

# Baratron® Pressure Measurement System - Differential Type 120 & Type 510

## Features and Benefits

### Type 120 Differential Pressure Transducer

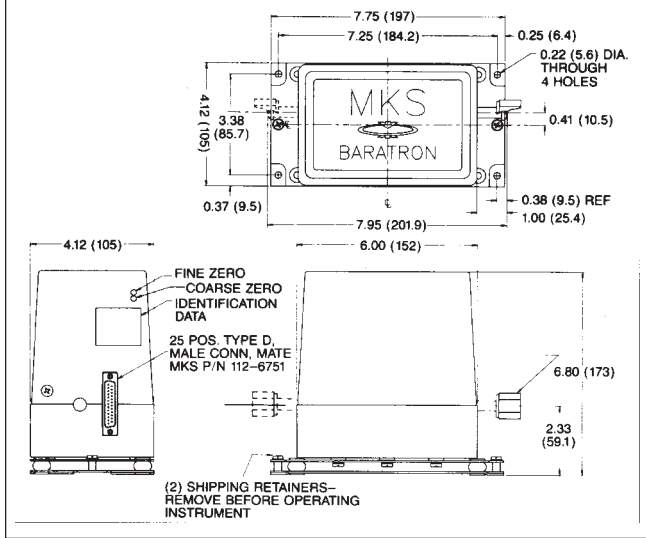
- Remote range turndown (or via front panel of the Type 510), to provide 0-10 VDC for 10% or 100% of Full Scale
- Stand-alone compact transducer package houses sensor and all signal conditioning electronics
- Full five decades of useable measurement range with differential pressure measurement to  $10^{-5}$  inH<sub>2</sub>O
- Sensor is temperature controlled at 45°C for extremely stable performance
- Ideal for low differential pressure applications such as engine testing, flow test stands, and wind tunnel simulations
- Fully CE compliant to EMC Directive 89/336/EEC

### Type 510 Power Supply/Readout

- Economical single-channel unit provides power supply, readout, front panel or remote range change, zeroing, and zero bypass capabilities for Type 120 Transducer
- 4½ place digital display with 7-segment planar LED
- User-selectable pressure units: mmHg, inHg, inH<sub>2</sub>O, mbar, kPa, cmH<sub>2</sub>O, and psi
- Two fully adjustable “vacuum fail-safe” process relay alarm limits normally energized below set point
- Fully CE compliant to EMC Directive 89/336/EEC

## Dimensional Drawing

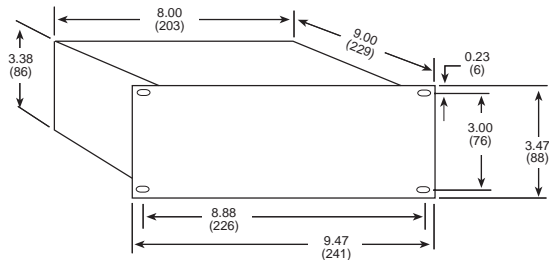
### Type 120 Differential



*Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced). Face to face 4 VCR fittings are available, but not shown. The Type 510 dimensional drawing is on page 2.*

## Dimensional Drawing

## Type 510



Note: Allow 2.5" (63 mm) clearance behind rear panel for connectors/cables.

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

## Description

**Type 120 Differential Pressure Transducer:** The Type 120 is the most accurate stand-alone differential Baratron available. This state-of-the-art transducer uses capacitance-based technology to provide highly accurate and reliable low differential pressure measurement. The 120 Differential combines the proven MKS Type 698 Baratron High Accuracy Sensor and Type 270 Signal Conditioning Electronics — oscillator, demodulator, and amplifier— within a single, chemically inert, injection-molded, high impact Ryton® enclosure. The compact Type 120 Differential can be powered by 24-30 VDC or  $\pm 15$  VDC, and has a high level 0-10 VDC output.

Standard features include a temperature-controlled sensor to 45°C, a remotely activated range turndown capability to provide Full Scale output of 0-10 Volts for 100% and 10% of sensor range, and a remote automatic zeroing capability up to  $\pm 2\%$  of Full Scale. Full Scale ranges up to 500 psid are available. The sensor is rugged, and its all-welded Inconel construction offers superior corrosion resistance for use in harsh environments. Calibration is available in ranges of inH<sub>2</sub>O, cmH<sub>2</sub>O, mmHg, and psid.

**Type 510 Power Supply:** The Type 510 half-rack module is designed for use with the MKS Type 120 Baratron Differential Pressure Transducer, and provides the 120 user with the following power supply, pressure readout, range changing, zeroing, and alarm limit capabilities:

**Power Supply/Readout:** A power supply of +22 to +32 VDC is available to power the Type 120 Transducer. Pressure is displayed on a 4½ digit LED panel meter.

**Range Changing:** The range of the 120 can be changed to provide Full Scale output from 100% ( $\times 1$ ) to 10% ( $\times 0.1$ ) of sensor range via a front panel switch, or it can be remotely changed via TTL signals through a rear panel connector.

**Zeroing:** Zeroing of the Type 120 Transducer up to  $\pm 2\%$  of Full Scale is achieved via a switch on the 510's front panel, or is remotely activated by TTL signals through a rear panel connector. An LED on the Type 510 is illuminated when the signal being corrected exceeds  $\pm 2\%$  of Full Scale. This zero correction can be "bypassed" via a front panel switch or rear panel connector while the zero is adjusted manually.

**Set Points:** Two independently adjustable alarm limits are provided for process control. These alarm limits monitor the output of the 120 and are energized when the pressure is below set point value. In the event of a power loss the set points are de-energized, and their position is maintained (latched) until power is restored.

## Specifications

<b>Type 120 Baratron Differential Pressure Transducer</b>							
<b>Calibration</b>	Unidirectional (0 < Px < +F.S.)					Bidirectional (-F.S. < Px < +F.S.)	
<b>Full Scale Ranges</b>	mmHg/psid		mmHg/psid			mmHg/psid	
	1 / 0.02		5000 / 100			1 / 0.02	
	10 / 0.2		10000 / 200			10 / 0.2	
	100 / 2		15000 / 300			100 / 2	
	1000 / 20		20000 / 400 25000 / 500			1000 / 20	
<b>Accuracy</b>	0.12% standard	0.08% optional	0.05% optional	0.12% standard	0.08% optional	0.25% standard	0.15% optional
<b>Resolution</b>	1 x 10 <sup>-6</sup> of F.S.					1 x 10 <sup>-6</sup> of F.S.	
<b>Temperature Regulated</b>	45°C					45°C	
Zero Coefficient/°C	12 ppm					12 ppm	
Span Coefficient/°C	100 ppm					100 ppm	
Operating Range	15°C to 40°C					15°C to 40°C	
<b>Maximum Overpressure</b>	125% of F.S. or 35 psig whichever is larger: Pr>Px: 125% of F.S.					125% of F.S. or 35 psig whichever is larger: Pr>Px: 125% of F.S.	
<b>Line Pressure</b>	kPa (150 psig)					kPa (150 psig)	
<b>Wetted Materials</b>	Inconel, 304 & 316 S.S.					Inconel, 304 & 316 S.S.	
Px	Inconel, 304 & 316 S.S., ceramic, Palladium					Inconel, 304 & 316 S.S., ceramic, Palladium	
Pr	Inconel, 304 & 316 S.S., ceramic, Palladium					Inconel, 304 & 316 S.S., ceramic, Palladium	
<b>Volume</b>	3.5 cc		14 cc			3.5 cc	
Px	25.0 cc		8.0 cc			25.0 cc	
Pr	25.0 cc		8.0 cc			25.0 cc	
<b>Time Response</b>	< 40 msec					< 40 msec	
<b>Warm-up Time</b>	4 hours					4 hours	
<b>Fittings</b>	Swagelok 4 VCR-F					Swagelok 4 VCR-F	
<b>Electrical Connector</b>	25-pin Type "D", male					25-pin Type "D", male	
<b>Input Power</b>	±15 or +24 to 30 VDC @ 700 mA on turn-on, 450 mA after warm-up					±15 or +24 to 30 VDC @ 700 mA on turn-on, 450 mA after warm-up	
<b>Output Signal</b>	0 to +10 VDC into >10K load					-10 to +10 VDC into >10K load	
<b>Range Multiplier</b>	x1 or x0.1 ranges selectable via TTL low or pin grounding					x1 or x0.1 ranges selectable via TTL low or pin grounding	
<b>Remote Zero Adjust</b>	Zero adjust initiated via TTL low or pin grounding adjustment range: 2% of F.S					Zero adjust initiated via TTL low or pin grounding adjustment range: 2% of F.S.	
<b>Electromagnetic Compatibility</b>	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable properly grounded at both ends					Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable properly grounded at both ends	

**Type 510 Power Supply/Readout** *(5,000, 15,000, 20,000 and 25000T range sensors will not read direct on the 510 Power Supply/Readout)*

<b>Display Type</b>	4½ digit panel meter, 7-segment planar LED display
<b>No. of Channels</b>	1
<b>Range Multiplier</b>	Front panel switch, x1 and x0.1 of sensor Full Scale
<b>Alarm Limit Relays</b>	2, adjustable from 0.2% to 100% of Full Scale
<b>Relay Contact Rating</b>	SPDT, 2 Amps @ 28 VDC, 1 Amp @ 120 VAC resistive
<b>Operating Temperature Range</b>	15° to 50°C
<b>Input Power Required</b>	90-132/180-264 VAC, 50-60 Hz
<b>Power Consumption</b>	75 Watts @ 115 VAC, 60 Hz
<b>Output Voltage to Transducer</b>	Minimum: +22 VDC (1.5 Amp load @ 100 VAC line input) Maximum: +32 VDC (0.3 Amp load @ 132 VAC line input)
<b>Analog Outputs</b>	0-10 VDC into > 2K load
<b>Electromagnetic Compatibility</b>	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable properly grounded at both ends

Specifications are subject to change without notice.  
Baratron® is a registered trademark of MKS Instruments, Inc., Andover, MA.

Inconel® is a registered trademark of Inco Alloys International, Huntington, WV.  
Swagelok® and VCR® are registered trademarks of Swagelok Marketing Co., Solon, OH.  
Ryton® is a registered trademark of Phillips 66 Co., Pasadena, TX.

## Ordering Information

## Type 120A Baratron Differential Pressure Transducer

model number example

120AD 00100 R AU

Type 120A Differential	120AD
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**Pressure Range Full Scale** (for other engineering units, consult Applications Engineering)

1 mmHg	00001
10 mmHg	00010
100 mmHg	00100
1000 mmHg	01000
5000 mmHg	05000
10,000 mmHg	10000
15,000 mmHg	15000
20,000 mmHg	20000
25,000 mmHg	25000

**Fittings** (for additional fitting options, consult Applications Engineering)

Swagelok 4 VCR female	R
Swagelok 8 VCR female	B

**Accuracy***Unidirectional Calibration:*

(0.05% option available on 1, 10, 100, and 1000 mmHg ranges only)

Standard: $\pm 0.12\%$ of Rdg.	AJ
Optional: $\pm 0.08\%$ of Rdg.	BU
Optional: $\pm 0.05\%$ of Rdg.	CU

*Bidirectional Calibration:*

(available on 1, 10, 100 and 1000 mmHg ranges only)

Standard: $\pm 0.25\%$ of Rdg.	EB
Optional: $\pm 0.15\%$ of Rdg.	DB

## Type 510 Power Supply/Readout

model number example

510B

Type 510	510B
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**Other Power Supply Options for Type 120 Transducer (Direct Reading)**

Type 146 four-channel vacuum gauge digital power supply/readout	146B
Type 651 pressure controller/self-tuning/digital PID	651C
Type 660 single-channel digital display only	660A

**Cables**

Type 120 to Type 510, 10 ft. (For lengths over 10 ft., use CB120-8-XX where XX is length in feet.)	CB120-7-10
Type 120 to Type 146, 10 ft. (For lengths over 10 ft., use CB120-2-XX where XX is length in feet.)	CB120-1-10
Type 120 to Types 651, 660, 10 ft. (For cable lengths over 10 ft., consult Applications Engineering.)	CB120-6-10