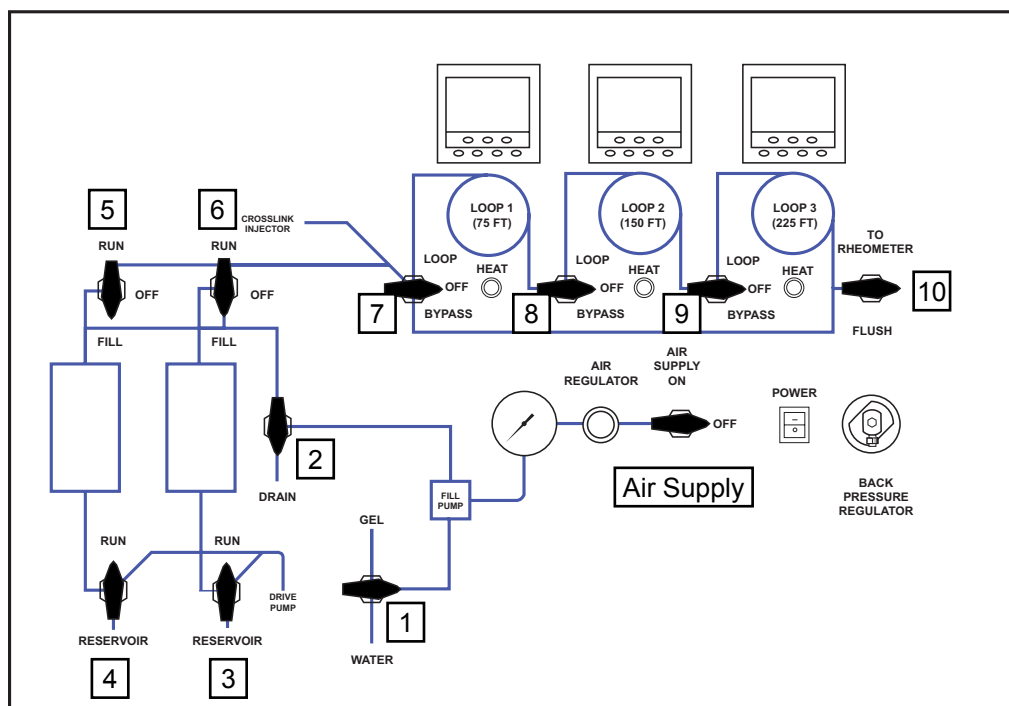


# Operation

## Emptying Accumulators

To Empty Accumulators:

1. Turn valve 1 to the OFF position.
2. Turn valve 2 to the DRAIN position.
3. Turn valve 3 to the RUN position.
4. Turn valve 4 to the RUN position.
5. Turn valve 5 to the FILL position.
6. Turn valve 6 to the FILL position.
7. Turn valve 7 to the OFF position.
8. Turn valve 8 to the OFF position.
9. Turn valve 9 to the OFF position.
10. Turn valve 10 to the OFF position.



# Appendix

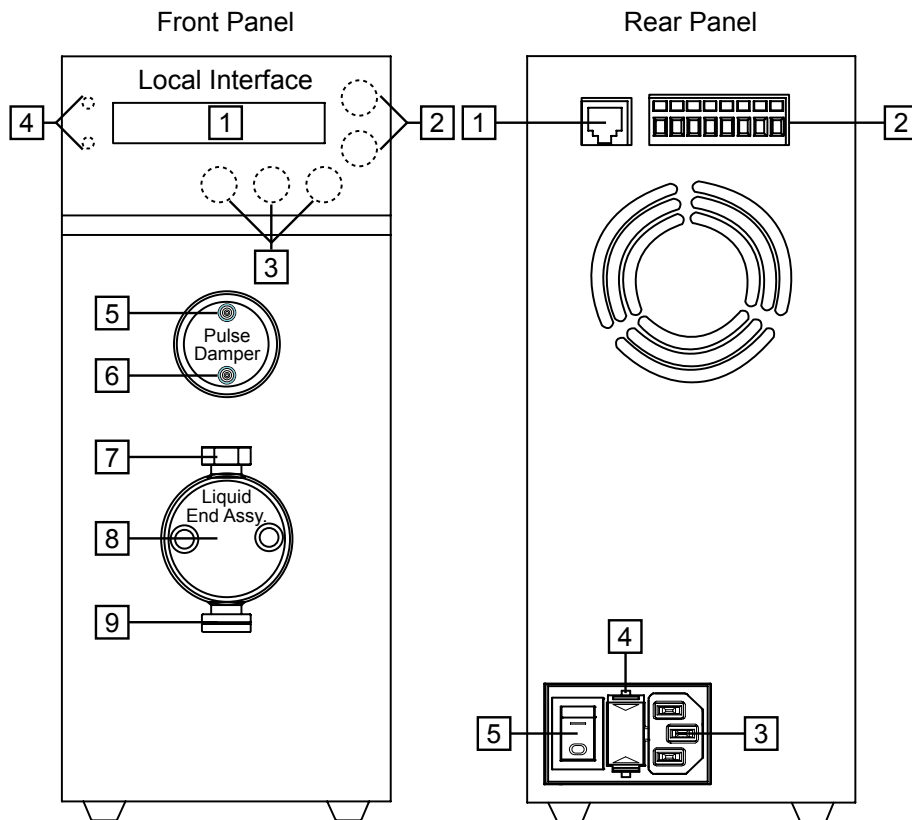
## Troubleshooting

Symptom	Cause	Remedy
<b>Power</b>		
There is no power to the machine	The main power cord is not plugged in.	Ensure the power cord(s) is firmly into the wall and the machine
	One of the fuses for the main power supply is blown	Check and replace the fuses
<b>Heating / Cooling</b>		
The unit is not heating	The heater switches are not pressed	Turn the heater switch to the on position
	The heater fuse is blown	Replace heater fuse
The unit is overheating	The thermocouple is not plugged in	Plug in the thermocouple
	The temperature controller is not programmed correctly	Check the temperature ramp profile in the software or on the Eurotherm temperature controller
	The Eurotherm temperature controller is not working	Replace the temperature controller
The unit is not able to maintain temperature or the temperature is cycling uncontrollably	The thermocouple is not plugged in	Plug in the thermocouple

Symptom	Cause	Remedy
<b>Pressure</b>		
The unit will not hold/build pressure	There is a leak at one of the fittings	Trace the tubing and tighten the leaking connection  Replace the regulator
	The regulator (black valve) is leaking	Rebuild the regulator according to specs (rebuild kits and manuals are available)
	The back pressure regulator is leaking	Replace the regulator
	The pump is broken (not cycling, constantly cycling)	Replace the pump
<b>Leaks</b>		
Water is not flowing to the cell	The tubing is plugged	Check the tubing for obstruction
	The fittings are clogged	Check the openings and clean if necessary

# Appendix

## Diagrams



### Front Panel

#### Local Interface:

1. **Liquid Crystal Display (LCD)**- Displays Flow rate, pressure (with optional pulse damper), other allowed functions.
2. **Up/Down Keys**- UP and DOWN arrow keys set flow rates, change pump settings.
3. **Permanent Functions Keys**- DISPLAY, ΔMENU, and RUN/STOP keys are control keys permanently defined for direct control of major instrument functions.
4. **Status LEDs**- Indicate pump running or fault.

**Pulse Damper:** Optional pulse damper for minimized fluid delivery pulsation.

5. **Outlet Port**- Connection to downstream device.

6. **Inlet Port**- Connection from pump outlet.

#### Liquid End Assembly:

7. **Outlet Valve**- Provides tubing connection for pump output.
8. **Cylinder**- Contains pumping chamber and piston wash ports.
9. **Inlet Valve**- Provides tubing connection to fluid source. Inlet valve has an additional groove on the hexagonal portion of the valve.

### Rear Panel

1. **RS232**- RJ11 connector for RS232 communication.
2. **I/O**- Input/output connections for remote analog control, pressure out, error out, remote start, and stop.
3. **Power Entry**- Provides power connection with modular cord.
4. **Fuse**- Housing for pump fuses.
5. **On/Off**- Turns the power to the pump on and off.

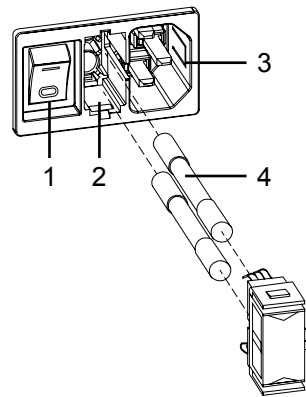
# Maintenance

## Fuses

As you look at the power entry module, you will see:

1. ON/OFF Switch
2. Fuse Drawer
3. Power Inlet
4. Fuses

The power entry module is self selecting for voltage within the range of 100-240V. The provided power cord is plugged into the power inlet. Plug the power cord of the pump into a grounded, properly rated outlet and turn the power switch to ON. The power is turned on by positioning the ON/OFF switch so the "1" is depressed. After you have confirmed there is electrical power, turn the power off by positioning the ON/OFF switch so the "0" is depressed



**Power Entry Module**



# Warranty and Return Policy

## Warranty:

OFI Testing Equipment, Inc. (OFITE) warrants that the products shall be free from liens and defects in title, and shall conform in all respects to the terms of the sales order and the specifications applicable to the products. All products shall be furnished subject to OFITE's standard manufacturing variations and practices. Unless the warranty period is otherwise extended in writing, the following warranty shall apply: if, at any time prior to twelve (12) months from the date of invoice, the products, or any part thereof, do not conform to these warranties or to the specifications applicable thereto, and OFITE is so notified in writing upon discovery, OFITE shall promptly repair or replace the defective products. Notwithstanding the foregoing, OFITE's warranty obligations shall not extend to any use by the buyer of the products in conditions more severe than OFITE's recommendations, nor to any defects which were visually observable by the buyer but which are not promptly brought to OFITE's attention.

In the event that the buyer has purchased installation and commissioning services on applicable products, the above warranty shall extend for an additional period of twelve (12) months from the date of the original warranty expiration for such products.

In the event that OFITE is requested to provide customized research and development for the buyer, OFITE shall use its best efforts but makes no guarantees to the buyer that any products will be provided.

OFITE makes no other warranties or guarantees to the buyer, either express or implied, and the warranties provided in this clause shall be exclusive of any other warranties including ANY IMPLIED OR STATUTORY WARRANTIES OF FITNESS FOR PURPOSE, MERCHANTABILITY, AND OTHER STATUTORY REMEDIES WHICH ARE WAIVED.

This limited warranty does not cover any losses or damages that occur as a result of:

- Improper installation or maintenance of the products
- Misuse
- Neglect
- Adjustment by non-authorized sources
- Improper environment
- Excessive or inadequate heating or air conditioning or electrical power failures, surges, or other irregularities
- Equipment, products, or material not manufactured by OFITE
- Firmware or hardware that have been modified or altered by a third party
- Consumable parts (bearings, accessories, etc.)

## Returns and Repairs:

Items being returned must be carefully packaged to prevent damage in shipment and insured against possible damage or loss. OFITE will not be responsible for equipment damaged due to insufficient packaging.

Any non-defective items returned to OFITE within ninety (90) days of invoice are subject to a 15% restocking fee. Items returned must be received by OFITE in original condition for it to be accepted. Reagents and special order items will not be accepted for return or refund.

OFITE employs experienced personnel to service and repair equipment manufactured by us, as well as other companies. To help expedite the repair process, please include a repair form with all equipment sent to OFITE for repair. Be sure to include your name, company name, phone number, email address, detailed description of work to be done, purchase order number, and a shipping address for returning the equipment. All repairs performed as "repair as needed" are subject to the ninety (90) day limited warranty. All "Certified Repairs" are subject to the twelve (12) month limited warranty.

Returns and potential warranty repairs require a Return Material Authorization (RMA) number. An RMA form is available from your sales or service representative.

Please ship all equipment (with the RMA number for returns or warranty repairs) to the following address:

OFI Testing Equipment, Inc.  
Attn: Repair Department  
11302 Steeplecrest Dr.  
Houston, TX 77065  
USA

OFITE also offers competitive service contracts for repairing and/or maintaining your lab equipment, including equipment from other manufacturers. For more information about our technical support and repair services, please contact [techservice@ofite.com](mailto:techservice@ofite.com).