



Series 354

Quick Start Guide for Series 354 Micro-Ion® Gauge Modules with Analog Output or RS-485 Digital Interface, Tungsten or Yttria-coated Iridium filaments, and pressure readout in Torr, mbar, or Pascal

Quick Start Guide p/n 354079-Rev. E

NOTICE

More detailed instructions regarding installation, operation, and service of the Series 354 Micro-Ion Gauge Module are provided in the Instruction Manual, p/n 354004 for the Analog Output version, or 354008 for the RS-485 version, which can be downloaded from the MKS website. Go to: www.mksinst.com and search for 354004 or 354008.

This Quick Start Guide is for the following Series 354 Micro-Ion Modules:



Figure 1: Micro-Ion Module with Analog Output (p/n 354002 with digital display shown)



Figure 2: Micro-Ion Module with RS-485 Digital Interface (p/n 354005 shown)

Catalog Numbers for Micro-Ion Modules covered in this Quick Start Guide and Instruction Manuals 354004 & 354008

Modules with Analog Output:

- 354001-XX-X and 354002-XX-X
- 354019, 20354014, 20354015

Modules with RS-485 Digital Interface:

- 354005-XX-X, 354029-XX-X, 20354017-XX-X

General Description

The Series 354 Micro-Ion Gauge Modules, shown above, are modular instruments consisting of a Micro-Ion vacuum gauge and electronics enclosure capable of measuring vacuum pressures from 1×10^{-9} Torr to 5×10^{-2} Torr (10^{-9} mbar, 10^{-7} Pa).

Benefits of the design include:

- Compact, Convenient, Cost Saving Vacuum Measurement
- Generates less heat than typical glass ionization gauges
- Dual filaments increase equipment uptime
- Rugged all-metal, RF and noise-immune module is CE compliant
- Gauge can easily be replaced

The RS-485 digital interface version provides industry-standard digital RS-485 communications over networks as well as direct connections to a personal computer. The setpoint relay can be easily controlled via the RS-485 digital interface.

The setpoint relay in the RS-485 version (354005) can be used to control various devices such as a safety interlock, valve, digital input for a scanner, or programmable logic controller. The setpoint relay trip points can be set to customized pressure settings to turn power ON or OFF to the appropriate device.

Intended Use

The intended use of this instrument is to measure vacuum pressure in the range of 1×10^{-9} Torr to 5×10^{-2} Torr. This device is to be used only in accordance with the instructions in this Quick Start Guide and the Instruction Manual, p/n 354004 or 354008.

Improper Use

- Removal of any factory installed components
- Modifying any factory installed components
- Removal of any labeling or warranty seals
- Operation of this device in any condensing vapor or liquid environment
- CE Conformity: The manufacturer's declaration becomes invalid if the operator modifies the original product or installs additional components.

Safety Notices

These safety precautions must be observed during all phases of installation, operation, and service of this product. Failure to comply with these precautions or with specific warnings elsewhere in this instruction guide violates safety standards of design, manufacture, and intended use of the instrument. MKS Instruments, Inc./Granville-Phillips disclaims all liability for the customer's failure to comply with these requirements.

These instructions do not and cannot provide for every contingency that may arise in connection with the installation, operation, or maintenance of this product. If you require further assistance, please contact MKS, Granville-Phillips Division at the address given on this instruction guide.

Safety Symbols

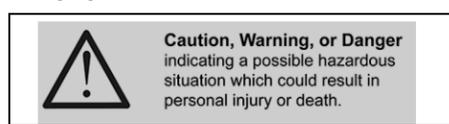


Figure 3: Safety Symbol on the Micro-Ion Module

CAUTION

General Safety Notices

Do not use this instrument to measure the pressure of flammable or explosive gases. Using the Micro-Ion Vacuum Gauge Module to measure the pressure of flammable or explosive gases can cause a fire or explosion resulting in severe property damage or personal injury.

Exposing the Micro-Ion Vacuum Gauge Module to moisture can cause fire or electrical shock resulting in severe property damage or personal injury.

To avoid exposing the Module to moisture, install it in an indoor environment. Do not install the Module in any outdoor environment.

To avoid measurement error or product failure due to over pressurization, install pressure relief valves or rupture disks in the system if pressure substantially exceeds 1000 Torr (1333 mbar, 133 kPa).

Improper grounding could cause product failure or personal injury. Follow ground network requirements for the facility. Maintain all exposed conductors at Earth ground. Make sure the vacuum port to which the module is mounted is properly grounded.

This document is not a substitute for complete safety and installation guidance. Consult the appropriate Instruction Manual (354004 or 354008) for safety notices and information regarding installation and use of this product.

High Voltage

WARNING

Electrical Shock or Personal Injury

The service and repair information in this instruction guide is for the use of Qualified Service Personnel. To avoid possible electrical shock or personal injury, do not perform any procedures in this manual or perform any servicing on this product unless you are qualified to do so.

Grounding Requirements

WARNING

High Voltage and Proper Grounding

All components of a vacuum system used with this or any similar high voltage product must be maintained at Earth ground for safe operation.

Be aware that grounding this product does not guarantee that other components of the vacuum system are maintained at Earth ground.

Verify that the vacuum port to which the Series 354 Micro-Ion Module is mounted is electrically grounded. It is essential for personnel safety as well as proper operation that the envelope of the gauge be connected to a facility ground.

Connect power cords only to properly grounded

Over-pressure Conditions

WARNING

Failure to install appropriate pressure relief devices for high-pressure applications can cause product damage or personal injury.

Install appropriate pressure relief devices for automatic backfilling or other applications in which malfunction or normal process conditions can cause high pressures to occur.

Suppliers of pressure relief valves or disks can be located via an online search and are listed on Thomas.net under "Relief Valves" and "Rupture Disks". **Confirm that these safety devices are properly installed before installing and operating the Micro-Ion Module.**

Location of the Micro-Ion Gauge Module on the Vacuum Chamber

Use the following the guidelines to determine the best location for the Micro-Ion Module on your vacuum system.

- For greatest accuracy and repeatability, locate the Module in a stable, room-temperature environment. Ambient temperature should never exceed 40 °C (104 °F) operating, non-condensing, or 70 °C (158 °F) non-operating.
- Locate the Module away from internal and external heat sources and in an area where ambient temperature remains reasonably constant. Do not mount the Module above other equipment that generates excessive heat.
- Do not locate the Module near the pump, where gauge pressure might be lower than system vacuum pressure.
- Do not locate the Module near a gas inlet or other source of contamination, where inflow of gas or particulates causes atmospheric pressure to be higher than system atmosphere.
- Do not locate the Module where it will be exposed to corrosive gases such as mercury vapor or fluorine.

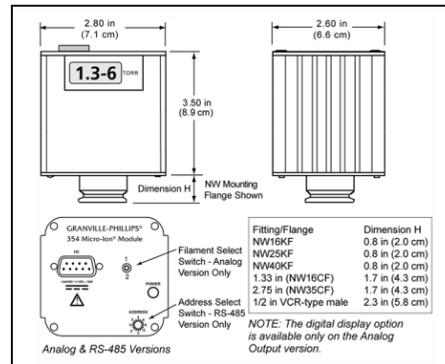


Figure 4: Dimensions of the Micro-Ion Module

Attach the Micro-Ion Module to the Vacuum Chamber

Connect the Micro-Ion Gauge to the vacuum system flange using the appropriate gasket and mounting hardware.

Orient the Micro-Ion Module to prevent condensation of process vapors on the internal surfaces through line-of-sight access to its interior. If vapor condensation is likely, orient the port downward to help liquids drain out.

Do not use a compression mount/quick connect fitting for positive pressure applications.

For an NW16KF, NW25KF or NW40KF flange:

The NW##KF style flange requires a self-centering O-ring between mating flanges. Use a metal clamp and tighten the clamp to compress the mating flanges together. Do not use a plastic clamp. See the Grounding Requirements.

Attach the Micro-Ion Gauge to the mating NW-style connector on the vacuum chamber. Use a new seal and the appropriate tools to tighten the metal clamp.

For an NW16CF (1.33 inch) or NW35CF (2.75 inch) flange:

Attach the gauge to the mating 2-3/4 inch flange on the vacuum chamber. Use a new copper seal between the flanges - do not use a previously used seal. If the flanges have leak test grooves, be sure they are properly aligned.

Finger tighten all 6 bolts.

Use the appropriate tools to tighten the 6 bolts. Tighten the bolts in a circular pattern (such as 1, 3, 5, 2, 6, 4, 1, 3, 5, 2, 6, 4) until the flanges are in contact. After contact, torque each bolt to 12 lb ft.

For a VCR-type fitting:

Remove the bead protector cap from the fitting.

Place the gasket into the female nut.

Assemble the components and tighten them to finger-tight.

While holding a back-up wrench stationary, tighten the female nut 1/8 turn past finger-tight on 316 stainless steel or nickel gaskets, or 1/4 turn past finger-tight on copper or aluminum gaskets. **Do not twist the gauge to tighten the fitting.**

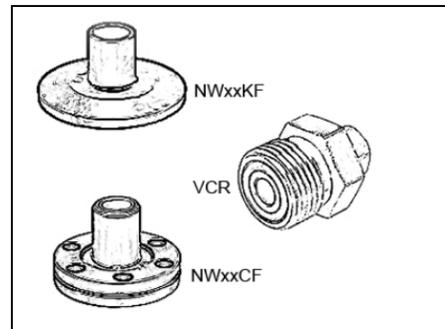


Figure 5: Common Vacuum Connection

Grounding Requirements

WARNING

Improper grounding could cause product failure, property damage, or serious personal injury.

To reduce the risk of product failure, property damage, or serious personal injury, follow the ground network requirements for the facility.

- Maintain all exposed conductors at Earth ground.
- Ground the module housing to the vacuum chamber as instructed below.
- Make sure the vacuum port to which the module is mounted is properly grounded.

The module generates 180 Vdc internally during normal operation and up to 250 Vdc during Micro-Ion gauge degas. It is essential for personnel safety and proper operation of the module that the envelope of the gauge be properly connected to a facility ground.

Chassis Ground

If the module has a VCR type fitting or ConFlat flange, the module chassis will be properly grounded via the vacuum chamber connection.

If the gauge has an NWxxKF flange, check continuity between the gauge and the vacuum chamber.

If the fitting requires a rubber gasket, rubber O-ring, Teflon tape, or other material that prevents metal-to-metal contact between the base of the gauge and the vacuum chamber, attach a ground connection between the Micro-Ion Gauge and the vacuum chamber.

1. Attach a metal hose clamp or other metal clamp to the gauge stem.
2. Install a 3.31 mm² (12 AWG) or larger copper wire between the clamp and a metal ground lug, bolt, or stud on the vacuum chamber.

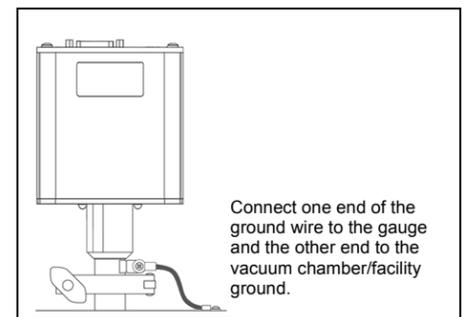


Figure 6: Ground the Micro-Ion Gauge to the Vacuum Chamber

Power Supply Requirements

Provide power as specified below and in Figure 7. Operating current is the steady-state current during normal operation with the ion gauge ON. The Micro-Ion gauge will not activate and an emission error will occur if insufficient power is supplied during Micro-Ion gauge activation.

Required input power is 24 Vdc, ±15%, 12 W max.

Table 1: Analog Output version with 9-pin Connector

Connector Pin	Input Voltage	Operating Power
4	24 Vdc (±15%)	12 W max

Table 2: RS-485 version with 9-pin Connector

Connector Pin	Input Voltage	Operating Power
2	24 Vdc (±15%)	12 W max

Electrical Connections and Power Requirements

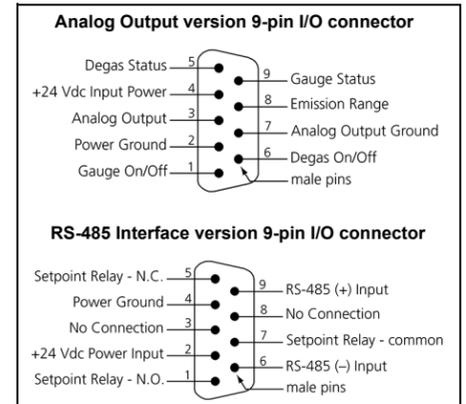


Figure 7: 9-pin I/O Connectors

Table 3: Analog Output version I/O Connector Pin Descriptions

Pin #	Description	Function
1	Gauge On/Off	The application of a continuous ground is required for an "ON" condition. Removal of the ground turns the gauge OFF.
2	Power Ground	Use for input power return, IG ON/OFF, Degas ON/OFF, and status outputs.
3	Analog Output	Used in conjunction with Pin 7, Analog Output Ground.
4	Input Power	+24 Vdc ±15%, 12 watts max. Protected against reversal and overvoltage.
5	Degas Status	Open collector transistor (grounded emitter) rated at 40 V max. VCE, 50 mA max. Transistor OFF = degas OFF, transistor ON = degas ON.
6	Degas ON/OFF	Application of Ground turns degas "ON".
7	Analog Output Ground	Use in conjunction with the Analog Output only.
8	Emission Current	Application of a ground increases emission current from 100 µA to 4 mA.
9	Gauge Status	Open collector transistor (grounded emitter) rated at 40 V max. VCE, 50 mA max. Transistor OFF = Gauge OFF, transistor ON = Gauge ON. NOTE: For Catalog Numbers 20354014 and 354019, Pin 9 is for FILAMENT SELECT. Assert low (to Power Ground, Pin 2) to select FILAMENT 2. Allow this pin to float high or pull to logic high level for FILAMENT 1 to be selected. This function is active only if the FILAMENT SELECT switch is in the REMOTE position. No Gauge Status line is provided for these products.

