

Portable Instrument Detectors

Technical Note



Portable mass spectrometry is becoming widely used in security and forensic applications to quickly identify on-scene suspicious substances, chemical threats or contraband. These instruments provide quick and reliable analysis when fast answers are needed. Yet portable mass spectrometers pose unique challenges to instrument designers. Accurate analysis needs to be fast, the instrument needs to be small yet robust, and due to power constraints, often the vacuum is poor.

Photonis offers a wide range of standard and custom detectors that are ideal for operating in poor vacuum and elevated pressure environments. Photonis detectors support various mass spectrometry types including quadrupole, and ion trap mass filters. Our focus on high gain, low noise detectors ensures your analysis will be accurate.

Poor Vacuum Operation Electron Multipliers

How do your detectors perform in poor vacuum environments?

Unlike the discrete dynode electron multipliers, Magnum™ detectors from Photonis are specifically designed to operate under poor vacuum, optimize mass resolution, provide longer life, and increase dynamic range in mass spectrometry measurements. Their compact size and high performance makes them ideal solutions for portable and compact analytical instruments. This performance boost is a result of Photonis Spiraltron™ technology that uses six individual spiral multiplier channels fed by a single integral ion collection aperture (Figure 1). The high degree of channel curvature ensures that ion feedback noise is virtually eliminated. This technology ensures that these compact detectors can still achieve high gain while maintaining low noise.

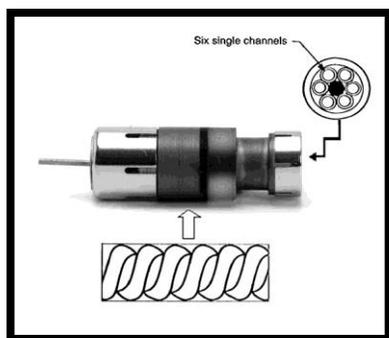


Figure 1

Spiraltron™ Electron Multipliers are specifically designed for poor vacuum applications, such as portable mass spectrometers. Spiraltron™ Electron Multipliers can operate effectively at pressures well into the 10^{-3} Torr range, while compact MegaSpiraltron™ and Daly detectors (Figure 2) can all operate at 10^{-2} Torr.



Figure 2: detectors available for operation in poor vacuum environments

Microchannel Plate-Based Mass Spectrometer Detectors

Photonis is the world's largest manufacturer of microchannel plates (MCPs), made with our proprietary glass formula. We specialize in custom designing our MCPs and offer the greatest range of options including geometries, sizes and coatings. Our Long-Life™ Microchannel Plates provide sustained output up to five times longer than other MCPs. Additionally, MCPs from Photonis provide immunity from magnetic fields, low noise and high electronic gain.

MCPs are available as standalone pieces or complete detectors with mounting hardware. Our specialty XPR MCP detector is designed to perform in poor vacuum environments, making it an ideal choice for residual gas analysis and portable instrumentation. The MCP is encased in the stainless steel housing and is bakeable up to 300°F. This detector works in both Faraday mode and electron multiplication mode.



XPR MCP detector

Additionally, Photonis provides MCPs which are used in single and triple quadrupole analytical instruments. The extended lifetime, magnetic immunity, and high gain are critical factors in these applications. Single quad and triple quad instruments are often used for metabolite analysis, making their reliability and level of efficiency essential.

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