

Interfacing PMA Detectors to a Campbell Datalogger

APPLICATION NOTE 111

Overview

Following is a set of instructions to guide you through programming and wiring a PMA series detector to a Campbell CR10 datalogger. This example uses an outdoor UVB detector with temperature compensation algorithm, model PMA1102.

The PMA series detectors require a ±5V power supply. A power supply inverter is available from Solar Light Co. (part number PMA2010). This inverter requires a positive voltage from 5 to 12V DC and will produce a ±5V supply for the detector. Current requirements may vary, be sure to check your detector's current requirement on the product specification sheet.

Connecting a PMA1102 to Campbell CR10 Datalogger

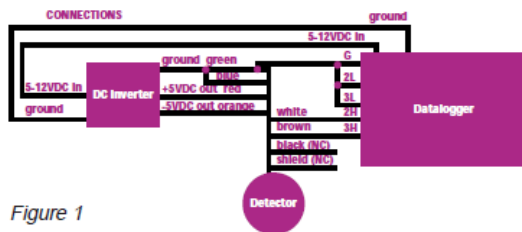


Figure 1

PMA series detector connected to a Campbell CR10 datalogger using a PMA2010 inverter box. The inverter box is only required if a -5V supply is not available.

Programming

The following programming example is a guideline. Before deploying, careful testing must be done by each user to determine if all functions of their program are functioning properly.

*1Table 1 Programs
01:1Sec. Execution Interval

Section 1.0

Measure CR10 Battery Voltage

01:P10Battery Voltage
0110Loc[;BatryVolt]

Section 2.0

The Multiplier (M) will equal the calibration factor provided by Solar Light Co. Typical values are 25 to 50 MEDs/Hr/V or 0.025 to 0.050 MEDs/Hr/mV

The offset (O) will equal the dark value multiplied by -1. The offset will also be supplied by Solar Light Co. Typical values are between -3mV and +3mV.

```
02: .....P .....2 .....Volt(DIFF)
01: .....1 .....Rep
02: .....25 .....2500mV 60 Hz rejection Range
03: .....2 .....IN Chan
04: .....1 .....Loc[:MED / Hr]
05: .....M .....Mult          User entered value
06: .....O .....Offset        User entered value
```

Section 3.0

Measure PMA1102 Temperature Sensor

```
08: .....P .....2 .....Volt(DIFF)
01: .....1 .....Rep
02: .....25 .....2500 mV 60 Hz rejection Range
03: .....3 .....IN Chan
04: .....2 .....Loc[:PMA_Temp]
05: .....0.1 .....Mult
06: .....-500 .....Offset
```

Section 4.0

This section applies a temperature effect correction factor of 1.0% per degree C using the following formula:

$$SUV_{corr} = \frac{SUV_{meas}}{1 + (T_{det} - 25) \times 0.01}$$

where SUV_{meas} is 'MED/Hr' prior to correction, SUV_{corr} is 'MED/Hr' after correction, and T_{det} is 'PMA_Temp'.

```
09: .....P .....34 .....Z=X+F
01: .....2 .....X Loc PMA_Temp
02: .....-25 .....F User input: Temp in degrees C at
03: .....3 .....ZLOC[:TcorFactr] calibration * -1

10: .....P .....37 .....Z=X+F
01: .....3 .....X Loc TcorFactr
02: .....0.01 .....F
03: .....3 .....Z Loc [:TcorFactr]

11: .....P .....34 .....Z=X+F
01: .....3 .....X Loc TcorFactr
02: .....1 .....F
03: .....3 .....Z Loc[:TcorFactr]

12: .....P .....38 .....Z=X/Y
01: .....1 .....X Loc MED/Hr
02: .....3 .....Y Loc TcorFactr
03: .....1 .....Z Loc[:MED/Hr]
```

Section 5.0

Calculate KW/m² from MEDs/Hr. The conversion factor from Solar Light Co. is 58.3E-6 kW/m² / MED/Hr. This is performed in two steps.

13:P ...37 ...Z=X*F
01:1X Loc MED/HR
02:5.85 ...F
03:11Z Loc[:kWm⁻²]

14:P ...37 ...Z=X*F
01:11X Loc kWm⁻²
02:0.00001 ...F
03:11Z Loc[:kWm⁻²]

Section 6.0

Calculate MEDs and kJ / m²

15:P ...30 ...Z=F
01:2.7778
.....F (Exec. Interval in secs. / 3600)
02:4 -- ...Exponent of 10
03:6Z Loc[:HrsLapsed]

16:P ...36 ...Z=X*Y
01:1X Loc MED/Hr
02:6Y Loc HrsLapsed
03:7Z Loc[:MEDs]

17:P ...37 ...Z=X*F
01:11X Loc kW m⁻²
02:1F (Execution Interval in Seconds)
03:12Z Loc[:kJ m⁻²]

Section 7.0

Output hourly averages (MED / Hr, kW / m²) and totals (MEDs, kJ / m²)

18:P ...92 ...If time is
01:0minutes (seconds—) into a
02:60minute or second interval
03:10set high Flag 0 (output)

19:P ...77 ...Real Time
01:220 ...Day, Hour-Minute

20:P ...71 ...Average
01:1Rep
02:1Loc MED / Hr

21:P ...71 ...Average
01:1Rep
02:11Loc kW m⁻²

22:P ...72 ...Totalize
01:1Rep
02:7Loc MEDs

23:P ...72 ...Totalize
01:1Rep
02:12Loc kJ m⁻²



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