MotoWeigh® IMW

In-Motion Checkweigher with 920i Programmable HMI Indicator/Controller

Technical Manual

Contents

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

*Rice Lake continually offers web-based video training on a growing selection of product-related topics at no cost. Visit **www.ricelake.com/webinars***

1.0   Introduction

The *In-Motion Weighing Systems* is a continuous process weighing instrument used for product sorting and data collection. The system averages weights on the scale, displays the averaged weight and sends the average weight information to the Dynamic Conveyor Scale Integrator (DSCI) via a serial port.

Configuration and calibration of the indicator is managed using serial commands or the indicator front panel keys. See the 920i Technical Manual (PN 67887) for more information about configuration of the indicator.

This manual is intended for use by service technicians responsible for installing and servicing *In-Motion Weighing Systems*.

Manuals and additional resources are available from the Rice Lake Weighing Systems website at **www.ricelake.com**

Warranty information can be found on the website at **www.ricelake.com/warranties**

1.1   Overview

The system is primarily composed of the following components.

- A scale merged with a conveyor and drive mechanism
- A single photo eye for operation or two photo eyes which trigger start and stop weighment capture
- A 920i HMI integrator linked and programmed to average the weight signal at the rate of 60 times per second between the start and stop photo eye inputs

Note *The scale sample rate is set to 60 Hz (default) and must not be changed.*

As an object moves onto the scale conveyor, it passes the over run photo eye which ensures only one product is on the scale at a time. Traveling the scale, the object passes in front of the start data collection photo eye which detects the leading edge of the product and triggers the 920i to start collecting weights. When the leading edge of the object passes the stop data collection photo eye, the collected weights are averaged and then displayed as the last weight.

A smooth product transition and matching belt speeds are necessary to achieve accurate results. Photo eyes and reflectors must be kept clean for optimal performance. Extreme water pressure should be avoided around the electronic components, even with equipment that is wash down rated.

1.1.1   Hardware Requirements

Cards

- Slot 1 - Single A/D card
- Slot 2 - 1 MB memory card
- Slot 3 - 24-channel digital I/O card

Serial Ports

- Port 1 - Printer reports
- Port 2 - Diagnostics/iRev/Keyboard)
- Port 3 - Data port (real-time checkweighing data)
- Port 4 - Serial protocol

Note *This program requires registration to become operational.*

1.2   Safety

Safety Signal Definitions:

⚠ **DANGER**	*Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.*
⚠ **WARNING**	*Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death. Includes hazards that are exposed when guards are removed.*
⚠ **CAUTION**	*Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.*
IMPORTANT	*Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.*

General Safety

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

⚠ **WARNING**

Failure to heed could result in serious injury or death.

Do not open the indicator. All procedures that require work inside the indicator enclosure must be performed by qualified service personnel only.

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

Do not operate without the system completely assembled.

Do not use for purposes other than weight taking.

Do not place fingers into slots or possible pinch points.

Do not use this product if any of the components are cracked.

Do not exceed the rated specification of the unit.

Do not make alterations or modifications to the unit.

Do not remove or obscure warning labels.

Do not submerge.

There is a risk of explosion if battery is replaced by an incorrect type.

EtherNet port is not intended for use on telecom network circuits that are subject to lightning or power faults.

If opening the unit, ensure the power cord is disconnected from the outlet.

2.0   Installation

Use the following steps to install the *In-Motion Weighing Systems*.

2.1   Unpacking the Crate

The shipping carton contains the *In-Motion Weighing Systems* components. After unpacking, visually inspect the unit to ensure all components are included and undamaged. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

2.2   Installation

Install the system taking into consideration the environment, the working direction (left/right) and the existing system, if applicable.

1. Level the feet to ensure there is no gap between the floor and each foot. See Section 2.2.1 on page 4 for information on leg and foot adjustment.

2. Set the gap between the weighing system's belts as close as possible without touching, to ensure smooth conveyance of product.

3. Loosen the overload stop bolts on the scale conveyor; there are four bolts, one on each corner of the scale spider bracket. The scale will not weigh accurately if the bolts are not loosened.

> **Note** *Refer to Section 2.4 on page 6 for overload adjustment settings.*
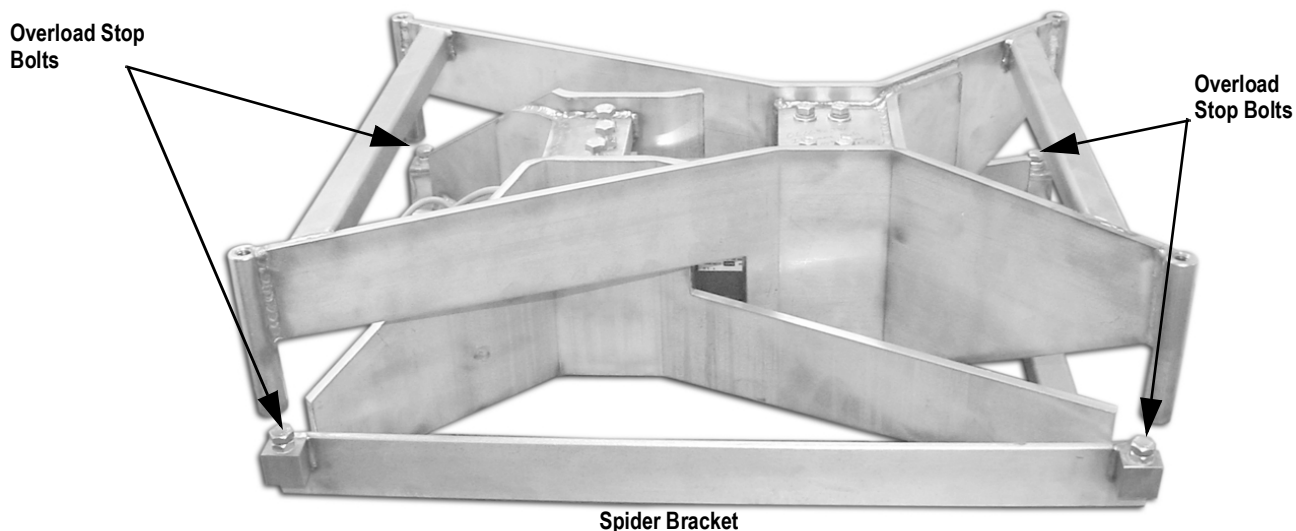
Figure 2-1. Overload Stop Bolt Location

4. Supply the specified voltage according to the included drawings. Only one input voltage is necessary to control the system.

> **⚠ WARNING** *Do not run the In Motion Weighing Systems **without all the guards, guides and shields in place and attached where necessary.***

2.2.1 Leg/Feet Adjustment

The legs come attached at the highest mount location up inside of the carriage for ease of shipping (Figure 2-2). Use the following steps to adjust the legs and feet to achieve the required line height..
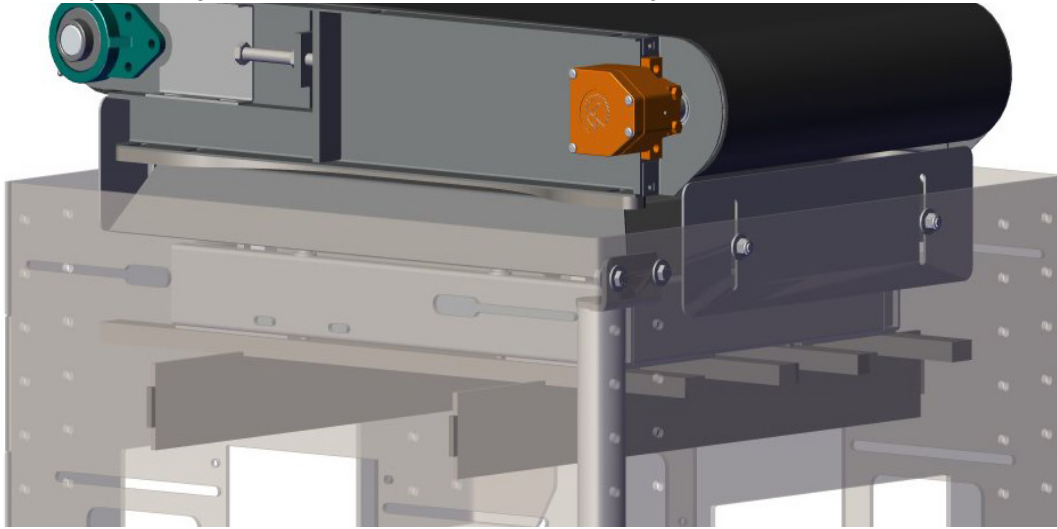
Figure 2-2. Adjustable Leg Location (only one shown in Figure 2-2)

1. Use a forklift to move the unit to the desired location. Forklift pockets are available on the unit.
2. Using a 9/16 wrench, loosen the lower hardware assembly on each leg.

Upper Hardware Assembly

Lower Hardware Assembly
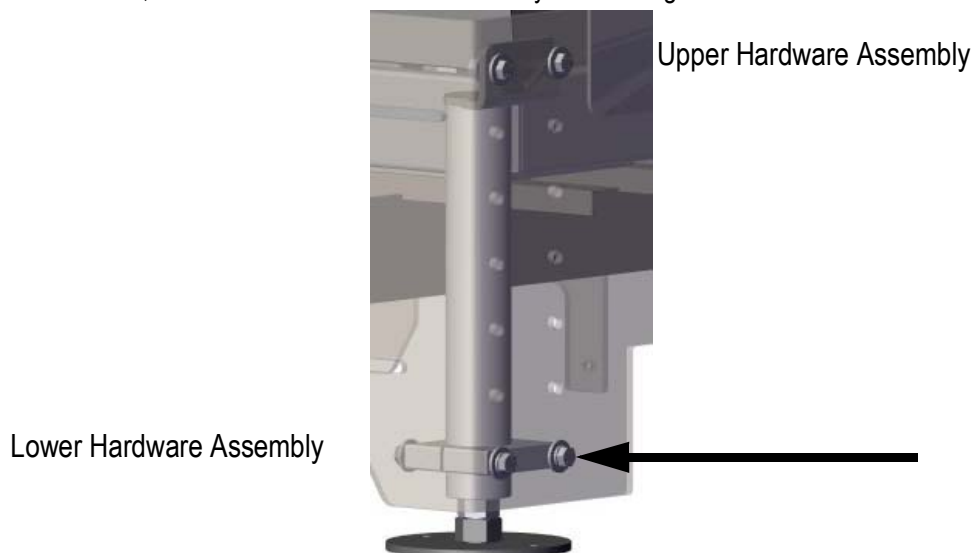
Figure 2-3. Upper and Lower Hardware Assembly

3. Loosen the upper hardware assembly and move the leg assembly down to desired hole configuration.

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4. For fine leg adjustment a six inch rod is located inside each leg extension. Loosen the two large nuts and adjust the feet until the unit is level; tightening the nuts when the desired fine adjustment is achieved.
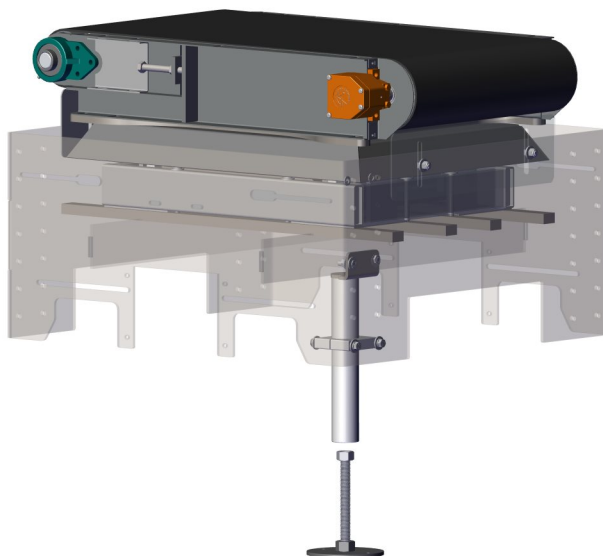
Figure 2-4. Fine Leg Adjustment (only one leg shown)

5. Tighten the lower hardware assembly to hold the legs and rod securely.

2.3 Recommended Auto Zero Settings

Rice Lake Weighing Systems recommends the following Auto Zero settings be used when setting up the conveyor scale.

2.3.1 ZTRKBND

Zero Track Band automatically zeros the scale when within the specified range if the weight is within the Stand Still Time (*SSTIME*) and the Zero Range (*ZRANGE*) settings.

> *Example:*
>
> *50 x 0.02 lb scale. Auto zero 0.50 lb. Take 0.50/0.02 = 25*
>
> *25 is the number that will be entered.*

2.3.2 Zero Range (ZRANGE)

Zero Range is the allowed percentage that can be zeroed. It can be set up to 100% (recommended range – 10-15%).

2.3.3 Motion Band (MOTBAND)

Motion Band sets the level (display divisions) at which scale motion is detected. Set to 2 for in-motion weighing.

2.3.4 Stand Still Time (SSTIME)

Stand Still Time is the length of time that the scale is out of motion. Set to 2 (200 ms) for in-motion weighing.

> **Note** *All of the parameters listed above must be set in the listed order for the auto zero feature to work along with using a push zero or a forced zero between weights in the user program.*

2.3.5 Zeroing Between Weighments

Press **Setup** several times until *Auto Zero* displays. The time value that is entered is the time from when the product is weighed to when the product is removed from the scale. This is an estimated value.

When that time has expired, the user program sends a zero command to the 920i, as long as all of the above parameters are met. Then the system zeros the scale.

2.4   Overload Stop Bolt Adjustment

The *In Motion Weighing Systems* has load cells equipped with a self-contained protection system to prevent them from being loaded above the rated capacity.

Use the following steps to adjust the overload stop bolt.

1. Place a test weight of 5% over the scale capacity in the center of one quadrant of the conveyor platform. The weight integrator should display a reading above the capacity or *O-Cap*.
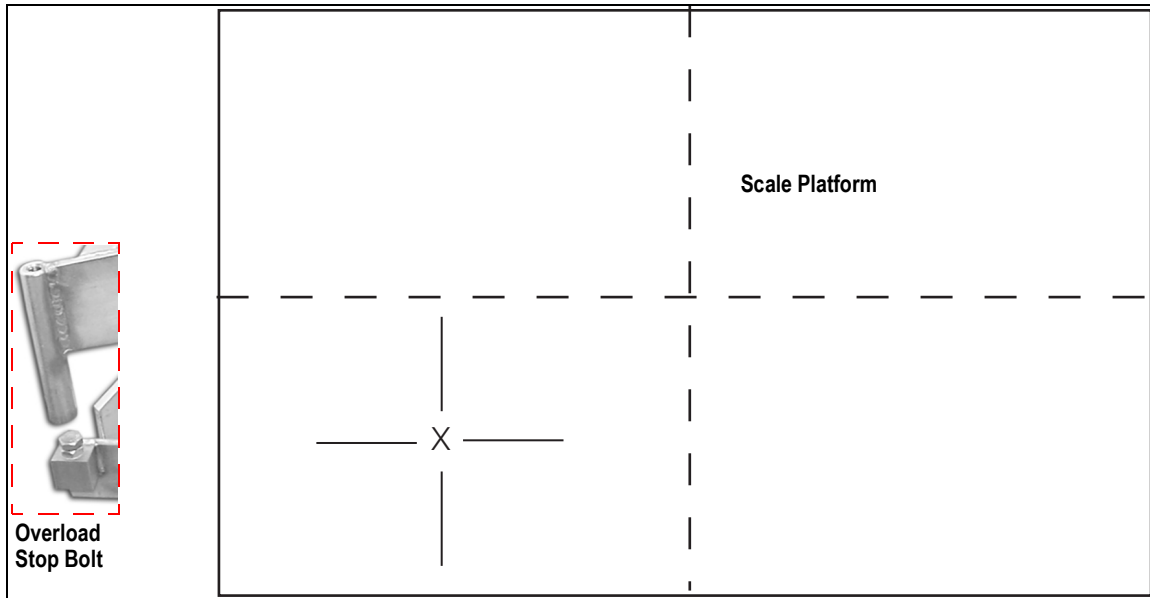
Figure 2-5. Place Test Weight in Quadrant

2. Loosen the stop bolt jam nut corresponding to the quadrant supporting the test weight.
3. Adjust the overload stop bolt so that it contacts the overload stop block on the bottom of the frame and the integrator reads slightly less than the applied weight.
4. Tighten the overload stop bolt jam nut.

Repeat steps 1-4 for each of the remaining quadrants of the scale.

2.5   Installation Checklist

Use the following checklist when setting up the *In-Motion Weighing Systems*.

2.5.1   Installation

___   When placing the conveyors, ensure all are aligned with 1/4" spacing between transfers.

___   Ensure all conveyors and the weighing platform are level.

___   Ensure the feet are properly installed and anchored to the floor using a minimum of two anchors per conveyor in opposite corners.

___   After leveling, be sure to set the jam nuts on the feet to hold in position and keep from moving.

2.5.2   Control Panel Wiring

___   Run motor cable from the infeed/outfeed conveyors to the appropriate terminals on the control panel (if applicable).

___   Wire peripheral devices (scanners, printers, metal detection) into the control panel (if applicable).

___   Connect the system power per electrical drawings (included).

> **Note**   *Motor overloads and VFD are factory configured prior to shipping.*

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2.5.3   Setting up the Scale
___   Lower the overload stops on each corner of the weighing platform

___   Calibrate the scale to zero weight and full capacity. The scale capacity is etched in the tag located on the stainless steel shroud.

___   Enter the configuration mode in the 920i and record the current scale graduations (grads). Increase the grads.

___   Adjust the overload stop bolts. See Section 2.4 on page 6.

___   Re-enter configuration mode and return the number of grads to the previous recorded value.

___   Place a full capacity weight in the center of the scale and then on all four corners to verify that the weight is within the permissible tolerance range for the system.

2.5.4   Component Tests
___   Verify that the photo eyes, when triggered, change the state of their respective relays per the electrical drawings.

___   Press the **E-Stop** softkey to make sure its respective relay changes states.

___   Log into the Motoweigh program with the user name 1 and press the **More=>** softkey. Then press the **Conveyor Start** softkey.

___   The system conveyors should begin running. Verify that they are turning in the right direction. Swap the two phases if they are not and adjust the VFD for the desired speed.

___   Observe the static weight display while the conveyors are running. Adjust the filter settings if necessary to stabilize weight fluctuations.

2.5.5   Product Setup
___   Enter *Setup —> Product Setup —> Add.*

___   Follow on screen prompts to configure the checkweighing settings for the product being set up.

___   Enable the diagnostics, *Setup —> More —> Diagnostics*. When prompted, press **Yes**.

___   Using the monitor mode in iRev, connect a laptop to port 2 of the 920i indicator.

> 📝 Note   *The Diagnostic mode prints all weight samples, plus the calculated weight to the terminal screen in iRev.*

2.5.6   System Test
___   Press the **Start** softkey on the main menu to start operation.

___   Send a product across the weighing platform and observe the diagnostic data being sent to the laptop.

___   Based on the diagnostic data sent, make necessary adjustments to the photo eye positions and re-run product to verify.

___   The in-motion calculated weight must match the static weight of the actual product.

___   Observe the time required to reach the diverter and adjust the diverter values, if needed.

3.0   Configuration

Softkeys and menus used to configure the *In-Motion Checkweighing System* are discussed in this section.

Note	*The scale sample rate must be set to 60 Hz. This is the default setting and should not be changed. A normally closed photo eye must be used.*

3.1   Security

Users must log in to the *IMC*. The default login name is *Admin* and there is no password until one is specified by the user. Additional users can be added to the user database and assigned one of four security levels. Each increasing level of security includes access to all features and functionality for the lower security levels.

Security Level	Authority
Operator	Run products/view statistics; cannot access setup menu options
Supervisor	Set up products/run reports; See Supervisor Menus on page 11
Maintenance	Set up system features/functions; See Maintenance Menus on page 12
Administrator	Access to all menus plus user setup, See Administrator Parameters on page 13

Table 3-1. Login Security Levels

3.1.1   Login Procedures

When the 920i is powered on, *Enter Login Name* is displayed.

Enter Login Name:		
=> ▌		
Home		Cancel		End

Figure 3-1. Login Menu

1.   Press the **Up** arrow. The character map is displayed.

2.   Enter Admin using the indicator arrows to move the cursor to highlight the letters.

3.   Press (enter) to add the highlighted letter to the prompt field.

Note	*If an incorrect letter is entered, press* CLR *on the numeric keypad to delete it.*

4.   Once *Admin* is displayed, press the **Down** arrow until the cursor moves to the final letter in the prompt field.

5.   Press (enter) to complete the login process.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
Sp ! # $ & ? @ ( ) < > + - * % = / \ " . , : ; ' ^ _ ` | ~ [ ] { }

=> ADMIN▌

| Home | | Cancel | | End |

Figure 3-2. Character Map

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3.1.2 User Setup - Administrator Access

To setup users, access the main menu as the Administrator. A **Setup** softkey displays.

1. Press the **Setup** softkey to view the program menu.
2. Press the **More =>** softkey until the *Users* softkey displays. Only administrators can access this feature. See Administrator Parameters on page 13.
3. Press the **Users** softkey to access the list of users in the system.
   - Press the **Add** softkey to enter the login name, password, and security level for a new user.
   - Press the **Edit** softkey to change the password and security level for existing users.
   - Press the **Delete** softkey to delete a user from the system. After logging out, the user is no longer be available.
   - Press the **Search** softkey to enter a user name. If the user is found, it is displayed in the list. If it is not found, *Login Name Not Found* is displayed.

Note	*The Administrator user name cannot be deleted from the system and the Administrator's security level cannot be changed.*

A strong password is recommended for the Administrator; use a password with characters and digits.

When editing a user, press (enter) *on the 920i to keep the same security level currently assigned to them.*

3.2 Products

Use the following section to add, edit, delete and search products.

3.2.1 Adding a Product

When adding a product, the user is prompted to enter a product ID, product description, product tare weight, units of weight to use when weighing and the five zone ranges, as either a percentage or weight value. After adding a product, use the *Calibrate Product* menu item to set up weighing delay durations.

Add a product using the 920i display softkeys.

Start	Statistics	Select Product	More =>	Setup

Figure 3-3. 920i Main Menu

1. Press **Setup** softkey.
2. Press **Products**. The menu as in Figure 3-4.

```
07/31/2015          02:15PM              SCALE #1




    ────────>                         <────────



   Arrow keys: Up/Down = Scroll      Left/Right = Page
```

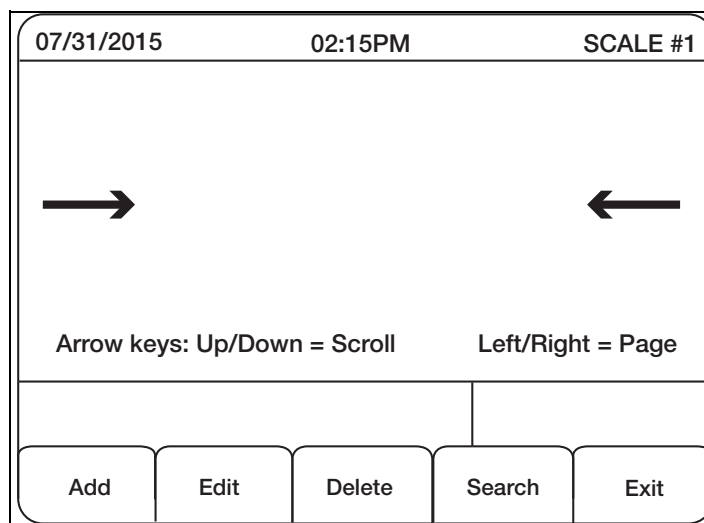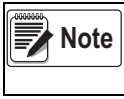| Add	Edit	Delete	Search	Exit

Figure 3-4. Products Menu

3. Press the **Add** softkey. The *Add Product* parameters display. See Table 3-2 on page 10 for parameter descriptions.

> **Note**
> *Access the character map by pressing the UP arrow on the 920i display. If an incorrect letter or number is entered, press the CLR key.*
> *To exit the character map, use the down arrow key on the 920i display until cursor moves to the final letter. Press* **Enter***.*

Parameter	Description
ID	Product ID – one to eight characters
Description	Product description – up to 20 characters; Can be numeric or alpha-numeric
Units	Units of measure – primary, secondary or tertiary
Tare Weight	System tare value while using the product in a run
TO2	Weights above this value will be considered to be in the TO2 range
TO1	Weights above this value and below TO2 are considered to be in high range; Set the value to the same as TO2 to disable this range
Target	Target weight – must be specified if the system tolerance type is either offset or percent
TU1	Weights below this value and above TU2 are considered in the TU1 range; Set the value the same as the TU2 value to disable range
TU2	Weights below this value will be considered to be in the TU2 range
Adjust Percent	Adjusts the weight of every item by a set percentage; Zero is recommended *Example: If the system is consistently reading 10% low, adjust percent to 10% to compensate.*
Reject Action	Stop or divert for rejected projects
Reject Delay	The delay (in milliseconds) after a product is weighed before turning on the reject diverter
Reject On Time	The amount of time (in milliseconds) to engage the diverter
TO2 Reject	If yes, the item is rejected if the weight falls in the TO2 range
TO1 Reject	If yes, the item is rejected if the weight falls in the TO1 range
TU1 Reject	If yes, the item is rejected if the weight falls in the TU1 range
TU2 Reject	If yes, the item is rejected if the weight falls in the TU2 range

Table 3-2. Product Parameters

Edit a product description:

1. Press the **Edit** softkey.
2. Scroll through the menu parameters using the down arrow and make appropriate edits.
3. If no edit is to be made to a particular parameter, press **Enter** to advance to the next parameter in the list.

Delete a product:

1. Select product to be deleted.
2. Press the **Delete** softkey
3. Press **Yes** to delete.

Search for a product:

1. Press the **Search** softkey.
2. Enter the Product ID.
3. Press to access the product.

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3.3 Menus and Softkeys

The main menu consists of seven softkeys. Pressing the **More=>** softkey displays the last two softkeys.
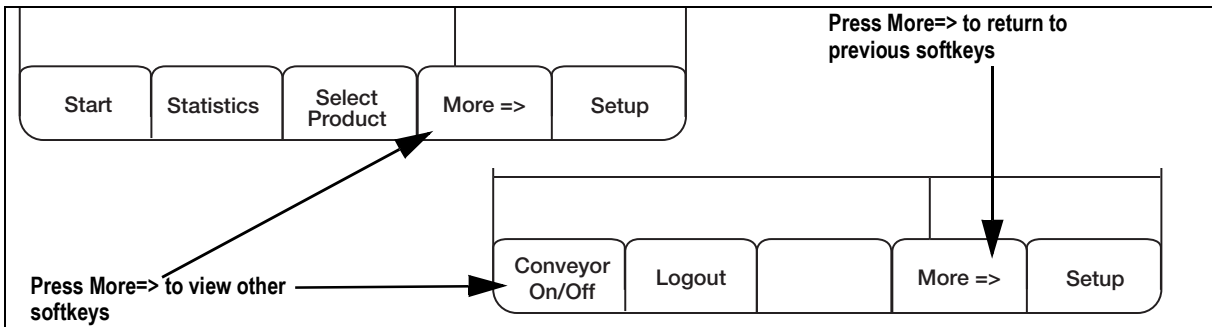
Figure 3-5. Main Menu 1

Softkey	Description
Start	Press **Start** to begin the conveyor, the product is detected and weighed
Statistics	Displays product statistics, these statistics are updated in real time during the weighing process *Note: The standard deviation is calculated for at least the last 5000 products*
Select Product	Product list, use the **Up/Down** arrows to highlight the desired product, then press **Select Product** A search for a product can also be done from this display by pressing the **Search** softkey
Conveyor On/Off	Starts and stops the weight conveyor, this does not check-weigh products crossing the scale section
Logout	Logs out of the system
More=>	Toggles between parameters
Setup	Enters the setup menu, not available to operators

Table 3-3. Main Menu Softkeys

3.3.1 Setup Softkey

Press the **Setup** softkey to access the *Setup* menu. This menu consists of seven sub-menus.

Supervisor Menus
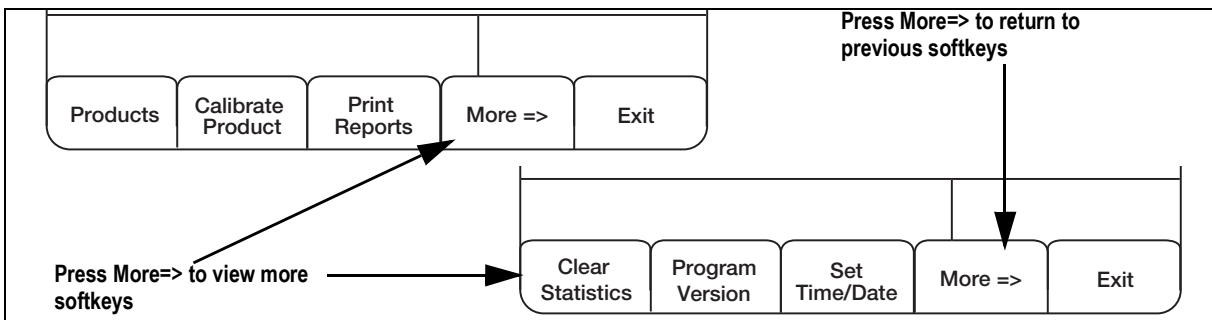
Figure 3-6. Setup Menu – Supervisor Parameters

Softkey	Description
Products	Accesses the product database list, products can be added, edited, deleted, or searched
Calibrate Product	Allows the user to calibrate each product; See Section 4.0 on page 14 for calibration details
Print Reports	Allows the user to print a user, product, zone, or parameter report. See Section 5.0 on page 19
Clear Statistics	Clears all product statistics
Program Version	Displays the program version
Set Time/Date	Used to set the time and date for the 920i
More=>	Accesses next parameter display
Exit	Returns to the main menu

Table 3-4. Supervisor Menu Softkeys

Maintenance Menus

Figure 3-7. Setup Menu – Maintenance Parameters

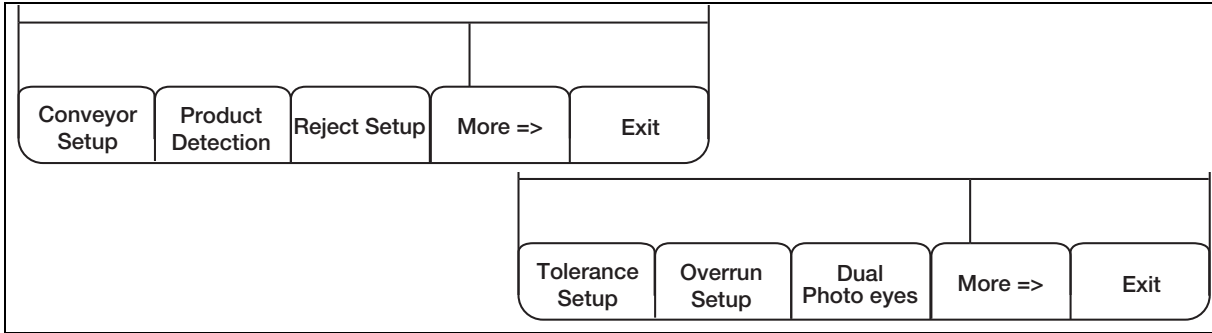| Softkey	Description
Conveyor Setup	Enter the start conveyor output; changing this output may require changes in the 920i configuration file to set up digital I/O points
Product Detection	Define the start data collection input, the stop data collection input, the maximum photo-eye on time (in milliseconds), photo eye alarm output, and photo eye alarm duration (in milliseconds) Setting the maximum photo eye *On* time to 0 disables the photo eye alarm feature Changing the inputs or output may require changes in the 920i configuration file to set up digital I/O points Flicker time is set up under this parameter and is the time in milliseconds (ms) after which a product has been detected, a new product cannot be detected
Reject Setup	Define the reject output as well as product defect input 1 and 2; changing the inputs or output may require changes in the 920i configuration file to set up digital I/O points
Tolerance Setup	Define the output relays used to indicate the 5 zone ranges for each product check weighed; out of tolerance alarm output, out of tolerance alarm duration, and zone type (by weight or by percent of target) are also set here **Note:** *When editing the zone type, press* **Enter** *to keep the current value*
Overrun Setup	Set the overrun photo eye input, the overrun alarm output and the overrun alarm duration Set the alarm duration to 0 to disable; if an overrun is detected, the overrun alarm signals the error, however the system attempts to continue the weighing process
Single/Dual Photoeyes	Toggles from single photo-eye to dual photo-eyes; the displayed softkey is the number of photo eyes that will be used in the weighing process A single photo eye starts data collection input only; dual photo eyes uses start and stop data collection as well as the overrun input, if enabled **Note:** *Dual photo eyes are the preferred method*
More=>	Accesses next parameter display
Exit	Returns the user to the main menu

Table 3-5. Maintenance Softkeys

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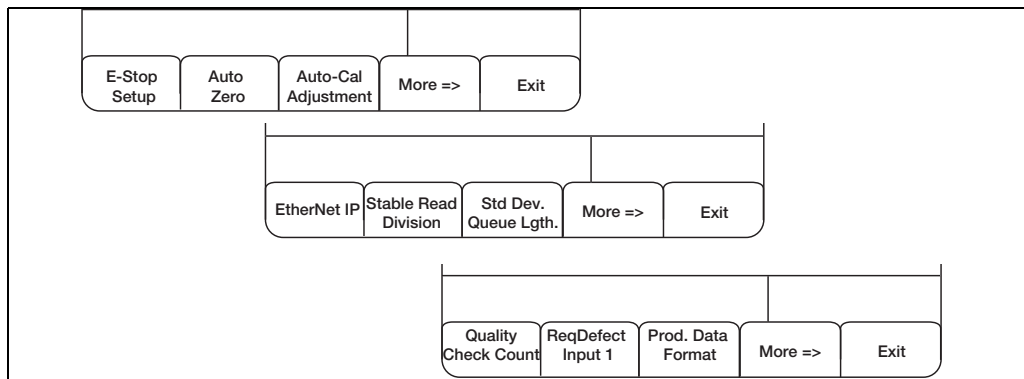WEIGHING SYSTEMS

General Parameters

Figure 3-8. General Setup Menus

Softkey	Description
E-Stop Setup	Set the E-Stop input; setting the input to 0 disables the feature Changing the input may require changes in the 920i configuration file to set up digital I/O points
Auto-Zero	Enter a value to specify the auto-zero period (in milliseconds); it begins when the product is finished and can last until the next product reaches the photo eye; use this feature to zero the scale between weighments, if there are drifting issues or difficulties obtaining an accurate weighment
Auto-Cal Adjustment	Fine tune the delay before sample time and sample time settings; this is by a percentage of the total sample time during the auto calibration of a single photo eye system Default rate is 20%, valid values 0-49%
EtherNet IP	Set the duration of the EtherNet IP output of Slot 0, Bit 1; set to 0 to disable
Stable Read Division	Key in a value for the number of stable read divisions; default is 15 **Note: It is not recommended to change this parameter**
Std Dev. Queue Lgth.	The number of products included in the calculation of the standard deviation
Quality Check Count	Define the number of consecutive products to divert during a quality check
Require Defect Input 1	When set to *Yes*, a pulse on defect input 1 means the product is acceptable; when set to *No*, a pulse on defect input 1 means the product is not acceptable and will be rejected
Product Data Format	Configure the real-time data string on port 3; this string can be customized using tokens, delimiters or static text; See Section 7.2 on page 28 on page for further information
More=>	Access next parameter display
Exit	Returns to the main menu

Table 3-6. Setup Menu 5 Softkeys and Descriptions

Administrator Parameters

Figure 3-9. Administration Menu

Softkey	Description
Users	Access the user database list; users can be added, edited, and deleted
Diagnostics	Dump weight samples from a weighment out of port 2 during setup or for troubleshooting
Transmit Weights	When set to *Yes*, the custom serial string is sent out port 3 after each item is weighed
More=>	Return to the supervisor parameters
Exit	Return to the main menu

Table 3-7. Administration Softkeys

4.0 Calibration

To calibrate, run a sample product across the scale to see the distribution curve and set up the weighing parameters for each product, including sample delay and sample time.

By pressing **Start**, the conveyor begins and the photo-eye detects product. At the end of five seconds, the system alerts the user to the time at which the detection input was cleared. A graph is displayed showing the timing of the product weight across the five seconds. The user can then set the delay before sampling time and sample duration by viewing the graph weight and product detection details.

Note	*Calibrate each product individually. A normally closed photo eye must be used.*

4.1 Single Photo Eye Product Calibration

1. Log in as the administrator (Section 3.1 on page 8). The main menu is displayed.

Start	Statistics	Select Product	More =>	Setup
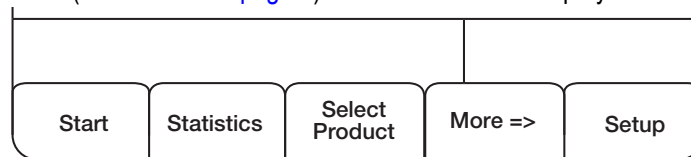
Figure 4-1. Main Menu

2. Press the **Setup** softkey to access additional parameters.
3. Press the **Calibrate Product** softkey. The *Calibration* menu is displayed.

```
07/31/2015              08:16 AM              Scale #1



            ———➜    Product 1    ⬅———
                    Product 2

   Arrow Keys: Up/Down = Scroll   Left/Right = Page


   Select           Search            Cancel
```

Figure 4-2. Calibration Menu

4. Press **Up** and **Down** arrow keys to select the desired product.
5. Press the **Select** softkey when desired product is between the arrows. The *Calibration* menu displays.

07/31/2015	08:17 AM	Scale #1

| 0 ms | 1200 ms | 2400 ms | 3600 ms | 4800 ms | 6000 ms |

Delay: 500   Duration: 300   Min. Detect   0

| Start | Delay Before Sample | Sample Duration | Min. Detect Duration | Exit |
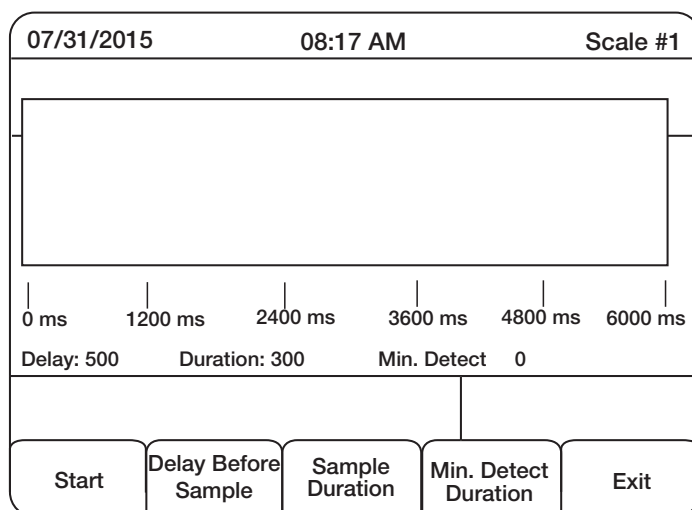
Figure 4-3. Calibration Menu

Softkey	Description
Start	Begins in-motion calibration process
Delay Before Sample	Amount of time (milliseconds) after an item completely passes the photo eye before weight is measured Useful when the photo-eye is mounted ahead of the belt
Sample Duration	Sample duration (milliseconds)
Min. Detect Duration	Time (milliseconds), that the photo eye must stay on in order to count as a product; If 0 is selected, the feature is disabled
Exit	Returns to main menu

Table 4-1. Calibration Screen Softkeys and Descriptions

Note *The Delay Before Sample and Sample Duration softkeys should be used only for fine tuning after auto calibration. If an additional auto calibration is performed after these values are set, they are reset to zero.*

6. Press the **Start** softkey to start auto calibration. The item moves past the photo-eye, across the belt and is auto calibrated. A graph is displayed showing the timing of the product weight across five seconds.
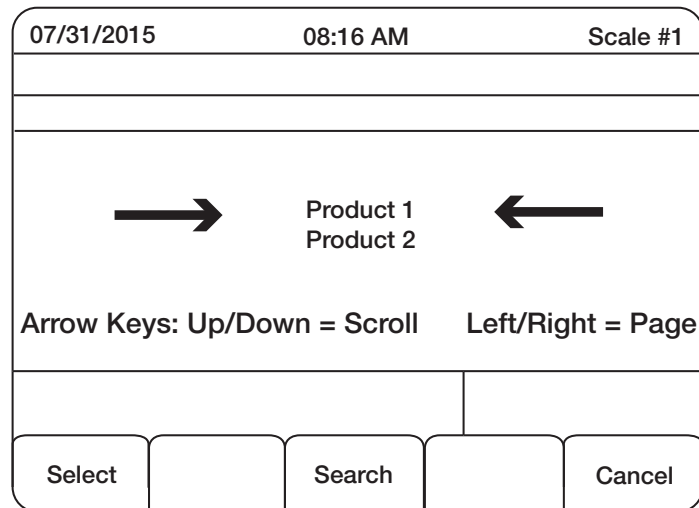
07/31/2015	08:18 AM	Scale #1

Item is entirely on scale

Item leaves scale

Item enters scale

| 0 ms | 1200 ms | 2400 ms | 3600 ms | 4800 ms | 6000 ms |

End weight sample

Delay: 500   Duration: 300   Min. Detect 0

Begin weight sample

Detection at 2016 milliseconds

| Start | Delay Before Sample | Sample Duration | Min. Detect Duration | Exit |
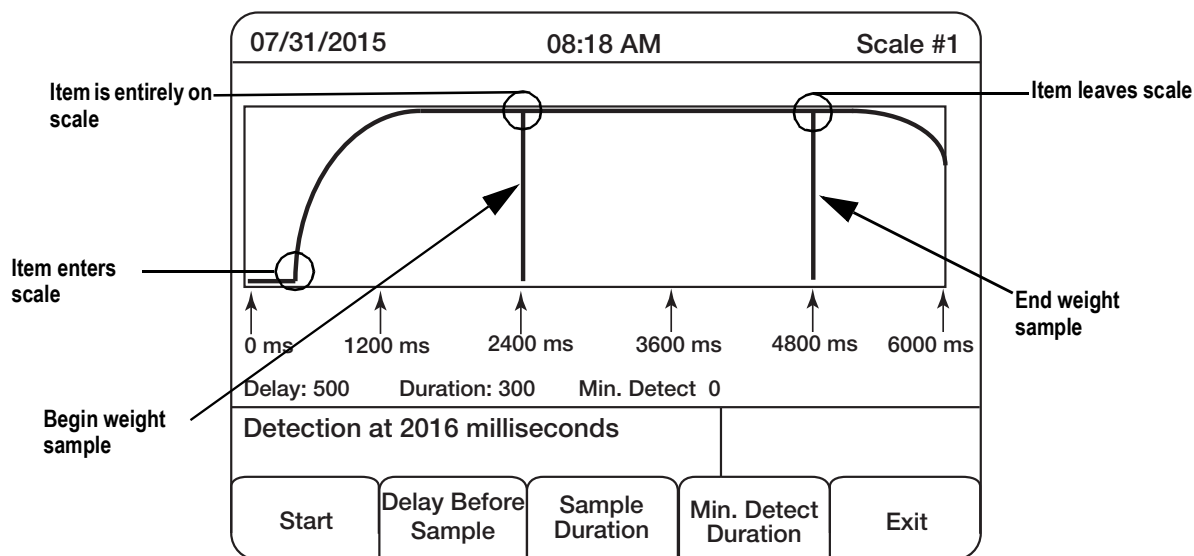
Figure 4-4. Distribution Curve Graph

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> **Note** *If there is no **End weight sample** line or it is near the five second marker, the sample time may be too long. Move the product closer to the photo eye and perform another auto calibration. If this does not work, use the* **Sample Duration** *softkey to reduce the value.*

7. Set a ***delay before sample*** value (in milliseconds), if the photo eye is mounted ahead of the belt.
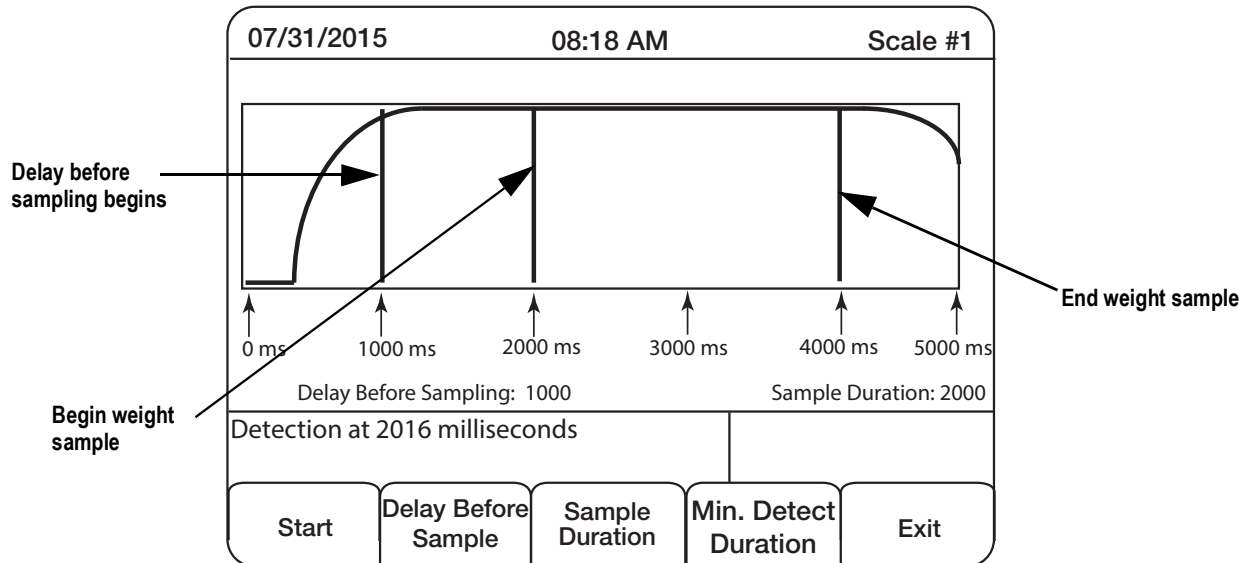
Figure 4-5. Distribution Curve With Delay Before Sampling

Once the graph displays a distribution curve representing the product entering and leaving the scale, calibration is successful.

4.1.1 Optimal Graph Adjustments

The distribution curve should be symmetrical; there should be an arc as the item enters the belt and an arc as it leaves. Figure 4-4 and Figure 4-5 show an arc as the product enters the belt, but not the full arc as the product leaves.

This works, but it leaves little room for unexpected variables. Since the weighment is measured until the product is almost off the belt, an inaccurate weighment is more likely. Taking the weight at the center of the distribution curve is preferred. Figure 4-6 is an example of an optimal distribution curve.
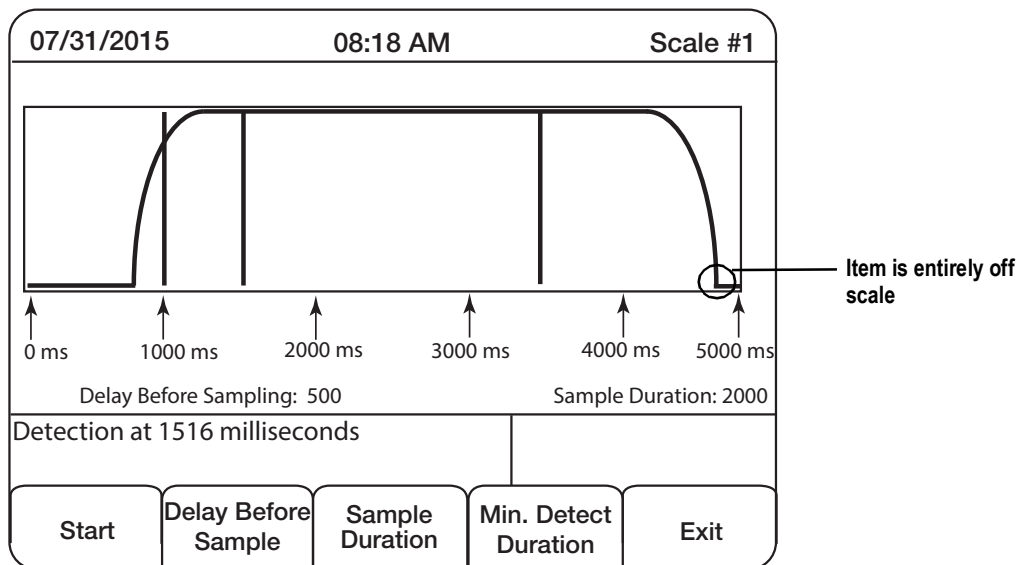
Figure 4-6. Optimal Distribution Curve

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Fine-tuning the delay before sample and/or sample time may be necessary to achieve an optimal graph. Once one of these values is set, the graph refreshes with the latest auto calibration displayed under the new parameters. Do not perform another auto calibration or any fine-tuning is reset to zero. Use the latest auto calibration and fine-tune, repeatedly if necessary, until a symmetrical graph is displayed.

4.2   Calibrating a Product with Diagnostics Using Single or Dual Photo Eyes

1. Log in as the Administrator.
2. Press the **Setup** softkey.
3. Press the **Diagnostics** softkey.

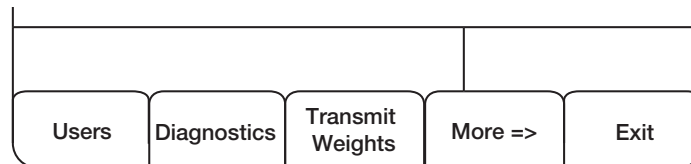|				
Users	Diagnostics	Transmit Weights	More =>	Exit

Figure 4-7. Administration Menu

4. Press the **Yes** softkey to dump weight samples out Port 2 (9-pin serial port).

When enabled, the 920i streams diagnostic weight information out of Port 2 each time a new product is detected. Use a straight through 9-pin serial cable to connect the 920i to a laptop with a terminal program like Hyperterminal or Procomm to view this data.

The default baud rate on port 2 should be set at 115200, N-8-1. Use the same settings on the terminal program.

This can also be viewed using iRev by selecting the monitor mode under the communications tab.

> **Note** I*t is recommended to use a single product for each of the steps, statically weighing the product before weighing in motion. The static weight and the in motion weight should be the same.*

Press the **Start** softkey from the Main Menu. When a product passes over the scale and weighing is complete, the indicator sends the diagnostic data to the laptop.

> *An example of diagnostic data:*
>
> *Sample Time: 650 milliseconds*
>
> *Samples: 64*
>
> *High Sample: 3.33*
>
> *Low Sample: 0.89*
>
> *Vibration: 2.44*
>
> *Weight Samples:*
>
> *0.890.891.281.281.692.102.102.492.492.82*
>
> *3.073.073.223.223.303.333.333.333.333.33*
>
> *3.333.333.333.333.333.333.333.333.333.33*
>
> *3.333.333.333.333.333.333.333.333.333.33*
>
> *3.333.333.333.333.333.333.333.333.333.33*
>
> *3.333.333.333.333.333.333.333.333.333.33*
>
> *3.333.333.333.33*
>
> *Calculated Weight: 2.38*

Each weight sample taken in the time between photo eye triggers can be viewed. In this case, the known product weighs 3.33 pounds, but the calculated weight is incorrect because the samples start off very light. This is an indication that the ***Start Data Collection Photo Eye*** has been placed too close to the entry of the scale (dual photo eye) or the ***Delay Before Sample*** time is too short (single photo eye) and is being triggered before the scale is supporting the entire weight of the product.

To correct this example, move the **Start Data Collection Photo Eye** closer to the end of the scale or slightly increase the **Delay Before Sample** time and run the same product again. The goal is to have the photo eyes in a position where all of the samples are equal.

In some cases, it is necessary to move the **Stop Data Collection Photo Eye** (dual photo eye) or decrease the **Sample Time** (single photo eye).

This example shows a diagnostic result that would indicate this:

Sample Time: 500 Milliseconds

Samples: 49

High Sample: 3.33

Low Sample: 0.12

Vibration 3.21

Weight Samples:

3.333.333.333.333.333.333.333.333.333.33

3.333.333.333.333.333.333.333.333.333.33

3.333.333.333.333.333.333.333.333.333.33

3.333.333.333.333.333.333.333.333.333.33

3.332.982.562.201.901.100.670.330.12

Calculated Weight: 3.12

The calculated weight is incorrect because the **Stop Data Collection Photo Eye** is being triggered or the **Sample Time** expires when the product is starting to be supported by the out feed conveyor. To fix this, move the **Stop Data Collection Photo Eye** closer to the entry of the scale or shorten the **Sample Time**.

IMPORTANT	*For products running at a high rate of speed, the total number of samples can be as small as five. This is the minimum number of samples recommended.*

This example shows an ideal result of diagnostics:

Sample Time: 410 Milliseconds

Samples: 41

High Sample: 3.33

Low Sample: 3.33

Vibration: 0

Weight Samples:

3.333.333.333.333.333.333.333.333.333.33

3.333.333.333.333.333.333.333.333.333.33

3.333.333.333.333.333.333.333.333.333.33

3.333.333.333.333.333.333.333.333.333.33.3.33

Calculated Weight: 3.33

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5.0   Print Reports

Use the following instructions to access the **Print Reports** softkey.

1.   Press the **Setup** softkey. The first setup menu displays.

Products	Calibrate Product	Print Reports	More =>	Exit
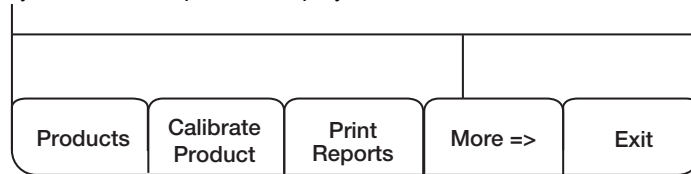
Figure 5-1. Supervisor Menu

2.   Press the **Print Reports** softkey. The ***Print Reports*** menu displays.

08/17/2015	09:10 AM	Scale #1

User Report
Product Report
Statistics Report
Parameter Report

Arrow Keys: Up/Down = Scroll   Left/Right = Page

Print				Exit

Figure 5-2. Print Reports Menu

3.   Use the **up/down** arrows to scroll through the reports.
4.   With the desired report between the arrows, press the **Print** softkey. See Figure 5-3 on page 20 for report examples.

```
Product Report
--------------

06/24/2015 12:42PM

              ID: 1
     Description: 111
           Units: Primary
     Tare Weight: 0.00 lb
       TO2 Value: 10.00 lb
       TO1 Value: 9.00 lb
       Target Wt: 8.00 lb
       TU1 Value: 7.00 lb
       TU2 Value: 6.00 lb
     Reject Delay: 50 milliseconds
   Reject On Time: 250 milliseconds
     Sample Delay: 500 milliseconds
      Sample Time: 300 milliseconds
 Min. Detect Time: 0 milliseconds
     Flicker Time: 0 milliseconds

              ID: 2
     Description: 222
           Units: Primary
     Tare Weight: 0.00 lb
       TO2 Value: 7.00 lb
       TO1 Value: 6.00 lb
       Target Wt: 5.00 lb
       TU1 Value: 4.00 lb
       TU2 Value: 3.00 lb
     Reject Delay: 222 milliseconds
   Reject On Time: 222 milliseconds
     Sample Delay: 500 milliseconds
      Sample Time: 300 milliseconds
 Min. Detect Time: 0 milliseconds
     Flicker Time: 0 milliseconds
```
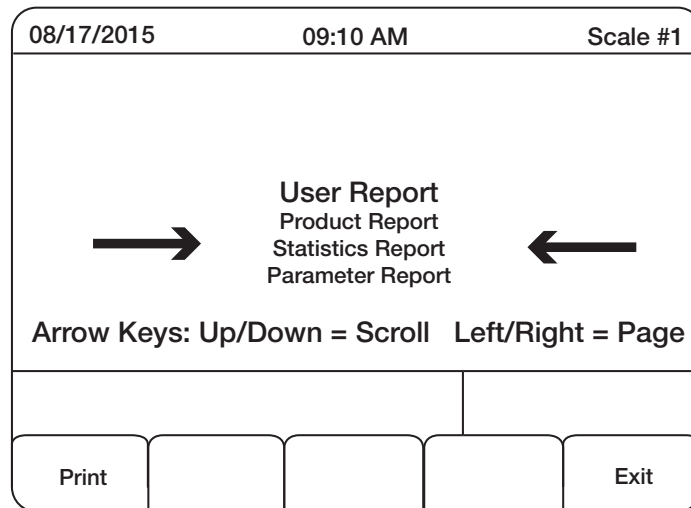
```
Statistics Report
-----------------

06/24/2015 12:48PM

              ID: 1
     Description: 111
       TO2 Count: 3
       TO1 Count: 35
    Target Count: 19
       TU1 Count: 1
       TU2 Count: 13
      TO2 Weight: 73.22 lb
      TO1 Weight: 335.24 lb
   Target Weight: 158.70 lb
      TU1 Weight: 6.40 lb
      TU2 Weight: 44.00 lb
 Accepted Weight: 573.56 lb
    Standard Dev: 0.00 lb
    Defect Count: 0
    Reject Count: 0

              ID: 2
     Description: 222
       TO2 Count: 0
       TO1 Count: 0
    Target Count: 36
       TU1 Count: 0
       TU2 Count: 00
      TO2 Weight: 0.00 lb
      TO1 Weight: 0.00 lb
   Target Weight: 181.80 lb
      TU1 Weight: 0.00 lb
      TU2 Weight: 0.00 lb
 Accepted Weight: 181.80 lb
    Standard Dev: 0.10 lb
    Defect Count: 0
    Reject Count: 0
```

```
Parameter Report
----------------

06/24/2015 12:53PM

            E-Stop Input: 15

    Conveyor Start Output: 1

 Start Data Collection Input: 3
  Stop Data Collection Input: 4
      Overrun Photo-Eye Input: 8

            Reject Output: 2

              TO2 Output: 5
              TO1 Output: 11
           Target Output: 6
              TU1 Output: 12
              TU2 Output: 7
   Tolerance Alarm Output: 13
     Tolerance Alarm Time: 1000

              Zone Type: Weight

       Overrun Alarm Output: 14
         Overrun Alarm Time: 1000 milliseconds

   Product Defect Input 1: 9
   Product Defect Input 2: 10
```

```
USER REPORT

User Report
-----------

09/01/2015 12:53PM

    User: Admin
    Time: 09/01/2015 12:50PM
 Activity: Logged In

    User: Admin
    Time: 09/01/2015 12:53PM
 Activity: Run Product: 1

    User: Admin
    Time: 09/01/2015 12:53PM
 Activity: Stop Running Product
```

Figure 5-3. Report Examples

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6.0 Option Card Installation

Use the following procedure to install option cards in the 920i.

> ⚠️ **WARNING** *Disconnect power to the indicator prior to removing the backplate.*
> *Use a wrist strap for grounding and protecting components from electrostatic discharge (ESD) when working inside the indicator enclosure.*

1. Place indicator face down on an anti-static work mat.
2. Remove screws securing the backplate to the enclosure body.
3. Carefully align the option card connector with connector J5 or J6 on the 920i CPU board.
4. Press down firmly to seat the option card in the CPU board connector.
5. Using the screws and lock washers provided in the option kit, secure the other end of the option card to the standoffs on the CPU board.
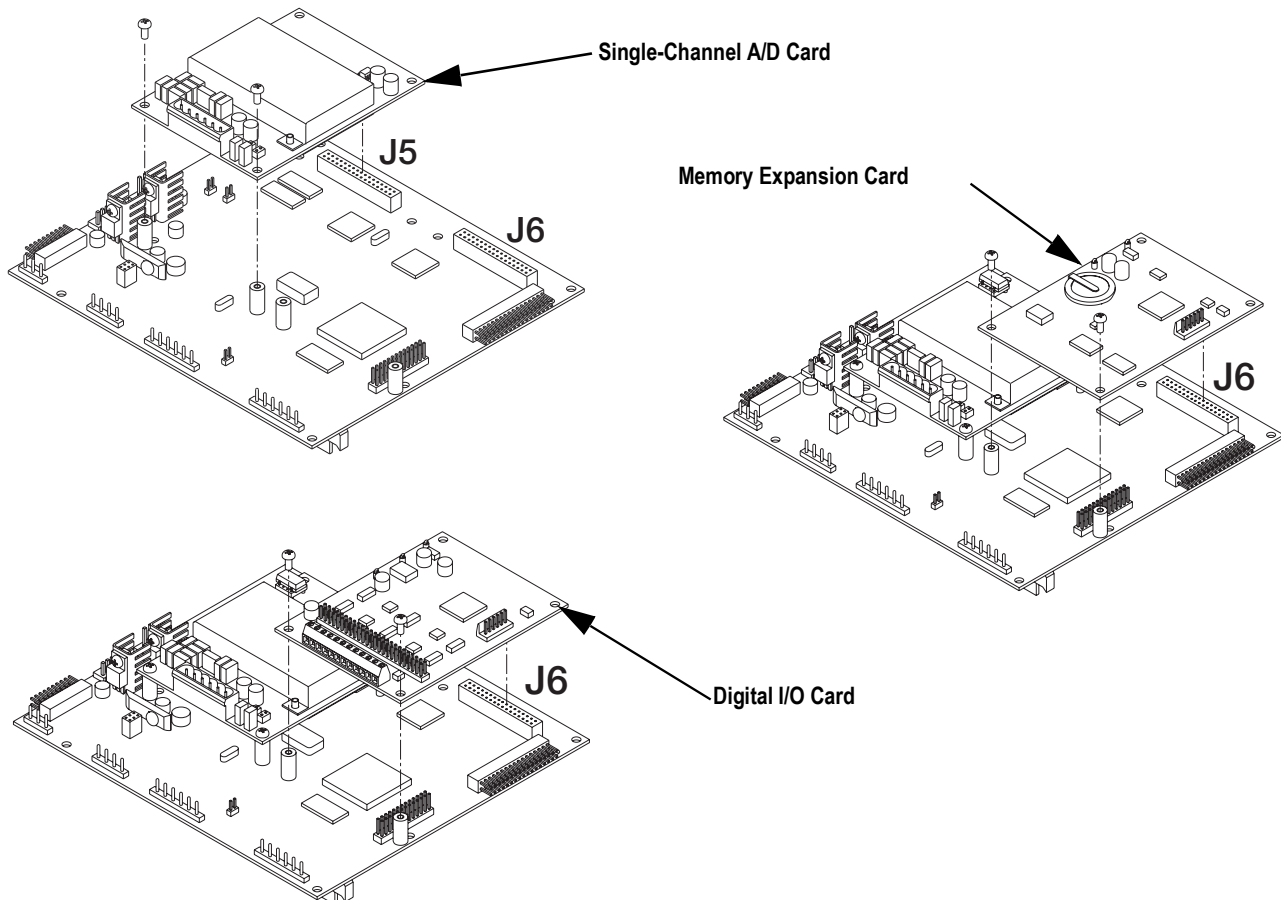
Figure 6-1. Install Option Card

6. Make connections to the option card as required.
   - See Section 6.1 on page 22 for the Memory Expansion Card
   - See Section 6.2 on page 22 for the Digital I/O card
   - See Section 6.3 on page 23 for the Single-Channel A/D Card
7. Use cable ties to secure loose cables inside the enclosure.

6.1 Memory Expansion Card
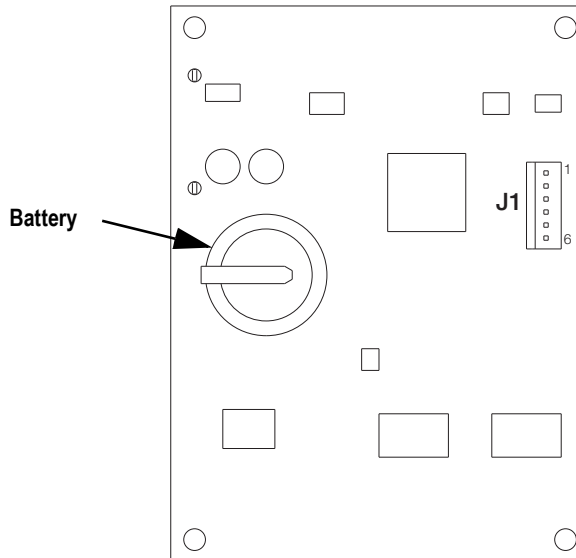
Figure 6-2. Memory Expansion Card

Periodically check the battery voltage on installed memory option cards. Batteries should be replaced when the battery voltage falls to 2.2 VDC. Life expectancy of the battery is 10 years.

Note | All database information stored on a memory card is lost if the memory card battery fails.

CAUTION | *There is a risk of explosion if the battery is replaced with an incorrect type. Dispose of batteries per manufacturer instruction.*

Specifications

1 MB, non-volatile SRAM with supervisory write protection

3 V high-density lithium battery

6.2 Digital I/O Expansion Card

A digital I/O expansion card installed on connector J5 of the CPU board, is configured as slot 1. A card installed at connector J6 is configured as slot 2.

Figure 6-3 shows the available connections on the Digital I/O option card connector J3 (up to eight digital I/O channels). Connector J2 provides all 24 channels using a 50-pin ribbon cable (Table 6-1).

Figure 6-3. Digital I/O Expansion Card

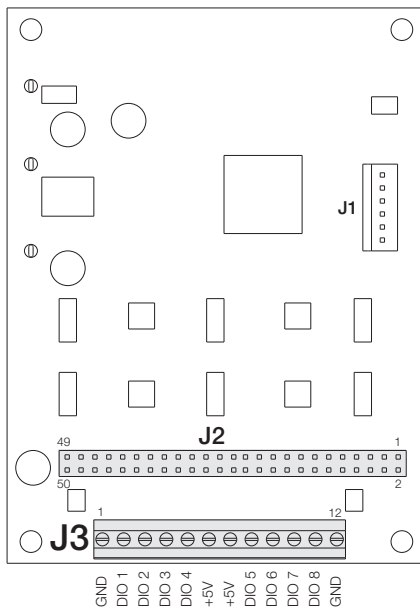| Pin	Signal	Pin	Signal
1	DIO24	27	DIO11
3	DIO23	29	DIO10
5	DIO22	31	DIO9
7	DIO21	33	DIO8
9	DIO20	35	DIO7
11	DIO19	37	DIO6
13	DIO18	39	DIO5
15	DIO17	41	DIO4
17	DIO16	43	DIO3
19	DIO15	45	DIO2
21	DIO14	47	DIO1
23	DIO13	49	+5V
25	DIO12	even pins	GND

Table 6-1. Ribbon Cable Connections

Use the DIG I/O menu to configure digital I/O as necessary. See the 920i manual (PN 67887) for more information.

Specifications

I/O Channels	Up to 24, 5 V/TTL, each software configurable as input or output
Relay Supply Voltage	5 VDC, 1 A maximum
Input Voltage	0–5.5 V maximum
Digital Outputs	24 mA balanced outputs with sink/source capability
Input Protection	8-screw terminal: 300 W transient voltage suppression for ESD, EFT (electrical fast transients), tertiary lightning, and system-generated transients per IEC 60001-4-2, 60001-4-4, and 60001-4-5; European Standards EN50082 and EN61000-4
	Remaining I/O: 2 KV HBM, 100 V machine model
I/O Connection	50-pin ribbon connector, 8-screw terminal connector

6.3   Single-Channel A/D Card Installation

1. Route the cables through the cord grips and wrap the shield wires around the ground stud on the enclosure to attach cables from load cells or junction boxes to the A/D card.

2. Secure shield wires to the ground stud with the kep nut included in the parts kit.
   See the 920i installation manual (PN 67887) for more information about grounding cables.

3. Remove connector from J1 on the A/D card. Wire the load cell cable from the load cell or junction box to connector J1 as shown in Table 6-2.

4. If using 6-wire load cell cable (with sense wires), remove jumpers JP1 and JP2 before reinstalling connector J1. For 4-wire installation, leave jumpers JP1 and JP2 on.

5. When connections are complete, reinstall the load cell connector on the A/D card and use cable ties to secure the load cell cable to the inside of the enclosure.
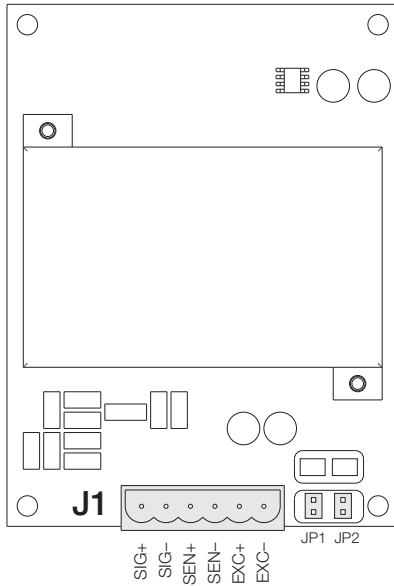
Figure 6-4. Single-Channel A/D Card

J1 Connector Pin	Function
1	+SIG
2	–SIG
3	+SENSE
4	–SENSE
5	+EXC
6	–EXC
For 6-wire load cell connections, remove jumpers JP1 and JP2.	

Table 6-2. A/D Card Pin Assignments

Specifications

Excitation Voltage	10 ± 0.5 VDC,
	16 x 350 W or 32 x 700 W load cells per A/D card
Sense Amplifier	Differential amplifier with
	4- and 6-wire sensing
Analog Signal Input Range	–10 mV/V to +70 mV/V
Analog Signal Sensitivity	0.3 mV/grad minimum @ 7.5 Hz
	1.0 mV/grad typical @ 120 Hz
	4.0 mV/grad typical @ 960 Hz
A/D Sample Rate	7.5–960 Hz, software selectable
Input Impedance	>35 MW 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	Signal, excitation, and sense lines protected

6.4   Closing the Enclosure

The backplate must be reinstalled once cabling is complete.

1.   Ensure no excess cable is left inside the enclosure and tighten cord grips.

2.   Position the backplate over the enclosure and reinstall the backplate screws.

3.   Use the torque pattern shown in Figure 6-5 to prevent distorting the backplate gasket.

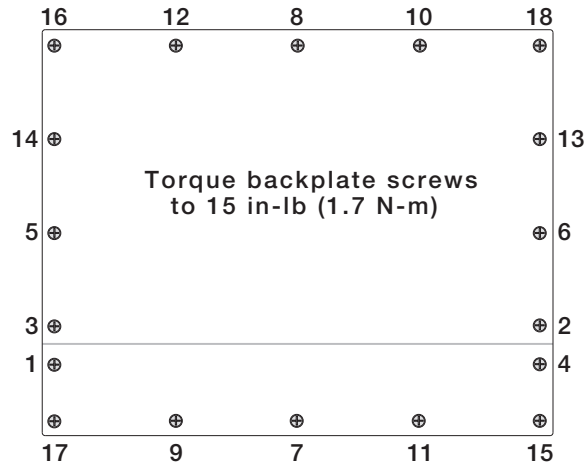4.   Torque screws to 15 inch-lb (1.7 N-m).

Figure 6-5. 920i Enclosure Backplate

5.   Reconnect power to the indicator.

The indicator automatically recognizes all installed option cards when it is powered on. No hardware-specific configuration is required to identify the newly installed card to the system.

7.0   Database/Communication

7.1   Database Tables and Stored Variables

The following tables list the variables for the user database, product database and user activity database. All data is stored in the PC database.

Field	Type	Description
Name	String	User login name
Password	String	User password
SLevel	String	User security level 1 Operator 2 Supervisor 3 Maintenance 4 Administrator

Table 7-1. User Database Variables (100 Record Maximum)

Field	Type	Description
Name	String	User login name
Time	String	Event timestamp
Event	String	Event description

Table 7-2. User Activity Database (500 Record Maximum)

Field	Type	Description
ID	String (8)	Product ID
Desc	String (20)	Product description
Tare	Real	Product tare weight (container weight, if weighed with product)
TO2	Real	TO2 Weight or Percentage of Target
TO1	Real	TO1 Weight or Percentage of Target
Target	Real	Product target weight
TU1	Real	TU1 Weight or Percentage of Target
TU2	Real	TU2 Weight or Percentage of Target
UseUnits	String (10)	Units to Use
DBSample	Integer	Delay before sampling (single photo eye mode)
SampleTrn	Integer	Sample duration (single photo eye mode)
TO2Dvrt	String	Yes to divert products in this weight category
TO1Dvrt	String	Yes to divert products in this weight category
TU1Dvrt	Stringr	Yes to divert products in this weight categore
TU2Dvrt	Stringr	Yes to divert products in this weight categore
ProdID	String (8)	Product ID
Adjust	Real	Product adjustment value
RjctActn	String (7)	Stop or divert selection for rejected product
RjctDely	Integer	Reject delay
RjctOT	Integer	Reject output on time
MinDet	Integer	Minimum detection period
FlickTm	Integer	Flicker time

Table 7-3. Product Database Variables (1000 Record Maximum)

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7.1.1   Statistics Database Table

Field	Type	Description
ProdID	String (8)	Product ID
TO2Cnt	Integer	TO2 product count
TO1Cnt	Integer	TO1 product count
TarCnt	Integer	Target product count
TO1Cnt	Integer	TU1 product count
TO2Cnt	Integer	TU2 product count
AccumWt	Real	Accummulated product weight
AccumTO2	Real	TO2 accumulated product weight
AccumTO1	Real	TO1 accumulated product weight
AccumTar	Real	Targert accumulated weight
AccumTU1	Real	TU1 accumulated weight
AccumTU2	Real	TU2 accumulated weight
StdDev	Real	Standard deviation (last 300 weights)
DfectCnt	Integer	Number of times the product has had a defect
RjctCnt	Integer	Number of times the product has been rejected

Table 7-4. Statistics Database Variables

7.1.2   I/O Table

I/O Slot	Bit	Type	Description
0	1	Output	Used to signal PLC when new weight data is available
	2-6	Off	Not used
3	1	Output	Conveyor start output
	2	Output	Reject output
	3	Programmability	Start data collection photo eye
	4	Programmability	Stop data collection photo eye (dual photo-eye mode)
	5	Output	TO2 Output
	6	Output	Target Output
	7	Output	TU2 Output
	8	Programmability	Overrun photo eye (dual photo eye mode)
	9	Programmability	Product defect input 1
	10	Programmability	Product defect input 2
	11	Output	TO1 Output
	12	Output	TU1 Output
	13	Output	Tolerance Alarm Output
	14	Output	Overrun Alarm Output
	15	Programmability	Emergency Stop input
	16	Output	Photo eye alarm

Table 7-5. 920i Digital I/O Assignments

7.2 Port 3 Customizable Real-Time Data String

The **Product Data Format** softkey allows the user to configure the real-time data string on port 3. This string can be customized using tokens, delimiters or static text.

1. From the ***Main Menu***, press the **Setup** softkey.

2. Press the **More=>** softkey until the **Product Data Format** softkey displays.

3. Press **Product Data Format** softkey to modify this string. See See "General Parameters" on page 13..

4. Press **UP** on the 920i to display the full keyboard.

5. Use keyboard to enter the desired string. In order for the string to be sent, set transmit weights to ***Yes***.

Command	Description
<STX>	Start of text
<ETX>	End of text
<CR>	Carriage return
<LF>	Line feed
<WT>	Weight using current 920i decimals
<UNITS>	lb, kg
<STATUS>	Accepted or Rejected
<PID>	Product ID
<UID>	Unit ID
<DT>	Date and time (mm/dd/yyyy hh:mm:AM/PM)
Default: <WT><CR> Example: Product data format is set to: <STX>, <PID>, <WT>, <UNITS>, <STATUS>, <DT>, <ETX> Output: <STX>, 12345, 100.5, lb, accepted, 09/04/2015 09:13AM, <ETX>	

Table 7-6. Real Time Data Tokens

Real time data can be sent over Ethernet TCP/IP or wireless communications.

> **Note** *EtherNet TCP/IP or wireless requires the 920i option card be installed.*

7.3 Port 4 Serial Protocol

General Format

    <STX> | <ADDRESS> | <COMMAND> | <DATA FIELD 1> | <DATA FIELD...> | <ETX>

Each message begins with a start of text character (<STX>), followed by the destination address (<Address>), variable data fields and an end of text (<ETX>) character. Pipe characters (|), 0x7C, are used to separate the message parts for easier viewing.

```
<STX>        = 0x02
|            = 0x7C
<Address>    = two-byte ASCII digits to specify the 920i indicator address
|            = 0x7C
<Command> = Instruction that describes what to do with the data
|            = 0x7C
<Data Fields>=Variable number of data fields, separated by pipe (0x7C) characters
|            =0x7C
<ETX>        =0x03
```

Update Product Command

    <STX> | <ADDRESS> | UPDATE-PRODUCT | <ID> | <Description> | <Tare Wt> | <TO2> | <TO1> | <Target> | <TU1> | <TU2> | <ETX>

Example:

    <STX> | 01 | UPDATE-PRODUCT | 12345 | Bag of widgets | 100 | 4000 | 3000 | 2000 | 1000 |

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> **Note** *This command only updates a subset of the properties of an existing product. It does not create a new product.*

Select Product Command

<STX> | <Address> | SELECT-PRODUCT| <ID> | <ETX>

Example:

<STX> | 01 | SELECT-PRODUCT | 12345 | <ETX>

A product can be run by stopping the current product (if necessary), selecting a new product, then starting the system.

Start Product Command

<STX> | <Address> | STOP | <ETX>

Example:

<STX> | 01 | START| <ETX>

Stop Product Command

<STX> | <Address> | STOP | <ETX>

Example:

<STX> | 01 | STOP | <ETX>

ACK/NAK Responses

Each command sent from the PC is acknowledged by the 920i with an ACK or NAK response. Data sent from the indicator to the PC does not require an ACK or NAK response to the indicator.

<STX> | <Address> | <ACK> | <ETX>

or

<STX> | <Address> | <NAK> | <Reason for failure> | <ETX>

If the PC receives a NAK response, the reason for failure can be displayed by the user. The reason for failure text is also displayed at the indicator.

7.4   Fieldbus Protocol

Slot 4 of the 920i is available for a Fieldbus IP option. This gives the 920i the ability to communicate with a PLC. In order for this communication, setpoints are used to store real time product data. Also an output is fired each time new product data is available for the PLC. This output duration can be configured to allow the flexibility to accommodate both fast and slow processing PLCs. This is done using the EtherNet IP® softkey on setup menu 6.

Each time a product is successfully weighed its information is stored into Gross setpoints.

Setpoint Number	Description
97	Weight
98	Time*
99	1 for Accepted, 0 for Rejected

Table 7-7. Setpoint Values

* Setpoint values are numbers, the time values are formatted as HHMMSS on a 24 hours basis.

- 1 AM displays as 10000
- midnight displays as 0.
- 3:15:15 PM displays as 151515.

Slot 0, Bit 1 will be fired each time the product data is updated in the setpoints signaling the PLC to retrieve the data.

7.4.1 PLC Fieldbus Output to the 920i

PLC fieldbus output to the 920i to monitor the input and read the setpoint value.

Outputs	Description
1	320 - command to read setpoint
2	97 - setpoint number to read
3	0
4	0

Table 7-8. Fieldbus Output Commands

7.4.2 Response to Command 320

With the following example of 800.5 lb checkweighed on the scale.

Input	Description
1	320 - command echoed back
2	16712 - batch status containing the output slot 0, bit 1 as bit #3 of this value. Binary = 0100000101001000
3	17480 - MSW
4	8192 - LSW

Table 7-9. Fieldbus Response Commands

The PLC monitors Input 2, bit #3 when it is set to a 1. The PLC grabs the weight values in input 3 and 4. The values in input 3 and 4 are in IEEE floating point notation.

7.5 FCC Statement

The 920i complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Radio certificate number:

- US: R68WIPORTG
- Canada: 3867A-WIPORTG

8.0   Maintenance/Troubleshooting

8.1   Preventive Maintenance

A few simple steps will help to maximize and maintain the performance of the *In-Motion Weighing Systems* and will extend the life of the product.

Start of Shift

- Photo eyes and reflectors must be kept clean and free of debris
- Ensure photo eyes are properly aligned for optimum scale performance
- Check the calibration of the scale using test weights
- Check scale overloads to ensure they are set properly if the system weight verification fails

Weekly

- Grease all bearings on the conveyor system. (frequency will vary depending on use)

Monthly

- Check the belt tension and alignment of the conveyors periodically to ensure maximum scale and conveyor performance. Belt tension can be adjusted on the idler end if needed
- Check the set screws in the sprockets
- Check drive timing belt tensions
- Backup configuration and database information using iRev. (frequency of backup depends on frequency of changes to configuration files and the addition of new files)

> **Note** *Not all conveyor equipment systems are wash-down rated. Even in those that are, extreme water pressure should be avoided around the electrical components of the unit and the load cells.*

8.2   Troubleshooting

Table 8-1 lists general troubleshooting tips for various hardware error conditions.

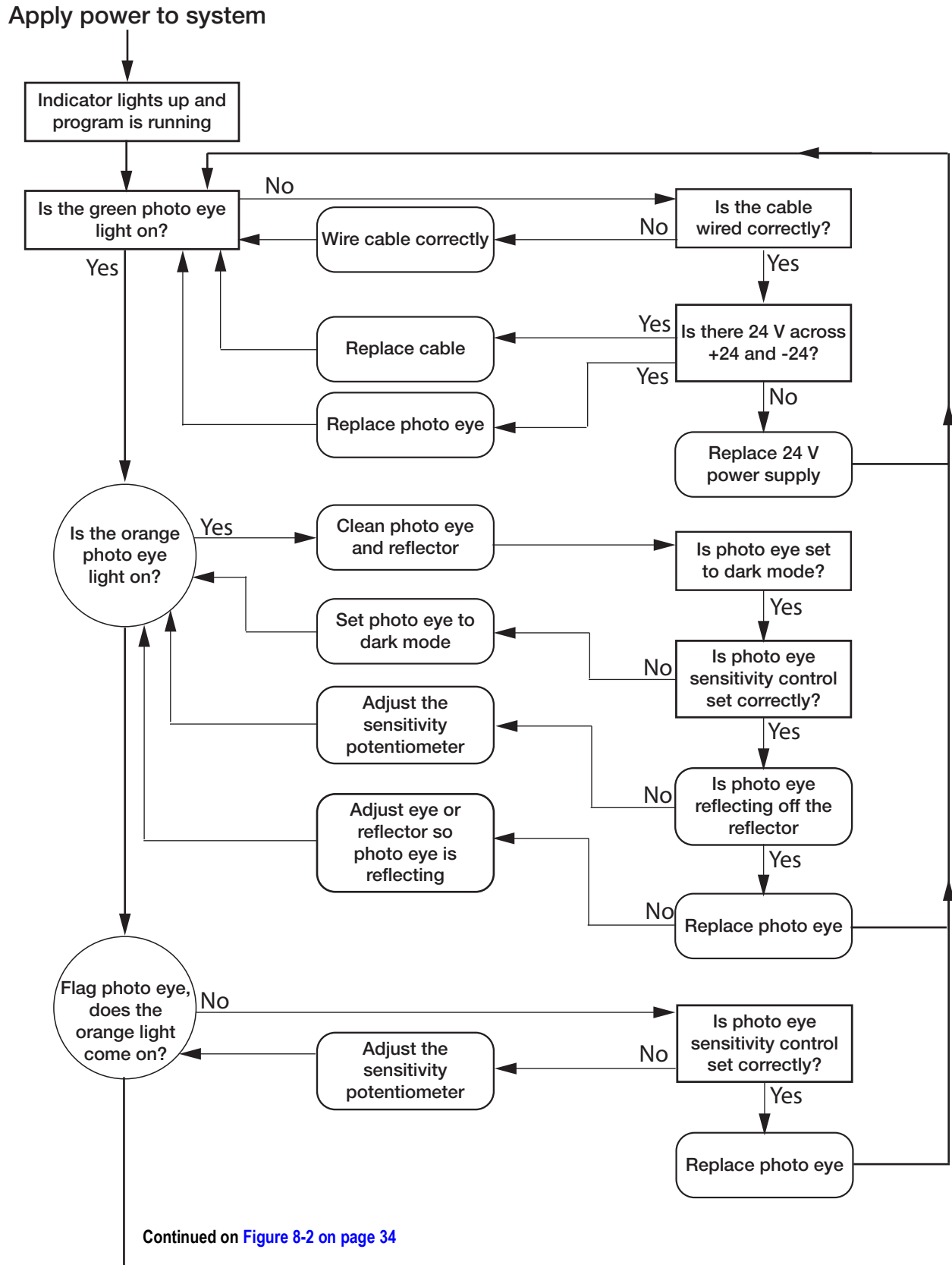| Symptom	Probable Cause	Remedy
Load cell is reading a negative weight	Overload stops are touching the scale	Adjust the overload stops
	Binding on the scale	Remove outside factors in contact with the scale
	Load cell is faulty	Replace the load cell
Load cell is drifting	Needs recalibration	Recalibrate the load cell
	Load cell is faulty	Replace the load cell
Program does not detect a product	No power to Photo eyes (green light is off)	Wire cable correctly, replace the cable, replace the photo eye, replace the 24V power supply
	Photo eyes do not change state (orange light) Photo eye is dirty, the reflector is dirty, the photo eye is not in line with the reflector	Clean Photo eye and reflector, ensure the photo eye is in line with the reflector
	Input relay does not change state	Wire the cable correctly, replace the cable, replace the input relay
	Program does not detect the input	Ensure I/O is set correctly, new 920i program, replace 50 pin cable, replace 24 channel digital I/O card
Program detects a product but displays a zero weight	Program is set to single photo eye, not dual	Press the softkey in the **Setup Menu** to select Dual
	For a single eye system, ***Delay Before Sample*** or ***Sample Duration*** is not set correctly	Under the **Calibrate Product** softkey, change timing
	Filtering is set too high	Change the 920i filtering settings
	Photo eyes are not in the correct position	Adjust the photo eyes
	Program is marking the product as a defect	Change ***Require Defect Input 1*** to no
Program is displaying a weight that is a too low	Photo eyes are not in the correct position	Use diagnostic photo eyes
	Filtering is set too high	Adjust the filtering
	For a single eye system, ***Delay Before Sample*** or ***Sample Duration*** is not set correctly	Under the **Calibrate Product** softkey, change timing
Program is not getting consistent weights	Filtering is set too low	Adjust the filtering
	Too much vibration in the system	Remove any outside factors that could affect the scale (fans, forklift traffic, etc)
	Products are spaced too close together	Correct product spacing

Table 8-1. Troubleshooting Tips

RICE LAKE
W E I G H I N G   S Y S T E M S

8.3   Photo Eye Troubleshooting

Apply power to system

```
┌──────────────────────────┐
│ Indicator lights up and  │
│   program is running     │
└──────────────────────────┘
```

Is the green photo eye light on? — No → Is the cable wired correctly?
— Wire cable correctly ← No
Yes ↓

Is there 24 V across +24 and -24? — Yes → Replace cable
Yes → Replace photo eye
No → Replace 24 V power supply

Is the orange photo eye light on? — Yes → Clean photo eye and reflector
→ Is photo eye set to dark mode?
Yes ↓
Is photo eye sensitivity control set correctly? — No → Set photo eye to dark mode
Yes ↓
Is photo eye reflecting off the reflector — No → Adjust the sensitivity potentiometer
Yes ↓
Replace photo eye — No → Adjust eye or reflector so photo eye is reflecting

Flag photo eye, does the orange light come on? — No → Is photo eye sensitivity control set correctly?
— Adjust the sensitivity potentiometer ← No
Yes ↓
Replace photo eye

Figure 8-1. Photo Eye Troubleshooting Diagram – Page 1

Continued from Figure 8-1 on page 33

Does the input relay turn on in panel?

No

Yes

Is the cable wired correctly?

No

Wire cable correctly

Yes

Is the e-stop pressed?

Yes

Release e-stop

No

Replace input relay

Does the program see a product?

No

Is the 50 pin cable connected at both ends?

No

Plug in Cable

Yes

Is the I/O set correctly in program?

No

Set I/O

Yes

Replace 50 pin cable

Replace 24 channel DI/O card

If system is not getting an accurate weight see basic troubleshooting **See** Section 8.2 on page 32

Figure 8-2. Photo Eye Troubleshooting Diagram – Page 2

RICE LAKE
W E I G H I N G   S Y S T E M S