# Series 902B

## Absolute Piezo Transducer

The 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 1000 Torr Full Scale range, 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.

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 100-1000 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.


## Product Features

- Low cost transducer alternative to more expensive conventional transducers
- 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
- Process control from up to three set point relays with fast response time
- Optional integrated touch-screen display available for local pressure indication, etc.
- Multiple interface options, Analog, RS232, RS485, and EtherCAT®

### Applications

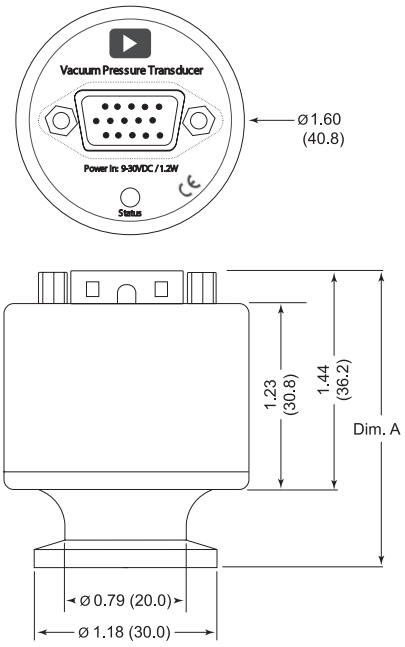
- Freeze drying
- Plasma sterilization of medical equipment
- Vacuum packaging in the food industry
- Vacuum furnaces
- General foreline vacuum measurement applications

The 902B is available with an RS232, RS485, and EtherCAT 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.

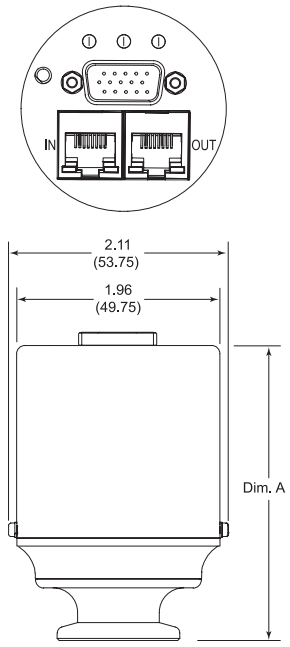
Many applications require continuous surveillance of system pressure and warning of atypical pressure levels. The flexible relay options of the 902B can provide warning to external safety logic in cases of abnormal pressure and loss of power. The display option offers real time readout of measured pressure, view of transducer settings and set point status. The compact design of the 902B 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.

**RS232/RS485/Analog**




| Flange | A |
|---|---|
| NW 16 KF | 1.93 (49.1) |
| NW 16 KF Ext | 2.58 (65.6) |
| 4 VCR® | 3.20 (81.4) |
| 8 VCR® | 3.24 (82.4) |

**EtherCAT**




| Flange | A |
|---|---|
| NW 16 KF | 2.84 (73.39) |
| NW 16 KF Ext | 3.52 (89.41) |
| 4 VCR® | 4.43 (112.52) |
| 8 VCR® | 4.47 (113.54) |

*Dimensional Drawing - Unless otherwise specified, dimensions are nominal values in inches (mm referenced).*

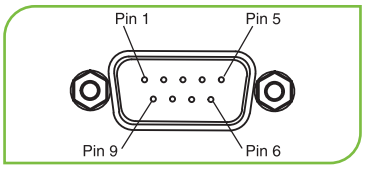
## Specifications

| | |
|---|---|
| **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] | 100 to 1000 Torr ±1% of Reading, 10 to 100 Torr ±5% of Reading |
| **Repeatability**[1] | 100 to 1000 Torr ±0.3% of Reading, 10 to 100 Torr ±1% of Reading |
| **Operating Temperature Range** | 0 to 40°C (32 to 104°F) |
| **Maximum Bakeout Temperature** | 100°C (non-operating) |
| **Digital Communication** | RS485 / RS232 / EtherCAT |
| **Analog Output (Absolute Pressure)** | 0 to 10 VDC, 100 Ω maximum output impedance, linear or logarithmic |
| **Analog Output Resolution** | 16 bit |
| **Digital Output Resolution** | 0.1 Torr |
| **Relays (Optional)**<br>**Relay Contact Rating**<br>**Relay Response** | • Three relays SPDT; EtherCAT 1 relay SPDT<br>• 1 A @ 30 VAC/VDC resistive<br>• 100 ms maximum |
| **Power Requirements** | 9 to 30 VDC < 1.2 watt maximum, EtherCAT 24V ±15% |
| **Temperature Coefficients**<br>**Zero**<br>**Span** | <br>• 0.01% of Full Scale/°C<br>• 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) |
| **Compliance** | CE, ETG 5003.1, ETG 5003.2, ETG 5003.2080 |

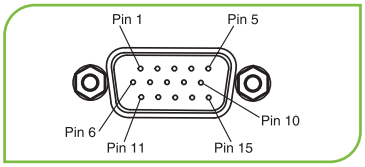
*Note: [1] Accuracy and repeatability are typical values measured at ambient temperature after zero adjustment.*

| Pin | RS232/485 9 pin Sub-D | RS232/485 15 pin Sub-D | EtherCAT 15 pin Sub-D | RJ45 EtherCAT IN/OUT |
|---|---|---|---|---|
| 1 | Relay Normally Open | RS485 (-)/RS232 transmit | NC | TX+ |
| 2 | Relay Normally Closed | RS485 (+)/RS232 receive | NC | TX- |
| 3 | Power (+) (9-30 VDC) | Power (+) | Input Power (+) 9 to 24 VDC | RX+ |
| 4 | Power Return (-) | Power (-) | Power Return - | NC |
| 5 | Analog Output (+) | Analog Output (+) abs. | Signal Output + | NC |
| 6 | Relay Common | Analog Output (-) | Signal Common | RX- |
| 7 | RS485 (-)/RS232 Transmit | Relay #1 NO | NC | NC |
| 8 | Analog Output | Relay #1 Common | NC | NC |
| 9 | RS485 (+)/RS232 Receive | Relay #1 NC | NC | |
| 10 | | Relay #2 NC | NC | |
| 11 | | Relay #2 Common | NC | |
| 12 | | Relay #2 NO | NC | |
| 13 | | Relay #3 NC | NC | |
| 14 | | Relay #3 Common | NC | |
| 15 | | Relay #3 NO | Chassis Ground | |

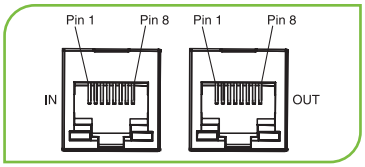
*Pinouts -D-Sub 15 pin HD, D-Sub 9 pin, Analog, RS232/485 and D-Sub 15 pin HD, RJ45, EtherCAT*




*9 pin D Subminiature Connector*




*15 pin D Subminiature Connector*




*RJ45 EtherCAT IN/OUT Connector*

| Ordering Code Example: 902B-1E0V0 | Code | Configuration |
|---|---|---|
| **Model** | | |
| 902B Piezo Transducer | 902B | 902B |
| **Flange** | | |
| KF16<br>1/8'' NPT-M<br>VCR4<br>VCR8<br>KF16 Ext | 1<br>3<br>4<br>5<br>8 | 1 |
| **Interface** | | |
| RS232/Analog<br>RS485/Analog<br>EtherCAT/Analog | 1<br>2<br>E | E |
| **Analog Out** | | |
| 0-10 VDC (Linear 10 mV/Torr)<br>0-5 VDC (Linear 5 mV/Torr) | 0<br>1 | 0 |
| **Connector Relays** | | |
| D-Sub 9 pin male/One Relay[1]<br>D-Sub 15 pin HD male/No Relay<br>D-Sub 15 pin HD male/Three Relays[2]<br>D-Sub 15 pin HD male/One Relay (EtherCAT only) | 1<br>2<br>3<br>V | V |
| **Enclosure** | | |
| Standard/Viton Sealing<br>Standard/Viton Sealing/Display (not available with EtherCAT) | 0<br>4 | 0 |

*Notes:*
*[1] Backward compatible with 1st generation 902 Piezo Transducer*
*[2] Not available with EtherCAT*


**PDR900 Power Supply and Display**
*The PDR900 power supply and readout unit is a stand alone, single channel controller for use with the Series 900 digital vacuum transducers.*


**902B 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.*

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