

Quorum Technologies

## INSTRUCTION MANUAL

FOR

CA508 CARBON EVAPORATOR  
POWER SUPPLY

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## 1. GENERAL DESCRIPTION OF SYSTEM

The CA508 Carbon Evaporation Attachment comprises three parts namely:

- (i) The CA508 Dual voltage power supply
- (ii) A Carbon rod evaporation head
- and (iii) A Carbon fibre evapoartion head.

The power supply is a variable voltage unit switchable between 10V/100A and 20V/50A AC. The voltage is varied using a front panel mounted zero voltage solid state controller. The voltage range is selected by means of a rear panel ELECTRODE CONTROL switch, position 1 giving 10V maximum and position 2 giving 20V maximum. The current is monitored by the front panel mounted 100A meter.

The 10V range is used in conjunction with the carbon rod type of evaporation head, whereas the 20V range is used with the carbon fibre evaporation head.

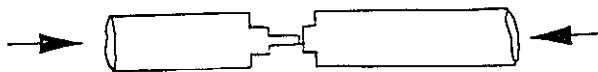
There are a series of heads available for the various types of sputter coaters which are listed below:

ROD HEADS	FIBRE HEADS	COATER COMPATIBLE
CA522R	CA522F	SC502
CA500R	CA500F	SC500/500A
CA051R	CA051F	SC510/515
CA065R	CA065F	SC650/650A

The choice of head ensures that the top plate geometry is compatable with the users sputter coater .

## 2. PACKING SCHEDULE

- 2.1 Unpack the CA508 power supply. The power supply should be fitted with a plug to fit into the auxillary output socket of the users sputter coater. Check that the voltage label on the back panel corresponds to laboratory electrical supply.
- 2.2 Unpack the top plate assemblies which incorporates the carbon evaporation source. Included with carbon rod evaporation sources are 10 spare shaped carbon rods (6.3mm/1/4" diameter) and with the fibre heads, 1 metre of spare fibre is included. The low tension (LT) leads are also included.
- N.B. A higher glass chamber is also included with the carbon sources for the CA502 sputter coater carbon attachments.
- 2.3 It is our policy to ship the evaporation sources with either the carbon rods or fibre in position. Particularly with the rods, check that rod tip has not been broken in transit. One rod has a flat face; the other rod has a fine shaped tip approximately 1.5mm diameter and 3.5mm long. Replace broken rods and position under maximum tension.



- 2.4 These instruments are tested before leaving the factory and some discolouration may be noticed around the source area.

### 3. INSTALLATION

- 3.1 Remove Sputter coater top plate assembly and disconnect high tension lead (and earth/ground lead where appropriate) from the socket. This ensures that no high voltages can be applied to the sputter head during carbon evaporation.
- 3.2 Substitute the required carbon evaporation head and also work chamber where appropriate.
- 3.3 Connect the LT leads from the top plate assembly to the rear panel of the CA508 power supply. There is no particular polarity.
- 3.4 Insert the power lead of the CA508 power supply into the auxillary output socket of the sputter coater. This output socket is interlocked to the vacuum in the chamber.
- 3.5 Evacuate the chamber in the usual manner. It is not required to use argon gas for evaporation, although a better vacuum may be achieved by flushing the system with argon.
- 3.6 Set the voltage control knob at zero and switch on POWER. Set the three position rocker switch at OFF. With either head in position loaded with either rod or fibre and with the chamber fully evacuated (ensuring no vacuum leaks), change the three position rocker switch to CONT (continuous). Increase the applied voltage slowly and observe the current meter. The current reading will slowly increase and the carbon source will gradually increase in temperature until a red-orange glow is achieved. Stop at this point and observe that the vacuum level falling back as a result

of the outgassing of the carbon.

Reposition the voltage control to zero and the switch to OFF. Switch off the rotary pump and vent thre system which is now ready for use.

## 4. OPERATION

### 4.1 OPERATION WITH CARBON FIBRE SOURCE

- 4.11 The carbon fibre source has two clamps for holding the fibre. A piece of fibre is inserted leaving approximately 6-10mm excess length of fibre so as the fibre is not taut between the clamps. Excess material can be trimmed off with scissors.
- 4.12 The specimen holder is loaded with specimen mounts and evacuate the chamber in the usual manner. Allow the system to evacuate to the best possible vacuum.
- 4.13 Ensure that Position 2 on the rear panel electrode switch has been selected. With POWER on and CONT selected increase the applied voltage until the fibre heats up to give a bright orange glow. After 30 seconds, switch the LT switch to OFF and allow the chamber to re-evacuate to its ultimate vacuum.
- 4.14 Increase the voltage control knob to 7-8 on the scale. Select PULSE on the LT switch. Depress the PULSE button. The fibre will reach white heat and the carbon will FLASH evaporate quickly onto the specimens(5-10 seconds only are required). The best conditions of current operation and time may be established by the user.
- 4.15 When sufficient carbon has been evaporated reduce the voltage control to zero. Vent the chamber and retrieve the samples.

NOTE; THE SOURCE WILL BE HOT.

- 4.16 It is fairly general that the fibre will break after a single

evaporation. This will be observed by the current falling to zero. With care, the fibre can be re-used but more generally it has to be replaced after each run.

#### 4.2 OPERATION WITH CARBON ROD SOURCE

- 4.21 Check that the carbon rods are intact and are under maximum tension.
- 4.22 The specimen holder is loaded with specimen mounts and evacuate the chamber in the usual manner. Allow the chamber to evacuate to the best possible vacuum.
- 4.23 Ensure that Position 1 on the rear panel electrode switch has been selected. With POWER on and CONT selected increase the applied voltage until the rod tip heat up to give a bright orange glow. After 30 seconds, switch the LT switch to OFF and allow the chamber to re-evacuate to its ultimate vacuum.
- 4.24 Increase the voltage control knob to 7-8 on the scale. Select PULSE on the LT switch. Depress the PULSE button. Sufficient carbon should be deposited in 10 second bursts. If higher resistance carbon rods are used it may be necessary to use higher settings of voltage. The best conditions of voltage/current and time may be established by the user.

NOTE: IF NO REDUCED DIAMETER TIP REMAINS, AVOID HEATING THE CARBON RODS AS THIS WILL THEN RESULT IN THE HEATING OF THE TOTAL

4.25 When sufficient carbon has been evaporated reduce the voltage control to zero. Vent the chamber and retrieve the samples.

NOTE: THE SOURCE WILL BE HOT.

4.26 The rods should be reshaped for each run.

## 5. USEFUL NOTES AND TROUBLE SHOOTING

5.1 If you are unable to get a current reading with the carbon rods, check the following:

- (a) Lead connections to power supply are tightly clamped.
- (b) Carbon rods are set for maximum tension, making good electrical contact with each other.
- (c) Check 10amp fuse. If this fuse is to be replaced, a hi-speed fuse must be used so as to protect the voltage control circuit.

Additional shaped or unshaped carbon rods and a carbon rod shaper may be purchased from Bio-Rad.

6. ORDERING INFORMATION FOR SPARES

374-102        10A fuses (Pkt 10)

A0832        Shaped carbon rods (6.3mm)(Pkt 10)

A0833        Shaped carbon rods (4.6mm)(Pkt 10)

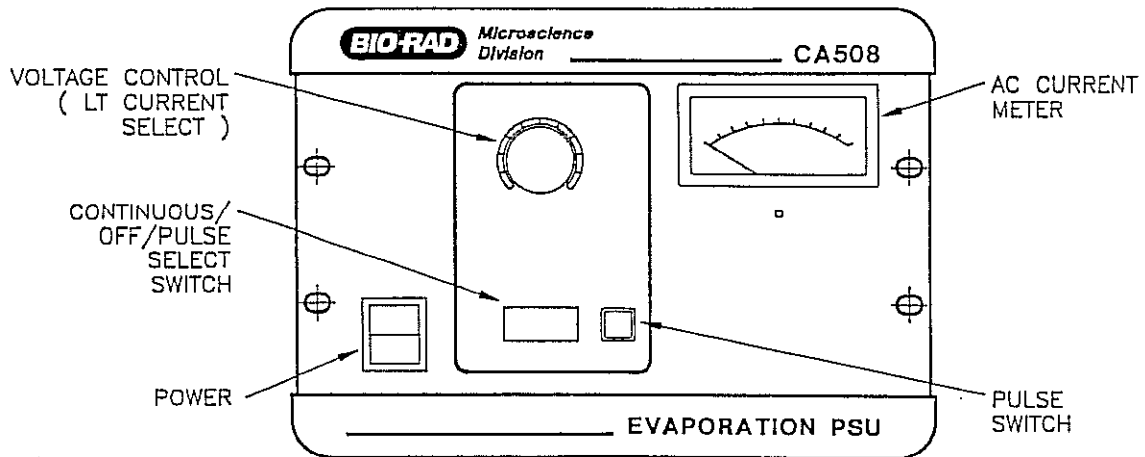
A0834        Shaped carbon rods (3mm)(Pkt 10)

A0816        Carbon Fibre (1 metre)

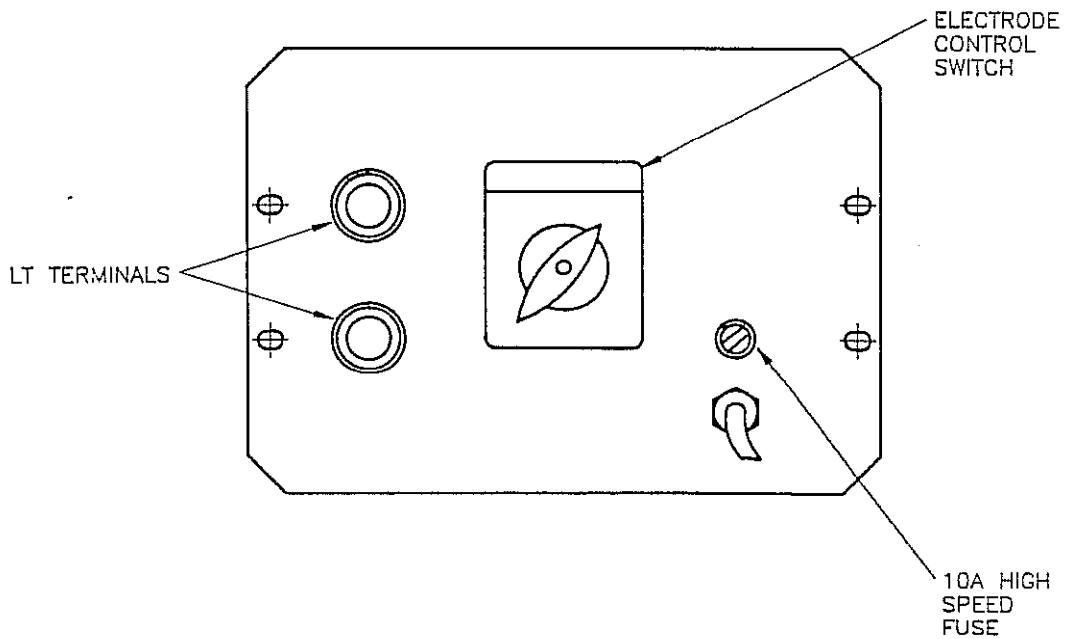
A0702        Carbon Rod shaper (state voltage)  
              Includes 1 drilled collet (1/4") and 2 blank collets.

A0705        Set 3 drilled collets (state hole size)

A0704        Spare grinding wheel.



CA 508 FRONT PANEL



CA 508 REAR PANEL

**FRONT AND REAR PANELS**

