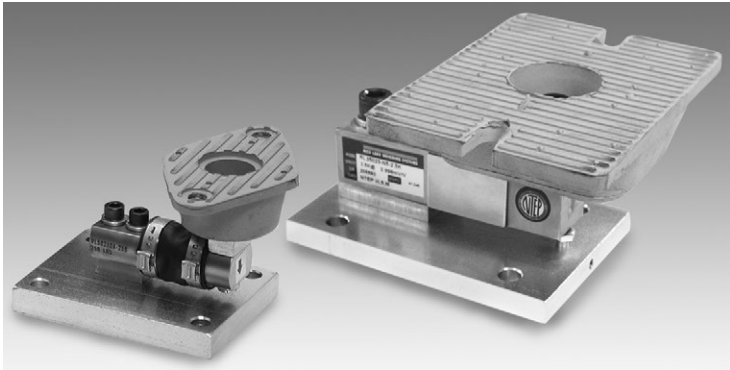


# RL50210 TA

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*Load Cell Mounting Kit*

## Installation Manual



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# Revision History

This section tracks and describes manual revisions for awareness of major updates.

Revision	Date	Description
B	August 21, 2023	Revision history established; updated washer count
C	February 23, 2024	Updated bolt count

*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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# 1.0 Introduction

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



Manuals and additional resources are available on the Rice Lake Weighing Systems website at [www.ricelake.com](http://www.ricelake.com)

Warranty information can be found on the website at [www.ricelake.com/warranties](http://www.ricelake.com/warranties)

## 1.1 Overview

The 50210 TA/65059 Mini-Tank Weighing Assembly provides an easy-to-use, cost-effective and reliable method for low capacity weighing applications. They are ideal for installations where checking requirements are low. The flexible neoprene mounting system allows for bolting the units directly to the mounting surface without extra plates or load buttons. The neoprene pad also allows the vessel to expand/contract without restriction and provides a degree of shock protection.

### Applications

- Small tanks and hoppers
- Conveyor/In-motion weighing
- Small platform scales where minor shock loading may be a problem

### Kit Includes

- One JB4SS NEMA Type 4X stainless steel signal trim junction box
- Three or four RL50210 cantilever beam load cells (50-250 lb models)
- Three or four RL30000 single-ended beam load cells (500 lb models)
- Three or four RL32018 alloy steel load cells (1000-2500 lb models)
- Three or four neoprene isolation/compression mounts
- 25 ft of our hostile environment EL147HE SURVIVOR® load cell cable

### Standard Features

- Zinc plated, mild steel modules
- Lower weighing ranges from 50-500 lb (22.7-226.8 kg) per module
- Environmentally protected load cells
- Neoprene isolation/compression mounts allow for minor misalignment, thermal expansion and shock absorption
- Overload stop for 500 lb (226.8 kg) modules provides durability

### Options

- Stainless steel modules available in 50, 100, 150, 250 and 500 lb (22.7, 45.4, 68.0, 113.4, 226.8 kg) capacity with RL50219SS and RL39123 stainless steel load cells or Vishay Sensortronics 65023 SS load cells
- 65059 kits available with Vishay Sensortronics 60040 load cells, capacities: 50-250 lb (22.7-113.4 kg) or 65023 load cells, capacity: 500 lb (226.8 kg)

Capacities of 1,000-2,500 can be fitted with RL32018S-HE or RL31019S-HE stainless steel, welded seal, IP67 load cell. This is a non part-numbered special. Consult factory for quote information.

## 1.2 Safety

### 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.



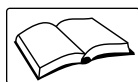
**CAUTION:** Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.



**IMPORTANT:** Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

### 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.**

**Before attempting to operate this unit, make sure every individual who operates or works with this unit has read and understands the following safety information.**

**Do not allow minors or inexperienced persons to install this unit.**

**Do not operate without all shields and guards in place.**

**Do not use for purposes other than weight taking.**

**Do not place fingers into slots or possible pinch points.**

**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.**

**Do not remove or obscure warning labels.**

## 2.0 Mechanical Installation

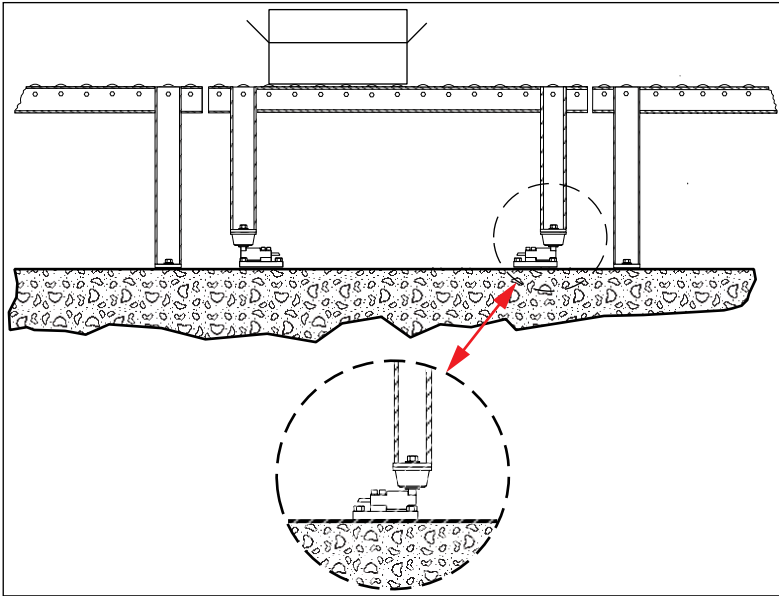


Figure 2-1. Typical Mounting Configuration

### 2.1 Compression Weighing Assemblies Installation Guidelines

After installation, the top and bottom plates must be level within  $\pm 0.5^\circ$ . If the mounting surfaces are not level, 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 which greatly affect accuracy.
- Deflection of the mounts top or base plate due to loading should not exceed  $\pm 0.5^\circ$ .
- Reinforcement of legs or support structure may be necessary to correct this; vessels with long legs should have cross bracing applied between adjacent legs to keep them from spreading under loads.

Compression mounting systems use three, four, or more mounts.

- More than eight mount systems should be avoided as even weight distribution becomes difficult to achieve.
- The load on each mount assembly should vary no more than 20%.
- Add shims where necessary to achieve correct load distribution.

If the actual load cells are used during installation, 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.

The neoprene mount of the RL50210 TA/65059 compresses as load is applied, making the mount particularly suitable for applications involving very minor shock loading.

- It is not recommended for vessels with attached piping because the added downward deflection of the vessel as it is loaded makes it difficult to design a piping system with the required degree of flexibility.

Do not install weigh modules until all welding is completed.

- The heat generated by the 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, connect the ground in such a way that the current does not flow through the load cell.
- Protect the load cell and cable from weld splatter.

*Example: if welding on the mount top plate, the ground must be connected to the vessel, not to the mount base or support structure.*



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

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.

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



## 2.2 Mount Installation

Use the following steps to install the RL50210 TA/65059. The figures are typical load cell mount installations for the 50-250 and 500 lb configuration.

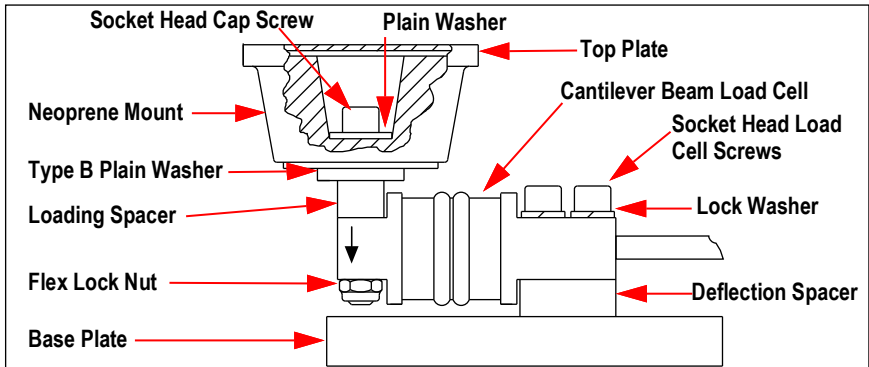


Figure 2-2. 50-250 lb Installation

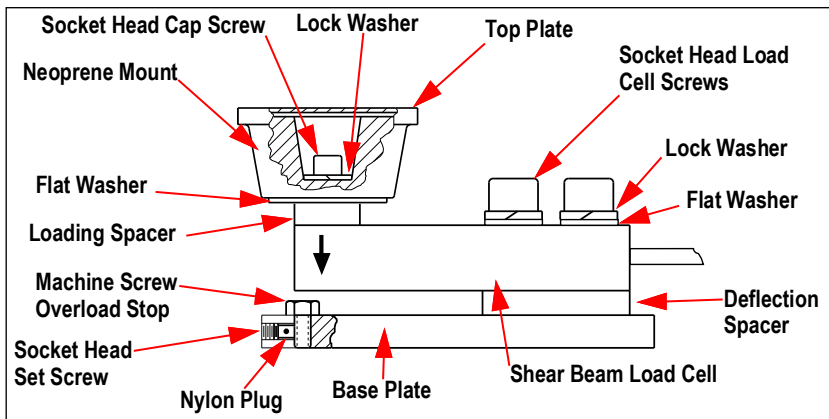


Figure 2-3. 500 lb Installation

The type of installation, vessel support structure and the surface the mount is to be placed on, determines the method of locating, attaching and assembling the RL50210 TA/65059. Carefully consider the following three areas that commonly cause accuracy problems:

- It is important the supporting legs are adequately braced so they do not spread when the system is fully loaded.
- Make sure the supporting structure has the necessary strength to prevent excessive deflection when the system is fully loaded.
- Check to see if there is any 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 the direction it should be oriented.

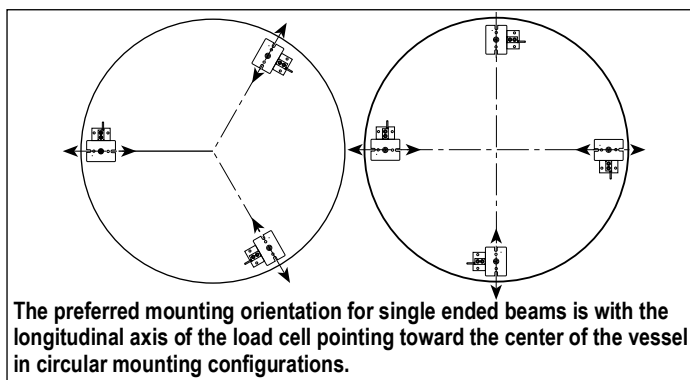


Figure 2-4. Circular Mounting

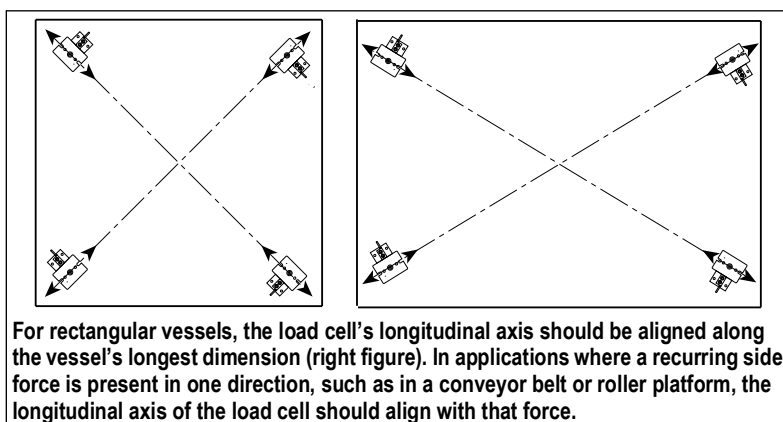


Figure 2-5. Rectangular Mounting

2. Lift and block the vessel to the same height as the assembled mounts.
3. Remove the block from one support point and slide a mount into position.
4. If the mount is being fitted under the leg of a vessel, verify that the center line of the leg passes through the center of the neoprene mount (through the center of the load cell's load hole).
5. Attach the top plate of the neoprene mount by bolting. Do not fully tighten as shimming may be necessary to level.
6. Repeat Steps 4 and 5 for the remaining mounts. The vessel should now be supported on the mounts alone.
7. Move the vessel to its final position, if needed.

8. 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 also indicates if the load is evenly distributed on all mounts. Shim if necessary.
9. Attach the base plates to the foundation using anchors for concrete or by bolting or welding to a steel structure.
10. Verify that the base plates are no more than  $\pm 0.5^\circ$  out of level. Shim if necessary.
11. Check that the top plates are no more than  $\pm 0.5^\circ$  out of level. Shim if necessary and fully tighten the bolts.
12. Check the excitation for each load cell, measuring the output with a voltmeter. The variation in load among the cells should be no more than 20%. Shim if necessary.
13. Check that the two screws securing the load cell to the base plate are tight. Torque as listed in [Table 2-1](#).

Load Cell Capacity (lb)	Recommended Torque (ft-lb)
50 - 250	12
500 - 2500	70

Table 2-1. Torque Values

## 3.0 Load Cell Wiring

- 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 affects temperature compensation and voids the load cell warranty.
  - 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 water/liquids do not run directly down the cables onto the load cells or junction box.
- Attach load cell cable to the dead structure, not the vessel.
- Use flexible conduit and conduit adapters to connect the load cells, if conduit protection is required against mechanical or rodent damage.
- Connect cables for the load cells to the summing board in the junction box according to [Table 3-1](#) and/or the labels on the terminal strips of the junction box. To verify the wiring scheme, see the certification shipped with the load cell.
- Use positive and negative remote sense lines if the wiring from the junction box to the indicator is longer than 25 ft.

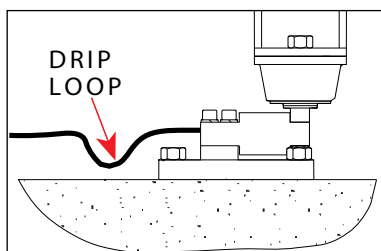


Figure 3-1. Drip Loop

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

Table 3-1. Wiring

## **4.0 Junction Box Connections, Adjustments and Calibration**

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

## 5.0 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. Look for mechanical causes for first.

If the system can be calibrated but doesn't return to zero, loses calibration or demonstrates non-linearity or non-repeatability. See [Table 5-1](#).

Problem	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*

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 the 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 persists:

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.

## 6.0 Maintenance and Replacement Parts

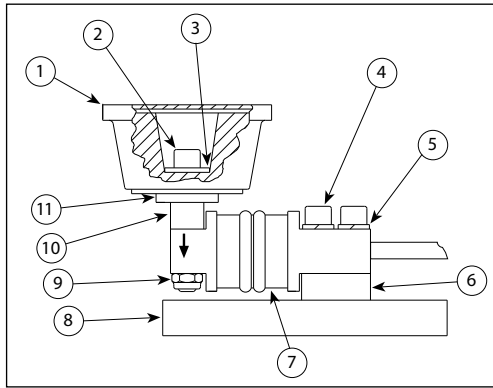


Figure 6-1. 50-250 lb Capacity Parts Diagram

Mild Steel RL50210 TA/65059 50-250 lb Capacity						
No.	Description	Qty.	Replacement Part Numbers			
			50 lb	100 lb	150 lb	250 lb
1	Vibration Mount	1	18255	18256	18245	18257
2	Socket Head Cap Screw	1	14983	14983	14983	14983
3	Plain Washer	1	21940	21940	21940	21940
4	Socket Hd. Load Cell Screws	2	14982	14982	14982	14982
5	1/4 in Lock Washer	2	15147	15147	15147	15147
6	Deflection Spacer	1	18241	18241	18241	18241
7	Cantilever Beam Load Cell	1	See Load Cell Guide			
8	Base Plate	1	18247	18247	18247	18247
9	Flex Lock Nut	1	14643	14643	14643	14643
10	Loading Spacer	1	18240	18240	18240	18240
11	1/4 in Type B Plain Washer	1	22011	22011	22011	22011

Table 6-1. Mild Steel 50-250 lb Capacity Replacement Parts

Stainless Steel RL50210 TA/65059 50-250 lb Capacity						
No.	Description	Qty.	Replacement Part Numbers			
			50 lb	100 lb	150 lb	250 lb
1	Vibration Mount	1	18255	18256	18245	18257
2	Socket Head Cap Screw	1	63790	63790	63790	63790
3	Plain Washer	1	63791	63791	63791	63791
4	Socket Hd. Load Cell Screws	2	63789	63789	63789	63789
5	1/4 in Lock Washer	2	15148	15148	15148	15148
6	Deflection Spacer	1	63794	63794	63794	63794
7	Cantilever Beam Load Cell	1	See Load Cell Guide			
8	Base Plate	1	63795	63795	63795	63795
9	Flex Lock Nut	1	63788	63788	63788	63788
10	Loading Spacer	1	63793	63793	63793	63793
11	1/4 in Type B Plain Washer	1	63792	63792	63792	63792

Table 6-2. Stainless Steel 50-250 lb Capacity Replacement Parts

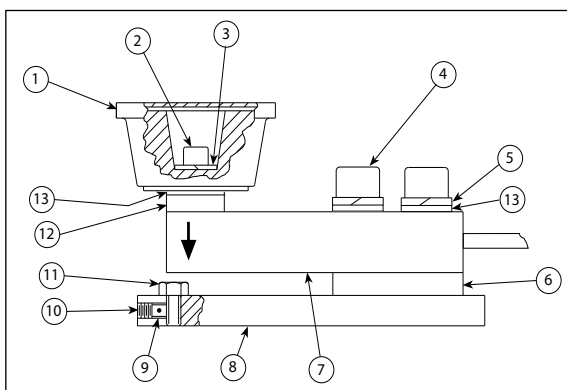


Figure 6-2. 500 lb Capacity Parts Diagram



Mild Steel RL50210 TA/65059 500 lb Capacity				
No.	Description	Qty.	Replacement Part Numbers	
			RL50210	65059
1	Vibration Mount	1	18244	18244
2	Socket Head Cap Screw	2	32185	32185
3	Lock Washer	1	15167	15167
4	Socket Hd. Load Cell Bolts	2	15069	15069
5	1/2 in Lock Washer	2	15167	15167
6	Deflection Spacer	1	17754	18260
7	Shear Beam Load Cell	1	<i>See Load Cell Guide</i>	
8	Base Plate	1	18248	18248
9	Nylon Plug	1	18246	18246
10	Socket Head Set Screw	1	14949	14949
11	Mach. Screw Overld. Stop	1	14886	14886
12	Loading Spacer	1	18259	18239
13	1/2 in Flat Washer	1	15173	15173
14	Hex Socket Head Cap Screw	1	221905	221905

Table 6-3. Mild Steel 500 lb Capacity Replacement Parts

Stainless Steel RL50210 TA/65059 500 lb Capacity				
No.	Description	Qty.	Replacement Part Numbers	
			RS50210	65059
1	Vibration Mount	1	18244	18244
2	Socket Head Cap Screw	1	32280	32280
3	Lock Washer	1	15168	15168
4	Socket Hd. Load Cell Bolts	2	15065	15065
5	1/2 in Lock Washer	3	15168	15168
6	Deflection Spacer	1	18411	18383
7	Shear Beam Load cell	1	<i>See Load Cell Guide</i>	
8	Base Plate	1	18382	18382
9	Nylon Plug	1	18246	18246
10	Socket Head Set Screw	1	14950	14950
11	Mach. Screw Overld. Stop	1	14887	14887
12	Loading Spacer	1	18410	18381
13	1/2 in Flat Washer	1	15170	15170

Table 6-4. Stainless Steel 500 lb Capacity Replacement Parts

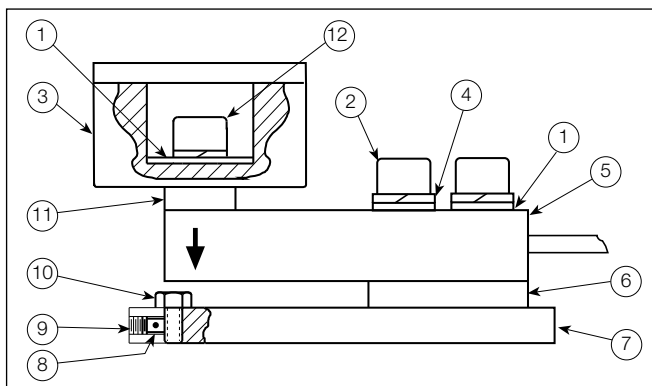


Figure 6-3. 1,000 - 2,500 lb Capacity Parts Diagram

Mild Steel RL50210 TA/65059 1,000 - 2,500 lb Capacity					
No.	Description	Qty.	Replacement Part Numbers		
			1,000 lb	2,000 lb	2,500 lb
1	1/2 in Flat Washer	3	15173	15173	15173
2	Socket Head Cap Screw	2	15076	15076	15076
3	Neoprene Mount	1	18258	26819	26819
4	1/2 in Lock Washer	3	15167	15167	15167
5	Shear Beam Load Cell	1	See Load Cell Guide		
6	Deflection Spacer	1	18260	18260	18260
7	Base Plate	1	18248	18248	18248
8	Nylon Plug	1	18246	18246	18246
9	Socket Head Set Screw	1	14949	14949	14949
10	Mach. Screw Overld. Stop	1	14886	14886	14886
11	Loading Spacer	1	18239	18239	18239
12	Socket Head Cap Screw	1	15076	15069	15069

Table 6-5. Mild Steel 1,000-2,500 lb Capacity Replacement Parts

Stainless Steel RL50210 TA/65059 1,000 - 2,500 lb Capacity					
No.	Description	Qty.	Replacement Part Numbers		
			1,000 lb	2,000 lb	2,500 lb
1	1/2 in Flat Washer	3	15170	15170	15170
2	Socket Head Cap Screw	2	15077	15077	15077
3	Neoprene Mount	1	18258	26819	26819
4	1/2 in Lock Washer	3	15168	15168	15168
5	Shear Beam Load Cell	1	<i>See Load Cell Guide</i>		
6	Deflection Spacer	1	18383	18383	18383
7	Base Plate	1	18382	18382	18382
8	Nylon Plug	1	18246	18246	18246
9	Socket Head Set Screw	1	14950	14950	14950
10	Mach. Screw Overld. Stop	1	14887	14887	14887
11	Loading Spacer	1	18381	18381	18381
12	Socket Head Cap Screw	1	15077	15065	15065

Table 6-6. Stainless Steel 1,000-2,500 lb Capacity Replacement Parts



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