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Application Note Number 4: Extorr XT Series RGA Dynamic Range

Abstract: The Extorr XT Series probe is placed into a turbomolecular pumped system and sweeps are taken. The dynamic range of the system is displayed as the graph scale is changed to show smaller and smaller peaks.

To give an idea of the sort of dynamic range you can expect with the Extorr XT Series RGA, it is placed in a turbomolecular pumped system. As shown in Figure 1, nitrogen (or carbon monoxide) at 28 amu and oxygen at 32 amu are present in the vacuum system background.

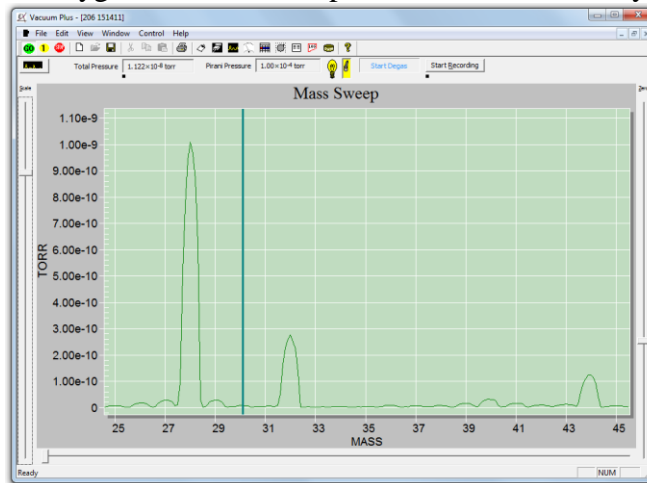


Figure 1

Changing the gain on the graph as in Figure 2, small peaks on the order of 5×10^{-12} Torr are visible in the system.

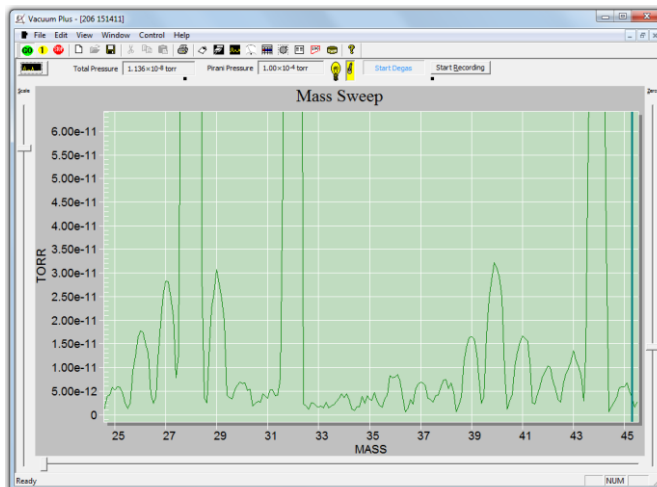


Figure 2

Next air is let into the system. A mass sweep from 27 amu to 47 amu is shown in Figure 3. Increasing the gain on the graph display as in Figure 4, peaks which are about of 5×10^{-12} Torr become visible. These small peaks represent about 5 ppm of the total gas. Clearly, neither N_2 nor O_2 can be seen in the system in the ppm range because relatively large amounts were in the background to start with. Removing mass 28 from the background of a stainless steel system is difficult. Removing mass 32 is somewhat easier. This implies that the limit of detection is determined by the chemical noise in the vacuum system not the RGA, even an RGA with the impressive dynamic range of the Extorr XT System.

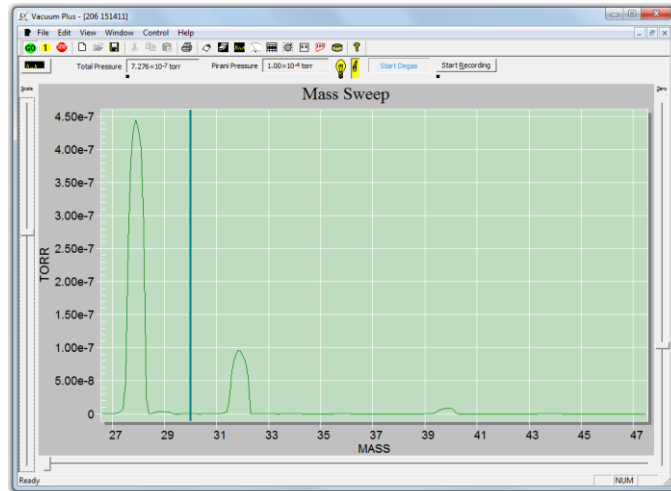


Figure 3

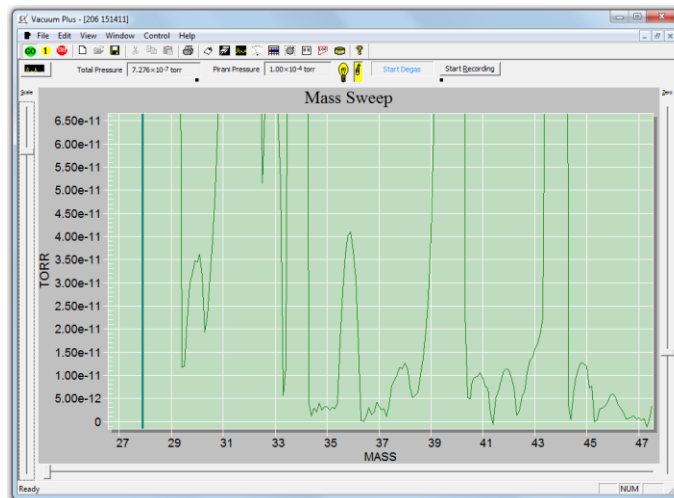


Figure 4