

DA07A

Absolute Baratron® Digital Capacitance Manometer with EtherCAT® Communications (Full Scale Pressure from 1 to 1000 Torr/mbar)*



The DA07A Baratron® Capacitance Manometer is the next generation EtherCAT® manometer from MKS, the industry leader in capacitance manometer pressure gauges.

The DA07A builds off the same Inconel® sensor as the industry and process proven MKS 600 Series and DA02 Baratron Capacitance Manometer, resulting in long life, low maintenance, exceptional corrosion resistance, and high maximum overpressure limit. The manometer is equipped with a 1 ms EtherCAT® communication refresh rate, 12 ms nominal pressure response time, extensive use of automotive grade electronics, and an extended maximum ambient operating temperature of 60°C. The advanced electronics in

the DA07A also provides an improved signal to noise ratio and faster response time than the industry-standard DA02. Further, the resolution and response of both the analog and digital pressure signal can be user optimized for specific applications through adjustment of the programmable filter setting.

Available with the standard MKS sensor or optional proprietary etch/fluorine/deposition friendly sensor for enhanced stability and reduced process induced zero drift in critical etch or deposition applications.

Product Features

- 1 ms EtherCAT refresh rate
- 12 ms pressure signal response time (typical)
- Options for unheated and heated to 45°C, 80°C or 100°C
- Expanded ambient operating temperature to 60°C for unheated, and 80°C and 100°C heated manometers
- Standard MKS sensor or etch/fluorine/deposition friendly sensor option available
- Digital filter value can be used to optimize the analog and digital response time/signal noise for users application
- "Sensor ready" and "device fault" relay contacts included
- Optional pressure-based relay contacts can be user configured through EtherCAT
- Meets current ETG Semiconductor Technical Working Group profiles including the Common Device Profile, Firmware Update and Vacuum Pressure Gauge profiles



Key Benefits

- Improved signal-to-noise ratio and configurable filtering allows full optimization of noise floor and response time
- Inconel sensor offers superior process immunity over other materials, enabling longer life and more stable control under harsh process conditions
- High maximum overpressure limit of 45 psia, protects the sensor from permanent damage from high pressure excursions
- Excellent long-term stability reduces maintenance needs
- Optional etch/fluorine/deposition friendly sensor minimizes process byproduct induced zero drift

*See DA05A product for pressure ranges <1 Torr/mbar.

Specifications

Full Scale Ranges¹		1, 2, 10, 20, 100, 200, 500, 1000 Torr or mbar
Resolution²		0.001% Full Scale
Ambient Operating Temperatures	Unheated 45°C 80°C and 100°C	<ul style="list-style-type: none"> • 0° to 60°C • 15° to 40°C • 15° to 60°C
Accuracy^{3,4}	Unheated 45°C 80°C and 100°C	<ul style="list-style-type: none"> • 0.25% of Reading • 0.10% of Reading • 0.25% of Reading
Temperature Coefficients - Zero	Unheated	<ul style="list-style-type: none"> • 0.015% Full Scale/°C for 1 Torr • 0.010% Full Scale/°C for 2 Torr • 0.005% Full Scale/°C for 10-1000 Torr
	Heated	<ul style="list-style-type: none"> • 0.002% Full Scale/°C
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 nominal (1 hour stabilization timer for unheated)
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% @ 150 mA • ±15 VDC @ 180 mA • +24 VDC ±10% @ 560 mA • ±15 VDC @ 480 mA • +24 VDC ±10% @ 800 mA • ±15 VDC @ 700 mA
Output Signal	Analog Digital	<ul style="list-style-type: none"> • 0 – 10 VDC into > 10 kΩ load • EtherCAT
Response Time	Pressure EtherCAT Update Rate	<ul style="list-style-type: none"> • 12 ms nominal (10-90% of a step response) influenced by step size and digital pressure filter setting • Refresh Rate 1 ms
Trip Relays	Standard Optional⁵	<ul style="list-style-type: none"> • Two solid state relays for "sensor ready" and "device fault" status. • Two optional 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. <p>Relay capacity of 0.375 amps @ 30 VDC. Relay complies with UL1577 requirements.</p>
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		<ul style="list-style-type: none"> • ½" (12 mm) OD tube • 8 VCR® male or female compatible • NW16-KF • 1.33" (34 mm) OD CF
Compliance⁶		<ul style="list-style-type: none"> • EU27: CE • United Kingdom: UKCA • US: FCC 15B • Canada: CAN ICES-3(B)/NMB-3(B) • Australia: AS CISPR11 • South Korea: KC • Japan: JIS C 61326-1 • Taiwan: CNS 13803 • EtherCAT: ETG.5003.2080 S (R) V1.30 Vacuum Pressure Gauge

¹ See DA05A product for pressure ranges <1 Torr/mbar.

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

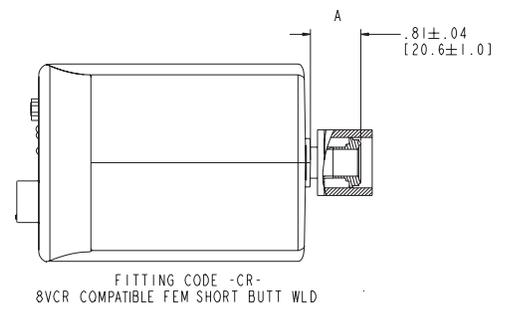
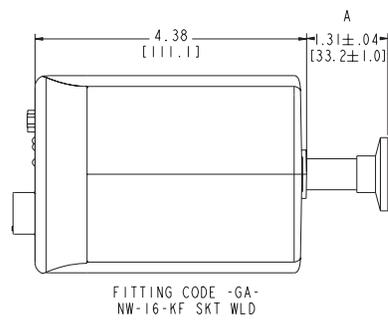
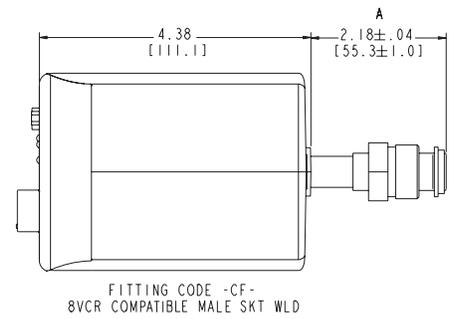
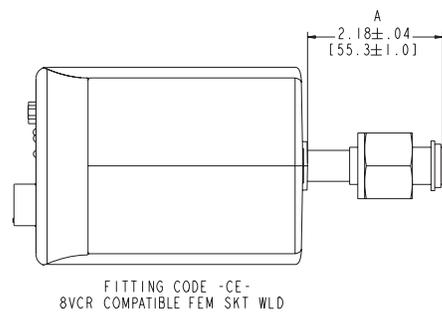
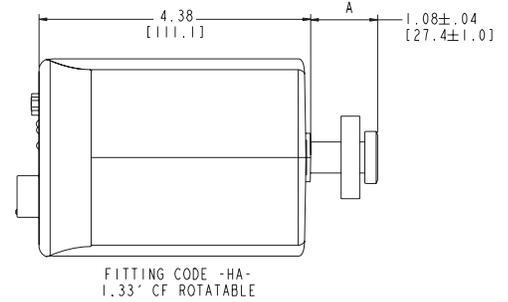
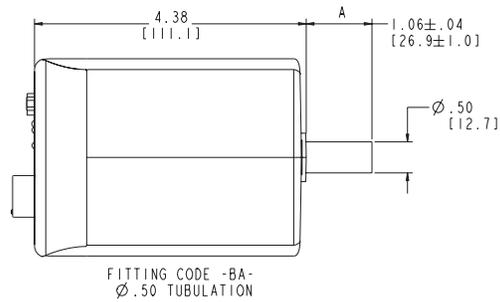
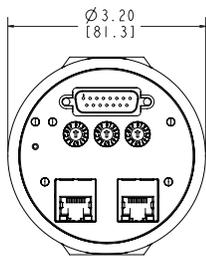
³ Includes non-linearity, hysteresis, and non-repeatability.

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

⁵ Relay hysteresis default setting of 0.5% of Full Scale and is adjustable through EtherCAT.

⁶ When connected to a properly shielded cable, grounded at both ends.

Dimensional Drawings



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: DA07A01TCES24BAA0V0	Code	Configuration
Model		
DA07A Baratron Digital Capacitance Manometer	DA07A	DA07A
Pressure Range		
1	01	01
2	02	
10	11	
20	21	
100	12	
200	22	
500	52	
1000	13	
Units of Measurement		
Torr absolute	T	T
mbar absolute	M	
Fittings		
½" OD tube	BA	CE
8 VCR (compatible) female	CE	
8 VCR (compatible) male	CF	
8 VCR (compatible) female, short inlet tube (use with sensor type T or M)	CR	
NW-16KF	GA	
1.33" OD CF (rotatable)	HA	
Sensor Type		
Standard sensor, standard inlet tube length	S	S
Short tube, standard sensor (use with fitting code CR)	T	
Etch/fluorine/deposition/friendly sensor	L	
Short tube etch/fluorine/deposition friendly sensor (use with fitting code CR)	M	
Input/Output Voltages		
±15 VDC input, 0-10 VDC analog output	2	2
24 VDC input, 0-10 VDC analog output	3	
Sensor Temperature		
Unheated	0	4
45°C	4	
80°C	8	
100°C	1	
Electrical Connector		
15-pin D-subminiature male connector with screw lock	B	B
15-pin D-subminiature male connector with slide lock	P	
Trip Points		
None	00	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	
Reserved		
Reserved	0	0
Calibration Orientation		
Full Scale > 1 Torr	0	V
Vertical (Full Scale ≤ 1 Torr only)	V	
Horizontal (Full Scale ≤ 1 Torr only)	H	
Accuracy		
Standard accuracy	0	0

Notes:

¹ Units with trip points have default setpoints and actuation direction based on the part number code but are user adjustable through EtherCAT.

² Custom part numbers can be requested for copy exact applications.

³ 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.



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DA07A_03/24

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