Residual Gas Analyzers

XT Series

Extorr XT Series Residual Gas Analyzers

The Extorr XT systems are ideal for gas analysis, leak detection and vacuum processing applications. These reliable, easy to use RGAs are available with 100, 200, and 300 amu Mass ranges and have a partial pressure detection limit of 5 x 10^{-14} Torr with the optional electron multiplier. The included Pirani gauge allows the entire pump down process, from Atmosphere to UHV, to be monitored with a single instrument. Intelligent filament start up design keeps the filament off until the pressure is low enough for safe operation. Unlike other designs, Extorr's filament, ionizer and electron multiplier can be replaced by the user. The included VacuumPlus software package operates in Windows 2000, XP, 7, 8, or 10 and communicates with the RGA Electronics Command and Control Unit (CCU) using RS-232C or USB.

Compact Rugged Design

A Pirani gauge, a Bayard / Alpert (B/A) Ion gauge, and a Quadrupole mass analyzer are contained on a single 2.75" Conflat® flange. The compact CCU contains all of the RGA electronics. It is powered by the included 24 VDC supply and is easily removed from the probe for high temperature bake outs.

Long-Life Dual Filaments

Dual thoria coated iridium filaments are used for electron emission. The filaments are protected from over pressure by both the Pirani gauge and the B/A Ion gauge to ensure minimum down time. If a filament does burn out, the second filament will allow for normal operation until the filaments are replaced. Extorr offers inexpensive replacement filaments and ionizers that can be changed by the user in a matter of minutes.

Ultra-Sensitive Detection

The XT Series RGAs feature a standard Faraday cup detection system allowing partial pressure measurements from 10^{-4} Torr to 2.4 x 10^{-12} Torr.
With the optional electron multiplier, the partial pressure sensitivity is extended to 1 x 10^{-14} Torr.
Extorr's novel electrometer measures ion currents from 10^{-6} to 10^{-15} amps in a single scan. This huge dynamic range means that very large and very small signals may be measured at the same time.

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Ionizer Degas

The built in degassing function cleans the ionizer by heating its surfaces using electron bombardment. This lowers the ionizer's contribution to background chemical noise and also helps to restore reduced sensitivity caused by contamination. The VacuumPlus software has a timer that automatically ends the degas cycle after 10 minutes.

Extorr VacuumPlus Software

All Extorr RGA systems come standard with the VacuumPlus real time Windows software package. An intuitive graphical user interface makes system setup and data logging quick and easy. The display graph can be set to linear or log format and the data can be scaled using slider bars or axis limit values. The intensity units can be set to Torr, Pascal, or Ion Current. The appearance of the graph can be customized by changing the colors of the background and plot lines and the Grid Lines may be turned on and off. For further analysis, Data Logging files can be saved for easy transfer into spread sheets or other programs. The data logging files are a CSV format that contains plain text ASCII character fields. Data may be saved in a single file or in multiple files. The multiple file mode also has several options to determine when each individual file is created and saved. Graphic images can be saved in a file or copied to the clipboard for importing directly into other windows programs.

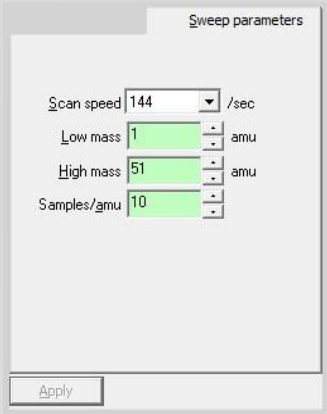
VacuumPlus allows for complete control of mass scale tuning, sensitivity calibration, ionizer setup and electron multiplier gain adjustment.

All RGA settings may be saved in a configuration file. Separate configurations can be created and saved for leak checking or other special test methods and then recalled to repeat the test in the future.

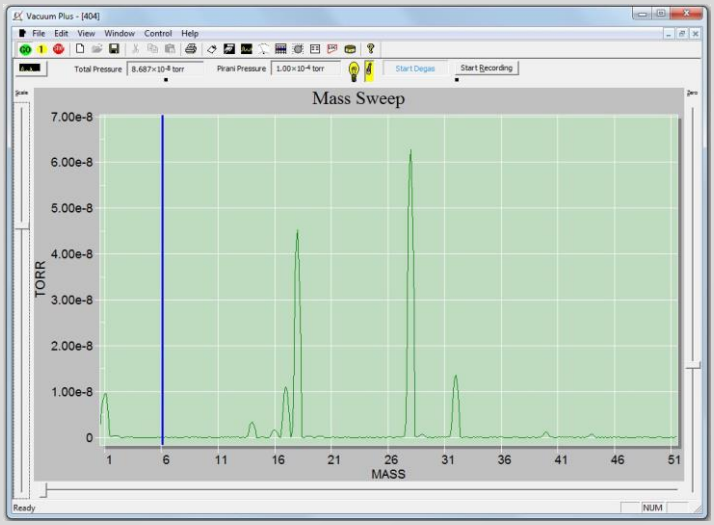
Software updates are available on the Extorr website, www.extorr.com, at no cost to the user.

Analog Sweep Mode

The fundamental mode of any RGA is the analog mass sweep. The system may be set to scan from a start mass to an end mass within the range of the RGA. The scan speed and number of data samples per amu may be changed for the application. The partial pressure versus mass data can be viewed on the graph in real time or saved to a data logging file for additional analysis.



Sweep Parameters Tab



Partial Pressure vs. Mass Graph

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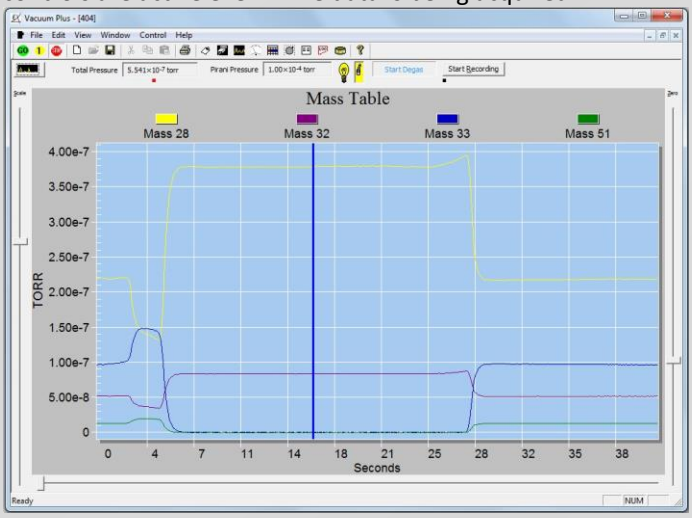
Trend Mode

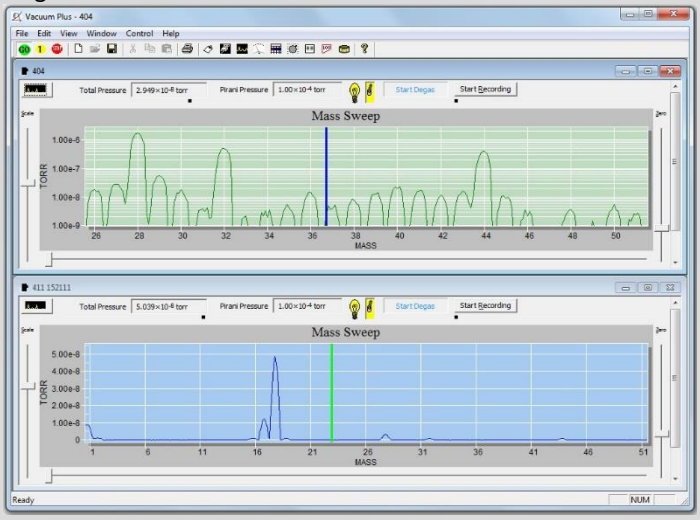
The peak intensities of up to 16 ions of interest may be followed as a function of time. A strip chart of the selected masses can be viewed on the graph or saved to a data logging file for additional analysis. Axis scaling and zoom controls are active even while data is being acquired.



Trend Mode Pressure vs. Time

Multiple Head Operation

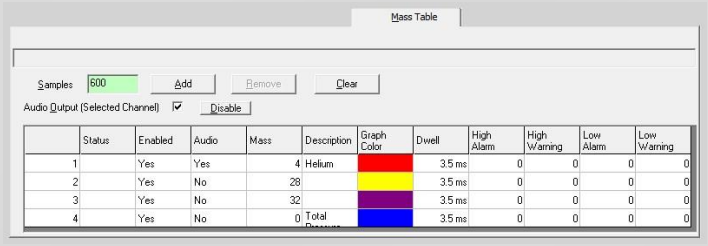
VacuumPlus supports multiple head operation when more than one RGA is needed. Up to 9 CCUs can be controlled in a single window.



Multiple RGA Operation

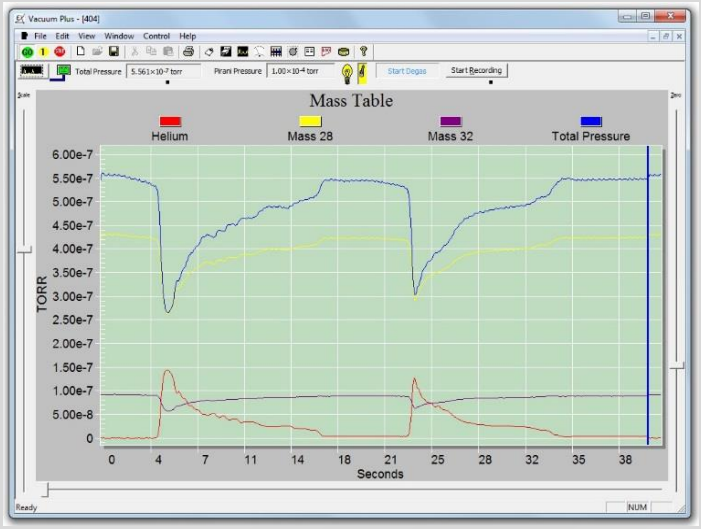
Leak Detect Mode

In the vacuum leak detect mode, a particular gas is monitored over time. Helium is the most common leak detect gas, but any other gas may be used.



Leak Detect Mode Mass Table

The intensity trace of the leak detection gas can be viewed in real time on the graph and an audio tone that changes pitch with the intensity may be enabled.



Leak Detect Mode showing Helium, Air and Total Pressure

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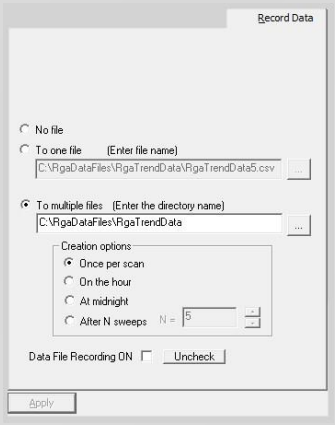
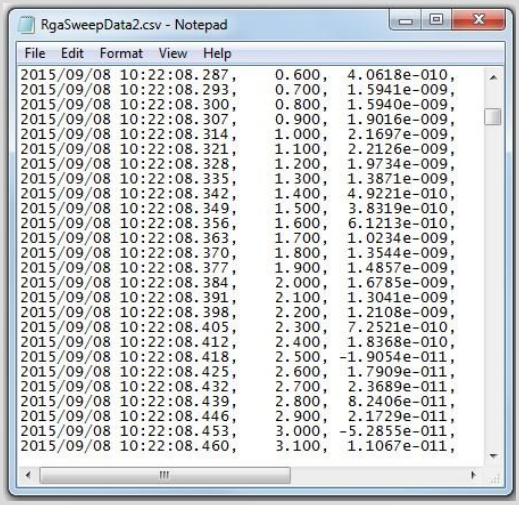
Data Logging

Data files can be saved in a Comma Separated Values (CSV) format for easy transfer to other programs .The CSV file contains plain text ASCII character fields for the Date and Time, the Mass number, and the Intensity. Data can be saved to a single file or in multiple files. The creation options for multiple files include Once per scan, On the hour, At midnight, or After N scans.



Record Data Tab

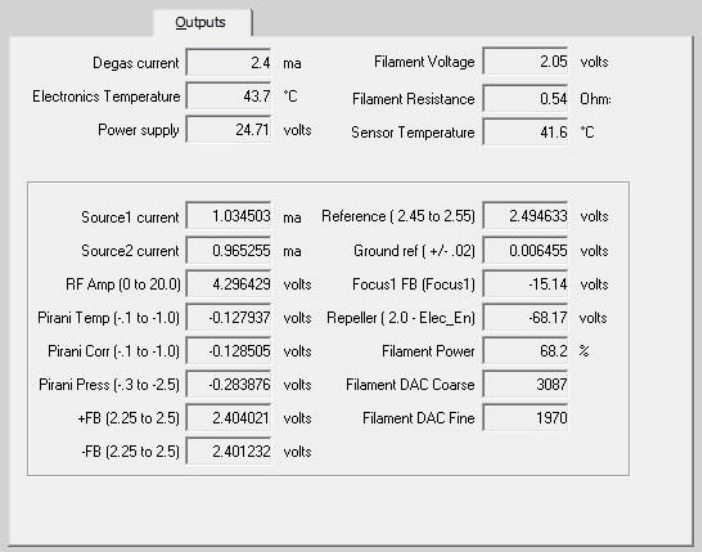
The data logging files can be saved in any local or shared network folder and the CSV files may be viewed or modified in any text editor.



CSV File Date and Time, Mass Number and Intensity Values

Diagnostic Outputs

Although the XT Series is designed for reliable operation, useful diagnostic information is available at the click of the mouse. The Outputs tab shows real-time measurements of the filament voltage, emission current, electronics temperature, and much more. This information will quickly tell you of a filament problem or shorted probe.



Outputs Tab

Performance and Value

The Extorr XT Series RGA it is the only vacuum gauge you will ever need. The combination of flexibility and competitive price make Extorr an outstanding vacuum measurement value.

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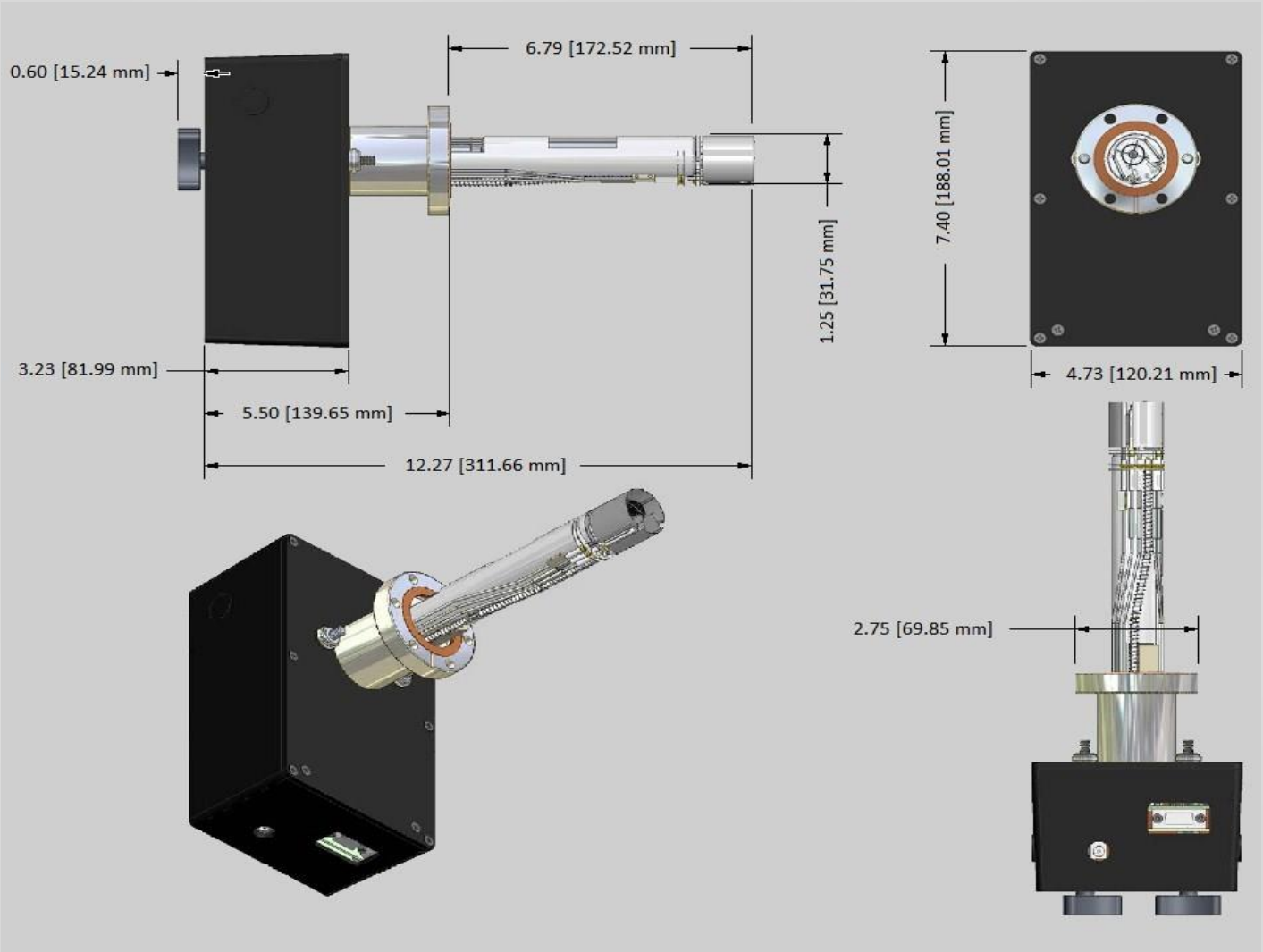

RGA Dimensional Drawing, Inches [mm]

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XT Series Specifications

Mass range

XT100	1 to 100 amu Faraday cup (FC)
XT200	1 to 200 amu Faraday cup (FC)
XT300	1 to 300 amu Faraday cup (FC)
XT100M	1 to 100 amu Faraday cup (FC) and Electron Multiplier (EM)
XT200M	1 to 200 amu Faraday cup (FC) and Electron Multiplier (EM)
XT300M	1 to 300 amu Faraday cup (FC) and Electron Multiplier (EM)

Mass filter type Quadrupole

Detector type Faraday cup (FC), Standard
Electron Multiplier (EM), Optional

Resolution Better than 0.5 amu @ 10% peak height. Adjustable to constant peak width throughout the mass range.

Sensitivity (A/Torr) 6×10^{-4} into Faraday cup. Measured with N_2 @ 28 amu with 1 amu full peak width, 10% height, 70 eV electron energy, 6 eV ion energy and 2 mA electron emission.

Minimum detectable partial pressure

Detector	Dwell	Minimum Detectable partial Pressure
Faraday Cup	200 ms	2.4×10^{-12} Torr * 7.2×10^{-12} Torr **
	5 seconds	5×10^{-13} Torr * 1.5×10^{-12} Torr **
Electron Multiplier	200 ms	1×10^{-14} Torr * 3×10^{-14} Torr **
	5 seconds	2×10^{-15} Torr * 6×10^{-15} Torr **

* Measured by calculating one standard deviation of the baseline noise divided by the sensitivity for nitrogen.
** Measured by calculating three standard deviations of the baseline noise divided by the sensitivity for nitrogen.

Operating range UHV to Atmosphere
Pirani gauge, 10^{-3} Torr to ATM
Ion Gauge below 5×10^{-3} Torr
RGA operation below 10^{-4} Torr

Operating temperature
50 °C Electronics, 100 °C Probe

Bakeout temperature
300 °C (Probe only, CCU removed)

Total pressure measurement
10^{-3} Torr to ATM, Pirani gauge
2×10^{-10} Torr to 5×10^{-3} Torr, B/A type Ion Gauge

Probe Materials SS304, Kovar, Tungsten, Alumina, Iridium, Copper, Nickel, Thoria, Platinum

Ionizer Design Open ion source, electron impact ionization

Filament Dual thoria coated iridium with firmware protection. Built-in 1 to 30W degas ramp-up. Field replaceable.

Electron energy 11 to 150eV, programmable

Ion energy 1 to 12eV, programmable

Focus Voltage 0 to 150V, programmable

Electron emission current
0.1 to 4 mA, programmable

Probe mounting flange
2.75" CF

Minimum tube I.D. 1.375"

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

Minimum PC Requirements
PC running Windows 2000, XP, 7, 8, 10 or 11 with at least 1024 x 768 graphics, keyboard, mouse and 1 Unused USB or RS-232C Port.

Software Included VacuumPlus Windows based application.

Power requirement 24 VDC @ 2.5 Amps.
120/240 VAC adaptor included.

Weight 9 lbs. Total, Probe and CCU.

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