

C A M B R I D G E

SCALE WORKS, INC.

Model: 770 Light Vehicle Scale

Size: 8'x30'x5"

Size: 10'x30'x5"

Capacity: 40K CLC: 20K

Capacity: 60K CLC:30K

Installation, Set-Up and Operation Manual



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Section 1.0

General Introduction

The Model 770 Series will be delivered with all load cells installed and pre-wired to the appropriate junction box at the factory. No load cell to “J” Box wiring is required for the installation.

The light vehicle 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.

These dimensions are critical. SEE FIGURE (A)

Section 2.0

Specifications

<u>Model</u>	<u>Size</u>	<u>Description</u>	<u>Number of Load Cell</u>	<u>Load Cell Capacity</u>	<u>Number of Modules</u>
770-830-4020	8’x30’x5”	40K Capacity/20K CLC	12	10K	5
770-830-6030	8’x30’x5”	60K Capacity/30K CLC	12	15K	5
770-1030-4020	10’x30’x5”	40K Capacity/20K CLC	12	10K	5
770-1030-6030	10’x30’x5”	60K Capacity/30K CLC	12	15K	5

Size Per Module

Width x Length

8’x6’x5”

10’x6’x5”

Maximum Weight per Module

1,300 lbs

1,500 lbs

Certification: Meets all NIST 44 Requirements

NTEP Certified No: 16-113

Concentrated Load Capacity: 40K Capacity– 20K CLC

60K Capacity– 30K CLC

Section 2.0

Specifications Continued

Height: 5 1/2" Top of Deck to Foundation Pier (Scale Only)

Height: 6" Top of Deck to Foundation when installed with ramps and lag down/locator plate

Width: 8'-0" " or 10'-0"

Load Cell: Single Ended Shear Beam Type

40,000 lb. Capacity Scale = (12) 10K Load Cells

60,000 lb. Capacity Scale = (12) 15K Load Cells

3 mV/V Output @ 350 Ohm Bridges

Class 111L 4,000 div.

Required Tools and Hardware

<u>Quantity</u>	<u>Description</u>
2	3/4"-10 Eye Bolts
2	1 -1/8" Open End Wrench
2	1 -1/2" Open End Wrench
1	Builders Level
1	Phillips Screwdriver
1	Assorted Pack of Allen Wrenches
1	Medium Blade Screwdriver
1	Wire Strippers
1	Volt Meter
1	Tape Measure
14	1/2" x 4" Concrete Lags
Misc.	(6) Conductor Load Cell Cable from Scale Deck to Digital Indicator

Section 3.0

Installation for Model: 770 Series Light Vehicle Scale

- Step 1.** After shipping bands are cut and protective covering is removed from the base, insert $\frac{3}{4}$ -10 eye bolts into the holes in the scale deck (eye bolts are not included).
- Step 2.** Hook chain or cable to eye bolts to lift the scale modules from the skid. Note: Check to be sure that the chain or cable has sufficient lifting capacity for the scale module weight.
- Step 3.** The scale module should be lifted approximately (1) foot off the floor. This will allow ample clearance to move the scale away from the skid or remove the skid from underneath the scale.
- Step 4.** Move the scale modules to their installation site.
- Step 5.** Locate the carton containing the leveling feet, hardware, cables, etc. and remove the contents.
- Step 6.** Locate the (2) ramps and (8) lag down /locator plates.
- Step 7.** Position the ramps approximately 30' 1-1/2" apart measuring from top of ramp plate to top of opposite ramp plate. Make sure the ramps are equal distance apart from one side to the side of the ramp.
- It is important to measure the diagonal from ramp to ramp. If out of square, readjust and remeasure until diagonal is the same and a distance of 30' 1-1/2" between ramps.

SEE FIGURE (A)

- Step 8.** 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 (4) leveling foot assemblies into the (4) load cells located in each corner of the module. Adjust the leveling feet so the overall height of the module from the bottom of the leveling foot to the top of the deck is approximately 5-1/2" - 5-3/4". Position the (2) leveling feet on **Section (1)** of **Module (1)** into the locator plates attached to the ramp. Locate (2) locator plates and position under the (2) leveling feet of **Section (2)**.

SEE FIGURE (A)

Section 3.0

Installation for Model: 770 Series Light Vehicle Scale Continued

Step 9. Locate **Module (3)**, the second module to be installed. This module is marked **Section (3)** on one end and **Section (4)** on the other end. Locate and install (4) leveling feet into the (4) load cells located in each corner of the module. Adjust the leveling feet so the overall height of the module from the bottom of the leveling foot to the top of the deck is approximately 5 1/2" - 5 3/4".

Note: Set **Module (3)** with six feet between **Module (1)** and **Module (3)** to leave room to set **Module (2)** into position. Position (4) lag down/locator plates under each of the (4) leveling feet.

SEE FIGURE (A)

Step 10. Locate **Module (2)**. There are no leveling foot assemblies to install in this Module. Lower **Module (2)** into position, between **Modules (1)** and **(3)**, by aligning **Section (2)** of **Module (2)** over **Section (2)** of **Module (1)** and **Section (3)** of **Module (2)** over **Section (3)** of **Module (3)**. **Modules (1), (2), and (3)** are interlocking by a series of pins in **Modules (1)** and **(3)** and corresponding holes in **Module (2)**. Align pins and corresponding holes and complete lowering the **Module (2)** into position.

Note: Be sure the (2) modules are aligned correctly and **Module (2)** has mated with **Module (1)** and **Module (3)**. The deck plates should be flush.

Step 11. Locate **Module (5)**, the fourth module to be installed. This module is marked **Section (5)** on one end and **Section (6)** on the other end.

Install (4) leveling foot assemblies into the (4) load cells located in each corner of the module. Adjust the leveling feet so the overall height of the module from the bottom of the leveling foot to the top of the deck is approximately 5-1/2"- 5-3/4". Position the (2) leveling feet on **Section (6)** of **Module (5)** into the locator plates attached to the ramp. Locate (2) locator plates and position under the (2) leveling feet of **Section (5)**.

SEE FIGURE (A)

Step 12. Locate **Module (4)**. There are no leveling foot assemblies to install in this Module. Lower **Module (4)** into position, between **Modules (3)** and **(5)**, by aligning **Section (4)** of **Module (4)** over **Section (4)** of **Module (3)** and **Section (5)** of **Module (4)** over **Section (5)** of **Module (5)**. **Modules (3), (4), and (5)** are interlocking by a series of pins in **Modules (3)** and **(5)** and corresponding holes in **Module (4)**. Align pins and corresponding holes and complete lowering the **Module (2)** into position.

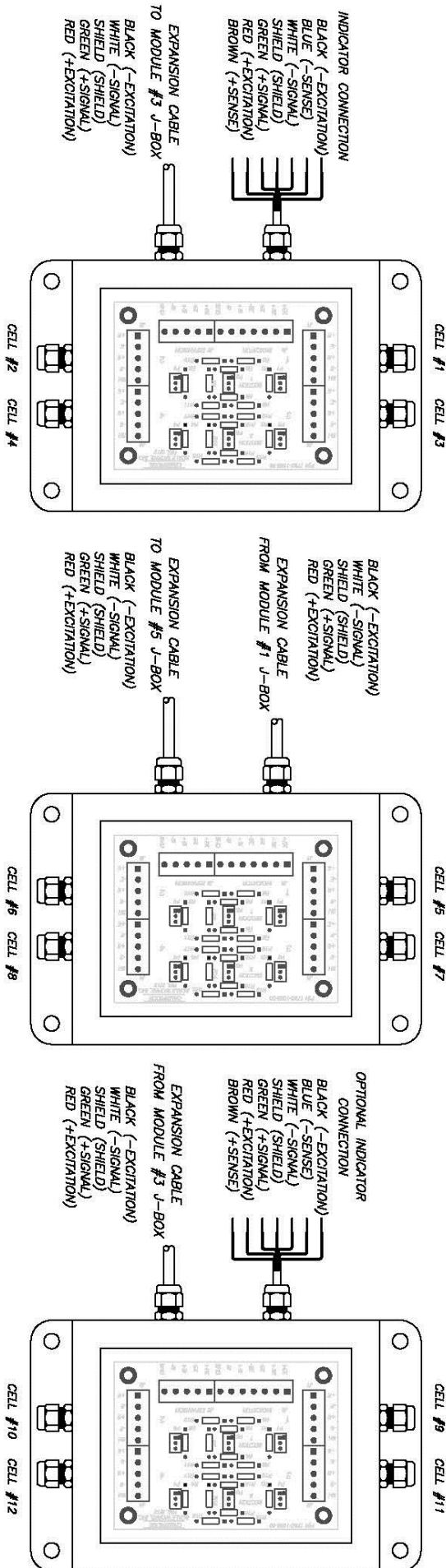
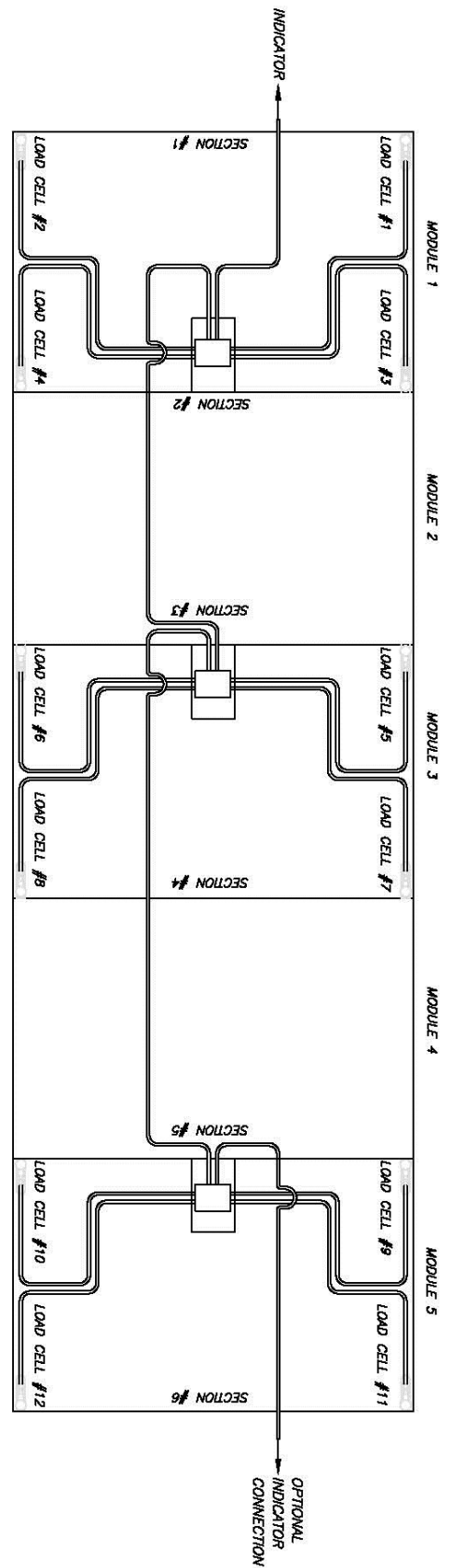
Section 3.0

Installation for Model: 770 Series Light Vehicle Scale Continued

- Step 13.** Locate the flat head socket cap screws packed in the parts carton. Install (2) flat head socket cap screws (at each side) of **Sections (2), (3), (4) and (5)**. Tighten all screws to secure modules in place.
- Step 14.** Locate the (12) leveling feet height adjusters at the access holes in the scale deck. Insert a standard flat head screwdriver into each of the access holes to adjust the leveling foot up or down. Adjust each leveling foot so that the scale is flush and level with the ramps. Check each of the leveling feet several times to ensure each leveling foot has equal pressure on the foot locator plate. After this is complete, locate the cap plugs packed in the parts carton. Insert cap plugs into the leveling access holes to prevent dirt and debris from entering the adjust area.
- Step 15.** Locate the (3) junction boxes under the top deck access panels.
- A. (4) load cell junction box should be located in **Section (2)** of **Module (1)** and will have been prewired from **Modules (1), Section (1) and (2)**.
 - B. (4) load cell junction box should be located in **Section (3)** of **Module (3)** and will have been prewired from **Module (3), Section (3) & (4)**.
 - C. (4) load cell junction box should be located in **Section (5)** of **Module (5)** and will have been prewired from **Module (5), Section (5) and (6)**.
 - D. Run a load cell cable between the (3) junction boxes (“J-Box” interconnect cables provided in parts box). Each box is expanded and the indicator cable can exit either junction box in **Section (2)** or **Section (5)**.
 - E. Pull the load cell wires through the tubes to the correct “J” Box.

See load cell Wiring Diagram- FIGURE (B)

- Step 16.** Run indicator cable from junction box to desired location and wire according to indicators wiring instructions.
- Step 17.** 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.



TYPICAL LOAD CELL CONNECTIONS

TYPICAL POTENTIOMETER ADJUSTMENT

CLOCKWISE

COUNTER

DECREASE READINGS

INCREASE READINGS

BLACK (-EXCITATION)

WHITE (-SIGNAL)

SHIELD (SHIELD)

GREEN (+SIGNAL)

RED (+EXCITATION)

FIGURE (B)
WIRING DIAGRAM

TEST REPORT

WEIGHT READING AND OR
LOAD CELL mV OUTPUT

CELL #1 READING	SECTION # 1	CELL #2 READING
CELL #3 READING	SECTION # 2	CELL #4 READING
CELL #5 READING	SECTION # 3	CELL #6 READING
CELL #7 READING	SECTION # 4	CELL #8 READING
CELL #9 READING	SECTION # 5	CELL #10 READING
CELL #11 READING	SECTION # 6	CELL #12 READING

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 disbursement 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 **770 Light Vehicle 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 **770 Light Vehicle Scale** as described in this manual. If the operator has difficulty using their **770 Light Vehicle 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 **770 Light Vehicle 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