MSI TranSend 7000 Series

Single and Multiple Channel Transmitters and Receivers

Technical Manual

RICE LAKE WEIGHING SYSTEMS

April 19, 2023

PN 167375 Rev E

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Revision History

This section tracks and describes manual revisions for awareness of major updates.

Revision	Date	Description
E	April 19, 2023	Established revision history; added RF regulatory information

Table i. Revision Letter History

Contents

1.0 Introduction . . . 7
- 1.1 Overview . . . 7
  - 1.1.1 Transmitters . . . 7
  - 1.1.2 Receivers . . . 7
- 1.2 Standard Features . . . 8
- 1.3 FCC Compliance . . . 8
- 1.4 Safety . . . 9
- 1.5 MSI-7000 Front Panel . . . 10
- 1.6 MSI-7001 Front Panel . . . 11
- 1.7 MSI-7000HD Front Panel . . . 12
- 1.8 MSI-7001HD Front Panel . . . 13

2.0 Installation . . . 14
- 2.1 Unpacking and Assembly . . . 14
- 2.2 Connect Load Cell Cables . . . 14
  - 2.2.1 MSI-7001 TranSend . . . 14
  - 2.2.2 MSI-7000 TranSend and MSI-7000HD . . . 15
  - 2.2.3 MSI-7001HD . . . 15
- 2.3 Connect Power . . . 16
  - 2.3.1 MSI-7001 TranSend . . . 16
- 2.4 Network Connections . . . 16
- 2.5 Analog Output Connection . . . 16
  - 2.5.1 MSI-7001 TranSend Connector . . . 16
  - 2.5.2 MSI-7000 TranSend Wiring . . . 16
  - 2.5.3 PLC Wiring Diagrams . . . 17
- 2.6 Relays . . . 18
- 2.7 RF Network Transmission Strength . . . 18
- 2.8 Radio Compliance . . . 19
  - 2.8.1 802.15.4 (XBee 3 and XBee 3-PRO) . . . 19
  - 2.8.2 802.15.4 (XBee 2SC) . . . 19
  - 2.8.3 Wi-Fi . . . 19
  - 2.8.4 FHSS (Frequency Hopper Spread Spectrum) . . . 20
- 2.9 Antenna Options . . . 20
  - 2.9.1 Available Antennas . . . 21
- 2.10 Mounting the Enclosure . . . 22

3.0 ScaleCore Connect . . . 26
- 3.1 Installation . . . 26
  - 3.1.1 System Requirements . . . 26
  - 3.1.2 Install Program . . . 26
  - 3.1.3 Connect Product to Computer . . . 27
- 3.2 Configuration/Setup . . . 27
  - 3.2.1 Connected Devices . . . 27
  - 3.2.2 Device Profiles . . . 27
  - 3.2.3 Configuration . . . 28
  - 3.2.4 Load Cells . . . 32
  - 3.2.5 Calibration . . . 35
  - 3.2.6 Inputs / Outputs . . . 37

3.2.7 Monitors . . . 37
3.3 Advanced Setup . . . 38
3.3.1 File Menu . . . 38
3.3.2 Administration Menu . . . 39
3.3.3 Communications . . . 39
3.3.4 Program . . . 41
3.3.5 Device Profiles . . . 43
3.3.6 Maintenance . . . 43
3.3.7 Stream Print String . . . 44
4.0 MSI mV Scale Calibration . . . 46
5.0 Optional Rugged Remote . . . 49
5.1 Operation . . . 49
5.1.1 Power . . . 50
5.1.2 Zero . . . 50
5.1.3 Tare . . . 50
5.1.4 Programmable Function Keys . . . 50
5.2 Conflict and Jamming Considerations . . . 50
5.3 FCC Compliance . . . 50
6.0 Specifications . . . 51

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1.0 Introduction

The MSI TranSend 7000 Series of wireless load cell interface transmitters and receivers are efficient communication devices that replace the need for traditional wire runs. The MSI TranSend 7000 Series is designed to work with ScaleCore-based products and are compatible with a broad range of transmitting and receiving devices. The transmitters in the series can interface with any type of load cell. This manual provides the details for installation, configuration and calibration for the MSI-7000 TranSend, MSI-7001 TranSend, MSI-7000HD and MSI-7001HD.

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

Warranty information is available at www.ricelake.com/warranties

1.1 Overview

The MSI TranSend 7000 Series offers a wireless option in systems where it would be difficult to have a load cell cable. Replacing the cable with an RF link, the output will be calibrated to match the device that the cable was connected to. A single MSI TranSend 7000 Series transmitter or receiver can be used to communicate with a ScaleCore-based remote display or indicator. A paired transmitter and receiver can be used to wirelessly send weigh data to virtually any indicator or remote display.

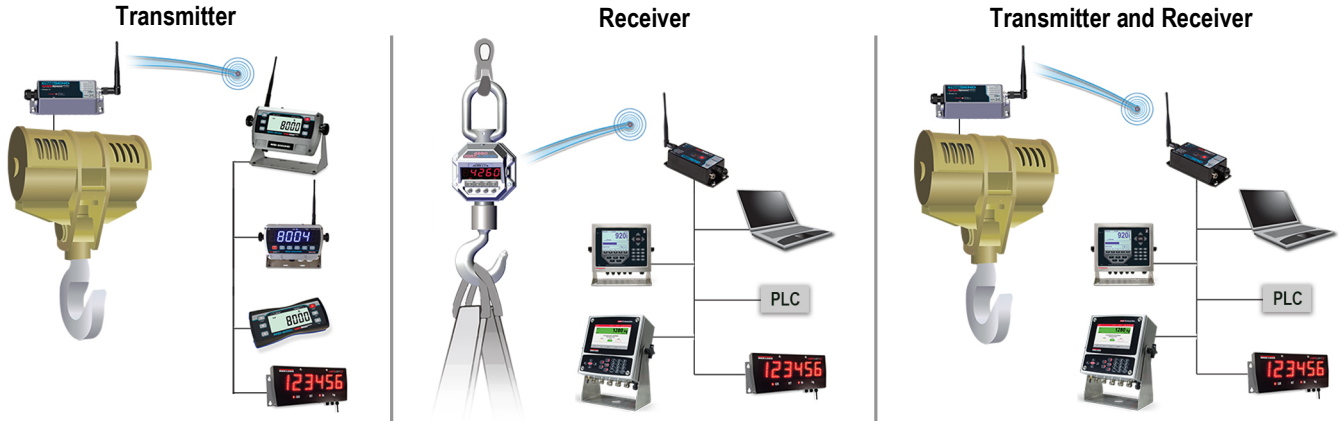


Figure 1-1. MSI TranSend 7000 Series

1.1.1 Transmitters

An MSI TranSend 7000 Series transmitter can be used to send weigh data wirelessly to an MSI TranSend 7000 Series receiver or a ScaleCore-based remote display. ScaleCore-based indicators can also be used as transmitters to send weigh data to either an MSI TranSend 7000 Series receiver or a ScaleCore-based remote display.

Transmitter Model Options

- MSI-7000 TranSend
- MSI-7001 TranSend
- MSI-7000HD
- MSI-7001HD
- MSI-3460
- MSI-4260
- MSI-7300
- MSI-8000HD
- MSI-8004HD

NOTE: Refer to Section 1.5 on page 10 for available MSI TranSend 7000 Series model configurations.

1.1.2 Receivers

An MSI TranSend 7000 Series receiver can be used to receive weigh data wirelessly from an MSI TranSend 7000 Series transmitter or a ScaleCore-based indicator. ScaleCore-based remote displays can also be used as receivers to receive weigh data from either an MSI TranSend 7000 Series transmitter or a ScaleCore-based indicator. All MSI receivers are compatible with all MSI transmitters, except for the receivers that provide an mV signal to a digital weight indicator.

Receiver Model Options

- MSI-7000 TranSend
- MSI-7001 TranSend
- MSI-8000
- MSI-8000HD
- MSI-8004HD
- LaserLight 2

NOTE: Refer to Section 1.5 on page 10 for available MSI TranSend 7000 Series model configurations.

1.2 Standard Features

- Works with any basic digital weight indicator
- Excitation to load cell(s) provided by the transmitter, not the indicator
- Each transmitter/receiver set is individually paired for communication
- Auto-sleep mode - power down during non-use, power up with weight change
- Serial communication cable included

Additional HD Features

- IP68 milled aluminum enclosure
- 2nd radio modem available (MSI-7000HD only)

1.3 FCC Compliance

United States

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

Canada

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

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

1.4 Safety

Safety Definitions:

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

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

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

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

General Safety

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

WARNING

Failure to heed could result in serious injury or death.

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

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

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

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

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

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

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

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

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

Do not remove or obscure warning labels.

There are no user serviceable parts. Any repairs are to be performed by qualified service personnel only.

1.5 MSI-7000 Front Panel

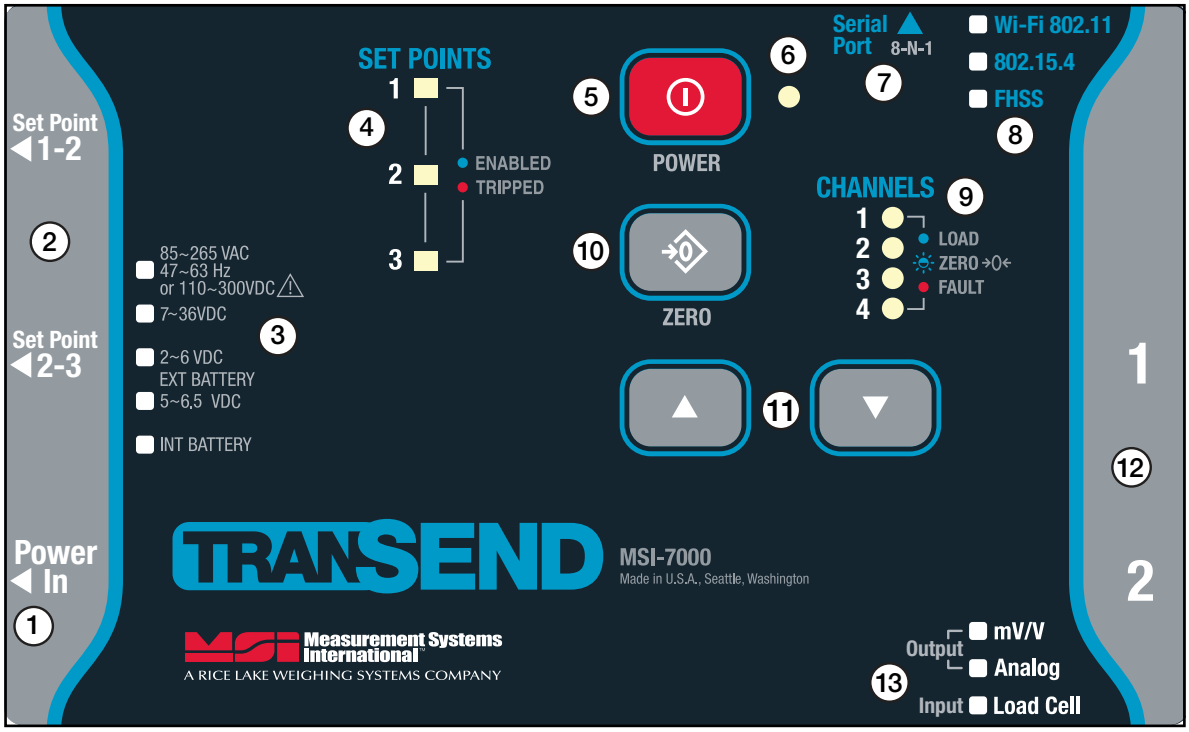


Figure 1-2. MSI-7000 Front Panel

Item No.	Description
1	Power Input – Located on the side of the unit
2	Setpoint 1-3 Connections – Located on the side of the unit
3	Type of Power Source – Type will be checked
4	Setpoint LEDs Green – Setpoint is enabled and not tripped Red – Setpoint is enabled and tripped Orange – Setpoint configuration error
5	Power Button
6	Power LED – Indicates unit is on when lit Steady Green – On with good battery (or AC) Steady Orange – On with low battery Blinking Red – On with very low battery
7	Serial Port – Located on the top of unit; Pre-set at 9600 baud and 8-N-1
8	Wireless Options – Type is checked
9	Channel LEDs – Indicates which channel is being controlled by the unit Off – Sensor is disabled Blinking Orange – RF is disconnected Steady Orange – Sensor fault (overload/underload/uncal/error/etc.) Blinking Blue – Sensor is in CoZ and working properly Steady Blue – Sensor is loaded and working properly Steady Purple – Sensor Selected (for two seconds)
10	Zero Button – Press to zero the currently selected channel
11	Arrow Buttons – Use to scroll through channels
12	Load Cell Inputs – Located on the side of the unit
13	Output / Input – Type is checked

Table 1-1. MSI-7000 Front Panel Controls

1.6 MSI-7001 Front Panel

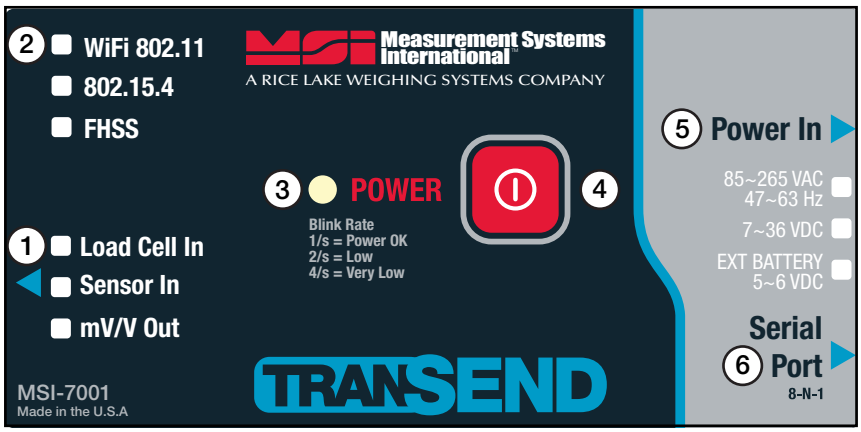


Figure 1-3. MSI-7001 Front Panel

Item No.	Description
1	Output / Input – Type is checked
2	RF Frequency – Type is checked
3	Transmitter Power LED – Indicates state of unit power Steady short green blinks – Good battery (or AC power) Two red blinks then a pause – Low battery Four red blinks then a pause – Very low battery Steady red – Load cell fault (overload/underload/uncal/error/etc.) Five green blinks per second – Calibration mode Receiver Power LED – Indicates state of unit power Steady short green blinks – RF connected, good battery (or AC power) Two short red blinks then a pause – RF connected, low battery Four short red blinks then a pause – RF connected, very low battery Steady long red blinks – RF disconnected and good battery (or AC power) Long red blink, short red blink then a pause – RF disconnected and low battery Long red blink, three short red blinks – RF disconnected and very low battery *NOTE: Older units have a single color red LED and newer units have a dual color red and green LED. Blinking patterns are consistent for all units.*
4	Power Button Press & release – Turns unit on Press & hold 1-4 seconds – Will auto zero Press & hold 5 seconds – Turns unit off
5	Power Input – Located on the side of the unit; Type is checked
6	Serial Port – Located on the side of unit; Pre-set at 9600 baud and 8-N-1

Table 1-2. MSI-7001 Front Panel Controls

1.7 MSI-7000HD Front Panel

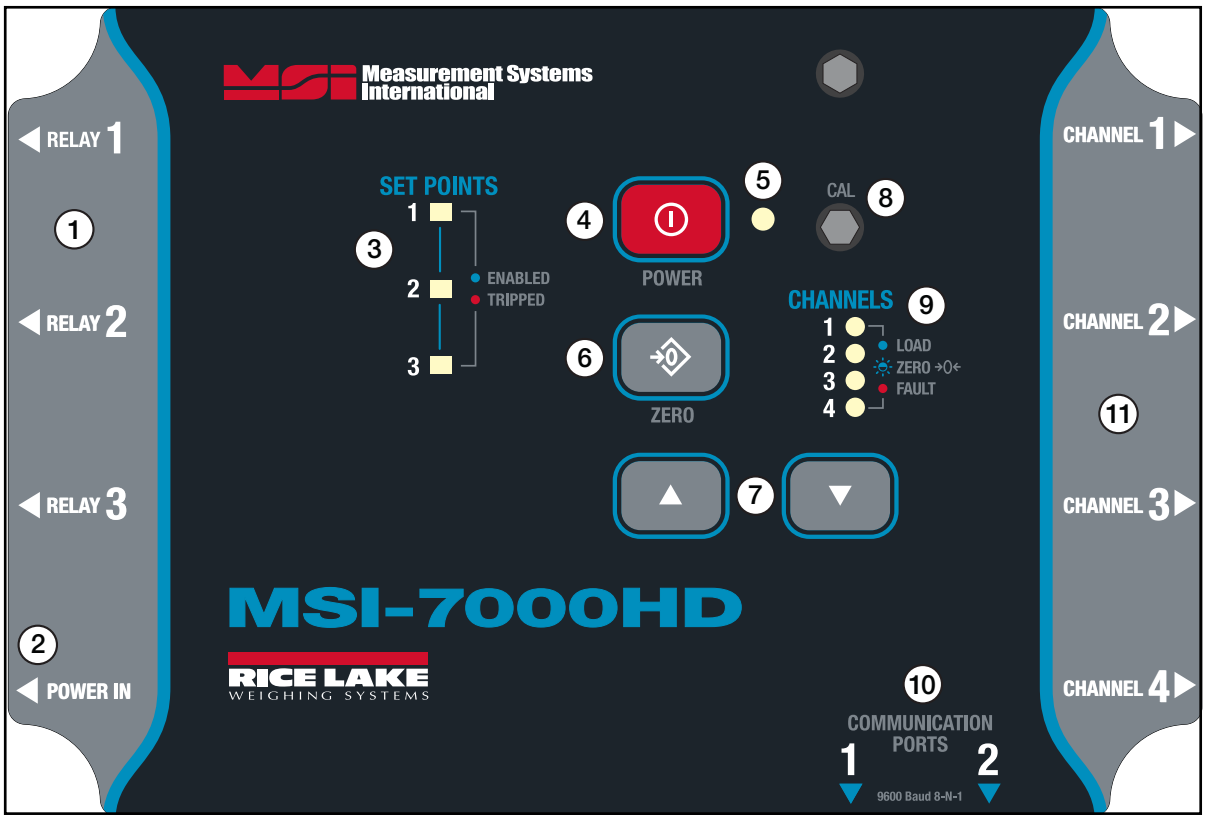


Figure 1-4. MSI-7000HD Front Panel

Item No.	Description
1	Setpoint 1-3 Connections – Located on the side of the unit
2	Power Input – Located on the side of the unit
3	Setpoint LEDs Green – Setpoint is enabled and not tripped Red – Setpoint is enabled and tripped Orange – Setpoint configuration error
4	Power Button
5	Power LED – Indicates unit is on when lit Steady Green – On with good battery (or AC) Steady Orange – On with low battery Blinking Red – On with very low battery
6	Zero Button – Press to zero the currently selected channel
7	Arrow Buttons – Use to scroll through channels
8	Calibration Screw – Used when unit is in NTEP mode
9	Channel LEDs – Indicates which channel is being controlled by the unit Off – Sensor is disabled Blinking Orange – RF is disconnected Steady Orange – Sensor fault (overload/underload/uncal/error/etc.) Blinking Blue – Sensor is in CoZ and working properly Steady Blue – Sensor is loaded and working properly Steady Purple – Sensor Selected (for two seconds for zeroing)
10	Communication Ports – Comm Port 1 is pre-set at 9600 baud and 8-N-1; Comm Port 2 is pre-set at 38400 baud and 8-N-1
11	Load Cell Inputs - Located on the side of the unit

Table 1-3. MSI-7000HD Front Panel Controls

1.8 MSI-7001HD Front Panel

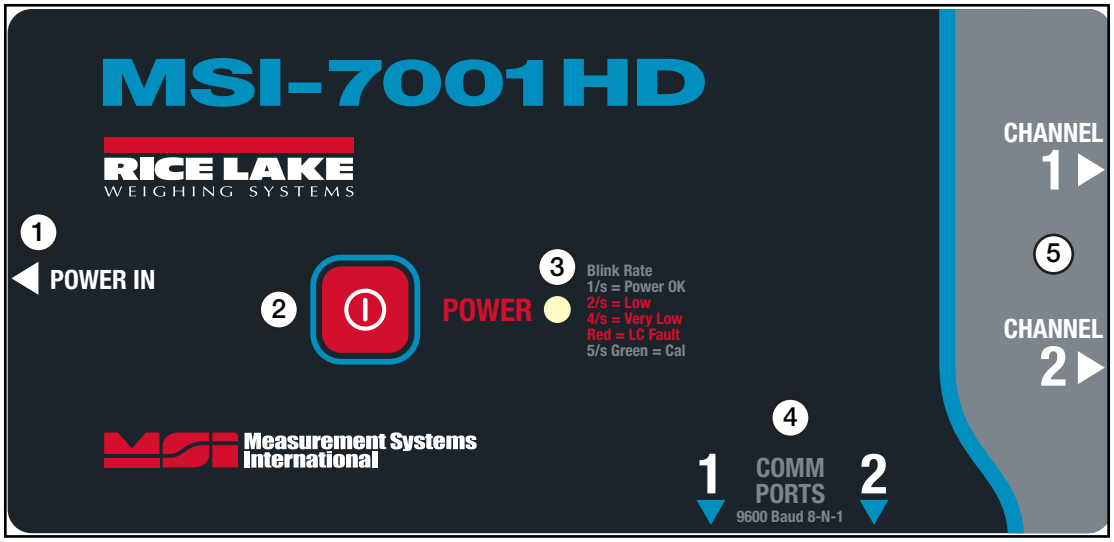


Figure 1-5. MSI-7001HD Front Panel

Item No.	Description
1	Power In Connection – Located on the side of the unit
2	Power Button Press & release – Turns unit on Press & hold 1-4 seconds – Will auto zero Press & hold 5 seconds – Turns unit off
3	Transmitter Power LED – Indicates state of unit power Steady short green blinks – Good battery (or AC power) Two red blinks then a pause – Low battery Four red blinks then a pause – Very low battery Steady red – Load cell fault (overload/underload/uncal/error/etc.) Five green blinks per second – Calibration mode Receiver Power LED – Indicates state of unit power Steady short green blinks – RF connected, good battery (or AC power) Two short red blinks then a pause – RF connected, low battery Four short red blinks then a pause – RF connected, very low battery Steady long red blinks – RF disconnected and good battery (or AC power) Long red blink, short red blink then a pause – RF disconnected and low battery Long red blink, three short red blinks – RF disconnected and very low battery
4	Communication Ports – Comm Port 1 is pre-set at 9600 baud and 8-N-1; Comm Port 2 is pre-set at 38400 baud and 8-N-1
5	Load Cell Connectors - Located on the side of the unit.

Table 1-4. MSI-7001HD Front Panel Controls

2.0 Installation

This section describes procedures for connecting load cell and serial communications cables, along with instructions for mounting the enclosures.

2.1 Unpacking and Assembly

Immediately after unpacking, visually inspect the contents to ensure all components are included and undamaged. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

2.2 Connect Load Cell Cables

2.2.1 MSI-7001 TranSend

If using the optional pre-wired cable, refer to the load cell wiring guide table for connecting the cable to the load cell.

OR

If using the field wire-able connector refer to Figure 2-1 and Table 2-1 to connect an MSI-7001 TranSend transmitter to a load cell or j-box.

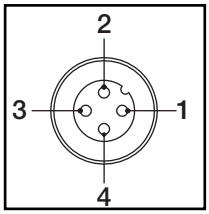


Figure 2-1. Field Wire-able Male Connector

Connector Pin #	Wire Color	Function
1	Brown	+Excitation
2	White	-Excitation
3	Blue	+Signal
4	Black	-Signal

Table 2-1. MSI-7001 TranSend – Load Cell Wiring Guide

NOTE: Test performance before cutting off the shield at the cable end. The metal braid shield is connected to the metal shell of the cordset's connector head. If the MSI-7001 TranSend is grounded through its mounting screws, this is usually sufficient. In most applications it is not necessary to connect the shield to the junction box shield terminal. Sometimes noise pickup is improved by connecting the shield inside the junction box. However, it may make noise pickup worse.

2.2.2 MSI-7000 TranSend and MSI-7000HD

For MSI-7000 TranSend and MSI-7000HD transmitters, feed standard load cell cables through the cord grips and wire to the terminal strip.

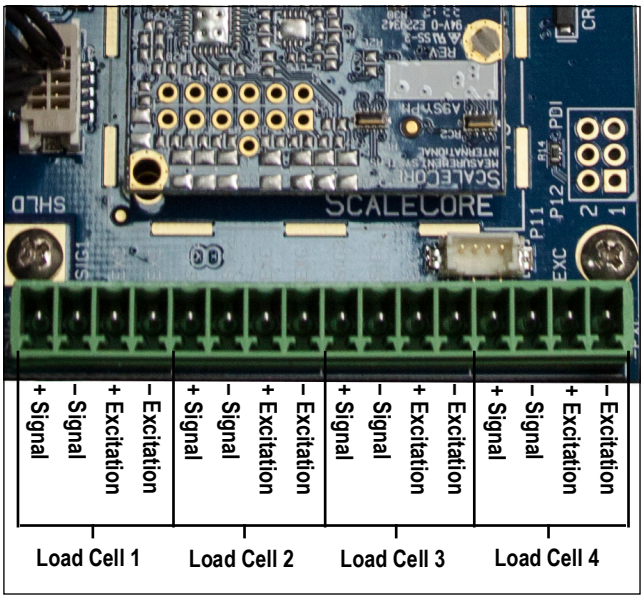


Figure 2-2. Load Cell to Terminal Block Connection

NOTE: In most applications it is not necessary to connect the shield to the j-box shield terminal. Sometimes noise pickup is improved by connecting the shield inside the j-box. However, it may make noise pickup worse. Test performance before cutting off the shield at the cable end.

2.2.3 MSI-7001HD

For MSI-7001HD transmitters, feed standard load cell cables through the cord grips and wire to the terminal strip.

NOTE: Load Cells 1 and 2 share a common excitation connection in two load cell configurations.

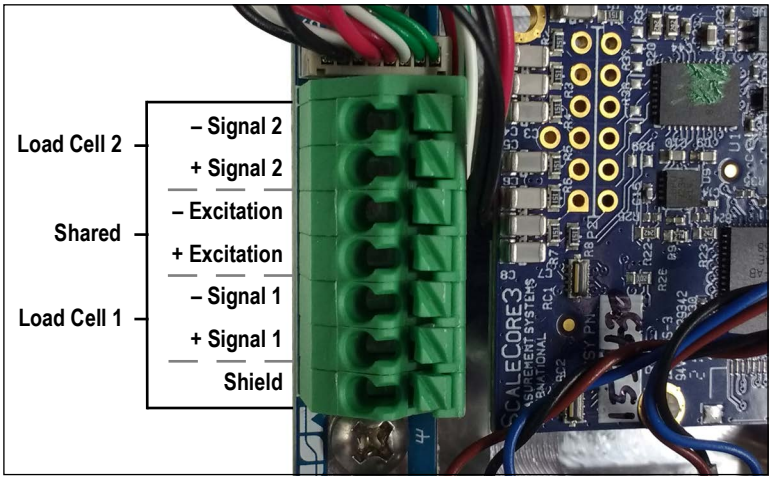


Figure 2-3. MSI-7001HD Load Cell to Terminal Block Connection

2.3 Connect Power

2.3.1 MSI-7001 TranSend

1. Connect the power source to the MSI-7001 TranSend.

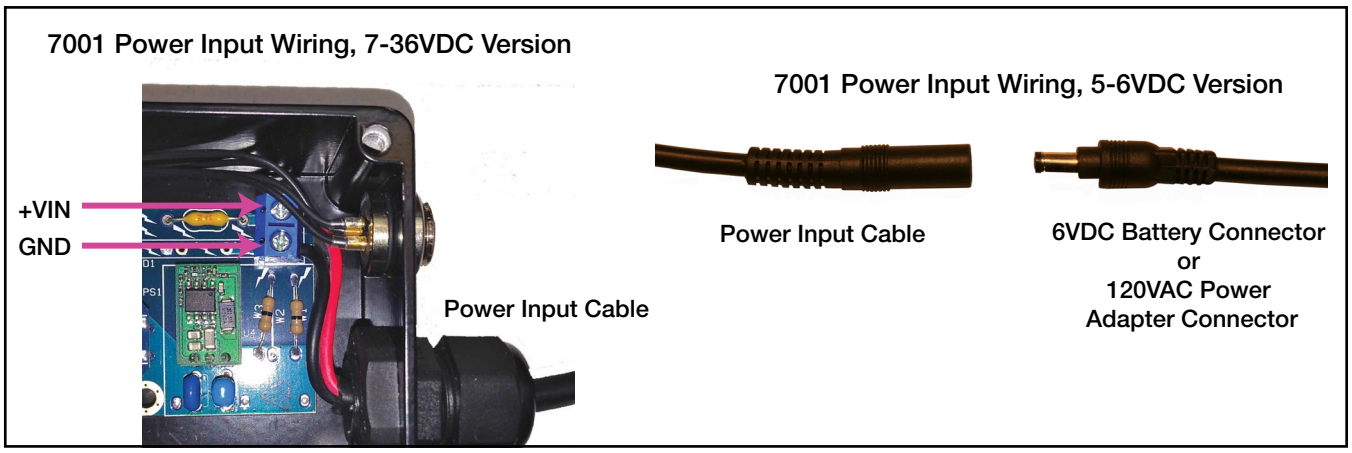


Figure 2-4. Power Input Wiring

2.4 Network Connections

When connecting to a remote device for a network setting, transmitting and receiving units must be set to ensure network and channel settings match.

NOTE: The Device ID must be unique to each unit (Section 3.2.3 on page 28).

2.5 Analog Output Connection

2.5.1 MSI-7001 TranSend Connector

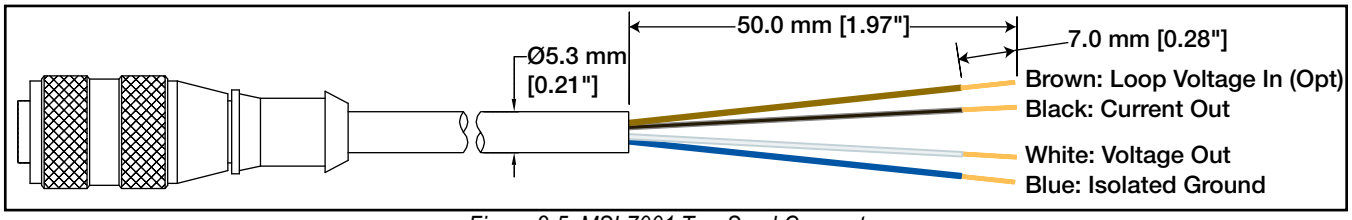


Figure 2-5. MSI-7001 TranSend Connector

2.5.2 MSI-7000 TranSend Wiring

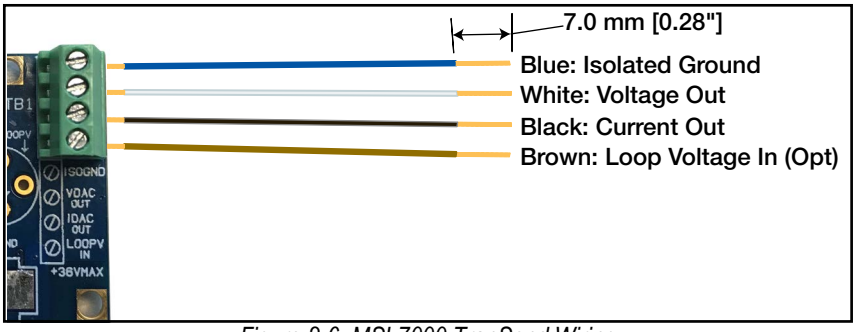


Figure 2-6. MSI-7000 TranSend Wiring

2.5.3 PLC Wiring Diagrams

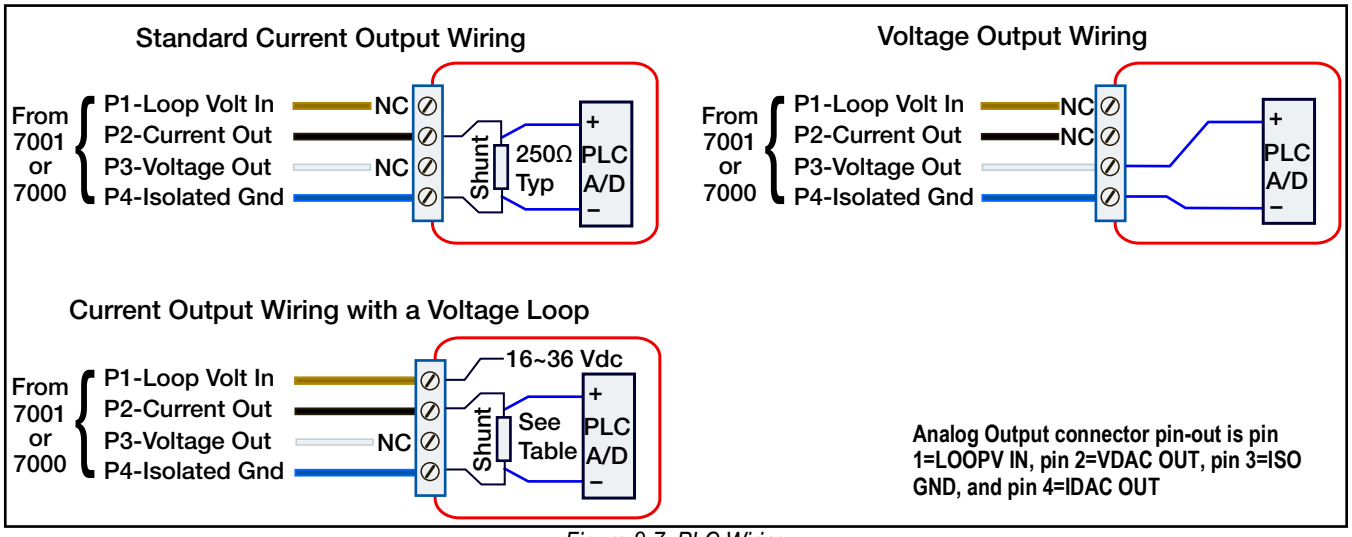


Figure 2-7. PLC Wiring

Pin #	Wire Color	Function	Comment
1	Brown	Loop Voltage In	Optional for increasing compliance. Input range: +16V to 36V max
2	Black	Current Out	Will drive 20mA into 625Ω without external boost voltage (Table 2-3)
3	White	Voltage Output	Specified for load resistance ≥1kΩ. Recommended load resistance: 100kΩ to minimize voltage drop due to wire resistance in connecting cable
4	Blue	Isolated Ground	Connection required for current and voltage output

Table 2-2. Analog Output Wiring

External Loop Voltage Input	20mA Output Max R_{wiring}+ R_{shunt}	24mA Output Max R_{wiring}+ R_{shunt}
None	625Ω	520Ω
18V	750Ω	625Ω
24V	1.05kΩ	875Ω
30V	1.35kΩ	1.125kΩ
36V	1.65kΩ	1.375kΩ

Table 2-3. Current Compliance Table

2.6 Relays

The MSI-7000 TranSend can be equipped with three Form C Coil relays for process control or safety related systems. The MSI-7000HD comes standard with three relays.

Relays are installed and wired out to 3 pins on a M12 connector.

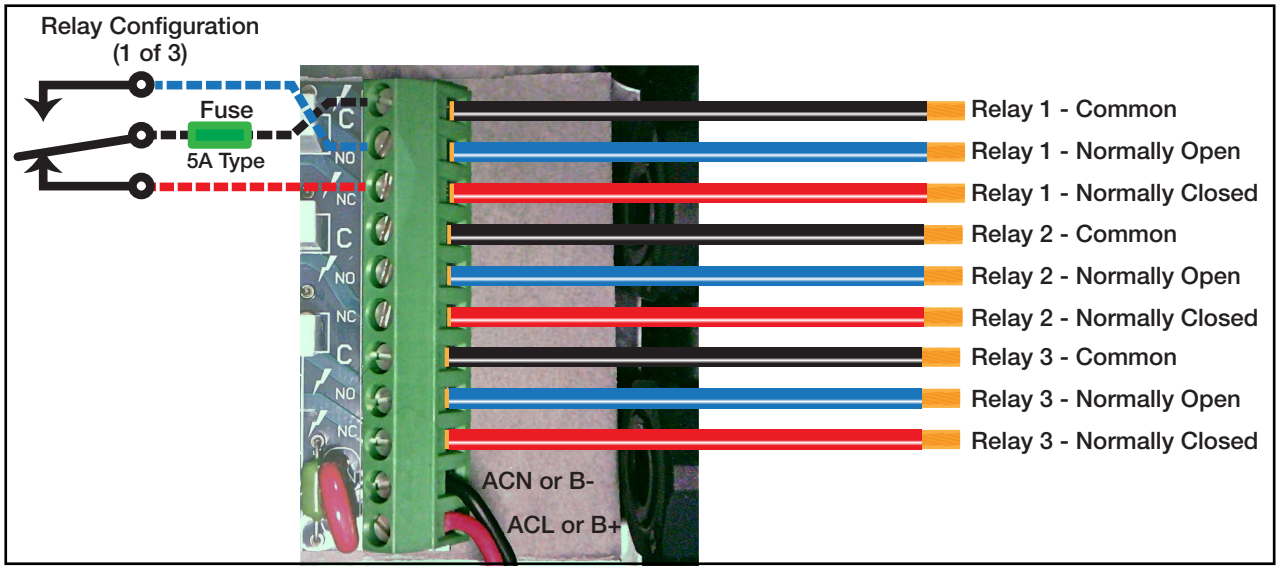


Figure 2-8. Relay Wiring Diagram

With normally open wiring, the contact is de-energized when the setpoint is inactive. When the setpoint is tripped, the contact will close and the relay will energize.

With normally closed wiring, the contact is closed and energized when the setpoint is inactive. When the setpoint is tripped, the contact will open and the relay will de-energize.

See Section 3.2.6 on page 37 for programming setpoints.

2.7 RF Network Transmission Strength

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

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

Table 2-4. Transmission Strength Settings

2.8 Radio Compliance

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

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

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

2.8.1 802.15.4 (XBee 3 and XBee 3-PRO)

FCC Statement

Contains FCC ID: MCQ-XBEE3

International Certifications

Canada: Radio Certificate Number: IC 1846A-XBEE3

Australia: RCM

Brazil: ANATEL 06329-18-01209

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

Japan (XBee 3 only): R210-119309

Mexico: IFETEL (IFT) RCPDIXB19-1820

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

2.8.2 802.15.4 (XBee 2SC)

FCC Statement

Contains FCC ID: MCQ-S2CTH

International Certifications

Canada: Radio Certificate Number: IC 1846A-S2CTH

Australia: RCM

Brazil: ANATEL 0616-15-1209

EU: Yes, when used with CE approved products

Japan: R210-105563

Mexico: IFETEL (IFT) RCPDIS219-1821-A1

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

2.8.3 Wi-Fi

FCC Statement

Contains FCC ID: T9J-RN171

International Certifications

Canada: Radio Certificate Number: IC 6514A-RN171

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

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

- EN 300 328 : V1.8.1 (2012)
  This product is compliant with the following standards and/or other normative documents:
  Safety (article 3.1A) EN 60950-1:2006+A11:2009+A1:2010+A12:2011
  EMC (article 3.1b) EN 301 489-1 : V1.9.2 (2011) In accordance with the specific requirements of ETSI EN 301 489-17: V2.2.1 (2012)

2.8.4 FHSS (Frequency Hopper Spread Spectrum)

FCC Statement

Contains FCC ID: HSW-DNT24

International Certifications

Canada: Radio Certificate Number: IC 4492A-DNT24

ETSI Certified

2.9 Antenna Options

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

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

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

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

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

2.9.1 Available Antennas

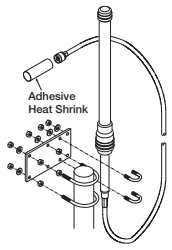
Standard Antenna

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

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

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

Long Range OMNI 9 dBi Antenna



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

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

This antenna is supplied with a 10 foot (3m) coax cable pre-attached. The 10-foot cable allows placement of the antenna above the unit for ease of clearing possible obstacles to data transmission. It is also available with an N connector for applications requiring longer coax cable lengths.

Vehicle Mount Whip Antenna

The vehicle mount whip antenna mounts directly to the roof of mobile vehicles and is weatherproof.

This 5 dBi gain whip mounts in a 3/4" hole on the roof of the vehicle.

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

YAGI Antenna

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

Corner Reflector Antenna

14 dBi Corner Reflector

9 dBi Corner Reflector

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.

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.

2.10 Mounting the Enclosure

The MSI TranSend 7000 Series transmitters and receivers can be mounted either vertically or horizontally to a flat surface.

If mounted inside an enclosure or I-beam, use the correct antenna for the environment and distance. Please call Rice Lake Weighing Systems, if assistance is needed to select an antenna, or reference the antenna selection guide in the appendix.

NOTE: Antennas must be placed within line-of-sight for reliable communications.

IMPORTANT: A standard antenna and coax connector are resistant to water, but not water-proof. Seal the TNC base with an adhesive heat shrink boot if antenna is exposed to water.

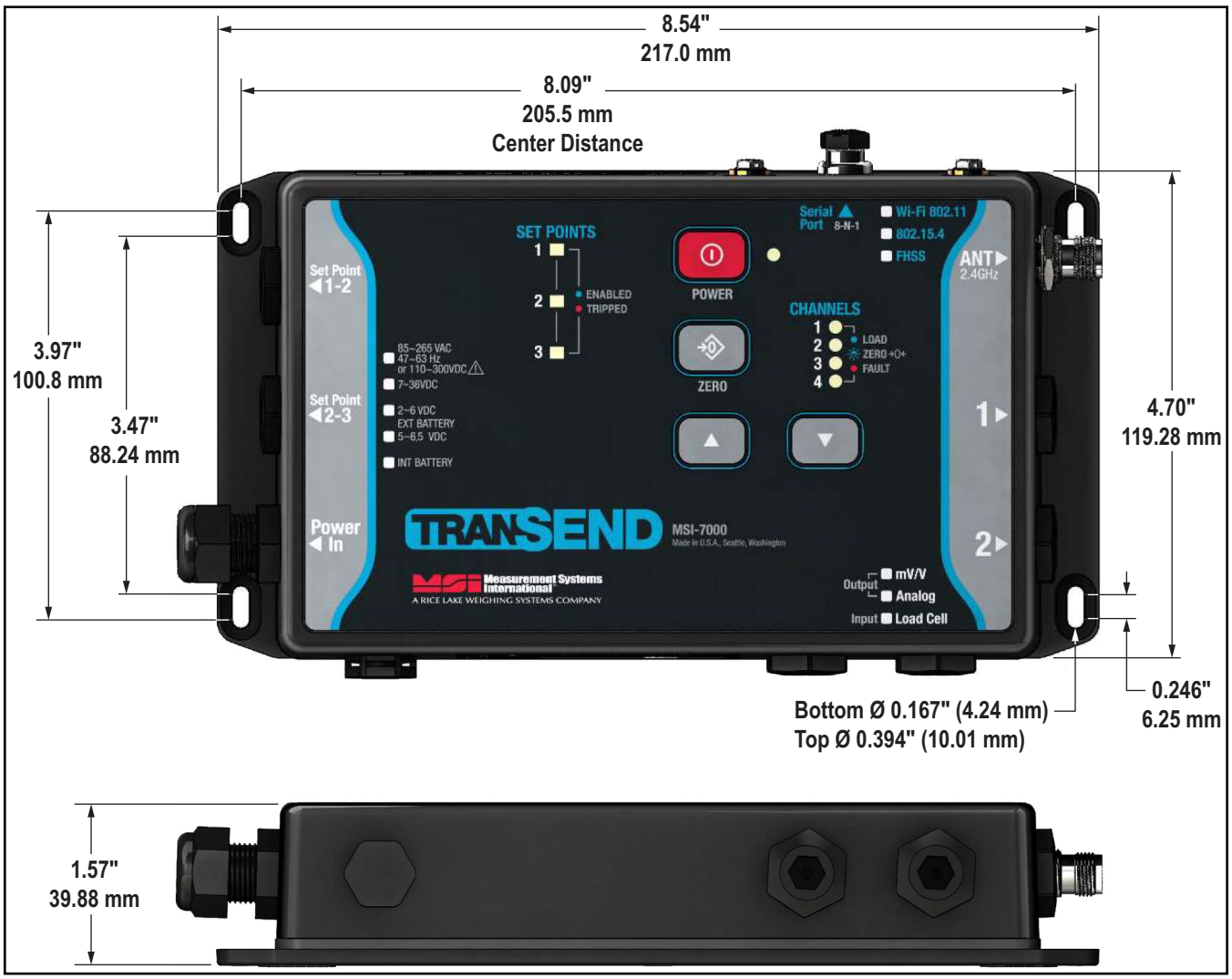


Figure 2-9. Mounting Dimensions – MSI-7001 TranSend

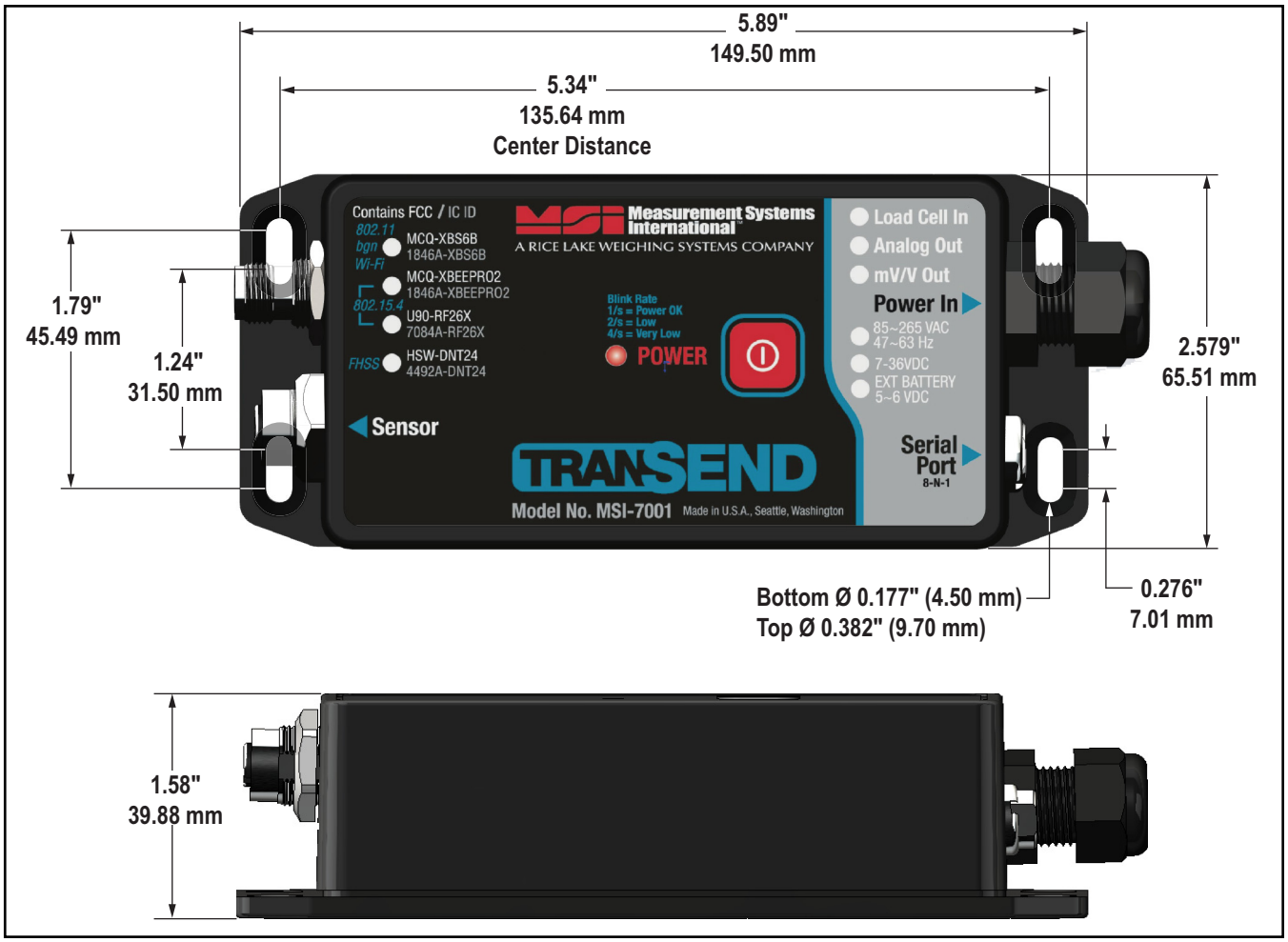


Figure 2-10. Mounting Dimensions – MSI-7000 TranSend

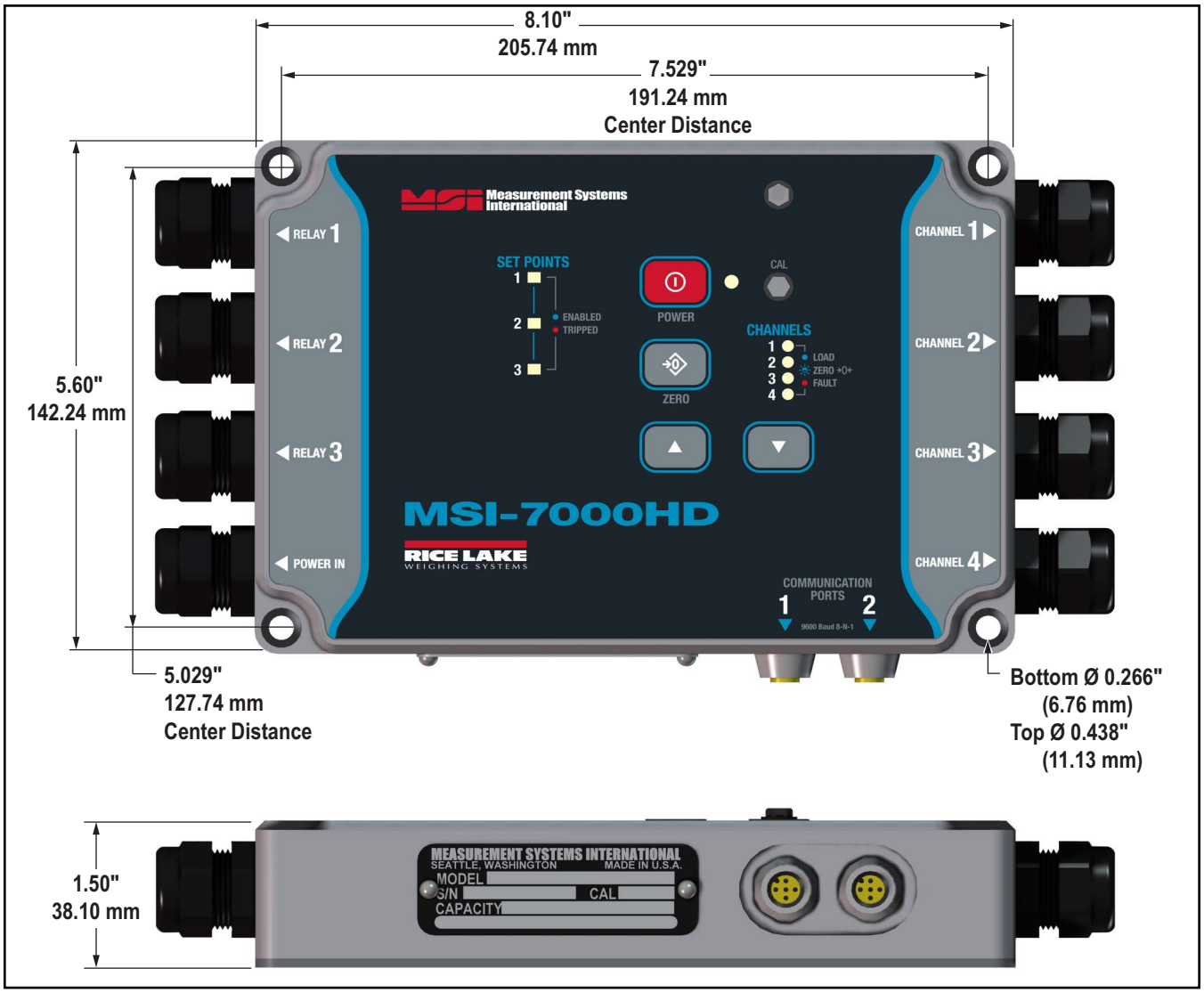


Figure 2-11. Mounting Dimensions – MSI-7000HD

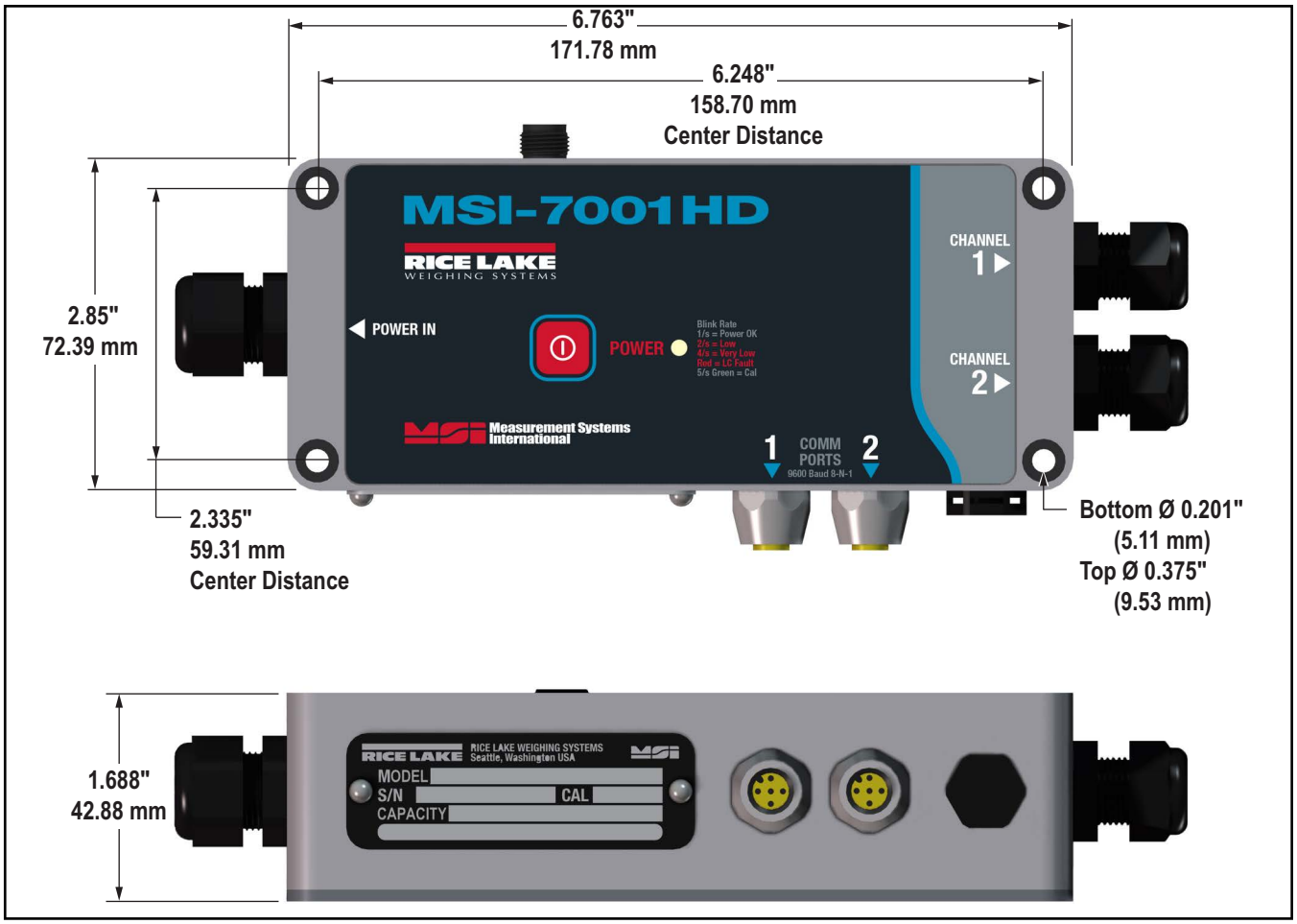


Figure 2-12. Mounting Dimensions – MSI-7001HD

3.0 ScaleCore Connect

ScaleCore Connect can be used to program and configure all MSI products using *ScaleCore* software.

This application provides a complete solution for *ScaleCore* family product configuration and setup. It allows complete backup, copy and restore of a scale configuration including calibration.

3.1 Installation

Install the *ScaleCore Connect* Software onto a computer for setting up multiple products.

3.1.1 System Requirements

Specifications subject to change without notice.

Typical

Windows® Operating System

Display: 800 x 600 or greater

Built-in serial port or USB to serial port adapter

FTDI chip set required (Tripp-Lite USB/Serial Adapter [PN 153603] recommended)

JAVA JRE 1.7 or Newer

To download and install JAVA JRE: https://java.com/en/download/manual.jsp

3.1.2 Install Program

To install:

1. Open the Rice Lake website and navigate to the MSI software page and scroll to the ScaleCore Connect file.
2. Download the *ScaleCore Connect* software to the computer.
3. Extract the zip file to generate the *ScaleCore Connect* folder.
4. Open the folder and double click on ***ScaleCoreConnect_XX-XX.exe***.

NOTE: Folder structure must be kept intact. Application will not work without the companion folder.

5. A security warning may display, press **Run** to continue.
6. *ScaleCore Connect* will automatically connect to any connected *ScaleCore* device. If a device was not connected to the PC before launching the application, connect device and press **Auto Connect** to establish the connection for configuration/setup of the device.

NOTE: Make sure USB/serial drivers are installed and up-to-date If the scale does not appear.

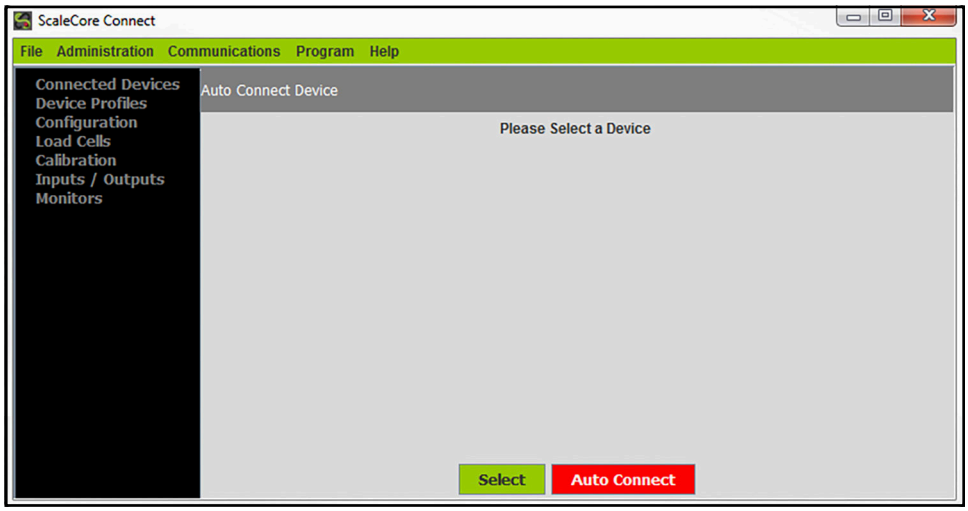


Figure 3-1. ScaleCore Connect Main Display

3.1.3 Connect Product to Computer

ScaleCore Connect supports interfacing to MSI *ScaleCore* products from serial (RS-232). The connection depends on the available interfaces of the particular *ScaleCore* product being used. Please refer to the specific device manual for more details on the interface capabilities.

3.2 Configuration/Setup

This section is a guide for setting up the product being read by the *ScaleCore Connect* program.

Prior to making changes to a product profile it is recommended to save a backup. See Acquire Profile from Device on page 42.

At anytime during set up, press **Cancel** to return to previous page without saving.

3.2.1 Connected Devices

Displays currently connected devices, they must be connected and powered on.

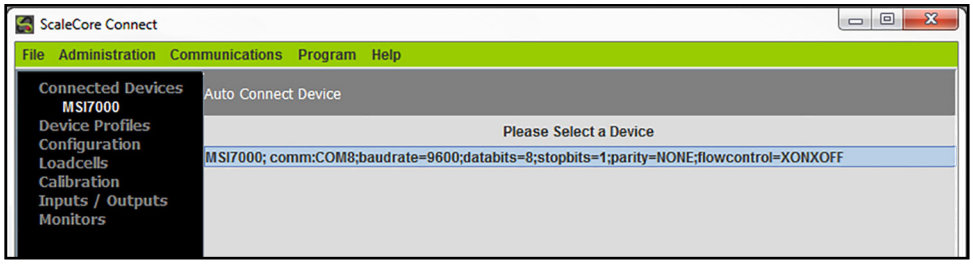


Figure 3-2. Connected Devices

1. Press **Auto Connect**. Connected devices display.
2. Select the device to configure and press **Select**.

3.2.2 Device Profiles

See Section 3.3 on page 38 for the advanced setup of the device profiles.

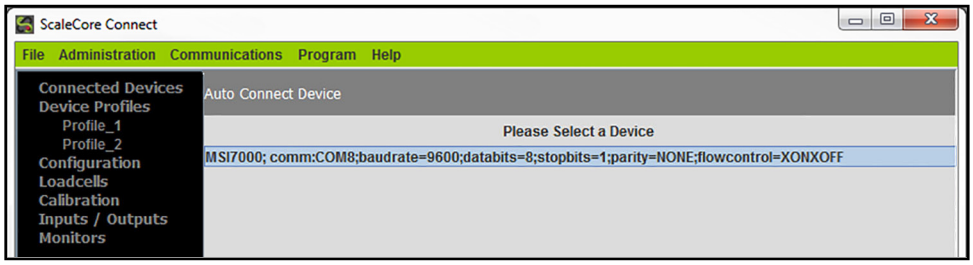


Figure 3-3. Device Profiles

3.2.3 Configuration

Auto Connect under configuration can be pressed to view available product. Use the rest of this menu to configure the product.

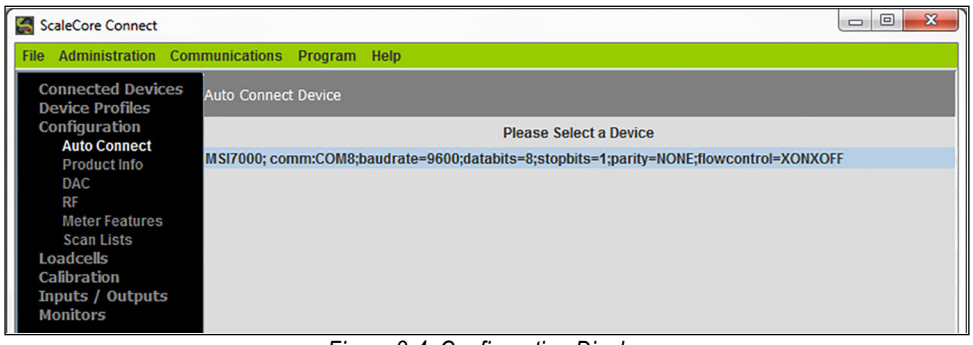


Figure 3-4. Configuration Display

Product Info

Product information is documented in this window.

NOTE: Do not change these settings without consulting Rice Lake Weighing Systems or a local dealer.

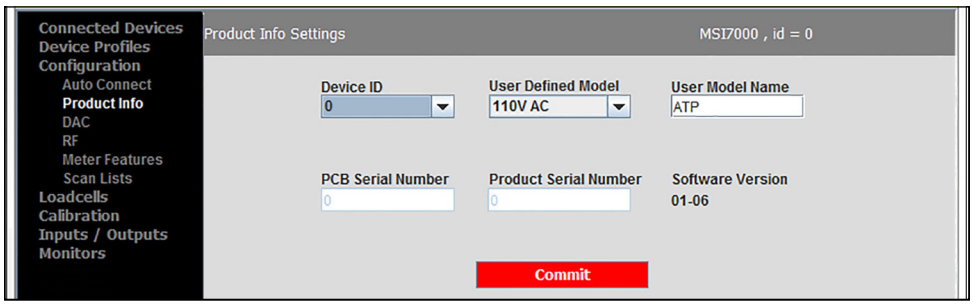


Figure 3-5. Product Info Settings

1. Select **Configuration**, then **Product Info**.
2. Enter the information for the product as follows:

   Device ID – number given to the current product (Selections: 1-255)

   User Defined Model – power source of current product

NOTE: Only 6V Battery and 110V AC (AC and 7-36V) are valid option for the MSI TranSend 7000 series products.

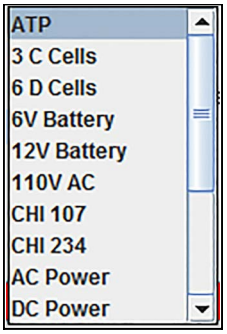


Figure 3-6. User Defined Model Selections

User Model Name – enter a name for the product

PCB Serial Number – serial number for the PCB board, read only

Product Serial Number – serial number of displayed product, read only

Software Version – displays the version of software currently installed, read only

3. Press **Commit** to save. New settings will not take affect until power is cycled on the product.

DAC Configuration

ScaleCore Connect provides controls for DAC (Digital to Analog Converter) output functions in *ScaleCore* (mV) products. Controls include calibration and manual control.

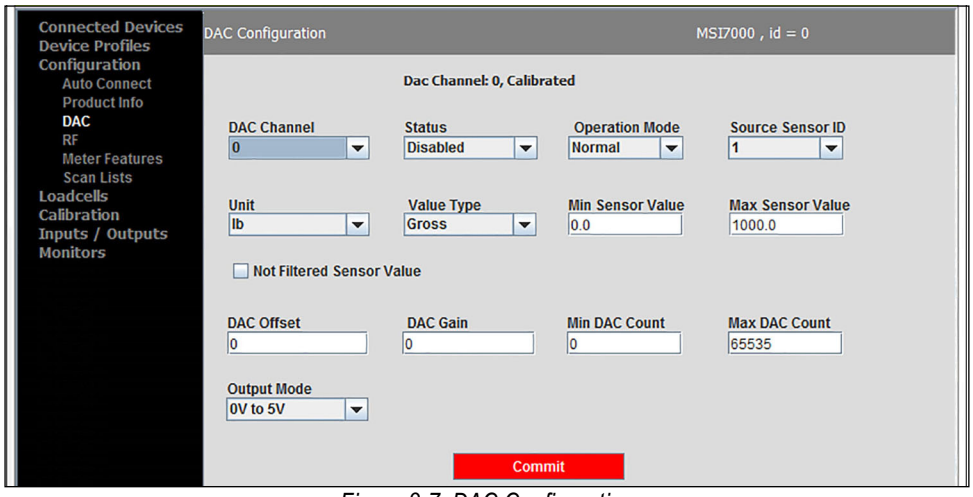


Figure 3-7. DAC Configuration

1. Select **Configuration**, then **DAC**.
2. Enter the information for the current product as follows:

   DAC Channel – select the channel to be used

   Status – select Disabled (default) or Enabled

   Operation Mode – select Normal (default) or Manual

   Source Sensor ID – select a number 1-16

   Unit – select unit to be used

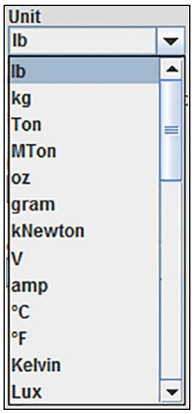


Figure 3-8. DAC Unit Selection

Value Type – select value type to be used

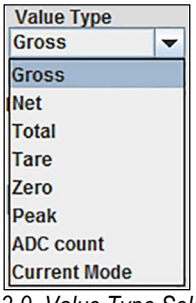


Figure 3-9. Value Type Selections

Min Sensor Value – enter min sensor value acceptable
Max Sensor Value – enter max sensor value acceptable
Not Filtered Sensor Value – check box is applicable
DAC Offset – current calibration value
DAC Gain – current calibration value
DAC Count – current calibration value
Min DAC Count – enter min DAC Count acceptable
Max DAC Count – enter max DAC Count acceptable
Output Mode – select output mode to be used

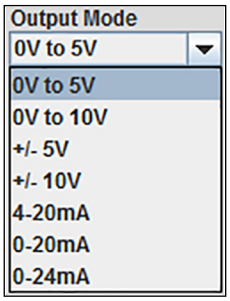


Figure 3-10. Output Mode Selections

3. Press Commit to save.

RF Configuration

Radio Frequency (RF) configuration allows the setup of RF cards available in the products connected.

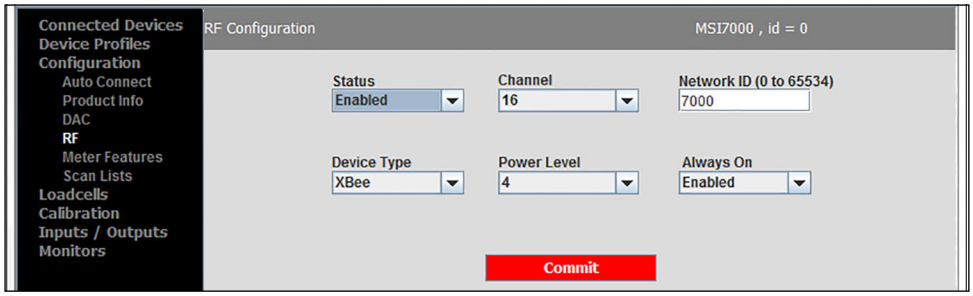


Figure 3-11. RF Configuration

1. Select **Configuration**, then **RF**.
2. Enter the following parameters:

   Status – select Enabled (default) or Disabled
   Channel – select a channel from 12-23
   Network ID – enter a number from 0-65534 for an ID
   Device Type – select XBee or Other (for all other cards installed)
   Power Level – select a level from 0-4 (only on transmitters; power level does not change on receivers)
   Always On – select Enabled or Disabled (default)

NOTE: Only set Always On to Enabled when using Rugged Remote. Having this parameter set to Enabled will drain the battery even when the scale if off. Disconnect the battery when not in use.

3. Press Commit to save. New settings will not take affect until power is cycled on the product.

Meter Features

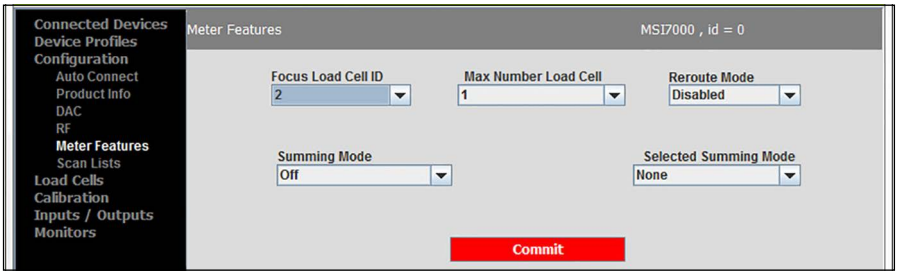


Figure 3-12. Meter Settings

1. Select **Configuration**, then **Meter Features**.
2. Enter the following parameters:

   Focus Load Cell ID – select a number from 1-5
   Max Number Load Cell – select a number from 1-4
   Reroute Mode – select Enabled or Disabled (default)
   Summing Mode – select a combination to add loads

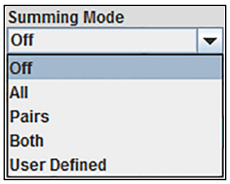


Figure 3-13. Summing Mode Selections

Selected Summing Mode – select an option if further definition is needed for summing

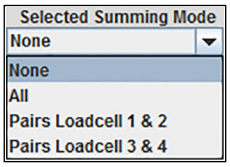


Figure 3-14. Selected Summing Mode Selections

3. Press **Commit** to save.

Scan Lists

Scan Lists will automatically scan all available serial ports for any attached *ScaleCore* devices.

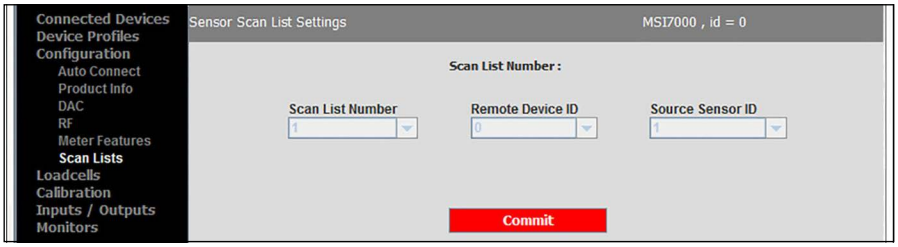


Figure 3-15. Scan Lists

1. Select **Configuration**, then **Scan Lists**.
2. Enter the following parameters:

   Scan List Number – select a scan list number
   Remote Device ID – select a remote device ID number
   Source Sensor ID – select a source sensor ID number

3. Press **Commit** to save.

3.2.4 Load Cells

The general load cell display allows the load cells' parameters to be set to for each load cell connected to the connected device.

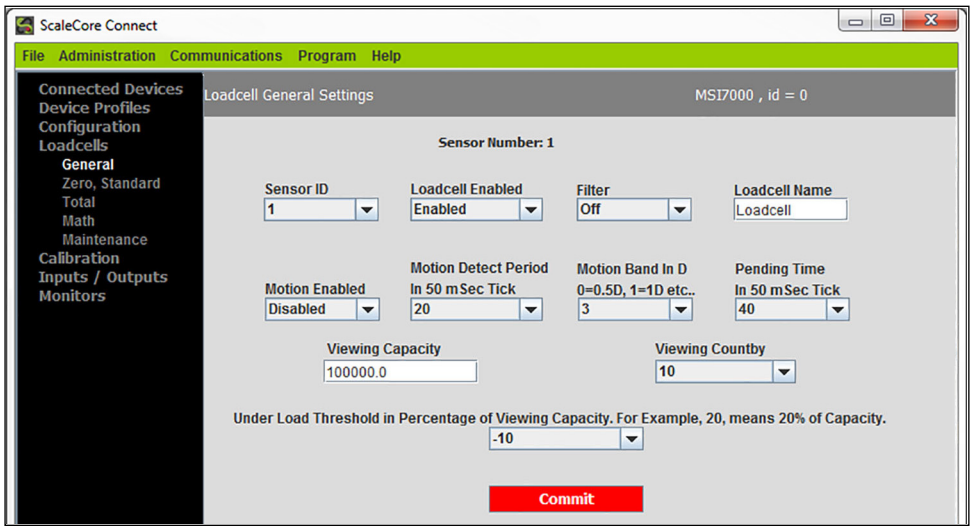


Figure 3-16. Load Cell General Settings

1. Select **Load Cells**, then **General**.
2. Set the following general parameters as needed for the current product:

   Load Cell Number – select a load cell number 1-5

   Load Cell Enabled – select Enabled (default) or Disabled

   Filter – set filtering to Off, Low, Medium or High

   Load Cell Name – enter a name to identify the load cell

   Motion Enabled – select Enabled or Disabled (default)

   Motion Detect Period in 50 mSec Tick – select a number from 1-255

   Motion Band In D, 0=0.5D, 1=1D etc. – select a number from 1-255

   Pending Time in 50 mSec Tick – select a number from 1-255

   Viewing Capacity – enter a capacity

   Viewing Countby – select 0.0001-5000

   Under Load Threshold – select a number from -100 to 90

3. Press Commit to save.

Zero Standard

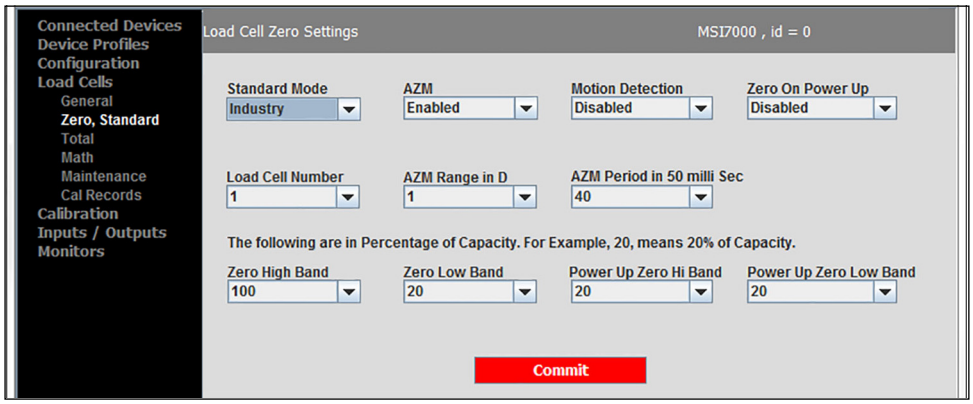


Figure 3-17. Load Cell Zero Settings

1. Select **Load Cells**, then **Zero, Standard**.

2. Enter the following parameters for the current product:

   Standard Mode – select Industry, NTEP, OIML or One Unit
   AZM – select Disabled or Enabled
   Motion Detection – select Disabled or Enabled
   Zero On Power Up – select Disabled or Enabled
   Load Cell Number – select the load cell number from 1-4
   AZM Range in D – select a number from the AZM range (0-255)
   AZM Period in 50 milli Sec – select a number from the AZM period (20-255)
   Zero High Band – select the zero high band number from 1-100 (in percentage of capacity)
   Zero Low Band – select the zero low band number from 1-20 (in percentage of capacity)
   Power Up Zero Hi Band – select the power up zero hi band number from 1-25 (in percentage of capacity)
   Power Up Zero Low Band – select the power up zero low band number from 1-20 (in percentage of capacity)

3. Press Commit to save.

Total

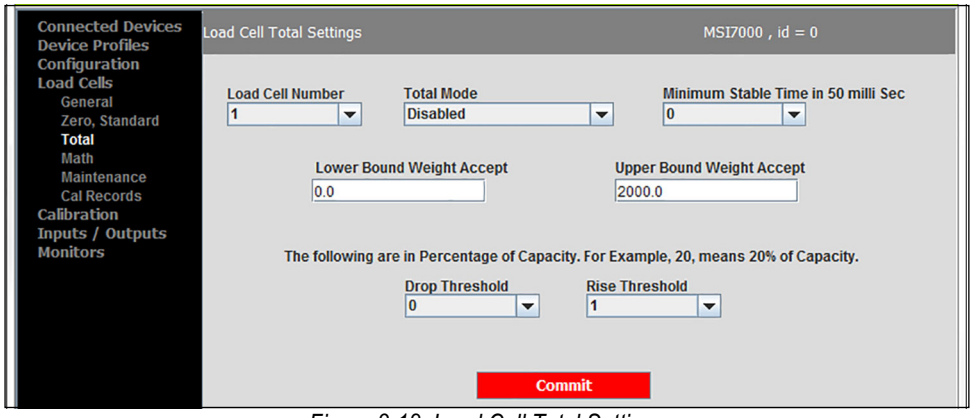


Figure 3-18. Load Cell Total Settings

1. Select **Load Cells**, then **Total**.
2. Enter the following parameters:

   Load Cell Number – select the load cell number from 1-5
   Total Mode – select the type of total mode for the connected product

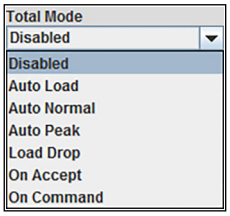


Figure 3-19. Total Mode Selections

   Minimum Stable Time in 50 milli Sec – select the minimum stable time from 0-255
   Lower Bound Weight Accept – enter the lower bound weight
   Upper Bound Weight Accept – enter the upper bound weight
   Drop Threshold – select the drop threshold number from 0-100
   Rise Threshold – select the rise threshold number from 0-100

3. Press Commit to save. New settings will not take affect until power is cycled on the product.

Math

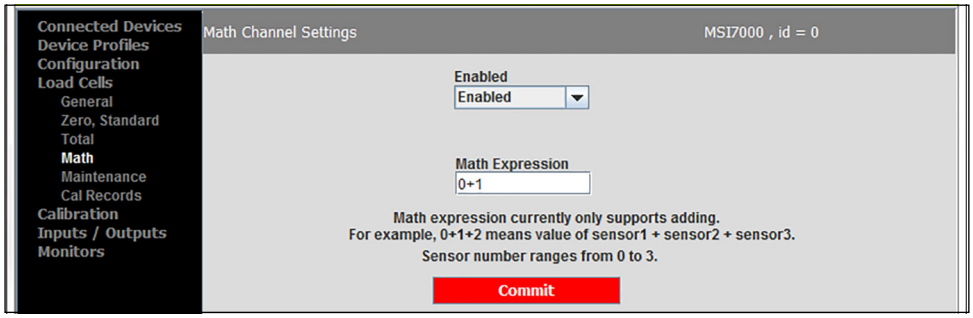


Figure 3-20. Math Channel Settings

1. Select **Load Cells**, then **Math**.
2. Enter the following parameters:

   Enabled – select Enabled or Disabled

   Math Expression – enter math expression
3. Press **Commit** to save.

Maintenance

See Section 3.3.6 on page 43 for the advanced setup of the maintenance settings.

NOTE: Do not change these settings without consulting Rice Lake Weighing Systems or a local dealer.

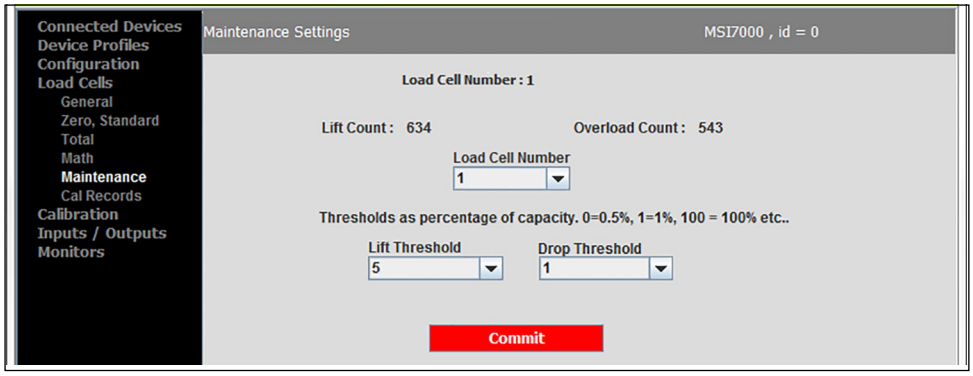


Figure 3-21. Maintenance Settings

Calibration Records

1. Select **Load Cells**, then **Cal Records**.
2. Select **Load Cell Number** and the recorded calibration settings for selected load cell displays.

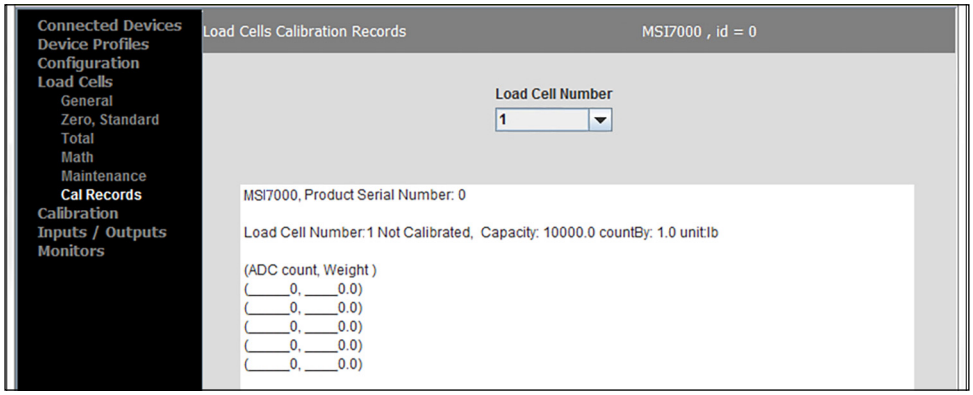


Figure 3-22. Calibration Records Settings

3.2.5 Calibration

A visual interface for performing the available types of load cell calibration to ensure the *ScaleCore* product is accurate.

The available methods of calibration are:

- **Full Cal Load Cell** – enter scale unit, capacity and countby
- **Re-Cal Load Cell** – uses current scale unit, capacity and countby
- **Full C-Cal Load Cell** – enter scale unit, capacity and countby; allows a calibration using a Constant Calibration (C-Cal) number without the requirement of test weights
- **Re-C-Cal Load Cell** – use current scale unit, capacity and countby; allows a calibration using a C-Cal number without the requirement of test weights
- **Multi Load Cell** – use when calibrating multiple load cells, perform a Full Calibration on each load cell to be calibrated

Full Calibration

1. Select **Calibration**, then **Full Cal Load Cell**.

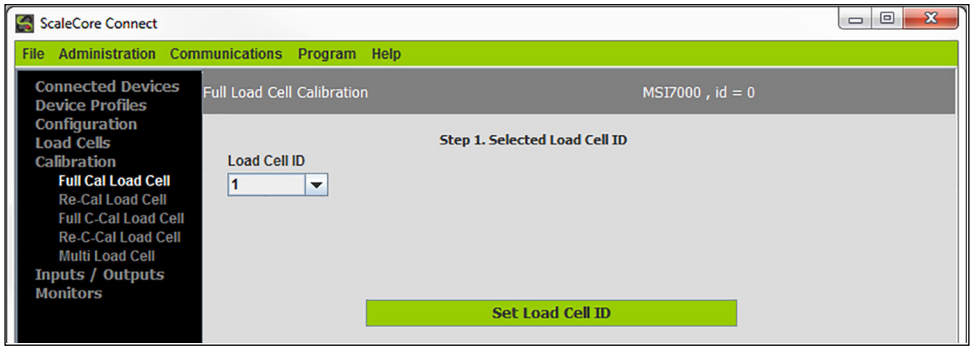


Figure 3-23. Select Load Cell ID

2. Select the **Load Cell ID** number from 1-4.
3. Press **Set Load Cell ID**.
4. Set the **Unit** and **Capacity** parameters.
5. Press **Set Unit And Capacity**.

NOTE: Press Cancel to end current calibration and restore the previous calibration.

6. Select the desired **Countby** parameter, then press **Set Selected Countby**.
7. Ensure there is no weight on the load cell, then press **Unload Test Weight**.
8. Enter the test weight value, then press **Set Test Weight #X**.
9. Press **Finish**. The constant cal number is displayed, document the number for use later if needed.
10. Repeat steps above for each load cell to be calibrated.

Re-Calibration

1. Select **Calibration**, then **Re-Cal Load Cell**.
2. Select the Load Cell ID number from 1-4.
3. Press **Set Load Cell ID**.
4. Ensure there is no weight on the load cell, then press **Unload Test Weight**.
5. Enter the test weight value, then press **Set Test Weight #X**.
6. Press **Finish**. The constant calibration number is displayed, document the number for use later if needed.
7. Repeat steps above for each load cell to be re-calibrated.

Full Constant Calibration

1. Select **Calibration**, then **Full C-Cal Load Cell**.
2. Press **Set Load Cell ID**.
3. Set the **Unit** and **Capacity** parameters.
4. Press **Set Unit And Capacity**.
5. Select the desired **Countby** parameter, then press **Set Selected Countby**.
6. Ensure there is no weight on the load cell, then press **Unload Test Weight**.
7. Enter the constant calibration number, then press **Set Constant Cal #**.

Constant Re-Calibration

1. Select **Calibration**, then **Re-C-Cal Load Cell**.
2. Press **Set Load Cell ID**.
3. Ensure there is no weight on the load cell, then press **Unload Test Weight**.
4. Enter the constant calibration number, then press **Set Constant Cal #**.

3.2.6 Inputs / Outputs

Setpoints

Setpoints provide a trip point for load values.

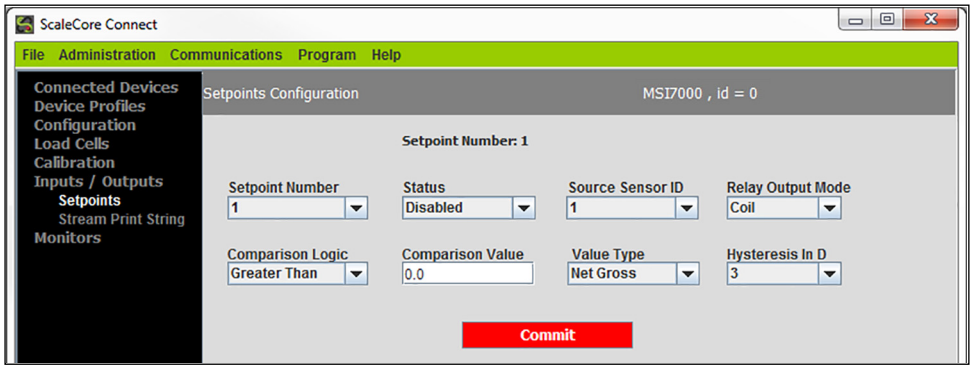


Figure 3-24. Setpoint Configuration

1. Select **Inputs / Outputs**, then **Setpoints**.
2. Enter the following parameters:

   Setpoint Number – select the setpoint number from 1-3
   Status – select Disabled or Enabled
   Source Sensor ID – select the source sensor ID number from 1-5
   Relay Output Mode – select Coil or Latch
   Comparison Logic – select Undefined, Greater Than or Less Than
   Comparison Value – enter the comparison value
   Value Type – select the value type parameter

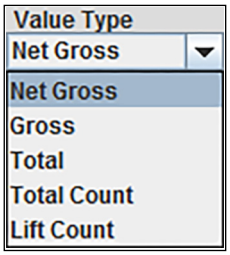


Figure 3-25. Value Type Selections

   Hysteresis in D – select the hysteresis in D number from 0-99

3. Press Commit to save.

Stream Print String

See Section 3.3.7 on page 44 for the advanced setup of the stream print string settings.

NOTE: Do not change these settings without consulting Rice Lake Weighing Systems or a local dealer.

3.2.7 Monitors

Select the view to be used for viewing the data from the product.

Terminal

Streams the data in a print format.

Meter

Displays a meter view for viewing and troubleshooting.

3.3 Advanced Setup

This section is a guide for the advanced setup of the product being read by the *ScaleCore Connect* program. The following setup instructions are for dealers or service technicians only. Please contact Rice Lake Weigh Systems or a local dealer for assistance before proceeding.

Prior to making changes to a product profile it is recommended to save a backup. See Acquire Profile from Device on page 42.

At anytime during set up, press Cancel to return to previous page without saving.

3.3.1 File Menu

The ***File Menu*** is used to open an existing profile or exit the program.

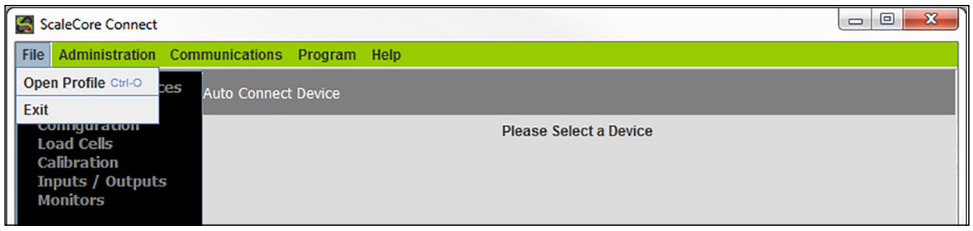


Figure 3-26. File Menu Selections

Open Profile

Profiles can be exported and saved, then imported into a different product. To open a previously saved profile:

1. Select **File**, then **Open Profile**.
2. Navigate to where the profile is stored.
3. Select the file and press Open. A valid profile file then displays on the left panel, under Device Profile.
4. Select the intended profile from the left panel. Application displays all information as if it was that device.

NOTE: The profiles that show up grayed out are read only.

To clone the open profile see Clone Profile to Device on page 42.

Exit

To close *ScaleCore Connect* application.

3.3.2 Administration Menu

Administration allows the setup of User Privileges. Selections are Normal User Mode and Administrator Mode. The current password must be available to complete this setup.

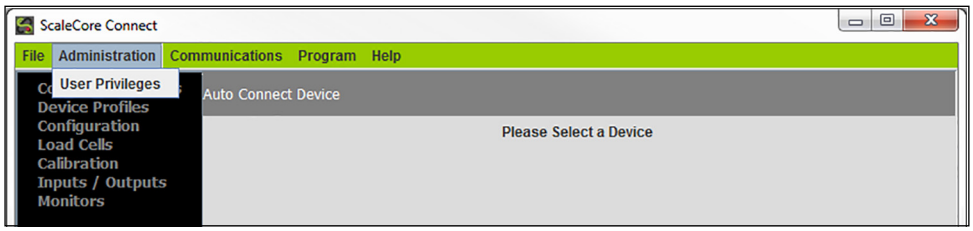


Figure 3-27. Administration Menu Selection

1. Select **Administration**, then **User Privileges**. User Privileges window displays.

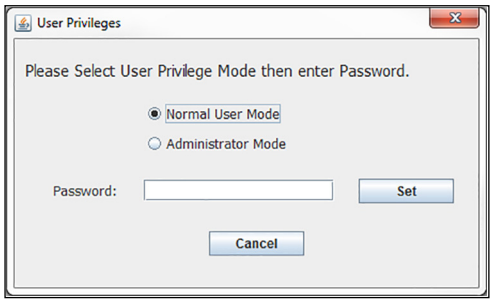


Figure 3-28. User Privileges

2. Select either Normal User Mode or Administrator Mode.
3. Enter the password and press Set.

3.3.3 Communications

Communications allows the selection and configuration of the stream ports.

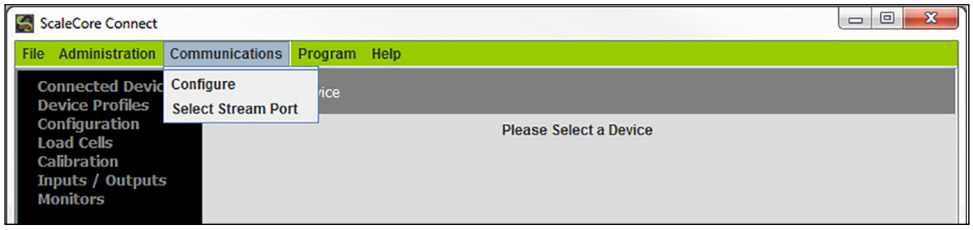


Figure 3-29. Communications Menu Selections

To select the stream port:

1. Select **Communications**, then **Select Stream Port**.
2. Select the port to be used from the drop down.

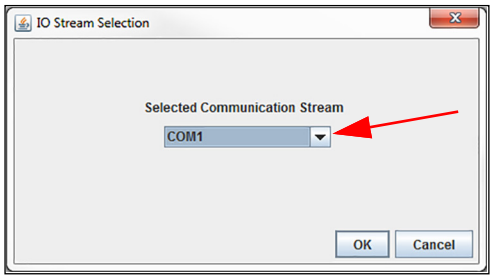


Figure 3-30. Select Stream Port

3. Press OK to save and return to main page.

Stream Port Setup

To configure communications stream ports:

1. Select **Communications**, then **Configure**.
2. Select the port to be configured and press Configure Stream.

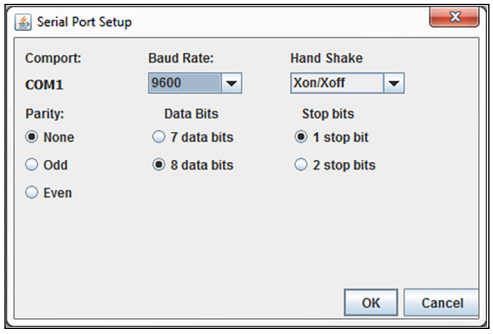


Figure 3-31. Communication Setup

3. Set the option:
   - **Baud Rate** – Rate at which information is transferred through the port
     Selections: 9600 (default), 19200, 38200, 57600, 115200
   - **Hand Shake** – Signals transmitted back and forth over a communications network in order to establish a valid connection between two stations.
     Example: A hardware handshake uses dedicated wires like request-to-send (RTS) and clear-to-send (CTS) lines in an RS-232 serial transmission
     Selections: None, RTS/CTS, XON/XOFF (default)
   - **Parity** – error detection technique that tests the integrity of digital data in the computer
     Selections: None (default), ODD, EVEN
   - **Data Bits** – number of bits used to represent one character of data
     Selections: 7 data bits, 8 data bits (default)
   - **Stop Bits** – indicates end of a character or of the whole transmission
     Selections: 1 stop bit (default), 2 stop bits
4. Press OK to save and return to Communication Setup.
5. Press OK to return to main page.

3.3.4 Program

Program is used to program the application code, acquire a profile from a connected device or clone a profile from another connected product.

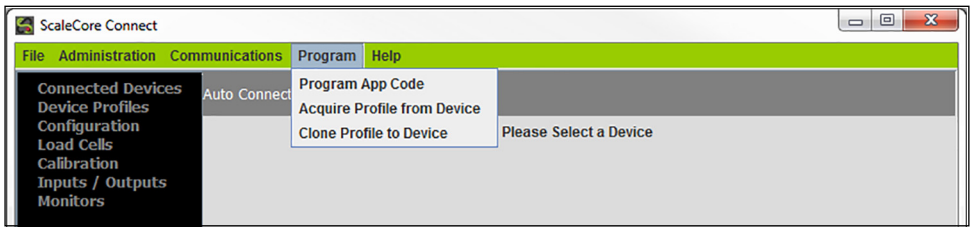


Figure 3-32. Program Menu

Program App Code

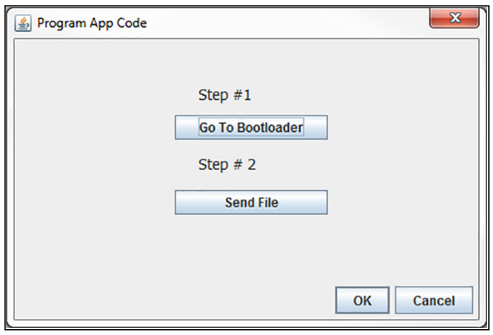


Figure 3-33. Program App Code

1. Select **Program App Code** from the **Program** drop down menu.
2. Press **Go To Bootloader**, application switches to the terminal mode screen and displays the bootloader menu.

   ** If the terminal mode screen displays strange characters, change the baud rate to 38400. See Stream Port Setup on page 40 to change the baud rate. Once the baud rate has been changed, make sure cursor is in the terminal screen and press the "R" key to refresh the terminal screen. The bootloader menu will display.*

   ** If the unit shuts off after pressing the Go To Bootloader button, press the power key to restart the unit and the bootloader menu will display on the terminal screen.*

3. Press **Send File**, a file dialog box pops-up.
4. Select an app code file from the file dialog box, press **Open**, app code file is sent to the target device.

Acquire Profile from Device

ScaleCore Connect will acquire the profile from an attached device.

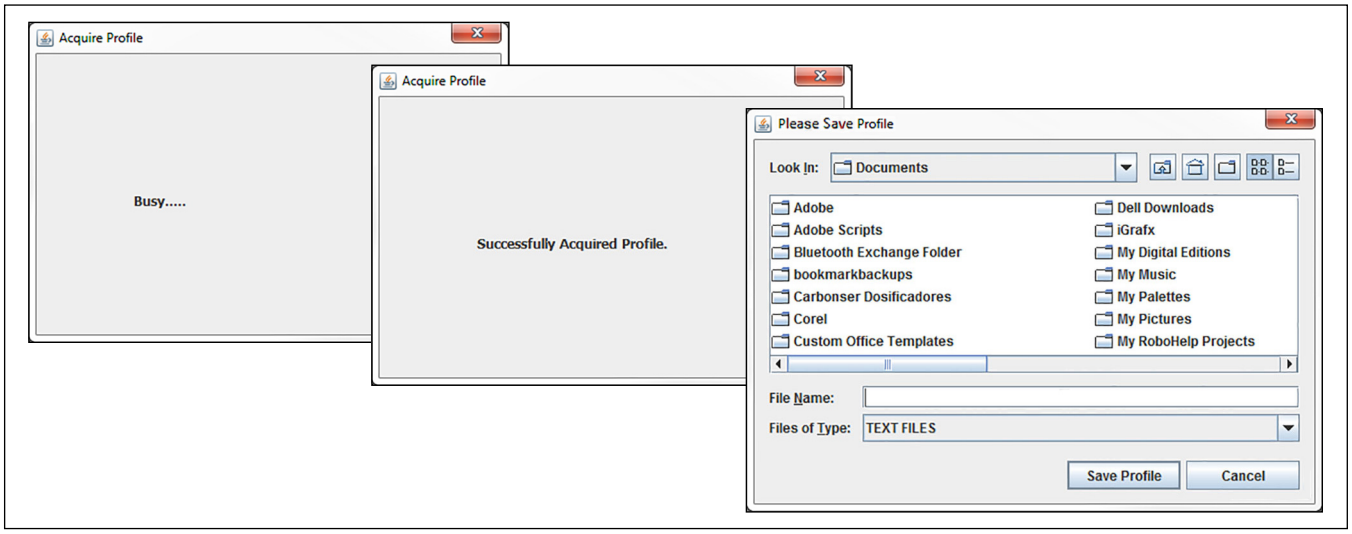


Figure 3-34. Acquire Profile

1. Select **Acquire Profile from Device** from the **Program** drop down menu.
2. When prompted save the file to desired location.

Clone Profile to Device

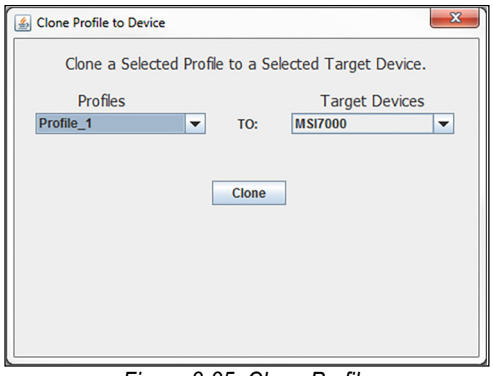


Figure 3-35. Clone Profile

1. Select **Clone Profile to Device** from the **Program** drop down menu.
2. Select the Profiles to clone to the Target Devices.
3. Press Clone.
4. Once profile is successfully cloned to the target device, the target device is configured based on the cloned profile info.

NOTE: For example, a user can acquire a profile from Device A and saved it as Profile_A. Then select this Profile_A and clone it to Device B. Device B will now behave like Device A.

3.3.5 Device Profiles

A device profile contains the entire settings of a device, such as load cell calibration, communication settings, setpoints, relay, print string, etc.

3.3.6 Maintenance

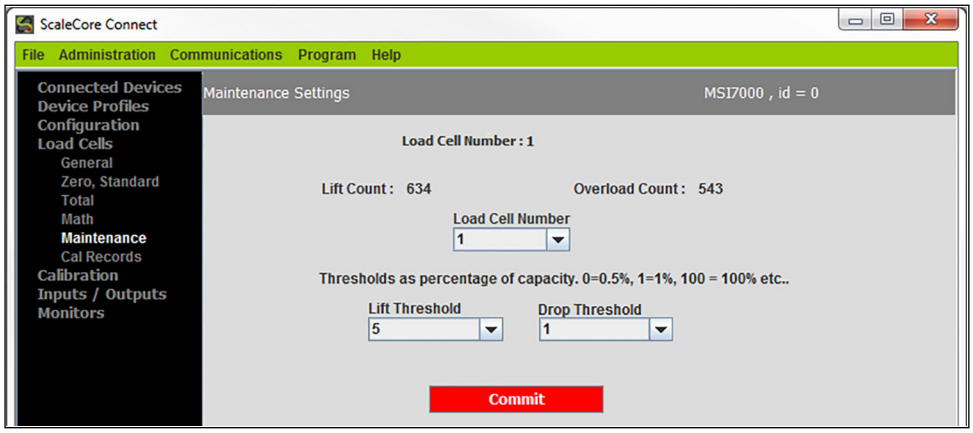


Figure 3-36. Maintenance Settings

1. Select **Load Cells**, then **Maintenance**.
2. Enter the following parameters:

   Sensor ID – select the sensor ID from 1-4

   Lift Threshold – select the lift threshold number from 0-100

   Drop Threshold – select the drop threshold number from 0-100

3. Press Commit to save.

3.3.7 Stream Print String

Listeners

The Listeners feature controls the machine to machine communications interfaces.

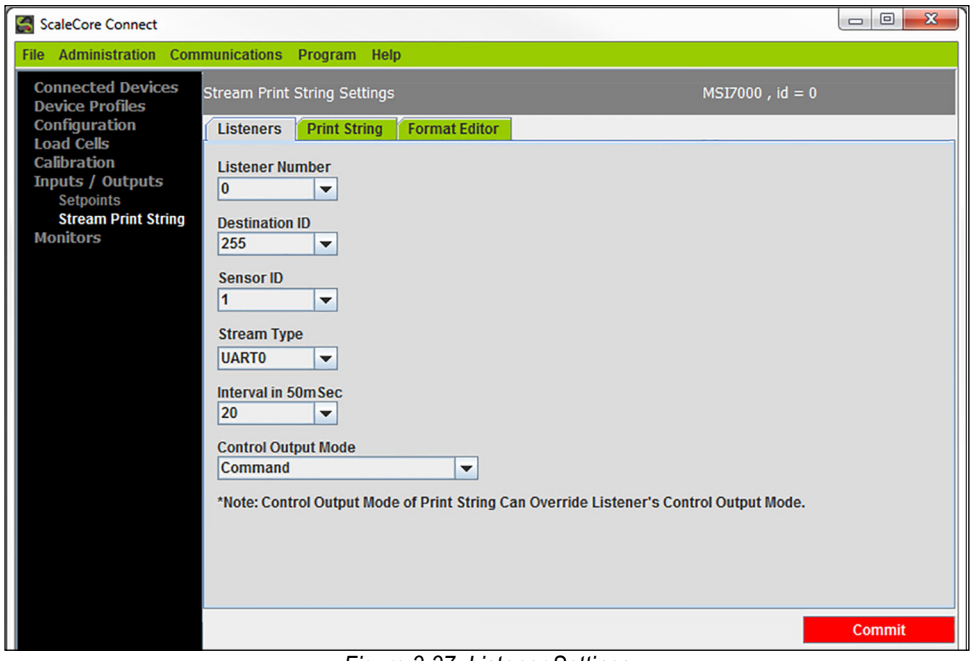


Figure 3-37. Listener Settings

1. Select **Inputs / Outputs**, then **Stream Print String**.
2. Select the **Listeners** tab.
3. Enter the following parameters:

   Listener Number – select stream listener number from 0-2

   Destination ID – select the ID assigned to the stream listener from 0-255; 255 indicates broadcast ID, it is for every device that attached

   Sensor ID – select the sensor the listener will observe from 1-5

   Stream Type – select the type of this stream listener

   Interval in 50mSec – select interval value from 0-255; *example, 20 means 20x50milliSec = 1 second*

   Control Output Mode – select the mode for the listener

4. Press **Commit** to save.

Print String

The edit print string, allows the mode, interval and composite for a listener to be configured. The mode can be configured to print on command, on stable load, continuous, or it can be disabled. The print composite allows the combination of the configured print formatters to produce a great deal of information in a single print.

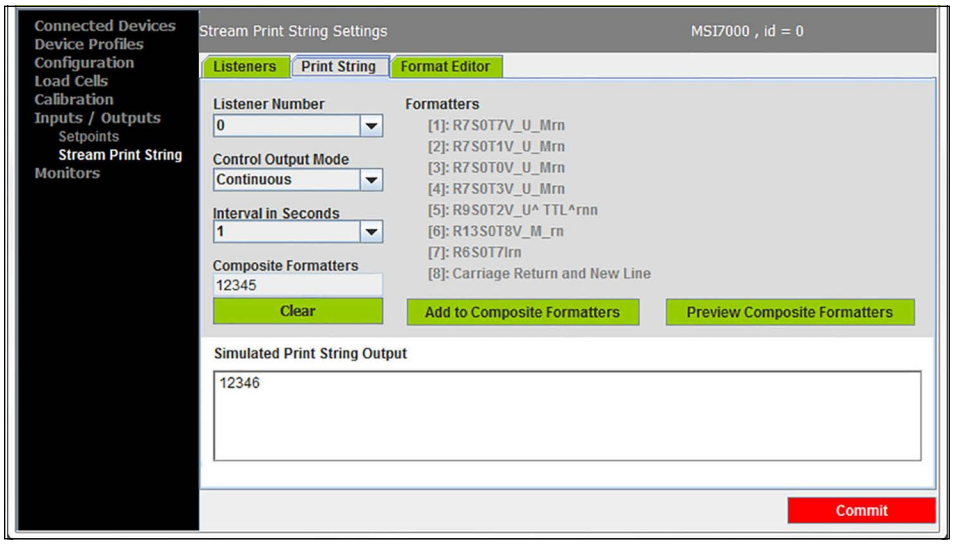


Figure 3-38. Print String Settings

1. Select **Inputs / Outputs**, then **Stream Print String**.
2. Select the **Print String** tab.
3. Enter the following parameters:

   Listener Number – select stream listener number from 0-2
   Control Output Mode – select the output mode for the print string; Disabled, Command, Stable Load, Continuous
   Interval in Seconds – select the interval period on continuous output from 0-255; 0 (fastest) up to 255 seconds
   Composite Formatters – add formatters from list; preview as needed; clear to reset selected formatters

4. Press **Commit** to save.

Format Editor

The format editor function allows customization of the formatted print information that a *ScaleCore* device can produce. Custom print formatters can be generated with the help of the custom interface within the format editor.

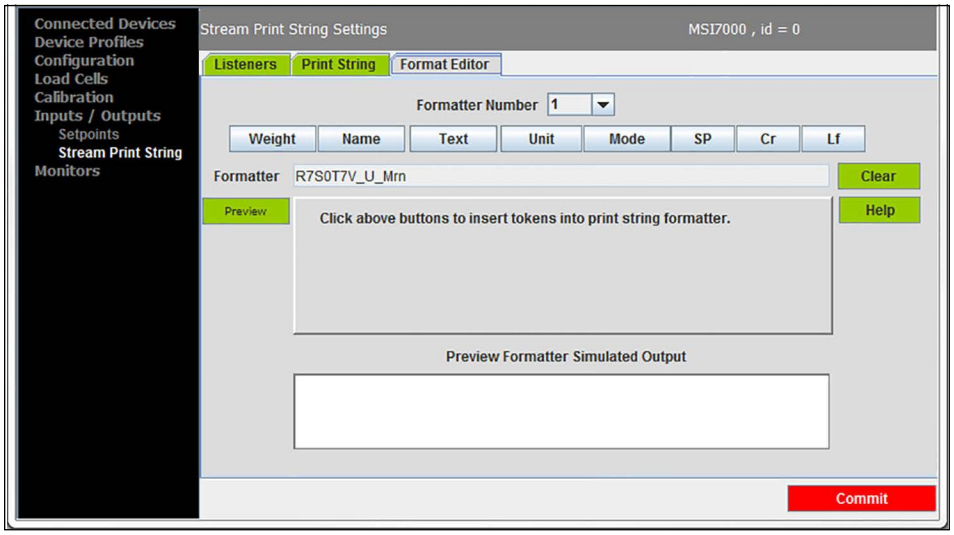


Figure 3-39. Format Editor

Use the buttons to create the string or type it into the formatter box. The maximum length for this print string is 18 characters.

4.0 MSI mV Scale Calibration

Use the following instructions to calibrate an MSI TranSend 7000 Series receiver unit. The ***MSI mV Scale Calibration*** software can be downloaded from the Rice Lake Weighing Systems website.

1. Power on the transmitter and receiver units.
2. On the connected computer, navigate to the ***MSI mV Scale Calibration*** program.
3. Double click MSI mV Scale Calibration.exe.
4. Select ***Calibration*** from the drop-down menu.

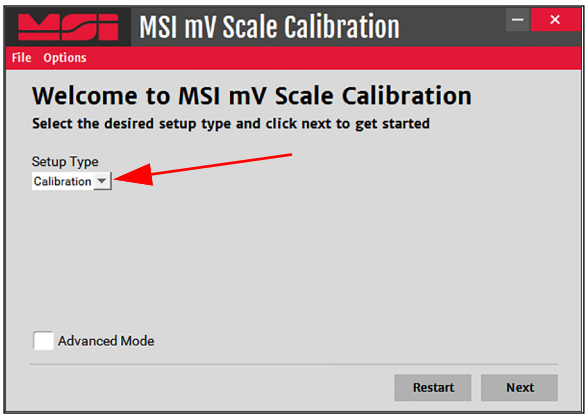


Figure 4-1. Calibration

5. Press **Next**.
6. Select the COM port the *SendIt* receiver is connected to from the drop-down menu.

NOTE: All other terminal windows must be closed (ScaleConnect/Tera Term).

If no Com Port selection is available, ensure the serial cables are properly connected, the drivers are installed properly and that the SendIt Pair is powered up. Once an acceptable connection has been made, restart the calibration program.

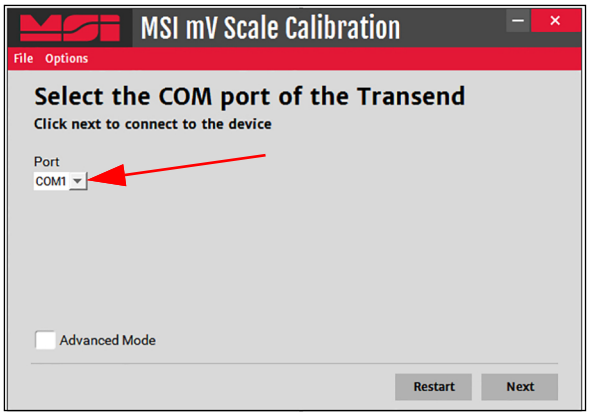


Figure 4-2. COM Port Selection

7. Check the ***Advanced Mode*** dialogue box to change the upper and lower range percent detected by the *SendIt* system, if necessary.

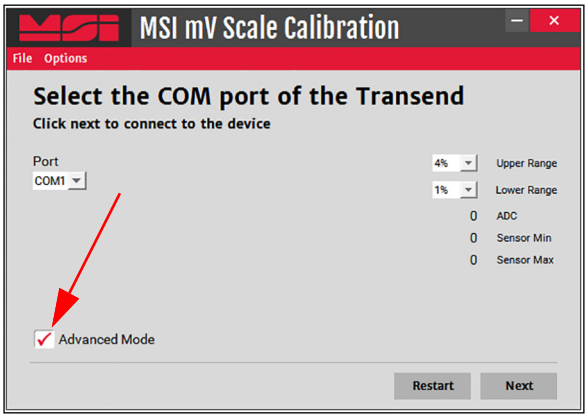


Figure 4-3. Advanced Mode

8. Press **Next**.
9. Enter the total scale capacity.

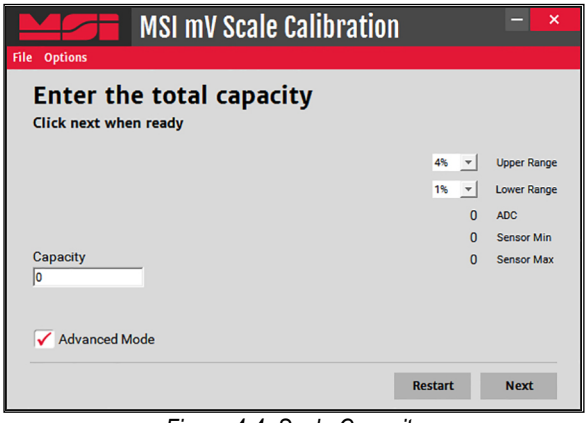


Figure 4-4. Scale Capacity

10. Press **Next**.
11. Remove all weight from the scale.

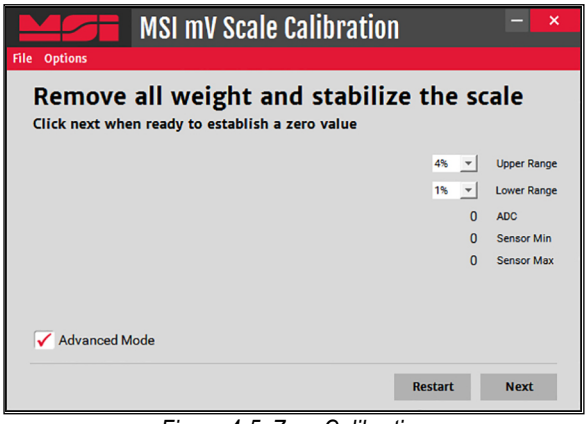


Figure 4-5. Zero Calibration

12. When scale is stable, press **Next**.

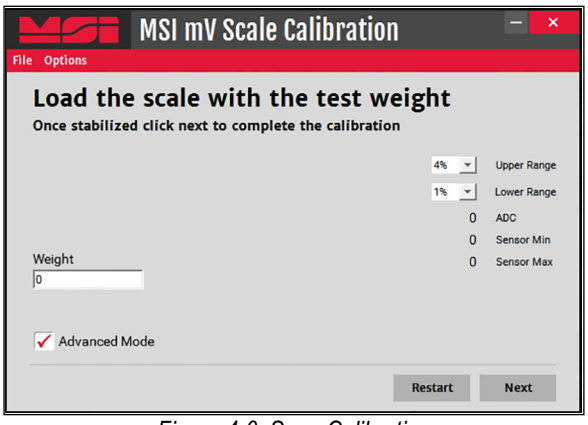


Figure 4-6. Span Calibration

13. Load test weights onto the scale.
14. Enter the appropriate weight value in the weight dialogue box.
15. Press **Next**. ***Calibration Complete*** displays.

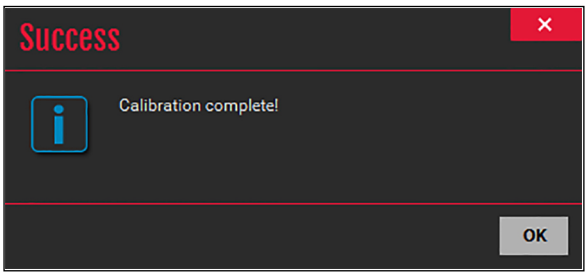


Figure 4-7. Calibration Complete

16. Press **OK** to return to the calibration start display.
17. Calibrate the indicator, see the indicator manual for instructions.

5.0 Optional Rugged Remote

The MSI-7000 with an installed RF modem can be controlled with an optional Rugged Remote. The Rugged Remote is a transmit only device that can be used to perform basic scale functions. The range may vary up to 100' or more depending on room conditions and line of sight.

The RF modem in the MSI-7000 must be configured to accept communication from the Rugged Remote, contact Rice Lake Weighing Systems for pairing requirements.

NOTE: A Rugged Remote is paired to an individual device and cannot be reprogrammed in the field.

Figure 5-1. Rugged Remote

5.1 Operation

The Rugged Remote is paired to a single ScaleCore RF device and replicates the front panel buttons. Slight variations between each device's buttons will result in different operation in the Rugged Remote. See Table 5-1 for corresponding buttons for the Rugged Remote and the connected device.

NOTE: The Rugged Remote can only be paired to a single ScaleCore device. Reprogramming to configure communication to a different ScaleCore device can only be performed at the factory or with the purchase of additional RF modems.

Rugged Remote	Description
POWER	Power
ZERO	Zero
TARE/F1	Tare
FCN/F2	Function

Table 5-1. Corresponding Buttons

5.1.1 Power

The Rugged Remote can be enabled to turn on and off the ScaleCore device it is paired remotely. The hold function must be enabled.

NOTE: The Hold feature causes the device's modem to stay on and continuously draw from the battery, even when the device is turned off, resulting in decreased battery life.

5.1.2 Zero

Press ZERO to remove small deviations in zero when the scale is unloaded.

This key is not programmable.

5.1.3 Tare

Press TARE/F1 to tare the scale.

5.1.4 Programmable Function Keys

TARE/F1 and FCN/F2 are programmable in the scale. Function is defaulted to Test. See scale manual to configure the function key for Rugged Remote operation.

5.2 Conflict and Jamming Considerations

It is important to understand that only one transmitter at a time can be activated within a reception area. While the transmitted signal consists of encoded digital data, only one carrier of any frequency can occupy airspace without conflict at any given time. This is not to say that there cannot be multiple remote controls for the unit, but rather that two cannot be used simultaneously.

5.3 FCC Compliance

The Rugged Remote has 802.15.4 certification (Section 2.8 on page 19).

6.0 Specifications

Power
MSI-7000: 5-6 VDC, 7-36 VDC, 85-265 VAC
MSI-7001: 5-6 VDC, 7-36 VDC, 85-265 VAC
MSI-7000HD: 7-36 VDC, 9-36 VDC, 85-265 VAC
MSI-7001HD: 5-6 VDC, 7-36 VDC, 9-36 VDC, 85-265 VAC

Excitation Voltage
Transmitter: +4.8 VDC, 16 x 350 ohm or 32 x 700 ohm load cells

Standard Antenna
1/2 wave 2dBi, articulated

Frequency
Direct sequence spread spectrum at 2.4 GHz, 802.15.4

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

Communication Ports
Full duplex RS-232

Circuit Protection
RFI, EMI, ESD protection

Operating Temperature
-40 °F to 185 °F (-40 °C to 85 °C)

Rating/Material
MSI-7000 TranSend: NEMA Type 4 (IP65), aluminum black powder coated (excludes wall cube model)
MSI-7001 TranSend: NEMA Type 4 (IP65), aluminum black powder coated (excludes wall cube model)
MSI-7000HD/MSI-7001HD: IP66, Milled Anodized Aluminum

Additional RF Options
Wi-Fi
802.15.4
FHSS

Warranty
One-year limited

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