Sentry Calibrator

2 Point
Current Loop
Calibration

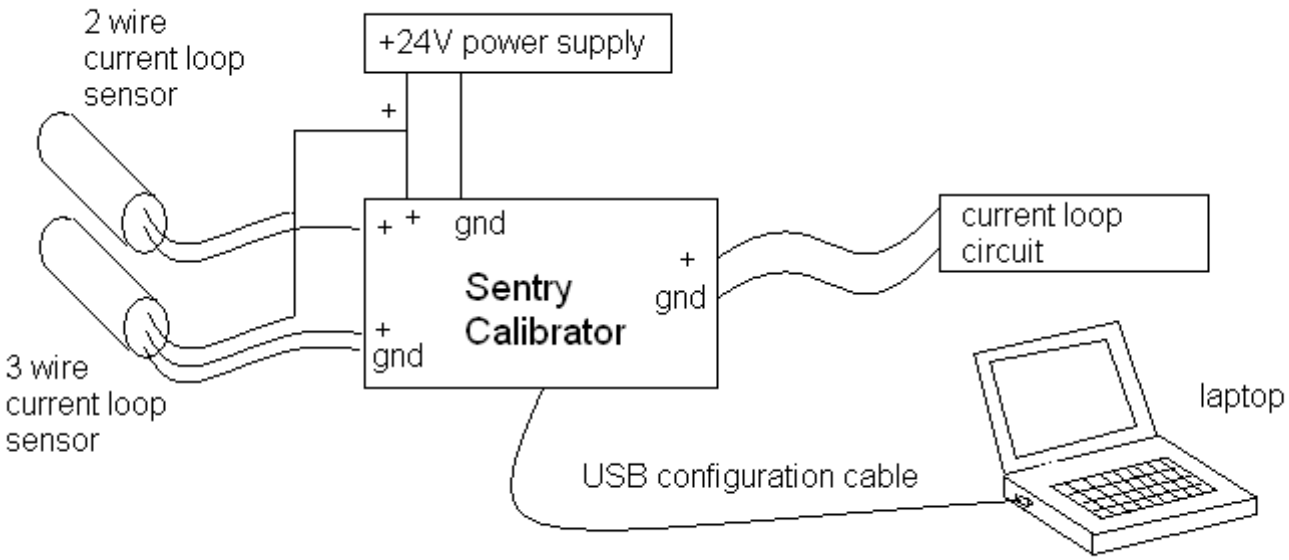
Models

SC-DIN
SC-WALL

Engineering and Manufacturing Services
47745—193rd St. Toronto, SD 57268 USA
(P) (605) 794-2072 (F) (605) 794-2073 emssensors.com

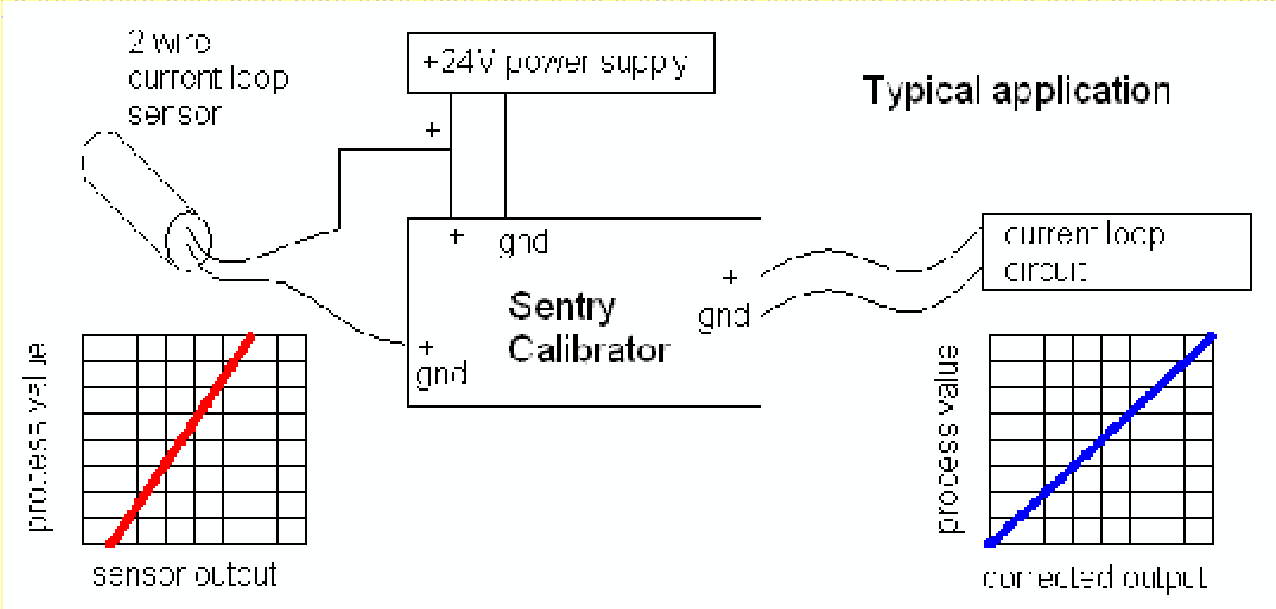
Theory of Operation

The Sentry Calibrator translates a current loop sensor output to a corrected output that is more accurate. This is done by programming the Sentry Calibrator with correction values for two points along the output curve. This allows for a mathematical recalculation of every measured value and a correction applied to bring the output to greater accuracy.



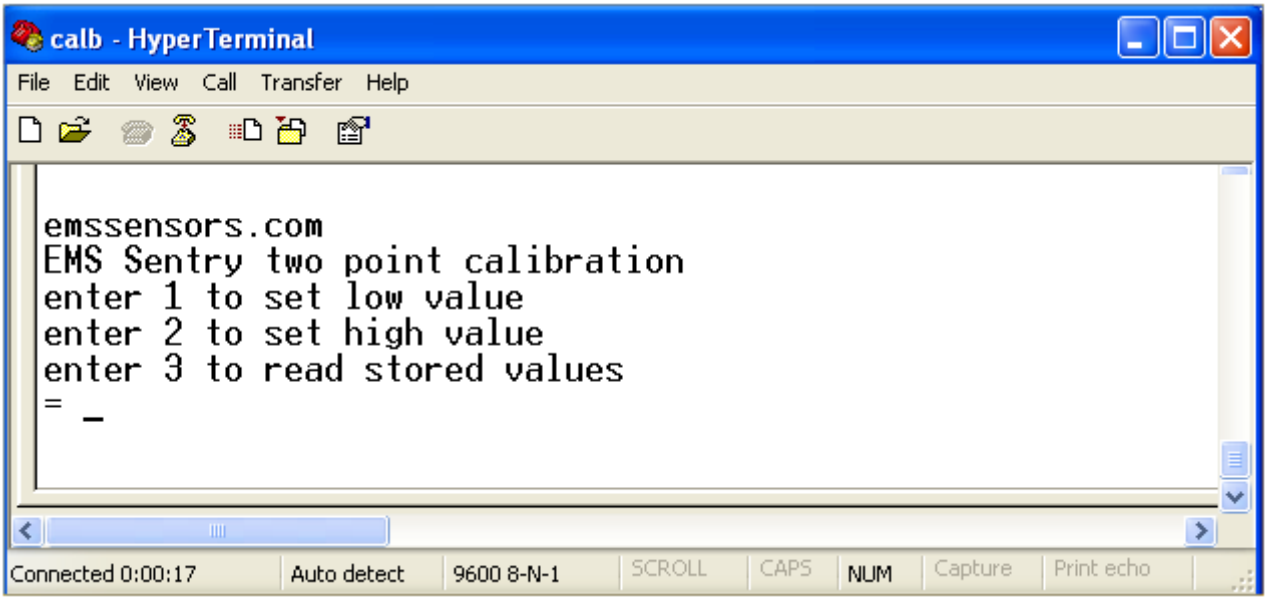
Either two wire or three wire current loop sensors can be used. The output is two wire current sourcing and can accommodate almost any application including most three wire circuits. The Sentry calibrator is placed in series between the sensor and the circuit the sensor would normally be connected to.

Once the Sentry Calibrator has been programmed, there in no need for a laptop or PC connection. The programmed values will remain in protected memory so that they can be retrieved in the event of a power failure.

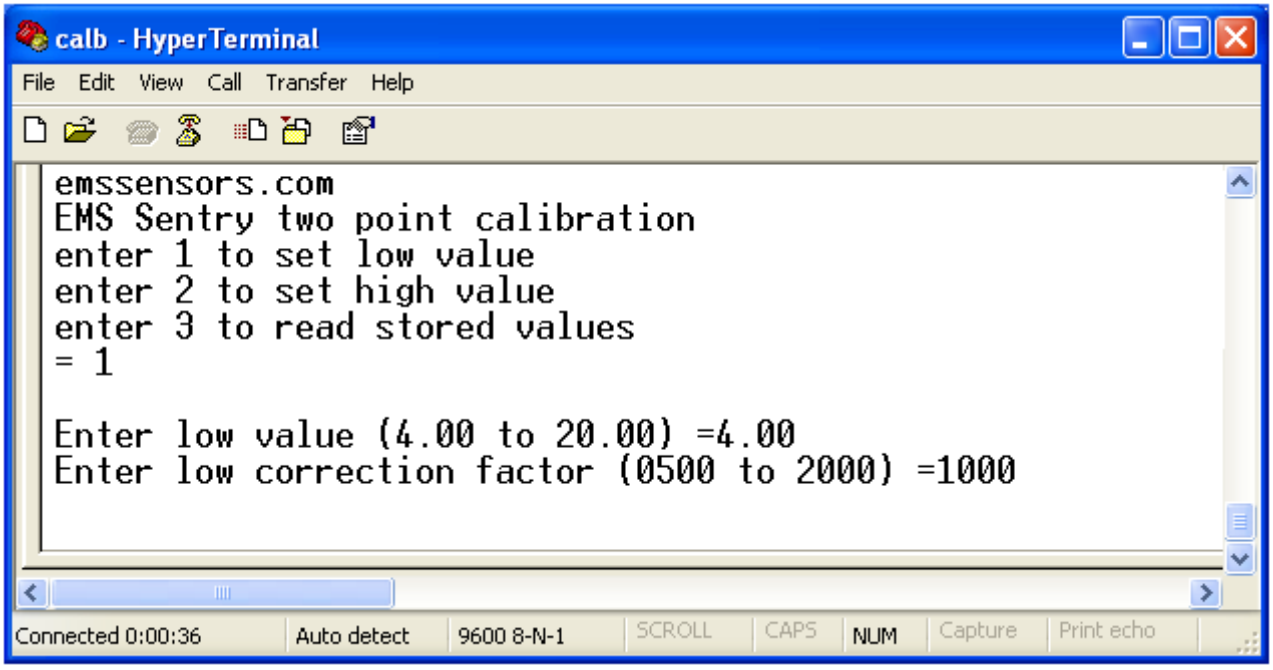


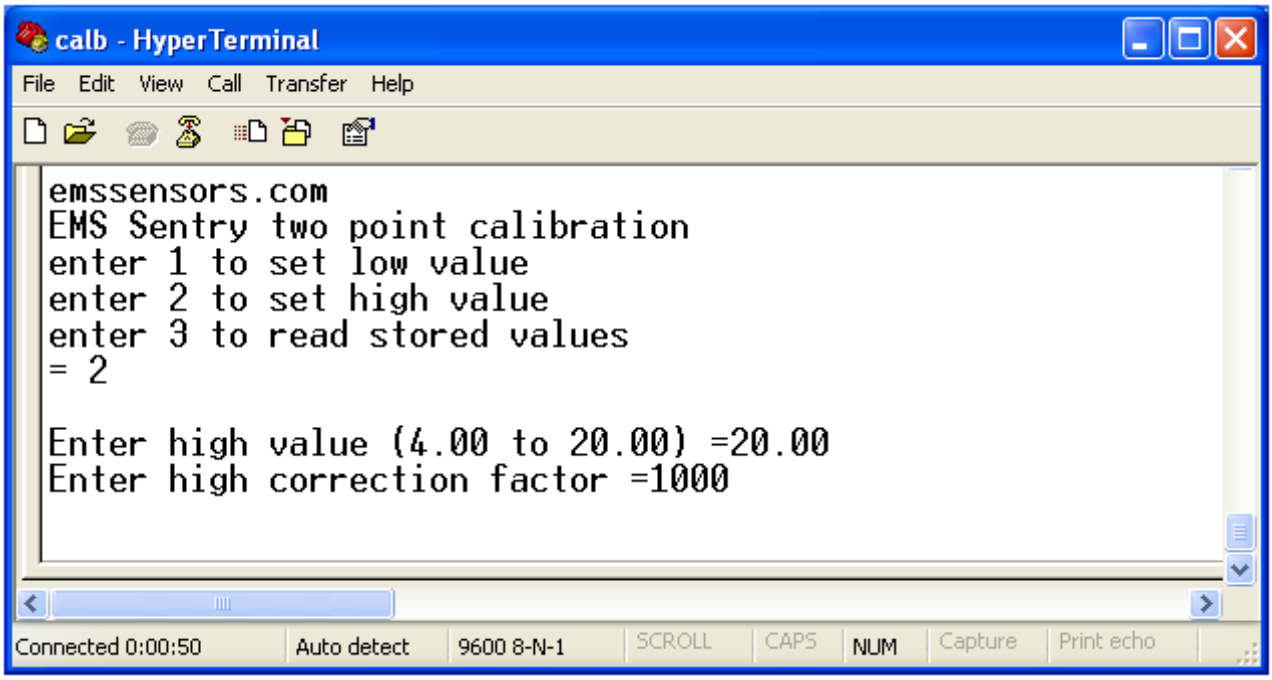
Programming

The Sentry Calibrator is connected to a PC or laptop via a USB configuration cable (USBCC001). When +24VDC is applied to the Sentry Calibrator, it will send out a text menu As shown below;

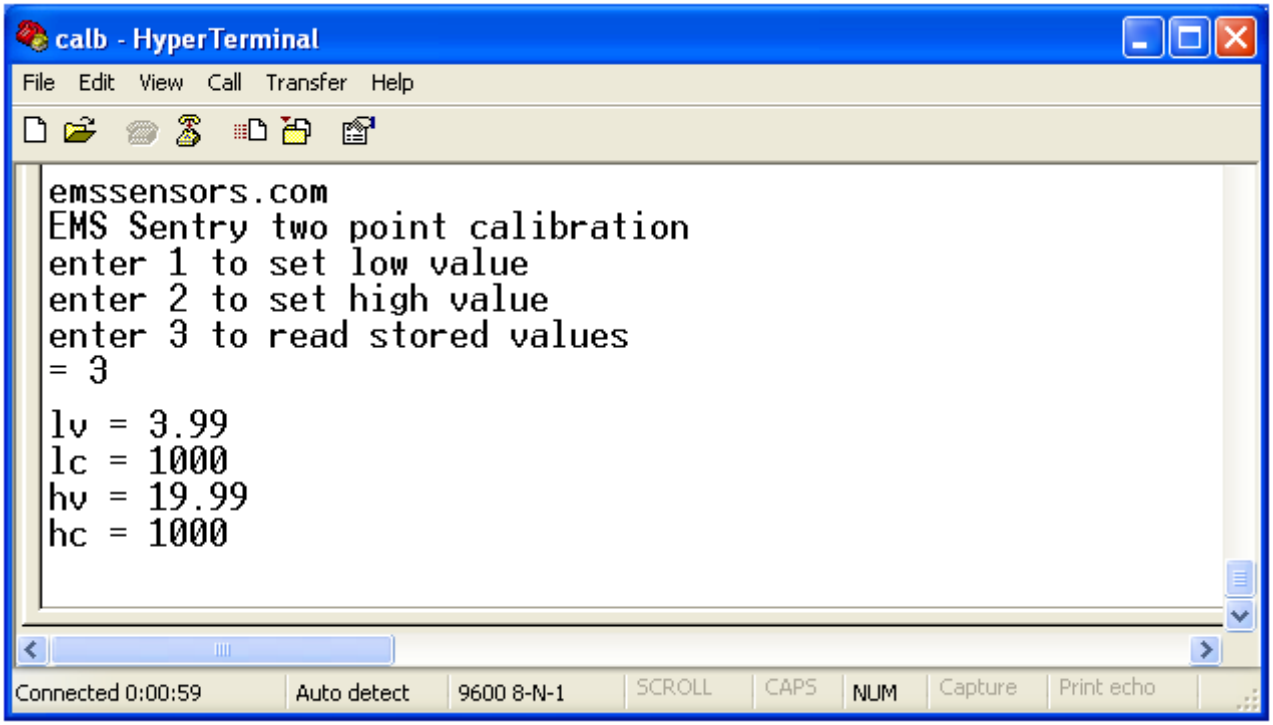


Below the selection is shown for a low value. Here 4mA is selected as the input value and a correction value of 1000 is selected. (500 = lowering the value by 50%, 2000 = raising the value by 100%). The selection of 1000 results in no correction value applied.





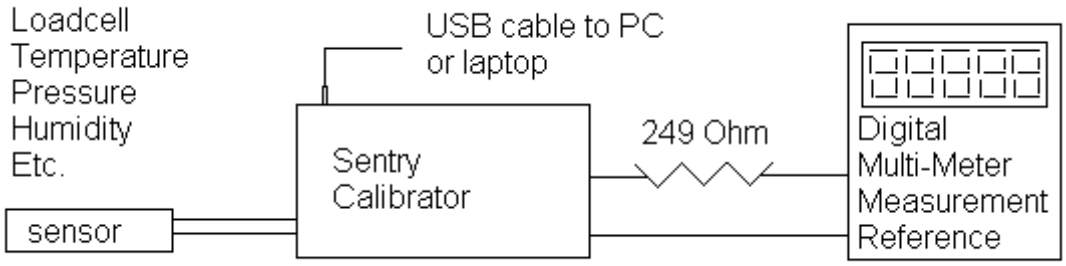
In the illustration above, a high value of 20.00 mA was selected and a correction factor of 1000 (no correction) was selected.



If a sensor was reading OK at 4mA and 5% high at 20mA, the following values may be programmed into the Sentry Calibrator;

LV = 4.00, LC = 1000, HV = 20.00, HC = 950

Calibration Procedure



The following procedure can be used to program the Sentry Calibrator;

1. Expose the sensor to a known low value of process condition (weight, temperature, etc.)
2. Calculate what the sensor current output should be.
3. Connect a PC with Hyperterminal from the USB port to the Sentry Calibrator.
4. Use the current value and select correction factors to provide the desired output current.
5. Expose the sensor to a known high value of process condition.
6. Calculate what the sensor current should be.
7. Use the current value and select correction factors to provide the desired output current.
8. Disconnect the USB cable.

Any low value and any high value can be used. However, it is recommended to use values as far apart as possible. For example a low value of 8mA and a high value of 16mA is better than a low value of 11mA and a high value of 13mA.

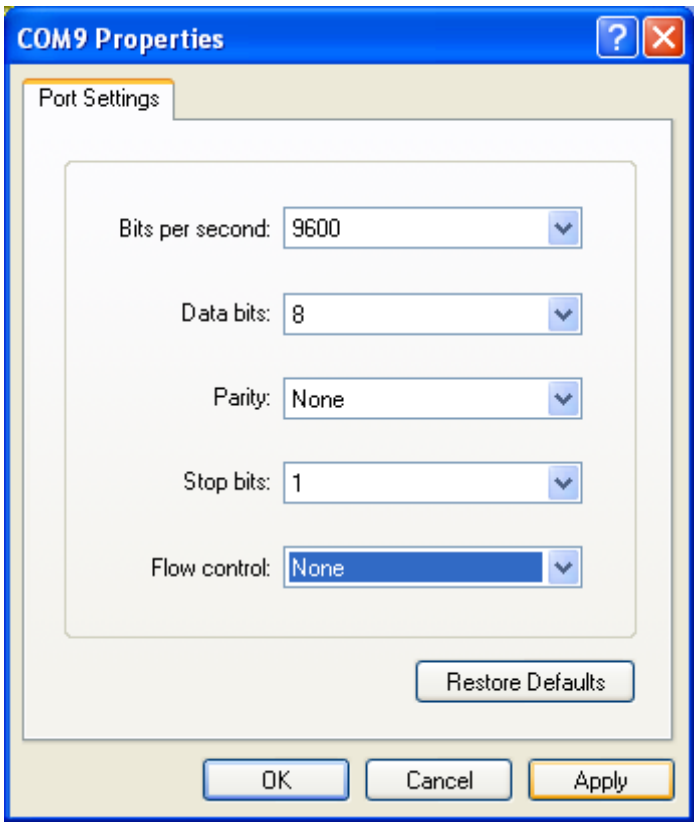
If the Sentry Calibrator is powered up after the PC is connected and hyperterminal is running, the menu should be promptly displayed on the display. If the USB cable is connected after the Sentry Calibrator is powered up, the menu may take 30-60 seconds to come up.

If a mistake is made or the Sentry Calibrator locks up, wait 30-60 seconds and the selection menu should reappear on the hyperterminal. Once an entry is made it is written into the protected memory and the USB cable can be removed at any time.

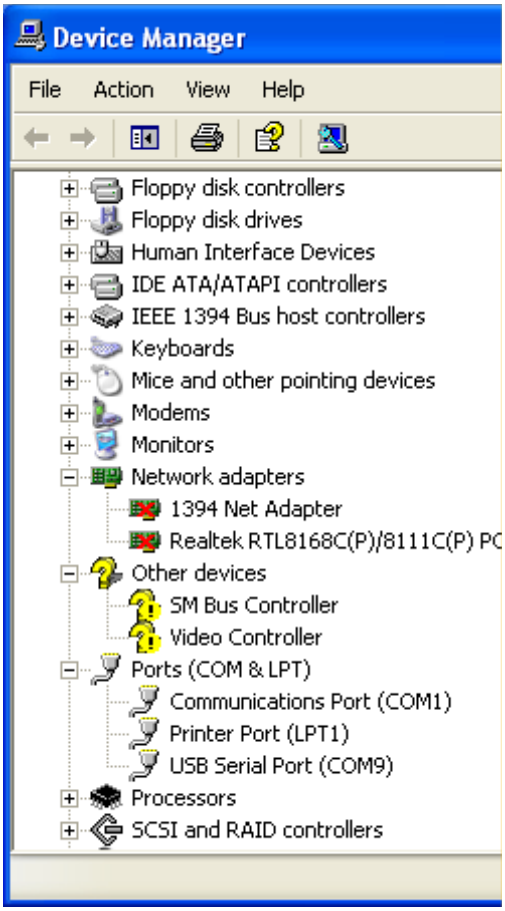
Any serial communication terminal should work if hyperterminal is not available. Testing has also been done with the open source RealTerm available from Sourceforge.

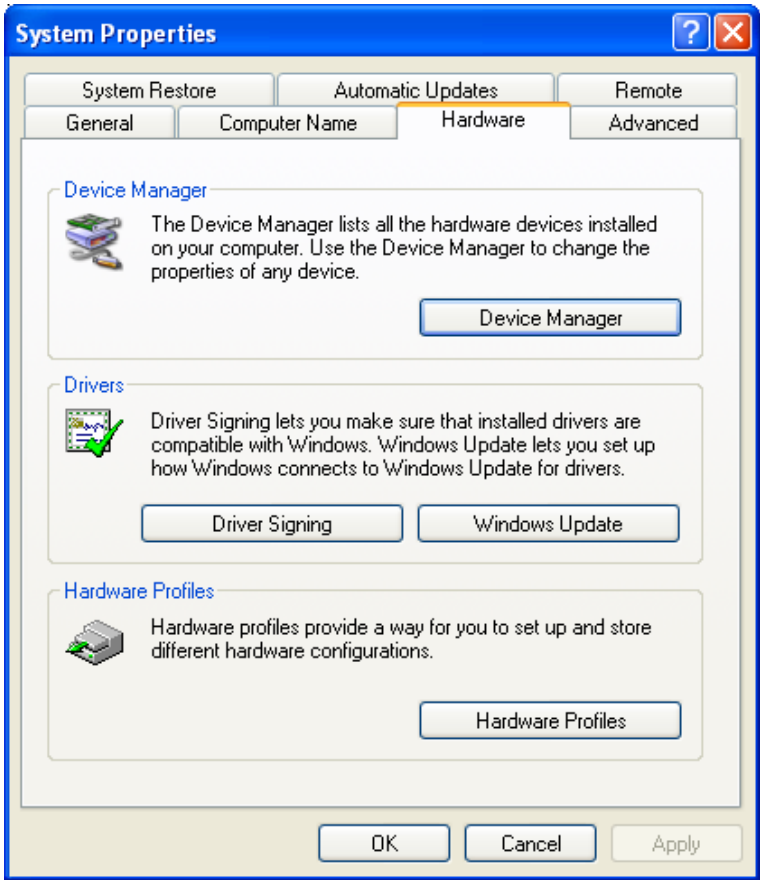
After calibration, the USB cable and the measurement reference are removed and the output of the Sentry Calibrator is reconnected to the application circuit.

Hyperterminal
settings



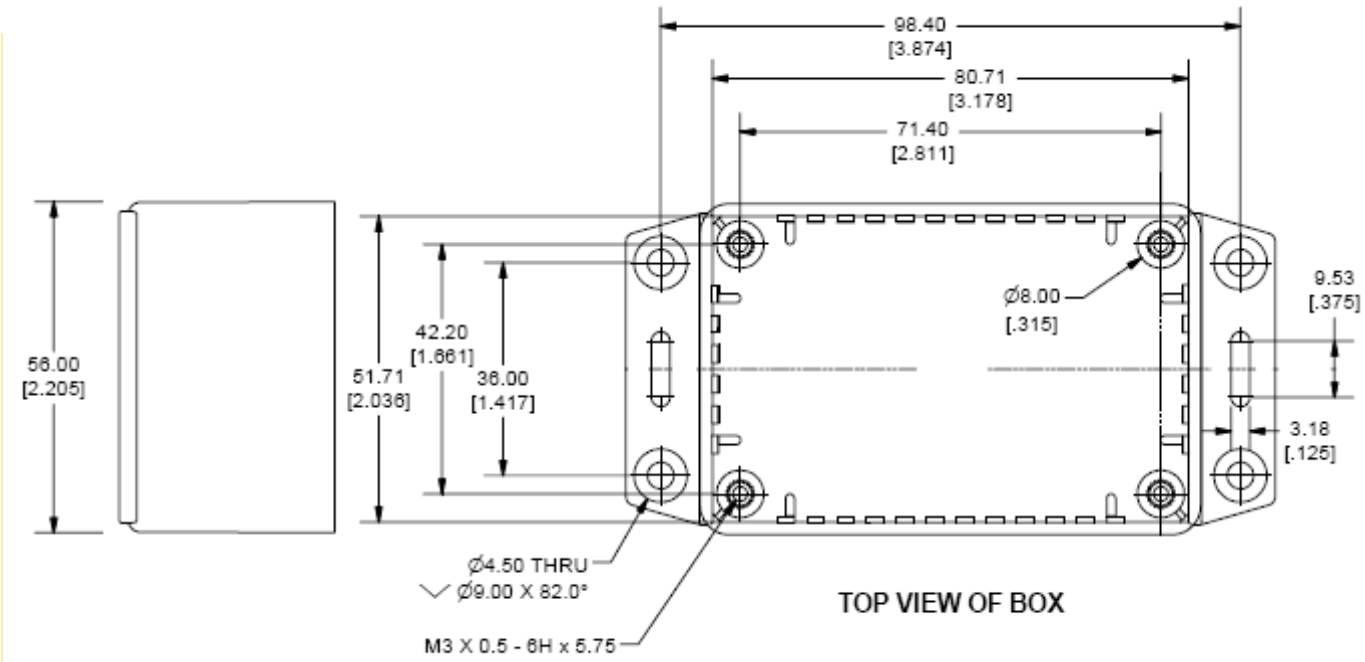
USB com port assignment



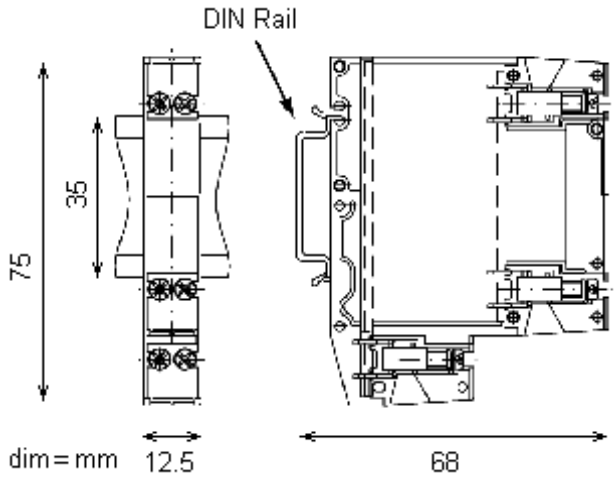


Two Types of Sentry Calibrator

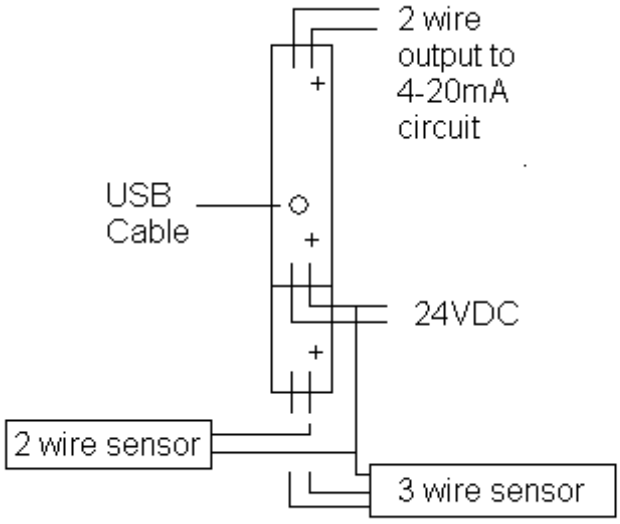
Wall Mount

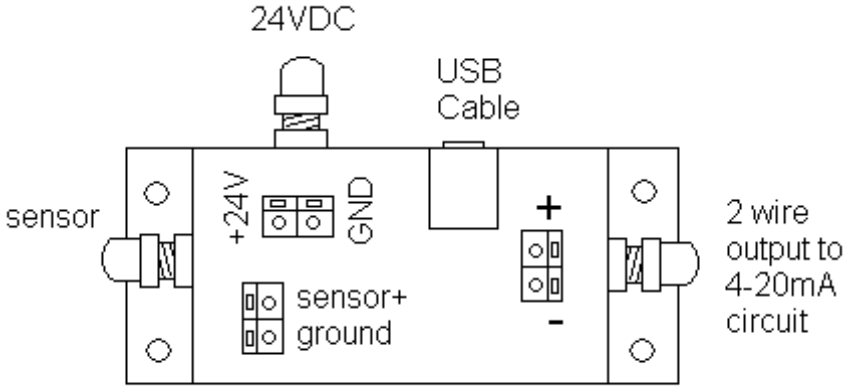


DIN Rail



Wiring


2 wire
output to
4-20mA
circuit
USB
Cable
+
+
+
24VDC
2 wire sensor
3 wire sensor


24VDC
USB
Cable
sensor
+24V
GND
sensor+
ground
+
-
2 wire
output to
4-20mA
circuit

Specifications

Cable Glands: 1/4” NPT
Resolution: 10 microvolts
Input power: +24V @ 50mA
Sensor Input: 2 wire or 3 wire current loop sensor 0-20mA
Current Output: 2 wire 0-20mA