



Biochemical Diagnostics, Inc.

The Multi-Prep® Sample Preparation/Evaporation Workstation Operation Manual

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I. INTRODUCTION

Biochemical Diagnostics Multi-Prep Sample preparation/Evaporation (SP/E) Workstation is a laboratory instrument designed to make your SPE sample preparation faster, more efficient, and less subject to operator error. This is accomplished by using a single workstation to house the sample collection tubes during the elution, sample evaporation and derivatization operations. By eliminating the transfer of tubes from station to station the processing time is greatly reduced and the chance of sample tube mix-up is virtually eliminated. The two models currently available include the SP/E-28 (28 samples), SP/E-48 (48 samples), and the SE 72

The SE-72 is a stand alone sample evaporator designed specifically to be used with the Hamilton Company Microlab® Star robotic system; customized for use with the Biochemical diagnostics gravity flow columns.

II. BLOCK HEATER SPECIFICATIONS

A. Power Requirements: 110V + 10% 5 Amps 50-60Hz

B. Physical:

Weight: 20 lbs. (including heating block)

Dimensions: Width - 17.6''

Depth - 10.5''

Height (w/o guide posts) - 4.00''

Height (w/guide posts) - 10''

C. 1. Temperature Accuracy: $\pm 3\%$ after calibration

2. Repeatability: $\pm 3\%$

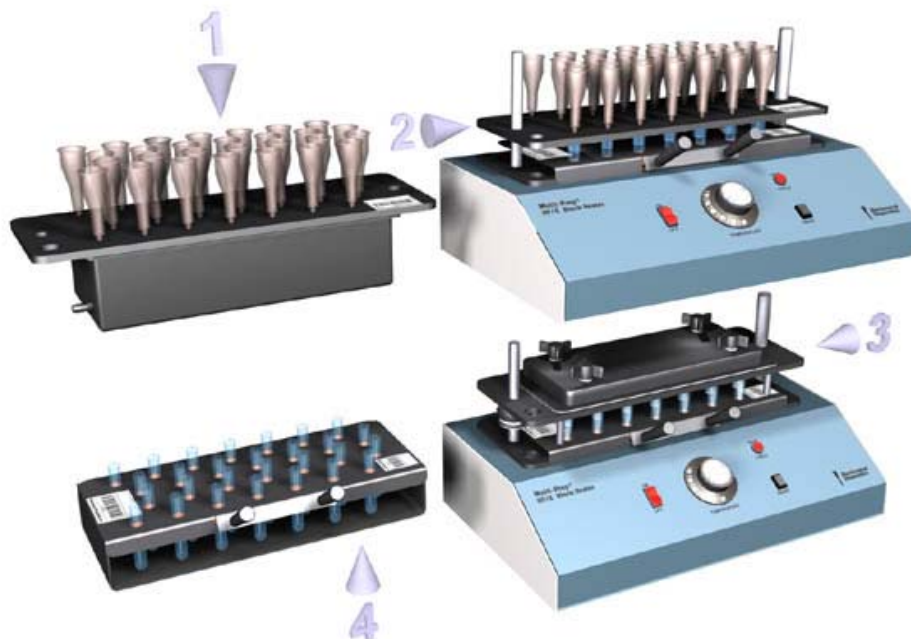
3. The heater can be calibrated for optimum performance.

D. Temperature Range: Room temperature to 100° C

E. Heater Wattage: SP/E-28 –180 watts SP/E-48 – 360 watts SE-72 – 360 Watts

F. Fuse: 5 amp resettable circuit Breaker – 110v

G. Power Cord: Standard three prongs, grounding required, indoor use only.



1 Columns are loaded into the column mounting plate, which is, in turn, positioned on the waste pan for sample processing according to the extraction method being followed. Plugs are provided to block unused column holes in the event that vacuum drying is required for the procedure being followed. The hose nipple on the waste pan is attached to a waste line that is normally open to allow liquids to flow into a waste container. If column drying is called for in the extraction procedure the stopcock is closed and the hose nipple on the column mounting plate is attached to a vacuum line. It is recommended that a liquid trap be incorporated in the vacuum line to protect the pump from contamination.

2 The column mounting plate is moved to the transfer rack normally positioned on the SP/E Block Heater. The two alignment rods on the heating block and four standoffs attached to the column mounting plate are used to position the column tips just inside the rim of the collection tubes. The standoffs are positioned onto locator pins set into the transfer rack. The standoffs and locator pins are keyed to each other to prevent reversal of the columns relative to the bar-coded or numbered collection tubes. An allen screw is used to adjust and lock the standoffs at their proper height. The SP/E-48 and an updated version of the SP/E-28 use a threaded standoff that is screwed onto the column mounting plate to hold the standoffs in place.

3 The column mounting plate is removed from the SP/E Block Heater and is replaced with the evaporation manifold. The vertical position of the evaporation manifold is adjusted using the quick release support sleeves that slide up and down on each alignment rod when the split ring is pinched, and lock into position when it is released. A nitrogen or argon tank is hooked up to the manifold nipple and the gas flow is adjusted as needed. Plugs have been provided to seal drying tips that are not needed. The stainless steel evaporation tips are easily replaced by removing the four thumbscrews that hold the manifold cover in place. The temperature of the heating block is adjusted (ambient -100°C) as required by the extraction and/or derivatization method. The evaporation manifold should be stored upside down or on the support rack to prevent damage to the evaporation tips.

IV. INITIAL INSPECTION AND SETUP

A. INITIAL INSPECTION

This instrument has been carefully tested and inspected both electrically and mechanically before shipment. In addition, each unit undergoes a 24-hour burn-in. The instrument should be carefully inspected for damage from transit before discarding packing material. The shipping container must be retained for warranty repairs.

B. ASSEMBLY

1. HEATING UNIT - The upper heating block is lowered onto the lower heating block, which is keyed to accept the block in its proper position. This two-block configuration enables the quick interchange of heating blocks with different hole configurations.
2. COLUMN MOUNTING PLATE – The SP/E –48 requires the use of Universal Column Adaptors (UCA) to accommodate the 3 mL syringe barrel extraction column luer fittings. A package of 50 UCA's is supplied with each SP/E-48 instrument. Each column hole is threaded to accept a UCA. The easiest way to screw the UCA into the column mounting plate is to fit a column into the luer fitting and turn the UCA clockwise until it is tightly seated in the plate. A slight clockwise turn of the column as it is being pulled upward will easily remove the column from UCA. An updated SP/E-28 column mounting plate is available with threaded holes. The earlier version uses a press fit UCA in an unthreaded hole. Either hole, threaded or unthreaded, will work with the 15 mL amber column without using a UCA.

A. POWER SWITCH

The power switch, when in the “on” position, applies power to the temperature control.

B. TEMPERATURE CONTROL

The temperature control knob is rotated to change the heating block temperature. In order to obtain the most consistent temperature control the knob should always be stopped in the forward (most clockwise) position at the desired temperature on the control knob.

C. CALIBRATION – *The SP/E instruments are factory calibrated and usually do not require further adjustment.*

Turn the control knob to the temperature that you wish to operate the instrument at. Insert a thermometer into the thermometer hole located forward of the guidepost on the left side of the heating block. Allow the temperature to rise until the red heat cycle lamp goes off. If the temperature is not within 5% of the desired temperature the instrument may be calibrated as follows:

Control knobs with Celsius and Fahrenheit scales

The calibration screw is located in the center of the temperature control knob shaft. Carefully remove the knob without rotating it in the process. Use a narrow, long shafted screwdriver to remove the red putty from the top of the screw and turn the screw counter clockwise (to the left) to increase the temperature until the red heat cycle lamp comes on. To decrease the temperature at a particular knob setting, turn the screw clockwise (to the right) until the red heat cycle lamp goes off.

Control knobs with Fahrenheit scale

The calibration screw is located on the back of the thermostatic control instead of in the center of the temperature control knob and requires the removal of the protective box located on the inside face of the control panel. Adjustments must be made by an individual qualified to perform electrical repairs and maintenance or returned to Biochemical Diagnostics for calibration.



D. POWER RESET

In the event that a power surge trips the 5 amp resettable circuit breaker, pushing the reset button located beneath the heat cycle lamp should restore power. If this does not work it may indicate a more serious problem, in which case, please contact technical services at Biochemical Diagnostics, Inc.

VI. MAINTENANCE - *The following work must be performed by an individual qualified to do electrical repairs.*

Replacement of silicone heating element:

In the unlikely event that the silicone heating element needs to be replaced the following steps are necessary:

- A. Unplug the instrument power cord and allow the heating block to cool.
- B. Remove the upper heating block.
- C. Remove the tabs holding the temperature sensor in place on the lower block.
- D. **Carefully lift the sensor off the block without creating any sharp bends in the metal sensor tubing.** (The outer Teflon tubing is for protection from corrosion).
- E. Remove the six screws holding the lower heating block in place on its base.
- F. Lift the lower heating block out of the unit taking care not to damage the temperature sensor.
- G. The silicone heating pad is now visible, located on the heating block base. Note its position to insure that the replacement pad is placed in the exact same location.
- H. Disconnect the two lead wires from the heating pad using the quick disconnect fittings.
- I. Remove the old heating pad.
- J. Peel the protective paper off the adhesive side of the new heating pad and press the pad (adhesive side down) onto the position of the old pad.

K. Reconnect the lead wires and reattach the unit.

Note: Do not turn on the POWER until the heating blocks are in place. *The heating pad will be damaged if it is not in contact with a heat sink when power is applied.*

REPLACEMENT OF THE TEMPERATURE SENSOR CONTROL UNIT:

The temperature sensor control unit is located in the protective housing attached to the front control panel.

A. Unplug the SP/E Block Heater power cord.

B. Remove the protective housing and disconnect the wires from the unit. *Although a wiring diagram has been provided it is wise to mark the wires for easier replacement.*

C. Pull off the temperature control knob from the control panel and remove the two screws holding the sensor control unit in place.

D. When installing the new unit it is important to carefully bend the temperature sensor into approximately the same configuration as the original. Do not create any sharp bends or crimps in the tubing.

CLEANING THE EVAPORATION TIPS

After placing the evaporation manifold in a fume hood they may be washed with methanol by washing the tips individually as needed, by dipping the evaporation manifold tips into a bath of methanol, or using an aerosol sprayer to wash them.

REPLACING THE PLASTIC EVAPORATION TIPS WITH STAINLESS STEEL EVAPORATION TIPS

Remove the evaporation cover and remove the plastic tips by tapping them with a small rubber or plastic tipped hammer until they loosen. The new stainless steel tips are placed in their mounting holes with an "O" ring (provided) on each side of the aluminum plate. The nylon nut is threaded into place and hand tightened. Over tightening will cause the "O" ring to bulge out from beneath the nut.

PRECAUTIONS

The Multi-Prep SP/E Workstation should be operated in a fume hood or laboratory room designed for efficient fume removal.

Prolonged contact of the workstation housing to strong solvents can soften the paint. To prevent softening, solvent spill should be blot dried as soon as possible.

VIII. WARRANTY

Biochemical Diagnostics, Inc. warrants that the instrument has been tested by quality control to insure optimum operating performance and repeatability of results. We further warrant that this instrument is free from defects in material and workmanship. Should defects in materials or workmanship develop within 12 months from delivery of the product, we will service or repair the equipment without charge to the customer.

If we determine that misuse, abnormal operating conditions, or repair work by unauthorized personnel has caused a fault during the warranty period, repairs by Biochemical Diagnostics or an authorized service center will be billed according to the severity of the damage.

We reserve the right to perform warranty service either, on-site, in our own repair facility, or at an authorized repair center. Repair work and replacement of parts under the above warranties is F.O.B. factory or service branch.

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**Biochemical
Diagnostics, Inc.**

SE-72, SP/E-28, SP/E-48 WIRING DIAGRAM

