

# RL1900 SERIES

---

*Mounting Assembly Kit*

## Installation Guide



**RICE LAKE WEIGHING SYSTEMS**  
Industrial Solutions on a Global Scale™



25711

# Contents

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Mechanical Installation .....</b>	<b>2</b>
2.1 General Installation Guidelines for Tank Mounts .....	2
2.2 Installing the RL1900 Mount .....	3
<b>3. Load Cell Wiring .....</b>	<b>5</b>
<b>4. Junction Box Connections, Adjustments &amp; Calibration ....</b>	<b>6</b>
<b>5. Troubleshooting .....</b>	<b>6</b>
<b>6. Maintenance and Replacement Parts .....</b>	<b>7</b>
<b>7. Limited Warranty .....</b>	<b>8</b>



## 1. Introduction

---

The RL1900 Series Mounting Assemblies are designed to accommodate normal vessel expansion in all directions while still exercising self-checking capabilities. The center-pivoting, tension loading design incorporates spherical washers and a unique pivoting trunnion that is self-restoring to its center position. Vessel leveling and adjustment can be done easily with the center loading bolt, and the load cell can be replaced without raising the vessel.

The mount is available in capacities from 1,000 to 10,000 lb. It features 304 stainless steel construction with hermetically sealed load cells, making it ideal for rigorous washdown and corrosive environments.

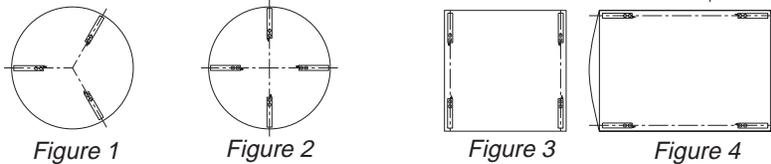
### **Caution**

The installation should be planned by a qualified structural engineer to avoid product failure. Each installation is unique, and this booklet is meant to serve only as an overview for installation of the RL1900 Series Mounting Assembly.

## 2. Mechanical Installation

### 2.1 General Installation Guidelines for Tank Mounts

In circular mounting configurations, the preferred mounting orientation is with the long axis of the load cell pointing toward the center of the vessel, as illustrated in Figures 1 and 2 below.

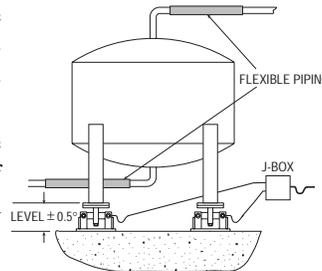


Figures 3 and 4 illustrate mounting configurations for rectangular vessels where the long axis of the load cell should be parallel to the long dimension of the vessel. In any application where a recurring force is present in one direction, as in a conveyor belt or roller platform, the long axis of the load cell should align with that force.

1. Mounting surface for base plate and top plate must be level within  $\pm 5^\circ$  to minimize side loads and extraneous forces. If the mounting surfaces are not level, then shims or grout may be used to level the mount.

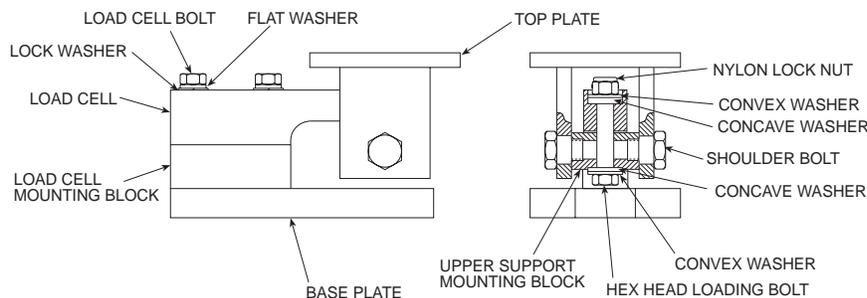
If possible, check level and plumb again when container is fully loaded because deflections in legs and supporting structures may cause additional side forces that greatly effect accuracy. Reinforcement such as cross bracing of legs or other support structures may be necessary to correct this. Deflection of the mount's top or base plate due to loading should not exceed  $\pm 5^\circ$ .

2. The relative load on each mount assembly should vary by no more than 20%. During installation, add shims where necessary to verify that the correct load distribution is achieved on each mount.
3. During installation, dummy load cells can be used to prevent overload damage. However, if the actual load cells are used during installation of the weighing assembly, extreme care must be taken to prevent overload damage. A tank or hopper weighing several tons can exert huge forces when dropped only a fraction of an inch.
4. It is crucial that flexible sections are close to the vessel and all piping or conduit be horizontal. If flexible piping is not used, make sure the distance from the vessel to the first pipe support is 20-30 times the pipe diameter. For details, see the technical information section of the Rice Lake Weighing Systems Load Cell Product Selection Guide. In smaller, lower capacity tanks and hoppers, isolating the resultant forces becomes extremely critical. If possible, flexible conduit piping should be used close to the vessel instead of the rigid variety.



5. Load cells should not be installed in the mounts until all welding is completed. The heat generated from welding current passing through a load cell can damage the adhesive holding the strain gauge to the body. If possible, use a dummy load cell when welding to maintain finished height. If welding is unavoidable after load cell installation, ground in such a manner as to prevent welding current from passing through the load cell. Ground the welder as closely as possible to the point of welding. Never rely on check rods or piping for grounding.
6. When possible, use only “hermetically sealed” load cells in washdown applications. “Environmentally protected” load cells are not suitable for such applications and will be damaged. If tanks and surrounding equipment are 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.
7. Detailed instructions for installing this load cell mount follow. When installing the load cells, use the bolts provided or grade 5 or stronger hardened bolts. Pay particular attention to the recommended torque values. Some mounts require very loosely torqued bolts to allow the load cells to flex easily. Others must be very tight to prevent the load cells from creeping or digging into the mount.

## 2.2 Installing the RL1900 Mount



The type of installation, structure of the vessel supports, and strength of the mounting surface determines the method of locating, attaching, and assembling the RL1900 Mounting Assembly. Carefully consider three areas that commonly cause accuracy problems:

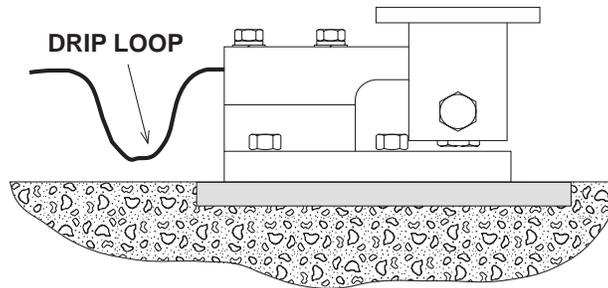
- Are the supporting legs adequately braced so they will not spread when the system is fully loaded?
- Does the supporting structure have the necessary strength to prevent flexing when the system is fully loaded?
- Is there attached equipment such as skirting, venting, or piping which is likely to cause binding or lack of flexibility?

After considering any areas that may cause accuracy problems, follow these installation steps.

1. Determine where to position the mount and in which direction it should be oriented.
2. Assemble the mount and load cell according to the drawings shown at the beginning of this section. For load cells using 1/2" mounting bolts, torque to 65 FT-LBS. Torque 3/4" mounting bolts to 295 FT-LBS. Adjust the center loading bolt on all mounts to give the lowest overall profile height, while leaving at least a 1/8" gap between the load cell and the upper support loading block.
3. Lift and block the vessel to the same height as the assembled mounts.
4. Lift one corner or side of the vessel enough to slide that mount into place.
5. If the mount is being fitted under the leg of a vessel, verify that the leg's center line passes through the center of the top plate (through the center of the load cell's load hole).
6. Attach the top plate by bolting. Do not fully tighten because shimming may be necessary to level.
7. Repeat steps 4, 5, and 6 for the remaining mounts. The vessel should now be supported on the mounts alone.
8. If necessary, move the vessel to its final position. Verify that there is no initial misalignment between the base plate and top plate by lifting the vessel slightly at each support point in turn. This will also indicate if the load is evenly distributed on all mounts. Shim if necessary (this only applies to systems utilizing more than 3 mounts).
9. Attach the base plates to the foundation using anchor bolts for concrete or by bolting or welding to a steel structure. Verify that the base plates are no more than  $\pm 5^\circ$  out of level. Shim as necessary.
10. Check that the top plates are no more than  $\pm .5^\circ$  out of level. Shim if necessary and fully tighten the bolts.
11. The load distribution can be checked more accurately by connecting each load cell to the junction box and indicator in turn and measuring the output with a voltmeter. To verify wiring scheme, check the installation manuals for the junction box and indicator. Shim if necessary. The variation in load among the cells should be no more than 20%.

### 3. Load Cell Wiring

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 (66 °C). **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 excess cable and protect it 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. Attach load cell cable to the dead structure, not the vessel.
3. 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.
4. Connect cables for standard RTI SSB and HBM SB3 load cells to the summing board in the junction box according to the guide shown below and the labels on the terminal strips of the junction box. To verify the wiring scheme, see the certification shipped with each load cell.
5. If the wiring from the junction box to the indicator is longer than 25 feet, use positive and negative remote sense lines for better performance.



LOAD CELL WIRE COLOR	FUNCTION
Green	+EXC
Black	- EXC
White	+SIG
Red	-SIG
Gray or Bare	SHIELD

## 4. Junction Box Connections, Adjustments & Calibration

- Refer to Junction Box manual for trimming details.
- Refer to the indicator manual and/or the “Technical Information” section in the Load Cell Product Selection Guide for system calibration guidelines.

## 5. Troubleshooting

If the system powers up and gives some type of stable digital readout that varies with the load on the system, the system problems are probably caused by factors other than the load cells. All too often, the load cells are blamed for a malfunctioning system; 90% of the time, the problem lies elsewhere. Look for mechanical causes for your problem first.

If the system can be calibrated but doesn't return to zero, loses calibration, or demonstrates non-linearity or non-repeatability, see the following chart for possible causes and refer to the following list of checks.

Symptom	Possible Cause
No return 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 shock damage; mechanical binding
Lost calibration	Out of level or plumb; moisture problem; mechanical binding
Drifting readout	Moisture in junction box, cables, or load cell; mechanical binding

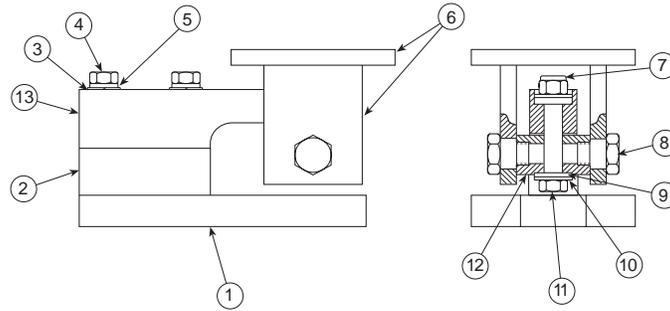
1. Check load cell mount for debris restricting load cell movement or debris between scale and structure. Check any overload stops for proper clearance.
2. Check that tank/vessel and mounts are plumb, level, and square at the critical areas.
3. Check all piping and conduit for connections which restrict vessel movement.
4. If check rods are used, loosen all connections to finger tight only for testing.
5. Check load cell cables for physical or water damage.
6. Check all electrical connections, especially in the junction box.

If the problem still is not found:

7. Check possible indicator malfunction by using a load cell simulator to input a known good signal into the indicator.
8. 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 after all these checks the problem still cannot be isolated, reconnect all but one load cell. 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 the simulator.

## 6. Maintenance and Replacement Parts



### RL1900 STAINLESS STEEL MOUNTS

No.	Description	No. Req.	Replacement Part Numbers	
			1,000lb-5,000lb	10,000lb
1	Base Plate .....	1	18254 .....	18280
2	Load Cell Mounting Block .....	1	18253 .....	18281
3	Flat Washer .....	1	15175 .....	15180
4	Load Cell Bolt .....	2	14767 .....	14790
5	Lock Washer .....	2	15168 .....	15182
6	Upper Support/Top Plate .....	1	22293 .....	18282
7	Nylon Lock Nut .....	1	14666 .....	14689
8	Shoulder Bolt .....	2	22735 .....	22735
9	Concave Washer .....	2	22736 .....	22742
10	Convex Washer Set .....	2	22737 .....	22743
11	Hex Head Loading Bolt .....	1	14763 .....	14789
12	Upper Support Mounting Block ...	1	22738 .....	22744
13	Load Cell .....	1	See Load Cell Selection Guide	

## **7. Limited Warranty**

---

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two (2) years after system start-up. The two-year warranty obligation is contingent upon clear documentation which establishes the start-up date. In the absence of irrefutable documentation establishing the system start-up date, the two-year warranty coverage will commence upon the date of shipment of equipment from Rice Lake Weighing Systems.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

1. Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
2. At the option of RLWS, the equipment will be returned to RLWS at the expense of the Buyer.
3. Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
4. Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
5. RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
6. In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.

© 1995 Rice Lake Weighing Systems, Inc. Rice Lake, WI USA. All Rights Reserved. Rice Lake Weighing Systems • 230 West Coleman St. • Rice Lake, Wisconsin 54868 • USA •