

SURVIVOR[®] ATV

Portable Truck Scale

Assembly Instructions



© Rice Lake Weighing Systems. All rights reserved.

Rice Lake Weighing Systems® is a registered trademark of
Rice Lake Weighing Systems.

All other brand or product names within this publication are trademarks or
registered trademarks of their respective companies.

All information contained within this publication is, to the best of our knowledge, complete and
accurate at the time of publication. Rice Lake Weighing Systems reserves the right to make
changes to the technology, features, specifications and design of the equipment without notice.

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 manual revisions for awareness of major updates.

Revision	Date	Description
D	August 15, 2025	Established revision history; updated grounding diagram, manual format and warning/note icons

Table i. Revision Letter History



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

Contents

1.0 Introduction	5
1.1 Safety	5
1.2 Disposal	6
1.3 Installation Overview	6
1.3.1 General Assembly Order	6
1.3.2 Assembly Time Estimates	6
1.3.3 Recommended Equipment and Tools	7
1.3.4 Lifting and Handling	7
1.4 Serial Tag	8
2.0 Assembly	9
2.1 Deck Module Assembly	9
2.2 Setup	10
2.3 Scale Relocation	11
3.0 Connecting Electronic Equipment	12
3.1 Indicator to Peripherals	12
3.2 J-Box Connections	12
3.3 Single-Point Ground Conductor	13
3.4 Electrical Ground Connections	14
3.5 Installing Transient Protection	15
4.0 Trimming and Calibration	17
4.1 Overview and Equipment Required	17
4.1.1 Load Cell Trimming	17
4.1.2 Equipment Required	17
4.2 Trimming Individual Cells	17
4.2.1 Side 1	17
4.3 Trimming Paired Sections	18
4.4 Calibrating with Test Weights	19
4.4.1 Equipment Required	19
5.0 Load Cell Replacement	20
5.1 Replacement Procedure	20
5.2 End Clean-outs	21



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

1.0 Introduction

This manual is intended for use by technicians responsible for installing and servicing the SURVIVOR® ATV Series portable truck scale. The ATV truck scale has been designed to significantly reduce installation time. A well-organized, experienced installation crew should be able to install a typical three module 70 ft x 11 ft ATV truck scale in less than 4 hours. This estimated time may vary.



NOTE: This booklet covers ATV portable truck scale installations. Use these instructions as general installation guidelines unless the engineering drawings furnished with your scale differ from the instruction in this booklet. Engineering drawings furnished with your scale always take priority over these general installation guidelines.

Refer to the engineering drawings furnished with the scale for all component numbering sequences.

Package includes: Bolt-on backfill ramp bulkheads (removable for concrete approaches); assembled weighbridge modules and weighbridge fasteners; load cells with conduit fitting; load cell mounts; copper transient bypass cables at each load cell; metal conduit on weighbridge for load cell cable runs; flexible conduit from load cell to metal conduit; conduit fittings for flexible to metal conduit; polycarbonate junction box(es); home run cable to indicator (60 ft long) and print packages including installation manual.



NOTE: Package does not include: peripherals; freight charges including material handling/crane; transportation permits and fees; escort(s) charge; or insurance transportation fees.



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

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

1.1 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.

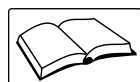


CAUTION: Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.



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.

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 Disposal



Product Disposal

The product must be brought to appropriate separate waste collection centers at the end of its life cycle.

Proper separate collection to recycle the product helps prevent possible negative effects on the environment and to health, and promotes the recycling of the materials. Users who dispose of the product illegally shall face administrative sanctions as provided by law.

1.3 Installation Overview

The modular sections of the ATV truck scale are shipped pre-assembled and ready to be placed on a flat surface using a crane. The self-contained modules are positioned on a prepared and level site. The weighbridge is lowered onto the load cells by retracting the shipping stands.

The indicator is connected to one of the two junction boxes (J-boxes). That J-box is then connected to the other J-box via an expansion cable.

You can then back fill material to bulkheads and calibrate to finish the installation.

1.3.1 General Assembly Order

1. Based on location of the indicator, place the first self-contained module into position on level compacted ground or other flat surface. Asphalt is not recommended.



NOTE: Be sure to arrange module with the j-box positioned toward the indicator.

2. Install spacer tubes and set the other self-contained module.
3. Place center (bridge module) between end modules.
4. Retract shipping stands.
5. Back fill material.
6. Connect to indicator and calibrate.

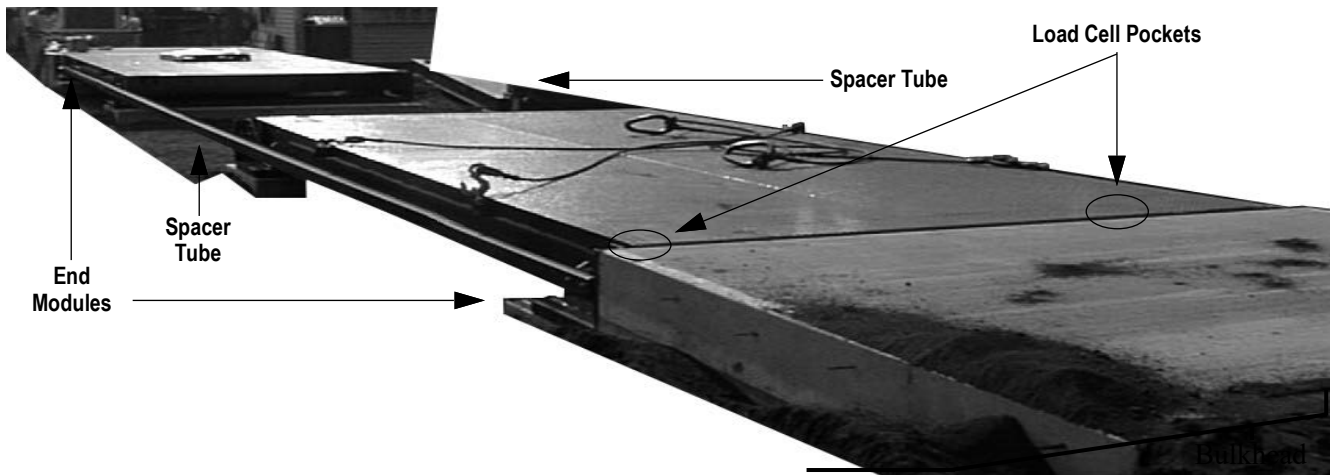


Figure 1-1. Weighbridge with Self-Contained Modules in Place

1.3.2 Assembly Time Estimates

When scheduling installation for a typical three-module, 70 ft truck scale, plan for a two-hour minimum crane rental to place the modules into position. A two-man crew, aided by a crane operator, can unload modules from the truck and place them into position in approximately one hour.*

Retracting shipping stands and backfilling material can be done in approximately 1–2 hours.* Load cells in self-contained modules are pre-wired to the J-box at the factory. Connect expansion and/or home run cable to complete wiring in approximately 1/2 hour (these estimated times may vary).

* Typical self-contained module weight of 70 ft x 11 ft, three module scale.

1.3.3 Recommended Equipment and Tools

- Crane – maximum module weight is approximately 12,500 lbs.*
- Four chains or cables (8 ft minimum length each) with hooks
- One low-profile 4-ton bottle jack
- 5/16 in allen wrench
- Hammers, maul, pry bar
- Socket wrenches to 1-1/2 in (drive compatible with torque wrench)
- Box end wrenches to 1-1/4 in
- Open end wrench set (7/16 in to 1-1/4 in)
- 4 ft bubble level
- Hand tools for pulling and connecting electrical wiring

1.3.4 Lifting and Handling

Deck modules can be lifted (see [Figure 1-2](#)) using four chains or cables attached to the four gussets mounted on the outside of the main beams. The gussets provide balanced lifting of the modules with bulkheads attached.



Figure 1-2. Unloading Modules From Truck



DANGER: Loads may disengage from crane scale hook and shackle or lifting eye if proper procedures are not followed. A falling load may cause serious injury or death.

Never lift more than the crane scale's assigned Working Load Limit (WLL) rating.

1.4 Serial Tag

The serial tag on an ATV Series portable truck scale truck scale is found at the end of the scale near the SURVIVOR logo (see [Figure 1-3](#)). A duplicate tag is placed inside of the J-box pocket (see [Figure 1-4](#)).

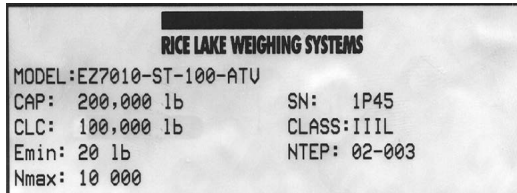


Figure 1-3. Serial Tag (Scale)

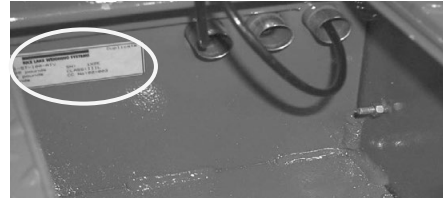


Figure 1-4. Serial Tag (J-Box)

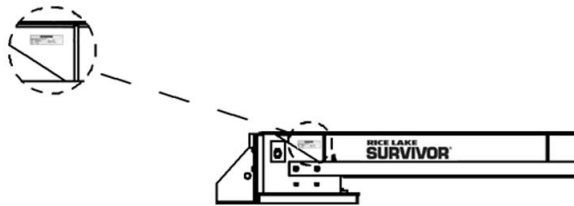


Figure 1-5. Serial Tag Placement (Module)

2.0 Assembly

The following sections detail deck module assembly, setting load cell mounts, and scale relocation.



WARNING: Crush hazard; Keep hands, feet and other body parts clear when setting weighbridge modules in place. Moving parts can crush and cut.

2.1 Deck Module Assembly



NOTE: The bridge module is placed on truck last. Set it off to the side when unloading modules at installation site.

1. Considering the location of the indicator, place first self-contained module of the ATV into position on a flat surface. Be sure to arrange module with J-box positioned toward indicator (see [Figure 2-1](#)).

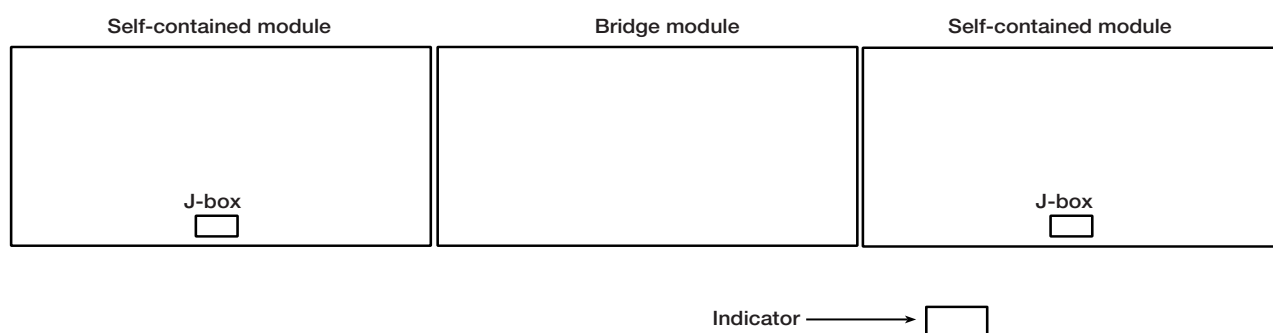


Figure 2-1. Module Placement

2. Install spacer tubes to the first module using the supplied hardware (see [Figure 2-2](#)).

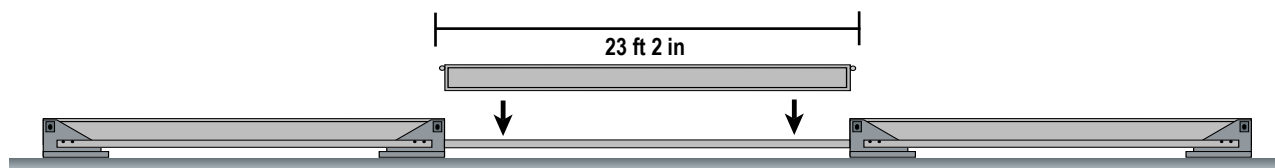


Figure 2-2. Spacer Tube Installation

3. Set other self-contained module to other end of spacer tube (spacer tube is used to ensure proper distance between self-contained modules for installation of bridge module). This module should also be arranged with J-box positioned toward indicator.
4. Remove load cell cover plates (requires 5/16 in Allen wrench) and place bridge module into receptacles on self-contained modules.



NOTE: Before installing the bridge module, check for debris that may have fallen into the two pin-connection receptacles. If the pins do not seat squarely in the receptacles, raise the module slightly and reset the module. Check the modules for proper alignment.



Figure 2-3. Pin and Receptacle Interface



Figure 2-4. Two Self-Contained Module Connection (No Bridge Module)

2.2 Setup

1. Back off shipping bolts located on ends of weighbridges (four for each self-contained module) until each bolt is no longer inserted in the scale (see [Figure 2-5](#)).

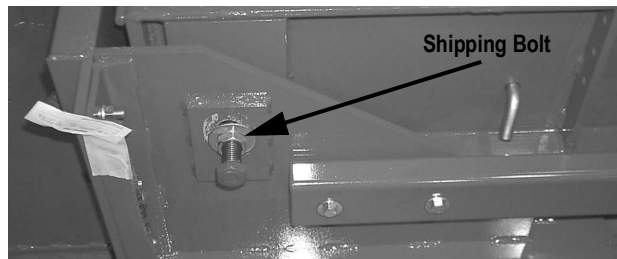


Figure 2-5. Weighbridge Shipping Bolts

2. Remove the bolt which connects the stand to bulkhead base (see [Figure 2-6](#)). Re-install this bolt in the bulkhead base after the stand is raised in [Step 4](#).

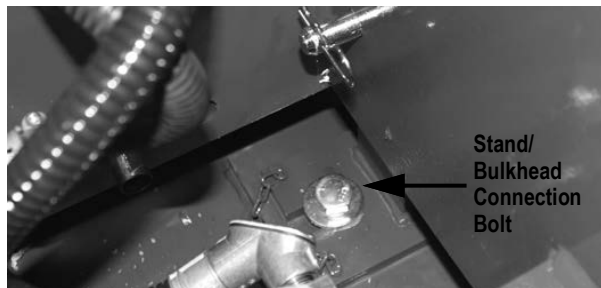


Figure 2-6. Bolt Connecting Stand to Bulkhead

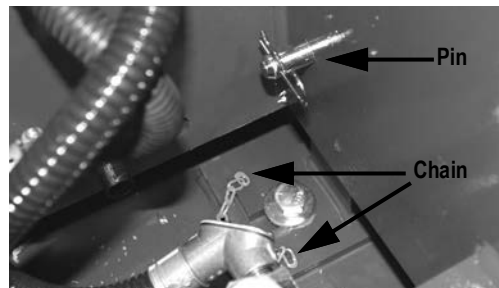


Figure 2-7. Hitch Pin and Chain

3. Install jack under corner of scale and remove weight of scale from stand located in load cell pocket.
4. Remove hitch pin that holds the stand up (see [Figure 2-7](#)).
5. Lift stand up with chain located inside load cell pocket (see [Figure 2-7](#)).
6. Re-install the bolt and hitch pin previously removed, and the stand will hold in the retracted position.
7. Slowly lower weighbridge onto load cell link and remove jack. Repeat for all load cell pockets.

8. Connect expansion cable between J-boxes on self-contained modules.
9. Wire home run cable and indicator.
10. Apply anti-seize compound to bolt threads and install load cell cover plates.
11. Install bolt-on wings (shipped on pallet). See [Figure 2-8](#).

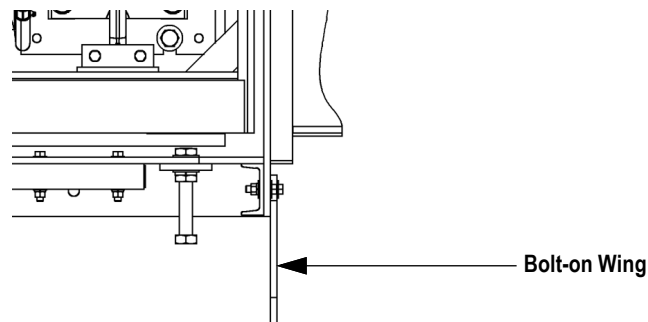


Figure 2-8. Bolt-on Wing

12. Back fill material against bulkheads to establish a ramp and approach as needed.
13. Calibrate the scale (see [Trimming and Calibration on page 17](#)).

2.3 Scale Relocation

Use the following steps when relocating the ATV portable truck scale series truck scale.

1. Remove load cell cover plates.

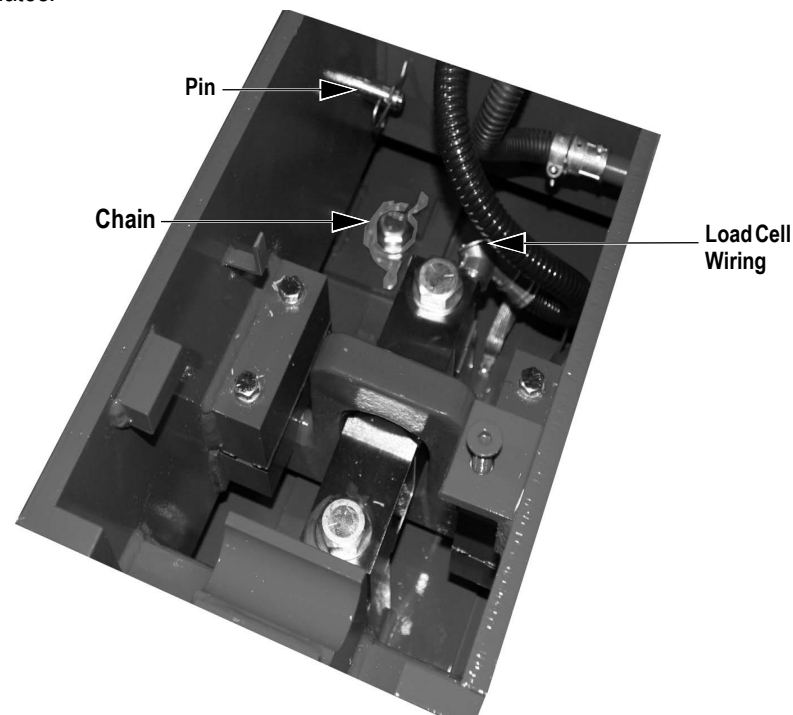


Figure 2-9. Load Cell Cover Plate Removed

2. Remove hitch pin that holds stand in retracted position (see [Figure 2-9](#)).
3. Jack up each corner of module until hitch pin can be re-installed in shipping position.
4. Install bolt connecting stand to bulkhead base (see [Figure 2-6 on page 10](#)).
5. Install shipping bolts on end of modules (see [Figure 2-5 on page 10](#)).
6. Remove home run cable and expansion cable.
7. Remove spacer tubes.
8. Remove backfill material.
9. Relocate modules starting with bridge module.

3.0 Connecting Electronic Equipment

Sixty feet of six-wire home run cable is supplied for wiring the J-box to the indicator. It is best to run this in 3/4 inch galvanized metal or plastic conduit from the J-box to the indicator. Conduit for this purpose and for connecting peripherals is to be obtained locally. A section of flexible conduit with connector is provided where this cable exits the load cell pocket. Do not run any other electrical cables in or near the conduit to the indicator.

3.1 Indicator to Peripherals



Figure 3-1. Conduit Run in Trench

Conduit runs may be buried in a trench or secured above ground. Use separate conduit runs for AC power and DC data lines to avoid interference. As a general guideline, run AC and DC cables in separate trenches if possible. When DC data cables must run in the same trench as AC power lines, separate cables as much as possible.

3.2 J-Box Connections

Each J-box contains a JB8SPT summing board with DC transient protection devices. A desiccant such as the RLWS Industrial Corrosion Inhibitor (PN 16037) should be added to the J-box before final closure.

Each self-contained module has a single J-box located in the J-box pocket. A summing card mounted within the J-box is used to make all cable terminal connections. All terminal pins are clearly marked as to function.

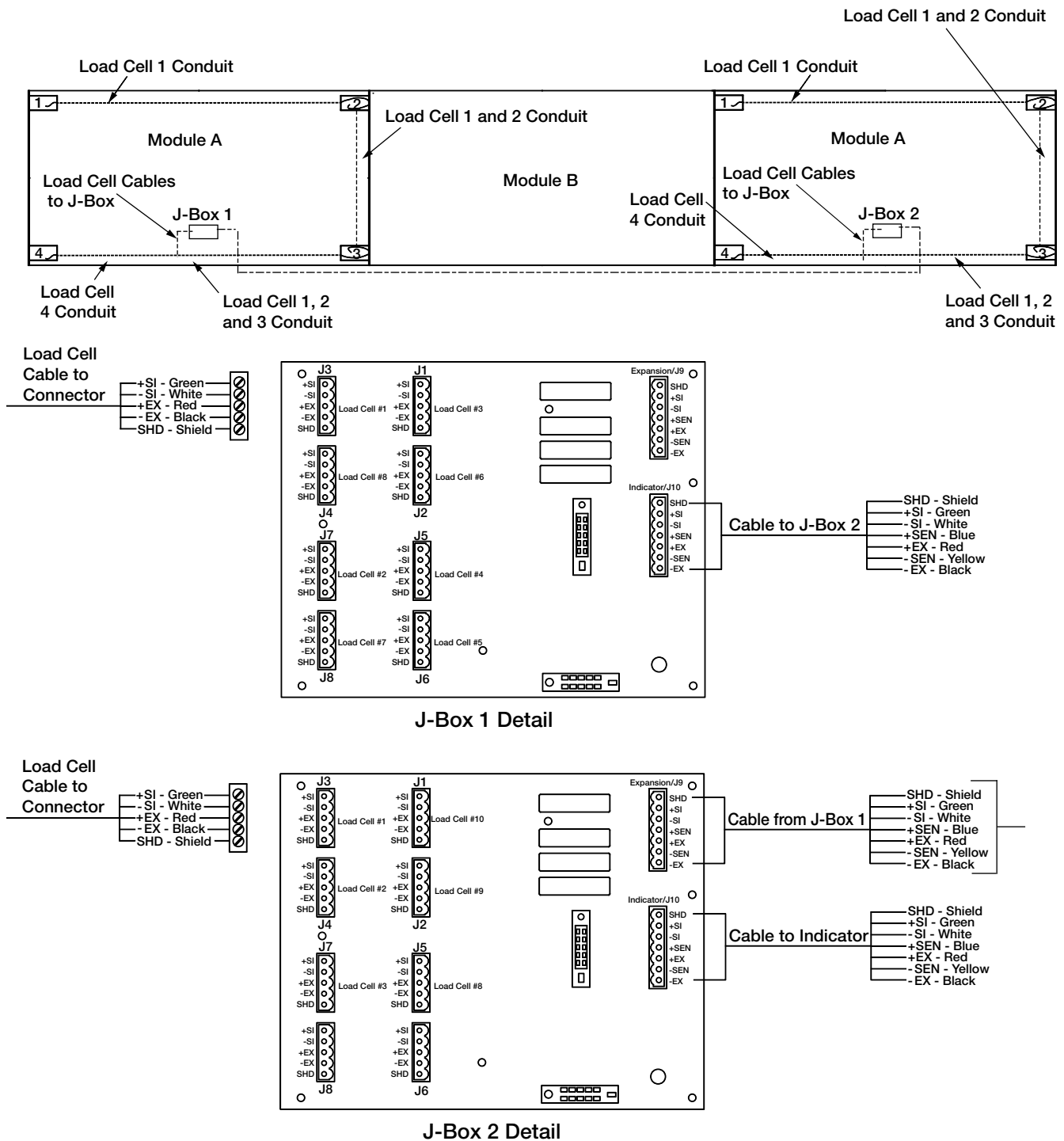


Figure 3-2. J-Box Wiring and Conduit

3.3 Single-Point Ground Conductor

A bare 10 gauge solid wire is run from the scale frame to the main AC power earth ground. If DC transient protection is included, it must be properly grounded to function correctly.

3.4 Electrical Ground Connections



IMPORTANT: *Improper grounding systems on outdoor truck scales often cause corrupted data from ground-loop current flows and costly lightning damage to electronics.*

Always strive for a **single-point grounding** system (see [Figure 3-4](#)). 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 power line 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. 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 one 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 in x 8 ft copper rods driven 8 ft 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 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. 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. 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 J-box and attach it to the ground lug located in the J-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 J-box ground lug to the ground lug located in the J-box pocket. Grounding of the J-box is essential for operation of the DC transient protection incorporated into the J-box.

3.5 Installing Transient Protection

A two-year lightning protection package comes standard all truck scales. The individual components of this comprehensive package are designed to protect AC and DC portions of the system. The lightning protection package includes:

- DC transient protection included with standard J-box board(s). This DC transient protection handles up to eight load cells. Scales with more than eight load cells require additional J-boxes.
- Self-contained DC transient protection unit in the home run cable at the indicator.
- A 115 VAC uninterruptable power supply/surge protector in the AC line before the indicator.
- Number 10 bare ground conductor cable buried in earth from scale frame to DC transient board at indicator and finally to the AC power ground lug.

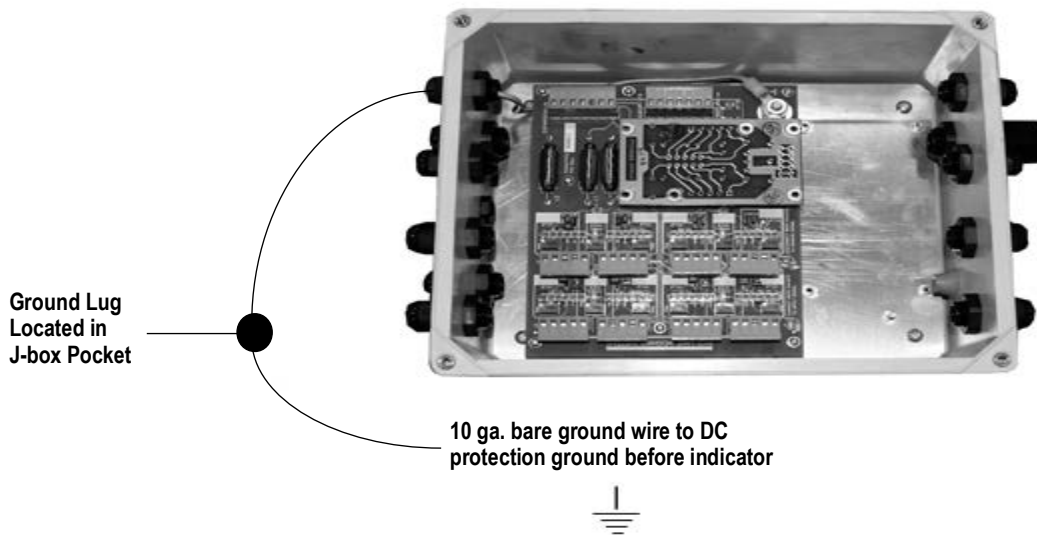


Figure 3-3. Grounding and Transient Protection on ATV Scale



NOTE: Serial communications (if used) may also require transient protection to fully protect entire system. A TP-232 DC Transient Protection is suitable protection for serial communications lines. In addition, printers, remote displays and other devices connected to serial communications should be protected with AC transient protection.

See [Figure 3-4 on page 16](#) to properly set up single-point grounding.

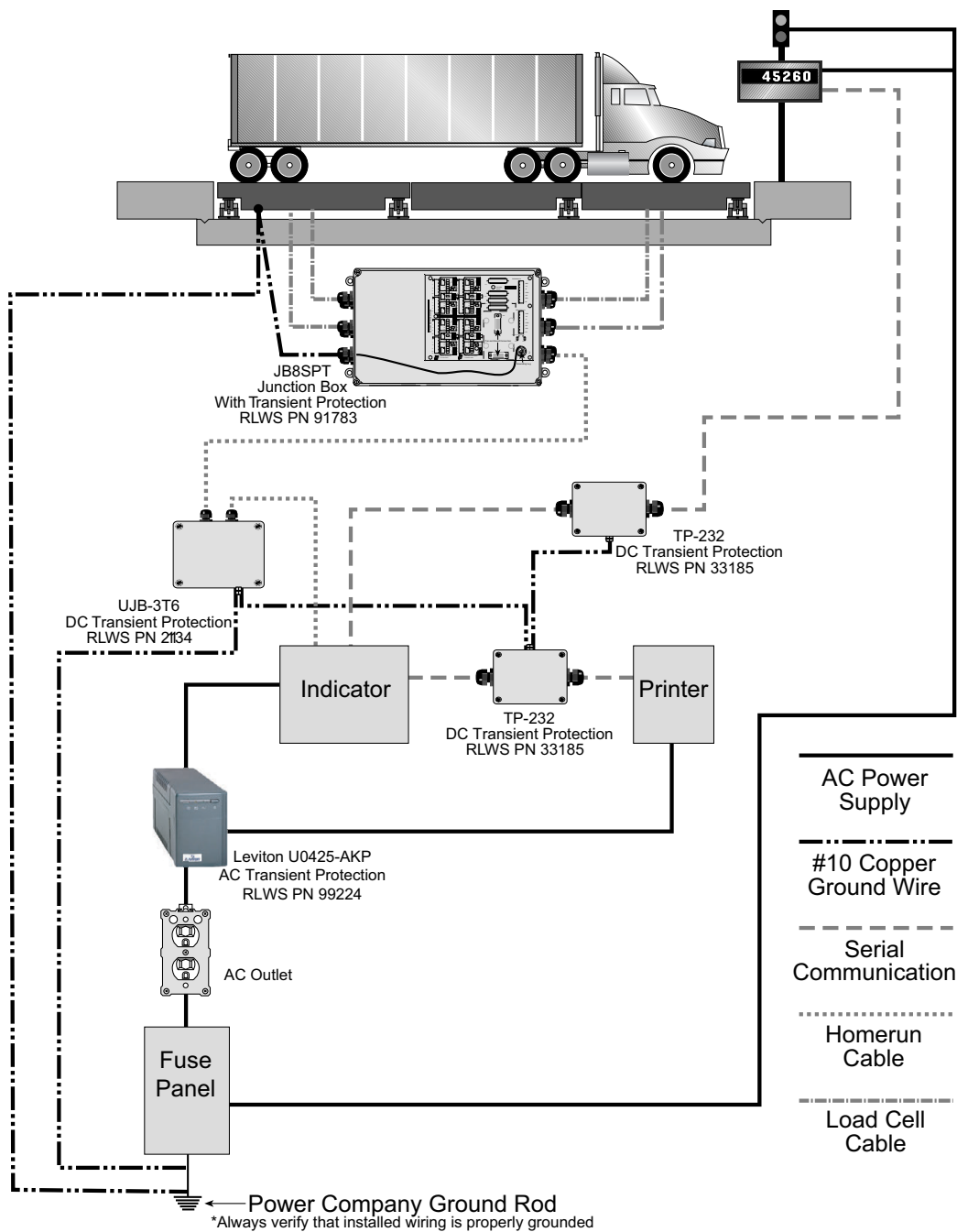


Figure 3-4. Single-Point Grounding Diagram

4.0 Trimming and Calibration

The following section describes steps in trimming individual cells and pairs of cells, and calibration of the ATV truck scale. See J-box instructions located in the J-box for details on trimming.

4.1 Overview and Equipment Required

4.1.1 Load Cell Trimming

Individual load cell signal trimming (equalizing the signal output from each load cell) must be done first along each side of the scale so all cells on a side have equal signal output. Adjustments can be interactive, so each side should be done at least twice.

Once that is done, load cell *pairs*—one from each side—are trimmed as paired sections until each sectional output is equal. Adjustments to each section should also be done at least twice.

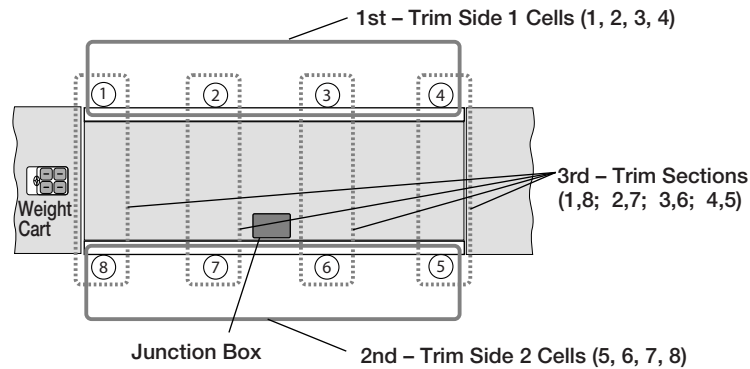


Figure 4-1. Load Cell Trimming Diagram

4.1.2 Equipment Required

Both of these trimming operations can be done using a weight cart parked in various locations on the scale. Final verification of equal output trimming, however, requires test weights to be placed on the deck in various locations.

4.2 Trimming Individual Cells

Connect all load cells to the summing board terminals in the J-box and connect the main interface cable from the J-box to the indicator. Power up the indicator.

Turn all load cell potentiometers (individual and section) in the J-box clockwise so all signals are at full strength. Refer to the J-box instruction manual for proper set-up of jumpers and dip switches prior to trimming, then proceed to individual cell trimming.

4.2.1 Side 1

The first objective is to adjust individual load cells along one side of the scale for equal signal output when equal weight is put on those cells. For convenience, that side of the scale is referred to as side 1. The trimming weight you use is the loaded weight cart.

1. Park the cart as close as possible to side 1 being trimmed with the wheels centered over the end load cell mount (No. 1 in Figure 4-2). Record the indicator reading. Remember that the scale is still uncalibrated, so the indicator readings are simply raw counts rather than weight units.

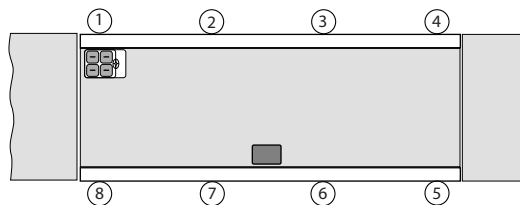


Figure 4-2. Trimming Load Cell Number One

2. Move the cart directly over mount No. 2 and record that reading. Move the cart directly over mount No. 3 and record that reading. Move the cart so the wheels are centered directly over mount No. 4 (you may have to turn the weight cart around so all wheels remain on the scale) and record the reading.

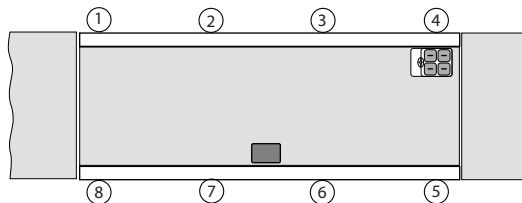


Figure 4-3. Trimming Load Cell Numbers 2, 3, and 4

3. The lowest reading of the four is the reference cell. Do not change that cell's signal. Instead use the individual cell potentiometers for the other three cells to reduce those signals to match your reference cell. Remember that you turned all pots to full signal before starting, so you can not increase the signal from any cell — only decrease signal by trimming with the pots.
4. Note that the best trim is always the least trim. If one of the four readings differs from the others by more than 5% of the displayed counts, there is probably a mechanical problem with that load cell mount causing the large difference. Find it and correct it before going on. Check for binding, an out-of-level or misaligned link, or similar problems with the load cell and mount. *Do not* try to trim down large signal differences with resistance pots — that only adds larger problems later because of interaction between mounts.
5. Park the loaded weight cart over one of the high-reading cells on side 1. Turn that cell's individual potentiometer until the displayed reading equals your recorded reference cell reading. Repeat for the other two high-reading cells on side 1.
6. As adjustments are somewhat interactive, repeat the process in steps 1 – 5 until all four cells on side 1 read within .1% of each other.
7. Repeat steps 1 – 6 for load cells 5 – 8 on side 2 of the scale.

4.3 Trimming Paired Sections

Now that all individual load cells are trimmed for equal output, pairs of load cells on opposite sides of the scale must be trimmed for equal sectional output. This process is called **section trimming**.

1. Park the loaded weight cart in the middle of the scale and directly over an imaginary line connecting an end pair of cells (1 and 8 in Figure 4-4). Record the indicator reading.

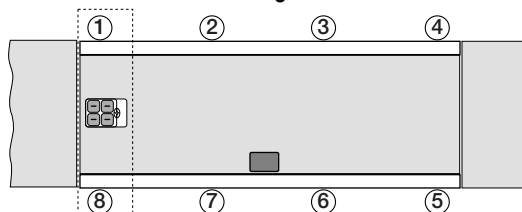


Figure 4-4. Trimming Paired Section 1:8

2. Move the weight cart directly over the next paired cell section (2, 7 in Figure 4-5) and record the indicator reading. Do the same for the last two paired sections (cells 3, 6 and 4, 5).

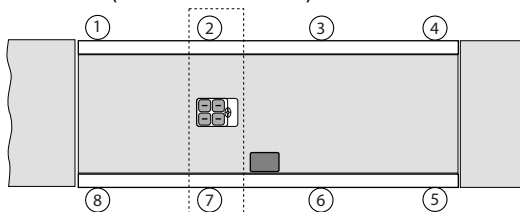


Figure 4-5. Trimming Paired Sections 2:7, 3:6, and 4:5

3. Choose the lowest reading of the four as your reference section, which is not adjusted. Using the *section* potentiometers, reload the other three sections in turn and trim the sections to match the reading of the reference section. Recheck section readings a second time as the adjustment made can be somewhat interactive.
4. As a final verification of the load cell trimming, do a final corner check. Place a 1000 lb weight on one corner of the platform and record the raw-count reading on the indicator. Move the weight to all of the other corners in turn and record those readings. The readings should be within .1% of each other.

4.4 Calibrating with Test Weights

The calibration procedure can only be done after all trimming as described above has been completed. A qualified scale technician with a test weight truck and the expertise to access the scale indicator's setup or calibration mode must perform the calibration procedure.

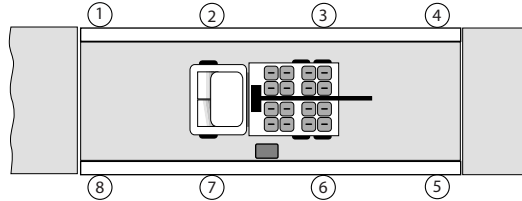


Figure 4-6. Calibration with Test Weights

4.4.1 Equipment Required

Truck scales are routinely calibrated using 25% of the capacity weight of the scale. Certified Class F test weights equaling at least 12.5% of the scale's capacity are required for calibrating a commercial legal-for-trade truck scale. In addition, some type of weight for a substitution test of an additional 12.5% of the capacity is required. This can be the test-weight truck, bags of sand, or any convenient items easy to load onto the scale. This total calibration weight of 25% of scale capacity (12.5% test weights, 12.5% substitution weight) is required by weights and measures officials for commercial truck scales in most states. Check with your local weights and measures officials for the requirements in your jurisdiction.

Industrial scales not used for legal-for-trade transactions do not require certified test weights. Weight equal to 25% of scale capacity is recommended for calibrating such scales.

See **NIST Handbook 44** for detailed calibration requirements and procedures.

5.0 Load Cell Replacement

5.1 Replacement Procedure

1. Position jack beneath one of the weighbridge's main frame members close to the load cell mount. (Allow room for load cell removal and installation.) Raise jack approximately 1/2 in and put setting block(s) under the scale deck.



CAUTION: As a safety precaution, always use setting blocks when jacking scale module.

2. Disconnect the load cell terminal connections in the junction box.
3. Disconnect the flex conduit from the rigid conduit at the frame.



NOTE: Attach a pull cord to the load cell cable at the j-box before pulling the cable through the conduit.

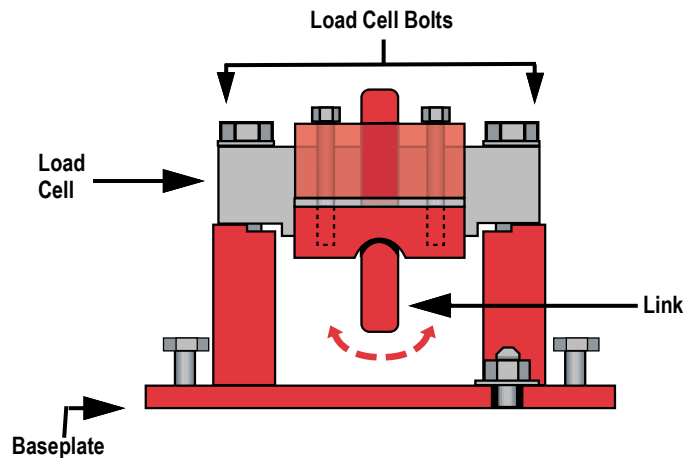


Figure 5-1. Load Cell Replacement

4. Pull the load cell cable out of the conduit.
5. Remove the two load cell bolts and lift out load cell and link assembly.
6. Remove 90 degree conduit connector and flex cable. Install 90 degree conduit connector and flex conduit on new load cell in the same position as was removed.
7. Install link over new load cell. Reinstall load cell and link assembly onto the baseplate. Install load cell mount bolts and torque to 50 – 75 ft-lb.
8. Pull load cell cable through conduit using pull cord. Make a loop in flex conduit between the load cell and the rigid conduit. Reconnect flex conduit to rigid conduit.
9. Remove setting blocks and lower scale module so that it rests on the link. Check link to verify that it is centered and plum.
10. Connect wiring to terminals in junction box.



NOTE: RLWS has 1/4 in (PN 67293), 1/8 in (PN 67294) and 1/16 in (PN 67291) shims available to level scale. Do not exceed over 3/4 in of shims combined. If more is necessary, contact RLWS for other options.

5.2 End Clean-outs

End cleanouts are standard on all ATV truck scales. Simply remove the bolts and cover plate to gain access. Apply anti-seize compound to bolt threads prior to re-installing cover plate.

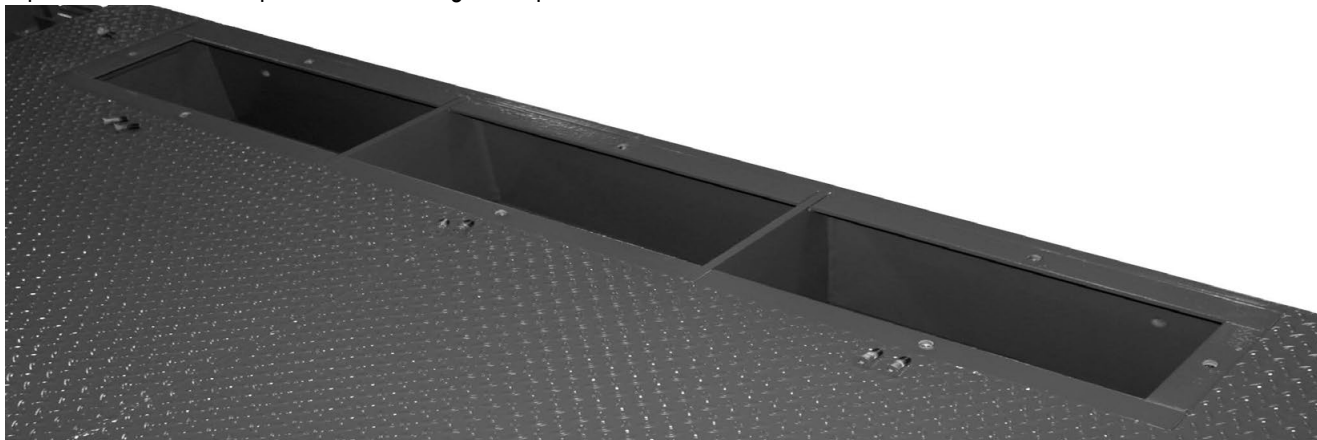


Figure 5-2. End Cleanouts with bolts and cover plate removed



© Rice Lake Weighing Systems Content subject to change without notice.

230 W. Coleman St. • Rice Lake, WI 54868 • USA USA: 800-472-6703 • International: +1-715-234-9171