# SURVIVOR® 1700HE

*Weigh Module Kit*

# Installation Guide


RICE LAKE WEIGHING SYSTEMS
Industrial Solutions on a Global Scale℠

ISO 9001 REGISTERED

33318

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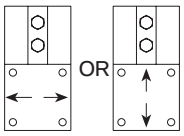
# 1. Introduction

The Survivor® 1700HE Weigh Module Kit is ideally suited for light to medium capacity micro-ingredient batching and mixing in a variety of hostile environments, especially where moisture is present. The load cell is stainless steel and hermetically sealed with an IP rating of IP66/68 to provide superior corrosion, moisture ingress, and mechanical protection. The RLHBB and RLHTO load cells are each waterproof guaranteed and OIML C3 certified (20kg-5,000kg) to offer the ultimate in durability and accuracy in any environment.

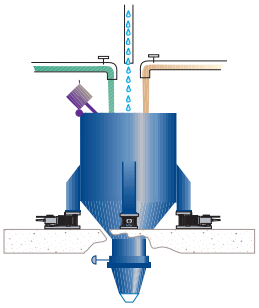



An important feature of the Survivor 1700HE is that the load may be checked in one of two directions. This allows positioning in one of two orientations for proper checking.

Integral jacking/shipping bolts offer a means to remove the load from the load cell for quick removal and replacement of a load cell and worry-free transport. The load introduction mechanism also isolates the load cell from side loads, overloads, and underloads. For reliability and accuracy, the Survivor 1700HE is the perfect mounting assembly for light capacity weighing.

The 1700HE modules are available from 5-250kg (11-550lb) capacities using RLHBB cantilever beam load cells. In capacities from 500-5,000kg (1,100-11,000lb), the units use RLHTO single-ended shear-beam load cells.

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.



# 2. Mechanical Installation

## 2.1 Installation Guidelines for Compression Weighing Assemblies

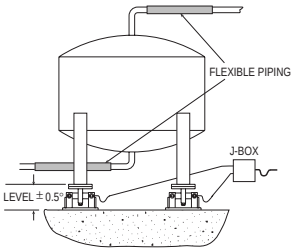
1. The mounting surface for the base plate and top plate must be level. After installation, the top and bottom plates must be level within ±0.5°. If the mounting surfaces are not level, then shims and/or grout may be used to level the mount.

   If possible, check that the mount is level when the vessel is fully loaded because excessive deflections in legs and supporting structures may cause additional side forces that affect accuracy. Deflection of the mount's top or base plate due to loading should not exceed ±.5°. Reinforcement of legs or support structure may be necessary. Vessels with long legs should have cross bracing applied between adjacent legs to keep them from spreading under loads.

2. Compression mounting systems use 3, 4, or more mounts. More than eight mount systems should be avoided as even weight distribution becomes extremely difficult to achieve. The load on each mount assembly should vary by no more than 20%. During installation, add shims where necessary to achieve correct load distribution.

3. 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. Dummy load cells can be used during installation.

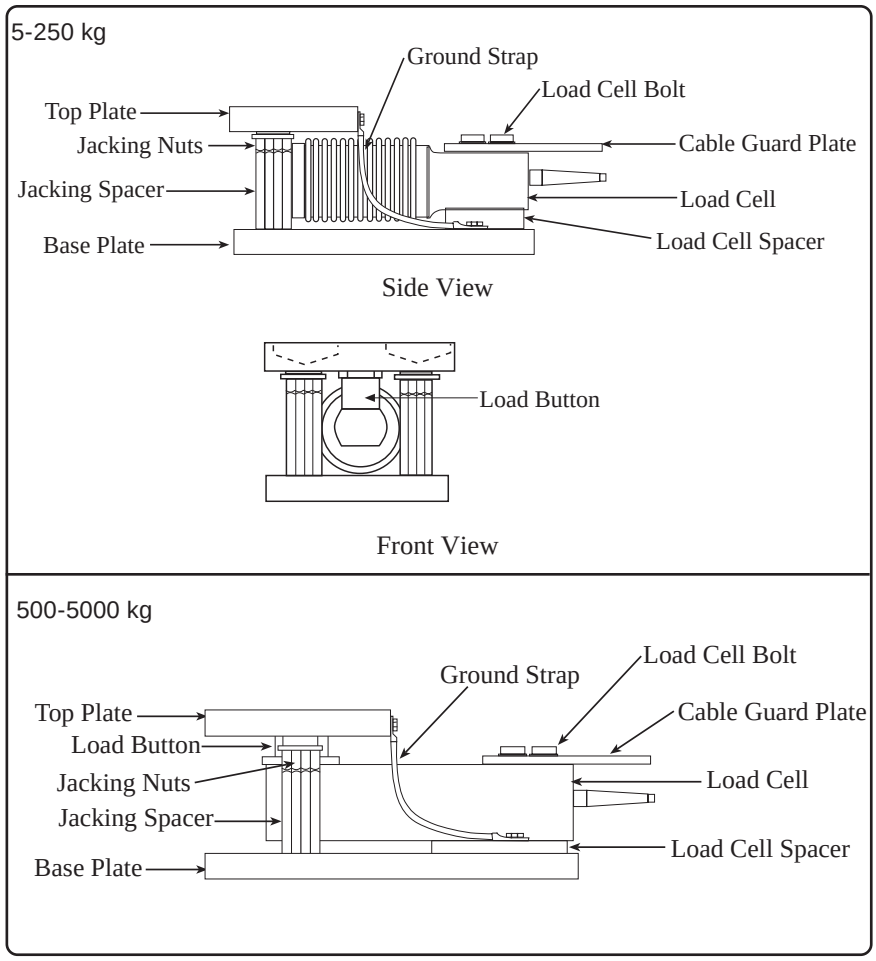
4. It is crucial that all piping or conduit be horizontal and flexible. If flexible piping is not used, make sure the distance from the vessel to the first pipe support is 20-30 times the pipe diameter. For details, see the technical information section of the RLWS Load Cell Product Selection Guide. In smaller, lower capacity tanks and hoppers, isolating the resultant forces becomes extremely critical.




5. Load cells should not be installed in the mounts until all welding is completed. The heat generated by welding current passing through a load cell can damage the adhesive holding the strain gauge to the body. If possible, remove the load cell when welding using the jacking/shipping bolts to maintain final 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. For example, if welding on the mount top plate, the ground must be connected to the vessel, not to the mount base or support structure. Also, protect the load cell and cable from weld splatter.

6. All support points should be equally stiff so that they deflect by the same amount as the vessel is loaded.

## 2.2 Installing the RL1700HE Module




The type of installation, vessel support structure, and the surface upon which the mount is to be placed determines the method of locating, attaching, and assembling the 1700HE weigh module. 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 excessive deflection 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. The preferred mounting orientation for single ended beams is with the longitudinal axis of the load cell pointing toward the center of the vessel in circular mounting configurations as illustrated in Figures 1 and 2 below.

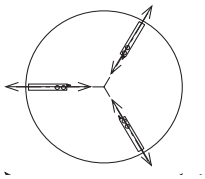


*Figure 1*

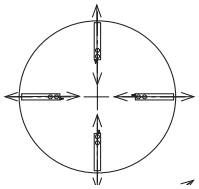


*Figure 2*

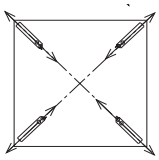


*Figure 3*

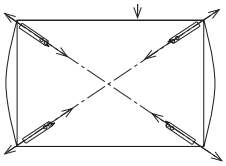


*Figure 4*

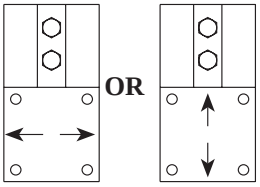
Figures 3 and 4 illustrate mounting configurations for square and rectangular vessels. For rectangular vessels, the load cell's longitudinal axis should be aligned along the vessel's longest dimension as shown in Figure 4. In any application where a recurring side force is present in one direction, such as in a conveyor belt or roller platform, the longitudinal axis of the load cell should align with that force.

Note:
The load may be checked in one of two directions. Make sure the top plate moves in the proper direction (see step 2).

2. To assemble each module, remove the load cell bolts, position the load cell, and pass the load cell bolts through the load cell and the load cell spacer, and thread them into the base plate. Lift the top plate (do not loosen the retaining bolts) and place the load button into the load hole of the load cell. Rest the top plate on the load button. Verify that the retaining bolts do not protrude above the plane of the top plate. Adjust if necessary.

   During installation or transport, the jacking nuts may be used to isolate the top plate from the load cell to avoid any damage to the load cell.

   The load may be checked in one of two directions. To use the alternate checking feature, lift the top plate clear of the load button, turn the load button 90°, and restore the top plate to its original position.




3. Lift and block the vessel to the same height as the assembled mounts.

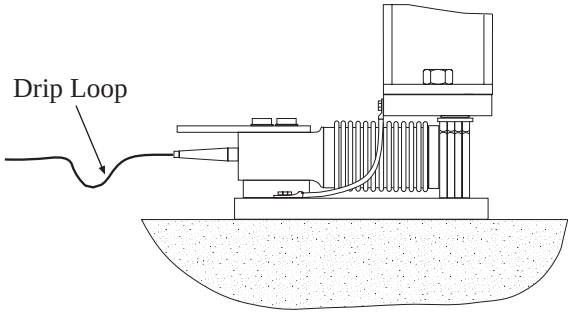
4. Use the jacking nuts to fully raise the top plate, automatically ensuring correct alignment of the top plate and base plate during installation.

5. Remove the block from one support point and slide a mount into position.
6. 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 load button.
7. Attach the top plate by bolting. Do not fully tighten as shimming may be necessary to level.

   Note:
   The threads in the top plate of the 5-250kg modules are 1/2"-20 N.F. threads. The threads in the top plate of the 500-5000kg modules are 3/4"-10 N.C. threads.
8. Repeat steps 4, 5, and 6 for the remaining mounts. The vessel should now be supported on the mounts 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. Verify that the load button is centered in the top plate to allow equal travel on either side.
10. If the jacking nuts were used to isolate the load cell from the load, lower them to the jacking spacers to lower the vessel to rest on the load cells.
11. Attach the base plates to the foundation using anchors for concrete or by bolting or welding to a steel structure. Verify that the base plates are no more than ±.5° out of level. Shim as necessary.
12. Check that the top plates are no more than ±.5° out of level. Shim if necessary and fully tighten the bolts.
13. The load distribution can be checked by lifting the vessel sightly at each support point in turn or, more accurately, by exciting each load cell in turn and measuring the output with a voltmeter. The variation in load among the cells should be no more than 20%. Shim if necessary.
14. Check that the two screws securing the load cell to the base plate are tight.

## 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. **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 RLHBB, RLHTO, TEDEA 355, and TEDEA 3510 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 the load cell.
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.




*RLHBB, 355*

| LOAD CELL WIRE COLOR | FUNCTION |
|---|---|
| Green | +EXC |
| Black | -EXC |
| Red | +SIG |
| White | -SIG |
| Bare | SHIELD |
| Blue | +SEN |
| Brown | -SEN |

*RLHTO, 3510*

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

## 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 |

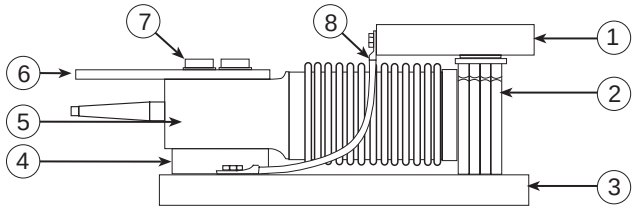
1. Check load cell mount for debris restricting load cell movement or debris between scale and structure. Check any overload stops for proper clearance.
2. Check that tank/vessel and mounts are plumb, level, and square at the critical areas.
3. Check all piping and conduit for connections that restrict 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




| Ref # | Part # | Description |
|---|---|---|
| Rated Capacity: 5 - 250 kg | | |
| 1 | 33036 | Top plate, stainless steel |
| 2 | 33041 | Checking/jacking assembly, stainless steel |
| 3 | 33035 | Base plate, stainless steel |
| 4 | 33037 | Load cell spacer, stainless steel |
| 5 | 32678 | Load cell, RLHBB-5 kg, Class E |
| 5 | 32677 | Load cell, RLHBB-10 kg, Class E |
| 5 | 31259 | Load cell, RLHBB-20 kg, OIML C3 |
| 5 | 31260 | Load cell, RLHBB-50 kg, OIML C3 |
| 5 | 31261 | Load cell, RLHBB-100 kg, OIML C3 |
| 5 | 31262 | Load cell, RLHBB-200 kg, OIML C3 |
| 5 | 31263 | Load cell, RLHBB-250 kg, OIML C3 |
| 6 | 33038 | Cable guard plate, stainless steel |
| 7 | 33040 | Load cell bolt set, stainless steel |
| 8 | 33039 | Ground strap (includes fasteners) |
| Rated Capacity: 500 - 2,000 kg | | |
| 1 | 33050 | Top plate, stainless steel |
| 2 | 33055 | Checking/jacking assembly, stainless steel |
| 3 | 33049 | Base plate, stainless steel |
| 4 | 33051 | Load cell spacer, stainless steel |
| 5 | 31253 | Load cell, RLHTO-500 kg, OIML C3 |
| 5 | 31250 | Load cell, RLHTO-1000 kg, OIML C3 |
| 5 | 31251 | Load cell, RLHTO-2000 kg, OIML C3 |
| 6 | 33052 | Cable guard plate, stainless steel |
| 7 | 33054 | Load cell bolt set, stainless steel |
| 8 | 33053 | Ground strap (includes fasteners) |
| Rated Capacity: 5000 kg | | |
| 1 | 33043 | Top plate, stainless steel |
| 2 | 33048 | Checking/jacking assembly, stainless steel |
| 3 | 33042 | Base plate, stainless steel |
| 4 | 33044 | Load cell spacer, stainless steel |
| 5 | 31252 | Load cell, RLHTO-5000 kg, OIML C3 |
| 6 | 33045 | Cable guard plate, stainless steel |
| 7 | 33047 | Load cell bolt set, stainless steel |
| 8 | 33046 | Ground strap (includes fasteners) |

# 7. 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:

1. Upon discovery by Buyer of such non-conformity, 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 non-conformity 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.



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