.mks

Series 902B

ABSOLUTE PIEZO TRANSDUCER

The MKS Series 902B Piezo transducer combines the pressure measurement technology of a MEMS-based Piezo sensor with a metal sealed stainless steel 316 diaphragm and integrated electronics. The 902B provides economical, absolute pressure measurement that is independent of gas type.

With a measurement range of 0.1 to 1000 Torr Full Scale, the sensor is ideal for a wide range of applications including semiconductor manufacturing, thin film coatings, freeze-drying, analytical instruments, medical devices, automotive and aerospace.

Features & Benefits

- Measurement range of 0.1 to 1000 Torr Full Scale
- Low cost transducer alternative to more expensive conventional transducers
- Gas independent pressure measurement for accurate, total pressure measurement
- Sensor is suitable for harsh processes due to robust design and stainless steel construction
- Solid state Piezo sensor resistant to damage from air inrush and vibrations
- Compact system design with integrated electronics and sensor in one unit
- Mountable in any orientation for ease of installation
- Reduced process cycle time due to sensor's fast, accurate and repeatable pressure measurements
- Ease of operation with both analog output and digital communication
- Multiple analog output emulations available
- Process control from up to three set point relays with fast response time
- Optional integrated touch-screen display available for local pressure indication, etc.
- CE marked, compliant with EMC Directive 2004/108/EEC and RoHS

Applications

The 902B is well suited for sterilized environments because the only material exposed to the vacuum is stainless steel 316. This includes freeze drying processes and plasma sterilization of medical equipment.

The 902B has an attractive price-performance ratio making it an excellent alternative to more expensive conventional transducers, especially in applications where the highest measurement accuracy is not needed. This includes vacuum packaging in the food industry and vacuum furnaces.

The 902B is robust and can withstand harsh environments, g-forces and mechanical vibrations. This makes it a good candidate for general foreline vacuum measurement applications.

The digital communication interface, analog output emulation, three set point option and compact design makes the 902B a versatile transducer that is easy to integrate in most vacuum systems.
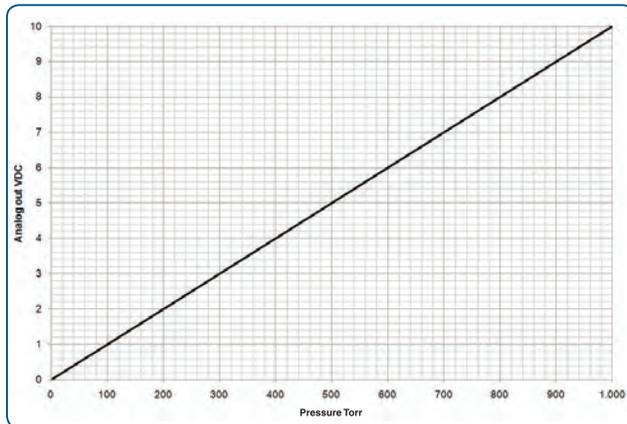
Description

The Series 902B Piezo transducer is based on a silicon piezo resistive pressure sensor that measures absolute vacuum pressure with an accuracy of ±1% of Reading (from 10-1000 Torr). The sensor is robust and resistant to mechanical vibration and g-forces. Furthermore, the sensor technology makes the transducer gas type independent. With only stainless steel 316 exposed to the process gas, the transducer can be used in many demanding applications.

The 902B is available with an RS232 or RS485 digital communication interface for setup of transducer parameters and to provide real time pressure measurement. In addition, the 902B has a 16 bit analog pressure output that can be interfaced to external analog equipment for pressure readout or close loop control. The standard output is linear from 0-10 VDC, but other outputs are also available.
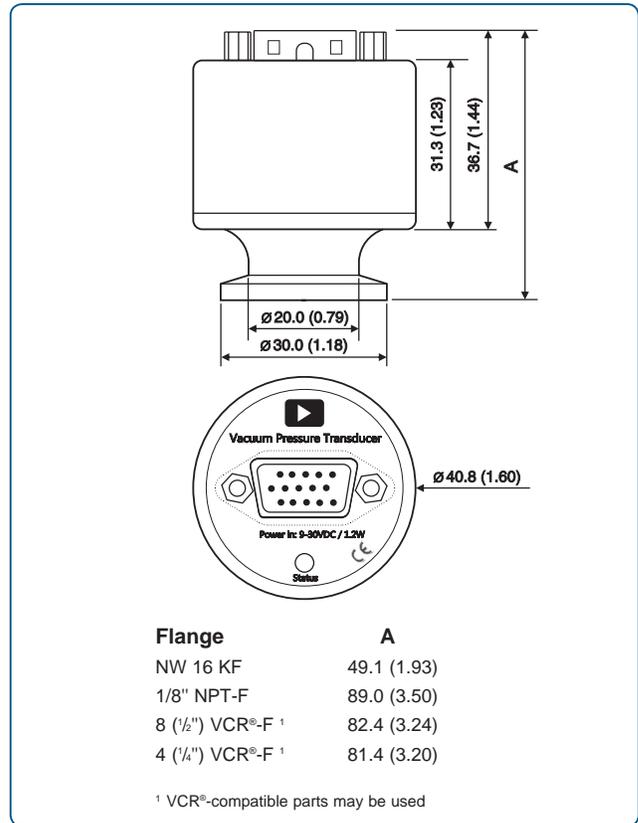
The 902B has up to three mechanical relays which can be used for process control, for example interlocking isolation valves and vacuum pumps. The SPDT relays include both normally open and close contacts and can be set to energize above or below a set point trip value. Many applications require continuous surveillance of system pressure and warning of atypical pressure levels. The flexible relay options of the 902B can provide warning to external safety logic in cases of abnormal pressure and loss of power. The display option offers real time readout of measured pressure, view of transducer settings and set point status.

The 902B's compact design significantly reduces the amount of space occupied by the transducer. This is particularly appealing to system designers and allows design of compact systems or equipment. The 902B is also available in a 9 pin version, offering backward compatibility with the first generation 902. The 902B can be used as a standalone device or together with the PDR900 controller.
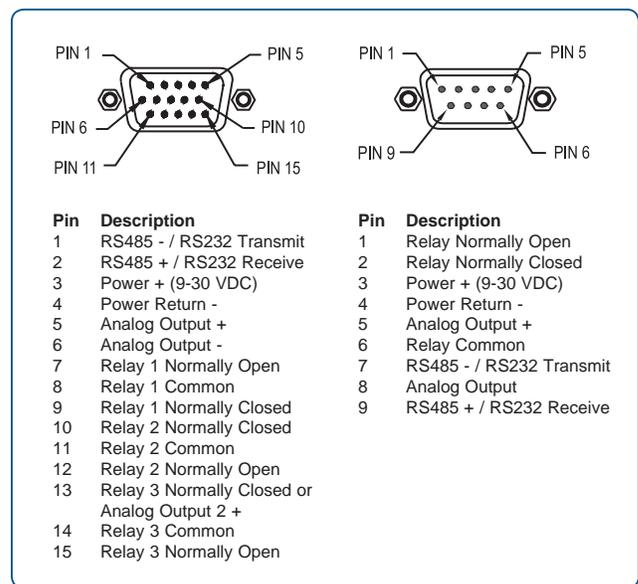

Flange	A
NW 16 KF	49.1 (1.93)
1/8" NPT-F	89.0 (3.50)
8 (½") VCR®-F [1]	82.4 (3.24)
4 (¼") VCR®-F [1]	81.4 (3.20)

[1] VCR®-compatible parts may be used

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

Pin	Description
1	RS485 - / RS232 Transmit
2	RS485 + / RS232 Receive
3	Power + (9-30 VDC)
4	Power Return -
5	Analog Output +
6	Analog Output -
7	Relay 1 Normally Open
8	Relay 1 Common
9	Relay 1 Normally Closed
10	Relay 2 Normally Closed
11	Relay 2 Common
12	Relay 2 Normally Open
13	Relay 3 Normally Closed or Analog Output 2 +
14	Relay 3 Common
15	Relay 3 Normally Open

Pin	Description
1	Relay Normally Open
2	Relay Normally Closed
3	Power + (9-30 VDC)
4	Power Return -
5	Analog Output +
6	Relay Common
7	RS485 - / RS232 Transmit
8	Analog Output
9	RS485 + / RS232 Receive

Standard Analog Output—
Pressure vs. Voltage

PinOuts —
D-Sub 15 pin HD and D-Sub 9 pin versions

Specifications

Sensor Type	Stainless steel enclosed Piezo (Absolute Pressure)
Measuring Range	0.1 to 1000 Torr
Over Pressure Limit	1500 Torr
Set Point Range	1 to 1000 Torr
Accuracy[1] (10-1000 Torr)	±1% of Reading
Repeatability[1]	±0.3% of Reading
Operating Temperature Range	0 to 40°C (32 to 104°F)
Maximum Bakeout Temperature	100°C (non-operating)
Digital Communication	RS485 / RS232 (4,800 to 230,400 Baud)
Controls	Zero adjust, span adjust, analog output, pressure units, baud rate, address, factory default, set point functions: value, hysteresis, direction, enable
Status	Pressure reading, units, set point, operating time, transducer temperature, user tag, model, device type, serial number, firmware and hardware versions, part number, manufacturer
Analog Output[2] **(Absolute Pressure)**	0 to 10 VDC, 100 Ω maximum output impedance, linear or logarithmic
Analog Output Resolution	16 bit (Primary) 12 bit (Secondary)[3]
Digital Output Resolution	0.1 Torr
Relays (Optional)	Three relays SPDT
Relay Contact Rating	1 A @ 30 VAC/VDC resistive
Relay Response	100 ms maximum
Power Requirements	9 to 30 VDC < 1.2 watt maximum
Temperature Coefficients	
Zero	0.01% of Full Scale/°C
Span	0.02% of Reading/°C
Installation Orientation	Any
Internal Volume (KF16)	1.023 cm^3
Materials Exposed to Vacuum	316 Stainless Steel
Electronics Casing	304 Stainless steel
Weight (with KF16 flange)	0.37 lb (170 g)
CE Certification	2004/108/EEC Electromagnetic Compatibility

Notes:
[1] Accuracy and repeatability are typical values measured at ambient temperature after zero adjustment.
[2] Other analog outputs available (extensive output emulation options).
[3] Hardware option

Ordering Code Example: 902B-11032	Code	Configuration
Type 902B Piezo Transducer	902B-	902B
Flange		
KF16	1	
1/8" NPT	3	1
4 VCR	4	
8 VCR	5	
Interface		
RS232/Analog	1	1
RS485/Analog	2	
Analog Out		
0-10 VDC (Linear 10 mV/Torr)	0	
0-5 VDC (Linear 5 mV/Torr)	1	
2-10 VDC (LOG10)	2	
1-5 VDC (LOG5)	3	0
1 VDC/Decade	4	
0-10 VDC (100 mV/Torr)	5	
1-9.8 VDC	6	
Connector/Relays		
D-Sub 9 pin male/One Relay[See Note (1)]	1	
D-Sub 15 pin HD male/No Relay	2	
D-Sub 15 pin HD male/Three Relays	3	3
D-Sub 15 pin HD male/Three Relays/Dual Analog Out	5	
RJ45/FCC68 8 pin (Edwards/Oerlikon Type)/No Relay	8	
Hirschmann 6 pin (Pfeiffer/Inficon Type)/No Relay	9	
Enclosure/Display		
IP40/No Display	0	
IP54/No Display	2	2
IP40/Display	4	
IP40/Display (SI Units)	6	

Note:
[1] Backward compatible with 1st generation 902 Piezo Transducer

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PDR900 Power Supply & Display

The PDR900 power supply and readout unit is a stand alone, single channel controller for use with the Series 900 digital vacuum transducers. It can be used as a stand-alone power supply readout unit or as a tool for configuration, calibration and diagnostics of system integrated transducers in OEM applications.

901P with Display

The optional integrated touch-screen display is user configurable; the user can change pressure units, orientation and has access to set point parameters as well as gas type. The display also indicates the status of the available set point relays. Displayed reading can be seen from >5 meters away on the high contrast display.