USER MANUAL

Trimble LOADRITE H2250 haul truck monitor

LOADRITE H2250 User manual

IMPORTANT SAFETY INFORMATION

PLEASE READ CAREFULLY BEFORE USING THE LOADRITE™ WEIGHING SYSTEM

⚠	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
⚠WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

⚠WARNING

Work on trucks and all heavy machinery is a hazardous activity. Only experienced professionals should install LOADRITE equipment.

It is your sole responsibility to place, secure and use the LOADRITE Weighing System in a manner that will not cause accidents, personal injury or property damage. Always observe safe operating practices.

Do not install the LOADRITE Weighing System in a way that may interfere with the safe operation of the vehicle, or deployment of safety equipment.

Before you use the LOADRITE Weighing System for the first time, familiarize yourself with the system and its operation.

⚠CAUTION

Do not handle the LOADRITE Weighing System if it is hot. Let the product cool, out of direct sunlight.

Ensure that the LOADRITE Weighing System is connected to a power source with the correct fitting and voltage requirements.

Do not attempt to service the LOADRITE Weighing System as this could result in personal injury.

CAUTION

Removing LOADRITE Weighing System equipment or adding accessories could affect the accuracy of weighing data and your warranty.

Do not install cables over horizontal surfaces where they may be stood on or hit by falling objects.

Failure to adhere to these warnings and cautions may lead to death, serious injury or property damage. Trimble Navigation Limited disclaims all liability for installation or use of the LOADRITE Weighing System that causes or contributes to death, injury or property damage, or that violates any law.

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1.   WELCOME

Thank-you for purchasing this LOADRITE Monitoring and Weighing System. Please read this manual carefully before using the Indicator for the first time. Keep this manual in a safe place and use as your first point of reference.

Formatting

The following formatting in this manual identifies specific types of information:

Convention	Type of Information
Bold	‣ Indicates a button on the Indicator, or ‣ Indicates an area displayed on-screen, including buttons, headings, field names and options.
Italics	‣ Indicates the name of a screen or window, or ‣ Indicates an operation mode that the Indicator can be set to.
Monospace	The exact error message displayed on-screen.

Action Terms

The following terms are used throughout this manual to describe actions:

Term	Description
Press	Push and release a button quickly.
Press and hold	Push and hold a button for 2-3 seconds.
Select	Use the arrow buttons to "highlight" an item in a menu or list

2.   INTRODUCTION

The Trimble LOADRITE H2250 Haul Truck Monitor System measures the weight of material shifted and many other operational parameters of a standard Rigid Body Haul Truck.

Sensors installed on the truck measure the load, ground slope, tray position, truck location, speed and other values. This data is all collected by the Indicator mounted in the cab of the truck.

The H2250 is designed to be largely hands-free for the truck driver. In most applications the driver will not need to press any buttons on the Indicator. However the display does show a range of information that can be valuable to the driver.

The main purpose of the product is to provide a rich set of information on the material moved and the productivity of the truck as a basis for improving overall site performance.

3. QUICK START GUIDE

3.1. TURNING ON THE SYSTEM

The LOADRITE Indicator will turn on automatically when you start the truck.

3.2. THE RUN SCREEN

The *Run* screen displays when the Indicator turns on, or comes out of *Standby* mode. It will display the Payload weight, time and number of parameters the system was configured with when it was installed.
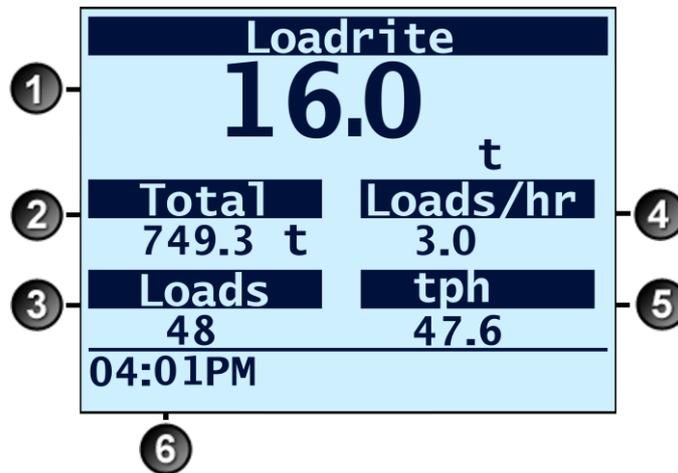
	Component	Description
1	**Payload**	The current 'live' payload value on the truck.
2	**Information**	Set at installation. In the above example: ▸ Total: Shows the Daily Total of material hauled.
3	**Information**	Set at installation. In the above example: ▸ Loads: The number of Loads hauled today.
4	**Information**	Set at installation. In the above example: ▸ Loads/hr: The average number of loads hauled per operating hour today.
5	**Information**	Set at installation. In the above example: ▸ tph: t per hour hauled while operating today.
6	**Clock**	The current time. This is automatically updated and adjusted for Daylight Savings.

3.3.   INDICATOR FEATURES

Icon	Name	Description
	Error Light	Illuminates when an error has occurred: ▸ Fast flash (0.5 second interval): Pressure Transducer or Tilt Sensor error ▸ Slow flash (2.0 second interval): Data memory is at, or over, 75% capacity.
	Standby Mode	When displaying the *Run* screen, press to enter *Standby* mode.
	Productivity	When displaying the *Run* screen, press to display the current Productivity information.
	Brightness	When displaying the *Run* screen, press to adjust the screen brightness. Press repeatedly to step through the brightness levels.
	Diagnostics	Displays the *Diagnostics* screen.
	Setup Menu **Back**	▸ Displays the time and date before promoting for an access code for the *Setup Menu*. ▸ Moves back one menu screen without changing the data.
	Up	Moves up a list of options.
	Down	Moves down a list of options.
	Enter	▸ Selects an item. ▸ Accepts changes.
	Numbers	Used to enter numbers.
	Decimal Point	Used to enter a decimal point.
	Print Report	Displays the *Print Report* screen, from where you can print summary reports of today's and yesterday's productivity.
	Clear Entry	Resets a value to the default or to **0** during data entry.
	Zero	This button is reserved for future functionality.

3.4.   DELAY TIME ENTRY

The *Delay Time Entry* functionality is only available if enabled during installation.
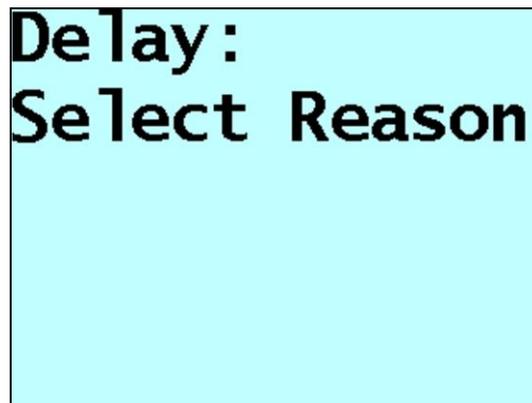
If you see the above message, the Indicator has detected that there has been an operational delay and you must select the reason for the delay:

1)   Press ⬆ or ⬇ to scroll through the possible reasons for the delay.

2)   Press ⏎ to select the correct reason.
     The reason will be recorded and the *Run* screen will display.

TIP: The list of reasons for the operational delay are configured using InsightHQ.

3.5.   STANDBY

If you are not going to use the LOADRITE Weighing System for a while, you can put the Indicator into *Standby* mode by completing the following:

▸   Press ⏻
     The Indicator will enter *Standby* mode.

How do I exit *Standby* mode?

▸   Press any button to exit *Standby* mode.
     The *Run* screen will display.

4.   HOW IT WORKS

Most system functions are automatic and do not require specific input by the truck driver.

4.1.   WEIGHING

The H2250 is effectively two scales in one product:

Loading Indication Scale

Weighing is undertaken in the same manner as many of the OEM and after-market scale products. This gives an *approximate* payload indication to the driver as the truck is being loaded, however should not be expected to be highly accurate.

Production/Productivity Scale

Weighing is undertaken while the haul truck is in motion from loading to dumping, using gas pressure and ground slope signals. This method allows the H2250 to compensate for ground conditions, friction and a range of other errors, yielding a more accurate value for the payload.

When the load is dumped, the final calculated weight will be shown on the display for a short time. The word **Dumped** is shown to the right of the weight value. This is the value that is recorded as the payload.

4.1.1.   Sensors

The following sensors collectively determine the payload:

▸ The Pressure Transducers measure the total load (weight) from each of the four gas/oil suspension struts (two at the front, two at the rear).

▸ An Angle Sensor on the tray measures the ground slope, and also detects when the tray is being tipped (dumped).

▸ A GPS sensor is determines the location and speed of the vehicle.

4.1.2.   Accurate weighing

For maximum accuracy, ensure that:

▸ There is no material build-up in the truck tray.

4.2.   PRODUCTIVITY MONITORING

Weight measurement is an important part of the H2250 system, however it forms only part of the value to users. The H2250 system is fully integrated with the InsightHQ product and provides a great deal of productivity information, as well as supporting safe operation of the site. The system is designed to be able to be operated completely 'hands off' by the truck driver, meaning that no button presses or interaction is required, although summary productivity information is available, if required.

Information available to users and management includes:

▸ Material movement (the payload of material and where it was moved from and to)

▸ Cycle times (including breakdown into queuing, loading, travel, idle, dumping times, etc)

▸ Fuel usage (optional)

▸ Speed tracking (including the reporting of excess speed and alerts).

5.   PRODUCTIVITY INFORMATION

The LOADRITE H2250 Indicator has several truck productivity functions for recording and displaying information. The H2250 system is primarily designed to operate with the LOADRITE InsightHQ system to provide this productivity data, however the Indicator can display some basic productivity data to the truck driver as well.

5.1.   ON-SCREEN PRODUCTIVITY

The *Run* screen is configured to display basic productivity information by default, however other information may be displayed as detailed below.

Default productivity options:

‣ Daily total (from midnight)

‣ Loads per hour (for the day)

‣ Number of loads (for the day)

‣ Tonnes per hour (for the day while the truck is running).

Other available options:

‣ Location (based on geofenced areas such as stock-piles, bins, etc)

‣ Speed (of truck)

‣ Distance traveled (for the day)

‣ Operating time (total time the truck was turned on for the day)

‣ t.km/hr (ton x distance / time; This is a useful measure of how quickly material is moved)

‣ Truck status (moving, stopped, dumping, etc)

‣ Cycle time (average time from dump to dump).

TIP: The LOADRITE H2250 can also display an overview of most of these values by pressing 🔲 .

5.2. PRINTED REPORTS

Printing functionality requires the connection of a LOADRITE printer.

The *Full Day Report* provides a useful summary of information on the productivity of the system. Both reports can be printed on demand by completing the following:

1) Press .

2) Press or to select one of the following options:

   ‣ **Today** - Prints the truck's operational data up until the current time.

   ‣ **Prev Day** - Prints the truck's operational data from the previous 24 hour period.

3) Press .

Example report

```
#############################
Full Day Report
LOADRITE
ID #: 8841   Truck #1
Report Printed:
5:36 PM  23 MAY 2016
Start:  12:00 AM 23 MAY

Totals:
Sand:                    0.0 t
33:                     53.4 t

Load Counts:
Sand:                       0
33:                         3

Productivity Summary

Total:               6935.9 t
Loads:                    442
Distance:            396.3 km
Operating:              19:51
tph:                    349.4
Loads/hr:                22.3

-----------------------------
```

Report contents

Item	Description
Full Day Report	The type of report printed.
LOADRITE	This line is a configurable 16 character identifier for when there are multiple systems.
ID #	The ID number of the system, selected at installation.
Truck	The number of the truck.
Report Printed	The time and date the report was actually printed.
Start	**The beginning of the 24hr period (time and date) that the report covers.**
Totals	The subtotals for each product, as defined by the geofence configuration.
Load Counts	The number of loads for each product, as defined by the geofence configuration.
Productivity Summary	A summary of productivity for the day: ‣ **Total:** Daily total ‣ **Loads:** Number of loads ‣ **Distance:** Distance traveled ‣ **Operating:** Total operating time (total time the truck was turned on) ‣ **tph:** tonnes per hour. ‣ **Loads/hr:** Loads per hour.

6. DIAGNOSTIC INFORMATION

```
User Diagnostics
Weight:              4.0
Pressures  1:  6% 2:  6% 3:  7% 4:  7%
Pitch:  1.9  Roll:  -0.6  Accel: 1.000
Lat: -36.000572   Long: 174.000153
Speed: 20.0  Course:   0  Sat:10
Comms OK
```
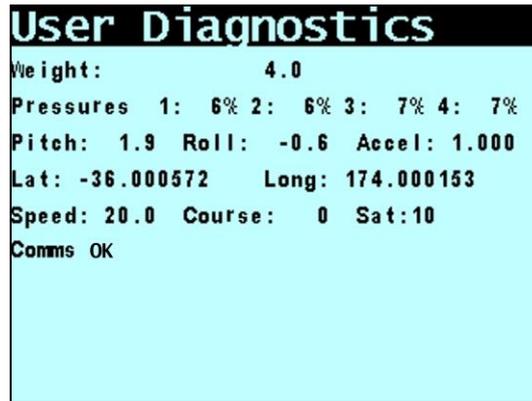
The LOADRITE H2250 can display a range of useful diagnostic data. To access the *User Diagnostics* screen, press .

Weight

This is the current "live" weight being calculated for the payload.

Pressures 1, 2, 3, 4

The pressure (%) of the four suspension struts. A value of less than **0%** or greater than **100%** indicates a fault.

Pitch, Roll, Accel

The current angles (in degrees) of the angle sensor mounted on the tray near the pivot. On level ground, the values for **Pitch** and **Roll** should be close to **0** (typically within +/- 5° depending on installation). As the tray is raised, the value of **Pitch** should change to be much more positive or negative. The value for **Accel** (acceleration) should be close to **1.000**.

Lat, Long

The current latitude (**Lat**) and longitude (**Long**) coordinates from the GPS receiver. The values should change as the truck moves.

Speed, Course, Sat

‣ The speed (**Speed)** and direction (**Course**) of the truck, as calculated from the GPS receiver.

‣ The number of GPS satellites (**Sat**) that the GPS receiver currently has "in view". For optimal accuracy, the number of satellites should be between **8** and **12**. A value of less than **8** may mean that the GPS antenna is blocked by part of the truck or the truck is too close to a tall or large object such as a cliff or a set of product bins).

Comms

The communications status (**Comms**) indicates whether there is a connection between the LOADRITE Communications Controller (LCC) and the Indicator:

‣ **OK** - indicates that the LCC and Indicator are communicating correctly.

‣ **Not Connected** - indicates that there is a problem with the LCC, wiring or scale configuration, which requires attention.

Other Data

More diagnostic information may be displayed, depending on the configuration settings.

7.   APPENDIX A: SYSTEM SPECIFICATIONS

7.1.   WEIGHING ACCURACY

Typical accuracy is +/- 3% of the **Full Scale** value for most types of standard rigid body trucks. This may vary with different truck designs, operator and the physical condition of the truck suspension.

7.2.   TRADE APPROVAL

The LOADRITE H2250 system is a very accurate weighing systems, but not *Legal for Trade*.

Each country or state may have different rules on the definition of *Legal for Trade*. It is important that the operator/owner of the equipment understands these definitions.

7.3.   POWER REQUIREMENTS

Supply voltage	12 ~ 32V DC
Supply current - LOADRITE Indicator	160mA typical, 350mA max.
Supply current - LOADRITE Printer	50mA standby, 4A peak
Transient capability	ISO 16750-2: 4.6.4: Figure 8 and Table 5, 24V alternator without load dump suppression

7.4.   PHYSICAL SPECIFICATIONS

LCD display	Backlit; 3.8in (diagonal); QVGA.
Tactile keypad	Backlit; Numeric and special functions.
Weight	1.5 kg (3.2lb)
Dimensions	W145 x L240 x D110mm (5.7 x 9.4 x 4.3in)

7.5.   ENVIRONMENTAL SPECIFICATIONS

|	
Operating temperature	-10°C ~ 50°C (14°F ~ 122°F)
Operating humidity	20 ~ 90% RH non-condensing
Storage temperature	-50°C ~ 100°C
Storage humidity	10 ~ 95% RH
Indicator	Protected to IP54.

8. APPENDIX B: SPAN CALIBRATION ADJUSTMENT

This function allows small changes to be made to the LOADRITE H2250 calibration if a truck is modified, or if no accurate test load was available when the H2250 was calibrated at installation time.

The adjustment is carried out by entering the known weight of a reference scale (for example, a wheel loader with a scale installed) and the corresponding total provided by the LOADRITE H2250.

To perform the adjustment, a security access code must be obtained from your LOADRITE installer.

CAUTION The LOADRITE Weighing System alters its calibration every time this function is used. It is important that this function is only used once with a given set of data. If the same weights are entered again, the LOADRITE Weighing System will over-correct and its accuracy will be seriously impaired.

1) Press [icon].

2) Enter the security access code provided by the LOADRITE installer, then press [icon].
   The *Enter LR value* screen will display.
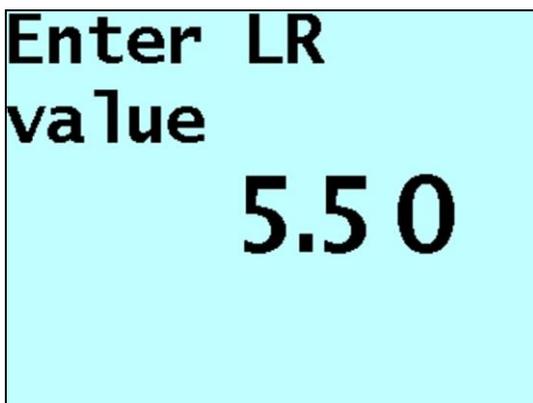
```
Enter LR
value
      5.50
```

3) Enter the total weight provided by the LOADRITE Indicator, then press [icon].
   The *Enter Ref value* screen will display.
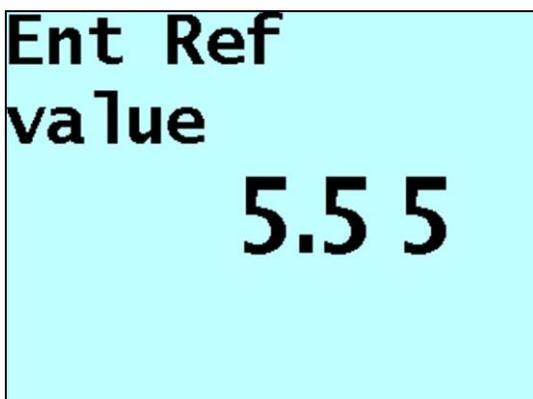
```
Ent Ref
value
      5.55
```

4) Enter the known reference weight, then press [icon].
   The LOADRITE Indicator will briefly display the percentage of difference between the two values, before returning to the *Run* screen.

9.   APPENDIX C: ERROR MESSAGES

| Error Message	Description
Pressure Error	This message is displayed when a Pressure Transducer fault occurs and is pressed.
NT (No Transducer)	Indicates that there is no signal or that the Pressure Transducer has been disconnected.
OR (Over Range)	Occurs if one or more Pressure Transducers has been damaged or a cable has been shorted or damaged.
Tilt Sensor Error	Indicates that the Angle Sensor or its cable has been disconnected or damaged.

10.   APPENDIX D: WARNING MESSAGES

The Indicator will display a warning message when the truck may be being operating outside of normal operating parameters.

IMPORTANT: The below warnings are intended to aid in safe operation of the truck, but are not intended to be a substitute for normal good practice driving.

10.1.   SPEED LIMIT

The *Speed Limit* functionality is only available if enabled during installation.
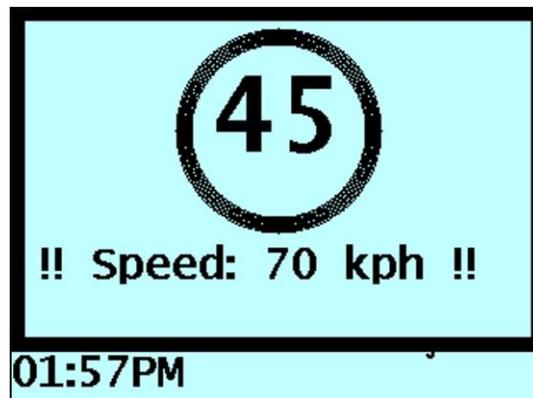
If the truck exceeds the specified speed limit, the Indicator will "beep" and the above message will be displayed. If after five seconds the truck speed is still above the limit, the Indicator will log it as a Speeding Event. Each Speeding Event is available for reporting in LOADRITE InsightHQ.

10.2.   TIP ALERT

The *Tip Alert* functionality is only available if enabled during installation.
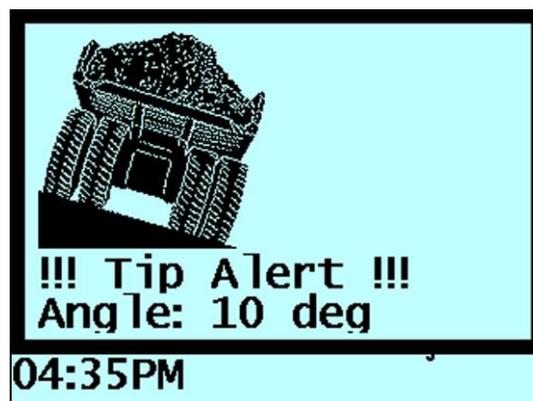
There are two side slope limits:

▸   a limit for when the truck is stationary,
▸   a limit for when the truck is moving faster than the specified minimum speed.

If the truck exceeds the specified side slope limits, the Indicator will "beep" and the above message will be displayed.

NOTE: Site management should define the safe limits for the site conditions. The side slope limits are usually set to be less than the maximum safe side ground slope that the truck tray can be raised.

10.3.   OVERLOAD
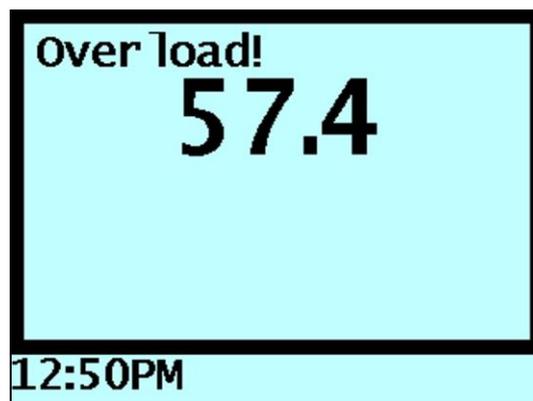
The Indicator will display the **Overload** warning message if the payload on the truck is more than 20% above the **Max Load** value of the truck specified at installation. The message will remain until the load is dumped.

10.4.   TRAY UP
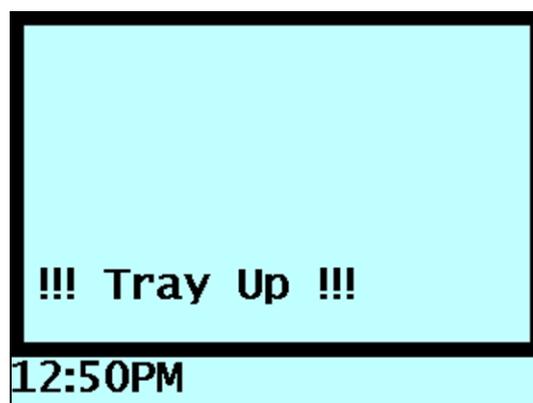
The Indicator will display the **Tray Up** warning message if the truck starts to drive while the tray is fully raised (above 40°)

11. APPENDIX E: MAINTENANCE

For accurate weighing with the LOADRITE H22500, it is advised to service the truck regularly.

Item / Area	Task	Maintenance Interval				
		D	W	M	Q	Y
Greasing of linkages	Confirm the joints at the ends of the suspension struts and the rear trailing arm linkage area are greased as per the truck manufacturer's instructions.		✓			
Calibration	Check the calibration, if required. For example, load the truck with a Wheel Loader fitted with a LOADRITE scale. Compare this with the dumped weight from the truck, after driving the load for more than 500m.			✓		
Suspension Struts	Have qualified service people check that the suspension struts for correct gas levels. Some truck manufacturers recommend replacing the oil in the struts every 12-24 months.					✓

Key:

▸ **D**: Daily

▸ **W**: Weekly

▸ **M**: Monthly

▸ **Q**: Quarterly

▸ **Y**: Annually

12. APPENDIX F: GLOSSARY

D

Display

A screen with adjustable backlighting for night and low-light operations. Used to display weight information and messages.

G

Geofence

A virtual boundary that identifies a specific part of a site. Geofences allow the location of vehicles to be monitored and aligned with productivity information.

I

Indicator

The LOADRITE user interface installed in a truck and uses to record weight and productivity information.

InsightHQ

Advanced reporting and analysis software used to track productivity for the whole site or multiple sites.

K

Keypad

A set of numeric or alphanumeric buttons on the Indicator which allow you to enter numbers, letters and other characters. Depending on the Indicator model, *Keypad* may also refer to other buttons along-side the numeric or alphanumeric buttons.

L

LOADRITE Communications Controller (LCC)

A modem used to transmit data from a LOADRITE Indicator to an email address, a FTP site, LOADRITE InsightHQ or LOADRITE Data Services.

LOADRITE Weighing System

Refers to the entire LOADRITE hardware and software weighing system installed at a site, including the Indicator, transducers, sensors, modem, InsightHQ software, etc.

P

Printer

An optional accessory that provides a paper record of the weighing information collected by the Indicator.

▸ See also *Docket* or *Ticket*.

S

Site

The location of the operation where the LOADRITE weighing system is being used.

▸ See also *LOADRITE Weighing System* and *Site*.

Standby

A low-power mode which the Indicator can be set to between weighs.

13. APPENDIX G: LEGAL INFORMATION

Disclaimer

Trimble Navigation Limited operates a policy of on-going development. Please note that while every effort has been made to ensure that the data given in this document is accurate, due to continued product development, the information, figures, illustrations, tables, specifications, and schematics contained herein are subject to change without notice. Trimble Navigation Limited does not warrant that this document is error-free. The screenshots and other presentations shown in this manual may differ from the actual screens and presentations generated by the actual product. All such differences are minor and the actual product will deliver the described functionality as presented in this document in all material respects. If you find any errors in the document, please report them to us in writing.

Trimble Navigation Limited assumes no liability in connection with the use of any LOADRITE branded product.

Compliance

Jurisdiction	Policy	Description	Top-Level Requirement
Australia / New Zealand	Radiocommunications (EMC Standards) Notice 2004 No. 2	Emissions (industrial)	EN 61000-6-4:2006
Canada	ICES-003:2012 Issue 5	Emissions (industrial)	EN 61000-6-4:2006
Europe	Electromagnetic Compatibility Directive 2004/108/EC	Emissions (industrial)	EN 61000-6-4:2006
		Immunity (industrial)	EN 61000-6-2:2006
	Restriction of Hazardous Substances Directive 2002/95/EC	Hazardous Substances	
United States of America	FCC Part 15 Subpart B - Radio Frequency Devices	Unintentional emission (industrial)	15.107(b) and 15.109(b)

CE

This LOADRITE product is fully EMC (Electro-Magnetic Compatibility) compliant and is CE marked accordingly. A Declaration of Conformity, in accordance with the EMC Directive 89/336/EEC (and as amended) is available from Trimble Navigation Limited on request: info@loadritescales.com

Trimble Navigation Limited cannot be held responsible for modifications made by the User and the consequences thereof, which may alter the conformity of the product with CE marking.

This LOADRITE product is explicitly excluded from the scope of EU RoHS 2 Directive 2011/65/EU in article 2, section (4), paragraphs: (d), (e), (f) and (g).

This device complies with part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class A digital apparatus complies with Canadian ICES-003 (A) / NMB-003 (A).

WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. This Notice is being provided in accordance with California's Proposition 65.

Disposing of LOADRITE electronic equipment

This electronic product is subject to the EU Directive 2002/96/EC for Waste Electrical and Electronic Equipment (WEEE) which requires the separate collection, treatment, recycling and environmentally-sound final disposal of waste of electrical and electronic equipment. As such, this product must not be disposed of at a municipal waste collection point.

Please refer to local regulations for directions on how to dispose of this product in an environmentally-friendly manner.

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