

# DA02B

Absolute Baratron® Capacitance Manometer with EtherCAT® Communications (Full Scale Pressures from 0.1 to 1000 Torr)\*



## Please Note

\* Not recommended for new designs. For new applications see DA05A for Full Scale pressures <1 Torr/mbar and DA07A for Full Scale pressures 1 Torr/mbar and greater.

For well over half a century, the MKS Baratron® capacitance manometers have led the industry in performance, accuracy, reliability, and worldwide installed base. The DA02B 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 DA02B 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 or heated to 45°C, 80°C, or 100°C 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.

## 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 or heated to 45°C, 80°C, or 100°C 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



*Photo is for illustration purposes only. The DA02B is shown with an 8 VCR fitting.*

## Key Benefits

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

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## Specifications

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<b>Full Scale Ranges<sup>1</sup></b>		0.1, 0.25, 1, 2, 10, 20, 100, 200, 500, and 1000 Torr (and metric equivalents)
<b>Resolution<sup>2</sup></b>		0.001% Full Scale
<b>Operating Temperatures</b>	<b>Unheated</b> 45°C 80°C and 100°C	<ul style="list-style-type: none"> <li>• 0 to 50°C</li> <li>• 15° to 40°C</li> <li>• 15° to 50°C</li> </ul>
<b>Accuracy<sup>3,4</sup></b>	<b>Unheated</b>  45°C  80°C and 100°C	<ul style="list-style-type: none"> <li>• 0.50% of Reading for ranges &lt; 1 Torr 0.25% of Reading for ranges ≥ 1 Torr</li> <li>• 0.15% Reading for ranges &lt; 1 Torr 0.10% of Reading for ranges ≥ 1 Torr</li> <li>• 0.50% of Reading for ranges &lt; 1 Torr 0.25% of Reading for ranges ≥ 1 Torr</li> </ul>
<b>Temperature Coefficients - Zero</b>	<b>Unheated</b>  45°C  80°C and 100°C	<ul style="list-style-type: none"> <li>• 0.020% Full Scale/°C for &lt; 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</li> <li>• 0.005% Full Scale/°C for ranges &lt; 1 Torr 0.002% Full Scale/°C for ranges ≥ 1 Torr</li> <li>• 0.010% Full Scale/°C for ranges &lt; 1 Torr 0.002% Full Scale/°C for ranges ≥ 1 Torr</li> </ul>
<b>Temperature Coefficients - Span</b>	<b>Unheated</b> <b>Heated</b>	<ul style="list-style-type: none"> <li>• 0.04% Reading/°C</li> <li>• 0.02% Reading/°C</li> </ul>
<b>Materials Exposed to Gases</b>		Inconel and Incoloy nickel alloys (Fittings are made from 300 series stainless steel)
<b>Internal Sensor Volume</b>		6.3 cm <sup>3</sup> for ½" OD tube fitting. Volumes with other fitting available on request
<b>Warmup Time</b>		2 hours for ranges ≥ 1 Torr; 4 hours for ranges < 1 Torr
<b>Overpressure Limit</b>		45 psia (310 kPa)
<b>Input Power</b>	<b>Unheated</b> 45°C 80°C and 100°C	<ul style="list-style-type: none"> <li>• +24 VDC ±10% @ 300 mA or ±15 VDC @ 300 mA</li> <li>• +24 VDC ±10% @ 600 mA or ±15 VDC @ 600 mA</li> <li>• +24 VDC ±10% @ 800 mA or ±15 VDC @ 800 mA</li> </ul>
<b>Output Signal</b>	<b>Analog</b> <b>Digital</b>	<ul style="list-style-type: none"> <li>• 0 – 10 VDC into &gt; 10 kΩ load</li> <li>• EtherCAT</li> </ul>
<b>Response Time</b>	<b>EtherCAT Update Rate</b>	3.3 ms
<b>Trip Relay Option</b>		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.
<b>Electrical Connectors</b>	<b>Analog</b> <b>EtherCAT</b>	<ul style="list-style-type: none"> <li>• 15-pin D-subminiature male</li> <li>• Two (2) RJ45 female receptacles for incoming and network signals</li> </ul>
<b>External Indicators</b>		Multicolor status LED and two (2) red/green LEDs for EtherCAT communications status
<b>Connection Fittings</b>	<b>Standard</b> <b>Optional</b>	<ul style="list-style-type: none"> <li>• ½" (12 mm) OD tube</li> <li>• 8 VCR® male or female, 8 VCO® female, NW16-KF, NW25-KF, and 1.33" (34 mm) OD CF</li> </ul>
<b>Compliance<sup>5</sup></b>		CE, ETG.5003.2080 Vacuum Pressure Gauge

<sup>1</sup> Not recommended for new designs. For new applications see DA05A for Full Scale pressures <1 Torr/mbar and DA07A for Full Scale pressures 1 Torr/mbar and greater.

<sup>2</sup> Theoretical resolution under ideal laboratory conditions. Actual resolution in service is usually determined by system design factors not under MKS's control.

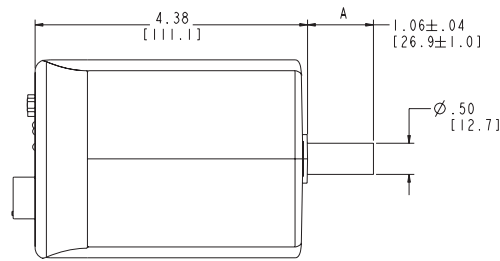
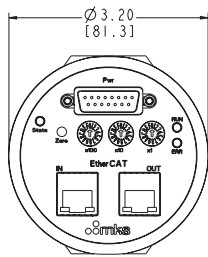
<sup>3</sup> Includes non-linearity, hysteresis, and non-repeatability.

<sup>4</sup> Accuracy specification and NIST-traceable calibration points included on calibration sheet are from Full Scale to 10% of Full Scale.

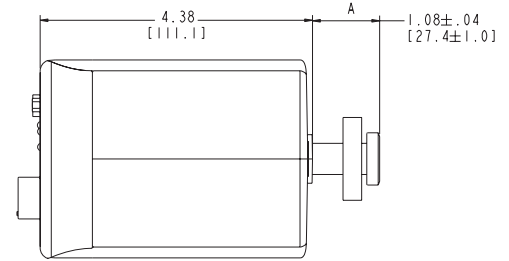
<sup>5</sup> When connected to a properly shielded cable, grounded at both ends.

## Dimensional Drawings

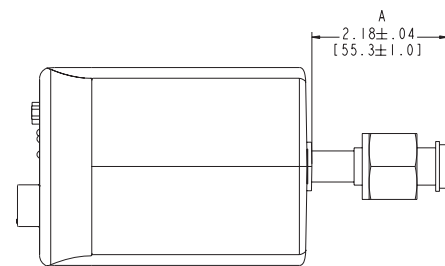
**Please Note** \* Not recommended for new designs. For new applications see DA05A for Full Scale pressures <1 Torr/mbar and DA07A for Full Scale pressures 1 Torr/mbar and greater.



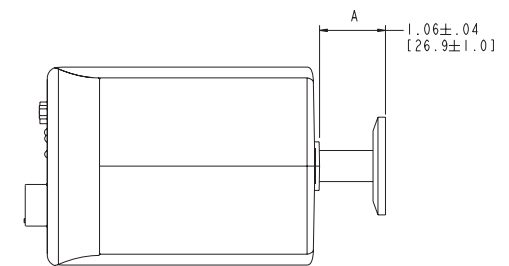
FITTING CODE -BA-  
Ø.50 TUBULATION



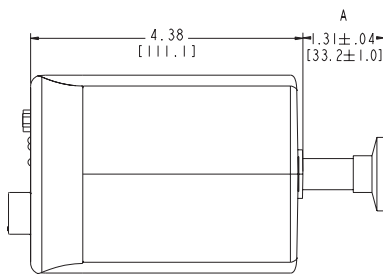
FITTING CODE -HA-  
1.33" CF ROTATABLE



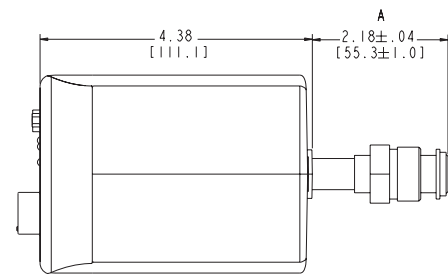
FITTING CODE -CE-  
8VCR FEM SKT WLD



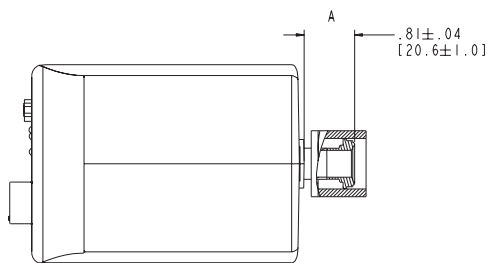
FITTING CODE -GC-  
NW-25-KF FACE WLD



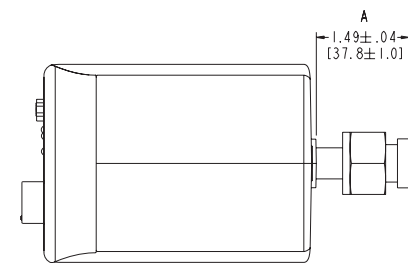
FITTING CODE -GA-  
NW-16-KF SKT WLD



FITTING CODE -CF-  
8VCR MALE SKT WLD



FITTING CODE -CR-  
8VCR FEM SHORT BUTT WLD



FITTING CODE -DA-  
8VCO FEM SKT WLD

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Ordering Code Example: DA02B11TCES24C00AA	Code	Configuration
<b>Model</b>		
DA02B Baratron Digital Capacitance Manometer	DA02B	DA02B
<b>Pressure Range*</b>		
0.1	.1	11
0.25	RE	
1	01	
2	02	
10	11	
20	21	
100	12	
200	22	
500	52	
1000	13	
<b>Units of Measurement</b>		
Torr absolute	T	T
mbar absolute	M	
kPa absolute	K	
<b>Fittings</b>		
½" OD tube	BA	CE
8 female VCR	CE	
8 male VCR	CF	
8 female VCR, short inlet tube (use with sensor type T or M)	CR	
KF16	GA	
KF25	GC	
1.33" OD CF (rotatable)	HA	
<b>Sensor Type</b>		
Standard sensor, standard inlet tube length	S	S
Standard sensor, reduced inlet tube length (use with fitting code CR)	T	
Deposition/etch/fluorine friendly sensor (range to 20 Torr)	L	
Short tube deposition/etch/fluorine friendly sensor (range to 2 Torr, use with fitting code CR)	M	
<b>Input/Output Voltages</b>		
+24 VDC or ±15 VDC input, 0-10 VDC analog output	2	2
<b>Sensor Temperature</b>		
Unheated	0	4
45°C	4	
80°C	8	
100°C	1	
<b>Electrical Connector</b>		
(2) RJ45 EtherCAT jacks with 15-pin D-subminiature connector	C	C
<b>Calibration Orientation (select V or H for range ≤ 1 Torr)</b>		
Standard (ranges > 1 Torr)	0	0
Vertical (standard for ranges ≤ 1 Torr)	V	
Horizontal (available for ranges ≤ 1 Torr only)	H	
<b>Accuracy</b>		
Standard accuracy	0	0
<b>Trip Points**</b>		
None	None	AA
Trip A above 50%, Trip B above 50% of Full Scale Range	AA	
Trip A above 50%, Trip B below 50% of Full Scale Range	AB	
Trip A below 50%, Trip B below 50% of Full Scale Range	BB	
Trip A below 50%, Trip B above 50% of Full Scale Range	BA	

**Notes:**

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\*\* 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 ship with latest firmware at the date of manufacture. A custom part number should be requested for locked firmware/EtherCAT® ESI file.