TuffSeal®

Light to Mid-Range Capacity Junction Box
JB4ES/JB4SS/JB4EP/JB4EPT/JB4SP/JB4SPT

Installation Manual

February 27, 2025

RICE LAKE WEIGHING SYSTEMS

PN 184803 Rev E

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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

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

Revision	Date	Description
–	July 24, 2017	The TuffSeal manual, part number 91909, has been updated to 184803
A	January 29, 2020	Revision history established after Rev A
B	June 7, 2022	Added information on new mid-range junction box
C	September 15, 2023	Added information on board installation
D	November 10, 2023	Added diagrams in appendix
E	February 27, 2025	Added JB4SPT and JB4EPT; updated diagrams

Table i. Revision Letter History

Contents

1.0 Introduction

The TuffSeal® series are excitation or signal trim junction boxes that can accommodate two, three or four load cells. Primarily used in floor and hopper scales, each model also has the capability to extend to more than four load cells using an excitation connector.

All models have a new Prevent® breather vent, which inhibits the buildup of pressure caused by sudden temperature or environmental changes. It must be changed every six months to a year, it does become dirty over time. When correctly installed and torqued to 10 lb/in, all models can withstand 900 PSI water pressure.

All terminals function properly without modification. However, load cell output can be individually trimmed with potentiometers which is further explained in Section 4.0 on page 14 of this manual.

NOTE: The TuffSeal manual, part number 91909, has been updated to 184803 effective July 24, 2017.

Figure 1-1. Junction Boxes

Manuals and additional resources are available on 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 Model Designations

The TuffSeal junction box comes in several different models including stainless steel for the small junction box and Fiberglass Reinforced Polyester (FRP) or polycarbonate enclosures for the mid-range junction box. Some models are FM Approved. Applications vary from use in floor scales to hoppers so selection can vary from a light to a mid-range capacity junction box.

1.2 Special Conditions of Use

WARNING: Electrostatic Charging Hazard – Clean junction box enclosure with a damp cloth only.

This equipment was examined and approved for connection to a single Indicator only.

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 indicator enclosure. These procedures are to be performed by qualified service personnel only.

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

Do not operate without all shields and guards in place.

Do not step on the unit.

Do not jump up and down on the scale.

Do not use for purposes other then weight taking.

Do not place fingers into slots or possible pinch points.

Do not use load bearing components worn beyond 5% of the original dimension.

Do not use this product if any component is 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.

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

Keep hands, feet and loose clothing away from moving parts.

2.0 Mounting Procedure

The TuffSeal junction boxes come in two sizes:

- 4-Channel small enclosure (JB4ES and JB4SS)
- 4-Channel mid-range FRP enclosure (JB4EP JB4SP)
- 4-Channel mid-range FRP or polycarbonate enclosure (JB4SPT and JB4EPT)

Mount junction boxes in a location that is convenient for servicing and away from standing water. Ensure to use the supplied cable, do not cut the cable.

IMPORTANT: Load cell output is temperature compensated for the supplied cable length. Altering the length can change the cell's signal output.

2.1 Small Junction Boxes (JB4ES and JB4SS)

Depending on the mounting surface, the JB4ES and JB4SS enclosure can be attached using two pan-head screws, bolts, or other suitable fasteners (not included).

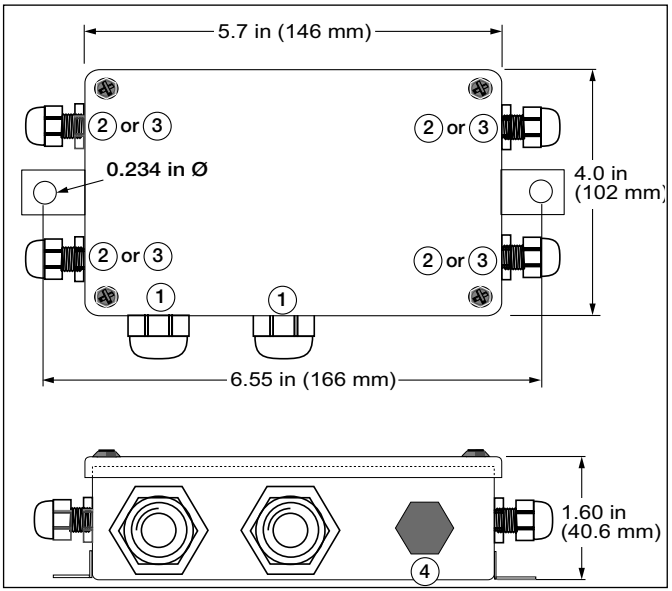


Figure 2-1. JB4ES and JB4SS Enclosure Dimensions

Item No.	Description	Qty
1	SL-11, PG-11 Cord Grips, Cable Diameter 0.197 - 0.394 in	2
2	SL-7, PG-9 Cord Grips, Cable Diameter 0.118 - 0.255 in	4
3	SL-7, PG-7 Cord Grips, Cable Diameter 0.138 - 0.315 in	4
4	Breather Vent	1

Table 2-1. JB4ES and JB4SS Enclosures

2.2 Mid-Range Junction Boxes (JB4EP and JB4SP)

Depending on the mounting surface, the JB4EP and JB4SP enclosure can be attached using four pan-head screws, bolts or other suitable masonry fasteners.

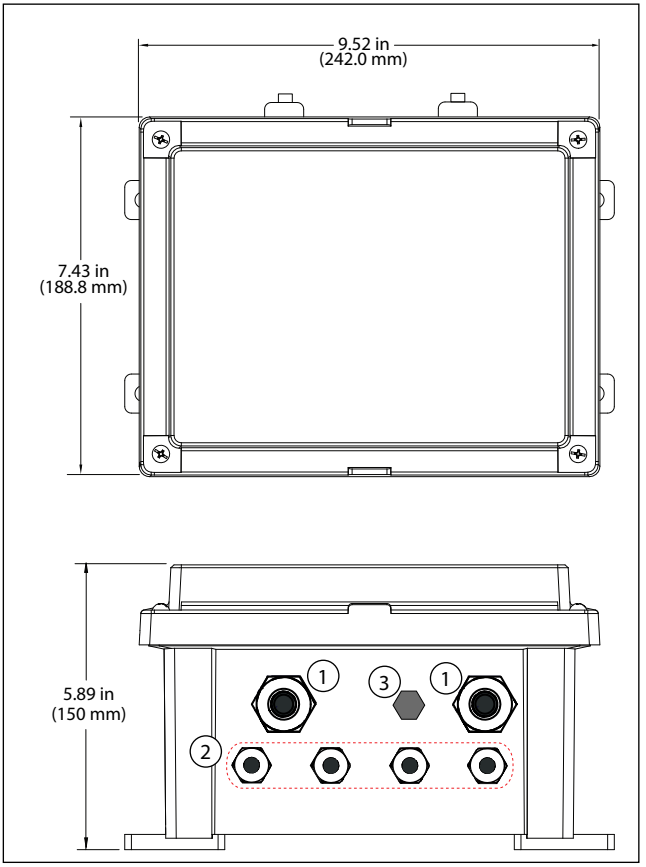


Figure 2-2. JB4EP and JP4SP Enclosure Dimensions

Item No.	Description	Qty
1	SL-11, PG-11 Cord Grips, Cable Diameter 0.197 - 0.394 in	2
2	SL-7, PG-9 Cord Grips, Cable Diameter 0.118 - 0.255 in	4
3	Breather Vent	1

Table 2-2. JB4EP and JB4SP Enclosures

2.3 Mid-Range Junction Boxes (JB4SPT and JB4EPT)

Depending on the mounting surface, the JB4SPT and JB4EPT enclosure can be attached using four pan-head screws, bolts or other suitable masonry fasteners.

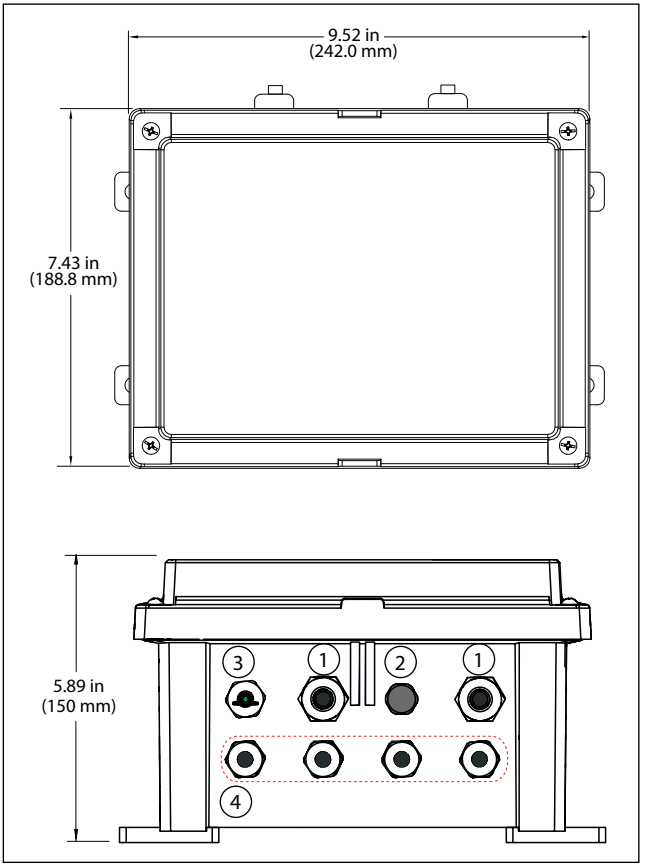


Figure 2-3. JB4EP and JP4SP Enclosure Dimensions

Item No.	Description	Qty
1	SL-11, PG-11 Cord Grips, Cable Diameter 0.197 - 0.394 in	2
2	Breather Vent	4
3	SL-7, PG-9 Cord Grips, Cable Diameter 0.118 - 0.255 in with Ground Wire Connector	1
4	SL-7, PG-9 Cord Grips, Cable Diameter 0.118 - 0.255 in	4

Table 2-3. JB4SPT and JB4EPT Enclosures

3.0 Junction Box Wiring

3.1 Connect Load Cells

All TuffSeal junction box models connect and trim up to four load cells per board.

It is possible to use this junction box with other combinations. Use the expansion port on the main board to connect to transient boards or multiple junction boxes in series to accommodate applications that have more than four load cells.

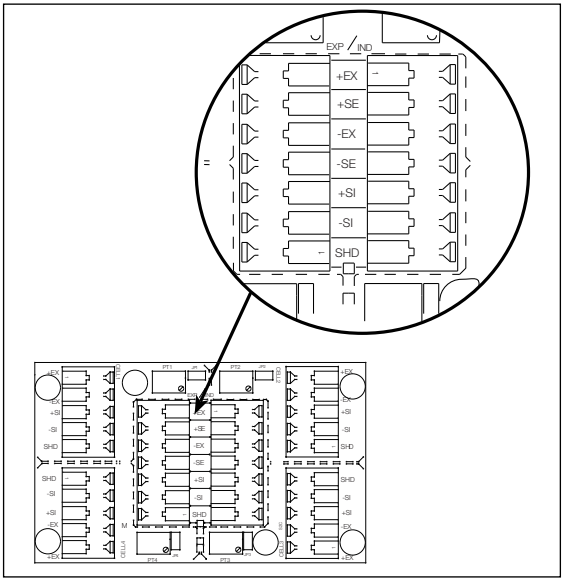


Figure 3-1. Expansion Port Wiring Location

1. Determine the wiring pattern to be used.
2. Route the load cell cables through the cord grips, do not tighten the grips.
3. Strip the wire insulation back 1/4 inch to expose the wire.
4. Push in and hold the quick-connect lever with a small screwdriver.
5. Insert the appropriate wire into the exposed wire opening.
6. Release the screwdriver to allow the spring-loaded gate to close and lock the wire in place.

NOTE: The spring-loaded terminals accommodate 12-28 gauge wire.

3.2 Connect Indicator

The indicator terminal strip is used to connect the main cable to the indicator.

1. Determine the indicator's load cell input connections from the indicator manual.
2. Run a cable from the indicator terminal into the junction box through the cord grip.

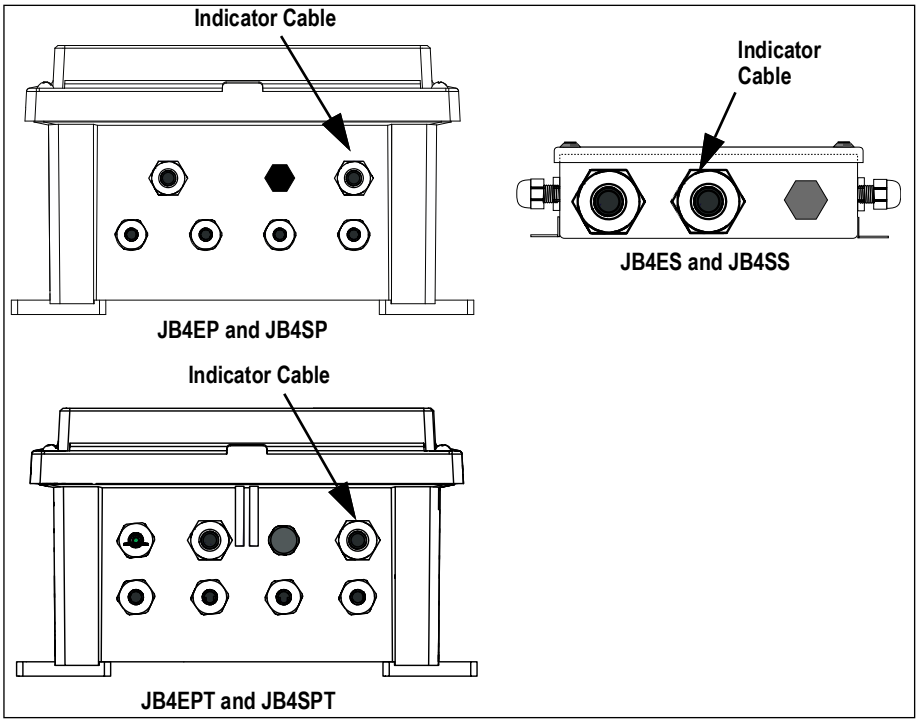


Figure 3-2. Indicator Cable Location

3. Strip the wire insulation back 1/4 inch to expose the wire.
4. Push in and hold the quick-connect lever with a small screwdriver.
5. Insert the appropriate wire into the exposed wire opening.
6. Release the screwdriver to allow the spring-loaded gate to close and lock the wire in place.

IMPORTANT: If cables can be exposed to liquids, bend a downward loop in all cables near the cord grips so fluids draining down the cables drip off before reaching the junction box.

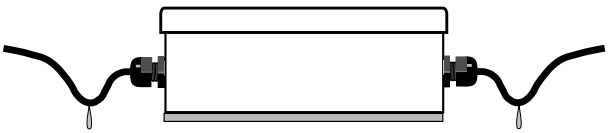


Figure 3-3. Drip Loop Cable

3.3 Connect Transient Protection Board

JB4SPT (92762)/JB4EPT (92763) junction boxes include a transient protection board that protects load cells from voltage transients. The transient protection board connects to the expansion port on the 4 Channel Load Cell Junction Box Board as follows:

Transient Protector Board Arc 2 Connector	4 Channel Load Cell Junction Box Board Expansion Connection
1	+ Excitation
2	- Excitation
3	+ Signal
4	- Signal

Table 3-1. Transient Protection and 4 Channel Junction Box Board Connections

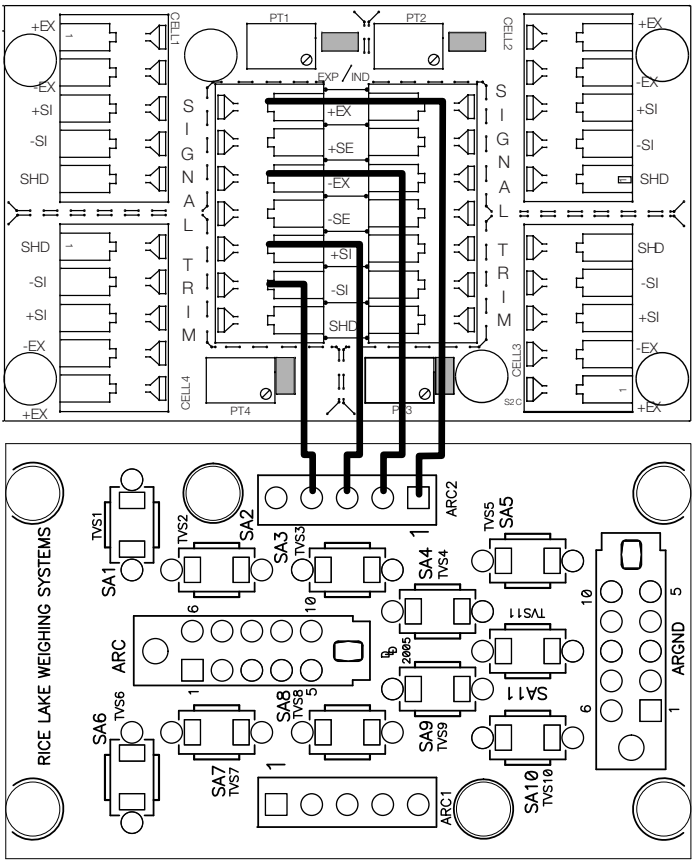
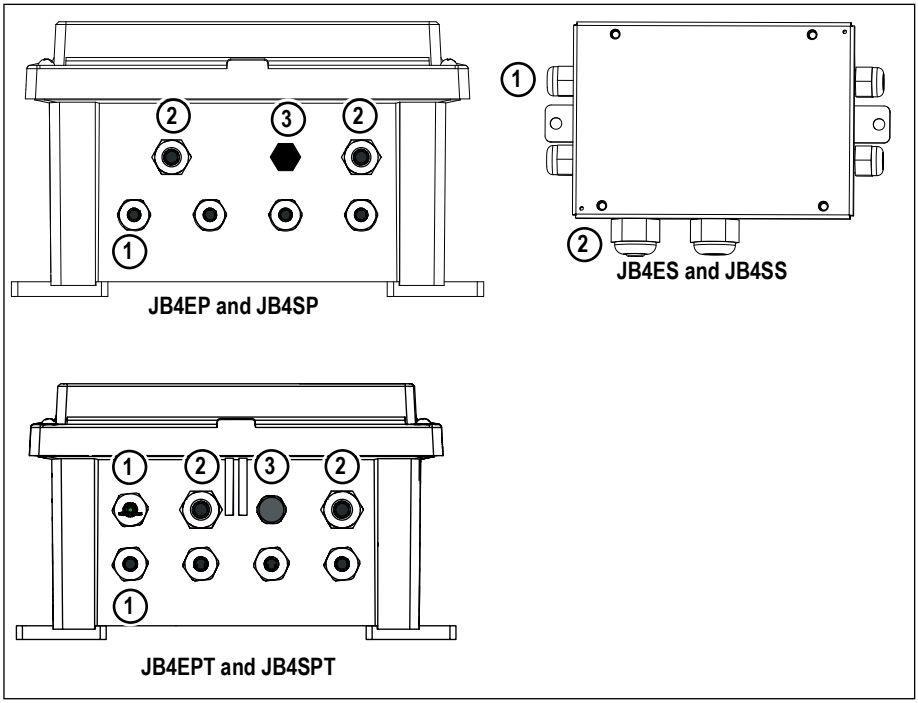


Figure 3-4. Transient Protection and 4 Channel Junction Box Board Connected

3.4 Torque Cord Grips and Breather Vent

1. After cable connections are made, pull excess cable out of the enclosure.
2. Tighten the cord grip assemblies with a torque wrench.
3. Plug unused cord grips o prevent moisture entry.

IMPORTANT: See the Electronic Replacement Parts and Components catalog to order extra cord grip hole plugs.



Element	Description	Torque Specification
1	PG7 (only JB4ES and JB4SS) or PG9 Cord Grip	22 in-lb
2	PG11 Cord Grip	33 in-lb
3	Breather Vent	10 in-lb

Table 3-2. Cable Grip and Breather Vent Torque Specifications

4.0 Trimming Procedure

Trimming is a process of equalizing the output from multiple individual load cells. If needed, load cell output can be individually trimmed with potentiometers.

If more than 5% of normal output needs to be trimmed to equalize output, check for other possible problems. When all errors except cell mismatch and cable extensions or reductions have been corrected, continue with the trimming.

4.1 Excitation Board Trimming (JB4ES, JB4EP and JB4EPT)

Use the following steps to properly trim the JB4ES and JB4EP junction boxes.

1. Determine the number of load cells needed.
2. Remove the jumpers to enable trimming of each load cell in use.
3. Set all potentiometers fully clockwise to give maximum signal output from each load cell.

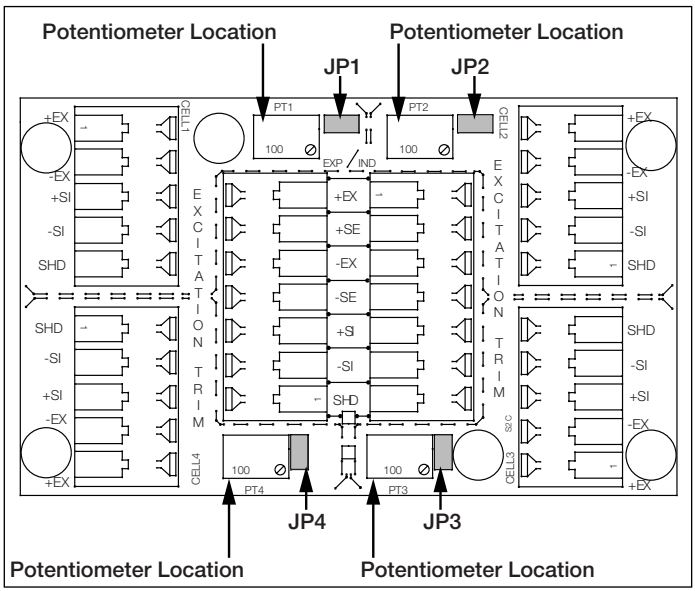


Figure 4-1. Excitation Main Board

4. Zero the indicator.
5. Place calibrated test weights over each load cell. The amount of test weights to be used depends on the scale configuration.

NOTE: Refer to Handbook 44 Field Manual, published by NIST (National Institute of Standards and Technology, for weight recommendations. For a four cell platform, it's 25% of scale capacity is recommended.

6. Record the value displayed on the indicator once test weight is placed on each corner, directly over the load cell. Do not allow weight to overhang the sides.
7. Allow the scale to return to zero each time to check for friction or other mechanical problems.
8. Select the load cell with the lowest value as the reference load cell. This load cell will not be trimmed.
9. Place the same test load over one of the other load cells.
10. Use the corresponding potentiometer to trim the load cell equal to the reference load cell.
11. Repeat Steps 9 and 10 until all remaining load cells have been trimmed.
12. Once trimming is complete, check all loads cells again for repeatability. If necessary, repeat Steps 4 through 11.
13. Place the supplied desiccant filter it in the junction box.
14. Replace the cover and tighten the screws in an alternating pattern to be certain the gasket is compressed equally in all locations.

IMPORTANT: Inspect the desiccant during normal service and change the desiccant as needed.

4.2 Signal Board Trimming Procedure (JB4SS, JB4SP and JB4SPT)

Use the following steps to properly trim the JB4SS and JB4SP junction boxes.

1. Determine the number of load cells needed.
2. Ensure jumpers are in place to enable trimming the load cells. Remove jumpers for unused cells.
3. Set all potentiometers fully clockwise to give maximum signal output from each cell.

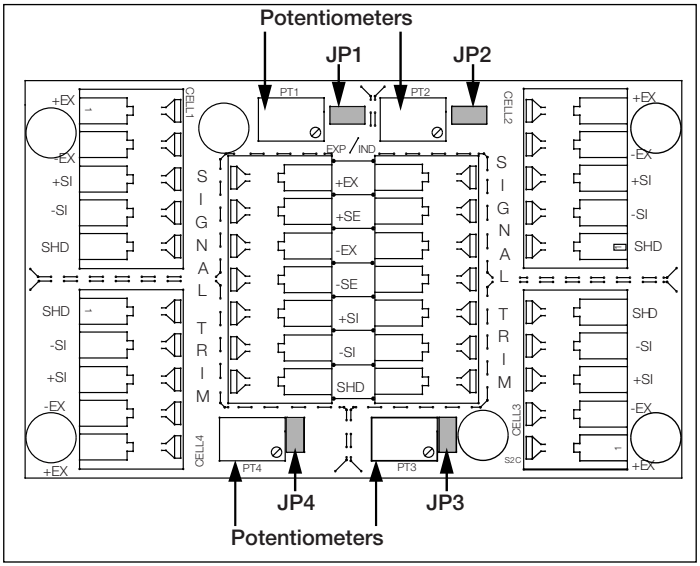


Figure 4-2. Signal Trim Main Board

4. Zero the indicator.
5. Place calibrated test weights over each load cell in turn. The amount of test weights to be used will depend on the scale configuration.

NOTE: Refer to Handbook 44 Field Manual, published by NIST (National Institute of Standards and Technology, for weight recommendations. For a four cell platform, it's 25% of scale capacity is recommended.

6. Record the value displayed on the indicator once test weight is placed on each corner, directly over the load cell. Do not allow weight to overhang the sides.
7. Allow the scale to return to zero each time to check for friction or other mechanical problems.
8. Select the load cell which has the lowest value as the reference point. This cell will not be trimmed.
9. Place the same test load over one of the other load cells.
10. Use the corresponding potentiometer to trim the load cell equal to the reference load cell.

11. Repeat Steps 9 and 10 until all remaining load cells have been trimmed.
12. Once trimming is complete, check all loads cells again for repeatability. If necessary, repeat Steps 4 through 11.
13. Place the supplied desiccant filter it in the junction box.
14. Replace the cover and tighten the screws in an alternating pattern to be certain the gasket is compressed equally in all locations.

IMPORTANT: Inspect the desiccant during normal service and change the desiccant as needed.

5.0 Board Installation

The 4 channel board is used in many Rice Lake Weighing systems products and is FM approved. Use this document when replacing the board in existing product.

WARNING: Some procedures described in this manual require work inside the product. These procedures are to be performed by qualified service personnel only.

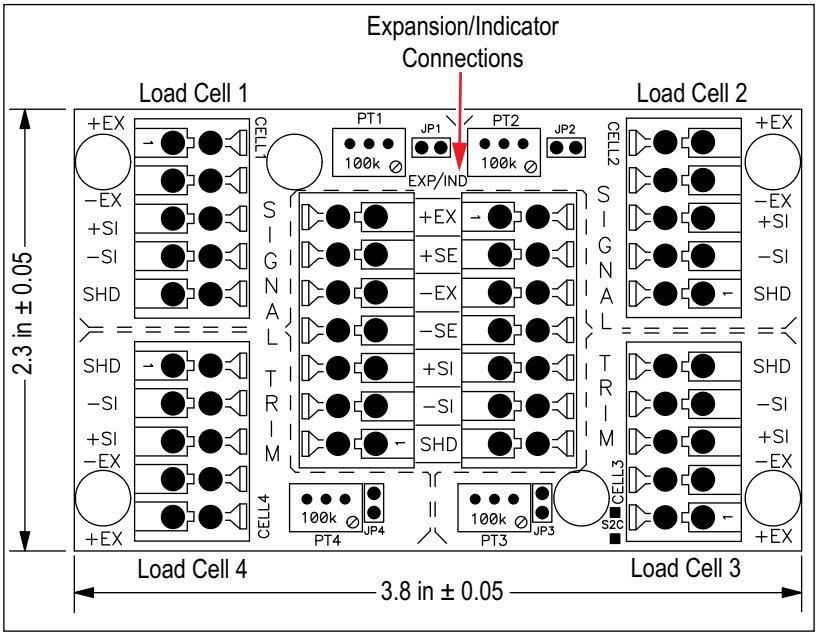


Figure 5-1. 4 Channel Junction Box Board

5.1 Installation

To replace the board in existing product, follow these steps:

1. Open the product and locate the current 4-channel board.
2. Record the wiring configuration of the current board.
3. Remove the wiring from the board.
4. Loosen mounting screws and remove the board from the product.
5. Install the new board and secure with mounting hardware.
6. Reinstall the wiring as noted in Step 2.
7. Close the product.

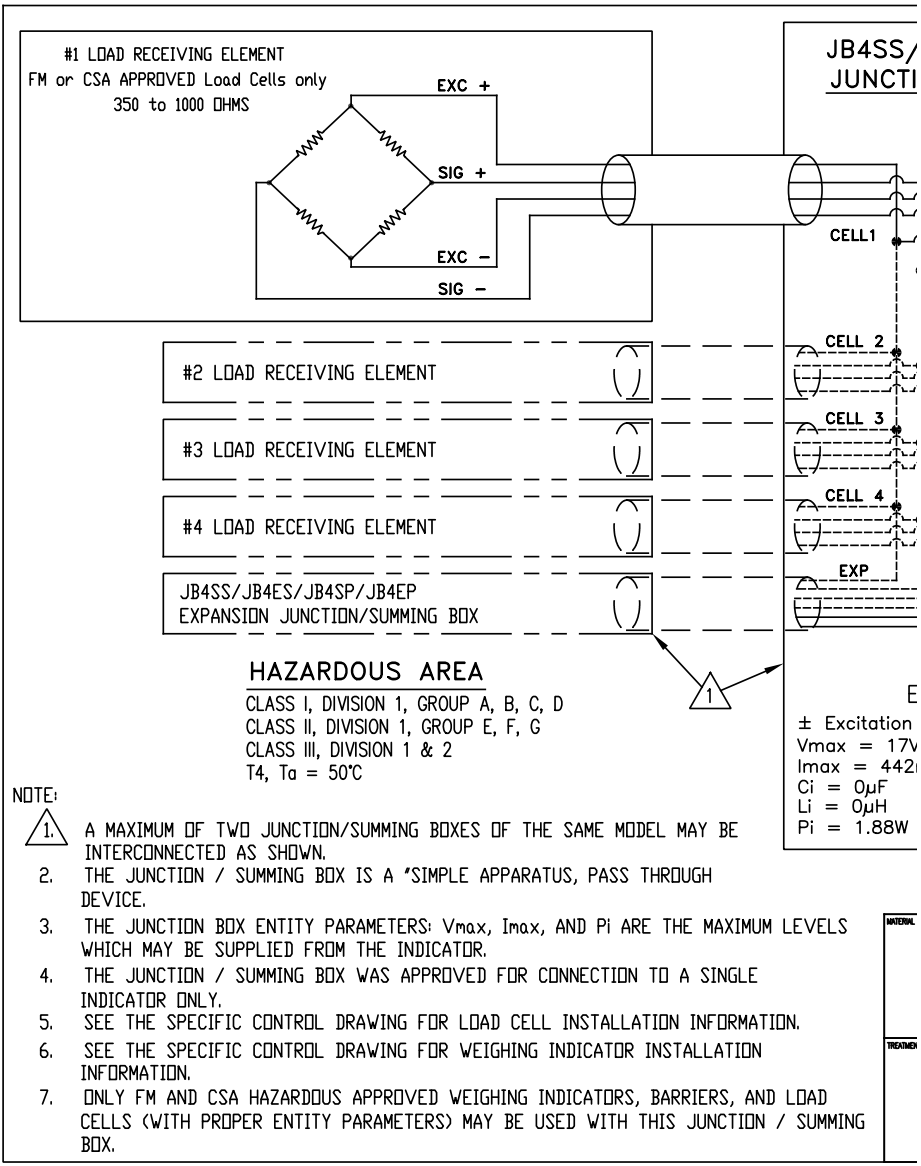
Refer to the product manual for additional information.

5.2 Special Conditions of Use

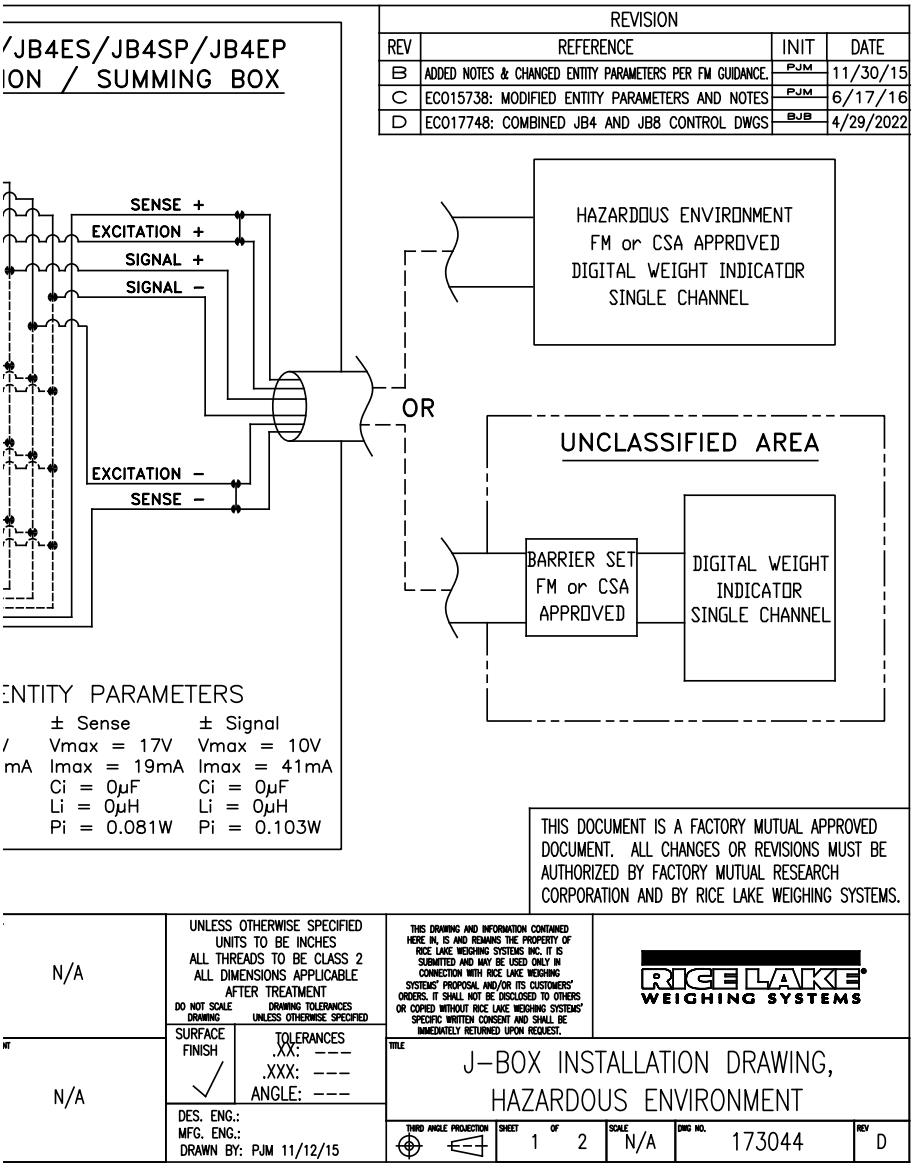
- Clean the product enclosure with a damp cloth only - Electrostatic Charging Hazard.
- This equipment was examined and approved for connection to a single Indicator only.

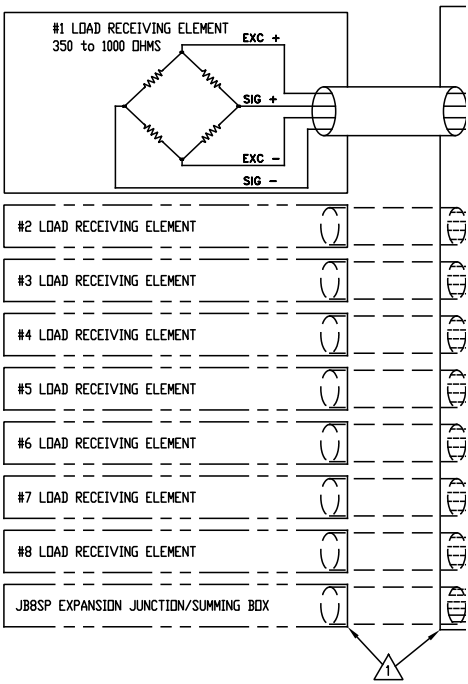
5.3 Wiring Diagrams (See next page)

IMPORTANT: The drawings on the following pages apply to J4BSS, JB4ES, JB4SP and JB4EP junction boxes.



NOTE: For full sized version of 173044 J-Box Drawing, see our website linked below.





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NOTE:

1. A MAXIMUM OF TWO JUNCTION/SUMMING BOXES OF THE SAME MODEL MAY BE INTERCONNECTED AS SHOWN.
2. THE JUNCTION / SUMMING BOX IS A "SIMPLE APPARATUS, PASS THROUGH DEVICE.
3. THE JUNCTION BOX ENTITY PARAMETERS: Vmax, Imax, AND Pi ARE THE MAXIMUM LEVELS WHICH MAY BE SUPPLIED FROM THE INDICATOR.
4. THE JUNCTION / SUMMING BOX WAS APPROVED FOR CONNECTION TO A SINGLE INDICATOR ONLY.
5. SEE THE SPECIFIC CONTROL DRAWING FOR LOAD CELL INSTALLATION INFORMATION.
6. SEE THE SPECIFIC CONTROL DRAWING FOR WEIGHING INDICATOR INSTALLATION INFORMATION.
7. ONLY FM AND CSA HAZARDOUS APPROVED WEIGHING INDICATORS, BARRIERS, AND LOAD CELLS (WITH PROPER ENTITY PARAMETERS) MAY BE USED WITH THIS JUNCTION / SUMMING BOX.

REVISION			
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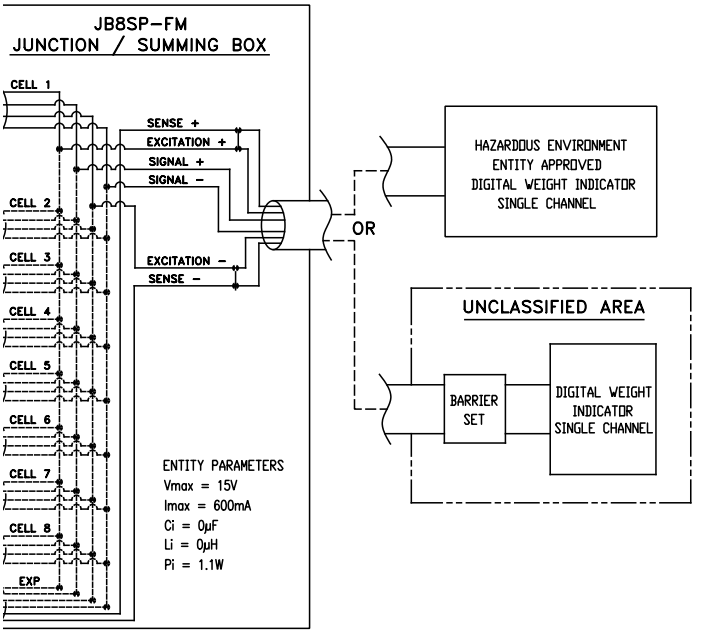
—	SEE SHEET 1	—	—



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I, DIVISION 1, GROUP A, B, C, D
II, DIVISION 1, GROUP E, F, G
III, DIVISION 1 & 2
I, II, III, DIVISION 2 G: ABCDEFG
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