0970

RINGMOUNT®
Weigh Modules

Installation and Service Manual

E16104400A
(6/06).00

METTLER TOLEDO

Publication Revision History

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

Publication Name: 0970 Ring Weigh Modules Installation and Service Manual

Publication Part Number: 16104400A Publication Date: 11/00

Part Number	Date	Revisions
A16104400A	3/01	Changed product name to Ringmount™ Weigh Modules. Added Ex approval information and control drawing for FM approval.
B16104400A	4/01	Added note about bolt clearance to installation section.
C16104400A	8/01	Added Declaration of Conformity.
C16104400A.01	2/03	Added notes to RAAD box installation. Revised U-bolt part number.
D16104400A	2/04	Added 10,000-kg weigh module and hazardous area information.
D16104400A.01	4/04	Added information for replacing 10,000-kg load cells.
E16104400A	6/06	Added information about new shipping block hardware. Added color codes for Teflon load cell cable. Updated hazardous area information.

INTRODUCTION

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

Information about METTLER TOLEDO Technical Training can be obtained by writing, calling, or faxing:

METTLER TOLEDO
1900 Polaris Parkway
Columbus, Ohio 43240 USA
Phone: (614) 438-4511
Fax: (614) 438-4958
www.mt.com

WARNING!

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

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

DECLARATION OF CONFORMITY

Konformitätserklärung
Déclaration de conformité
Declaración de Conformidad
Conformiteitsverklaring
Dichiarazione di conformità

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

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

Model/Type: RLC (load cell)

to which this declaration relates is in conformity with the following standard(s) or other normative document(s).
auf das sich diese Erklärung bezieht, mit der/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).
Al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
Waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
A cui si riferisce questa dichiarazione è conforme alla/e sequente/i norma/e o documento/i normativo/i.

in combination with an indicator terminal produced by Mettler-Toledo is in conformity with the following directives and standards.

Council directive on the harmonization of the laws of the Member states:	**Standards:**	**Certificate number (if applicable)**
relating to non-automatic weighing instruments (90/384/EEC) amended by directive (93/68/EEC), Article 1.2.a.	EN 45501 and OIML R60/1991	D09-00.08
relating to electromagnetic compatibility (89/336/EEC) amended by directive (93/68/EEC; 92/31/EEC)	EN 50081-1 EN 50082-2	
relating to electrical apparatus for potentially explosive atmospheres (84/47/EEC)	EN 50014:1977 + A1 – A5, General requirements and EN 50020:1977 + A1 – A2, Intrinsic safety "I"	Ex-94.C.2142 (rating: EEx lb IIC T6)

Worthington, Ohio USA, May, 2001 **Mettler-Toledo, Inc.**

Darrell Flocken, Manager – Weights & Measures
Office of Weights and Measures

Important notice for verified weighing instruments in EC countries.

M

Weighing instruments verified at the place of manufacture bear the preceding mark on the packing label and a green M-sticker on the descriptive plate. They may be set to work immediately.

M

Weighing instruments that are verified in two steps have no green 'M' on the descriptive plate, bear the aforementioned identification on the packing label. The second step of the verification must be carried out by the Mettler-Toledo service approved or by the W&M authorities. Please contact your Mettler-Toledo organization.

The first step of the verification has been carried out in the manufacturing company. It comprises all tests according to EN 45501 – 8.2.2 in regards to scales with analog connection to the weighing platform, a weighing test according to EN 45501 – 3.5.3.3 must be carried out additionally. This test is not necessary if the terminal bears the serial number of the weighing platform.

According to EN 45014

PROPRIETARY NOTICE

The information contained in this publication is derived in part from proprietary and patented data of METTLER TOLEDO. This publication shall not be copied in whole or in part without prior written approval of METTLER TOLEDO, nor shall it be used for any purpose other than that intended. This document is subject to change without notice.

STANDARD WARRANTY

METTLER TOLEDO warrants that the equipment covered by this warranty will be free from defects in workmanship and material for one year from date of installation or eighteen (18) months from date of shipment to the buyer, whichever comes first.

Should any such defects be found and reported during the first thirty (30) days after installation (if installation occurs during the warranty period), METTLER TOLEDO (herein referred to as the "Company") will, at its option, refund the purchase price or correct such defects, furnishing replacement parts and service free of charge to the buyer. For the remainder of the first 12 months of the warranty term, the Company will furnish necessary replacement parts and on-site technician's service free of charge, provided the Buyer agrees to pay reasonable technician's travel time, vehicle mileage, and associated travel expenses to and from the nearest authorized Company service location. If the equipment is covered by a two-year warranty, for the last 12 months or remaining balance of the warranty period, whichever comes first, the Company will furnish the necessary replacement parts to the Buyer free of charge, provided that the Buyer agrees to pay reasonable technician's on-site labor services, travel time, mileage, and expenses to and from the nearest authorized Company service location. The following are NOT covered under any of these warranties:

1. Initial installation and ongoing scale calibration.
2. Damage to scale components by gross abuse, fire, flooding, explosion, water, voltage surges, or civil disturbance.
3. Normal maintenance or consumable items.

This warranty covers only the 0970 RINGMOUNT weigh module. 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 applicable only to the United States of America.

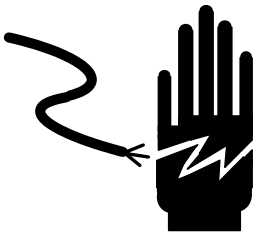
Export Products: The Company warrants equipment destined for export or sold for export to be free from defects in workmanship and material for a period of one year from date of installation or 18 months from date of shipment to the Buyer, whichever occurs first. Should any such defect be found within that period, parts will be furnished free of charge (ex works) point of origin or final distribution center. If the Buyer requests the performance of warranty work provided for under the foregoing warranty outside of the contiguous United States, the Buyer shall be required to pay for labor, travel time, living, and travel expenses of any personnel required to perform such warranty work.

APPLICATION GUIDES

The only warranty of METTLER TOLEDO is for the product it supplies under the Product Warranty Statement listed above. Weighing application guidelines pertain to METTLER TOLEDO products.

Precautions

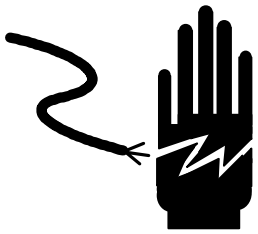
READ this manual BEFORE operating or servicing this equipment.



⚠ 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.

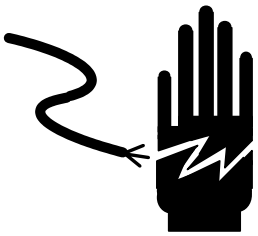
FOLLOW these instructions carefully.



⚠ WARNING

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

SAVE this manual for future reference.



⚠ 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.

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

⚠ CAUTION

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.

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

⚠ CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

CALL METTLER TOLEDO for parts, information, and service.

⚠ CAUTION

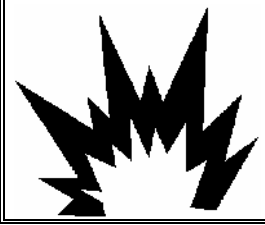
<u>DO NOT</u> PASS WELDING CURRENT THROUGH THE LOAD CELLS! WHEN WELDING ON A SCALE, ALWAYS GROUND THE WELDING DEVICE AS CLOSE TO THE WORK AS POSSIBLE. NEVER WELD CLOSER THAN WITHIN 4 FEET (1.2 METERS) OF ANY LOAD CELL WITHOUT REMOVING THE LOAD CELL.

⚠ WARNING

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

⚠ CAUTION

BE SURE TO BLOCK THE SCALE WHEN IT IS IN THE RAISED POSITION. OBSERVE ALL APPROPRIATE SAFETY PROCEDURES WHEN INSTALLING AND SERVICING THE WEIGH MODULES.



⚠ WARNING

IF USED IN A HAZARDOUS AREA, THE HAZARDOUS AREA MUST BE MADE SAFE PRIOR TO INSTALLATION, REPLACEMENT, OR TROUBLESHOOTING. FAILURE TO COMPLY COULD RESULT IN PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.

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

0970 Weigh Modules

Model 0970 RINGMOUNT® weigh modules are used to convert tanks, hoppers, and other structures into scales. Each weigh module consists of a torsion ring load cell and the mounting plates needed to attach it to a structure. The weigh modules are available in capacities of 250 kg to 10,000 kg.

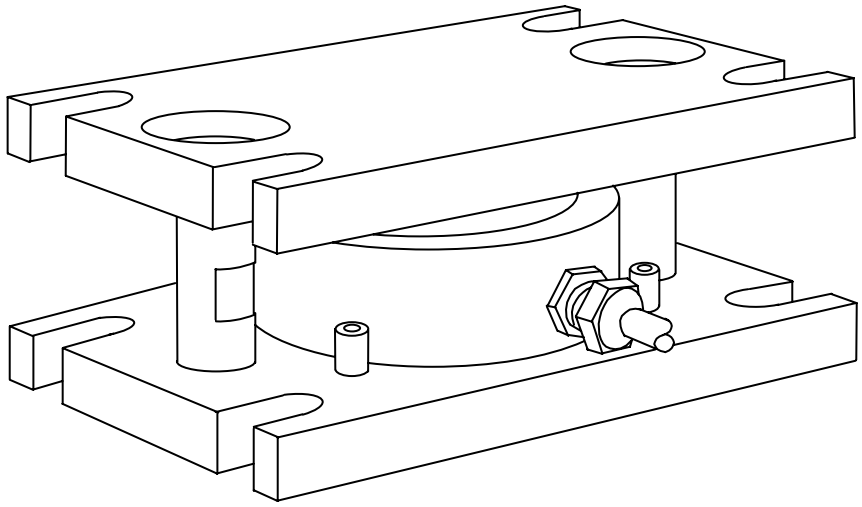


Figure 1-1: Model 0970 RINGMOUNT Weigh Module

This manual explains how to install and service Model 0970 weigh modules. If any information is incorrect or missing from the manual, please use the Publication Suggestion Report at the back of the manual to tell us about it.

Model Number

Table 1-1 shows how to determine the correct model number for an application using Model 0970 weigh modules.

Model Number Configuration					
XXXX	**X**	**X**	**XX**	**X**	**-XX**
Model	**Weigh Module Type**	**# of Modules**	**Load Cell Capacity**	**Metrology**	**Junction Box**
0970	0 = Standard C = Custom	1 to 9	X2 = 250 kg X5 = 500 kg 01 = 1,000 kg 02 = 2,000 kg 03 = 3,500 kg 05 = 5,000 kg 10 = 10,000 kg	4 = C3 Ex, 5Kd NTEP, FM 6 = C6 Ex, FM	-1 = Analog Junction Box -2 = No Junction Box XX = Custom

Table 1-1: Load Cell Configuration

Accuracy

Scale accuracy depends on:

- The design of the support steel for the module and of the receiving structure (tank, hopper, conveyor, etc.) mounted to the modules
- The design and number of dead-to-live connections attached to the scale
- The total load cell capacity
- Environmental factors: wind, vibration, temperature variations, etc.

Refer to METTLER TOLEDO *Weigh Module Systems Handbook* (Part Number *15598500A) for assistance.

* May have an alphabetical prefix.

Power Supply Requirements

A METTLER TOLEDO digital indicator is used to power the analog load cells in Model 0970 weigh modules. The type of digital indicator that is used determines which type of junction box (Analog, RAAD, or IDNet) is required for the weigh modules.

Refer to the digital indicator's service manual for the indicator's power requirements.

Load Cell Specifications

Model:	RLC
Capacities (E_{max}):	250 kg, 500 kg, 1,000 kg, 2,000 kg, 3,500 kg, 5,000 kg, 10,000 kg
Rated output (RO):	2 mV/V (1.75 mV/V for 250-kg load cells, 2.05 mV/V for 10,000-kg load cells)
Maximum excitation voltage:	30 VDC maximum
Input terminal resistance:	1,110 ± 50 ohms (1,100 ± 50 for 250 kg and 10,000 kg)
Output terminal resistance:	1,025 ± 25 ohms (1,025 ± 50 for 250 kg and 10,000 kg)
Sealing:	Hermetically sealed, IP66 and IP68
Material:	Stainless steel
Cable length:	5 meters (16.5 feet) 250 kg to 5,000 kg 10 meters (32.8 feet) 10,000 kg
Temperature range (compensated):	-10°C to +40°C (+14°F to +104°F)
Safe side load:	100% of E_{max}
Safe overload:	150% of E_{max}
Combined error (linearity and hysteresis):	± 0.02% of rated output
Zero balance:	± 1.0% of rated output (1.5% for 250 kg and 10,000 kg)

Approvals

NTEP Certification

Model RLC load cells (except 250-kg and 10,000-kg load cells) meet or exceed NIST Handbook-44 requirements for Class III 5000 divisions/multiple cell (minimum). A certificate of conformance was issued under the National Type Evaluation Program (NTEP) of the National Conference of Weights and Measures (certificate number 00-124).

OIML Certification

Model RLC load cells meet or exceed OIML requirements for R60 C3 3000 divisions. An optional RLC load cell is available to meet C6 6000-division accuracy (1,000 kg to 5,000 kg). European Test Certificate: D09-00.08.

Entity Approval

Entity approval permits the application of individually approved components (even from various manufacturers) to be used together to build a solution that is approved. When installing equipment in hazardous areas, it is necessary to compare the entity values of the load cells, junction boxes, connecting cables, and other components. Those entity values include voltage, current, power, capacitance, and inductance.

The components must compare as follows in order for the wiring to be considered intrinsically safe:

V_{max} or U_i (Maximum voltage permitted) ≥ V_t or U_o (Total voltage output)

I_{max} or I_i (Maximum current permitted) ≥ I_t or I_o (Total current output)

P_{max} or P_i (Maximum power permitted) ≥ P_t or P_o (Total power output)

C_i (Unprotected capacitance) + C_{cable} (Cable capacitance) ≤ C_a or C_o (Allowable capacitance)

L_i (Unprotected inductance) + L_{cable} (Cable inductance) ≤ L_a or L_o (Allowable inductance)

If the above conditions are not true, then the circuit will not be intrinsically safe and must not be installed in a hazardous area. If the parameters compare favorably as shown above, then the circuit is intrinsically safe and can be installed in a hazardous area. Always refer to the electrical regulations for the country of installation for specific wiring requirements.

United States Approval

The United States safety approvals are based on entity values. Reports on the RLC load cells were submitted to Factory Mutual for compliance with FM Approval Standards Class No. 3600, 3610, 3611, and 3810. They were approved as intrinsically safe devices and issued the following certificate:

FM Original Approval Job Identification #3010183
IS/I,II,III/1/ABCDEFG/T4 – TA800818; ENTITY; NI/I/2/ABCD/T6; S/II,III/2/FG

The following chart lists the Factory Mutual entity values for the load cells.

V_t (Total voltage output)	25 V
I_t (Total current output)	600 mA
P_t (Total power output)	1.25 W
C_a (Allowable capacitance)	0
L_a (Allowable inductance)	29 µH

When used in hazardous areas, the load cells must be installed according to control drawing TA800818 (see Figure 1-2).

European Approval

The European safety approvals are based on entity values. The RLC load cells were submitted to KEMA for compliance with EN50014, EN50020, EN50021, and EN50281-1-1. They were approved as intrinsically safe devices and issued the following certificates:

KEMA 03ATEX1372 X
II 2 G EEx ib IIC T4 or T6 Ta = -20°C to +40°C
II 2 D T 70°C

KEMA 03ATEX1373 X
II 3 G EEx nL IIC T4 or T6 Ta = -20°C to +40°C
II 3 D T 70°C

The RLC load cells have been certified to IP66 ingress protection.

The following chart lists the entity values for the load cells.

U_o (Total voltage output)	19.1 V
I_o (Total current output)	323 mA
P_o (Total power output) for class T6	1.25 W
P_o (Total power output) for class T4	2.75 W
C_o (Allowable capacitance)	0.4 nF*
L_o (Allowable inductance)	0 µH*

*Includes permanently connected cable for a maximum length of 15 m. For longer cables, the additional capacitance and inductance have to be taken into account.

When used in hazardous areas, the load cells must be installed according to installation instructions document 16936000A (see Figure 1-3).

Junction Boxes

TB100771 and TB100772 junction boxes were submitted to KEMA for compliance with EN50014, EN50020, EN50021, and EN50281-1-1. They were approved as intrinsically safe devices and issued the following certificates:

KEMA 03ATEX1396 X
II 2 GD EEx ia IIC T4 T 90 °C Ta = -20°C to +60°C

KEMA 03ATEX1397 X
II 3 GD EEx nL IIC T4 90°C or
II 3 GD EEx nA II T4 T 90 °C Ta = -20°C to +60°C

TB100771 and TB100772 junction boxes have been certified to IP64 (IP6x) ingress protection.

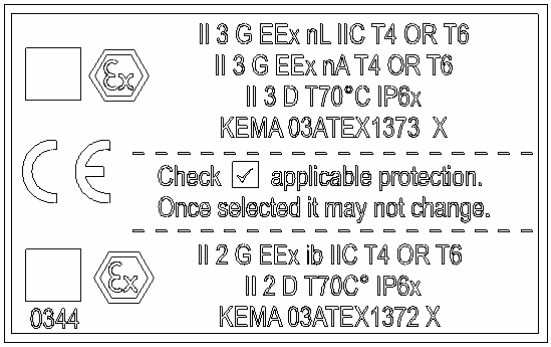
The following chart lists the entity values for the junction boxes.

U_o (Total voltage output)	30 V
I_o (Total current output)	1 A
P_o (Total power output)	2 W

When used in hazardous areas, the junction boxes must be installed according to installation instructions document A16953600A (see Figure 1-4).

Product Markings

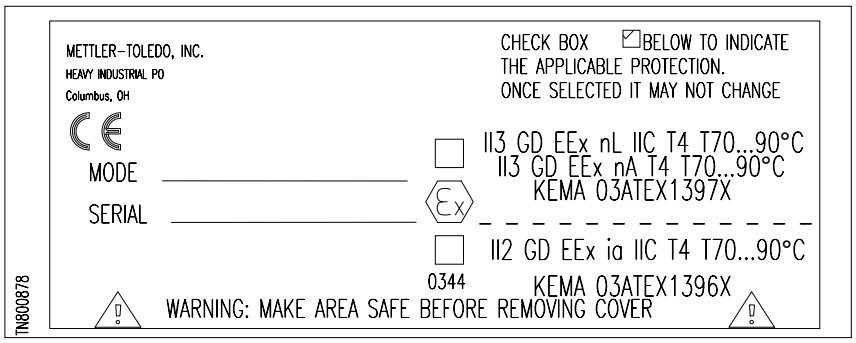
METTLER TOLEDO is not responsible for classifying hazardous areas. Each RLC load cell should have the following label attached to it:



If you install a load cell in a hazardous area, use a permanent marker to place a mark in the check box on the label that indicates the applicable protection (KEMA 03ATEX1372 X or KEMA 03ATEX1373 X). Once the label has been marked, it may not be changed.

Junction Boxes

TB100771 and TB100772 junction boxes should have the following label attached:



If you install a junction box in a hazardous area, use a permanent marker to place a mark in the check box on the label that indicates the applicable protection (KEMA 03ATEX1396 X or KEMA 03ATEX1397 X). Once the label has been marked, it may not be changed.

Grounding

Make sure that all hazardous area installations are properly grounded. All grounding and equal potential bonding connections must be made according to local regulations based upon the country of installation. Refer to local codes and the control drawing provided in this manual for information about grounding.

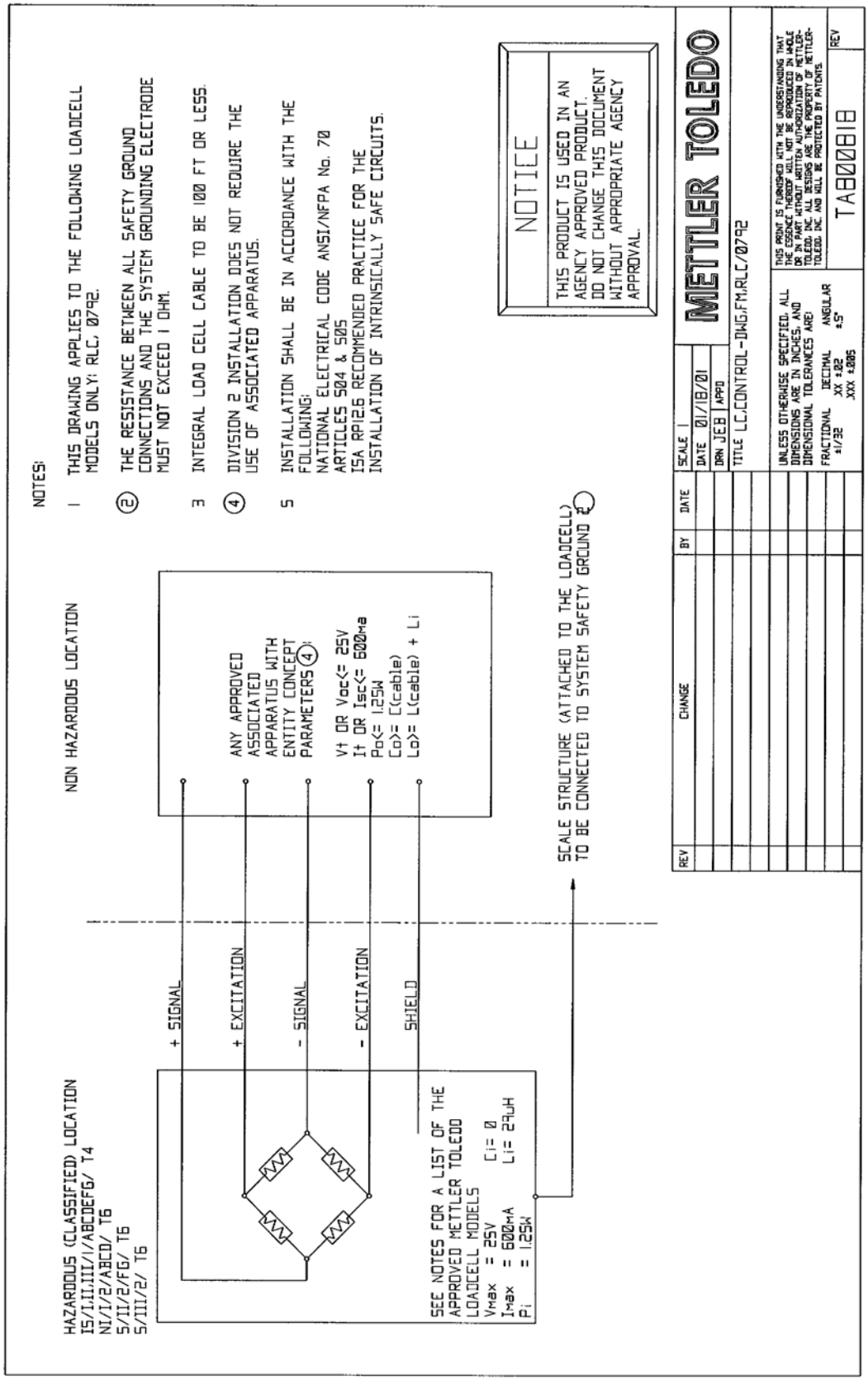


Figure 1-2: Control Drawing for RLC Load Cell

Mettler-Toledo, Inc.
150 Accurate Way,
Inman, SC 29349
USA

Installationsanleitung
Installation Instruction

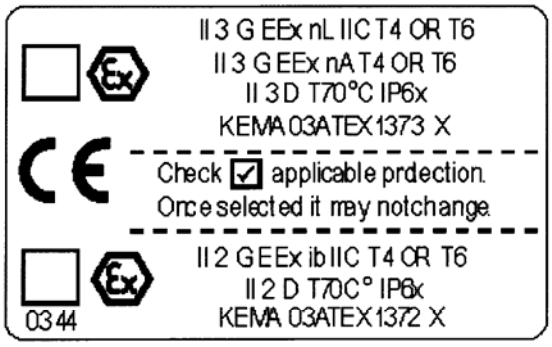
Lastzellen Typen: **RLC**
Load cell model numbers: **RLC**

Anschlußplan bzw. Farbcodetabelle:
Wire according to the following color code:

Deutsch		English	
Farbe	Zustand	Colour	Function
Rosa	+ Spannung	Pink	+ Excitation
Grau	- Spannung	Grey	- Excitation
Braun	+ Signal	Brown	+ Signal
Rot	- Signal	White	- Signal
Klar	Schirm	Clear	Shield

Installation
Installation
Installation wie in den Konformitätsbescheinigungen KEMA 03ATEX1372 X oder KEMA 03ATEX1373 X beschrieben.
Install according to Certificate Number KEMA 03ATEX1372 X or KEMA 03ATEX1373 X.

Markieren Sie mit einem wasserfesten Stift den Einsatzbereich (KEMA 03ATEX1372 X or KEMA 03ATEX1373 X) der Messzelle auf dem dafür vorgesehenen Feldern des Hinweisschildes. Wurde bereits eine Zuordnung vorgenommen, darf diese nicht mehr verändert werden.
With a permanent marker place a mark (✓) in the box on the load cell label to indicate the applicable protection (KEMA 03ATEX1372 X or KEMA 03ATEX1373 X). Once selected it may not be changed.



Mettler-Toledo PN 16936000A

Page 1 of 1

Figure 1-3: Installation Instructions for RLC Load Cell

Mettler-Toledo, Inc.
Columbus, Ohio
USA

Installationsanleitung
Installation Instructions

Typennummer des Anschlusskastens: TB100771-X, TB100772-X, TB100777-X, TB100778-X
X ist die Nummer der Abschlusskastenlöcher
Junction Box Model Numbers: TB100771-X, TB100772-X, TB100777-X, TB100778-X
where: -X designates the number of holes in the junction box

Schließen Sie die Kabel laut Farbcodetabelle bzw Anschlussplan an:
Wire according to the following color codes:

	Farbcode der Wägezelle Load Cell Color Code		Farbcode des Kabels zum Terminal Home Run Cable Color Code
ANALOG ANALOG			
Beschreibung/Description	Farbe/Color	Farbe/Color	Farbe/Color
+ Excitation	rosa/Pink	grün/Green	weiss/White
- Excitation	grau/Grey	schwarz/Black	blau/Blue
+ Signal	braun/Brown	weiss/White	grün/Green
- Signal	weiss/White	rot/Red	schwarz/Black
Shield	durchsichtig/Clear	gelb/Yellow	orange/weiss/Orange/White
+ Sense	nicht verwendet/Not Used		gelb/Yellow
- Sense	nicht verwendet/Not Used		Not/Red
POWERCELL und MTX POWERCELL and MTX			
Beschreibung/Description	Farbe/Color		Farbe/Color
A	gelb/Yellow		
B	blau/Blue		
N.C.	weiss/White		
+V	rot/Red		
GND	grün/Green		
CGND	orange/Orange		
A			gelb/Yellow
B			blau/Blue
GND			schwarz/Black
GND			braun/Brown
GND			grün/Green
+VC			orange/Orange
+VB			rot/Red
+VA			weiss/White

Installation/Installation

Installation wie im EG-Baumusterprüfbescheinigung KEMA03ATEX1396X oder Baumusterprüfbescheinigung KEMA 03ATEX1397X.

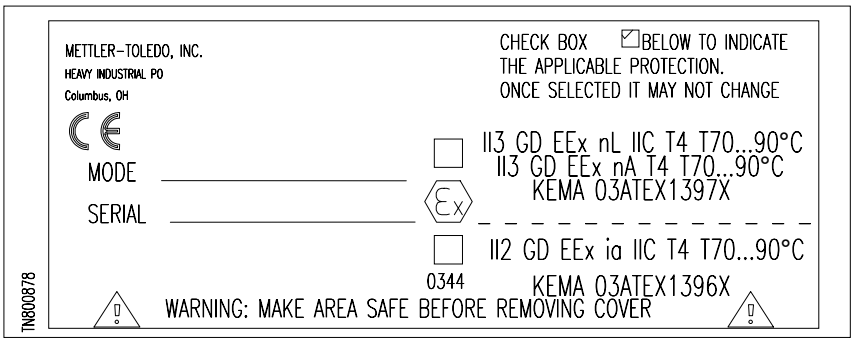
Install according to EC-Type Examination Certificate KEMA03ATEX1396X or Type Examination Certificate KEMA 03ATEX1397X.

Markieren Sie mit einem wasserfesten Stift den Einsatzbereich (KEMA03ATEX1396X oder KEMA 03ATEX1397X) des Anschlusskastens auf dem dafür vorgesehenen Feldern des Hinweisschildes. Wurde bereits eine Zuordnung vorgenommen, darf diese nicht mehr verändert werden.

With a permanent marker, a mark (√) must be placed in the location on the junction box label which indicates the applicable protection (KEMA03ATEX1396X or KEMA 03ATEX1397X). Once selected it may not be changed.

A16953600A

Figure 1-4: Installation Instructions for TB100771/TB100772 Junction Box



Jahr der Herstellung:
Year of manufacture:
Das Herstellungsjahr wird mit der letzten Stelle der Seriennummer (S/N) des Anschlusskastens wie folgt gekennzeichnet:
The year of manufacture is indicated by the last character on the junction box serial number (S/N) as follows:

Jahr/Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Buchstabe/Character	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T

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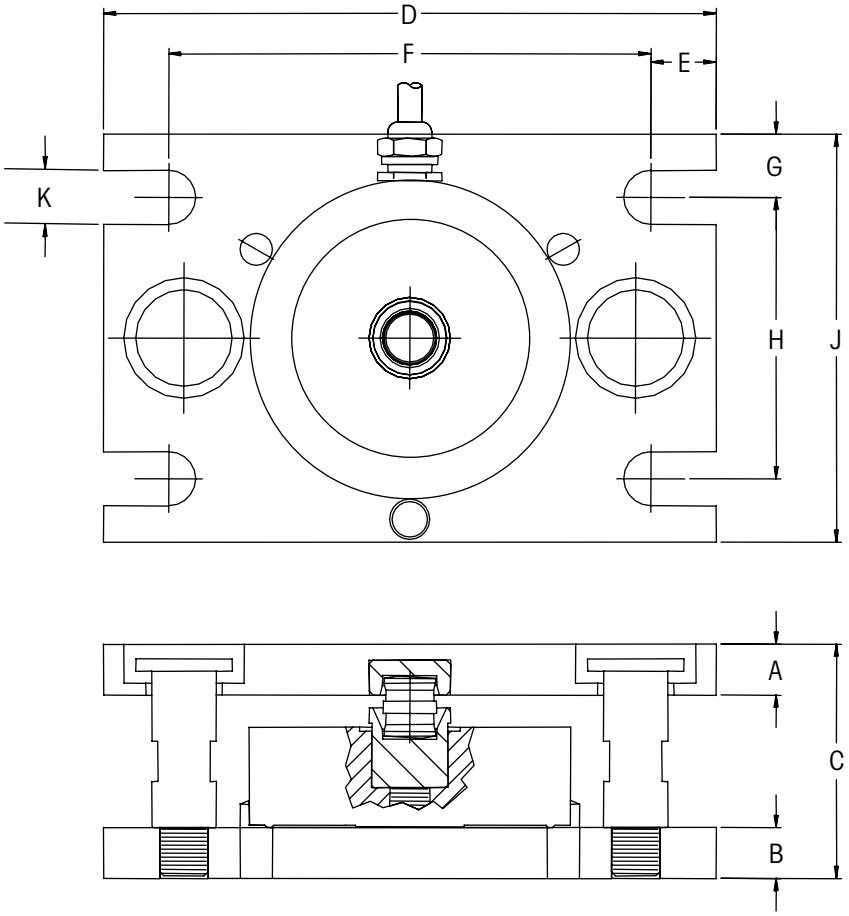
Figure 1-4: Installation Instructions for TB100771/TB100772 Junction Box

Dimensions



Load Cell Capacity	A	B	C	D	E
250-5,000 kg	12.7 mm (0.5 inch)	12.7 mm (0.5 inch)	58.4 mm (2.3 inches)	152.4 mm (6.0 inches)	16.2 mm (0.64 inch)
10,000 kg	25.4 mm (1.0 inch)	19 mm (0.75 inch)	99.5 mm (3.92 inches)	203.2 mm (8.0 inches)	19 mm (0.75 inch)

Load Cell Capacity	F	G	H	J	K
250-5,000 kg	120 mm (4.72 inches)	15.8 mm (0.62 inch)	70 mm (2.75 inches)	101.6 mm (4.0 inches)	13.5 mm (0.53 inch)
10,000 kg	165.2 mm (6.5 inches)	19 mm (0.75 inch)	82.6 mm (3.25 inches)	120.6 mm (4.75 inches)	18 mm (0.71 inch)

Table 1-2: 0970 RINGMOUNT Weigh Module Dimensions

2 Inspection and Site Selection

Inspection

When you receive your weigh modules, inspect the packing containers and modules for freight damage. Inspect:

1. Load cell and suspension assemblies
2. Load cell cables and junction box
3. Overall assembly

If you find damage, contact your freight carrier immediately. Fill out the enclosed warranty card and return the weigh module to the address indicated.

Site Selection

Problems installing weigh modules are often caused by inappropriate site conditions. Before installing the weigh modules, make sure the site meets the following criteria:

- All support surfaces should be level.
- Adequate support, where each module meets the floor or structure, throughout the scale's weighing capacity.
- Uniform deflection of the weigh module supports (top and bottom), maintaining less than one-half degree out of level at gross capacity.
- Proper drainage away from each of the weigh modules.
- No heavy vibrations or wind currents at or near the scale.
- Access around each weigh module for installation and service.
- Locations on the scale to add test weights for calibration.
- Access to the scale for moving test weights to the scale's loading locations.
- A position near the scale to mount the junction box.
  (Do not mount the junction box on the live portion of the scale.)
- No excessive or unusual loading caused by the site or type of equipment mounted to the weigh modules.
- Shared foundation: Does the vessel to be weighed have an exclusive, isolated support foundation? Does it share supports with other vessels? If the vessel shares a foundation, the scale's accuracy might be affected by the weight of other structures on the foundation.

If the site meets the criteria listed here, proceed with the installation. Otherwise, make necessary adjustments before installing the modules.

3 Installation

General Guidelines

⚠ WARNING

IF USED IN A HAZARDOUS AREA, THE HAZARDOUS AREA MUST BE MADE SAFE PRIOR TO INSTALLATION, REPLACEMENT, OR TROUBLESHOOTING. FAILURE TO COMPLY COULD RESULT IN PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.

Each application has its own unique requirements and should be planned by a qualified structural engineer. This manual is meant to serve only as a general guide for installation.

Use the Right Number of Weigh Modules

A typical system uses either three or four weigh modules. The exact number is usually determined by the structure that they will support. Each weigh module in a system should support the same amount of weight (within 20%). We do not recommend using more than eight weigh modules in a system. With more than eight modules, the structure's weight will not be distributed evenly at the support points.

Select Bolts Carefully

NOTE: The 10,000-kg weigh modules have 55 mm (2.17 inches) of clearance between the top and base plates.

These are low-profile weigh modules with only 33 mm (1.3 inches) of clearance between the top and base plates. Take into account the limited clearance when selecting bolts (or other fasteners) to secure the top and base plates.

Provide Adequate Structural Support

Tank legs or structural support lugs should be rigid enough to prevent the support points from deflecting under load.

Connect Piping Properly

Piping connected to a tank can affect weighing accuracy by exerting unwanted forces on the scale. Keep piping connections to a minimum and make sure they are flexible enough to allow the tank to deflect freely as weight is added.

Protect Load Cells from Damage

- Load cells can be damaged if too much weight is placed on them. To protect against damage, make sure that the hold-down bolts and shipping blocks are positioned properly during installation.
- Do not pass welding current through the load cells.

Installation

If the weigh modules are to be mounted to a concrete floor, locate and anchor the base plates to the concrete before setting the weigh structure (tank, hopper, etc.) on the modules. Make sure that you will be able to adjust the weigh structure to align it correctly with the weigh modules.

Before you begin installation, make sure that the top plate of each weigh module is locked into position so that it will not transfer any load to the load cell. During installation, the shipping blocks should be in position (see Figure 3-1) and clamped to the hold-down bolts.

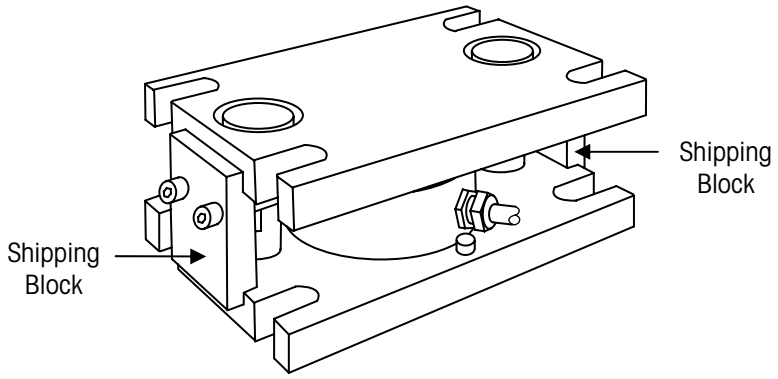


Figure 3-1: Weigh Module with Shipping Blocks in Position

1. Position the weigh modules so that each will support an equal portion of the total load and so the load on any module will not exceed the load cell capacity.
2. Level each weigh module so that each mounting plate (top and base plate) is within 1/2° of level in both longitudinal and lateral directions (see Figure 3-2).

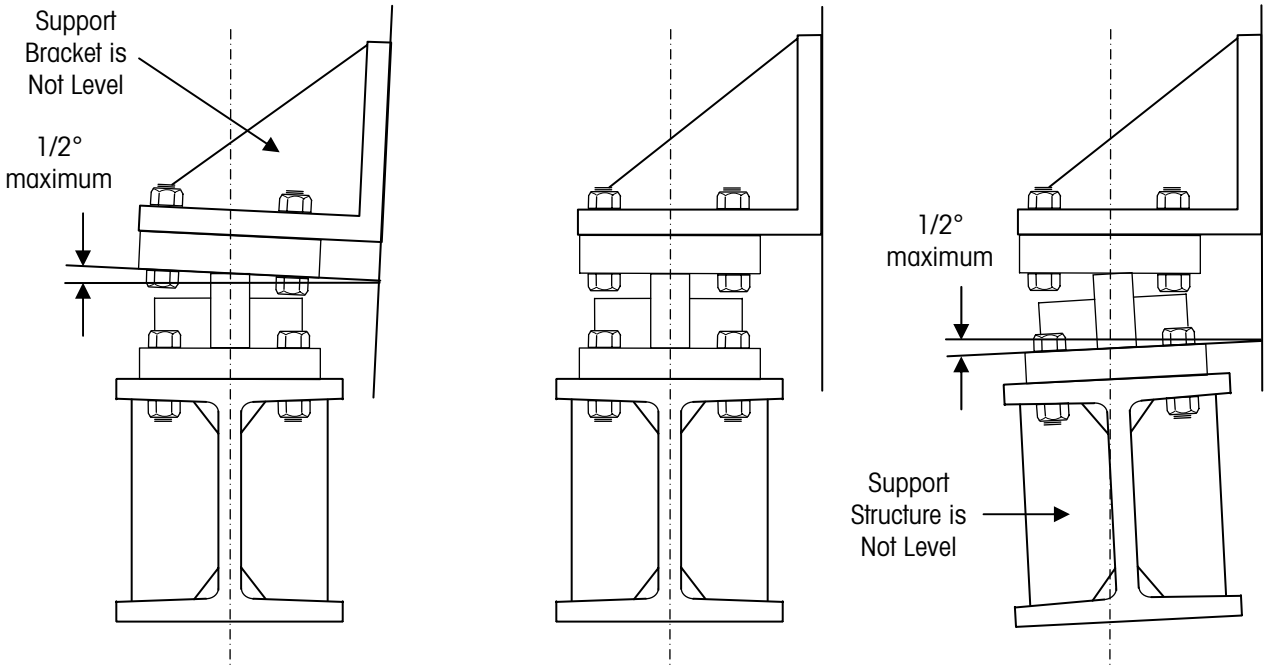


Figure 3-2: Maximum Amount that a Mounting Plate can be out of Level

3. Slowly lower the weigh structure onto the weigh modules.
4. Add stainless steel shims between the structure and top plates if needed, so that each top plate is within 1/2° of level in both longitudinal and lateral directions.
5. Bolt or weld the weigh module top plates to the weigh structure supports, and the base plates to the foundation or support steel. See Table 3-1 for bolt sizes. There is limited clearance between the top and base plates. Be sure to take that into account when selecting bolts (or other fasteners) to secure the plates.

NOTE: Mounting plate bolts are not supplied by METTLER TOLEDO.

0970 Weigh Module	Base Plate Bearing psi (K Pascal)	Top Plate Bolts (Metric)	Base Plate Bolts (Metric)
250 kg	23 (158)	1/2-13 UNC (M12 x 1.75)	1/2-13 UNC (M12 x 1.75)
500 kg	46 (317)		
1,000 kg	92 (634)		
2,000 kg	184 (1,267)		
3,500 kg	322 (2,217)		
5,000 kg	459 (3,168)		
10,000 kg	580 (4,001)	5/8-18 UNC (M16 x 2)	5/8-18 UNC (M16 x 2)

Table 3-1: 0970 Bearing Support and Mounting Bolt Sizes

6. If the top plates are to be welded to the weigh structure or the base plates welded to a structural steel support, the weld should be 3/8 inch fillet, 1 inch long, and 3 inches pitch (2 inches between welds).

⚠ CAUTION

DO NOT PASS WELDING CURRENT THROUGH THE LOAD CELLS! WHEN WELDING ON A SCALE, ALWAYS GROUND THE WELDING DEVICE AS CLOSE TO THE WORK AS POSSIBLE. NEVER WELD CLOSER THAN 4 FEET (1.2 METERS) TO ANY LOAD CELL WITHOUT REMOVING THE LOAD CELL.

7. After securing all the top and base plates, remove the shipping blocks and clamps.

NOTE: Consider calibrating the scale before connecting any piping to the scale. The scale can then be used as a meter to determine if a proper live-to-dead connection was made.

8. Mount the junction box in a location where the load cell cables can be properly terminated in the junction box. Do not mount the junction box on the scale.

   Note: Each load cell is supplied with a standard length of cable. Do not lengthen or shorten load cell cables in the field! Changing the length of a load cell cable will affect compensation and void the warranty. If a cable is too long, simply coil the excess cable and place it in or near the junction box. Nonstandard lengths of cable can be ordered for applications that require them.
9. Connect the load cell cables to the junction box and terminate wires according to the wiring and color code decal on the underside of the junction box lid.
10. Connect the junction box to the scale indicator with an appropriate cable.
11. Confirm that all live-to-dead connections are flexible and securely anchored at both the scale and dead connection point.

Modes of Operation

Analog Mode

Model 0970 weigh modules can be used with an analog junction box for summing the load cell outputs. Only analog-compatible indicators work with an analog junction box. See Figure 3-3 and Table 3-2 for cable connections.

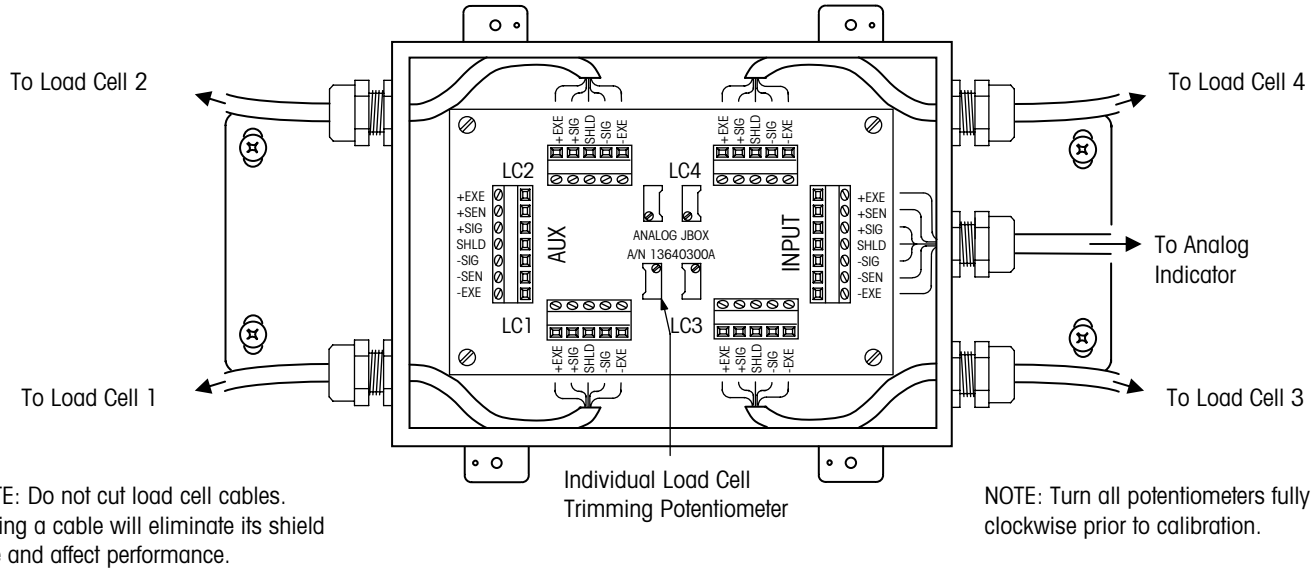


Figure 3-3: Analog Junction Box Detail

Load Cell Wiring			Instrument Cable Wiring*	
Function	**Standard Wire Color**	**Teflon Wire Color**	**Function**	**Color**
+ Excitation	Pink	Red	+ Excitation	White
+ Sense	—	—	+ Sense	Yellow
+ Signal	Brown	Green	+ Signal	Green
Shield	Clear	Plated Copper	Shield	Orange
- Signal	White	White	- Signal	Black
- Sense	—	—	- Sense	Red
- Excitation	Gray	Black	- Excitation	Blue
*Based on METTLER TOLEDO cable no. 510624370				

Table 3-2: Analog Junction Box Wiring Codes

RAAD Mode

Model 0970 weigh modules can be used with a RAAD junction box for summing load cell outputs. A JAGUAR® or JAGXTREME™ indicator must be used with the RAAD junction box. The indicator serves as the host for the RAAD junction box, allowing you to use the indicator's keypad to adjust scale parameters. See Figure 3-4 and Table 3-3 for cable connections. Load cell wiring for RAAD mode is the same as for analog mode.

NOTE: The RAAD box is a Remote Addressable Analog-to-Digital junction box. It converts a standard analog signal to a DigiTOL signal and allows monitoring of individual load cell channels.

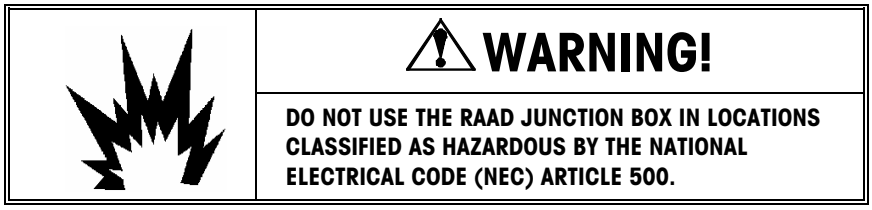
NOTE: A DigiTOL POWERCELL card must be installed in the JAGUAR or JAGXTREME indicator.

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

NOTE: If more than one junction box is used, connect the junction boxes in a daisy chain. Connect Terminal TB5 on the first junction box to Terminal TB2 on the next junction box in the series.

The addresses of the DigiTOL cards in the second RAAD box must be reset to the factory settings and then re-addressed to the correct load cell number.

Switch Positions (SW)
SW1: On if Load Cell 1 is used
SW2: On if Load Cell 2 is used
SW3: On if Load Cell 3 is used
SW4: On if Load Cell 4 is used
SW5: On if last J-box in series



WARNING!

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

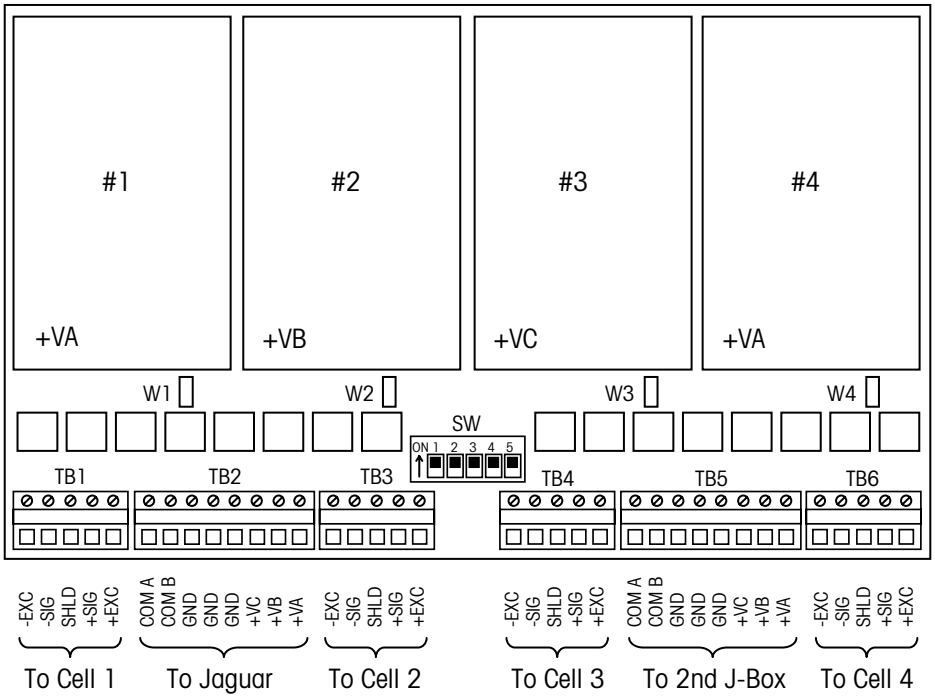


Figure 3-4: RAAD Junction Box Detail

RAAD TB2 Terminal	Function	Jaguar Terminal
1	+20 VDC (+VA)	8
2	+20 VDC (+VB)	7
3	+20 VDC (+VC)	6
4	Ground	5
5	Ground	4
6	Ground	3
7	COM B	2
8	COM A	1

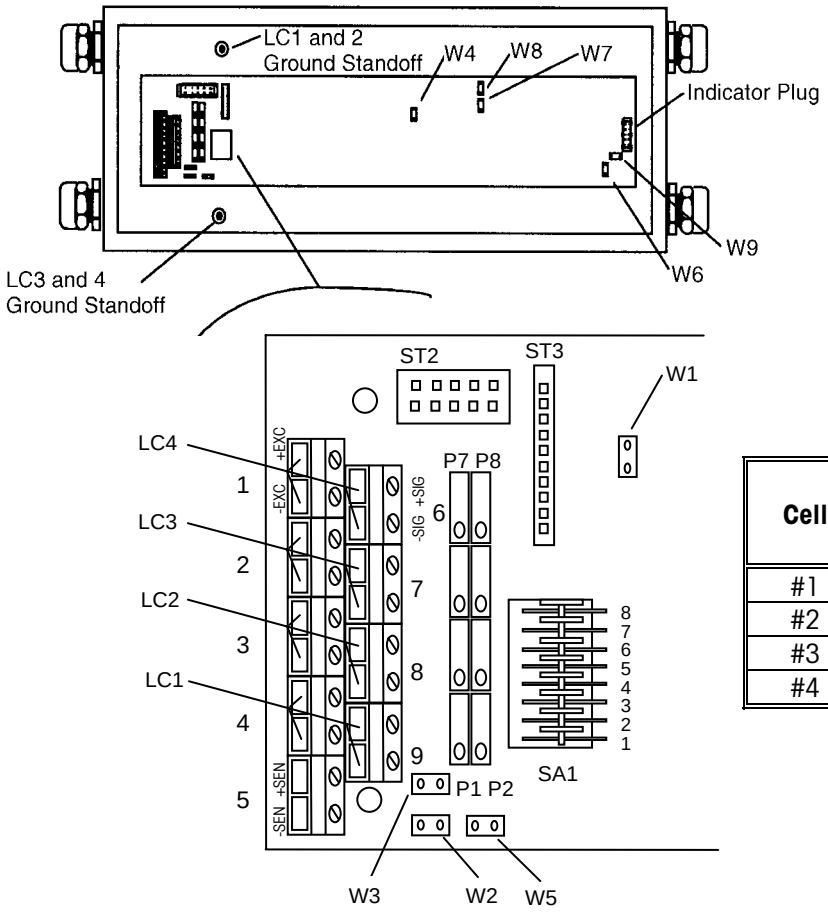
Table 3-3: RAAD Junction Box Wiring

IDNet Mode

The IDNet junction box can output an IDNet data format compatible with METTLER TOLEDO IDNet weight displays. See Figure 3-5 and Table 3-4 for cable connections. For detailed information about the indicator capabilities and operating instructions, refer to the appropriate service manual.

⚠ WARNING!

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



Cell	Terminal			
	+ Exc. Pink	- Exc. Gray	+ Sig. Brown	- Sig. White
#1	4	4	9	9
#2	3	3	8	8
#3	2	2	7	7
#4	1	1	6	6

Figure 3-5: IDNet Junction Box Detail and Wiring

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

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

Table 3-4: IDNet Default Factory Settings

Home Run Cable Connection

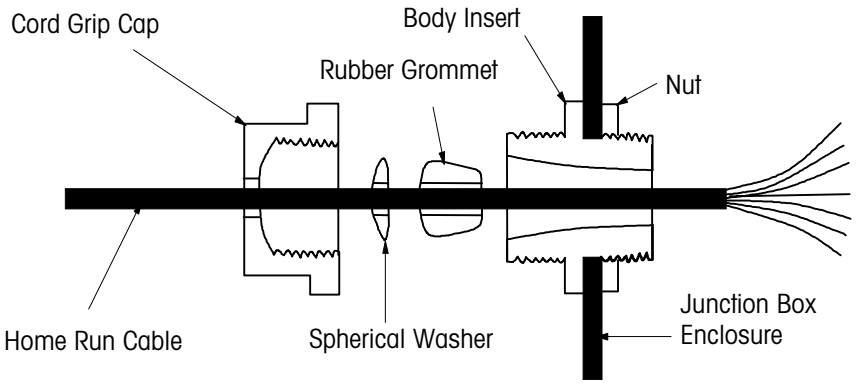


Figure 3-6: Cord Connection Details

Connect the home run cable from the scale indicator to the junction box (refer to Figure 3-6):

1. Wire the home run cable to the PCB according to Figure 3-3 for Analog, Figure 3-4 for RAAD, or Figure 3-5 for IDNet.
2. Place the desiccant bag inside the junction box.
3. Reinstall the junction box lid. Make sure that the rubber gasket is clean and correctly positioned. Tighten all screws and make sure all cord grip caps are secure.

4 Calibration

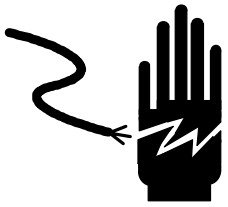
Shift Adjust

Before making calibration adjustments, check all mechanical parts and make sure that the scale provides repeatable weight readings. To check repeatability, repeatedly place a test weight in the same position on the scale and confirm that you get the same weight reading each time.

Then perform a shift adjust so that the weight reading at or near each weigh module is the same for the same test weight.

The test weight used for the shift test should equal at least 10 percent of the rated scale capacity. Test weights should be concentrated directly (or as close as possible) over the weigh modules.

Analog Junction Box Shift Adjustment



⚠ 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.

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

1. Successively place the test weight at each of the designated locations (at or near the weigh modules). Record the displayed weight readings.
2. Determine the location with the lowest weight reading.
3. Proceeding clockwise, place the test weight at each designated location. If necessary, adjust the trim potentiometer corresponding to that location to obtain the weight reading recorded in Step 2.
4. Repeat this procedure until all weight readings at the designated locations are the same or within the tolerances specified by the local weights and measures authority.
5. Make sure all cable connectors and cord grip caps are tight, place the desiccant bag in the box, and reinstall the junction box lid.

RAAD Junction Box Shift Adjustment

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

IDNet Junction Box Shift Adjustment

Perform the shift adjust procedure using the load cell trim potentiometers mounted on the PCB inside the IDNet junction box (see Figure 4-1).

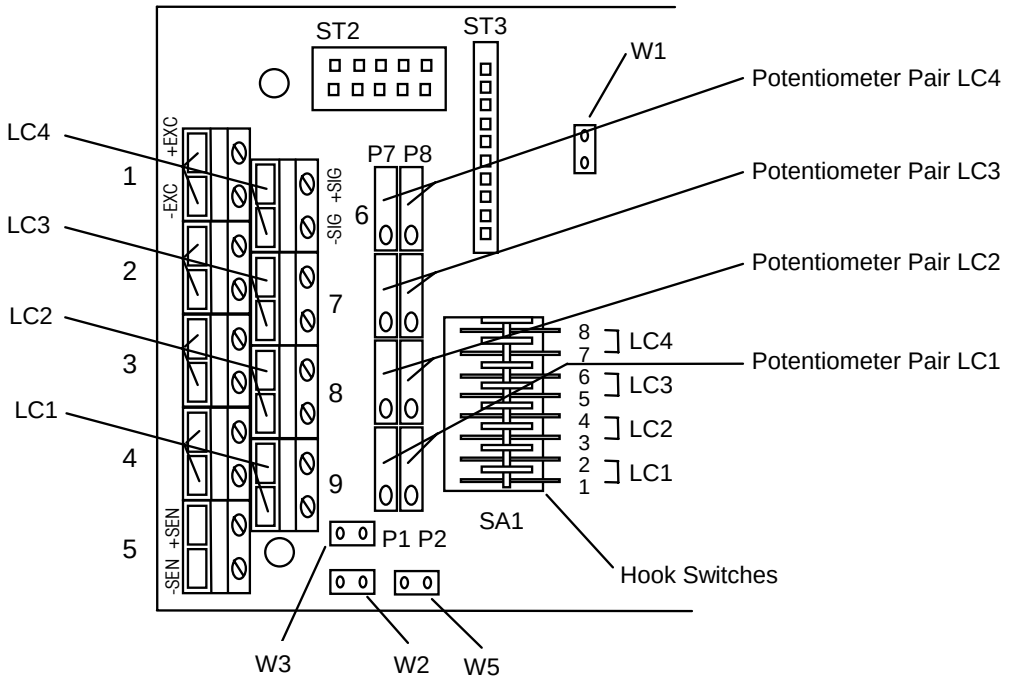


Figure 4-1: IDNet Potentiometer Adjustment

1. Successively place the test weight(s) at the designated locations and record each weight reading. If the readings are within the desired tolerance, no shift adjustment is needed. If the readings are not within the desired tolerance, perform Steps 2 to 6.
2. Activate the trim potentiometers by opening the eight hook switches (if they are not already open) on the PCB (see Figure 4-1). Once activated, the switches remain open. Do not close the latches, even after completing the shift adjustment.
3. Start the adjustment at the load cell having the highest positive reading. This process trims the load cells to match the value of the lowest recorded value.
4. To make minor adjustments, turn the trim potentiometers (each load cell has two) clockwise to increase the reading or counterclockwise to decrease the reading.

5. If the scale needs further adjustment, turn all potentiometers counterclockwise. Stop turning the potentiometers when the indication on the instrument or meter stabilizes.
6. Reapply the test weight(s) to the location that has the highest recorded weight reading. Then adjust the load cell potentiometers to match the reading of the location that has the lowest recorded value. Repeat this step until the readings at all locations are the same or within the specified scale tolerances. Repeat Step 1 to verify shift tolerances.
7. Make sure all cable connectors and cord grip caps are tight. Then place a desiccant bag in the box, leave all hook latches open, and reinstall the junction box lid.

Scale Calibration (Span)

METTLER TOLEDO recommends calibrating the scale using test weights equal to the scale's capacity. With the proper test weight, continue calibrating the weighing system according to the instructions provided in your digital indicator manual.

Options for Calibration

Calibration with Test Weights

The most accurate, reliable way to calibrate a scale is to hang test weights from the tank. This method is useful when accuracy is extremely important and in tanks holding less than 10,000 kg.

Take readings as you add and remove weights. This yields a graph of the scale's performance from zero to maximum, and back to zero.

Calibration with Test Weights and Material Substitution

The substitution method is recommended for larger installations where it is physically impossible to hang test weights equal to the tank's maximum capacity. When performed correctly, this method yields a reliable performance graph.

1. Record the weight reading for the empty tank before you hang test weights. Hang the test weights (for example, 1,500 kg) and record the weight reading of the tank with the test weights attached. Then remove the test weights and record the weight reading of the empty tank to make sure that it is the same as the first reading.
2. Add enough water to the tank to equal the weight reading obtained with the test weights, and record this weight reading.
3. Leave the water in the tank. Hang the same test weights again, and record the combined weight of the tank (with both water and test weights). Then remove the test weights, and record the weight reading.
4. Add enough additional water to the tank to equal the combined weight, and record the weight reading.
5. Repeat steps 3 and 4 until the tank is full.

Calibration with Material Transfer

When calibrating with material transfer, weigh a material (usually water) on an existing scale and transfer it to the tank scale being calibrated. You can do this in a single transfer or in stages until you reach the tank's maximum capacity. This method provides only a rough calibration. It is only as accurate as the existing scale and the integrity of the transfer process. Even under the best circumstances, you cannot tell if allowable errors are cumulative or compensating.

Electronic Calibration

When using the electronic calibration method, replace the load cell cables with leads from a load cell simulator. The simulator sends out a signal equal to the signal the load cells should produce. Electronic calibration is noted for its speed and simplicity; however, it calibrates only the electronics. It does not verify the scale performance because it assumes that the tank and all mechanical connections are in perfect working order.

1. With the simulator adjusted to zero output, set the indicator to zero.
2. Adjust the simulator to full output, a signal equal to that which all the load cells should produce at their rated capacity.
3. Adjust the indicator to show the total capacity of all load cells in the system.
4. Attach the load cell input to the indicator.
5. "Zero off" the empty weight of the tank.

5 Routine Care and Maintenance

General

Once you have installed your scale, you should have an authorized METTLER TOLEDO representative periodically inspect and calibrate it. If the scale is used for legal-for-trade purposes, consult the local weights and measures authorities for minimum inspection requirements. Contact your local authorized METTLER TOLEDO service representative for information on periodic inspection and calibration services.

Site Inspection

Make sure that the scale site remains in good condition. Check for changes in the dead-to-live connections, changes in support for the weigh modules, overloading and excessive vibration conditions, and debris or material build-up under or around the scale that could prevent the scale from moving freely.

Weigh Module and Junction Box Inspection

During periodic inspections of the weigh modules, check the following:

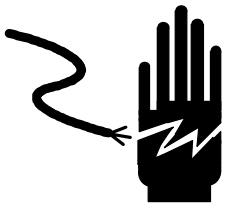
- Load cells and rocker pins for signs of unusual wear
- Clearance between the hold-down bolts and the top plate
- Floor drain for adequate drainage away from the weigh modules
- Junction box lid: Is it properly sealed? Are all cord grips tight?
- Moisture or foreign material present around or inside the junction box assembly
- Instrument cable: Is it damaged? Does it bind the scale?
- Repeatability and shift of the scale

6 Troubleshooting

General

⚠ WARNING

IF USED IN A HAZARDOUS AREA, THE HAZARDOUS AREA MUST BE MADE SAFE PRIOR TO INSTALLATION, REPLACEMENT, OR TROUBLESHOOTING. FAILURE TO COMPLY COULD RESULT IN PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.



⚠ WARNING

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

⚠ CAUTION

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

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

Check the instrument cable for damage and check all connections for any loose/incorrect wiring. Examine the physical location of the scale, checking for the following:

- Water
- Corrosive materials
- Unlevel floors
- High vibrations
- Air currents
- Physical damage to the scale platform or frame

Isolate the Problem

To determine whether the problem is in the scale or the digital indicator:

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

Check Wiring

1. Remove power from the system.
2. Remove the lid from the junction box and check the interior for moisture and foreign material.
3. Make sure that all wiring connections are tight and that no insulation material is touching the terminal contacts.
4. Check all cable connections for correct wiring. The wiring color codes are given in Table 6-1.
5. Make sure that the trim resistor is still installed on the -Signal load cell wire.
6. Check all cable connectors and cord grip caps on the junction box. Tighten any loose connectors.

*See Figure 3-4 and Table 3-3 for RAAD box instrument cable wiring.

Load Cell Wiring			Instrument Cable Wiring*	
Function	**Standard Wire Color**	**Teflon Wire Color**	**Function**	**Color**
+ Excitation	Pink	Red	+ Excitation	White
+ Sense	—	—	+ Sense	Yellow
+ Signal	Brown	Green	+ Signal	Green
Shield	Clear	Plated Copper	Shield	Orange
- Signal	White	White	- Signal	Black
- Sense	—	—	- Sense	Red
- Excitation	Gray	Black	- Excitation	Blue
*Based on METTLER TOLEDO cable no. 510624370				

Table 6-1: Load Cell Wiring Color Codes

Check Load Cells

1. Remove power from the system. Fully disconnect each load cell and check for proper input/output resistances (see Table 6-2).

Measuring Points	Resistance
+Exc (Pink) to -Exc (Gray)	1,060 to 1,160 ohms (1,050 to 1,150 ohms for 250-kg and 10,000-kg load cells)
+Sig (Brown) to -Sig (White)	1,000 to 1,050 ohms (975 to 1,075 ohms for 250-kg and 10,000-kg load cells)

Table 6-2: Load Cell Measuring Points

2. If resistance is within specification, perform a shorted-signal symmetry test.
   - Short the signal leads together and place one multimeter lead on the shorted signals and one lead on the +Excitation wire. Note the resistance value.
   - Remove the lead from the +Excitation wire and place it on the –Excitation wire. The two resistance values should be approximately equal.
3. If the load cells pass the shorted-signal test, reconnect them and reapply power to the scale. Confirm that the proper excitation voltage is reaching the load cells by placing multimeter leads on the excitation positions of each load cell terminal.
4. If proper excitation voltage is reaching the load cells, check the output signal from each cell by disconnecting the signal leads and measuring voltage output. If one cell has a particularly high or low dead-load output, it is suspect. The maximum output possible from any cell is 30 mV at 15 VDC excitation and loaded to gross capacity (26.25 mV for 250-kg load cells).
5. If any load cell has an unusual signal, remove all load from that cell.
   - With the power on, measure the output from the suspect load cell. The no-load zero output should be ± 1.0% of the full scale output (± 1.5% for 250-kg load cells). For example, if the excitation voltage is 15 VDC, then the full scale output would be 30 mV (26.25 mV for 250-kg load cells) and the no-load zero output should be within ± 0.3 mV (within ± 0.4 mV for 250-kg load cells).
6. If a load cell fails any of the above tests, replace it.

Check Mechanical Components

Because the 0970 weigh module design is so simple, only a few mechanical components require troubleshooting. Make sure that the scale can move freely.

Check the following:

- Is the scale rocking? Reshimming may be required.
- Check the rocker pins for unusual wear. Replace unevenly worn pins or pins with flattened bearing surfaces.
- Check new or modified dead-to-live connections on the scale.
- Does rigid piping or poor structural support result in mechanical binds?

Load Cell Replacement Procedure

Remove Load Cell

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. Loosen the watertight cable connector on the junction box and remove the cable from the enclosure.
5. If the load cell cable runs through a conduit, attach a string to the end of the defective load cell cable. The string should be both strong enough and long enough to pull the new load cell cable through the conduit.
6. Loosen the weigh module's hold-down bolts, using an open-end wrench (250-5,000 kg: 13 mm; 10,000 kg: 17 mm) at the flats on the shaft of each bolt.
7. **250-5,000 kg:** Carefully jack up the weigh structure 5 mm (0.2 inch).

   10,000 kg: Carefully jack up the weigh structure 9 mm (0.4 inch).
8. Remove the load cell retaining screw from the base plate, and keep it for reinstallation. Remove the load cell from the weigh module assembly.

⚠ CAUTION

BE SURE TO BLOCK THE SCALE WHEN IT IS IN THE RAISED POSITION. OBSERVE ALL APPROPRIATE SAFETY PROCEDURES WHEN INSTALLING AND SERVICING THE WEIGH MODULES.

9. Carefully pull the defective load cell cable through the conduit while feeding the string through the junction box opening. Once the string is at the load cell location, detach it from the load cell cable.

10. Remove the rocker pin and load cell receiver from the defective load cell.

Install New Load Cell

1. Install the rocker pin and load cell receiver in the new load cell.
2. Center the new load cell on the base plate, making sure that the rocker pin fits into the receiver in the underside of the top plate.
3. Attach the new load cell cable to the string and carefully thread it through the conduit into the junction box opening.
4. Thread the load cell cable through the connector on the junction box. When the cable length inside the box is sufficient, tighten the box connector.
5. Wire the new load cell cable to the proper terminal on the PCB, according to the wiring code.
6. Make sure that the rocker pin is properly aligned with the receiver in the top plate. Then, slowly lower the top plate until the rocker pin is properly seated.
7. Tighten the weigh module's hold-down bolts to the lowered position.
8. Insert the load cell retaining screw into the base plate.
9. Reattach the instrument cable and power-up the indicator. Perform a shift adjust if required, and recalibrate the scale.

7 Service Parts

Refer to the following drawing and table when ordering parts for Model 0970 weigh modules.

0970 Weigh Module

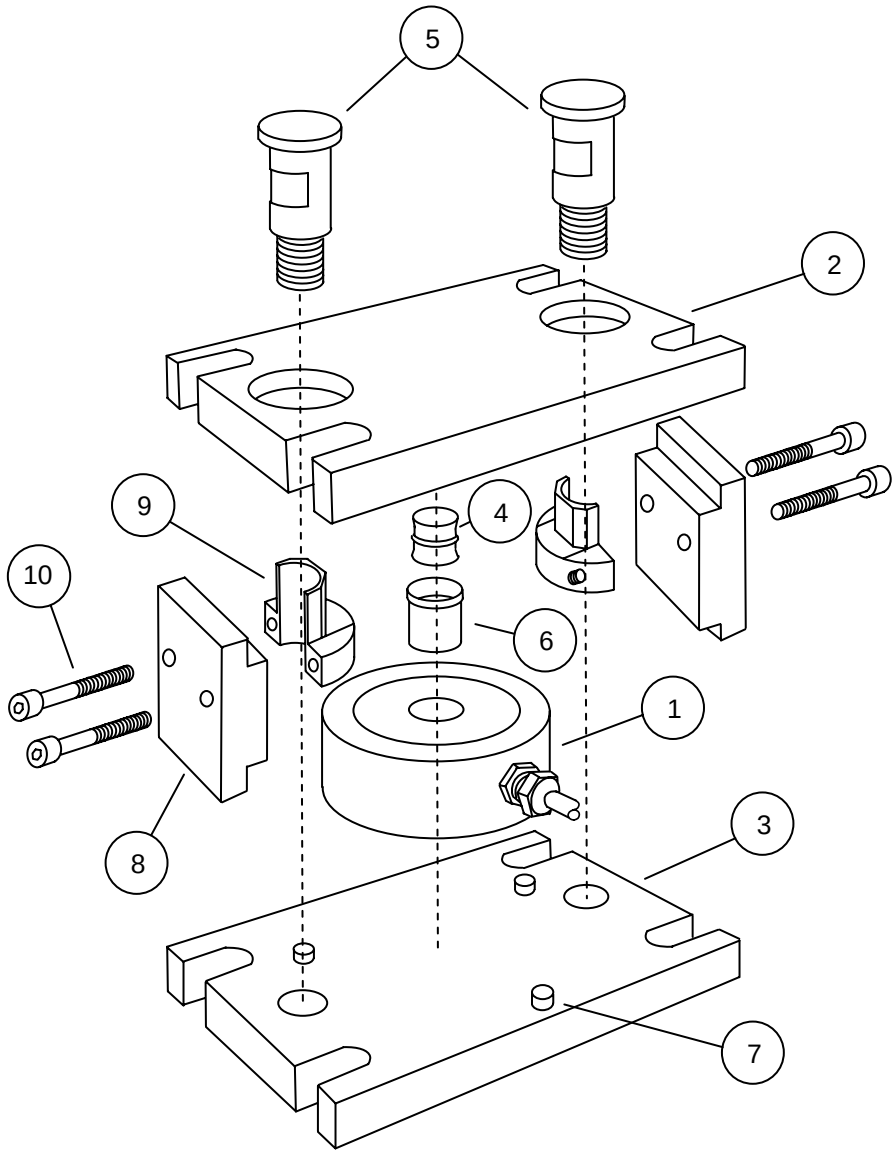


Figure 7-1: 0970 Weigh Module Assembly

Ref. No.	Part Number	Description	Qty.
1	TB600935-050	250-kg Load Cell, OIML C3, Ex, FM	1
	TB600941-050	500-kg Load Cell, OIML C3, Ex, NTEP/FM	
	TB600947-050	1,000-kg Load Cell, OIML C3, Ex, NTEP/FM	
	TB600953-050	2,000-kg Load Cell, OIML C3, Ex, NTEP/FM	
	TB600959-050	3,500-kg Load Cell, OIML C3, Ex, NTEP/FM	
	TB600965-050	5,000-kg Load Cell, OIML C3, Ex, NTEP/FM	
	TB600971-100	10,000-kg Load Cell, OIML C3, Ex, FM	
	TB600949-050	1,000-kg Load Cell, OIML C6, Ex, FM	
	TB600955-050	2,000-kg Load Cell, OIML C6, Ex, FM	
	TB600961-050	3,500-kg Load Cell, OIML C6, Ex, FM	
	TB600967-050	5,000-kg Load Cell, OIML C6, Ex, FM	
2	TA600978-S6	Top Plate with Receiver, SS (250 - 5,000 kg)	1
	TA601078-S6	Top Plate with Receiver, SS (10,000 kg)	
3	TA600976-S6	Base Plate, SS (250 - 5,000 kg)	1
	TA601076-S6	Base Plate, SS (10,000 kg)	
4	TA800776	Rocker Pin, SS (250 - 5,000 kg)	1
	TN800867	Rocker Pin, SS (10,000 kg)	
5	TN600975	Hold-Down Bolt, M12 x 1.75, SS (250 - 5,000 kg)	2
	TN601075	Hold-Down Bolt, M16 x 2, SS (10,000 kg)	
6	TN600980	Load Cell Receiver (250 - 5,000 kg)	1
	TN601080	Load Cell Receiver (10,000 kg)	
7	MZ0901010543	Load Cell Retaining Screw, M6x1, SS	1
8	17288600A	Shipping Block (250 - 5,000 kg)	2
	TN601240	Shipping Block (10,000 kg)	
9	17288700A	Ring Clamp (250 - 5,000 kg)	2
	TN601239	Ring Clamp (10,000 kg)	
10	MZ0901010629	Socket-Head Screw, M4 x 0.7 (250 - 5,000 kg)	4
	MZ0901010634	Socket-Head Screw, M6 x 1 (10,000 kg)	

Table 7-1: 0970 Weigh Module Assembly

8 Reference Material

Reference Drawings

- *Weigh Module Systems Handbook,* Part Number *15598500A (may have a letter prefix)
- *Do-It-Yourself Guide To Building Tank Scales,* Part Number TH3100.1E

General Dimensions	Analog Wiring Diagram	RAAD Box Wiring Diagram	IDNet Wiring Diagram
TB601176	TB100809	15962700A	TB100600

Table 8-1: Reference Drawings

Recommended Spare Parts

For part numbers, refer to Chapter 7.

Qty.	Description
1	Load cell
1	Junction box circuit board (type of board is per model of scale)
1	Junction box desiccant bag
1	Rocker pin

Table 8-2: Recommended Spare Parts

METTLER TOLEDO

Publication Suggestion Report

If you have suggestions concerning this publication, please complete this form and fax it to (614) 841-7295

Publication Name: METTLER TOLEDO 0970 RINGMOUNT Weigh Modules Installation and Service Manual

Publication Part Number: E16104400A **Publication Date: 6/06**

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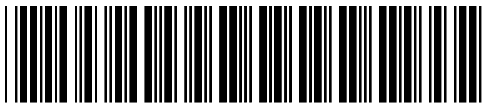

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