



Instruction Manual
Basic Melting Point Apparatus
Advanced Melting Point Apparatus



TABLE OF CONTENTS

Package Contents	1
Warranty	1
Installation	2
Maintenance & Servicing	2
Environmental Conditions	2
Equipment Disposal	2
Safety Instructions	3-4
Standards & Regulations	3-4
Specifications	5
Basic Control Panel	6
Operating Instructions - Basic Unit	7-8
Advanced Control Panel	9
Operating Instructions - Advanced Unit	10-12
Troubleshooting	13
Replacement Parts	14-15
Accessories	16

PACKAGE CONTENTS

Melting Point Apparatus
92" (234cm) detachable power cord
Capillary Tube Pack
Instruction manual

WARRANTY

Manufacturer warrants this product to be free from defects in material and workmanship when used under normal conditions for five (5) years. Register your equipment or instrument online at: www.vwrsp.com/warranty for US residents or www.vwrcanlab.com/warranty for Canadian residents. For your reference, make a note of the serial number, date of purchase and supplier here.

Serial Number: _____

Date of Purchase: _____

Supplier: _____

INSTALLATION

Upon receiving the VWR Melting Point Apparatus, check to ensure that no damage has occurred in shipment. It is important that any damage that occurred in transport is detected at the time of unpacking. If you do find such damage the carrier must be notified immediately.

DO NOT lift the unit by oven, power cord, or arm (Advanced only). After unpacking, place the Melting Point Apparatus on a level bench or table, away from explosive vapors. Ensure that the surface on which the unit is placed will withstand typical heat produced by the unit and place the unit a minimum of 6" (15.2cm) from vertical surfaces. Always place the unit on a sturdy work surface. Position the unit in such a way that it is easy to reach and unplug the power cord from the back of the unit.

The Melting Point Apparatus is supplied with a power cord that is inserted into the IEC connector on the back of the unit first, then it can be plugged into a properly grounded outlet. The 120V unit plugs into a 120 volt, 50/60 Hz source. The 230V unit plugs into a 230 volt, 50/60 Hz source.

MAINTENANCE & SERVICING

The Melting Point Apparatus is built for long, trouble-free, dependable service. No lubrication or other technical user maintenance is required. It needs no user maintenance beyond keeping the surfaces clean. The unit should be given the care normally required for any electrical appliance. Avoid wetting or unnecessary exposure to fumes. Spills should be removed promptly after the unit has cooled down. **DO NOT** use a cleaning agent or solvent on the front panel which is abrasive or harmful to plastics, nor one which is flammable. Always ensure the power is disconnected from the unit prior to any cleaning. If the unit ever requires service, contact your VWR representative.

INTENDED USE

The VWR Melting Point Apparatus intended for general laboratory use. Safety cannot be guaranteed if used outside of the intended use.

ENVIRONMENTAL CONDITIONS

Operating Conditions:	Indoor use only.
Temperature:	5 to 40°C (41 to 104°F)
Humidity:	20% to 40% relative humidity, non-condensing
Altitude:	0 to 6,562 ft (2000 M) above sea level

Non-Operating Storage:	
Temperature:	-20 to 65°C (-4 to 149°F)
Humidity:	20% to 40% relative humidity, non-condensing

Installation Category II and Pollution Degree 2 in accordance with IEC 664.

EQUIPMENT DISPOSAL



This equipment must not be disposed of with unsorted waste. It is your responsibility to correctly dispose of the equipment at life-cycle-end by handing it over to an authorized facility for separate collection and recycling. It is also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect the persons involved in the disposal and recycling of the equipment from health hazards.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment. By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

SAFETY INSTRUCTIONS

Please read the entire instruction manual before operating the Melting Point Apparatus.



WARNING! DO NOT use the Melting Point Apparatus in a hazardous atmosphere or with hazardous materials for which the unit was not designed. Also, the user should be aware that the protection provided by the equipment may be impaired if used with accessories not provided or recommended by the manufacturer, or used in a manner not specified by the manufacturer.

Always operate unit on a level surface for best performance and maximum safety.



CAUTION! To avoid electrical shock, completely cut off power to the unit by disconnecting the power cord from the unit or unplug from the wall outlet. Disconnect unit from the power supply prior to maintenance and servicing.

Spills should be removed promptly, after the unit has cooled down. **DO NOT** immerse the unit for cleaning. **DO NOT** operate the unit if it shows signs of electrical or mechanical damage.

The main supply power cord provided with this product is rated to safely handle the products electrical load under the stated environmental conditions. **DO NOT** replace the cord with an inadequately rated main supply cord.

The Melting Point Apparatus is designed to be operated in dry conditions. **DO NOT** place anything other than the appropriate capillary tubes in the oven opening.



CAUTION! The Melting Point Apparatus is not explosion proof. Use caution when unit is on or when heating volatile materials.



Earth Ground - Protective Conductor Terminal



Alternating Current

STANDARDS & REGULATIONS

The manufacturer hereby declares under it's sole responsibility that the construction of this product conforms in accordance with the following standards:

Safety standards:

CAN/CSA C22.2 No. 61010-1

CAN/CSA C22.2 No. 61010-2-010

UL 61010-1

EN 61010-1

EN 61010-2-010

EMC standards:

FCC Part 15 Subpart B

ICES-003

IEC 61326-1

EN 61326-1

CISPR 11

EN 55011

INSTRUCTIONS DE SÉCURITÉ

Veuillez lire le manuel d'utilisation dans sa totalité avant de faire fonctionner le appareil à point de fusion.



ATTENTION ! Ne pas se servir d'un appareil à point de fusion dans un environnement dangereux ou avec des matières dangereuses pour lesquelles cet appareil n'a pas été conçu. D'autre part, sachez que la protection offerte par l'appareil devient obsolète si l'unité est utilisée avec des accessoires non fournis ou recommandés par le fabricant ou si l'appareil est utilisé de façon non appropriée.

Toujours utiliser l'appareil sur une surface de niveau pour assurer une performance optimale et une sécurité maximale.



AVERTISSEMENT ! Pour éviter tout risque d'électrocution, coupez complètement l'alimentation à l'appareil, débranchez le cordon d'alimentation de l'appareil ou de la prise murale. Débranchez l'alimentation avant toute procédure d'entretien et de dépannage. Les renversements doivent être rapidement nettoyés une fois que l'appareil s'est refroidi. Ne pas immerger l'appareil pour le nettoyer. Ne pas faire fonctionner l'appareil s'il semble avoir subi des dommages électriques ou mécaniques.

Le cordon d'alimentation principal fourni avec ce produit est calibrée pour supporter en toute sécurité le chargement des produits électriques dans les conditions définies. NE PAS remplacer ce cordon avec un cordon d'alimentation principal mal classé.

Les appareil à point de fusion sont conçus pour fonctionner à sec. Ne pas verser d'eau, d'huile ou d'autres liquides dans les puits des appareils. La chambre dans laquelle sont insérés les blocs chauffants modulaires et les bains ne doit pas être remplie de liquide, quel qu'il soit. Ne pas placer autre chose que les blocs chauffants appropriés dans cette cavité.



AVERTISSEMENT ! Les appareil à point de fusion ne sont pas antidéflagrants. Faites attention quand l'appareil est sous tension ou quand des matières volatiles sont en train de chauffer.



Terre - Borne du conducteur de protection



Courant alternatif

NORMES ET RÉGLEMENTATIONS

Le fabricant déclare par la présente, sous sa seule responsabilité, que la construction de ce produit est conforme aux normes suivantes :

Normes de sécurité :

CAN/CSA C22.2 No. 61010-1

CAN/CSA C22.2 No. 61010-2-010

UL 61010-1

EN 61010-1

EN 61010-2-010

Normes EMC :

FCC Partie 15 Sous-partie B

ICES-003

IEC 61326-1

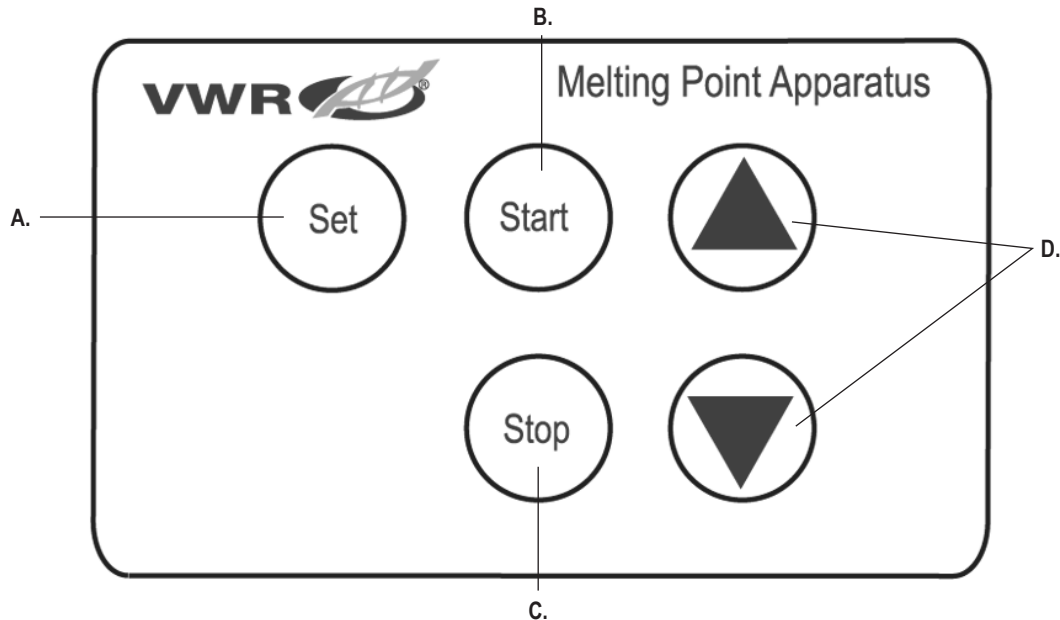
EN 61326-1

CISPR 11

EN 55011

MELTING POINT APPARATUS SPECIFICATIONS- 120/230V

	Basic	Advanced
Dimensions (L x W x H):	10.75 x 7.5 x 4.25" (27.3 x 19.1 x 10.8cm)	14 x 7.5 x 4.25" (35.6 x 19.1 x 10.8cm)
Electrical 50/60 Hz:	120V, 0.75 amps, 85 watts 230V, 0.50 amps, 110 watts	
Fuses:	5mm x 20mm, 250V, 5 amp quick acting	
Temperature range:	ambient +5°C to 400°C	
Temperature accuracy:	+/-1%	
Temperature resolution:	1°C	0.1°C
Ramp rate:	2°C/min	0.1°C to 10°C/min
Memory:	N/A	1000 tests (4 temperatures per test)
Controls:	see page 6	see page 9
Ship weight:	4lbs (1.81kg)	4.5lbs (2.04kg)



BASIC MELTING POINT APPARATUS CONTROL PANEL

The touch pad and the LCD display contain all of the controls needed to operate the Basic Melting Point Apparatus.

- A. "Set" button:** Set temperature; set date; set time
- B. "Start" button:** Start heating to set temperature; start ramping to melt temperature; view data
- C. "Stop" button:** Stop ramping and return to set temperature; stop viewing data; turn heater off; return to standby mode
- D. Up and Down Arrows:** Scroll through temperature values to set; scroll through date and time to set; scroll through data to view

BASIC MELTING POINT APPARATUS OPERATING INSTRUCTIONS

This unit is ideal for high throughput applications that require accurate results. It heats at a fixed ramp rate of 2°C per minute after the set temperature is reached. Touch pad controls are used to operate the heater, and the temperature values are displayed on an easy-to-read LCD screen.

1. Prepare the Sample in a Capillary Tube:

- Ensure the sample is dry.
- Grind the sample into a fine powder.
- Press the open end of the capillary tube 2mm deep into the powder to collect the sample.
- When 2mm of the sample has been collected at the open end of the tube, carefully turn it around and tap the closed end against the table.
- Ensure the sample is packed at the closed end of the capillary tube.

2. Standby Mode:

- When the unit is plugged in, the date/time and actual temperature will be shown on the LCD screen. This is the unit in standby mode.

3. Set Temperature:

- Press the "Set" button
- Use the Up and Down Arrows to select a temperature

4. Start Heating to Set Temperature:

- Press the "Start" button to start heating the oven to the set temperature.
- The actual temperature will be displayed on the LCD screen.
- An audible alarm will sound when the set temperature has been reached.
- If the ramping phase is not initiated within 30 minutes of reaching the set temperature, the unit will return to the set temperature screen.
- If the unit remains on the set temperature screen for 30 minutes without initiating the heating phase, the unit will return to standby mode and the heater will turn off to prevent indefinite heating.

5. Insert Sample into Oven:

- Insert 1-3 capillary tube(s) containing the prepared sample(s), closed end first, into the opening on top of the oven. Wait 30 seconds to stabilize before continuing to Step 6.

6. Start Ramping to Melt Temperature:

- After the capillary tubes have been inserted into the oven, press "Start" to start heating to the melt temperature.
- The temperature will increase at a fixed ramp rate of 2°C/min until the user presses "Stop" or until the oven reaches a maximum temperature of 400°C, whichever comes first.
 - If the oven reaches 400°C during the ramping phase, "Ramping Stopped" will be displayed and the unit will maintain the maximum temperature for 30 minutes. After 30 minutes, it will revert back to the set temperature to prevent overheating.
 - If the "Stop" button is pressed during the ramping phase, the unit will revert back to the set temperature.

7. Determine the Melting Point of the Sample:

- Observe the following changes during the ramping phase:
 - Signs of change - Darkening, shriveling, sintering
 - First signs of liquid formation
 - Formation of a meniscus
 - Formation of a completely clear liquid

NOTE: BASIC UNIT DOES NOT HAVE MEMORY CAPACITY. DATA WILL NOT BE SAVED. RECORDED TEMPERATURES WILL BE ABLE TO BE VIEWED DURING STEP 8 ONLY.

- Press "Start" to record the first temperature in the melting range. The oven will continue heating.
- Press "Start" to record the second temperature in the melting range. The oven will continue heating.
- Press "Start" to record the third temperature in the melting range. The oven will continue heating.

- e. Press "Start" to record the fourth and final temperature in the melting range. Ramping will stop and the oven temperature will immediately start decreasing back to the set temperature selected in Step 3.

8. View Recorded Data:

NOTE: BASIC UNIT DOES NOT HAVE MEMORY CAPACITY. DATA WILL NOT BE ABLE TO BE VIEWED AFTER THIS STEP.

- a. After the final temperature is recorded, "View Data?" will be shown on the display.
- b. To return to the set temperature screen without viewing the data, press "Stop."
- c. To view the data for the test that was just completed, press "Start" and use the Up Arrow to scroll. When viewing is complete, press "Stop" to return to the set temperature screen.

9. Repeat Steps 4-8 to continue testing with the same set temperature selected in Step 3.

10. If a new set temperature is required, use the Up and Down Arrows to select a new temperature. Repeat Steps 4-8 to continue testing with the new set temperature.

11. If testing is complete, Press "Stop" after Step 8 to turn the heater off and return to standby mode.

12. Unplug unit when it is not in use.

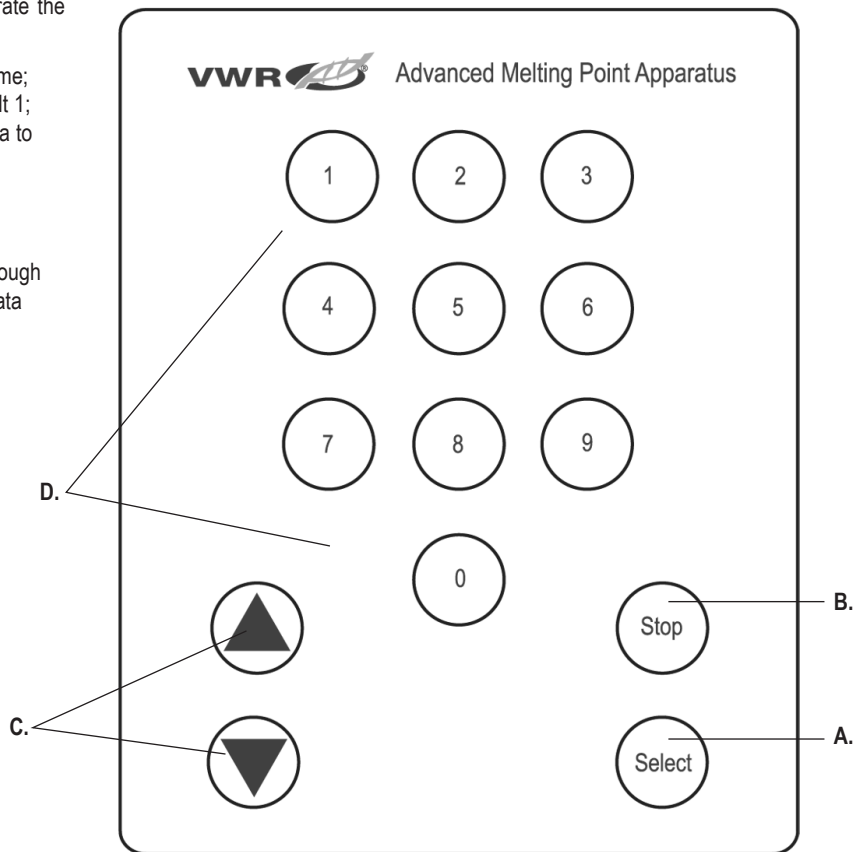
SET DATE AND TIME – BASIC ONLY:

- 1) Hold "Set" button and press Up Arrow for 3 seconds
- 2) When "Set Date/Time?" is displayed on the LCD screen, press "Set"
- 3) Use Up and Down Arrows to select the month, and press "Set"
- 4) Use Up and Down Arrows to select the day, and press "Set"
- 5) Use Up and Down Arrows to select the year, and press "Set"
- 6) Use Up and Down Arrows to select the hour, and press "Set"
- 7) Use Up and Down Arrows to select the minute, and press "Set"
- 8) Use Up and Down Arrows to select "A" for AM or "P" for PM, and press "Set"
- 9) If the correct date and time are displayed on the screen, press "Stop" to return to standby mode

ADVANCED MELTING POINT APPARATUS CONTROL PANEL

The touch pad and the LCD display contain all of the controls needed to operate the Advanced Melting Point Apparatus.

- A. **“Select” button:** Select temperature; select ramp rate; select date; select time; start heating to set temperature; start ramping to melt temperature; save Melt 1; save Melt 2; save Melt 3; save Melt 4; view data; save data to unit; save data to USB
- B. **“Stop” button:** Stop ramping and return to set temperature; turn heater off; move on to next prompt; return to standby mode
- C. **Up and Down Arrows:** Scroll through temperature values to set; Scroll through date and time to set; Scroll through ramp rate to set; Scroll through saved data
- D. **Numeric keys** – enter temperature, ramp rate, test number, date, and time



ADVANCED MELTING POINT APPARATUS OPERATING INSTRUCTIONS

This unit can be used for a variety of applications that require accurate and repeatable results. It heats at the selected ramp rate after the set temperature is reached. Touch pad controls are used to operate the heater, and the temperature values are displayed on an easy-to-read LCD screen.

1. Prepare the Sample in a Capillary Tube:

- Ensure the sample is dry.
- Grind the sample into a fine powder.
- Press the open end of the capillary tube 2mm deep into the powder to collect the sample.
- When 2mm of the sample has been collected at the open end of the tube, carefully turn it around and tap the closed end against the table.
- Ensure the sample is packed at the closed end of the capillary tube.

2. Adjust the Viewing Window:

Arm Angle

- Loosen the adjustment knob on the side of the arm to allow 2mm of space.
- Pull arm out 2mm to allow movement.
- Move the arm up or down to choose the desired angle. There are five angles to choose from.
- When an appropriate angle is chosen, tighten the knob to hold the arm in place.

Arm Extension

- Hold the bottom of the arm and pull the top of the arm out.
- When an appropriate height is chosen, let go and it will be held in place.

DO NOT PULL ON THE OVEN WHEN EXTENDING THE ARM.

Oven Angle

- Loosen the adjustment knob on the side of the oven to allow 2mm of space.
- Rotate the oven to the desired viewing angle.
- When an appropriate angle is chosen, tighten the knob to hold the arm in place.

3. Standby Mode:

- When the unit is plugged in, the date/time and actual temperature will be shown on the LCD screen. This is the unit in standby mode.

4. Set Temperature:

- Press the "Select" button
- Use the numeric buttons to select a temperature or Up and Down Arrows
- When the correct temperature is displayed on the screen, press "Select"

5. Set Ramp Rate:

- After the Set Temperature is selected, the Ramp Rate will be displayed on the LCD screen
- Use the numeric buttons or Up and Down Arrows to select a ramp rate

6. Start Heating to Set Temperature:

- When the correct ramp rate is displayed on the screen, press "Select" to start heating the oven to the set temperature.
- The actual temperature will be displayed on the LCD screen.
- An audible alarm will sound when the set temperature has been reached.
- If the ramping phase is not initiated within 30 minutes of reaching the set temperature, the unit will return to the set temperature screen.
- If the unit remains on the set temperature screen for 30 minutes without initiating the heating phase, the unit will return to standby mode and the heater will turn off to prevent indefinite heating.

7. Insert Sample into Oven:

- Insert 1-3 capillary tube(s) containing the prepared sample(s), closed end first, into the opening on top of the oven. Wait 30 seconds to stabilize before continuing to Step 8.

8. Start Ramping to Melt Temperature:

- After the capillary tubes have been inserted into the oven, press "Select" to start heating to the melt temperature.

- b. The temperature will increase at the ramp rate selected in Step 5 until the user presses "Stop" or until the oven reaches a maximum temperature of 400°C, whichever comes first.
- i. If the oven reaches 400°C during the ramping phase, "Ramping Stopped" will be displayed and the unit will maintain the maximum temperature for 30 minutes. After 30 minutes, it will revert back to the set temperature to prevent overheating.
- ii. If the "Stop" button is pressed during the ramping phase, the unit will revert back to the set temperature.

9. Determine the Melting Point of the Sample:

- a. Observe the following changes during the ramping phase:
 - i. Signs of change - Darkening, shriveling, sintering
 - ii. First signs of liquid formation
 - iii. Formation of a meniscus
 - iv. Formation of a completely clear liquid
- b. Press "Select" to record the first temperature in the melting range. The oven will continue heating.
- c. Press "Select" to record the second temperature in the melting range. The oven will continue heating.
- d. Press "Select" to record the third temperature in the melting range. The oven will continue heating.
- e. Press "Select" to record the forth and final temperature in the melting range. Ramping will stop and the oven temperature will immediately start decreasing back to the set temperature selected in Step 4.

10. View Recorded Data:

- a. After the final temperature is recorded, "View Data?" will be shown on the display.
- b. To move on to the next prompt without viewing the data, press "Stop."
- c. To view the data for the test that was just completed, press "Select" and use the Up and Down Arrows to scroll. When viewing is complete, press "Stop" to move on to the next prompt.

11. Save Data to Unit:

- a. After "Stop" is pressed, "Save Data to Unit?" will be shown on the display.
- b. To move on to the next prompt without saving data to the unit, press "Stop."
- c. To save the data for the test that was just completed, press "Select." When saving is complete, display will move on to next prompt.

12. Save Data to USB:

- a. After data is saved to the unit or "Stop" is pressed, "Save Data to USB?" will be shown on the display.
- b. To return to the set temperature screen without saving data to a USB, press "Stop."
- c. To save the data for the test that was just completed to a USB, insert USB on the right side of the unit and press "Select." When saving is complete, display will return to the set temperature screen.

13. Repeat Steps 4c-12 to continue testing with the same set temperature and ramp rate selected in Steps 4 and 5.

14. If a new set temperature or ramp rate is required, use the numeric buttons or Up and Down Arrows to select a new temperature. Repeat Steps 4c-12 to continue testing with the new set temperature and/or ramp rate.

15. If a new set temperature or ramp rate is required, or if testing is complete, Press "Stop" after Step 12 to turn the heater off and return to standby mode.

16. Unplug unit when it is not in use.

SET DATE AND TIME – ADVANCED ONLY:

- 1) Hold "Select" button and press Up Arrow for 3 seconds
- 2) When "Set Date/Time?" is displayed on the LCD screen, press "Select"
- 3) Use numeric buttons or Up and Down Arrows to select the month, and press "Select"
- 4) Use numeric buttons or Up and Down Arrows to select the day, and press "Select"
- 5) Use numeric buttons or Up and Down Arrows to select the year, and press "Select"
- 6) Use numeric buttons or Up and Down Arrows to select the hour, and press "Select"

ADVANCED MELTING POINT APPARATUS OPERATING INSTRUCTIONS CONT'D

- 7) Use numeric buttons or Up and Down Arrows to select the minute, and press "Select"
- 8) Use Up and Down Arrows to select "A" for AM or "P" for PM, and press "Select"
- 9) If the correct date and time are displayed on the screen, press "Stop" to return to standby mode

VIEW DATA IN STANDBY MODE – ADVANCED ONLY

- 1) Hold "Select" button and press Down Arrow for 3 seconds
- 2) When "View Data?" is displayed on the LCD screen, press "Select"
- 3) Enter Test Number using the numeric buttons and press "Select"
- 4) Use Up and Down Arrows to scroll through data for selected test.
- 5) Press "Stop" to return to Standby Mode.

SINGLE POINT CALIBRATION WITH CALIBRATION USB ACCESSORY – ADVANCED ONLY

This procedure is to fine tune and calibrate the unit at a specific temperature setting. This process may be repeated for up to (5) separate set-points. If a sixth calibration set-point is entered, the first set-point entered will be overwritten.

CALIBRATE TO REFERENCE SAMPLE:

- 1) Turn unit on.
- 2) Refer to the Advanced Melting Point Apparatus Operating Instructions (Steps 1-9) to determine the experimental melting point of the reference sample.
- 3) Remove reference sample.
- 4) Insert Calibration USB Accessory.
- 5) Set temperature to the accepted melting point of the reference sample.
- 6) When "Set Temp Reached" is displayed, hold "Stop" and Up Arrow buttons at the same time for 3 seconds.
- 7) When "SPC Temp" is displayed, enter the experimental melting point determined in Step 2.
- 8) Press "Select" to exit calibration mode and return to normal heating.

CALIBRATE TO EXTERNAL TEMPERATURE PROBE:

- 1) Turn unit on.
- 2) Insert Calibration USB Accessory.
- 3) Set desired temperature.
- 4) When "Set Temp Reached" is displayed, insert external temperature probe into the oven opening and measure the temperature with a calibrated precision instrument or thermometer.
- 5) Hold "Stop" and Up Arrow buttons at the same time for 3 seconds.
- 6) When "SPC Temp" is displayed, enter the temperature displayed on the thermometer.
- 7) Press "Select" to exit calibration mode and return to normal heating.

This process may be repeated at the same set-point multiple times for fine tuning if desired.

The unit will now use the biased offset for that specific temperature setting. The decimal point of the display will flash to indicate a biased offset is being used. All other temperature settings will use the standard factory calibration. This offset will be stored in memory and retained until reset.

To restore unit to factory setting:

Hold the "Stop" and Down Arrow buttons at the same time for 3 seconds. The reset will be confirmed with (2) audible beeps. This will reset all (5) stored set-points. Press the "Select" button to exit calibration mode and return to normal heating.

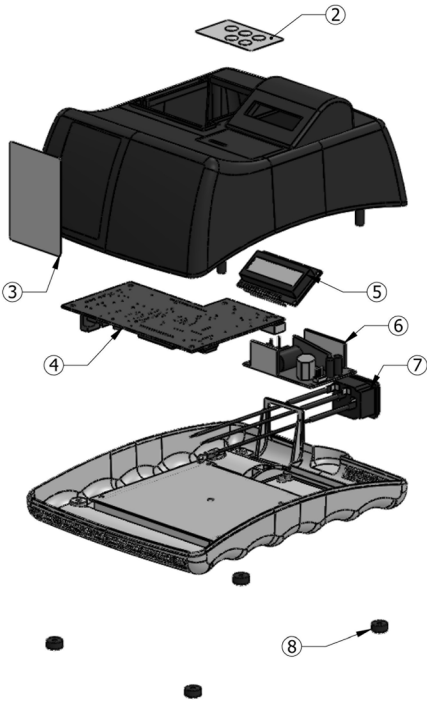
TROUBLESHOOTING

To clear error press the stop button.

Problem	Cause	Solution
Unit fails to power on	Missing or blown fuse	Add or replace fuse as necessary. If problem persists, please contact your VWR representative for repair.
E1	Faulty temperature sensor	This error cannot be fixed by the end user. Please contact your VWR representative for repair.
E2	Heating element failure	This error cannot be fixed by the end user. Please contact your VWR representative for repair.
E3	Unit cannot reach set-point	Use Single Point Calibration instructions to calibrate to external temperature device (Advanced option only). If problem persists, please contact your VWR representative for repair.

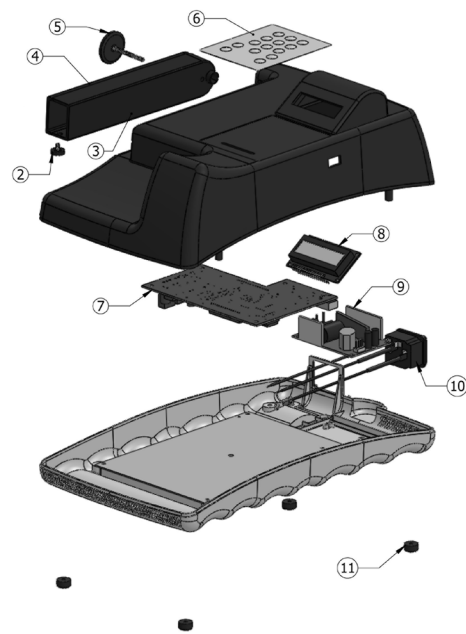
Errors will cause heating function to cease.

BASIC MELTING POINT APPARATUS REPLACEMENT PARTS



DESCRIPTION	PART NUMBER	
2. Membrane Switch	80856427	
3. Quick Start Guide Label	80857352	
4. Control Board	80856426	
5. Display Board	80856423	
6. Power Supply	80856425	
7. Power Entry Module Assembly	80856429	
8. Rubber Foot (4)	80857188	
Detachable 92" (234cm) power cord:	120V	80856139
	Euro plug	12120761

ADVANCED MELTING POINT APPARATUS REPLACEMENT PARTS



DESCRIPTION	PART NUMBER
2. Arm Cap	80857350
3. Lower Arm, Bottom	80854328
4. Lower Arm, Top	80854332
5. Adjustment Knob, Large	80857351
6. Membrane Switch	80856428
7. Control Board	80856426
8. Display Board	80856423
9. Power Supply	80856425
10. Power Entry Module Assembly	80856429
11. Rubber Foot (4)	80857188

Detachable 92" (234cm) power cord: 120V 80856139
Euro plug 12120761

ACCESSORIES FOR MELTING POINT APPARATUS

Accessory Type	Description	Compatibility	Part Number
Capillary Tube (pack of 100)	Capillary tubes with one end open.	Basic, Advanced	80863294
Cooling Block	Metal block for oven to reduce cooling time.	Basic, Advanced	80863295
Calibration USB	Allows single point calibration to an external temperature device.	Advanced	80863249

MANUFACTURED BY:

TROEMNER, LLC

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www.troemner.com
80857346 (REV B - 1/22)