

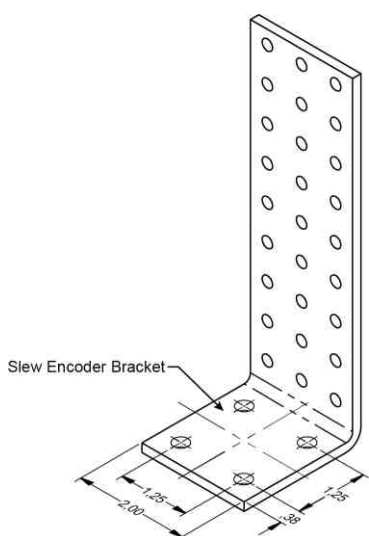


Figure: Mounting bracket footprint. Dimensions are in inches.

Once the mounting bracket is installed, screw on the encoder with the nuts and bolts provided. Put tension on the spring by inserting the cotter pin in the middle hole in front of the hinge.

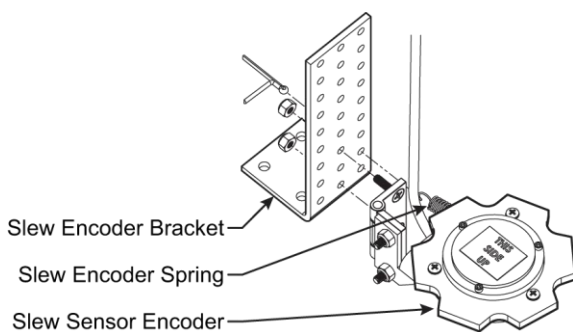


Figure: Slew encoder installation. Typical installation.

**NOTE** - The tension applied by the slew encoder spring is required to keep the encoder gear in contact with the slew gear.

### 2.14.5 Slew Transmitter Location

**NOTE** - To ensure reliable radio communication between the slew sensor and the GS920, the following conditions must be respected:

1. The antenna of the slew transmitter should not be in contact with metal.
2. The antenna should point to the left or to the right of the boom; it should not point directly to, or away from, the GS920.
3. The antenna should have a clear line of sight to the GS920; in most cases this means mounting the transmitter outside of the crane structure on the same side of the boom as the operator's cab.

The slew transmitter is connected to the slew encoder with a 6 ft. cable, but it can be installed beside the transmitter if convenient; the cable can be cut to the length required.

### 2.14.6 Slew Transmitter Installation

**NOTE** - The transmitter must be installed such that it does not interfere with the crane through all normal movements. It may be installed at any angle if the cover can be removed when required to change the battery.

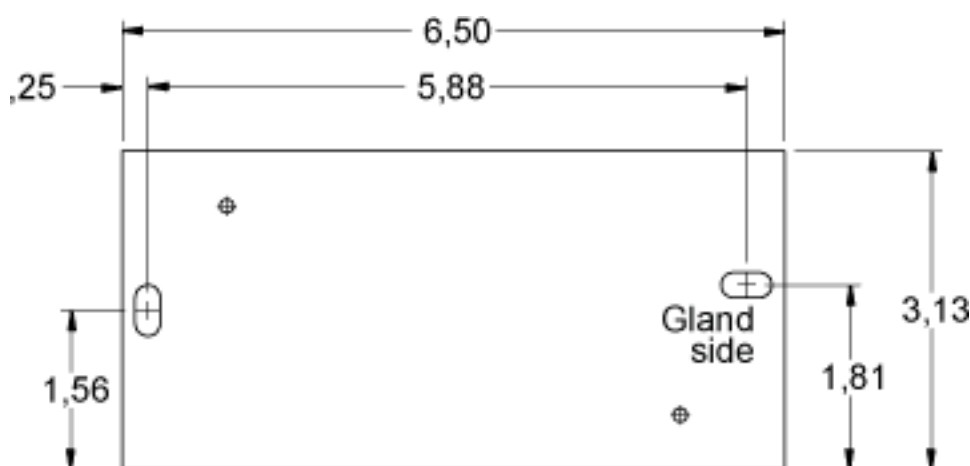


Figure: Slew transmitter. Dimensions are in inches. Not to scale.

Screw the slew transmitter to a flat surface with 1/4 in. screws.

If needed, weld pads can be used to facilitate transmitter installation.

**NOTE** - Do not weld in proximity to Trimble sensor/transmitters.

Tie wraps can be used to secure the cable between the encoder and transmitter.

### 2.14.7 Cable Length Adjustment

If the cable between the encoder and transmitter is too long, it can be cut to the desired length;

Remove the cover from the transmitter using either a flat or a Phillips No. 2 screwdriver.

Using a small flat screwdriver, loosen the 6 screws of the terminal block and remove the wires from it. Lay down the transmitter cover on a clean surface.

Loosen the cable gland with a 3/4 in. wrench and pull the cable from the inside of the transmitter box until you reach the desired length. Tighten the gland back with the wrench. Do not overtighten.

Cut the cable excess, leaving about 4 in. in the transmitter box. Remove the sheath to about 2 in., remove the shield and remove the individual sheaths on the 6 wires to about 1/4 in. Connect the 6 wires in the terminal block respecting the color codes and tighten the terminal block screws.

Replace the transmitter cover and screw it in place.

Test the sensor for proper function: start-up the LiftingWorks application and move the encoder wheel.

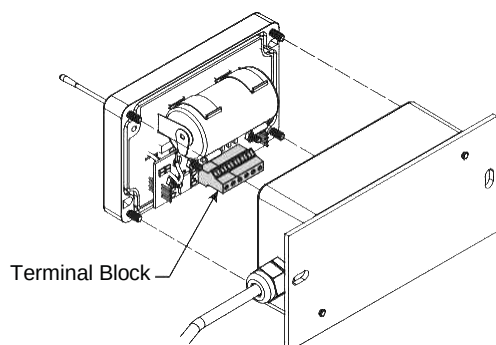


Figure: Cable length adjustment

## 2.15 Slow Sensor Calibration

The slow sensor needs to be calibrated on the crane where it is installed on before utilization.

Go to menu, select the slow sensor.

Menu Set crane gear teeth number; enter the teeth count of crane's slew gear.

Menu Set slow sensor gear teeth; enter the teeth count of the gear of the slow sensor installed.

Menu Slew angle must increase when rotates to the right. Reverse rotation; depending on how the slow sensor is installed, the rotation direction may be reversed. The slew value should go up when you swing to right (clockwise).

Menu Adjust/confirm slew value; enter the current position of the slew (swing).

Menu Press enter to save calib in sensor; the settings will be saved in the sensor.

## 2.16 Data Logger

The GS920 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 32 000 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 USB mass storage device (USB key) and then transferred to a personal computer for analysis.

### 2.16.1 Recording Modes

Adjust the data logger recording mode as required:

Go to menu and select Data Logger.

Enter the user password.

Select the data logger recording mode.

Return to the main page of the LiftingWorks application or scroll down to adjust the data logger date and time (see [Date and Time, page 74](#)).

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

### 2.16.1.1 *Recording Modes description*

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 recording data logger mode is selected on menu Click Minutes, press Enter and then use Up and Down to adjust the record interval in minutes.

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 Variation (%), Click and then 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 (see step 3 above) click Threshold No. 1 and adjust the peak threshold for the first load cell.

Go down to repeat for the second load cell etc. Up to four load cells can be programmed for automatic peak data logging.

User input. The status of all sensors is recorded on demand. A normally open push button must be installed on a digital input to the GS920 through a pre-determined wire of the power supply and lockout cable.

All data. All communications between a main unit and its sensors are recorded.

## 2.16.2 Date and Time

Adjust the data logger date and time as required:

Go to menu and click Data Logger.

Enter the user password.

Click Date.

The digits of the year should be flashing: adjust the year and press Next.

Adjust the month and press Next.

Adjust the day.

Click Time and adjust the time.

The hour should be flashing: adjust the hour from 00 (midnight) to 23 (11 pm).

Press Next to adjust the minute.

Adjust the minute and press Next.

Adjust the second and press Enter to save any changes.

Return to the main page of the LiftingWorks application.

## 2.17 Sensor List

All sensors in the GS920 system are programmed in the sensor list. The GS920 uses information from all sensors in the sensor list. Conversely, the GS920 will not use or not show the 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.

**NOTES** - Information displayed 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.

To ensure communication, sensors must be at least six feet from the GS920.

### 2.17.1 How to Add a Sensor to the GS920

Determine the radio identification number (ID) of the sensor to be added. This number between 10000 and 99999 is engraved on the sensor.

Go to menu Sensor list.

Enter the user password.

Advance to the next empty sensor position in the sensor list "No sensor". Up to 32 sensors may be added to the sensor list.

Select the sensor type.

Program the sensor ID.

Return to the main page of LiftingWorks application.

### 2.17.2 How to Remove a Sensor from the GS920

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.

Go to menu sensor list.

Enter the user password.

Select the sensor to be removed and click to modify.

Select “No sensor”. This will remove the sensor from the sensor list but retain the sensor ID.

Return to the main page of LiftingWorks application.

**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”.

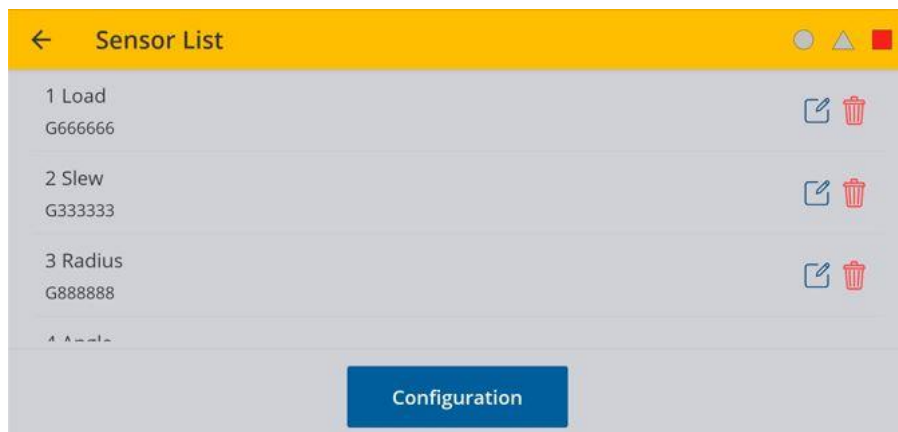


Figure: The sensor list

## 2.18 Network Options

### 2.18.1 Listen to Sensor Only

When the GS920 is started it normally wakes up the sensors in the sensor list and takes control of them. The last main control unit powered on that is programmed for a sensor becomes that sensor's network controller. This means that if a second main control unit is programmed for a sensor, it will take control of it; the sensor will no longer acknowledge communication from the first main control unit. Occasionally it may be useful to monitor an installed system from a remote control without disrupting the existing network. The GS920 can be programmed to operate in "listening mode". In this mode the GS920 will connected with tablet will display the information from programmed sensors without becoming the network controller.

**NOTE** - Sensors can only have one network controller at a time. To receive communication from a sensor without taking control of that sensor a main control unit must first be programmed in "listening mode".

#### 2.18.1.1 *Program the listen only mode*

Go to menu and click Network Options.

Enter the user password.

Click Network Control.

Choose between "NETWORK CONTROLLER" and "LISTEN ONLY mode" mode.

Return to the main page of LiftingWorks application.

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

**NOTE** - To regain network control of programmed sensors adjust the GS920 to "Network Controller", shut the main control unit off, and then start it again.

## 2.18.2 Remote Monitoring

The remote-monitor mode enables one GS920 (the supervisor control unit) to monitor another GS920 (the operator control unit) from a remote location.

The supervisor control unit is synchronized with the operator control unit configuration and listens directly to the sensors in the sensor list. Furthermore, with the option “sync operating page” the supervisor control unit can be synchronized to the exact page shown by the operator control unit when not in menu mode.

### 2.18.2.1 Setup

Set the mode to remote monitor on line 1 of menu Network Control.

Set the ID of the operator control unit to be monitored on line 2.

Set the sync operating page option as required on line 3.

When communication has been established and the supervisor control unit configuration has been synchronized the message Remote monitor of id Gxxxxx appears on the top line of the supervisor control unit.

### 2.18.2.2 Operation

The supervisor control unit is not synchronized when the operator control unit is in the menu mode. When the operator control unit is returned from menu to operating mode it synchronizes the supervisor control unit with any changes that have been made to the system configuration.

The supervisor control unit records all normal data logger events in parallel with the operator control unit, except during synchronization or when it is turned off.

When remote monitoring is turned off, the entire system configuration is cleared from the supervisor control unit and all parameters revert to their default values.

### 2.18.2.3 Restrictions

Both the supervisor and operator of main unit must have exactly the same firmware and capacity chart (if applicable). Remote monitoring uses the standard Trimble radio protocol; it is subject to the same limitations. A clear and direct line of sight may be required between the remote monitor and both the operator control unit and the system sensors.

Supervisor control unit system parameters cannot be adjusted when in remote monitor mode. An operator control unit can only be monitored by one supervisor control unit at a time.

### 2.18.3 Repeater

Communication between a GS920 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<sup>1</sup>. The battery life of the sensor repeater will be reduced to 35 days<sup>2</sup>. This function should not be used where it is not required.

#### 2.18.3.1 *Program a sensor repeater*

In menu click Set Up Sensor Repeater.

Click Select repeater and program the radio ID number of the sensor that will be the repeater.

Click Select source and the radio ID number of the sensor that will be the source.

Press Set up repeater to save the new network path. The following messages will be displayed briefly:

Parameters saved correctly

Communicating with remote sensor...

Configuration saved success fully

Return to the main page of LiftingWorks application.

#### 2.18.3.2 *Clear a sensor repeater*

In menu click 2) Repeater List. REPEATER LIST details the last repeater programmed. When no repeater has been programmed, no repeater set up message is displayed.

Select a repeater in the list and press Remove repeater to shut down the repeater programmed. The following messages will be displayed briefly:

Removing network path...

Initializing network...

---

<sup>1</sup> 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.

<sup>2</sup> 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.

To shut down additional repeaters repeat step 1 and 2. Test all system functions after setting up or removing a repeater. Shut off and then restart the GS920.

Return to the main page of LiftingWorks application.

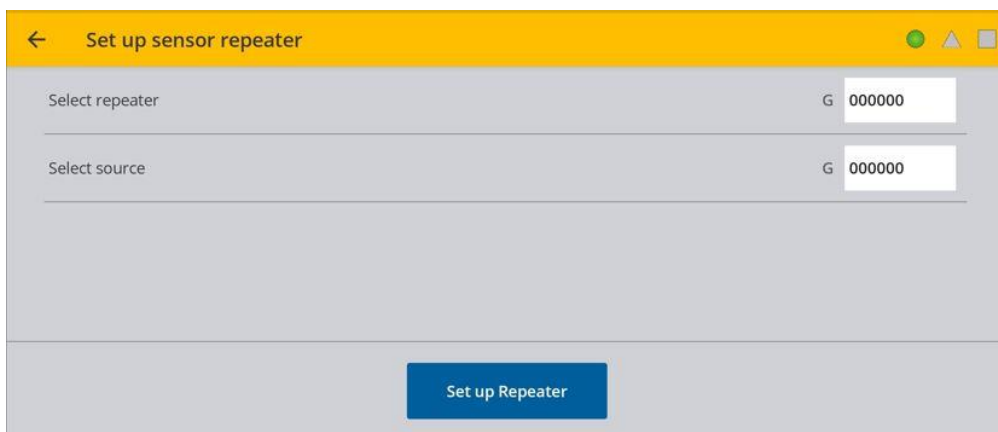


Figure: Program a sensor repeater

### 2.18.3.3 Wireless Sensor Update

It is possible to send a firmware update to a sensor using the GS920 (menu 4I) 4) INSTALL SENSOR UPDATE).

For more information on installing a sensor update please contact Trimble.

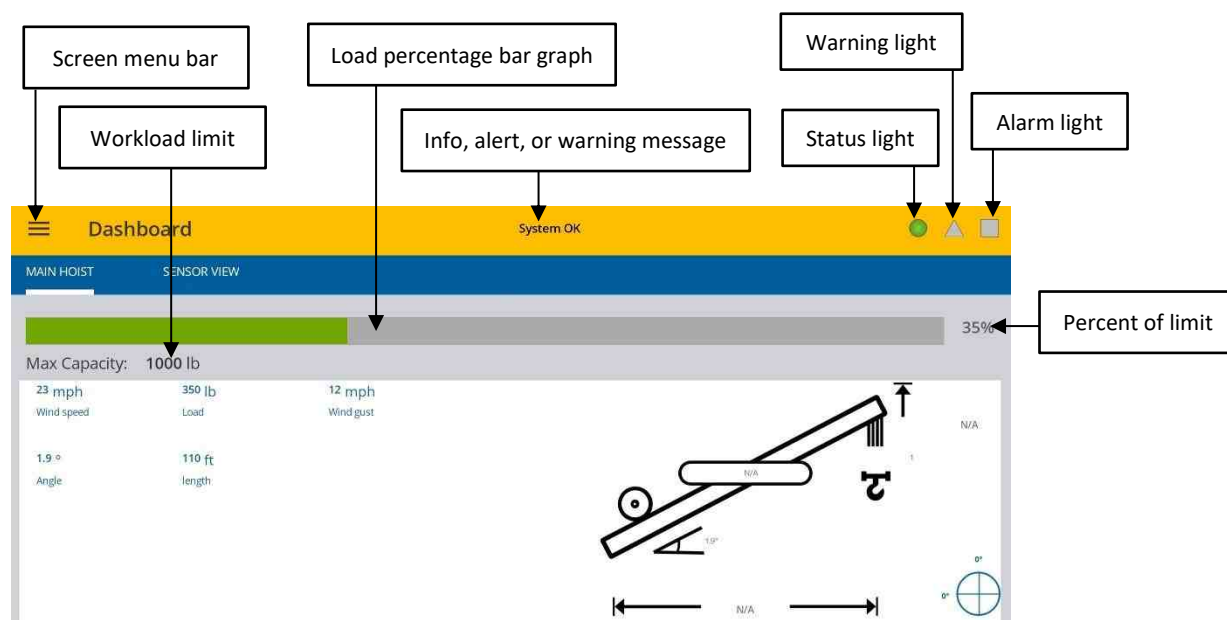
# 3 Operation

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## 3.1 GS920

The detailed information is displayed on the LiftingWorks application. warnings, alarms, and radio status are also communicated by the buzzer.



## 3.2 USB Port

The USB port is used to download data from the data logger or to upload capacity charts using a USB mass storage device (USB key).

## 3.3 Warning

### 3.3.1 Status light (green)

The status light stays on when the GS920 has a reliable radio communication link to all programmed sensors.

### 3.3.2 Warning light (yellow)

The warning light flashes when;

The communication with a sensor is not established ("NoRX" appears on the LiftingWorks application)

A warning threshold has been reached (typically 90% of the maximum limit);

An alarm is bypassed.

The sensor battery life drops below 10%. Normally several weeks of battery life remains from the moment the low battery message first appears.

A warning message is also generated on the dashboard screen of LiftingWorks application.

### 3.3.3 Alarm light (red)

The alarm light flashes when a sensor limit is reached (100% and more). An alarm message is also generated on the LiftingWorks application.

## 3.4 Menu System

System limits are not monitored when the system is in menu mode. Do not operate the crane in menu mode. Do not navigate system menus when operating the crane.

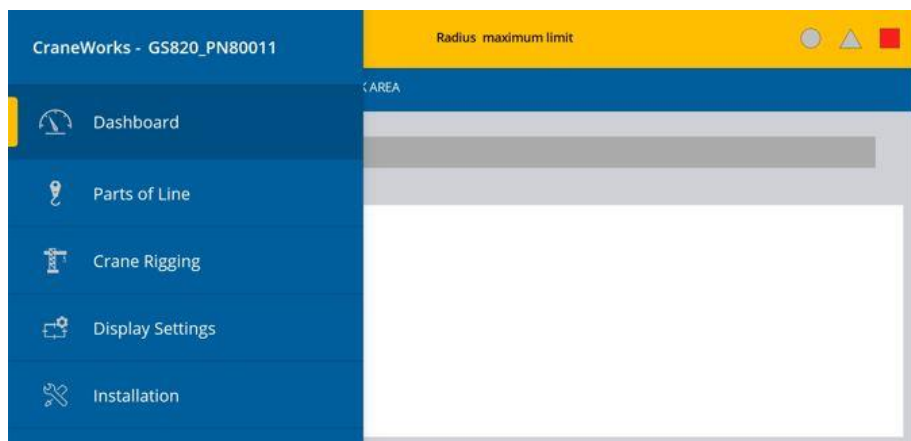


Figure: Basic menus (level one)

There are eight basic menus (level one) used to program, consult and control the GS920 system:

- Parts of Lines
- Crane Rigging
- Display Settings
- Installation
- System Diagnostic
- System limits
- Tare
- Information

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

### 3.4.1 Password Protection

The submenus of menu Installation are protected by a password by default. Password settings can be adjusted in menu Password Settings. If the user password is forgotten, it can be changed as long as the administrator password is known.

**NOTE** - Forgotten the password? Contact Trimble technical support. See [page 11](#).

### 3.4.2 Menu Layout

The menus accessible to the operator without password protection under the default factory settings are listed below.

- Parts of Line
- Crane Rigging
- Display Settings
- Installation
- System Diagnostic
- System Sensors Diagnostic
- Radio Network Diagnostic
- Radio network
- Last sensors received
- Search for sensors
- Bit Error Rate Test
- Lockout Diagnostic
- Display Diagnostic
- Digital Input Diagnostic
- System Limits
- Tare
- Information

### 3.4.3 Parts of Line

The load sensor often shares the weight with multiple parts of line. For accurate load indication the GS920 must be programmed for the number of parts of line.

Go to menu **Parts of Line**.

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. Click to modify.

Adjust the number of parts of line.

Return to the main page of LiftingWorks application.

## 3.5 Rated Capacity Indicators

The GS920 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.

### 3.5.1 Capacity chart Programming

The capacity chart programmed can be verified in the Information menu: press **Menu** and select **Information** (press **Exit** to return to the main page of LiftingWorks application).

**NOTE** - If the chart number information screen says, “Chart not available”, no chart is loaded in the GS920 and “Chart not used”, the GS920 has not been programmed to function as a rated capacity indicator. If rated capacity indication is required contact the person responsible for the GS920 system installation and maintenance. If in doubt, contact Trimble.

### 3.5.2 Rated Capacity Indicators

The GS920 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.

### 3.5.3 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 GS920; this is done by following the chart wizard in menu **Crane Rigging**.

**NOTE** - It is possible to leave the chart wizard at any time by pressing **Bypass/Exit**; the GS920 will show the message “Rigging aborted”. Current capacity chart selection may have changed, possibly changing the rated capacity indicated by the GS920. Always complete the chart wizard all the way to the “Rigging ok” message before operating the crane.

Click on **CRANE RIGGING Enter** to start the chart wizard.

The first page of the chart wizard is select hoist. Click on the selected 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.

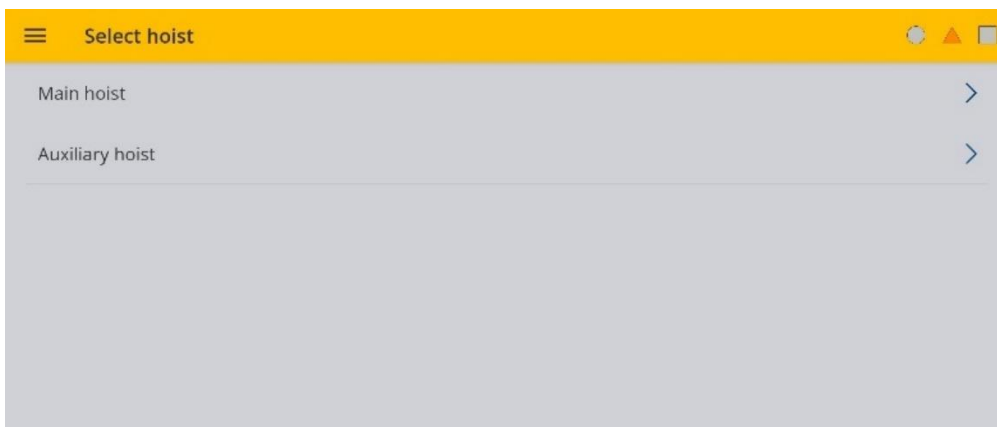


Figure: Select hoist menu

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). Select from the list of choices and then click 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.

After the last step has been completed, the GS920 lifting application should be Rigging ok and then returns to menu 2). Go back to return to the main page of LiftingWorks application or click to rig another hoist. If a sensor required by the selected capacity chart is not a part of the system or has not established communication with the GS920, then the GS920 will show the sensor invalid.

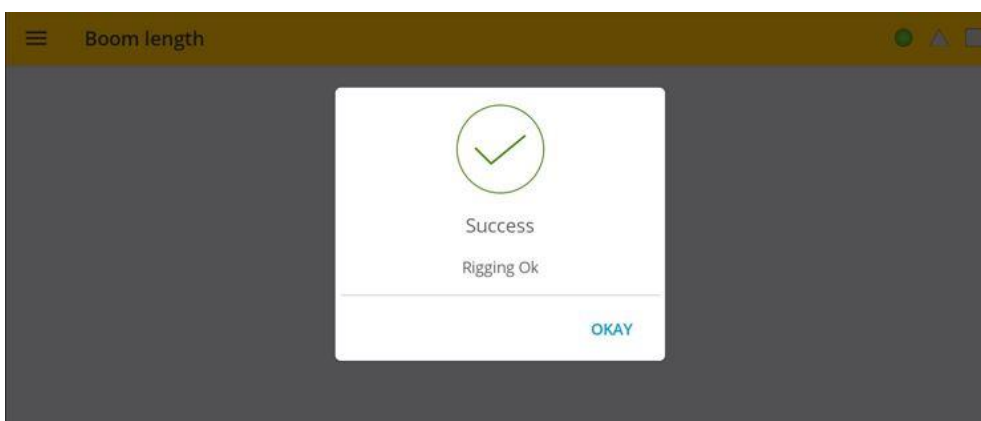


Figure: The GS920 "rigging ok"

## 3.6 Display Settings

Program the LiftingWorks application for operator preferences in menu Display Settings.

Go to Menu Display Settings.

Modify the setting.

Click on the setting to confirm.

Go back to the main page of LiftingWorks application.

### 3.6.1 Units

The weight units for load display may be selected according to operator preference.

Length units are associated with weight units by default.

| Unit                                                 | Equivalent | Weight    | Length Unit |
|------------------------------------------------------|------------|-----------|-------------|
| Pound (lb)                                           | 1 lb       | 0.4536 kg | Foot (ft.)  |
| Kilogram (kg)                                        | 2.205 lb   | 1 kg      | Meter (m)   |
| Short ton (T)<br><i>United States</i>                | 2000 lb    | 907.2 kg  | Foot (ft.)  |
| Long ton (T)<br><i>United Kingdom</i>                | 2240 lb    | 1016 kg   | Foot (ft.)  |
| Metric tonne (t)<br><i>International System (SI)</i> | 2205 lb    | 1000 kg   | Meter (m)   |

### 3.6.2 Wind speed units

The wind speed units can be set to km/h, mph, m/s, or knot.

### 3.6.3 Rounding

By default, indicated load is rounded off to the nearest 50 lb or 50 kg. For control unit in pounds or kilograms, the rounding value can be adjusted to 1, 10, 50, 100, 200, 500 or 1000. For control unit in US short tons, British long tons, or metric tonnes, the rounding value can be adjusted to 0.01, 0.02, 0.05, 0.1, 0.2, 0.5 or 1.

## 3.7 System Diagnostic

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

### 3.7.1 System Sensors Diagnostic

Go to menu System Sensors Diagnostic.

Select the sensor click to see the sensor data in menu Sensor information.



| System sensors         |        |
|------------------------|--------|
| Sensor Id              | 218710 |
| Sensor type            | Slew   |
| Raw value              | 193    |
| Battery (%)            | 100    |
| Temperature (°F)       | 759    |
| Emitted RF power (dBm) | 15     |

Figure: Sensor information menu

### 3.7.2 Radio Network Diagnostic

Go to menu “Last sensors received”. Sensors are shown with their radio ID number and the sensor type.

**CAUTION** - The list of “last sensors received” includes all functioning GS series sensors within range. Programming a GS920 for sensors from a different system will disable that system and render indication by both systems inaccurate.

Go to menu Search for sensors.

Click to launch a sensor search.

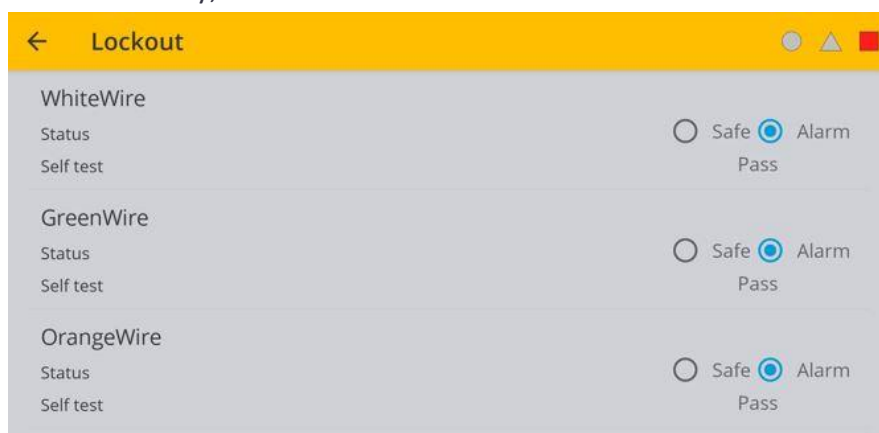
Go to menu Bit error rate test. This test should only be conducted by Trimble technical service personnel.

Go back to the main page of LiftingWorks application.

### 3.7.3 Lockout Diagnostic

Menu Lockout diagnostic shows the lockout condition of the output (alarm or safe) and the self-test (pass or fail); it is recommended to manually test the lockout condition;

Go to menu Lockout. Select № 1 White wire. To temporarily activate or deactivate the lockout relay, Click on it.



Repeat diagnostic test for GREEN WIRE.

Repeat diagnostic test for ORANGE WIRE.

Go back to the main page of LiftingWorks application.

### 3.7.4 Display Diagnostic

Go to menu Display Diagnostic. The page shows different information.

Time: current time according to the GS920 internal clock.

Date: current date according to the GS920 internal clock.

Time clock battery: self-test pass or fail.

External power: external power supply voltage.

Main control unit Internal temperature.

Base station ID. The base station ID should be the same as the GS920 main control unit serial number printed on the left side of the box.

Power supply

Radio certification: “FCC”, “IC” indicates Federal Communications Commission (U.S.A.) and Industry Canada certification, “CE” indicates European Community certification.

Radio frequency: the frequency used by the system network.

Go back to the main page of LiftingWorks application.

### 3.7.5 Current Alarms

Go to menu Current Alarms to see the complete list of current alarms. The same alarms are displayed in the messenger at the top of the main screen.

## 3.8 System Limits

### 3.8.1 Set hoist limits

The limit menu on LiftingWorks application, the limits for each sensor in the sensor list.

Go to menu System Limits.

Click on a sensor to modify.

Adjust the limit.

Go back to the main page of LiftingWorks application.

When using the GS920 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 GS920 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.

**NOTES** - Press Left and Right 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.

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

## 3.9 Tare

### 3.9.1 Zero the hook

Go to menu Tare.

Select the load sensor.

Click set or clear tare weight.

Go back to the main page of LiftingWorks application.

## 3.10 Information

Go to Menu Information. Standard info menu pages include:

Software package

Firmware

Language pack

Graphic library

Capacity chart

Sensors update pkg

BIOS (Bootloader) number and version

USB driver

Critical system alerts or information messages are also displayed on the top part of the dashboard screen on LiftingWorks application. See examples below:

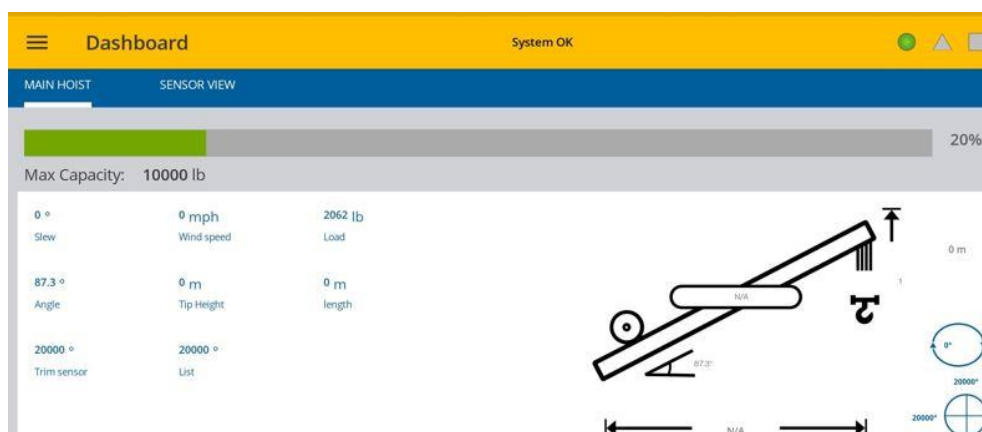


Figure: The GS920 “system ok”

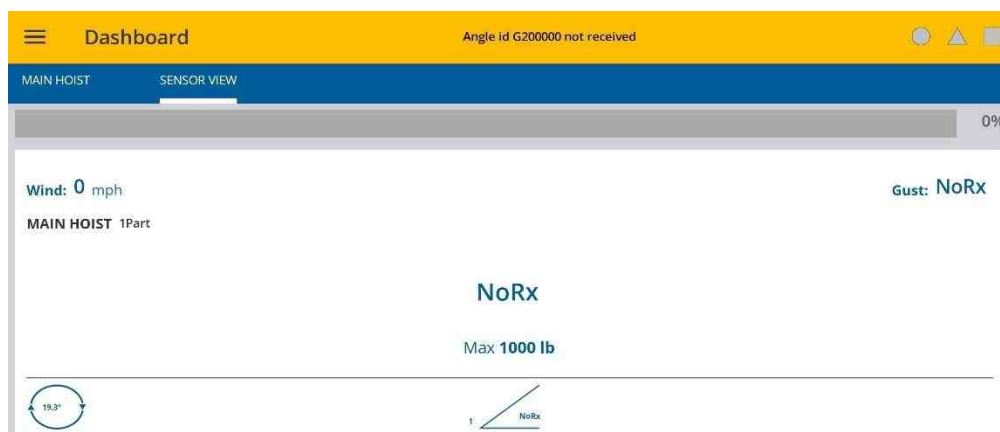


Figure: The GS920 an information alert

| Alert                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Load ID: G15000<br>Maximum limit       | <p>The sensor indicates a value greater than the operator adjusted limit.</p> <p><b>WARNING</b> - Do not operate the crane beyond the limits specified by the manufacturer!</p> <p>Verify operator adjusted limits in the limit menu.</p>                                                                                                                                                                                                |
| Angle ID: G15000<br>Minimum limit      | <p>The sensor indicates a value less than the operator adjusted limit.</p> <p><b>WARNING</b> - Do not operate the crane beyond the limits specified by the manufacturer!</p> <p>Verify operator adjusted limits in the limit menu.</p>                                                                                                                                                                                                   |
| Load ID: G15000 Low battery            | <p>Less than 10% of battery life remains in the sensor.</p> <p>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.</p>                                                                                                                                                                                      |
| Load ID: G15000 Not received           | <p>The main controller isn't receiving communication from the sensor.</p> <p>Verify that the sensor ID number programmed matches the ID number of the sensor installed on the crane. Go to menu 5A1.</p>                                                                                                                                                                                                                                 |
| Verify white wire (unexpected voltage) | <p>Voltage is detected on the lockout wire when in alarm<sup>1</sup>. With the standard relay configuration voltage should not be present on a lockout wire in alarm condition.</p> <p>Verify the wire connection. See <a href="#">Power Supply and Lockout Connection, page 15</a>.</p>                                                                                                                                                 |
| Verify white wire (shorted to ground)  | <p>Voltage is not detected on the lockout wire when safe<sup>2</sup>. With the standard relay configuration voltage should be present on a lockout wire in safe condition.</p> <p>Verify the wire is not shorted to ground.</p> <p>Verify the wire is not connected directly to the valve coils; a relay should be installed between the wire and the valve coils. See <a href="#">Power Supply and Lockout Connection, page 15</a>.</p> |
| Main out of chart                      | <p>One or more primary conditions of the chart selected for the hoist is not met (example: telescopic boom length).</p> <p>Verify the conditions of the selected rated capacity chart.</p>                                                                                                                                                                                                                                               |
| Main angle above chart maximum         | <p>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).</p> <p>Verify the boom and jib angles permitted by the rated capacity chart selected.</p>                                                                                                                   |
| Main angle below chart minimum         | <p>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).</p> <p>Verify the boom and jib angles permitted by the rated capacity chart selected.</p>                                                                                                                |

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.

### 3.11 Mast Settings

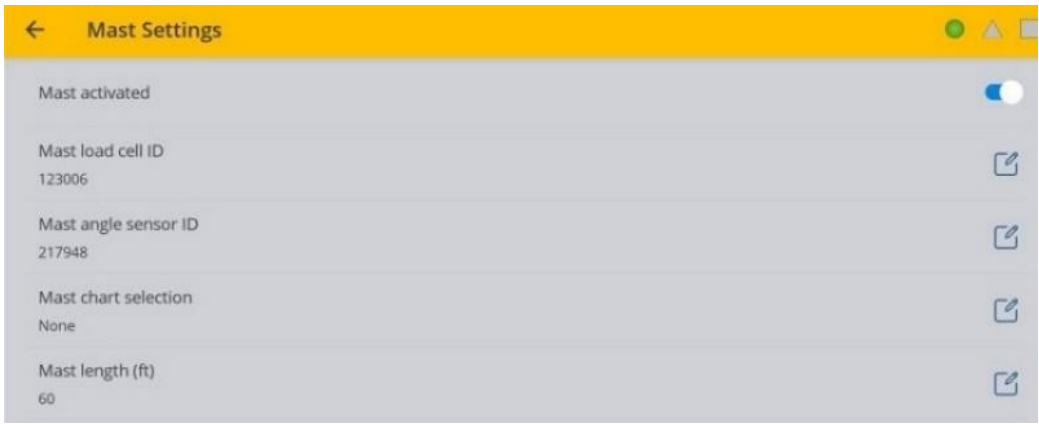


Figure: The GS920 the mast information

Activate mast tab in menu 1.

For mast load indication set the mast load cell ID in menu 2; for mast angle and radius indication set the mast angle sensor id in menu 3. Mast radius indication can be calibrated by adjusting the mast radius parameters in 6 to 9.

**NOTES** - When a load or an angle sensor is associated to the mast, the word “(mast)” is added to the sensor type in the sensor list.

When the mast is deactivated, the system ignores the sensors associated to the mast; however, the mast sensor ID numbers are retained to facilitate future re-activation.



Figure: Mast settings menu

To indicate rated mast capacity, the GS920 must be programmed with rated mast capacity charts. Set the mast capacity chart selection mode in menu 4E) 4. The options are:

**None:** Rated mast capacity is not indicated. The mast load limit is determined by the load cell limit (menu 6) and the number of parts of line.

**Operator mode:** The operator must manually select the appropriate mast capacity chart in the Crane Rigging menu.

**Automatic mode:** The mast capacity chart is automatically determined by the crane load chart(s) selected.

## 3.12 Work Area Management

**NOTES** - The orientation indicated by the LiftingWorks application (left or right) must be followed to ensure limits are correctly programmed. For a mast, the work area cannot be defined.

**WARNING** - Radius and tip height indication must be accurately calibrated for work area management. Use of the work area management feature with incorrect radius or tip height indication may result in an accident-causing loss of property, serious injury or death.

### 3.12.1 Fixed Limits

Adjust fixed limits in the learning mode by positioning the crane at the limit and then recording the position.

**Slew safe area:** Define safe area slew limits and warning zone. The LiftingWorks application will alert the operator when a slew limit is approached or exceeded.

Select Slew in menu 1).

Step 1 of 3: Position the boom tip at the left slew limit of the work area, and then click on it.

Step 2 of 3: Swing right to the right slew limit of the work area, and then click on it.

Step 3 of 3: Position the boom tip safely inside the limits of the new work area.

By default, the slew limit warning zone is adjusted to 5°.

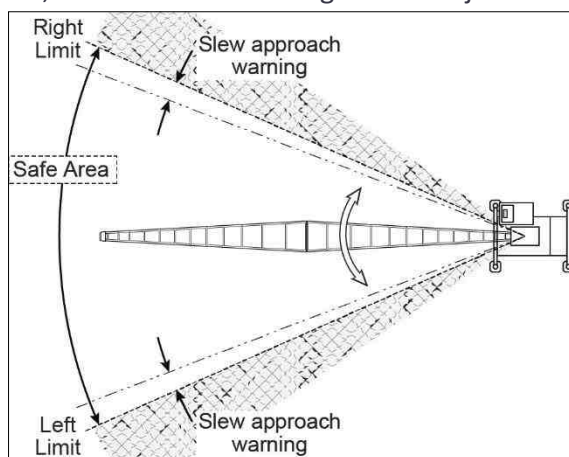


Figure: Slew free area

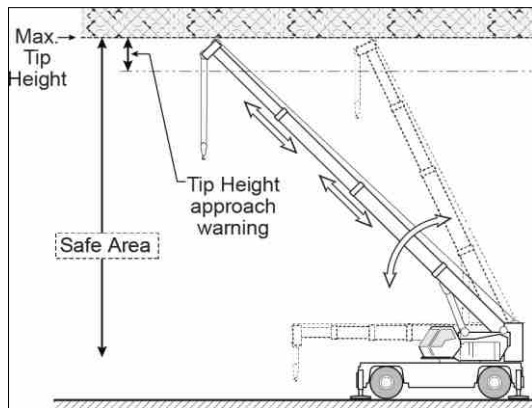
**Maximum tip height:** Define the maximum tip height limit and warning zone. The LiftingWorks application will alert the operator when the maximum tip height limit is approached or exceeded.

Select Height in menu 1).

Position the boom tip at the maximum height limit and then click on it.

Lower the boom tip to a safe height.

The height limit warning zone is adjusted to 5 ft. by default. To adjust the size of the height limit warning zone, go to menu 2).



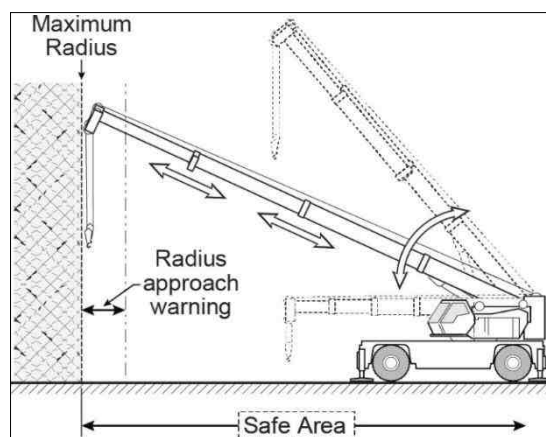
**Maximum radius:** Define the maximum radius limit and warning zone. The LiftingWorks application will alert the operator when the maximum radius limit is approached or exceeded.

Select Radius in the menu 1).

Position the boom tip at the maximum radius limit of the work area and click on it.

Position the boom tip safely inside the limits of the new work area.

The radius limit warning zone is adjusted to 5 ft. by default. To adjust the size of the radius limit warning zone, go to menu 2).



### 3.12.2 Dynamic Limits

**Slew and maximum tip height:** Define the maximum tip height limit for every degree of rotation within the slew limits of the safe area. The LiftingWorks application will alert the operator when a slew or tip height limit is approached or exceeded.

Select Slew and Height in the menu 1).

Position the boom tip at the left slew and height limit of the work area then click to start work area definition.

Swing right to define the tip height limit through all slew positions. When the right slew and height limit of the work area is reached Click on it.

Position the boom tip safely inside the limits of the new work area.

To adjust the size of the height and slew limit warning zones, go to menu 2).

**Slew and maximum radius:** Define the maximum radius limit for every degree of rotation within the slew limits of the safe area. The LiftingWorks application will alert the operator when a slew or radius limit is approached or exceeded.

Select Slew and Radius in the menu 1).

Position the boom tip at the left slew and radius limit of the work area then click to start work area definition.

Swing right to define the radius limit through all slew positions. When the right slew and radius limit of the work area is reached Click on it.

Position the boom tip safely inside the limits of the new work area.

To adjust the size of the radius and slew limit warning zones, go to menu 2).

**Slew, maximum tip height and maximum radius:** Define the maximum tip height and the maximum radius limits for every degree of rotation within the slew limits of the safe area. The LiftingWorks application will alert the operator when a slew, maximum tip height or radius limit is approached or exceeded.

Select Slew, Radius and Height in the menu 1).

Position the boom tip at the left slew and radius limit of the work area, and then click to start work area definition.

Swing right to define the radius limit through all slew positions. When the right slew and radius limit of the work area is reached Click on it.

Position the boom tip within 2° of the left slew limit and at the height limit of the work area, and then press Enter to start definition of the height limit for the work area.

Swing right to define the height limit through all slew positions. When the right slew and height limit of the work area is reached Click on it.

Position the boom tip within the limits of the safe area.

To adjust the size of the radius, height, and slew limit warning zones, go to menu 2).

### 3.12.3 Virtual Wall

A virtual wall can be defined by two points. During the slew and radius limit definition wizard:

Position the boom tip at the left end of the virtual wall.

Press the virtual wall button. The radius limit drawing on the LiftingWorks application will be temporarily disabled.

Position the boom tip at the right end of the virtual wall.

Press on the virtual wall button again to generate the wall (straight line) between the two positions defined.

### 3.12.4 Limit Warning, Alarm and Lockout

Limit warning: When the boom tip reaches enters a warning zone the LiftingWorks application will alert the operator with an intermittent beep, the yellow warning light, and an intermittent warning message on the LiftingWorks application. The size of the work area limit warning zones can be adjusted in menu 2).

Limit alarm: When a work area limit is reached the LiftingWorks application will alert the operator with the buzzer, the red alarm light, and an intermittent alarm message on the LiftingWorks application.

Lockout triggers: The LiftingWorks application can be configured to trigger lockout on the following condition:

Slew left and right limit

Slew left and right warning limit

Warning left rotation

Warning to right rotation

Maximum radius

Maximum height

For information on lockout triggers, see [Lockout Settings, page 18](#).

### 3.12.5 Chart Area Management

Chart area management enables the rated capacity indicator system to automatically select the correct capacity chart based on working area as defined by the crane manufacturer on the rated capacity chart. Chart area management will determine capacity by load position.

### 3.12.6 How to Delete Work Area Limits

Go to menu 3) Erase Work Area.

Click to erase the work area.

# 4 USB Tool

In this chapter:

- ▶ [Data Logger Transfer from main unit, page 104](#)
- ▶ [Upload Capacity Charts, page 105](#)
- ▶ [Data Logger Viewer, page 106](#)

Download data or upload capacity charts using a USB mass storage device (USB key) without removing the main control unit from the crane.

**WARNING** - Before transferring (or downloading) data logger or firmware updates, make sure the crane is stopped and is in a safe state. The crane cannot be monitored during the download process.



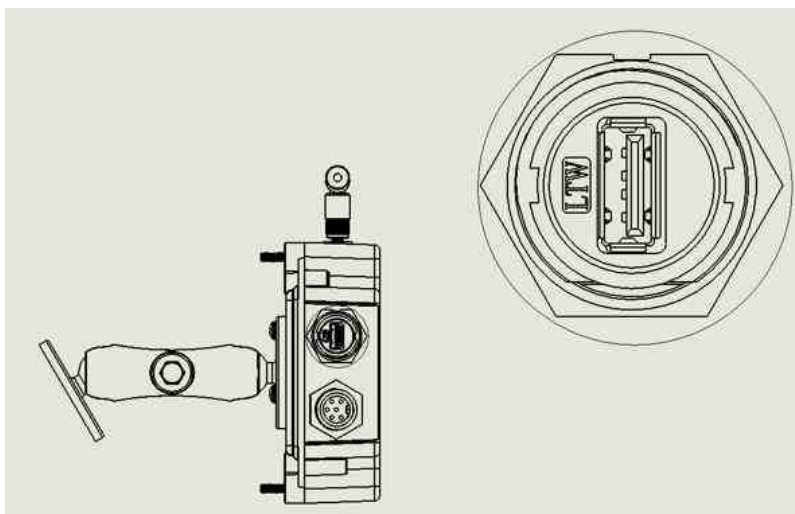
Figure: Transfer charts or data logger files

## 4.1 Data Logger Transfer from Main Unit

### 4.1.1 Transfer From Main Control unit to USB

**NOTE** - To copy the data logger to the USB key, a password is required; contact Trimble to get the download password. The unit ID will be asked by Trimble.

**Make sure there is at least 8 MB of available space on the USB key.** Connect the USB key in the USB port, on the left side of the main control units.



After a short delay (about 2 seconds), USB Menu appears on the LiftingWorks application.

Click on Copy data log to USB. In most case, you will be prompted to enter a password; enter the download password given by Trimble and Click once again to confirm the data logger download.

Transfer progress is indicated on screen.

When the transfer is done, a Transfer successful message will appear, then unplug the USB key.

The crane is now ready for operation.

### 4.1.2 Transfer From USB Device to PC

Connect the USB key to a computer.

The data logger file is located in the root directory of the USB device:

“Trimble\_MM\_dd\_yyyy\_hh\_mm\_ss.dtl” where the double letters represent the time and date of the USB transfer. The size of the file should be 8192 kB.

## 4.2 Upload Capacity Charts

**NOTE** - Contact Trimble to get the upload password; this password changes according to the random number indicated on the LiftingWorks application. Please provide the random number to Trimble.

Connect the USB key to a computer and copy the updated chart on the USB key.

Connect the USB key in the USB port.

After a short delay (about 2 seconds), the USB Menu will appear on the LiftingWorks application. Select Get file from USB.

Choose the file to upload and press Enter. Example typical file name: SPKG3\_XXXX.820.

A password may be required; enter the upload password given by Trimble and press Enter.

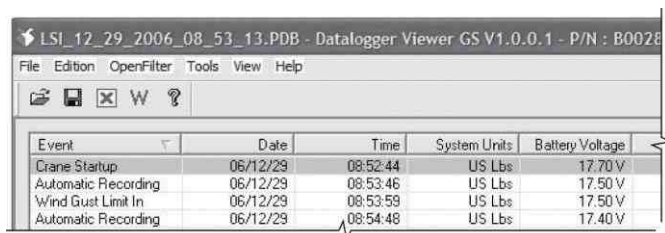
Transfer progress is indicated on screen.

When the transfer is done, a Transfer successful message appears. Press Enter and then unplug the USB key. The GS920 will restart by itself.

## 4.3 Data Logger Viewer

The data logger viewer is a software application used to display the data logger log file on a personal computer (PC).

The data logger viewer converts the log 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.



The screenshot shows the 'Data Logger Viewer GS V1.0.0.1' window. The title bar includes the file path 'LSI\_12\_29\_2006\_08\_53\_13.PDB' and the P/N 'B0028'. The menu bar has 'File', 'Edition', 'OpenFilter', 'Tools', 'View', and 'Help'. Below the menu is a toolbar with icons for opening, saving, printing, and help. The main area contains a table with the following data:

| Event               | Date     | Time     | System Units | Battery Voltage |
|---------------------|----------|----------|--------------|-----------------|
| Crane Startup       | 06/12/29 | 08:52:44 | US Lbs       | 17.70 V         |
| Automatic Recording | 06/12/29 | 08:53:46 | US Lbs       | 17.50 V         |
| Wind Gust Limit In  | 06/12/29 | 08:53:59 | US Lbs       | 17.50 V         |
| Automatic Recording | 06/12/29 | 08:54:48 | US Lbs       | 17.40 V         |

Figure: Excerpt of a full report in Data Logger Viewer

### 4.3.1 Installation on a PC

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

Click Start.

Click My Computer.

Double-click on the CD-ROM drive.

Double-click on setup.exe.

Complete the installation as instructed on screen.

### 4.3.2 Quick Start

Start the data logger viewer application.

Open the log file (see [Transfer from USB Device to PC, page 104](#)). Only .dtl files generated by the GS920 data logger can be displayed.

### 4.3.3 Full Report

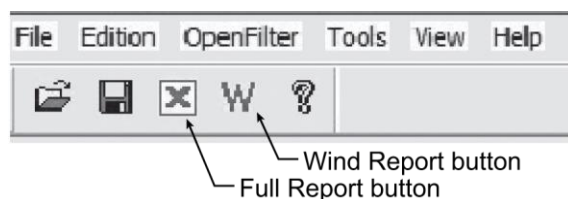


Figure: Data Logger Viewer toolbar

To export the full report to Excel, click Full Report in the toolbar. The following table shows the information in the reports.

| Column          | Description                                                                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Event           | Record trigger<br><br>Examples: Crane start-up, sensor alarm. The beginning and end of sensor alarms are indicated as "in" and "out": examples: "overload in", "overload out". |
| 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 | Control unit power supply voltage at the time of the event.                                                                                                                    |
| Temperature     | Internal temperature of the main control unit.                                                                                                                                 |
| Firm. Version   | Control unit firmware version at the time of the event.                                                                                                                        |
| Sensor # 1      | Sensor type: the sensor number corresponds to the sensor list programmed in the GS920.                                                                                         |
| Sensor Status   | Sensor was active or inactive at the time of the event.                                                                                                                        |
| Sensor Battery  | Sensor battery level.                                                                                                                                                          |
| Value           | Sensor value.                                                                                                                                                                  |

### 4.3.4 Wind Report

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

To export a wind report in Excel, click Wind Report 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: Excerpt of a Wind report

The following table shows the information in the 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.                              |

Wind charts. The data from the Wind or Max Gust columns can be easily charted.

Press Ctrl and select the time column and either the Wind or the Max Gust column.

Click Insert Chart.

Select X-Y (Scatter).

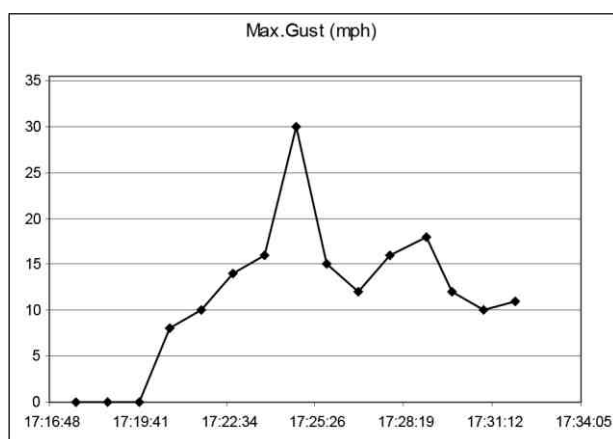


Figure: Max. Gust Chart

# 5 Maintenance

In this chapter:

- ▶ [Sensors, page 110](#)
- ▶ [Anti-Two-Block Switch, page 113](#)
- ▶ [Replacing a Sensor Antenna, page 114](#)
- ▶ [Load Cells, page 117](#)

## 5.1 Sensors

### 5.1.1 Replacing Sensor Battery

**NOTES** - Protect the interior of the sensor from dirt and humidity at all times.

Both lithium and alkaline batteries can be used, however lithium battery will last about 2.5 times longer.

Unscrew the two allen screws about a quarter of an inch.

5.1.1.1.1.2 Hex key 5/32 in.

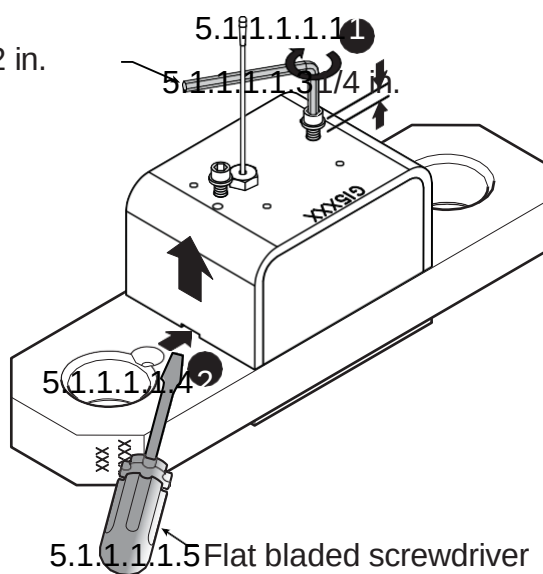


Figure: Remove the sensor box from the mounting plate

Insert a flat bladed screwdriver in the battery cover notch to pry the box away from the mounting plate. The silicone seal may cause some resistance.

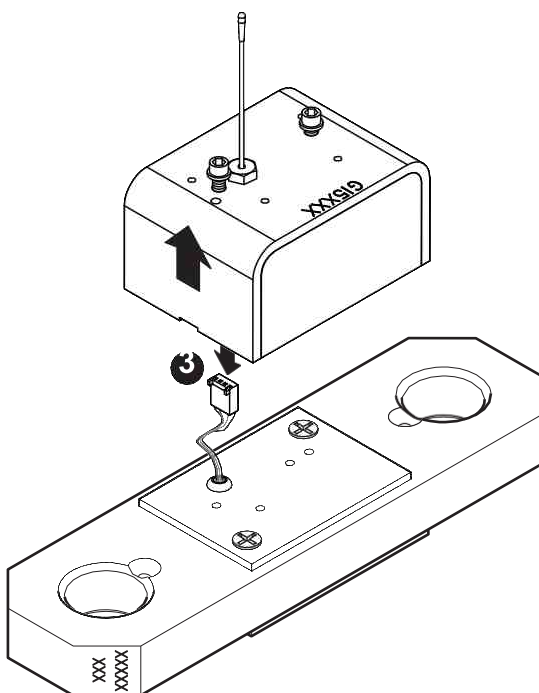


Figure: Disconnect the data wires

The data wires of a load cell may be disconnected to facilitate battery replacement.

Remove the battery by hand.

Remove the remaining silicone from both the box and the mounting plate.

Install the new battery: insert the positive end and then push in the direction of the positive pole.

**NOTE** - A 3.6-volt lithium “D” cell battery will provide about two years of battery life for a load cell, while an alkaline “D” cell battery will provide less than one year of battery life. Actual battery life will vary greatly depending on the application, the frequency of use, the age and quality of the battery etc.

Reconnect the data wires if disconnected.

- 5.1.1.1.1.6 New high quality “D”  
 5.1.1.1.1.7 cell battery: 3.6 V lithium,  
 5.1.1.1.1.8 or alkaline

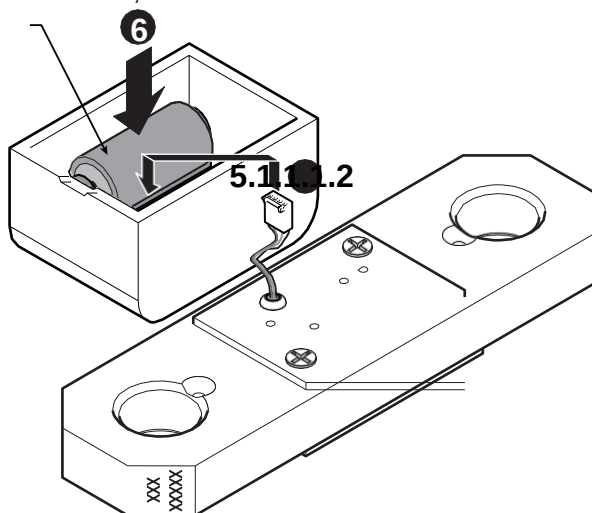


Figure: Install the new battery and reconnect the data wires

Apply a non-corrosive RTV silicone all around the edge of the mounting plate to create a new seal without bubbles or breaks.

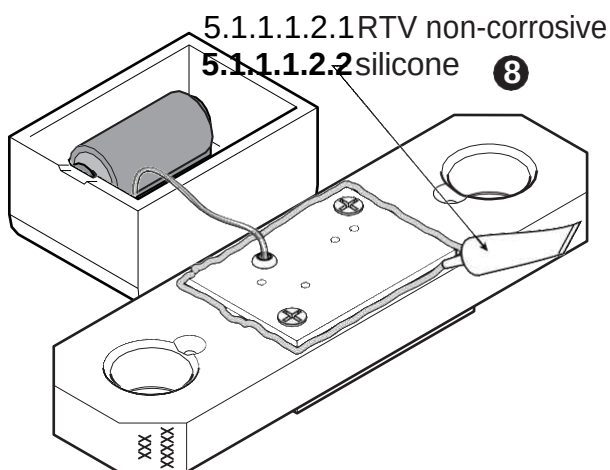


Figure: Apply non-corrosive RTV silicone

Reposition the box over the mounting plate and screw in the hex screws. ***Do not overtighten.***

## 5.2 Anti-Two-Block Switch

### NOTES -

1. Replace all the batteries of the anti-two-block switch at the same time.  
Unchanged batteries will reverse polarity severely reducing battery life.
2. Always protect the interior of the anti-two-block switch from dirt and humidity.
3. Both lithium and alkaline batteries can be used, however lithium battery will last about 2.5 times longer.

### 5.2.1 Replacing the GS075B Battery

Remove the GS075B anti-two-block from the crane and clean off dust and grime.

Unscrew the two screws of the battery cover and remove the battery cover.

Remove the battery by hand.

Insert the new battery following the positive-negative schematic.

Reposition the battery cover and screw in both screws.

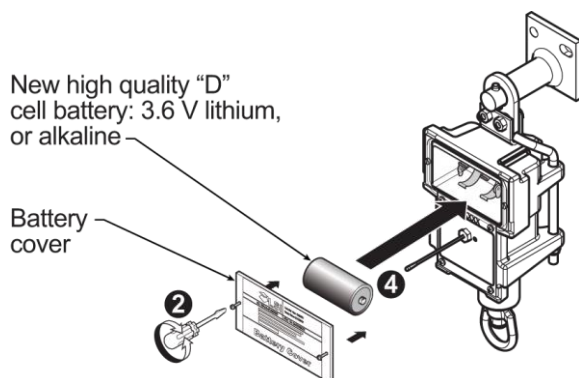


Figure: Replacing GS075B battery

Reinstall the anti-two-block switch.

Test the anti-two-block system for alarm and lockout before use.

## 5.3 Replacing a Sensor Antenna

Heavily damaged antennas (ripped out, sheared off, wire exposed and fraying etc.) should be replaced to ensure effective communication between the sensor and the cabin mounted main control unit.

This procedure may be followed without removing the sensor from the crane if it is safe to do so. If removed, an angle sensor must be re-calibrated during reinstallation for correct angle value (see the angle sensor installation section of the user's manual).

**NOTE** - The interior of the sensor must be protected from dust, grime, and water at all times.

Place the crane, boom, jib or ball hook such that the sensor is safely accessible.

Clean dust, grime, and water from the sensor.

Identify the short black whip antenna and the white hex bolt securing it.

Inspect the antenna for signs of obvious physical damage.

Carefully unscrew the white nylon hex bolt completely and slide it up the antenna.

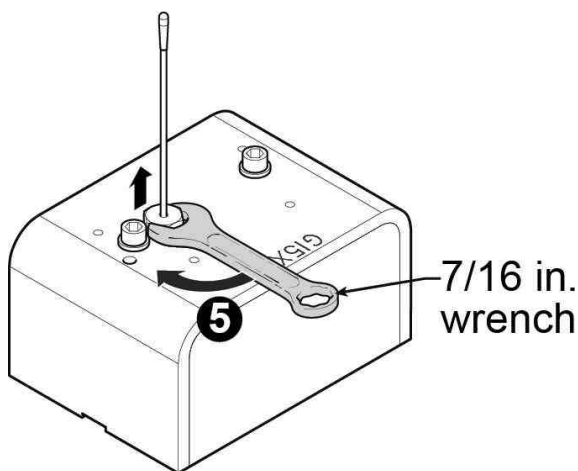


Figure: Unscrew the white nylon hex

Grip the antenna by the base of the black plastic sheathing and pull it straight out of the hole in which it is seated. Place the old antenna aside.

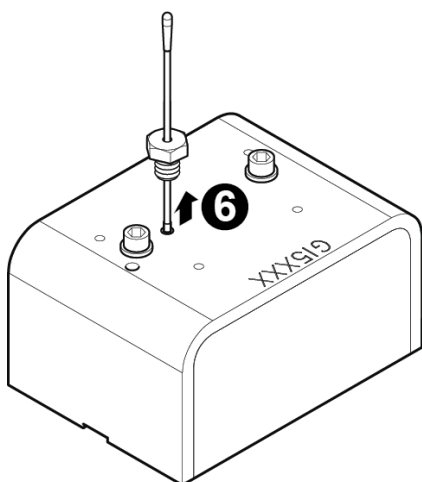


Figure: Pull out the antenna

Slide the white nylon hex bolt to the middle of the length of the new antenna.

Coat the exposed metal foot of the new antenna with an electrical insulating compound by carefully inserting it in the mouth of the compound tube.

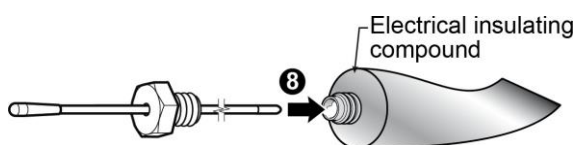


Figure: Coat the exposed metal foot of the antenna

Hold the new antenna by the black plastic sheathing and guide it through the hole in the sensor box. Carefully seat the antenna in its mating connector. When the antenna is correctly seated, pulling on it will be met with light resistance.

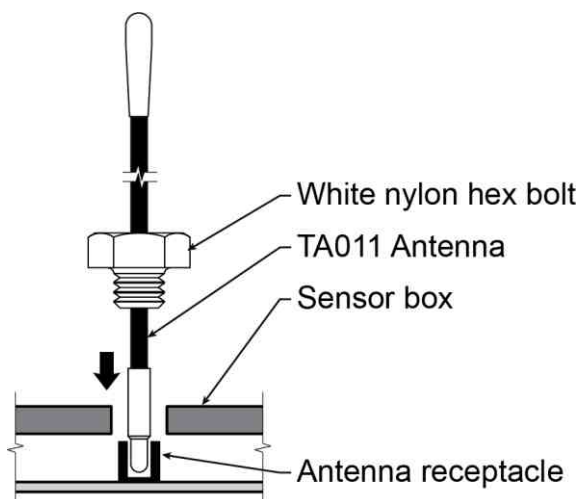


Figure: Install the new antenna

Carefully re-thread, screw-in and tighten the white nylon hex bolt to secure the antenna in place. ***Do not overtighten.***

Reinstall the sensor if necessary (if removed from the boom or jib, an angle sensor will require re-calibration during the installation procedure, see the angle sensor installation section of the user's manual).

Verify that the sensor functions properly.

## 5.4 Load Cells

**WARNING** - Heavy shock may affect load indication accuracy. Inspect the load cell regularly for clearly visible dents or scratches. Test the load indication if collision damage is visible.

### 5.4.1 Reading Accuracy

Trimble flat bar load links are pre-calibrated at the factory. No “zeroing” or other calibration is required on installation. Each link is heat treated to age the steel and ensure stable readings for many years; the load cells are individually temperature compensated to guarantee accuracy. Trimble flat bar load links are calibrated to indicate between 100% and 104% of their Safe Working Load (SWL).

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

SAE J 159 4.2.1 recommends load indicating devices should show not less than 100% of the actual load and not more than 110% of the actual load.

### 5.4.2 Load Testing

Trimble recommends testing the load cell every year for accuracy. The simplest way of testing a load cell is to lift at least two known weights. A test weight should be known with an accuracy of  $\pm 1\%$ . If the load cell is installed at the boom tip dead end, all additional equipment such as blocks, slings, sensors, etc. should also be known to an accuracy of  $\pm 1\%$ .

Determine the accuracy of the tested system with the following formula<sup>1</sup>:

5.4.2.1.1.1.1 *Indicated Load*

5.4.2.1.1.1.2 *Actual Load*

$$\frac{\text{Indicated Load}}{\text{Actual Load}} \times 100 = \% \text{ of Load}$$

The test loads must be significantly relative to the load cell capacity. The minimum test weight is about 20% of the safe working load; a good test weight is greater than 50% of the SWL. For example, a 30 000 lb load cell on four parts of line has a SWL of 120 000 lb; the minimum test load in this case would be 24 000 lb, a good test load would be 60 000 lb or more.

---

<sup>1</sup> Reference: SAE-J-159 7.3

### 5.4.3 Care

**Battery.** Lithium batteries older than 18 months old (alkaline batteries over 6 months old) should be changed at the first available planned inspection even if there is not yet a low battery warning. This will avoid costly delays in the field.

**Corrosion.** Verify that no corrosion is visible on the battery holder inside the load cell transmitter. If some trace of corrosion is visible, rub it off gently and put a small amount of dielectric grease\* on each battery holder post to protect the contacts.

**Mechanical stresses.** Verify the load cell sides for dents or heavy scratches. The side of the load cell under the transmitter box is the most sensitive region. Engraving a number in this area will affect load cell accuracy and reliability. If the transmitter box has been hit and the box does not fit perfectly to the underlying link, please call Trimble to have it repaired. Engraving on the transmitter box sides will not affect reading.

**Seal.** If the transmitter box has been removed it must be correctly resealed with RTV non-corrosive silicone.

**Antenna.** Small scratches on the antenna will not affect radio communications. A heavy bending of the antenna or bare sections on the wire may reduce the radio efficiency.

**Hex bolts.** The hex head bolts on the transmitter box are there to protect the antenna and to hold the transmitter box on the load cell link. If one or both hex nuts are scratched, it will not affect the load cell readings or operation. If the bolt head is bent or sheared verify that the transmitter box fits tightly to the load cell link before contacting Trimble for replacement bolts.

# 6 Troubleshooting

In this chapter:

- ▶ [Main unit Not On, page 120](#)
- ▶ [Main Unit In Alarm, page 120](#)
- ▶ [Sensor Malfunction, page 120](#)
- ▶ [Battery Diagnostic, page 120](#)
- ▶ [Radio Communication, page 121](#)
- ▶ [Lockout Malfunction, page 121](#)

## 6.1 Main unit Not On

Verify the connection between the yellow cable wires and the crane power supply.

Verify the crane battery, the fuse and the accessory switch.

Carefully disconnect the yellow cable from the main unit and reconnect it.

## 6.2 Main unit In Alarm

Identify the sensor in alarm. Place the sensor in safe condition (press Bypass if necessary).

Verify that the limits, the parts of line and the tare are correctly adjusted.

Verify all sensor batteries: see Battery Diagnostic section, below.

Verify the red light on the sensor box flashes (release the wire rope of an anti-two-block, change the load on a load sensor, change the angle of an angle sensor, change the boom length of a length sensor).

Verify radio communication: see Radio communication troubleshooting section below.

## 6.3 Sensor Malfunction

Verify the sensor batteries: see Battery Diagnostic section below. Make sure the light flashes while inserting the sensor batteries.

Verify the red light on the sensor box flashes (change the load on a load sensor, change the angle of an angle sensor, change the boom length of a length sensor).

Verify radio communication: see Radio communication section below.

## 6.4 Battery Diagnostic

Go to menu 5A) System Sensors Diagnostic. Select a sensor and press Enter to verify the sensor status.

Battery: 50%: 50% of battery life remains (typically several months).

Unable to reach remote sensor: communication not yet established. Verify the radio ID corresponds to the installed sensor.

Battery status is usually known within 2 minutes. When 10% or less battery life remains, for any sensor, a message will be generated (the Info alert light will flash). Follow the battery diagnostic procedure to identify the sensor. Batteries do not need to be replaced before the Low Battery message is generated.

Usually several days, or weeks, of operation remain from the moment the Low Battery message comes. A new high quality alkaline or lithium 'D' cell battery may be used.

## 6.5 Radio Communication

Verify that the antennas have a direct clear line of sight to each other.

Verify that the antennas do not point directly towards, or directly away from, each other.

Verify that the antennas are not in contact with metal other than the sensor itself.

Verify the antenna for damage.

Go to menu 5A) System Sensors Diagnostic. Select a sensor and press Enter to verify the sensor status.

Received RF power: 85% means radio reception is at 85%.

## 6.6 Lockout Malfunction

Verify the connections of the lockout wire(s) (white, green, orange, blue).

Verify lockout coil connections.

Verify correct relay installation for lockout systems drawing more than one ampere on the white wire.

Carefully disconnect the yellow cable from the main unit and reconnect it.

To simulate conditions of alarms or security, see [Lockout Diagnostic, page 91](#).

# 7 Certification Notes

## 7.1 Important Notes for Hazardous Area Certified Components

### 7.1.1 Specifications

**WARNING -**

- 1. Understand manual before operation.
- 2. Replace batteries only in a non-hazardous area.
- 3. Substitution of components may impair intrinsic safety.
- 4. Substitution of components may impair suitability for Class I, Division 2.
- 5. Do not remove power cable from main control unit when on.

### 7.1.2 Battery type

| Models        |                  | Battery type and specification   |
|---------------|------------------|----------------------------------|
| GC005-ATEX-CE | GS001-ATEX-CE    | “D” Type 3.6 V lithium batteries |
| GC012-ATEX-CE | GS002-ATEX-CE    | Tadiran TL-5930 model            |
| GC018-ATEX-CE | GS005-ATEX-CE    | Temperature code “T4”            |
| GC035-ATEX-CE | GS010-01-ATEX-CE |                                  |
| GC060-ATEX-CE | GS010-02-ATEX-CE |                                  |
| GC100-ATEX-CE | GS010-03-ATEX-CE |                                  |
| GC170-ATEX-CE | GS-011-ATEX-CE   |                                  |
|               | GS020-ATEX-CE    |                                  |
|               | GS030-10         |                                  |

### 7.1.3 Sensors

GCxxx-ATEX-CE series sensors, GS001-ATEX-CE, GS002-ATEX-CE, GS010-ATEX-CE, GS011-ATEX-CE, GS020-ATEX-CE, GS005-ATEX-CE, GS030-10, GS031-10 (all intrinsically safe):



### 7.1.4 Ensuring Safe Operation in Hazardous Areas

#### WARNING -

1. Equipment must be correctly installed according to the instructions described in this manual and need to be installed in locations providing adequate protection from impact and external damage.
2. Always make sure the system works properly. Test all components before using the crane. A description of LiftingWorks application status and warning lights is available in the operation section of this manual.

### 7.1.5 Product Repair and Servicing

Trimble products have no replaceable or user serviceable parts except the antenna and the batteries. Suggested load cell maintenance instructions are described in [Maintenance, page 109](#). For any other suspected problems, damage or required servicing, please contact Trimble Support, see [Technical support, page 11](#).

## 7.2 Equipment Markings

ATEX marking

GCxxx, GS001, GS002, GS005, GS010, GS020

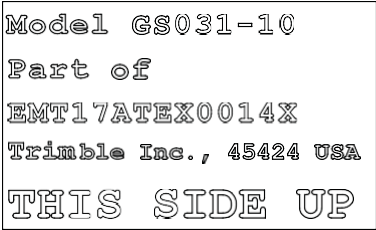
|                                                                                                                                                                                               |                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>1 (888) 819 4355   +1 (281) 664 1330                                                                   | Model №: GC012-CSA-CE<br>Load Cell 5.4 t (12 000 lb)<br>Single part line pull capacity<br><b>Please read reference manual for details</b>                                                                                                           |
| <br>Built in 2008<br>4495 Hamel Blvd, suite<br>110, Québec, QC,<br>Canada<br>Serial number is on the front |  II 1 G Ex ia IIC T4<br>08ATEX0068 Issuer: 0344<br><b>Exia IIC T4</b><br><b>WARNING – DO NOT REPLACE BATTERY WHEN AN EXPLOSIVE GAS ATMOSPHERE MAY BE PRESENT</b> |

**Ignition hazard: “WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD”**

GS030-10



GS031-10

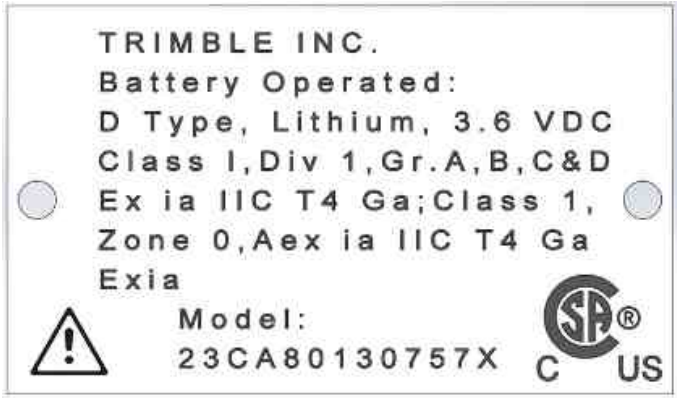


FCC Marking

GCxxx, GS001, GS002, GS005, GS010, GS020



Sensor CSA Label:



Intrinsically safe sensors have the following stainless-steel plate, P/N UB223\_Rev-B\_CSA.

## 7.3 Class 1, Division 1 Certifications - Sensors

**Class 1, Division 1 certification** (intrinsically safe) is available for most Trimble sensors.

**Certificate CSA # 80130757** on master contract 215780 is available on request.

Applicable requirements certified by CSA include:

CSA C22.2 No. 60079-0-19 : Equipment - General Requirements (Explosive atmospheres)

CSA C22.2 No. 60079-11-14 Part 11: Equipment protection by Intrinsic Safety (Explosive atmospheres)

CSA C22.2 No. 61010-1-12 : Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.

UL 60079-0-2020 Standards for Explosive atmospheres : Equipment – General Requirements

UL 60079-11-2018 Explosive atmospheres – Part 0: Equipment - General Requirements

UL 61010-1-2019: Safety Requirements for Electrical Equipment for Measurement, Control and Lab Use.

## 7.4 Class 1, Division 2 Certifications – GS920(To be updated)

**Class 1, Division 2 certification** (Non-Incendive) is available for the GS550 and GS920.

**Certificate CSA #XXXX** on master contract XXXXXX is available on request.

Applicable requirements certified by CSA 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 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, seventeenth 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.

## 7.5 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.

## 7.6 FCC Compliance Statement (USA)

FCC: S9E-131488

Compliance Statements: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including, an interference that may cause undesired operation.

Caution Statements:

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

## 7.7 Industry Canada (IC) Compliance Statement

IC: 5817A-131488

Compliance Statements: This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: 1) This device may not cause interference., 2) This device must accept any interference, including interference that may cause undesired operation of the device.

Déclarations de conformité: Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Caution Statements:

- This equipment complies with radio frequency exposure limits set forth by Industry Canada for an uncontrolled environment.
- This equipment should be installed and operated with a minimum distance of 20 cm between the device and the user or bystanders.

Déclarations de mise en garde:

- Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par Industrie Canada pour un environnement non contrôlé.
- Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre le dispositif et l'utilisateur ou des tiers.

**NOTE** - Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC ID: S9E-131488 IC: 5817A-131488

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 dB. Antennas not included in this list or having a gain greater than 2.0 dB 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 isotopically radiated power (e.i.r.p.) is not more than that

permitted for successful communication.

### Antenna List

Trimble P/N: TA001

Description 1/4 wave monopole

MFG Linx Technologies

P/N ANT-916-CW-QW

Trimble P/N: TA008

Description: 1/2 wave dipole

MFG: Nearson

P/N: S467AH-915S

## 7.8 EMI/EMC

EMI/EMC (Electro-Magnetic Immunity & Electro- Magnetic Compatibility): EN 301 489-3 V1.4.1 (2002-08)

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

Clause 8.3: Limits for conducted emissions DC power input/output 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 conformed to requirements of CISPR 16-1.

Clause 8: 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

ESD (Electrostatic Discharges)

Trimble products are tested against norm EN 61000-4.

Other Compliances

SAE J159 and SAE J987

ASME B30.5-2000

Franklin laboratory: Trimble 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

## 7.9 Environmental Conditions

Ambient temperature: 84° C maximum for the sensors, and 59° C maximum for the main control unit

Operating temperature: -35° C to 85° C (-31° F to 185° F)

Humidity range: 0% to 100%

## 7.10 CE

### 7.10.1 Declaration of Conformity

|                                                                                                                                                                                                                                                                                   |                                                                                      |                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|                                                                                                                                                                                                  |                                                                                      | LOAD SYSTEMS INTERNATIONAL INC.                                                  |
| <b>Declaration of Conformity</b><br>According to EN 45014                                                                                                                                                                                                                         |                                                                                      |                                                                                  |
| <b>Manufacturer's Name:</b> Load Systems International Inc.                                                                                                                                                                                                                       |                                                                                      |                                                                                  |
| <b>Manufacturer's Address:</b>                                                                                                                                                                                                                                                    |                                                                                      |                                                                                  |
| <b>Canada:</b><br>4495 Blvd. Wilfrid-Hamel, Suite 110<br>Québec, QC, Canada, G1P 2J7                                                                                                                                                                                              | <b>United States of America:</b><br>9633 Zaka Road<br>Houston, TX 77064              | <b>United Arab Emirates:</b><br>Q3-171 SAIF Zone, P.O. Box 7976<br>Sharjah - UAE |
| Declare under our own responsibility that the products:                                                                                                                                                                                                                           |                                                                                      |                                                                                  |
| <b>Load sensors:</b> GC005-CE; GC005-ATEX-CE; GC012-CE; GC012-ATEX-CE; GC018-CE;<br>GC018-ATEX-CE; GC035-CE; GC035-ATEX-CE; GC060-CE; GC060-ATEX-CE; GC100-CE;<br>GC100-ATEX-CE; GC170-CE; GC170-ATEX-CE; GS001-CE; GS001-ATEX-CE; GS002-CE;<br>GS002-ATEX-CE; GS007-CE; GS009-CE |                                                                                      |                                                                                  |
| <b>Anti-Two-Block :</b> GS005-CE, GS005-ATEX-CE; GS075-CE; GS050-CE; GS050-ATEX-CE                                                                                                                                                                                                |                                                                                      |                                                                                  |
| <b>Angle sensors :</b> GS010-XX-CE; GS010-XX-ATEX-CE; GS011-XX-CE; GS011-XX-ATEX-CE;<br>GS012-CE, GS030-CE, GS030-10                                                                                                                                                              |                                                                                      |                                                                                  |
| <b>Wind speed sensors :</b> GS020-CE; GS020-ATEX-CE                                                                                                                                                                                                                               |                                                                                      |                                                                                  |
| <b>Pressure sensors:</b> PT00120-XXX; PT00130-XXX                                                                                                                                                                                                                                 |                                                                                      |                                                                                  |
| <b>Gateways:</b> GS2XX-XX-CE                                                                                                                                                                                                                                                      |                                                                                      |                                                                                  |
| <b>Displays:</b> GS320-CE; GS375-CE; GS550-CE; GS550-ATEX-CE; GS550-03-CE; GS550-XX-CE; GS820-CE; GS820-XX-CE                                                                                                                                                                     |                                                                                      |                                                                                  |
| to which this declaration refers conform to the relevant standards or other standardising documents:                                                                                                                                                                              |                                                                                      |                                                                                  |
| <b>Safety:</b> IEC 61010-1; 2 <sup>nd</sup> ed. (2001), EN 61010-1; 2 <sup>nd</sup> ed. (2001)                                                                                                                                                                                    |  |                                                                                  |
| <b>Wireless:</b> EN 300 220-3 V1.1.1 (2000-09)                                                                                                                                                                                                                                    |                                                                                      |                                                                                  |
| <b>EMC:</b> EN 301 489-3 V1.4.1 (2002-08)                                                                                                                                                                                                                                         |                                                                                      |                                                                                  |
| Québec, August 16, 2012                                                                                                                                                                                                                                                           |                                                                                      |                                                                                  |
| <br>Eric Beaulieu<br>Technologies Manager                                                                                                                                                      |                                                                                      |                                                                                  |

### 7.10.2 CE Safety

**WARNING** - When captors are used, the ambient temperature should not be higher than 84 °C and the main control unit should not be used when the ambient temperature is higher than 59 °C, otherwise there can be a burn possibility.

**WARNING** - For the operator's safety, take only the ambient temperature range into consideration. The device should be used within this range specified above.

**WARNING** - The protection will be impaired if the material and equipment are used in a manner not specified by the manufacturer.

**NOTE** - The IP of equipment corresponds to 65.

# 8 GS920 Menu Outline

|                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Parts of Line                                                                                                                                                                                                                                                                                                                                    |
| 2) Crane Rigging                                                                                                                                                                                                                                                                                                                                    |
| 3) Display Settings                                                                                                                                                                                                                                                                                                                                 |
| Unit<br>Language<br>Backlight mode<br>Wind speed units<br>Tensioning                                                                                                                                                                                                                                                                                |
| 4) Installation                                                                                                                                                                                                                                                                                                                                     |
| 4A) Sensor List                                                                                                                                                                                                                                                                                                                                     |
| 4A1) Sensor type and radio identification number<br>Configuration select (automatic, manual)<br>Configuration number<br>Start up page                                                                                                                                                                                                               |
| 4B) Sensor Calibration                                                                                                                                                                                                                                                                                                                              |
| 4B1) Automatic value calibration wizard<br>4B2) Manual parameter adjustment<br>4B3) Reset sensor parameters                                                                                                                                                                                                                                         |
| 4C) Radius and Height Settings                                                                                                                                                                                                                                                                                                                      |
| Boom length<br>Slew offset<br>Boom foot height offset<br>Tip height tolerance<br>Boom top length<br>Boom top offset<br>Jib offset<br>Lattice extension offset<br>Jib mounting point perpendicular<br>Jib mounting point parallel<br>Reel includes manual<br>Manual boom section length<br>Fully retracted boom length<br>Fully extended boom length |

|                                              |                                       |
|----------------------------------------------|---------------------------------------|
| <b>4C) Radius and Height Settings (cont)</b> |                                       |
| 15) Main hoist                               | 18) Auxiliary hoist 3                 |
| 15A) Jib length                              | 18A) Jib length                       |
| 15B) Luffing jib length                      | 18B) Luffing jib length               |
| 15C) Lattice extension length                | 18C) Lattice extension length         |
| 15D) Sheave head length perpendicular        | 18D) Sheave head length perpendicular |
| 15E) Sheave head length parallel             | 18E) Sheave head length parallel      |
| 15F) Sheave radius                           | 18F) Sheave radius                    |
| 15G) Deduct                                  | 18G) Deduct                           |
| 16) Auxiliary hoist                          | 19) Auxiliary hoist 4                 |
| 16A) Jib length                              | 19A) Jib length                       |
| 16B) Luffing jib length                      | 19B) Luffing jib length               |
| 16C) Lattice extension length                | 19C) Lattice extension length         |
| 16D) Sheave head length perpendicular        | 19D) Sheave head length perpendicular |
| 16E) Sheave head length parallel             | 19E) Sheave head length parallel      |
| 16F) Sheave radius                           | 19F) Sheave radius                    |
| 16G) Deduct                                  | 19G) Deduct                           |
| 17) Auxiliary hoist 2                        | 20) Auxiliary hoist 5                 |
| 17A) Jib length                              | 20A) Jib length                       |
| 17B) Luffing jib length                      | 20B) Luffing jib length               |
| 17C) Lattice extension length                | 20C) Lattice extension length         |
| 17D) Sheave head length perpendicular        | 20D) Sheave head length perpendicular |
| 17E) Sheave head length parallel             | 20E) Sheave head length parallel      |
| 17F) Sheave radius                           | 20F) Sheave radius                    |
| 17G) Deduct                                  | 20G) Deduct                           |
| <b>4D) Chart Settings</b>                    |                                       |
| Rated capacity indicator                     | Retracted boom length tolerance       |
| Crane capacity chart interpolation           | Intermediate boom length tolerance    |
| Out of charts default working load limit     | Extended boom length tolerance        |
| Enable start section                         | Radius tolerance                      |
| Enable stop section                          | Boom angle tolerance                  |
| <b>4E) Mast Settings</b>                     |                                       |
| <b>4F) Work Area</b>                         |                                       |
| 4F1) Work Area Limit Wizard                  | 4F3) Erase Work Area                  |
| 4F2) Warning Settings                        |                                       |
| <b>4G) Load Moment Indicator</b>             |                                       |

|                                                             |                                                             |
|-------------------------------------------------------------|-------------------------------------------------------------|
| 4H) Password Settings                                       |                                                             |
| Administrator password                                      | Sensor Calibration password protection                      |
| User password                                               | Radius Settings password protection                         |
| Tare menu password protection                               | Chart Settings password protection                          |
| Limit menu password protection                              | Memory Banks password protection                            |
| Info menu password protection                               | Data logger password protection                             |
| System start-up password protection                         | Lockout Settings password protection                        |
| Parts of Line menu password protection                      | Network Options password protection                         |
| Chart Rigging password protection                           | System Diagnostic password protection                       |
| Display Settings password protection                        | Alarm Bypassed protection                                   |
| Sensor List password protection                             |                                                             |
| 4I) Network Options                                         |                                                             |
| 4I1) Network control                                        | 4I3) Set up sensor repeater                                 |
| 4I2) Repeater list                                          | 4I4) Install sensor update                                  |
| 4J) Memory Banks                                            |                                                             |
| Save config. A (Copy configuration to memory bank A)        | Get config. B (Copy memory bank B to current configuration) |
| Save config. B (Copy configuration to memory bank B)        | Get config. C (Copy memory bank C to current configuration) |
| Save config. C (Copy configuration to memory bank C)        | Restore default (Restore factory configuration)             |
| Get config. A (Copy memory bank A to current configuration) | Clear configuration                                         |
| 4K) Data Logger                                             |                                                             |
| 4L) Lockout Settings                                        |                                                             |
| 4M) Boom Deflection                                         |                                                             |
| 5) Diagnostic                                               |                                                             |
| 5A) System Sensors                                          |                                                             |
| 5B) Radio Network                                           |                                                             |
| 5B1) Radio network                                          | 5B3) Search for sensors                                     |
| 5B2) Last sensors received                                  | 5B4) Bit Error Rate Test                                    |
| 5C) Lockout                                                 |                                                             |
| 5D) Main page                                               |                                                             |
| - Time                                                      | GS920 base station identification number                    |
| - Date                                                      | GS920 (portable) battery level                              |
| - Time clock battery test                                   | Radio certification                                         |
| - External power supply voltage                             | Radio frequency                                             |
| - Internal temperature                                      |                                                             |

|                    |                                                                                                                                             |                                                                                                                                       |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 5E) Digital Input  |                                                                                                                                             |                                                                                                                                       |
| 5F) Current Alarms |                                                                                                                                             |                                                                                                                                       |
| 6) System Limits   |                                                                                                                                             |                                                                                                                                       |
| 7) Tare            |                                                                                                                                             |                                                                                                                                       |
| 8) Information     |                                                                                                                                             |                                                                                                                                       |
|                    | <ol style="list-style-type: none"><li>1. Software package</li><li>2. Firmware</li><li>3. Language pack</li><li>4. Graphic library</li></ol> | <ol style="list-style-type: none"><li>1. Capacity chart</li><li>2. Sensors update pkg</li><li>3. BIOS</li><li>4. USB driver</li></ol> |

