A member of the Avery Weigh-Tronix Group

GSE Tankmount

Integrated Tank Assembly (ITA)

User Instructions

39-10-42089
Issue AG

Table of Contents

1 General information and warnings

1.1 About this manual

This manual is divided into chapters by the chapter number and the large text at the top of a page. Subsections are labeled as shown by the 1.1 and 1.1.1 headings. The names of the chapter and the next subsection level appear at the top of alternating pages of the manual to remind you of where you are in the manual. The manual name and page numbers appear at the bottom of the pages.

1.1.1 Text conventions

Key names are shown in **bold** and reflect the case of the key being described. If a key has a dual function it may be referred to by its alternate function.

Displayed messages appear in ***bold italic*** type and reflect the case of the displayed message.

Annunciator names appear as *italic* text.

1.1.2 Special messages

Examples of special messages you will see in this manual are defined below. The signal words have specific meanings to alert you to additional information or the relative level of hazard.

CAUTION!
This is a Caution symbol.
Cautions give information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

NOTE: This is a Note symbol. Notes give additional and important information, hints and tips that help you to use your product.

1.2 Installation

NO USER SERVICEABLE PARTS. REFER TO QUALIFIED SERVICE PERSONNEL FOR SERVICE.

Equipment to be powered by a UL Listed I.T.E. power supply: rated 12 -36VDC and marked “LPS”, or a UL Listed power supply rated 12-36VDC and marked “Class 2.”

The Socket-Outlet shall be installed near the equipment and shall be easily accessible.

1.3 Routine maintenance

IMPORTANT: This equipment must be routinely checked for proper operation and calibration.
Application and usage will determine the frequency of calibration required for safe operation.

2 Tank mount installation

2.1 Environmental considerations

- Install the vessel in an environment where temperature fluctuations are minimized and where it will be protected from wind and drafts.
- Use load cells with temperature compensation that will allow the most satisfactory performance.
- Use a shield to protect the load cells from radiant heat sources.
- If thermal expansion/contraction of the vessel is expected, choose a mount that will allow lateral movement.
- Avoid an environment where its support structure is subject to vibration. Minimize vibrations and forces transmitted via attached piping or vessel restraints.
- Select load cells and mounts with proper corrosion and moisture protection. Fully welded and sealed, stainless steel cells provide excellent protection.
- Use a junction box with appropriate environmental protection.

2.2 Number and capacity of load cells

The number of vessel supports determines the number and capacity of the load cells required. It becomes more difficult to get even weight distribution on all supports as the number of load cells increases beyond three.

Examples:

Upright Cylindrical Vessels In Compression

Three or more symmetrically mounted load cells. Three provides the most even weight distribution between cells. Other factors may require that more supports be used with the vessel for strength or stability. The fewer number of load cells, the easier to distribute the weight evenly.

Rectangular Or Horizontally Mounted Cylindrical Vessels In Compression

Most practical is four cells, one at each corner of the vessel. Other factors may require that more supports be used with the vessel for strength or stability. The fewer the number of cells, the easier to distribute the weight evenly.

Suspended Vessels (Tension Or Compression)

One or more load cells may be used. Using three, symmetrically mounted, load cells or fewer has the advantage of not requiring accurate adjustment of the length of the supports to distribute the weight evenly. Other factors may require that more supports be used with the vessel for strength or stability.

- Appropriate individual cell capacity: Calculate Total empty vessel weight + the maximum that the vessel can hold when filled to overflowing divided by the number of supports. Chose a cell that meets or just exceeds this calculation. If the vessel is mounted out of doors, additional capacity may be required to protect from wind induced overload.

- Do not needlessly oversize the load cells; Best accuracy is achieved when maximum weighing is close to the load cells capacity.
- If it is not possible to trim the corners before or after installation then the use of load cells with matched outputs is desirable. If the vessel is not symmetrical and/or the material is not self-leveling, trimming or matching is a necessity for accuracy.
- Support the vessel entirely on load cells; do not use dummy cells or flexures that would hinder good performance.

2.3 Prepare mounting location

To insure precise operation, the mounting surface for the tank mount top and bottom plates must be level. If the mounting surfaces are not level, use shims and/or grout to level the surface. The top and bottom plates must be level within ±0.5?.

Be sure to use dummy load cells during installation to avoid overloading the actual load cell.

Determine where to position the tank mount assembly and in which direction it should be oriented. The tank mount assembly is designed to allow for lateral movement in the direction perpendicular to the load cell.

2.4 Mechanical

- Support the load cell mounts on a rigid structure so that all points are equally supported and the vessel stays vertical. Vehicular traffic or other forces must not cause deflection of the vessel's support structure.
- Ladders, pipes and check rods, etc. must have as little interaction with the vessel as possible.
- Where piping or conduit must be attached to the vessel: Use the smallest diameter, thinnest walled pipe that will meet all other specifications. Use the longest reasonable unsupported horizontal length to connect the vessel. 25 times the pipe diameter as a minimum to the first support or use a horizontally mounted flexible connection.
- There must be no tension between electrical cables or hoses and the vessel.
- Mount pneumatic solenoids for integral gates or valves on the vessel then connect the supply lines horizontally as in piping.

- Attached piping is usually the largest source of error in vessel weighing. The lower the capacity of the vessel the more likely inaccuracies of this type will be apparent. Correctly installed piping and electrical connections followed by an in place calibration will result in the best system performance.

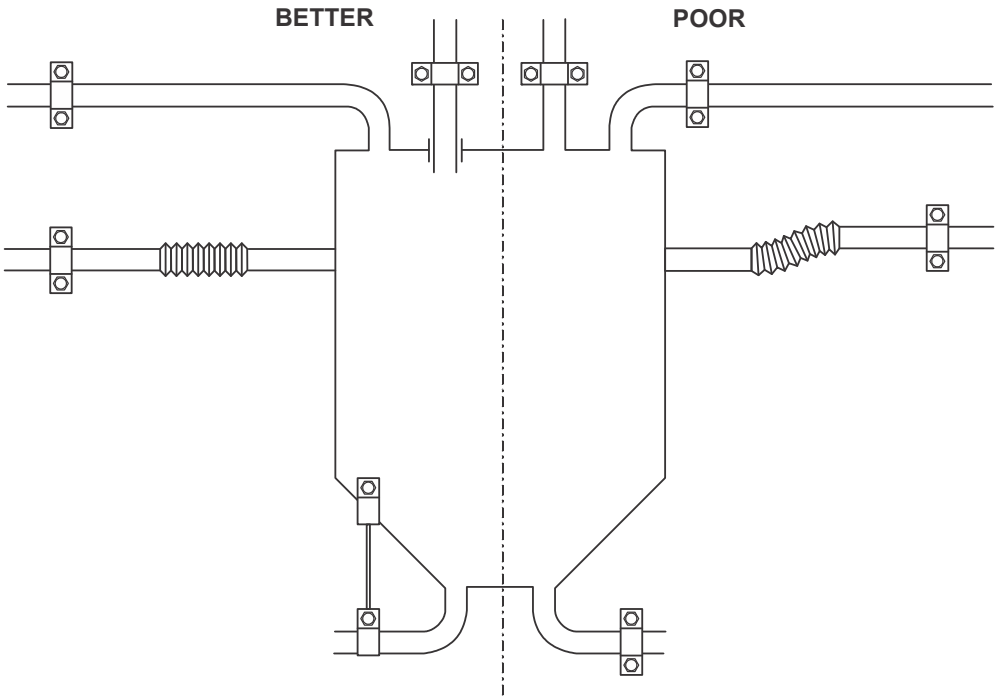


Figure 2.1 Piping

2.5 Installation

2.5.1 Concrete footing or floor

1. Position tank mount assembly bottom plate on foundation and use as a template for hole patterns.
2. Remove bottom plate drill holes.
3. Install threaded rods in the foundation. Make sure the rods line up with the holes in the tank mount assembly plates.
4. Install leveling nuts on threaded foundation rods.
5. Place tank mount assembly over threaded rods and align tank mount assembly in plane of maximum thermal expansion/contraction.
6. Loosely attach nuts to foundation rods and tank mount assembly. Do not tighten nuts at this time.
7. Level and plumb the tank mount assembly (0.5?).

2.5.2 Metal structure

1. Position tank mount assembly on beam or support and use as a template for hole patterns. Be sure to center the tank mount with shear center of support beam.
2. Remove tank mount assembly and drill holes.
3. Align tank mount in plane of maximum thermal expansion/contraction.
4. Install bolts and nuts loosely. Do not tighten at this time.
5. Level and plumb the tank mount assembly (0.5?).

2.5.3 ITA only

Install the ITA as you would most tank mount load cells. The following is a guide to insure maximum performance from your system.

Prepare the ITA: The ITA top Plate must move freely. ***Every ITA comes from the factory correctly assembled and locktighted and should not require adjustment.***

The load must be applied vertically to the load cells.

- Use a level to insure that the base plate is level. If not, level the supporting points, if this is not possible then shim the load cell base plate.
- Use a level to insure that the load cell is level then lower the vessel close to the load cell.
- Visually inspect the foot of the vessel support to insure that it aligns evenly with the level load cell. If it does not, shim the foot so that the load cell remains level.

If a temperature insulator is required between the foot and the load cell, use only a rigid isolator. Only the outer load cell ring may contact the foot or insulator.

If the ITA has been disassembled for any reason, perform the following:

- Remove the large center screw.
- Align the convex load disc and the load cell with the center hole in the base plate.
- Locktight and install the large screw and continue to turn it until the Rubber O-Ring just contacts the convex load disc.
- Back the screw off ¼ turn. The Screw provides lateral restraint and lift off protection, never remove it or back it off more than the suggested amount.

The center portion of the ITA load cell mount is not live. Therefore, if any part of the tank leg or adapter plate makes contact with the center, it will affect the weighing accuracy of the system.

3 Calibration

Ideally the vessel will have a means of hanging weight from the corners of the vessel to trim the load cell outputs and for calibration. If it is not possible use test weights to calibrate, a known amount of product or substitute should be used.

Calibration in place can help compensate for interference from piping, electrical connections and slightly misaligned load cells.

4 Maximize operational accuracy

If using a GSE indicator, try the Future Gross parameter. This feature calculates the cutoff point based on current flow rate and a manually entered freefall time.

An evenly flowing material can be most accurately measured. Reduce to a minimum the surging (i.e. diaphragm pump) of liquids while a weight reading is being taken.

Slow down the filling cycle as much as possible or use a 2-speed fill cycle to reduce to a minimum the amount of freefall material when nearing the cutoff.

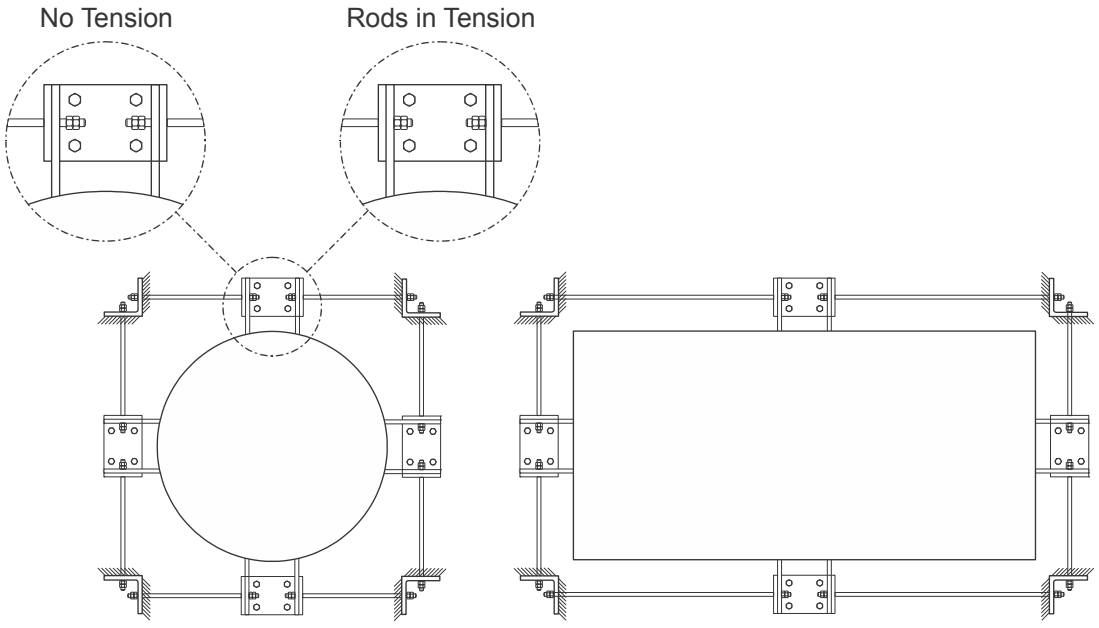
If possible, switch off any vibrating or mixing equipment while the weight is being determined.

5 Additional consideration

The GSE tank mounts are self checking with integral lift off restraint, however, additional vessel restraints may be required to prevent a vessel from falling from unexpected forces, protect connections from fatigue or to keep connections aligned.

Check Rods and Stay Rods can be identical with the exception of the actual connection to the vessel. The following Table lists their traits and uses.

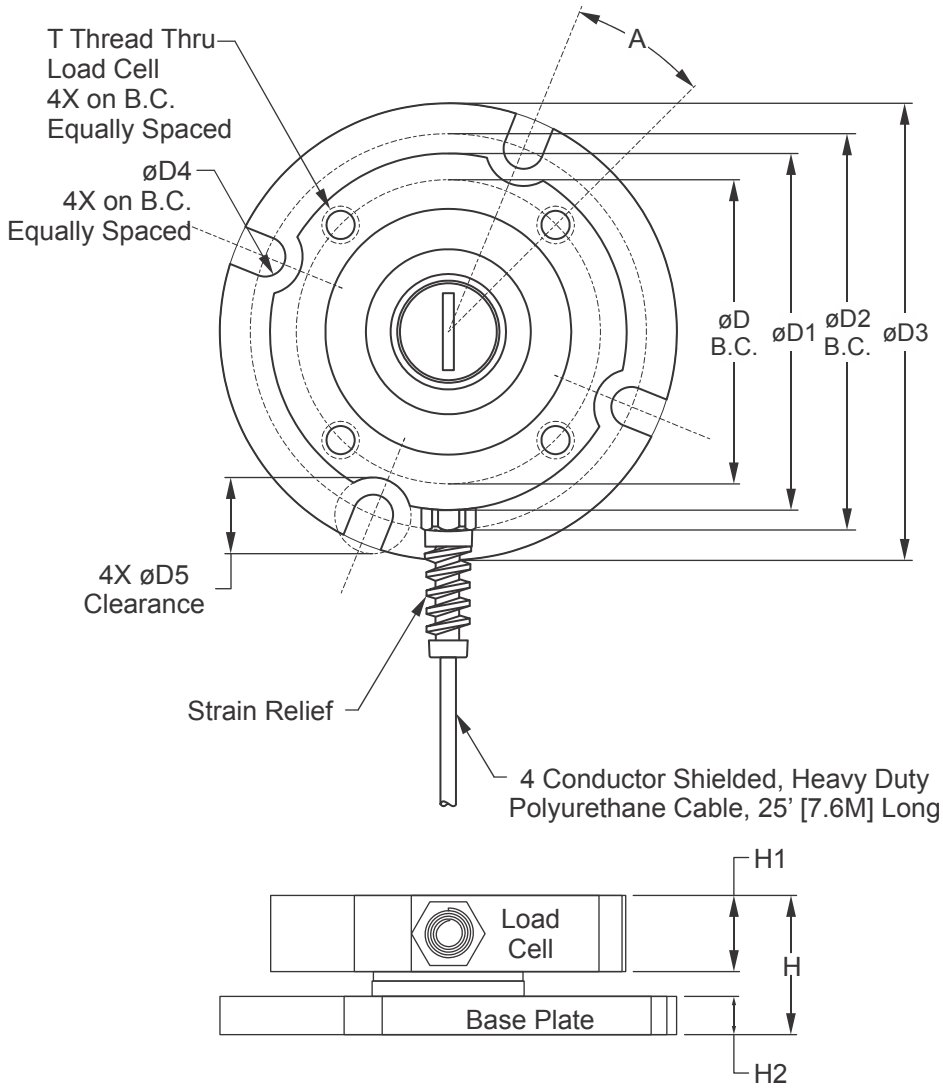
Check Rods	Stay Rods
Prevent excessive Motion	Prevent any Horizontal Motion
Can be mounted Vertically for suspended vessels. Used to prevent falling in case of a catastrophic load cell failure.	Cannot be used vertically
Mounting is Tangential for Circular Vessels – Parallel for Rectangular Vessels	
Installed without Tension or Compression	Installed with slight Tension
Should have no effect on accuracy	Should have minimal effect on accuracy. Length and diameter of the rod directly influences this. Use the longest, thinnest rod of suitable strength.



CAUTION: Never exceed recommended bolt torque. An over torqued bolt can be structurally weakened.

LC …Low Carbon MC…Medium Carbon Q…Quenched T…Tempered Steel A…Alloy	 **SAE 0-2 LC 74000 PSI**	 **SAE 3 MC 100000 PSI**	 **SAE 5 MC T 120000 PSI**	 **SAE 6 MC QT 133000 PSI**	 **SAE 7 MC QTA 133000 PSI**	 **SAE 8 MC QTA 150000 PSI**
Bolt-Coarse *Fine	**Approximate Dry Torque Coarse / Fine**					
¼-20 *28	4/6	9/10	10/11	10/12	10/12	12/14
5/16-18 *24	9/12	17/19	19/21	21/23	21/24	25/29
3/8-16 *24	16/22	30/33	33/36	39/44	40/45	45/50
7/16-14 *20	24/34	47/51	54/59	60/69	60/70	70/80
½-13 *20	38/52	69/75	78/85	94/99	95/100	110/120
9/16-12 *18	52/71	103/112	114/124	133/147	135/150	150/170
5/8-11 *18	98/115	145/158	154/168	135/205	140/210	220/240
¾-10 *16	155/180	234/255	257/280	310/350	320/360	380/420
7/8-9 *14	206/230	372/405	382/416	500/560	520/580	600/660
1-8 *14	310/350	551/600	587/640	780/840	800/860	900/990
1 1/8-7 *12	480/523	794/865	872/950	1305/1425	1325/1444	1430/1559
1 ¼-7 *12	675/736	1105/1204	1211/1320	1790/1950	1825/1989	1975/2153
1 3/8-6 *12	900/981	1500/1635	1624/1770	2425/2655	2500/2725	2650/2888
1 ½-6 *12	1100/1200	1775/1935	1943/2118	2915/3175	3000/3270	3200/3488
Lubrication Factors	Zinc Plate	Cadmium Pl	Chrome Pl	Dry Film	Oil	Oil/Graphite
	-15%	-25%	N/C	-50%	-15-40%	-55%

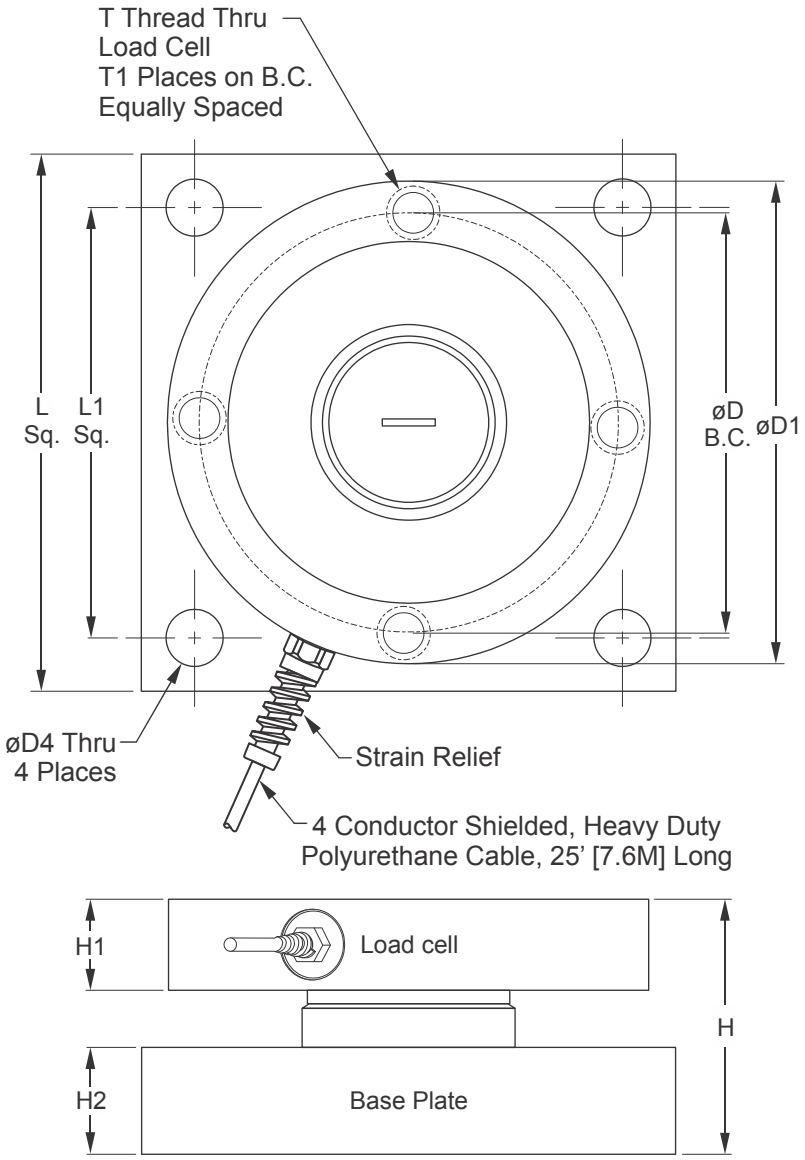
6 ITA dimensional drawings



Dimensions in table: INCH
MM

Rated Capacity (lbs)	H	H1	H2	D	D1	D2	D3	D4	D5	A	T
1K - 10K	1.37 34.9	0.75 19.1	0.375 9.5	3.000 76.2	3.50 88.9	3.900 99.1	4.50 114.3	0.400 10.2	0.75 19.1	23.0°	3/8-16
15K	1.62 41.15	0.75 19.1	0.625 15.88	3.000 76.2	3.50 88.9	3.900 99.1	4.50 114.3	0.400 10.2	0.75 19.1	23.0°	3/8-16
20K - 50K	2.53 64.3	1.30 33.0	0.75 19.1	4.825 122.6	5.50 139.7	6.250 158.8	7.00 177.8	0.563 14.3	1.25 31.8	17.0°	1/2-13
60K -125K	3.12 79.2	1.50 38.1	1.00 25.4	5.500 139.7	6.50 165.1	7.00 177.8	8.00 203.2	0.813 20.7	1.75 44.5	52.5°	3/4-16

Figure 6.1 ITA Dimensions: 1 K to 125 K



Dimensions in table: INCH
MM

Rated Capacity (lbs)	H	H1	H2	L	L1	D	D1	D4	T	T1
150K -225K	4.75 120.7	1.70 43.2	2.00 50.8	10.00 254.0	8.00 203.2	7.825 198.8	9.00 228.6	1.06 26.9	1-12	4
250K -450K	6.40 162.6	2.25 57.2	3.00 78.2	11.00 279.4	9.00 228.6	7.750 196.9	9.00 228.6	1.31 33.3	7/8-14	6

Figure 6.2 ITA Dimensions 150 K to 450 K

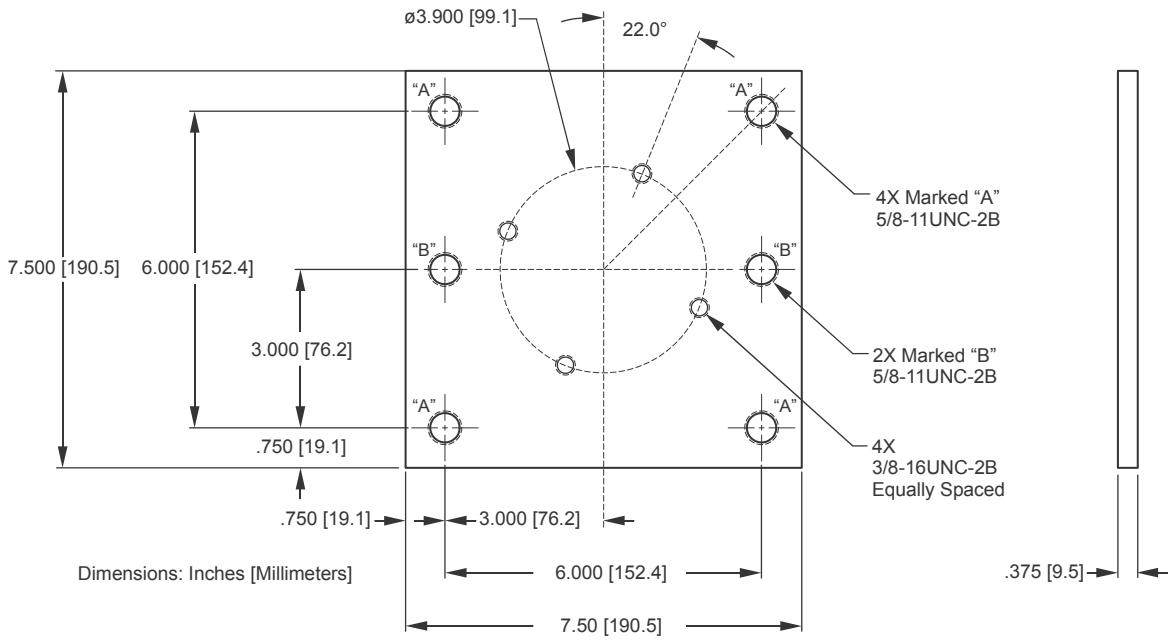


Figure 6.3 Mounting Plate Dimensions 1K - 10K

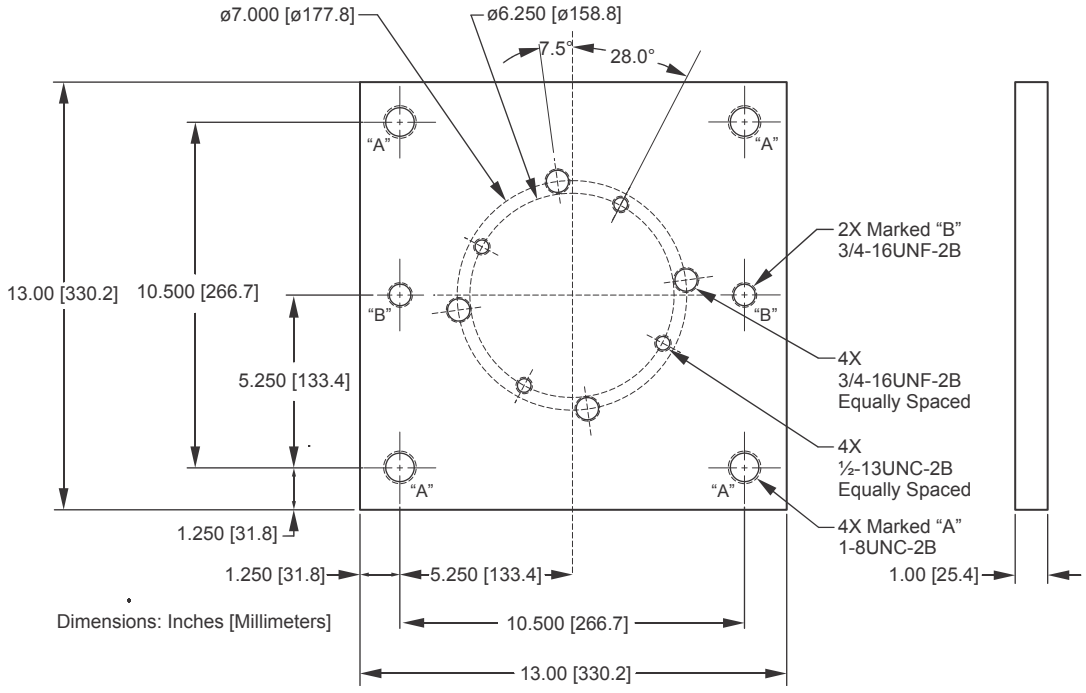


Figure 6.4 Mounting Plate Dimensions 20K - 125K

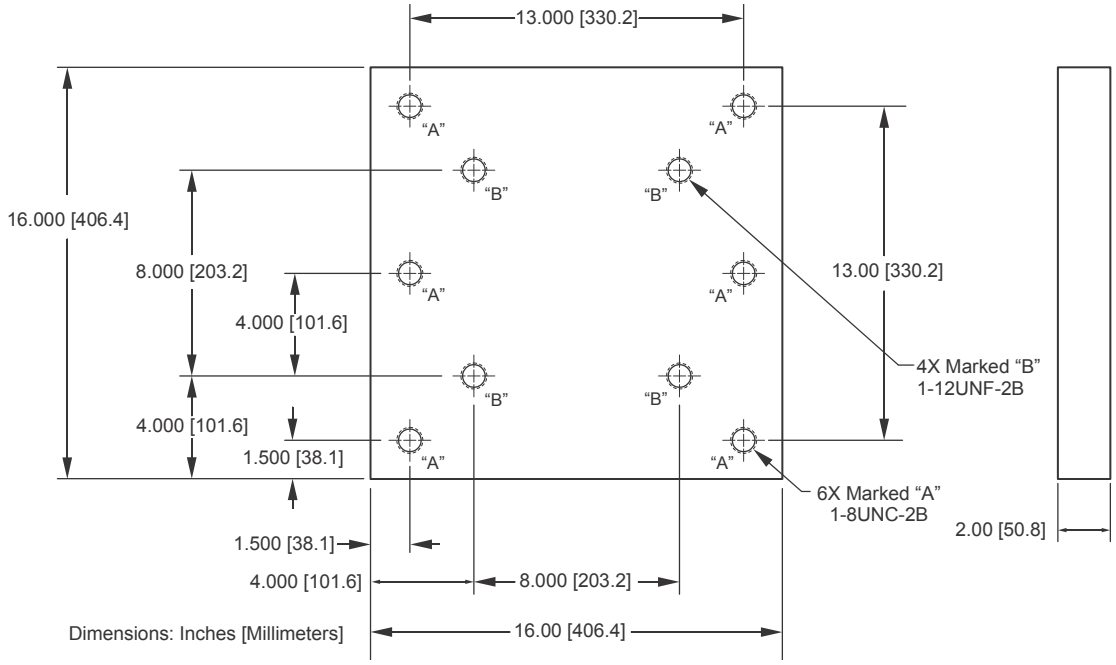


Figure 6.5 Mounting Plate Dimensions 150K - 225K

6.1 Load Cell Specifications

	1K to 10 K	20 K to 50 K	60 K to 125 K	150 K to 225 K
Construction	Stainless Steel, Hermetic	Stainless Steel, Hermetic	Stainless Steel, Hermetic	Stainless Steel, Hermetic
Exc. Voltage	10 – 15 VDC or VAC	10 – 15 VDC or VAC	10 – 15 VDC or VAC	10 – 15 VDC or VAC
Output	3 mV/V nominal	3 mV/V nominal	3 mV/V nominal	3 mV/V nominal
Temp Range	10° F to 100° F	10° F to 100° F	10° F to 100° F	10° F to 100° F
Bridge Resistance	350 Ohms nominal	350 Ohms nominal	350 Ohms nominal	350 Ohms nominal
Insulation Resistance	5000 Meg Ohms min	5000 Meg Ohms min	5000 Meg Ohms min	5000 Meg Ohms min
Linearity	0.05 % Full Scale	0.05 % Full Scale	0.05 % Full Scale	0.05 % Full Scale
Repeatability	0.01 % Full Scale	0.01 % Full Scale	0.01 % Full Scale	0.01 % Full Scale
Max load safe	150 % of rated capacity	150 % of rated capacity	150 % of rated capacity	150 % of rated capacity
Max Load ultimate	300 % of rated capacity	300 % of rated capacity	300 % of rated capacity	300 % of rated capacity

6.2 Mounting Specifications

	1K to 10 K	20 K to 50 K	60 K to 125 K	150 K to 225 K
Uplift Restraint	100 % of rated capacity	100 % of rated capacity	100 % of rated capacity	100 % of rated capacity
Lateral Restraint	100 % of rated capacity	100 % of rated capacity	100 % of rated capacity	100 % of rated capacity
Non- Parallel Accommodation	± 3 “	± 3 “	± 3 “	± 3 “
Thermal Accommodation	± .1 °	± .17 °	± .2 °	± .25 °

6.3 Load Cell Wiring

+ Excitation	Green
- Excitation	Black
+ Signal	White
- Signal	Red

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