



Installing and Operating the 14214

Simultaneous-Mode *ACTIVE FILM Multiplier*[™]

INTRODUCTION

The Simultaneous-Mode *ACTIVE FILM Multiplier*[™] can deliver both analog and pulse-counting signals simultaneously to the detection electronics. The analog output is active continuously, while the pulse-counting output is active only when the 'gate' electrode is in the OPEN state. When the 'gate' is in the CLOSED state the pulse-counting section of the multiplier is gated off to protect it from large signal peaks.

The following discussion is intended as a guide for properly installing a 14214 *ACTIVE FILM Multiplier* to obtain optimal performance from both analog and pulse-counting outputs

OPERATIONAL CONSIDERATIONS

The typical operating gain in the analog section of the multiplier is $1-3 \times 10^4$. The typical operating gain of the pulse-counting section of the multiplier is $1-3 \times 10^3$ (both sections together having a combined gain of $\sim 5 \times 10^7$). The following general guideline will help eliminate problems when using the 14214 Simultaneous Mode *ACTIVE FILM Multiplier*.

1. All electrical connection leads should be kept as **short and straight** as possible. To straighten electrical leads place the shaft of a small, clean screwdriver inside the coil of the wire lead. Pull the screwdriver slowly away from the multiplier so that the coil unwinds around the shaft
2. Using a separate power supply for the 'gate' voltage will minimize transients when the state of the gate electrode is switched. Experimental testing of a simultaneous mode multiplier has shown that if the voltage to the gating electrode is supplied by a simple voltage divider attached to the +HV supply, very large gating transients can be seen on the analog output when the gate voltage is switched. By using a separate power supply for the gate voltage minimal gating transients were observed.

INSTALLATION GUIDELINES

The input aperture of the 14214 simultaneous mode multiplier should be mounted to be on the same axis as the quadrupole rods and exit aperture and should be positioned $\sim 3-5$ mm from the quadrupole exit aperture.

For the first 16 hours after installation and exposure to vacuum, the applied high voltages to the 14214 should be limited to: -HV: < 2.0 kV and +HV: < 1.2 kV

SPECIFICATIONS FOR 14214

Internal resistance, analog section	25 Megohms
Internal resistance, pulse section	18.4 Megohms
Gate response time	< 20 msec.
Gate attenuation	> 4000:1
Dark current analog section, 2.5 kV analog section, 1.0 kV pulse section	< 1 picoamp
Dark counts pulse section: 1.8 kV analog section, 1.4 kV pulse section	< 0.05 counts/sec
Analog section gain, 1.8 kV analog section, 1.0 kV pulse section	$\geq 5 \times 10^3$
Pulse section gain, 1.8 kV analog section, 1.0 kV pulse section	$\geq 2 \times 10^7$



www.etpsci.com

A DIVISION OF SGE GROUP OF COMPANIES

SGE International Pty. Ltd.
Tel: +61 (0) 9837 4200
Fax: +61 (0) 9874 5672
Email: techsupport@etpsci.com

SGE, Incorporated (USA)
Toll Free: (800) 945 6154
Fax: (512) 836 9159
Email: usa@sge.com

SGE Europe Ltd
Tel: +44 (0) 1908 568844
Fax: +44 (0) 1908 566790
Email: uk@sge.com



www.sge.com