RLC

RLC Self-Aligning Silo Mount

Installation Manual

October 5, 2018

RICE LAKE
WEIGHING SYSTEMS

PN 51725 Rev A

Contents

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1.0 Introduction

The RLC Self-Aligning Silo Mount, together with the RLC load cell family, are an ideal solution for process control, batch weighing, silo/hopper and belt applications.

The RLC mount incorporates a unique rocker pin design that uses hardened stainless steel components on all load bearing surfaces. The fully stainless steel construction provides long-term reliability, even in the harshest of environments.

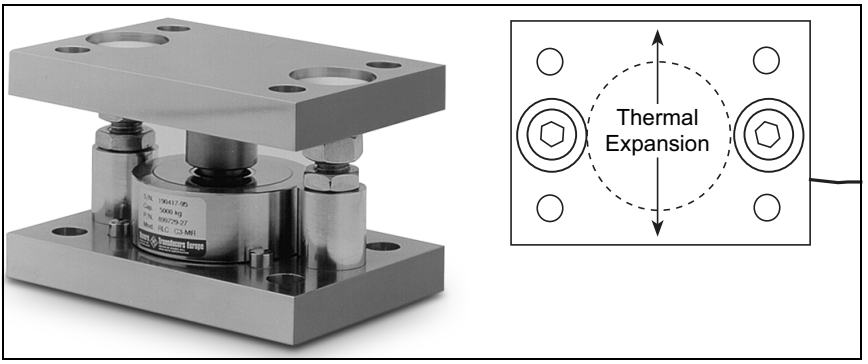

Figure 1-1. RLC Self-Aligning Silo Mount

Manuals can be viewed or downloaded from the Rice Lake Weighing Systems website at **www.ricelake.com/manuals**

Warranty information can be found at **www.ricelake.com/warranties**

1.1 Safety

Safety Signal 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. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

WARNING

Failure to heed may result in serious injury or death.

The installation should be planned by a qualified structural engineer. Each installation is unique, and this manual is meant to serve only as a general guideline for installation.

Do not use for purposes other than weight measurement.

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.

2.0 Installation

2.1 Guidelines for Weigh Module Installation

After installation, the top and bottom plates must be level within ±0.5°. If the mounting surfaces are not level, use shims and/or grout to level the mount.

1. Check to ensure the module is level when the vessel is fully loaded, if possible.
   - Excessive deflections in legs and supporting structures could cause additional side forces which affect accuracy.
   - Deflection of the mount's top or base plate due to loading should not exceed ±0.5°.
2. Reinforce legs or other support structures as needed to correct this.
   - Vessels with long legs should have cross bracing applied between adjacent legs to keep them from spreading under load.
3. Compression mount systems use three or more mounts.
   - Do not use more than eight modules in a system, the weight distribution becomes difficult to achieve.
   - The load on each module should not vary by more than 20%.
   - During installation, add shims as needed to achieve correct load distribution.
4. 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.
   - Dummy load cells can be used during installation.

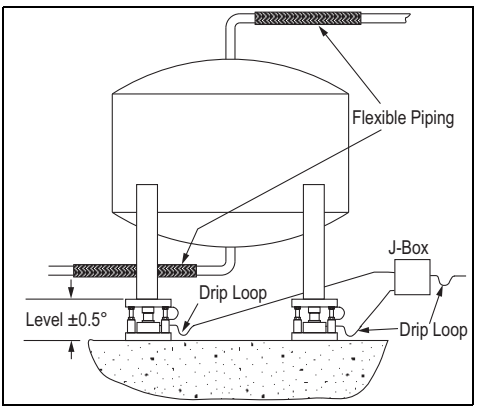

Figure 2-1. Horizontal Piping

Ensure all piping or conduit is horizontal and flexible.

- 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.
- For details, see Load Cell and Weigh Module Handbook (PN 22054).

2.1.1 Load Cells

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.

- Use a dummy load cell when welding to maintain finished height.
- If welding is unavoidable after load cell installation, connect the ground in such a way that the current does not flow through the load cell.

  Example: If welding on the module top plate, the ground must be connected to the vessel, not to the mount base or support structure.
- Protect the load cell and cable from weld splatter.
- Use of only hermetically sealed load cells in washdown applications is recommended.
- 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 weighing assembly is not standing in water.
- All support points should be equally stiff so that they deflect by the same amount as the vessel is loaded.
- Never expose the load cell to excessive forces as this might seriously jeopardize personal safety.
- If major load movement is anticipated, stay rods should be used to restrain the platform or vessel.
- Multiple load cell applications require the mounts to be installed on the same horizontal plane and level.
- Never use mounts or load cells to pull uneven surfaces together; use shim plates when appropriate.
- Perform routine maintenance to assure long-term reliability and performance.
- This includes a careful physical inspection of bolts and parts, as well as the removal of any material or debris build up from the load cell and mounting fixtures. Serious damage can occur if mounting systems do not function correctly.

2.2 Installing the RLC

The RLC self-aligning mount should be installed without the load cell or dummy being present, while observing the following guidelines:

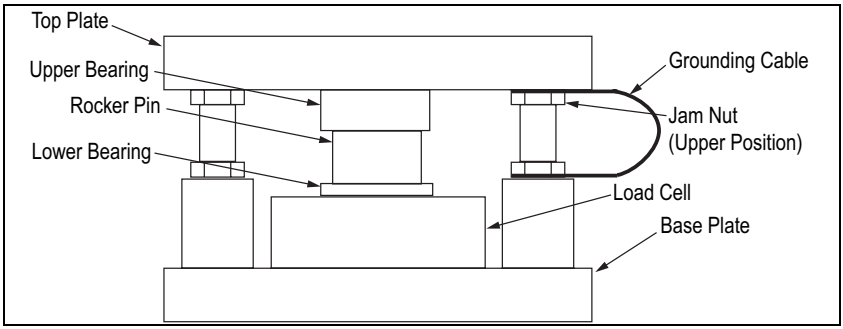

Figure 2-2. Silo Mount Assembly

1. Assemble the self-aligning mount as shown in the assembly drawing, ensuring the top and base plates are correctly aligned.

IMPORTANT ***The RLC does not lie in the center of the base plate and so care must be taken to ensure that the upper bearing locating hole is correctly aligned.***

2. The top plate must be locked in the upper position using the jam nuts.
3. Securely lock the M12 x 60 or M16 x 70 socket head screws by turning the M12 or M16 nuts downwards to the baseplate.
4. Locate the self-aligning mount and secure it by using the four upper and lower fixing holes.
5. Coat lower bearing load surface with high pressure grease and insert into RLC load cell.
6. Remove the M8 x 20 hex socket screw.
7. Coat upper bearing load surface with high pressure grease, and slide assembly into place, ensuring that upper bearing and rocker pin are properly located.
8. Replace screw to contain RLC load cell assembly.
9. Rotate M12 or M16 nuts counter clockwise by 1/2 turn at a time until the load is taken by the RLC.

WARNING ***For safety reasons, always use a tool to align the upper bearing as necessary during this process.***

10. A correctly installed mount should result in a height of 2.95" (75 mm) or 3.94" (100 mm) for the low and high capacities respectively. Verify a free horizontal movement of 3 mm.

Note ***Do not weld tank leg to top plate as this would make it impossible to remove the top plate if necessary.***

11. Load cell must only be replaced when the vessel is empty. Run jam nuts up bolts until contacted with underside of top plate and continue until rocker pin can be removed and load cell can be slid out.

CAUTION ***Use extreme care when lowering the vessel. The force of a vessel weighing several tons can damage a load cell if dropped only a fraction of an inch.***

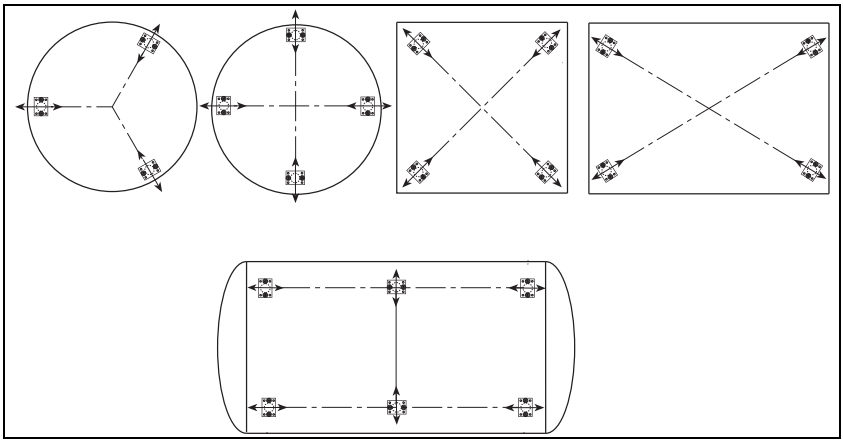

Figure 2-3. Load Cell Orientation

3.0 Load Cell Wiring

1. Route the load cell cables so they will not be damaged or cut. Cable must not be routed near heat sources greater than 150° F.

IMPORTANT ***Do not shorten load cell cables. The load cell is temperature compensated with the supplied length of cable. Cutting the cable affects temperature compensation.***

2. Coil and protect excess cable so it will not be mechanically damaged or sitting in water.
3. Provide a drip loop in all cables so that water or other liquids do not run directly down the cables onto the load cells or the junction box.
4. Attach load cell cable to the dead structure, not the vessel.
5. Use flexible conduit and conduit adapters at the load cells if conduit protection is necessary against mechanical or rodent damage to cables.
6. Connect cables to the summing board in the junction box, according to Table 3-1 on page 7 and the labels on the terminal strips of the junction box. To verify the wiring scheme, see the certification shipped with each load cell.
7. Use positive and negative remote sense lines if the wiring running from the junction box to the indicator is longer than 25'.

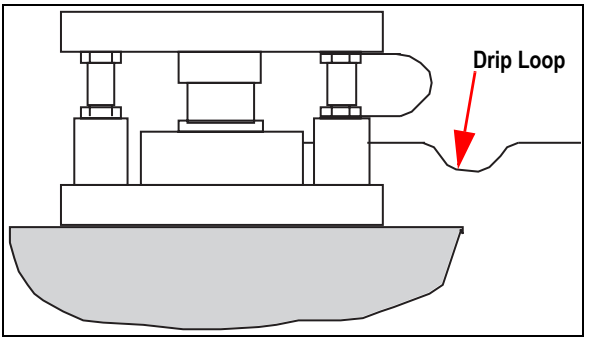

Figure 3-1. Drip Loop

Load Cell Wire Color	Function
Pink	+EXC
Grey	–EXC
Brown	+SIG
White	–SIG
Bare	SHIELD

Table 3-1. Load Cell Wiring

4.0 Junction Box

4.1 Connections, Adjustments & Calibration

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

5.0 Troubleshooting

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

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 5-1. Troubleshooting Chart

If the system can be calibrated but doesn't return to zero, loses calibration, or demonstrates non-linearity or non-repeatability, refer to Table 5-1 for possible causes and perform the following checks.

1. Check weigh module for debris restricting load cell movement or debris between scale and structure.
2. Check that tank/vessel and modules 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 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.

6.0 Maintenance and Replacement Parts

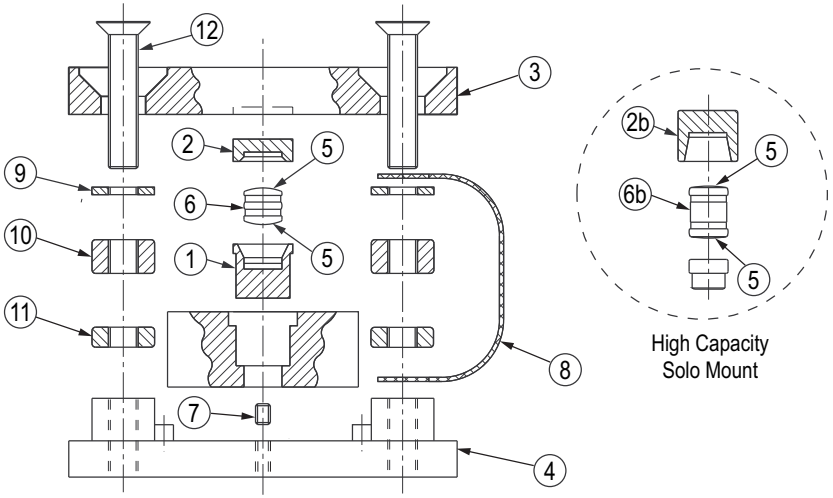

Figure 6-1. Replacement Parts

Item No.	Description	Part No.
1	Lower Bearing	Consult factory
2	Upper Bearing	
3	Top Plate	
4	Base Plate	
5	High Pressure Grease	
6	Rocker Pin	
7	Set Screw, Socket, Hex (SS A2 M8 x 20)	
8	Grounding Cable	
9	Washer (SS A2 M12)	
10	Nut, Hex (SS A2 M12)	
11	Nut, Thin Hex (SS A2 M12)	
12	Screw, Counter Sunk, Hex (SS A2 M12)	

Table 6-1. Replacement Part Descriptions

230 W. Coleman St. • Rice Lake, WI 54868 • USA
U.S. 800-472-6703 • Canada/Mexico 800-321-6703 • International 715-234-9171 • Europe +31 (0)26 472 1319