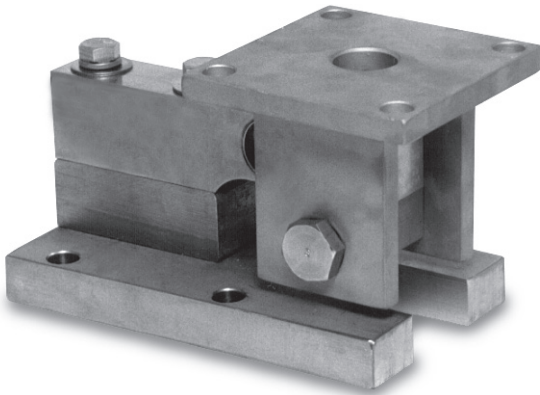


# RL1900 Series

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*Mounting Assembly Kit*

## Installation Manual



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# Revision History

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

Revision	Date	Description
C	February 11, 2025	Established revision history; updated manual format

*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](http://www.ricelake.com/training) or obtained by calling 715-234-9171 and asking for the training department.

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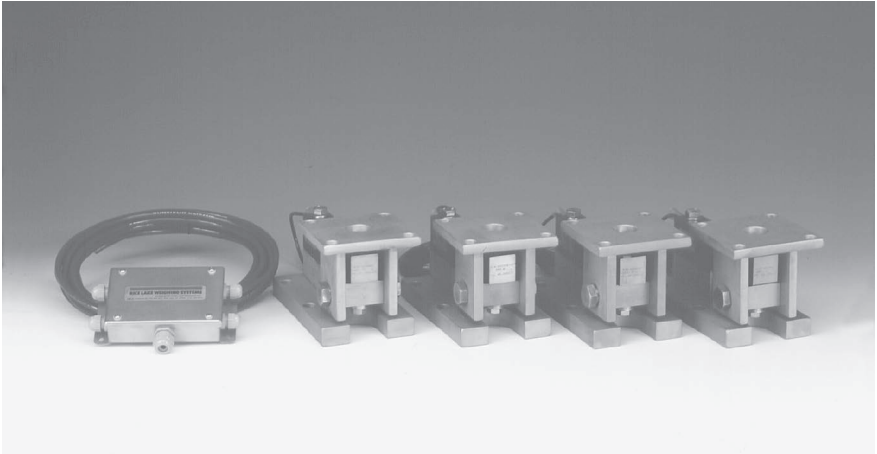
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# 1.0 Introduction

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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 stainless steel welded IP67 rated load cells, making it ideal for applications in demanding environments.



Manuals are available from Rice Lake Weighing Systems at [www.ricelake.com/manuals](http://www.ricelake.com/manuals)

Warranty information is available at [www.ricelake.com/warranties](http://www.ricelake.com/warranties)

## 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.

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## General Safety

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*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.*



**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.*

## 2.0 Installation

### 2.1 Mechanical Installation

#### 2.1.1 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 (see [Figure 2-1](#)).

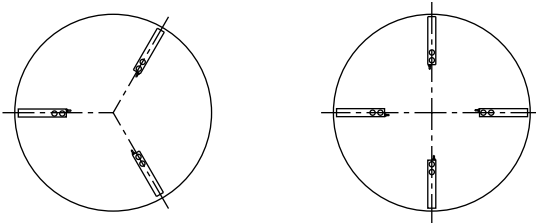


Figure 2-1. Tank Mount Orientation

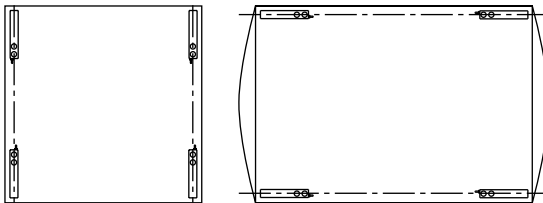


Figure 2-2. Rectangular Vessel Configuration

[Figure 2-2](#) illustrates 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  $\pm 5$  degrees 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  $\pm 5$  degrees.

2. The relative load on each mount assembly should vary by no more than 20 percent. 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.

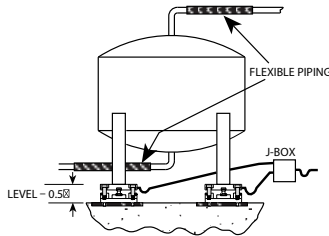


Figure 2-3. Hopper Tank and J-Box

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.

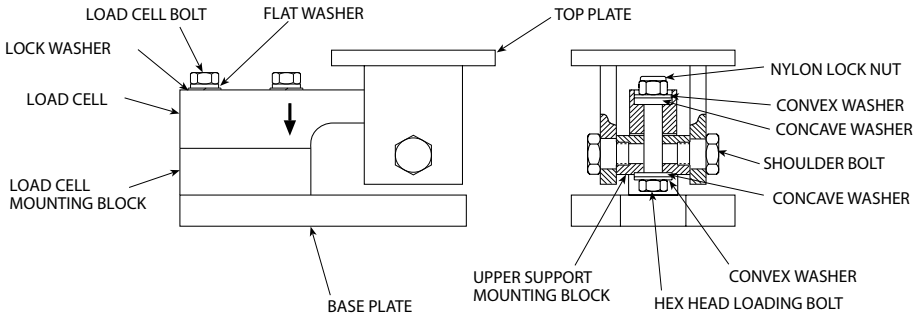


Figure 2-4. RL1900 Series Mounting Kit



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

### 2.1.2 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 RL 1900 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?
1. Determine where to position the mount and 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 in mounting bolts, torque to 65 ft-lb. Torque 3/4 in mounting bolts to 295 ft-lb\*. Adjust the center loading bolt on all mounts to give the lowest overall profile height, while leaving at least a 1/8 in 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  $\pm 0.5$  degrees out of level. Shim as necessary.
10. Check that the top plates are no more than  $\pm 0.5$  degrees 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 percent.
12. Use these torque specs only on the bolts used to mount the load cell to the mounting block and base plate (see [Figure 2-4 on page 9](#) for part description).

## 2.2 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.

- 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 (see [Figure 2-5](#)). Attach load cell cable to the dead structure, not the vessel.

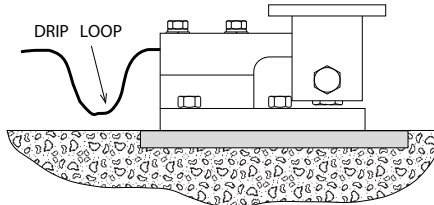


Figure 2-5. Drip Loop Illustration

- 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.
- Connect cables for standard RLSSB and VPG RTISSB 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.

Load Cell Wire Color	Function
Green	+EXC
Black	-EXC
White	+SIG
Red	-SIG
Gray or Blue	SHIELD

Table 2-1. Load Cell Wiring

- 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.

## 2.3 Junction Box Connections, Adjustments, and Calibrations

- Refer to junction box manual for trimming details.
- Refer to indicator manual for system calibration guidelines.

## 3.0 Troubleshooting and Maintenance

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

*Table 3-1. Symptoms and Possible Causes*

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 is not found:

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 the problem still cannot be isolated:

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



***NOTE: 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.***

### 3.1 Replacement Parts

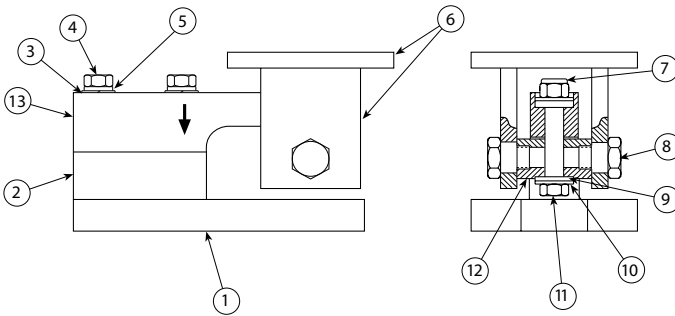


Figure 3-1. RL1900 Stainless Steel Mounts

No.	Description	No. Req.	Replacement Part Numbers	
			1,000-5,000 lb	10,000 lb
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 Guide	

Table 3-2. Replacement Parts List





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