

# DA03B

## Heated (150°C to 200°C) Absolute Baratron® Capacitance Manometer with EtherCAT® Communications



The DA03B Baratron® capacitance manometer operates at sensor temperatures up to 200°C and is well suited for use in advanced applications such as Chemical Vapor Deposition (CVD), Atomic Layer Deposition (ALD), semiconductor processes, and lyophilization. High temperature operation minimizes the deposition of process byproducts within the sensor, reducing output drift caused by contamination. The DA03B product leverages the same proven digital architecture and EtherCAT® communications as the industry-standard DA02A, but utilizes a larger sensor than in the DA03A or 631D product for increased sensitivity and decreased process related zero drift.

The DA03B is completely self-contained and is available in either +24 VDC or  $\pm 15$  VDC input power configurations. Its Inconel® sensor is resistant to corrosion, and its

overpressure rating of 45 psia ensures good repeatability and stability regardless of the system operating conditions. Optional sensors and deposition traps are available for enhanced zero drift capabilities. The high-performance digital electronics of the DA03B also includes fail-safe over-temperature protection and LED status lights to indicate the operating state. Solid state relay outputs provide indication of sensor at temperature and heater failure. Additional options include an internally-mounted set of two (2) UL recognized solid state trip relays provided for pressure trip points for control of external equipment or components. The pressure trip relays may be set by the user over the EtherCAT bus at atmospheric pressure, eliminating the need for vacuum pumps during set point adjustment.

### Product Features

- Sensor operating temperature of 150°C to 200°C (factory set)
- High 45 psia overpressure rating for improved stability and repeatability
- Optional internally-mounted, user programmable solid state process relays for external control
- Insensitive to gas composition
- EtherCAT interface and analog outputs



### Key Benefits

- Long-term performance in ALD, CVD, Lyophilization, and other advanced manufacturing processes
- Minimizes the deposition of byproducts
- Provides fail-safe over-temperature protection
- All-Inconel larger sensor for superior sensitivity, corrosion resistance, and long-term stability

## Specifications

|                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Full Scale Pressure Ranges</b>                                                         | 1, 2, 3, 5, 10, 20, 100, 1000 Torr                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Accuracy<sup>1,2</sup></b>                                                             | ±0.25% of Reading                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Temperature Coefficients - Zero</b><br><b>150°C/160°C</b><br><br><b>200°C</b>          | <ul style="list-style-type: none"> <li>• ±0.004% Full Scale/°C for &gt;1 Torr</li> <li>• ±0.008% Full Scale/°C for 1 Torr range</li> <li>• ±0.008% Full Scale/°C for &gt;1 Torr</li> <li>• ±0.016% Full Scale/°C for 1 Torr range</li> </ul>                                                                                                                                                            |
| <b>Temperature Coefficients - Span</b>                                                    | ±0.02% Reading/°C                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Response Time</b><br><b>Analog/Digital</b><br><b>EtherCAT</b>                          | <ul style="list-style-type: none"> <li>• 35 ms (nominal) influenced by pressure range, step size, and digital pressure filter settings</li> <li>• Refresh Rate = 3.3 ms</li> </ul>                                                                                                                                                                                                                      |
| <b>Internal Volume</b>                                                                    | 6.3 cm <sup>3</sup> typical. Contact MKS for volumes with specific flanges.                                                                                                                                                                                                                                                                                                                             |
| <b>Input Power</b>                                                                        | ±15 VDC @ 1.6A or +24 VDC @ 1.3A at start up (factory set)                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Signal</b>                                                                      | Analog 0-10 VDC into >10kΩ load, EtherCAT                                                                                                                                                                                                                                                                                                                                                               |
| <b>Warmup Time</b>                                                                        | 2.5 hours typical                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Operating Temperature Range</b>                                                        | 15 to 50°C                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Ambient Airflow Requirements</b><br><b>150/160°C Models</b><br><br><b>200°C Models</b> | <ul style="list-style-type: none"> <li>• 50 ft/min for ambient temperatures of 40 - 50°C</li> <li>• 150 ft/min for ambient temperatures of 40 - 50°C</li> </ul>                                                                                                                                                                                                                                         |
| <b>Resolution<sup>3</sup></b>                                                             | 0.001% of Full Scale                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Overpressure Limit</b>                                                                 | 45 psia                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Materials Exposed to Process Gases</b>                                                 | Inconel® and Incoloy® nickel alloys (some fitting options are 300 Series Stainless)                                                                                                                                                                                                                                                                                                                     |
| <b>Trip Relays</b><br><br><b>Standard</b><br><br><b>Optional</b>                          | <ul style="list-style-type: none"> <li>• Two (2) internal solid state relays provided for heater "at temperature" status and heater failure. Relay capacity of 1 amp at 30 VDC.</li> <li>• Two (2) internal process pressure trip relays, solid state, independently adjustable by customer at atmospheric pressure from 0.5% to 100% of Full Scale range. Relay capacity of 1 amp @ 30 VDC.</li> </ul> |
| <b>Fittings</b><br><br><b>Standard</b><br><br><b>Optional</b>                             | <ul style="list-style-type: none"> <li>• ½" (12 mm) OD tube</li> <li>• Swagelok® 8 VCR® female, 8 VCR male, NW16-KF, NW25-KF, Mini-CF, 1.5" TriClover, and 2" TriClover</li> </ul>                                                                                                                                                                                                                      |
| <b>Compliance<sup>4</sup></b>                                                             | CE, UL1577 (Trip Relays only)                                                                                                                                                                                                                                                                                                                                                                           |

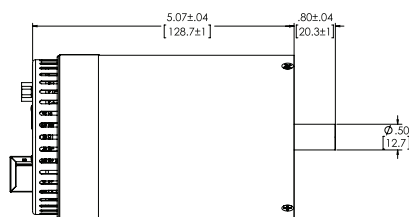
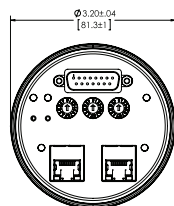
<sup>1</sup> Includes non-linearity, hysteresis, and non-repeatability.

<sup>2</sup> Accuracy specification and NIST-traceable calibration points included on calibration sheet are from Full Scale to 10% of Full Scale.

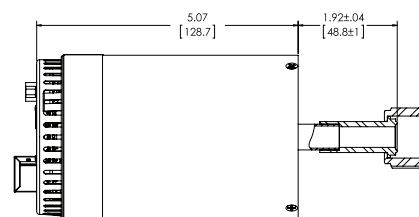
<sup>3</sup> Theoretical resolution under ideal laboratory conditions. Actual resolution in service is usually determined by system design factors not under MKS's control.

<sup>4</sup> When connected to a properly shielded cable, grounded at both ends.

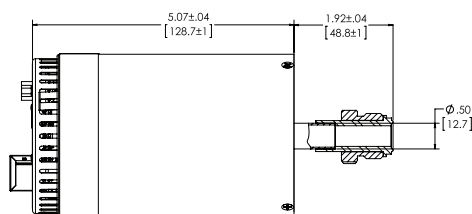
## Dimensional Drawings



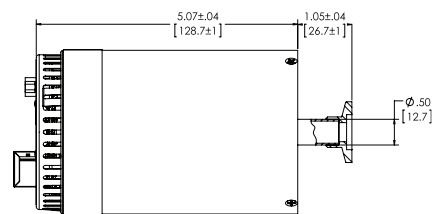
FITTING CODE -BA-  
Ø.50 TUBULATION



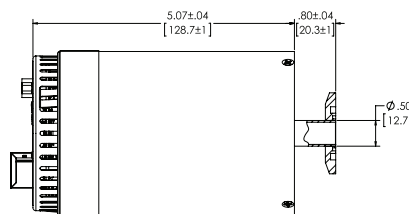
FITTING CODE -CE-  
8 VCR FEM SKT WLD



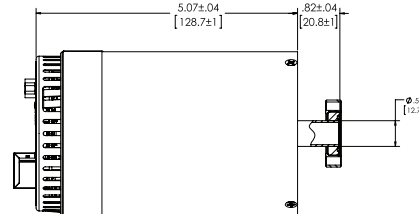
FITTING CODE -CF-  
8 VCR MALE



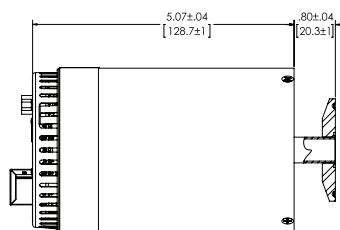
FITTING CODE -GA-  
NW-16-KF SOCKET WELD



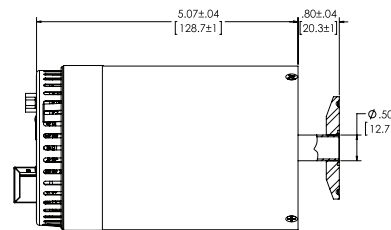
FITTING CODE -GC-  
NW-25-KF FACE WELD



FITTING CODE -HA-  
1.33 INCH CONFLAT, ROTATABLE



FITTING CODE -KA-  
1.50 TRI-CLOVER FLANGE



FITTING CODE -KB-  
2.00 TRI-CLOVER FLANGE

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

| Ordering Code Example: DA03B11TCES36BAA0000                |  |  | Code  | Configuration |
|------------------------------------------------------------|--|--|-------|---------------|
| Model                                                      |  |  |       |               |
| DA03B Absolute Manometer                                   |  |  | DA03B | DA03B         |
| Ranges (Torr)                                              |  |  |       |               |
| 1                                                          |  |  | 01    | 11            |
| 2                                                          |  |  | 02    |               |
| 3                                                          |  |  | 03    |               |
| 5                                                          |  |  | 05    |               |
| 10                                                         |  |  | 11    |               |
| 20                                                         |  |  | 21    |               |
| 100                                                        |  |  | 12    |               |
| 1000                                                       |  |  | 13    |               |
| Units of Measurement (as shown on calibration sheet)       |  |  |       |               |
| Torr                                                       |  |  | T     | T             |
| mbar                                                       |  |  | M     |               |
| kPa                                                        |  |  | K     |               |
| Fittings                                                   |  |  |       |               |
| ½" OD tube                                                 |  |  | BA    | CE            |
| 8 VCR female                                               |  |  | CE    |               |
| 8 VCR male                                                 |  |  | CF    |               |
| NW16-KF                                                    |  |  | GA    |               |
| NW25-KF                                                    |  |  | GC    |               |
| Mini-CF                                                    |  |  | HA    |               |
| 1.5" TriClover <sup>1</sup>                                |  |  | KA    |               |
| 2.0" TriClover <sup>1</sup>                                |  |  | KB    |               |
| Sensor Type                                                |  |  |       |               |
| Standard                                                   |  |  | S     | S             |
| Deposition/Fluorine Friendly (1, 2, 10, 100, 1000 Torr)    |  |  | L     |               |
| Input/Output Voltages                                      |  |  |       |               |
| ±15 VDC                                                    |  |  | 2     | 3             |
| +24 VDC                                                    |  |  | 3     |               |
| Sensor Temperature                                         |  |  |       |               |
| 200°C                                                      |  |  | 2     | 6             |
| 160°C                                                      |  |  | 6     |               |
| 150°C                                                      |  |  | 5     |               |
| Electrical Connector <sup>2</sup>                          |  |  |       |               |
| 15-pin D with Screw Locks                                  |  |  | B     | B             |
| 15-pin D with Slide Lock Posts                             |  |  | P     |               |
| Integral Relays <sup>3</sup>                               |  |  |       |               |
| No Relays                                                  |  |  | 00    | AA            |
| Trip Point A Above Set Point, Trip Point B Above Set Point |  |  | AA    |               |
| Trip Point A Above Set Point, Trip Point B Below Set Point |  |  | AB    |               |
| Trip Point A Below Set Point, Trip Point B Below Set Point |  |  | BB    |               |
| Trip Point A Below Set Point, Trip Point B Above Set Point |  |  | BA    |               |
| Reserved                                                   |  |  |       |               |
| Reserved For Future Use                                    |  |  | 0     | 0             |
| Calibration Orientation                                    |  |  |       |               |
| Ranges 1 Torr and above (not required)                     |  |  | 0     | 0             |
| Accuracy                                                   |  |  |       |               |
| Standard                                                   |  |  | 0     | 0             |
| Other Options                                              |  |  |       |               |
| None                                                       |  |  | 0     | 0             |

Notes:

<sup>1</sup> Products with TriClover fittings have Type 316L stainless steel fittings.

<sup>2</sup> For CE compliance, the mating electrical connector must be properly grounded.

<sup>3</sup> Units with trip points have default set points of 50% of Full Scale, a default hysteresis of 0, and actuation direction based on the part number code. The settings 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.