2158 Analog
2160 DigiTOL®
2162 IDNet
VERTEX® Floor Scales
Installation and Service Manual

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METTLER TOLEDO

Publication Revision History

An overview of this manual's revision history is compiled below.

Publication Name: 2158 VERTEX Floor Scales Installation and Service Manual

Part Number: A14691400A **Publication Date: 11/96**

Part Number	Date	Revisions
B14691400A	2/01	Replaced declarations of conformity. Added standard model numbers table. Replaced NIST and OIML acceptance tolerance graphs. Replaced analog junction box drawing. Removed information about DigiTOL smart mode junction box.

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 43240 USA
Phone: (614) 438-4511
Fax: (614) 438-4958
www.mt.com

WARNING!

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

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

Declaration of conformity

Konformitätserklärung
Déclaration de conformité
Declaración de Conformidad
Conformiteitsverklaring
Dichiarazione di conformitá

We/Wir/Nous/Wij/Noi: **Mettler-Toledo, Inc.**
1150 Dearborn Drive
Worthington, Ohio 43085 USA

declare under our sole responsibility that the product,
erklären, in alleiniger Verantwortung, daß dieses Produkt,
déclarons sous notre seule responsabilité que le produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
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dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Type: Analog Load Cells
Models: 744, 745 and 745A

(when used within the technical requirements listed in Mettler Toledo documentation and installed as a Load receptor as listed in Type approval certificate T2206, Table 4.)

to which this declaration relates is in conformity with the following standard(s) or other normative document(s).
auf das sich diese Erklärung bezieht, mitder/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
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CE Conformity / CE-Konformität / Conformité CE
90/384/EU Nonautomatic Balances and Scales / Nichteselbsttätige Waagen / Balances à Functionnement non automatique
Article 1.2.a.
89/336/EU EMC Directive / EMU-Richtlinie / Directive concernant la CEM
EN55 022, B: 1987 Emissions / Funkstörungen
EN50 082-2: 1995 Immunity
73/23/EU Low Voltage / Niederspannung / basse tension
EN61010-1 el. Safety / el. Sicherheit / sécurité el.
94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres
EN 50 014 : 1977 + A1…A5, General requirements
EN 50 020 : 1977 + A1…A5, Intrinsic safety "i"

Other Directives and Standards / Andere Richtlinien und Normen / Autres documents
corresponding to local requirements / entsprechend lokalen Anforderungen / correspondant aux exigences locales

R60	OIML International Recommendation, Metrological regulation for load cells
EEx ib IIC T4	el. Safety / el. Sicherheit / sécurité el. (PTB Nr. Ex-95.D.2051, for models 744 and 745)
EEx ib IIC T4	el. Safety / el. Sicherheit / sécurité el. (KEMA No. Ex-98.D.0965, for model 745A)

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures
Worthington, Ohio USA
~~**September, 1996**~~
Revised January 1999 **(Added: model 745A, conformity to 89/336/EU – 73/23/EU – 94/9/EC)**

according to EN45014

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STANDARD WARRANTY

METTLER TOLEDO warrants that the equipment covered by this warranty will be free from defects in workmanship and material for two years from date of installation or twenty-six (26) 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 Model 2158, 2160, and 2162 VERTEX floor scales. 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.

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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.

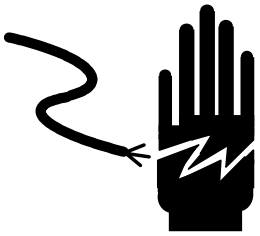
FOLLOW these instructions carefully.

SAVE this manual for future reference.

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

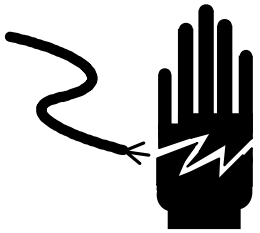
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



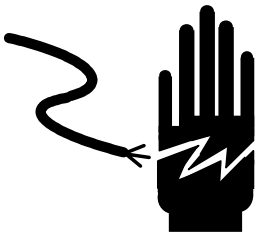
⚠ WARNING

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.



⚠ WARNING

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



⚠ 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.

⚠ CAUTION

BEFORE CONNECTING/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

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

CONTENTS

1 Introduction

VERTEX® industrial floor scales are heavy-duty scales that can be installed in a pit or on top of the floor. Three models are available: 2158 for use with analog indicators, 2160 for use with DigiTOL® indicators, and 2162 for use with IDNet systems.

Model Numbers

The following table shows how standard model numbers are determined for VERTEX floor scales.

XXXX	X	X	X	X	X	X	-X
Model	**Revision**	**Platform**	**Load Cell Metrology**	**Junction Box**	**Size**	**Scale Capacity**	**Scale Metrology**
2158 2160 2162	0	0 = Mild steel, tread plate 1 = Mild steel, smooth plate 2 = Stainless steel, tread plate 3 = Stainless steel, smooth plate	0 = 744 H44 2 = 745 H44 4 = 745 R60	0 = Analog 1 = DigiTOL 3 = IDNet	0 = 30"x30" 1 = 3x3 feet 2 = 4x4 feet 3 = 4x5 feet 4 = 5x5 feet 5 = 4x6 feet 6 = 5x7 feet A = 1x1 m B = 1.2x1.5 m C = 1.2x1.2 m D = 1.5x1.5 m	0 = 500 lb 1 = 1,000 lb 2 = 2,500 lb 3 = 5,000 lb 4 = 10,000 lb 5 = 20,000 lb 6 = 250 lb A = 600 kg B = 1,500 kg C = 3,000 kg D = 6,000 kg E = 10,000 kg	-b[1] -A[2] -B[3] -C[4] -F[5]

[1] 2,500d for 500-lb, 2,500-lb, and 5,000-lb capacities; 2,000d for 1,000-lb, 10,000-lb, and 20,000-lb capacities.

[2] 5,000d for 500-lb to 10,000-lb capacities; 4,000d for 20,000-lb capacities.

[3] 10,000d for 500-lb to 20,000-lb capacities.

[4] 1,250d for 250-lb capacities.

[5] 3,000d for 600-kg to 6,000-kg capacities; 2,000d for 10,000-kg capacities.

Load Cells

All VERTEX floor scales include stainless steel, cantilever-beam load cells with integral four-conductor, shielded cables (see note). The load cell suspension uses a rocker pin positioned between the cell and a fixed receiver in the frame (see Figure 1-1). Individual load cell capacities for Models 2158, 2160, and 2162 are listed below:

Note: Scales 4′ x 6′ and smaller use cables that are 7.5′ long. Scales larger than 4′ x 6′ and all 20K capacity scales use cables that are 15′ long. DO NOT mix cables of different lengths within a platform.

Scale Platform Capacity	Capacity of Each Load Cell	Minimum Approved Graduation Size
500 lb	250 lb	0.1 lb
1,000 lb	500 lb	0.2 lb
2,500 lb	1,250 lb	0.5 lb
5,000 lb	2,500 lb	1.0 lb
10,000 lb	5,000 lb	2.0 lb
20,000 lb	10,000 lb	5.0 lb

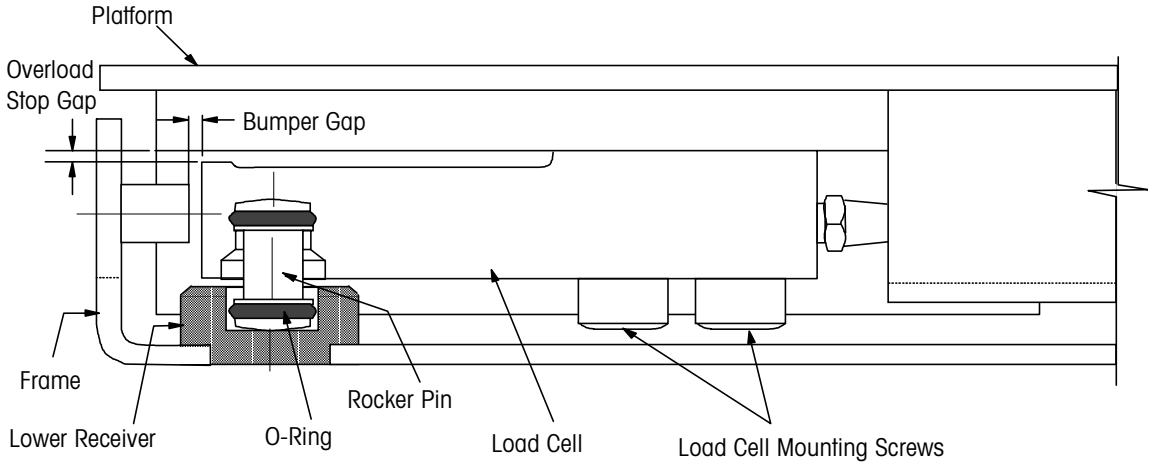


Figure 1-1: Load Cell and Suspension Detail

Load Cell Specifications

Model number: 745 (744 for 250-lb load cells)

NTEP certificate of conformance: 92-108A2 (91-089 for 250-lb load cells)

EC test certificate: T2154 EC Type Approval: T2206

Maximum excitation voltage: 15 VDC or VAC rms

Recommended excitation voltage: 15 VDC

Full scale output: 2 mV/V

Input terminal resistance: 385 Ohms minimum

Output terminal resistance: 350 $\pm$ 2 Ohms

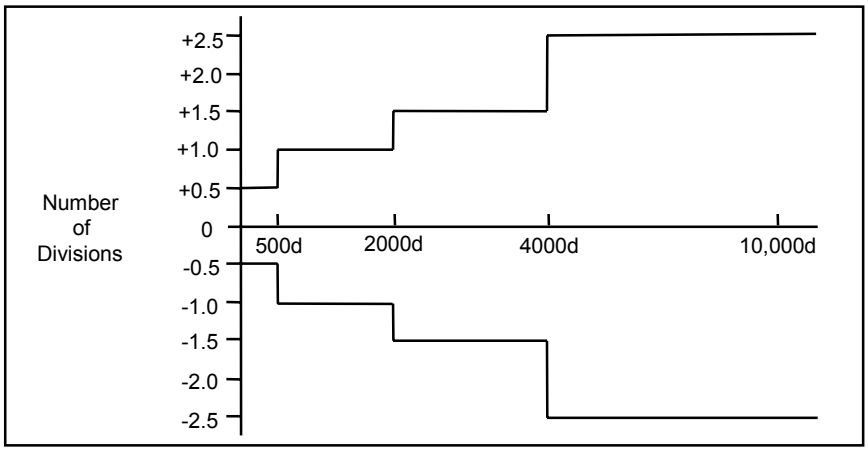
Temperature range compensation: -10°C to +40°C (+14°F to +104°F)

Safe side load: 100% of full load cell rating

Safe overload: 150% of full load cell rating

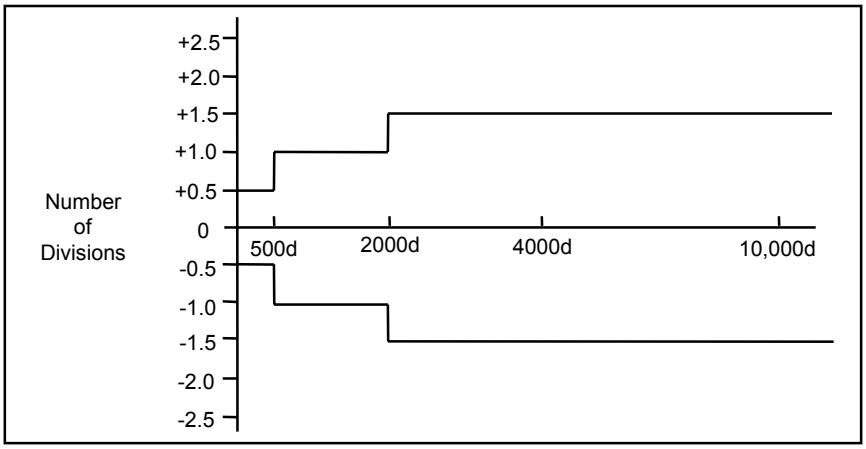
Scale Accuracy

Models 2158 and 2160 VERTEX floor scales meet or exceed the National Institute of Standards and Technology (NIST) Handbook 44 requirements for Class III scales. Standard VERTEX scales meet 5000-division accuracy. Certificates of Conformance No. 91-097 (2158) and No. 94-010 (2160) were issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures. The Model 2162 VERTEX floor scale has not been submitted for approval.



Applied Weight	Allowable Error
0 - 500 Divisions	± 1/2 Division
501 - 2,000 Divisions	± 1 Division
2,001 - 4,000 Divisions	± 1.5 Divisions
4,001 - 10,000 Divisions	± 2.5 Divisions

Figure 1-2: NIST Class III Acceptance Tolerances



Applied Weight	Allowable Error
0 - 500 Divisions	± 1/2 Division
501 - 2,000 Divisions	± 1 Division
2,001 - 10,000 Divisions	± 1.5 Divisions

Figure 1-3: OIML Acceptance Tolerances (Model 2158 only)

End Loading

Models 2158, 2160, and 2162 may be end loaded up to 100% of the platform's rated capacity or two times the individual load cell rating (whichever is less) across any end of the scale.

Platform Assembly

VERTEX floor scales have a single-channel reinforced platform with a plate that can be removed to gain access to the junction box. Standard mild steel scales have a safety tread plate surface. Stainless steel scales have a platform structure very similar to the mild steel unit. Standard stainless steel scales have a smooth deck surface with a glass bead blast finish. Threaded holes are provided in the platform. When installing or removing a platform, screw eyebolts into these holes and lift the platform by the eyebolts.

Support Frames

Standard Above-Floor Frame

Standard VERTEX scales have a formed-angle frame with all sides turned under the scale for a fully captured assembly (see Figure 1-4). When used for top-of-floor installations, the scales can be equipped with optional ramps to provide access to all four sides of the scale. Optional scale guards can be mounted on sides of the scale that do not have ramps, to provide protection in high-traffic areas. Standard VERTEX frames can be used for in-floor applications; however, a Quick-Pit frame is recommended.

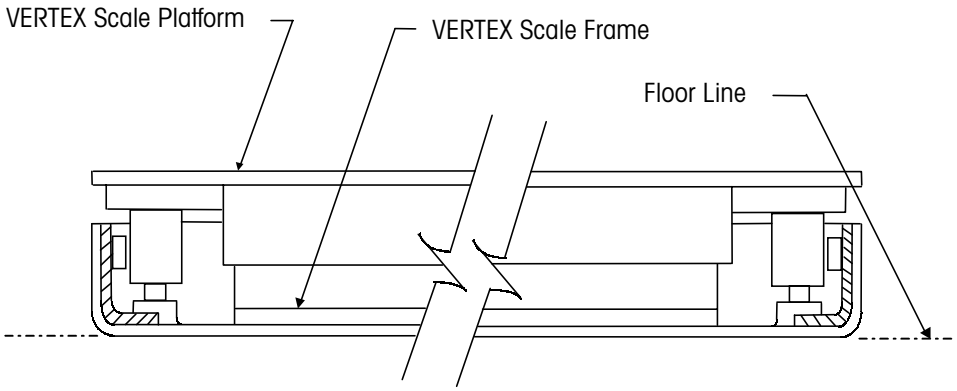


Figure 1-4: VERTEX Frame

Quick-Pit In-Floor Frame

The Quick-Pit frame option provides a unitized scale assembly, eliminating the need for additional pit coping with in-floor installations. The upper flange of the rugged C-channel frame acts as the pit coping around the perimeter of the scale platform. The Quick-Pit frame provides the following benefits:

- Pits are correct depth
- Pits are always square
- No field assembly or welding of coping
- Easy to install, no pit forming required
- Ability to move the scale in the future

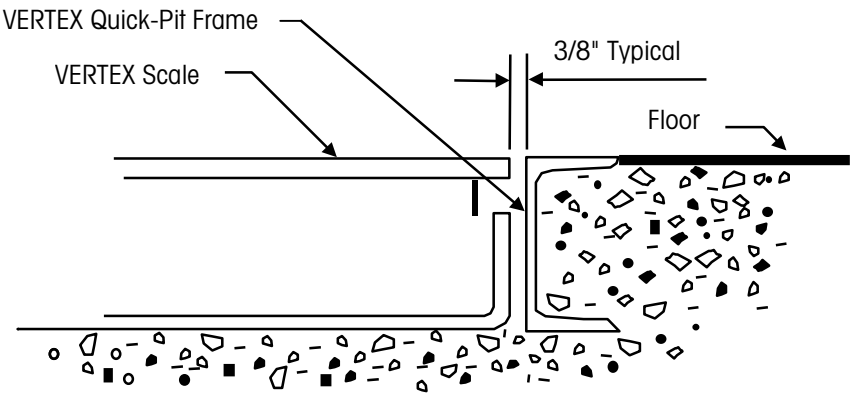


Figure 1-5: Quick-Pit Frame

Forklift Channel Frame

The Forklift Channel frame is used when scale portability is required. The rugged C-channel construction and fork blade guides ensure safe lifting and transport.

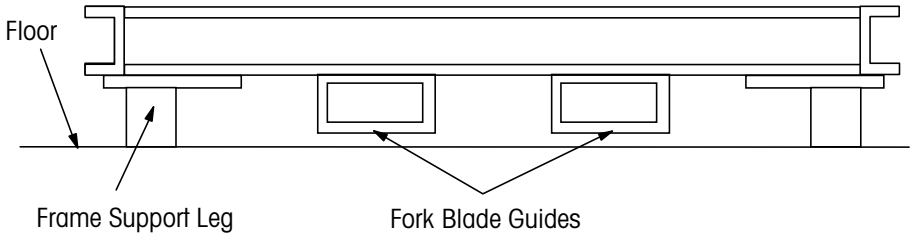


Figure 1-6: Forklift Channel Frame

Truck Dock Frame

The Truck Dock frame option offers maximum scale protection in high-traffic, above-floor applications. The heavy-duty, C-channel frame is compatible with all standard ramps to allow access to any side of the scale.

Access Ramps

Access ramps are available for all 2158, 2160, and 2162 VERTEX floor scales. VERTEX ramps can accommodate single or multi-directional traffic. Ramps are available in 36" or 60" lengths, depending on the width of the scale. The maximum ramp angles are listed below:

Scale Capacity	Scale Height	Ramp Length	Ramp Angle
500 to 5,000 lb	3"	36"	4.4°
500 to 5,000 lb	3"	60"	2.6°
10,000 lb	3 3/8"	36"	4.9°
20,000 lb	4"	36"	5.9°

2 Inspection and Site Selection

Inspection

When the VERTEX floor scale is delivered, visually inspect it for any damage that might have occurred during shipment and handling. Inspect the following:

1. Frame assembly for any warping or bent angles
2. Load cell and suspension assemblies
3. Load cell cables
4. Load cell summing junction box
5. Overall platform assembly

If you find any damage, contact your freight carrier immediately.

Site Selection

Many problems associated with floor scale installations are caused by improper site conditions. Before installing the scale, check the proposed location for the following conditions:

1. The area where the scale will be located should be level to within 1/4" from the highest to the lowest corner.
2. The floor/support at each corner of the scale must be strong enough to maintain support throughout the entire weighing capacity of the scale.
3. There should be proper drainage away from the scale.
4. There should be no heavy vibrations or wind currents at or near the scale.
5. The scale should not be subjected to excessive or unusual loading due to the location or type of equipment used.

If the site is acceptable, proceed with the installation. If not, choose a new location or select another scale.

3 Installation (Top of Floor)

Locate Scale

After inspecting the site, place the VERTEX floor scale in the desired location.

Remove Platform

To remove the scale platform from the frame, install eyebolts (two 3/4-10 UNC eyebolts are required) in the threaded holes provided in the platform. Make sure that the eyebolts are snug and completely threaded into the holes before lifting the platform. Attach a chain or strap to the eyebolts, and lift the platform with a forklift or crane.

⚠ WARNING

USE EXTREME CAUTION WHEN LIFTING AND MOVING THE SCALE TO THE DESIRED LOCATION. DO NOT ATTEMPT TO LIFT AND MOVE THE SCALE BY YOURSELF OR INJURY COULD OCCUR.

Anchor Frame

1. Locate the anchor holes in all four corners of the frame. There are a total of eight anchor holes, two holes per corner (see Figure 3-1). Scale frames with sides 7 feet long or longer require an additional anchor at the midpoint of each of those sides.
2. Drill anchor holes into the floor, using the frame as a guide. The 1/2" anchors are to be provided by others or can be purchased from METTLER TOLEDO. Drill anchor holes to the diameter and depth specified by the supplier.
3. All corners of the frame must touch the floor and must be level within ±1/16". If the scale is out of level or if gaps exist between the frame and floor, shim between the frame and the floor. Corner shims (1/16" thick) can be purchased from METTLER TOLEDO (Part No. 58-030025) or fabricated using Figure 3-2 as a guide.
4. Secure the frame to the floor by installing the anchors and flat head socket cap screws (1/2-13 UNC x 1.5" long). The screws are provided with the scale. Be sure to use flat head screws to maintain clearance between the head of the screw and the bottom of the deck throughout the weighing range.

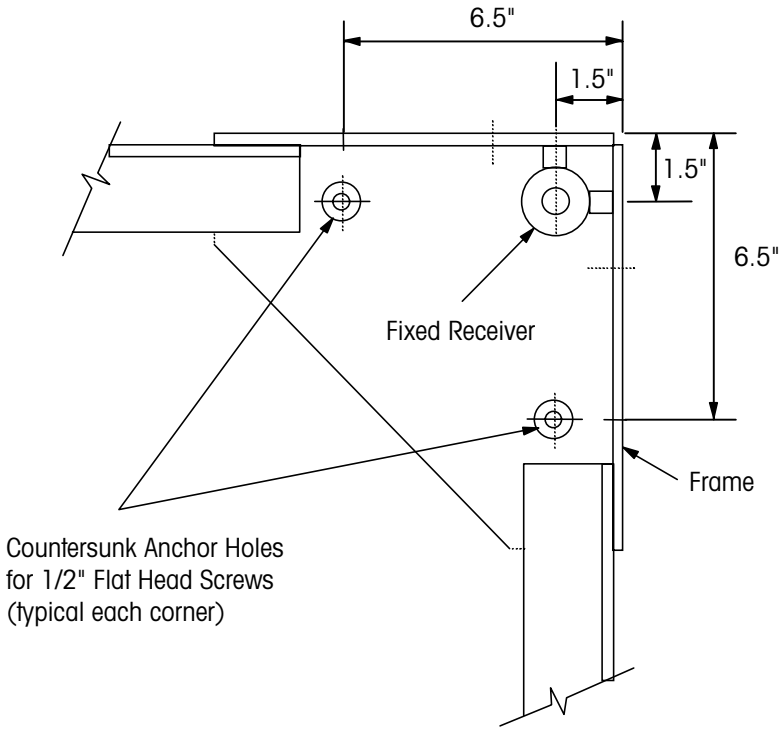


Figure 3-1: Frame Corner Detail (Top View)

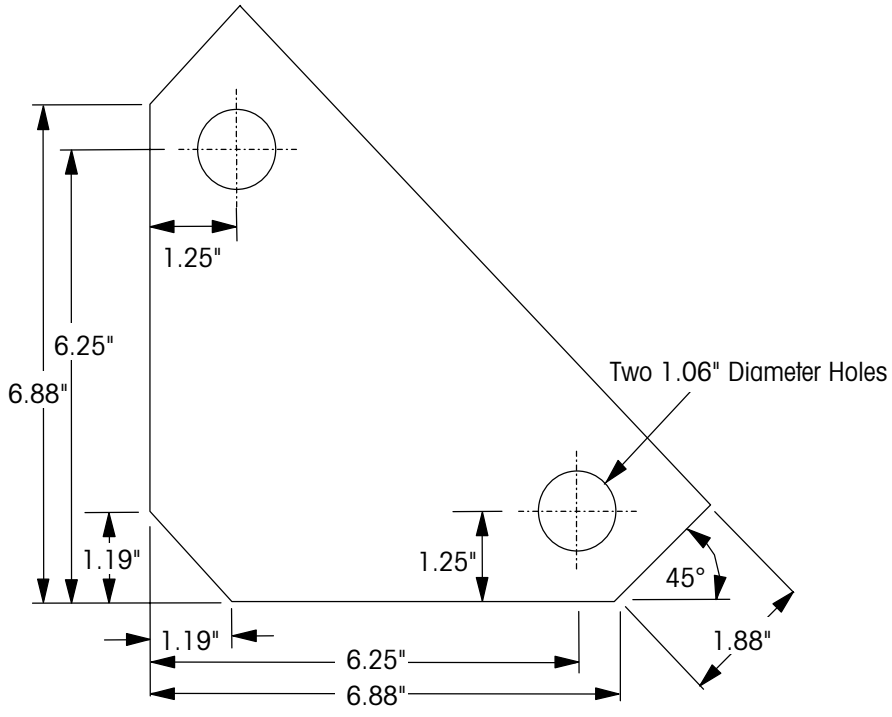
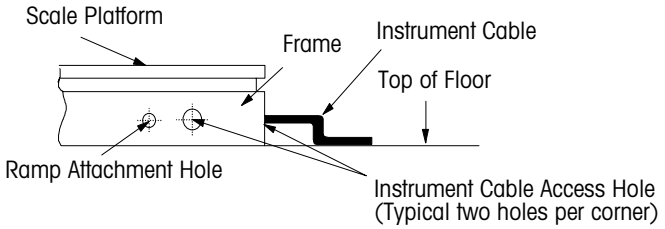


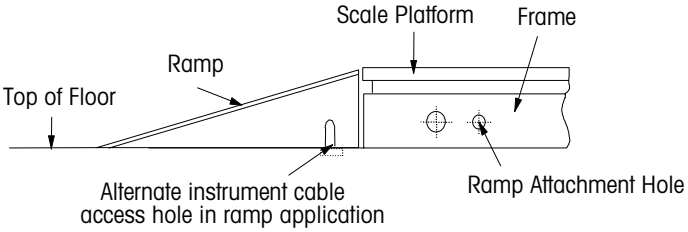
Figure 3-2: Leveling Shim Detail

Route/Attach Instrument Cable

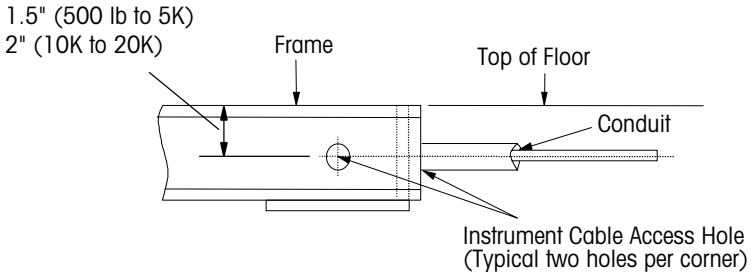
1. Remove the junction box access plate from the platform.
2. A loose coil of instrument cable is located inside the platform channel on either side of the junction box assembly.
3. Thread the instrument cable through the hole provided in the scale frame and platform, continuing through the inside of the platform channel and stopping at the junction box (see Figure 3-3).



VERTEX Scale (without ramp)



VERTEX Scale (with ramp)



Quick-Pit Frame

Figure 3-3: Instrument Cable Access Locations

4. Remove the junction box lid.
5. Loosen the instrument cable connector, and thread the cable through the connector (pull enough cable to reach the INPUT terminal on the junction box PCB).
6. Route the cable as shown in Figure 3-4.
7. Connect the instrument cable to the INPUT terminal on the PCB as shown in Figure 3-6 For Analog, Figure 3-7 For DigiTOL, or Figure 3-8 For IDNet.
8. Place the desiccant bag inside the junction box.
9. Reinstall the junction box lid. Make sure that the rubber gasket is clean and correctly positioned. Tighten all screws and make sure all cord grip caps are secure (see Figure 3-5).

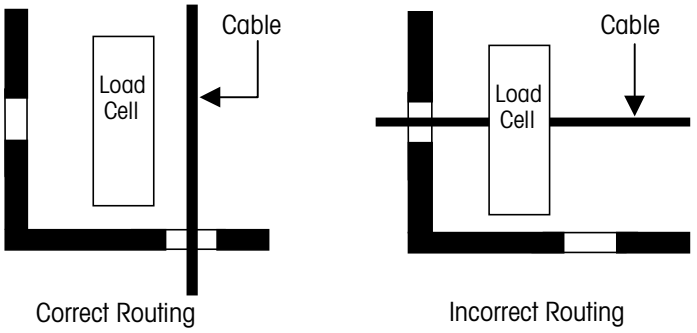


Figure 3-4: Instrument Cable Routing

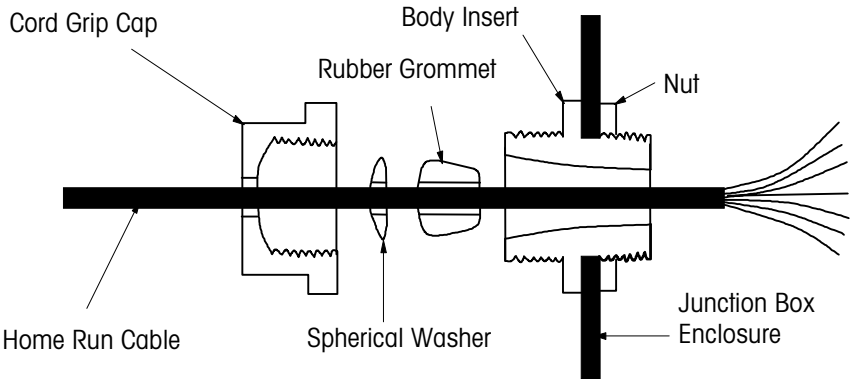
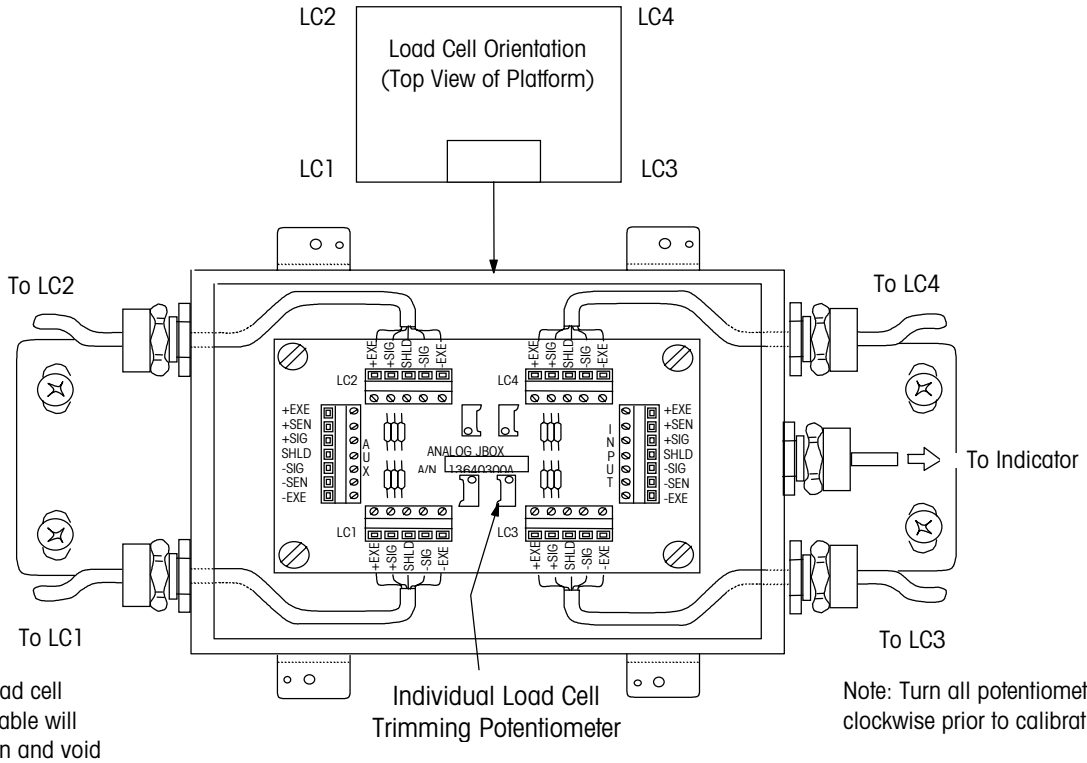


Figure 3-5: Cord Connector Details

Modes of Operation

Analog Mode

A Model 2158 floor scale is used with an analog junction box for summing the load cell outputs. Only analog-compatible indicators work with the analog junction box. See Figure 3-6 and Table 3-1 for the correct cable connection.



Note: Do not cut load cell cables. Cutting a cable will affect compensation and void the warranty.

Note: Turn all potentiometers fully clockwise prior to calibration.

Figure 3-6: Analog Junction Box Detail

Load Cell Wiring		Instrument Cable Wiring*	
Function	**Color**	**Function**	**Color**
+Excitation	Green	+Excitation	White
+Sense	Not Used	+Sense	Yellow
+Signal	White	+Signal	Green
Shield	Yellow	Shield	Orange
-Signal	Red	-Signal	Black
-Sense	Not Used	-Sense	Red
-Excitation	Black	-Excitation	Blue
		*(Based on METTLER TOLEDO Cable Number 510624370)	

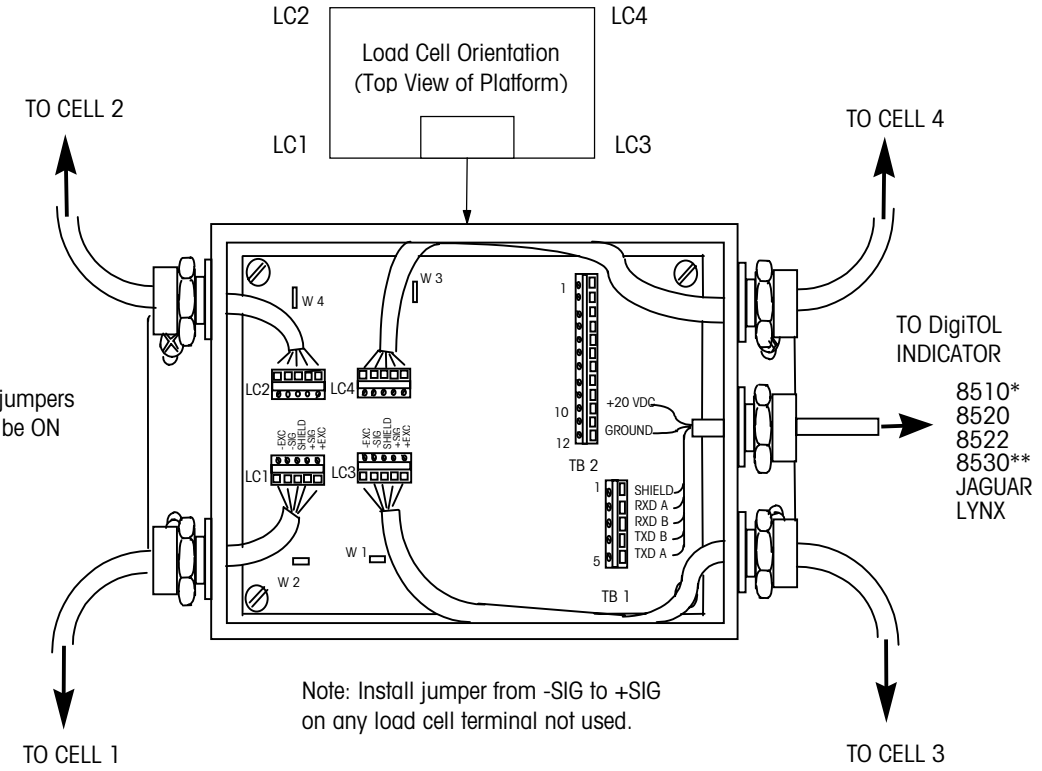
Table 3-1: Analog Junction Box Wiring Codes

DigiTOL DLC Mode

A Model 2160 floor scale is used with a DigiTOL junction box for summing load cell outputs. Only DigiTOL indicators work with a DigiTOL junction box. In the DLC mode, the indicator serves as the host for the DigiTOL junction box, allowing you to use the indicator's keypad to adjust scale parameters. See Figure 3-7 and Table 3-2 for cable connections.

⚠ WARNING

DO NOT USE THE DigiTOL JUNCTION BOX IN LOCATIONS CLASSIFIED AS HAZARDOUS BY THE NATIONAL ELECTRICAL CODE (NEC) ARTICLE 500.



Note: For 2 mV/V load cells, jumpers W1, W2, W3, and W4 must be ON (shorting the pins).

Figure 3-7: DigiTOL Junction Box Detail

Terminal Number	Position	Function	Wire Color
TB2	10	+20 VDC	Green
TB2	12	Ground	Blue
TB1	1	Shield	Orange
TB1	2	RXD A	Red
TB1	3	RXD B	White
TB1	4	TXD B	Yellow
TB1	5	TXD A	Black

*Not compatible with Model 8510 Panel Mount DigiTOL Indicator or Models 8572 and 8582 counting scales.

**Not compatible with Model 8530VS.

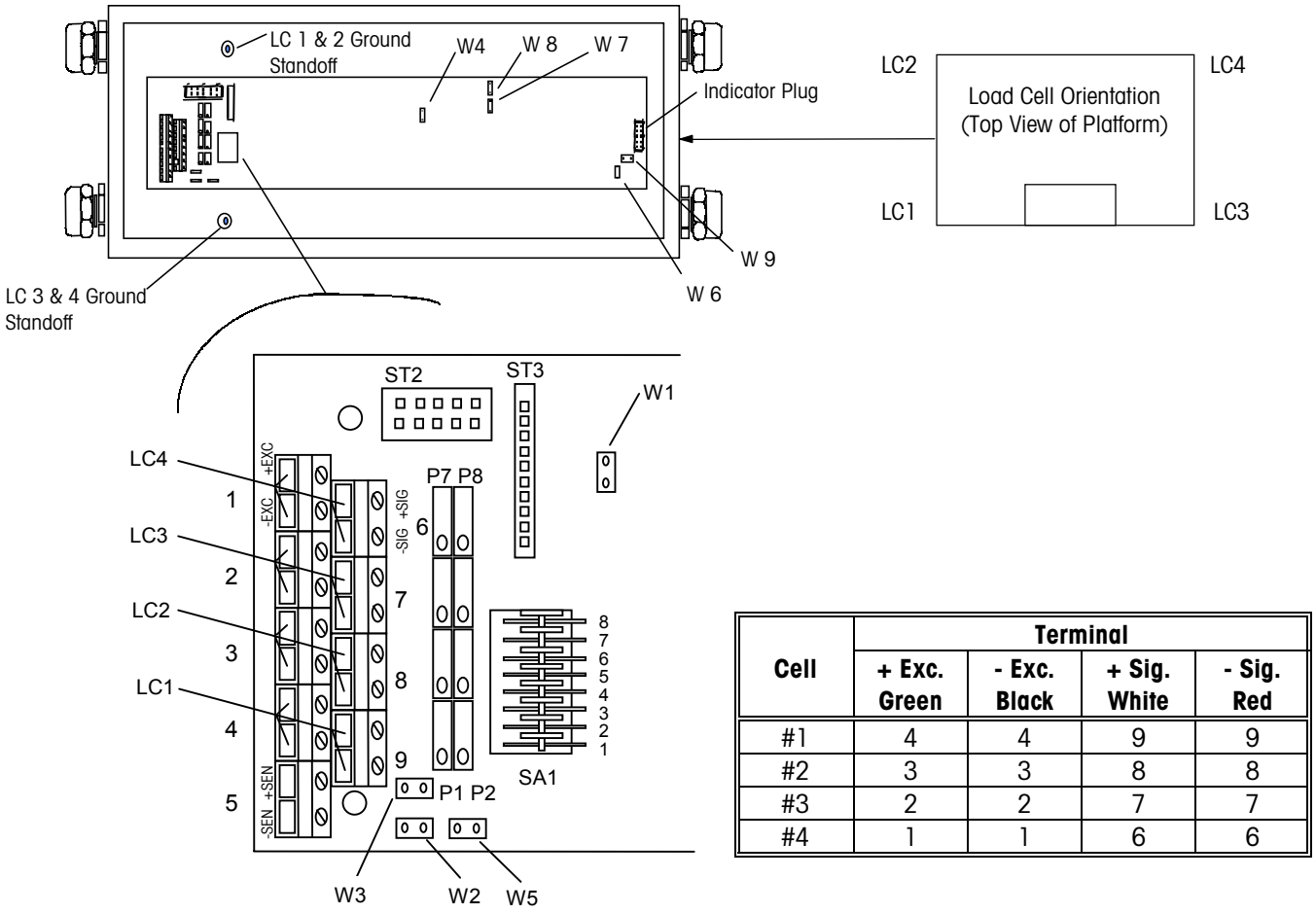
Table 3-2: DigiTOL Junction Box Wiring

IDNet Mode

A Model 2162 floor scale is used with an IDNet junction box to output an IDNet data format compatible with the METTLER TOLEDO ID1 and ID5 weight display, or the Jaguar industrial terminal. See Figure 3-8 and Table 3-3 for cable connections. For information about the indicator and how to operate it, refer to the appropriate indicator manual.

⚠ WARNING

DO NOT USE THE IDNet JUNCTION BOX IN LOCATIONS CLASSIFIED AS HAZARDOUS BY THE NATIONAL ELECTRICAL CODE (NEC) ARTICLE 500.



Cell	Terminal			
	+ Exc. Green	- Exc. Black	+ Sig. White	- Sig. Red
#1	4	4	9	9
#2	3	3	8	8
#3	2	2	7	7
#4	1	1	6	6

Figure 3-8: IDNet Junction Box Detail and Wiring

Note: For 2 mV/V load cells, jumpers W1, W2, W3, and W4 must be ON (shorting the pins).

Jumper	Status	Description
W1	Closed (ON)	Matching the gain at 2 mV/V load cells
W2	Closed (ON)	No external sensing (-SEN)
W3	Closed (ON)	No external sensing (+SEN)
W4	Closed (ON)	Internal reference voltage = 3.5 Volts
W5	Open (OFF)	Excitation voltage for load cells = 4.0 Volts
W6	Closed (ON)	Internal supply voltage = 7.1 Volts
W7	2-3	Protocol IDNet
W8	1-2	Interface 20 mA
W9	Open (OFF)	Supply voltage IDNet
SA1	Closed (ON)	Trim Potentiometers Circuit Disabled

Table 3-3: IDNet Default Factory Setting

Reinstall Platform

1. Clear all debris from the scale area. Make sure that all four load pin receivers in the frame are clean and free of all foreign material.
2. Replace the platform into the frame. Make sure there is slack in the cable between the frame and platform and that no cable pinching occurs.
3. Move the platform back and forth in both directions to make sure that the rocker pins are seated in the receivers and there is no binding.
4. Calibrate the scale according to the METTLER TOLEDO indicator manual.

4 Optional Ramp Installation

You can install a ramp on any side of a VERTEX floor scale. Each ramp is shipped complete with a kit of parts, which includes two ramp attachment lugs and two 3/8-16 UNC x 1" hex head cap screws with lock washers for securing the lugs to the frame.

1. After the frame is anchored to the floor (but with the platform not installed), locate the two holes on the side of the scale frame where the ramp is to be attached (see Figure 4-1).

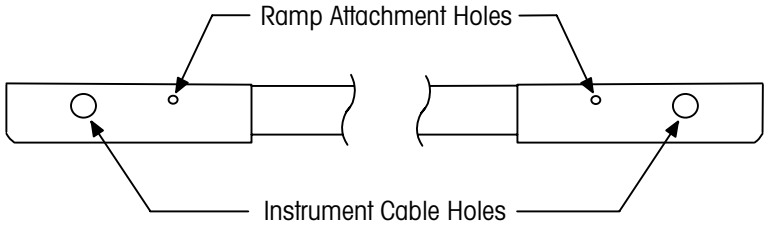


Figure 4-1: Side View of Scale Frame

2. From the inside of the scale frame, insert the 3/8-16 UNC screws with lock washers through the ramp attachment holes.
3. Thread the ramp attachment lugs onto the screws until the lugs touch the outside surface of the frame. Torque the lug attachment screws to 30 ft-lb.
4. The front plate of the ramp has two slots that provide a friction type fit when slid over the attachment lugs. Lift the ramp and align the front plate slots with the lugs. Lower the ramp until the slots are fully engaged in the grooves on the lugs (see Figure 4-2).

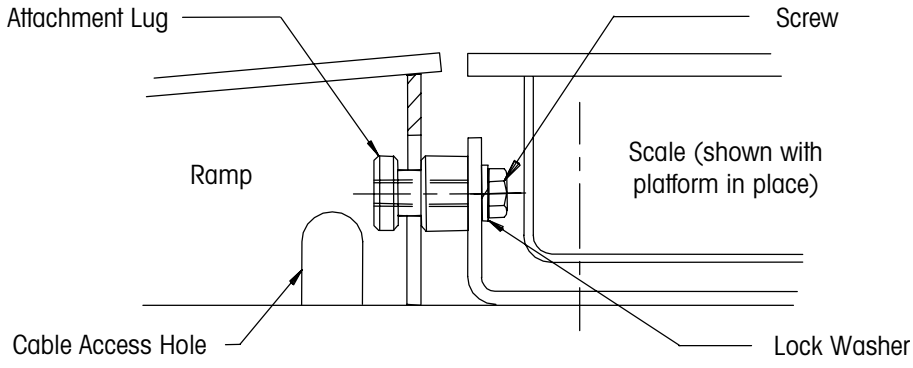


Figure 4-2: Ramp Attachment Detail

5. Make sure that the ramp is stable. Shim under the corners of the ramp if required. Proceed with installation of the platform. The instrument cable can be routed through the ramp via the slot below the attachment lug and the cable access hole.

5

Optional Scale Guard Installation

Scale guards are used with the standard top-of-floor VERTEX frame to provide protection against accidental forklift hits, etc. Scale guards are available for all sizes and capacities of standard VERTEX scales.

1. Locate the scale guard a minimum of 3/8" from the side of the scale frame.
   - If the scale capacity is 500 to 5,000 lb, the 3" leg of the guard should be vertical (equal to platform deck height).
   - If the scale capacity is 10,000 lb, the 3-3/8" leg should be vertical.
   - For a 20,000-lb scale, use a 4" scale guard.

   It is important that the scale guard does not touch the scale platform.
2. Two 9/16" diameter holes are provided for anchoring the scale guards to the floor. Using the holes as a drill template, install 1/2" anchors into the floor (anchors and anchor bolts by others).
3. Insert the 1/2" anchor bolts and tighten them to secure the scale guard to the floor (see Figure 5-1).

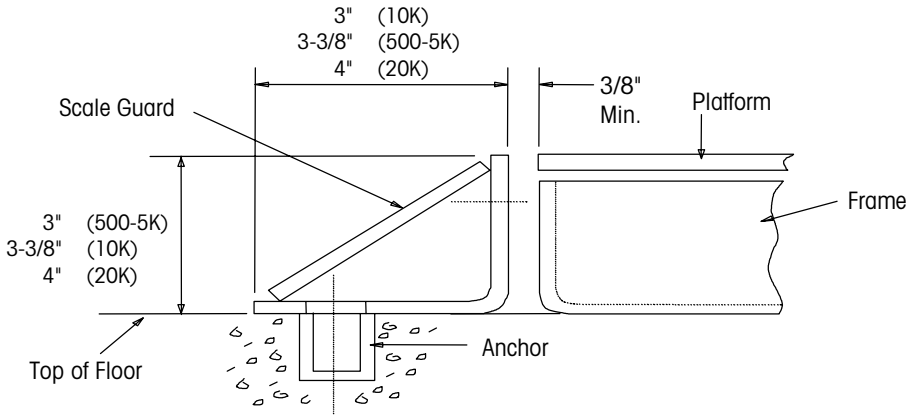


Figure 5-1: Scale Guard Installation Detail

6

Optional Forklift Frame Installation

The 2158, 2160, and 2162 Forklift Channel Option is easy to assemble. The standard VERTEX scale assembly (platform and frame) is mounted within the separate forklift frame. The assembly sequence is as follows:

1. Remove the junction box access plate from the platform, and remove the manual and instrument cable. The eight flat head screws shipped with the scale will not be used.
2. Inspect the separate forklift frame. Along with the frame there should be four clamping bars, eight flat head screws (1/2-13 x 1.5" long), and four 5/8" spacers (10,000-lb capacity scale only). Each clamping bar should have two tapped holes. These parts are used for mounting the scale frame to the forklift frame.

Note: The 10K capacity VERTEX scale uses a 5/8" spacer between the Quick-Pit frame and the standard frame.

3. Also included is a bubble level assembly, which mounts on the side of the forklift frame as shown in Figure 6-1. The bubble level is used to check the suitability of the chosen location. Mount the bubble level first before beginning assembly of the scale to the forklift frame.
4. Remove the platform from the standard VERTEX frame.
5. Place the standard VERTEX frame into the forklift channel frame. Line up the eight mounting holes in both frames, two per corner. Insert the eight mounting screws into the holes and through both frames.
6. Install a clamping bar beneath each frame corner by threading the two projecting screws into the tapped holes provided. Tighten all screws until they are finger-tight (see Figure 6-1).
7. Make sure that there is an equal gap between the two frames on all sides. The oversized mounting holes in the forklift frame allow for any required adjustment. Once the gap is equal, finish tightening all mounting screws.
8. While the platform is removed from the frame, wire the instrument cable to the junction box PCB. Route the cable out the appropriate corner of the platform. Place the rocker pins into the load cells.
9. Reinstall the platform into the frame, carefully routing the instrument cable out the appropriate corner of both frames.
10. Continue with the installation and calibration as described in the METTLER TOLEDO digital indicator manual.

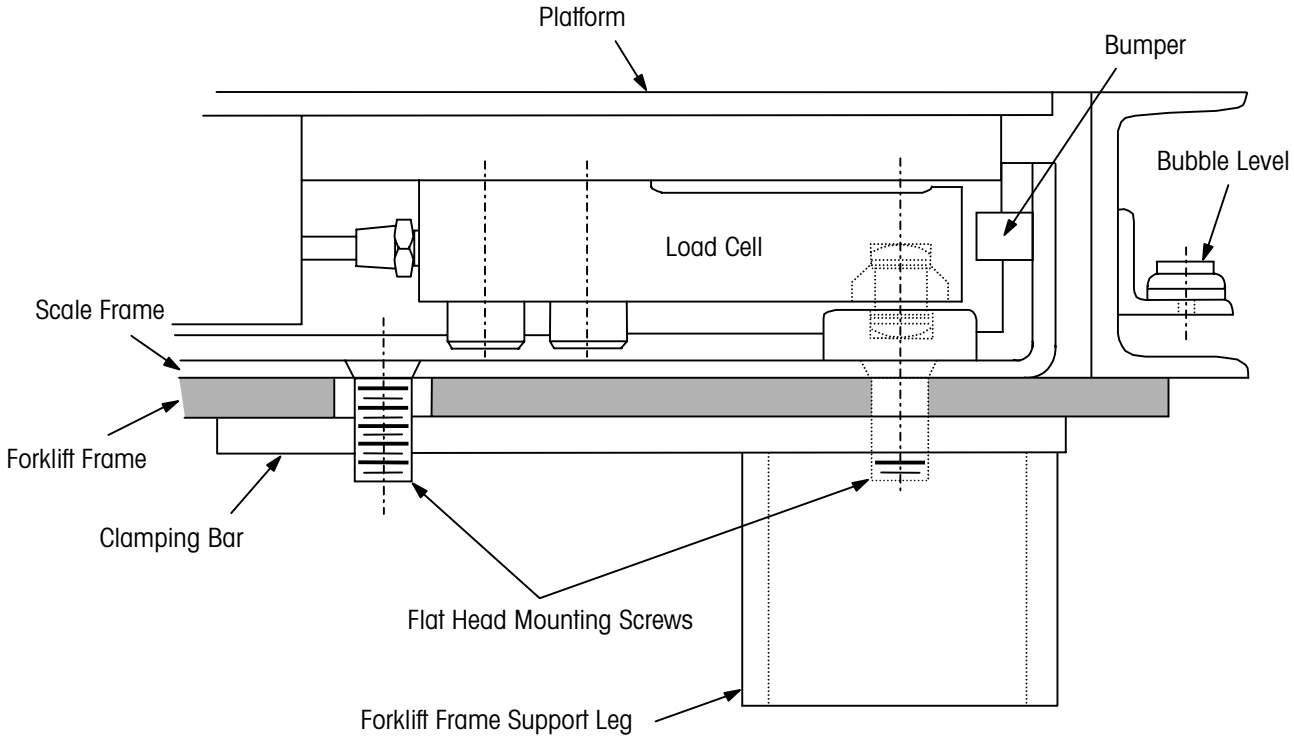


Figure 6-1: Forklift Frame Assembly Detail

7

Quick-Pit Installation (In-Floor)

The Quick-Pit frame makes it easy to install a standard above-floor VERTEX floor scale in a pit. You can install the Quick-Pit frame in the floor before you receive the VERTEX scale assembly. When you receive the scale assembly, simply lower the standard frame into the Quick-Pit frame and anchor it. Insert the scale platform to complete the installation.

Contact METTLER TOLEDO for latest pit construction drawings.

1. Before constructing a pit, contact METTLER TOLEDO or an authorized METTLER TOLEDO distributor to obtain the latest pit construction drawing.
2. Cut a pit in the floor according to the dimensions shown on the pit construction drawing. The Quick-Pit frame requires an opening that allows a 3" gap around the perimeter of the frame. The pit depth will vary from 8" (500-5K capacity) to 10" (10K capacity).
3. Position the instrument cable conduit as shown in the drawing. Use a high-grade steel conduit (3/4" EMT thin-wall conduit minimum, supplied by others). Do not secure the conduit until the frame is in the correct position.
4. Reverse the shipping brackets on the Quick-Pit frame so they extend outward from the frame (see Figure 7-1). Remove the VERTEX scale assembly at this time (if assembly was shipped within the Quick-Pit frame).
5. Place the frame into the pit, with the shipping brackets resting on the existing floor (see Figure 7-1).
6. Center the frame in the pit opening, and make sure the frame is level. If the frame is not level, shim between the shipping brackets and existing floor as required.
7. Secure the instrument cable conduit to the frame.
8. Mask off the four corner plates and the top flange of the frame to prevent concrete from adhering to these surfaces.
9. Pour concrete around the perimeter of the frame. Work the concrete until it is level with the top flange of the frame, and make sure the undersides of all corner base plates are completely covered. Slope the floor at least 1/2" per foot to a suitable drain at the center of the pit.

USE A MINIMUM OF 3000 PSI STRENGTH CONCRETE AT 28 DAYS WITH 5 TO 7% AIR ENTRAINMENT

Note: The 10K capacity VERTEX scale uses a 5/8" spacer between the Quick-Pit frame and the standard frame.

10. Once the concrete has properly cured, mount the standard VERTEX frame inside the Quick-Pit frame. Lower the standard frame into the Quick-Pit frame, center it, and then locate the eight anchor holes in the corners. METTLER TOLEDO supplies eight 1/2-13 UNC x 1.5" long (2" long for 10K capacity) flat head socket cap screws for securing the frame. The 1/2" anchors are to be supplied by others or can be purchased from METTLER TOLEDO. Using the frame as a guide, drill anchor holes to the diameter and depth specified by the supplier. Install the anchors into the concrete, and then secure the frame using the eight flat head screws provided (see Figure 7-2).
11. Install the scale platform and have the scale calibrated by an authorized METTLER TOLEDO service technician.

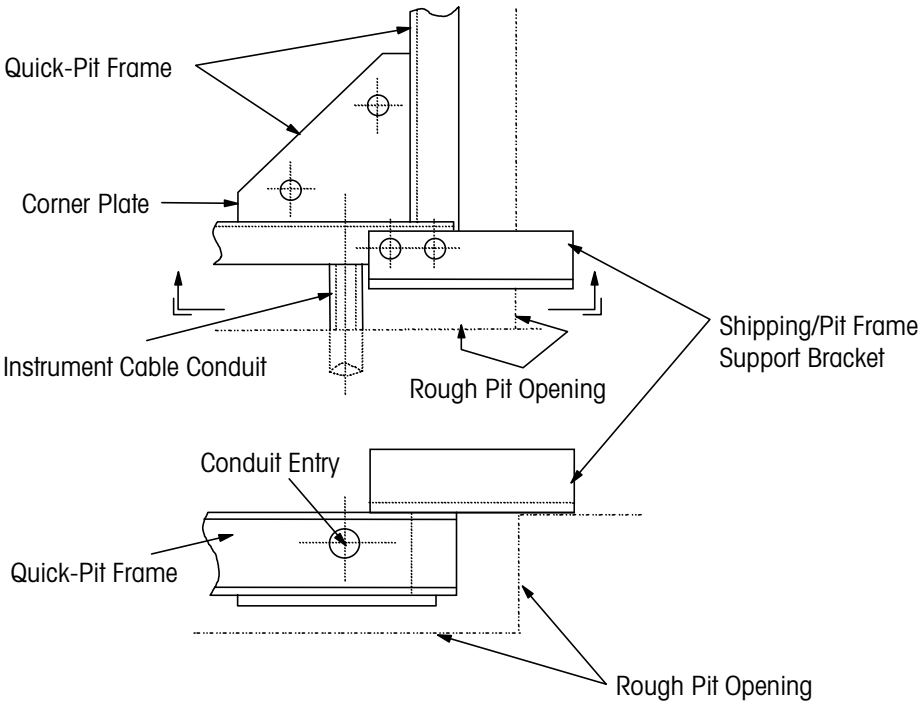


Figure 7-1: Shipping/Pit Frame Support Bracket Detail

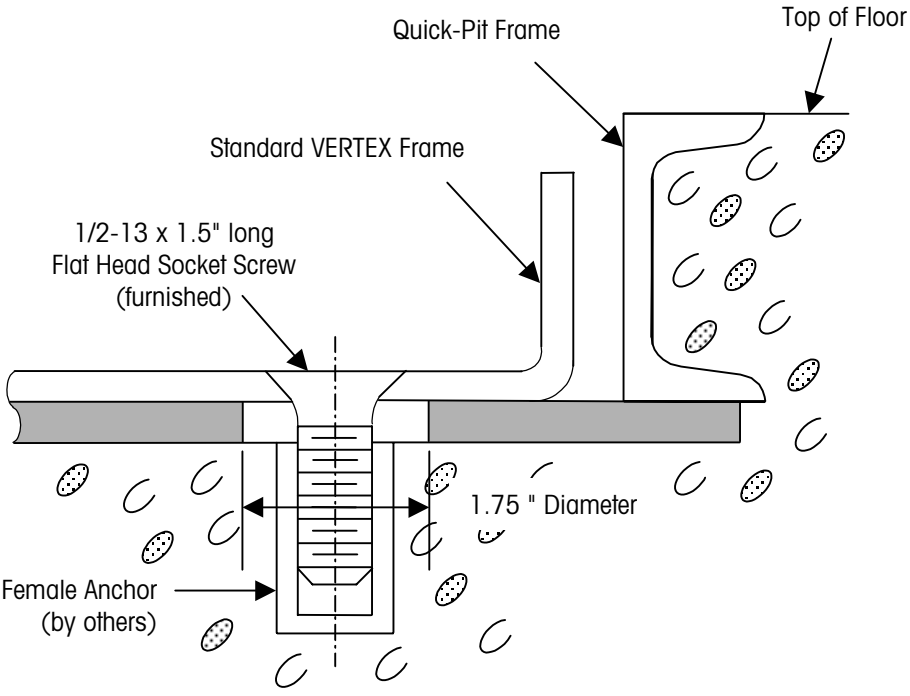
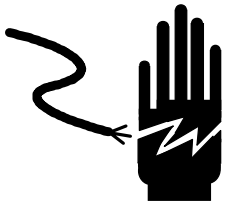


Figure 7-2: Frame Anchoring Detail

8 Calibration

Shift Adjust



⚠ 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.

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. Each VERTEX floor scale is shift adjusted at the factory. For a new installation, the only adjustment that should be needed is minor load cell trimming.

After the scale has been installed and shimmed, check all mechanical parts to make sure that they work properly. Then check the scale's repeatability by placing a test weight on the same location on the platform several times to make sure that you get the same weight reading each time. After checking for repeatability, adjust the load cell trimming potentiometers as needed.

Analog Junction Box Shift Adjustment

Use the following procedure to trim the load cells:

1. Remove the access plate from the scale platform, and open the junction box.
2. Figure 8-1 shows two sets of test weight locations. If you use a test weight equal to 1/4 of the rated scale capacity, place the test weight at each corner of the scale platform. If you use a test weight equal to 1/2 of the rated scale capacity, place the test weight at the center of each quadrant of the scale platform.

   Place a test weight at location A and record the weight reading. Then move the test weight to location B and record the weight reading. Continue until you have taken a weight reading at each of the four locations.

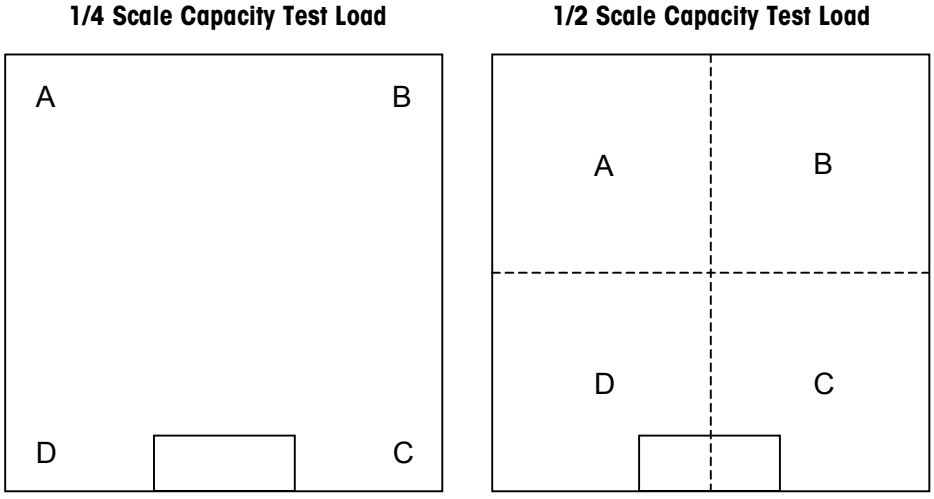


Figure 8-1: Test Weight Locations

3. Place the test weight at the location immediately clockwise from the location at which you got the lowest weight reading. Then adjust the trimming potentiometer for the load cell that corresponds to the corner of the scale where the test weight is positioned (see Figure 8-2). Make the adjustment by turning the potentiometer until the weight reading matches the lowest reading.

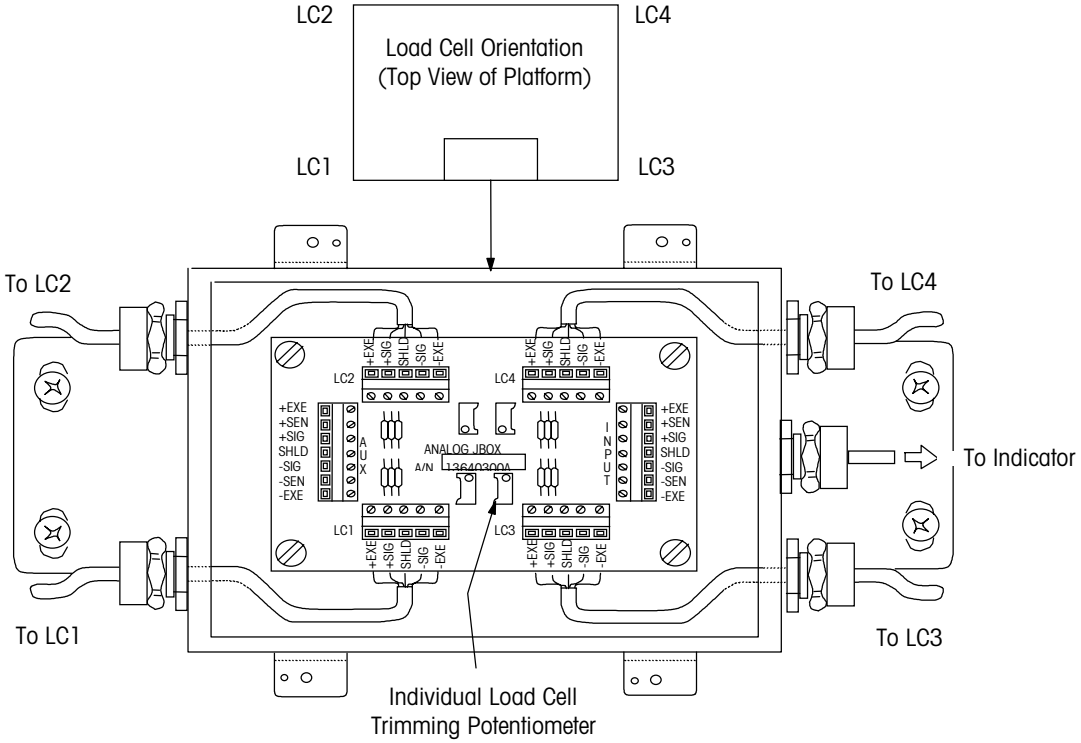


Figure 8-2: Load Cell Trimming Potentiometers

4. Proceeding clockwise, repeat the adjustment described in Step 3 for the next two test weight locations.

NOTE: Because the trimming potentiometers interact with each other, any adjustment will affect the weight readings at all four corners of the scale.

5. Repeat Steps 2 to 4 until the weight readings at all corners of the platform are the same or are within the specified National Institute of Standards and Technology (NIST) Handbook 44 Scale Accuracy Requirements.
6. Replace the junction box lid and platform access plate.

DigiTOL Junction Box Shift Adjustment

Perform the shift adjust procedure at the indicator, with the indicator in Setup mode. For shift adjustment instructions, refer to the manual for the weight indicator you are using.

IDNet Junction Box Shift Adjustment

Perform the shift adjust procedure using the load cell trim potentiometers mounted on the PCB inside the IDNet junction box.

1. Successively place the test weight(s) at the test weight locations and record each weight reading. If the readings are within desired tolerance, shift adjust is not required. If the readings are not within desired tolerance, perform Steps 2 through 6.
2. Activate the trim potentiometers by opening the eight hook switches (if not already open) located on the PCB (Figure 8-3). Once activated, the switches remain open. Do not close the latches, even after completing the shift adjustment.
3. Start the adjustment at the load cell having the highest positive reading. This process trims the load cells to match the value of the lowest recorded value.
4. To make minor adjustments, turn the trim potentiometers (each load cell has two) clockwise for a positive increase, or counterclockwise for a negative result.
5. If the scale needs further adjustment, turn all potentiometers counterclockwise. Stop turning the potentiometers when the weight reading on the indicator stabilizes.
6. Reapply the test weight(s) to the location having the highest recorded weight reading. Then, adjust that load cell's potentiometers to match the reading of the location having the lowest recorded value. Repeat this step until the readings at all locations are the same, or within the specified scale tolerances. Repeat Step 1 to verify shift tolerances.
7. Confirm that all cable connectors and cord grip caps are tight. Then place the desiccant bag in the junction box, leave all hook latches open, and reinstall the junction box lid.

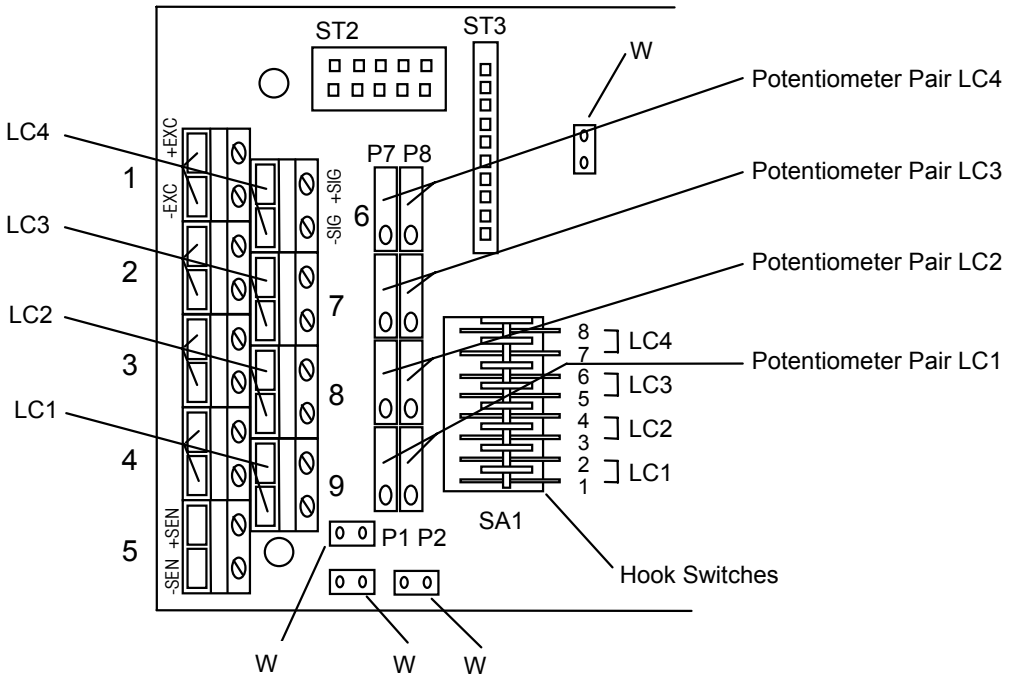


Figure 8-3: IDNet Potentiometer Adjustment

Scale Calibration

METTLER TOLEDO recommends calibrating the scale using test weights equal to the scale's capacity. Follow the calibration instructions in the manual provided with the scale terminal.

9 Routine Care and Maintenance

General

Once the scale has been installed, it should be inspected and calibrated periodically by an authorized METTLER TOLEDO representative. If the scale is used for legal-for-trade purposes, consult the local weights and measures authorities for minimum inspection requirements. Contact your local authorized METTLER TOLEDO service representative for information about periodic inspection and calibration services.

Site Inspection

Make sure that the scale site remains in good condition. Check for alterations in the surrounding floor, excessive vibrations, and possible overloading conditions.

Platform Inspection

During periodic inspections of the scale, check the following:

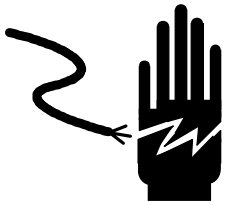
1. Are there any unusual wear points, paths, or marks on the weighing platform?
2. Is the scale frame bent or damaged?
3. Is the junction box lid properly sealed and all cable connectors tight against the enclosure?
4. Is there any moisture or foreign material around or inside the junction box assembly?
5. Is the instrument cable damaged or binding the scale?
6. Is there any debris or material build-up under or around the platform that could prevent the platform from moving freely?
7. For pit installations, is the floor drain clear and providing adequate drainage?
8. Visually inspect the load cells, rocker pins, and fixed bumpers for signs of unusual wear.
9. Check repeatability and shift of the scale.

10 Troubleshooting

General

If the scale does not operate properly, find out as much about the problem as possible. Try to determine whether the problem is constant or intermittent. Mechanical and electrical influences can cause malfunctions, so be patient and use sound logic when troubleshooting.

When troubleshooting a VERTEX floor scale, examine the scale's physical location. Check for the presence of water, corrosive materials, unlevel floors, high vibrations, air currents, or physical damage to the scale platform or frame. Also check the instrument cable for damage, and all connections for loose or improper wiring.



⚠ 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

BEFORE CONNECTING/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.

Isolate the Problem

Determine whether the problem is in the scale or the digital indicator.

1. Remove power from the system, and then disconnect the digital indicator from the scale.
2. Connect the digital indicator to a load cell simulator (analog simulator available from METTLER TOLEDO).
3. Reapply power and test the indicator. If the problem persists, consult the digital indicator manual for further troubleshooting assistance.
4. If the problem is NOT present with the load cell simulator attached to the indicator, remove power, disconnect the simulator, and reconnect the scale. If the problem persists, continue troubleshooting the scale.

Note: For Model 2160, to determine if the problem is caused by a bad load cell, you must connect the analog simulator to the load cell terminal of the junction box PCB.

Check Wiring

1. Remove power from the system.
2. Remove the access cover plate from the scale platform.
3. Remove the lid from the junction box and check the interior for moisture and foreign material.
4. Make sure that all wiring connections are tight and that no insulation material is touching the terminal contacts.
5. Check all cable connections to make sure they are wired correctly. The wiring color codes are given in Table 10-1:

Load Cell Wiring		Analog Instrument Cable*	
Function	**Color**	**Function**	**Color**
+Excitation	Green	+Excitation	White
+Sense	Not Used	+Sense	Yellow
+Signal	White	+Signal	Green
Shield	Yellow	Shield	Orange
-Signal	Red	-Signal	Black
-Sense	Not Used	-Sense	Red
-Excitation	Black	-Excitation	Blue
Instrument cable color code based on METTLER TOLEDO cable no. 510624370			

* See Figure 3-7 for DigiTOL instrument cable wiring.

Table 10-1: Load Cell Wiring Color Codes

6. Check all cable connectors and cord grip caps on the junction box.
7. Tighten any loose connectors.

Note: For Model 2160, make sure that jumpers W1, W2, W3, and W4 are in the ON position.

Check Load Cells

1. Remove power from the system. Fully disconnect each load cell and check for proper input/output resistances (see Table 10-2).

Measuring Points	Resistance
Any lead to shield or ground	Infinity
+Exc (Green) to -Exc (Black)	385 ohms minimum
+Sig (White) to –Sig (Red)	348-352 ohms

Table 10-2: Load Cell Measuring Points

2. If resistance is within specification, perform a shorted-signal symmetry test.
   - Short the signal leads together and place one multimeter lead on the shorted signals and one lead on the +Excitation wire. Note the resistance value.
   - Remove the lead from the +Excitation wire and place it on the –Excitation wire. The two resistance values should be approximately equal.
3. If the load cells pass the shorted-signal test, reconnect them and reapply power to the scale. Confirm that the proper excitation voltage is reaching the load cells by placing multimeter leads on the excitation positions of each load cell terminal.
4. If proper excitation voltage is reaching the load cells, check the output signal from each cell by disconnecting the signal leads and measuring voltage output. If one cell has a particularly high or low dead-load output, it is suspect. The maximum output possible from any cell is 30 mV at 15 VDC excitation and loaded to gross capacity.
5. If any load cell has an unusual signal, remove all load from that cell.

   Note: Remove signal leads from terminals to measure output.

   - With the power on, measure the output from the suspect load cell. The no-load zero output should be ± 1.5% of the full scale output. For example, if the excitation voltage is 15 VDC, then the full scale output would be 30 mV and the no-load zero output should be within ± 0.45 mV.
6. If a load cell fails any of the above tests, replace it.

Check Mechanical Components

Because the VERTEX design is so simple, there are only a few mechanical components to troubleshoot. Make sure that the platform can move freely and that the load cells are not resting against the fixed bumpers. If the load cells touch the fixed bumpers when there is no motion in the scale platform, check the following:

1. The platform should be level and should not rock. Otherwise, shimming may be required.
2. Check the rocker pins for unusual wear. Replace any rocker pins that are unevenly worn or have flattened bearing surfaces.
3. Examine the rocker pin receivers in the frame. If the bearing surface is sunken, depressed, or unevenly worn, replace the frame.
4. If the fixed bumpers on the frame are excessively worn or damaged, the entire frame should be replaced.
5. Inspect the platform and frame for physical damage. Replace any platform or frame that is bent or has broken welds.
6. Verify that the load cell overload stop gap is set properly:

Note: 5,000-lb and 10,000-lb load cells do not have an overload stop.

Load Cell Capacity	Overload Stop Gap
250 lb	0.009" to 0.012"
500 lb	0.009" to 0.015"
1250 lb	0.012" to 0.018"
2500 lb	0.017" to 0.023"

Load Cell Replacement

1. Remove power to the digital indicator and disconnect the instrument cable.
2. Remove the access plate from the platform to gain access to the junction box. Remove the junction box cover and locate the defective load cell terminal.
3. Disconnect the defective load cell cable from its terminal on the summing PCB.
4. Loosen the cable connector on the junction box and remove the cable from the enclosure.

Note: The instrument cable may need to be removed from the junction box to allow the platform to be removed.

5. Carefully remove the platform from the frame assembly, lifting it by eyebolts screwed into the holes in the platform. Position the platform on a stable surface that allows access to the defective load cell and cable as well as offering protection to the other load cells during disassembly.
6. Attach a string to the end of the defective load cell's cable. The string should be long enough and strong enough to pull the new load cell's cable through the platform structure.

7. Remove the two load cell mounting screws and keep them for reinstalling the new load cell. Use a 3/8" hex Allen socket wrench to remove the 1/2-13 UNC socket head cap screws that mount 250-lb to 5,000-lb load cells. Use a 1-1/8" hex Allen socket wrench to remove the 3/4-10 UNC socket head cap screws that mount 10,000-lb load cells. Then lift the load cell from the mounting surface.
8. Carefully pull the defective load cell's cable through the platform while feeding the string in at the junction box opening. Once the string is at the load cell location, detach it from the load cell cable.
9. Remove the rocker pin with O-rings from the defective load cell. Reinstall it in the new load cell.
10. Attach the new load cell's cable to the pulling string and carefully thread it through the platform into the junction box opening. Coil any excess cable and store it within the platform side channel.
11. Secure the new load cell to the platform. Apply an anti-seize compound such as Never-Seez to the threads of the mounting screws and tighten with a calibrated torque wrench to 100 ft-lb (250-lb to 5,000-lb load cells) or 250 ft-lb (10,000-lb load cells).

Note: Make sure load cell and platform mounting surfaces are free of grease and other foreign materials.

12. Verify that the load cell overload stop gap is set properly:

Note: 5,000-lb and 10,000-lb load cells do not have an overload stop.

Load Cell Capacity	Overload Stop Gap
250 lb	0.009" to 0.012"
500 lb	0.009" to 0.015"
1250 lb	0.012" to 0.018"
2500 lb	0.017" to 0.023"

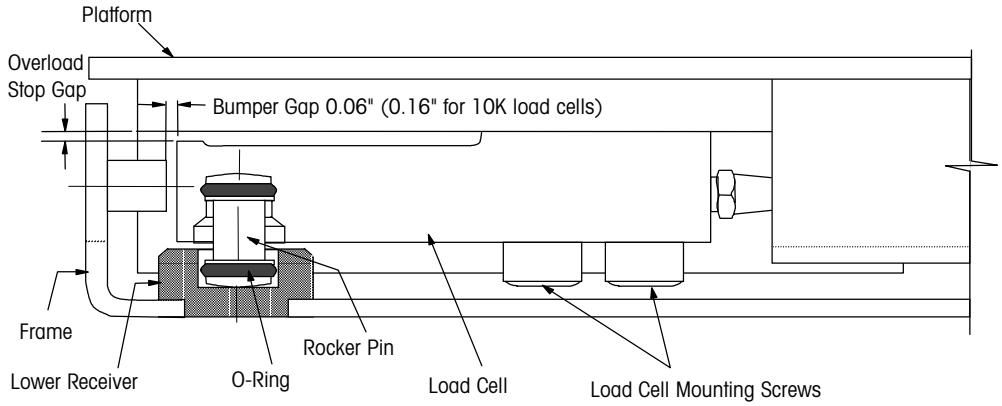


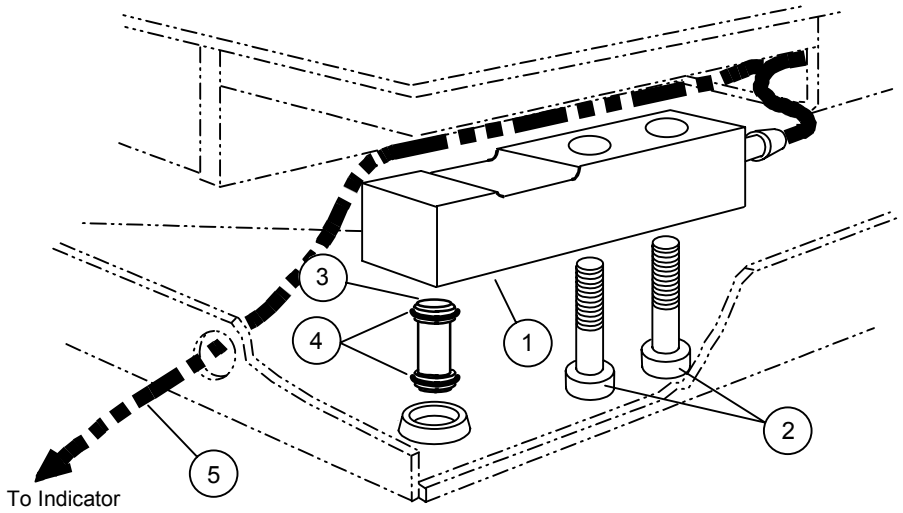
Figure 10-1: Load Cell Installation

13. Thread the load cell cable through the connector on the junction box. When enough cable is inside the box, tighten the connector.
14. Wire the new load cell cable to the proper terminal on the PCB according to the wiring codes shown in Chapter 3.
15. Reinstall the platform in the frame. Make sure that the rocker pins are properly seated and aligned with the receivers in the frame.
16. Reconnect the instrument cable and power-up the indicator. Perform a shift adjust and recalibrate the scale.

11 Service Parts

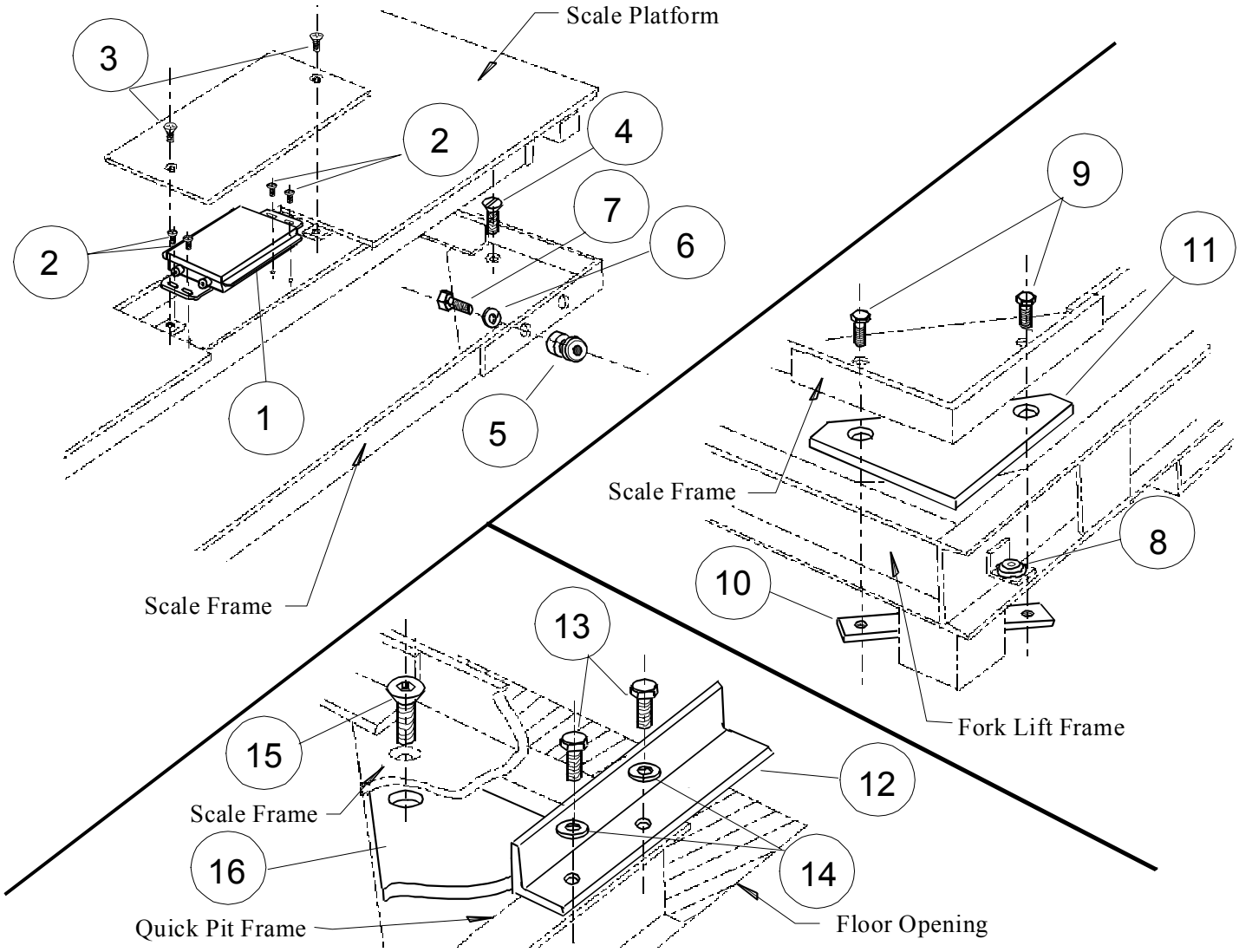
Note: Proper overload gap:
250 lb cell - 0.009" to 0.012"
500 lb cell - 0.009" to 0.015"
1250 lb cell - 0.012" to 0.018"
2500 lb cell - 0.017" to 0.023"

Note: Torque load cell bolts to 100 ft-lb (250-lb-5000-lb cells) or 250 ft-lb (10,000-lb cells).



Load Cell and Rocker Pin Assembly

Ref. No.	Part Number	Description	Qty.
1	TB600488	250-lb load cell (5000d) with 7.5-foot cable	4
	TB600488-1	250-lb load cell (5000d) with 15-foot cable (5 x 7 platform only)	
	TB600529-2	500-lb load cell (5000d) with 7.5-foot cable	
	TB600529-3	500-lb load cell (5000d) with 15-foot cable (5 x 7 platform only)	
	TB600363-1	1250-lb load cell (5000d) with 7.5-foot cable	
	TB600363	1250-lb load cell (5000d) with 15-foot cable (5 x 7 platform only)	
	TB600342-1	2500-lb load cell (5000d) with 7.5-foot cable	
	TB600342	2500-lb load cell (5000d) with 15-foot cable (5 x 7 platform only)	
	TB600343-1	5000-lb load cell (5000d) with 7.5-foot cable	
	TB600343	5000-lb load cell (5000d) with 15-foot cable (5 x 7 platform only)	
	TB600364-1	10000-lb load cell (5000d) with 15-foot cable	
	TB600454-2	550-kg C3 R60 OIML with 7.5-foot cable	
	TB600454	550-kg C3 R60 OIML with 15-foot cable (5 x 7 platform only)	
	TB600455-2	1100-kg C3 R60 OIML with 7.5-foot cable	
	TB600455	1100-kg C3 R60 OIML with 15-foot cable (5 x 7 platform only)	
	TB600456-2	2200-kg C3 R60 OIML with 7.5-foot cable	
	TB600456	2200-kg C3 R60 OIML with 15-foot cable (5 x 7 platform only)	
	TB600457	4400-kg C3 R60 OIML with 15-foot cable (5 x 7 platform only)	
2	TN800647	1/2-13 bolt x 1.75" long (250-lb - 2.5K load cell)	8
	TN800650	1/2-13 bolt x 2" long (5K load cell)	
	TN800654	3/4-10 bolt x 2.5" long (10K load cell)	
3	TN200050	Rocker pin (250-lb - 2.5K load cell)	4
	MN21018	Rocker pin (5K load cell)	
	TN201975	Rocker pin (10K load cell)	
4	MZ0909000005	O-ring (250-lb - 5K load cell)	8
	MZ0909000012	O-ring (10K load cell)	
5	510624370	24-gauge, 6-conductor, shielded home run cable	Varies



Junction Box and Option Hardware

Junction Box

Ref. No.	Part Number	Description	Qty.
1	TB100395	Analog junction box assembly (model 2158) Consists of: *13640300A Analog PCB TA800218 Desiccant Bag	1
	TB100515-5	DigiTOL junction box assembly (model 2160) Consists of: *13839900A DigiTOL PCB TA800218 Desiccant Bag	
	TB100569-4	IDNet junction box assembly (model 2162) Consists of: ME209351 IDNet PCB ME200308 Lock Nut ME209911 Washer TA800218 Desiccant Bag	
2	MZ0901010379	1/4-20 Phillips head screw x 1/4" long	4
3	MZ0901010035	3/8-16 flat head screw x 3/4" long	2
4	MZ0901010298	1/2-13 flat head screw x 1.5" long	8
NS	ME504235	Cable, IDNet x 5 m long	-

* May have an alpha prefix.
NS = Not Shown

Ramp Option Hardware

5	TA201611	Lug, ramp (per ramp)	2
6	MZ0901030076	3/8" lock washer (per ramp)	2
7	MZ0901010124	3/8-16 hex head bolt x 1" long (per ramp)	2

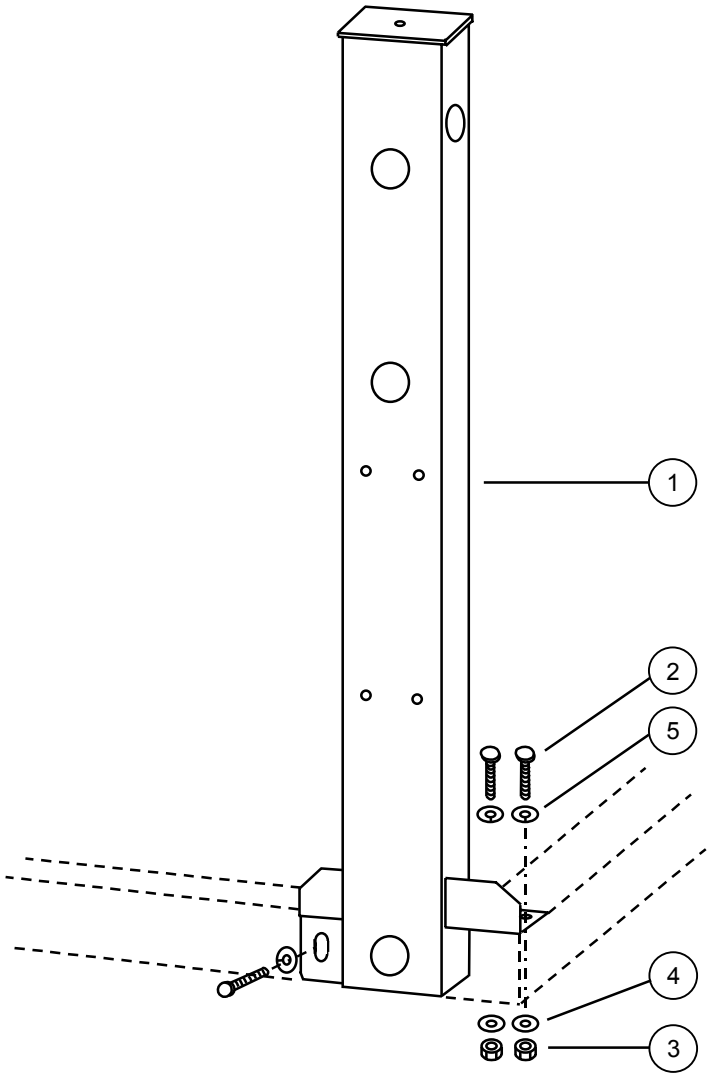
Fork Lift Frame Option Hardware

8	TN201817	Bubble level	1
9	MZ0901010298 MZ0901010451	1/2-13 flat head screw, hex socket x 1.5" long 1/2-13 flat head screw, hex socket x 1.5" long, SS	8
10	TN202231	Hold-down strap, SS	4
11	TN201705	5/8" spacer plate (UHMW poly)**	4

Quick-Pit Frame Option Hardware

12	TN202623	Shipping angle	4
13	MZ0901010033	3/8-16 hex head screw x 3/4" long	8
14	MZ0901030011	3/8" zinc washer	8
15	MZ0901010249	1/2-13 flat head screw, hex socket x 2.25" long**	8
16	TN201705	5/8" spacer plate (UHMW poly)**	4

** Parts for 10K capacity only.



Indicator Column

Ref. No.	Part Number	Description	Qty.
1	TB203682	Indicator Column	1
2	MZ0901010076	3/8-16 bolt x 1.25" long, SS	3
3	MZ0901020016	3/8-16 hex nut, SS	3
4	MZ0901030060	3/8" washer, SS	3
5	MZ0901030076	3/8" lock washer, SS	3

12 Reference Material

Reference Drawings

Scale Capacity	General Dimensions	Quick-Pit Assembly	Fork Lift Frame
1,000-5,000 lb	TC201789	TB201773	TC201787
10,000 lb	TC201789	TC201774	TC201787
20,000 lb	TC202033	TC201774	--

Recommended Spare Parts

For part numbers refer to service parts.

Quantity	Description
1	Load cell (capacity of cell required depends on scale capacity)
1	Junction box circuit board (type of board depends on model of scale)
1	Junction box desiccant bag
1	Rocker pin (by capacity of load cell)
2	Rocker pin O-ring (by capacity of load cell)

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Publication Part Number: B14691400A **Publication Date: 2/01**

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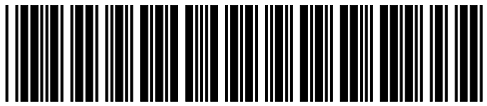

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