METTLER TOLEDO

2185

Scale Base

Technical Manual

TM 002185I02

INTRODUCTION

Information regarding Toledo Scale technical training may be obtained by writing:

TOLEDO SCALE COMPANY
INDUSTRIAL TRAINING
P.O. BOX 1705
COLUMBUS, OHIO 43216

WARNING

BEFORE GAINING ACCESS TO ANY INTERNAL PARTS OF THE SCALE, ALWAYS REMOVE POWER FROM THE UNIT BY UNPLUGGING THE AC POWER CORD. BEFORE PERFORMING ANY SERVICE ON THIS EQUIPMENT, THIS MANUAL MUST BE REVIEWED AND UNDERSTOOD.

THIS MODULE AND ITS ASSOCIATED EQUIPMENT MUST BE INSTALLED, ADJUSTED, AND MAINTAINED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL EQUIPMENT IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY.

WHEN THIS EQUIPMENT IS INCLUDED AS A COMPONENT PART OF A SYSTEM, THE RESULTING DESIGN MUST BE REVIEWED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL COMPONENTS IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

IF THIS DEVICE IS USED IN AN AUTOMATIC OR MANUAL FILLING CYCLE, ALL USERS MUST PROVIDE A HARD WIRED EMERGENCY STOP CIRCUIT OUTSIDE THE MODEL 2185 CIRCUITRY. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

TOLEDO SCALE RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT PREVIOUS WRITTEN NOTICE.

INDEX

CONSTRUCTION	FACTORY NUMBER	LOAD CELL CAPACITY	MAXIMUM GROSS SCALE CAPACITY
General Purpose Steel	2185-0011	500 lb	330 lb (149 kg)
	2185-0012	1000 lb	660 lb (299 kg)
	2185-0013	2000 lb	1800 lb (816 kg)
	2185-0016*	500 lb	330 lb (149 kg)
	2185-0017*	1000 lb	660 lb (299 kg)
	2185-0018*	2000 lb	1800 lb (816 kg)
Stainless Steel	2185-0001	500 lb	330 lb (149 kg)
	2185-0002	1000 lb	660 lb (299 kg)
	2185-0003	2000 lb	1800 lb (816 kg)
	2185-0031*	500 lb	330 lb (149 kg)
	2185-0032*	1000 lb	660 lb (299 kg)
	2185-0033*	2000 lb	1800 lb (816 kg)

* – These bases use a 3000 OIML load cell.
The initial weight on the load cell is approximately 120 lb (54 kg).

I. GENERAL DESCRIPTION

The Model 2185 Base and Platform may be used on a bench, floor or provided on wheels where portability is required. The Model 2185 is extremely rugged yet has twice the sensitivity of scales of similar capacity. It utilizes a precision load cell, protected to 200% of scale capacity by overload stops in each corner of the scale. A unique eight flexure design assures correct weighing of off-center loads and eliminates the use of pivots and bearings.

The stainless steel versions of the Model 2185 are specifically designed for hose down environments. The base is constructed of 11 gauge, 304 stainless steel for maximum protection in food processing, chemical or similarly corrosive environments. The design incorporates a NEMA 4 load cell for reliable operation and an open bottom construction to prevent accumulation of corrosive material inside the base.

FEATURES

Rugged – Designed for heavy duty industrial use.

Versatile – Choice of three platform sizes. Capacities from 200 pounds to 1600 pounds with a wide range of accessories.

Low Maintenance – The Model 2185 contains no pivots or bearings thus eliminating routine maintenance.

Accurate – Utilizes a highly accurate Toledo load cell.

Fast – Digital readout displays correct weight within 2 to 3 seconds.

II. SPECIFICATIONS

A. APPROVED CAPACITIES

B. ACCURACY STATEMENT

The Model 2185 meets or exceeds the National Bureau of Standards Handbook 44 digital scale requirements for a Class III weighing device.

C. LOAD CELL DESCRIPTION

The Model 2185 uses the Toledo medium capacity cantilever load cell with integral overload stop. The specifications for the load cell and base are:

Output Rating -	2mv/v of excitation
Input Resistance -	423 ohms +/- 35 ohms
Output Resistance -	437 ohms +/- 5 ohms
Safe Overload -	150% of stated scale capacity
Scale Corner Capacity -	100% of stated scale capacity
Load Cell Cable -	Separate six conductor cable
Operating Range -	-10 degrees C to 40 degrees C
Humidity Limits -	5 to 95% non-condensing

D. BASE AND WEIGHT PLATFORM ASSEMBLY

1. Dimensions and Weight

   The Model 2185 measures 24.5" X 30.5" X 7.4" high excluding leveling feet or wheels. The approximate shipping weight is 255 pounds.

2. Weigh Platform

   Lift-off type platform that weighs approximately 21 pounds. The platform measures 24" X 30" X4.5" high and extends over the base frame to provide flexure and transducer protection.

3. Weight Platform Support Frame

   The support frame utilizes an eight flexure arrangement for stabilization. Rubber pads and external adjustable stops at the corners of the base provide overload and shock protection.

RECOMMENDED INDICATION		LOAD CELL CAPACITY (POUNDS)	MICROVOLT (μV) PER INCREMENT		MAXIMUM ADDITIONAL ALLOWABLE BACKWEIGHT	
AVOIRDUPOIS	METRIC		AVOIRDUPOIS	METRIC	AVOIRDUPOIS	METRIC
200 lb X 0.02 lb	100 kg X 0.01 kg	500 lb	1.2	1.3	130 lb	49 kg
500 lb X 0.05 lb	200 kg X 0.02 kg	1000 lb	1.5	1.3	160 lb	99 kg
1000 lb X 0.1 lb	500 kg X 0.05 kg	2000 lb	1.5	1.6	800 lb	316 kg
1600 lb X 0.2 lb	800 kg X 0.1 kg	2000 lb	3	3.3	200 lb	17 kg

4. Base Support Frame

   The base contains four leveling feet and adjustable overload stops in the corners. Wheels (when specified) are contained within the base frame. Provisions for mounting a support column for the digital instrumentation are contained on all bases.

E. OPTIONAL ACCESSORIES

1. Wheel kit of parts.

2. Adjustable height stand with wheels and brake-type locking mechanism.

NOTE: When using either of the wheel accessories with the 2185, be certain to lock the wheels before using the scale.

3. Short and tall support columns for digital instrumentation.

III. UNPACKING AND SETUP PROCEDURE

The base and platform assembly is factory assembled, adjusted and shipped as one integral unit.

A. UNPACKING PROCEDURE

The weigh platform is a lift-off type. DO NOT ATTEMPT TO LIFT THE MODEL 2185 UNIT BY THE WEIGH PLATFORM.

1. Remove the straps which retain the base to the wooden shipping pallet. Also remove the cardboard shipping protector.

2. Carefully lift off the weigh platform by lifting up evenly from opposite sides.

3. Verify that the specified equipment has been received and no damage has occurred during shipment. If damage is found, notify the carrier immediately.

4. Remove the unit from the shipping pallet and if required, add the purchased accessories such as wheels, column or adjustable height stand using the instructions included with the accessory.

NOTE: All units are shipped with leveling feet. Remove the leveling feet for use with the wheel option.

5. Place the Model 2185 base where it will be utilized. Be sure to leave sufficient space between the base and the supporting structure for interconnecting load cell cable.

6. Level the unit using the base mounted adjustable feet noting the level indicator located near the load cell. See Figure 1 for the correct positioning of the level bubble.

INCORRECT
BUBBLE IS NOT CENTERED

CORRECT
BUBBLE IS CENTERED

FIGURE 1

B. SETUP PROCEDURE

1. Place the Model 2185 on the floor or on a stable, stationary support.

2. Refer to Figure 2. Loosen and lower the two shipping lock nuts on the overlift stop screw (located near the center of the platter support frame) to allow 1/4 of an inch minimum clearance between the top shipping lock nut and platform support frame. See Figure 3.

FIGURE 2

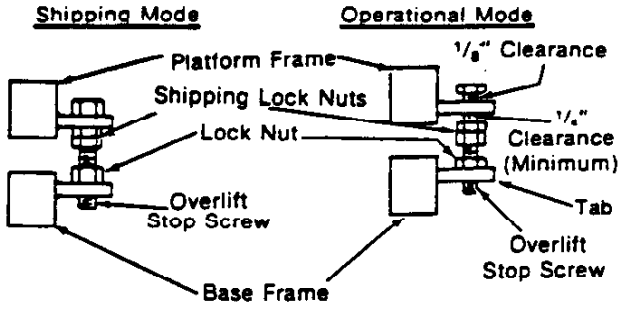


FIGURE 3

3. The overlift stop screw has been factory adjusted to allow 1/8 of an inch maximum movement when platform support frame is gently lifted upwards. If an adjustment is required, loosen the base frame lock nut and adjust for the 1/8 of an inch clearance. Tighten the lock nut securely. Refer to Figure 3.

> NOTE: Make sure that the overlift screw does not bind or touch the platform support frame. Bend the tab (shown in Figure 3) on the support base to obtain the required clearance around the overlift screw.

4. Attach the load cell cable as described in Section IV (the next section).

5. Calibrate the Model 2185 to the proper capacity referencing the technical manual of the Digital Indicator or scale with which the Model 2185 is used.

> NOTE: Allow the Digital Indicator and Model 2185 to warm-up with AC power applied for at least 15 minutes before attempting calibration.

IV. LOAD CELL CONNECTIONS

WARNING !

DISCONNECT ALL POWER TO THIS UNIT BEFORE SERVICING

A. CONNECTION TO 2185

1. Thread the 6 pin end of the load cell interconnecting cable onto the round jack at the side of the load cell.

> NOTE: Make certain the connector engages the load cell mating jack properly. Cross threading or failure to tighten the connector (hand tighten) may cause failure due to moisture, etc.

2. Route the load cell cable through the proper sized strain relief clamp in the base frame and tighten the clamp.

> NOTE: Make sure the load cell cable is routed through the cable strain relief to clear the weigh flexures and flexure towers. Two different sized clamps are provided. Use the smaller one for either 24 gauge or 20 gauge load cell cable and the larger one for the 16 gauge load cell cable.

B. CONNECTION TO AN INDICATOR

Attach the remaining end of the load cell interconnecting cable to the Digital Indicator or Scale with which it will be used. Refer to the technical manual of the associated indicator or scale to determine which of the following four methods is correct for your use.

1. Terminal Strip Connection

The load cell cable from the Model 2185 attaches directly to the terminal strip TB1 in the Models 8139 and 8140 Digital Indicators. Reference Figure 4 for color code.

Important: DO NOT remove the orange ground wire from the cable. Connect the orange wire to chassis ground of the Model 8139 or Model 8140. DO NOT connect to the center terminal of TB1.

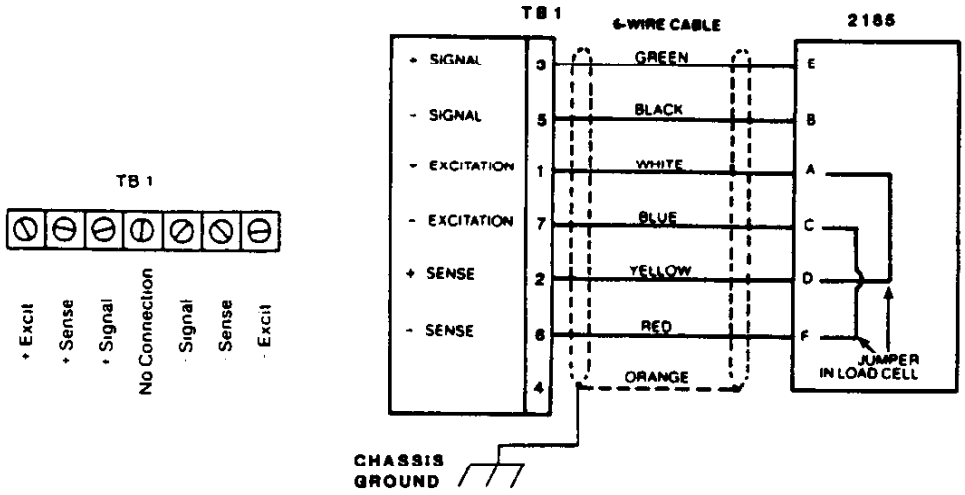
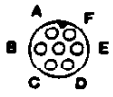


FIGURE 4

2. 7 Pin Load Cell Connection

Certain Toledo equipment (i.e., Indicator Models 8130, 8132, 8136, etc.) use a round seven pin connector (#0917-0078) to connect the Model 2185 Base. The pin configuration for this connection is shown in Figure 5.

Important: Attaching the load cell cable to this connector must be performed by qualified service personnel.



PIN	DESCRIPTION
A	+ Signal
B	— Signal
C	+ Excitation
D	— Excitation
E	+ Sense
F	— Sense
G	Shield

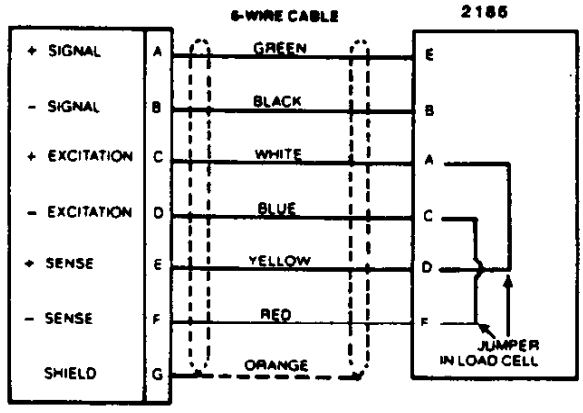
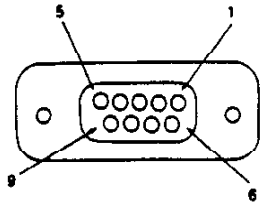


FIGURE 5

3. 9 Pin Load Cell Connection

Other Toledo Scale products (i.e., Models 8142, 8580, 8582, etc.) use a nine pin connector (#0917 0117) to connect the Model 2185. The pin configuration for this connection is shown in Figure 6.

Important: Attaching the load cell cable to this connector must be performed by qualified service personnel.



PIN	DESCRIPTION
1	+ Excitation
2	+ Sense
3	Shield
4	— Sense
5	— Excitation
7	+ Signal
8	— Signal

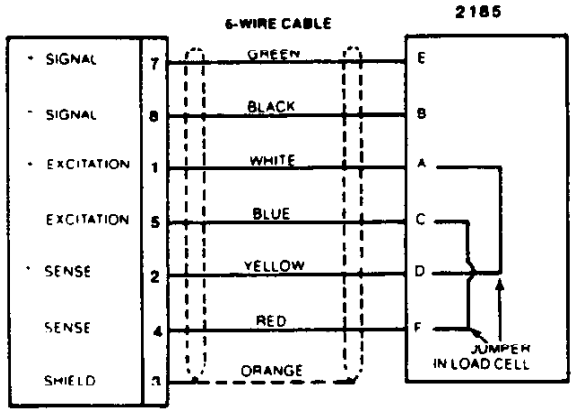
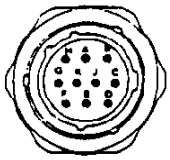


FIGURE 6

4. 10 Pin Load Cell Connection

Several stainless steel enclosures (i.e., Models 8142, 8580, etc.) require the use of a ten pin connector (#0917-0118) to connect the Model 2185 Base. The pin configuration for this connection is shown in Figure 7.

Important: Attaching the load cell cable to this connector must be performed by qualified service personnel. This connector must also be sealed by potting to provide strain relief and moisture protection. The potting kit part number is 125839 00A.



PIN	DESCRIPTION
A	+ Signal
B	— Signal
C	+ Excitation
D	— Excitation
E	+ Sense
F	— Sense
G	Shield

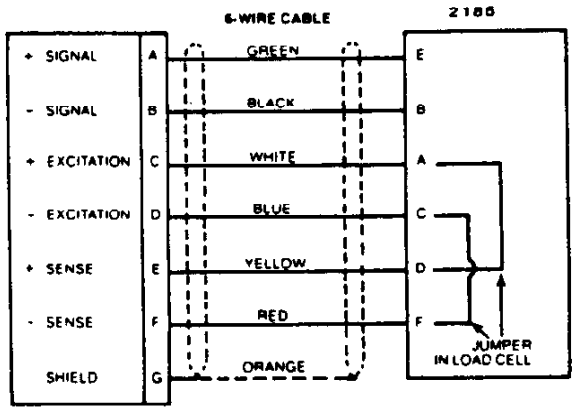


FIGURE 7

V. MECHANICAL ADJUSTMENTS

Changing indication, instability or mechanical friction must be corrected before proceeding with any mechanical adjustments. The Model 2185 has been carefully adjusted at the factory. Do not make shift or overload stop adjustments unless absolutely necessary.

A. TEST PREPARATION

Do not place test weights directly on the weigh platform support frame. They could fall into the weighing mechanism damaging flexures, load cell, etc. Invert the standard platter and place on top of the support frame for making internal shift and overload stop adjustments. Be careful, the platter has a tendency to slide on the platform support frame during the placement of test weights.

Exercise the Model 2185 base two times by placing full capacity test weight load on the platform before making any adjustments. Lift, do not slide the test weights from one position to the next during the test.

B. SHIFT TEST

A shift test is required to verify that all sections of the scale platform weigh within tolerance. The following procedure has been condensed from the 1987 National Bureau of Standards Handbook 44.

1. Type of Test

Depending upon how the Model 2185 base is used, the shift test must be performed differently. The two possibilities are:

1.1 Bench or Counter Scale

Place test weights equal to one-half scale scale capacity sequentially at positions A, B, C and D as shown in Figure 8.

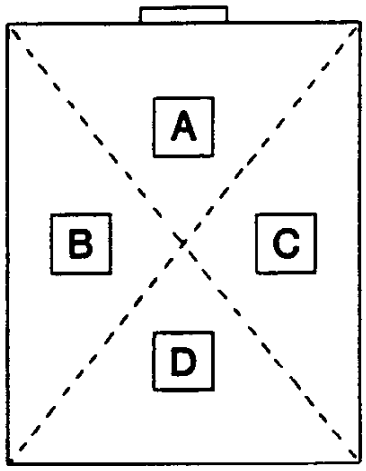


FIGURE 8

Positions A, B, C and D are centered halfway between the center and the edges of the platform.

1.2 Floor, Portable or Built-in Scale

Place test weights equal to one-half scale capacity sequentially at locations E, F, G and H. Also place test weights equal to one-fourth scale capacity sequentially at locations E', F', G' and H', as shown in Figure 9.

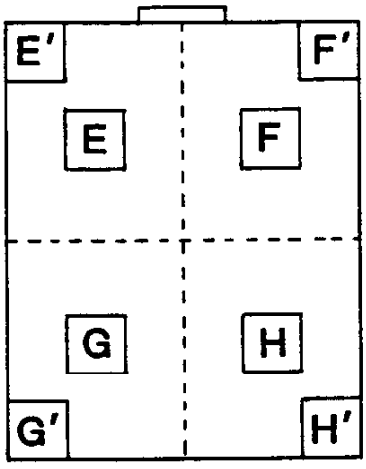


FIGURE 9

Positions E, F, G and H are centered halfway between the center and corners of the platform. Positions E', F', G' and H' are at the corners of the platform.

2. Tolerance Table

The following table shows the tolerances in d (divisions) for each shift test. Reference sections T.N.3.1. (Table 6), T.N.3.2. and T.1.2. (Table 5) of Handbook 44 for more information.

TOLERANCE TABLE				
Scale Capacity	Shift Test Weight	Acceptance Tolerance ±	Maintenance Tolerance ±	Class III Shift Tolerance
6000d	2000d 4000d	1d 1.5d	2d 3d	Must agree within the absolute value of the Maintenance Tolerance.
10,000d	2500d 5000d	1.5d 2.5d	3d 5d	

3. For scales labeled Class III (refer to the data plate), the tolerances shown in Table 6 in Handbook 44 apply. In addition, the results must agree within the absolute value of the Maintenance Tolerance (T.N.4.4.).

4. For scales not labeled Class III (refer to the data plate), the tolerances shown in Table 5 or Table 6 in Handbook 44 apply.

C. SHIFT ADJUSTMENT

All Toledo Scale understructures are shift adjusted at the factory and should not require any field adjustments. If, however, an adjustment is required, refer to the following procedure.

To correct a shift error, shims are placed between the appropriate flexure tower mounting pad and the weigh flexure. If shims are required, they must be ordered separately. The thickness and part numbers of the available shims are listed next.

Shim Thickness	Part Number
0.0005"	A116026 00A
0.001"	A113387 00A
0.003"	A113388 00A
0.005"	A113389 00A
0.01"	A116061 00A

Procedure:

1. Place the correct test weight load on the platter sequentially at locations A, B, C and D. Note and record the display indication at each location. Refer to Figure 8.

2. Equalize all indications by placing appropriate shim or combination of shims at the point listed in the following chart using a trial and error method. Refer to Figure 10 for shim placement locations.

TEST WEIGHT PLACEMENT RESULTS	POINT OF SHIM PLACEMENT
A is less than D	1
D is less than A	2
C is less than B	3
B is less than C	4

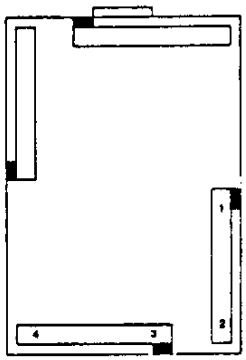


FIGURE 10

3. Repeat the shift test and readjust if necessary. Be sure to note the thickness of the installed shims and the effect they had and make your error correction proportionally.

MAKE SURE THE FLEXURE RETAINING SCREWS ARE TIGHT - 50 FT LBS MINIMUM TORQUE REQUIREMENTS.

4. If the shift adjustment is done properly, the Model 2185 Base should meet the shift test accuracy requirements for the test shown in Figures 8 and 9.

D. OVERLOAD STOP ADJUSTMENT

There is an adjustable self-locking overload stop located at each corner of the Model 2185. These stops are positioned between the platform support frame and the base frame as shown in Figure 11. All overload stops are adjusted at the factory and should not require readjustment, however, if an adjustment is required, refer to the following procedure.

1. Place the listed overload test weight at the corner of the platform.
2. Adjust the overload screw so that it just touches the upper support frame.
3. Repeat this procedure at all four corners.

SCALE INDICATION	OVERLOAD TEST WEIGHT REQUIREMENT
200 lb X 0.02 lb	330 lb
100 kg X 0.01 kg	150 kg
500 lb X 0.05 lb	660 lb
200 kg X 0.02 kg	300 kg
1000 lb X 0.1 lb	1800 lb
500 kg X 0.05 kg	818 kg
1600 lb X 0.2 lb	1800 lb
800 kg X 0.1 kg	818 kg

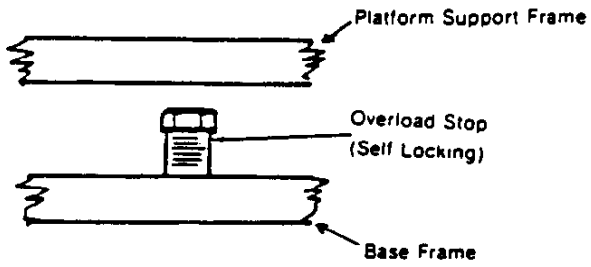
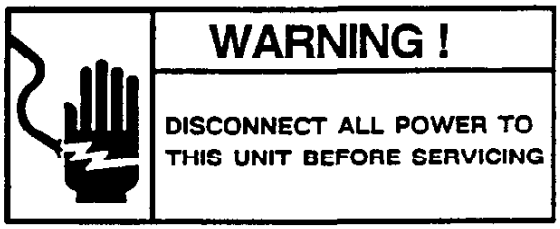


FIGURE 11

VI. TROUBLESHOOTING



Weighing inaccuracies and/or changing indication may be the result of a problem in one of three areas. These areas are described next.

A. INTERNAL PROBLEMS

1. Loose weigh flexures.
2. Loose load receiver or loose load cell mounting plate.
3. Platform support rubbing the overlift stop screw.
4. Lack of proper lubrication, Toledo part number 081536 00A, on load receivers.
5. Load cell cable interfering with weigh flexures.
6. Defective load cell.

B. INTERCONNECTING PROBLEMS

1. Poor solder connection at end of load cell cable.
2. Moisture in load cell cable where protective insulation has been cut.
3. Incorrect type of load cell cable used. Toledo uses special cable.

C. INDICATOR PROBLEMS

1. Poor AC power conditions.
2. Presence of RFI or static.
3. Refer to the technical manual of the digital indicator used for other possible causes.

VII. CHANGING LOAD RECEIVERS

The Toledo medium capacity cantilever load cell has built-in overload stops and is mounted directly to the base support frame – no support plate. Each load receiver has a mirror finish or synergistic coated mating contact surface. Protect the contact surface at all times from disfigurement, dust, dirt, and other foreign materials. Otherwise weighing inaccuracies could occur.

Proceed With Caution

Changing either the load cell or platform support frame receiver requires the removal of the load cell assembly (See Figure 12).

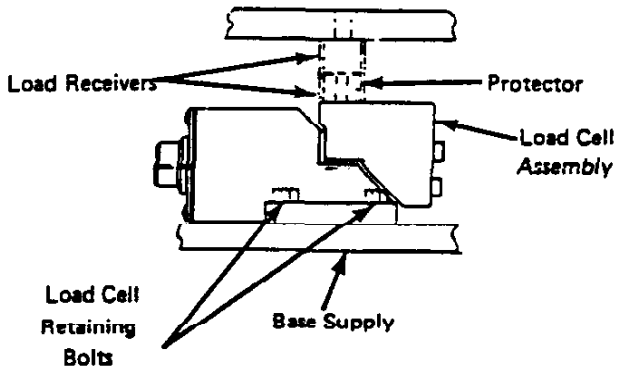


FIGURE 12

A. REMOVAL

1. Loosen and raise the shipping lock nuts on the overlift stop screw up against the platform frame. Refer to Figure 2.
2. Remove the load cell.
   - 2.1 Roll down receiver protector.
   - 2.2 Remove retaining screws.
   - 2.3 Hold protector in place and remove load cell from base unit.
   - 2.4 Remove, if required, protector from around load cell receiver.
3. Removal of the load receiver.

CAUTION: Excessive horizontal or vertical forces can damage the weigh flexures or the load cell.

- 3.1 The support frame is left in place (attached to the eight flexures) during receiver removal.
- 3.2 Place and clamp the load receiver end of the load cell in a vise. The load cell may be destroyed if this procedure is not followed.
- 3.3 Carefully remove the load receiver by unscrewing it from the load cell.

B. REPLACEMENT

1. Place and clamp the load receiver end of the load cell in a vise. The load cell may be destroyed if this procedure is not followed.
2. Cover the threads of the replacement receiver with a light coating of Toledo Scale part number 081536 00A lubricant.
3. *Install the receiver into the load cell and* tighten securely.
4. Place the rolled up protector around the load cell receiver and slide the load cell in place. Align and secure the load cell in position. Keep all lubricant off of the protector.
5. Adjust the overlift stop per instructions in Section III, Part B shown in Figure 3.
6. Roll up the protector around both receivers.
7. Recalibrate the scale.

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