DENTON VACUUM, INC.

OPERATING INSTRUCTIONS

FOR DENTON VACUUM DV-502

HIGH VACUUM EVAPORATOR

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II. System Description

This DV-502 Bell Jar System has been configured with a 14" dia. by 18" high Pyrex bell jar and a stainless steel eight port collar. This permits mounting of several different types of sources.

Included with this system are a minigun electron beam gun, CC-100 ion beam source and two resistance sources with an upside down rotary omni substrate holder.

The system controller is microprocessor based and the operating program contains all of the information necessary for manual control of subsystems consistent with interlock requirements and automatic sequencing. SCR controls are included in all sub-systems that require power adjustment.

III. Subsystem Description

A. Pumping System

This system includes:

High Vacuum Pump:	CTI 100
Mechanical Pump:	Alcatel 2008 (two-stage, direct drive, 7 CFM)

The overall pumping cycle to high vacuum may be varied by re-setting the crossover point by adjusting the vacuum T.C. gauge set-point.

III. Subsystem Description

B. Glow System

To use the glow discharge:

1. Set the gas system so the bell jar vacuum reads about 10 to 20 microns of argon.
2. Select glow on the filament/glow selector switch.
3. Press glow power switch.
4. Slowly bring up glow power adjust until the right plasma is achieved.

WARNING:

The glow operates at about 4000 volts. Do not touch any feedthroughs when operating this system.

III. Subsystem Description

C. Vacuum Gauges

Pressure measurements are monitored at a number of locations within the vacuum system. Four positions may be monitored by thermocouple sensors indicating pressures from micron range to atmosphere. Two other positions can be monitored by a cold cathode gauge for pressure measurement from 10x10 -4 torr to 1x10 -7 torr. A DV-6A Ionization Gauge provides pressure readings for the cold cathode gauge tube.

There are two discharge gauge tubes located in the system. The more commonly used one is located in the trap above the high vacuum valve and is used for chamber pressure measurement. A second tube is located below the poppet valve for spot checking of the cryopump blank off capability. The clip and lead wires must be manually switched from one tube to another to get the different readings.

WARNING: The discharge gauge must be turned off before switching the wires.

There are four thermocouple (TC) gauge sensors located in the pumping system, and readable from the front panel.

On the top panel, positions 1 and 2 measure:

1. Between the mechanical pump and roughing/regen valves (Labeled "A").
2. Between roughing valve and the trap assembly - measures chamber pressure (Labeled "B").

III. Subsystem Description

C. Vacuum Gauges (cont'd)

On the main panel, thermocouple 1 and 2 gauges have setpoints and measure:

TC-1 - Between roughing valve and the trap assembly. Used for auto pumpdown (Labeled "C").

TC-2 - In cryo line - Used for regeneration (Labeled "D").

III. Subsystem Description

D. Gas Control

This system is provided with a Brooks Instruments gas flow control to give flow from 0 to 100 SCCM of gas flow. On the gas control panel, there are two switches: Gas 1 and Gas 2. However, only Gas 1 is currently functional to a solenoid valve. The Brooks manual should be read completely before attempting to operate the gas system.

III. Subsystem Description

E. System Controller

Operation of the coating system is supervised by a microprocessor based controller. The controller provides for the operation of all vacuum valves, vacuum valve sequences and interlocks. Subsystems primary power ON/OFF control and subsystem interlocking are routed through the controller. All automatic pumping and process cycles are controlled by the controller. The program that provides for total system operation is contained in the memory unit. This type of memory requires battery backup for extended periods of system shutdown and will retain the operating program for one year.

The subsystems have been interlocked to provide maximum operator safety and minimum shutdown time due to inadvertent operation of front panel control switches.

III. Subsystem Description

F. Sources

This system has three types of sources. For the DVI Minigun and the CC-100 Ion Source, separate manuals are being provided.

The Resistance Source is a 2 KVA source capable of 500 amps at 5 volts or 200 amps at 10 volts. These voltages can be selected by the customer changing the primary wiring on the filament transformer. Factory setting is for 10 volts.

WARNING: The system must be completely shut down and off line if any wiring changes are being made or any maintenance is being performed either inside the control rack or beneath the pumping system.

The filaments are controlled by the "Filament Adjust" knob on the front panel. The AC current meter next to the knob has a switch to select the 0 - 100 amp scale or the 0 - 500 scale. Take time to note which scale the meter is on and which transformer primary taps (5 or 10 volts) are being used to avoid excessive power levels to the filament.

To operate the filaments:

1. Select the set of posts that current will be directed to by the post selection switch located on the pumping system cabinet.
2. Turn on Filament Power.
3. Turn Filament Power up slowly to a "soak" value (typically 10% of ultimate power) and hold for desired length of time.
4. Fire off filament by bringing power up to desired level.