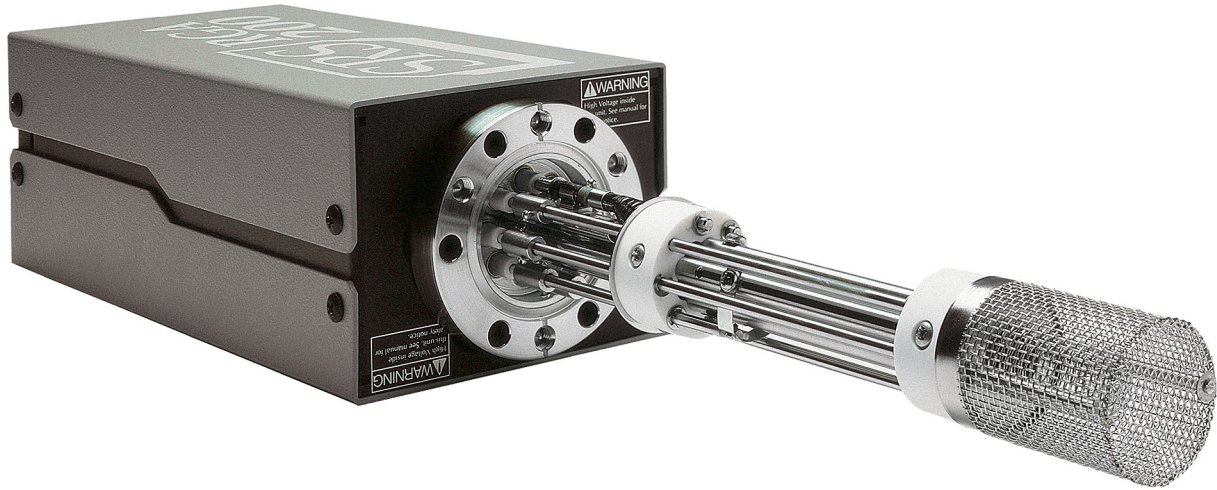# Residual Gas Analyzers

RGAs — 100 amu, 200 amu and 300 amu systems

- 100, 200 and 300 amu systems

- Better than 1 amu resolution

- 6 decades of dynamic range

- 5×10^{-14} Torr detection limit

- RGA Windows & LabVIEW software

- Field-replaceable electron multiplier and filament

- RS-232 and Ethernet interfaces

- RGA100 ... $4950 (U.S. list)

- RGA200 ... $6400 (U.S. list)

- RGA300 ... $7950 (U.S. list)

Residual Gas Analyzers

The 100, 200 and 300 amu residual gas analyzers from SRS offer exceptional performance and value. These RGAs provide detailed gas analysis of vacuum systems at about half the price of competitive models. Each RGA system comes complete with a quadrupole probe, electronics control unit (ECU), and a real-time Windows software package that is used for data acquisition and analysis, as well as probe control.

Rugged Probe Design

The probe consists of an ionizer, quadrupole mass filter, and a detector. The simple design has a small number of parts which minimizes outgassing and reduces the chances of introducing impurities into your vacuum system. The probe assembly is rugged and mounts onto a standard 2.75" Conflat® flange. It is enclosed within a stainless steel tube, with the exception of the ionizer which requires just 2.5" of clearance in your vacuum system — about that of a standard ion gauge. The probe is designed using self-aligning parts so it can easily be reassembled after cleaning.

Compact Electronics Control Unit

The densely packed ECU contains all the necessary electronics for controlling the RGA head. It is powered by either an external +24 VDC (2.5 A) power supply or an optional, built-in power module which plugs into an AC outlet. LED indicators provide instant feedback on the status of the electron multiplier, filament, electronics system and the probe.

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The ECU can easily be removed from the probe for high-temperature bakeouts.

Unique Filament Design

A long-life, dual thoriated-iridium (ThO_2/Ir) filament is used for electron emission. Dual ThO_2/Ir filaments last much longer than single filaments, maximizing the time between
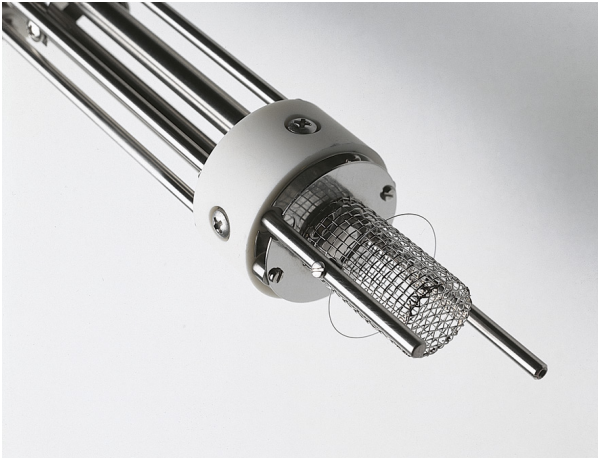
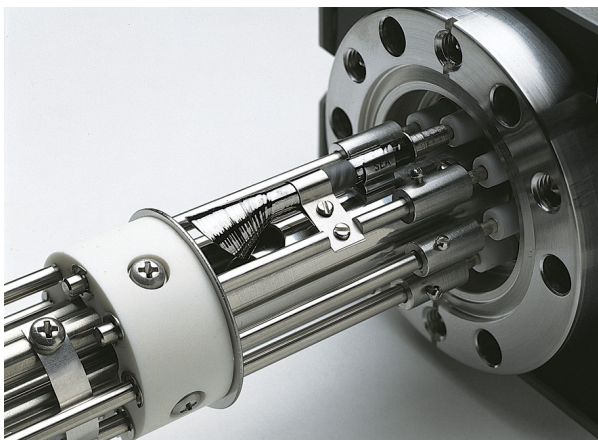*Dual ThO_2/Ir filament*

filament replacement. Unlike other designs, SRS filaments can be replaced by the user in a matter of minutes.

Continuous Dynode Electron Multiplier

A Faraday cup detector is standard with all SRS RGAs, allowing partial pressure measurements from 10^{-5} Torr to 5×10^{-11} Torr. For increased sensitivity and faster scan rates,

Continuous dynode electron multiplier

an optional electron multiplier is offered that detects partial pressures down to 5×10^{-14} Torr. This state-of-the-art, multi-

channel, continuous-dynode electron multiplier (EM) offers increased longevity and stability, and can also be replaced by the user — a first for RGAs.

Useful Features

SRS RGAs have a built-in degassing feature. Using electron impact desorption, the ion source is thoroughly cleaned, greatly reducing the ionizer's contribution to background noise.

A firmware driven filament protection feature constantly monitors (675 Hz) for over pressure. If over pressure is detected, the filament is immediately shut off, preserving its life.

A unique temperature-compensated, logarithmic electrometer detects ion current from 10^{-7} to 10^{-15} amps in a single scan, with better than 2 % precision. This huge dynamic range means you can make measurements of small and large gas concentrations simultaneously.

Complete Programmability

Communication with computers is made via the RS-232 interface. Analog and histogram (bar) scans, leak detection, and probe parameters are all controlled and monitored through a high-level command set. This allows easy integration into existing programs.

RGA Windows Software

The RGA systems are supported with a real-time software package that runs on Windows OS computers. The intuitive graphical user interface allows measurements to be made quickly and easily. Data is captured and displayed in real-time or scheduled for acquisition at a given time interval for long-term data logging. Multiple spectral data and individual measurements can be collected together in one sequence. Versatile docking windows and widgets give the user various ways to organize the display. Data can be scaled manually or automatically, in linear or log format on plots. Units are selectable among Torr, Bar, Pascal and Amp. Features include common gas labels, programmable audio and visual alarms, expandable library, composition analysis, and comprehensive on-line help.

The software also allows complete RGA control with easy mass scale tuning, sensitivity calibration, ionizer setup, and electron multiplier gain adjustment. For further analysis, data files can be saved in CSV text format for easy transfer into spreadsheets. Graphic images can be saved in common formats (PNG, BMP, TIFF, JPG, SVG, PDF) or copied to the clipboard for importing directly into other programs. An optional stand-alone monitor (PPM100) can be used to control the RGA without a host computer.

Multi-Head Operation

The software supports multiple head operation when more than one RGA is needed. With a software instance independently control an RGA, multiple RGAs can be controlled and run

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concurrently with multiple software instances. The number of RGAs is only limited by the system resources.

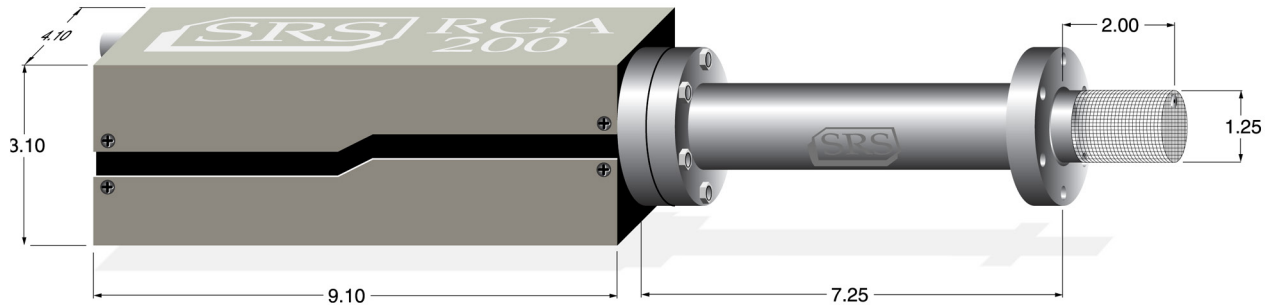**Performance and Value**

The SRS family of RGAs is ideal for applications involving gas analysis, leak detection, and vacuum processing. We offer 100, 200 and 300 amu systems with supporting Windows software, and options that include an electron multiplier and a built-in power module for AC line operation. The RGA Windows software is available on the web at www.thinkSRS.com.

RGA rear panel
(without AC power module)

RGA rear panel
(with AC power module)

RGA dimensional drawing (inches)

Operational

Mass range

RGA100	1 to 100 amu
RGA200	1 to 200 amu
RGA300	1 to 300 amu

Mass filter type   Quadrupole

Detector type   Faraday cup (FC), standard
Electron multiplier (EM), optional

Resolution
(per AVS std. 2.3)   Better than 0.5 amu @ 10 % peak
height. Adjustable to constant peak
width throughout the mass range.

Sensitivity (A/Torr) 2×10^{-4} (FC), <200 (EM). User
adjustable throughout high voltage
range. Measured with N_2 @ 28 amu
with 1 amu full peak width,
10 % height, 70 eV electron energy,
12 eV ion energy, and 1 mA electron
emission current.

Minimum detectable
partial pressure 5×10^{-11} Torr (FC),
5×10^{-14} Torr (EM)
Measured with N_2 @ 28 amu with
1 amu full peak width, 10 % height,
70 eV electron energy, 12 eV ion
energy, and 1 mA electron
emission current.

Operating range 10^{-4} Torr to UHV (FC)
10^{-6} Torr to UHV (EM)

Operating temperature   70 °C (max.)

Bakeout temperature   300 °C (without ECU)

Ionizer

Design   Open ion source, cylindrical
symmetry, electron impact ionization

Material   SS304 construction

Filament   Thoriated iridium (dual) with
firmware protection. Built-in
1 to 10 W degas ramp-up.
(Field replaceable)

Electron energy   25 to 105 V, programmable

Ion energy   8 or 12 V, programmable

Focus voltage   0 to 150 V, programmable

Electron emission current   0 to 3.5 mA, programmable

General

Probe dimension   8.75" from flange face to top
of ionizer

Probe insertion   2.0"

Probe mounting flange   2.75" CF

Minimum tube I.D.   1.375"

ECU dimensions   3.1" × 4.1" × 9.1" (WHD). Easily
separated from the probe for bakeout.

LED indicators   Power ON/OFF, filament ON/OFF,
degas ON/OFF, electron multiplier
ON/OFF, RS-232 Busy, Error,
Overpressure, Burnt Filament

Warm-up time   Mass stability ±0.1 amu after 30 min.

Computer interface   RS-232C, 28,800 baud with high-
level command set

Software   Windows based application

Power requirement   24 VDC @ 2.5 amps, male DB9
connector, optional built-in power
module for AC line operation

Weight   6 lbs.

Warranty   One year parts and labor on defects
in materials and workmanship

Ordering Information

RGA100	100 amu RGA w/ RS-232	$4950
RGA200	200 amu RGA w/ RS-232	$6400
RGA300	300 amu RGA w/ RS-232	$7950
Option 01	Electron multiplier	$1895
Option 02	AC power module	$350
Option 03	Ion counting output	$250
O100HJRW	Heater jacket	$1500
O100MAX	Max. insertion nipple (4.5" CF)	$1200
O100REA	Ethernet adapter for RGA	$600
PPM100	Optional stand-alone monitor	$4995
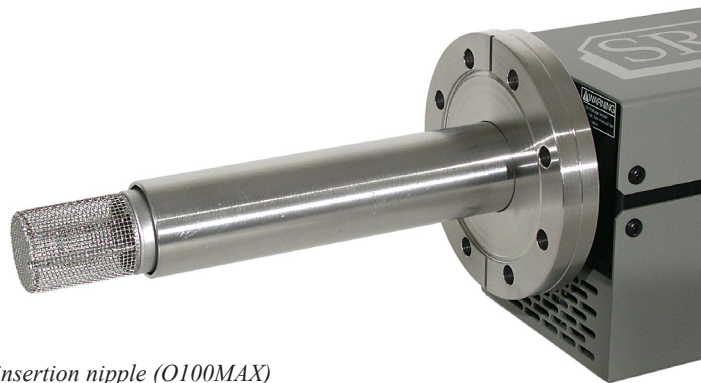
Maximum insertion nipple (O100MAX)