HEISE®

New . . .

HEISE HIGH LINE DIFFERENTIAL PRESSURE MEASUREMENT

APPLIES TO DUAL SENSOR HEISE PRODUCTS

Models: PTE-1 Calibrator & PM Digital Indicator

Option Highlights

- *Portable, field-worthy highline differential measurement*
- *Capable of supporting static pressures to 7500 psi*
- *Interchangeable pressure modules allows system configuration for specific measurement application*
- *Media compatibility of 316 SS*
- *Capable of measuring current or voltage outputs of device under test*
- *Measures both static and d/p values at the push of a button*

The Capability

The same powerful tool that provides the ability to measure gauge, absolute, compound, low static differential pressures and vacuum now can provide the ability to measure high static low differential pressures.

Measuring relatively low differential pressures at elevated static pressures has long been a source of frustration. The frustration is further complicated when the measurement needs to be done in the field. Until now, there has not been a truly portable means for measuring high-line low differential pressures.

The Heise Model PTE-1 hand held calibrator and Model PM digital indicator overcome these difficulties with ease.

These portable pressure measurement instruments weigh in at under 4 pounds when configured for the measurement of high static differential pressures. Not only are they small and lightweight but they are also extremely flexible.

Interchangeable pressure measurement modules allow for quick in-field change of the working range of the system. For example, literally in seconds, the system can be converted from the configuration for measuring a 10 inch of water differential at 500 psi static to the configuration for the measurement of a 10 psi differential at 1000 psi static . . . or any other d/p measurement.

The Method

These products use a unique two sensor approach to dp pressure measurement. This approach eliminates the need to be concerned over inadvertent overpressure of low pressure differential sensors. Both of the pressure sensors can see full static pressure . . . no balancing is required as is the case with standard d/p measurement devices. This capability eliminates the need for the use of a 3 way valve to protect easily overpressured differential pressure measurement cells and simplifies the process of hook-up and measurement.

The Result

Normally, the dual sensor approach would produce measurement results of less than desired accuracy. This is due to the fact that the additive inaccuracies of two sensors must be accounted for in this approach. However, these products avoid this problem by combining extremely high accuracy sensors with the ability to eliminate both zero and span static offset effects. The result is an instrument capable of measurement accuracies to ±0.4% of the d/p range for a wide array of differential pressure measurements.

The Decision

The decision is yours. Now there is a single instrument that can handle all your pressure measurement requirements . . . including high static d/p measurements. The ability to interchange pressure ranges and with calibrator models measure analog outputs from the device under test and data log the measurement values make these products the type of multi-function measurement tools needed today.

SPECIFICATION EXPLAINED

For d/p Measurement Ranges Less Than or Equal to 10% of the Operating Range of the Two Installed Sensors

The specification for the accuracy of the d/p measurement value is a function of the full scale range of the sensors and the range of the differential pressure measurement to be made. Look-up tables are provided on the next page that provide the accuracy of the d/p measurement at differing measurement parameters.

The basic equation to calculate the accuracy of the d/p measurement for d/p ranges less than or equal to 10% of the operating range of the sensors used is as follows:

±0.37% of dp range ±1 count

where the value of the ±1 count is calculated for a maximum resolution of 100,000 counts. The counts used will always mirror the full scale range. For example a 5, 50, 500 or 5000 psi range will have 50,000 counts. A 10, 100, 1000 psi range would have 100,000 counts and a 20, 200 and 2000 psi range sensor would provide 20,000 counts. When calculating the accuracy for a differential to be measured in terms of inches of water, using psi range sensors, be certain to calculate the range of the sensor in terms of the inches of water equivalent to determine the value of the ±1 count.

The percent error contributed by the last count is calculated as follows:

Step 1: Determine the static range in the units to be used.

Step 2: Determine number of counts for the range designated.

Step 3 Determine the value of the last count in the associated engineering unit.

Step 4: Divide the count value by the full scale d/p range in the engineering unit of measure to be used.

Step 5: Multiply the calculated value by 100 to generate a percent equivalent.

Step 6: For *total* maximum error add the 0.37% value to the calculated count value. The 0.37% value represents the maximum contribution for non-linearity for d/p ranges less than or equal to 10% of the range of the sensors in use.

For d/p Measurement Ranges Greater Than or Equal to 10% of the Operating Range of the Two Installed Sensors

The specification for d/p measurement ranges that are greater than 10% of the rated range of the sensors in use is a function of the ratio between the d/p range to be measured and the span of the measurement range of the sensors installed. The second table on the next page provides the accuracy values for measurement parameters falling into this classification. For measurement values within this classification, but of differing parameters, the following equation can be used to calculate the accuracy of the measurement:

±0.37% of dp range ±0.1(R1)

where:

R1 is the ratio between the full scale range of the sensors in use and the range of the d/p measurement to be made. This ratio is expressed as follows:

$$\frac{\text{Sensor full scale}}{\text{d/p full scale}}$$

For total measurement accuracy add the calculated value for the ratio of the sensor multiplied by 0.1 to the 0.37 value. The 0.37 value represents the maximum contribution for non-linearity.

LLOYD'S REGISTER QUALITY COMPANY ISO9001

INSTRUMENT DIVISION DRESSER

HEISE®

USE THESE TABLES FOR D/P RANGES LESS THAN OR EQUAL TO 10% OF THE FULL SCALE RANGE OF THE SENSORS IN USE

INCHES OF WATER D/P MEASUREMENTS (% OF D/P SPAN ACCURACY)

d/p (in H_2O)	OPERATING RANGE OF SENSORS (psi)		
	0/5-0/30	0/50-0/300	0/500-0/7500
1	1.37	10	100
2	0.87	5	50
3	0.70	3.7	33
4	0.62	2.9	25
5	0.57	2.4	21
6	0.54	2.1	17
7	0.51	1.8	14
8	0.50	1.6	13
9	0.48	1.50	11
10	0.47	1.37	10
15	0.44	1.04	7.0
20	0.42	0.87	5.4
25	0.41	0.77	4.4
50	0.39	0.57	2.4
75	0.38	0.50	1.7
100	N/A	0.47	1.4
150	N/A	0.38	1.04
200	N/A	0.38	0.87
250	N/A	0.37	0.77
300	N/A	0.37	0.70
400	N/A	0.37	0.62
500	N/A	0.37	0.57
1000	N/A	N/A	0.47
2000	N/A	N/A	0.42

PSI D/P MEASUREMENTS (% OF D/P SPAN ACCURACY)

d/p Range (psi)	OPERATING RANGE OF SENSORS (psi)			
	0/5-0/10	0/15-0/100	0/150-0/1000	0/1500-0/7500
0.5	0.39	0.57	2.37	20
1	0.38	0.47	1.37	10
2	N/A	0.42	0.87	5
3	N/A	0.40	0.70	3.7
4	N/A	0.40	0.62	2.9
5	N/A	0.39	0.57	2.4
6	N/A	0.39	0.54	2.1
7	N/A	0.38	0.51	1.8
8	N/A	0.38	0.50	1.6
9	N/A	0.38	0.48	1.50
10	N/A	0.38	0.47	1.37
15	N/A	N/A	0.44	1.04
20	N/A	N/A	0.42	0.87
25	N/A	N/A	0.41	0.77
50	N/A	N/A	0.39	0.57
75	N/A	N/A	0.38	0.50
100	N/A	N/A	0.38	0.47
150	N/A	N/A	N/A	0.44
200	N/A	N/A	N/A	0.42
250	N/A	N/A	N/A	0.41
300	N/A	N/A	N/A	0.40
400	N/A	N/A	N/A	0.40
500	N/A	N/A	N/A	0.39
1000	N/A	N/A	N/A	N/A
2000	N/A	N/A	N/A	N/A

USE THIS TABLE FOR D/P RANGES GREATER THAN 10% OF THE FULL SCALE RANGE OF THE SENSORS IN USE

d/p RANGE (% of Sensor Spans)	ACCURACY (% of d/p Range)	d/p RANGE (% of Sensor Spans)	ACCURACY (% of d/p Range)
15	1.04	60	0.54
20	0.87	65	0.52
25	0.77	70	0.51
30	0.70	75	0.50
35	0.66	80	0.50
40	0.62	85	0.49
45	0.59	90	0.48
50	0.57	95	0.48
55	0.55	100	0.47

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