



# The Overhead Weighing Solutions Buyer's Guide

Information to help you choose a system for your overhead weighing needs



**RICE LAKE**<sup>®</sup>  
WEIGHING SYSTEMS

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# Introduction

Rice Lake Weighing Systems' Measurement Systems International (MSI) brand of overhead weighing systems offers a comprehensive selection of quality weighing devices from tension dynamometers to crane scales.

MSI's tension dynamometer and selection of crane scales make durable and dependable solutions for a wide range of capacities and applications. Whether you need custom overload protection, a simple load monitoring device or a Legal for Trade system, MSI has a product to fit your unique requirements. Master challenging and high-temperature environments using proven load-sensing systems designed with a minimum of 5:1 Ultimate Safety Factor. From fishing and marine scale applications to heavy capacity coil handling, MSI overhead weighing equipment has a place in virtually every environment.

## Overhead Weighing Systems Complement Every Industry

- Aviation/Helicopter Load Monitoring
- Port and Freight Terminals
- Construction
- Concrete Production
- Mining Facilities
- Steel Mills and Foundries
- Waste Management
- Chemical Processing
- Fishing Industry
- Energy Production
- Material Handling





MSI-4260M

MSI-3460  
Challenger 3

## Crane Scales

Crane scales ensure safety and deliver accurate load measurements in many applications. When used properly, crane scales can help prevent unsafe conditions by providing real-time measurement of the operational load and immediate feedback to operators and safety systems.

### MSI-3460 Challenger 3

The MSI-3460 offers long-range viewing with a 1.5-inch, ultra-bright LED digital display. The MSI-3460 is suitable for light- to medium-duty applications up to 15,000 pounds.

### MSI-4260 Port-A-Weigh

The MSI-4260 is built for heavy-duty dynamic weighing, ideal in bridge crane, foundry and in-process material handling applications.

### MSI-4260 IS Intrinsically Safe Port-A-Weigh

The MSI-4260 IS is intrinsically safe, featuring a 5:1 safety factor and exceeding OSHA, ANSI and ASME safety requirements.

### MSI-4260M

The MSI-4260M is the most robust scale on the market for marine and industrial weighing, able to capture weight with  $\pm 0.1\%$  accuracy and a resolution between 3,000 and 5,000 divisions.



MSI-9300  
Port-A-Weigh Plus  
CellScale RF

MSI-9300HT Hi-Torque  
Port-A-Weigh Plus  
CellScale RF

### MSI-4300 Port-A-Weigh Plus

The MSI-4300 is ideal for medium- to heavy-capacity industrial applications as well as fishing and marine scale applications requiring a large LCD display.

### MSI-6260CS Trans-Weigh CellScale™ RF

The MSI-6260CS is ideal for medium- to heavy-capacity and duty-cycle applications not requiring an integral display.

### MSI-9300 Port-A-Weigh Plus CellScale RF

The MSI-9300 uses advanced RF communication technology for complex medium- to heavy-capacity and duty-cycle applications.

### MSI-9300HT Hi-Torque Port-A-Weigh Plus CellScale RF

The MSI-9300HT is designed with a high torque load train for fixed hook applications. Available in capacities up to 60 tons.



MSI-6260CS  
Trans-Weigh  
CellScale RF



# Tension Dynamometers

Tension dynamometers, or simply dynamometers, can be used to measure either vertical or horizontal tension. Rugged but lightweight, dynamometers are ideal for measuring tension in rigging, load tests, crane and elevator certification, and other straight-line lifting applications.

## MSI-7300 Dyna-Link 2

The MSI-7300 is the industry's most advanced digital tension dynamometer. Constructed of high-grade, aircraft-quality aluminum with an anodized finish and gasket sealing, the Dyna-Link 2 is built to address caught-load or slack-line issues that may cause unsafe conditions.

## MSI Dyna-Clamp Tension Meter

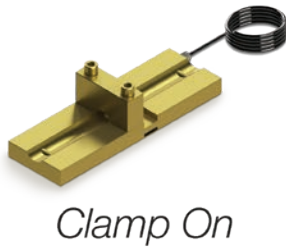
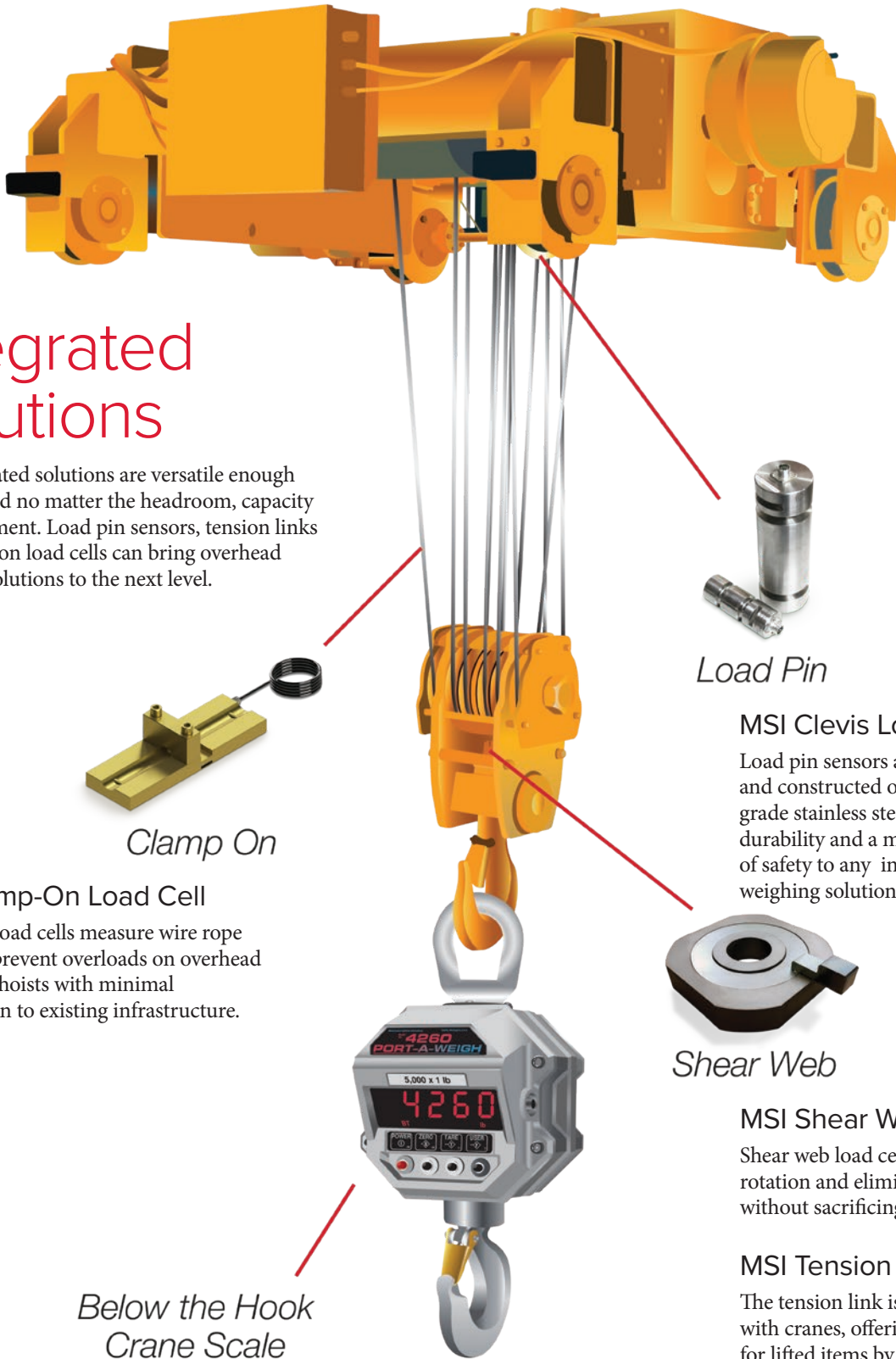
The MSI Dyna-Clamp clamp-on tension meter is safe and easy to use, with a site window ensuring accurate placement of the wire rope being tested by the operator. Unlike other clamp-on tension meters, the Dyna-Clamp is designed with an easy-turn power screw that doesn't require as much manual force to engage the wire rope the operator is testing.



MSI Dyna-Clamp Tension Meter

# Integrated Solutions

MSI integrated solutions are versatile enough to be applied no matter the headroom, capacity or environment. Load pin sensors, tension links and clamp-on load cells can bring overhead weighing solutions to the next level.



*Clamp On*

## MSI Clamp-On Load Cell

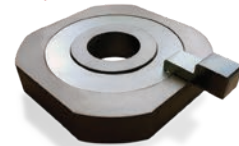
Clamp-on load cells measure wire rope tension to prevent overloads on overhead cranes and hoists with minimal modification to existing infrastructure.



*Load Pin*

## MSI Clevis Load Pin Sensors

Load pin sensors are custom-designed and constructed of strictly industrial-grade stainless steel, providing extreme durability and a minimum 5:1 factor of safety to any integrated overhead weighing solution.



*Shear Web*

## MSI Shear Web Load Cell

Shear web load cells compensate for hook rotation and eliminate headroom loss without sacrificing accuracy.

*Below the Hook  
Crane Scale*



## MSI Tension Link

The tension link is suited for integration with cranes, offering force measurement for lifted items by measuring at the dead-end becket.

## Low Headroom Option

The Low headroom option integrates a below the hook crane scale directly into the bottom block by replacing the existing hook.



## Indicators and Remote Displays

Indicators communicate weight data and increase process control. Remote displays allow operators to use weighing systems from a distance, promoting safety and efficiency.

### MSI-8000 RF Remote Display

The MSI-8000 is a full-featured handheld remote display enabling users to operate weighing systems from a distance—and out of harm's way.

### MSI-8000HD Indicator/RF Remote Display

The MSI-8000HD's full waterproof construction resists harm from the elements, making it an especially resilient indicator.



*MSI-8000 RF  
Remote Display*





### MSI-8004HD Indicator/RF LED Remote Display

With the option to view the display in either red or green LEDs, the MSI-8004HD provides longer viewing distances for more diverse environments and applications.

### MSI-9750A CellScale RF Portable Indicator

The MSI-9750A functions as a simple, easy-to-use, full-featured portable RF terminal when networked with other CellScale family products.



*MSI-9750A CellScale RF Portable Indicator*



## Indicators and Remote Displays

### 1280 Enterprise™ Series Indicator

The 1280 Enterprise Series with color touchscreen, web server view and multiple protocol types delivers uncompromising speed in any overhead weighing environment.

*SCT-2200 Advanced Series Signal Conditioning Weight Transmitter*

### SCT-2200 Advanced Series Signal Conditioning Weight Transmitter

For PLC systems that require weight data from a scale, Rice Lake's compact SCT transmitters deliver equivalent signal-conditioning function without the cost or bulk of a full-sized weight indicator or controller.



*MSI-9850 CellScale RF Digital Indicator*

### MSI-9850 CellScale RF Digital Indicator

The MSI-9850 serves as a wireless remote controller and weight indicator, providing remote access to multiple scales and sensors in a configured CellScale network.

# Wireless Network Solutions

From the initial weighing on the scale to the final numeric value on the indicator, efficient communication is key to the success of the entire overhead weighing process. Wireless transmitters and receivers easily communicate data between various electronics in your scale system.

## TranSend™ Wireless Load Cell Interface

TranSend is a wireless load cell interface that transforms load cell signal and transmits the data wirelessly to a receiving unit.

## MSI-9000 CellScale Wireless Weighing Solution

The MSI-9000 is an innovative, technologically advanced product for wireless weighing in industrial plant applications.

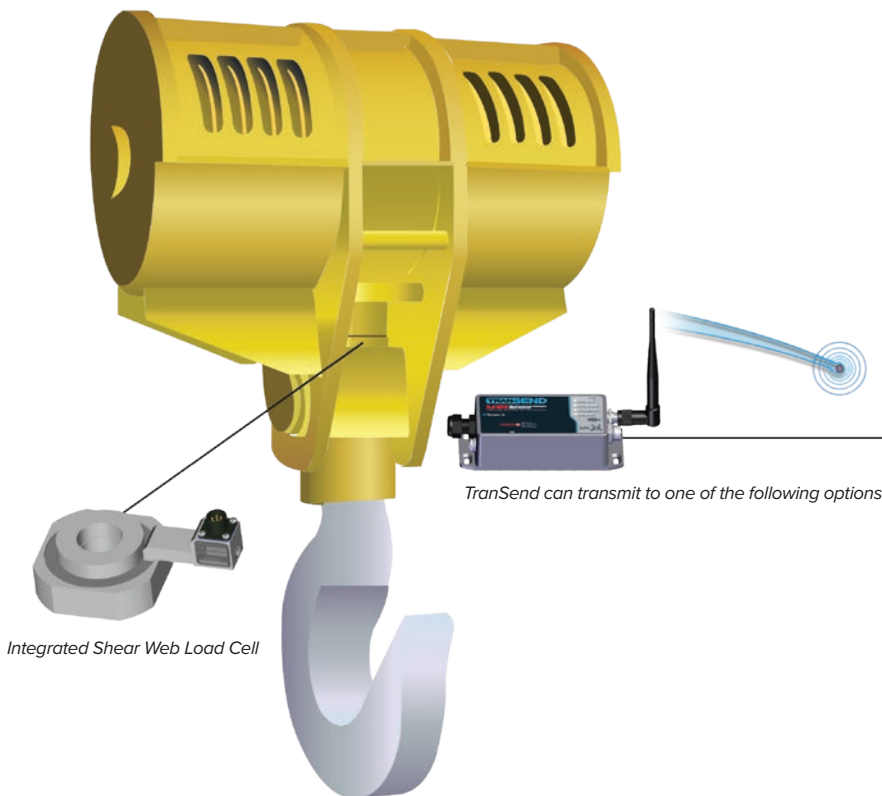
## MSI-9020 CellModem

The MSI-9020 provides a wireless interface from a CellScale product to any serial device with support for computers, remote displays, printers, PLCs and virtually any serial connected device.



MSI-9000 CellScale  
Wireless Weighing Solution

TranSend Wireless Load Cell Interface



MSI-8000HD Remote

MSI-8004HD Remote

MSI-8000  
Handheld Remote

LaserLight2  
Remote Display

TranSend can transmit to one of the following options

Integrated Shear Web Load Cell



## Before You Buy

Crane scales measure real-time operational loads and provide immediate feedback to operators to prevent unsafe conditions. Determine the best crane scale for your application by exploring your overhead weighing goals and analyzing aspects of your environment.

### Overhead Weighing Goals

- Load monitoring prevents crane accidents, ensures compliance, maintains employee safety and protects equipment. Scales should meet OSHA, ANSI, ASME and other safety design standards (5:1 ultimate safety factor). Accuracy is 1-3% full scale.
- Process control helps meet the requirements of in-process crane scales, which include accurate weighments, real-time information and integration with manufacturing data acquisition systems. Accuracy is 0.1% full scale.
- Data integration systems increase informational exactness and control, stream data from the weighing system to a customer's database program and help reduce human error.

### RF and Signal Processing Solutions

Add traceability and transparency to your processes. With several methods of radio frequency (RF) technology, wireless communication products can be easily integrated with almost any industry or environment.

Whether used in shipping, material handling, foundries, shipyards, construction or freight applications, Rice Lake's MSI brand of trusted overhead weighing solutions assists in creating safe and efficient operations.

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## Crane Weighing Solutions

Common overhead weighing equipment includes below-the-hook crane scales, integrated scales, integrated sensors and RF and signal processors. From bridge cranes to gantry and tower cranes, rugged, reliable overhead weighing solutions are available for many different applications.

Below are common types of cranes and their ideal weighing systems:

### Monorail Hoist

The most commonly used hoist is the monorail hoist, which uses a chain hoist or block with wire rope or cable and has a one- to 10-ton capacity. Due to their high capacity and versatility, monorail hoists are often used in industrial facilities.

Recommended scale: MSI-3460

### Jib Crane

A jib crane is designed with a horizontal member supporting a moveable hoist and is commonly used in workstation applications and machine shops. It is also useful in production and shipping where there may be a need to weigh smaller machine parts during or after production to check weight for shipment.

Recommended scale: MSI-3460

### Bridge Crane

In a one- to 100-ton bridge crane, the trolley moves laterally while the bridge moves longitudinally. In turn, this offers a wide range of motion, integrates easily into existing applications and boosts efficiency.

Recommended scales: MSI-4260, MSI-4300, MSI-9300, MSI-6260CS

### Rail Mounted or Rubber Tire Gantry

The rail mounted or rubber tire gantry moves similarly to a bridge crane and is frequently found in factory applications such as steel yards, paper mills and other heavy industrial facilities. They are common on rails or tires, as well as in heavy capacity weighing industries where capacities can range from one to 200 tons.

Recommended scale: MSI-4260, MSI-6260, MSI-9300

### Semi Gantry

Similar to a gantry crane, a semi gantry has one end of the bridge rigidly supported on one or more legs that run on a fixed rail or runway. The other end of the bridge is supported by a truck running on an elevated rail or runway.

Recommended scale: MSI-3460, MSI-4260

### Integrated Weighing Solutions

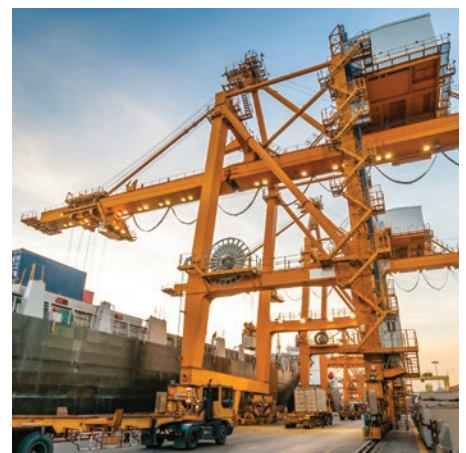
Most bridge, monorail, jib, gantry and straddle crane safety systems employ an integrated load sensing system. An integrated load sensor is installed and integrated where load is consistently applied relative to the actual load the crane is handling, generally with sheave pin, load link and compression designs.



*We recommend the MSI-3460 for jib cranes.*



*Bridge cranes pair well with a variety of MSI scales, though environment can impact the choice.*



*Multiple MSI scales can be used with rail mounted and rubber tire gantry cranes.*

# Create an Integrated System



01

Determine what type of sensor you need.

- Load pins offer accuracy of 1-3% of their rated capacity.
- Load links and shear web load cells have an accuracy of 0.5% of their rated capacity.
- Clamp-on load cells have an accuracy of 3-5% of the hoist capacity and will accommodate a wire rope up to 3/4" in diameter.
- Custom sensors are also available.

02

Choose a cable length.

- Options include 5, 10, 15, 20, 25 and 30 feet.
- Rice Lake recommends using a bulkhead connector with mating cable.
- Custom length cables are available.



03

Decide whether you want an RF transmitter or signal conditioner.

- MSI-7000/7001 TranSend (100-300 ft)
- MSI-9000 CellScale (500-1,000 ft)
- SCT-2200 (N/A)



04

Choose a remote display or controller.

- Handheld: MSI-8000 or MSI-9750A
  - Desktop: MSI-9850
  - Desktop LCD: MSI-8000HD
  - Desktop LED: MSI-8004HD
  - Tablet
  - Desktop Programmable: 1280 Enterprise Series\*
- \*custom user programs are available.

05

Your RF transmitter or signal conditioner will have the following relays:

- 2, 3, 4, 8 (MSI-7000 TranSend)
- 2, 4, 8 (MSI-8000HD, MSI-8004HD)
- 3 (MSI-9000 CellScale)
- Up to 3 (MSI-9850)
- 2 (SCT-2200)
- Inquire about other available I/O and fieldbus options.



06

Select a remote display.

- Hardwired or wireless
- 4- or 6-inch LaserLight2®



# Tips for Installation

Get years of successful operation from your MSI overhead weighing systems with these tips and best practices for installation and calibration.

## Required Equipment and Documentation

The following items are necessary for successful installation, configuration, simulated calibration, pre-calibration or final calibration of MSI scales and systems:

- Laptop with MSI Configuration Program downloaded
- Product-specific serial cables
- Tripplite USB-to-serial converter cable
- Manuals (digital or hardcopy)

Load cell simulators and system schematics, available by request at the time of order, are technically optional equipment and documents. However, simulators and system schematics can help troubleshoot problems that may occur during installation.

Additionally, test weights for calibration and weight verification are required for integrated systems, but are recommended for calibrating other MSI products as well.

## Best Practices for a Successful and Timely Installation

Before beginning installation, power on all of electronics to ensure basic system functionality. If there is an issue with any electronics in the system, contact customer support for help resolving the issue. To become more familiar with the MSI scale or system, review all manuals before beginning setup or calibration procedures.

In addition, perform a practice calibration on the system before attempting a full calibration on-site. If your system was factory calibrated, test the current calibration of the system before installation by performing a simulated calibration. A serial cable should be stored at the weighing system site after installation to ease any troubleshooting during future maintenance.

## Troubleshooting Tips for Problems During Installation

- If there are installation problems, refer to the optional system schematic for a wiring guide. Check connection points and ensure components are properly grounded.
- If the system has communication errors, review antenna locations to ensure they are within the recommended distance and have no solid objects blocking the transmission. Locate crane remotes, Wi-Fi or Bluetooth® modems and competing RF weighing systems to determine whether these sources may be causing an interference.
- Phone support or an RF site survey may be necessary for persistent issues. To assist with phone support, record all the networks, IDs, serial numbers and print strings associated with the system.
- If problems continue during installation, request on-site support from an MSI product specialist.

Rice Lake offers a comprehensive line of MSI overhead weighing systems, including crane scales, tension dynamometers and integrated solutions. Rental supplies for RF site surveys are also available to assist with product installation and troubleshooting. Live customer support can be reached 24/7 by phone and industry experts are always ready to help with any product questions.



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# Calibration and Maintenance

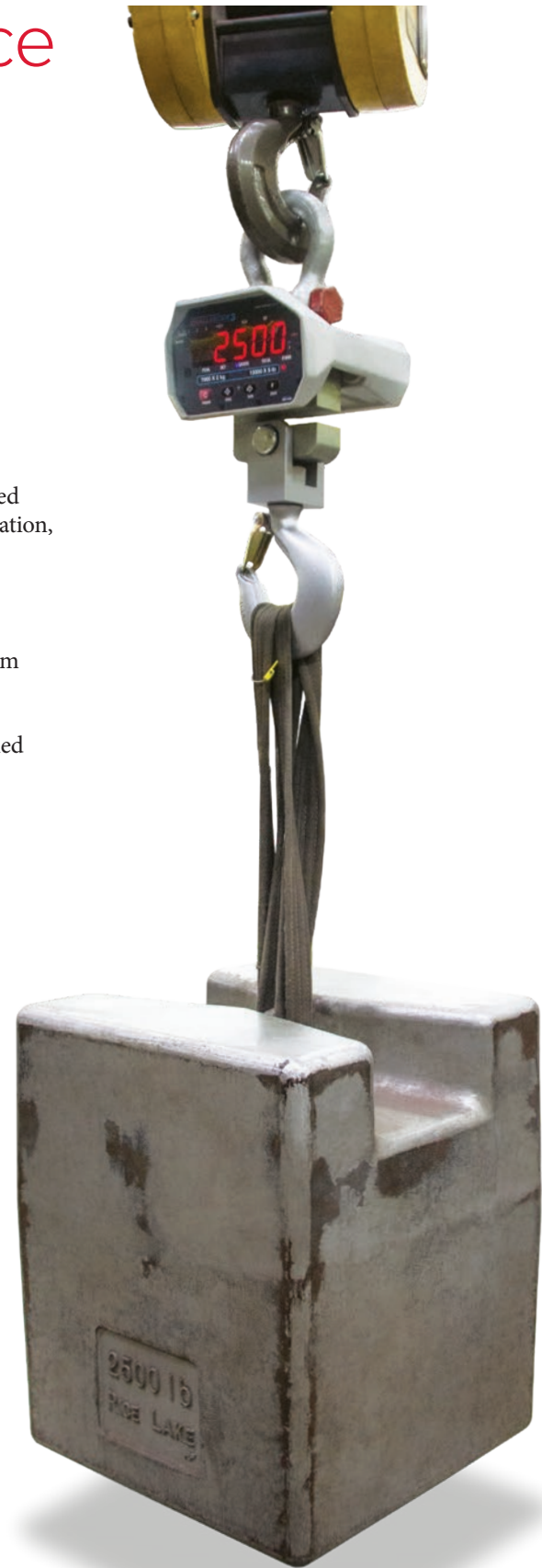
## Calibration

Overhead weighing systems should undergo scheduled calibration tests to make sure weight readouts are accurate. This is particularly important for applications where Legal for Trade certification is necessary.

A certified scale dealer will calibrate overhead weighing equipment after installation. If your overhead weighing system is going to provide weight readouts for commerce, the scale will need to have a Legal for Trade approval to ensure the weight is within a certain degree of accuracy. Discuss with your scale supplier if you will need a crane scale that meets Legal for Trade approval, and which approval agencies, such as the National Type Evaluation Program (NTEP), Measurement Canada, or state and local approval agencies, need to provide certification for commerce in your area. The scale's calibration interval is determined by the frequency of use, individual application requirements, and federal, state and local guidelines. Each scale component should be tested and detailed test reports should be provided to the customer and government authorities. After calibration, detailed reports must be provided to weights and measures authorities.

## Protective Features and Scheduled Maintenance

Many manufacturers design scales with protective features to reduce the chances of system failure and minimize the amount of maintenance needed. For example, a scale may be built with self-contained protective features to prevent it from being loaded above its rated capacity. Still, inspections of your overhead weighing equipment should be scheduled regularly to make sure your system is running properly.



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# Glossary

## Accuracy

The ability of a scale to measure a known weight value correctly.

## Analog to Digital

Conversion of continuously varying (analog) voltage levels to discrete binary-numbered (digital) values (e.g., a load cell output can be fed through an A/D converter to produce a continuous stream of digitized information and sent to a digital indicator).

## Calibration

The comparison of load cell outputs against standard test loads.

## Capacity

The amount of weight the scale is capable of weighing accurately.

## Clamp-On Load Cell

Load cells used for measuring wire rope tension and preventing and detecting overload for overhead cranes and hoists.

## Crane Scale

A suspended scale that is used for light-to heavy-capacity overhead weighing.

## Handbook H-44

A comprehensive set of requirements for weighing and measuring devices that are used in commerce and law enforcement activities; not a federal law, but developed and updated annually by the National Conference on Weights and Measures. Its complete title is "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices."

## Indicator/Controller

Indicators function as control devices for overhead weighing systems. They collect the digital weight readout from the scale's load cells and also provide process reports and data.

## Integrated Solution

A permanently-installed shear web load cell, clevis load pin or clamp-on load cell used to provide constant load monitoring and prevent overloads.

## International Organization of Legal Metrology (OIML)

Treaty organization that recommends technical requirements for weighing and measuring equipment prior to the sale or distribution of a model or type within the state, nation, etc.

## Legal for Trade

An industry recognized term to distinguish approval from the appropriate weights and measures regulating authority to use a scale for weight-based transactions and commerce.

## Linearity

A factor that makes up a scale's accuracy. Linearity is the scale's ability to measure as close to the target weight as possible.

## Load Cell

A device that produces an output signal proportional to the applied weight or force.

## Load Pin Sensor

A unique, industrial-grade integrated solution that offers safety, strength and corrosion resistance in overhead weighing applications.

## Maximum Allowable Variation

A deficiency in the weight, measure, or count of an individual package beyond which the deficiency is considered to be an unreasonable error.

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## Glossary Continued

### National Institute of Standards and Technology (NIST)

An agency within the United States Department of Commerce. NIST regulates measurement in the United States to ensure accurate weight-based commerce. NIST's specifications and requirements for fair and accurate weighing systems are documented in Handbook 44 (H-44).

### National Type Evaluation Program (NTEP)

A program of cooperation between the National Conference on Weights and Measures, NIST, state weights and measures officials and the private sector for determining conformance of weighing equipment with the provisions of H-44.

### Output

The signal (voltage, current, pressure, etc.) produced by a load cell. Where the output is directly proportional to excitation, the signal must be expressed in terms such as volts per volt, millivolts per volt, or volts per ampere, etc., of excitation.

### Remote Display

An instrumentation device for displaying weight data separately from an indicator/controller.

### Repeatability

A factor that makes up a scale's accuracy. Repeatability is the scale's ability to measure and display the same weight each time it is tested. Repeatability is measured in standard deviation.

### Shear Web Load Cell

An integrated, low-profile load cell that compensates for hook rotation and eliminates headroom loss.

### Tare

The weight of an empty container or vehicle, or the allowance or deduction from gross weight made on account thereof.

### Tension Link

An integrated solution for cranes designed to provide force measurement for lifted items.

### (Tension Link) Dynamometer

An instrument used for measuring vertical and horizontal tension in overhead weighing applications such as rigging, load tests or crane and elevator certification.

### Tolerance

A value fixing the limit of allowed departure from the labeled contents, usually presented as a plus (+) and minus (-) value.

### Twist Lock Sensor

A durable, accurate SOLAS solution equipped with an internal strain gauge for measuring vertical tension while a crane is under load.

### Units

The unit of measure that is to be represented: lb, kg, kN, etc.

### Wireless Network Solutions

Used to communicate data between scale electronics.



Rice Lake Weighing Systems has been manufacturing and distributing weight-related products since 1946 and is a global leader in measurement and weighing solutions.

In 2012, Rice Lake acquired Measurement Systems International to better serve our customers with an expanded product offering. MSI has been providing niche weighing technologies worldwide since 1977. Rice Lake's MSI overhead weighing solutions are advanced products designed to meet the unique application requirements of a variety of industries.

Find additional resources at [www.ricelake.com/MSI](http://www.ricelake.com/MSI)



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