Edwards

Instructions
11-E085-92-881
September 1981
Supersedes M11913

Accessory installation instructions for Edwards E306A vacuum coating unit

ADDITIONAL INSTRUCTIONS RELEVANT TO E306A COATING UNIT

Edwards vacuum coater E306A	11-E085-91-880
Freeze fracturing and etching accessory	11-E085-08-881
Optical film monitor OFM3	11-E086-31-880
Ion plating unit	11-E085-46-881
Twin hearth electron bombarded source	11-E085-11-880
Ion beam etching accessory	M11915
Ion beam thinning accessory	M11947

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11-E085-92-880
AMENDMENT
September 1981

Page 46-47 SEM Planetary Workholder

Assembly

1) Set the Rotatilt 3 at zero degrees.
2) Align the planet tray on the Rotatilt 3 by means of the alignment tool supplied. This should be inserted into the centre hole of the tray; check that the tool rotates freely. Secure the tray in this position with the two socket cap head screws provided.
3) Remove the alignment tool from the tray.
4) Place the metal/PTFE coated washer onto the spindle of the spinner so that the PTFE coating is uppermost when assembled to the planet tray.
5) Assemble the spinner to the tray. Engage the bayonet of the spinner to the Rotatilt 3. Rotate the spinner slowly to check for freedom of rotation.
6) Fit samples to planets (see diagram) and place the planets (maximum of 8) onto the workholder.
7) Set the rotational speed to suit requirements.
8) Optimum source positions to ensure good coverage are as indicated in the diagram.

Contents

General Information

1) Read the entire instruction before attempting assembly in order to fully understand each step.

2) It is recommended that electrical installation be accomplished only by a qualified electrician.

3) During accessory assembly or maintenance ensure that all electrical and water supplies to the coating unit are isolated.

4) Ensure that all electrical and water connexions are secure.

5) HT connexions should be made only with the HT cable supplied or with cable of the same specification.

6) The wiring of the coating unit is numbered and colour coded for easy reference.

7) Clean all parts before assembly.

8) Do not use undue force during assembly.

9) Do not oil or grease chains and bearings to be fitted in the vacuum chamber.

10) Ensure that O-rings and seals are free from dirt and grit.

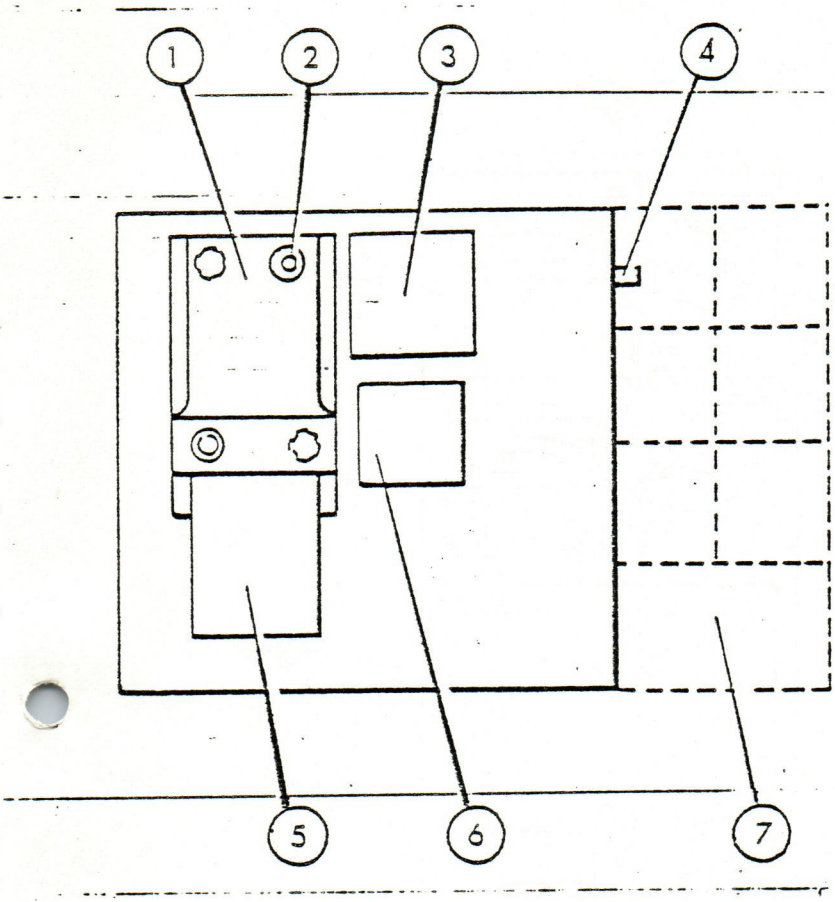
11) Check the leak tightness of all vacuum joints before operating the vacuum coater.

12) Parts removed from the unit to enable the fitting of an accessory should be stored for future use.

13) For improved access to the underside of the baseplate, remove the baseplate shroud and the worktop from the unit. These should be replaced when the accessories have been installed.

14) The coating unit is fitted with safety and protective devices (i.e. overload trips and vacuum switches) to prevent damage to the equipment or injury to an operator. These devices must not be tampered with or modified.

Floor plan of unit



1.	Rotary pump
2.	Position for oil mist filter
3.	LT transformer
4.	Connexions of services
5.	Rotary pump motor
6.	Position for HT transformer
7.	Overhang of control case

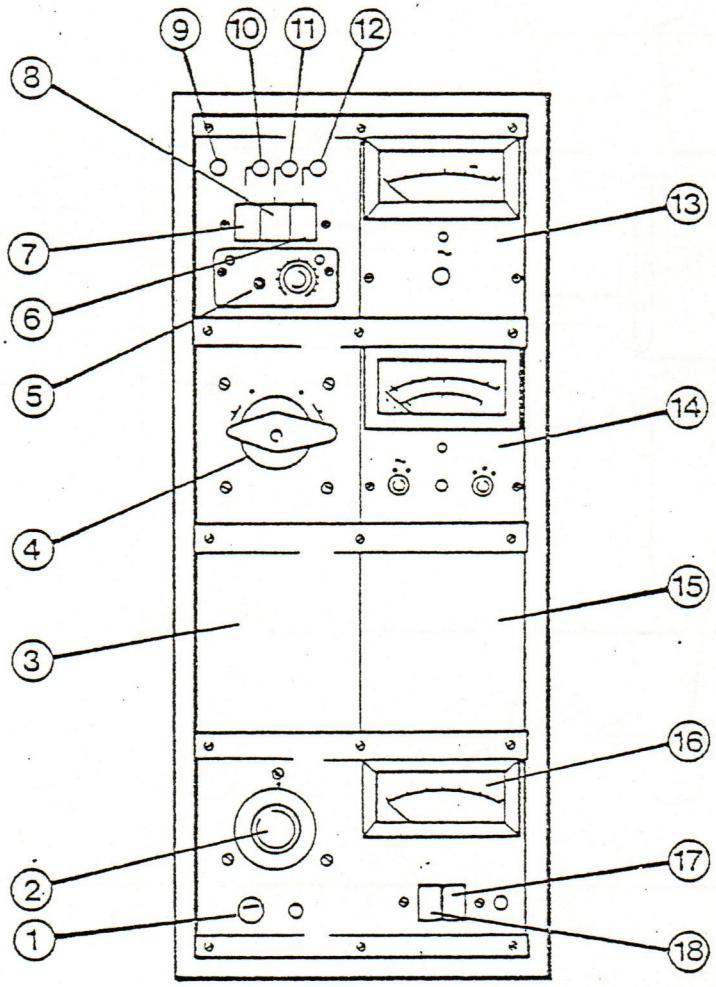
Consumable items

The following items which are deemed to be consumable can be purchased from Edwards High Vacuum. Spares are also available and a list can be found in the instruction for the coater.

Type A1 tungsten helices	packs of 10	11-H014-01-001
Type A2 tungsten helices	packs of 10	11-H014-01-002
Type B1 tungsten baskets	packs of 10	11-H014-01-021
Type B2 tungsten baskets	packs of 10	11-H014-01-022
Type C1 molybdenum boats	packs of 10	11-H014-01-040
Type C3 molybdenum boats	packs of 10	11-H014-01-041
Type C2 molybdenum boats	packs of 10	11-H014-01-044
Pure carbon rod 6.35 mm d x 120 mm		11-E027-01-003
Platinum/carbon rod 6.35 mm d x 120 mm		11-E027-01-009
Pure carbon rod 3 mm d x 300 mm	packs of 20	11-E085-19-030
6 position EBS filaments	packs of 5	11-E036-19-015
6 position EBS cermet hearths	packs of 5	11-E027-03-004
6 position EBS carbon supports	packs of 5	11-E025-24-035
Foreline trap sorb (activated alumina)	0.45kg	09-H026-00-050

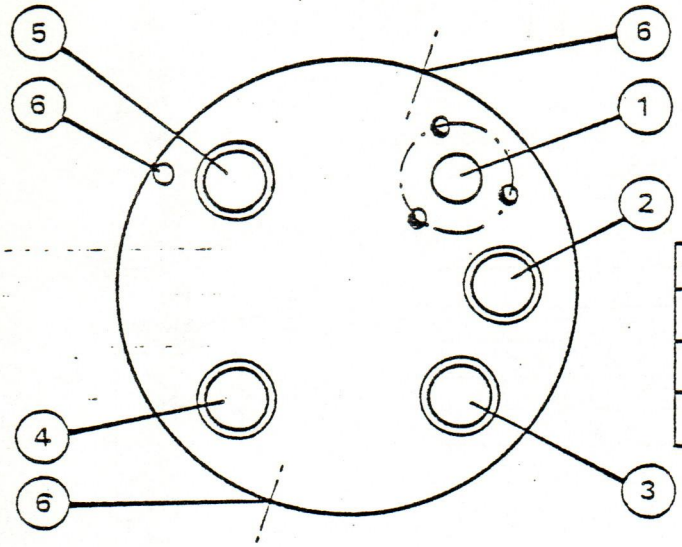
Control panel

of E306A coater

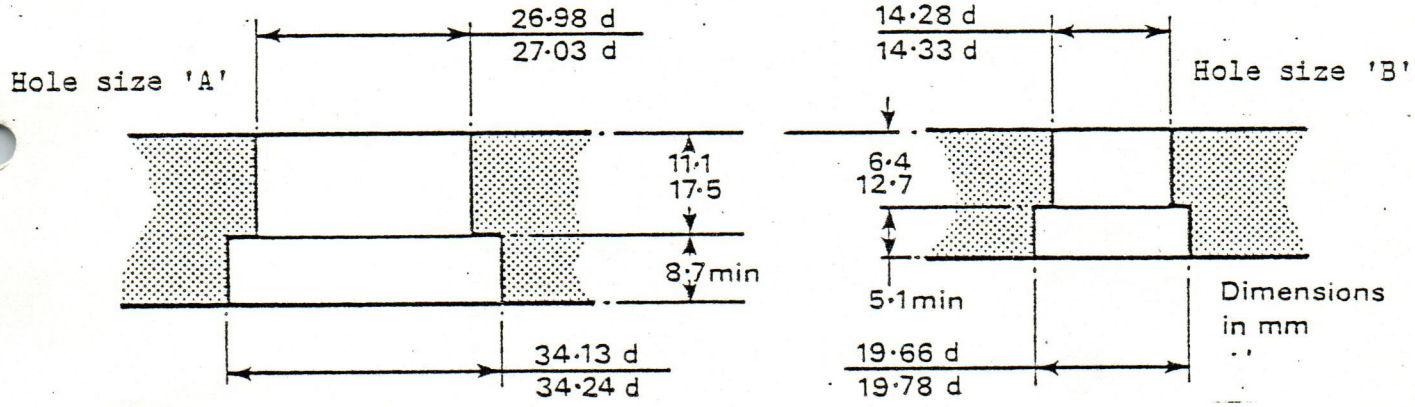


Key	Legend	Function
1	trip	Overload protection: press to reset
2	Power control	Controls the HT and LT current levels
3	-	Blank panels - remove for fitting other accessories
4	l.t. selector	Source selection if fitted
5	12V DC	Jack socket to provide 12V d.c. supply for Rotatilt-3
6	air admit	Opens and closes the air admittance valve
7	rotary pump	Switches the rotary pump on and off
8	diff pump	Switches the diffusion pump on and off
9	~	Indicates when the mains electricity supply is applied to the unit
10	rotary pump	Indicates that the rotary pump is switched on
11	diff pump	Indicates that the diffusion pump is switched on
12	air admit	Indicates that the air admittance valve is open
13	Pirani 10	Indicates the backing pressure; works in conjunction with the gauge head above the rotary pump
14	Penning 8	Indicates the chamber pressure; works in conjunction with the gauge head at baseplate position 7
15	-	Blank panel
16	-	Indicates HT or LT primary current
17	LT	Selects the LT circuit
18	HT	Selects the HT circuit

Top plate details

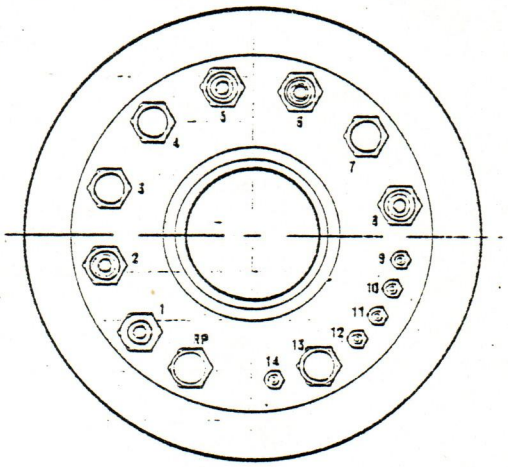


Location	Hole size	Fitting supplied
1	special	special plug
2,3,4,5	A	blank plug
6	M6	-



Chamber baseplate details

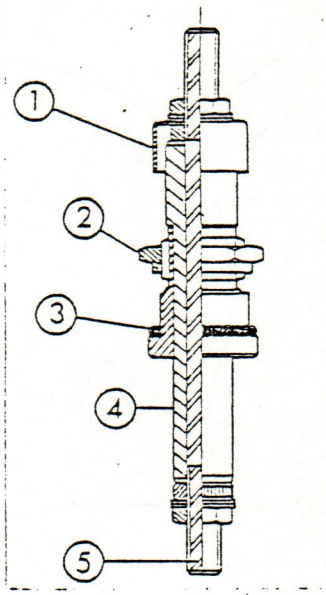
Baseplate position	Hole size	Fitting
RP	A	Roughing port
1	A	Type 6 leadthrough
2	A	Earth electrode
3	A	Blank plug
4	A	
5	A	
6	A	
7	A	Penning gauge head
8	A	Blank plug
9	B	
10	B	
11	B	
12	B	
13	A	
14	B	Chamber gas admittance port



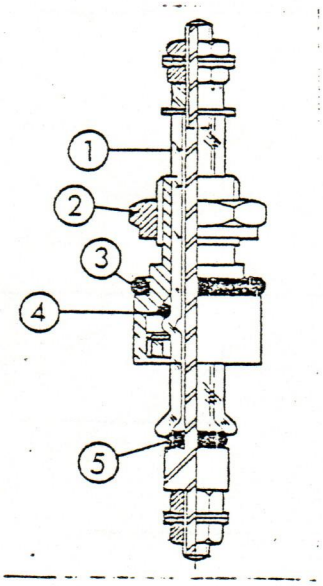
Leadthrough details

Type 6D

Used on these accessories:
Four position turret source
Electron bombarded source
Filament holder
Carbon evaporation sources



1.	Shield
2.	Securing nut
3.	O-ring (VIT0215)
4.	Ceramic insulator
5.	Centre electrode



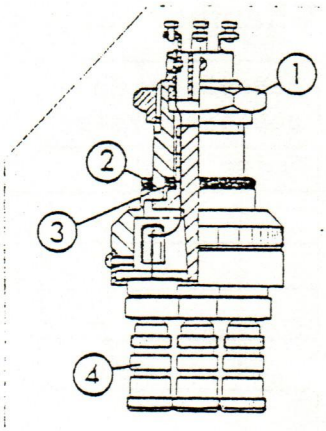
Type 7D

Used on these accessories:
Plasmaglo
D.C. sputtering

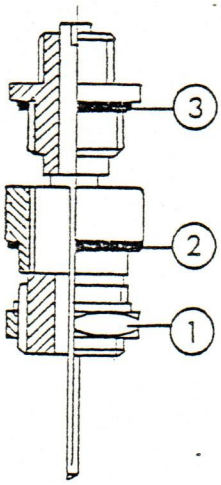
1.	Glass insulator
2.	Securing nut
3.	O-ring (VIT0113)
4.	O-ring (VIT4A)
5.	O-ring (VIT2A)

Type TL4

Used on these accessories:
Radiant heater
Ion beam etching
Freeze fracture and etching
IBT200



1.	Securing nut
2.	O-ring (VIT0215)
3.	O-ring (VIT0114)
4.	Co-axial connector (4 off)

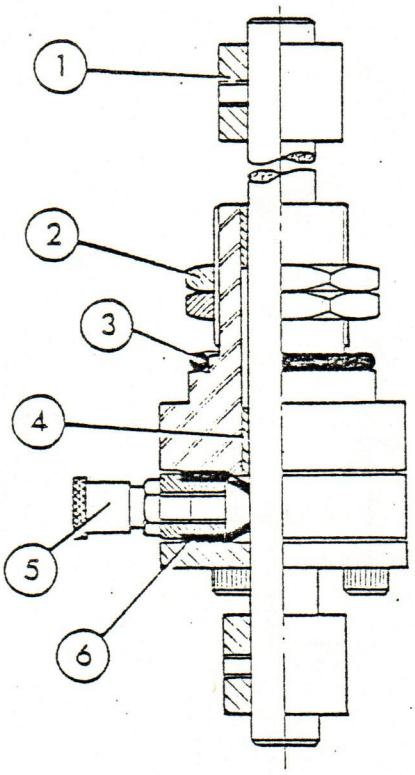


Type 12

Used on these accessories:
Rotatilt-3

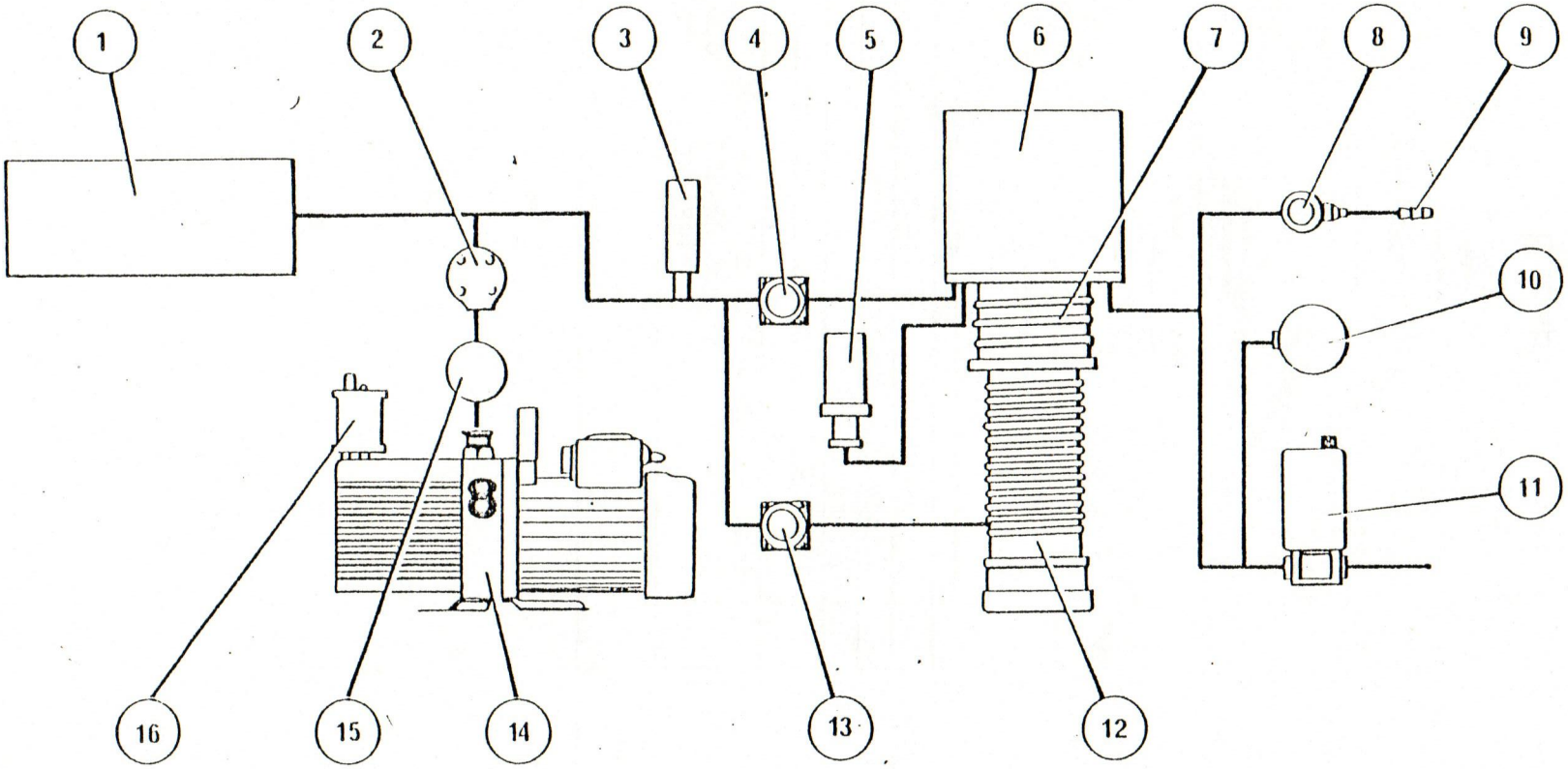
1.	Securing nut
2.	O-ring (VIT0113)
3.	O-ring (VIT0111)

Shaft seal



Used on these accessories:
Four position turret source
Electron bombarded source
Source shutter

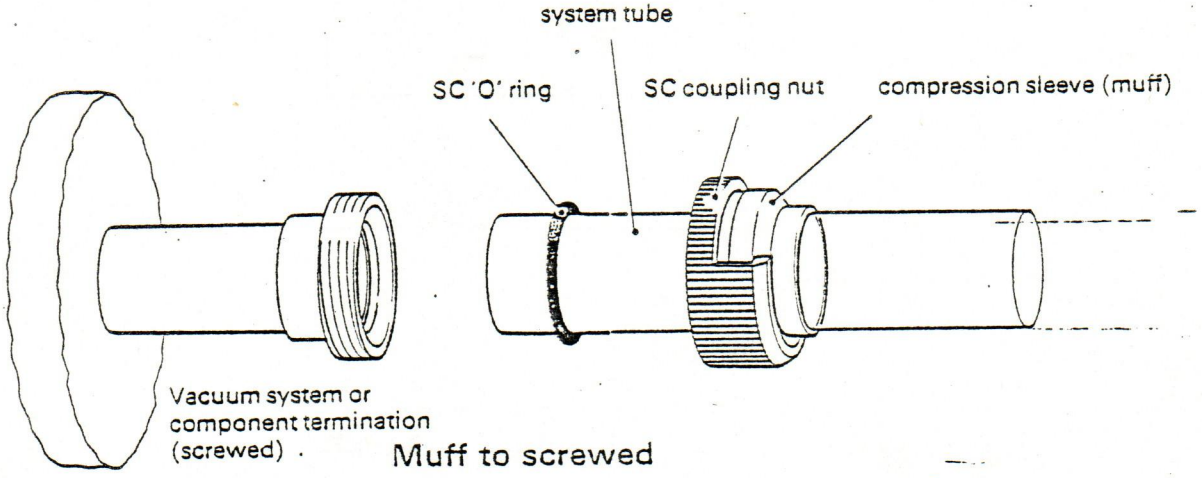
1.	Collar
2.	1 inch BSF locknut
3.	O-ring (VIT0215)
4.	Bearing
5.	Grease cap
6.	Seal rubber 1/4 inch 08-C006-00-000 3/8 inch 08-C006-05-000 1/2 inch 08-C006-01-000



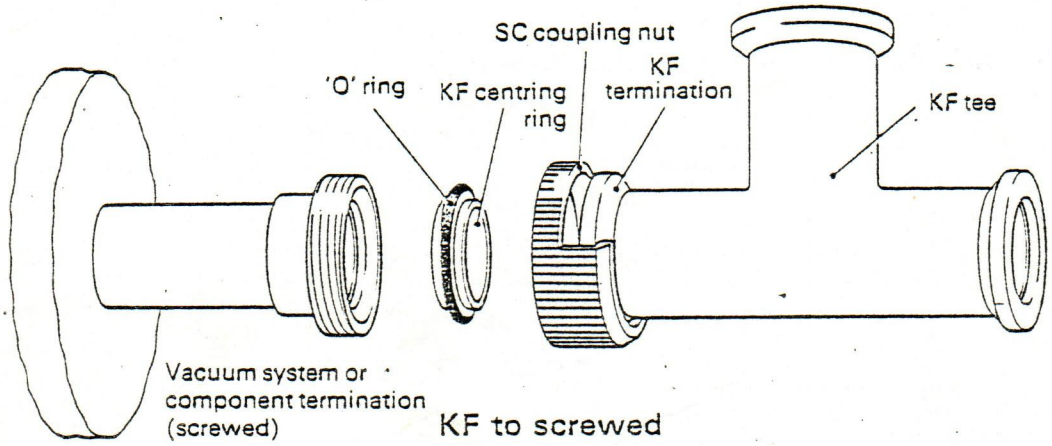
1. Ballast tank*
2. Foreline trap*
3. Pirani gauge head
4. Roughing valve
5. Penning gauge head
6. Chamber
7. High vacuum valve
8. Needle valve
9. Gas bleed nozzle
10. Vacuum switch
11. Solenoid valve
12. Diffusion pump
13. Backing valve
14. Rotary pump
15. Ballast valve*
16. Oil mist filter*

* When fitted

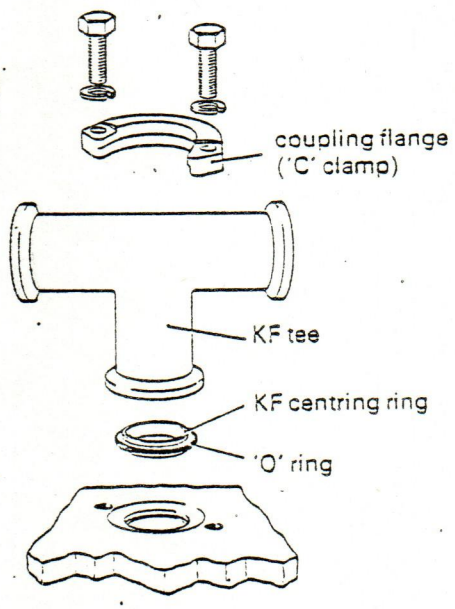
Method of assembling vacuum connexions



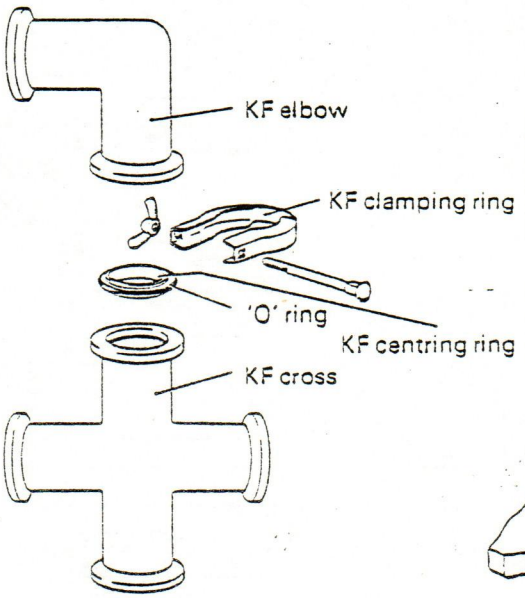
Muff to screwed



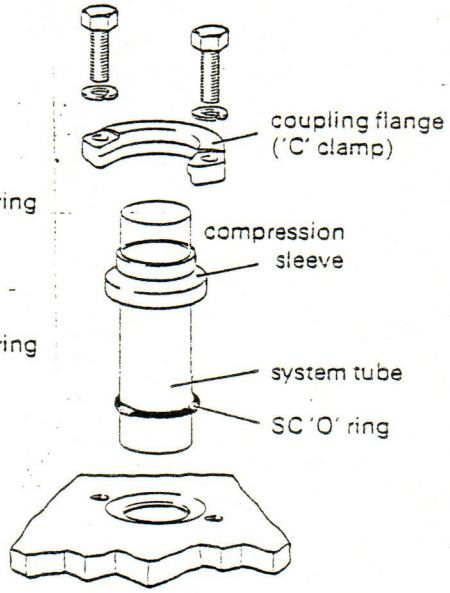
KF to screwed



KF to flat surface



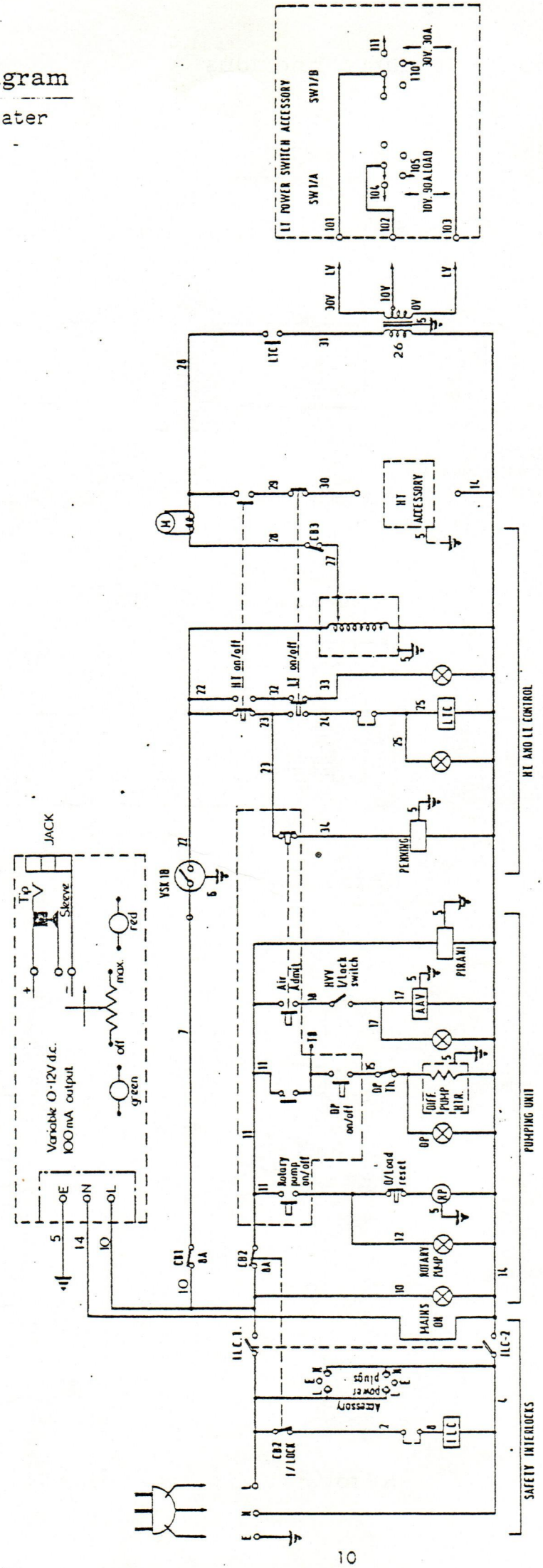
KF to KF



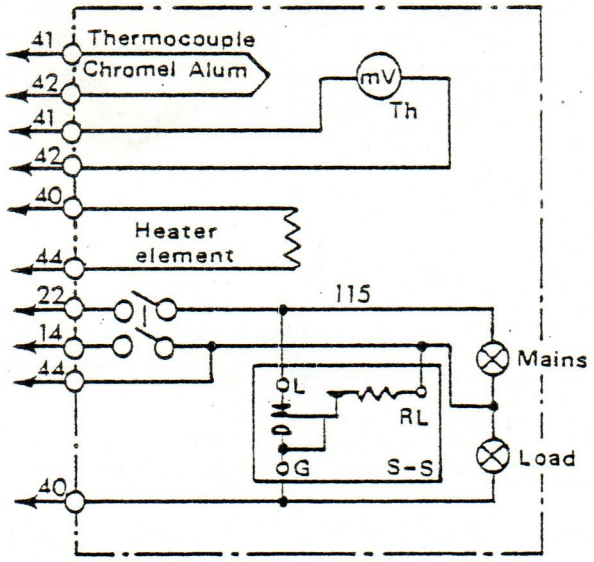
Tube to flat surface

Circuit diagram

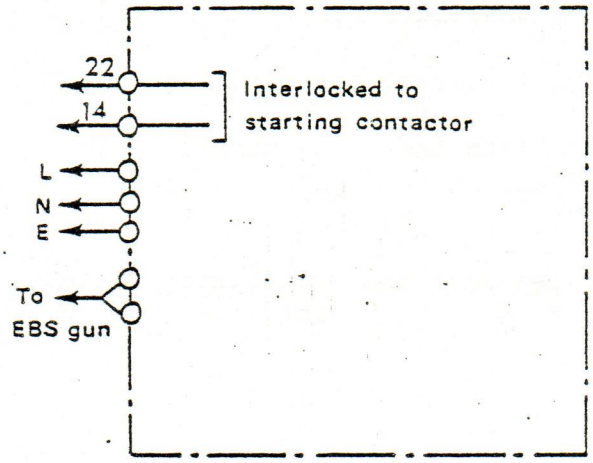
of E306A coater



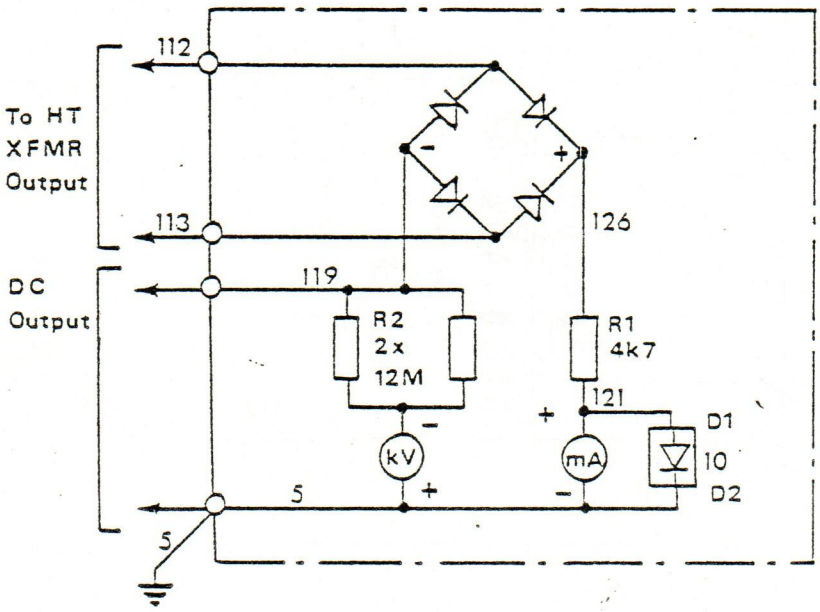
Accessory circuit diagrams



Radiant heater



Six position
electron beam source



D.C. Sputtering
rectifier unit

HT Power supply (11-E085-05-000)

An HT power supply unit is necessary for the operation of the 'Plasmaglo' ion bombardment accessory. It is rated at 3.3kV at 50mA (5kV open circuit). The power supply unit comprises an HT transformer with fixing screws, leadthroughs, HT cables and connexion cap adaptors. This accessory is normally factory fitted.

Installation

1) Refer to the circuit diagram for the coating unit.

2) Locate the transformer in the base of the coating unit and in a central position with the HT connexions towards the rear.

3) Using the screws provided, fix the transformer in position; tapped holes are provided in the base of the coater.

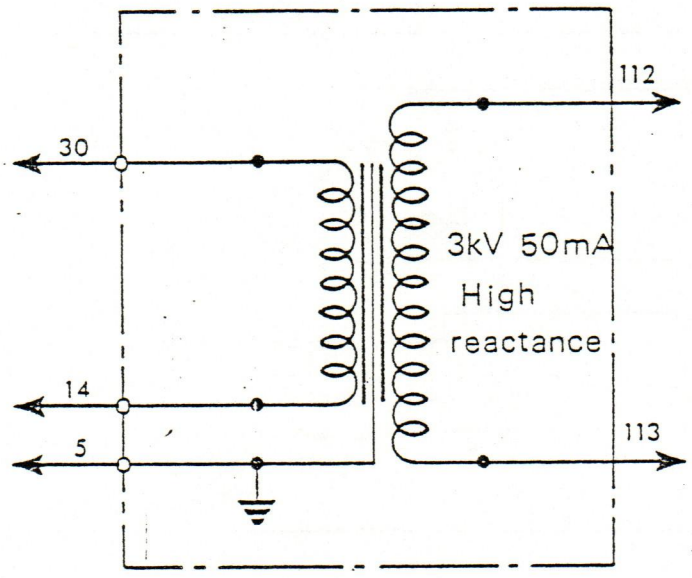
4) Connect wires number 14 and 30 from the primary of the transformer (matching the voltage to the electricity supply) to the terminal block inside the cabinet.

5) Remove the blank plugs from baseplate positions 11 and 12.

6) Fit two type 7 leadthroughs in baseplate positions 11 and 12.

7) Fit two HT connexion adaptors to the HT terminals of the transformer and two to the lower terminals of the leadthroughs in positions 11 and 12.

8) Connect the two red HT cables from the transformer to the leadthroughs and press the HT connectors on to the adaptors.



Ballast tank (11-E085-67-000)

This accessory allows the rotary pump to be switched off during shadow casting to ensure sharp definition by eliminating vibration. It is recommended that this accessory be used in conjunction with a foreline trap accessory to prevent oil contamination of the tank. This accessory is normally factory fitted.

The accessory comprises:

1 SC25 Speedivalve
1 SC10 elbow
3 SC10 coupling nuts
3 SC10 compression sleeves
1 long connexion tube
1 short connexion tube
1 wiring link
1 ballast tank
3 hex. head screws M6 x 16
3 washers M6
3 Viton O-rings (08-H021-23-036)

Assemble as follows:

1) Disconnect the coating unit from the mains electricity supply.

2) Remove the front half of the worktop, open the control case and remove the front and rear panels.

3) Disconnect the flexible tube from the rotary pump to the backing/roughing valve assembly.

4) Remove the blank from the bottom of the six-way junction block in the valve system.

5) Mount the ballast tank to the inside of the right-hand side of the cabinet; two bolt holes are provided in the cabinet side and one on the front corner upright to which the brackets can be bolted.

6) Assemble the two stainless steel tubes to the SC10 elbow and connect this assembly between the tank and the valve junction block. The shorter of the two tubes is attached vertically from the bottom of the junction block.

7) Remove the handle from the Speedivalve by pushing out the rolled pin. Fit the valve to the lower end of the elbow on the backing/roughing valve system (or to the foreline trap accessory, if fitted). The shaft of the Speedivalve will project through the plastic plug in the cabinet side. Replace the valve handle.

8) Re-fit the flexible vacuum tube to the vacuum pump and to the Speedivalve after trimming to length.

9) With the wiring link supplied, link the terminals 11 and 13 on the terminal bank. This will allow the rotary pump to be switched off, still leaving the diffusion pump operating.

10) Replace panels and top cover. Close the control case.

Foreline trap (04-A133-04-000)

A foreline trap contributes to the achievement of a clean vacuum by preventing back-migration of rotary pump oil vapour into the system. It is filled with activated alumina which has a long life but must be regenerated or replaced when saturated. Recommended for use with a ballast tank accessory.

The accessory comprises the foreline trap assembly, two SC25 nuts and a container of activated alimina.
This accessory is normally factory fitted.

Before operation of the coating unit, the foreline trap basket containing the alumina must be baked to a temperature of 300° - 350°C, either in air or under vacuum. This will drive off any water vapour and bring the sorb to a regenerated state. Remove the basket from the oven after a soak period of two hours (minimum) and allow it to cool in a covered container, so that contact with atmospheric air is minimal.

Assemble as follows:

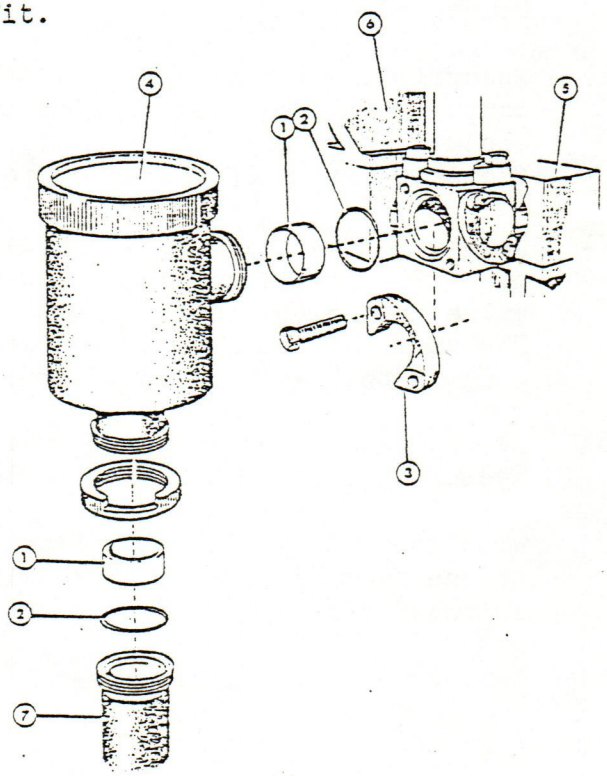
1) Remove the SC25 elbow which connects the flexible tube above the rotary pump to the roughing valve. This is connected by C-clamps.

2) Fit the foreline trap (loading port uppermost) to the roughing valve in place of the elbow. Use the O-ring and its carrier together with the C-clamp removed with the elbow to secure the trap.

3) Remove the loading port cap and insert the basket of activated alumina. Replace the cap.

4) Connect the trap by its lower connexion to the SC25 Speedivalve. Use one of the nuts supplied with the accessory, together with an O-ring carrier and O-ring.

Note: The flexible tube between the Speedivalve and the rotary pump may require trimming to fit.



1.	Insert
2.	O-ring (VIT0215)
3.	'C' clamp
4.	Foreline trap
5.	Roughing valve
6.	Backing valve
7.	Rotary pump flexible connexion

Outlet mist filter (04-A462-01-000)

An outlet mist filter type MF20 is designed to be fitted to the outlet port of an E2M8 rotary vacuum pump. It is an alternative to venting to outside atmosphere and will remove noxious fumes from the exhaust gases. A plug is provided for draining collected oil. An accessory is available for the MF20 filter, which uses activated charcoal to trap vapours associated with oil discharge and thus prevent oily smells; this accessory is the type OF20 odour filter (code 04-A462-10-000).
This accessory is normally factory fitted.

Replacements

MF20 filter element	14-A462-01-800
0.5kg charcoal for OF20	09-H122-05-001
Felt gaskets for OF20 (pkt 10)	09-A223-02-014

Installation (see also instruction 04-A462-01-881)

The MF20 filter is designed to fit directly to the pump outlet port, in place of the nozzle. The O-ring, supplied with the pump, should be lightly lubricated prior to fitting. Fit flexible tubing from the outlet of the filter to the exhaust nozzle of the coating unit.

Oil draining

The separated oil must be drained periodically. It must never be allowed to rise above the base of the filter element. Clean oil may be returned to the pump.

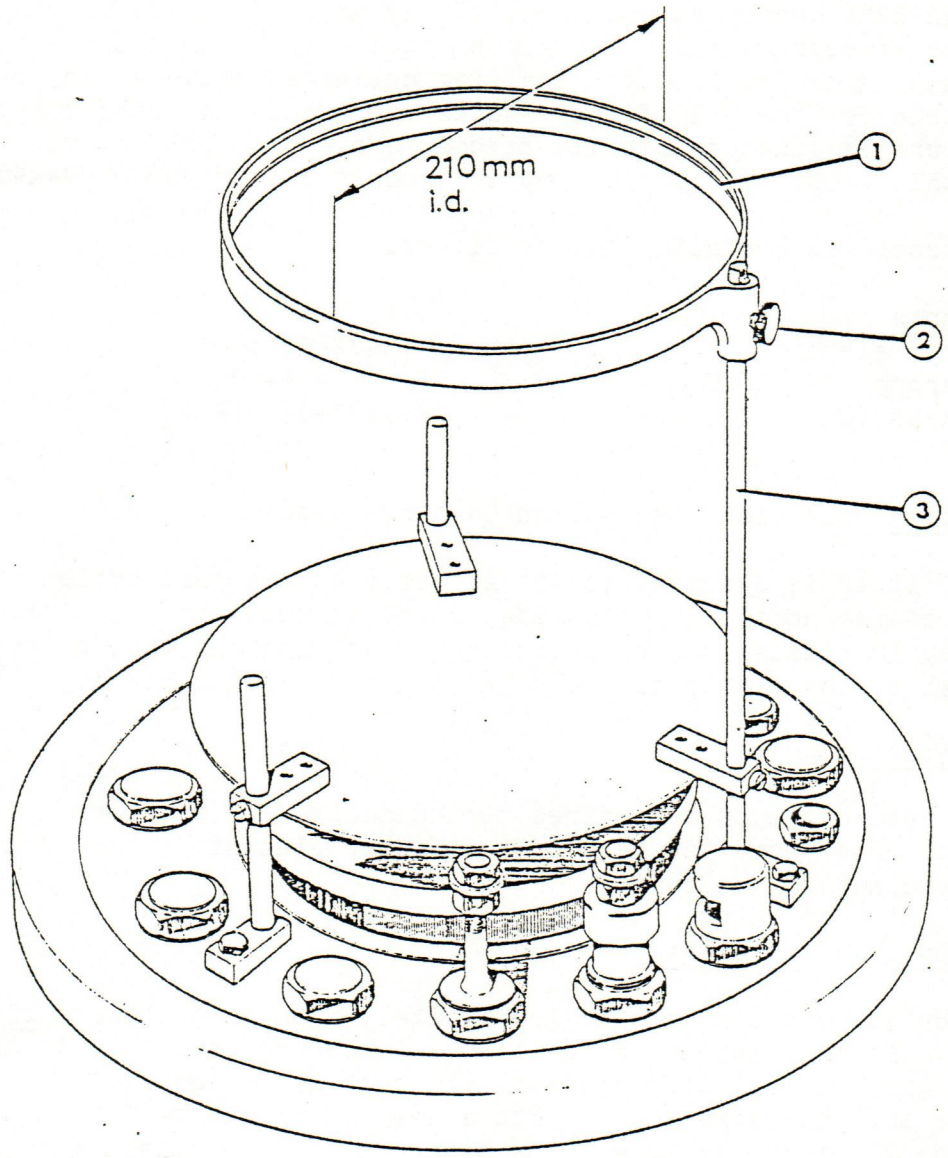
Renewal of filter element

The filter element can be used indefinitely when subjected to clean oil mist. If the element clogs, through other contaminants in the effluent gas, it will lift against spring pressure and allow mist to escape into the atmosphere. Fit a new element as follows:
Remove the lid securing screw, the body lid, the body seal and the Starlock washer, lift out the spring, seal washer and the O-ring. Withdraw the filter element. Replace all O-rings with new ones from the kit (lubricated lightly with pump oil) and reassemble with new element.

To fit OF20 to MF20

Remove the lid, seal and Starlock washer from the MF20 unit. Place the OF20 tray on the MF20, engage the tray shaft on the stud and screw home. Place the tray tube over the assembly; fit the lower felt dust filter. Fill the tray with the activated charcoal until level with the top of the tray. Position the upper felt filter, the tray lid and washer over the centre tube. Replace the filter lid assembly and tighten down securely.

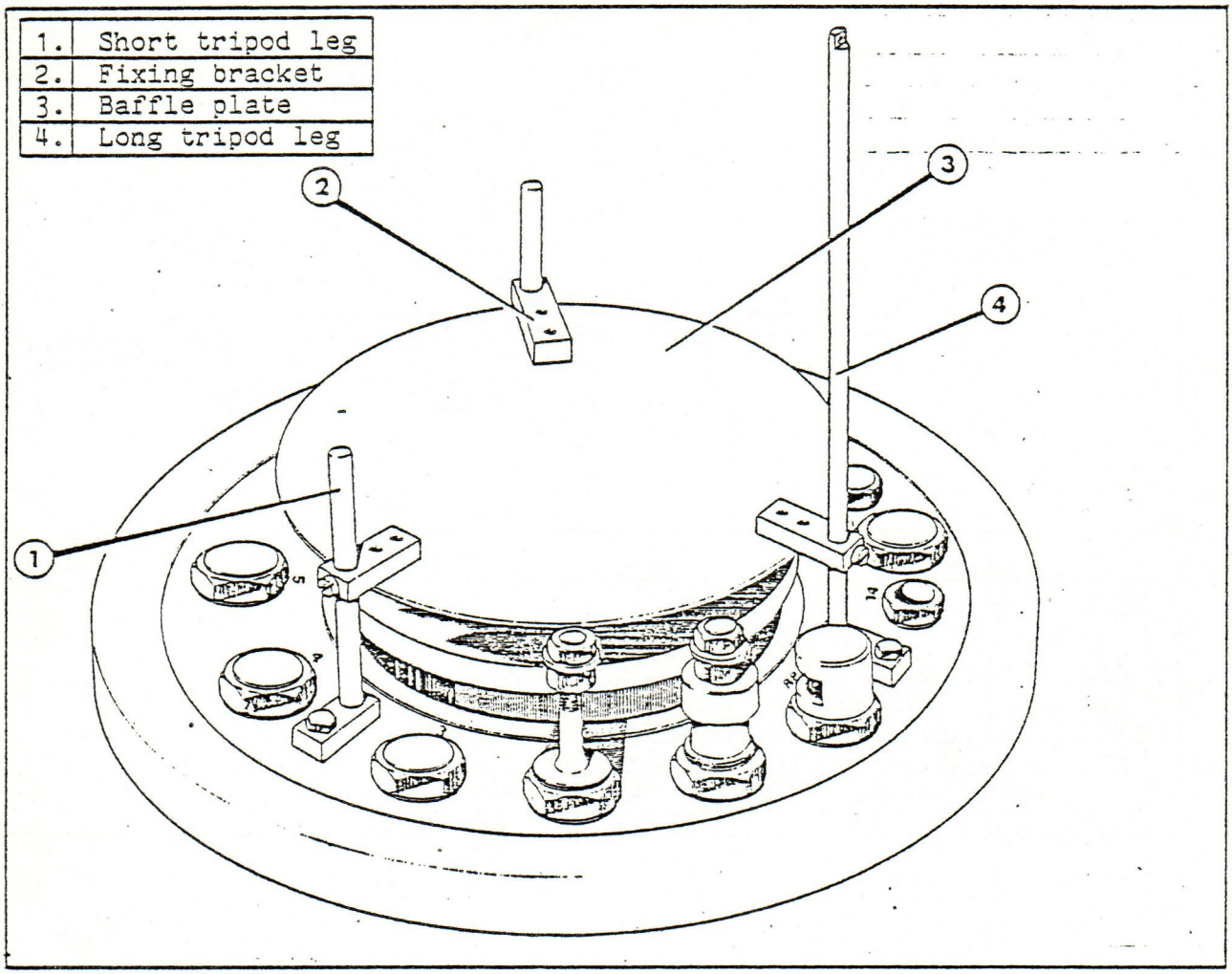
Workholder ring (11-E025-05-000)



1	Workholder ring
2	Securing screw
3	Long tripod leg

A workholder ring is designed to be fitted onto the long tripod leg to which it is secured by a knurled screw. This enables it to be positioned at any convenient height or to be swung clear of the workchamber to facilitate loading. The ring is recessed to accept the spherical workholder or other substrate holders of 210mm diameter.

Tripod and baffle plate (11-E025-01-000 and 11-E025-02-000)



The stainless steel tripod comprises one long leg and two shorter legs complete with securing screws and washers. It is fitted to the baseplate of the coating unit to provide a support for the baffle plate and other accessories.

The baffle plate is attached to the tripod to locate it over the high vacuum valve. It provides a support for work when evaporating in a downward direction and prevents coating materials and debris from being deposited upon the high vacuum valve plate.

Assembly

1) Mount the long tripod leg onto the baseplate between the roughing port and position 14. Line up the foot of the tripod leg with the radius of the baseplate.

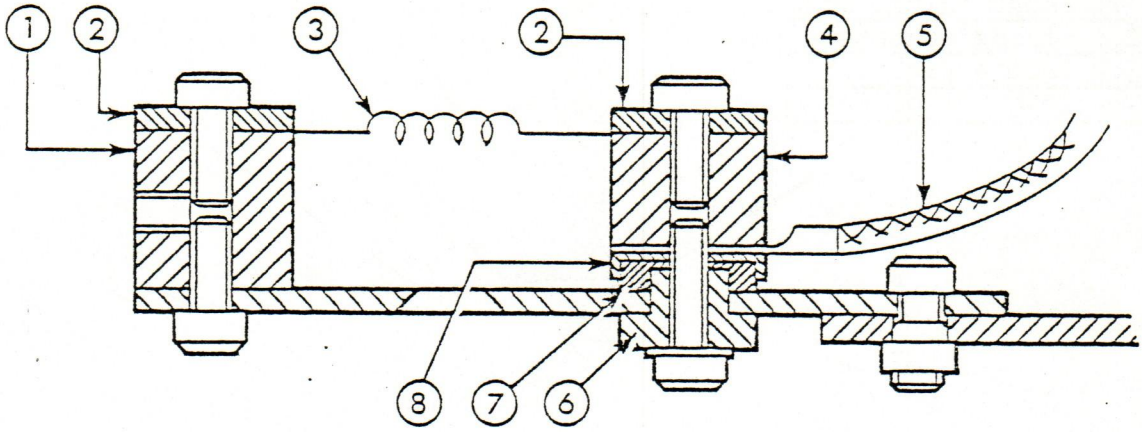
2) Mount the shorter tripod legs onto the baseplate between positions 3 and 4, and positions 7 and 8.

3) Loosely mount the brackets to the baffle plate.

4) Assemble the baffle plate onto the tripod so that each leg passes through a fixing bracket hole.

5) Set the baffle plate so that the minimum distance between the baseplate and the lower surface of the baffle plate is 45mm. Tighten the locking screws in each bracket.

Filament holder (11-E085-69-000)



1.	Filament post 11-E085-69-009
2.	Clamp plate 11-E085-69-010
3.	Filament
4.	Filament post 11-E085-69-008
5.	Braid assembly 11-085-69-003
6.	Flanged insulating bush 11-E001-00-234
7.	Insulating washer 11-E001-00-235
8.	Side insulator shield 11-E036-15-009

The filament holder is designed to accept tungsten baskets, hairpins, helices or molybdenum boats, all of which can be firmly clamped to give longer filament life. It is fitted into the chamber on a jointed, single arm fixing which allows up, down or sideways evaporation.

A removable collimating tube, which is fully rotatable, enables the coating to be directed onto the specimen only. This ensures that the chamber and other accessories remain clean and contamination free.

The filament holder is suitable for shadow casting with the commonly used metals and also for aperture cleaning using a molybdenum boat.

Installation

1) Remove the upper nut and washer from the upper terminal of the leadthrough at baseplate positions 1 and 2 or other convenient position.

2) Attach the filament holder sub-assembly to the leadthrough at baseplate position 1.

3) Connect the flexible strap from the filament holder sub-assembly to the leadthrough at baseplate position 2.

4) Replace the nuts and washers on the leadthroughs to secure when the filament holder is correctly positioned.

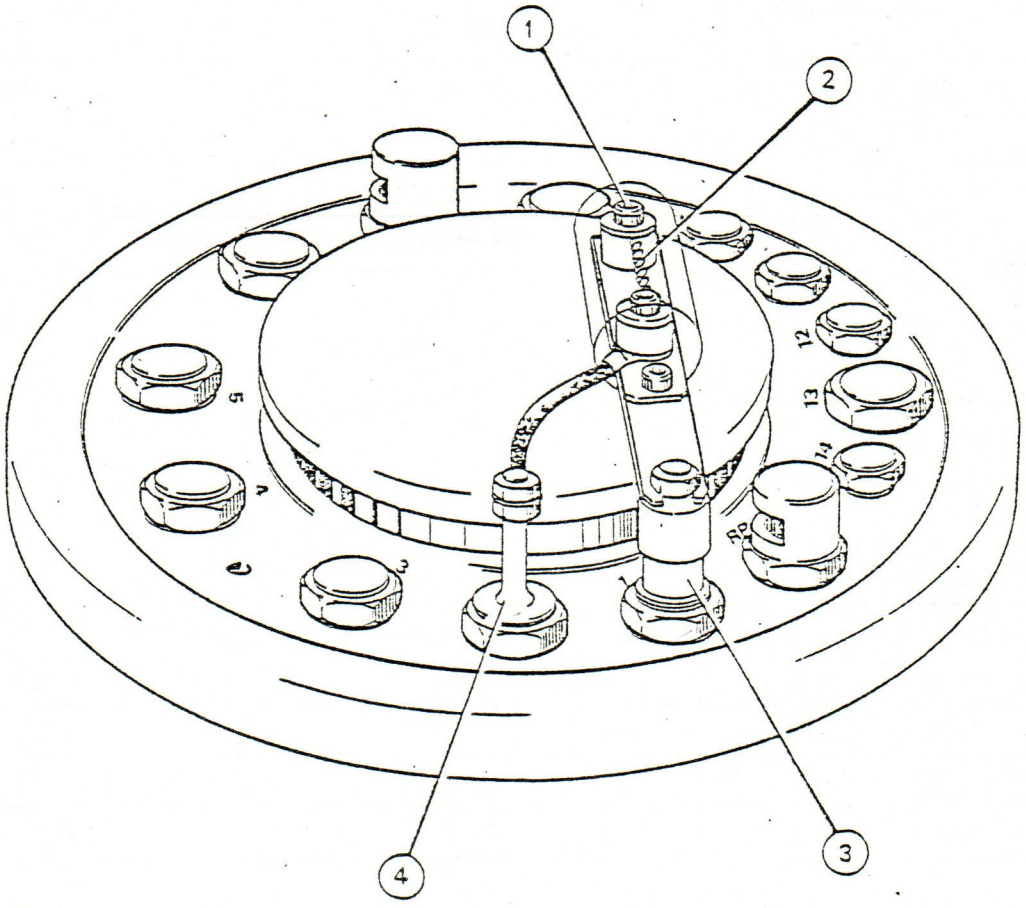
5) Remove the cap head screw from the end of the collimating tube.

6) Fit a filament or boat (see source details and dimensions diagram) between the terminals.

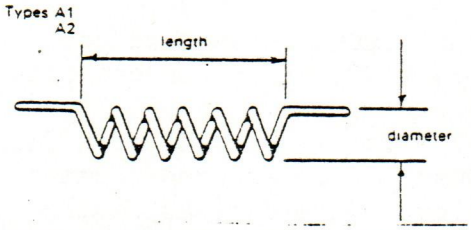
7) Replace the collimating tube and cap head screw so that the hole is set in the desired direction of evaporation.

8) To change the effective height of a filament, two electrode extensions must be fitted (code number 11-E069-00-201); this will also allow downwards evaporation. The source can be aligned with the sample on a Rotatilt 3 at any desired angle. For many applications the source can be used without the collimating tube to give wide coverage. Alternatively, the hole in the collimating tube can be increased in size or extra holes can be drilled so that the source evaporant may be directed to a quartz crystal monitor.

1	Filament clamp screw
2	Filament
3	Type 6 leadthrough
4	Earth pillar



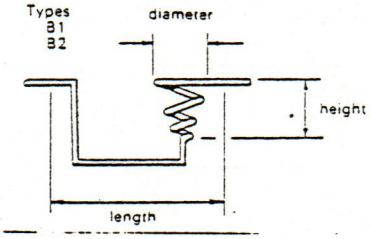
Filaments



Tungsten helical filaments

Suitable for the evaporation of aluminium and gold for SEM evaporation techniques.

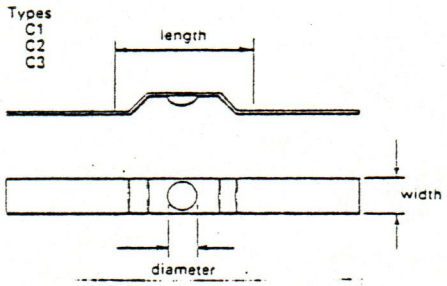
Type	Length mm	Diameter mm	Strands mm	Evaporation current	Code number
A1	19	4.8	1 x 0.5 mm	15/20A	11-H014-01-001
A2	19	4.8	3 x 0.5 mm	40A	11-H014-01-002



Tungsten baskets

Suitable for the evaporation of granules in applications such as chrome shadowing.

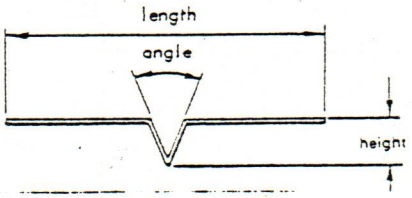
Type	Length	Diameter mm	Height mm	Strands mm	Evaporation current	Code number
B1	14.5	2.4	4	1 x 0.5 mm	15/20A	11-H014-01- 021
B2	16	4.8	6	3 x 0.5 mm	30/40A	11-H014-01-022



Molybdenum boats

For the evaporation of silver and gold and for heating electron microscope apertures.

Type	Length mm	Diameter mm	Width mm	Thickness mm	Evaporation current	Code number
C1	19	4.8	6.5	0.05	25A	11-H014-01-040
C2	51	9.5	9.5	0.05	45A	11-H014-01-044
C3	32	9.5	11	0.1	80A	11-H014-01-041

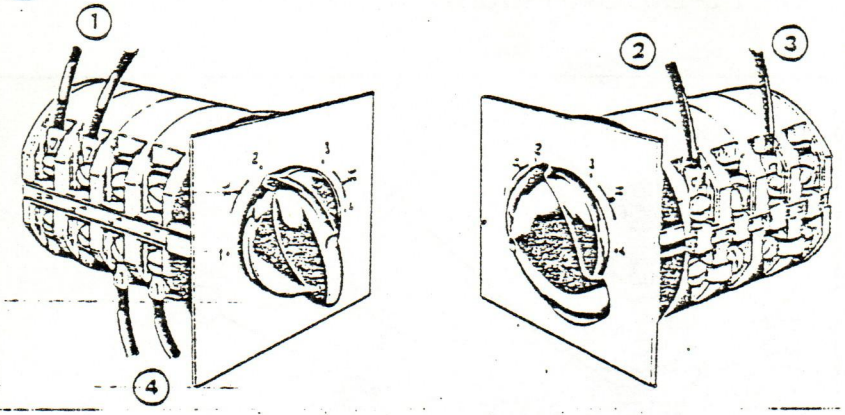


Tungsten hairpin filament

Suitable for the evaporation of wire for shadow-casting.

Length mm	Angle	Height mm	Strands	Note:
50	45°	6.5	1 x 1.05 mm	Prepared by user

Source selector (11-E085-04-000)



1	To baseplate leadthroughs (10V)
2	To transformer (30V)
3	To transformer (10V)
4	To baseplate leadthroughs (30V)

A source selector switch permits all four low tension evaporation positions to be selected in sequence. Two voltages are available, 10V or 30V. This accessory is normally factory fitted.

Installation

1) Disconnect the coating unit from the electricity supply.

2) Remove a blank panel from the control case.

3) Remove the secondary (LT) wire from the LT transformer but leave intact the OV wire to the earth electrode.

4) Connect to the selector switch the LT cables supplied:

   cable 101 to switch contact 2
   cable 102 to switch contact 10
   cable 104 to switch contact 9
   cable 105 to switch contact 13
   cable 110 to switch contact 7
   cable 111 to switch contact 3

5) Open the control case and feed the LT cables through the space vacated by the blank panel. Fit the selector switch into the control case.

6) Feed the LT cables through the back of the unit. Connect cable 101 to the transformer 30V secondary tapping and cable 102 to the transformer 10V secondary tapping.

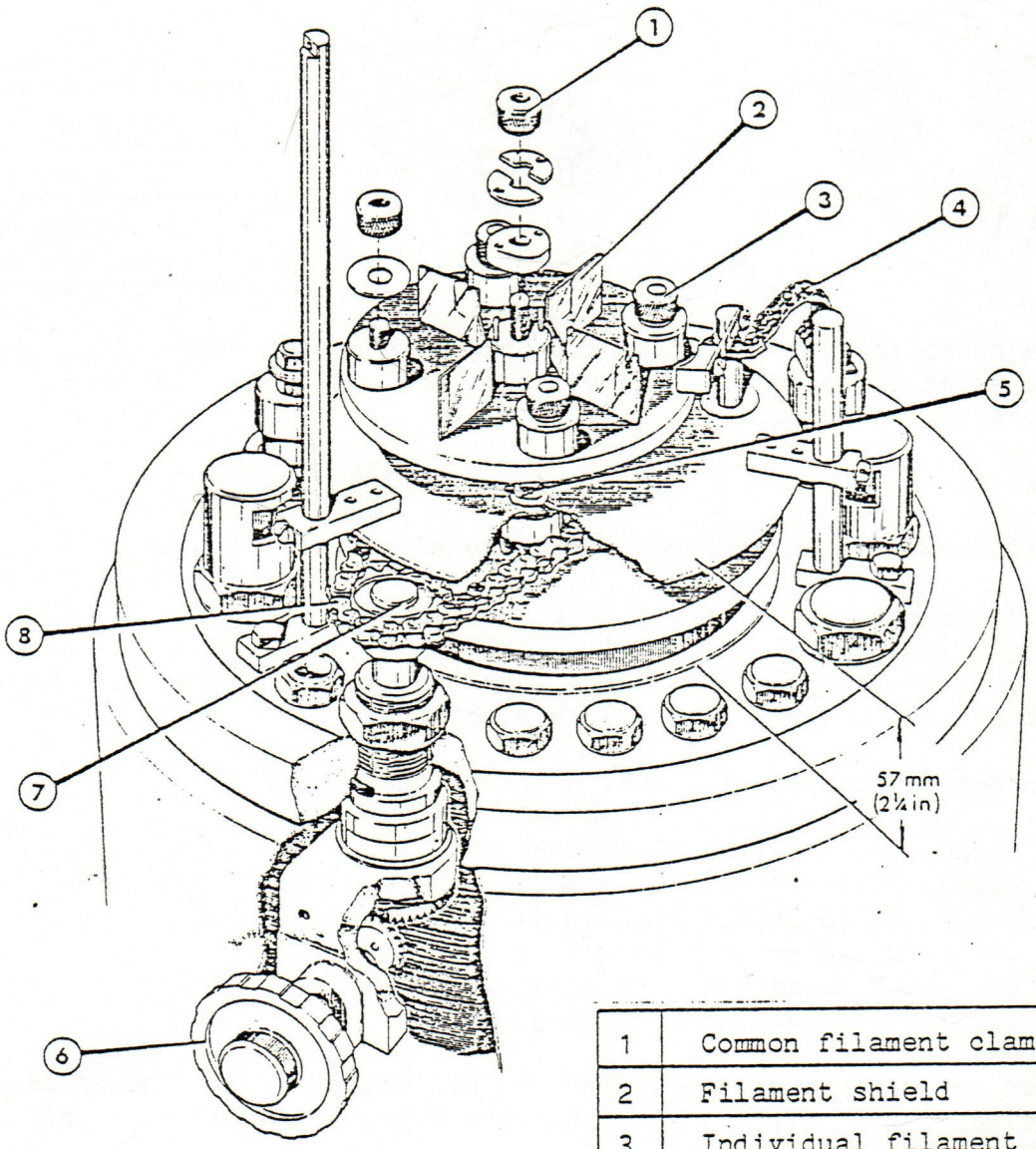
7) Connect cables, 104, 105, 110 and 111 to convenient type 6 leadthroughs on the baseplate. Cables 104 and 105 will carry 10V; cables 110 and 111 will carry 30V.

   Note: as indicated on the circuit diagram, cable 104 is energised by switch position 1; cable 105 by switch position 2; cable 110 by switch position 3 and cable 111 by switch position 4.

8) Towards the rear of the left-hand pump stack support member there is an 8mm dia. hole. Into this hole fit the nylon screw and sandwich any of the four LT cables not connected to the baseplate between the two nylon nuts.

   Note: If this accessory is factory fitted before delivery of the coating unit then the LT output leads will be connected to the nylon screw. The required output lead will need to be connected to the appropriate baseplate leadthroughs.

Four position turret source (11-E023-01-000)



1	Common filament clamp
2	Filament shield
3	Individual filament clamp
4	Copper braid
5	Tension adjusting nut
6	Control wheel
7	Drive sprocket
8	Chain

A turret source accessory is indexed by means of an externally mounted handwheel operating through a rotary shaft seal. Four different evaporation sources may be selected for central evaporation using boats, baskets or filaments. The primary use of the source is for multi-layer deposition in a single vacuum cycle. It can also be used for thick film deposition employing up to four sources in sequence, each charged with the same material.

The accessory comprises a turret assembly (including a baffle plate, fixing brackets, screws and washers); a rotary drive unit and a driving chain with spring link.

Assembly

1) Connect a 10V supply to position 6 by exchanging LT cables (see page 21) or remove the leadthrough and LT cable from position 1 in the baseplate and transfer it to position 6. Fit the blank plug into position 1.

2) Assemble the brackets to the turret assembly baffle plate.

3) Check that the electrical brushes on the turret assembly make firm contact with a filament terminal and the terminal plate. Reset the brush pillars for firm contact, if necessary.

4) Remove the blank plug from baseplate position 13.

5) Remove the sprocket from the rotary drive; this is secured by a grub-screw.

6) Fit the rotary drive (complete with O-ring) upwards through baseplate position 13 and secure with the locknut; check that the handwheel shaft is aligned to the baseplate radius.

7) Fit the spring-link into the driving chain. Engage the driving chain over the turret assembly sprocket and the slackened tension sprocket of the turret accessory.

8) Engage the rotary drive sprocket in the driving chain and hold the assembly above the baseplate before mounting it on the tripod.

9) While holding the turret and baffle plate assembly (complete with chain and drive sprocket) orientate it so that the tension sprocket is adjacent to position 13 on the baseplate.

10) At the orientation described above, mount the baffle plate onto the tripod legs attached to the baseplate; at the same time, locate the drive sprocket onto its shaft.

11) Set the assembly so that the upper surface of the baffle plate is 57mm above the baseplate. Tighten the bracket screws. Tighten also the drive sprocket grub screw.

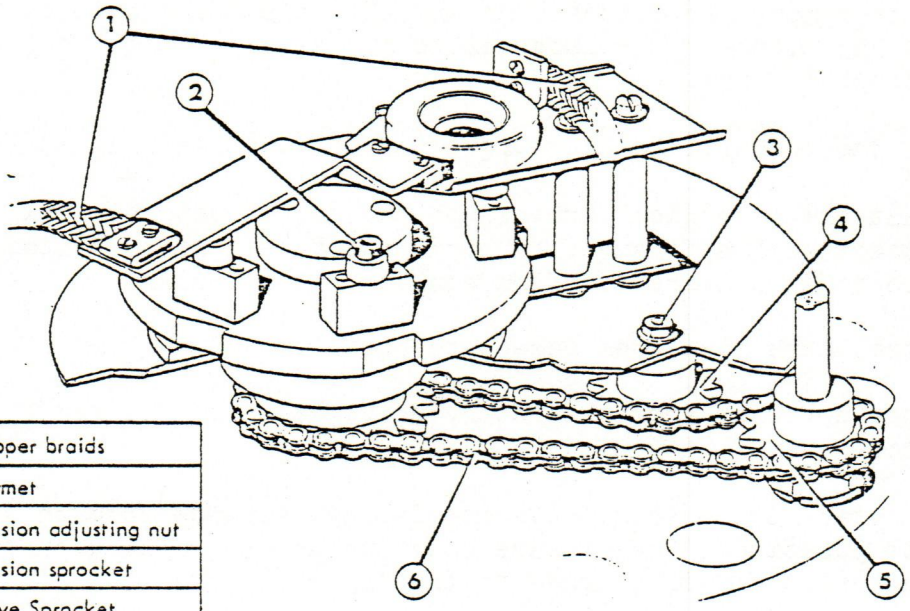
12) Take up the slack in the chain by repositioning the tension sprocket

13) Turn the rotary drive handwheel to check that all settings are satisfactory.

14) Engage the free end of the copper braid with the upper terminal of the leadthrough at baseplate position 6. Secure with the nut and washer.

15) Secure each evaporation filament or boat by means of the outer filament securing nuts. Tighten the inner securing nuts when the free ends of the filaments (or boats) are in the plate.

Six position electron beam source (11-E025-24-000)



(1)	Copper braids
(2)	Cermet
(3)	Tension adjusting nut
(4)	Tension sprocket
(5)	Drive Sprocket
(6)	Drive chain

Electron beam sources are used when evaporant reacts adversely with normal resistance heated source materials and also to evaporate materials which have a high melting point.

The accessory comprises a six-hearth turret with rotary drive and an electron beam gun mounted on a baffle plate. The assembly is normally mounted on the tripod accessory. Also supplied with the source are cermet hearths, tungsten emitters and a 6D electrode.

A power supply unit is available (code 11-D325-01-000) which can provide up to 900VA. It is complete with HT voltage and emission current meters and variable transformers for control.

Assembly

1) Fit a type 6 leadthrough at baseplate position 8.

2) Attach the fixing brackets to the lower face of the turret assembly baffle plate.

3) Mount the turret assembly on the tripod so that the tension sprocket is adjacent to baseplate position 13.

4) Set the upper face of the assembly baffle plate to the optimum height of 75mm above the baseplate; tighten the brackets screws.

5) Engage the free ends of the copper strips with the terminals of the leadthroughs at baseplate positions 1 and 8.

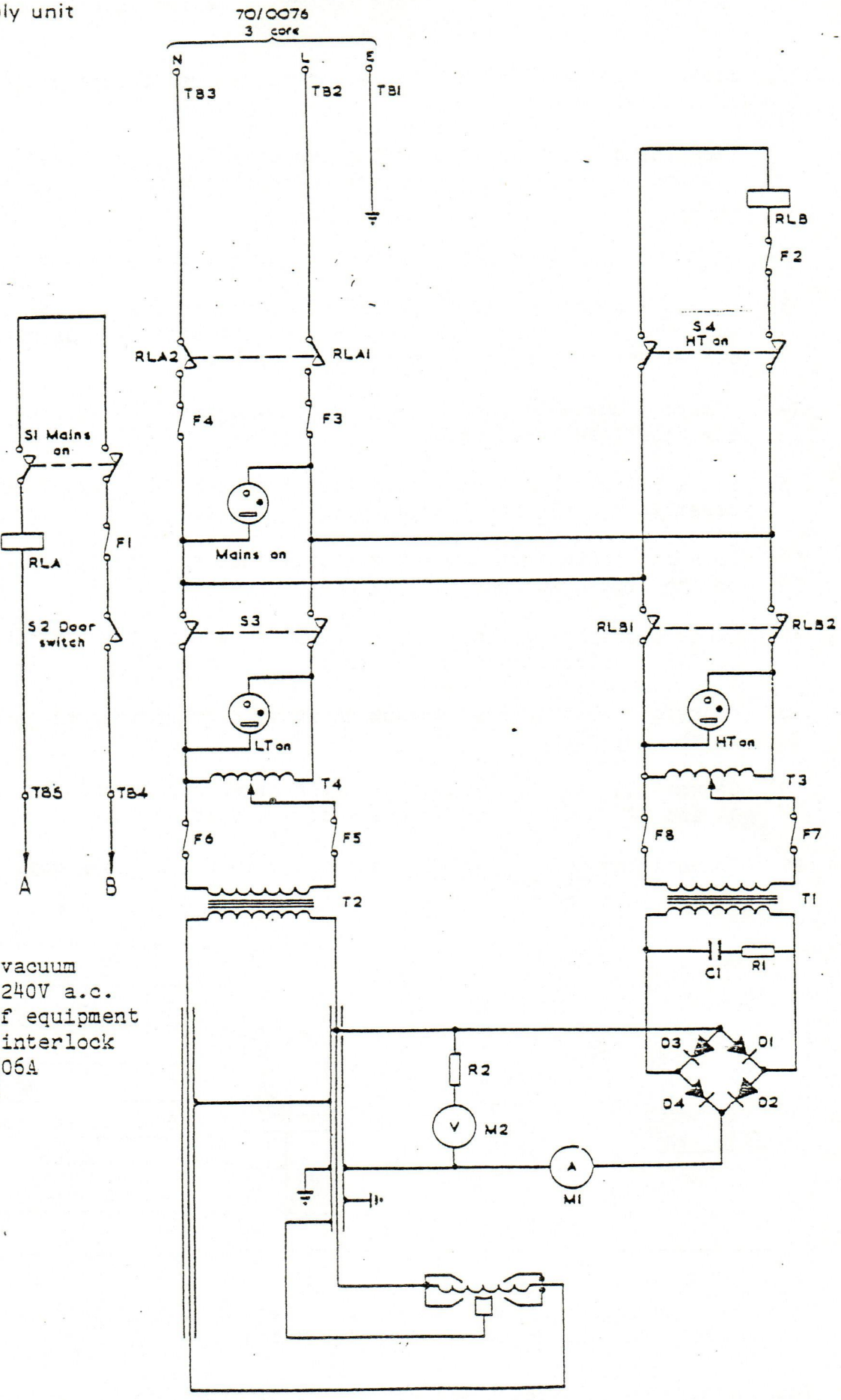
6) Remove the blank plug from baseplate position 13.

7) Remove the sprocket from the rotary drive by releasing the grub-screw.

8) Fit the rotary drive (complete with O-ring) into the underside of baseplate position 13 and secure with the locking nut. Align the handwheel shaft to the baseplate radius.

Circuit diagram for six position E.B.S.

power supply unit



Connect to vacuum controlled 240V a.c. terminals of equipment for supply interlock e.g. for E306A
A = wire 14
B= wire 22

9) Re-locate the sprocket on the rotary drive and secure with the grub-screw.

10) Slacken the tension sprocket which is secured though a slot in the baffle plate.

11) Pass the driving chain over the turret assembly sprocket, the tension sprocket and the rotary drive sprocket. Fit the spring link.

12) Adjust the tension sprocket to take up the slack in the chain.

13) Turn the rotary drive handwheel to check for freedom of movement, such that the turret rotates and when the handwheel is rotated backwards the hearths rise concentrically.

14) Locate a suitable hearth (e.g. carbon, cermet) in each of the six baseplate positions.

15) Fit a filament concentrically with the hearth and electrode assembly and then replace the cover over the filament assembly.

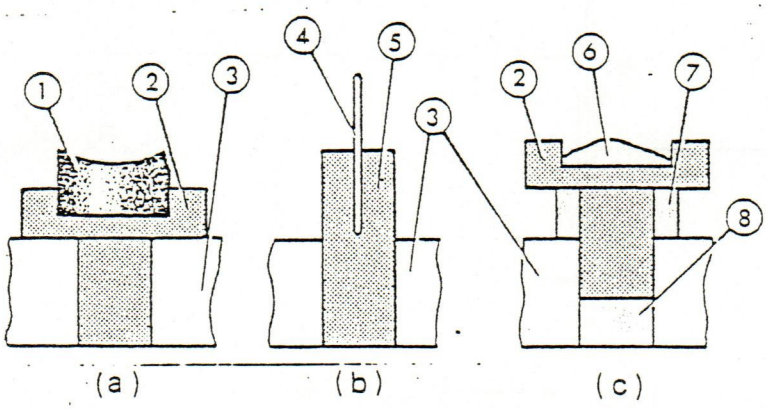
16) Pass the cable from the power supply unit through the cut-out on the left-hand panel of the coater.

17) Connect the heavy leads in the cable to a baseplate leadthrough; one to position 1 and the other to position 8.

18) Connect the earth lead in the cable to a convenient earth point on the baseplate.

19) Connect the two thin wires from the power supply unit to connexions 14 and 22 in the terminal block of the coating unit.

20) Connect the mains lead of the power supply unit to a supply of at least 10A.

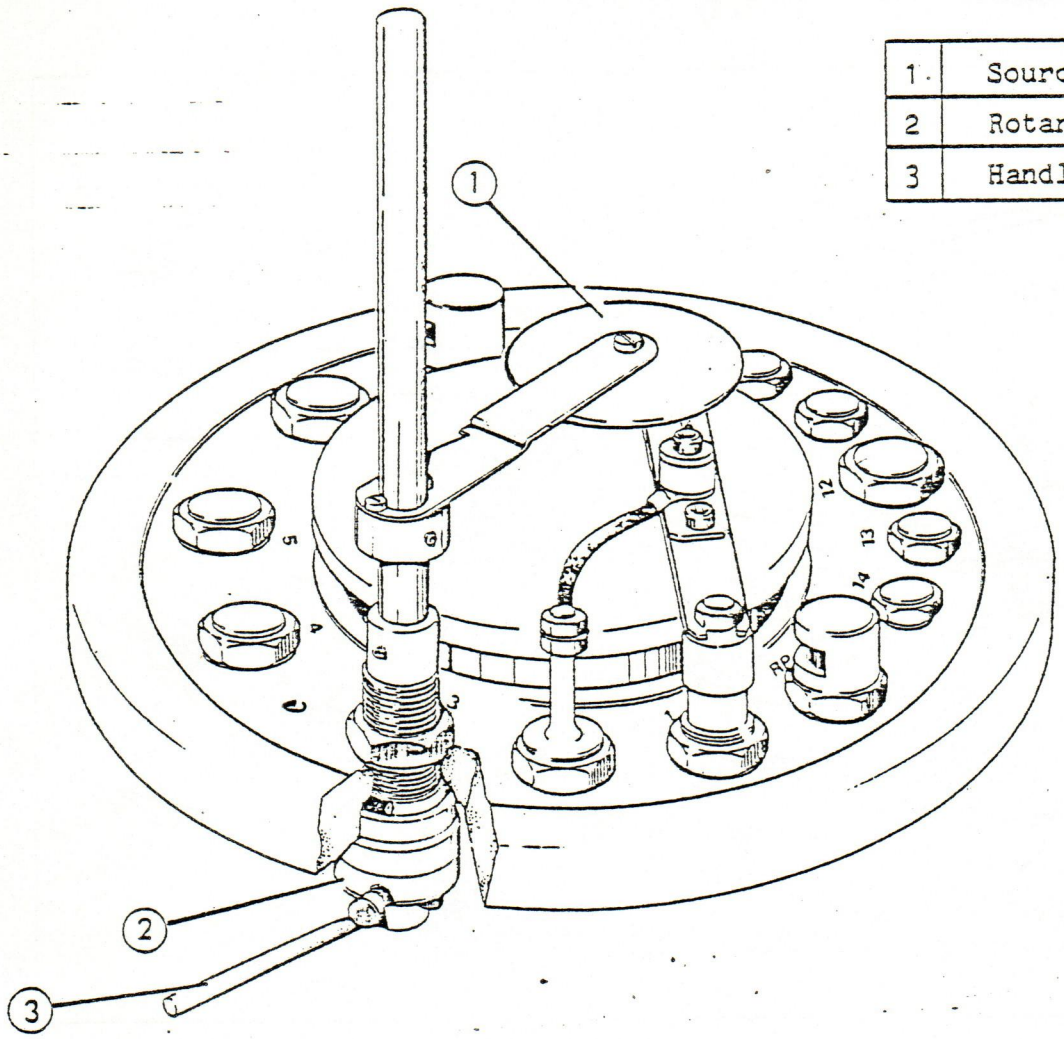


1	Cermet
2	Carbon hearth
3	Copper base
4	Tungsten or molybdenum
5	Carbon rod
6	Powder
7	Spacer 1
8	Spacer 2

A cermet and carbon support are supplied as in illustration (a) which is suitable for the majority of applications.

Rods of high melting point materials e.g. tungsten, can be evaporated if they are supported by a carbon rod or similar, see illustration (b). The carbon support can also be used as a larger hearth if it is raised by a spacer, as in illustration (c).

Manual source shutter (11-E025-04-000)



1	Source shutter
2	Rotary vacuum seal
3	Handle

The shutter is designed to be operated from outside the vacuum chamber by means of a lever and a sealed rotary shaft; it is fully adjustable. The stainless steel shutter is used where the evaporation process requires accurate commencement or termination. It also serves as a shield to prevent heat radiation and volatile constituents reaching the substrate during source degas periods.

The accessory comprises a source shutter, handle and rotary vacuum seal and shaft assembly.

Fitting

1) Remove the blank plug from baseplate position 3.

2) Transfer the O-ring from the blank plug to the rotary vacuum seal.

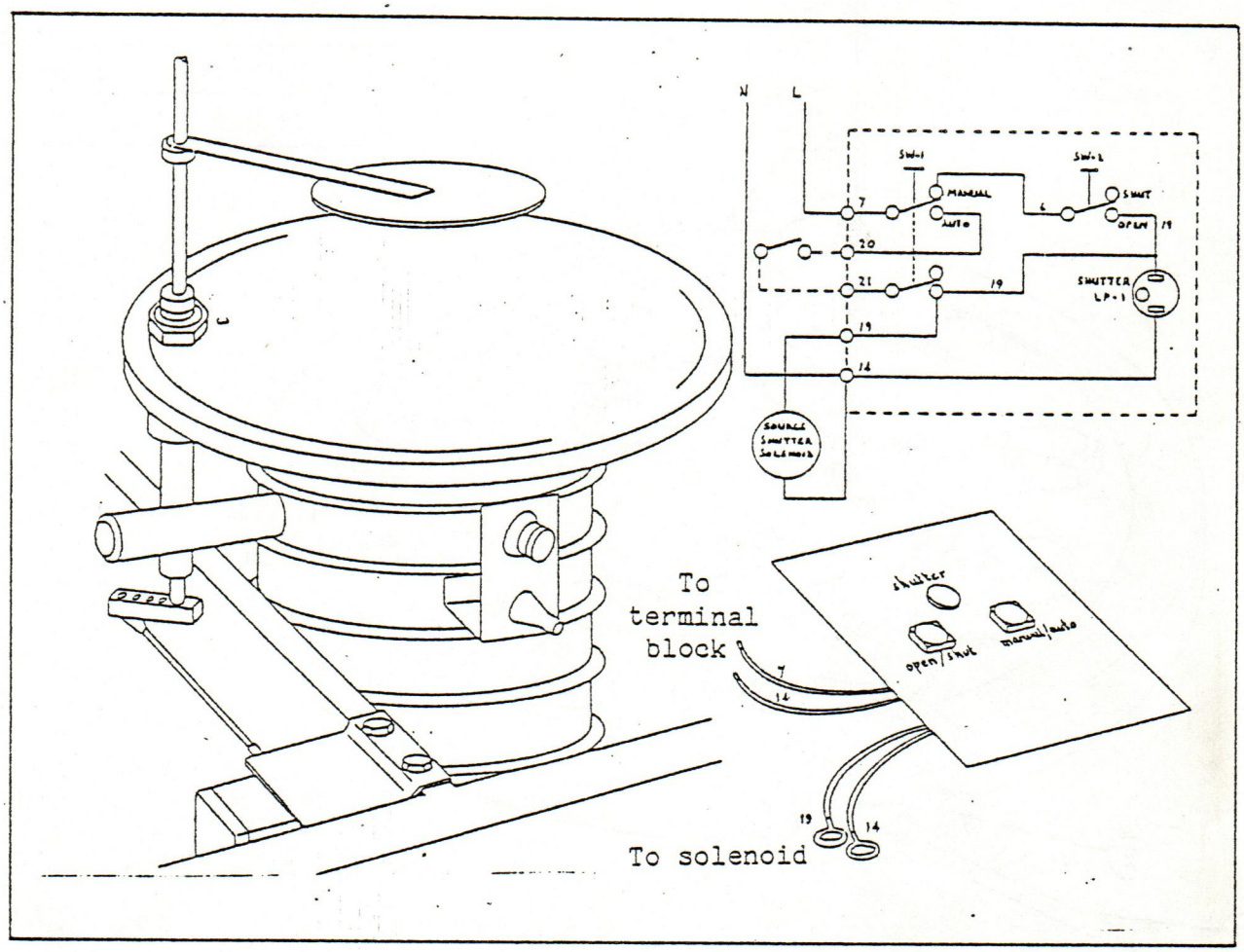
3) Fit the rotary vacuum seal into the underside of baseplate position 3 and secure with the nut from the blank plug.

4) Slide the source shutter, boss lowermost, over the upper end of the shaft.

5) Position the shutter so that it just clears the source and secure by tightening the grub screws.

6) Move the handle in a clockwise direction to check that the source is covered.

Electro-magnetic source shutter (11-E085-21-000)



The accessory provides an automatic source shutter when used in combination with an Edwards film thickness monitor and terminator.

The unit consists of a solenoid assembly connected to a rotary shaft seal by a linkage rod. A shutter pan is mounted on the shaft seal.

A control unit provides manual selection of the shutter position and automatic selection when controlled by a terminator.

Installation

1) Disconnect the coating unit from the mains electricity supply.

2) Remove the electrode shields and worktops from the coating unit.

3) Remove the blank plug from baseplate position 3.

4) Fit the shaft seal, O-ring and nut into baseplate position 3.

5) Position the solenoid bracket at the front of the left-hand cross-member (see illustration) and mark the screw hole locations; these are approximately 25mm and 100mm from the front edge. Drill through at the marked positions using a drill bit of 10mm diameter.

6) Mount the control panel in a vacant position in the E306A control box.

7) Connect the wires from the control panel numbered 7 and 14 to the terminal block inside the cabinet of the coating unit. Connect the wires from the control panel numbered 19 and 14 to the solenoid.

8) Attach the solenoid to the cross-member with screws, shakeproof washers and nuts.

9) Connect the operating arm from the solenoid to the actuating lever on the shaft; push the end of the lever onto the ball joint.

10) Connect a terminator of a film thickness monitor to shutter terminals numbered 20 and 21 (see also FTM3 instructions)

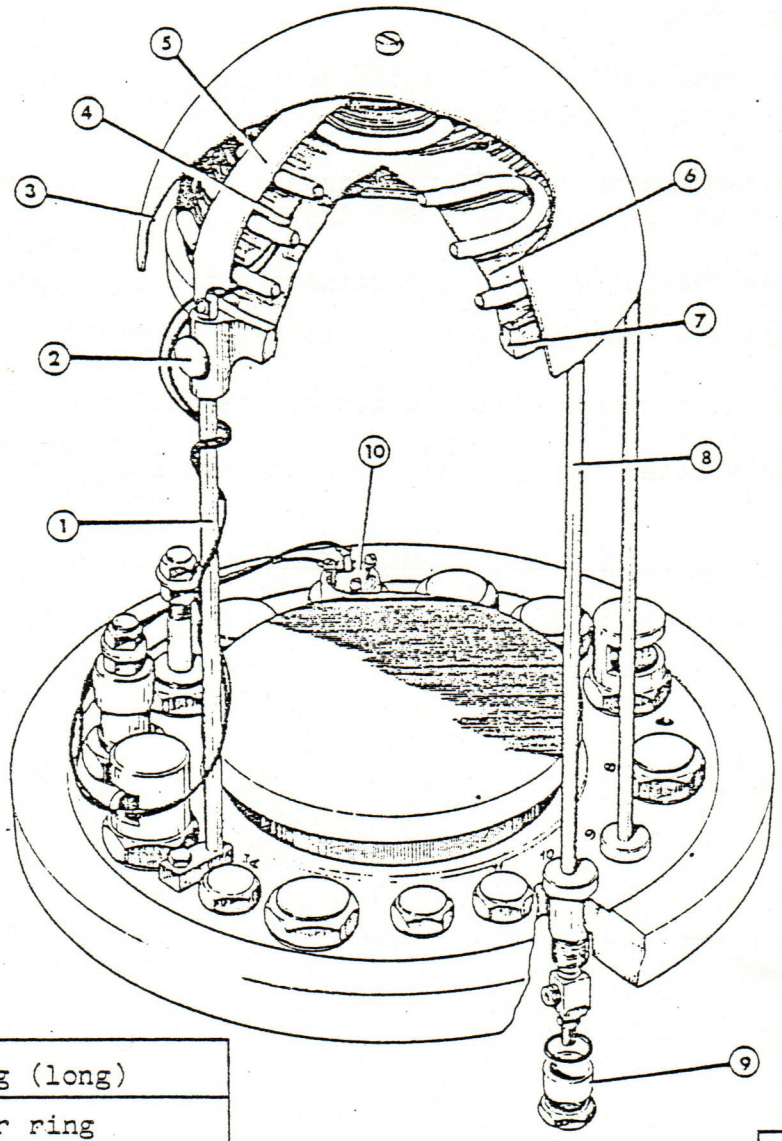
11) Connect the coating unit to the mains electricity supply.

12) Ensure that the manual/auto button is not depressed.

13) Press the shutter open/close button to operate the shutter pan.

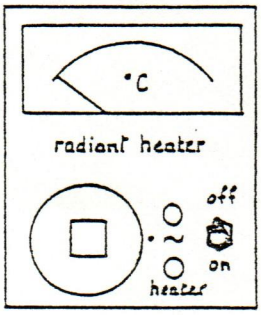
14) Adjust the shutter pan for the best position above the source.

Radiant heater and spherical workholder (11-E085-03-000)



1	Tripod leg (long)
2	Workholder ring securing screw
3	Radiation shield
4	Thermocouple finally positioned by customer
5	Radiation shield support bracket

6	Workholder
7	Workholder ring
8	Radiant heater
9	Spacer
10	Type TL4 leadthrough



The heating of substrates prior to and during deposition is often necessary to prevent adsorption of contaminants and to ensure hard and suitably annealed coatings. It is of particular advantage during the deposition of anti-reflection films on glass substrates.

The accessory comprises a sheathed heater coil, reflector and spherical workholder; a thermocouple, leadthroughs and meter to indicate substrate temperature and a regulator. The regulator permits temperature adjustment to values in excess of 300°C.

This accessory should be used in conjunction with both a tripod and a workholder ring accessory.

Installation

1) Attach the tripod legs to the baseplate.

2) Mount the workholder ring onto the long tripod leg and temporarily swing it clear of the baseplate.

3) Remove the securing nuts, spacers and O-rings from the radiant heater leadthroughs. Mount the radiant heater into baseplate positions 9 and 10 and secure with the removed items. Ensure that the heater is central.

4) Attach the radiation shield support bracket (at the deflected end) to the top of the long tripod leg.

5) Place the radiation shield over the radiant heater and secure to the bracket with the screw supplied.

6) Remove from baseplate position 4, the blank plug complete with O-ring. Fit the O-ring to the type TL4 thermocouple leadthrough and assemble the leadthrough into baseplate position 4.

7) Connect the thermocouple leads to pins 1 and 2 of the leadthrough. Note that these leads are an exact length and must not be shortened.

8) Lay the thermocouple leads around the baseplate and up the long tripod leg. The free end will be placed in contact with the substrate.

9) Remove a blank from the control panel and fit in its place the radiant heater panel.

10) Connect the leads from the panel to the terminal block inside the coater cabinet. Match the numbers on the leads to those on the terminal block.

11) Connect the leads from the thermocouple leadthrough to the terminal block positions 41 and 42. Note: these leads must be reversed if the meter indicates a negative deflexion when the thermocouple is heated.

12) Connect the two leads from the radiant heater leadthroughs to the terminal block positions 40 and 44.

13) Take the spherical workholder and cut from it the coating apertures required. Fit the substrates into the workholder.

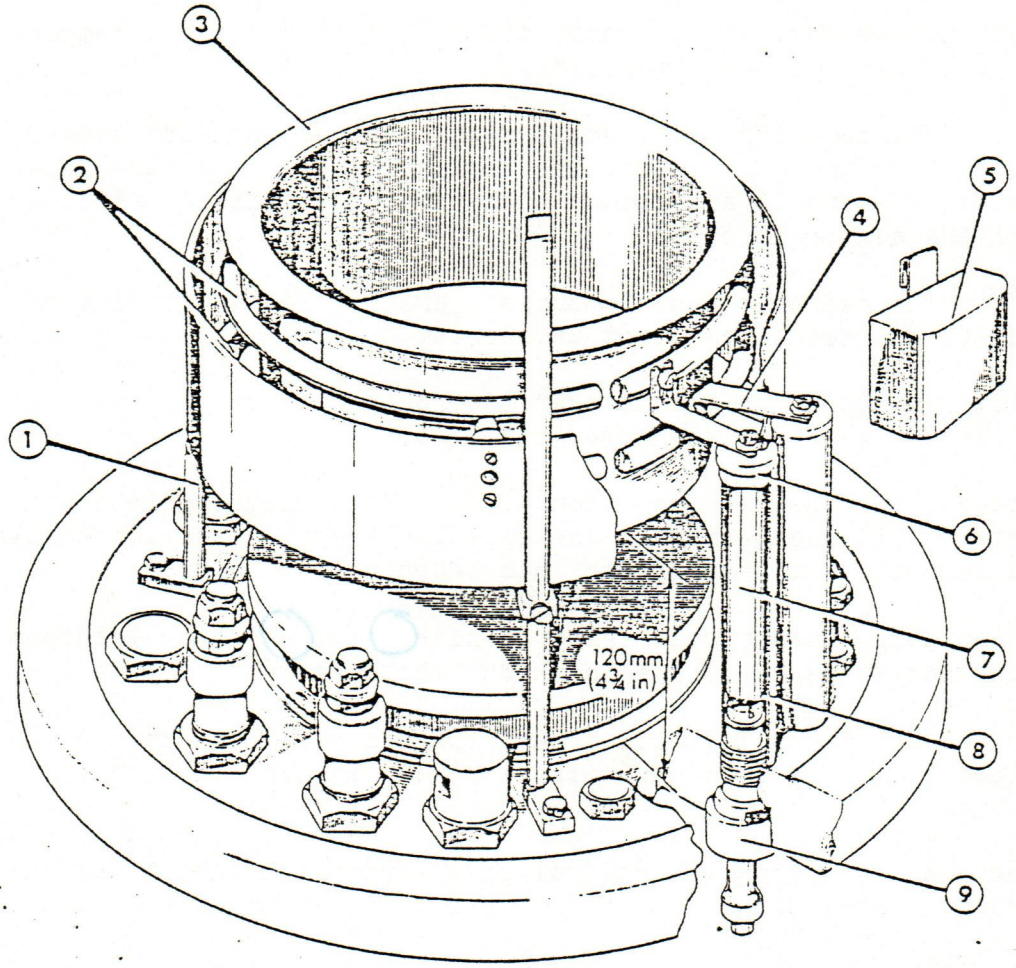
14) Place the workholder into the workholder ring.

15) Locate the workholder ring in position under the radiant heater.

16) Place the thermocouple in contact with the upper surface of a suitable substrate.

17) Close all panels, replace shrouds and worktops before re-connexion to the mains electricity supply.

Plasmaglo accessory (11-E025-06-000)



1	Tripod assembly
2	HT rings
3	Shield
4	Connexion tab
5	Protection cap

6	Insulated spacer
7	Leadthrough extension
8	Outer tube
9	Type 7 leadthrough

$d_A = 220$
$d_I = 145$
$h = 50$
} Plasmaglo-Ring

A 'Plasmaglo' ion bombardment cleaning system comprises a.c. electrodes in ring form. The purpose is to effect random bombardment of the chamber and fittings by positive ions in a glow discharge. This cleaning effect is often vital to successful deposition.

Edwards 'Plasmaglo' cleaning system incorporates a shielded cathode electrode to prevent direct electron bombardment of the substrate surfaces, which can be the cause of undesirable surface coatings.

Installation

1) The accessory comprises one 'Plasmaglo' assembly with three legs and two connexion tubes; two leadthrough extensions; two outer tubes; two insulated spacers; one protection cover and one shield.

2) Disconnect the coating unit from the mains electricity supply.

3) Remove the implosion guard and chamber from the unit.

4) Remove the baseplate shroud and the worktop from the unit.

5) Remove the loose nuts, washers and the securing nut from the leadthroughs at positions 11 and 12 of the baseplate.

6) Screw the leadthrough extension pieces onto the upper terminals of the two leadthroughs.

7) Fit the leadthroughs to baseplate positions 11 and 12 and replace the securing nuts on the two leadthroughs by the outer tubes. Ensure that the leadthroughs do not drop through the baseplate. Tighten the outer tubes to secure a leak-tight joint between leadthroughs and baseplate.

8) Fit the insulated spacers over the leadthrough extension pieces and into the end of the outer tubes.

9) Fit a nut and then a washer (previously removed from each leadthrough terminal) to each leadthrough extension terminal.

10) Release the securing screw in each fixing bracket of the HT ring assembly to clear the tripod leg aperture.

11) Assemble the HT ring assembly onto the tripod so that the connexion tabs locate onto the leadthrough extensions.

12) Set the lower surface of the assembly to the optimum height of 120mm above the baseplate and secure by tightening the bracket screws.

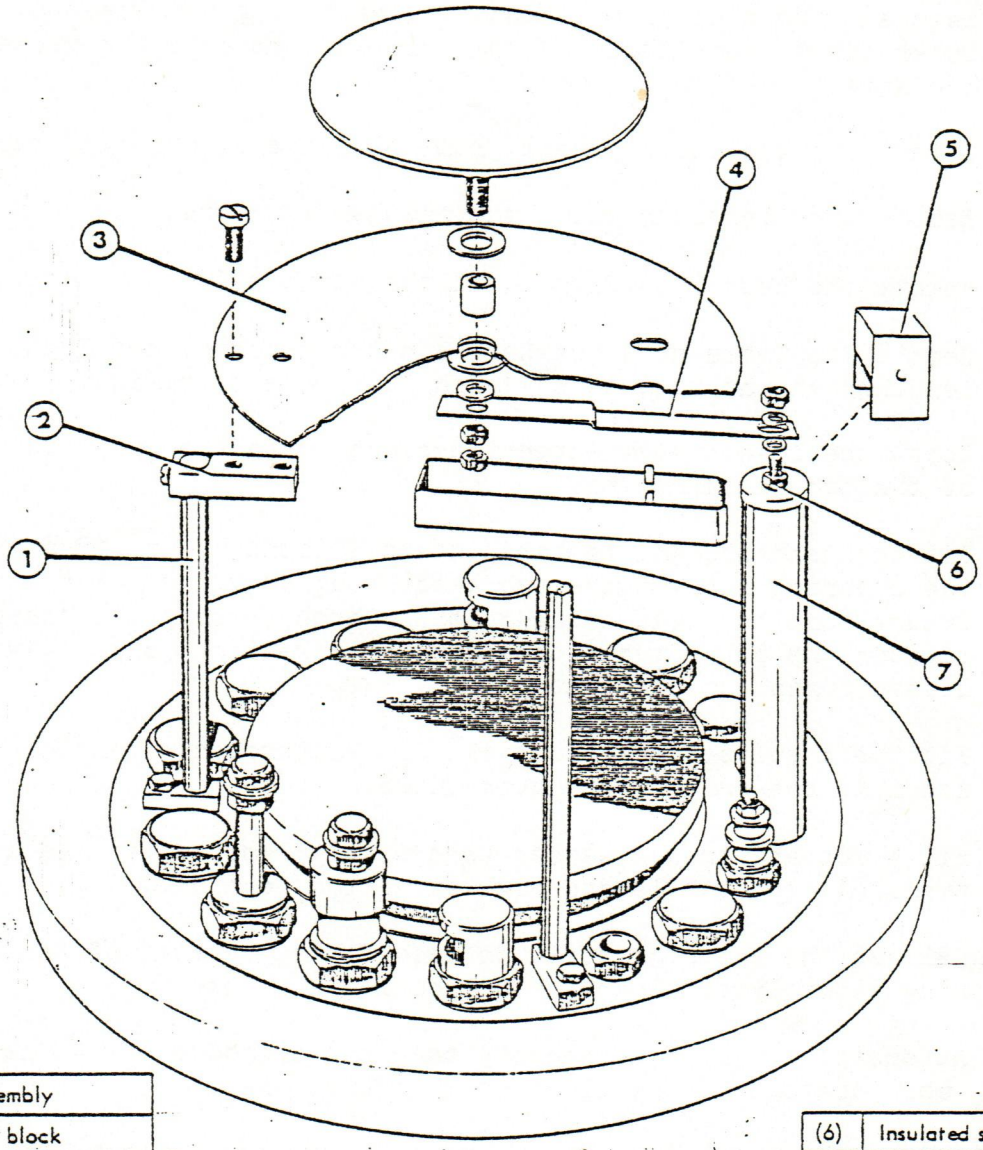
13) Secure the connexion tabs to the leadthrough extension terminals with the remaining nuts and washers.

14) Place the protection cover over the leadthrough extensions and clip it into place on the HT ring assembly.

15) Place the shield inside the HT ring assembly.

16) Replace all covers; pump down and test glow discharge.

D.C. Sputtering accessory (11-E085-37-000)



(1)	Tripod assembly
(2)	Mounting block
(3)	D.C. cathode assembly
(4)	Connexion strip
(5)	Protection cover

Upward cathode arrangement

(6)	Insulated spacer
(7)	Outer tube
(8)	Cathode
(9)	Protection cover

Sputter coating is a method of depositing metals other than by normal evaporation techniques and is especially attractive where continuous and uniform conducting layers are desired without the need for complicated rotate and tilt mechanisms. Sputtering occurs in a low vacuum so restricting the mean free path lengths of the metallic atoms resulting in multi directional coatings which penetrate deeply into irregular surfaces.

Installation in coating unit.

WARNING: DISCONNECT FROM THE MAINS ELECTRICITY SUPPLY

If a material other than copper or gold is to be sputtered it is necessary to do one of the following:

(a) Electroplate the copper disc with the required material.

(b) Fix a disc of the required material to the copper disc. This disc can be soldered to the copper disc.

(c) Make a new cathode disc from the material to be sputtered. The dimensions of the disc can be altered to give different sputtering characteristics - for example, smaller diameter gives higher sputtering current densities.

1) Remove the hexagonal nuts and the washers from the upper terminal of the leadthrough at position 11 on the baseplate.

2) Screw the leadthrough extension piece to the leadthrough terminal.

3) Remove the securing nut from the leadthrough, ensuring that the leadthrough does not fall through the baseplate.

4) Screw the outer tube to the leadthrough, and tighten to secure a leak-tight joint between leadthroughs and baseplate.

5) Fit the insulated spacer over the leadthrough extension piece and into the end of the outer tube.

6) Fit a nut and then a washer, previously removed from the leadthrough terminal, to the leadthrough extension terminal.

7) Secure the mounting block to the cathode side of the d.c. cathode assembly (for downward cathode) or to the terminal side of the assembly (for upward cathode).

8) Release the securing screw in the mounting block sufficiently to clear the tripod leg aperture.

9) Place the d.c. cathode assembly, mounting block lowermost, above the tripod legs and orientate the assembly so that the mounting block is above the tripod leg diametrically opposite the leadthrough extension.

10) Lower the assembly, allowing the tripod leg to slide through the aperture of the mounting block and the connexion strip to engage with the leadthrough extension.

11) Set the cathode surface to the optimum height of 120 mm (downward cathode) or 150 mm (upward cathode) above the baseplate, and tighten the securing screw in the mounting block.

12) Secure the connexion strip to the extension terminal with the remaining nut and washer previously removed from the leadthrough terminal.

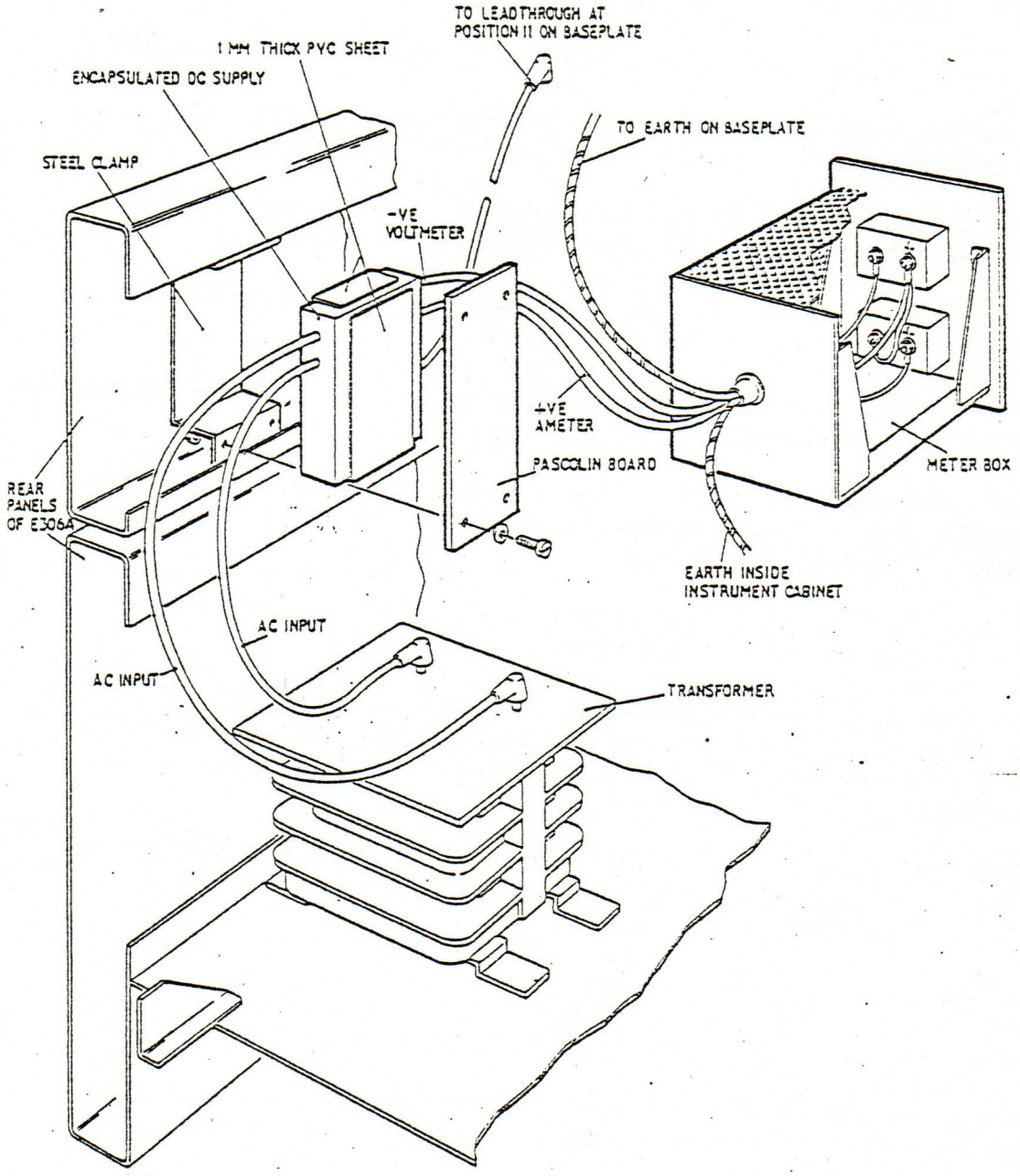
13) Place the short protection cap over the leadthrough extension terminal, ensuring that it does not touch the connexion strip.

14) Place the long protection cap over the connexion strip ensuring that it does not touch the strip.

15) Remove the rear panel of the coating unit.

16) Remove the worktop from the E306A unit.

17) Locate the encapsulated d.c. supply assembly in the rear panel of the unit; secure the fixing plate by means of the four screws and nuts (see illustration).



Assembly of encapsulated d.c. supply

18) Connect the two a.c. input leads (marked 'a' and 'b') to the terminals on the HT transformer. This will displace input leads already connected to the transformer and these should be tied out of the way until next required.

19) Remove a blank panel from the control case.

20) Put the loose ends of the two meter leads ('d' and 'e') through the aperture in the control case.

21) Connect the leads into the meter box, as indicated.

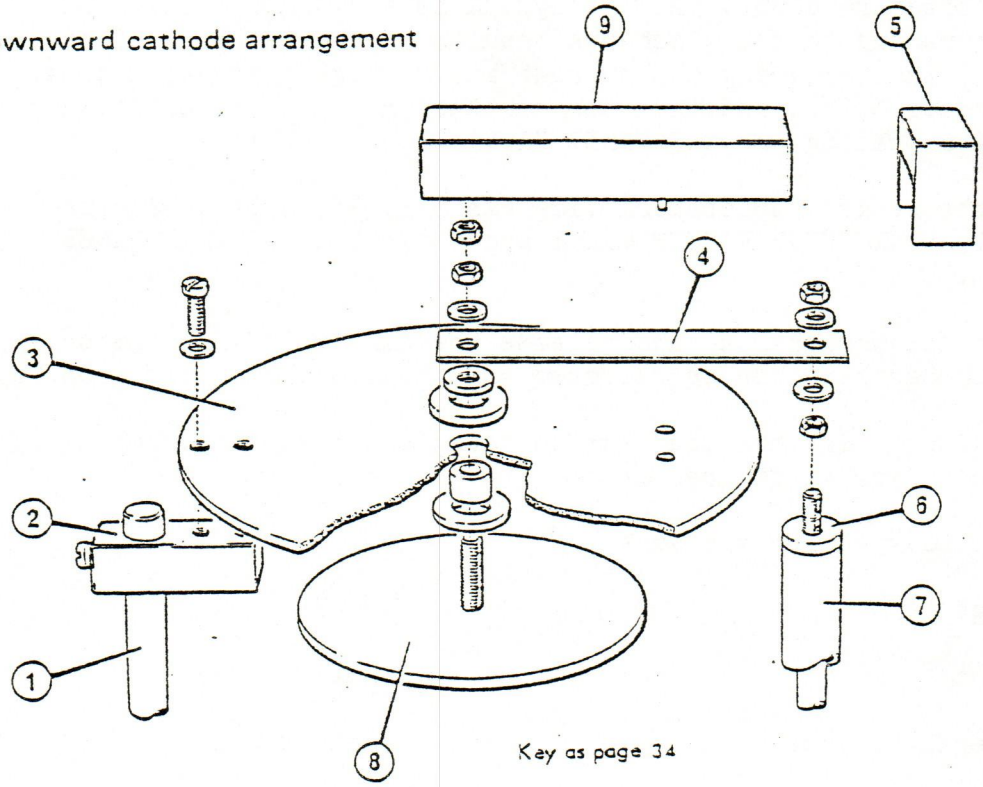
22) Connect one earth wire (yellow/green) from the meter box to the earth terminal inside the control case.

23) Connect the other earth wire from the meter box to the baseplate earth terminal

24) Locate the meter box in the aperture of the control case and secure with the four screws.

25) Connect the d.c. lead from the encapsulated d.c. supply assembly to the leadthrough at baseplate position 11 (below the baseplate).

Downward cathode arrangement



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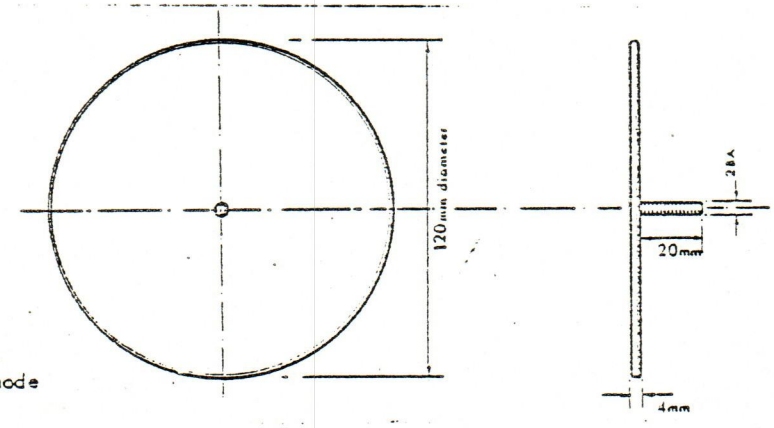


Dimensions of cathode

Operation

(a) Rough out the chamber and change over to high vacuum as described in the working instructions for the coating unit.

(b) Slowly open the HIGH VACUUM VALVE, leave open for approximately 5 seconds then almost close the valve, leaving it just cracked open.

(c) Press HT switch and increase the variable resistance control to obtain 1.5kV on the top meter. Adjust the GAS INLET VALVE until a steady reading of 25 mA is shown on the lower meter. Further control of the discharge, if needed, can be obtained by adjustment of the HIGH VACUUM VALVE, thus varying the effective pumping speed.

Note: A specific mass of metal may be deposited during each sputtering cycle by noting the voltage, current and cycle time needed. Results can then be repeated within close tolerances, provided the voltage and current of the discharge are kept constant throughout the sputtering period.

The voltage and current values of a discharge depend on gas density and not on pressure alone. As the system is a dynamic one a rise in temperature due to the discharge results in the decrease of the gas density, thus altering the current and voltage characteristics. These characteristics, and thus the sputtering rate, are maintained constant by adjusting the GAS INLET VALVE.

(d) When the desired sputtering time has elapsed, switch off the HT, close the HIGH VACUUM VALVE and press the AIR ADMITTANCE button.

(e) Remove the workchamber and release the AIR ADMITTANCE button. The chamber can then be reloaded and the cycle repeated from (a).

Abridged information when used for scanning electron microscope specimen preparation. Typical figures are:

Target to specimen distance	30 mm
Voltage	1.5 kV
Current	25 mA
Sputtering period	1½ minutes
Gas used	Argon

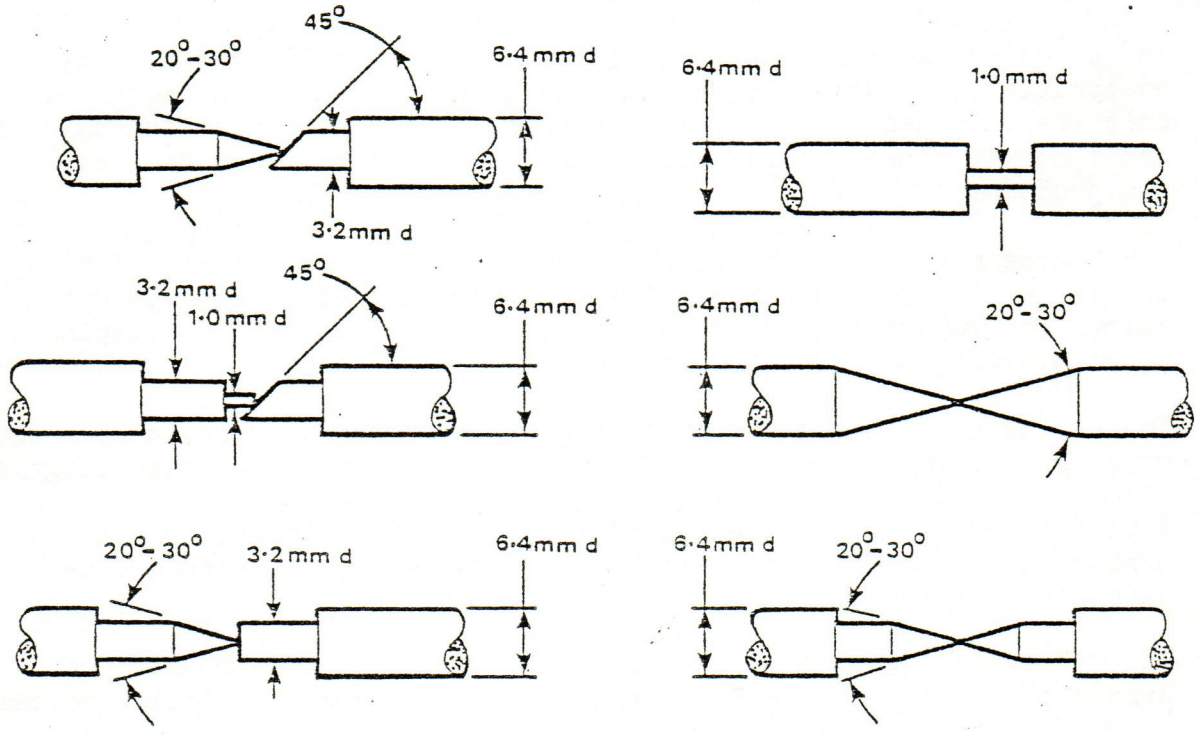
Code numbers

DC sputtering accessory complete	11-E085-37-000
Shield adaptor	11-E069-00-046
Shield	11-E069-00-045
Electrode shield	11-E069-00-044
Electrode extension	11-E069-00-039
Insulation bush	11-E069-00-040
Encapsulated d.c. supply	11-E085-37-023
Meter box assembly	11-E085-37-011
Cathode sub-assembly	11-E028-01-012
Shield	11-E028-01-010
Conductor cover	11-E028-01-011
Lug	11-E028-01-008
Conductor	11-E028-01-007
Washer	11-E028-01-006
Insulating washer	11-E028-01-005
Insulating bush	11-E028-01-004
Support plate	11-E028-01-001

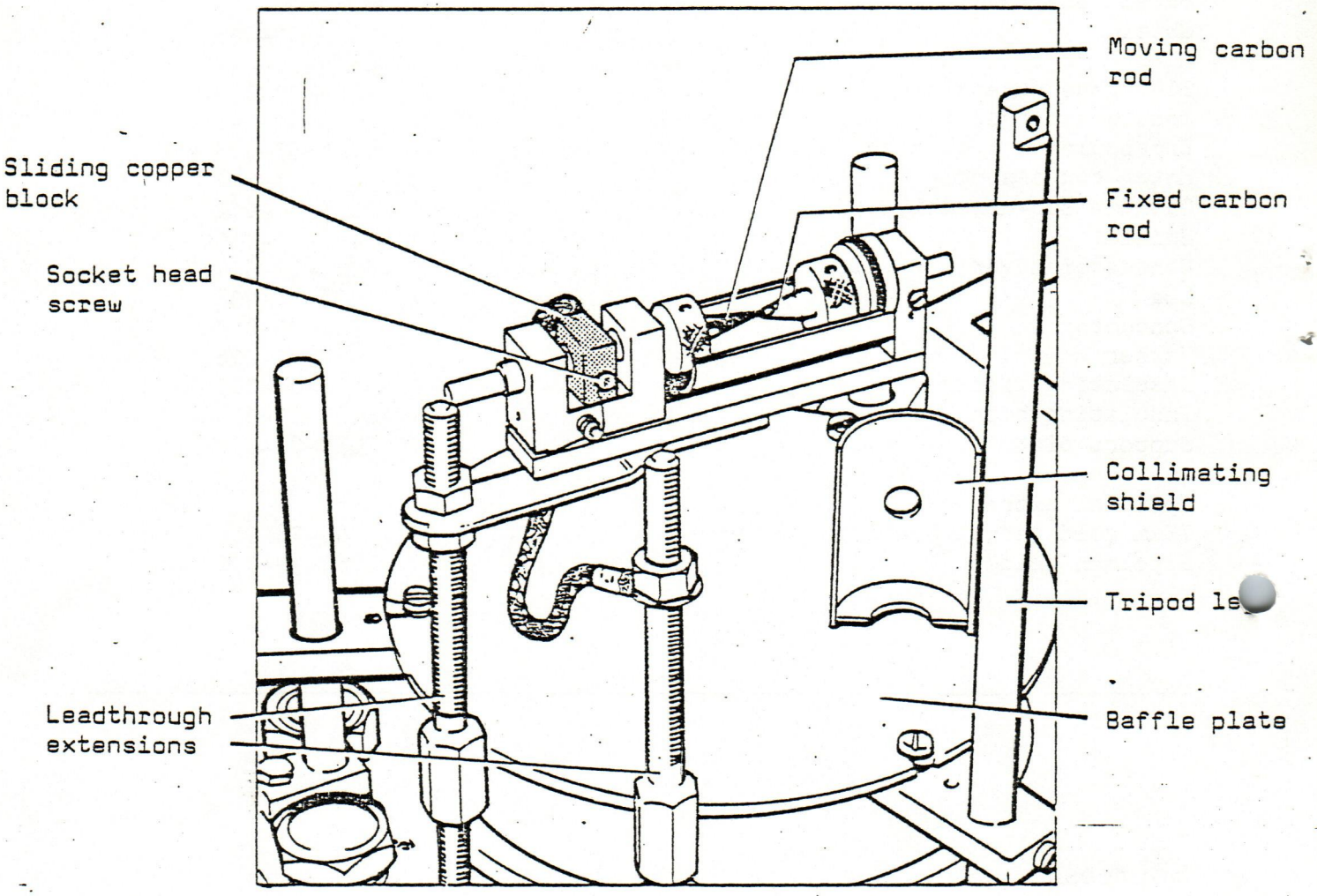
Optional extra

75mm gold target specimen holder	11-E085-38-000
Specimen holder	11-E085-39-000

Sources



Single carbon evaporation source (11-E085-19-000)



The accessory is designed to allow upwards, downwards and sideways evaporation. A rotatable collimating shield is supplied to enable only the specimen to be coated, avoiding contamination of the chamber and other fittings. This also permits continuous observation of the process.

The source may be used with carbon rods of nominally 1/8 in (3mm) or 1/4 in (6.35mm) diameter. The rods are clamped in collets which allows for any variation in rod diameter. This method of clamping permits short lengths of rod to be used for economy.

The moving rod is advanced by spring pressure and travels in bearings which give a smooth, uniform advance of the rod with accurate alignment.

A positive stop is provided allowing the amount of travel of the carbon rod to be repeated if required, thus enabling reproducible films to be evaporated.

The evaporation source is supplied complete with leadthroughs and extension arms to fit an Edwards E306A coater or other similar coaters.

The accessory comprises a source assembly, two leadthrough extensions and one type 6D leadthrough, an earth leadthrough, four carbon rods, and two 3mm colletts.

Installation

1) Disconnect the coating unit from the electicity supply.

2) Fit the leadthrough provided into a convenient position in the baseplate.

3) Fit an earth pillar to the baseplate. Note that positions 5 and 6 respectively are recommended.

4) Connect the LT earth lead to the lower terminal of the earth pillar.

5) Connect an LT cable of the required voltage to the lower terminal of the type 6 leadthrough.

6) Evaporation can take place from either the centre or the side of the chamber and also in an upward, downward or sideways mode.

7) For downward evaporation, fit the leadthrough extensions to both the leadthrough and the earth pillar.

8) Fit the carbon source bracket on to the earth pillar (or extension) and secure it with a nut and washer on either side of the bracket.

9) Fit the copper braid to the leadthrough and secure with a nut and washer. Ensure that the braid does not touch any chamber fitting.

10) Fit a carbon rod into the fixed carbon holder and align the tip with the centre of the shield.

11) Fit a carbon rod into the movable carbon holder and align it so that it is pressed into contact with the fixed carbon rod. The sliding block travel can be adjusted to control the total amount of carbon evaporated. This facility can be used to obtain repeatable evaporations. The collett nuts must be tightened firmly with the tommy-bar.

12) When the source is arranged for side evaporation, allow adequate clearance with other parts. Loosen the socket head screw securing the shield to the fixed carbon end of the assembly. Rotate the shield to give maximum coverage of the specimen; tighten the screw to secure.

13) Remove the shield if not required for the evaporation technique.

14) To change the colletts from one size to another, release the 3mm socket head screw on the copper block; remove the collett tightening nut and pull the tight-fitting collett out of the source. Refit the collett in reverse order but ensure that the spring is correctly fitted. When using the 3mm collett, the rod must be firmly clamped by means of the tommy-bar on the clamp nut.

Suggested operating techniques

The resistance of a carbon rod is influenced by its composition and graphite content. Graphite rods appear hard and shiny, whereas carbon rods are softer and dirtier to touch. Rods supplied by Edwards High Vacuum contain a high percentage of graphite but the ¼ inch rod can be used on both techniques to be described.

Technique 1 is suggested for graphite rods having a low resistance and Technique 2 for carbon rods having a high resistance.

When carbon rods are employed at a low voltage (10V), the high resistance will cause only a red hot glow without evaporation. This could cause damage to the source and particularly to the flexible braid.

Conversely, a graphite rod employed at high voltage (30V) will cause the overload to trip.

There are many ways to sharpen carbon rods for electron microscopy use and the following describes one shape. It is important not to use blunt rods which take heavy current and can cause damage.

Technique 1

1) Sharpen the sliding rod to a fine point in a pencil sharpener or similar and chamfer the end of the fixed rod to 45°.

2) Set the rod travel at 3mm.

3) Set the source to substrate distance at 100mm.

4) Connect the rod holder to a 10V supply.

5) Turn up the variable transformer to evaporation point (aproximately 8 - 10 on the scale and meter reading 60 - 80).

6) Evaporate for a duration of 5 seconds minimum.

7) This technique should result in a typical medium carbon film of approximately 200 angstroms thickness.

Technique 2

1) Sharpen the sliding rod to a fine point in a pencil sharpener or similar and chamfer the end of the fixed rod to 45°.

2) Set the rod travel at 3mm.

3) Set the source to substrate distance at 100mm.

4) Connect the rod holder to a 30V supply.

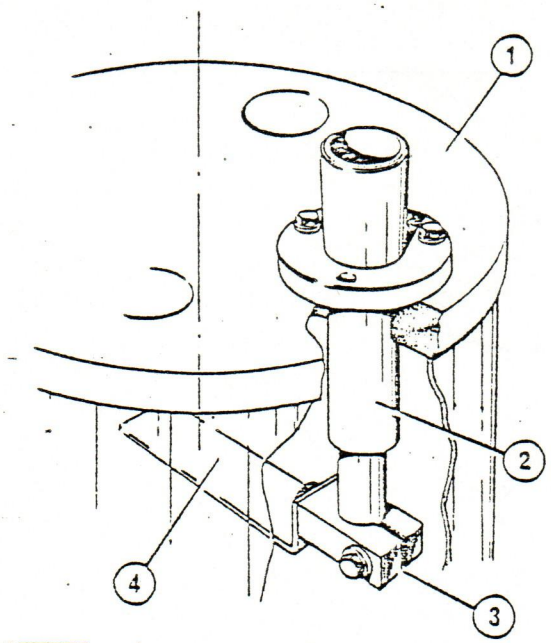
5) Trip out the overload button.

6) Set the variable transformer to approximately position 8.

7) Evaporate in short pulses on the overload button with a pause between each pulse, e.g. three pulses of a half second duration with a two-second pause between each pulse.

8) This technique should result in a typical medium carbon film of approximately 200 angstroms thickness.

Specimen cooling accessory (11-E052-01-000)



1	Chamber top plate
2	Body
3	Clamp
4	Specimen carrier

This accessory is designed to be fitted into the top plate of a cylindrical vacuum chamber. It comprises a small externally mounted liquid nitrogen container connected via a copper rod to a copper specimen carrier of adjustable angle and height.

Techniques for which the accessory may be used include freeze drying; protecting thermally labile specimens and for supporting high vapour pressure materials.

No provision is made for mounting a specimen on the carrier because specimens differ in size and shape. Means of support should be considered before fitting the unit.

Assembly

1) Remove the top-plate from the cylindrical bell jar.

2) Remove the blanking flange from the top-plate; this is secured by three screws. A vacuum sealing gasket, under the blanking flange, must be left in place.

3) From the body of the cooling accessory remove the specimen carrier and the clamp.

4) Locate and secure the body of the accessory in place of the blanking flange.

5) Attach the clamp and specimen carrier to the body of the accessory.

6) Reposition the top-plate on the glass cylinder

Notes

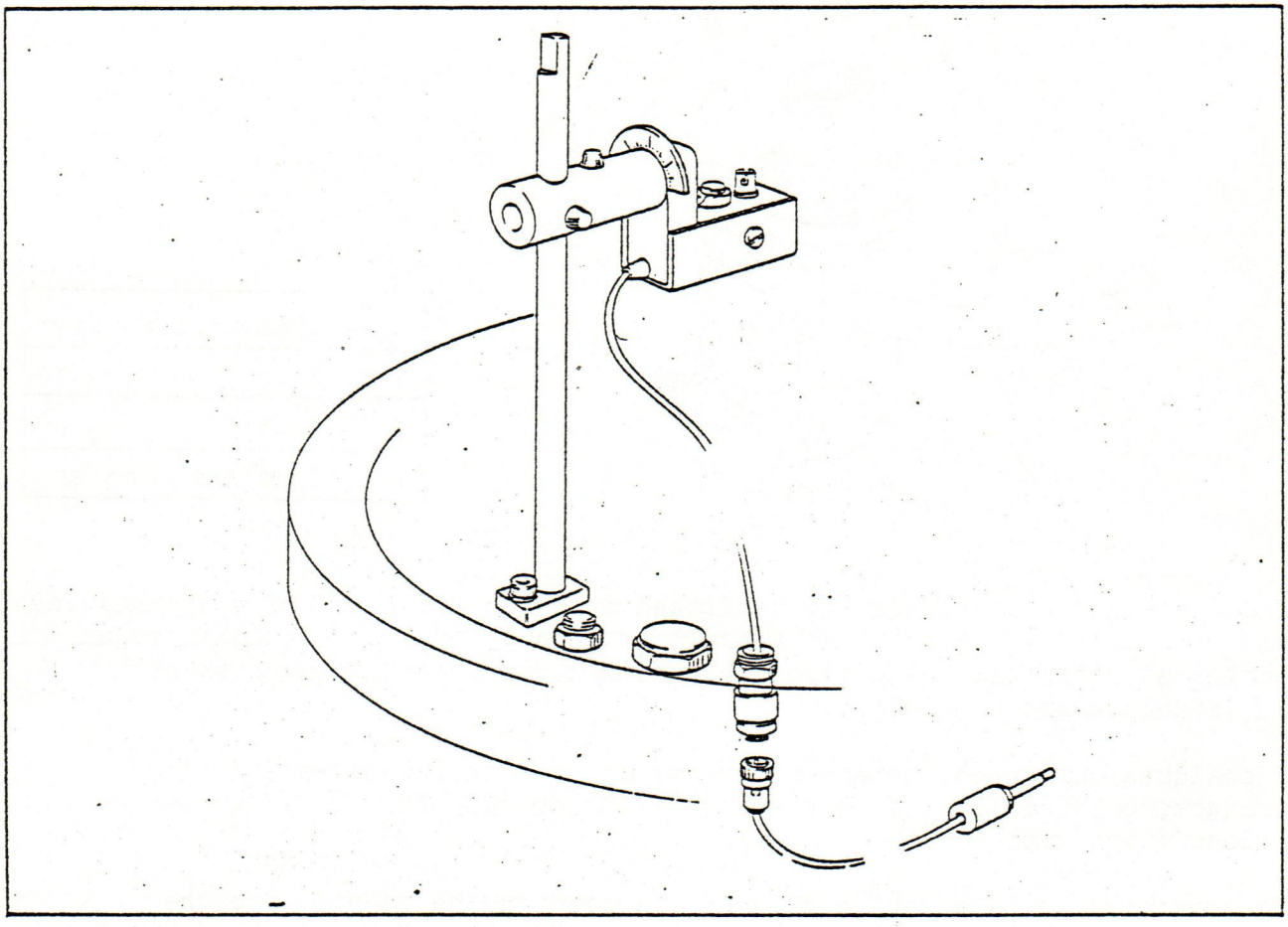
a) The carrier is long enough to support the substrate above the evaporation source.

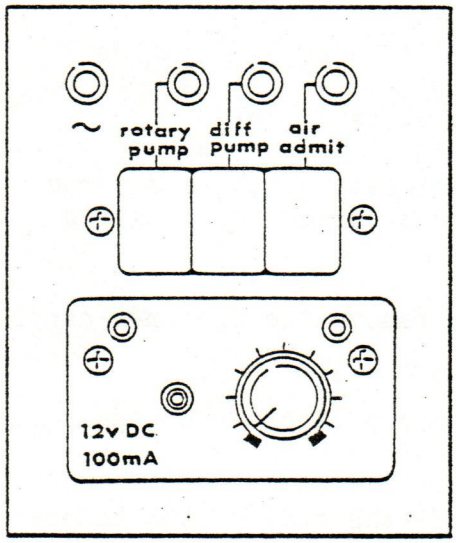
b) The carrier can be tilted to effect static shadowing.

c) The carrier can be turned to one side to clear the Rotatilt-3 accessory.

d) The body can be used as a cryopump when charged with a suitable coolant.

Rotatilt 3 (11-E085-70-000)





Pump start control panel

The Rotatilt 3 workholder drive system incorporates a low voltage motor controlled from a variable 12V dc power supply incorporated in the E306A coater. This design obviates the need for an external motor and rotary vacuum leadthrough. It also enables a simple bell jar to be used. The Rotatilt 3 is supplied complete with a vacuum leadthrough and connecting plug. The unit may be driven from any low voltage, low current source, if required.

The unit can be fitted to a standard tripod leg in the E306A; it can be mounted in any position in the chamber for various applications and configurations. This provides a wide range of working distances and angles.

The speed of rotation of the Rotatilt 3 is variable between 0 and 150 rpm approximately. Angular control facilities are provided enabling the grids to be rotated through 180°. A scale indicates the precise angle of the grids. An alignment jig is provided to ensure that the evaporation source is located at right angles to the specimen holders.

A range of specimen holders is available, which employ a simple bayonet fitting. It includes TEM grid holders and SEM specimen holders.

The applications of the Rotatilt 3 include cone shadowing of complex molecules such as DNA; static shadowing; replica manufacture and SEM sample preparation.

A Rotatilt stand (code number 11-E085-74-000) is available for locating the Rotatilt accessory in the vacuum chamber when the standard tripod is not used. It is also ideal for using the accessory in a coating unit of other manufacture.

Installation

1) Mount the body and barrel assembly onto a tripod leg by means of the hole in the barrel. Tighten the thumb-screw to secure.

2) Remove a blank plug from a convenient vacant position in the baseplate (i.e. positions 9, 10, 11, 12).

3) Insert the type 12 leadthrough (fitted with an O-ring) into the underside of the hole in the baseplate. Secure with a nut.

4) Connect the plug at the end of the flying lead into the socket on the body of the Rotatilt 3.

5) Connect the power supply cable to the type 12 leadthrough by means of the screw connector.

6) Pass the power supply cable from the leadthrough, through the hole in the cover of the baseplate, to the jack socket in the pumpstart control panel.

7) Rotate the knob on the panel in a clockwise direction to start the motor and to select the speed. The green lamp indicates "mains on" and the red lamp "overload" i.e. short circuit.

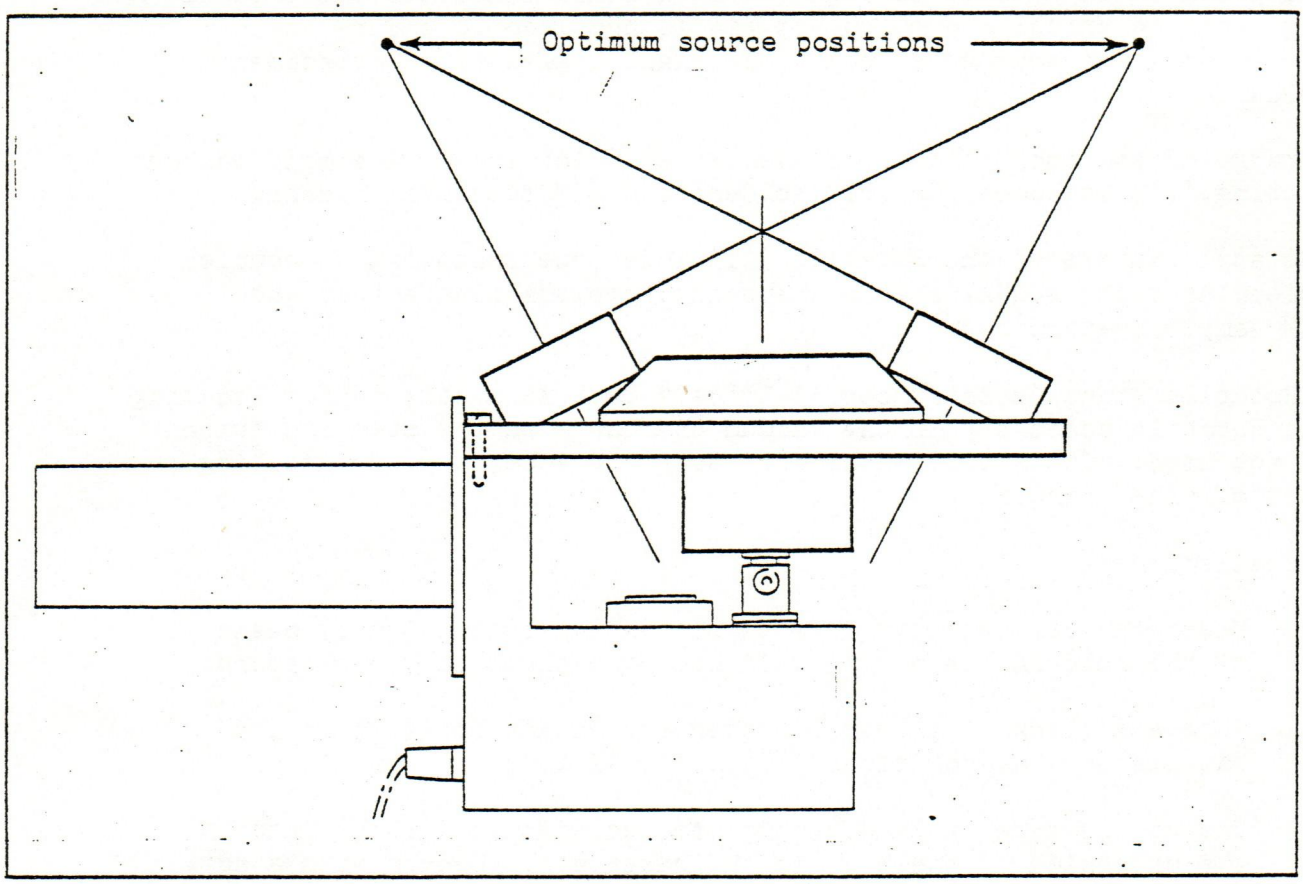
   Note that the electronic speed controller is protected against short circuits.

8) On a selected tripod leg the Rotatilt 3 can be positioned almost anywhere in the chamber and can be aligned with the evaporation source by means of the alignment rod.

9) Push the rod through the bayonet holder of the Rotatilt 3 to line up with the evaporation source. At zero degrees the source will be directly above or below the rod; alternatively it could be offset to a selected angle especially when used in combination with a carbon source.

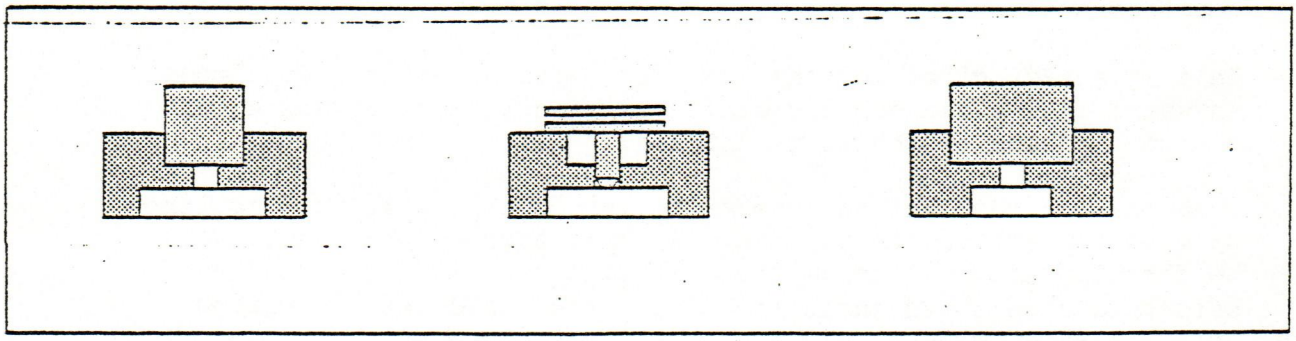
10) When the Rotatilt 3 is positioned satisfactorily insert a specimen holder into the bayonet fitting.

SEM Planetary workholder (11-E085-72-000)



The SEM planetary workholder is used in conjunction with the Rotatilt 3 which provides the necessary controlled rotation facility, thus obviating the need to have two separate motorised accessories.

Using the advantages of the Rotatilt 3, the SEM planetary workholder can be mounted horizontally in any location in the chamber beneath the evaporation sources, in a position that ensures overall coating of the SEM samples.



The workholder accepts eight planets which are pre-drilled to take SEM stubs of 10mm or 15mm diameter, and also the 1/8 in and 3mm pin type. It is therefore suitable for use with the widest range of microscopes.

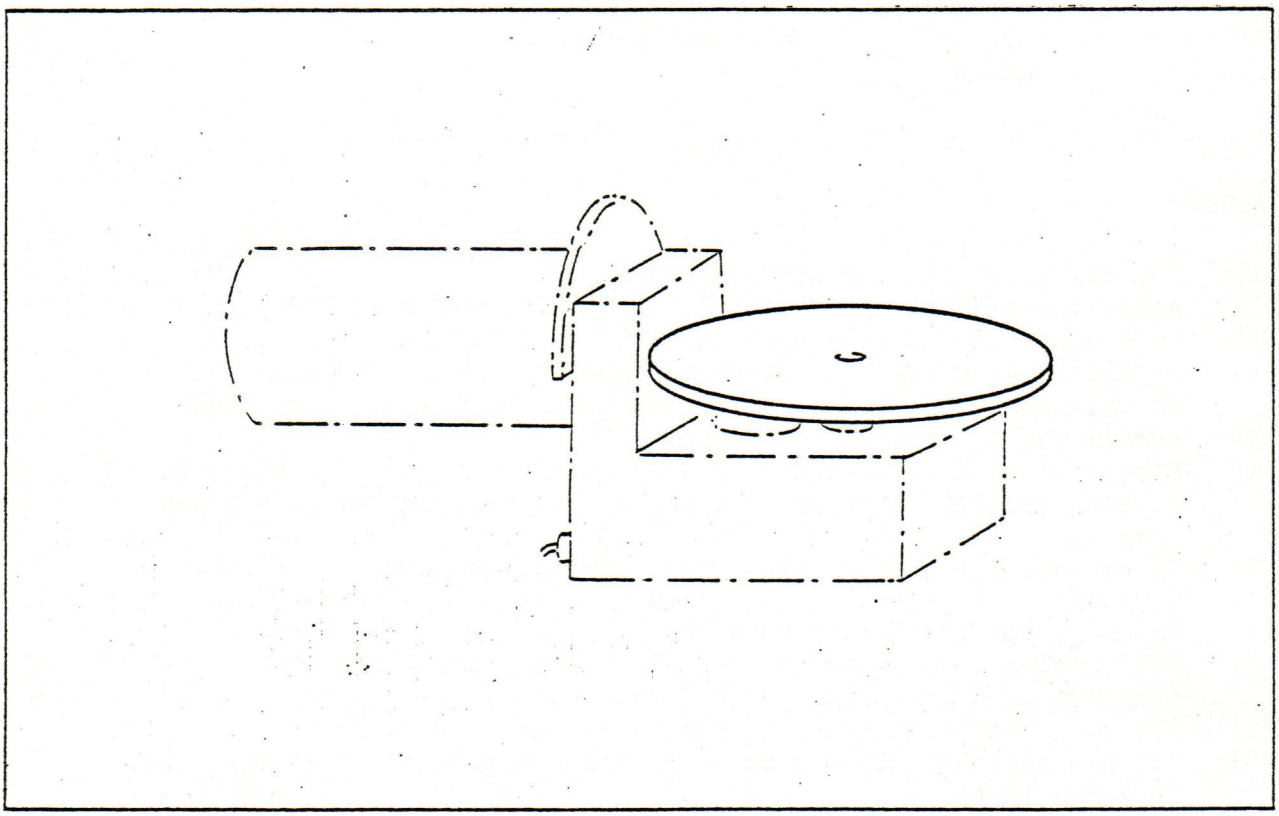
Additionally, large diameter SEM sample holders may be mounted directly on the workholder in place of the planets. The rotational speed of the planets may be varied to suit individual requirements and specific applications.

The workholder is very compact and easy to keep clean.

Assembly

1) Set the Rotatilt 3 at zero degrees.
2) Align the planet tray on the Rotatilt 3 by means of the alignment tool supplied. This should be inserted into the centre hole of the tray; check that the tool rotates freely. Secure the tray in this position with the two socket cap head screws provided.
3) Remove the alignment tool from the tray.
4) Place the metal/PTFE coated washer onto the spindle of the spinner so that the PTFE coating is uppermost when assembled to the planet tray.
5) Assemble the spinner to the tray. Engage the bayonet of the spinner to the Rotatilt 3. Rotate the spinner <u>slowly</u> to check for freedom of rotation.
6) Fit samples to planets (see diagram) and place the planets (maximum of 3) onto the workholder.
7) Set the rotational speed to suit requirements.
8) Optimum source positions to ensure good coverage are as indicated in the diagram.

Plane workholder (11-E085-73-000)

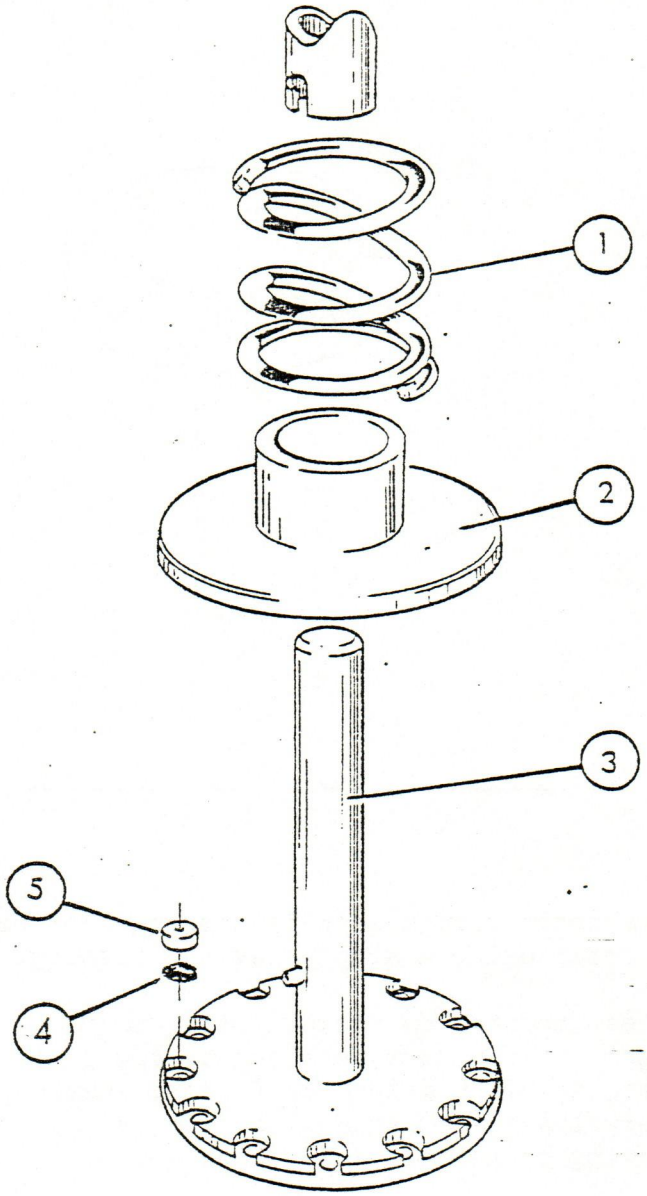


This accessory is specifically designed to mount standard 3 inch x 1 inch microscope slides on its 80mm diameter surface. It can be easily adapted to fit specimens not accommodated by standard workholders.

Fix slides and samples to the surface of the workholder by means of double-sided adhesive tape or other fixative.

Slide the workholder and spring assembly on to the shaft of the Rotatilt 3 and lock in position by turning the assembly in a clockwise direction.

3mm Grid holder (11-E085-71-000)



1	Spring
2	Clamp plate
3	Grid holder assembly
4	Grid
5	Grid retainer

The accessory is designed for use with the Rotatilt 3 and is mounted on to it by means of a bayonet fitting. Up to eleven 3mm grids may be accommodated in numbered positions in the holder. The angular plane of the grid holder rotates around the axis of the Rotatilt 3 to ensure repeatable and precise shadow casting. To give low angle shadowing of the grids a very thin clamping plate is provided.

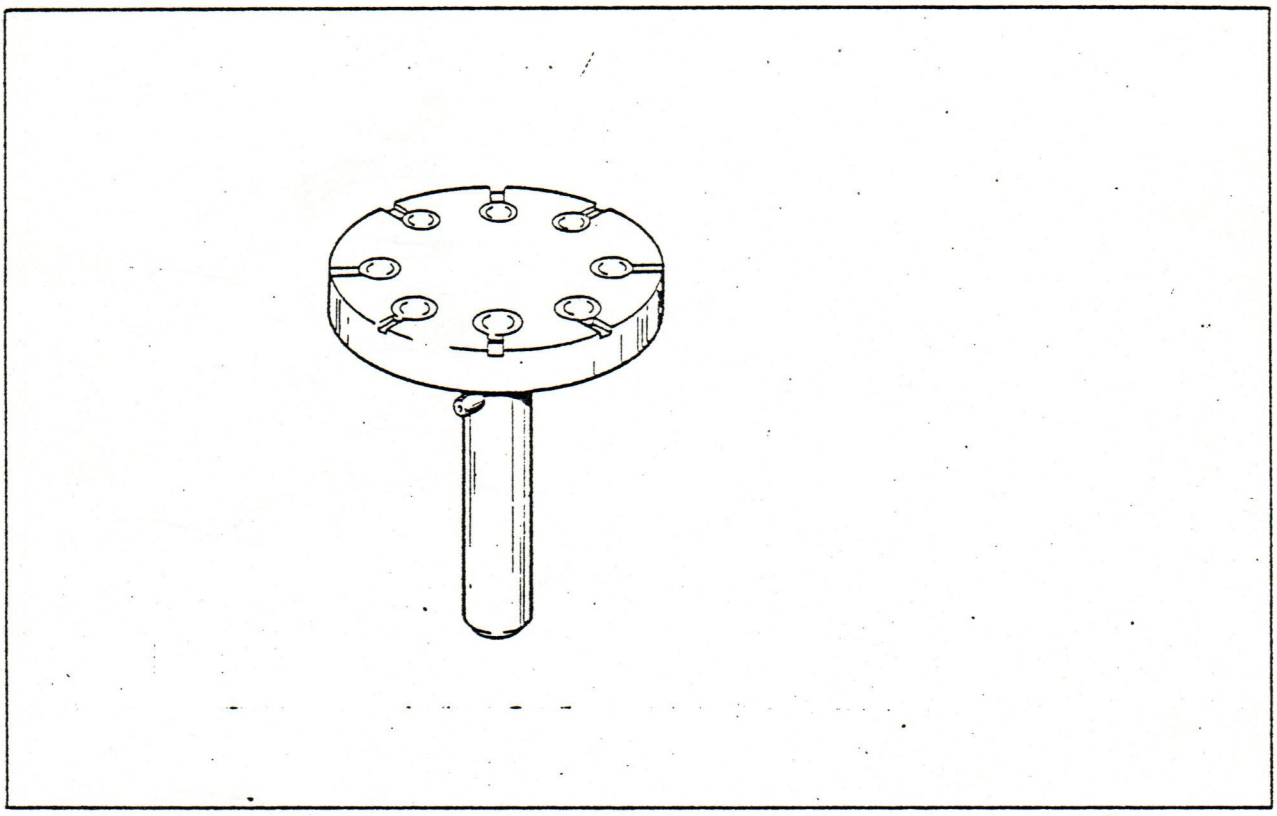
Assembly

1) Load the grids into the grid holder, inserting a grid retainer on each grid.

2) Place the clamp plate and spring on the grid holder.

3) Slide the grid holder assembly on to the shaft of the Rotatilt 3 and lock into position by turning the holder assembly in a clockwise direction.

Magnetic grid holder (11-E085-35-000)



The magnetic grid holder is designed for use with the Rotatilt 3 and is mounted using a simple bayonet fitting.

Samples, mounted on nickel grids and placed on the front surface of the grid holder, are retained by low power permanent magnets in numbered positions. This method of fitting enables whole grids to be coated at very low shadowing angles. It is particularly suitable for rotary shadowing of nucleic acid molecules.

The grid holder is supplied with nickel grids and non-magnetic grid tweezers.

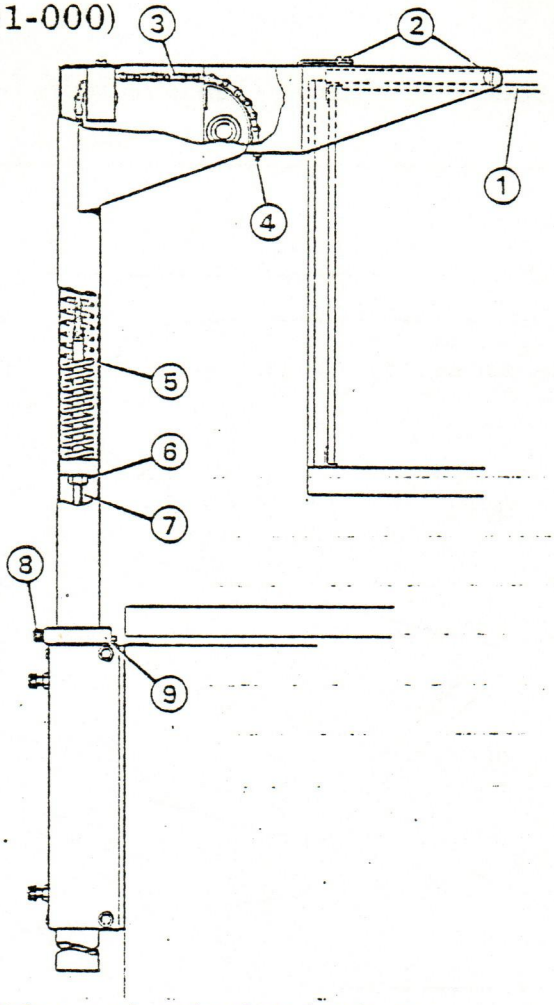
Assembly

1) Load the grids onto the grid holder front surface at the centre of the numbered circles.

2) Place the spring on the grid holder

3) Slide the grid holder and spring assembly on to the shaft of the Rotatilt 3 and lock into position by turning the grid holder assembly in a clockwise direction.

Top plate counterbalance (11-E085-01-000)



1	Chamber top
2	Securing screws
3	Chain
4	Retaining nut
5	Spring
6	Spring adjusting nut
7	Adjusting rod
8	Collar screws
9	Adjustment collar

This accessory provides a method for lifting and swinging back the top plate when the cylindrical type chamber is specified (e.g. freeze fracturing and etching accessory or IBT200). A spring loaded hinge assembly fits to the rim of the top plate and to the side of the coating unit. The spring tension is fully adjustable to accommodate the weight of any accessory configuration up to a maximum of 15.0kg.

The accessory comprises a support bracket assembly and a pillar and saddle assembly together with a spanner and screws.

Assembly

1) Mount the support bracket to the left hand rear corner of the coating unit cabinet by means of three screws supplied.

2) Slacken the spring adjusting nut with the special box spanner provided.

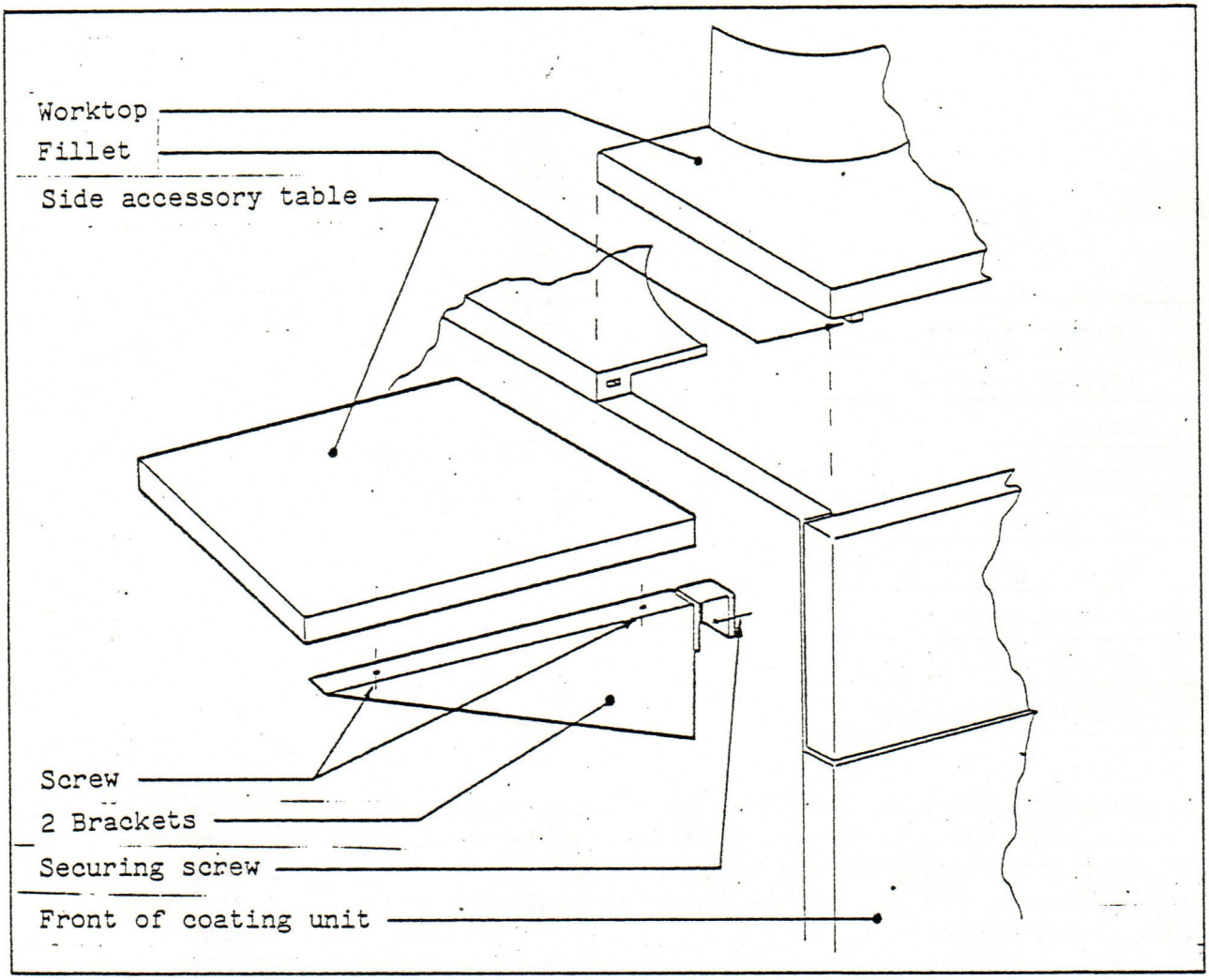
3) Slide the pillar into position. Adjust the height of the pillar at the adjustment collar to fix the saddle to the chamber lid. Ensure that the stop pins in the collar and support bracket are in contact when the lid is centred on the chamber.

4) Use the stepped screws and spacers to attach the saddle assembly to the chamber top-plate. Make final adjustments to the collar so that the spring under the third mounting point is slightly compressed. Tighten both screws.

5) With the special box spanner, tighten the spring adjusting nut until the spring is compressed sufficiently to support the chamber top-plate.

6) Tighten the two socket-head screws to clamp the column and prevent it from rotating.

Side accessory table (11-E085-66-000)



The table is designed for attachment to the left-hand side of an E306A unit to provide an extra worktop of 305 x 380mm.

Assemble the kit of parts as follows:

1) Remove the worktop from the front of the coating unit.

2) Remove approximately two inches from each end of the fillet under the left-hand edge. This will prevent an obstruction by the brackets when the worktop is replaced.

3) Locate the two brackets over the side panel of the coater.

4) Place the accessory table onto the brackets so that the leading edge is in line with the front of the coater.

5) Mark the screw positions on the underside of the accessory table.

6) Remove the table and brackets from the coating unit and screw the brackets to the marked positions on the underside of the table.

7) Mount the assembled table onto the coating unit and insert a securing screw into each bracket to prevent accidental removal.

8) Replace the worktop onto the coating unit.

Communication with Edwards

Any communication relating to the subject of this instruction should be addressed to Edwards High Vacuum or to the supplier from whom it was purchased.

Please specify:

1) the model, serial number and code.

2) the date of purchase.

3) your order number and the suppliers sales reference.

Equipment should not be returned to the supplier without prior arrangement.

IMPORTANT Health and Safety

Under Section 3 of the Health and Safety at Work Etc Act 1974 every employer has a duty to conduct his business so as not to expose persons not in his employment to risks to their health and safety. When goods are returned to the supplier, therefore, warning must be given if their usage is likely to render the equipment hazardous in any way.

Edwards High Vacuum and its distributors reserve the right to refuse acceptance of any equipment returned which they have reason to believe may be hazardous.

Damage in transit

If any damage has occurred in transit, it is important to inform both the carrier and the supplier within three days of delivery.