GS320 Display & Wind Speed Sensor

Installer and User’s Manual
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**1: GENERAL**

### 1.1 Introduction
The wind speed indicator kit includes a GS320 display and a wind speed sensor. The GS320 creates a two-way radio network with the wind speed sensor to bring live readings on screen. The GS320 has a user-adjustable maximum wind speed limit and will generate an alarm when this limit is reached. Voltage is generated on the green wire when the system is in alarm mode; this can be used to activate a remote siren, light, or lockout function.

### 1.2 Recommended Operating Conditions

**Supply voltage:**
- 9 to 30 volts

**Current requirements:**
- maximum 1 amperes

**Output wire voltage:**
- 0 volts or supply voltage – 0.7 volts

**Output wire current capability:**
- 0.75 amperes

**Operating temperature:**
- -40°C to +85°C (-40°F to 185°F)

### 1.3 Start-Up
On power up, the display will show two horizontal lines and the green status light will flash.

Once a reliable radio communication network is established, the display lights will remain lit without flashing. If the status light flashes continuously for more than 30 seconds, the GS320 may not be correctly programmed for the wind speed sensor. To correctly program the GS320 for the wind speed sensor, follow the *Wind speed ID number* procedure in Section 2, *Operation* on p. 4 of this manual.

### 1.4 About This Manual

**WARNING**

READ CAREFULLY AND UNDERSTAND THIS MANUAL BEFORE PROCEEDING.

This service manual describes how to install, operate and maintain the GS320 Display & Wind Speed Sensor. While many sections of this service manual have information common to all LSI-Robway displays, this one is specific to the Wind Speed Sensor pairing.

**1.4a How To Provide Feedback To LSI-Robway**

LSI-Robway welcomes your feedback on the accuracy and effectiveness of this document. Please send feedback to doc@lsirobway.com. Please include the title of the manual and version (this information is in the Document Revision History on p. 15) with your feedback.

**1.4b How This Manual Is Updated**

LSI-Robway will issue new releases of this manual as new material becomes available. Refer to the Document Revision History on p. 15 of the manual.

**1.4c Notifications Included in Document**

The following notations may be used in this manual:

**NOTE**

HINTS AND TIPS TO FACILITATE SYSTEM INSTALLATION OR UNDERSTANDING.

**CAUTION**

PROTECT YOURSELF AGAINST PRODUCT PERFORMANCE ISSUES, PRODUCT FAILURE, AND/OR PROPERTY DAMAGE.

**WARNING**

PROTECT YOURSELF AGAINST SERIOUS INJURY OR DEATH.
2: OPERATION

2.1 Units
The GS320 indicates wind speed in miles per hour (mph) or metres per second (m/s). Current units are indicated by a small green light.

To change units press and hold the Down button for 5 seconds. Verify the alarm threshold every time the current units are changed.

2.2 Alarm Threshold
Press the Set Limit button to see the alarm threshold.

NOTE
EVERY TIME THE UNITS ARE CHANGED, THE LIMIT MUST BE VERIFIED AND RE-ADJUSTED IF REQUIRED.

To change the limit, press and hold down the Set Limit button, and use the Up or Down buttons repeatedly to increase or decrease the limit.

2.3 Listen-Only Mode
When the GS320 is started, it wakes up the wind speed sensor programmed to it and takes control of the sensor. This means that if a second display is programmed for the sensor, it will take control of it; the sensor will no longer acknowledge communication from the first display. The GS320 can be programmed to operate in “listening mode”. In this mode the GS320 will display information from the programmed sensor without becoming the network controller.

CAUTION
A SENSOR CAN HAVE ONLY ONE NETWORK CONTROLLER AT A TIME.
TO RECEIVE COMMUNICATION FROM A SENSOR WITHOUT TAKING CONTROL OF THAT SENSOR, THE DISPLAY MUST FIRST BE PROGRAMMED IN “LISTEN-ONLY MODE.”

2.4 Display Settings
This section describes how to manually change the ID number the GS320 will listen to, and how to change some other display behaviors. Changing the wind speed ID number is required only if the wind speed sensor is changed and the display must be manually set to listen to another one.

Press and hold the Up and Down buttons simultaneously for 5 seconds. The display will beep and then indicate the currently programmed wind speed sensor ID number, one digit at a time. The ID number must contain six digits; if the ID number is 120, the first three digits are “000.”

1. Press Set Limit button to change from one screen to the next.

2. To change a digit, use the Up and Down buttons.
   - “Ld” means Listening De-activated (default). Press Down to change to “LA.”
   - “LA” means Listening Mode Active. Another GS320 display must be the master of the wind speed sensor.
   - “OS” means Output Standard: fail safe output (default). The output provides power when wind speed is safe, below the limit. Press Down to change to “OI.”
   - “OI” means Output Inverted: the output wire is energized when wind speed is above the limit.
   - “SA” means Save. When this screen is displayed, press the Down button to save the ID number and above options and then exit.
   - “CA” means Cancel. Press the Down button to exit without saving. The system will retain the previously set ID number and options.

Figure 2: Example of ID number 18820
3: MAINTENANCE

3.1 Replacing the Sensor Battery

CAUTION

PROTECT THE INTERIOR OF THE SENSOR FROM DIRT AND HUMIDITY AT ALL TIMES.

NOTE

BOTH LITHIUM OR ALKALINE BATTERIES CAN BE USED; HOWEVER, A LITHIUM BATTERY WILL LAST ABOUT 2.5X LONGER.

1. Unscrew the two allen screws about a quarter of an inch.
2. 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 3: Remove sensor box from mounting plate

3. Remove the battery by hand.
4. Remove the remaining silicone from both the box and the mounting plate.
5. 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, 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.

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

Figure 4: Install the new battery

7. Reposition the box over the mounting plate and screw in the hex screws. Do not over-tighten.

Figure 5: Apply non-corrosive RTV silicone
3.2 Replacing the 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 display unit.

This procedure may be followed without removing the sensor from the crane if it is safe to do so.

**CAUTION**

THE INTERIOR OF THE SENSOR MUST BE PROTECTED FROM DUST, GRIME, AND WATER AT ALL TIMES.

1. Place the crane, boom, jib, or ball hook such that the sensor is safely accessible.
2. Clean dust, grime, and water from the sensor.
3. Identify the short black whip antenna and the white hex bolt securing it.
4. Inspect the antenna for signs of obvious physical damage.
5. Carefully unscrew the white nylon hex bolt completely and slide it up the antenna.

![Figure 6: Unscrew the white nylon hex](image6.png)

6. 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 7: Pull out the antenna](image7.png)

7. Slide the white nylon hex bolt to the middle of the length of the new antenna.
8. 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 8: Coat the exposed metal foot of the antenna](image8.png)

9. 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 9: Install the new antenna](image9.png)

10. Carefully re-thread, screw-in and tighten the white nylon hex bolt to secure the antenna in place. **Do not overtighten.**
11. Reinstall the sensor if necessary.
12. Verify that the sensor functions properly.
4: INSTALLATION

4.1 Display GS320

**WARNING**

INSTALLATION MUST BE MADE IN COMPLIANCE WITH LSI-ROBWAY INSTRUCTIONS AND USING LSI-ROBWAY SUPPLIED COMPONENTS ONLY.

FAILURE TO INSTALL ALL PARTS, OR REPLACING PARTS OR COMPONENTS WITH PARTS OR COMPONENTS NOT SUPPLIED BY LSI-ROBWAY, MAY LEAD TO SYSTEM FAILURE, SERIOUS INJURY, OR DEATH.

**CAUTION**

DO NOT CRACK OR PUNCTURE THE FACE COVER MEMBRANE. DO NOT POWER WASH THE DISPLAY. THE GS550 UNDERHOOK DISPLAY IS SPLASH- AND RAIN-PROOF. WATERPROOFING DEPENDS IN PART ON THE INTEGRITY OF THE MEMBRANE. POWER WASHING WILL VOID THE WARRANTY.

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4.1a Mounting Bracket

1. Determine the mounting location; the display may be installed either inside or outside the cab. It can be mounted on the dash, on a sidewall, or on the ceiling of the cab.

To ensure reliable radio communication between wind speed sensor and the GS320, the antenna should not be in contact with metal and should have a direct and clear line of sight to the sensor antenna. The mounting bracket requires a flat surface of at least 2.5 inches in diameter on both sides and where the back of the surface is accessible in order to tighten the nuts.

2. Drill 1/4-inch bolt holes through the mounting surface with a 1/4-inch bit following either the two-, three-, or the four-hole configuration.

3. Install the display with bolts. Add washers and lock nut behind the mounting surface and tighten sufficiently (bolts, nuts and washers not included).

**NOTE**

IF THE NUTS ARE ON THE OUTSIDE OF THE CAB, CAULK WITH SILICONE BETWEEN THE WASHERS AND THE CAB TO PREVENT WATER ENTRY.

4. Loosen the wing nut of the bracket arm to adjust display orientation to facilitate viewing by the operator and then tighten it back up.

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![Diagram of Display Dimensions](image1)

**Figure 10:** Display dimensions (inches). Not to scale

![Diagram of Mounting Bracket Footprint](image2)

**Figure 11:** Display mounting bracket footprint. Not to scale

![Diagram of Display Installation and Orientation](image3)

**Figure 12:** Install the display and adjust orientation
4.1b Antenna Position

*For optimal performance, the antenna should be positioned on its side such that it is parallel to the sensor antenna* (but not pointing directly to or directly away from it).

5. Adjust the antenna position with the articulating base.

6. The antenna should have 5 inches of clear space all around it.

7. The antenna should have an unobstructed line of sight to all sensor antennas at all boom angles.

4.1c Power Supply and Lockout Connection

1. Connect the blue wire (ground) to the negative terminal of the battery or the panel connection; alternatively, bolt the blue wire to the body of the machine with a 1/4-inch or 5/16-inch bolt. The ground connection must be strong enough to sustain three amperes.

2. Connect the red wire to a fused accessory source, rated at least three amperes, that supplies +12 or +24 volts when the machine is in use. The GS320 will automatically detect the voltage level and adjust itself.

3. Lockout wire (if required): connect the green wire to a Bosch relay coil terminal. Connect the other coil terminal of the relay to the ground. When in safe condition, the green wire will energize at the battery positive level.

4. Any current greater than one ampere on the green wire triggers an auto re-settable fuse. Current will resume flowing several seconds after the short circuit is eliminated.

**NOTE**

*IF NO VOLTAGE IS PRESENT ON THE GREEN WIRE, REMOVE THE LOAD CONNECTED TO IT.*

4.2 Power Supply Verification

The power from the crane needs to be checked in the DC and AC modes under the following conditions:

- Engine start-up
- Engine idling
- Engine revving up, during complete process (not just when it is revved up)
- Engine revving down (same process as above)
- Engine shut-down

The DC power should not exceed 30 VDC and the AC should be negligible (e.g. <1 VAC).
4.3 Wireless Wind Speed Sensor GS020

1. Remove the mounting rod from the wind speed sensor.
2. Determine the mounting rod position.

d. There should be a clear and unobstructed line of sight between the wind speed sensor antenna and the cabin mounted display unit.

Figure 14: GS020 wireless wind speed sensor

**CAUTION**

- DO NOT WELD IN PROXIMITY TO LSI-ROBWAY SENSORS/TRANSMITTERS.

a. Install the mounting rod on the same side of the boom as the cabin mounted display, perpendicular to the boom, and at the highest point possible.

b. The wind speed sensor must pivot freely on the mounting rod at all boom angles.

c. The wind cups must be fully exposed to the wind and spin freely at all boom angles.

Figure 15: Swivel orientation

Figure 16: Wind clearance

e. The transmitter antenna should not contact any metal object.

3. Weld or screw the mounting rod to the boom at the selected position.

Figure 17: Radio line of sight – crane top view

**NOTE**

- ANGLE IRON CAN BE USED TO EXTEND THE MOUNTING POSITION TO BE CLEAR OF THE BOOM TOP.

4. Re-position the wind speed sensor on the mounting rod. Add the washer and secure with the cotter pin.
5: CERTIFICATION NOTES

5.1 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.

FCC ID: QVBGS000  IC: 7076A-ICGS000
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 3.0 dB. Antennas not included in this list or having a gain greater than 3.0 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 isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

ANTENNA LIST

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<th>TA008</th>
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<tr>
<td>MFG</td>
<td>Nearson</td>
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<tr>
<td>MFG P/N:</td>
<td>S467AH-915S</td>
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FCC ID: QVBGS300  IC: 7076A-ICGS300
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 isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

ANTENNA LIST

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<th>TA011</th>
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<td>1/4 wave monopole</td>
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<tr>
<td>MFG</td>
<td>LSI-Robway</td>
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5.2 CE

5.2a Declaration of conformity

Declaration of Conformity
According to EN 45014

Manufacturer’s Name: Load Systems International Inc.

Canada: 4495 Blvd. Wilfrid-Hamel, Suite 110
Québec, QC, Canada, G1P 2J7

United States of America: 9223 Solon, Suite A
Houston, TX 77064

United Arab Emirates: Q3-171 SAIF Zone, P.O. Box 7976
Sharjah - UAE

declare under our own responsibility that the products:

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<tbody>
<tr>
<td>GC005-CE, GC005-ATEX-CE</td>
<td>5 000 lb Capacity Load Cell</td>
</tr>
<tr>
<td>GC012-CE, GC012-ATEX-CE</td>
<td>1 200 lb Capacity Load Cell</td>
</tr>
<tr>
<td>GC018-CE, GC018-ATEX-CE</td>
<td>18 000 lb Capacity Load Cell</td>
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<tr>
<td>GC035-CE, GC035-ATEX-CE</td>
<td>35 000 lb Capacity Load Cell</td>
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<tr>
<td>GC060-CE, GC060-ATEX-CE</td>
<td>60 000 lb Capacity Load Cell</td>
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<td>GC100-CE, GC100-ATEX-CE</td>
<td>100 000 lb Capacity Load Cell</td>
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<tr>
<td>GS001-CE, GS001-ATEX-CE</td>
<td>170 000 lb Capacity Load Cell</td>
</tr>
<tr>
<td>GS002-CE, GS002-ATEX-CE</td>
<td>Load Transmitter With Pigtail 6 in.</td>
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<tr>
<td>GS005-CE, GS005-ATEX-CE</td>
<td>Load Transmitter With Pigtail 6 in for balanced cell</td>
</tr>
<tr>
<td>GS010-XX-CE, GS010-XX-ATEX-CE</td>
<td>Angle Sensor</td>
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<td>Angle Sensor With Length Input</td>
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<td>GS012-CE</td>
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<td>Wind Speed Sensor</td>
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<td>GS035-CE</td>
<td>Pressure Transducer</td>
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<td>Anti-Two-Block Sensor</td>
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<td>GS075-CE</td>
<td>All-In-One Anti-Two-Block Switch Weight</td>
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<tr>
<td>GS2XX-CE</td>
<td>LSI Wireless Gateway</td>
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<td>GS375-CE</td>
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<tr>
<td>GS820-CE</td>
<td>Graphical GS display</td>
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</table>

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


Wireless: EN 300 220-3 V1.1.1 (2000-09)

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

Québec, April 1st, 2010

Eric Beaulieu
Technologies Manager

5.2b CE Safety

WARNING

WHEN SENSORS ARE USED, THE AMBIENT TEMPERATURE SHOULD NOT BE HIGHER THAN 84°C AND THE DISPLAY SHOULD NOT BE USED WHEN THE AMBIENT TEMPERATURE IS HIGHER THAN 59°C, OTHERWISE THERE CAN BE A BURN POSSIBILITY.

FOR THE OPERATOR’S SAFETY, TAKE ONLY THE AMBIENT TEMPERATURE RANGE INTO CONSIDERATION. THE DEVICE SHOULD BE USED WITHIN THE SPECIFIED RANGES.

CAUTION

THE IP OF EQUIPMENT CORRESPONDS TO 65.

WARNING

THE PROTECTION WILL BE IMPAIRED IF THE MATERIAL AND EQUIPMENT ARE USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER.
6: LIMITED WARRANTY - APRIL 1ST, 2013

6.1 Limited Warranty

LOAD SYSTEMS INTERNATIONAL INC. (hereafter “LSI”) warrants its products (the “Products”) will be free from defects in materials and workmanship for a period as determined by the product family as indicated below (the “Warranty Period”).

<table>
<thead>
<tr>
<th>warranty duration</th>
<th>product family</th>
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<tbody>
<tr>
<td>24 months</td>
<td>GC Series Load Cells, GD Series Line Riders, GP Series Load Pins GS001, GS002, GS003, GS004, GS005, GS007, GS010, GS011, GS012, GS020, GS030, GS031, GS035, GS050, GS075, GS101, GS106, GS110, GS112, GS220, GS221, GS222, GS224, GS550, GS820, LP Series Load Pins, LS051, LS055, PT00100</td>
</tr>
<tr>
<td>12 months</td>
<td>GS026, GS320, GS375</td>
</tr>
</tbody>
</table>

Unless otherwise specified, the default Warranty Period for the Products is 12 months after delivery of such product. Please consult LSI for any Product that is not listed in the above chart for further details.

The Warranty Period commences after delivery of such Products to the user (as evidenced on a LSI document) subject to installation and use in accordance with specifications described in the LSI Installer and User’s Manual, as amended from time to time, LSI technical materials and any related writings published by LSI with respect with such Products and any applicable industry standards.

During the Warranty Period, LSI or its designated service representative shall repair, or at its option, replace any Product that is confirmed to be defective by LSI, in its sole discretion, representing and not exceeding during Product use. Failure by the owner or user of the Product to supply such information shall be deemed a material default of the terms and conditions of this Limited Warranty and shall be irrevocably construed as evidence that the Product was misused or abused. Consequently LSI shall irrevocably be relieved of any obligations to compensate the user or owner of the Product for any and all damages resulting from Product failures when data logging equipment, and access to its content, cannot be freely and readily provided, unhampered, to LSI.

LSI will pay ground freight transportation costs of replacement or repaired parts or Products to the destination in the countries in which it maintains a service center (currently Canada, continental United States of America, United Kingdom, Australia and the United Arab Emirates) (the “Territory”). LSI will not pay any transportation costs of replacement or repaired parts to a destination outside of the Territory. Shipping and handling costs to locations outside the Territory shall be the responsibility of and borne by Purchaser or Owner of the Product prior to any shipment by LSI. (Contact LSI to obtain a Return Authorization Number and the address to ship parts). The Product or part shall be returned to LSI or its designated service representative, accompanied by the Return Authorization Number with prepaid shipping charges. The purchaser must insure the shipment or accept the risk of loss or damage during the shipment. Purchaser shall also pay any tariff or duty applicable to the return of the defective part or Product. LSI will, at its option, repair or replace the Product or part returned to LSI or to its designated service representative. LSI owns all parts or Products replaced, repaired or removed from a repaired Product. If LSI repairs a Product, the Product Warranty coverage Period is not extended and the Limited Warranty shall expire as if uninterrupted at the end of the last month of the original Warranty Period from shipping from LSI. If LSI replaces a Product, the replaced Product is warranted for the remainder of the original term or sixty consecutive (60) days, whichever is longer.

LSI reserves the right to require from the user or owner of the Products, prior to determining if the Limited Warranty coverage is applicable, that LSI receive the data logging equipment used with the Products and that LSI be authorized to retrieve all information from such data logging equipment in order to, among others, ensure that the written instructions and applicable standards, including safety margins, were respected and not exceeded during Product use. Failure by the owner or user of the Product to supply such information shall be deemed a material default of the terms and conditions of this Limited Warranty and shall be irrevocably construed as evidence that the Product was mishandled.

6.2 Warranty Services Procedures

In order to benefit from this Limited Warranty, the purchaser must notify LSI’s customer service or LSI’s authorized distributor or representative originally responsible for the sale of the Products within 10 days of the occurrence of a suspected defect in materials or workmanship, and in any case prior to the expiry of the Warranty Period. Timely notification will permit the purchaser to obtain a Return Authorization Number which will indicate return procedures and terms and conditions of such returns. A proof of purchase of the Product, such as an invoice or a receipt certifying the validity of the Warranty, must be presented in order to obtain Limited Warranty coverage. In any event, even if a Return Authorization Number is provided to purchaser, LSI reserves the right to inspect the damaged

6.3 Exclusion of Other Warranties

THE ABOVE WARRANTY IS THE SOLE WARRANTY APPLICABLE AND THERE ARE NO EXPRESS, LEGAL OR IMPLIED WARRANTIES OR CONDITIONS IN RELATION TO ANY PRODUCTS INCLUDING ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, NON-INFRINGEMENT.
6.4 Exclusion

This Limited Warranty does not cover and shall not apply to:

- Any Product that is misused or abused, including being altered, modified or repaired not in accordance with LSI written instructions or authorizations or used not in compliance with LSI’s instructions and/or industry standards and practices;
- Any incidental costs or expense, such as shipping charges to LSI or an designated service representative as well as the technician out-of-pocket expenses including traveling, lodging and meal expenses, if any; The damages caused during the transport or the moving of the Product;
- Damages caused by accidents, abuse, misuse, a force majeure (described as events outside a LSI’s or any Product user’s control, including war, riot, strikes, embargoes) or external cause;
- Any cost, damage or expenses for field labor or any other expenses related to or arising from the replacement of defective parts.
- Products used for pile-driving, wire rope activated clamshell or dragline applications. If purchaser uses the Products for pile-driving, wire rope activated clamshell or dragline application, the Limited Warranty will be deemed to have been violated for abuse.
- Any costs associated with providing LSI with data logging equipment.

6.5 Limitation of Liability

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

SOME STATES OR JURISDICTIONS DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

6.6 Recommended Practices

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

6.7 Choice of Law

This Limited Warranty shall be governed by and construed in accordance with:

- the laws of the Province of Quebec, Canada for products sold by LSI in Quebec;
- the laws of the Province of Ontario, Canada for products sold by LSI in Ontario and anywhere else in Canada; and
- the laws of the State of New York for products sold by LSI anywhere in the United States of America or anywhere else, excluding Canada.

6.8 Entire Agreement

This document contains the entire agreement of the parties regarding the subject matter of the Product and supersedes all previous communications, representations, understandings and agreements, either oral or written, between you and LSI.

6.9 Vienna Convention Excluded

The United Nations Convention on Contracts for the International Sale of Goods does not apply to this Limited Warranty.
## REVISION HISTORY

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<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Summary of Change</th>
<th>Approved By</th>
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<tbody>
<tr>
<td>1.1</td>
<td>May 21, 2013</td>
<td>Updated formatting to LSI-Robway style.</td>
<td>B. Pimparé</td>
</tr>
<tr>
<td>1.2</td>
<td>July 30, 2013</td>
<td>Minor formatting and wording changes for internal consistency.</td>
<td>M. Young</td>
</tr>
<tr>
<td>1.3</td>
<td>Feb. 23, 2015</td>
<td>Logo &amp; address updates, etc.</td>
<td>A. Latvatalo</td>
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