

# AX3040

*Axle Scale*

## Installation Manual



**RICE LAKE**<sup>®</sup>  
WEIGHING SYSTEMS

PN 111845 Rev A

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# 1.0 Introduction

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This manual is intended for use by service technicians responsible for installing and servicing the Rice Lake AX3040 Axle Scale. It is designed so that on-site installation time is reduced as much as possible.



Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at [www.ricelake.com](http://www.ricelake.com)

Warranty information can be found on the website at [www.ricelake.com/warranties](http://www.ricelake.com/warranties)

## 1.1 Safety

### Safety Symbol Definitions:



Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death and includes hazards that are exposed when guards are removed.



Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.



Indicates information about procedures that, if not observed, could result in damage to equipment or corruption of and loss of data.

### General Safety

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Do not operate or work on this equipment unless you have read and understand the instructions and warnings in this manual. Failure to follow the instructions or heed the warnings could result in injury or death. Contact Rice Lake Weighing Systems for replacement manuals. Proper care is your responsibility.



Failure to heed may result in serious injury or death.

**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 than weight measurement.

**DO NOT** place fingers into slots or possible pinch points.

**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** remove or obscure warning labels.

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

## 1.2 Overview

The Rice Lake AX3040 Axle Scale is low profile, permanent or portable systems available for use in a variety of non-NTEP applications. It has been designed for long term service with a minimum of maintenance and comes in a variety of configurations, aluminum or steel construction, with capacities from 30 to 40 tons.



Figure 1-1. Rice Lake AX3040 Axle Scale

## 1.3 Capacities and Configurations

The Rice Lake AX3040 Axle Scale comes in a variety of capacities and configurations (see Table 1-1). Each system consists of two weigh pads with junction boxes and connecting cables, and ramps.

Material	Length	Axle Capacity
Steel Construction - Painted Black	7'	60,000lb (30,000lb each)
	12'	80,000lb (40,000lb each)
	14'	80,000lb (40,000lb each)
Aluminum Construction - Shot Blasted	7'	60,000lb (30,000lb each)

Table 1-1. Rice Lake AX3040 Axle Scale Capacity and Configurations

## 2.0 Installation

The following section describes information on unpacking, site preparation, assembly and installation of the Rice Lake AX3040.

### 2.1 Installation Overview

Standard installation consists of the following steps:

1. Select a site
2. Check for levelness and smoothness of site
3. Unpack weigh pads and ramps
4. Attach ramps to weigh pads
5. Connect cables
6. Calibrate unit

### 2.2 Site Preparation

Careful consideration must be taken when preparing a site to install the Rice Lake AX3040.



**Note** The scale must be placed on a flat and level hard surface. The material should be equal to or better than 3000 psi. concrete.



#### Important

- Never load the weigh pads beyond capacity.
- Avoid areas where the weigh pads could receive damaging side impacts or shock damage.
- Avoid areas where water may damage pads, which are not meant for washdown environment.
- The site should have a level grade for the approach and exit.
- If the Rice Lake AX3040 is not on level ground, errors can occur due to weight being transferred toward and away from the weigh pads (due to unlevel grade). Also friction in the vehicle's suspension system can draw the weight off the axle being weighed - especially if the brakes are applied.
- Ensure the area is clear of rocks and debris.
- All cables must be protected against crushing and/or cutting, or moisture.

### 2.3 Unpacking the AX3040

Remove all packing material that surrounds the scale and inspect it for visible damage caused during shipment. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.



**Note** Shipping method may vary, typical is shown.

Homerun cable, manual, and 4 lifting eyebolts taped to weighbridge

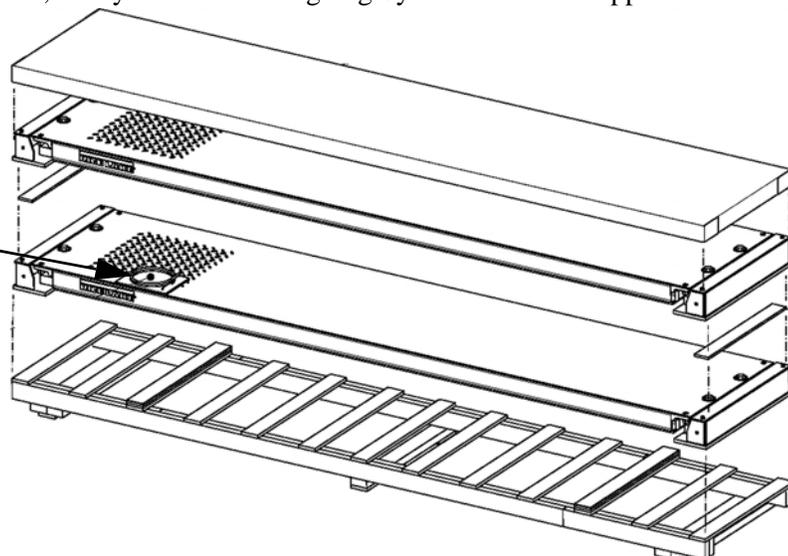


Figure 2-1. Packaging Kit

## 2.4 Setup and Assembly

The Rice Lake AX3040 can be set up either in a shallow pit, with the top surface of the weighbridge sitting at grade or it can be set on top of a level concrete pad with approach ramps installed.

Once the site has been properly prepared, lift the weighbridge into position ensuring that they correspond to the wheel configurations and dimensions of the vehicle being weighed. The tires of the vehicle should center on the platforms. See Section 2.4.1.



**Note** See Figure 2-4 and 2-5 for location or positioning of junction box and cables.

### 2.4.1 Positioning Weigh Pads

1. Screw the provided eye bolts completely down to the shoulder.
2. Attach chains to eye bolts to lift and position the weigh pads.



#### WARNING

*Eye bolts must always be inserted into the top of the scale. Lifting should always occur with the top plate facing up and the eye bolts securely attached through the nuts welded to the bottom side of the top plate. Lifting from the bottom of the plate could cause nuts to break loose and the scale to fall.*

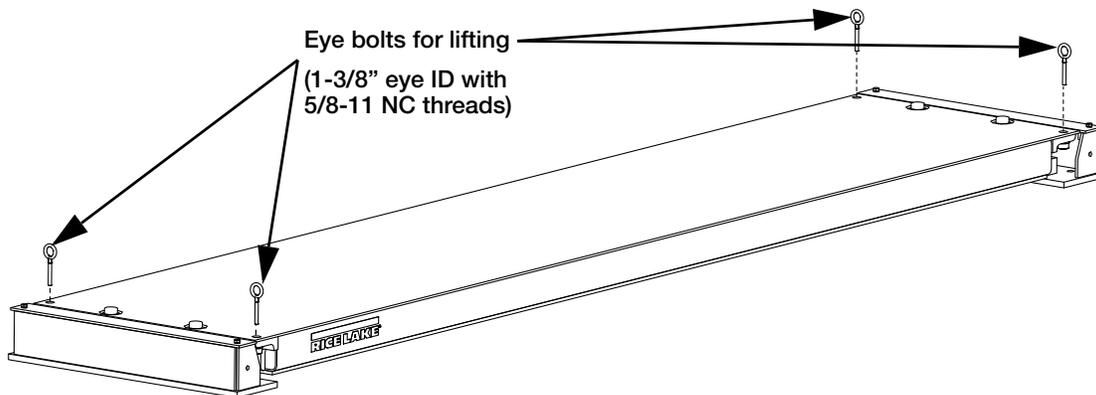


Figure 2-2. Eye bolts to Move the Rice Lake AX3040 into Place

3. Once weigh pads are in place, they can be anchored using the holes in the bottom plate of the end sections.

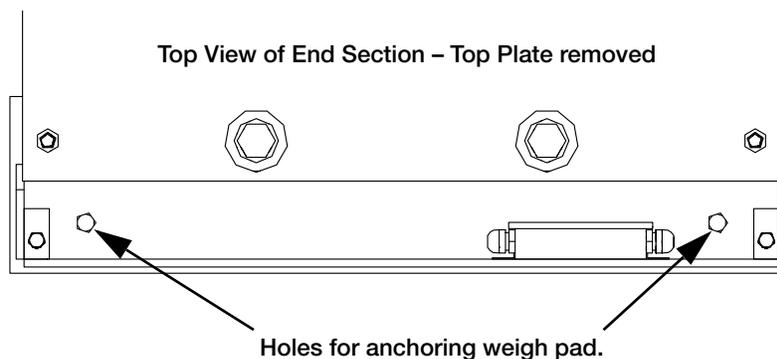


Figure 2-3. Anchor Hole in End Section



**Note** Recommended anchor bolts (PN 41973) are sold separately, contact Rice Lake Weighing Systems to order.

## 2.4.2 Cabling the Weigh Pads

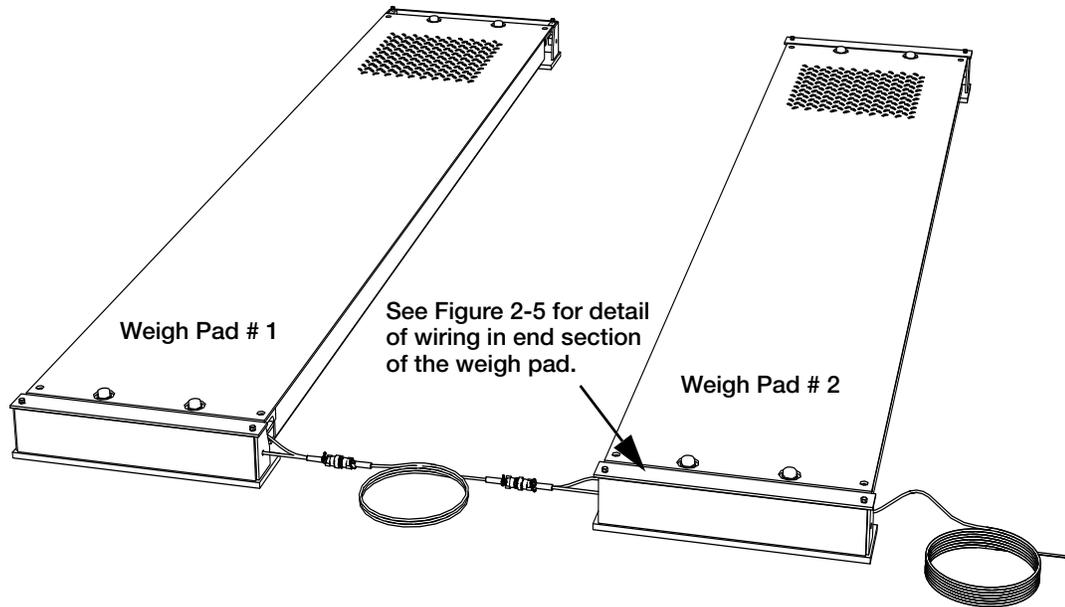


Figure 2-4. Cabling Diagram Full View

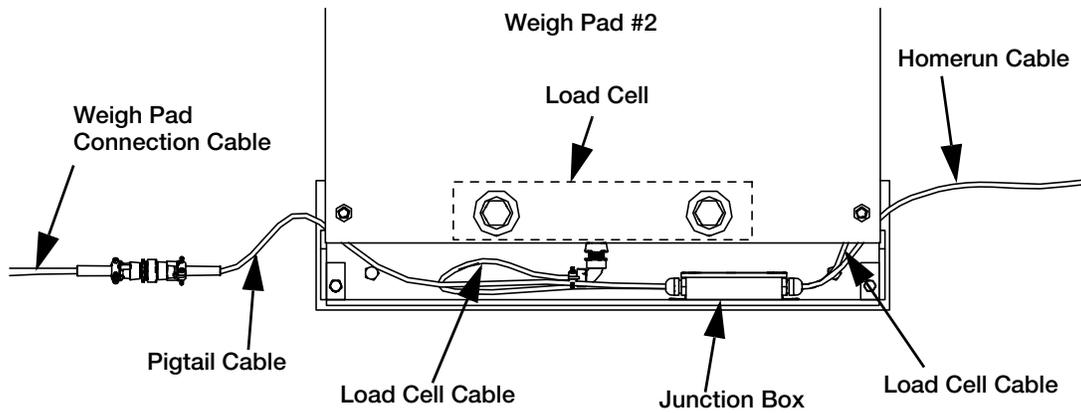


Figure 2-5. End of Weigh Pad Close-up Cabling Diagram – (Top Plate Has Been Removed For Clarity)

### 2.4.3 Installing Access Ramps

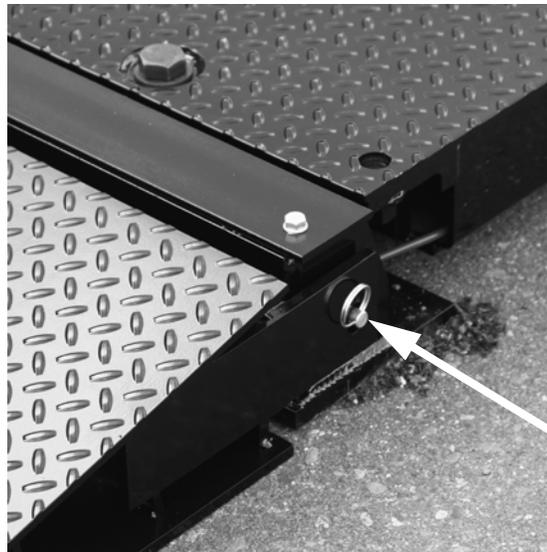
Access ramps are designed to fit securely to the Rice Lake AX3040.



Figure 2-6. Access Ramp

Once the Rice Lake AX3040 is set in place, ramps can be fitted to the weigh pad using release pins.

1. Set ramps in place, tightly against the load cell end mount of the weigh pad. with the ramp tabs on each side of the load cell mount end of the weigh pad. See Figure 2-7.
2. The holes on the ramp tabs and on the load cell mount end of the weigh pad must match up. Install the release pin ensuring it goes through both the ramp and the load cell mount.



Release Pin – holds the weigh pad and ramps together.

Figure 2-7. Release Pin Location

## 3.0 Junction Box Connections

The Rice Lake AX3040 uses a modified JB4SS signal trim junction box. It comes in a stainless steel enclosure. The junction box has been designed to connect and trim the two load cells in each weigh pad. Use the expansion port on the JB4SS board to connect the two weigh pads in series. Use the indicator connection to connect the weigh pads to the indicator.

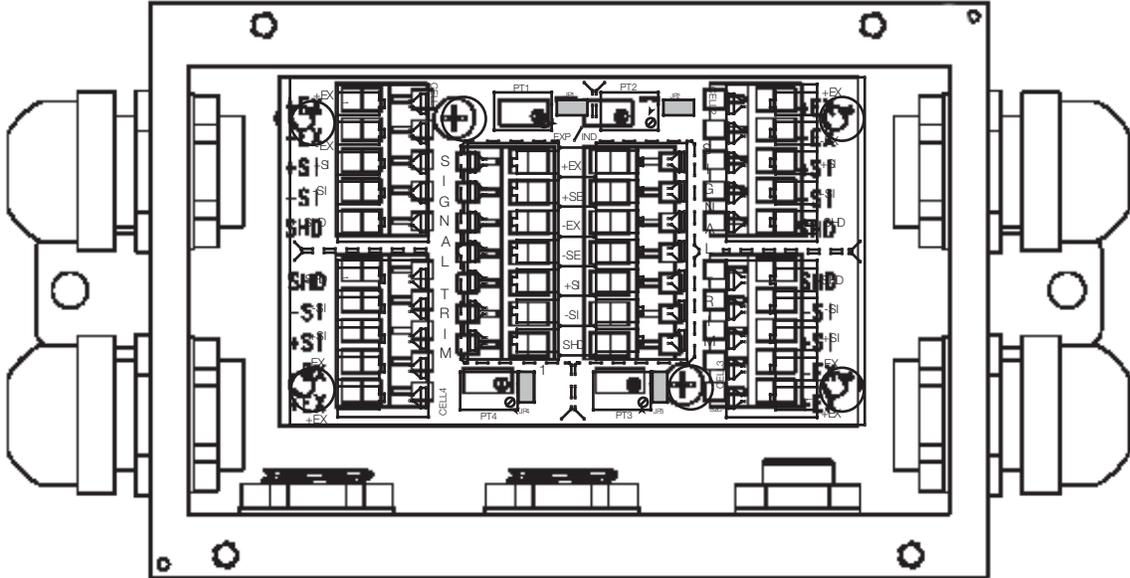
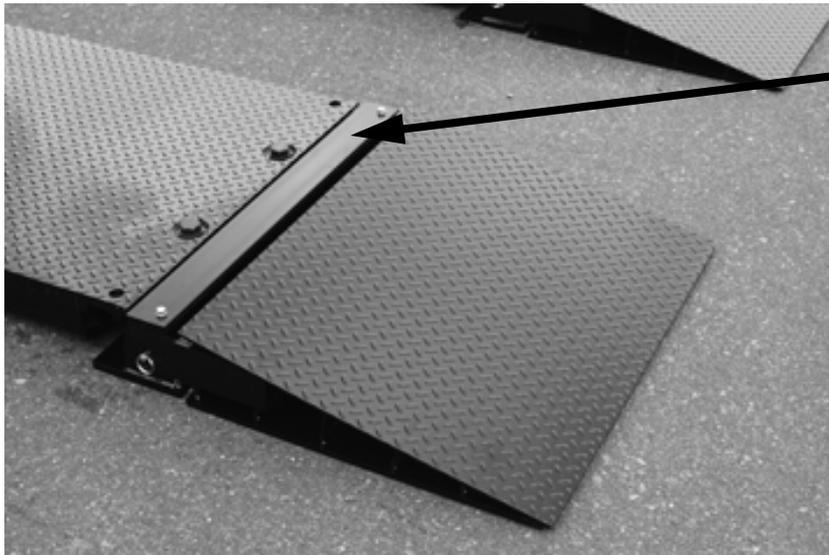


Figure 3-1. AX3040 Junction Box

### 3.1 Junction Box Location

The junction box is located inside the end plate of the Rice Lake AX3040 next to the load cell as shown in Figure 3-3. The junction box comes pre-installed and pre-wired from the factory.



To access the junction box area, remove the two bolts using a 9/16" socket and remove top plate.

Figure 3-2. Remove Top Plate to Access the Junction Box

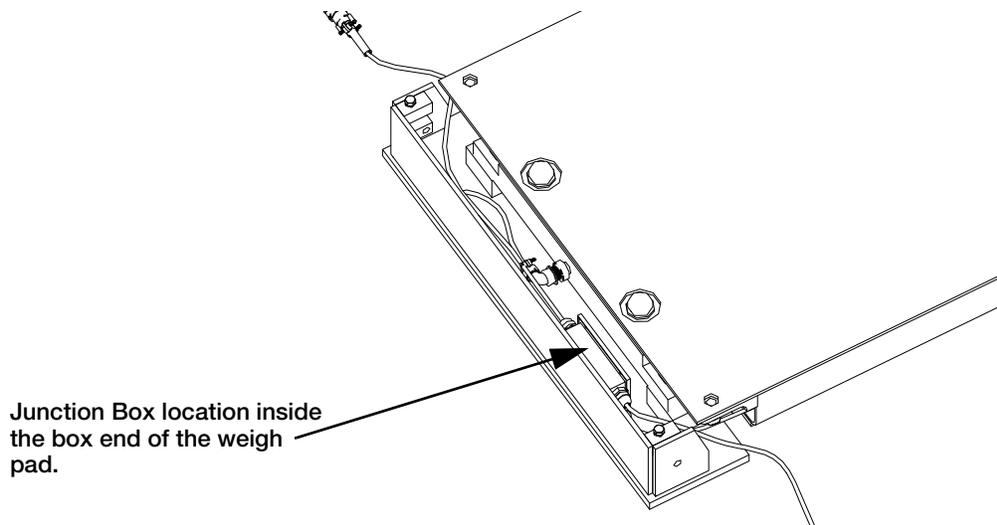


Figure 3-3. Junction Box Position

### 3.2 Connect Cable

The Rice Lake AX3040 uses military style connectors between the load cell, the junction box, and on the cable that connects the two weigh pads. The Rice Lake AX3040 also comes with a 50 foot homerun cable to enable the installer to hook up the Rice Lake AX3040 to the indicator. Figure 3-4 shows a typical wiring diagram.

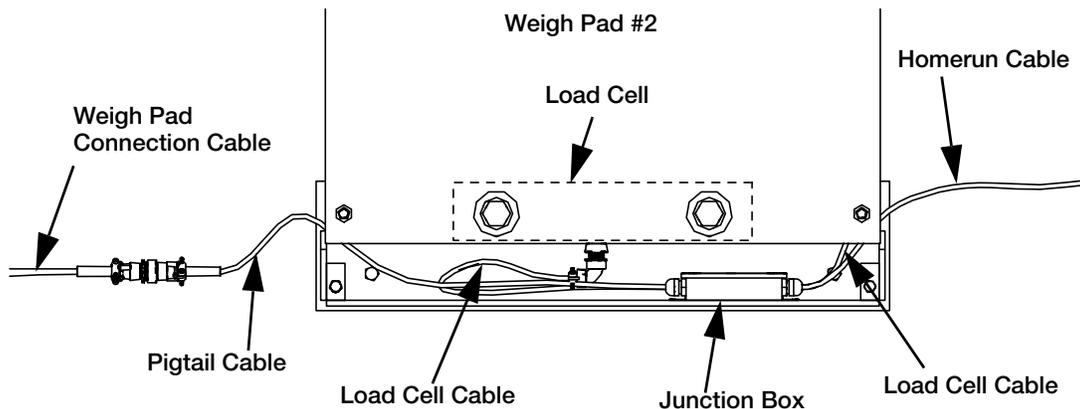


Figure 3-4. Cabling to the Indicator

1. Once the weigh pads are put into place, connect them using weigh pad connection cable provided.
2. Connect homerun cable to j-box indicator connection and run the cable out the side of the weigh pad to the indicator, connect to the indicator per the indicator instruction manual.
3. Ensure all cables are protected from crushing and pinching.



Figure 3-5. Run Homerun Cable Out the Side of the AX3040 to the Indicator

### 3.3 Electrical Ground Connections



**Important** *Improper grounding systems on axle scales often cause corrupted data from ground-loop current flows and costly lightning damage to electronics.*

Always strive for a **single-point grounding** system. Do not drive ground rods at the scale location to establish separate earth grounds for the scale. These separate earth grounds do not share the same zero reference as the existing earth ground for the AC power system. This difference in electrical potential invites ground-loop current flow between the separate grounds, often corrupting serial data like RS-232 which depends on a stable zero reference.

In addition, a separate earth ground system at the scale can actually invite lightning or power surge damage:

- A minor powerline surge in the scale house electrical supply should immediately be shunted to ground. If a separate ground system exists at the scale with a lower potential than the main ground, the surge may travel out to the scale ground rod, damaging load cells on its way.
- A nearby lightning ground strike may instantly raise the zero potential of a ground rod at the scale location, while leaving the scale house ground rod unaffected less. That lightning surge now takes the easiest path to the lower-potential ground—through the scale wiring and back to the scale house ground, possibly damaging the indicator on its way.

Therefore, the best grounding system for the scale is the same grounding system used for the incoming AC power system. The 120 VAC power source used to power the indicator is connected to an existing earth grounded rod system at the scale house or other building where the indicator is located. This should consist of a double ground rod system of two 5/8" x 8' copper rods driven 8' deep at the service entrance where the local utility company brings their lines into the building.

The local utility company can test the resistance of the existing ground rods with a clamp-on megohmmeter that measures zero resistance. A reading of  $3\frac{3}{4}$  or less is acceptable as a ground. If the test determines that the grounding system is inadequate, the utility company can suggest methods to improve the system. It is crucial that the scale owner authorize and make the recommended improvements to ensure an adequate electrical ground. Do not connect the scale to the AC power supply until the grounding system is adequate.

Be certain each load cell grounding strap is securely connected to the top plate and bottom plate of each load cell mount. Some models have ground straps included to install between modules if more than one segment is used. These inter-module straps ensure that the entire scale is connected to the same single point ground. There should be metal-to-metal contact with no presence of paint or grout. This strap is designed to channel power surges on the deck around—rather than through—the load cell to ground. These, and all, ground connections must be torqued to a specified value and retorqued at regular service intervals. A thick coating of anti-oxidant grease should be maintained on all ground connections to prevent corrosion.

A separate grounding system conductor must extend uninterrupted from the main service panel ground to the scale to protect load cells and scale wiring from lightning and other transient damage. This ground wire conductor must be an unsheathed #10 copper wire or larger. Run the bare ground wire conductor intact from the AC power ground rod to the scale in a separate trench. Bring the wire up from the trench near the junction box and attach it to the ground lug located in the junction box pocket. This grounds the scale frame to the same single-point ground as the AC power for the indicator.

A ground wire is included to attach the junction box ground lug to the ground lug located in the junction box pocket. Grounding of the junction box is essential for operation of the DC transient protection incorporated into the junction box.

## 4.0 Trimming & Calibrating

The Rice Lake AX3040 is delivered with the junction box corner-trimmed. However, once the weigh pads have been set up, you may want to verify that end weight values on each weigh pad are the same. We suggest you use 25% of the weigh pad capacity for verification. Provided the values are the same, you can perform calibration using 25% of the Rice Lake AX3040 total capacity. Take care to distribute the test weights evenly across the two weigh pads. Refer to the indicator manual to determine correct calibration procedures.

### 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.

Whenever a substantial amount of trim (more than 5% of normal output), seems necessary to equalize output, check for other possible problems. The best trim is always the least amount of trim. When all errors except cell mismatch and cable extensions or reductions have been corrected, continue with the trimming.

Use the following steps to properly trim the junction box.

1. Make sure jumpers are in place to enable trimming of the cells corresponding to each load cell. See Figure 4-1 for the location of jumpers JP1, JP2, JP3, and JP4. Note that you need to remove jumpers for any unused cells.

Set all potentiometers fully clockwise to give maximum signal output from each cell (See Figure 4-1 for location of potentiometers).

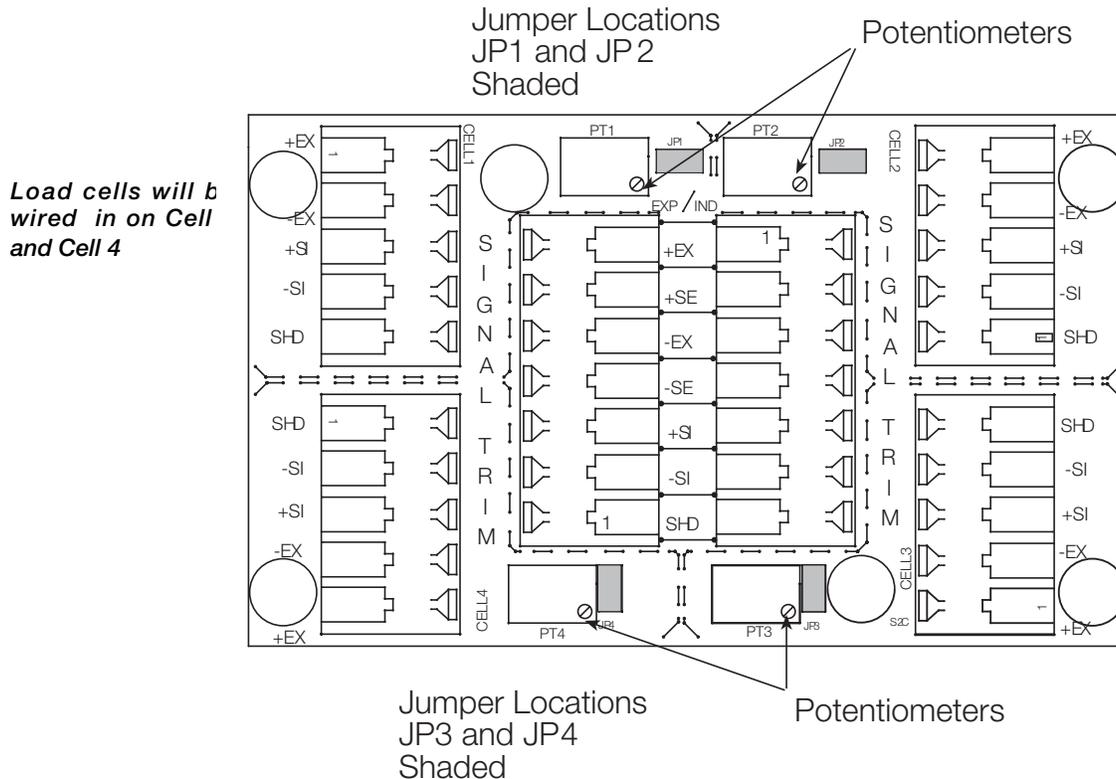


Figure 4-1. Potentiometer Locations

2. Zero the indicator and place calibrated test weights over each load cell one at a time. The amount of test weight to be used will depend on the configuration. Rice Lake Weighing Systems suggest you use 25% of the weigh pad capacity.
3. Record the value displayed on the indicator after each test weight is placed one at a time on each end (directly over the load cell) without allowing the weight to overhang the sides. Allow the AX3040 to return to zero each time to check for friction or other mechanical problems. Select the load cell that has the lowest value as your reference point. This cell will not be trimmed and will be your reference load cell.
4. Place the same test load over each cell one at a time. Using the corresponding potentiometer, trim each cell down to equal the reference load cell. As end corrections are somewhat interactive, check all cells again for repeatability. If necessary, repeat steps 4 and 5.



**Note** *Trimming procedures must match in order to proceed to weigh pad/section trimming in Step 10.*

5. Pull excess cable out of the enclosure and 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.
6. Unused hubs must be properly plugged to prevent moisture entry.
7. Remove the desiccant from the plastic bag, and insert the desiccant bag into the junction box before closing. Inspect the desiccant during normal service and change the desiccant as needed.
8. Replace the cover and torque the cover screws in an alternating pattern 15 in/lbs to be certain the gasket is compressed equally in all locations.
9. When the homerun cable is protected and in its final position, complete connection to the indicator. See the indicator installation manual for wiring information.
10. Perform calibration using 25% of the Rice Lake AX3040 total capacity referring to the indicator manual to determine the correct calibration procedure.

## 5.0 Service Information

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The following sections provide information to keep the Rice Lake AX3040 running at peak performance.



**Note** *Disconnect power from the system prior to inspection or cleaning.*

### 5.1 Cleaning and Maintenance

After proper installation, maintenance is the most critical factor in the operation and life expectancy of the Rice Lake AX3040. Maintenance checks are surprisingly simple, but are often overlooked or ignored until problems arise.

It is recommended that the owner do inspections on a daily and weekly basis, and mechanical inspections should be done at least every six months. Actual frequency of these inspections is relative to the environmental conditions and usage of the AX3040.

A variety of cleaning procedures should be used to maintain the longevity of the AX3040.

#### Load Cell Trays

Use either air or light water pressure to clean accumulated dirt and debris from the trays. If water is used to clean the trays, use air pressure to dry them.

#### Connectors

If the connectors show signs of dirt or corrosion, clean them with a small stiff (dry) brush. Clean connector pins with a commercial non-residue contact cleaner. Do not use oil or a silicon base cleaner. They will leave a residue that can trap dirt. Also, denatured alcohol in a trigger spray bottle is an excellent cleaner. Drench the connector with the cleaner. Wait until the connectors have thoroughly dried before reconnecting.

### 5.2 Maintenance Checklist



**Note** *Platforms left assembled for more than one year without maintenance may be difficult to disassemble.*

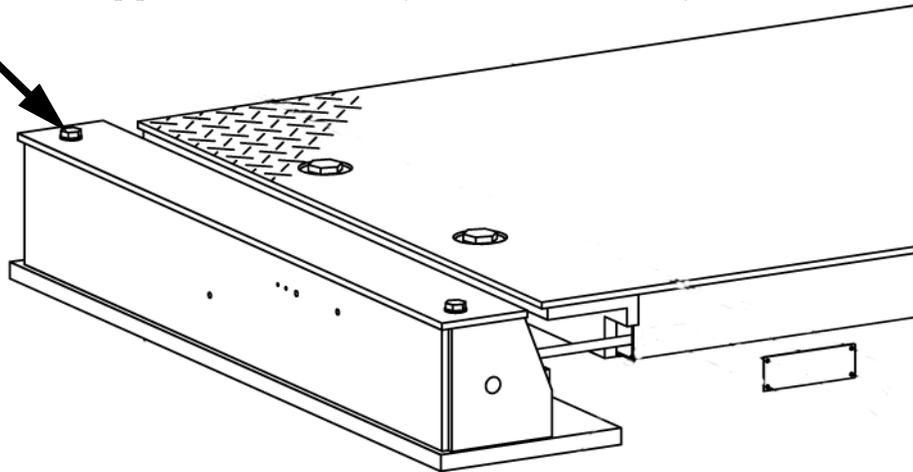
- Monitor the system to make sure it functions properly and meets accuracy standards.
- Ensure mechanical parts show no damage, deterioration, or change in configuration.
- Ensure that all connectors are intact and sealed against moisture and that all are clean and dry.
- Ensure that platforms and cables show no sign of salt built up.
- Ensure there is no dirt or debris in the load cell trays or under the platforms.
- Ensure the pit is clean and drained (where applicable).
- Ensure all cables are intact and show no signs of pinching or cuts. Be sure splices are tightly sealed.
- Ensure all bolts and nuts tightened to proper torque.
- Ensure that operating personnel are familiar with the Rice Lake AX3040 systems safe and proper operation and maintenance.
- Always use a non-corrosive anti-seize compound on all nuts and bolts when re-assembling the platforms.

## 5.3 Load Cell Replacement

Use the following steps to replace a load cell in the Rice Lake AX3040.

1. Open the load cell mount end top plate which covers the junction box and cabling and set aside.

*Remove bolts and remove load cell mount end top plate.*

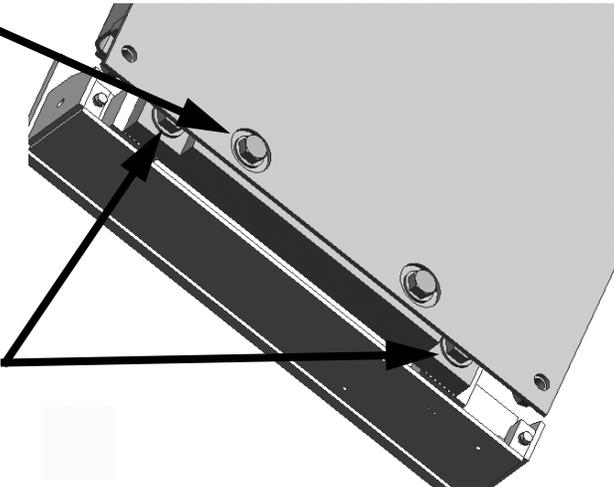


*Figure 5-1. Remove Bolts That Hold The Box End Plate Down*

2. Loosen the bolts that hold the load cell in place.

*Loosen and remove bolts that hold weighbridge down*

*Remove bolts holding load cell into place.*



*Figure 5-2. Loosen Bolts That Hold The Weighbridge Down*

3. Lift up weighbridge deck plate.
4. Loosen the bolts that hold the load cell in place.
5. Disconnect the load cell cable from the load cell.
6. Replace the load cell. Torque bolts 300ft/lb and use an anti-seize compound.
7. Reverse steps to re-assemble the weighbridge.
8. Reconnect the load cell cables to the junction box.
9. Trim corners of junction box per “Trimming Procedure” on page 10.

# 6.0 Appendix

## 6.1 Replacement Parts and Drawings

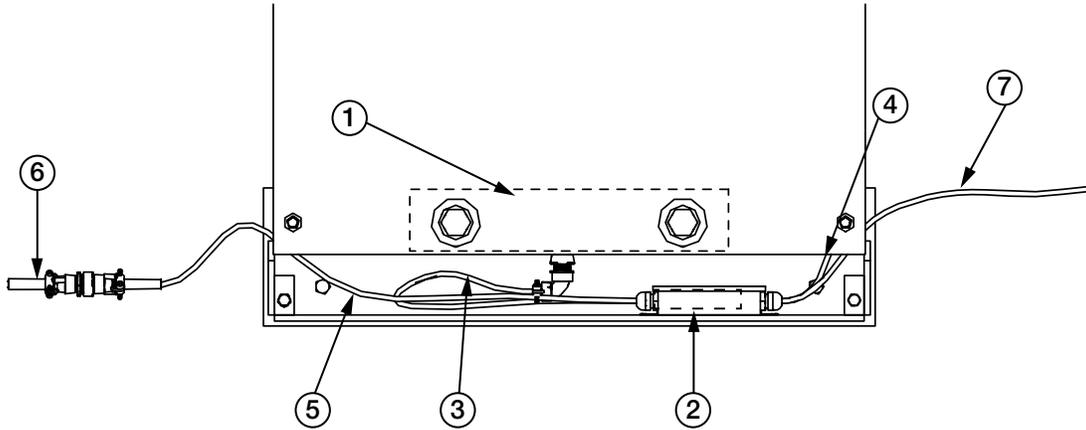


Figure 6-1. Replacement Parts Drawing (Weigh Pad 2 Shown)

Item No.	Part No.	Description
1	111766	Load Cell
2	111901	Junction Box
	110166	Cap Screw, Hex HD 7/8-14 (qty. 4) (not shown)
	110164	Cap Screw, Hex HD 1-14 (qty. 4) (not shown)
3	112119	Cable, assy, 7 position, 2 ft going from j-box to closest load cell
4	112120	Cable, assy, 7 position, 17 ft going from j-box to farthest load cell (12 ft and 14 ft scales)
	114628	Cable, assy, 7 position, 7 ft going from j-box to farthest load cell (7 ft scale)
5	112121	Cable, assy, 7 position, 3 ft going from j-box interconnect
6	112122	Cable, assy 7 position, 10 ft going from j-box to j-box (Weigh Pad Connection Cable)
7	67041	Cable, 50 ft (Homerun Cable)

Table 6-1. Replacement Parts List





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