Installation Manual

POWERCELL® PDX®

Load Cell

METTLER TOLEDO

ServiceXXL

Tailored Services

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation to protect your investment. Contact us about a ServiceXXL agreement tailored to your needs and budget.

We invite you to register your product at

www.mt.com/productregistration

so we can contact you about enhancements, updates and important notifications concerning your METTLER TOLEDO contact.

Precautions

READ this manual BEFORE operating or servicing this equipment.

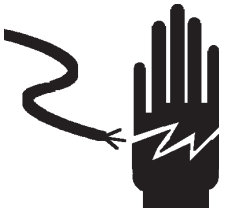
FOLLOW these instructions carefully.

SAVE this manual for future reference.

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

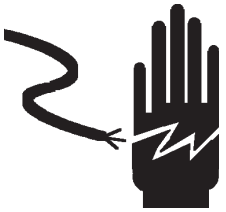
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



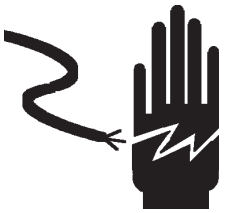
⚠ WARNING

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.

⚠ WARNING

BEFORE CONNECTING/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.

⚠ CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

⚠ CAUTION

DANGER OF BODILY HARM OR PROPERTY DAMAGE!

- When a module is being moved, do not place your fingers or other body parts 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.

⚠ CAUTION

FOR SAFTY REASONS DO NOT REPLACE MORE THAN ONE LOAD CELL AT A TIME.

⚠ CAUTION

POOR CONTACTS:

- Keep all electrical parts absolutely dry on the inside and as dry as possible on the outside.
- If the cable ends will be exposed to the weather for a long period (not connected to the load cell), apply dielectric compound, cover the cable ends with plastic, and secure the open end with duct tape.

⚠ CAUTION

RISK OF COMMUNICATION FAILURES DUE TO EXPOSED STRANDS OF WIRES

- Make sure that no stray conductors are left unsecured. Exposed strands of wires can lead to communication failures if they bridge the connection in the terminal block.

Disposal of Electrical and Electronic Equipment

In conformance with the European Directive 2002/96 EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

Contents

1 Introduction

1.1 General

The POWERCELL® PDX® load cell provides unequalled accuracy and reliability. This innovative load cell builds on the success of the industry-leading POWERCELL brand, which is operating reliably in every corner of the world. Its weighing performance is kept stable through "in-cell" measurement and correction of errors caused by weather, low voltage, and radio and telephone interference. The POWERCELL PDX load cell has the unique advantage of proactively recognizing and reporting potential weighing errors and problems before they lead to under-reported income, overload fines, and complaints from customers or suppliers. By resisting lightning damage up to 80,000 amperes, the load cell provides 24/7 operation and reduces your maintenance budget and unnecessary out-of-pocket expenses. Cables resist water, lightning, and rodents, and, if they are damaged, they can be replaced without recalibrating the scale.
This manual explains the preferred procedure for installing POWERCELL PDX load cells in a scale.

Figure 1-1: POWERCELL PDX Load Cell

2 Components

2.1 Introduction

All POWERCELL PDX load cell components are made of high-quality material and are designed and tested to function for a long time. They include the following features:

- Rugged enclosure for protection from the environment (mud, stones, water, ice, etc.).
- Thick heavy-duty boots to prevent buildup of stones, dirt, snow, and ice.
- Super heavy-duty cables to eliminate electromagnetic interference and rodent damage. Cables can be replaced without recalibration.
- Larger load cell buttons to increase the service life.
- Two connectors for operation without junction boxes.

Figure 2-1: POWERCELL PDX Load Cell Components

Depending on the region and related logistics, the components will arrive within the scale shipment or as a separate package.

METTLER TOLEDO offers two types of receivers for the POWERCELL PDX load cell: Standard and Retrofit. The selection of components depends on the receiver type.

2.2 Receiver Variant 1 "Standard"

The "standard" receiver is a new design. It combines the strength of our previous receivers with easy installation and maintenance.

This solution requires three threaded holes (M12 x 1.75) in the base plate for the locating pins. The force from the scale is introduced through the top surface of the upper receiver. Shims can be added only under the lower receiver or under the base plate.

2.2.1 Assembly

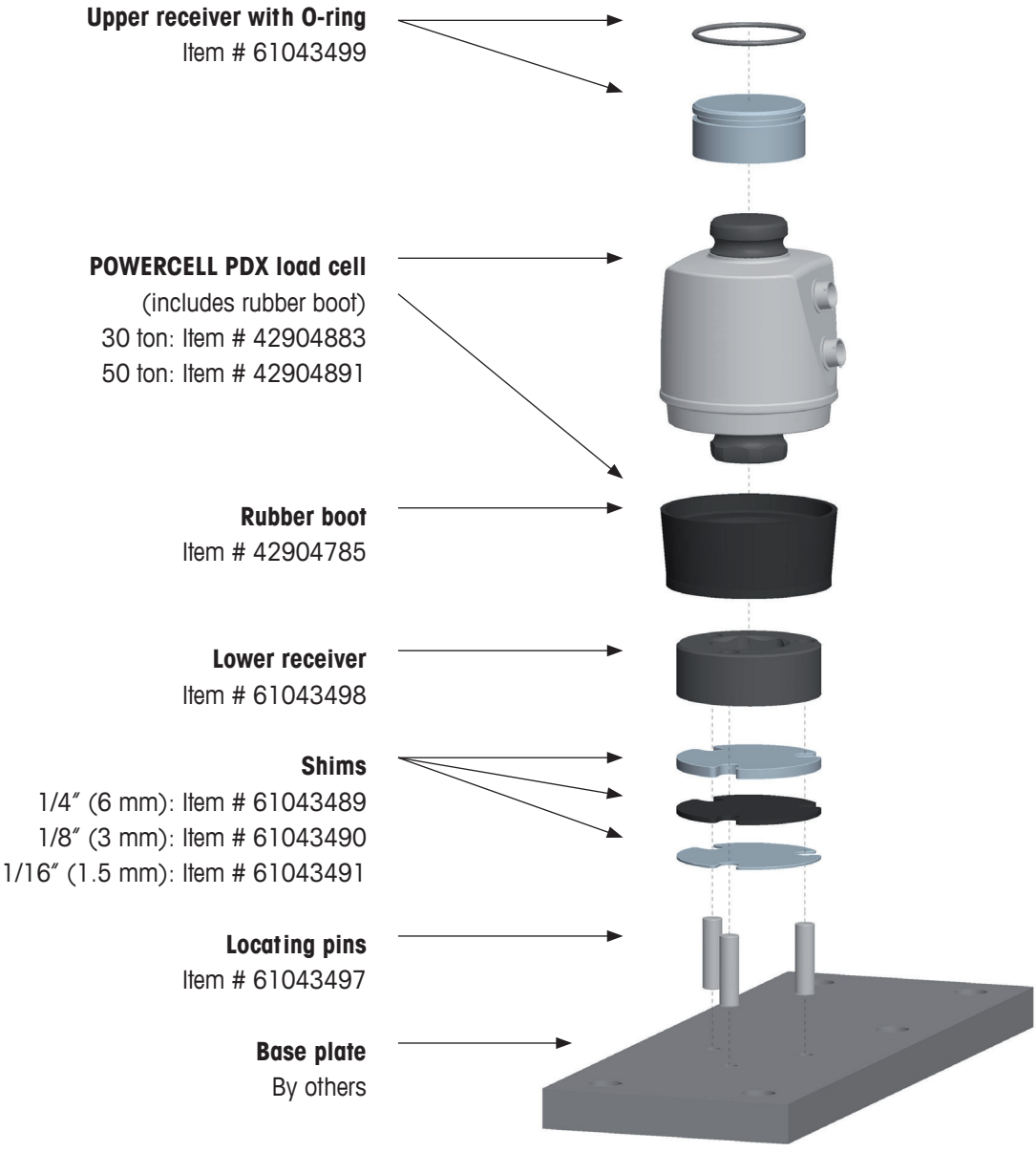
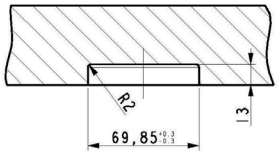


Figure 2-2: Assembly for Receiver Variant 1 "Standard"

2.2.2 Dimensions

Top receiver plate (cross section)
The thickness of the top receiver plate depends on the scale design.

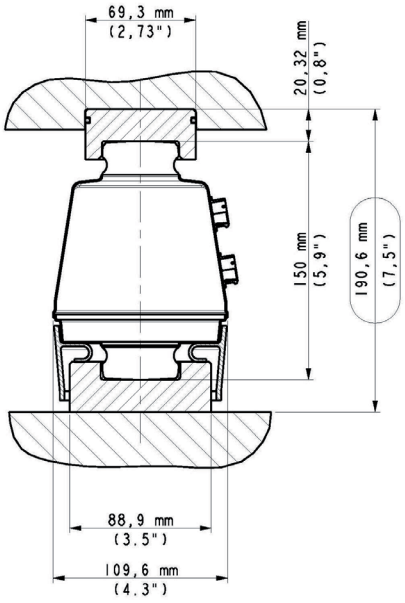
Ø 69.85-mm hole required for receiver.
Depth = 13 mm



Load cell stack-up (cross section)
Dimension without shims.

Height from top surface of the base plate to the bottom surface of the top receiver plate = 177.6 mm.

Overall height = 190.6 mm
Maximum Ø = 109.6 mm (load cell)



Base plate (top view)
Size and thickness depends on the foundation design and stability.

3 x M12x1.75 threaded holes required for locating pins.
Minimum depth = 13 mm
(120° separation)

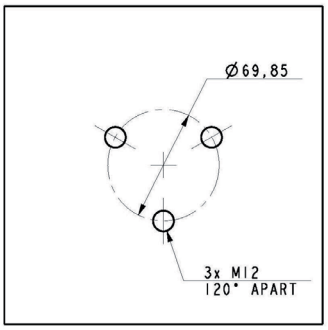


Figure 2-3: Dimensions for Receiver Variant 1 "Standard"

2.3 Receiver Variant 2 "Retrofit"

The "retrofit" receivers are designed to make POWERCELL PDX load cells compatible with scales that are built for use with POWERCELL 760 or MTX load cells (designs using a 69.85-mm-diameter hole). The receivers are not compatible with other POWERCELL load cells that use smaller-diameter receivers.

This solution requires holes in the base plate for the lower receiver (Ø 69.85 mm) and a roll pin (Ø 12.7 mm). The force from the scale is introduced through the shoulders of both upper and lower receivers. Shims can be added under both the upper and lower receivers, but not to exceed 9 mm at either receiver. If additional shimming is necessary, shim under the base plate(s).

2.3.1 Assembly

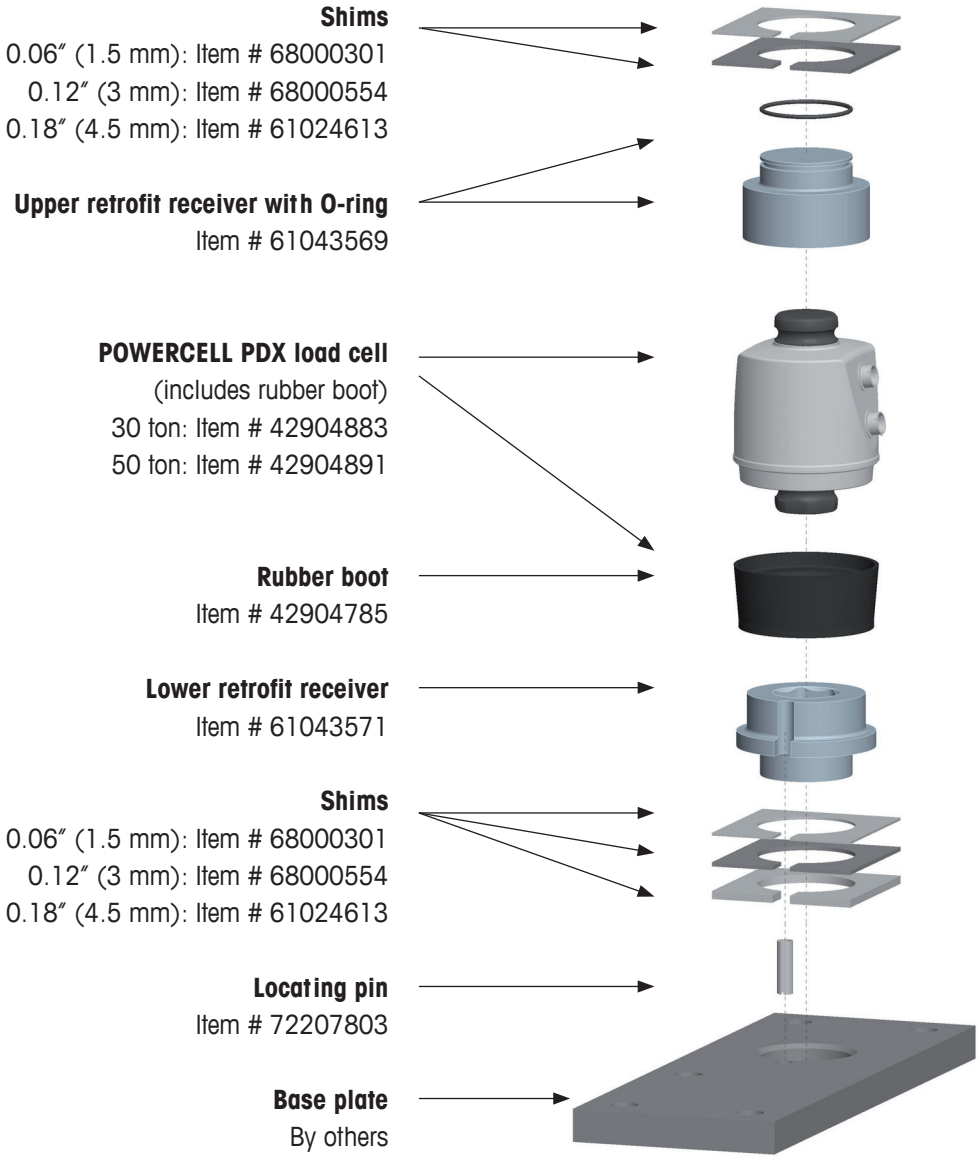
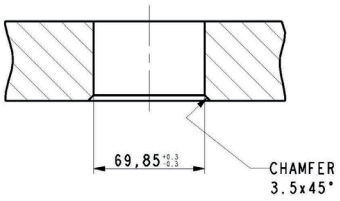


Figure 2-4: Assembly for Receiver Variant 2 "Retrofit"

2.3.2 Dimensions

Top receiver plate (cross section)
The thickness of the top receiver plate depends on the scale design.

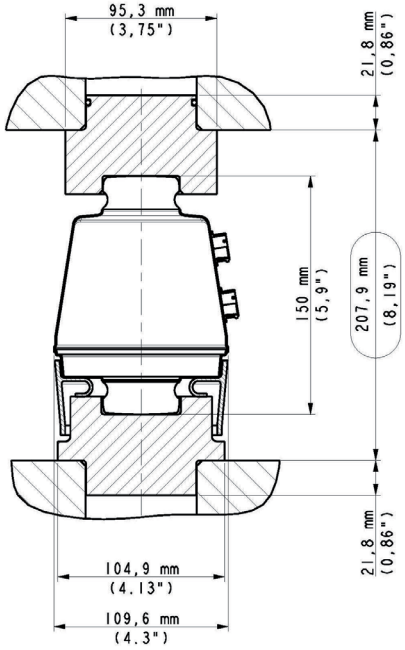
Ø 69.85-mm hole required for receiver.
With chamfer = 3.5 mm x 45°
Minimum depth = 25 mm



Load cell stack-up (cross section)
Dimension without shims.

Height from top surface of the base plate to the bottom surface of the top receiver plate = 207.9 mm.

Overall height = 251.5 mm
Maximum Ø = 109.6 mm (load cell)



Base plate (top view)
Size and thickness depends on the foundation design and stability.

Ø 69.85-mm hole required for receiver.
With chamfer = 3.5 mm x 45°
Minimum depth = 25 mm

Ø 12.7-mm hole required for locating pin.
Minimum depth = 20 mm

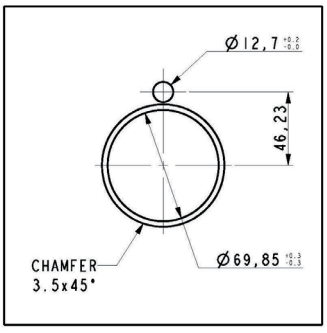


Figure 2-5: Dimensions for Receiver Variant 2 "Retrofit"

2.4 Cables

The POWERCELL® PDX® network is designed to minimize cable length and promote easy installation. No junction boxes are needed. POWERCELL PDX load cell cables are installed using quick-connect connectors, which produce an audible "click" when installed properly. Because each POWERCELL PDX load cell has two interface ports, the host terminal can be connected to the most conveniently accessible load cell in the network, and the "daisy chain" starts at that load cell. Each load cell is cabled to the next, until the last load cell in the network is connected. The cables can be connected to either port on the load cells. A termination connector and protective boot are secured to the last port of the last load cell to complete the chain. Corrosion-resistant, glass-to-metal connectors ensure a good cell-to-cell connection and resist environmental elements. The METTLER TOLEDO IND780 terminal can support a network with as many as 24 nodes (with an auxiliary power supply). With the IND780 terminal, these load cells can be parsed into four logically independent platforms.

Always refer to drawing TC100884x when installing a POWERCELL PDX load cell system. The "x" in the drawing number is a place holder for the revision number. The latest copy of this drawing is available from METTLER TOLEDO.

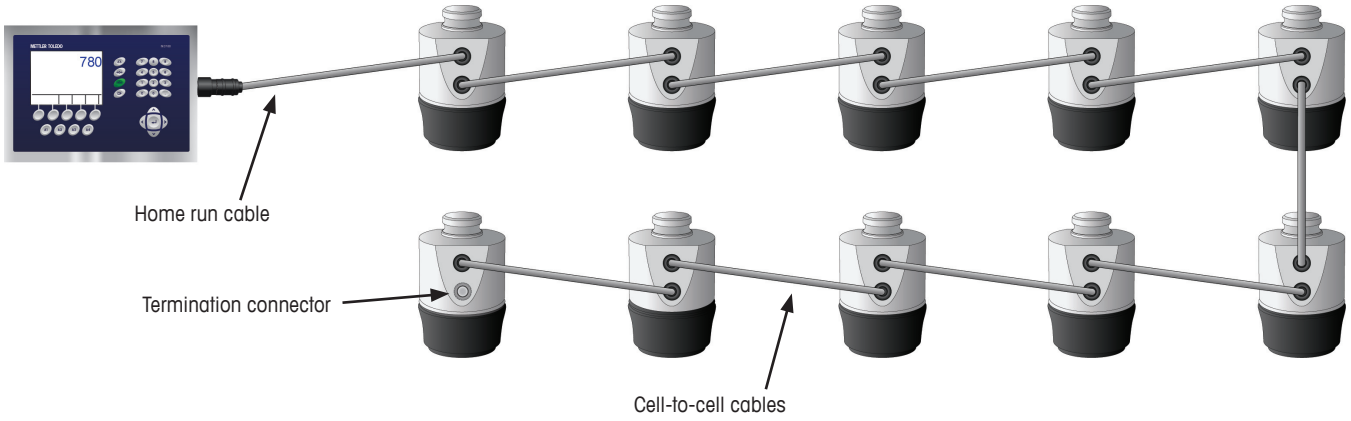


Figure 2-6: POWERCELL PDX Load Cell Network

NOTE: The cables that are required depend on the length and width of the scale and the position of conduits.

Recommended and minimum bend radii for these cables:

- Recommended: 4" (10 cm).
- Minimum: 2" (5 cm).

3 Installation

Installation Procedure

METTLER TOLEDO recommends the following procedure for installing POWERCELL PDX load cells. Some installation steps can vary slightly depending on the scale design. It is the technician's responsibility to install the load cells correctly.
METTLER TOLEDO has achieved the best results by positioning the whole scale before anchoring the base plates to the foundation. That procedure, which requires using locating tools, is described in this chapter.
A summary of the essential installation steps is provided at the end of this chapter.

3.1 Foundation Requirements

All base plates for the load cells must be level and in the same plane for accurate and repeatable weighing. Shims can be added under the receivers to level the scale. METTLER TOLEDO recommends that the top of the foundation at the base plate locations be level and in one plane (within ± 3 mm).

Snap a chalk line on the foundation to mark the location of each side of the scale from approach coping to approach coping.

- These chalk lines will be used to align the modules as they are set in place.
- Check the distance between the approach copings against the foundation drawing to ensure that there is sufficient room for the scale.
- Check the diagonal measurements to ensure that the foundation is square. If the foundation is not square, it could prevent you from installing the scale or cause weighing errors after the scale is installed. Refer foundation problems to the customer or customer's contractor for correction.

3.2 Positioning Base Plates

Roughly position the base plates on the foundation at the chalk lines. Refer to the scale's general layout drawing for the correct position of the load cell axes.

3.3 Installing Locating Pins

Variant 1 "Standard"

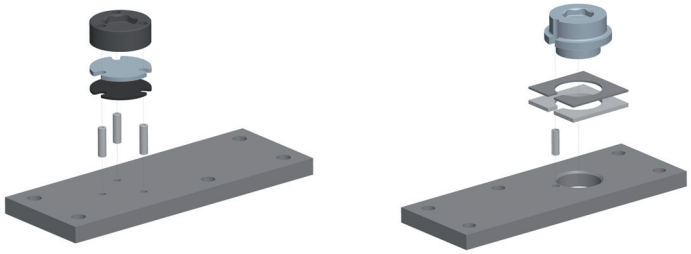
Install three locating pins (socket-head pins) in each base plate.

- Grease the threads of the pins with Loctite® 242® threadlocker.
- Insert the M12x1.75 threaded ends into the base plate.
- Firmly tighten the pins with a 6-mm "Allen" or hex-head wrench.

Variant 2 "Retrofit"

Install a roll pin in each base plate.

- Insert the tapered end first.
- Tap the pin with a small hammer until it is completely vertical.
- Do not hammer the pin completely into/through the base plate hole until the receiver has been installed.



Variant 1 Variant 2

Figure 3-1: Locating Pin Installation

3.4 Installing Lower Receivers

Variant 1 "Standard"

Place one lower receiver on each base plate, aligning the holes with the locating pins.

- Make sure there are no stones or debris between the receiver and base plate

Variant 2 "Retrofit"

Use anti-seize compound to grease the lower receivers and insert one into each of the base plates, aligning the notch with the roll pin.

- Make sure that all receivers are snug in the base plate by visually inspecting for a gap. If you find a gap, place a piece of hard wood above the receiver and gently hammer it until the receiver is seated properly.

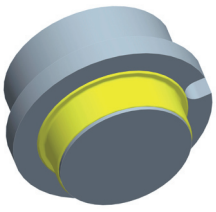


Figure 3-2: Lower Receiver (Variant 2)

3.4.1 Measuring and Shimming

Shims are used to balance (or equalize) the scale mechanically, removing any inconsistencies in the level of the foundation or scale.
Use a transit to check the elevation of the receiver at each base plate location.

- Make sure that all receivers are at the same height and the scale will not be above or below the horizontal plane formed by the approaches. To check this accurately, rest the measuring rod on the top surface of the receiver at each base plate location.
- Use a spirit level to verify that all base plates are level in both planes.
- If the plates are not level, grind the concrete (below the base plate in the locations where the plates are too high) and/or add shims until the plates are level in both directions.
- Do not exceed the following shimming thickness at the lower receivers:
  Variant 1 "standard" = maximum 12 mm (bottom receiver only)
  Variant 2 "retrofit" = maximum 18 mm (split between the top and bottom receivers)
  If you need to shim more than these amounts, shim between the base plate and foundation.

Notes:

- When shimming, always ensure that the top of the scale and the approach are in the same plane to ± 4 mm.
- The scale should be shimmed as closely as possible to the correct height in order to achieve the best repeatability and accuracy. Shimming to within 1 mm saves time during calibration because it ensures that the scale load is well distributed across all the load cells.

3.5 Installing Upper Receivers

Use anti-seize compound to grease the upper (top) receivers and insert a receiver into each load cell receiver plate on the scale.

- The large O-ring on the receiver will hold it in place. Make sure the receiver is inserted correctly by verifying that it is not tilted.
- The receiver should rest firmly on the receiver block. If it does not, make sure that it is not skewed and then gently tap the receiver into place with a block of wood and a hammer.

3.6 Inserting Locating Tools

METTLER TOLEDO recommends using locating tools because this is the most accurate method of positioning the scale and base plates. It ensures that the load cells are positioned vertically and reduces installation time. Other methods, such as adjusting by sight or by spirit level, generally deliver poor results because they do not guarantee that the load cells will be correct in all axes.

Variant 1 "Standard"
Insert a locating tool into each lower receiver. Check for proper seating by looking for a gap in the receiver shoulder and the base plate.

Variant 2 "Retrofit"
Insert a locating tool into each lower receiver, aligning the notch with the locating pin. Check for proper seating.

Variant 1 Variant 2

Figure 3-3: Locating Tools

NOTE: The locating tools for receiver variant 2 are slightly longer than the POWERCELL PDX load cells with receivers. This will cause the deck of the scale to be higher when the scale is installed for positioning the base plates (described in the next step).

3.7 Installing Scale Modules

⚠ CAUTION

DANGER OF BODILY HARM OR PROPERTY DAMAGE!

- When a module is being moved, do not place your fingers or other body parts 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.

The installation procedure of the scale depends on the scale design. Refer to the scale's installation manual for the recommended method of placing and coupling the scale modules.

1. Slowly lower the module onto the locating tools, lowering the approach end first.
2. Check the module's alignment with the chalk line snapped on the foundation.
3. Inspect the locating tools to make sure they are seated properly. If there is a gap between the shoulder and the receiver, use a large hammer to tap the side of the base plate (on the side with the gap) until the locating tool seats firmly. You will hear a definite "crash" sound when it seats.
4. Test all positions. When you are satisfied that all base plates are aligned properly, proceed to the next step.

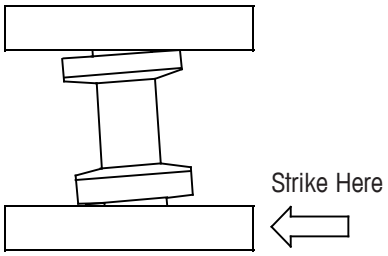


Figure 3-4: Adjusting the Locating Tool

3.8 Removing Locating Tools

⚠ CAUTION

FOR SAFTY REASONS DO NOT REPLACE MORE THAN ONE LOAD CELL AT A TIME.

Remove a locating tool and replace it with a load cell, using the procedure described in the following two steps. Repeat the procedure until all load cells have been installed.

1. Jack up the module and remove the locating tool.
2. Fill the lower receiver with multi-purpose grease (item # 68004326, included with the load cell kit).
3. If you need to adjust the height of the deck, add or remove shims at this time. Do not exceed the following recommended maximum shimming at a load cell or the receiver could become dislodged:
   12 mm for Variant 1 (do not place any shims at the upper receiver)
   18 mm for Variant 2 (do not place more than 9 mm of shims at the upper or lower receiver)

NOTE: If additional shimming is needed, place shims between the foundation and the base plate. This type of shim must be sourced locally; it is not supplied with the scale.

Final shimming should be determined by viewing each load cell's output after addressing the load cells, but before calibrating the scale.

3.9 Installing Load Cells

METTLER TOLEDO recommends positioning the load cells with the serial numbers in sequence so that the lowest number is installed at the first location and the highest number at the final location (see Figure 3-5).

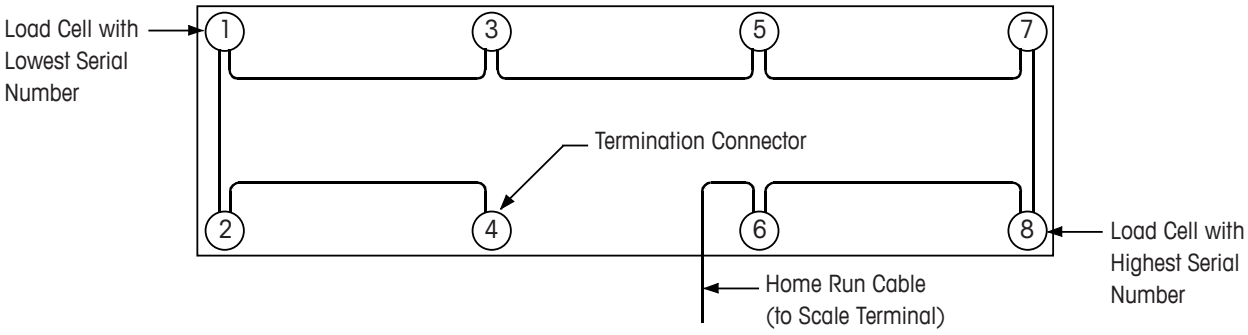


Figure 3-5: Cable Routing for POWERCELL PDX Load Cell Network

1. Apply multi-purpose grease to the load surface of the cell buttons at the top and bottom of the POWERCELL PDX load cell.
2. Place the hex end of the load cell into the lower receiver, ensuring that that the two hex surfaces mate.
3. Make sure the cable connectors point toward the outside of the scale and are oriented 30° out and away for the best cable routing.
4. Make sure the hex surface of the load cell is aligned properly with the hex surface of the lower receiver. To check alignment, rotate the load cell with your hand. The load cell should rotate freely several degrees.
5. Gently lower the module onto the load cell, ensuring that the top end of the load cell is seated inside the receiver socket.

NOTE: To keep the load cell connectors clean, leave the caps on the connectors until you are ready to install the cables.

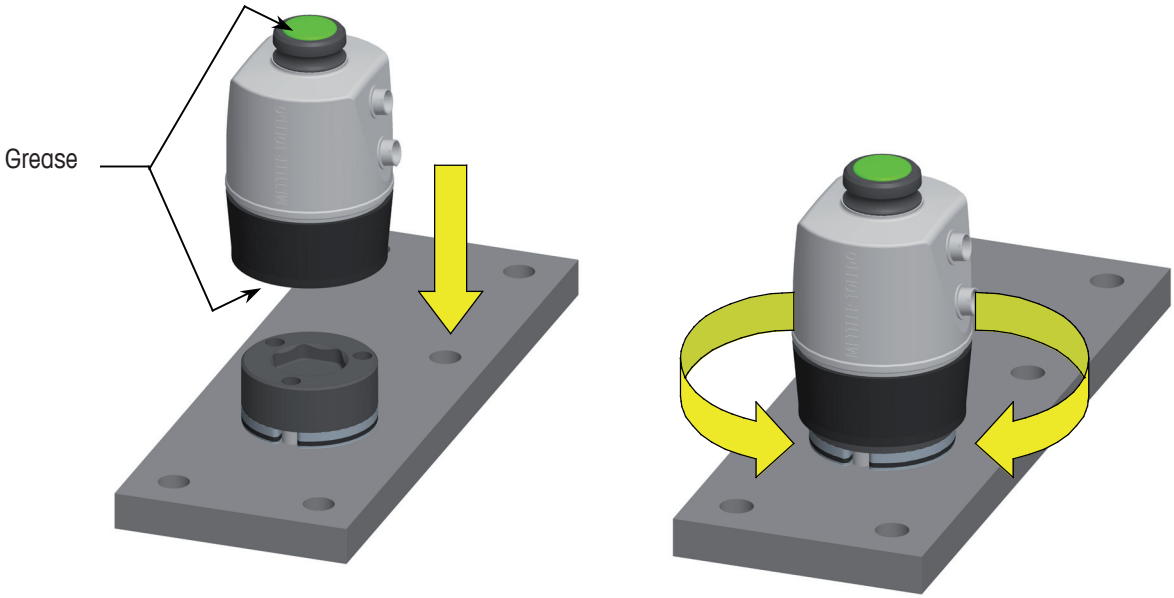


Figure 3-6: Installing the Load Cell

3.10 Cabling

⚠ CAUTION

POOR CONTACTS:

- Keep all electrical parts absolutely dry on the inside and as dry as possible on the outside.
- If the cable ends will be exposed to the weather for a long period (not connected to the load cell), apply dielectric compound, cover the cable ends with plastic, and secure the open end with duct tape.

3.10.1 General Information

- Determine how the cabling will be routed. The load cell in the most convenient position can take the home run cable input. A daisy-chain network must be created from this point with a terminating connector on the last load cell.
- Route the cables through conduits to connect the daisy chain.
- Secure the cables to the modules with wire ties so the cables are off the ground.

Dress the cables to form a drip loop at a point before the cables connect to the load cells.

- Water collecting on a cable will travel along the cable to its lowest point before reaching connectors or seals.
- It is important that the load cell cable allows the load cell to move freely. The drip connection should behave like a spring.
- A straight connection (no drip loop) could cause premature cable failure by putting excessive pulling-stress on the cable end.

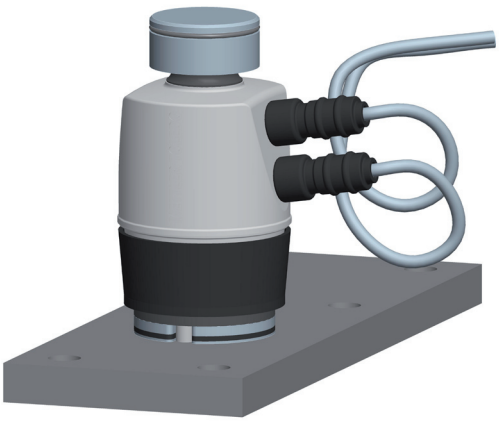


Figure 3-7: Dressing the Load Cell Cables

3.10.2 Connecting the Home Run Cable

1. Connect the home run cable to the POWERCELL PDX load cell as described in the procedure for connecting load cell cables.
2. Connect the home run cable to the terminal as described in the terminal's manual.

Notes:

- See the wiring diagram for maximum home run cable length.
- Use only home run cables approved by METTLER TOLEDO (see Chapter 4 for available cable lengths).

⚠ CAUTION

RISK OF COMMUNICATION FAILURES DUE TO EXPOSED STRANDS OF WIRES

- Make sure that no stray conductors are left unsecured. Exposed strands of wires can lead to communication failures if they bridge the connection in the terminal block.

3.10.3 Connecting Load Cell Cables

POWERCELL PDX cables are not integrally attached to the load cells. This allows easy replacement of a damaged cable or load cell (where permitted) without the need for recalibration.

1. Inspect each load cell and cable connector.
    - Dielectric compound is applied inside the load cell connector at the factory. This compound provides an additional moisture barrier for the contacts.
    - Remove the transportation caps from the connectors on the load cell and cable.
    - Inspect both connectors to determine if they are free from foreign material or dirt. Remove any foreign objects. Ensure that the pins in the load cell are straight. The connector must be correctly and completely seated so the gasket will seal out all moisture.

⚠ CAUTION

PROBLEMS WITH CONNECTING CABLES

- Do not apply dielectric compound to new load cells or cable connectors (it is already applied at the factory).

2. Connect the cable connector to the load cell.
   - To secure the connection, press the connector inward and turn the connector ring clockwise. There will be an audible click when the connector is properly closed.
     Tip: Simultaneously push in (toward the load cell) and twist the connector to get it to seat/unseat properly.
   - Do not use wrenches or pliers on the load cell or cables. If the fit is correct and free of foreign material, you should be able to assemble the connection easily by hand (insert the cable connector and then twist the connector ring).
   - The connector is keyed in the proper orientation. The key inside the lower connector is positioned 180° opposite of the top connector (see Figure 3-8).
   - If your view is obstructed, twist the cable to feel the position of the key. Once the key is aligned, the connector will slip in easily (don't force it).
   - The two connectors on the POWERCELL PDX load cell are interchangeable and can take either an incoming or outgoing cable.

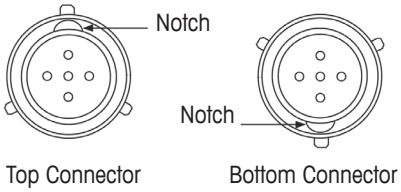


Figure 3-8: Load Cell Cable Connectors

3. Push the rubber connector boot forward over the load cell connector to protect the connector from dirt and ice.
   - Make sure the connection is free of any foreign material except the dielectric compound that has been applied by METTLER TOLEDO.
   - Leave enough slack in the cable so that the load cell can move freely. If the cable is too tight, it can break when the scale moves.

3.11 Shimming

When all cables have been connected, address the load cells electronically (according to the technical manual for a compatible scale terminal such as IND560 or IND780). After addressing the load cells via the terminal, follow the mechanical shimming procedure.
The shimming procedure used during installation should have provided the optimal mechanical installation. Now it is possible to make small corrections by verifying the output of each load cell.

NOTE: Do not electronically shift adjust the scale (load cells) until you are sure you have mechanically shimmed all load cells according to the following steps.

3.11.1 Prerequisites

Before starting the shimming sequence, the following conditions must be fulfilled:

- Each load cell is addressed in accordance to the terminal's technical manual.
- The load cells have warmed up for approximately 1/2 hour. That allows the electronics to reach their optimal operating temperature. If the scale has not warmed up sufficiently, you will notice some drift in the load cell output.
- In the scale terminal, the values of the shift constant for each load cell should be 1 (not adjusted). Failure to make sure that these values are set to 1 will significantly lengthen the calibration time.
- During installation you should have shimmed the base plates so that the scale is level with the approach. If the scale is still below the approach, shim the receivers until the scale is the required height.
- Make sure that you know the proper location of each cell in your scale and that cells 1, 2, 3, and 4 are supporting the first (or starting) module of the scale.

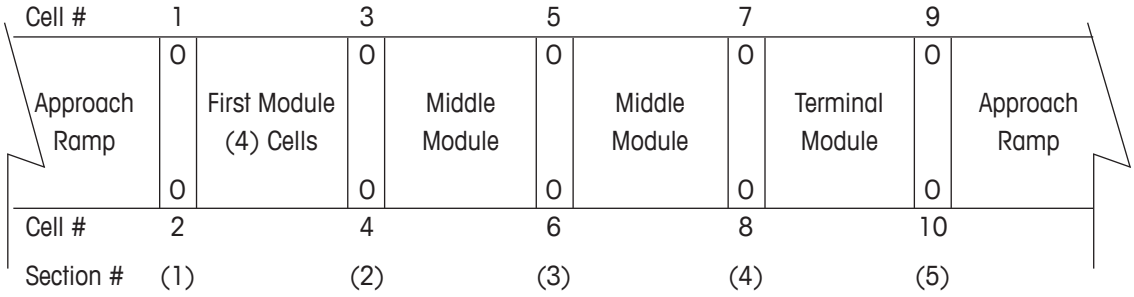


Figure 3-9: Recommended Load Cell Numbering

3.11.2 Load Distribution

Due to the differences in weight loading, the pairs of cells under middle modules will transmit double the weight of the pairs at the approach ends of the scale. That is because cells 3 and 4 are carrying half the weight of both the starter module and the middle module, while cells 1 and 2 are carrying only half the weight of the starter module. The weight on cells 3 and 4 is about double that on cells 1 and 2.

Ideally, the pairs of cells in a section should have the same load and corresponding output (for example, 1–2, 3–4, 5–6, etc.).

Both the 30t and 50t POWERCELL PDX load cells will transmit 0.1 kg per count as their minimum value; however, the terminal will allow you to decrease the sensitivity if you wish.

3.11.3 Shimming Sequence

Each load cell in the section pair should see the same amount of weight. Otherwise, the scale is not mechanically balanced and requires shimming. Shimming should be done with test weights or a service vehicle to ensure the best results.
Shimming to a lower percentage than the 20% mentioned below improves calibration and scale performance.
Example: A typical 18-meter concrete weighbridge weighs about 33 tons. If the bridge were evenly balanced, you would see 2750 kg on each of the end load cells and 5500 kg on the middle cells. If you were to use a test mass of 3 tons to perform a shift test, the end cells would increase their output to 5750 kg (2750 kg + 3000 kg) and the middle cells would increase their output to 8500 kg (5500 kg + 3000 kg).

Ideal values with shift test load applied:

Cell 1 5750	**Cell 3** 8500	**Cell 5** 8500	**Cell 7** 5750
Cell 2 5750	**Cell 4** 8500	**Cell 6** 8500	**Cell 8** 5750

Observed values with shift test load applied:

Cell 1 5000	**Cell 3** 8500	**Cell 5** 8500	**Cell 7** 5750
Cell 2 5900	**Cell 4** 8600	**Cell 6** 8500	**Cell 8** 5750

The difference between the highest and lowest observed values would be 3600 kg (8600 kg – 5000 kg). Twenty percent of the difference would be 720 kg (3600 kg * 0.2). Cell 1 indicates the lowest amount of weight because it is not being loaded as much as its peers, so it should be shimmed until the weight indicates a higher value not to exceed 5720 kg (the actual value of 5000 kg + the target shift value of 720 kg). Add mechanical shims and retest this cell with the test load. You should notice that the load on cell 1 increased and the loads on cells 2, 3 and 4 may have decreased. Perform this test again until the scale meets your desired condition.
If you didn't reach your target value, jack up the module and add another shim. If you exceeded your target value when shimming, replace the shim that you used with the next thinner size.
NOTES:

- Remember that most of the time an uneven load is caused by an uneven foundation. In some cases, the scale might also be uneven (more frequently with concrete scales because they are stiffer).
- If you don't mechanically shim the scale, you might experience problems with repeatability and with calibration. Neither problem is related to the load cells.
- Performing mechanical shimming will speed up calibration.

3.11.4 Calibration and Shift Adjustment

Instructions for programming and calibrating the scale terminal can be found in the terminal's manual. Capacity and increment size vary depending on local law. Higher capacities and resolution are available on request.
NOTES:

- Both the 30t and 50t POWERCELL PDX load cells transmit 0.1 kg per count ("d").
- You will usually see double the indication on the middle load cells because one load cell pair is supporting two modules.
- If you notice a change when driving in one direction and then in another, you need to check that all your load cells have a value of 1 and then repeat the shimming procedures.

3.12 Installation Summary

METTLER TOLEDO recommends using the installation procedure in this chapter for POWERCELL PDX load cells. Some installation steps can vary depending on the scale design.
The following steps are essential:

- Check foundation to ensure that base plate locations are level and in one plane.
- Mark positions of base plates and place base plates on foundation (do not attach them yet). If base plates are already attached to foundation, make sure they are positioned correctly.
- Insert locating pins or roll pins into base plates.
- Grease lower receivers and set them into base plates. Check for proper seating.
- Check elevation of lower receivers and add shims if necessary.
- Grease upper receivers and set them into the scale. Check for proper seating.
- Apply load cell lubricant to top and bottom buttons of load cells.
- Position each load cell with its hex end in the lower receiver. Make sure the cable connector points toward the outside of the scale.
- Gently lower the module onto the load cell. Make sure that the top end of the load cell is seated inside the receiver socket.
- Connect all cables and ensure correct seating.
- Commission the electronics of scale according to technical manual.
- Add shims until the output of each load cell is within the required range.

For programming and calibration, refer to the terminal's manual.

4 Service Parts

4.1 Item Numbers

Item Number	Description	Spare Part	Service Part (Included)[1]	Likely to be Replaced[2]
POWERCELL PDX Load Cells (includes rubber boot)				
42904883	30t POWERCELL PDX Load Cell, H44 + OIML C3	X		
42904884	30t POWERCELL PDX Load Cell, OIML C4	X		
42904885	30t POWERCELL PDX Load Cell, OIML C6	X		
42904891	50t POWERCELL PDX Load Cell, H44 + OIML C3	X		
42904892	50t POWERCELL PDX Load Cell, OIML C4	X		
42904785	Rubber Boot (supplemental)			X
Receivers and Shims (new PDX style)				
61043498	Lower Receiver, Standard	X		X
61043499	Upper Receiver, Standard	X		X
61043497	Locating Hex Pin, Lower Receiver (3 per receiver)	X		
61043489	Receiver Shim, 1/4″ (6 mm)		X	
61043490	Receiver Shim, 1/8″ (3 mm)		X	
61043491	Receiver Shim, 1/16″ (1.5 mm)		X	
Receivers and Shims (POWERCELL and MTX retrofit style)				
61043569	Upper Receiver, Retrofit, 45t	X		X
61043571	Lower Receiver, Retrofit, 45t	X		X
72207803	Locating Roll Pin, Lower Receiver (not new)	X		
68000554	Receiver Shim, 0.12″ (3 mm)		X	
68000301	Receiver Shim, 0.06″ (1.5 mm)		X	
61024613	Receiver Shim, 0.18″ (4.5 mm)		X	
Auxiliary Materials				
61043093	Locating Tool (new PDX style)			
61007565	Locating Tool (POWERCELL and MTX retrofit style)			
68004326	Multi-purpose Grease (not new)		X	
68004320	Dielectric Compound (not new)		X	

Item Number	Description	Spare Part	Service Part (Included)[1]	Likely to be Replaced[2]
Cell-to-Cell Cables				
61043480	POWERCELL PDX Load Cell Cable, 2 meters	X		X
61043523	POWERCELL PDX Load Cell Cable, 4 meters	X		X
61043481	POWERCELL PDX Load Cell Cable, 5 meters	X		X
61043482	POWERCELL PDX Load Cell Cable, 7 meters	X		X
61043483	POWERCELL PDX Load Cell Cable, 8 meters	X		X
61043484	POWERCELL PDX Load Cell Cable, 9 meters	X		X
61043485	POWERCELL PDX Load Cell Cable, 10 meters	X		X
61043486	POWERCELL PDX Load Cell Cable, 11 meters	X		X
61043487	POWERCELL PDX Load Cell Cable, 12 meters	X		X
61043488	POWERCELL PDX Load Cell Cable, 24 meters	X		X
61043496	Termination Connector	X		X
Home Run Cables				
61044730	POWERCELL PDX Home Run Cable, 10 meters	X		X
61044731	POWERCELL PDX Home Run Cable, 20 meters	X		X
61044732	POWERCELL PDX Home Run Cable, 30 meters	X		X
61044733	POWERCELL PDX Home Run Cable, 40 meters	X		X
61044734	POWERCELL PDX Home Run Cable, 50 meters	X		X
61044735	POWERCELL PDX Home Run Cable, 60 meters	X		X
61044736	POWERCELL PDX Home Run Cable, 70 meters	X		X
61044737	POWERCELL PDX Home Run Cable, 80 meters	X		X
61044738	POWERCELL PDX Home Run Cable, 90 meters	X		X
61044739	POWERCELL PDX Home Run Cable, 100 meters	X		X
61044740	POWERCELL PDX Home Run Cable, 110 meters	X		X
61044741	POWERCELL PDX Home Run Cable, 120 meters	X		X
61044742	POWERCELL PDX Home Run Cable, 130 meters	X		X
61044748	POWERCELL PDX Home Run Cable, 140 meters	X		X
61044749	POWERCELL PDX Home Run Cable, 150 meters	X		X
61044750	POWERCELL PDX Home Run Cable, 160 meters	X		X
61044751	POWERCELL PDX Home Run Cable, 170 meters	X		X
61044752	POWERCELL PDX Home Run Cable, 180 meters	X		X
61044753	POWERCELL PDX Home Run Cable, 190 meters	X		X
61044754	POWERCELL PDX Home Run Cable, 200 meters	X		X
61044755	POWERCELL PDX Home Run Cable, 210 meters	X		X
61044757	POWERCELL PDX Home Run Cable, 220 meters	X		X
61044758	POWERCELL PDX Home Run Cable, 230 meters	X		X
61044759	POWERCELL PDX Home Run Cable, 240 meters	X		X
61044760	POWERCELL PDX Home Run Cable, 250 meters	X		X
61044761	POWERCELL PDX Home Run Cable, 260 meters	X		X
61044762	POWERCELL PDX Home Run Cable, 270 meters	X		X
61044763	POWERCELL PDX Home Run Cable, 280 meters	X		X
61044764	POWERCELL PDX Home Run Cable, 290 meters	X		X
61044765	POWERCELL PDX Home Run Cable, 300 meters	X		X

[1] These are reference part numbers for parts that ship with the POWERCELL PDX load cell system and are required for installation.
[2] These are spare parts that are subject to potential wear and replacement over the life of the scale.

4.2 MTMS Part Numbers

Item Number	Description	Trade Name / Part Number
POWERCELL PDX Load Cells (includes rubber boot)		
42904883	30t POWERCELL PDX Load Cell, H44 + OIML C3	42904883-MTMS
42904884	30t POWERCELL PDX Load Cell, OIML C4	42904884-MTMS
42904885	30t POWERCELL PDX Load Cell, OIML C6	42904885-MTMS
42904891	50t POWERCELL PDX Load Cell, H44 + OIML C3	42904891-MTMS
42904892	50t POWERCELL PDX Load Cell, OIML C4	42904892-MTMS
42904785	Rubber Boot (supplemental)	
Receivers and Shims (Variant 1 Standard)		
61043498	Lower Receiver, Standard	TA207197
61043499	Upper Receiver, Standard	TA207633
61043497	Locating Hex Pin, Lower Receiver	TN207198
61043489	Receiver Shim, 1/4" (6 mm)	TA207315-1
61043490	Receiver Shim, 1/8" (3 mm)	TA207315-2
61043491	Receiver Shim, 1/16" (1.5 mm)	TA207315-3
Receivers and Shims (Variant 2 Retrofit)		
61043569	Upper Receiver, Retrofit, 45t	TA314817
61043571	Lower Receiver, Retrofit, 45t	TA314818
72207803	Locating Roll Pin, Lower Receiver	MZ0904000063
68000554	Receiver Shim, 0.12" (3 mm)	TA200833-1
68000301	Receiver Shim, 0.06" (1.5 mm)	TA200833-2
61024613	Receiver Shim, 0.18" (4.5 mm)	TA200833-3
Auxiliary Materials		
61043093	Locating Tool (Variant 1 Standard)	TA207484
61007565	Locating Tool (Variant 2 Retrofit)	
68004326	Multi-purpose Grease	TN203217
68004320	Dielectric Compound	TN203256

Item Number	Description	Trade Name / Part Number
Cell-to-Cell Cables		
61043480	POWERCELL PDX Load Cell Cable, 2 meters	TA000233-002
61043481	POWERCELL PDX Load Cell Cable, 5 meters	TA000233-005
61043482	POWERCELL PDX Load Cell Cable, 7 meters	TA000233-007
61043483	POWERCELL PDX Load Cell Cable, 8 meters	TA000233-008
61043484	POWERCELL PDX Load Cell Cable, 9 meters	TA000233-009
61043485	POWERCELL PDX Load Cell Cable, 10 meters	TA000233-010
61043486	POWERCELL PDX Load Cell Cable, 11 meters	TA000233-011
61043487	POWERCELL PDX Load Cell Cable, 12 meters	TA000233-012
61043488	POWERCELL PDX Load Cell Cable, 24 meters	TA000233-024
61043496	Termination Connector	TN000235
Home Run Cables		
61044730	POWERCELL PDX Home Run Cable, 10 meters	TA000237-010
61044731	POWERCELL PDX Home Run Cable, 20 meters	TA000237-020
61044732	POWERCELL PDX Home Run Cable, 30 meters	TA000237-030
61044733	POWERCELL PDX Home Run Cable, 40 meters	TA000237-040
61044734	POWERCELL PDX Home Run Cable, 50 meters	TA000237-050
61044735	POWERCELL PDX Home Run Cable, 60 meters	TA000237-060
61044736	POWERCELL PDX Home Run Cable, 70 meters	TA000237-070
61044737	POWERCELL PDX Home Run Cable, 80 meters	TA000237-080
61044738	POWERCELL PDX Home Run Cable, 90 meters	TA000237-090
61044739	POWERCELL PDX Home Run Cable, 100 meters	TA000237-100
61044740	POWERCELL PDX Home Run Cable, 110 meters	TA000237-110
61044741	POWERCELL PDX Home Run Cable, 120 meters	TA000237-120
61044742	POWERCELL PDX Home Run Cable, 130 meters	TA000237-130
61044748	POWERCELL PDX Home Run Cable, 140 meters	TA000237-140
61044749	POWERCELL PDX Home Run Cable, 150 meters	TA000237-150
61044750	POWERCELL PDX Home Run Cable, 160 meters	TA000237-160
61044751	POWERCELL PDX Home Run Cable, 170 meters	TA000237-170
61044752	POWERCELL PDX Home Run Cable, 180 meters	TA000237-180
61044753	POWERCELL PDX Home Run Cable, 190 meters	TA000237-190
61044754	POWERCELL PDX Home Run Cable, 200 meters	TA000237-200
61044755	POWERCELL PDX Home Run Cable, 210 meters	TA000237-210
61044757	POWERCELL PDX Home Run Cable, 220 meters	TA000237-220
61044758	POWERCELL PDX Home Run Cable, 230 meters	TA000237-230
61044759	POWERCELL PDX Home Run Cable, 240 meters	TA000237-240
61044760	POWERCELL PDX Home Run Cable, 250 meters	TA000237-250
61044761	POWERCELL PDX Home Run Cable, 260 meters	TA000237-260
61044762	POWERCELL PDX Home Run Cable, 270 meters	TA000237-270
61044763	POWERCELL PDX Home Run Cable, 280 meters	TA000237-280
61044764	POWERCELL PDX Home Run Cable, 290 meters	TA000237-290
61044765	POWERCELL PDX Home Run Cable, 300 meters	TA000237-300

5 Specifications

Parameters		Unit of Measure	Specification				
Trade Name			POWERCELL PDX				
Model Number			SLC820				
Load Cell Type			Column Compression, Digital Weight Processor (DWP)				
Rated Capacity (R.C.) 1		t (klb, nominal)	30 (66)		50 (110)		
Sensitivity at R.C.		d @ R.C.	300,000		500,000		
Communication			Controller Area Network (CAN), Encrypted				
Communication Rate		kbit/sec	125				
Effective System Update Rate (14 cells)		Hz	40				
Effective System Update Rate (24 cells)		Hz	15				
Weighing Performance							
Cable Length, Cell to Cell (typical)		m (ft)	5, 12 (16, 39)				
Cable Length, Home Run (maximum)		m (ft)	100, 200, 300 (328, 656, 984)				
Warm-up Time from Cold Start		minutes	15				
Effect of Cable Length on System Accuracy		kg	0				
Temperature Effect on Minimum Dead Load Output		Vmin/ºC (…/ºF)	0.8/5ºC (0.8/9ºF)				
Temperature Range	Compensated[2]	ºC (ºF)	-10 to +40 (+14 to +104)				
	Operating	ºC (ºF)	-30 to +55 (-22 to +131)				
	Safe Storage	ºC (ºF)	-40 to +80 (-40 to +176)				
Humidity Effect, Continuous		100% RH	0				
Barometric Pressure Effect on Zero Load Output		Vmin/kPa	< 1				
Metrology	Linearity[3]	ppm R.C.	< 100				
	Hysteresis	ppm R.C.	< 160				
	Combined Error[3]	ppm R.C.	< 300				
		Class	C3	C4	C6	C3	C4
Temperature Effect on	Span[3, 4]	ppm R.C./ºC	<±13.3	<±10.0	<±6.6	<±13.3	<±10.0
Creep at R.C.4	10s to 30m	ppm R.C.	<±167	<±125	<±83	<±167	<±125
Zero Return4	30 min at R.C.	ppm R.C.	<±167	<±125	<±83	<±167	<±125
Nonrepeatability		ppm R.C.	<± 50				
Zero Balance		%R.C.	< 0.1				
Predictive Diagnostics (System)							
Breach Detection			Loss of Hermetic Seal				
Maximum Overload			Maximum Overload				
Load Cell Temperature			Minimum, Maximum, Actual				
Asset Management			Serial Number				
Load Cell Voltage			Minimum, Maximum, Actual				
Communication Signal Level			High, Low				
Tilt Angle			Current Position, Maximum Recorded				

[1] R.C. = Rated or full capacity as specified on the data plate.
[2] Certified according to approval agency or notified body (third party).
[3] The combined error of span, linearity error, and hysteresis will not exceed 80% of the error limits for OIML R60.
[4] TC of span, creep, and creep return for HB44 typically meet OIML C3 performance.

Parameters		Unit of Measure	Specification				
Metrological Approvals							
European/OIML Approval[5]	Number		TC7579; T2206; R60/2000-NL1-09:08				
	Class		C3	C4	C6	C3	C4
	nmax		3000	4000	6000	3000	4000
	Y		6383	12,500	20,000	8772	12,500
	Vmin	kg	4.7	2.4	1.5	5.7	4.0
	pLC		0.8 (Terminal = 1)				
	Humidity Symbol		CH (Hermetic Seal)				
	Min. Dead Load	kg	50				
NTEP Approval[5]	Number		NTEP 08-090				
	Class		III L-M				
	nmax		10,000				
	Vmin (typical)	kg	1.8		2.2		
	Min. Dead Load	kg (lb)	50 (110)				
Hazardous Area							
(in process)							
Electrical							
Supply Voltage Regulated in the Load Cell	Typical	V DC	12 or 24 (external supply)				
	Minimum/Maximum	V DC	12/24				
Lightning Protection[6]	Max. Tested (IEEE4-95)	A	> 80,000				
Insulation Resistance @ 50VDC		M_	> 2000				
Breakdown Voltage V AC > 500							
Mechanical							
Material	Spring Element		17-4 PH Stainless Steel (magnetic)				
	Enclosure		Electropolished 304 Stainless Steel				
	Low-Profile Receivers		17-4 PH Forged and Machined Stainless Steel, Hardened				
	Anti-Rotation		6-Point Hexagonal				
	Cable Entry Fittings		Stainless Steel, Laser Welded				
	Cable, Load Cell		Braided Stainless Steel, Oil Resistant, 9mm, 5 Conductors, Internal/External Shielded with Drain Wires				
	Cable, Home Run		Braided Stainless Steel, Oil Resistant, 9mm, 5 Conductors, Internal/External Shielded with Drain Wires				
	Connectors		Quick-Connect, Stainless Steel, Glass-to-Metal				
Protection	Type		Hermetic (submersible)				
	IP Rating		IP68 (1m - 7 days submersion), IP69K test reports on file				
	NEMA Rating		NEMA 6P (submersible)				
Load Limit	Safe	%R.C.	200				
	Ultimate	%R.C.	300				
Safe Dynamic Load		%R.C.	70				
Direction of Loading			Compression				
Deflection @ R.C., typical		mm (in)	0.51 (0.020)		0.71 (0.028)		
Horizontal Restoring Force		%A.L./mm[7]	1.82				
Shipping Weight, nominal		kg (lb)	3.0 (6.6)		3.2 (7.0)		

[5] See certificate for complete information.
[6] Tested by Elektro Swiss AG (40,000A) and Lightning Technologies, Inc. (80,000A).
[7] Percent of the vertical applied load (A.L.) per mm of displacement..

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