RoughDeck® CC

Caster Cargo Scale with EZ Mount Load Cell Kits and a TuffSeal® Junction Box

Installation Manual

September 20, 2021

RICE LAKE WEIGHING SYSTEMS

PN 203881 Rev B

Contents

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1.0 Introduction

The installation should be planned by a qualified structural engineer.

Each installation is unique, this manual is meant to serve as a general guideline for installation.

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**

The RoughDeck CC Caster Cargo Scale has a 20,000 lb capacity with a powder coat surface for durability. Load and unload the caster deck scale in all directions with 360 degree swivel casters (108 Kalpar Casters model DL55014893).

The EZ Mount kits provide an extremely accurate method for weighing medium and large capacity structures that are subject to large thermal expansion/contraction or vibration forces. The design uses a double ended shear beam load cell (700 Ω bridge) and transmits the load with a sliding pin on the load-bearing groove of the cell. This design is very effective in providing for thermal expansion/contraction with little friction.

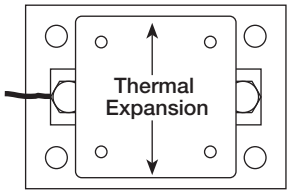

Figure 1-1. Thermal Expansion

In the majority of applications, the assemblies are self-checking and held captive with no need for check or stay rods, making this mount a good choice for areas with frequent seismic activity. The sliding pin design eases load cell installation and replacement without the need to raise the structure a large amount.

The RoughDeck CC uses four stainless steel EZ Mount 1 weigh modules (Section 2.2 on page 4) containing 10,000 lb stainless steel IP67 load cells (RL70000SS).

The RoughDeck CC also utilizes a JB4SS TuffSeal NEMA Type 4X stainless steel signal trim junction box. The TuffSeal junction box can be placed in any of the corners of the caster deck (Section 4.2 on page 8) and accessed through any of the 4 removable deck panels along with the load cells and mounts.

1.1 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. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

WARNING

Failure to heed may result in serious injury or death.

Do not use for purposes other than weight measurement.
Do not use any load-bearing component that is worn beyond 5% 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 use without the deck completely assembled.
Do not place fingers into slots or possible pinch points.

2.0 Mechanical Installation

This section provides an overview of mechanical installation information.

2.1 General Installation Guidelines

The RoughDeck CC system uses four EZ mounts. EZ mounts come assembled to the mount risers with wooden blocks to keep the load cell from being loaded during shipping.

Figure 2-1. EZ Mount Assemblies

The mounting surface for the mounts must be level within ±0.5°.

Note ***If the mounting surfaces are not level, use shims and/or grout to level the mount.***

If possible, check that the mount is level when the structure is fully loaded because excessive deflections in legs and supporting structures may cause additional side forces, which affect accuracy. Deflection of the mounts top or base plate due to loading should not exceed ±0.5°.

The load on each mount assembly should vary by no more than 20%.

Note ***Add shims where necessary to achieve correct load distribution.***

WARNING ***During installation, avoid overload damage to the load cells.***

2.2 Mount Installation

Secure an EZ Mount assembly to the riser mount plate in each corner of the caster deck. The access panel top plate and corner caster plate need to be removed to access the mounting holes to secure the EZ Mount assemblies.

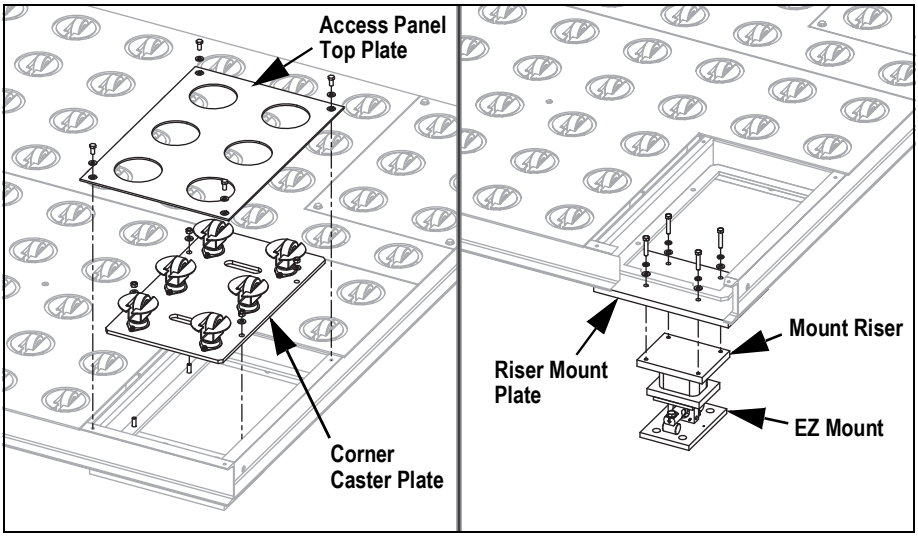

Figure 2-2. EZ Mount Assembly Installation

EZ Mount Orientation

Position EZ Mount assemblies so the load cell cables are positioned on the inside.

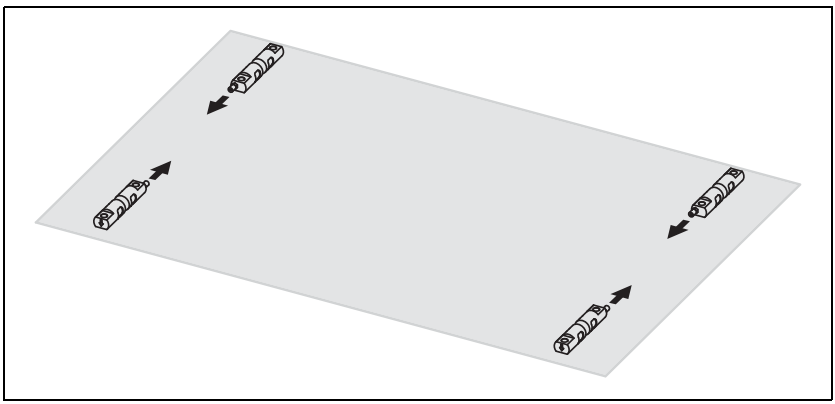

Figure 2-3. Load Cell Orientation

Note ***The arrow on the load cell should point in the direction of the load.***

Secure the EZ Mount Base Plate

Verify that there is no initial misalignment and that the load cells are in the center of the hole in the top plate loading bracket. Relocate if necessary.

Attach the base plates to the foundation using suitable anchors for concrete or by bolting or welding to a steel structure.

Note ***Verify that the base plates are no more than ±0.5° out of level. Shim if necessary and fully tighten mounting bolts.***

Note ***Verify bolts securing the load cell to the base plate are tight. Only torque load cell bolts to 20 foot-pounds. This allows the double-ended load cell to flex under load.***

If surrounding equipment is frequently steam cleaned, or if the load cell is subjected to direct washdown, a protective shroud for the weighing assembly is recommended.

Proper drainage is necessary so the weighing assembly is not standing in water. All support points should be equally stiff so that they deflect by the same amount as the structure is loaded.

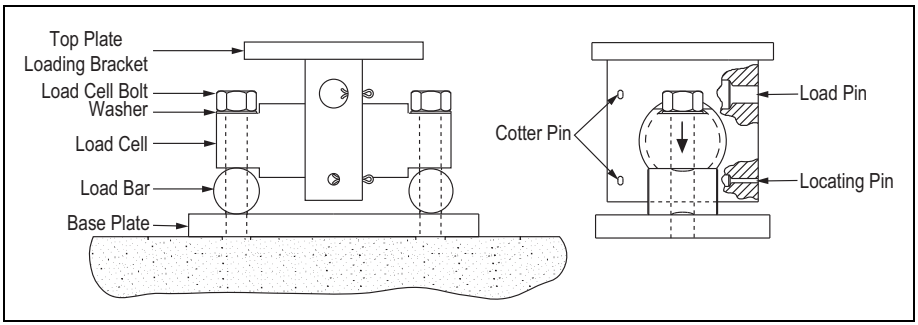

Figure 2-4. EZ Mount Parts Illustration

3.0 Load Cell Wiring

This section provides an overview of load cell wiring information.

1. Route the load cell cables so they will not be damaged or cut. Cable should not be routed near heat sources greater than 150°F. Do not shorten any load cell cable. The load cell is temperature compensated with the supplied length of cable. Cutting the cable will affect temperature compensation. Coil and protect excess cable so it will not be mechanically damaged or be sitting in water.
2. Provide a drip loop in all cables so that water or other liquids will not run directly down the cables onto either the load cells or the junction box.

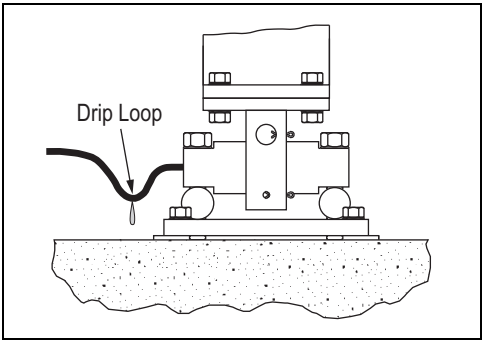

Figure 3-1. Drip Loop

Note ***If conduit protection is necessary against mechanical or rodent damage to the load cell cables, use flexible conduit and conduit adapters at the load cells. Conduit can also provide protection against moisture ingress into the load cell.***

3. Connect cables for RL70000SS load cells to the summing board in the junction box according to Table 3-1 and the labels on terminal strips of the junction box.

Wire Color	Signal
Red	+ Excitation
Black	– Excitation
Green	+ Signal
White	– Signal
Gray or Bare	Shield

Table 3-1. Load Cell Wiring

Note ***To verify the wiring scheme, see the certification shipped with each load cell.***

4.0 TuffSeal Junction Box

The RoughDeck CC comes with the TuffSeal stainless steel junction box. The TuffSeal JB4SS is a signal trim junction box that can accommodate four load cells.

Manuals and additional resources are available on the Rice Lake Weighing Systems website at www.ricelake.com. Refer to the Load Cell and Weigh Module Handbook (PN 22054) for additional system calibration details.

The TuffSeal JB4SS has a 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 in-lb, all models can withstand 900 PSI water pressure.

All terminals will function properly without modification. However, load cell output can be individually trimmed with potentiometers which is further explained in Section 4.4 on page 11.

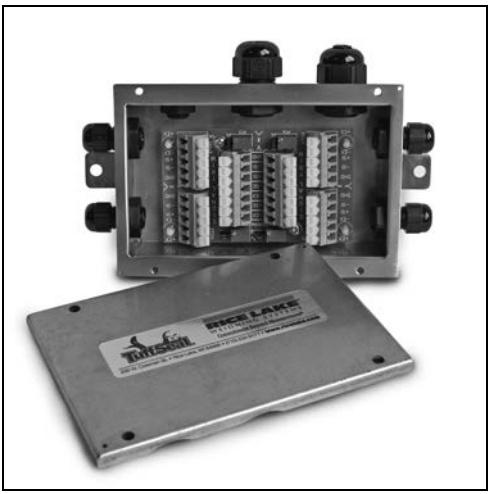

Figure 4-1. TuffSeal Junction Box

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

4.1 Dimensions

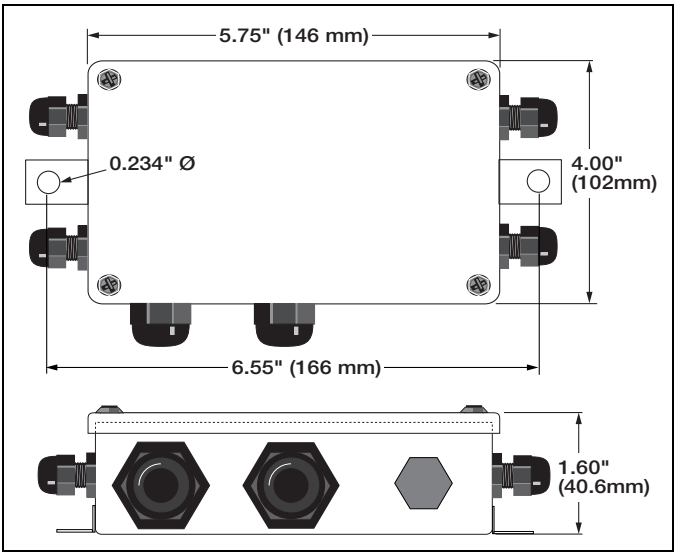

Figure 4-2. JB4ES and JB4SS Enclosure Dimensions

4.2 Mounting Location

The TuffSeal junction box can be mounted in any of the four corners of the caster deck to the top of the riser mount plate. The access panel top plate and corner caster plate need to be removed to mount the junction box (see Figure 2-2 on page 4).The junction box should be mounted in a location that is convenient for servicing.

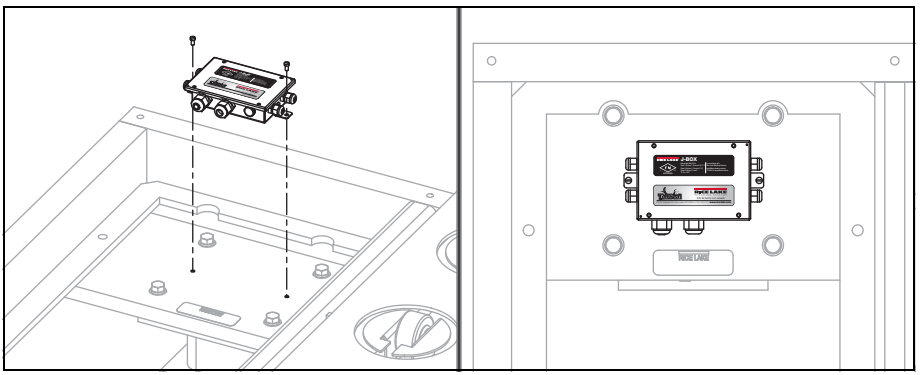

Figure 4-3. Junction Box Mounting Location

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

4.3 Junction Box Wiring

The TuffSeal JB4SS junction box has been designed to connect and trim up to four load cells.

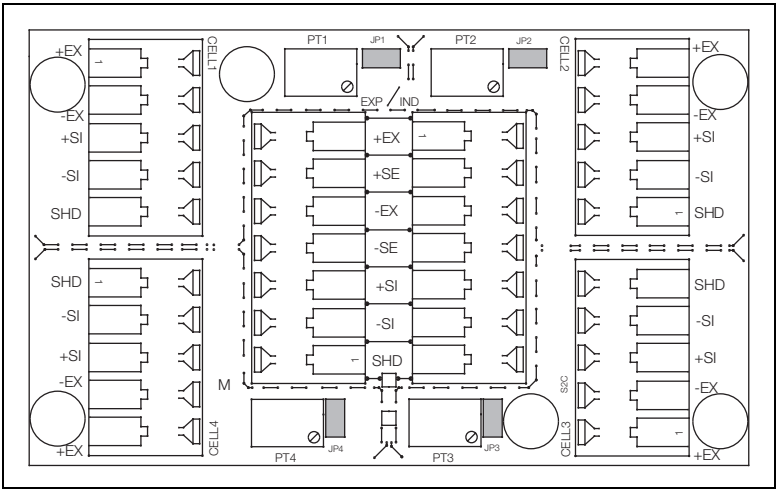

Figure 4-4. Junction Box Board Layout

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" 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 will accommodate 12-28 gauge wire.***

4.3.1 Connect Indicator

The indicator terminal strip is used to connect the main cable to an indicator. This equipment was examined and approved for the connection to a single indicator only.

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.

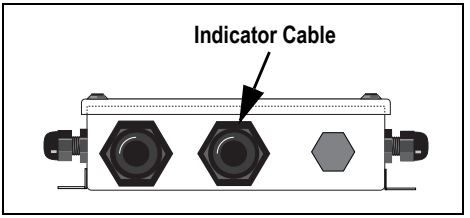

Figure 4-5. Indicator Cable Location

3. Strip the wire insulation back 1/4" 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.

If cables could be exposed to water or other liquids, bend a short downward loop in all cables near the cord grips so any fluids draining down the cables will drip off before reaching the junction box.

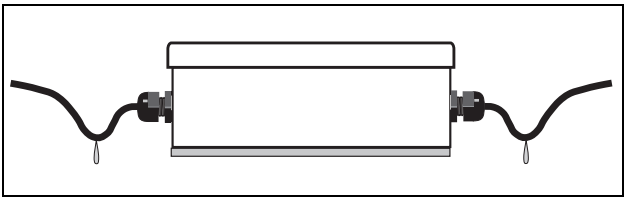

Figure 4-6. Drip Loop Cable

4.4 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.

4.4.1 Signal Board Trimming Procedure

Use the following steps to properly trim the TuffSeal JB4SS junction box.

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.

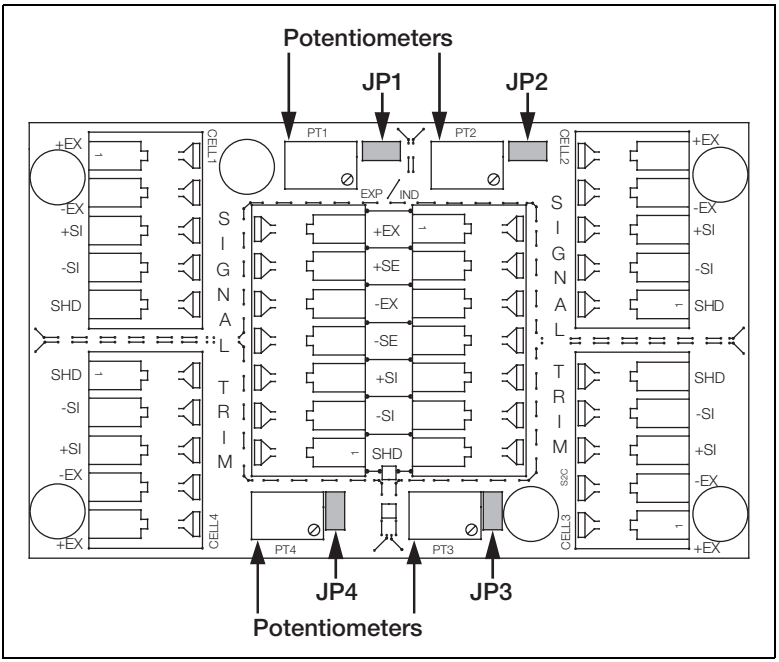

Figure 4-7. Junction Box Board

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 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. Pull excess cable out of the enclosure.
14. Tighten the cord grip assemblies with a wrench. To be watertight, each cord grip must be tightened so the rubber sleeve begins to protrude from the hub.
15. Plug unused hubs to prevent moisture entry.
16. Place the supplied desiccant filter it in the junction box.
17. Replace the cover and tighten the screws in an alternating pattern to be certain the gasket is compressed equally in all locations.

IMPORTANT

See the Electronic Replacement Parts and Components catalog to order extra hole plugs if needed for Step 15.

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

5.0 Calibration

Calibration of the load cells in the EZ Mounts should be performed by a service technician. Please contact a local scale dealer for assistance with calibration.

Use certified test weights to calibrate the scale after the EZ Mount assemblies are installed under the RoughDeck CC scale deck (Section 2.2 on page 4) and the junction box corner trimming procedure has been performed (Section 4.4 on page 11).

Rice Lake Weighing Systems recommends using weights greater than 20% of the scale's rated capacity and that the weights be evenly distributed when calibration is performed.

The greater the weight used to perform calibration the more linear the scale will be.

6.0 Troubleshooting

This section provides an overview of troubleshooting information.

Issues associated with load cells are often non-load cell related. Ensure all parts of the device are properly connected and secured prior to troubleshooting:

1. Check load cell mount for debris restricting load cell movement or debris between scale and structure.
2. Check that the structure and mounts are plumb, level, and square at critical areas.
3. Check the load cell cables for damage.
4. Check all electrical connections.

If the system can be calibrated but does not return to zero, loses calibration, or demonstrates non-linearity or non-repeatability, see Table 6-1 for troubleshooting information.

Symptom	Possible Cause
Not returning to zero	Mechanical binding or debris in seals or under load cells; May have lost system calibration
Non-linearity	Thermal expansion or deflection under load causing binding or side load
Non-repeatability	Loose load cell mount; Drifting caused by moisture; Load cell overload or shack damage; Mechanical binding
Lost calibration	Out of level or plumb; Moisture problem; Mechanical binding
Drifting readout	Moisture in junction box, cables or load cells; Mechanical binding

Table 6-1. Troubleshooting Information

If issues persist:

1. Check possible indicator malfunction by using a load cell simulator to input a known good signal into the indicator.
2. Disconnect each load cell's signal leads at the junction box and check individual load cell outputs with a multimeter then check input/output impedances for comparison with load cell manufacturer's specifications.

If previous troubleshooting does not resolve the issue, see the following procedure:

1. Reconnect all but one load cell.
2. Replace the load cell with a load cell simulator. Alternate so that each load cell is individually disconnected and replaced with a simulator.

If there is a problem with a particular load cell, the symptom should disappear when that load cell is disconnected and replaced with simulator.

7.0 Replacement Parts

7.1 EZ Mount 1 Weigh Modules

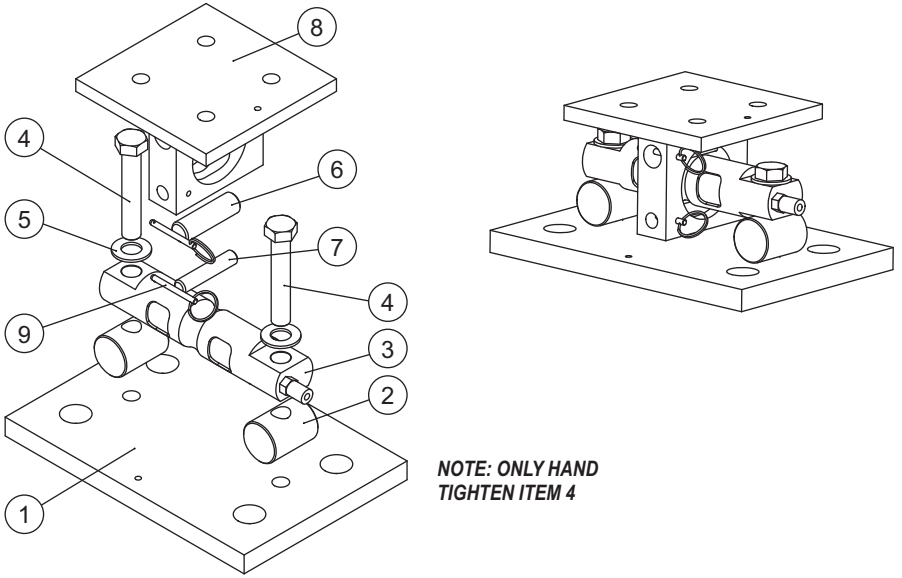

Figure 7-1. EZ Mount Stainless Steel Replacement Parts Diagram

Item No.	Part No.	Description	Qty
1	18370	Base Plate, EZ Mount 5K/20K SST	1
2	18267	Pin, Load Bearing 1-1/2 DIA x 2 SST	2
3	30432	Load Cell, DEB RL70000SS-10K SST	1
4	14774	Bolt, 5/8-18 x 3-1/8, Hex Head SST	2
5	15178	Washer, Flat 5/8 SST	2
6	18270	Load Pin, 3/4 DIA SST	1
7	18373	Locating Pin, 1/2 DIA SST	1
8	193590	Top Plate Weldment, EZ Mount 1, 5K/20K SST	1
9	191645	Quick Release Pin, 3/16 DIA x 1-5/8 Usable Length	2
Not Shown	208534	Shim Kit	4

Table 7-1. EZ Mount Stainless Steel Replacement Parts List

7.2 TuffSeal JB4SS Junction Box

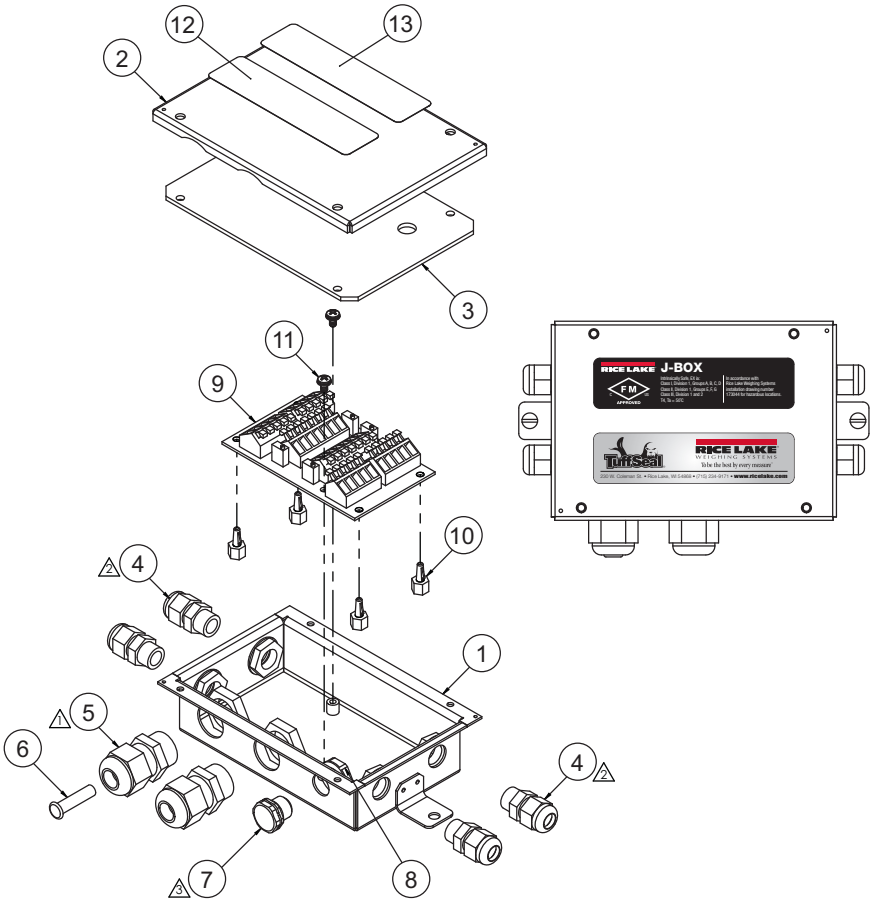

Figure 7-2. TuffSeal JB4SS Replacement Parts Diagram

1 PG11 Cord Grip Nuts to be tightened to 33 in-lb

2 PG7 Cord Grip Nuts to be tightened to 22 in-lb

3 Breather Vent Nut to be tightened to 10 in-lb

Item No.	Part No.	Description	Qty
1	88955	J-Box, Small Universal Enclosure	1
2	88957	Cover, J-Box Small SST Universal	1
3	89689	Gasket, Cover Small Stainless J-Box	1
4	58983	Cable Grip, SL-7 with Nut	4
5	59001	Cable Grip, SL-11 with Nut	2
6	19538	Post, Slotted Black Seal 1/4 x 1	1
7	88733	Vent, Breather Sealed Gortex Membrane Black	1
8	88734	Nut, Breather Vent M12 x 1 Thread	1
9	88958	Board, 4 Channel ST Signal Trim with Expansion	1
10	91581	Standoff, Circuit Board 5/32 Snap-In x 0.250 FEM END Untapped No. 6	4
11	14839	Screw, Mach 6-32NC x 1/4 SEMS Steel Zinc Plated	2
12	92266	Label, TuffSeal Large Metallic Adhesive	1
13	190009	Label, FM Junction Box JB4SS Enclosure	1

Table 7-2. TuffSeal JB4SS Replacement Parts List

230 W. Coleman St. • Rice Lake, WI 54868 • USA
U.S. 800-472-6703 • Canada/Mexico 800-321-6703 • International 715-234-9171 • Europe +31 (0)26 472 1319