Melting Point Device

DMP Series

Operating Manual

A & E LAB (UK) CO.,LTD.

BEFORE USE:

Please read the following instructions:

Read the Manual first before operating the instrument

For indoor use only

Ambient temperature range +5°C to +40°C

Use in a well-ventilated area.

Relative humidity not exceeding 80%

Mains supply fluctuation not exceeding 10%

Warning

ALL UNITS MUST BE EARTH

Check the line supply is sufficient to meet the power requirement of the unit!

Warranty

We provide the ONE-year limited warranty for the units in this series.

This warranty does NOT apply if damage is caused by fire, accident, misuse, neglect, incorrect adjustment or repair, damage caused by incorrect installation, adaptation, modification, fitting of non-approved parts or repair by unauthorized personnel. When returned the defective products, customers should be responsible for the shipping and insurance costs.

LIMITATION OF LIABILITY

NOTWITHSTANDING ANY OTHER PROVISIONS HEREIN, UNDER NO CIRCUMSTANCES IS EITHER PARTY LIABLE FOR ANYCONSEQUENTIAL, SPECIAL, INCIDENTAL, INDIRECT, MULTIPLE, ADMINISTRATIVE, OR PUNITIVE DAMAGES, OR ANY DAMAGE OF AN INDIRECT OR CONSEQUENTIAL NATURE ARISING OUT OF OR RELATED TO ITS PERFORMANCE, WHETNER BASED UPON BREACH OF AGREEMENT, WARRANTY, OR NEGLIGENCE AND WHETHER GROUNDED IN TORT, CONTRACT, CIVIL LAW, OR OTHER THEORIES OF LIABILITY, INCLUDING STRICT LIABILITY, EVEN IF ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES. THE COMPANY'S TOTAL LIABILITY INCLUDING, BUT NOT LIMITED TO, LIABILITY FOR INDEMNITY, DEFENSE, AND HOLD HARMLESS OBLIGATIONS IS LIMITED TO NO MORE THAN THE AMOUNT PAID TO THE COMPANY UNDER THE CUSTOMER'S ORDER AND THE CUSTOMER AGREES TO INDEMNIFY THE COMPANY FOR ANY EXCESS AMOUNTS. TO THE EXTENT THAT THIS LIMITATION OF LIABILITY CONFLICTS WITH ANY OTHER PROVISION(S) OF THIS AGREEMENT, SUCH PROVISION(S) WILL BE REGARDED AS AMENDED TO WHATEVER EXTENT REQUIRED TO MAKE SUCH PROVISION(S) CONSISTENT WITH THIS PROVISION.

Overview

The DMP SERIES are portable and easy operated melting point device. It has been developed for replacement of the glass thermometer type melting point apparatus. A clear vision view is obtained via a magnified lens, appropriate view angle from the extendible feet, and bright vision through built in LED light.

The DMP-300 is the upgrade version of the DMP-200. the DMP-300 is additionally equipped with internal fan for rapidly cooling down the temperature after measurement complete; internal LED display to simultaneously have a view on the sample and temperature reading; a handheld “READ” push button to quickly response while the sample melt; a data recording system to store 32 sets of reading data; and an optional printer to print every results in the experiment, see the Table 1 for the detail comparison.

Figure 1: Overview of the Melting Point Device. ①Extendible feet; ②Sample window; ③Viewer; ④Control panel; ⑤Hand held jack port (DMP-300 only); ⑥Printer port (DMP-300 only); ⑦ Calibration inlet

The DMP SERIES can measure three different samples simultaneously. Samples are placed in the three different one-end capillary tubes and insert to the three holes of the sample chamber (Figure 1, ②). When start the device, the heated block in the sample chamber is heated and the samples are view through the viewer (Figure 1, ③) until the samples melt. The melting point temperature can be easily read from the temperature display or **within the viewer (DMP-300 only).** the heated rate is divided into two different speeds: fast and slow speed. The fast speed runs at 20˚C/min to reach a certain temperature point which is called “fast stage”, and the slow speed can be set at any point between0.2˚C/min to 10˚C/min. The temperature is kept at the fast stage point and beeping and waiting further action. User does not need to keep viewing samples at this stage. The fast stage point can be empirically or experimentally determined. The fast stage is normally set at 10˚C below the known melting point of the samples.

The DMP-300 comes with hand held button. Just plug the hand held to the jack port (Figure 1, ⑤), and push button when the sample melt instead using the “Read” button in the keypad. To help to reduce the viewing time.

The DMP-300 have optional printer port and the printer must be purchased separately. When connected the printer, it will automatically print the sample ID, date of measurement and the melting point while pushing the “Read” button.

Table1. DMP-100, DMP-200 , DMP-300

Model	DMP-100	DMP-200	DMP-300
Temperature range (ºC)	Ambient to 300	Ambient to 350	Ambient to 400
Temperature accuracy (ºC)	± 0.5	± 0.5	± 0.5
Display	Four digit LED	Four digit LED	Four digit LED
Display resolution (ºC)	0.1	0.1	0.1
Readout and temperature hold	Yes	Yes	Yes
Calibration Capability	Yes	Yes	Yes
Number of samples	3	3	3
Fast Stage Ramp rate (ºC/min)	20 fixed	20 fixed	20 fixed
Slow Ramp rates (ºC/min)	adjustable between 0.2 to 10 at 0.1 (ºC/min) interval	adjustable between 0.2 to 10 at 0.1 (ºC/min) interval	adjustable between 0.2 to 10 at 0.1 (ºC/min) interval
Cooling rate (ºC/min)	-	-	25
Inside Block Temperature View	No	No	Yes
Hand held "READ" push button	No	No	Yes
Data Recording	No	No	Yes
Print	No	No	Yes
Dimensions (w x d x h)	222*190*200	222*190*200	222*190*200
Net weight	2.5 Kg	3.0 Kg	3.5 Kg
Electrical supply	120 or 230V, 50Hz,75W	120 or 230V, 50Hz, 75W	120 or 230V, 50Hz, 75W

Operation

Place the unit in the firm and flat surface and make sure that the extendible feet at the right position to give a good view angle.

1. Prepare the samples: placing the sample into capillary tube, and slightly tape the tubes to move the samples all the way to the bottom of the tube.

2. Plug the unit into an electrical outlet. Make sure that the correct voltage and appropriate line supply.

3. Turn on the unit, make sure all the indictors (heating, fast and slow) are off. The light in the viewer will be on at this time and the temperature display will show the current heated block temperature.

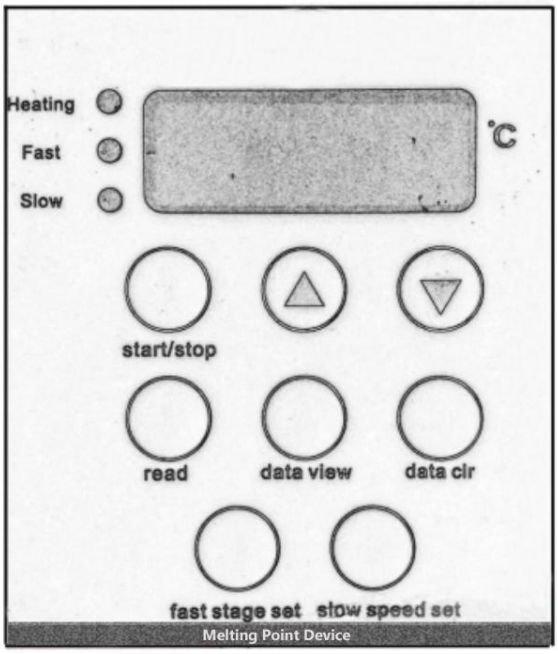

Figure 2: Overview of the control panel of the DMP SERIES.

4. Setting the fast stage point: Press the “fast stage set” button, the temperature display will show the previous set value. And use the two arrow keys to scroll up or down to the desired value and then release the “fast stage set” button.

(DMP-300 only) If the setting temperature is 5 °C lower than the block temperature, the fan will be automatically turned on until the block temperature down to 5 °C below the fast stage temperature.

5. Setting the slow speed: Press the “slow speed set” button, the temperature display will show the previous set value. And use the two arrow keys to scroll up or down to the desired value and then release the “slow speed set” button. The slow speed must be set properly before start the run!

6. Carefully insert the sample tubes into the three holes in the sample chamber separately. Look through the viewer to see whether the tubes are placed correctly or not.

7. Press “start/stop” button to start the fast stage heating. The “heating” indicator will be on. When reaching the fast stage temperature point the “fast” indicator will be on together with the “heating” indicator. And in the same time, the machine will beep to remind the user that the machine has reached the fast stage and wait for the next step. Do not do any action until the “fast” indicator is on and the machine beeps.

(DMP-300 only) Please wait the fan stop to press “start/stop” button, otherwise it will display “Err2”.

8. After reaching the fast stage, press “start/stop” button again to start the slow speed heating. At this time, the “fast” indicator will be off and the “slow” indicator will be on.

9. Continuously viewing the samples until the samples melt. Press “read” button in the keypad onceto hold the reading. **(DMP-300 only) you can connect the handheld “read” button to machine by simply plug the button input to the machine, and press the handheld “read” button instead of the “read” button in the keypad.** In this time, the “slow” indicator will blink, indicating the temperature is hold at that temperature point through PID control mode. The reading data will be stored in the machine or **printed out from the printer (DMP-300 only).** To continue, press “read” button again, and the “slow” indicator will be steady on gain, and the temperature will start ramping at the setting speed again.

10. After finish the measurement, press the “start/stop” button. The unit starts to cool down to room temperature and all indicators go off.

11. For the continuous measurement of the next set of samples, just insert the new sample tubes into the holes of the sample chamber and repeat the step 7 – 10.

12. The machine can be calibrated by simply adjusting the reading temperature through the micro-potentiometer located in a “calibration” labeled hole in the right hand side of the instrument (see Figure 1, ⑦) using external probe: Put a capillary tube containing an external probe in the sample chamber, run the machine as running normal sample. When reaching the fast stage temperature point, wait until the temperature reading in the machine is stable, compare the reading to the value of the external probe, adjust the temperature reading to the correct reading using a small screw, press “start/stop” button twice to stop the process, and the machine is calibrated. More accurately, if the melting point is known, you can do the calibration on the melting point as described in **Step 9.**

The calibration is work on one point value only. To test the different material, users must calibrate again.

13. Data reporting system: Every time you push the “READ” button, data will be stored in the memory. The machine can only store 32 sets of data. You can record the data later after the analysis. Please make sure that there is enough sets of data to store. **Before the analysis, press “data clr” button to clear all data in the memory.**

(DMP-300 only) Data will be shown in two lines: first line will be “X.Y”: X indicated the number of run, for example, the first run will show “1.Y”, and the second run will show “2.Y”. The “Y” indicates the reading time. For example, in the first run, you push 6 times of “read” button to record: first sample initial melting point, first sample middle melting point, first sample final melting point; and second sample initial melting point, second sample middle melting point, and second sample final melting point, then the data will be:

1.1 - first sample initial melting point; 1.2 – first sample middle melting point; 1.3 – first sample final melting point; 1.4 – second sample initial melting point; 1.5 – second sample middle melting point; 1.6 – second sample final melting point.

Use arrow key to move the data view to read every set of data. When the data is full, the display will show “FULL”.

When pressing “data clr”, it will show “n”, use the arrow key to change “Y”, then press “data clr” one more time to show “CE”. This means that the data has been cleared from the memory.

When machine connected to optional printer, the printer will automatically print the result with date of measurement and result. There is no restriction on the data number.

Calibration

1. External Probe Calibration:

Calibration can be done in stable temperature status. Insert the capillary containing the external probe to sample location. Set the fast stage temperature at the desired point, press “start/stop’ button to run the machine. After the machine reach temperature (machine will beep), use a small screw to adjust the micro-potentiostat in the “calibration inlet” to the correct value, and then press the “start/stop” button twice to terminate the run. Or during the slow ramping, press the “read” button to hold the run for 2 minute, and machine will beep at this time and then adjust micro-potantiostat to the correct value.

2. Standard Chemical Calibration:

To calibrate the machine with known melting point of a type of test material, when the chemical starts to melt, press the “read” button and wait further about 2 minutes until the machine starts beeping. At this time, the reading will be fluctuated within +/- 0.5, adjust the temperature reading to the correct reading using a small screw through “calibration” inlet.

Maintenance and Service

Please make sure that the unit disconnects from electricity supply and allows cooling down before to do any repair or cleaning!!!

Cleaning: The unit must be clean using soft cloth routinely. To clean the heated block, 1) unscrew the sample chamber cover by removing the four screws and lift the cover; 2) loosen the screws connecting to the plate. Do not remove completely; 3) push the plate to one side; 4) remove the glass window for cleaning by turning the unit upside-down; 5) after cleaning, tighten the screw and put the cover back on.

Changing fuse: When the display and chamber light stays off by turning on the switch, the possibility may be from the fuses. To replace the fuse: disconnect the unit from electricity supply; unscrew the four screws from the bottom of the base and find the two fuses mounted on the electricity outlet; remove the old fuses and replace them with new fuses. Please **NOTE**: the fuse used in 230V is T1A while T2A in 115V; assemble back the base and check the electricity safety before using the unit again. **This must be done by qualified personnel!**

Inspection Report

Model _____

Serial Number _____

Safety

	1. Integrity	√
	2. Packing status	√
	3. Correct warning label	√
	4. Electrical earth continuity	√
	5. Electrical Insulation	√
	6. Electrical Flash Test	√
Functional	**1. Visual acceptance**	√
	2. Appropriate control function	√
	3. Indicators	√

Quality Control Inspector

Packing list	
Name	Quantity
Melting Point Device	1
Power Cord	1
Operating Manual	1

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