



HIGH VOLTAGE POWER UNIT

WITH VARIABLE OUTPUT
230 VOLT VERSION

USER'S MANUAL

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DESCRIPTION

Supplied with 230 volts A.C. from a generator, the High Voltage Power Unit will output D.C. voltages up to 700 volts at a maximum power of 100 Watts.

A 1 : 1 transformer ensures that the electronics is isolated from the generator supply or the domestic mains supply if used. A variable transformer allows the output voltage to be continuously varied to enable the operator to set the current to a useable level within the confines of the maximum rating of 100W and 1Amp. For example, the current should not exceed 0.5Amp at 200Volts or 0.25Amp at 400Volts.

If there is no leak in the liner being tested, it will not be possible to achieve any output current. So, although the voltmeter will show a reading, no current will be visible on the ammeter. A test resistor is supplied to allow the High Voltage Power Unit to be checked if the above situation occurs. The test resistor should only be used for a short time to demonstrate that the Power Unit is working satisfactorily.

The leads to the electrodes should have their bare ends inserted into the clips under the protective cover. To prevent shock hazard, this cover has a magnetic switch which will shut down the Power Unit if it is opened whilst in operation.

Position the 'HIGH VOLTAGE' warning sign supplied so as to be visible to any untrained personnel who may be in the area.

Before switching ON, ensure that the variable control is turned fully counterclockwise and the 'HI / LO' switch is set to 'LO'.

When A.C. is applied, a neon lamp will glow. To switch the Power Unit on, the two blue buttons must be pressed simultaneously when the relay inside will be heard to 'clunk'. In an emergency, the red 'OFF' button can be hit when power will be removed from the circuitry. The voltage adjustment controls may now be used to deliver an output current within the power constraints described above. The 'HI' range may be selected if more current is required.

WARNING! DO NOT MAKE ANY ADJUSTMENTS TO THE ELECTRODES OR CABLES UNTIL THE POWER UNIT IS SWITCHED OFF WITH NO VOLTAGE SHOWING ON THE METER. FOR EXTRA SAFETY, REMOVE THE GENERATOR CABLE AND THE ELECTRODE LEADS FROM THE SAFETY COVER.

SURVEY PROCEDURE

The usual method to investigate for damage to plastic liners in landfill sites is to position the High Voltage Power Unit outside the the liner confines and power it from a diesel or gasoline fuelled generator. Only about 100 Watts is required so a light 300VA portable Honda type machine sold for recreational use will probably suffice. These are, however, not intended for use outside in wet weather so some cover may be necessary which will allow exhaust to exit and air to be drawn in for the intake. Take care not to restrict ventilation such that the generator may overheat.

An electrode should now be positioned preferably centrally within the landfill liner material but this is not too critical. Take care not to damage the liner material by puncturing it by pushing the electrode in too far. This electrode should now be connected to the H.V.P.U. by means of a cable of suitable length and current carrying capability. P.V.C. covered hook-up wire of about 18 S.W.G. multi-stranded for flexibility will be a good compromise between strength and weight. A battery clip should be on the outside end of this wire for gripping the stainless steel electrode and a binding post on the side of the cable reel connected to the inboard end. A short jumper lead having a banana plug on one end goes into the binding post with its other end bare to be clipped under the safety cover on the H.V.P.U. This should be unplugged from the cable reel when winding out or in.

A second similar cable arrangement should be used to connect to the land outside the liner. It is not important which electrode goes to the Brown or Blue clip. The clip cover must be shut down for the H.V.P.U. to switch on.

The High Voltage Power Unit should be switched on and a current passed between the liner inner material and the outside earth. Any perforations in the liner will allow a current to pass between the two separated materials. The survey frame is now used to survey the site in a grid pattern logging the voltage at discrete stations along lines after which the data can be downloaded using the provided 'EL-WIN' software. To localise a leak point, the Digital Volt Meter which is permanently connected to the input terminals may be viewed for voltage changes as the frame is moved around without the need to record.

H.V.P.U. OPERATION

Before applying A.C. power:

The leads to the electrodes should have their bare ends inserted into the clips under the protective cover. To prevent shock hazard, this cover has a magnetic switch which will shut down the Power Unit if it is opened whilst in operation. Use only the Brown and Blue clips as the Green one is not used.

Position a 'HIGH VOLTAGE' warning sign so as to be visible to any untrained personnel who may be in the area.

Before switching ON, ensure that the variable control is turned fully counterclockwise and the 'HI / LO' switch is set to 'LO'.

When A.C. is applied, a neon lamp will glow. To switch the Power Unit on, the two blue buttons must be pressed simultaneously when the relay inside will be heard to 'clunk'. In an emergency, the red 'OFF' button can be hit when power will be removed from the circuitry. The voltage adjustment controls may now be used to deliver an output current within the power constraints described above. The 'HI' range may be selected if the HVPU is being used in a low conductivity area.

WARNING! DO NOT MAKE ANY ADJUSTMENTS TO THE ELECTRODES OR CABLES UNTIL THE POWER UNIT IS SWITCHED OFF WITH NO VOLTAGE SHOWING ON THE METER. FOR EXTRA SAFETY, REMOVE THE GENERATOR CABLE AND THE ELECTRODE LEADS FROM THE SAFETY COVER.

There are components within the HVPU to dump the high voltage when the unit is shut down and in the event of failure of these components, there exists a secondary bleed circuit which discharges the high voltage but this takes a few minutes. If in doubt, always wait for several minutes before making adjustments.

WARNING!

THIS POWER UNIT IS CAPABLE OF SUPPLYING LETHAL VOLTAGES. DO NOT TOUCH WIRES OR CONTACTS OR ELECTRODES UNTIL THE UNIT HAS BEEN POWERED DOWN AND THE SUPPLY FROM THE GENERATOR HAS BEEN DISCONNECTED. WAIT AT LEAST 5 MINUTES FOR VOLTAGES TO DECAY BEFORE TOUCHING ANY CONTACTS.

MAINTENANCE

The High Voltage Power Unit should be protected from rain.

Do not operate under intense sun. Provide shielding if necessary.

Try to avoid dust or sand being drawn inside by the cooling fan.

Freight in a well cushioned case. Do not throw the case into vehicles.

Examine power and other cables from time to time to avoid damage and possible injury to personnel.

Ensure that the electric generator is well serviced and that the electric alternator is providing the correct voltage free from transient spikes.

Make sure that civilian personnel, children or animals do not approach the cables and electrodes.

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