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# Series 354

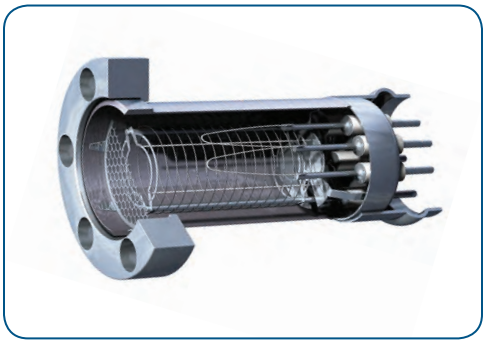
## MICRO-ION® VACUUM GAUGE MODULE

The MKS Micro-Ion® Gauge Module combines the world's smallest ionization gauge with the control electronics to create a compact, convenient, reliable, and cost-saving solution for many high vacuum applications. The Micro-Ion gauge includes many features that provide for a much more accurate and repeatable measurement than traditional Bayard-Alpert gauges from 5 x $10^{-2}$ Torr to $10^{-9}$ Torr. The all-metal package provides a rugged enclosure and a high level of immunity to electrical noise. High performance in a small volume is achieved though a number of enhancements including a patented dual ion collector design that optimizes electron motion and ion collection.

Modules are available with analog output, RS-485 or DeviceNet™ interfaces. The analog output and DeviceNet versions have a digital display option for convenient, point-of-use pressure readout.

## Features & Benefits

- Compact, convenient, reliable, cost-saving vacuum measurement
- Vacuum pressure measurement to $10^{-9}$ Torr ($10^{-9}$ mbar, $10^{-7}$ Pa)
- Dual filaments increase equipment uptime
- Ultra-clean construction allows rapid response during pump down
- Rugged, all-metal, RF and noise-immune module is CE compliant
- Optional local display aids in setup and diagnostics
- RS-485 and DeviceNet digital interfaces available
- Provides increased long term stability over traditional designs



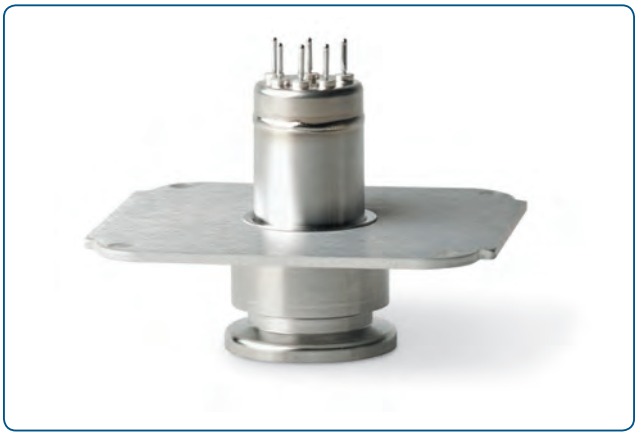
*Cross section of the Micro-Ion® Vacuum Gauge*

# Description

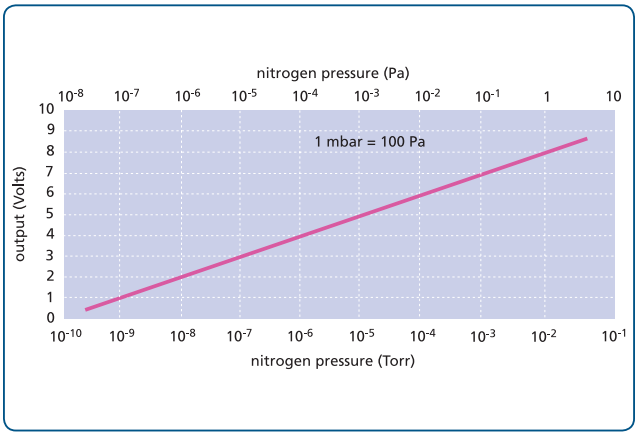
- **Wide Measurement Range:** Allows vacuum system performance to be monitored continuously from 5 x $10^{-2}$ to $10^{-9}$ Torr (7 x $10^{-2}$ to $10^{-9}$ mbar, 7 to $10^{-7}$ Pa).
- **Dual Filaments:** Dual, burn-out resistant yttria-coated iridium filaments provide long gauge life. Unscheduled downtime is avoided by using the second filament as a back-up until the gauge can be replaced during regular maintenance procedures.
- **Ultra-Clean Construction:** Micro-Ion gauges are designed, constructed and processed to minimize outgassing. All components are vacuum fired and assembled in a Class 100 cleanroom environment. This assures rapid, repeatable response during vacuum chamber pumpdown.
- **Cooler Operation:** At only 8% of the power consumption of a glass or nude gauge, the Micro-Ion gauge generates much less heat to disturb a process or experiment.
- **Analog Output Version:** The basic version provides an easy-to-use analog output signal that is linear with the logarithm of the pressure. An optional large green LED display provides point-of-use pressure indication.
- **Digital Interface Version:** Modules are available with an RS-485 or DeviceNet interface for easy compatibility with computer controlled processes. The digital interface versions have a setpoint relay allowing for control of other vacuum equipment or to provide a safety interlock.
- **All-Metal Package:** Provides high level of immunity to RF noise and is CE compliant.
- **Replaceable Gauge:** The Micro-Ion gauge can be quickly and easily replaced using only a screwdriver.
- **Wide Selection of Vacuum Fittings:** Simplifies installation on your vacuum system.
- **Long Term Stability:** End caps which control ion flow, welding grid windings every 180°, and the all metal housing provide repeatable measurements over time.




*Micro-Ion® Vacuum Gauge Module*



*Replacement Gauge*




*Analog Output Signal*

# Specifications

| | |
|---|---|
| **Measurement Range for Air and $N_2$** See Notes (1), (2), (3) | |
| Torr | 1 x $10^{-9}$ to 5 x $10^{-2}$ |
| mbar | 1 x $10^{-9}$ to 7 x $10^{-2}$ |
| Pa | 1 x $10^{-7}$ to 7 |
| **Emission Current** | 0.1 or 4 mA |
| **Degas** | Electron bombardment, 3 W with 2-minute timer |
| **Overpressure Protection** | Gauge turns off at factory set upper pressure limit |
| **Weight** | 370 gm (12 oz) with NW16KF flange |
| **Power Required** | 24 VDC ±15%, 12 W max |
| **Operating Temperature** | 0°C to 40°C ambient, non-condensing |
| **Non-Operating Temperature** | -40°C to 70°C |
| **Case Material** | Aluminum extrusion |
| **CE Compliance** | |
| EMC Directive | 2004/108/EC; EN61326-1 |
| Low Voltage Directive | 2006/95/EC; EN61010-1 |
| **Analog Output Version** | 1 Volt/decade, logarithmic, 0 to 9 V |
| Filament Control | Toggle switch on top of module |
| Input Signals | Filament on/off, degas on/off and emission current are set by continuity to ground |
| Output Signals | Filament and degas on/off status are determined by an open collector transistor |
| Connector | 9-pin D male |
| Display (option) | 2 digits plus exponent, green LED |
| **RS-485 Interface Version** | RS-485 with one setpoint relay |
| Parameters Adjustable | Filament on/off, degas on/off, emission current select, filament select, setpoint (value, direction, and hysteresis) |
| Baud Rate | 19200 Baud (default value) |
| Data Format | ASCII, 8 data bits, one stop-bit, no parity, no handshake (default values) |
| Relay Configuration | Single-pole, double-throw (SPDT) |
| Relay Contact Rating | 1 A at 30 VDC resistive load, 0.5 A at 125 VAC non-inductive |
| Connector | 9-pin D male |
| **DeviceNet Interface Version** | |
| Messaging | Polled I/O and explicit |
| Data Rates | 125, 250 or 500 kbaud, switch selectable |
| Address | 0 to 63, selected by using the Low and High address switches |
| **Micro-Ion Gauge** | |
| Sensitivity | 20/Torr, 15/mbar, 0.15/Pa |
| X-ray Limit | < 3 x $10^{-10}$ Torr, < 4 x $10^{-10}$ mbar, < 4 x$10^{-10}$ Pa See Note (3) |
| Filament Materials | Yttria-coated iridium or tungsten See Note (4) |
| Other Materials Exposed to Gas | 304 stainless steel, alumina, tantalum, tungsten, CuAg eutectic, Kovar® |
| Internal Gauge Volume | 10.8 $cm^3$ (0.66 $in.^3$) to the port screen |
| Gauge Bakeout Temperature | 200°C maximum (with electronics removed) |

**Notes:**

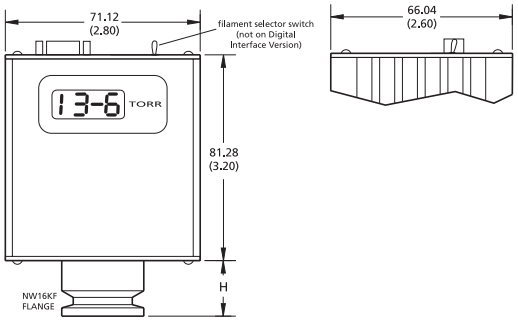
(1) Measurements will change with different gases and mixtures. Correction parameters for common gases are provided in the instruction manual.

(2) Micro-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) Tungsten filaments are for applications involving gases containing fluorine, chlorine, or other gas species that poison yttria-coated iridium filaments. Tungsten filaments are not recommended for general vacuum applications because they may burn out when exposed to high pressures, including but not limited to $H_2O$.

# Ordering Information

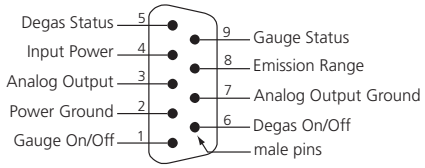



| Vacuum Connection | Dim. H |
|---|---|
| 1/2 inch 8 VCR-type female | 58.4 (2.3) |
| 1.33 inch (NW16CF) Conflat-type | 43.2 (1.7) |
| 2.75 inch (NW35CF) Conflat-type | 43.2 (1.7) |
| NW16KF | 20.3 (0.8) |
| NW25KF | 20.3 (0.8) |
| NW40KF | 20.3 (0.8) |

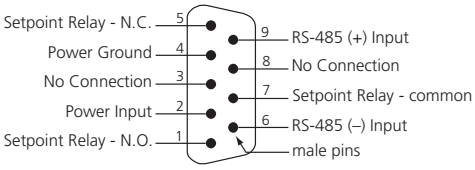
## Dimensional Drawing —

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

**Analog Output Version, No Setpoints**




**Digital Interface Version, One Setpoint**




## Electrical Connectors —

*Analog Output and Digital Interface Versions*

# Model Number Matrix

Choose a basic model, filament type, vacuum connection, and measurement unit to create your catalog number. For example to order a Micro-Ion Module with 3-digit display, analog output, yttria-coated iridium filaments, NW25KF fitting, and display in Torr: select catalog number 354002-YE-T.

**Micro-Ion Modules:**

| | |
|---|---|
| **Analog Output, No Setpoint Relays** | |
| No digital display | 354001 - ## - # |
| 3-digit display | 354002 - ## - # |
| **RS-485 Interface, 1 Setpoint Relay** | |
| No digital display (Torr only) | 354005 - ## - # |
| **DeviceNet Interface, 2 Setpoint Relays** | |
| No digital display | 354009 - ## - # |
| 3-digit display | 354006 - ## - # |

| | |
|---|---|
| **Filament** | |
| Yttria-coated iridium | Y |
| Tungsten | T |
| **Vacuum Connection** | |
| NW16KF | D |
| NW25KF | E |
| NW40KF | K |
| 1.33-inch (NW16CF) Conflat®-type | F |
| 2.75-inch (NW35CF) Conflat®-type | G |
| 1/2 inch 8 VCR-type male | H |
| **Measurement Units** | |
| Torr | T |
| mBar | M |
| Pascal | P |

# Replacement Gauges

Add the options below to create your catalog number.

| | 354003 - ## |
|---|---|
| **Filament** | |
| Yttria-coated iridium | Y |
| Tungsten | T |
| **Vacuum Connection** | |
| NW16KF | D |
| NW25KF | E |
| NW40KF | K |
| 1.33-inch (NW16CF) Conflat-type | F |
| 2.75-inch (NW35CF) Conflat-type | G |
| 1/2 inch 8 VCR-type male | H |


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Series 354 - 4/16
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