SENSORS SYSTEMS SERVICES

3PS, Inc.
3 Point Solutions

SD50LT-DAQ-001

User's Guide

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Contents

WARNING!

This equipment must be operated by trained personnel. ALL safety related functions are the responsibility of the user. This equipment is NOT intended to replace personal responsibility for any safety related function.

This product must be used as specified in this manual. Using the product in any manor not specified in this manual or as specified by 3PS may negatively impact the protection capability of the product

1 Introduction

The SD50LT-DAQ is an industrial display that is smaller than the rugged outdoor model. The display is highly configurable and can be used to monitor a multitude of sensors and provide alarm outputs. The SD50LT is a feature rich display and below are some of the features of the system.

Features:

- Light weight steel enclosure
- Daylight readable display
- 24/12 volt power supply
- 5 Pin pluggable phoenix style connections
- Simple menu driven display
- USB and Ethernet connectivity for field upgrades and data extraction
- Internal SD Card for data logging
- Two 3PSNet data interfaces for fast data monitoring
- Requires use of external keyboard or mobile device for data entry

2 Definitions & Acronyms

- 3PSNet – Is a proprietary protocol on a CAN bus message that allows for simple communications between devices on a network.

3 Quick Start Guide

The SD50LT arrives from the factory with the customer application preconfigured per application requested. This quick start guide serves as a general startup procedure though actual application may vary. See the addendum for specific application types for additional information.

Prior to beginning installation remove all system components from its shipping container(s) and review components to ensure that all are undamaged and correct according to the order placed.

Along with the system order, a systems level schematic should be provided. Before beginning installation, lay out all pieces in the system and follow the instructions below.

1. Layout the system components per system drawing and validate all part numbers.
2. Connect all connectors and cables per the system drawing
3. Connect all power connectors
4. Ensure that the system boots properly. Boot time is normally 10-20 seconds and you will see a 3PS splash screen with a progress bar.
5. Once booted, screen will default to the main application window. The system should ship with all sensors preconfigured. If not, you will see "NA" for the data value.
6. Check the sensor configuration
7. Review and modify all range setting preferences
8. Review all alarm settings.
9. Ensure that all data and sensors are correct.
10. Power down the system
11. Remove all cabling
12. Mount all system components in their permanent locations including the SD50LT
13. Connect all cables ensuring that there are no tight bend radiuses, pinch or crush points and that the cable is secured properly for the application
14. Power up the system
15. Verify that all devices are functioning
16. Verify all system settings and values are correct
17. Calibrate the system per recommended calibration requirements
18. System is now in service

4 Mechanical

The SD50LT-DAQ is a DIN mount/ panel mount solution. The mechanical section of this manual will outline the physical dimensions, mounting and connection schemes for the SD50LT.

4.1 Control Box

The enclosure for the SD50LT is designed to take minimal space in the electrical enclosure. The front panel display is shown in Figure 1.

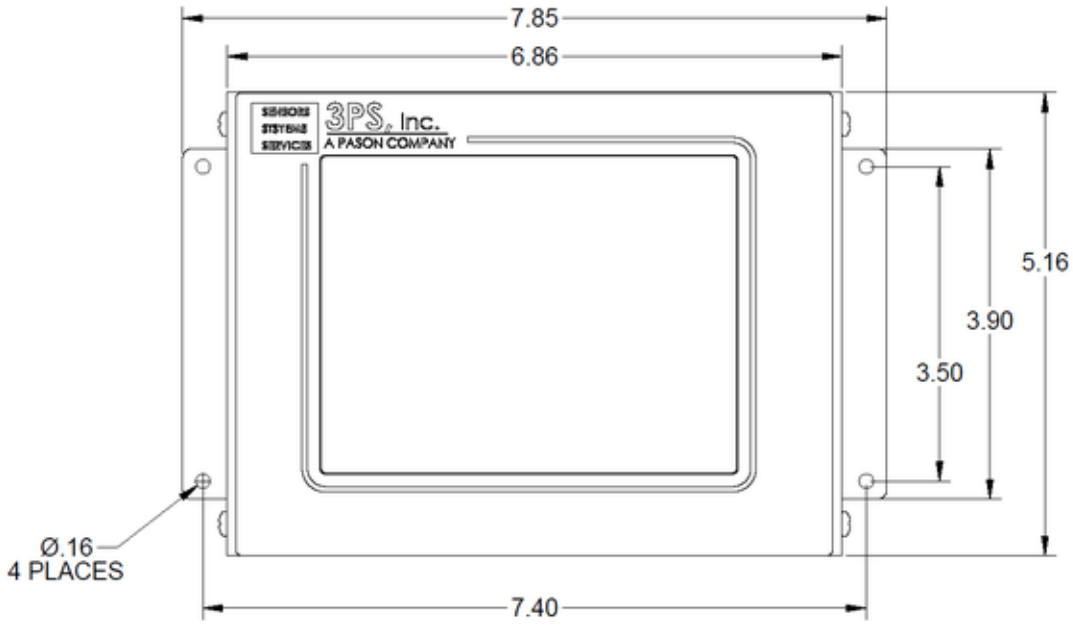


Figure 1: Front View of the SD50LT

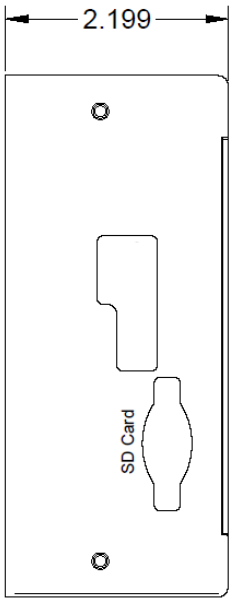


Figure 2 Side Profile of the SD50LT

4.2 Connections

The Connections for the SD50LT are simple Phoenix style connectors. Figure 3 outlines the individual connections. Connectors may vary based on actual unit ordered.

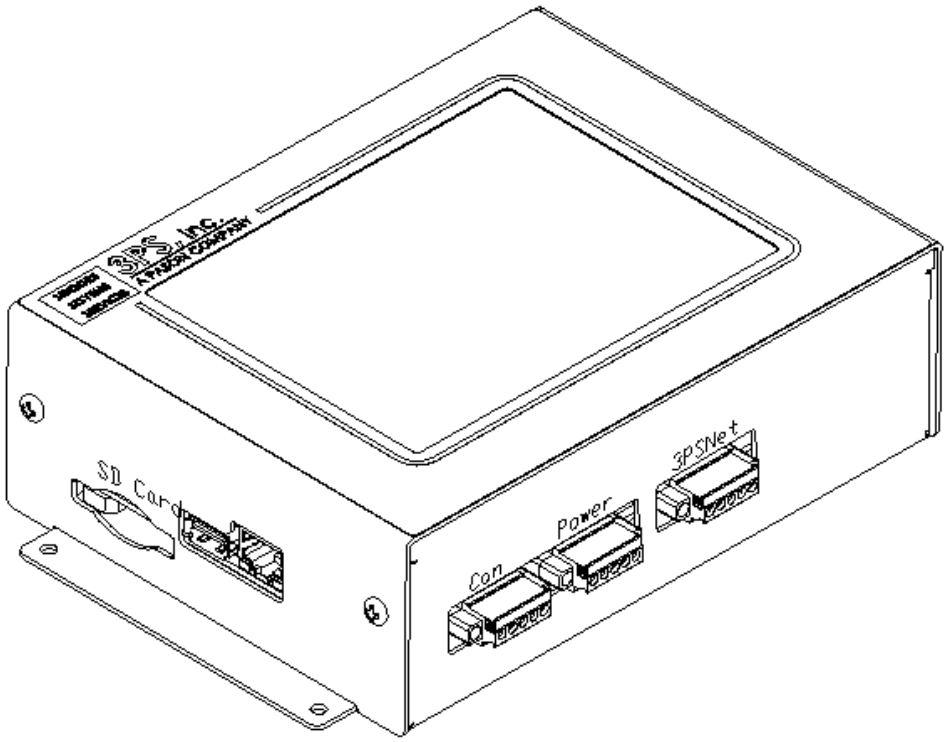
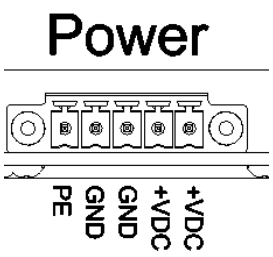


Figure 3 I/O Connectors

4.2.1 Power

The power connector is a 5 pin Phoenix style connector. The pinout for the connector is shown in the table below. The incoming power can be configured for 12 volts DC to 24 volts DC.

Table 1 Power Connector

Pin	Signal	Location
1	+VDC	
2	+VDC	
3	GND	
4	GND	
5	Shield	

Note: Ensure that the chassis ground is connected to the chassis of the system or another earth ground reference.

Note: Ensure that the bare shield wire is connected to the chassis of the system or another earth ground reference.

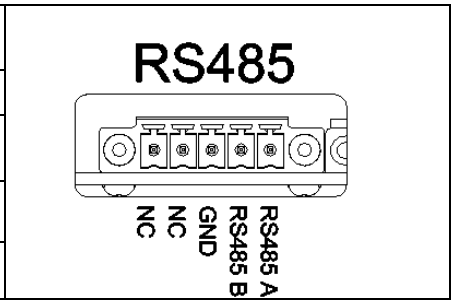
4.2.2 RS485

The RS485 connector is a 5 pin Phoenix style connector. The pinout for the connector is shown in the table below.

Table 2 RS485 Connector

Pin	Signal	Location

1	RS485 +
2	RS485-
3	GND
4	No Connected
5	No Connected



Note: Only pins 1-3 are connected internally. The shield connection is to be made at the scoreboard or terminating device.

Note: The RS485 has built in termination.

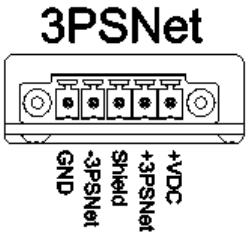
Note: In some instances it may be acceptable to not connect the ground connection. In general it should be connected.

4.2.3 3PSNet Ports 1&2

The 3PSNet connector is a 5 Pin 3PS Turk style connector. The part number for the connector on the SD50LT is CBL7009-M55-22-05. The pinout for the connector is shown in the table below.

Table 1 3PSNet Connector

Pin	Signal	Location

1	+24VDC	
2	3PSNet+	
3	Shield	
4	3PSNet-	
5	GND	

Note: The second 3PSNet port is optional and generally not installed.

Note: The +24VDC/+12VDC and shield connection are only installed if the unit set up for the internally power network option.

Note: Excessively noise environments will require and isolated power supply for the network.

4.2.4 Ethernet Port

The Ethernet port will utilize a standard RJ45 connection.

4.2.5 USB Port

The SD50LT is equipped with a USB port. The port can be used to extract log file information. See the software section for more details on how to use the USB functions.

The USB Port is a Type A connector and will support most memory sticks. This port is also used to configure and calibrate the system using an external Keyboard.

4.2.6 SD Flash

The SD50LT has an integrated SD Card that can be utilized for data logging, as well as storing a backup of system configurations & user settings. In the event of an SD50LT failure, the SD Card can be moved to a new system and a system recovery may be performed to minimize downtime.

Note: Commercially rated SD cards may be used but may not meet the environmental requirements.

5 Display Functions

The SD50LT can be configured to display numerous devices for several applications. The core of the display's configurability is around its unique software architecture. The applications for several load monitoring applications share a common set of menus and screens that allow the user to install and setup the system more easily once familiar with they system.

The display can be configured to have multiple data display screens to allow the user to select what and how information is presented. These can include an application specific screen for applications such as a winch or crane as well as detailed screens that allow the users to see individual data elements and trending. All of the data screens are accessible through the 4 hotkey buttons below the display.

Additionally, the SD50LT has an advanced user menu that can be used to configure the system. The menu is easily entered and easily navigated.

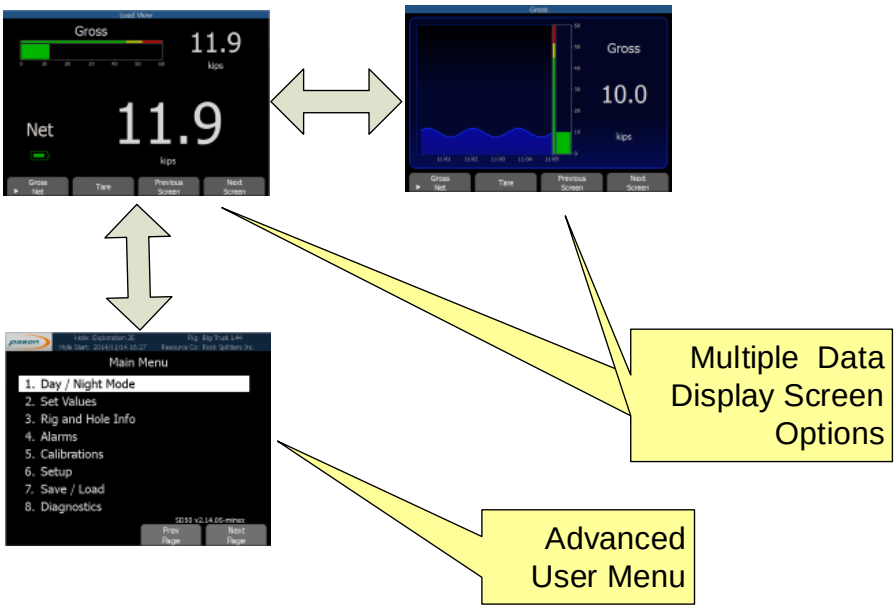


Figure 4 Software Architecture

5.1 Screen Details

This section identified some of the critical screens for the user interface. It provides a device centric display that provides application specific information. Because the display is device type specific it allows for simple configurability of the system and minimizes collateral information not normally associated with the application.

5.1.1 Main Screen

The following provides an example of the screen types that are available for the SD50LT. The SD50LT may have one or more main screens. The features included on the screen include battery life for wireless devices, bar graphs that shows the where the load is in the range of the sensor, gross and net values and other critical application elements. From the main screen, critical functions like Tare, Payout Reset and Alarm Acknowledge are easily accessible if configured. The SD50LT shows on-screen alarm notifications, but ensures that alarm popups don't cover any critical data.

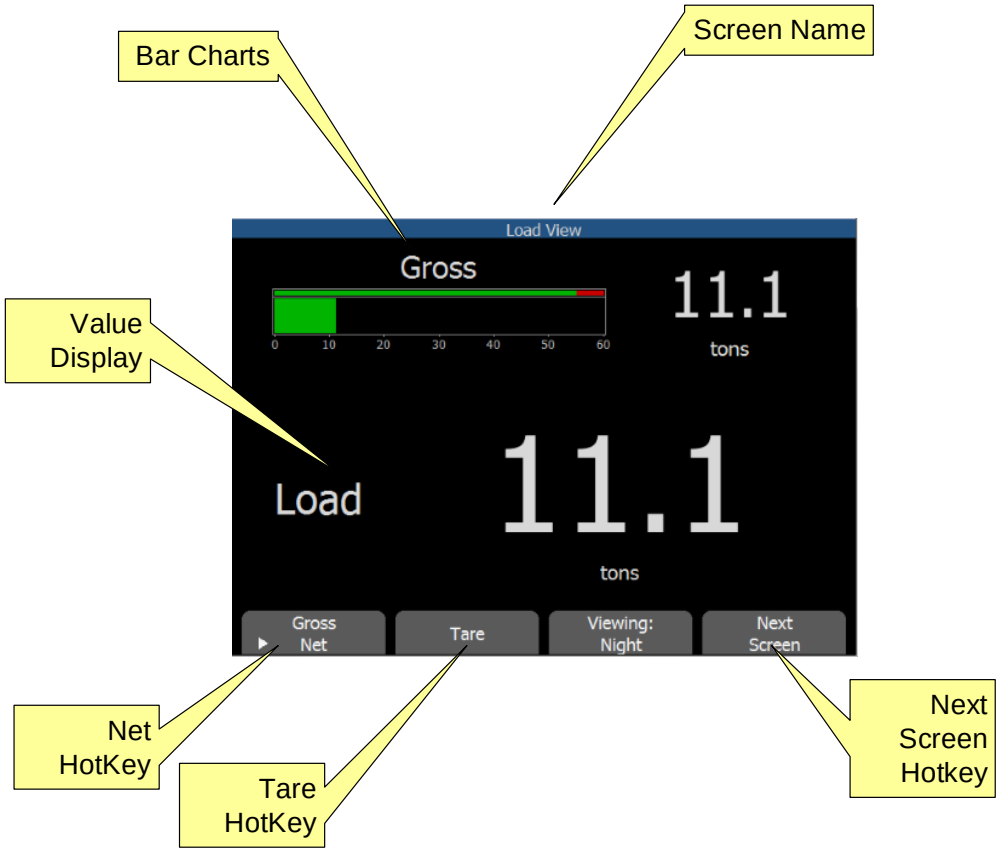


Figure 5 Main Screens Bridge Example

Feature	Description
Screen Name	Shows the screen title and can be used to reference different system elements
Bar Charts	Bar charts have settable ranges, alarm indication and color changing status.
Value Display	Values are displayed with large fonts that show critical information. The values auto scale.
Net Hotkey	The Net hotkey is used to toggle between net and gross values. If the button indicates "Net" the values are displayed as net values. If the button indicates "Gross" the values are displayed as gross values.
Tare Hotkey	The Tare Hotkey is used to Tare information on the current screen. The user

	is prompted to confirm
Next Screen	The Next Screen Hotkey moves to the next data screen.

5.1.2 Display Details

Along with the overview screen, the SD50 also provides detailed screens. The detailed screen similar to that of Figure 6 provides an in depth look at an individual data point. The detailed view provides the current value, a bar chart to quickly identify the load with respect to the range, and a graph that shows the trend over the last five minutes of operation.

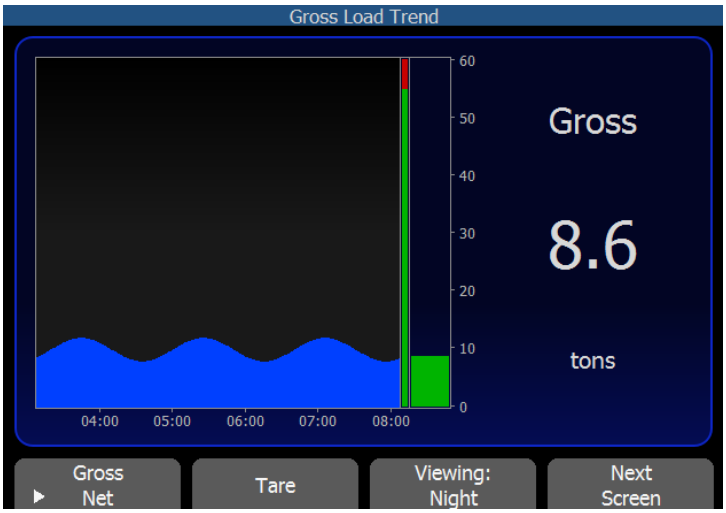


Figure 6 Individual sensor extended information

Feature	Description
Bar Charts	Bar charts have settable ranges, alarm indication and color changing status.
Data Value	Values are displayed with large fonts that show critical information. The values auto scale.
Trend Graph	The Trend Graph shows the last few minutes of data for the data value

	that is being monitored.
Net Hotkey	The net hotkey is used to toggle between net and gross values. If the button indicates net, values are displayed as net values. If the button indicates gross, values are displayed as gross values
Tare Hotkey	The Tare Hotkey is used to Tare information on the current string. The user is prompted to confirm to tare the value when the hotkey is pushed.
Previous Screen	The Previous Screen Hotkey reverts to the previous data screen
Next Screen	The Next Screen Hotkey moves to the next data screen.

5.2 Program Menu Description

This section provides a description and general usage information for the various program menu items. These features include: Tare, Gross/Net, Payout, Alarms, Setup, Security and others based on specific configuration requirements. The menu is accessed by pressing the "Esc" button on an external keyboard connected via USB. Pressing the "Esc" button again will back out of the menu tree.

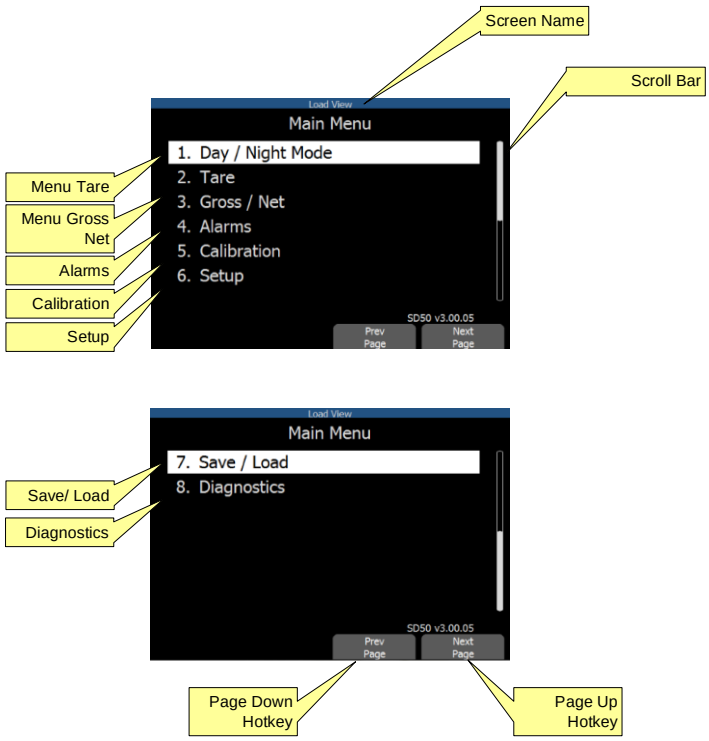


Figure 7 Menu Screen Description

Feature	Description
Scroll Bar	The scroll bar is used to show that there are multiple screens of data.
Display Brightness	In this menu example the operator can push 1 to initiate the Display Brightness operation. Once in this menu the user may select from different brightness settings.
Tare	In this menu example the operator would push 2 to initiate a Tare operation. If the Tare operation is highlighted pressing enter will also initiate a tare operation.
Gross Net	In this menu example the operator would push 3 to initiate a Gross/Net operation. If the Gross/Net operation is highlighted pressing enter will also initiate the operation. If there is more than one data value, the user will be prompted to make a selection.
Alarms	In this menu example the operator would push 4 to enter the alarm

	options. If Alarms is highlighted, pressing enter will also enter the menu.
Calibration	In this menu example the operator would push 5 to enter the Calibration options. If Calibration is highlighted, pressing enter will also enter the menu.
Setup	In this menu example the operator would push 6 to enter the Setup options. If Setup is highlighted, pressing enter will also enter the menu.
Save / Load	The Save/Load menu item allows the user to move data on and off of the SD50LT. The data can be moved to the on board SD Card or to a USB Stick.
Diagnostics	The diagnostics screen provides system software information as well as raw sensor data.
Previous Screen	The Previous Screen Hotkey reverts to the previous data screen
Next Screen	The Next Screen Hotkey moves to the next data screen.

5.2.1 Day / Night Mode

The SD50LT offers 2 color pallets to promote better viewing in day or night mode operation. The user can select the color pallet of choice.

5.2.2 Alarms

The SD50LT is highly configurable and can provide alarm notifications for the system. The available alarms will vary depending on the application. For each alarm, the user can access parameters like alarm thresholds and triggering delays.

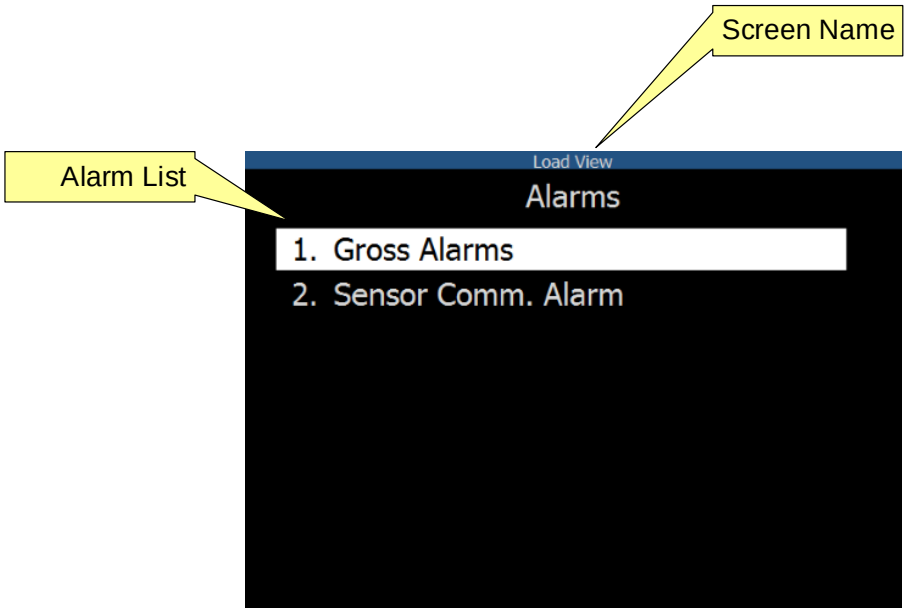


Figure 8 Available Alarms

Feature	Description
Alarm List	Provides a list of available alarms that can be used with the system.

5.2.2.1 General Alarm Setup

Each element in the SD50 may be configured to support alarms. Figure 9 illustrates the alarm setup options.

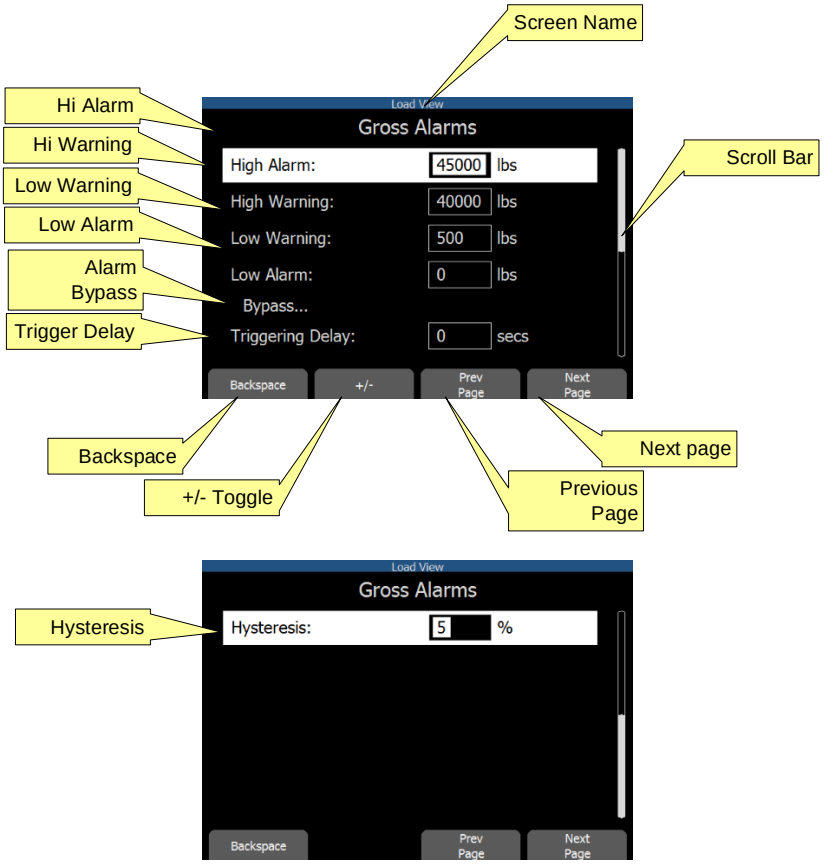


Figure 9 Alarm Setup

Feature	Description
Scroll Bar	The scroll bar is used to show that there are multiple screens of data.
Previous Page	The Previous Page Hotkey reverts to the previous data screen
Next Page	The Next Page Hotkey moves to the next data screen.
+/- Value	+/- Value toggle.
Backspace	The Backspace is used to delete the last character entered.

High Alarm	The High alarm classification is an example of an upper alarm condition. It can be tied to relays and generates on screen notification and sounds the sonic alarm.
High Warning	The High Warning classification is an example of an upper warning condition. It can be tied to relays and generates on screen notification and sounds the sonic alarm.
Low Warning	The Low Warning classification is an example of a lower Warning condition. It can be tied to relays and generates on screen notification and sounds the sonic alarm.
Low Alarm	The Low alarm classification is an example of a lower alarm condition. It can be tied to relays and generates on screen notification and sounds the sonic alarm.
Alarm Bypass	The alarm bypass function turns alarms on or off.
Triggering Delay	Used to eliminate alarm events caused by short spikes in value. Prevents the alarm from triggering until the value has remained past the threshold continuously for the amount of time set.
Hysteresis	Hysteresis provided in percent is provided on the lower side of the alarm. This provides for a condition that forces the value being monitored to drop below the alarm set point by the hysteresis amount before the alarm is removed.

5.2.2.2 System Alarms

System level alarms such as a communications alarm are also provided. These may be enabled or disable by the user. A Communication alarm is an example of a system level alarm. For the communications alarm the system will monitor wireless and hardwired communications and trigger an alarm if the timer is exceeded. In the event of a communications alarm all relays go to a failsafe state.

5.2.2.3 Alarm Notification

When an alarm happens, there are several onscreen notifications to inform the operator of an issue. Figure 10 is an example of the screen notification.

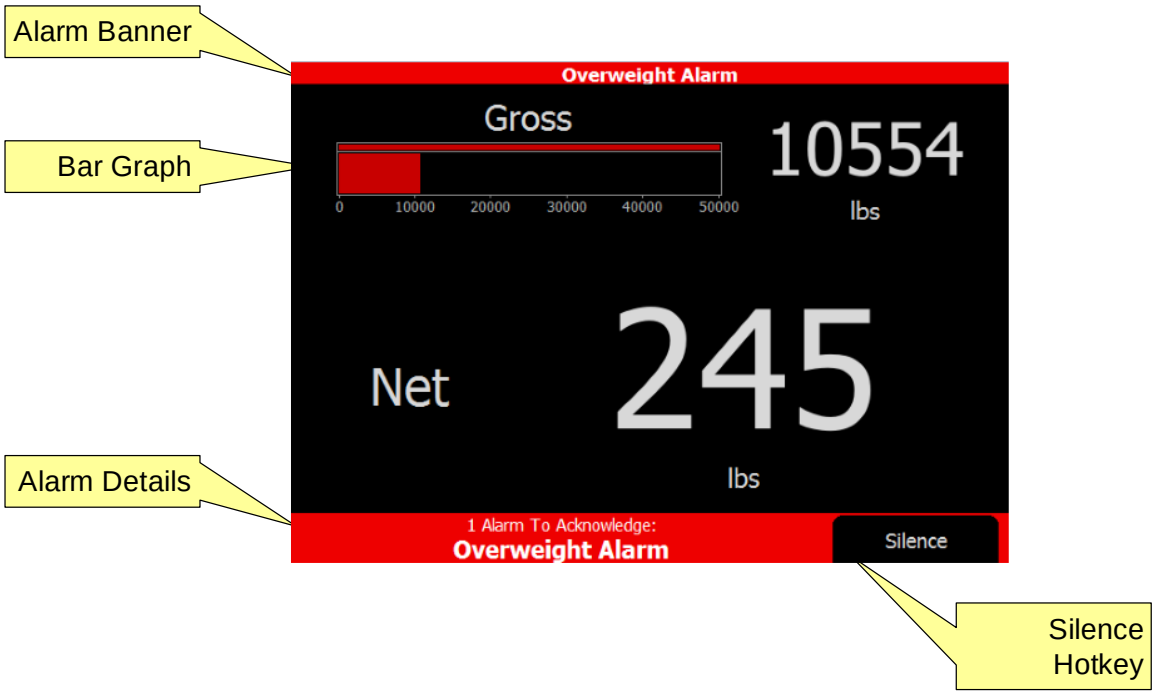


Figure 10 Alarm Notification

Feature	Description
Alarm Banner	The alarm banner shows the alarm condition.
Bar Graph	The bar graph illustrates the current value in relation to the display range. The bar graph also shows the alarm status
Alarm Details	The Alarm Details banner shows the alarms in more detail, and allows the user to silence the alarm condition.
Silence Hotkey	The silence hotkey will silence the alarm buzzer and remove the lower banner.

5.2.3 Calibration

The calibration menu shows a list of all calibrations in the system. An individual calibration can be selected from this menu and edited. Figure 11 shows the calibration menu pages. This section will outline the basic steps for a multi-step calibration.

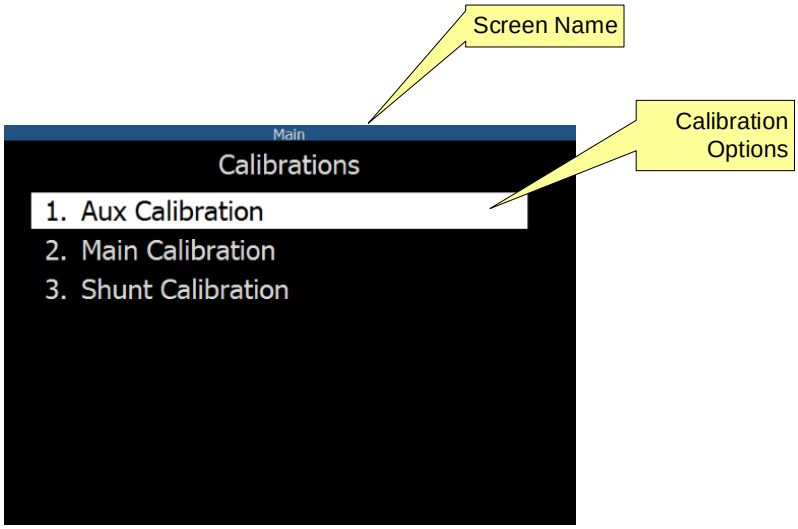


Figure 11 Calibration Menu

Feature	Description
Calibration Options	Page options for calibration. Use the up and down arrows to highlight options and select the option using the "Enter" key on a keyboard. There will typically be a calibration for each set of sensor values including inputs such as load, angle, and boom length.

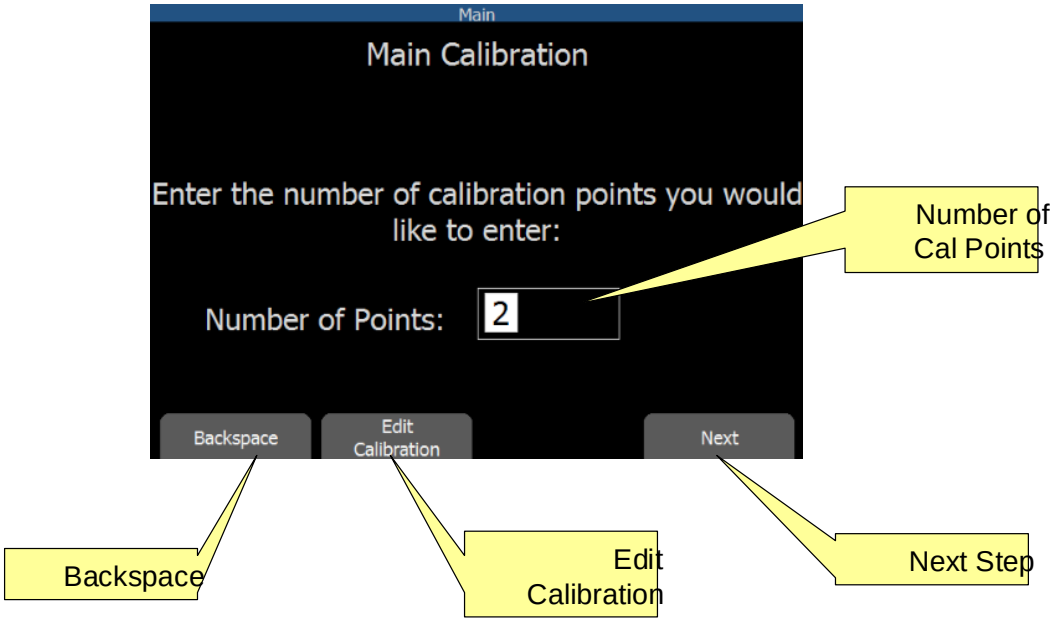


Figure 12 Calibration

Feature	Description
Number of Cal Points	Enter the number of calibration points desired. Zero is always the first point. System supports up to 20 calibration points
Next Step	The Next Step button
Edit Cal Table	The Edit Calibration Table hot function button will pull up the calibration table and allow the calibration to be manually edited.
Backspace	The Backspace is used to delete the character entered in reverse order

Figure 13 illustrates the first step in a multistep calibration.

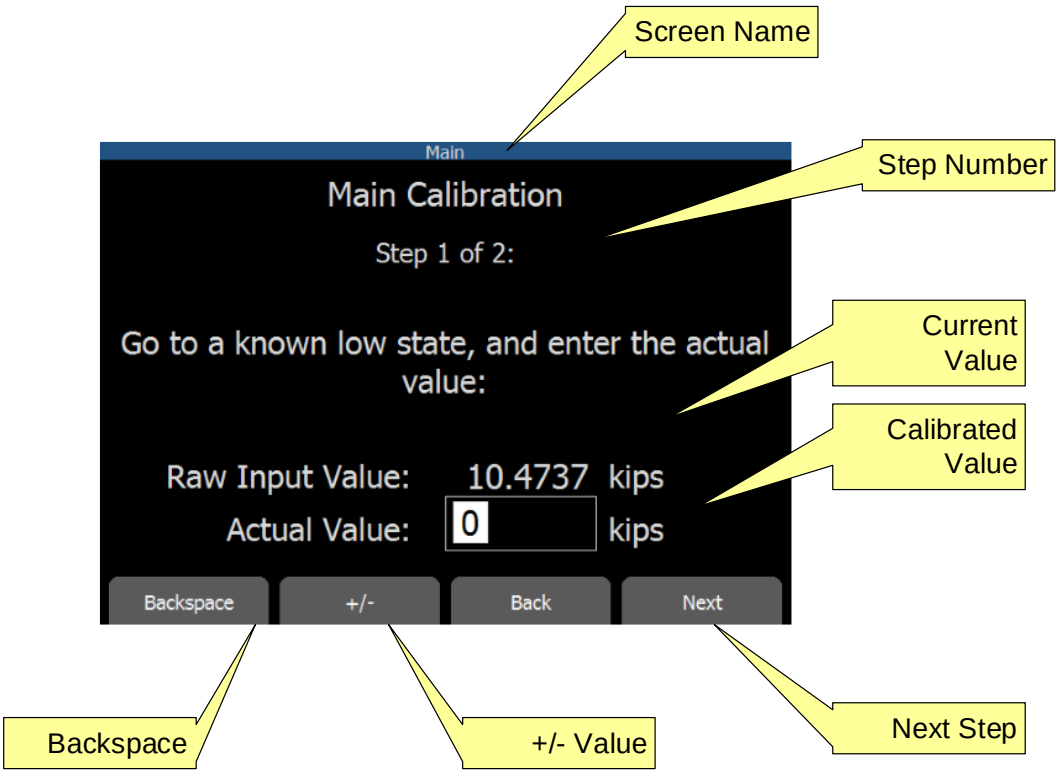


Figure 13 Calibration Step 1

Note: The software is limited to 20 points for calibration.
Note: The First calibration point should always be taken in a no load Condition.

Feature	Description
Step Number	The step number identifies which step in the calibration the user is at.
Raw Value	Displays the current value of the sensor device in its base units as selected in the System Units Setting.

Actual Value	The Actual Value field is set to the value that is displayed in the main screens.
Next Step	Proceed to the next step of the calibration.
+/- Value	+/- Value toggle.
Backspace	The Backspace is used to delete the character entered in reverse order

Figure 32 shows the final step of calibration as indicated by the step number.

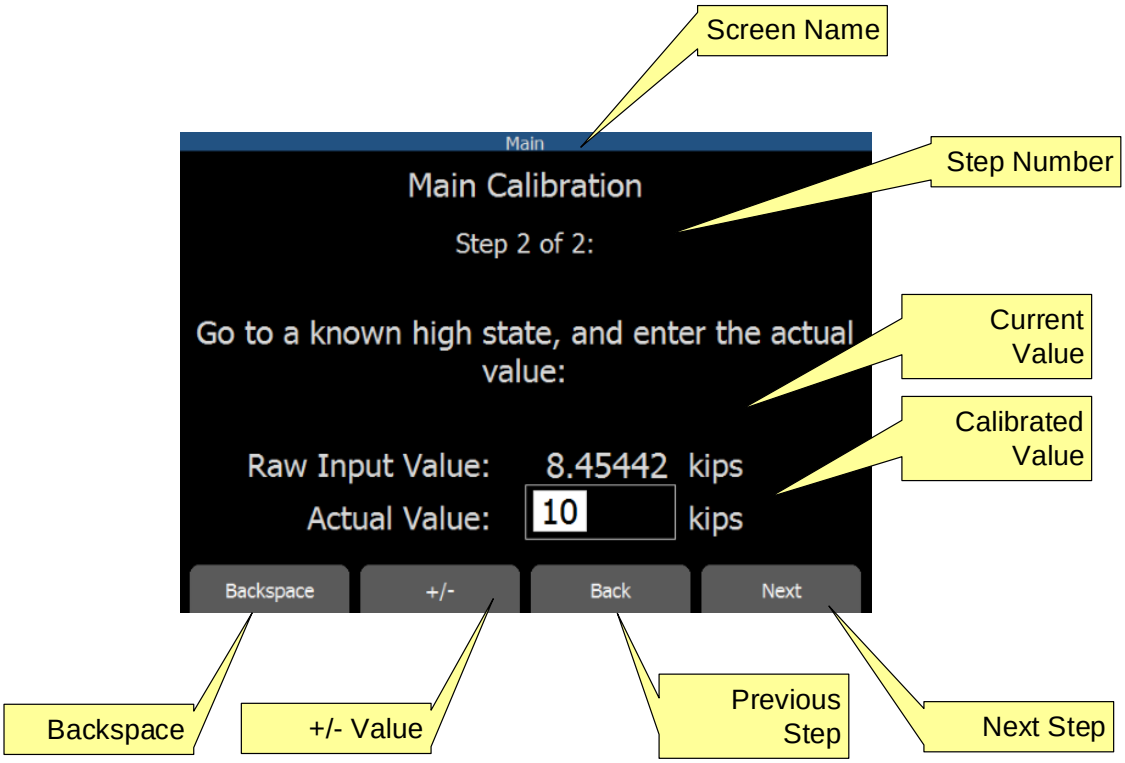


Figure 14 End Calibration

Feature	Description
Step Number	The step number identifies which step in the calibration the user is at.
Raw Value	Displays the current value of the sensor device in its base units as selected in the System Units Setting.
Actual Value	The Actual Value field is set to the value that is displayed in the user display in relation to the raw value.
Next Step	Proceed to the next step of the calibration.
Previous Step	Go back to the previous step of the calibration.
+/- Value	+/- Value toggle.
Backspace	The Backspace is used to delete the character entered in reverse order

Figure 15 is the calibration review chart that shows raw data vs. calibrated values are used to identify the adjusted slope for the load. Once the user selects "Apply" the calibration is complete.

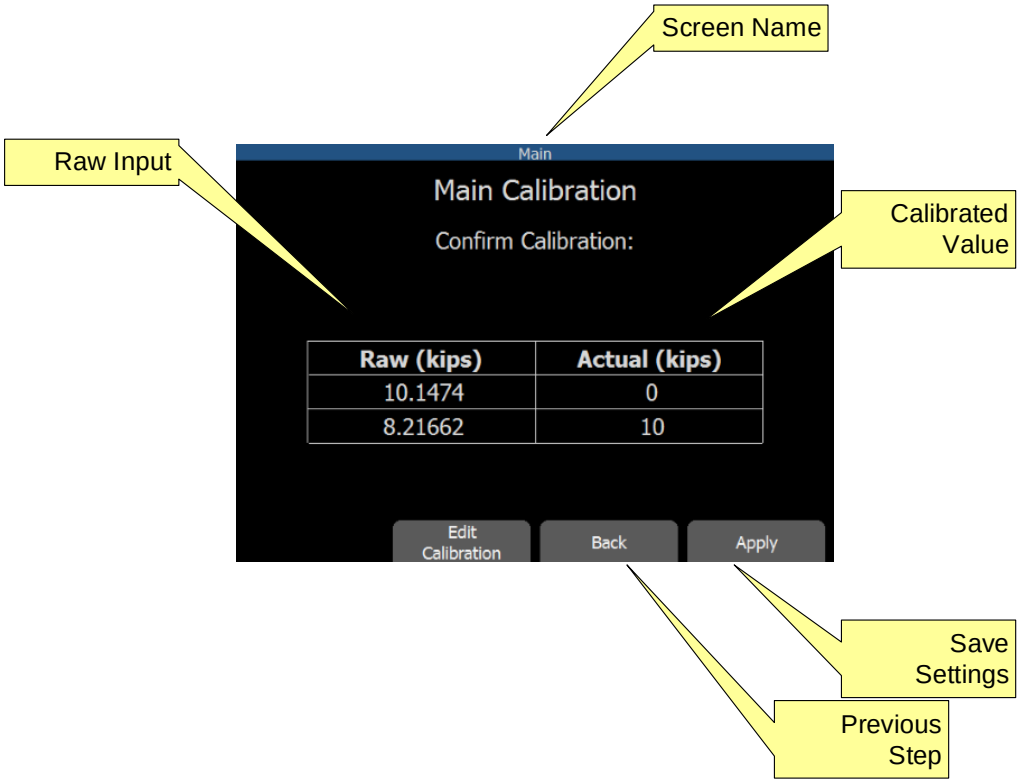


Figure 15 Calibration Review

Feature	Description
Raw Value	Displays the current value of the sensor device in its base units as selected in the System Units Setting.
Actual Value	The Actual Value field is set to the value that is displayed in the user display in relation to the raw value.
Save settings	Applies the settings to the system
Previous Step	Return to previous screen.

If the calibration is successful, the page shown in figure 16 is displayed.

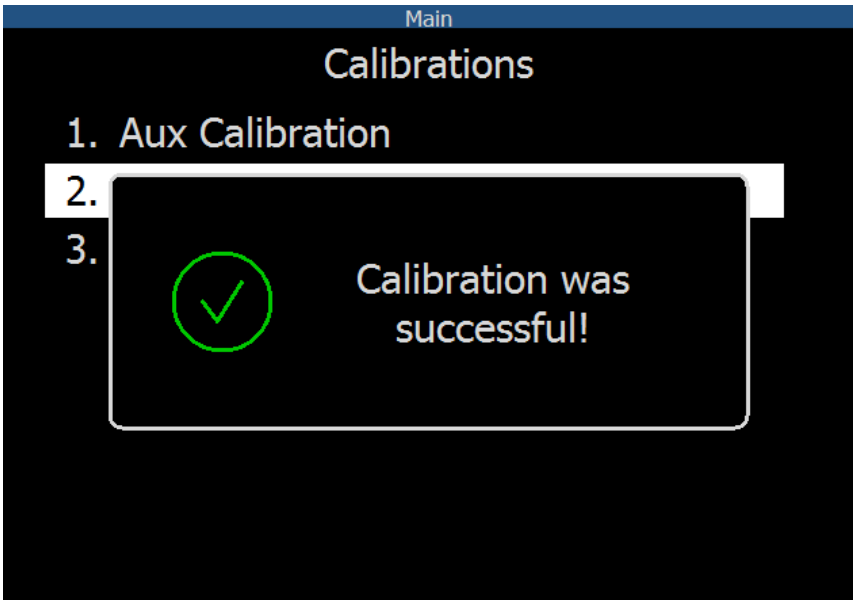


Figure 16 Calibration Complete

In certain situations, running a calibration sequence may not be the best option for modifying a calibration table. The calibration table may be accessed from the Edit Calibration hotkey function button. Once pressed the calibration table will be displayed as shown in figure 17. The values may be edited using the up and down arrow buttons and the selected cell will be highlighted.

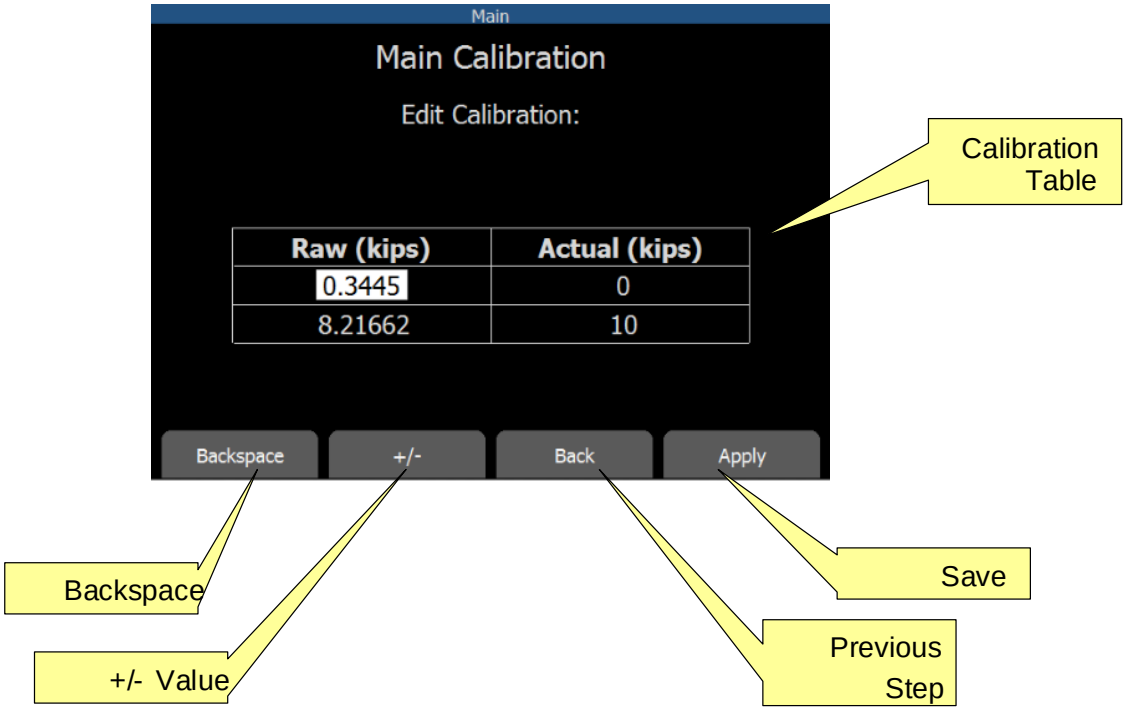


Figure 17 Edit Calibration Table

Feature	Description
Calibration Table	Displays the current values of the sensor calibration in its base units as selected in the System Units Setting.
Save settings	Applies the settings to the system
Previous Step	Return to previous screen.
+/- Value	+/- Value toggle.
Backspace	The Backspace is used to delete the character entered in reverse order

5.2.4 System Setup

The Setup menu provides access setup and change system settings. These settings including elements such as Ranges, Units, Sensor Address, and other setup features that shape the operation and appearance of the SD50LT screen. The menu can be navigated by using the up and down arrows or simply selecting the corresponding numeric value. Some configurations may have minor variations in the menu format that are not covered in this document. If there are question about any features, contact 3PS Support.

Figure 18 System Setup

Feature	Description
Scroll Bar	The scroll bar is used to show that there are multiple screens of data.
Display Ranges	Pressing 1 enters the Display ranges page. If highlighted pressing enter performs the same function. Sets the display range for bar charts
Units	Used to select units for the system data values.
Screen & Keyboard	Pressing 3 allows the operator to set up screen and keyboard sleep and lock functions.
Sensor Addresses	Pressing 4 enters the Sensor Address page. If highlighted the pressing enter performs the same function. This screen is used to configure network devices to communicate to the SD50LT.
Relay Output	Pressing 5 enters the Relay Output setup function. The user can assign alarms, set polarity and select additional functionality.
Date and Time	Pressing 6 enters the Date and Time page. If highlighted pressing enter performs the same function. Sets the System Time and Date. The Time and Date are used for system logging.
Web and FTP Access	Pressing 7 provides access to web and ftp features that available on the SD50. These option have password security built in.
Networking	Pressing 8 enters the Network page. If highlighted the pressing enter performs the same function. Used to set the network settings.
Application Specific Choices	Depending on the application, other menu options may be present. Selecting the number or highlighting the option will enter the pages for the options. See application notes of manual addendums for additional information.
Previous Screen	The Previous Screen Hotkey reverts to the previous data

	screen
Next Screen	The Next Screen Hotkey moves to the next data screen.

Display Range & Filtering

The SD50LT allows display ranges and filtering to be configured for each channel. Figure 31 shows the range and filtering screen for a single channel. Figure 19 describes the Display Range setup page.

Figure 19 Display Range Setup

Feature	Description
Range Min	Sets the minimum range for the data value of interest. The value is in the base units for the data value.
Range Max	Sets the maximum range for the data value of interest. The value is in the base units for the data value.
Display Precision	Display precision is used to set the number of decimal points shown in the data values.
Averaging Time	Averaging Time is in seconds. This function provides a recursive (rolling) average of the data based on the Time and data rage of the input.
Filter Dead Band	This establishes a filter band in which the data if filtered. If the change in the value exceeds this value it will automatically update. This allows for heavy filtering in a given band but still allows the system to change rapidly based on significant loads.
Zero Dead Band	The Zero Dead Band value defines a positive and negative limit in which the load must exceed before the value registers on the screen.
Rounding Enable	Rounding Enable enables or bypasses the rounding feature.
Rounding Interval	If rounding is enabled the associated Rounding Interval is applied to the output value.
Backspace	The Backspace is used to delete the character entered in reverse order
+/- Control	Toggles the value between positive and negative values.
Previous Screen	The Previous Screen Hotkey reverts to the previous data screen
Next Screen	The Next Screen Hotkey moves to the next data screen.

5.2.4.1 **Units**

The SD50LT Base Units can be setup to allow any desired base units which allows data to be displayed in a form factor of preference. Figure 20 illustrates the Units Selection Page accessible from the menu. Some SD50LT software configurations may have more or less selections based on customer requirements. The up and down arrows can be used to select the desired units. After highlighted pressing the Enter key will select the units. Additionally, the units may be selected by directly pressing the number associated with the desired units.

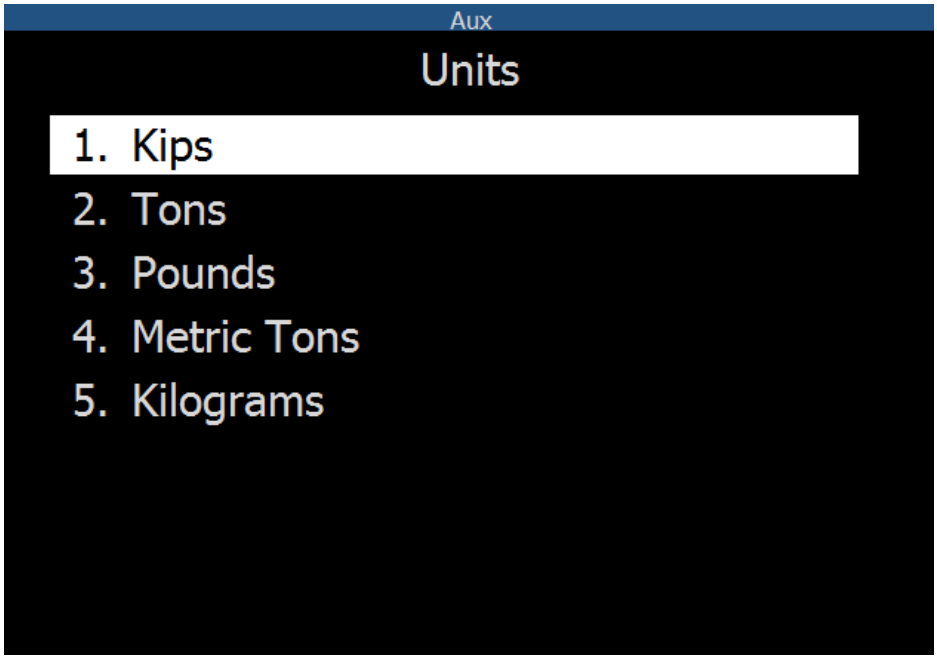


Figure 20 Units Selection

5.2.4.2 Screen & Keyboard

The Keyboard Lockout feature is available in some versions of the application. This option can be used to prevent accidental key presses. The Keyboard lock feature can be explicit or automatic depending on the option selected by the user. The Automatic option lock the keyboard after 3 minutes of nonuse. Figure 21 illustrates the Keyboard lockout feature.

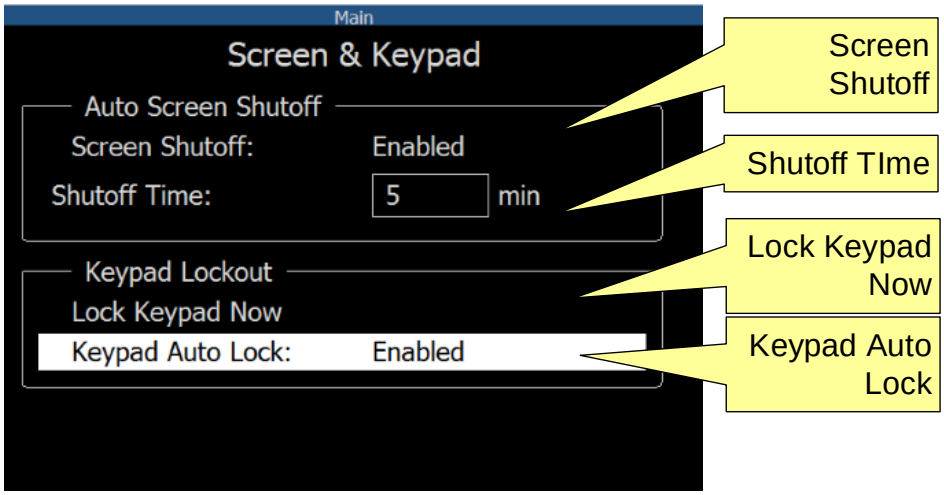


Figure 21 Keyboard Lockout Settings

Feature	Description
Screen Shutoff	The Screen Shutoff Enable enables the sleep mode for the screen. The screen will turn back on if a key is pressed or an alarm occurs.
Shutoff Time	If a key is not press within the shutoff time the screen will turn off. The minimum time is 1 minute and the maximum time is 120 minutes.
Lock Keyboard Now	The Lock Keyboard Now option lock the Keyboard. This prevents and accidental keypresses. If a key is pressed the display provides instructions for unlocking the Keyboard.
Keyboard Auto Lock	The Keyboard Auto Lock is a feature that Automatically locks the Keyboard if the display is not in use. If a key is pressed the display provides instructions for unlocking the Keyboard.

5.2.4.3 Sensor Addresses

The SD50LT sensors communicate over a communications network and are connected in a trunk and branch style network. Each sensor must have a unique address or conflicts

may impact the device's ability to communicate correctly on the network. All sensors have the network ID stamped or labeled directly on the sensor.

The device may be selected using the up and down arrow keys. Once highlighted the Keyboard can be used to enter the ID. Once the network ID is entered pressing the enter key accepts the address.

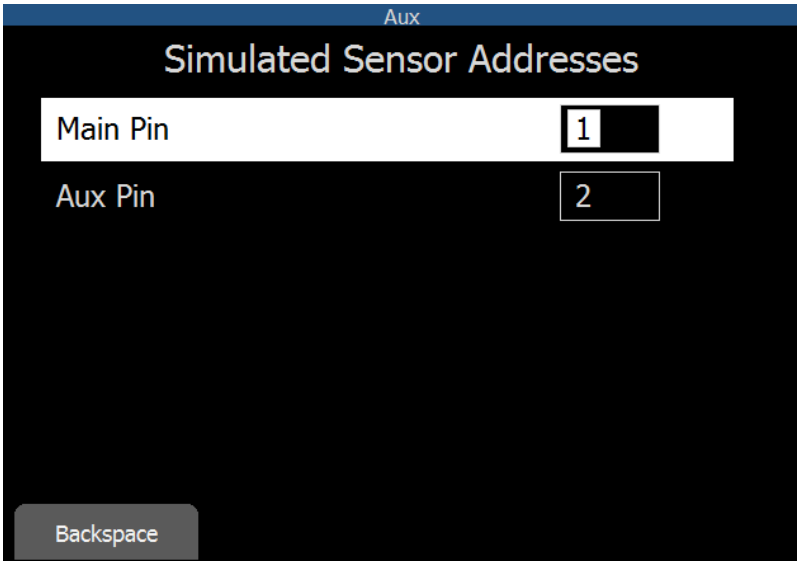


Figure 22 3PSNet addresses.

5.2.4.4 Relay Setup

The Relay Setup Page is used to configure the relay module to communicate with the SD50LT. The relays can be configured to several preconfigured events and alarms.

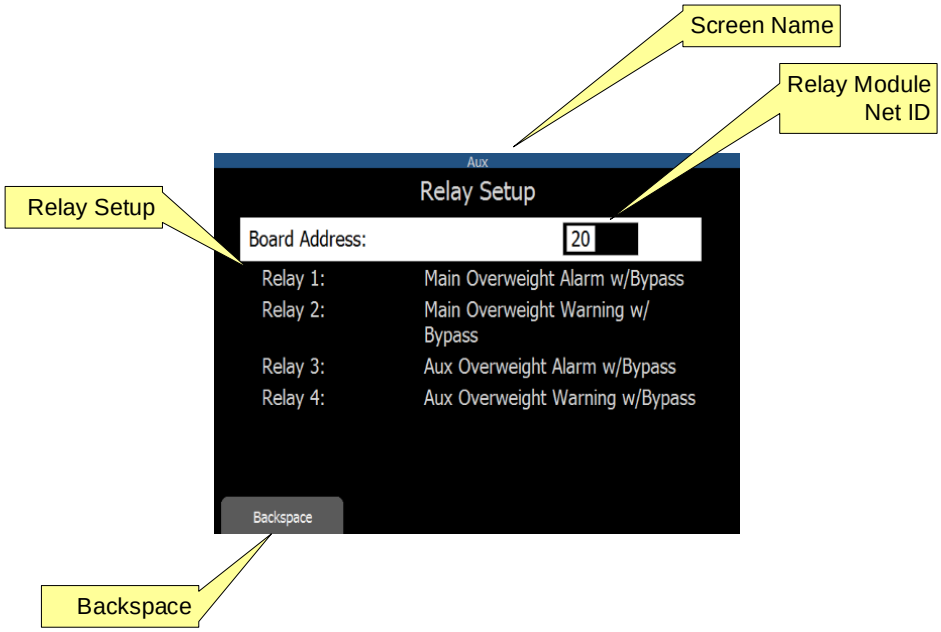


Figure 23 Relay Module Setup

Feature	Description
Relay Module ID	The Relay Module ID is used to setup the Relay modules Net ID.
Relay Setup	The Relay Setup is used to connect a Relay port to a system event. When selected, system event page opens and an event is selected.
Backspace	The Backspace is used to delete the character entered in reverse order

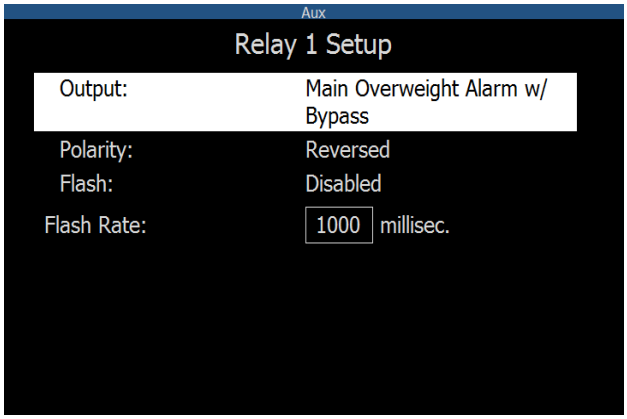


Figure 24 Relay Setup

Feature	Description
Output	The Relay Setup Output is used to select the alarm or condition in which the relay will react to.
Polarity	Relay Polarity allows the relay to operate in normal or reverse software logic. Running in reverse logic is failsafe and recommended.
Flash	Flash option turns the relay on and off in an alarm condition with a 50% duty cycle. This works well in applications with a strobe of pulsed audio
Flash Rate	Flash Rate is duty cycle of the flash option.

When the relay number is selected the Select Relay Output screen is opened and an alarm can be mapped to the relay number. The alarm conditions that are available will vary depending on the configuration and application. The options are navigated using the up and down arrows using the enter key to select an alarm condition. An example of the Relay Outputs conditions is illustrated in figure 25.

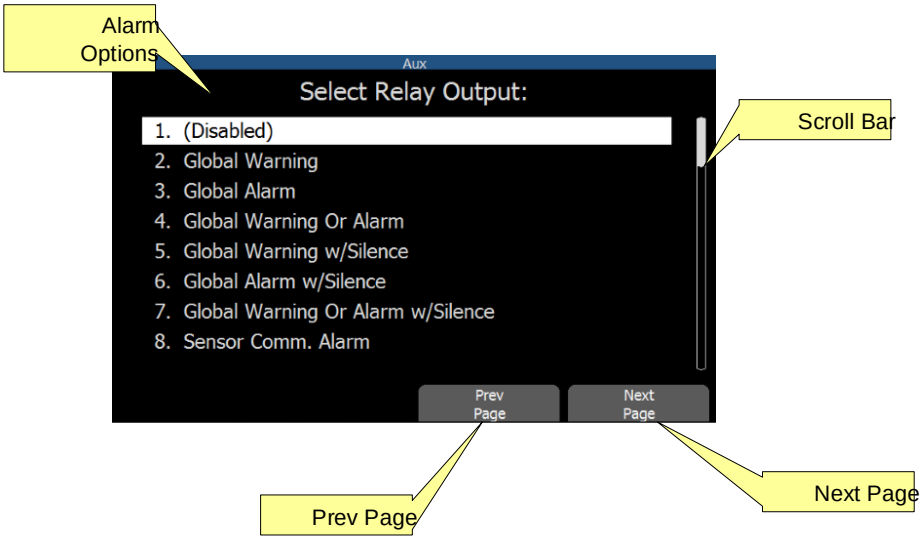


Figure 25 Relay Event Setup

Feature	Description
Scroll Bar	The scroll bar is used to show that there are multiple screens of data.
Previous Screen	The Previous Screen Hotkey reverts to the previous data screen
Next Screen	The Next Screen Hotkey moves to the next data screen.
Alarm Options	The Relay Options list shows the list of events that the relay can be connected to. The Options can be selected by pressing the list number of scrolling through the list and selecting enter on the Keyboard.

If the condition only is selected the relay will remain active while the condition exists. If the condition with bypass is selected the relay will be active if the condition exists and is not bypassed in the alarm menu. If the condition with silence is selected the relay will be active if the condition exists and the user has no silenced the alarm on the screen.

5.2.4.5 Date and Time Setup

The Menu Date and Time Setup page is used to set the data and time for the system. The date and time information is used for data and event logging. The date and time needs to be setup after each power cycle. The Date and Time page are described in figure 34.

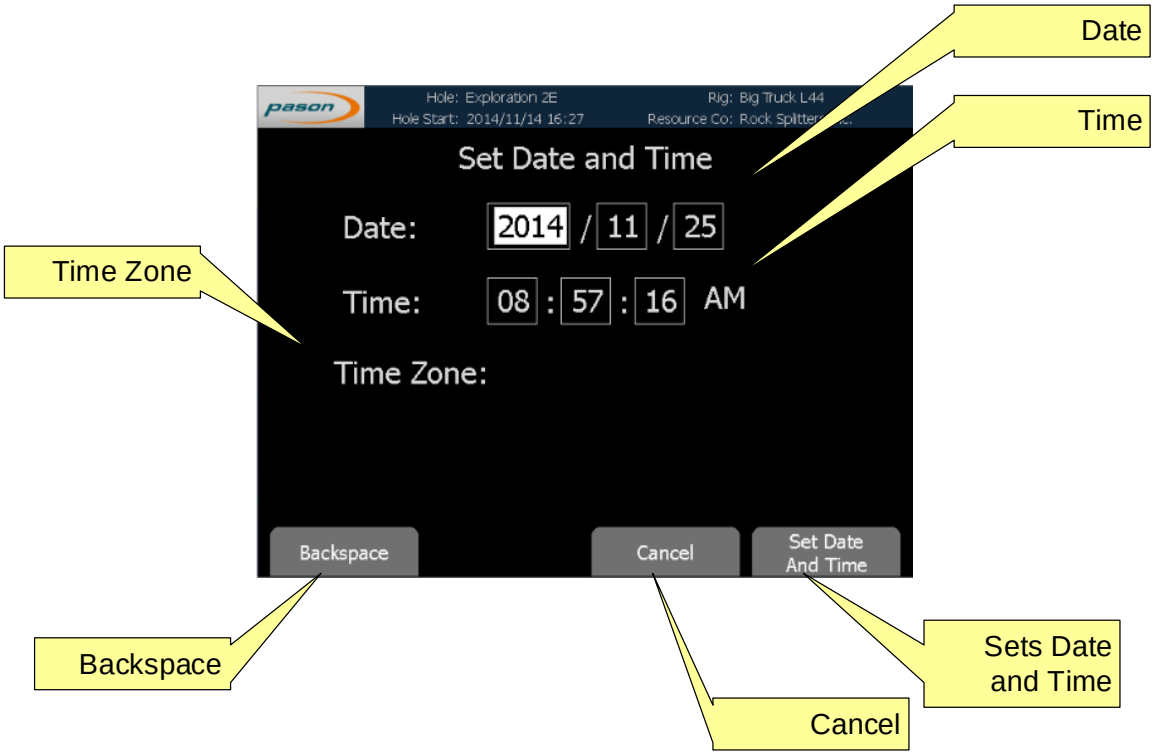


Figure 26 Date and Time

Feature	Description
Date	The date fields are used to set the date for the system.
Time	The time field is used to enter the time for the system.
Time Zone	The time zone field allows the user to select a time zone based on a list of available options.
Set Time and Date	The Set Time and Date Hotkey are used to set the current time

	and date for the system.
Cancel	Cancel backs the user out of the Time and Date Set up preserving the previously entered data.
Backspace	The Backspace is used to delete the character entered in reverse order

5.2.4.6 Web and FTP Access

The SD50LT supports both web services and FTP access to allow for more monitoring and data retrieval capability. The Web Server and FTP Server can be individually enabled or disabled depending on if the user needs the feature. The Web Server can also be set up with a password. Refer to the Web / FTP Server addendum for more information.

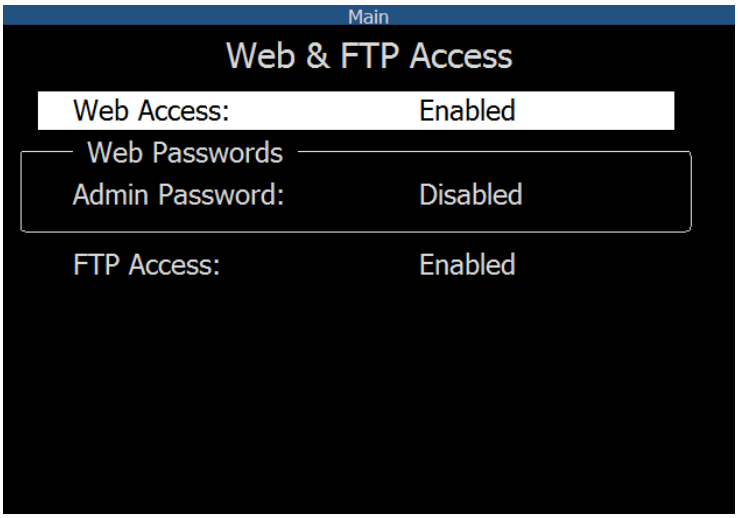


Figure 27 Web and FTP Access

5.2.4.7 Networking

The Ethernet Address Settings sets the Ethernet port settings for the SD50LT. The up and down arrow keys are used to select the desired field to change. The selected item

that is modified will be highlighted. Pressing the Esc key clears the entire field. Pressing the Enter key accepts the value in the text box. If the Esc Key is pressed while not modifying a field the screen will move up one level in the menu.

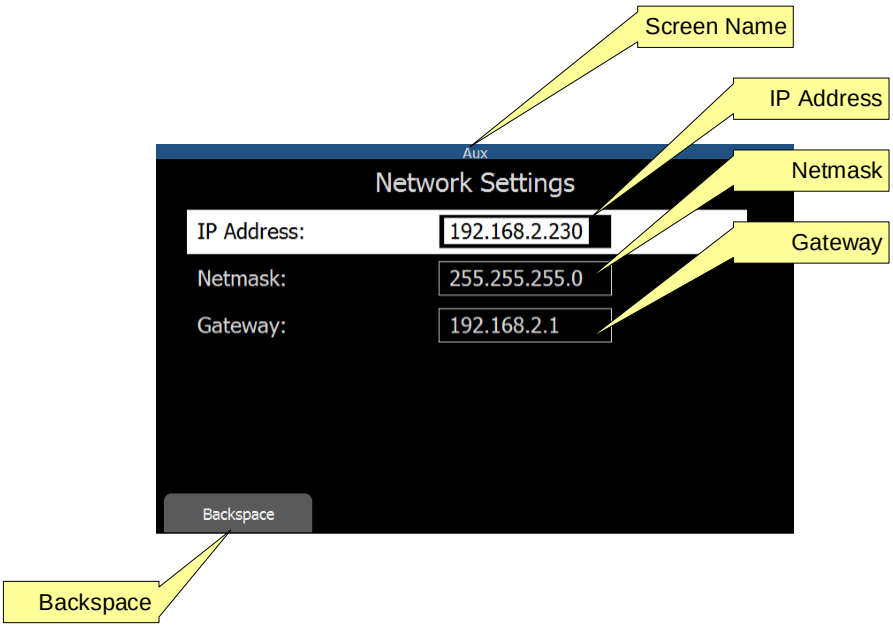


Figure 28 Ethernet Settings

Feature	Description
IP Address	Displays the network address
Netmask	Displays the Netmask
Gateway	Displays the Gateway
FTP Access	The FTP Access function is an enable or disable for the FTP server access. The FTP server allows for read only access of the system configuration and log file information.
Backspace	The Backspace is used to delete the character entered in reverse order

5.2.4.8 Security Settings

The SD50LT has a robust security system to protect the configuration of the unit. The SD50LT supports a single user password that allows the user to log into the system critical pages such as Alarms, Calibration and Systems Setup. Figure 29 shows the first security screen seen on a fresh unit. Once enabled the user can configure security options or change passwords.

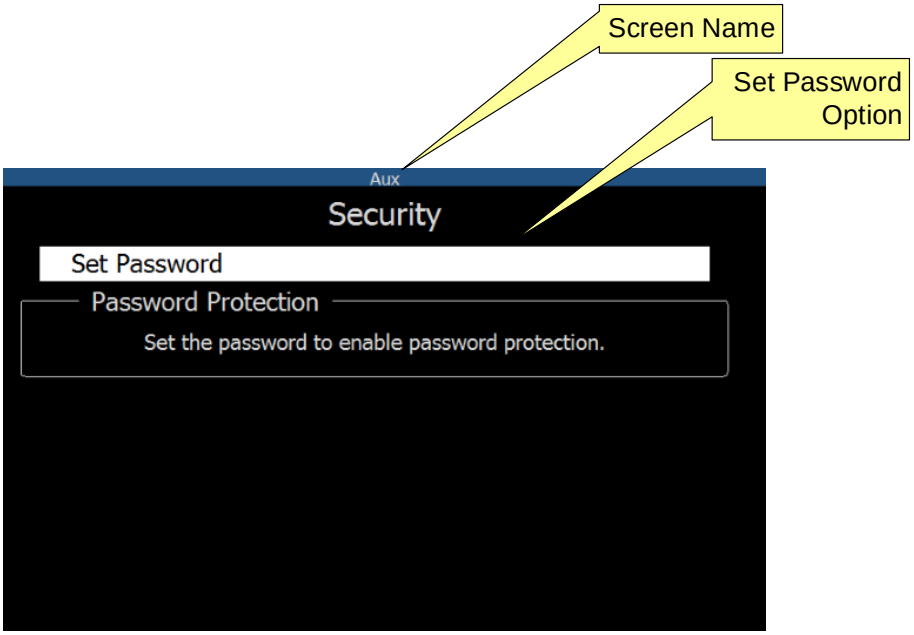


Figure 29 Initial Password Security Screen

Feature	Description
Set Password	The Set Password menu option allow for menu based multi-level security. Designed for simplicity it allows the user to select which items to protect.

When setting a new password for the first time the password must be entered twice. The password must be a minimum of 4 characters and a maximum of 6 characters. Once the Password is confirmed, accepting the password overwrites the existing password.

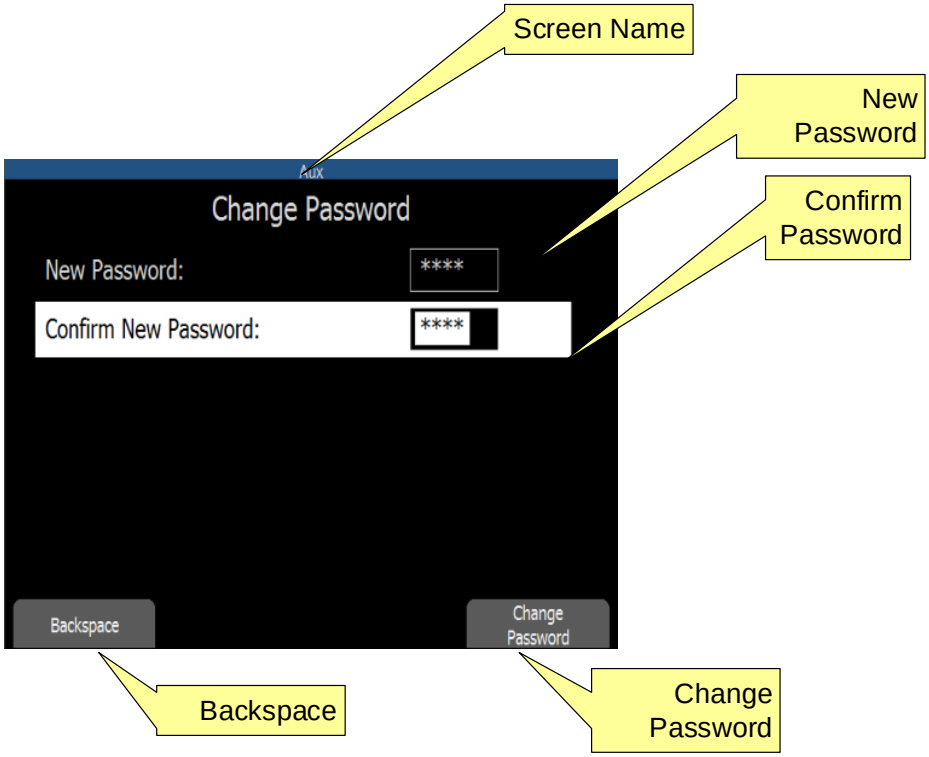


Figure 30 Initial Password Setup

Feature	Description
New Password	In the Initial Password Setup page the New Password field is used to set the new system password.
Confirm Password	Once a new password had been selected the next step is to confirm the password
Accept	Once the page information is entered the Change Password Hotkey saves the changes.
Backspace	The Backspace is used to delete the character entered in reverse order

When returning to the Security page after initial setup the page will be similar to the image outlined in figure 31. From this page the user can change passwords or set

individual security options for the SD50LT. The options are modified using the up and down arrow keys and the enter key will toggle the setting.

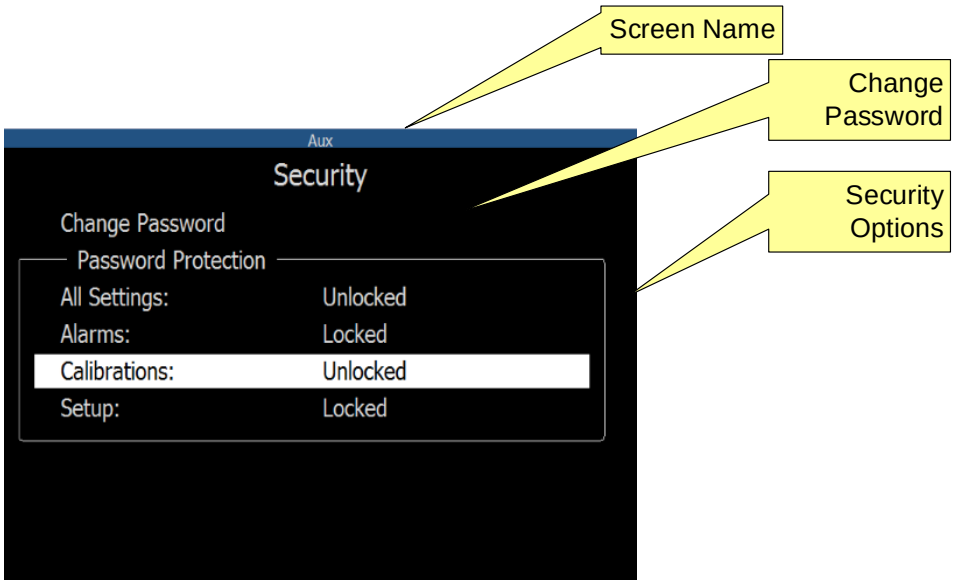


Figure 31 Security Options

Feature	Description
Change Password	The change option feature allows the user to modify the system password.
Security Options	The alarms, calibration, and setup menus are password protected. The options can open or you can select which of these features have password protection.

The password must be a minimum of 4 characters and a maximum of 6 characters. Once the Password is accepted, the new password overwrites the existing password. The change password screen is shown in figure 32.

When changing the SD50LT password following steps should be followed:

1. Enter the current password
2. Enter the new password
3. Confirm the new password
4. Press change password hotkey.

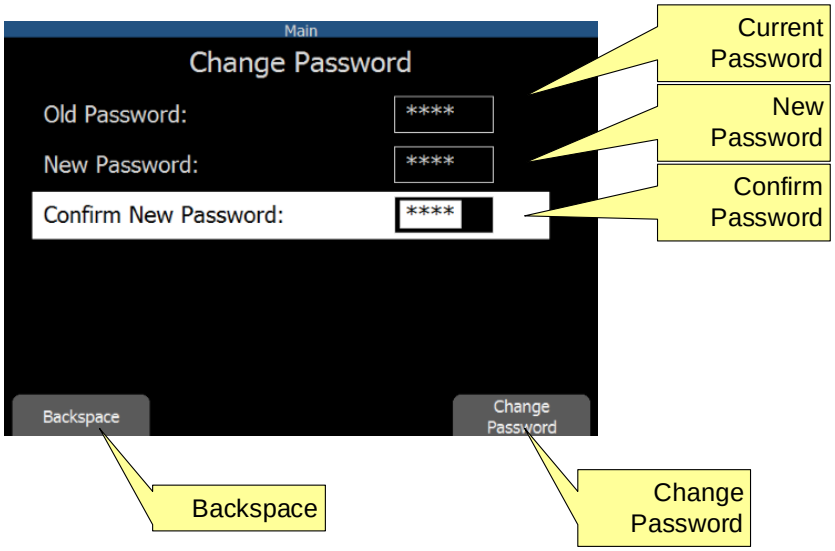


Figure 32 Change Password

Feature	Description
Current Password	Text field for current password.
New Password	Text field for entering new password.
Confirm Password	Text field for confirming new password
Change Password	Change Password Hotkey to save changes.
Backspace	The Backspace is used to delete the character entered in reverse order

When the password change is successful the following screen will be seen.

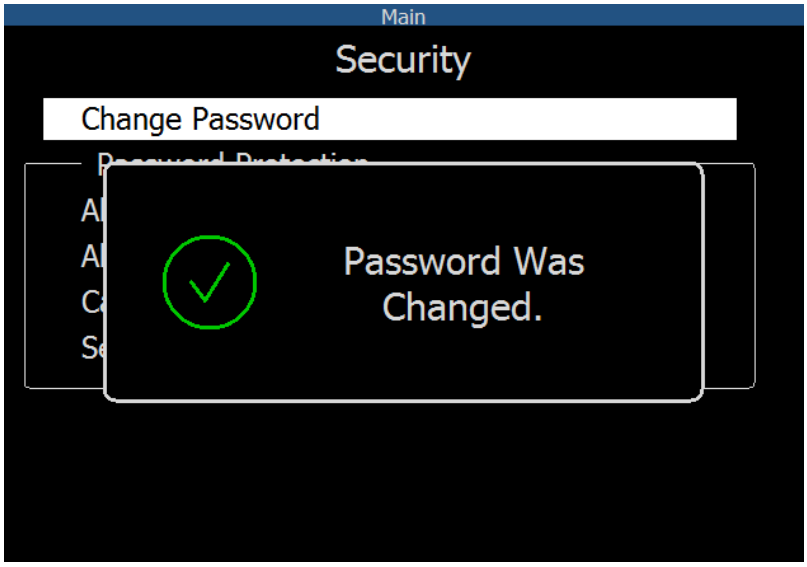


Figure 33 Password Change Successful

If a password is entered incorrectly a popup will notify the operator to renter the password.

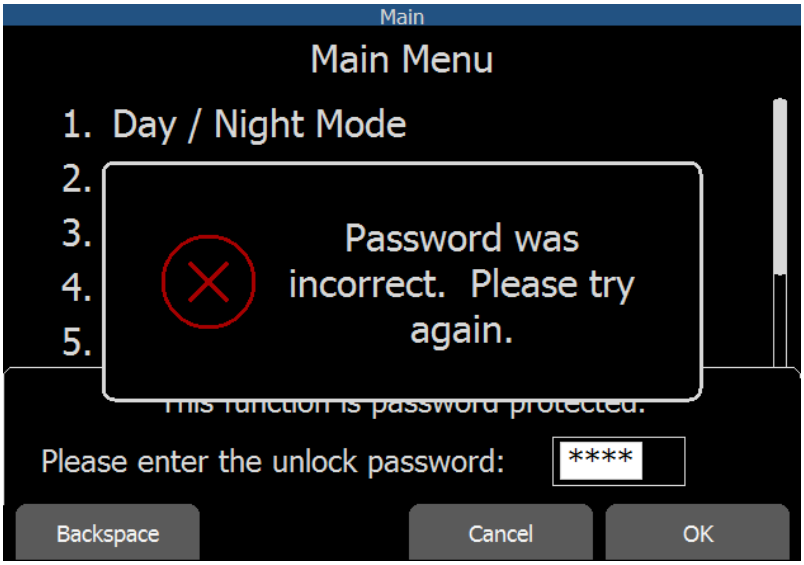


Figure 34 Incorrect Password Entry

5.2.5 Load / Save

The Load / Save menu option allows the user to perform several operations to move information to and from the SD50LT including data and programming information.

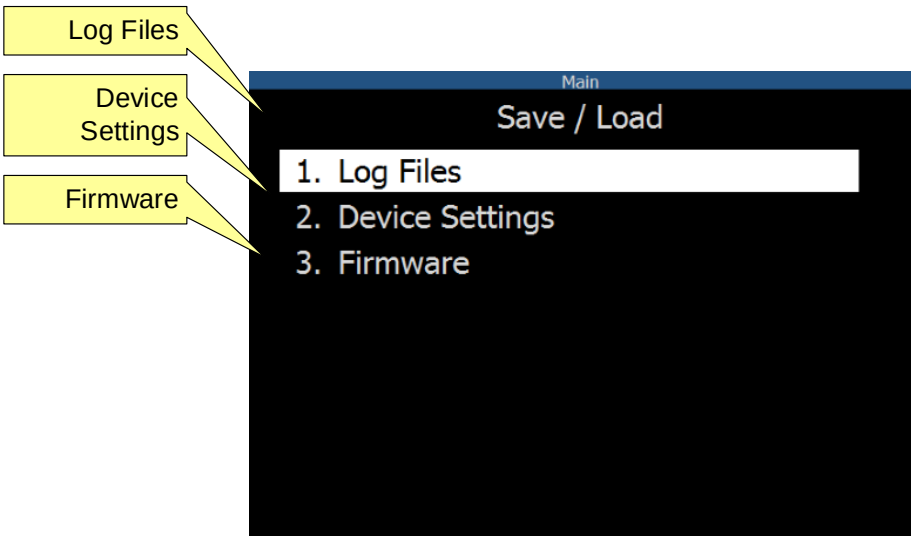


Figure 35 Save / Load Screen

Feature	Description
Save Log Files	The Save Log Files selection allows the user to select a start and stop period for archiving data to a USB Stick. This option is only available if the USB option is installed on the SD50LT and a recognized USB drive is installed.
Save Device Settings	The Save Device Settings Options allows the user to create a backup file of the system's configuration, user settings and calibration data. The data may be backed up to either the internal SD card or an external USB Stick.
Load Device Settings	The Load Device Settings Options allows the user to restore a backup file of the systems configuration, user settings and or calibration data. The data may be loaded from either the internal SD card or an external USB Stick.

Restore Factory Settings	The Restore Factory Settings option clears the Calibration and User setting for the system. Selecting this option will erase all user entered settings and will require the user to reenter the system setup.
Update Firmware	The Update firmware option allows the user to update the SD50LT application over USB. The update process is completed using the prompts from the screen.

Note: Utilizing these features may change the operation of the SD50LT. Caution should be taken when using any of these menu items.

5.2.5.1 Log Files

The Log Files selection searches for USB media and allows the user to export log files. The process is self-guided and is only allowed if a USB stick is detected.

5.2.5.2 Device Settings

The Device Settings options allows the operator to save, load or delete user settings. On selection, the SD50LT searches for media, such as an SD card or USB stick, to modify settings. If saving settings, the SD50LT will save a time stamped zip file to the selected media. If loading settings, the SD50LT will guide the user through selecting a file and uploading new information to the device. The Delete option deletes all user settings including passwords from the device.

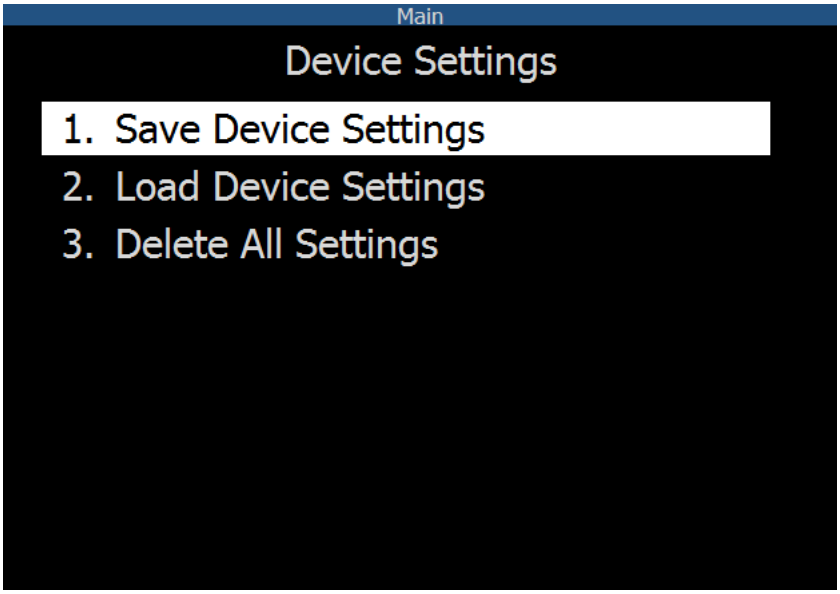


Figure 36 Device Settings

5.2.5.3 Firmware

The Firmware option allows the user to upload new firmware over USB. The SD50LT will detect the USB drive and show and firmware files available for upload. The self-guided process will walk the user through the upgrade.

5.2.6 Diagnostics

The Diagnostics screen provides details that are useful to trouble shoot the SD50LT. The Version information provides part and serial number information as well as software version information. The View Data Values screen provides sensor input data. Figure 37 is an illustration of the diagnostics screen.

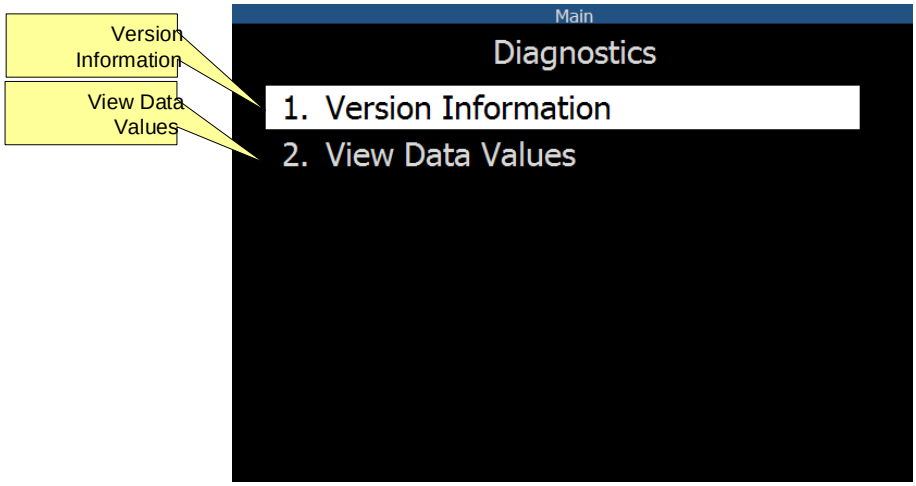


Figure 37 Diagnostic Menu

Feature	Description
Version Information	The Version Information option provides details on the SD50LT product part number and software control.
View Data	The View Data Values option provides details on sensor inputs into the

values.	SD50LT.

5.2.6.1 Version Information

The Version Information Screen provides system version information. This may include the operating system version, system part number, SD50LT model number, Serial number and a build code. This information is critical to perform upgrades and trouble shooting. Figure 38 illustrates the version screen.

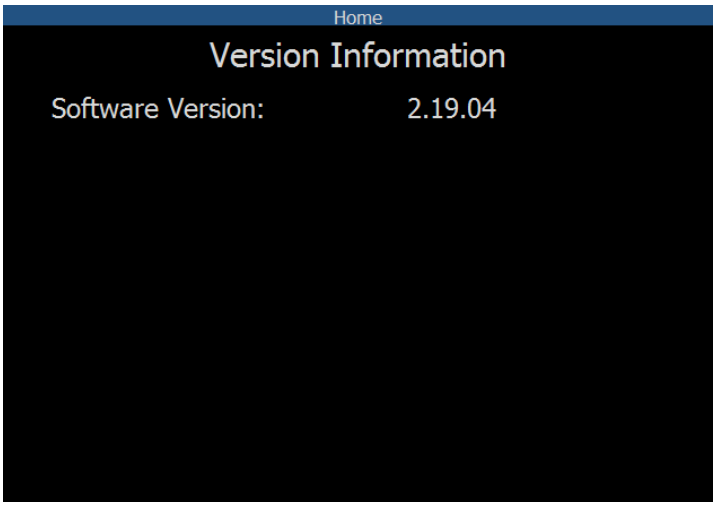


Figure 38 Version Information

5.2.6.2 View Data Values

The View Date Values Screen displays all of the data values that are available in the configuration. An example of the data values screen is shown in figure 39.

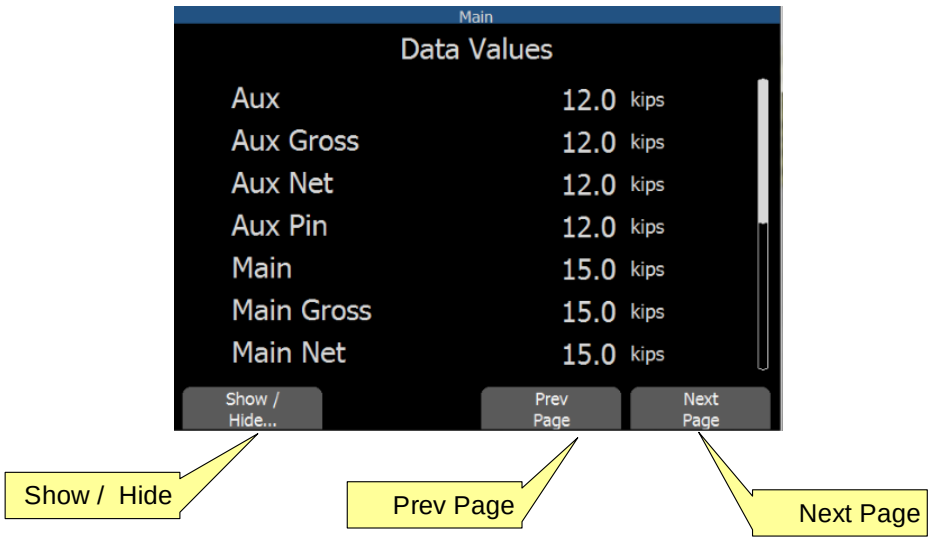


Figure 39 Raw Data Values

Feature	Description
Show / Hide	The Show Hide Hotkey will either show or hide all data values.
Page Up	The Page Up Hotkey function is used to scroll through the menu option. This has the same function as the up and down arrow keys on a keyboard.
Page Down	The Page Down Hotkey function is used to scroll through the menu option. This has the same function as the up and down arrow keys on a keyboard.

6 Specifications

Environmental:

Operation Altitude:	≤ 1500M
Operation Temperature:	-20 to +65°C
Storage Temperature:	-40 to +85°C
Enclosure Rating	None

Electrical:

Supply Voltage (See Note 1.)	10.5 – 28.0 VDC
Supply Current	1.2A max
Transient Voltage Protection	
Reverse Polarity Protection	
RFI Filtered	

Note 2 Current does not include power required by sensors or other items connected to the SD50LT-DAQ

Mechanical:

Enclosure dimensions	8.2″w x5.6″h x 3.8″d
Materials	Steel
Polycarbonate Lens	1/8″ (3.2 mm) Thick
Weight	~3 lbs

Reference A – Option Matrix

The part number matrix below outlines the part number configuration for the SD50LT. It has configurable options that can be selected at the time of ordering and will drive the build configuration.

SD50LT-DAQ-001	**SD50LT-DAQ with 4 Gb SD Card, Ethernet and USB.**

Figure 40 Configuration Options

Reference E – Warranty Requirements

3PS, Inc. (the "Company") warranties the products or parts it manufactures against defects in materials and workmanship as follows:

- For a period of 18 months from time of shipment, or 12 months from date of installation, whichever comes first and provided the products or parts have been paid for and stored, handled, installed and used under proper conditions.
- The Company's liability under this Warranty Policy shall extend to the repair or replacement of a defective product or part only, at the Company's option.
- All Warranty work is to be performed at the Company's facilities.
- Products or parts being returned under this Warranty Policy are to be returned freight prepaid to the Company, and the Company will return the product or part to the customer freight prepaid.
- No field service is included. Field service work can be performed at the rate published by the Company and in the Company's sole discretion.
- The Company reserves the right, in its sole discretion, to make all determinations as to whether or not work requested is covered by this Warranty Policy.
- The Company's liability will be no more than the amount the customer has paid for the product or part that is the subject of a claim. This is the maximum amount for which the Company is responsible.
- During the Warranty period, the Company will, at its sole discretion, repair or replace defective products or parts for the customer, or refund the amount paid for the product or part less depreciation, upon its return to the Company. The Company reserves the right to refund the purchase price as its exclusive Warranty remedy.
- The Company shall not be liable for and does not assume any responsibility for loss of business or any indirect, incidental, special or consequential damages suffered by the customer or any subsequent buyer.
- TO THE EXTENT PERMITTED BY LAW AND EXCEPT AS SET FORTH IN THIS WARRANTY POLICY, THE COMPANY DOES NOT MAKE, AND SHALL NOT BE DEEMED TO HAVE MADE, ANY OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, TO THE CUSTOMER OR BUYER OR ANY OTHER PERSON OR ENTITY REGARDING THE PRODUCT, PARTS OR ANY OTHER MATTER. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED REPRESENTATIONS AND WARRANTIES RELATING TO THE PRODUCT, PARTS OR ANY OTHER MATTER, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED REPRESENTATION OR WARRANTY AS TO THE QUALITY, MERCHANTABILITY, SUITABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE, OR NON-INFRINGEMENT OF OR WITH RESPECT TO THE PRODUCT OR PARTS, WHETHER USED ALONE OR IN COMBINATION WITH OTHER MATERIALS, PRODUCTS OR SUBSTANCES.
- The Warranties provided herein are not transferable.