


VACUUM GENERATORS LIMITED

ION PUMP POWER SUPPLY

MODEL VPS120A

TECHNICAL HANDBOOK

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## SAFETY PRECAUTIONS

This equipment has been designed and tested in accordance with IEC Publication 348 "Safety Requirements for Electronic Measuring Apparatus". The following precautions should be observed to ensure safe operation of the apparatus.

### 1. Transportation and Storage

Careful inspection of the unit must be made after it has been subjected to transportation or storage. Any serious damage which could render it dangerous must be acted upon to safeguard any potential user.

### 2. Mains Connector and Plug

The supply lead plug shall only be inserted into a supply socket equipped with an earthed contact. Extension of the lead must include a suitable conductor for the protective earth. Should a two pin supply plug be used an additional earth lead must be added between earth and the frame of the instrument.

### 3. Fuses

Only the specified value and type of fuse must be fitted in the event of replacement.

The brown supply lead is equipped with a series fuse and should the unit be used with a two pin plug (see note 2) then it is possible, if the supply plug is reversed, for parts of the equipment to remain at supply potential after the fuse has ruptured.

For complete protection of the interconnecting lead the supply should have either a fused plug or be connected to a supply source which is fused at not greater than 5 amps. (220/240V).

### 4. Removal of Covers

Care must be exercised if the covers of the unit are removed. Equipment should be disconnected from the supply voltages source for repair or maintenance. Should it be necessary to carry out adjustments with the supply voltage connected then this work must be done by a qualified person.

Note also that capacitors in power supplies and mains filters can be charged when the equipment is disconnected from the supply. Before commencing work on the unit these should be discharged in a safe manner.

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## 1. INTRODUCTION

The VPS120A is a simple to operate supply designed and constructed with modern components and techniques to provide a versatile high voltage current limited source and vacuum pressure measurement system.

Diode or triode pumps with speeds from 0-120 l/sec are catered for by the supply. Measurement of total pressure over the range  $10^{-4}$  to  $10^{-9}$  mbar is provided on a pump speed compensated meter scale.

The supply is backed by the full Vacuum Generators warranty and service organisation and bring the latest techniques into the hands of all vacuum users in a readily understood and useable form.

If you are not familiar with vacuum technology, it may be useful before reading this manual to study the Glossary of vacuum technology (Appendix A).

## 2. DESCRIPTION

### 2:1 General

The VPS120A is a variable power supply suitable for diode or triode pumps with speeds in the range 0-120 l/sec. The H.T. circuit doubler-bridge configuration gives a degree of conformity to the ideal constant power characteristic required for high pumping speed over a wide pressure range. An automatic circuit is incorporated to protect both pump and supply during use, please refer to the circuit description for details. Operation on nominal supplies of 110V, 120V, 220V or 240V is possible by selecting the appropriate input supply range on an internal voltage selector panel.

Remote control facilities including recorder outputs are provided via sockets on the rear panel to enable the supply to form part of a process control system if required.

### 2:2 Specification

#### D.C. Outputs:-

Open Circuit Output		Nominal Short Circuit Current Settings (50HZ Supply)		
Voltage Setting		High	Medium	Low
High	$\pm 7.6KV$	400mA	200mA	100mA
Medium	$\pm 6.2KV$	320mA	160mA	80mA
Low	$\pm 5.1KV$	260mA	130mA	65mA
1170V tap on transformer $\pm 3.0KV$		160mA	80mA	40mA

The s/c currents are nominal and may vary by  $\pm 20\%$ , they are also proportional to the supply frequency. To select the appropriate range for your pump please refer to the installation section of this manual.

Metering and Recorder Outputs:-

Meter Ranges:	K.V. 0-8KV F.S. $\pm 5\%$ accuracy. Pressure - $10^{-4}$ to $10^{-9}$ mbar log scale, $\pm \frac{1}{2}$ decade. Current - 200mA, 20mA, 2mA, 200 $\mu$ A, 20 $\mu$ A F.S. $\pm 5\%$ nominal accuracy.
Recorder Outputs 1 and 2:	0 - +10V, 1K nominal impedance. 0V corresponds to $10^{-9}$ mbar. +10V corresponds to $10^{-4}$ mbar. Connection via a 2 pole 1/4" jack.  A simulated pressure control is provided, whose output is available at both recorder sockets and the level shown on the meter.
Remote Control:	Pump supply on/off via 1/4" 2 pole jack on rear panel. Remote control switching level 24V d.c. at 5mA.  Pump supply on/off and reset trip via D type connector. 5.0 to 30V d.c. input at a nominal impedance of 3K5. Both of these inputs are isolated w.r.t. ground and the supply. Two isolated status outputs are provided at the D type connector indicating supply on and a tripped condition.
Control Relay:	A N.O. and N.C. pair of contacts rated at 10A 240V a.c. are provided, these change over when power is applied to the pump.
Power Requirements:	98 - 132V or 198 - 264V. 48 - 62Hz. 1200VA maximum.
Overall Dimensions:	Width - 482mm. Height - 176mm. Depth - 327mm. Overall depth including handles etc. - 390mm.
Weight:	24kg.
Ambient Operating Temperature Range:	$10^{\circ}\text{C}$ - $35^{\circ}\text{C}$ .

Connectors: E.H.T. output. Amphenol 97 series single pole.  
Supply input. IEC Pattern 3 Pole 10A.  
Control relay. Amphenol 97 series four pole.

Recorder output 1,2 1/4" 2 pole jack.  
Remote pump on/off 1/4" 2 pole jack.

Remote control 15 way subminiature D type.

### 3. INSTALLATION

#### 3:1 Checks on Receipt of Instrument

On receipt of the ion pump supply please remove all packing material and check immediately that you have received all the items on the shipping list and that no visible damage has occurred to the equipment.

If any damages or omissions are found, please report them at once to the Company or local agent.

The package for the ion pump supply has been designed to provide all the protection normally necessary so should any damage have occurred to the box, then please return it for inspection by us to aid future despatch quality.

#### 3:2 Installation Planning

The VPS120A is suitable for free standing or rack mounted use where it requires 178mm (7") of panel space. Other dimensions are given in the specification section of this manual. When rack mounted supporting runners must be provided due to the weight of the unit. The supply will operate satisfactorily in ambient temperatures up to 35°C. Since the supply operates at high voltages (5-8KV) standard high voltage precautions must be observed when planning your installation. Location of the supply is determined by cabling between equipment. The earth braid cable (supplied) and pump supply lead type IPLS are nominally 2 metres long and this restricts the distance and location of the supply relative to the pump.

NOTE:- THE EARTH BRAID CABLE MUST ALWAYS BE CONNECTED BETWEEN THE PUMP AND SUPPLY. THE SCREEN OF THE PUMP SUPPLY LEAD SHOULD NOT BE SOLELY RELIED ON AS THE RETURN.

#### 3:3 Initial Set Up Procedure

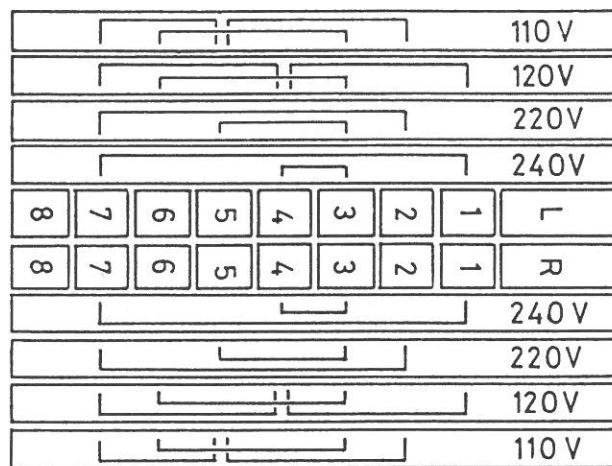
Supply Voltage:

WARNING VOLTAGES DEVELOPED IN THIS UNIT ARE LETHAL. DO NOT CONNECT THE SUPPLY TO THE UNIT DURING THIS INITIAL SET UP PROCEDURE.

The supply voltage setting of the unit is indicated in the window under the high voltage selection panel on the rear of the instrument. This is factory set to 240V unless specifically requested otherwise.

If the supply available is other than 240V then proceed as follows to change the nominal supply requirement.

- i) Remove the unit top cover (5 M4 posidrive screws).
- ii) Remove the supply selector cover located on the left hand side plate (2 M4 countersunk posidrive screws). Printed on this cover are the links for the four possible nominal supply voltage settings. This is reproduced below for reference.



- iii) Connect the links as shown for the supply available. Both L and R blocks must be changed.  
N.B. An extra link is required for 110, 120V operation.
- iv) Unscrew the voltage indicator plate on the rear panel and rotate it until the correct supply voltage is indicated at the window. Tighten the retaining screw.
- v) When changing from a supply in the range 198-264V to a supply in the range 98-132V, a fuse located on the front panel beneath the supply switch must be changed from a 5A, quick blow to a 10A quick blow fuse, both are 1 1/4" glass cartridge type. The reverse of this operation of course applies.
- vi) Replace all covers, a safety contact is activated if the top cover is not in place. This completes the supply voltage setting procedure.

#### Pump Supply Output

From the specification section of this manual select the open circuit voltage, short circuit current and polarity (positive for diode, negative for triodes) appropriate for your ion pump. The three selector plugs are located behind the perspex cover on the rear panel. Replace the cover after selection, a safety cutout is activated if the cover is not fitted properly. For pumps requiring a 3KV supply it is necessary to alter the tapping on the transformer. Reconnect the wire on the 1840V tapping on the transformer to the 1170V tap and set the O.C. voltage selector to LOW.



## Connectors

- i) Supply: connect via the amphenol 97 series socket supplied with the unit as follows:

L Live. N Neutral.  $\neq$  Earth.

For 198 - 264V supplies 0.75mm<sup>2</sup> (6A) 3 core connector cable is suitable, for 98 - 132V supplies 1.25mm<sup>2</sup> (13A) 3 core cable should be used.

Ensure that a reliable earth connection is made via the supply connector cable.

- ii) Pump: The earth braid cable should always be used to avoid relying on the pump cable screen. The braid should be connected to the two earthing posts provided on the back of the unit and a suitable point on the pump.

Connect the pump supply lead between the VPS120A and the pump ensuring that the spring provided is installed in the pump body before inserting the connector.

WARNING WHEN CONNECTING OR DISCONNECTING THE PUMP SUPPLY CABLE THE E.H.T. MUST BE TURNED OFF.

This completes the initial setting up procedure, the unit is ready for operation.

## 4. OPERATING INSTRUCTIONS

### 4:1 Front Panel Controls and Indicators

