RheoSense microVISC SOP

Equipment

RheoSense µVISC

Contacts

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Why Should I use this Equipment?

To quickly, easily, and accurately determine viscosities of solutions at or near room temperature using a small sample volume.

Safety tips for user and instrument

1) Prepare your sample far enough away from the machine to avoid chemical spills, especially on connectors.
2) Always use gloves when handling samples or system components.
3) After drawing a sample into the pipette, wipe the outside dry with a lint-free wipe before inserting into the microVISC.
4) Never manually depress a pipette plunger after you mount it into the unit (could result in permanent damage to the sensor).
5) Do not allow particles larger than 10% of the sensor channel depth in the sample. A table of chip types and operating ranges is available in the appendix. Check the chip type before taking measurements to ensure that your sample can be safely and accurately measured.
6) Always perform a cleaning cycle with appropriate solution before and after measurements.
7) Samples above 100cP will take more than one cleaning cycle.

8) When using acidic or basic solvents, try to take measurements without breaks between runs and run a cleaning cycle immediately after measurements are finished. Prolonged exposure to acids or bases can damage the sensor.

Quick start user guide

1) Enable temperature control using on/off button on the left side of the panel.
   a) Change the set point using the arrows (tap for 0.1° increments, hold for 1° increments) or by using the numeric keys when the set point is flashing.
   b) Advanced options (temperature margin, soak time, etc) can be changed by pressing "Menu" and "2" for temperature control.
2) Load a pipette with sample by grasping the flange and slowly drawing back the plunger while tip of pipette is in the sample
3) Mount the pipette in the unit by guiding the tip into the sample inlet port and firmly pushing down on the flange until it clicks into place
4) Press the RUN/STOP button on the keypad to run in Auto, Advanced, or Cleaning mode. The mode can be changed by pressing ENTER on the main panel and using the arrow keys.
5) Remember these three rules
   a) MNF (measure nothing first): in this case, "nothing" is a 1% Aquet solution in the cleaning cycle. A cleaning cycle **must** always be run before **and** after sets of measurements.
   b) MSS (measure something simple): in the case of polymer solutions or suspensions, measure the pure solvent.
   c) MYS (measure your stuff): if measuring samples at a range of concentrations/viscosities, start with the lowest and work your way up.

Helpful hints

1) Check the sensor type before beginning a measurement to ensure that the viscosity of your sample will be in range of the sensor's measurement capacity.
2) Always hold pipettes by the rectangular flange to minimize heat transfer to the sample.
3) Always try to load the pipette so there are no bubbles in it.
   a) After loading the pipette with sample, hold the pipette vertically and push the plunger up slightly until the bubble is expelled from the tip.
4) If possible, load your sample before enabling the temperature control. After a new sample is loaded, you must wait for the temperature to re-stabilize, which can take 3-5 minutes.
5) If repeated measurements of one sample show a gradual increase or decrease in viscosity, the priming volume may have been insufficient. Repeat the measurement until the reading is stable.
6) To conserve sample volume when measuring consecutive samples with large differences in viscosity, run a cleaning cycle between measurements.

Operating Modes

1) Automatic
   a) After loading the sample and pressing RUN/STOP, the system will automatically move the pusher to the plunger position, prime the sensor with test fluid (10-200μL), pause for

sample relaxation (10-20s), take a baseline measurement, and measure the viscosity of your sample.

b) During the measurement, the following values are displayed:
   i) Viscosity (mPa-s)
   ii) Temperature (°C)
   iii) Pumping rate (s^{-1} or µL/min)
   iv) Dispensed volume (µL)
   v) Pressure (%age of full scale)
   vi) Measurement progress bar

c) Other measurement parameters can be viewed using the up/down arrow keys.

d) After a measurement is complete there are 3 options:
   i) Press RUN/STOP to take another measurement of the same sample.
   ii) Press MENU to access advanced parameters and functions.
   iii) Press .HOME to return pusher to home position and enable removal of the sample.

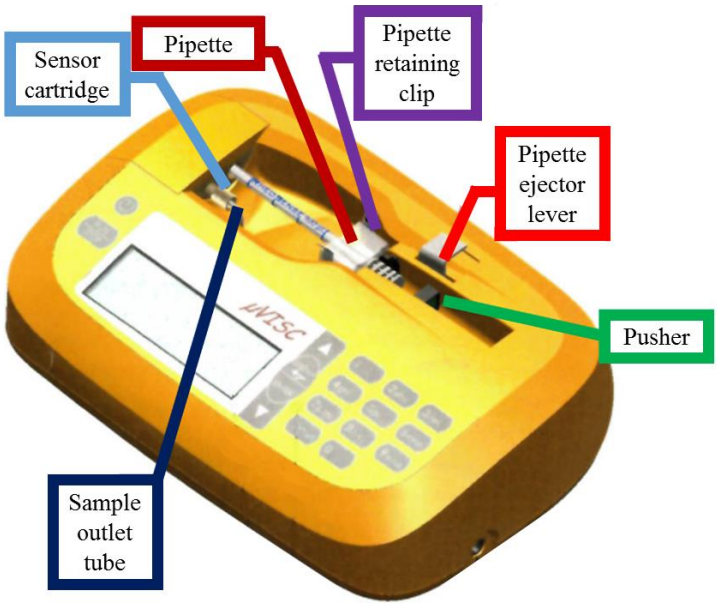
2) Advanced
   a) In advanced mode, you can specify all of the following parameters (or leave some on auto for the measurement system to decide):
      i) Rate: units are either in s^{-1} for shear rate or µL/min for flow rate. Flow rate range is 0.5-450 µL/min.
      ii) Measurement volume: available measurement volume is 5-400 µL.
      iii) Priming volume: available priming volume is 1-200 µL.
      iv) Pause time (for stress dissipation after priming): available pause time is 0-36000 seconds.
3) Cleaning
   a) To clean the sensor cartridge, fill a new pipette with solvent that is miscible with the samples used. The system will dispense the entire contents of the pipette at 100 µL/min. After running a cleaning cycle of solvent, repeat with 1% Aquet solution.

Appendix

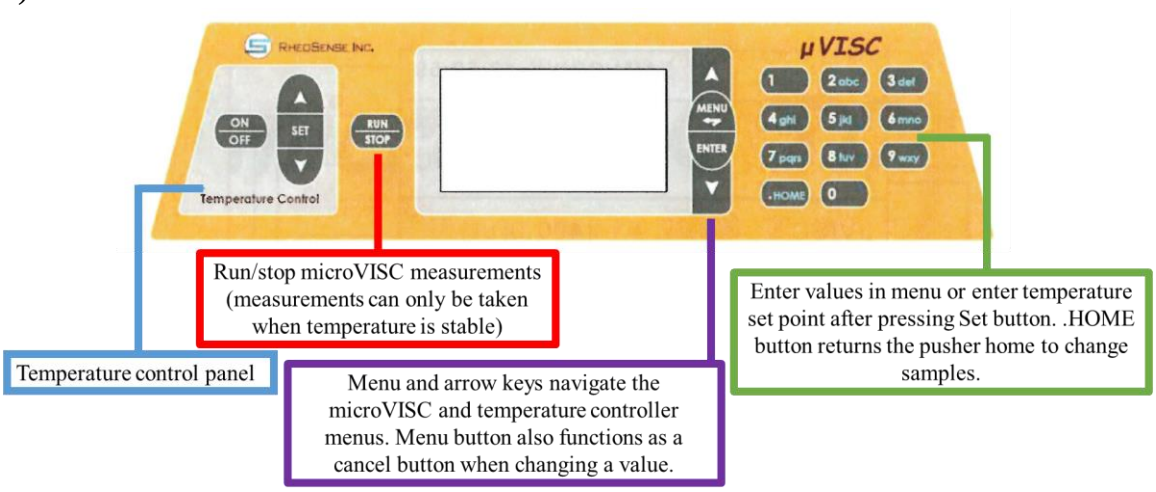
1) Chip types and operating ranges

Chip type	Viscosity range (cP)	Flow channel depth (µm)
A05	0-100	50
A10	4-600	100
A20	10-2,000	200
A30	30-8,000	300
B10	60-5,000	100
B20	70-10,000	200
B30	100-20,000	300
C10	400-22,000	100
C20	500-40,000	200
C30	2,000-80,000	300

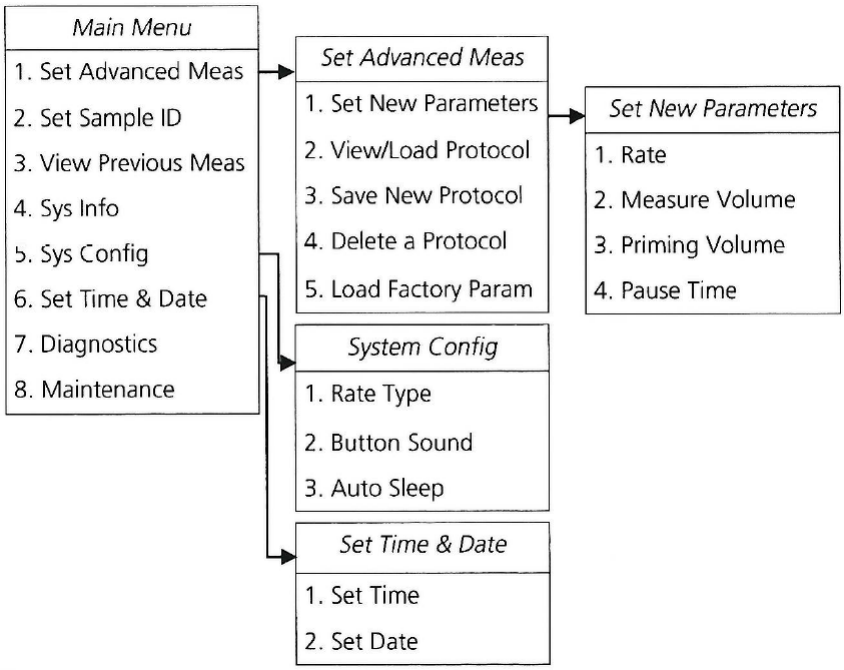
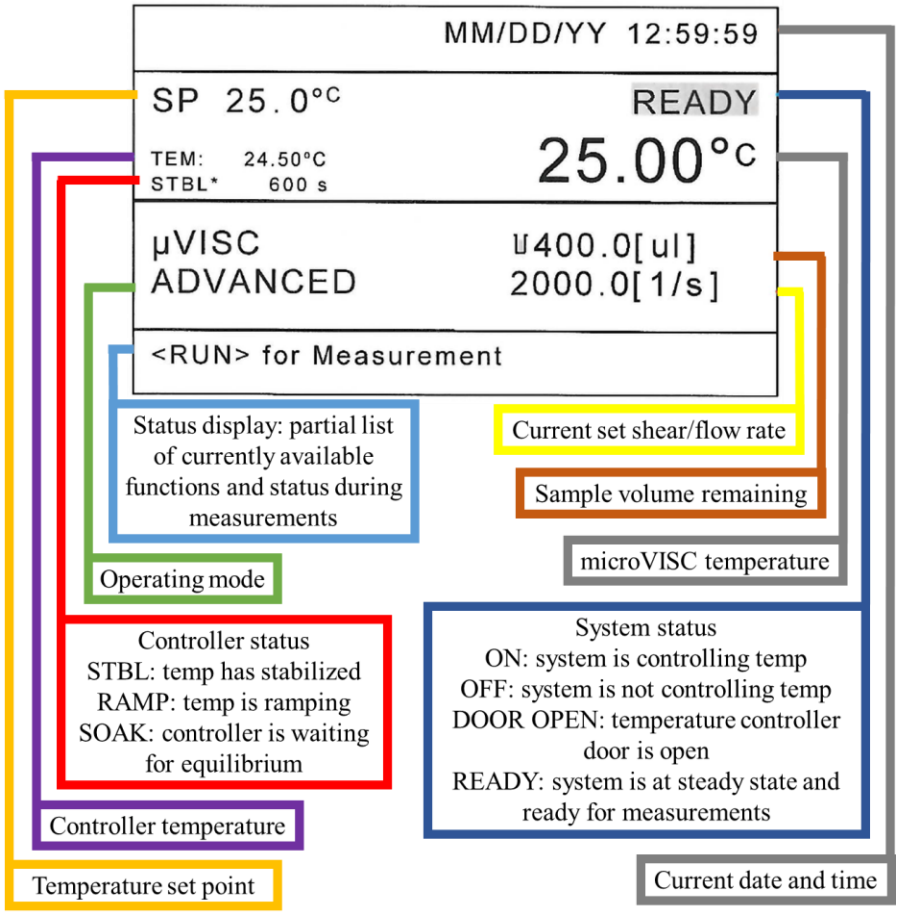
2) Hardware Overview



3) Main Panel Overview



4) Menu Structure



5) LCD Display Overview