This document assumes you have experience connecting to your CR1000.

The procedure of interfacing the C-sense is described in two sections:

- Wiring the C-sense to the CR1000
- Running PC200W to configure the CR1000 for data collection

Note: This procedure was developed with Campbell Scientific PC200W 4.2 Build 4.2.0.6. Campbell Scientific PC200W software can be found at the following web address:

http://www.campbellsci.com/downloads?sb=PC200W&c=9999.

1. Wiring the C-sense to the CR1000

   There are 4 wires coming from the C-sense: red, black, green, and white. The table below defines their function and where they should connect to the CR1000.

C-sense Pigtail wire color	Function	CR1000 Connection
Red	Supply Voltage: 6-12 VDC	Power Out: 12V
Black	Supply Ground: 0 VDC	Power Out: G
White	Positive Signal to CTD: 0-5 VDC	SE 1(Single Ended)
Green	Negative Signal to CTD: 0 VDC	Ground
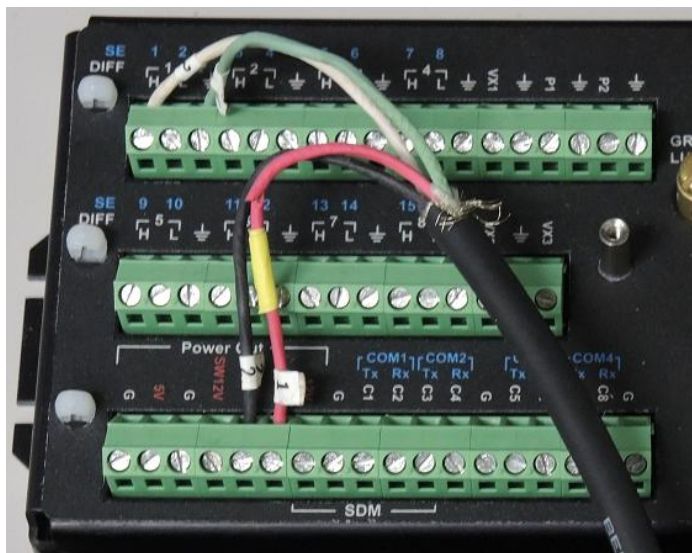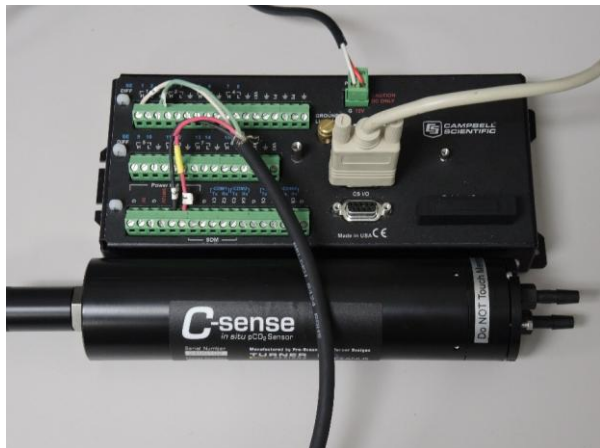
In the images above, the white and green wires coming from the C-sense pigtail are connected to the 1st and 3rd cells on the terminal block, respectively. This is representative of a single ended analog sensor connected to Single Ended Channel 1. The red and black wires coming from the C-sense need to be connected to the "Power Out" section of the CR1000. Connect the red wire to a "12V" port under the "Power Out" section, connect the black wire to a "G" port under the "Power Out" section. The image on the right shows these connections in greater detail.

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2. Running PC200W to configure the CR1000 for data collection

   2.1 After the CR1000 is powered and connected to your PC using a serial cable, click on "Connect" in the upper left corner of the PC200W Datalogger Support Software.
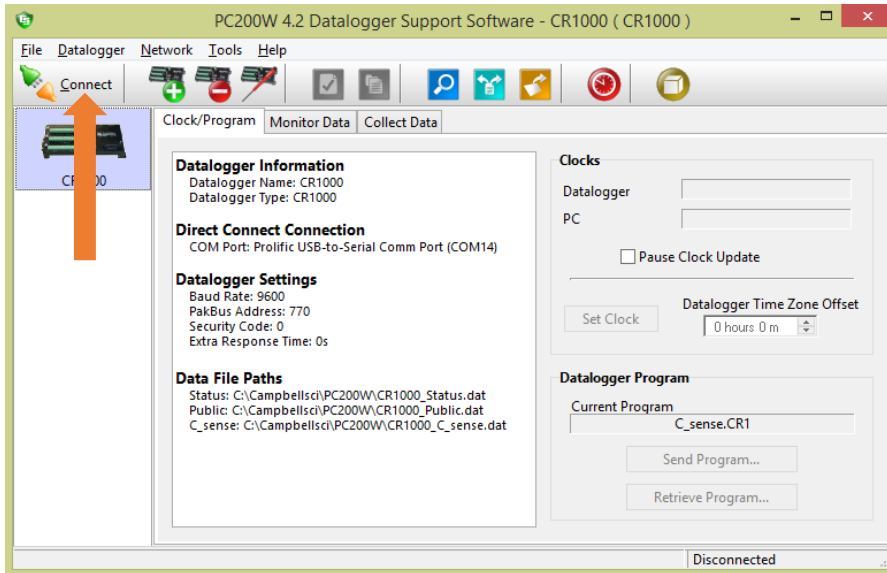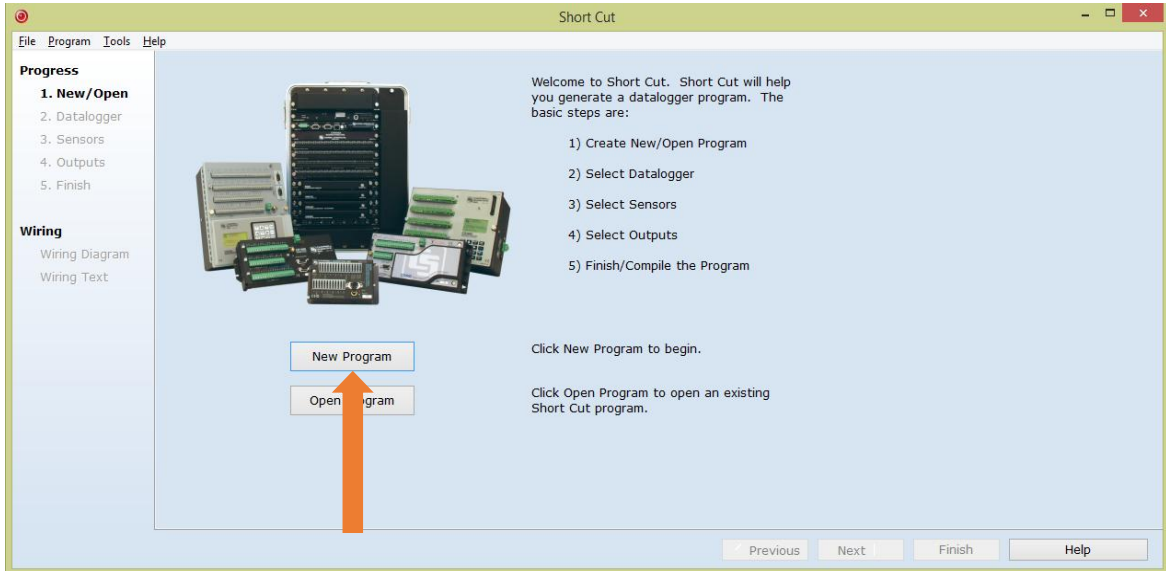

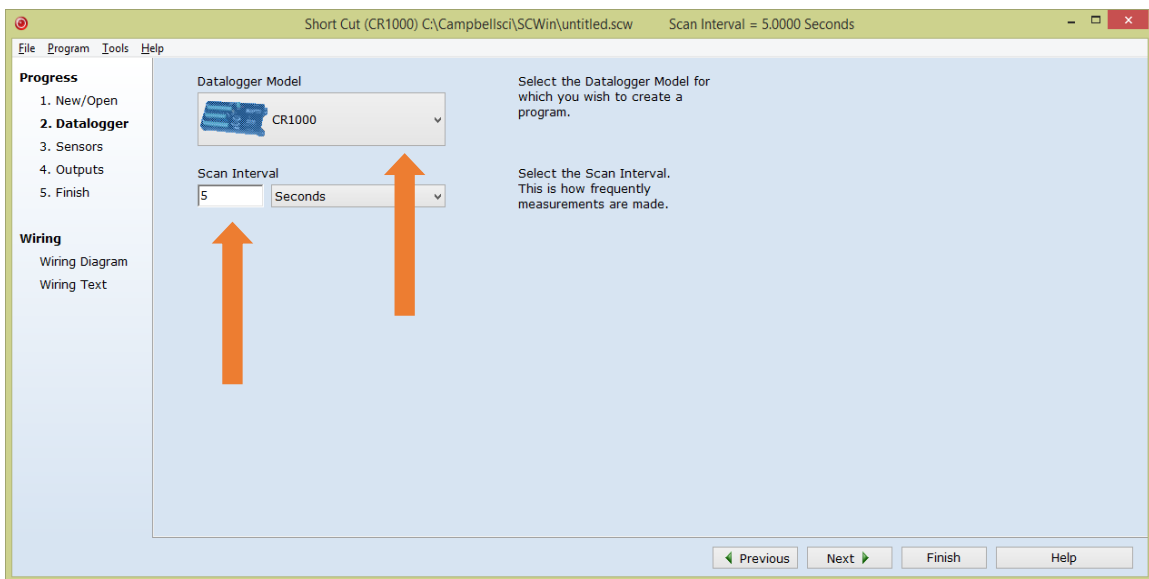   2.2 After connecting, the GUI will display a "Connection Time" in the lower right corner.
Click on the red clock face icon in the toolbar of the PC200W GUI. A new window will open titled "Short Cut".

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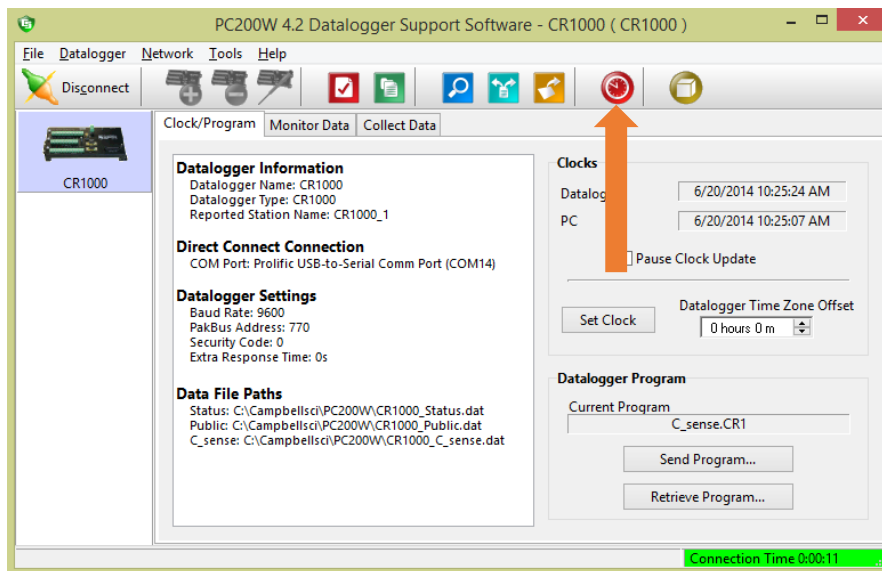
2.3 Click on the "New Program" button

2.4 Under "Datalogger Model", select CR1000 if it isn't selected already. Designate a "Scan Interval". Click on "Next".


If this is the first time running the Short Cut utility, a prompt will appear asking for a choice of ac Noise Rejection. Select 60 Hz for the United States and other countries using 60 Hz ac voltage. Select 50 Hz for Europe and other countries operating on 50 Hz ac line voltage.

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2.5 A new window will open with the left panel titled "Available Sensors and Devices". Expand the "Sensors" folder by clicking the triangle next to it. Expand the "Generic Measurements" folder by clicking the triangle next to it. Highlight the "Single-Ended Voltage" entry by clicking on it once. Click on the right facing arrow in between the left and right panels to add this measurement to the configuration.
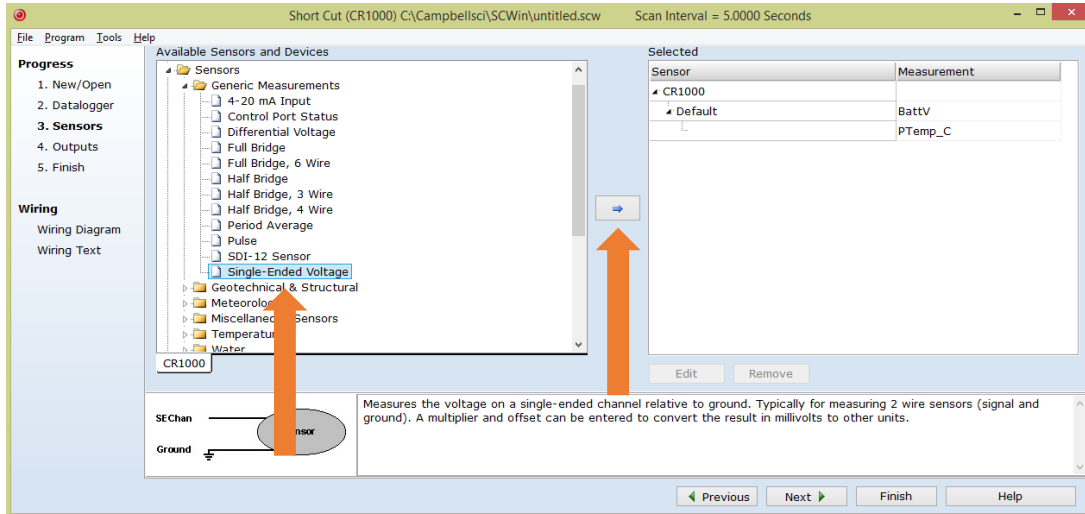

2.6 A new window will open titled "Single-Ended Voltage (Version 3.0)". Click next to the dropdown menu titled "Range of sensor voltage" and select "0 to 5000 mV", it is the first entry in the list. Within the "Multiplier" and "Offset" fields, enter the slope and offset from the calibration sheet of your C-sense. **The values from the calibration sheet must be in units of millivolts**. Click on "OK". The "Single-Ended Voltage (Version 3.0)" window will close. Click on "Next" in the remaining Short Cut GUI.

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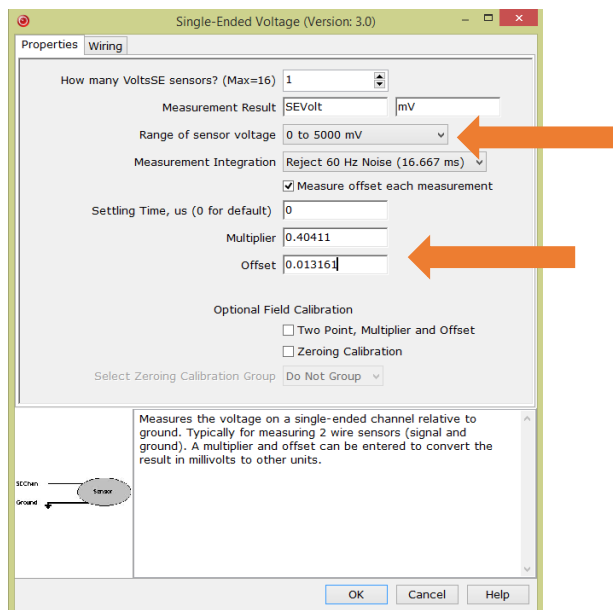
2.7 The left panel now reads, "Selected Sensors" and the right panel reads "Selected Outputs". Under "Selected Sensors", highlight the last entry, "VoltsSE", by clicking it once. Click once on the "Sample" button in between the left and right panel. This action will add the "VoltsSE" to the Selected Outputs panel. Take note of the "Table Name" under "Selected Outputs", as this is the name of the text file that will be created when you retrieve data from the CR1000. In this case, it is named "C_sense". Populate the "Store Every" field with the same value you used for Scan Interval in step 4. Click on "Finish".
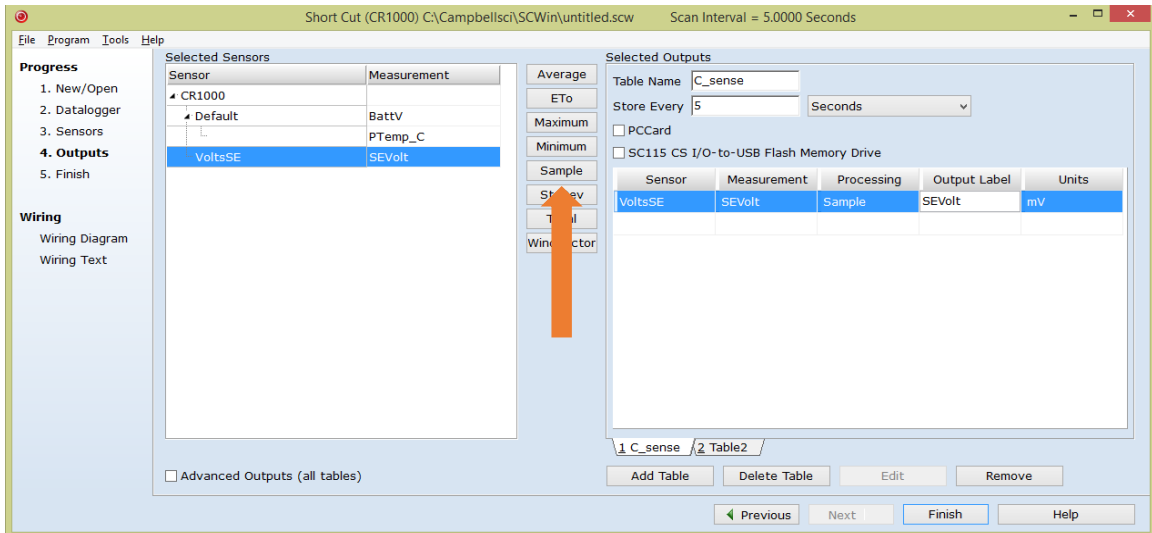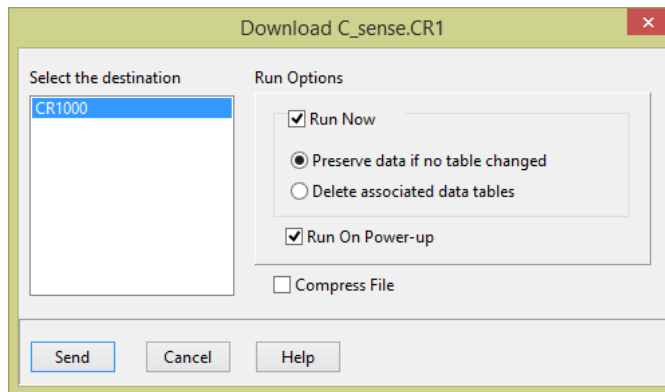

2.8 A new GUI will open asking you to save the program configuration (*.scw). After you save, the software will ask you if you wish to send program to the datalogger, click "Yes".
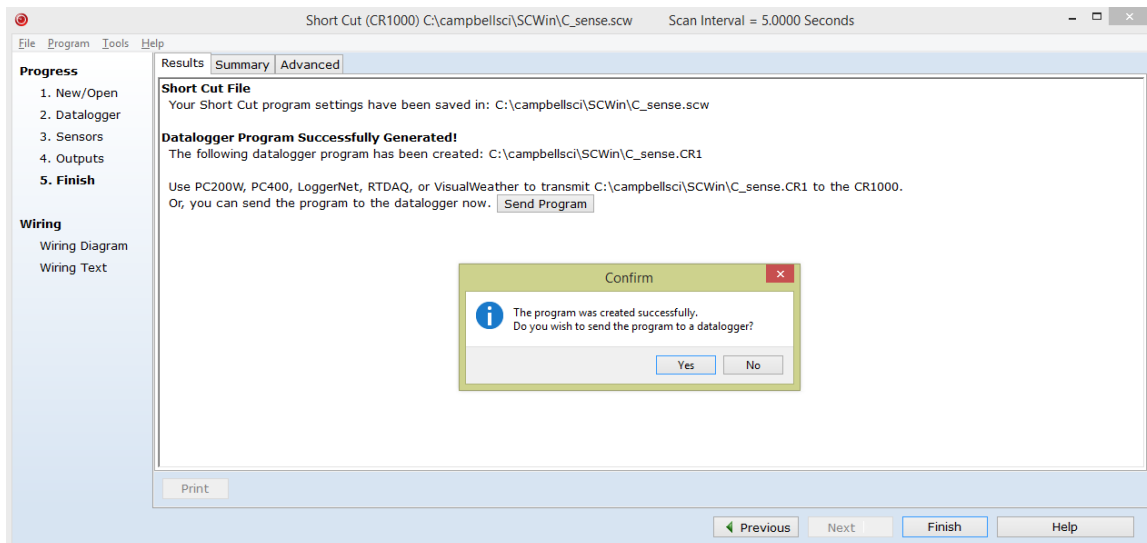
2.9 Within the GUI referenced in step 7, you will notice two file types are created from this operation, the C_sense.scw file is the PC200W software configuration representing the C-sense interface to the CR1000. The file that is delivered to and compiled by the datalogger is C_sense.CR1. The delivery of the *.CR1 file will cause all data on the CR1000 to be deleted. The GUI will prompt you if this is OK. Click "Yes".

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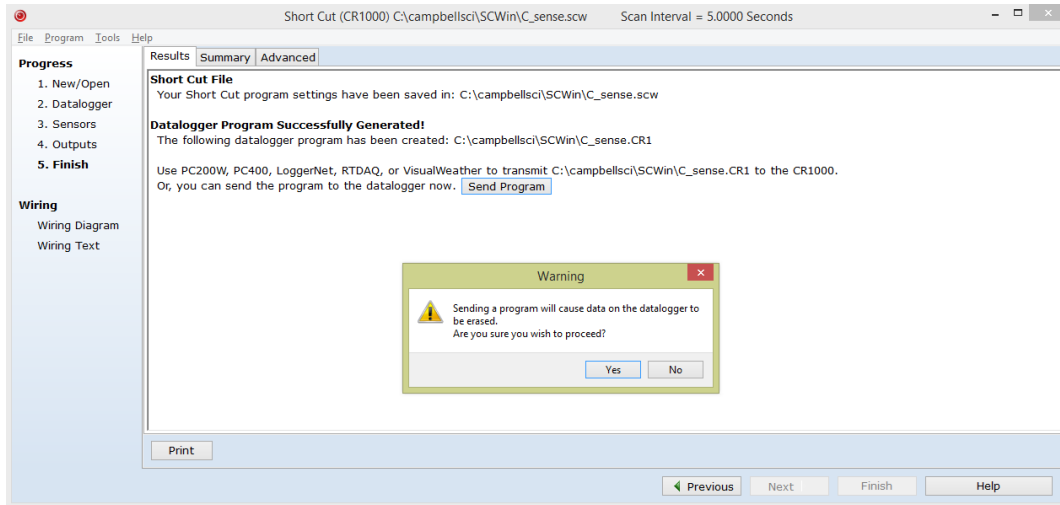
2.10 After clicking "Yes", one last GUI will appear titled "Download C_sense.CR1". Click "Send".

The settings shown above are the default. They will cause the program to run immediately, as well as after powering, in the event that power is cycled.

2.11 After successful compilation, a window will open titled, "Compile Results". Click on "OK".

2.12 Exit out of the Short Cut utility. Click on the "Monitor Data" tab.

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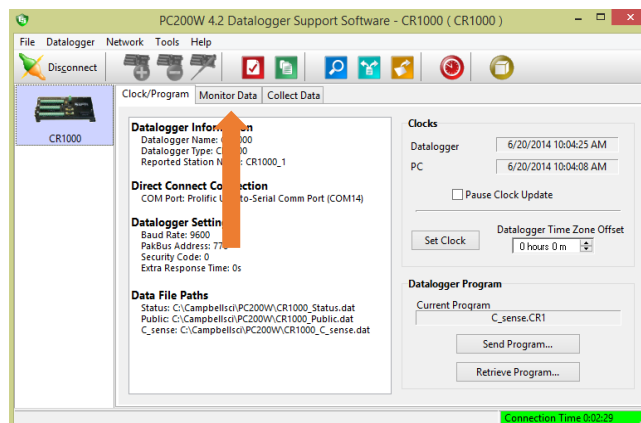
2.13 Depending on the previous operation of the CR1000, you may or may not see data in the spreadsheet. If you see data, as in the example below, highlight the name of the variable, and then click "Delete". Do this for all the variables present.
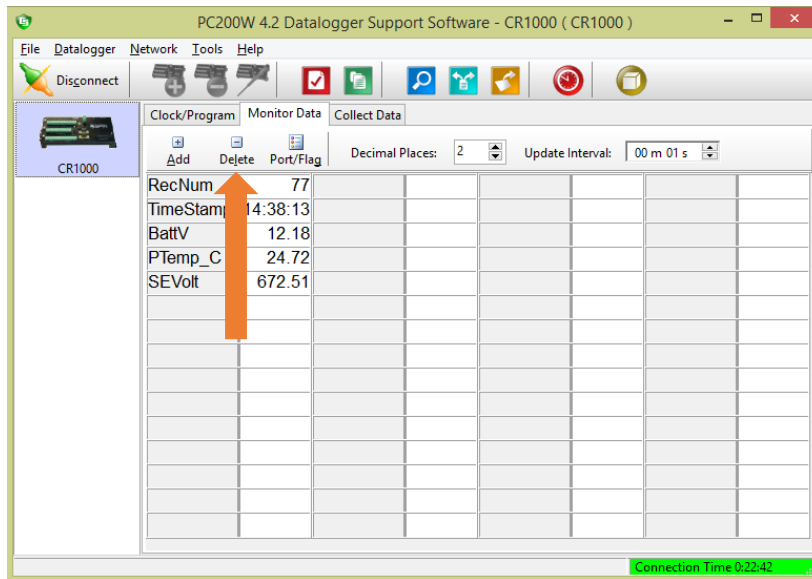
2.14 When the spreadsheet is empty, click on the "Add" button. A new GUI will open titled "Add Selection". Under the "Tables" column, highlight the "C_sense" entry. The associated fields of "RecNum","TimeStamp", and "SEVolt" will appear under the "Fields" column. Click on "Paste". The variables under the "Fields" column will now be in the spreadsheet and updating according to your sampling interval. Click on "Close".

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2.15 You will see the "RecNum" field increasing at a rate of one every Scan Interval (in this case 5 seconds). This represents record number. The time stamp will be displayed ("TimeStamp"), and the ppm of CO_2 measured by the C-Sense ("SEVolt"). At this point, the CR1000 is logging data.