0951

Load Cell Conversion Kit

Service Manual

B12308000A
(01/97) .00

METTLER TOLEDO

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Declaration of conformity

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Déclaration de conformité
Declaración de Conformidad
Verklaring de overeenstemming
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,
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declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Type: Analog Load Cell

Models: **736** **(when used within the technical requirements listed in Test certificate TC2826 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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Waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
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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.

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

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures
Worthington, Ohio USA
September, 1996

according to EN45014

INTRODUCTION

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

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

METTLER TOLEDO
350 W. Wilson Bridge Road
Worthington, Ohio 43085
(614) 438-4511

FCC Notice

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

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

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

PRECAUTIONS

READ this manual BEFORE operating or servicing this equipment.

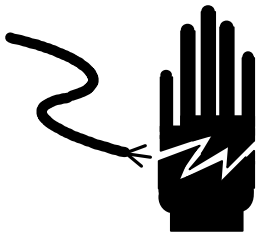
FOLLOW these instructions carefully.

SAVE this manual for future reference.

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

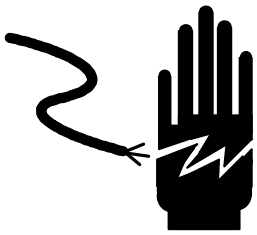
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



WARNING

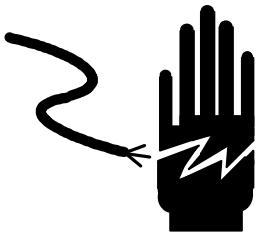
ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.



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 REMOVING THE FUSE OR SERVICING.

CAUTION

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

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

CONTENTS

1 Introduction

The information provided in these instructions is for the installation of the Mettler Toledo Model 0951 Load Cell Conversion Kit using the steelyard rod of a mechanical scale.

There are two types of kits; a 3,000d Class III general purpose “commercial” and a 10,000d Class III L for vehicle scale applications.

These instructions **do not** include information relative to the installation of a full load cell system, i.e., suspended (by load cells) hopper or tank scales. Do not attemp the installation of suspended systems using these instructions.

This K.O.P. has been designed for installation in the steelyard of an existing mechanical dial scale. The load cell assembly is installed by removing the appropriate length of steelyard rod and then attaching the remaining steelyard rod sections (2) to the load cell assembly.

If the mechanical scale is to be used, the dial, the cabinet and the lever suspension system must be in good operating condition.

It is important to note that the electronic indicator and the mechanical dial **cannot** be used simultaneously. The dial head must be locked (i.e., mechanically grounded) when the electronic indicator is being used. Similarly, when using the mechanical dial, the electronic indicator will not accurately indicate the applied load, thus the electronic indicator reading must be disregarded.

2

Sizing the Load Cell

Follow the steps below to determine what size load cell to place in the steelyard rod:

1. Determine the force of the **initial pull** at the end of the transverse lever.
2. Determine the weight of the platform **(Deadweight)**.
3. Determine the **capacity** of the scale.
4. Determine the **multiple** of the lever system.
5. Insert the above variables into the following formula to determine the required load cell size:

$$\text{Load Cell Size} = \text{Initial Pull} + \frac{\text{Deadweight of Platform}}{\text{Multiple}} + \frac{\text{Capacity}}{\text{Multiple}}$$

6. Choose an 0951 Load Cell Conversion Kit that contains a load cell closest to the calculated size but not lower in capacity.

3

Plan the Conversion

Locate the load cell where it will have adequate clearance and where the cable can be routed to have a good loop to minimize the affect of the cable on the mechanical dial. Measure the steelyard rod or mark it where it will be cut. Be sure to allow for the full movement of the rod when the mechanical scale is used. See Figures 1 and 2.

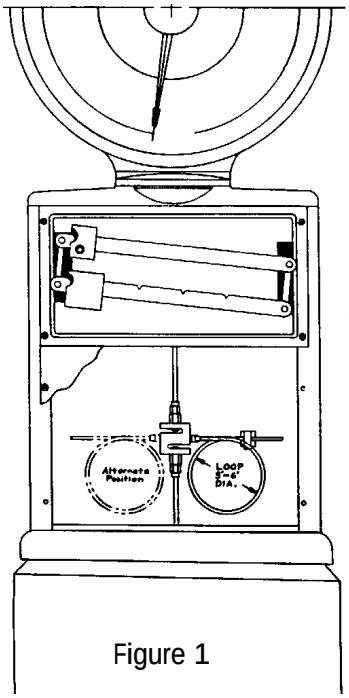
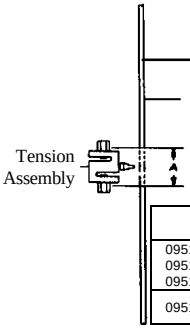


Figure 1



Model Number	Capacity	Assembly Only: 1/2-13	W/Adaptors: 3/16-18 & 3/8-16
09513111,09513112,09513113 09513114,09513315,09514113, 09514114,09514115	1K & Under	3 3/4" to 4"	6" to 6 1/4"
09513116,09514116	2 K	4 3/4" to 5"	7" to 7 1/4"

Figure 2

Note: The length of the steelyard rod is important in the calibration of the mechanical scale and it should be measured carefully. The chart shows the length of the rod to cut out depending on the kit being used for the diameter of the rod to adaptors needed. See Figure 2.

For overhead systems with upward pull at the main lever tip (or nose iron), the load cell will be in the steelyard rod between the nose iron and the bench lever.

4

Supporting the Levers

WARNING

Support the lever system to provide protection to those persons working around the equipment and to the equipment throughout the installation of the conversion kit.

1. Remove all weight from the platform or all material from the tank or hopper.
2. Before removing the steelyard rod, the levers must be securely supported to remove any load from the steelyard rod. This can be done on most small scales (eg., bench or portable scales) by raising the tip or small end of the main lever by hand and placing a block (i.e., hard wood) under the main lever near the tip (nose iron). The block is to be of sufficient size to hold the main lever up (load off the steelyard rod) and keep the main lever from moving side to side. See Figure 3.

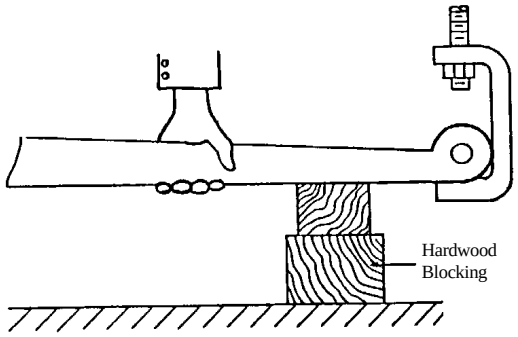


Figure 3 - BLOCKING

3. On larger scales (eg., floor, built-in, motor truck scales) a hydraulic jack may be needed to raise the tip end of the main lever (s). Once raised the main Lever (s) is then blocked, as explained, near the nose iron. See Figure 4.

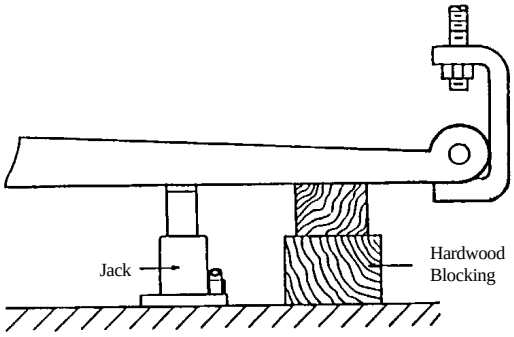
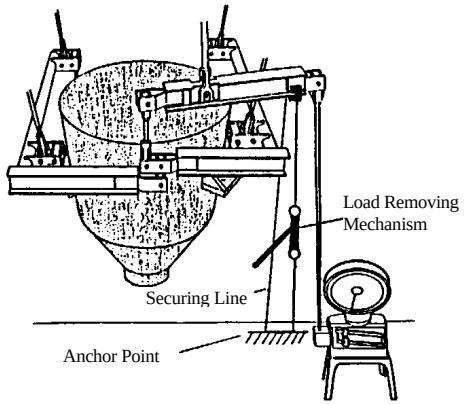


Figure 4 - BLOCKING

4. When installing the conversion kit in an existing tank or hopper mechanical lever system, the support for the lever system is done according to the direction of pull at the main lever nose iron. In many cases the direction will be downward as in a standard or self-contained scale. For these scales lever support is done as stated above.
5. For conversion where the levers are higher than the mechanical dial (overheads systems), the force or pull direction is upward at the nose iron. For the conversions the upward movement of the main lever must be prevented by securing the main lever at the nose iron.
    - Pull the main lever down, at the nose iron, remove the upward force from the steelyard rod. A lever hoist or “come-a-long” can be used.
    - Independent of the load removing mechanism, secure the main lever (at the nose iron) with chains, wire rope, load binder, etc., to pound adequate anchor points. See Figure 5.



Hopper with indicating head below lever system.

Figure 5 - SECURING

IMPORTANT: Both the LOAD REMOVING MECHANISM and the SECURING LINE (S) must be load rated equal to or greater than the load at the nose iron.

The lifting or pulling mechanism is not a part of the blocking/securing. Adequate blocking/securing will provide a safe and secure locking of the main lever independent of the lifting or pulling mechanism. The blocking/securing must be such that it must be intentionally removed, i.e., not able to be accidentally dislodged or removed.

WARNING:
TO AVOID INJURY -

1) Work carefully, making safety the most important factor in this conversion installation. Keep hand and clothing away from pinch points and moving parts.
2) Blocking to be done with hardwood block (s) of sufficient size to support the load. See Figure 3 and 4.
3) On overhead systems both the load removing mechanism and the securing system must be load rate equal to or higher than the load at the nose iron. Anchor points must be sound and adequate. See Figure 5.

5

Removing the Steelyard Rod

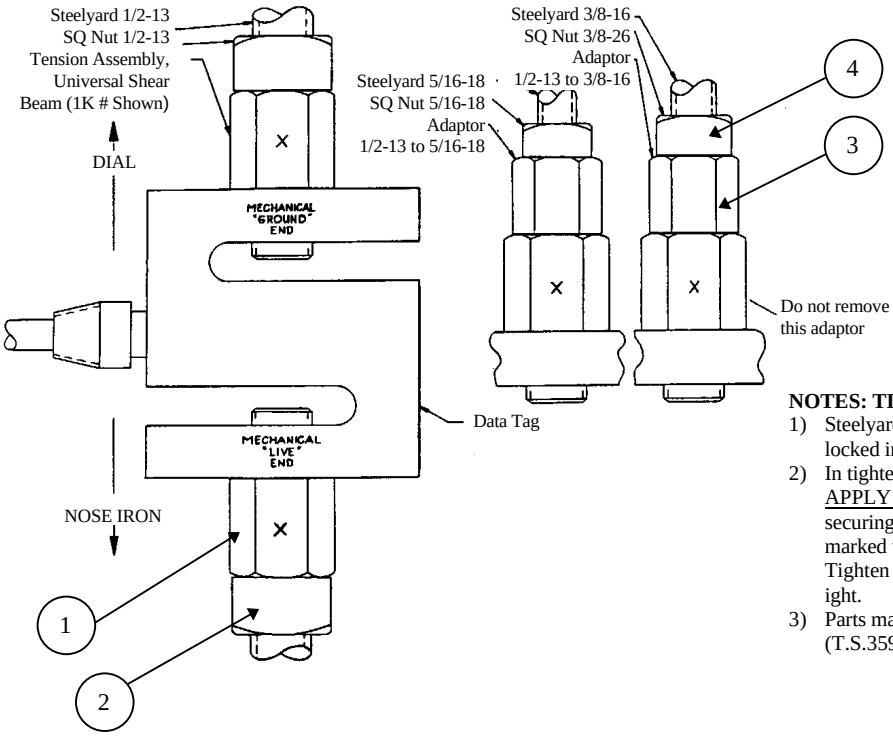
After the weight is removed from the steelyard rod through supporting the lever system, the steelyard rod may then be safely removed. **Note** the position of the steelyard rod as it must be re-installed in the same position.

Cut and thread the existing rod to the proper length. as an alternative, a fully threaded steel rod, eg., all-thread may be used in place of the existing steelyard rod.

6

Assemble Rod and Load Cell

The load cell is supplied with two (2) factory installed adaptors for 1/2-13 threaded rods. **The adaptors (marked with an X in Figure 6) are locked in place and must not be removed from the load cell.** Any Attempt to do so may result in damage to the load cell and will void the warranty. If the steelyard is either 3/8-16 or 5/16-18 use the additional adaptors supplied with the conversion kit. These adaptors will fit the 1/2-13 thread in the permanent adaptors on the load cell. See Figure 6.



NOTES: TIGHTENING OF PARTS

1) Steelyard is to be bottomed in adaptors and locked in place by nuts.
2) In tightening adaptors (when needed) and nuts, DO NOT APPLY TORQUE TO LOAD CELL. Tighten bu securing/Holding L.C. adaptor (Factory Tightened, marked w/X on DWG.) adjacent to parts being tightened. Tighten each part by turning part 1/4-1/2 turn past snug ight.
3) Parts may be "Loctited" in place with tightening in 2)A (T.S.359430XXX-Loctite#271).

Figure 6

0951 Mounting Hardware		
Item Number	Description	Part Number
1	1/2”-13 to 3/8”-24 Adaptor 1/2”-13 to 1/2”-20 Adaptor	A12304200A A12304300A
2	1/2”-13 Square Nut	R00432050
3	1/2”-13 to 3/8”-16 Adaptor 1/2”-13 to 5/16”-18 Adaptor	A12307700A A12307600A
4	3/8”-16 Square Nut 5/16” Square Nut	R00446050 R00468050

Attach steelyard rod section, which connects to dial weight beam, to the mechanical “ground” end of the load cell assembly. See Figure 6.

Attach steelyard section which connects to nose iron, to the mechanical “live” end of the load cell assembly. See Figure 6.

Caution: When tightening adaptors, steelyard sections or replacement rods, always use a wrench (3/4 inch) on the permanent adaptor on the load cell. **Do not** apply any torque to the load cell body; instead, always put both wrenches on the adaptors/nuts adjacent to the end of the load cell being tightened. Use a 3/4 inch wrench on the permanent adaptor (marked with an X in Figure 6), the 5/16 and 3/8 adaptors can be turned with a 5/8 wrench.

NEVER USE TOOLS ON OR APPLY FORCE TO THE LOAD CELL BODY.

Also, available from Mettler Toledo Service parts are adaptors for 1/4-28 and 5/8-11 Threaded rods.

ADAPTOR	FINISH	PART NUMBER
1/2-13 to 1/4-28 UNF	Zinc Plated 17-4 PH Stainless	12323000A 12323200A
1/2-13 to 5/8-11 UNC	17-4 PH Stainless Steel	12323300A

7

Install Steelyard Rod and Load Cell Assembly

Place steelyard road and load cell assembly backin the scale cabinet. Be sure to install the assembly exactly as it was before the cell was added to the rod. All locking devices should be in place. The rods or nuts must not be free to turn. See Figure 6.

8

Secure Load Cell Cable

Form a loop (about 6”) in the load cell cable. Refer to drawing (Figure 1). Secure the cable with the clamps supplied. This is to be done carefully, causing minimum interference to the operation of the mechanical dial scale.

For overhead systems where the load cell is in the steelyard rod between the nose iron and the bench lever, the cable is secured by attaching a cable clamp to the dial head (locked) or the cabinet body.

9

Connect Load Cell Cable

Connect the load cell cable to the electronic instrument. The color code is shown below for tension loading of this load cell.

WIRE COLOR	FUNCTION FOR TENSION LOADING
Red	-Signal
White	+Signal
Green	+Excitation
Black	-Excitation
Yellow	Shield

10

Calibration

See instruction/technical manual for the particular electronic indicator instrument being used. When calibrating and using the electronic instrument, the mechanical indicator (dial) must be locked to prevent travel. Dial travel will cause nonlinearity that cannot be compensated for in either the electronic instrument or the load cell. The scale (mechanical-electronic) cannot be used or calibrated simultaneously due to this dial travel. Also, the load cell cable will have a small affect on the mechanical scale calibration.

The weight of the load cell will change the mechanical scale zero, necessitating the resetting of the dial to read zero.

Both the mechanical (if used) and electronic scale calibration must be checked with test weights. To assure accuracy over the entire range of operation, full scale capacity must be applied. Only if a sufficient test weights are **not** available a “build-up” method may be used to make a full capacity-known load.

11 Appendix

Conversion Kit
Load Cell KOP'S

Load Cell Capacity (lb)	NIST H-44 Accuracy Class	Cable Length (ft)	Load Cell Thread Size	Shipping Weight (lb)	Model Number	Load Cell Number
For General Purpose "Commercial" Weighing						
50	III/3000d	25	3/8"-24 UNF	5	09513111	TA600238
100	III/3000d	25	3/8"-24 UNF	5	09513112	TA600240
200	III/3000d	25	3/8"-24 UNF	5	09513113	TA600242
500	III/3000d	25	1/2"-20 UNF	5	09513114	TA600246
1000	III/3000d	25	1/2"-20 UNF	5	09513115	TA600250
2000	III/3000d	25	1/2"-20 UNF	5	09513116	TA600252
For Vehicle Scale Applications						
200	IIIL/10000d	25	3/8"-24 UNF	5	09514113	TA600243
500	IIIL/10000d	25	1/2"-20 UNF	5	09514114	TA600247
1000	IIIL/10000d	25	1/2"-20 UNF	5	09514115	TA600251
2000	IIIL/10000d	25	1/2"-20 UNF	5	09514116	TA600253

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