DIGI-SENSE®
THE STANDARD IN PRECISION MEASUREMENT

User Manual

Digi-Sense® 12-Channel Benchtop Data Logging Thermocouple Thermometer

Model: 92000-01

Table of Contents

Introduction

The Digi-Sense® 12-Channel Benchtop Data Logging Thermocouple Thermometer with full color LCD display. All 12 channels are easily viewed from one screen. Each channel can be configure to either J, K, T, S, R, and E type thermocouples. Alarm conditions can be configured for each channel. An alarm output is available for driving a 24volt, 1A load. Data points can be stored in the devices memory and exported to a USB stick for download in CSV format. Includes DAQ software for real-time visual display of all channels. The thermometer is supplied with a grid-mounting clamp on the back of the device.

Unpacking

Check individual parts against the list of items below. If anything is missing or damaged, please contact your instrument supplier immediately.

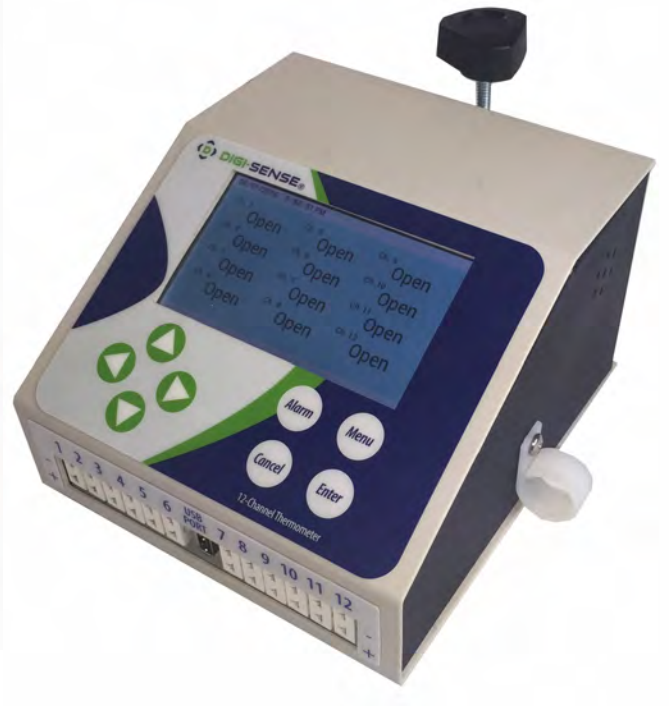
1. 12-Channel Benchtop Data Logging Thermocouple Thermometer
2. Grid support bracket (attached to the back of the thermometer)
3. 5ft. (1.5m) detachable AC to 12V DC power pack.
4. 4GB USB Stick
5. Smaller cable holders.
6. USB Cable

Initial Setup

- Install 12-channel device in safe operating area.
- Connect the thermocouple sensor(s) to the thermocouple input connector(s) located on the bottom of the front panel. All ports do not have to be filled.
- Attach applicable wall-mount adapter.
- Plug the supplied AC to DC power pack into the connector on the back panel of the device.

Front Panel

(The 12-Channel device user interface is designed to function around eight buttons, four purposed buttons and four navigation buttons.)



1. CANCEL Button
For all screens where the user may change a setting on the multi-channel, pressing cancel undoes the changed setting and reverts to the previously selected option as well as clearing the confirmation popup**.** If the sidebar menu is selected, the multichannel returns to the previous screen

2. ALARM Button
For all screens, the alarm button functions to silence the alarm when it is active.

3. ENTER Button
For all screens where the user may change a setting, enter selects the chosen value and triggers a confirmation popup**.** When the user is in the sidebar menu, enter selects the menu option and triggers the transition to the next screen

4. MENU Button
The MENU button provides access to all user-configurable setup parameters of the thermometer. Pressing this key once will scroll through parameter options. Pressing and holding this key will exit to the home screen, saving any changes made up to that point.

5. UP & DOWN Arrow Buttons
For all screens with selection, up and down toggles through the settings' options. For screens to set a value, up/down are used to increment and decrement accordingly**.** In the sidebar menu, up and down navigates through the sidebar.

The user's ability to continue to move upward and downward through options is shown by gray arrows adjacent to the sidebar menu and above and below the settings options.

6. LEFT & RIGHT Arrow Buttons
The left and right buttons are only used in screens that have multiple settings to change per screen and required the ability to toggle left and right in addition to up and down. This includes: setting the date, time, alarm set points, and alarm hysteresis values.

7. **Thermocouple Inputs**

There are 12 thermocouple inputs located on the bottom of the front panel that can read temperatures of several different thermocouple types. Refer to page 20 for questions on what types, the accuracy of calibration and temperature range of the thermocouples.

8. **USB Port**

Here the user can plug a USB thumb drive into the 12-Channel to capture the data that was logged in an excel spreadsheet.

Display Features

The display features include aspects that are constant throughout all screens.

1. TIME & DATE
The time/date is located in the upper left corner of the screen. The date may be set to format preference of the user.

2. **ALARM ICON**

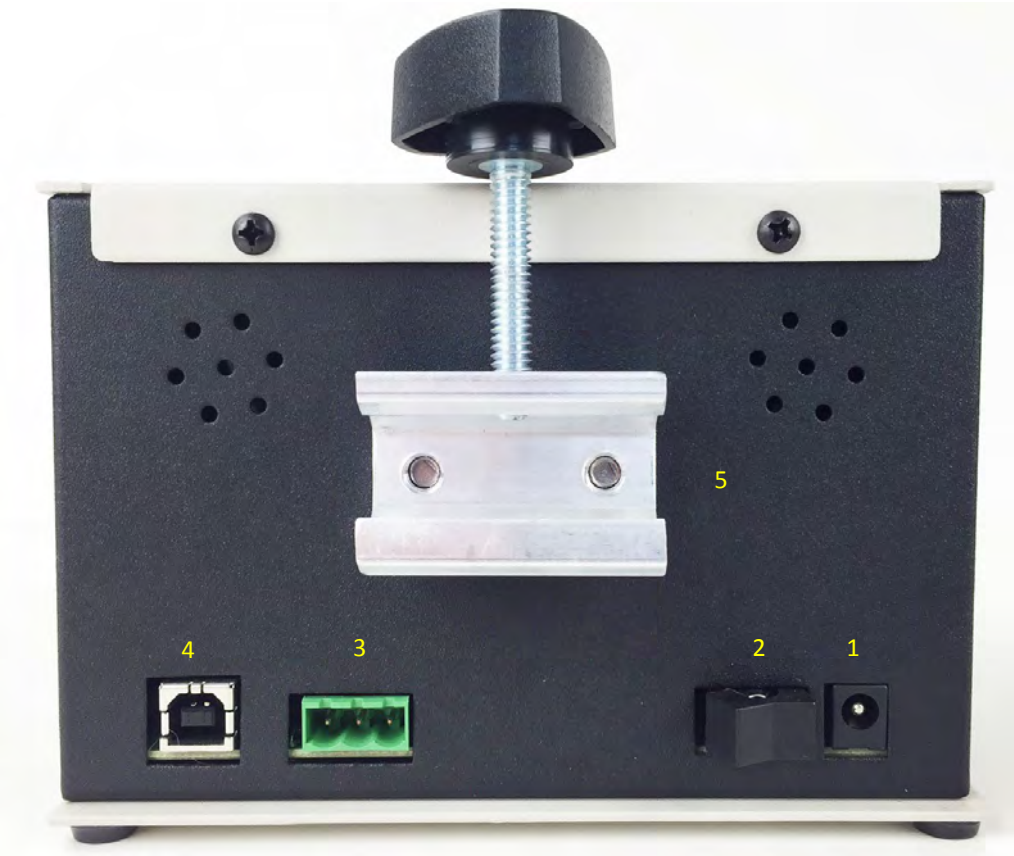
Present after an *audible* alarm has been set**.** Remains in the bottom left corner of the screen.

3.**TIME ELAPSED**

Records the time since the multichannel started logging data. Remains in the bottom left corner adjacent to the alarm icon.

4.**VISIBLE ALARM**
When the alarm triggers it will cause a visible alarm no matter what screen is currently being viewed. This alarm cannot be turned off. The screen background will become red and flash

Back Panel



1. **12 Volt DC Power input** - The provided AC to DC power pack connects here.

2. **Power Switch** - This is used to turn the device on and off.

3. **Audible Alarm Output** - This output will be used to drive an outside alarm if an external alarm is required.

4. **USB Communication Port** - This will be used to communicate with the DAQ software so the user can see a graph of the real time data as it is being logged by the device.

5. **Grid Bracket Holder** - This can be used to mount the device. It allows the user to swivel the device up or down on a horizontal bar to allow for optimal viewing angle of the display.

Active Display Screen

- This is the active display screen that will be visible while navigating the menu screens.
- Initially, only two buttons will be active from this screen.
    - These are the “Menu” button and the “Alarm” button.
        - When the “Menu” button is pressed it will take the user to the main menu.

Main Menu

The main menu screen continues to display the temperature readings with the main menu sidebar present.

- Here the user may change the global settings on the multichannel, channel specific settings, start
- This is the first sidebar menu that the user access's.

Button Navigation:

(All sidebar menu’s after this one will work in the same manner and will be able to be navigated as follows)

- “Up” & “down” buttons will be used to navigate through the sidebar menu.
    - The one that is highlighted is the currently selected sub menu.
- Pressing the “Enter” button will select the highlighted option on the sidebar.
    - This will send you directly to the chosen screen.
- Pressing the “Cancel” button will dismiss the current menu and return user to previous menu.
- The arrows that are adjacent to the sidebar reflect whether or not there are more options to scroll through.

The next page will start taking the user through the sub menu options.

Global Settings

Global Setting includes: screen captures as the user would see of each function, description of that functions, and how to navigate through the screen in the Global Settings Menu.

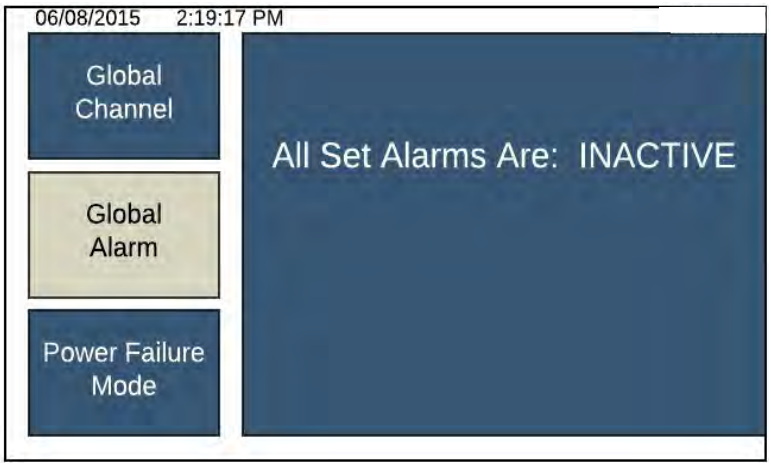
Global Channel:

- Here the user may activate/deactivate all active channels that have been enabled in the channel specific menu.

Global Alarm:

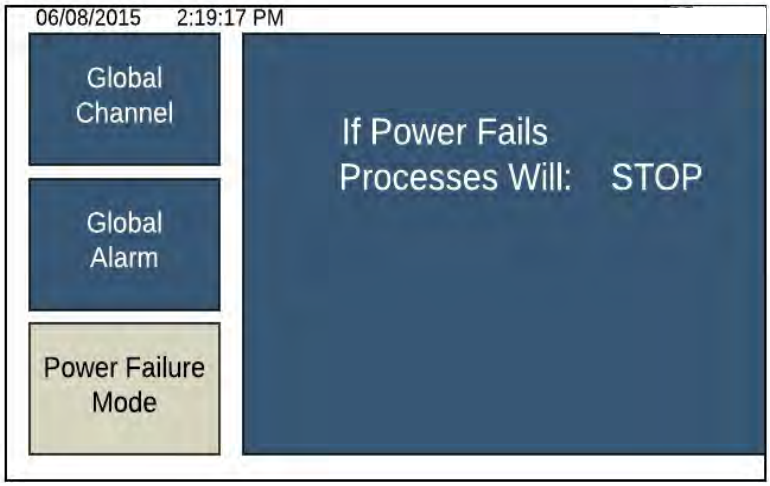
- Here the user may activate/deactivate all the presently set audible alarms that have been enabled in the channel specific menu.

(This will not disrupt temperature readings only disable audible alarms.)



Power Failure Mode:

- Power Failure Mode controls the multichannel process in the event of a power outage.
- The options are Resume or Stop. Both options will store all the channel and calibration settings.
    a. When in Resume mode, when powered back on, the machine will continue to log data, and trigger alarms according to previously set specifications.



    b. When in Stop mode, when powered back on, the machine will not continue to log data, or trigger alarms. These must be reset by the user.

Global Settings (Continued)

Time Settings:

- The set time screen is where the user can set the time displayed at the top of the screen.

(The user will set the hours with the Up and Down arrows. Then, the user will press the Enter button to transition to minutes. Repeat for minutes and seconds.)

Date Settings:

- The Set Date Function is divided into two screens, one to select format and then one to input the value.
  - The set format screen provides the user with six date orientations and two different layout options: mm/dd/yyyy or Mmm dd, yyyy.

(Upon entry into the screen, a prompt to select the format appears. Up and Down buttons toggle through the set date options and lay out options. Enter selects the format. Once the user selects their preferred format, the set date screen appears.)

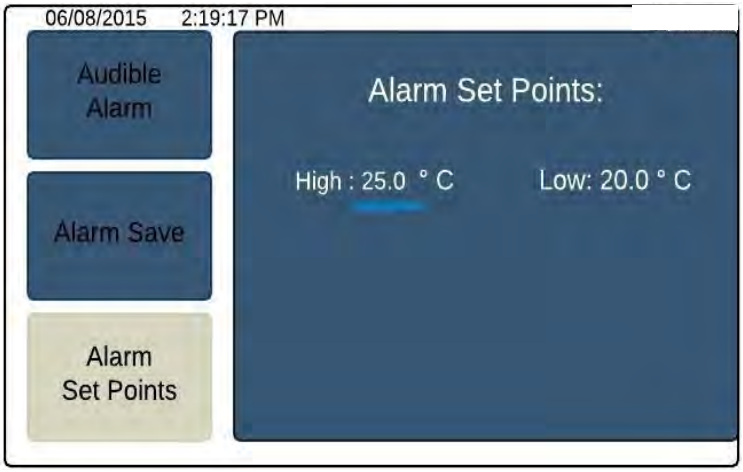
- Here the user inputs the month, day, and year values into the format they selected.

(Up and Down arrows select the numeric value. "Enter" sets the value, and shifts the user to the right to input the next value. Left and Right arrows provide the user with the ability to move to the month, day, and year as needed. When the final value has been entered, "Enter" sets the date and triggers the confirmation popup. "Cancel" returns to the date format selection option)

Global Settings (Continued)

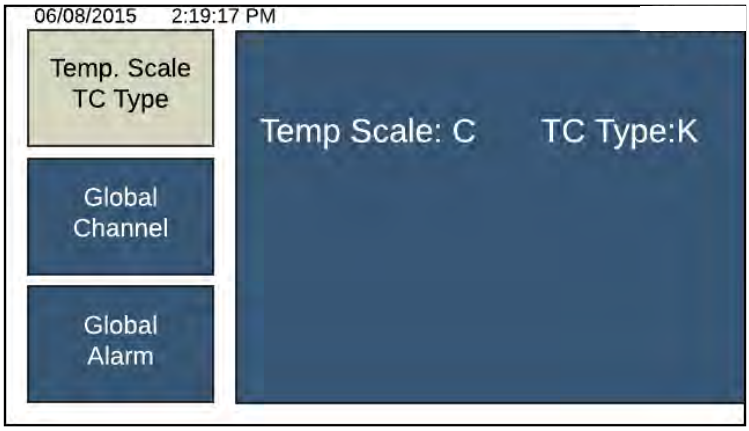
Alarm Setpoints:

- Alarm Set Points for all channels can be set here. This is composed of a chosen low and high value, that will trigger the alarm. *(Upon entry the high set point is underlined. Up and Down arrows are used to select the numeric value. Pressing "Enter" sets the value and triggers a popup, and switches to set the Low Value. Up and Down arrows select the value and pressing "Enter" sets the value and triggers another popup. Left and Right arrows allow the user to toggle between high and low.)*



Temp Scale and TC Type:

- Here the user can choose the units they want the monitor to read in. The user can also adjust globally what thermocouple type they want all channels to be reading.

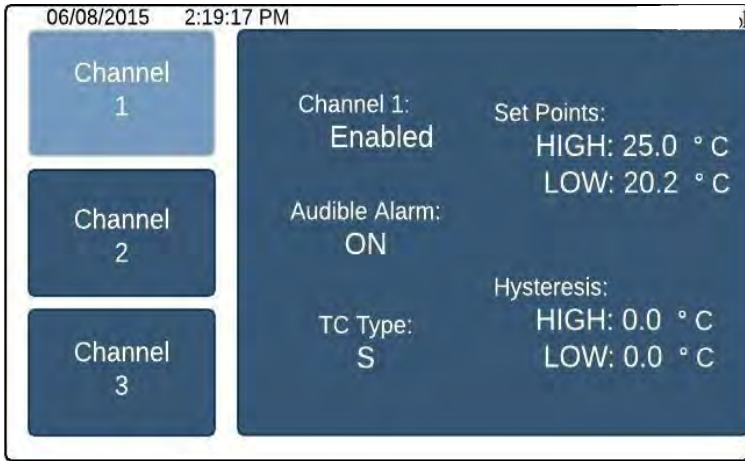


Channel Settings

Channel Settings includes: screen captures as the user would see of each function, description of that function, and how to navigate through the screen in the Channel Settings Menu.

Channel Selection:

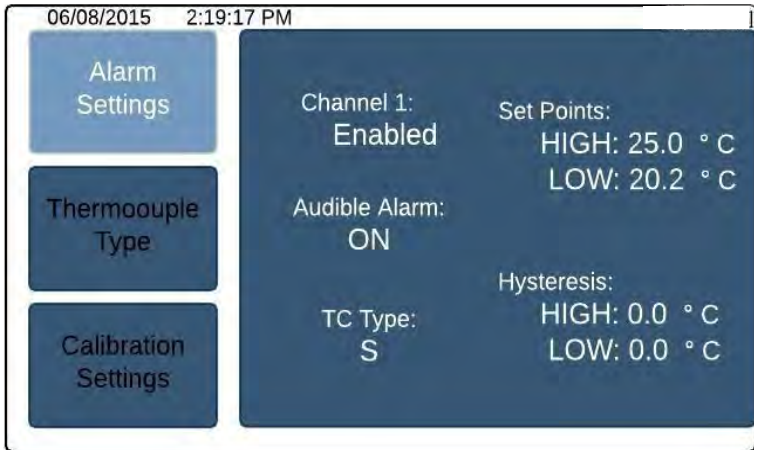
- Channel Selection screen displays the present settings for the channel highlighted in the sidebar.
- Here the user may scroll through the twelve channels and gather information at a glance as well as select what channel to change the settings.



Channel Settings (Continued)

Channel Specific Menu:

- The Channel Specific Menu continues to display the present settings for the channel the user selected. Here the user may select what type of setting to adjust: Alarm Settings, Thermocouple Type, Calibration Settings, and Channel Enable/ Disable.

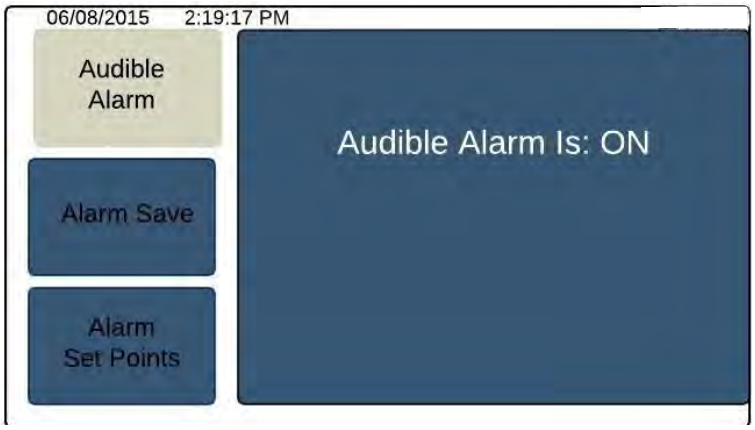


Alarm Settings:

(Within the Alarm Settings menu there are four available parameters to set; Audible Alarm, Alarm Save, Alarm Setpoints, and Alarm Hysteresis.)

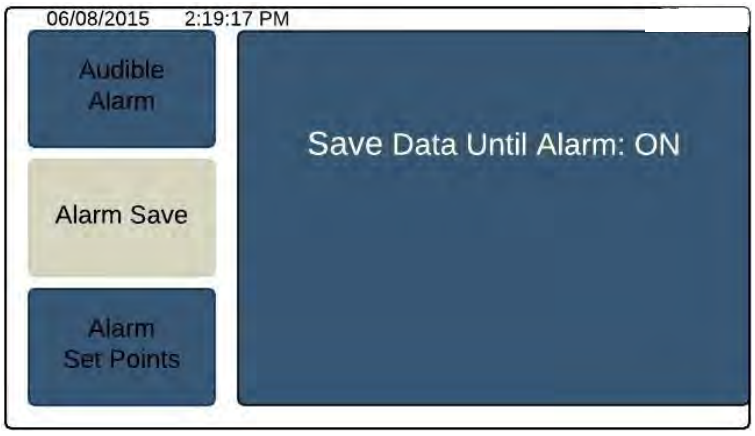
Audible Alarm:

- The Audible Alarm is set per channel.
- This function controls whether the alarm will have a tone.
- When the alarm sounds there is a visible component that cannot be disabled.



Alarm Save:

- Alarm Save is channel specific controlled.
- This function provides the user the option to log data until the alarm temperature set points are reached or continue to log data after the value is reached.

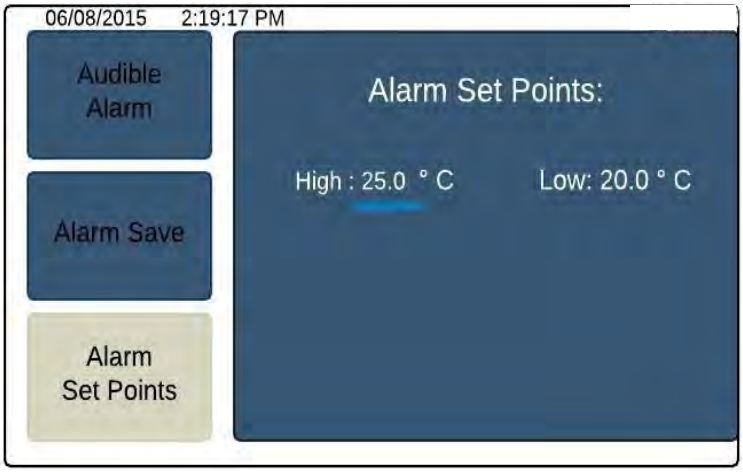


Channel Settings (Continued)

Alarm Setpoints:

- Alarm Set Points are channel specific temperatures, composed of a chosen low and high value, that will trigger the alarm.

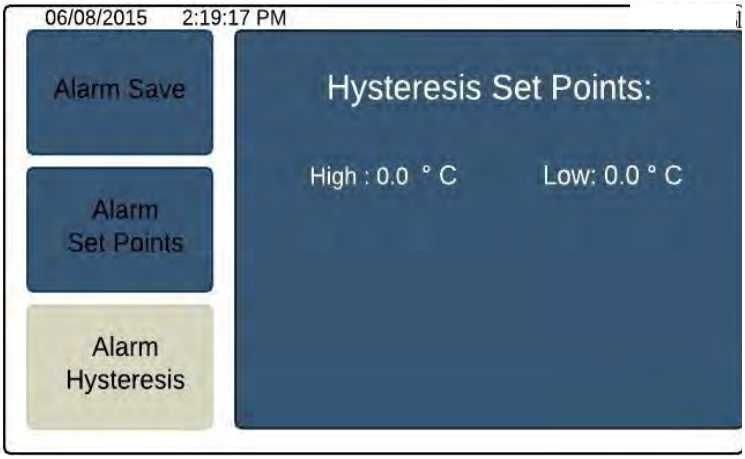
(Upon entry the high set point is underlined. Up and Down arrows are used to select the numeric value. Pressing "Enter" sets the value and triggers a popup, and switches to set the Low Value. Up and Down arrows select the value and pressing "Enter" sets the value and triggers another popup. Left and Right arrows allow the user to toggle between high and low.)



Alarm Hysteresis:

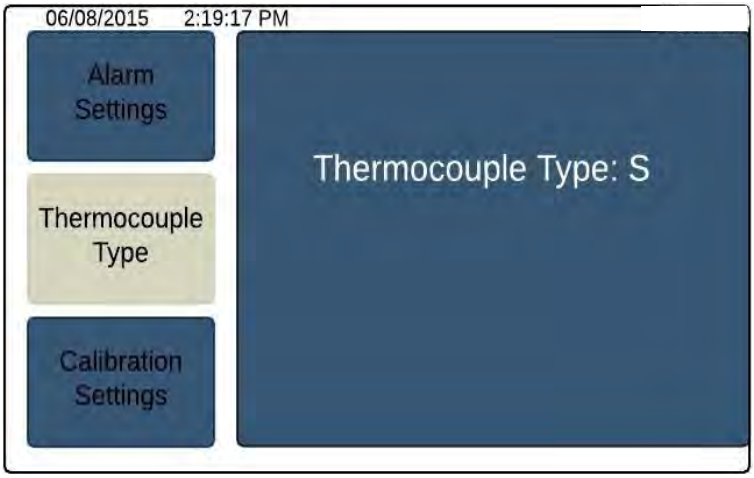
- The Alarm Hysteresis value is the variation above and below the alarm set point for the multichannel to detect.

(This screen is navigated the same as Alarm Set Points)



Thermocouple Types:

- Thermocouple Type, allows the user to choose what thermocouple they will be using for the channel.
- Options: J, K, T, S, R and E.



Channel Settings (Continued)

Calibration Settings:

(Within the calibration settings menu there are four separate menu's that are accessible; Set Calibration Points, Reset Unit Calibration, View current Calibration Points, and View Current Slopes and Offsets. The user is able to view only the last two. The other two are password protected.)

Set Calibration Pts:

- This setting should not be changed by the user. This is a password protected function.
- The unit is calibrated before leaving the warehouse.
- If the unit needs re-calibrated contact Cole-Parmer.

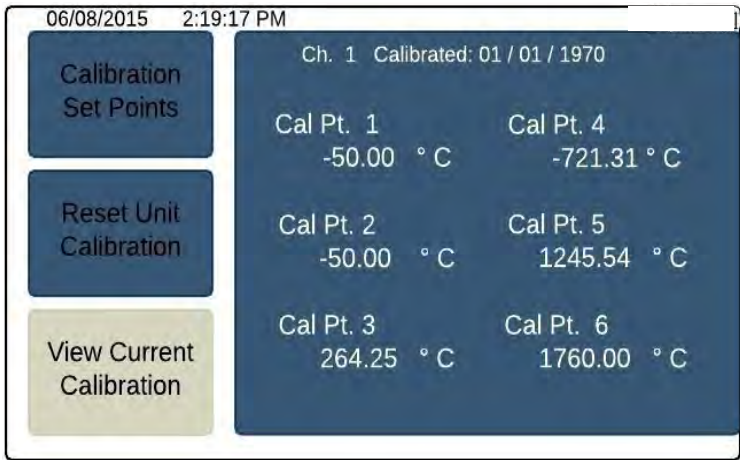
Reset Unit Calibration:

- This setting should not be changed by the user. This is a password protected function.
- The unit is calibrated before leaving the warehouse.
- If the unit needs re-calibrated contact Cole-Parmer.

View Current Calibration Set Points:

- This function allows the user to view the presently set calibration points for the selected channel.
- There are NO modifications that can be made in this function.

(While no settings can be changed, the user must press "Cancel" to return to the sidebar menu.)

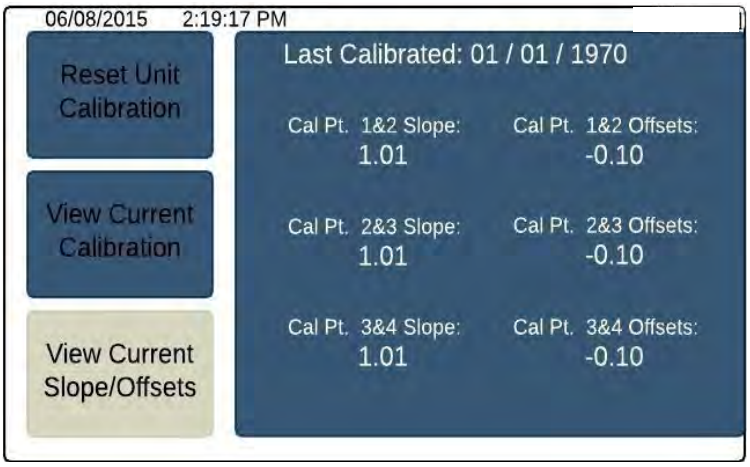


Channel Settings (Continued)

View Current Slopes/Offsets:

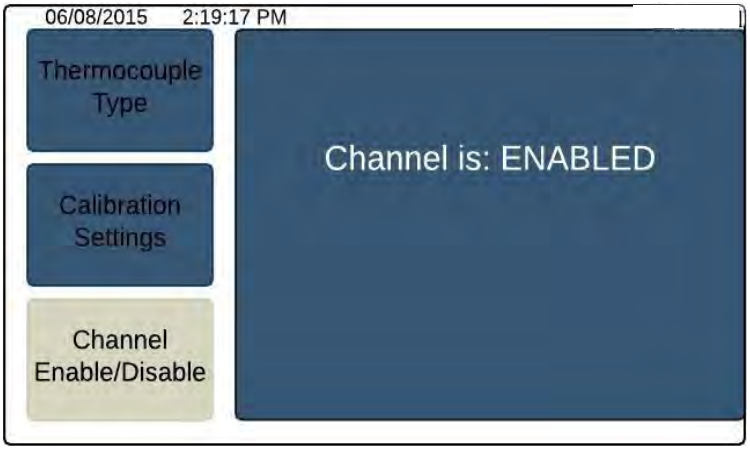
- This function allows the user to view the slopes and offsets for each of the calibration points.
- A green arrow on the right queues the user to view the rest of the slopes and offsets.

(The Up and Down arrows toggle through the calibration slopes and offset pages.)



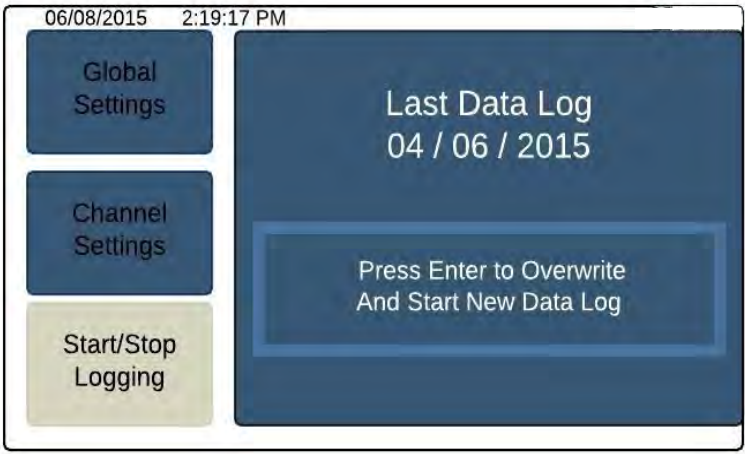
Channel Enable/Disable:

- Channel Specific Enable/Disable options allow the user to turn the channel on/off.
- This provides the user the flexibility to adjust the settings for as many channels as they need, but only measure and log data from enabled ones.



Start/Stop Logging

- Here the user can log data points that save internally.
- **The new data will ALWAYS overwrite the previous data log!!!**
- While the data is being logged the unit must stay on.
- Pressing the “Enter” button while on this screen, while data is being logged, will stop the data log.
- **The user should ALWAYS stop the data log before copying to the USB.**
- **Do not allow the device to run out of internal memory. There is a table at the end of the user manual that allows you to see the max time you can log.**



Copy to USB

- Here the user will follow the on-screen instructions.
- No buttons will be active during this process.
- When finished, press the “Cancel” button to go back to the Main Menu.
- Make sure to stop the data log before copying to USB.
- For best results, do not plug the USB into the device while monitoring temperature.

(For this function, it is recommended that a new USB be used. This will improve the data transfer speed)

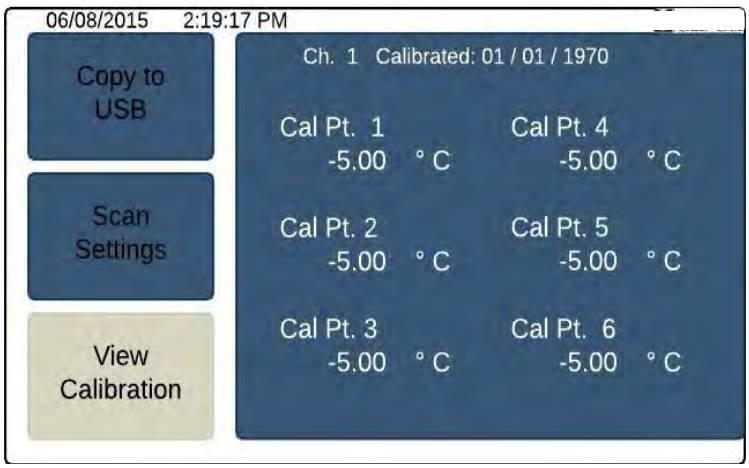
Scan Settings

- This screen allows the user to set the scan rate; this controls the interval of time between scanning individual channels.
- The default value is 2 seconds. This is the lowest time this function can achieve.

View Calibration Points:

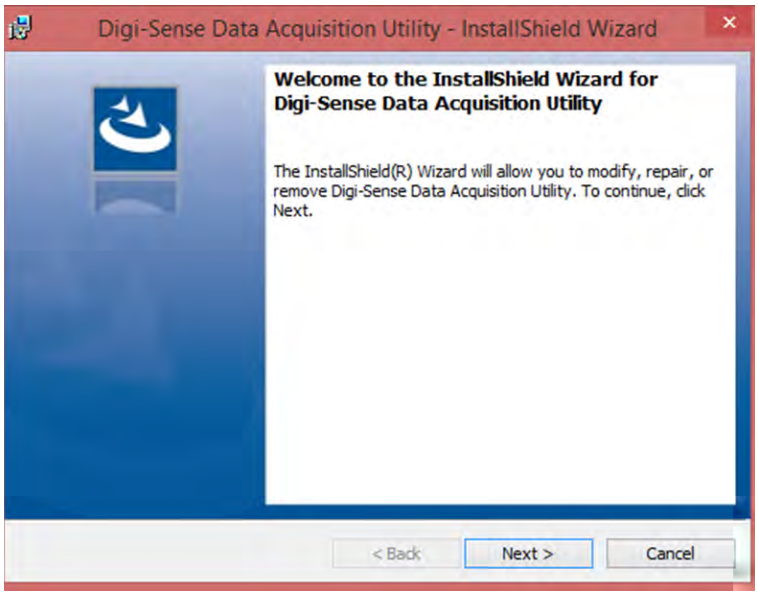
- This View Calibration Points is branched off the main menu and allows the user to see the calibration points for every channel.

(Since no setting can be manipulated, the only buttons when the sidebar menu is inactive are the Up and Down arrows to toggle through the different channels.)

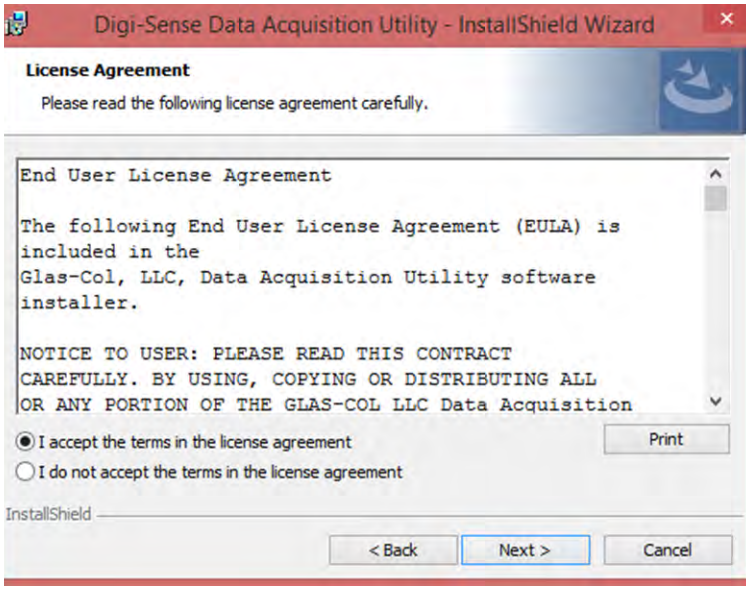


Installing DAQ Software

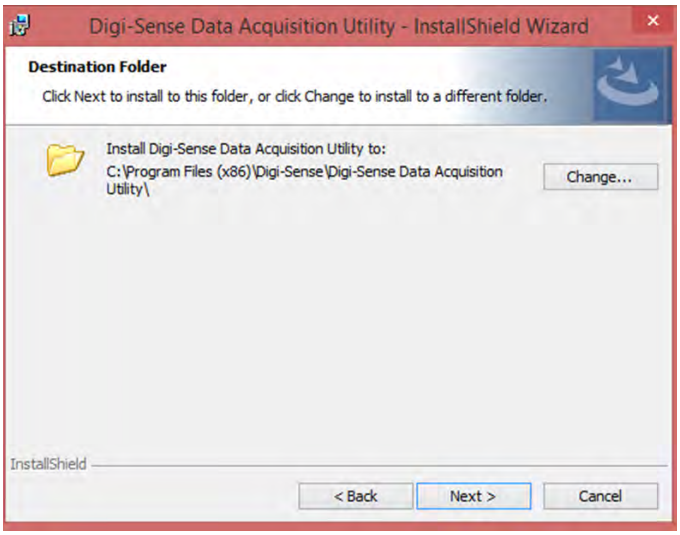
- Extract the Digi_Sense.12-Channel-DAQ.Installer zip file.
- Run the Setup.exe file to install the software.



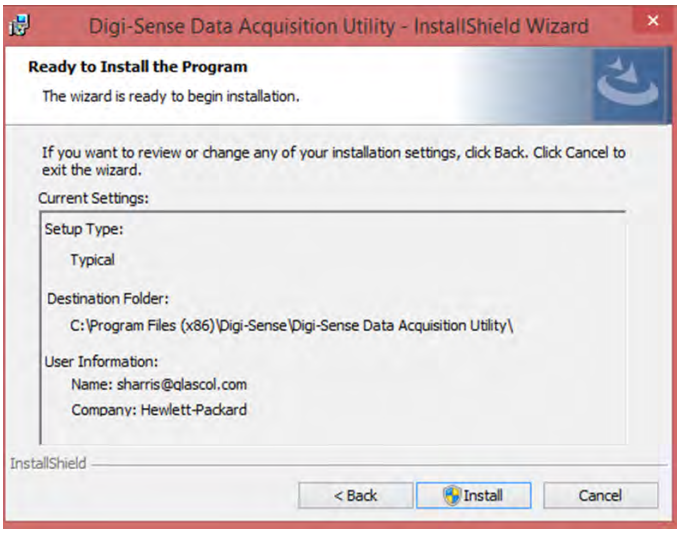
- Select the next to continue with the installation of the software.
- Select Cancel if you wish to abort the installation of the software.



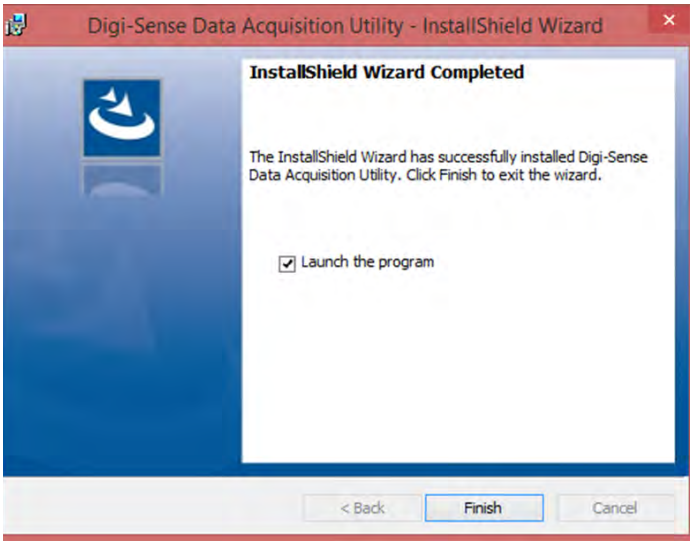
- We recommend that you read the terms and conditions before you agree.
- To continue select “I accept the agreement” and click next.
- Select Cancel if you wish to abort the installation of the software.



- Select where you would like the DAQ Software to be stored on your computer.
- After selecting the appropriate place, click next to continue.
- Select Cancel if you wish to abort the installation of the software.

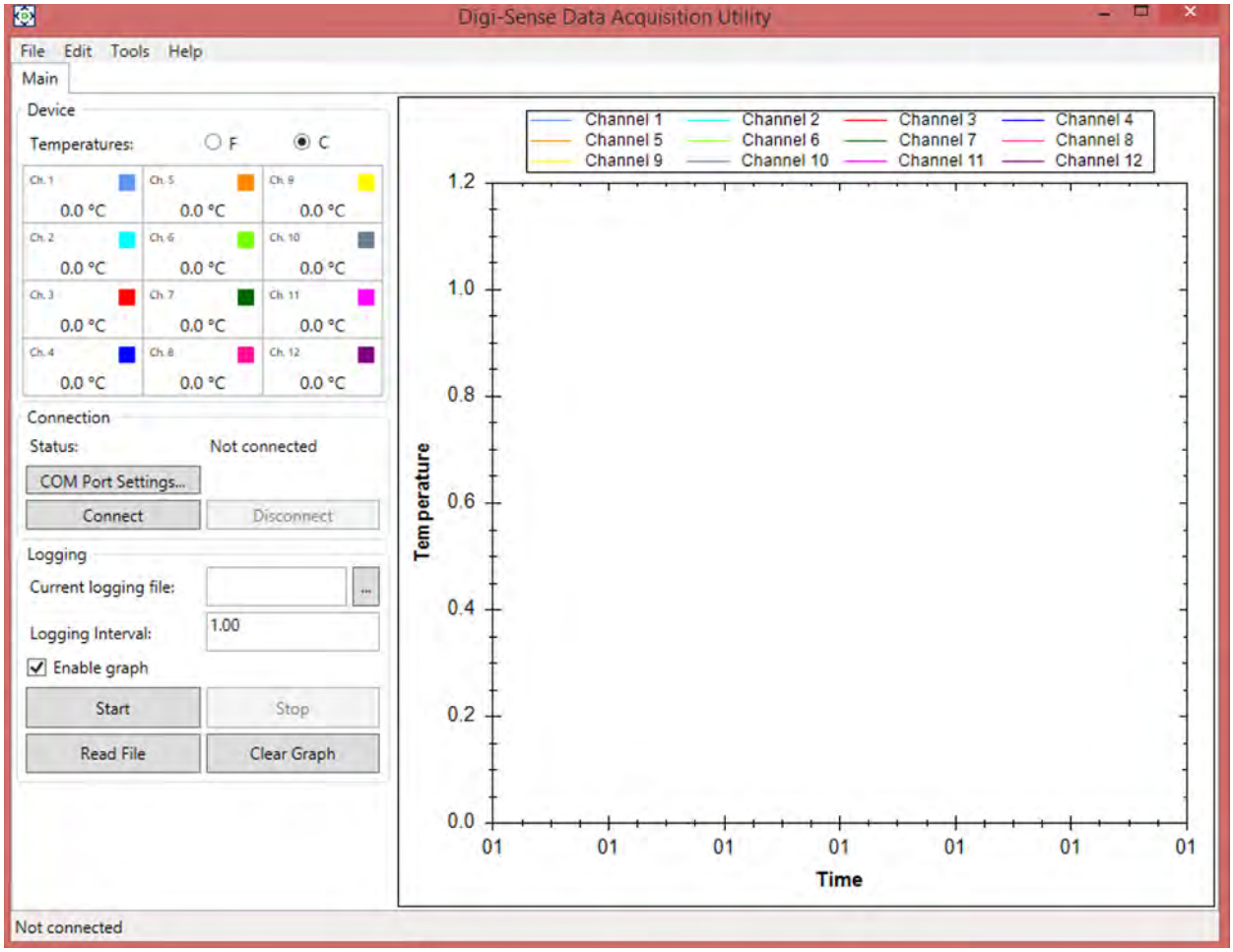


- Click Install to continue. Then wait for the installation process to complete.
- Select Cancel if you wish to abort the installation of the software.



- Click Finish once the installation process is complete.
- Select Back if you would like to change any of the previous selections.

Program Operations:



1. Connect the 12-Channel Benchtop Data Logging Thermocouple Thermometer to the computer with the proper USB cable. Then power on the device. This should be completed prior to starting the software.
2. Select the correct COM port that the computer has assigned for communications between the 12-Channel and computer. Do this by selecting the COM Port settings button and selecting the correct COM port.
3. Select the connect button to connect to the 12-Channel Benchtop Data Logging Thermocouple Thermometer . When connection is made the disconnect button will be selectable and the current process temperature will be displayed .
4. If there is a desire to only graph a selection of channels. Just click the number in the channel icon(s) to the left that you wish to hide on the graph.
5. Data logging setup: Type file name and select where you want the data saved on the computer. Adjusting the logging interval will change the sampling rate of data recorded. This software will allow the user to log data at 1sec intervals. Select the start button to start logging data.
6. Zoom Feature: To zoom in on data, click and drag around the portion of graphed data with the mouse pointer in graph area. To un-zoom and return to the normal view, right click on graph and select un-zoom.

Safety Precautions

DANGER: DO NOT REMOVE COVER! HIGH VOLTAGE IS PRESENT IN THE THERMOMETER. Contact supplier for service.

WARNING: Specifications for the power cord: see page 19.

WARNING: Use of separate temperature limit control is recommended were a fault condition could occur and result in a fire or other hazardous condition.

WARNING: If Static Event occurs please power cycle the device.

Specifications for 12-Channel Monitoring Device

Power input: 90~264VAC, 1A

Operating environment: 32 to 77ºF (0 to 25ºC); 90% RH, noncondensing

Maximum altitude: 2187 yd (2000 m)

Pollution degree: 2 (normally only nonconductivity pollution occurs)

Installation category II: local level (connect to branch circuit and not directly to a main circuit,
such as a fuse panel)

Storage: 32 to 140ºF (0 to 60ºC); 5 to 80% RH, noncondensing

Fuse: 12 VDC, 2 amp rated (fast-acting)

AC to 12VDC Power Pack: 12 VDC, 1A, 5ft. (1.5m)

Process memory: data retention upon power failure via nonvolatile memory

Dimensions (W x H x D): 6" x 6.5" x 4" (15.24 x 16.51 x 10.16 cm)

Specifications for Sensor Input

- Thermocouple (grounded or nongrounded)
- Automatic cold junction compensation and break protection for sensor

Type J	**-310 to 1832°F (-190 to 1000°C)**
Type K	**-328 to 2502°F (-200 to 1372°C)**
Type T	**-200 to 752°F (-200 to 400°C)**
Type R	**32 to 3214°F (0 to 1768°C)**
Type S	**32 to 3214°F (0 to 1768°C)**
Type E	**-328 to 1832°F (-200 to 1000°C)**

Range

Sensor accuracy

Calibration accuracy

Types J, K, T, E: ±0.1% of span or ±1°C

Types R, S: ±0.2% of span

Type T below –50°C: ±0.2% of span

Accuracy span is 1000°F (540°C) minimum

Calibration ambient temperature @ 22°C ±3°C

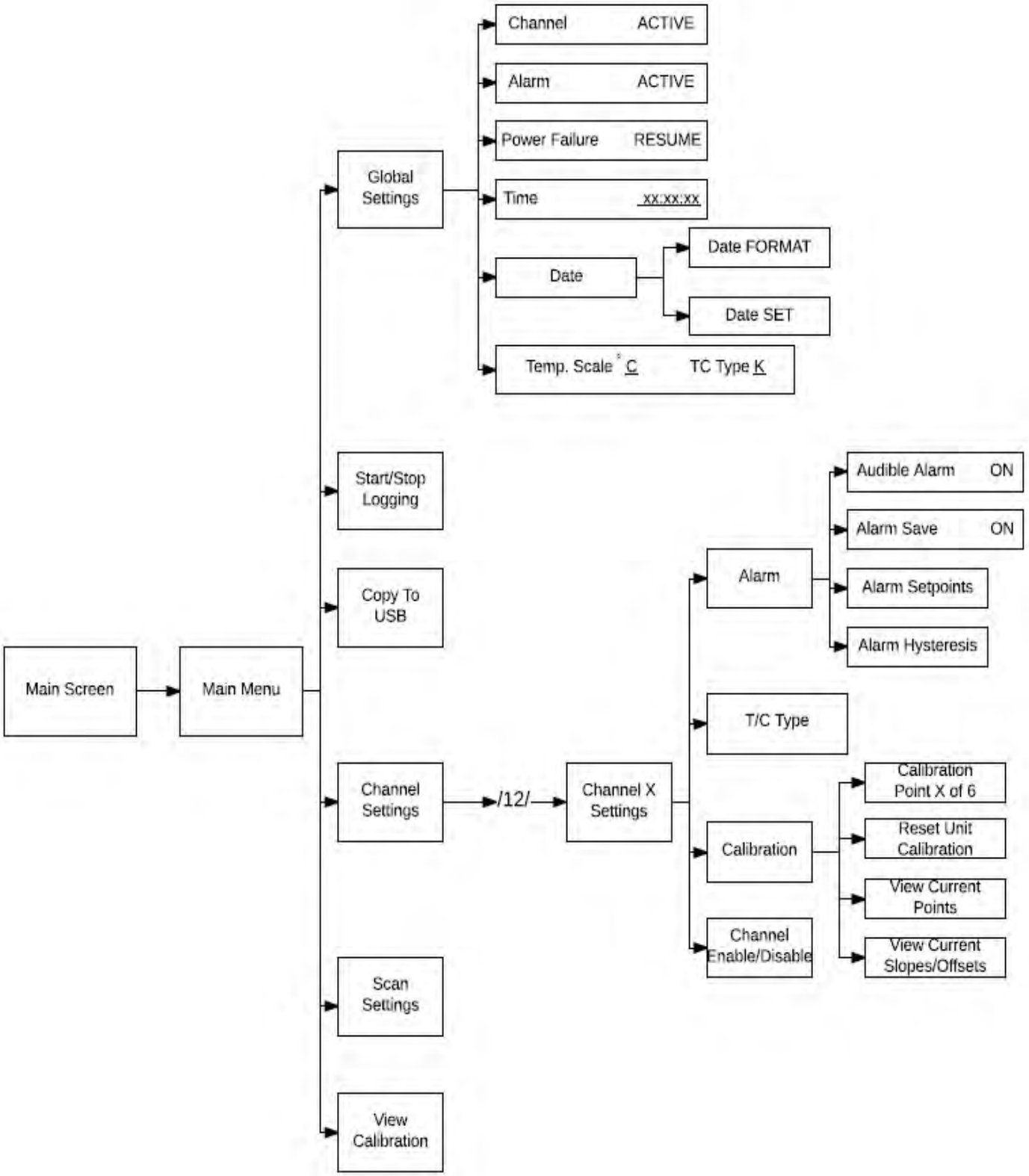
Temperature Stability: ±0.1°C/°C rise in ambient maximum

Scan Rate Specifications

The table below shows how long the 12-Channel Benchtop Data Logging Thermocouple Thermometer will log data before it runs out of useable memory. The numbers below were calculated as if all 12 channels are being logged at the same time. If the user is not logging all 12 channels, they will be able to log for a longer time.

Scan Rate (sec)	Log Time days hours:min:sec	Data Points per Log
2	6 20 : 36 : 32	296, 296
4	13 17 : 13 : 05	296, 296
6	20 12 : 49 : 36	296, 296
8	27 10 : 26 : 10	296, 296
10	34 07 : 02 : 41	296, 296
20	68 14 : 05 : 25	296, 296
30	102 21 : 08 : 03	296, 296

Screen Flow Charts



Maintenance

- Simple preventive maintenance steps include keeping the thermometer clean. Protect it from overload, excessive dirt, oil and corrosion.
- Cleaning: If cleaning is necessary, use only a damp cloth with water only. Wipe only the exterior of the control chassis.

CATALOG NUMBERS **92000-01**

SERIAL NUMBER _____

DATE OF PURCHASE _____

Rev. 2 1/12/17