# **MSI-8004HD**

RF Indicator





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# 1.0 Introduction

The *MSI-8004HD RF Indicator* is a combination of the sound and proven mechanical design of the industry standard, with today's most advanced electronics. It provides a superb feature set unmatched by any scale in its class or price range. The *MSI-8004HD* is versatile, reliable, accurate and easy to operate. RF remote control and remote display options are available to further enhance the safety and usability. Installed optional relays optimize work-flow and process control.

This manual is intended for use by qualified technicians responsible for setting up and operating the MSI-8004HD.



Manuals can viewed or downloaded from the Rice Lake Weighing Systems website at <u>www.ricelake.com</u>

Warranty information can be found on the website at www.ricelake.com/warranties

## **1.1 Features**

- Meets or exceeds U.S./International safety and environmental standards
- No license required. Meets U.S./International RF transmission laws
- The display enclosure is pending IP65, for outdoor use
- The enclosure is built with rugged construction throughout
- Six, 1.5" (38 mm), LED digits for clear weight readings
- Selectable units for kg or lb
- · Automatic or manual weight totalization for loading operations
- Eight setpoints can be set for in-range load/weight value for operator alerts or process control
- · ScaleCore technology provides quick and easy firmware updates and calibration/setup backup
- · Optional hard-wired link for applications where RF is not allowed



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## 1.2 Safety

#### **Safety Signal Definitions:**



Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.



Indicates a potentially hazardous situation that, if not avoided could result in serious injury or death. Includes hazards that are exposed when guards are removed.



Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.



Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

#### **General Safety**



Do not operate or work on this equipment unless this manual has been read and all instructions are understood. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals.



Failure to heed may result in serious injury or death.

Do not allow minors (children) or inexperienced persons to operate this unit.

Do not stand near a load being lifted as it is a potential falling hazard. Keep a safe distance.

Do not use for purposes other then weight taking or dynamic load monitoring.

Do not use any load bearing component that is worn beyond five percent of the original dimension.

Do not use any associated lifting product if any of the load bearing components are cracked, deformed or show signs of fatigue.

Do not exceed the rated load limit of the associated scale/dynamometer unit, rigging element or the lifting structure.

Do not allow multi-point contact with the hook, shackle or lifting eye of the associated scale/Dynamometer unit.

Do not allow high torque on the scale/dynamometer unless it is specifically designed for high torque.

Do not make alterations or modifications to the unit or associated load bearing devices; any alterations void the warranty. Do not remove or obscure warning labels.

There are no user serviceable parts within the MSI-8004HD. Any repairs must be performed by qualified service personnel only.



## **1.3 Front Panel Description**

The MSI-8004HD front panel keys and annunciators are described in Table 1-1.



Figure 1-1. Front Panel

## **1.3.1 Key/Annunciator Functions**

Item No.	Description
1	Setpoints — user programmable setpoints for overload warnings; they are green when set and flash red when tripped
2	Scale Channel — blue LED indicates the channel on display; if red, a fault is detected
3	Display Digits — includes six 1.5" (38 mm) sunlight visible LED's; Color - Blue or Red/Green/Orange
4	<b>kg</b> – indicates load display is in kilograms <b>Ib</b> – indicates load display is in pounds
5	Net – RF linked device is in Net load mode; a tare weight is subtracted from the gross load
6	Total – RF linked device is displaying the total accumulated weight; a temporary display lasting less than 5 seconds
7	RF – indicates an active radio communication link with a scale or indicator
8	Low Battery - illuminates when approximately 10% of battery life remains, flashes when automatic shutdown is eminent
9	<b>Center of Zero</b> — indicates that the scale/Dyna-Link is within 1/4 d of zero
10	Standstill $-$ load has settled within the motion window (usually $\pm$ 1d); if off, the scale will not zero, tare or totalize
11	<b>Function 3 Key</b> – pre-programmed to <b>Print</b> and cannot be changed; performs diagnostic and display tests when pressed with Function 2 key
12	<b>Function 2 Key</b> – programmable to user selectable functions, see Section 4.0 on page 20; performs diagnostic and display tests when pressed with Function 3 key; Default <b>Channel</b>
13	Function 1 Key – programmable to user selectable functions, see Table 4.2 on page 22; Default Units
14	Tare Key — removes current weight and puts the system into Net weight mode
15	Zero Key – zeros the residual load on a scale/Dyna-Link
16	Power Key — turns the unit on and off

Table 1-1. Keypad/Annunciator Functions

See Section 4.0 on page 20 for key functions when in setup menu.



## **1.4 System Configurations**

The MSI-8004HD models and part numbers are listed below.

Part No	Description	Comments
178263	MSI-8004HD Indicator, 4CH AC, Blue	85~264VAC, 47~440Hz, 120~370VDC (add filter)
178265	MSI-8004HD Indicator, 4CH AC, Red/Green	85~264VAC, 47~440Hz, 120~370VDC (add filter)
178267	MSI-8004HD Indicator, 4CH DC, 8-32V, Blue	Best for external 12V SLA Batteries
178269	MSI-8004HD Indicator, 4CH DC 8-32V, Red/Green	Best for external 12V SLA Batteries
178270	MSI-8004HD Indicator, 4CH DC 9-36V Iso, Blue	Do not use on 12V Vehicle Systems
178271	MSI-8004HD Indicator, 4CH DC 9-36V Iso, Red/Green	Do not use on 12V Vehicle Systems
183480	MSI-8004HD Indicator, 4CH DC External Battery, Blue	
183481	MSI-8004HD Indicator, 4CH External Battery, Red/Green	

Table 1-3. Indicator Configurations

## 1.5 **Options**

Part No	Option	Description
133620	Serial Cable, 2' with DB9 female conn	
139309	Antenna Kit, Long Range Omni-directional, 9dBi with 3m Coax	Intended for omni-directional mast mounting (up to $2^{"}\mathcal{O}$ ). Beam-width. Must be mounted vertically.
139310	Antenna Kit, Corner Reflector, 9dBi with 3m Coax	Intended for directional wall or mast mounting (up to 2" Ø). Beam-width: 75° Elevation, 65° Azimuth
139311	Antenna Kit, Corner Reflector, 12dBi with 3m Coax	Intended for directional wall or mast mounting (up to 2" Ø). Beam-width: 50° Elevation, 36° Azimuth
139312	Antenna Kit, YAGI, 15dBi with 3m Coax	Highly directional wall or mast mounting (up to 2'' $\emptyset$ ). Beam-width: 30° Elevation, 34° Azimuth
139313	Antenna Kit, Vehicle Mount, 5dBi with 5m Coax	Omni-directional. Mounts in 3/4" Hole.
183437	Battery, 5V Li-ion	Replacement battery for use only with MSI-8004HD assemblies that support the external battery.
182224	Car Charger	Car charger for MSI-8004HD battery
172492	Relay Option Kit, 4 relays, 240VAC 12A, momentary	Most common Coil Form C, 4 Relay option. Replaces back cover. Relays rated to 230VAC 12A
172495	Relay Option Kit, 8 relays, 240VAC 12A, momentary	Most common Coil Form C, 8 Relay option. Replaces back cover. Relays rated to 230VAC 12A
172490	Relay Option Kit, 4 relays, 240VAC 12A, latching	
171676	Relay Option Kit, 8 relays, 240VAC 12A, latching	
172493	Relay Option Kit, 4 relays, 60Vpk 3A, Form A SSR	Form A SSRs
172501	Relay Option Kit, 8 relays, 60Vpk 3A, Form A SSR	Form A SSRs
172493	Relay Option Kit, 4 relays, 60Vpk 3A, Form C SSR	Form C SSRs. Requires 8 relays
172501	Relay Option Kit, 8 relays, 60Vpk 3A, Form C SSR	Form C SSRs. Requires 16 Relays
172494	Relay Option Kit, 4 relays, 200Vpk 0.9A, Form A SSR	Form A SSRs
172498	Relay Option Kit, 8 relays, 200Vpk 0.9A, Form A SSR	Form A SSRs
172500	Relay Option Kit, 4 relays, 200Vpk 0.9A, Form C SSR	Form C SSRs. Requires 8 relays
172502	Relay Option Kit, 8 relays, 200Vpk 0.9A, Form C SSR	Form C SSRs. Requires 16 Relays
Custom co	mbinations of relays are available by special order.	

Table 1-4. Available Options



# 2.0 Operation

This section covers the basic operation of the MSI-8004HD.

## 2.1 Power

Power the indicator On/Off by pressing

## 2.2 Zero

Sets the zero reading of the scale to remove small deviations in zero when the unit is unloaded. See Section 2.3 for zeroing (taring) a package, rigging or pallet weights.

Press

The weight must be stable in the motion window for the zero function to work.

- When using multiple scales, ensure the scale to be zeroed is displayed.
- The backup memory in the unit stores the tare reading, and can restore it even if power fails.
- Zero works in Gross or Net mode.
- Zeroing while in Net mode will zero the gross load causing the display to show a negative tare value.
- The scale must be stable within the motion window and  $\square$  illuminated before it will zero. The scale remembers the zero request for two seconds. If a motion clears in that time, it will zero.
- The scale will accept a zero setting over the full range of the scale. Zero settings above 4% of full scale will subtract from the overall capacity of the scale.

Example:

If 100 lb is zeroed on a 1000 lb scale, the overall capacity of the scale will reduce to 900 lb plus the allowed over-range amount.

## 2.3 Tare

Tare is used to zero out a known weight such as rigging, a container or pallet and display the load in Net weight.

#### 2.3.1 Tare and Display the Net Load

- 1. Load the item that needs to be tared onto the scale.
- 2. Press  $\swarrow$ . The weight display changes to  $\square$  and **Net** is displayed.

#### 2.3.2 Clear Tare and Revert to Gross Load

Press . **Net** turns off indicating the unit is in gross mode.

- Only positive gross load readings can be tared
- Setting or changing the tare has no effect on the gross zero setting
- Taring will reduce the apparent over range of the scale

#### Example:

When taring 100 lb of rigging on a 1000 lb scale, the scale will overload at a net load of 900 lb (1000-100) plus any additional allowed overload (usually about four percent or 9 d).

To view the gross load without clearing the tare value, an **F-key** can be programmed to Net/Gross. See Section 4.2.3 on page 23.



# 3.0 Installation

This section describes the installation of the MSI-8004HD.

## 3.1 Unpacking

Remove the *MSI-8004HD* from the packaging and inspect for visible damage. If damaged occurred during shipping, notify Rice Lake Weighing Systems and the shipper immediately.

Retain original packaging when possible, in the event that it needs to be returned, it must be properly packed with sufficient packing materials.

## 3.2 Getting Started

The *MSI-8004HD* is often shipped pre-configured with a scale. If purchased separately, or to be used with a different system, the RF transceivers will have to be paired. Follow the RF Setup Procedure in Section 6.0 on page 38.

The system automatically connects with the scale once the RF setup is complete. It is recommended to do a site survey to identify operating range and usability of the RF Link. Position the scale at an average operational height, and try the link at various positions and distances. The range may vary by the rotation of the scale/Dyna-Link, as well as the site and installation variables.

## 3.3 Mounting the MSI-8004HD

The provided tilt stand can be used to mount the MSI-8004HD to a wall or counter top.

It can also be mounted directly to a wall or panel using bolts in the mounting holes of the unit.



Figure 3-1. Mounting Holes



## 3.4 **Opening the Enclosure**

The indicator enclosure must be opened to connect the load pin cables and other interface connections.



**WARNING** Before opening the unit, ensure the power is disconnected.



Figure 3-2. Open Enclosure

- 1. Place the indicator face down on an anti-static work mat.
- 2. Remove the screws securing the backplate to the enclosure. Retain for re-installation.
- 3. Remove the backplate to access the interior and set it aside.



## 3.5 Wiring/Connections

See Section 6.6 on page 46 for wiring connections of the serial cable and printer.

WARNING Before opening the unit, ensure the power is disconnected.

#### 3.5.1 Connect Load Pins

- 1. Remove backplate. See Section 3.4.
- 2. Loosen the cable connectors and remove the pin.



Figure 3-3. Load Pin Cable Connectors

- 3. If connecting four load pins, insert the two hole insert into the cable connectors.
- 4. Run load pin cables through the cable connectors into the indicator.
- 5. Loosen the screws in load pin connector.
- 6. Insert stripped end of each wire into the holes of the connector as indicated in Figure 3-4.
- 7. Re-tighten screws to secure wires.



Figure 3-4. Install Load Pin Cables

8. Align the back plate on the enclosure and secure with screws.

(I) Important The indicator must be calibrated once the load pins have been connected. See Section 5.0 on page 32.

#### 3.5.2 Power Supply

Both AC and DC power supply are available for the *MSI-8004HD*. See Section 1.4 on page 4 for available configurations.



Figure 3-5. Power Supply

- 1. Remove backplate. See Section 3.4 on page 7.
- 2. Loosen screws in the power wire connector to pull the wires from the connector.
- 3. Remove the screw securing the ground wire (AC Only).
- 4. Loosen the cable connector and pull the power cable from the enclosure.
- 5. Push new cable through the cable connector and reconnect wiring as shown in Figure 3-5.
- 6. Ensure all connections are tight and reinstall the back plate.

## 3.6 **RF Card Replacement**

1. Remove backplate. See Section 3.4 on page 7.



Figure 3-6. XBee Card Location

- 2. Disconnect the antenna wire from the XBee card.
- 3. Pull card up to remove from the CPU Board.
- 4. Align new card with the connection. Ensure it is in line with the correct holes. See Figure 3-7.
- 5. Press card into place and reconnect the antenna wire.

Note The matching card must be installed in the attached scale. See the scale manual for instructions.

The *MSI-8004HD* can have two RF cards installed at a time. The other card can be Wi-Fi, Bluetooth or FHSS. If ordered with purchase of a system, it will be installed and paired to the scale included in the order. To order separate or for more information Contact Rice Lake Weighing Systems or a local dealer.



## 3.7 ScaleCore Card Replacement

1. Remove backplate. See Section 3.4 on page 7.



Figure 3-7. ScaleCore Card Location

- 2. Pull the ScaleCore card up to remove it.
- 3. Align the new card to the CPU board and standoffs.
- 4. Press firmly to secure the card in place.

## 3.8 Antenna Replacement

There are many antenna options available with the *MSI-8004HD* (Section 6.10 on page 49). This section contains instructions to replace the standard antenna. For other options, contact Rice Lake Weighing Systems or a local dealer.



Figure 3-8. Replace Antenna

- 1. Remove backplate (only if replacing the internal antenna cable). See Section 3.4 on page 7.
- 2. Unscrew the antenna from the cable connector.
- 3. If replacing antenna cable, remove the connector and o-ring from the enclosure and disconnect from the XBee card.
- 4. Install a new antenna or antenna cable, reverse the above steps.



## 3.9 Tilt Stand



Figure 3-9. Install Tilt Stand

- 1. Place Locktite<sup>®</sup> on the end of the set screws and screw them into the hole on each side of the indicator.
- 2. Place a washer over each set screw.
- 3. Align the stand with the set screws on the indicator.
- 4. Place the remaining washers on the set screws on each side of the indicator.
- 5. Screw knobs onto set screws loosely.
- 6. Adjust tilt of indicator to desired position and tighten knobs.

## 3.10 Battery Option

Battery powered *MSI-8004HD* configuration are available as listed in Table 1-3. The battery powered *MSI-8004HD* is powered by a 5VDC Li-ion rechargeable battery built into the included Tilt Stand Kit.

This battery operates for up to 80 hours (depending on LED brightness setting) before requiring recharging. Charging time for a completely discharged battery is up to eight hours. A spare battery pack is recommended to keep the *MSI-8004HD* in continuous operation.



To obtain maximum service life from the batteries they should be stored between -4°F and 122°F (-20°C and +50°C). Stored batteries should be recharged every three months.

## 3.10.1 Battery Life

The battery life of the MSI-8004HD depends on a number of factors:

- brightness of the LED display and number of segments lit
- amount of RF activity
- age of the battery
- condition of the SLA battery.

In order to conserve battery life, the MSI-8004HD includes the following features.

- Automatic Off Mode senses no activity after a set amount of minutes and turns the scale off.
- Sleep Mode dims the display after a set amount of minutes of no scale activity.

The *MSI-8004HD* automatically turns off when the battery is discharged and requires recharging. Li-ion batteries benefit from frequent recharging and can be recharged when there is still available life.



Due to the maintenance discharge imposed on the battery by the *MSI-8004HD* electronics, do not store with the battery in the indicator. Remove the battery if it will not be used for more than two weeks.

Note Use the following note for battery charging, storage and disposal:

- \* For continuous indicator use, a fully charged spare battery is recommended
- \* Replace the drained battery as close as possible to the low battery warning
- \* Batteries that have not been deep discharged should withstand 500 to 1500 charging cycles
- \* Low battery warning annunciator indicates two to four hours of use prior to indicator powering off
- \* For long term storage, remove the battery to prevent deep discharge
- \* Recycle battery at an authorized recycling center when the average life drops to 20 hours or less

#### 3.10.2 Battery Charger

The battery option is shipped with a charger designed to charge and maintain the battery. Exact charging time will depend on the degree of discharge of the battery. A battery removed when the low battery warning first appears should take about six hours to fully charge.

#### 3.10.3 Install Battery Option



Figure 3-10. Tilt Stand with Battery Option

- 1. Power off the indicator.
- 2. Remove indicator from the tilt stand by removing the knobs, washers and screws.
- 3. Install the indicator on the battery option tilt stand. See Section 3.9 on page 12.
- 4. Remove the USB cable to the battery, if needed
- 5. Remove the back plate of the indicator. See Section 3.4 on page 7.





Figure 3-11. USB Cable to CPU Board

- 6. Connect the cable from the battery to the CPU board.
- 7. Replace the back plate.
- 8. Plug the USB cable to the battery.
- 9. Power on the indicator.

#### 3.10.4 Replace Battery

1. Power off the indicator.



Figure 3-12. Disconnect USB Cable

- 2. Remove the cable from the USB plug in the battery.
- 3. Remove indicator from the tilt stand by removing the knobs, washers and screws.



Figure 3-13. Remove Battery Hold Down

- 4. Press on the battery hold down tabs and push it up to release it from the tilt stand.
- 5. Remove the battery.
- 6. Place a charged battery on the tilt stand, ensuring the end with connections is facing the correct direction.
- 7. Put the tabs from the battery hold down into the slots on one side of the tilt stand and rotate it down over the battery.
- 8. Press the tabs it and insert into holes in the tilt stand.
- 9. Reinstall the indicator. See Section 3.9 on page 12.
- 10. Connect the USB cable to the battery.
- 11. Power on the indicator.



## 3.11 Parts Illustrations

Refer to the following illustrations and list for replacement parts.

#### 3.11.1 MSI-8004 Indicator



Figure 3-14. MSI-8004 Parts Illustration



ITEM NO.	Part No.	DESCRIPTION			
1	176517 08	Enclosure Machined 8004	1		
2	177368 08	Conn, Feed Thru, Liquid, Dome, PG13, GY	2		
3	177365 08	PG13 Insert For Cable Gland, 2 Hole, 5 mm			
4	177366 08	O-Ring, PG13, Buna-N, 8004	3		
5	177364 08	Conn Feed Thru, Liquid Tight, Dome, PG13, Blk	1		
6	142554 08	Pin Round Acetal 0.312 Ø x 3/4''	3		
7	177363 08	O-Ring, PG9, Buna-N, 8004	2		
8	See Note*	Power Cord	1		
9	143283 08	Antenna 2.4 GHz	1		
10	143272 08	Washer Seal SS #6	1		
11	143271 08	Screw Mach Hex HD DR HD 6-32 x 1/4'' SS	3		
12	158438 08	Plug 0.750 Ø w/ Adhesive	2		
13	See Note*	PCA 8004 Indicator	1		
14	177362 08	Key Cap, SMS Switches	6		
15	144537 08	Screw LKG PCH PH 6-32 x 1/4'' SS (AC Only)			
16	142233 08	Screw LKG MACH PNH 4-30 x 3/16'' SS			
17	See Note*	PCA Scalecore3 4 Channel			
18	144929 08	Spacer Miniature Dual	2		
19	153110 08	O-Ring 7-1/4 x 0.103	1		
20	152034 08	Cover Fixed Mount	1		
21	146538 08	Washer Split Lock SS #6	8		
22	146022 08	Bolt HH 6-32 X 1/4'' CAP SS			
23	148637 08	Serial Number Tag	1		
24	144773 08	Radio Module XBEE-PRO	1		
25	177579 08	LED Filter Med Grey 8004	1		
26	178180 08	Overlay, MSI-8004HD, Std	1		
27	159855 08	Overlay FCC	1		
28	141593 08	Conn Feed Thru Liquid Tight Dome PG9 w/ Nut	1		
29	141991 08	Pin Round Acetal 0.25 Ø	1		
30	152051 08	Cable Assembly RF COAX	1		
31	153793 08	O-Ring 1/2 ID x 0.070	1		
32	142039 08	Silicone Oil 1000 CS	AR		
33	146543 08	Screw PH 4-40 X 1/4" NYLON	1		
* Part nu	* Part number varies per configuration				

Table 3-1. MSI-8004 Parts List



## 3.11.2 Tilt Stand



Figure 3-15. Tilt Stand Assembly (155173)

ITEM NO.	Part No.	DESCRIPTION	QTY.
1	155172 08	Tilt Stand	1
2	146200 08	Washer Flat 5/8 Plated	4
3	155192 08	Screw Set Allen DR CP SS 5/16-18 x 7/8 LG	2
4	143879 08	Knob Fluted 5/16-18 Internal Thread	2
5	142031 08	Adhesive Loctite <sup>®</sup> 271-21 Red 0.34 oz	2
6	143224 08	Rubber Feet	4

Table 3-2. Tilt Stand Parts List



## 3.11.3 Battery Option



Figure 3-16. Battery Option Parts Illustration

ITEM NO.	Part No.	DESCRIPTION	QTY.
1	155172 08	Tilt Stand	1
9	183437 08	Battery, 5V Li-ion, USB	1
7	183070 08	Battery Hold Down 8004	1
8	148599 08	Pad Battery Side	4
6	143224 08	Rubber Feet	4
3	155192 08	Screw Set Allen DR CP SS 5/16-18 x 7/8 LG	
4	142031 08	Adhesive Loctite <sup>®</sup> 271-21 Red 0.34 oz	AR
5	143879 08	Knob Fluted 5/16-18 Internal Thread	2
2	146200 08	Washer Flat 5/8 Plated	
10	183494 08	Cable Assembly USB Power	1



# 4.0 Setup

The front panel keys function as shown below, when navigating through the menus during setup.

- Press  $\begin{bmatrix} \text{WITS} \\ \text{Et} \end{bmatrix}$  to enter or select a parameter.
- Press to scroll through the parameters.
- To enter a decimal point, press while the digit is blinking.
- Press  $\boxed{\mathbb{Z}_{P}}$  to save and go back one level or to weigh mode.  $5 \text{E}_{D} \text{-} E$  displays briefly.
- To change an entered value, press  $\boxed{\frac{2ER0}{10}}$  to step back one digit and press  $\boxed{\frac{2ER0}{F2}}$  to change the digit.
- Press **Power** to exit without saving changes.
- Press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$   $\begin{bmatrix} @ PRINT \\ F3 \end{bmatrix}$  simultaneously to initiate a test of the unit.

## 4.1 Setup Menu

To enter the setup menu, press the  $\begin{bmatrix} CHAU \\ F2 \end{bmatrix}$  and  $\begin{bmatrix} POWER \\ O \end{bmatrix}$  keys at the same time.

Note Not all parameters are available when the regulatory setting is HB-44 or R76, see Section 4.12 on page 30.

Parameters	Choices	Description	
FUnc I		Function key 1 – Configurable to listed parameters, see Section 4.2 on page 22; Default DFF	
FUnc2		Function key 2 – Configurable to listed parameters, see Section 4.2 on page 22; Default DFF	
	OFF	No function is assigned. The F-Key is disabled	
	EESE	Test – runs an LCD test, see Section 4.2.1 on page 22	
	ŁoŁA∟	Total – accumulates multiple weighments, see Section 4.2.2 on page 23	
	บ-ยยา	View total – activates the total weight display followed by the number of samples See Section 4.2.2 on page 23	
	nEtGr	Net/Gross – toggles between Net and Gross modes, see Section 4.2.3 on page 23	
	P-HLd	Peak Hold – automatically updates the display when a higher peak weight reading is established See Section 4.2.4 on page 23	
	2Un it	2 Units – switches the force units between lb and kg. See Section 4.2.5 on page 23	
	H ir ES	Hi Res – the unit is more sensitive to motion and movement resulting in a less stable display See Section 4.2.6 on page 23	
	Pr int	Print – outputs a configured text string to the RS-232 port on the base of the Dyna-Link. See Section 4.2.7 on page 24	
	EArE	Tare – can be programmed to a F-key if desired, however, the MSI-8004HD has a dedicated tare key so it is not necessary	
	EhAn	Chan – displays connected scan channels in order	
	££∟.rd	Total Remote Devices – switching display summing methods of local physical load pins (all, pairs or both). See Section 6.1 on page 38.	

Table 4-1. Setup Menu Parameter Descriptions



Parameters	Choices	Description	
A-OFF	OFF	Auto Off – prolongs the battery life of the scale by turning power off after the set time (in minutes)	
	15	that the scale is not in use.	
	30	dee dection 4.0 on page 24	
	45 50		
SI FEP	DEE	Sleep – time (in minutes) before unit enters the sleep mode	
5666,	5	See Section 4.4 on page 25	
	15		
	30		
d iSPL	AUEo	Display Intensity – used to set the display brightness	
	Lo- 1	See Section 4.5 on page 25	
	Lo-2		
	п 1 Н 2		
CoLor	GrEEn	LED – set the display color to green, red or blue	
	rEd	NOTE: when green is selected, if setpoint 1 trips, the display color changes to red and if	
	orAnGE	setpoint 2 trips the display will turn to orange	
	ьгоЕ		
582Po in25 5222 1-8		Setpoints can be enabled/disabled only when using the remote display; see Section 4.6 on page 26	
	GrEAL	Greater Than - setpoint triggers when the tension exceeds the value	
	LESS	Less Than – setpoint triggers when the tension is less than the value	
	OFF	Off - setpoint parameter is disabled	
OutPut		Relay Output – dependant on the application being used	
	LAEch	Latch – if power is lost, the relay retains it's settings	
	Co 11	Coil – needs power to remain position	
LotAr	OFF	Total Accumulation - sets the choice for weight accumulation for a single scale. See Section 4.2.2 on page 23. When set to off, it's disabled.	
	եեւՕո	Total On - Is a manual choice for accumulation. See Section 4.2.2 on page 23.	
	A. LoAd A. LASE H. H.GH	Auto Total - Choices for setting automatic accumulations.	
F il EFr	OFF		
	LO	Weight Filter – allows the scale to adjust to situations where there may be movement	
	H r 1 H - 7		
lla .h	n r <u>c</u> Ib		
	ka		
	Ton	Weight Units – toggle units between pounds and kilograms	
	Mton		
	kN		
Ь.L ,FE	SEAnd LonG	Battery Life – sets the options for standard or extended battery life See Section 4.11 on page 30	
SEAnd	indUS	Standards – sets the industry standard to be used	
	НЬ-ЧЧ	Note: When set to HB-44 or R76 the following options are not accessible:	
	76 		
	IUn it		
		b. L IFE	

Table 4-1. Setup Menu Parameter Descriptions

Function key setup is independent.

- $[V_{F1}]$ ,  $[F_2]$ ,  $[F_3]$  and  $[T_{ARE}]$ ,  $[F_3]$  are preprogrammed to the parameters noted on the key.
- (Final and (Final can be programmed to other parameters if desired (Section 4.2 on page 22). If set to *OFF* there is no action when pressed. Keys can be reprogrammed to default selections, if desired.
- If a programmed function key does not work, the connected scale may not be set up to support the key. *Example: If the Function key is set for TOTAL, then TOTAL mode setup in the Setup Menu must also be set up for the target scale.*

## 4.2 Function Keys



3. Press  $\begin{bmatrix} 2ER0 \\ -\infty \end{bmatrix}$  to abort the test at any time.

Internal tests are also performed; if any test fails, an error code is displayed. See Section 7.2 on page 53 for a description of all error codes.

## 4.2.2 Total

- 1. Ensure the total mode has been programmed in the setup menu. If this has not been setup the **F-Key** assigned to *Total* will not work.
- 2. Program an F-key to Total. See Section 4.2 on page 22.
- 3. Press Fx-Total to perform the total function set in Section 4.8 on page 28.



This feature should not be confused with the ttl.rd (Total Remote Devices) function, which will add weight from two or more load sensors.

#### 4.2.3 Net/Gross

Program an F-key to NetGross. See Section 4.2 on page 22.

Press Fx-NetGross to toggle between gross and net (gross minus tare). Fx-NetGross only functions if a tare has been established.

The operator can switch back to gross from net without clearing the tare value. Only clearing or setting a new tare changes the tare value held before switching into Gross mode.

#### 4.2.4 Peak Hold

Peak hold uses a high speed mode of the A/D converter allowing it to capture transient loads at a far higher rate than typical scale.

- Peak Hold is cleared and enabled by pressing Fx-P-HLd.
- When a new peak is detected, the Fx LED will flash three times.
- The accuracy of the system in peak hold is slightly reduced to 0.2 percent of Capacity + 5d.
- The filter setting is turned off while in peak hold mode to obtain the fastest acquisition rate.

Example

*The Peak Hold function is useful in Dynamic and Fall tests. Common tests include Overall Breaking Strain (OB€), Breaking Force, and Cycled Breaking Strain.* 

Capture Peak Force:

- 1. Program an F-key to P-HLd. See Section 4.2 on page 22.
- 2. Prepare the stand test and test sample.
- 3. Press ZERO →∞
- 4. Press *Fx*-P-HLd, confirm that Pk is illuminated on the display.

Note A small jump in the reading may occur depending on the stability of the test device.

- 5. Apply the test weight. The Fx LED blinks three times when a new peak ID is detected
- 6. Remove the weight and the peak value is recorded.
- 7. To run a new test, press *Fx*-P-HLd to clear the peak value. Repeat steps 3 to 6.

#### 4.2.5 Units

is preprogrammed to Units. To use as units, do not program to a different parameter.

Press (

to set the units required for display.

#### 4.2.6 Hi-Res

Program an F-key to HiRes. See Section 4.2 on page 22.

Pressing Fx-HiRes places the display into a temporary high resolution mode. This mode continues until Fx-HiRes is pressed again, or power is cycled.



Note Hi-Res mode does not increase the accuracy, but allows for smaller weight incrementation to display.



#### 4.2.7 Print

The *Print* function is set to  $\begin{bmatrix} 2 \text{ PRINT} \\ F3 \end{bmatrix}$ , so there is no need to program F1 or F2 to print.

## 4.3 Auto-Off

The Auto-Off feature powers off the unit when not in use. The time limit is reset when a button is pressed or the detected load is in motion exceeding 10 d. Using the battery option will save battery life.

When disabled, the unit only turns off by pressing [Power], or if the battery dies.

To set the Auto-Off function:





## 4.4 Sleep

The *Sleep* parameter reduces power consumption by automatically dimming the display during periods of inactivity. To wake the unit, either a button must be pressed (front panel or RF remote), the weight must change by the amount set for Auto-Off (d) or there is a motion event.



## 4.5 Display Brightness

The Display setup menu is used to set the display brightness. There are four fixed brightness settings and one automatic light-sensing brightness setting.

The Auto setting automatically detects the ambient light and adjusts the brightness of the display accordingly. Bright light causes the display to be at the brightest setting. The display brightness reduces as ambient light reduces.

There are four fixed brightness settings, LO-1, LO-2, HI-1 and HI-2. Lower brightness settings increase battery life.

- 1. Press and hold **CHAN** and **POWER**. FUnc I displays.
- 2. Press (HAN) the to scroll to the d .5PL.
- 3. Press . The current setting is displayed.
  - Press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$  to scroll through the available settings.

Note The display brightness changes as each setting is displayed.

- 5. Press when the desired setting is displayed .  $5EPE \mid$  displays.
- 6. Press zero to exit setup and store the settings.



4.

## 4.6 Setpoints

*MSI-8004HD* display setpoints can be configured from remote devices or local math channel. If setpoint source is configured from remote devices, then setpoint event will be logical or with other remote device's setpoint event.

The MSI-8004HD supports eight LEDs for triggered setpoints. Common uses of setpoints are for warnings or process control.

The *MSI-8004HD* has an audible output option that is triggered by Setpoint 1. Contact Rice Lake Weighing Systems for other setpoint output options.

Setpoint	Description				
	Setpoint Mode				
OFF	Setpoint is not activated				
GrEAE	Indicates the setpoint will trigger when the weight exceeds a set value				
LESS	.E55 Indicates the setpoint will trigger when the weight is less than a set value				
	Setpoint Weight Type				
nEt9r	responds to net or gross weight				
Gr o 55	responds to gross weight regardless of the display				
ŁoŁA∟	E□ER_ responds to the totaled weight				
t-cnt	responds to the total count (number of samples)				
LFont	LFcnt responds to the number of times the weight has exceeded 25% of capacity				

#### Table 4-2. Available Setpoint Settings

When the display color is set to green, the *MSI-8004HD* is set to change the color of the display when setpoints 1 and 2 are tripped. This is useful in warning of possible overload conditions. This feature is not available with the blue LED display or when the display color is set to orange or red.

To set the display color to green and not have it change when setpoints are tripped, only use setpoints three through eight. The color of the display is based upon which setpoints are tripped. It can be used for any type of setpoint.

Setpoint 1	Setpoint 2	Display Color
Not tripped	Not tripped	Green
Not tripped	Tripped	Orange
Tripped	Х	Red

Table 4-3. Display Colors- Green Only

Whenever Setpoint 1 is tripped, the display will turn red, regardless of the state of setpoint 2. To set the setpoint:

- 1. Press and hold  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$  and  $\begin{bmatrix} POWER \\ 0 \end{bmatrix}$ . FUnc I displays.
- 2. Press  $(5 \pm P \pm 1 B)$ .
- 3. Press **Press**. The current setpoint mode is displayed.
- 4. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll to the setpoint mode desired.
- 5. Press **WITS**. The current setpoint weight type is displayed.
- 6. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll to the desired weight type.
- 7. Press The desired weight type continues to display.





## 4.7 Output

Relay output allows the selection of Latch or Coil relays.

- Latch relays retain position even if the power fails,
- Coil relays reset when power fails.

Important In the event of a power failure, the Latch relay uses continuous battery power and will deplete the battery more quickly than the coil relay.

- 1. Press and hold (RAN and POWER . FUnc / displays.
- 2. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll to DUEPUE.
- 3. Press **1**. The current setting is displayed.
- 4. Press  $[F_2]$  to toggle between  $[\Box \cap L]$  and  $L \not\models L \vdash L$ .



Note The display brightness changes as each setting is displayed.

- 5. Press when the desired setting is displayed. b. L FE displays.
- 6. Press  $\overbrace{\rightarrow}^{\text{ZERO}}$  to exit setup and store the settings.



## 4.8 Total Mode

For the accumulation of multiple weighments, the Total function uses the displayed load, so gross and net readings can be added into the same total.

There are four modes of totalizing, a manual and three auto modes.

All modes require that the weight on the scale return below 0.5% (relative to full scale) of *Gross Zero* or *Net Zero* before the next weighment can be added. Applied weight must be  $\geq 1\%$  of full scale above *Gross Zero* or *Net Zero* before it can be totaled.

#### **Manual Total**

Manual Total ( $E \vdash \Box n$ ) adds a current weight to a previously accumulated value manually. To add weight to the total it must be greater than 1% of capacity and not yet totaled. This assures that a weight on the scale is only added to the total once.

- 1. Program a F-key to Lot RL. See Section 4.2 on page 22.
- 2. With the weight to be added on the scale, press **F-Total**. The acknowledge LED blinks to indicate the weight was accepted and the *TOTAL* annunciator lights. Then the total weight is displayed for five seconds and the number of samples is displayed for two seconds.
- 3. Repeat steps 1 & 2 until all weight samples have been added.



Total Mode will not function while the scale is in motion, ensure a is on. If the system fails to achieve stable readings, increase the filter setting or increase the size of the scale division (d) in the Init Cal procedure. The F-Total functions as View Total only until the 1% threshold is exceeded to allow the addition to the total value.

#### **Auto Total**

This mode has three variations which are programmed in the Setup menu.

Program an F-key to AUTO TOTAL, it functions as Auto Total On / Auto Total Off. See Section 4.2 on page 22.

Setpoint	Description
A. LoAd	Auto Load – ensures any settled load above the Rise Above threshold will be automatically totaled. The scale must fall below the Drop Below threshold before the next total is allowed.
A. LASE	Auto Last – takes the last settled weight to auto total with. The total occurs only once the scale goes below the threshold. This allows the load to be adjusted without a total occurring. Once the load is removed, the scale uses the last settled reading for total.
R. Н ,GH	Auto High – uses the highest settled reading. This is useful for loads that can't be removed all at once.

Table 4-4. Auto Load Selections

#### Set Total Mode

- 1. Press and power simultaneously. FUnc I will display.
- 2. Press  $[HAN]_{E2}$  to scroll to  $E_0 \in A_{L}$ .
- 3. Press **The currently saved total mode is displayed**.
- 4. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll through the choices.
- 5. With choice displayed, press to select. F Le will be displayed.
- 6. Press zero to exit setup and store the settings.

#### **Reset Total Load**

To reset the total load to zero, press **Fx-Total** again and while the total load is being displayed, quickly press





## 4.9 Filter

The Filter settings are used to stabilize the weight in an unstable condition. Increasing the filter will improve the stability, however settling times will be longer. The *MSI-8000HD* employs algorithms that speed up large weight changes while still controlling vibration even with high filter settings.

Parameter	Description	
DFF	Disables filtering function	
Lo	Low Filter	
H 1	High Filter	
H 2	Very High Filter	

Table 4-5. Filter Parameters

Use the following steps to set up filtering.

- 1. Press and power simultaneously. FUnc I displays.
- 2. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll to F  $\_\_$   $EE_{\_}$ .
- 3. Press . The currently saved filter value displays.
- 4. Press  $\begin{bmatrix} CHAN \\ P2 \end{bmatrix}$  to scroll through the values.
- 5. With choice displayed, press to select. Un the displays.
- 6. Press  $\overbrace{\bigcirc}^{\text{ZERO}}$  to save and exit to weighing mode.

## 4.10 Unit

- 1. Press and rest simultaneously. FUnc I displays.
- 2. Press CHAN to scroll to Un it.
- 3. Press displays with lb or kg in the lower right of the display area.
- 4. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to toggle between lb and kg.
- 5. With the desired choice displayed, press use to select.
- 6. Press zero to save and exit to weighing mode.



## 4.11 Battery Life – Optional

Select either Standard (5EAnd) or Long (LonG).

In *Long* battery life mode, the system is placed into a sleep state for several seconds at a time if there is no change in tension. This disables the display in order to reduce power consumption and increase battery life. After several seconds, the *MSI-8004HD* will wake up to check for any changes in tension. If there is a change in tension, the unit stays awake. The unit also stays awake if it is in configuration mode.

Although long battery life mode can significantly increase battery life, performance is better in standard battery life mode.



## 4.12 Standard Settings

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1.

Setting the Standard to Hb-44 or r-75 will disable the setup menu after power is cycled. To change this setting, the CAL button must be pressed. It is important that all settings have been configured, including power savings, display color, brightness, and setpoints prior to setting the standard.

To press the Cal button, the seal must be broken. This removes the Legal for Trade setting and must be Important resealed by a qualified technician to continue as a Legal for Trade unit.

Selection	Description
Industrial ( שלשתיו)	With the Industrial standard, there is full range zero, access to units switching, filters and peak hold Most common setting
Handbook 44 (Hb- 44)	Enables only approved features per the NTEP HB-44 rules and regulations. Access is denied to Peak Hold, and the zero range may be limited. The Filter menu is moved to the calibration setup menu, so filters are only accessible through the calibration seal
R-76 ( 16)	Sets the scale to enable only approved features per OIML R-76. Only kg weight units are available. The zero range is limited to 4% (-1 to +3% relative to calibrate zero). Net/Gross function is temporary. Once net weight is established, pushing an F key set for Net/Gross will cause a maximum 5 second display of the gross weight.Clear the Tare to display gross weight constantly. Other metrological aspects are changed to meet R-76 requirements.
1Unit ( IUn ıE)	The 1unit standard is the same as Industrial, except units switching is inhibited. Used for metric only countries or where 1unit standard is to allow the scale to be calibrated in units other than lb or kg, since conversions are eliminated. Contact Rice Lake for more information on the standards settings.

Table 4-6. Standard Menu Selections

Use the following steps to set up standard settings.

- Press CHAN and POWER simultaneously. FUnc I displays.
- 2. Press CHAN to scroll to 5ERnd.



- 3. Press **WITS**. The current standard displays.
- 4. Press  $[F_2]$  to scroll through the settings.
- 5. With desired setting displayed, press **Fi** to select. Fline I displays.
- 6. Press  $\overrightarrow{\mathbb{R}}$  to save and exit to weighing mode.



# 5.0 Calibration

The *MSI-8004HD* is calibrated using standard precision test weights. It is required that the weight used is at least 10% of full capacity in order to achieve rated accuracy.

Example:

Use at least a 500 kg test weight to calibrate a 5000 kg capacity unit. The MSI-8004HD RF Indicator supports load pin linearization with up to four span points that can be calibrated in any order. Usually only one cal span point is necessary and is sufficient to reach rated accuracy.

When adequate test weights are not available, the *MSI-8004HD* can be calibrated using a constant calibration (*E-ERL*) See Section 5.2.2.

## 5.1 Calibration Switch

To calibrate the MSI-8004HD indicator it must be put into the calibration mode.



Figure 5-1. Calibration Switch

- 1. Remove screw and washer from the top of the unit.
- 2. Insert a small non-conductive tool into the hole far enough to press the switch. ERL is displayed.

**D**Important Caution should be used when pressing the configuration switch to avoid damage to the switch and other board components.

## 5.2 Reset the Load Pin Calibration

To remove current calibration, a calibration reset must be performed.

- 1. Select the load pin to reset by pressing the F-Key that is programmed to LhAn.
- 2. Press the calibration switch and simultaneously. -E5EŁ flashes.
- 3. Press CHAN . 5Ur E flashes.
- 4. Press to reset the calibration for current load pin. EAL displays.
- 5. Proceed with the Initial Calibration. See Section 5.3.

Important Pressing resets all indicator settings to the original factory settings.

Pressing

to cancel reset and return to the previous menu.



## 5.3 Initial Calibration

Initial calibration is used to setup units, capacity and resolution (d) required for the load pin or after a calibration reset.

- 1. Press the calibration switch. See Section 5.1 on page 32.
- 2. Press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$  to select the load pin to be calibrated.
- 3. Press ZERO and CHAN simultaneously. [AL displays.
- 4. Press Un L displays.
- 5. Press The default units display.
- 6. Press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$  to scroll through the available units.
- 7. With desired unit displayed, press 1 to select. ERP is displayed.
- 8. Press **T**. The default capacity is displayed.
- 9. To enter a different capacity, press
- 10. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll through numbers and  $\begin{bmatrix} UHIS \\ E1 \end{bmatrix}$  to save the selected number and move to next digit.
- 11. When correct capacity is displayed, press  $\begin{bmatrix} u_{\text{H}} \\ H \end{bmatrix}$  to store the value. d displays.
- 12. Press The default display divisions are displayed.
- 13. Press to scroll through the available display divisions.
- 14. With desired display division displayed, press use to select. UnLd displays.
- 15. Proceed with the routine calibration, starting with Step 2 of Section 5.3.1 on page 33.

#### 5.3.1 Routine Calibration

For maintenance and routine calibration use the following steps.

- 1. Press the calibration switch. See Section 5.1 on page 32.
- 2. Press Units . Unit displays.
- 3. Remove all weight from the scale.
- 4. Press **MITS**. 0 flashes.
- 5. Press PR55 displays momentarily, then LoAd I displays.
- 6. Load the scale with a precision test weight; for best accuracy a test weight of 10% of capacity or more is recommended.



- 7. Press **Capacity** of the scale flashes.
- 8. To enter a test weight other than the capacity, press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$

to scroll through numbers and

- to save the selected number and move to next digit.
- 10. When the correct weight is displayed, press to store the value. If **Cal** value is within limits, PR55 displays momentarily, then LoRd2 displays.
- 11. Press  $\begin{bmatrix} \text{WITS} \\ \text{F1} \end{bmatrix}$  to enter the second load.
- 12. Add load to scale and press

9.

Press

- 13. Press **13**. The current weight on the scale flashes.
- 14. Repeat Step 3 through Step 10 for up to four loads.
- 15. When all loads are complete, press  $\begin{bmatrix} 2ER0\\ +\infty \end{bmatrix}$  to store the calibrations. ERL'd displays.
- 16. Press to view the cal number. E EAL flashes momentarily followed by the value. Record the E EAL value, it is required when performing a E EAL calibration. See Section 5.3.2 on page 34.
- 17. Press  $\boxed{\mathbb{Z}_{\text{ED}}}$ . 5Eor E displays momentarily, then 5EEUP displays.
- 18. Press to exit calibration. 5 Lor E displays momentarily, then the unit returns to weigh mode.

Repeat this procedure to calibrate all scales that are connected to the MSI-8004HD remote display.

#### 5.3.2 C-Cal Calibration

When adequate test weights are not available, the scale can be calibrated using a cal number calibration which is referred to as  $\mathcal{L}-\mathcal{L}AL$ . To use  $\mathcal{L}-\mathcal{L}AL$ , a factory generated  $\mathcal{L}-\mathcal{L}AL$  value must be known. Rice Lake supplies replacement load pins with the  $\mathcal{L}-\mathcal{L}AL$  value stamped on the serial number label. When a calibration is preformed with test weights, a new  $\mathcal{L}-\mathcal{L}AL$  is generated.

The  $\mathcal{L}$ - $\mathcal{L}\mathcal{R}\mathcal{L}$  number must be known prior to starting this procedure. Rice Lake prints this number on the serial number label.  $\mathcal{L}$ - $\mathcal{L}\mathcal{R}\mathcal{L}$  reduces slightly the accuracy of the system and is intended for non-critical use only. For highest accuracy, calibrate with precision test weights.

1. Press the calibration switch. See Section 5.1 on page 32.

When doing the initial calibration option, units and capacity must be set. See Section 5.3 on page 33.

- 2. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll to E E H L.
- 3. Press Units . Unit displays.
- 4. Remove all weight from the scale.
- 5. Press [1]. 0 flashes and PR55 will display momentarily. Then E-ERL is displayed.
- 6. Press  $\square$ . The last known  $\square$ - $\square$  value is displayed.



- 7. To accept the number displayed, press and skip to Step 10.
   To enter a different *E*-*EAL* value continue with next step.
- 8. Press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$  to scroll through numbers and  $\begin{bmatrix} UNITS \\ F1 \end{bmatrix}$  to save the selected number and move to next digit.
- 9. When the correct E-EAL value is displayed, press us to store. PA55 displays followed by EAL'd.
- 10. Press  $\boxed{200}$ . 5Eor E displays momentarily, then 5EEUP displays.
- 11. Press  $\begin{bmatrix} 2EP0 \\ -\infty \end{bmatrix}$  to exit calibration. 5 b or E displays momentarily, then the unit returns to weigh mode.

## 5.4 Setup

Setup is used to set the desired Industry Standard and Auto Zero Maintenance (AZM).

- 1. Press the calibration switch. See Section 5.1 on page 32.
- 2. Press CHA to scroll to SELUP. 5EAnd displays. 3. Press The current standard setting displays. 4. Press to scroll to AULoD. See Section 5.4.1. 5. Press Press to enter Auto Zero Maintenance. 6. 7. Press to toggle between  $\Box \cap / \Box FF$ . to set on or off.  $\Box$ . P- UP displays. 8. Press 9. Press to enter zero on power-up. 10. Press to toggle between 0n/0FF. to set on or off. 52 And displays. 11. Press to return to  $\square \square \square$ . 12. Press again to exit calibration. 5 Lor E displays momentarily and the unit returns to weigh mode. 13. Press



## 5.4.1 Standard Settings

Below are	the four	selections	in the	standards menu.
-----------	----------	------------	--------	-----------------

Standard Type	Description
Industrial IndU5	With the Industrial standard, there is full range zero, access to units switching, filters, and peak hold
Handbook 44 Hb44	Sets the scale to enable only approved features per the NTEP HB-44 rules and regulations; access is denied to Peak Hold and the zero range may be limited. The filter menu is moved to the cal setup menu, so filters are only accessible by breaking the calibration seal
R-76 r - 75	<ul> <li>Sets the scale to enable only approved features per OIML R-76</li> <li>only kg units are available</li> <li>zero range is limited to 5% (-2 + 3% relative to calibrate zero)</li> <li>net/gross function is temporary</li> <li>once net weight is established, press an F-key, set to net/gross to display the gross weight momentarily</li> <li>to display only gross weight clear the tare</li> <li>other meteorological aspects are changed to meet R-76 requirements.</li> </ul>
One Unit 1 נוח ו-ב	The one unit standard is the same as Industrial, except that unit switching is inhibited, which is useful for metric only countries; allows the scale to be calibrated in units other than Ib or kg, since conversions are eliminated.

#### Table 5-1. Standard Settings Parameter

Contact Rice Lake Weighing Systems for more information on the standards settings.



## 5.5 Reset the Load Pin Calibration

To remove current calibration, a calibration reset must be performed.

- 1. Press the *F-Key* set to scan to scroll to load pin to reset.
- 2. Press the calibration switch and  $\begin{bmatrix} POWER \\ 0 \end{bmatrix}$  simultaneously.  $\neg E5EE$  flashes.
- 3. Press CHAN . 5Ur E flashes.
- 4. Press  $\begin{bmatrix} CHAN \\ FZ \end{bmatrix}$  to reset the calibration for current load pin. EAL displays.
- 5. Proceed with the Initial Calibration. See Section 5.3.

Important Pressing resets all indicator settings to the original factory settings.

Press the revious menu.



# 6.0 Communications Setup

The MSI-8004HD uses 802.15.4 transceivers to communicate which operates in the 2.4 GHz systems if:

- Antennas are isolated at least 10' (3 m) from the equipment.
- *MSI-8004HD* based RF systems are peer to peer. In multiple scale connections, it acts as the network coordinator.

The *MSI-8004HD* uses three numbers to establish a piconet. A piconet is a network that is created using a wireless Bluetooth connection. Table 6-1 lists out the three elements used in setting up a piconet.

Name	Description	Recommended Number Range
ScaleCore ID	Used to identify each device in a piconet, its range is 0-254 and cannot be duplicated within the same RF channel	20-30
RF Channel	Establishes the base network that all interconnected devices must match	12-23
Network ID	A 64 bit number that all interconnected devices must match, do not use a small number to avoid other 802.15.4 transceivers that default to a network ID of 0	Maximum of six digits with a range of 0-65535

NOTE: For all devices that interconnect, the RF channel and network ID must match. The ScaleCore ID must be unique. The Dyna-Link or crane scale that is the weight source should be set to a ScaleCore ID of 0. If other source devices are added, they can be added in sequence.

Table 6-1. Piconet Setup Ranges

O PRIN

at the same time. **bU5**9 flashes momentarily before

## 6.1 Communications Menu

To enter the Communications menu, press and entering the communications menu.printer setup

Parameters	Settings	Description		
Pr int		Print – prints a ticket if connected to a printer; see Table 6-3 on page 38		
rF		Radio Frequency – see Table 6-8 on page 41		
Add ing	רחם בחב Load Totaling – The total number of Remote Sensor Devices (RD's) – Range 1-4 (Default is			
	tt.rd	Methods of summing load pins $P_{LL} - \text{total load pins} (1-4)$ $P_{r}$ $= -\text{sum in pairs (requires four remotes) see Section 6.3.1 on page 44 boLh - \text{sum in pairs plus grand total}uSEdEF - programmed using a computer program such as ScaleCore Connect\sigmaFF - \text{summing is disabled}$		
ScAnLS	רי אבי ב	-		
	Sc id	ScaleCore ID – number must match		
	Sensor ID			

Table 6-2. Communications Menu Parameters

The RS-232 communications port is capable of outputting load data. All RF linked device weight modes are available in user formatted form. The control mode directs the *MSI-8004HD* to print. See Section 6.1.1.

The communications port settings are independent of print settings in connected scales. They are only in the *MSI-8004HD*.

Settings	Description	
L iSEnr	Print setup – select the channel the port will be used with. Options: D, I, 2	
DUEPUE	Port selection – Select the port to use for communication with the printer; Options Park D. rF. Park	
Տերոն	String Setup – print string format number entry screen. See Table 6-7	
Entri	Print Control Options: USEr, LaRd, Cant, OFF See Table 6-4	
r AEE	Output Rate – print string output rate number entry screen. (0-65535 seconds)	





#### 6.1.1 Control Modes

The user can select four control modes. They are described in Table 6-4.

Mode	Description
USEr	Printing is controlled by pressing F-3 Print
	One print occurs when a stable load is read, the scale must return to near zero before another print occurs
LoAd	NOTE: Other configurations of load are available using the ScaleCore Connect. It can be downloaded from the Rice Lake Website
Cont inUoUS	The unit will continuously output the data at a rate specified in the rate parameter (up to 65,535 seconds); setting the
	interval to 0 will set an interval as fast as the system can go
OFF	Printing is disabled; power consumption is lower with the print off

Table 6-4. Control Modes

#### 6.1.2 Standard Print Strings

Commands that can be used to format gross, net and print strings are shown below.

Command	Description
<t></t>	Load data
<u></u>	Units
<m></m>	Load mode (lb/kg)
<crlf></crlf>	Carriage return line feed
<sp></sp>	Space

Table 6-5. Standard Print Strings

1	Current load	Fixed output length: 16. Leading zeros suppressed except for the least significant digit (LSD). <tttttt><sp><uu><sp><mmmmm><crlf></crlf></mmmmm></sp></uu></sp></tttttt>
2	Net load	Fixed output length:16. Leading zeros suppressed except for the LSD. <tttttt><sp><uu><sp>NET&gt;<sp><crlf></crlf></sp></sp></uu></sp></tttttt>
3	Gross load	Fixed output length: 16. Leading zeros suppressed except for the LSD. <tttttt><sp><uu><sp>GROSS&gt;<crlf></crlf></sp></uu></sp></tttttt>
4	Tare Weight	Fixed output length:16. Leading zeros suppressed except for the LSD. <tttttt><sp><uu><sp>TARE&gt;<crlf></crlf></sp></uu></sp></tttttt>
5	Total Weight	Fixed output length: 16. Leading zeros suppressed except for the LSD. <ttttttt><sp><uu><sp>TTL&gt;<crlf></crlf></sp></uu></sp></ttttttt>
6	Number of Samples Totaled	Fixed output length: 16. Leading zeros suppressed except for the LSD. <sp><sp><sp><sp><sp><sp><sp><sp><sp><crlf></crlf></sp></sp></sp></sp></sp></sp></sp></sp></sp>
7	Current Weight Mode	Net, Gross, Peak, etc <sp><mmmmm>CRLF&gt;</mmmmm></sp>
8/9	Carriage Return/ Line Feed	Used to add a space between print records. <crlf></crlf>

Table 6-6. Standard Print Strings

Combinations of the standard print strings can be entered in the string number entry screen.

Example: To get a Net, Gross, Tare printout with a space between records, enter 2349.



#### **Print Strings Formats**

String No.	Format	Prints
1	Wt-Unit-Mode 🖑	Current weight
2	Wt-Unit-Net 🖑	Net weight
3	Wt-Unit-Grs 🖑	Gross weight
4	Wt-Unit-Tare 🖑	Tare weight
5	Wt-Unit-Total 🖑	Total weight
6	#Samples-TCNT 🖑	Total count
7	no units or mode 🖑	Current weight
8	-	Reserved
9	4	CR-LF

Table 6-7. Print Strings Formats

The *ScaleCore Connect* application can also be used for custom output strings and can be downloaded from the Rice Lake website.

The serial output is configured as 38400 baud, Xon/Xoff handshaking, no hardware handshaking, 1 stop bit, no parity. Other baud rates are possible by special order only.

#### 6.1.3 Printer Output Setup

Use the following steps to set up the printer output.

at the same time. Pr in E displays. 1. Press and 2. Press L 5Enr displays. 3. Press to scroll to 55-nG. Press The current print string number is blinking. 4. 5. Press to scroll through the numbers and press UNITS F1 to save number and move to the next digit. Example: If Net, Gross and Tare are to be used for the print format, the entry required is 2349. The 2 is net, 3 is Gross, 4 is tare and 9 inserts a space before the next print output. to save the print mode. Entru displays. Once value is set, press 6. 7. Press The current control mode displays. to scroll through the options. 8. Press 9. When the desired control mode is displayed, press . - ALE displays. **Note** If control mode has been set to continuous, press then proceed to Step 13. . The current print rate displays. 10. Press





## 6.2 RF Setup

The MSI-8004HD allows the use of dual RF modems. In addition to the XBee modem other options include:

- FHSS
- Wi-Fi
- Bluetooth
- Other

Contact Rice Lake Weighing Systems or a local dealer for more information about these options.

Mode	Description
On. OFF	Enable RF – On/Off, affects continuous mode only.
Sc id	ScaleCore ID – range 1-254, (20-30)
[hn_	RF Channel – Range 12-23 NOTE: The RF communication channel is not the same as the scan channel and is not preprogrammed to the F2 key
nEE id	Network ID – Range 0-65535
StrEn	Transmission Strength – Range 0-4; see Table 6-9 on page 43
ЕЯЪЕ	Select radio card that is being used; select 26EE when the XBee card is installed; for all other cards, use DLhEr
Hold	When set to Dn, the radio continues to use power. This will use the battery power faster. Default is set to DFF.

#### Table 6-8. RF Setup Parameters – XBee Modem Only



It is possible to have multiple separate MSI ScaleCore RF networks in the same location. Each device on the same network must be on the same channel.

#### For best performance, different ScaleCore networks should be on different RF channels

Use the following steps to set up the RF menu parameters.

- 1. Press and eprint simultaneously. Pr int displays.
- 2. Use the  $\bigcirc$  to scroll to  $\neg F$ .





- 4. Press The currently saved parameter is displayed.
- 5. Press  $\square$  to toggle between  $\square$  and  $\square$  FF.
- 6. With On displayed, press using it's RF Modem(s) for communication.
- 7. Press . The current ScaleCore ID displays.
- 8. Press to scroll through numbers and  $\begin{bmatrix} units \\ F1 \end{bmatrix}$  to save number and move to next digit.
- 9. When value is correct, press [1] to store. [hn∟ displays.
- 10. Press **11**. The current channel setting displays.
- 11. Press  $\begin{bmatrix} CHAN \\ F2 \end{bmatrix}$  to scroll through numbers and  $\begin{bmatrix} UNTS \\ F1 \end{bmatrix}$  to save number and move to next digit.
- 12. When value is correct, press  $\begin{bmatrix} utts \\ FI \end{bmatrix}$  to store.  $\neg E \vdash d$  displays.
- 13. Press **13**. The current Network ID displays.

14. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll through numbers and  $\begin{bmatrix} WITS \\ E1 \end{bmatrix}$  to save number and move to next digit.

Rice Lake Weighing Systems recommends at least a four digit for the Network ID, to ensure there are no conflicts with any other 802.15.4 networks.

- 15. When value is correct, press us to store. 54-En displays.
- 16. Press **The current strength setting displays**.
- 17. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll through 0-4.
- 18. When the number is correct, press [] EVPE is displayed.
- 19. Press [19]. The current type displays.
- 20. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to scroll through values.
- 21. With selected value displayed, press UNTS. Hold displays.
- 22. Press **1**. The current setting displays.
- 23. Press  $\begin{bmatrix} CHAN \\ E2 \end{bmatrix}$  to toggle between on and off.
- 24. When the selection is correct, press  $\begin{bmatrix} U \\ FI \end{bmatrix}$  to store.  $\Box_{\Box}$ .  $\Box$ FF displays.



25. Press **ZERO** to save and exit the RF menu.

26. Press zero to exit to the communication menu.

Transmission strength should be set to the lowest setting possible to achieve the transmission required. Both the scale and the MSI-8004HD should be set to the same transmission strength.

Setting	RF Power Level	Transmit Current	Note
0	10dBm	137mA	Lowest Transmission Power
1	12dBm	155mA	(default on 7300s and 8000s)
2	14dBm	170mA	—
3	16dBm	188mA	—
4	18dBm	215mA	—

Table 6-9. Transmission Strength Setting – XBee Modem Only

## 6.3 Setup Multiple Sensor Network

The *MSI-8004HD* can monitor up to four load pins. They can be read individually, in pairs or summed. Load pin is shown for illustration purposes only, others can also be used.



Figure 6-1. Multiple Sensor Network

Each load pin has a unique ScaleCore ID (SCID). The IDs must be consecutive, starting with 0. Set the Total Number of Load Pins

at the same time.  $P_{r}$  in E is displayed. 1. Press and to scroll to cF. nEE. 2. Press 3.  $E \Pi_0$ . Ld is displayed. Press 4. Press The Load Totaling setting displays. to scroll through numbers and to save the selected numbers. 5. Press UNITS

Note

- 6. When correct number of remote displays attached (2-4) is displayed press **F**. See Section 4.8 on page 28. This number does not include the *MSI-8004HD* or any modems *LL\_rd* displays.
- 7. Press T. The Load Totaling setting displays.
- 8. Press  $[F_2]$  to scroll through numbers and  $[F_1]$  to save the selected numbers.
  - Press Press Lnord displays.
- 10. Press

9.

twice to exit to the weigh mode.

#### 6.3.1 Load Totaling Settings

The four different types of load totaling modes are explained below.

#### AII

All channels are added together. Press F-ttl.rd to view the sum of all sensors connected. Press Fx-ttl.rd again. *Etc.* rd (total remote sensor devices) displays to confirm that the summed channels are being displayed.



If only the sum is to be observed, disable the Scan function key using the function key setup menu (Section 4.2 on page 22).

#### Pairs

Pairs is used with four sensor systems, scrolling through the channels with Fx-ELLrd, they will be presented as separate weights first and then as pairs. This display is proceeded by the LCD message PA ir 1 and PA ir 2.

#### Both

This mode displays both the pair totals and the overall total. Each press of Fx-EEL.rd scrolls through the summed combinations. First PA ir I, then PA ir I then the sum of all connected sensors is displayed.

#### Off

Sensor summing is disabled. A function key set to ELL rd is unnecessary.

Use the following steps to set the Load Totaling parameters.

- 1. Program an *F-key* to the *EEL.rd* function. See Section 4.2 on page 22. The current channel is displayed.
- 2. Press Fx-ttl.rd. Ad. ALL is displayed briefly, then the summed total.

Continue pressing Fx-ttl.rd to view all enabled sum types.

#### 6.3.2 Scan Weight Inputs

- 1. Program F1 to the 5cAn function, and F2 to the ELL rd function for summed sensor readings. See Section 6.3.1.
- 2. With the current channel displayed, press to change display to the next channel. The scan channel number is displayed briefly, then the scan channel weight is displayed.

3. Press  $\begin{bmatrix} uurs \\ Et \end{bmatrix}$ . In a two sensor system the scan returns to the first channel (0).

## 6.4 Scanlist ID

The scanlist ID specifies the load pin, one through four, that will be used for summing totals. It allows up to four devices to be summed together on the remote display.

at the same time. Pr in E displays. 1. Press and to scroll to 5cAnL5. 2. Press 3. Press L 15E 1d displays. Current L 15E 1d flashes. 4. Press to save the selected numbers. Set the ID number of the 5. Press to scroll through numbers and UNITS F1 load pin that will be assigned to Scale.1 (0-3 are used to represent 1-4). to store the number. 5c d displays. 6. Press 7. Press . Current 5c d flashes. to scroll through numbers and to save the selected numbers. The scale ID must match 8. Press the ID of the LC/Sensor it is being connected to. 9. Press to store the number. 5n. d displays. Current 5n. d flashes. 10. Press to save the selected numbers. The sensor number is 11. Press to scroll through numbers and UNITS F1 used to select a load pin connected to the scale being addressed in L 15E id. to store the number. L 15E d displays. 12. Press 13. Press twice to save and exit to the weigh mode.

The sum now reflects the total of all LC/Sensors specified.

## 6.5 Zero and Tare in Multiple Load Pin Systems

The channel that is displayed is considered the *Focus Channel*. Pressing  $\overbrace{\swarrow}^{\text{ZERO}}$  or  $\overbrace{\checkmark}^{\text{ZERO}}$  affects only the displayed channel. When displaying summed channels, **ZERO** or **TARE** commands will be sent to all devices that contribute to the displayed weight.

#### Example:

If in the Both mode, and displaying pair 1 (sum of SC0 and SC1), pressing ZERO will zero only SC0 and SC1. If displaying the grand total using the ALL mode, pressing ZERO will zero all connected sensors.

#### Using the Tare function:

If one device is tared in the individual display mode, the summed weight will be the sum of a Net and a Gross weight.

If TARE is pressed when displaying any of the summed modes, all devices that add to the current display are tared and placed in Net mode.



## 6.6 Communications Port Hardware



Figure 6-2. Comm Port Wiring

The wires are screwed into the RS-232 terminal block inside the enclosure. Route the cable through a cord grip, the other end should be a nine pin female connector that can then be plugged into a computer or printer's serial port.

The *MSI-8004HD* RS-232 communication port is used for software updates, connecting to a remote display and for connecting to an RS-232 device.

To access the serial connectors and connect the cable, the back cover of the MSI-8004HD will first need to be removed. See Section 3.4 on page 7.

To connect to the serial ports, a cable with RS-232 signals brought out to wires on one end and to a standard D9 female serial connector on the other end is required. The wires will need be screwed into terminal block TB6 (Figure 6-2). Connect to the signals as labeled in the figures 6-3 through 6-5.

Data Configuration: The data output is fixed at 8-1-N.

Baud Rate: Is set at 38.4 k baud and is not programmable.

Handshaking: No hardware handshaking is supported. Xon/Xoff software handshaking is always on.

Comm Port 2 can either be used as a second wired serial port or for the second RF radio module. If the second RF radio module is being used, then the wired comm port 2 must be disabled. The serial port can be enabled or disabled through switch SW10, located on the main circuit board directly above terminal block TB6.

An unterminated cable (PN 143348) is available for wiring a connector to the M12 connector found on the *MSI*-8004HD.



The following diagrams show how to wire standard D9 connectors to access Communications Port 1 or Communications Port 2.



Figure 6-3. Communications Wiring

Wiring the shield drain to the metal shell of the connector is recommended. In some circumstances it may be necessary to disconnect the shield drain wire at the connector frame to prevent ground loops which can cause unstable readings. In extreme cases it may be necessary to use an isolated RS-232 interface.



## 6.7 Relays

The MSI-8004HD can be equipped with up to two relays for process control or safety systems.

Two independent relays are factory installed and are wired out to 4 pins on a M12 connector. The connecting cables are shown in Table 6-10.

Part No.	Description
144440	PVC 4 m, rated to 250 VRMS, 4 A
	PVC 10 m, rated to 250 VRMS, 4 A
Alternately u	se a field wire able connector
156256	Conn, Female 4 pin field wire able, IP67
	Right angle for 4-6 mm
	Straight for cable 6-8 mm OD
	Right angle 6-8 mm OD

Table 6-10. Relay Connector Cable Part Numbers

#### 6.7.1 Relay Options

Relays are normally open (1 Form A). Specifications are listed below.

Relay Type	Description
AC/DC coil relay	<ul> <li>AC/DC Coil Relay: 144520 PA1a-5 V. 4 A Fuse: 144307</li> <li>AC Rating: 250 VAC @ 5 A.(limited by connector/cordset rating to 5 A continuous)</li> <li>DC Rating: 5 A @ 30 VDC, 0.5 A @ 100 VDC</li> <li>Best choice for 90% of applications.</li> </ul>
AC/DC SSR (solid state relay) - 60V	<ul> <li>Better for battery powered units and mates well with 24VDC industrial power supplies</li> <li>AC/DC SSR 60 VPK, 2.7 A: 13178 AQZ202D. 2 A Fuse: 144319</li> </ul>
AC/DC SSR - 120V	<ul> <li>For 115VAC operation when SSRs are preferred.</li> <li>AC/DC SSR 200 VPK. 0.9 A: 13180 AQZ207D. 0.75 A Fuse: 155221</li> </ul>
Other available relays	<ul> <li>AC/DC SSR 100 VPK, 2 A: 13179 AQZ205D. 1.5 A Fuse: 155220</li> <li>AC/DC SSR 400 VPK, 0.45 A: 13181 AQZ204D. 0.375 A Fuse: 155222 (Use limited to 250VRMS due to connector and Cordset limitations)</li> <li>DC Only SSRs</li> <li>DC SSR 60 VPK, 4 A: 13182 AQZ102D. 3 A Fuse: 155223</li> <li>DC SSR 200 VPK, 1.3 A: 14566 AQZ107D. 1 A Fuse: 160448</li> </ul>
	NOTE: Normally open relays (1 Form A) can be made to function as normally closed (1 Form B) by programming the setpoint as a less than type. If the 8000HD is turned off or loses power, they will open.
One 1 Form B closed SSR	AC/DC SSR 400 VPK, 0.5 A: 14628 AQZ404. 0.5 A Fuse 144583 (Use limited to 250 VRMS due to connector and Cordset limitations). Requires a minor modification on the Relay board and can only be ordered by contacting Rice Lake Weighing Systems.

Table 6-11. Relay Options

## 6.8 FCC Statement

Contains FCC ID: MCQ-PS2CTH

The MSI-8004HD complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

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

## 6.9 International RF Certifications

Canada: Radio Certificate Number: IC 1846A-PS2CTH

Australia & New Zealand: DIGI-090F15C247

The product is compliant with the following standards and/or other normative documents:

Safety (article 3.1A) EN60950-1:2001

EMC (article 3.1b) ETSI EN 301 489-1 v1.7.1 (2007-04) In accordance with the specific requirements of ETSI EN 301 489-17 v1.2.1 (2002-08)

Spectrum (article 3.2) ETSI EN 300 328 v1.7.1 (2006-10)

## 6.10 Antenna Options

Note To meet FCC licensing rules, use only antennas supplied or recommended by Rice Lake Weighing Systems.

Antenna placement is critical to problem-free use of the system.

- Ensure a relatively clear transmission path exists between the devices to be connected. Radio signals travel primarily by line of sight (LOS), obstructions between stations may degrade the system performance.
- When using the long range antenna, mount the antenna on an elevated structure to ensure there is a clear LOS transmission path. This ensures the antenna will clear surrounding obstructions. Do not provide a ground plane for the antenna.
- Fixed station locations often benefit from directional antennas when the location of the other components of the RF network are fixed and/or in the same direction. Never use a directional antenna on a mobile system.
- If using the standard antenna, ensure the antenna is not blocked by any metal. Transmission is good through most kinds of glass so mounting a meter next to a window will work fine. If there is no clear line of sight location to mount the receiving device, consider switching to the long range antenna so the antenna can be set up remotely.
- The standard and long range antennas are vertical plane devices. They should be vertical, pointing up or down, when high off the ground. Do not mount them sideways. The long range 9 dBi antenna is particularly sensitive to off axis mounting. Use a level to ensure the antenna is exactly 90° perpendicular to the earth.
- Do not mount an omni-directional antenna next to metallic or concrete surfaces. This can result in reflections and undesired RF characteristics. Use a corner reflector instead.
- After installation, seal the antenna connection with an adhesive heat shrink boot. Failure to seal the antenna may result in liquid destroying the antenna and device it's connected to.



Rice Lake Weighing Systems does not recommend extending the coaxial cable beyond three meters. At 2.4 GHz more loss will result from coax losses than are gained by raising the antenna. If the antenna must be extended, use a very low loss 50 ohm coax such as RG-214, RF-195, or other low loss varieties.

For very short extensions (<1m), cables made with RG-316 are suitable.

#### FCC STATEMENT

#### FCC ID: HSW-2450M

Note: This unit has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.



#### 6.10.1 Standard Antenna

The standard antenna is an articulated 1/2 wave 2 dBi gain design with a standard TNC connector that mounts directly on the enclosure.

This antenna and coax connector, though resistant to water, is not water-proof. Seal the TNC base with an adhesive heat shrink boot if this antenna might be exposed to rain or other weather conditions where it could get wet.

This antenna must be vertically oriented and is suitable for most short to medium range applications.

#### 6.10.2 Long Range OMNI 9 dBi Antenna

This omni-directional high gain antenna is remotely mounted with a low loss coaxial cable and increases the range up to four times.

The antenna must be vertically mounted. The vertical Beamwidth (-3dB point) is 14 degrees.

This antenna is supplied with a 10 foot (3m) coax cable pre-attached. The 10-foot cable allows placement of the antenna above the unit for ease of clearing possible obstacles to data transmission.

It is also available with an N connector for applications requiring longer coax cable lengths.



#### 6.10.3 Vehicle Mount Whip Antenna

The vehicle mount whip antenna mounts directly to the roof of mobile vehicles and is weatherproof. This 5 dBi gain whip mounts in a 3/4" hole on the roof of the vehicle.

The mount includes 17' of low loss coax terminated in a TNC connector.

#### 6.10.4 YAGI Antenna

For maximum range, a 14 dBi gain Yagi Antenna is available by special order. Please contact Rice Lake Weighing Systems for details.





#### 6.10.5 Corner Reflector Antenna

Corner reflector antennas are often the best choice for a wall mounted antenna. Rice Lake Weighing Systems offers a 14 dBi and a 9 dBi corner reflector.



#### 6.10.6 Patch Antenna

The patch antenna is for applications where the standard antenna is vulnerable to physical damage or outdoor applications.

The patch antenna is mildly directional which requires more care in antenna placement for long range applications. Patch antennas are available by special order only. Please contact Rice Lake Weighing Systems for details.



## 7.1 Troubleshooting

Problem	Possible Cause	Solution
	Discharged battery	Recharge the battery (Battery option only)
Display is blank when the power but- ton is pressed	Defective battery	Replace the battery (factory replacement only) (Battery option only)
	Defective switch or circuit board	Requires authorized service
Display does not function properly/	Improperly loaded software	Reinstall the software
front panel buttons do not function	Faulty circuit board	Requires authorized service
normally/indicator doesn't turn off.	Loose connectors	Requires authorized service
	Out of calibration	Calibrate the unit
Indicator does not respond to tension	Faulty load pin	Replace the load pin
changes	Load pin connector	Check connectors and wires
	Tared tension is added to load to	Return to gross tension mode
Display over ranges below 100% of		Bo-zoro the scale
capacity	Too much tension/load has been	Re-zero the scale
	$\Delta ZM$ (Auto 0) is turned off	
Display drifts	Rapid temperature changes such as moving the scale from indoors to outdoors	Wait until the scale temperature has stabilized
	Scale not zeroed before load is lifted	Zero the scale with no load attached
Displayed tension shows a large error	lb/kg units causing confusion	Select proper units
	Requires recalibration	Recalibrate the unit
	Excessive vibration	Increase filtering or increase <b>d</b> in Cal
Display reading is not stable	Excessive side loading	Improve load train symmetry
	Load pin faulty	Check load pin connections
Display toggles between <i>Error</i> and	Load exceeds capacity	Reduce tension immediately
Load	Faulty load pin or wiring	Check load pin and load pin wiring
Display toggles between <i>Error</i> and <i>Button</i>	A key is stuck or is being held down	Check switches for damage
Weight is on the indicator and RF Remote Display does not match	Units are not paired	See Section 6.2 on page 41
<b>BT</b> is blinking	The battery is low	Recharge the battery (Battery option only)
Unit turns on, then immediately off	The battery is low	Recharge the battery (Battery option only)
	The system not stable	Wait for stable symbol to turn on
Load will not zero	Zero out of range	Zero range might be limited. Reduce the tension or use Tare instead
Load will not tare or total	The system not stable	Wait for the stable symbol to turn on, or if in a mechanically noisy crane, increase the filtering or reduce the size of the scale increment d. It is also possible to increase the motion window. Con- tact Rice Lake Weighing Systems if there is a prob- lem getting the MSI-8000HD to zero, tare or total due to stability issues
Setpoint lights blink	Set point is enabled and the trigger point has been reached	Disable set points if they are not needed
Manual total does not work	A function key is not set to <b>total</b>	Set up Func1 or Func2 for <b>total</b>
	Tension must be stable	Increase filtering for more stability

Table 7-1. Troubleshooting

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Problem	Possible Cause	Solution
	Load must be stable	Wait for stable symbol 📐 🖌 to turn on or increase filtering for more stability
The auto total does not work	Load thresholds are not reached	Weight must exceed one percent of capacity for auto total to work. Weight must drop below 0.5% of capacity for additional weighments to register

Table 7-1. Troubleshooting (Continued)

## 7.2 Error Codes

The ScaleCore Processor in the MSI-8004HD RF Indicator detects errors and generates error codes to aid in troubleshooting.

Error Code	Definition	Comment
LcOFF	LC Disabled	A load pin was not enabled
2CAL	In Cal	The system is in calibration mode. Do not send commands unrelated to calibration.
unCAL	Not Calibrated	System has not been calibrated
LoAd	Overload	The load/weight exceeds set capacity +9d, or load pin is damaged or disconnected.
UndLd	Underloaded	The load/weight is more than 20 percent negative, or load pin is damaged or discon- nected.

Table 7-2. Error Codes

## 7.3 Service Counters

WARNING

Only a Rice Lake Weighing Systems factory representative can reset the service counters, as these are an important safety warning feature. A thorough load train inspection is necessary, prior to resetting service counters, to ensure product safety.

All Rice Lake RF linked scales/Dyna-Link 2 maintain two service counters for safety.

- The first counter (LFCnt) counts lifts above 25% of capacity.
- The second counter (OLCnt) counts the number of times the RF linked scale has been overloaded.

These counters warn the user to inspect the load train after a number of overloads or a long term frequency of high capacity lifts. Power up will be interrupted when the lift counter exceeds 16383 lifts or the overload counter exceeds 1023 overloads. Inspect the load train, then push any key to continue operation.

This feature is only available on *MSI-8004HD* Software release 2.00 and above. Service counters are available on the scale/Dyna-Link 2 front panel test function.

## 7.3.1 Access the Service Counters

Press

CHAN F2 and  $\begin{bmatrix} \Omega \\ F3 \end{bmatrix}$  simultaneously, the following items display:

- LFEnE displays briefly, followed by the number of lifts
- DLEnE displays briefly, followed by the number of times the weight has exceeded capacity
- E-ERL and its value displays
- The unit returns to the weigh mode

Note F1 must be pressed, if the Test function is set to F1, it will need to be pressed twice.

Reference the *Crane Scale Safety and Periodic Maintenance Manual, PN 153105*, for proper loading techniques to improve the safety and longevity of the crane scale or Dyna-Link. This publication is available at <u>www.ricelake.com</u> and is included on the CD shipped with the *MSI-8004HD*.



## 7.4 Mechanical Dimensions



Figure 7-1. Mechanical Dimensions

## 7.5 Firmware Update

Updating firmware in the MSI-8004HD requires the following:

DCE serial cable built per DCE cable schematic

PC with Rice Lake's MSI ScaleCore Connect Program

USB to serial converter (if the PC does not have standard RS-232 serial ports)

Ensure the driver for the USB converter is properly installed, and that the terminal program is set up for the proper communications port.

The latest firmware code is available from the Rice Lake Weighing Systems technical support and can be emailed upon request. The firmware version is displayed when the *MSI-8004HD* is turned on as *01-04* (versions will vary). *MSI-8004HD* firmware updates do not require a recalibration of the connected scale. Consult the version release notes for information regarding the updated code.

- 1. Set up the terminal serial port to 8 data bits, no parity, 1 stop bit, 38400 BAUD, XON/XOFF (flow control).
- 2. Connect the *MSI-8004HD* to the Dyna-Link serial port using the cable from Section 6.6 on page 46. Connect the D9 connector to a PC or USB adapter.
- 3. Optional step: Test that there is a connection by typing {00FF01?}. If the connection is good the *MSI*-8004HD will respond with {000001r2;0;01E02;2011-07-08;11:05} or something similar.
- 4. On the terminal keyboard, type {ffff09=0199}. The MSI-8004HD shuts off.
- 5. Press **POWER** to turn the unit on again. The following menu should display.

MSI-8004HD RF Indicator SCALECORE2 BOOT LOADER Ver. xx-xx (c) Date, Time

- (u) Download and program application code (the bootloader version may vary)
- (q) query app code info
- (g) execute app code
- (r) refresh



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Note The bootloader version may vary.





6. Type **u**.

Terminal should display:

Send File NOW, or press ^ to abort:

7. Send the .prg file using the file send feature of the terminal program. The character # will tick away as the ScaleCore programs.

8. After the file is received, the terminal displays *Completed*. Then the boot menu displays again.

MSI-8004 Rice Lake MSI SCALECORE3 BOOT LOADER Ver. xx-xx (c) Date, Time

- (u) Download and program application code (the bootloader version may vary)
- (q) query app code info
- (g) execute app code
- (r) refresh
- 9. Optional step: send **q** to check the program. The ScaleCore will respond with a message that details the 32b checksum, the product ID and version, and the Application Code version number in the following form:

Computed Signature 76F481D8 32b CRC must match (76F481D8 is an example only) Received Signature 76F481D8 Product ID 07 MSI-8000 product family Product Version ID 00 Optional features code App Code Version xx-xx Firmware version number

If the CRC Signature does not match, go back to step 4 and try again.

10. Send an  $\mathbf{r}$  to restore the boot menu.

MSI-8004 Rice Lake MSI SCALECORE3 BOOT LOADER Ver. xx-xx (c) Date, Time

- (u) Download and program application code (your bootloader version may vary)
- (q) query app code info
- (g) execute app code
- (r) refresh
- 11. Send a **g**. The *MSI-8004HD* should start.



# 8.0 Specifications

Enclosure	NEMA Type 4, IP66 milled anodized aluminum with o-ring gaskets
Keypad	On/Off, Zero (100%), Tare, Print, and two user-defined keys for the following functions: peak hold, high resolution, total, view total, net/gross, units switching
Display	6-digit 1.5'' (38 mm) LED
Units Displayed	Pounds, kilograms
Annunciators	Stable, COZ, BT, RF, TTL, NET, kg, lb
	function LEDs. Channels: 1, 2, 3, 4, Setpoints
Power	90-267 VAC, 9-36 VDC, 18-72 VDC, 120-300 VDC
Operating Temp.	-4° F to 140° F (-20°C to 60°C)
RF Remote Channels	Up to four remote sensors, monitored individually, in pairs, or sum all (non-A/D version only)
Service Counters	A/D version only
A/D Inputs	Two independent or summing load pin inputs
Excitation	4.8 V current limited and over-voltage protected
Filtering	Off, Low, Hi-1, Hi-2
RF Radio Link	2.4 GHz 802.15.4
RF Effective Range	Typically 100' (33 m) or more
Data I/O	Dual RS-232 comm ports
Warranty	One-year limited
Optional	Bluetooth, Wi-Fi
Approvals:	
	7.000



NTEP COC #17-036 nmax: 10 000 Accuracy Class: III / III L





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