



# ML

## MEDIUM/HIGH CAPACITY WEIGH MODULE

### *applications*

- Tank, Bin and Silo Weighing
- Reactor Weighing
- Bulk Material Inventory/Processing
- Level Monitoring and Control
- Washdown/Aggressive Environments

### *features*

- 1,000 to 450,000 lbs. Capacities
- Excellent Overall Performance
- Very Low Profile Design
- 0.05 Accuracy Class
- Stainless Steel/Welded Seals
- Accommodates Vessel Movement
- Self-Checking/Including Uplift
- Easy Installation and Start Up
- IP67 Environmental Sealing
- Two Year Warranty

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#### *application tip:*

The *ML Series Weigh Modules* are uniquely low profile and offer exceptional versatility at an attractive price point.

The ML Series is a very robust medium to high capacity weigh module solution constructed of stainless steel<sup>(1)</sup> ML Series modules are designed to accurately measure compression loads in capacities ranging from 1,000 lbs. to 450,000 lbs. The unique, low profile load cell design is integrated into an articulating mount which readily accommodates angular, eccentric and side loading effects, with minimal sensitivity to these anomalies. To facilitate easy installation, a symmetrical mounting bolt pattern is provided on the base plate, the load cell and the optional load plate. The load plate can rotate and articulates approximately 3° in any direction to compensate for misalignment with mating support surfaces during installation and use. Provisions for thermal expansion and contraction are built-in. The ML is a self-checking assembly, capable of tolerating side loads and uplifting loads up to 100% of Rated Capacity. To achieve a sealing rating of IP67, welded environmental barriers are fitted to seal the load cell. The integral 25 foot cable is PVC jacketed and shielded to minimize the effects of RFI and EMI. The attributes of the ML Series make it ideal for food/beverage processing, inventory monitoring, bulk material handling, tank and silo weighing, or for any application where a versatile, durable weigh module solution is needed. High temperature (400°F) versions are available in the 1K to 50K capacity ranges.

(1) 150K and higher capacities use painted steel base plates.

*Innovative Measurement Solutions*





## PERFORMANCE

Rated capacities <sup>(1)</sup> (lbs.):	1K, 2.5K, 5K, 10K, 15K, 20K, 25K, 35K, 50K, 60K, 75K, 100K, 150K, 200K, 250K, 300K, 400K, & 450K
Rated output (FSO):	3 mV/V ± 0.1%
Combined error:	≤ 0.10 % FSO
Non-linearity:	≤ 0.05 % FSO
Hysteresis:	≤ 0.05 % FSO
Non-repeatability:	≤ 0.05 % FSO
Creep (20 minutes):	≤ 0.03 % of load
Zero balance:	≤ 1 % FSO
Zero return (20 minutes):	Better than 0.03 % FSO

<sup>(1)</sup> ("K" = thousand)

## MECHANICAL

Load Cell Material:	17-4ph Stainless steel
Load Cell Finish:	Matte
Mount Material:	Stainless steel (1K-100K) Mild steel (150K-450K)
Mount Finish:	Matte (1K-100K) Paint (150K-450K)
Safe overload:	Compression: 150% FSO Side load: 100% FSO
Ultimate overload:	Compression: 300% FSO Side load: 150% FSO
Weight:	See table below

## ELECTRICAL

Input impedance:	350 (nominal)
Output impedance:	350 ± 3 ohms
Insulation resistance:	>5000 Megohms @ 50VDC
Excitation Voltage:	10 V AC/DC (15 V maximum)
Cable Color code:	+ Excitation (green) - Excitation (black) + Output (white) - Output (red) Shield (bare)
Cable type:	4-conductor, 22 AWG, PE/PVC DuoWrap <sup>®</sup> jacket; tinned-copper shield; 25 feet; Finished conductors

## ENVIRONMENTAL

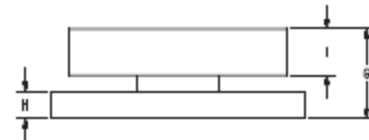
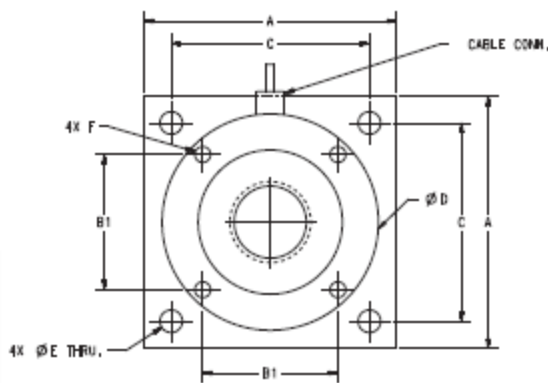


Temperature, operating:	0 to +150 °F (-18 to +65°C)
Temperature, compensated:	10 to +110 °F (-12 to +43°C)
Temperature effects:	Zero < 0.0015% FSO/°F < 0.0026% FSO/°C Output < 0.0008% of Rdg./°F < 0.0014% Rdg./°C
Sealing:	IP67

## OPTIONS

Mild Steel or Stainless Steel Top Plates; High Temperature Operation; Load Receiver Pads; Conduit Adapters; Display/Control Instruments.

## dimensions (1K-100K)



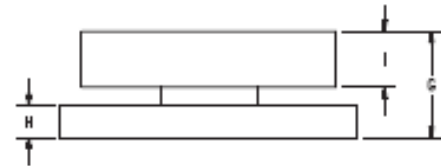
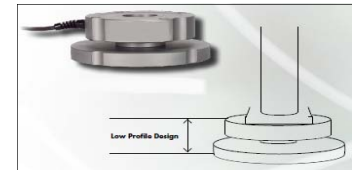
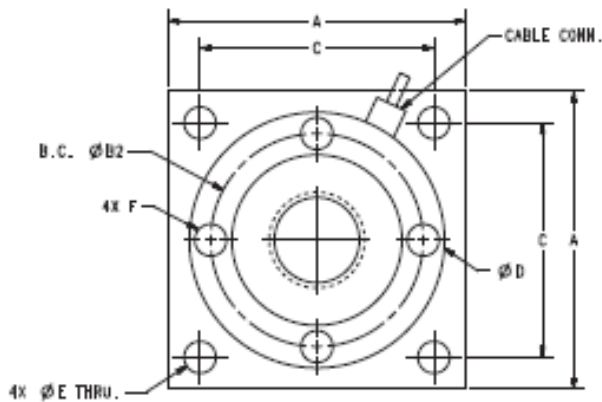
100% CUSTOMER SATISFACTION GUARANTEED

### DIMENSIONS (INCHES)

Rated Capacity	A	B1	C	D	E	F	G	H	I	Conduit Adapter
1k-10k	4.0	2.0	3.25	3.5	0.4	3/8-16	1.35	.375	.75	N/A
15k	4.0	2.0	3.25	3.5	0.4	3/8-16	1.60	.625	.75	N/A
20k-50k	7.0	3.75	5.50	6.0	.63	1/2-13	2.48	.75	1.3	1/2-14 NPT
60k-100k	8.0	4.25	6.50	7.0	.81	3/4-16	2.50	1.0	1.3	1/2-14 NPT



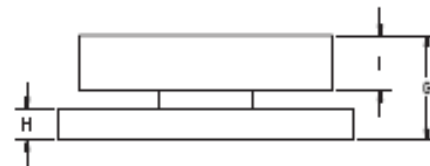
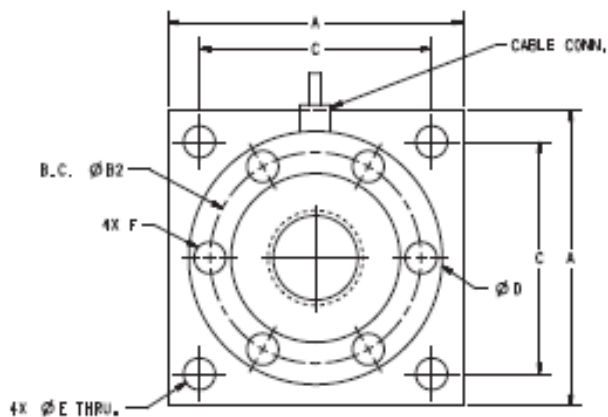
## dimensions (150K-200K)



### DIMENSIONS (INCHES)

Rated Capacity	A	B2	C	D	E	F	G	H	I	Conduit Adapter
150k-200k	10.0	7.825	8.0	9.0	1.1	1-14	4.75	2.0	1.7	1/2-14 NPT

## dimensions (250K-450K)



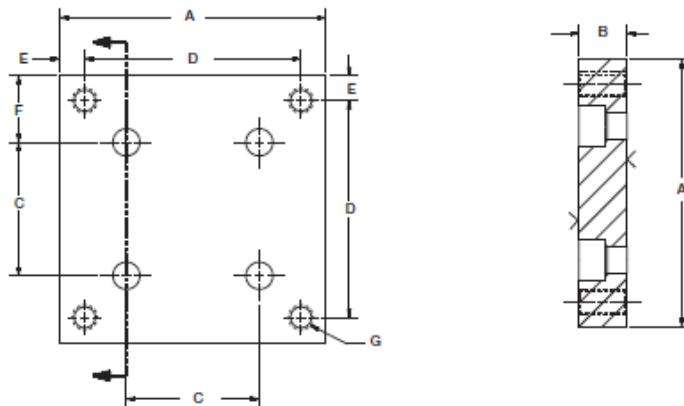
### DIMENSIONS (INCHES)

Rated Capacity	A	B2	C	D	E	F	G	H	I	Conduit Adapter
250k-450k	11.0	7.75	9.0	9.0	1.3	7/8-14	6.42	3.0	2.25	1/2-14 NPT



## dimensions (Steel & Stainless Steel Top Plates)

### Optional Top Plates

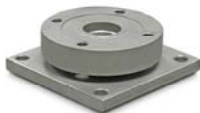


### DIMENSIONS

Rated Capacity	A	B	C	D	E	F	G
1k - 15k	4.00	.72	2.00	3.25	.38	1.00	3/8-16 NC
20k - 50k	7.00	.97	3.75	5.50	.75	1.62	5/8-11 NC
60k - 100k	8.00	1.46	4.25	6.50	.75	1.88	3/4-16 NF
150k - 200k	10.00	1.94	5.53	8.00	1.00	2.25	1-14 UNS
250k - 450k	11.00	2.94	7.75 B.C.	9.00	1.00	1.00	1-1/4-12 NF

## typical system configuration

### Sense



### Condition

Analog Transmitters



Serial Transmitters



Digital Indication



Process Control



Batch Control



Data Acquisition



### Output

0-5 VDC

0-10VDC

±5 VDC

±10 VDC

4-20 mA

0-20 Ma

Rs-232

Rs-422

Rs-485

20 mA Serial Loop

Profibus DP

DeviceNet

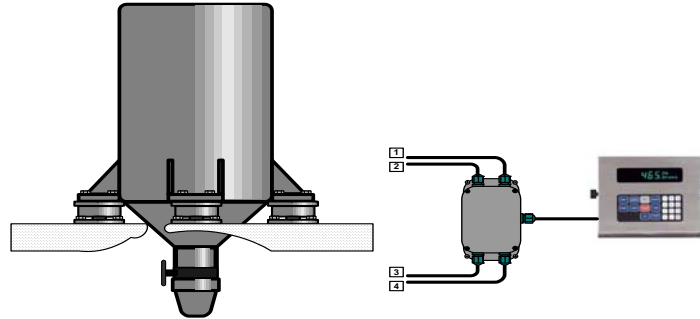
CANOpen

ControlNet

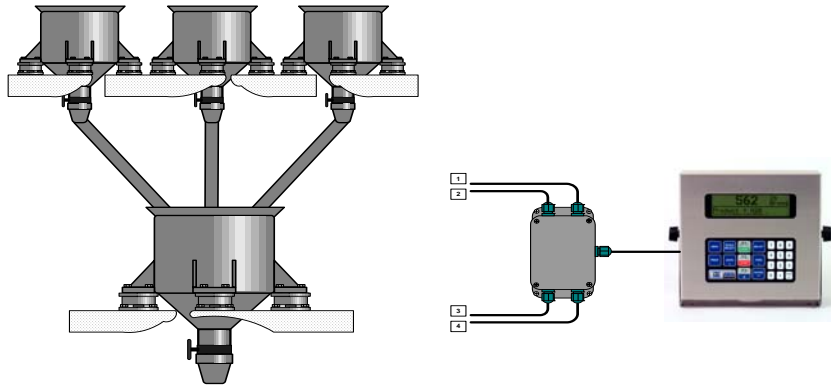
Modbus RTU

Modbus Plus

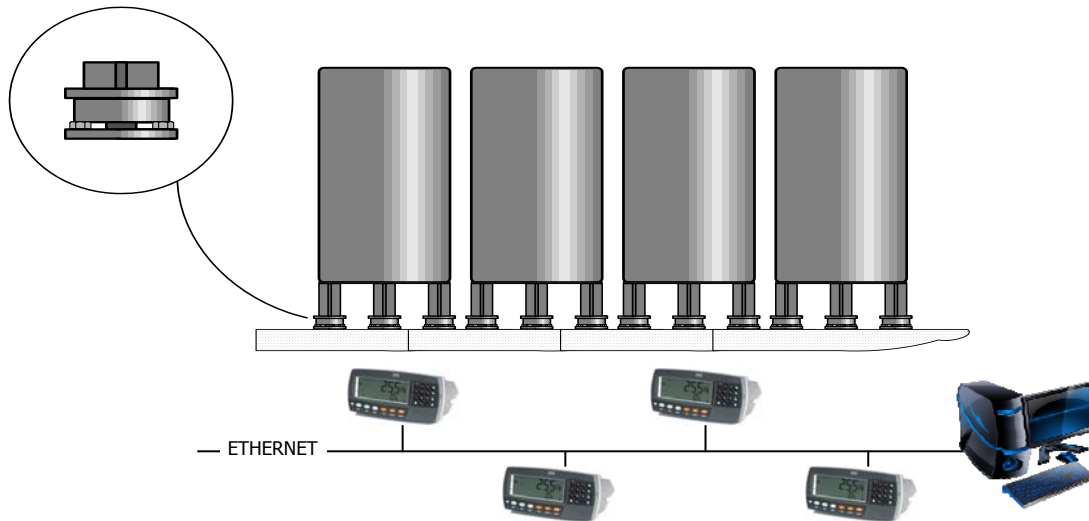
## installation examples



Process Hoppers/Reactors with Set Point Control & PLC Interface



Stand Alone Batching Process



Bulk Material Inventory Monitoring & Control



## available options

- Load Plate/Adapter
- Shock Load Isolation Pads
- Non-Standard Cable Lengths
- In-Line Signal Conditioning Amplifier Solutions
- Transmitters and Control Instrumentation
- Hazardous Environment Solutions
- Use and Installation Guide

## commercial information

- All reference information contained herein is subject to change without notice. Please consult Sentran, LLC for certified drawings and specifications as needed.
- Do Not exceed safe limits.
- Take Notice! This product is intended to yield exceptional performance when used in accordance with prescribed procedures and purposes. Failure to use this product accordingly could result in diminished performance and/or failure leading to consequences dangerous to personnel.
- Application and use of this product is the sole responsibility of the user. Please contact Sentran, LLC for applications assistance as needed.

## application recommendations/suggestions

- The surfaces to which the ML Weigh Modules are attached and/or are reacting against must be of sufficient structural integrity to carry loads up to and exceeding the ultimate ratings of the weigh modules being used, taking into account the mating surface area of the top and/or bottom weigh module plates.
- The load on each weigh module used in multiple support applications should vary by no more than 20% over the complete loading range. Add shims as necessary to achieve satisfactory load distribution.
- The mounting surfaces of the base and top plates must be level within  $\pm 0.5^\circ$  after installation. If the mounting surfaces are not level, shims and/or structural grout can be used to bring the mount into level tolerance.
- Take extreme care when placing the vessel on the weigh modules to prevent shock/overload damage. A vessel and/or structure can create extraordinarily high forces when dropped only a fraction of an inch.
- It is crucial that piping and rigid attachments of any kind be minimized. Such elements create force shunts and when used, attachment to the weigh vessel should be made via flexible couplings.
- The ML Series Weigh Module is an ideal solution for weighing medium and large capacity tanks, bins, hoppers and silos.
- This weigh module design incorporates a low profile shear web load cell with load introduction via a hardened spherical washer set arranged on the load-bearing hub section of the load cell. This technique effectively minimizes the effects of off-axis, eccentric loads and accommodates movement common to thermal expansion/contraction, wind loading and other side force influences.
- Used properly, the ML Series Weigh Modules are self-checking and held captive with no need for ancillary checking of any kind.
- The ML Series Weigh Module design facilitates simplified load cell installation and replacement by virtue of its unique low profile, articulating load introduction feature, and a rotating base plate coupling for easy alignment.
- The ML Series Weigh Module utilizes a welded-seal, stainless steel load cell with an IP67 rating. Utilizing sealed conduit for the cable run, vented on the instrumentation end, can increase the rating to IP66/68, making it suitable for washdown.
- Weighing applications have numerous application-specific considerations to be addressed both mechanical and electrically. Therefore, installation of all weighing system components should always be planned by a qualified, professional engineer. Any information provided by Sentran, LLC is intended only as informational and does not constitute a formal recommendation for any given application.