Pressure & Vacuum Measurement Solutions

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Series 937B

DIGITAL COMBINATION VACUUM GAUGE SYSTEM

The Series 937B combination vacuum gauge system is part of the MKS family of vacuum gauges. It is the third generation of the very successful 937 Series. The 937B will operate and display as many as six sensors simultaneously, and each controller can be configured to the user's gauging requirements. This highly flexible product enables a wide range of gauging technologies, tailoring the system to each individual application. The Series 937B combines the sensor technologies of the cold cathode, hot cathode, standard Pirani, convection Pirani, MKS Baratron® capacitance manometer and absolute Piezo sensors to measure from ultra-high vacuum to above atmospheric pressure.

Features & Benefits

- Provides simultaneous readout for a combination of up to six vacuum gauges
- Wide measurement range of 10^{-11} to 20,000 Torr
- Intuitive menu for ease of setup
- Large easy to read backlit display
- User-configurable for units of pressure in Torr, millibar, Pascal, or microns
- Operates hot and cold cathodes, Baratron capacitance manometers, Piezo and Pirani sensors for maximum flexibility
- Configurable for up to six heated MKS Baratron capacitance manometers
- Twelve independent relay set points for improved process control with variable hysteresis
- Fast response cold cathode card protects vacuum system in the event of a sudden pressure rise
- Computer Interface: RS232, RS485 (built in) and Profibus DPV1 (optional)
- Independent, buffered, combined and standard analog outputs for each channel
- Gas-type sensitivity allows sensors to be used for rough leak detection
- Leak test function with bar graph display and audio alarm
- Field upgradeable
- Modular design
- Fully CE compliant with 2014/30/EU EMC Directive; 2014/35/EU Low Voltage Directive

The Controller

The 937B controller is designed for versatility, reliability and economy. The large, easy to read, liquid crystal display provides readout for up to six sensors simultaneously. The back lit LCD display, intuitive menus and simple push button front panel, allows for ease in setup of the 937B.

The 937B, enables the use of any sensor card in each of the sensor card slots. The 937B can be configured with up to three hot or cold cathode type gauges, or three dual sensor cards for a maximum of six gauge connections.

Set Points

Twelve independently adjustable set points are standard. This allows for the automation of process related functions. The set point values are nonvolatile and remain unchanged after power down or power failure. They are easily viewed and configured in the channel set up screen. The 937B also includes an adjustable control set point that turns the cold cathode or hot cathode gauges power off or on, at the desired pressures, extending the sensor's life.

Leak Test

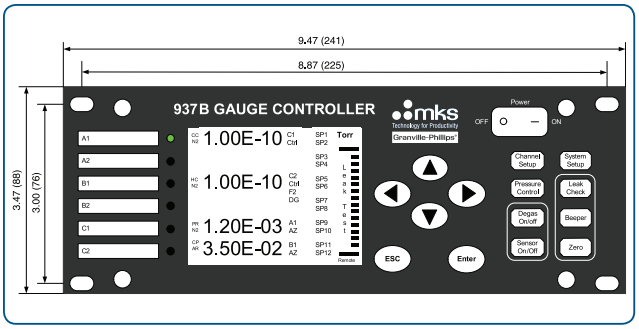
The leak test mode includes a bar graph and variable audible alert to assist in locating leaks within a system. The function operates with the cold cathode, hot cathode, Pirani, and convection sensors. By taking advantage of differences in tracer gas sensitivity, this provides an excellent tool for helping locate coarse system leaks.

Analog Output Signals

The controller provides analog output signals accessible on the rear panel connector. Three types of analog signals are available. Unprocessed analog signals are used to provide the fastest response times. The logarithmic output voltages are scaled so that 0.6 Volts equals one decade of pressure. Combination output can be created by combining up to three sensors with a combined range from 10^{-11} to 20,000 Torr.

Digital Signals

In addition to analog outputs, the 937B communicates digitally for direct computer communication with built in connections for RS232 or RS485. A communication slot in the 937B chassis accepts an optional Profibus DPV1 board. The 937B can communicate with a host computer using either of these ports. Remote control of set points and cold cathode high voltage disable are some of the many features available with communications options.



Dimensional Drawing —

Dimensions are nominal value in inches (millimeters referenced).

Pirani Sensors

In Pirani-type sensors, vacuum measurement is based on thermal conductivity of the gas. The sensor tube contains a fine wire that is maintained at a constant temperature. Heat transferred from the wire relates to the amount of gas present and is used to indicate pressure. There are two types of Pirani tubes that can be run on the 937B. Both the standard and convection enhanced Pirani's are shielded and CE approved.

Convectron® Pirani – Series 275

MKS Convectron® gauges have been the world-standard convection-enhanced Pirani gauge for over 35 years and are used in thousands of vacuum processes to accurately measure pressure from atmosphere to 10^{-3} Torr. To assure the highest level of accuracy and gauge-to-gauge reproducibility, every Convectron gauge is individually calibrated at the factory, thereby making controller adjustment unnecessary.

Standard Pirani - Series 345

The Standard Pirani sensor will read continuously from $5x10^{-4}$ Torr to 100 Torr. Pressure readings above 100 Torr read as 200 Torr, 400 Torr, and Atmosphere. The sensor has a greater signal output at the high vacuum end of its range, providing an added half decade of reading, down to $5x10^{-4}$ Torr.

The Pirani platinum filament ensures compatibility with a wide array of process gases. Only UHV compatible materials are exposed to vacuum. The 345 Pirani sensor is shielded for use where CE marking is a requirement and has a standard 9-pin D-sub connector.

Convection Enhanced Pirani - Series 317

The convection Pirani style sensor design enhances heat transfer through convection at higher pressures. This sensor will read continuously with full resolution from $1x10^{-3}$ Torr to 1,000 Torr, providing a continuous readout above 100 Torr. A 250°C bakeable version is available upon request.

Description

Capacitance Manometers

Capacitance manometers supported by the 937B controller include the MKS Baratron® Series 722, 626 and 627D. Capacitance manometers measure pressure directly by measuring the deflection of a thin Inconel® diaphragm. Capacitance manometers are widely known for their accuracy and reliability and are available in Full-Scale ranges from 20,000 Torr to 0.02 Torr with three decades of reading when connected to the 937B.

Absolute Piezo Transducer

The Series 902B Piezo transducer combines the pressure measurement technology of a Piezo sensor with an integrated electronic control circuit. The 902B Piezo is an absolute direct reading sensor, allowing the measurement to be gas independent. The sensor includes a unique temperature compensation, allowing for high accuracy over a wide measurement range (10 to 1,000 Torr). The Series 902B Piezo is used in conjunction with the capacitance manometer card.

Hot Cathode Sensors

Hot cathode vacuum measurement is based on the ionization probability of a gas in a defined volume. Hot cathode sensors are Bayard-Alpert style, which utilizes a fine wire collector located in the center of a grid. Because of its small area, few x-rays hit the collector and the gauge can measure pressures to very low levels. The Series 937B operates the Mini Ion Gauge and the Low Pressure Nude Hot Cathode sensor. Both sensors will measure from 10^{-2} to 10^{-10} Torr and include dual filaments for reduced downtime.

Mini Ion Gauge

The compact Mini-Ion Gauge is an ideal replacement for the older glass BA gauge. It is significantly smaller than a glass gauge, but has the same fitting options, so it is easy to install on any system. Additionally, there is no glass envelope to break, so safety concerns are minimized. Each Mini-Ion Gauge has two yttria-coated iridium filaments and a screen to shield the grid and filaments from large particles.

Nude Hot Cathode Ionization Vacuum Sensor

The Low Power Nude Tube is available with a choice of yttria-coated iridium or tungsten filaments. Since the sensing portion of the tube is located within the vacuum system and experiences the system true pressure, nude tubes give a representative pressure measurement and respond more quickly to pressure changes than a glass envelope sensor. This minimizes the effects of tube pumping and outgassing as seen with glass tubes. The yttria-coated iridium filament is resistant to damage caused by high oxygen partial pressures and accidental exposure to atmosphere. The tube operates at lower temperatures, giving a lower chemical reaction rate and minimizing thermal interference. At low pressures, tubes with tungsten filaments have the advantage of low internal outgassing rates. The hot cathode gauge calibration depends on the gas type, because ionization probability differs for each gas. The dependence makes it possible to use the hot cathode gauge as a leak detector.

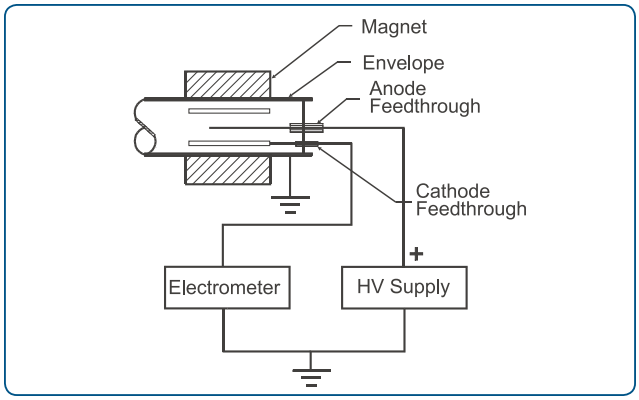
Cold Cathode Sensors

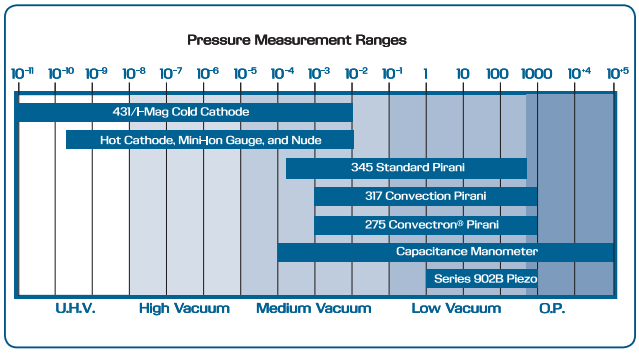
In a cold cathode gauge, ionization is the result of a high voltage discharge of electrons. Sensitivity is enhanced by a magnetic field. Cold cathode gauges are rugged sensors without filaments to break or burnout.

There are two cold cathode gauges: the Series 431 and the I-Mag®. All inverted magnetron designs include an isolated collector. This dual feed through approach makes the MKS cold cathode less susceptible to contamination and allows for a wide pressure measurement range.

The I-Mag Cold Cathode Sensor provides a lower cost alternative to the 431 where high operating temperature is not important. The sensor is more compact, less expensive and easier to maintain. If bakeout is required, the magnets and sensor connectors can be removed and the sensor can be baked to 400°C.

In addition, we provide a variety of customized gauges to suit specific customer needs. This includes special sensors for many semiconductor processes as well as high energy physics facilities. We have special versions of the 431 that will operate at 250°C or that can be used in high radiation environments.



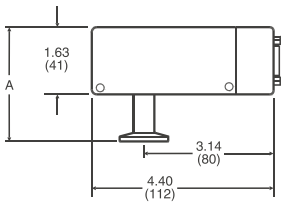


937B Controller Specifications

Measurement Range	1.0 x 10^{-11} to 20,000 Torr 1.0 x 10^{-11} to 2.7 x 10^{-4} mbar 1.0 x 10^{-9} to 2.7 x 10^{+6} Pascal 1.0 x 10^{-8} to 2.0 x 10^{+7} microns
Operating Temperature	5° to 40° C (41° to 104°F)
Storage Temperature	-10° to 55°C (14° to 131°F)
Relative Humidity	80% max for temperatures less than 31°C, decreasing linearly to 50% maximum at 40°C
Power Requirement and Consumption	150 watts maximum 100 - 240 VAC 50/60 Hz
Set Point Relays	Twelve pressure dependent set points; SPDT relays, contact rating 2 amps @ 30 Vac
Output	Buffered, log linear & linear output for each channel & channel combinations
Front Panel Controls	Power on-off switch, setup and operational commands can be accessed via the keypad
Display	320x240 color QVGA TFT LCD with back lighting. Up to 6 pressure displays. Display indicators for unit of measure, calibration functions, user calibration, set points, gauge position indicators
Leak Test	Relative logarithmic bar graph display and variable rate audio signal
Insulation Coordination	Over voltage Category II, Pollution Degree 2
CE Certification w/Appropriate Sensors	2014/30/EU EMC Directive; 2014/35/EU Low Voltage Directive
Controller Weight	8 lbs (3.6 kg)

317 Convection Enhanced Pirani Sensor

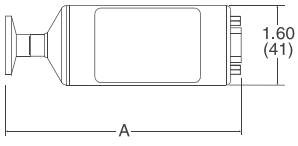
Size	A in./mm
NW 16 KF	2.76 (70)
NW 25 KF	2.76 (70)
1 1/3" CF	3.06 (78)
2 3/4" CF	2.73 (69)
8 VCR-F*	2.83 (72)
4 VCR-F*	2.51 (64)
1/8" NPT-M	2.93 (74)
15 & 18 mm	3.19 (81)



**VCR® or VCO®-compatible parts may be used.*

345 Standard Pirani Sensor

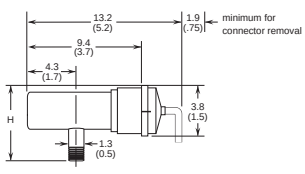
Size	A (in./mm)
NW 16 KF	4.83 (123)
NW 25 KF	4.34 (110)
1 1/3" CF	5.87 (149)
2 3/4" CF	5.87 (149)
8 VCR-F*	5.83 (148)
1/8" NPT-M	5.65 (144)
15 & 18 mm	5.78 (147)



**VCR® or VCO®-compatible parts may be used.*

275 Convectron® Pirani Sensor

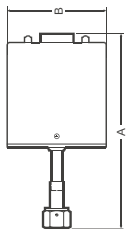
Size	H (in./cm)
NW 16 KF	2.70 (6.86)
NW 25 KF	2.70 (6.86)
NW 40 KF	2.70 (6.86)
1 1/3" CF	2.50 (6.35)
2 3/4" CF	2.50 (6.35)
1/8"/1/2" tubulation	2.50 (6.35)
1/4" VCR-F	2.80 (7.11)
1/2" VCR-F	3.20 (8.13)
3/8" VCO-M	3.10 (7.11)



**VCR® or VCO®-compatible parts may be used.*

Capacitance Manometer (Baratron®)

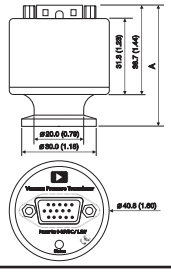
Dimension A (in./mm)	626B/627D	722B
NW 16 KF	5.18 (132)	4.70 (119)
1 1/3" CF	5.05 (128)	4.57 (116)
1/2" Tube	4.93 (125)	4.75 (121)
8 VCR-F* (low range)	6.05 (154)	5.57 (142)
8 VCR-F* (high range)	6.14 (156)	5.66 (144)
8 VCO-F*	6.05 (154)	5.57 (142)
Dimension A		
Weld Stub		3.94 (100)
Dimension B	2.56 (65)	1.50 (38)



**VCR® or VCO®-compatible parts may be used.*

902B Absolute Piezo Diaphragm Sensor

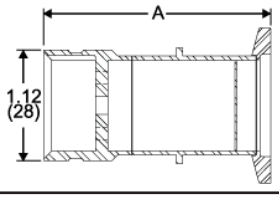
Size	Dimension A (in./mm)
NW 16 KF	(1.93) 49.1
1/8" NPT-F	(3.50) 89.0
4 (1/4") VCR-F*	(3.20) 81.4)
8 (1/2") VCR-F*	(3.24) 82.4



**VCR® or VCO®-compatible parts may be used.*

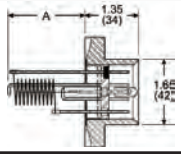
Mini-Ion® Gauge

Size	A (in./mm)
NW 16 KF	3.07 (78)
NW 25 KF	2.31 (59)
NW40 KF	2.31 (59)
1 1/3" CF	3.45 (88)
2 3/4" CF	2.37 (60)
1" Tube	2.16 (55)
3/4" Tube	3.95 (100)



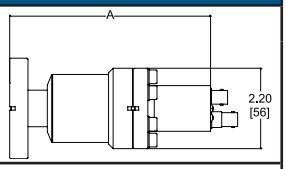
Nude Hot Cathode Ionization Vacuum Sensor

Size	Dimension A (in./mm)
NW 40 KF	1.89 (48)
2 3/4" CF	1.94 (49)



431 Cold Cathode Sensor

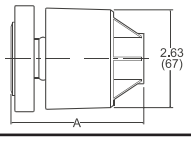
Size	A (in./mm)
NW 25 KF	6.72 (171)
NW 40 KF	6.32 (161)
2 3/4" CF (non-rotatable)	6.27 (159)
1" Tube	6.22 (158)
8 VCR-F*	7.59 (193)



**VCR® or VCO®-compatible parts may be used.*

I-Mag® Cold Cathode Sensor

Size	Dimension A (in./mm)
NW 25 KF	3.41 (87)
NW 40 KF	3.41 (87)
2 3/4" CF rotatable	3.47 (88)
1" Tube	3.26 (83)



Specifications

	Cold Cathode	Hot Cathode		Standard Pirani	Convectron/Convection Enhanced Pirani	Absolute Piezo	MKS Baratron®
Models	**Series 431 & I-Mag®**	**Mini Ion Gauge**	**Nude Hot Cathode Ionization Vacuum Sensor**	**Series 345**	**Series 317/Series 275**	**Series 902B**	**722B, 626B and 627D**
							
Sensor Construction (materials exposed to vacuum)	**Series 431:** Stainless steel, silver-copper brazing alloy,alumina ceramics, aluminum AL 6061, Elgiloy®, OFHC® copper **I-Mag:** Stainless steel, 6061 aluminum, Inconel®, glass and alumina ceramic	Yttria-coated iridium, nickel, 304 stainless steel, glass, tungsten,platinum clad molybdenum	Tungsten or yttria-coated iridium(filament), nickel, Inconel® X-750, 304 stainless steel, glass, tungsten,platinum	304 stainless steel, platinum alloy, silver brazing alloy, nickel, glass	**Series 317:** 304 stainless steel, nickel 200, glass, platinum **Series 275:** 304 stainless steel, borosilicate glass, Kovar®, Alumina, NiFe alloy, polyimide	316 stainless steel	Inconel
Measurement Range	$1.0x10^{-11}$ to $1.0x10^{-2}$ Torr $1.3x10^{-11}$ to $1.3x10^{-2}$ mbar $1.3x10^{-9}$ to 1.3 Pascal $1.0x10^{-8}$ to 10 Micron	$1.0x10^{-10}$ to $1.0x10^{-2}$ Torr $1.3x10^{-10}$ to $1.3x10^{-2}$ mbar $1.3x10^{-8}$ to 1.3 Pascal $1.0x10^{-8}$ to 1.0x10 Micron	$1.0x10^{-10}$ to $1.0x10^{-2}$ Torr $1.3x10^{-10}$ to $1.3x10^{-2}$ mbar $1.3x10^{-8}$ to 1.3 Pascal $1.0x10^{-8}$ to 1.0x10 Micron	$5.0x10^{-4}$ Torr to ATM $7.0x10^{-4}$ mbar to ATM $7.0x10^{-2}$ Pascal to ATM $5.0x10^{-1}$ Micron to ATM	$1.0x10^{-3}$ to $1.0x10^{+3}$ Torr $1.3x10^{-3}$ to $1.3x10^{+3}$ mbar $1.3x10^{-1}$ to $1.3x10^{+5}$ Pascal $1.0x10^{+6}$ Micron	0.1 to 1000 Torr 0.13 to $1.3x10^{+3}$ mbar 13 to $1.3x10^{+5}$ Pascal	Three decades of measurement below Full Scale
Resolution	1% of indicated decade, except 10% below 10^{-10} Torr and above 10^{-3} Torr	1% of indicated decade	1% of indicated decade	% of indicated decade, except 10% below 10^{-3} Torr and above 100 Torr - see text	1% of indicated decade	1% of indicated decade	1 x 10^{-4} of Full Scale
Set Point Response	120 milliseconds	120 milliseconds	120 milliseconds	120 milliseconds	120 milliseconds	100 milliseconds	120 milliseconds
Set Point Range	$2.0x10^{-10}$ to $9.5x10^{-3}$ Torr $2.7x10^{-10}$ to $1.2x10^{-2}$ mbar $2.7x10^{-8}$ to 1.2 Pascal $2.0x10^{-7}$ to 9.5 micron	$5.0x10^{-10}$ to $9.5x10^{-3}$ Torr $6.5x10^{-10}$ to $1.2x10^{-2}$ mbar $6.5x10^{-8}$ to 1.2 Pascal $5.0x10^{-8}$ to $9.5x10^{-1}$ micron	$5.0x10^{-10}$ to $9.5x10^{-3}$ Torr $6.5x10^{-10}$ to $1.2x10^{-2}$ mbar $6.5x10^{-8}$ to 1.2 Pascal $5.0x10^{-8}$ to $9.5x10^{-1}$ micron	$2.0x10^{-3}$ to $9.5x10^{+1}$ Torr $2.7x10^{-3}$ to $1.2x10^{+2}$ mbar $2.7x10^{-1}$ to $1.2x10^{+4}$ Pascal 2.0 to $9.5x10^{+4}$ micron	$2.0x10^{-3}$ to $9.5x10^{+2}$ Torr $2.7x10^{-3}$ to $1.2x10^{+3}$ mbar $2.7x10^{-1}$ to $1.2x10^{+5}$ Pascal 2.0 to $9.5x10^{+5}$ micron	1.0 to $1.0x10^{+3}$ Torr 1.3 to $1.3x10^{+3}$ mbar $1.3x10^{-2}$ to $1.3x10^{+5}$ Pascal	Dependent on Full Scale range
Reproducibility	5% of indicated pressure	5% of indicated pressure	5% of indicated pressure	5% of indicated pressure	5% of indicated pressure	0.3% of indicated pressure	*
Cables & Connectors	Maximum length is 300 ft **Series 431:** Cables connected via bayonet type coaxial connectors **I-Mag Tube Side:** molded connector with a positive locking bolt Controller Side: bayonet connector and threaded coaxial connector	Molded tube connector with locking mechanism, custom D-sub connector to controller, maximum length is 50 ft	Molded tube connector, custom D subconnector to controller, maximum length is 50 ft	Maximum length is 500 ft Series 345: 9-pin D-sub to 9-pin D-sub connectors, multiconductor shielded cable	**Series 317:** Maximum length is 500 ft 9 pin D-sub connectors, multiconductor shielded cable **Series 275:** 9 pin D-sub connectors, multiconductor shielded cable	Maximum length is 500 ft 9-pin D-sub to 9-pin D-sub	Maximum length is 50 ft. 9-pin D-sub with polarized key to 15-pin D-sub
Operating Temperature	0° to 70°C (32° to 158°F)A high operating temperature version of the Series 431 is available. Call for information.	0° to 60°C (32° to 140°F)	0° to 60°C (32° to 140°F)	0° to 50°C (32° to 122°F)	**Series 317:** 0° to 50°C (32° to 122°F) **Series 275:** 4° to 50°C (39° to 122°F)	0° to 40°C (32° to 104°F)	*
Bakeout Temperature	**Series 431:** 100°C (212°F) cables removed 250°C version available **I-Mag:** to 400°C (752°F) with CF flanges, with magnet and cable removed	60°C with cable attached, 300°C with CF, 150°C with KF	60°C with cable attached, 300°C with CF, 150°C with KF	50° C (122°F)	**Series 317:** 100°C (212°F) shielded version *Special order version available to 250°C. **Series 275:** 150°C (302°F)	100°C (212°F), non-operating	N/A
Weight	**Series 431:** 2.8 lbs. (1.3 Kg) w/ CF **I-Mag:** 2.0 lbs (0.8 Kg) w/ CF	0.8 lb (360 g) CF flange	0.9 lb (400 g) CF flange	0.5 lb (200 g)	**Series 317:** 0.5 lb (200 g) **Series 275:** 3 oz (85 g)	5.9 oz (170 g)	Dependent on selected sensor*
Xray Limit		3 x 10^{-10} Torr	3 x 10^{-10} Torr				
Sensitivity		12 $Torr^{-1}$ (±20%)	9 $Torr^{-1}$ (±20%)				
Degas Power		5 W	20W				
Emission Current		1 mA at < 1 x 10^{-4} Torr, 100 µA at > 1 x 10^{-4} Torr, regulated to ±3%	1 mA at < 1 x 10^{-4} Torr, 100 µA at > 1 x 10^{-4} Torr, regulated to ±3%				
Volume	**Series 431:** 1.8 $in.^3$ (30 cm^3) max **I-Mag:** 0.9 $in.^3$ (15 cm^3) max	1.4 $in.^3$ (23 cm^3)	Zero	0.5 $in.^3$ (8.0 cm^3) maximum	**Series 317:** 2.0 $in.^3$ (33 cm^3) maximum **Series 275:** 2.14 $in.^3$ (35 cm^3) maximum	0.06 $in.^3$ (1.02 cm^3)	Dependent on selected sensor*

**For Baratron Capacitance Manometer information, please visit the MKS website at www.mksinst.com.*

Base Controller	Country Code	Base Gauge Slot "A"	Gauge Choice Slot "B"	Gauge Choice Slot "C"	Communication Port
Part Code	Part Code	Part Code	Part Code	Part Code	Part Code
937B	US EU UK JP CA (Canada)	CC Cold Cathode CT Dual Convection Pirani/ Standard Pirani CM Dual Baratron/Piezo HC Hot Cathode Nude/ Mini-Ion Gauge NA Blank	CC Cold Cathode CT Dual Convection Pirani/ Standard Pirani CM Dual Baratron/Piezo HC Hot Cathode Nude/ Mini-Ion Gauge NA Blank	CC Cold Cathode CT Dual Convection Pirani/ Standard Pirani CM Dual Baratron/Piezo HC Hot Cathode Nude/ Mini-Ion Gauge NA Blank	PF Profibus NA Blank

The basic Series 937B includes the controller, a power cable, accessory connector kit, and instruction manual. Space is provided for up to three gauge modules and one communication module. Sample part number: 937B-US-CCCCCT-NA.

Plug-In Controller Modules

Part Number	Type
100015185	Cold Cathode
100015132	Dual Standard Pirani/Convection Pirani
100015267	Dual Capacitance Manometer/Piezo
100015641	Hot Cathode (Mini-Ion Gauge/Nude)
100015940	Profibus Card

Use these part numbers when purchasing boards separately for retrofit.

Accessories

Part Number	Type
103150001	USA power cable
100005651	Half rack mounting kit
100016467	937B Instruction Manual
100006734	Rebuild kit for 431 cold cathode tube
100002353	Rebuild kit for I-Mag cold cathode
100005279	Spanner wrench for 431 rebuild
100007700	Full rack mounting kit
100016120	Adapter, SMA – F to BNC – M
100016121	Adapter, Connector, SMA – M to BNC – F

275 Convectron Pirani Sensor

Part Number	Type
275203	NW 16 KF
275071	1/8" NPT-M ½" tube
275282	8 VCR-F *
275256	1 1/3" CF
275238	2 ¾" CF
275196	NW 25 KF
275185	4 VCR®-F *

** VCR® or VCO®-compatible parts may be used.*

345 Standard Pirani Sensor

Part Number	Type
103450210	NW 16 KF
103450211	1/8" NPT-M ½" tube
103450212	8 VCR-F *
103450213	1 1/3" CF
103450214	2 ¾" CF
103450215	NW 25 KF
103450216	15 mm. Tube
103450218	18 mm. tube

**VCR® or VCO®-compatible parts may be used.*

317 Shielded Convection Pirani Sensor

Part Number	Type
103170010SH	NW 16 KF
103170011SH	1/8" NPT-M ½" tube
103170012SH	8 VCR-F *
103170013SH	1 1/3" CF
103170014SH	2 ¾" CF
103170016SH	15 mm. Tube
103170018SH	18 mm. Tube
103170027SH	NW 25 KF
103170029SH	4 VCR®-F *

** VCR® or VCO®-compatible parts may be used.*

431 Cold Cathode Sensor

Part Number	Type
10431004	NW 25 KF
10431001	NW 40 KF
10431002	2 ¾" CF
10431003	1" Tube
10431005	8 VCR®-F

**VCR® or VCO®-compatible parts may be used.*

I-Mag® Cold Cathode Sensor

Part Number	Type
104230004	NW 25 KF
104230001	NW 40 KF
104230002	2 ¾" CF
104230003	1" Tube

Ordering Information

Mini-Ion Gauge Hot Cathode Sensor	
Part Number	Type
100011085	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, 1" Tube
100011111	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, 1 1/3" CF
100011112	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, 2 3/4" CF
100011113	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, NW 25 KF
100011114	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, NW 40 KF
100011118	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, NW 16 KF
100011127	Mini-Ion Gauge Sensor, Y_2O_3 coated Ir filament, 3/4" Tube

Nude Hot Cathode Ionization Vacuum Sensor	
Part Number	Type
100005987	Nude Tube Sensor, Tungsten, NW 40 KF
100005980	Nude Tube Sensor, Tungsten, 2 3/4" CF
100006841	Nude Tube Sensor, Y_2O_3 coated Ir, NW 40 KF
100006842	Nude Tube Sensor, Y_2O_3 coated Ir, 2 3/4" CF

Series 902B Piezo Transducer	
Part Number	Type
902B-12010	902 Transducer, NW 16 KF, RS485
902B-42010	902 Transducer, 4 VCR-F*, RS485
902B-52010	902 Transducer, 8 VCR-F*, RS485
902B-11010	902 Transducer, NW 16 KF, RS232
902B-41010	902 Transducer, 4 VCR-F*, RS232
902B-51010	902 Transducer, 8 VCR-F*, RS232
**VCR® or VCO®-compatible parts may be used.*	

626B/627D Baratron® Absolute Capacitance Manometer (RoHS Compliant)

Example: Type 626BXXXYZ; 626B with male Type D connector
Type 627DXXXYZ; 627D with male Type D connector

Ranges (Torr) (XXX)	Code
0.1	.1T
0.25	RET
1	01T
2	02T
10	11T
20	21T
100	12T
500	52T
1000	13T
10000 (627D only)	14T
20000 (627D only)	24T

Fittings (Y)

1/2" tube	A
Swagelok 8 VCR female	B
Mini-CF, rotatable	C
NW 16 KF	D
Swagelok 8 VCO® female	E
2 3/4'' CF, rotatable	L
NW 25 KF	Q

Accuracy (Z)

Standard: 0.25% of Rdg. (optional 0.10 Torr)	E
Standard: 0.50% of Rdg. (0.10 Torr)	F
Optional: 0.15% of Rdg. (10, 100, 1000 Torr ranges only)	D

NOTE:
1. For gauge isolation, refer to MKS' line of Cv™ Valves and the In Situ Diagnostics Access (IDA™) Valve.

722B Baratron® Compact Absolute Capacitance Manometer (RoHS Compliant)

Example: Type 722BXXXYYWGZ

Ranges (Torr) (XXX)	Code
10	11T
100	12T
1000	13T
10000	14T
25000	RCT

Fittings (Y)

1/2" tube	BA
Swagelok 4 VCR female	CD
Swagelok 8 VCR female	CE
Swagelok 8 VCO® female	DA
NW 16 KF	GA
Mini-CF, rotatable	HA

Input/Output (W)

+13 to +32 VDC input, 0-10 VDC output	2

Accuracy (G)

Standard: 0.5% of Rdg.	F

Connector (Z)

9-pin Type "D"	A

NOTE: High pressure units are not available with NW 16 KF fittings. Consult High Pressure Fitting matrix or contact MKS Applications Engineering.

For complete product specifications and Baratron capacitance manometer datasheets, please visit the MKS website at www.mksinst.com. Contact Applications Engineering for other capacitance manometer options.

Ordering Information

431 Cold Cathode Cables	
Part Number	Type
100016217 100016218 100016219 100016220 100016221	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m) 100 ft (30.5 m) Custom (max length 300 ft.)

I-Mag® Cold Cathode Cables	
Part Number	Type
100016295 100016296 100016297 100016298 100016299	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m) 100 ft (30.5) Custom (max length 300 ft.)

Mini-Ion Gauge Cables	
Part Number	Type
100011106 100011107 100011108	10 ft. (3.0m) 25 ft. (7.6m) 50 ft. (15.2m)

Nude Hot Cathode Ionization Vacuum Sensor Cables	
Part Number	Type
100010909 100010910 100010911	10 ft. (3.0m) 25 ft. (7.6m) 50 ft. (15.2m)

275 Convectron Cables	
Part Number	Type
100016980 100016981 100016982	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m)

345 and 317 Pirani Cables	
Part Number	Type
103170006SH 103170007SH 103170008SH 103170009SH	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m) Custom (max length 500 ft.)

902B Absolute Piezo Cables	
Part Number	Type
100011869 100011870 100011871 100011872	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m) Custom (max length 50 ft.)

626B and 627D Baratron® Cables	
Part Number	Type
100007555 100007556 100007557	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m)

722B Baratron® Cables	
Part Number	Type
100016951 100016952 100016953	10 ft (3.0 m) 25 ft (7.6 m) 50 ft (15.2 m)

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