30042 / 1.0 / 2025-05-13 / MH / EU-NA
97-1137-02 Rev. G

Installation and operating instructions
Load Disc LD3xi / LD3xiC

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:

America:
Phone 800-833-0081
techservice@anderson-negele.com

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Welcome

This manual describes the installation of the Load Disc load cell and its various hardware options. It includes procedures for levelling and shimming the vessel. Instructions for wiring the load cell to the junction boxes and wiring the junction boxes together and to the signal processor are also included. Refer to the signal processor manual for specific information on wiring the junction boxes to the signal processor.

If you have any questions about the product, its installation or commissioning please contact Anderson-Negele Support at

Tel. +49-8333-9204720 or

by e-mail to: support@anderson-negele.com

Manual Conventions

Three kinds of special explanations appear throughout the manual:

Warning, Caution and Note.

Warning

Possible danger to people. Injury may result if this information is ignored.

Caution

Possible risk to the product. The Load Disc 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 Load Disc.

Caution

If welding on the vessel, electric current may pass through the Load Disc, causing damage to the transducer and possibly the signal processor. To avoid damage, follow these precautions.

1. Disconnect the Load Disc cables from the Signal Processor.
2. Ground the welding unit as close as possible to the welding joint.

The welding ground must be between the Load Disc and the welding joint so that the welding current does not flow through the load disc to earth ground.

Note

High temperatures can damage the load disc.

When welding near a Load Disc, observe the temperature of the metal nearby. If it becomes too hot to touch, stop welding and remove the Load Disc before continuing. Before reinstalling the Load Disc, verify that no damage has occurred by using the measurement procedures in the Troubleshooting section, see Appendix.

Specification LD3xi		
Technical Features	Excitation Voltage - Operating Range Maximum Current Impedance Recommended Supply Voltage Compression Functional Integrity Humidity Protection Class Materials Electrical connection Cable Shipping Weight	5...15 V DC Full-Bridge 16 mA @ 10 V DC excitation 700 Ω ± 2 % 10 V DC 3 x rated load 1.5 x rated load (compression) 100 % IP68 / NEMA-6P Stainless steel 1.4542 (17-4 PH 900), Brushed Finish Sealed cable attached 4-conductor, shielded, with tinned pigtail (5 m (16 ft)) 2.5 kg (5 lbs)
Measurement Accuracy	Non-Linerity/Hysteresis Combined Return to Zero Zero Balance Rated Output	0.03 % rated load 0.026 % rated load / > 30 min. 1 % rated capacity 2 mV/V ± 0.1 %
Deflection	All models	0.1...0.2 mm
Temperature ranges	Ambient Temperature Range Temperature Sensitivity Storage Temperature Range	-10...40 °C (14...104 °F) (0.0017 %/°C (0.00094 %/°F) -20...80 °C (-4...176 °F)
Base Plate Size (length x width) **Installed Height** **Top Adapter Plate Size (length x width)**	All models LD3xi with UA3xi LD3xi with LT3xi All models	152.4 x 88.9 mm (6.0 x 3.5") 69.3 mm (2.75") Adjustable from 127 to 131.3 mm (5 to 5.2") 152.4 x 88.9 mm (6.0 x 3.5")
Authorizations	All models	ATEX

Accuracy table		
Model	**Rated Load**	**Tolerance / Accuracy**
220	= 100 kg	± 0.03 kg
550	= 250 kg	± 0.08 kg
1100	= 500 kg	± 0.15 kg
2200	= 1,000 kg	± 0.30 kg
5500	= 2,500 kg	± 0.75 kg

Specification LD3xiC		
Technical Features	Excitation Voltage - Operating Range Maximum Current Impedance Recommended Supply Voltage Compression Functional Integrity Humidity Protection Class Materials (Load Cell unit and Cage) Electrical connection Cable Shipping Weight	5...15 V DC Full-Bridge 16 mA @ 10 V DC excitation 700 Ω ± 1 % 10 V DC 3 x rated load 1.5 x rated load (compression) 100 % IP68 / NEMA-6P Stainless steel 1.4542 (17-4 PH 900), Brushed Finish Sealed cable attached 4-conductor, shielded, with tinned pigtail (5 m (16 ft)) 3.9 kg (18.7 lb)
Measurement Accuracy	Non-Linerity/Hysteresis Combined Return to Zero Zero Balance Rated Output	0.03 % rated load 0.026 % rated load / > 30 min. 1 % rated capacity 2 mV/V ± 0.1 %
Deflection	All models	0.1...0.2 mm
Temperature ranges	Ambient Temperature Range Temperature Sensitivity Storage Temperature Range	-10...40 °C (14...104 °F) (0.0017 %/°C (0.00094 %/°F) -20...80 °C (-4...176 °F)
Base Plate Size (length x width) **Top Plate Size (length x width)** **Installed Height**	 LD3xiC with Cage	160 x 120 mm (6.30 x 4.72 in) 120 x 120 mm (4.72 x 4.72 in) 100.0 mm (3.94 in)
Authorizations	All models	ATEX

Accuracy table		
Model	**Rated Load**	**Tolerance / Accuracy**
11000	= 5,000 kg	± 1.5 kg
16500	= 7,500 kg	± 2.25 kg
22000	= 10,000 kg	± 3.0 kg

Field of application / intended use

Description

The Load Disc LD3xi / LD3xiC is a low profile load cell that is bolted to both the support surface and the vessel supports, and is used to measure the weight of materials in vessels and tanks. The sealed, stainless steel construction–IP68 rated unit with an optional NEMA-6P watertight cable system andcable entry makes the LD3xi / LD3xiC ideal for use in high-pressure washdown and occasionally submerged environments. The LD3xi / LD3xiC offers system performance accuracy of 0.03%.

The low-profile design for low clearance installations also keeps the vessel's center of gravity low and stable. Vessel tipping, walking or overturning while agitating is eliminated. Installation and setup is simplified with less hardware. No external vessel hold-downs are necessary, even in areas of high wind or seismic activity. There are no moving parts that can wear out or require replacement.

In bakery, pasta, confectionary and spice processing to resins, concrete/aggregate, sand, pulp, minerals and other dry-to-wet operating conditions, the LD3xiC offers very specific advantages not available in most higher priced load cells. Standards include a tough cage mounting fixture into which the 17-4 stainless steel LD3xiC cell securely locks in place. Since the LD3xiC cell can be loaded before or after the tank is installed onto the cage fixture, you have more flexibility in mounting procedures. If ever the cell needs to be replaced, it can be unloaded without having to remove the cage fixture itself. The LD3xiC is available in virtually all popular weight capacities from 100 to 10,000 kg (220 to 22,000 lbs.). and is easy to specify due to identical dimensions and price.

Measuring system

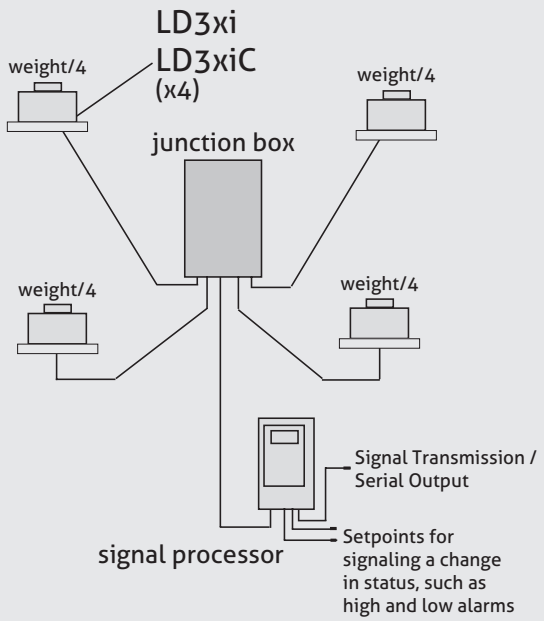
The deflection of the Load Disc load cell by the vessel weight is measured by the semi-conductor sensor, which is completely sealed within the waterproof cavity of the transmitter. The sensor converts the deflection into an electrical signal that is directly proportional to the increase or decrease of the vessel content. Material movements and changes in the material repose have no effect on the accuracy of the system. The accurate weight information is then sent to a signal processor for display, information transfer and storage (see figure 1-2).

Applications

The waterproof design of the Load Disc load cell makes it ideal for measuring bulk material in hygienic and CIP environments. It is particularly well suited for use on mixing and blending vessels, surge hoppers and agitator vessels. The rugged, solid, bolt-in-place mounting ensures the stability of storage vessels even outdoors, with gusset plates, and in all application types.

Figure 1-1
LD3xi Compression Load Cell with optional NEMA-6P cable system

Figure 1-2:
General installation layout for Load Disc using a junction box.



Description of the installation options

Hardware options for the Load Disc

Universal Top Adapter Plate, Adjustable Top Adapter Plate, Anyadapter Top Adapter Plate (on request), Adjustable Base Adapter Plate.

As well as the LD3xiC Load Cell configuration.

See chapters 2 and 3 for more detailed installation instructions and refer to the technical drawings in the appendix.

Universal Top Adapter Plate

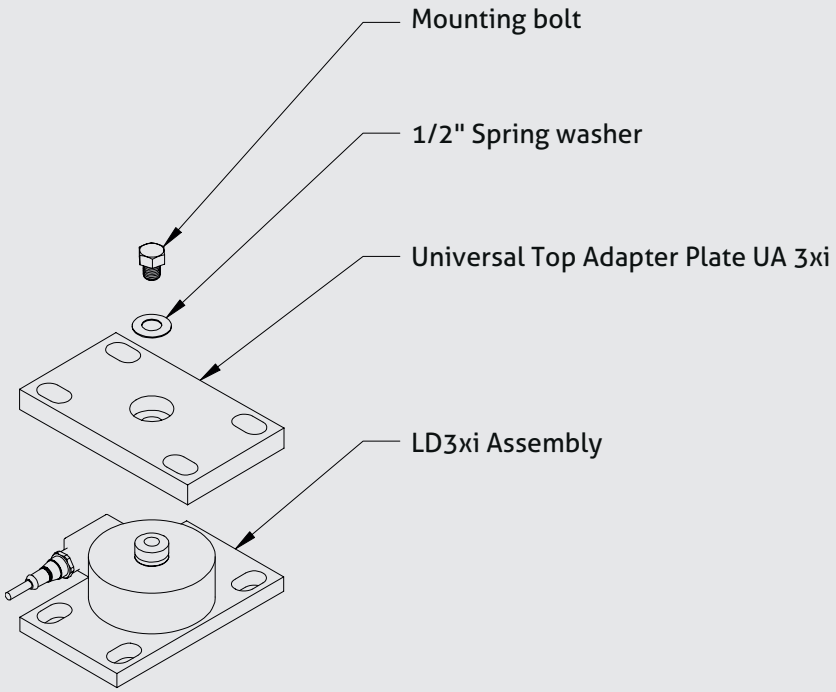
Contents: Universal Top Adapter Plate, spring washer, hexagonal fixing screw.

The adapter plate attaches to the Load Disc with the bolt and washer.

The adapter plate then bolts to a customer-supplied vessel gusset or a flat plate welded to the vessel leg

Note

Up to 3° compensation of tilt in the floor or vessel legs



Leveling Top Adapter Plate

Contents: Universal Top Adapter Plate, hex head bolt, set of spherical washers, one leveling nut and one jam nut.

The adapter plate attaches to the Load Disc with the hex bolt. The adapter plate then bolts to a customer-provided gusset or a flat plate welded to the vessel legs.

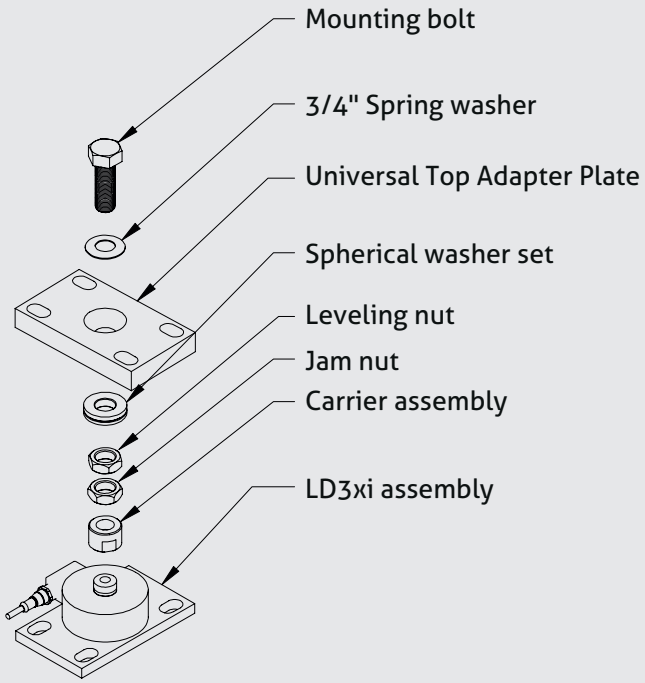
The additional leveling function allows vertical height adjustment, which is secured by a locking-jam nut.

Note

Up to 3° compensation of tilt in the floor or vessel legs.

360° movement of the top plate.

Height adjustment from 104 to 107.2 mm.



Anyadapter Top Adapter Plate (Optional on request)

This option consists of the Anyadapter top plate with a universal hole pattern, which fits a wide range of vessel feet, a hex head bolt, a set of spherical washers, one leveling and one jam lock nut.

The adapter plate attaches to the Load Disc with the hex bolt. The adapter plate then bolts to a customer-provided gusset or a flat plate welded to the vessel legs.

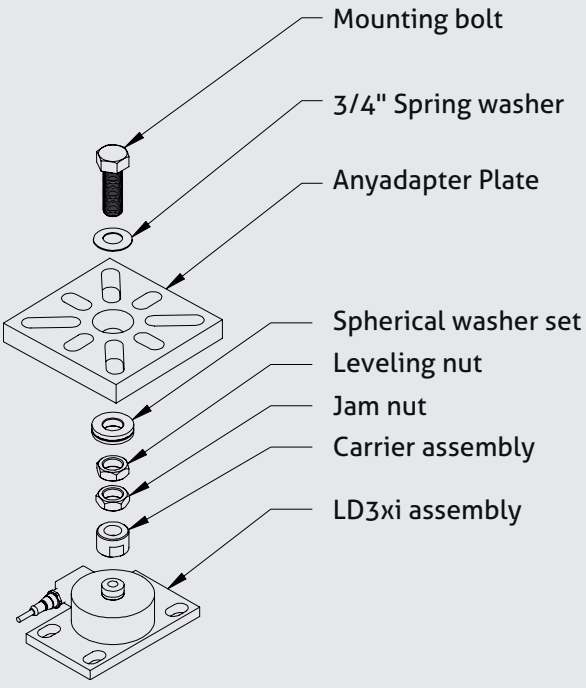
The additional leveling function allows vertical height adjustment, which is secured by a locking-jam nut.

Note

Up to 3° compensation of tilt in the floor or vessel legs.

360° movement of the top plate.

Height adjustment from 104 to 107.2 mm.



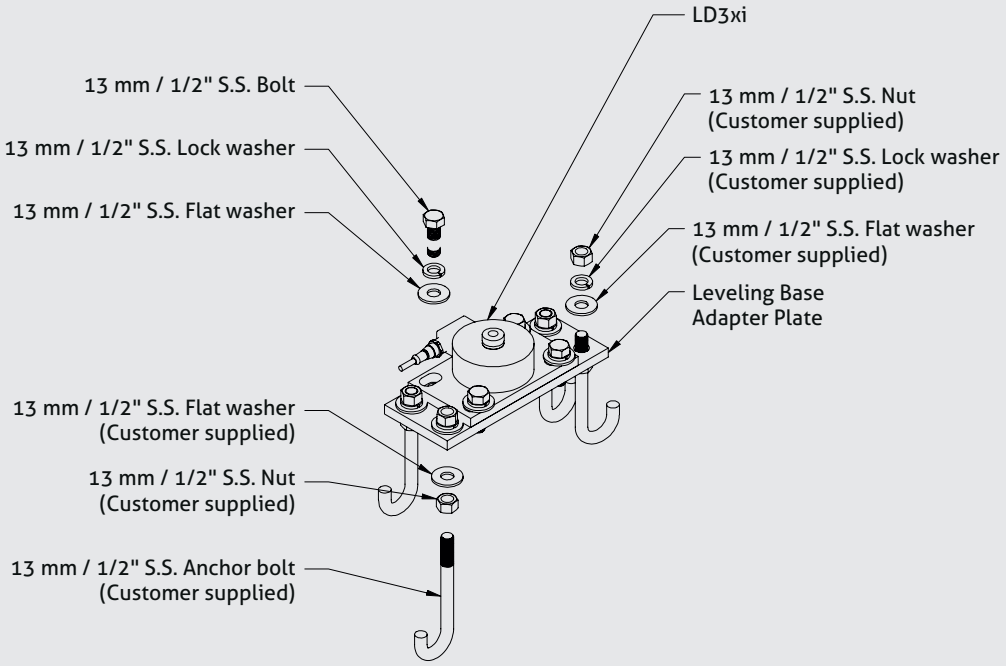
Leveling Base Plate

Contents: Leveling Base Plate, 4 hex bolts each, flat washers and lock washers.

The Load Disc bolts onto the leveling base plate. This plate rests on four leveling nuts and washers screwed onto anchor bolts installed in the foundation. By turning the leveling nuts, it is possible to adjust the height of the Load Disc, and thus of the vessel, for proper load distribution.

Note

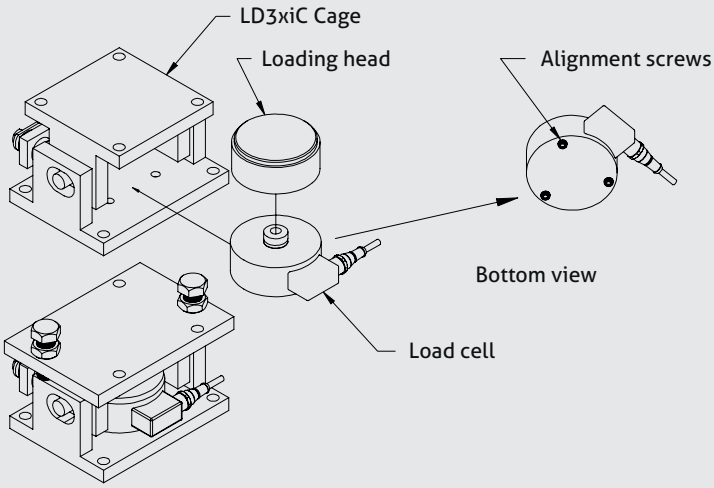
This kit requires a top adapter plate for correct installation (not shown).



LD3xiC Load Disc

Contents: LD3xiC load cell assembly (load cell and installed set screws) and a cage assembly.

The load cell has the loading head on top and they both slide into the cage assembly. They are held in place with three set screws. The set screws are pre-installed into the load cell at the factory. The load cell assembly slips down into the holes of the cage assembly. (The LD3xiC assembly does not include jacking bolts).



Preparing for the Load Disc installation

Check shipment

Check Load Disc order items

The following items are included in a typical order for each vessel (quantities depend on the application):

· LD3xi/LD3xiC Load Cell

· Junction Boxes or molded junctions

· Top or Bottom Hardware (LD3xi only)

If additional items are required, please contact Anderson-Negele before proceeding. Substituting parts without Anderson-Negele approval may result in system problems and will void the warranty.

Visual inspection

Carry out a visual inspection of all equipment in the order - including Load Discs, junction boxes and signal processors - to ensure that they have not been damaged during transport. If an item is damaged, contact Anderson-Negele.

Note

An Anderson-Negele signal processor or Anderson-Negele test meter is required to set up and install the system.

Equipment (customer side)

The following equipment is needed to install Load Discs:

· Lifting equipment

· Tape measure

· Level

· Pry bar

· Marking pen

· Wrenches

· ASTM A-325 bolts (or equivalent strength), lock washers and flat washers to secure Load Disc to vessel support (if applicable)*.

· ASTM A-325 (or equivalent strength) anchor bolts, lock washers, flat washers, and nuts to secure Load Disc to vessel foundation (if applicable)*.

· Anderson-Negele test gauge or signal processor

· Shims (if applicable)*

· Grout (if applicable)*

· Digital Multimeter (DMM), optional

* See Technical Drawings in Appendix for appropriate bolt size.

Measuring Sensor Output

To measure the output of the LD3xi/LD3xiC, the sensor needs to have an excitation voltage applied to it from a signal processor, a DC voltage generator, or a KM test meter.

To use the excitation from the Anderson-Negele Test Meter, put the switch in the simulate position and wire the positive to the red position and the negative to the black position.

Standard Fixed Cable

The excitation would be applied to the excitation wires of the standard fixed cable, red (positive) and black (negative). The millivolt signal can be measured on the output wires, white (positive) and Yellow (negative).

Standard Fixed Cable

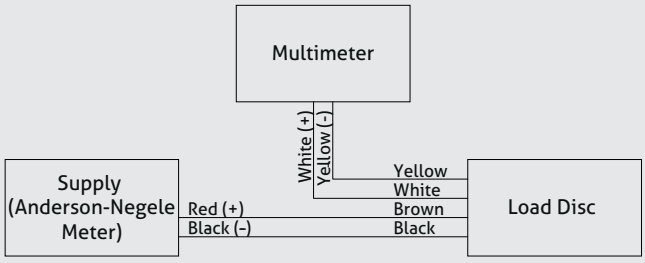
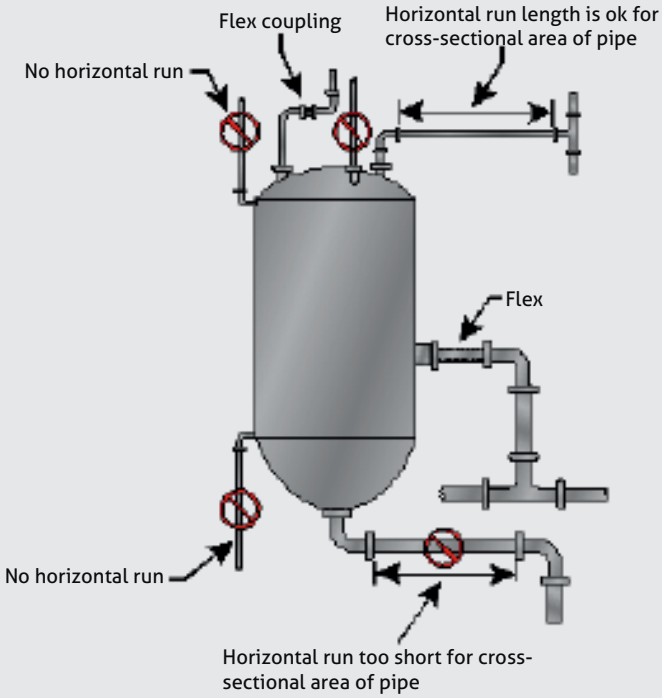


Figure 2-1:
Examples of typical causes of error



Vessel preparation

Review the following list of possible sources of error and make the recommended corrections before installing the Load Discs:

- An inadequate vessel foundation may allow excessive movement. Ensure the foundation is concrete or steel.
- 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 minimise this problem.
- Cross-connecting structures can transfer loads from adjacent vessels. Install slip joint or flexible couplings to minimise this problem.
- Shock loads can damage the Load Disc. Install protective barriers or stops to prevent vehicles from hitting the vessel supports.

Factors influencing performance

An independent, isolated vessel with no connection to another vessel or adjacent structure provides the most accurate results for a weight measurement system. Examples of this type of application are floor scales and truck scales. Connections to other vessels or structures affect accuracy, because the transducers interpret strain changes caused by the connecting structures as changes in the material weight.

Some typical causes of errors related to connecting structures and, where applicable, methods for reducing errors follow:

- Concealed load-bearing components
- Attached conveyor systems or moving components
- Rigid piping connection between vessel and another adjacent structure
- Poor foundation
- Flexible structure
- Uneven load
- Vessel extends through roof
- Attached walkways

Mounting the Load Disc

General information

- Ensure that the surfaces to which the base plates bolt down are clean, smooth, flat and level, with less than 1° slope in any direction.
- Ensure that the vessel supports / gussets are clean, smooth, flat and level, with less than 1° of slope in any direction.
- Position the Load Disc so that the cable cannot be pinched or chafed and can be easily routed to the junction box.
- When lifting the container to install the Load Disc, prevent it from tipping or falling over.
- Distribute the load carefully and evenly to ALL Load Discs. PLACING THE LOAD ON ONLY ONE LOAD DISC MAY CAUSE DAMAGE.

Hardware and bolts

1. all bolts and fittings for fastening the Load Disc to the vessel and to the foundation shall be ASTM A-325 or equivalent. (See Technical Drawings, Appendix)

Load Disc General installation

Installation with:

Universal Top Plate Adapter, Leveling Top Plate Adapter, Anyadapter Plate, Leveling Base Adapter Plate as well as the LD3xiC.

1. Prior to installing the load cell, verify that they are the correct capacity for your application by reviewing the information on the label.
2. Measure the load cell voltage output. With no-load, the meter should read 0mV. (This measurement range is used only to verify the condition of the Load Disc.)
   If the reading is significantly outside of this range, consult the factory before continuing the installation.

If you have the LD3xiC, go to Step 5.

3. Place bolt through center hole of adapter plate and install hardware for your application (See Appendix: TI Drawings)
   a) For Universal Top Plate Adapter, install bolt and plate to LD3xi, tightening bolt to 7-14 Nm (5-10 ft-lbs.).
   b) For Leveling and Anyadapter, install washers and nuts to the bolt and plate, making sure the washers/ nuts are loosely tightened against plate. Install the plate assembly to the LD3xi, tightening bolt to 7-14 Nm (5-10 ft-lbs.).
4. For Leveling and Anyadapter applications, adjust plate to lowest position by lowering jam nut to top of LD3xi and tighten. Then lower leveling nut to the jam nut.

Caution

If you lift the container or a container foot after the installation, loosen the screws on all load discs to avoid overloading.

2. use the specified hardware and bolt sizes. The use of hardware other than specified may either reduce strength or overstress the Load Disc during installation, which will void the warranty.
3. 3. all bolts must be kept loose until levelling and alignment is completed.

Securing the Load Disc after leveling/shimming

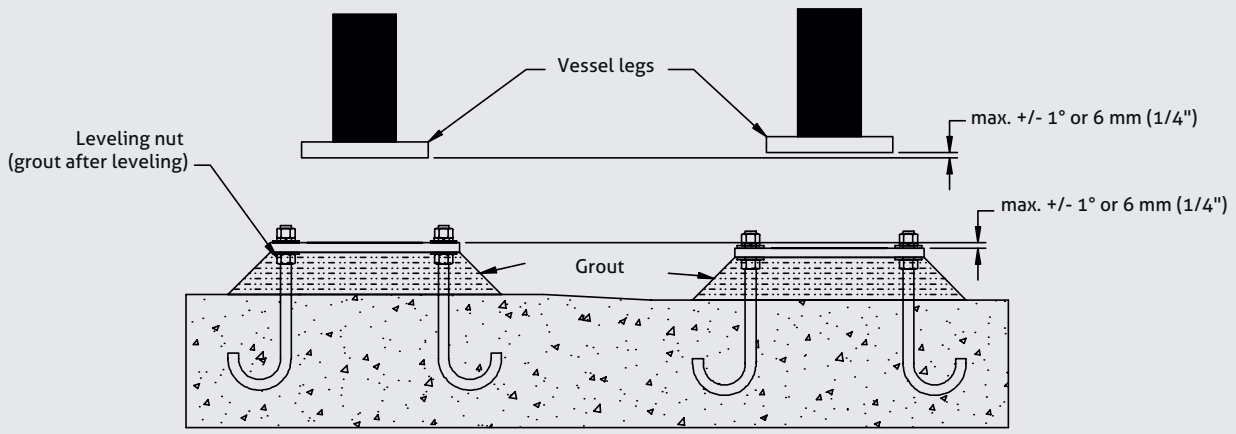
When the criteria for weight distribution through leveling and/or shimming have been met, complete the installation by tightening the screws.

Note

- Concrete foundation and grout are examples. The principles apply to all foundation types
- Foundation anchor provided by the customer

5. Raise the vessel.
6. Inspect the foundation and vessel mounting surfaces that will mate to the LD3xi/LD3xiC plates.
   a) Check the mounting hole locations and size on both the foundation base and the vessel foot pad. (Refer to the TI drawings, Appendix)
   b) Also check the surfaces for flatness and angular misalignment. A baseplate with leveling nuts is recommended. (See Figure 3-1)

Figure 3-1
Uneven surfaces



7. Mount the LD3xi/LD3xiC assembly to the foundation. (See TI drawings, Appendix)
   a) Lower the LD3xi/LD3xiC to the foundation. Take care to align the mounting holes with the foundation mounting holes/studs.
   b) Install the bolts and nuts as required. DO NOT fully tighten the bolts at this time. Leave a 6 mm (1/4-inch) gap between the nut and the washer to allow for positioning of the Load Discs. (See Figure 3-2.)
   c) Repeat Steps 7a and 7b for the remaining Load Discs.
8. Record the voltage output at "no-load" condition now that it is in position.
   a) Assign a number (1, 2, 3, etc.) to the load disc and make a note of it.
   b) Measure the output of load cell.
   c) Repeat steps a and b for all the Load Discs.

Figure 3-2
Leave 6 mm (1/4-inch) gap for positioning

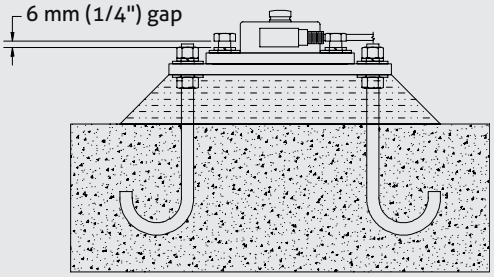


Figure 3-3
Weight Distribution Chart: Record YOUR system's Load Outputs

Load Disc #	No load output (mV)	Dead weight output (mV)	Output Change (mV) (Dead Weight Output - No-Load Output)
1			
2			
3			
4			

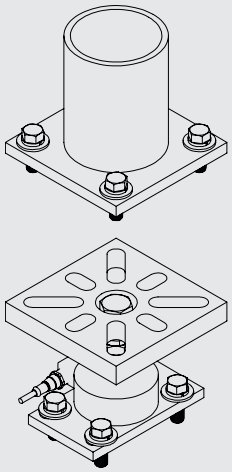
9. Mount the vessel to the LD3xi/LD3xiC.
   a) Lower the vessel gently onto the Load Discs. (Alignment pins may be used to help guide and position the vessel.) (See Figure 3-4)
   b) Center the Load Disc top mounting holes with the vessel mounting holes, using the clearance available from the bottom mounting holes.

Note

If the vessel hole pattern does NOT match the Load Disc hole pattern, modify the mounting holes on the vessel. Avoid forcing the Load Disc into position by tightening the mounting bolts or using hammers. The holes in the container must be adjusted in size or relocated

   c) Place the four top bolts (customer supplied) through the vessel and the Load Disc mounting holes. The bolts must be able to pass freely through the holes without interference.
   d) Tighten the bolts, leaving a 6 mm (1/4-inch) gap for positioning. (See Figure 3-2)
10. Check dead weight output.
   a) Record the dead weight output on your Weight Distribution Chart that was started on page 13.
   b) Calculate the Output Change. (Change should be positive.)

Figure 3-4
Lower vessel onto top plate.



Note

All output changes should be positive! If you detect a negative output change, check the wiring polarity and vessel load distribution.

Note

The example below is an ideal situation (load is centered). For off-center loads caused by offset mixers or gearboxes, the weight will be on some supports more than others.

Do not attempt to shim ALL supports to ten percent of average output. Distribute the support weight between each other and make sure all legs are carrying a load.

Calculation example

Mean value output change = (86 mV + 83 mV + 69 mV + 89 mV) / 4 = 81.8 mV

Permissible range for output change = Mean value of the output change ± 10% = 81.8 mV ± (.1 x 81.8 mV) = 73.6 to 90.0 mV.

Figure 3-5
Example of Dead Weight Outputs and Output Change

Load Disc #	No load output (mV)	Dead weight output (mV)	Output Change (mV) (Dead Weight Output - No-Load Output)
1	+3	+89	+86
2	+4	+87	+83
3	+2	+71	+69
4	-3	+86	+89

Leveling and Shimming

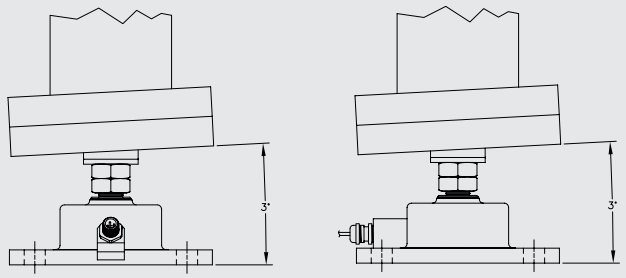
The main objective of vessel leveling/shimming is to distribute the weight evenly across all Load Discs. Uneven weight distribution will reduce the accuracy of the entire weight measurement system and, in extreme cases, may damage the Load Discs.

After performing the general instructions (pages 12 to 14), begin the leveling and shimming instructions in this section.

Universal Top Adapter Plate UA

1. Based on the weight distribution table (Figure 3-3) and a visual inspection, raise the vessel and insert shims as needed to adjust the weight distribution to the Load Disc. Start with the support with the „lowest output" first!
2. Carefully lower the vessel and measure the dead weight output and output change of all Load Discs to see how they are affected. Record this again in the weight distribution table on page 13.
3. Repeat steps 1 and 2 until you reach the desired output change of all Load Discs.

Figure 3-6
Compensation of misalignment up to 3 degrees.



Leveling Top Adapter Plate LT, Anyadapter Top Plate, Leveling Base Plate LB

1. Based on the weight distribution table and a visual inspection, raise the leveling nut to adjust the top plate until the weight distribution is within the weight distribution guidelines (see page 14). Check for gaps and use shims as needed.
2. Carefully lower the vessel and measure the dead weight output and output change of all Load Discs to see how they are affected. (See weight distribution table on page 13.)
3. Repeat steps 1 and 2 until you achieve the desired output change of all Load Discs.

Note

For installations where leveling nuts are not used, load balancing on the Load Disc must be achieved by adding or removing shims. Adjusting the Load Disc to evenly distribute the weight of the vessel may require adding shims (customer provided) systematically.

Note

The Universal Top Adapter Plate will compensate for misalignment up to three degrees (Figure 3-6). Ideally the load is evenly distributed across the plate.

Note

Shimming one Load Disc may influence the load on the Load Disc on the opposite side. Take this into account when aligning.

Note

Shims are typically applied between the Load Disc Top Adapter Plate and the corresponding vessel plate. The gap itself may exist at the top plate or the base plate.

Caution

If you need to lift the vessel or one vessel leg after installation, loosen the bolts on all Load Disc to prevent overloading.

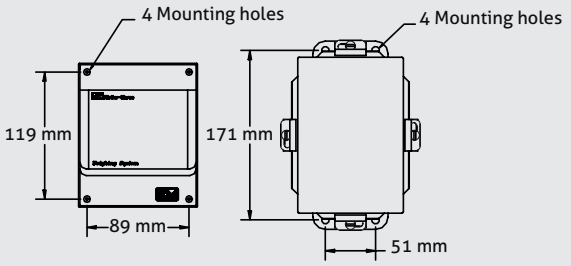
Mounting and wiring of the Stainless Steel Junction Box

Mounting junction box

1. Refer to Figure 3-7, hold the junction box at the desired mounting location. Mark the four mounting holes.
2. Mount the junction box with hexagon socket screws 6 mm screws and washers.

   See chapters 2 and 3 for more detailed installation instructions and refer to the technical drawings in the appendix.

Figure 3-7
Plastic and Stainless Steel Junction Box Mounting



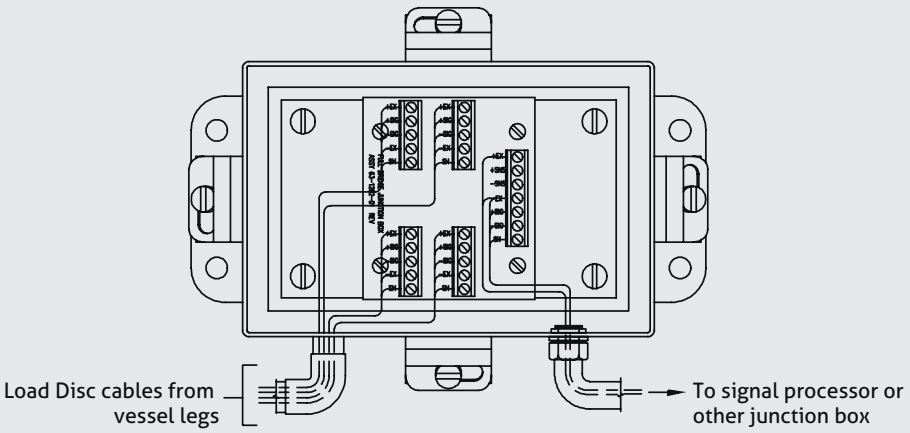
Wiring the Load Disc to the Junction Box

Refer to Figure 3-8. The stainless steel junction box can accommodate up to eight Load Disc, with up to two Load Disc wires on each terminal. Note that the junction box has no pre-cut holes or fittings for conduit.

Proceed as follows:

1. prepare the junction box -
   a) Remove the cover of the junction box.
   b) Remove the terminal board from the connection box.
   c) Carefully lay out the cable configuration - connect the Load Disc cables to the terminals on the left side and the signal processor cable to the right side. Several Load Disc cables can pass through the same cable channel.
   d) Cut the necessary connection holes in the bottom and/or sides of the junction box.
   e) Install waterproof fittings.
   f) Seal the fittings with Sikaflex™ or electrical grade sealant.

Figure 3-8
Wiring Load Discs to Stainless Steel Junction Box



2. Pass the Load Disc cable through the desired connection. (See Figure 3-8).
3. Estimate the required length of cable to the terminal block, allowing a little extra for strain relief. Cut off the excess cable.
4. Remove 76 mm (3") of the cable jacket to expose the three wires inside. Remove 6 mm (1/4") of insulation from the end of each wire.
5. Connect the Load Disc wires to the selected TB3 terminals on the left side of the junction box: brown or red wire to R, white wire to W, and black wire to B.
6. Connect the Load Disc wires to the selected TB2-5 terminals on the left side of the junction box: red or brown wire to +EX, white wire to +SIG, and black wire to -EX, and blue or yellow wire to -SIG.

Note

Earth the cable shielding only at the signal processor.

Note

If you have a 61-6036-01 Stainless Steel J-Box with trimming pots, refer to page 18.

Wiring Stainless Steel Junction Boxes Together and to Signal Processor

1. Remove the junction box cover.
2. See Figure 3-8. Route the 4-conductor cable through the fitting into the junction box farthest from the signal processor. Connect wires from the cable to the TB1 terminal in the junction box: red or brown wire to +EX, white wire to +SIG, and black wire to -EX, and blue or yellow wire to -SIG.
3. Route the cable through conduit to the next junction box. Estimatethe 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: red or brown wire to +EX, white wire to +SIG, and black wire to -EX, and blue or yellow wire to -SIG.
4. Route another cable through the fitting into this junction box, and attach wires to the TB1 terminal: red or brown wire to +EX, white wire to +SIG, and black wire to -EX, and blue or yellow wire to -SIG.
5. Repeat steps 3 and 4 until all junction boxes on the vessel are wired together.
6. Route the cable from the last junction box through conduit to the signal processor. For information on wiring the junction box to the signal processor, refer to the signal processor manual. One vessel occupies one channel in the Signal Processor - the channel shows the average value of all Load Discs under the vessel.

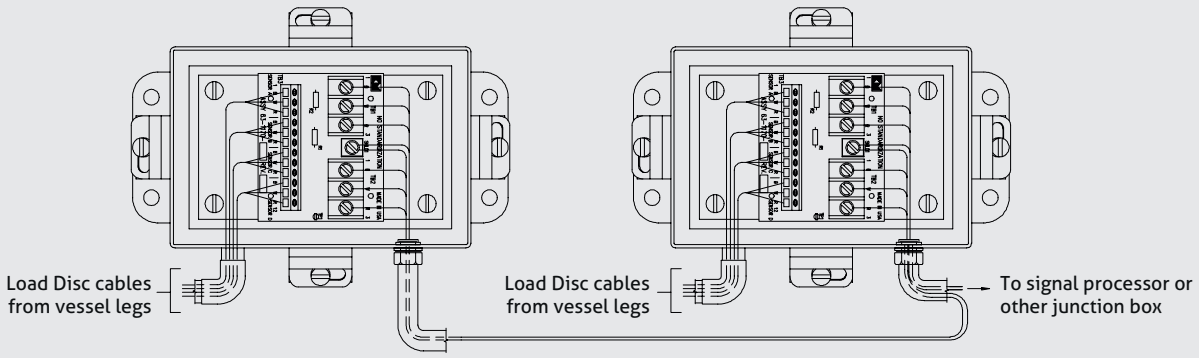
Note

1. The cable conduit fitting and the cable conduit for wiring the junction box with the other junction boxes and to the signal processor must be installed.
2. Seal all conduit fittings against water entry. Install drain holes at the lowest point(s) of the conduit to allow condensation to drain away.
3. Use a shielded 3-conductor connection cable for wiring the junction boxes to each other and to the signal processor. For lengths up to 300 m (1,000'), use 18-gauge Belden™ 8791 cable. For lengths from 300 m to 600 m (1,000' to 2,000'), use 16-gauge Belden™ 8618 cable.
4. When connecting the cable to the junction box terminals, remove 76 mm (3") of the cable jacket to expose the three conductors and the shield. Remove 6 mm (1/4") of insulation from the ends of each wire.
5. All spliced wires between the junction box and the signal processor must be soldered and encapsulated in waterproof heat shrink tubing.

Caution

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

Figure 3-9
Wiring Stainless Steel Junction Boxes Together and to Signal Processor



Trim Box Mounting and Wiring

Mounting

1. See Figure 3-9. Hold the junction box at the desired-mounting location. Mark the four mounting holes.
2. Mount the junction box with #8-32 socket head cap screws and flat washers. Tighten the screws until snug.

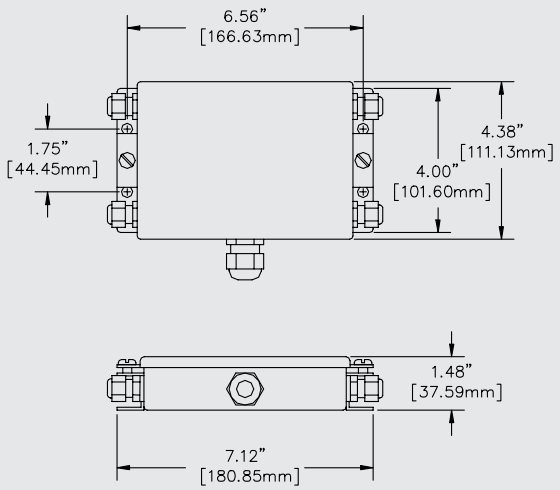
Wiring

See Figure 3-10. The summing stainless steel junction box accommodates up to eight Load Discs. Follow this procedure:

1. Thread the Load Disc cable through the desired conduit-fitting. (See Figure 3-10).
2. Seal fittings with Sikaflex or electrical grade sealant.
3. Estimate the required length of cable to the terminal strip, allowing a little extra for strain relief. Do not cut the excess cable.
4. Strip back 76 mm (3") of the cable sheathing to expose the four wires and the shield inside. Strip back 6 mm (1/4") of insulation from the end of each of the wires.
5. The trim box is designed for two, three or four load cells. Determine the number of load discs that will be wired to the trim box, and cut the JU jumpers for any unused inputs. The wire coding for the load disc:

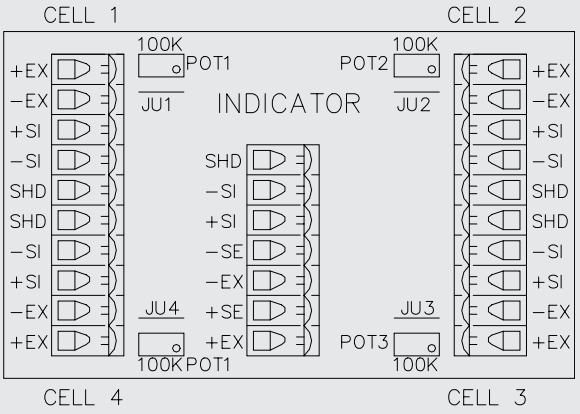
   Red or Brown = +EX
   Black = -EX
   White = +SI
   Blue or Yellow = -SI
6. Wire each load disc to the terminals, leaving the cord grips loose until the trimming has been complete. The terminals have quick connect levers that open when pushed. A screwdriver or ballpoint pen can be used to open or close jaws. The terminals can accommodate wire gauges #14 through #26.
7. Set all the potentiometers fully clockwise for inputs being used. This will give the maximum output from each load disc.
8. A calibration of the electronic indicator is needed before before trimming functions can be done. Refer to the electronic indicator manual for the calibration procedure.
9. Place test weights above each load cell and record the weight value displayed on the electronic indicator. The test weights should be directly above each load cell and not overhanging.

Figure 3-9
Summing Stainless Steel Junction Box Mounting



10. The cell that has the lowest weight displayed will not be adjusted; it will be the reference load cell. Place the weights above a load cell and adjust the potentiometer to match the displayed weight from the reference load cell.
11. After each potentiometer adjustment, the zero (no test weights applied) should be checked.
12. Repeat for each load cell. Do not adjust the reference load cell potentiometer.
13. When all of the cells are trimmed, a final calibration is required.

Figure 3-10
Wiring Load Discs to Junction Box



System Calibration for the Load Disc

Calibration methods

Install a signal processor before calibration. Refer to the signal processor manual for how to input the calibration parameters.

There are two calibration methods:

- Live load calibration - set lo span and hi span as you move 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 the material.

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

Manual calibration allows you to start using the system as soon as the Load Disc, 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 the rated load and the A/D converter sensitivity of the signal processor. These values are known, can be calculated, or can be obtained from the signal processor. Manual calibration is also based on the current weight of material in the vessel.

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

Refer to the indicator manuals for detailed calibration instructions.

Note

For use with Trim Box, refer to Trim Box Mounting and Wiring on page 18.

Troubleshooting the Load Disc System

Functional Check: Measuring Output (while wired to Signal Processor)

1. Mesure the output of the load cell using procedure from page 10.
2. Verify the output to be between 0mV and +/- 1mV, stable.
3. Repeat Steps 1 and 2 for each LD3xi.
4. If the load cells are installed under the vessel, verify stability of each load cell.

Functional Test: Measuring Resistance

The following will be true between -18 and 38 °C (0 and 100 °F):

1. Measure between the disconnected excitation wires and verify the resistance to be 700 ohms +/- 15 ohms, with a stable reading.
2. Measure between the disconnected output wires and verify the resistance to be 700 ohms +/- 15 ohms, with a stable reading.

Note

The "no-load" condition is when the Load Disc stands alone without any weight applied.

Note

Note: When using the 61-6036-01 trim box, and a sensor fails, the sensor must be replaced. When the sensor wires are removed from the junction box, the jumper must be soldered back in place.

Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in the display	Fluctuations can be caused by moisture in cable conduit, junction boxes, or PCBs.	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 or Dow Corning™ RTV 739 or RTV 738. Other sealants may contain acetic acid, which is harmful to electronics.
	Fluctuations can be caused by damaged Load Disc.	Using Digital Multimeter (DMM), check resistance for individual Load Discs: 1. Measure between the disconnected excitation wires and verify the resistance to be 700 ohms +/- 15 ohms, with a stable reading. 2. Measure between the disconnected output wires and verify the resistance to be 700 ohms +/- 15 ohms, with a stable reading. 3. Place one DMM lead on the LD's shield wire and take four measurements to each of the other wires. The reading should be greater than 5 giga-ohms. 4. Repeat Steps 1 through 3 for each suspect Load Disc, until damaged Load Disc is located.

Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in display readings	Fluctuations 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).
Sudden Change in Weight Reading or System Requires Frequent Recalibration	One broken Load Disc can cause indicated weight to shift up or down by large amount, up to 100% of full-scale live load.	Using Digital Multimeter (DMM), check resistance of the individual Load Discs as described above under step 1 to 4.
	Check signal processor excitation voltage and incoming AC voltage for accuracy and stability (refer to signal processor manual).	Sudden change in weight reading can be caused by problems with signal processor.

Appendix D. Technical Drawings (TI)

This appendix contains the following technical drawings for the LD3xi:

Drawing No. **Drawing Title**

REVISIONS					
LTR	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE
A	PRODUCTION RELEASE	BWC	HLK	TS	5/3/02
B	PER ECO 4894	BWC	TS	TS	6/14/02
C	PER ECO 4959	BWC	TS	TS	1/22/03
D	PER ECO 5002, 5009	BWC	TS	TS	4/18/03

INSTALLATION INSTRUCTIONS FOR THE LD3xi:

(See Installation manual KM #97-1137-02 for Details)

Hardware Options

The following hardware options and their installation will be descibed:

Universal Top Adapter Plate (UA3xi)

Leveling Top Plate Adapter (LT3xi)

Anyadapter Plate (AD3xi)

Leveling Base Adapter Plate (LB360)

GENERAL INFORMATION:

These general requirements apply to all applications:

1. Ensure the surfaces where the baseplates bolt down onto are clean, smooth, flat, and level, with less than 1° of slope in any direction.
2. Ensure vessel legs/guessets are clean, smooth, flat, and level, with less than 1° of slope in any direction.
3. Position Load Disc so the cable cannot be snagged or chafed and can be easily routed to the junction box.
4. When raising the vessel for Load Disc installation, use proper support to prevent the vessel from tipping or falling.
5. During installation, carefully distribute the load to ALL load discs evenly. CAUTION: PLACING THE LOAD ON ANY ONE LOAD DISC MAY CAUSE DAMAGE.
6. All bolts and hardware to attach the Load Disc to the vessel and to the foundation are customer supplied. KM recommends ASTM A-325 (or equivalent) SAE grade 8 material or stronger.
7. Use specified hardware and bolt sizes. Using other than the specified hardware can either reduce strength or overstress the Load Disc during installation, voiding the warranty.
8. All bolts are kept loose until shimming and leveling is complete.

Installation Instructions:

1. Prior to installing to LD3xi's, verify that they are the correct capacity for your application by reviewing the information labeled on the LD3xi.
2. Connect the LD3xi's cable to the Volt Meter, Measure the LD3xi voltage output. With no load on the LD3xi, the Meter should read between the preliminary measurements of +1mV and -1mV. (This measurement range is used only to verify the condition of the Load Disc). If the reading is significantly outside of this range, consult the factory before continuing the installation.
3. Place bolt through center hole of adapter plate and install hardware for your application:
   a. For Universal Adapter, install bolt and plate to LD3xi, tighten bolt to 5-10 FT-LBS maximum.
   b. For Leveling top and Anyadapter, install washers and nuts to bolt and plate making sure the washers/nuts are loosely tightened against plate. Install the plate assembly to the LD3xi, tighten bolt to 5-10 FT-LBS maximum.
4. For Leveling Top and Anyadapter applications, adjust plate to lowest position by lowering jam nut to top of LD3xi and tighten. Then lower leveling nut to the jam nut.
5. Raise the vessel.
6. Inspect the foundation and vessel mounting surfaces that will mate to the LD3xi plates.
   a. Check the mounting hole loacations and size on both the foundation base and the vessel foot pad.
   b. Also check the surfaces for flatness and angular misalignment. A baseplate with leveling nuts is recommended. (See Figure 1: Angular Misalignment).
7. Mount the LD3xi assembly to the foundation.
   a. Gently lower the LD3xi to the foundation. Take care to align the mounting holes with the foundation mounting holes/studs.
   b. Install the bolts and nuts as required. DO NOT fully tighten the bolts at this time. Leave a 1/4-inch gap between the nut and the washer to allow for positioning of the Load Discs. (See Figure 2: Gap for positioning).
   c. Repeat steps a and b for remaing Load Discs.
8. Measure the LD3xi the voltage output at "no-load" condition now that it is in position.
   a. Record the no-load output into Figure 3: Weight Distribution Chart or create your own similar table.
   b. Assign a number (1,2,3, etc.) to the LD3xi and note it.
   c. Repeat steps 8a and 8b for all the LD3xi.
9. Mount the vessel to the LD3xi's.
   a. Lower the vessel gently onto the Load Discs. (Alignment pins may be used to help guide and position the vessel). (see Figure 5 Lowering the vessel).
   b. Center the Load Disc top mounting holes with the vessel mounting holes, using the clearance available from the bottom mounting holes.

Note: If the vessel hole pattern does NOT match up with the Load Disc hole pattern, modify the mounting holes on the vessel. DO NOT hammer or force the Load Disc into position by tightening the mounting bolts. The vessel holes will need to be resized or relocated.

   c. Place the four top bolts (customer supplied) through the vessel and the Load Disc mounting holes. The bolts must be able to pass freely through the holes without interference.
   d. Tighten the bolts, leaving a 1/4-inch gap for positioning. (See Figure 2 Gap for Positioning).
10. Check dead weight output.
   a. Record the dead weight output on your Weight Distribution Chart that was started in step 8a.
   b. Calculate the Output Change. (Change should be positive).
   c. The output increase from no-load to dead weight can be within ten percent of the AVERAGE output increase. In the example the average output change for Load Discs #1, #2 and #4 meet this condition, while the output from Load Disc #3 is too low indicating it is carrying less weight.
   d. Load Disc #3 will require a shimming and/or leveling procedure which will distribute the weight more evenly over all of the supports. Refer to sheet 2.

Note: All output changes should be positive! If you observe a negative output change, check wiring polarity and vessel load shifting.

Note: The calculation example used is an ideal situation (load centered). Off center loads caused by offset mixers or gear boxes will place weight on some supports more than others. Do not attempt to shim all supports to 10% of the average output. Balance the support weight between each other making sure all legs carry a load.

ECO ACCUMULATION:	APPROVALS	DATE
ECO 1:	DRAWN: BW Cooper	4/29/02
ECO 2:	CHECKED: HL Keene	5/3/02
ECO 3:	PROJ. ENGR: T Szymanski	5/3/02
ECO 4:	PRODUCTION: M Nguyen	5/6/02
ECO 5: INCORPORATE ABOVE ECO'S	PURCHASING G Colburn	5/3/02

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMAL .X± -- .XX± -- .XXX± --
ANGULAR ±--
DO NOT SCALE DRAWING
SCALE: --
PROJECT FILE NAME:
USED ON:

KM Kistler-Morse Bothell, WA

TITLE
INSTALLATION ARRANGEMENTS, 220lb-5500lb, LOAD DISC 3xi

SIZE	DWG. No.	REV.
B	TI-LC.LD3xi-01	D

ACAD# TI-LC.LD3xi-01D SHT 1 of 13

Leveling and Shimming:

The main objective of leveling/shimming the vessel is to distribute the weight evenly on all of the Load Discs. Uneven weight distribution will reduce the accuracy of the weight measurement system as a whole and in extreme cases may cause Load Disc damage.

See previous section "Installation Instructions" for hardware installation/assembly details before proceeding with this section.

Leveling for the Universal Top Adapter Plate

1. Based on the Weight Distribution Chart (Figure 3) and visual inspection, cut/place shims as required to adjust adjust the distribution of weight on the Load Discs. Begin with the "smallest change" disc first.
2. Measure the dead weight output and the output change change of all of the Load Discs to see how they are affected. Record again into the Weight Distribution Chart (Figure 3).
3. Repeat Steps 1 and 2 until you have achieved the desired output change of all of the Load Discs.
4. Securing LD3xi after leveling
   Once the weight distribution criteria has been satisfied through leveling and/or shimming, complete the installation by tightening the required bolts for your application.

Note: For installations where leveling nuts are not used, load balancing on the Load Discs must be achieved by adding or removing shims. Adjusting the Load Discs to distribute the vessel weight evenly may require adding shims (supplied by customer) systematically to all disc locations.

Note: The Universal Adapter Top Plate will accommodate angular misalignment up to three degrees maximum. (Figure 6 Angular Misalignment up to 3 Degrees) Ideally, the load is distributed evenly across the top plate.

Leveling for the Leveling Top plate Adapter, Leveling Base Adapter Plate, and the Anyadapter Plate

1. Based on the Weight Distribution Chart and visual inspection, use the leveling feature to adjust the top plates until the weight distribution falls within the weight distribution guidelines.
2. Measure the dead weight output and the output change of all of the Load Discs to see how they are affected. (See Figure 3: Weight Distribution Chart)
3. Repeat Steps 1and 2 until you have achieved the desired output change of all of the Load Discs.
4. Securing LD3xi after leveling
   Once the weight distribution criteria has been satisfied through leveling and/or shimming, complete the installation by tightening the required bolts for your application.

CAUTION: If you need to raise the vessel or one vessel leg after installation, loosen the bolts on all Load Discs to prevent overloading.

Note: For installations where a leveling feature is incorporated into the hardware design, load balancing can be achieved by adjusting the leveling nuts. Shims may be used to fill gaps.

Note: The Leveling feature allows .125" of vertical adjustment. To adjust: Turn the leveling nut clockwise to lower, counterclockwise to raise. Once the proper adjustment is obtained, tighten the jam nut against the leveling nut to lock in place.

Note: Shimming the plates of one Load Disc will probably affect the weight distribution on the Load Disc located on the opposite side. Keep this in mind while shimming.

Note: Shims are typically applied between the LD3xi Top Hardware and mating vessel plate, but the gap condition may exist at either the top or bottom plates.

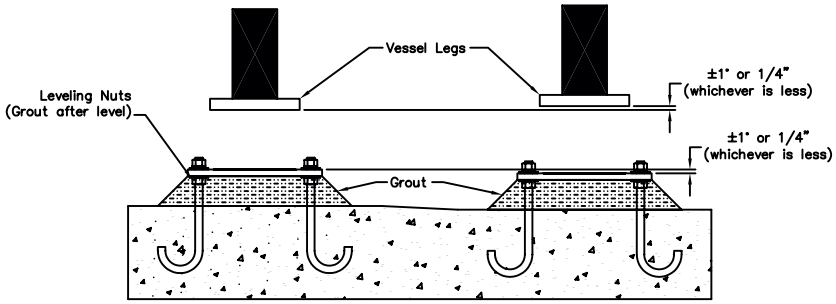


FIGURE 1: ANGULAR MISALIGNMENT

Note: Concrete foundation and grouting shown for reference only. The concepts apply to all foundation types.

Anchor bolts supplied by customer.

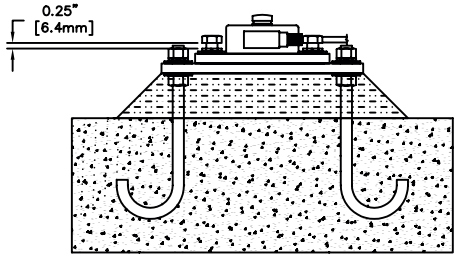


FIGURE 2: LEAVE 1/4" GAP FOR POSITIONING

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI–LC.LD3xi–01	REV. D
ACAD# TI–LC.LD3xi–01D sh2		SHT 2 of 13

INSTALLATION OPTION FLAGNOTES:

1. I–Beam should be rigid enough not to deflect more than .062" [1.57mm] or tilt 1/2" under full load; otherwise customer should weld stiffeners into the web and also weld stiffener plates on top of I–Beam wher Load Disc 3xi is to be installed.

2. The maximum available thread depth for the 7/16"–20 bolt on LD3xi top is .35" [8.9mm].

3. For 220 lb – 5500 lb Load Disc 3xi transducers, KM recommends using 1/2"–13 [13mm] Anchor Bolts and Nuts (ASTM–325, or equivalent SAE grade 8 or stronger).

4. Adapter plate overall dimensions and hole patterns are the same as the base plate.

5. DELETED.

6. DELETED.

7. Torque the top plate mounting bolt to 5–10 FT–LBS maximum.

8. When using leveling nuts, after leveling and load balancing of Load Discs is completed and Load Discs are secured in place, pack grout or cement in place. When grouting underneath the steel plate, do not grout past the bottom edges of the steel plate to facilitate removal of the Load Disc 3xi.

9. The leveling feature allows .20" [5.08mm] of vertical adjustments. To adjust: Turn the leveling nut clockwise to lower, counterclockwise to raise, maxium 3 turns allowed. Once the proper adjustment is obtained tighten the jam nut against the leveling nut to lock in place.

10. Tighten then back off 1/8 turn.

11. This drawing is for general layout assistance only. Local electrical codes and practices should be observed.

12. Mount conduit and transducer entry fittings first on the bottom of the J–Box and then the sides as space permits. DO NOT mount the fittings through the top. Common tess can also be used. Check J–Box first to insure adequate space is available before punching conduit holes and mounting J–Box.

13. To prevent fluid leaks into the conduit, use water tight conduit fittings at all conduit joints and o–rings/gaskets on fittings to box surfaces. Plug conduit entry at signal processor with Sikaflex 1A polyurethane sealant or RTV 738 to prevent moisture from traveling up conduit to the signal processor. Use "Rectorseal #5" (or equivalent) pipe thread compound on all Load Disc cable assembly fittings, unions, tees, reducer bushings, etc. wrench thighten all fittings.

Load Disc #	No–Load Output (mV)	Dead Weight Output (mV)	Output Change (mV) (Dead Weight Output – No–Load Output)
1			
2			
3			
4			
5			
6			
7			
8			

FIGURE 3: WEIGHT DISTRIBUTION CHART: RECORD YOUR SYSTEM'S LOAD OUTPUT

KM Kistler-Morse Bothell, WA

SIZE	DWG. No.	REV.
B	TI–LC.LD3xi–01	D
ACAD# TI–LC.LD3xi–01D sh3		SHT 3 of 13

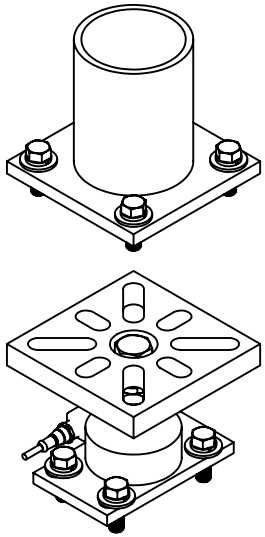


FIGURE 5: LOWER VESSEL
ONTO TOP PLATE

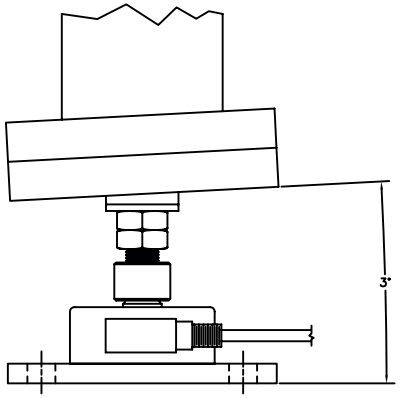
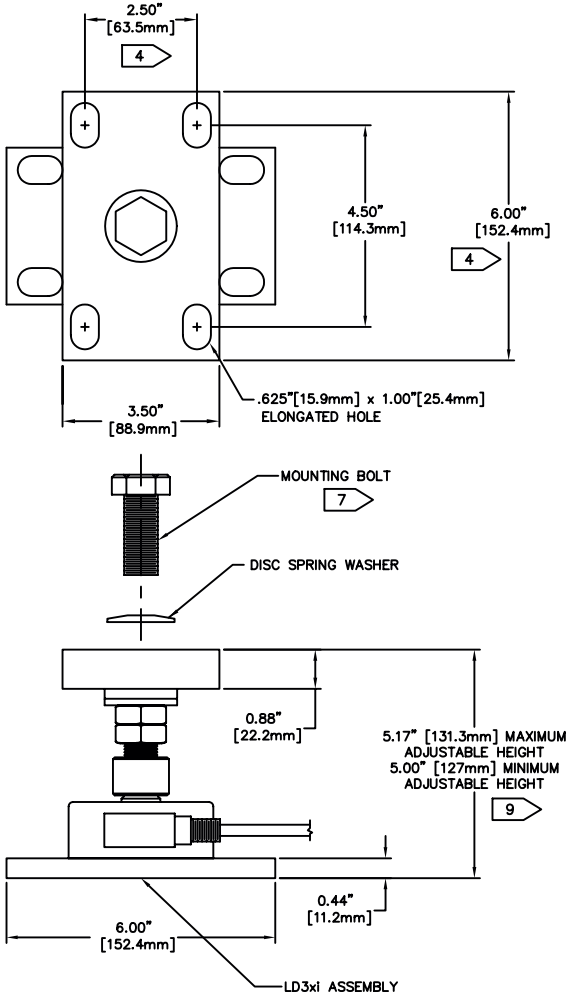
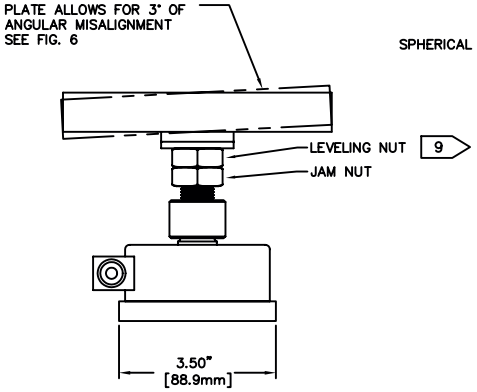
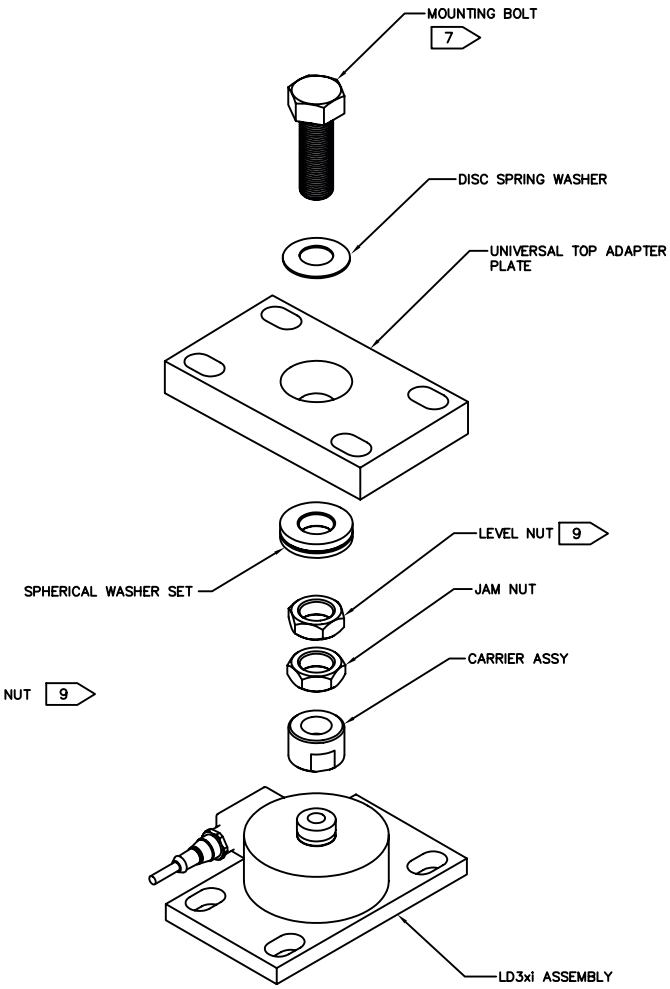


FIGURE 6: ANGULAR MISALIGNMENT
UP TO 3 DEGREES

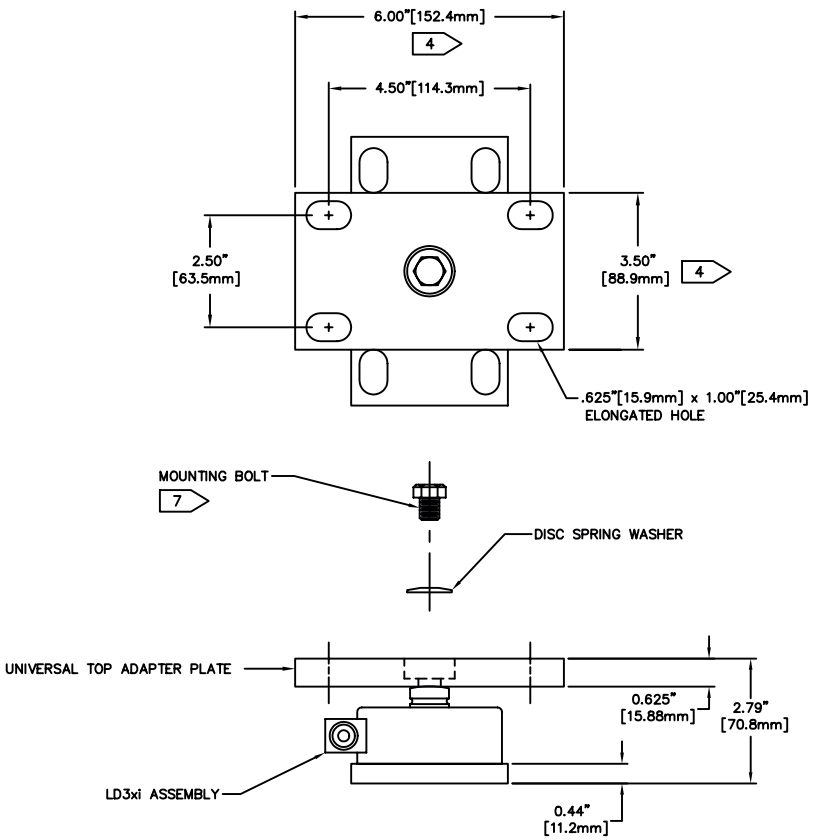


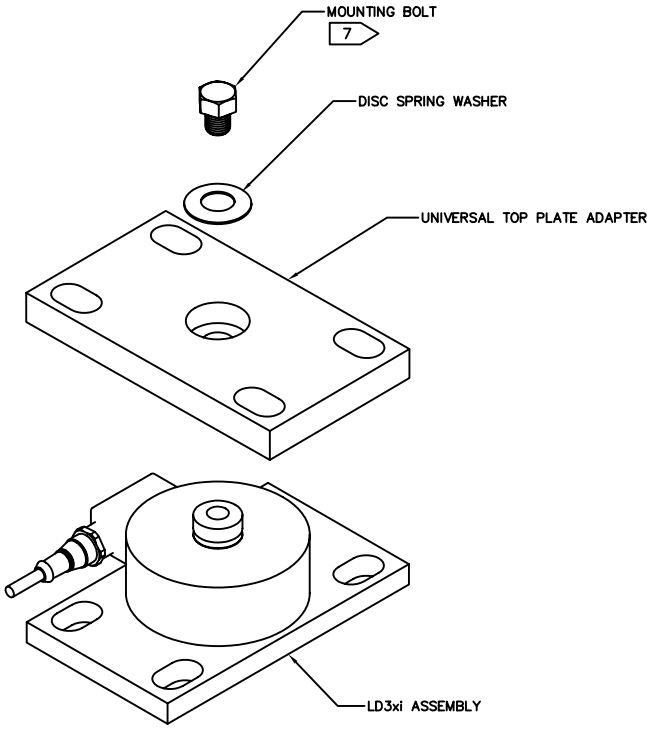




220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
WITH LEVELING TOP UNIVERSAL ADAPTER PLATE (LT3xi)
MOUNTING DIMENSIONS

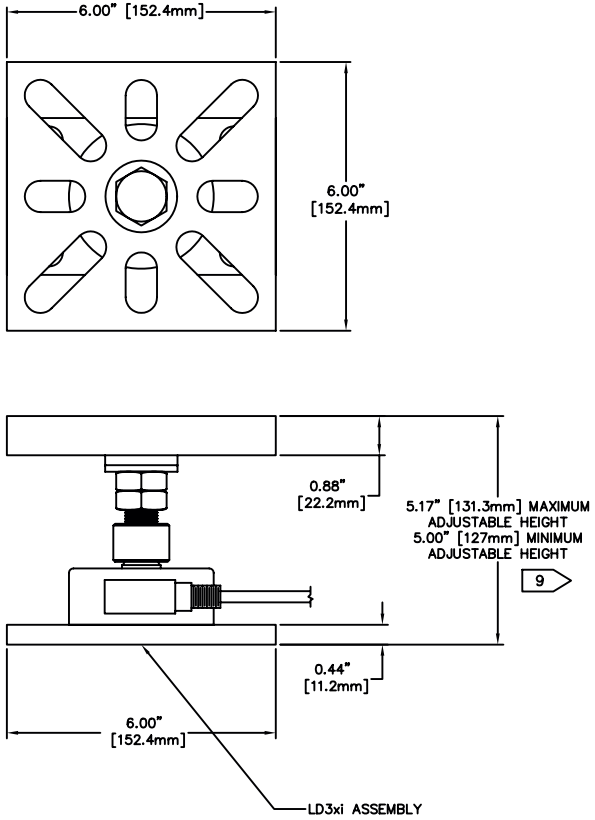
KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI–LC.LD3xi–01	REV. D
ACAD# TI–LC.LD3xi–01D sh5		SHT 5 of 13

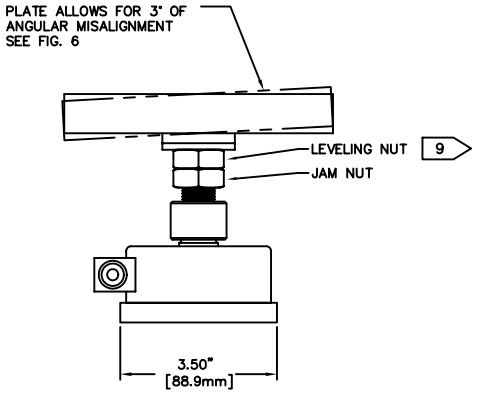


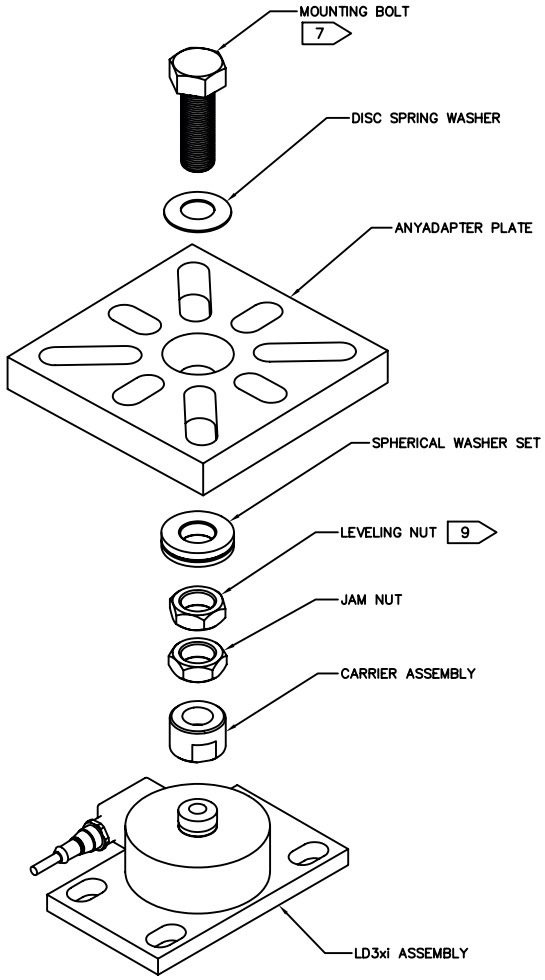


220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
WITH UNIVERSAL TOP ADAPTER PLATE (UA3xi)
MOUNTING DIMENSIONS

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI–LC.LD3xi–01	REV. D
ACAD# TI–LC.LD3xi–01D sh6		SHT 6 of 13

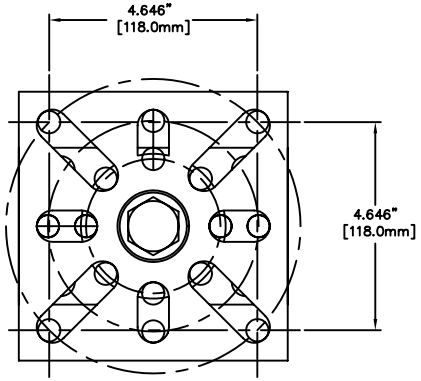


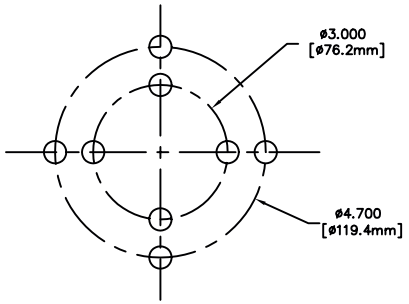




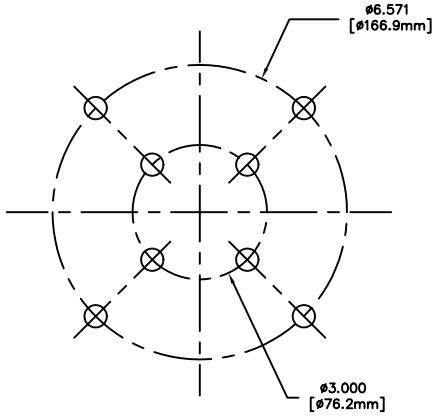
220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
WITH ANYADAPTER TOP ADAPTER PLATE (AD3xi)
MOUNTING DIMENSIONS

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xi-01	REV. D
ACAD# TI-LC.LD3xi-01D sh7		SHT 7 of 13





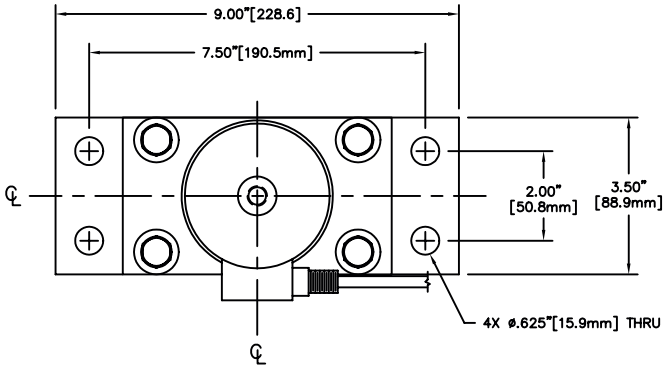
MINIMUM/MAXIMUM BOLT PATTERN
FOR HORIZONTAL/VERTICAL SLOTS

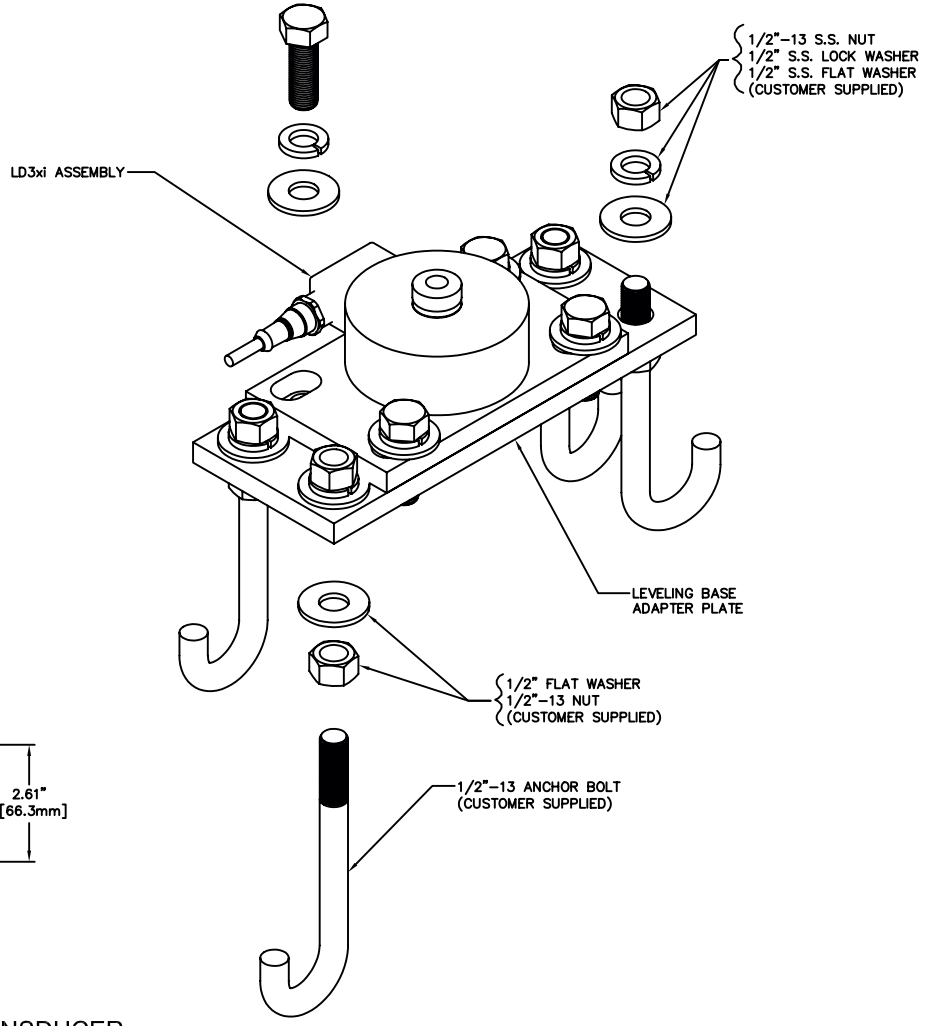


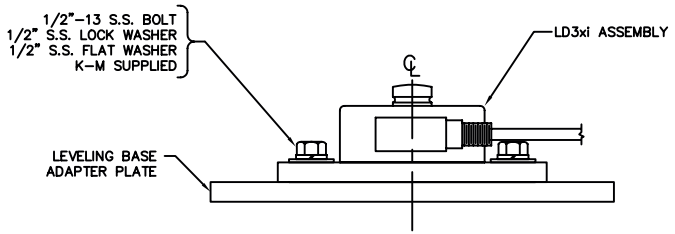
MINIMUM/MAXIMUM BOLT PATTERN
FOR ANGLED SLOTS

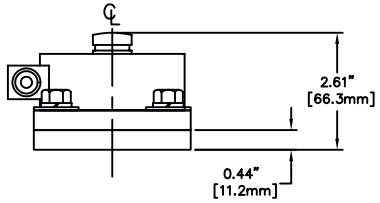
VESSEL MOUNTING HOLE PATTERNS
FOR ANYADAPTER TOP ADAPTER PLATE (AD3xi)
(MINIMUM (4) 1/2" HEX HEAD BOLTS REQUIRED)

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xi-01	REV. D
ACAD# TI-LC.LD3xi-01D sh9		SHT 8 of 13



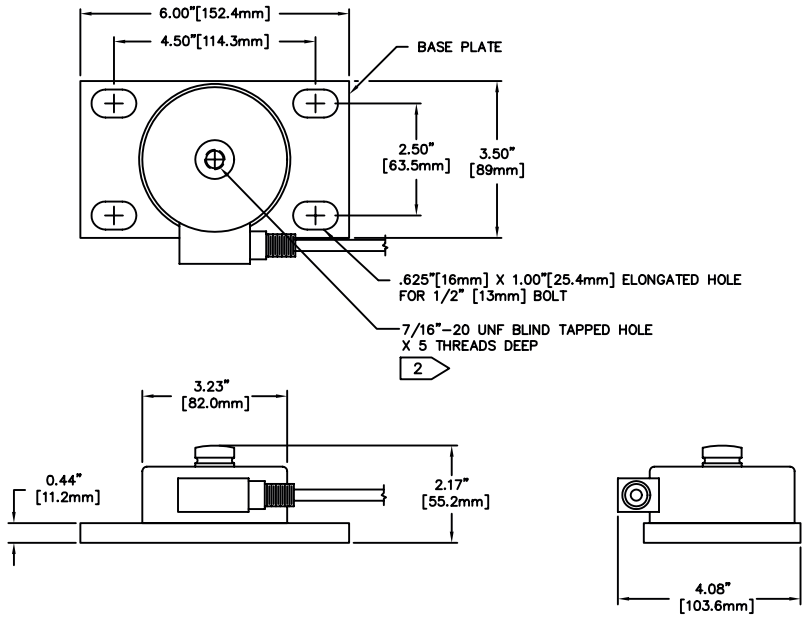




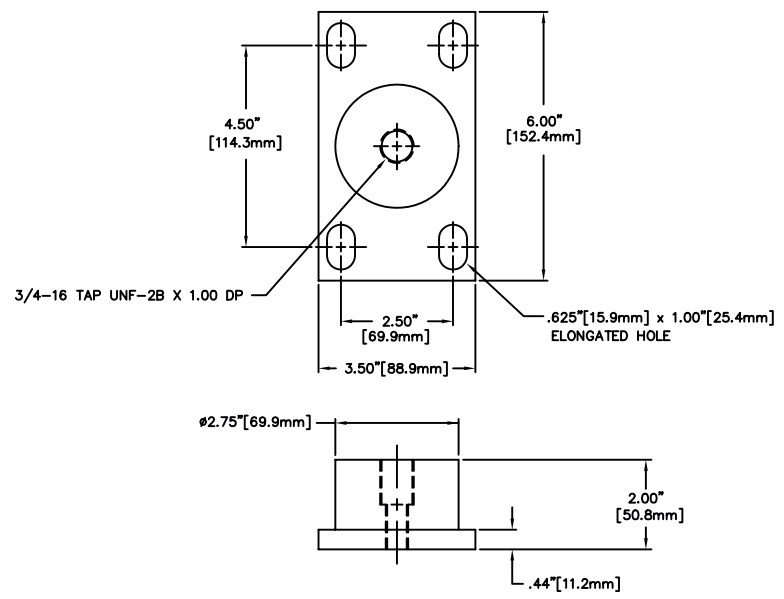


220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
WITH LEVELING BASE ADAPTER PLATE (LB360)
MOUNTING DIMENSIONS

Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI–LC.LD3xi–01	REV. D
ACAD# TI–LC.LD3xi–01D sh9		SHT 9 of 13



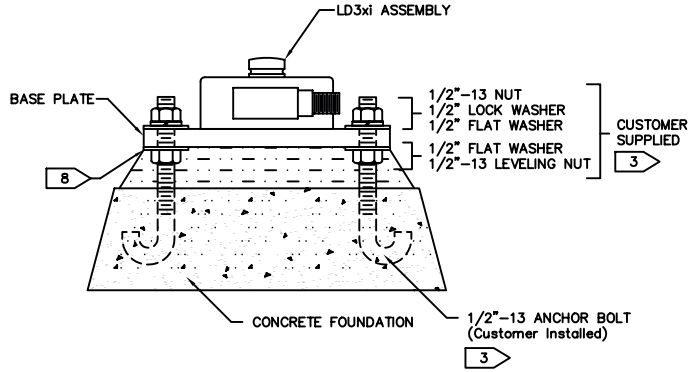
220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
MOUNTING DIMENSIONS



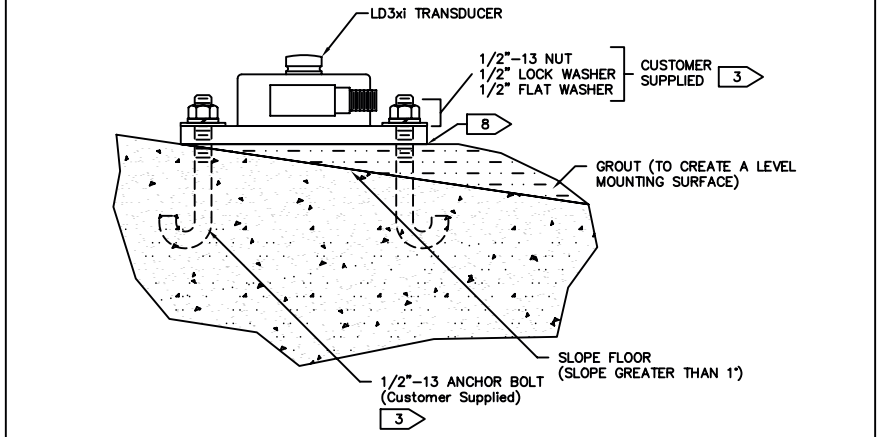
220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER DUMMY
MOUNTING DIMENSIONS

Kistler-Morse
Bothell, WA

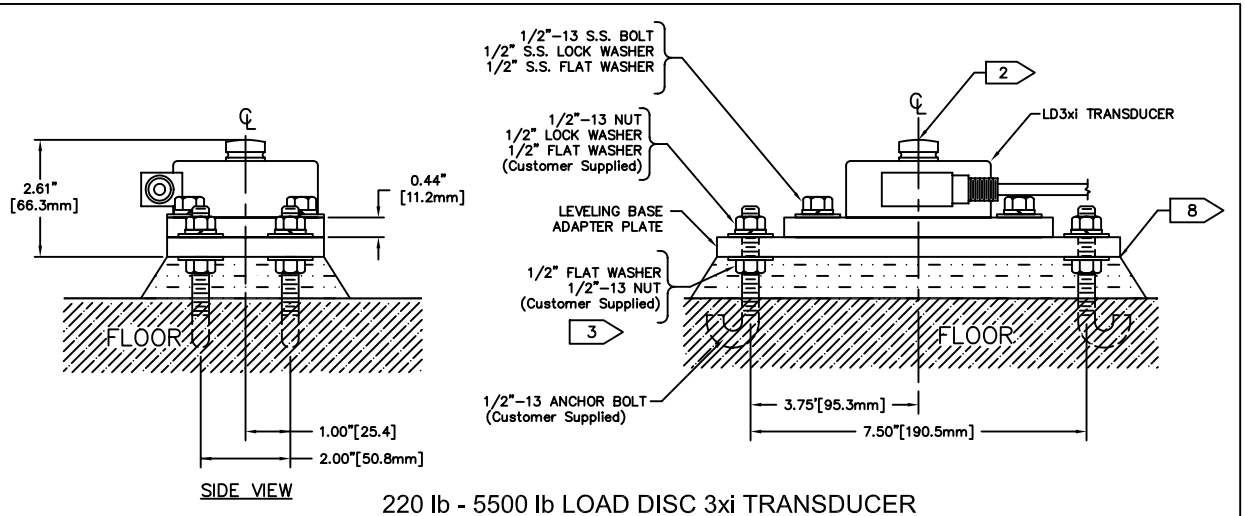
SIZE	DWG. No.	REV.
B	TI-LC.LD3xi-01	D
ACAD# TI-LC.LD3xi-01D sh10		SHT 10 of 13



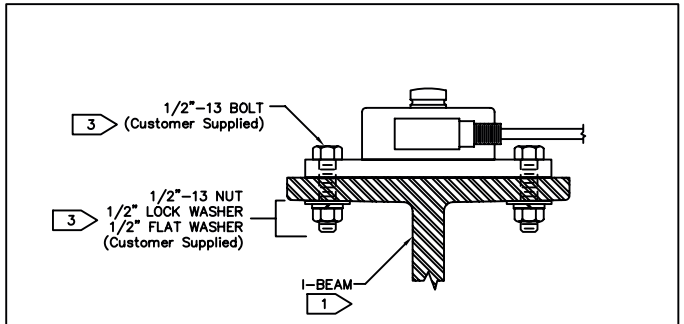
220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER ON
CONCRETE FOUNDATION WITH ANCHOR BOLTS



220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
MOUNTED ON SLOPE FLOOR



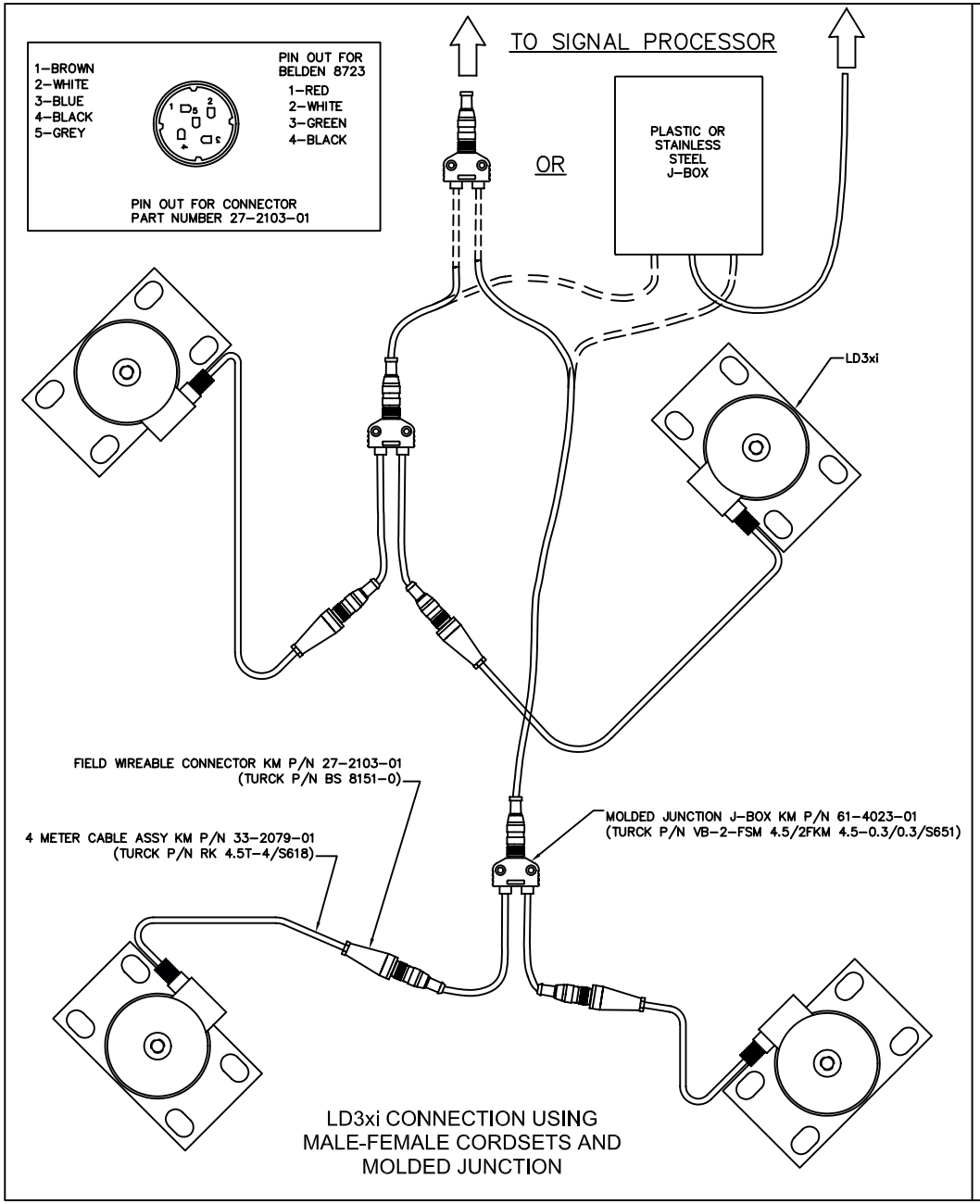
220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
WITH LEVELING BASE ADAPTER PLATE (LB360)



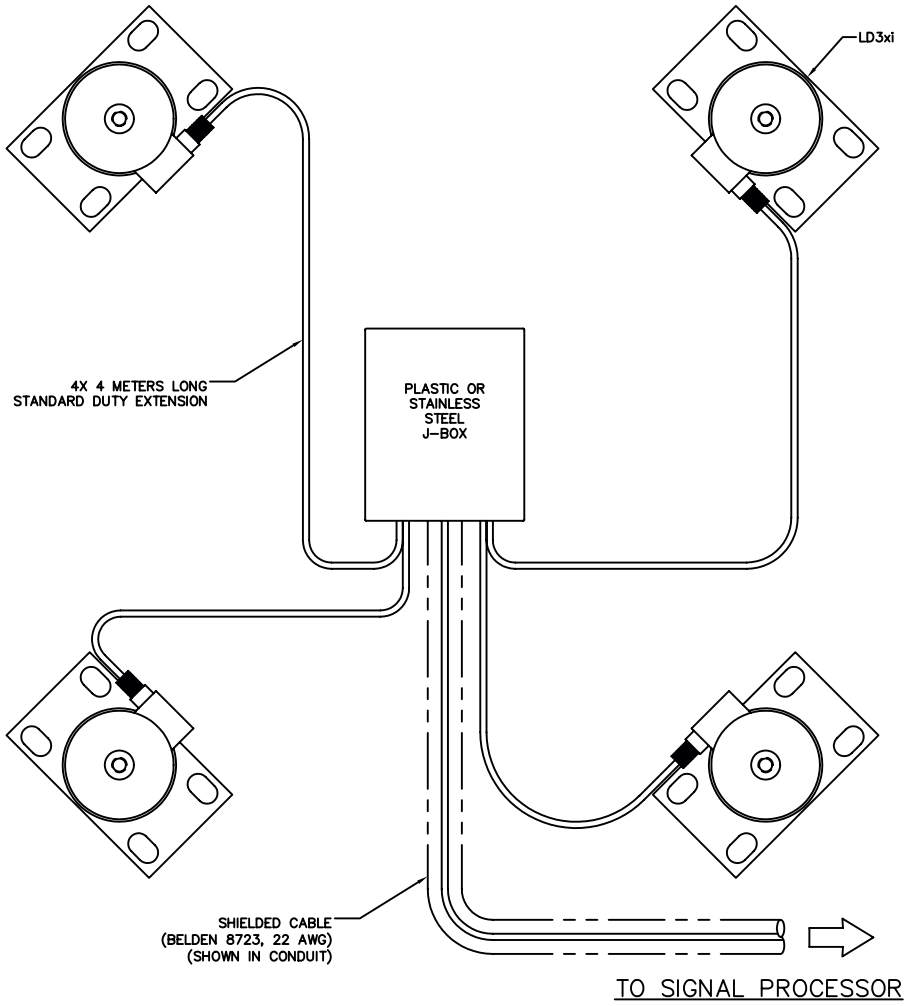
220 lb - 5500 lb LOAD DISC 3xi TRANSDUCER
MOUNTED ON I-BEAM

Kistler-Morse
Bothell, WA

SIZE	DWG. No.	REV.
B	TI–LC.LD3xi–01	D
ACAD# TI–LC.LD3xi–01D sh11		SHT 11 of 13

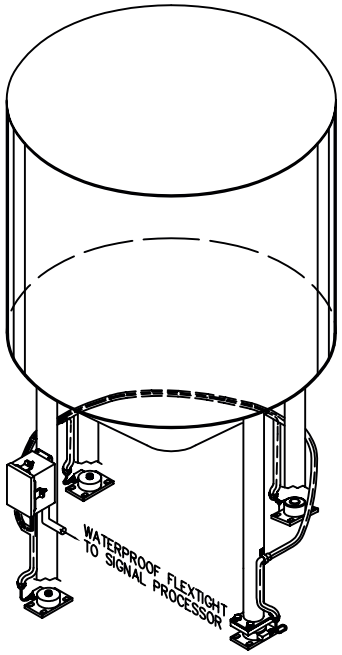


LD3xi CONNECTION USING
MALE-FEMALE CORDSETS AND
MOLDED JUNCTION



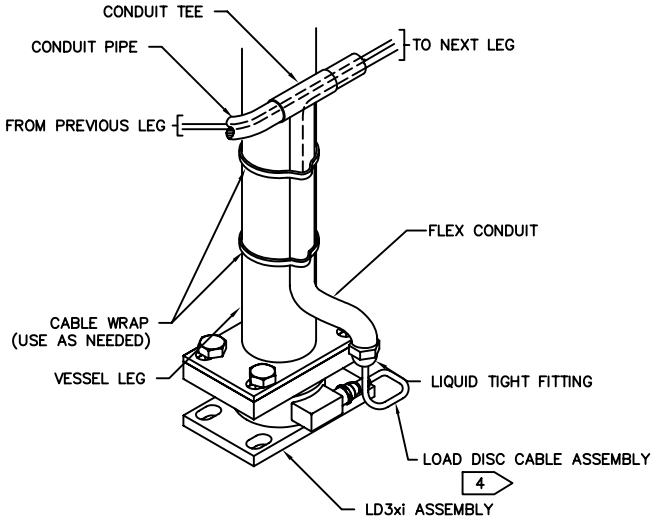
LD3xi CONNECTION USING
STAINLESS STEEL J-BOX

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI–LC.LD3xi–01	REV. D
ACAD# TI–LC.LD3xi–01D sH12		SHT 12 of 13



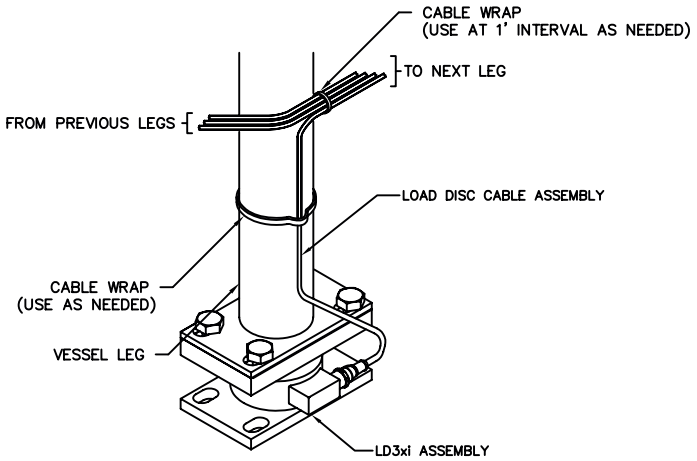
TYPICAL LOAD DISCS CABLE ROUTING ON VESSEL LEGS

(SEE DETAILS A & B FOR TYPICAL CONDUITED AND NON-CONDUITED LOAD DISC CABLE LAYOUT ASSISTANCE)



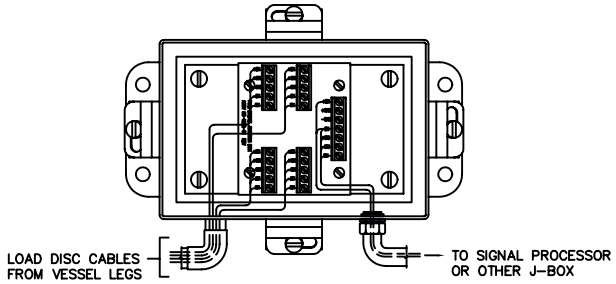
DETAIL A

CONDUITED LOAD DISC CABLE LAYOUT (PREFERRED)



DETAIL B

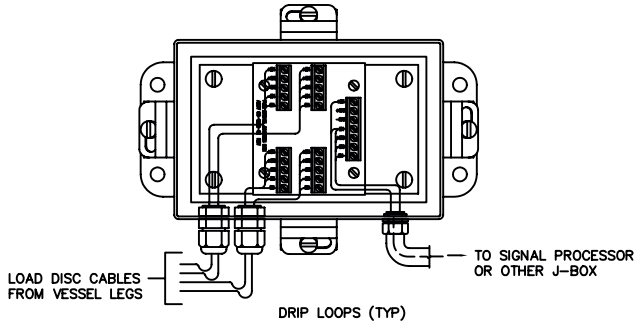
NON-CONDUITED LOAD DISC CABLE LAYOUT (NOT RECOMMENDED)



DETAIL C

STAINLESS STEEL J-BOX WITH CONDUITED LOAD DISCS CABLES

12



DETAIL D

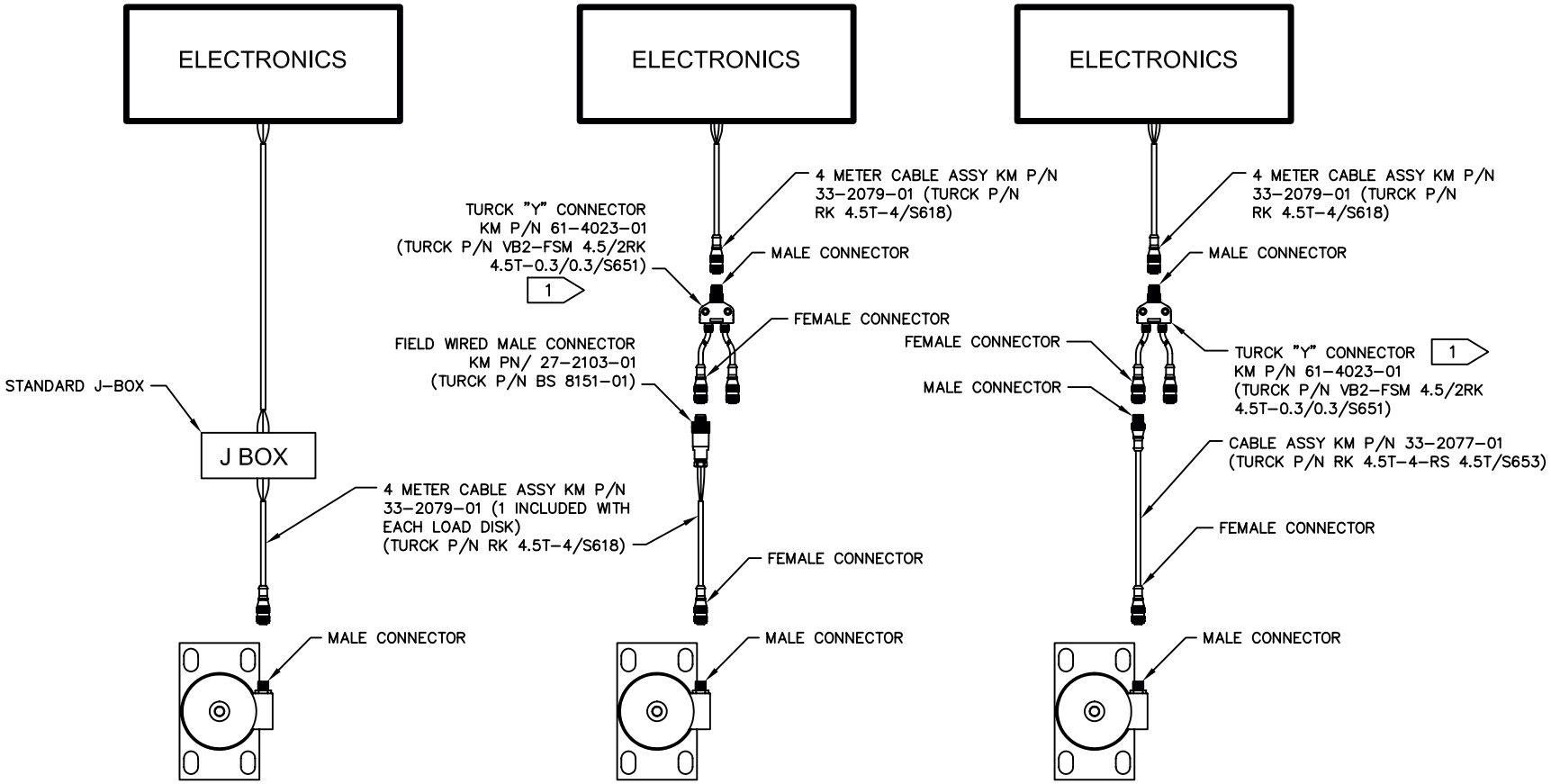
STAINLESS STEEL J-BOX WITH NON-CONDUITED LOAD DISCS CABLES

12

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xi-01	REV. D
ACAD# TI-LC.LD3xi-01D sh13		SHT 13 of 13

REVISIONS					
LTR	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE
A	PRODUCTION RELEASE	BWC	HLK	TS	5/3/02

LD3xi (WITH TURCK OPTION) TYPICAL CABLING DIAGRAM



NOTES:

1 WHEN USING 61-4023-01, USE 2 FOR 3 LOAD DISC, USE 3 FOR 4 LOAD DISC.

ECO ACCUMULATION:	APPROVALS	DATE
ECO 1:	DRAWN: BW Cooper	5/3/02
ECO 2:	CHECKED: HL Keene	5/3/02
ECO 3:	PROJ. ENGR: T Szymanski	5/3/03
ECO 4:	PRODUCTION: M Nguyen	5/6/02
ECO 5: INCORPORATE ABOVE ECO'S	PURCHASING G Colburn	5/3/02

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMAL .X± -- .XX± -- .XXX± --
ANGULAR ±--
DO NOT SCALE DRAWING
SCALE: --
PROJECT FILE NAME:
USED ON:

Kistler-Morse Bothell, WA

TITLE: LD3xi TYPICAL CABLING DIAGRAM

SIZE	DWG. No.	REV.
B	TI-LD3xi-01	A

ACAD# TI-LD3xi-01A SHT 1 OF 1

REVISIONS					
LTR	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE
A	PRODUCTION RELEASE	BWC	TS	TS	4/18/03

CAGED INSTALLATION INSTRUCTIONS FOR THE LD3xiC:

This drawing is for general layout assistance only. Local electrical codes and practices should be observed.

GENERAL INFORMATION:

These general requirements apply to all applications:

1. Per customer choice, the LD3xiC cage (with shims) could be installed without the Transducer. The Trasnducer could be installed after the entire installation is complete.
2. Ensure the surfaces where the cage assembly bolts down are clean, smooth, flat, and level, with less than 1° of slope in any direction.
3. Ensure vessel legs/guessets are clean, smooth, flat, and level, with less than 1° of slope in any direction.
4. Position cage assembly so the cable cannot be snagged or chafed and can be easily routed to the junction box. The LD3xiC MUST BE orientated as shown in Figure 4 for proper operation, see sheet 7.
5. When raising the vessel for Load Disc Installation, use proper support to prevent the vessel from tipping or falling.
6. During installation, carefully distribute the load to ALL load discs evenly. *CAUTION:* PLACING THE LOAD ON ANY ONE LOAD DISC MAY CAUSE DAMAGE.
7. All bolts and hardware to attach the Load Disc to the vessel and to the foundation are customer supplied. Size of bolts and material to be determined by customer.
8. All bolts are kept loose until shimming and leveling is complete.

Load Disc Installation Instructions:

1. Prior to installing Load Disc's, verify that they are the correct capacity for your application by reviewing the information labeled on the Load Disc.
2. Assemble the LD3xiC; Place loading head on top of the Load, Disc and slide into Cage assembly. Align 3 screws with the 3 holes on the bottom of the cage assembly (See Detail A).
3. Raise the vessel.
4. Inspect the foundation and vessel mounting surfaces that will mate to the disc.
   a. Check the mounting hole loacations and size on both the foundation base and the vessel foot pad.
   b. Also check the surfaces for flatness and angular misalignment. A baseplate with leveling nuts is recommended. (See Figure 1: Angular Misalignment).
5. Mount the LD3xiC assembly to the foundation.
   a. Gently lower the LD3xiC to the foundation. Take care to align the mounting holes with the foundation mounting holes/studs.
   b. Install bolts and nuts as required. DO NOT fully tighten down the disc at this time. Leave a 1/4–inch gap between the nut and the washer to allow for positioning of the Load Discs. (See Figure 2: Gap for positioning).
   c. Repeat steps a and b for remaing Load Discs.
   d. Per customer choice, the LD3xiC cage (with shims) could be installed without the Transducer. The Trasnducer could be installed after the entire installation is complete.
6. Measure the LD3xiC the voltage output at "no–load" condition now that it is in position.
   a. Record the no–load output into Figure 3: Weight Distribution Chart or create your own similar table.
   b. Assign a number (1,2,3, etc.) to the LD3xiC and note it.
   c. Repeat steps 6a and 6b for all the LD3xiC.
7. Mount the vessel to the LD3xiC's.
   a. Lower the vessel gently onto the Load Discs cage assemblies. (Alignment pins may be used to help guide and position the vessel).
   b. Center the Load Disc top mounting holes with the vessel mounting holes, using the clearance available from the bottom mounting holes.

Note: If the vessel hole pattern does NOT match up with the Load Disc hole pattern, modify the mounting holes on the vessel. DO NOT hammer or force the Load Disc into position by tightening the mounting bolts. The vessel holes will need to be resized or relocated.

   c. Place the four top bolts (customer supplied) through the vessel foot and the LD3xiC's cage mounting holes. The bolts must be able to pass freely through the holes without interference.
   d. Tighten the bolts, leaving a 1/4–inch gap for positioning. (See Figure 2 Gap for Positioning).
8. Check dead weight output.
   a. Record the dead weight output on your Weight Distribution Chart that was started in step 6a.
   b. Calculate the Output Change. (Change should be positive).
   c. The output increase from no–load to dead weight can be within ten percent of the AVERAGE output increase. In the example the average output change for Load Discs #1, #2 and #4 meet this condition, while the output from Load Disc #3 is too low indicating it is carrying less weight.
   d. Load Disc #3 will require a shimming and/or leveling procedure which will distribute the weight more evenly over all of the supports. Refer to sheet 3.

Note: All output changes should be positive! If you observe a negative output change, check wiring polarity and vessel load shifting.

Note: The calculation example used is an ideal situation (load centered). Off center loads caused by offset mixers or gear boxes will place weight on some supports more than others. Do not attempt to shim all supports to 10% of the average output. Balance the support weight between each other making sure all legs carry a load.

ECO ACCUMULATION:	APPROVALS	DATE
ECO 1:	DRAWN: BW Cooper	3/13/03
ECO 2:	CHECKED: HL Keene	4/14/03
ECO 3:	PROJ. ENGR: T Szymanski	4/14/03
ECO 4:	PRODUCTION: R Stilnovich	4/18/03
ECO 5: INCORPORATE ABOVE ECO'S	PURCHASING G Colburn	4/17/03

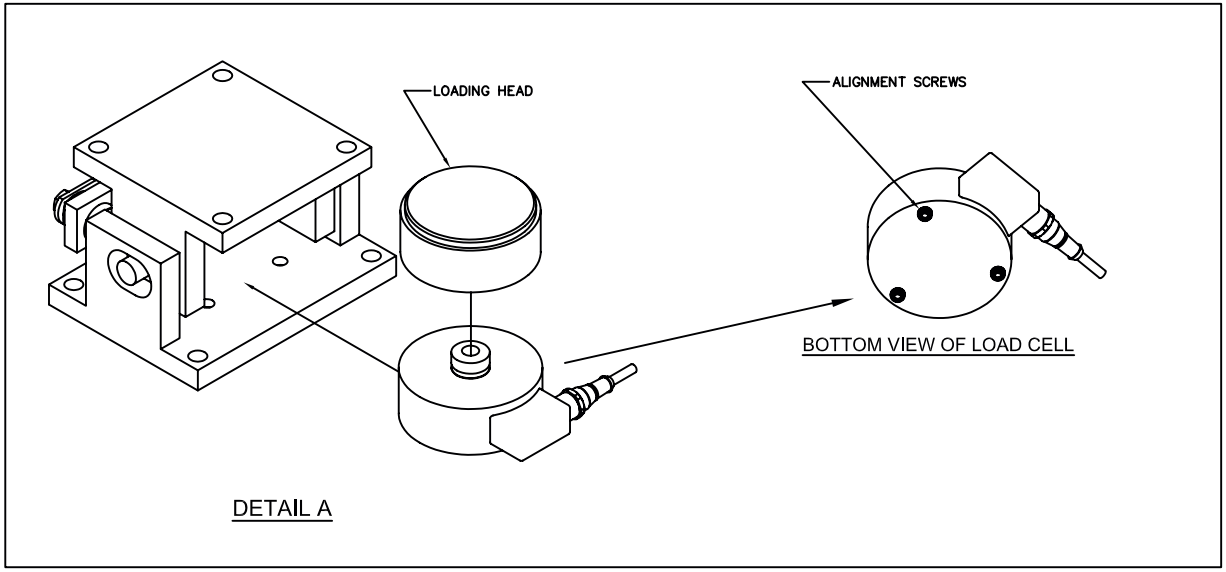
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMAL .X± -- .XX± -- .XXX± -- ANGULAR ±--
DO NOT SCALE DRAWING
SCALE: --
PROJECT FILE NAME:
USED ON:

Kistler-Morse Bothell, WA

TITLE: INSTALLATION ARRANGEMENTS LD3xiC

SIZE	DWG. No.	REV.
B	TI-LC.LD3xiC-01	A

ACAD# TI–LC.LD3xiC–01A.DWG SHT 1 OF 7



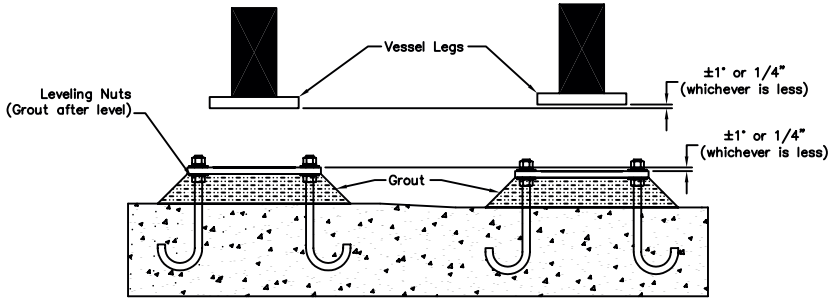


FIGURE 1: ANGULAR MISALIGNMENT

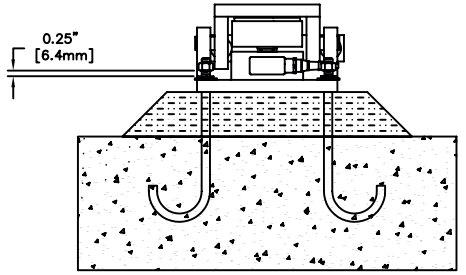


FIGURE 2: LEAVE 1/4" GAP FOR POSITIONING

Note: Concrete foundation and grouting shown for reference only. The concepts apply to all foundation types.

Anchor bolts supplied by customer.

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xiC-01	REV. A
ACAD# TI-LC.LD3xiC-01A		SHT 2 OF 7

Leveling and Shimming:

The main objective of leveling/shimming the vessel is to distribute the weight evenly on all of the Load Discs. Uneven weight distribution will reduce the accuracy of the weight measurement system as a whole and in extreme cases may cause Load Disc damage.

1. Based on the Weight Distribution Chart (Figure 3) and visual inspection, cut/place shims as required to adjust adjust the distribution of weight on the Load Discs. Begin with the "smallest change" disc first.

2. Measure the dead weight output and the output change change of all of the Load Discs to see how they are affected. Record again into the Weight Distribution Chart (Figure 3).

3. Repeat Steps 1 and 2 until you have achieved the desired output change of all of the Load Discs.

4. Securing LD3xiC after leveling
   Once the weight distribution criteria has been satisfied through leveling and/or shimming, complete the installation by tightening the required bolts for your application.

CAUTION: If you need to raise the vessel or one vessel leg after installation, loosen the bolts on all Load Discs to prevent overloading.

Note: Shims are typically applied between the LD3xiC Top Hardware and mating vessel plate, but the gap condition may exist at either the top or bottom plates.

Load Disc #	No-Load Output (mV)	Dead Weight Output (mV)	Output Change (mV) (Dead Weight Output – No-Load Output)
1			
2			
3			
4			

FIGURE 3: WEIGHT DISTRIBUTION CHART: RECORD YOUR SYSTEM'S LOAD OUTPUT

INSTALLATION OPTION FLAGNOTES:

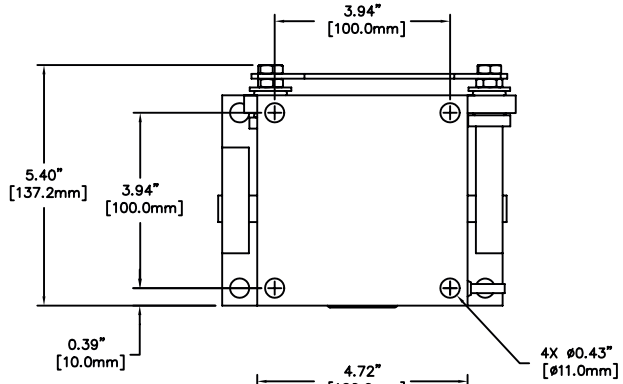
1. I-Beam should be rigid enough not to deflect more than .062" [1.57mm] or tilt 1/2" under full load; otherwise customer should weld stiffeners into the web and also weld stiffener plates on top of I-Beam wher Load Disc 3xiC is to be installed.

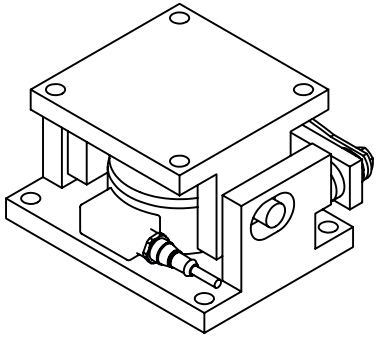
2. Size of Bolts and material to be determined by customer.

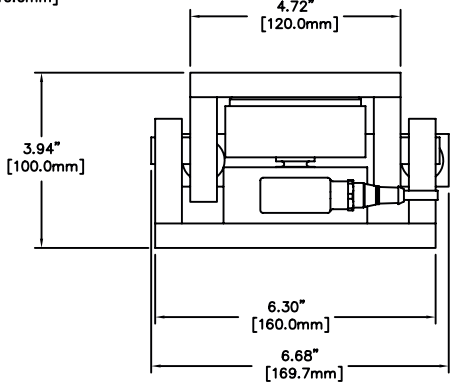
3. Mount conduit and transducer entry fittings first on the bottom of the J-Box and then the sides as space permits. DO NOT mount the fittings through the top. Common tess can also be used. Check J-Box first to insure adequate space is available before punching conduit holes and mounting J-Box. See Details E and F.

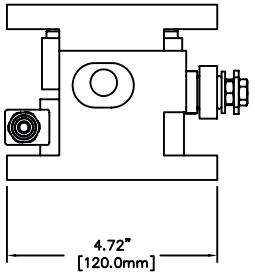
4. To prevent fluid leaks into the conduit, use water tight conduit fittings at all conduit joints and o-rings/gaskets on fittings to box surfaces. Plug conduit entry at signal processor with Sikaflex 1A polyurethane sealant or RTV 738 to prevent moisture from traveling up conduit to the signal processor. Use "Rectorseal #5" (or equivalent) pipe thread compound on all Load Disc cable assembly fittings, unions, tees, reducer bushings, etc. wrench thighten all fittings. See Details C and D

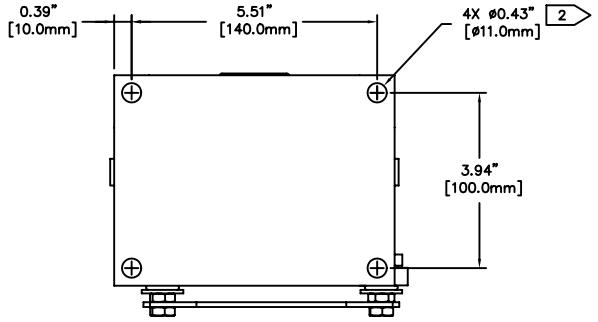
KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xiC-01	REV. A
ACAD# TI-LC.LD3xiC-01A		SHT 3 OF 7



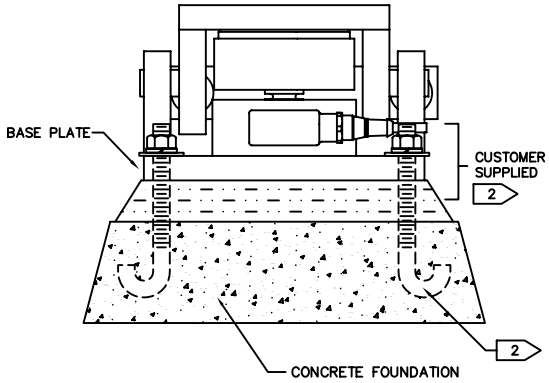




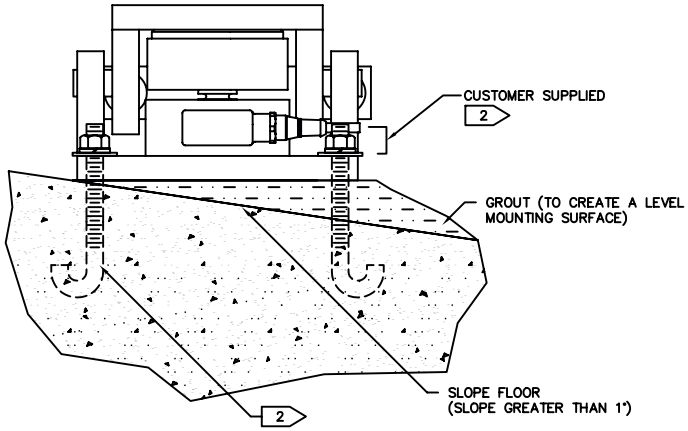




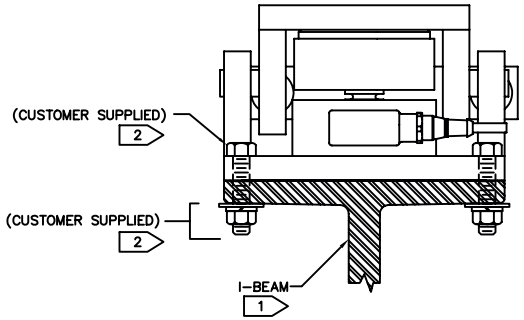
Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xiC-01	REV. A
ACAD# TI-LC.LD3xiC-01A		SHT 4 OF 7



LOAD DISC 3xiC TRANSDUCER ON
CONCRETE FOUNDATION WITH ANCHOR BOLTS



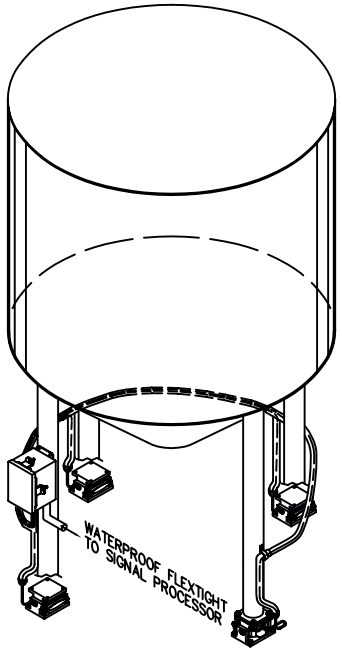
LOAD DISC 3xiC TRANSDUCER
MOUNTED ON SLOPE FLOOR



LOAD DISC 3xiC TRANSDUCER
MOUNTED ON I-BEAM

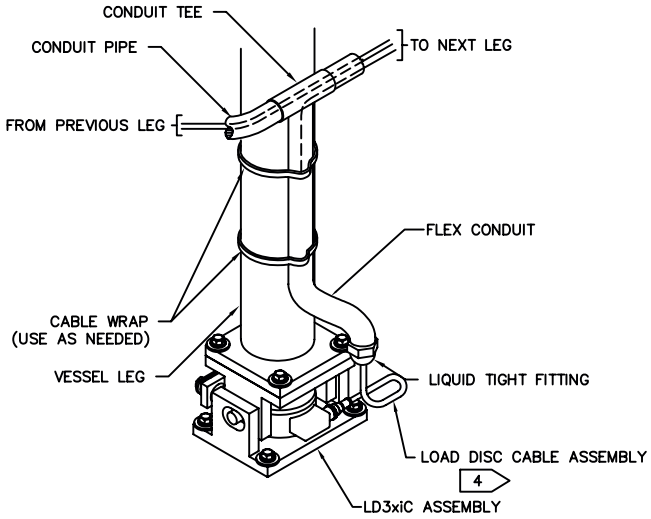
Kistler-Morse
Bothell, WA

SIZE	DWG. No.	REV.
B	TI-LC.LD3xiC-01	A
ACAD# TI-LC.LD3xiC-01A		SHT 5 OF 7



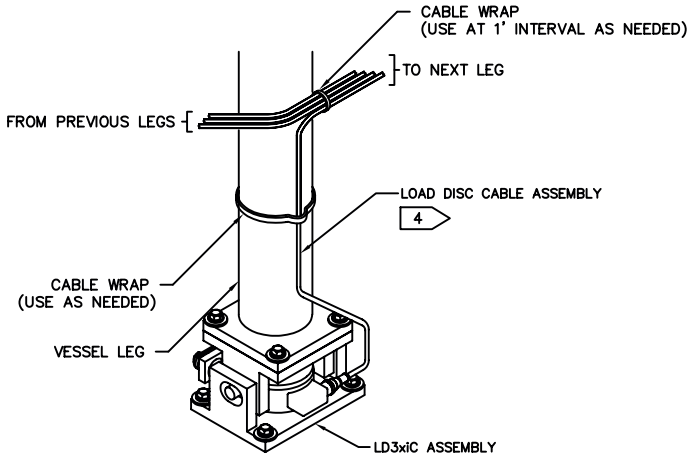
TYPICAL LOAD DISCS CABLE ROUTING ON VESSEL LEGS

(SEE DETAILS A & B FOR TYPICAL CONDUITED AND NON-CONDUITED LOAD DISC CABLE LAYOUT ASSISTANCE)



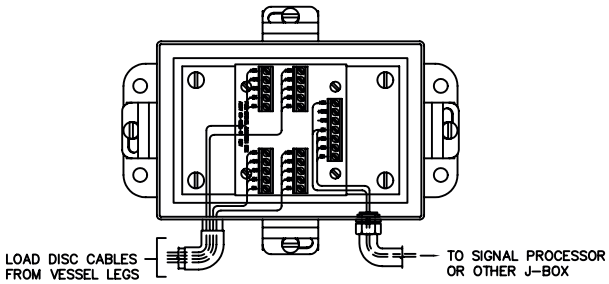
DETAIL C

CONDUITED LOAD DISC CABLE LAYOUT (PREFERRED)



DETAIL D

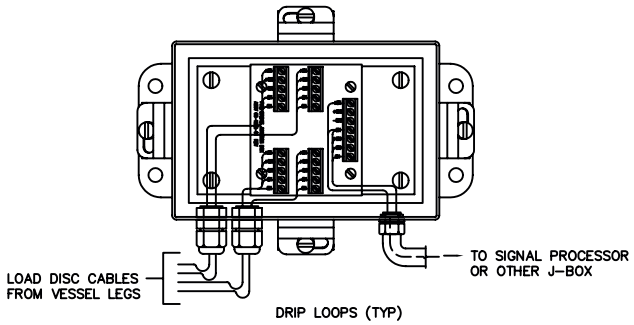
NON-CONDUITED LOAD DISC CABLE LAYOUT (NOT RECOMMENDED)



DETAIL E

STAINLESS STEEL J-BOX WITH CONDUITED LOAD DISCS CABLES

3

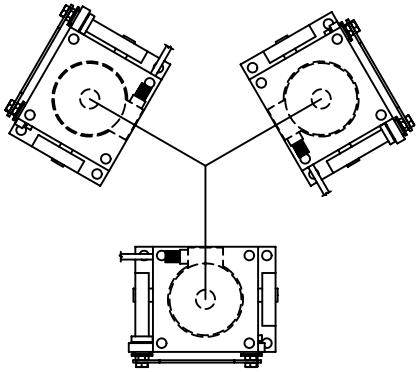


DETAIL F

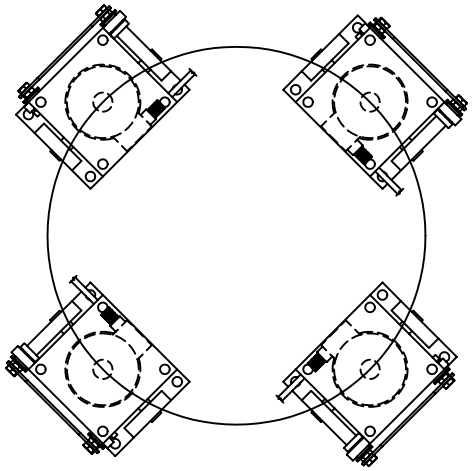
STAINLESS STEEL J-BOX WITH NON-CONDUITED LOAD DISCS CABLES

3

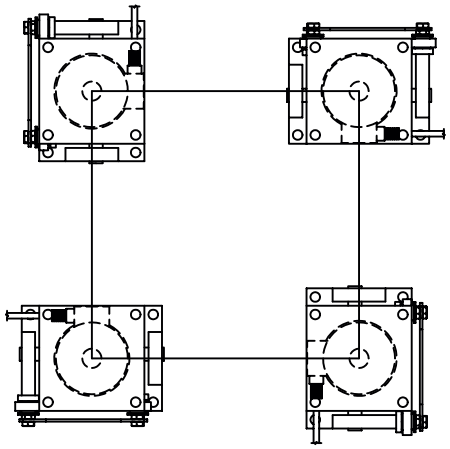
KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xiC-01	REV. A
ACAD# TI-LC.LD3xiC-01A		SHT 6 OF 7



CIRCULAR SYSTEM WITH
3 SUPPORT POINTS



CIRCULAR SYSTEM WITH
4 SUPPORT POINTS



SQUARE SYSTEM WITH
4 SUPPORT POINTS

FIGURE 4

KM Kistler-Morse Bothell, WA		
SIZE B	DWG. No. TI-LC.LD3xiC-01	REV. A
ACAD# TI-LC.LD3xiC-01A		SHT 7 OF 7

INSTALLATION OPTION FLAGNOTES:

1> I–Beam should be rigid enough not to deflect more than .062" [1.57mm] or tilt 1/2" under full load; otherwise customer should weld stiffeners into the web and also weld stiffener plates on top of I–Beam where Load Disc LD3 is to be installed.

2> The maximum available thread depth for the 3/4"–16 bolt on LD3 top is .55" [14.0mm].

3> For 1Klb–25Klb Load Disc LD3 transducers, KM recommends using 1/2"–13 [13mm] Anchor Bolts and Nuts (ASTM–325, or equivalent SAE grade 8 or stronger).

4> Adapter plate overall dimensions and hole patterns are the same as the base plate.

5> Deleted

6> Refer to drawing RF–LC.LD3–01 for additional Retro–fit installations.

7> Torque the 3/4"–16 top plate mounting bolt to 5–10 FT–LBS maximum.

8> When using leveling nuts, after leveling and load balancing of Load Discs is completed and Load Discs are secured in place, pack grout or cement in place. When grouting underneath the steel plate, do not grout past the bottom edges of the steel plate to facilitate removal of the Load Disc LD3.

9> The leveling feature allows .125" of vertical adjustments. To adjust: Turn the leveling nut clockwise to lower, counterclockwise to raise. Once the proper adjustment is obtained tighten the jam nut against the leveling nut to lock in place.

10> Tighten then back off 1/8 turn.

11. This drawing is for general layout assistance only. Local electrical codes and practices should be observed.

12> Mount conduit and transducer entry fittings first on the bottom of the J–Box and then the sides as space permits. DO NOT mount the fittings through the top. Common tess can also be used. Check J–Box first to insure adequate space is available before punching conduit holes and mounting J–Box.

13. To prevent fluid leaks into the conduit, use water tight conduit fittings at all conduit joints and o–rings/gaskets on fittings to box surfaces. Plug conduit entry at signal processor with Sikaflex 1A polyurethane sealant or RTV 738 to prevent moisture from traveling up conduit to the signal processor. Use "Rectorseal #5" (or equivalent) pipe thread compound on all Load Disc cable assembly fittings, unions, tees, reducer bushings, etc. wrench thighten all fittings.

14> When attaching conduit, DO NOT twist the Load Disc cable assembly fitting or hose. Hold the Load Disc cable assembly stationary and wrench tighten the male Flextight fitting body. Then insert the conduit and compression nut on the fitting body and wrench tighten. Reverse the process to remove.

Load Disc #	No–Load Output (mV)	Dead Weight Output (mV)	Output Change (mV) (Dead Weight Output – No–Load Output)
1			
2			
3			
4			
5			
6			
7			
8			

FIGURE 3: WEIGHT DISTRIBUTION CHART: RECORD YOUR SYSTEM'S LOAD OUTPUT

Load Disc #	No–Load Output (mV)	Dead Weight Output (mV)	Output Change (mV) (Dead Weight Output – No–Load Output)
1	+3	+89	+86
2	+4	+87	+83
3	+2	+71	+69
4	–3	+86	+89

FIGURE 4: EXAMPLE OF DEAD WEIGHT OUTPUT AND OUTPUT CHANGE