

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 Ranges ¹ | 50, 200, 1000, 5000, 10000, 20000, 30000, 50000 (sccm) |
| Control Modes | Downstream or Upstream |
| Pressure Measurement Accuracy | ±0.5% of Reading |
| Temperature Coefficients | |
| Zero | ±0.02% of Full Scale /°C |
| Span | ±0.04% of Reading /°C |
| Pressure Readout Units ² | Torr, kPa, mbar |
| Pressure Resolution | 0.1 Torr |
| Pressure Control Accuracy ³ | ±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 Time ⁴ | <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 | Normally Closed |
| Seat Material | PTFE (Teflon®) or Elastomer (Viton®), Buna-N, Neoprene, EPDM |
| Leak Integrity | |
| External (scc/sec He) | <1 x 10 ⁻¹⁰ |
| Through closed valve | <1.0% of orifice Full Scale (Nitrogen at 25 psig on inlet to atmosphere) <0.1% of orifice Full Scale - Elastomer |
| Wetted Materials | |
| Standard | 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) | PTFE (Teflon) or Elastomer (Viton) |
| Surface Finish | 10 μinches, average Ra |
| Weight | <3 lbs (1.36 kg) |

Digital I/O

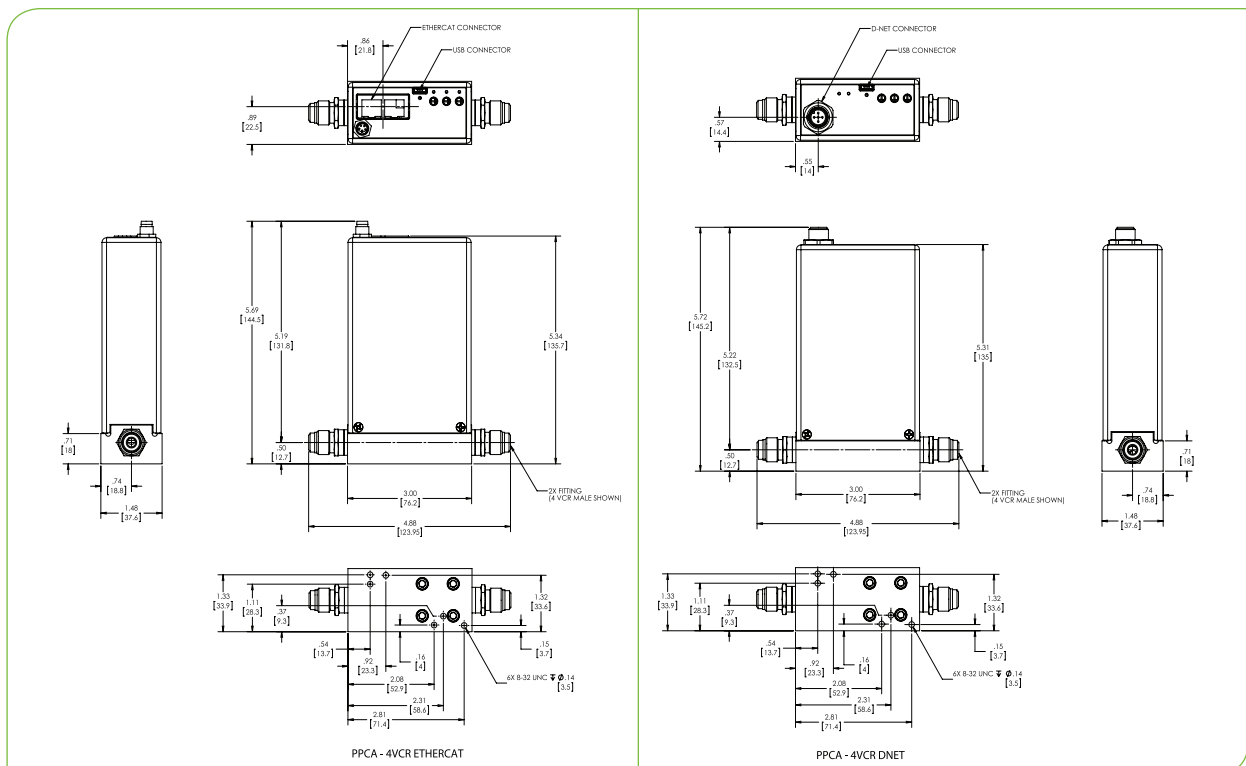
DeviceNet™

| | |
|----------------------------|--|
| Input Power Required | +11 to +25 VDC per (< 4 watts) |
| Connector | 5 pin micro connector (power and comm.) |
| Data Rate Switch/Selection | 4 positions: 125, 250, 500K (Default), (programmable over network) |
| Comm. Rate (s) | 125 Kbps, 250 Kbps, 500 Kbps |
| MAC ID Switches/Addresses | 2 switches, 10 positions; 0,0 to 6,3, 1 to 254 |
| Network Size | Up to 64 nodes |
| Visual Indicators | LED Network (green/red) LED Module (green/red) |
| Compliance | CE |

EtherCAT®

| | |
|----------------------------|---|
| Input Power Required | +24 VDC (<5 watts) |
| Connector | 2 x RJ-45 (comm.) male, M8 male, 5 pin (power) |
| Data Rate Switch/Selection | No switch |
| Comm. Rate (s) | 100 Mbps |
| Mac ID Switches/Addresses | 3 switches, 16 positions |
| Network Size | Up to 4095 nodes |
| Visual Indicators | LED Power (green) LED Run (green) LED Error (red) LED Comm (green) |
| Compliance | CE |

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



Dimensional Drawing

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

Ordering Information

| Ordering Code Example: PPCAA51TR8ADV1020 | Code | Configuration |
|--|------|---------------|
| PPCA Pressure Controller | PPCA | PPCA |
| Sensor Type | | |
| Absolute | A | A |
| Pressure Range Full Scale and Units | | |
| 10 Torr | 11T | 51T |
| 20 Torr | 21T | |
| 50 Torr | 51T | |
| 100 Torr | 12T | |
| 200 Torr | 22T | |
| 500 Torr | 52T | |
| 1000 Torr | 13T | |
| 100 mBar | 12M | |
| 500 mBar | 52M | |
| 1000 mBar | 13M | |
| 1 kPa | 10K | |
| 5 kPa | 50K | |
| 10 kPa | 11K | |
| 100 kPa | 12K | |
| Fittings | | |
| Swagelok 4 VCR | R | R |
| Electrical Connector | | |
| DeviceNet | 6 | 8 |
| EtherCAT | 8 | |
| Orifice Size | | |
| A (50 sccm) | A | A |
| #1 (200 sccm) | 1 | |
| #2 (1000 sccm) | 2 | |
| #3 (5000 sccm) | 3 | |
| #4 (10000 sccm) | 4 | |
| #5 (20000 sccm) | 5 | |
| #6 (30000 sccm) | 6 | |
| #7 (50000 sccm) | 7 | |
| Pressure Control | | |
| Upstream (inlet) | U | D |
| Downstream (outlet) | D | |
| Plug Material | | |
| Buna N/NC | B1 | V1 |
| EPDM/NC | E1 | |
| Neoprene/NC | N1 | |
| Teflon/NC | T1 | |
| Viton/NC | V1 | |
| Reserved | | |
| Standard | 0 | 0 |
| Firmware | | |
| DeviceNet | 10 | 20 |
| EtherCAT | 20 | |



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