

MSI-8000HD

RF Remote Display

Technical Manual



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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 MSI-3460 Challenger 3, MSI-4260 Port-A-Weigh or MSI-7300 Dyna-Link 2. It has an RF effective range of 300' (line of sight) and operates on a license-free 2.4 GHz frequency.

It is fully sealed for outdoor use in most ambient conditions and enhances the safety and usability of Rice Lake's Dyna-Link and crane scale systems. 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-8000HD*.



Manuals are available for viewing and/or downloading from the Rice Lake Weighing Systems website 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/NEMA Type 4 for outdoor use
- The enclosure is built with rugged construction throughout with shock cushioning on the corners
- Six, 1" (24 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 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 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.



1.3 Front Panel Description

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

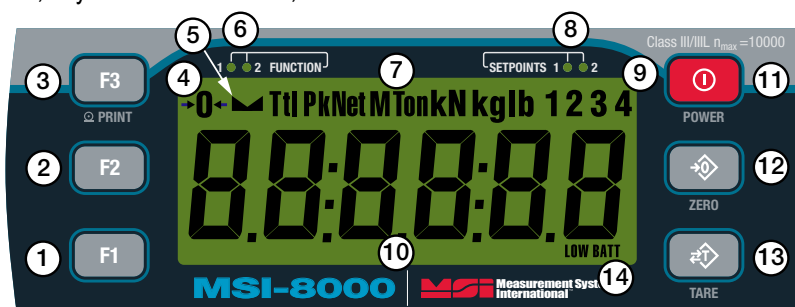


Figure 1-1. Front Panel

1.3.1 Key/Annunciator Functions

Item No.	Description
1	Function 1 Key – programmable to user selectable functions, see Table 4.2 on page 9 . Default is <i>Off</i> Functions as the Enter/Select key when in the setup menus
2	Function 2 Key – programmable to user selectable functions, see Table 4.2 on page 9 . Default is <i>Off</i> Functions as the Scroll key in the setup menus
3	Function 3 Key – 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 load has settled within the motion window (usually $\pm 1d$); scale/Dyna-Link will not zero, tare or totalize if set to OFF
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, a temporary display lasting less than 5 seconds
	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 – indicates the RF Linked Device is displaying in U.S. Short Tons (1 ton = 2000 lb); 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 – includes six 1.22" (31 mm) sunlight visible LCD's.
11	Power Key – powers the unit on and off. When the unit is in setup mode, it returns the display to the weigh mode without storing changes.
12	Zero Key – zeros the residual load on a scale/Dyna-Link. In setup mode, it stores changes and returns to the prior level.
13	Tare Key – removes current load value and puts the system into <i>Net</i> 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

1.4 System Configurations

The *MSI-8000HD* models and part numbers are listed below.

Part No	Description	Notes
Non RF Versions		
154853	MSI-8000HD-1, Final Assy Remote Display Battery	Common version, no RF
159381	MSI-8000HD-1, 18-72VDC Isolated, 2 Channel	Hi-V forklifts 24VDC-72VDC
RF Versions		
159376	Final Assy Remote Display 9-36VDC Isolated 8000HD	
159377	Final Assy Remote Display 18-72VDC Isolated 8000HD	
153591	Final Assy Remote Display AC Power 8000HD	
160476	MSI-8000HD-2, 7-36VDC	

Table 1-2. System Configurations

1.5 Options

Part No	Option	Description
154813	Rechargeable Lithium Polymer Battery	Provides up to 36 hours operation when fully charged
162178	Option kit, remote standard antenna	Remotes to the standard Antenna included in all RF 8000HD
139310	Antenna kit, corner reflector, 9dBi with 3m coax	Intended for directional wall or mast mounting (up to 2" Ø). Beamwidth: 75° Elevation, 65° Azimuth
139311	Antenna kit, corner reflector, 12dBi with 3m coax	Intended for directional wall or mast mounting (up to 2" Ø). Beamwidth: 50° Elevation, 36° Azimuth
139312	Antenna kit, YAGI, 15dBi with 3m coax	Highly directional wall or mast mounting (up to 2" Ø). Beamwidth: 30° Elevation, 34° Azimuth
139313	Antenna kit, vehicle mount, 5dBi with 5m coax	Omnidirectional; mounts in 3/4" hole
149549	8000 battery charger, US plug	—
149550	8000 universal battery charger, international plugs	Comes with plugs for US, Europe, UK, Aus, China
182223	8000 battery vehicle charger	Plugs into the 12VDC or 24VDC cigarette lighter outlet
155173	Option kit, tilt stand 8000HD	—
155193	Option kit, Ethernet (hard wired)	RJ-45 Cable (included)
155352	Option kit, custom relays and fuses	Allows other SSR options and combination of relays types; see Section 6.8.1 on page 31
158779	Option kit, 2 coil relays, 250VAC / 30VDC 4A	Includes 4m cable
158780	Option kit, 2 SS relays 60VPK 2.7A (AC OR DC)	Includes 4m cable
158781	Option kit, 2 SS relays 200VPK 0.4A (AC OR DC)	Includes 4m cable
--	Option Kit, Extended Relay	Allows for up to eight relays; see Section 6.8.2 on page 32
162406	Option kit, Wi-Fi 8000HD-1 802.11b	Uses top TNC connector for antenna
162407	Option kit, Wi-Fi 8000HD, 802.11b	Requires an external coax cable for externally mounted antenna. (included)
171203	Audible alarm	Not compatible with battery versions
--	Wireless computer interfaces USB, Serial RS-232, Serial RS-485 Ethernet Bridge, Wi-Fi Ethernet	Used to interface with remote scoreboard displays, networks or directly into a computer using USB.


Table 1-3. Available Options



2.0 Operation


This section covers the basic operation of the *MSI-8000HD*.

2.1 Power

Power the indicator On/Off by pressing .


2.2 Zero

Sets the zero reading of the scale/Dyna-Link 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 within the motion window for the zero function to work.



Note Consider the following when zeroing the scale:

- * 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/Dyna-Link must be stable within the motion window and  is lit before it will zero. The scale/Dyna-Link remembers the zero request for two seconds. If a motion clears in that time, it will zero.
- * The scale/Dyna-Link will accept a zero setting over the full range of the scale/Dyna-Link. Zero settings above 4% of full scale/Dyna-Link will subtract from the overall capacity of the scale/Dyna-Link.


Example:

If 100 lb is zeroed on a 1000 lb scale/Dyna-Link, the overall capacity of the scale/Dyna-Link 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/Dyna-Link.
2. Press . The weight display changes to 0 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 4% 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](#).

3.0 Installation

This section describes the installation of the *MSI-8000HD*.

3.1 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.

3.2 Getting Started

The *MSI-8000HD* is often shipped pre-configured with a compatible sensor unit such as an Dyna-Link 2 or one of the MSI crane scales. 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 6.3 on page 25](#).

Once the RF setup is complete for the *MSI-8000HD*, the system will automatically connect with a scale/Dyna-Link. It is recommended to do a site survey to identify operating range and usability of the RF Link. Position the scale/Dyna-Link 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.

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 3-1. Battery Charger

3.3 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.

3.4 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.

3.4.1 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.

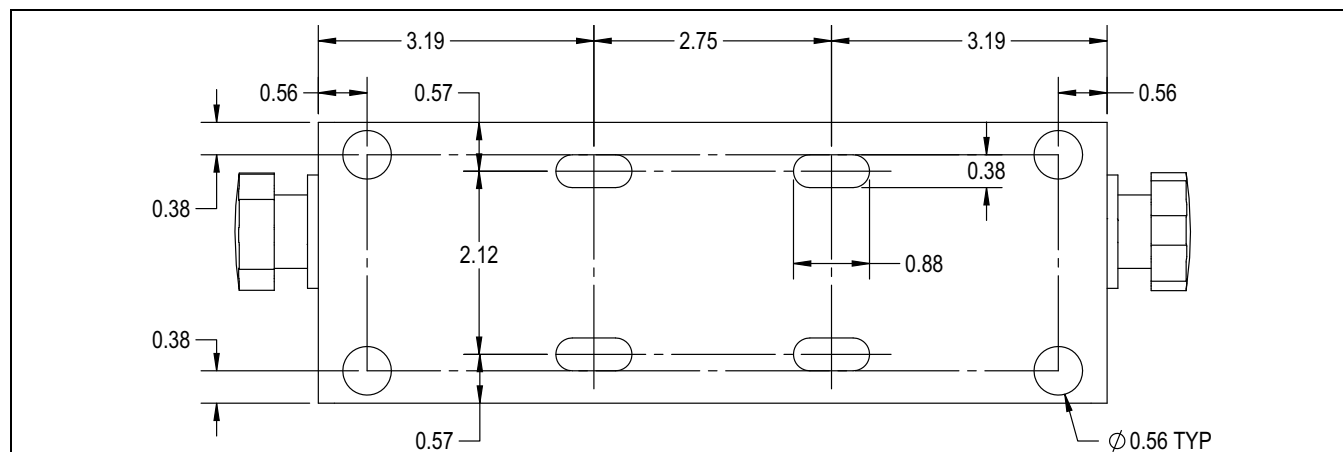


Figure 3-2. Tilt Stand - Bottom Dimensions

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.

3.4.2 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 3-3.
3. Drill the holes as needed.
4. Align the unit with the holes and secure with the appropriate hardware.

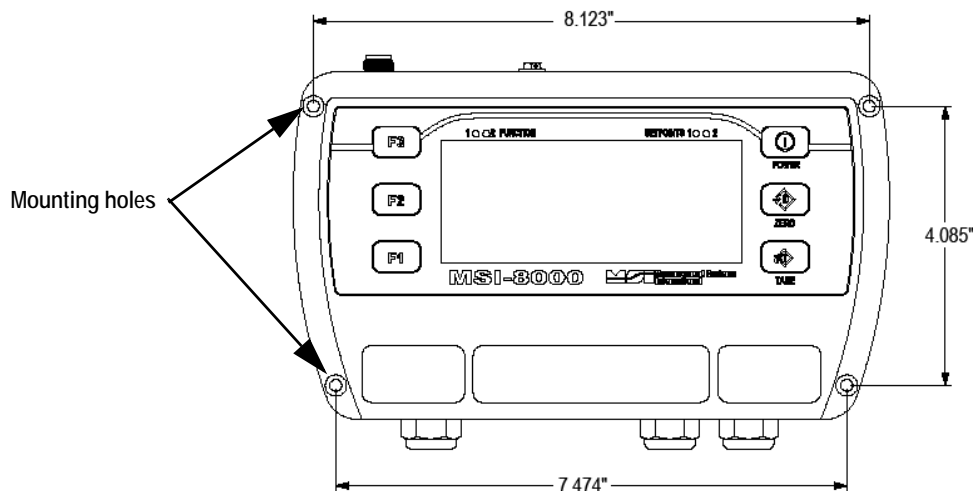









Figure 3-3. Mounting Hole Dimensions

4.0 Setup

The front panel keys work as shown below, when navigating through the menus during set up.

- 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.

4.1 Setup Menu

To enter the setup menu, press the  and  keys at the same time.

Parameters	Description
Func1 Func2	Function key 1 – Configurable to listed parameters, see Section 4.2 on page 9 ; Default OFF
	Function key 2 – Configurable to listed parameters, see Section 4.2 on page 9 ; Default OFF
	OFF – no function is assigned; key is disabled
	Test (TEST) – runs an LCD test; see Section 4.2.1 on page 9
	Total (TOTAL) – accumulates multiple weighments; see Section 4.2.2 on page 10
	View total (VIEW) – activates the total weight display followed by the number of samples; see Section 4.2.2 on page 10
	Net/Gross (NETGR) – toggles between Net and Gross modes, see Section 4.2.3 on page 10 .
	RF Remote Learn (LEARN) – used for programming the RF remote control
	Peak Hold (PHLD) – automatically updates the display when a higher peak weight reading is established see Section 4.2.4 on page 10 .
	2 Units (2UNITS) – switches the force units between lb and kg. see Section 4.2.5 on page 10 .
	5 Units (5UNITS) – scrolls through all available units: lb, kg, Tons (US Short), Metric Tons, and kiloNewtons see Section 4.2.5 on page 10 .
	High Resolution (HIGHRES) – the unit is more sensitive to motion and movement resulting in a less stable display see Section 4.2.6 on page 11 .
	Print (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 11 .
	Tare (TARE) – not used, <i>MSI-8000HD</i> has a dedicated tare key
	Scan (SCAN) – displays connected scan channels in order
Total Remote Devices (TOTALRD) – displays the summed weight of RF connected sensors; see Section 4.2.8 on page 11	
Auto Off	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; Settings: OFF, 15, 30, 45, 60; see Section 4.3 on page 11
Setpoint 1-8	Setpoints
	Greater Than (GREATER) – setpoint triggers when the tension exceeds the value
	Less Than (LESS) – setpoint triggers when the tension is less than the value
	Off (OFF) – the setpoint parameter is disabled

Table 4-1. Setup Menu Parameter Descriptions





Parameters	Description
OUTPUT	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	Battery Life – sets the options for standard or extended battery life; Settings: Standard, Long; see Section 4.6 on page 13
STANDARD	Standards – sets the industry standard to be used; Settings: INDU5, Hb-44, r-76, IUnit

Table 4-1. Setup Menu Parameter Descriptions (Continued)








4.2 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 Scale/Dyna-Link 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.

To set a function key use the following steps:

1. Press  and  at the same time, Func1 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.





4.2.1 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
- **50FE** followed by the version number
- **bALE** followed by the battery level in volts
- **d. tESE** followed by counting from 00000 to 99999

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 36](#) 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 set up, the F-Key assigned to *Total* will not work.
2. Program an F-key to Total. See [Section 4.2 on page 9](#).
3. Press Fx-Total to perform the total function that was set in [Section 4.8.2 on page 16](#).

4.2.3 Net/Gross

Program an F-key to NetGross. See [Section 4.2 on page 9](#).

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.

4.2.4 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/Dyna-Link 2.

- 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 9](#).
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 may occur 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 steps [Step 3](#) to [Step 6](#).

4.2.5 Units

Program an F-key to Unit. See [Section 4.2 on page 9](#).

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






4.2.6 Hi-Res

 **Note** Only available with the MSI-7300 Dyna-Link (refer to the Dyna-Link manual PN 152160)

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. See [Section 4.2 on page 9](#).

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.


4.2.7 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*. See [Section 6.2 on page 22](#) for more details on data output.


4.2.8 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).*

4.3 Auto-Off

The *Auto-Off* feature powers 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. This will save battery life, if battery option is being used.

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 . Func1 displays.
2. Press  to scroll to A-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.

4.4 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 *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 . Func1 displays.
2. Press  to scroll to the desired setpoint (STPT1 - 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 . Sn1-4 displays.
9. Press  to toggle between Sn1-4 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 digit is blinking. To correct a digit, press  to step back.

13. Press  to exit setup and store the settings.








4.5 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 . Func1 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.

4.6 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. Func1 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.



4.7 Standards

Industrial (INDUS)

The Industrial standard has full range zero, access to units switching, filters, and peak hold. This is the most common setting for the *MSI-8000HD*.

Handbook 44 (Hb-44)

This setting 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 (R-76)








Sets the scale to enable only approved features per OIML R-76. Only kg weight units are available and 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 (UNIT)

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.

Standards Setup

Use the following steps to set up standard settings.

1. Press  and  simultaneously. Func1 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. Func1 displays.
6. Press  to save and exit to weighing mode.

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

4.8 Remote Display 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	Description
Filter	Weight Filter – allows the scale to adjust to situations where there may be movement ; Settings: OFF, LO, Hi -1, Hi -2 see Section on page 16 ; Hi-2 – MSI-7300 only
Total	Total Accumulation sets the choice for weight accumulation for a single scale; OFF = disabled; see Section 4.2.2 on page 10 ;
	Total On (Total On) - a manual choice for accumulation; see Section 4.2.2 on page 10 .
	Auto Total - choices for setting automatic accumulations; Settings: R. Load, R. Last, H. High
Setpoint	Greater Than (Greater) – setpoint triggers when the tension exceeds the value; see Section 4.4 on page 12
	Less Than (Less) – setpoint triggers when the tension is less than the value; see Section 4.4 on page 12
	Off (OFF) - the setpoint parameter is disabled; see Section 4.4 on page 12
Battery	Battery Life – sets the options for standard or extended battery life; Settings: Standard, Long; see Section 4.6 on page 13

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

4.8.1 Filter Setup

Filter settings are used to stabilize the weight in an unstable condition. Increasing the filter will improve the stability, but settling times will be longer.

Use the following steps to set up filtering.

1. Press  and  simultaneously. Func1 displays.
2. Press  to scroll to Filter.
3. Press . The currently saved filter 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 (**⏪⏩⏪**) 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. See [Section 4.2 on page 9](#).
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.



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*. See [Section 4.2 on page 9](#).

Setpoint	Description
R. L _o R _d	Auto Load – ensures settled load above the Rise Above threshold is automatically totaled; scale must fall below the Drop Below threshold before the next total is allowed
R. L _A S _t	Auto Last – takes the last settled weight to auto total with; total occurs only once the scale goes below the threshold; 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. H _i G _H	Auto High – uses the highest settled reading; useful for loads that can't be removed all at once

Table 4-4. Auto Load Selections

Set Total Mode

1. Press **F1** and **POWER** simultaneously. **F_Unc 1** will display.
2. Press **F2** to scroll to **⏪⏩⏪**.
3. Press **F1**. The currently saved total mode is displayed.
4. Press **F2** to scroll through the choices.
5. With choice displayed, press **F1** to select. **F_Unc** 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 **ZERO**.



5.0 Calibration

The *MSI-8000HD* remote display can be used for calibrating MSI ScaleCore-based crane scales and dynamometers, including MSI-3460 Challenger 3, MSI-4260 Port-A-Weigh or MSI-7300 Dyna-Link 2.

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/dynalink can be calibrated using a constant calibration (C-Cal.) See [Section 5.2.2](#).

5.1 Calibration Switch

To calibrate a scale that is in NTEP mode, the calibration switch must be pressed to put it in the calibration mode.

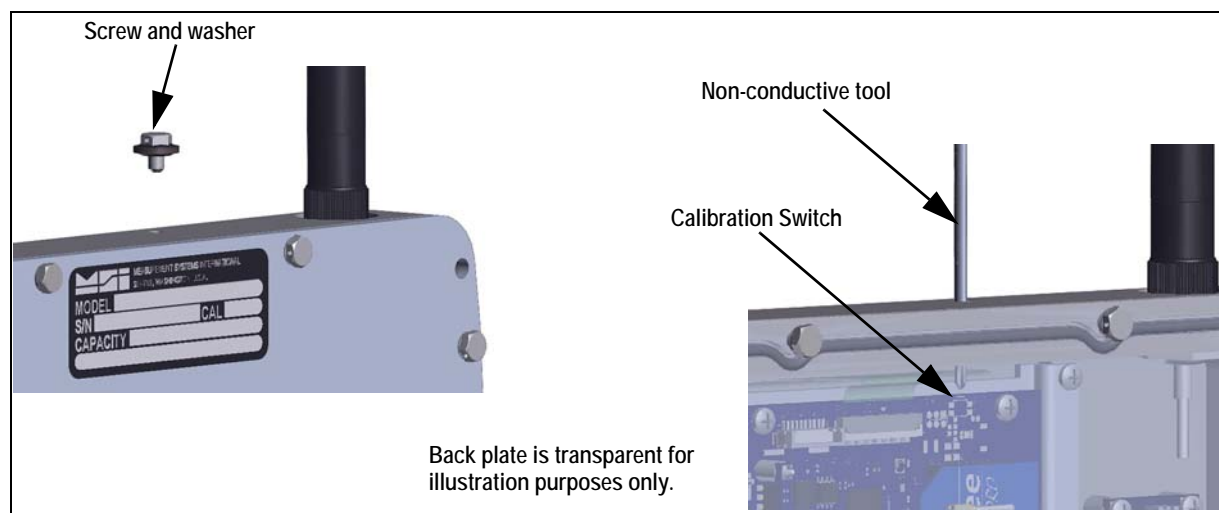


Figure 5-1. Press Configuration Switch

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 NTEP.

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. CAL 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. Cap 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. UnLd displays.
14. Proceed with the routine calibration, starting with [Step 2](#) of [Section 5.2.1](#).

5.2.1 Routine Calibration

For maintenance and routine calibration use the following steps.

1. Press the configuration switch. CAL is displayed.
2. Press , UnLd displays.
3. Remove all weight from the scale.
4. Press ,  flashes.
5. Press , Pass displays momentarily, then Load1 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 Load2 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 3](#) through [Step 10](#), up to four loads.














15. When all loads are complete, press  to store the calibrations. CaL'd displays.
16. Press  to view the cal number. C-CaL flashes momentarily followed by the C-CaL number, record the value, this number will be required if calibrating with C-CaL, see [Section 5.2.2](#).
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 preformed with test weights, a new C-Cal is generated.

The C-Cal number must be known prior to starting this procedure. Rice Lake prints this number on the serial number label. 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 is displayed.
4. Remove all weight from the scale.
5. Press  ,  flashes and Pass will display momentarily. Then C-CaL is displayed.
6. Press  , the last known C-CaL is displayed.
7. To except the number displayed press  . Skip to Step 10. To enter a different C-CaL continue with next step.
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.
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  and  simultaneously. 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 [Section 4.7 on page 14](#) for details of the standards.
6. When desired option is displayed press . Auto0 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.

5.4 Reset the Load Cell Calibration

To 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. Press and hold the calibration switch, then press . rESEt flashes.
3. Press , SurE flashes.
4. Press  to reset the calibration for current load cell. CaL displays.
5. Proceed with the Initial Calibration, Section 5.2.

IMPORTANT

Pressing  resets all indicator settings to the original factory settings.



Note

Press the  to cancel reset and return to the previous menu.



6.0 Communications Setup

The *MSI-8000HD* uses 802.15.4 transceivers to communicate.

802.15.4 operates in the 2.4GHz systems if:

- Antennas are isolated at least 10' (3 m) from the equipment.
- *MSI-8000HD* based RF systems are peer to peer. For multiple scale connections, the *MSI-8000HD* acts as the network coordinator.

The *MSI-8000HD* uses three numbers to establish a piconet. A piconet is a network that is created using a wireless RF connection. [Table 6-1](#) lists out the three elements used in setting up a piconet. The *MSI-8000HD* ID is recommended to be in the range of 20-30.

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

6.1 Communications Menu

To enter the Communications menu, press  and  at the same time. *Busy* flashes prior to entering the menu.

Parameters	Description
<i>Print</i>	Print – prints a ticket if connected to a printer
<i>RF</i>	Radio Frequency – see Table 6-9 on page 25
<i>CF.net</i>	Total number of Remote Sensor Devices (<i>RFID</i>) – Range 1-4 (Default = 1) Total Remote Displays (<i>TELD</i>) <i>RLL</i> – sum of all remote devices <i>Pris</i> – sum in pairs (requires four remotes) <i>both</i> – sum in pairs plus grand total <i>usedEF</i> – programmed using a computer program such as Scope <i>off</i> – summing is disabled
<i>Scale</i>	List ID (<i>ListID</i>) ScaleCore ID (<i>ScaleID</i>) – number must match remote device ID Sensor ID (<i>SensorID</i>)

Table 6-2. Communications Menu Parameters

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	↵	CR-LF

Table 6-3. Print Strings



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

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 6-4. Transmission Strength Settings

6.2 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 6.2.1](#).

The communications port settings are independent of any print settings in connected scales. They reside only in the *MSI-8000HD*.

Choices	Description
LSERR	Print setup – select the channel the port will be used with; Settings: 0, 1, 2
OUTPUT	Port selection. Select the port to use for communication with the printer; Settings: Port 0, rF, Port 2
STRING	String Setup – print string format number entry screen; see Table 6-3
CONTROL	Print Control Options: USER, LOAD, CONT, OFF; see Table 6-6
RATE	Output Rate – print string output rate number entry screen (0-65536 seconds)

Table 6-5. Print Setup Parameters

6.2.1 Control Modes

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


Mode	Description
USER	Printing is controlled by pressing 
LOAD	One print occurs when a stable load is read, the scale must return to near zero before another print occurs NOTE: Other configurations of load are available using the ScaleCore Connect. It can be downloaded from the Rice Lake Website
CONTINUOUS	Continuously outputs the data at a rate specified in the rate parameter (up to 65,535 seconds); setting to 0 sets interval as fast as system can go
OFF	Printing is disabled – power consumption is lower with the print off

Table 6-6. Control Modes



6.2.2 Standard Print Strings

This section includes commands to format gross, net and print strings.

Command	Description
<T>	Load data
<U>	Units
<M>	Load mode (lb/kg)
<CRLF>	Carriage return line feed
<SP>	Space

Table 6-7. Standard Print Strings

1	Current load	Fixed output length: 16. Leading zeros suppressed except for the least significant digit (LSD) <TTTTTT><SP><UU><SP><MMMM><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	Current Weight Mode	Net, Gross, Peak, etc <SP><MMMM><CRLF>
8/9	Carriage Return/ Line Feed	Used to add a space between print records <CRLF>

Table 6-8. 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.

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

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.





6.2.3 Printer Output Setup

Use the following steps to set up the printer output.

1. Press  and  at the same time. Print displays.
2. Press . Listnr displays.
3. Press  to scroll to StrnG.
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. Cntrl 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 . Listnr 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. strnG displays.
19. Press  three times to exit, StorE displays briefly, then the unit returns to weigh mode.



6.3 RF Setup

Allows the setup of the Radio Frequency.

Mode	Description
On. OFF	Enable RF – On/Off, affects continuous mode only
Sc id	ScaleCore ID – range 0-254, (20-30)
Chnl	RF Channel – Range 12-23
net id	Network ID – Range 0-65535
Stren	Transmission Strength – Range 0-4; See Table 6-4
TYPE	Allows the selection of radio card that is being used; cards other than XBee is the other selection; Other, ZBEE
Hold	Allows user to power on the device via rugged remote; set to On , the radio continues to use power; uses the battery power faster Default = OFF

Table 6-9. RF Setup Parameters



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

1. Press **F1** and **F3** at the same time, Print displays.
2. Use the **F2** to scroll to RF.
3. Press **F1**. On.Off displays.
4. Press **F1**. The currently saved parameter is displayed.
5. Press **F2** to toggle between on and off.
6. With On displayed, press **F1** to select. Off is only used when the 8000 is hardwired to a Dyna-Link. Scid displays.
7. Press **F1**. The current ScaleCore ID displays.
8. Press **F2** to scroll through numbers and **F1** to save the selected numbers.
9. When number is correct, press **F1** to store the number. Chnl displays.
10. Press **F1**. The current channel setting displays.
11. Press **F2** to scroll through numbers and **F1** to save the selected numbers.
12. When number is correct, press **F1** to store the number. netid displays.
13. Press **F1**. The current Network ID displays.
14. Press **F2** to scroll through numbers and **F1** 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 **F1** to store the number. stren displays.

16. Press **F1**. The current Strength setting displays.
17. Press **F2** to scroll through 0-4.
18. When the number is correct, press **F1**. type is displayed.
19. Press **F1**. The current type displays.
20. Press **F2** to scroll through values.
21. With selected value displayed, press **F1**. Hold displays.
22. Press **F1**. The current setting displays.
23. Press **F2** to toggle between on and off.
24. When the selection is correct, press **F1** to store the number. On.Off displays.
25. Press  to save and exit the RF menu.
26. Press  to exit to the communication menu.

6.4 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.

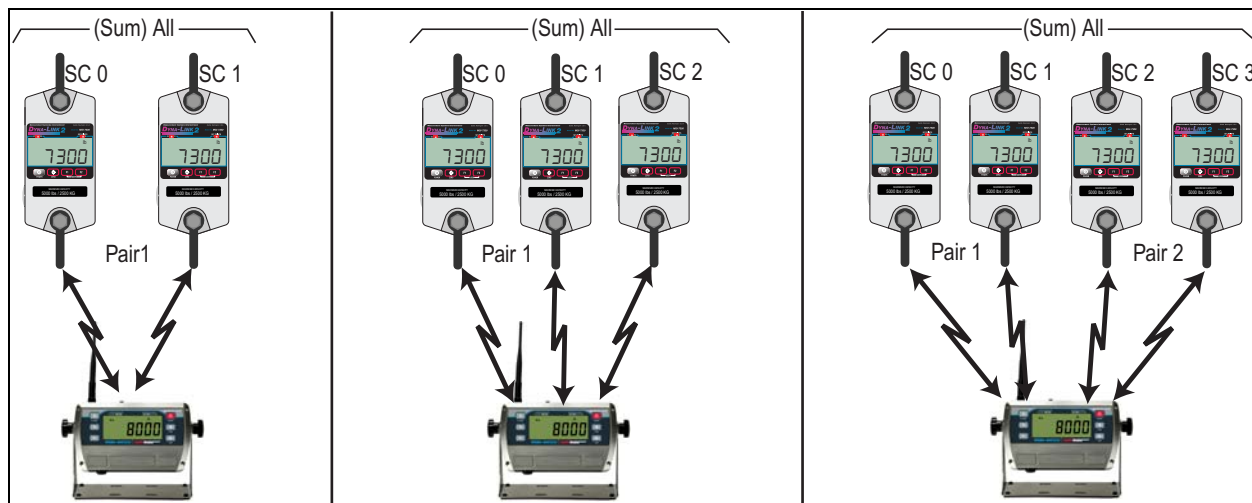

















Figure 6-1. Multiple Sensor Network

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

6.4.1 Set the Total Number of Load Cells

1. Press  and  at the same time. *Pr int* is displayed.
2. Press  to scroll to *cF. nEt*.
3. Press  *tno. rd* is displayed.
4. Press . The total number of remote devices is displayed.
5. Press  to scroll through numbers and  to save the selected numbers.
6. When correct number of remote displays attached (1-4) is displayed, press . See [Section 4.2.8](#). This number does not include the *MSI-8000HD* or any modems. *tEt. rd* displays.
7. Press . The load totaling setting displays.
8. Press  to scroll through numbers and  to save the selected numbers.
9. Press . *tnord* displays.
10. Press  twice to exit to the weighing mode.

6.4.2 Scan Weight Inputs

1. Program F1 to the *Scan* function, and F2 to the *tEt. rd* function for summed sensor readings. See [Section 6.4.3](#).
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).

6.4.3 Load Totaling Settings

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

All

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



If the sum is the only thing to be observed, disable the Scan function key using the function key setup menu ([Section 4.2 on page 9](#)).

Pairs

Used with four sensor systems, scrolling through the channels with *FH-tEt. rd*, they will be presented as separate weights first and then as pairs. This display is preceded 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 *FH-tEt. rd* scrolls through the summed combinations. First *PA ir 1*, then *PA ir 2* then the sum of all connected sensors is displayed.












Off

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

1. Program an F-key to the **ttl.rd** function. See [Section 4.2 on page 9](#). The current channel is displayed.
2. Press **FH-ttl.rd**. **Ad. ALL** is displayed briefly, then the summed total.
3. Continue pressing **Fx-ttl.rd** to view all enabled sum types.



6.5 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 **ScanL5**.
3. Press . **LC id** displays.
4. Press . Current **LC id** 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).
6. Press  to store the number. **Sc id** displays.
7. Press . The scale ID must match the ID of the LC/Sensor being connected to.
8. Press  to store the number. **sn.id** displays.
9. Press . The sensor number is used to select a LC connect to the Scale being addressed in **LC id**.
10. Press  to store the number. **LC id** displays.
11. Press  twice to exit to the weighing mode.

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

6.6 Zero and Tare in Multiple Load Cell Systems

The channel that is displayed is considered the *Focus Channel*. Pressing  or  will only affect the displayed channel. When displaying summed channels, ZERO 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.*

6.7 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.

Connector: M12 industrial IP67 rated. An adapter cable (PN 150964) 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: Programmable for 300 to 230.4 k baud in 8 steps. The bootloader for updating software is always 38.4 k baud

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

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

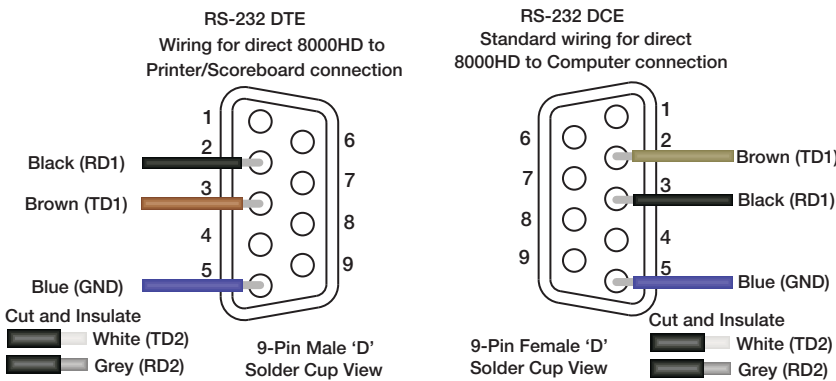
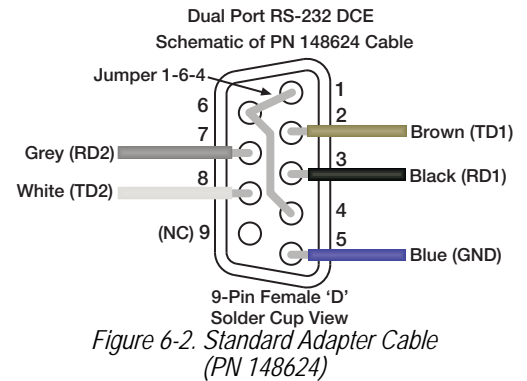


Figure 6-3. Communications Port 1 Wiring

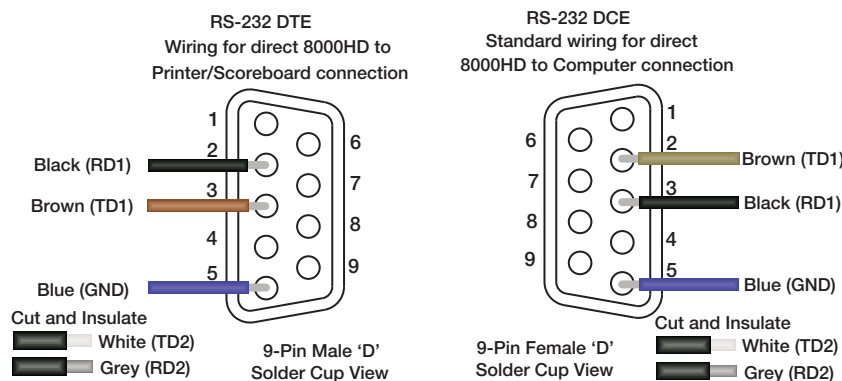


Figure 6-4. Communications Port 2 Wiring

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

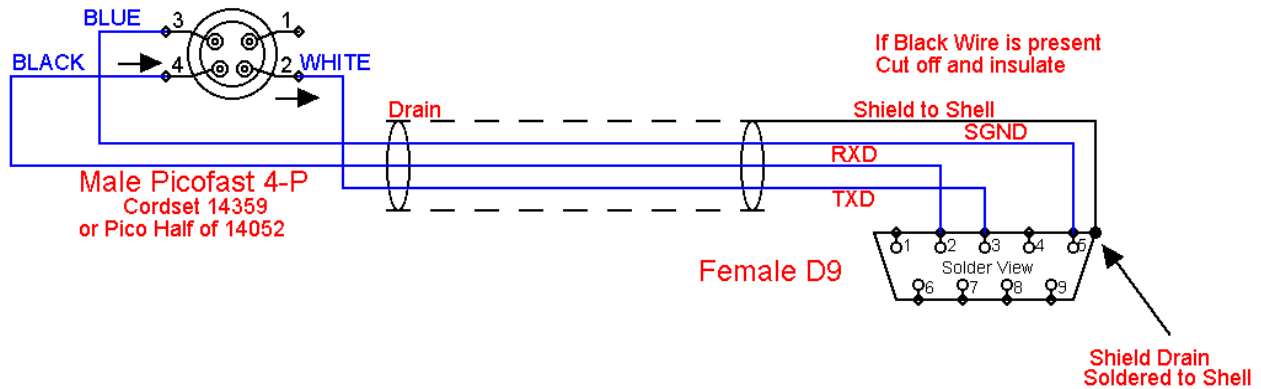


Figure 6-5. DCE Configuration for Computer Connection

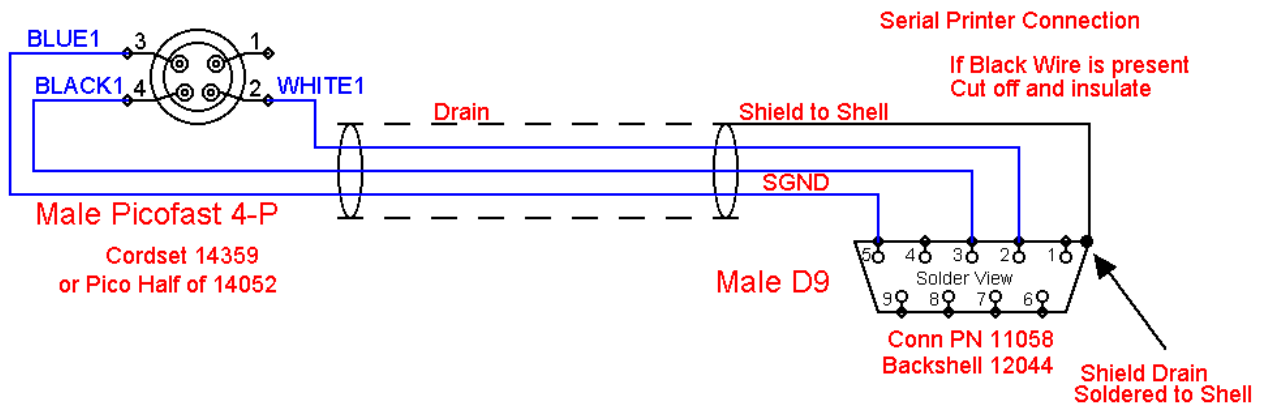


Figure 6-6. DTE Configuration for Direct Connection to a DCE Printer

6.8 Relays

The *MSI-8000HD* 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 the table below.

Part No.	Description
144440	PVC 4 m, rated to 250 VRMS, 4 A
	PVC 10 m, rated to 250 VRMS, 4 A
Alternately use 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

6.8.1 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 @ 5 A. (limited by connector/cordset rating to 5 A continuous) DC Rating: 5 A @ 30 VDC, 0.5 A @ 100 VDC Best choice for 90% of applications.
AC/DC SSR (solid state relay) - 60V	<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><i>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.</i></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><i>NOTE: Requires a minor modification on the Relay board and can only be ordered by contacting Rice Lake Weighing Systems. See Figure 6.8.2 on page 32.</i></p>

Table 6-11. Relay Options

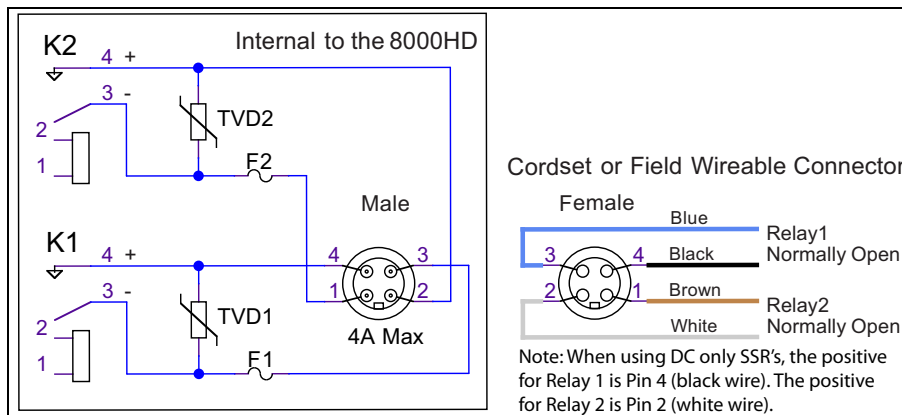


Figure 6-7. One 1 Form B closed SSR

6.8.2 Extended Relay Kit – Optional

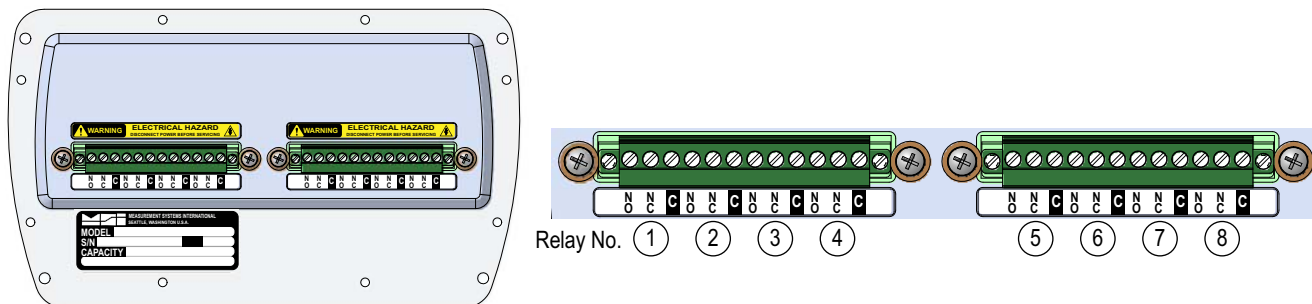


Figure 6-8. Extended Relay Kit:

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

Table 6-12. Expanded Relay Option Kits

6.9 FCC Statement

Contains FCC ID: MCQ-PS2CTH

The *MSI-8000HD* 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.

6.10 International RF Certifications

Canada Radio Certificate Number: IC 1846A-PS2CTH

Australia & New Zealand: DIGI-090F15C247

Contact Rice Lake Weighing Systems for further information on international certifications.

6.11 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.



6.11.1 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.



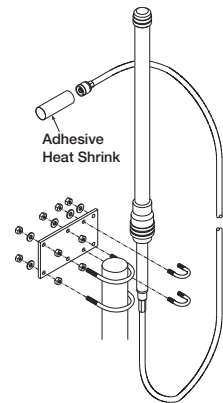
6.11.2 Long Range OMNI 9 dBi Antenna

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.



6.11.3 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.



6.11.4 YAGI Antenna

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



6.11.5 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.



14 dBi Corner Reflector



9 dBi Corner Reflector

6.11.6 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.

7.0 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 (Battery option only)
	Defective battery	Replace the battery (factory replacement only) (Battery option 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	Re-zero the scale
	Too much tension/load has been zeroed	Re-zero 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 <i>Error</i> and <i>Load</i>	Load exceeds capacity	Reduce tension immediately
	Faulty load cell or wiring	Check load cell and load cell wiring
The 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 scale/Dyna-Link and RF Remote Display does not match	Units are not paired	See Section 6.3 on page 25
<i>Lo Batt</i> is blinking	The battery is low	Recharge the battery (Battery option only)
The unit turns on, then immediately off	The battery is low	Recharge the battery (Battery option only)
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 the tension or use Tare instead
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 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
The manual total does not work	A function key is not set to <i>total</i>	Set up Func1 or Func2 for <i>total</i>
	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 auto total to work; weight must drop below 0.5% of capacity for additional weighments to register

Table 7-1. Troubleshooting

7.2 Error Codes

The ScaleCore Processor in the *MSI-8000HD RF Remote Display* 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	The load/weight exceeds set capacity +9d, or load cell is damaged or disconnected.
 Error  UndLd	Underloaded	The load/weight is more than 20 percent negative, or load cell is damaged or disconnected.

Table 7-2. Error Codes

7.3 Service Counters



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.

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 $\text{E}5\text{E}$. See Section 4.2 on page 9.
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.
 - C-Cal and its value is displayed.
 - The unit returns to the weighing mode.



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 www.ricelake.com and is included on the CD shipped with the *MSI-8000HD*.



7.4 Mechanical Dimensions

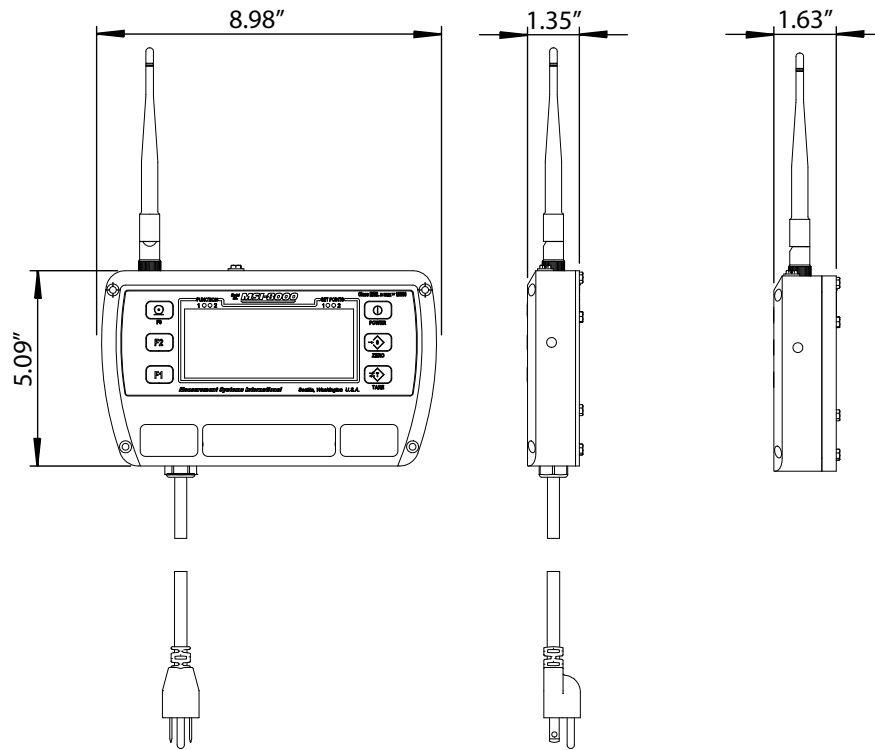


Figure 7-1. MSI-8000HD Dimensions

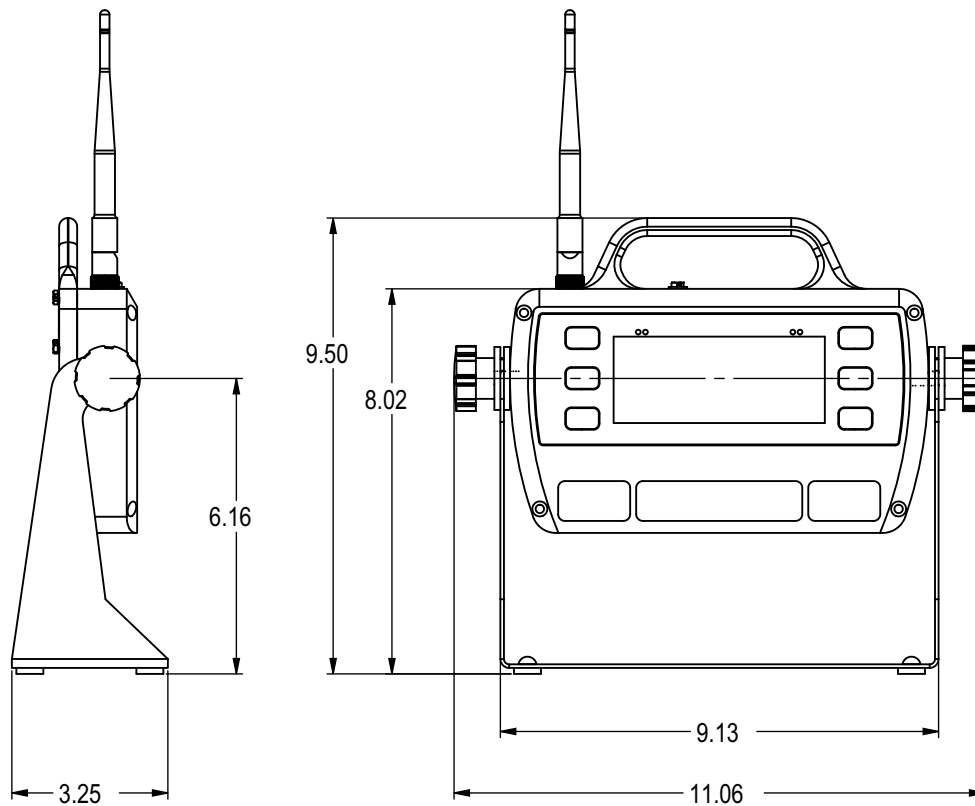


Figure 7-2. MSI-8000HD Dimensions with Tilt Stand

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 {ffff09=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 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



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.

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

Completed

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

MSI-8000 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

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
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
```

32b CRC must match (76F481D8 is an example only)



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 SCALECORE2 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-8000HD* should start.

7.6 Reset the Remote Control

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


1. Press the calibration switch and  simultaneously. Sure? displays.
2. Press  to reset the current indicator settings to the default factory settings. CaL will display.
3. An initial calibration will need to be performed on the current load cell. See [Section 5.2 on page 17](#).

IMPORTANT

Pressing  will reset only the current load cell calibration settings. See [Section 5.4 on page 20](#).



Note

Press the  to cancel reset and return to the previous menu.



8.0 Specifications

Enclosure	NEMA Type 4, IP68 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 1.0" (25 mm) LCD
Units Displayed	Pounds, kilograms, tons, metric tons, kilonewtons
Annunciators	Stable, COZ, peak, kg, kN, lb, M, ton, setpoint, function LEDs. Channels: 1, 2, 3, 4, TTL
Power	Legal: 90-264 VAC, 9-36 VDC Industrial: 90-267 VAC, 9-36 VDC, 18-72 VDC, 120-300 VDC
Operating Temp.	Legal: 14° F to 104° F (-10°C to 40°C) Industrial: -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 cell inputs
Excitation	8V current limited and over-voltage protected
Filtering	Off, Low, Hi-1, Hi-2
RF Radio Link	2.4GHz 802.15.4
RF Effective Range	Typically 100 or more feet (33m)
Data I/O	Dual RS-232 comm ports
Warranty	One-year limited

Approvals



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





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