

Application Note

Using the RC18 PV Reference Cell with the CR1000X Data Logger



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1 Overview

This Application Note provides a guide and example datalogger code for using the RC18 with the CR1000X data logger from Campbell Scientific.

Your RC18 provides its measurement results in digital format via RS-485 Modbus protocol (Modbus RTU). This Application Note contains Example Code for CR1000X using RS485 communication.

For more information on the **RC18**, consult the RC18 User Guide, available from the Atonometrics website.

Note: Read the entire RC18 User Guide before attempting to follow any instructions in this Application Note.

For more information on **Campbell Scientific data loggers**, including other models not mentioned here, consult relevant documentation provided by Campbell Scientific. Campbell Scientific provides a tutorial on data logger programming, available at [this link](#).

2 Communication Wiring

Connect the RS485 communication pins of your RC18 (consult RC18 User Guide for wiring and pinout) to the terminals for your selected communication port on the data logger (consult Campbell Scientific documentation).

For the Example Code provided here, using an Atonometrics-supplied cable, hookup should be as follows:

Function	RC18 Power & RS485 Connector Pin	Atonometrics Cable 830256-XXX Wire Color	CR1000X Terminal
10-30 VDC	1	Pink	12V
Ground	2	Black	G
RS-485 A+	7	White	C6 (even)
RS-485 B-	8	Purple	C5 (odd)

3 Communication Settings

For **RS485 communication**, your RC18 Modbus Node Address, Baud Rate, and Data Format must be programmed into your data logger code.

Note: For using the Example Code, all communication settings on the RC18 must be at the factory default values of Modbus node address 18, baud rate 57600, format 8-N-1. If necessary, use the RC18 client as shown in the RC18 User Guide to change communication parameters back to defaults.

4 Modbus Registers

Consult the RC18 User Guide for a list of Modbus register options for datalogging. The Example Code shows a subset of available registers.

Note: On the CR1000X, it is necessary to add 1 to all the register values shown in the RC18 User Guide when providing a starting register number to the ModbusMaster command, as noted in the comments provided in the Example Code.

5 Example Code

Example Code for using the Campbell Scientific CR1000X data logger with the RC18 is provided in a folder that accompanies this document, available via the Atonometrics website.

You may use the Example Code to test your wiring and overall setup and/or as a starting point for developing your own codes that may include logging of additional instruments.

The Example Code provided here requires that your RC18 is configured at its factory default settings for IP address, Modbus Node Address, Baud Rate, etc. When using these codes for troubleshooting, reset your RC18 unit's settings to the default values by using the RC18 client.

The Example Code must be loaded onto your CR1000X data logger. Consult Campbell Scientific documentation for instructions. To modify the code for other Campbell Scientific data loggers, consult Campbell Scientific documentation.

6 Troubleshooting

Campbell Scientific's data logger setup software applications (PC400 or LoggerNet) provide a "Monitor Data" screen that displays most recent data, as shown in **Figure 6-1-**. From this screen you may monitor the current output of your RC18 to ensure that communication is working. The RC18_ModbusStatus variable provided in the Example Code can also be viewed from this screen. This status will read whether the communication was successful or whether there was an error.

Note: If the RC18_ModbusStatus variable does not appear on your Monitor Data screen, add it to the display using the appropriate menu options on the screen.

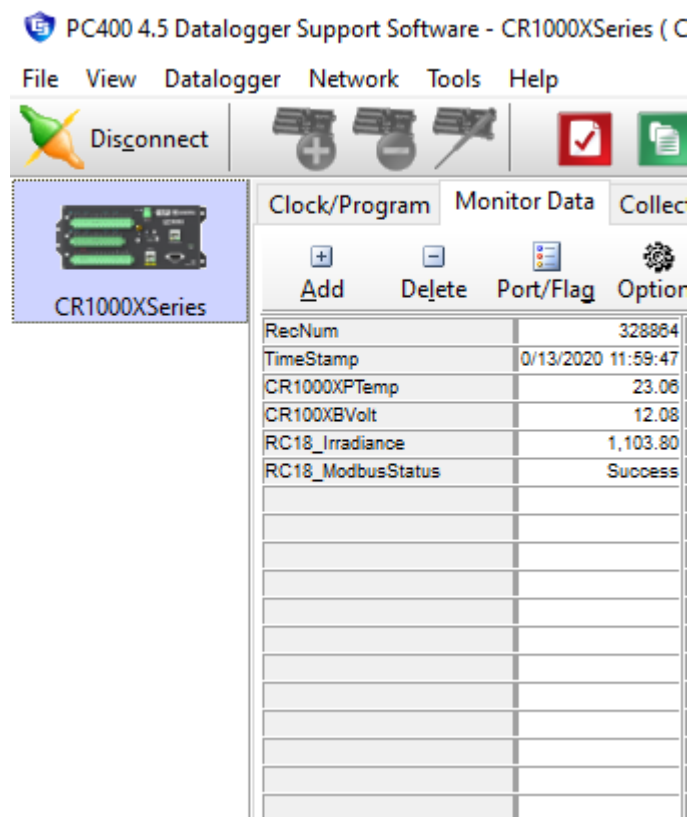


Figure 6--1: Campbell Scientific PC400 Monitor Data Screen

If communication is unsuccessful, check the following:

- Verify that the RC18 is powered.
- Check the RC18 with the RC18 Client and the RC18 Configuration Kit to ensure that the unit is working properly.
 - Consult the RC18 User Guide for additional information.
- Verify the cable wiring between the RC18 and the Campbell Scientific data logger.
- Verify all the parameters of the SerialOpen command.
 - In Campbell Scientific's code editor you can check these and view help information by right-clicking on the command.
 - The serial communication parameters (baud rate, data format, address, etc.) must match the settings that you have separately programmed on the RC18 itself.
 - If using our Example Code and if RC18 is at its factory default values, all settings should be correct.
- Verify all the parameters of the ModbusMaster command.
 - In Campbell Scientific's code editor you can check these and view help information by right-clicking on the command.
 - The serial communication parameters (baud rate, data format, address, etc.) must match the settings that you have separately programmed on the RC18 itself.
 - If using the Example Code and if RC18 is at its factory default values, all settings should be correct.
 - If necessary, try increasing the timeout in the ModbusMaster command.
- During operation, check the RC18_ModbusStatus of the ModbusMaster command as discussed in the previous section.