SENSORS FOR FOOD AND LIFE SCIENCES.

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Installation and operating instructions
Weighing System Load Stand® II

Note

Please read these installation and operating instructions carefully. All instructions in this manual must be followed exactly to ensure proper operation of the unit.

If you have any questions regarding the product, installation or commissioning, please contact Anderson-Negele Support at support under:

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Other countries:
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Welcome

In many applications, weighing systems for content measurement offer a more practical and precise solution than other techniques. With a field-proven sensor program of the brand Kistler-Morse, Anderson-Negele now also offers precise, robust and efficient solutions in this measuring category.

This manual describes the installation of the sensors and its various hardware options. It includes procedures for adjusting the vessel, and instructions for wiring the sensors to one or several junction boxes and to the signal processor.

Refer to the signal processor manual for specific information on wiring the junction boxes to the signal processor.

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Authorized Personnel

All instructions described in this document must be performed by authorised and qualified service personnel only. Before installation, please read these instructions and familiarise yourself with the requirements and functions. The required personal protective equipment must always be worn when servicing the device.

Use

The device is solely intended for use as described in this manual. Reliable operation is ensured only if the instrument is used according to the specifications described in this document. For safety and warranty reasons, use of accessory equipment not recommended by the manufacturer or modification of this device is explicitly forbidden. All servicing of this equipment must be performed by qualified service personnel only. This device should be mounted in locations where it will not be subject to tampering by unauthorized personnel.

Misuse

Improper use or installation of this device may cause the following:

· Personal injury or harm

· Application specific hazards such as vessel overfill

· Damage to the device or system

Manual Conventions

Two kinds of special explanations appear throughout the manual: Caution and Note.

Caution

Possible risk to the product. The sensor or other equipment may be damaged if this information is ignored.

Note

Contains additional information about a step or feature critical to the installation or operation of the sensors.

Inspection and storage

Inspect each package upon receipt for damage that may have occurred due to mishandling during shipping. If the unit is received damaged, notify the carrier or the factory for instructions. Failure to do so may void your warranty.

If the device is not scheduled for immediate installation:

1. Following inspection, repackage the unit into its original packaging.
2. Select a clean dry site, free of vibration, shock and impact hazards.
3. If storage will be extended longer than 30 days, the unit must be stored at temperatures between 0 to 40 °C (32 to 104 °F) in non-condensing atmosphere with humidity less than 85 %.

Caution

Do not store a non-powered unit outdoors for a prolonged period.

Field of application / intended use

Description

The Load Stand® II is a direct vessel-to-foundation structural member designed to be your dependable and accurate continuous inventory monitoring and control solution. The Load Stand® II system is ideal for vessels with loads of 45,000 kg (100,000 lbs) or more and is available for loads of 11,000 to 453,000 kg (25,000 to 1,000,000 lbs) per support point.

The monolithic design becomes an integral part of the vessel structure for maintenance free weight measurements. The sensing elements are field replaceable without taking the vessel out of service.

The mechanical design of the Load Stand® II lends to simplified design of the mounting, whether by legs or gussets. Simple, rugged, and easy to match end-mounting plates yield minimum design time and easy installations.

Product features

- Monolithic Design
- High Output
- Multiple Weight Ranges
- Solid State Strain Sensors
- Limited Down Time

Specification Load Stand® II Weighing Cells		
Technical Features	Excitation Voltage - Operating Range Maximum Current Recommended Supply Voltage Functional Integrity Humidity Protection Class Materials Sensor Junction Box	12...30 V DC Half-Bridge 15.52 mA @ 12 VDC excitation 12 V DC 2 x rated load (compression) 100 % Non-condensing Designed for outdoor applications Pedestal: Carbon Steel 1.0044 (ASTM A53 GR) Flanges: Carbon Steel 1.0459 (ASTM A36) Finish: Polyester Powder Coating 4 x Microcell II Plastic or Stainless Steel (ATEX), included
Measurement Accuracy	Non-Linearity/Hysteresis Combined Repeatability Rated Output No Load Output	0.2 % of rated load 0.2 % of rated load 320 mV DC @ 12 V DC ±1 % ±50 mV
Temperature ranges	Ambient Temperature Range Operational Temperature Range Storage Temperature Range	Standard: -18...38 °C (0...100 °F) Mid: 10...66 °C (50...150 °F) -34...66 °C (-30...150 °F) (outside this range the accuracy may be reduced) -34...66 °C (-30...150 °F)
Authorizations	All models	ATEX (option)

Installation of the Load Stand® II

Vessel preparation

There are two aspects to successful use of Load Stands—properly functioning Load Stands and appropriate vessel support characteristics. Review the following list of error sources, and make the recommended corrections before you install Load Stands:

- An inadequate vessel foundation can allow excessive movement. Ensure the foundation is concrete or steel. Refer to the installation drawings (Figure 2 and figure 3) for details.
- Hidden load-bearing structures, such as discharge chutes or plumbing supported by the floor, can reduce loads on the vessel supports. Install flexible couplings to minimize this problem.
- Cross-connecting structures, such as catwalks and manifolds, can transfer loads from adjacent vessels. Install slip joint or flex couplings to minimize this problem.
- Shock loads can damage the Load Stand. Install protective barriers or stops to prevent vehicles from hitting the vessel supports.
- Extra holes in the vessel gusset or vessel base plate which bolts to the Load Stand, replace the gusset/ plate with the correct number of holes for bolting to the Load Stand.

Hardware

1. Anderson-Negele provides rubber washer assemblies for the Load Stand® top mounting hole connections.
2. All other hardware to attach the Load Stand® to the vessel and to the foundation is customer-supplied.
3. Use specified hardware and bolt sizes.
4. Use bolts with sufficient threaded length to accommodate the thickness of the connecting parts and the specified nuts and washers. The length of the bolts should not be so long that they interfere with other parts of the installation.

- Anderson-Negele recommends the placement of a base plate beneath the Load Stand. Refer to the installation drawings (Figure 2 and figure 3) for material thickness for a load stand base.
- During installation, do not put the entire vessel load on less than the correct number of Load Stands.
- If you need to raise the vessel or one vessel leg after installation: Loosen the bolts on all the Load Stands prior to raising the vessel or leg to prevent overloading.

Caution

Remove power from the unit before installing, removing, or making ajustments.

Caution

Using larger than specified sizes may overstress the Load Stand® during installation, damaging the Load Stand® and voiding the warranty.

Installation

Caution

Use proper supports to prevent the vessel from tipping or falling.

1. Inspect the load stand. With orders of different types, make sure the correct load stand will be installed.
2. Measure the No Load Output to ensure it's ±50 mV.
3. Raise the vessel.
4. Inspect the bottom of the vessel mounting surface to ensure it is perfectly flat. Check for angular misalignment. Remove any debris from the mounting surface. Depending on the foundation (concrete or beam mounting) refer to the respective indications on figure 2 and figure 3.
5. Mount the Load Stands on the foundation.
   a) Place the customer-supplied leveling nuts and hardened washer on each anchor bolt on the load stand. Check the angular alignment.
   b) Carefully place the Load Stand® on the leveling nuts/washers, aligning the mounting holes with the foundation anchor bolts. The alignment should allow the load stand to easily slide onto the anchor bolts.
   c) Place the customer-supplied hardened washer and nut on each anchor bolt. Do not fully tighten the nuts at this time. Leave a 6 mm (1/4") gap between the nut and washer to allow for positioning the Load Stand.
   d) Repeat Steps A through D for each Load Stand.
   e) Record the no load output by connecting the electronics and following chapter "Shimming of the Load Stand".
6. Mount the vessel on the Load Stands:

Note

On 22,680 kg (50,000 lb) or larger Load Stands, a pry bar may be used at the base of the Load Stand® to gently move it into position.

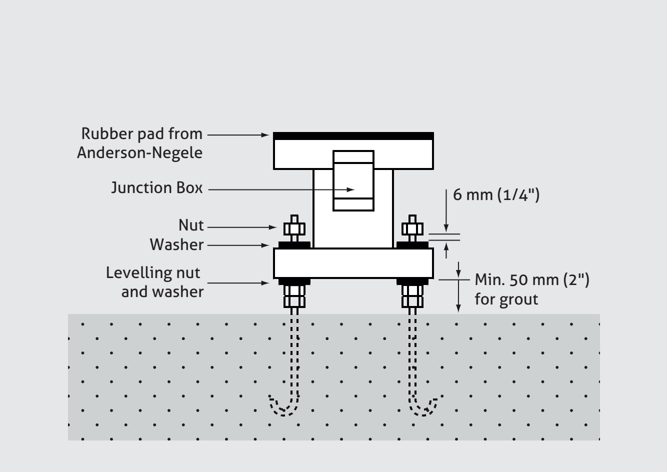
Caution

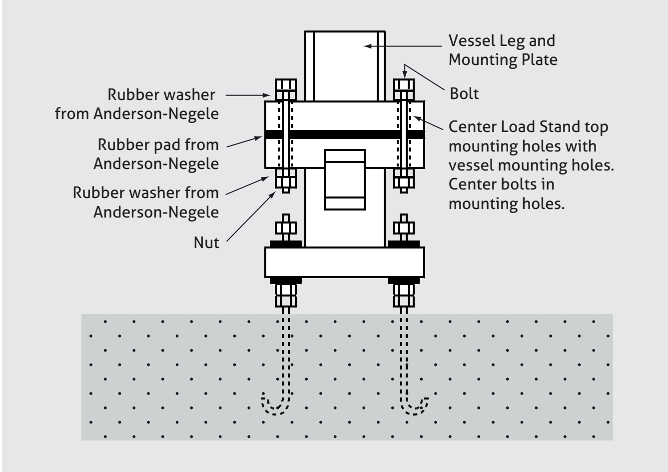
If the vessel hole pattern does not match up with the Load Stand® hole pattern, modify the mounting holes on the vessel. Do not force the Load Stand® into position by hammering or by tightening the mounting bolts.

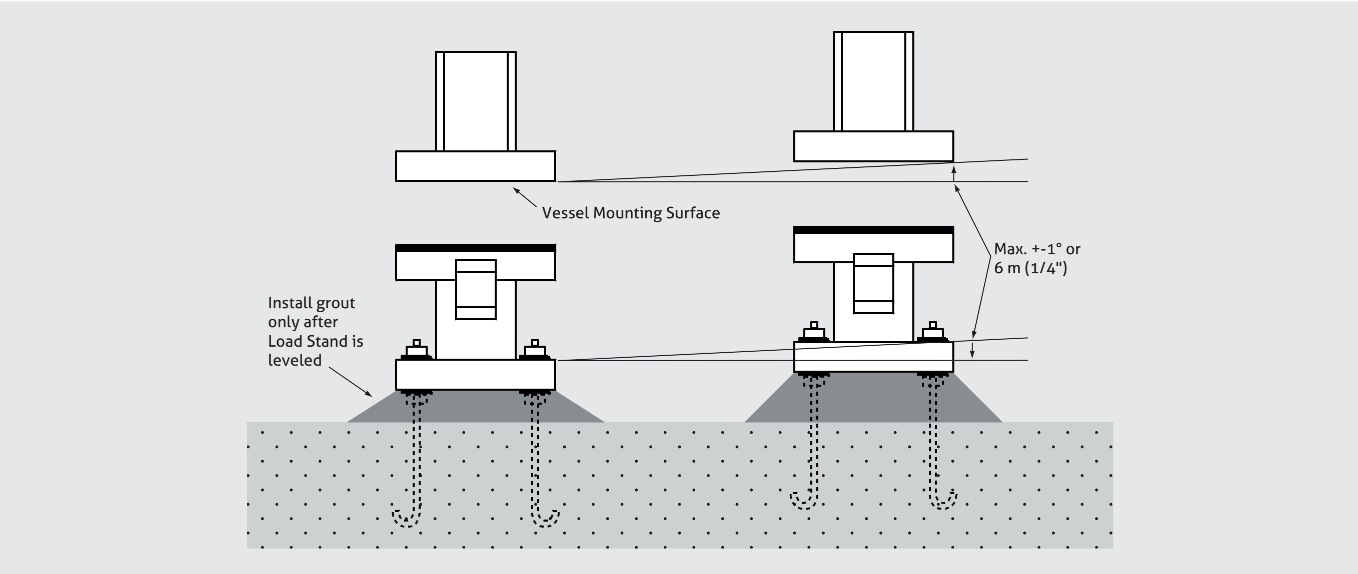
   a) Slowly lower the vessel until it is resting on the Load Stand® assemblies. Alignment pins may be used to help guide and position the vessel.
   b) Center the Load Stand® top mounting holes with the vessel mounting holes, using the clearance available from the Load Stand® bottom mounting holes.
   c) Place a rubber washer on each customer-provided top bolt. Place the four top bolts through the vessel, rubber pad, and Load Stand® mounting holes.
   d) Place a rubber washer and customer provided nut on the end of each bolt. Tighten the nuts finger tight. Do not compress the rubber washers at this time.
7. Perform preliminary leveling shimming:
   a) Inspect the installation for gaps between the vessel mounting plate and the Load Stand.
   b) Eliminate gaps by doing one or a combination of the following:
      - Turn the leveling nuts, only to raise the entire load stand.
      - Install one or more full shims above the Load Stand® rubber pad. Two shims are provided by Anderson-Negele with each Load Stand.
      - Install one or more partial shims above the Load Stand® rubber pad. Two shims are provided by Anderson-Negele with each Load Stand. Using the Load Stand® flange as a guide, mark the required shim shape on a thin piece of cardboard. Use this as a template to cut the required shape from a full shim.

Caution

If installing shims, loosen the top bolts on all the Load Stands before raising the vessel.







Shimming the load stands

Shimming the load stands distributes the weight evenly on all Load Stands, increasing system accuracy and life. Perform this procedure while the vessel is still empty:

1. Check if Leveling Needed
   a) Remove the junction box cover.
   b) Connect the red, white, and black wires of a 3-conductor cable to the corresponding terminals on TB1 of the Load Stand® junction box. Connect the other end of the cable to the corresponding terminals of the Anderson-Negele Test Meter. Turn on the power to the Test Meter and set the Simulate/Test switch to the Test position.

Note

If an Anderson-Negele Test Meter is not available, before proceeding refer to Chapter Set-up - Alternative method for checking output.

   c) Verify the dead weight voltage output of the Load Stand® from step 3f.
   d) Calculate the change in output, as shown in the example. Output Change = installed output - uninstalled output. The change in output must be positive.

- Check the wiring polarity at the Test Meter. Ensure the red, white, and black wires are connected to the corresponding terminals.
- If the wiring is correct and you still observe a negative output change, the vessel may be tilted. Vessel tilting shifts the load onto some Load Stands while putting other Load Stand(s) in a no load or tension load condition.

  This can occur in cases of extreme thermal deformation or unequal vessel leg length. Proceed to Step 2 to level the vessel.

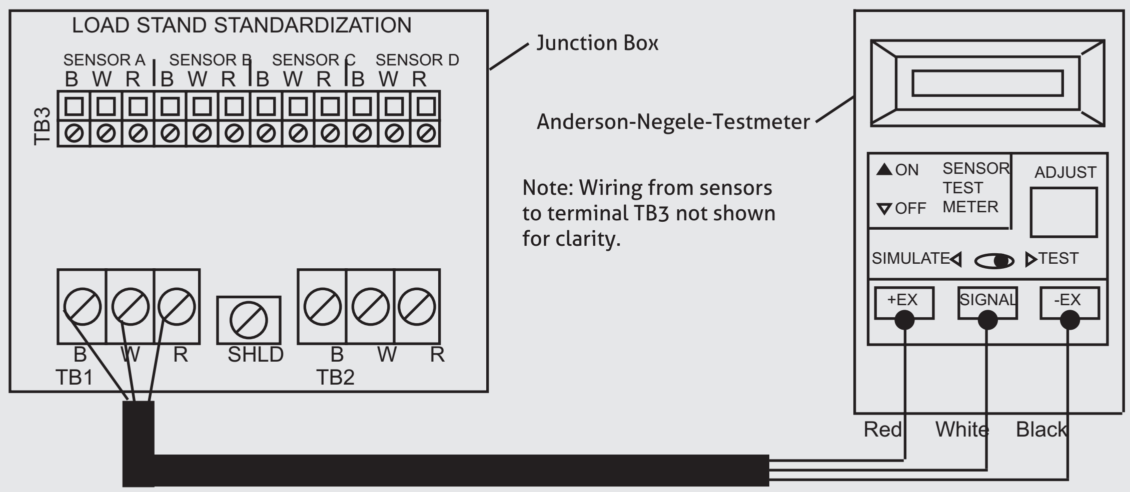
e) Repeat Steps A through D for each Load Stand® for this vessel.

f) Calculate the average output change for all Load Stands for this vessel. The output increase for each Load Stand® must be within ±25 % of the average output increase. Load Stands 1, 2, and 4 meet this requirement, while Load Stand® 3 does not.

g) If the installation meets the criteria described above (change in output is positive and is within ±25 % of the average output increase), the vessel is sufficiently level.

- If sufficiently level, proceed to Step 3 to complete the installation.
- If not sufficiently level, level the vessel as described in Step 2. 8

Checking Output using Anderson-Negele-Testmeter



Example Recording and Analysis of Output for Level Check			
Load Stand® Nr.	**Not installed output (no load) (mV)**	**Installed dead weight (mV)**	**Output change (Installed - Not installed) (mV)**
1	+30	+90	+60
2	-15	+50	+65
3	+17	+30	+13
4	-25	+30	+55
Average Output Change = (60 + 65 + 13 + 55) / 4 = 48.25			
Allowable Range for Output Change max. ± 25 % = 48.25 ± (1/2 x 48.25) = 36.18 to 60.3			

All Load Stands must meet the requirement that all output changes must be positive (+). Load Stands 1, 2, and 4 meet the requirement that the output change be within ±25 % of the average output change. Load Stand® 3 does not meet the requirement, and its small output change indicates it is carrying much less weight than the other supports. This load stand must be adjust with the leveling nuts or by shimming to carry additional weight. The vessel must be level to distribute the weight evenly over all the supports.

2. Shimming.
    a) Raise the vessel legs for the low output load stands.
    b) Raise or lower the load stand with the leveling nuts or add shim(s) above the rubber pad as required adjusting the distribution of weight on the Load Stands. Raising the leveling nuts and/or adding shims increases the weight on the Load Stand. Lowering the leveling nuts and removing shims decreases the weight on the Load Stand.

Note

Adjusting leveling nuts and/or shimming on one Load Stand® affects the weight distribution on all Load Stands.

    c) Slowly lower the vessel leg onto the Load Stand® assembly.
    d) Repeat Step 1, rechecking the output of all the Load Stands and recalculating the Output Change (dead weight output - no-load output).
    e) Repeat Steps 2A through 2D until the installation meets the criteria for weight distribution.
3. Complete Installation: Once the vessel is level, complete the installation:
    a) Tighten the nuts on the anchor bolts per the local code.
    b) Verify readings.
    c) Tighten the nuts on the upper bolts 1/2 to 1 turns past finger tight. This will compress the rubber washers and rubber pad.
    d) Apply double nut, adhesive or spoil the upper bolts and anchor bolts to prevent loosening of the nuts.
    e) Pack grout or concrete under the Load Stand. Do not grout above the bottom edge of the Load Stand® assembly.
    f) Replace the junction box cover if not ready to begin wiring the junction boxes together and to the signal processor, to ensure no moisture enters the box.

Caution

Loosen the top bolts of all the Load Stands before raising the vessel.

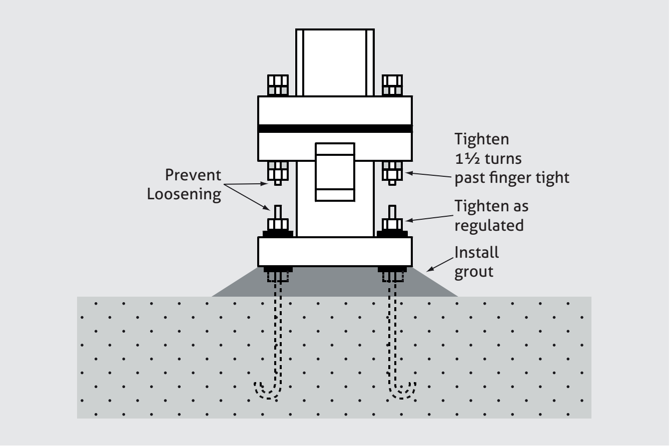


Figure 1
Load Stand® dimension chart (For any note references, see Figure 2 or 3)

LOAD STAND II DIMENSIONS

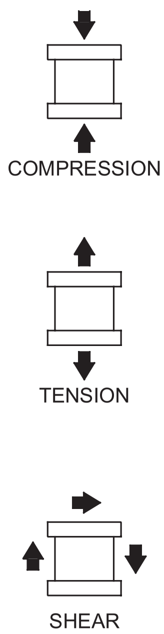
LOAD RATING	P	A	B	DB 1	DH	R	H	T	TP	DW	TW	WEIGHT	RT	XX 5
25,000 lbs (11,339.8 kg)	3.5 SCH. 40	6.25in (158.7mm)	4.25in (107.9mm)	ø.625in (ø15.9mm)	.875in (22.2mm)	1.00in (25.4mm)	7.37in (187.2mm)	1.25in (31.7mm)	.37in (9.5mm)	1.30in (33.0mm)	.44in (11.2mm)	32 lbs (14.5 kg)	1.25in (31.7mm)	.187in (4.7mm)
50,000 lbs (22,679.6 kg)	4 SCH. 120	7.00in (177.8mm)	4.75in (120.6mm)	ø.75in (ø19.0mm)	1.00in (25.4mm)	1.12in (28.4mm)	9.37in (238mm)	1.50in (38.1mm)	.37in (9.5mm)	1.48in (37.5mm)	.65in (16.5mm)	50 lbs (22.6 kg)	1.50in (38.1mm)	.187in (4.7mm)
75,000 lbs (34,020 kg)	6 SCH. 120	9.80in (248.9mm)	6.75in (171.4mm)	ø1.00in (ø25.4mm)	1.25in (31.7mm)	1.50in (38.1mm)	12.37in (314.2mm)	2.00in (50.8mm)	.37in (9.5mm)	2.00in (50.8mm)	.77in (19.6mm)	130 lbs (58.9 kg)	2.00in (50.8mm)	.187in (4.7mm)
100,000 lbs (45,359.2 kg)	6 SCH. 120	9.80in (248.9mm)	6.75in (171.4mm)	ø1.00in (ø25.4mm)	1.25in (31.7mm)	1.50in (38.1mm)	12.37in (314.2mm)	2.00in (50.8mm)	.37in (9.5mm)	2.00in (50.8mm)	.77in (19.6mm)	130 lbs (58.9 kg)	2.00in (50.8mm)	.187in (4.7mm)
150,000 lbs (68,040 kg)	8 SCH. 120	12.20in (312.4mm)	8.50in (215.9mm)	ø1.25in (ø31.7mm)	1.50in (38.1mm)	1.90in (48.2mm)	15.37in (390.4mm)	2.50in (63.5mm)	.37in (9.5mm)	2.50in (63.5mm)	1.03in (26.2mm)	230 lbs (104.3 kg)	2.50in (63.5mm)	.187in (4.7mm)
200,000 lbs (90,718.4 kg)	8 SCH. 160	12.20in (312.4mm)	8.50in (215.9mm)	ø1.25in (ø31.7mm)	1.50in (38.1mm)	1.90in (48.2mm)	15.37in (390.4mm)	2.50in (63.5mm)	.37in (9.5mm)	2.50in (63.5mm)	1.03in (26.2mm)	240 lbs (108.8 kg)	2.50in (63.5mm)	.187in (4.7mm)
300,000 lbs (136,077.7 kg)	12 SCH. 140	16.50in (419.1mm)	12.40in (314.9mm)	ø1.75in (ø44.4mm)	2.00in (50.8mm)	1.68in (42.6mm)	22.00in (558.8mm)	3.00in (76.2mm)	.75in (19.1mm)	3.37in (85.5mm)	1.05in (26.7mm)	590 lbs (267.6 kg)	3.00in (76.2mm)	.187in (4.7mm)
400,000 lbs (181,440 kg)	14 SCH. 140	17.50in (444.5mm)	13.50in (342.9mm)	ø2.00in (ø50.8mm)	2.25in (57.2mm)	2.00in (50.8mm)	22.75in (577.8mm)	3.00in (76.2mm)	.75in (19.1mm)	3.75in (95.3mm)	1.05in (26.7mm)	775 lbs (351.5 kg)	3.00in (76.2mm)	.187in (4.7mm)
500,000 lbs (226,796.2 kg)	16 SCH. 140	18.50in (469.9mm)	14.75in (374.6mm)	ø2.00in (ø50.8mm)	2.25in (57.2mm)	1.87in (47.4mm)	24.50in (622.3mm)	3.50in (88.9mm)	.75in (19.1mm)	3.75in (95.3mm)	1.05in (26.7mm)	900 lbs (408.2 kg)	3.50in (88.9mm)	.187in (4.7mm)
750,000 lbs (340,194.3 kg)	20 SCH. 140	24.00in (609.6mm)	19.00in (482.6mm)	ø2.50in (ø63.5mm)	2.75in (69.8mm)	2.50in (63.5mm)	30.00in (762mm)	3.50in (88.9mm)	.75in (19.1mm)	4.50in (114.3mm)	1.05in (26.7mm)	1,625 lbs (737.1 kg)	3.50in (88.9mm)	.187in (4.7mm)
1,000,000 lbs (453,592.4 kg)	24 SCH. 120	27.00in (685.8mm)	21.50in (546.1mm)	ø3.00in (ø76.2mm)	3.25in (82.5mm)	2.75in (69.8mm)	35.50in (901.7mm)	4.00in (101.6mm)	.75in (19.1mm)	5.50in (139.7mm)	1.05in (26.7mm)	2,350 lbs (1065.9 kg)	4.00in (101.6mm)	.187in (4.7mm)

MAXIMUM FRAME LOADS ALLOWED PER AISC 14th Ed. 7

LOAD STAND LOAD RATING	COMPRESSION	TENSION	SHEAR
25,000 lbs (11,338 kg)	55,810 lbs (25,310 kg)	33,068 lbs (14,999 kg)	9,165 lbs (4,156 kg)
50,000 lbs (22,676 kg)	116,138 lbs (52,670 kg)	47,618 lbs (21,599 kg)	16,227 lbs (7,359 kg)
75,000 lbs (34,014 kg)	222,838 lbs (101,060 kg)	84,654 lbs (38398 kg)	35,102 lbs (15,919 kg)
100,000 lbs (45,351 kg)	222,838 lbs (101,060 kg)	84,654 lbs (38398 kg)	35,102 lbs (15,919 kg)
150,000 lbs (68,027 kg)	371,511 lbs (168,486 kg)	115,737 lbs (52,497 kg)	61,379 lbs (27,841 kg)
200,000 lbs (90,703 kg)	457,519 lbs (207,491 kg)	115,737 lbs (52,497 kg)	69,442 lbs (31,498 kg)
300,000 lbs (136,054 kg)	856,097 lbs (388,253 kg)	226,845 lbs (102,895 kg)	87,952 lbs (39,888 kg)
400,000 lbs (181,406 kg)	1,043,947 lbs (473,445 kg)	258,683 lbs (117,316 kg)	113,174 lbs (51,326 kg)
500,000 lbs (226,757 kg)	1,372,421 lbs (622,413 kg)	296,288 lbs (134,394 kg)	112,419 lbs (50,984 kg)
750,000 lbs (340,136 kg)	2,093,619 lbs (949,487 kg)	352,096 lbs (159,681 kg)	169,760 lbs (76,989 kg)
1,000,000 lbs (453,515 kg)	2,636,143 lbs (1,195,530 kg)	459,880 lbs (208,562 kg)	194,012 lbs (87,987 kg)

ULTIMATE FRAME LOADS (BASED ON MATERIAL STRENGTH) (REFERENCE ONLY)

LOAD STAND LOAD RATING	COMPRESSION	TENSION	SHEAR
25,000 lbs (11,338 kg)	93,202 lbs (42,268 kg)	55,223 lbs (25,048 kg)	15,305 lbs (6,941 kg)
50,000 lbs (22,676 kg)	193,950 lbs (87,974 kg)	79,522 lbs (36,070 kg)	27,100 lbs (12,290 kg)
75,000 lbs (34,014 kg)	372,140 lbs (168,771 kg)	141,372 lbs (64,125 kg)	58,621 lbs (26,585 kg)
100,000 lbs (45,351 kg)	372,140 lbs (168,771 kg)	141,372 lbs (64,125 kg)	58,621 lbs (26,585 kg)
150,000 lbs (68,027 kg)	620,424 lbs (281,371 kg)	193,282 lbs (87,671 kg)	102,502 lbs (46,494 kg)
200,000 lbs (90,703 kg)	764,056 lbs (346,511 kg)	193,282 lbs (87,671 kg)	115,969 lbs (52,602 kg)
300,000 lbs (136,054 kg)	1,429,682 lbs (648,382 kg)	378,832 lbs (171,835 kg)	146,880 lbs (66,612 kg)
400,000 lbs (181,406 kg)	1,743,392 lbs (790,654 kg)	432,000 lbs (195,198 kg)	189,000 lbs (85,714 kg)
500,000 lbs (226,757 kg)	2,291,943 lbs (1,039,430 kg)	494,801 lbs (224,438 kg)	187,740 lbs (85,143 kg)
750,000 lbs (340,136 kg)	3,496,344 lbs (1,585,644 kg)	588,000 lbs (266,667 kg)	283,500 lbs (128,571 kg)
1,000,000 lbs (453,515 kg)	4,402,358 lbs (1,996,534 kg)	768,000 lbs (348,299 kg)	324,000 lbs (146,939 kg)



Legend

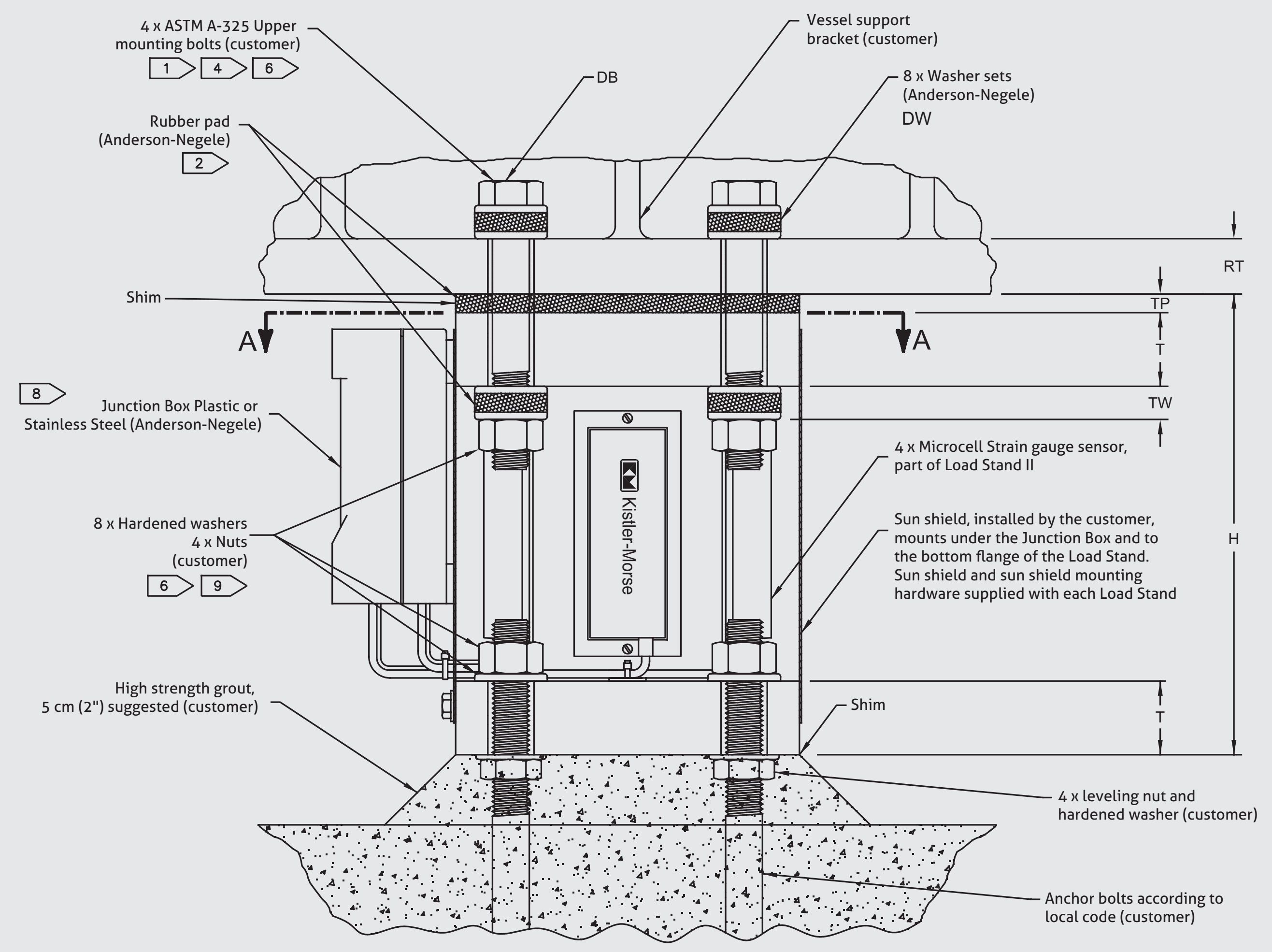
A	Outside Dimension
B	Hole Dimension
DB	Bolt Size
DH	Hole Diameter
DW	Washer Outside Diameter
H	Installed Height
P	Pipe Size
R	Corner Radius
RT	Recommended Thickness
T	Plate Thickness
TP	Pad Thickness
TW	Washer Thickness

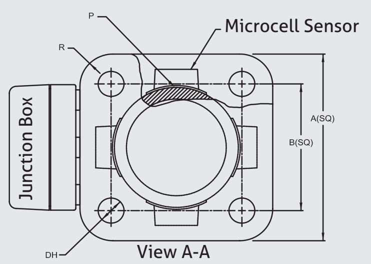
Note

Refer to installation notes on next pages:

Fig. 2 (concrete mounting)
Fig. 3 (beam mounting)
Fig. 4 (Wiring and Signal cable routing)

Figure 2
Concrete Mounting





Operation and Installation

The Load Stand® II can compensate for thermally induced expansion by slightly tilting the screws in oversized holes. The mounting holes on the vessel should be of the same size as the Load Stand® II („DH“) and their position should not be more than ±1.5 mm (0.6") from their ideal position.

Level and fill with grout so that there is there is no gap between the Load Stand® unit and the foundation. This is mandatory to assure proper operation.

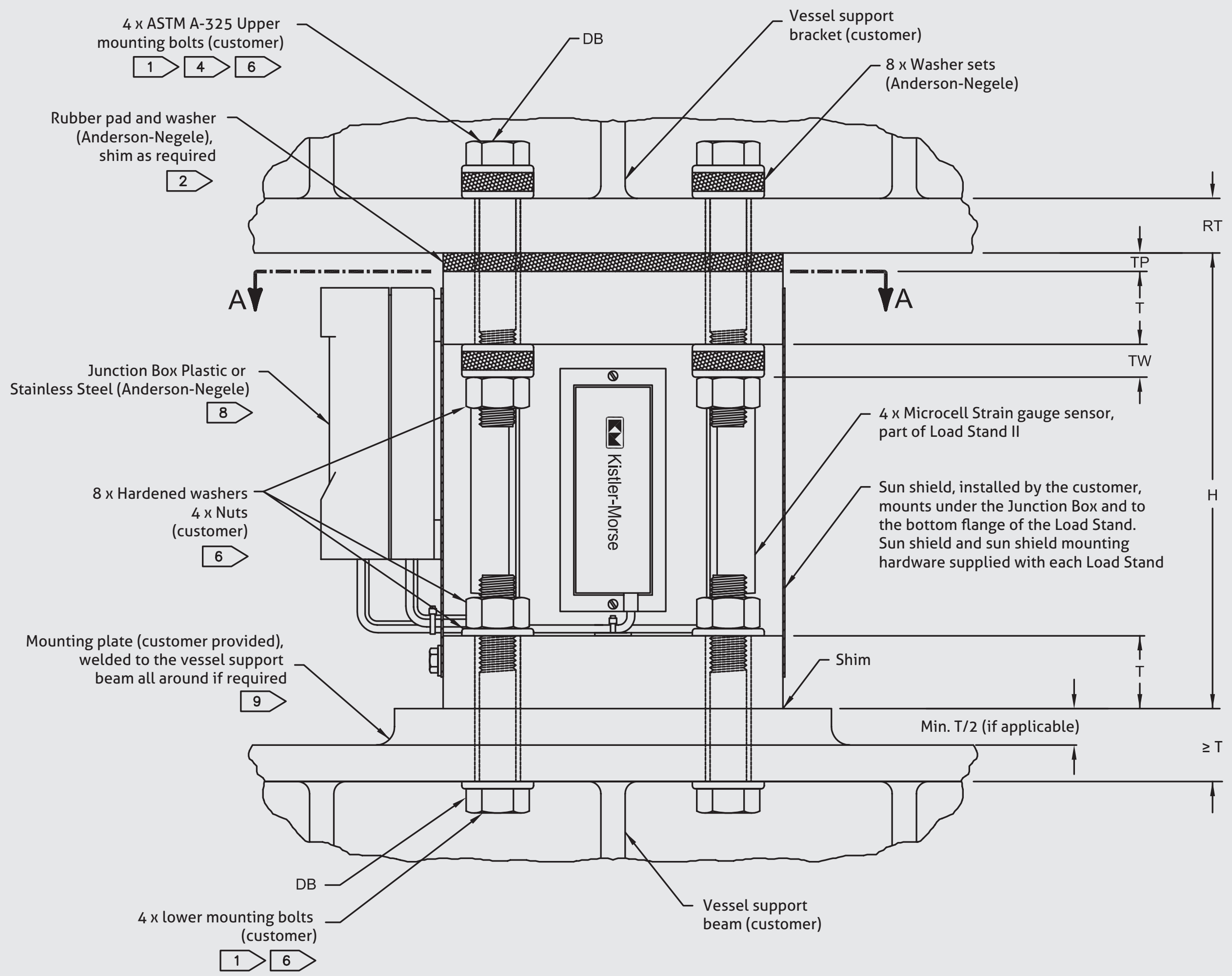
Customer provided loads and thermal expansion must be must be taken into account so that applicable building codes and and usage characteristics are met.

Load Stand® II has been designed in accordance with the Uniform Builidng Code UBC, 1988 edition. Additional information and test results can be obtained from Anderson-Negele upon request.

Notes

1. Bolts: ASTM A-325, bolt length determined by and supplied by customer.
2. Pads: Supplied by Anderson-Negele
4. Install upper mounting bolts in oversized holes (DH) and tighten nuts 1/2 to 1 turns past “finger tight”.
5. XX = Maximum thermal deformation allowed, computed as shown here : X = DH - DB - 1.5 mm (1/16").
6. Use one of the following to prevent loosening Apply double nut, adhesive or spoil bolt threads.
7. The loads listed are the maximum ASD loads for the condition listed (Compression, Tension or Shear) and are based on AISC 14th edition. All Load Stands must be selected to resist the combined loading effects for the specific jobsite and building code requirements. Load combinations can be found in the applicable building code.
8. Conduit entry sized for 3/4" NPT fitting. Use sealing washers and flexible conduit (liquid tight recommended) to maintain NEMA-4 rating and to de-couple conduit run from the weighing system.

Figure 3
Beam Mounting



Operation and Installation

The Load Stand® II can compensate for thermally induced expansion by slightly tilting the screws in oversized holes. The mounting holes on the vessel should be of the same size as the Load Stand® II („DH") and their position should not be more than ±1.5 mm (0.6") from their ideal position.

Level and fill with grout so that there is there is no gap between the Load Stand® unit and the foundation. This is mandatory to assure proper operation.

Customer provided loads and thermal expansion must be must be taken into account so that applicable building codes and and usage characteristics are met.

Load Stand® II has been designed in accordance with the Uniform Builidng Code UBC, 1988 edition. Additional information and test results can be obtained from Anderson-Negele upon request.

Notes

1 Bolts: ASTM A-325, bolt length determined by and supplied by customer.

2 Pads: Supplied by Anderson-Negele

4 Install upper mounting bolts in oversized holes (DH) and tighten nuts 1/2 to 1 turns past "finger tight".

5 XX = Maximum thermal deformation allowed, computed as shown here : X = DH - DB - 1.5 mm (1/16").

6 Use one of the following to prevent loosening Apply double nut, adhesive or spoil bolt threads.

7 The loads listed are the maximum ASD loads for the condition listed (Compression, Tension or Shear) and are based on AISC 14th edition. All Load Stands must be selected to resist the combined loading effects for the specific jobsite and building code requirements. Load combinations can be found in the applicable building code.

8 Conduit entry sized for 3/4" NPT fitting. Use sealing washers and flexible conduit (liquid tight recommended) to maintain NEMA-4 rating and to de-couple conduit run from the weighing system.

9 We recommend to insure system performance and maximum loading capacity a rigid, flat mounting surface approximately twice dimension "A" long, the same width as the flange , and a minimum of one half dimension "T" thick. If the existing beam flange does not meet these requirements plate can be welded to the beam a shown, however the plate should be a minimum one half dimension "T" thick.

Electrical installation

Caution

Very high voltage is present. Remove power from the unit before installing, removing or making adjustments.

General Safety

When using electrical equipment, you should always follow basic safety precautions, including the following:

- The installation and wiring of this product must comply with all national, federal, state, municipal, and local codes that apply.
- Properly ground the enclosure to an adequate earth ground.
- Do not modify any factory wiring. Connections should only be made to the terminals described in this section.
- All connections to the unit must use conductors with an insulation rating of 300 V minimum, rated for 105 °C (212 °F), a minimum flammability rating of VW-1, and be of appropriate gauge for the voltage and current required (see specifications).
- Do not allow moisture to enter the electronics enclosure. Conduit should slope downward from the unit housing. Install drip loops and seal conduit with silicone rubber product.

Disconnect requirements for permanently installed equipment

A dedicated disconnecting device (circuit breaker) must be provided for the proper installation of the unit. If independent circuits are used for power input and main relay outputs, individual disconnects are required.

Disconnects must meet the following requirements:

- Located in close proximity to the device
- Easily accessible to the operator
- Appropriately marked as the disconnect for the device and associated circuit
- Sized appropriately to the requirements of the protected circuit (See specifications)

Installation

There are two versions of the junction box enclosure. Both versions have four small holes, which are used for factory-wiring the sensors to the junction box. In addition, the junction box has one or two large holes for wiring the junction box to other junction boxes and the signal processor:

- One large hole (conduit installation); the large hole accommodates a 3/4" conduit fitting.
- Two large holes (non-conduit installation); the two large holes are equipped with PG13.5 cable fittings. Cable trays for non-conduit installations are required.

Guidelines

- The procedure below assumes the conduit/cable tray has been installed.
- Seal all conduit fittings against water entry. Install drain holes at conduit/cable tray lowest elevation(s) to allow condensation to drain.
- Use Belden 3-conductor shielded interconnect cable or equivalent to wire junction boxes together and to the signal processor, for lengths up to 305 m (2,000').
- When wiring cable to junction box terminals, strip back 3" (76 mm) of cable sheathing to expose the three conductor wires and shield wire inside. Strip 1/4" (6 mm) of insulation from the end of each of the conductor wires. Spread a generous bead of sealant around the sides of the PG 13.5 cable fittings. Install the fittings in the two large holes.

Caution

Use only Sikaflex™ 1A polyurethane sealant, Sikaflex™ ProSelect Construction sealant or Dow Corning™ RTV 739 or RTV 738. Other sealants may contain acetic acid, which is harmful to sensors and electronics.

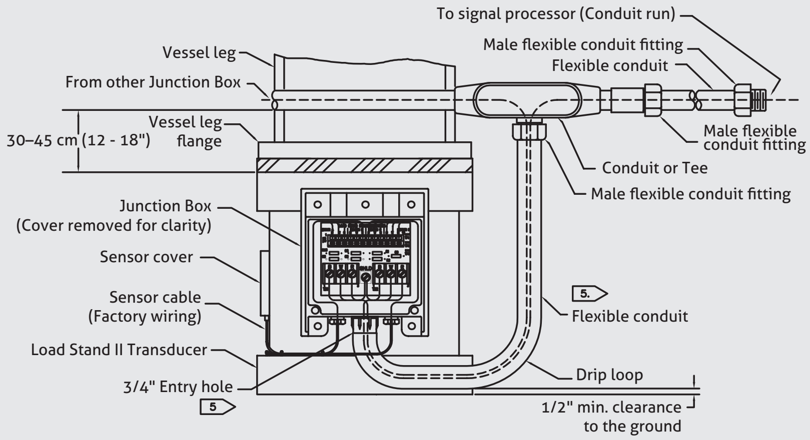
1. See **Figure 4:** Route the 3-conductor cable through the fitting into the junction box farthest from the signal processor. Connect wires from the cable to the TB2 terminal in the junction box: black wire to B, white wire to W, and red wire to R. Connect the cable shield wire to the Shield terminal between TB1 and TB2.
2. Route the cable through conduit/cable tray to the next junction box. Estimate the required length of cable to the terminal strip, allowing a little extra for strain relief. Cut the excess cable. Connect wires from the cable to the TB1 terminal in the junction box: black wire to B, white wire to W, and red wire to R. Connect the cable shield wire to the Shield terminal between TB1 and TB2.
3. Route another 3-conductor cable through the fitting into this junction box, and attach wires to the TB2 terminal: black wire to B, white wire to W, and red wire.
4. Repeat Steps 2 and 3 until all junction boxes for the vessel are wired together.
5. Route the cable from the last junction box through conduit to the signal processor. Refer to the signal processor manual for wiring the junction box to the signal processor. One vessel takes up one channel in the signal processor—the channel shows the average value from all the Load Stands supporting the vessel.

Caution

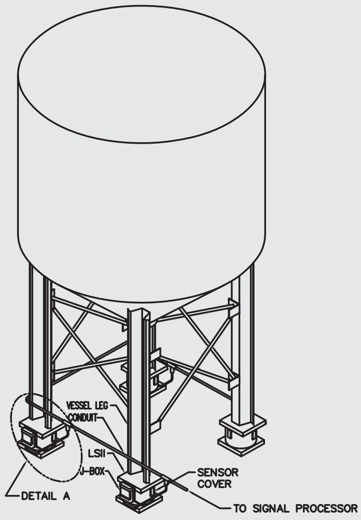
All wiring routed between Junction Boxes and Signal Processor must be continuous (no splices)

Figure 4
Signal Cable Layout

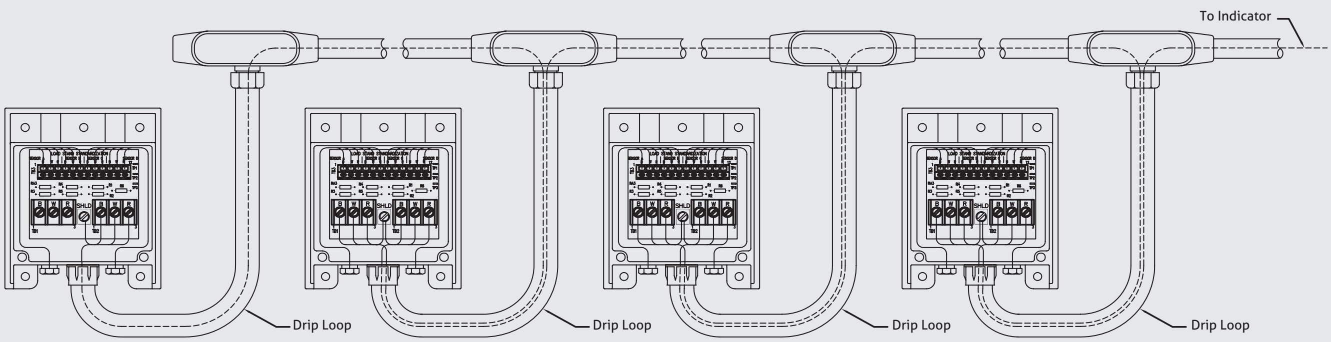
Detail A
Preferred method with conduit installation



Typical cable and conduit routing



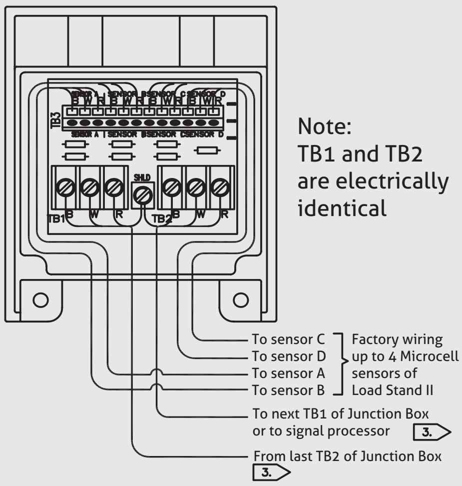
Typical Sensor Wiring



Notes

1. All connection parts are customer provided (unless otherwise noted).
2. Diagrams only examplary. Local electrical installation requirements or code must be observed.
3. If the distance transducer - signal processor is max. 305 m (1000’), use 3-wire, shielded 18 AWG interconnect cable for wiring junction boxes to each other and to the signal processor. If the distance is between 305 and 610 m use 16 AWG cable.
4. Up to 4 Load Stand® sensor cables can be connected in one junction box. Junction boxes can be interconnected as required.
5. The conduit entry hole on this junction box is designed for conduit with 0" NPS connector. Adapter plugs are required for other connections and wiring to the signal processor.
6. Junction boxes must always be securely closed and all unused openings securely sealed with the plugs provided.

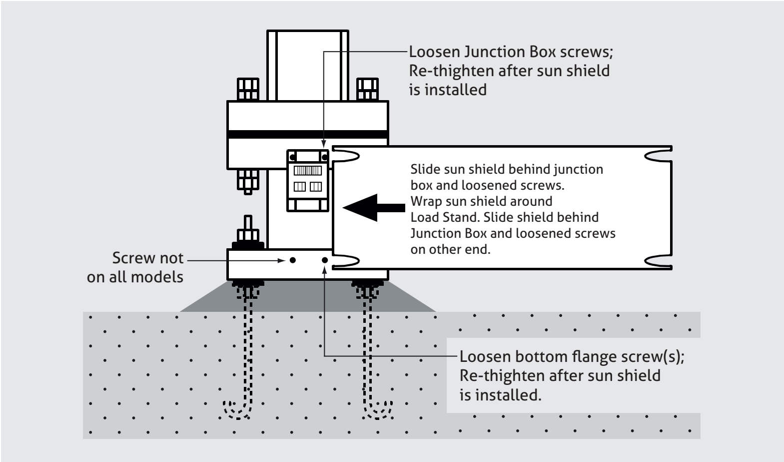
Typical Transducer / Junction Box Interconnect Diagram



Installation of the sun shield

The sun shield reduces sun-induced stresses in the Load Stand® sensors and provides additional protection for the sensors.

1. With the junction box cover off, slightly loosen the screws attaching the junction box to the Load Stand.
2. Slightly loosen the horizontal screw(s) on the bottom flange of the Load Stand.
3. Wrap the sun shield around the Load Stand, slipping the cutout slots behind the loosened screws.
4. Tighten the junction box screws and the horizontal screw(s) on the bottom flange.
5. Replace the junction box cover.



Calibration

Calibration methods

Before calibrating, you must install a signal processor.

There are two calibration methods:

- Live Load calibration: set lo span and hi span while moving material into or out of the vessel. This is the preferred method.
- Manual calibration: set scale factor counts, scale factor weight, and zero calibration value without moving material. This method is less accurate than Live Load calibration.

A Live Load calibration requires you to move a known quantity of material into or out of the vessel while performing the procedure. The quantity of material moved must be at least 25 % of the vessel's total capacity to provide best accuracy. Live Load calibration is also based on the material weight currently in the vessel.

Manual calibration allows you to start using the system as soon as sensors, junction boxes, and signal processor are installed and wired, even if you cannot move any (or enough) material now. Manual calibration values are based on system parameters, including sensor sensitivity, vessel stress, and signal processor A/D converter sensitivity. These values are known, can be calculated, or can be obtained from the signal processor. Manual calibration is also based on the material weight currently in the vessel.

Note that manual calibration does not take into account the actual response to changes in weight. Theoretically, a change in weight results in a proportional change in digital counts. However, the structure.s actual response to load and interaction with piping, catwalks, a roof, discharge chutes, etc. prevents the system from achieving theoretical values. Manual calibration is a good start, but to obtain the highest accuracy, perform a Live Load calibration when scheduling permits you to move material into or out of the vessel.

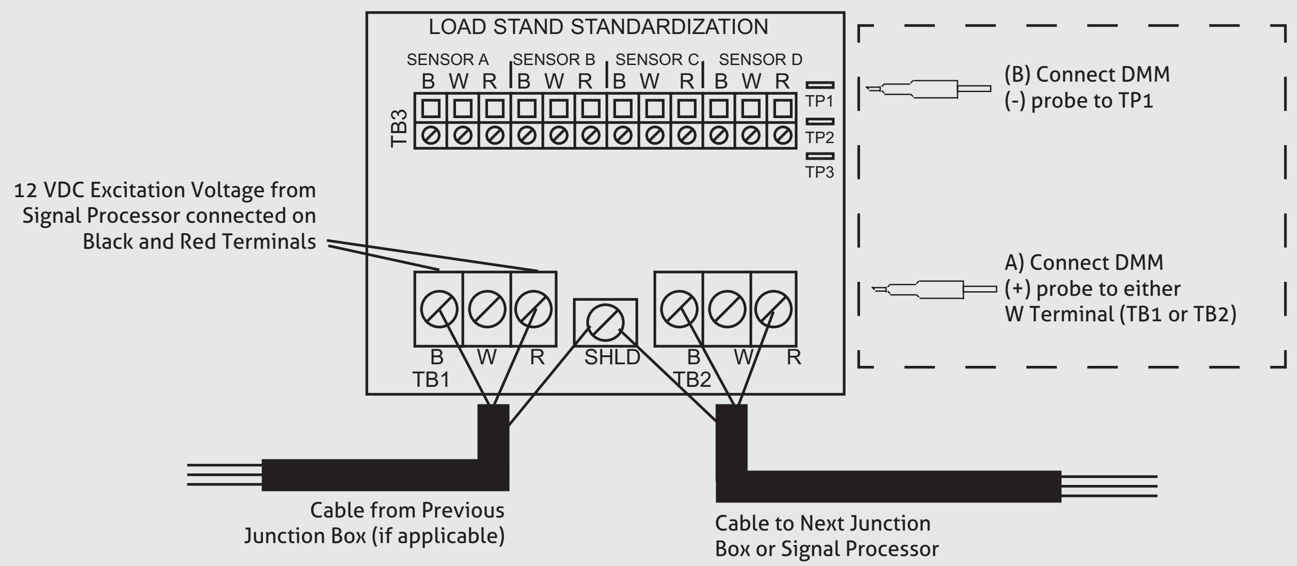
Refer to the signal processor manual for the procedure to input calibration parameters.

Alternative method for checking output

If you do not have an Anderson-Negele Test Meter, use a Digital Multimeter (DMM) and the Load Stand® II junction box to monitor the voltage output of each Load Stand® before and during installation. Set up the DMM as described below.

1. Disconnect the white wires from the W terminals on TB1 and TB2 in the junction box, see Figure below.
2. Connect the DMM (+) probe to the W terminal on either TB1 or TB2 **(See A).**
3. Connect the DMM (-) probe to TP1 in the junction box **(See B).**
4. Set a voltage range on the DMM that will accommodate a measured range of ±1 volt.
5. See Pre-Check Procedures, for details on checking the voltage output before installation. See Leveling Vessel, Hardware Installation, for details on monitoring the voltage output to determine if the vessel weight is evenly distributed among the Load Stands.
6. Once output is verified, reconnect the white wires on the W Terminals on TB1 and TB2 in the junction box.

Using DMM and Junction Box to Monitor Voltage Output



Troubleshooting Load Stand® II

Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in Display Readings	Fluctuations can be caused by small amplitude drift or oscillation, with peak-to-peak disturbance of 0.1 % to 0.5 % of full scale, is normal. Problem likely to be noticed shortly after initial installation.	Reduce drift or oscillation by setting 'count by' and 'averaging' appropriately on signal processor (refer to signal processor manual).
	Fluctuations can be caused by moisture in the cable conduit, junction boxes, or PCBs. Problem likely to be noticed on system that previously functioned correctly.	Check conduit, junction boxes and PCBs for water contamination. Find water entry source and correct problem. Dry with a hair drier. Remove/ replace corroded parts and materials. Caution: If using sealant to eliminate water entry, use Sikaflex™ 1A polyurethane sealant, Sikaflex™ ProSelect Construction sealant or Dow Corning™ RTV 739 or RTV 738. Other sealants may contain acetic acid, which is harmful to sensors and electronics.
	Fluctuations can be caused by jammed bolts or heat radiation/ conduction. Problem likely to be noticed shortly after initial installation or on system that previously functioned correctly in cool or overcast weather.	Loosen nuts on top bolts and inspect top bolts. · Top bolts free to move in holes: If vessel is heated, it may be radiating or conducting heat through vessel legs and affecting Load Stand® sensors. · To reduce head radiation/conduction: a) Insulate vessel. b) Contact Anderson-Negele to discuss adding a high temperature insulating pad. · Top bolts jammed: Jammed top bolts indicate undersized bolt holes on vessel mounting flange and/or vessel support movement beyond limits of Load Stand® clearance holes. Resulting side loads affect Load Stand® sensors. · To reduce side loads: a) Enlarge vessel mounting flange bolt holes to provide additional clearance.
	Fluctuations can be caused by damaged Load Stand® sensor. Problem likely to be noticed shortly after initial installation or on system that previously functioned correctly.	Using Digital Multimeter (DMM), check resistance for individual Load Stands: 1. Set meter resistance scale to accommodate measured range up to 20,000 Ω. 2. At the suspect Load Stand® junction box, remove wiring at TB1 and TB2, which connects to other Load Stands and signal processors.

Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in Display Readings	Fluctuations can be caused by damaged Load Stand® sensor. Problem likely to be noticed shortly after initial installation or on system that previouslyfunctioned correctly.	3. Put one DMM lead on W and other lead on R terminal on TB1 of Load Stand® junction box. Record resistance, and verify it is 7,660 ± 700 Ω. If reading is outside this range, one or more Load Stand® sensors are damaged and must be replaced—go to Step 7 to identify which sensor is damaged. 4. Put one DMM lead on W and other lead on B terminal on TB1 of Load Stand® junction box. Record resistance, and verify it is 7,660 ± 700 Ω. If reading is outside this range, one or more Load Stand® sensors are damaged and must be replaced—go to Step 7 to identify which sensor is damaged. 5. Verify readings from Steps 3 and 4 are within 700 Ω of each other. If not, one or more Load Stand® sensors are damaged and must be replaced—go to Step 7 to identify which sensor is damaged. 6. Repeat Steps 2 through 5 for each suspect Load Stand, until Load Stand® with damaged sensor is located. 7. Identify damaged sensor at Load Stand® identified in Step 3, 4, or 5: a) Remove one sensors's wires from junction box terminal TB3. b) Put one DMM lead on sensor's white wire and other lead on red wire. Record resistance, and verify it is 1.45 K ± 200 Ω. If resistance is outside this range, sensor is damaged and must be replaced. c) Put one DMM lead on sensor's white wire and other lead on black wire. Record resistance, and verify it is 1.45K ± 200 Ω. If resistance is outside this range, sensor is damaged and must be replaced. d) Verify readings from Steps B and C are within 700 Ω of each other. If not, sensor is damaged and must be replaced. e) Repeat Steps A through D for each sensor, until damaged sensor is located and replaced.

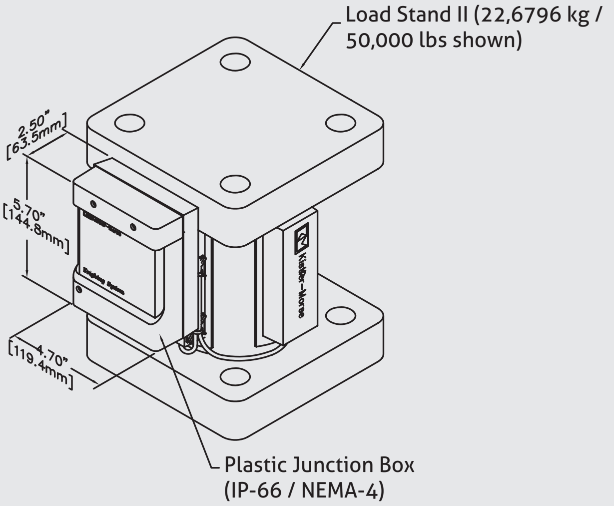
Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in Display Readings	Fluctuations in readings can be caused by short to ground.	Using a Digital Multimeter (DMM) or ohmmeter, check for shorts to ground as follows: 1. Set meter resistance scale to accommodate maximum measured range. 2. Disconnect junction box wires of suspect vessel from signal processor. 3. With one lead to earth ground and other lead to white wire, check resistance on disconnected wires: If reading is less than infinite (i.e., there is resistance), a short is indicated; proceed to Step 4 to identify location. If no short is indicated, investigate other explanations for problem. 4. Starting with junction box closest to signal processor in daisy chain, disconnect wires connecting junction box to other junction boxes. With one lead to earth ground and other lead to white terminal on TB3, check resistance on wires leading from junction box: If the reading is less than infinite (i.e., there is resistance), short is indicated; proceed to Step 5 to identify location. If no short is indicated, proceed to next junction box in daisy chain, disconnecting wires connecting it to other junction boxes and checking resistance. Perform for each junction box down chain until short is located; proceed to Step 5 to identify location. **Note:** Sun shield or junction box mounting bolts are good locations for connecting probe to ground. 5. Disconnect wires for one sensor from above-identified junction box. With one lead to earth ground and other lead to white wire, check resistance on disconnected sensor wires: If reading is less than infinite (i.e., there is resistance), short is indicated. Replace shorted sensor. If no short is indicated, disconnect next sensor's wires from junction box and check resistances. Repeat for each sensor wired to junction box until short is located. Replace shorted sensor.

Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in Display Readings	Fluctuations in readings can be caused by problems with signal processor.	Check signal processor excitation voltage and incoming AC voltage for accuracy and stability (refer to signal processor manual).
Repeatable Drift over 24-hour Period	Periodic drift is most likely caused by thermal expansion due to sun's radiation or vessel's response to its own heating cycles. Problem likely to be noticed shortly after initial installation or on system that previously functioned correctly in cool or overcast weather.	Loosen nuts on top bolts and inspect top bolts. · Top bolts free to move in their holes: If vessel is heated, it may be radiating or conducting heat through vessel legs and affecting Load Stand® sensors. · To reduce head radiation/conduction: a) Insulate vessel. b) Use a heat shield like a metal plate to reflect heat. c) Contact Anderson-Negele to discuss adding a high temperature insulating pad. · Top bolts jammed—Jammed top bolts indicate undersized bolt holes on vessel mounting flange and/or vessel support movement beyond limits of Load Stand® clearance holes. Resulting side loads affect Load Stand® sensors. · To reduce side loads: a) Enlarge vessel mounting flange bolt holes to provide additional clearance. If support movement and heat radiation/conduction have been eliminated as source of error and periodic drift still indicates system is not meeting specifications (Appendix A), contact Anderson-Negele. **Note:** If keeping long-term records, take level readings at same time each day to minimize error.

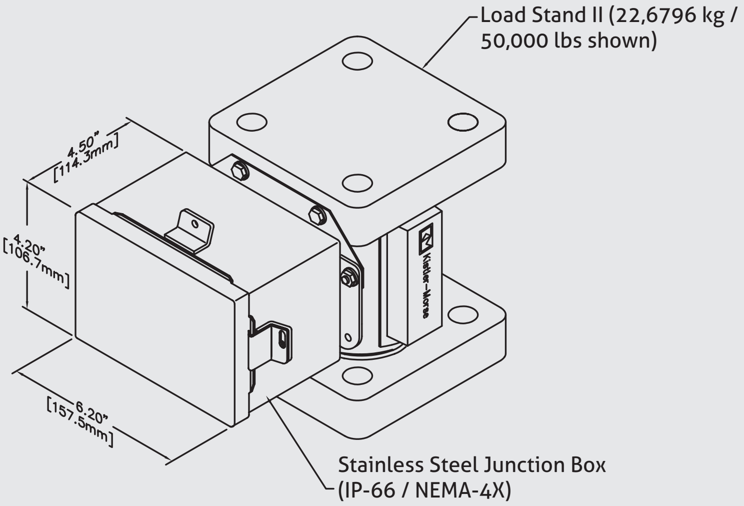
Problem	Description	Solution
Sudden Change in Weight Reading or System Requires Frequent Recalibration	Sudden change in weight reading can be caused by a broken Load Stand, causing indicated weight to shift up or down by large amount, up to 100 % of full-scale live load. Problem likely to be noticed on system that previously functioned correctly.	Check voltage outputs of individual Load Stands (refer to Chapter 2, Pre-Check Procedures, the section titled Method 1: Measuring Output). Voltage should be between -750 mV and +750 mV on installed Load Stands. If not, check Load Stand® resistance as described above in Problem 1.
	Sudden change in weight reading can be caused by problems with signal processor.	Check signal processor excitation voltage and incoming AC voltage for accuracy and stability (refer to signal processor manual).

Dimensional drawings

Load Stand® II with Plastic Junction Box (IP-66 / NEMA-4)



Load Stand® II with Stainless Stell Junction Box (IP-66 / NEMA-4X)



Notes