## **Keynes Controls Ltd**

### VibWire-201

**Product Training Video** 

# **Keynes Controls Ltd**

### VibWire-201

#### Slide Number

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# VibWire-201-Pro

Vibrating Wire Sensor Analyser, Logger and Display Unit

- Connecting the instrument to a PC
- Installing and running the device configuration software
- Scanning the instrument for Calibration Factors
- Windows Free Software
- Sample Manufacturer's Calibration Factors
- Select Thermistor Type
- Understanding the Sensor Linearisation Formula
- Storing new sensor types into the unit
- Download and Restore Projects

#### **Running Time 5 Minutes**

### Software Features

#### Sensor Number 0.. 200

#### Sensor Number

The sensor number assigns the order in which a defined sensor will be scanned by the instrument. The instrument scans from starts from Sensor 0 and continues for all assigned sensors.

#### **Sensor Types**

The User can preset the sensor type and process option. See Slides X a Y for further details. Useful when many sensors of the same type are to be used.

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Press this button in order to download the current instrument configuration settings.

Press this button in order to write the sensor details into the instrument.

#### **Defined Sensor Types**



# **Initial Window**



#### VW201Cal Desktop App

Connect a USB cable connects the VibWire-201 to a Windows PC

#### Activate the VW201Cal Software

The Device Configuration will appear as shown opposite.

Press the "**Connect**" button to download and display the parameters stored inside the unit. This action also prepares the instrument to accept new parameters.

#### **Default Screen**

Once the VW201Cal software is installed and activated then the default screen will appear. Only when a VW201 has been connected to a PC can any previously stored settings be accessed and changed.

Device Configuration Window

o a Windows PC	File			
	Sensors Types The	ermistors		
	Sense	or Name	ID	^
	0 NoNa	ame	Undefined	
oosite.	1 NoNa	ame	Undefined	
	2 NoNa	ame	Undefined	
y the parameters stored inside	3 NoNa	ame	Undefined	
accept new parameters.	4 NoNa	ame	Undefined	
	5 NoNa	ame	Undefined	
	6 NoNa	ame	Undefined	
ctivated then the default screen ected to a PC can any anged.	Close 1	Connect Save Help		
ownload and display sensor arameters from the VibWire-20'		Store para	meters into the VibWire-	201

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# **Downloading the Instrument Configuration**

#### **Press the Connect Button**

The blue status bar will appear as the Instrument configuration is downloaded

Any Pre-set Sensor Configurations will be displayed in the table,

	D	Proc	Mid Hz	A	В	С	D	Therm#
SO	Undefined	2	2000	0.	1.0000	0.	0.	0
S1	Undefined	2	2000	0.	1.0000	0.	0.	0
S2	Undefined	2	2000	0.	1.0000	0.	0.	0
S3	Undefined	2	2000	0.	1.0000	0.	0.	0
S4	Undefined	2	2000	0.	1.0000	0.	0.	0
S5	Undefined	2	2000	0.	1.0000	0.	0.	0
S6	Undefined	2	2000	0.	1.0000	0.	0.	0
S7	Undefined	2	2000	0.	1.0000	0.	0.	0
S8	Undefined	2	2000	0.	1.0000	0.	0.	0
Close	Connect	Save	Н	elp				

# **Sensor Scanning Operations**

- 1. Connect the VibWire-201 to a Windows PC using the supplied USB Cable.
- 2. Activate the VW201Cal Software.
- 3. Download any Preset Sensor Calibration Factors and display the results in the VW201Cal software.
- 4. Assign all of the Vibrating Wire Sensor Calibration Factors into the instrument.

Each sensor can be individually configured.

5. Assign the Sensor Name - Starting with **Sensor 0** and continuing until all the Sensors are configured, or updated.

The instruments starting scanning at Sensor 0 then increments automatically to Sensor 1 etc ...

- 6. Save the new Calibration Factors into the instrument,
- 7. Any recorded values are stored onto an SD Card inserted into the unit.
- 8. The results are stored in the order they are assigned to the device, Sensor 0 being the first column of data
- 9. with a separate column for each defined sensor. CSV files can be read into any spreadsheet including Google Docs,,,

# **Temperature Sensor Configuration**

T0 is the preset thermistor calibration parameters for the most popular temperature sensor built into many vibrating wire sensors.

**T1** and **T2** are for User assigned calibration factors for the temperature sensors.

The calibration factors are taken from the temperature section of vibrating wire sensor manufacturers data sheet.

If no temperature sensor calibration factors are supplied then simply use the preset T0 type in the software. The results should

be accurate.

		10	RU	A	B	0	D
0	YSI44005	25.000	3000.0	0.0033540	2.5627E-4	2.0829E+6	7.3003E-8
[1	Undefined	25.000	3000.0	0.	0.	0.	0.
12	Undefined	25.000	3000.0	0.	0.	0.	0.

# **Temperature Sensor Configuration**

#### **Steinhart-Hart Thermistor Factors and Beta Value Calibration Factors**

The most accurate temperature readings are carried out when the thermistor calibration factors are assigned for use with the Steinhart-Hart thermistor equation.

For this operation to be undertaken then you are looking for parameters such as T0 = 25 Deg C R0 = 3 K Ohm and Parameters A, B, C and D on the sensor data sheet.

#### Beta Value

Some sensor manufacturer's do not supply the full temperature sensor calibration factors but use the simplified 'Beta' Factor. This is can be used and set into the VW201Cal software.

The calibration factors will be shown similar to

T0 = 25 Deg C R0 = 3 K Beta = 3461

The calibration factors for the software will be A = 0 B = 3461 C = 0 D = 0. Only the 'B' factor is used.

# **Temperature Sensor Configuration**

When there are no temperature setup factors assigned to a Calibration report then set the thermistor type to type **T0**. This is the default setting preset into the software for the most popular industry standard temperature built into many different vibrating wire sensors.



**Preset Thermistor Calibration Parameters** 

Ø							
					E +44-00 fi +44-00	1825 765044 1825 744398	<ul> <li>info@itmsol</li> <li>www.itmsol</li> </ul>
VI	BRATING	WIRE INS	TRUMENTS	CALIBRAT	TON CER	TIFICATE	
Instrument	Type : W	9 Vibrating	Wire Piezomet	er Se	rial No.	Used for calculation	KPA using
Instrument	Range : 0	.00 to 1500.0	kPa	Calibrat	tion Date	Period units	
Gaure Fact	ters in kPa			Anderen	Temperati	re : 21°C	
Period Gau	ge Factor ()	K): 7705.9070	1000	Barome	tric Press	Used for calculation	te KPA using
Linear Gau	ge Factor (	G): (kPa\li	git)0.7705900	Calibrat	tion Technic	ian : Wayne l	Diprose
Linear Gau Polynomial Polynomial	ge Factor ( Gauge Fac Gauge Fac	G): (kPa/di tor A: -0.000 tor B: -0.707	gic)0.7705900 0055233680(9) 7797000	Calibrat Calibrat Mensor Vibrat	tion Technic APC 550 ing Wire	used for calculation	Diprose ng KPA using s
Linear Gau Polynomial Polynomial Polynomial	ige Factor ( Gauge Fac Gauge Fac Gauge Fac	G): (kPa%i tor A: -0.000 tor B: -0.707 tor C**: 495	gi()0.7705900 005523368000 7797900 7.505000	Calibrat Calibrat Mensor Vibrat Regress	tion Technic APC 600 ing Wire ion Zero	used for calculation polynomial factor : 6662.4	Diprose ng KPA using s
Disear Gau Polynomial Polynomial Applied (kPa)	ge Factor () Gauge Fac Gauge Fac Gauge Fac Reading (Period)	G): (kPa/d) tor A: -0.000 tor B: -0.707' tor C**: 4957 Reading F <sup>9</sup> /1000	gir)0.7705900 0055233680(0) 7797000 7.505000 Calculated (Linear)	Calibra Calibra Mensor Vibrat Regress Error %FS (Linear)	tion Technic APC 600 ing Wire ion Zern Linear Increment	lian : Wayne I Used for calculati polynomial factor : 6662.4 Calculated (Polynomial)	Diprose ng KPA using s Error %F (Polynomia
Disear Gau Polynomial Polynomial Polynomial Applied (kPa) 0.00	ge Factor () Gauge Fac Gauge Fac Gauge Fac Reading (Period) 3875.3	G): (kPa/db tor A: -0.000 tor B: -0.707 tor C**: 495 Reading F*/1000 6658.7	gii)0.7705900 005523368000 7797000 Calculated (Linear) 2.849	Calibra Galibra Mensor Vibrat Regress Error %FS (Linear) 0.19	tion Technic APC 600 ing Wire ion Zero Linear Increment 0.0	Used for calculatin polynomial factor : 6662.4 Calculated (Polynomial) -0.285	Diprose ng KPA using s Error %F (Polynomia -0.02
Disear Gau Polynomial Polynomial Applied (kPa) 0.00 150.00	ge Factor () Gauge Fac Gauge Fac Gauge Fac Reading (Period) 3875.3 3932.7	G): (kPa4di tor A: -0.000 tor B: -0.707 tor C**: 495 Reading F*/1000 6658.7 6465.8	gi()0.7705900 005523368000 7797900 7.505000 Calculated (Linear) 2.849 151.496	Calibra Mensor Vibrat Regress Error %FS (Linear) 0.19 0.10	tion Technic APC 600 ing Wire ion Zern Linear Iocrement 0.0 -192.9	lan : Wayne l Used for calculatin polynomial factor : 6662.4 (Polynomial) -0.285 150.230	Diprose ng KPA using s Error %F (Polynomia -0.02 0.02
Linear Gau Polynomial Polynomial Applied (kFa) 0.00 150.00 300.00	ge Factor () Gauge Fac Gauge Fac Gauge Fac Gauge Fac (Period) 3875.3 3932.7 3992.4	G): (kPa46) tor A: -0.000 tor B: -0.707 tor C**: 4957 Reading F*/1000 6656.7 6465.6 6273.8 5273.8	gi()0.7705900 005523363000 77979000 Calculated (Linear) 2.849 151.496 299.450 469.775	Calibra <u>Gelibra</u> <u>Celibra</u> <u>Celibra</u> <u>Vibrat</u> Regress Error %FS (Linear) 0.19 0.10 -0.04 -0.06	tion Technic APC 800 ing Wire ion Zero Linear Increment 0.0 -192.9 -192.0	lian : Wayne l Used for calculatin polynomial factor : 6662.4 (Polynomial) -0.285 150.230 299.634	Diprose ng KPA using 5 Error %F (Polynomia -0.02 0.02 -0.02 0.02
Linear Gau Polynomial Polynomial Applied (kPa) 0.00 150.00 300.00 450.00	ge Factor ( Gauge Fac Gauge Fac Gauge Fac (Period) 3875.3 3932.7 3992.4 4055.7	G): (kPa/d) tor A: -0.000 tor B: -0.707 tor C**: 4957 Reading F*1000 6658.7 6465.8 6273.8 6079.5 5885.3	gi()0.7705900 005523368000 7797000 Calculated (Linear) 2.849 151.496 299.450 449.175 569.824	Calibrat Mensor Vibrat Regress Error %FS (Linear) 0.19 0.10 -0.04 -0.06	tion Technic tion Equili APC 600 ing Wire Ion Zern Linear Increment 0.0 -192.9 -192.0 -194.3 -194.3	lan : Wayne l Used for calculati polynomial factor : 6662.4 Calculated (Polynomial) -0.285 155.230 299.634 4550.433 500.698	Diprose ng KPA using s Error %F (Polynomia -0.02 -0.02 -0.02 -0.03 0.05
Linear Gau Polynomial Polynomial Polynomial Applied (kPa) 0.00 150.00 300.00 450.00 600.00	ge Factor ( Gauge Fac Gauge Fac Gauge Fac (Period) 3075.3 3932.7 3932.4 4055.7 4122.1	G): (kPa/d) tor A: -0.000 tor B: -0.707 tor C**: 495 Reading F*/1000 6658.7 6465.8 6273.8 6273.8 6273.8 5285.3 5692.4	eiti)0.7705900 005523368000 7797000 Calculated (Linear) 2.849 151.496 299.450 449.175 598.924 747.421	Calibrat Mensor Vibrat Regress Error %FS (Linear) 0.19 0.10 -0.04 -0.06 -0.08 -0.17	tion Technic tion Equit APC 600 ing Wire- lion Zern Linear Increment 0.0 -192.9 -192.9 -194.3 -194.2 -192.5	lian : Wayne J Used for calculatin polynomial factor : 6662.4 Calculated (Polynomial) -0.285 150.230 299.634 450.433 600.698 749.564	Error %F (Polynomia -0.02 -0.02 -0.02 -0.03 0.03 -0.03
Linear Gau Polynomial Polynomial Applied (kPa) 0.00 150.00 300.00 450.00 600.00 750.00	ge Factor ( Gauge Fac Gauge Fac Gauge Fac Gauge Fac (Period) 3075.3 3932.7 3992.4 4055.7 4122.1 4191.3	G): (kPa46 tor A: -0.000 tor B: -0.707 tor C**: 495 Reading F*/1000 6658.7 6465.8 6273.8 6079.5 5885.3 5692.4 5496.5	ti00.7705960 005523365000 77979000 Calculated (Linear) 2.849 151.496 299.450 449.175 598.824 747.471 898.430	Calibrat Meanson Vibrat Regress Error %FS (Linear) 0.19 0.10 -0.04 -0.06 -0.08 -0.17 -0.10	tion Technic tion Equit approximation Control tion Zern Linear Increment 0.0 -192.9 -192.3 -194.2 -194.2 -195.9	lan : Wayne ) Used for calculatin polynomial factor : 6662.4 Calculated (Polynomial) - 0, 285 150, 230 299, 634 450, 413 600, 630 749, 564 900, 324	Error %F (Polynomia -0.02 -0.02 -0.03 0.05 -0.03 0.05
Linear Gau Polynomial Polynomial Applied (kPa) 0.00 150.00 300.00 450.00 650.00 750.00 900.00	ge Factor ( Gauge Fac Gauge Fac Gauge Fac Gauge Fac (Period) 3075.3 3932.4 4055.7 4122.1 4121.3 4265.4 4342.6	G): (kPadd tor A:-0.009 tor B:-0.707 tor C**: 4957 tor C**: 4957 Reading F'1009 6659.7 6465.8 6679.5 5885.3 5692.4 5496.5 5502.3	tin)0.7705900 005523368000 7797900 Calculated (Linear) 2.849 151.496 299.450 449.175 598.824 747.471 898.430 1048.079	Calibrat Mensor Vibrat Regress Error %FS (Linear) 0.19 0.10 0.04 -0.04 -0.08 -0.17 -0.10 -0.12	tion Technic tion Equil APC 860 ing Wire linear Increment 0.0 -192.9 -192.0 -194.3 -192.9 -192.9 -195.9 -195.9 -195.9	lan : Waynel Used for calculatin polynomial factor : 6662.4 Calculated (Polynomial) -0.285 150.230 299.634 450.433 600.699 749.564 900.324	Diprose Ing KPA using S Error %F (Polynomia -0.02 -0.02 -0.02 -0.03 0.05 -0.03 0.02 -0.02 -0.02
Lisear Gau Polynomial Polynomial Polynomial (kPa) 0.000 150.00 300.00 450.00 600.00 900.00 900.00 1050.00	ge Factor ( Gauge Fac Gauge Fac Gauge Fac Gauge Fac (Period) 3075.3 3932.7 3992.4 4055.7 4122.1 4155.3 4265.4 4342.6	G): (kPadd tor A: -0.909 tor B: -0.707 tor C**: 495 tor C**: 495 tor C**: 495 6550.7 6465.8 6273.8 6679.5 5885.3 5592.4 5592.4 5502.3	ti0)0.7705900 005523368000 7797000 Calculated (Linear) 2.849 151.496 299.450 449.175 598.824 747.471 898.430 1048.079 1199.731	Calibra Messor Vibrat Regress Error %FS (Linear) 0.19 0.10 -0.04 -0.04 -0.06 -0.09 -0.00 -0.10 -0.10 -0.13 -0.13 -0.02	tion Technic tion Equit and APC 500 ing Wire 1 ion Zero Linear Increment 0.0 -192.9 -192.9 -194.2 -195.9 -195.9 -195.2	lian : Wayne l Used for calculatin polynomial factor : 6662.4 Calculated (Polynomial) -0.285 150.230 299.634 450.433 600.639 749.564 900.324 1099.534	Diprose sg KPA using s Error %FF (Polynomia -0.02 -0.02 -0.03 0.03 -0.02 -0.

Formulae: Linear\* E = G(R0 - R1) Polynomial\*\* E = AR1<sup>2</sup> + BR1 + C

\* The zero reading should be established on site by the user on installation. \*\* The site value of C must be calculated using the formula C = -(AR0\*+BR0)

The instrument detailed hereon has, as applicable, been inspected, tested and calibrated in secontance with ISO 9001:2008 approved procedures and, unless otherwise indicated, performs within ± 0.10% (Polynomial) as aspecificd. Thus, the instrument conforms in all respects to our relevant specifications and drawings.

mindel a Certified:

The image opposite shows a sample calibration report for a Vibrating Wire Piezometer

This is a simple example of how to use the calibration report using the Linear Gauge Factor calibration parameters to determine the the sensor output in **SI Units of KPa**. This time the calculation will use the Digits which is **Process 1** 

#### Note

The calibration parameters have been assigned to a Sensor ID Type "PEIZO-2 10m KPa"

**Process = 1** this ensures the VibWire-201 uses the **E = G**.(R1-R0) Formula

where G = Linear Gauge Factor = 0.77059 as shown in the Calibration Report

R1 = Current Sensor Reading from the VibWire-201 R0 = Initial Condition Reading this is typically set to 0

vice Cor	figuration								
nsors [T	ypes Thermistors								
		Proc	Mid Hz	A	в	c	D	Therm#	
SO									
S1	PEIZO-2KPa	1	2000	0	-0.7705	5 O	0	TO	
S2									
				-					

3.0					1 +64-10	1825744398	<ul> <li>www.ibms</li> </ul>
•	BRATING	WIRE IN	STRUMENTS	CALIBRAT	TION CER	TIFICATE	
Instrument	Type : W	9 Vibrating	Wire Piezomet	er Se	rrial No.	Used for calculation	ng KPA using
Instrument	Range : 0.	00 to 1500.0	kPa	Calibrat	tion Date	Period units	
Cause Fact	are in kPa			Ambilia	Temperat		
STREET PALS	ILS.IN.M.A					Used for calculation	e KPA usine
Period Gau	ge Factor (I	(): 7705.907	0000	Barome	tric Press	units	
Linear Gau	ge Factor (6	i): (kPa/di	git)0.7705900	Calibrat	tion Techni	cian : Wayne l	Diprose
Polynomial	Gauge Fact	or A: -0.000	005521368000	Calibrat	tion Equit	0.29 Julio - 193	
Polynomial	Gauge Fact	B: -0.707	7797900	Mensor	APC 600	Used for calculation	ng KPA using
Polynomial	Gauge Fact	tor C**: 495	7.505000	Regress	ion Zero	: 6662.4	
Applied	Reading	Reading	Calculated	Error %FS	Linear	Calculated	Error %
(kPa)	(Period)	F%1000	(Linear)	(Linear)	Incremen	t (Polynomial)	(Polynom)
0.00	3875.3	6658.7	2.849	0.19	0.0	-0.285	-0.02
150.00	3932.7	6465.8	151.496	0.10	-192.9	150.230	0.02
300.00	3992.4	6273.8	299.450	-0.04	-192.0	299.634	-0.02
450.00	4055.7	6079.5	449.175	-0.06	-194.3	450.413	0.03
600.00	4122.1	5885.3	598.824	-0.08	-194.2	600.698	0.05
750.00	4191.3	5692.4	747.471	-0.17	-192.9	749.504	-0.03
1050.00	4343 6	5902 3	1048 070	-0.10	-104 2	1049 359	-0.04
1200.00	4425 7	5105 5	1100 731	-0.02	-196.8	1199.963	0.00
1350.00	4513.2	4909.5	1350.766	0.05	-196.0	1349.530	-0.03
1500.00	4607.3	4711.0	1503.729	0.25	-198.5	1500.572	0.04
		F - 0					
P. armunate	dynamial**	F = AR	12 + RR1 + C				
1	of summary	n - AR					
	reading she	uld be estab	lished on site by	the user on i	astallation.		

#### Using Natural Units = $A(R1)^2 + B(R1) + C + K(T1-T0) - (S1-S0)$

This is a simple example of how to use the calibration report using the Polynomial calibration parameters to determine the sensor output in **SI Units of KPa**.

This time the calculation will use Process 2(Polynomial Calculation)A = -5.523E-6B = -7.078E-1C = 4957.50Values taken from the sample data sheet

The calibration parameters have been assigned to a Sensor ID Type "Peizo-Polynom-2"



#### **Calibration Parameters**

(Equation 1)

**Further Information** 

when the initial conditions are known then it is possible to expand on the use linear formula

**Process = 1** this ensures the VibWire-201 uses the  $E = G_1(R1-R0)$  Formula

E = G.R1 - G.R0 where G.R0 is a constant value and is used as an Offset

It is possible to use the

where **G = Linear Gauge Factor = 0.77059** as shown in the Calibration Report

R1 = Current Sensor Reading from the VibWire-201 R0 = Initial Condition Reading and this is typically set

#### The VibWire-201-Pro uses:

Calibration equation.	Natural Units = A(R1) <sup>2</sup> + B(R1) + C + K(T1-T0) - (S1-S0)	(Equation 1)
and this is expanded to:	= C(R1-R0) <sup>2</sup> + B(R1-R0) + A + K(T1-T0) - (S1-S0)	(Equation 2)

when initial conditions in the measurements are involved. where S0 = Initial Condition (SI unit) S1 = Current reading T0 = Initial temperature (Deg C) T1 = Current temperature

The additional terms used in equation 2 only change the constant parameter (A) and are not often used.

# **Selecting Hz, Digits or Engineering Units**

In order to set the instrument to use the correct calculation type for the frequency component of a vibrating wire sensor then it has to be told what to do.

The VibWire-201 supports only 3 separate process options for all of its sensor operation

#### **Process Option = 0**

All calculations are based on using the raw sensor value in Hz

Typically only the Offset and Scale Parameters only.

Yout = Raw Signa (Hz)I x Scale + Offset Only parameters A and B are required C and D are not used and set to 0

**Process Option = 1** 

This option uses the calculation Digits =  $\frac{\text{Frequency}^2}{1000}$  (Hz<sup>2</sup>)

#### **Process Option Tab**

#### 0 - Hz 1 = Digits 2 = SI Units

1	ID	Proc	Mid Hz	A	8	C	D	Therm#	
S0	Undefined	2	2000	0.	1.0000	0.	0.	0	
S1	Undefined	2	2000	0.	1.0000	0.	0.	0	
S2	Undefined	2	2000	0.	1.0000	0.	0.	0	
S3	Undefined	2	2000	0.	1.0000	0.	0.	0	
S4	Undefined	2	2000	0.	1.0000	0.	0.	0	
S5	Undefined	2	2000	0.	1.0000	0.	0.	0	
S6	Undefined	2	2000	0.	1.0000	0.	0.	0	
S7	Undefined	2	2000	0.	1.0000	0.	0.	0	
S8	Undefined	2	2000	0.	1.0000	0.	0.	0	

### **Sensor Polynomial Coefficients**

The VibWire-201-Pro uses the industry standard equation often quoted on sensor calibration reportes to convert sensor frequency in Hz, to natural units.



### **Sensor Polynomial Coefficients**

### Natural (SI) Units = $A(R1)^2 + B(R1) + C + D(T1-T0) - (S1-S0)$ (Equation 1)

Nearly all vibrating wire sensor manufacturer's use the above equation, or variations to determine the Natural (SI) value from a measured sensor frequency reading.

Occasionally some sensor manufacturers rearrange the above formula shown on the calibration reports to look something like

### Natural (SI) Units = $D(R1)^2 + C(R1) + B + A (T1-T0) - (S1-S0)$

This just a rearrangement of the terms but care has to be taken to ensure the coefficients are set into the correct order for storage into the VibWire-201.

### **Sensor Polynomial Coefficients**

### Natural (SI) Units = $A(R1)^2 + B(R1) + C + D(T1-T0) - (S1-S0)$ used by the instrument

Worked Example 1 - This example below shows the calibration factors have been swapped around by the sensor manufacturer, This is a common practice between the different manufacturers and care should be taken to watch out for this change. The calibration equation has been given as

#### **Pressure** $H^{2}0mm = D(R1)^{2} + C(R1) + B + A(T)$ where D = 6751.454C = 9.564E-4B = -0.9453A = 0.07346(Parameters are random and for example only) 2nd Order Term Linear Term **Temperature Compensation** Constant Take care to assign the polynomial Device Configuration × coefficients to the correct cell. File Sensors Types Thermistors ID Proc Mid Hz А в C D Therm# ^ Piezo-sample-1 6751.454 9.564E-4 -0.9453 0 07346 SO 2 2000 **T**0 S1 S2 **S**3 Sensor Identify Name Polynomial Option 2nd Order Term Linear Term Constant **Temperature Compensation**

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### **Sensor Groups and Types**

Once all of the sensors to be scanned have been defined and stored into the instrument then it is an easy operation to assign the scanning operations.

Repeat for all Sensors that are to be Scanned

Assign Sensor Identifier - Keynes suggests that an identifier string clearly shows sensor location and type

Assign the Sensor Type - A pull down list shows all the defined sensor types that can be used.

Store the configuration into the instrument by pressing the "Save" button.

### **Sensor Groups and Types**



The images above show how the Configuration settings used in the VW201Cal software appear on the instrument display.

The details for Sensor Type Peizo-Poly-2 can be seen on slide 10

### Sensor Groups and Types



software appear on the instrument display.

The details for Sensor Type **Peizo-Linear-1** can be seen on slide 10