



Pressure

& Control Measurement

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Micro-Baratron® Pressure Transducers

**TYPE 870B SINGLE ENDED
TYPE 872B FLOW-THROUGH**

Today's process tools and equipment require reliable transducer and display performance in small geometrics with multiple fitting options. MKS addresses all of these issues by offering a building block design which allows custom configuration to your needs.

Features & Benefits

- Capacitance technology at a competitive price
- Incoloy® wetted surface provides superior corrosive gas and liquid compatibility
- 4-20 mA models approved for Class I Division 2 service
- Highest overpressure ratio tolerances on the market assure no degradation in zero repeatability or performance
- Accuracy specified in % of reading for superior results in lower pressure ranges
- CE Mark compliant
- Optional integrated display gives local reading of line pressure (1000 Torr, 100 and 250 PSIA ranges)
- Optional NEMA 4 enclosure for outdoor service
- 5 Ra finish (standard)
- Replaceable electronics

Theory of Operation

MKS has been utilizing Baratron® capacitance manometer technology for more than three decades because it yields the most stable, accurate and reliable sensors available today. The sensor construction is of intrinsically durable and well-matched materials, providing extremely low thermal coefficients for wide temperature range performance. MKS then combines this already highly accurate and stable sensor with sophisticated electronics to further

optimize performance in an EMI/RFI insensitive high level output. Enhanced accuracy, long term stability and low temperature coefficients produce the repeatability so important in today's gas measurement applications. As a result, the Type 870B/872B is a higher accuracy pressure transducer offering superior value and performance.



Accuracy is specified as a percent of **Reading**, not Full Scale, as seen in some of the lower performance devices. **Percent of Reading** accuracy provides you with an even more accurate output signal in the lower scale of the pressure range — where it is needed most. (Figure 1).

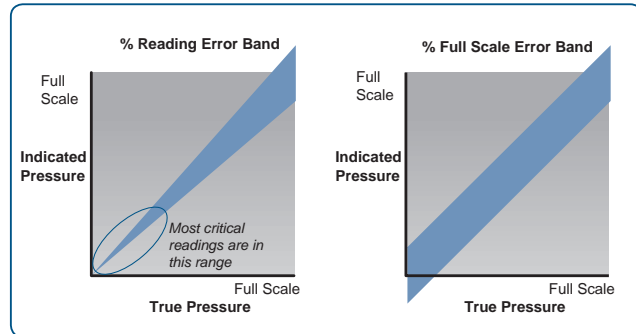


Figure 1 —
Comparison of MKS repeatability expressed as percent of Reading transducer versus other percent of Full Scale transducers.

The Type 870B/872B transducers are ideally suited for use in delivery systems that feed ultrapure gases to critical process systems. Their wetted surfaces exposed to the gas stream have a finish of better than 5 $\mu\text{in Ra}$. These transducers exhibit superior dry-down characteristics, and contribute no particles above background.

After manufacture and assembly, they are purged with ultraclean nitrogen prior to double bagging in a class 100 environment.

The all-Incoloy[®] construction of the sensors in the 870B/872B allows for high overpressure tolerances that reduce errors due to line pressure spikes. High burst pressure ratings contribute to overall system safety. On existing gas cabinets and process systems, field replacement of common dial gauges or lower performance transducers is made easy due to the small size, industry standard end-to-end lengths, and electrical interface choices of these transducers.

A variety of fittings are available in different styles and sizes. A selection of power supply inputs (+12 to +32 VDC), output signals (0-5 or 0-10 VDC, or 4-20 mA two-wire), and connectors (9-pin or 15-pin Type "D", Bendix[®], or flying leads) enable the equipment or manufacturing engineer to easily interface the 870B/872B pressure transducers with virtually any control system.

The optional local integrated display provides a digital readout of the line pressure at the transducer. The display, which is available on the 1000 Torr, 100 and 250 PSIA ranges with the 0-10VDC output signal, provides a highly-visible red LED display of the pressure and the units of measurement. The display can also be switched to show any of four different units (PSIA, Torr, bar, and kPa) without requiring recalibration or re-ranging of the transducer itself. It takes its power from the incoming transducer voltage, so no additional cables are required.

Specifications

Configuration

Type 870B
Type 872B

Ultraclean, single-ended
Ultraclean, flow-through

Full Scale Ranges

Type 870B
Type 872B

1000 Torr to 3000 psia
1000 Torr to 3000 psia

Accuracy (including non-linearity, hysteresis, and non-repeatability)

1.0% of Reading

Temperature Coefficients

Zero
Span

0.02% of F.S./ $^{\circ}\text{C}$, 50 psia to 3000 psia; 0.04% of F.S./ $^{\circ}\text{C}$, 1000 Torr
0.04% of Rdg./ $^{\circ}\text{C}$, 50 psia to 3000 psia; 0.08% of Rdg./ $^{\circ}\text{C}$, 1000 Torr

Ambient Operating Temperature Overpressure Limit¹

0 $^{\circ}$ to 50 $^{\circ}\text{C}$ (32 $^{\circ}$ to 122 $^{\circ}\text{F}$)
1.5 \times F.S. for ranges from 1000 Torr to 500 psi
1.2 \times F.S. for ranges from 501 to 3000 psi
10 \times F.S. for ranges from 1000 Torr to 500 psi

Burst Pressure

5 \times F.S. for ranges from 501 to 3000 psi
Incoloy[®]
 $\leq 5\mu\text{in Ra max.}$

Materials Exposed to Gases

Wetted Surfaces

+13 VDC to +32 VDC @ 10 mA max.
+12 VDC to +32 VDC (regulated if below 13 VDC) @ 10 mA max.
+13 to +32 VDC excitation

Input Power Required

0 to 10 Volt output
0 to 5 Volt output
2-wire 4-20 mA output

Output

0 to 10 VDC
0 to 5 VDC
2-wire 4-20 mA output with
+13 to +32 VDC at transducer terminals

into > 10K Ω load
into > 10K Ω load

Electromagnetic Compatibility

Typically into 0 to 900 W load (depending upon excitation)
CE compliant to EMC Directive 2004/108/EC²
FM3611-1986 for Class I, Division 2, Groups A, B, C, and D (4-20 mA output signal only)

Non-Incendive Approval

Operating Environment

Indoor operation standard, optional NEMA4-rated outdoor operation (4-20 mA output signal only)

Electrical Connectors

Male 9-pin or male 15-pin Type "D" at end of 9' flying lead,
Bendix[®] at end of 9' flying lead, or 6' or 10' flying leads

Fittings

Type 870B (single-ended)
Type 872B (flow-through)

$\frac{1}{2}$ " weld stub, $\frac{1}{4}$ " weld stub, $\frac{1}{4}$ " butt-weld "T", 4 VCR[®] male, 4 VCR[®] female
 $\frac{1}{4}$ " weld stub, 4 VCR[®] male, 4 VCR[®] female, surface mount

¹The pressure at which the transducer can be subjected without degradation of performance when returned to a normal operation pressure range.

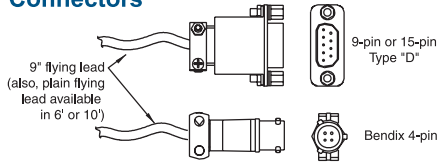
²For CE compliance the mating connection must be properly grounded.



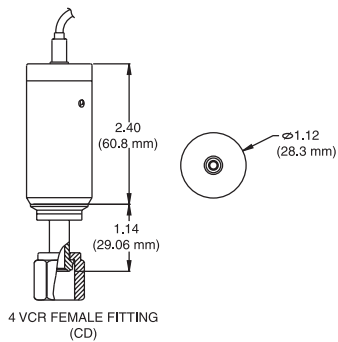
Dimensional Drawing

Type 870 Single-ended

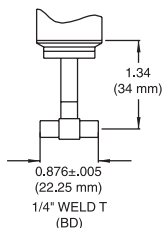
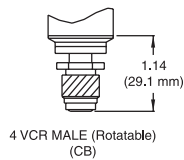
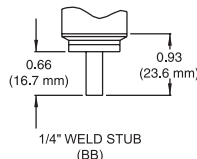
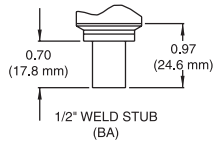
Connectors



Transducers

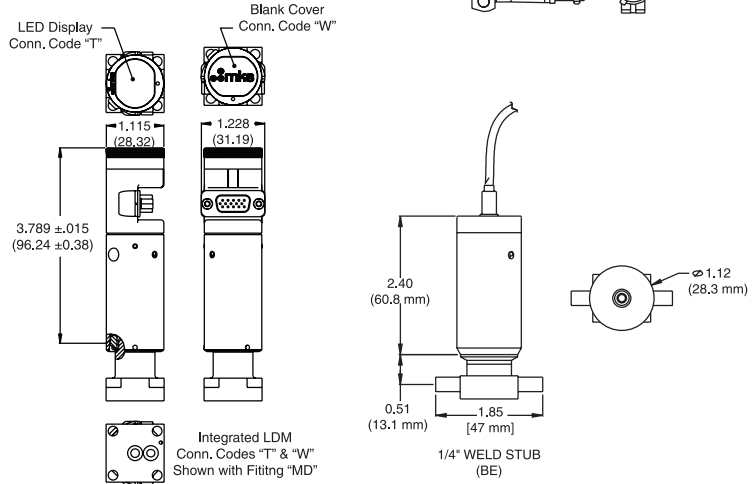
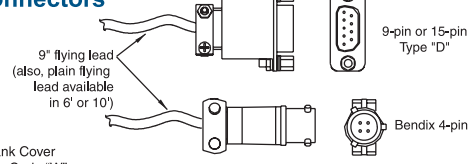


Fittings

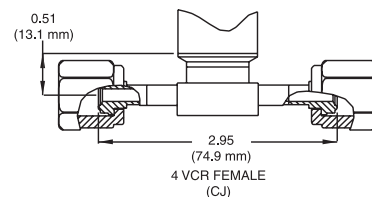
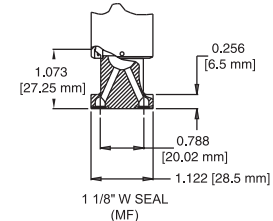
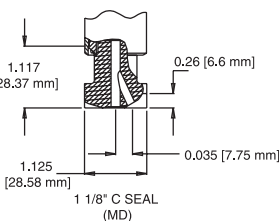
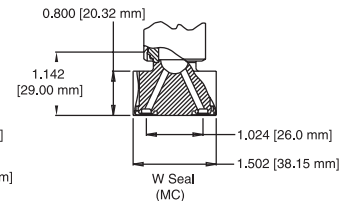
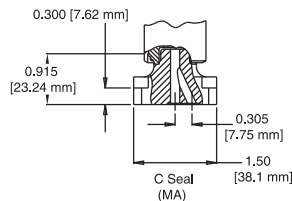
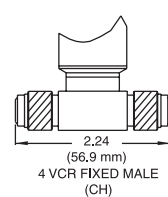
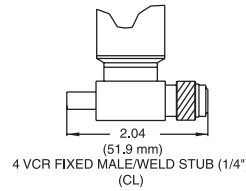
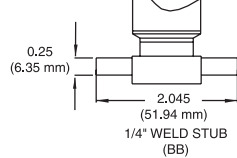


Type 872 Flow-through

Connectors



Fittings



Dimensional Drawing —

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



Ordering Information

Ordering Code Example: 870B33PCB2GA4	Code	Configuration	
Model Type			
Type 870B Single-ended	870B	870B	
Type 872B Flow-through	872B		
Pressure Range Full Scale*			
1000 Torr	13T	33P	
100 psia	12P		
250 psia	RDP		
1000 psia	13P		
3000 psia	33P		
Fittings			
<i>Type 870B only:</i>			
½" weld stub	BA	CB	
¼" weld stub	BB		
¼" Butt-welded "T"	BD		
4 VCR male, rotatable	CB		
4 VCR female	CD		
<i>Type 872B only:</i>			
¼" weld stub (2.045" face-to-face)	BB		
¼" weld stub (1.85" face-to-face)	BE		
4 VCR male, nonrotatable (2.78" face-to-face)	CA		
4 VCR male, nonrotatable (2.24" face-to-face)	CH		
4 VCR female (2.95" face-to-face)	CJ		
4 VCR male, nonrotatable / ¼" weld stub	CL		
4 VCR female (3.045" face-to-face)	CM		
1.5" C-seal surface mount	MA		
1.5" W-seal surface mount	MC		
1 1/8" C-seal surface mount	MD		
1 1/8" W-seal surface mount	MF		
Input/Output			
+13 to +32 VDC/0-10 VDC	2	2	
+12 to +32 VDC/0-5 VDC	3		
4-20 mA with +13 to +32 VDC at terminals	4		
Accuracy			
1% of Reading	G	G	
Connectors			
9-pin Type "D" on end of 9" flying lead	A	A	
15-pin Type "D" on end of 9" flying lead	C		
Bendix 4-pin on end of 9" flying lead	D		
6' flying leads	F		
10' flying leads	L		
Bendix 4-pin 4-20 mA on pins A&B	H		
Integrated Local Display (1000 Torr, 100 or 250 PSIA, 0-10VDC output)	T		
15-pin high density Type "D", side facing	W		
Environmental			
Standard enclosure (indoor use)	1	4	
NEMA 4 compliant enclosure (outdoor use, F&L connector codes only)	4		

* Other engineering units available (i.e. KPa). Consult Applications Engineering for additional information.



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