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Pressure & Vacuum Measurement Solutions

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Series 347

STABIL-ION® MODULE

MKS vacuum gauge modules are an ideal solution for applications that do not need front panel displays and controls. These compact, convenient, and reliable modules mount the controller electronics directly on the gauge. The Stabil-Ion module makes available all the features and benefits of the Stabil-Ion gauge in a modular device. The Stabil-Ion module is available with analog output. The Stabil-Ion module is part of the MKS modular family of products that include the Mini-Convectron® module, Micro-Ion® module, the Cold Cathode Gauge module, and the Micro-Ion® Plus module.

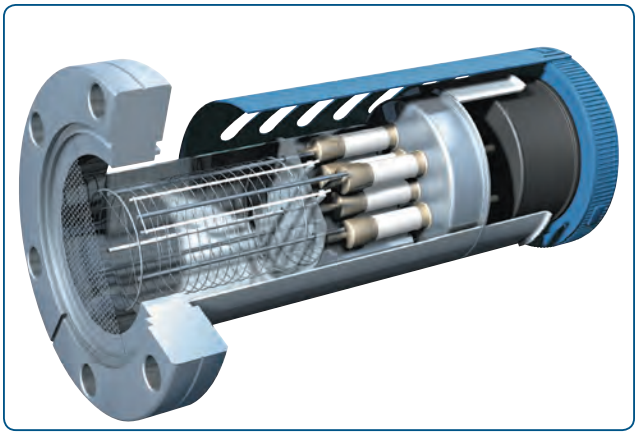
The stability, accuracy, and reliability of the Stabil-Ion gauge are the results of many years of testing and design. Stabil-Ion gauges are the only high vacuum process control gauge that do not change calibration over time. Its patented design is based on a number of enhancements including tensioned filaments, a precision-wound stress-relieved grid, and electrostatic shields. These enhancements result in an ionization gauge that is superior to all other designs in terms of accuracy, repeatability, and gauge-to-gauge reproducibility. The high measurement performance and rugged design of the Stabil-Ion gauge make it the gauge of choice for critical vacuum processes.

Features & Benefits

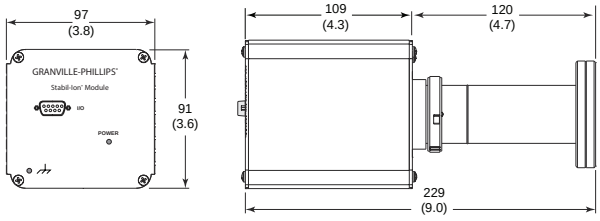
- Superior Stabil-Ion gauge performance in a compact package
- Accurate vacuum pressure measurement from the 10^{-10} Torr range (10^{-10} mbar, 10^{-8} Pa)
- Dual gauge filaments increase equipment uptime
- Analog output interface
- All metal design eliminates glass and provides high immunity to RF noise
- Modular design allows for quick and easy gauge replacement

Description

- **Rugged Stainless Steel Enclosure:** Prevents grid and filament damage during mounting and eliminates the risk of glass breakage.
- **Tensioned Filaments:** Stay precisely positioned to maintain calibration.
- **Electrostatic Shields:** Completely surround the electrode structure - providing a stable, accuracy enhancing electrical environment.
- **Precision-Wound, Stress-Relieved Grid:** Retains its original shape even after high-temperature degassing, thus reducing measurement errors.
- **Vacuum Fired Components:** The gauge is designed, constructed, and processed to minimize outgassing. The gauge is never touched by bare hands during manufacturing.
- **Choice of Range and Dual Filaments:** Available as extended range or ultra-high vacuum with burn-out resistant yttria-coated iridium filaments. Unscheduled down time is avoided by using the second filament as a back-up until the gauge can be replaced during the next routine maintenance cycle.

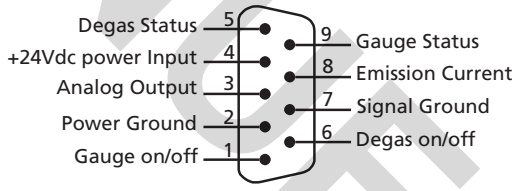


Stabil-Ion® Gauge Cutaway



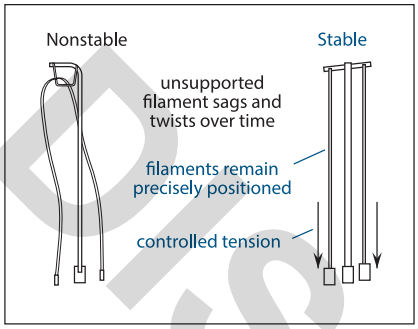
Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in millimeters (inches referenced).

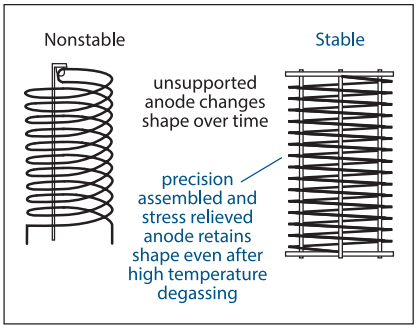


Analog Connector

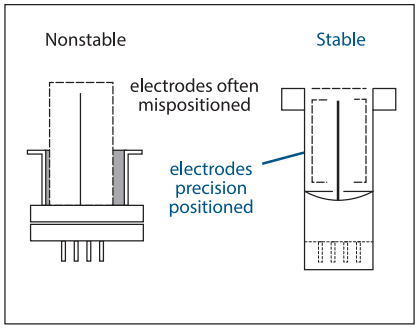
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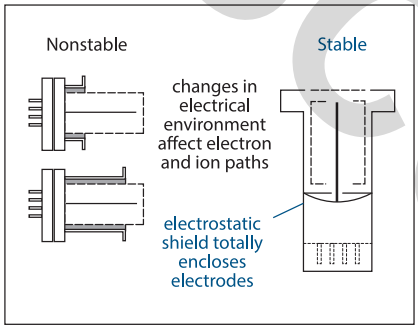
Filament must remain in position over time.



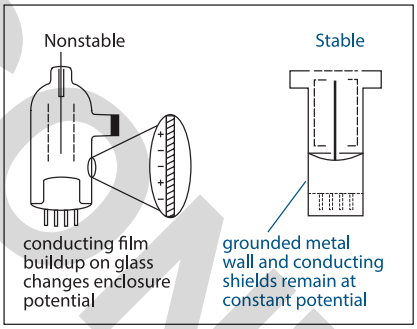
Anode must remain in position over time.



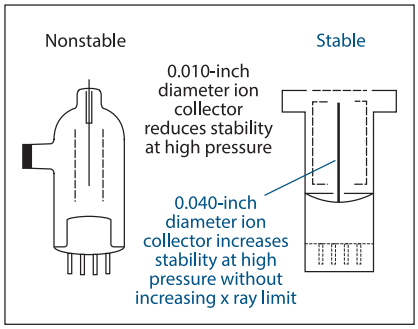
Electrode position relative to wall must not vary gauge to gauge.



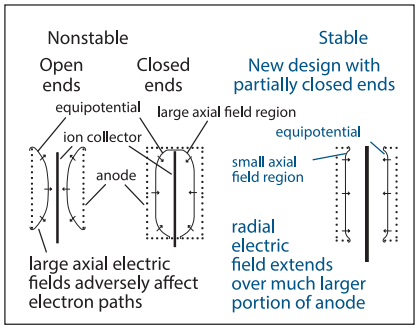
Electrical environment must not change.



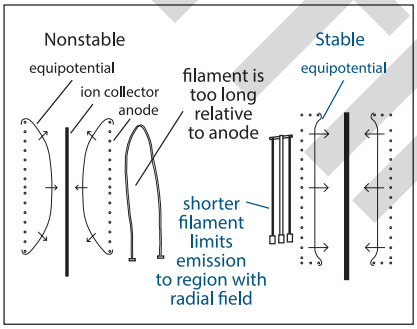
Electrical environment must not change.



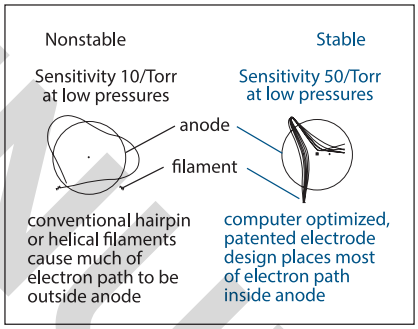
Ion space charge at high pressure must be minimized.



Axial electric fields must be minimized.



Electron emission must be limited to central region of anode.



Electron trajectories must be controlled.

Causes of Unstable Behavior of Typical B-A Gauges vs. Stable Behavior of Stabil-Ion® Gauges —

Long-term, accurate measurement is assured by the unique design and careful manufacturing of the Stabil-Ion Gauges. Here are the more important problems with older BA gauge designs that we removed in order to achieve accuracy over time and gauge-to-gauge. Sophisticated computer simulations of electron and ion trajectories helped greatly in identifying the causes of nonstable behavior.

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Specifications and Ordering Information

Measuring Range for N_2 or Air (See Notes 1, 2)	
UHV Gauge	
Torr	$1x10^{-10}$ to $2x10^{-2}$
Mbar	$1x10^{-10}$ to $3x10^{-2}$
Pa	$1x10^{-8}$ to 3
Extended Range Gauge	
Torr	$2x10^{-10}$ to $2x10^{-2}$
Mbar	$3x10^{-10}$ to $3x10^{-2}$
Pa	$3x10^{-8}$ to 3
Accuracy for N_2 (See Note 4)	±25% of Reading from $1x10^{-8}$ to $1x10^{-4}$
Repeatability (See Note 5)	±10% of Reading from $1x10^{-8}$ to $1x10^{-4}$
Emission Currents	0.1 mA and 4.0 mA
X-ray Limit (See Note 3)	
UHV	$2x10^{-11}$ Torr; $3x10^{-11}$ mbar; $3x10^{-9}$ Pa
Extended Range	$2x10^{-10}$ Torr; $3x10^{-10}$ mbar; $3x10^{-8}$ Pa
Degas	Electron bombardment, 20 W with 2-minute timer
Filament Material	Yttria-coated iridium
Operating Temperature	0°C to 40°C ambient, non-condensing
Non-Operating Temperature	-40°C to 70°C
Gauge Bakeout Temperature	450°C with electronics removed
Power	24 VDC +15%, 75 W maximum, 3.75 A at 20 VDC
Case Material	Aluminum
Approximate Weight	800 gm (1 lb, 12.5 oz)
Materials Exposed to Gas	All vacuum fired, UHV compatible
Internal Volume	73.0 cm^3, (4.45 $inch^3$) to the port screen
Analog Output	1 volt/decade, logarithmic, 0 to 9 VDC
Remote Input Signals	Gauge ON/OFF, degas ON/OFF, set by continuity to ground
Remote Output Signals	Gauge and degas status by open collector transistor
I/O Connector Output	1 volt/decade, logarithmic, 0-9 VDC
Remote Input Signals	Gauge on/off, degas on/off, set by continuity to ground
Remote Output Signals	Gauge and degas status by open collector transistor

Notes:

[1] Measurements will change with different gases and mixtures. Correction factors for common gases are provided in the instruction manual.

[2] Stabil-Ion gauges are not intended for use with flammable or explosive gases.

[3] The X-ray limit is the absolute lowest indication from the gauge. It is not practical to make repeatable measurements near the X-ray limit.

[4] Accuracy (the difference between the gauge reading and a calibrated reference standard) is determined statistically and includes the combined performance of the gauge electronics.

[5] Repeatability refers to the ability of the same module to read the same pressure at different times.

Model Number Matrix

Stabil-Ion Gauge Module with analog output, no relays, Yttria-coated iridium gauge filaments, Torr. To order a Stabil-Ion Gauge Module with analog output, extended range gauge, yttria-coated iridium filaments, and measurement units in Torr, select catalog number 347054-YE-T.

Stabil-Ion Gauge Module:	347054 - Y# - T
Gauge Type:	
Extended Range	E
UHV	U

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