



# **Precision Spin Coater Model KW-4A Operation Manual**

SPI Supplies Part #12170



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For further information regarding any of the other products designed and manufactured by SPI Supplies, contact your local representative or directly to SPI Supplies at the address above.

- Carbon and Sputter Coaters
- Plasma Reactor for ashing and etching
- High Vacuum Bench Top Evaporators
- Critical Point Dryers
- Electron Microscopy Consumables



## Warranty

The SPI Supplies unit you have purchased is guaranteed to be free of defects in workmanship on the day of shipment. This warranty covers parts and labor for a period of one year, excluding shipping charges or consumables. Breakage of glassware is specifically excluded from this warranty.

Proper use of your unit, according to the operation manual, should result in trouble-free operation. Any improper use of the SPI Supplies unit through modifications or unreasonable operating procedures will void this warranty.

## Disclaimer

SPI Supplies instruments are designed for simplicity of installation and operation. This manual provides full and complete information in both these areas. SPI Supplies therefore assumes no liability or responsibility of any kind for damage or injury resulting from incorrect installation or operation of the machine.



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## I. Features

1. Dual speed controls with continuous speed adjustment and individual timers. Initially, spinner rotates at a low speed (Speed I) for a pre-set cycle time (Timer I) and automatically switches to a high speed (Speed II) for pre-set cycle time (Timer II):

FEATURE	MINIMUM	MAXIMUM
Speed I in rpm	500	2,500
Speed II in rpm	1,000	8,000
Timer I in seconds	2	18
Timer II in seconds	3	60

*Refer to Figure 1 for location of feature*

2. LED speed indicator with speed stability  $\pm 1\%$  and coating uniformity  $\pm 3\%$ .

*Refer to Figure 1 for location of feature*

3. Power:

Model KW-4A-1: 110 V, 50/60 Hz, 40 W

Model KW-4A-2: 220 V, 50/60 Hz, 40 W

4. Can be used to coat substrate with diameter range from 5 to 100 mm.

## II. Safety Precautions

1. Do not touch or hold the shaft or chuck while rotating. Severe injury may result.
2. Substrate may fly off rotating chuck. Precautions should be taken to protect operator and others from injury while operating spin coater equipment.
3. Dangerous electrical potentials are present inside-the cabinet. Be sure to unplug the line cord before opening the cabinet.
4. Motor brushes and switch contacts may produce electrical sparks. Do not use the laboratory spinner in the presence of any explosive atmosphere.

**WARNING: Early Termination of preset cycle may result in machine reverting to maximum revolutions when restarting.**

**Please shut off machine before resetting.**



### III. Introduction

This manual is intended for all users of the SPI Supplies **CPD 7501 Critical Point Drying Apparatus** (SPI Part #13218) and provides information on the installation, operation and maintenance of the instrument.

#### A. Return of Goods

If goods are to be returned to SPI Supplies for repair or servicing the customer should contact SPI Supplies or their local distributor before shipment. A "Return Authorization Number" should be obtained in advance of any shipment. This number is to be clearly marked on the outside of the shipment. To obtain an RA#, contact our Customer Service Department and be sure to provide us with the following details:

- \* SPI Invoice Number and Invoice Date (if applicable)
- \* Method of shipment if applicable (post office, UPS, FedEx, Air Freight, etc.)
- \* Product(s) in question
- \* What is wrong with the product, or why do you want to make this return?

#### B. Returns Procedure

##### Warranty Claim

All components are sold with a **return to factory warranty** (unless otherwise stated) which covers failure during the first 12 months after delivery.

Returns must be sent courier paid, SPI Supplies will cover the return courier costs. This covers defects, which arise as a result of a failure in design or manufacturing. It is a condition of warranty that equipment must be used in accordance with the manufacturers instructions and not have been subjected to misuse. This warranty does not cover consumable items such as sputter coating targets and carbon evaporation material. To make a claim under the terms of this warranty provision contact the Customer Service Department at SPI Supplies.

##### Chargeable Repairs

Contact the Customer Service Department at SPI Supplies who will be able to provide an estimate of repair costs.

Service of equipment is generally completed within twenty working days after receipt of the equipment. A minimum evaluation fee is normally applied. Additional fees are charged as a per hour repair rate in addition to parts.



### Returns

All returns to SPI Supplies are required to follow the procedure described above in Section III, B. All returned items are required to have a Return Authorization Number

### Packaging and Shipping

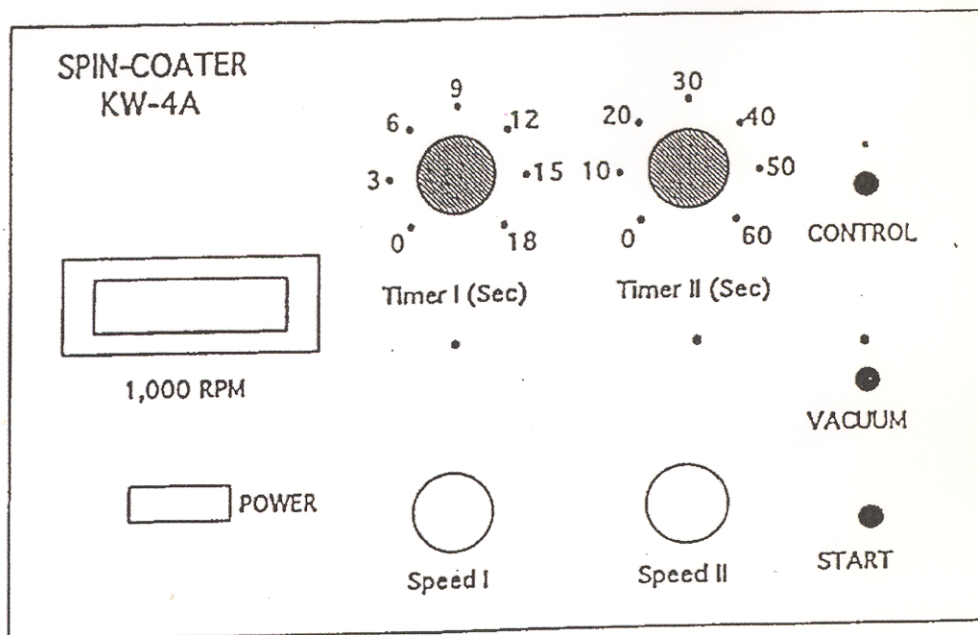
All goods shipped to the factory must be sealed inside a clean plastic bag and packed in a suitable carton. If the original packaging is not available SPI Supplies should be contacted for advice. SPI Supplies will not be responsible for damage resulting from inadequate returns packaging or contamination of delicate structures by stray particles under any circumstances. All non-warranty goods returned to the factory must be sent courier pre-paid. They will be returned courier, pre-paid and added to the final invoice unless otherwise arranged.

## IV. Controls and Functions

A schematic of the control panel is shown in Figure 1. The function of each switch is described as follows:

1.     **Power:**       Turns spin coater power on and off.
2.     **Speed I:**     Adjusts the spinning operation speed in lower range. 2500 rpm is maximum for Speed I.  
  
          **Speed II:**   Adjusts the spinning operation speed in higher range. 8000 rpm is maximum for Speed II.
3.     **Control:**     This button should be pressed before any spinning operation begins. This button should be pressed again whenever any spinning operation needs to be stopped.
4.     **Vacuum:**     Control vacuum to the vacuum chuck. The motor will not operate if this button is not pressed. Re-pressing this button during spinning will cause the spinning operation to stop.
5.     **Start:**       Starts the spinning operation cycle. Spinning operation will start only when both the "Control» and "Vacuum" buttons are pressed.
6.     **Timer I:**     Sets the spinning operation cycle time for the Speed I range or lower speed range.  
                          Timer I can be adjusted between 1 and 18 seconds.  
  
          **Timer II:**   Sets the spinning operation cycle time for the Speed II range or higher speed range.  
                          Timer II can be adjusted between 3 and 60 seconds.





**Figure 1:** Control Panel of Spin Coater Model KW-4A



## V. Operations

*Note: Determine the spinning speeds and spin cycle time required by your coating materials and substrate accordingly.*

1. Select and install a sample chuck (optional accessory, not included in the KW-4A) which fits the size of substrate to be coated. Match the notch at bottom of the chuck with the pin on the center shaft, and mount the chuck firmly on the spinning shaft.
2. Turn the "Power" switch on.  
Press the "Control" button one time only.
3. Set spin cycle time and speeds accordingly.  
Speed I is for low speed and the spin cycle time for this speed range' should be set with Timer I.  
Speed II is for high speed and the spin cycle time for this speed range should be set with Timer II.
4. Place the substrate on the sample chuck and make sure the substrate is centered before spinning operation begins.
5. Press "Vacuum" button one time only to turn on the vacuum.

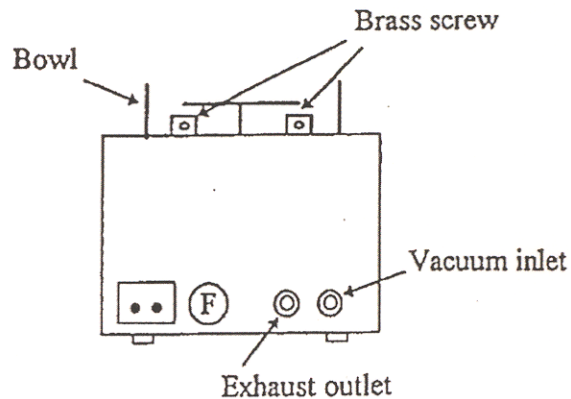
*Coating material must be ready for substrate before Start I button is pressed since coating material must be applied at the low speed or Speed I during the time or spin cycle period set by Timer I.*

6. Push the "Start" button to start spinning operation.  
The substrate will spin at the low speed or Speed I for time period pre-set by Timer I.  
The substrate will spin at the high speed or Speed II for time period pre-set by Timer II.
7. Coating material applied to the substrate must be applied at the low speed or Speed I, not at the high speed or Speed II.
8. Place the bowl cover over the bowl.
9. When cycle ends, press "Vacuum" button to turn the vacuum off.
10. Remove the bowl cover.

## V. Operations (continued)

11. Remove the substrate. Note: make sure that "Vacuum" button is off in order to remove substrate.
12. Repeat steps 3 through 11 for more samples
13. Turn "Power" switch off when all spinning operations are finished.
14. Remove the chuck and bowl.  
Clean these items appropriately.

Note:



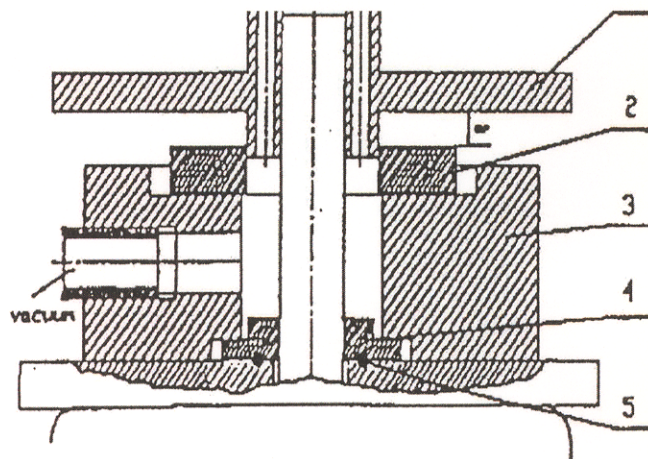
This equipment has been modified and can be connected to an external exhaust system. During the coating operation it can reduce harmful vapor getting into the air.

Fasten the bowl with the two brass screws supplied and connect an exhaust system to the exhaust outlet. (See sketch)



Note 2:

The function of the 2 brass rings is to establish an air tight vacuum chamber. After pulling out the chuck and speed test disk for cleaning, we must replace them in a correct position. (see sketch). Put the upper ring on the speed test disk's bottom round platform, leave a gap between ring and disk, brush some vacuum grease on the ring, turn over the disk and insert it into the motor shaft. If all are on the correct position, you can feel the vacuum is strong test by your finger or a vacuum dial gauge.



1. Speed test disk.
2. Upper brass ring
3. Vacuum chamber
4. Bottom brass ring
5. O ring