

Load Disc LD3™/LD360s™ Installation Manual



◆ CAUTION

It is essential that all instructions in this manual be followed precisely to ensure proper operation of the equipment.



NOTICE

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CAUTION

Follow these rules if welding is done on the vessel after installation of the Load Disc. The electrical current of the welder may pass through the Load Disc, causing damage to the transducer and possibly to the signal processor. To avoid damage, follow these precautions:

1. Disconnect the Load Disc cables from the signal processor.
2. Ground the welder as close to the welding joint as possible. The welding ground must be between the Load Disc and the weld joint to prevent the welding current from going through the Load Disc to earth ground.

Note

High temperatures can damage the Load Disc. If you are welding in the vicinity of a Load Disc, monitor the temperature of the metal adjacent to the Load Disc. If it becomes too hot to touch, stop welding immediately and remove the Load Disc before continuing. Prior to reinstalling the Load Disc, verify that no damage has occurred by referring to the measurement procedures in Troubleshooting, Appendix C.

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Introduction

This chapter describes the organization, manual conventions, and provides specification information.

Welcome

This manual describes the installation of the Load Disc load cell and its various hardware options. It includes procedures for leveling and shimming of the vessel if it is necessary. 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.

Contact KM at 1-800-426-9010 if you have any questions regarding the installation. For outside the USA and Canada, call 864-574-2763.

About this manual

The chapters are organized in the following way:

Chapter 1:	Description of the Load Disc
Chapter 2:	Preparing the Load Disc for Installation
Chapter 3:	Mounting the Load Disc

Appendix A through D include contact info, system calibration, troubleshooting charts and technical drawings (TT's).

Manual Conventions

Three kinds of special explanations appear throughout the manual — *Warning*, *Caution* and *Note*. The format and significance of each is defined below:

 **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.

Specifications

	LD3	LD360s
Mechanical		
Compression	4 x Rated Load	4 x Rated Load
Tension	1 x Rated Load	1 x Rated Load
Shear	0.5 x Rated Load	0.5 x Rated Load
Functional Integrity	2 x Rated Load (compression)	2 x Rated Load (compression)
Electrical		
Excitation Voltage	10-14 VDC	10-14 VDC
Impedance	7.5K Ohms±1%	7.5K Ohms±1%
Maximum Current	3mA @ 12 VDC excitation	3mA @ 12 VDC excitation
Output (@ 12 VDC excitation)		
Non-Linearity/Hysteresis combined:	0.08% of standardized output	0.08% of standardized output
Return to Zero	0.05% of Rated Output	0.05% of Rated Output
Zero Balance	1% Rated Capacity	1% Rated Capacity
Rated Output (12 VDC excitation)	360 mV±1% (30mV/V nominal)	360 mV±1% (30mV/V nominal)
Environmental		
Temperature Range		
Standard Temperature Range	0° to 100°F (-18° to 38°C)	0° to 100°F (-18° to 38°C)
Mid Temperature Range	50° to 150°F (10° to 66°C)	50° to 150°F (10° to 66°C)
Temperature Sensitivity Change	±0.015% rated load per degree Fahrenheit over the compensated range, 0° to 100°F	±0.015% rated load per degree Fahrenheit over the compensated range, 0° to 100°
Temperature Zero Shift	0.006%/°F (0.011%/°C)	0.006%/°F (0.011%/°C)
Humidity	100%	100%
Storage Temp Range-Std and Mid Rating	-40° to 176° F (-40° to 80°C) NEMA -6P (include NEMA -4X and NEMA -6); hermetically sealed for high pressure caustic washdown and prolonged submergence in water. <i>(Cable must be installed and tightened to meet rating.)</i>	-40° to 176°F (-40° to 80°C) NEMA -6P (include NEMA -4X and NEMA -6); hermetically sealed for high pressure caustic washdown and prolonged submergence in water <i>(Cable must be installed and tightened to meet rating.)</i>
Physical		
Construction	17-4 PH 900 stainless steel	17-4 PH 900 stainless steel
Connection	Nickel plated brass body with a polyimide insert and neoprene Grommet. 22 AWG 3 conductor unshielded with PVC sheath (15' standard)	6P rated sealed 5-conductor 12mm male receptacle Turck Eurofast compatible
Shipping Weight	5.0 lbs (2.3 kg)	5.0 lbs (2.3 kg)

Chapter 1:

Description of the Load Disc

This chapter describes the Load Disc Compression Load Cell and its installation options.

Introduction



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

The Load Disc 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—NEMA-6P rated unit with watertight cable system and cable entry—makes the Load Disc ideal for use in high-pressure wash down and occasionally submerged environments.

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. The high output of the semiconductor sensor allows immunity to industrial electrical noise and longer "load cell to signal processor" runs.

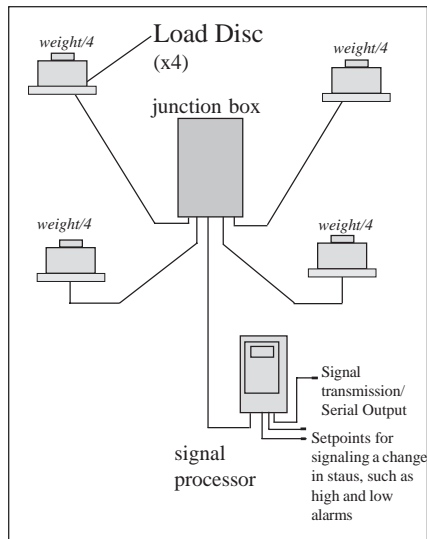


Figure 1-2:
General installation layout for Load Disc using a junction box.

General Description of Measurement System

The deflection of the Load Disc load cell by the vessel weight is measured by the semiconductor sensor, which is entirely sealed within the watertight cavity of the transducer. The sensor converts the deflection into an electrical signal which is directly proportional to the increase or decrease of the vessel contents. Material movement and changes in material repose will not affect the accuracy of the system. Accurate weight information is then sent to a signal processor for display, information transmission and storage (See Figure 1-2).

Applications Description

The watertight design of the Load Disc load cell makes it ideal for measuring bulk material in the sanitary and clean-in-place environments. It is particularly suitable for use on mixing and blending vessels, surge hoppers, and agitated vessels. Rugged, solid, bolt-in-place mounting assures vessel stability in outdoor storage vessels with gussets or legs used in all process industries.

Installation Option Descriptions

This section will briefly describe the following hardware options for the Load Disc:

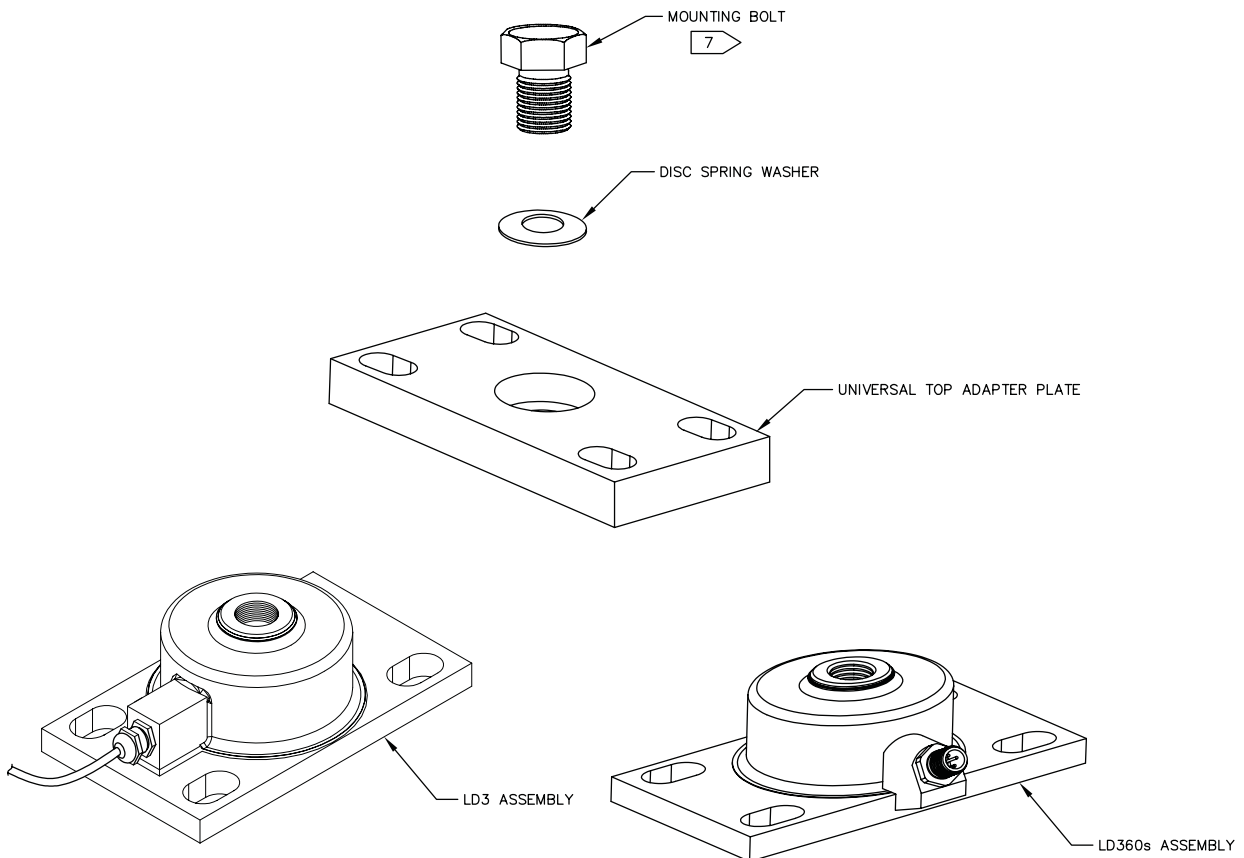
Universal Top Plate Adapter, Leveling Top Plate Adapter, Anyadapter Plate and Leveling Base Adapter Plate.

See Chapter 2 and 3 for more specific installation instructions and refer to the TI drawings located in Appendix D.

Universal Top Adapter Plate

This option consists of the **Universal Top Adapter Plate, spring washer** and a **hex head bolt**. The adapter plate attaches to the load disc with the bolt and washer. The adapter plate then bolts to a vessel gusset or a flat plate welded to the vessel leg, using customer-supplied hardware.

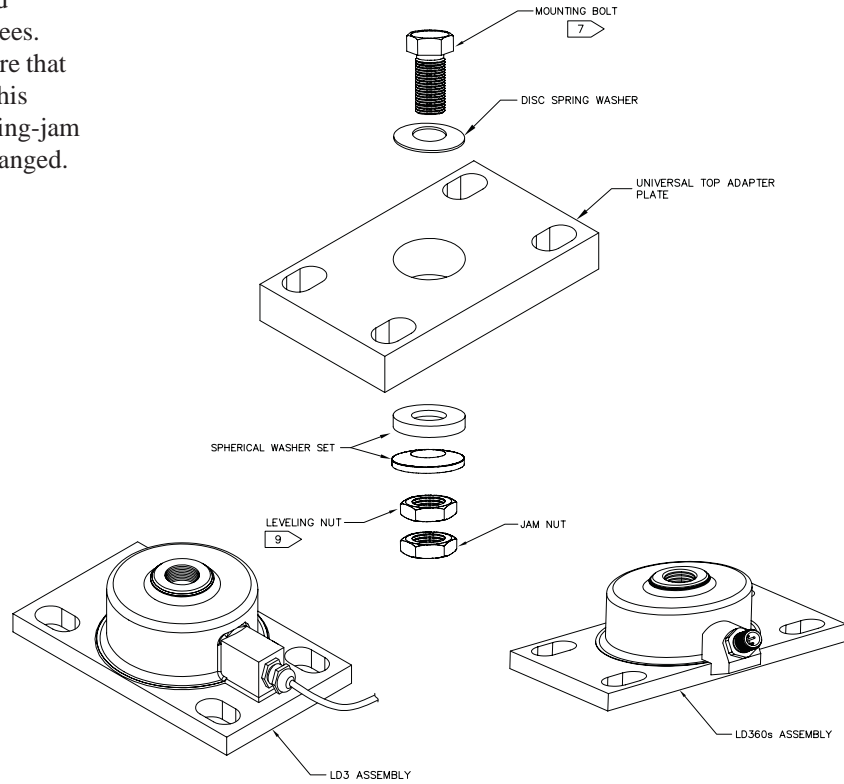
Note: Accommodates up to three degrees of tilt in the floor or vessel legs.



Leveling Top Plate Adapter (1,000 - 7,500 lb capacity ONLY)

This option consists of the **Universal Top Adapter Plate**, a **hex head bolt**, **spherical washer set** and **jam nuts**. The adapter plate attaches to the load disc with the hex bolt and hardware. The adapter plate then bolts to a vessel gusset or a flat plate welded to the vessel leg, using customer-supplied hardware.

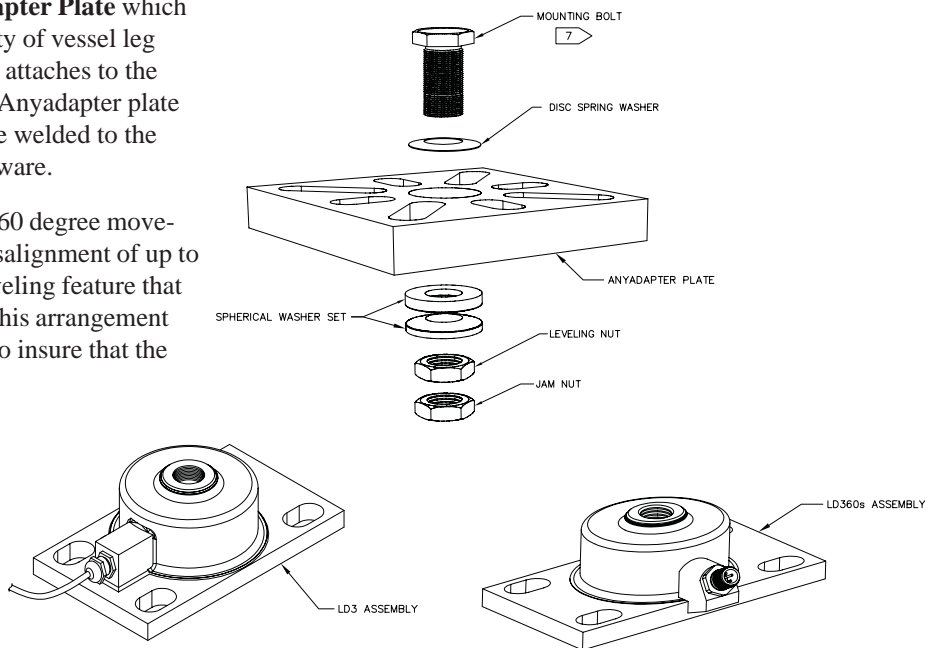
This hardware arrangement allows 360 degree movement of the top plate and angular misalignment of up to 3 degrees. Additionally, there is a leveling feature that allows vertical height adjustments. This arrangement also incorporates a locking-jam nut to insure the height remains unchanged.



Anyadapter Plate (1,000 - 7,500 lb capacity ONLY)


This option consists of the unique **Anyadapter Plate** which has a universal bolt pattern (to fit a variety of vessel leg flanges), and a **hex head bolt**. The plate attaches to the load disc with the bolt and washers. The Anyadapter plate then bolts to a vessel gusset or a flat plate welded to the vessel leg, using customer-supplied hardware.

This hardware arrangement allows 360 degree movement of the top plate and angular misalignment of up to 3 degrees. Additionally, there is a leveling feature that allows vertical height adjustments. This arrangement also incorporates a locking-jam nut to insure that the height remains unchanged.

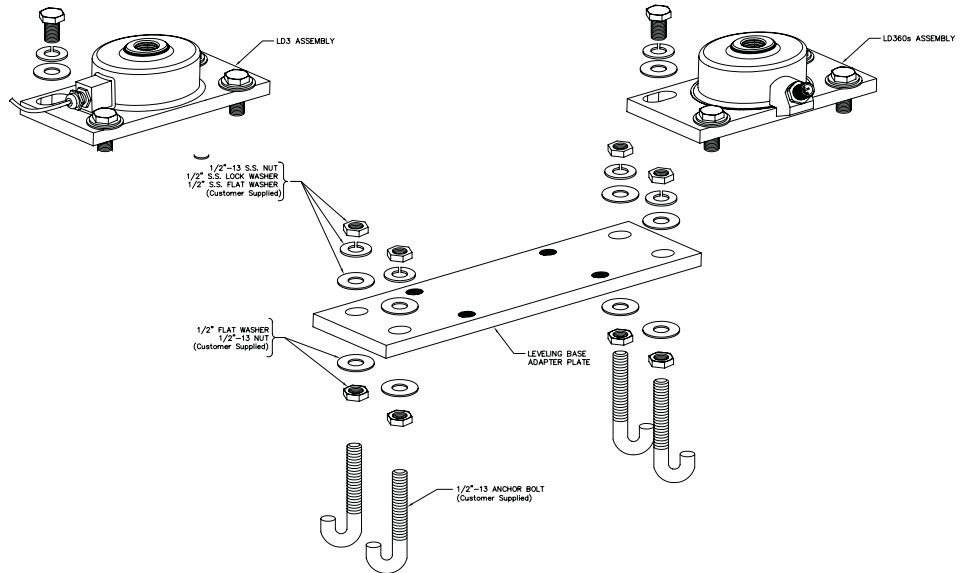


Leveling Base Adapter Plate

This kit consists of a **Leveling Base Adapter Plate** and **four hex bolts, flat washers, and lock washers**. The Load Disc bolts onto the leveling base adapter plate. This plate rests on four leveling nuts and washers screwed onto anchor bolts installed in the foundation. By turning the leveling nuts, the height of the load discs and thus the vessel, can be adjusted for proper load distribution.

 **Note:**
Adapter plate not shown in illustration at right.

This kit requires an adapter plate for proper installation.



Chapter 2:

Preparing for the Load Disc Installation

This chapter describes the pre-check procedures for the Load Disc. Checking the Load Discs before installation will ensure properly working equipment that will provide accurate monitoring of vessel contents.

Check Shipment


Perform the following prior to installing the Load Disc:

Check Load Disc Order Items

The following items are included with a typical order for each vessel (quantities dependent on application):

- Load Disc Load Cell
- Junction Boxes or Molded Junction Boxes
- Top or Bottom Hardware

If any items are needed, contact KM before proceeding. Substituting parts without KM approval may cause system problems and will void the warranty.

 **Note:**
A KM signal processor or a KM Test Meter are required to set up and install the system.

Visual Check

Visually inspect all equipment in the order — including Load Discs, junction boxes, and signal processors — to verify they have not been damaged during shipment. If any item has been damaged, contact KM for a replacement.

Prepare Installation Equipment (Customer Supplied)

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)*

KM Test Meter or signal processor

Shims (if applicable)

Grout (if applicable)

*Digital Multimeter (FLUKE™ or equivalent)
optional*

* See TI drawings in Appendix D for the appropriate bolt size.

Vessel Preparation

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

- An inadequate vessel foundation can 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 minimize this problem.
- Cross-connecting structures, such as catwalks and manifolds, can transfer loads from adjacent vessels. Install slip joint or flex couplings to minimize this problem.
- Shock loads can damage the Load Disc. Install protective barriers or stops to prevent vehicles from hitting the vessel supports.

Factors That Affect Performance

An independent, isolated vessel with no connection to any other 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 being caused by changes in the material weight.

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

- Catwalk
- Hidden load bearing members
- Vessel goes through roof
- Tripper conveyors or deck plating
- Rigid piping connection between vessel and another adjacent structure
- Poor Foundation
- Flexible Structure
- Uneven Loading

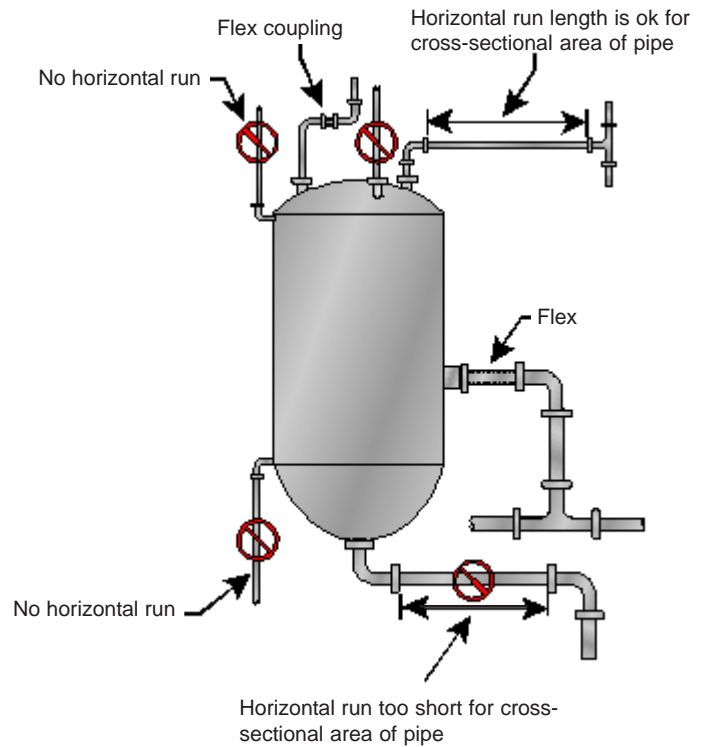


Figure 2-1:
Examples of typical causes of error.

Chapter 3: Mounting the Load Disc

This chapter describes installation and wiring of the Load Disc and junction boxes. Follow all instructions carefully to ensure proper operation of the system.

General Information

The Load Disc has a variety of mounting hardware options that accommodate almost all possible applications. These general requirements apply to all applications:

- Ensure the surfaces where the baseplates bolt down onto are clean, smooth, flat, and level, with less than 1° of slope in any direction.
- Ensure vessel legs/gussets are clean, smooth, flat, and level, with less than 1° of slope in any direction.
- Position Load Disc so the cable cannot be snagged or chafed and can be easily routed to the junction box.
- When raising the vessel for Load Disc installation, use proper support to prevent the vessel from tipping or falling.
- During installation, carefully distribute the load to ALL Load Discs evenly. **PLACING THE LOAD ON ANY ONE LOAD DISC MAY CAUSE DAMAGE.**
- Hardware and Bolts —
 1. All bolts and hardware to attach the Load Disc to the vessel and to the foundation are customer-supplied, ASTM A-325 or equivalent. (See TI drawings Appendix D)
 2. 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.
 3. All bolts are kept loose until shimming and leveling is complete.
- Securing Load Disc after Leveling/Shimming —

Once the weight distribution criteria has been satisfied (page 3-4) 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.

Load Disc General Installation

This section describes the Load Disc installation procedures for the following hardware options:

Universal Top Plate Adapter, Leveling Top Plate Adapter, Anyadapter Plate, and Leveling Base Adapter Plate.

1. Prior to installing the Load Discs, verify that they are the correct capacity for your application by reviewing the information engraved on the Load Disc baseplates.
2. If you have not already done so, connect the Load Disc cable to the KM Test Meter (See pg. C-1). Measure the Load Disc voltage output. With no-load, the preliminary measurement should be +5mV and -5mV. (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. Raise the vessel.
4. Remove the cable from the KM Test Meter to the Load Disc.
5. Place bolt through center hole of adapter plate and install hardware for your application (See Appendix D:TI Drawings)
 - a. For Universal Top Plate Adapter, install bolt and plate to the Load Disc, tightening bolt to 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 Load Disc, tightening bolt to 5-10 ft-lbs.
6. For Leveling and Anyadapter applications, adjust plate to lowest position by lowering jam nut to top of Load Disc and tighten. Then lower leveling nut to the jam nut.

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

★ **Anchor bolts supplied by customer.**

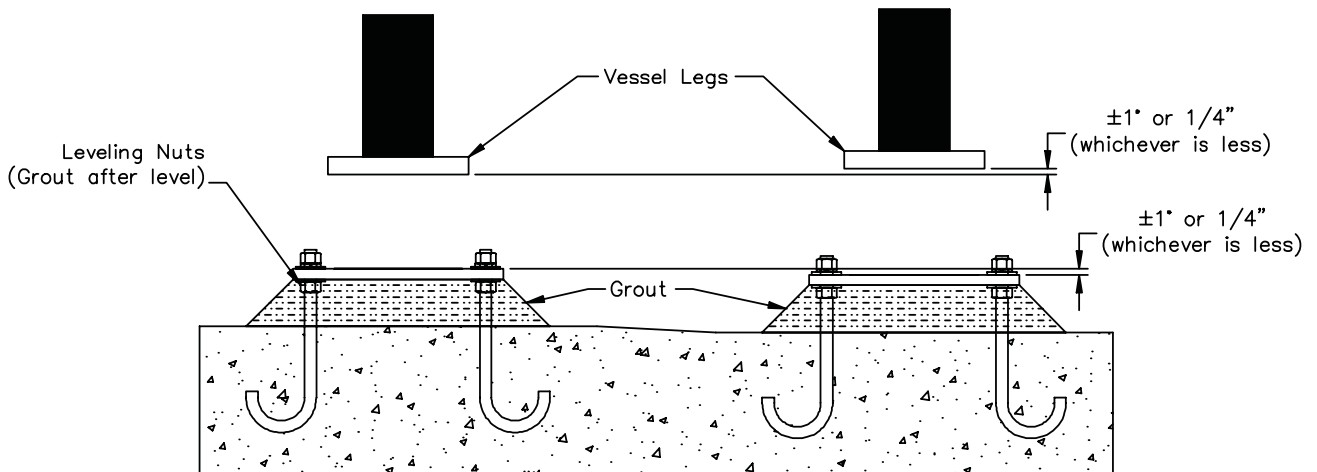


Figure 3-1: Angular misalignment

7. Inspect the foundation and vessel mounting surfaces that will mate to the Load Disc 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 D.)
 - b. Check the surfaces for flatness and angular misalignment. *A baseplate with leveling nuts is recommended.* (See Figure 3-1 below)

8. Mount the Load Disc assembly to the foundation. (See TI drawings, Appendix D)
 - a. Gently lower the Load Disc 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 positioning of the Load Discs.** (See Figure 3-2.)
 - c. Repeat Steps **8a** and **8b** for the remaining Load Discs.

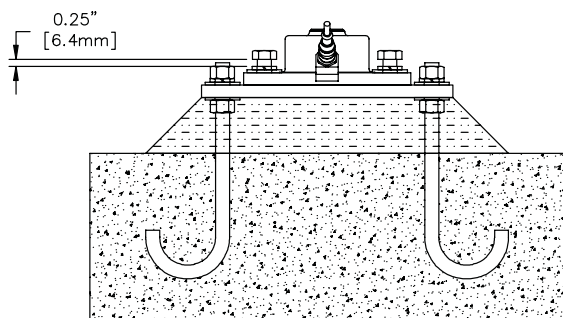
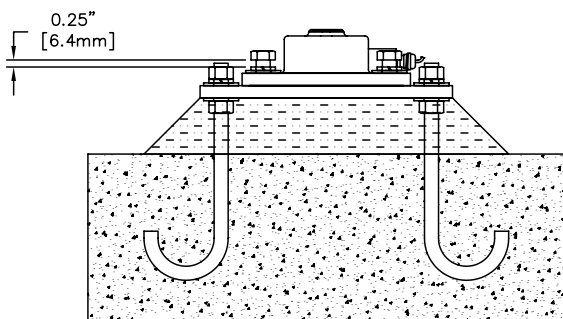


Figure 3-2: Leave 1/4-inch gap for positioning

9. Re-install the Load Disc cable and record the voltage output at “no- load” condition now that it is in position.
 - a. If not already done, connect the Load Disc cable to the KM Test Meter as seen in Figure C-1 Troubleshooting.
 - b. Turn on the power to the KM Test Meter and set the Simulate/Test switch to the Test position.
 - c. Record the no-load output into Figure 3-3 below or create your own similar table. See the example chart in Figure 3-5.
 - d. Assign a number (1, 2, 3, etc.) to the Load Disc and note it.
 - e. Repeat steps c and d for all the Load Discs.

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

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

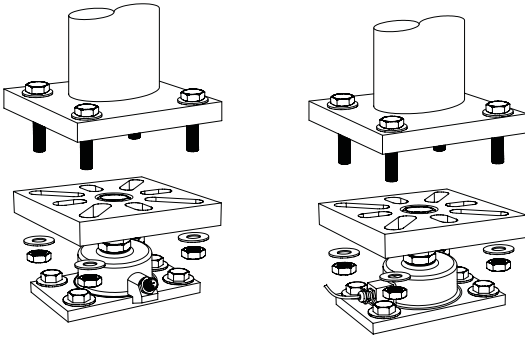


Figure 3-4: Lower vessel onto top plate.

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

★ **Note:** The example below is an ideal situation (load is centered). Offcenter 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 ten percent of the average output. Balance the support weight between each other making sure all legs carry a load.

Calculation Example:

$$\text{Average Output Change} = (86mV + 83mV + 69mV + 89mV) / 4 = 81.8mV$$

$$\text{Allowable range for Output Change} = \text{Average Output Change} \pm 10\% = 81.8mV \pm (.1 \times 81.8mV) = 73.6 \text{ to } 90.0 \text{ mV}$$

10. Mount the vessel to the Load Disc.
 - 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 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 3-2)
11. Check dead weight output.
 - a. Connect the Load Disc cable to the KM Test Meter, if not already done.
 - b. Record the dead weight output on your Weight Distribution Chart that was started on page 3-3. See the example below in Figure 3-5.
 - c. Calculate the Output Change. (Change should be positive.)
 - d. The output increase from no-load to dead weight can be within ten percent of the AVERAGE output increase. In the example below, 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.
 - e. Load disc #3 will require a shimming and/or leveling procedure which will distribute the weight more evenly over all of the supports. (See page 3-5, Leveling/Shimming)

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

Leveling and Shimming

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 Top Plate will accommodate angular misalignment up to three degrees maximum (Figure 3-6). Ideally, the load is distributed evenly across the top plate.

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 Load Disc Top Plate and mating vessel plate, but the gap condition may exist at either the top or bottom plates.

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

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.

Once the general instructions have been completed (page 3-2 through 3-4), begin the leveling and shimming instructions in this section.

Leveling/Shimming using Universal Top Adapter Plate (1,000 to 7,000 lb capacity ONLY)

1. Based on the Weight Distribution Chart (Figure 3-3) and visual inspection, raise the vessel and cut/place shims as required to adjust the distribution of weight on the Load Discs. *Begin with the "lowest output" support first!*
2. Gently lower the vessel and measure the dead weight output and the output change of all of the Load Discs to see how they are affected. Record again into the Weight Distribution Chart on page 3-3.
3. Repeat Steps 1 and 2 until you have achieved the desired output change of all of the Load Discs.

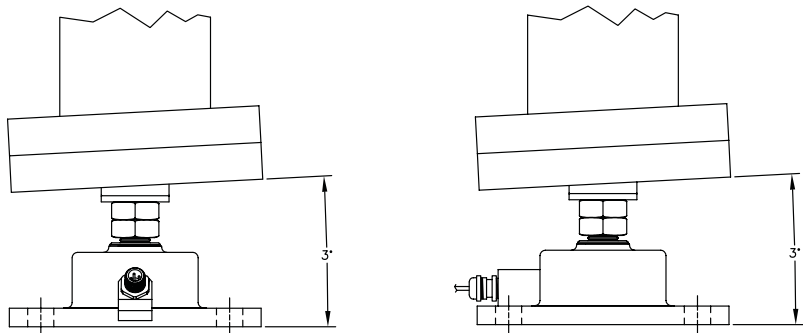




Figure 3-6: Angular misalignment up to 3 degrees.

Leveling/Shimming using Leveling Top Adapter Plate, Leveling Base Adapter Plate, and the Anyadapter Plate

1. Based on the Weight Distribution Chart and visual inspection, raise the leveling nut to adjust the top plate until the weight distribution falls within the weight distribution guidelines (See page 3-4). Check for gaps and use shims as required.
2. Gently lower the vessel and measure the dead weight output and the output change of all of the Load Discs to see how they are affected. (See Weight Distribution Chart page 3-3.)
3. Repeat Steps 1 and 2 until you have achieved the desired output change of all of the Load Discs.

 **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.**

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

Stainless Steel Junction Box Mounting and Wiring

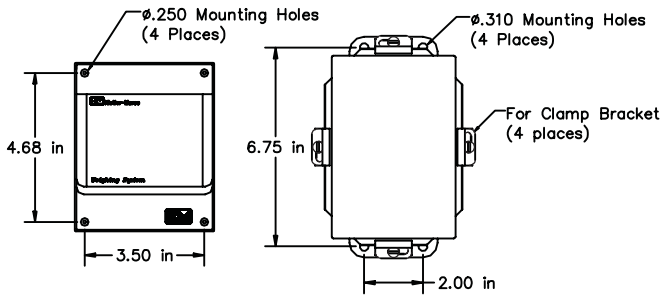


Figure 3-7: Plastic and Stainless Steel Junction Box Mounting

Mounting Junction Box

1. See Figure 3-7. 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 per your application. Tighten the screws until snug.

Wiring Load Discs to Junction Box

See Figure 3-8. The stainless steel junction box accommodates up to eight Load Discs, with up to two Load Disc wires at each terminal. Note that the junction box has no pre-cut holes for conduit or fittings. Follow this procedure:

1. Prepare junction box —
 - a. Remove the junction box cover.
 - b. Remove the terminal board from the junction box.
 - c. Carefully lay out the conduiting configuration — the Load Disc cables connect to the terminals on the left and the signal processor cable connects on the right. Several Load Disc cables may enter the box through the same conduit.
 - d. Cut the required fitting holes in the bottom and/or sides of the junction box.
 - e. Install liquid tight fittings.
 - f. Seal fittings with Sikaflex™ or electrical grade sealant.

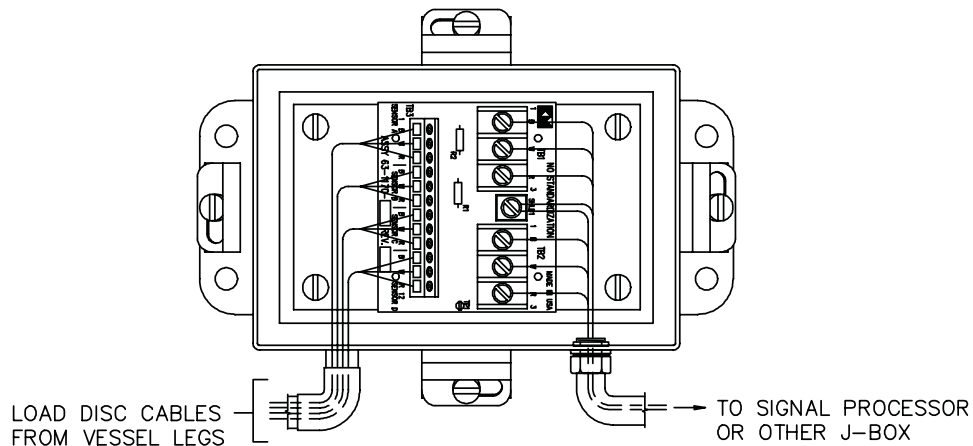



Figure 3-8: Wiring Load Discs to Stainless Steel Junction Box

2. Thread the Load Disc cable through the desired conduit fitting. (See Figure 3-8).
3. Estimate the required length of cable to the terminal strip, allowing a little extra for strain relief. Cut the excess cable.
4. Strip back 3” (76mm) of the cable sheathing to expose the three wires inside. Strip back 1/4” (6mm) of insulation from the end of each of the wires.
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. Perform Steps 2 through 5 for each Load Disc you wire to this junction box. Up to two Load Discs can be wired to each terminal.
7. Replace the junction box cover if not ready to begin wiring the junction boxes together.

 **Note: Ground the cable shield only at the signal processor.**

Wiring Junction Boxes Together and to Signal Processor

 **Notes:**

1. **The procedure below assumes the conduit fitting and conduit for wiring the junction box to the other junction boxes and to the signal processor has been installed.**
2. **Seal all conduit fittings against water entry. Install drain holes at conduit’s lowest elevation(s) to allow condensation to drain.**
3. **Use Belden™ 3-conductor shielded interconnect cable or equivalent to wire junction boxes together and to the signal processor. For lengths up to 1,000’ (305m) use 18-gage Belden™ 8791 cable. For lengths from 1,000’ to 2,000’ (305m to 610m) use 16-gage Belden™ 8618 cable.**
4. **When wiring cable to junction box terminals, strip back 3” (76mm) of cable sheathing to expose the three conductor wires and shield wire inside. Strip 1/4” (6mm) of insulation from the end of each of the conductor wires.**
5. **All spliced wiring routed between junction boxes and signal processor must be soldered and encapsulated in waterproof heatshrink.**

1. Remove the junction box cover.
2. See Figure 3-9. Route the 3-conductor cable through the fitting into the junction box farthest from the signal processor. Connect wires from the cable to the TB1/TB2 terminal in the junction box: **black wire to B, white wire to W, and brown or red wire to R.**
3. Route the cable through conduit to the next junction box. Estimate the required length of cable to the terminal strip, allowing a little extra for strain relief. Cut the excess cable. Connect wires from the cable to the TB1/TB2 terminal in the junction box: **black wire to B, white wire to W, and brown or red wire to R.**

CAUTION: Only use 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.

4. Route another 3-conductor cable through the fitting into this junction box, and attach wires to the TB1 TB2 terminal: **black wire to B, white wire to W, and brown or red wire to R.**
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. Refer to the signal processor manual for wiring the junction box to the signal processor. One vessel takes up one channel in the signal processor — the channel shows the average value from all the Load Discs under the vessel.

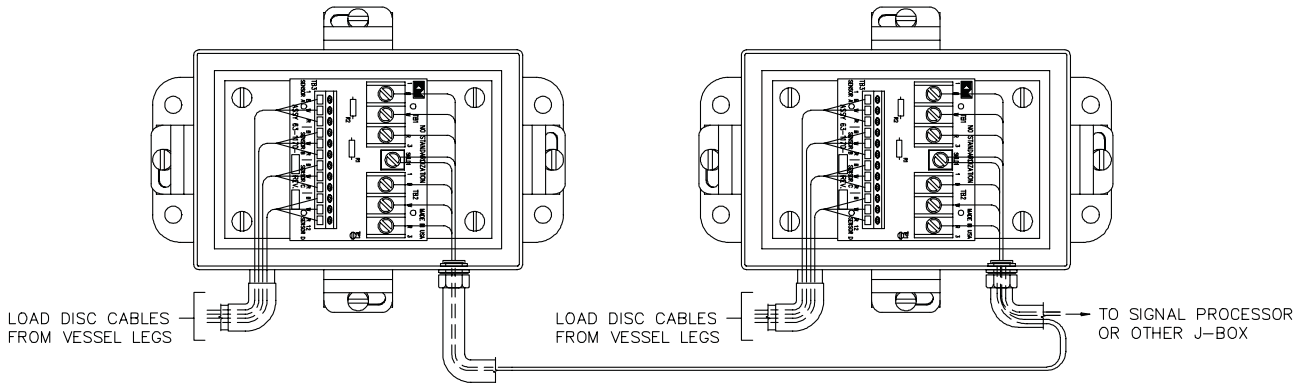


Figure 3-9: Wiring Stainless Steel Junction Boxes Together and to Signal Processor

Appendix A: Contact Information

Contact Information

You may reach Kistler-Morse headquarters at the following:

Mail: Kistler-Morse
150 Venture Boulevard
Spartanburg, SC 29306 USA

Telephone: 1-800-426-9010
(864) 574-2763

Fax: (864) 574-8063

E-mail: sales@kistlermorse.com

Website: <http://www.kistlermorse.com>

Technical Service

A complete, unabridged copy of our product warranty is available upon request from KM. A summary of the warranty, *subject to the terms and conditions listed fully in the warranty*, follows:

KM warrants the equipment to be free from defects in material and workmanship for two years from date of shipment to original user. KM will replace or repair, at our option, any part found to be defective. Buyer must return any part claimed defective to KM, transportation prepaid.

KM maintains a fully trained staff of field service personnel who are capable of providing you with complete product assistance.

Phone Consultation


Our Customer Service staff provides the following services by telephone, via our regular and toll free number (toll free in U.S.A. and Canada only):

- Technical, application, and troubleshooting assistance
- Spare parts assistance
- Warranty (replacement) assistance

On-Site Consultation

KM's Field Service staff can provide additional services at your request. Contact KM for rate and scheduling information for the following services:

- Technical, application, startup, and troubleshooting assistance on-site
- Training on-site or at our production facility
- Service calls
- Equipment updates to our latest configuration

 **Note: Load Disc installation, field wiring, conduit installation, and junction box and signal processor mounting must be performed by the customer. The AC power must be connected to the signal processor, but not energized, prior to KM beginning work.**

General descriptions of some of these standard services follow. Of course, if your service needs vary from those described, we are available to discuss them with you.

Installation, Startup Assistance, and On-Site Training

The system will be powered up and checked for proper electrical operation. For best results, KM requires moving a known amount of material, such as a truckload, for Live Load calibration. Live Load calibration will be performed if actual material or weight devices can be moved. If it is not possible to move material, a Manual calibration will be performed. Recommendations for the optimal performance of the system will be provided.

On-site training will include simulation of the Live Load calibration process (if Live Load calibration can not be performed while KM is on site) and instruction covering operation and maintenance of the system.

Troubleshooting

KM will troubleshoot systems for mechanical, electrical, calibration, and wiring errors. Normal component repairs will be made and wiring errors will be corrected, including replacement of non-repairable printed circuit boards. (To troubleshoot your own equipment, see Appendix C for Equipment Troubleshooting charts)

Service Calls

KM will perform on-site repair/replacement services.

Return Material Authorization

If a part needs to be sent to the factory for repair, contact KM and request a Return Material Authorization (RA) number. The RA number identifies the part and the owner and must be included with the part when it is shipped to the factory.

Appendix B: System Calibration for the Load Disc

This chapter describes general procedures for calibrating the Load Disc system.

Calibration Methods

Before calibrating, install a signal processor. Refer to the signal processor manual for the procedures to input calibration parameters.

There are two calibration methods:

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

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

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

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

Refer to the indicator manual(s) for detailed calibration instructions.

Appendix C: Troubleshooting the Load Disc System

This section describes an output check and some common problems. For each problem, one or more possible explanations are listed. For each explanation, suggested solutions are provided.

Note: The “no-load” condition is when the Load Disc stands alone without any weight applied.

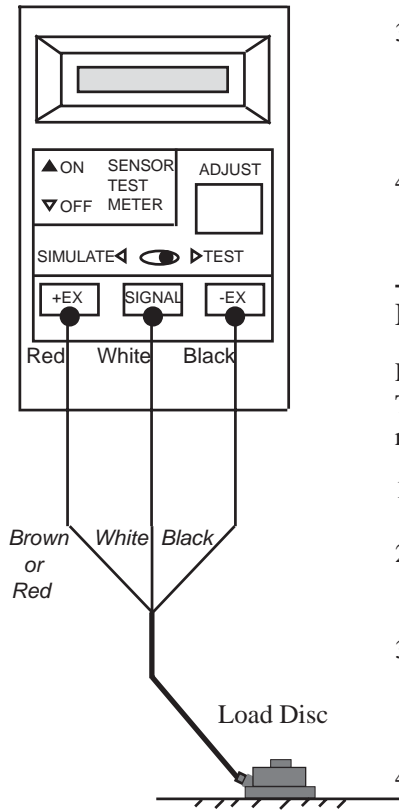


Figure C-1: Load Disc connection to the KM Test Meter.

Functional Check: Measuring Output

1. Connect the brown or red, white and black wires of the Load Disc to the corresponding Test Meter terminals, as shown in Figure C-1. Place the Load Disc on a stable surface.
2. Turn on the power to the Test Meter and set the Simulate/Test switch to the Test position.
3. Verify the *no-load* output is between + 5mV and -5mV. (This preliminary measurement specification simply determines the condition of the Load Disc. If the output reading is outside +/- 5mV, consult KM.)
4. Repeat Steps 2 and 3 for each Load Disc.

Functional Check: Measuring Resistance

Follow this procedure to test the Load Discs if you do not have a KM Test Meter or if the *no-load* output using the Test Meter was out of range for a Load Disc.

1. Set the ohmmeter resistance scale to accommodate a measured range up to 20K ohms.
2. Put one DMM lead on the Load Disc’s black wire and the other lead on the brown wire. Verify the brown-to-black resistance is between 4.0K ohms and 6.0K ohms.
3. Place the Load Disc on a stable surface. Put one DMM lead on the Load Disc’s white wire and the other lead on the brown wire. Verify the brown-to-white resistance is between 8.5K ohms and 9.0K ohms.
4. Put one DMM lead on the Load Disc’s white wire and the other lead on the black wire. Verify the black-to-white resistance is between 8.5K ohms and 9.0K ohms **and** within 40 ohms of the brown-to-white reading from Step 3.
5. Repeat Steps 2 through 4 for each Load Disc. If any reading is outside the above ranges, contact KM for assistance before proceeding with installation.

Problem	Problem Details	Solution
<p>Small Amplitude Changes or Erratic Fluctuations in display readings</p>	<p>Fluctuations can be caused by moisture in cable conduit, junction boxes, or PCBs.</p>	<p>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.</p> <p>CAUTION</p> <p><i>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.</i></p>
	<p>Fluctuations can be caused by damaged Load Disc.</p>	<p>Using Digital Multimeter (DMM), check resistance for individual Load Discs:</p> <ol style="list-style-type: none"> 1. Set meter resistance scale to accommodate measured range up to 20,000 ohms. 2. Remove one Load Disc's wires from junction box terminal. 3. Put one DMM lead on Load Disc's white wire and other lead on brown wire. Record resistance reading, and verify it is 8,750 ± 250 ohms and stable. If reading is outside this range, Load Disc is damaged and must be replaced. 4. Put one DMM lead on Load Disc's white wire and other lead on black wire. Record resistance reading, and verify it is 8,750 ± 250 ohms and stable. If reading is outside this range, Load Disc is damaged and must be replaced. 5. Verify readings from Steps 3 and 4 are within 400 ohms of each other. If not, Load Disc is damaged and must be replaced. 6. Repeat Steps 2 through 5 for each suspect Load Disc, until damaged Load Disc is located.

Problem	Problem Details	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.	<p>Using Digital Multimeter (DMM), check resistance for individual Load Discs:</p> <ol style="list-style-type: none"> 1. Set meter resistance scale to accommodate measured range up to 20,000 ohms. 2. Remove one Load Disc's wires from junction box terminal. 3. Put one DMM lead on Load Disc's white wire and other lead on brown wire. Record resistance reading, and verify it is 8,750 ± 250 ohms and stable. If reading is outside this range, Load Disc is damaged and must be replaced. 4. Put one DMM lead on Load Disc's white wire and other lead on black wire. Record resistance reading, and verify it is 8,750 ± 250 ohms and stable. If reading is outside this range, Load Disc is damaged and must be replaced. 5. Verify readings from Steps 3 and 4 are within 400 ohms of each other. If not, Load Disc is damaged and must be replaced. 6. Repeat Steps 2 through 5 for each suspect Load Disc, until damaged Load Disc is located.
	Sudden change in weight reading can be caused by problems with signal processor.	Check signal processor excitation voltage and incoming AC voltage for accuracy and stability (refer to signal processor manual).

Appendix D. Technical Drawings (TI)

This appendix contains the following technical drawings for the Load Disc:

Drawing No.	Drawing Title	
TI-LC.LD360s-(revC)	Installation Arrangements, 1K-25K, Load Disc 360s (14 Pages)	
	Installation Instructions	Page 1-4
	LD360s with Leveling Top Universal Adapter Plate	5
	LD360s with Universal Top Adapter Plate	6
	LD360s with Anyadapter Plate	7
	Mounting hole patterns for Anyadapter	8
	LD360s with Leveling Base Adapter Plate	9
	LD360s Mounting Dimensions	10
	LD360s Mounting to Floor and I-beam	11
	LD360s with Gusset Leg Attachment on I-Beam	12
	LD360s Cabling using Molded Junction Conn, J-Box	13
	LD360s Conduit/Non-conduit Cable Layout	14
RF-LC.LD360s-(revA)	Retrofit TI-DWG, 1K-25K, Load Disc 360s (1 Page)	
	LD360s/UA360 Retrofit from LDII/UA1	1
TI-LD360s-01(revB)	LD360s Typical Cabling Diagram (1 Page)	1
TI-LD360s-FM-01	FM Approved Installation Drawings (3 Pages)	1-3
TI-LC.LD3-(revA)	Installation Arrangements, 1K-25K, LD3 (14 Pages)	
	Installation Instructions	Page 1-4
	LD3 with Leveling Top Universal Adapter Plate	5
	LD3 with Universal Top Adapter Plate	6
	LD3 with Anyadapter Plate	7
	Mounting hole patterns for Anyadapter	8
	LD3 with Leveling Base Adapter Plate	9
	LD3 Mounting Dimensions	10
	LD3 Mounting to Floor and I-beam	11
	LD3 with Gusset Leg Attachment on I-Beam	12
	LD3 Cabling using Molded Junction Conn, J-Box	13
	LD3 Conduit/Non-conduit Cable Layout	14
RF-LC.LD3-(revA)	Retrofit TI-DWG, 1K-25K, LD3 (1 Page)	1
TI-LC.LD3&LD360-01	Load Block to Load Disc Retrofit Installing (1 Page)	1

INSTALLATION INSTRUCTIONS FOR THE LD360s:
(See Installation manual KM #97-1137-01 for Details)

Hardware Options

The following hardware options and their installation will be described:

- Universal Top Adapter Plate (UA360)
- Leveling Top Plate Adapter (LT360) (1Klb-7.5Klb Systems only)
- Anyadapter Plate (AD360) (1Klb-7.5Klb Systems only)
- 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. 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 LD360s, verify that they are the correct capacity for your application by reviewing the information engraved on the LD360s baseplates.
2. Connect the LD360s's cable to the KM Test Meter. Measure the LD360s voltage output. With no load on the LD360s, the KM Test Meter should read between the preliminary measurements of +5mV and -5mV. (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. Remove the cable from the KM test meter to the LD360s.

4. Place bolt through center hole of adapter plate and install hardware for your application:
 - a. Universal Adapter, install bolt and plate to LD360s, 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 LD360s, tighten bolt to 5-10 FT-LBS maximum.

5. For Leveling Top and Anyadapter applications, adjust plate to lowest position by lowering jam nut to top of LD360s and tighten. Then lower leveling nut to the jam nut.
6. Raise the vessel.
7. Inspect the foundation and vessel mounting surfaces that will mate to the LD360s plates.
 - a. Check the mounting hole locations 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).
8. Mount the LD360s assembly to the foundation.
 - a. Gently lower the LD360s 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 g and b for remaining Load Discs.

9. Re-install the LD360s cable and record the voltage output of the LD360s at "no-load" condition now that it is in position.
 - a. If not already done, connect the LD360s cable to the KM Test Meter.
 - b. Record the no-load output into Figure 3: Weight Distribution Chart or create your own similar table. See the example chart in Figure 4.
 - c. Assign a number (1,2,3, etc.) to the LD360s and note it.
 - d. Repeat steps g and d for all the LD360s.

10. Mount the vessel to the LD360s'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.

REVISIONS

LT#	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE
A	PER ECO 4830, 4855, 4861	BWC	JT	TS	3/22/02
B	PER ECO 4896	BWC	TS	TS	9/30/02
C	PER ECO 4958	BWC	TS	TS	1/23/03
D	on page 3 Deleted Note 5 (omnialide) Revised Note 6 to remove omnialide	ECN	SE	JD	2-14-06

- 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).

11. Check dead weight output.
 - a. Connect the Load Disc cable to the KM Test Meter, if not already done.
 - b. Record the dead weight output on your Weight Distribution Chart that was started in step 9c. See the example chart in Figure 4.
 - c. Calculate the Output Change. (Change should be positive).
 - 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.

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

Calculation Example: (See Fig. 4)
Average Output Change =
 $(96mV + 83mV + 69mV + 89mV) / 4 = 81.8mV$

Allowable range for Output Change =
Average Output Change \pm 10% =
 $81.8mV \pm (.1 \times 81.8mV) = 73.6$ to $90.0mV$

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.



FILE	TI-LC.LD360s-01	REF	KM
UNSPECIFIED TOLERANCES DECIMALS: .001		MATERIAL	Noted
FINISH			

SCALE	NONE
SIZE	B
SHEET	1
of	14
TITLE	INSTALLATION ARRANGEMENTS 1K-25K, LOAD DISC 360s
PART	TI-LC.LD360s-01

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 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 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 LD360s 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 1 and 2 until you have achieved the desired output change of all of the Load Discs.
4. **Securing LD360s 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 LD360s Top Hardware and mating vessel plate, but the gap condition may exist at either the top or bottom plates.

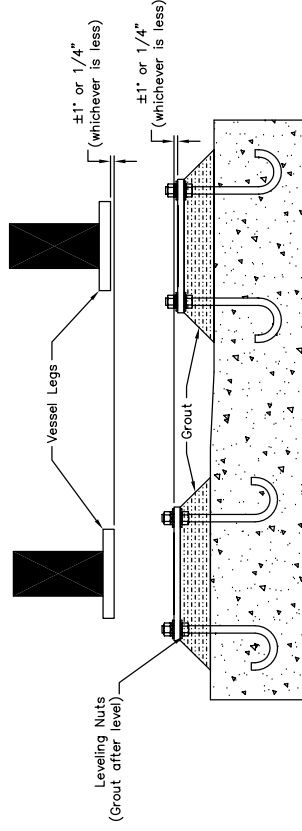


FIGURE 1: ANGULAR MISALIGNMENT

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

Anchor bolts supplied by customer.

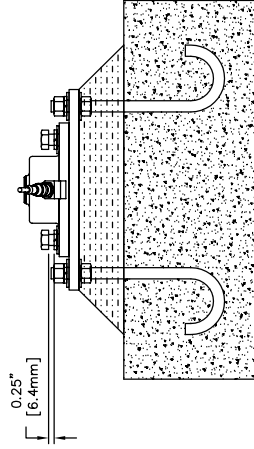


FIGURE 2: LEAVE 1/4" GAP FOR POSITIONING

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 when Load Disc 360s is to be installed.
- 2 The maximum available thread depth for the 3/4"-16 bolt on LD360s top is .55" [14.0mm].
- 3 For 1Klb-25Klb Load Disc 360s transducers, KM recommends using 1/2"-13 [1.3mm] 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 360s.
- 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 tees 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 RIV 736 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 tighten 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

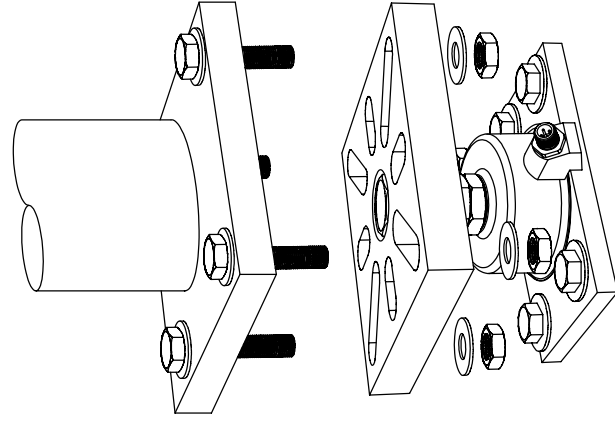


FIGURE 5: LOWER VESSEL
 ONTO TOP PLATE
 1Klb-7.5Klb SYSTEMS ONLY

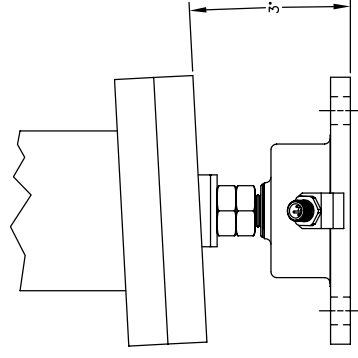


FIGURE 6: ANGULAR MISALIGNMENT
 UP TO 3 DEGREES
 1Klb-7.5Klb SYSTEMS ONLY

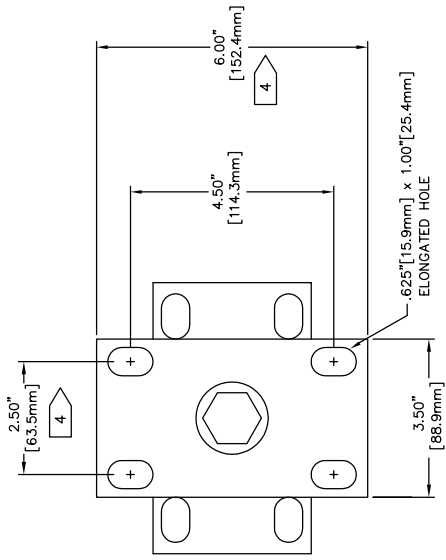


TABLE A

CAPACITY	HEIGHT
1K-7.5K	4.219" [107.2mm]
	MAXIMUM ADJUSTABLE HEIGHT
	4.094" [104mm]
	MINIMUM ADJUSTABLE HEIGHT

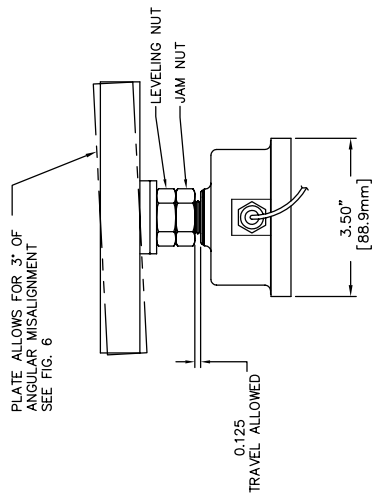
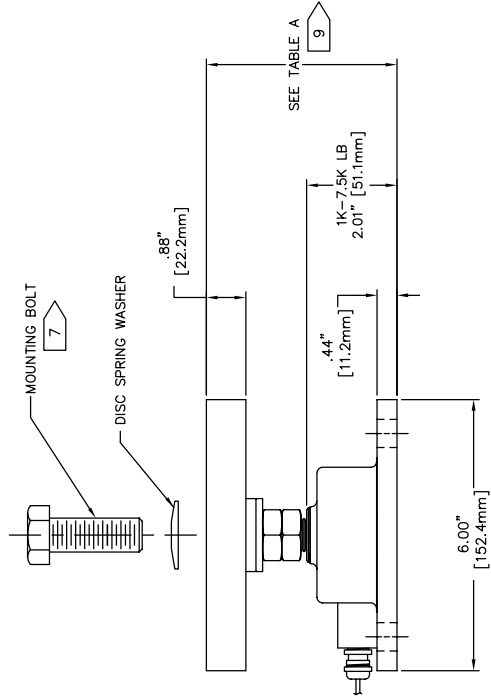
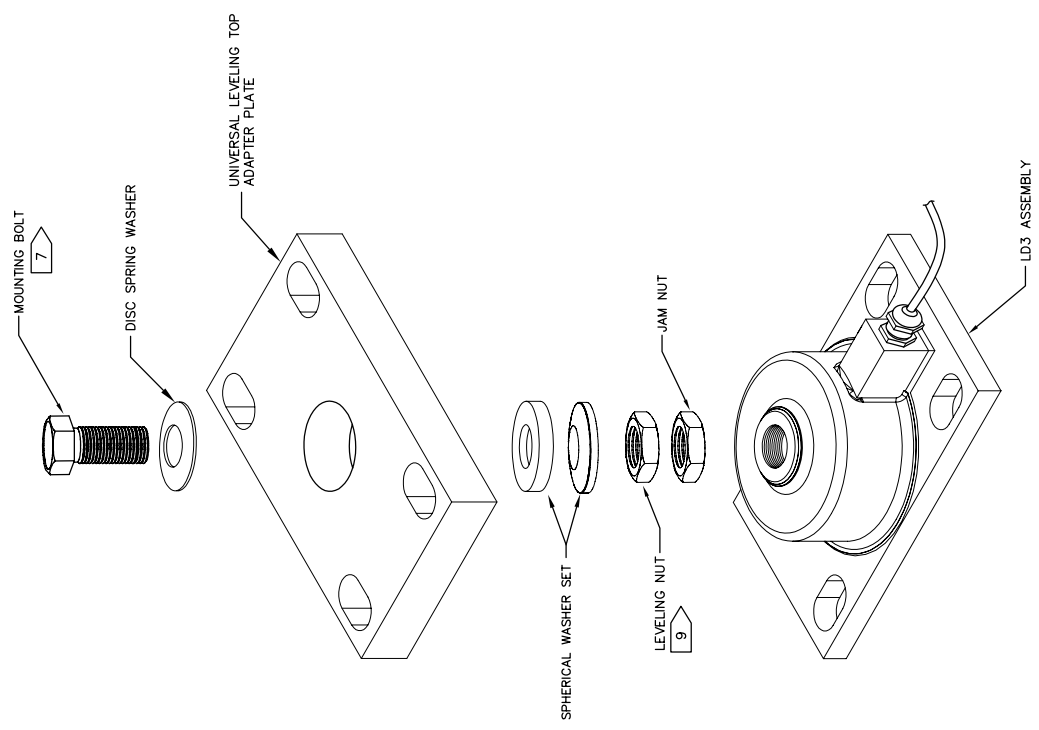
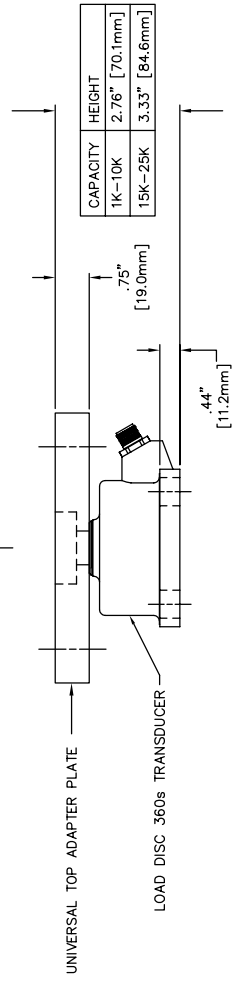
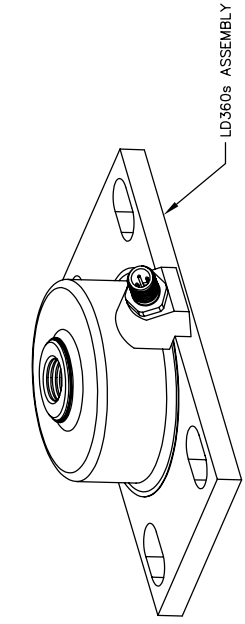
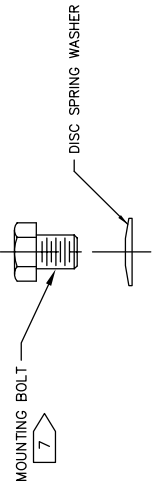
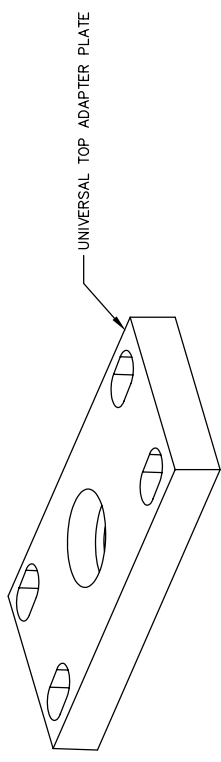
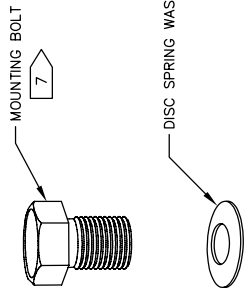
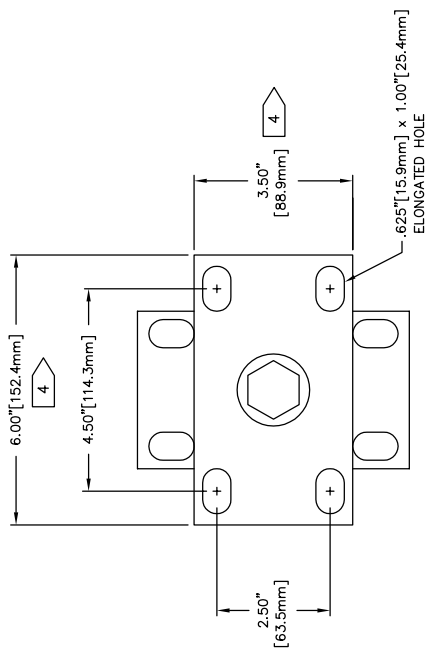


PLATE ALLOWS FOR .3" OF ANGULAR MISALIGNMENT SEE FIG. 6

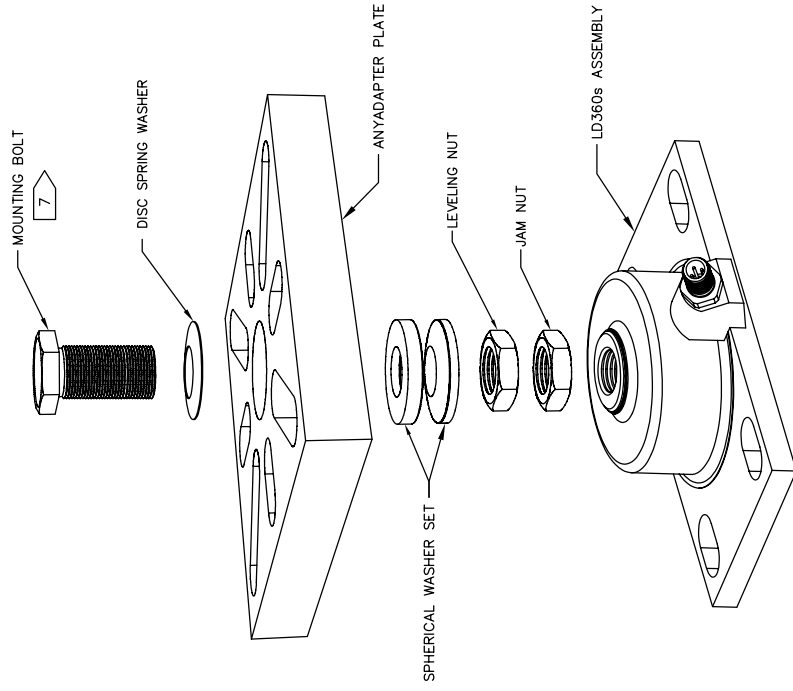
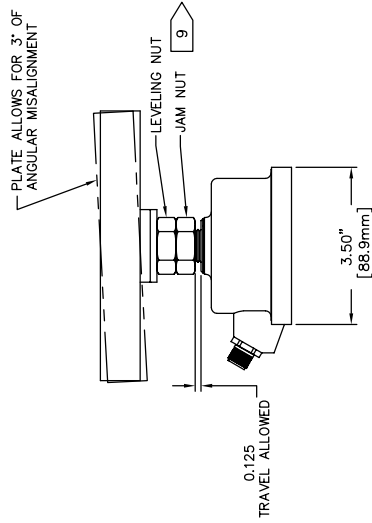
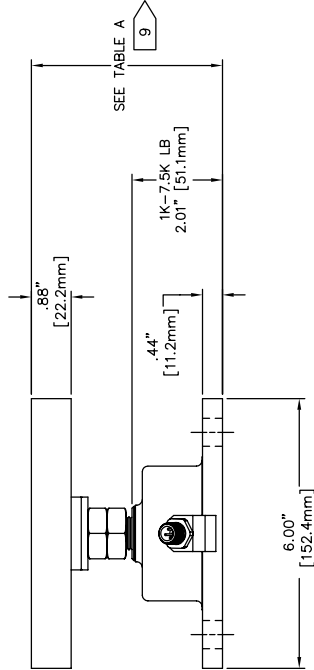
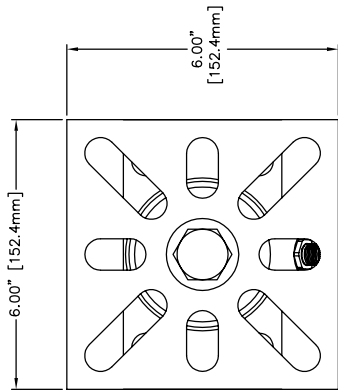
1Kib-7.5Kib LOAD DISC LD3 TRANSDUCER WITH LEVELING TOP UNIVERSAL ADAPTER PLATE MOUNTING DIMENSIONS



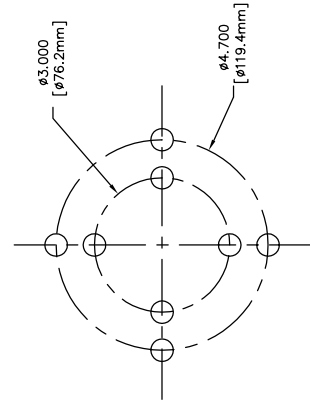
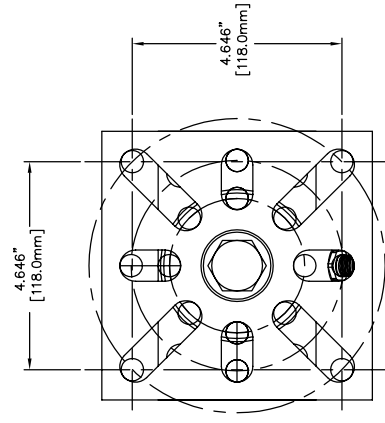
1Klb-25Klb LOAD DISC 360s TRANSDUCER
WITH UNIVERSAL TOP ADAPTER PLATE (UA360)
MOUNTING DIMENSIONS

TABLE A

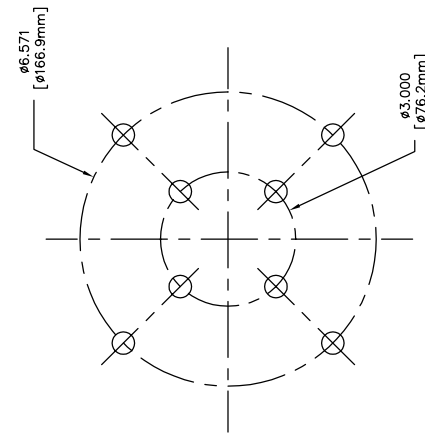
CAPACITY	HEIGHT
1K-10K	4.218" [107.2mm]
	MAXIMUM ADJUSTABLE HEIGHT
	4.094" [104mm]
	MINIMUM ADJUSTABLE HEIGHT



1Klb-7.5Klb LOAD DISC 360s TRANSDUCER
WITH ANYADAPTER TOP ADAPTER PLATE (AD360)
MOUNTING DIMENSIONS

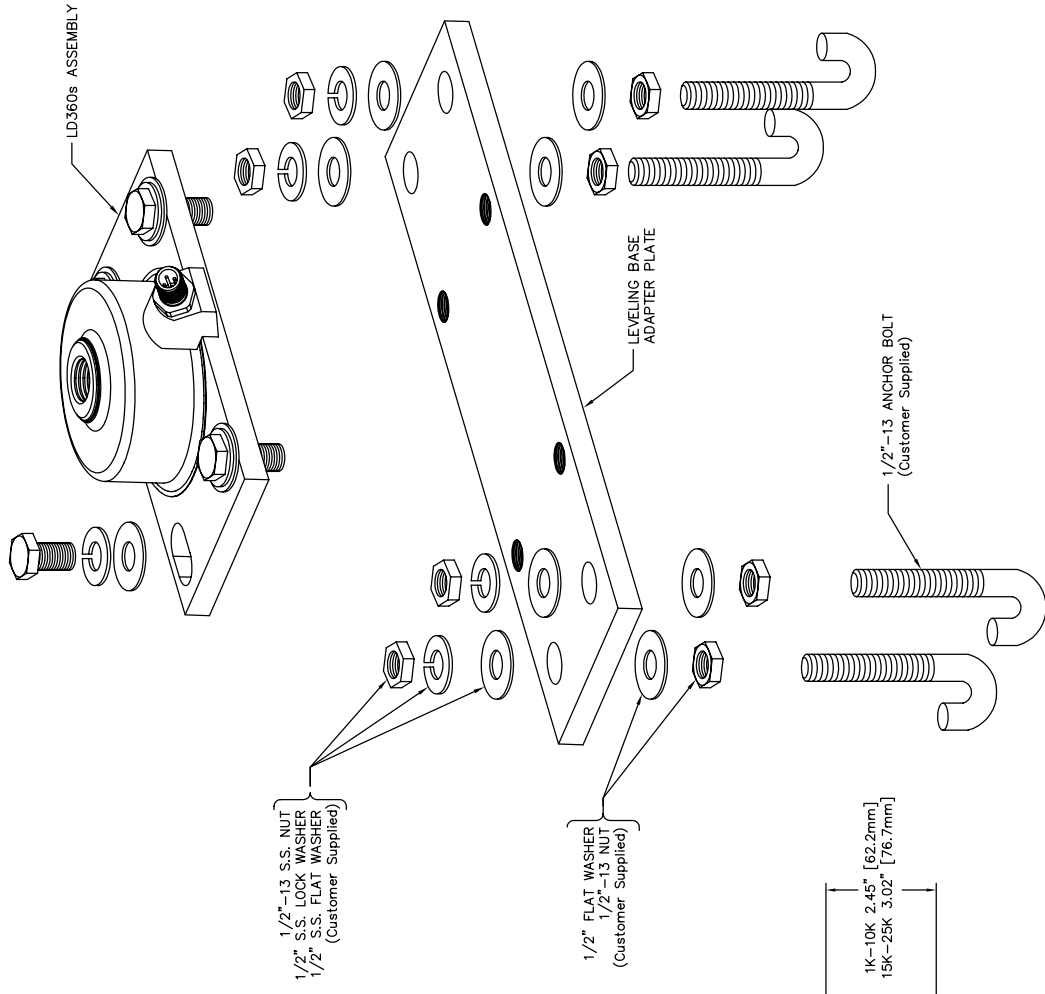


MINIMUM/MAXIMUM BOLT PATTERN
FOR HORIZONTAL/VERTICAL SLOTS



MINIMUM/MAXIMUM BOLT PATTERN
FOR ANGLED SLOTS

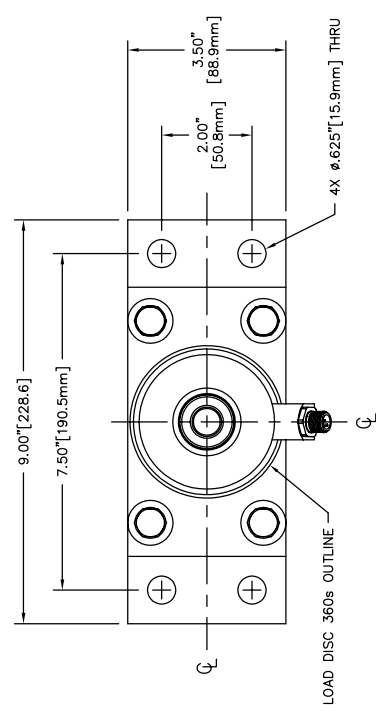
VESSEL MOUNTING HOLE PATTERNS
FOR ANY ADAPTER TOP ADAPTER PLATE (AD360)
(MINIMUM (4) 1/2" HEX HEAD BOLTS REQUIRED)



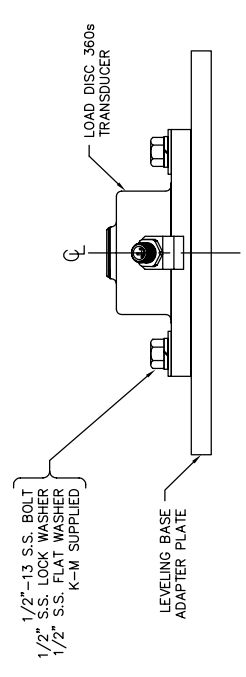
1/2"-13 S.S. NUT
 1/2" S.S. LOCK WASHER
 1/2" S.S. FLAT WASHER
 (Customer Supplied)

1/2" FLAT WASHER
 1/2"-13 NUT
 (Customer Supplied)

1K-10K 2.45" [62.2mm]
 15K-25K 3.02" [76.7mm]



LOAD DISC 360s OUTLINE
 4X ϕ 6.25" [15.9mm] THRU

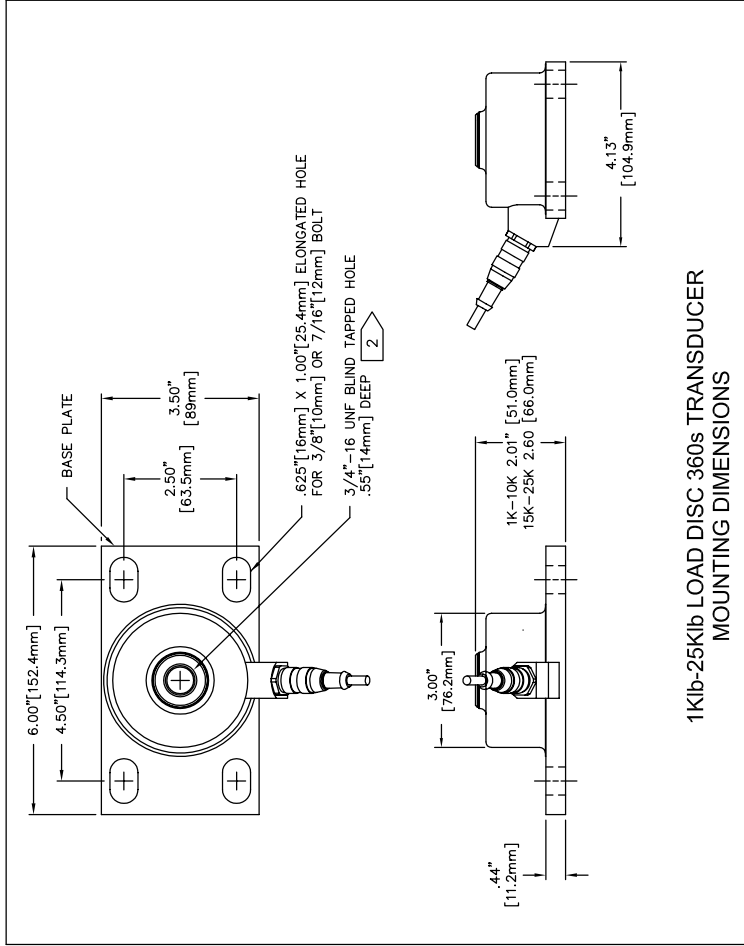


1/2"-13 S.S. BOLT
 1/2" S.S. LOCK WASHER
 1/2" S.S. FLAT WASHER
 K-M SUPPLIED

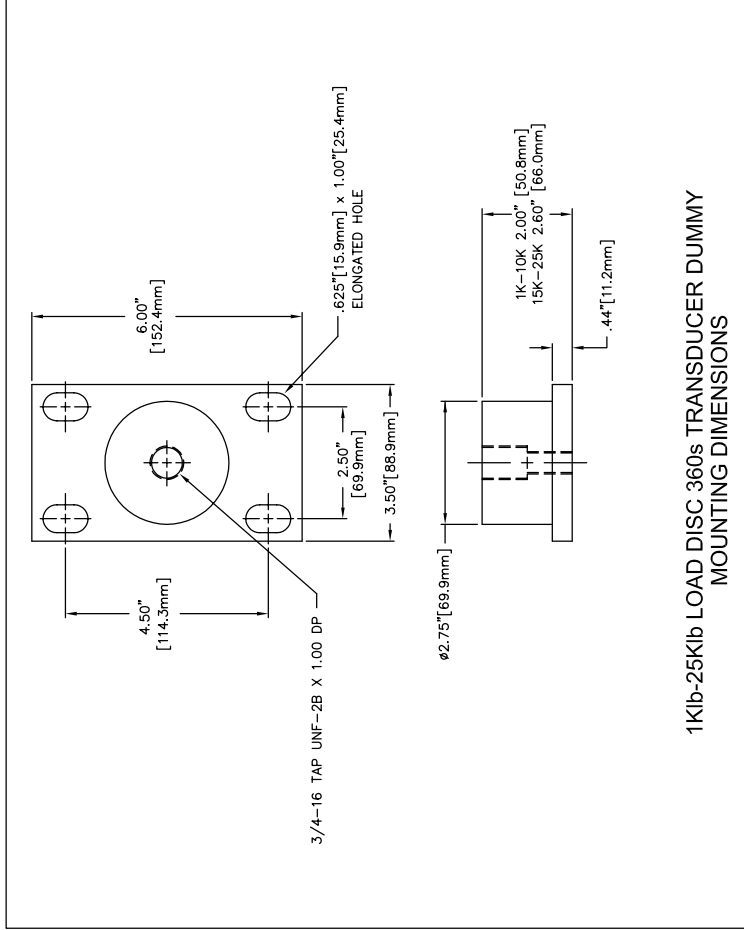
LOAD DISC 360s
 TRANSDUCER

LEVELING BASE
 ADAPTER PLATE

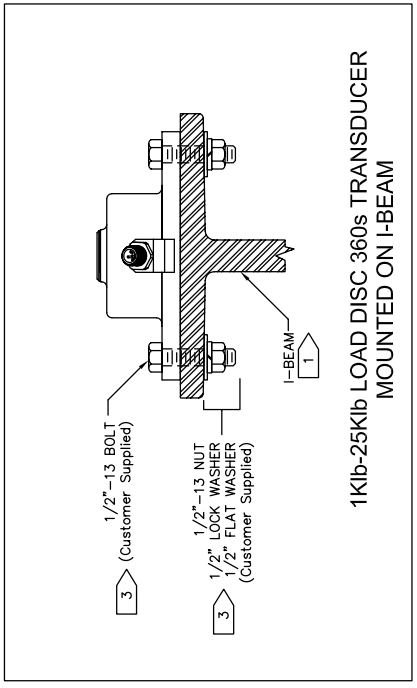
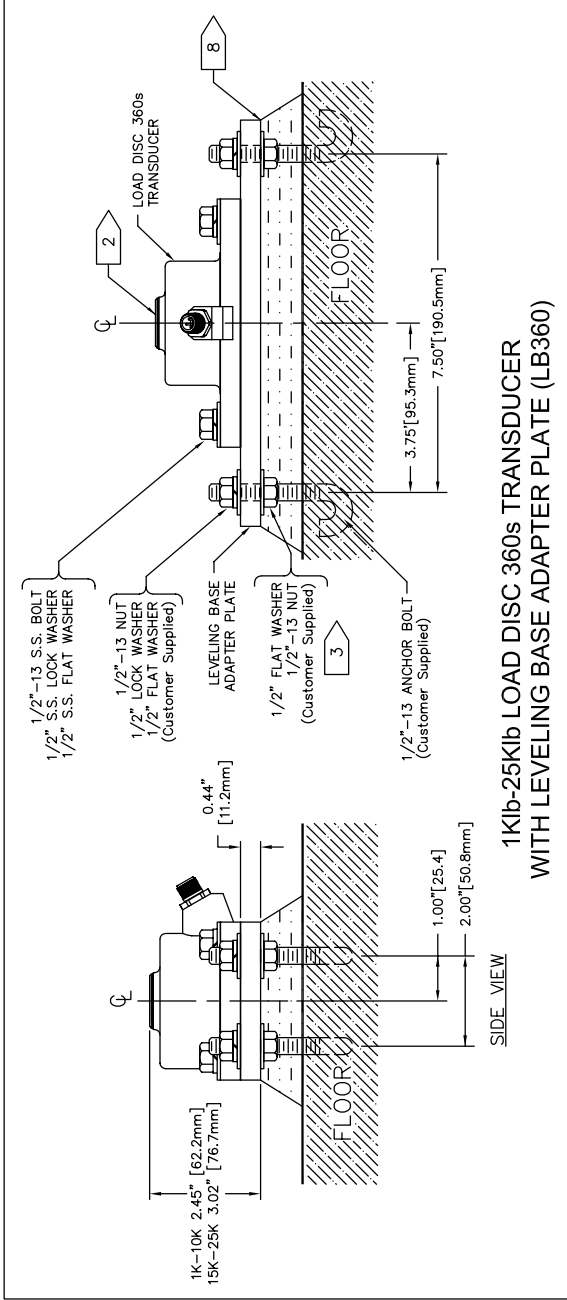
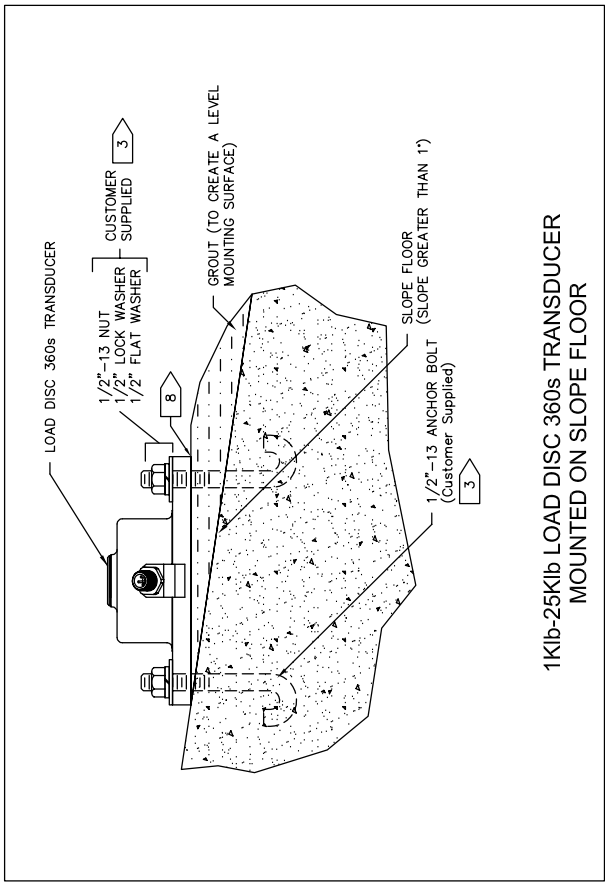
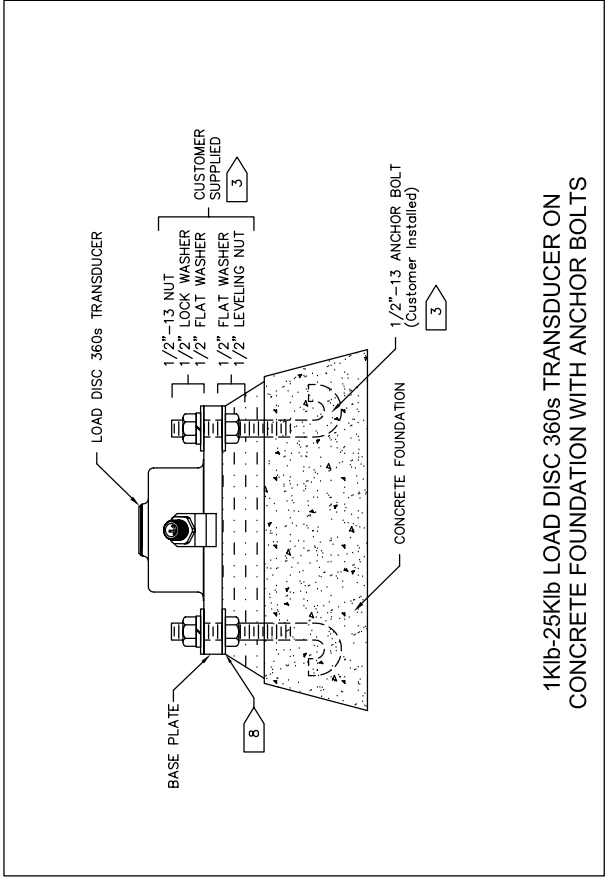
1Klb-25Klb LOAD DISC 360s TRANSDUCER
 WITH LEVELING BASE ADAPTER PLATE (LB360)
 MOUNTING DIMENSIONS

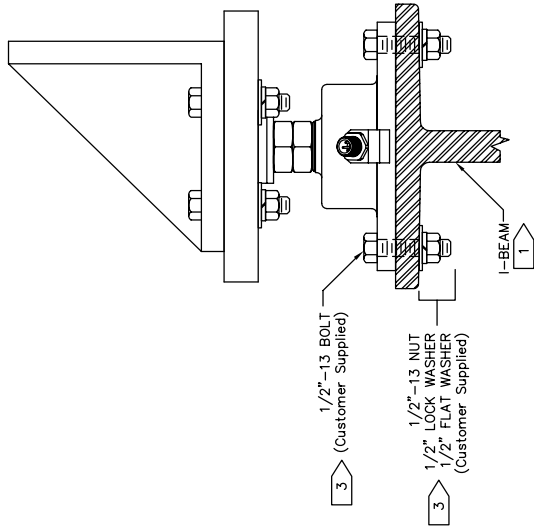


1Klb-25Klb LOAD DISC 360s TRANSDUCER MOUNTING DIMENSIONS

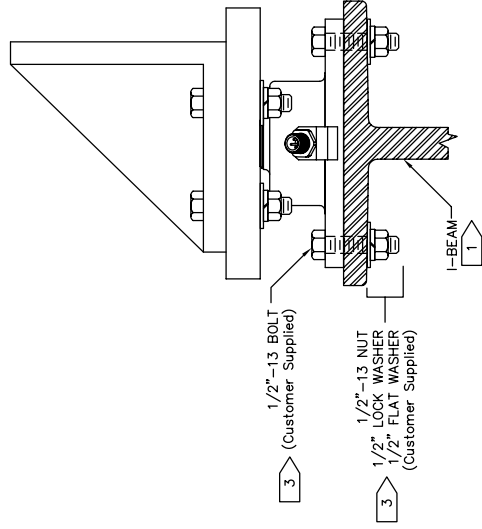


1Klb-25Klb LOAD DISC 360s TRANSDUCER DUMMY MOUNTING DIMENSIONS

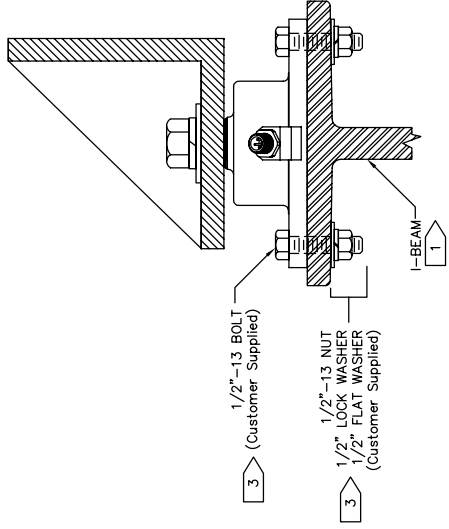




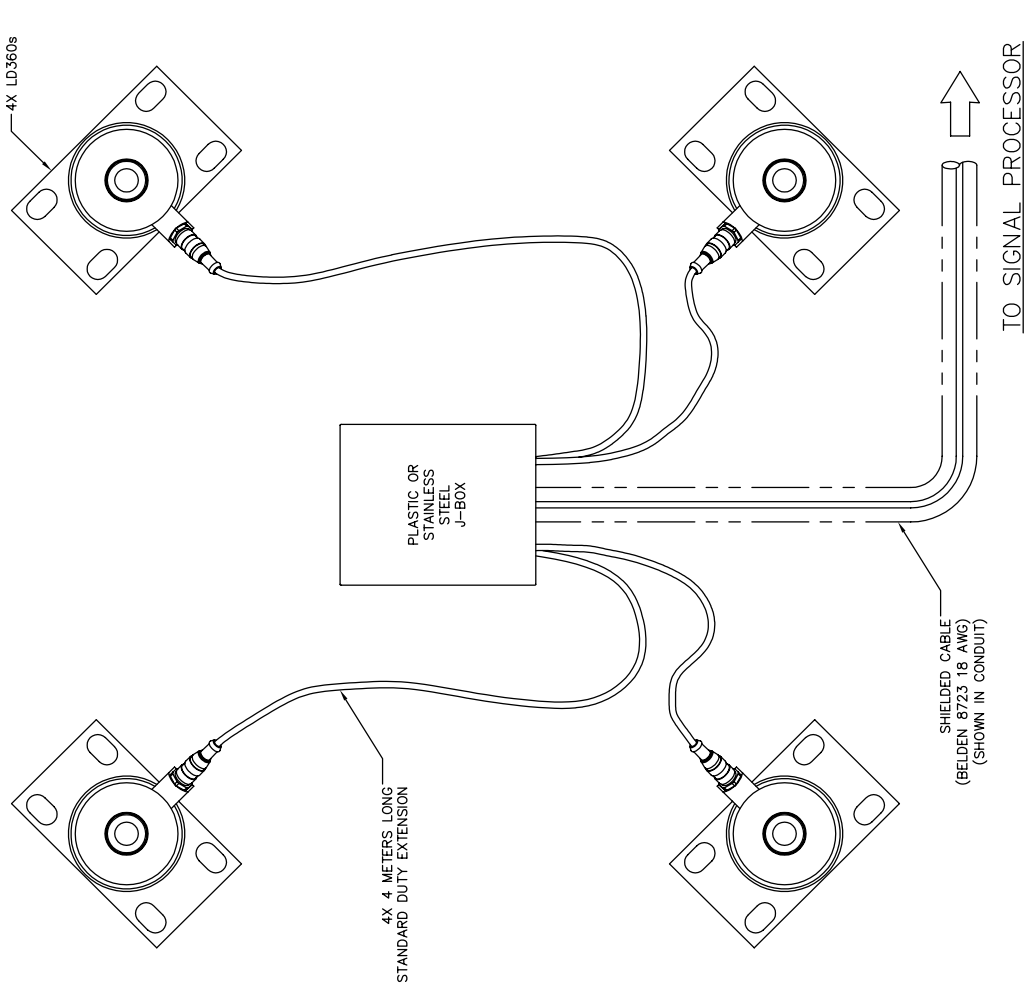
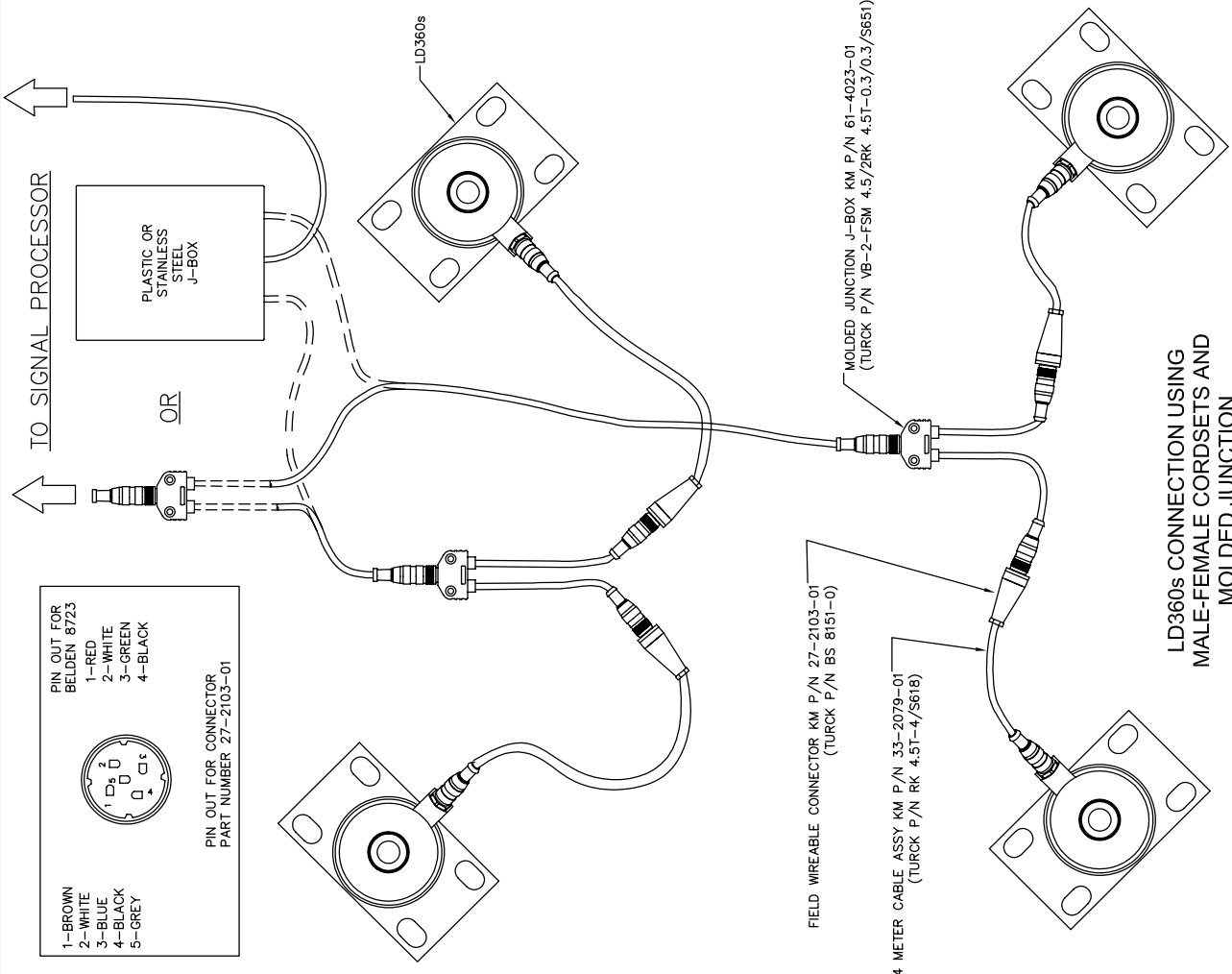
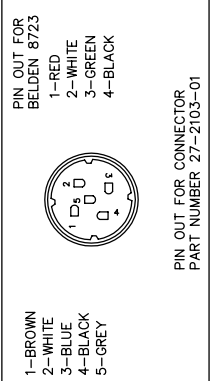
1Klb-7.5Klb LOAD DISC 360s TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.
LT360

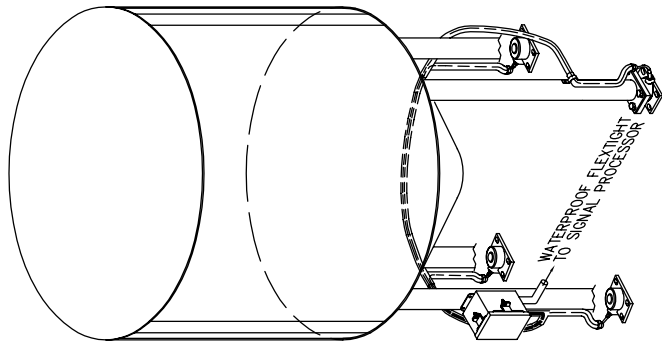


1Klb-25Klb LOAD DISC 360s TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.

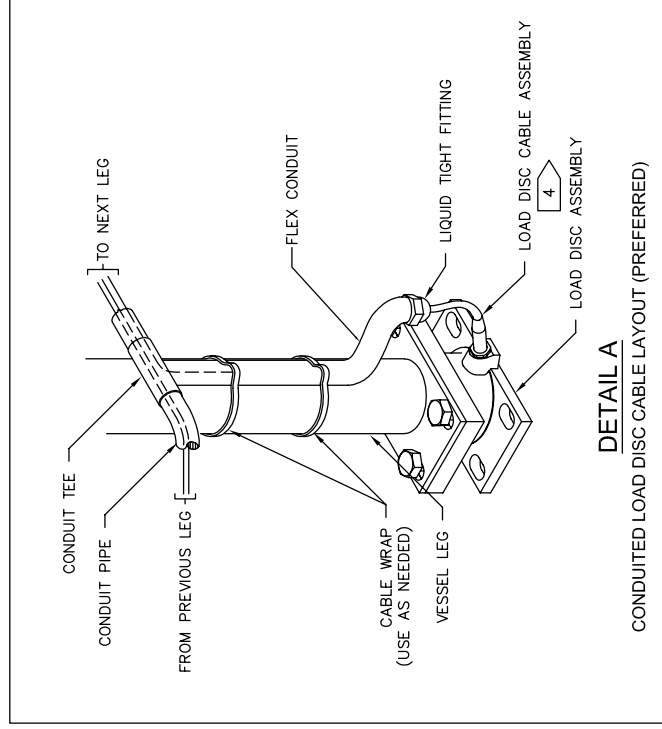


1Klb-25Klb LOAD DISC 360s TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.



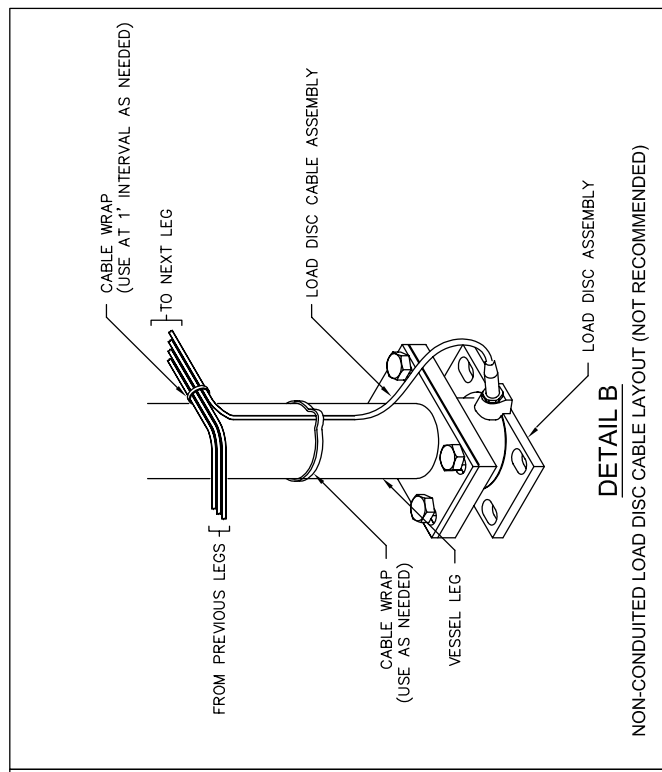


TYPICAL LOAD DISCS CABLE ROUTING ON VESSEL LEGS
 (SEE DETAILS A & B FOR TYPICAL CONDUITED AND
 NON-CONDUITED LOAD DISC CABLE LAYOUT ASSISTANCE)



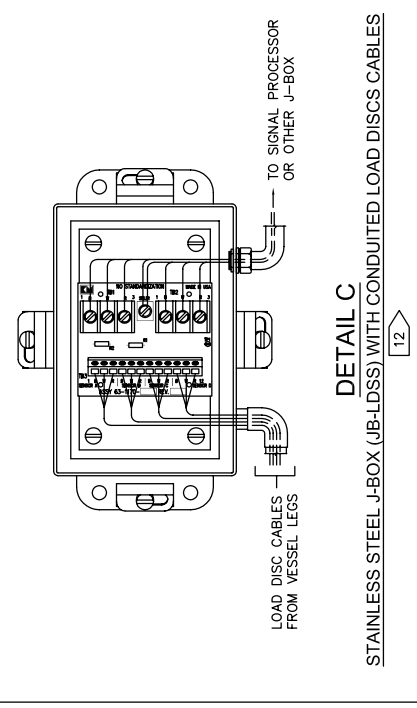
DETAIL A

CONDUITED LOAD DISC CABLE LAYOUT (PREFERRED)



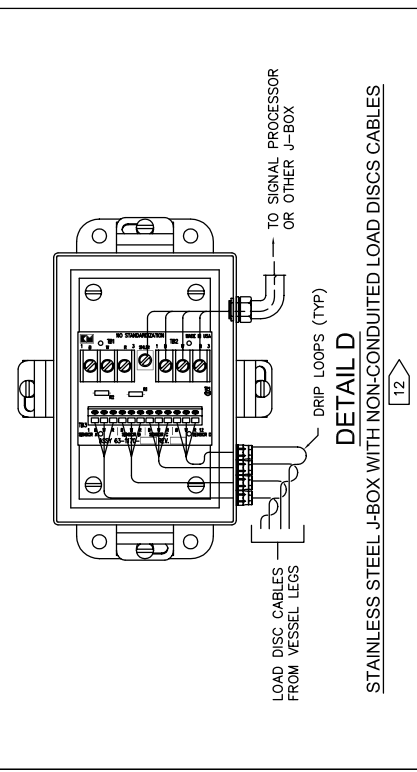
DETAIL B

NON-CONDUITED LOAD DISC CABLE LAYOUT (NOT RECOMMENDED)



DETAIL C

STAINLESS STEEL J-BOX (JB-LDSS) WITH CONDUITED LOAD DISCS CABLES



DETAIL D

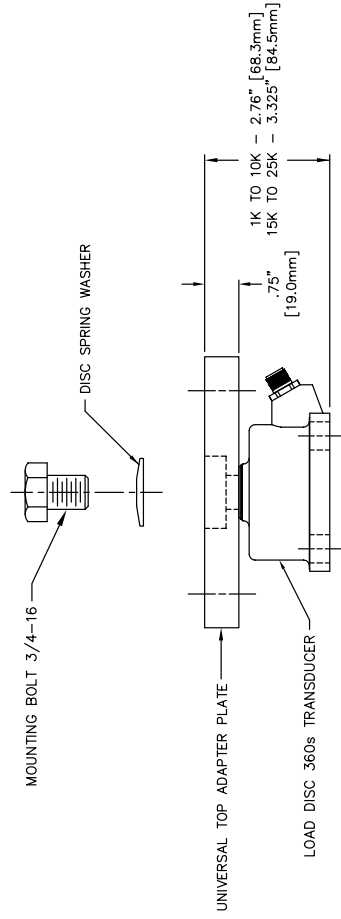
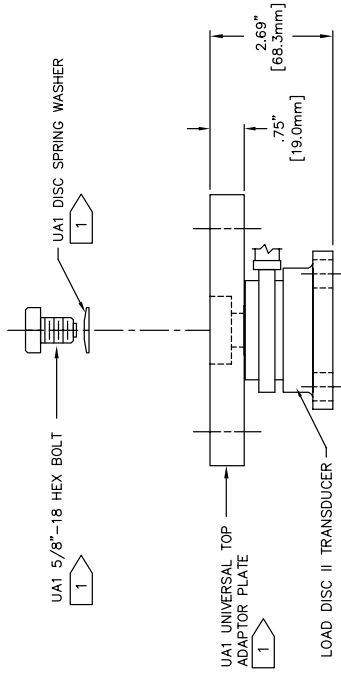
STAINLESS STEEL J-BOX WITH NON-CONDUITED LOAD DISCS CABLES

REVISIONS			
LTR	DESCRIPTION	CHECKED	APPROVED
A	PRODUCTION RELEASE	BWC	JT
B	Deleted page 2 (omnislide)	ECN 06-072	SF JD
			DATE 3/22/02 2-14-06

NOTES:

1 ITEMS THAT WILL BE REPLACED WHEN RETRO-FITTING TO A LD360s.

LD360s/UA360 RETROFIT
FROM LD-II/UA1

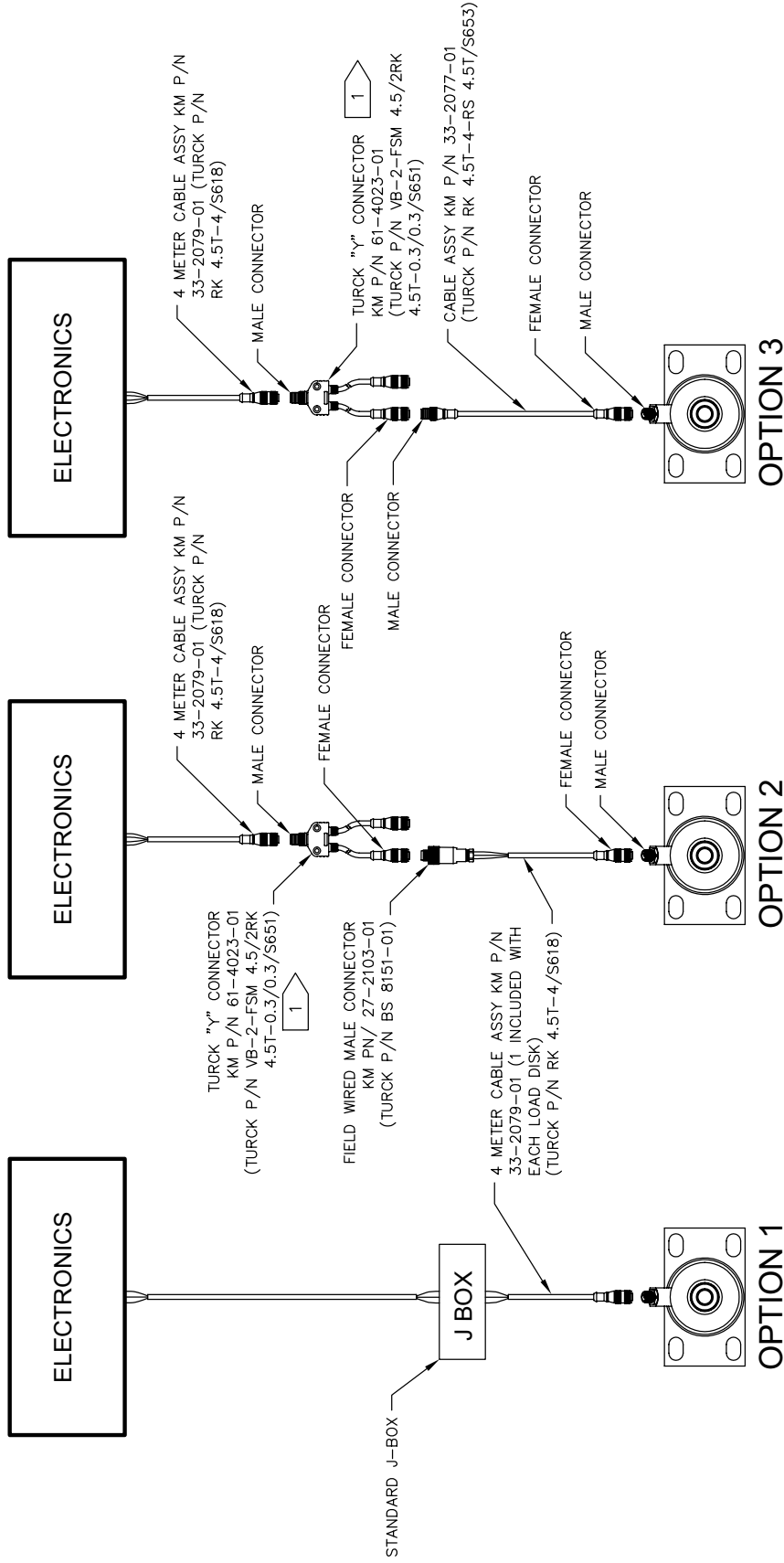


**UNCONTROLLED
COPY**

venture MECHANICAL 150 VENTURE BLVD. SPARTANBURG, SC 29506	TITLE	RETRO-FIT TI-DWG	SCALE	NONE
	FILE	RF-LC.LD360s-01	SIZE	B
UNSPECIFIED TOLERANCES DIMENSIONS ARE TO CENTER UNLESS NOTED DIMENSIONS TO SURFACE UNLESS NOTED DIMENSIONS TO HOLE UNLESS NOTED DIMENSIONS TO EDGE UNLESS NOTED DIMENSIONS TO CENTER UNLESS NOTED	MATERIAL	RF-LC.LD360s-01	PART	RF-LC.LD360s-01
	FINISH	Noted		
				SHEET 1 of 1


LD360s TYPICAL CABLING DIAGRAM

REVISIONS		INCORP.		CHECKED		APPROVED		DATE	
LTR	DESCRIPTION	BWC	JT	TS	TS	TS	TS	TS	TS
A	PRODUCTION RELEASE								3/22/02
B	PER ECO 4871, 4876								9/27/02



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

ECO ACCUMULATION:		APPROVALS		UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES	
ECO 1:	ECO 2:	DRAWN:	DATE	DECIMAL TOLERANCES	ANGULAR TOLERANCES
		BW Cooper	3/22/02	XX	4--
		CHECKED: J Thornton	3/22/02	.XXX	---
		PROJ. ENGR: T Szymanski	3/22/02	DO NOT SCALE DRAWING	SCALE: ---
		PRODUCTION:		PROJECT FILE NAME:	
		PURCHASING:		USED ON:	



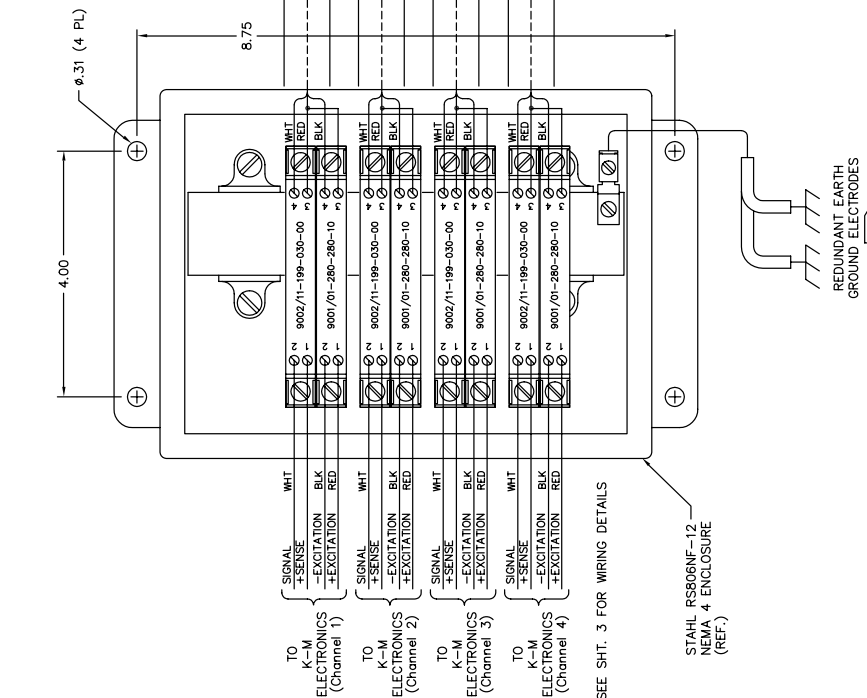
Kistler-Morse
Bottell, WA

LD360s
TYPICAL CABLING DIAGRAM

SIZE	DWG. No.	REV.
B	TI-LD360s-01	B
ACAD#	TI-LD360s-01B	SHT 1 OF 1

REVISIONS			
LTR	DESCRIPTION	INCORP.	CHECKED APPROVED DATE
A	PRODUCTION RELEASE	BMC	TS 7/8/02
B	PER ECO 4915	DFS	TS 9/03/02
C	PER ECO 4928	BMC	TS 9/26/02

MODEL SBMVS-N4 INTRINSIC SAFETY BARRIER ASSEMBLY (4 CHANNELS MAX.)
(TYPICAL INTERCONNECT DIAGRAM)



SEE SHT. 3 FOR WIRING DETAILS

STAHL_RSS06NF-12
NEMA 4 ENCLOSURE
(REF.)

FM CONTROLLED DOCUMENT
WITHOUT PRIOR FM APPROVAL

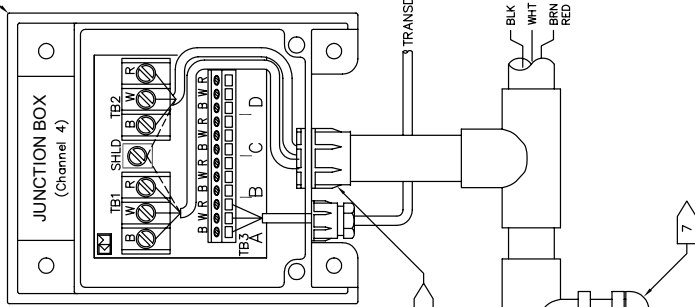
NON-HAZARDOUS LOCATION

HAZARDOUS LOCATION

CLASS I, II, III, DIVISION 1, GROUP C, D, E, F, & G
CLASS I, II, III, DIVISION 2, GROUP A, B, C, D, F, & G

TYPICAL FOUR CHANNEL INSTALLATION

TYPICAL JUNCTION BOX WIRING



NOTES: (APPLICABLE TO SHEETS 1, AND 2)

- NO CHANGES TO THIS DOCUMENT ALLOWED WITHOUT PRIOR FACTORY MUTUAL APPROVAL.
- THE BARRIER ENCLOSURE MUST BE LOCATED OUTSIDE THE HAZARDOUS AREA, AS NEAR ITS BOUNDARY AS POSSIBLE.
- DELETED.
- FOR FACTORY MUTUAL APPROVAL, INSTALLATION MUST BE IN ACCORDANCE WITH THIS TECHNICAL ILLUSTRATION DRAWING AND WITH ANSI/ISA RP2.06.01 AND NEC ANS/NFPA 70.
- ALL INTERCONNECT CABLE SHOWN IS PROVIDED, AND INSTALLED BY THE CUSTOMER. CABLES LEAVING THE ENCLOSURE MUST BE ROUTED THROUGH CONDUIT CARRYING ONLY THOSE CABLES. EACH CHANNEL MUST BE WIRED THROUGH A SEPARATE CONDUIT FROM THE BARRIER ENCLOSURE TO ITS INDIVIDUAL JUNCTION BOX TO COMPLY WITH GROUP C HAZARDOUS LOCATION REQUIREMENTS.
 - INSTALL 3/4" CONDUIT NUT WITH LIQUID TIGHT SEALS ON BOTH SIDES OF JUNCTION BOX ENTRY. ACCEPTABLE SOURCES ARE THOMAS AND BETTS #142SL, REGAL #8028, OR EQUIVALENT.
 - TO PREVENT MOISTURE ACCUMULATION IN JUNCTION BOX, INSTALL A DRAIN IN LOWER PORTION OF CONDUIT. USE GROUSE-HINDS #ECD17 DRAIN OR EQUIVALENT.
- PROTECTIVE COVER MUST BE REPLACED ON THE BARRIER ENCLOSURE WHEN WIRING IS COMPLETED.
- THE BARRIER GROUND BUS MUST BE CONNECTED TO EARTH GROUND ELECTRODES USING REDUNDANT WIRES. RESISTANCE NOT TO EXCEED 1 OHM.
- TERMINATE WIRES SO THAT BLACK CONNECTS TO B, WHITE CONNECTS TO W, AND BROWN OR RED CONNECTS TO R.
- CAUTION: DO NOT APPLY IN EXCESS OF 8 LB-IN. OF TORQUE TO JUNCTION BOX COVER SCREWS.

(NOTES CONTINUED ON SHEET 2)

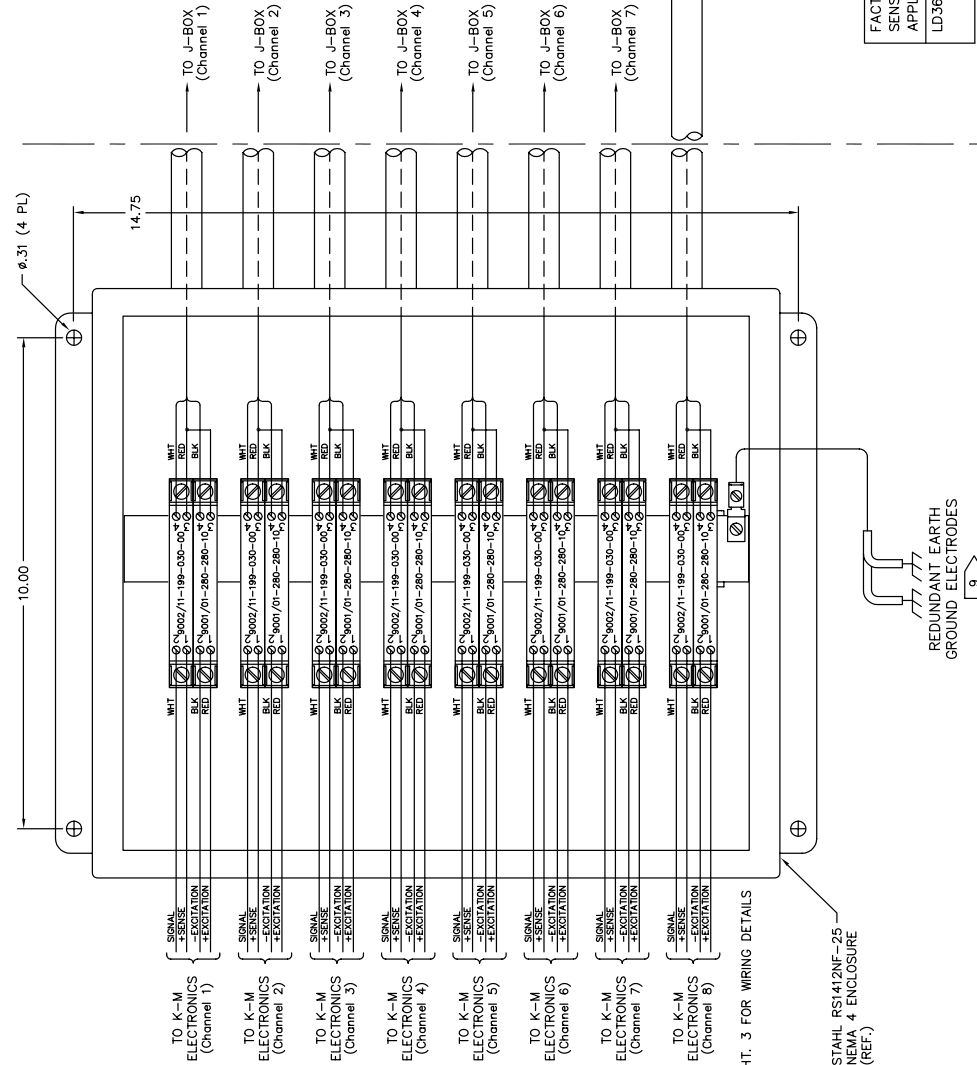
ECO ACCUMULATION:	APPROVALS	DATE	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
ECO 1:	DRAWN: BW Cooper	4/11/02	DECIMAL
ECO 2:	CHECKED: R. Barnett	7/3/02	ANGULAR
ECO 3:	PROJ. ENGR: Szymanski	7/8/02	.X# --- ±--
ECO 4:	PRODUCTION:		.XX# --- ±--
ECO 5:	INCORPORATE ABOVE ECOS		DO NOT SCALE DRAWING
	PURCHASING		SCALE: ---

PROJECT FILE NAME:	SIZE DWS: No.	REV.
	B TI-LD360s-FM-01	C
USED ON:	ACAD# TI-LD360s-FM-01C	SHT. 1 OF 3



INSTALLATION:
STAHL SAFETY BARRIER
(FM APPROVED)

MODEL SBMVS-N4 INTRINSIC SAFETY BARRIER ASSEMBLY (8 CHANNELS MAX.)
(TYPICAL INTERCONNECT WIRING DIAGRAM)



- NOTES: (CONTINUED FROM SHEET 1)
12. DUST TIGHT CONDUIT SEALS MUST BE USED WHEN INSTALLED IN CLASS II AND III HAZARDOUS LOCATIONS.
 13. CONTROL ROOM EQUIPMENT CONNECTED TO THE BARRIERS MUST NOT USE OR GENERATE MORE THAN 250V.
 14. THE TOTAL CABLE SERIES INDUCTANCE AND TOTAL CABLE SHUNT CAPACITANCE INCLUDING THE CABLES BETWEEN THE JUNCTION BOXES AND THE TRANSDUCERS AND BETWEEN JUNCTION BOXES, MUST NOT EXCEED THE CABLE INDUCTANCE AND CAPACITANCE VALUES IN TABLE 2, FOR APPLICABLE GROUPS.

TABLE 2

INTRINSICALLY SAFE CABLE PARAMETERS:

SERIES INDUCTANCE	GROUP C & E	GROUPS D, F, & G
.4uF	1.73mH	3.4mH
1.0uF		

TYPICAL JUNCTION BOX WIRING

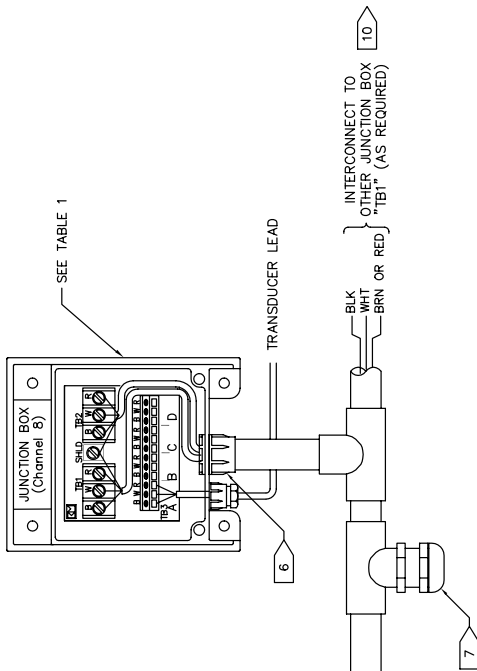


TABLE 1

FACTORY MUTUAL APPROVED APPLIES	FACTORY MUTUAL APPROVED JUNCTION BOX MODEL NUMBERS:	FACTORY MUTUAL APPROVED JUNCTION BOX PART NUMBER SERIES:
LD360s	JB1	61-3070, 61-4016
	JB2	61-3070, 61-4017

CLASS I, II, III, DIVISION 1, GROUP C, D, E, F, & G
CLASS I, II, III, DIVISION 2, GROUP A, B, C, D, F, & G

NON-HAZARDOUS LOCATION
HAZARDOUS LOCATION

TYPICAL MULTI CHANNEL INSTALLATION

KM Kistler-Morse
Bothell, WA

SIZE DWG. NO. **B** TI-LD360s.FM-01
REV. **C**

ACAD# TI-LD360s.FM-01C | SHT 2 OF 3

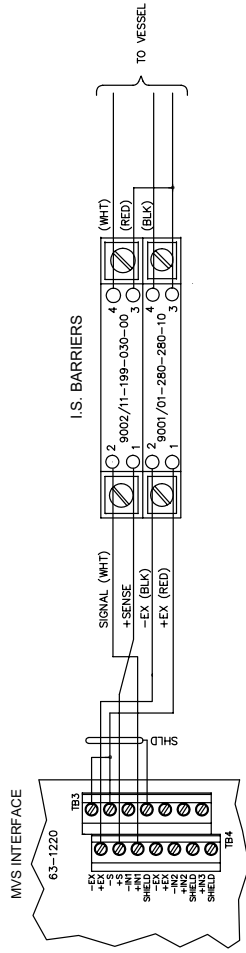
FM CONTROLLED DOCUMENT
NO CHANGES TO DRAWING
WITHOUT PRIOR FM APPROVAL

SEE SHT. 3 FOR WIRING DETAILS

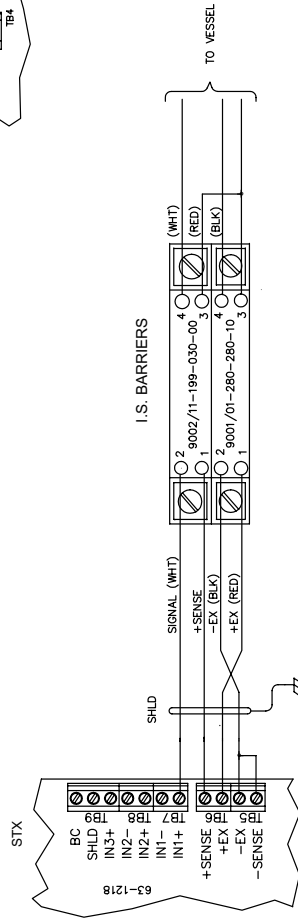
STAHL RS1412NF-25
NEMA 4 ENCLOSURE
(REF.)

REDUNDANT EARTH
GROUND ELECTRODES

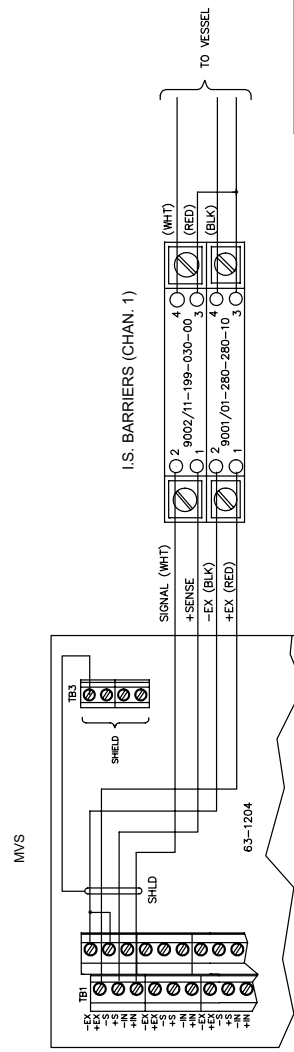
TYPICAL CONNECTION FOR STX SYSTEMS, MVS RESIDENT.



TYPICAL CONNECTION FOR STAND-ALONE STX SYSTEMS.



TYPICAL CONNECTION FOR TRANSDUCERS (SENSORS)



CONNECT ADDITIONAL BARRIERS FOR EACH CHANNEL THE SAME WAY

TYPICAL STAHL BARRIER CONNECTIONS TO MVS FOR DIFFERENT APPLICATIONS.



Kistler-Morse
Bothell, WA

SIZE	DWG. No.	REV.
B	TI-LD360s.FM-01	C

ACAD# TI-LD360s.FM-01C SHT 3 OF 3

FM CONTROLLED DOCUMENT
NO CHANGES TO DRAWING
WITHOUT PRIOR FM APPROVAL

REVISIONS		ECN #	DRAWN BY	APPTD BY
A	INIT. RELEASE	06-056	SE	DM
			2-3-06	2-3-06

INSTALLATION INSTRUCTIONS FOR THE LD3

Hardware Options

The following hardware options and their installation will be described:
 Universal Top Adapter Plate (UA3)
 Leveling Top Plate Adapter (LT3) (1Klb-7.5Klb Systems only)
 Anyadapter Plate (AD3) (1Klb-7.5Klb Systems only)
 Leveling Base Adapter Plate (LB3)

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/gussets 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. 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 LD3, verify that they are the correct capacity for your application by reviewing the information engraved on the LD3 baseplates.
2. Connect the LD3 cable to the KM Test Meter. Measure the LD3 voltage output. With no load on the LD3, the KM Test Meter should read between the preliminary measurements of +5mV and -5mV. (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. Remove the cable from the KM test meter to the LD3.

4. Place bolt through center hole of adapter plate and install hardware for your application:
 - a. For Universal Adapter, install bolt and plate to LD3, 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 LD3, tighten bolt to 5-10 FT-LBS maximum.

5. For Leveling Top and Anyadapter applications, adjust plate to lowest position by lowering jam nut to top of LD3 and tighten. Then lower leveling nut to the jam nut.

6. Raise the vessel.

7. Inspect the foundation and vessel mounting surfaces that will mate to the LD3 plates.
 - a. Check the mounting hole locations 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).

8. Mount the LD3 assembly to the foundation.
 - a. Gently lower the LD3 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).

9. Repeat steps a and b for remaining Load Discs.
 - a. Re-install the LD3 cable and record the voltage output of the LD3 at "no-load" condition now that it is in position.
 - i. If not already done, connect the LD3 cable to the KM Test Meter.
 - b. Record the no-load output into Figure 3: Weight Distribution Chart or create your own similar table. See the example chart in Figure 4.
 - c. Assign a number (1,2,3, etc.) to the LD3 and note it.
 - d. Repeat steps a and d for all the LD3 units.

10. Mount the vessel to the LD3.
 - 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 discs 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).

11. Check dead weight output.
 - a. Connect the Load Disc cable to the KM Test Meter, if not already done.
 - b. Record the dead weight output on your Weight Distribution Chart that was started in step 9c. See the example chart in Figure 4.
 - c. Calculate the Output Change. (Change should be positive).
 - d. 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.
 - e. Load Disc #3 will require a shimming and/or leveling procedure which will distribute the weight more evenly over all of the supports.

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

Calculation Example: (See Fig. 4)

Average Output Change = $(86mV + 83mV + 69mV + 89mV) / 4 = 81.8mV$

Allowable range for Output Change = $Average\ Output\ Change \pm 10\% = 81.8mV \pm (.1 \times 81.8mV) = 73.6\ to\ 90.0mV$

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.

venture MEASUREMENT CORPORATION SPARTANBURG, SC 29306		TITLE INSTALLATION ARRANGEMENTS 1K-25K, LOAD DISC LD3		SCALE NONE
FILE TI-LC.LD3-01	REF KM	MATERIAL Noted	PART TI-LC.LD3-01	SHEET 1 of 14
UNFINISHED TOLERANCES DIMENSIONS TO 4 DEC FINISH DIMENSIONS TO 2 DEC DIMENSIONS IN PARENTHESIS ARE CRITICAL DIM. OR NOTE				

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 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 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 LD3 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 1 and 2 until you have achieved the desired output change of all of the Load Discs.
4. **Securing LD3 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 LD3 Top Hardware and mating vessel plate, but the gap condition may exist at either the top or bottom plates.

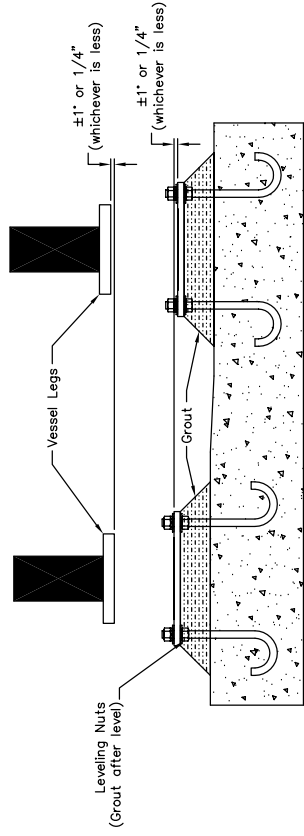


FIGURE 1: ANGULAR MISALIGNMENT

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

Anchor bolts supplied by customer.

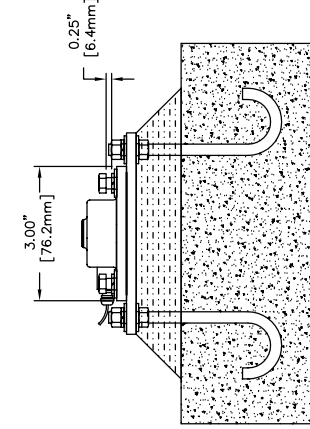


FIGURE 2: LEAVE 1/4" GAP FOR POSITIONING

INSTALLATION OPTION FLAGNOIES:

- 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-A325, 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, counter-clockwise to raise. Once the leveling 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 tees 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 758 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 tighten 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

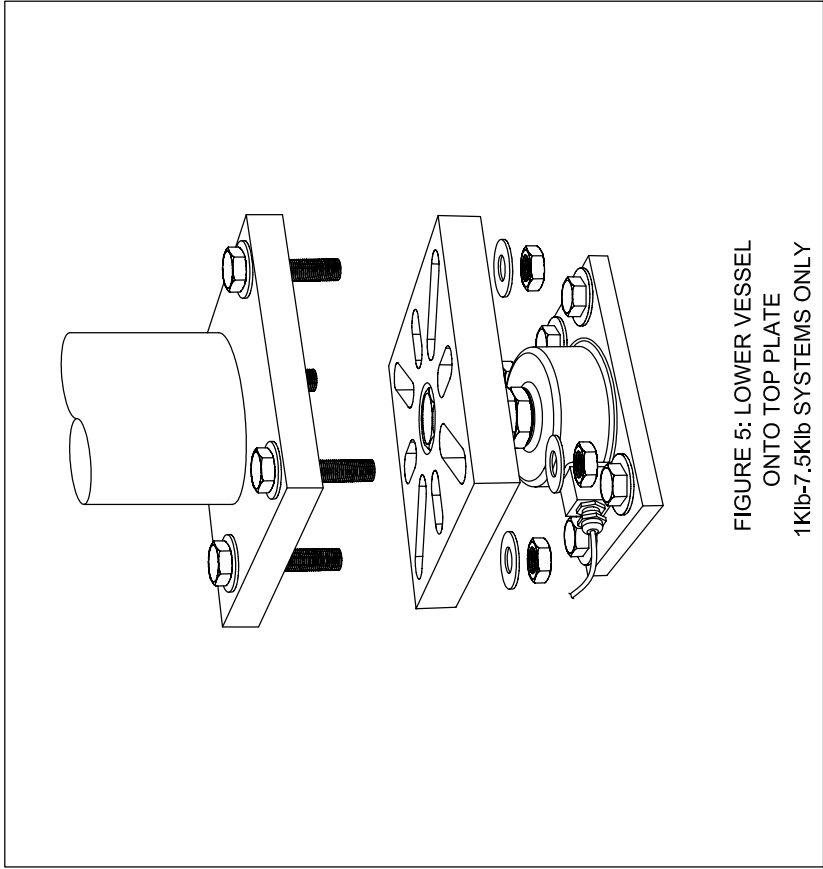


FIGURE 5: LOWER VESSEL
 ONTO TOP PLATE
 1Klb-7.5Klb SYSTEMS ONLY

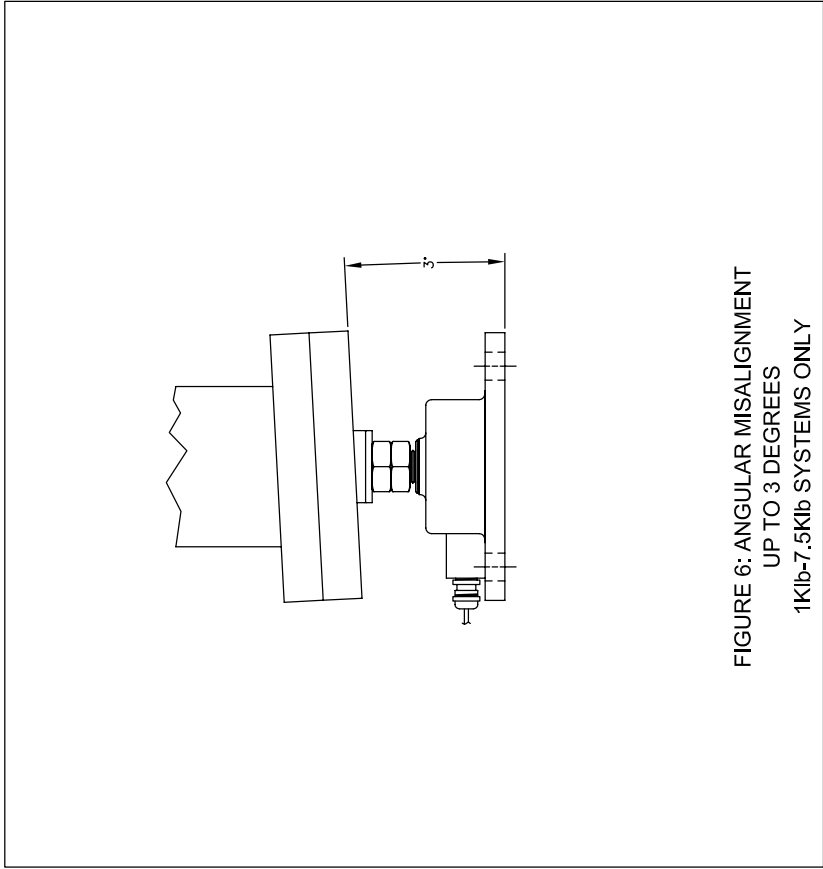


FIGURE 6: ANGULAR MISALIGNMENT
 UP TO 3 DEGREES
 1Klb-7.5Klb SYSTEMS ONLY

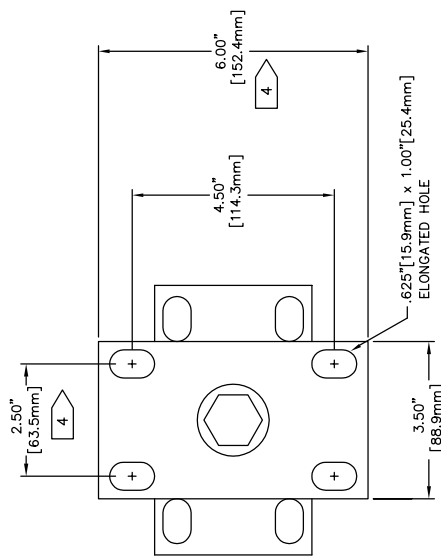
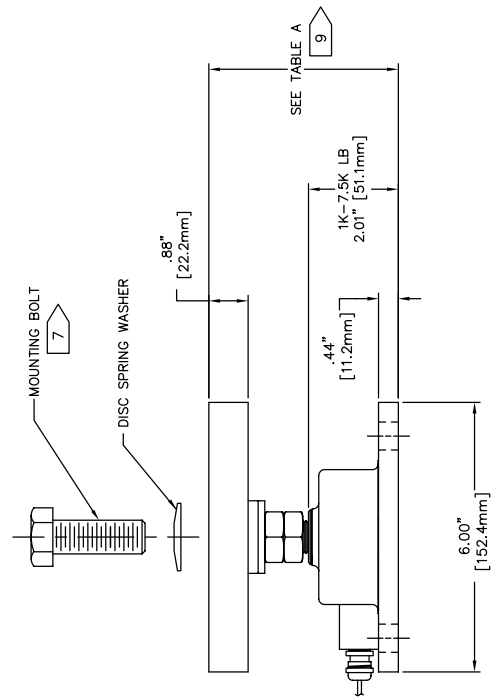
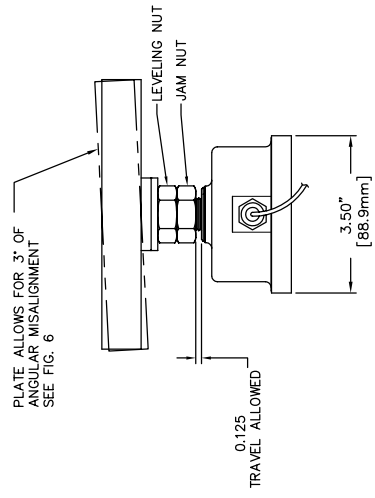
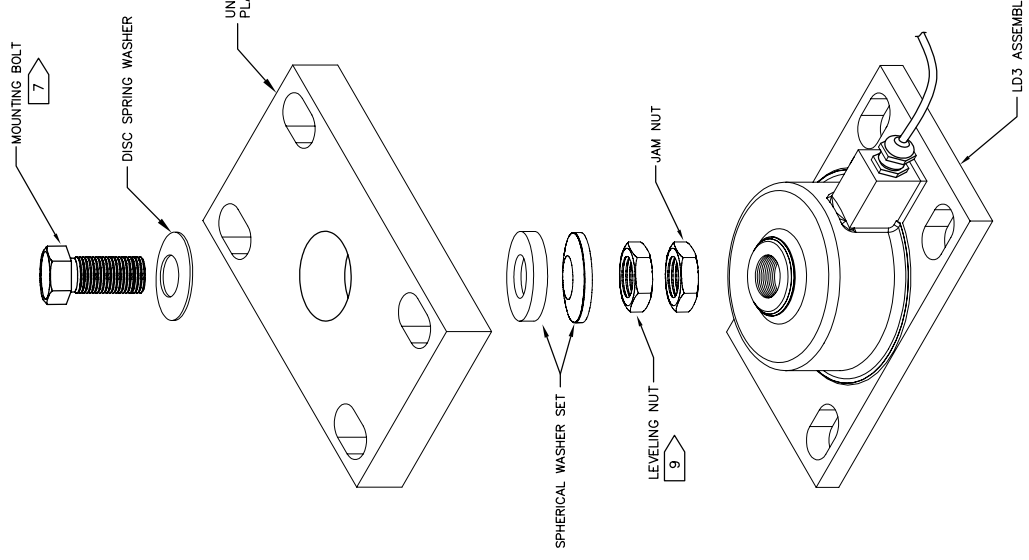
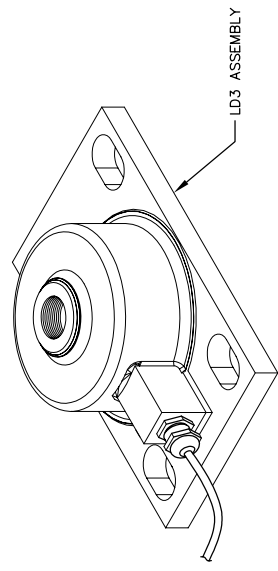
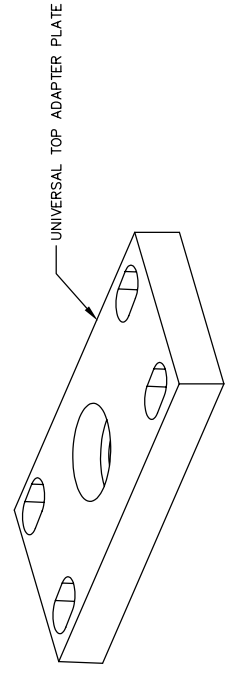
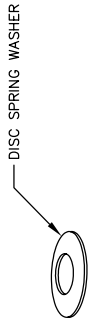
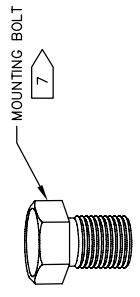
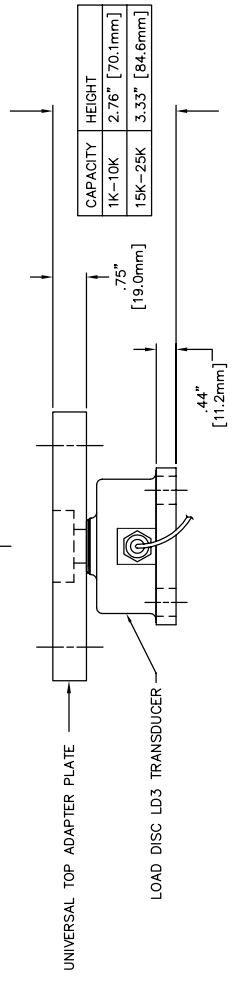
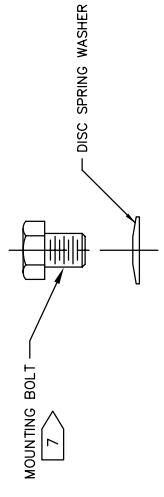
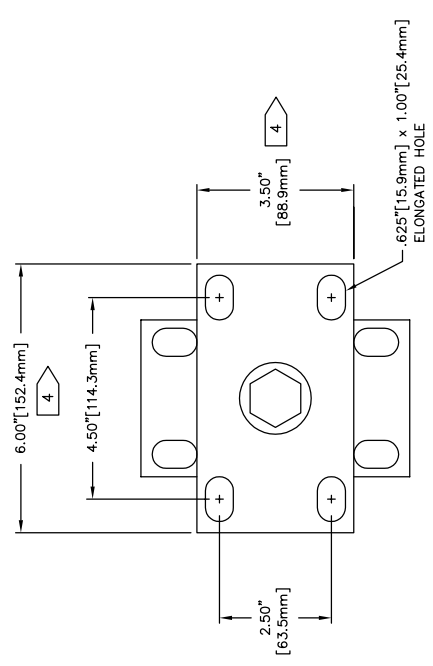


TABLE A

CAPACITY	HEIGHT
1K-7.5K	4.218" [107.2mm]
	MAXIMUM ADJUSTABLE HEIGHT
	4.094" [104mm]
	MINIMUM ADJUSTABLE HEIGHT



**1Kib-7.5Kib LOAD DISC LD3 TRANSDUCER
WITH LEVELING TOP UNIVERSAL ADAPTER PLATE
MOUNTING DIMENSIONS**



**1Kib-25Kib LOAD DISC LD3 TRANSDUCER
WITH UNIVERSAL ADAPTER PLATE
MOUNTING DIMENSIONS**

TABLE A

CAPACITY	HEIGHT
1K-10K	4.219" [107.2mm]
	MAXIMUM ADJUSTABLE HEIGHT
	4.094" [104mm]
	MINIMUM ADJUSTABLE HEIGHT

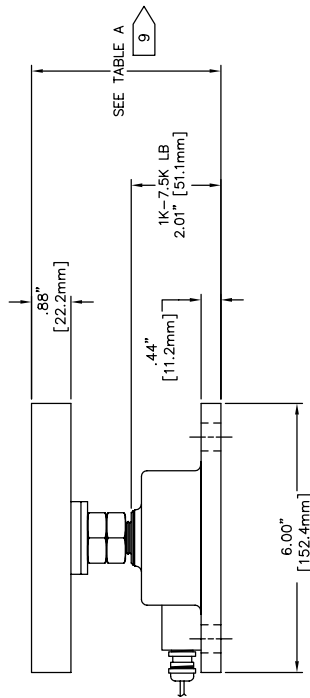
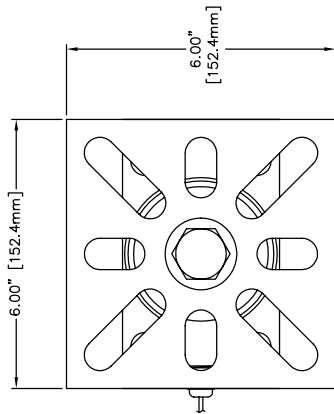
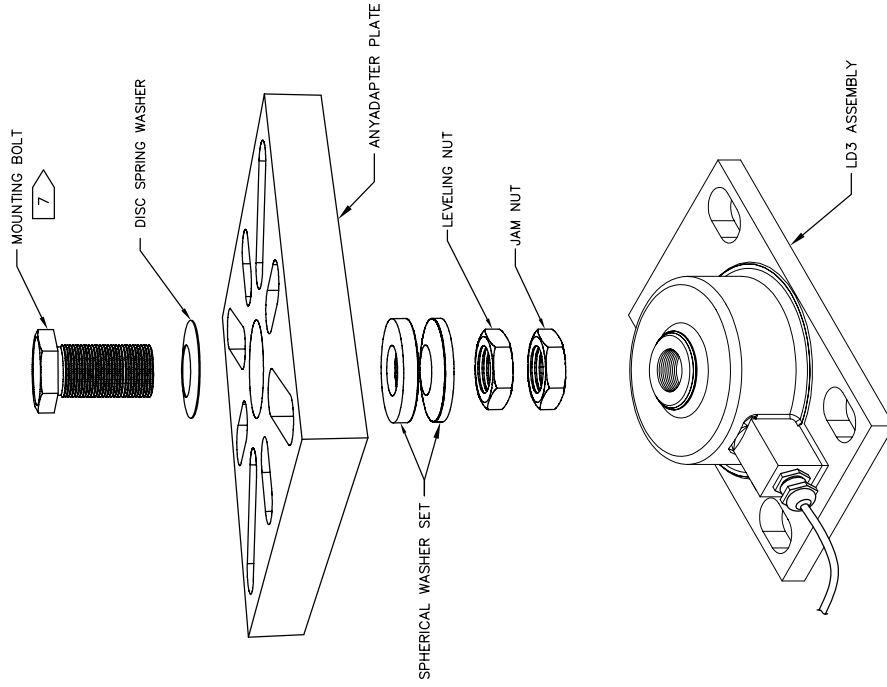
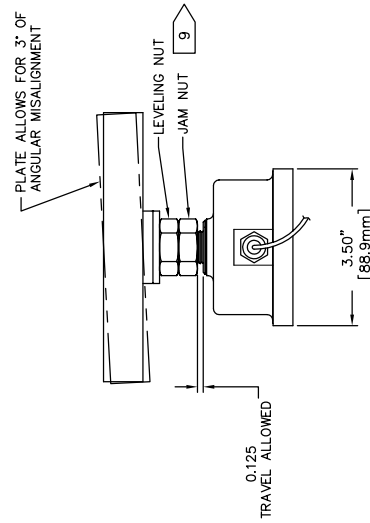
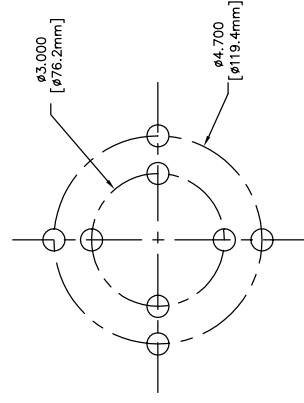
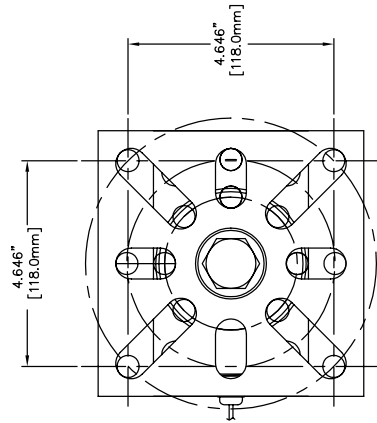


TABLE A

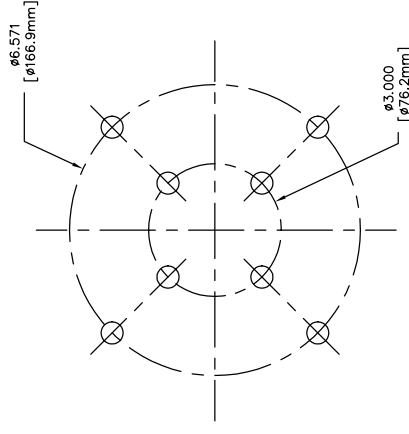
1K-7.5K LB	2.01" [51.1mm]
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1Klb-7.5Klb LOAD DISC LD3 TRANSDUCER WITH ANYADAPTER TOP ADAPTER PLATE MOUNTING DIMENSIONS

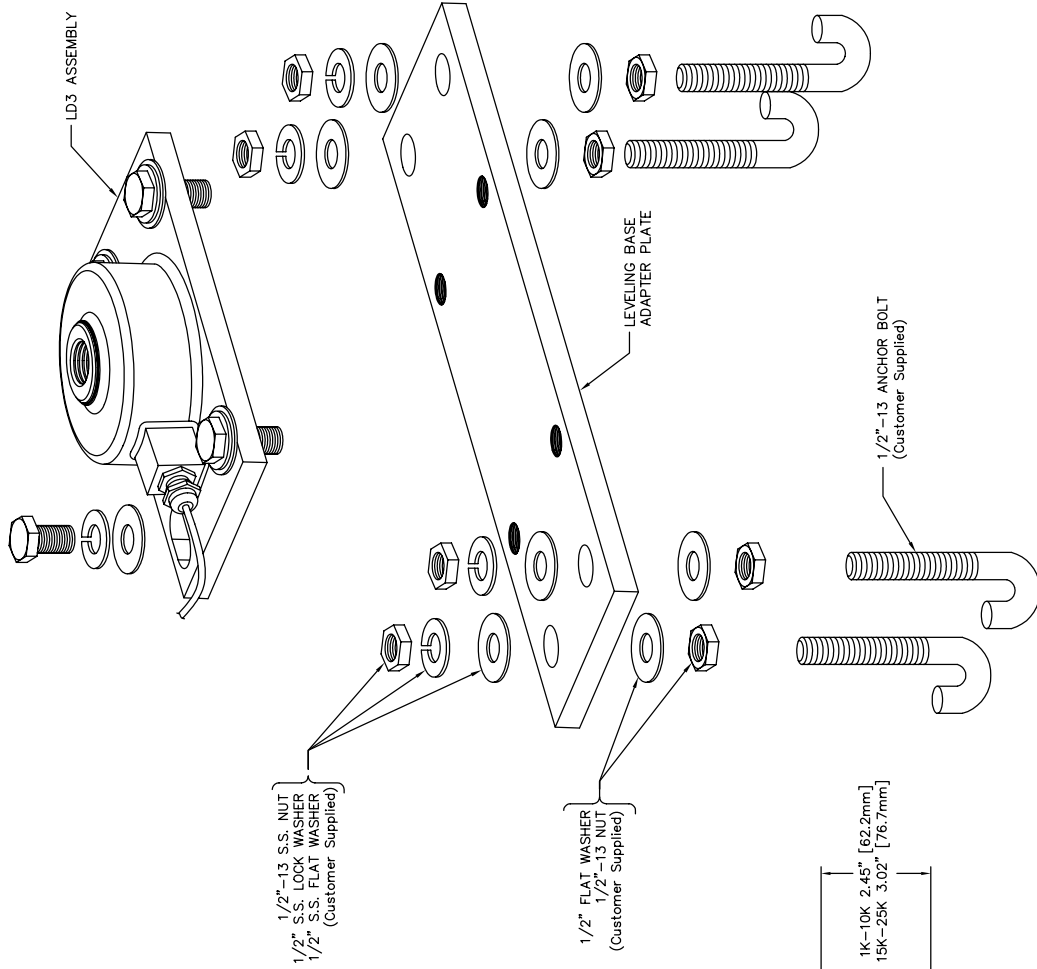


MINIMUM/MAXIMUM BOLT PATTERN
FOR HORIZONTAL/VERTICAL SLOTS



MINIMUM/MAXIMUM BOLT PATTERN
FOR ANGLED SLOTS

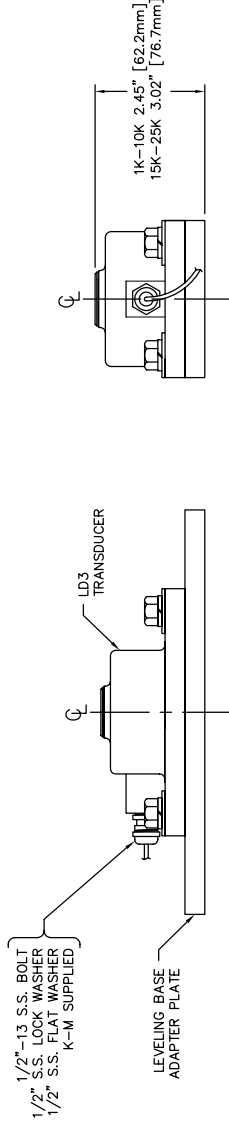
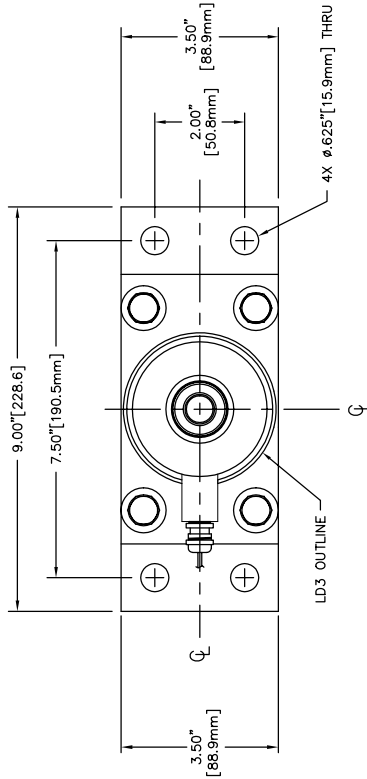
**VESSEL MOUNTING HOLE PATTERNS
FOR ANY ADAPTER TOP ADAPTER PLATE
(MINIMUM (4) 1/2" HEX HEAD BOLTS REQUIRED)**



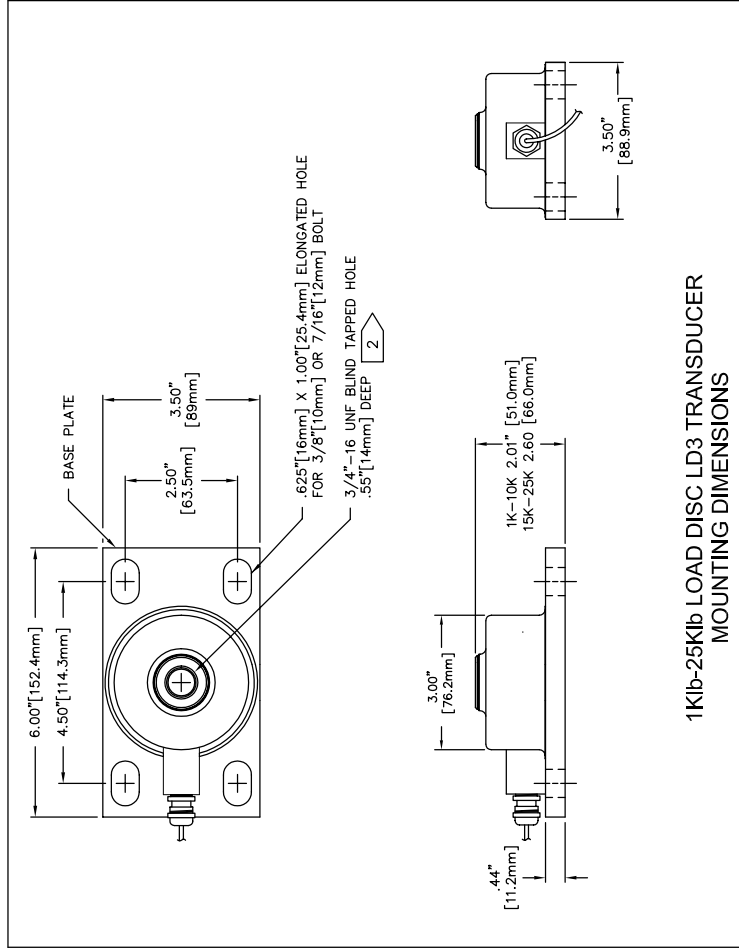
1/2"-13 S.S. NUT
 1/2" S.S. LOCK WASHER
 1/2" S.S. FLAT WASHER
 (Customer Supplied)

1/2" FLAT WASHER
 1/2"-13 NUT
 (Customer Supplied)

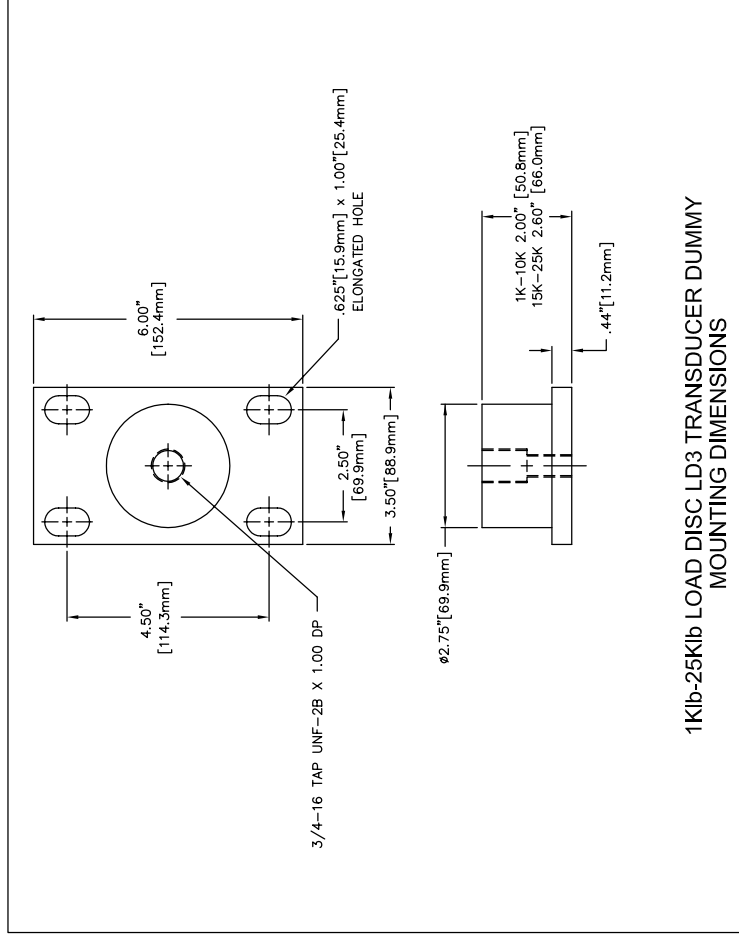
1/2"-13 ANCHOR BOLT
 (Customer Supplied)



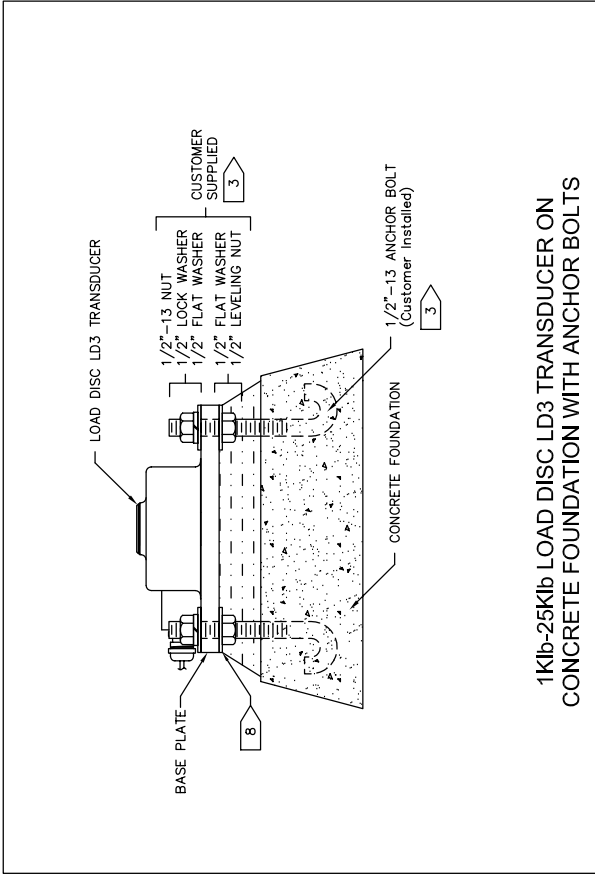
**1Kib-25Kib LOAD DISC LD3 TRANSDUCER
 WITH LEVELING BASE ADAPTER PLATE
 MOUNTING DIMENSIONS**



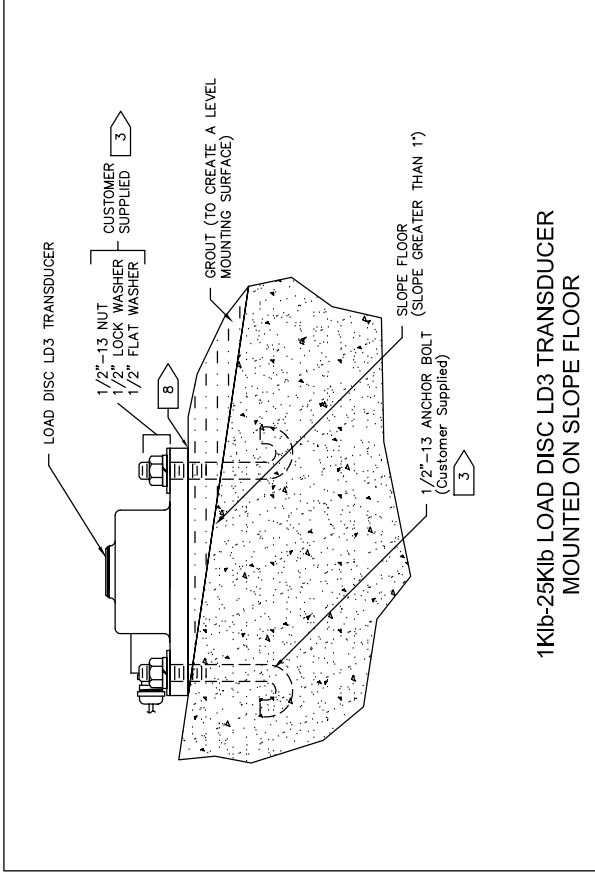
1Klb-25Klb LOAD DISC LD3 TRANSDUCER MOUNTING DIMENSIONS



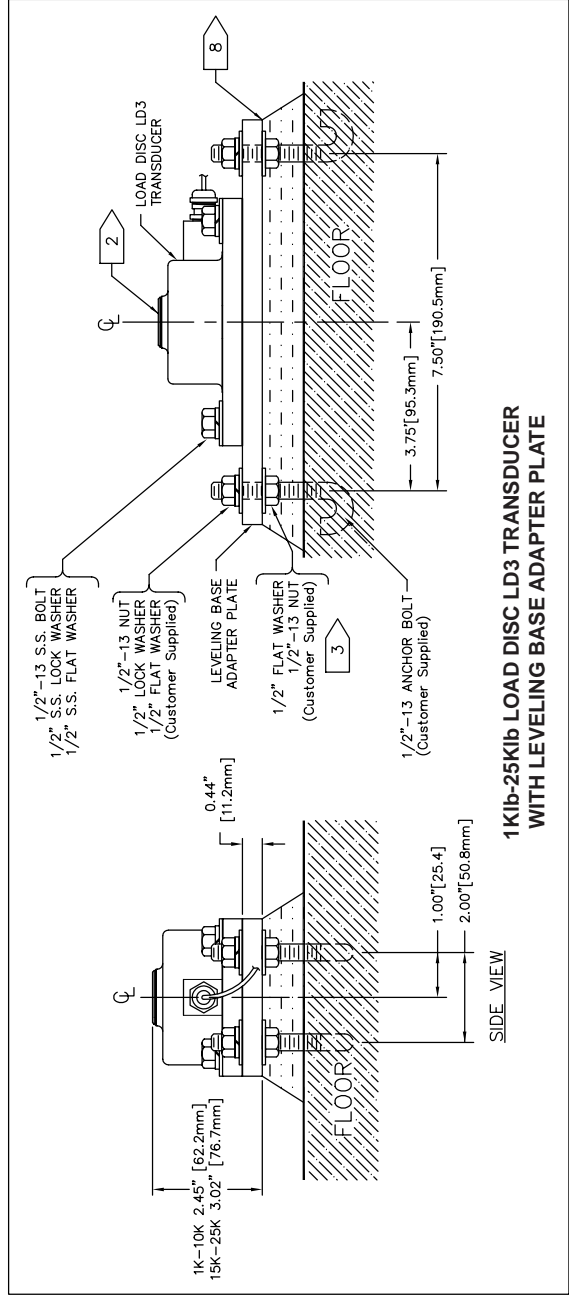
1Klb-25Klb LOAD DISC LD3 TRANSDUCER DUMMY MOUNTING DIMENSIONS



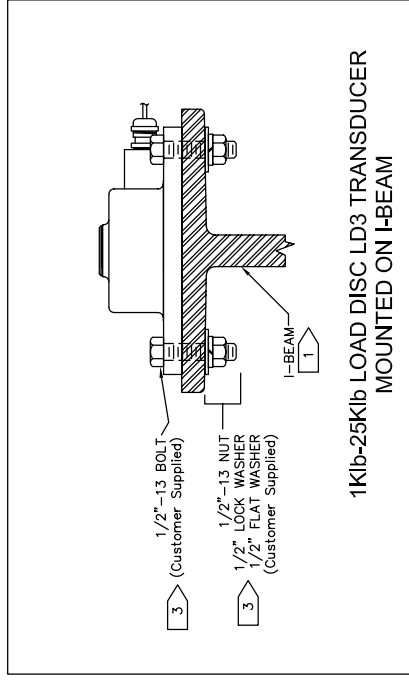
1Klb-25Klb LOAD DISC LD3 TRANSDUCER ON
CONCRETE FOUNDATION WITH ANCHOR BOLTS



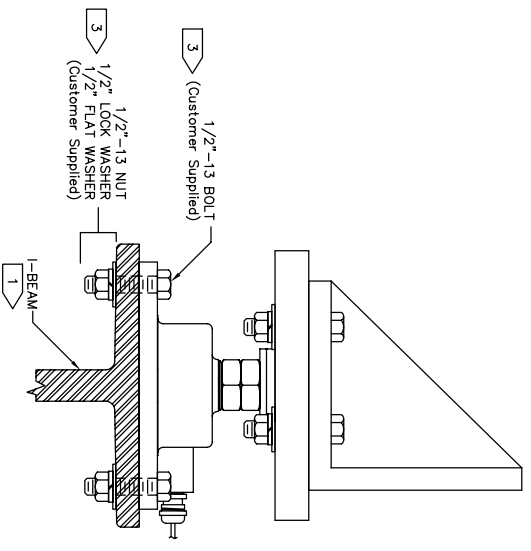
1Klb-25Klb LOAD DISC LD3 TRANSDUCER
MOUNTED ON SLOPE FLOOR



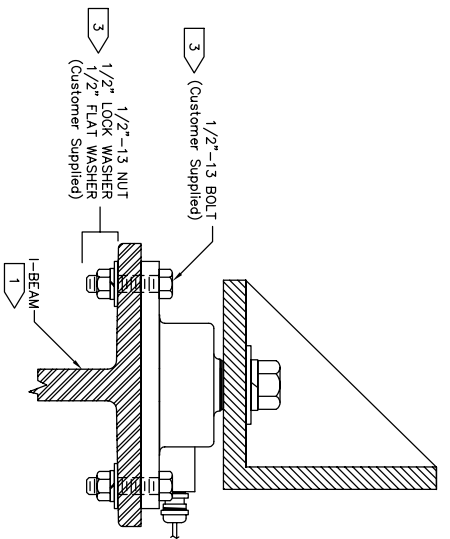
1Klb-25Klb LOAD DISC LD3 TRANSDUCER
WITH LEVELING BASE ADAPTER PLATE



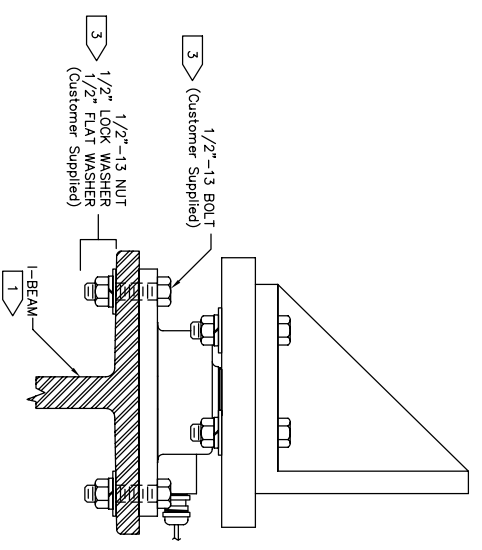
1Klb-25Klb LOAD DISC LD3 TRANSDUCER
MOUNTED ON I-BEAM



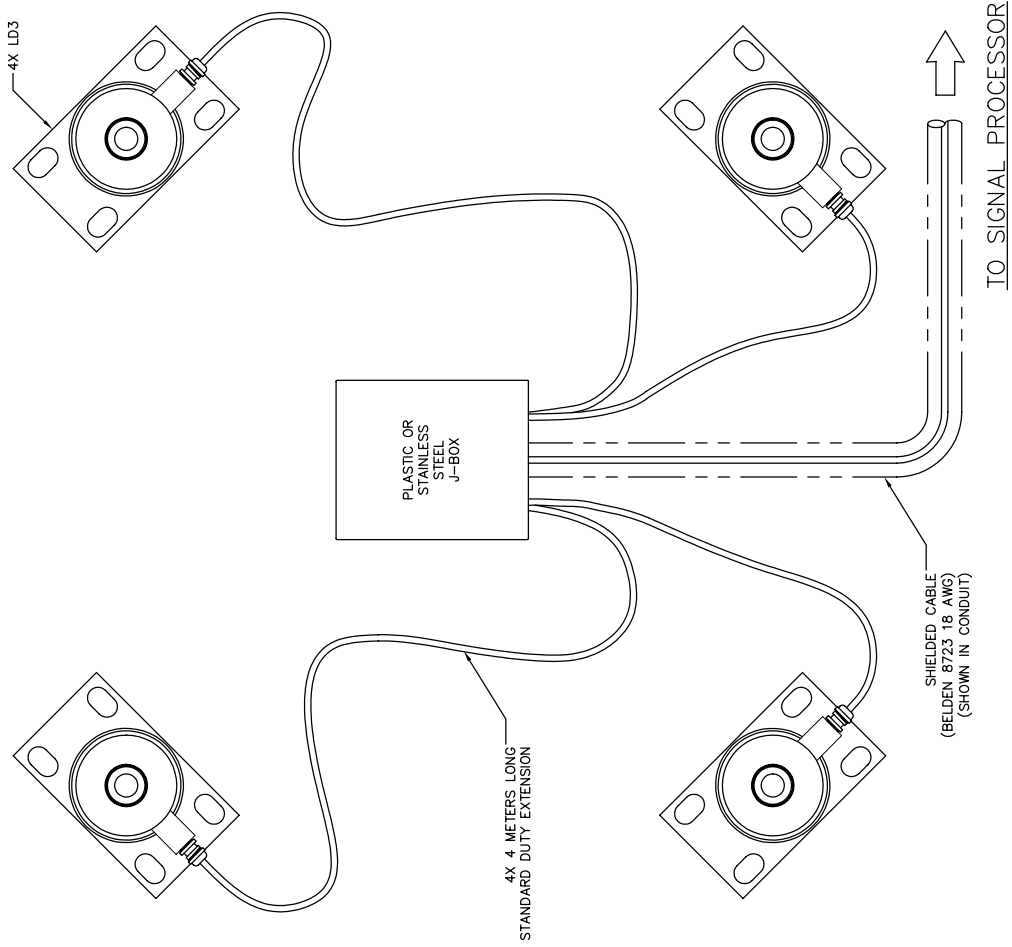
1Klb-7.5Klb LOAD DISC LD3 TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.
LT360



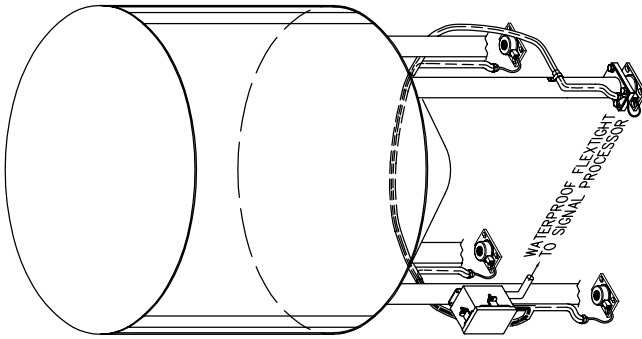
1Klb-25Klb LOAD DISC LD3 TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.



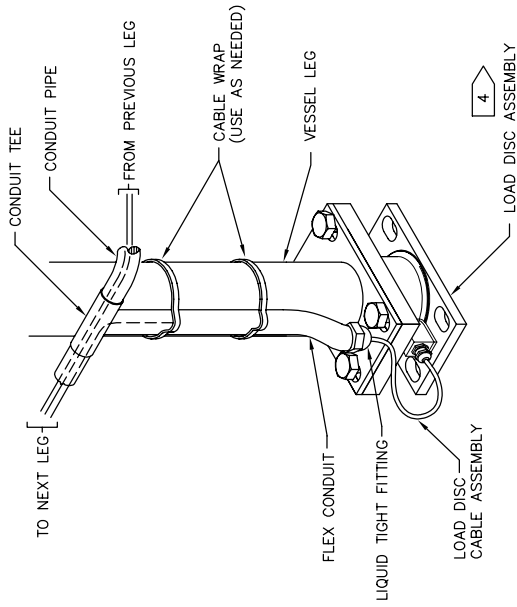
1Klb-25Klb LOAD DISC LD3 TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.



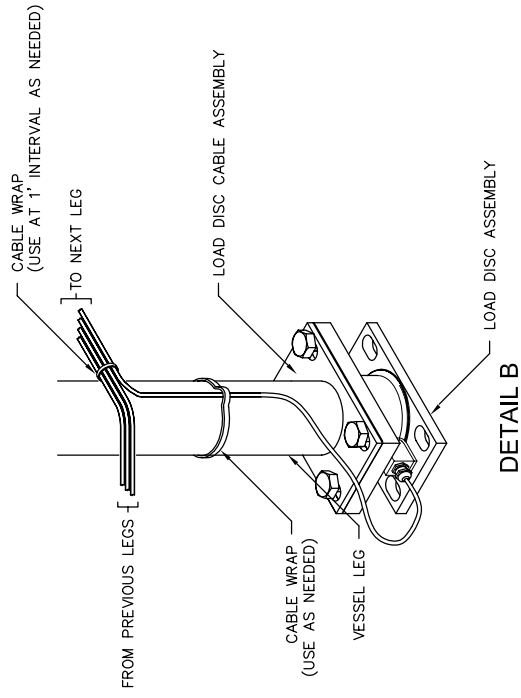
TYPICAL A LEG LD3 CONNECTION USING
STAINLESS STEEL J-BOX



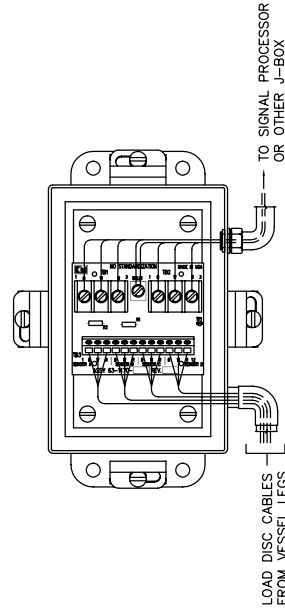
TYPICAL LOAD DISCS CABLE ROUTING ON VESSEL LEGS
 (SEE DETAILS A & B FOR TYPICAL CONDUITED AND
 NON-CONDUITED LOAD DISC CABLE LAYOUT ASSISTANCE)



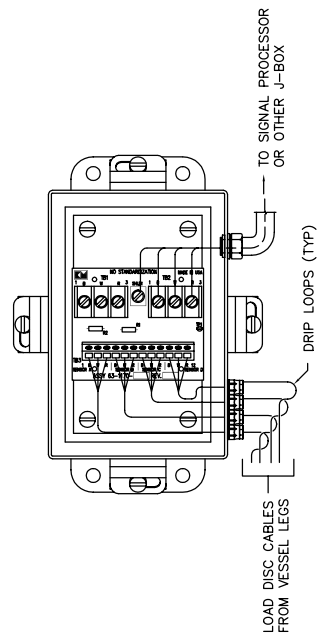
DETAIL A
 CONDUITED LOAD DISC CABLE LAYOUT (PREFERRED)



DETAIL B
 NON-CONDUITED LOAD DISC CABLE LAYOUT (NOT RECOMMENDED)



DETAIL C
 STAINLESS STEEL J-BOX (JB-LDSS) WITH CONDUITED LOAD DISCS CABLES

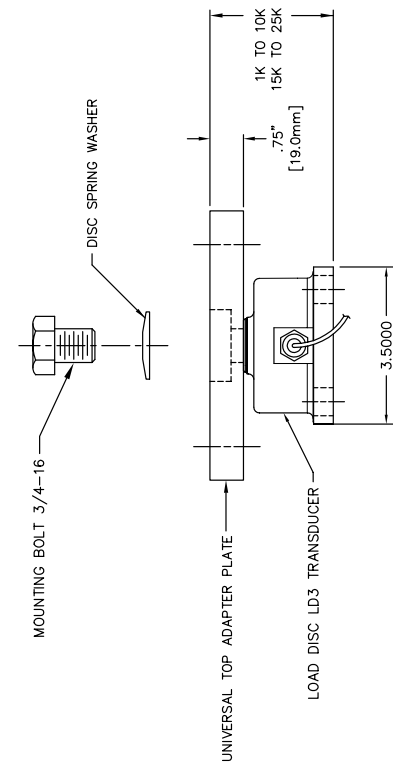
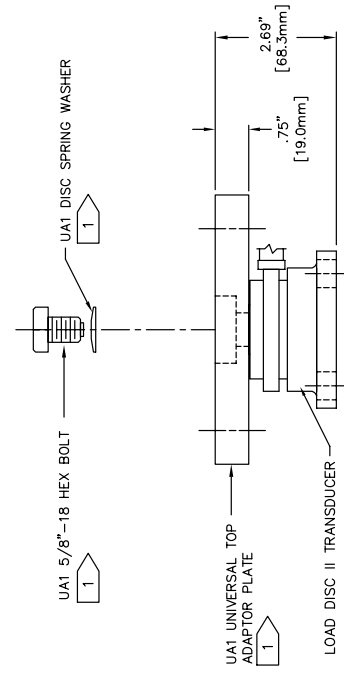


DETAIL D
 STAINLESS STEEL J-BOX WITH NON-CONDUITED LOAD DISCS CABLES

REVISIONS		EON #	DRAWN BY	APP'D BY
A	INIT. RELEASE	SE 06-056		
			DATE	DATE
			2-3-06	

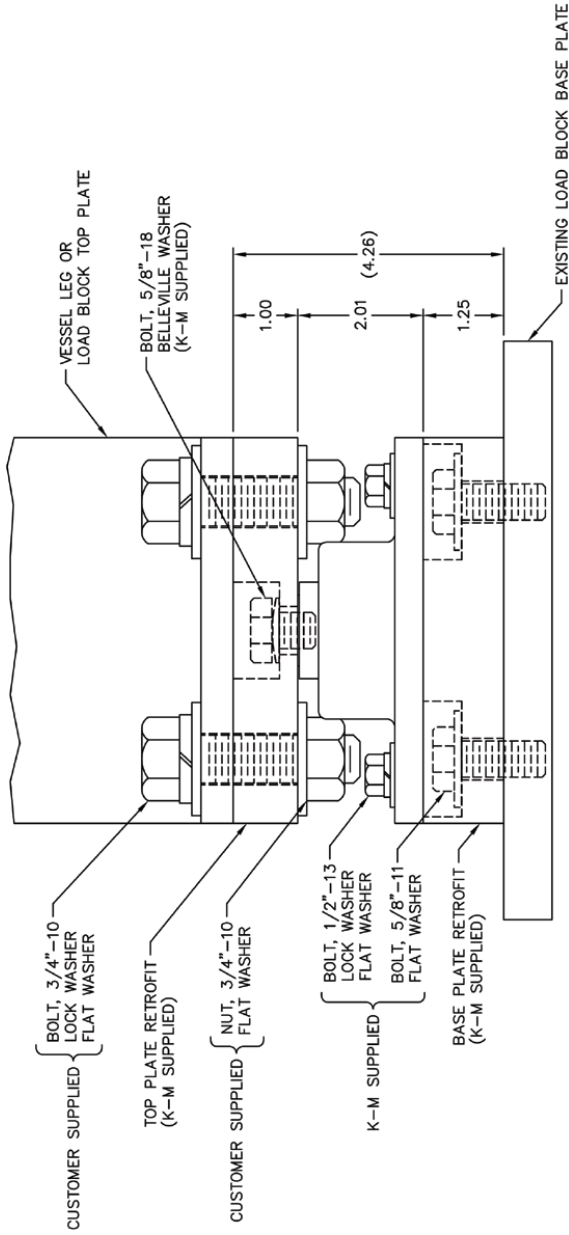
1 ITEMS THAT WILL BE REPLACED WHEN RETRO-FITTING TO AN LD3.

LD3/JA360 RETROFIT
FROM LD-II/JA1



venture MEASUREMENT INCORPORATED SPARTANBURG, SC 29306	TITLE	SCALE	SHEET
	RETRO-FIT TI-DWG 1K-25K, LOAD DISC LD3	NONE	1 of 1
FILE	REF	SIZE	B
RF-LC-LD3-01	KM		
UNSPECIFIED TOLERANCES DIMENSIONS: .0005 SURFACE FINISH: 320 MATERIAL: 304 SS PARTS TO BE SUPPLIED BY OTHERS: INDICATED BY FINISH SYMBOLS	MATERIAL	PART	
	Noted	RF-LC-LD3-01	

REVISIONS		ECN #	DRAWN BY	APP'D BY
A	INIT. RELEASE	06-056	DATE 2-17-06	DATE



venture ME A S U R E M E N T 150 VENTURE BLVD. SPARTANBURG, SC 29306	TITLE	RETROFIT KIT, LOAD BLOCK to LD3 & LD360s 1K-10K	SCALE	NONE
	REF	KM	SIZE	B
MATERIAL T1-LC.LD3&360-01 ANALYSIS 200 1/2-10 200 3/4-10 ANALYSIS & BREAK EXOS JOE CENTER & BREAK EXOS JOE © - ORIGINAL FILE ON SITE	FILE	T1-LC.LD3&360-01	PART	T1-LC.LD3&360-01
			SHEET	1 of 1