

DA02A

Absolute Baratron® Capacitance Manometer with EtherCAT® Communications



For well over half a century, the MKS Baratron® capacitance manometers have led the industry in performance, accuracy, reliability, and worldwide installed base. The DA02A Baratron capacitance manometer continues that progression of high performance into networked systems, using industry-standard EtherCAT digital communications to connect to complex process tools.

Based on the proven E28 and 600 Series absolute analog manometer products, the DA02A meets the current ETG.5003 Semiconductor Device Profile and is designed for use in advanced manufacturing systems. It uses the same Inconel®-based capacitance sensor as analog communication Baratron manometer products, and thus

offers the same long lifetime, low maintenance, and high corrosion resistance. Two (2) independently configurable solid state trip relays for pressure are available as an option to permit the control of external components. It is available in unheated, 45°C, 80°C, or 100°C temperature-controlled versions, Full Scale measurement ranges from 0.1 to 1000 Torr (13.3 Pa to 133.3 kPa), and a wide variety of different connection fittings for use in a wide range of applications.

Photo is for illustration purposes only. The DA02A is shown with an 8 VCR fitting.



Product Features

- Includes both analog output and EtherCAT communications
- Full Scale measurement ranges from 0.1 to 1000 Torr (13.3 Pa to 133.3 kPa)
- Available in unheated, 45°, 80°, or 100°C temperature-controlled versions
- Available with EtherCAT standard +24VDC or traditional ±15 VDC input power configuration
- Deposition/fluorine friendly sensor option available
- Optional deposition traps are available to minimize process buildup in the manometer
- Push button zero

Key Benefits

- Industry-leading accuracy and repeatability
- Inconel-based sensor offers superior corrosion resistance to common process gases
- Excellent long-term stability

Specifications

| Performance | | |
|---------------------------------|------------------------------------|---|
| Full Scale Ranges | | 0.1, 0.25, 1, 2, 10, 20, 100, 200, 500, and 1000 Torr (and metric equivalents) |
| Resolution ¹ | | 0.001% Full Scale |
| Operating Temperatures | Unheated 45°C 80°C and 100°C | <ul style="list-style-type: none"> 0 to 50°C 15° to 40°C 15° to 50°C |
| Accuracy ^{2,3} | Unheated 45°C 80°C and 100°C | <ul style="list-style-type: none"> 0.50% of Reading for ranges < 1 Torr 0.25% of Reading for ranges ≥ 1 Torr 0.15% Reading for ranges < 1 Torr 0.10% of Reading for ranges ≥ 1 Torr 0.50% of Reading for ranges < 1 Torr 0.25% of Reading for ranges ≥ 1 Torr |
| Temperature Coefficients - Zero | Unheated 45°C 80°C and 100°C | <ul style="list-style-type: none"> 0.020% Full Scale/°C for < 1 Torr 0.015% Full Scale/°C for 1 Torr 0.010% Full Scale/°C for 2 Torr 0.005% Full Scale/°C for 10 to 1000 Torr 0.005% Full Scale/°C for ranges < 1 Torr 0.002% Full Scale/°C for ranges ≥ 1 Torr 0.010% Full Scale/°C for ranges < 1 Torr 0.002% Full Scale/°C for ranges ≥ 1 Torr |
| Temperature Coefficients - Span | Unheated Heated | <ul style="list-style-type: none"> 0.04% Reading/°C 0.02% Reading/°C |
| Materials Exposed to Gases | | Inconel and Incoloy nickel alloys (Fittings are made from 300 series stainless steel) |
| Internal Sensor Volume | | 6.3 cm ³ for ½" OD tube fitting. Volumes with other fitting available on request |
| Warmup Time | | 2 hours for ranges ≥ 1 Torr; 4 hours for ranges < 1 Torr |
| Overpressure Limit | | 45 psia (310 kPa) |
| Input Power | Unheated 45°C 80°C and 100°C | <ul style="list-style-type: none"> +24 VDC ±10% @ 300 mA or ±15 VDC @ 300 mA +24 VDC ±10% @ 600 mA or ±15 VDC @ 600 mA +24 VDC ±10% @ 800 mA or ±15 VDC @ 800 mA |
| Output Signal | Analog Digital | <ul style="list-style-type: none"> 0 – 10 VDC into > 10 kΩ load EtherCAT |
| Response Time | EtherCAT Update Rate | 3.3 ms |
| Trip Relay Option | | Two (2) internally mounted process pressure trip relays, solid state, independently adjustable through EtherCAT by customer at atmospheric pressure from 0.5% to 100% of Full Scale range. Relay capacity of 0.20 amps@ 30 VDC. Complies with UL1577 requirements. Trip point option also includes two similar relays for "at temperature" and heater error status. |
| Electrical Connectors | Analog EtherCAT | <ul style="list-style-type: none"> 15-pin D-subminiature male Two (2) RJ45 female receptacles for incoming and network signals |
| External Indicators | | Multicolor status LED and two (2) red/green LEDs for EtherCAT communications status |
| Connection Fittings | Standard Optional | <ul style="list-style-type: none"> ½" (12 mm) OD tube 8 VCR® male or female, 8 VCO® female, NW16-KF, NW25-KF, and 1.33" (34 mm) OD CF |
| Compliance ⁴ | | CE, ETG.5003.2080 Vacuum Pressure Gauge |

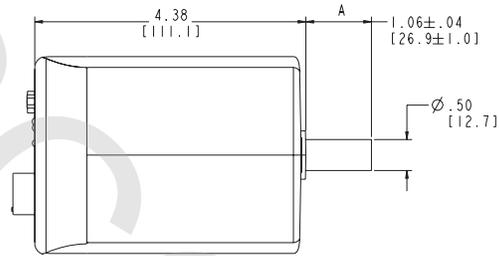
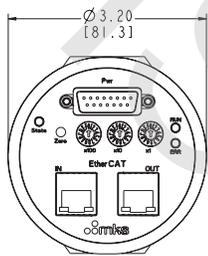
¹ Theoretical resolution under ideal laboratory conditions. Actual resolution in service is usually determined by system design factors not under MKS's control.

² Includes non-linearity, hysteresis, and non-repeatability.

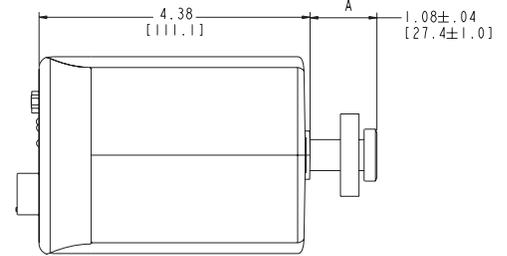
³ Accuracy specification and NIST-traceable calibration points included on calibration sheet are from Full Scale to 10% of Full Scale.

⁴ When connected to a properly shielded cable, grounded at both ends.

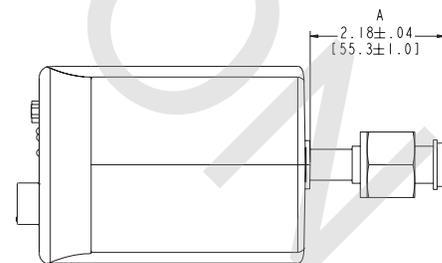
Dimensional Drawings



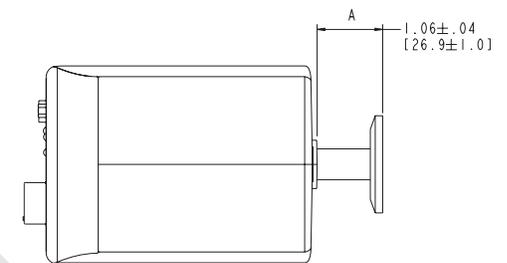
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Ø .50 TUBULATION



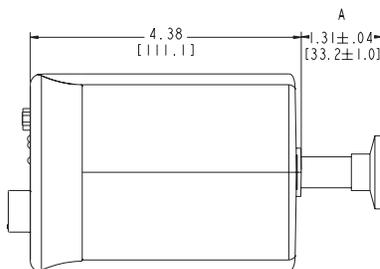
FITTING CODE -HA-
1.33" CF ROTATABLE



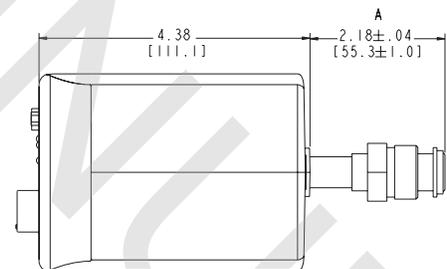
FITTING CODE -CE-
8VCR FEM SKT WLD



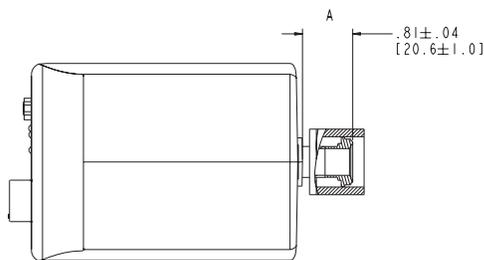
FITTING CODE -GC-
NW-25-KF FACE WLD



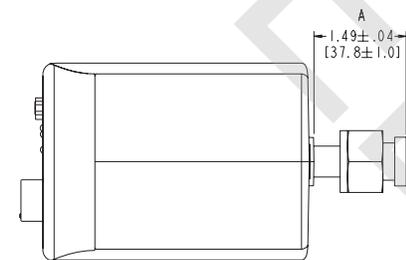
FITTING CODE -GA-
NW-16-KF SKT WLD



FITTING CODE -CF-
8VCR MALE SKT WLD



FITTING CODE -CR-
8VCR FEM SHORT BUTT WLD



FITTING CODE -DA-
8VCO FEM SKT WLD

Unless otherwise specified, dimensions are nominal values in inches (mm referenced). For sensor code L or M, dimension A is 0.03" longer.

| Ordering Code Example: DA02A11TCES24C00AA | Code | Configuration |
|--|--|---------------|
| Model | | |
| DA02A Baratron Digital Capacitance Manometer | DA02A | DA02A |
| Pressure Range | | |
| 0.1 0.25 1 2 10 20 100 200 500 1000 | .1 RE 01 02 11 21 12 22 52 13 | 11 |
| Units of Measurement | | |
| Torr absolute mbar absolute kPa absolute | T M K | T |
| Fittings | | |
| ½" OD tube 8 female VCR 8 male VCR 8 female VCR, short inlet tube (use with sensor type T or M) KF16 KF25 1.33" OD CF (rotatable) | BA CE CF CR GA GC HA | CE |
| Sensor Type | | |
| Standard sensor, standard inlet tube length Standard sensor, reduced inlet tube length (use with fitting code CR) Deposition/etch/fluorine friendly sensor (range to 20 Torr) Short tube deposition/etch/fluorine friendly sensor (range to 2 Torr, use with fitting code CR) | S T L M | S |
| Input/Output Voltages | | |
| +24 VDC or ±15 VDC input, 0-10 VDC analog output | 2 | 2 |
| Sensor Temperature | | |
| Unheated 45°C 80°C 100°C | 0 4 8 1 | 4 |
| Electrical Connector | | |
| (2) RJ45 EtherCAT jacks with 15-pin D-subminiature connector | C | C |
| Calibration Orientation (select V or H for range ≤ 1 Torr) | | |
| Standard (ranges > 1 Torr) Vertical (standard for ranges ≤ 1 Torr) Horizontal (available for ranges ≤ 1 Torr only) | 0 V H | 0 |
| Accuracy | | |
| Standard accuracy | 0 | 0 |
| Trip Points* | | |
| None Trip A above 50%, Trip B above 50% of Full Scale Range Trip A above 50%, Trip B below 50% of Full Scale Range Trip A below 50%, Trip B below 50% of Full Scale Range Trip A below 50%, Trip B above 50% of Full Scale Range | None AA AB BB BA | AA |

Notes: * Units with trip points have default setpoints and actuation direction based on the part number code but are user adjustable through EtherCAT. Custom Part numbers can be requested for copy exact applications. Standard part numbers will ship with the latest firmware at the date of manufacture. A custom part number should be requested for locked firmware/EtherCAT® ESI file.