

TELTRON

Atomic Physics Educational Apparatus

TEL 813 kV Power Unit

A general purpose metered laboratory power supply, particularly suitable for operating Teltron Tubes 522, 523, 524, 525, 530 and 555.

Power Output

kV Output
0 to ± 5 kV with Centre Tap
or 0 to ± 2.5 kV.
Current: 3mA max.
(short circuit current).
Power: 3.5 watts max.
Ripple & Noise: Less than 0.3%
of output at maximum power.
Stability:
2% for $\pm 10\%$ mains change.
Heater Supply: 6.3V, 3A rms max.,
fully insulated for 5kV working.

Metering

Calibration: 0 — 5kV, 0 — 2.5kV.
Scale length:
119mm, 100 μ A, linear.

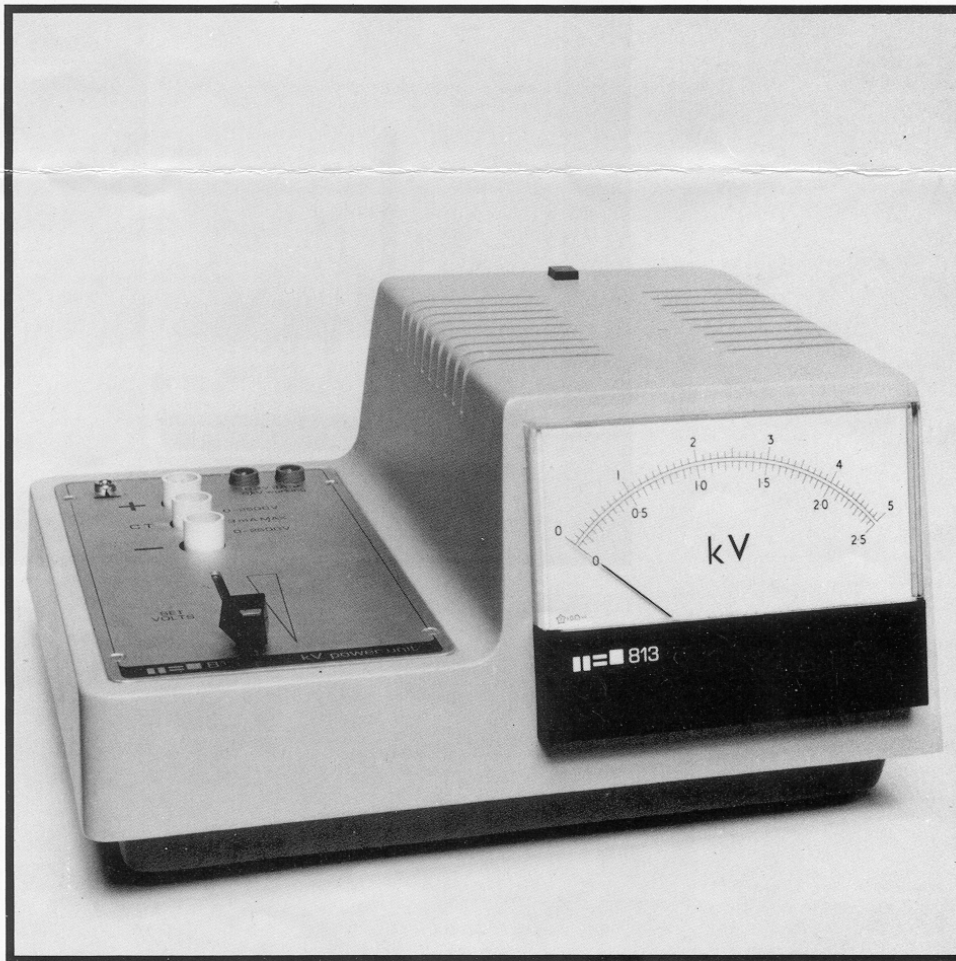
Power Input

110, 220, 240V $\pm 10\%$, 50/60Hz.
Power Selector
Situated underneath.
Power On Neon indicator lamp.

General

Housing: Glass fibre reinforced resin
moulding on cast aluminium base.
Ambient Temp: 35°C (95°F) max.
Dimensions
W: 280; D: 230; H: 150mm.
Weight: 5.2Kg.

See control layout overleaf



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Controls

Voltage Control

Slider movement:

variable 0 to ± 5 or ± 2.5 kV.

Power On/Off Switch

Situated at back.

Connections

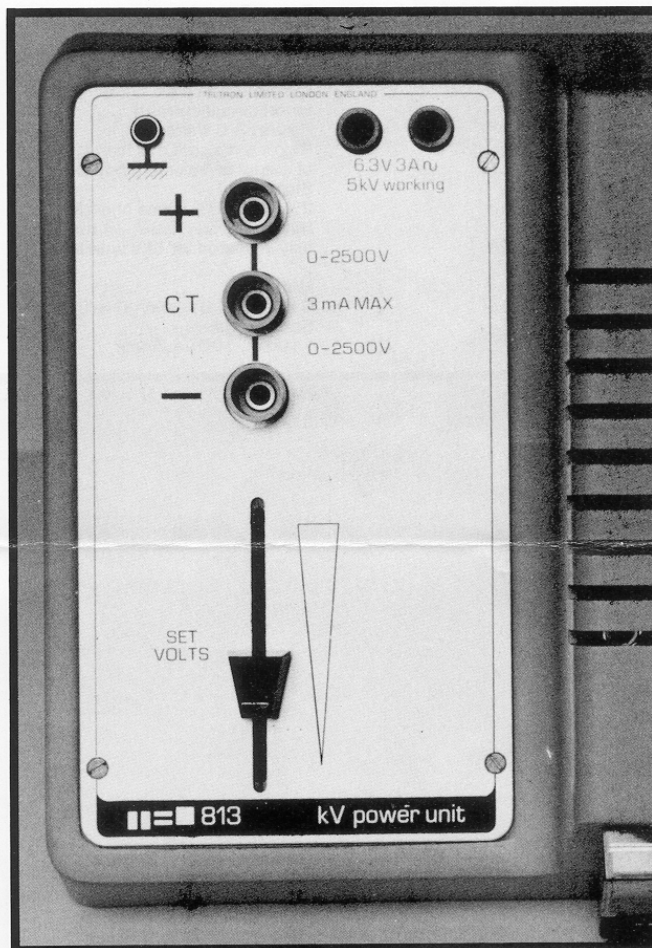
kV Output — 3 x 4mm Sockets.

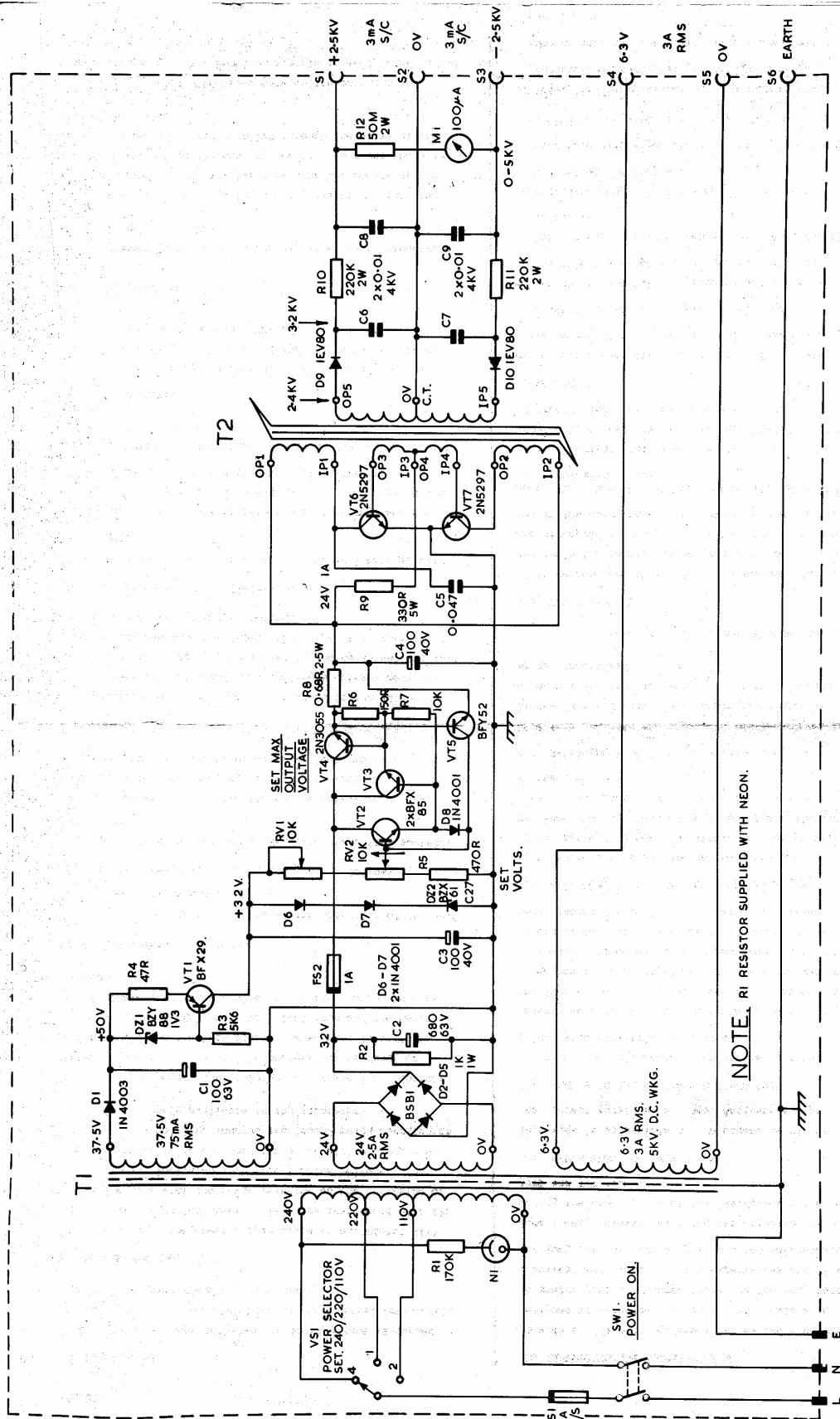
Heater Supply — 2 x 4mm Sockets.

Earth — 1 x 4mm Socket.

Mains Cable:

Integral, 2 metres long.





NOTE. R1 RESISTOR SUPPLIED WITH NEON.

K.V. POWER UNIT. TEL.813-CIRCUIT DIAGRAM.

1.0 UNPACKING

If any damage is apparent when the packing case is opened the supplier of the equipment should be notified immediately and the instrument should not be used.

2.0 INITIAL CHECKS

Attach a plug to the power supply cable in accordance with the wiring instruction sheet. Tilt the instrument onto its side and ensure that the power selector on the underside of the instrument indicates the correct mains voltage; to readjust the selector pull out the black plug and replace, with the arrow pointing towards the legend which corresponds to the power supply available in the laboratory.

Check that the power fuse is securely screwed in. Connect the mains supply to the unit by depressing the Power On Switch (WHITE) on the back panel. When this is performed, the Power On Lamp (RED) will be illuminated and the meter will indicate a voltage provided a voltage control has been advanced.

3.0 OPERATING INSTRUCTIONS

Having completed the initial checks the operation of the unit will become self evident.

The normal operational sequence would be as follows -

Push the voltage control down, away from the output sockets. Switch off.

Connect the required load to the output sockets. Depress Power On Switch, push voltage control up, towards the output sockets, to give required KV voltage reading.

3.1 CURRENT LIMIT

If the output voltage cannot be increased to the full normal rating check current drawn by inserting a current meter in series with the load. The meter would indicate that the full power rating has been realised. Any increase in current will produce a decrease in output voltage.

The short circuit current limits are -

3.0 mA ± 0.5 mA for either the full output or a half output connection.

Accidental short circuit of either output arrangement should not result in any damage provided that it is not maintained for very long periods at high ambient temperatures.

Normal operation should resume as soon as the short circuit is removed.

3.2 VOLTAGE LIMIT

This is determined by the setting of an internal control, potentiometer RVI, (see circuit diagram) and is independent of mains input voltage within the specified limits.

3.3 OPERATING TEMPERATURE

The instrument is designed to operate at ambient temperatures of up to 35°C (95°F) Max.

It is convection and radiation cooled, the heavy aluminium alloy base acting as a massive heat sink and cooled by the air drawn in through the gap between the cover and the base around the perimeter and expelled through the slots at the top of the cover.

It is important that the space between the base and the mounting surface of the bench or a table is left unobstructed to allow free air circulation.

4.0 SERVICING AND MAINTENANCE

As with all Teltron equipment the KV power unit has been designed to withstand the abuse and misuse which all apparatus used for course demonstration and student practical work traditionally experiences and it will operate for long periods without the need for maintenance.

Some items, however, will require attention at some time during the useful life of the instrument - the indicator lamp and the fuses.

4.1 REPLACEMENT OF 'POWER FUSE'

This fuse is accessible on the underside of the instrument. The correct fuselink is 1 Amp, Anti-surge Type.

4.2 ACCESS TO THE ELECTRONIC COMPONENTS

Switch off and disconnect from the mains supply. Remove the slider knob by lifting it upwards.

Invert the instrument onto a piece of soft cloth and remove the four screws fixing the cover to the base. Hold the cover and the base together and invert the unit again putting it down in its normal upright position. Lift the cover carefully and rotating it as if it was hinged at the right hand side of the unit let it rest on its side.

4.3 REPLACEMENT OF 'POWER ON' INDICATOR LAMP

Each lampholder is an integral unit containing a permanently fixed neon with a resistor within the red plastic lampholder. Unsolder the two leads and push out the whole assembly. Insert, push hard in a new indicator and reconnect the leads to the same points.

4.4 REPLACEMENT OF FUSELINK FS.2

FS.2 fuse protects the supply to the transistor controller of the 24V IA supply (see circuit diagram). It is fitted in an open fuseholder mounted on the terminal board of the mains transformer.

FUSE TYPE: 1 Amp, QUICK BLOW TYPE

4.5 FAULT FINDING

It is recommended that unless professional facilities are available the rectification of only minor and obvious faults are attempted by the user; for correction of more obscure faults the user should seek advice of the supplier.

Note: ALL POWER TRANSISTORS OPERATE WELL ABOVE CHASSIS POTENTIAL (100V)

It is important that if any of these are replaced their insulating black, plastic covers are refitted correctly to protect the user from voltage hazards.

ELEMENTARY FAULTS

A. Indicator Lamp fails to operate but the meter indicates voltage when the slider control is advanced.

Power Indicator Lamp and/or associated wiring defective.

B. Indicator Lamp fails to operate and the meter does not indicate a voltage when slider control advanced.

Mains plug, Indicator Lamp and/or Power Fuse (F.S.1) defective.

C. Indicator Lamp on but the meter does not read anything when slider control advanced.

FS.2 fuse defective; VT6 or VT7 transistor defective.

Wiring to the meter defective; Meter defective.

D. Meter indicates maximum voltage reading which is independent of the slider voltage control.

One or more of transistors VT2, VT3 and VT4 defective.