About these instructions

These instructions explain how to install the Granville-Phillips® Series 355 Micro-Ion® gauge. The gauge measures vacuum pressure by producing a current that is proportional to the density of the gas inside the gauge tube.

The gauge operates with an ionization gauge controller. The gauge connects to a Granville-Phillips Series 358 controller or a Series 355 cable adaptor. When connected to the cable adaptor, the gauge operates with a Granville-Phillips Series 303, 307, 330, 338, 340, or 350 controller or Varian senTorr® controller.

⚠ WARNING

Using the gauge to measure the pressure of flammable or explosive gases can cause a fire or explosion resulting in severe property damage or personal injury.

Do not use the gauge to measure the pressure of flammable or explosive gases.

Preventing gauge contamination

To avoid contaminating the gauge, follow these guidelines while unpacking and installing the gauge:

- Wear sterile gloves and observe standard cleanroom practices.
- Connect the gauge to the vacuum system *immediately* after you've removed the gauge from its protective bag.
- Do not touch the vacuum connection port.
- Do not scratch the vaccum port seal surfaces.
- After removing the cap plug, handle the gauge carefully to avoid damaging the port screen.

Mounting and orientation

The gauge may be mounted in any orientation.

- Locate the gauge in the place within the vacuum system where pressure measurement is most important. Valves or other constrictions near the gauge may cause erroneous pressure readings.
- Locate the gauge where ambient temperature remains relatively constant.
- Do not locate the gauge near a heat source or strong magnetic field.

- Do not locate the gauge near the pump, where gauge pressure might be lower than normal vacuum pressure.
- Do not locate the gauge near a gas inlet or other source of contamination, where inflow of gas or particulates causes atmospheric pressure to be higher than system atmosphere.

Figure 1 Dimensions of 355 Micro-Ion gauge

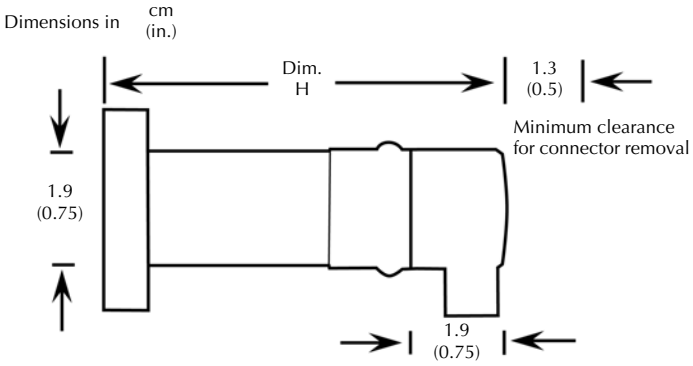


Table 1 355 Micro-Ion gauge fittings

Fitting	Dim. H	
	cm	in.
VCR® type fitting	8.1	3.2
KF flange	7.3	2.9
ConFlat® flange	7.3	2.9
Compression fitting	9.4	3.7

⚠ CAUTION

Twisting the gauge to tighten the fitting to the vacuum chamber can damage the gauge's internal connections.

- Do not twist the gauge to tighten the fitting.
- Use appropriate tools to tighten the fitting.

VCR® type fitting

Remove the plastic or metal bead protector cap from the fitting.

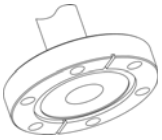
a. If a gasket is used, place the gasket onto the male nut.
b. Assemble the components and tighten them finger-tight.
c. While holding a back-up wrench stationary, tighten the male nut 1/8 turn past finger-tight on 316 stainless steel or nickel gaskets, or 1/4 turn past finger-tight on copper or aluminum gaskets. *Do not twist the gauge to tighten the fitting*.

KF flange

The NW mounting system requires O-rings and centering rings between mating flanges.

a. Tighten the clamp to compress the mating flanges together.
b. Seal the O-ring.

ConFlat® flange



To minimize the possibility of leaks with ConFlat flanges, use high strength stainless steel bolts and a new, clean stainless steel with OFHC copper gasket.

a. Avoid scratching the seal surfaces.
b. Finger tighten all bolts.
c. Use a wrench to continue tightening 1/8 turn at a time in crisscross order (1, 4, 2, 5, 3, 6) until flange faces make contact. Further tighten each bolt about 1/16 turn.

Compression fitting

Do not use a compression fitting for positive pressure applications such as backfilling.

⚠ WARNING

Using a compression fitting for positive pressure applications can cause forcible ejection of the fitting, resulting in severe property damage or personal injury.

To avoid forcible ejection of the fitting, do not install or use a compression fitting for backfilling or other applications where positive pressure exists within the gauge.

The gauge port is designed to fit a standard 1/2-inch compression/quick connect mounting such as an Ultra-Torr® fitting.

a. Apply a light film of vacuum grease, such as Apiezon® grease, to ensure proper sealing.
b. Insert the gauge tube port into the compression fitting and finger tighten the press ring.

Connect cable to cable adaptor or controller

The gauge can connect to a Granville-Phillips Series 355 cable adaptor or a Series 358 ionization gauge controller. Use Micro-Ion cable supplied by Granville-Phillips. Clamp all gauge cables to the vacuum station to minimize strain that will be transmitted to the gauge pins if the vacuum station and controller move relative to each other.

Connections to cable adaptor

The cable adaptor includes a panel-mount or bulkhead-mount control box with 0.9 m (3 ft.) hardwired cable to the controller and a 0.9 m (3 ft.) cable extension for the gauge. To connect cable to a controller with a remote power supply, refer to the instructions that are shipped with the controller.

Connections to Series 358 controller

Use Micro-Ion cable to connect the gauge to a Series 358 controller. The cable is available in 3 m (10 ft), 8 m (25 ft.) or 50 m (50 ft.) lengths. To connect cable to the controller, refer to the instructions that are shipped with the controller.

Gauge pins

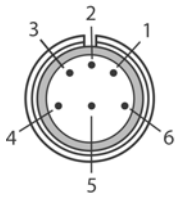
Figure 2 illustrates the 6-pin miniature tube pinout.

WARNING

Touching the gauge pins while the gauge is connected to a controller can cause a high−voltage electrical discharge through a gas or plasma, resulting in severe property damage or personal injury.

- Do not touch the gauge pins while the gauge is connected to a controller.
- Before operating the gauge, make sure the cable connector completely covers the gauge pins.

Figure 2 6-pin miniature tube pinout



Pin	Description
1	Filament 2
2	Filament Common
3	Filament 1
4	Grid
5	Collector
6	Grid

Ensure proper grounding

WARNING

Improper grounding could cause a high−voltage electrical discharge through a gas or plasma, resulting in severe product damage or serious personal injury.

Follow ground network requirements for the facility.

- Maintain all exposed conductors at earth ground.
- Make sure the vacuum port to which the gauge is mounted is properly grounded.
- Make sure all exposed conductive parts of the gauge, controller, and vacuum chamber are properly grounded.

Make sure all exposed conductive parts of the gauge, controller, and vacuum chamber are properly grounded.

Degas

Electron bombardment degas of gauge electrodes removes gas that has been absorbed into the internal surfaces of the gauge. During degas, emission current increases to 15 mA and the grid bias increases to 250 VDC, resulting in an increased grid temperature to drive off adsorbed gases.

During degas, you must turn on the pump to remove the gases from the internal surfaces of the gauge.

The control enables pressure measurement during degas and automatically generates electron bombardment power for degas whenever emission current is 10 mA.

- You cannot degas the gauge by resistance heating the grid.
- Do not degas the gauge unless pressure is lower than 5×10^{-5} Torr (6.66×10^{-5} mbar, 6.66×10^{-3} Pa).

WARNING

Performing a degas while pressure is higher than 5×10^{-5} Torr (6.66×10^{-5} mbar, 6.66×10^{-3} Pa) can cause a high−voltage electrical discharge, resulting in severe product damage or personal injury.

Before performing a degas, make sure system pressure is lower than 5×10^{-5} Torr (6.66×10^{-5} mbar, 6.66×10^{-3} Pa).

Bakeout

To achieve an ultraclean state, you can bake the gauge at a temperature between 150° and 200° C (302° and 392° F). Disconnect gauge cable if the gauge will be baked at a temperature higher than 150° C (302° F).

Physical specifications

Mounting orientation	Any
Materials	Vacuum fired, UHV compatible
Envelope	304L stainless steel
Collector	Tungsten
Grid	Tantalum
Filaments	Tungsten or yttria-coated iridium
Weight	0.1 kg (4 oz.) with 1.33 in ConFlat flange (NW16CF)
Internal volume	10.8 cm^3 (0.66 $in.^3$)

Operating specifications

X ray limit	3×10^{-10} Torr (3.99×10^{-10} mbar, 3.99×10^{-8} Pa) maximum
Sensitivity for N_2	20/Torr (15/mbar, 0.15/Pa)
Electron bombardment degas	3 W at 250 to 330 V
Bakeout temperature, nonoperating	200° C (392° F) maximum with cable disconnected 150° C (302° F) maximum with cable connected
Operating temperature	0 to 50° C (32 to 122° F) ambient, noncondensing
Filament emission current	4 mA maximum 15 mA for electron bombardment degas
Filament bias potential	+30 V
Filament heating voltage	1.2 V (2.3 V maximum)
Filament heating current	2.0 A (3.0 A maximum)
Collector potential	0 V
Grid potential	+180 V

Series 355

Series 355 Vacuum Gauge
Installation Instructions

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More detailed instructions regarding installation, operation, and service of the Micro-Ion System are provided in the Instruction Manual (part number 358013) which can be downloaded at: www.mksinst.com

Installation Instructions

Instruction manual part number 013606
Revision A November 2014

Series 355

To obtain a copy of these instructions online, visit *www.mksinst.com*

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Installation Instructions

Instruction manual part number 013606
Revision A Novemeber 2014