

MSI-8000HD

RF Remote Display

Technical Manual



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Revision History

This section tracks and describes the current and previous manual revisions for awareness of major updates and when the updates took place.

Revision	Date	Description
C	July 5, 2022	Revision history established after Rev C
D	January 18, 2023	Added time and date printing functionality

Table i. Revision Letter History



Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at www.ricelake.com/training or obtained by calling 715-234-9171 and asking for the training department.

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1.0 Introduction

The MSI-8000HD RF Remote Display makes wireless control easy with the ability to operate weighing systems from a distance. The wireless remote display can be used for viewing MSI ScaleCore-based crane scales and dynamometers, including any RF compatible devices. It has an RF effective range of 100 ft (line of sight) and operates on a license-free 2.4 GHz frequency. It is fully sealed for outdoor use in most ambient conditions.

This manual is intended for use by qualified technicians responsible for setting up and operating the MSI-8000HD.



Manuals and additional resources are available from Rice Lake Weighing Systems at www.ricelake.com/manuals

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 IP68 for outdoor use
- The enclosure is built with rugged construction throughout with shock cushioning on the corners
- Six, 1" (26.4 mm), LCD digits for clear weight readings
- Selectable units for kg/lb/tons (US short)/metric tons/kilo-newtons
- 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

1.2 FCC Compliance

United States

This equipment 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 harmful 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 his own expense.

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

1.3 Safety

Safety Definitions:



DANGER: 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.



WARNING: 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.



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



IMPORTANT: 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.



WARNING

Failure to heed could 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 than 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 unit. Any repairs must be performed by qualified service personnel only.

Close proximity to audible alarm for sustained periods of time could be hazardous. Hearing protection may be required.

Do not use solvents or aggressive substances to clean the MSI-8000HD.

Do not submerge.

1.4 Front Panel Description

The MSI-8000HD front panel, keys and annunciators, are described in [Table 1-1](#).



Figure 1-1. MSI-8000HD Front Panel

Key/Annunciator Functions

Item No.	Key	Description
1	Function 1	Programmable to user selectable functions (Section 4.3 on page 15); Default is Off ; Functions as the Enter/Select key when in the setup menus
2	Function 2	Programmable to user selectable functions (Section 4.3 on page 15); Default is Off ; Functions as the Scroll key in the setup menus
3	Function 3	Pre-programmed to Print and cannot be changed
4	Center of Zero	Indicates that the scale/Dyna-Link is within 1/4 d of zero
5	Standstill	Indicates that the load has settled within the motion window (usually ± 1 d); When this is turned off, the scale/Dyna-Link will not zero, tare or totalize
6	LED Functions	Indicates the current displayed function <i>Example: If F1 blinks, the peak hold reading is captured. If F2 blinks, the Display and Function Test reading is captured.</i>
7	Total	Indicates the RF linked device is displaying the total accumulated weight; Displays only momentarily
	Peak	Indicates the RF linked device is in the peak hold mode
	Net	Indicates the RF linked device is in Net load mode; A tare weight is subtracted from the gross load
	Metric Ton	In conjunction with the Ton annunciator, indicates the RF linked device is displaying metric tons
	Ton	Illuminated, indicates the RF Linked Device is displaying in U.S. Short Tons (1 ton = 2000 lb); When illuminated with M the RF Linked Device is displaying in metric tons (1 metric ton = 1000 kg)
	Kilonewtons	Indicates load display is in kilonewtons
	Kilograms	Indicates load display is in kilograms
	Pound	Indicates load display is in pounds
8	Setpoints	User programmable setpoints for overload warnings; Setpoints 1 and 2 are red high brightness LEDs
9	Multiple Sensors	Number lit indicates the sensor being displayed; If more than one number is lit, sensors are being summed <i>Example: If both numbers 1 and 2 are lit, then the weight displayed equals the sum of sensor 1 and sensor 2.</i>
10	Display Digits	Include six 1.22" (31 mm) sunlight visible LCD's
11	Power	Powers the unit on and off; In setup mode, it returns the display to the weigh mode without storing changes
12	Zero	Zeros the residual load on a scale/Dyna-Link 2; In setup mode, it stores changes and returns to the prior level
13	Tare	Removes current load value and puts the system into Net weight mode
14	Low Battery	Indicates about 10% of battery life remains; Symbol flashes when automatic shutdown is eminent

Table 1-1. Keypad/Annunciator Functions

2.0 Installation

This section provides an overview of MSI-8000HD RF Remote Display installation instructions.

2.1 Unpacking

When unpacking the MSI-8000HD, ensure that all parts are accounted for and check for any visible damage. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately. If the MSI-8000HD must be returned, it must be properly packed with sufficient packing materials. If possible, retain the original carton when shipping the unit back.

2.2 Getting Started

The MSI-8000HD is often shipped pre-configured with an RF compatible ScaleCore transmitting device. If the MSI-8000HD is purchased separately, or is to be used with a different system, the RF transceivers will have to be paired. Follow the RF Setup Procedure in [Section 6.4 on page 34](#).

Once the RF setup is complete for the MSI-8000HD, the system will automatically connect with the ScaleCore transmitting device. It is recommended to do a site survey to identify operating range and usability of the RF Link. Position the ScaleCore transmitting device at an average operational height, and try the link at various positions and distances. The range may vary by the rotation of the ScaleCore transmitting device, as well as the site and installation variables.

Battery Charging (Optional)

For units with an optional battery, fully charge the battery by plugging the charger into the charge port. Depending on the discharge level of the battery this can take up to six hours.



Figure 2-1. Battery Charger

2.3 Opening the Enclosure

The indicator enclosure must be opened to connect the scale load cell cable and other interface connections.



WARNING: Before opening the unit, ensure the power cord is disconnected from the power outlet.

1. Disconnect the power to the indicator.
2. Place the indicator face down on an anti-static work mat.
3. Remove the screws that secure the backplate to the enclosure.
4. Lift the backplate away to access the boards and set it aside.

2.4 Mounting the MSI-8000HD

The MSI-8000HD can be placed on a table, counter or table using the tilt stand. The tilt stand is equipped with four rubber bumper to keep it from sliding while using the MSI-8000HD.

2.4.1 Mounting with Tilt Stand

A tilt stand is shipped with the MSI-8000HD for mounting. It can be mounted on a desk, counter or table. It can also be mounted to a wall or panel and the MSI-8000HD can be rotated for easy viewing.

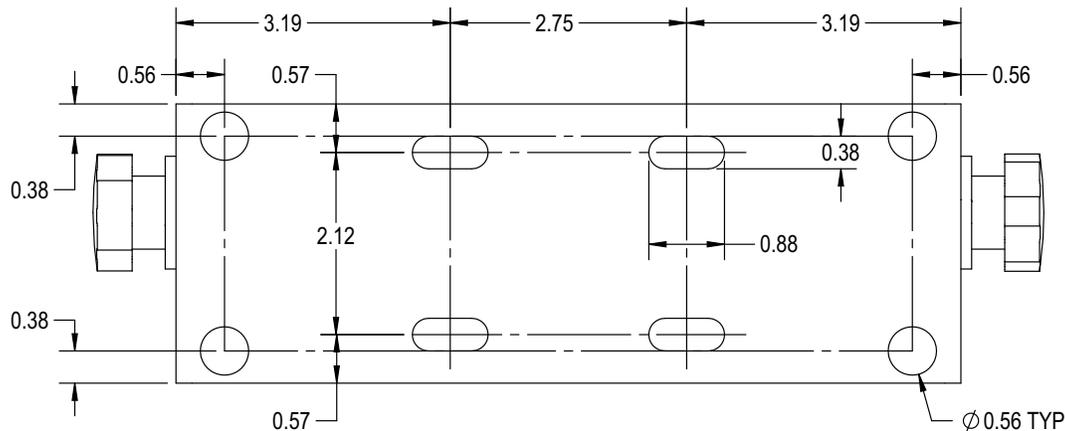


Figure 2-2. Tilt Stand – Bottom Dimensions

To secure to one of the options above:

1. Using the tilt stand, mark holes as needed.
2. Drill the holes for the hardware being used.
3. Secure the tilt stand to the surface. If mounting to a wall or panel, ensure it is mounted horizontally.
4. Install the MSI-8000HD into the tilt stand at an angle that will allow easy viewing.

2.4.2 Direct Mounting

The MSI-8000HD can be mounted directly to a wall or panel using the four holes in the corners of the unit.

1. Hold the remote display against the wall or panel where it is to be mounted.
2. Mark the hole location. This can also be done by measuring according to the dimensions in [Figure 2-3](#).
3. Drill the holes as needed.
4. Align the unit with the holes and secure with the appropriate hardware.

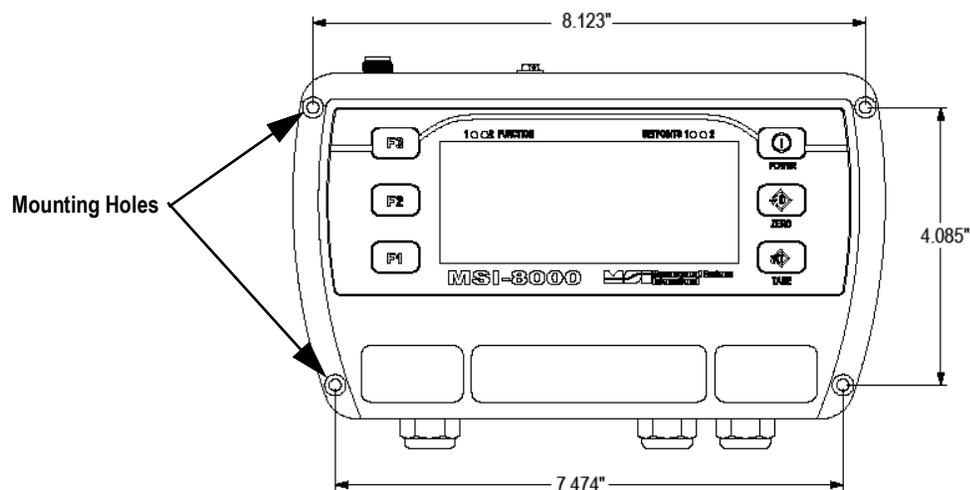


Figure 2-3. Mounting Hole Dimensions

3.0 Operation

This section provides an overview of MSI-8000HD RF Remote Display operation instructions.



NOTE: Ensure the recommended battery or power supply is secured prior to device operation (Section 2.0 on page 10).

3.1 Power

Power the indicator On/Off by pressing .

3.2 Zero

Press  to take out small deviations in zero when the scale is unloaded. For zeroing (taring) package or pallet weights, see Section 3.3. The zero key can be used in **GROSS** or **NET** mode.



NOTE: The backup memory in the unit stores the zero reading and retains it even if the power fails.

Zeroing while in **NET** mode will zero the **GROSS** weight causing the display to show a negative tare value.

The scale must be stable within the stable window.

The unit will only zero if  is on and there has been no activity for two seconds.

The scale will accept a zero setting over the full range of the scale (NTEP and other Legal for Trade models may have a limited zero range).

Zero settings above 4% of full scale will subtract from the overall capacity of the unit.

Example: If 100 lb on a 1,000 lb scale is zeroed, the overall capacity of the scale will reduce to 900 lb, plus the allowed over-range amount.

3.3 Tare

Tare is used to zero out a known weight, such as a packing container or pallet, and display a **NET** weight. The **TARE** function is defined as a **Tare-In** or **Tare-Out** operation. To tare the scale:

1. Hang the empty container from the scale.
2. Press  to enter a tare value. The MSI-3460C stores the current weight as a tare value and subtracts the value of the container from the **GROSS** weight.  displays and the weight mode changes to **NET**.
3. Add the product to the packing container. The **NET** weight is displayed.

3.3.1 View Tare

To view the **GROSS** weight without clearing the tare value:

1. Program  to the **NET/GROSS** function (Section 4.3 on page 15).
2. Press  to toggle between net and **GROSS** values. This will only work if a tare value has been established.



NOTE: The backup memory in the MSI-8000HD stores the Tare reading and can restore it even if power fails.

Only positive **GROSS** weight readings can be tared. The **STABLE** annunciator must be on, indicating weight reading is stable. Setting or changing the tare has no effect on the **GROSS** zero setting. Taring will reduce the apparent over range of the scale. The RF Remote Control has **NET/GROSS** permanently available.

*Example: Taring a 100 lb container on a 1,000 lb scale, the scale will overload at a **NET** weight of 900 lb (1,000-100) plus any additional allowed overload (usually 4% or 9d).*

3.3.2 Clear Tare

To clear a saved tare value, press . The **GROSS** weight displays.

4.0 Setup

This section provides an overview of MSI-8000HD RF Remote Display setup instructions.

4.1 Setup Navigation

To navigate the menus during setup, follow the information below:

- Press  to enter or select a parameter
- Press  to scroll through the parameters
- To enter a decimal point, press  while the digit is blinking
- Press  to save and go back one level or to weigh mode; *StorE* displays briefly
- If a wrong value is entered, press  to step back one digit and press  to change the digit
- Press  to exit without saving changes

4.2 Setup Menu

To enter the setup menu on the MSI 8000HD RF Remote display receiver, press  and  keys at the same time.

The MSI-8000HD RF Remote Display is capable of performing setup function remotely on the RF transmitter that it is receiving information from. To enter the setup menu of the connected scale or weight indicator, press  and  keys at the same time

Parameters	Choices	Description
Func 1 Func 2	P	Function key 1 – Configurable to listed parameters (Section 4.3 on page 15); Default OFF Function key 2 – Configurable to listed parameters (Section 4.3 on page 15); Default OFF
	OFF	No function is assigned; The F-Key is disabled
	TEST	Test – Runs an LCD test (Section 4.3.1 on page 15)
	TOTAL	Total – Accumulates multiple weighments (Section 4.3.2 on page 15)
	VIEW TOTAL	View total – Activates the total weight display followed by the number of samples (Section 4.3.2 on page 15)
	NET/Gross	Net/Gross – Toggles between Net and Gross modes (Section 4.3.3 on page 16)
	Peak Hold	Peak Hold – Automatically updates the display when a higher peak weight reading is established (Section 4.3.4 on page 16)
	2 Units	2 Units – Switches the force units between lb and kg or tons and metric tons, depending on unit currently selected (Section 4.3.5 on page 16).
	5 Units	5 Units – Scrolls through all available units: lb, kg, Tons (US Short), metric tons and kilonewtons (Section 4.3.5 on page 16)
	Hi Res	Hi Res – The unit is more sensitive to motion and movement resulting in a less stable display (Section 4.3.6 on page 16)
	Print	Print – Outputs a configured text string to the RS-232 port on the base of the Dyna-Link (Section 4.3.7 on page 16)
	TARE	Tare – Not used, MSI-8000HD has a dedicated tare key
	SCAN	Scan – Displays RF connected channels in order
	Total Remote Devices	Total Remote Devices – Displays the summed weight of RF connected sensors (Section 4.3.8 on page 17)
Auto Off	OFF 15 30 45 60	Auto Off – Prolongs the battery life of the scale by turning power off after the set time (in minutes) that the scale is not in use (Section 4.4 on page 17)
Setpoint 1-8	GREATER LESS OFF	Greater Than – Setpoint will trigger when the tension exceeds the value Less Than – Setpoint will trigger when the tension is less than the value Off - The setpoint parameter is disabled
OUTPUT	P LATCH COIL	Relay Output – Dependant on the application being used Latch – If power is lost, the relay retains it's settings Coil – Needs power to remain position
Battery Life	Standard LONG	Battery Life – Sets the options for standard or extended battery life (Section 4.7 on page 19)
Standards	INDUS hb-44 r-76 UNIT	Standards – Sets the industry standard to be used

Table 4-1. Setup Menu Parameter Descriptions

4.3 Function Keys

There are two programmable function keys on the MSI-8000HD, **F1** and **F2**.

- Function key setup is independent of the connected scale/Dyna-Link function keys

-  and  are standard on the MSI-8000HD and do not need to be programmed

- If a function key does not work, the connected RF transmitter may not be set up to support the key

Example: If the Function key is set for $\epsilon\sigma\epsilon RL$, then $\epsilon\sigma\epsilon RL$ mode setup in the Setup Menu must also be set up for the target scale.

To set a function key use the following steps:

1. Press  and  at the same time, *Func 1* will display.
2. Press  to scroll to the function key to be programmed.
3. Press . The currently saved parameter will display.
4. Press  to scroll through the choices.
5. Press  to select the desired choice.
6. Press  to save and exit.

4.3.1 Test

The test feature only tests the MSI-8000HD. Set an **F-key** to **TEST**.

To run a test, press **Fx-TEST**, the following items scroll across the display.

- Light all LCD segments and the LEDs
- $5\sigma F\epsilon$ followed by the version number
- $5\epsilon R\sigma d$ followed by the weighing standard
- $bR\epsilon\epsilon$ followed by the battery level in volts
- $dR\epsilon\epsilon$ followed by the date in "YY.MM.DD" format
- $\epsilon, \pi\epsilon$ followed by the time in 24 hr format
- $d. \epsilon\epsilon\epsilon\epsilon$ followed by a full display digit test

The test can be single stepped by:

1. Press **Fx-TEST**, immediately press  to stop the auto scroll.
2. Use  to scroll through the steps and  to view the step value.
3. Press  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 47](#) for a description of all error codes.

4.3.2 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** ([Section 4.3](#)).
3. Press **Fx-Total** to perform the total function that was set in [Section 4.8.2 on page 20](#).

4.3.3 Net/Gross

Program an **F-key** to **NetGross** (Section 4.3 on page 15).

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 will change the tare value held before switching into Gross Mode.

4.3.4 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 Dynameters.

- 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% of Capacity + 5 d
- The filter setting is turned off while in peak hold mode to ensure 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** (Section 4.3 on page 15).
2. Prepare the stand test and test sample.
3. Press .
4. Press **Fx-P-HLd**, confirm that **Pk** is lit on the display.



NOTE: A small jump in the reading occurs depending on the stability of the test device.

5. Apply the test weight. The **Fx** LED will blink 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 [Step 3–Step 6](#).

4.3.5 Units

Program an **F-key** to **Unit** (Section 4.3 on page 15).

Press **Fx-Unit** to set the units parameter to units required for display.

4.3.6 Hi-Res

When set to on, the filter is automatically set to the **Hi-1** setting (if **Hi-2** is already set, then the filter is not changed). This will have a small effect on settling time. When set to off, the filter setting resets to the previous filter setting.

Program an **F-key** to **HiRes** (Section 4.3 on page 15).

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. In the Hi-Res mode the appropriate **Fx** LED blinks continuously at a slow rate.



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

Use  or  to zero out any initial error.

Hi-Res mode is not available when the weighing standard is set to a legal-for-trade standard such as HB-44 or R76

4.3.7 Print

The Print function is set to **F-3** key, so there is no need to program F1 or F2 to Print. Then pushing F1 or F2 on the scale will cause the Comm Port on the Remote to output the selected data string.

If an F-Key is programmed as Print and the Print Setup is configured as continuous, then the F3-Print key is used for Start Print/ Stop Print.

4.3.8 Total Remote Devices

Sensor summing must be enabled in the communications setup menu. If the **Pairs** or **Both** modes are enabled in the communications setup menu, then pressing **Fx-ttl.rd** will scroll through the available combinations.



NOTE: It is common to program **F1** for **SCAN** and **F2** for **ttl.rd** (Total Remote Devices) to allow quick switching between individual channel displays (with **Scan**) or the summed weight (with **ttl.rd**).

4.4 Auto-Off

The **Auto-Off** feature prolongs the battery life by powering off the unit when not in use. When a button is pressed or the detected load is in motion exceeding 10 d, the time limit is reset.

When disabled, the unit will only turn off by pressing , or the battery dies.

To set the **Auto-Off** function:

1. Press and hold  and . **FUNCT** displays.
2. Press  to scroll to **R-off**.
3. Press . The current auto off time displays.
4. Press  to scroll through the available times.
5. Press  when the desired time is displayed. **SLEEP** displays.
6. Press  to exit setup and store the settings.

4.5 Setpoints

The MSI-8000HD supports eight setpoints. Common uses of setpoints are for warnings or process control. It comes standard with two LED outputs for triggered setpoints. The triggering of setpoints 1 and 2 are indicated on the two setpoint relays. All eight setpoints can be used to trigger relays if the MSI-8000HD is ordered with relays.

The MSI-8000HD 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
GREAT	Indicates the setpoint will trigger when the weight exceeds a set value
LESS	Indicates the setpoint will trigger when the weight is less than a set value
Setpoint Weight Type	
NETGR	responds to net or gross weight
GROSS	responds to gross weight regardless of the display
TOTAL	responds to the totaled weight
T-CNT	responds to the total count (number of samples)
LFcnt	responds to the number of times the weight has exceeded 25% of capacity

Table 4-2. Available Setpoint Settings

To set the setpoint:

1. Press and hold  and . FUNC 1 displays.
2. Press  to scroll to the desired setpoint (SETPt 1 - 8).
3. Press . The current setpoint mode is displayed.
4. Press  to scroll to the setpoint mode desired.
5. Press . The current setpoint weight type is displayed.
6. Press  to scroll to the desired weight type.
7. Press . The desired weight type continues to display.
8. Press . Sn 1-4 displays.
9. Press  to toggle between Sn 1-4 and Sn 5.
10. With the desired setting displayed, press . The current weight type value is displayed.
11. Press  to scroll the numbers and  to enter each digit.
12. When the correct value is displayed, press . The next setup menu item is displays.

 **NOTE:** To enter a decimal point, press  while the digit is blinking. To correct a digit, press  to step back.

13. Press  to exit setup and store the settings.

4.6 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  and . **FUNC 1** displays.
2. Press  to scroll to the **OUTPUT**.
3. Press . The current setting is displayed.
4. Press  to toggle between **COIL** and **LATCH**.

 **NOTE:** The display brightness changes when each setting is displayed.

5. Press  when the desired setting is displayed. **B.LIFE** displays.
6. Press  to exit setup and store the settings.

4.7 Battery Life – Optional

Select either Standard (**STAND**) 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-8000HD will wake up to check for any changes in tension. If there is a change in tension, the unit will stay awake. The unit will also stay 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.

1. Press  and  simultaneously. **FUNC 1** displays.
2. Press  to scroll to **B.LIFE**.
3. Press . The currently saved battery life displays.
4. Press  to toggle between the choices.
5. With choice displayed, press  to select. **STAND** displays.
6. Press  to save and exit to weighing mode.

4.8 Remote Scale Setup

The MSI-8000HD RF Remote Display can be used to operate several MSI crane scales (MSI-4260, MSI-3460 and MSI-7300). Some functions can also be set using the MSI-8000HD. The information in this section pertains to the setup of the scale being used with the remote.

Parameters	Choices	Description
FILT _R	OFF	Weight Filter – allows the scale to adjust to situations where there may be movement See Section 4.8.1
	LO	
	Hi - 1	Hi-2 – MSI-7300 only
	Hi - 2	
TOTAL	OFF	Total Accumulation - sets the choice for weight accumulation for a single scale (Section 4.3.2 on page 15); When set to off, it's disabled
	TTOn	Total On - Is a manual choice for accumulation (Section 4.3.2 on page 15)
	A. LOAD	Auto Total - Choices for setting automatic accumulations
	A. LAST	
	H. HIGH	
SETP _T 1-B	GREATER	Greater Than – Setpoint triggers when the tension exceeds the value (Section 4.5 on page 18)
	LESS	Less Than – Setpoint triggers when the tension is less than the value (Section 4.5 on page 18)
	OFF	Off - The setpoint parameter is disabled (Section 4.5 on page 18)
BATTERY	STAND	Battery Life –Sets the options for standard or extended battery life; See Section 4.7 on page 19
	LONG	

Table 4-3. Settings for the Scale using the Remote

4.8.1 Filter Setup

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.

Use the following steps to set up filtering.

1. Press  and  simultaneously. FUNC 1 displays.
2. Press  to scroll to FILT_R.
3. Press . The currently saved total mode displays.
4. Press  to scroll through the choices.
5. With choice displayed, press  to select. UNIT displays.
6. Press  to save and exit to weighing mode.

4.8.2 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 (Total) 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 Total (Section 4.3 on page 15).
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 Step 1 and Step 2 until all weight samples have been added.



NOTE: Total Mode will not function while the scale is in motion, ensure  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** (Section 4.3 on page 15).

Setpoint	Description
R. 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
R. Last	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. High	Auto High – Uses the highest settled reading; This is useful for loads that can not be removed all at once

Table 4-4. Auto Load Selections

Set Total Mode

1. Press  and  simultaneously. FUNC 1 displays.
2. Press  to scroll to Total.
3. Press . The currently saved filter mode displays.
4. Press  to scroll through the choices.
5. With choice displayed, press  to select. FILTER displays.
6. Press  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 .

4.8.3 Standard

The 8000HD Remote Display does not have its own standard.

Selection	Description
Industrial (INDUS)	This is the most common setting for the MSI-8000HD; With the Industrial standard, there is full range zero, access to units switching, filters, and peak hold
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; Can only be changed if calibration button has been pressed
R-76 (R-76)	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; Can only be changed if calibration button has been pressed
1Unit (1UNIT)	The 1unit standard is exactly 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 4-5. Standard Menu Selections

Use the following steps to set up standard settings.

1. Press  and  simultaneously. *FUNC 1* displays.
2. Press  to scroll to *Stand*.
3. Press . The currently saved standard displays.
4. Press  to scroll through the choices.
5. With choice displayed, press  to select. *FUNC 1* displays.

Press  to save and exit to weighing mode.

5.0 Calibration

This section provides an overview of MSI-8000HD RF Remote Display calibration instructions.

The MSI-8000HD RF Remote Display can be used for calibrating MSI ScaleCore-based scales, dynamometers, and other RF transmitting devices.

They can be 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.

When adequate test weights are not available, the scale/dynamometer can be calibrated using a constant calibration (C-CAL) ([Section 5.2.2 on page 26](#)).

5.1 Calibration Switch

To calibrate a scale that is in HB-44 or R-76 standard, the calibration switch must be pressed to put it in the calibration mode.

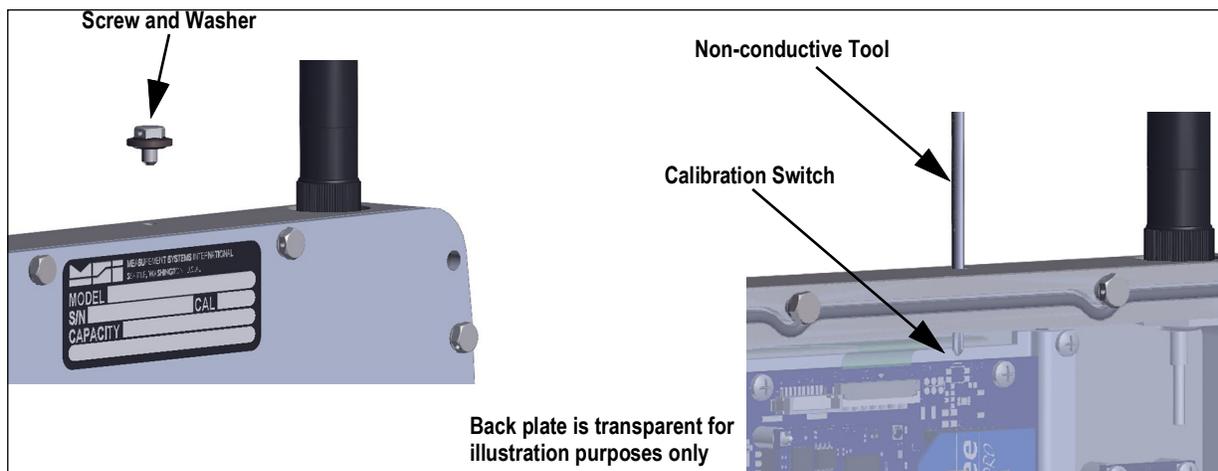


Figure 5-1. Press Configuration Switch

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. **CAL** is displayed.



IMPORTANT: Care should be used when pressing the configuration switch to avoid damage to the switch and other board components.



NOTE: The MSI-8000HD Remote Display will need to be resealed after calibration is complete, to be in compliance with legal for trade operation.

Any connected weighing device that is set for a legal-for-trade mode cannot be calibrated remotely without first pressing the physical calibration button on the device being calibrated.

5.2 Initial Calibration

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

1. Press  and  simultaneously. $\square RL$ displays.
2. Press the programmed **F-Key** to scroll to the load cell to be calibrated.
3. Press , $Unit$ displays.
4. Press . The default units are displayed.
5. Press  to scroll through the available units.
6. With desired unit displayed, press  to select. $\square RP$ is displayed.
7. Press . The default capacity is displayed.
8. To enter a different capacity, press .
9. Press  to scroll through numbers and  to save the selected numbers.
10. When all numbers have been selected, press  to store the number. d displays.
11. Press . The default display divisions are displayed.
12. Press  to scroll through the available display divisions.
13. With desired display division displayed, press  to select. $Unit d$ displays.
14. Proceed with the routine calibration, starting with [Step 3 on page 25](#).

5.2.1 Routine Calibration

For maintenance and routine calibration use the following steps.

1. Press the configuration switch. $\square RL$ is displayed.
2. Press , $UnLd$ displays.
3. Remove all weight from the scale.
4. Press , \square flashes.
5. Press , $PASS$ displays momentarily, then $Ld1$ 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 , the capacity of the scale flashes.
8. To enter a test weight other than the capacity, press .
9. Press  to scroll through numbers and  to save the selected numbers.
10. When the correct weight is displayed, press  to store the number. If cal value is within limits, $PASS$ displays momentarily then $Ld2$ displays.
11. Press  to enter the second load.
12. Add load to scale and press .
13. Press , the current weight on the scale flashes.
14. Repeat [Step 4–Step 10](#), up to four loads.
15. When all loads are complete, press  to store the calibrations. $\square RL$ displays.
16. Press  to view the cal number. $\square - \square RL$ flashes momentarily followed by the $\square - \square RL$ number, record the value, this number will be required if calibrating with $\square - \square RL$ ([Section 5.2.2 on page 26](#)).
17. Press . $StorE$ displays momentarily, then $SEtUP$ displays.
18. Press  to exit calibration. $StorE$ displays momentarily, then the unit returns to weigh mode.

Repeat this procedure to calibrate all scale/Dyna-Link 2's that are connected to the MSI-8000HD remote display.

5.2.2 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 C-Cal. To use C-Cal, a factory generated C-Cal number must be known. Rice Lake supplies replacement load cells with the C-Cal value stamped on the serial number label. When a calibration is performed with test weights, a new C-Cal is generated.

The C-Cal number must be known prior to starting this procedure. C-Cal 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  and  simultaneously. **CAL** displays.
2. Press  to scroll to **C-CAL**.
3. Press , **UnLd** displays.
4. Remove all weight from the scale.
5. Press , **0** flashes and **PASS** will display momentarily then **C-CAL** displays.
6. Press , the last known **C-CAL** displays.
7. To accept the number displayed press . Skip to [Step 10](#).
To enter a different **C-CAL** number, press .
8. Press  to scroll through numbers and  to save the selected numbers.
9. When the correct number is displayed, press  to store the number. **PASS** displays momentarily then **CAL'd** displays.
10. Press . **StorE** displays momentarily then **SEtUP** displays.
11. Press  to exit calibration. **StorE** displays momentarily then the unit returns to weigh mode.

5.3 Setup

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

1. Press the configuration switch (Section 5.2 on page 24). *cAL* displays.
2. Press  to scroll to *SEtUP*.
3. Press , *StAnd* displays.
4. Press , the current standard setting displays.
5. Press  to scroll through calibration standards selections. See Table 5-1 for standards details.
6. When desired option is displayed press . *AUT00* displays.
7. Press  to enter Auto Zero Maintenance.
8. Press  to toggle between *On/OFF*.
9. Press  to set on or off. *0. P-UP* displays.
10. Press  to enter zero on power-up.
11. Press  to toggle between *On/OFF*.
12. Press  to set on or off. *StAnd* displays.
13. Press  to return to *cAL*.
14. Press  again to exit calibration. *StorE* displays momentarily then the unit returns to weigh mode.

Standard Settings

Below are the four selections in the standards menu.

Standard Type	Description
Industrial <i>IndUS</i>	The common setting for the MSI-8000 RF Remote Display; With the Industrial standard, you have 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 through the Cal Seal
R-76 <i>r-76</i>	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; Only stable weights may be printed; Negative weight display is limited to -20d
One Unit <i>Unit</i>	The one unit standard is exactly the same as Industrial, except unit switching is inhibited; This is useful for Metric only countries; Another use of the One Unit standard is to allow the scale to be calibrated in units other than lb or kg, since conversions are eliminated

Table 5-1. Standard Settings Parameter

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

5.4 Reset the Load Cell Calibration

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

1. Press the **F-Key** set to scan to scroll to load cell to reset.
2. Power down the unit.
3. Press and hold the calibration switch then press  to turn on the unit. *rESEt* flashes.
4. Press , *SURE* flashes.
5. Press  to reset the calibration for current load cell. *CRL* displays.
6. Proceed with the Initial Calibration ([Section 5.2 on page 24](#)).

 **IMPORTANT:** Pressing  resets all indicator settings to the original factory settings.

 **NOTE:** Press the  to cancel reset and return to the previous menu.

5.5 Auto Zero Maintenance (AZM)

An auto zeroing maintenance mechanism is used to adjust the zero reading to the center-of-zero. The center-of-zero is defined as the weight reading within 1/4 d of zero. AZM continuously adjusts zero to maintain the center-of-zero. It is recommended that AZM is on to maintain the highest accuracy.

There are circumstances when it should be turned off. This can happen when minor variations of weight occur while picking up scale attachments and the variations fall within the AZM capture window. The AZM capture window (usually 1 d) and capture time (usually 8 seconds) can be adjusted by Rice Lake Weighing Systems to meet custom requirements.

The settings of AZM are dictated in Legal for Trade standards and cannot be adjusted.

Use the following steps to set up Legal for Trade standard settings.

1. Enter **Configuration** mode ([Section 5.1 on page 23](#)). *LR* displays.
2. Press  to scroll to *SETUP*.
3. Press . *Stand* displays.
4. Press  to scroll to *AUTO*.
5. Press . The current setting is displayed.
6. Press  to toggle between *On* or *OFF*.
7. Press . *0. P-UP* displays.
8. Press  twice to save settings. *STORE* displays briefly and exits setup.

5.6 Zero Power Up (0.P-UP)

This feature will cause the unit to automatically zero after the unit is turned on. Default is *OFF*.

1. Enter **Configuration** mode ([Section 5.1 on page 23](#)). *LR* displays.
2. Press  to scroll to *SETUP*.
3. Press . *Stand* displays.
4. Press  to scroll to *0. P-UP*.
5. Press . The current setting is displayed.
6. Press  to toggle between *On* or *OFF*.
7. When desired value is displayed, press . *ENTER* displays.
8. Press  twice to save settings. *STORE* displays briefly and exits setup.

6.0 Communications

This section provides an overview of MSI-8000HD RF Remote Display communication instructions.

6.1 Communications Setup

The 802.15.4 transceiver is used to communicate between the MSI-8000HD and other connected ScaleCore devices. The 802.15.4 transceiver is also capable of connecting to any supported device with an 802.15.4 Modem. 802.15.4 operates in the 2.4 GHz ISM band and does not require the end user to obtain a license. 802.15.4 can coexist with other 2.4 GHz systems if caution is taken to isolate antennas at least 10' (3 m) from the crane scales.

The 802.11 Wi-Fi option communicates directly with a standard RF access point. This option is covered by the Wi-Fi for ScaleCore User Guide."

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 must 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.

NOTE: 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, but for best performance different ScaleCore networks should be on different RF channels.

Table 6-1. Piconet Setup Ranges

6.2 Communications Menu

To enter the Communications menu, press  and  at the same time. *bL5Y* flashes momentarily before entering the communications menu.

Parameters	Choices	Description
<i>Print</i>	--	Print – Prints a ticket if connected to a printer
<i>rF</i>	--	Radio Frequency (Section 6.4 on page 34)
<i>EF.nEt</i>	<i>Load</i>	Load Totaling – The total number of Remote Sensor Devices (RD's) – Range 1–4 (Default is 1)
	<i>EtL.rd</i>	Total Remote Displays
		All – Sum of all remote devices
		Prirs – Sum in pairs (requires four remotes)
<i>SEARnLS</i>	<i>ScId</i>	ScaleCore ID – Number must match
	<i>SnId</i>	Sensor ID
	<i>YEAR- Month dAY hour MiNUTE</i>	Date/Time – Set date and time for printing output (Section 6.9 on page 40)
		both – Sum in pairs plus grand total
		vseDef – Programmed using a computer program such as Scope
		off – Summing is disabled

Table 6-2. Communications Menu Parameters

6.3 Printer Setup

The RS-232 communications port is capable of outputting load data. All of the RF linked weight device weight modes are available in user formatted form. The control mode program is what controls the MSI-8000HD to print and is described in [Section 6.3.1](#).

The communications port settings are independent of any print settings in connected scales.

Choices	Description
LS _{ET} NC	Print Setup – Select the channel the port will be used with; Options: 0, 1, 2
oU _{ET} PV _{ET}	Port Selection – Select the port to use for communication with the printer; Options <i>Port 0</i> , <i>RF</i> , <i>Port 2</i>
S _{ET} NC	String Setup – Print string format number entry screen (Section 6.3.3 on page 33)
C _{NT} RL	Print Control Options – <i>USER</i> , <i>LOAD</i> , <i>CONT</i> , <i>OFF</i> (Table 6-4)
rR _{ET} E	Output Rate – Print string output rate number entry screen (0–65536 seconds)

Table 6-3. Print Setup Parameters

6.3.1 Control Modes

The user can select four control modes. The control modes are described in [Table 6-4](#).

Mode	Description
User	Printing is controlled by pressing the F3 key
Load	One print occurs when a stable load is read, the scale must then return to near zero before another print will occur NOTE: Other configurations of load are available using ScaleCore Connect. It can be downloaded from the Rice Lake Website.
Continuous	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

6.3.2 Standard Print Strings

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

Command	Description
<T>	Load data
<U>	Units
<M>	Load mode (lb/kg)
<CRLF>	Carriage return line feed
<SP>	Space
<STX>	Start of text character (ASCII 2)
<P>	Space for positive, - for negative
<W7.>	7-digit weight, floating decimal, leading spaces
<S>	Status, upper case: <SP> =OK, M=Motion, O=Overload, Z=Zero, I=Invalid

Table 6-5. Standard Print Strings

Print String Number	Parameter	Description
1	Current load	Fixed output length: 16; Leading zeros suppressed except for the least significant digit (LSD) <TTTTTT><SP><UU><SP><MMMMM><CRLF>
2	Net load	Fixed output length:16; Leading zeros suppressed except for the LSD <TTTTTT><SP><UU><SP>NET<SP><SP><CRLF>
3	Gross load	Fixed output length: 16; Leading zeros suppressed except for the LSD <TTTTTT><SP><UU><SP>GROSS<CRLF>
4	Tare Weight	Fixed output length: 16; Leading zeros suppressed except for the LSD <TTTTTT><SP><UU><SP>TARE<CRLF>
5	Total Weight	Fixed output length: 16; Leading zeros suppressed except for the LSD <TTTTTT><SP><UU><SP>TTL<CRLF>
6	Number of Samples Totaled	Fixed output length: 16; Leading zeros suppressed except for the LSD <SP><SP><SP><SP><SP><SP><SSSSSS><SP><T-CNT><SP><CRLF>
7	Rice Lake / Condec:	Stream Data Format <STX><P><W7.><U><M><S><CR><LF>
8/9	Carriage Return/Line Feed	Used to add a space between print records <CRLF>

Table 6-6. Standard Print Strings



NOTE: If unit is in legal for trade mode (r76-HB44) the only print string available is number 1.

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.

6.3.3 Printer Output Setup

Use the following steps to set up the printer output.

1. Press  and  at the same time. *PRINT* displays.
2. Press . *LISTEN* displays.
3. Press  to scroll to *SENT*.
4. Press . The current print string number is blinking.
5. Press  to scroll through the numbers and press  to save and move to the next number.
Example: If Net, Gross and Tare are to be used for the print format, the entry required would be 2349. The 2 is net, 3 is Gross, 4 is tare and 9 inserts a space before the next print output.
6. Once all numbers are set, press  to save the print mode. *ENTER* displays.
7. Press . The current control mode displays.
8. Press  to scroll through the options.
9. When the desired control mode is displayed, press . *RATE* displays.

 **NOTE:** If control mode has been set to continuous, press  then proceed to [Step 13](#).

10. Press . The current print rate displays.
11. Press  to scroll through the numbers and press  to save and move to the next number.
12. When number is correct, press . *LISTEN* displays.
13. Press . The current listener value displays.
14. Press  to scroll through the numbers and press  to save and move to the next number.
15. Once the desired value is displayed, press  to save. *OUTPUT* displays.
16. Press . The current output displays.
17. Press  to scroll through the options.
18. Once the desired output is displayed, press  to save. *SENT* displays.
19. Press  three times to exit, *STORE* displays briefly, then the unit returns to weigh mode.

6.3.4 Custom Print Formatters

The ScaleCore Connect application is used to create custom output formatters. Download the ScaleCore Connect software from the Rice Lake website. For more information see the ScaleCore Connect software manual (PN 185725).

Custom formatters are also configured in the ScaleCore Webserver. For more information, see the ScaleCore Webserver technical manual (PN 208738).

The serial output is configured as 9600 baud, Xon/Xoff handshaking, no hardware handshaking, 1 stop bit, no parity. Other baud rates are possible by special order only.

6.4 Radio Setup

Allows the setup of the Radio.

Mode	Description
on.off	Enable radio – On/Off, affects continuous mode only
SCId	ScaleCore ID – Range 1–254, (20–30)
ChnL	RF Channel – Range 12–23
netId	Network ID – Range 0–999999
StrEn	Transmission Strength – Range 0–4 (Table 6-8)
TYPE	Allows the selection of radio card that is being used; For cards other than XBee/802.15.4 use the other selection: DYNL, ZBEE
hold	When set to On, the radio continues to use power; This will use the battery power faster; Default is set to OFF; Hold must be enabled when using a Rugged Remote to turn on the MSI-8000HD

Table 6-7. RF Setup Parameters



NOTE: Transmission strength should be set to the lowest setting possible to achieve the transmission required. Both scale/Dyna-Link and MSI-8000 RF Remote Display should be set at the same transmission strength setting.

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

Table 6-8. Transmission Strength Settings

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

- Press **F1** and **F3** at the same time, *PRINT* displays.
- Press **F2** to scroll to *RF*.
- Press **F1**. *on.off* displays.
- Press **F1**. The currently saved parameter is displayed.
- Press **F2** to toggle between on and off.
- With *on* displayed, press **F1** to select. *off* is used when the 8000 is hardwired to a Dyna-Link. *SCId* displays.
- Press **F1**. The current ScaleCore ID displays.

8. Press  to scroll through numbers and  to save the selected numbers.
9. When number is correct, press  to store the number. `CHNL` displays.
10. Press . The current channel setting displays.
11. Press  to scroll through numbers and  to save the selected numbers.
12. When number is correct, press  to store the number. `NETID` displays.
13. Press . The current Network ID displays.
14. Press  to scroll through numbers and  to save the selected numbers.



NOTE: 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 number is correct, press  to store the number. `STREN` displays.
16. Press . The current Strength setting displays.
17. Press  to scroll through 0–4.
18. When the number is correct, press . `TYPE` is displayed.
19. Press . The current type displays.
20. Press  to scroll through values.
21. With selected value displayed, press . `hold` displays.
22. Press . The current setting displays.
23. Press  to toggle between on and off.
24. When the selection is correct, press  to store the number. `ONOFF` displays.
25. Press  to save and exit the RF menu.
26. Press  to exit to the communication menu.

6.5 Setup Multiple Sensor Network

The MSI-8000HD can monitor up to four load sensors. The sensors can be read individually, in pairs or summed. Dyna-Link 2 is shown for illustration purposes only. The Challenger 3 or Port-A-Weigh can also be used.

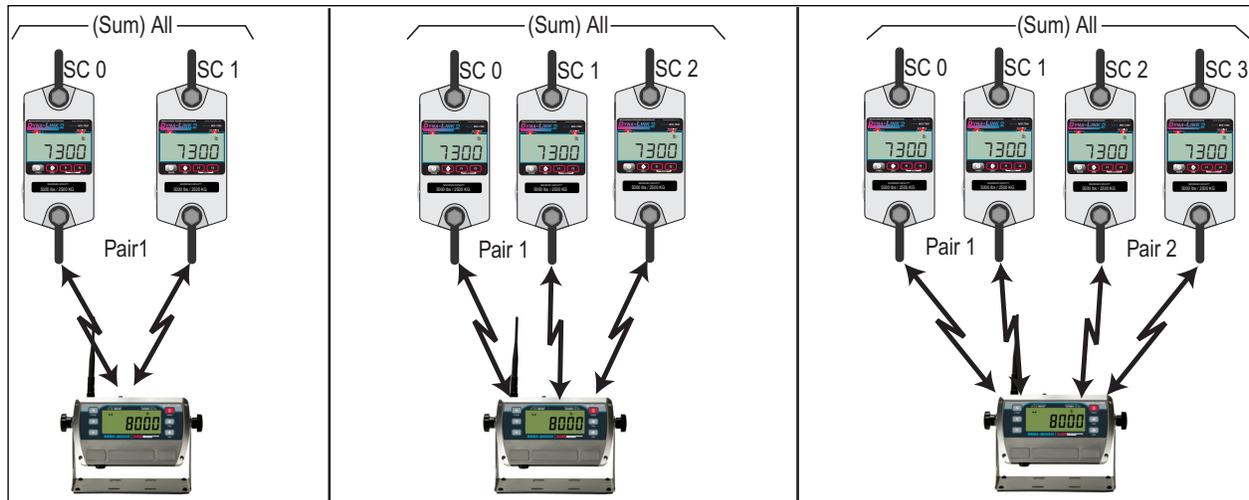


Figure 6-1. Multiple Sensor Network

Each sensor has a unique ScaleCore ID (SCID). The IDs must be consecutive, starting with 0. This is set in the sensor setup, not in the MSI-8000HD. See the scale/Dyna-Link 2 operation manual, available at www.ricelake.com.

6.5.1 Set the Total Number of Load Cells

1. Press **F1** and **F3** at the same time. *PRINT* is displayed.
2. Press **F2** to scroll to *CELLS*.
3. Press **F1** *LOAD* is displayed.
4. Press **F1**. The Load Totaling setting displays.
5. Press **F2** to scroll through numbers and **F1** to save the selected numbers.
6. When correct number of scales/Dyna-Link 2 attached (2-4) is displayed, press **F1**. This number does not include the MSI-8000HD or any modems. *LOAD* displays.
7. Press **F1**. The Load Totaling setting displays.
8. Press **F2** to scroll through numbers and **F1** to save the selected numbers.
9. Press **F1**. *LOAD* displays.
10. Press **ZERO** twice to exit to the weighing mode.

6.5.2 Scan Weight Inputs

1. Program **F1** to the *Scan* function, and **F2** to the *Load* function for summed sensor readings (Section 6.5.3).
2. The current channel is displayed, press  to change to the next channel. The scan channel number is displayed briefly, then the scan channel weight is displayed.
3. Press . In a two sensor system the scan returns to the first channel (0).

6.5.3 Load Totaling Settings

There are four different types of load totaling modes and are explained below.

All

All channels are added together, press *F-Load* to view the sum of all sensors connected. Pressing *FH-Load* again confirms that the summed channels are being displayed, by briefly displaying *Load* (total remote sensor devices).



NOTE: *If the sum is the only thing to be observed, disable the Scan function key using the function key setup menu (Section 4.3 on page 15).*

Pairs

Used with four sensor systems, scrolling through the channels with *FH-Load*, they will be presented as separate weights first and then as pairs. This display is preceded by the LCD message *PAIR 1* and *PAIR 2*.

Both

This mode displays both the pair totals and the overall total. Each press of *FH-Load* scrolls through the summed combinations. First *PAIR 1*, then *PAIR 2* then the sum of all connected sensors is displayed.

Off

Sensor summing disabled. A function key set to *Load* is unnecessary.

1. Program an F-key to the *Load* function (Section 4.3 on page 15). The current channel is displayed.
2. Press *FH-Load*. *ADALL* is displayed briefly, then the summed total.
3. Continue pressing *FH-Load* to view all enabled sum types.

6.6 ScanList ID

The ScanList ID specifies the load cell/sensor that scale one through four will use for summing totals. It allows up to four devices to be summed together on the remote display.

1. Press  and  at the same time. *Print* displays.
2. Press  to scroll to *SCANLS*.
3. Press . *ListID* displays.
4. Press . Current *ListID* flashes.
5. Set the ID number of the LC/Sensor that will be assigned to Scale.1 (0-3 are used to represent 1-4. For example, 0=1, 1=2, 2=3, 3=4).
6. Press  to store the number. *SLID* displays.
7. Press . The scale ID must match the ID of the LC/Sensor being connected to.
8. Press  to store the number. *SLID* displays.

9. Press , The sensor number is used to select a LC connect to the Scale being addressed in L, S, d .
10. Press  to store the number. L, S, d displays.
11. Press  twice to exit to the weighing mode.

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

6.7 Zero and Tare in Multiple Load Cell Systems

The channel displayed is considered the **Focus Channel**. Pressing  or  only affects the displayed channel. When displaying summed channels, ZERO or TARE commands are sent to all devices that contribute to the displayed weight.

Example: If in the Both modes, 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 then pressing ZERO will zero all connected sensors.

6.8 Communications Port Hardware

The MSI-8000HD RF Remote Display RS-232 communication port is used for software updates, connecting to a remote display and for connecting to any RS-232 device.

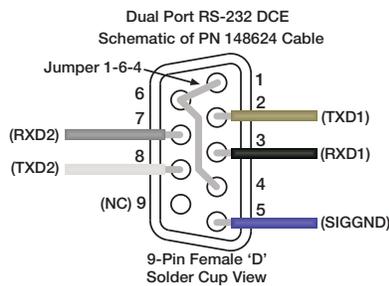


Figure 6-2. Standard Adapter Cable (PN 148624)

Connector – M12 industrial connector. An adapter cable (PN 148624) is required to connect the MSI-8000HD RF Remote Display to a computer. This adapter cable converts the 8000 connector to a standard D9 serial connector. The 503489 cable can be converted to DTE by using a Null Modem adapter.

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

Baud Rate – The baud rate is not programmable. Port 1 baud rate is fixed at 9600. Port 2 baud rate is fixed at 38.4k. The bootloader for updating software is 38.4k baud.

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

This configuration plugged into standard DTE connector disables Comm Port 2. Turn Comm Port 2 off using Comm Port menu.

An unterminated cable is available (PN 143348) for wiring a connector to the M12 connector found on the MSI-8000HD RF Remote Display.

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

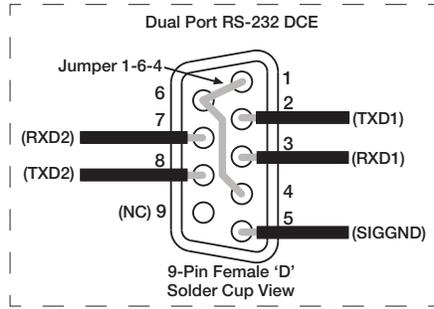


Figure 6-3. Communications Port 1 Wiring

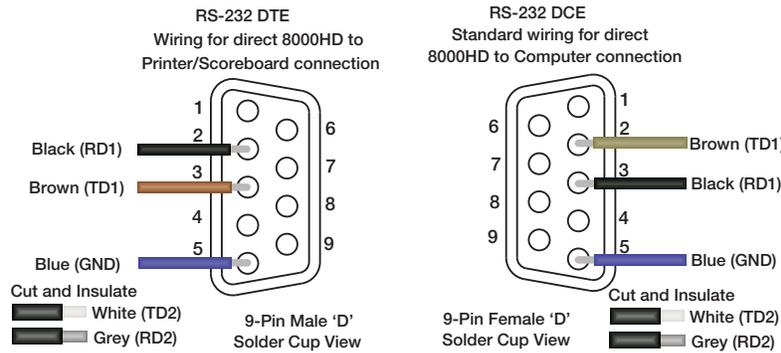


Figure 6-4. Communications Port 2 Wiring

Wiring the shield drain to the metal shell of the connector is recommended, however, 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.

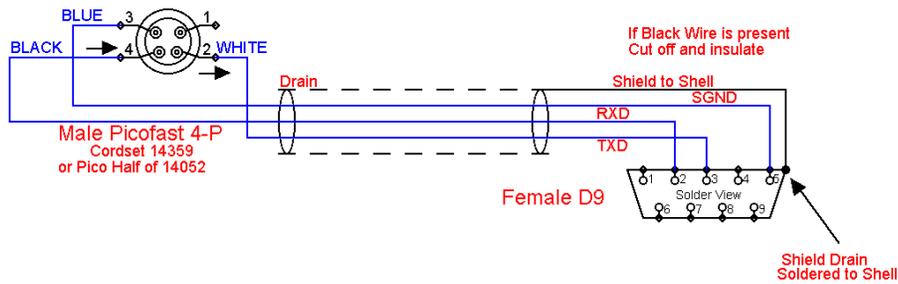


Figure 6-5. DCE Configuration for Computer Connection

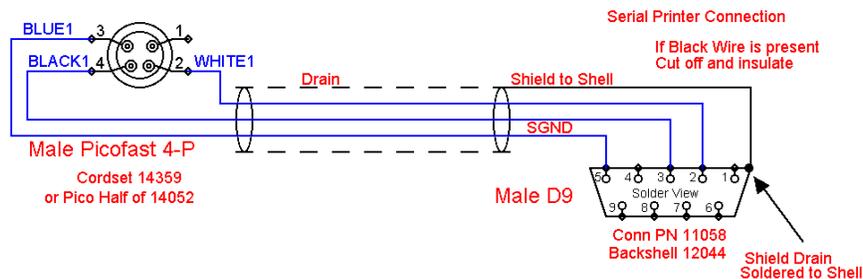


Figure 6-6. DTE Configuration for Direct Connection to a DCE Printer

6.9 Real Time Clock

RTC capability enables the time and date to be included when printing load data. Time and date only display on the LCD screen during the power-on sequence or during the TEST sequence. Time displays in a 24-hour clock format and date displays as “YY-MM-DD”. Print time and date formatting is determined by the programmed print string.



NOTE: Time and date support is not available on older versions of the MSI-8000HD. If time and date support is not available, time and date will either not display during the display TEST or the time and date will show up as all zeros. If you would like time and date support and your MSI-8000HD does not support it, please contact your dealer.

Allows the setup of the time and date.

Mode	Description
YEAR	Two-digit year
Month	Month (1-12)
DAY	Day of the month (1-31)
hour	Hour on a 24-hour clock 0 — 12:00 am, midnight 1-11 — AM hours 12 — 12:00 pm, Noon 13-23 — PM hours
minute	Minute (0-59)

Table 6-9. RF Setup Parameters

Press ZERO twice to save the time and date. Seconds reset to zero upon saving.

6.10 Relays

The MSI-8000HD can be equipped with up to eight 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 MSI-8000HD can also be equipped with an eight relay expansion. The relays for the expansion pack are accessed through a terminal blocks on the backside of the MSI-8000HD. See [Section 6.10.2 on page 42](#).

The connecting cables are shown in the table below:

Part No.	Description
144400	PVC 4 m, rated to 250 VRMS, 4 A
	PVC 10 m, rated to 250 VRMS, 4 A
Alternately use a field wireable connector	
156256	Straight for cable 4-6 mm OD
	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

6.10.1 Relay Options

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

Relay Type	Description
AC/DC coil relay	<ul style="list-style-type: none"> AC/DC Coil Relay: 144520 PA1a-5 V. 4 A Fuse: 144307 AC Rating: 250 VAC at 5 A (limited by connector/cordset rating to 5 A continuous) DC Rating: 5 A @ 30 VDC, 0.5 A at 100 VDC Best choice for 90% of applications.
AC/DC SSR (solid state relay) - 60 V	<ul style="list-style-type: none"> Better for battery powered units and mates well with 24VDC industrial power supplies AC/DC SSR 60 VPK, 2.7 A: 13178 AQZ202D. 2 A Fuse: 144319
AC/DC SSR - 120V	<ul style="list-style-type: none"> For 115VAC operation when SSRs are preferred. AC/DC SSR 200 VPK. 0.9 A: 13180 AQZ207D. 0.75 A Fuse: 155221
Other available relays	<ul style="list-style-type: none"> AC/DC SSR 100 VPK, 2 A: 13179 AQZ205D. 1.5 A Fuse: 155220 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) DC Only SSRs DC SSR 60 VPK, 4 A: 13182 AQZ102D. 3 A Fuse: 155223 DC SSR 200 VPK, 1.3 A: 14566 AQZ107D. 1 A Fuse: 160448 <p>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.</p>
One 1 Form B closed SSR	<ul style="list-style-type: none"> 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) <p>NOTE: Requires a minor modification on the Relay board and can only be ordered by contacting Rice Lake Weighing Systems (Figure 6.10.2 on page 42).</p>

Table 6-11. Relay Options

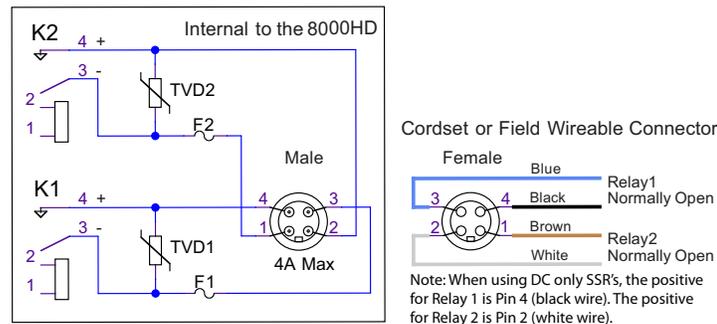


Figure 6-7. Cordset or Field Wireable Connector

6.10.2 Extended Relay Kit – Optional

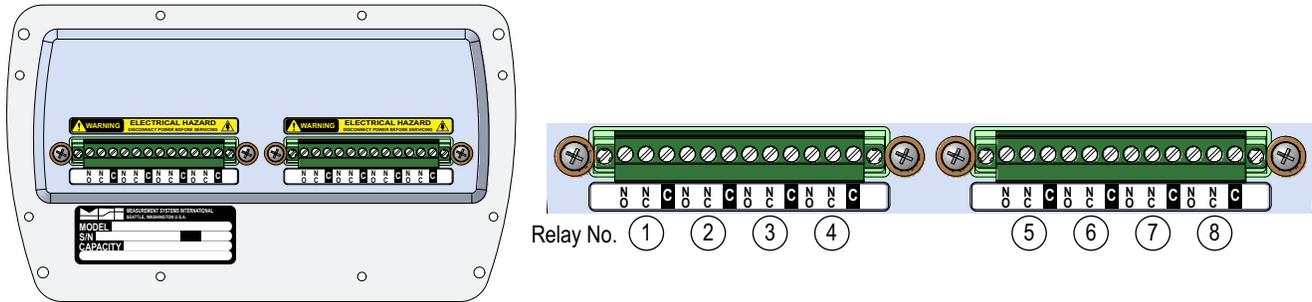


Figure 6-8. Extended Relay Kit:

Part No.	Description
172502	8-CH 0.9 A 200 VPK SSR FORM C
172501	8-CH 3 A 60 VPK SSR FORM C
172500	4-CH 3 A 60 VPK SSR FORM C
172498	8-CH 0.9 A 200 VPK SSR
172497	8-CH 3 A 60 VPK SSR
172495	8-CH 12 A 5 V RELAYS MOMENTARY
172494	4-CH 0.9 A 200 VPK AC/DC SSR
172493	4-CH 3 A 60 VPK AC/DC SSR
172492	4-CH 5 V MOMENTARY
172490	4-CH 5 V LATCHING RELAYS
171676	8-CH 12 A RELAYS LATCHING

Table 6-12. Expanded Relay Option Kits

6.11 Radio Compliance

All radio options meet FCC and international radio compliance per the certification information listed in this section.

These modules may have additional international certifications that are not listed in this section.

Please contact Rice Lake Weighing Systems if you require operation in a jurisdiction that is not listed.

6.11.1 802.15.4 (XBee 3 and XBee 3-PRO)

FCC Statement

Contains FCC ID: MCQ-XBEE3

International Certifications

Canada: Radio Certificate Number: IC 1846A-XBEE3

Australia: RCM

Brazil: ANATEL 06329-18-01209

EU (XBee 3 only): Yes, when used with CE approved products

Japan (XBee 3 only): R210-119309

Mexico: IFETEL (IFT) RCPDIXB19-1820

South Korea (XBee 3 only): R-C DIG-XBEE3

6.11.2 802.15.4 (XBee 2SC)

FCC Statement

Contains FCC ID: MCQ-S2CTH

International Certifications

Canada: Radio Certificate Number: IC 1846A-S2CTH

Australia: RCM

Brazil: ANATEL 0616-15-1209

EU: Yes, when used with CE approved products

Japan: R210-105563

Mexico: IFETEL (IFT) RCPDIS219-1821-A1

South Korea: MSIP-CRM-DIG-XBee-S2C-TH

6.11.3 Wi-Fi

FCC Statement

Contains FCC ID: T9J-RN171

International Certifications

Canada: Radio Certificate Number: IC 6514A-RN171

Korea: Radio Certificate Number: KCC-CRI-029-RN-171

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

- EN 300 328 : V1.8.1 (2012)

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

Safety (article 3.1A) EN 60950-1:2006+A11:2009+A1:2010+A12:2011

EMC (article 3.1b) EN 301 489-1 : V1.9.2 (2011) In accordance with the specific requirements of ETSI EN 301 489-17: V2.2.1 (2012)

6.11.4 Bluetooth

FCC Statement

Contains FCC ID: T9J-R41-1

International Certifications

Canada: Radio Certificate Number: IC 6514A-RN411

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

- EN 300 328-1
- EN 300 328-2 2.4GHz

6.11.5 FHSS (Frequency Hopper Spread Spectrum)

FCC Statement

Contains FCC ID: HSW-DNT24

International Certifications

Canada: Radio Certificate Number: IC 4492A-DNT24

ETSI Certified

6.12 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 that you have a clear LOS transmission path; This will ensure 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 place 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 (like the underside of a large bridge crane); 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



NOTE: 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.

6.12.1 Available Antennas

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.

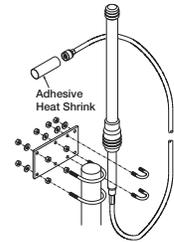


Long Range OMNI 9 dBi Antenna

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.



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.



YAGI Antenna

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



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.



14 dBi Corner Reflector



9 dBi Corner Reflector

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.

7.0 Troubleshooting and Maintenance

7.1 Troubleshooting

Problem	Possible Cause	Solution
The display is blank when the power button is pressed	Discharged battery	Recharge the battery
	Defective battery	Replace the battery (factory replacement only)
	Defective switch or circuit board	Requires authorized service
The display does not function properly/ Front panel buttons do not function normally/scale/Dyna-Link will not turn off	Improperly loaded software	Reinstall the software
	Faulty circuit board	Requires authorized service
	Loose connectors	Requires authorized service
Scale/Dyna-Link does not respond to tension changes	Out of calibration	Calibrate the unit
	Faulty load cell	Replace the load cell
	Load cell connector	Check connectors and wires
The display over ranges below 100% of capacity	Tared tension is added to load to determine overload point	Return to gross tension mode
	Zero requires adjustment	Rezero the scale
	Too much tension/load has been zeroed	Rezero the scale
The display drifts	AZM (Auto 0) is turned off	Turn AZM on
	Rapid temperature changes such as moving the scale from indoors to outdoors	Wait until the scale temperature has stabilized
The displayed tension shows a large error	Scale not zeroed before load is lifted	Zero the scale with no load attached
	lb/kg units causing confusion	Select proper units
	Requires recalibration	Recalibrate the unit
The display reading is not stable	Excessive vibration	Increase filtering or increase <i>d</i> in Cal
	Excessive side loading	Improve load train symmetry
	Load cell faulty	Check load cell connections
The display toggles between Error and Load	Load exceeds capacity	Reduce tension immediately
	Faulty load cell or wiring	Check load cell and load cell wiring
The display toggles between Error and Button	A key is stuck or is being held down	Check switches for damage
RF Remote Display does not match the weight application	Units are not paired	See setting the RF Network address procedures
Lo Batt is blinking	The battery is low	Recharge the battery
Unit turns on, then immediately off	The battery is low	Recharge the battery
The load will not zero	The system not stable	Wait for stable symbol  to turn on Increase filtering for more stability
	Zero out of range	Zero range might be limited; Reduce tension or use Tare
The 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 <i>d</i> ; It is also possible to increase the motion window; Contact Rice Lake Weighing Systems if there is a problem getting the unit 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
The manual total does not work	A function key is not set to total	Set up Func1 or Func2 for total
	Tension must be stable	Increase filtering for more stability
The auto total does not work	Load must be stable	Wait for stable symbol  to turn on or increase filtering for more stability
	Load thresholds are not reached	Weight must exceed one percent of capacity for autototal to work; Weight must drop below 0.5% of capacity for additional weighments to register
RTC does not stay updated when power is off	Coin-cell battery may be spent	Replace coin-cell battery (Section 7.7 on page 50)

Table 7-1. Troubleshooting

7.2 Error Codes

The ScaleCore Processor in the unit detects errors and generates error codes to aid in troubleshooting.

Error Code	Definition	Comment
LcOFF	LC Disabled	A Load cell 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
 Error  LoAd	Overload	Tension/Weight exceeds set capacity +9 d or load cell is damaged or disconnected
 Error  UndLd	Underloaded	Tension/weight is more than 20% negative or load cell is damaged or disconnected

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 to ensure product safety.

Service Counters are important safety warning features and can only be reset at the factory by certified Rice Lake personnel.

As part of the reset process, the service technician will perform a thorough load train inspection to ensure user safety and confirm that the product is ready to be returned for regular service.

See the Crane Scale Safety and Periodic Maintenance Manual (PN 153105) for proper loading techniques to improve the safety and longevity of your MSI Overhead Weighing Product. Download the Crane Scale Safety and Periodic Maintenance Manual (PN 153105) at www.ricelake.com.

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-8000HD 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

Use the following steps to access the service counters

1. Program an **F-key** to **EESE** (Section 4.3 on page 15).
2. Press **Fx-Test** and then immediately press **F1** again. The following items display:
 - **LFCnt** will display briefly, followed by the number of lifts
 - **OLCnt** displays briefly, followed by the number of times the weight has exceeded capacity
 - **E-EL** and its value is displayed
 - The unit returns to the weighing mode



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

7.4 Mechanical Dimensions

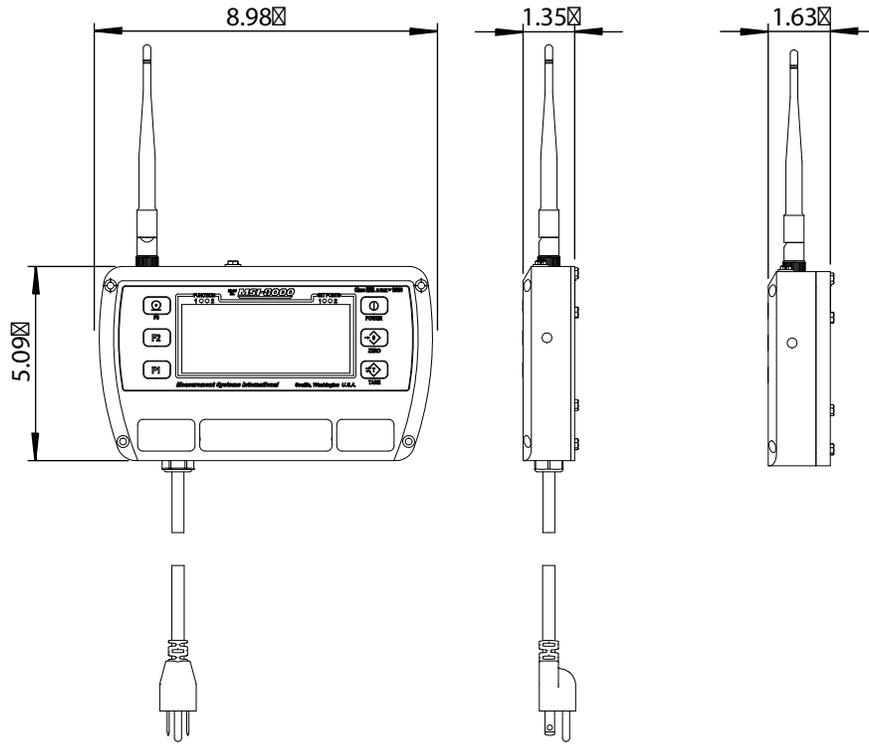


Figure 7-1. MSI-8000HD Dimensions

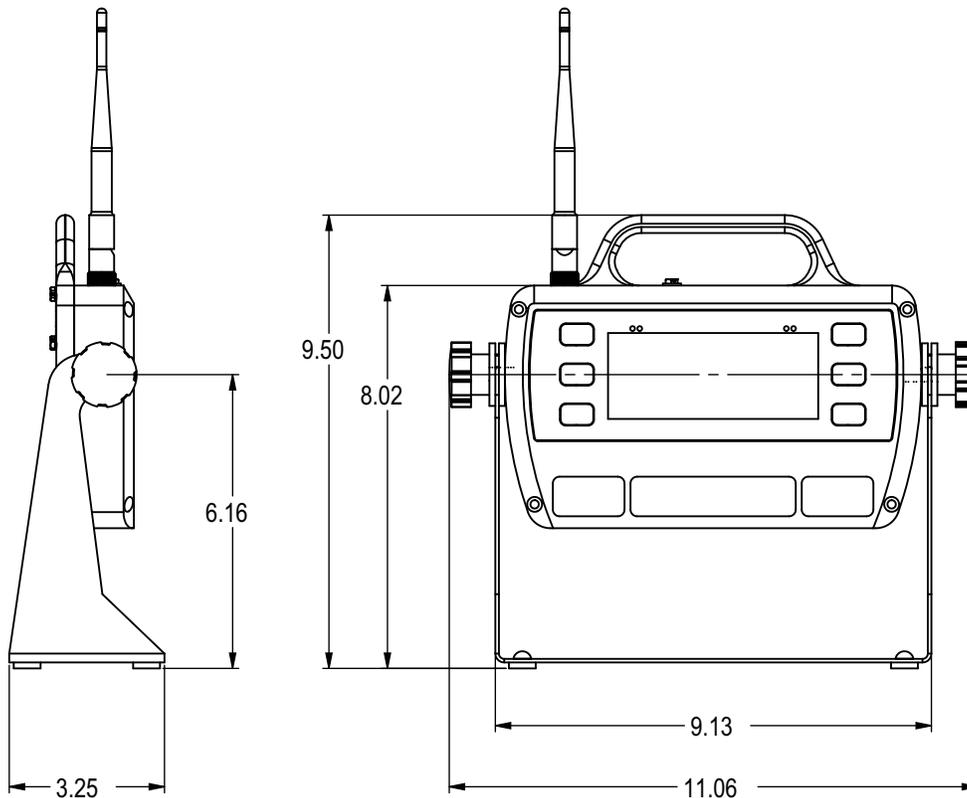


Figure 7-2. MSI-8000HD Dimensions with Tilt Stand

7.5 Firmware Update

Updating firmware in the MSI-8000HD requires the following:

- DCE serial cable (PN 150964, or build per DCE cable schematic)
- PC with a terminal program (Teraterm Pro recommended)
- 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 on request. The firmware version is displayed when the MSI-8000HD is turned on in form **01-04** (versions will vary). MSI-8000HD 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, 9600 BAUD, XON/XOFF (flow control).
2. Connect to the Dyna-Link serial port using the DCE cable. 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-8000HD will respond with {000001r2;0;01E02;2011-07-08;11:05} or something similar.
4. On the terminal keyboard, type {**fff09=0199**}.
5. Change the terminal serial port to 38400 Baud. Press the “r” key to refresh the display. The following menu should appear.
 MSI-8000HD RF Remote Display SCALECORE3 BOOT LOADER Ver. xx-xx (c) Date, Time
 (u) Download and program application code (bootloader version may vary)
 (q) Query app code info
 (g) Execute app code
 (r) Refresh



NOTE: Bootloader version may vary.

6. Type **u**

Terminal should display:

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

```
Send File NOW, or press ^to abort: #####
#####
#####
#####
```

Completed

8. After file is received terminal should display “Completed.” Then the boot menu appears again.
 MSI-8000 SCALECORE3 BOOT LOADER Ver. 00-05 (c) 2012-05-02 17:06
 (u) Download and program application code (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 01-04  Firmware version number
```

If the CRC Signature does not match, go back to [Step 4](#) and try again.

10. Send an “r” to restore the boot menu.
 MSI-8000 SCALECORE3 BOOT LOADER Ver. 00-05 (c) 2012-05-02 10:55
 (u) Download and program application code (bootloader version may vary)
 (q) Query app code info
 (g) Execute app code
 (r) Refresh
11. Send a “g.” The MSI-8000HD RF Remote Display should start.

7.6 Factory Reset

Resetting the unit will change all settings back to the default factory settings.

1. Power off the MSI-8000HD.
2. Press the calibration switch and  simultaneously. *5U-EP* displays.
3. Press  to reset the current indicator settings to the default factory settings. *CRL* displays.
4. An initial calibration will need to be performed on the current load cell ([Section 5.2 on page 24](#)).

 **IMPORTANT:** Pressing  will reset only the current load cell calibration settings ([Section 5.4 on page 28](#)).

 **NOTE:** Press the  to cancel reset and return to the previous menu.

7.7 Coin-Cell Battery Replacement

The RTC utilizes a CR2016 coin-cell battery to maintain time and date while the MSI-8000HD remote display is disconnected from a power supply. If the MSI-8000HD no longer updates the time and date while the power is disconnected from a power supply, the battery may need to be replaced. Battery life is expected to be approximately 5 years with a fresh battery.

To replace the coin-cell battery, the circuit board must be detached from the mounting bracket.

1. Disconnect the power cable from the power source.
2. Remove the 8 hex screws on the back of the MSI-8000HD with a 1/4 in socket wrench.
3. Remove the rear cover.
4. Gently lift the black cable lock on the back edge of the P6 LCD connector
5. Carefully remove the LCD ribbon cable by pulling it gently out of the P6 port.

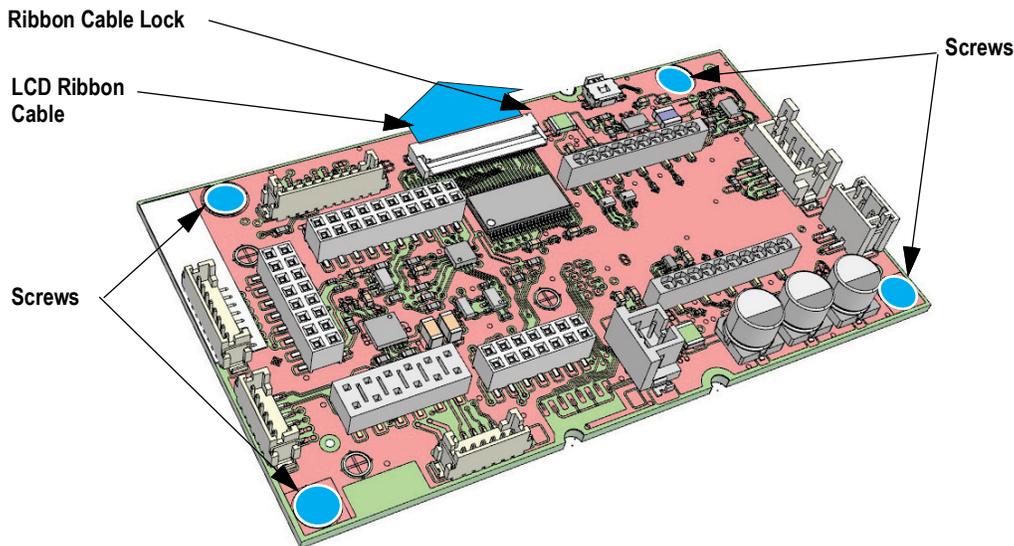


Figure 7-3. CPU Board Top

6. Remove the four screws securing the circuit board to the mounting bracket.
7. Gently flip the circuit board over, being careful not to twist or damage the push button flex cable.

8. Carefully remove the coin-cell battery from the battery holder with a small flathead screw driver.

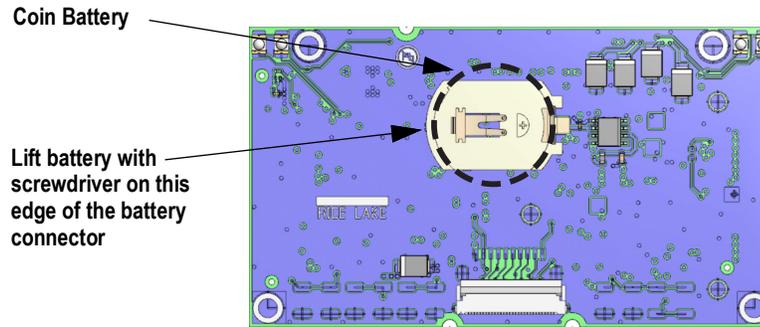


Figure 7-4. CPU Board Bottom



IMPORTANT: Attempting to directly lift the coin-cell battery without a screwdriver could result in pulling the battery holder off of the circuit board. If the battery holder is pulled off of the circuit board, the entire board must be replaced.

9. Replace the battery in the holder with the positive side facing up.
10. Flip the circuit board back over and loosely replace the four screws into the mounting bracket.
11. Fully and evenly replace the LCD ribbon cable into the P6 port, shifting the circuit board if necessary.
12. Switch the black cable lock down to secure the ribbon cable in place.
13. Gently tighten the screws to secure the circuit board to the mounting bracket.
14. Ensure that the gasket is seated directly in the channel.
15. Replace the rear cover, ensuring that the gasket is seated directly in the channel.
16. Torque the 8 hex screws on the back cover to 12-15 in-lbs.

8.0 Specifications

Power:

90-267 VAC, 9-36 VDC, 18-72 VDC, 120-300 VDC
Optional battery power module available

Excitation Voltage:

4.8V current limited and over-voltage protected

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 cell inputs

Filtering:

Off, Low, Hi-1, Hi-2

RF Radio Link:

2.4 GHz 802.15.4
Compatible with all ScaleCore™ based products

RF Effective Range:

Typically 100 to 300 ft, line of sight; for longer range consult factory

Communication Ports:

Dual RS-232 communication ports

Optional Communications:

Wi-Fi
Serial RF (Single Sequence or FHSS)

Annunciators:

Stable, COZ, peak, kg, kN, lb, M, ton, setpoint, function LEDs
Channels: 1, 2, 3, 4, TTL

Display:

Six-digit 1.0 in (26.4 mm) LCD

Units Displayed:

Pounds, kilograms, tons, metric tons, kilonewtons

Keys/Buttons:

On/Off, Zero (100%), Tare, Print, and Two userdefined keys for the following functions: peak hold, high resolution, total, view total, net/gross, units switching

Rating/Material:

Enclosure: NEMA Type 4, IP68 milled anodized aluminum with O-ring gaskets

Temperature Range:

Operating: -4 °F to 140 °F (-20 °C to 60 °C)
Certified: 14 °F to 104 °F (-10° °C to 40 °C)

Warranty:

One-year limited

Approvals



NTEP
COC #15-110
Accuracy Class: III/IIIL n_{max} : 10,000



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