2254 Predator™

Analog Floor Scales

Installation and Service Manual

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(2/96)

INTRODUCTION

This publication is provided as a guide for the trained technician for installing, calibrating, and servicing the 2254 Predator™. Repair or adjustment by unauthorized persons voids the METTLER TOLEDO warranty.

For information regarding your METTLER TOLEDO distributor, Sales, and Service location, please contact:

METTLER TOLEDO
6600 Huntley Road
Columbus, Ohio 43229
(614) 841-7300

ORDERING INFORMATION

It is most important that the correct part number is used when ordering parts. Parts orders are machine processed, using only the part number and quantity as shown on the order. Orders are not edited to determine if the part number and description agree.

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PROPRIETARY NOTICE

STANDARD WARRANTY: 2254 Predator™

Mettler Toledo warrants that the equipment covered by this warranty will be free from defects in workmanship and materials for a period of 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 replacements 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. For 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 Model 2254 Predator™ floor scale understructure. 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 only applicable to the United States of America. Consult Mettler Toledo for Export Warranty Terms and Conditions.

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.
- **Always** take proper precautions when handling static sensitive devices.
- **Do not** connect or disconnect load cells or a scale base to the equipment with power connected or damage may result.
- **Always** remove power and wait at least 30 seconds before disconnecting any cables. Failure to observe this precaution may result in damage to, or destruction of the equipment.
- **Save** this manual for future reference.
- **Call** METTLER TOLEDO for parts, information, and service.

WARNING!

Only permit 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

For continued protection against shock hazard, connect this unit to a properly grounded outlet only. Do not remove the ground prong.

WARNING

Disconnect all power to this unit before removing the fuse or servicing.

CAUTION

Before connecting or disconnecting any internal electronic components or interconnecting wires between electronic equipment, always remove power and wait at least 30 seconds. Failure to observe these precautions could result in bodily harm or damage to or destruction of the equipment.

CONTENTS

1 Specifications

General Description

The model 2254 Predator™ is a fully electronic low profile floor scale suited for top-of-floor general purpose weighing. Specifications include:

- Platform Size—48 in. x 48 in. x 3.5 in. (121.9cm x 121.9cm x 8.9cm)
- Gross Capacity—5,000 lb/2,500 kg
- 4 LoadCells—2,500lb (1,135kg)

Power Supply Requirements

Load cell power supply is provided by the Mettler Toledo Digital Indicator. Maximum excitation voltage is 15 VDC.

Accuracy

Predator floor scales meet or exceed the National Institute of Standards and Technology (NIST) Handbook 44 requirements for Class III devices. Predator scales meet 1,000 division accuracy. A certificate of conformance (No. 96-001) was issued under the National Type Evaluation Program (NTEP) of the National Conference of Weights and Measures.

Load Cells

Four 2,500 lb cantilever load cells are provided in all 2254 Predator floor scales. Each cell is complete with an integral 4-conductor, shielded, color coded cable. The cell suspension has an adjustable foot to level the scale deck.

Platform Assembly

The Predator scale platform consists of a 48 in. (121.9 cm) square mild steel tread plate deck, four analog load cells mounted at the corners, junction box mounted on one side, and recessed bubble level.

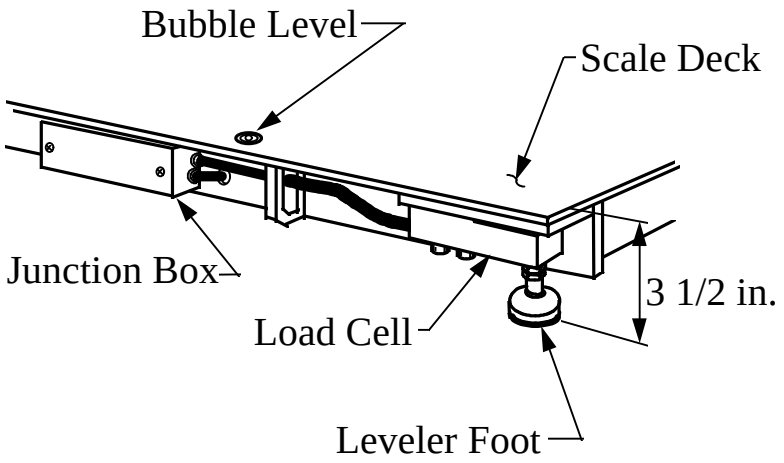


Figure 1-1 Platform Assembly

2 Inspection and Site Selection

Inspection

Upon delivery of the 2254 Predator, visually inspect the scale for any damage which may have occurred during shipment and handling. Inspect the following areas:

- Platform assembly for any damage
- Load cells and leveling feet
- Load cell cables
- Load cell summing junction box
- Overall platform assembly

If any damage is noted, contact your freight carrier immediately.

Site Selection

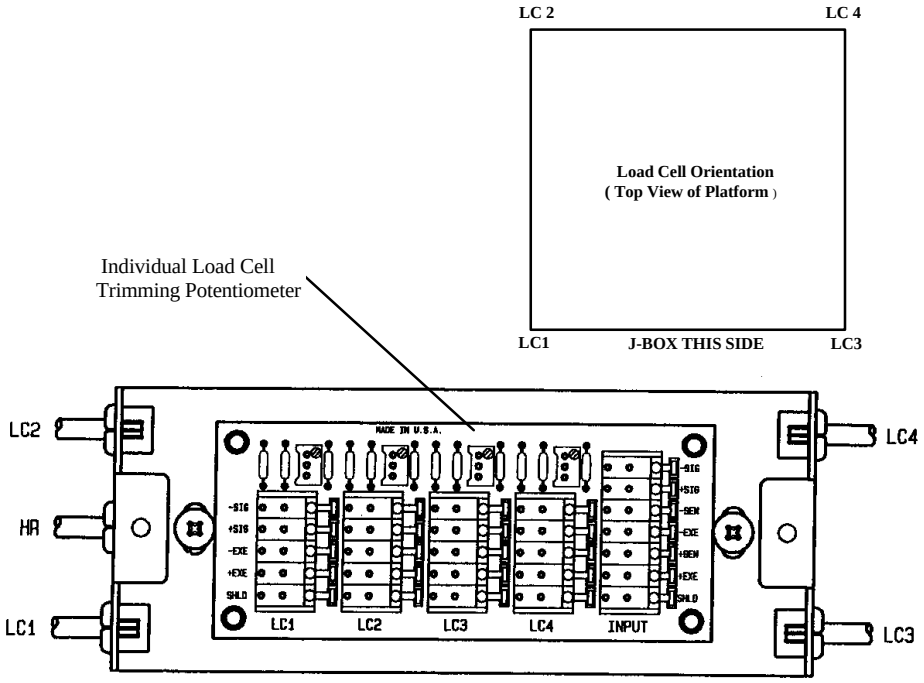
Many problems associated with floor scale weighing are caused by improper scale location. Before you begin weighing with the Predator, check the following conditions:

- Is the scale platform level?
- Is the floor/support at each corner of the scale area able to maintain support throughout the entire weighing capacity of the scale?
- Are there any heavy vibrations or wind currents present at or near the scale?
- Will the scale be subjected to excessive or unusual loading due to the location or type of equipment used?

3 Modes of Operation

The 2254 Predator uses an analog junction box for summing the load cell outputs. Only analog compatible indicators will work with Predator.The correct cable connection is given in Figure 3-1.

Note: Turn all potentiometers fully clockwise prior to calibration.



Load Cell Wiring		Instrument Cable Wiring	
Function	**Color**	**Function**	**Color**
+ Excitation	Green	+ Excitation	White
		+ Sense	Yellow
+ Signal	White	+ Signal	Green
Shield	Yellow	Shield	Orange
– Signal	Red	– Signal	Black
		– Sense	Red
– Excitation	Black	– Excitation	Blue
		(Based on Mettler Toledo cable number 510624370)	

Figure 3-1: Predator Analog Junction Box Details and Wiring Codes

4 Calibration

Shift Adjust

Note: Before proceeding, check the shift characteristics to determine if any shift trimming is required.

This adjustment should be made only after all mechanical parts are checked, and the scale has proven repeatable. Repeatability is checked by repeatedly placing a test weight on the same position of the platform and checking for repeatable weight reading. Shift adjust is then done to make the weight reading for each corner of the platform the same for the same test weight.

The amount of test weight used for the shift test should equal 1/2 of the rated scale capacity. Test weights should be concentrated at the center of each quadrant of the scale platform.

Shift Adjustment

The shift adjustment is made by adjusting load cell trim potentiometers mounted on the junction box PCB.

1. Successively place the test weight at each of the four designated locations (center of each scale quadrant). Note and record the displayed indications.
2. Determine the location with the lowest indication. The corresponding load cell is NOT trimmed.
3. Place the test weight at the location with the lowest indication. Note and record the indication.

Note: Because the trim potentiometers interact with each other, any adjustment will affect all corner indications.

4. Proceeding clockwise, place the test weight at each designated location. If necessary, adjust the trimming potentiometer corresponding to that location to obtain the indication recorded in step 3.
5. Repeat this procedure until all indications at the designated locations are the same or within the specified NIST Handbook 44 Tolerance Requirements.
6. Reinstall junction box cover.

Scale Calibration

It is recommended to calibrate the scale using a test weight equal to the scale capacity. With the proper test weight, continue with the calibration of the weighing system in accordance with the instructions provided in the manual of your digital indicator.

5 Routine Care and Maintenance

General

Once the scale is installed, it is recommended that the assembly be inspected and calibrated periodically by an authorized Mettler Toledo representative. Contact your local authorized Mettler Toledo Service representative for information on periodic inspection and calibration services.

Site Inspection

Ensure that the scale site remains in good condition as described in Chapter 2. Check for alterations in the surrounding floor, excessive vibrations, and possible overloading conditions.

Platform Inspection

During periodic inspections of the scale assembly, check the following:

- Are there any unusual wear points, paths, or marks on the weighing surface?
- Is the junction box cover on and are the load cell cables in good condition?
- Is there any moisture or foreign material present around or inside the junction box assembly?
- Is the instrument cable free from damage or binding the scale?
- Is there any debris or material build-up under or around the platform that could inhibit freedom of movement?
- Visually inspect the load cells and leveling feet for signs of unusual wear.
- Check repeatability and shift of the scale.

6 Troubleshooting

General

If operational difficulties are encountered, obtain as much information about the problem as possible. Is the problem constant or intermittent? Malfunctions can be caused by mechanical or electrical influences so be patient and use sound logic when troubleshooting. When troubleshooting a 2254 Predator scale, examine the physical location of the scale, checking for the presence of the following: water, corrosive materials, unlevel floors, high vibrations, air currents, and/or physical damage to the scale platform. Also check the instrument cable for damage and all connections for any loose/incorrect wiring.

CAUTION

Before connecting or disconnecting any internal electronic components or interconnecting wiring between electronic equipment, always remove power and wait at least 30 seconds. Failure to observe these precautions could result in bodily harm or damage to or destruction of the equipment.

Isolate the Problem

First, determine if the problem is in the scale platform or the digital indicator. After removing power from the system, disconnect the digital indicator from the Predator scale assembly and connect a load cell simulator to the indicator (analog simulator available from Mettler Toledo). Reapply power. If the problem is still present, consult the digital indicator manual for further troubleshooting assistance.

If the problem is NOT present with the load cell simulator attached to the indicator, remove power, disconnect the simulator and reconnect the Predator platform. If the problem reoccurs, further scale platform troubleshooting is required.

Check Wiring

Remove power from the system, then remove the cover from the junction box. Check the interior for moisture or any foreign material.

Note: The junction box is not a sealed, water-tight box.

Ensure that all wiring connections are tight and that no insulation material is touching the terminal contacts. Check all cable connections for correct wiring. The wiring color code is as follows:

Load Cell Wiring		Instrument Cable Wiring	
Function	**Color**	**Function**	**Color**
+ Excitation	Green	+ Excitation	White
		+ Sense	Yellow
+ Signal	White	+ Signal	Green
Shield	Yellow	Shield	Orange
– Signal	Red	– Signal	Black
		– Sense	Red
– Excitation	Black	– Excitation	Blue
		(Based on Mettler Toledo cable number 510624370)	

Check Load Cells

Check each load cell for proper bridge resistances.

Measuring Points	Resistance
Any lead to shield or ground	Infinity
+Exc (Green) to - Exc (Black)	350 Ohm minimum
+Sig (White) to - Sig (Red)	348 to 352 Ohms

If bridge resistances are within specification, perform a “shorted signal” symmetry check. 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 indicated. Next, remove the lead from the +Excitation wire and place it on the –Excitation wire. Both resistance values should be equal within 1 Ohm.

If the cells pass the above test, reapply power to the scale platform. Confirm that proper excitation voltage is reaching the load cells by placing multimeter leads on the excitation positions of each load cell terminal. Excitation voltage can vary from 5 VDC to 15 VDC depending upon the application and digital indicator used.

If proper excitation voltage is reaching the load cells, check the output signal from each cell. 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.

Note: Remove signal leads from terminals to measure output.

If any cell has an unusual signal, remove all load from that cell by raising the platform. With the power still on, measure the output from the suspect load cell. The "no load" zero output should be $\pm$ 1.5% of the full scale output. For example, if the excitation voltage is 15 VDC then the full scale output is 30 mV. Therefore, the no load zero output should be within $\pm$ 0.45 mV. If the load cell is out of specification, replace it.

If a load cell fails any of the above tests, replace it.

Check Mechanical Components

Due to the simplicity of the Predator, there are few mechanical components to troubleshoot. Ensure that the platform has freedom of movement and that the loading end of the load cells are not resting against the bottom of the deck. Check the following:

- Is the platform level or rocking? Foot adjustment may be required.
- Are the leveling feet worn? Replace any feet that are unevenly worn or bent.
- Is there any load cell damage. Replace any damaged load cell(s).
- Is there any apparent physical damage to the platform? Replace a platform that is bent or has broken welds.
- Are the load cell and platform mounting surfaces free of grease and other debris?
- Verify that a gap exists between the bottom of the deck and the load cell.

Load Cell Replacement Procedure

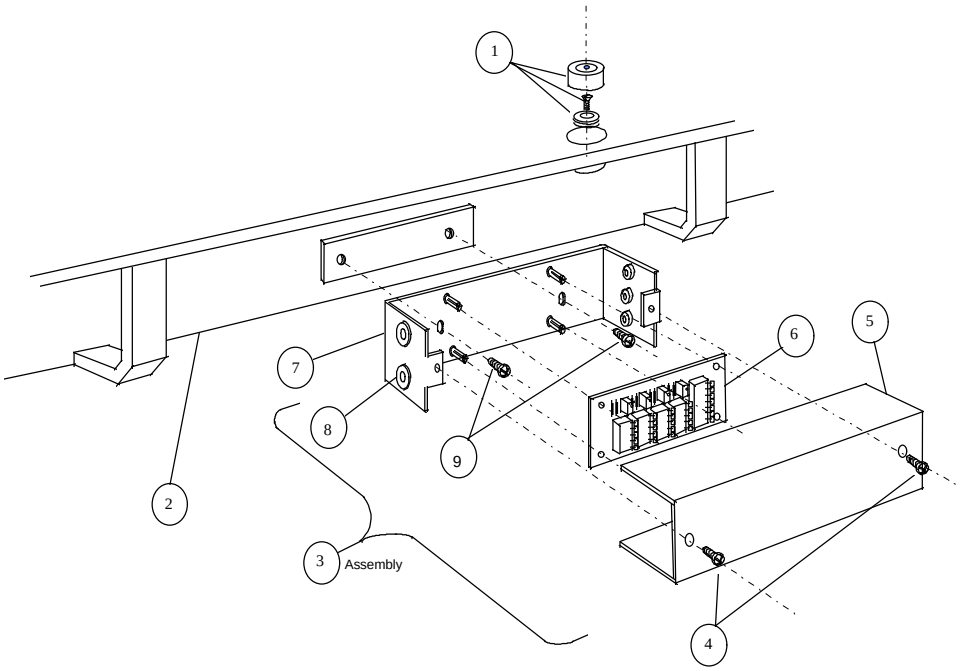
1. Remove power to the digital indicator and disconnect the instrument cable.
2. Remove the junction box cover and locate the defective load cell terminal.
3. Disconnect the defective load cell cable from its terminal on the summing PCB.
4. Remove the cable from the enclosure.
5. Carefully position the platform onto a stable supporting surface that allows access to the defective cell and cable as well as offering protection to the other cells during disassembly.
6. Affix a string to the end of the cable attached to the defective load cell. The string should be of sufficient strength and length to pull the new load cell cable through the platform structure.
7. The load cells are fastened to the platform using two 1/2 - 13 UNC socket head cap screws. Remove the two load cell mounting screws with a 3/8 in. hex allen socket, retaining the screws for reinstallation. Lift the load cell from the mounting surface.
8. Carefully pull the defective load cell 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 leveling foot from the defective load cell and reinstall it in the new load cell.
10. Attach the new load cell's cable to the pulling string and carefully thread the new cable through the platform into the junction box opening. Coil and store any excess cable within the platform.
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.

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

12. Thread the load cell cable through the connector on the junction box.
13. Wire the new load cell cable to the proper terminal on the PCB per the wiring code shown.
14. Level the scale with the leveling feet.
15. Reattach the instrument cable and power-up the indicator. Perform shift adjust and recalibrate the scale.

7 Service Parts

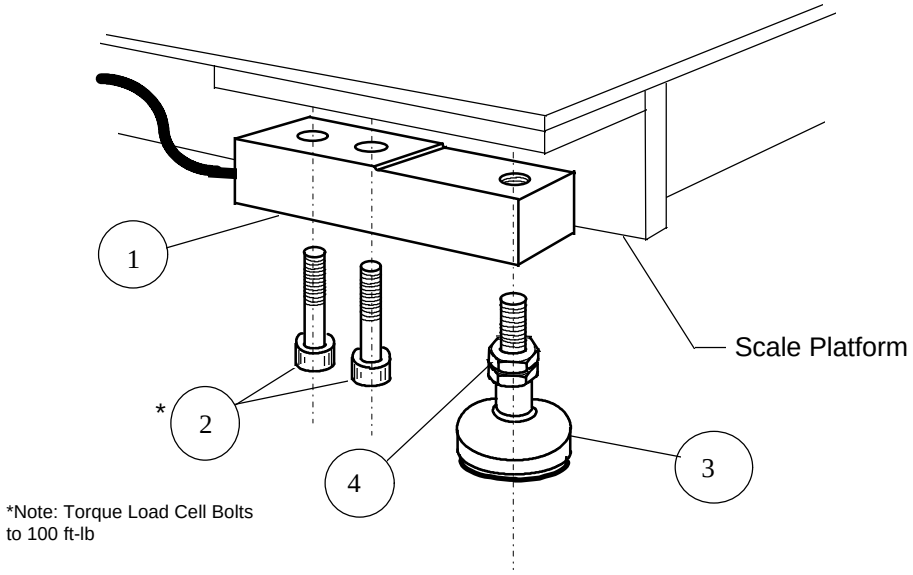
Junction Box
and Bubble Levell



Reference Number	Part Number	Description	Qty
1	TN201817	Circular Bubble Level	1
2	TB203048	2254 Platform, 4x4, 5K	1
3	TA100562	Analog Junction Box Assembly (Complete)	1
4	TN203092	10-32 Fillister Hd. Screw x 3/16 in. Lg.	1
5	TA100560	Cover, Junction Box	1
6	*143788 00A	Analog Junction Box PCB	1
7	TA100561	Junction Box Base	1
8	MZ1405000153	Cable Bushing	5
9	MZ0901010407	10-32 Ph. Hd. Screw x 3/16 in. Lg.	2

* May have a letter prefix

Load Cell and Foot



Reference Number	Part Number	Description	Qty
1	TB600531	2,500 lb Analog Load Cell	4
2	MZ0901010333	1/2-13 Soc. Hd. Screw x 1 3/4 in. Lg.	8
3	TA201509	Leveling Foot	4
4	MZ0901020092	Nut, 1/2 -20 Hex	4

8 Reference Material

Reference Drawings

Refer to TB203105 for Predator general dimensions.

Recommended Spare Parts

Part Number	Description
TB600531	2,500 lb Analog Load Cell
*143788 00A	Analog Junction Box PCB
TA201509	Leveling Foot

* May have a letter prefix

Load Cell Data

- Model number: 759
- Maximum excitation voltage: 15 VDC or VAC rms
- Recommended excitation voltage: 15 VDC
- Full scale output: 2 mV/V
- Input terminal resistance: 350 Ohm minimum
- Output terminal resistance: 350 $\pm$ 2 Ohms
- Temperature range compensation: –10°C to +45°C (+15°F to +115°F)
- Safe side load: 100% of full load cell rating
- Safe overload: 150% of full load cell rating

METTLER TOLEDO
Scales & Systems
6600 Huntley Road
Columbus, Ohio 43229-1012

P/N: 14859500A

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