CLS-920i

920i® Cargo Lift Scale

Installation Manual

RICE LAKE™
WEIGHING SYSTEMS
Commitment Beyond Measurement®

ISO 9001 REGISTERED

96312

Contents

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About This Manual

This manual is intended for use by individuals responsible for installing the CLS-920i Cargo Lift Scale along with the 920i HMI digital weight indicator. This manual covers information on the installation of the scale carriage, signal cable installation (if applicable), and the installation, configuration, and calibration of the 920i HMI digital weight indicator.

NOTE: ***While the functionality remains the same for the standard 920i HMI digital weight indicator, there are certain menu choices found in the User Configuration section of this manual that are specific to this application.***

Warning *Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.*

Warning *Take all necessary safety precautions when installing the scale carriage, including wearing safety shoes, protective eyewear, and using the proper tools.*

The *CLS-920i Operator Card*, PN 96313 included with this manual, provides basic operating instructions for users of the CLS-920i and the 920i HMI digital weight indicator. Please leave the operator card with the indicator when installation and configuration is complete.

1.0 Introduction

The CLS-920i Cargo Lift Scale is a rugged, dependable cargo lift scale that can withstand many years of repeated use. When mounted on a forklift, the CLS-920i saves time and money by allowing you to weigh loads immediately when you pick them up with a forklift instead of carrying the load to a floor scale.

The CLS-920i is used with Rice Lake's 920i HMI digital weight indicator and the setup and calibration of the indicator is discussed in detail in the following sections.

Onboard Features

Features of the basic cargo lift scale include:

1.1 Scale Carriage

Features of the scale carriage include:

- NTEP approved, Class III, 5,000 lb, 1:1000
- Class II forklift with 16" cleat style carriage
- Two (2) stainless steel load cells
- Cover plate
- Mechanical overload protection
- Flexure plates with bolts welded into place
- Welded centering pin
- View port
- Two-channel iQube
- Wired or wireless communication

Figure 1-1. Fork Lift with CLS-920i

1.2 Considerations Before Installation

While the CLS-920i Cargo Lift Scale will fit most typical forklifts, there are certain considerations that must be taken into account prior to installing the scale. Due to the extra weight of the CLS-920i, the net lifting capacity of the forklift is decreased by approximately 10%. Use the following formula below, to calculate the net capacity of the unit.

NOTE: ***Formulas can give you a good estimate of how capacity will be affected. But you should work closely with your forklift manufacturer before making a decision. Their data reflects, in most cases, testing with specific forklifts and attachments.***

$$\text{Net Capacity} = \frac{A(B + C) - D(E + F)}{E + G + H}$$

Where:

A = Truck basic capacity in pounds

B = Inches from the front wheel center line to fork face

C = Inches from fork face to truck rating point (usually 24")

D = Weight of the scale in pounds (*428 lbs*)

E = Inches from the front wheel center line to the carriage face

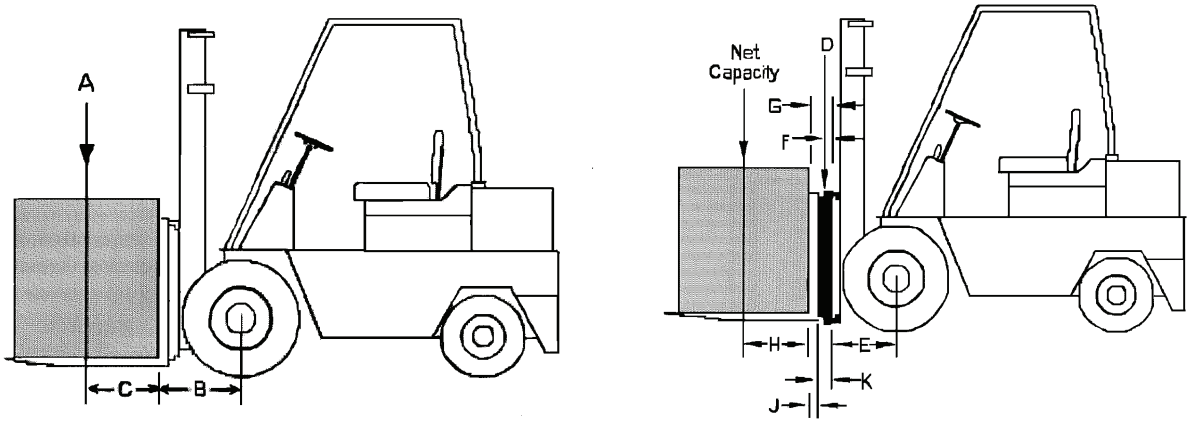
F = Inches from the carriage face to scale Horizontal Center of Gravity (HCG)

G = J + K (inches from the carriage face to rear face of load

H = Inches from fork face to new truck rating point

J = Thickness of fork

K = Thickness of scale



Caution **Another consideration is the indicator power source will be connected directly to the battery of the forklift. Most typical is 12 volts for propane, gas and diesel forklifts. However, some diesel forklifts are 24 volts.**

The CLS Series Cargo Lift scale will not operate on a positive ground forklift. Verify the forklift has a negative ground electrical system. Refer to the forklift users manual to further verify grounding requirements.

1.2.1 CLS Classes and ID Plates

During the initial sale or installation of the CLS-920i, you need to remind your customer that they must have an ID plate on their forklift updated stating the new lifting capacity and center of gravity information. This requirement is per OSHA rules and regulations.

1.3 920i Digital HMI Indicator

Features of the basic *920i* include:

- Support for A/D scale or serial scale inputs. The maximum number of scale inputs is 28; these can be combined to represent up to 32 scale configurations.
- Four digital I/O channels on main board, each configurable as either input or output.
- Four serial ports on main board (Ports 1–4) support duplex RS-232 up to 115200 bps. Port 2 supports hardware handshaking and remote keyboard input; Ports 3 and 4 support 20mA output; Port 4 supports 2-wire RS-485 communications.
- External DB-9 and DIN-8 connectors for serial connection to a PC and attachment of PS/2-type remote keyboard.

1.3.1 Front Panel

The *920i* front panel, shown in Figure 1-2, consists of a 27-button keypad with a large backlit LCD display. The keys are grouped as five configurable softkeys, five primary scale function keys, four navigation keys, and numeric entry keys.

Weight information is displayed with a graphical scale in six font sizes up to 1.2 inches. Up to four scale widgets can be displayed in legal-for-trade, multiple-scale applications. Status areas on the display are used for operator prompts and entering data. The remainder of the display can be graphically configured for representation of a specific application. Display contrast can be adjusted with the LCD contrast potentiometer.

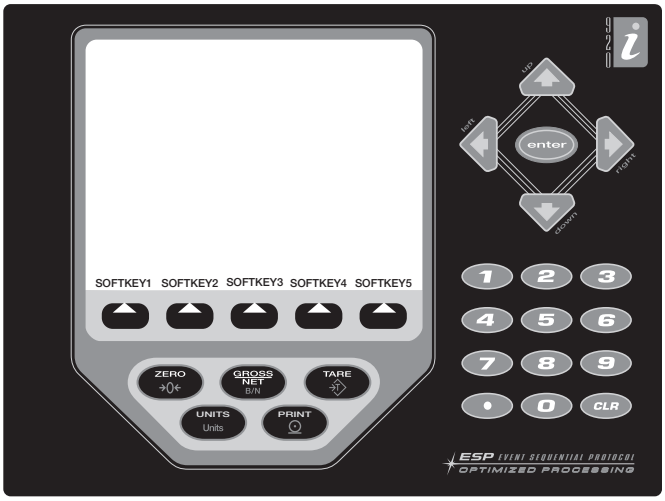


Figure 1-2. 920i Front Panel

1.3.2 Enclosures

The *920i* is housed in a stainless steel enclosure that is rated for NEMA 4X/IP66.

1.3.3 Operating Modes

The *920i* has two modes of operation:

Normal mode

Normal mode is the weighing mode of the indicator. The indicator displays gross, net, or tare weights as required, using the secondary display to indicate scale status and the type of weight value displayed. Once configuration is complete and a legal seal is affixed to the large fillister-head screw on the indicator enclosure, this is the only mode in which the *920i* can operate.

Setup mode

Most of the procedures described in this manual require the indicator to be in setup mode, including configuration and calibration.

To enter setup mode, remove the large fillister head screw from the enclosure. Insert a screwdriver or a similar tool into the access hole and press the setup switch once. The indicator display changes to show scale configuration menus.

1.3.4 Indicator Operations

Basic *920i* operations are summarized below:

Toggle Gross/Net Mode

Press the GROSS/NET key to switch the display mode from gross to net, or from net to gross. If a tare value has been entered or acquired, the net value is the gross weight minus the tare. If no tare has been entered or acquired, the display remains in gross mode.

Gross mode is indicated by the word Gross (or Brutto in OIML mode); net mode is indicated by the word Net.

Toggle Units

Press the UNITS key to switch between primary, secondary, and tertiary units.

Zero Scale

1. In gross mode, remove all weight from the scale and wait for the standstill annunciator (◣◢).
2. Press the ZERO key. The center of zero (→0←) annunciator lights to indicate the scale is zeroed.

Acquire Tare

1. Place container on scale and wait for the standstill annunciator (◣◢).
2. Press the TARE key to acquire the tare weight of the container.
3. Display shifts to net weight and shows the word *NET* on the display.

Remove Stored Tare Value

1. Remove all weight from the scale and wait for the standstill annunciator (◣◢).
2. Press the TARE key (or, in OIML mode, the ZERO key). Display shifts to gross weight and shows the word Gross.

Print Ticket

1. Wait for the standstill annunciator (◣◢).
2. Press the PRINT key to send data to the serial port.

Accumulator Functions

The accumulator must be enabled before use in either normal mode or setpoint operations. Once enabled, weight (net weight if a tare is in the system) is accumulated whenever a print operation is performed using the PRINT key, digital input, or serial command. The scale must return to zero (net zero if a tare is in the system) before the next accumulation.

The Display Accum softkey can be configured to display the current accumulator value. Printing while the accumulator is displayed, or when the setpoint PSHACCUM function is active, uses the ACCFMT print format

Press the CLEAR key twice to clear the accumulator.

1.3.5 Softkey Operations

Softkeys can be defined to provide additional operator functions for specific applications. Softkey assignments are listed on the tabs shown at the bottom of the LCD display; softkey functions are activated by pressing the **arrow** keys below the softkey tabs (Figure 1-2 on page 3).

The particular set of softkeys shown on the display is determined by the indicator configuration and program.

Softkey	Description
Time/Date	Displays current time and date; allows time and date change.
Display Tare	Displays tare value for the current scale
Display Accum	Displays accumulator value, if enabled, for the current scale.
Display ROC	Displays rate-of-change value, if enabled, for the current scale.
Setpoint	Displays a menu of configured setpoints; allows display and change of some setpoint parameters.
Batch Start	Starts a configured batch.
Batch Stop	Stops a running batch and turns off all associated digital outputs. Requires a batch start to resume processing.
Batch Pause	Pauses a running batch. (Same as stop, but digital outputs, if on, are not turned off.)
Batch Reset	Stops a batch and resets it to the first batch step.
Weigh In	Allows truck ID entry; generates weigh-in ticket for truck weighing applications.
Weigh Out	Allows truck ID entry; generates weigh-out ticket for truck weighing applications.
Truck Regs	Displays truck register; allows deletion of individual or all entries. Truck register can be printed by pressing the **PRINT** key while the truck register is displayed.
Unit ID	Allows display or change of Unit ID.
Select Scale	For multi-scale applications, provides a prompt to enter the scale number to be displayed.
Diagnostics	Provides access to diagnostic displays for the attached two channel *iQUBE*.
F1–F10	User-programmable keys; defined by application.
More…	For applications with more than five defined softkeys, the **More…** key is automatically assigned to the fifth softkey position. Press **More…** to toggle between groups of softkeys.

Table 1-1. Configurable Softkeys

1.4 Accepting Weight Data to the Indicator

The 920i can accept data in two different ways from the two-channel iQube and depending upon which version of the CLS-920i is purchased, will come with different components. They are:

- Wired - Coil Cable

Figure 1-3. Coil Wired Signal Cable That Runs Between the 920i Indicator and the Two-Channel iQube

- Wireless - Attached onto the back of the 920i HMI digital weight indicator and collects data from the two-channel iQube without the use of a coil wire cable but instead uses a lithium-ion battery which is housed on the scale itself for power.

Figure 1-4. Wireless Version of Communication

2.0 Scale Base Installation

This section describes procedures for installing the CLS-920i scale base.

Warning *Take all necessary safety precautions when installing the scale carriage. including wearing safety shoes, protective eyewear and using the proper tools which are listed in Section 2-3.*

The CLS-920i Cargo Lift Scale is shipped from the factory with the scale already calibrated to the indicator. Minimal recalibration and adjustments might be necessary once the scale is installed onto the forklift. Those calibration steps are contained in Section 6.0.

2.1 Unpacking

The CLS-920i Cargo Lift Scale is shipped upright on a sealed pallet as shown in Figure 2-1.

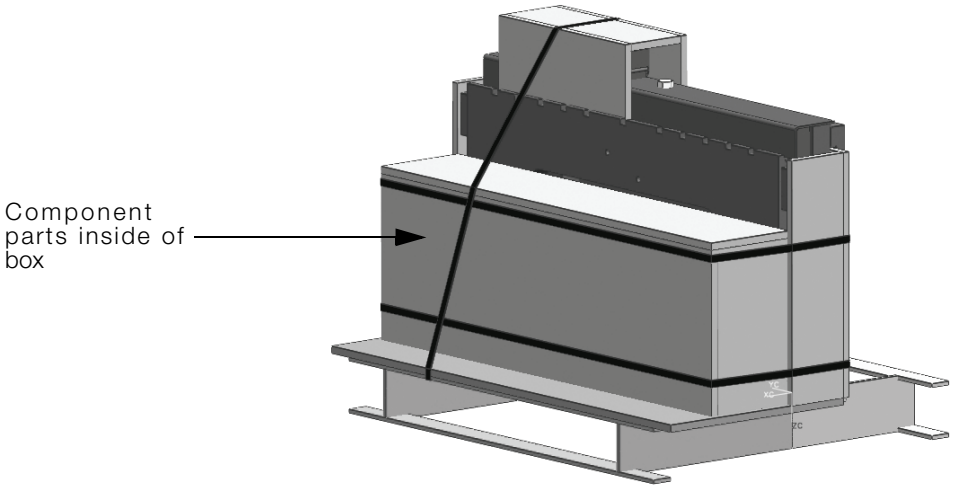


Figure 2-1. CLS-920i Packaging

Upon receipt of the shipping pallet, inspect it for any visible signs of damage. Immediately after unpacking, visually inspect the contents to ensure all components are included and undamaged. The shipping pallet should contain the following:

- One (1) scale carriage assembly with cover plate
- Indicator component box which includes the following:
  - One (1) electronic indicator with mounting bracket and hardware
  - One (1) power cable
  - CLS-920i Cargo Lift Installation manual
- Hardware component box which includes the following:
  - Two (2) cleats with four bolts
  - Cage clamp mounting assembly and hardware
  - Two (2) lithium-ion batteries (wireless version)
  - Two-bay battery charger (wireless version)
  - Coiled interface cable (wired version)

NOTE: *To ensure that all products received from the manufacturer are in good shape upon arrival, it is recommended to fully inspect all contents and properly fill out the bill of lading.*

If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

2.2 Before Installation

Before installing the CLS-920i on a forklift, the forklift should be in good operating condition in order to get the optimal amount of weighing accuracy. The following items are things to look for prior to installing the CLS-920i onto a forklift:

- Inspect the forklift tines for any damage.
- Check the locking pin on the forks for proper function.
- Check and adjust the lift chain so the heel of the forks have a 1/2" to 1" of clearance from the floor when the carriage is down and the mast is vertical.
- The slot for the centering pin should be clear of grease and debris.
- The top cleats of the scale rest on top of the forklift and should remain clear of grease and debris that could alter the scales' performance.

It should be noted that while Rice Lake's CLS-920i will fit most typical forklifts, some considerations must be note. The height of the carriage, width of the carriage inside of the guards, if applicable, and the voltage of the forklift must be taken into consideration.

The indicator will be connected directly to the battery of the forklift. Ensure the type and style of the forklift and the type of power it provides will be compatible with the indicator. Most propane, gas, and diesel fueled forklifts provide 12 volts of power. Some diesel models also provide 24 volts and electric forklifts provide 36 to 48 volts of power.

NOTE: ***All systems must have a negative ground.***

2.3 Tools Needed to Install the CLS-920i Onto the Forklift

Once the forklift is deemed in good mechanical and operating condition, you'll need the following tools to remove it from its shipping pallet and install onto the forklift.

Tool	Size	Purpose of Tool
Socket Wrench	3/4"	To unbolt the fastening bolts holding the scale to the pallet and to open the top cover plate for wired versions
Allen Wrench	1/2"	To bolt and unbolt the bottom cleats of the scale
Wrench - 2" adjustable	1- 1/2"* 1-5/8"*	For adjusting the shim bolts and jam nuts *Note: Use a 2" adjustable as both the shim bolts and jam nuts are painted and a smaller wrench wouldn't fit.
Tin Snips or Band Cutters		To cut the metal banding surrounding the CLS while on the pallet
Torque Wrench w/ 1/2" Allen		To tighten the cleats to 125 ft-lbs
Electric Grinder - if necessary		For grinding the center pin if necessary

Table 2-1. Recommended Tools for Unpacking the CLS-920i

2.4 Scale Base Installation

The scale and indicator are shipped in an upright position as illustrated in Figure 2-2 and is enclosed in a protective wood cover. The upright position allows for ease of installation, especially if one person is installing the scale.

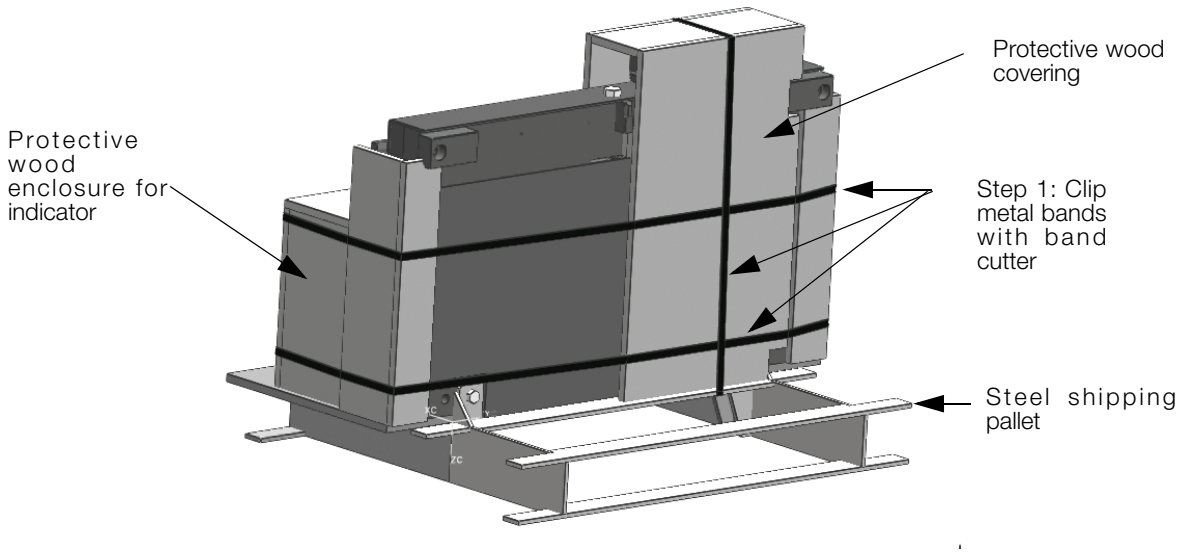


Figure 2-2. Scale Component Parts on Shipping Pallet

Use the following steps to install the scale base to the forklift.

1. Clip the three metal bands that are encircling the scale and component box on the backside of the pallet (shown in Figure 2-2) and also remove the protective wood pieces which protect the sides of the scale.
2. Remove the wooden cover containing the indicator. It should be noted that there are two screws holding the indicator to the shipping pallet. Back those two screws out to remove the indicator.
3. Loosen the bolts from the scale carriage assembly and back them out using a 3/4" socket wrench. The nuts holding the bolts on the backside of the scale are welded onto the scale which requires the use of only one socket wrench. **This is what holds the scale in an upright position**.

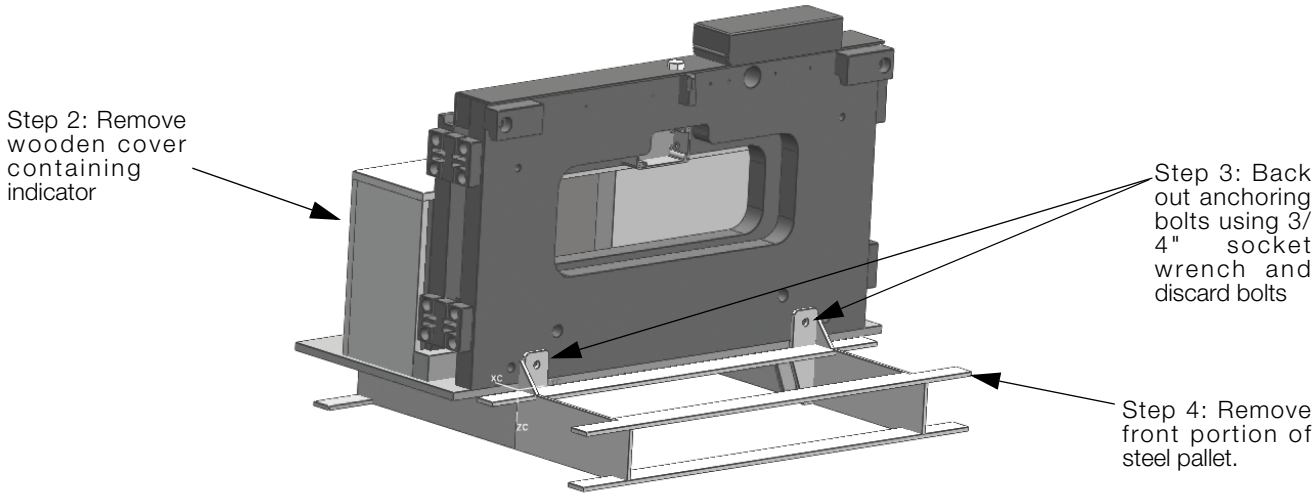


Figure 2-3. Bolt Location on Pallet

4. Remove the front portion of the steel pallet that the scale is sitting on.

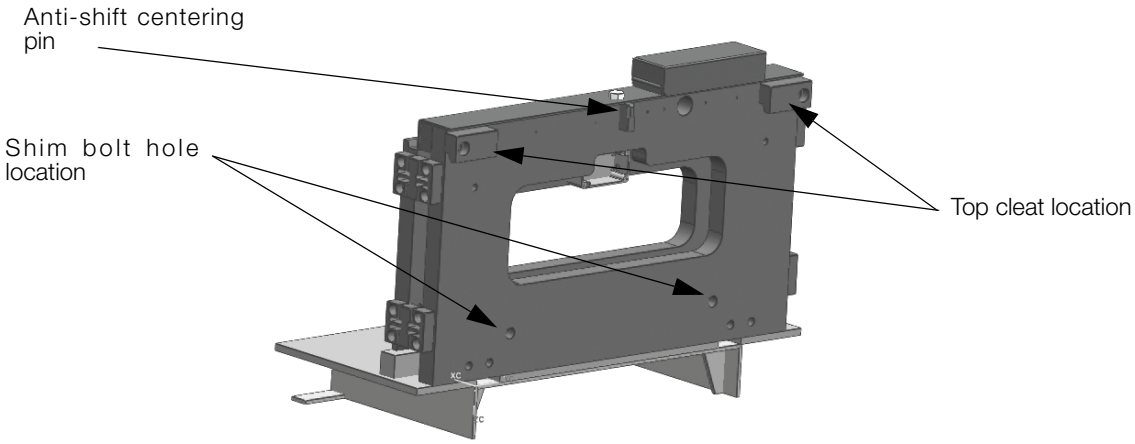


Figure 2-4. Removal of Steel Pallet and Top Cleat Locations

5. Verify that the shim bolts are flush with the back plate of the scale. Not doing so will place the entire scale out of alignment when attaching it onto the forklift and will make it difficult to make final adjustments once the scale is mounted to the forklift.
6. Seal the two-channel iQube if it is to be used in Legal-For-Trade applications.
7. Making sure the forklift tines are removed from the forklift, move the forklift in close to the pallet and scale.
8. Carefully and slowly raise the scale carriage slightly so the top cleats (cleat location shown in Figure 2-4) of the scale hook onto the forklift carriage.
9. Ensure that the anti-shift centering pin on the scale assembly is aligned with the center notch on the forklift carriage.

NOTE: ***The scale's centering pin should be aligned with the middle notch of the truck carriage. Verify that the centering pin is adjusted so that the pin is located well within the center notch area of the carriage. The centering pin should not touch the bottom of the notch on the original carriage, as this will cause side to side tilting of the scale. The outside top cleats provide support to the scale assembly and the centering pin only helps to position the scale on the forklift carriage. The centering pin should not bear any weight. If it does, the use of a grinder to grind down the centering pin will remedy that.***

10. Tilt the mast forward to catch the scale assembly and carefully raise the carriage to a comfortable working position.
11. Attach the bottom cleats to the bottom of the scale assembly (see Figure 2-5), so that the lip of the cleat is behind the original carriage.
12. Torque the bottom cleat retaining bolts to 125 ft-lbs (shown in Figure 2-5 for bottom cleat location).

Warning ***Failure to properly torque the safety plate retaining bolts may result in bodily harm or damage to equipment.***

13. Next, adjust the shim bolts so that they are adjusted for minimal clearance between the bottom cleats and the scale carriage. This clearance needs to be .020 inch thickness and can be measured by using a feeler gauge.
14. Tighten the shim bolt jam nuts and verify their clearances as shown in Figure 2-5.

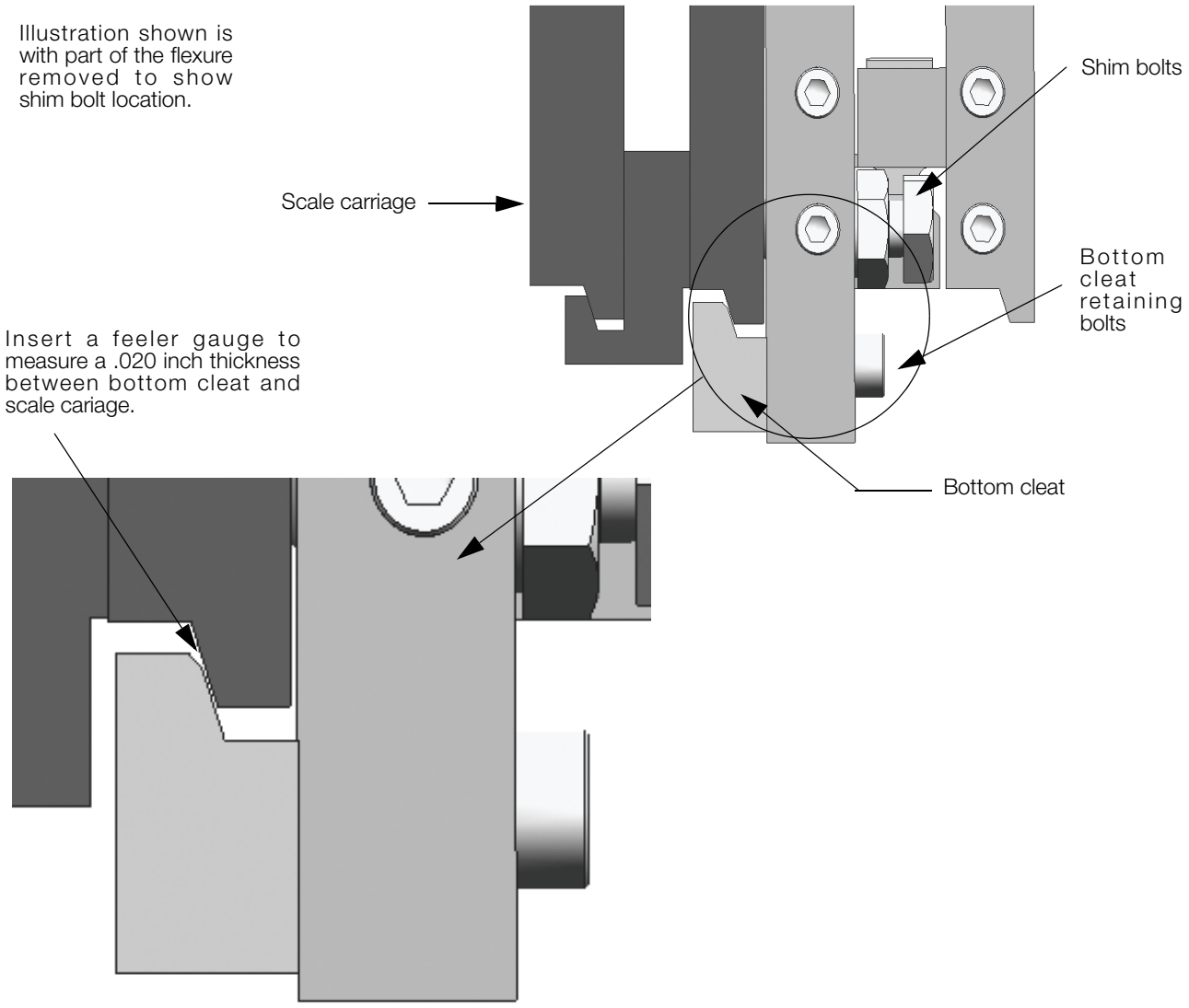


Figure 2-5. Bottom Cleat Location and Assembly

15. Now reattach the forklift tines to the scale assembly by attaching them in the center of the scale and sliding them off to the sides.

3.0 Indicator Hardware Setup

3.1 Mounting the 920i Indicator

Location of the indicator is a matter of operator preference and should be installed in a location that allows for free vision.

The universal mounting bracket which is included (shown in Figure 3-1 with the optional bar code scanner), enables the indicator to be mounted to the safety cage using the supplied hardware.

Figure 3-1. CLS Mounting Bracket

The indicator tilt position is adjustable by using a wrench so you can pick the best viewing angle for the operator.

Vibration isolators are also included in the supplied mounting bracket hardware. This cushions the indicator from vibration. These vibration isolators are shown below in Figure 3-2.

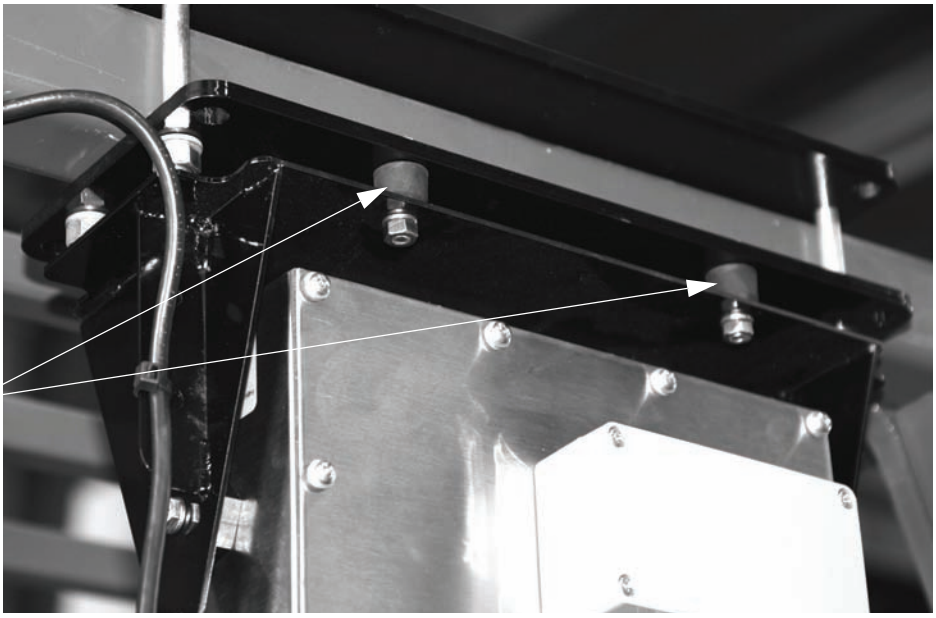


Figure 3-2. Vibration Isolator Control Location

3.2 Cable Connections

The 920i indicator provides four cord grips and two MIL-C connectors for cabling into the indicator. The free cord grips come with a plug installed to prevent moisture from entering the enclosure.

Figure 3-3 shows the assignments for the 920i cord grips.

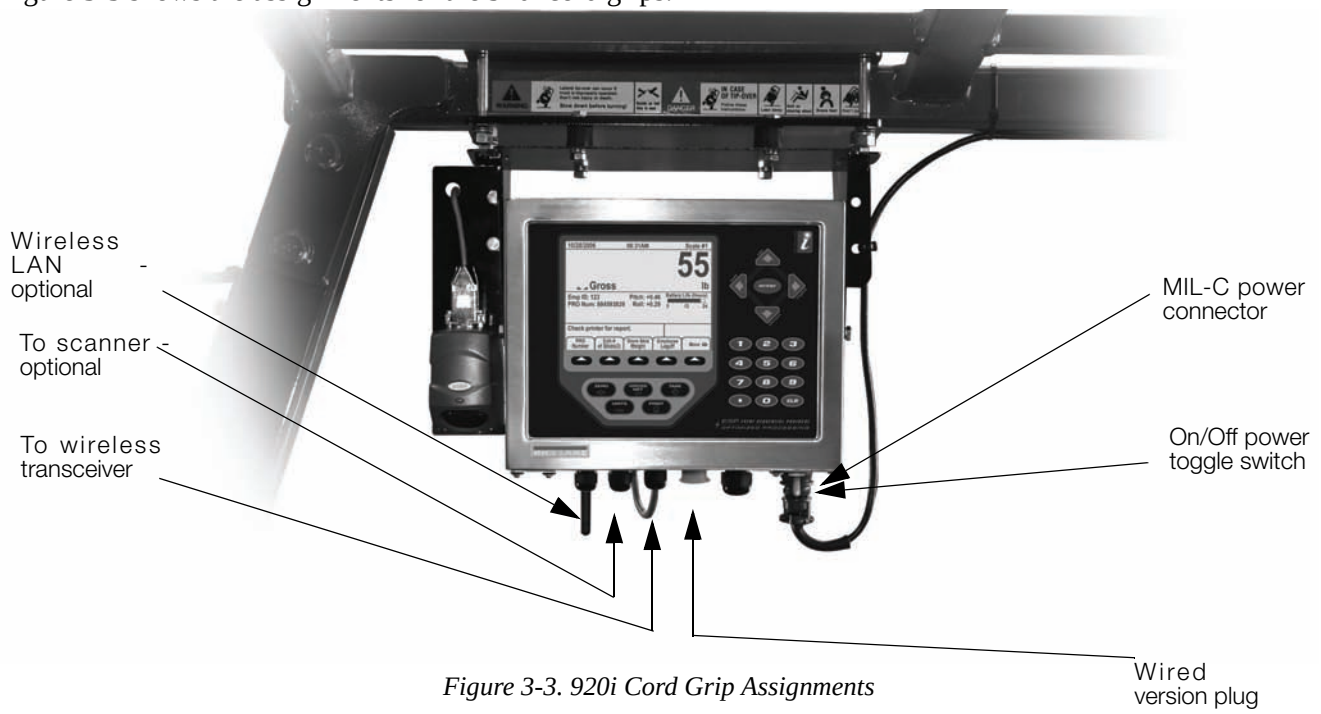


Figure 3-3. 920i Cord Grip Assignments

3.3 Supplying Power to the Indicator From the Forklift Battery

Caution **The indicator power source will be connected directly from the battery of the forklift. Most typical is 12 volts for propane, gas, and diesel forklifts. However, some diesel forklifts are 24 volts.**

The CLS series cargo lift scale will not operate on a positive ground forklift. Verify the forklift has a negative ground electrical system.

Refer to the forklift users manual to further verify grounding requirements.

There is a supplied on/off power toggle switch which manually cuts power from the battery of the forklift. This way there won't be any additional draw on the battery when the scale is not in use.

Figure 3-4. Toggle Switch Location

The indicator draws its power from the forklift battery. After the indicator is mounted, run the power cable along the forklift chassis down to the forklift battery.

Figure 3-5. Run Power Cable to the Forklift Battery

NOTE: *DO NOT plug in the power connector into the bottom of the indicator until power hookup is completed.*

A supplied in-line fuse is also included with the CLS-series cargo lift scale. The fuse comes enclosed in an in-line fuse holder (shown in Figure 3-6) and is attached where the stripped termination of the wires is located. Replacement of the in-line fuse is described in the CLS-series Service manual if needed.

Figure 3-6. Inline Fuse

Attach the three stripped wires to the forklift battery using the following wire code.

NOTE: *Supplied termination hardware includes (3) 1/4" eyelits for 1/4" bolts..*

Wire Color	Signal
Brown	Positive on Battery
Blue	Negative on Battery
Green	Ground/Chassis

Table 3-1. Power Hookups to Forklift Battery

3.4 Routing the Power/Serial Communications Cable

Special care should be taken when routing the power/serial communications cable (if the standard coiled wired version is used). To ensure that the signal cable is installed properly and away from situations that could cause it harm use the following steps.

1. Mount the indicator to the forklift per instructions in Section 3.1.
2. Lay the coiled up signal cable along the route between the indicator and the forklift scale.

Figure 3-7. Signal Cable Between Scale and Indicator

The preferred route is through the center of the mast. If it has a three stage mast, route along side the mast as shown in Figure 3-8.

Figure 3-8. Signal Cable Located Between the Scale and the Indicator

3. Secure with cable ties at the bottom of the scale and at the top of the mast
4. Slowly and carefully extend the mast to all positions to confirm that the cable isn't pulled too tight or that there are pinch points along the way.
5. Check for proper signal cable clearance as the side shifter is moved back and forth.

3.5 Supplying Power to the Two-Channel iQube Using a Lithium-Ion Battery

If using a wireless version of the CLS-920i, the CLS scale uses a supplied lithium-ion battery to supply power to the two-channel iQube. The wireless version of the CLS-920i does not come with a coiled cable. The lithium-ion battery is located on the top of the cover plate in a painted enclosure.

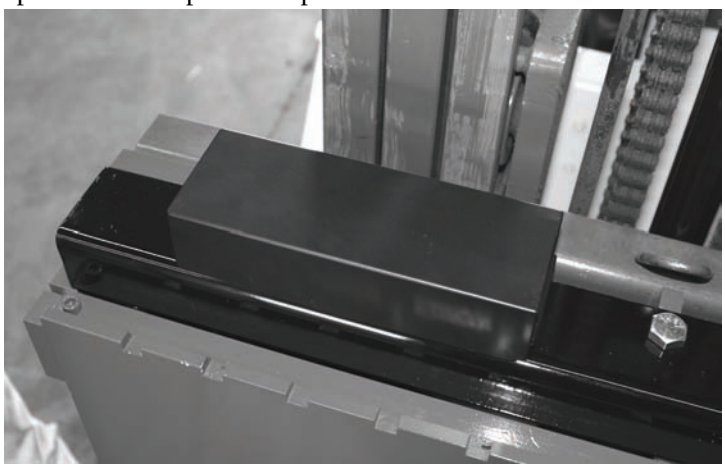


Figure 3-9. Lithium-Ion Battery Location

3.5.1 Lithium-Ion Battery Specifications

Nominal Capacity		6600 mAh
Nominal Voltage		11.1 V
Charging Method		Constant Current
		Constant Voltage
Charging Voltage		12.6 V
Charging Current		4.0 A
Charging Time		100% @ 8 hours
Ambient Temperature	Charge	0° - +40°C
	Discharge	-20° - +60°C
	Storage	-20° - +50°C
Weight (Maximum)		430 g
Dimensions (Maximum)	Depth	22.80 mm
	Length	214.0 mm
Volumetric Energy Density		466 Wh/l
Gravimetric Energy Density		167 Wh/kg
Maximum Hours of Charge		24 Hours
Nominal Capacity		6600 mAh

Table 3-2. Battery Specifications

3.5.2 General Precautions

There are some precautions that should be taken when handling lithium-ion batteries.

Handling

- Do not short circuit
- Do not immerse in water
- Do not disassemble or deform battery
- Keep away from excessive heat (+100°C) or dispose of battery in fire
- Avoid excessive physical shock or vibration

- Keep out of reach of children
- Never use a battery that appears to have suffered abuse
- Do not crush or attempt to disassemble the battery

Charge and Discharge

- Battery must be charged in an appropriate charger only
- Never use a modified or damaged charger
- Specified product use only

Storage

- Store in a cool, dry and well ventilated area

Disposal

- Regulations vary for different countries. Dispose of in accordance with local regulations

3.5.3 Charging the Lithium-Ion Battery

The lithium-ion battery comes with a two-bay, level-3 stand alone smart battery charger, a DC power jack, and a AC power cord as shown in Figure 3-10.

Figure 3-10. Two-Bay Battery Charger and Parts for the Lithium-Ion Battery

The average charge time for the battery is eight hours each.

Use the following steps to charge the battery prior to use:

1. Insert the plug end of the power cable into the DC power jack on the battery charger and the AC plug into an outlet.
2. Insert battery into the bay.
3. There is one LED indicator in front of each bay which will illuminate to indicate the status of the battery as follows:

Signal	Description
Off	No Battery
Green Flashing	Fast Charging
Green Solid	Fully Charged
Yellow Flashing	Recalibrating
Yellow/Green Alternating	Recalibrating
Yellow Solid	Standby
Red Flashing	Error

Table 3-3. Battery Charging LED Signals

3.5.4 Calibrating the Lithium-Ion Battery

In order to keep the battery fuel gauge as accurate as possible, it is necessary to occasionally run the pack through a recalibration cycle. To do this, place the battery in the left bay of the charger and press the button on the front label (see Figure 3-10). This will initiate the recalibration sequence in the **left bay** only. The process can take up to nine hours to complete and a recommended recalibration should be done once quarterly to keep the battery accurate.

3.5.5 Battery Removal

The lithium-ion battery itself is housed inside of the battery box and is encased in a foam core protecting it from vibration.

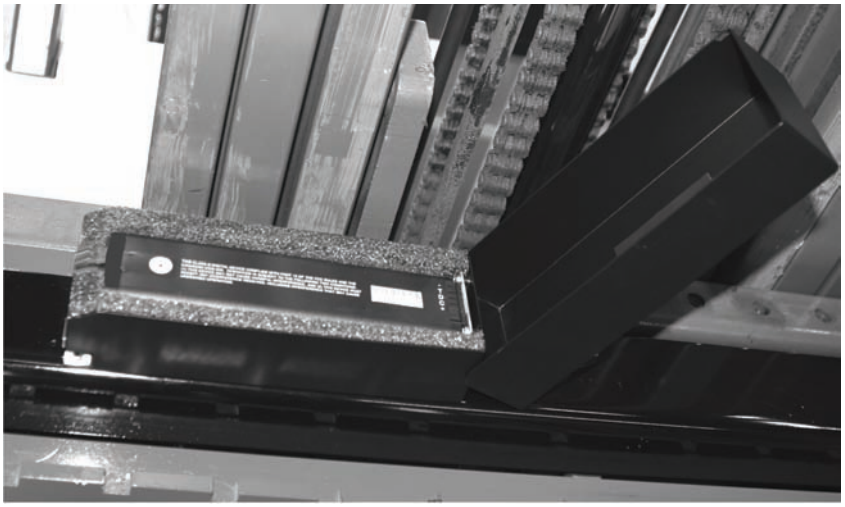


Figure 3-11. Lithium-ion Battery Box Opened

Figure 3-12 shows how to pull the lithium-ion battery out of the battery box.

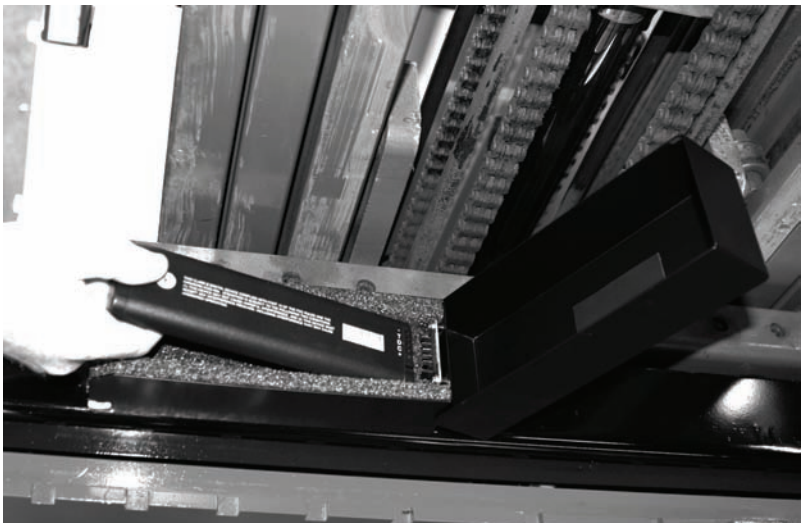


Figure 3-12. Pulling the Lithium-Ion Battery Out

If the battery is not put back into the battery box correctly or the battery is not functioning correctly, the following error message is displayed on the 920i indicator.

Figure 3-13. Comm Error Message

3.5.6 Battery Disposal

When using Lithium-Ion batteries, be sure to observe the following precautions for disposal as stated in the material safety data sheet regarding lithium-ion batteries.

national power™
CORPORATION

MSDS
LITHIUM-ION BATTERIES (Li-ion)

The batteries referenced herein are exempt articles and are not subject to the OSHA Hazard Communication Standard requirement. This sheet is provided as a service to our customers.

MSDS

Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". OSHA has defined "article" as a manufactured item other than a fluid or particle; (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempt from the requirements of the Hazard Communication Standard; hence a MSDS is not required.

The following components are found in a Lithium Ion battery:

Component	Material	Formula
Positive Electrode	Lithium Cobalt Oxide	$LiCoO_2$
Negative Electrode	Graphite	C
Electrolyte	Ethylene Carbonate – Solvent	$C_3H_4O_3$
	Diethyl Carbonate – Solvent	$C_5H_{10}O_3$
	Lithium Hexaflurophasphate – Salt	$LiPF_6$

The overall reaction is: $Li_xC + Li_{1-x}CoO_2 \leftrightarrow C + LiCoO_2$

Disposal

All Lithium Ion batteries are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream. These batteries, however, do contain recyclable materials and are accepted for recycling by the Rechargeable Battery Recycling Corporation's (RBRC) Battery Recycling Program. Please call 1-800-8-BATTERY for information on recycling your used Lithium Ion battery or go to the RBRC website at www.rbrc.org for additional information.

Transportation

All lithium (primary and rechargeable) batteries are not subject to the requirements of the U.S. Department of Transportation (DOT) Subchapter C, Hazardous Material Regulations because each of our batteries meets the exceptions under 173.185 (b). These regulations will remain in effect until we are advised of new regulations.

All lithium batteries are exempt from the DOT Hazardous Materials Subchapter as long as they are separated to prevent short circuits and packed in strong packing for conditions normally encountered in transportation.

Notice: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. We make no warranty expressed or implied.

3.6 Two-Channel iQube Junction Box

The two-channel iQube sits in an area between the front and back plate of the scale itself, providing protection for the two-channel iQube. The two-channel iQube comes from the factory pre-wired and no additional work needs to be done to it. Should the user need to replace load cells, then additional information on wiring is located in the *CLS-Series Service Manual*, PN 96314.

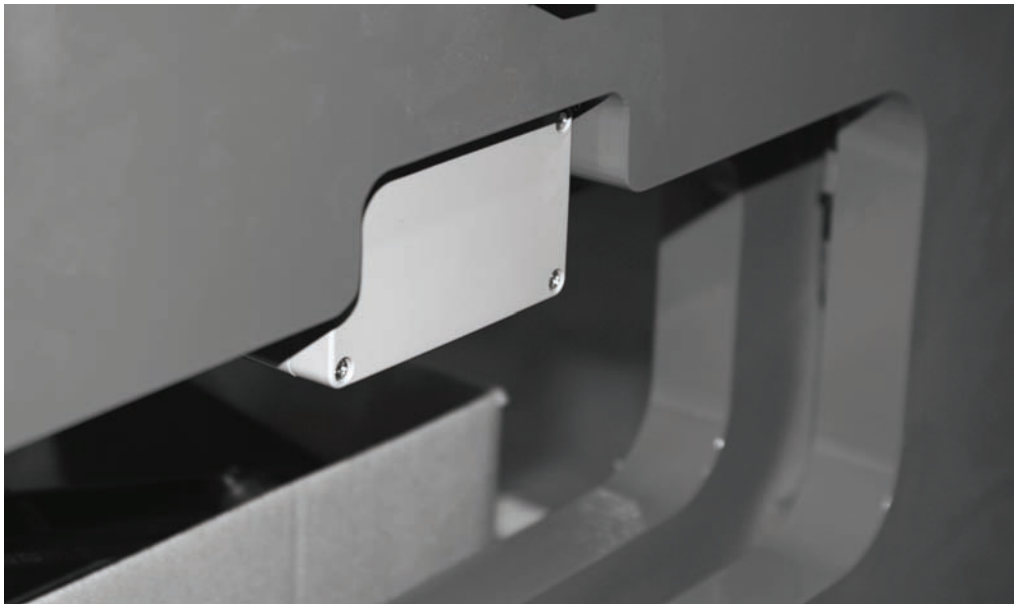


Figure 3-14. Location of Two-Channel iQube on CLS-Series Scale

3.7 Peripheral Scanner

The CLS-920i has the ability of scan bar codes of various products being moved. The scanner is mounted in a convenient location next to the indicator as shown in Figure 3-15.

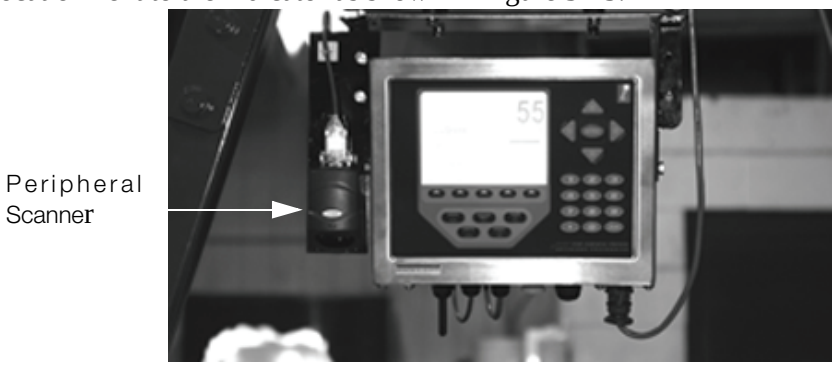


Figure 3-15. Scanner Location

Additional information on the scanner is found in Section 9 of this manual.

4.0 Configuration of Scale Parameters

NOTE: ***While the fuctionality remains the same for a standard 920i HMI indicator, there are certain menu choices that need to be changed in the User Configuration section of this manual specific to the proper functioning of the CLS-Series Cargo Lift Scale.***

To configure the *920i* indicator, the indicator must be placed in setup mode. The setup switch is accessed by removing the large fillister head screw on the backplate of the universal and deep enclosures. Switch position is changed by inserting a screwdriver into the access hole and pressing the switch.

When the indicator is placed in setup mode, a series of menus is shown across the top of the display, along with the words *Scale Configuration*. The SCALES menu is highlighted as the first used to configure the indicator. Detailed descriptions of these menus are provided in Section 4.2.

When configuration is complete, press the **Exit** or **Save and Exit** softkey to exit setup mode, then replace the setup switch access screw.

- The **Exit** softkey exits setup mode without saving parameter changes to NV RAM. Changes made to the configuration remain in the system until indicator power is cycled.
- **Save and Exit** writes all parameter changes to NV RAM before returning to normal mode.

4.1 Configuration Methods

The *920i* indicator can be configured by using the front panel keys to navigate through a series of configuration menus or by sending commands or configuration data to an indicator serial port. Configuration using the menus is described in Section 4.1.3.

Configuration using the serial port can be accomplished using either the serial command set or the *iRev* configuration utility.

NOTE: Some configuration parameters, such as those used to configure the *920i* display and widgets, cannot be accessed through the configuration menus. *iRev* provides the most complete and efficient configuration interface for the *920i*.

4.1.1 iRev Configuration

The *iRev* configuration utility provides the preferred method for configuring the *920i* indicator. *iRev* runs on a personal computer to set configuration parameters for the indicator. When *iRev* configuration is complete, configuration data is downloaded to the indicator.

NOTE: ***All configuration parameters can be set up using iRev except configuration parameters associated with the iQube. Those parameters must be set up manually which is explained in further detail in Section 4.2.2.***

iRev supports both uploading and downloading of indicator configuration data. This capability allows configuration data to be retrieved from one indicator, edited, then downloaded to another indicator with an identical hardware configuration.

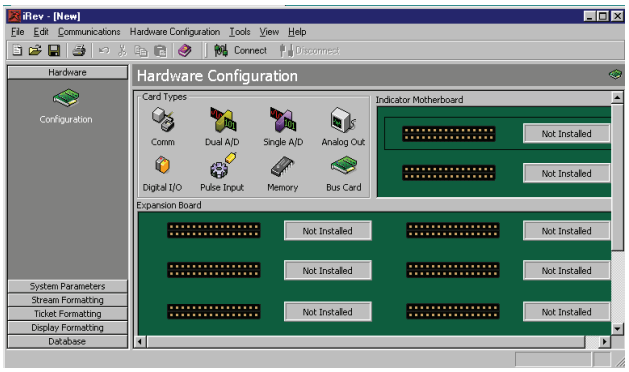


Figure 4-1. iRev Hardware Configuration Display

To use *iRev*, do the following:

1. Install *iRev* on an IBM-compatible personal computer. See Section 5.0 on page 50 for detailed hardware and software requirements.
2. With both indicator and PC powered off, connect the PC serial port to the RS-232 pins on the indicator serial port.
3. Power up the PC and the indicator. Use the setup switch to place the indicator in setup mode.
4. Start the *iRev* program.

iRev provides online help for each of its configuration displays. Parameter descriptions provided in this manual for front panel configuration can also be used when configuring the indicator using *iRev*: The interface is different, but the parameters set are the same.

See Section 6.4 for more information about using *iRev* to configure the *920i*.

4.1.2 Serial Command Configuration

The serial command set can be used to configure the *920i* indicator using either a personal computer, terminal, or remote keyboard. Like *iRev*, serial command configuration sends commands to the indicator serial port; unlike *iRev*, serial commands can be sent using any external device capable of sending ASCII characters over a serial connection.

Serial commands duplicate the functions available using the indicator front panel and provide some functions not otherwise available. Serial commands can be used to simulate pressing front panel keys, to configure the indicator, or to dump lists of parameter settings.

4.1.3 Front Panel Configuration

Use the CONFIG submenu under the SCALES menu to configure A/D scales. For example, in an indicator with a single-channel A/D card installed in Slot 1, the Scale Configuration display will show the A/D listed (*Slot 1 Channel 1*) under the *AVAILABLE A/D's* column. Use the **left** navigation key to select the A/D, then press the center softkey, **Add**. The A/D is then moved to the Associated A/D's column. If no other A/D's are listed in the *AVAILABLE A/D's* column, the center softkey changes to **Done**, as shown in Figure 4-2. Press **Done** to exit the Scale Configuration display..

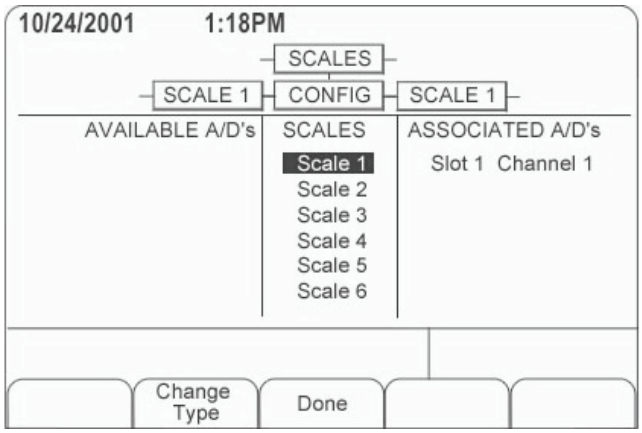


Figure 4-2. Scale Configuration Display

4.1.4 Total Scale Configuration

The output of two or more A/D scales or *iQUBE* systems can be configured to function as a total scale. Once configured and calibrated, the total scale can be sued as a source for other system functions, including streaming, setpoints, print formatting, and analog output.

To set up a total scale from the indicator front panel, use the scale configuration display (see Figure 4-2) to select the A/D scales or *iQUBE* systems to configure as a total scale. (Use the **Change Type** softkey to show available A/D scales or *iQUBE* systems; use the right navigation key to select the total scale sources.) In *iRev*, assign the total scale to an unused position then select source scales from the existing A/D scales or *iQUBE* systems.

The FORMAT configuration of the total scale (see Figure 4-5 on page 28) should match that of the source scales. However, the value specified for the total scale GRADS parameter should be specified as the sum of the GRADS values for the source scales. For example: if SCALE 1 is set to GRADS=10000, SCALE 2 to GRADS=5000, SCALE 3 (the total scale) should be set to 15000 grads.

The total scale will show an overrange indication if the maximum capacity of any source scale is exceeded, and show dashes if any source scale reads a negative value. Source scales will respond to Tare and Zero operations performed on the total scale.

4.2 Menu Structures and Parameter Descriptions

The *920i* indicator can be configured using a series of menus accessed through the indicator front panel when the indicator is in setup mode. Table 4-1 summarizes the functions of each of the main menus.

Menu		Menu Function
SCALES	Configuration	Configure and calibrate scales.
SERIAL	Serial	Configure communications ports.
FEATURE	Feature	Set date and time formats, truck mode, passwords, keyboard locks, regulatory mode, and initial consecutive number value, define softkeys and setpoint prompts.
PFORMT	Print Format	Set print format used for header, gross, net, truck in/out, setpoint, and auxiliary ticket formats. See Section 6.0 on page 53 for more information.
SETPTS	Setpoints	Configure setpoints and batching mode.
DIG I/O	Digital I/O	Assign digital input/output functions.
ALGOUT	Analog Output	Configure analog output module. Used only if analog output option is installed.
VERSION	Version	Display installed software version number. The **Reset Config** softkey on the Version menu can be used to restore all configuration parameters to their default values.

Table 4-1. 920i Menu Summary

The following sections provide graphic representations of the *920i* menu structures and tables describing the menu parameters. Default values are shown in **bold** type; numeric ranges and string values are shown in *italic* type. Parameters shown surrounded by a dotted-line box only appear under the special circumstances explained under each box.

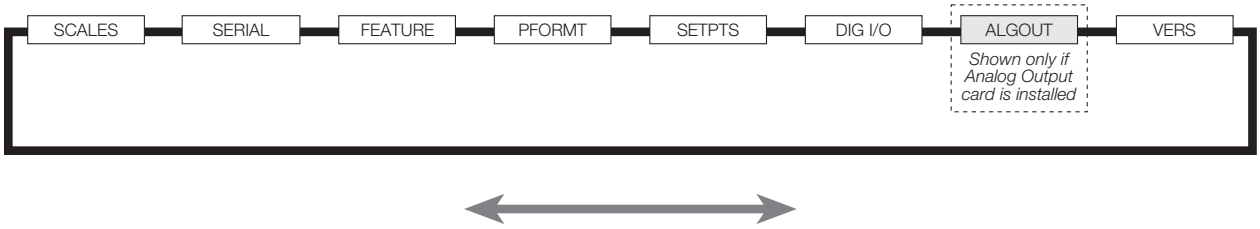


Figure 4-3. Configuration Menu Flow

4.2.1 SCALES Menu

The SCALES menu is shown in Figure 4-4. The FORMAT submenu is shown in Figure 4-5 on page 28; the CALIBR submenu is shown in Figure 4-6 on page 32. Parameters shown in each diagram are described in the table following that diagram.

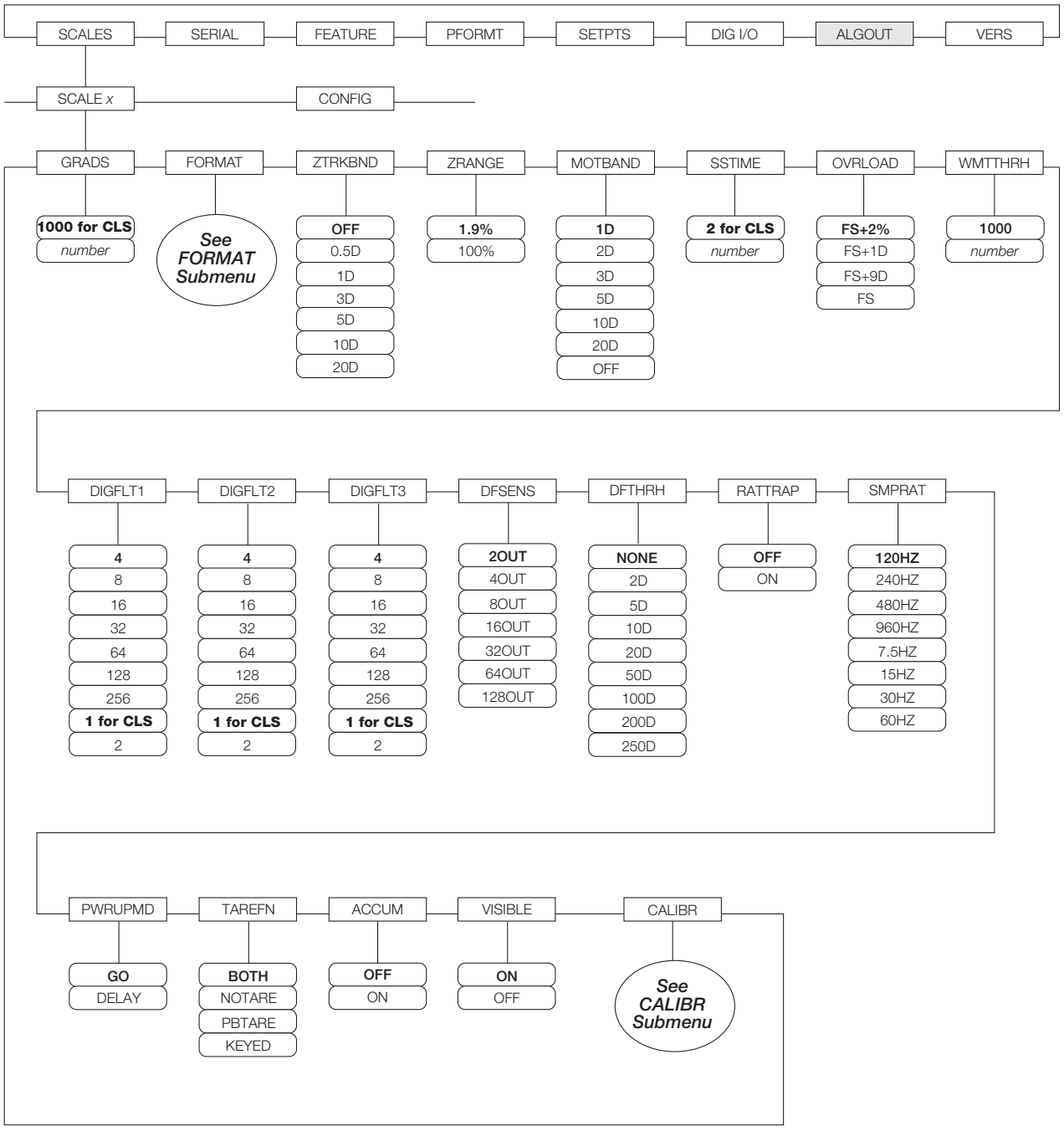


Figure 4-4. SCALES Menu

SCALES Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
SCALE*x*		Allows configuration and calibration of each scale
CONFIG		Lists available and associated A/Ds
Level 3 submenus		
GRADS	**1000** *1–9999999*	Specifies the number of full scale graduations. The value entered must be in the range 1–9999999 and should be consistent with legal requirements and environmental limits on system resolution. To calculate GRADS, use the formula, GRADS = *Capacity* / *Display Divisions*. Display divisions for primary and secondary units are specified under the FORMAT submenu.
FORMAT	PRIMAR SECNDR TERTIA ROC	See Level 4 submenu descriptions in Table 4-3 on page 29.
ZTRKBND	OFF 0.5D 1D 3D 5D 10D 20D	Automatically zeroes the scale when within the range specified, as long as the input is within the ZRANGE and scale is at standstill. Selections are ± display divisions. Maximum legal value varies depending on local regulations.
ZRANGE	1.9% 100%	Selects the range within which the scale can be zeroed. The 1.9% selection is ± 1.9% around the calibrated zero point, for a total range of 3.8%. Indicator must be at standstill to zero the scale. Use 1.9% for legal-for-trade applications.
MOTBAND	1D 2D 3D 5D 10D 20D OFF	Sets the level, in display divisions, at which scale motion is detected. If motion is not detected for 1 second or more, the standstill symbol lights. Some operations, including print, tare, and zero, require the scale to be at standstill. Maximum legal value varies depending on local regulations. If this parameter is set to OFF, the standstill annunciator does not light; operations normally requiring standstill (zero, tare, print) are performed regardless of scale motion. If OFF is selected, ZTRKBND must also be set to OFF.
SSTIME	**2** *number*	Specifies the length of time the scale must be out of motion, in 0.1-second intervals, before the scale is considered to be at standstill. Values greater than 10 are not recommended.
OVRLOAD	FS+2% FS+1D FS+9D FS	Determines the point at which the display blanks and an out-of-range error message is displayed. Maximum legal value varies depending on local regulations.
WMTTHRH	1000 *number*	Specifies the minimum number of grads required for a weighment to be added to the recorded number of weighments.
DIGFLT1 DIGFLT2 DIGFLT3	**1** 2 4 8 16 32 64 128 256	Selects the digital filtering rate used to reduce the effects of mechanical vibration from the immediate area of the scale. Choices indicate the number of A/D conversions per update that are averaged to obtain the displayed reading. A higher number gives a more accurate display by minimizing the effect of a few noisy readings, but slows down the settling rate of the indicator. See Section 10.9 on page 119 for more information about digital filtering.

Table 4-2. SCALES Menu Parameters

SCALES Menu		
Parameter	**Choices**	**Description**
DFSENS	2OUT 4OUT 8OUT 16OUT 32OUT 64OUT 128OUT	Digital filter cutout sensitivity. Specifies the number of consecutive readings that must fall outside the filter threshold (DFTHRH parameter) before digital filtering is suspended. See Section 10.9 on page 119 for more information about digital filtering.
DFTHRH	NONE 2D 5D 10D 20D 50D 100D 200D 250D	Digital filter cutout threshold. Specifies the filter threshold, in display divisions. When a specified number of consecutive scale readings (DFSENS parameter) fall outside of this threshold, digital filtering is suspended. If NONE is selected, the filter is always enabled. See Section 10.9 on page 119 for more information about digital filtering.
RATTRAP	OFF ON	Enables RATTLETRAP® digital filtering. RATTLETRAP is most effective at filtering repeating vibrations caused by mechanical noise from nearby machines but may increase settling times over standard digital filter selections.
SMPRAT	120HZ 240HZ 480HZ 960HZ 7.5HZ 15HZ 30HZ 60HZ	Sample rate. Selects measurement rate, in samples per second, of the analog-to-digital converter. Lower sample rate values provide greater signal noise immunity: the default 120 Hz value may be too fast to provide the desired stability in some static weighing applications. NOTE: The maximum total sample rate for all configured A/D channels—the sum of the sample rates for all scales—is 1200 Hz. For example, up to ten scales can be configured with 120 Hz sample rates, or up to twenty scales with 60 Hz sample rates.
PWRUPMD	GO DELAY	Power up mode. In GO mode, the indicator goes into operation immediately after a brief power up display test. In DELAY mode, the indicator performs a power up display test, then enters a 30-second warm up period. If no motion is detected during the warm up period, the indicator becomes operational when the warm up period ends; if motion is detected, the delay timer is reset and the warm up period repeated.
TAREFN	BOTH NOTARE PBTARE KEYED	Enables or disables push-button and keyed tares. Possible values are: BOTH: Both push-button and keyed tares are enabled NOTARE: No tare allowed (gross mode only) PBTARE: Push-button tares enabled KEYED: Keyed tare enabled
ACCUM	OFF ON	Accumulator. Specifies whether the scale accumulator is enabled. If enabled, accumulation occurs whenever a print operation is performed.
VISIBL	ON OFF	Scale visibility. Specifies whether scale data is displayed.
CALIBR	WZERO WVAL WSPAN WLIN REZERO	See Level 4 submenu descriptions in Table 4-6 on page 32.

Table 4-2. SCALES Menu Parameters (Continued)

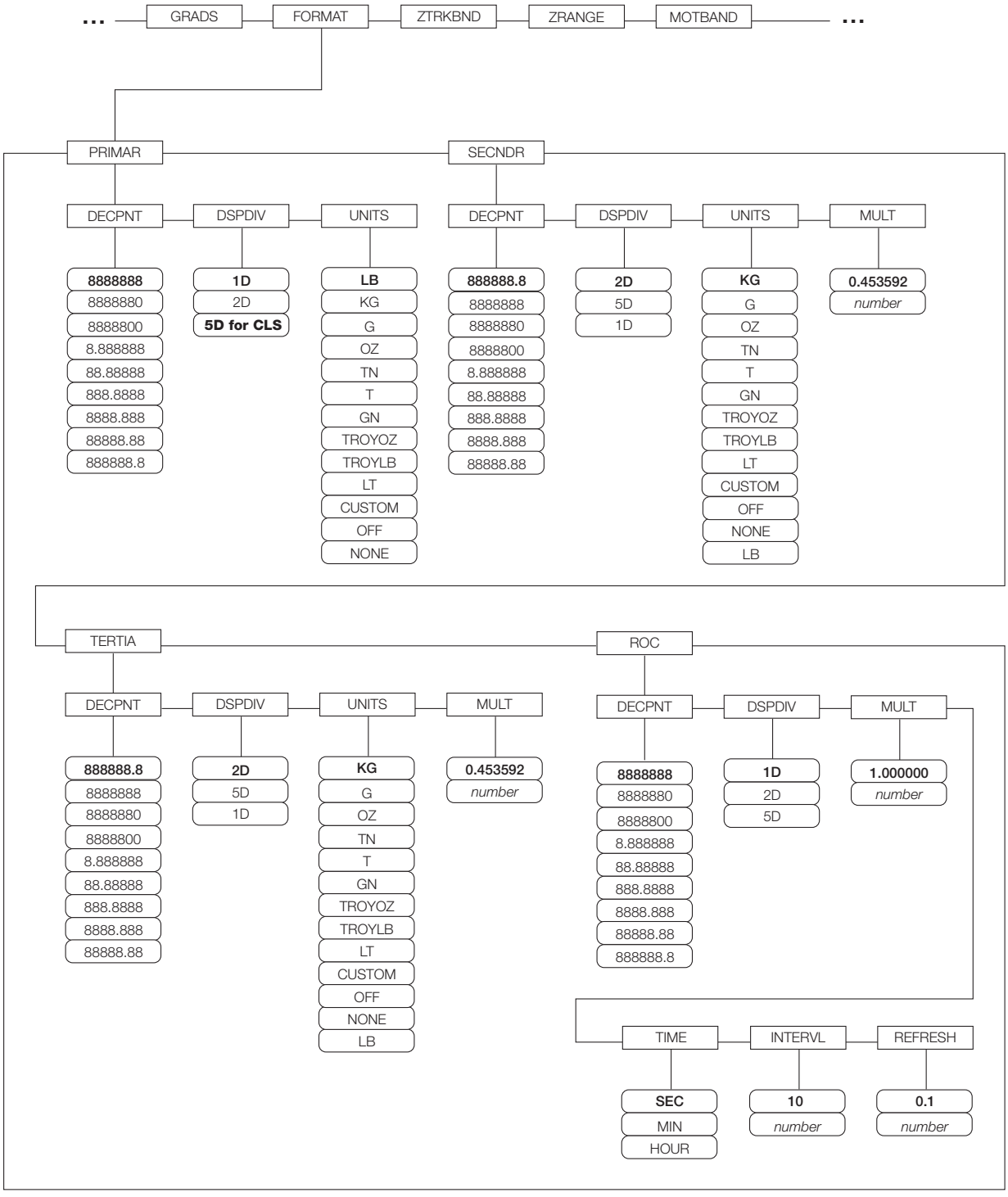


Figure 4-5. SCALES Menu, FORMAT Submenu

SCALES Menu, FORMAT Submenu		
Parameter	**Choices**	**Description**
Level 4, FORMAT submenu		
PRIMAR	DECPNT DSPDIV UNITS	Specifies the decimal position, display divisions, and units used for the primary units. See Level 5 submenu parameter descriptions.
SECNDR	DECPNT DSPDIV UNITS MULT	Specifies the decimal position, display divisions, units, and conversion multiplier used for the secondary units. See Level 5 submenu parameter descriptions.
TERTIA	DECPNT DSPDIV UNITS MULT	Specifies the decimal position, display divisions, units, and conversion multiplier used for the tertiary units. See Level 5 submenu parameter descriptions.
ROC	DECPNT DSPDIV MULT TIME INTERVL REFRESH	Specifies the decimal position, display divisions, conversion multiplier, time units, update interval, and refresh interval used for the rate of change units. See Level 5 submenu parameter descriptions.
Level 5 submenus		
Primary Units (PRIMAR) Parameters		
DECPNT	8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	Decimal point location. Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.
DSPDIV	1D 2D **5D**	Display divisions. Selects the minimum division size for the primary units displayed weight.
UNITS	LB KG G OZ TN T GN TROYOZ TROYLB LT CUSTOM NONE OFF	Specifies primary units for displayed and printed weight. Values are: LB=pound; KG=kilogram; G=gram; OZ=ounce; TN=short ton; T=metric ton; GN=grain; TROYOZ=troy ounce; TROYLB=troy pound; LT=long ton.

Table 4-3. SCALES Menu, FORMAT Submenu Parameters

SCALES Menu, FORMAT Submenu		
Parameter	**Choices**	**Description**
Secondary Units (SECNDR) and Tertiary Units (TERTIA) Parameters		
DECPNT	888888.8 8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88	Decimal point location. Determines the location of the decimal point or dummy zeros in the secondary or tertiary units display.
DSPDIV	2D 5D 1D	Display divisions. Selects the value of minimum division size of the displayed weight for secondary or tertiary units display.
UNITS	KG G OZ TN T GN TROYOZ TROYLB LT CUSTOM OFF NONE LB	Specifies secondary or tertiary units for displayed and printed weight. Values are: LB=pound; KG=kilogram; G=gram; OZ=ounce; TN=short ton; T=metric ton; GN=grain; TROYOZ=troy ounce; TROYLB=troy pound; LT=long ton.
MULT	0.453592 *0.000001–9999999*	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the secondary or tertiary units. The default is 0.453592, which is the conversion factor for changing pounds to kilograms. See Section 10.10 on page 120 for a list of multipliers. To shift between primary, secondary, and tertiary units, press the UNITS key.
Rate of Change (ROC) Units Parameters		
DECPNT	8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	Decimal point location. Determines the location of the decimal point or dummy zeros in the display.
DSPDIV	1D 2D 5D	Display divisions. Selects the minimum division size for the ROC units displayed weight.

Table 4-3. SCALES Menu, FORMAT Submenu Parameters (Continued)

SCALES Menu, FORMAT Submenu		
Parameter	**Choices**	**Description**
MULT	1.0 *0.000001–9999999*	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the displayed rate of change units. To calculate the MULT value, use the following equation: MULT = (SMPRAT / INTERVL) * *(seconds_per_ROC_unit)* * *(ROC/PRIMAR_precision_adjustment)* Where: • SMPRAT is the value specified for the A/D sample rate on the SCALES menu • INTERVL is the specified ROC interval • *seconds_per_ROC_unit* is an adjustment for the ROC UNITS parameter. If ROC UNITS is set to SEC, use 1; use 60 for UNITS=MIN, use 3600 for UNITS=HOUR. • *ROC/PRIMAR_precision_adjustment* compensates for any difference in the DECPNT and DSPDIV parameters specified for primary units and ROC units. For example, if the ROC DECPNT parameter is set to 8888888 (no decimal) and with DSPDIV=1, ROC precision is 1. If PRIMAR DECPNT is set to 8888880 (null units position) and DSPDIV=2, PRIMAR precision is 20. (That is, weights will be displayed in increments of 20.) In this example, the precision adjustment would be 1 / 20, or 0.05. *Example:* If SMPRAT=120HZ, INTERVL=240, ROC UNITS=MIN, and the precision is compensated as described above, MULT would be calculated as follows: MULT = (120 / 240) * 60 * 0.05 = 1.5 To calculate a ROC MULT value based on secondary or tertiary units, multiply the calculated primary units MULT value by the conversion factor for the alternate units. For example, if a MULT value of 1.5 is calculated for pounds as the primary unit, calculate the MULT value for kilogram secondary units by multiplying the original MULT value by 0.453592: MULT*(kg)* = 1.5 * 0.453592 = 0.680388 See Section 10.10 on page 120 for information about conversion factors.
TIME	SEC MIN HOUR	Rate-of-change units.
INTERVL	10 *1–100*	Update interval. Specifies the number of refreshes over which the rate-of-change is calculated.
REFRESH	0.1 *0.1–60*	Refresh interval. Specifies the number of seconds between rate-of-change samples. The value specified for this parameter should be an integer not less than 1% and not more than 50% of the update interval (INTERVL parameter) specified. For example, if the INTERVL parameter value is 100, the REFRESH specified should be in the range of 1.2–60.

Table 4-3. SCALES Menu, FORMAT Submenu Parameters (Continued)

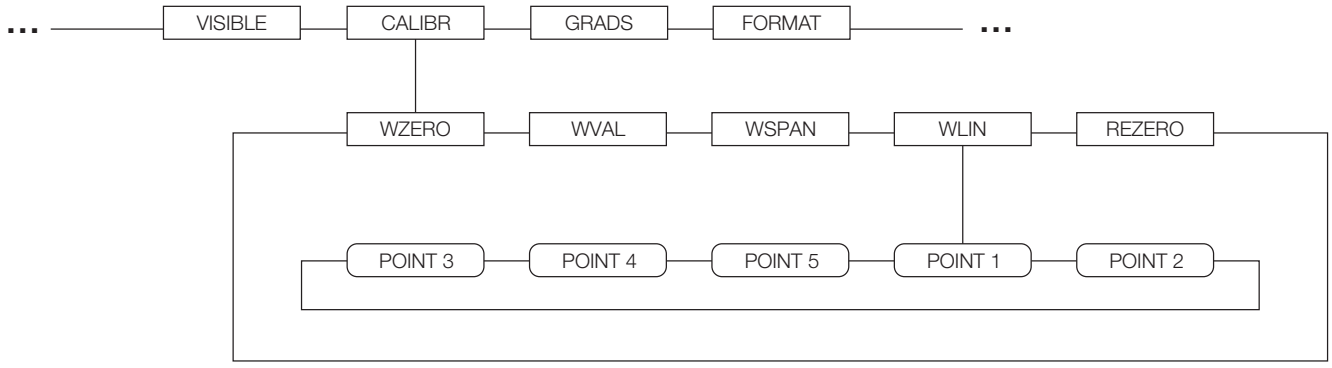


Figure 4-6. SCALES Menu, CALIBR Submenu

NOTE: ***For the CLS Series Cargo Lift Scale, do not use this section as reference for calibration. Please refer to. Section 6.0 for complete calibration instructions.***

SCALES Menu, CALIBR Submenu		
Parameter	**Choices**	**Description**
Level 4, CALIBR submenu		
WZERO	—	Press ENTER to display and edit the zero calibration A/D count or millivolts value.
WVAL	—	Press ENTER to display and edit the test weight value.
WSPAN	—	Press ENTER to display and edit the span calibration A/D count or millivolts value.
WLIN	POINT 1 — POINT 5	Press ENTER to display and edit test weight and calibration values for up to five linearization points. Perform linear calibration only after WZERO and WSPAN have been set.
REZERO	—	Press ENTER to remove an offset value from the zero and span calibrations. **NOTE:** *Use this parameter only after WZERO and WSPAN have been set.*

Table 4-4. SCALES Menu, CALIBR Submenu Parameters

4.2.2 SERIAL Menu

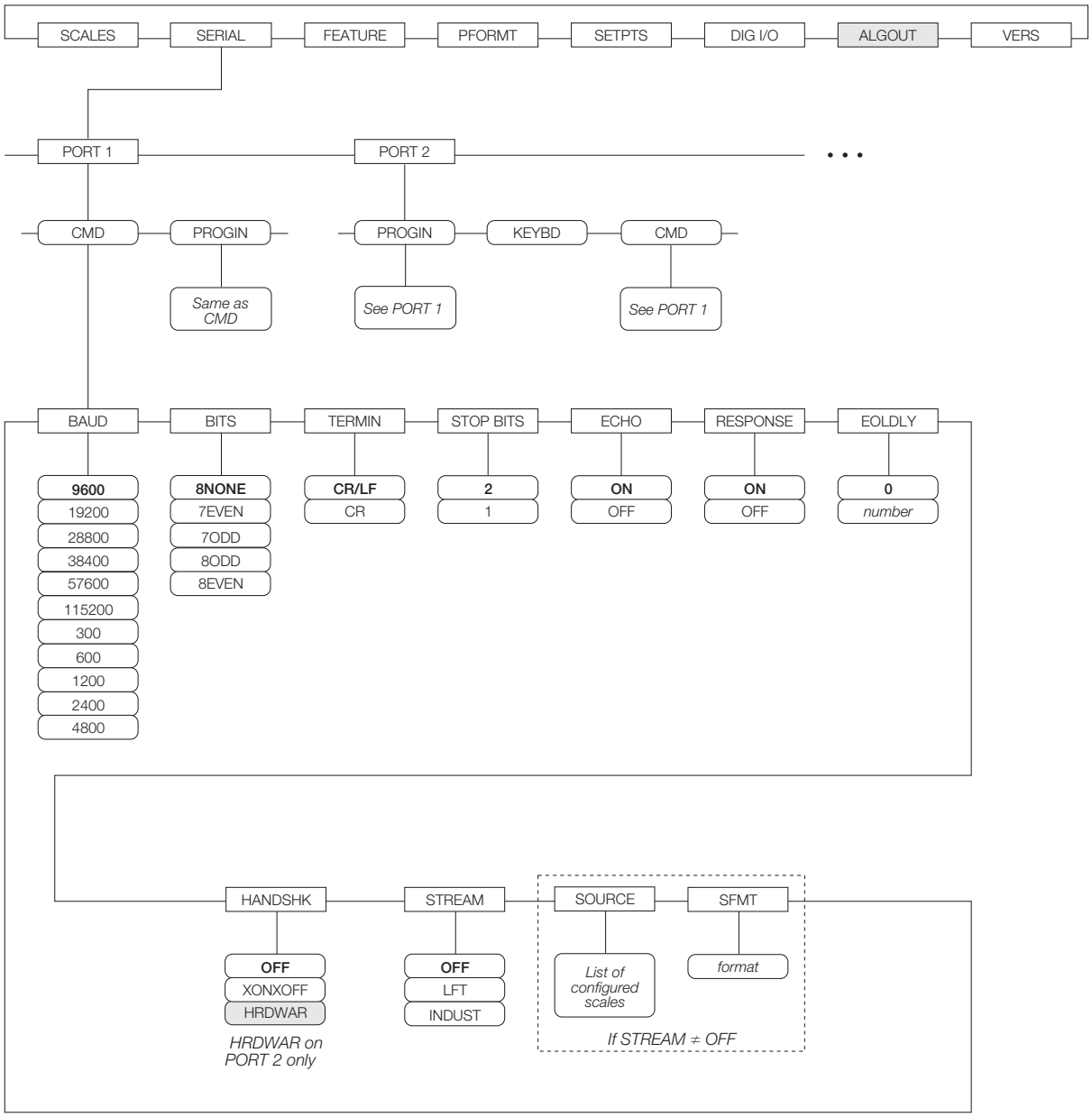


Figure 4-7. SERIAL Menu, Ports 1 and 2

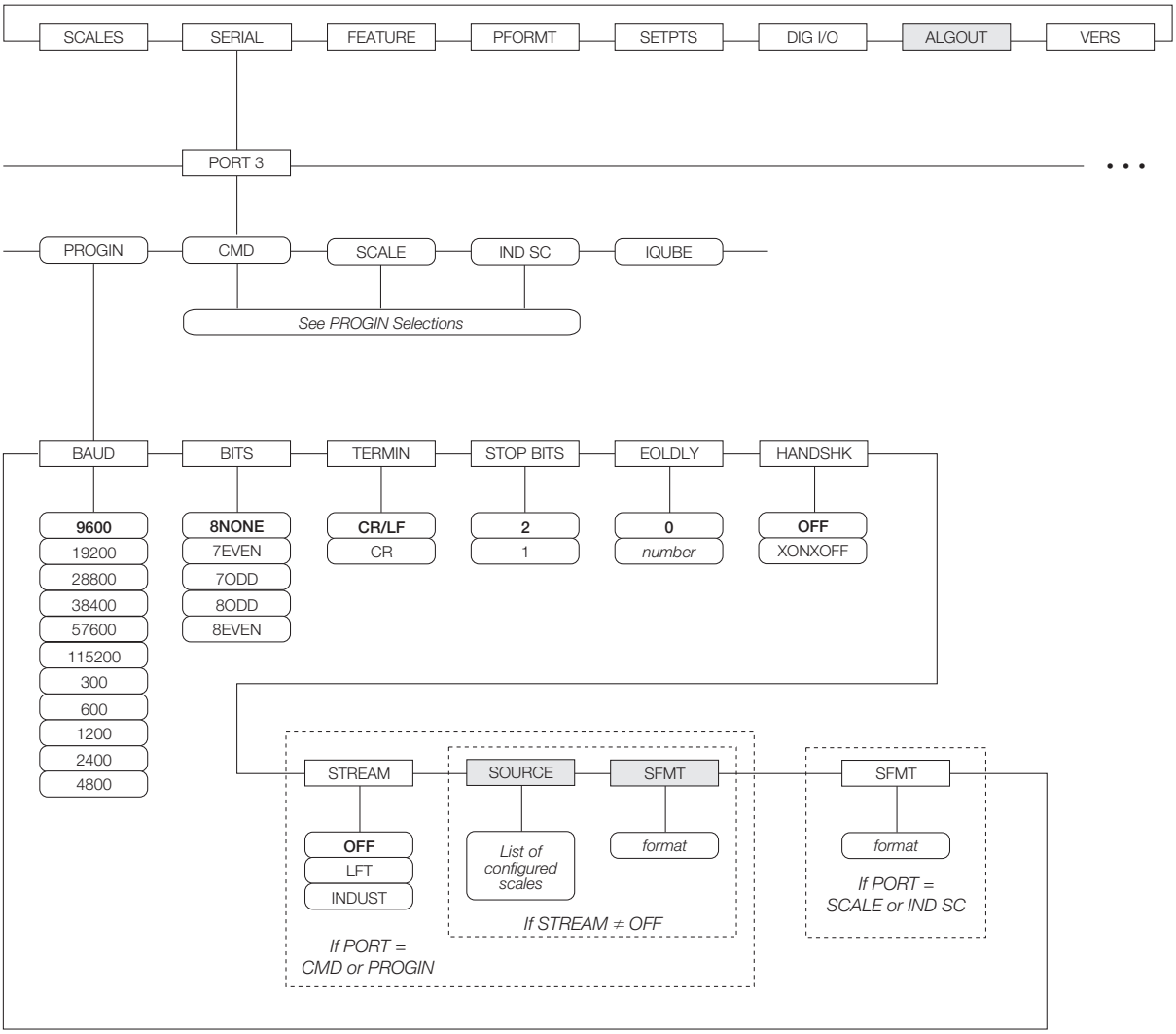


Figure 4-8. SERIAL Menu, Port 3

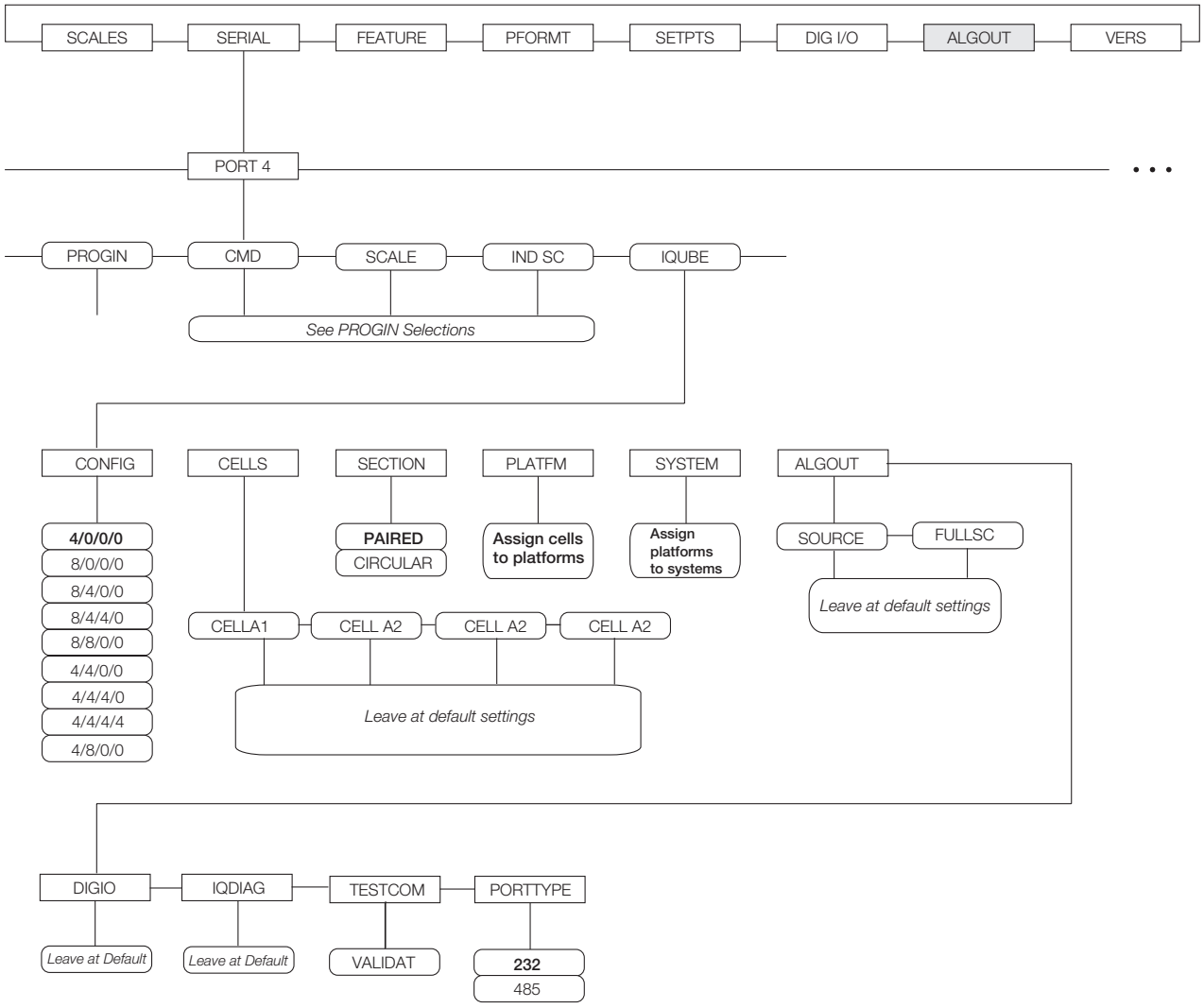


Figure 4-9. SERIAL Menu, Port 4 for CLS-920i Configuration

SERIAL Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
PORT 1 PORT 2 PORT 3 PORT 4 … PORT *x*	CMD PROGIN KEYBD SCALE IND SC IQUBE	Specifies the type of data received by the port: CMD: Remote command input PROGIN: Programmable input KEYBD: Remote keyboard input SCALE: Legal-for-trade serial scale input IND SC: Industrial (non-legal-for-trade) scale input IQUBE: *iQUBE* serial scale input KEYBD is available only on Port 2; SCALE, IND SC, IQUBE, and HIPREC are available only on Ports 3 and 4 and higher (expansion ports). **NOTE:** *The keyboard interface is not hot-pluggable. Power-off the 920i before plugging the keyboard cable into the Port 2 connector.*
Level 3 Submenus		Port 1–Port 32
CONFIG	4/0/0/0 8/0/0/0 8/4/0/0 8/4/4/0 8/8/0/0 4/4/0/0 4/4/4/0 4/4/4/4 4/8/0/0	iQube board configuration.
CELLS	CELLA1 CELLA2 CELLA3 CELLA4	iQube load cell configuration
SECTION	PAIRED CIRCULAR	iQube section definition
PLATFRM	A1 A2	iQube platform definition
SYSTEM	PLATFRM1	iQube platform definition
ALGOUT	SOURCE FULLSC	iQube analog output definition
DIGIO	Leave at default setting	iQube digital I/O configuration
IQDIAG	Leave at default setting	iQube diagnostics parameter
TESTCOM	VALIDATE	iQube communications tester
PORTTYPE	232 485	Specifies whether Port 4 is used for RS-232 or RS-485 communications. If 485 is selected, additional prompts are shown to specify half- or full-duplex operation and RS-485 address. **NOTE:** *RS-485 communications can be specified for Port 4, and for odd numbered expansion ports 5 and higher.*

Table 4-5. CLS-920i Serial Menu Parameters

4.2.3 FEATURE Menu

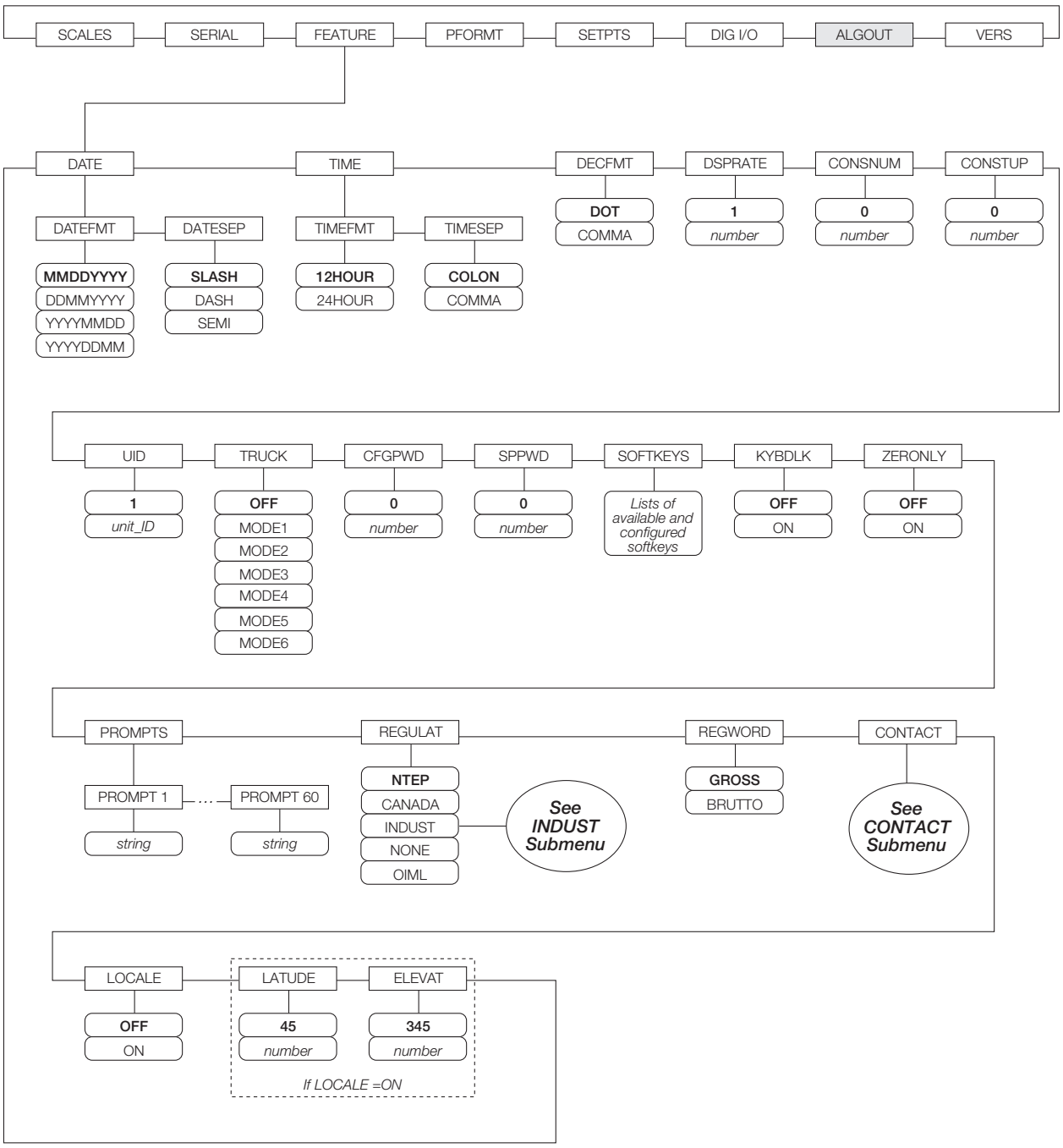


Figure 4-10. FEATURE Menu

FEATURE Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
DATE	DATEFMT DATESEP	Allows selection of date format and date separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE softkey or the SD serial command to set the date. See Section 9.0 on page 80 for information about using the serial commands.
TIME	TIMEFMT TIMESEP	Allows selection of time format and separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE softkey or the ST serial command to set the time. See Section 9.0 on page 80 for information about using the serial commands.
DECFMT	DOT COMMA	Specifies whether decimal numbers are displayed using a period (DOT) or comma as the decimal symbol.
DSPRATE	1 *1–80*	Display update rate. Specifies the display update rate, in the number of 100-millisecond intervals between updates. The default value, 1, provides about 10 updates per second. The maximum value updates the display every 8 seconds.
CONSNUM	0 *0–9999999*	Consecutive numbering. Allows sequential numbering for print operations. The consecutive number value is incremented following each print operation that includes <CN> in the ticket format. When the consecutive number is reset, it is reset to the value specified on the CONSTUP parameter.
CONSTUP	0 *0–9999999*	Specifies the consecutive number start-up value used when the consecutive number is reset by sending the KCLRCN serial command or a CLRCN digital input. Value specified must be in the range 0–9 999 999.
UID	1 *unit-ID*	Specifies the unit identification number. Value specified can be any alphanumeric value, up to eight characters.
TRUCK	OFF MODE1 MODE2 MODE3 MODE4 MODE5 MODE6	Specifies the truck mode used. If selected, the indicator switches from normal mode to the selected truck mode. MODE1: Auto clear ID, keyed tares, value swapping MODE2: Auto clear ID, no keyed tares, value swapping MODE3: Stored ID, keyed tares, value swapping MODE4: Stored ID, no keyed tares, value swapping MODE5: Stored ID, keyed tares, no value swapping MODE6: Stored ID, no keyed tares, no value swapping
CFGPWD	0 *0–9999999*	Configuration password. Specify a non-zero value to restrict access to all configuration menus.
SPPWD	0 *0–9999999*	Setpoint password. Specify a non-zero value to restrict access to the setpoint menu. The SPPWD is also shared by, and can be used to protect, the truck register. If a non-zero setpoint password is specified, the password must be entered before deleting any entries from the truck register.

Table 4-6. FEATURE Menu Parameters

FEATURE Menu		
Parameter	**Choices**	**Description**
SOFTKEYS	<blank> Time/Date Display Tare Display Accum Display ROC Setpoint Batch Start Batch Stop Batch Pause Batch Reset Weigh In Weigh Out Truck Regs Unit ID Select Scale *F1–F10* Diagnostics	Use the **Add** and **Remove** softkeys to select softkeys to be displayed in weighing mode.
KYBDLK	OFF ON	Keyboard lock. Specify ON to disable the keypad in normal mode.
ZERONLY	OFF ON	Zero key only. Specify ON to disable all front panel keys except ZERO in normal mode.
PROMPTS	*PROMPT1–PROMPT60*	Specify prompts for use in setpoint names. Prompts are referenced by the NAME parameter under the SETPTS submenus; prompts can be shown on the display during setpoint execution.
REGULAT	NTEP CANADA INDUST NONE OIML	Regulatory mode. Specifies the regulatory agency having jurisdiction over the scale site. • OIML, NTEP, and CANADA modes allow a tare to be acquired at any weight greater than zero. NONE allows tares to be acquired at any weight value. • OIML, NTEP, and CANADA modes allow a tare to be cleared only if the gross weight is at no load. NONE allows tares to be cleared at any weight value. • NTEP and OIML modes allow a new tare to be acquired even if a tare is already present. In CANADA mode, the previous tare must be cleared before a new tare can be acquired. • NONE, NTEP and CANADA modes allow the scale to be zeroed in either gross or net mode as long as the current weight is within the specified ZRANGE. In OIML mode, the scale must be in gross mode before it can be zeroed; pressing the ZERO key in net mode clears the tare. • INDUST provides a set of subparameters to allow customization of tare, clear, and print functions in non-legal-for-trade scale installations. See Level 4 parameter descriptions in Table 4-8 on page 42. The value specified for this parameter affects the function of the front panel TARE and ZERO keys. See Section 10.2 on page 108 for a complete description of TARE and ZERO key functions for each of the regulatory modes.
REGWORD	GROSS BRUTTO	Sets the term displayed when weighing in gross mode. Selecting BRUTTO replaces the *Gross* annunciator with *Brutto*.
CONTACT	—	Allows specification of contact information for use in *iQUBE* alert messages. See Level 3 submenu descriptions in Table 4-7 on page 41.
LOCALE	OFF ON	Locale. Set this parameter ON to enable the LATUDE and ELEVAT parameters. Specifying latitude and elevation of the scale site provides compensation for gravitational effects. Attached scales must be recalibrated after changing this parameter from OFF to ON. NOTE: Gravitational compensation settings do not affect *iQUBE* scales.

Table 4-6. FEATURE Menu Parameters (Continued)

FEATURE Menu		
Parameter	**Choices**	**Description**
LATUDE	45 *0–90*	Latitude. Specify the latitude of the scale site in degrees. This parameter is shown only if LOCALE=ON.
ELEVAT	345 *±0–9999*	Elevation. Specify the elevation of the scale site in meters. Valid values are –9999 through 9999. This parameter is shown only if LOCALE=ON.
Level 3 submenus		
DATEFMT	MMDDYYYY DDMMYYYY YYYYMMDD YYYYDDMM	Specifies the format used to display or print the date.
DATESEP	SLASH DASH SEMI	Specifies the date separator character.
TIMEFMT	12HOUR 24HOUR	Specifies the format used to display or print the time.
TIMESEP	COLON COMMA	Specifies the time separator character.

Table 4-6. FEATURE Menu Parameters (Continued)

FEATURE Menu, CONTACT Submenu

The CONTACT submenu allows entry of contact information for a contact company or scale dealer. Contact information can be displayed by pressing the **Contacts** softkey on the Version menu in setup mode or the **Diagnostics** softkey when in weigh mode. Contact information may be used in print formats.

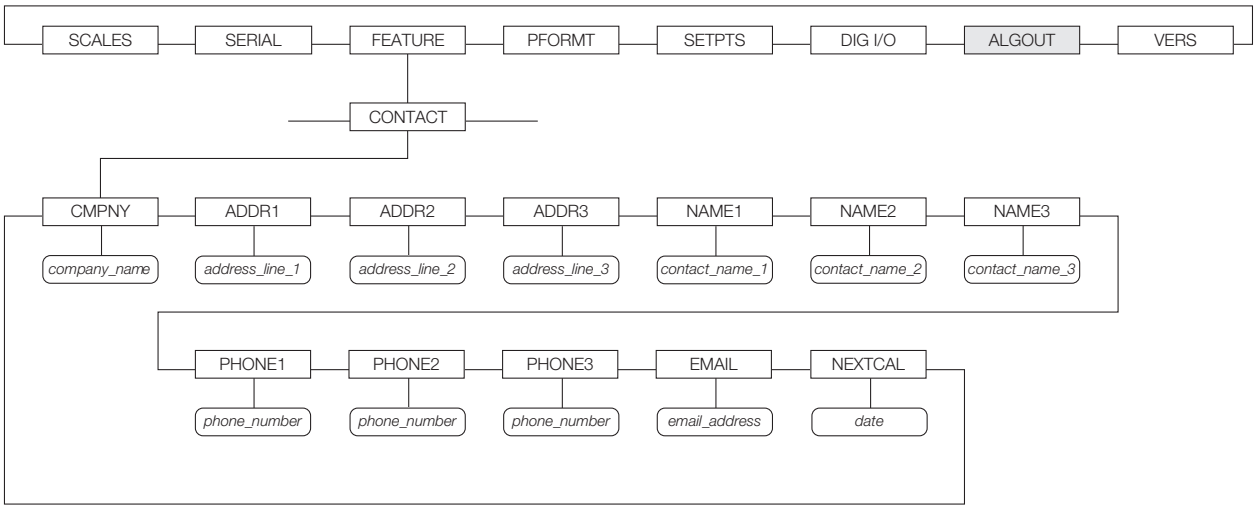


Figure 4-11. CONTACT Submenu

FEATURE Menu, CONTACT Submenu		
Parameter	**Choices**	**Description**
Level 3, CONTACT submenu		
CMPNY	*company_name*	Enter the name of the contact company or dealer.
ADDR1–ADDR3	*address*	Enter up to three lines of address information for the contact company.
NAME1–NAME3	*contact_name*	Enter names of up to three contact persons.
PHONE1–PHONE3	phone_number	Enter phone numbers for each of the contact persons specified for the NAMEx parameter.
EMAIL	*email_address*	Enter the e-mail address of the contact company or dealer. If the *iQUBE* alert support is used to send automated alert e-mail messages, enter the e-mail address to which the alert messages will be sent.
NEXTCAL	*date*	Enter the next scheduled calibration date using the month/day/year format on the DATEFMT parameter. Separator characters are not required.

Table 4-7. CONTACT Submenu Parameters

FEATURE Menu, REGULAT/INDUST Submenu

The INDUST setting of the REGULAT parameter allows customization of several tare, clear, and print functions for use in *non-legal-for-trade* scale installations.

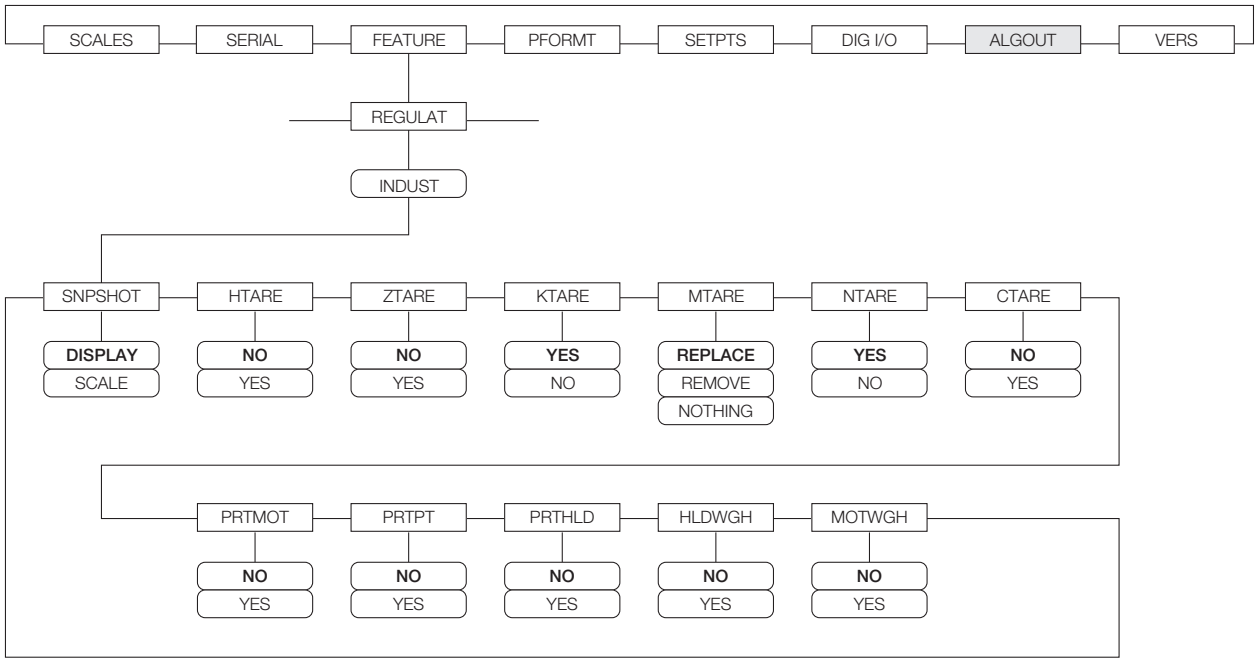


Figure 4-12. REGULAT / INDUST Submenu

FEATURE Menu, REGULAT / INDUST Submenu		
Parameter	**Choices**	**Description**
Level 4, REGULAT / INDUST submenu		
SNPSHOT	DISPLAY, SCALE	Display or Scale weight source.
HTARE	NO, YES	Allow tare in display hold
ZTARE	NO, YES	Remove tare on ZERO
KTARE	YES, NO	Always allow keyed tare
MTARE	REPLACE, REMOVE, NOTHING	Multiple tare action
NTARE	NO, YES	Allow negative or zero tare
CTARE	YES, NO	Allow CLEAR key to clear tare/accumulator
PRTMOT	NO, YES	Allow print while in motion
PRTPT	NO, YES	Add PT to keyed tare print
PRTHLD	NO, YES	Print during display hold
HLDWGH	NO, YES	Allow truck weighment during display hold
MOTWGH	NO, YES	Allow truck weighment in motion

Table 4-8. REGULAT / INDUST Submenu Parameters

4.2.4 PFORMT Menu

See Section 6.0 on page 53 for information about custom print formatting.

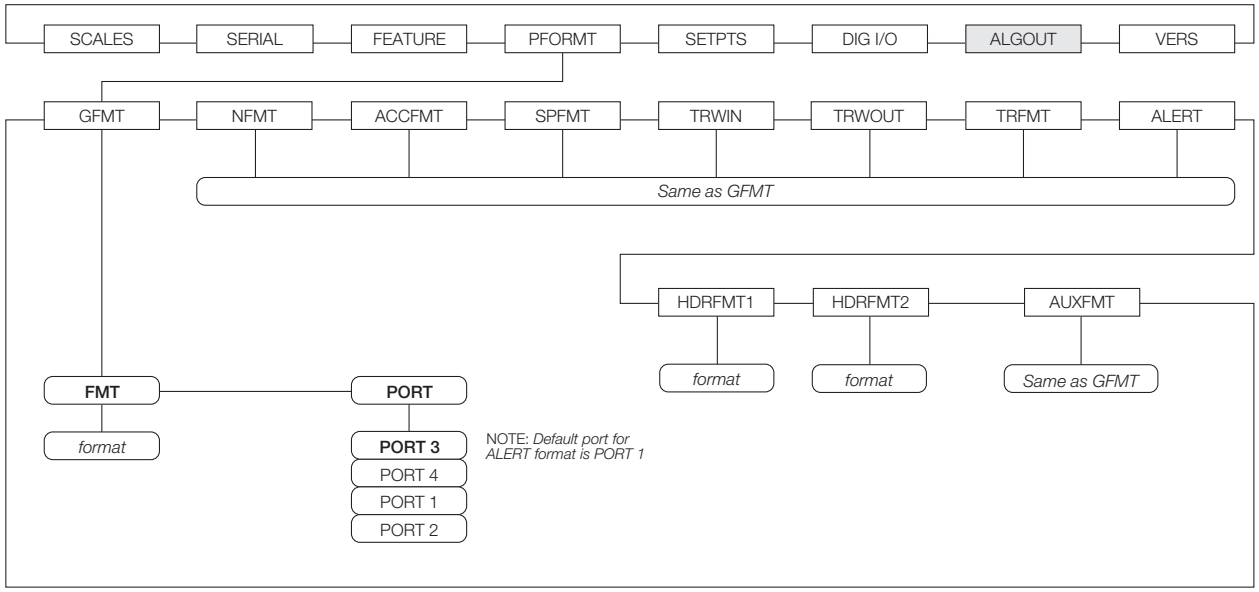


Figure 4-13. PFORMT Menu

4.2.5 SETPTS Menu

Submenus for the various setpoint kinds (shown as *Go to X* in Figure 4-14) are described in Figures 8-2 through 8-9, beginning on page 65.

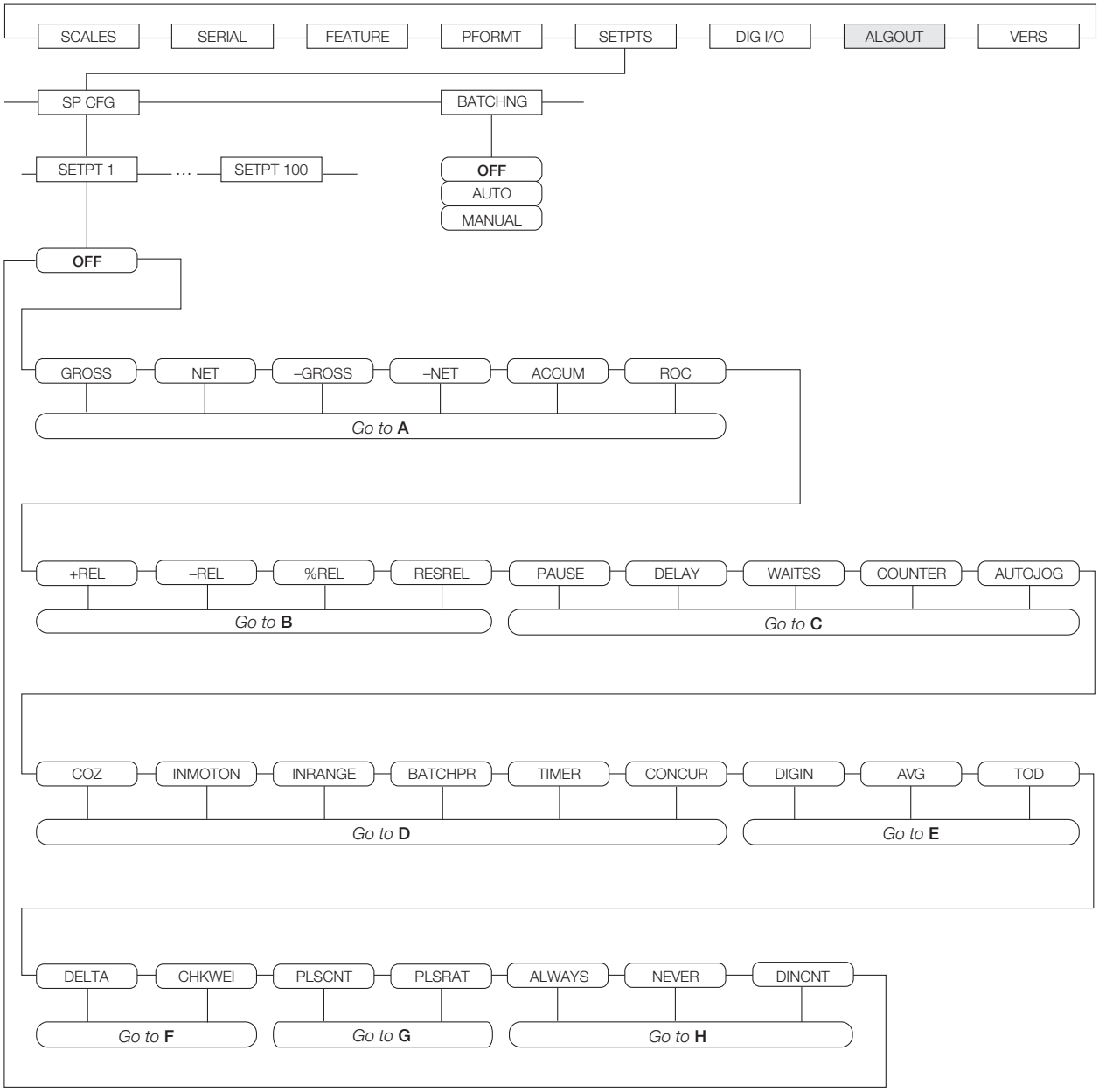


Figure 4-14. SETPTS Menu

4.2.6 DIG I/O Menu

The DIG I/O menu shown in Figure 4-15 is used to assign functions to digital inputs and outputs. SLOT 0 represents the four I/O bits available on the CPU board (connector J2); additional slots, each with 24 I/O bits, are shown only if one or more digital I/O expansion cards are installed.

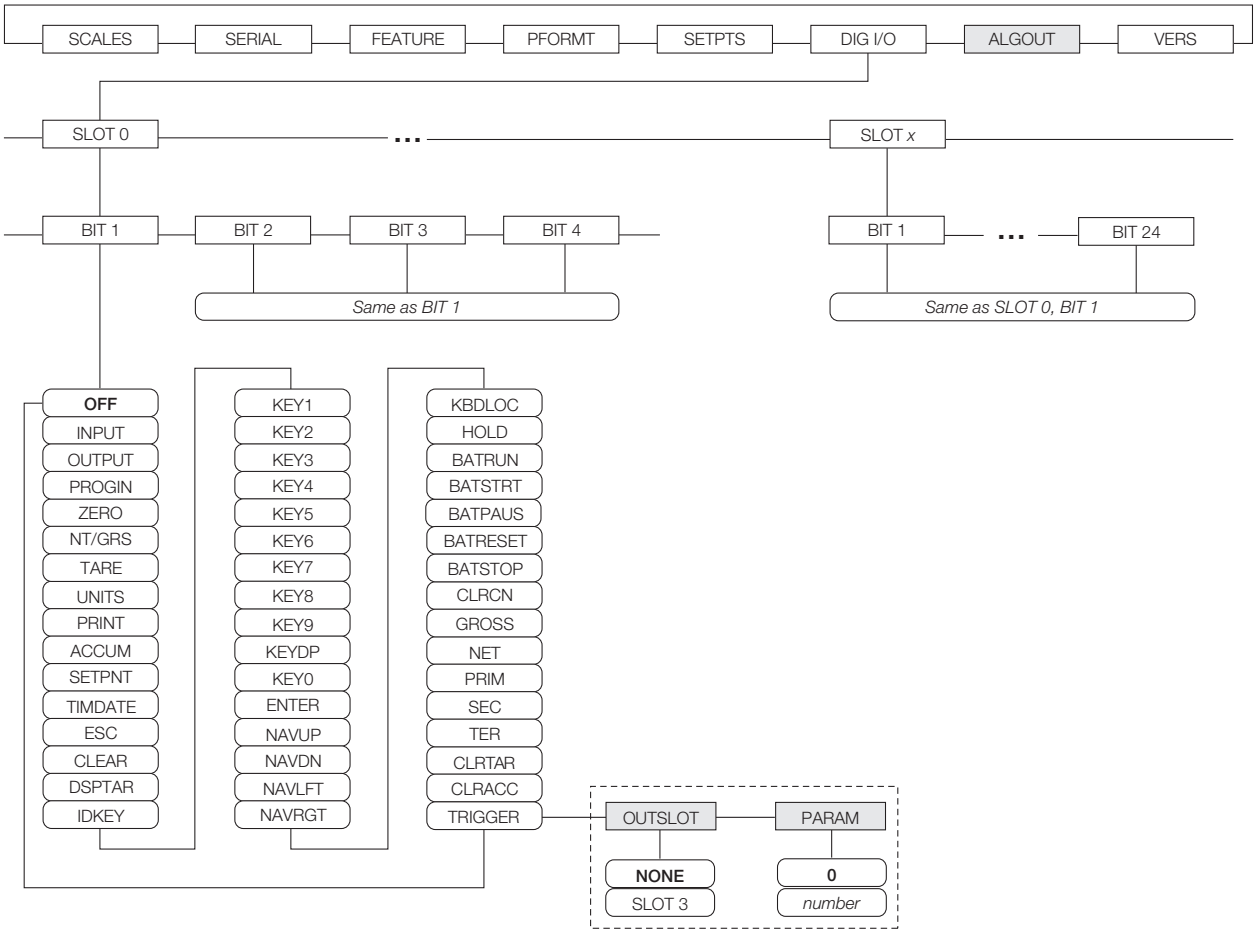


Figure 4-15. DIG I/O Menu

DIG I/O Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
SLOT*x*	BIT *y*	Lists available digital I/O slots.
Level 3 submenus		
BIT *y*	OFF INPUT OUTPUT PROGIN ZERO NT/GRS TARE UNITS PRINT ACCUM SETPNT TIMDATE ESC CLEAR DSPTAR IDKEY KEY0—KEY9 KEYDP ENTER NAVUP NAVDN NAVLFT NAVRGT KBDLOC HOLD BATRUN BATSTRT BATPAUS BATRESET BATSTOP CLRCN GROSS NET PRIM SEC TER CLRTAR CLRACC TRIGGER	Specifies the function of the digital I/O bit. • OFF indicates that the bit is not configured. • INPUT assigns the bit as a digital input used for DIGIN setpoints. • OUTPUT assigns the bit as a digital output for setpoint or program use. • PROGIN assigns the bit as a digital input used to generate a program event. • ZERO, NT/GRS (net/gross mode toggle), TARE, UNITS, and PRINT provide the same functions as the five major front panel keys. • ACCUM adds the current scale weight to the accumulator, if the scale accumulator is enabled. • SETPNT, and TIMDATE provide the same functions as the Setpoint and Time/Date softkeys. • ESC provides a function equivalent to the Cancel softkey. • CLEAR simulates pressing the front panel CLR key. • DSPTAR displays the current tare; equivalent to pressing the Display Tare softkey. • IDKEY displays a prompt to enter a new unit ID; equivalent to pressing the Unit ID softkey. • KEY0—KEY9 and KEYDP (decimal point) simulate pressing keys on the numeric keypad. • ENTER simulates pressing the front panel ENTER key. • NAVUP, NAVDN, NAVLFT, and NAVRGT simulate pressing the navigation keys. • KBDLOC locks the keyboard (indicator front panel) when held low. • HOLD holds the current display. Releasing this input clears the running average filter. • BATRUN allows a batch routine to be started and run. With BATRUN active (low), the BATSTRT input starts the batch; if BATRUN is inactive (high), BATSTRT resets the batch. • BATSTRT starts or resets a batch routine, depending on the state of the BATRUN input. • BATPAUS pauses a batch routine when held low. • BATRESET stops the batch sequence and resets to the first batch step. • BATSTOP stops the batch routine. • CLRCN resets the consecutive number to the value specified on the CONSTUP parameter (FEATURE menu). • GROSS, NET, PRIM, SEC, and TER select gross or net weight display, and primary, secondary, or tertiary units display modes. • CLRTAR clears the current tare for the active scale. • CLRACC clears the active accumulator. • TRIGGER
Level 4 submenus		TRIGGER subparameters
OUTSLOT	NONE PORT 3	Specifies the card slot receiving the trigger output.
PARAM	0 *number*	Specifies the value passed as a parameter to the option card in the specified slot.

Table 4-9. DIG I/O Menu Parameters

4.2.7 Analog Output Menu

The ALGOUT menu is shown only if the analog output option is installed. If the analog output option is installed, configure all other indicator functions and calibrate the indicator itself before configuring the analog output. See the *Analog Output Card Installation Instructions*, PN 69089, for more information.

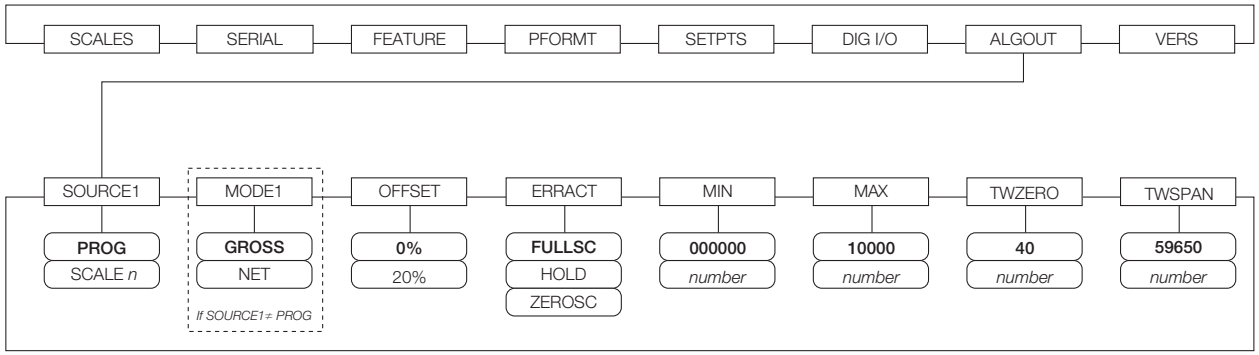


Figure 4-16. Analog Output Menu

ALG OUT Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
SOURCE1	PROG SCALE*n*	Specifies the scale tracked by the analog output. PROG indicates that the analog output is under program control.
MODE1	GROSS NET	Specifies the weight data, gross or net, tracked by the analog output.
OFFSET	0% 20%	Zero offset. Select 0% for 0–10 V or 0–20 mA output; select 20% for 4–20 mA output. This parameter must be set before calibrating the analog output.
ERRACT	FULLSC HOLD ZEROSC	Error action. Specifies how the analog output responds to system error conditions. Possible values are: FULLSC: Set to full value (10 V or 20 mA) HOLD: Hold current value ZEROSC: Set to zero value (0 V or 4 mA)
MIN	000000 *0–9999999*	Specifies the minimum weight value tracked by the analog output. Specify a value in the range 0–9999999.
MAX	10000 *0–9999999*	Specifies the maximum weight value tracked by the analog output. Specify a value in the range 0–9999999
TWZERO	40 *0–65535*	Tweak zero. Enter tweak value to adjust the analog output zero calibration. Use a multimeter to monitor the analog output value.
TWSPAN	59650 *0-65535*	Tweak span. Enter tweak value to adjust the analog output span calibration. Use a multimeter to monitor the analog output value.

Table 4-10. Analog Output Menu Parameters

4.2.8 Version Menu

The VERS menu can be used to check the installed software version or, by using the **Reset Config** softkey, to restore all configuration parameters to their factory default values. There are no parameters associated with the Version menu: when selected, the indicator displays the installed software version number.

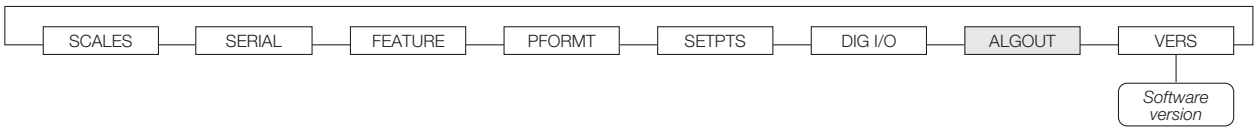


Figure 4-17. Version Menu

The **Contacts** softkey on the Version menu allows display of contact information (see "FEATURE Menu, CONTACT Submenu" on page 41). If an *iQUBE* scale is configured, a **Diagnostics** softkey also provides access to *iQUBE* diagnostic information.

5.0 Configuration of User Parameters

The CLS-920i has many parameters that must be configured in order for the indicator software to work properly. Once the indicator is configured for the basic scale parameters and is saved, the following main menu screen appears.

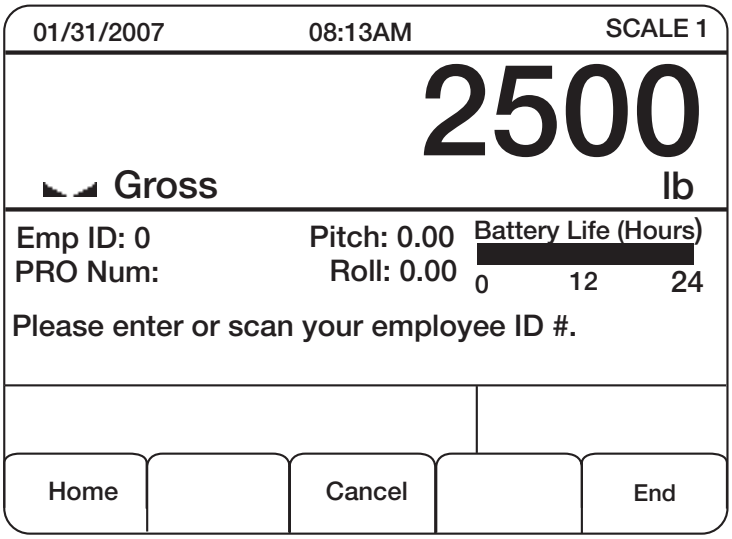


Figure 5-1. CLS-920 Main Screen

Enter your employee ID or login using the numeric keypad on the 920i indicator and press the **enter** key. If the employee ID is already in the CLS-920i database, the following screen appears.

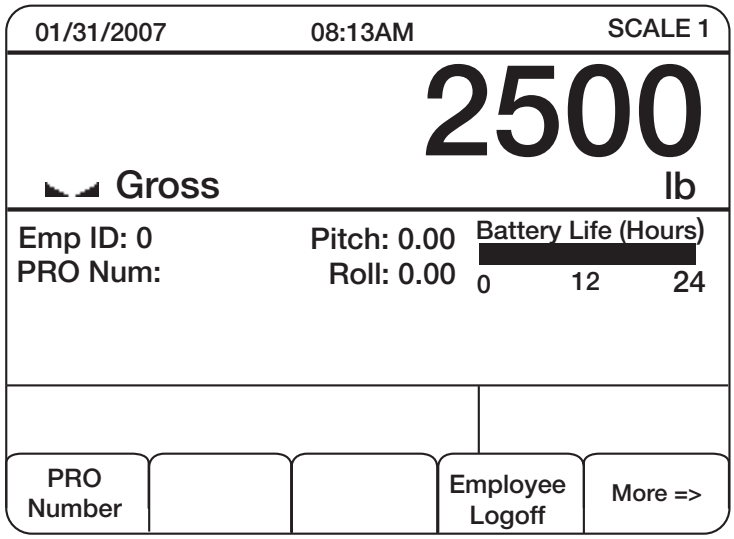


Figure 5-2. Employee Database Menu Screen

If the employee ID or login that is entered is a new ID, then the indicator will state that the *ID Has Been Entered Into The Employee Database* and then Figure 5-2 is displayed. At this point there are three available softkeys that can be used to either **Employee Logoff**, enter the **PRO Number** or press the **More =>** softkey to access additional parameters.

5.1 PRO Number

The PRO Number is an acronym for **P**rogressive **R**otating **O**rder. A pro number is assigned to each shipment and serves as a tracking number and a carrier invoice number. Select the PRO Number softkey to enter a pro number and the following screen is displayed.

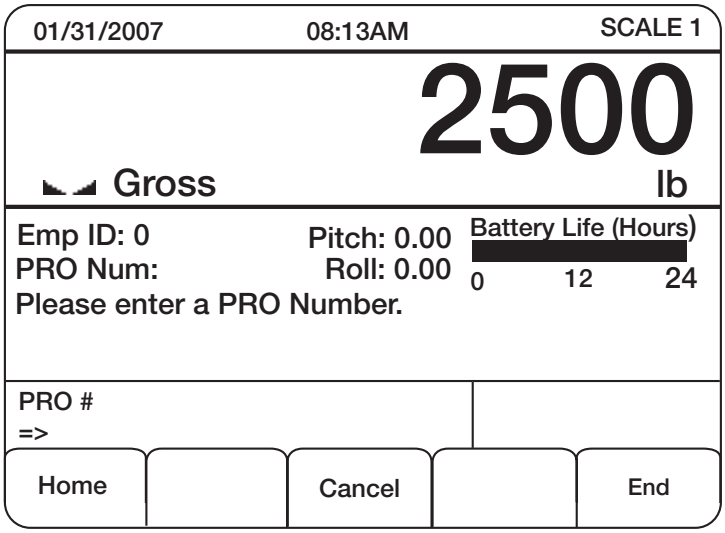


Figure 5-3. PRO Screen

Enter the PRO number and press the enter key on the 920i. If it is not a valid PRO number, the indicator screen will state that *Entry not a valid PRO #*.

Another attempt to enter a PRO number will occur and if a correct PRO number is not entered, *Entry Mode Cancelled* will be displayed on the screen.

5.2 More =>

The **More =>** softkey takes the user to another set of softkeys that can access various user program parameters. Press the **More =>** softkey to access the following list of additional softkeys on the 920i.

- Existing PRO Skid Count
- Calibration Check
- Utilities Menu
- Supervisor Menu

All of the above mentioned items are explained in further detail in the following sections.

An employee can access all of the softkeys that are programmed into the 920i user program other than the Supervisor menu. That needs a password to access those additional parameters.

5.3 Calibration Check

Press the **Calibration Check** softkey on the 920i to enter in a new calibration weight or keep the existing one if one has already been entered.

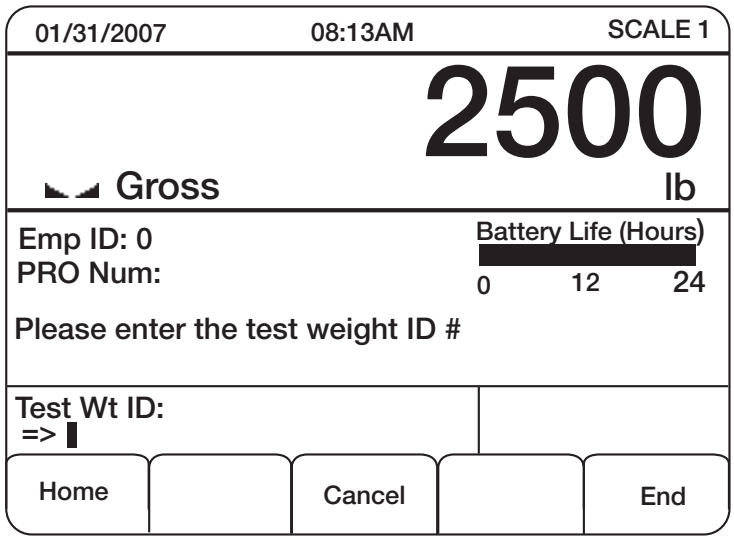


Figure 5-4. Calibration Check Screen

Enter a test weight ID number into the 920i and press **enter.** You are then asked to *Enter Test Weight Amount* using the numeric keypad on the 920i. Enter that amount and press the **enter** key.

Then the following screen appears.

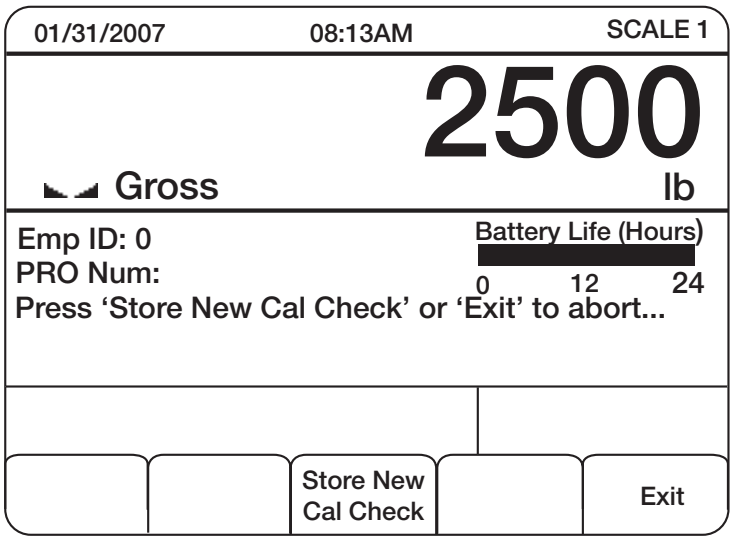


Figure 5-5. Store New Calibration Check Screen

Place the test weights on the forks of the scale at this time.

Press the **Store New Cal Check** softkey to store the new calibration check amount or press **Exit** to exit out of the sequence. If the **Store New Cal Check** softkey is pressed the user is alerted that the *New Calibration Check is Stored* and the screen goes back to the Main Menu screen.

5.4 Utilities Menu

The Utilities Menu offers two different parameters for the user to check. They are:

- Diagnostics
- Get battery status

5.4.1 Diagnostics Softkey

By pressing the **Diagnostics** softkey, the user can check the status of the load cell and make sure that it is functioning properly. Press the **Diagnostics** softkey and the following screen appears.

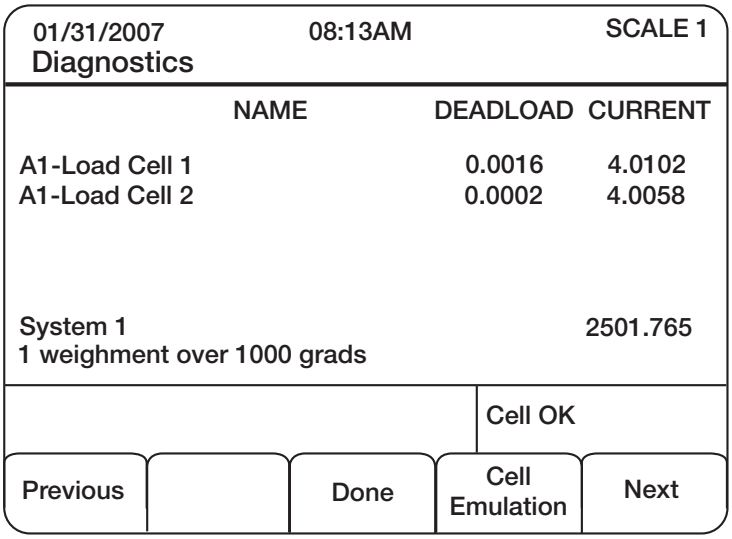


Figure 5-6. Diagnostics Screen

By pressing the **Previous** softkey, the following screen appears. It gives calibration and contact information.

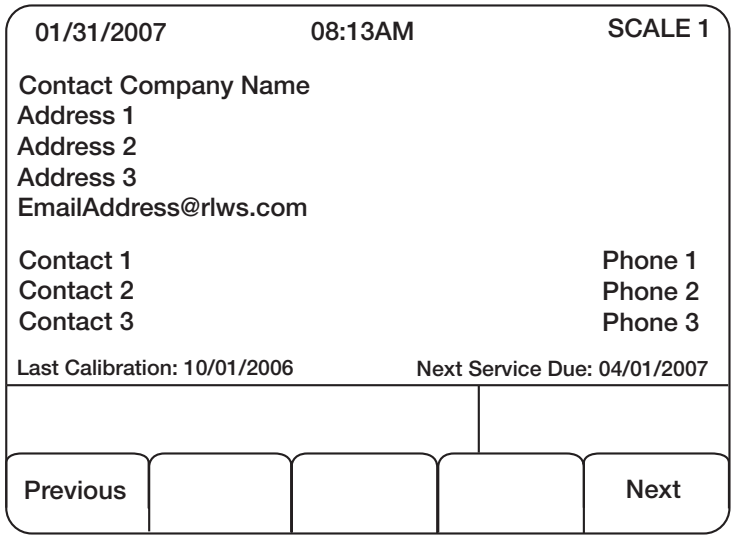


Figure 5-7. Calibration Contact Screen

Press the **Previous** softkey again to return back to the Main Menu screen.

5.4.2 Cell Emulation

Press the **Cell Emulation** softkey to simulate actual current and weight running through the load cell. This is done to check the load cells and see that they're functioning properly. Figure 5-8 illustrates what the screen looks like if the **Cell Emulation** softkey is pressed.

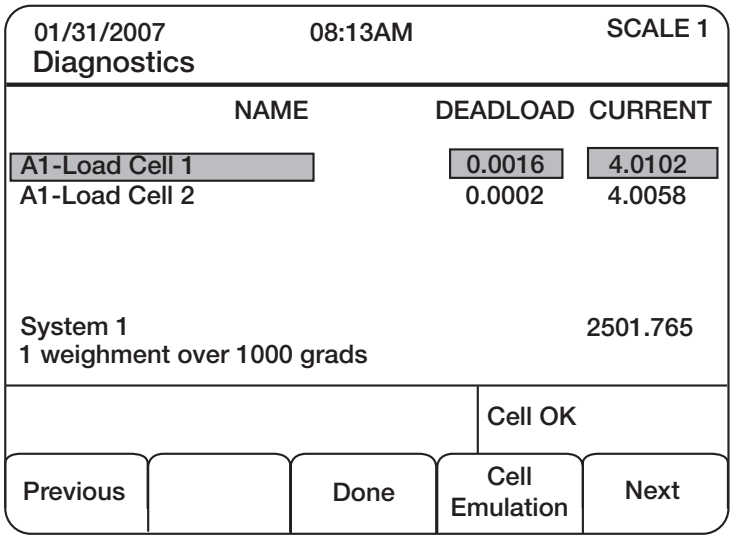


Figure 5-8. Cell Emulation Screen

Press the **Previous** softkey again to return back to the Main Menu screen.

5.4.3 Get Battery Status

Press the **Get Battery Status** softkey to find out how much time is remaining on the forklift wireless junction box battery. It is measured in hours is and briefly displayed on the screen when the **Get Battery Status** softkey is pressed. If the CLS Cargo Lift Scale is a wired version, the *Battery Life Remaining* will show N/A.

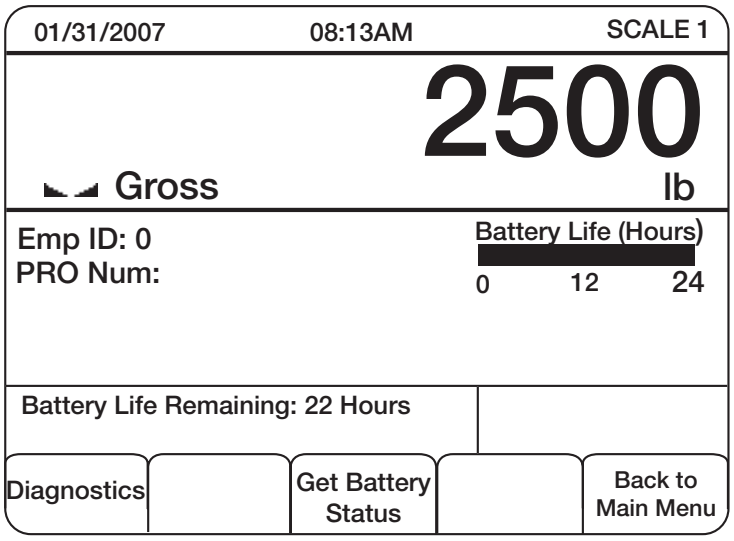


Figure 5-9. Battery Status Screen

5.5 Supervisor Menu

Press the **Supervisor Menu** softkey to gain access to application parameters and other settings.Upon pressing that softkey the operator is asked to enter a password.

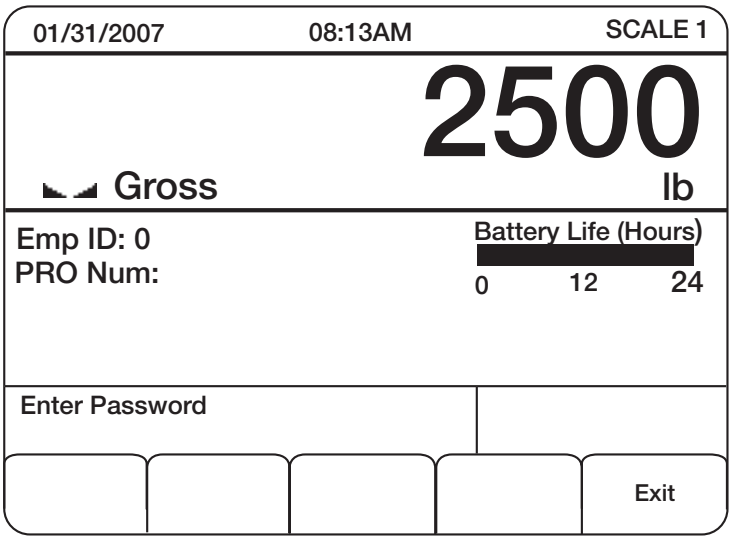


Figure 5-10. Supervisor Menu

The default password is *0* and the user will not be asked to enter a password when the password is 0. In effect, leaving the password at 0 (zero) disables password protection. Select *Password* from near the bottom of the Supervisor Menu list to change the password.

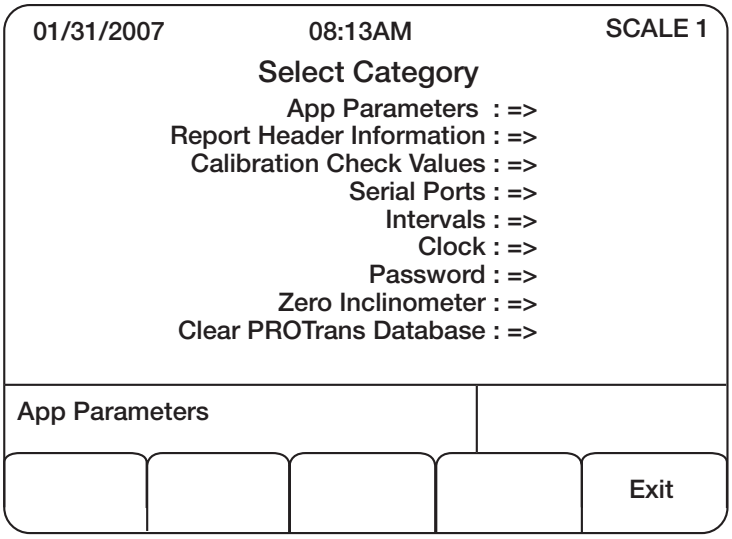


Figure 5-11. Supervisor List

The Supervisor Menu is organized as a “list of lists” and is best described in table 5-1.

NOTE: *Any parameter description ending with an arrow => indicates that the parameter will expand to show more parameters or softkeys when selected.*

Parent List	Parameter Name	Default Value	Min	Max	Type	Description
App Parameters	Zero Tolerance Weight	5	1	1000	Integer	This is the maximum weight that the forklift scale must return to between lifting and weighing skids. If the weight doesn't fall below this weight after weighing and removing a skid from the forks, another weighment is not allowed. If the message, Scale must zero between skids, then the operator must lower the skid if one is on the forks. If the weight doesn't fall below the Zero Tolerance Weight with the forks empty, zero the scale with the ZERO key on the 920i.
	Show Pitch & Roll	None			Yes/No	During the initial installation and setup, it might be adventageous to see the pitch and roll information. Set this value to YES to have the 920i show the pitch and roll data on the main screen.
	Minimum PRO Length	9	1	20	Integer	The program needs to be able to identify and validate an entered or scanned data as a PRO number. Set this value to the minimum length of a valid PRO number.
	Maximum PRO Length	9	1	20	Integer	Set this value to the maximum length of a valid PRO number.
	Alpha Characters in PRO	None			Yes/No	Some PROs are numeric only, other may have letters in the string. Set this value to YES if the entered or scanned PRO string will contain numbers and letters.
	Scanner Begin Token (ASCII Value)	2	1	127	Character	The scanner data must be wrapped with a start character and an end character for the 920i to recognize it. The default is an ASCII 2 (STX) and the scanner must be configured to send this character. If for some reason, the scanner you are using cannot send a STX, you may set this value to the ASCII value of the starting character the scanner will be sending.
	Scanner End Token (ASCII Value)	3	1	127	Character	The default is an ASCII 3 (ETX) and the scanner must be configured to send this character. If for some reason, the scanner you are using cannot send an ETX, you may set this value to the ASCII value of the ending character the scanner will be sending.
	Battery Life Offset (Hrs)	0	0	48	Integer	If a battery has been properly calibrated or the life is not linear, it may be necessary to add an offset to the displayed battery life. If the battery life seems to show plenty of life and then quickly fails to no life at 8 hours for example, then enter 8.0 for this setting. This should correct the displayed battery life to represent the true hours remaining.

Table 5-1. Supervisor List Parameters

Parent List	Parameter Name	Default Value	Min	Max	Type	Description
	Allow New Employee IDs	Yes			Yes/No	The 920i has an employee database that holds up to 1000 employees ID numbers. When an employee logs in by entering or scanning his employee ID, the database is searched for a matching ID. If not found, this error message appears, *Employee ID not in DB* when new employee IDs are not allowed. If the employee ID is being scanned from a badge and there is no chance of data entry error, then this setting can be set to YES. In that case, the first time a new employee ID is scanned, it will be entered into the database and the message *New Employee: nnnn stored in Database* is displayed (where nnnn is the new employee ID.
Report Header Information	Address Line 1				30 Character String	The address lines are up to four lines of 30 characters each. This text will be printed on the top of each report.
	Address Line 2					
	Address Line 3					
	Address Line 4					
	Towmotor ID					The towmotor and Scale IDs are additional pieces of information that will be printed on each report.
	Scale ID					
Calibration Check Value	Calibration Weight ID #				12 Character String	The calibration check values are present in this list for viewing purposes only. These values are set when the calibration check procedure is performed after pressing the **Calibration Check** softkey.
	Calibration Weight	0			32000 Real	
	Measured Weight	0			32000 Real	
	Last Calibration Time & Date				20 Character Date	
Serial Ports	Scanner Port	1	1	12	Port	The serial ports can be changed if necessary. The 920i has 4 serial ports on the CPU board. Ports 7 and 8 may also be available if the wireless LAN option card is installed. **NOTE:** *iQube must be configured into Port 4 and the default values cannot be changed.*
	Report Printer Port	3	1			
	iQube Port	4	1			
	PC Interface Port	2	1			
	Debug Port	0	0			

Table 5-1. Supervisor List Parameters

Parent List	Parameter Name	Default Value	Min	Max	Type	Description
Intervals	Display Time	1.7	0	20	Second	This is the amount of time that messages will be displayed before disappearing.
	Data Entry Timeout	60.0		240		When a prompt is open and the 920i is expecting the user to enter data, the prompt will close after a number of seconds.
	Configuration Exit Timeout	120.0		240		If you have pressed the **Supervisor Menu** softkey and are in the configuration parameters list (this list), and no keys have been pressed in a number of seconds, the 920i will exit and return to the main menu.
	Password Timeout	20.0		240		Once a valid password is entered to access the Supervisor Menu, and then the Supervisor Menu is exited by the user, you have this number of seconds to re-enter the Supervisor Menu without having to re-key your password.
	Polling Frequency	0.25		5		This setting is no longer used.
Clock	Time				Time	Selecting Time will prompt the user to enter the time in this format, HHMM. Use this to correct the time during daylight savings time, small descrepancies in time, or to set the time for the first time.
	Date				Date	Selecting Date will prompt the user to enter the date in this format DDMMYY. Use this to set the date for the first time.
	Time Format	HH:MM XM			String	These settings are no longer used.
	Date Format	MM/DD/YY			String	
Password	Enter New Password	0			String	*Enter New Password.*
Zero Inclinometer	User will be prompted, Are you sure?	Select Yes or No softkey			Command	This function is used to set the smart junction box (iQube) pitch and roll inclinometer to 0 degrees. Make sure the forks are level before pressing the **Yes** softkey.
Clear PRO Trans DB	User will be prompted, Are you sure?	Select Yes or No softkey			Command	This function clears the PRO# transaction database. Select the **Yes** or **No** softkey

Table 5-1. Supervisor List Parameters

6.0 Calibration

NOTE: ***While the functionality remains the same for a standard 920i HMI weight indicator, there are certain menu choices that need to be changed in the manual that are specific to the proper functioning of the CLS-Series Cargo Lift Scale which include calibration.***

The *920i* can be calibrated using the front panel: Use the following steps to calibrate the CLS-920i Cargo Lift Scale.

NOTE: ***The forklift tines must be in place as test weights will be placed upon them.***

NOTE: ***Use a level to ensure the forklift tines are level from front to back (pitch), and side to side (roll) prior to calibration.***

NOTE: ***The test weight used to calibrate the CLS Cargo Lift Scale cannot be greater than 2500 lbs.***

1. With the 920i indicator in normal weighing mode, press the **More =>** softkey, then the **Supervisor Menu** softkey. Enter a password if it asks for it.
2. Using the **up/down** arrows, highlight the *Zero Inclinometer* menu item. Press the **right arrow** key.
3. Ensure that the forklift tines are level both front to back and right to left and press the **Yes** softkey.
4. Press the **Exit** softkey and return to the normal weighing mode.
5. Put the indicator into setup mode by pressing the indicator's setup switch (located on the underside of the indicator). The indicator's setup menu is displayed with the *SCALES* highlighted. The following menu structure represents the menu path that is noted in the rest of the calibration sequence.

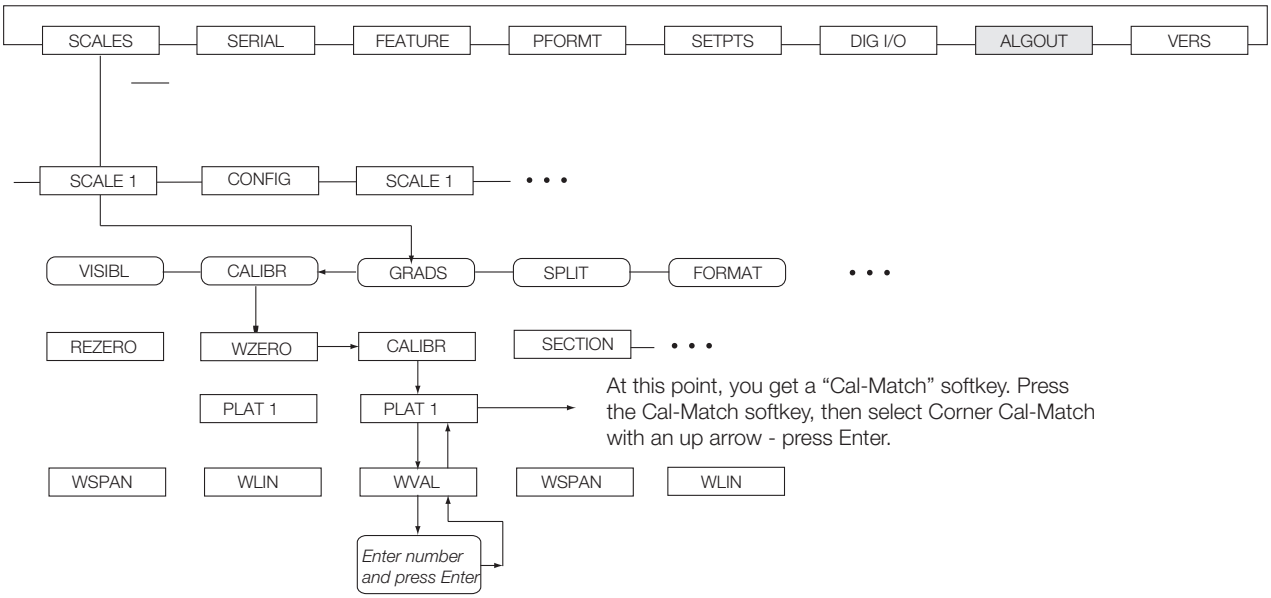
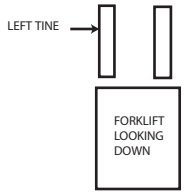


Figure 6-1. Calibration Menu for the CLS-920i

6. Press the **down** arrow twice to highlight *GRADS*, then press the **left** key once to *CALIBR*.
7. Press the down key once to *WZERO*, then the right key to *CALIBR*.
8. Press the **down** key three times to display the value of the test weight that will be used. Using the numeric keypad on the 920i, enter the value of the test weight you will be using and press the **Enter** key. Note that if the indicator displays the error *iQube not updated*, press the **Enter** key again. If the indicator continues to display the error message, make sure the iQube has power applied (wired connection is good, or the battery is in place if it is a wireless version), and that the value entered for the test weight is correct.
9. Press the **up** key once to *PLAT1*.
10. Press the **Cal-Match** softkey, then the **up** key once to highlight *Corner Cal-Match*.
11. Make sure there is no weight on either fork (zero) and press the **Enter** key. The CLS system's zero point will then be calibrated.

12. The indicator will then prompt *Cal-Match Point 1*. Carefully place the test weight on the left tine (from the forklift operator's point of view). 

With the weight in place, press the **Enter** key.
13. The indicator will then prompt *Cal-Match Point 2*. Remove the weight from the left tine and place it on the right tine (you must use exactly the same test weight). When ready, press the **Enter** key.
14. The calibration will finalize. When done, press the **Save and Exit** softkey.
15. Calibration can be verified by placing the test weight on either tine - the reading must be the same.

7.0 Daily Operation

Once configuration of the user's parameters are all entered, the CLS-920 should be ready for daily operation. The following sub-sections give an overview of how you will use the CLS-920 during a normal work shift.

1. At the start of a shift, enter the employee ID number.

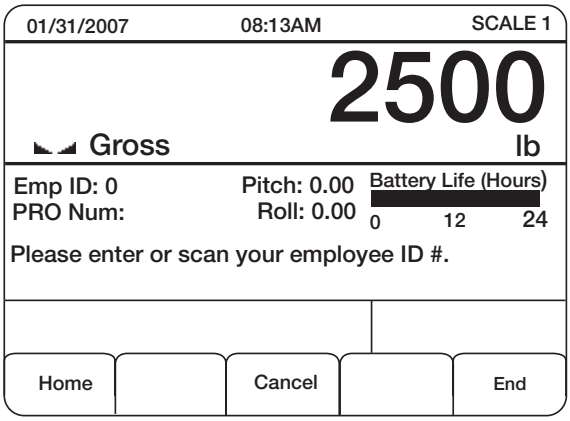


Figure 7-1. Enter Employee ID

If it is a new employee number, enter a numerical employee ID number and press the **enter** key. You get a screen display that says, *124 Stored in Database*, or whatever employee ID number was entered.

2. Select the PRO Number softkey to enter a nine-digit PRO number in the indicator using the bar code scanner or key it in on the numeric keypad.

NOTE: *The PRO number digit length can be changed by going into the Supervisors softkey menu => Application Parameters => Minimum PRO length and Maximum PRO length.*

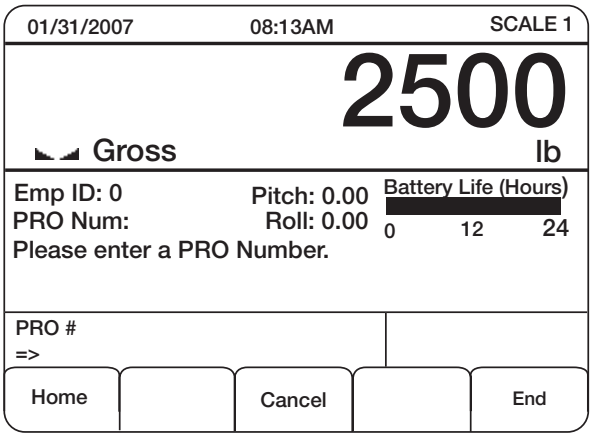


Figure 7-2. Enter PRO Number

Press **enter** to save that PRO Number and then the next sreen to appear is:.

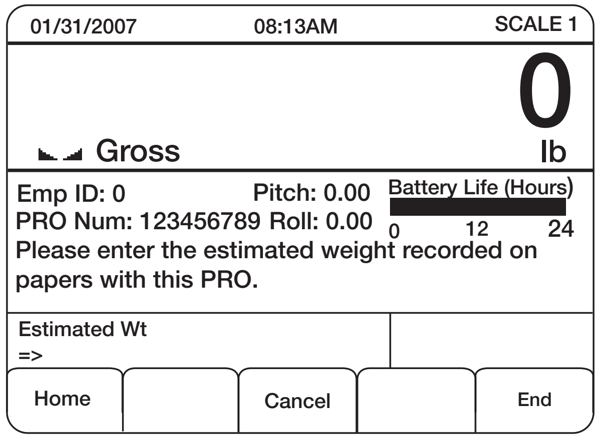


Figure 7-3. Enter Estimated Weight

Enter the estimated weight and press the **enter** key.

The next screen to appear is:

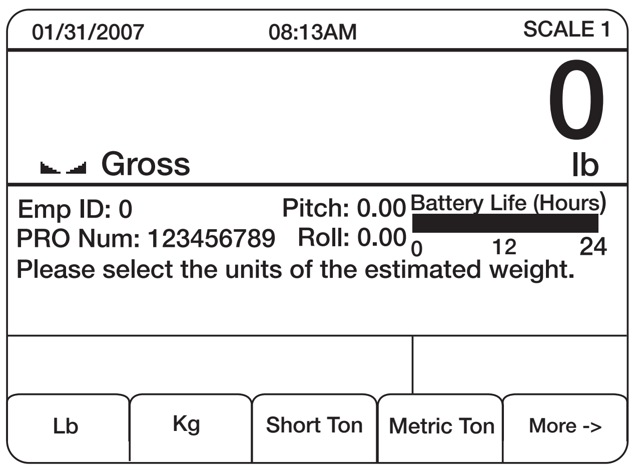


Figure 7-4. Enter Units of Measure

Enter the estimated unit weight and press **enter.**

The screen displays the following:

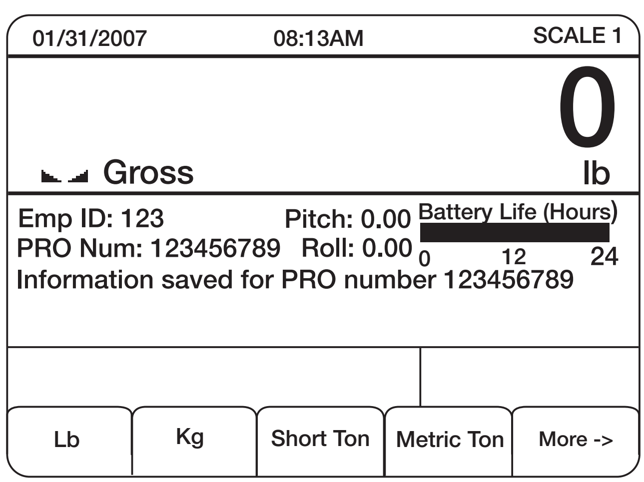
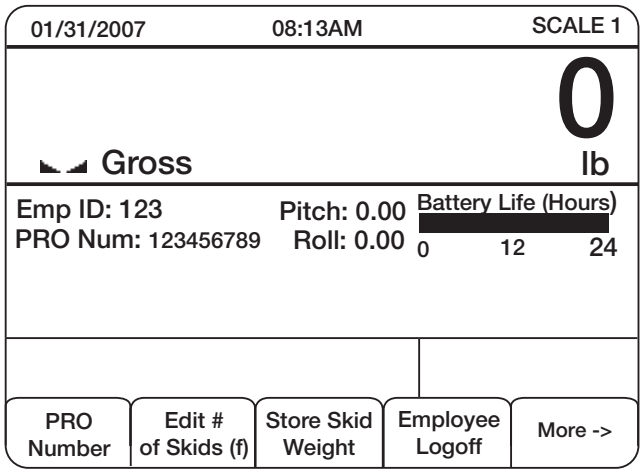


Figure 7-5. Information Saved

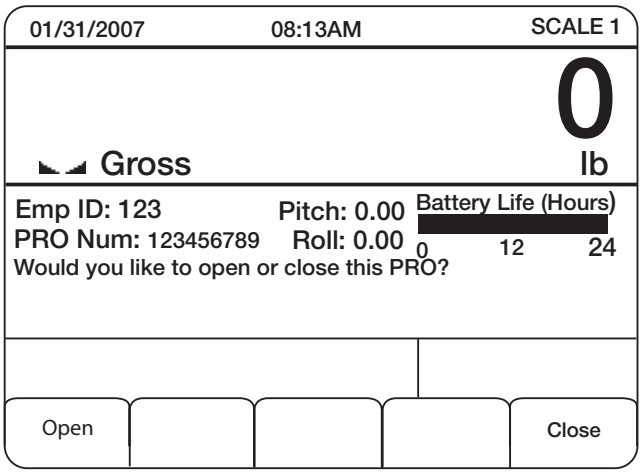
Then it defaults back to the main Pro screen, shown below.



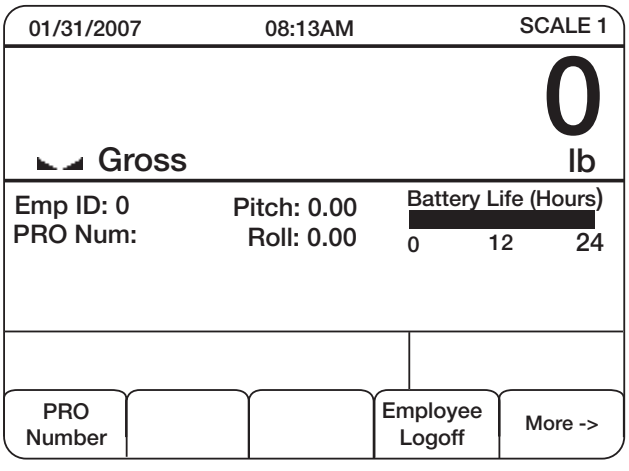
Pre-existing PRO Number

If the PRO Number is a pre-exisiting number then the steps listed differ slightly.

1. Key in the existing PRO Number and the following screen appears.



2. Select either the **Open** or **Close** softkey. By pressing the **Close** softkey, the screen closes out and goes back to Figure 7-8.



If **Open** is selected, the following screen appears.

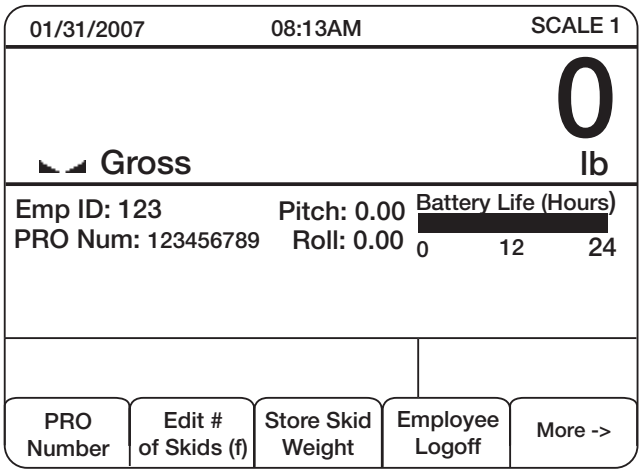


Figure 7-9. Open PRO Number Screen

Edit # of Skids (f)

Press the **Edit # of Skids (f)** softkey to access the following screen.

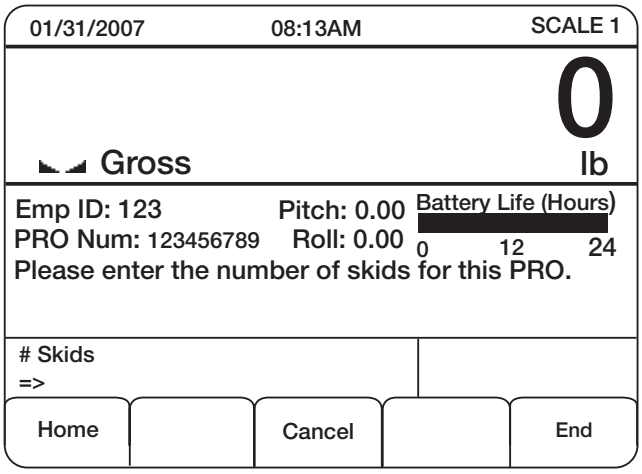


Figure 7-10. Enter Skid Amount

Enter the number of skids and press **enter**. The screen will briefly display *# Skids Updated* before returning back to the main screen as shown in Figure 7-9.

Store Skid Weight

Press the **Store Skid Weight** softkey to access the following screen.

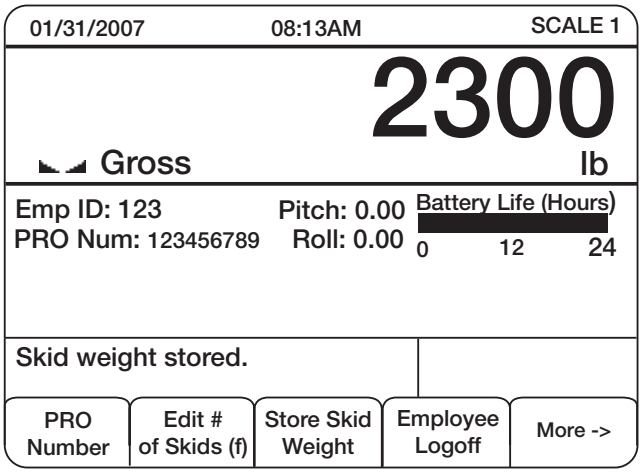


Figure 7-11. Enter Skid Weight

The screen will indicate that the skid weight is stored, on which skid it's stored, and the weight is displayed on the indicator display.

If there is no weight on the forklift, then the screen will say *No weight on forklift*.

8.0 Reports

The CLS-920i has the option to print reports using a wireless connection.
Press the **Print** key on the 920i indicator and the following softkey selections appear.

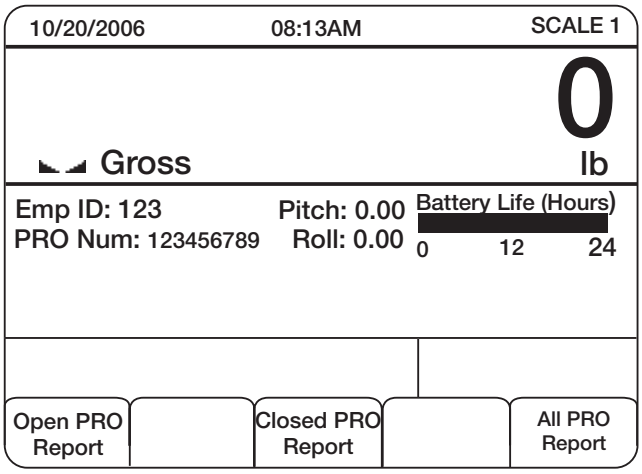


Figure 8-1.

Those three softkeys that appear are:

- Open PRO report
- Closed PRO report
- All PRO report

Press the appropriate softkey for the report you want to download and the following is briefly displayed on the 920, *Printing report, please wait* followed by *Check printer for report*.

8.1 Report Format

The format of each report has already been programmed into the CLS. The only item that can be changed are the headers of each report. To change the header, access the **Supervisor Menu** softkey, Report Header Information.

Sample printouts of each PRO report are shown in the following pages.

8.1.1 Open PRO Report

The following report gives an example of an open PRO report.

PROReports.TXT

Open PRO Transactions Report
Rice Lake Weighing Systems
230 West Coleman Street
Rice Lake, WI 54868
800-472-6703
Towmotor ID # : CLS Demo Kit
Scale ID # : Unit #1
Current Time : 01:57 PM
Current Date : 01/16/07

PRO Number 123456789
PRO Number Status : OPEN
Employee Number : 123
Last Transaction Time/Date : 01:56 PM 01/16/07
Actual Accumulated Weight : 1495.0 lb
Actual Number of Skids : 1
Estimated Accumulated Weight : 4500.0 lb
Estimated Number of Skids : 3
Transaction Stored Remotely : NO

Calibration Weight ID# :
Calibration Weight Value : 0.0
Acutal Measured Weight : 0.0
Last Calibration Time/Date :

Closed PRO Transactions Report
Rice Lake Weighing Systems

8.1.2 Closed PRO Report

The following gives an example of a closed PRO report.

PROReports.TXT

Towmotor ID # : CLS Demo Kit
Scale ID # : Unit #1
Current Time : 01:58 PM
Current Date : 01/16/07

PRO Number 888888888
PRO Number Status : CLOSED
Employee Number : 123
Last Transaction Time/Date : 09:44 AM 01/15/07
Actual Accumulated Weight : 1500.0 lb
Actual Number of Skids : 1
Estimated Accumulated Weight : 1050.0 lb
Estimated Number of Skids : 1
Transaction Stored Remotely : NO

PRO Number 123456789
PRO Number Status : OPEN
Employee Number : 123
Last Transaction Time/Date : 01:56 PM 01/16/07
Actual Accumulated Weight : 1495.0 lb
Actual Number of Skids : 1
Estimated Accumulated Weight : 4500.0 lb
Estimated Number of Skids : 3
Transaction Stored Remotely : NO

Calibration Weight ID# :
Calibration Weight Value : 0.0
Acutal Measured Weight : 0.0
Last Calibration Time/Date :

8.1.3 All PRO Report

The following gives an exaple of an all PRO report.

PROReports.TXT

230 West Coleman Street
Rice Lake, WI 54868
800-472-6703
Towmotor ID # : CLS Demo Kit
Scale ID # : Unit #1
Current Time : 01:58 PM
Current Date : 01/16/07

PRO Number 888888888
PRO Number Status : CLOSED
Employee Number : 123
Last Transaction Time/Date : 09:44 AM 01/15/07
Actual Accumulated Weight : 1500.0 lb
Actual Number of Skids : 1
Estimated Accumulated Weight : 1050.0 lb
Estimated Number of Skids : 1
Transaction Stored Remotely : NO

Calibration Weight ID# :
Calibration Weight Value : 0.0
Acutal Measured Weight : 0.0
Last Calibration Time/Date :

All PRO Transactions Report
Rice Lake Weighing Systems
230 West Coleman Street
Rice Lake, WI 54868
800-472-6703

9.0 Scanner Option

The CLS-920i, has an optional scanner system (Symbol® MS-320x semi-omnidirectional scan) which provides a quick and easy integration into bar code scanning into all types of OEM devices. Figure 9-1 illustrates the scanner used with CLS-920i (optional).

Figure 9-1. Bar Code Scanner

9.1 Mounting the Scanner

A special mounting plate comes with the scanner and can be mounted directly to the mounting bracket that holds the 920i indicator to the forklift cage. Use the two screws provided to mount the plate either on the left or the right side of the indicator.

Figure 9-2. Mounted Scanner Plate

Once the mounting plate is attached, the scanner needs to be connected. To connect the scanner use the following steps:

1. Plug the nine-pin D-connector into the miniscan scanner.
2. Run the other end of the scanner cable through the grommeted hole on the mounting bracket and down to an available cord grip on the indicator.

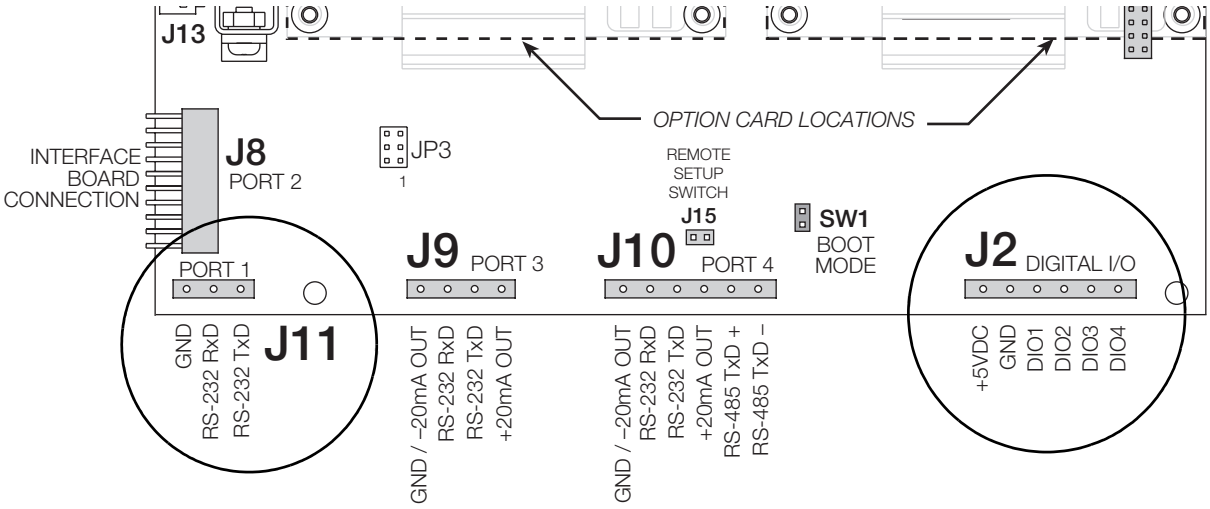
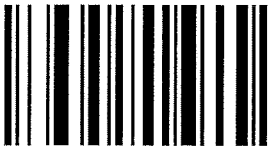


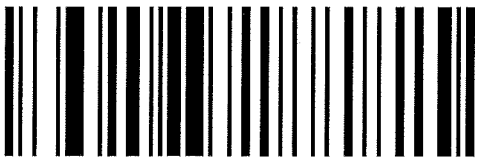
Figure 9-3. 920i CPU Board Pin Locations for Connecting the Scanner

3. Connect the scanner cable red wire to **J2**, pin 1(+5V), and black wire to **J2**, pin 2 (GND) on the 920i CPU board.
4. Connect the green wire to **J11**, pin 2 (RXD) and white wires to **J11**, pin 3 (TXD) on the 920i CPU board.
5. Check all connections to ensure they are secure in the pluggable screw terminals.
6. Program the miniscan using the following bar codes in the order given which are shown on the following pages. Carefully and slowly scan each of the bar codes to program the scanner.



"Fast Warble"

Set All Defaults

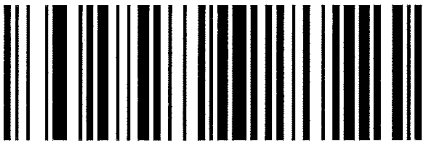


"Fast Warble"

Slab Pattern

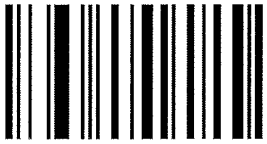
"Fast Warble"

<PREFIX> <DATA> <SUFFIX 1>



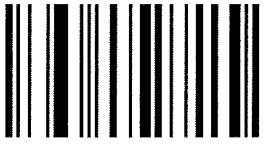
"Beep Beep"

Scan Prefix



"Beep Beep"

1



"Beep Beep"

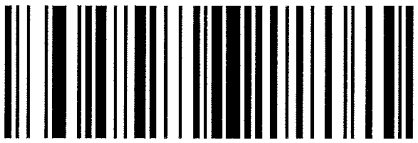
0

"Beep Beep"

0

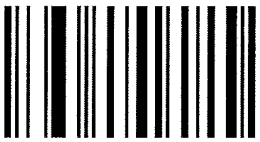
"Fast Warble"

2



"Beep Beep"

Scan Suffix 1



"Beep Beep"

1

"Beep Beep"

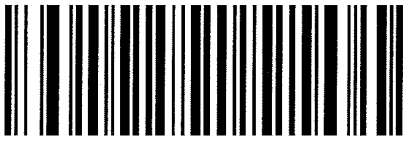
0

"Beep Beep"

0

"Fast Warble"

3



"Fast Warble"

Omnidirectional Pattern

9.2 Scanning

Refer to the following steps when scanning an item.

1. Ensure that all connections are secure.
2. Once power is applied to the scanner, the LED lights a continuous red color.
3. Ensure the bar code is within scanning range.
4. Upon successful decode, the scanner LED turns green and the beep is heard and the following screen is displayed on the 920i indicator.

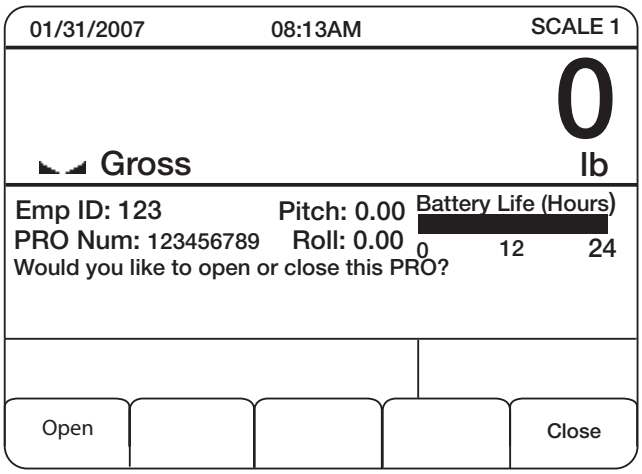


Figure 9-4. 920i Screen After Scanning a Bar Code

9.3 Beeper Indications

The beeper indicates the scanner's status as follows:

Beeper	Indication
3 Beeps	Power up (or reset) has occured
1 Beep	A bar code is successfully decoded
4 Beeps	Transmission error. Bar code data was not received by the host.
Fast Warble	A programming parameter was entered successfully

Table 9-1. Scanner Beeper Indications

9.4 Laser Pattern

The scanner has been set up to emit an omnidirectional scan pattern. The scan pattern is a high speed rotating omni-directional scan pattern that provides very aggressive performance on 1-D bar codes because there are virtually no holes in the pattern. This ensures fast throughput at the point of activity and the ability to read 1-D symbols in 360 degree of rotation, eliminating the need to orient the bar code in the field of view.

9.5 Scanner Troubleshooting

Problem	Possible Cause	Possible Solutions
No red LED/nothing happens when attempting to scan	No power to the scanner	Check the system power. Confirm that the correct host interface cable is used.
		Check for loose cable connections
Scanner cannot read the bar code	Interface/power cables are loose	Check for loose cable connections
	Scanner is not programmed for the correct bar code type	Ensure the scanner is programmed to read the type of bar code to be scanned. Try scanning other bar code(s) and other bar code types.
	Incorrect communication parameters	Check that the communication parameters (baud rate, parity, stop bits) are set properly
	Bar code symbol is unreadable	Check the symbol to make sure it is not defaced. Try scanning similar symbols of the same code type.
	Inappropriately hot environment	Remove the scanner from the hot environment and allow it to cool down.

Table 9-2. Scanner Troubleshooting

10.0 Appendix

10.1 Two-Channel IQube Diagnostics

The two-channel iQube provides a number of diagnostic tests. See the table below for a list of diagnostic error messages. It also describes the tests that can be enabled or disabled in the diagnostics of the two-channel iQube.

Test	Definitiion	Description	920i Default	Revolution III/ two-channel Default
Zero Reference	Which cell is out of tolerance at zero	Threshold: the upper limit of the zero reading of the cells	0.125mV	0.200 mV
		Percent threshold: the percentage of zero reading of adjacent cells	25%	20%
		Delay: time to wait until the next testing process	900 seconds	900 seconds
Load Cell Drift	Checks for load cell outputs that have changed over time with load applied	Limit	0.025mV	0.025mV
		Percent limit	10%	10%
		Time	30 seconds	30 seconds
		Load: minimum load needed to initiate the test	1000 lb	1000 lb
Peak to Peak Limit	Check for noisy load cell output not attributed to environmental conditions	Limit	0.125mV	0.250mv

Table 10-1. Two-Channel iQube Diagnostic Settings

10.1.1 Diagnostic Setup

Parameters associated with each of the two-channel iQube's diagnostics test can be set using the 920i menus, iRev, or Revolution III.

When using the two-channel iQube with the 920i indicator, a Diagnostics softkey can be configured to display diagnostic information when in weigh mode. Use the FEATURE menu, SOFTKEYS submenu, to select the diagnostics softkey.

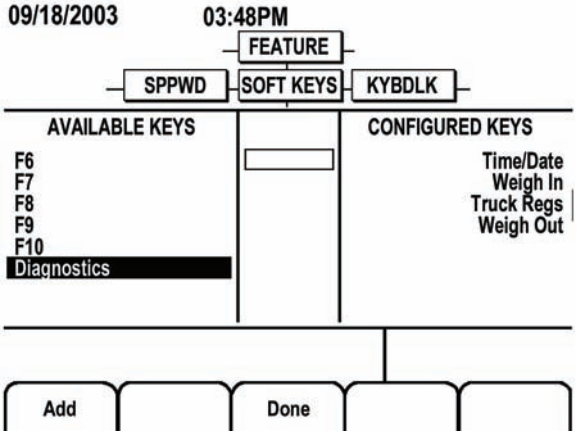


Figure 10-1. Selecting Diagnostics Softkey

10.2 Indicator Troubleshooting

Table 10-2 lists general troubleshooting tips for various hardware and software error conditions. See the following pages for additional information about specific diagnostic tools.

The distributor site for the *920i* at **www.ricelake.com** includes a section of Frequently Asked Questions. RLWS will post answers to questions presented to the technical support group. Check the site often for new postings.

Symptom	Cause/Remedy
Indicator does not power up	Possible blown fuse or bad power supply. Check fuses (see Section 2.8 on page 13) and replace if necessary. Fuse specifications are listed on page 90; fuse replacement part numbers are listed in Table 2-7 on page 14. If fuses are good, check all voltages on CPU board. Power supply should output both +6V and –6V levels to the CPU board (see Figure 2-5 on page 9). If power supply appears bad, check the small glass fuse (2.5A, 5x20mm) on the power supply board.
Front panel power indicator blinking ( )	Power supply overloaded. Check for shorts in A/D card regulators or in the DC-to-DC converter of any installed analog output or pulse input cards.
"Blue screen"	Check LCD contrast pot (under interface board access cover; see Figure 2-3 on page 8). Possible corrupt core software; reset or reload software.
Hangs in "888" display	Corrupt core software. Reset or reload software.
Tare and truck data pointers are corrupt, *Tare storage is corrupt* error messages at startup	Possible dead battery. Perform configuration reset then check for low battery warning on display. If battery is low, replace battery, perform another configuration reset, then reload files.
Divide by zero error message at startup	User program error.
ERROR message in weight display	Excitation voltage too low or off. Excitation voltage is provided by the A/D card.
Dashes in weight display	Overrange or underrange scale condition. Check scale. For out-of -range conditions in total scale display, check all scale inputs for positive weight values.
Display reads *0.000000*	Scale not updating. Check for bad option card hanging the bus.
Cannot enter setup mode	Possible bad switch. Test switch; replace interface board if necessary.
Serial port not responding	Possible configuration error. For command input, ensure port INPUT parameter is set to CMD.
A/D scale out of range	Check source scale for proper mechanical operation. Check load cell and cable connection. Possible bad load cell: check indicator operation with load cell simulator.
Locked — Scale in use	Scale is assigned as an input to a total scale or is the source for a serial scale, analog output, or setpoint. If not correct, deconfigure this scale assignment and reconfigure as required.
Serial scale out of range	Check source scale for proper mechanical operation. Check cable connection. Possible format mismatch between serial scale and *920i*: Check SFMT specification under SERIAL menu.
Option *x* Error	Field bus card (Profibus, DeviceNet, or Remote I/O) in slot *x* failed to initialize.
Option card failure	Possible defective card or slot. Disconnect power, install card in different slot, then apply power again.
Option card hardware diagnostic error	Required option card not found.
Expansion board does not power up	Check expansion board power supply.

Table 10-2. Basic Troubleshooting

NOTE: *Always save copies of the indicator configuration, calibration, iRev and iRite files on a local PC so that these are available when a software reload or upgrade is required.*

10.2.1 Option Card Diagnostic Errors

Option cards are detected by the *920i* at power-up. If the current indicator configuration requires an option card but that card is not detected at power-up, an error similar to the following is displayed:

HARDWARE CRITICAL TO PROPER OPERATION
WITH CURRENT CONFIGURATION
CANNOT BE FOUND

A/D SLOT 4 CHANNEL 1

INSTALL HARDWARE OR RECONFIGURE

To recover from this error you can do the following:

- If the option is required, ensure that the card is properly seated in its slot and cycle the power. If the card is still not recognized, replace the card or try installing the card in a different slot.
- Enter setup mode and reconfigure to eliminate the requirement for the option.
- Go to the VERSION menu and use the **Reset Config** softkey (or RESETCONFIGURATION command) to perform a configuration reset. Configuration reset returns all configuration values to their factory defaults.

See Section 10.2.2 below, for information about using the HARDWARE serial command to verify that installed cards are recognized.

10.2.2 Using the HARDWARE Command

The HARDWARE serial command can be issued to verify that all installed cards are recognized by the system. The HARDWARE command returns a string of card type codes, representing cards installed in slots 1–14:

HARDWARE=3,3,2,4,5,0,0,0,0,0,0,0,0,0

Table 10-3 lists the card codes returned by the HARDWARE command.

Code	Card Type
0	*No card installed*
1	Dual-Channel Serial Expansion Card
2	Dual-Channel A/D Card
3	Single-Channel A/D Card
4	Analog Output Card
5	24-Channel Digital I/O Expansion Card
6	Pulse Input Card
7	1 MB Memory Expansion Card
9	DeviceNet Card
10	Profibus Card
11	EtherNet/IP Card
12	Remote I/O Card
14	Custom Card
15	Analog Input Card

NOTE: *Code 11 is returned only by the EtherNet/IP card. The standard 10M/100Mbps Ethernet card does not return a card type code. Any slot containing a standard Ethernet card will return a value of 0 on the HARDWARE command.*

Table 10-3. HARDWARE Command Option Card Codes

If an installed card is not recognized (HARDWARE command returns a code of *0* for that slot), ensure that the card is seated properly. Reinstall the card, if necessary, then cycle the indicator power to read the configuration again. If the card is still not recognized, try installing it in another slot.

10.2.3 User Program Diagnostic Errors

Faulty user programs can cause critical errors that are detected by the *920i* at power-up. The following error message is caused by a user program attempting to divide by zero:

A CRITICAL USER PROGRAM ERROR
HAS BEEN DETECTED

DIVIDE BY ZERO

SYSTEM RESET IS REQUIRED

To recover from this error you can do the following:

- Cycle the indicator power to reset the user program.
- Correct the *iRite* program to eliminate the divide by zero operation. Recompile the program, then download the corrected program to the indicator.

If technical assistance is required, contact RLWS technical support.

Diagnostic Boot Procedure

If a user program causes an error in the start-up handler, press and hold the setup switch while cycling power to the *920i* to place the indicator in setup mode. Use *iRev* monitor mode to send the PCLR command erase clear the user program.

If the error is still not cleared, perform the following diagnostic boot procedure.

1. Disconnect power to the *920i.*
2. Connect the serial port of a PC with *iRev* installed to port 2 of the *920i*. Connection must be made at 38400 bps.
3. Open the indicator enclosure and place a jumper across the SW1 boot mode pins (see Figure 2-5 on page 9).
4. Power up the *920i.* The indicator will stall at the diagnostic monitor.

5. Start *iRev* and enter monitor mode, then type BOOT.
6. Use the indicator setup switch to enter setup mode.
7. Remove the jumper from SW1.
8. From monitor mode, enter the RESETCONFIGURATION command.

Determine the cause of the startup handler error, make program corrections, then reload the corrected user program and test.

10.2.4 Using the XE Serial Command

The XE serial command can be used to remotely query the *920i* for the error conditions shown on the front panel. The XE command returns a decimal number representing any existing error conditions. For multi-scale applications, the value returned by the XE command represents all error conditions, if any, present on all configured scales.

If more than one error condition exists, the number returned is the sum of the values representing the error conditions (see Table 10-4 on page 80). For example, if both a tare error (TAREERR, 65536) and a truck database checksum error (ETRUCKERR, 8192) have occurred, the XE command returns the value 73728, representing the sum of those two error conditions.

Error Code	Value	Description
VIRGERR	1	Virgin error
PARMCHKERR	2	Configuration checksum error
LOADCHKERR	4	Calibration checksum error
PRINTCHKERR	8	Print format checksum error
ENVRAMERR	16	General NVRAM error
ENVCRC1ERR	32	Setpoint NVRAM data error
ENVCRC2ERR	64	
ENVCRC3ERR	128	
ENVCRC4ERR	256	
ENVCRC5ERR	512	
ENVCRC6ERR	1024	
ENVCRC7ERR	2056	
ENVCRC8ERR	4096	
ETRUCKERR	8192	Truck database checksum error
GRAVERR	16384	Gravity calibration error
ADPHYSICALERR	32768	A/D physical error
TAREERR	65536	Tare checksum error
STRINGERR	262144	String program error
POWER_FAIL	524288	Power failure
RTCERR	1048576	Real time clock error

Table 10-4. Error Codes Returned on XE Command

10.3 Regulatory Mode Functions

The function of the front panel **TARE** and **ZERO** keys depends on the value specified for the REGULAT parameter on the FEATURE menu. Table 10-5 describes the function of these keys for the NTEP, CANADA, OIML, and NONE regulatory modes. **TARE** and **ZERO** key functions are configurable when the REGULAT mode is set to INDUST (see Table 10-6 on page 81).

REGULAT Parameter Value	Weight on Scale	Tare in System	Front Panel Key Function	
			TARE	ZERO
NTEP	zero or negative	no	*no action*	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	TARE	
CANADA	zero or negative	no	*no action*	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	*no action*	
OIML	zero or negative	no	*no action*	ZERO
		yes	CLEAR TARE	ZERO *and* CLEAR TARE
	positive	no	TARE	ZERO
		yes	TARE	ZERO *and* CLEAR TARE
NONE	zero or negative	no	TARE	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	CLEAR TARE	

Table 10-5. TARE and ZERO Key Functions for REGULAT Parameter Settings

Table 10-6 lists the subparameters available when configuring a scale using INDUST mode. The table includes the default values of the INDUST subparameters and the effective (not configurable) values used by the NTEP, CANADA, OIML, and NONE regulatory modes.

REGULAT / INDUST Parameter		REGULAT Mode				
Parameter Name	Text Prompt	INDUST	NTEP	CANADA	OIML	NONE
SNPSHOT	Display or Scale weight source	DISPLAY	DISPLAY	DISPLAY	DISPLAY	SCALE
HTARE	Allow tare in display hold	NO	NO	NO	NO	YES
ZTARE	Remove tare on ZERO	NO	NO	NO	YES	NO
KTARE	Always allow keyed tare	YES	YES	NO	YES	YES
MTARE	Multiple tare action	REPLACE	REPLACE	NOTHING	REPLACE	REMOVE
NTARE	Allow negative tare	NO	NO	NO	NO	YES
CTARE	Allow CLEAR key to clear tare/accumulator	YES	YES	NO	NO	YES
PRTMOT	Allow print while in motion	NO	NO	NO	NO	YES
PRTPT	Add PT to keyed tare print	NO	NO	YES	YES	NO
PRTHLD	Print during display hold	NO	NO	NO	NO	YES
HLDWGH	Allow weigh during display hold	NO	NO	NO	NO	YES
MOTWGH	Allow weighment in motion	NO	NO	NO	NO	NO

Table 10-6. REGULAT / INDUST Mode Parameters, Comparison with Effective Values of Other Modes

10.4 PS/2 Keyboard Interface

Serial port 2 on the *920i* CPU board provides a PS/2-type keyboard interface for use with a remote keyboard. To use the keyboard interface, set the INPUT parameter for Port 2 (under the SERIAL menu) to *KEYBD*.

Table 10-7 summarizes the *920i*-specific functions provided by the keyboard interface; most other alphanumeric and navigational keys provide functions equivalent to those typical for PC operation. Menu parameters and serial commands that affect indicator keypad operation (including the KBDLCK, ZERONLY, and KLOCK serial commands) also affect the remote keyboard.

NOTE: *The keyboard interface is not hot-pluggable. Disconnect power to the 920i before plugging the keyboard cable into the Port 2 connector.*

Key	Function
F1	Softkey 1
F2	Softkey 2
F3	Softkey 3
F4	Softkey 4
F5	Softkey 5
F6 (Alt+Z)	ZERO key
F7 (Alt+G)	GROSS/NET key
F8 (Alt+T)	TARE key
F9 (Alt+U)	UNITS key
F10 (Alt+P)	PRINT key
F11	*Not used*
F12	
Print Screen	Same as PRINT key, in both normal and setup modes

Table 10-7. PS/2 Keyboard Functions

10.5 Data Formats

Continuous Output Serial Data Format

If continuous transmission is configured for a serial port (STREAM parameter set to LFT or INDUST on the SERIAL menu), the *920i* sends data using the Consolidated Controls serial data format shown in Figure 10-2:

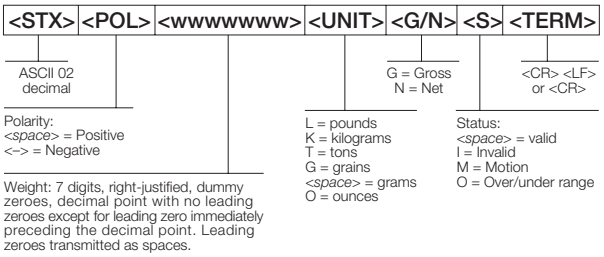


Figure 10-2. Continuous Output Serial Data Format

Demand Output Serial Data Format

When demand mode is configured for the serial port (STREAM parameter set to OFF), the *920i* uses a data string formatted for a basic ticket printout. The particular ticket format printed depends on the indicator configuration.

You can customize the ticket to work with a wide variety of printers, scoreboard displays, and other remote equipment.

RS-485 Data Formats

Two-wire RS-485 communications is available on port 3 of the CPU board; four-wire RS-485 communications is supported on the "A" ports of any installed serial expansion cards.

The *920i* has a built-in RS-485 software protocol which is enabled when you assign a non-zero address to the indicator. Valid RS-485 addresses must be in the range 1–255; the address is specified on the ADDRESS parameter on the SERIAL menu.

All remote commands are initiated using the data format shown in Figure 10-3:

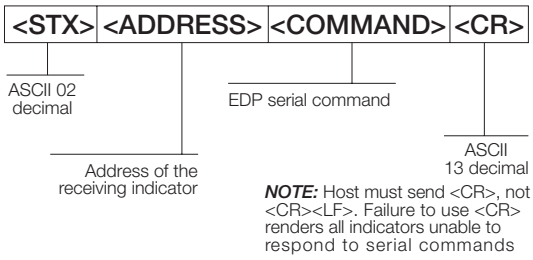


Figure 10-3. RS-485 Send Data Format

If the initiating device address matches the port address of an *920i* on the RS-485 network, that indicator responds. For example, with demand outputs, or in response to a KPRINT command, the responding indicator uses the format shown in Figure 10-4:

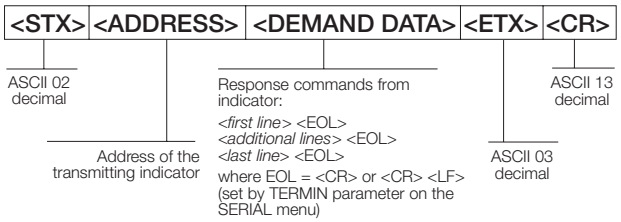


Figure 10-4. RS-485 Respond Data Format

Example: To send the KPRINT command from an ASCII terminal to an indicator at address 65 (decimal) on the RS-485 network, use the format shown in Figure 10-3.

- The keyboard equivalent for the start-of-text (STX) character is CONTROL-B.
- The indicator address (65) is represented by an upper case "A".
- The carriage return (CR) character is generated by pressing the **ENTER** key.

Therefore, to send the KPRINT command to the indicator at address 65, enter the following at the terminal: CONTROL-B, A, K, P, R, I, N, T, **ENTER**.

The indicator responds with the format shown in Figure 10-4:

```
<STX>  A    SCALE #1     <EOL>
            GROSS 1699 LB<EOL>
            08/20/1998 10:05 AM<EOL>
<ETX> <CR>
```

If continuous transmission is configured for the serial port, the *920i* sends data using the data format shown in Figure 10-5:

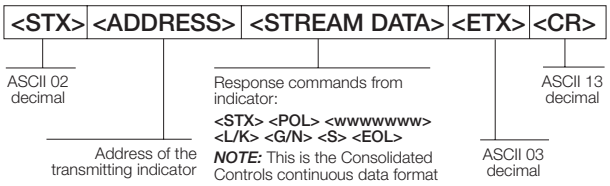


Figure 10-5. RS-485 Continuous Data Format

10.6 ASCII Character Chart

Use the decimal values for ASCII characters listed in Tables 10-8 and 10-9 when specifying print format strings under the *920i* PFORMT menu. The actual character printed depends on the character mapping used by the output device.

The *920i* can send or receive any ASCII character value (decimal 0–255). Due to limitations of the indicator display, some characters cannot be shown.

Control	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ctrl-@	NUL	00	00	space	32	20	@	64	40	`	96	60
Ctrl-A	SOH	01	01	!	33	21	A	65	41	a	97	61
Ctrl-B	STX	02	02	“	34	22	B	66	42	b	98	62
Ctrl-C	ETX	03	03	#	35	23	C	67	43	c	99	63
Ctrl-D	EOT	04	04	$	36	24	D	68	44	d	100	64
Ctrl-E	ENQ	05	05	%	37	25	E	69	45	e	101	65
Ctrl-F	ACK	06	06	&	38	26	F	70	46	f	102	66
Ctrl-G	BEL	07	07	’	39	27	G	71	47	g	103	67
Ctrl-H	BS	08	08	(	40	28	H	72	48	h	104	68
Ctrl-I	HT	09	09	)	41	29	I	73	49	i	105	69
Ctrl-J	LF	10	0A	*	42	2A	J	74	4A	j	106	6A
Ctrl-K	VT	11	0B	+	43	2B	K	75	4B	k	107	6B
Ctrl-L	FF	12	0C	,	44	2C	L	76	4C	l	108	6C
Ctrl-M	CR	13	0D	-	45	2D	M	77	4D	m	109	6D
Ctrl-N	SO	14	0E	.	46	2E	N	78	4E	n	110	6E
Ctrl-O	SI	15	0F	/	47	2F	O	79	4F	o	111	6F
Ctrl-P	DLE	16	10	0	48	30	P	80	50	p	112	70
Ctrl-Q	DC1	17	11	1	49	31	Q	81	51	q	113	71
Ctrl-R	DC2	18	12	2	50	32	R	82	52	r	114	72
Ctrl-S	DC3	19	13	3	51	33	S	83	53	s	115	73
Ctrl-T	DC4	20	14	4	52	34	T	84	54	t	116	74
Ctrl-U	NAK	21	15	5	53	35	U	85	55	u	117	75
Ctrl-V	SYN	22	16	6	54	36	V	86	56	v	118	76
Ctrl-W	ETB	23	17	7	55	37	W	87	57	w	119	77
Ctrl-X	CAN	24	18	8	56	38	X	88	58	x	120	78
Ctrl-Y	EM	25	19	9	57	39	Y	89	59	y	121	79
Ctrl-Z	SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
Ctrl-[	ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
Ctrl-\	FS	28	1C	<	60	3C	\	92	5C	|	124	7C
Ctrl-]	GS	29	1D	=	61	3D	]	93	5D	}	125	7D
Ctrl-^	RS	30	1E	>	62	3E	^	94	5E	~	126	7E
Ctrl-_	US	31	1F	?	63	3F	_	95	5F	DEL	127	7F

Table 10-8. ASCII Character Chart (Part 1)

ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ç	128	80	á	160	A0		192	C0	α	224	E0
ü	129	81	í	161	A1		193	C1	β	225	E1
é	130	82	ó	162	A2		194	C2	Γ	226	E2
â	131	83	ú	163	A3		195	C3	π	227	E3
ä	132	84	ñ	164	A4		196	C4	Σ	228	E4
à	133	85	Ñ	165	A5		197	C5	σ	229	E5
å	134	86	ª	166	A6		198	C6	µ	230	E6
ç	135	87	º	167	A7		199	C7	τ	231	E7
ê	136	88	¿	168	A8		200	C8	Φ	232	E8
ë	137	89		169	A9		201	C9	Θ	233	E9
è	138	8A	¬	170	AA		202	CA	Ω	234	EA
ï	139	8B	1/2	171	AB		203	CB	δ	235	EB
î	140	8C	1/4	172	AC		204	CC	∞	236	EC
ì	141	8D	¡	173	AD		205	CD	ϕ	237	ED
Ä	142	8E	«	174	AE		206	CE	∈	238	EE
Å	143	8F	»	175	AF		207	CF	∩	239	EF
É	144	90		176	B0		208	D0	≡	240	F0
æ	145	91		177	B1		209	D1	±	241	F1
Æ	146	92		178	B2		210	D2	≥	242	F2
ô	147	93		179	B3		211	D3	≤	243	F3
ö	148	94		180	B4		212	D4	⌠	244	F4
ò	149	95		181	B5		213	D5	⌡	245	F5
û	150	96		182	B6		214	D6	÷	246	F6
ù	151	97		183	B7		215	D7	≈	247	F7
ÿ	152	98		184	B8		216	D8	°	248	F8
Ö	153	99		185	B9		217	D9	•	249	F9
Ü	154	9A		186	BA		218	DA		250	FA
¢	155	9B		187	BB		219	DB		251	FB
£	156	9C		188	BC		220	DC		252	FC
¥	157	9D		189	BD		221	DD	²	253	FD
Pts	158	9E		190	BE		222	DE		254	FE
ƒ	159	9F		191	BF		223	DF		255	FF

Table 10-9. ASCII Character Chart (Part 2)

10.7 Digital Filtering

Standard digital filtering uses mathematical averaging to eliminate the variant digital readings that the A/D converter sends periodically because of external vibration. Digital filtering does not affect the indicator measurement rate, but does affect the settling time. The selections from 1 to 256 reflect the number of readings averaged per update period. When a reading is encountered that is outside a predetermined band, the averaging is overridden, and the display jumps directly to the new value.

DIGFLTx Parameters

The first three digital filtering parameters, DIGFLT1, DIGFLT2, and DIGFLT3, are configurable filter stages that control the effect of a single A/D reading on the displayed weight. The value assigned to each parameter sets the number of readings received from the preceding filter stage before averaging.

A rolling average is passed to successive filters for an overall filtering effect that is effectively a weighted average of the product of the values assigned to the filter stages (*DIGFLT1 x DIGFLT2 x DIGFLT3)* within a time frame corresponding to the sum of the values (*DIGFLT1 + DIGFLT2 + DIGFLT3)*.

Setting the filters to 1 effectively disables digital filtering.

RATTLETRAP® Filtering

RATTLETRAP digital filtering (RATTRAP parameter set ON) uses a vibration-dampening algorithm to provide a combination of the best features of analog and digital filtering. The RATTLETRAP algorithm evaluates the frequency of a repeating vibration then derives a composite displayed weight equal to the actual weight on the scale less the vibration-induced flaws. It is particularly effective for eliminating vibration effects or mechanical interference from nearby machinery. Using RATTLETRAP filtering can eliminate much more mechanical vibration than standard digital filtering, but will usually increase settling time over standard digital filtering.

DFSENS and DFTHRH Parameters

The digital filter can be used by itself to eliminate vibration effects, but heavy filtering also increases settling time. The DFSENS (digital filter sensitivity) and DFTHRH (digital filter threshold) parameters can be used to temporarily override filter averaging and improve settling time:

- DFSENS specifies the number of consecutive scale readings that must fall outside the filter threshold (DFTHRH) before digital filtering is suspended.
- DFTHRH sets a threshold value, in display divisions. When a specified number of consecutive scale readings (DFSENS) fall outside of this threshold, digital filtering is suspended. Set DFTHRH to NONE to turn off the filter override.

Setting the Digital Filter Parameters

Fine-tuning the digital filter parameters greatly improves indicator performance in heavy-vibration environments. Use the following procedure to determine vibration effects on the scale and optimize the digital filtering configuration.

1. In setup mode, set the digital filter parameters (DIGFLT1–DIGFLT3) to 1. Set DFTHRH to NONE. Return indicator to normal mode.
2. Remove all weight from the scale, then watch the indicator display to determine the magnitude of vibration effects on the scale. Record the weight below which all but a few readings fall. This value is used to calculate the DFTHRH parameter value in Step 4.

   For example, if a heavy-capacity scale (10000 x 5 lb) produces vibration-related readings of up to 50 lb, with occasional spikes to 75 lb, record 50 lb as the threshold weight value.
3. Place the indicator in setup mode and set the DIGFLT*x* parameters to eliminate the vibration effects on the scale. (Leave DFTHRH set to NONE.) Find the lowest effective value for the DIGFLT*x* parameters.
4. Calculate the DFTHRH parameter value by converting the weight value recorded in Step 2 to display divisions:

   threshold_weight_value / display_divisions

   In the example in Step 2, with a threshold weight value of 50 lb and a display divisions value of 5 lb: *50 / 5 = 10.* DFTHRH should be set to 10D for this example.
5. Finally, set the DFSENS parameter high enough to ignore transient peaks. Longer transients (typically caused by lower vibration frequencies) will cause more consecutive out-of-band readings, so DFSENS should be set higher to counter low frequency transients.

   Reconfigure as necessary to find the lowest effective value for the DFSENS parameter.

10.8 Conversion Factors for Secondary Units

The *920i* has the capability to mathematically convert a weight into many different types of units and instantly display those results with a press of the **UNITS** key.

Secondary and tertiary units can be specified on the FORMAT menu using the SECNDR and TERTIA parameters, or by using serial commands.

- To configure secondary or tertiary units using the front panel menus, use the Table 10-10 to find the conversion multiplier for the MULT parameter. For example, if the primary unit is pounds and the secondary unit is short tons, set the MULT parameter to 0.000500.
- To configure secondary or tertiary units using serial commands, use the Table 10-10 to find the conversion multiplier for the SC.SEC.MULT or SC.TER.MULT command. For example, if the primary unit is pounds and the secondary unit is short tons, send the serial command SC.SEC.MULT= 0.0005<CR> to set the multiplier for the secondary units.

NOTE: Ensure that the secondary decimal point position is set appropriately for the scale capacity in the secondary units. If the converted value requires more digits than are available, the indicator displays an overflow message (*OVERFL*).

For example, if the primary units are short tons, secondary units are pounds, and the secondary decimal point is set to 8888.888, the indicator will overflow if 5 tons or more are applied to the scale. With 5 tons applied, and a conversion factor of 2000, the secondary units display needs five digits to the left of the decimal point to display the 10000 lb secondary units value.

Primary Unit	*x Multiplier*	Secondary/ Tertiary Unit
grains	0.064799	grams
	0.002286	ounces
	0.000143	pounds
	0.000065	kilograms
	0.002083	troy ounces
	0.000174	troy pounds
ounces	437.500	grains
	28.3495	grams
	0.06250	pounds
	0.02835	kilograms
	0.911458	troy ounces
	0.075955	troy pounds
pounds	7000.00	grains
	453.592	grams
	16.0000	ounces
	0.453592	kilograms
	14.58333	troy ounces
	1.215278	troy pounds
	0.000500	short tons
	0.000446	long tons
	0.000453	metric tons

Table 10-10. Conversion Factors

Primary Unit	*x Multiplier*	Secondary/ Tertiary Unit
grams	15.4324	grains
	0.035274	ounces
	0.002205	pounds
	0.001000	kilograms
	0.032151	troy ounces
	0.002679	troy pounds
kilograms	15432.4	grains
	35.2740	ounces
	1000.00	grams
	2.20462	pounds
	32.15075	troy ounces
	2.679229	troy pounds
	0.001102	short tons
	0.000984	long tons
	0.001000	metric tons
short tons	2000.00	pounds
	907.185	kilograms
	0.892857	long tons
	0.907185	metric tons
metric tons	2204.62	pounds
	1000.00	kilograms
	1.10231	short tons
	0.984207	long tons

Table 10-10. Conversion Factors (Continued)

Primary Unit	*x Multiplier*	Secondary/ Tertiary Unit
long tons	2240.00	pounds
	1016.05	kilograms
	1.12000	short tons
	1.01605	metric tons
troy ounces	480	grains
	31.10348	grams
	0.031103	kilograms
	1.09714	ounces
	0.068571	pounds
	0.083333	troy pounds
troy pounds	5760	grains
	373.2417	grams
	0.373242	kilograms
	13.16571	ounces
	0.822857	pounds
	12	troy ounces

Table 10-10. Conversion Factors (Continued)

10.9 Dimension Drawings

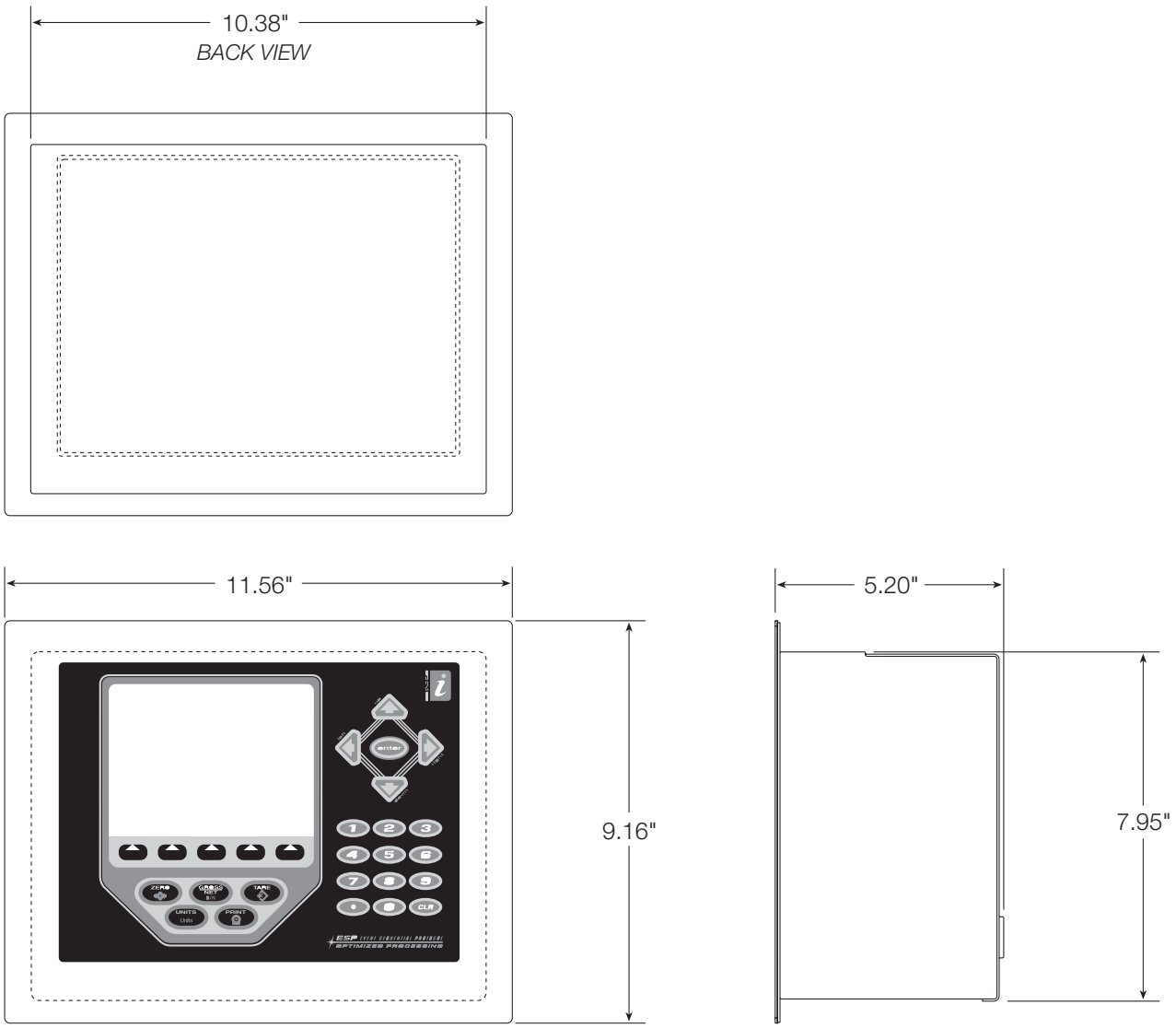


Figure 10-6. Panel Mount Model Dimensions

10.10 920i Specifications

Power

Line Voltages	115 or 230 VAC
Frequency	50 or 60 Hz
Power Consumption (universal model, 32 x 350Ω load cells)	
115 VAC	400 mA (46 W)
230 VAC	250 mA (58 W)
Fusing	
115 VAC	2 x 2A TR5 subminiature fuses Wickmann Time-Lag 19374 Series UL Listed, CSA Certified and Approved
230 VAC	2 x 2A TR5 subminiature fuses Wickmann Time-Lag 19374 Series UL Recognized, Semko and VDE Approved

A/D Specifications

Excitation Voltage	10 ± 0.5 VDC, 16 x 350Ω or 32 x 700Ω load cells per A/D card
Sense Amplifier	Differential amplifier with 4- and 6-wire sensing
Analog Signal Input Range	–10 mV to +40 mV
Analog Signal Sensitivity	0.3 µV/grad minimum @ 7.5 Hz 1.0 µV/grad typical @ 120 Hz 4.0 µV/grad typical @ 960 Hz
A/D Sample Rate	7.5–960 Hz, software selectable
Input Impedance	>35 MΩ typical
Internal Resolution	8 000 000 counts
Wt Display Resolution	9,999,999
Input Sensitivity	10 nV per internal count
System Linearity	±0.01% of full scale
Zero Stability	±150 nV/°C, maximum
Span Stability	± 3.5 ppm/°C, maximum
Input Voltage Differential	±800 mV referenced to earth ground
Input Overload	Load cell signal lines ±10 V continuous, ESD protected
RFI/EMI Protection	Communications, signal, excitation, and sense lines protected

Digital Specifications

Microcomputer	Motorola ColdFire® MCF5307 main processor @ 90 MHz
Digital I/O	4 I/O channels on CPU board; optional 24-channel I/O expansion cards available
Digital Filter	Software selectable: 1–256, enhanced Rattletrap® hybrid digital filtering

Serial Communications

Serial Ports	4 ports on CPU board support up to 115200 bps; optional dual-channel serial expansion cards available
Port 1	Full duplex RS-232
Port 2	RS-232 with CTS/RTS; PS/2 keyboard interface via DB-9 connector
Port 3	Full duplex RS-232, 20 mA output
Port 4	Full duplex RS-232, 2-wire RS-485, 20 mA output

Operator Interface

Display	320x240 pixel VGA LCD display module with adjustable contrast, 75Hz scan rate 26000 cd/m^2 brightness
Keyboard	27-key membrane panel, PS/2 port for external keyboard connection

Environmental

Operating Temperature	
Legal	–10 to +40°C (14 to 104°F)
Industrial	–10 to +40°C (14 to 104°F)
Storage Temperature	–10 to +70°C (14 to 158°F)
Humidity	0–95% relative humidity

Enclosure

Enclosure Dimensions	
Universal enclosure (without tilt stand)	10.56 in x 8.51 in x 4.61 in 268 mm x 216 mm x 117 mm
Deep enclosure (without tilt stand)	10.76 in x 8.51 x 5.25 in 273 mm x 216 mm x 133 mm
Panel mount enclosure	11.5 in x 9.1 in x 5 in 292 mm x 231 mm x 127 mm
Wall mount enclosure	14 in x 18 in x 6.75 in 356 mm x 457 mm x 171 mm
Weight	
Universal enclosure	9.5 lb (4.3 Kg)
Wall mount enclosure	23 lb (10.4 Kg)
Rating/Material	NEMA 4X/IP66, stainless steel

Certifications and Approvals

NTEP
CoC Number01-088
Accuracy Class III/IIIL n_{max}: 10 000

Measurement Canada
Approval AM-5426
Accuracy Class III n_{max}: 10 000

UL

Universal model
File Number:E151461

Panel mount model
File Number:E151461, Vol 2

Wall mount model
UL 508A control panel approved
File Number:E207758

OIML
GB-1140 n_{max}: 6 000
GB-1135 n_{max}: 10 000

CLS-920i Digital Indicator Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

NO TERMS, CONDITIONS, UNDERSTANDING, OR AGREEMENTS PURPORTING TO MODIFY THE TERMS OF THIS WARRANTY SHALL HAVE ANY LEGAL EFFECT UNLESS MADE IN WRITING AND SIGNED BY A CORPORATE OFFICER OF RLWS AND THE BUYER.

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