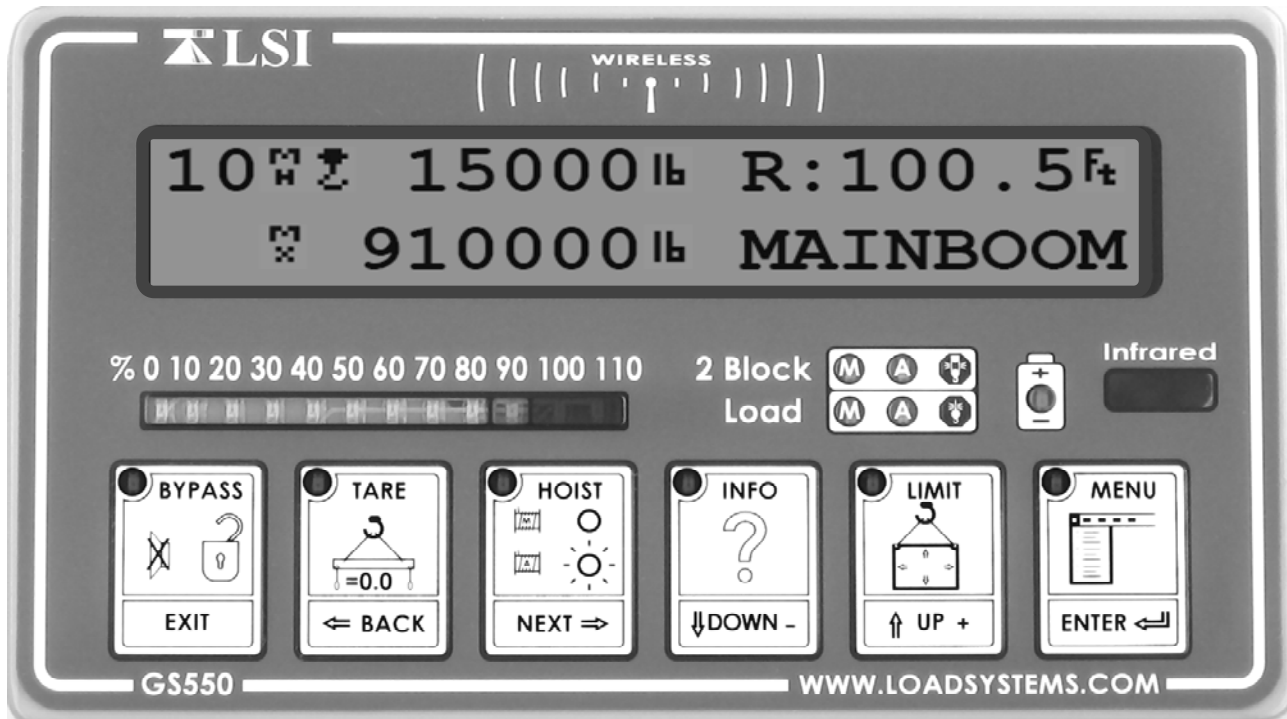Load Systems International

Master User's Manual

The GS550 System

Document Part Number GM550, Version 2004, Revision B

Engineered weighing solutions for crane and lifting application

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Master User's Manual Convention

Warning means that there is a possible danger. This action should be performed in order to meet the proper operation, and it is performed not to break the system. If this is not followed, some failures or breaks can occur. Also, to emphasize the word Warning, this word is preceded by the icon.

Important means that an important note is mentioned in order to catch the user's attention on the correct way to use or to maintain the system, that is to say Good Manufacturing Practices. This is icon-illustrated with.

Note means a notice or note to the installer in order to inform him or her about the installation, for example, or it reflects an informative statement on the product.

Tip is given in order to make the system easy-to-use or to ease the maintenance procedures. This is icon-illustrated with.

CE and ATEX Certifications

For information on CE and ATEX Certifications, please refer to sections relative on certification and declaration of conformity.

Safe Operation in Hazardous Area

For information on Safe Operation Hazardous Area, refer to the Safe Operation Hazardous Area sub-section.

Equipment Marking

The *Equipment Marking* section describes regulations or standards used.

Warning!

This device is intended as an operator aid only and is not a substitute for safe operating practices. Read the Master User's Manual.

Test before every use.

1.   Introduction

1.1 Overview

The GS550 system includes the cabin mounted GS550 radio display and compatible crane mounted sensors. The GS550 creates a two-way radio network with the sensors to bring required lift data to the operator. Hoist load, boom and jib angles, boom length, wind speed and pending two-block can be detected and indicated to the operator in real time. Working load radius can be calculated and compared to a rated capacity chart (if programmed). Furthermore the GS550 can be programmed to generate warnings, alarms and lockout commands, all triggered by adjustable thresholds and limits. All these events can be recorded by the data logger with a time and date stamp. The exact operational function of the GS550 system depends on the sensor configuration used and the rated capacity charts programmed (where applicable). The GS550 includes an infrared port to facilitate software and chart updates and data logger downloads using a compatible personal digital assistant (PDA) or cell phone. Compatible sensors include the GS050 anti-two-block, the GC series load cells and GS001 series line rider and load pin transmitters, the GS010 angle sensors, the GS011 angle sensor and length transmitter and the GS020 wind speed sensor. The GS550 system is designed as an operator aide and is in no way a substitute for safe operating practice

1.2 Version Compatibility (applies for produced manufactured prior to June 2007)

GS series product with version 2 firmware is not compatible with GS series product with version 1 firmware. For information on upgrading GS series product from version 1 to version 2 firmwares please contact LSI.

1.3 Start-Up

The GS550 (see Figure 1) must be correctly programmed for the system sensors installed. The GS550 powers up with several green lights flashing, this indicates that the display is waking up programmed sensors and creating a radio communication link with each. Once a reliable radio communication network is established, all green lights will remain lit without flashing.

This process may take up to one minute. The delay is created by the battery management function and does not affect system security. If an anti-two-block switch detects a pending two-block event, if a load cell detects a change in load, or if an angle sensor detects a change in angle, the appropriate radio link will be established in less than 0.1 seconds. To immediately wake-up a load cell, lift the hook with a load; to immediately wake up an angle sensor, change the boom angle.

In special conditions of lockout created by a missing sensor, you may press the **BYPASS** button to allow the system to work. When rigging the crane, out of normal capacity chart condition could create annoying alarms, and the display could then be put in 'rigging mode'. If the rig mode is enabled in the display, press **BYPASS** for 10 seconds to activate it. If the rig mode is not available, contact your *LSI* representative or *LSI* technical support (p. 75).
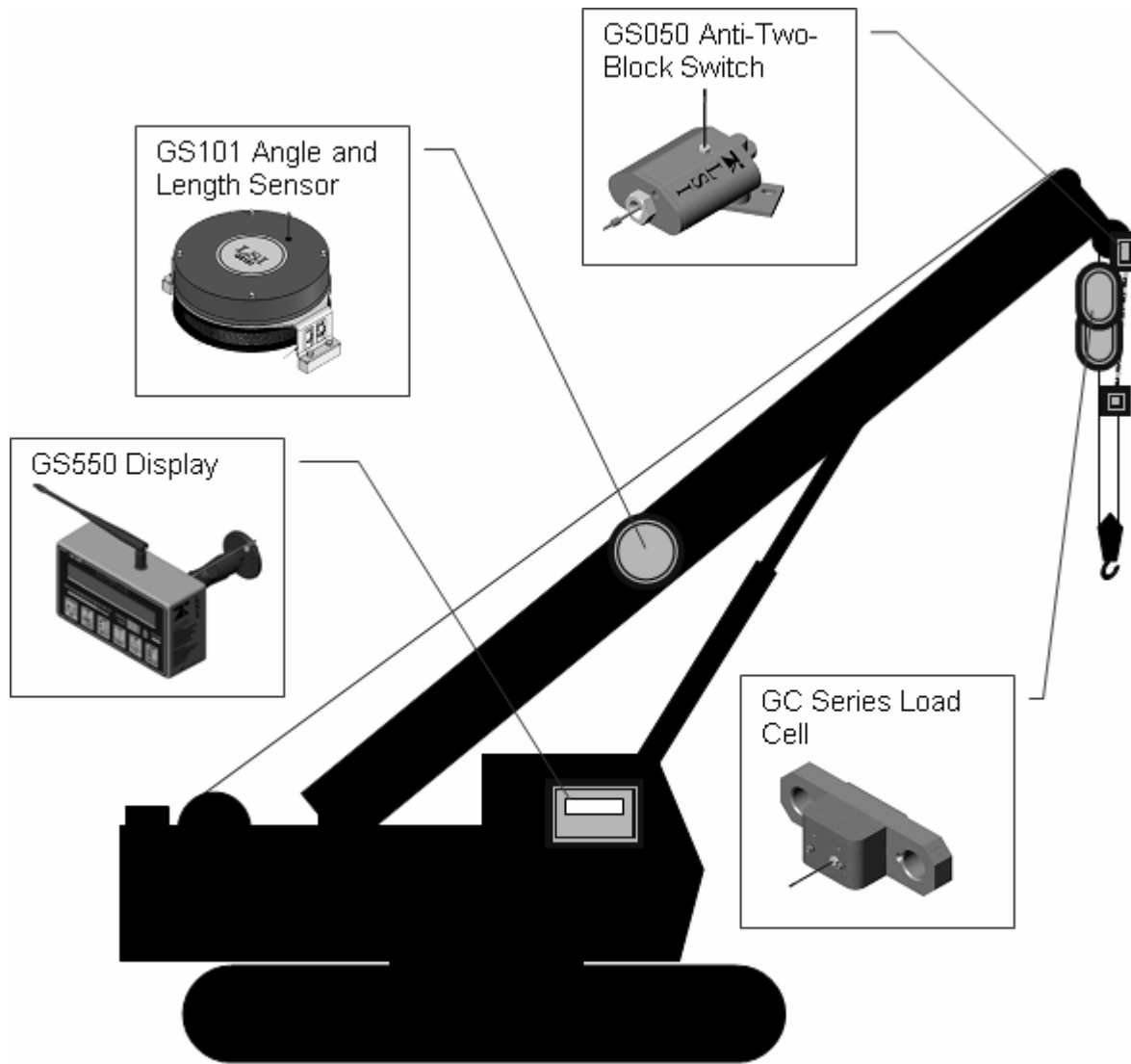
Figure 1 Key Components In A Typical System

2. Operation

2.1 Display GS550

The GS550 displays detailed information on the backlit, two lines liquid crystal display (LCD) (see Figures 2 and 3). Additional information including warnings, alarms, and radio status is communicated by the display lights and the display buzzer.
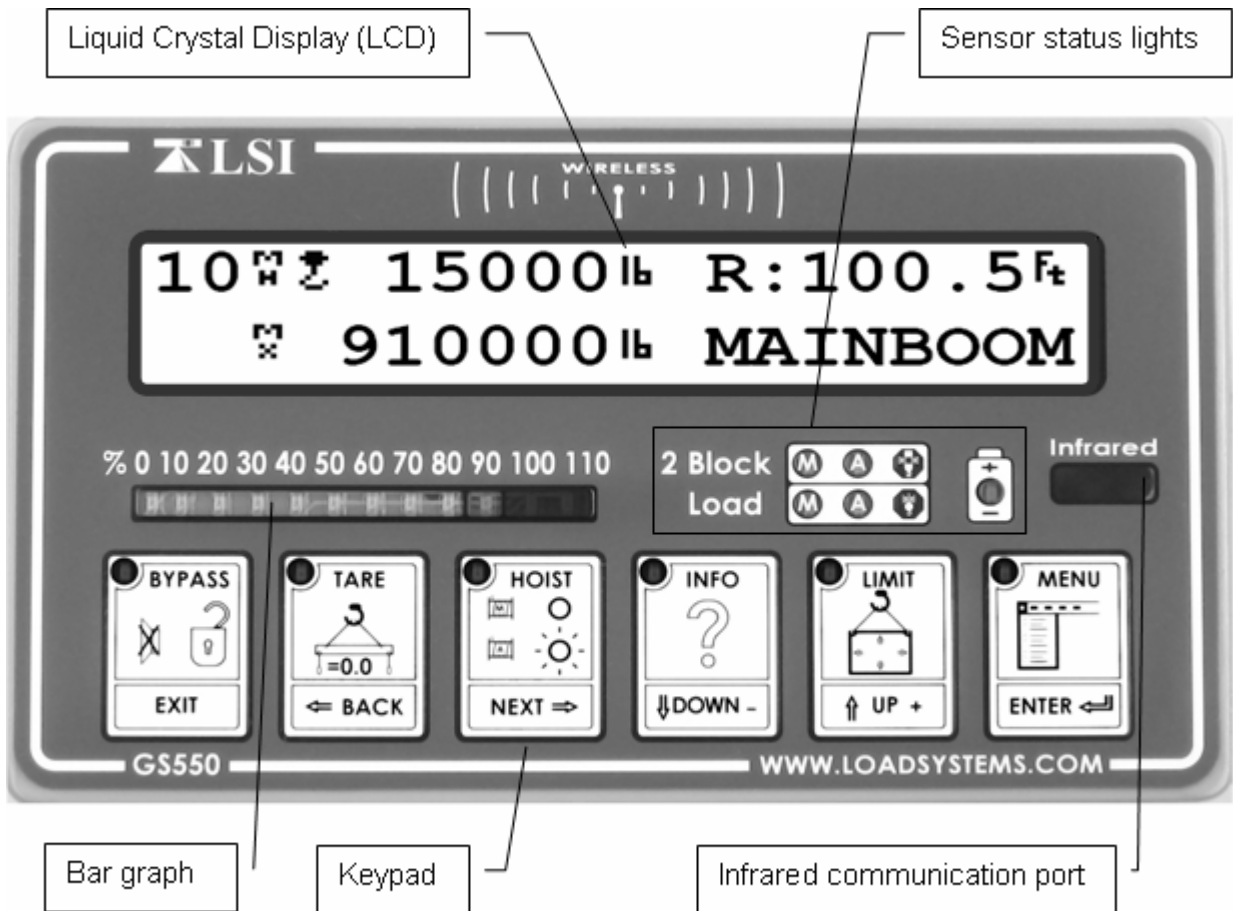
Figure 2 GS550 Front View
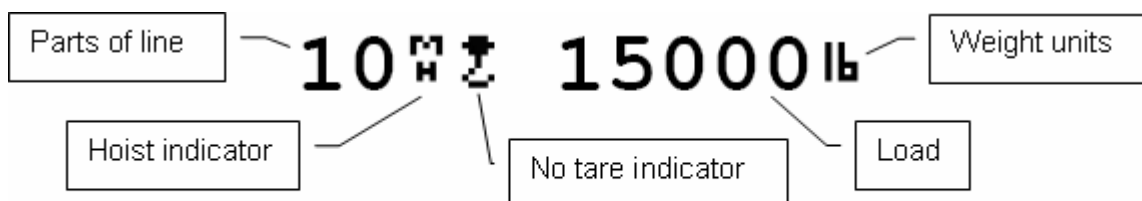
Figure 3 GS550 Load Display

2.1.1 Liquid Crystal Display

Detailed lift data and system information is displayed here. The liquid crystal display (LCD) can be adjusted to facilitate viewing in varied lighting conditions. See the 2.4 Display Settings section of this manual.

2.1.2 Sensor Status Lights

Detailed lift data and system information is displayed here. The liquid crystal display (LCD) can be adjusted to facilitate viewing in varied lighting conditions.

2 Block. The red 2 Block alarm light comes on when a programmed anti-two-block switch is in alarm.

The green "M" (main) and "A" (auxiliary) anti-two-block radio status lights stay on when the GS550 has a reliable radio communication link to all programmed anti-two-block sensors. The radio status lights flash green when communication is intermittent or absent. The M refers to the first anti-two-block sensor programmed in the sensor list. The A refers to all other anti-two-block sensors programmed in the sensor list.

Load. The red Load alarm light comes on when a load sensor is in overload.

The green "M" (main) and "A" (auxiliary) load radio status green lights stay on when the GS550 has a reliable radio communication link to all programmed sensors. The radio status lights flash green when communication is intermittent or absent. The M refers to the first sensor programmed in the sensor list except anti-two-block. The A refers to all other sensors programmed in the sensor list except anti-two-block.

Low Battery. The amber light of the battery icon comes on when battery life for a sensor programmed in the sensor list drops below 10%. Normally several weeks of battery life remains from the moment the low battery light first comes on.

Bar Graph. The bar graph displays the gross load lifted by a load sensor as a proportion of the maximum load allowed, expressed in 10% increments. Maximum load is the lowest of the operator set maximum load limit and the working load limit (WLL) as calculated from the rated capacity charts*. When there are two or more load sensors programmed in the sensor list the bar graph will indicate the load for the sensor closest to its maximum allowable.

2.1.3 Infrared Port

The infrared port is used to download data from the data logger or to upload firmware updates and capacity charts using a GT103 portable download tool or other compatible device.

2.1.4 Keypad

The keypad consists of six buttons used to control, consult, program, and troubleshoot the GS550 display and system. Each button has two functions; a primary function for the operation display, and a secondary function for menu navigation and programming. The secondary functions are described in the 2.2.2 Menu Navigation sub-section of this manual. The primary functions are described below.

** **WLL is indicated by rated capacity indicators only.**

BYPASS. Press **BYPASS** to override lockout for emergency purposes*. The alarm will remain silent until the next alarm; lockout will re-engage as soon as the button is released.
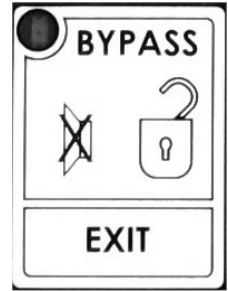
TARE. Zero the hook and rigging weight.

1. Press **TARE** to enter the tare menu.
2. Use **Next** to select the load sensor.
3. If no tare value, then press **Tare** to create a tare value equal to the weight on the load sensor. Example: with hook block and rigging only. Load display is net weight (gross weight minus tare value).
4. To remove tare value, press **Tare**.
5. Press **Exit** to return to the operation display.
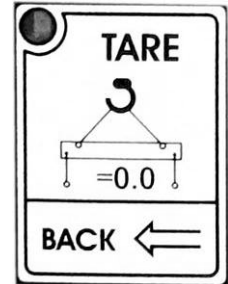
Tare and Load Indication

	LCD Indicator	Tare Light	LCD Load Value	Bar Graph
No tare value		Off	Gross weight	Gross weight
Tare value		On	Net weight	Gross weight

Tare. Zero rope payout (length).

- Press **Tare** to enter the tare menu.
- Use **Next** to advance to the rope payout sensor.
- Press **Enter** to zero rope payout length. The new zero will be saved by the rope payout sensor.
- Press **Exit** to return to the operation display.

```
Sensor No 2ropePayou
Enter -> set zero
```
```
Communicating with
remote sensor
```
```
New rope payout zero
saved in sensor
```
```
Sensor No 2ropePayou
Enter -> set zero
```
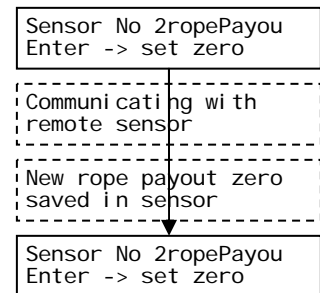
Hoist. Press **Hoist** to change the operating display page. The exact order and content of operation display pages depends on system sensor and capacity chart configuration. Systems with more than one load sensor typically display main hoist load information on the first page and auxiliary hoist load information on the second page.

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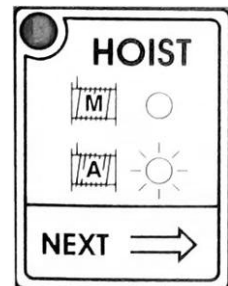
* **This applies only if the GS550 has been correctly installed to control crane lockout function.**

Info. When the orange **Info** light flashes press **Info** to see critical system alerts. Press **Next** to advance from one page to the next.

Standard info menu pages include:

- BIOS (Binary Input Output System) number and version
- Firmware number and version
- Chart number and version (if available)
- SPKG (Software Package) number

Alert	Description
`Load       id: G15000` `Sensor maximum limit`	The sensor indicates a value greater than the operator adjusted limit ⚠️ **Warning!** **Do not operate the crane beyond the limits specified by the manufacturer.** • Verify operator adjusted limits in the limit menu.
`Load       id: G15000` `Sensor minimum limit`	The sensor indicates a value less than the operator adjusted limit ⚠️ **Warning!** **Do not operate the crane beyond the limits specified by the manufacturer.** • Verify operator adjusted limits in the limit menu.
`Load       id: G15000` `Sensor low battery`	Less than 10% of battery life remains in the sensor. • Schedule battery replacement for the next available opportunity. Typically several weeks of operation remain from the moment the sensor low battery warning is first triggered.
`Load       id: G15000` `No communication`	The display isn't receiving communication from the sensor. • Verify that the sensor id number programmed matches the id number of the sensor installed on the crane. Go to menu 5A1.
`Verify white wire` `(unexpected voltage)`	Voltage is detected on the lockout wire when in alarm[*]. With the standard relay configuration voltage should not be present on a lockout wire in alarm condition. • Verify the wire connection. Refer to the Power Supply and Wire Connection sub section of the Installation Manual.
`Verify white wire` `(shorted to ground)`	Voltage is not detected on the lockout wire when safe[†]. With the standard relay configuration voltage should be present on a lockout wire in safe condition. • Verify the wire is not shorted to ground. • Verify the wire is not connected directly to the valve coils; a relay should be installed between the wire and the valve coils. Refer to the Power Supply and Wire Connection sub section of the Installation Manual.
`Main` `Out of chart`	One or more primary conditions of the chart selected for the hoist is not met (example: telescopic boom length). • Verify the conditions of the selected rated capacity chart.

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[*] **If the lockout relay is inverted this alert will occur when voltage is detected on the wire when safe.**
[†] **If the lockout relay is inverted this alert will occur when voltage is not detected on the wire in alarm.**

Main `angle` `above chart maximum`	The boom or jib angle is above the maximum angle permitted by the selected chart. (For charts determined by radius only this message will occur when the radius is less than the minimum radius permitted by the chart). • Verify the boom and jib angles permitted by the rated capacity chart selected.
Main `angle` `below chart minimum`	The boom or jib angle is under the minimum angle permitted by the selected chart. (For charts determined by radius only this message will occur when the radius is greater than the maximum radius permitted by the chart). • Verify the boom and jib angles permitted by the rated capacity chart selected.

Table 1 Information Menu Alerts

Limit. Set hoist limits.

Press **Limit** to access the limit menu. The limit menu displays the limits for each sensor in the sensor list on successive pages.

Use **Next** to scroll from one limit to the next.

Use **Up** and **Down** to adjust a limit.

When using the GS550 as a load indicator without programmed crane specific rated capacity charts the load limit is typically set to the lesser of the rope limit, the hoist limit, and the maximum allowed capacity as determined from the capacity charts.

When using the GS550 as a rated capacity indicator with programmed crane specific rated capacity charts the load limit is typically set to the lesser of the rope limit and the hoist limit.
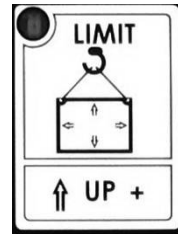
Tip

1. Press Up and Down simultaneously to return a limit to the factory default setting. The factory default maximum limit for load sensors is 10 000 lb per part of line.

2. When the weight units are tons the minimum load limit increment is 0.1 ton per part of line.

Menu. Press **Menu** to access the five basic system menus:

1) Parts of Lines

2) Crane Rigging

3) Display Settings

4) Installation

5) System Diagnostic
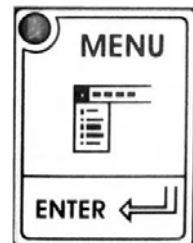
2.2 Menu System

There are five basic menus (level one) used to program, consult and control the GS550 system.

     1) Parts of Lines
     2) Crane Rigging
     3) Display Settings
     4) Installation
     5) System Diagnostic

The basic menus include nested sub-menus (level two, three and four) designed to address specific tasks including adjusting values, choosing from lists and following "wizards" through step by step processes.

2.2.1 Menu Numbers

Menus are identified by a number in the upper left corner (see Figure 4). The basic menus (level one) are numbered one through five. Level two menus are lettered alphabetically. Level three menus are numbered. Level four menus are alphabetized.
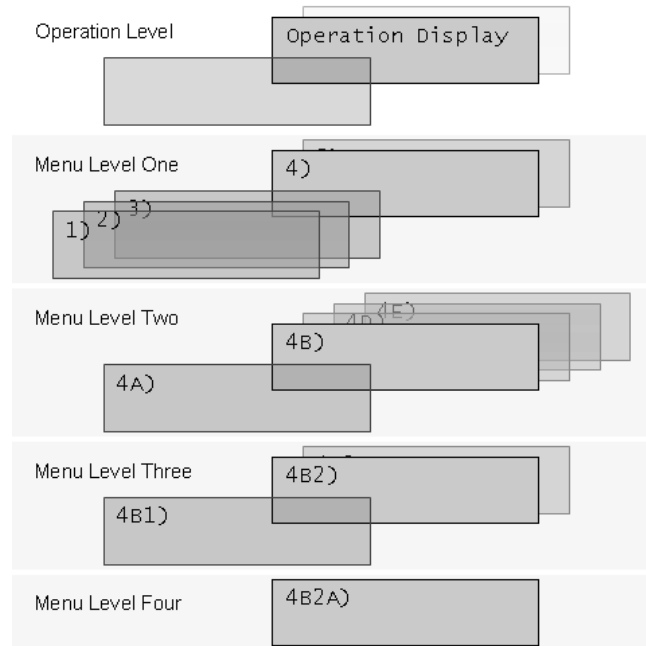
Figure 4 Menu Levels

2.2.2 Menu Navigation

From the operation display press **Menu** (see Figure 5) to see the five basic menus (level one). Press **Enter** to drill down one level and enter a selected menu. Press **Exit** to leave a menu and return up one level. Press **Next** to move to the next page within a menu; press **Back** to move to the previous page within a menu. Use **Up** and **Down** to modify numeric values and to move through a list of choices.

🔅 **Tip**

1. Most menus are circular; press Next **on the last page of a menu to return to the first page.**

2. Most lists are circular; press Down **on the last entry of a list to return to the first entry.**
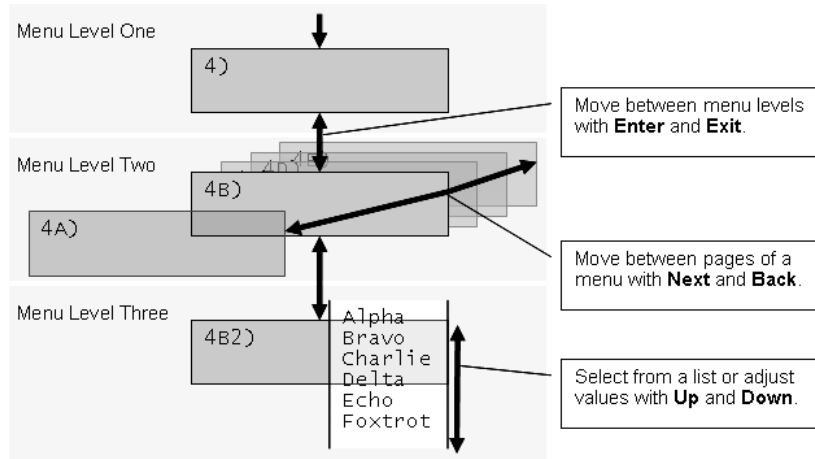
Figure 5 Menu Navigation

2.2.3 Password Protection

The submenus of menu 4) Installation are protected by a password by default. Password settings can be adjusted in menu 4H) Password Settings. The factory set administrator and user passwords are AZA. If the user password is forgotten, it can be changed as long as the administrator password is known.

Forgotten password? Call LSI technical support (Houston, TX) at 888 819 4355 or contact your local LSI representative.

2.2.4 Menu Layout

Figure 6 shows the menus accessible to the operator without password protection under the default factory settings.
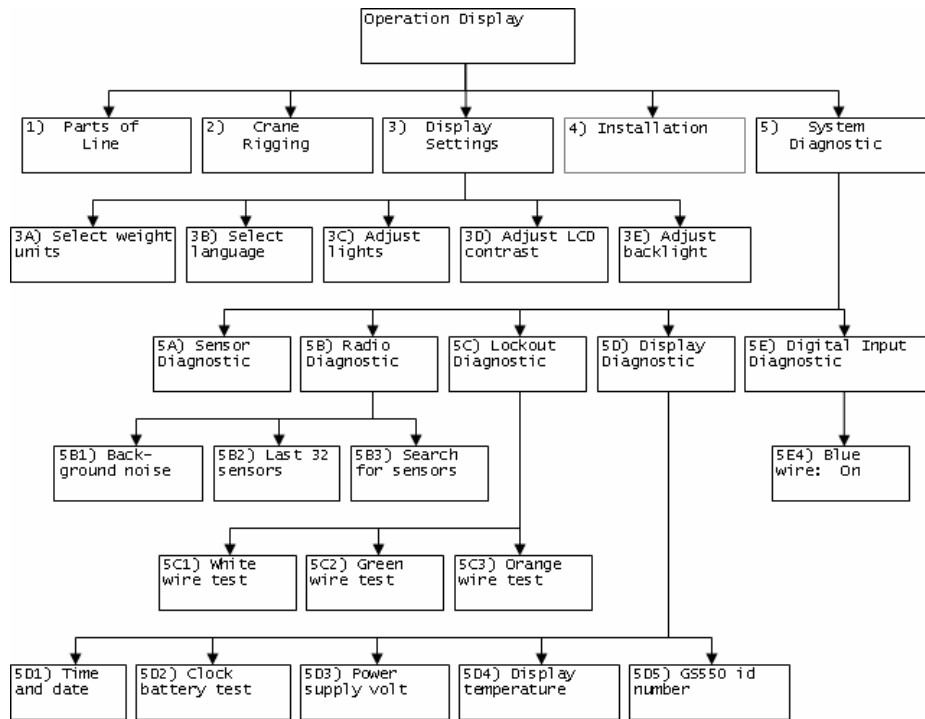
Figure 6 Open Access Menu: Default Factory Settings

2.2.5 Parts of Line

The load sensor often shares the weight with multiple parts of line. For accurate load indication the GS550 must be programmed for the number of parts of line.

1. Press **Menu** and **Enter** to enter menu 1) Parts of Line.
2. Use **Next** and **Back** to select the load sensor; typically sensor number one is associated with sheave one (the main hoist) and sensor number two is associated with sheave two (the auxiliary hoist) etc.
3. Use **Up** and **Down** to adjust the number of parts of line.
4. Press **Enter** to save any changes and then press **Exit** twice to return to the operation display.

2.3 Rated Capacity Indicators

The GS550 can be programmed to assist the operator by indicating the working load limit (WLL) from the crane specific rated capacity charts according to the angle and radius information received from the boom mounted sensors.

2.3.1 Display Programming

In order to indicate WLL the GS550 must be programmed with a valid rated capacity chart specific to the crane. The capacity chart programmed can be verified on the chart number page of the Information menu: press **Info** and **Next** twice (press **Exit** to return to the operation display). If the chart number information screen says "Chart not loaded" the GS550 has not been programmed to function as a rated capacity indicator. If rated capacity indication is required contact the person responsible for the GS550 system installation and maintenance. *If in doubt, contact LSI.*

2.3.2 Crane Rigging

Under no circumstances is the GS550 a substitute for safe operating practices. The operator must fully understand the crane rigging and the crane rated capacity chart to be able to correctly program the GS550 for rated capacity indication. The GS550 will not take into account critical variables such as weather, ground and crane conditions that will reduce the safe working capacity of the crane.

2.3.3 Chart Wizard

Rated capacity indication is based on interpretation of a selected capacity chart using boom angle and load radius. The chart must be selected by "rigging" the working hoist in the GS550; this is done by following the chart wizard in menu 2) Crane Rigging.

⚠ **Important!**

It is possible to leave the chart wizard at any time by pressing Bypass; the GS550 will display the message "Rigging ABORTED". Current capacity chart selection may have changed, possibly changing the rated capacity indicated by the GS550. Always complete the chart wizard all the way to the "Rigging ok" message before operating the crane.

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1. Press **Menu**, **Next**, and then **Enter** to start the chart wizard.
2. The first page of the chart wizard is generally "select hoist". Use **Up** and **Down** to select the hoist. If there is only one load sensor in the system select "main". With two or more load sensors in the system the main hoist is associated with the first load sensor in the sensor list; the auxiliary hoist is associated with the second sensor in the sensor list etc.
3. Press **Next** to advance to the next step of the chart wizard.
4. The steps that follow will depend on the size and complexity of the rated capacity chart itself. Typical steps include chart selection, outrigger / on rubber selection and boom length selection (lattice cranes only). Use **Up** and **Down** to select from the list of choices and then press **Next** to advance to the next step. For accurate rated capacity indication the rigging configuration selected in the chart wizard must reflect the actual rigging of the working sheave.
5. After the last step has been completed the GS550 will display "Rigging ok" and then it will return to the operation display. If a sensor required by the selected capacity chart is not a part of the system or has not established communication with the GS550, then the GS550 will display "sensor invalid".
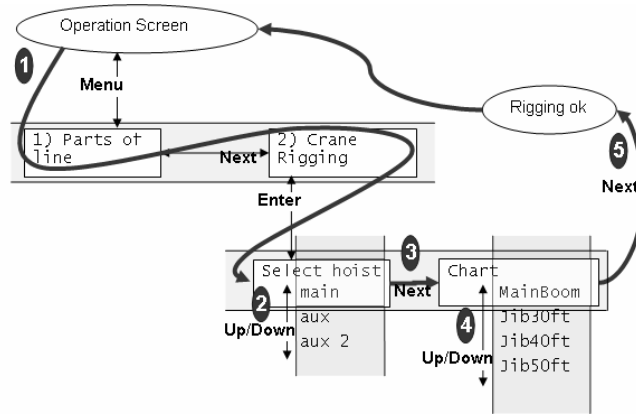
Figure 7 Chart Wizard: Steps 1 to 5 should be followed to select the capacity chart

2.4 Display Settings

Program the display for operator preferences in menu 3) Display Settings.

2.4.1 Weight Units

The weight units for load display may be selected according to operator preference. Length units are associated with weight units by default; see table 2.

1. Press **Menu**, and then **Next** twice.
2. Press **Enter** to go to menu 3A) Weight units.
3. Use **Up** and **Down** to select the weight units for load display.
4. Press **Next** to advance to the language adjustment page or press **Exit** twice to return to the operation display.

Unit	Notes	Equivalent Weight		Length Unit
Pound (lb)		1 lb	0.4536 kg	Foot (ft.)
Kilogram (kg)		2.205 lb	1 kg	Metre (m)
Short ton (T)	United States	2000 lb	907.2 kg	Foot (ft.)
Long ton (T)	United Kingdom	2240 lb	1016 kg	Foot (ft.)
Tonne (t)	International System (SI)	2205 lb	1000 kg	Metre (m)

Table 2 Weight Units

2.4.2 Language

Future versions of the GS550 will include different display language options.

5. Press **Menu**, and then **Next** twice.
6. Press **Enter**, and then **Next** twice to go to menu 3B) Display language.
7. Press **Up** and **Down** to change the display language

2.4.3 Light Intensity

Adjust the intensity off the LEDs (light emitting diodes) to facilitate viewing in bright sunlight or in reduced visibility.

8. Press **Menu**, and then **Next** twice.
1. Press **Enter**, and then **Next** twice to go to menu 3C) Light intensity adjustment.
2. Use **Up** and **Down** to adjust the intensity of the lights.
3. Press **Next** to advance to the contrast adjustment page or press **Exit** twice to return to the operation display.

2.4.4 Contrast

Adjust the LCD contrast to optimize visibility.

1. Press **Menu**, and then **Next** twice.
2. Press **Enter**, and then **Next** 3 times to go to menu 3D) LCD contrast adjustment.
3. Use **Up** and **Down** to adjust the display contrast.
4. Press **Next** to advance to the backlight adjustment page or press **Exit** twice to return to the operation display.

2.4.5 Backlight Mode

Adjust the LCD backlight control mode to conform to viewing and power supply conditions.

1. Press **Menu**, and then **Next** twice.
2. Press **Enter**, and then **Next** 4 times to go to menu 3E) Backlight mode.
3. Use **Up** and **Down** to select the backlight control mode. The LCD backlight can be always on, always off or on a four second timer. In the four second timer mode the backlight will come on for four seconds when any button is pressed.
4. Press **Next** to advance to the backlight adjustment page or press **Exit** twice to return to the operation display.

2.5 System Diagnostic

Diagnose system failures with the sub menus of menu 5) System Diagnostic.

2.5.1 System Sensors Diagnostic

1. Press **Menu**, **Back** and then **Enter** twice to go to menu 5A1).
2. Use **Back** and **Next** to select the sensor.
3. Press **Enter** to see sensor data (see Figure 8).
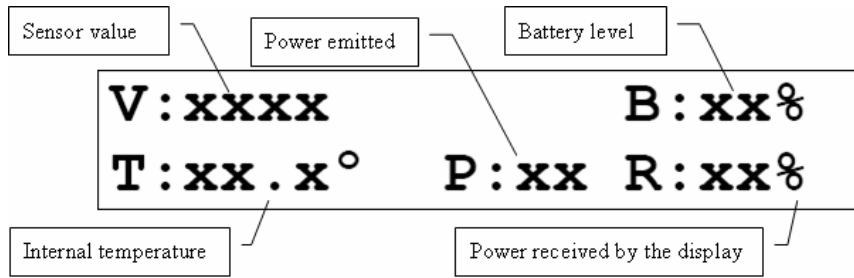
Figure 8 Sensor Diagnostic Data

4. Press **Enter** to get the sensor firmware product and version numbers (see Figure 9).
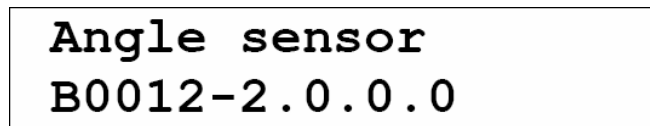
Figure 9 Sensor Firmware Product And Version Numbers

5. Press **Exit** five times to return to the operation display.

2.5.2 Radio Network Diagnostic

1. Press **Menu** and **Back**.
2. Press **Enter**, **Next**, and then **Enter** to go to menu 5B1) Radio network background noise.

⚠ **Warning!**

The "list of last 32 sensors received" includes all functioning GS series sensors within range. Programming a GS550 display for sensors from a different system will disable that system and render indication by both systems inaccurate.

---

3. Press **Next** to go to menu 5B2) List last 32 sensors received.
    a. Press **Enter** to access 5B21), the list of the last 32 sensors received. Sensors are shown with their radio id number and the sensor type.
    b. Use **Up** and **Down** to scroll through the list.
    c. Press **Exit** to return to menu 5B2)
4. Press **Next** to go to menu 5B3) Search for sensors.
    a. Press **Enter** to launch a sensor search. After searching, the display automatically re-verts to 5B21), the list of the last 32 sensors received (see step 3.a).
5. Press **Next** to go to menu 5B4) Bit error rate communication test. This test should only be conducted by LSI technical service personnel.
6. Press **Exit** three times to return to the operation display.

2.5.3 Lockout Diagnostic

1. Press **Menu** and **Back**.

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2. Press **Enter**, **Next** twice, and then **Enter** to go to menu 5C1) White wire… The page shows the lockout condition of the output (alarm or safe) and the self-test (pass or fail). To temporarily invert the lockout relay press **Up** or **Down**.

3. Press **Next** to go to menu 5C2) Green wire diagnostic.

4. Press **Next** to go to menu 5C3) Orange wire diagnostic.

5. Press **Exit** three times to return to the operation display.

2.5.4 Display Diagnostic

7. Press **Menu** and **Back**.

1. Press **Enter**, **Next** three times, and then **Enter** to go to menu 5D1) Time and Date. The page shows the current time and date according to the GS550 internal clock.

2. Press **Next** to go to menu 5D2) Time clock battery. Self-test pass or fail.

3. Press **Next** to go to menu 5D3) External power voltage.

4. Press **Next** to go to menu 5D4) Display internal temperature.

5. Press **Next** to go to menu 5D5) GS550 base station id. The base station id should be the same as the GS550 display serial number printed on the left side of the box

6. GS550-03 portable displays only: press **Next** to go to menu 5D6) Battery level. The battery level of the onboard rechargeable battery pack is indicated.

7. Press **Next** to go to menu 5D7) Radio. FCC, IC indicates Federal Communications Commission (U.S.A.) and Industry Canada certification, CE indicates European Community certification. The frequency used by the system network is indicated on the second line.

8. Press **Exit** three times to return to the operation display.

2.5.5 Digital Input Diagnostic

1. Press **Menu** and **Back**.

2. Press **Enter**, **Back**, and then **Enter** to go to menu 5E4) Blue Wire. The page shows the blue wire digital input status.

3. Press **Exit** three times to return to the operation display.

2.5.6 Password Settings

Three levels of access are available: administrator, operator and public. The administrator password is required to change the operator password. In the event both the administrator and the operator passwords are lost please call your LSI representative. Menus accessible from the operation display can be individually protected by the operator password.

1. Press **Menu** and **Next** three times.

2. Press **Enter** and then **Next** seven times to access the menu 4H1) Set administrator password.

3. 4H1) Set administrator password: Press **Next** three times to advance to the set user password page or, to change the administrator password, use **Up** and **Down** to adjust the flashing letter and then use **Next** to advance to the next letter. Press **Enter** to save any changes.

4. 4H2) Set user password: Press **Next** three times to advance to the tare menu protection page or, to change the user password, use **Up** and **Down** to adjust the flashing letter and then use **Next** to advance to the next letter. Press **Enter** to save any changes.

5. Menu 4H3) Tare protected: use **Up** and **Down** to switch between "yes" and "no" and press **Next** to advance to the next menu page.

6. Repeat step 4 to adjust password protection for each menu as required. Press **Enter** at any time to save changes made. Press **Exit** at any time to return to menu 4) Installation. If there are any unsaved changes the display will request confirmation: press **Enter** to save before quitting or press **Exit** to quit without saving.

2.5.7 Angle Calibration Procedure № 1: Mechanical Set-Up

1. Level the boom such that it is perfectly horizontal; use a high quality bubble or digital angle sensor. If the GS550 display indicates 0.0 degree then angle calibration is complete; if not then continue to step 2.
2. For GS011 angle/length sensors only: Carefully remove the cover of the LS101 cable reel.
3. Loosen the mounting screw in the slotted hole of the angle sensor mounting plate.
4. Pivot the angle sensor slightly until angle indication is correct.

⚲ **Tip**

When the angle sensor is moved very slowly, it may take several seconds to see an update at the GS550 display. Instead move the sensor up a couple of degrees, and then bring it back down to where it should be. The small light on the angle sensor flashes when it transmits a new value to the display.

2.5.8 Angle Calibration Procedure № 2: Correct with the GS550

Calibrate angle indication by adjusting the trim (offset) value in the GS550 display (see Figure 10); the GS550 will then communicate the updated trim value to the sensor.

1. Position the boom at a precisely known angle.
2. Press **Menu** and then **Next** three times to go to 4) Installation.
3. Press **Enter** and **Next** to go to 4B) Sensor Calibration.
4. Press **Enter** to go to the password page.
5. Use **Back**, **Next**, **Up** and **Down** to enter the user password.
6. Pess **Enter** and **Next** to go to 4B2) Manual parameter calibration.
7. Press **Enter** to go to page 4B2A)
8. Use **Back** and **Next** to select the angle sensor to be calibrated.
9. Press **Enter** and **Next** to go to the trim adjustment page.
10. Use **Up** and **Down** to adjust the trim value.

Example: If angle indicated is 0.3° over the actual angle, adjust the trim value to -0.3.

Example: If angle indicated is 0.9° below the actual angle, adjust the trim value to 0.9.

11. Press **Enter** to save changes.
12. Press **Exit** four times to return to the operation display.
13. Verify accurate angle indication at both very high and very low angles.

```
Operation Display

1) 2) 3)  4) Installation

    (4A)  4B) Sensor Calibration

          Enter user password:
          aaa

    (4B1)  4B2) Manual parameter
    cal    calibration

    4B2A)  4B2A) No. x id: Gxxxxx
    Load   Angle sensor

    Heart    Trim:  0.0
    Up/Do  Up/Down, Enter->Save
```
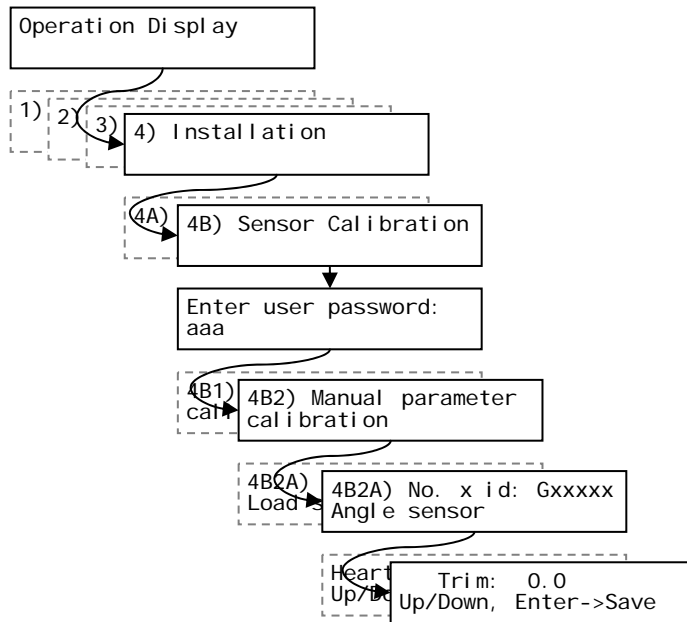
Figure 10 Angle Calibration Procedure N° 2

2.5.9 Boom Length Calibration Procedure № 1: Mechanical Set-Up

Figure 11 shows the actual boom length.
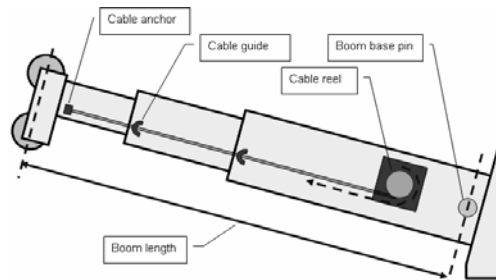
Figure 11 Actual Boom Length

⚠**Important!**

Monitor length sensor cable length remaining as the boom is extended for the first time with the installed cable reel. This generally requires a second person (in addition to the operator).

---

1. Fully retract the boom
2. Adjust the loose wire rope at the boom tip so that the displayed boom length matches the actual boom length.
3. Fully extend the boom

4. Verify the boom length indicated at full boom extension matches the actual fully extended boom length. If not then follow 2.5.10 Boom Length Calibration Procedure № 2: Correct with the GS550.

2.5.10 Boom Length Calibration Procedure № 2: Correct with the GS550

If the displayed boom length does not match the actual length of the boom retracted or extended and if it is not possible to easily correct by following Boom Length Calibration Procedure № 1 (previous page), then follow this procedure. This procedure is completed in the operators cab, it requires fully retracting, and then fully extending the boom, as prompted by the on screen instructions.

1. Press **Menu**, and then **Next** three times to go to menu 4) Installation (see Figure 12)
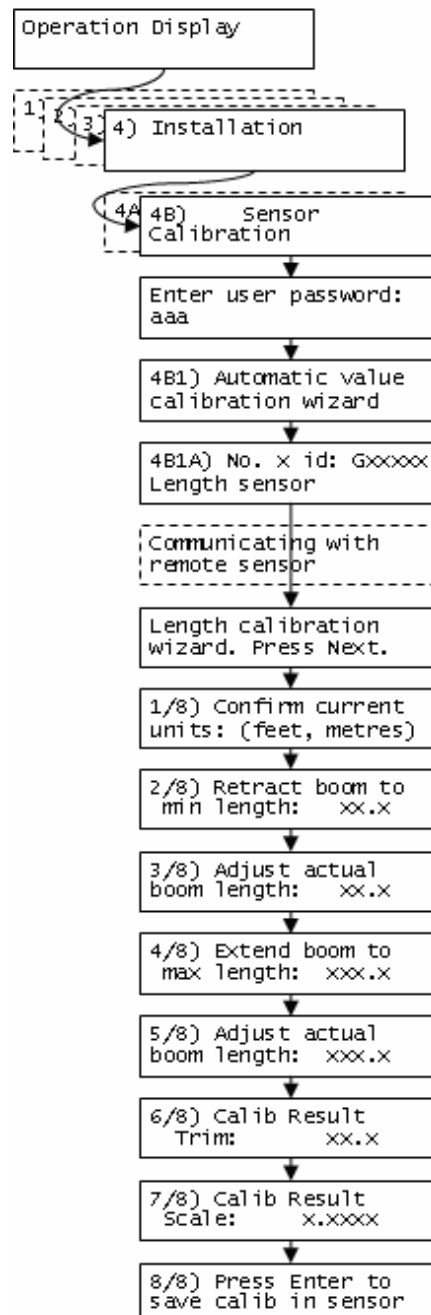
Figure 12 Boom Length Calibration Wizard

2. Press **Enter** and **Next** to go to menu 4B) Sensor Calibration.

3. Press **Enter** to go to the password page.

4. Use **Back**, **Next**, **Up**, and **Down** to enter the user password, and then press **Enter** to go to 4B1) Automatic Value Calibration Wizard.

5. Press **Enter** to go to 4B1A).

6. Use **Back** and **Next** to select the length sensor, and then press **Enter** to confirm communication with the sensor is possible.

7. Press **Next** to start the wizard.

8. Note the units that will be used during the calibration wizard, and then press **Next**.

9. Fully retract the boom, and then press **Next**.

10. Use **Up** and **Down** to adjust the length value displayed to equal the actual fully retracted boom length, and then press **Next**.

11. Fully extend the boom, and then press **Next**.

12. Use **Up** and **Down** to adjust the length value displayed to equal the actual fully extended boom length, and then press **Next**.

13. Note the new trim value, and then press **Next**.

14. Note the new scale value, and then press **Next**.

15. Press **Enter** to send the new calibration to the length sensor.

16. Press **Exit** three times to return to the operation display.

2.6 Radius

2.6.1 Radius Verification and Adjustment

1. Verify the boom and luffing jib[*] angles, and the boom length[†], are indicated correctly.
2. Verify the correct rated capacity chart is selected[‡].
3. Test № 1: measure the actual radius and compare to the radius indicated. Repeat with the boom at minimum angle, at 45 degrees, and at maximum angle; repeat at minimum and maximum boom length[†]. If radius indication is not accurate then go to step 4.
4. Measure the basic radius parameters on the crane (see pages 31 and 32).
5. Program the basic radius parameters in the radius settings menu (see page 29).
6. Test № 2: measure the actual radius and compare to the radius indicated. Repeat with the boom at minimum angle, at 45 degrees, and at maximum boom angle; repeat at minimum and maximum boom length[†]. If radius indication is not accurate then go to the next step.

💡 Tip

If the difference between the displayed radius and actual radius remains constant at all boom lengths and angles, then correct by adjusting the slew offset. For example: if the radius displayed is always 2.3 feet longer than the actual radius, then subtract 2.3 from the slew offset.

---

7. If the crane is rigged with the main boom only, then go directly to step 11.
8. If the crane is rigged with a rooster, jib, or other extension then the advanced radius parameters must be measured on the crane (see page 33), and then programmed in the radius settings menu of the display (see page 29).
9. Test № 3: measure the actual radius and compare to the radius indicated. Repeat with the boom at minimum angle, at 45 degrees, and at maximum boom angle; repeat at minimum and maximum boom length[†]. If radius indication is not accurate then go to the next step.
10. Test for boom deflection: is the radius indicated equal to the actual radius with the boom at 0 degrees and at 90 degrees but greater than the actual radius with the boom at 45 degrees? If yes then adjust the boom deflection value to compensate:
    a. Raise the boom to 45 degrees with a known load.
    b. Compare the indicated radius with the actual radius. Change the boom deflection value and again compare the radius displayed with the actual radius. Repeat until the radius displayed equals the actual radius.

---

[*] **When the hoist is rigged off a luffing jib only**

[†] **Telescopic boom cranes only**

[‡] **Systems with rated capacity charts programmed in the GS550 only**

Tip

With the boom at 45° and the maximum load on the hoist, the boom deflection value should equal the difference between the actual and the displayed radius. With the boom at 45° and half the maximum load on the hoist, the boom deflection value should equal twice the difference between the actual and the displayed radius.

11. Test № 4: measure the actual radius and compare to the radius indicated. Repeat with the boom at minimum angle, at 45 degrees, and at maximum boom angle; repeat at minimum and maximum boom length[†]. If radius indication is not accurate then go to the next step.

2.6.2 Radius Settings

1. Press **Menu**, and then **Next** three times to go to menu 4) Installation (see Figure 13).
2. Press **Enter**, and then **Next** twice to go to menu 4C) Radius Settings.
3. Press **Enter**; use **Up** and **Down**, **Back** and **Next** to enter the user password; and then press **Enter** to go to the first radius settings page 4C1) Boom length.
4. Use **Back** and **Next** to navigate between the radius settings pages and use **Up** and **Down** to adjust the settings.
5. Press **Enter** to save any changes and press **Exit** three times to return to the operation display.

Important!

Radius settings 4C13 to 4C20 are specific to the hoist line (or sheave number) selected on page 4C12.

Operation Display

1) 2) 3) 4) Installation

4A) 4B) 4C) Radius Settings

Enter user password:
aaa

4C1) Boom length
60.0

4C2) Slew offset
0.0

4C3) Height offset
0.0

4C4) Boom deflection
0.0

4C5) Boom top length
0.0

4C6) Boom top offset
0.0

4C7) No load
Deflection   0.0

4C8) Jib offset
0.0

4C9) Lattice extension
offset   0.0

Basic radius parameters

4C10) Jib mount point
perpendicular   0.0

4C11) Jib mounting
point parallel   0.0

4C12) Select hoist
main

4C13) Jib length
0.0

4C14) Luffing jib
length   0.0

4C15) Lattice
extension length   0.0

4C16) Manual length
                    0.0

4C17) Sheave head len.
perpendicular   0.0

4C18) Sheave head len.
parallel   0.0

4C19) Sheave radius
                    0.0

4C20) Deduct
                    0.0

Figure 13 Radius Settings

2.6.3 Basic Radius Parameters for a Lattice Crane

Jib mounting point

Jib offset angle

Head sheave

Sheave radius (menu 4C19)

(Your measurement)

Jib length

Sheave head length perpendicular (menu 4C17)
The distance from the head sheave centre to the boom centreline

(Your measurement)

Boom Length (menu 4C1)
The distance from the boom base pin to the head sheave centre

(Your measurement)

Boom base pin

Crane centre of rotation

Slew offset (menu 4C2)
The distance from the boom base pin to the crane centre of rotation
If the boom base pin is behind the centre of rotation this value will be negative.

(Your measurement)

Figure 14 Basic Radius Parameters For A Lattice Crane

2.6.4 Basic Radius Parameters for a Telescopic Boom Crane

Sheave head length perpendicular (menu 4C17)
- The distance from the head sheave centre to the boom centreline

(Your measurement)

Boom length: the distance from the boom base pin to the head sheave centre

Sheave radius (menu 4C19)

(Your measurement)

Boom base pin

Slew offset (menu 4C2)
- The distance from the boom base pin to the crane centre of rotation
- If the boom base pin is behind the centre of rotation this value will be negative.

(Your measurement)

Crane centre of rotation

Figure 15 Basic Radius Parameters For A Telescopic Boom Crane

2.6.5 Advanced Radius Parameters

Extensions, two possibilities:
1) Manual length (4C16): The offset is always zero degrees.
2) Lattice extension length(4C15): The offset angle must be adjusted.

4C15) Lattice extension length

4C9) Lattice extension offset angle is also used for hydraulic crane

4C5) Boom top length

4C6) Boom top offset angle

D2

D1

D3

4C5) Boom length includes boom top

Typical sheave heads:
• 4C17) Sheave head length perpendicular = D1
• 4C18) Sheave head length parallel = 0

Special top sheaves (example: rooster):
• 4C17) Sheave head length perpendicular = D2
• 4C18) Sheave head length parallel = D3

4C14) Luffing jib length (center sheave to center sheave)

4C13) and 4C11) Fixed jib length & offset angle

4C10) and 4C11) Jib mounting point parallel & perpendicular

4C9) and 4C15) Lattice extension length & offset angle

4C5) and 4C6) Boom top length & offset angle

4C1) Main boom

4A1) Boom angle sensor

4C14) Luffing jib angle sensor

4C5) Boom length includes boom top

Boom heel pin

4C2) Slew offset.

Figure 16 Advanced Radius Parameters

2.6.6 Load Pin Transmitter GS001

1. Determine the transmitter mounting position (see Figure 17).

    a. The load pin and transmitter pigtails must connect easily without stretching or kinking at all boom angles and working conditions. The jumper cable may be used between the load pin and transmitter to increase transmitter placement options.

    b. There must be direct unobstructed line of sight from the transmitter to the display; this may not be required on cranes with a maximum boom length less than 100 feet (33 metres).

    c. The transmitter antenna must not be in contact with any metal object.

⚠️**Warning!**

Do not weld in proximity to LSI sensor/transmitters.

---

2. Weld the mounting blocks where required.
3. Mount the load pin transmitter on the mounting blocks.

2.7 Load Pins, Line Riders and Compression Cells: Calibration

Load pins, line riders and compression cells must be calibrated at installation and every time thereafter the installation, the load sensor or the load transmitter is changed.
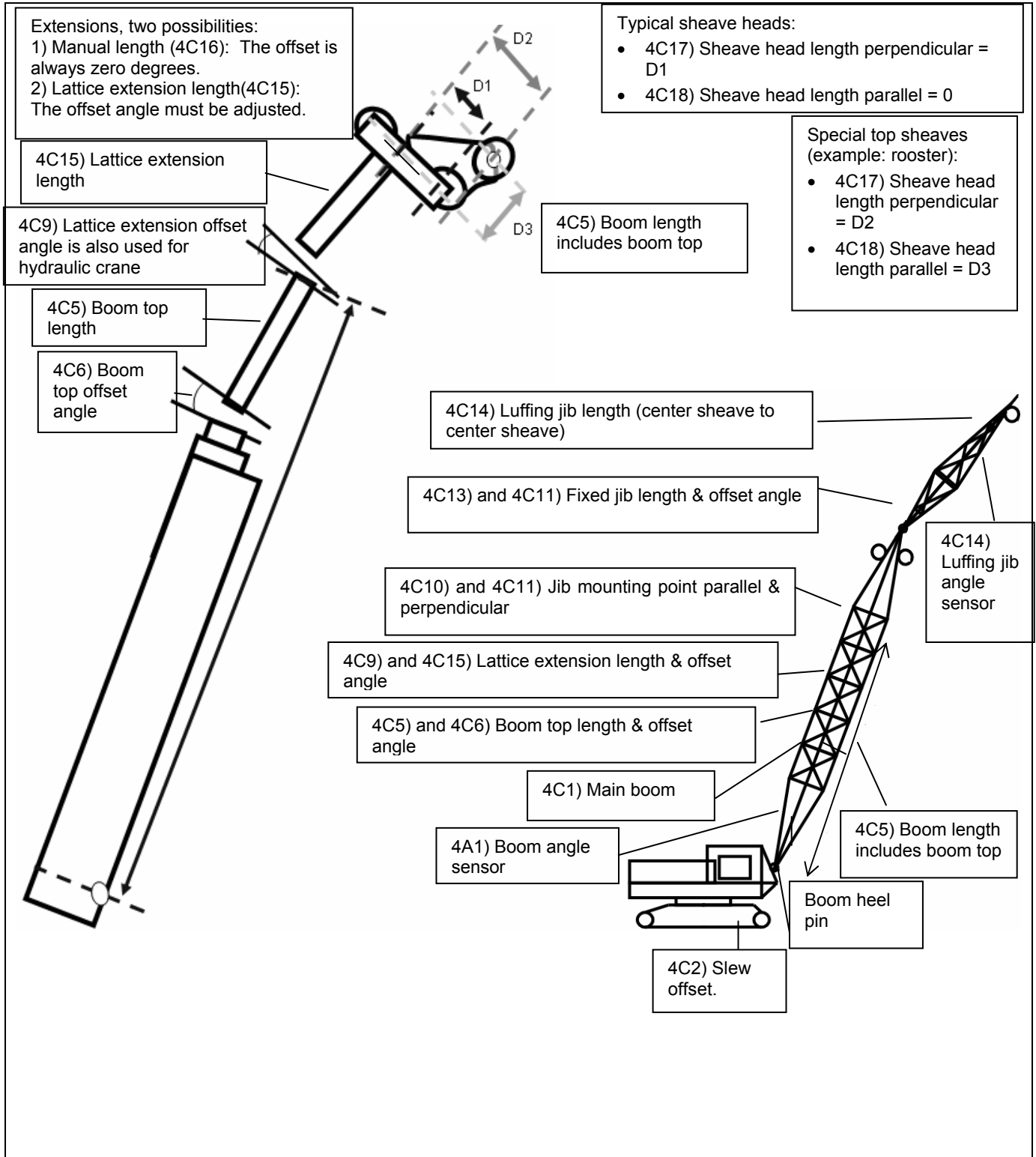

⚠️**Important!**

Do not recalibrate flat bar load links (part numbers GC005, GC012, GC018, GC035, GC060, GC100, and GC170).

This procedure requires two known weights. The first (light) weight should be about 10% of load sensor capacity and not less than 5%. The second (heavy) weight should be over 50% of capacity, and absolutely not less than 25%.

Diagram	Instructions
Operation Display 1) 3) 4) Installation 4A 4B) Sensor Calibration Enter user password: aaa 4B1) Automatic value calibration wizard 4B1A) No. x id: Gxxxxx Load sensor Communicating with remote sensor Load calibration wizard. Press Next. 1/9) Enter actual parts of line: 1 2/9) Confirm current unit: (lb, kg, T, t) 3/9) Lift known load No. 1: xxxx 4/9) Adjust actual load No. 1: xxxx 5/9) Lift known load No. 2: xxxx 6/9) Adjust actual load No. 2: xxxx 7/9) Calib Result Trim: xxx 8/9) Calib Result Scale: x.xxxx 9/9) Press Enter to save calib in sensor **Figure 17 Boom Length Calibration Wizard**	1. Press **Menu**, and then **Next** three times to go to menu 4) Installation (see Figure 17). 2. Press **Enter** and **Next** to go to menu 4B) Sensor Calibration. 3. Press **Enter** to go to the password page. 4. Use **Back**, **Next**, **Up**, and **Down** to enter the user password, and then press **Enter** to go to 4B1) Automatic Value Calibration Wizard. 5. Press **Enter** to go to 4B1A). 6. Use **Back** and **Next** to select the load sensor, and then press **Enter** to confirm communication with the sensor is possible. 7. Press **Next** to start the wizard. 8. Use **Up** and **Down** to adjust the actual parts of line on the load sensor, and then press **Next**. 9. Note the units that will be used during the calibration wizard, and then press **Next**. 10. Lift the first (lighter) known load, and then press **Next**. 11. Use **Up** and **Down** to adjust the load value displayed to equal the actual known load lifted, and then press **Next**. 12. Lower the first load, lift the second (heavier) known load, and then press **Next**. 13. Use **Up** and **Down** to adjust the load value displayed to equal the actual known load lifted, and then press **Next**. 14. Note the new trim value, and then press **Next**. 15. Note the new scale value, and then press **Next**. 16. Press **Enter** to send the new calibration to the load sensor. 17. Press **Exit** three times to return to the operation display.

2.8 Four Point Lift

The following functions are available for applications such as container cranes and gantry cranes that require load indication from four load sensors simultaneously.

- Sum load indication

- Imbalance
- Slack Rope

These functions can be used to generate an alarm condition on the lockout wires of the GS550.

2.8.1 Sum Load Indication

When sum load indication is programmed the sum of the loads on the pre-determined load sensors is indicated by the operation display. To activate sum load indication program a "Sum load sensor" in the sensor list. The "id number" is used to identify the load sensors to be summed.

Sum maximum limit. The maximum limit for the sum load can be adjusted in the limit menu; the default maximum limit for sum load indication is 10000 (lb or kg depending on load display units).

Program sum load indication.

1. Press **Menu**, and then **Next** three times.
2. Press **Enter** twice to go to the sensor list, menu page 4A1.
3. Press **Next** repeatedly to advance to the next available sensor position, usually following the four load sensors.
4. Determine the sum load cell "id number". For example: id 1234 to indicate the sum of load sensors № 1, № 2, № 3, and № 4, or id 34 to indicate the sum of load sensors № 3 and № 4.
5. Use **Up** and **Down** to adjust the id number.
6. Press **Next**.
7. The sensor type should flash; use **Up** and **Down** to select the sensor type "Sum load cell".
8. Press **Enter** to save any changes.
9. Press **Next** to program the imbalance sensor or press **Exit** three times to return to the operation display.
10. Adjust the sum maximum limit in the limit menu

2.8.2 Imbalance

Systems programmed for four load sensors and four load sum indication can be programmed with an imbalance sensor to warn against uneven load distribution or against unwanted rope payout if one corner of the load touches down before the others.

Imbalance factor limit. The imbalance factor is the percent difference between the load on one load sensor and the average load on the other three. The imbalance factor is calculated for each of the four load sensors and then compared to an adjustable limit. The default imbalance factor limit is 15%.

Imbalance minimum limit. Imbalance is not calculated when the four load sum is below the imbalance minimum limit. Adjust this limit to avoid generating an imbalance alarm under minimum load conditions (for example: with an empty container or with rigging only). The default imbalance minimum limit is 1000 (pounds or kilograms depending on load display units).

Program the imbalance sensor.

1. Press **Menu**, and then **Next** three times.

2. Press **Enter** twice to go to the sensor list (4A1).
3. Press **Next** repeatedly to advance to the next available sensor position, usually following the four load sensors and the sum load sensor.
4. The id can be left at 0, press **Next**.
5. The sensor type should flash; use **Up** and **Down** to select the sensor type Imbalance sensor. Only one imbalance sensor is required to calculate imbalance for all four load sensors.
6. Press **Enter** to save any changes.
7. Press **Exit** three times to return to the operation display.
8. Confirm the imbalance factor limit and the imbalance minimum limit in the limit menu.

Examples:

Imbalance factor calculation for load sensor № 1
Load № 1 Imbalance Factor $\quad = \quad 100 \quad \text{X} \quad \dfrac{\text{Average (Load 2, 3, and 4)} - \text{Load 1}}{\text{Average (Load 2, 3, and 4)}}$

If the imbalance factor limit is 15%, then the system is safe.
A 7500 B 8100   C 8000 D 8200 $\qquad$ Load № 1 (A) Imbalance Factor $\quad = \quad 100 \quad \text{X} \quad \dfrac{8100 - 7500}{8100} \quad = \quad 7.5\ \%$

If the imbalance factor limit is 15%, then an imbalance alarm is generated.
A 6800 B 8100   C 8000 D 8200 $\qquad$ Load № 1 (A) Imbalance Factor $\quad = \quad 100 \quad \text{X} \quad \dfrac{8100 - 6800}{8100} \quad = \quad 16\ \%$

2.8.3 Slack Rope

Systems programmed for four load sensors and four load sum indication can be programmed with a slack rope sensor to warn against unwanted rope payout when the load touches down.

Slack rope minimum limit. The slack rope sensor compares the sum load to an adjustable slack rope minimum limit. When the sum load goes below the slack rope limit a slack rope alarm is generated. The slack rope limit is usually adjusted to less than the weight of all rigging below the load sensors. The default slack rope minimum limit for is 1000 (pounds or kilograms depending on load display units).

Program the slack rope sensor.

1. Press **Menu**, and then **Next** three times.
2. Press **Enter** twice to go to the sensor list, menu page 4A1.
3. Press **Next** repeatedly to advance to the next available sensor position, usually following the four load sensors, the sum load sensor and the imbalance sensor.
4. The id can be left at 0, press **Next**.

5. The sensor type should flash; use **Up** and **Down** to select the sensor type Slack rope sensor. Only one slack rope sensor is required to calculate slack rope for all four load sensors.
6. Press **Enter** to save any changes.
7. Press **Exit** three times to return to the operation display.
8. Adjust the slack rope minimum limit in the limit menu.

2.9 List and Trim Angle Sensor

The GS010-03 is a two axis angle sensor designed to detect both list and trim angle. Minimum and maximum limits for list and trim angle are adjustable in the display (see Figure 18). The display will generate an alarm if the limits are exceeded and can be programmed to generate lockout. Furthermore list and trim angle can be used to control rated capacity chart selection where required (example: barge cranes).

List (roll)   Trim (pitch)
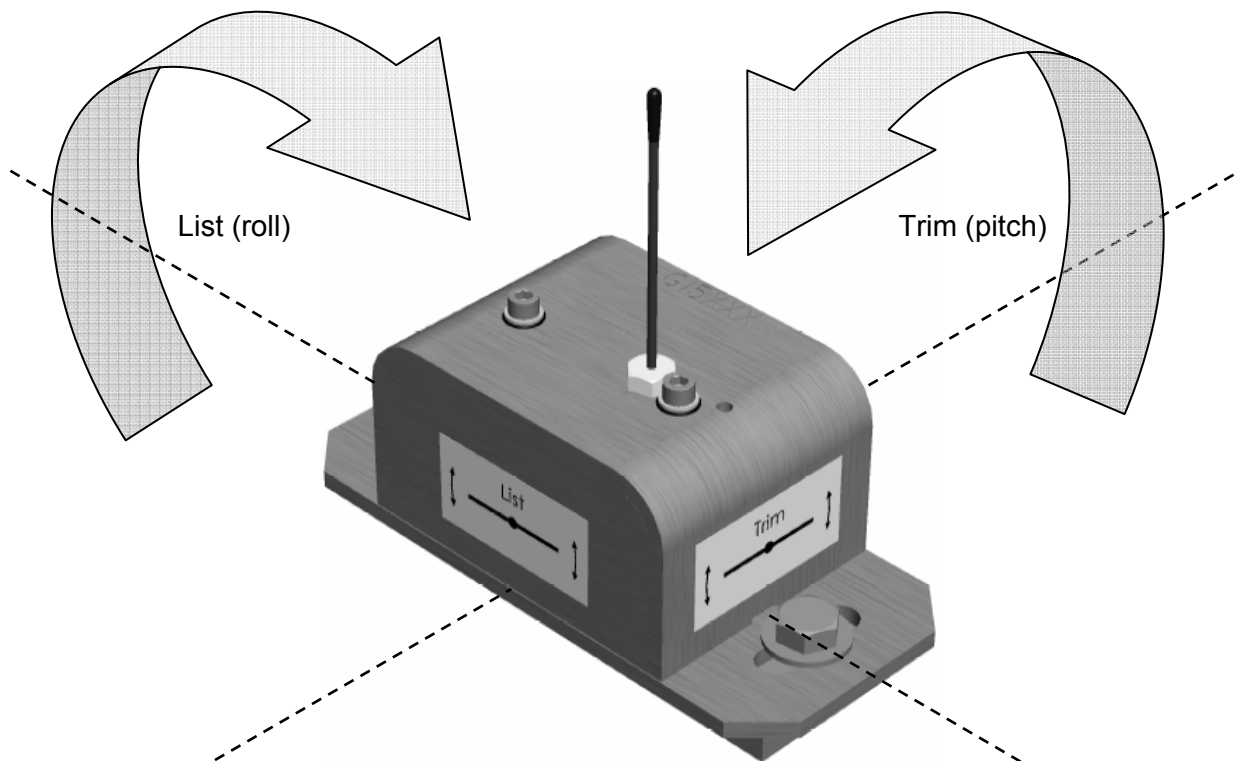
Figure 18 List And Trim Axes

2.9.1 Programming the GS550 for List and Trim Indication

For list indication, add the GS010-03 id number to the sensor list (menu 4A1) and select the sensor type "List sensor".

For trim indication, add the GS010-03 id number to the sensor list (menu 4A1) and select the sensor type "Trim sensor".

The maximum and minimum angles for list and trim indication can be adjusted in the limit menu. The default limits are 10.0° maximum and -10.0° minimum.

2.9.2 Mounting Instructions

> ⚠️ **Warning!**
>
> **Remove the angle sensor from any connecting metal structures or surfaces when welding the metal lugs to the mounting surface. Proximity to welding may cause permanent damage to the angle sensor and prevent accurate angle indication.**

1. Determine the angle sensor position.
   a. The mounting surface must be flat and known to be level (0°) in both the list and trim axes.
   b. The angle sensor must have a clear line of sight to the cabin mounted display.
   c. The angle sensor must be installed horizontally, with the antenna pointing up.
   d. The list and trim axes are indicated on the angle sensor, follow these indications to orient the sensor correctly for accurate list and trim indication.
   e. The angle sensor antenna must not contact a metal object.
2. Install the welding pads; keep the angle sensor well removed from the weld site and any connecting metal objects while welding.
3. Mount the angle sensor to the weld pads with the screws and washers provided.
4. Verify list and trim angle indication by the GS550 (see Figure 19); in operation display, use **Next** to advance to the list and trim indication page.

```
Trim angle:      0.5°
List angle:     -1.2°
```

Figure 19 Trim And List Angle Indication

2.9.3 List and Trim Angle Calibration Procedure

Calibrate angle indication by adjusting the offset values for list and trim in the GS550 display; the GS550 will then communicate the updated offset values to the sensor.

1. Install the sensor at a precisely known list and trim angle.
2. Press **Menu**, and then **Next** three times to go to 4) Installation.
3. Press **Enter** and **Next** to go to 4B) Sensor Calibration.
4. Press **Enter** to go to the password page.
5. Use **Back**, **Next**, **Up** and **Down** to enter the user password, and then press **Enter** to go to 4B1) Automatic value calibration wizard.
6. Press **Enter** to go to page 4B1A)
7. Use **Back** and **Next** to select the trim (or list) sensor.
8. Press **Enter** twice to go to the first step of the calibration wizard; note the uncorrected angle indicated.
9. Press **Next** to go to the second step, angle correction. Use **Up** and **Down** to adjust the angle value indicated until it is equal to the known angle.
10. Press **Next** to go to the third step, note the offset value.

11. Press **Enter** to communicate changes to the sensor.
12. Repeat steps 6 through 11 for the list angle.
13. Press **Exit** four times to return to the operation display.
14. Verify accurate list and trim angle indication (see Figure 20).
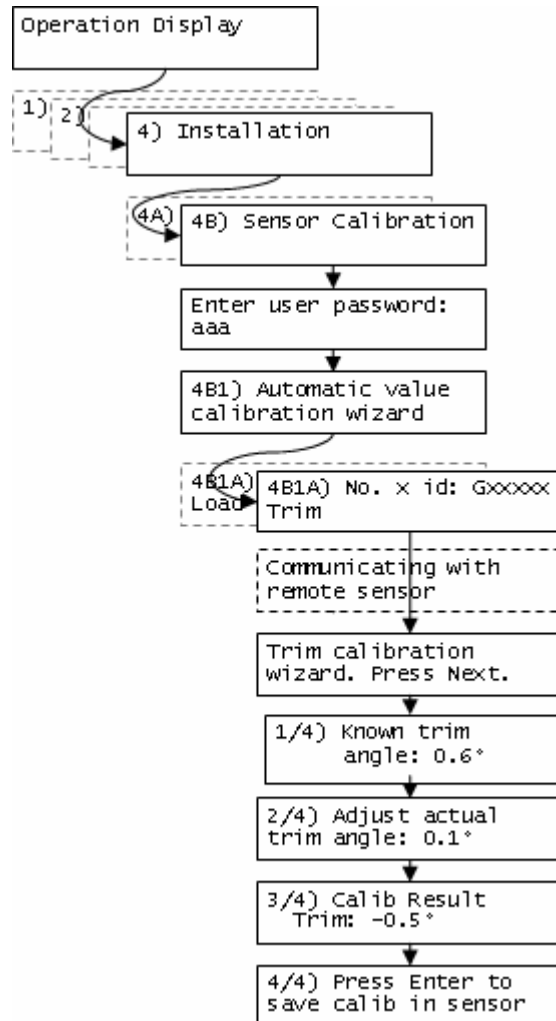
Figure 20 Trim Angle Calibration

2.10 Rope Payout
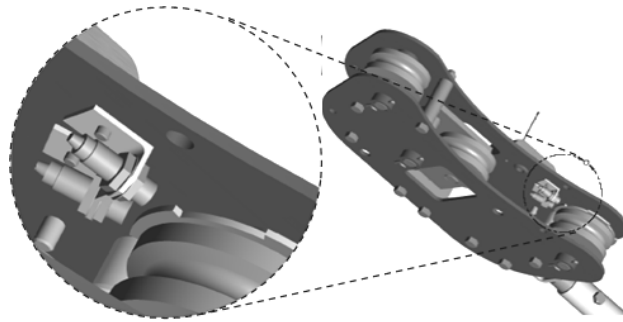
Figure 21 Rope Payout Display

Typically the rope payout sensor is factory installed on the line rider load sensor (see Figure 21). Alternatively the rope payout sensor may be installed on an appropriate sheave. Power supply must be provided to the rope payout sensor. A GS550 display can then be programmed to communicate with the sensor and to indicate rope payout (length) and rope speed.

Zero the rope payout using the **Tare** menu before calibration.

2.10.1 Rope Payout Initialization

⚠**Warning!**

Before you calibrate the system, ensure to initialize the rope payout for the following reasons:

1. **When you receive a Rope Payout system, the system should be reset to 0 to ensure it starts with the 0 position.**

2. **When you have already the GS550 display, the Rope Payout system should be reset to 0 because the display keeps into memory values, and the memory value requires an update or a reset to 0.**

To set the zero position of the rope payout, follow these steps:
1. On the display, press the **Tare** button.
2. Select the **Rope Payout** sensor.
3. Press the **Enter** button.
   The display will show "New rope payout zero saved in sensor".
4. Press the **Exit** button.

This concludes the rope payout initialization procedure.

2.10.2 Rope Payout Calibration Procedure № 1: Mechanical Set-Up

1. Hoist up to reel in the wire rope fully.
2. Install the rope payout system.
3. Zero the rope payout length in the Tare menu
4. Hoist down to pay out a known length of wire rope (for example: 20 feet).

5. Verify the rope payout indicated matches the actual length of wire rope paid out. If not then follow *Rope Payout Calibration Procedure № 2*.

2.10.3 Rope Payout Calibration Procedure № 2: Correct with the GS550

If rope payout indicated does not match actual rope payout, and if it is not possible to easily correct by following Rope Payout Calibration Procedure № 1, then follow this procedure. This procedure requires hoisting up to fully reel in the wire rope, and then hoisting down to pay out a known length of wire rope. For accurate calibration the "known length" paid out must be accurately measured.

1. Press **Menu**, and then **Next** three times to go to menu 4) Installation (see Figure 22).
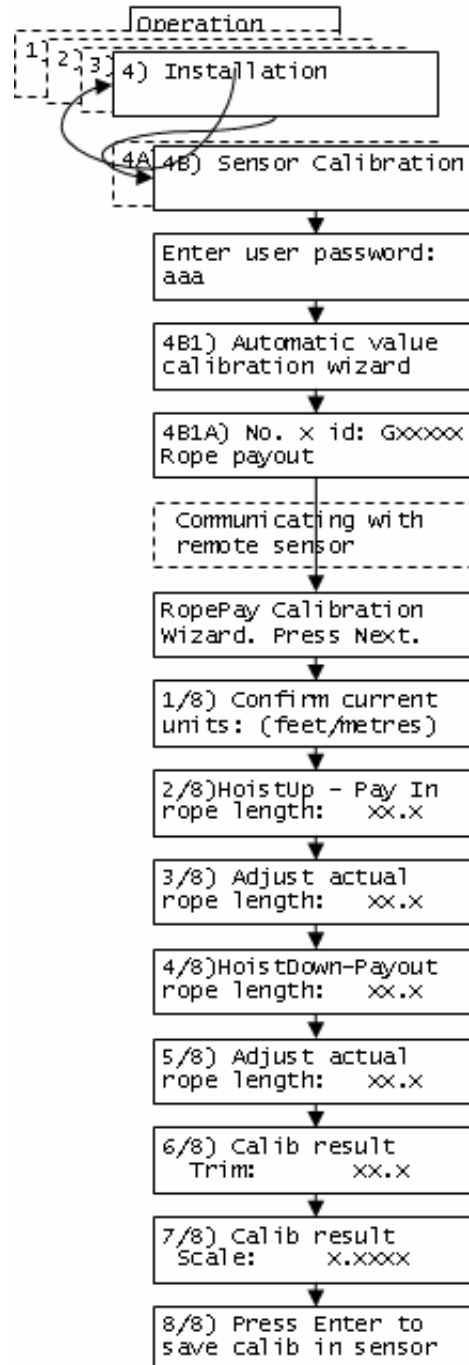
Figure 22 Rope Payout Calibration

2. Press **Enter** and **Next** to go to menu 4B) Sensor Calibration.

3. Press **Enter** to go to the password page.

4. Use **Back**, **Next**, **Up**, and **Down** to enter the user password, and then press **Enter** to go to 4B1) Automatic Value Calibration Wizard.

5. Press **Enter** to go to 4B1A).

6. Use **Back** and **Next** to select the rope payout sensor, and then press **Enter** to confirm communication with the sensor is possible.

7. Press **Next** to start the wizard.

8. Note the units that will be used during the calibration wizard, and then press **Next**.

9. Hoist up (pay in) the wire rope and then press **Next**.

10. Use **Up** and **Down** to adjust the actual wire rope payout length and then press **Next**.

11. Hoist down (payout) the wire rope and then press **Next**.

12. Use **Up** and **Down** to program the actual wire rope payout length and then press **Next**.

13. Note the new trim value, and then press **Next**.

14. Note the new scale value, and then press **Next**.

15. Press **Enter** to send the new calibration to the rope payout sensor.

16. Press **Exit** four times to return to the operation display.

2.10.4 Rope Payout Limits

The minimum and maximum rope payout (length) limits and the maximum rope speed limit can be adjusted in the display in the limit menu. The maximum rope payout limit can be programmed to trigger lockout when exceeded, see menu 4G Lockout Settings. The minimum rope payout limit and the maximum rope speed limit will trigger an alarm when exceeded. The default limit for maximum rope payout is 300 feet; the default minimum limit is -300 feet. The default limit for maximum rope speed is 15.0 feet per second. Figure 23 shows an alternative installation.
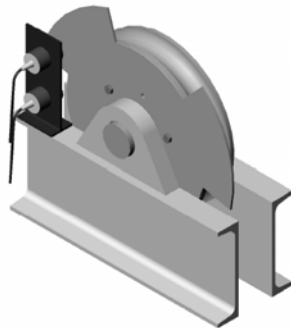
Figure 23 Alternative Installation

2.11 Data Logger

The GS550 includes a data logger that records all significant events including actual sensor values and a date and time stamp. The data logger memory can hold over 16 000 records, this is equivalent to several days or several years of operation depending on the recording mode selected and machine use. The data can be extracted using a portable download tool and then transferred to a personal computer for analysis.

2.11.1 Recording Modes

Adjust the data logger recording mode as required:

1. Press **Menu**, and then **Next** three times.
2. Press **Enter**, **Next** five times, and then **Enter** to go to menu 4F1) Data logger mode
3. Use **Up** and **Down** to select the data logger recording mode.
4. Automatic modes only: press **Next** to advance to the adjustment page for the interval (auto-matic recording mode), variation (automatic variation recording mode), or threshold (automatic peak recording mode).
5. Press **Enter** to save any changes.
6. Press **Exit** three times to return to the operation display or press **Next** to adjust the data logger date and time (see below).

<div>

💡**Tip**

All alerts are recorded by the data logger regardless of the mode selected.

</div>

Alarm only. Record alarms only. All the other data logger modes also record alarms.

Automatic recording. A record is added at a specified interval. When the automatic re-cording data logger mode is selected on menu page 4F1 (see step 4 above) press **Next** to go to page 4F11) and then use **Up** and **Down** to adjust the record interval in minutes.

<div>

⚠️**Important!**

Wind speed: the data logger recording mode must be set to automatic recording to log the data required by the wind speed report feature of the Data Logger Viewer software.

</div>

Automatic variation. A record is added when load increases by more than the operator adjusted percentage. When the automatic variation data logger mode is selected on menu page 4F1 (see step 4 above) press **Next** to go to page 4F11) and then use **Up** and **Down** to adjust the variation threshold.

Automatic peak. In the automatic peak mode the data logger analyzes the measured weight and records the peak value only. One threshold per load cell must be adjusted. When the weight drops by more than the peak threshold the peak weight is recorded. Only one event is recorded for each pick when the threshold is adjusted correctly. When the automatic peak data logger mode is selected on menu page 4F1 (see step 4 above) press **Next** to go to page 4F11) and then use **Up** and **Down** to adjust the peak threshold for the first load cell. Press **Next** to repeat for the second load cell etc. Up to four load cells can be programmed for automatic peak data logging.

User input. Available on request only, the status of all sensors is recorded on demand. A custom hardware modification to the GS550 display is required and a normally open push button must be installed on a digital input to the GS550 through a pre-determined wire of the power supply and lockout cable.

All data. All communications between a display and its sensors are recorded.

2.11.2 Date and Time

Adjust the data logger date and time as required:

1. Press **Menu**, and then **Next** three times.

---

2. Press **Enter**, and then **Next** five times.
3. Press **Next**, **Enter** and **Next** to go to menu 4F2) Adjust date.
4. The last two digits of the year should be flashing: use Up and Down to adjust the year.
5. Press **Next** to adjust the month.
6. The month should be flashing: Use **Up** and **Down** to adjust the month.
7. Press **Next** to adjust the day.
8. The day should be flashing: use **Up** and **Down** to adjust the day.
9. Press **Next** to adjust the time.
10. The hour should be flashing: use **Up** and **Down** to adjust the hour from 00 (midnight) to 23 (11 pm).
11. Press **Next** to adjust the minute.
12. The minute should be flashing: use **Up** and **Down** to adjust the minute.
13. Press **Next** to adjust the second.
14. The second should be flashing: use **Up** and **Down** to adjust the second.
15. Press **Enter** to save any changes.
16. Press **Exit** three times to return to the operation display.

2.12 The Sensor List

All sensors in the GS550 system are programmed in the sensor list. The GS550 uses information from all sensors in the sensor list. Conversely the GS550 will not use or display information from sensors that are not programmed to the sensor list. If a sensor is removed from the crane then it must be removed from the sensor list. If a sensor is replaced the sensor list must be updated with the new id number.

⚠**Warning!**

Information display from load, angle and boom length sensors that are not correctly installed will not be accurate.

Rated capacity, radius, and tip height based on information from angle and boom length sensors that are not correctly installed will not be accurate.

💡**Tip**

To ensure communication sensors must be at least six feet from the GS550 display.

2.12.1 How to Add a Sensor to the GS550

1. Determine the radio identification number (id) of the sensor to be added. This number between 10000 and 99999 is engraved on the sensor.
2. Press **Menu**, and then **Next** three times.
3. Press **Enter** twice to go to menu page 4A1) (see Figure 24).
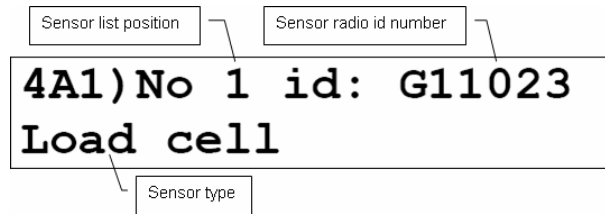
Figure 24 Menu Page 4A1) Sensor List

4. Advance to the next empty sensor position in the sensor list. Press **Next** repeatedly until the LCD shows "No sensor" on the bottom line. Up to 32 sensors may be added to the sensor list.

5. The id number should flash; this means it is adjustable. Use **Up** and **Down** to program the sensor id.

Tip

Press Up **and** Down **simultaneously to make the sensor id number jump directly to 15000. Press** Up **and** Down **simultaneously again to make the sensor id number jump directly to 10000. Press** Up **and** Down **simultaneously a third time to make the sensor id number jump directly to 0.**

6. Press **Next**.

7. The sensor type ("No sensor") should flash; this means it is adjustable. Use **Up** and **Down** to select the sensor type.

8. Press **Enter** to save any changes made to the sensor list.

9. Press **Exit** three times to return to the operation display.

2.12.2 How to Remove a Sensor from the GS550

1. Determine the sensor to be removed. If more than one sensor of the same type has been added to the sensor list then determine the radio identification number (id) of the sensor to be removed before proceeding. This number between 10000 and 99999 is engraved on the sensor.

2. Press **Menu**, and then **Next** three times.

3. Press **Enter** twice to go to menu page 4A1) (see Figure 25).
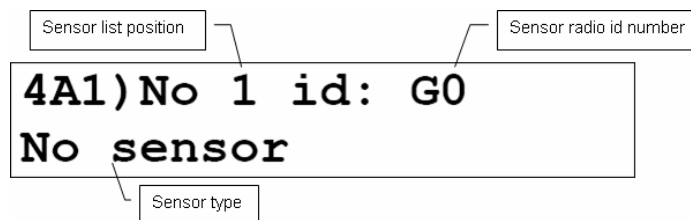
Figure 25 Menu Page 4A) Sensor List

4. Press **Next** repeatedly to advance to the page of the sensor list showing the id of the sensor to be removed.

5. The sensor id should flash, press **Next**, the sensor type should flash; this means it is adjustable. Use **Up** and **Down** to select "No sensor". This will remove the sensor from the sensor list but retain the sensor id.

> Tip
>
> **Press Next and Back simultaneously to remove the sensor from the sensor list. The id number will revert to 0, and the sensor type will revert to "No Sensor".**

6. Press **Enter** to save any changes made to the sensor list.
7. Press **Exit** three times to return to the operation display.

2.13 Network Options

2.13.1 Listen Only Mode

When the GS550 is started it normally wakes up the sensors in the sensor list and takes control of them. The last display started that is programmed for a sensor becomes that sensor's network controller. This means that if a second display is programmed for a sensor, it will take control of it; the sensor will no longer acknowledge communication from the first display. Occasionally it may be useful to monitor an installed system from a remote display without disrupting the existing network. The GS550 can be programmed to operate in "listening mode". In this mode the GS550 will display information from programmed sensors without becoming the network controller.

> ⚠ Important!
>
> **Sensors can only have one network controller at a time. To receive communication from a sensor without taking control of that sensor a display must first be programmed in "listening mode".**

Program the listen only mode.

1. Press **Menu**, and then **Next** three times.
2. Press **Enter**, **Next** eight times, and then **Enter** to go to menu 4l1).
3. Use **Up** and **Down** to switch between "network controller" and "listen only" modes.
4. Press **Enter** to save any change.
5. Press **Exit** three times to return to the operation display.

When a display is adjusted to listen only mode the following message flashes three times during the start-up routine: "The display is in listen only mode".

> Tip
>
> **To regain network control of programmed sensors adjust the GS550 to "network controller" (menu 4l1, see the procedure above), shut the display off, and then start it again.**

2.13.2 Repeater

Communication between a GS550 and a programmed sensor can be routed through a different programmed sensor (repeater). This can be done either to extend the range of the network or to assist communication around a large radio obstacle. The battery life of the sensor repeated (source) will be reduced by about a year[*]. The battery life of the sensor repeater will be reduced to 35 days[†]. This function should not be used where it is not required.

Program a sensor repeater.

1. Press **Menu**, and then **Next** three times.
2. Press **Enter**, and then **Next** eight times.
3. Press **Enter** and **Next** to go to menu 4I2) Set-up sensor repeater
4. Press **Enter** to go to menu 4I21) Select repeater.
5. Use **Up** and **Down** to program the radio id number of the sensor that will be the repeater.
6. Press **Next** to go to menu 4I22) Select source
7. Use **Up** and **Down** to program the radio id number of the sensor that will be repeated.
8. Press **Next** to go to menu 4I23) Enter to save The new network path
9. Press **Enter** to save the new network path. The following messages will be displayed briefly:
    *   "Parameters saved correctly"
    *   "Communicating with remote sensor…"
    *   "Configuration saved successfully"
10. Press **Exit** three times to return to the operation display

Clear a sensor repeater

11. Press **Menu**, and then **Next** twice.
12. Press **Enter**, and then **Next** eight times.
13. Press **Enter**, and then **Next** twice to go to menu 4I3). Menu 4I3 details the last repeater programmed. When no repeater has been programmed the menu 4I3) displays the message "No repeater registered"
14. To shut down the last repeater programmed press **Enter**. The following messages will be displayed briefly:
    *   "Removing network path…"
    *   "Initializing network…"
    *   To shut down additional repeaters repeat step 2
15. Press **Exit** three times to return to the operation display

---

[*] **Repeated (source) battery life estimated for standard product, using new factory specified batteries correctly installed, operating 32 hours per week. Individual results may vary with intensity of use, environmental conditions and other factors**

[†] **Repeater battery life estimated for standard product, using new factory specified batteries correctly installed. Individual results will not vary with of intensity of use; individual results may vary with environmental conditions and other factors.**

> ⚠️ **Important!**
>
> **Test all system functions after setting up or removing a repeater. Shut off and then restart the GS550; within one minute the 2 Block and Load, "M" and "A" flashing radio status lights () should remain solid.**

2.13.3 Wireless Sensor Update

It is possible to send a firmware update to a sensor using the GS550 (menu 4I4). For more information on installing a sensor update refer to the field service guide *How to Update the Firmware of a GS Series System* (document part number GM550 011) provided with the firmware update kit.

3. Portable Download Tool

The portable download tool consists of a compatible personal digital assistant (PDA) and LSI software kit. Update firmware, install rated capacity charts or export data logger files using the portable download tool without removing the display from the crane. The PDA and the GS550 display connect wirelessly through the IrDA (infrared) ports and the PDA and a personal computer (PC) can be connected with a USB cable (see Figures 26 and 27).
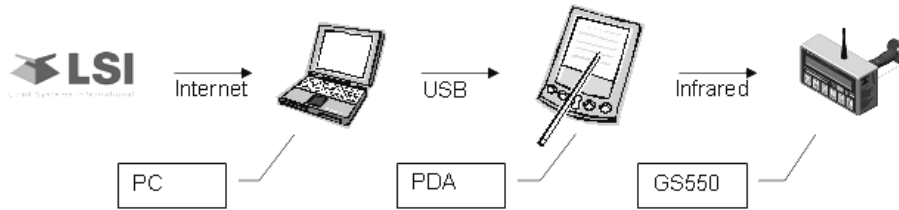
Figure 26 Transfer Firmware Updates And Rated Capacity Charts To The GS550
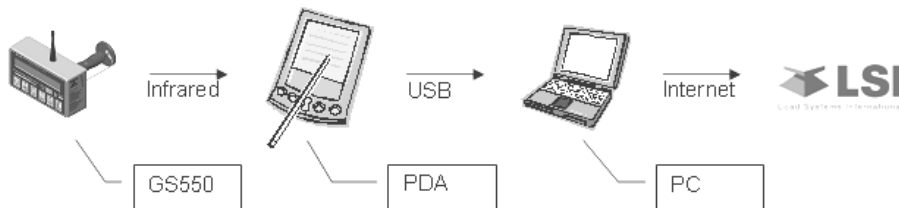
Figure 27 Transfer Data Logger Files From The GS550

⚠️**Important!**

The PDA must be charged to function.

The purpose of this section is to explain:

- How to install PDA software on a PC.
- How to update a GS550 firmware
    - o   Transfer files from a PC to the PDA.
    - o   Transfer files from the PDA to a GS550.
    - o   Conserve GS550 configuration when updating firmware
- How to extract a data logger file from the GS550
    - o   Transfer files from a GS550 to the PDA.
    - o   Transfer files from the PDA to a PC.

Figure 28 Transferring Files From A Palm To A GS550

3.1 Installing PDA Software

Insert the CD-ROM identified Desktop Software & manual in the personal computer (PC) CD-ROM drive; installation will begin automatically. This software is also available on the internet at Palm's web site:

http://www.Palmone.com/us/support/downloads/win_desktop.html

The software should be installed in the default directory:

C:\Program Files\Palm

Follow the installation wizard step by step.

When asked to create a new account, click **Yes**, but leave the name field blank. The installation wizard will automatically create a folder with the name of the PDA.

When prompted to reboot the PC click **Yes**.

In Windows Explorer go to

C:\Program Files\PalmOne and start HotSync.exe

A small icon will appear in the Windows tray bar to indicate that HotSync is installed on your PC; this software is used to establish communication and synchronize data between the PDA and the PC.

3.2 Transferring Files

3.2.1 Transfer Firmware Files from a Personal Computer to the PDA

Two types of files can be sent to the PDA:

- LSI files identified by the filename extension .pdb, including firmware, rated capacity charts and system configuration updates for the GS550.
- LSI files identified by the filename extension .prc, including firmware and data logger software for the PDA.
    1. Connect the PDA to a USB port on the personal computer (PC) using the supplied cable.
    2. In Windows Explorer: double click (or right click) on required file names with the .pdb or .prc extensions; Windows will automatically start a PalmOne list of files that will be sent to the PDA the next time the PDA is synchronized.
    3. On the PDA: press the star icon to start HotSync (see Figure 29). Once started HotSync will connect the PDA with the PC and update files from each.

Figure 29 Palm HotSync Page

3.2.2 Transfer Firmware Files from the PDA to a GS550

1. On the PDA, start the LSI Firmware software:
   a. Press the house icon to go to the Home menu.
   b. Select the LSI Firmware icon from the Home menu.
2. On the GS550 display, press and hold **Bypass** while starting the display. The display will enter a safer mode and allow firmware updates.
3. Align the infrared ports of the PDA and the GS550, about 6 inches (10 centimetres) apart.
4. On the PDA, send the file:
   a. Select a firmware or chart file to send from the LSI Firmware file list.
   b. Press Send. The GS550 will display
      Transferring

      When the transfer is complete the PDA generates a short musical alarm and the GS550 displays the version identification of the newly installed GS550 firmware (see Figure 30).
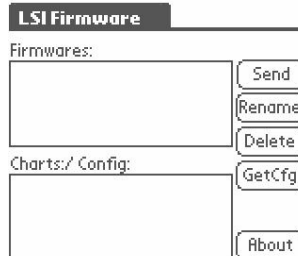
Figure 30 Palm LSI Firmware List

5. Repeat steps two through four to transfer any additional files.

💡**Tip**

For advanced users only. To conserve the GS550 configuration during a firmware update read the section that follows

3.2.3 Conserve GS550 Configuration When Updating Firmware

The LSI Firmware PDA Software can conserve the actual (old) system configuration, including the sensor list and radius parameters, when updating firmware in a GS550 display. When this option is selected the PDA retrieves the configuration from the GS550 and saves it before sending the new firmware. If a problem occurs during the firmware update, then the saved configuration file will be displayed in the LSI Firmware Charts/Config list on the PDA. The configuration can then be re-turned to the GS550 by following the instructions "Transfer Firmware Files from the PDA to a GS550"

1. On the PDA, start the LSI Firmware software:
    a. Press the house icon to go to the Home menu.
    b. Select All from the drop-down menu in the upper right hand corner.
    c. Select LSI Firmware.
2. Correctly align the infrared ports of the PDA and the GS550.
3. On the PDA, press GetCfg. The GS550 will display
       Transferring

    When the transfer is complete the PDA generates a short musical alarm and a file with the name
       CONFIG#
    is added to the Charts/Config list.

3.2.4 Transfer Data Logger Files from the GS550 to the PDA

1. On the PDA, start the LSI Datalogger software.
    a. Press the house icon to go to the Home menu
    b. Select All from the drop down menu in the upper right hand corner
    c. Select LSI Datalogger.
2. Align the infrared ports of the PDA and the GS550 about 6 inches (10 centimetres) apart.
3. On the PDA, receive the file:
    a. Press **Receive** (see Figure 31).
    b. Select **Complete** to transfer the entire data logger memory, or select **From Last** to transfer only data logged since the last download. The GS550 will display
           Transferring

        When the transfer is complete the PDA generates a short musical alarm and displays the uploaded file name in the LSI Datalogger file list.
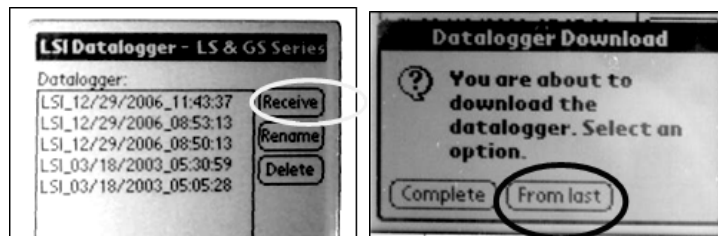
Figure 31 A) Palm LSI Datalogger File List; B) Palm LSI Datalogger Options

3.2.5 Transfer Data Logger Files from the PDA to a Personal Computer

1. Connect the PDA to a personal computer (PC) using the PDA -USB cable.

2. On the PDA, press the star icon to start HotSync. HotSync will connect the PDA with the PC and update files from each. Data logger files will be transferred to the following directory of the personal computer:

C:\Program Files\Palm\PALM_NAME\Backup

Note: PALM_NAME is the actual name of the PDA device.

3.3 Trouble Shooting PDA Communication Issues

Copy to a PDA when using several PDAs with the same PC

1. Transfer a firmware to a PDA
   a. In the **Explorer** window, right-click the file. Then, select "Send To"… and "PDA Quick Install" (see Figure 32).
   b. Or… double-click the firmware received in an email.
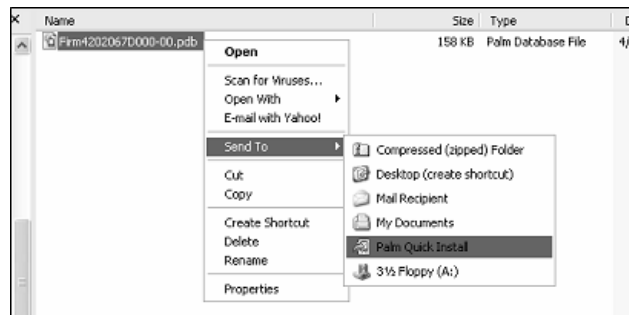
Figure 32 Send To Menu

2. Usually a window will pop up to confirm the addition of this file to the list of files to be transferred to a PDA. Verify the "User" in this window. Two or more "users" may be configured to the PC (see Figure 33).

Figure 33 Two User Name Example On The Same PC

Verify PDA memory.

1. Power up the PDA. With the plastic pen, press on the Home icon on the lower left side of the screen to see the time of day on the upper left.
2. Press on the time of day, a menu should pop up, press on <Info…> in this menu. A page will show how much free memory is available on the PDA.

   Example: 1.1M means 1.1 megabytes, equates to 1100 kb (kilobytes). Each GS550 firmware uses more than 140 kb of memory. If there is not enough memory left, verify if some applications or data logger files could be removed.

Note: A firmware with crane capacity charts may require more memory.

The PDA doesn't respond. If the PDA doesn't appear to respond to commands or if problems occur during a transfer operation then the PDA can be reset by pressing the reset button on the back. All applications will then restart; data should not be lost.
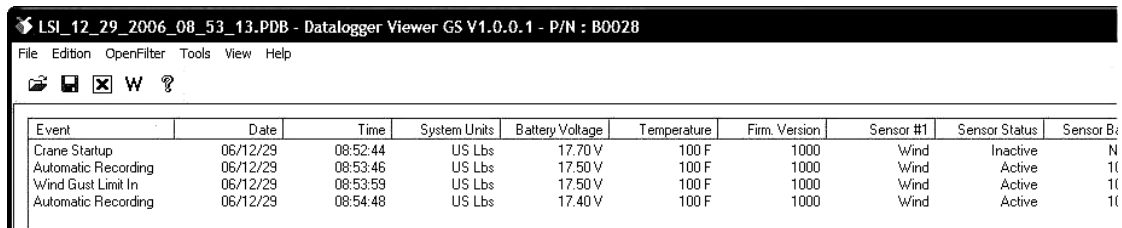
To Free Up Memory

1. Power up the Palm. With the plastic pen, press on the Home icon on the lower left side of the screen until an icon called "LS420 Download" is visible.

2. Press on the LS420 Download icon. A list of available files will be displayed.

3. Press on the file to be deleted

4. Press on the delete button

3.4 Data Logger Viewer

The **Datalogger Viewer** (see Figure 34) is a software application used to display on a personal computer (PC) a log file generated by the GS550 data logger. To transfer data logger files from a GS550 to a PC see the section "Transferring Files".

The Data logger viewer opens the log file, converts it from a PDA database file to a text (binary) file, and then displays the contents. Two reports can be produced and transferred to Excel, the full report and the wind speed report[*].

Figure 34 Datalogger Viewer System

3.4.1 Installation on a Personal Computer

Install the CD in a CD-ROM drive. The interactive installation process should start automatically within 30 seconds; if not then:

1. Click **Start**.
2. Click **My Computer**.
3. Double-click the CD-ROM drive.
4. Double-click setup.exe.
5. Complete the installation as instructed on screen.

3.4.2 Quick Start

1. Select the **Datalogger Viewer** application from the **Start** menu of the personal computer (see Figure 35).

---

[*] **The wind report is only available when the data logger has recorded in the *automatic recording* mode.**
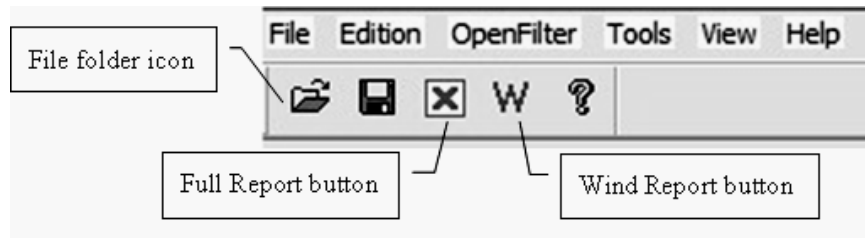
Figure 35 DataViewer Toolbar

2. Click the file folder icon to open a log file (or click **File**, and then **Open**).
3. Enter the file location.

   Example: A typical PDA file folder

   C:\Program Files\PDA\PDA_NAME\Backup\

   Note: PDA_NAME is the actual name given to the PDA.

4. Select the log file to open. Only .pdb files generated by the LSI software in the Portable Download Tool are supported.

   Example: A typical file name for a log file generated by a GS550 data logger

   LSI_08_13_2004_15_31_48.PDB

3.4.3 Full Report

To export the full report to Excel, click on the Full Report button in the toolbar. Table 3 shows full report column headings:

Column	Description
Event	Record trigger*
Date	Event date stamp.
Time	Event time stamp.
System Units	Length units (metric or US) and weight units at the time of the event
Battery Voltage	Display power supply voltage at the time of the event.
Temperature	Internal temperature of the display
Firm. Version	Display firmware version at the time of the event
Sensor # 1	Sensor type: the sensor number corresponds to the sensor list programmed in the GS550
Sensor Status	Sensor was active or inactive at the time of the event.
Sensor Battery	Sensor battery level
Value	Sensor value

Examples: *Crane start-up, sensor alarm. The beginning and end of sensor alarms are indicated as "in" and "out": examples: "overload in", "overload out".*

Table 3 Full report column headings

3.4.4 Wind Report

⚠**Important!**

The wind report is only available when the data has been recorded with the data logger in the automatic recording mode.

To create a wind report in Excel, click on the Wind Report button in the toolbar.

	A	B	C	D	E	F
1	Date	Time	Sensor ID	Wind (mph)	Nb. Gust	Max. Gust (mph)
2	2006-12-28	17:17:41	10033	0	0	0
3	2006-12-28	17:18:42	10033	0	0	0
4	2006-12-28	17:19:43	10033	0	0	0
5	2006-12-28	17:20:44	10033	5	0	8
6	2006-12-28	17:21:45	10033	6	0	10
7	2006-12-28	17:22:46	10033	8	0	14
8	2006-12-28	17:23:47	10033	12	0	16
9	2006-12-28	17:24:49	10033	22	1	30
10	2006-12-28	17:25:50	10033	13	0	15
11	2006-12-28	17:26:51	10033	9	0	12
12	2006-12-28	17:27:52	10033	9	0	16
13	2006-12-28	17:29:03	10033	8	0	18
14	2006-12-28	17:29:54	10033	8	0	12
15	2006-12-28	17:30:55	10033	7	0	10
16	2006-12-28	17:31:56	10033	7	0	11

Figure 36 Exerpt Of Wind Report

Column	Description
Date	Date of event recorded
Time	Time of event recorded
Sensor ID	Wind speed sensor id number
Wind (mph)	Average wind speed during the period
Nb. Gust	Number of gusts exceeding the wind speed maximum limit during the period.
Max. Gust (mph)	Maximum wind speed (gust) during the period.

Table 4 Wind report column headings

Wind charts. The data from the Wind or Max Gust columns can be easily charted (see Figure 37).
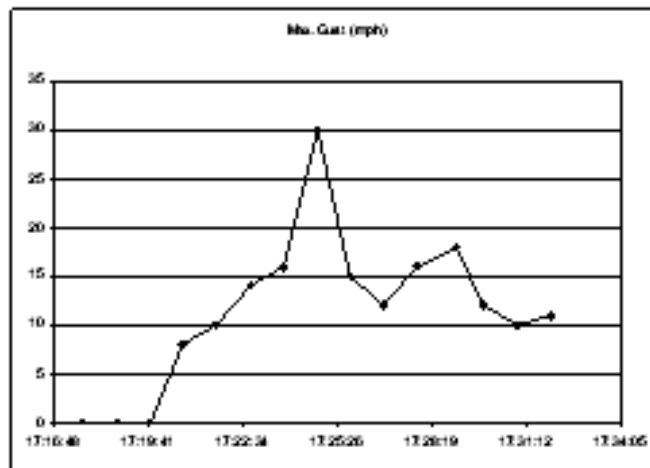
Figure 37 Maximum Gust Chart

1. Press Control and select the time column and either the Wind or the Max Gust column.
2. Click **Insert**, and then **Chart**.
3. Select X-Y (Scatter)

4. Certification Notes

4.1 Model Numbers

The model numbers for product certified by the Federal Communications Commission (FCC – United States of America), Industry Canada (IC), and the European Community (CE) can be found in the table below.

FCC and IC Certified	CE Certified	
GC005	GC005-CE	GC005-ATEX-CE
GC012	GC012-CE	GC012-ATEX-CE
GC018	GC018-CE	GC018-ATEX-CE
GC035	GC035-CE	GC035-ATEX-CE
GC060	GC060-CE	GC060-ATEX-CE
GC065	GC065-CE	GC065-ATEX-CE
GC100	GC100-CE	GC100-ATEX-CE
GC170	GC170-CE	GC170-ATEX-CE
GS001	GS001-CE	GS001-ATEX-CE
GS002	GS002-CE	GS002-ATEX-CE
GS005	GS005-CE	GS005-ATEX-CE
GS010-01	GS010-01-CE	GS010-01-ATEX-CE
GS010-02	GS010-02-CE	GS010-02-ATEX-CE
GS010-03	GS010-03-CE	GS010-03-ATEX-CE
GS011	GS011-CE	GS011-ATEX-CE
GS020	GS020-CE	GS020-ATEX-CE
GS050	GS050-CE	GS050-ATEX-CE
GS550	GS550-CE	GS550-ATEX-CE
GS550-03		
GS550-07	GS550-07-CE	GS550-07-ATEX-CE
GS550-08	GS550-08-CE	GS550-08-ATEX-CE
GS550-09	GS550-09-CE	GS550-09-ATEX-CE
GS550-10	GS550-10-CE	GS550-10-ATEX-CE

Table 5 Model Numbers

CSA and ATEX

CSA Class I, Division 1 and 2 Rated Equipment: part numbers end with "–CSA"

Example: GC012-CSA

ATEX Zone 0 & 2: the letters ATEX are included in the part numbers

Example: GC012-ATEX-CE

4.2 Important Notes for Hazardous Area Certified Components

> ⚠ **Warning!**
>
> **1. Understand manual before operation.**
>
> **2. Replace batteries only in a non-hazardous area.**

Specifications

For all sensors except the GS050-CSA & GS050-ATEX-CE, use 3.6V lithium batteries, Tadiran TL-5930 model.

For GS050-CSA & GS050-ATEX-CE anti-two-block switches, use only alkaline 'C' batteries, Duracell 1.5 volts PC1400 model.

> ⚠ **Warning!**
>
> 1. **Substitution of components may intrinsic safety.**
>
> 2. **Substitution of components may impair suitability for Class I, Division 2.**
>
> 3. **Do not remove power cable from display when on.**

Specifications

Here is one table that specifies which type of battery should be used for a particular component or component model. Please follow this table and each specification recommended.

Models	Battery Type	Par Number	Manufacturer	Voltage Per Cell	Temperature Code
GC005-ATEX-CE GC012-ATEX-CE GC018-ATEX-CE GC035-ATEX-CE GC060-ATEX-CE GC100-ATEX-CE GC170-ATEX-CE	D	TL-5930	Tadiran	3.6V	T4

Models (Continued)	Battery Type (Continued)	Par Number (Continued)	Manufacturer (Continued)	Voltage Per Cell (Continued)	Temperature Code (Continued)
GS001-ATEX-CE GS002-ATEX-CE GS005-ATEX-CE GS010-01-ATEX-CE GS010-02-ATEX-CE GS010-03-ATEX-CE GS-011-ATEX-CE GS020-ATEX-CE	D	TL-5930	Tadiran	3.6V	T4
GS050-ATEX-CE	C	PC1400	Tadiran	1.5V	T 150 °C

Sensors: GCxxx-ATEX-CE series sensors, GS001-ATEX-CE, GS002-ATEX-CE, GS010-ATEX-CE, GS011-ATEX-CE, GS020-ATEX-CE, GS005-ATEX-CE, GS050-ATEX-CE (all intrinsically safe): ⟨Ex⟩ **II 1 G Ex ia IIC T4**

GS550-ATEX-CE display: ⟨Ex⟩ **II 3 G ExnA II T4**

4.3 Ensuring Safe Operation in Hazardous Areas

⚠ **Warning!**

Equipment must be correctly installed according to the instructions desbribed in the Installation Manual, Installation chapter, page 4.
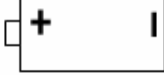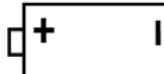
Always ensure the system works properly, and then test all componenents before using the crane. A description of display status and warning lights is available in the Operation chapter, page 10 of this manual.

4.4 Product Repair And Servicing

LSI products have no replaceable or user's serviceable parts, except the antenna (Installation Manual, page 10) and the batteries (Installation Manual, page 42). Suggested maintenance instructions of load cells are described on page 14 of the Installation Manual. For any other suspected problems, damage or required servicing, please contact your closest *LSI* office. Refer to *LSI* contact information as mentioned on page 52 of the Installation Manual.

4.5 Equipment Marking

Table 6 mentions the equipment marking. As you can see, each part number (P/N) has ATEX and FCC labels that you can consult for information.

P/N	ATEX Part Number (which ends with ATEX-CE)	FCC
GS050		
GCxxx GS001 GS002 GS005 GS010 GS020		
Inside Batt. Boxes: GCxxx GS001 GS002 GS005 GS010 GS020		

GS020	Ignition hazard: "WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD". Do not clean the wind cups in hazardous areas.	
Intrinsically, safe sensors have the following stainless steel plate: part number UB223:		LSI INC. Battery Operated: D Type, Lithium, 3.6 VDC Class I, Gr. A, B, C & D Exia INTRISICALLY SAFE Temperature Code: T4 Model: 215780 C US

Table 6 Equipment Marking

4.6 GS550 Display Labels
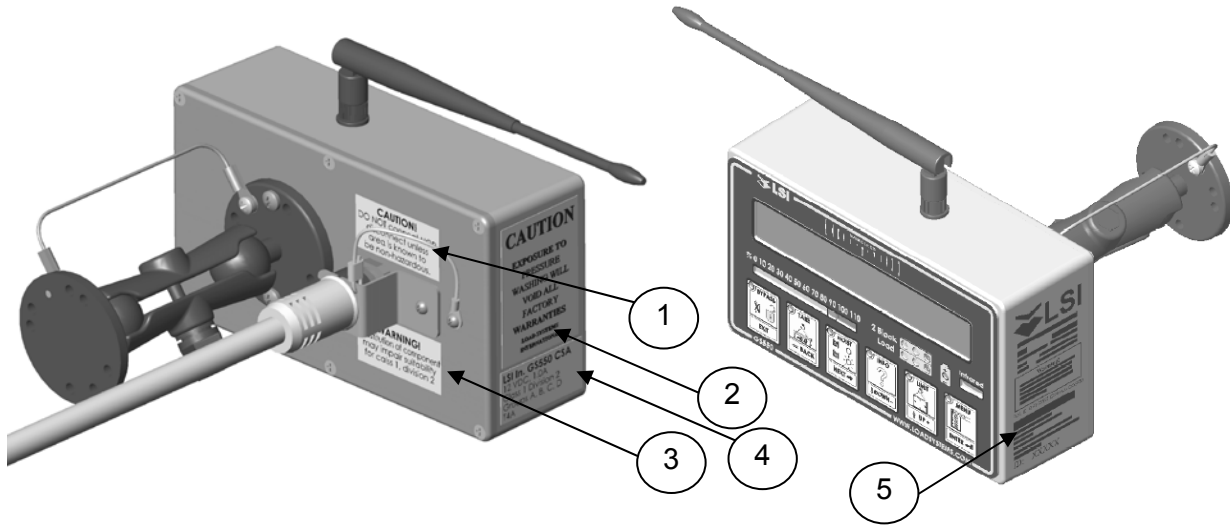
Figure 38 GS550 Display Labels

Label	CSA Class 1 Div 2	ATEX
1	UB227 Label	UB227 Label
2	UB217 Label	UB217 Label
3	UB226 Label	UB226 Label
4	UB228 CSA-specific	----
5		

UB227
Do not connect the system
Do notdisconnect the system unless this is a
non-hazardous area

UB217
Exposure to pressure washing will void all
factory warranties

UB226
Substitution of components may impair
suitability for Class 1 Division 2 or ATEX

UB228

4.7 Certifications Used For Class 1 Division 1 And Division 2

Class 1, Division 1 certification (intrinsically safe) is available for most *LSI* sensors. Class 1, Division 2 certification (non-incendiary) is available for the GS550 display.

Certificate CSA #1332949 on master contract 215780 is available on request.

Applicable CSA-certified requirements include:

- CSA Standard C22.2 No.0.4-M2004: Bonding and grounding of electrical equipment (protective grounding)
- CSA Standard C22.2 No.0-M1991: General requirements according to Canadian electrical code Part II.
- CSA Standard C22.2 No.0142-M1987: Process control equipment
- CSA Standard C22.2 No.157-M1992: Intrinsically safe and non-incendive equipment for use in hazardous locations
- CSA Standard C22.2 No.213-M1987: Non-incendive electrical equipment for use in class I, division 2 hazardous locations
- UL Standard 508, 17th edition: Industrial control equipment
- UL Standard 913, sixth edition: Intrinsically safe apparatus and associated apparatus for use in class I, II, III, division 1, hazardous (classified) locations (LS Series)
- UL Standard 913, seventh edition: Intrinsically safe apparatus and associated apparatus for use in class I, II, III, division 1, hazardous (classified) locations (GS Series)
- UL Standard 1604, third edition: Electrical equipment for use in class I and II, division 2, and class III hazardous (classified) locations.

4.8 ATEX Certifications

- EN 60079-0 : 2004 - Electrical apparatus for explosive atmospheres: General requirements
- EN 60079-11: 2007 - Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
- EN 60079-26   Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

Test Report: KEMA No. 211369200.

4.9 FCC and IC – Instructions to the User

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

FCC ID: QVBGS550   **IC: 7076A-ICGS550**

RF Exposure Warning:

This product complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. To comply with RF exposure requirements, the unit must be installed and operated with 20 cm (8 in.) or more between the product and your body. This product may not be collocated or operated in conjunction with any other antenna or transmitter.

This device has been designed to operate with the antennas listed below, and having a maximum gain of 2.0 dBi. Antennas not included in this list or having a gain greater than 2.0 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Antenna List

LSI P/N:	TA001		LSI P/N:	TA008
Description	¼ wave monopole		Description	½ wave dipole
MFG	Linx Technologies		MFG:	Nearson
P/N	ANT-916-CW-QW		P/N:	S467AH-915S

FCC ID: QVBGS000   **IC: 7076A-ICGS000**

FCC ID: QVBGS050   **IC: 7076A-ICGS050**

FCC ID: QVBGS075   **IC: 7076A-ICG075**

RF Exposure Warning:

This product complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. To comply with RF exposure requirements, the unit must be installed and operated with 20 cm (8 in.) or more between the product and your body. This product may not be collocated or operated in conjunction with any other antenna or transmitter.

This device has been designed to operate with the antennas listed below, and having a maximum gain of 0.5 dBi. Antennas not included in this list or having a gain greater than 0.5 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Antenna List

LSI P/N: TA011
Description   ¼ wave monopole
MFG   Load Systems International

4.10 EMI / EMC

EMI/EMC (Electro-Magnetic Immunity & Electro-Magnetic Compatibility):

EN 301 489-3 V1.4.1 (2002-08)

Clause 8: Immunity tests

Clause 8.2: Limits for radiated emissions from ancillary equipment, measured on a stand-alone basis (measuring a 10-m distance): Pass

Clause 8.3: Limits for conducted emissions DC power input/ouput ports: Pass

Test method used: CISPR 22, EN 61000-3-2: 2000, and EN 61000-3-3:1995+ A1:2001

All tests were performed using measurement apparatus defined in CISPR 16-1. Radiated emissions measurements compliant with CISPR 16-1 requirements.

EN301 489-1

Clause 9: Test Methods and levels for immunity tests

Enclosure-radio frequency electromagnetic field, EN 61000-4-3: Pass

Signal – RF common mode, EN 61000-4-6: Pass

DC Power input ports, RF common mode, EN 61000-4-6: Pass

Clause 9.2: Radio frequency electromagnetic field: Pass

Clause 9.5: Radio frequency common mode: Pass

4.11 ESD (Electro-Static Discharges)

LSI products are tested according to EN 61000-4 standards.

4.12 Other Compliances

- SAE J159 and SAE J987
- ASME B30.5-2000
- Franklin laboratory: *LSI* products are safe to use in proximity to blasting caps
- New-York City: MEA 110-05-E, in compliance with 19.1.1(a).1 requirements of Reference Standard RS 19-2 of the Building Code
- ABS (American Bureau of Shipping)
    API Spec 2C compliant

4.13 CE – Declaration of Conformity

LSI
Load Systems International

LOAD SYSTEMS INTERNATIONAL INC.

Declaration of Conformity
According to EN 45014

Manufacturer's Name: Load Systems International Inc.

Manufacturer's Address:

Canada:	United States of America:	United Arab Emirates:
4495 boul. Wilfrid-Hamel, bur. 110	9223 Solon Rd, Suite A	Y02 Saif Zone, P.O. Box 7976
Québec QC G1P 2J7	Houston TX 77064	Sharjah

declare under our own responsibility that the products:

Model	Description
GC005-CE	5 000 lb capacity load cell for Europe
GC012-CE	12 000 lb capacity load cell for Europe
GC018-CE	18 000 lb capacity load cell for Europe
GC035-CE	35 000 lb capacity load cell for Europe
GC060-CE	60 000 lb capacity load cell for Europe
GC065-CE	65 000 lb capacity load cell for Europe
GC100-CE	100 000 lb capacity load cell for Europe
GC170-CE	170 000 lb capacity load cell for Europe
GS001-CE	Load Transmitter With Pigtail 6 in. for Europe
GS002-CE	Load Transmitter w/pigtail & pull up for 0mv balanced cell for Europe
GS005-CE	Anti-Two-Block Transmitter for Europe
GS010-01-CE	Boom Angle sensor for Europe
GS010-02-CE	360° Angle sensor for Europe
GS010-03-CE	List Angle sensor for Europe
GS011-CE	Angle sensor with Length input for Europe
GS020-CE	Wind Speed sensor for Europe
GS050-CE	Anti-Two-Block sensor for Europe
GS550-CE	Standard GS display for Europe
GS550-07-CE	GS550 Display Spanish for Europe
GS550-08-CE	GS550 Display for Manitowoc for Europe
GS550-09-CE	GS550 Display for Shuttlelift for Europe
GS550-10-CE	GS550 Display Spanish for Shuttlelift for Europe

to which this declaration refers conform to the relevant standards or other standardising documents:

Wireless: EN 300 220-3 V1.1.1 (2000-09)
EMC: EN 301 489-3 V1.4.1 (2002-08)

Québec, June 26th, 2007

Dave Smith
President

Datasheets:

The following figures show all sensors, load cells and display available including the temperature and humidity levels. In addition, it is to mention that the ingress protection (IP) of equipment corresponds to 65. The ingress protection of equipment is an "international classification system for sealing effectiveness of enclosures". The first digit indicates "degree that persons are protected against contact with moving parts (other than smooth rotating shafts, etc.) and the degree that equipment is protected against solid foreign bodies intruding into an enclosure". The second digit of the IP code of equipment indicates "the degree of protection of the equipment inside the enclosure against the harmful entry of various forms of moisture (e.g. dripping, spraying, submersion, etc.)". Also, it is useful to know that an "X is used for one of the digits if there is only one class of protection; i.e., IP X4 which addresses moisture resistance only.)" [1]

⚠️ **Important!**
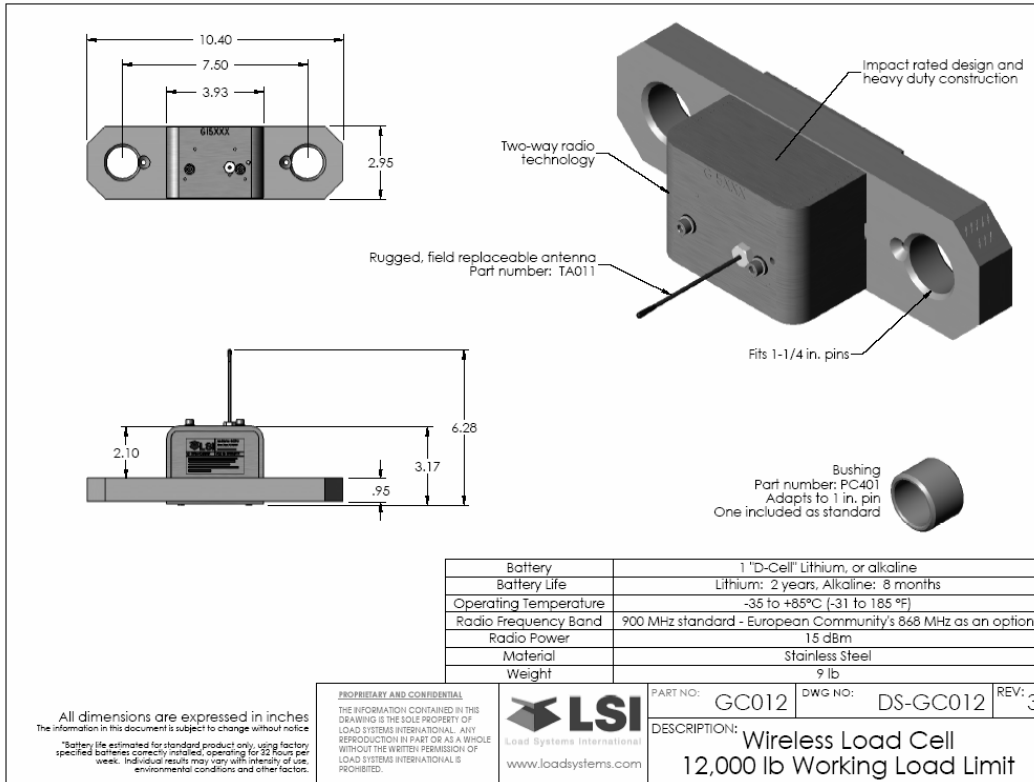
Measurements are subject to change. To have the exact measurement, please visit our website.
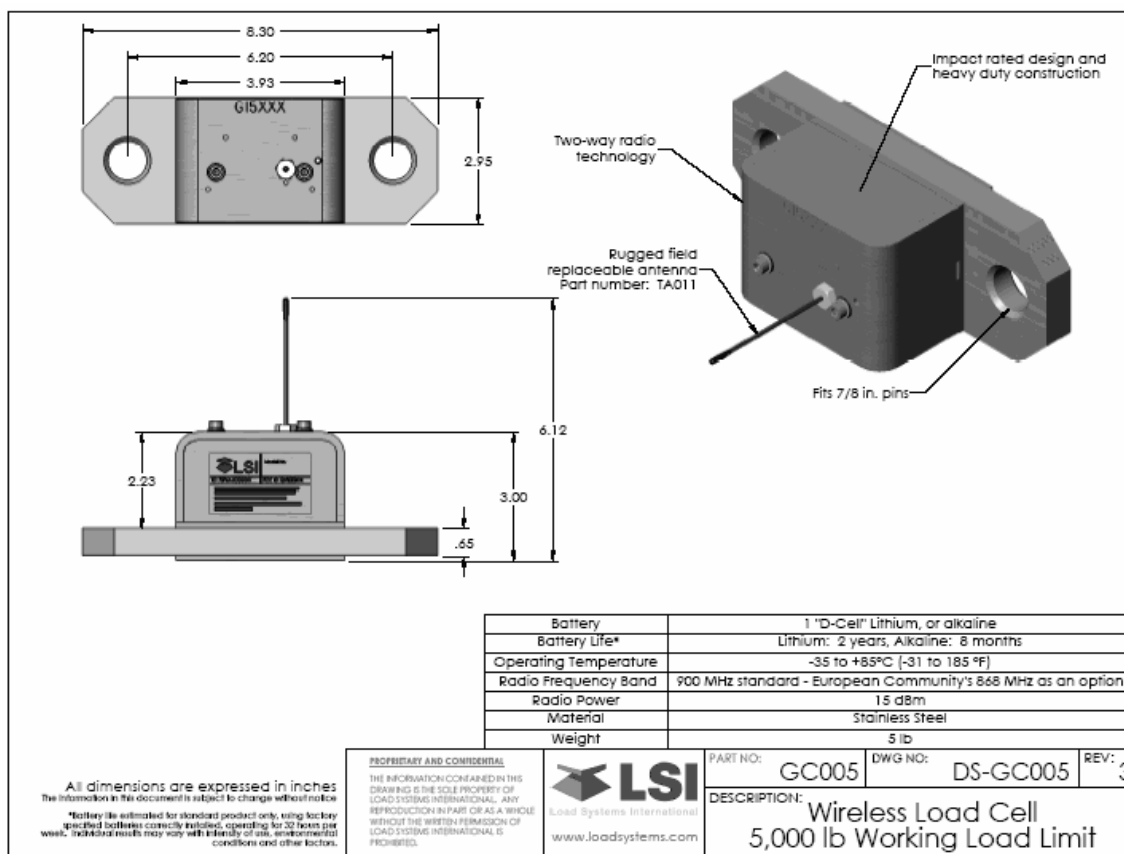
Figure 39 GC005 Wireless Load Cell

---

1. http://www.interpower.com/ic/IP_codes_info.asp

Figure 40 GC012 Wireless Load Cell

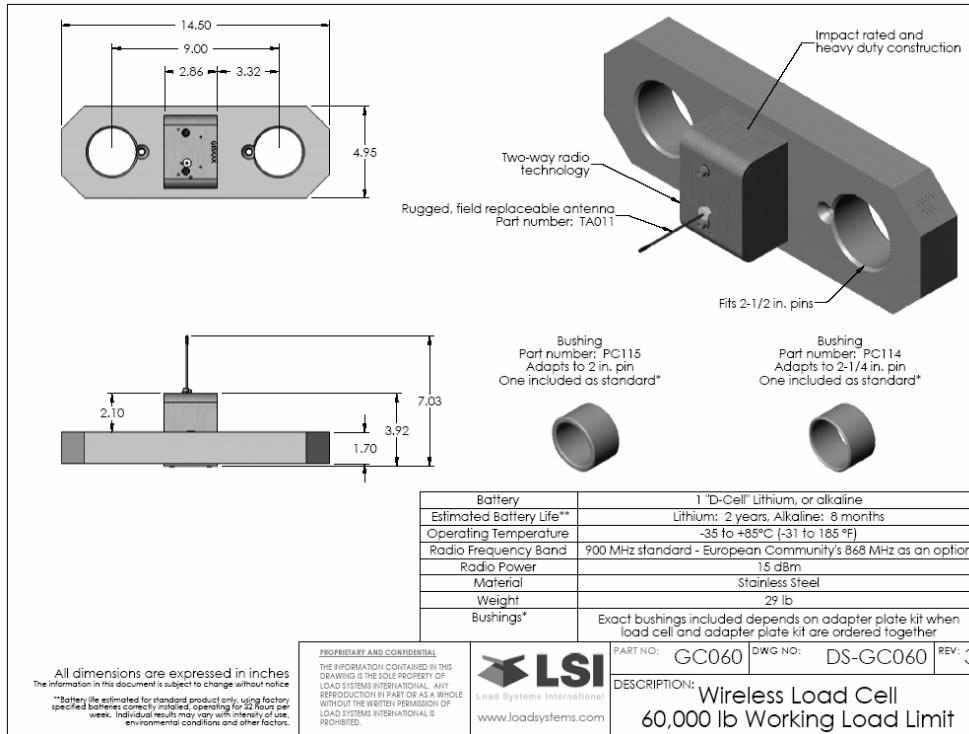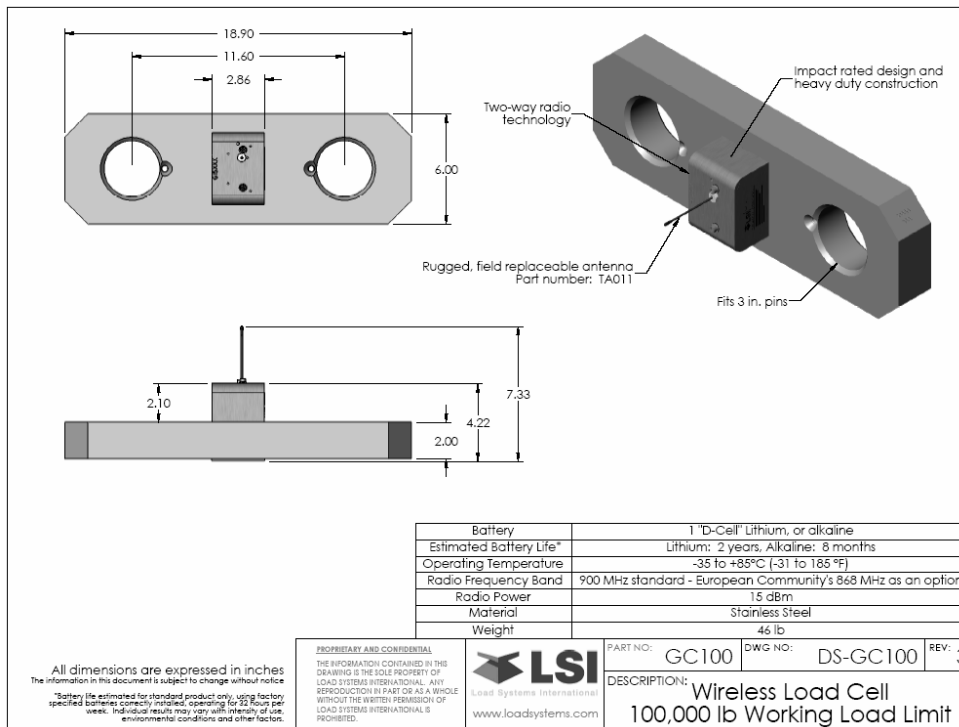**Figure 41 GC018 Wireless Load Cell**

The GS550 System

Figure 42 GC060 Wireless Load Cell

Figure 43 GC100 Wireless Load Cell

Figure 44 GC170 Wireless Load Cell

The following specifications appear in the GC170 drawing:

Battery	1 "D-Cell" Lithium, or alkaline
Estimated Battery Life*	Lithium: 2 years, Alkaline: 8 months
Operating Temperature	-35 to +85°C (-31 to 185 °F)
Radio Frequency Band	900 MHz standard - European Community's 868 MHz as an option
Radio Power	15 dBm
Material	Stainless Steel
Weight	94 lb

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www.loadsystems.com

PART NO: GC170   DWG NO: DS-GC170   REV: 3

DESCRIPTION: Wireless Load Cell
170,000 lb Working Load Limit

All dimensions are expressed in inches
The information in this document is subject to change without notice

*Battery life estimated for standard product only, using factory specified batteries correctly installed, operating for 32 hours per week. Individual results may vary with intensity of use, environmental conditions and other factors.

Figure 45 GS020 Wind Speed Sensor

The following specifications appear in the GS020 drawing:

Wind speed range	4 to 100+ MPH
Wind speed accuracy	±3 mph maximum (typical ±1 mph)
Battery	1 "D-Cell" Lithium, or alkaline
Estimated Battery Life*	Lithium: 16 months, Alkaline: 5 months
Operating temperature	-35 to +85°C (-31 to 185 °F)
Radio Frequency Band	900 MHz standard - European Community's 868 MHz as an option
Radio Power	15 dBm
Material	Stainless Steel
Weight	6 lb

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www.loadsystems.com

PART NO: GS020   DWG NO: DS-GS020   REV: 3

DESCRIPTION: Wind Speed Sensor

All dimensions are in inches
The information in this document is subject to change without notice

*Battery life estimated for standard product only, using factory specified batteries correctly installed, operating for 32 hours per week. Individual results may vary with intensity of use, environmental conditions and other factors.
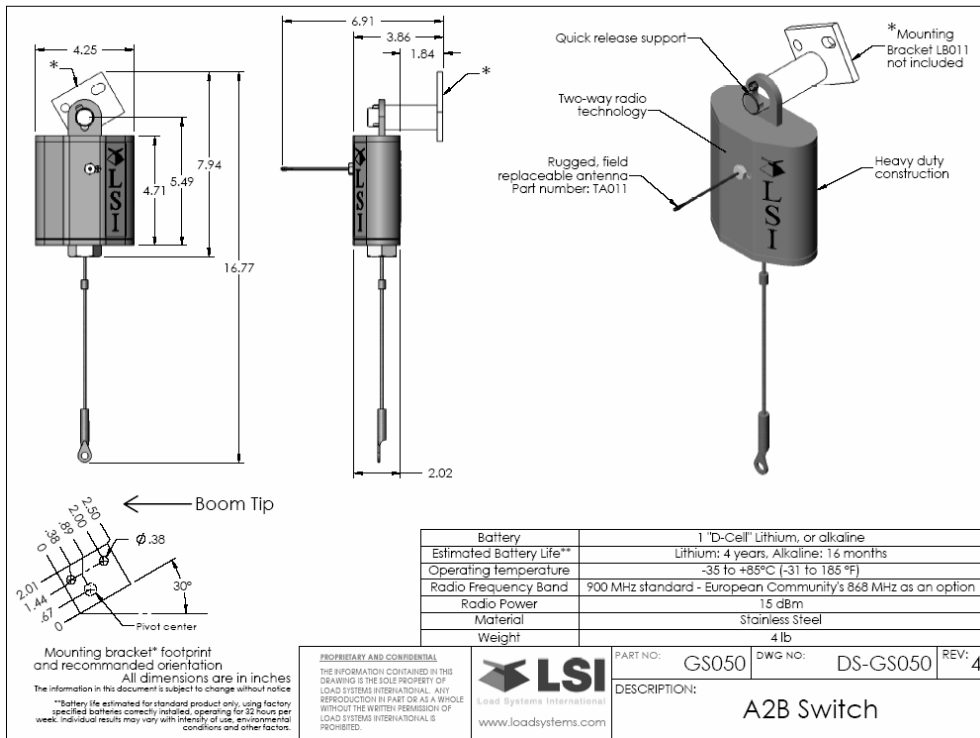
Figure 46 GS050 A2B Switch

Figure 47 GS550 Wireless Display

Environmental Conditions:

Operating temperature:	-35º C to 85º C (-31º F to 185º F)
Humidity range:	0% to 100% for all components except for GS020 Wind Speed Sensor, that is 10% to 100%

Cleaning Procedure For Load Cells

Each time you are changing batteries, the equipment cleaning procedure must be performed:

1. Open the casing.
2. Replace batteries verifying the contact with batteries, and the contacts are in good conditions.
3. If contacts have some dust or some rust, clean them.

⚠️**Important!**

Ensure LED is emitting signal.

---

4. Remove silicone from plate of the casing.
5. Replace the silicon milinary bag used for keeping humidity. If you do not have any, remove the old one only.
6. Apply dielectric grease on *Molex* connector.
7. Use silicone RTV on slot used for closing the casing and around the mounting plate.
8. Use alcool to clean.
9. Apply antiseize compound so screws will not be glued.
10. Reconnect load cell paying attention to chock wire.
11. Tighten screws gently and alternatively.
12. When there are bushings, grease them before the re-installation.
13. Grease the two holes.

⚠️**Important!**

- **In some cases, the antenna may be replaced. To know how to replace and clean it, refer to section Replacing A Sensor Antenna of the Maintenance Manual.**

---

5. GS550 Menu Outline

1) Parts of Line

2) Crane Rigging

3) Display Settings
  3A) Weight units
  3B) Display language
  3C) Light intensity
  3D) LCD contrast
  3E) Backlight mode

4) Installation
  4A) Sensor List
    4A1) Sensor type and radio identification number
    4A2) System selected configuration number
    4A3) Configuration number selection mode
  4B) Sensor Calibration
    4B1) Automatic value calibration wizard
    4B2) Manual parameter calibration
    4B3) Reset sensor parameters
  4C) Radius Settings
    4C1) Boom length
    4C2) Slew offset
    4C3) Height offset
    4C4) Boom deflection
    4C5) Boom top length
    4C6) Boom top offset
    4C7) No load deflection
    4C8) Jib offset
    4C9) Lattice extension offset
    4C10) Jib mounting point perpendicular
    4C11) Jib mounting point parallel
    4C12) Select sheave
    4C13) Jib length
    4C14) Luffing jib length
    4C15) Lattice extension length
    4C16) Manual length
    4C17) Sheave head length perpendicular
    4C18) Sheave head length parallel
    4C19) Sheave radius
    4C20) Deduct
  4D) Chart Settings
    4D1) Operation mode
    4D2) Crane capacity chart interpolation
    4D3) Out of charts default working load limit
    4D4) Enable start section
    4D5) Enable stop section
    4D6) Retracted boom length tolerance
    4D7) Intermediate boom length tolerance
    4D8) Extended boom length tolerance

    4D9) Radius tolerance
    4D10) Boom angle tolerance
  4E) Memory Banks
    4E1) Copy configuration to memory bank A
    4E2) Copy configuration to memory bank B
    4E3) Copy configuration to memory bank C
    4E4) Copy memory bank A to current configuration
    4E5) Copy memory bank B to current configuration
    4E6) Copy memory bank C to current configuration
    4E7) Restore factory configuration
    4E8) Clear configuration
  4F) Data Logger
    4F1) Data logger mode
    4F2) Adjust date
    4F3) Adjust time
  4G) Lockout Settings
    4G1) Warning level
    4G2) Alarm level
    4G3) Lockout level
    4G4) White wire lockout trigger
    4G5) Green wire lockout trigger
    4G6) Orange wire lockout trigger
    4G7) Blue wire lockout trigger
    4G8) Lockout relay inverted
  4H) Password Settings
    4H1) Set administrator password
    4H2) Set user password
    4H3) Tare menu password protection
    4H4) Limit menu password protection
    4H5) Info menu password protection
    4H6) System start-up password protection
    4H7) Parts of Line menu password protection
    4H8) Chart Rigging password protection
    4H9) Display Settings password protection
    4H10) Sensor List password protection
    4H11) Sensor Calibration password protection
    4H12) Radius Settings password protection
    4H13) Chart Settings password protection
    4H14) Memory Banks password protection
    4H15) Data logger password protection
    4H16) Lockout Settings password protection
    4H17) Network Options password protection
    4H18) System Diagnostic password protection
    4H19) Alarm Bypassed protection
  4I) Network Options
    4I1) Display mode
    4I2) Set-up sensor repeater
    4I3) Last repeater programmed
    4I4) Install update

5) System Diagnostic
  5A) System Sensors Diagnostic

5B) Radio Network Diagnostic
    5B1) Radio network background noise
    5B2) List last 32 sensors received
    5B3) Search for sensors

5C) Lockout Diagnostic
    5C1) White wire status and self-test
    5C2) Green wire status and self-test
    5C3) Orange wire status and self-test

5D) Display Diagnostic
    5D1) Time and date

5D2) Time clock battery test
5D3) External power supply voltage
5D4) internal temperature
5D5) GS550 base station identification number
5D6) GS550 (portable) battery level
5D7) Radio (certification and frequency)

5E) Digital Input Diagnostic
    5E4) Blue wire status

6. GS550 Menu Locator

Luffing jib length, 4C14

Manual length, 4C16
Manual parameter calibration, 4B2
Memory Banks, 4E
Memory Banks password protection, 4H14

N

Network Options, 4I
Network Options password protection, 4H17
No load deflection, 4C7

O

Operation mode, 4D1
Orange wire status and self-test, 5C3
Orange wire lockout trigger, 4G6
Out of charts default working load limit, 4D3

P

Parts of Line, 1
Parts of Line menu password protection, 4H7
Password Settings, 4H

R

Radio (FCC, IC or CE) and frequency, 5D7
Radio network background noise, 5B1
Radio Network Diagnostic, 5B
Radius Settings, 4C
Radius Settings password protection, 4H12
Radius tolerance, 4D9
Reset sensor parameters, 4B3
Restore factory configuration, 4E7

Retracted boom length tolerance, 4D6

S

Search for sensors, 5B3
Select sheave, 4C12
Sensor Calibration, 4B
Sensor Calibration password protection, 4H11
Sensor List, 4A
Sensor List password protection, 4H10
Sensor type and radio identification number, 4A1
Set administrator password, 4H1
Set user password, 4H2
Set-up sensor repeater, 4I2
Sheave head length parallel, 4C18
Sheave head length perpendicular, 4C17
Sheave radius, 4C19
Slew offset, 4C2
System Diagnostic, 5
System Diagnostic password protection, 4H18
System selected configuration number, 4A2
System Sensors Diagnostic, 5A
System start-up password protection, 4H6

T

Tare menu password protection, 4H3
Time and date, 5D1
Time clock battery test, 5D2

W

Warning level, 4G1
Weight units, 3A
White wire status and self-test, 5C1
White wire lockout trigger, 4G4

7. LSI PRODUCT WARRANTY

2006/05/26

LIMITED WARRANTY:

LOAD SYSTEMS INTERNATIONAL INC. ("LSI") warrants that its products (the "Products"), for a period of two (2) years after delivery of such Products (the "Warranty Period"), when installed and used in accordance with specifications described in user's manuals, technical materials and any related writings published by LSI with respect with such Products, will be free from defects in materials and workmanship. During the Warranty Period, LSI or its designated service representative shall repair, or at its option, replace any Product that is confirmed to be defective by LSI in accordance with the warranty services procedures described below.

WARRANTY SERVICES PROCEDURES:

In order to benefit of the above-mentioned warranty, the purchaser shall notify LSI's customer service or LSI's authorized distributor or representative originally responsible for the sale of the Products within the Warranty Period in order to obtain a Return Authorization Number. A proof of purchase of the Product, such as an invoice or a receipt certifying the validity of this warranty, shall be presented in order to obtain warranty services. In any event, even if a Return Authorization Number is provided to purchaser, LSI reserves the right to inspect the damaged Product or part before the final decision of repairing or replacing the defective Product or part.

The defective Product or part shall be returned to LSI or its designated service representative, accompanied by the Return Authorization Number with prepaid shipping charges at the address mentioned below. The purchaser must insure the shipment or accept the risk of loss or damage during the shipment. Purchaser shall also pay any tariff or duty applicable to the return of defective part or Product. LSI will, at its option, repair or replace the Product or part returned to LSI or to its designated service representative. LSI owns all parts removed from a repaired Product. If LSI repairs a Product, its warranty is not extended. If LSI replaces a Product, the replaced Product is warrantied for the remainder of the original term or sixty (60) days, whichever is longer.

LSI will pay transportation costs of replacement or repaired parts to the destination in Canada and the continental United States of America. LSI will not pay any transportation costs of replacement or repaired parts to destination outside of Canada and the continental United States of America which costs shall be for the purchaser's account.

Parts with a Return Authorization Number can be sent to the following location:

From the USA and Mexico:

Receiving Department Tel.: (281) 664-1330   Fax: (281) 664-1390
LSI – U.S. Warehouse
9223 Solon Rd., Ste. A
Houston, TX 77064-1238
United States

From Canada:

Warranty & Repair Tel.: (418) 650-2330   Fax: (418) 650-3340
Load Systems International Inc.
4495 boul. Wilfrid-Hamel, Bureau 110
Québec, QC G1P-2J7
Canada

EXCLUSION OF OTHER WARRANTIES

The above warranty is the sole warranty applicable and there are no express, legal or implied warranties or conditions in relation to any Products including any implied warranty or condition of merchantability, non-infringement or fitness for a particular purpose and those otherwise arising by statute or otherwise in law or from a course of dealing or usage of trade, which are expressly disclaimed. No oral or written information or advice given by LSI or its employees or representatives shall create a warranty or condition or in any way increase the scope of LSI's obligation. LSI does not warrant that the business results obtained from the use of the Products will be appropriate or adequate for the purchaser.

EXCLUSION

The above-mentioned warranty does not cover and shall not apply to:

- any shipping charges to LSI or an designated service representative as well as the technician out-of-pocket expenses including traveling, lodging and meal expenses, if any;

- the damages caused during the transport or the move of the Products;

- damages caused by accidents, abuse, misuse, a force majeure or external cause;

- Products altered, modified or repaired not expressly authorized by LSI;

- any cost, damage or expenses for field labor or any other expenses related to or arising from the replacement of defective parts.

- **Products used for pile-driving, wire rope activated clamshell or dragline applications. If purchaser uses the Products for pile-driving, wire rope activated clamshell or dragline application, the warranty will automatically become null and void.**

LIMITATION OF LIABILITY

To the maximum extent permitted by applicable law, in no event will LSI be liable to the purchaser or any third party for any indirect, special, consequential, incidental or exemplary damages whatsoever, including but not limited to loss or revenue or profit, lost or damaged data, business interruption or any other pecuniary loss whether based in contract, tort or other causes of action, even if LSI has been advised of the possibility of such damages. In any event, the total liability of LSI arising from any cause of action or claim whatsoever, whether (1) in contract, (2) in tort (including negligence, whether sole, joint, contributory, concurrent or otherwise, but not including intentional, reckless or wanton tort), (3) under strict liability, (4) under any environmental or antipollution law or regulation, (5) connected with any toxic or hazardous substance or constituent, (6) arising out of any representation or instruction, or under any warranty, (7) or otherwise, arising out of, connected with, or resulting from the design, manufacture, sale, resale, delivery, repair, replacement or use of Products or the furnishing of any service shall in no event exceed the price allocable to and paid to LSI for the individual unit of Products or service or part thereof which gives rise to the cause of action or claim.

RECOMMENDED PRACTICE

LSI recommends careful consideration of the following factors when specifying and installing the Products. Before installing a Product, the Installation, Operation, and Maintenance instructions provided with the unit must be read and understood.

8. LSI Contact Information

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Toll Free Phone:　　(888) 819 4355

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Technical Support

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LSI

Load Systems International