Series 901P

MicroPirani™ / Piezo Load Lock Transducer

Designed specifically for the load lock environment, the Series 901 Plus (901P) Load Lock Transducer (LLT) combines Piezo and MicroPirani™ sensor technologies. The combined output provides significantly higher accuracy, stability, repeatability and a faster response time than conventional thermal conductivity gauges. The 901P combines both absolute and differential pressure measurement technologies to provide superior performance and functionality. The 901P provides patented, gas independent absolute pressure measurement from 50 -1000 Torr with increased accuracy over thermal conductivity sensors.

Unlike traditional Pirani gauges, the sensor element in the MicroPirani is made of a one millimeter square silicon chip, allowing the measurements to be made in a very small volume. As a result of the MicroPirani technology, the 901P can read pressures down to 10^{-5} Torr, two decades below a standard Pirani sensor. The sensor design minimizes the effects of convection, subsequently the 901P can be mounted in any orientation without compromising accuracy.

Product Features

- Functionality of three sensors in a single transducer for space savings and wide measurement range
- Ultra compact design
- Accurate absolute pressure measurement from 1,000 to 10^{-5} Torr
- Gas independent absolute pressure measurement from 50 to 1,000 Torr
- Accurate atmospheric pressure reading, independent of gas type and barometric pressure changes
- Fast, accurate and repeatable pressure measurements reduces process cycle time
- Mountable in any orientation for ease of installation; no loss of measurement accuracy
- Optional integrated touch-screen display available for local pressure indication, etc.
- MicroPirani™ solid state sensor is resistant to damage from air inrush or vibration
- Three set points with fast response time for reliable process control (optional)
- Ease of operation via analog output, RS232, RS485, and EtherCAT
- Setup, diagnostic and operation software available
- Alternate analog output and electrical connectors available to match other vendors' gauges and facilitate an easy upgrade

Applications

The 901P has been specifically designed for pressure measurement within a vacuum load lock. It has the capability to replace multiple pressure measurement devices on a load lock with its absolute pressure measurement from atmosphere to 10^{-5} Torr and atmospheric switching capabilities. Subsequently OEMs can reduce costs with a simplified load lock design. The 901P can be used on load locks or any vacuum chamber requiring both absolute pressure measurement and atmospheric switching capabilities.

Compared to gauges used in traditional load lock designs, the 901P accurate atmospheric pressure measurement can improve load lock performance by faster cycle times and prevent contamination of load lock with atmospheric air.

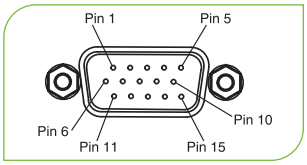
The Piezo is a differential pressure sensor, ensuring correct atmospheric pressure measurement under varying barometric pressure conditions. Piezo technology is a direct pressure reading, allowing the measurement to be gas independent. The Piezo sensor measures from -760 to +760 Torr relative to atmospheric pressure.

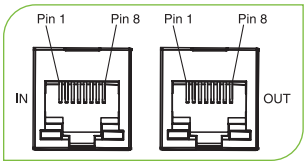
The 901P has RS232, RS485, and EtherCAT digital communication interfaces for setup of transducer parameters and to provide real time pressure measurement.

The 901P also has an analog pressure output of 1 VDC/ decade that can be interfaced to external analog equipment for pressure readout or control. Other analog outputs and curves can be selected via the digital user interface. A secondary optional analog output is used to provide the differential pressure measurement.

The 901P has up to three mechanical relays which can be used for process control, for example interlocking isolation valves and vacuum pumps.

Each set point can be assigned either to the differential piezo measurement or the combined absolute MicroPirani/ Piezo measurement. The 901P compact design significantly reduces the amount of space occupied by a vacuum gauge. This is particularly appealing to system designers and allows for a more compact vacuum system.



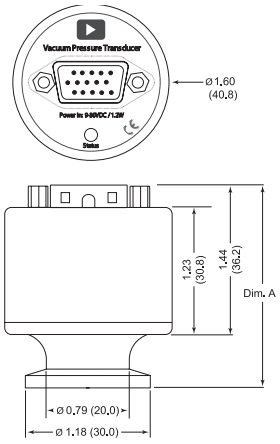


Pin	RS232/485 15 pin Sub-D	EtherCAT 15 pin Sub-D	RJ45 EtherCAT IN/OUT
1	RS485 (-)/RS232 transmit	NC	TX+
2	RS485 (+)/RS232 receive	NC	TX-
3	Power (+)	Input Power (+) 9 to 24 VDC	RX+
4	Power (-)	Power Return -	NC
5	Analog Output (+) abs.	Signal Output +	NC
6	Analog Output (-)	Signal Common	RX-
7	Relay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

Pinouts

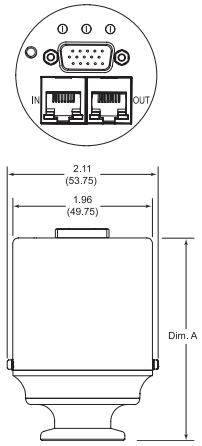
Three (3) set point relays and dual Aout, 15 pin D Subminiature and RJ45 EtherCAT IN/OUT Connectors

RS232/RS485/Analog



Flange	A
NW 16 KF	1.93 (49.1)
NW 16 KF Ext	2.58 (65.6)
NW 25 KF	2.00 (50.9)
1/8'' NPT-M	3.50 (89.0)
4 VCR®	3.20 (81.4)
8 VCR®	3.24 (82.4)
CF 1.33''	2.30 (58.5)

EtherCAT



Flange	A
NW 16 KF	2.84 (73.39)
NW 16 KF Ext	3.52 (89.41)
NW 25 KF	3.23 (82.04)
1/8'' NPT-M	4.47 (113.54)
4 VCR®	4.43 (112.52)
8 VCR®	4.47 (113.54)

Dimensional Drawing

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

Specifications

Sensor	
Type 1	MicroPirani (MEMS Thermal Conductivity)
Type 2	Piezo differential (MEMS diaphragm)
Measuring Range	
Absolute	1.0 x 10^{-5} Torr to 1500 Torr
Differential	-760 to +760 Torr
Set Point Range	
Absolute	5.0 x 10^{-4} Torr to 1000 Torr
Differential	-760 to +100 Torr
Calibration Gas	Air, Argon, Helium, Nitrogen, H_2, H_2O vapor, CO_2, Xenon, Neon
Operating Temperature Range	0° to 40°C (32° to 104°F)
Maximum Bakeout Temperature	80°C (176°F), non-operating
Digital Communication	RS485 / RS232 (4800 to 230400 Baud)
Controls	Zero adjust, span adjust, analog output, pressure units, baud rate, address, factory default, set point functions: value, hysteresis, direction, enable, transducer status, switch, LED test
Status	Absolute and differential 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 (Absolute Pressure)	1 to 9 VDC, 1 VDC/decade, 100Ω maximum output impedance
Analog Output Resolution	16 bit
Optional Analog Output 2 (Piezo Differential)	5 VDC = 0 Torr, 1 VDC/decade
Analog Output 2 Resolution	12 bit
Relays (Optional RS232 and RS485)	901P - 3 relays SPDT
Relay Contact Rating	1 A @ 30VAC/DC, resistive
Relay Response	100 msec maximum
Power Requirements	9 to 30 VDC, < 1.2 watts max (RS232/RS485) 9 to 30 VDC, < 2 watts max (EtherCAT)
MicroPirani	
Accuracy[1]	5 x 10^{-4} to 1 x 10^{-3} Torr ±10% of Reading 1 x 10^{-3} to 100 Torr ±5% of Reading 100 Torr to Atm ±25% of Reading
Repeatability[1]	1 x 10^{-3} to 100 Torr ±2% of Reading
Piezo Differential	
Accuracy Piezo[1]	-10 to +10 Torr ±10% of Reading -100 to -10 Torr ±8% of Reading -760 to -100 Torr ±1% of Reading +10 to 100 Torr ±5% of Reading
Repeatability[1]	-760 to +10 Torr ±1% of Reading
Zero Stability[1]	±0.1% of Full Scale (Full Scale = 760 Torr)
Overpressure Limit	1500 Torr (Absolute)
Electrical Connectors	
RS232/RS485/Analog	15-pin D-subminiature male
EtherCAT	
Analog	15-pin D-subminiature male
EtherCAT	Two (2) RJ45 female receptacles for incoming and network signals
Installation Orientation	Any
Internal Volume (KF16)	2.8 cm^3
Materials Exposed to Vacuum	Silicon, SiO_2, Si_3N_4, gold, low outgassing epoxy resin, 304 stainless steel, Viton®
Electronic Casing and Flange	304 stainless steel
Weight (with KF 16 Flange)	170 g
Compliance	CE, ETG.5003.2080 Vacuum Pressure Gauge

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

Ordering Information

Ordering Code Example: 901P-11030	Code	Configuration
901P Piezo Transducer	901P	901P
Flange		
KF16	1	1
KF25	2	
1/8'' NPT-M	3	
VCR4-F	4	
VCR8-F	5	
CF1.33	6	
KF16 Extended	8	
Interface		
RS232/Analog	1	1
RS485/Analog	2	
EtherCAT/Analog	7	
Analog Out		
Standard MKS	0	0
Connector Relays		
D-Sub 15 pin HD male/No Relay	2	3
D-Sub 15 pin HD male/Three Relays	3 (not available wth EtherCAT)	
D-Sub 15 pin HD male/Three Relays/Dual Aout (piezo differential)	4 (not available wth EtherCAT)	
D-Sub 15 pin HD male/Three Relays/Dual Aout (Absolute)	5 (not available wth EtherCAT)	
Enclosure		
Standard/Viton Sealing	0	0
Standard/Viton Sealing/Display	4 (not available wth 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. 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 pressure reading from individual sensors or combined reading can be seen from >5 meters away on the high contrast display.

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