

## Ratemeter

**WARNING - RADIOACTIVE MATERIAL CAN BE DANGEROUS. ALL RELEVANT SAFETY PRECAUTIONS SHOULD BE OBSERVED WHEN USING SUCH MATERIALS.**

### Introduction

The Ratemeter is designed for use in the laboratory as an instrument to provide an indication of the level of radioactivity of a variety of sources. It can also be used to provide a quantitative radiation level in counts per second.

### Operation

1. Plug a suitable Geiger-Muller (GM) tube into the shaped socket on the instrument. Set the high tension control to its minimum position (marked HT on front panel) and set the switch marked SOUNDER to the ON position.
2. Plug in the mains lead and switch on. The mains switch will illuminate green.
3. Place a weak radioactive source in front of the GM tube and increase the HT control until clicks first become audible. Note the HT voltage setting and increase this by a further 40V. The ratemeter is then ready for use.
4. If the instrument starts to count so rapidly (ie avalanching) when the HT is increased, eventually causing the apparatus to cease counting, reduce the HT until a satisfactory count rate is achieved. Conversely, if very weak sources are being used, increase the HT to provide a satisfactory count rate. A strong source too close to the GM tube will also cause avalanching. Move the source away from the tube to restore normal operation.
5. If a quantitative measurement of count rate is required, connect a high impedance (eg 10M $\Omega$ ) voltmeter to the pair of sockets on the instrument. The reading is then x1000 counts per second. ie a reading of 0.100V represents a count rate of 100 counts per second. The ratemeter will read to 1999 counts per second with an accuracy within 5%. For best results use a voltmeter with the highest possible input impedance. (eg a digital voltmeter). If a voltmeter with lower input impedance is used (eg a moving coil meter) then a reduced reading will be given.