

PPCA

Pressure Controller



The PPCA pressure controller provides pressure measurement and control for critical process applications such as backside wafer pressure control, transport chamber pressure control and process gas panel pressure balancing. The device may be configured for either upstream (inlet) or downstream (outlet) pressure control. This is accomplished in a compact package that saves critical space when compared to the previous multi-component systems necessary to accomplish the task.

The PPCA utilizes leading Baratron® capacitance manometer technology for pressure measurement from MKS Instruments. It is integrated along with a proportioning control valve and the latest in control electronics providing fast and accurate pressure control with critical flow monitoring as a system diagnostic. The PPCA can be

configured for 10 to 1000 Torr Full Scale pressure with a control range from 5 to 100% of Full Scale. This configurability makes the device suitable for transport chamber pressure control, critical backside wafer pressure control as well as run-vent pressure control applications. The control valve can be configured for Full Scale flow rates from 5 to 5000 sccm Full Scale depending on process conditions.

The PPCA is available with either digital (DeviceNet™ or EtherCAT®) I/O allowing for straightforward integration into new or retrofit applications. In-situ tuning and component diagnostics are enhanced through the device's micro USB user interface accessible via virtually any PC with a web browser.

Product Features

- Backside wafer cooling
- Fast response to set point with minimal overshoot
- Metal-sealed, cleanroom manufactured units meet critical high purity application needs
- Temperature compensation maintains device accuracy over its operating temperature range



Key Benefits

- Compact package
- Integral Baratron capacitance manometer technology provides accuracy, reliability, and wide range
- Configured for upstream or downstream pressure control

Specifications

Performance

Pressure Type	Absolute
Pressure Full Scale Ranges	10, 20, 50, 100, 200, 500 or 1000 Torr
Transducer Over Pressure Limit	2x Full Scale for all ranges
Maximum Differential Pressure	45 psid
Burst Pressure	1500 psig
Flow/Orifice Full Scale Ranges¹	50, 200, 1000, 5000, 10000, 20000, 30000, 50000 (sccm)
Control Modes	Downstream or Upstream
Pressure Measurement Accuracy	±0.5% of Reading
Temperature Coefficients	Zero Span <ul style="list-style-type: none"> • ±0.02% of Full Scale /°C • ±0.04% of Reading /°C
Pressure Readout Units²	Torr, kPa, mbar
Pressure Resolution	0.1 Torr
Pressure Control Accuracy³	<ul style="list-style-type: none"> • ±1.0% of Reading (≥10% Full Scale) • ±0.2% of Full Scale (<10% Full Scale)
Control Range	>5 to 100% of Full Scale
Typical Response Time⁴	<1.0 second (excluding system time constant)
Operating Temperature Range	10° to 50°C (50° to 122°F)
Storage Temperature Range	-20° to 80°C (-4° to 176°F)
Storage Humidity Range	0 to 95% relative humidity, non-condensing

¹ Orifice Full Scale ranges are nominal Full Scale flow rates for Nitrogen with 15 psig on the inlet and atmosphere on the outlet side.

² Some readout units may not be available over every primary I/O.

³ Accuracy includes linearity, hysteresis, and repeatability.

⁴ Typical response time is excluding system time constant.

Mechanical

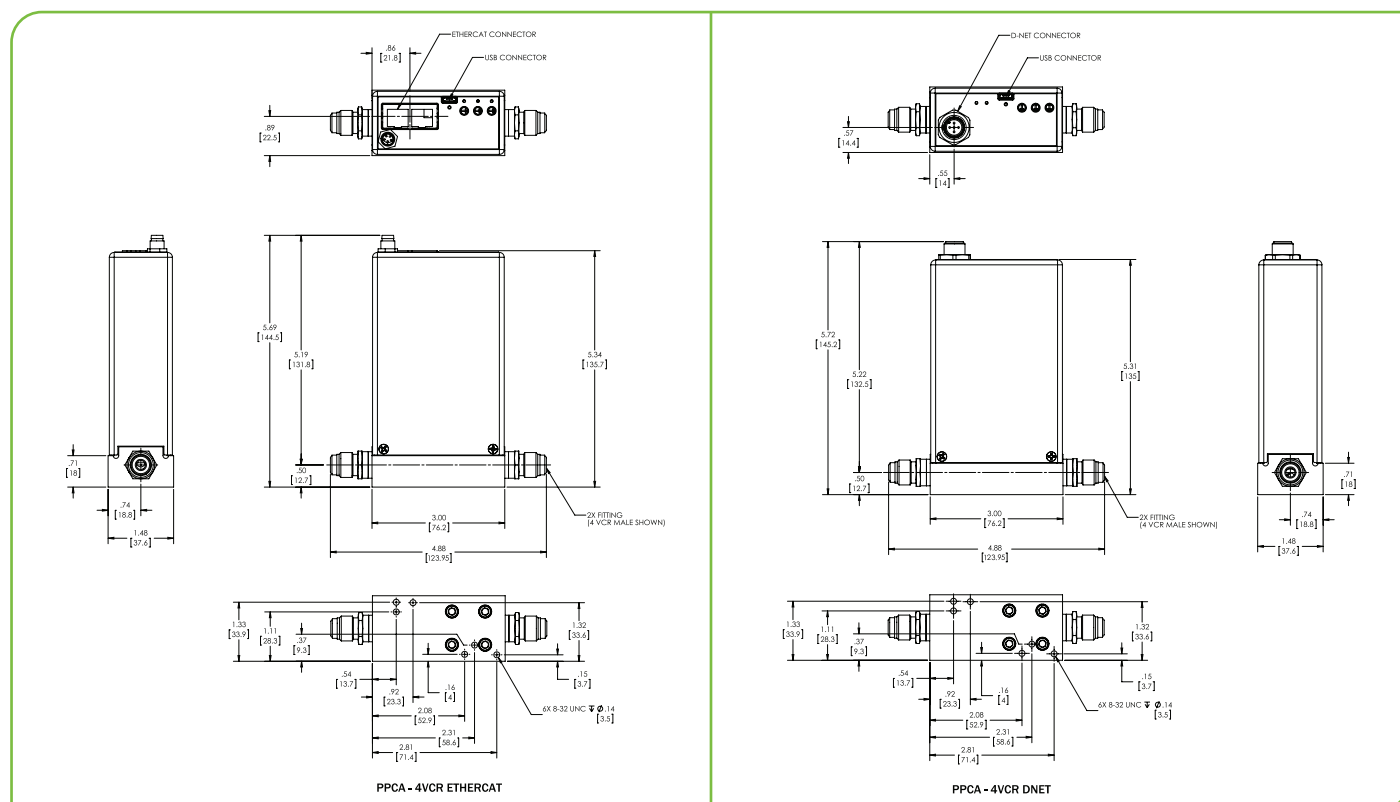
Fittings	Swagelok® 4 VCR®
Valve Options	Type <ul style="list-style-type: none"> • Normally Closed • PTFE (Teflon®) or Elastomer (Viton®), Buna-N, Neoprene, EPDM
Leak Integrity	External (scc/sec He) Through Closed Valve <ul style="list-style-type: none"> • <1 x 10⁻¹⁰ • <1.0% of orifice Full Scale (Nitrogen at 25 psig on inlet to atmosphere) • <0.1% of orifice Full Scale - Elastomer
Wetted Materials	Standard <ul style="list-style-type: none"> • 316L S.S. VAR (equivalent to 316 S.S. SCQ for semiconductor quality), 316 S.S., Elgiloy®, KM-45, Inconel® 718, 825 Incoloy® Optional (Valve Seat) <ul style="list-style-type: none"> • PTFE (Teflon) or Elastomer (Viton)
Surface Finish	10 μinches, average Ra
Weight	<3 lbs (1.36 kg)

Note: The pressure controllers require flow to operate, and will not control pressure in "dead-ended" (zero flow) applications.

Specifications

Digital I/O	DeviceNet™	EtherCAT®
Input Power Required	+11 to +25 VDC per (< 4 watts)	+24 VDC (<5 watts)
Connector	5 pin micro connector (power and comm.)	2 x RJ-45 (comm.) male, M8 male, 5 pin (power)
Data Rate Switch/Selection	4 positions: 125, 250, 500K (Default), (programmable over network)	No switch
Comm. Rate (s)	125 Kbps, 250 Kbps, 500 Kbps	100 Mbps
MAC ID Switches/Addresses	2 switches, 10 positions; 0,0 to 6,3, 1 to 254	3 switches, 16 positions
Network Size	Up to 64 nodes	Up to 4095 nodes
Visual Indicators	LED Network (green/red) LED Module (green/red)	LED Power (green) LED Run (green) LED Error (red) LED Comm (green)
Compliance	CE	CE

Dimensional Drawing



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

Ordering Information

Ordering Code Example: PCAA51TR8ADV1020	Code	Configuration
Model		
PPCA Pressure Controller	PPCA	PPCA
Sensor Type		
Absolute	A	A
Pressure Range Full Scale and Units		
10 Torr 20 Torr 50 Torr 100 Torr 200 Torr 500 Torr 1000 Torr 100 mBar 500 mBar 1000 mBar 1 kPa 5 kPa 10 kPa 100 kPa	11T 21T 51T 12T 22T 52T 13T 12M 52M 13M 10K 50K 11K 12K	51T
Fittings		
Swagelok 4 VCR	R	R
Electrical Connector		
DeviceNet EtherCAT	6 8	8
Orifice Size		
A (50 sccm) #1 (200 sccm) #2 (1000 sccm) #3 (5000 sccm) #4 (10000 sccm) #5 (20000 sccm) #6 (30000 sccm) #7 (50000 sccm)	A 1 2 3 4 5 6 7	A
Pressure Control		
Upstream (inlet) Downstream (outlet)	U D	D
Plug Material		
Buna N/NC EPDM/NC Neoprene/NC Teflon/NC Viton/NC	B1 E1 N1 T1 V1	V1
Reserved		
Standard	0	0
Firmware		
DeviceNet EtherCAT	10 20	20