

Direct Met Interfaces

1.0 General

H2NS offers direct interfacing to meteorological sensors. These include, wind speed counters, wind direction potentiometers, rainfall device and thermistors. A direct met interface PC board is required for the CPP-3794. In the CPP-2001, the various interfaces are incorporated on other PC boards.

1.1 Direct Met Interface CPP-3794

The direct met interface PC board contains the following features;

- 4 - 1.0v output reference voltages
- 3 – wind speed counter inputs
- 1 – rainfall counter input
- 3 – positions for thermistor interfacing
- 2 – Amplifiers (factory set to gain of 10)
- $\pm 12v$ and +5v outputs for sensor excitation
- Internal signal generator

1.1.1 1.0v Reference Voltages

The 1.0v references can be used as needed. Each output will provide 5mA. These are normally applied across wind direction potentiometers, and in some applications, thermistors.

1.1.2 Wind Speed Counters

The wind speed counters have an operational amplifier at the signal input. The input section operates as a signal comparator and amplifies, squares and limits the incoming signal level. Signal levels from 50mv to 5 v can be applied to the inputs.

1.1.3 Rainfall Counter

The CPP can be configured to handle the following types of rainfall inputs;

- Tipping bucket
- Weighing
- Analog signal conditioned (A/D input)

These configurations are presented in more detail in the CPP manual. The direct met interface PC board contains the rainfall counter, which is designed to collect data from a tipping bucket rainfall instrument. The tips are accumulated in the counter and processed by the CPP. The rainfall counter also has a separate battery backup system. This allows the rainfall counter to continue to collect tips from a rain gauge even during power outages. The rainfall battery is switched in/out with position #10 on switch SW1 on the direct met interface board.

1.1.4 Thermistor interfaces

The direct met interface PC board has slots for three thermistor interface daughter PC boards. The thermistor interface PC board has a reference voltage and provisions to install up to three precision resistors for interfacing to the various types of thermistors. Not all thermistors require the interface boards, as the resistors can be installed on the back panel of the CPP. Presented in each manufacturers section is information regarding thermistor interfacing.

1.1.5 Signal Amplifiers

The direct met interface PC board contains two signal amplifiers. These amplifiers are factory set for a gain of ten, and have about a $\pm 10\%$ gain and offset adjustment range.

1.1.6 Output Voltages

The direct met interface PC board offers $\pm 12v$ and $+5v$ outputs. The $\pm 12v$ can supply 15mA, and the $+5v$ can supply 100mA.

1.1.7 Internal Signal Generator

The direct met interface PC board has a circuit that can be used to test the wind speed counters. Switch SW1 is used to switch the test signal in/out of the counters. For normal operation switches 1-9 of SW1 should be in the off position. When the test frequencies are to be used, the actual wind speed sensor should be disconnected. Presented below is a definition of the test signals associated with SW1. The frequencies show are not exact, but are close, and can be used to verify the wind speed counter operation.

Definition SW1	
<u>Position #</u>	<u>Function</u>
1	19 Hz
2	38 Hz
3	75 Hz
4	150 Hz
5	300 Hz
6	600 Hz
7	Connect 1-6 to WSP3 input
8	Connect 1-6 to WSP2 input
9	Connect 1-6 to WSP1 input
10	Switch rainfall battery in

1.2 CPP-2001

The direct met interface PC board can be installed in the CPP-2001, but this is a special order and requires that some other board not be installed. The standard hardware delivered in the CPP-2001 will support the following direct met interfacing;

- 1 – 1.0v reference voltage
- 1 – wind speed counter input
- 1 – rainfall counter input
- 1 – position for a thermistor interface
- 1 – signal amplifier
- $\pm 12v$ and $+5v$ sensor excitation voltages
- Internal frequency generator

1.2.1 1.0v Reference Voltage

The 1.0v reference can be used as needed. The output will provide 5mA. This is normally applied across a wind direction potentiometer, and in some applications, thermistors.

1.2.2 Wind Speed Counter

The wind speed counter has an operational amplifier at the signal input. The input section operates as a signal comparator and amplifies, squares and limits the incoming signal level. Signal levels from 50mv to 5 v can be applied to the inputs.

1.2.3 Rainfall Counter

The CPP can be configured to handle the following types of rainfall inputs;

- Tipping bucket
- Weighing
- Analog signal conditioned (A/D input)

These configurations are presented in more detail in the CPP manual. A tipping bucket rainfall input should be connected to digital input number 1.

1.2.4 Thermistor interface

The CPP processor PC board has a slot for an interface daughter PC board. The thermistor interface PC board has a reference voltage and provisions to install up to three precision resistors for interfacing to the various types of thermistors. Not all thermistors require the interface boards, as the resistors can be installed on the back panel of the CPP. Presented in each manufacturers section is information regarding thermistor interfacing.

1.2.6 Output Voltages

The direct met interface PC board offers $\pm 12v$ and $+5v$ outputs. The $\pm 12v$ can supply 15mA, and the $+5v$ can supply 100mA.

1.2.7 Internal Signal Generator

The direct met interface PC board has a circuit that can be used to test the wind speed counters. Switch SW1 is used to switch the test signal in/out of the counters. For normal operation switches 1-9 of SW1 should be in the off position. When the test frequencies are to be used, the actual wind speed sensor should be disconnected. Presented below is a definition of the test signals associated with SW1. The frequencies show are not exact, but are close, and can be used to verify the wind speed counter operation.

Definition SW1	
<u>Position #</u>	<u>Function</u>
11	19 Hz
12	38 Hz
13	75 Hz
14	150 Hz
15	300 Hz
16	600 Hz
17	Connect 1-6 to WSP3 input

- 18 Connect 1-6 to WSP2 input
- 19 Connect 1-6 to WSP1 input
- 20 Switch rainfall battery in

2.0 Manufacturers

The manufacturers supported by the CPP are presented in the following sections.

2.1 Met One

H2NS offers a direct interface to Met One meteorological instruments. This is an option that must be purchased. Section ?? of the CPP manual provides detail on the rear panel connections for a direct met interface hook up.

Wind Direction Sensors

Met One wind direction sensors use a potentiometer. The CPP provides a 1.0v reference rear panel signal. The wind direction sensor should be connected across the reference voltage. The signal output of the wind direction sensor and the ground should be connected to a channel on the A/D converter. The channel selected on the A/D should be setup as 1v input channel.

Wind Speed Sensors

014 & 034

These wind speed sensors provide a reed switch contact closure derived from the rotating anemometer. The frequency of the reed switch correlates to the wind speed. The wind speed sensor should be connected across a WS input connector and ground. The CPP direct met interface provides an internal pull up resistor that allows the unit to convert the reed switch closures into electrical signals. In the initialization, the CPP asks for the starting wind threshold and the frequency that corresponds to a 100mph wind. Based on these two points the CPP can calculate the wind speed from the incoming frequency.

For an 010C sensor these values are:

MPH
100mph frequency = 1.111E+3
0.600E+0 starting threshold

MPS
100mph frequency = 2.485E+3
0.268E+0 starting threshold

For an 014 sensor these values are;

MPH
100mph frequency = 5.533E+1
1.000E+0 starting threshold

MPS
To report in meters/sec enter
100mph frequency = 1.238E+2
0.441E+0 starting threshold

For an 034 sensor these values are:

MPH

100mph frequency = 5.566E+1
1.000E+0 starting threshold

MPS

To report in meters/sec enter
100mph frequency = 1.244E+2
0.4471E+0 starting threshold