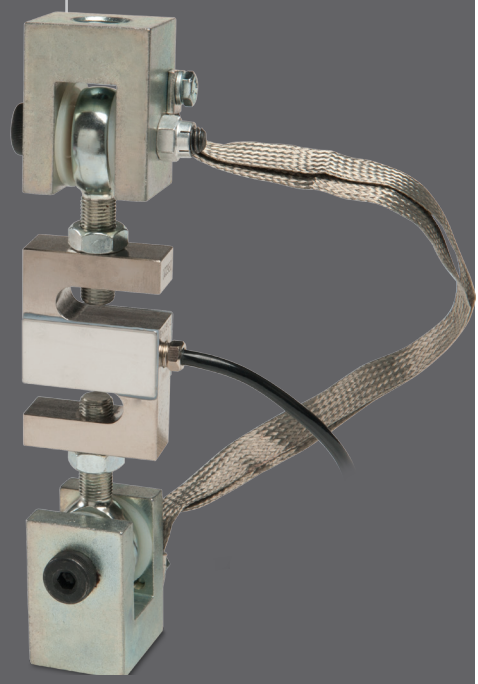
SENTRAN

Tension Weigh Module

MASeries

The MA Series is a high performance, tension weigh module constructed of mild steel, stainless steel or hermetically sealed stainless steel. The MA Series is designed to accurately measure tension loads in capacities ranging from 0-100 lbs. to 0-20,000 lbs.



The MA Series is a complete weigh module available in mild steel (MA1), stainless steel (MA3) or hermetically sealed stainless steel (MA4), The companion ZB Series load cell's integrated loading brackets reduce sensitivity to off-center loading effects, while making the load cell readily adaptable to in-line measurements. This load cell is available as Hostile Environment Sealed (IP66-High Pressure Jets), Harsh Environment Sealed (IP67-Limited Immersion) and Hermetically Sealed (IP68-Continuous Immersion) by virtue of proprietary, multi-redundant barriers uniquely integrated to protect all internal components. The output signal is calibrated to a close tolerance to facilitate in situ interchangeability and multiple load cell summing applications. The integral premium, instrumentation grade cable features a durable polyurethane-jacket over a tinned-copper braided shield for superior mechanical protection and to minimize the unwanted electrical effects of RFI and EMI. The MA Series is it an ideal choice for measurements in structural analysis, manufacturing, inventory, monitoring, process applications and for general force measurements and weighing situations where a dependable, versatile, high performance measurement solution is needed.

ISO 9001:2015 CERTIFIED · IP 66 · IP 67 · IP 68 · FM APPROVED

APPLICATIONS

- Tension Measurements
- Level and Inventory Monitoring
- Tank, Bin and Hopper Weighing
- Dynamometers
- Tensile Testing
- Guy Line/Cable Monitoring

FEATURES

- 100 to 20,000 lbs. Capacities
- 0.02% Accuracy Class - NTEP Grade
- Steel, Stainless Steel or Hermetically Sealed Stainless Steel
- PTFE-Lined Ball Joints
- Nylon Insulataion Washers
- Braided Grounding Strap
- IP66/IP67/IP68 Environmental Sealing
- Output Matched for Single or Multiple Load Cell Applications
- Two Year Warranty

For more information call **1-888-545-8988**

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MA Series Specifications

Innovative Measurement Solutions

PERFORMANCE

Rated Capacities [1] (lbs.)	(MA1) - 100, 150, 200, 250, 500, 750, 1K, 1.5K, 2K, 2.5K, 3K, 5K, 10K, 15K, 20K (MA3) - 100, 250, 500, 750, 1K, 2.5K, 3K, 5K (MA4) - 500, 750, 1K, 1.5K, 2K, 2.5K, 3K, 5K, 10K, 15K, 20K
Rated Output (FSO)	3 mV/V (MA1 & MA3), 2mV/V (MA4)
Output Tolerance	±0.25 % R.O.
Combined Error Band	≤ 0.02 % FSO (MA1) ≤ 0.05 % FSO (MA3) ≤ 0.03 % FSO (MA4)
Non-Linearity	≤ 0.02 % FSO (MA1) ≤ 0.05 % FSO (MA3) ≤ 0.03 % FSO (MA4)
Hysteresis	≤ 0.02 % FSO (MA1) ≤ 0.05 % FSO (MA3) ≤ 0.03 % FSO (MA4)
Non-Repeatability	≤ 0.02 % FSO (MA1 & MA3), ≤ 0.015 % FSO (MA4)
Zero Balance	± 1.0 % FSO
Creep (20 Minutes)	0.03 % of Load

[1] *("K"=Thousand)*

MECHANICAL

Load Cell Material	Alloy Tool Steel (MA1) 17-4ph Stainless Steel (MA3 & MA4))
Load Cell Finish	Electroless Nickel Plated (MA1) Electro-Polished (MA3 & MA4)
Mount Material	Steel (MA1) Stainless Steel (MA3 & MA4)
Mount Finish	Zinc Plated (MA1) Natural (MA3 & MA4)
Safe Overload	Compression/Tension: 150% FSO Side Load: 100% FSO
Ultimate Overload	Compression/Tension: 300% FSO Side Load: 50% FSO
Weight & Deflection	See Dimensions Page

ELECTRICAL

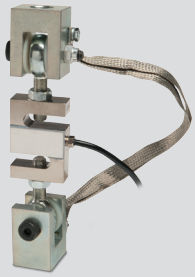
Input Impedance	385 ± 5 ohms (MA1 & MA3) 400 ± 51 ohms (MA4)
Output Impedance	350 ± 3 ohms (MA1 & MA3) 352 ± 3 ohms (MA4)
Insulation Resistance	>5000 Megohms @ 50 VDC
Excitation Voltage	10 V AC/DC (15 V Maximum)
Cable Color Code	+ Excitation (red) - Excitation (black) + Signal (green) - Signal (white) Shield (natural)
Cable Type	4-conductor, 22 AWG, Polyurethane Jacket, Tinned Copper Braid, Diameter: 0.187"
Cable Length	See Dimensions Table
Cable Termination	Finished Conductors
Cable Seal	Compression Glad Fitting (MA1) Glass-to-Metal; Conduit Adapter; Stainless (MA3) Conduit Adapter; Stainless (MA4)

ENVIRONMENTAL

Temperature, Operating	-4 to +140 °F (-20 to +60°C) (MA1 & MA3) 0 to +150 °F (-18 to +65°C) (MA4)
Temperature, Compensated	14 to +104 °F (-10 to +40°C)
Temperature, Storage	-60 to +185 °F (-50 to +85°C)
Temperature Effects	Zero < 0.0015% FSO/°F < 0.0026% FSO/°C
Temperature Effects	Output < 0.0008% of Rdg./°F < 0.0014% Rdg./°C
Sealing	IP67; Multi-redundant; Limited Immersion Tolerance (MA1/MA3) IP66; Multi-redundant; High Pressure Resistant and IP68; Continuous Immersion Tolerance (MA4)
FM Approval Intrinsically Safe: Non-Incendive:	Class I, II, III; Div.1 Groups A-G Class I; Div.2 Groups A-D

MA Typical System Configuration

SENSING LOAD CELL(S)



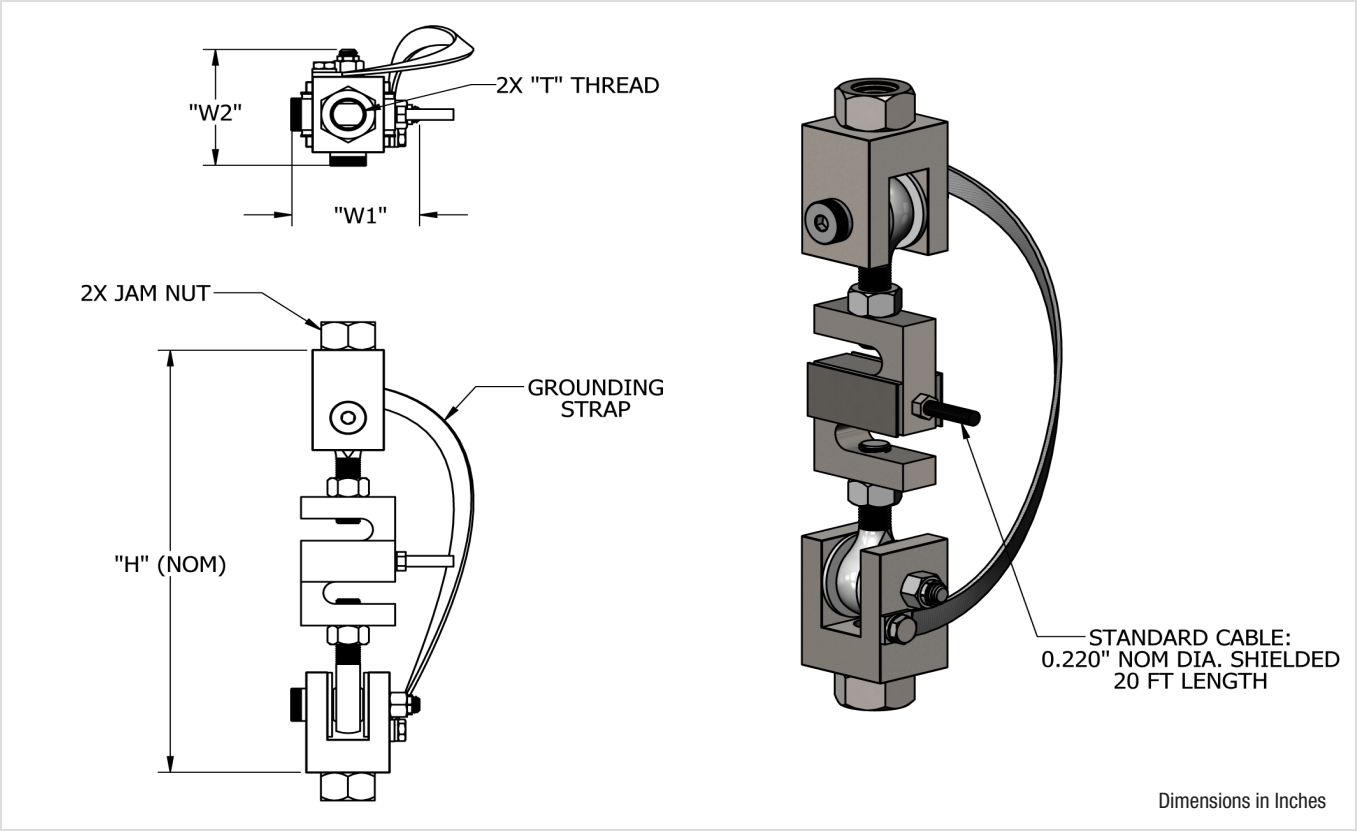
SIGNAL CONDITIONING

- Analog Transmitters 
- Serial Transmitters 
- Digital Indication 
- Process Control 
- Batch Control 
- Data Acquisition 

OUTPUT OPTIONS

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
Ethernet
Profibus DP
DeviceNet
CANOpen
ControlNet
Modbus RTU
Wireless

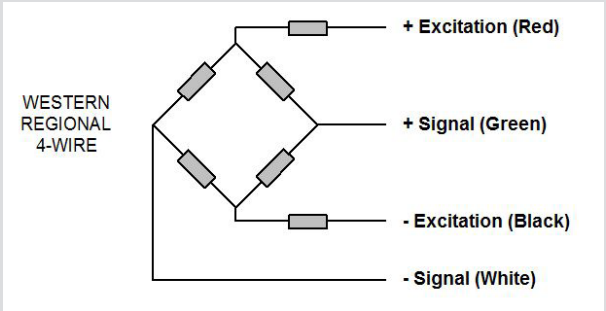
MA Dimensions



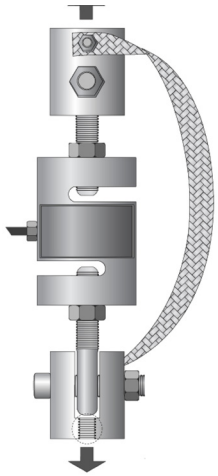
Dimensions in Inches

Capacity (LB)	H	W1	W2	T	Deflect	Weight
			DIMENSIONS (INCHES)			
100, 150, 200, 250	7.00	2.00	1.81	3/8-16 UNC-2B	0.010”	2.5 LBS
100, 150, 200, 250	7.00	2.00	1.81	1/2-13 UNC-2B	0.010”	2.5 LBS
500, 750, 1K, 1.5K, 2K	9.50	2.68	2.68	1/2-13 UNC-2B	0.012”	4.0 LBS
500, 750, 1K, 1.5K, 2K	9.50	2.68	2.68	5/1-11 UNC-2B	0.012”	4.0 LBS
2.5K	9.50	2.68	2.68	3/4-10 UNC-2B	0.012”	4.0 LBS
3K	10.75	3.37	3.37	3/4-10 UNC-2B	0.012”	6.5 LBS
5K	12.00	3.37	3.37	3/4-10 UNC-2B	0.012”	6.5 LBS
10K	12.25	3.37	3.37	1-8 UNC-2B	0.025”	15.0 LBS
15K	18.00	4.00	4.12	1 1/4-7 UNC-2B	0.025”	26.0 LBS
20K	20.00	5.00	4.12	1 1/2-6UNC-2B	0.025”	40.3 LBS

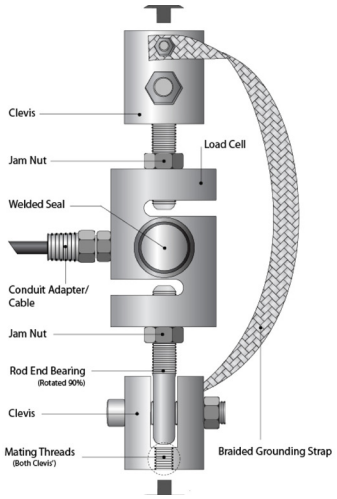
MA Wiring Diagram



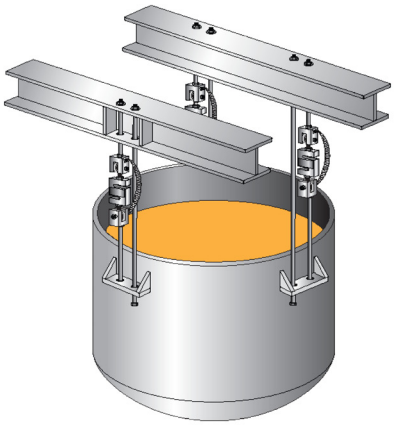
Tension Weigh Module



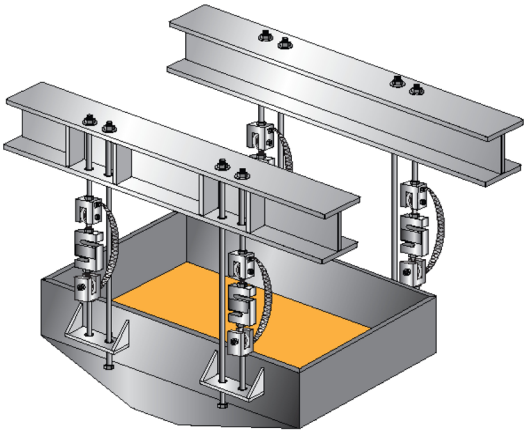
Stainless Tension Module Components



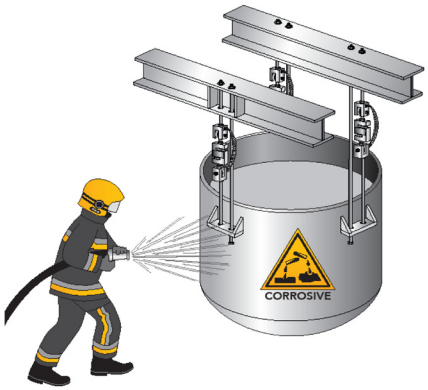
Hopper Weighing



Weigh Hopper



Corrosive/Washdown Hopper



Available Options

- High Temperature Operation (to 400°F)
- In-Line Analog or Serial Transmitters
- Display/Control Instrumentation
- Junction/Summing Boxes
- Wireless Operation
- MS Connectors
- Shunt Calibration
- Use and Installation Guide
- Custom and OEM Solutions

Application Recommendations / Suggestions

- The MA Series Weigh Module are designed to be loaded in tension.
- The versatility and performance features of the MA Series Weigh Module make them an ideal solution for single or multiple point weighing applications typical of in-process weighing, inventory monitoring, tanks, bins and hoppers. The MA Series are also readily adaptable to general tensile force measurements and monitoring typical of force testing equipment, cable tensioning and dynamometers.
- In multiple load cell applications, use care to ensure that the load on each load cell support varies by no more than 20% over the complete loading range. In applications involving four or more load cells, balancing of the load can be accomplished by loosening the jam nut and adjusting the rod end bearings on the MA Series to achieve satisfactory load distribution. This is best accomplished with minimum load applied.
- MA Series Weigh Modules output signals are calibrated to a close output tolerance to facilitate in situ interchangeability and multiple load cell summing applications. However, the use of a Sentran load cell signal trimming summing junction box is recommended for ease of interconnection and for achieving optimum performance and minimum sensitivity to changes in load distribution in multiple load cell applications.
- Sentran Weigh Modules are available in many capacity ranges and styles to accommodate virtually any weigh module requirement. The integral load cells are designed to be used over the complete range of “no load” (0) up to the rated capacity. For example, a 1,000 lbs. rated capacity load cell is designed to be used for measurements at any point within the range of 0 to 1,000 lbs. Sentran weigh modules can be safely loaded to 150% of rated capacity without affecting the load cell performance or integrity.
- The reason for the variety of capacities and styles of weigh modules is to allow the user to select the most ideal solution for a given application. Generally, the most ideal capacity is one in which at least 80% of the capacity range is utilized at some point in the measurement process, without exceeding the rated capacity. This allows the load cell to deliver the highest signal to load ratio, and therefore the highest resolution and most stable measurement. There are other factors to consider, such as excitation voltage, but correct “sizing” of the load cell is the first step. Both the dead load and the live load need to be considered in determining the gross load and the load cell capacity.
- The MA Series incorporate electrical isolation to minimize the effects of electrical surges associated with lightning strikes and welding. It is recommended that the structure these weigh modules are attached to be connected to a good earth ground if electrical surges are a possibility.
- These weigh modules carry Factory Mutuals “Non-Incendive” rating for hazardous locations rated at a Class I; Division 2 or lower.
- Contact Sentran’s expert Applications Specialists for additional professional guidance.

Commercial Information & Precautions

- Do not exceed specified Maximum Load Limits.
- The Safe Load Limit is the point to which normal loading will not cause the load cell to experience an excessive zero shift or a degradation in performance.
- Use reasonable care when applying load to any load cell. Load limits can be exceeded due to shock loading (i.e. dropping a load onto a load cell), off axis loading, side loading and similar loading conditions that are beyond design capabilities.
- The structural integrity of all load bearing components in any load cell system should be designed with safety redundant load paths. (Overload stops, overhead load arrestors, etc.)
- The surfaces to which the load cell(s) is attached and/or is reacting against must be of sufficient structural integrity to carry loads up to and exceeding the ultimate ratings of the load cell(s) being used, while also taking into account any companion hardware being used in conjunction with the load cell.
- To ensure optimum performance, all measuring system cabling should be run through dedicated conduit when available. Avoid proximity to electrical noise sources and use of “dirty” power sources.
- The load cell cable shield should be connected to a dedicated instrument ground point only.
- Force measurement and weighing applications have numerous application-specific considerations to be addressed both mechanically and electrically. Therefore, installation of all system components are the responsibility of the user and should always be approved by a qualified, professional engineer. Any information provided by Sentran, LLC is intended only as informational and does not constitute a formal recommendation for the use of any product for any application.
- Sentran offers application/installation/use guides on request for most standard products. Please contact your Sentran representative for assistance, or visit our technical library resource at www.sentranllc.com.

Legal Disclaimer

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