METTLER TOLEDO

VLM3

Value Line Weigh Modules

Installation and Service Manual

A16104500A
(8/01)

INTRODUCTION

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

DECLARATION OF CONFORMITY
Konformitätserklärung
Déclaration de conformité
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Conformiteitsverklaring
Dichiarazione di conformità

METTLER TOLEDO

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: 0792 Load Cell (Used in model VLM3 Weigh Module)

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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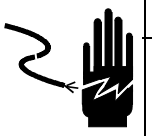
Council directive on the harmonization of the laws of the Member states:	**standards:**
Article 1.2.b relating to non-automatic weighing instruments (90/384/EEC) amended by directive (93/68/EEC)	EN 45501

Worthington, Ohio USA, February 2001 **Mettler-Toledo, Inc.**
Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures

according to EN45014

Precautions



⚠ 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.

- Read this manual before installing 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.

CONTENTS

1 Introduction

VLM3 Weigh Modules

Value Line VLM3 weigh modules are economical assemblies for converting tanks, conveyors, and other structures into scales. These compression-mount weigh modules are available in capacities ranging from 1,000 to 75,000 pounds.

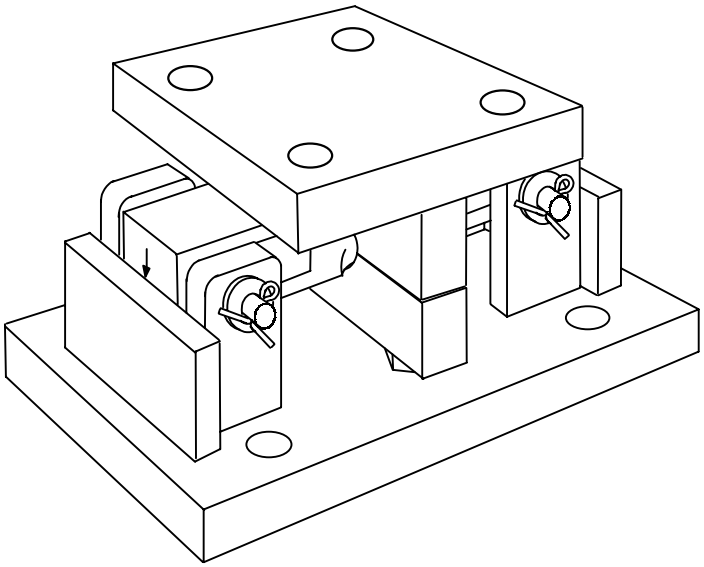


Figure 1-1: VLM3 Weigh Module

Model Numbers

The model numbers used for VLM3 weigh modules indicate the material they are made of, the number of weigh modules (load cells), and the capacity of the load cells. Use Table 1-1 to determine the correct model number to order for an application.

Value Line Model Numbering Scheme			
XXXX	**X**	**X**	**XX**
Model	**Material**	**No. of Load Cells**	**Capacity**
VLM3	C = Carbon Steel	1, 3, or 4	01 = 1,000 lb 02 = 2,000 lb 05 = 5,000 lb 10 = 10,000 lb 15 = 15,000 lb 25 = 25,000 lb 35 = 35,000 lb 50 = 50,000 lb 75 = 75,000 lb

Table 1-1: VLM3 Model Numbering Scheme

For example, Model VLM3C410 is a set of four 10,000-lb carbon steel VLM3 weigh modules.

Load Cell Specifications

Model Number: 0792

Capacities: 1,000, 2,000, 5,000, 10,000, 15,000, 25,000, 35,000, 50,000, 75,000 lb

Rated Output: 3 mV/V

Excitation Voltage: 15 VDC maximum

Sealing: Environmentally sealed

Material: 17-4 PH stainless steel

Cable Length: 20 feet (6.1 m) long, four-conductor cables

Input Terminal Resistance: 700 ± 7 ohms

Output Terminal Resistance: 700 ± 7 ohms

Temperature Range (compensated): 14ºF to +104ºF (-10ºC to +40ºC)

Safe Overload: 150% Rated Output

Safe Side Overload: 100% Rated Output

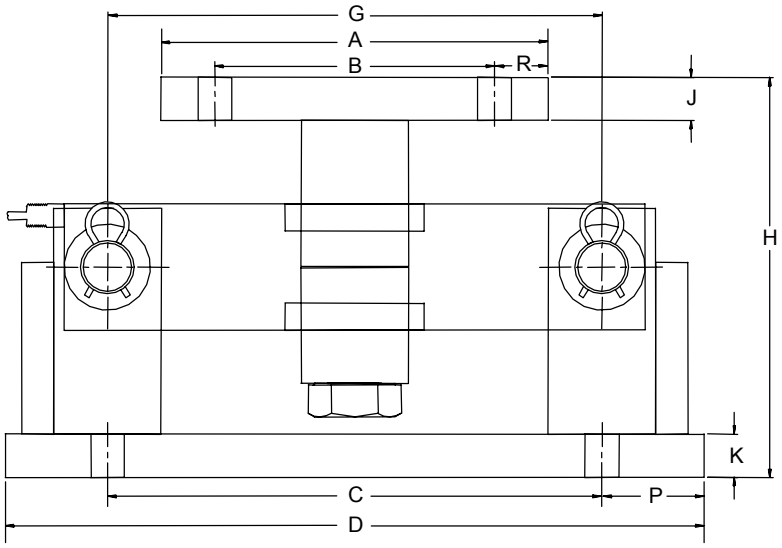
Zero Balance: ± 1.0% Rated Output

Approvals

NTEP Certification

NIST H-44 Class III 3,000d multiple cell.

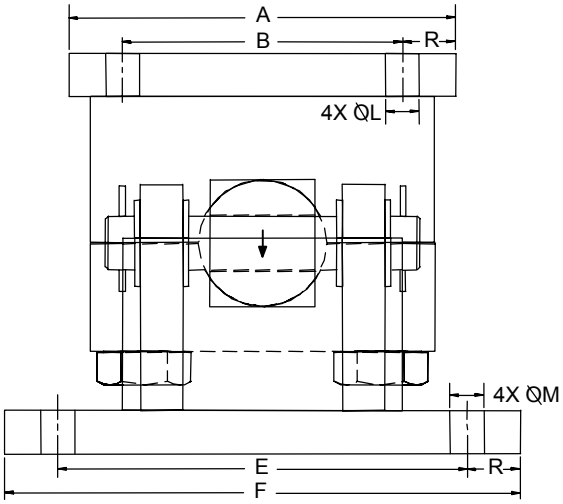
Dimensions



Side View of Weigh Module

Capacity (LB)	A	B	C	D	E	F	G
1-5K	4.00 (101.6)	2.75 (69.9)	6.25 (158.8)	9.25 (235.0)	3.75 (95.3)	5.00 (127.0)	6.25 (158.8)
10-35K	8.00 (203.2)	6.00 (152.4)	7.50 (190.5)	12.00 (304.8)	6.00 (152.4)	8.00 (203.2)	7.50 (190.5)
50-75K	9.00 (228.6)	6.50 (165.1)	11.50 (292.1)	16.25 (412.8)	9.50 (241.3)	12.00 (304.8)	11.50 (292.1)

Note: Dimensions are given in inches and (mm).



End View of Weigh Module

Capacity (LB)	H	J	K	L	M	P	R
1-5K	5.13 (130.3)	0.50 (12.7)	0.50 (12.7)	0.56 (14.2)	0.56 (14.2)	1.50 (38.1)	0.62 (15.7)
10-35K	7.90 (200.7)	0.75 (19.0)	0.75 (19.0)	0.81 (20.6)	0.81 (20.6)	2.25 (57.2)	1.00 (25.4)
50-75K	9.30 (236.2)	1.00 (25.4)	1.00 (25.4)	0.81 (20.6)	0.81 (20.6)	2.38 (60.5)	1.25 (31.7)

Note: Dimensions are given in inches and (mm).

2 Installation

General Installation Guidelines

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.

Select an Appropriate Site

- The floor or other surface on which the weigh modules will be mounted must be able to support the weight of the scale at full capacity.
- There should be no strong vibrations or wind currents near the scale.

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%). When you use more than four weigh modules in a system, it is more difficult to distribute the structure's weight evenly among the support points. However, the maximum number of weigh modules in a system is limited only by the scale terminal's ability to power all the load cells (typically 8 to 10 350-ohm load cells).

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

Do not pass welding current through the load cells.

Do Not Cut Load Cell Cables

Cutting a cable will affect compensation and void the warranty.

Weigh Module Orientation

Before installing the weigh modules, decide how they will be arranged. Space the weigh modules evenly so that each one supports approximately the same amount of weight.

In most applications, three or four weigh modules are used to support the structure. Figure 2-1 shows recommended mounting arrangements.

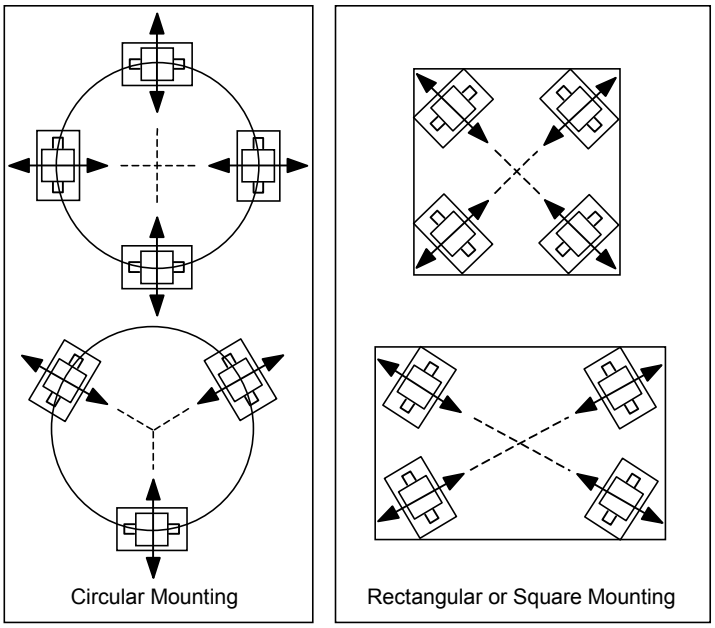


Figure 2-1: Plan View of Mounting Arrangements

Installation Procedure

The installation procedure will depend on the specific requirements of an application. One of the first things to consider is the foundation on which the scale will be placed. This is usually a concrete floor or steel beams. Whichever you are using, you will need to make sure that the foundation is level and strong enough to remain rigid under the weight of the full scale.

Assemble the weigh modules before you begin installation (refer to Figures 1-1 and 4-1). Place the load cell between the loading plate and lower clamp, and then bolt the loading plate and clamp together. **The arrow marked on the end of the load cell must be pointing downward.** Line up the holes in the load cell with the holes in the vertical lugs on the mounting plate. Insert shaft pins through the holes, and use flat washers and cotter pins to hold them in place.

1. Position a weigh module under each of the structure's support points, and carefully lower the structure onto the weigh modules.
2. Make sure that each support point rests securely on a module's loading plate and that all loading plates are level. Otherwise, add shims until the loading plates are level and there are no gaps between them and the support points.
3. Bolt the loading plate of each weigh module to the support point of the structure that is resting on it.
4. Position the structure on the foundation (concrete slab or steel beam). Mark the positions of the four mounting plate holes on the foundation.
5. Move the structure out of the way and drill the appropriate size holes in the foundation.
6. Reposition the structure, and anchor the mounting plates to the foundation. All mounting plates must be level, parallel to one another, and properly aligned.

Electrical Wiring

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.

1. Mount the junction box in a location where the load cell cables can be properly connected to the junction box. Do not mount the junction box on the scale.
2. Connect the load cell cables to the terminals inside the junction box according to the wiring code shown in Table 2-1.

Load Cell Wire Color	Function
Red	+ Excitation
Black	- Excitation
Green	+ Signal
White	- Signal
Bare	Shield

Table 2-1: Load Cell Wiring Code

3. Form a drip loop in each cable so that water will not run down the cable onto the load cell or junction box.
4. Connect the home run cable from the junction box to the scale terminal.

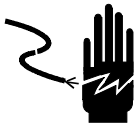
Calibration

Once the scale has been completely installed and wired, calibrate it according to the instructions in the manual for the scale terminal.

3 Troubleshooting

General

Scales should be inspected and recalibrated periodically by an authorized METTLER TOLEDO service representative. If a scale is not working properly, try to find out the source of the problem before replacing any load cells or other components.



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Check the Scale Terminal

Determine whether the problem is in the scale or the scale terminal.

1. Remove power from the system, and then disconnect the scale from the scale terminal.
2. Connect the scale terminal to a load cell simulator.
3. Reapply power and test the scale terminal. If the problem persists, its source is probably in the terminal. Consult the terminal's manual for further troubleshooting assistance.

Check the Wiring

1. Remove power from the system.
2. Check the load cell cables and home run cable for damage.
3. Open the junction box and check for moisture or foreign material inside the box.
4. Make sure that all wiring connections are tight and that no insulation material is touching the terminal contacts.
5. Make sure that all wires are connected to the correct terminals.

Check the Mechanical Components

1. Check for debris that could restrict the movement of the scale or load cells.
2. Make sure that each weigh module is able to move freely. Examine all piping and other dead-to-live connections for possible mechanical binding.
3. Check for any structural deflection that could cause mechanical binding.
4. Is the scale rocking or out of level? If so, it might need to be reshimmed.

Check the Load Cells

Make sure that all load cells are oriented properly. The arrow marked on the end of each load cell must be pointing downward.

1. Remove power from the system. Fully disconnect each load cell and check for proper input/output resistances.
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 45 mV at 15 VDC excitation and loaded to gross capacity.
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% of the full scale output. For example, if the excitation voltage is 15 VDC, then the full scale output would be 45 mV and the no-load zero output should be within ± 0.45 mV.
6. If a load cell fails any of the above tests, replace it.

4 Parts

VLM3

Refer to the following drawing and table when ordering parts for VLM3 weigh modules.

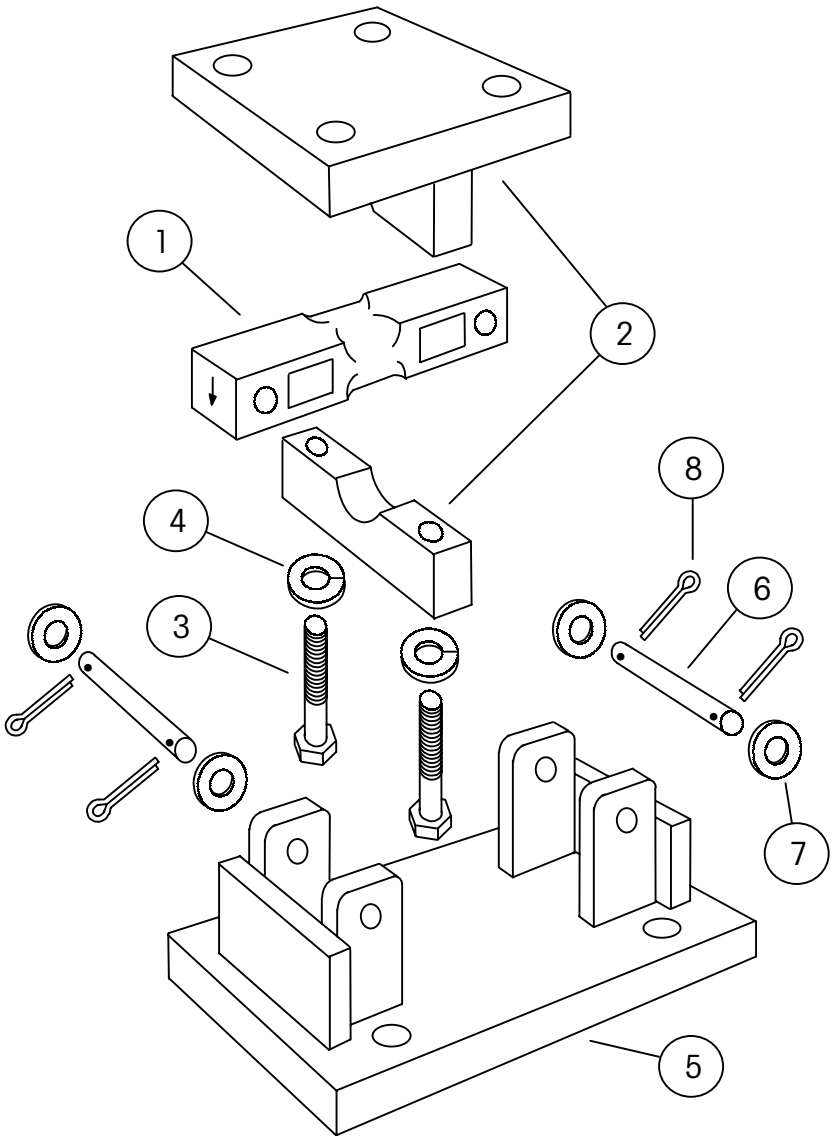

Figure 4-1: VLM3 Weigh Module Assembly

Ref. No.	Part Number	Description	Qty.
1	TB601003-020	1,000-lb Load Cell, 20-foot cable	1
	TB601004-020	2,000-lb Load Cell, 20-foot cable	
	TB601005-020	5,000-lb Load Cell, 20-foot cable	
	TB601006-020	10,000-lb Load Cell, 20-foot cable	
	TB601025-020	15,000-lb Load Cell, 20-foot cable	
	TB601007-020	25,000-lb Load Cell, 20-foot cable	
	TB601008-020	35,000-lb Load Cell, 20-foot cable	
	TB601009-020	50,000-lb Load Cell, 20-foot cable	
	TB601010-020	75,000-lb Load Cell, 20-foot cable	
2	083551020	Loading Plate Assembly (1K-5K)	1
	083558020	Loading Plate Assembly (10K-35K)	
	083565020	Loading Plate Assembly (50K-75K)	
3	083554020	Hexagonal Bolt, 1/2-13 x 1.75" (1K-5K)	2
	083561020	Hexagonal Bolt, 3/4-10 x 2.75" (10K-35K)	
	083568020	Hexagonal Bolt, 1-8 x 4" (50K-75K)	
4	083556020	Lock Washer, 1/2" (1K-5K)	2
	083563020	Lock Washer, 3/4" (10K-35K)	
	083570020	Lock Washer, 1" (50K-75K)	
5	083550020	Mounting Plate Assembly (1K-5K)	1
	083557020	Mounting Plate Assembly (10K-35K)	
	083564020	Mounting Plate Assembly (50K-75K)	
6	083555020	Shaft Pin, 7/16" x 3.62" (1K-5K)	2
	083562020	Shaft Pin, 3/4" x 4.76" (10K-35K)	
	083569020	Shaft Pin, 1.25" x 5.62" (50K-75K)	
7	083552020	Flat Washer, 1/2" (1K-5K)	4
	083559020	Flat Washer, 3/4" (10K-35K)	
	083566020	Flat Washer, 1.25" (50K-75K)	
8	083553020	Cotter Pin, 1/8" x 1" (1K-5K)	4
	083560020	Cotter Pin, 1/8" x 1" (10K-35K)	
	083567020	Cotter Pin, 1/8" x 1.75" (50K-75K)	
-	TB100393	Analog Junction Box, 4 holes	1
	TB100395	Analog Junction Box, 5 holes	

Reference Drawings

General Dimensions	Analog Wiring Diagram
TB204713	TB100505

Recommended Spare Parts

Qty.	Part Number	Description
1	See parts list	Load cell
1	*13640300A	Junction box circuit board
1	TA800218	Junction box desiccant bag

*May have letter prefix.

METTLER TOLEDO
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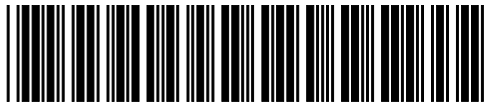

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