7461

Truckmate®
Steel Deck Weighbridge

Installation and Service Manual

16366500A
(2/02).00

INTRODUCTION

This publication is provided solely as a guide for individuals who have received Technical Training in servicing the METTLER TOLEDO product.

Information about METTLER TOLEDO Technical Training can be obtained by writing, calling, or faxing:

METTLER TOLEDO
1900 Polaris Parkway
Columbus, Ohio USA 43240
Phone: (614) 438-4511
Fax: (614) 438-4958
www.mt.com

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

PROPRIETARY NOTICE

The information contained in this publication is derived in part from proprietary and patented data of METTLER TOLEDO. This publication shall not be copied in whole or in part without prior written approval of METTLER TOLEDO, nor shall it be used for any purpose other than that intended. This document is subject to change without notice.

STANDARD WARRANTY

METTLER TOLEDO warrants that the equipment covered by this warranty will be free from defects in workmanship and material for one year from date of installation or eighteen (18) months from date of shipment to the buyer, whichever comes first.

Should any such defects be found and reported during the first thirty (30) days after installation (if installation occurs during the warranty period), METTLER TOLEDO (herein referred to as the "Company") will, at its option, refund the purchase price or correct such defects, furnishing replacement parts and service free of charge to the buyer. For the remainder of the first 12 months of the warranty term, the Company will furnish necessary replacement parts and on-site technician's service free of charge, provided the Buyer agrees to pay reasonable technician's travel time, vehicle mileage, and associated travel expenses to and from the nearest authorized Company service location. If the equipment is covered by a two-year warranty, for the last 12 months or remaining balance of the warranty period, whichever comes first, the Company will furnish the necessary replacement parts to the Buyer free of charge, provided that the Buyer agrees to pay reasonable technician's on-site labor services, travel time, mileage, and expenses to and from the nearest authorized Company service location. The following are NOT covered under any of these warranties:

1. Initial installation and ongoing scale calibration.
2. Damage to scale components by gross abuse, fire, flooding, explosion, water, voltage surges, or civil disturbance.
3. Normal maintenance or consumable items.

This warranty covers only the 7461 weighbridge. Refer to METTLER TOLEDO Standard Product Warranty for coverage of other scale system components, including scale instrument, printer, and/or other accessories.

THE COMPANY EXPRESSLY WARRANTS THE EQUIPMENT MANUFACTURED BY IT AS SET FORTH HEREIN. THE COMPANY MAKES NO OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED (INCLUDING WITHOUT LIMITATION WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE). IN ADDITION, THIS DOCUMENT SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDIES OF THE BUYER FOR ANY BREACH BY THE COMPANY OF ITS WARRANTIES HEREIN.

COMPANY LIABILITY UNDER THIS WARRANTY OR ANOTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED IN LAW OR FACT, SHALL BE LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE MATERIAL AND WORKMANSHIP, AND IN NO EVENT SHALL IT BE LIABLE FOR CONSEQUENTIAL OR INDIRECT DAMAGES.

This warranty coverage is applicable only to the United States of America.

Export Products: The Company warrants equipment destined for export or sold for export to be free from defects in workmanship and material for a period of one year from date of installation or 18 months from date of shipment to the Buyer, whichever occurs first. Should any such defect be found within that period, parts will be furnished free of charge (ex works) point of origin or final distribution center. If the Buyer requests the performance of warranty work provided for under the foregoing warranty outside of the contiguous United States, the Buyer shall be required to pay for labor, travel time, living, and travel expenses of any personnel required to perform such warranty work.

APPLICATION GUIDES

The only warranty of METTLER TOLEDO is for the product it supplies under the Product Warranty Statement listed above. Weighing application guidelines pertain to METTLER TOLEDO products.

Precautions

READ this manual BEFORE operating or servicing this equipment.

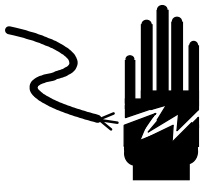
FOLLOW these instructions carefully.

SAVE this manual for future reference.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.

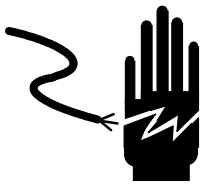


⚠ WARNING

PERMIT ONLY QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS, AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.

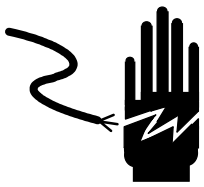
⚠ CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, SERVICING, CLEANING, OR REMOVING THE FUSE. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.



⚠ WARNING

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD, CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.

⚠ CAUTION

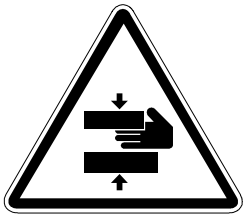
BEFORE CONNECTING OR DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT, ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY HARM OR DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT.

⚠ CAUTION

THE TOP REBAR MUST BE PLACED TO CLEAR THE ANCHOR BOLTS. REFER TO THE FOUNDATION DRAWINGS FOR ANCHOR BOLT LOCATIONS.

⚠ WARNING

WEIGHBRIDGE MODULES SHOULD ALWAYS BE MOVED SLOWLY AND CAREFULLY TO AVOID MECHANICAL SHOCK. MAKE SURE THAT THE LIFTING DEVICE USED TO MOVE THEM HAS A SUFFICIENT CAPACITY TO HANDLE THE MODULES SAFELY AND SECURELY.



⚠ WARNING

WHEN A MODULE IS BEING MOVED, DO NOT PLACE YOUR HANDS OR OTHER ITEMS BETWEEN THE MODULE AND ANY OTHER SURFACE. IF IT IS NECESSARY TO PLACE YOUR HANDS UNDER A MODULE DURING INSTALLATION, MAKE SURE THAT THE MODULE IS PROPERLY BLOCKED SO THAT IT CANNOT MOVE. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN BODILY HARM OR PROPERTY DAMAGE.

CONTENTS

1 Introduction

The Model 7461 TRUCKMATE® analog truck scale is designed for weighing highway vehicles, not for weighing concentrated-load vehicles such as heavy-capacity forklifts. It has a steel deck reinforced with orthotropic ribs. The truck scale must be installed on a concrete foundation (a variable footer foundation is standard).

A weighbridge consists of individual modules (11 feet wide is standard) that can be connected to form a single scale 17.5 feet long or longer. Each weighbridge has an overall height of approximately 16 inches from the surface of the foundation to the top of the deck (assuming 1/8 inch shims at the top and bottom of the load cells).

The concentrated load capacity (CLC) for Model 7461 weighbridges is 60,000 lb. The nominal capacity varies with the number of modules (number of load cells) used in the scale (see Table 6-1).

Due to the unique construction of these scales and the number of weighbridge support points (a four-module scale uses ten load cells), the force exerted on the foundation is only slightly more than the force that a truck would exert on the highway.

Maximum Loading

Model 7461 weighbridges have a gross scale capacity of up to 200,000 lb. A scale's gross capacity, however, is not the best indication of whether a truck is too heavy to be weighed on the scale. That is because trucks with different numbers and arrangements of axles apply their loads to a scale differently. To measure the actual strength of a weighbridge, we use its concentrated load capacity (CLC). A weighbridge's CLC represents the maximum axle load for a group of two axles spaced 4 feet apart (with an axle width of 8 feet). Table 1-1 shows the CLC rating for Model 7461 weighbridges.

Scale Length	Maximum Capacity	CLC
Less than or equal to 20 feet	70,000 lb	60,000 lb
Greater than 20 feet, less than 60 feet	120,000 lb	60,000 lb
Greater than or equal to 60 feet	200,000 lb	60,000 lb

Table 1-1: 7461 Weighbridge CLC Rating

Use Table 1-2 to determine the maximum load that a group of axles can apply to a weighbridge. Find the ratio that corresponds to (1) the number of axles in a group and (2) the distance between the front and rear axles in the group. Multiply that ratio by the CLC of the scale to determine the maximum combined axle load for the scale.

Distance between the front and rear axles in a group of axles	Two Axles	Three Axles	Four Axles	Five Axles	Six Axles
4 feet	1.000				
5 feet	1.000				
6 feet	1.000				
7 feet	1.000				
8 feet and less	1.000	1.000			
More than 8 feet	1.118	1.235			
9 feet	1.147	1.257			
10 feet	1.176	1.279			
11 feet		1.301			
12 feet		1.324	1.471	1.632	
13 feet		1.346	1.490	1.651	
14 feet		1.368	1.510	1.669	
15 feet		1.390	1.529	1.688	1.853
16 feet		1.412	1.549	1.706	1.871
17 feet		1.434	1.569	1.724	1.888
18 feet		1.456	1.588	1.743	1.906
19 feet		1.478	1.608	1.761	1.924
20 feet		1.500	1.627	1.779	1.941

Table 1-2: Ratio of CLC to Maximum Load on a Group of Two or More Consecutive Axles

Example:

What is the maximum combined axle load for the group of three axles at the rear of the truck shown in Figure 1-1? The truck will be weighed on a 7461 scale, which has a CLC rating of 60,000 lb. According to Table 1-2, the ratio for a group of three axles with a spacing of 12 feet is 1.324. Multiply 1.324 by the CLC rating to determine the maximum combined axle load: $1.324 \times 60{,}000 = 79{,}440$ lb.

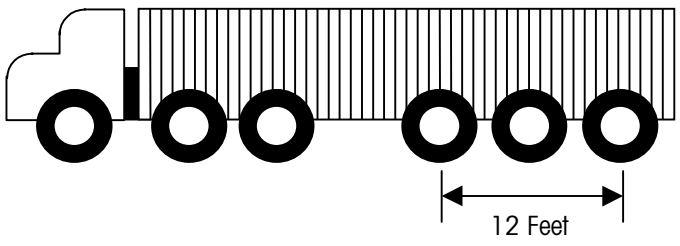


Figure 1-1: Sample Truck

2 Site Selection and Preparation

Site Requirements

The site selected for the scale must meet state and local requirements. The following is taken directly from Handbook 44 (H-44) 1999 edition issued by the National Institute of Standards and Technology:

> "UR.2.6. Approaches.
>
> UR.2.6.1. Vehicle Scales - On the entrance and exit ends of a vehicle scale installed in any one location for a period of 6 months or more, there shall be a straight approach as follows:
>
> (a) the width at least the width of the platform,
>
> (b) the length at least one-half the length of the platform but not required to be more than 12 m (40 ft), and
>
> (c) not less than 3 m (10 ft) of any approach adjacent to the platform shall be constructed of concrete or similar durable material to ensure that this portion remains smooth and level and in the same plane as the platform. However, grating of sufficient strength to withstand all loads equal to the concentrated load capacity of the scale may be installed in this portion. Any slope in the remaining portion of the approach shall ensure (1) ease of vehicle access, (2) ease for testing purposes, and (3) drainage away from the scale."

NOTE: The scale drawings provided meet part (a) of this requirement. The site must be located to meet parts (b) and (c).

Other requirements or considerations:

- The site should have good drainage. Surrounding areas should not drain through the site. The ideal scale site is on ground that is higher than the surrounding area.
- Make sure there are no buried pipes, sewer lines, wires, or foundations that would interfere with footing construction.
- The scale should be located away from high-power electrical transmission lines or substations.
- The site should have enough room to align trucks with the scale platform before pulling them onto the platform. This is especially important if trucks must turn before pulling onto the scale. There should also be enough room for trucks to pull off the scale.
- Trucks should not be left on the scale for longer than is necessary to take a vehicle weight reading.
- Some jurisdictions require that the scale platform be visible from the location of the scale terminal. Others allow the use of a closed-circuit TV or a voice intercom. Obtain official approval before starting construction.
- Provide clearance on at least one side of the scale for the full length of the platform to allow for testing and calibration.

Install the Foundation

The standard foundation for a 7461 truck scale is a variable footer. Install the foundation according to the correct drawing (see Chapter 10). Make sure the end walls are parallel and measure the same distance diagonally within 1/2 inch. The instrument cable conduit should be in place before the slab is poured. Cast-in-place concrete recommendations are provided in Chapter 8.

Foundations are designed to support a 7461 truck scale rated 100 tons, assuming the ground has a bearing surface of at least 2,500 lb per square foot for a variable footer design.

Base Plates

At the locations of the base plates, the concrete should be level and in the same plane (within ± 1/8 inch). The rest of the foundation should be graded slightly for drainage.

⚠ CAUTION

THE TOP REBAR MUST BE PLACED TO CLEAR THE ANCHOR BOLTS. REFER TO THE FOUNDATION DRAWINGS FOR ANCHOR BOLT LOCATIONS.

Curing

Let the concrete foundation cure for 7 to 10 days before installing the scale. Expanding anchor bolts should be installed after the foundation has cured, so that the anchors will seat correctly. Do not allow traffic or loading on scale until concrete reaches full strength, normally in 28 days.

3 Receiving and Inspection

Inspection

Check all items received against the shipping bill of lading. If any items are missing, notify the carrier immediately.

Inspect all items received. If there is any physical damage, notify the carrier immediately in order to collect damages.

⚠ WARNING

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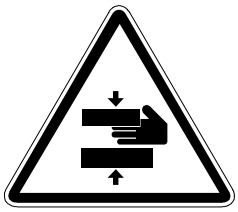

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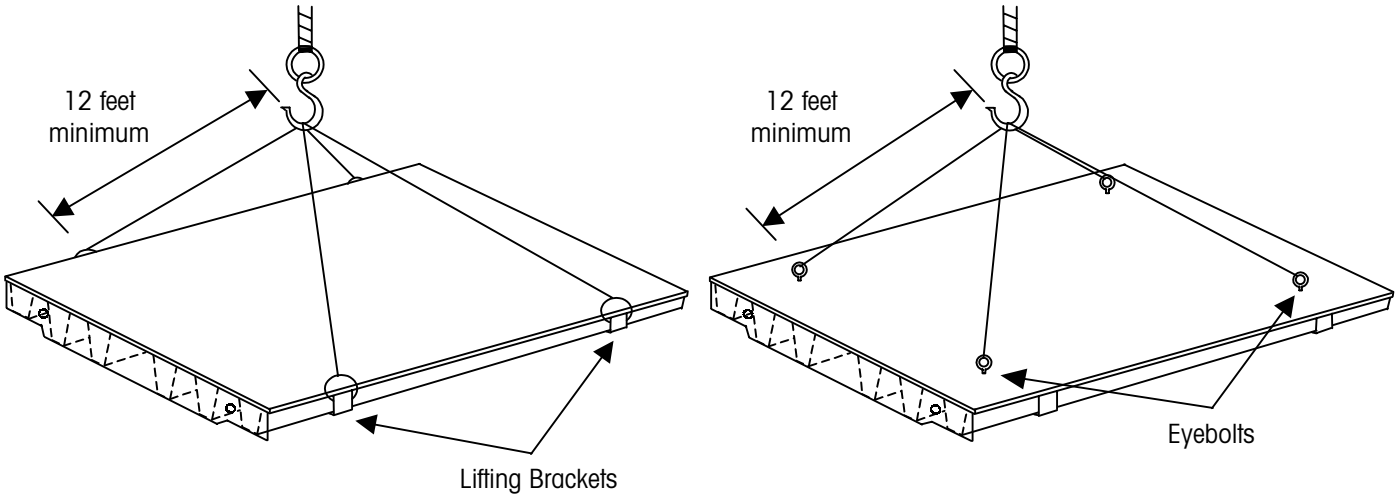
Unloading Procedure

If a METTLER TOLEDO truck is delivering the 7461 truck scale, the METTLER TOLEDO driver will handle and supervise unloading. Otherwise, unload the modules by lifting them with a quadlift chain as shown in Figure 3-1.

Above-Ground Installations: Attach the quadlift chain to the lifting brackets on the sides of the module.

Pit Installations: Modules for pit installations are 9 feet 10 inches wide with four 1.25-7 bolt holes in the top surface. Attach the quadlift chain to eyebolts screwed into the holes. Eyebolts are not provided with the scale.



Above-Ground Installations **Pit Installations**

Figure 3-1: Module Lifting Procedure

Approximate module weights are listed in Table 3-1. Modules for pit installations will weigh slightly less than the modules listed in the table.

Module Type	17.5 x 11 Module	20 x 11 Module
7461	4,869 lb	5,577 lb

Table 3-1: Approximate Module Weights

Storing Platforms

If you are going to store the modules, stack them one on top of the other. Make sure that the bottom module is stored off the ground. We recommend placing lengths of 4 x 4 lumber under the module to support it. Place additional lengths of 4 x 4 lumber between each pair of modules. Store all other mechanical accessories, electrical instrumentation, and load cells in a clean, dry area.

4 Installation Supplies Checklist

The following material and tools are needed to install a 7461 truck scale properly. They are not supplied by METTLER TOLEDO.

Material

- A small supply of Never-Seez bearing compound or a quality grease.
- Non-shrink, high-quality grout and mixing tools (not normally used, but might be required).

Tools

- Transit, tripod, rod
- 6-inch spirit level
- 100-foot measuring tape
- 100-foot chalk line
- 100-foot extension cords, 3/#14 wire
- Hammer drill, 1-inch or greater capacity
- 3/4-inch carbide drill bit at least 18 inches long for anchor bolts
- 6-foot crowbar to align modules
- Beckman or Fluke digital multimeter, 100+ meg ohm for insulation, wiring, and ground check
- Socket set, with sockets for the following bolt sizes:
  - 3/4 inch – Receiver plate bolts and anchor bolts
  - 5/8 inch – Side bumper bolts
  - 1/2 inch – End bumper bolts
- Air compressor or air pressure tank (cleaning nozzle to blow out anchor bolt holes)
- Normal installation tools
- Locating tools, one for each load cell (supplied only if scale is delivered by METTLER TOLEDO delivery system; otherwise, they must be purchased – Part No. TA204852)
- Welding apparatus (not normally used, but might be required)

Weighbridge Installation Checklist

This list summarizes the basic steps required for installing a 7461 truck scale on a dimensionally correct foundation.

	Check (✓) When Completed
1. Snap Chalk Lines on Foundation	_____
2. Position Base Plates	_____
3. Drill Holes in Foundation for Inside Anchor Bolts (Outside Anchor Bolts for Pit Installations)	_____
4. Install Inside Anchor Bolts (Outside Anchor Bolts for Pit Installations)	_____
5. Set Receivers into Base Plates and Check Height with Transit	_____
6. Insert Locating Tools in Receivers	_____
7. Bolt Coupler/Receiver Plates to Modules	_____
8. Set Modules on Locating Tools	_____
9. Make Sure Scale is Centered on Foundation and Level	_____
10. Align Base Plates and Make Sure Locating Tools are Vertical	_____
11. Tighten Anchor Bolts that were Installed in Step 4	_____
12. Drill Holes in Foundation for Remaining Anchor Bolts (Modules Must be Lifted to Drill Holes for Pit Installations)	_____
13. Install Remaining Anchor Bolts	_____
14. Tighten Bolts in Coupler/Receiver Plates	_____
15. Replace Locating Tools with Load Cells	_____
16. Install End Bumpers	_____
17. Install Side Bumpers	_____
18. Install Side Shields (Above-Ground Installations Only)	_____
19. Install Junction Box(es)	_____
20. Connect Load Cell Cables to Junction Box PCB	_____
21. Connect Home Run Cable	_____

5 Installation

Install Modules

The following instructions explain how to install a 7461 scale with an above-ground foundation (variable footer) and with a pit foundation. Note that the base plates are positioned differently for the two types of foundations.

After installing the concrete foundation (according to Chapter 2 and the foundation drawing for the scale), allow it to cure. Stub off the instrument cable conduit and complete conduit installation, if necessary.

1. Snap a chalk line on the foundation to mark the center line of the scale. This chalk line will be used to align the modules as they are set in place. Check the distance between the approach copings and check the diagonal measurements.
2. Position the base plates on the foundation. Each base plate has three bolt holes. One of the holes is oversized to allow you to reposition the plate slightly after you have set the modules in place.

   Above-Ground Installations: The base plates should be positioned with the oversized bolt holes facing the inside of the foundation. Figure 5-1 shows the base plate positions for 20'x11' modules in single and multiple configurations.

   Pit Installations: The base plates should be positioned with the oversized bolt holes facing the outside edges of the foundation, as shown in Figure 5-2.
3. Using a hammer drill, drill holes in the foundation for the anchor bolts that will be installed through the oversized bolt holes. Use the holes in the base plates as a guide for drilling.
4. Position a clamp bar on each base plate, aligning its bolt hole with the hole that you just drilled. Then install a 3/4-inch diameter anchor bolt and washer in each hole. The bolts should be seated and snug but not tightened.
5. Install a roll pin in each base plate.
6. Grease the bottom receivers (Never-Seez regular grade is recommended) and insert one in each of the base plates, aligning the notch with the roll pin. Then use a transit to check the elevation of each receiver. Make sure that all receivers are at the same height and that there is the same distance between each receiver and the top of the approach coping. To check this accurately, rest the measuring rod on the top surface of the receiver at each base plate location.

   The nominal height of the scale from the top (flat) surface of the receiver to the top of the weighbridge is 14-7/16 inches without shims. The total, nominal height of the scale is 16 inches when shimmed 1/8 inch at the top of the load cells and 1/8 inch at the bottom. The scale should be shimmed to fit the installation, with a maximum of 3/8 inch shims on top and 3/8 inch shims on bottom for a total of 3/4 inch. Never exceed either of these numbers. If more than 3/4 inch of shimming is required, shim under the base plate and grout under the entire base plate after accurately locating the scale and securing the anchor bolts. With 1 inch or more shimming, use anchor bolts that are long enough to extend at least 4 inches deep into the foundation (longer anchor bolts are not supplied by METTLER TOLEDO).

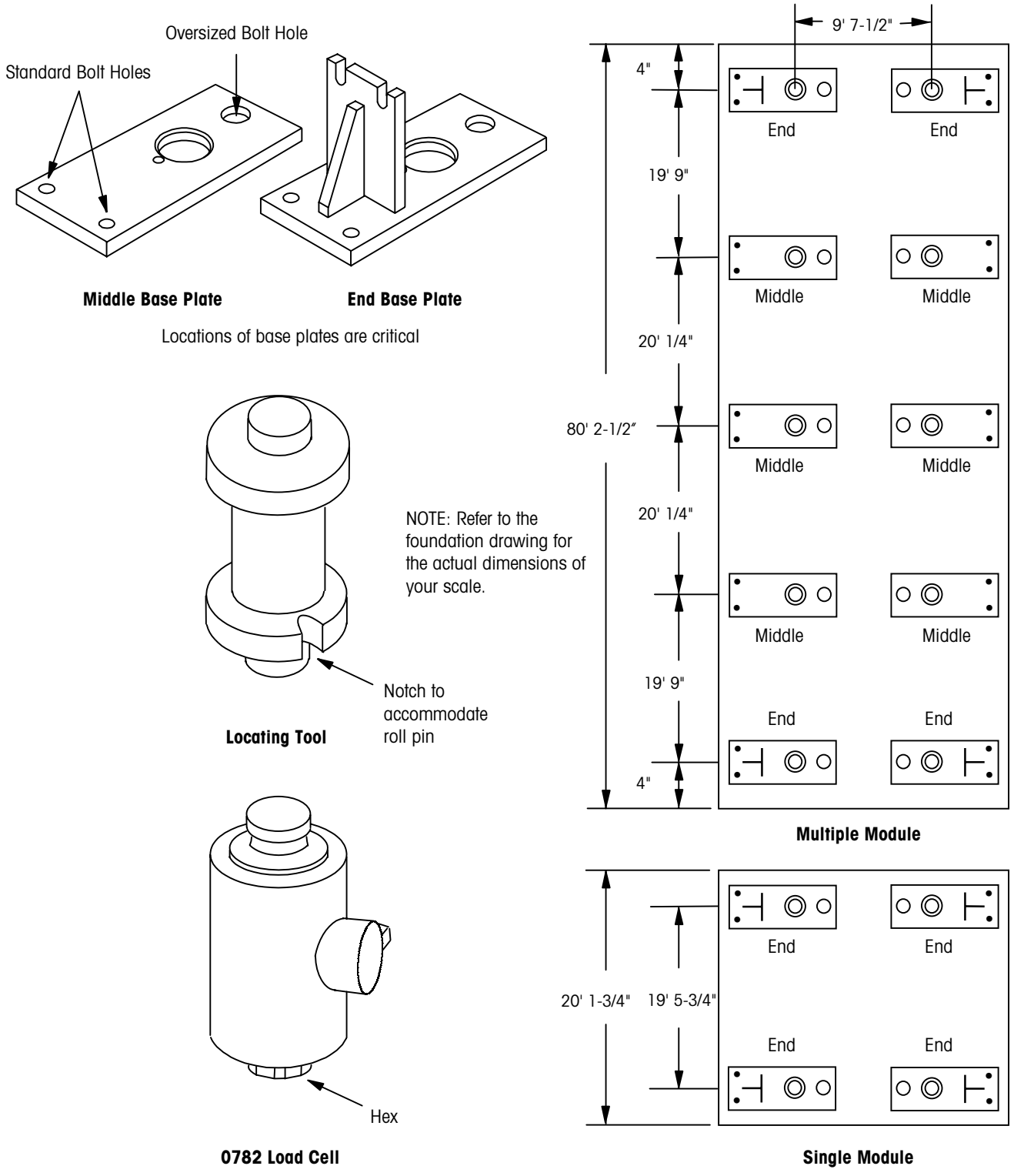
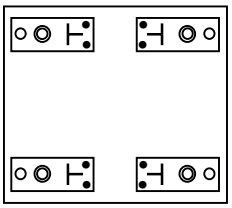


Figure 5-1: Base Plate Locations (Above-Ground Installations)

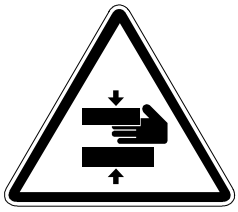
IMPORTANT! Be sure there are blocks under the modules any time the checking is not engaged (all modules are not set, or multi-scale platforms have not been coupled.) This is especially true if the truck crane is driving on a previous module to set the next one.



For pit installations, base plates are rotated 180 degrees so that the oversized bolt holes face the outside edges of the foundation.

Figure 5-2: Base Plate Locations (Pit Installations)

7. Insert a locating tool in each of the bottom receivers, aligning the notch with the roll pin.
8. Install the first module:
   - Bolt two end receiver plates and two coupler/receiver plates to the underside of the first module as shown in Figure 5-3 (for a single-module scale, use four end receiver plates). Use 3/4-inch bolts and washers. The bolts should be seated and snug but not tightened at this time.
   - Grease the top receivers (with Never-Seez) and insert a receiver into each load cell receiver block on the underside of the module.
   - Lift the module as shown in Figure 3-1. Position the module so that the end with the end receiver plates faces the approach wall. The first module should be reasonably square with the end wall and spaced away from the end wall as shown in the assembly drawing (approximately 3/4 inch).
   - Slowly lower the module onto the locating tools, lowering the approach end first. Check the module's alignment with the chalk line snapped on the foundation.



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9. If the scale has one or more middle modules, install each middle module:
   - Bolt two coupler/receiver plates to the underside of the middle module as shown in Figure 5-3. Use 3/4-inch bolts and washers. The bolts should be seated and snug but not tightened at this time.
   - Grease the top receivers (with Never-Seez) and insert a receiver into each load cell receiver block on the underside of the module.
   - Set the middle module in place by slowly lowering the end without receiver plates onto the coupler/receiver plates of the preceding module. The module will seat best if it is lowered almost level. Lower the other end onto the locating tools. Line up the bolt holes in the preceding module's coupler/receiver plates with the bolt holes in the middle module, and insert 3/4-inch bolts with washers. The bolts should be seated and snug but not tightened at this time.

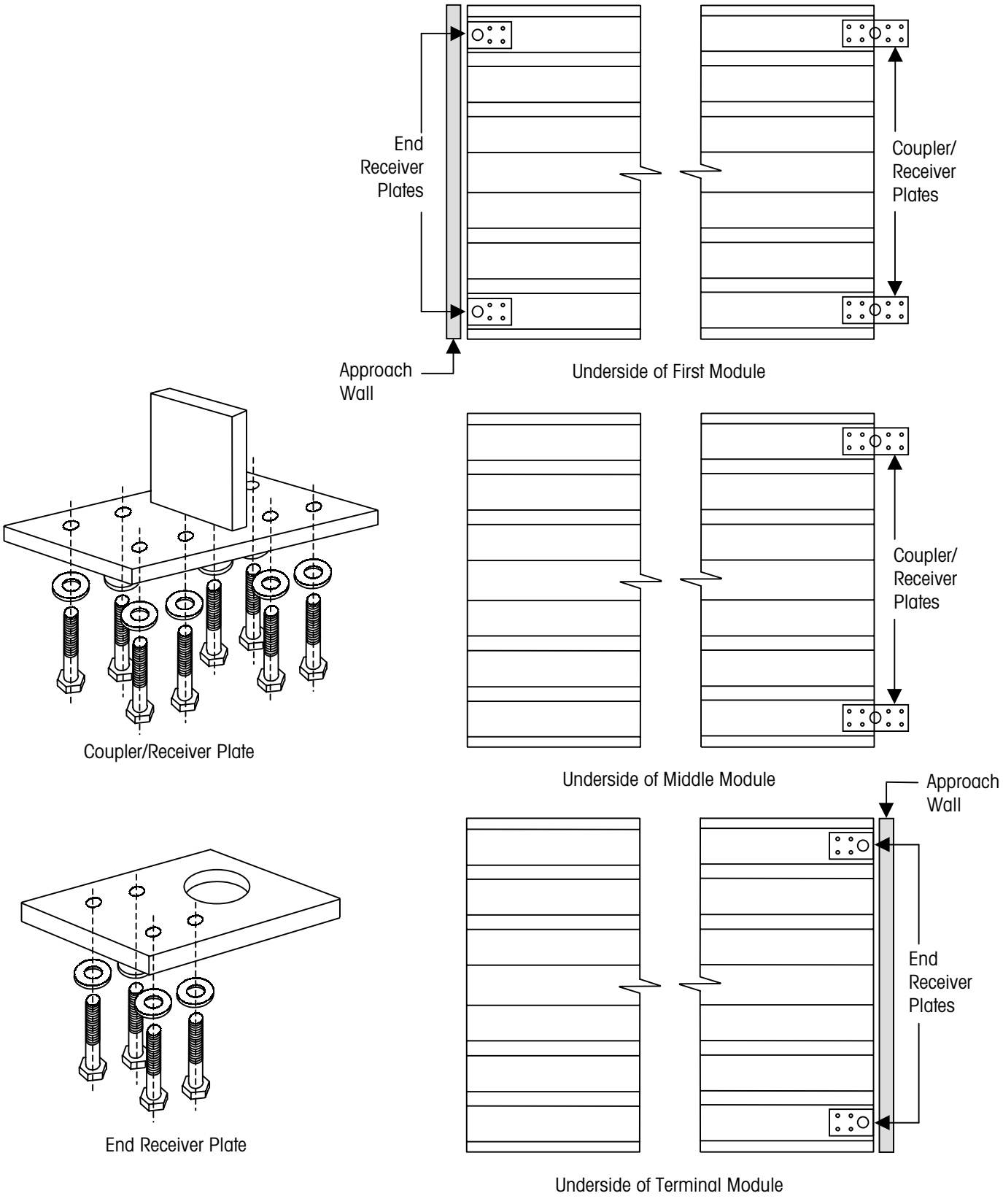


Figure 5-3: Installation of Receiver Plates

10. Install the terminal module:

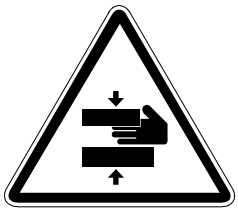
- Bolt two end receiver plates to the underside of the module as shown in Figure 5-3. The bolts should be seated and snug but not tightened at this time.
- Grease the top receivers (with Never-Seez) and insert a receiver into each load cell receiver block on the underside of the module.
- Set the terminal module in place, lowering the end without receiver plates onto the previous module's coupler/receiver plates. Line up the bolt holes in the coupler/receiver plates with the bolt holes in the terminal module, and insert 3/4-inch bolts with washers. The bolts should be seated and snug but not tightened. The gap between this module and the end approach wall should be the same as the gap at the other end of the scale (approximately 3/4 inch). If the foundation diagonals are out of square, then the clearance will vary across the approach wall. This clearance should not be greater than 1 inch or less than 3/8 inch at any point.

11. Square the base plates (in order to move the base plates, it may be necessary to use a pry bar to lift the module slightly while another person taps the base plate with a hammer). Check all the locating tools carefully. There should be no clearance between the shoulders on the locating tools and the top or bottom receivers. If there is clearance, you will need to add shims. When the base plates are in their final positions, tighten the anchor bolts that were installed in the oversized bolt holes.

12. Drill holes in the foundation for the remaining anchor bolts and install the bolts.

Above-Ground Installations: The base plates should be positioned with the two standard-sized bolt holes facing the outside edges of the foundation. Use these bolts holes as guides to drill holes in the foundation. Then install and tighten the 3/4-inch anchor bolts and washers.

Pit Installations: The base plates should be positioned with the two standard-sized bolt holes facing the inside of the foundation. Lift the modules one at a time to drill the bolt holes in the foundation. Then install and tighten the 3/4-inch anchor bolts and washers.



⚠ WARNING

WHEN A MODULE IS BEING MOVED, DO NOT PLACE YOUR HANDS OR OTHER ITEMS BETWEEN THE MODULE AND ANY OTHER SURFACE. IF IT IS NECESSARY TO PLACE YOUR HANDS UNDER A MODULE DURING INSTALLATION, MAKE SURE THAT THE MODULE IS PROPERLY BLOCKED SO THAT IT CANNOT MOVE. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN BODILY HARM OR PROPERTY DAMAGE.

13. Apply Loctite to the bolts in the coupler/receiver plates and end plates. Then tighten the bolts (torque to 100 lb-ft).

Install Load Cells

Use a transit to check the height of the scale deck near each load cell to determine if shimming is required.

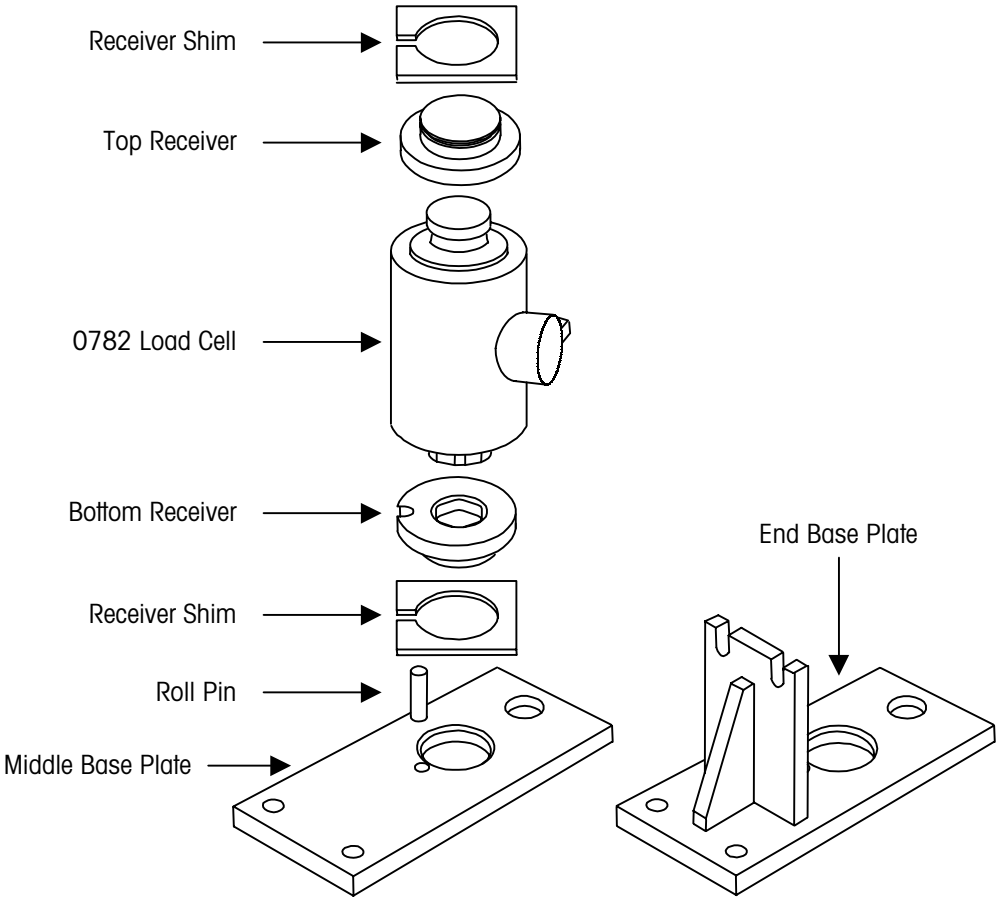


Figure 5-4: Load Cell Installation

Install each load cell as shown in Figure 5-4, using the following procedure:

1. Jack up the module about 1.5 inches and remove the locating tool.
2. Apply load cell lubricant to the load surface of the cell buttons at the top and bottom of the load cell.
3. Fill the hexagonal opening in the bottom receiver with a multi-purpose grease (nonfreezing).
4. If you need to adjust the height of the deck, add shims under the bottom receiver and above the top receiver. The maximum shimming to be used for a load cell is 3/4 inch. DO NOT place more than 3/8 inch of shims at the top or bottom receiver, or the receiver could become dislodged.
5. Install a Model 0782 load cell, positioning it so that the side with the cable attached faces away from the side wall of the foundation. Then lower the module onto the load cell.

Install End Bumpers

Bolt two bumpers to each end of the scale so that they face the end wall of the foundation (see Figure 5-5). Use the two pairs of bolt holes located at the ends of the terminal module's end plate.

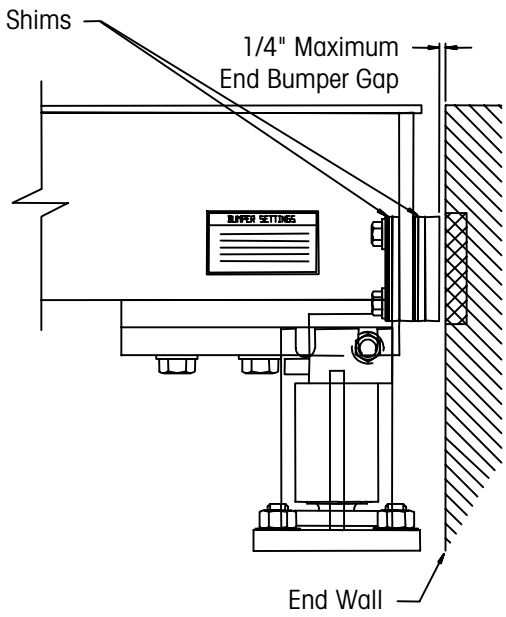


Figure 5-5: End Bumper Assembly (Side View)

Make sure there is a gap (1/4 inch maximum) between each bumper and the end wall. Shim between the bumper and the end plate to adjust the gap. Each bumper assembly includes six shims. All six shims must be installed with the bumper (otherwise the bumper assembly could be damaged). Any shims that are not installed between the bumper and the end plate should be installed on the inside of the end plate.

NOTE: Because of seasonal temperature changes, it might be necessary to adjust the bumpers every six months to maintain the proper gap.

Install Side Bumpers

Install the side bumper bolts (with washers and nuts) in the slots at the top of the vertical bumper plate on each of the end base plates (see Figure 5-6). Use shims if needed to adjust the side bumper gap to 1/8 inch maximum.

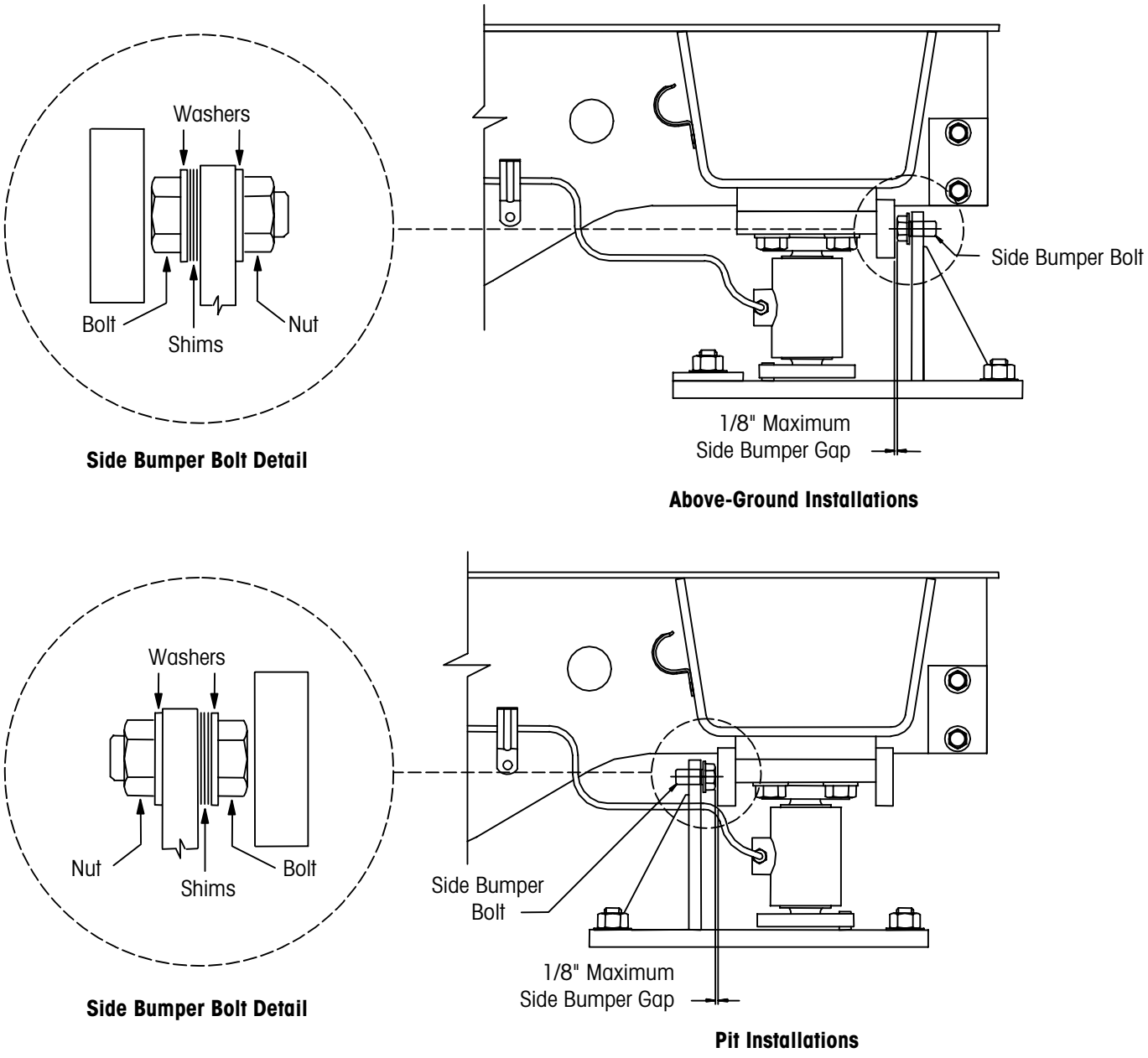


Figure 5-6: Side Bumper Bolt Assembly (End View)

Install Side Shields

NOTE: Side shields are not used for pit installations.

For above-ground installations, install a side shield on each middle base plate (see Figure 5-7). Remove the nuts and washers from the two outer anchors on each base plate. Position a side shield so that the slots fit over the anchors and place a 3/4-inch washer on each anchor. Then reinstall the standard nuts and washers.

NOTE: Adjust the position of the side shields so that they will not come in contact with the underside of the weighbridge.

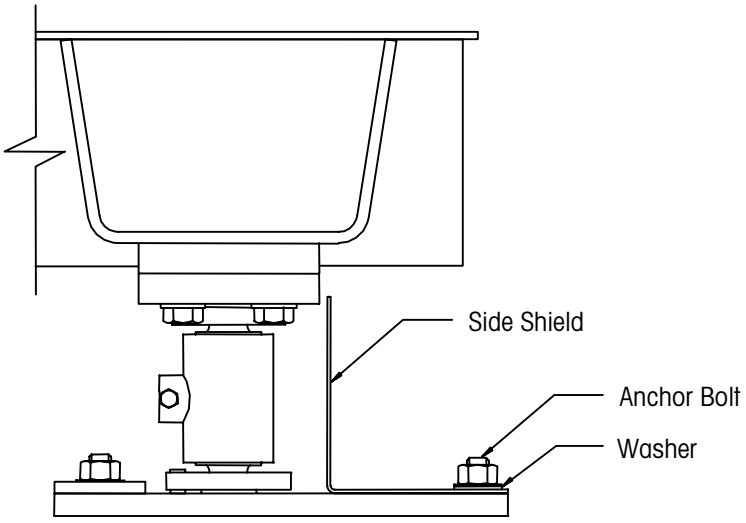


Figure 5-7: Side Shield Installation

Wiring Connections

1. Bolt the junction box(es) to the underside of the weighbridge at the location(s) shown on the wiring drawing (TC100673). Each junction box can be connected to six load cells, so the total number of junction boxes will depend on the size of the scale. If more than one junction box is used, connect the junction boxes in series using the cable that is supplied. You may cut the cable if a shorter length is required to connect the junction boxes.
2. Route the load cell cables through the conduit straps on the underside of the weighbridge as shown in the wiring drawing.
3. Wire the load cell cables to the terminals inside the junction box(es) as shown in Figure 5-8 and Table 5-1.

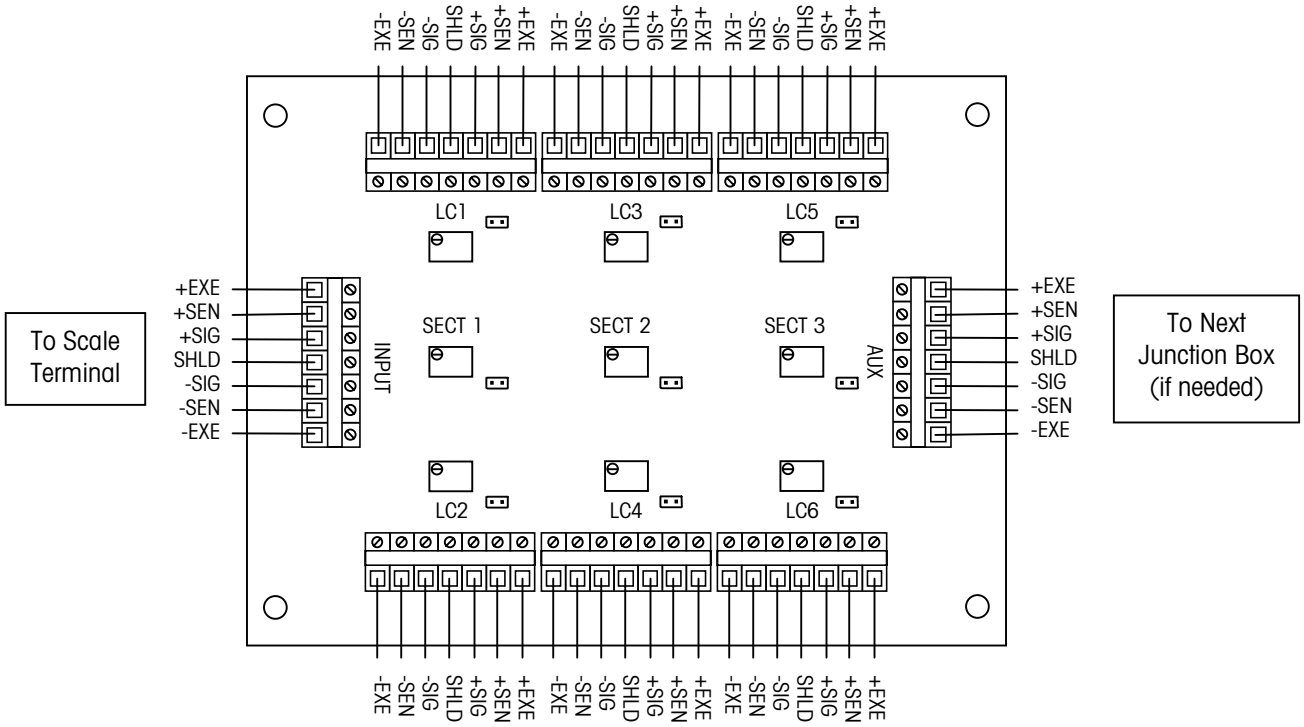


Figure 5-8: Junction Box Wiring

Function	Wire Color
+ Excitation	Green
+ Sense	Yellow
+ Signal	White
Shield	Yellow (heavy-gauge wire)
- Signal	Red
- Sense	Blue
- Excitation	Black

Table 5-1: Wiring Color Codes for Load Cell Cables

NOTE: Each pair of load cells (positioned directly across the width of the weighbridge from each other) is referred to as a section. They must be wired to the junction box as pairs. For example, wire load cell 1 to terminal 1 and load cell 2 to terminal 2 so that they form section 1. Figure 5-9 shows the recommended numbering scheme for load cells and sections.

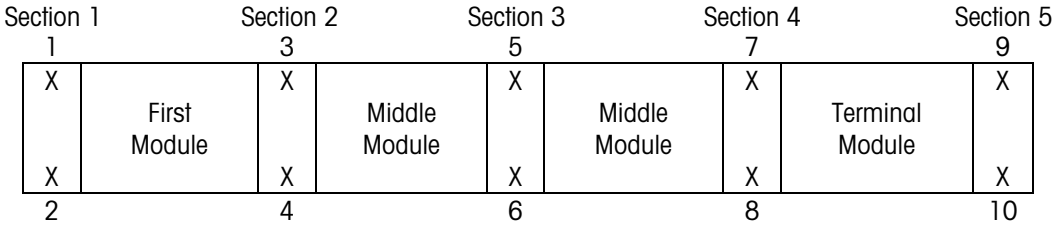


Figure 5-9: Load Cell Locations

4. Wire the home run cable from the scale terminal to the first junction box. Refer to Table 5-2 for the maximum length of the home run cable.

Number of Load Cells	Maximum Cable Length (20-Gauge Wire)
4	1,400 feet
6	800 feet
8	600 feet
10	500 feet
12	400 feet
14	300 feet

Table 5-2: Maximum Home Run Cable Lengths

Dress each load cell cable to form a drip loop at a point before the cable connects to the load cell or to the junction box. Water will drip onto the cable and follow the cable to its lowest point before dripping off. If a drip loop is provided, the water will run off before reaching moisture-sensitive components such as connectors or seals.

It is important that all the electrical parts are kept absolutely dry on the inside and as dry as possible on the outside. Continuous exposure can cause corrosion, which will eventually break down the seal and ultimately allow moisture to reach sensitive parts. Penetration of moisture can cause drifting, zero change, and in general degrade the accuracy of the scale.

Scale Finishing

Scale modules are often scratched and bumped in transit or during installation. To prevent rust, paint is provided in the installation kit to touch up any scratched or damaged areas. If a scratched area has started to rust, clean it with mineral spirits or lacquer thinner before applying the paint. Do not paint the scale platform when the temperature is below 60° F (15° C).

6 Calibration and Shift Adjustment

Instructions for programming and calibrating the scale terminal can be found in the terminal's manual. The following 7461 setup information will be needed.

Scale Length	No. of Load Cells	Programmed Capacity*	Increment Size
Less than or equal to 20 feet	4	70,000 lb	20 lb
Greater than 20 feet, less than 60 feet	6 to 8	120,000 lb	20 lb
Greater than or equal to 60 feet	8 or more	200,000 lb	20 lb

*Check serial plate on scale for total capacity.

Table 6-1: Scale Capacity and Increment Size

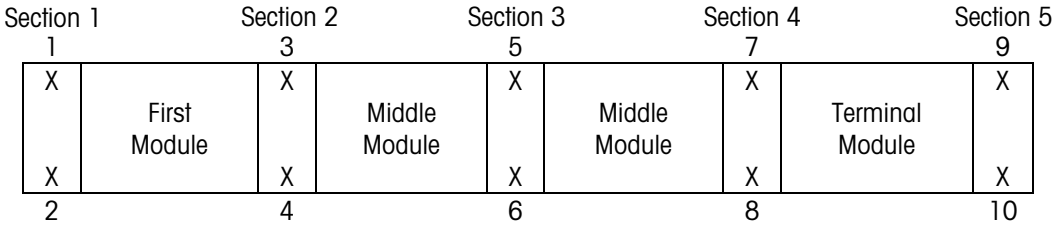


Figure 6-1: Load Cell Locations

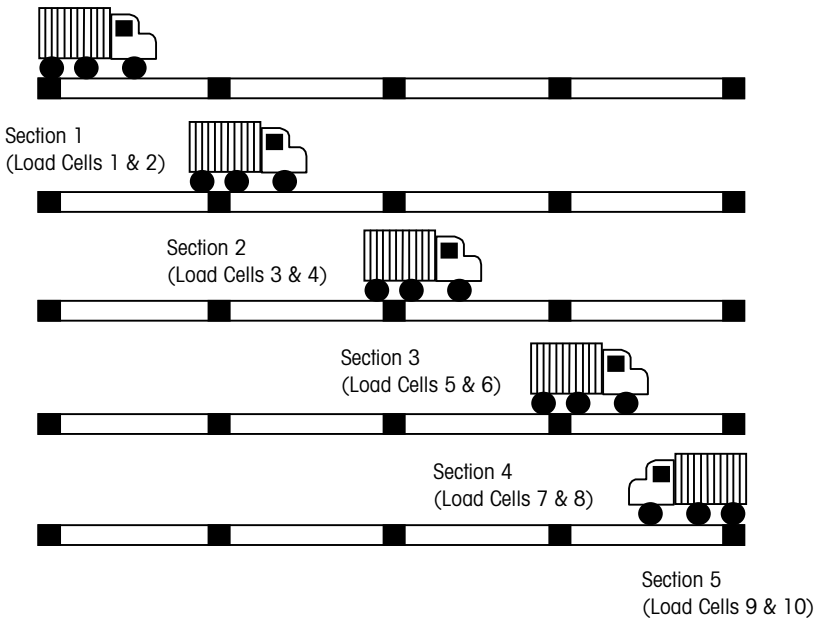


Figure 6-2: Test Truck Positions for Shift Adjustment

Calibration

1. After installation has been completed, drive a test truck across the scale three times in each direction to seat all mechanical parts.
2. Program and calibrate the scale according to the instructions in the scale terminal's manual.
3. Check the scale for repeatability and zero return:
   - Drive the test truck onto the scale, position it at the center of the platform, and record the weight.
   - Then remove the truck from the scale and record the return-to-zero value.
   - Repeat this procedure three times, making sure to position the truck at the same location on the platform each time. The weight readings must be within one graduation of each other. If they are not, correct any scale misalignment or other mechanical problems before continuing.

Shift Adjustment

When you shift adjust a scale, you are adjusting the output voltage (signal) of each load cell so that all load cells in the system produce a consistent signal. A correctly adjusted scale will give the same weight reading no matter where on the platform you place a test weight. To make adjustments, use the potentiometers on the junction box PCB to trim the load cells.

The trimming potentiometers on a junction box PCB correspond to the load cells that are wired to the junction box (see Figure 6-3).

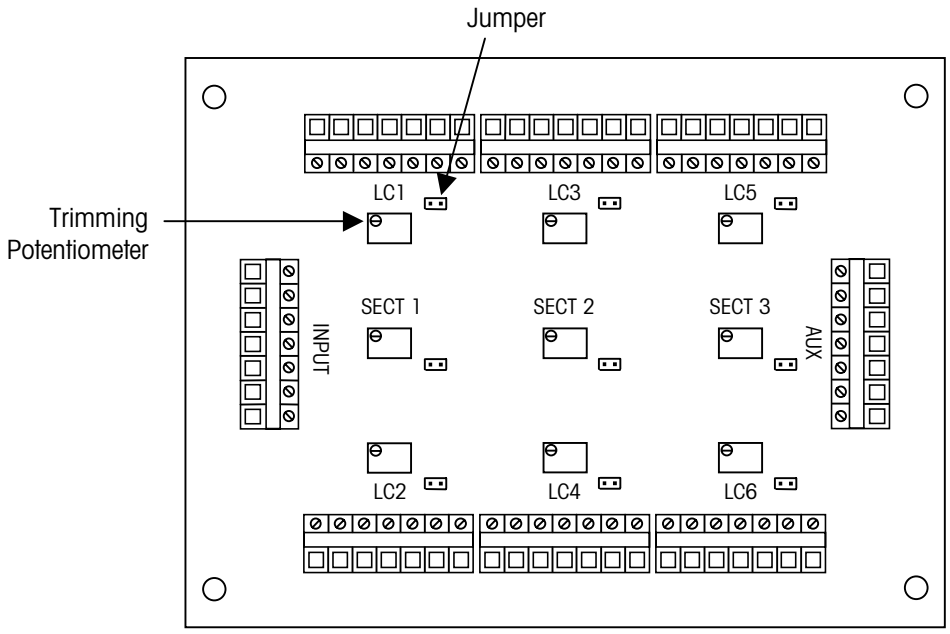


Figure 6-3: Junction Box PCB

There is one potentiometer for each individual load cell and one for each section (pair of load cells). Adjust the potentiometers by turning them with a small screwdriver, clockwise to increase the output and counterclockwise to decrease it. Next to each potentiometer is a jumper for enabling/disabling the potentiometer. The potentiometer is enabled when the jumper is on (shorting the pins) and disabled when the jumper is off.

The simplest way to shift adjust the scale is to disable the potentiometers for the scale sections and trim only those for the individual load cells. The jumpers for the individual load cells should be on; the jumpers for the scale sections should be off.

1. Position the test truck on the scale platform so that the weight is directly over load cell #1 and record the weight reading. Then move the test truck to the next load cell and record the weight reading. Continue until you have taken a weight reading for each load cell.
2. If you get the same weight reading at all load cells, no adjustment is needed. Otherwise, adjust the higher weight readings to match the lowest reading:
   - Position the test truck on the scale platform over one of the load cells at which you recorded a high weight reading. Then use a screwdriver to adjust the potentiometer that corresponds to the load cell. Turn the potentiometer counterclockwise until the weight reading matches the lowest reading.
   - Repeat the adjustment procedure for each load cell at which you recorded a high weight reading.
3. Because the trimming potentiometers interact with one another, you will need to repeat Steps 1 and 2 until the weight readings at all load cells are the same.

NOTE: If you want to trim both the individual load cells and the scale sections, enable all the potentiometers. Record weight readings at all test locations. To record a weight reading for a section, position the test truck on the scale platform directly between the two load cells that form the section.

Junction Box

After calibrating the scale, place the desiccant pack in the junction box and carefully seal the junction box against moisture. Make sure the desiccant is in an active (dry) condition. Tighten the junction box cover securely. Be careful that the bolts are not over-tightened, as this could warp the cover or force the gasket out of place. The optimum screw torque is 20 in-lb.

7 Maintenance

Frequency

Since the scale has no moving parts, it requires only minimum maintenance. But normal service inspection schedules are recommended.

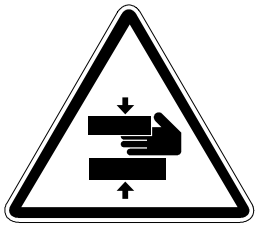
The underside and sides of the scale platform are painted with an epoxy paint. You will need to repaint these areas occasionally with an epoxy paint. Before repainting, clean the metal surfaces and remove all rust. The easiest method for painting the platform is with paint rollers. The temperature must be 60°F (15°C) or higher.

Check the calibration of the scale every six months. Adjust the bumper bolts if necessary. Replace the desiccant bags in the junction box if necessary.

Load Cell Replacement

If a load cell needs to be replaced, use the following procedure:

1. Use a hydraulic jack, test truck boom, or forklift to raise the scale approximately 1.5 inches at the load cell location. The scale should be raised only when it is unloaded. The force required to lift a module at an end receiver plate is at least half of the module weight listed in Table 3-1. The force required to lift a module at a coupler/receiver plate is at least the module weight listed in Table 3-1.



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2. With the scale raised up and blocked, remove the old load cell. Apply lubricant to the new load cell's cell buttons, and position the load cell with its hexagonal button in the bottom receiver. Lower the scale onto the new load cell, making sure that it seats properly.
3. Disconnect the old load cell cable from the junction box PCB. Then wire the new load cell cable to the PCB according to Table 5-1.
4. Check the calibration of the scale and recalibrate if required.

Spare Parts List

Part Number	Description
*12826800A**	0782 Load Cell, 30t, H44 10Kd
TA200764	Top Receiver with O-Ring
TA200814	Bottom Hex Receiver
TA200712-1	Receiver Shim, 11 gauge
TA200712-2	Receiver Shim, 16 gauge
TA200712-3	Receiver Shim, 7 gauge
TA204849-2	End Bumper Shims, 0.25 inch
TA204849-3	End Bumper Shims, 0.125 inch
TA204849-4	End Bumper Shims, 0.062 inch
TA200357-1	Side Bumper Shim, 11 gauge
TA200357-2	Side Bumper Shim, 16 gauge
TA200357-3	Side Bumper Shim, 22 gauge
TA204861-1	Coupler Shim, 0.125 inch
TA204861-2	Coupler Shim, 0.062 inch
*14019800A	CMOS Junction Box PCB
*14019900A	LPO Junction Box PCB
TA204852	Locating Tool

* May have a letter prefix. **May have an "OTC" suffix.

Load Cell Specifications

Model: 0782, NTEP (National Type Evaluation Program) Certificate of Conformance Number 01-004 for Class IIIL, 10,000 divisions.

Capacity: 30,000 kg / 66,150 lb

Material: Stainless Steel

Environmental Protection: Hermetically Sealed

Output: 2 mV/V Analog

Scale Certification

NTEP (National Type Evaluation Program) Certificate of Conformance Number 01-070 for Class IIIL, 10,000 divisions.

8 Cast-in-Place Concrete Recommendations

General

Work including: Providing all cast-in-place concrete work, including reinforcing, placing, curing, and cleanup.

Submit, on request only, product literature for admixtures and curing compounds proposed for use.

Materials

Cement: Portland Cement, ASTM C150, Type 1
Water: Potable
Aggregates: ASTM C33, size number 67
Admixtures:

- Water-reducing: ASTM C494, Type A or D
- Air-entraining: ASTM C260
- High-range, water-reducing admixture (superplasticizer): ASTM C494, Type F or G
- Nonchloride, noncorrosive accelerator: ASTM C494, Type C or E
- Calcium Chloride is **NOT** permitted.
- Use of mixtures other than those listed will not be permitted.

Reinforcing

Deformed bars: ASTM A615, A616, or A617. Yield strength to be 60 ksi. Welded wire fabric (if required): ASTM A185. Provide in sheet form.

Mixes

Use the following for fill in scale pan and for exterior slabs on grade:

- Compressive strength to be 4,000 psi (or as specified on foundation drawing), 28-day strength.
- Air content shall be 5 to 7 percent.
- Maximum water to cement ratio shall be 0.45.
- Maximum slump as placed shall be 4 inches.

Finish

Finish on flatwork shall be medium broom finish.

Curing and Protection

Curing Compound and Sealer: Federal Specification ASTM C309. The compound shall be a styrene butadiene type, 30% solids content minimum. The following are acceptable:

- Super Floor Coat, by Euclid
- Super Pliocure, by Euclid
- Masterseal 66, by Master Builders

When air temperature during placement is less than 40°F, or will be within 24 hours, temperature of concrete as placed is to be between 50°F and 90°F (55°F and 90°F for sections less than 12 inches thick). Maintain concrete temperature within these limits for the full curing period of 7 days.

Slab areas may be either moist-cured or receive an application of curing compound, except that when concrete above grade is placed in the open, and the air temperature exceeds 75°F, the concrete is to be moist-cured for the first 24 hours.

Whichever curing method is used, it shall begin immediately after the water sheen disappears and continue for at least 7 days. Do not allow curing to be delayed overnight.

9 Service Parts

7461 Truck Scale

Refer to the following drawings and tables when ordering parts for 7461 truck scales.

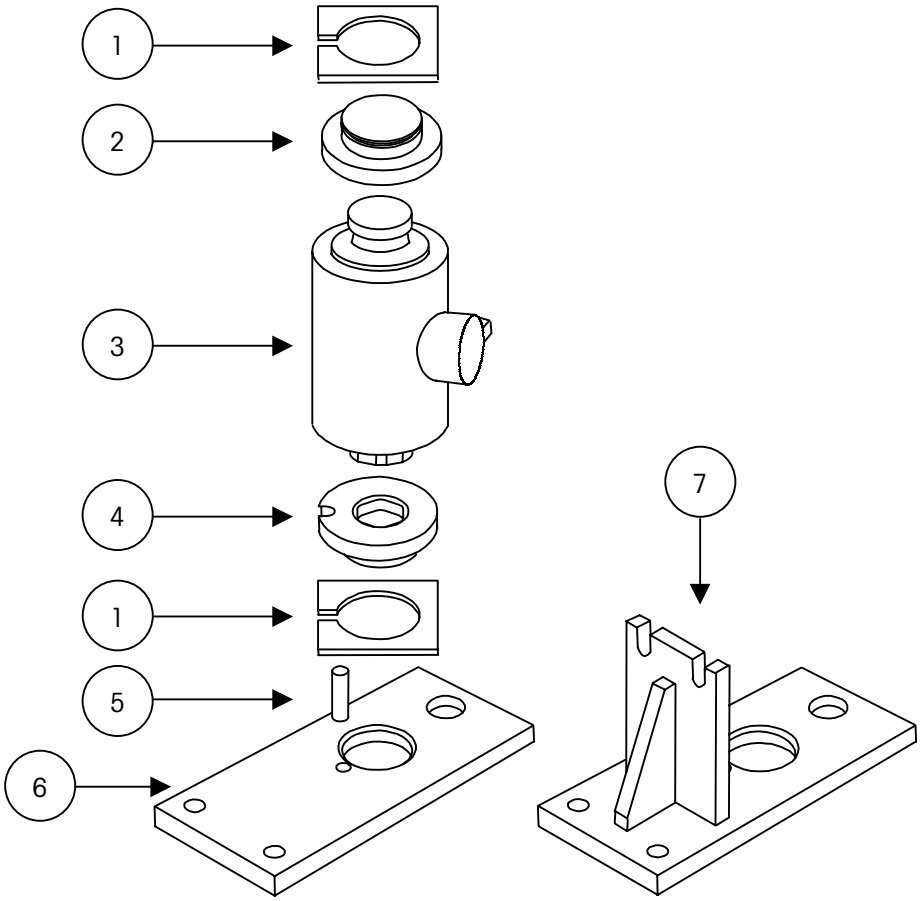

Figure 9-1: Load Cell Assembly

Ref. No.	Part Number	Description	Qty.
1	TA200712-1 TA200712-2 TA200712-3	Receiver Shim, Slotted, 11 gauge Receiver Shim, Slotted, 16 gauge Receiver Shim, Slotted, 7 gauge	Varies
2	TA200764	Top Receiver with O-ring	Varies
3	*12826800A	0782 Analog Load Cell, 30t, H44 10Kd, 13m cable	Varies
4	TA200814	Bottom Hex Receiver	Varies
5	MZ0904000063	Roll Pin, 1/2 x 1.5" long, SS	Varies
6	TA204814	Middle Base Plate	Varies
7	TB204919	End Base Plate	Varies
-	TN203217	Magnalube-G Load Cell Lubricant	-

* May have a letter prefix.

Table 9-1: Load Cell Assembly

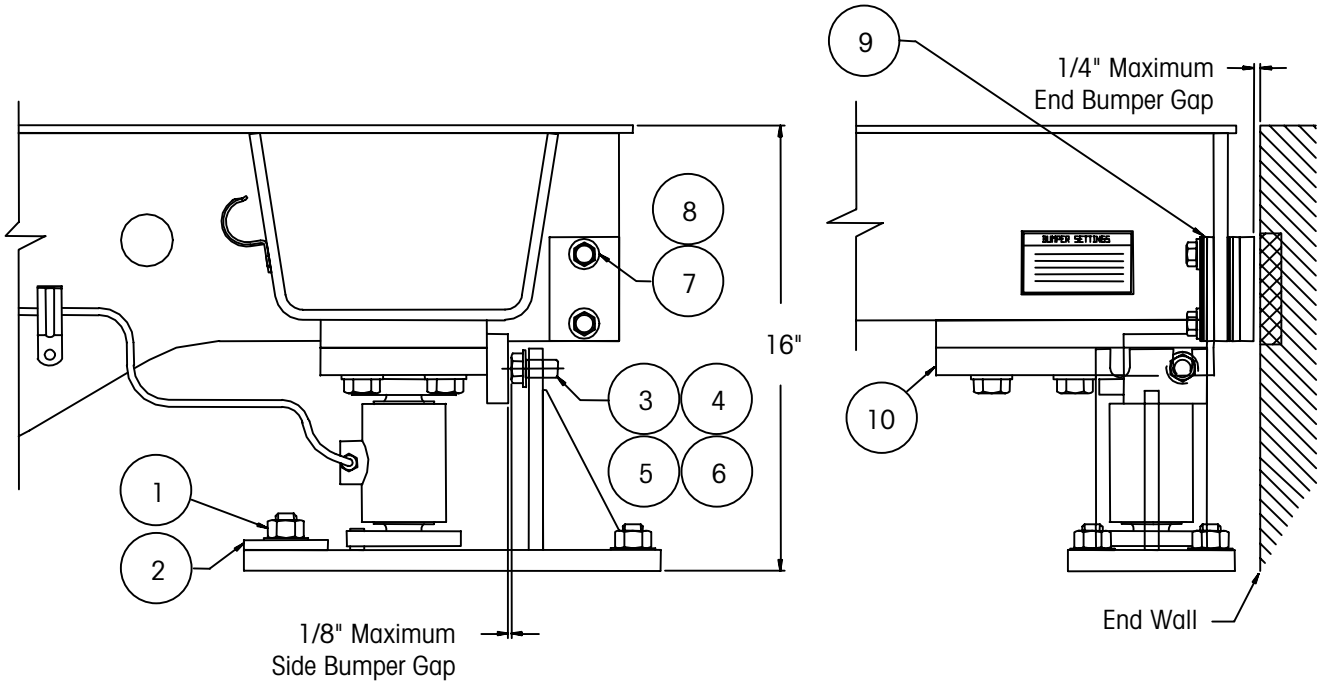

Figure 9-2: End of Scale Assembly

Ref. No.	Part Number	Description	Qty.
1	TN203216	Anchor Bolt, 3/4 inch	Varies
2	TN201244	Clamp Bar	Varies
3	MZ0901010375	Side Bumper Bolt, 5/8-11 x 1.25 inches long	Varies
4	TA200357-1 TA200357-2 TA200357-3	Slotted Shim, 11 gauge Slotted Shim, 16 gauge Slotted Shim, 22 gauge	Varies
5	MZ0901030062	Washer, 5/8 inch	Varies
6	MZ0901020066	Nut, 5/8-11	Varies
7	MZ0901010080	Bolt, 1/2-13 x 2 inches long	Varies
8	MZ0901030114	Washer, 1/2 inch	Varies
9	TA204849-1 TA204849-2 TA204849-3 TA204849-4	End Bumper End Bumper Shim, 0.25 inch End Bumper Shim, 0.125 inch End Bumper Shim, 0.062 inch	Varies
10	TA204812	End Receiver Plate	Varies

Table 9-2: End of Scale Assembly

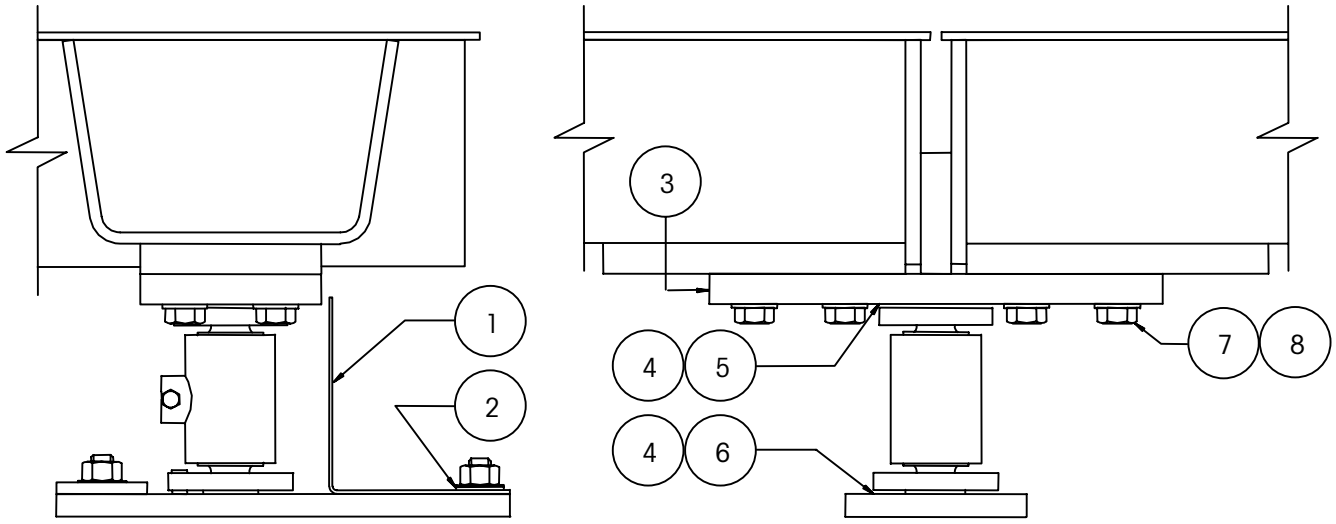

Figure 9-3: Module Connection Assembly

Ref. No.	Part Number	Description	Qty.
1	TA204910	Side Shield	Varies
2	MZ0901030111	Washer, 3/4 inch	Varies
3	TA204813	Coupler/Receiver Plate	Varies
4	TA200712-1 TA200712-2 TA200712-3	Receiver Shim, 11 gauge Receiver Shim, 16 gauge Receiver Shim, 7 gauge	Varies
5	TA200764	Top Receiver with O-ring	Varies
6	TA200814	Bottom Hex Receiver	Varies
7	MZ0901010534	Bolt, 3/4-10 x 2 inches long	Varies
8	MZ0901030090	Washer, 3/4 inch	Varies
-	MZ0602000178	Loctite #262 Threadlocker	-

Table 9-3: Module Connection Assembly

10 Reference Drawings

Scale Size	General Layout (Above Ground)	Foundation	Wiring Diagram
		Variable Footer	
17.5 x 11 feet	TC204818	TC204938	Standard: TC100673 Lightning Protection: TB100749
20 x 11 feet		TC204939	
35 x 11 feet	TC204851	TC204940	
40 x 11 feet		TC204931	
52.5 x 11 feet	TC204853	TC204941	
60 x 11 feet		TC204952	
70 x 11 feet	TC204854	TC204905	
80 x 11 feet		TC204859	
90 x 11 feet	TC204855	TC204942	
100 x 11 feet		TC204943	

Table 10-1: Reference Drawings for Model 7461 Truck Scales

NOTE: If you are installing the scale within an existing pit foundation, contact the factory for information about drawings.

METTLER TOLEDO

Publication Suggestion Report

If you have suggestions concerning this publication, please complete this form and fax it to (614) 841-7295

Publication Name: METTLER TOLEDO 7461 TRUCKMATE Installation and Service Manual

Publication Part Number: 16366500A **Publication Date: 2/02**

PROBLEM(S) TYPE:	DESCRIBE PROBLEM(S):	*INTERNAL USE ONLY*
☐ **Technical Accuracy**	☐ **Text** ☐ **Illustration**	
☐ **Completeness** What information is missing?	☐ **Procedure/step** ☐ **Illustration** ☐ **Definition** ☐ **Example** ☐ **Guideline** ☐ **Feature** ☐ **Explanation** ☐ **Other (please explain below)**	☐ *Information in manual* ☐ *Information not in manual*
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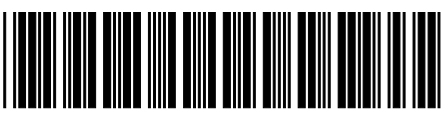

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