12 Channel
Temperature Monitor

BACK ▲ ▶ ENTER

○ OUTPUT 1
○ OUTPUT 2
○ OUTPUT 3
○ OUTPUT 4
○ ALARM

MINCO
MODEL CT224

CT224 Utilities

Software User Guide

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CT224 Utilities Software

Contents

Document Overview

This document provides an overview of how to use the CT224 Utilities Software

For More Information

For more information on the contents of this document, please contact your local Minco representative.

Introduction

CT224 Utilities allows the user to gain access to many of the CT224 features in an easy to use program. The software allows the user to configure the CT224 to the desired settings without the need to spend several minutes stepping through many menus. CT224 Utilities also provides an easy way to store the current configuration that is programmed into the CT224.

The CT224 also allows a computer to log data from the CT224. A simple interface allows the user to configure the frequency of readings that will be taken and store them into the specified CSV data file.

When the CT224 is in operation, the Status window provides a means of observing the current readings and output status of the CT224.

System Requirements

To use CT224 Utilities, the following minimum requirements must be met:

A computer running Windows XP®, Windows 7®, Windows 8®, or Windows 10®.

Available RS232 Serial Port (or USB-to-RS232 converter) for RS232 models or USB-RS485 converter (or RS232-to-RS485 converter) for RS485 models.

Minco CT224 with RS232 or RS485

RS-232 Communications

RS232 Communications allow easy connection of the CT224 to a computer for applications that are operated in a low noise environment with a distance of less than 50 ft between the CT224 and the computer. The CT224 has 6 terminal positions for connecting to the PC, only 3 will be used. This means that if a standard 9 or 25 pin D-sub connector is used to connect to the PC, the other end will need to have bare wires. If the cable has a connector on both ends, one end may need to be cut off to gain access to the wires.

RS232 allows for only one CT224 to be connected to the computer. If more than one unit must be connected to the computer, then an RS485 communications medium should be used. Due to the voltage level requirements for RS232, more than one device on the port will cause loading and disrupt the necessary voltage levels, which will ruin communications.

Wiring

The Receive Data (RD) signal from the computer port must be connected to the A+ terminal on the CT224. The Transmit Data (TD) signal from the computer must be connected to the B- terminal on the CT224. The Signal Ground (SG) from the computer must be connected to the S terminal on the CT224. The chart below shows the pinout for 9 pin and 25 pin connectors.

Pin Description	D- Type 9	D-Type 25
Transmit Data (TD)	Pin 3	Pin 2
Receive Data (RD)	Pin 2	Pin 3
Signal Ground (SG)	Pin 5	Pin 7
Request To Send (RTS)	Pin 7	Pin 4
Clear To Send (CTS)	Pin 8	Pin 5
Data Set Ready (DSR)	Pin 6	Pin 6
Carrier Detect (CD)	Pin 1	Pin 8
Data Terminal Ready (DTR)	Pin 4	Pin 20
Ring Indicator (RI)	Pin 9	Pin 22

Chart 1 – Pinout for computer serial ports

Wiring for RS232 and RS485 is shown in Figure 1. The signals for RS232 need only be connected to one of the sets of terminals (A, B, and S). The extra positions are only utilized when RS485 is used in a chain configuration as stated in section 3 of RS485 Communications.
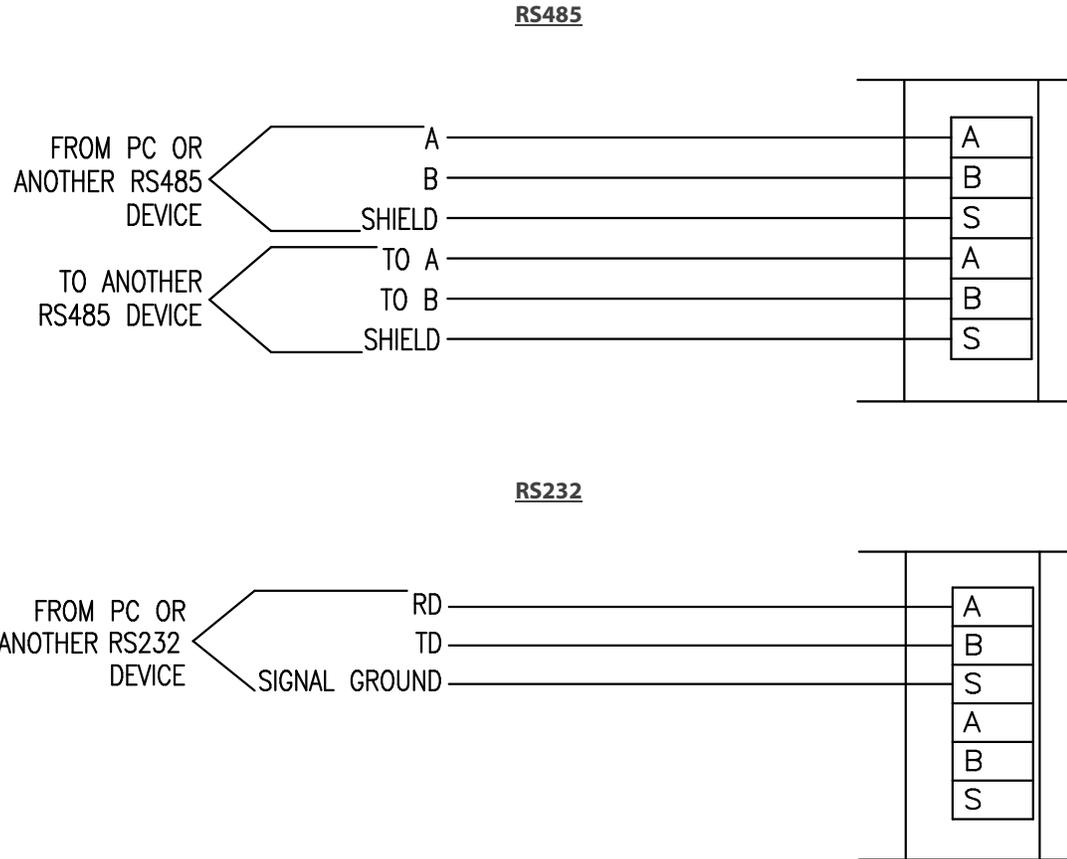
RS485

FROM PC OR
ANOTHER RS485
DEVICE

A

B

SHIELD

TO ANOTHER
RS485 DEVICE

TO A

TO B

SHIELD

| A |
| B |
| S |
| A |
| B |
| S |

RS232

FROM PC OR
ANOTHER RS232
DEVICE

RD

TD

SIGNAL GROUND

| A |
| B |
| S |
| A |
| B |
| S |

*Figure 1 – **Wiring for RS232 and RS485***

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RS485 Communications

RS485 Communications allow reliable communication in noisy industrial environments and allow wiring lengths up to 4000 ft. The CT224 has 6 terminal positions for connecting to the PC for communications. Three of the terminals can be used for input to the CT224 and the other three can be used to connect to the next CT224 in the chain or, if the unit is at the end of the chain, the extra terminals allow for easy connection of a termination resistor

RS485 allows for multiple devices to be connected to one network. Up to 128 CT224s can be connected to a given network. The RS485 standard allows up to 32 nodes to be connected on a half-duplex network. However, each CT224 accounts for only ¼ of a node, allowing up to 128 CT224s to be connected to the network.

Wiring

The connections on the CT224 are labeled as A, B, and S. The two signal wires are A and B. The A terminal should be connected to the A terminal on the RS232 to RS485 converter. The B terminal should be connected to the B terminal on the RS232 to RS485 converter. The S terminal should be connected to the shield. The shield wire should be connected to ground in one location only, to avoid ground loops, which can cause erratic communications.

A network of CT224s should be wired in a chain. A star or ring configuration is not appropriate for RS485. Each CT224 should only be connected to at most 2 other CT224s. Figure 2 shows the basic wiring for a chain configuration. Like terminals on the CT224s should be connected together in the chain, A to A, B to B, S to S.
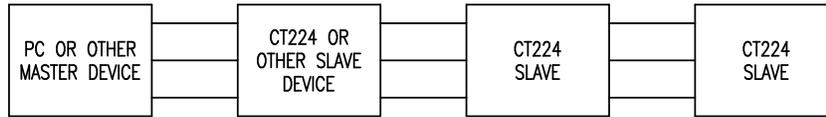

*Figure 2 – **Master Slave Chain***

End devices (Master and last Slave) on an RS485 network should be terminated to achieve error-free communications. The termination should match the characteristic impedance of the network. Normally this value is about 120 ohms. Figure 3 shows how to easily apply a termination resistor to the last CT224 in a chain. Do not use more than 2 termination resistors on the network. There are many other methods for terminating an RS485 network, but in most applications, terminating with 120 ohm resistors will provide error-free communications.
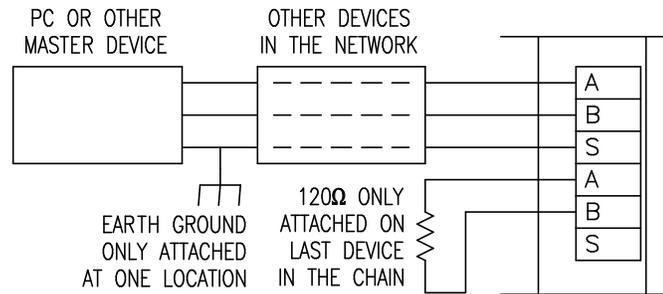

*Figure 3 - **Termination of RS485 Network***

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Using CT224 Utilities Software

Installation and Connecting to a CT224

1) Install CT224 Utilities by running 'Setup.exe'. The installation wizard will begin and guide you through the setup process.
2) After the software has installed, run CT224 Utilities by clicking Start > All Programs > Minco > CT224 Utilities.
3) Ensure a CT224 is properly connected to the computer through either RS232 or RS485. Note the CT224's Baud Rate and Modbus Address – both can be determined by viewing the Comm Settings menu options on the CT224. Default settings are Baud Rate of 9600 and Modbus Address of 1.
4) Enter the COM Port, Baud Rate, and Modbus Address in the applicable fields located on the bottom left of CT224 Utilities. If the COM Port is unknown, check the Windows Device Manager. In the Device Manager, RS232 Serial Ports may need to have their settings defined in Device Manager by right-clicking the applicable port > Properties > Port Settings. Set the Bits per second field to the baud rate, data bits to 8, parity to none, stop bits to 1, and no flow control.
5) Press the Connect to Device button and wait as the CT224's configuration is read. When finished, CT224 Utilities will automatically start displaying real-time readings and output status on the Status page.
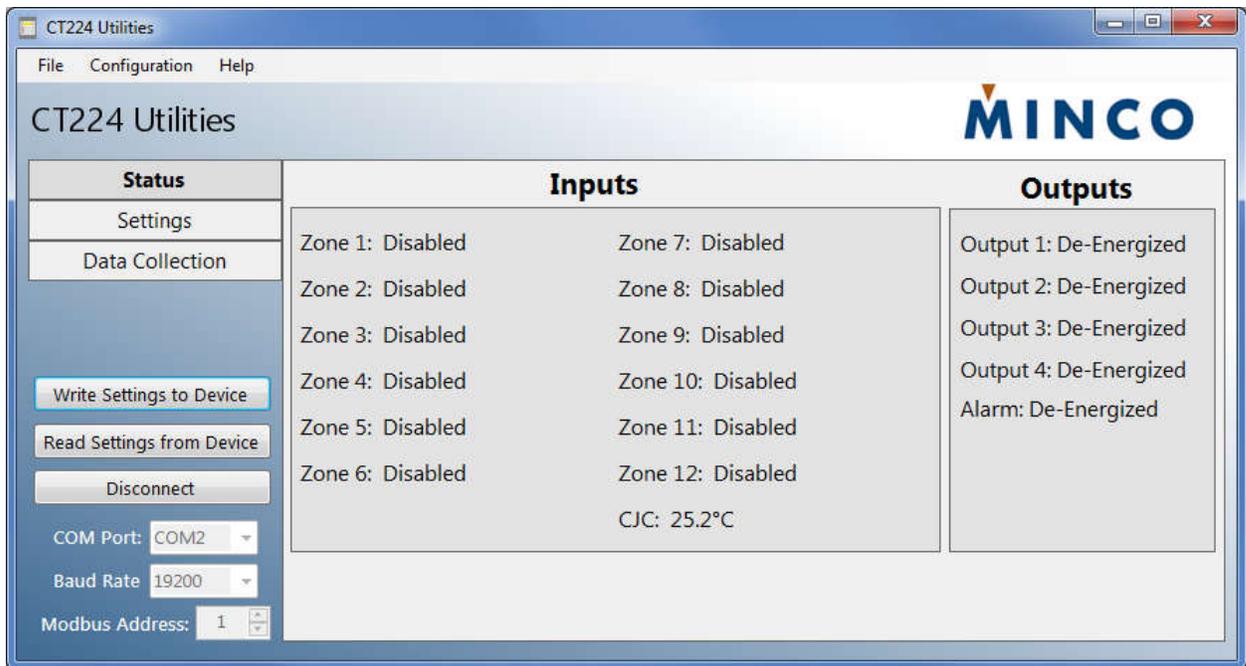

Figure 4 – Status Page

General Settings

The General Settings tab includes settings that affect the overall performance characteristics of the CT224.

Units: Determines if the CT224 will operate and display in °C or °F. Note that changing this value does not automatically update the trip points, offsets, etc. to compensate for the scale offset.

Reverse Acting Outputs: Checking an output's box causes the respective output to behave in the opposite manner, i.e. normally closed instead of normally open.

Zone to Display on CT224: Determines which zone is displayed on the CT224's display. Options include: High, Low, or Any.

Length of Alarm Silence: Defines the duration of silence when a user silences the alarm. Can be 0-100 minutes or never.

Action on Failed Sensor: Describes the behavior when one or more sensors fail (open, short). User can choose between sounding the alarm, tripping the relay(s) associated with the zone, or ignoring the failure.
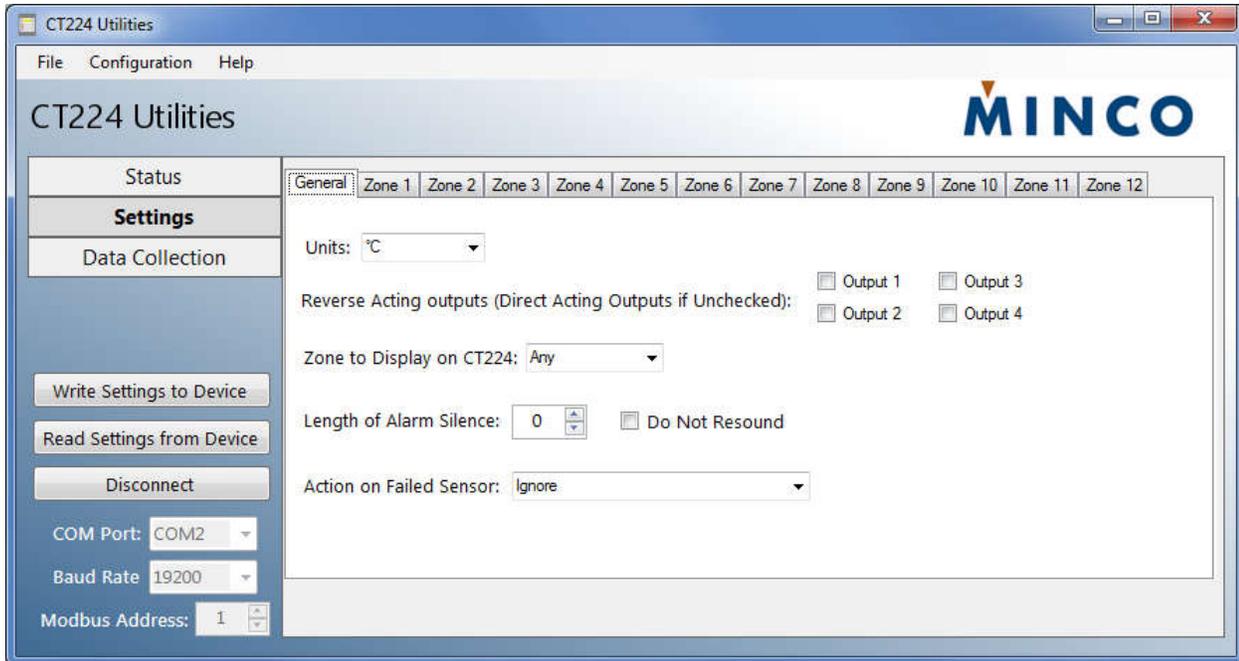

Figure 5 – General Settings

Zone Settings

The CT224 has twelve zones that can be configured to provide the desired output response. To simplify setup, the user can use the 'Copy Zone To' and 'Copy Zone From' buttons to copy all settings to or from another zone.

Zone Name: Up to 16 characters used to describe the zone. This is displayed on the Status page and the CT224's screen.

Input Type: Describes the zone's input type.

Input Range: (only visible for input types that have user-modifiable input ranges) Defines the high and low limits for the input. Any reading outside this range will result in a failed sensor reading. For 4-20 mA ranges, it describes the 4 and 20mA values.

Input Offset: Allows a constant value to be added or subtracted from the readings. Useful for accounting for lead wire resistance. Valid values are -99 to 99.

Trip Enable/Disable: This checkbox quickly enables or disables a trip on the CT224. Disabling a trip sets the trip value to 10000 which alerts the CT224 to ignore the trip settings.

Trip Point: Determines the value at which a trip occurs.

Trip Action: Determines whether a trip condition occurs when the input reading is above or below the trip point.

Outputs: Determines which outputs are engaged (or disengaged if reverse acting) when the trip occurs.

Output Reset: Determines how the trip condition is cleared. Options include manual reset, hysteresis, or by pressing enter on the CT224.

Hysteresis: (only visible when hysteresis is set as output reset type) Defines the hysteresis for the output to reset. The hysteresis value is evenly divided around the trip point. For example, if the trip point is 55.0C and Hysteresis is 0.1C, the output will engage at 49.95C, and disengage at 55.05C. Valid range is 0 – 20.
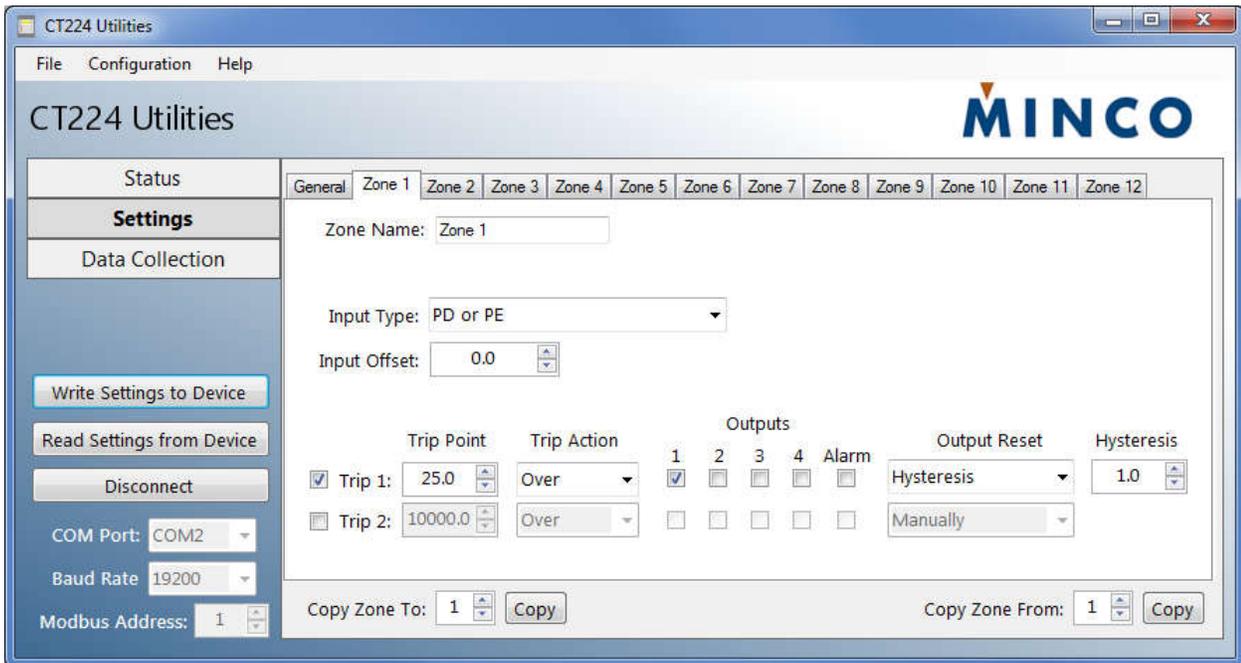
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Figure 6 – Zone Settings

Data Collection

Using the CT224 Utilities Data Logging feature, input values are passed from the CT224 and stored into a .CSV file. Starting data collection is as easy as setting the sample rate and file path and clicking the 'Start Data Collection' button. This will lock the configuration on the CT224 and bring you to the status page where device operation and data collection status can be monitored. When finished, simply press 'Stop Data Collection' on the bottom of the status page to save and close the generated .CSV file.

Sample Rate: Determines the sampling frequency, in seconds, of the CT224. It is important to note that this value is approximate due to communication delays and dropped communication transactions. However, the actual timestamps will be accurately recorded and saved on the CSV file. Valid rates are 1-3600 seconds (3600 seconds = 60 minutes).

File Path: The desired save location for the generated .CSV file.
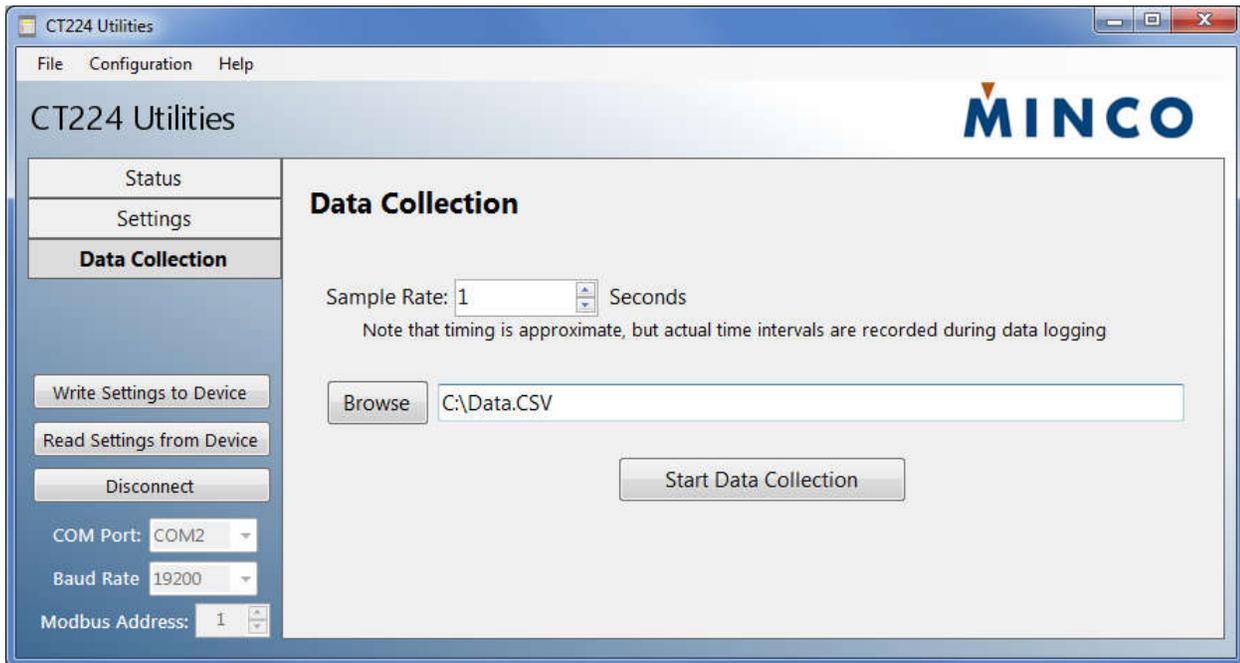
Figure 6 – Data Collection

Reading and Writing Configurations

When using the CT224 Utilities, settings are not saved onto the CT224 in real-time. Rather, settings are saved on the computer and written to the device when the 'Write Setting to Device' command is issued. This button turns red when the settings displayed by the CT224 Utilities software differ from the settings on the connected CT224.

Write Settings to Device: Clicking this button will overwrite the CT224's current configuration and replace it with the settings displayed on CT224 Utilities software. After the configuration has been transferred, CT224 Utilities will display a dialog asking to power cycle the CT224 before continuing. This is to ensure that the CT224 properly resets and acknowledges the configuration change. After the inputs have initialized, the click 'OK' on CT224 Utilities to read the CT224's configuration back and ensure the write was successful.

Read Settings from Device: This can be clicked to read the CT224's configuration and update the CT224 Utilities software to represent the device's settings.

Save Configuration: A configuration created with CT224 Utilities can be saved (for your records or to upload to another unit) by accessing the save function under the configuration menu strip.

Upload Configuration: This can be clicked to upload a saved configuration to a connected CT224. Access this function from the configuration menu strip.