

PCU-200 Laboratory Viscometer

SIMPLE START-UP

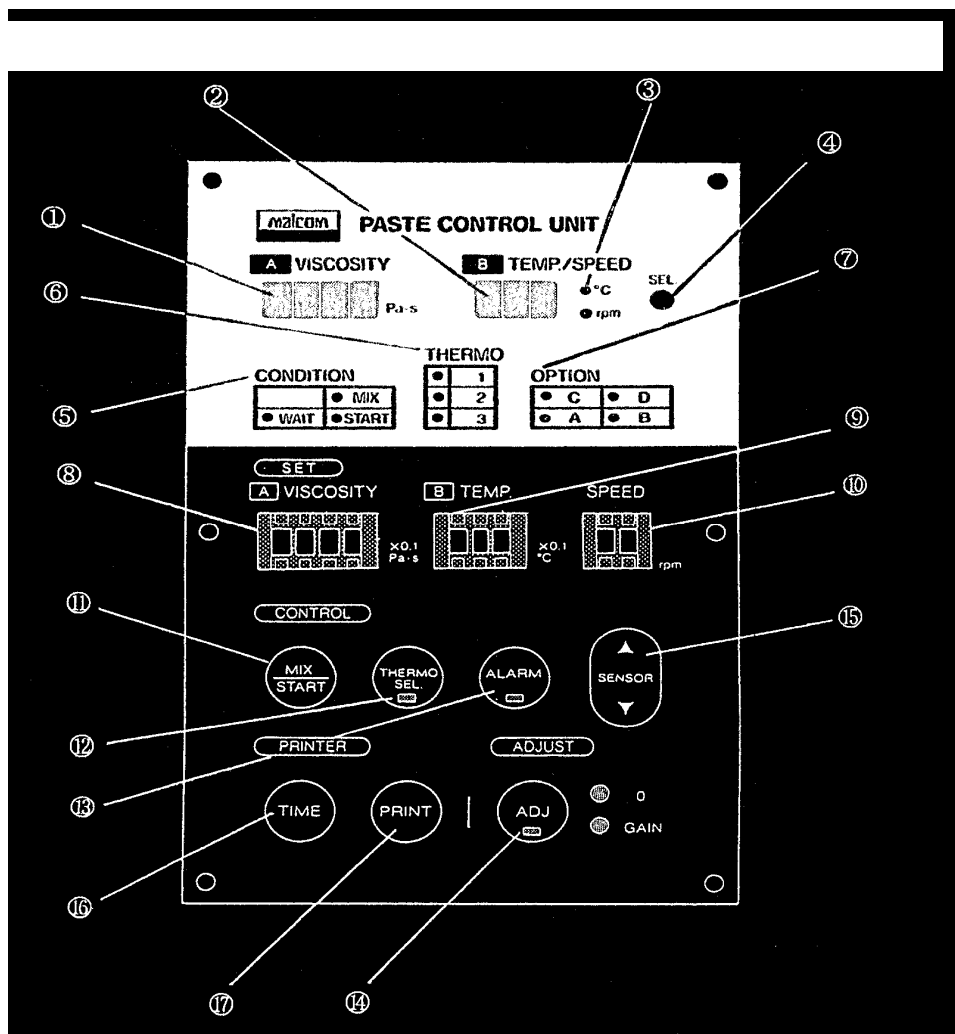
1. Turn power on. Power switch is located on lower rear panel. Press door to open.
2. Using the SENSOR UP/DOWN controller, move sensor all the way up.
3. Slide the inner spiral up, and turn in a clockwise direction to secure it.
4. Slide the outer cylinder over the inner spiral, and turn counter-clockwise to secure it.
5. Press heater unit latch, and pull unit out.
6. Insert solder paste jar (using adapter when needed), and tighten heater band screw.
7. Slide heater unit back in. Close door.
8. Initial settings:
 - a. Viscosity: 0000
 - b. Temp: 250
 - c. Speed: 10
9. Press MIX/START Button. Condition: Mix LED will light. Wait 2 minutes
10. Press THERMO SEL. Button. Thermo 1 LED will light.
11. Press MIX/START Button. Condition: Start LED will light.
 - a. Pressing the MIX/START Button again toggles between modes:
PCU-203 (Option LED: A)
PCU-205 (Option LED: B)
12. Lower sensor into paste, immersing the tip only about 3/4 of an inch.

TIME SET-UP

1. Press and hold TIME Button while powering on.
2. PRINT Button scrolls through selections.
Year → Month → Day → Hour → Minute
3. ADJ Button changes selection.

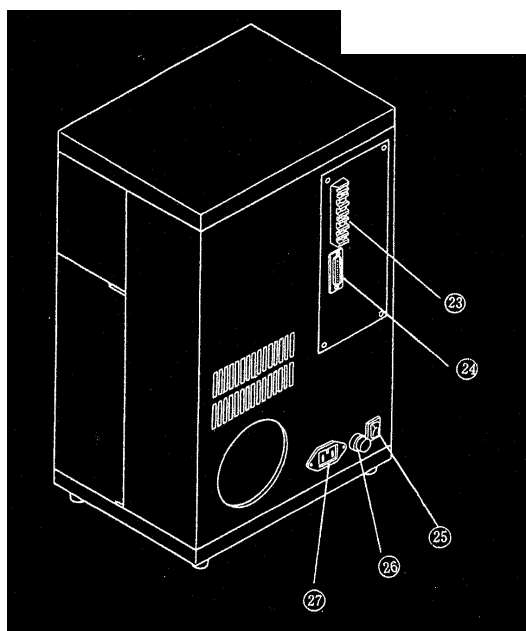
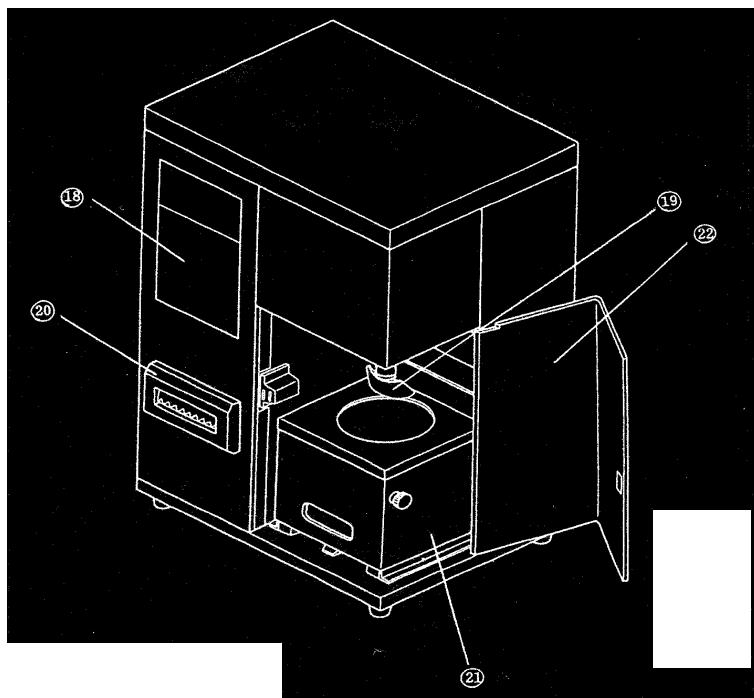
CONTROL PANEL

1. Viscosity Digital Display
2. Temp/Speed Digital Display
3. Temp/Speed LEDs and LED
4. Temp/Speed Select Switch
5. Condition LEDs
6. Thermostat LEDs
7. Option LEDs
8. Viscosity Set Switch
9. Temperature Set Switch
10. Speed Set Switch
11. Mix/Start Switch
12. Thermostat Select Switch
13. Alarm Switch and LED
14. Adjust Switch and LED
15. Sensor Up/Down Switch
16. Time Switch
17. Print Switch



Front View

- 18. Control Panel
- 19. Sensor
- 20. Printer
- 21. Thermostat
- 22. Door



Rear View

- 23. Terminal Block
- 24. RS-232C Connector
- 25. Power Switch
- 26. Fuse Holder
- 27. Power Cord Receptacle
- 28. Thermostat Size Switch

FUNCTIONS

1. Viscosity Digital Display

This four-digit display normally shows the present viscosity in Pa·s. If you were to ignore the decimal point, then the display would be in poise. This display also shows the year, day of month and hour of day when the time switch is pressed.

2. Temp/Speed Digital Display

This three-digit display normally shows either the current sample temperature or outer cylinder speed. This display also shows the month of the year and the minute of the hour when the time switch is pressed.

3. Temp/Speed LEDs

These LEDs indicate if the temp/speed digital display is showing the temperature in °C or the speed in RPM.

4. Temp/Speed Select Switch

This button is used to toggle the temp/speed digital between the temperature or speed.

5. Condition LEDs

These LEDs indicate what state the sensor is in. It is either MIXing the sample, STARTing to measure the sample, or WAITing for the sample to recover. The MIX and START conditions can be selected by using the mix/start switch.

6. Thermostat LEDs

These LEDs indicate which mode of temperature control is being used. "1" is the standard solder paste mode. "2" is the calibration liquid mode. "3" IS IDENTICAL TO "1". These modes are selected by the thermostat select switch.

7. Option LEDs

These LEDs indicate which option is being utilized: JIS standard (A), or on-line operation (B).

8. Viscosity Set Switch

Set this digital switch to the minimal acceptable value of viscosity. When utilizing the JIS standard or on-line operation options, (PCU-203, PCU-205), set this switch to 0000.

9. Temperature Set Switch

Set this digital switch to the desired temperature of the sample. The set temperature cannot be lower than 15°C, nor higher than 35°C. The temp/speed digital display will flash in this situation. The ISO standard temperature is 25°C

10. Speed Set Switch

Set this digital switch to the speed/shear rate required. Do not set the speed for greater than 50 RPM. The temp/speed digital display will flash if this is done. The shear rate is the speed multiplied by 0.6. The ISO standard speed is 10 RPM.

Example, 10 RPM x 0.6 = 6 sec.

11. Mix/Start Switch

Press this button when you wish to change the mode of operation. Each model of PCU-200 series viscometer has a different sequence of modes to choose from. The modes are cyclic according to the following:

PCU-201: Mixing, Measuring, no mode, Mixing.
PCU-203: Mixing, Measuring, JIS standard (option A), no mode, Mixing.
PCU-205: Mixing, Measuring, JIS standard (option A), on-line (option B), no mode, Mixing.

The viscosity set switch must be set to 0000 when utilizing the JIS standard or on-line modes.

12. Thermostat Select Switch and LED

This button allows you to select the mode of temperature control to use. The first press of the button will turn on the thermostat and this is indicated by the LED for MODE 1 illuminating. MODE 1 is for measuring solder paste. The next press of the thermostat select switch will select MODE 2, for calibrating the PCU-200 with silicon oil. A third press selects MODE 3, which is identical to MODE 1. The fourth press turns off the temperature control. This selecting is cyclic. The LED within the button flashes to indicate operation.

13. Alarm Switch and LED

Press this button on to activate the alarm program. The LED in the button will light. If the measured viscosity is over the viscosity set switch value, then the LED will slowly flash. However, if the viscosity drops below the viscosity set value, an alarm condition will occur. The wait LED will illuminate, the outer cylinder will stop rotating, and the two upper terminals of the rear panel terminal block will become closed. To reset the alarm, press this button a second time. If the viscosity set value is "0000", then the alarm program will not function.

14. Adjust Switch and LED

When calibrating the PCU-200, press this button to enable the zero adjustment. The LED will light when the button is pressed. Do not adjust the gain while this LED is illuminated. When setting the time, the adjust switch increments the flashing, selected, digit.

15. Sensor Up/Down Switch

Push on the arrows to raise or lower the sensor accordingly. There are limit switches to prevent overrun. The sensor should be in the fully up position when removing or installation the inner spiral and outer cylinder and when sliding the thermostat in or out.

16. Time Switch

Press and hold this button while turning the main power on to display date and time on the viscosity and temp/speed digital displays. The following is the format of the displays:

	Viscosity Display	Temp/Speed Display
First Press	year	month
Second Press	day of month, hour	minute
Third Press	viscosity	temp/speed

The sequence is cyclic and the hour is military, i.e., "13" means 1 o'clock in the afternoon. If the time switch is depressed while the power is turned on, it is then possible to set the time and date using the print and adjust switches.

17. Print Switch

Pressing this button will cause the built-in thermal printer to print out: the date and time, the speed and shear rate, the sample temperature and the viscosity. When setting the time, the print switch selects which digit is going to be changed.

18. Control Panel

This is where you find the many switches and LEDs used in the operation of the PCU-200.

19. Sensor

This is the heart of the viscometer. Here an outer cylinder rotates around an inner spiral. When fluid is subjected to this geometry, it undergoes constant shearing and is pumped through the sensor.

20. Printer

This thermal printer uses 2.25 inch wide rolls of thermal paper. Use the feed button to advance the paper out of the printer. Tear off the paper with an upward motion. The paper LED will illuminate when the paper supply is exhausted or torn.

21. Thermostat

This is the device that maintains the temperature of the sample. It is constructed of a peltier cooler/heater, a heat sink and a fan. If your thermostat is for 300cc jars, two aluminum adapters can be used for 100cc jar operation. The opening at the front of the thermostat has a catch that must be pressed to allow the thermostat to slide part way out of the PCU-200. Make sure the sensor is in full upright position before doing this.

22. Door

This tinted cover protects the sample from airborne contaminants. Additionally, it helps maintain a closed temperature controlled environment for the sample being measured. The door has a push-open, push-close locking mechanism.

23. Terminal Block

The terminal block on the rear panel has outputs for the alarm, viscosity and temperature. The viscosity output is 1mV/Pa·s and the temperature output is 10mV/°C.

24. RS-232C Connector

The PCU-205 comes equipped with this interface. It enables an IBM compatible computer to communicate, acquire data and controls the PCU-205 through use of the VAM-1 software. Connect only a Malcom specific cable to this connector. Other cables may damage the viscometer and hence, void the warranty. Connect the other end of the cable only to a serial port, not a parallel port.

25. Power Switch

This switch supplies power to the PCU-200. "Up" is ON and "Down" is OFF. If the time switch is held down while the power is turned ON, it then becomes possible to set the time and date.

26. Fuse Holder

This holds the fuse. Replace only with a 2A 250V fuse.

27. Power Cord Receptacle

One end of the power cord attaches here. The other plugs into an appropriate power outlet. Only supply the voltage indicated above the receptacle. Improper voltage will damage the PCU-200 and void the warranty.

28. Thermostat Size Switch

This three position toggle switch should be set in respect to the type of thermostat you have. If you have a 100cc thermostat that will only accept 100cc jars, then set the switch to 100cc. If you have a 300cc thermostat and you are using a 300cc jar, set the switch to 300cc. If you have a 300cc thermostat, but you are using a 100cc jar in conjunction with the aluminum adapters, set the switch to adapter.