RICE LAKE 882D BulkSlide Solids Flow Meter User Manual

Contents

RICE LAKE WEIGHING SYSTEMS

RICE LAKE 882D BulkSlide Solids Flow Meter

The BulkSlide Solids Flow Meter is a product designed by Rice Lake Weighing Systems. It is a device used for measuring the flow of solid materials. This manual provides information on the configuration and calibration of the device.

Product Usage Instructions

Introduction

Before setting up the device, it is important to read the safety instructions provided in section 1.1 of the manual. To access the setup menu, follow the instructions provided in section 1.2.1 or 1.2.2.

Scale Configuration and Load Cell Wiring

This section provides information on how to configure the scale and wire the load cell properly. Follow the instructions provided in this section carefully to ensure proper functionality of the device.

Digital I/O Configuration

This section provides instructions on how to configure the digital I/O parameters of the device. Follow the instructions provided in this section to ensure proper configuration.

Configuring Digital I/O Parameters

This section provides detailed information on how to configure the digital I/O parameters of the device. Follow the instructions provided in this section carefully to ensure proper configuration.

Wiring Input Relay

This section provides information on how to wire the input relay of the device. Follow the instructions provided in this section carefully to ensure proper wiring.

Calibration

This section provides instructions on how to calibrate the device. Follow the instructions provided in this section carefully to ensure accurate measurements.

Rice Lake Weighing Systems also offers technical training seminars and web-based video training on product-related topics.

Visit **www.ricelake.com/training** or **www.ricelake.com/webinars** for more information.

The most current version of this publication, software, firmware and all other product updates can be found on our website: **www.ricelake.com**

Revision History

Revision	Date	Description
A	May 22, 2022	Initial release
B	June 02, 2023	Added wiring input specifications

This section tracks and describes the current and previous manual revisions for awareness of major updates and when the updates took place.

Introduction

The BulkSlide solids flow meter measures the flow rate of gravimetrically fed bulk solids. Only free-flowing, nonadhesive bulk solids should be processed by the BulkSlide solids flow meter. The BulkSlide solids flow meter can be used for inventory mixing, blending or ratio control applications (in petrochemical, agricultural, aggregate, food and pharmaceutical industries).

This manual describes the configuration and wiring for the indicator and its hardware components. For more information see:

- BulkSlide Operation Manual (PN 206443) for BulkSlide hardware operation and installation
- 882D Technical Manual (PN 184260) for 882D indicator details

  Manuals are available from Rice Lake Weighing Systems at **www.ricelake.com/manuals**

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

Safety

Safety Definitions:

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

General Safety

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

WARNING
Failure to heed could result in serious injury or death.

- Some procedures described in this manual require work inside the enclosure. These procedures are to be performed by qualified service personnel only.
- Take all necessary safety precautions when installing the scale carriage including wearing safety shoes, protective eye wear and using the proper tools.
- Keep hands, feet and loose clothing away from moving parts.
- Do not allow minors (children) or inexperienced persons to operate this unit.
- Do not operate without all shields and guards in place.
- Do not use for purposes other then weight taking.
- Do not place fingers into slots or possible pinch points.
- Do not use any load bearing component that is worn beyond 5 percent of the original dimension.
- Do not use this product if any of the components are cracked.
- Do not exceed the rated load limit of the unit.
- Do not make alterations or modifications to the unit.
- Do not remove or obscure warning labels.
- Install and operate this product only if it is technically in serviceable condition and in the correct manner.
- Read manual completely before use and keep this manual and all other relevant documents complete and accessible to personnel at all times.

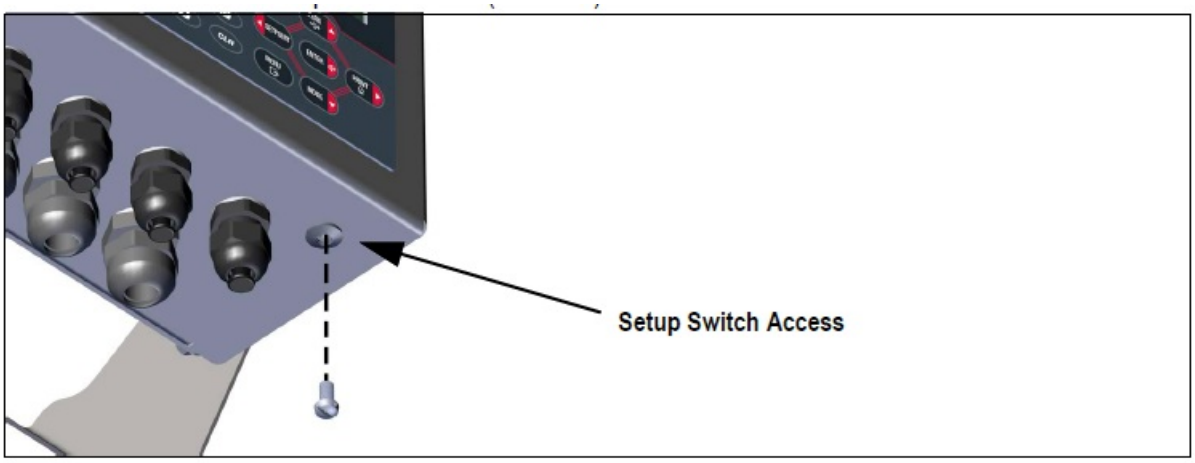
Accessing Setup Menu
During 882D indicator configuration there will be instances when access to the Setup Menu is required. The Setup Menu may be accessed on the 882D indicator in two ways:

- Pressing the setup switch
- Through the menu (if audit trail jumper is enabled)

Setup Switch Configuration Access
Perform the following to access the setup switch:

1. Use slotted screwdriver to remove the slotted screw.
2. Insert a non-conductive tool into the access hole to press the setup switch.

   IMPORTANT: Use caution when inserting the non-conductive too into the enclosure. Insert the tool about 3/4 inch, until the switch is engaged. Do not use excessive force which could damage the switch.
3. Reinstall slotted screw and torque to 15 in-lb (1.7 N-m).



User Menu Configuration Access

The 882D supports an Audit Trail jumper. If the jumper is set to ON, the Setup Menu is accessible through the front keypad. If set to OFF, the Setup Menu is not accessible, making it only accessible by pressing the setup switch.

1. If the audit trail jumper (JP4) is set to ON, Press PRINT Audit displays.
2. Press PRINT until Setup displays.

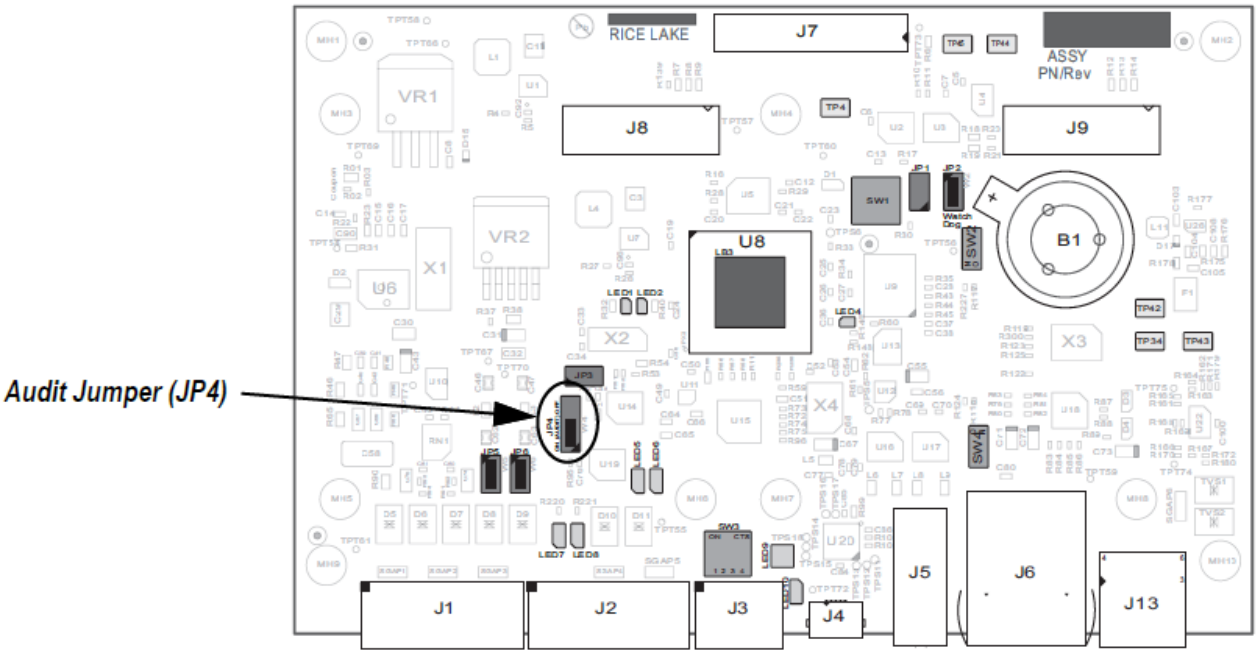


Figure 1-2. 882D CPU Board Audit Jumper (JP4)

Scale Configuration and Load Cell Wiring

- This section discuses 882D Scale Configuration parameters and load cell wiring.
- There are several Scale Configuration parameters that must be set on the 882D indicator in order for the BulkSlide solids flow meter to function properly. The majority of parameters are located in the Speed Sensing

and Weigh Frame Menus. For more information, see Section 2.1.

- Load cells must be wired to the indicator properly in order for the BulkSlide solids flow meter to function properly. In some cases wires must also be connected to an optional junction box and load cell. In addition the 882D indicator must be set to accept a 6 wire configuration from the load cell. For more information, see Section 2.2 on page 9.

Scale – Configuration Menu

Figure 2-1 and Table 2-1 illustrate and describe parameters in the Scale Configuration Menu that require configuration

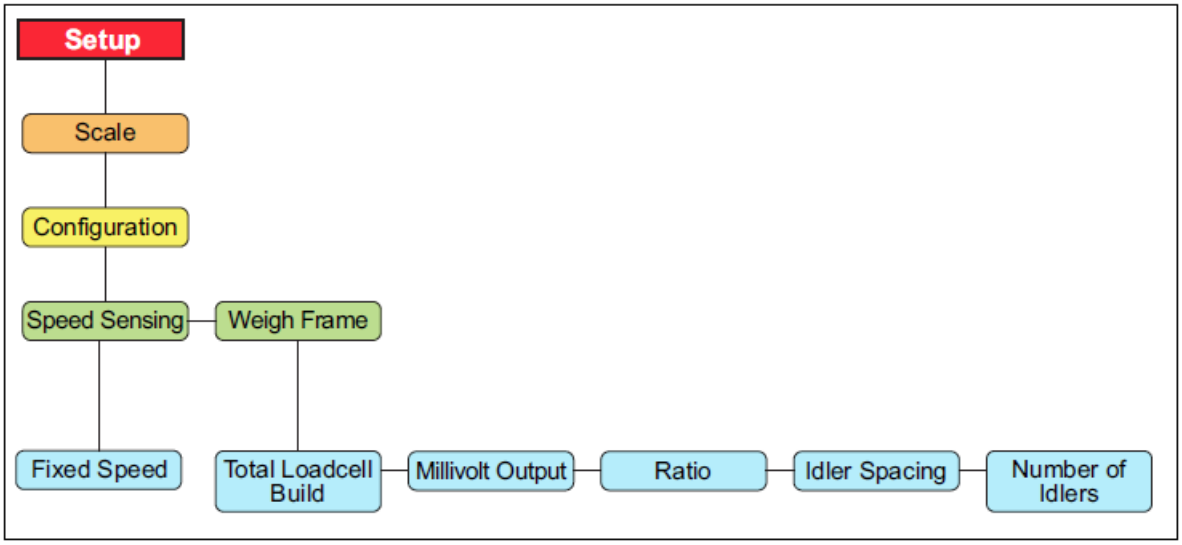


Figure 2-1. Scale – Configuration Menu

Parameter	Setting	Description
Speed Sensing	Fixed Speed	Specifies a fixed belt speed for the 882D (ft/min, m/s); If a non-zero value is e ntered the 882D will no longer calculate belt speed using the speed sensor; When using fixed speed there m ust also be a digital I/O configured and enabled as BELTRUNNING or the spe ed will be forced to 0; *Value range: 0.0-9999.0, 0.0 (default).* **Configure as 100 FPM or 1 ms**
Weigh Fram e	—	Settings related to the weigh frame
	Total Loadcell B uild	Defines the total capacity of all load cells in system (lb, kg). *Value range: 1.0-9 9999.0, 500.0 (default).* **Configure as capacity obtained from BulkSlide load cell, if two load cells are used, sum their capacities**
	Millivolt Output	Average mV/V rating of all load cells in the system; This is used for the theoretical calibration; Value must be greater than 0; *Value range: 0.1-4.5, 3.0 (default).* **Configure as measurement obtained from BulkSlide load cell, typically t his is 2 mV/V when using RL9018SS load cells**
	Ratio	The lever ratio for a pivoted weigh frame; The total load cell build is multiplied by the configured ratio to determine a working total load cell build value; *Value range: 0.0-9.999, 1.0 (de fault).* **Configure as 1**
	Idler Spacing	Spacing between the idlers used to determine weighing surface of belt scale (i n, m); *Value range: 0.01-9999.0, 48.0 (default).* **Configure as 12 inches**
	Number of Idlers	Number of idlers being used; *Value range: 1-4, 1 (default).* **Configure as 1**

Speed Sensing Configuration

1. Access Setup mode. For more information, see Section 1.2 on page 6.
2. Press MODE. *Scale* displays.
3. Press MODE. *Configuration* displays.
4. Press MODE. *Speed Sensing* displays.
5. Press MODE. *Pulse Input* displays.
6. Press PRINT until *Fixed Speed* displays.
7. Press MODE. The configured parameter displays.
8. Press SETPOINT, ZERO, MODE, and PRINT to configure value to 100 FPM (feet per minute) or 1 ms.
9. Press ENTER to accept the parameter. *Pulse Input* displays.
10. Press ZERO. *Speed Sensing* displays.
11. Press MENU to exit the menu. *Saved* briefly displays and indicator returns to Weigh Mode.

Weigh Frame Configuration

1. Access Setup mode. For more information, see Section 1.2 on page 6.
2. Press MODE. *Scale* displays.
3. Press MODE. *Configuration* displays.
4. Press MODE. *Speed Sensing* displays.
5. Press PRINT. *Weigh Frame* displays.
6. Press MODE. The *Total Loadcell Build* displays.
7. Press MODE. The *Total Loadcell Build value* displays.
8. Press SETPOINT, ZERO, MODE, and PRINT to configure value to total weight capacity of system.

NOTE: If two load cells are used, sum capacity of both load cells

9. Press ENTER to accept value. *Millivolt Output* displays.
10. Press MODE. The *Millivolt Output value* displays.
11. Press SETPOINT, ZERO, MODE, and PRINT to configure value in millivolts (mV).

NOTE: When using RL9018SS load cells, the millivolt value should be 2.0. Measure load cells for exact value, individual results may vary.

12. Press ENTER to the accept value. *Ratio* displays.
13. Press MODE. The *Ratio value* displays.
14. Press directional buttons to modify value to 1.
15. Press ENTER to accept value. *Idler Spacing* displays.

16. Press MODE. The *Idler Spacing value* displays.
17. Press directional buttons to modify value to 1.
18. Press ENTER to accept value. *Number of Idlers* displays.
19. Press MODE. The *Number of Idlers value* displays.
20. Press directional buttons to modify value to 1.
21. Press ENTER to accept value. *Total Loadcell Build* displays.
22. Press MENU to exit the menu. *Saved* briefly displays and indicator returns to Weigh Mode.
23. If required, reinstall the setup switch screw and torque to 15 in-lb (1.7 N-m).

Load Cell Wiring

The BulkSlide solids flow meter uses up to two RL9018SS load cells. RL9018SS load cells contain 6 wires for signal, sense and excitations transmission. This section discusses how to wire load cells in the BulkSlide solids flow meter.

Backplate Removal

Remove the backplate of the 882D to connect cables for installed option cards and to gain access to the display board, CPU board and power supply board.
WARNING: The 882D has no on/off switch. Before removing the backplate and opening the unit, ensure the power cord is disconnected from the power receptacle.

1. Place the 882D face-down on an anti-static work mat.
2. Remove the M4 nuts holding the backplate to the enclosure with a 7 mm socket or wrench.
3. Lift the backplate away from the enclosure. Disconnect the ground wire from the backplate by removing the M4 nut with a 7mm socket or wrench and set it aside.

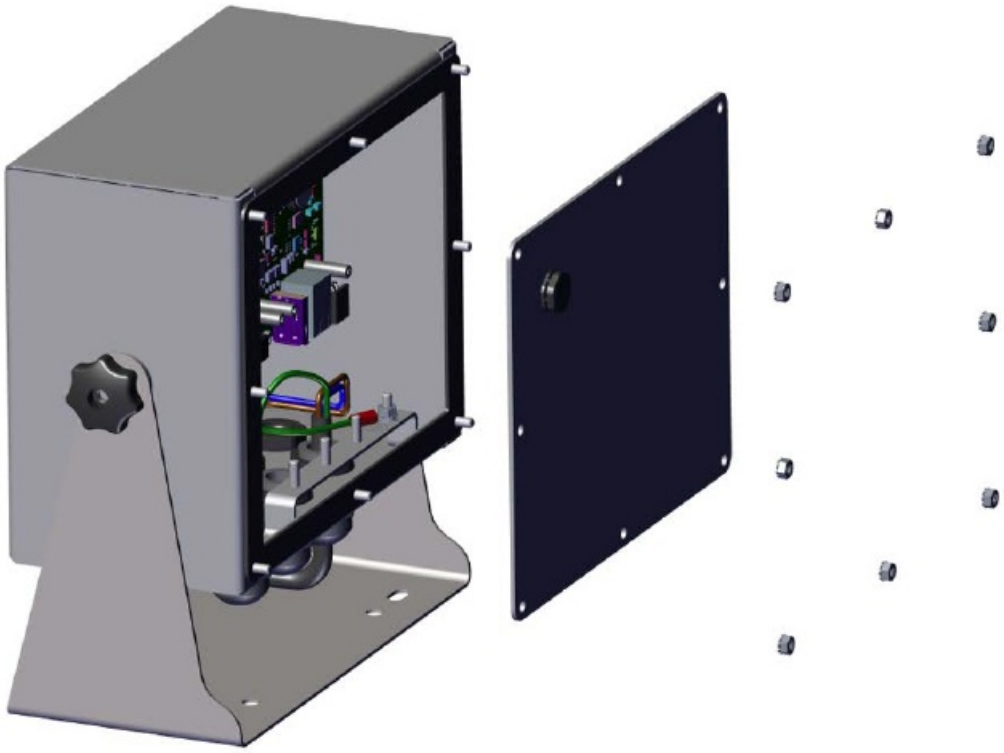


Figure 2-2. Removing the Backplate

Backplate Reinstallalation

Once cabling and grounding is complete (Section 2.2.4 on page 11, Section 2.2.5 on page 12, Section 2.2.6 on page 13 and Section 3.2 on page 15), reattach the backplate ground wire to the backplate. Position the backplate over the enclosure and install the eight backplate nuts. Use the torque pattern shown in Figure 2-3 to prevent distorting the backplate gasket. Torque nuts to 15 in-lb (1.7 N-m).

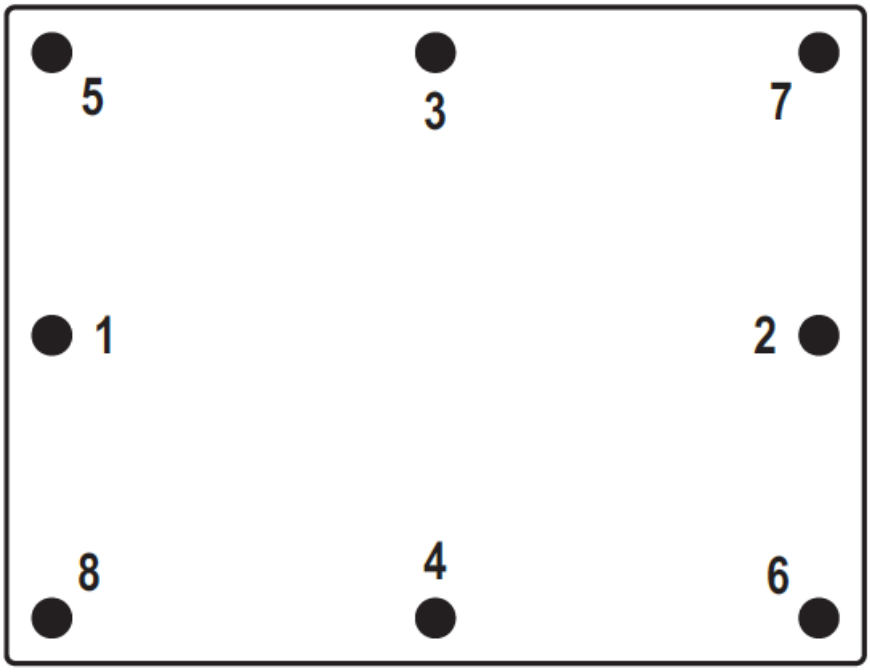


Figure 2-3. Torque Pattern

Cable Connections

The 882D has seven cord grips at the bottom of the enclosure, one is used for the power supply. The backplate

must be removed to make connections to the load cells, speed sensor, communications, digital inputs and digital outputs. Plugs must remain in all unused cord grips to prevent moisture and dust from entering the enclosure. Torque cord grip nuts to 33 in-lb (3.7 N-m).

WARNING: Power must be disconnected before servicing or installation. Failure to do so could result in electrical shock and damage to the CPU board.

IMPORTANT: Do not allow open/bare wires outside of the enclosure. Remove jumpers JP5 and JP6 for RL9018SS load cell 6-wire connections

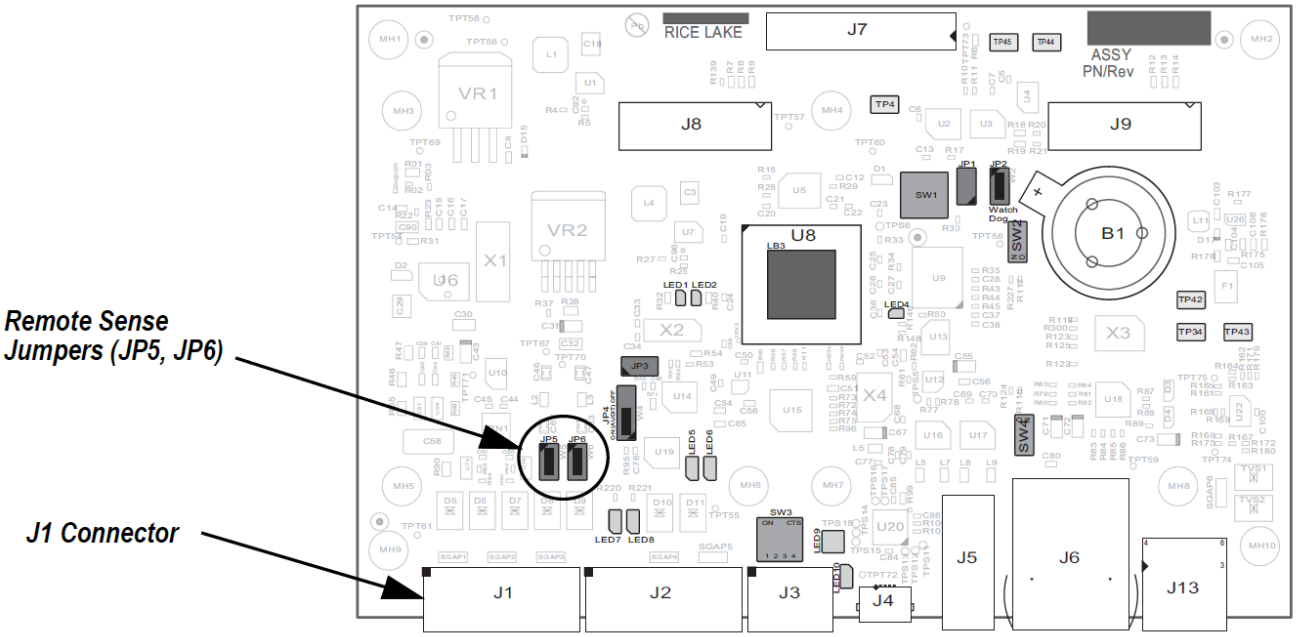
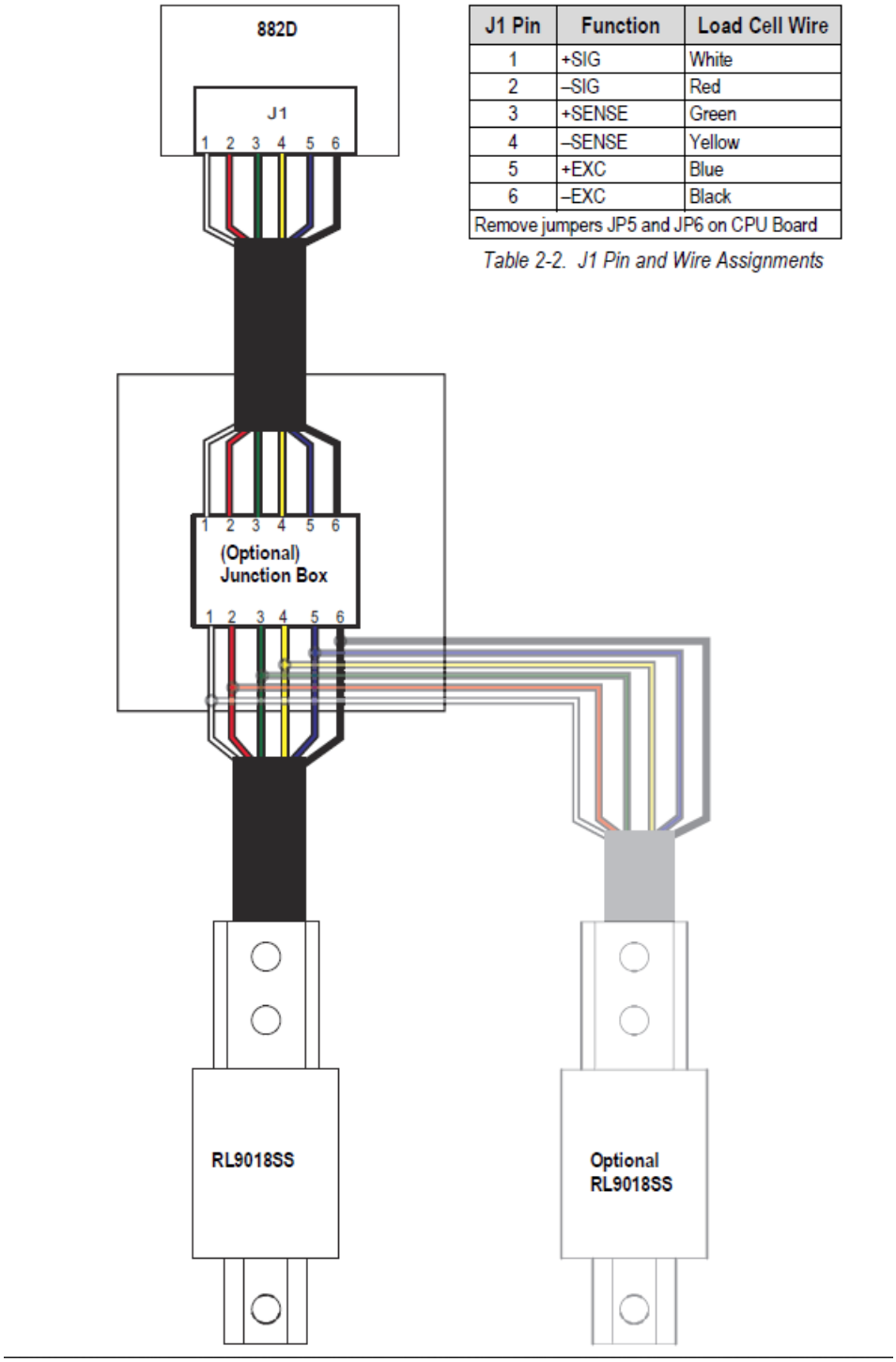


Figure 2-4. 882D CPU Board Jumpers

Load Cell Wiring Diagram

To attach the cable from a load cell or junction box, route cable to the J1 connector (Figure 2-4). Connector for the cable is included in the parts kit. Wire the load cell cable from the load cell or junction box to connector as shown in Table 2-1. Figure 2-5 illustrates J1 on the CPU Board connected to an RL9018SS load cell.



J1 Pin	Function	Load Cell Wire
1	+SIG	White
2	–SIG	Red
3	+SENSE	Green
4	–SENSE	Yellow
5	+EXC	Blue
6	–EXC	Black
Remove jumpers JP5 and JP6 on CPU Board		

Table 2-2. J1 Pin and Wire Assignments

Cable Shield Grounding

Except for the power cord, all cables routed through the cord grips must be shield grounded against the enclosure.

- Use hardware provided in the parts kit to install shielding clamps on the grounding studs at the bottom of the enclosure
- Install only the necessary amount of shielding clamps for the cord grips to be used; finger tighten nuts at this time
- Route cables through the cord grips and shielding clamps to determine the cable lengths required to reach the appropriate cable connectors
- Mark the cables to remove the insulated jackets and shielding as described in the next two sections

Foil Shielded Cable

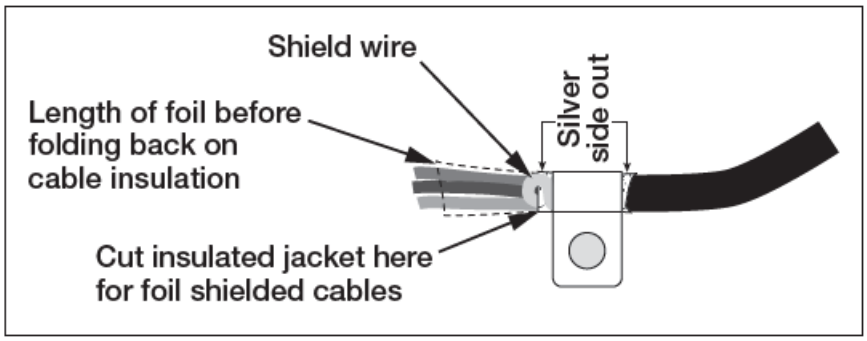


Figure 2-6. Foil Shielded Cable

1. Strip the insulated jacket and foil 1/2” (15 mm) past the shielding clamp.
2. Strip another 1/2” of the insulated jacket, leaving the foil shielding exposed.
3. Fold the foil shielding back on the cable where the cable passes through the clamp.
4. Ensure the silver (conductive) side of the foil is turned outward.
5. Wrap the shield wire around the cable so it contacts the foil where the cable passes through the clamp.
6. Torque the shielding clamp nut to 10 in-lb (1.13 N-m) so the clamp is around the cable and contacting the shield wire.

Braid Shielded Cable

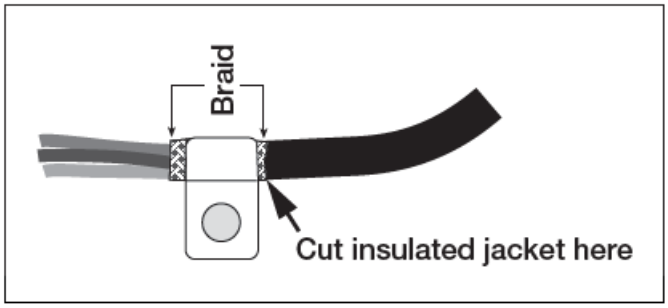


Figure 2-7. Braid Shielded Cable

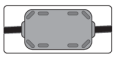
1. Strip the insulated jacket and braided shielding from a point just past the shielding clamp.
2. Strip another 1/2” (15 mm) of the insulated jacket, leaving the braid exposed where the cable passes through the clamp.
3. Tighten the shielding clamp nut

Power Cable Grounding

AC versions of the 882D are shipped with the AC power cable already installed and grounded to the enclosure. For DC versions of the 882D, use the following steps to ground and connect the DC power cable.

1. Run DC power cable (not included) through the cord grip (Figure 2-8).
2. One wire will be terminated (grounded) at a stud near the cord grip using the proper grounding stack. The backplate ground is already attached to a stud. Remove it so that the power cord ground can be on the bottom of the stack as represented in Figure 2-8. Torque nuts to 10 in-lb (1.13 N-m).
3. Run the other two wires toward the back of the enclosure and connect them to the three pin plug (included in the parts bag) that connects into the power supply board as shown in Figure 2-8 and Table 2-3.

Pin	AC	DC
1	N	+
2	Chassis GND	Chassis GND
3	L	–

 A ferrite core from the parts kit must be applied to the DC power cable within 1” of the cord grip.

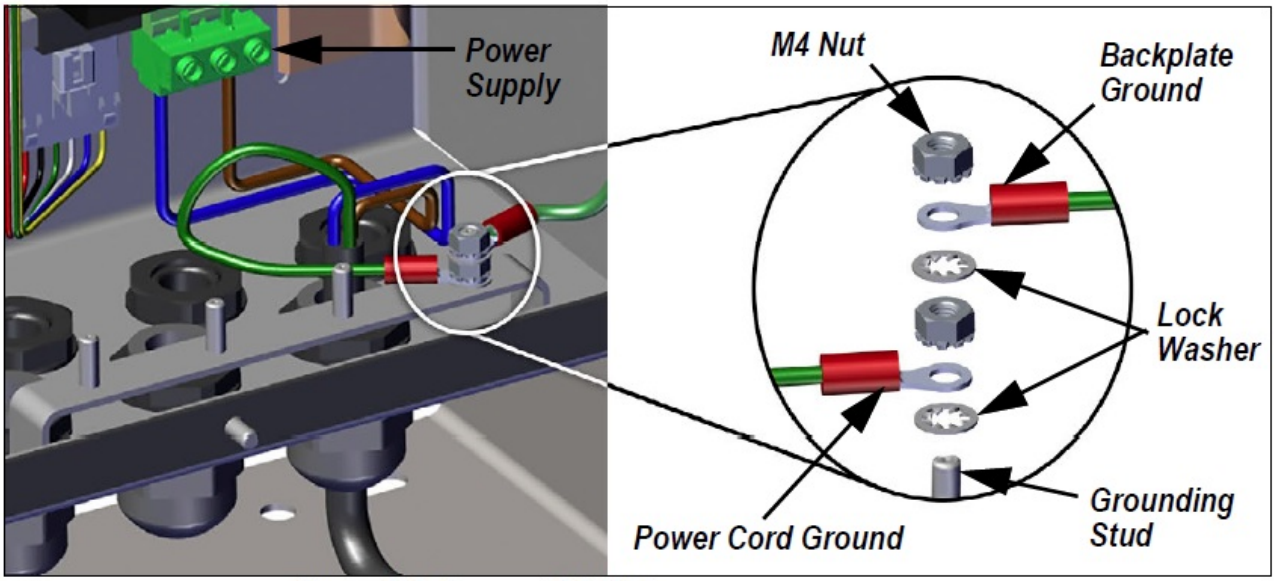


Figure 2-8. Connect DC Wiring

Digital I/O Configuration

This chapter discusses digital input and output (Digital I/O) configuration in the following topics:

- Configuring the 882D Digital I/O BELTRUNNING parameter (see Section 3.1)
- Wiring an input relay to the 882D indicator (see Section 3.2 on page 15)

Configuring Digital I/O Parameters

To properly utilize the fixed speed input, one of the digital inputs must be configured as a BELTRUNNING input. Figure 3-1 and Table 3-1 illustrate and describe parameters in the Digital I/O Menu that require configuration.

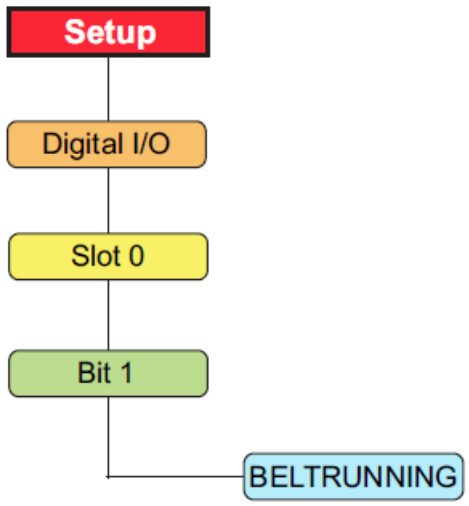


Figure 3-1. Setup – Digital I/O Menu

Parameter	Description
Slot 0	Select the bit to set the function; *Settings: Bit 1 – 4*
Slot 1	*Settings: Bit 1 – 24*
Slot 2	
Slot 0-2 submenu	
Bit n	BELTRUNNING — an input to tell the 882D the belt is running; if not configured, the belt is always considered running; must be configured if using Fixed Speed

Perform the following to set Bit 1 as BELTRUNNING

1. Access Setup mode. For more information, see Section 1.2 on page 6.
2. Press PRINT until *Digital I/O* displays.
3. Press MODE. *Slot 0* displays.
4. Press MODE. *Bit 1* displays.
5. Press MODE. The current parameter is displayed (the default configuration is *Off*).
6. Press PRINT until *BELTRUNNING* displays.
7. Press ENTER to accept the parameter configuration.
8. Press MENU to exit the menu.
9. If required, reinstall the setup switch screw and torque to 15 in-lb (1.7 N-m).

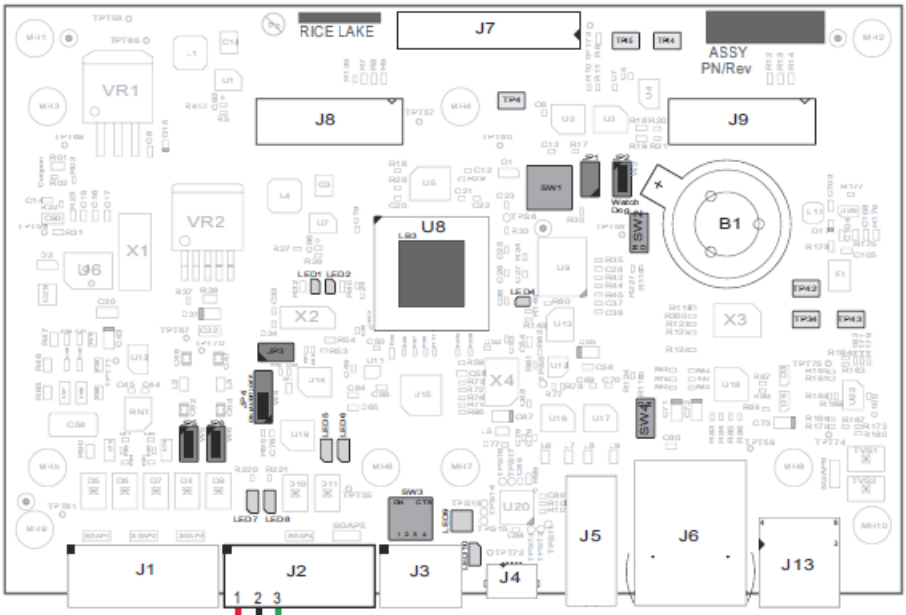
Wiring Input Relay

The digital input on the 882D must be wired to an optically isolated input relay which is connected to the material feeder of the BulkSlide solids flow meter. This is used with the BELTRUNNING input to prevent false totalization

values during no product conditions (see Section 3.1 on page 14).
NOTE: The appropriate input relay depends on what controls the feeder into the BulkSlide. AC or DC versions of input relays are available.

Figure 3-2 depicts two instances of wiring:

- From J2 on the 882D CPU Board (using first digital input) to an optically isolated relay
- From the optically isolated relay to material feeder controls



Connector	Pin	Signal
J2	1	5VDC, 500 mA max
	2	GND
	3	DIO1
	4	DIO2
	5	DIO3
	6	DIO4

Table 3-2. J2 Pin Assignments (Digital I/O)

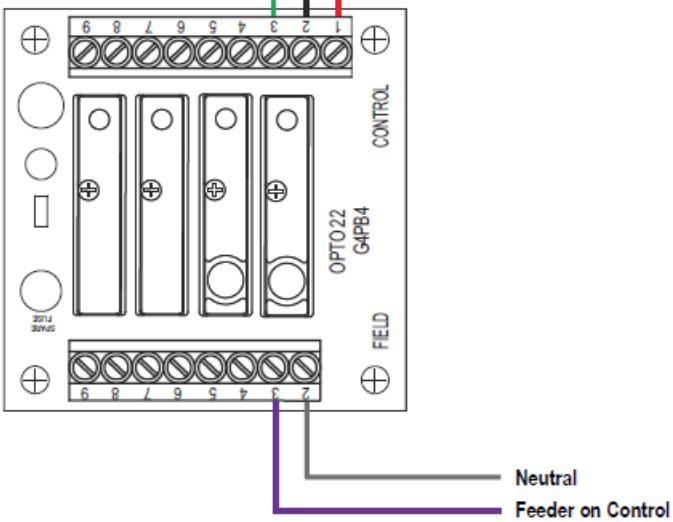


Figure 3-2. Digital Input Wiring

NOTE: If a jumper is wired in Digital I/O pins, tons per hour (TPH) calculation may be incorrect

Calibration

Before putting the machine in service it is important to perform calibration to ensure the it provides accurate readings. This section discusses three types of calibration:

- Static Zero Calibration (see Section 4.1.1)
- Material Calibration (see Section 4.1.2 on page 17)

- Calculating Correction Factor (see Section 4.1.3 on page 18)

Weigh Frame Calibration

Figure 4-1 displays navigation paths of how to access Static Zero Calibration, Material Weight Calibration and Linearization Correction Factor 1

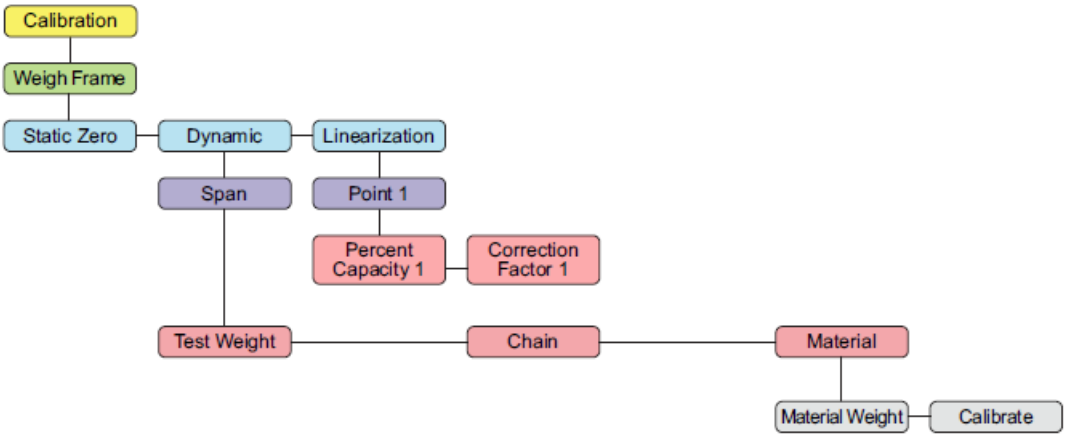


Figure 4-1. Weigh Frame Calibration Menu

Static Zero Calibration

The static zero calibration is based on four seconds of A/D readings. Perform the following to complete a static zero calibration

1. Access Setup mode. For more information, see Section 1.2 on page 6.
2. Press MODE. *Scale* displays.
3. Press MODE. *Configuration* displays.
4. Press MODE. *Speed Sensing* displays.
5. Press PRINT Ω. *Weigh Frame* displays.
6. Press MODE. *Static Zero* displays.
7. Press MODE. *Press Start to Begin* displays.
8. Ensure that there is no material being fed.
9. Press F1 START to initiate the calibration sequence. *Calibrating...* displays on the upper messaging line and a bar graph on the bottom line displays the progress of the calibration.

NOTE: Once "Press Start to Begin" displays, pressing MENU is the only way to cancel.

10. After the calibration is complete *Static Zero* displays again. Press MENU to return to the weigh mode.

Span (Material) Calibration

A span calibration should be performed using a material comparison test. A known amount of material can be delivered through the BulkSlide or material can be collected and weighed after being delivered through the BulkSlide. Multiple tests should be performed before making adjustments to ensure the system is repeatable. Use this method to calibrate the scale with a known amount of material. The material must be pre weighed or post weighed.

Perform the following to complete a material calibration:

1. Access Setup mode. For more information, see Section 1.2 on page 6.
2. Press MODE. *Scale* displays.
3. Press MODE. *Configuration* displays.
4. Press MODE. *Speed Sensing* displays.
5. Press PRINT. *Weigh Frame* displays.
6. Press MODE. *Static Zero* displays.
7. Press PRINT to scroll to *Dynamic*.
8. Press MODE. *Span* displays.
9. Press MODE. *Test Weight* displays.
10. Press PRINT to scroll to *Material*.
11. Press MODE. *Material Weight* displays.
12. Press PRINT. *Calibrate* displays.
13. Press MODE. *Press Start to Begin* displays.

NOTE: The pre or post weighed material weight is entered in Step 16.

14. Press F1 START. The 882D starts recording span averages.

- Displays: *Calibrating...*
  Run Time: XX:XX
- The weight being totalized during calibration displays in the numeric area at x10 resolution.
- Total annunciator is lit, but 1 and 2 are not.

15. Once the material has processed through the BulkSlide solids flow meter, press F2 STOP to end the sequence.
16. The 882D prompts for the amount of material in tons with the previously entered value as a default starting point.
17. Press ENTER to accept the default value.

    Or, use the keypad to enter a new value and press ENTER. The new value is saved to configuration.

NOTE: Pressing MENU aborts the calibration.

18. The 882D displays the previous error, the current error and prompts to accept or reject the calibration. *Enter Key To Accept* displays on the bottom line of the messaging area.
19. Press ENTER. *ACCEPTED* displays, the error and the new span value is stored.

    Or, press MENU to reject the calibration. *REJECTED* displays.

NOTE: The pre or post weighed material weight is entered in Step 16.

Calculating Correction Factor

When calculating the correction factor mathematically the value is entered under Linearization Point 1. A span calibration clears existing linearization points and populates Point 1 by setting Percent Capacity 1 to 100.0 and creating a value for Correction Factor 1.

The Correction Factor can be calculated as follows:

- (Actual Weight / Registered Weight) * Current Correction Factor
- Actual Weight is the real weight of material on the scale in tons
- Registered Weight is the measured weight of material the 882D totalizer shows in tons or pounds
- The Current Correction Factor value is created by the previously run Span Calibration

Perform the following to set Linear Point 1:

1. Access Setup mode. For more information, see Section 1.2 on page 6.
2. Press MODE. *Scale* displays.
3. Press MODE. *Configuration* displays.
4. Press MODE. *Speed Sensing* displays.
5. Press PRINT. *Weigh Frame* displays.
6. Press MODE. *Static Zero* displays.
7. Press PRINT to scroll to *Linearization*.
8. Press MODE. *Point 1* displays.
9. Press MODE. *Percent Capacity X* displays.

NOTE: A span calibration (Section 4.1.2 on page 17) populates the Correction Factor 1 percentage value for Point 1.

10. Press MODE. The current percent capacity for the point displays.
11. Enter a new percent capacity value for the point with the keypad, if necessary.
12. Press ENTER. *Correction Factor 1* displays.
13. Press MODE. The current correction Factor value for the point displays.
14. Enter a new correction Factor value for the point with the keypad, if necessary.
15. Press ENTER. *Percent Capacity 1* displays again.
16. Press MENU to return to weigh mode.

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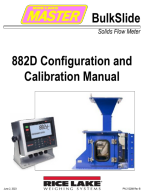
Documents / Resources

	**RICE LAKE 882D BulkSlide Solids Flow Meter** [pdf] User Manual 882D, BulkSlide Solids Flow Meter, 882D BulkSlide Solids Flow Meter, Solids Flow Meter, Flow Meter, Meter

References

- Rice Lake Weighing Systems
- Manuals | Rice Lake Weighing Systems
- Training | Rice Lake Weighing Systems
- Warranties
- Videos and Webinars | Rice Lake Weighing Systems
- Rice Lake Weighing Systems
- Rice Lake Weighing Systems
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