

RoughDeck™ FXB

Flexure Base Floor Scale

Installation/Operation Manual



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1. Introduction

The RoughDeck FXB is a flexure base floor scale. Unlike conventional mechanical scales, the base of a RoughDeck FXB has no moving parts and uses thin high-strength flexure plates that always stay aligned. The FXB is available in sizes from 18" x 24" with a 500 lb. capacity to 96" x 120" with a 30,000 lb. capacity. NTEP certification exists for models 18" x 24" (500 lb.) through 72" x 96" (10,000 lb.).

All models use an environmentally protected single "S" type load cell recessed into the frame for protection. Standard models include a mild steel deck, a deck plate, base, flexure plate pivoted levers, and 20 feet of signal cable. Stainless steel covers are optional, and complete stainless steel units can be ordered. See Section 5 for a complete list of optional equipment.

1.1 Scale Components

The RoughDeck FXB has six major components (as shown in Figure 1):

Weigh platform (deck frame and deck plate)

A rigid welded frame unit with a removable deck plate upon which weight is placed. The applied load is transmitted from the weigh platform, to the load bridge, to the levers, and then to the load cell.

Lever system

Structural members on each side of the scale are supported from the base by the fulcrum flexure. The structural members also support the weigh platform through the lever system to the tip of the primary lever: the primary lever is supported by the load cell.

Load cell

Electronic force measuring device mounted in a corner of the scale and rigidly fixed to the load bridge structure. Wire rope runs from one end of the load cell to the tip of the primary lever.

Flexure plates

Flat, high-strength thin plates that transmit the load forces due to the weight applied to the platform and to the lever system. The flexures provide a maintenance-free pivot point that supports the levers from the base and transmits forces from the load bridge to the levers and on to the load cell.

Load bridge

Two pieces of tubing or channel iron, one on either side of the scale and tied together by two cross members. The weigh platform is supported by the load bridge through four platform support pipes. The load bridge is suspended from the lever system through the load flexures.

Base frame

A rigid one piece, welded unit that supports the remaining scale system. The fulcrum flexure support stands are welded directly to the base frame.

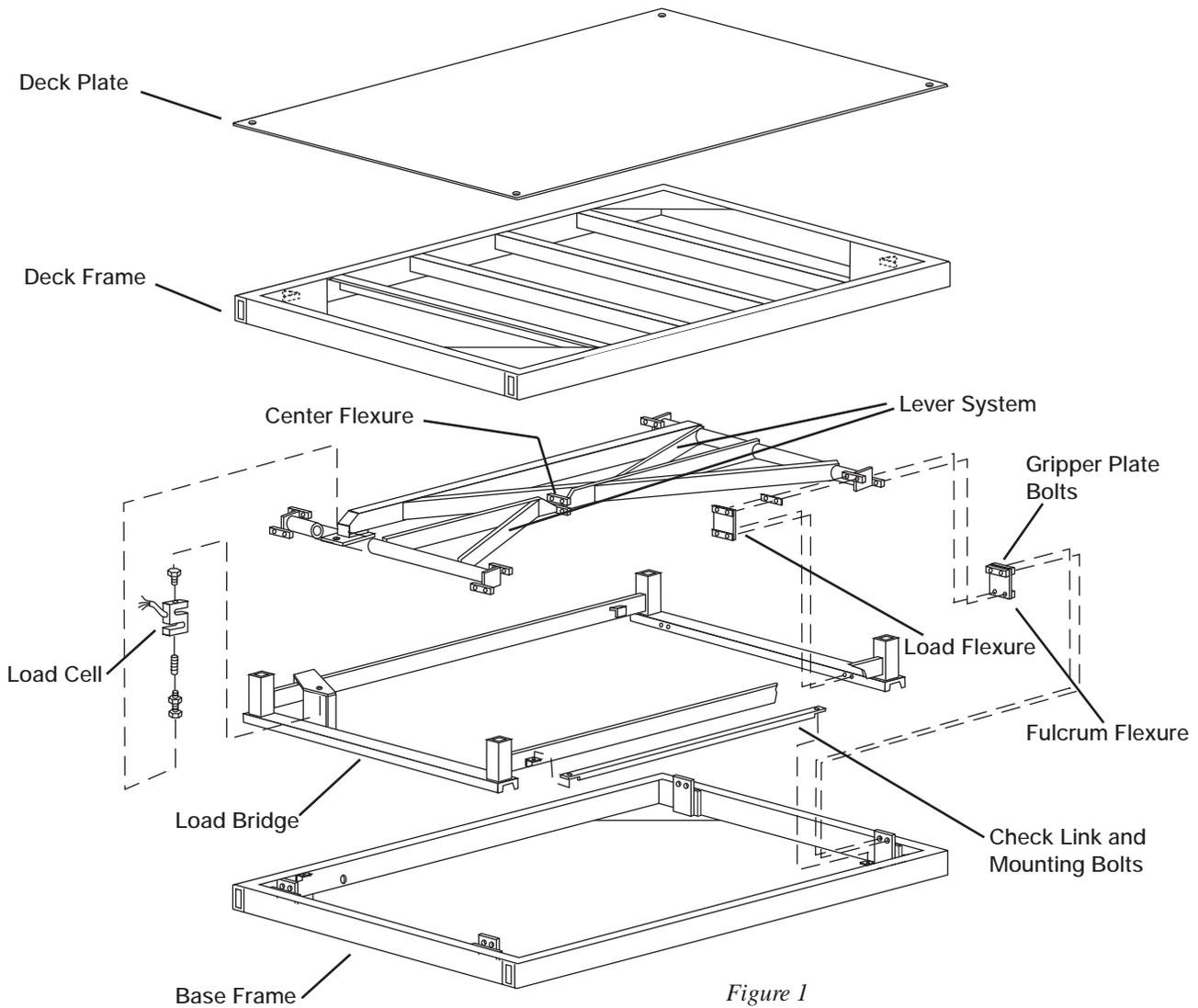


Figure 1

1.2 Operating Requirements

Electrical grounding

For systems where the scale is connected to a 120 VAC circuit, the instrument must be directly connected to an earth ground with a ground cable that has no more than 3 ohms resistance throughout its length and connections.

Grade level requirements

The supporting surface for the four feet of the scale must be level within 1/4" of horizontal.

Load cell excitation

Rated Excitation - 10 VDC

Maximum Excitation - 15 V

Safe static overloading capacity

Maximum - 150% of scale capacity.

Temperature

Compensated range 0°F to 150°F/-18°C to 65°C

1.3 How Flexure Levers Work

In the FXB, flexure levers replace pivots and bearings for the fulcrum and load and power points on the lever. The multiple of the lever for a flexure is calculated in the same manner as a pivot and bearing lever system. The reference point of the flexure is the center line through the flexure itself (see the following figure).

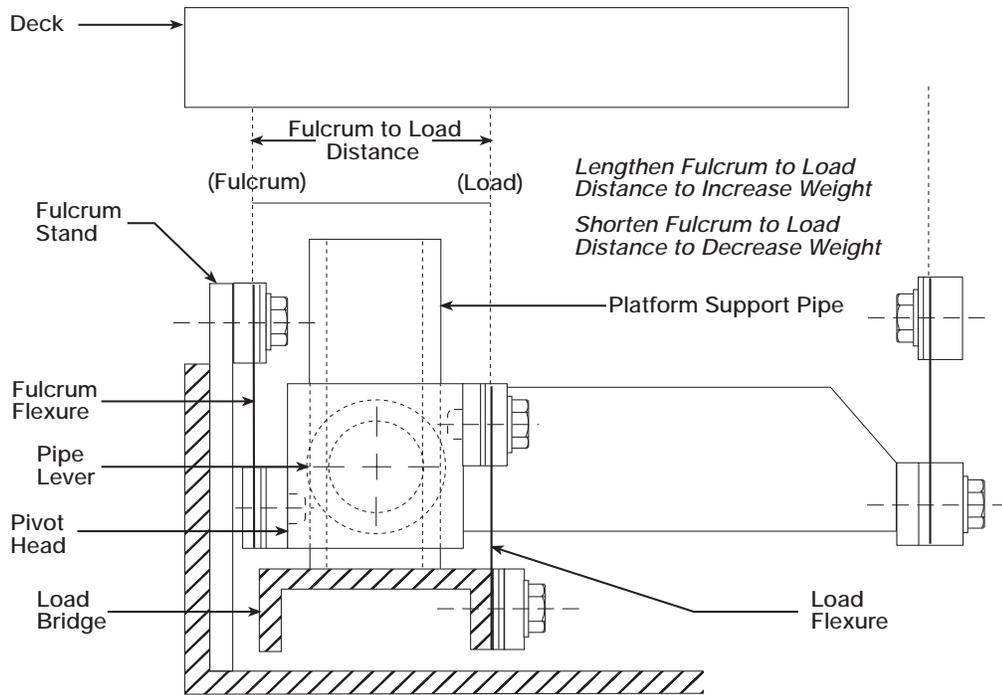


Figure 2

2. Unpacking and Inspecting

2.1 Unpacking

1. Remove banding straps.

⚠ Caution

Do not remove the scale from the packing skid by placing forks from a lift truck under the base assembly unless the scale is equipped with optional fork lift skids. Moving the scale without skids may damage the load cell and connections.

2. Lift scale base from wooden pallet by connecting hooked-ended chains to tubing in each corner of scale.
3. Remove weigh platform deck plate by removing four counter sunk screws from top of scale.
4. Remove weigh platform frame.



2.2 Inspecting

1. Inspect for signs of damage such as a bent frame, broken or bent flexures, and broken welds. This visual inspection is very important and should be performed with great care.
2. Verify that all gripper plate bolts are tight (four bolts holding each flexure plate in place).

3. Installation

3.1 Site Preparation

Because the scale must not be loaded beyond its capacity, even momentarily, do not select a site where overweight loads would have to maneuver to avoid crossing the platform. Use the following guidelines for site preparation:

- Avoid areas where the scale might receive damaging side impacts from items such as wheels or forklift tines, or shock damage from falling objects.
- For scales not meant for washdown environments, avoid areas where water may cause damage.
- The interface cable between the scale and the indicator must be protected against crushing, cutting, or moisture damage. Protect the cable by running it in conduit. Do not allow cable to lay in water.

For proper operation, the scale must be level within 1/4". Choose a site where the floor is close to this standard to avoid excessive shimming, or modify the floor at the chosen site to meet this standard. After a site is selected:

1. Use hook-end chains to move scale base to its permanent location. Location should be level and have a solid stable foundation. An unstable location causes inaccurate or fluctuating weight readings.
2. Verify that base rests firmly against floor on all four corner gussets. Shim between each gusset and floor as required to attain a firm and stable mounting.

3.2 Assembly

1. Cut bands holding load cell package from lever arm and remove load cell with wire rope.

Caution

The load cell is a delicate device and can be damaged if dropped, twisted when mounting, or shock loaded.

2. Insert a block under primary lever so it fits snugly. Remove shipping bolt and spacer. Shipping bolt is placed between load cell support frame and nose iron (in place of load cell) during shipping.
3. The load cell is shipped with wire rope. Remove outer nut from load cell wire rope.
4. Screw inner nut on wire rope flush with top of threads.
5. Remove load cell mounting bolt from top of cell.
6. Screw short threaded end of wire rope through bottom of load cell until flush with top.

Note:

The 3/4" spacer is used beginning with the 30" x 30" 2000 lb. model and all higher with the exception of the 48" x 48" 20000 lb. and 48" x 60" 20000 lb models which use the 1" spacer.

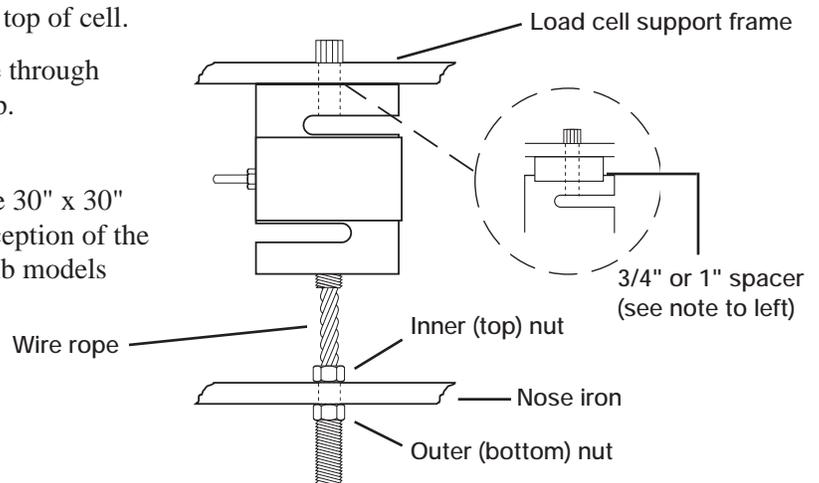
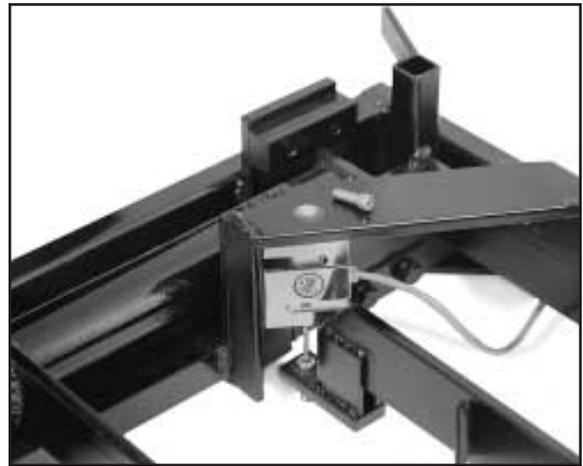


Figure 3

7. Carefully lower load cell into position at an angle so wire rope threaded rod end goes through hole of nose iron first. If used, position spacer between load cell support frame and load cell.
8. Position load cell so signal cable will travel directly out exit hole in base.
9. Position load cell vertically and lift until it touches load cell support frame. Align top hole of load cell with mounting hole of support frame and thread load cell mounting bolt down through housing into load cell. Do not tighten.



10. Place bottom nut on wire rope. Do not tighten.
11. Position load cell so it is not rubbing or touching side of support frame or lever system.
12. Tighten mounting bolt.
13. Carefully raise lever nose iron and tighten bottom nut finger tight. Using a wrench, carefully tighten bottom nut. Be sure to remove block from under primary lever.

⚠ Caution

When tightening the bottom nut, do not allow the wire rope to twist. Twisted rope causes side forces in the cell, which cause weight errors when the scale is loaded.

14. Screw strain relief fitting into side of base.
15. Route load cell cable through strain relief fitting. Verify cable is not touching any portion of the live weighing deck or levers.
16. Connect load cell cable to digital weight indicator.
17. Inspect under and around lever arms, pivot heads, and load bridge for any foreign material which could interfere with live portion of scale.
18. Re-install weigh platform and deck plate. The scale base is ready for calibration.

Note:

The weigh platform frame and scale base are match marked on the corner near the load cell for proper re-assembly.

3.3 Electrical Interface to Indicator

20 feet of 4-wire cable is supplied to connect the scale to the weight indicator. Use the wiring scheme in the following table to connect your RoughDeck FXB.

Color Code	Function
Red	+ Excitation
Black	- Excitation
Green	+ Signal
White	- Signal

To prevent electrostatic discharge, ground the scale base to the earth ground terminal of the same AC power source that is used to power the indicator.

4. Calibration and Adjustments

4.1 Calibration

1. Zero balance digital weight indicator.
2. Place test weights equal to 70% - 80% of scale's capacity on weigh platform and adjust weight indicator span for correct reading.
3. Remove test weights and check zero.
4. Repeat Steps 1 - 3 if weight indicator does not return to zero.

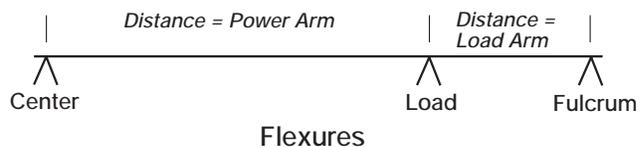
4.2 Mechanical Adjustments

The corners of the scale base are preset. If corners have extreme differences, check for bent flexures, broken welds, or foreign objects in the corners.

1. Apply test weights equal to 25% of scale capacity to each corner in sequence and observe weight indicator. Record these weights for reference.
2. If corner shift reading is within tolerance, do not make any mechanical adjustments. If it is not within tolerance, proceed to step 3.
3. Remove deck plate and weigh platform frame.
4. Loosen all check link mounting bolts (see Figure 1).
5. Loosen top and bottom load flexure gripper plate bolts on corner to be changed (see Figure 1). You do not have to completely remove bolts.
6. Use Figure 2 and exercise below as a guide and perform one of the following:
 - **Add** shims to increase fulcrum to load distance which increases weight reading for corner being adjusted.
 - **Remove** shims to decrease fulcrum to load distance which decreases weight reading for corner being adjusted.

Exercise: Determining Shim Amount

$$\text{shim thickness} = \frac{\text{error (lbs.)} \times \text{load arm (in.)}}{\text{load on platform (test weights)}}$$



For example, if:

Load error = 3 lbs.

Load arm distance = 4"

Load on platform = 1000 lbs.

$$.012 = \frac{3 \text{ (lbs.)} \times 4 \text{ (in.)}}{1000}$$

Then your shim would be .012.

Shims are available in .010" and .030" thicknesses. Weight readings change in a linear way proportional to shim thickness. For example, if adding a .010" shim increases weight reading 2 lbs. on that corner, a 030" shim will increase it 6 lbs.

7. Tighten all check link bolts.
8. Re-install weigh platform and deck plate.
9. Re-check corners per step 1.
10. Recalibrate scale as described in section 4.1.

5. Optional Equipment

The following options are available for the RoughDeck FXB:

Fork lift skids

Two 8" channels mounted on customer-specified centers.

Fork lift skids with weight indicator column

Two 8" channels mounted on customer-specified centers with one channel extended 12" and equipped with a bolt-on pipe stand weight indicator column. The weight indicator display is 54" above the floor. For models larger than 48" x 60", you must consult your distributor to determine the appropriate weight indicator column.

Epoxy-painted base

An epoxy-painted base with stainless steel hardware.

Stainless steel sheet metal platform covers

Stainless steel covers for the entire deck top.

Stainless steel construction

Stainless steel construction of the entire scale base.

6. Service Information

6.1 Troubleshooting

Problem	Probable Causes
Shift error	Center flexure offset from center line Corners not shimmed tightly to floor Nose-iron on power lever too high or too low Pivot heads need shimming
Erratic readings	Bent flexures or cable assembly Center leveling bolts not down far enough, or down too low Corners not shimmed tightly to floor Ground shield not connected to cannon plug or meter shield Loose connection in junction box
Non-linear weight reading	Center flexure offset from center line Damage to load cell Misaligned flexure or cable assembly Nose-iron on power lever too high or too low Pivot heads need shimming
Corner error	Corners not shimmed tightly to floor Loose gripper Misaligned flexure or cable assembly Pivot heads need shimming
Zero change	Corners not shimmed tightly to floor Damaged load cell Live assembly touching dead assembly Loose gripper Misaligned flexure or cable assembly Shipping block not removed during unpacking Obstruction under load bridge (probably at corner)

6.2 Load Cell Replacement

Replacement load cells can be ordered from Rice Lake Weighing Systems according to the table in Section 6.3. To replace a load cell in an FXB:

1. Remove deck assembly.
2. Loosen bottom locking nut (see Figure 3).
3. Remove signal cable access hole cover plate. Pull wire rope from plate and pass it through base.
4. Remove bottom lock nut from wire rope and back off upper lock nut. Using a hex allen wrench on flathead bolt, and an adjustable wrench to hold load cell body, remove load cell.
5. Remove wire rope from defective load cell and screw it into new load cell to approximate position it was in old load cell.
6. Insert wire rope into nose iron hole and turn lower nut on loosely.
7. Hold flat washer in place, and screw flathead bolt into top of load cell. Tighten flathead bolt securely using hex allen wrench and adjustable wrench.
8. Tighten lower lock nut on wire rope against nose iron finger tight only. Lock upper nut down against nose iron.
9. Pass signal cable through access hole and follow directions from Section 3.2.
10. Replace deck assembly and recalibrate according to Section 4.

6.3 Replacement Parts List and Accessories

Size	Capacity (lbs)	Load Cells	Wire Rope	Center	Flexures	
					Fulcrum	Load
18" x 24"	500	21432	17769	33306	33304	33304
18" x 24"	1000	21434	17769	33306	33304	33304
18" x 30"	500	21432	17769	33306	33304	33304
18" x 30"	1000	21434	17769	33306	33304	33304
18" x 30"	1500	21435	17769	33306	33304	33304
24" x 24"	500	21432	17769	33306	33304	33304
24" x 24"	1000	21434	17769	33306	33304	33304
30" x 30"	500	21432	17769	33306	33304	33304
30" x 30"	1000	21434	17769	33306	33304	33304
30" x 30"	1500	21435	17769	33306	33304	33304
30" x 30"	2000	21436	33084	33305	33303	33087
36" x 36"	1000	21436	33084	33305	33303	33087
36" x 36"	2000	21436	33084	33305	33303	33087
36" x 36"	5000	21437	33084	33305	33303	33087
38" x 46"	1000	21436	33084	33305	33303	33087
38" x 46"	2000	21436	33084	33305	33303	33087
38" x 46"	5000	21437	33084	33305	33303	33087
38" x 46"	10000	21439	33084	33305	33303	33087

Replacement Parts List and Accessories (continued)

Size	Capacity (lbs)	Load Cells	Wire Rope	Center	Flexures	
					Fulcrum	Load
48" x 48"	1000	21436	33084	33305	33303	33087
48" x 48"	2000	21436	33084	33305	33303	33087
48" x 48"	5000	21436	33084	33305	33303	33087
48" x 48"	7000	21438	33084	33305	33302	33087
48" x 48"	10000	21438	33084	33305	33302	33087
48" x 48"	20000	21442	33084	33087	33086	33307
48" x 60"	2000	21436	33084	33305	33303	33087
48" x 60"	5000	21436	33084	33305	33303	33087
48" x 60"	10000	21438	33084	33305	33302	33087
48" x 60"	20000	21442	33084	33087	33086	33307
48" x 72"	2000	21436	33084	33305	33303	33087
48" x 72"	5000	21436	33084	33305	33303	33087
48" x 72"	10000	21438	33084	33305	33302	33087
48" x 72"	20000	21440	33084	33087	33086	33307
60" x 60"	2000	21436	33084	33305	33303	33087
60" x 60"	5000	21436	33084	33305	33303	33087
60" x 60"	10000	21438	33084	33305	33302	33087
60" x 60"	20000	21440	33084	33087	33086	33307
60" x 72"	5000	21436	33084	33305	33086	33307
60" x 72"	10000	21438	33084	33305	33086	33307
60" x 72"	20000	21440	33084	33087	33086	33307
60" x 84"	5000	21438	33084	33305	33086	33307
60" x 84"	10000	21440	33084	33087	33086	33307
60" x 84"	20000	21442	33084	33087	33086	33307
72" x 96"	5000	21438	33084	33087	33086	33307
72" x 96"	10000	21440	33084	33087	33086	33307
72" x 96"	20000	21441	33084	33087	33086	33307
84" x 108"	5000	21438	33084	33087	33086	33307
84" x 108"	10000	21439	33084	33087	33086	*
84" x 108"	20000	21441	33084	33087	33086	*
96" x 120"	10000	21440	33084	33087	33086	33307
96" x 120"	20000	21442	33084	*	33086	33307
96" x 120"	30000	21443	33084	*	33086	33307

* Parts must be special ordered.

Note:

A 3/4" spacer (positioned above the load cell) is used beginning with the 30" x 30" 2000 lb. model and all higher with the exception of the 48" x 48" 20000 lb. and 48" x 60" 20000 lb models which use the 1" spacer. The part number for the 3/4" spacer is 33425 and the 1" spacer part number is 33426.

