

OVERVIEW

Quadrupole mass spectrometers used for residual gas analyzers have been downsized to solve problems of limited installation space. A trend of the downsizing would be an ever-greater degree in the future. However, it cannot be achieved just by reducing the ion source and Quadrupole electrode sizes. A small ion detector is also required essentially. To meet the requirement, Hamamatsu has developed compact ion detectors. The unique ion detector breaks the performance barriers on conventional electron multipliers and will prove the ideal result for your needs.



SPECIFICATIONS

GENERAL

Parameter	R8810	R8811/R8811-02	Unit
Input aperture diameter	$\phi 3$		mm
Dynode structure	Circular cage		—
Number of dynode stages	9	13	—
Dynode material	Al ₂ O ₃		—
Total resistance	9	13	M Ω
Operating ambient temperature	-30 to +50		°C
Storage temperature	-50 to +50		°C
Detection ion polarity	Positive		—

MAXIMUM RATINGS

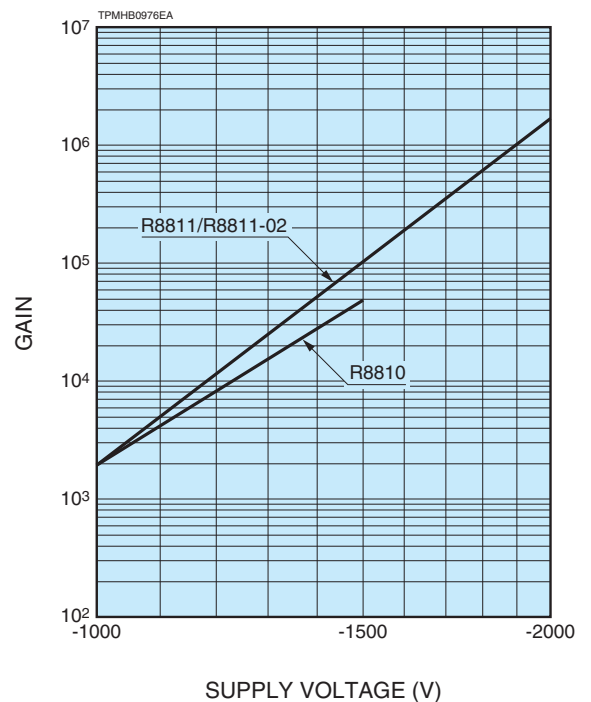
Parameter	R8810	R8811/R8811-02	Unit
Anode to first dynode voltage	-1500	-2000	V
Faraday cup voltage	-200		V
Operating vacuum level	0.5	0.01	Pa
Bake-out temperature (at 5×10^{-3} Pa)	350		°C
Average anode current ^(A)	1	10	μ A
Operating gain ^(B)	1×10^5	5×10^6	—

CHARACTERISTICS

Parameter	R8810	R8811/R8811-02	Unit
Recommended supply voltage	-1000	-1500	V
Gain (Typ.)	2×10^3	1×10^5	—
DC linearity (Typ.)	1	5	μ A
Dark current (Max.)	0.1	1	pA
Rise time (Typ.)	1.4	1.6	ns
Anode to all other electrode capacitance	1.1	0.8	pF

NOTE: (A) Averaged over any interval of 30 seconds maximum.
(B) Use a supply voltage that does not cause the operating gain to exceed its maximum rating.

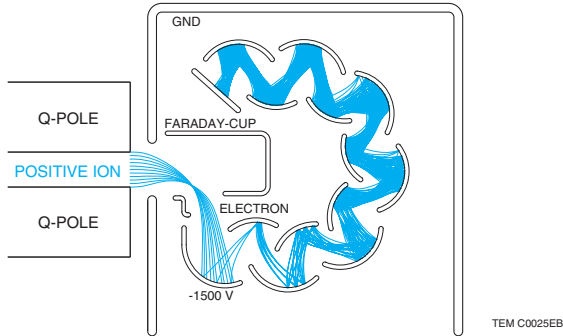
Figure 1: Typical gain



ELECTRON MULTIPLIER R8810/R8811/R8811-02

STRUCTURE

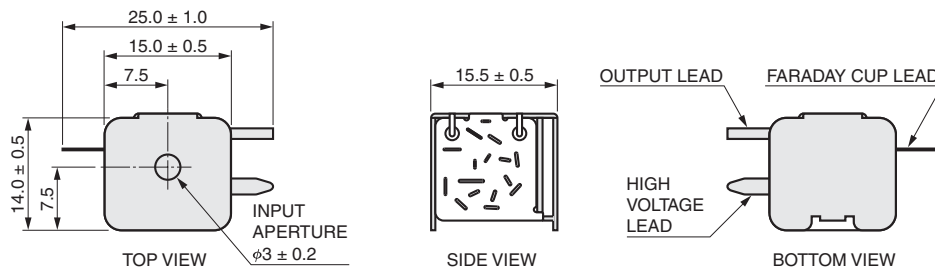
This electron multiplier has an off-axis structure and a Faraday cup needed for ion detection in Quadrupole mass spectrometers which are capable of making precise measurements over a wide dynamic range with a high S/N. The structure also incorporates a voltage divider, which is essential for discrete type electron multipliers. By simply wiring the high voltage, the signal and the Faraday cup, reliable operation can be achieved without adding any other parts.



Ions emitted from Quadrupole are multiplied while being deflected and focused by the electron lens created by the combination of the Faraday cup, the ion deflection electrodes and the electron multiplier electrodes. The layout of the Faraday cup, the ion deflection electrodes and the electron multiplier electrodes are designed by special 3D simulation of ion and electron trajectories. This layout allows detecting the input ions with high efficiency.

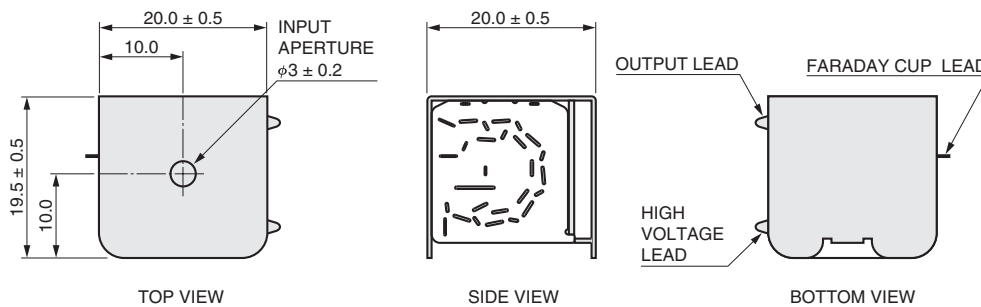
DIMENSIONAL OUTLINE (Unit: mm)

●R8810



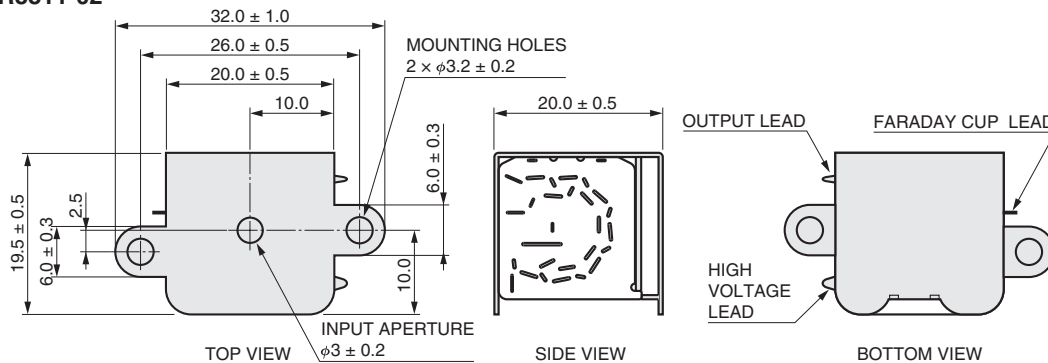
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●R8811



TPMHA0608EA

●R8811-02



TPMHA0635EA

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