1 Introduction

The Platinum controller and meter products support the full range of temperature (Thermocouple, RTD and Thermistors) inputs as well as process voltage and current inputs. The support for Process inputs (+/- 10 Vdc, +/- 1.0 Vdc, +/- 0.1 Vdc, +/- 0.05 Vdc, 0-24 mA and 4-20 mA) allows a wide range of pre-amplified strain and pressure bridge transducers to be used.

The differential ratiometric (+/- 50 mV, +/- 100 mV and +/- 1.0 Vdc) inputs provides direct support for bridge based sensors.

To further support strain applications the Platinum family includes several addition options:

a. TARE function – may be activated from the front panel or a remote digital input.

b. 10-Point Linearization – allows the conversion between weight / volume and other measurement units in irregularly shaped vessels.

c. Display Rounding – eliminates jitter on the display value while maintaining full accuracy of all measurements.

Figure 1. PLATINUM CN8EPt with Omega Pressure Load Cells

2 Process Voltage Inputs

The Platinum Process (Voltage) Inputs support three 'types':

Single Ended: +/- voltage measured with respect to analog ground

Differential: +/- voltage measured between two 'floating' input pins

Ratiometric: Measurement of potential between two floating input pins as a percentage of applied reference voltage.

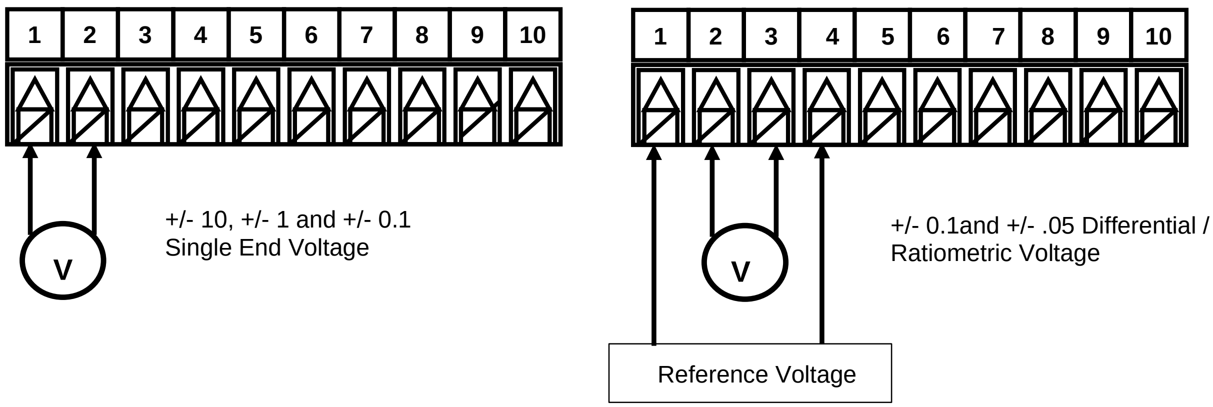

Figure 2. Process Voltage Inputs Diagram.

2.1 Single Ended Inputs

Single Ended inputs measure the voltage on the Analog Input terminal (AI+) with respect to the analog ground (ARTN) terminal.

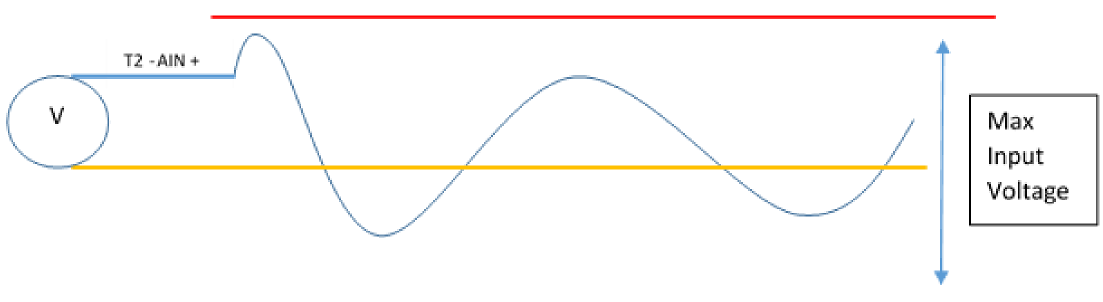

Figure 3. Single Ended Inputs

2.2 *Differential Inputs*

Differential Inputs measure the voltage difference between the AIN+ and AIN- terminals. An internal 2.048 reference voltage (Vref) is used and determines the maximum voltage difference. The analog voltages must be within +/- 2.0 volts of the analog ground (ARTN) voltage level, referred to as the Common Mode Voltage.

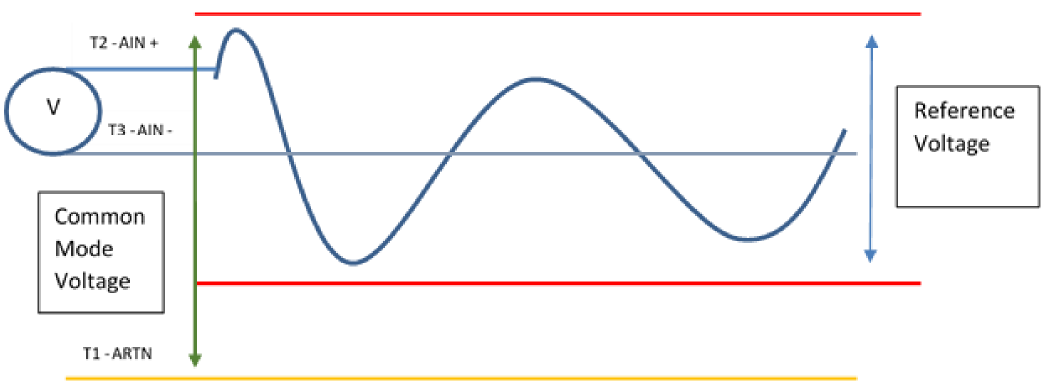

Figure 4. Differential Inputs-Common Mode Voltage.

2.3 *Ratiometric Inputs*

Ratiometric Inputs allow applying an external reference voltage (Vref) used by the Analog / Digital converter and the measured signal level directly proportional to the reference voltage. The external reference voltage must be in the range of 1.5 – 2.5 Vdc and applied between T4 (APWR) and T1 (ARTN). An internal 2.0 k ohm resistor is applied between the APWR and ARTN terminals.

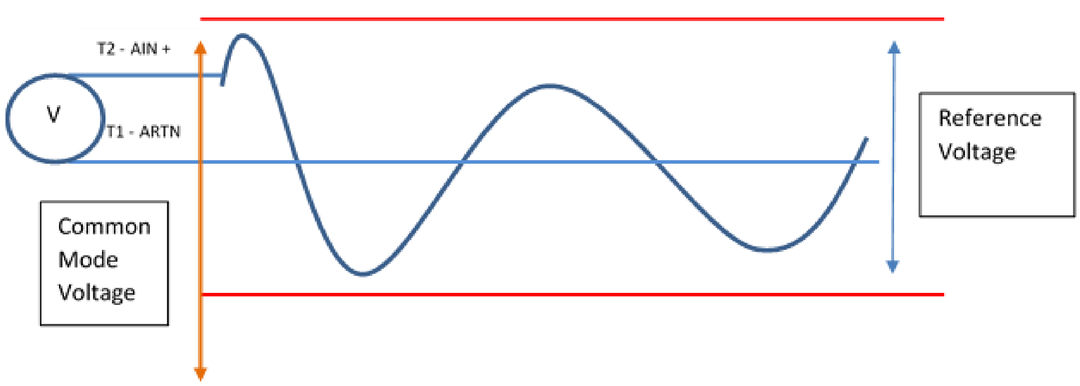

Figure 5. Ratiometric Inputs, external reference voltage.

3 Bridge Inputs

Ratiometric inputs are widely used for Bridge Inputs as found in Load Cell and Pressure Sensors because any fluctuations in the excitation voltage are eliminated in the final reading.

The input is configured as a ratiometric input, where the voltage difference between terminals 2 (AIN+) and 3 (AIN-) is measured with respect to the externally applied voltage reference applied between terminal 1 (ARTN) and terminal 4 (APWR).

The Excitation voltage, set to 5 or 10 Vdc is used to power the external bridge sensor. Two external resistors provide a divider circuit to ensure that the differential inputs are biased at ½ of the voltage generated by the on-board Excitation Voltage.

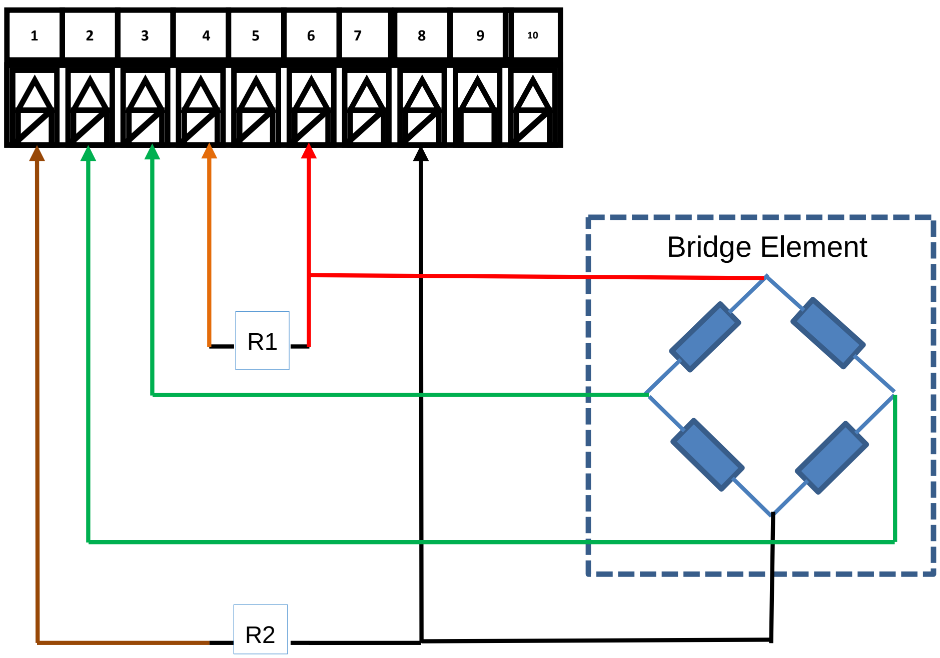

Figure 6. Bridge Element and Inputs.

Resistors (R1, R2): ~ 4.7 k ohms.

NOTE: An internal 2.0 k ohm resistor is connected between terminal 1 (ARTN) and terminal 4 (APWR).

3.1 Setting Input Process Range and Scaling

To calibrate to a specific bridge device the user will provide two known loads and enter the corresponding values. This allows the device to calculate a straight line correction:

Weight = Input Reading X Gain + Offset

Scaling operations allow translating source (input) signals to scaled output signal using a linear translation defined by a SLOPE (or gain) and an OFFSET. As shown below, (X1, Y1) and (X2, Y2) define two points on a line that has a certain SLOPE and OFFSET. Knowing the SLOPE and OFFSET allows determining the OUTPUT value for any given INPUT value using the equation:

Output = Input X SLOPE + OFFSET, where

GAIN = (Y2 - Y1) / (X2 - X1)

OFFSET = Y1 - (GAIN * X1).

The Input reading is expressed in terms of full scale, which is directly dependent on the Vref which is in turn derived from the excitation voltage. Due to the ratiometric design and the two point user bridge scaling the absolute value of the Excitation voltage does not enter into the weight calculation.

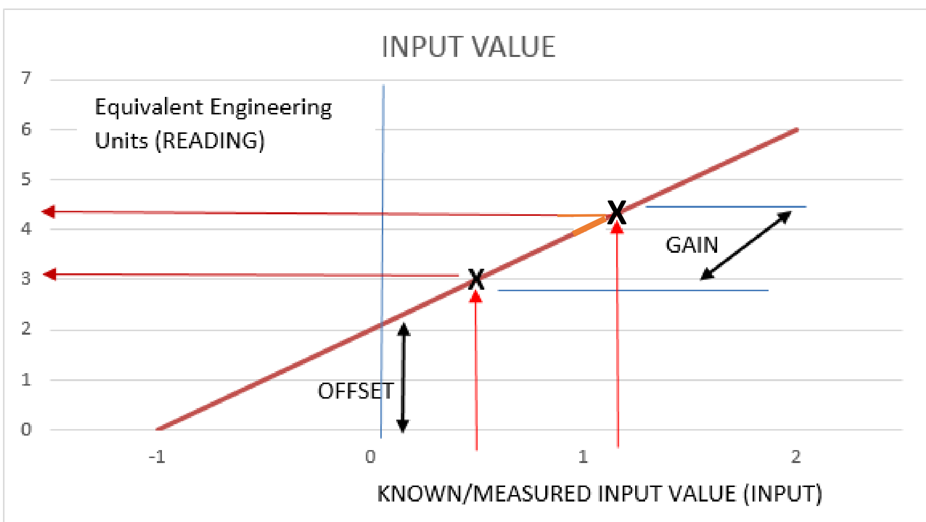

Figure 7. Process and Scaling Range.

- If (X2 - X1) == 0, the GAIN is set to 1 and the OFFSET is set to 0.

The Platinum excitation voltage default value is 5.0 Vdc. This may be changed to 10 Vdc thru the Platinum INIT/ECTN menu option depending on the selected load cell characteristics.

3.2 *Platinum Load Cell Configuration*

The following Menu commands may be entered to configure the Platinum unit for a 0.05 Vdc ratiometric input (connected to a suitable load cell) and allows setting up a simple scaling to convert the input signal to weight.

INIT	INPUT	PROC	+-0.5			Selects +/- 0.05 input
			TYPE	RTIO		Sets input to Ratiometric
			LIVE	RD.1	0	Enters '0 weight'
				IN.1	??	When unloaded load cell display stabilizes press enter to enter the first reference point
				RD.2	<50>	Enter a known weight (i.e., 50 kg)
				IN.2	??	Apply the 'known weight' to the load cell and when the display stabilizes press enter to enter the second reference point.
	TARE	DSBL				Disables TARE function
		ENBL				Enables Front panel TARE function
		RMT				

When the unit is configured navigate to the OPER/RUN mode and press enter. The measured weight applied to the load cell will be displayed.

To 'TARE' the system, press the ◀ button. The word 'TARE' is displayed. Pressing the ENTER button ↵ will return to the running state with a 0 weight displayed.

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