Instrumentation Northwest, Inc. (INW)

APPLICATION NOTE

USE OF THE PS9805 PRESSURE TRANSDUCER (serial numbers 2201000 and greater) WITH THE CAMPBELL SCIENTIFIC, INC. CR10X FOR HIGH PRECISION READINGS ON 5 PSI SENSORS April 2002

Introduction:

The purpose of this document is to provide programming information for Campbell Scientific CR10X data loggers for obtaining improved accuracy when using PS9805 - 5 PSI.

The Standard Measurement Programming (see below) results in a resolution of ±0.2 inches. This method uses the 25 mV Slow Range of the CR10X. This level of resolution is acceptable for many measurement needs. However, in the 0 – 5 PSI range, greater resolution is often needed.

Using the High Precision Measurement Programming (see page 2), instead, will result in an resolution of ±0.03 inches. This uses the 7.5 mV Slow Range of the CR10X.

Standard Measurement Program Example:

```
1: Ex-Del-Diff (P8)
        1: 2        Reps
        2: 3        25 mV Slow Range
        3: 1        DIFF Channel
        4: 1        Excite all reps w/Exchan 1
        5: 1        Delay (units 0.01 sec)
        6: 800      mV Excitation
        7: 1        Loc [Vr     ]
        8: 1.0      Mult
        9: 0.0      Offset

; Calculate L factor

L=100*(Vo/Vr)

; Measure Temperature

2: Temp (107) (P11)
        1: 1        Reps
        2: 5        SE Channel
        3: 2        Excite all reps w/E2
        4: 4        Loc [T      ]
        5: 1.0      Mult
        6: 0.0      Offset

; L can be translated to a pressure
; measurement using the following formula,
; where m and b (in psi) are determined from
; device calibration sheet

P=(m)*L + (b)

; Now data can be further processed or written
; to data storage memory.
```

In this example:
Vr = differential voltage at diff channel 1
Vo = differential voltage at diff channel 2
L = pressure measurement in nominal units
P = pressure measurement in psi units using provided calibration values m and b from calibration data sheet for the specific sensor being measured
T = temperature measurement in degrees C

High Precision Measurement Program Example:

```
1: Ex-Del-Diff (P8)
    1: 1      Reps
    2: 3      25 mV Slow Range
    3: 1      DIFF Channel
    4: 1      Excite all reps w/Exchan 1
    5: 1      Delay (units 0.01 sec)
    6: 800    mV Excitation
    7: 1      Loc [Vr     ]
    8: 1.0    Mult
    9: 0.0    Offset

2: Ex-Del-Diff (P8)
    1: 1      Reps
    2: 2      7.5 mV Slow Range
    3: 2      DIFF Channel
    4: 1      Excite all reps w/Exchan 1
    5: 1      Delay (units 0.01 sec)
    6: 800    mV Excitation
    7: 2      Loc [Vo     ]
    8: 1.0    Mult
    9: 0.0    Offset

; Calculate L factor

L=100*(Vo/Vr)

; Measure Temperature

3: Temp (107) (P11)
    1: 1      Reps
    2: 5      SE Channel
    3: 2      Excite all reps w/E2
    4: 4      Loc [T      ]
    5: 1.0    Mult
    6: 0.0    Offset

; L can be translated to a pressure
; measurement using the following formula,
; where m and b (in psi) are determined from
; device calibration sheet

P=(m)*L + (b)

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In this example:
Vr  = differential voltage at diff channel 1
Vo  = differential voltage at diff channel 2
L   = pressure measurement in nominal units
P   = pressure measurement in psi units using
      provided calibration values m and b
      from calibration data sheet for the specific
      sensor being measured
T = temperature measurement in degrees C
```
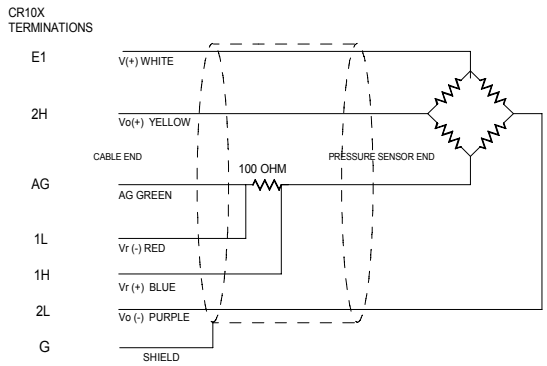
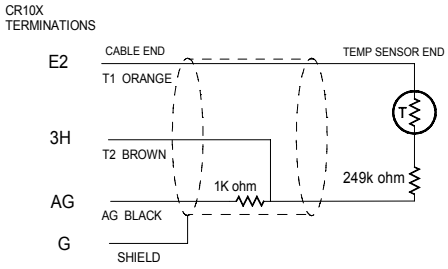

Wiring Diagram for above programming samples:





Instrumentation Northwest appreciates any comments you may have regarding this application note. Please call or write to:

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