CAMBRIDGE

SCALE WORKS, INC.

Model: LoLander Series Truck Scale

Model: LL10070-10FT

Model: LL10070-11FT

Installation, Set-Up and Operation Manual

NTEP NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

Made in USA

Cambridge Scale Works, Inc. • P.O. Box 670 • Honey Brook, PA. 19344

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Manual P/N: 5999-1066-00 (5/17)

Table of Contents

Section 1.0

General Introduction

The truck scale that you are about to install, represents the latest in "State-of-the-Art" modular steel technology specifically applied to the weighing industry. This manual is designed to aid you in the installation, calibration and troubleshooting. Provided with this manual are general drawings, check lists and test sheets to aid in your installation starts with a good foundation to build from. Double check all dimensions on the scale foundation, with the supplied drawings from the manufacturer before beginning the installation.

Make sure you have the required tools and materials to complete the installation. Proceed with the installation as described in the following sections of this manual.

Prior to beginning the installation of the scale, check the foundation, as built, against the foundation and setting drawings furnished. Check the diagonal dimension between the approach wall corners.

These dimensions are critical.

Section 2.0

Specifications

Model	Description
LL10070-10FT	100 Ton/ 70' Flat Top Steel Deck 10FT Wide
LL10070-11FT	100 Ton/ 70' Flat Top Steel Deck 11FT Wide

Deck Panel Specifications

Nominal Size: "L" x "W"	Steel Deck (Maximum Weight per Module)
15 ft. x 11 ft.	4,000
17.5 ft. x 11 ft.	4,500
20 ft. x 11 ft.	5,300

Certification: Meets all NIST 44 Requirements

NTEP Certified No 02-114

Concentrated Load Capacity: 35 TONS

Tandem Axle Capacity: 38,000 lbs. Single Axle

56,000 lbs. Dual Axle Tandem

63,000 lbs. Tri-Axle Tandem

Section 2.0

Specifications Continued

Height: 12” Top of Deck to Foundation Pier (Standard Model)

Width: 10’-0 “ or 11’-0”

Load Cell: Double Ended Shear Beam Type

60, 000 lb. Capacity each

3 mV/V Output @ 700 Ohm Bridges

Class 111L 10, 000 div.

Required Tools and Hardware

Quantity	Description
2	(2) Ton Bottle Jacks
Minimum of 16	4”x4”x12” Cribbing Blocks
2	1- 5/16” Open End Wrench
2	1– 1/2” Open End Wrench
1	Builders Level
1	Medium Phillip Screwdriver
1	Small Blade Screwdriver
1	Medium Blade Screwdriver
1	Wire Strippers
1	Volt Meter
1	Tape Measure
Misc.	(6) Conductor Load Cell Cable from Scale Deck to Digital Indicator

Section 3.0

Installation for Steel Deck Series Lolander Truck Scale

Step 1. Locate Module (1), the first to be installed. This module is marked with section (1) on one end and section (2) on the other end.

Install (2) Stainless Steel Check Pads with 9" stainless steel threaded rod into the holes on each side of section (1). These are check stops and will need final adjustment in a later step.

Set the first module with section (1) on pier (1) and section (2) on pier (2). Place several 4" blocks to set a working height of approximately 11.5"-12". Position section (1) 1.5" from the end wall.

SEE FIGURE (A)

Step 2. Locate Module (2), the second module to be installed. This module is marked with section (2) on one end and section (3) on the other end.

Set the second module with section (2) on pier (2) and section (3) on pier (3). Again, place several 4" blocks under module (2) to maintain the 11.5"-12" working height.

SEE FIGURE (A)

Hardware to Assemble Module (1) to Module (2)

Quantity 8: 7/8"- 9 x 4" Hex Head Cap Screw

Quantity 16: 7/8" Flat Washers

Quantity: 8: 7/8" Split Washers

Quantity: 8: 7/8" Hex Nuts

Locate the hardware and bolt Module (1) to Module (2) at section (2).

Note: Be sure the (2) modules are aligned correctly.

Install hardware through (8) holes, (4) on each side of module leaving the center hole to pull load cell cables. Do not over tighten at this point, slight adjustments may be necessary later.

Step 3. Locate Module (4), the third module to be installed. This module is marked section (4) on one end and section (5) on the other end.

Install (2) Stainless Steel Check Pads with 9" stainless steel threaded rod into the holes on each side of section (5).These are check stops and will need final adjustment in a later step.

Set the fourth module with section (5) on pier (5) and section (4) on pier (4). Place several more 4" blocks under module (4) to maintain working height. Position section (5) 1.5" from e end wall.

SEE FIGURE (A)

Section 3.0

Installation for Steel Deck Series Lolander Truck Scale Continued

Step 4. Locate Module (3), the last module to be installed. This module is marked section (3) on one end and section (4) on the other end.

Set module (3) with section (3) on pier (3) and section (4) on pier (4). This module should match up with section (3) and section (4) on modules placed in position in steps 2 and 3. Place several 4" blocks under module (3) to maintain working height.

Note: This should be a close fit. Move module (4) slightly if necessary to set module (3) into position. Install hardware to bolt Module 2 and 3 together. Refer back to Step 2 for the necessary hardware. Install hardware to bolt Module 3 and 4 together as in Step 2. Leave the center holes open to pull cables. (Do **NOT** tighten at this point, slight adjustments may be necessary later.)

Note: Check for approximately 1"-1.5" of equal clearance at each end of truck scale at level approach.

SEE FIGURE (A)

Step 5. Locate the (10) load cell stands and place a stand into each top access location. Position stands on the piers as shown in **FIGURE (B).**

Step 6. Locate the (10) "Nylatron" load cell mounting blocks. Place (1) block down over the set of pins in the stands.

SEE FIGURE (C)

Step 7. Locate the (10) 60K double ended shear beam load cells. Place one load cell on each "Nylatron" load cell mounting block.

SEE FIGURE (C)

Step 8. Locate the (20) load links. Place on link over each end of the load cell.

SEE FIGURE (C)

Step 9. Place a bottle jack under the (2) jack plates in section (1) on each side. Lift the scale section 1/4"-1/2" so that the load links are hanging from each side of the load cell can slide over the (2) load knobs welded to the scale. Slowly lower the jacks in section (1) making sure the load links sit properly on the load cells and load pins.

Note: It may be necessary to remove blocking and cribbing at this point to allow the load link to seat properly in the load cell and load cell pin.

SEE FIGURE (C)

Section 3.0

Installation for Steel Deck Series Lolander Truck Scale Continued

Step 10. Proceed to sections 2 through 5, repeating step 9 at each section until the scale is completely suspended on the load cells.

Step 11. Tighten up all hardware in sections 2-4.

Note: It is important at this point to check for approximately 1.5" of clearance at each end of the truck scale between the scale and the end wall "C" Channel.

Step 12. Check to see that all load links are receiving tension or load. If a set of links are loose it may be necessary to unhook the links, remove the load cell, remove the "Nylatron" load cell mounting block and place a "Nylatron" shim over the locator pin. Replace the "Nylatron" block, load cell and load links. Let the scale down to reseat the links. Repeat this procedure in other sections as necessary to place scale deck load evenly on all load cells.

Step 13. The scale at this point should be ready to set the "check" stops at each end of the scale. Adjust the check stops to 1/8" - 3/16" from end walls to allow minimum free swing without binding.

SEE FIGURE (A)

Step 14. Locate the (2) junction boxes.

A. (6) load cell junction box should be located in section (2) and will connect load cells from sections 1, 2 and 3.

B. (4) load cell junction box should be located in section (4) and will connect load cells from section 4 and 5.

C. Run a load cell cable between the junction boxes. Each box is expanded and the indica tor cable can exit either junction box.

D. Pull the load cell wires through the tubes to the correct "J" Box.

See load cell Wiring Diagram- FIGURE (D)

Step 15. Run indicator cable from either junction box to desired location and wire according to indicators wiring instructions.

Step 16. At this point a test truck with certified test weights will be necessary to calibrate the truck scale and adjust the sections. Use the "Test Report" sheet to record your weighments and adjustments.

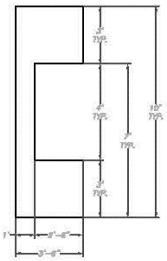
CONTRACTOR NOTES:

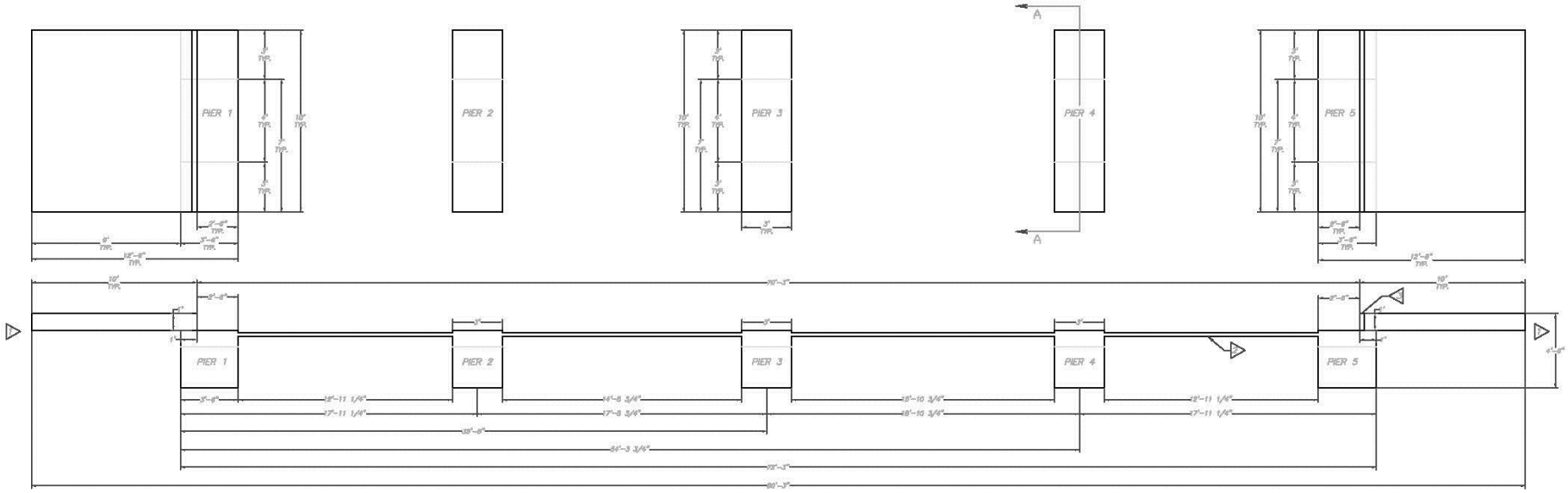
1) REINFORCING STEEL: DEFORMED BARS ASTM A615 GRADE 60, UNLESS OTHERWISE SPECIFIED.
2) STEEL: STRUCTURAL ASTM A36.
3) CONCRETE: 3000 PSI @ 28 DAYS, TYPICAL SLUMP 4.
4) STRUCTURAL CONCRETE MEMBERS ARE DESIGNED FOR "IN PLACE" LOADS. CONTRACTOR IS RESPONSIBLE FOR BRACING ALL STRUCTURAL ELEMENTS UNTIL COMPLETION OF THIS PROJECT.
5) STATE AND LOCAL AGENCIES MAY HAVE VARIOUS REQUIREMENTS FOR APPROACH RAMP LENGTH, PITCH, CONCRETE CLEAN OUTS, AND FOR CLEAN OUT HEIGHT. CHECK WITH STATE AND THE APPROPRIATE AGENCIES PRIOR TO CONSTRUCTION.
6) MONOLITHIC POUR OF SLAB AND PIERS IS ALLOWED, AT THE CONTRACTOR'S DISCRETION.
7) FOOTINGS SHOULD BE PLACED ON NATURAL UNDISTURBED SOIL, OR ENGINEERED FILL.
8) DEVELOP AND MAINTAIN SITE GRADES TO RAPIDLY DRAIN SURFACE AND AND RUN OFF AWAY FROM FOUNDATION.
9) ALL FILL TO BE COMPACTED TO 95% – 98% OF STANDARD PROCTOR DENSITY – ASTM 698.
10) PROVIDE 2" CONCRETE COVER ON ALL REINFORCING STEEL. (3" @ FOOTING REINFORCING STEEL) UNLESS OTHERWISE SPECIFIED.
11) PROVIDE PROPER SUPPORT OF ALL REINFORCING TO PREVENT DISPLACEMENT DURING CONCRETING.
12) CONCRETE SHOULD NOT CONTAIN FLY ASH.
13) PORTLAND CEMENT: ASTM C150, TYPE 1; AGGREGATE – 3/4".
14) WATER TO BE CLEAN POTABLE AND CONTAINING LITTLE OR NO ACIDS, ALKALINES AND ORGANIC MATERIALS.
15) CONCRETE SHOULD BE MAINTAINED ABOVE 50°F AND IN A MOIST CONDITION FOR AT LEAST 7 DAYS FOR NORMAL CONCRETE AND 3 DAYS FOR HIGH-EARLY STRENGTH CONCRETE.
16) SLAB TO BE LEVEL WITHIN 1/4".
17) APPROACHES TO BE ON A COMMON PLANE WITHIN 1/4".

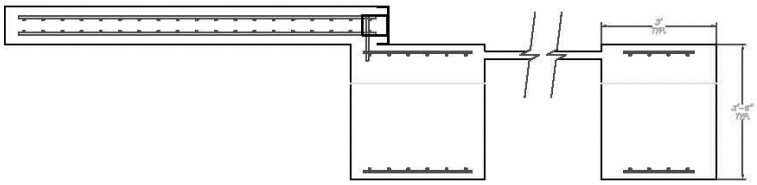
NOTES:

1. OPTIONAL (RECOMMENDED) APPROACH RAMP IS TO BE 1/2" SLOPE PER FOOT TO GRADE.
2. OPTIONAL (RECOMMENDED) WASH FLOOR IS 2" BELOW TOP SURFACE OF PIER SECTION. THICKNESS TO BE 3–4 INCHES.
3. 12 INCH "C" CHANNEL SUPPLIED BY CAMBRIDGE SCALE WORKS, INC.
4. 3'–6" PIER DEPTH IS STANDARD, BUT BE SURE THAT THIS IS BELOW THE FROST LINE IN YOUR AREA. IF ITS NOT TO EXTED DEPTH OF THE PIER BELOW THE FROST LINE.

SECTION "AA"
TYPICAL PIER







MODEL: LL10070–10FT
SIZE: 10' X 70'
CAPACITY: 100 TONS

PRELIMINARY

ITEM	QTY	PART NO	DESCRIPTION

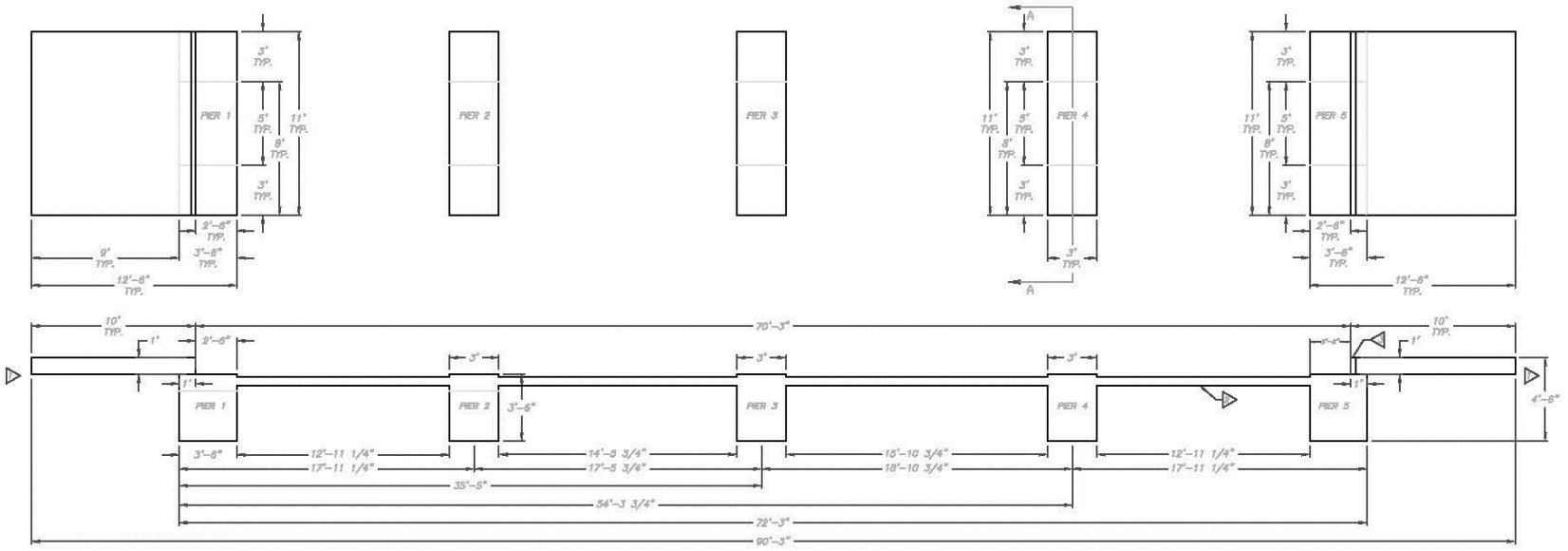
CAMBRIDGE SCALE WORKS

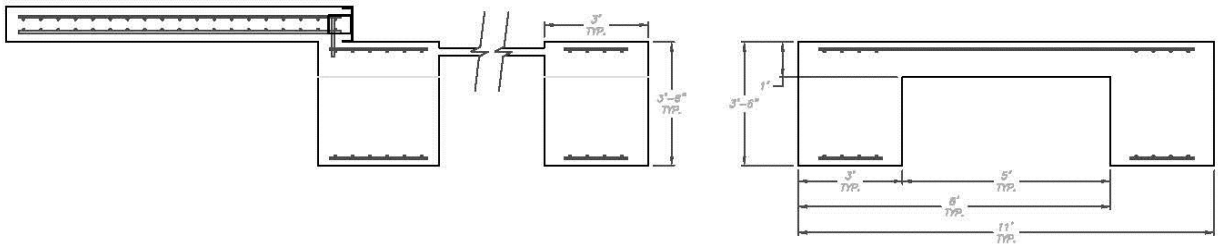
DRAWN: REL
FILE NO: D-4990-1047-00
DECIMAL: .X = ±.06, .XX = ±.01, .XXX = ±.005
ANGULAR: ±1°
SURFACE FINISH: 63
EDGE BREAK: .010–.020

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES

TRUCK SCALE
10' X 70' FLAT TOP, PIERS
MODEL: LL10070-10FT

JOB NO
PART NO 4990–1047–00
REVISION NO
SCALE N/A
DATE 10/23/06
DRAWING NO D–4990–1047–00





SECTION "AA"
TYPICAL PIER

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MODEL: LL10070-11FT
CAPACITY: 100 TON
SIZE: 70' x 11'

PRELIMINARY

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES

CAMBRIDGE SCALE WORKS

ITEM	QTY	PART NO	DESCRIPTION

DRAWN: REL
FILE NO: DC-4990-1049-00
DECIMAL: X = ±.06, XX = ±.01, XXX = ±.005
ANGULAR: ±1°
SURFACE FINISH: 63
DWG: 010-000

JOB NO: 4990-1048-00
PART NO: 4990-1048-00
REVISION NO:
SCALE: N/A
DATE: 10/10/08
DRAWING NO: DC-4990-1049-00

TRUCK SCALE NTEP #02-114
70' x 11' FLAT TOP PIERS
MODEL: LL10070-11FT

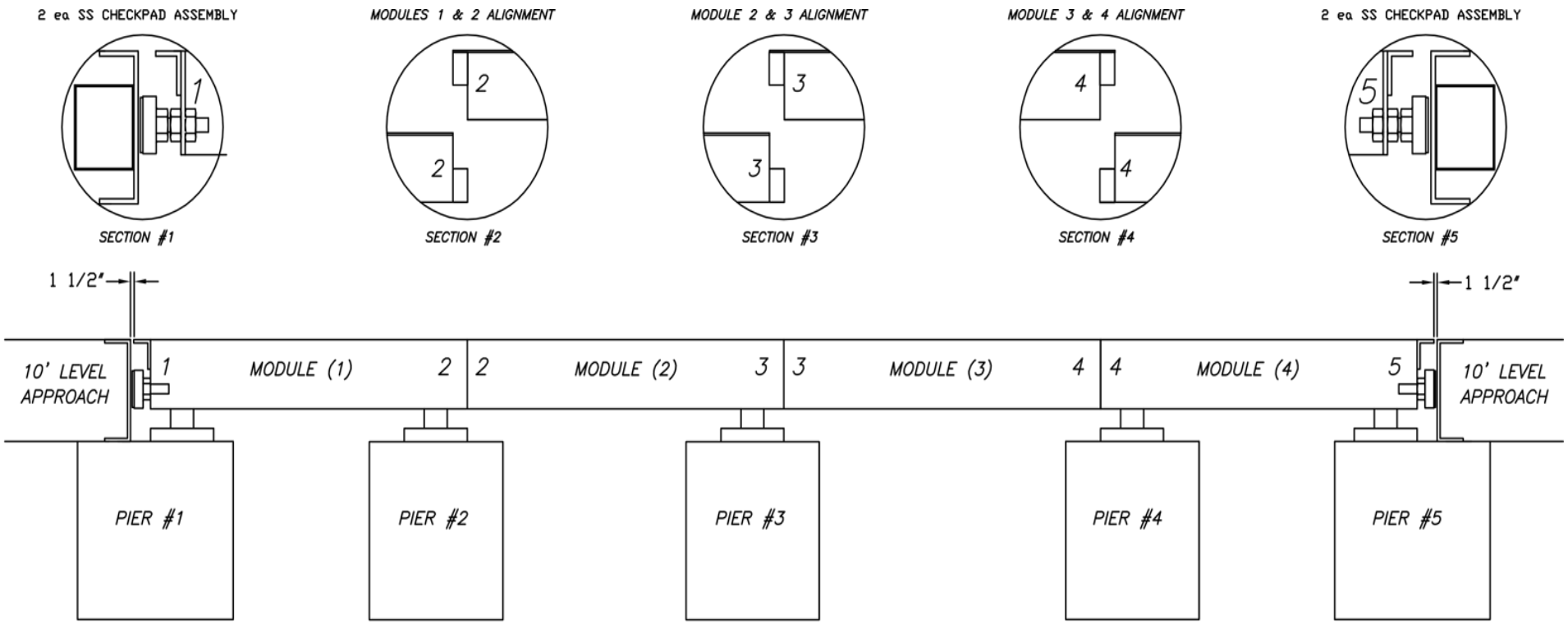


FIGURE (A)
MODULE SET PROCEDURE

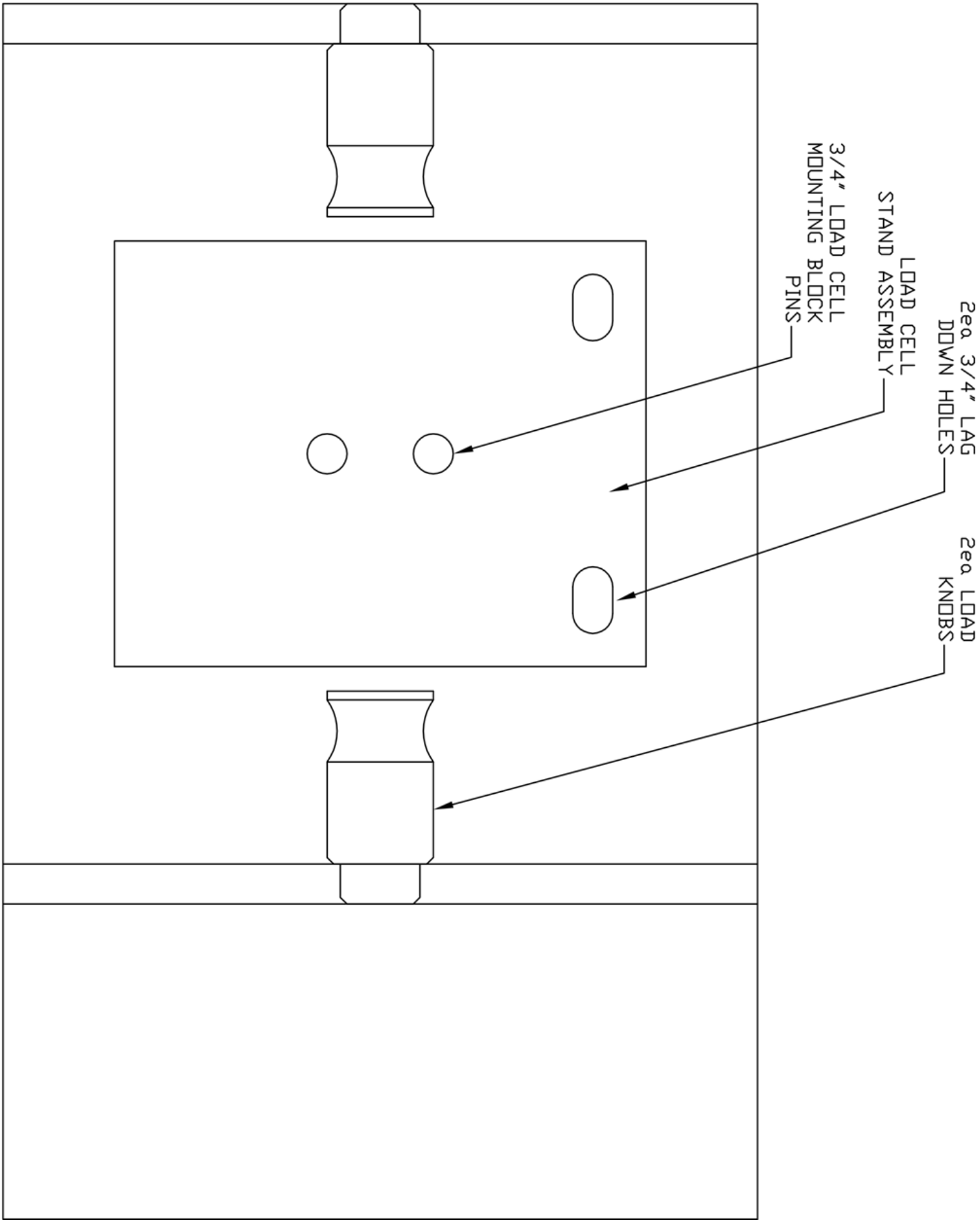


FIGURE (B)

LOAD CELL STAND

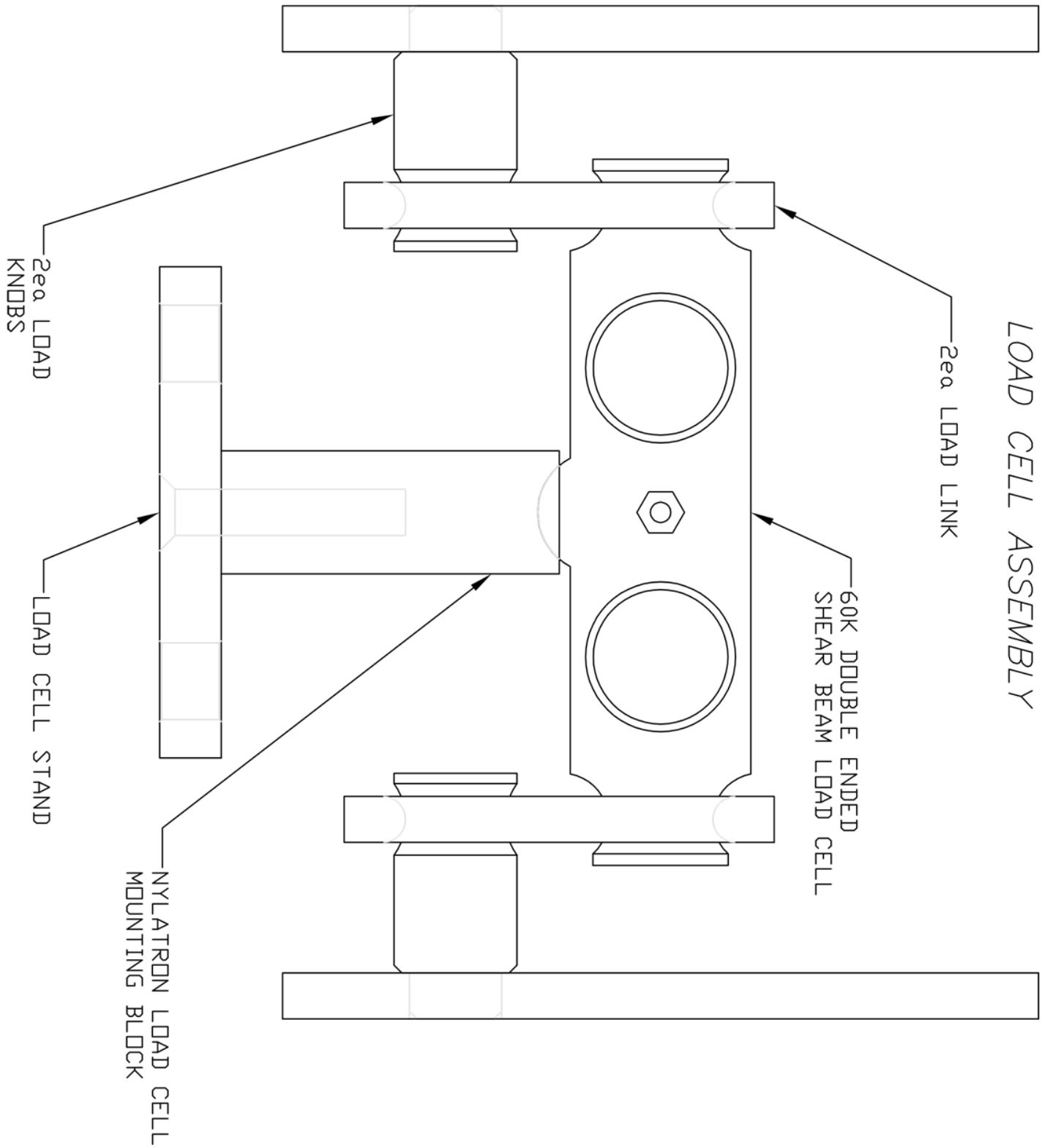


FIGURE (C)
LOAD CELL ASSEMBLY

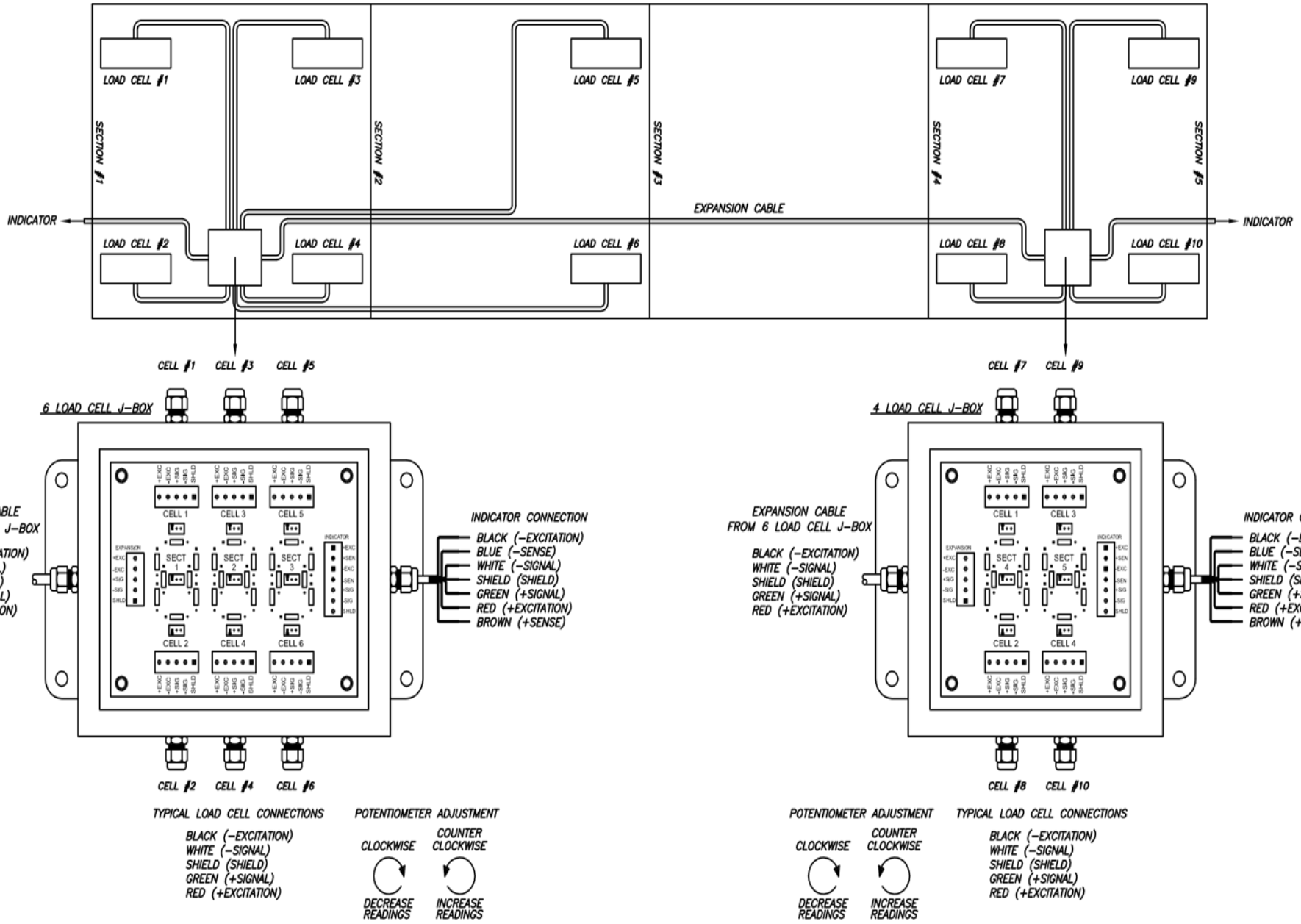
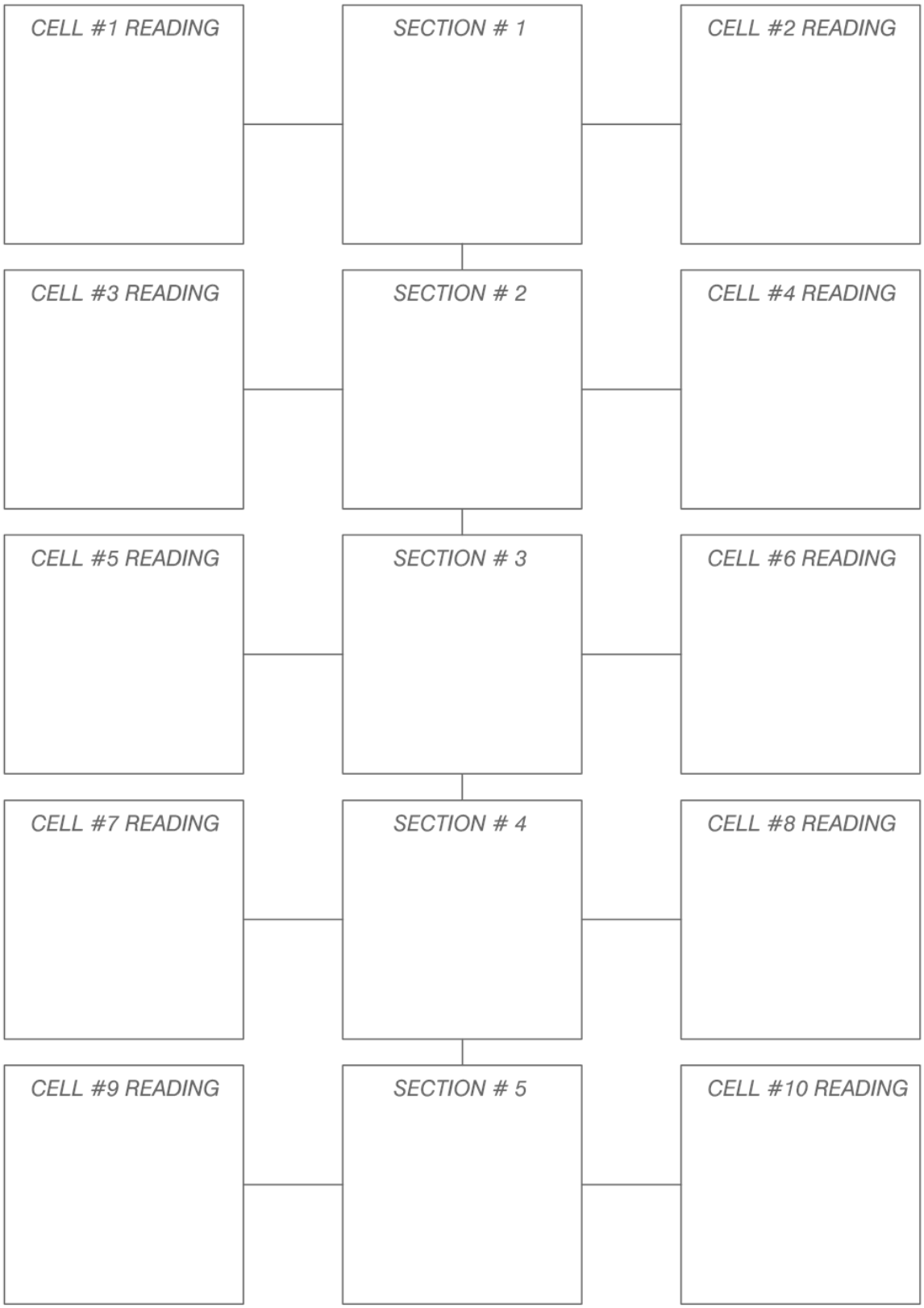


FIGURE (D)
WIRING DIAGRAM

TEST REPORT

WEIGHT READING AND OR
LOAD CELL mV OUTPUT



Section 4.0

Trouble Shooting Procedures

Digital Indicator Procedures:

It is always good trouble-shooting practices to isolate the problem to either one or two possibilities . The first being the digital indicator and the second the scale deck. To isolate these possibilities, it is recommended you have a good Digital Volt Meter and a good quality Load Cell Simulator, both of these tools will provide quick and easy diagnosis of the scale problems.

Step 1. Disconnect the digital indicator from the scale platform and install the load cell simulator on indicator. Observe the stability of indicator and also the voltage outputs. Refer to the indicator manual for proper voltages. If digital indicator functions properly, proceed to Step 2, if not refer to instrument manual for trouble-shooting procedures.

Step 2. Disconnect the cable from the digital indicator to the scale platform junction box. Install the load cell simulator at this point on the scale deck. Observe the stability of the digital indicator and also double check the indicator voltages at this point. If the indicator malfunctions, the possibilities of a bad cable are very likely. If the digital indicator performs properly, then proceed to the scale platform trouble-shooting.

Scale Platform Trouble-Shooting:

Step 1. Check scale deck for any mechanical binds (i.e. scale deck bumper assemblies binding, or debris packed under scale deck at either end of approach wall, or under scale.)

Step 2. Check each load cell assembly. Make sure it is vertical and plumb and has weight on the load cell. Check all load cell support stands and base plates and make sure they are tight and not shifting.

Step 3. Check all load cell cable connections in the junction box and make sure they are not broken and all connections are tight. Check load cell terminal boards for defective components, replace boards if any found. If you still have problems, proceed to the load cell trouble-shooting section.

Load Cell Trouble-Shooting:

Here are some easy to follow steps to help you trouble-shoot potential load cell problems. Before you begin, carefully inspect the cell for any physical damage such as distortion or cracks in metal parts, rippling of metal, etc. Don't forget to check the cable, as this is often the first area to cause a problem. Look for cuts, crimps and excessive abrasion. Make a note of anything that looks out of the ordinary.

Step 1. Zero Balance Changes in zero balance usually occur if the load cell has been overloaded. Using a milli-volt-meter, measure the load cell output under "no-load" condition. It should be less than 1% (the typical tolerance for zero balance) of the full scale output. Be sure to check the load cell specifications for zero balance and sensitivity.

Section 4.0

Trouble Shooting Procedures Continued

Typically load cells can shift up to approximately 10% of full scale and still function correctly. Replacing the load cell is recommended if the output has a shift greater than 10%. The element may be damaged beyond repair if it goes over 10%. The usual value for a 1% shift in zero balance is 0.3 mV. This assumes 10 volts excitation on a load cell with 3 mV/V output. Full scale output with these conditions is 30mV. One percent of 30 mV is 0.3 mV.

Step 2. Bridge Resistance Changes in bridge resistance are most often caused by a failure of a compensating element or by a broken or burned bridge wire usually resulting from an electrical transient such as lightning.

With an ohmmeter, measure the resistance across each pair of input and output leads. The values are the input and output resistance of the bridge and are normally about 700 ohms. Readings should be within 1.0% of the stated values. Readings outside of these limits suggest damage and require through inspection.

Step 3. Resistance to Ground Electrical leakage is usually caused by water contamination within the load cell or cables. Whether the leakage can be tolerated depends on the application and electronic instrumentation used. An unstable output is most often caused by water contamination.

By using a megohmmeter, a technician can measure the resistance between all five leads tied together (four live leads plus one ground) and the load cell metal body. The reading should be 5000 megohms or more. If the cell fails the test, remove the ground wire and test only the four live leads. If it tests correctly, an insulation problem in the cable is suggested.

Step 4. Load Cell Symmetry With an ohmmeter, measure the resistance between the (+) excitation and the (+) signal and then between the (+) excitation and the (-) signal. Repeat the process for the (-) excitation to both signal leads. Now look for the bridge symmetry. Compare the resistance of each leg of the cell. If the cell is unloaded, the values will be very nearly the same. If they aren't , the cell may be damaged. (Typical value is 1 ohm or less between each leg.)

Grounding

Cambridge **DOES NOT** recommend grounding the scale platform. The scale is insulated and supported by "Nylatron" load cell blocks which are a nonconductive material that isolates the scale from the ground dissipation of electric from lightning strikes.

Ground strapping the scale to a ground rod directs lightning ground dispursement directly to the scale and can cause load cells and junction board failure.

"Warning"

It is the customers responsibility to make sure the truck scale does not come into direct contact with the ground. Failure to do so may void the scale warranty.

Section 5.0 Warranty

CAMBRIDGE warrants the **Lolander Truck Scale** to be free of defects in workmanship and/or materials for 12 months from the date of shipment. This warranty of workmanship and/or materials is valid, if in the opinion of **CAMBRIDGE** the equipment has not been mechanically, environmentally, or electrically abused.

This warranty is limited, at the option of **CAMBRIDGE**, to repair, replace or an appropriate credit adjustment , not to exceed the original equipment sale price paid to **CAMBRIDGE**.

CAMBRIDGE assumes no liability in connection with the sales of its products beyond that stated above.

Warranty replacement parts and or repair services are performed at the factory in Cumberland, Maryland or by an authorized service group approved by **CAMBRIDGE**.

Warranty does not include travel expense if a factory technician is requested to perform repairs at a location other than the factory.

It is the user's responsibility to follow the proper set-up, calibration and operating procedures of the **Lolander Truck Scale** as described in this manual. If the operator has difficulty using their **Lolander Truck Scale** properly, please contact **CAMBRIDGE** at 1-301-724-4082. Any one of our Technicians will be happy to work with the user via telephone.

Section 6.0 Assistance

If at any time and you require assistance with your **Lolander Truck Scale**:

End User please contact your servicing scale dealer.

Authorized Cambridge Dealer/ Distributor please contact:

CAMBRIDGE SCALE WORKS, INC.

115 West Mary Street

Cumberland, MD 21502

Phone: (301) 724-4082

Fax: (301) 724-4964