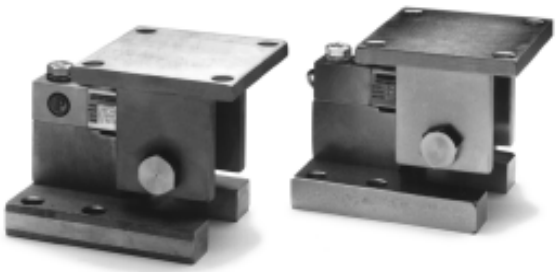
RL1800 SERIES

Weigh Module Kit

Installation Guide



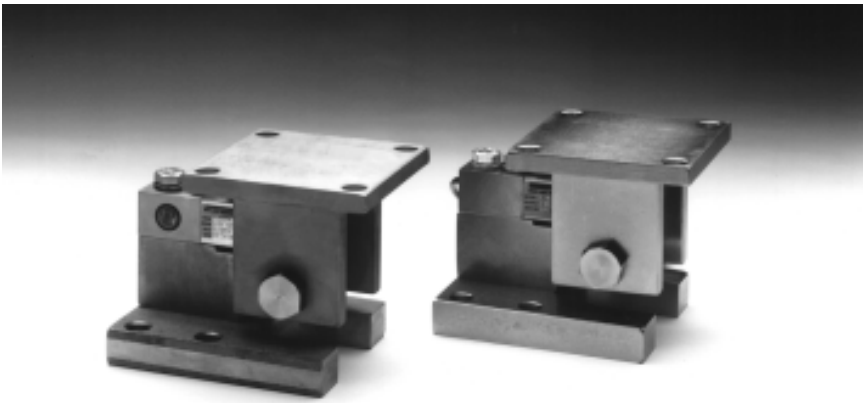
RICE LAKE WEIGHING SYSTEMS
Industrial Solutions on a Global Scale®

ISO 9001 REGISTERED

25712

Contents

12/98



1. Introduction

The RL1800 Series Weigh Modules 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 self-restores to its center position. Vessel leveling and adjustment can easily be done with the center loading bolt, and the load cell can be replaced without raising the vessel.

The module is available in two sizes. The small size accepts load cells with capacities from 250lb to 5,000lb. The large size accepts load cells from 5,000lb to 10,000lb capacities. Both sizes are available in tool steel or stainless steel.

Caution The installation should be planned by a qualified structural engineer. Each installation is unique, and this booklet is meant to serve only as an overview for installation of the RL1800 Series Weigh Modules.

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at **www.rlws.com**.

2. Mechanical Installation

2.1 General Installation Guidelines for Weigh Modules

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.

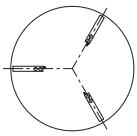


Figure 1

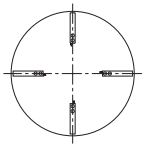


Figure 2

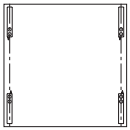


Figure 3

Figure 4

Figures 3 and 4 illustrate other mounting configurations. For rectangular vessels, 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, such as in a conveyor belt or roller platform, the long axis of the load cell should align with that force.

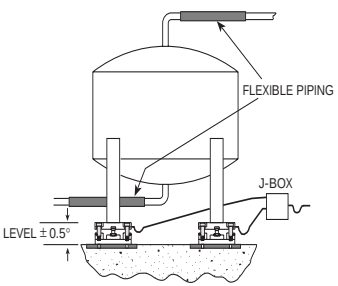
1. Mounting surface for base plate and top plate must be level within ±0.5° to minimize side loads and extraneous forces. If the mounting surfaces are not level, then shims or grout may be used to level the module.

   If possible, check level and plumb again when container is fully loaded because deflections in legs and supporting structures may cause additional side forces which greatly affect accuracy. Reinforcement such as cross bracing of legs or other support structures may be necessary to correct this. Deflection of the module's top or base plate due to loading should not exceed ±0.5°.

2. The load on each module should vary by no more than 20%. During installation, add shims where necessary to verify that the correct load distribution is achieved on each module.

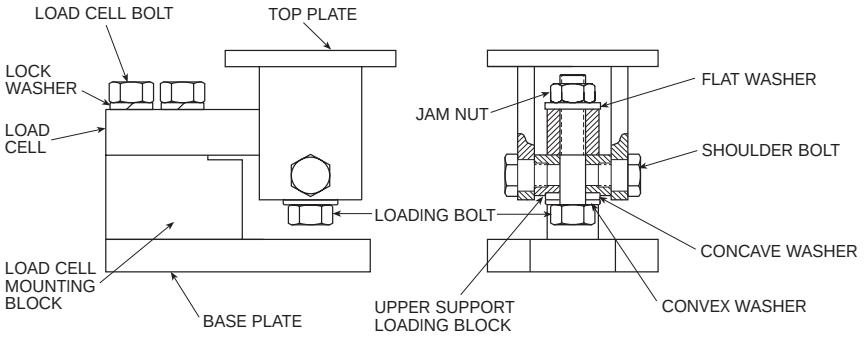
3. During installation, dummy load cells can be used to prevent overload damage. However, if the actual load cells are used during installation of the weigh module, extreme care must be taken to prevent overload damage. A tank or hopper weighing several tons can exert huge forces when dropped only a fraction of an inch.

4. It is crucial that all piping or conduit be horizontal and flexible sections are close to the vessel. 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. In smaller, lower capacity tanks and hoppers, isolating the resultant forces becomes extremely critical. When possible, flexible conduit piping should be used close to the vessel instead of the rigid variety. For details, see our *Weigh Modules & Vessel Weighing Systems* manual, PN 43918.

5. Load cells should not be installed in the modules 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 weigh module is recommended. Proper drainage is necessary so the weigh module is not standing in water.
7. Detailed instructions for installing this load cell module 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 modules 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 module.



2.2 Installing the RL1800 Module

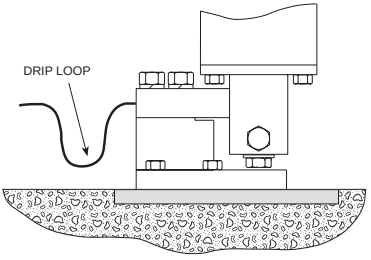
1. The type of installation, structure of the vessel supports, and strength of the mounting surface govern the method of locating, attaching, and assembling the RL1800 Weigh Module. Carefully consider three areas which commonly cause accuracy problems:

- 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?

2. Determine where to position the module and in which direction it should be oriented.
3. Assemble the module 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 modules 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.
4. Lift and block the vessel to the same height as the assembled modules.
5. Lift one corner or side of the vessel enough to slide that module into place.
6. If the module 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).
7. Attach the top plate by bolting. Do not fully tighten because shimming may be necessary to level.
8. Repeat steps 5, 6, and 7 for the remaining modules. The vessel should now be supported on the modules alone.
9. 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 modules. Shim if necessary (this only applies to systems utilizing more than 3 modules).
10. 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 ±0.5° out of level. Shim as necessary.
11. Check that the top plates are no more than ±0.5° out of level. Shim if necessary and fully tighten the bolts.
12. The load distribution can be more accurately checked 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. The variation in load among the cells should be no more than 20%. Shim if necessary.

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 RL30000, RL39123, and RL35083 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
Red	+EXC
Black	- EXC
Green	+SIG
White	- SIG
Gray or Bare	SHIELD

5. For better performance, use positive and negative remote sense lines if the wiring run from the junction box to the indicator is longer than 25 feet.

4. Junction Box Connections, Adjustments & Calibration

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

5. Troubleshooting

If system powers up and gives some type of stable digital readout that varies with the load on the system, system problems are probably caused by factors other than the load cells. All too often, 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

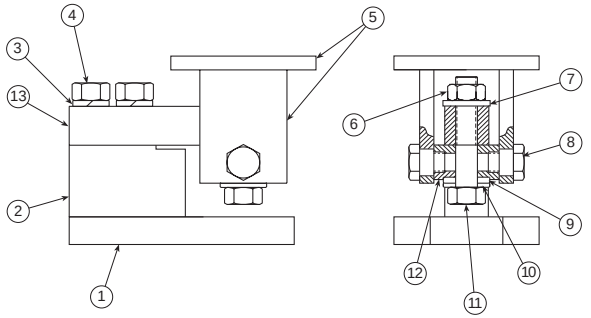
1. Check load cell module for debris restricting load cell movement or debris between scale and structure. Check overload stops for proper clearance.
2. Check that tank/vessel and modules are plumb, level, and square at critical areas.
3. Check all piping and conduit for connections that restrict vessel movement.
4. If check rods are used, loosen all connections to finger tight 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



RL1800 Tool Steel Modules

No.	Description	No. Req.	Replacement Part Numbers 250lb-5,000lb	5,000lb-10,000lb
1	Base Plate	1	22723	22728
2	Load Cell Mounting Block	1	22724	22729
3	Lock Washer	2	15167	15181
4	Load Cell Bolt	2	14765	14788
5	Upper Support	1	22725	22730
6	Jam Nut	1	14664	14687
7	Flat Washer	1	15173	15179
8	Shoulder Bolt	2	22726	22726
9,10	Spherical Washer Set	1	15198	15120
11	Hex Head Loading Bolt	1	14759	14786
12	Upper Support Mounting Block	1	22727	22731
13	Load Cell	1	See Load Cell Selection Guide	

RL1800 Stainless Steel Modules

No.	Description	No. Req.	Replacement Part Numbers 1,000lb-4,000lb	5,000lb-10,000lb
1	Base Plate	1	22732	22739
2	Load Cell Mounting Block	1	22733	22740
3	Lock Washer	2	15168	15182
4	Load Cell Bolt	2	14766	14789
5	Upper Support	1	22734	22741
6	Jam Nut	1	14766	14688
7	Flat Washer	1	15175	15180
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	14760	14787
12	Upper Support Mounting Block	1	22738	22738
13	Load Cell	1	See Load Cell Selection Guide	

7. RL1800 Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS brand load cells properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications. All load cell products are warranted against defects in materials and workmanship for two (2) years. Products marked as "waterproof" are warranted against defects in materials and workmanship relating to moisture ingress.

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:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- 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.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- 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.

RICE LAKE WEIGHING SYSTEMS
230 WEST COLEMAN STREET • RICE LAKE, WISCONSIN 54868 • USA