

# APPLIED KILOVOLTS

Ion Gun

Aug 07

## SAFETY & INSTALLATION INSTRUCTIONS FOR ION GUN POWER SUPPLIES

### PLEASE READ CAREFULLY BEFORE INSTALLING OR OPERATING THIS POWER SUPPLY

#### Power Supply Warning Symbols

Caution,  
Risk of electric shock



Caution  
Refer to accompanying documentation



#### Pin connections

Input Connector 12 pin polarised Molex bar to rear.

1	Fil control	7	Anode/Focus inhibit
2	Fil inhibit	8	Anode voltage monitor
3	Fil monitor	9	Anode current monitor
4	0 volt	10	+24 volt
5	+24 volt	11	Focus 1 control
6	Anode voltage control	12	Focus 1 monitor

#### Electrical Specification

UNIT TYPE	ANODE VOLTAGE	FOCUS VOLTAGE	HEATER (common to anode)
IG005PAA300	+25V to +5 kV at 100 uA	+25V to +5 kV at 100 uA	0 to 2.5 Amps at 8V
IG010PAA300	+50V to +10 kV AT 100 uA	+50V to +10 kV AT 100 uA	0 to 2.5 Amps at 8V
IG020PAA300	+100V to +20 kV at 100 uA	+100V to +20 kV at 100 uA	0 to 2.5 Amps at 8V

Ripple: Anode & focus 0.1% peak to peak, heater 1V peak to peak max.

Control (all outputs): 0 to +10 volt gives 0 to maximum.

Load regulation: Better than 1% for a 10% change in resistance.

Line regulation: Better than 1% for 1V change in input voltage.

Output accuracy: Better than  $\pm 5\%$  of full scale (all outputs).

Inhibit: Heater +24V or O/C - Inhibit.  
<+1.5V - Heater on.  
Anode & Focus +24V or O/C - Inhibit.  
<+1.5V - Outputs slow rise to maximum.

Monitors: Anode voltage 0 to +5V represents 0 to max. kV.  
Focus voltage 0 to +5V represents 0 to max. kV.  
Anode current 0 to +5V represents 0 to 100 uA (beam current).  
Heater current: 0 to +5V represents 0 to 2.5A.

Accuracy of readbacks: Better than  $\pm 5\%$ .

Temperature co-efficient: 300 ppm/°C (Anode & focus), 1% per °C (Heater).

#### Input Supply Voltage

24Vdc  $\pm 10\%$  at 1.8A . Impulse limited to (overvoltage) Category I of IEC60364-4-443.

#### Mounting

By 2 off M3 clearance holes.

#### Cleaning

Use a lint free cloth soaked with isopropyl alcohol, ensuring the unit is completely dry before use.

#### Environmental Conditions

Indoor use only, Operating Temperature 0°C to +45°C,  
Altitude up to 2000m, Storage Temperature -35°C to +85°C.  
Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40° C,  
For use in an environment of pollution degree 2.

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## General

On receipt the unit should be carefully unpacked and inspected to ensure that no transit damage has occurred. Provided that this inspection is satisfactory and reveals no evidence of damage then installation can proceed.

If an electrical test is to be carried out prior to fitting the power supply, it is essential that the person undertaking this work has received appropriate technical training to be aware of the hazards to which that person may be exposed in performing the tests, and of measures to minimise the risks to themselves, and other personnel. Metallic or conductive tools should not be used to adjust either of the potentiometers. The unit has no user serviceable parts and should not be dismantled.

DO NOT HANDLE OR TOUCH THESE UNITS WHEN THE SUPPLY IS CONNECTED. AFTER DISCONNECTION FROM THE SUPPLY, ALLOW 30 SECONDS BEFORE HANDLING SO THAT ALL THE CAPACITORS CAN DISCHARGE. To ensure that the output is fully discharged, short to ground before touching any high voltage circuit.

Care should be taken not to operate the unit outside the specified limits given above, failure to do so may damage the unit.

## COMPLIANCE WITH SAFETY STANDARDS

The unit is designed to meet Normalised European Safety Standards and hence installation of the power supply unit into the equipment should comply with the following requirements.

- a. A PROTECTIVE EARTH must be provided for safety in accordance with EN61010 Part 1:latest: Clause 6.5.1. The case of the units must be bonded to this protective earth.
- b. The output is classed as hazardous and must therefore not be accessible to operators. The output must be isolated from accessible circuits by Double Insulation or a protective screen as defined in EN61010-1.
- c. It is intended to be installed in an electrical enclosure and the unit and its input connector should not be accessible to the operator. Access should be restricted to authorised service personnel only, with use of a tool. Care should be taken to prevent access to the interior of the unit and protect against items (e.g. tools or wires) inadvertently entering the interior of the unit.
- d. The unit is not fitted with a fuse and so should be operated from a current limited supply of <3 amp.

## INSTALLATION

The outputs of these units are considered hazardous and should be installed such that they cannot become accessible. The output should be connected such that the shortest creepage and clearance path is to a protective earth connection. ENSURE that a LOW IMPEDANCE connection is made to the unit chassis from the system PROTECTIVE EARTH. The safety earth (ground) conductor must not contain any switches or fuses.

Under worst case conditions the unit draws a current of 1.8A and any input supply cable must be of a suitable type and rating. The unit is not fitted with a fuse and so should be operated from a limited supply. Fuses may be fitted externally to the unit to protect unit and interconnecting wiring etc. but these should be rated to prevent nuisance failures. Care should be taken in the design of the interconnecting wiring within the system to ensure that connectors with hazardous voltages cannot be connected to accessible circuits.

Ensure that the output is connected to the load prior to operation of the unit and that a good low impedance high voltage joint is made. Sharp points on either the high voltage or return joint should be avoided as this will cause corona which will make the output appear noisy. In general a tracking distance (creepage distance) of 25mm (1 inch), per 10kV to earth is advised as a minimum to ensure no breakdown or corona occurs, a much greater distance will be required under adverse conditions. Care must be taken not to damage the cable inner when forming the connections.

During arcing currents exceeding 1000 Amps will flow. It is important that these currents return to the high voltage power supply by the shortest possible route using the screen (shield) of the output cable. Failure to observe this will result in the control terminals of the unit seeing large voltage spikes during arcing and radiation of electromagnetic interference.

Adequate ventilation should be provided to keep the unit cool and the ventilation inlets should not be covered in any way. The ambient air temperature around the inlet must not exceed 50°C. The unit will operate in any orientation, however it is not recommended to operate with the side fitted with the silk-screen as the lowest face.

## OPERATING NOTES

1/ HIGH VOLTAGES ARE DANGEROUS. ENSURE THE OUTPUT IS FULLY DISCHARGED BY SHORTING TO GROUND BEFORE TOUCHING ANY HIGH VOLTAGE CIRCUIT.

2/ The unit is short circuit proof but care should be taken that the high voltage cannot be shorted into one of the control pin connections.