

Engineering Specifications

Centerline Weigh Modules

The portions of this specification that have been left blank (_____) should be filled with information about the specific application. Information for the blanks in Sections 1.1, 3.1, 4.1, and 5.3.11 can be found in Table 12-24 (Table 12-26 for OIML applications). Information for the blanks in Sections 5.3.1 to 5.3.9 can be found in Table 12-25 (Table 12-27 for OIML applications). If carbon steel weigh modules are specified in Section 1.1, use the Material and Finish Specifications for carbon steel weigh modules (Section 3). If stainless steel weigh modules are specified in Section 1.1, use the Material and Finish Specifications for stainless steel weigh modules (Section 4).

1 General Provisions

- 1.1 Provide a complete system consisting of _____ (qty) _____ lb/kg _____ (carbon steel or stainless steel) weigh modules to convert a free-standing structure into a scale.
- 1.2 Each module shall include load cell, top and bottom mounting plates, self-alignment suspension, and required installation location tools.
- 1.3 The system shall include a stainless steel NEMA 4X/IP65 summing junction box.
- 1.4 Each weigh module shall be completely factory assembled and does not require field adjustment.

2 Mechanical Specifications

- 2.1 The system shall be completely self-checking. No additional check rods, links, or stays are required.
- 2.2 The load point on each load cell shall remain stationary. Load cells which allow movement of the load point on the load cell are not acceptable.
- 2.3 The load introduction mechanism between the top plate and the load cell shall be a rocker pin design constructed of hardened 17-4ph stainless steel. The load pin shall have an O-ring seal at each end to prevent dirt and other foreign material from entering the bearing surface. Direct bolt connections between the top mounting plate and the load cell are not acceptable.
- 2.4 Each module shall include an alignment tool to accurately position the upper mounting plate relative to the load cell.

3 Material and Finish Specification (for Carbon Steel Weigh Modules)

- 3.1 Load cells shall be made of _____ and load pins shall be made of hardened 17-4ph stainless steel.
- 3.2 Top and bottom mounting plates shall be abrasive blasted to 1.5 to 2.5 mils profile per SSPC-SP10 (Near White Blast).
- 3.3 Mounting plates shall be painted with Carboline 890 high-build epoxy enamel. Coating must be cured to 3-6 mils DFT.
- 3.4 Coating must meet USDA regulations for incidental food contact.
- 3.5 Coating shall be lead and chromate free and cannot contain any substance defined as carcinogenic by the U.S. EPA.
- 3.6 Coating must be suitable for salt solution immersion.

3.7 Coating must be chemical resistant per ASTM D3912 (Splash, Spillage, and Fumes).

4 Material and Finish Specification (for Stainless Steel Weigh Modules)

4.1 Load cells shall be made of _____ and load pins shall be made of hardened 17-4ph stainless steel.

4.2 Top and bottom mounting plates shall be made of type 304 stainless steel and shall have an electro-polished finish.

5 Load Cell Specifications

5.1 All load cells shall meet or exceed the National Institute of Standards and Technology (NIST) Handbook 44 for Class III weighing devices and shall be certified by the National Type Evaluation Program (NTEP) for 3,000 division Class III accuracy.

5.2 OIML load cells can be offered as an option.

5.3 Load cells shall have the following individual characteristics:

5.3.1 Rated Capacity (R.C.): _____

5.3.2 Rated Output: _____

5.3.3 Zero Balance: _____

5.3.4 Combined Error Due To _____

Non-Linearity & Hysteresis: _____

5.3.5 Non-Repeatability: _____

5.3.6 Temperature Compensation: _____

5.3.7 Terminal Resistance _____

Input: _____

Signal: _____

5.3.8 Excitation Voltage: _____

5.3.9 Insulation Resistance: _____

5.3.10 Maximum Loads _____

Safe: 150% of R.C.

Ultimate Overload: 300% of R.C.

Safe Side: 100% of R.C.

5.3.11 Gauge Cavity & Wiring Seal Type: _____

(potted or hermetic) seal

5.4 Each load cell shall have an integral conduit fitting on the cable entrance into the load cell for enhanced moisture protection.

5.5 Each load cell shall have a data plate affixed to the load cell which clearly shows:

5.5.1 Manufacturer

5.5.2 Capacity

5.5.3 Part Number

5.5.4 Serial Number

5.5.5 Class Number

5.5.6 NTEP Certificate of Conformance Number

5.5.7 Maximum Divisions (Nmax)

5.5.8 Load Cell Vmin

5.6 Load cells shall be mounted to the base plate with high strength grade 5 bolts minimum.

6 Junction Box Specifications

6.1 Junction box enclosure shall be constructed of type 304 stainless steel and shall be designed to NEMA 4X/IP65 standards.

6.2 The junction box enclosure shall have washdown duty connectors, one for each load cell cable, and one additional connector for the

instrument cable. Multiple cables using single box connectors are not acceptable.

- 6.3 The junction box shall contain a printed circuit board for the purpose of individual load cell wiring termination, summing of the output signals from each load cell, trimming/balancing the load cell signals, and wiring the interface to the digital instrument.
- 6.4 The printed circuit board shall have individual connectors for each of the load cells, and the instrument interface cable. Each wire shall have a single terminal connection. Doubling up or ganging of wires to one terminal is not acceptable.
- 6.5 The summing printed circuit board shall have potentiometers, one per load cell for the electrical trimming/balancing of the load cell signals during calibration.

7 Warranty

- 7.1 The product shall be free from defects in workmanship and materials for a period of 1 year from date of original installation, or 18 months from the date of shipment to the original buyer, whichever occurs first. Technician travel time and mileage costs shall be covered by the manufacturer for the first 30 days after installation, with on-site labor and replacement parts covered for the first 12 months after installation.

8 Acceptable Manufacturers:

- 8.1 Scale system shall be METTLER TOLEDO's Centerlign Weigh Modules.

NIST System Specifications					
Qty.	Load Cell Capacity (lb)	System Capacity (lb)	Cable Length (ft)	Conduit Fitting	(H)ermetic (P)otted
4	250	1,000	15	1/4-18 NPT	P
4	500	2,000	15	1/4-18 NPT	H
4	1,250	5,000	15	1/4-18 NPT	H
4	2,500	10,000	15	1/4-18 NPT	H
4	5,000	20,000	15	1/4-18 NPT	H
4	10,000	40,000	30	1/4-18 NPT	H
4	20,000	80,000	30	1/4-18 NPT	H
4	30,000	120,000	30	1/4-18 NPT	H
4	45,000	180,000	30	1/4-18 NPT	H

Table 12-24: NIST Weigh Module System Specifications (Centerlign)

NIST Load Cell Specifications			
Rated Capacity of Load Cell (lb)	250, 500, 1,250, 2,500, 5,000, 10,000	20,000, 30,000	45,000
Rated Output	2.0 ± 0.002 mV/V	2.0 ± 0.005 mV/V	2.0 ± 0.005 mV/V
Zero Balance	± 0.02 mV/V	± 1.5% of R.C.	± 1.5% of R.C.
Combined Error Due to Non-Linearity and Hysteresis	0.03% of R.C.	0.02% of R.C.	0.02% of R.C.
Non-Repeatability	0.01% of R.C.	0.01% of R.C.	0.01% of R.C.
Temperature Compensation	-10° to +40° C +14° to +104° F	-10° to +40° C +14° to +104° F	-10° to +40° C +14° to +104° F
Terminal Resistance	Input: 385Ω Signal: 350Ω ±2Ω	Input: 380Ω ±20Ω Signal: 350Ω ±2Ω	Input: 2,200Ω ±100Ω Signal: 2,000Ω ±20Ω
Excitation Voltage	15 VDC max.	20 VDC max.	20 VDC max.
Insulation Resistance	5 GigaΩ min. @ 50 VDC	5 GigaΩ min. @ 50 VDC	5 GigaΩ min. @ 50 VDC
Maximum Loads % of R.C.	Safe: 150 Ultimate Overload: 300 Safe Side: 100	Safe: 150 Ultimate Overload: 300 Safe Side: 100	Safe: 150 Ultimate Overload: 300 Safe Side: 100

Table 12-25: NIST Load Cell Specifications (Centerlign)

OIML System Specifications					
Qty.	Load Cell Capacity (lb)	System Capacity (lb)	Cable Length (m)	Conduit Fitting	(H)ermetic Cell (P)otted Cell
4	220	880	4.57	1/4-18 NPT	H
4	550	2,200	4.57	1/4-18 NPT	H
4	1,100	4,400	4.57	1/4-18 NPT	H
4	2,200	8,800	4.57	1/4-18 NPT	H
4	4,400	17,600	9.14	1/4-18 NPT	H
4	9,072	36,288	9.14	1/4-18 NPT	H
4	13,608	54,432	9.14	1/4-18 NPT	H
4	20,412	81,648	9.14	1/4-18 NPT	H

Table 12-26: OIML Weigh Module System Specifications (Centerlign)

OIML Load Cell Specifications			
Rated Capacity of Load Cell (kg)	220, 550, 1,100, 2,200, 4,400	9,072, 13,608	20,412
Rated Output	1.94 ± 0.002 mV/V	2.0 ± 0.005 mV/V	2.0 ± 0.005 mV/V
Zero Balance (% of rated output)	1.0	1.0	1.0
Combined Error Due to Non-Linearity and Hysteresis	0.017% of R.C.	0.02% of R.C.	0.02% of R.C.
Non-Repeatability	0.01% of R.C.	0.01% of R.C.	0.01% of R.C.
Temperature Compensation	-10° to +40° C	-10° to +40° C	-10° to +40° C
Terminal Resistance	Input: 385Ω Signal: 350Ω ±2Ω	Input: 380Ω ±20Ω Signal: 350Ω ±2Ω	Input: 2,200Ω ±100Ω Signal: 2,200Ω ±20Ω
Excitation Voltage	15 VDC max.	15 VDC max.	15 VDC max.
Insulation Resistance	5 GigaΩ min. @ 50 VDC	5 GigaΩ min. @ 50 VDC	5 GigaΩ min. @ 50 VDC
Maximum Loads	Safe: 150% of R.C. Ultimate Overload: 300% of R.C. Safe Side: 100% of R.C.	Safe: 150% of R.C. Ultimate Overload: 300% of R.C. Safe Side: 100% of R.C.	Safe: 150% of R.C. Ultimate Overload: 300% of R.C. Safe Side: 100% of R.C.

Table 12-27: OIML Load Cell Specifications (Centerlign)