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97-1137-01 Rev. F

Installation and operating instructions
Load Disc LD3™ / LD360s™

Note

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

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

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

Other countries:
Phone +49-8333-9204720 or by
support@anderson-negele.com

ANDERSON INSTRUMENT COMPANY
156 Auriesville Road
Fultonville, NY 12072, USA

Phone 800-833-0081
info@anderson-negele.com
techservice@anderson-negele.com

NEGELE MESSTECHNIK GMBH
Raiffeisenweg 7
87743 Egg an der Guenz, GERMANY

Phone +49 (0) 83 33 . 92 04 - 0
sales@anderson-negele.com
support@anderson-negele.com

Table of contents

Welcome

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

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

Tel. +49-8333-9204720 or

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

Manual Conventions

Three kinds of special explanations appear throughout the manual:

Warning, Caution and Note.

Warning

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

Caution

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

Note

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

Caution

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

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

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

Note

High temperatures can damage the load disc.

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

Specification LD3		
Technical Features	Excitation Voltage - Operating Range	10...30 V DC
	Maximum Current	3 mA @ 12 VDC excitation
	Impedance	7.5 kΩ ±1 %
	Recommended Supply Voltage	12 V DC
	Compression	4 x rated load
	Functional Integrity	2 x rated load (compression)
	Humidity	100 %
	Protection Class	IP68 / NEMA-6P
	Materials	Stainless steel 1.4542 (17-4 PH 900), Brushed Finish
	Electrical connection	Nickel plated brass / polymide, with neoprene grommet
	Cable	22 AWG 3 conductor unshielded with PVC sheath (4.5 m)
	Shipping Weight	2.3 kg (5 lbs)
Measurement Accuracy	Non-Linearity/Hysteresis Combined	0.08 % performance
	Return to Zero	0.05 % standardized output
	Zero Balance	1 % rated capacity
	Rated Output	360 mV DC @ 12 V DC ±1 %
Deflection	Model 01K to 05K	0.1...0.15 mm
	Model 07K to 25K	0.2...0.3 mm
Temperature ranges	Ambient Temperature Range	Standard: -18...38 °C (0...100 °F); Mid: 10...66 °C (50...150 °F);
	Temperature Sensitivity	0.027 %/°C (0.015 %/°F)
	Storage Temperature Range	-40...80 °C (-40...176 °F)
Base Plate Size (length x width)	All models	152.4 x 88.9 mm (6.0 x 3.5")
Installed Height	LD3 with UA3	Model 01K to 10K: 70.1 mm (2.76") Model 15K to 25K: 84.6 mm (3.33")
	LD3 with LT3	Model 01K to 07K: adjustable from 104 to 107,2 mm (4.09 to 4.22")
Top Adapter Plate Size (length x width)	All models	152.4 x 88.9 mm (6.0 x 3.5")

Accuracy table		
Model	**Rated Load**	**Tolerance / Accuracy**
01K	= 454 kg	± 0.36 kg
02K	= 907 kg	± 0.73 kg
03K	= 1,361 kg	± 1.01 kg
05K	= 2,268 kg	± 1.81 kg
07K	= 3,402 kg	± 2.72 kg
10K	= 4,536 kg	± 3.63 kg
15K	= 6,804 kg	± 5.44 kg
20K	= 9,072 kg	± 7.26 kg
25K	= 11,340 kg	± 9.07 kg

Specification LD360s		
Technical Features	Excitation Voltage - Operating Range	10...30 V DC Half-Bridge
	Maximum Current	3 mA @ 12 VDC excitation
	Impedance	7.5 kΩ ±1 %
	Recommended Supply Voltage	12 V DC
	Compression	4 x rated load
	Functional Integrity	2 x rated load (compression)
	Humidity	100 %
	Protection Class	IP68 / NEMA-6P
	Materials	Stainless steel 1.4542 (17-4 PH 900), Polished Finish
	Electrical connection	IP68 / 6P rated sealed 4-conductor, 12 mm male receptacle
	Cable	Female molded connector to 4 m (13 ft) pigtail
	Shipping Weight	2.3 kg (5 lbs)
Measurement Accuracy	Non-Linearity/Hysteresis Combined	0.08 % performance: 0.1 % standardized output
	Return to Zero	0.05 % standardized output
	Zero Balance	1 % rated capacity
	Rated Output	360 mV DC @ 12 V DC ±1 %
Deflection	All models	0.2 mm
Temperature ranges	Ambient Temperature Range	Standard: -18...38 °C (0...100 °F); Mid: 10...66 °C (50...150 °F);
	Temperature Sensitivity	0.027 %/°C (0.015 %/°F)
	Storage Temperature Range	-40...80 °C (-40...176 °F)
Base Plate Size (length x width)	All models	152.4 x 88.9 mm (6.0 x 3.5")
Installed Height	LD360s with UA360	Model 01K to 10K: 70.1 mm (2.76") Model 15K to 25K: 84.6 mm (3.33")
	LD360s with LT360	Model 01K to 07K: adjustable from 104 to 107.2 mm (4.09 to 4.22")
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25K	= 11,340 kg	± 9.07 kg

Field of application / intended use

Description

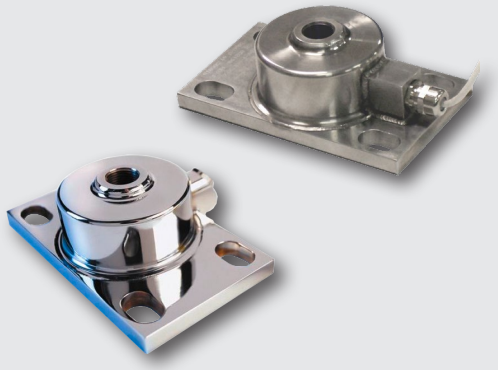
The Load Disc is a compact load cell that is bolted to both the support surface and the vessel supports and is used to measure the weight of materials in vessels and tanks. The sealed, stainless steel construction with waterproof cable system and cable entry (IP68 / NEMA-6P rating) makes the Load Disc ideal for use in applications involving high pressure wash down and occasionally submerged environments.

The low-profile design for low clearance installations keeps the centre of gravity of the vessel low and stable. Vessel tipping, walking or overturning during agitation is eliminated. Installation and set-up is simplified by the reduction of components.

No external vessel hold-downs are required, even in areas of high wind or seismic activity.

There are no moving parts that wear out or require replacement. The high output power of the solid-state sensor allows for immunity to industrial electrical noise and longer distances from the load cell to the signal processor.

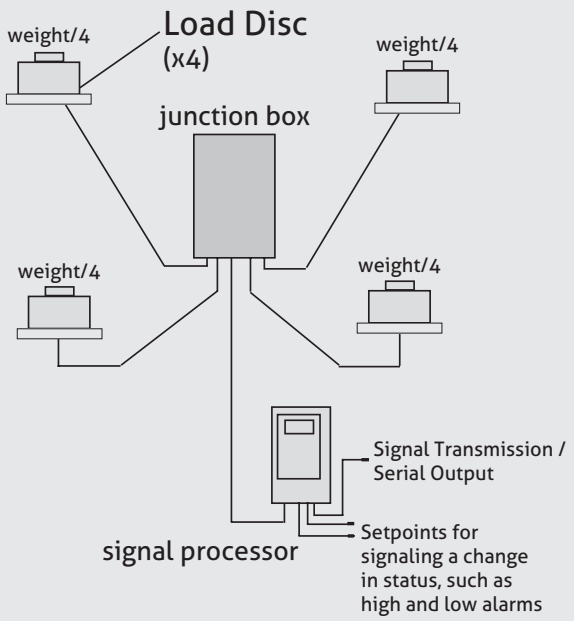
Figure 1-1
Load Disc compression load cell with optional IP68 / NEMA-6P cable system



Measuring system

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

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



Applications

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

Description of the installation options

Hardware options for the Load Disc

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

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

Universal Top Adapter Plate

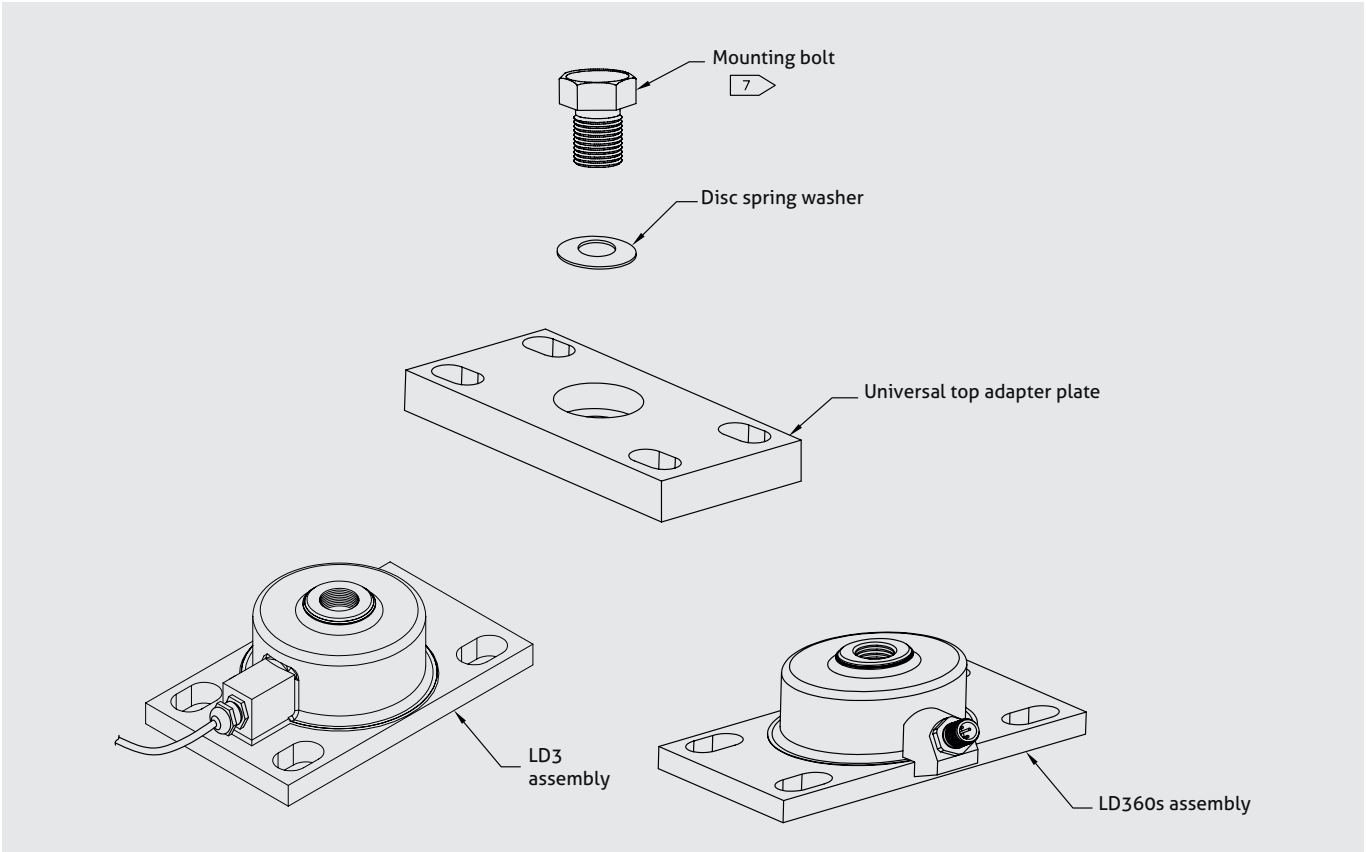
Contents: Universal Top Adapter Plate, spring washer, hexagonal fixing screw.

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

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

Note

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



Leveling Top Adapter Plate (nominal load 450 - 3,400 kg)

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

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

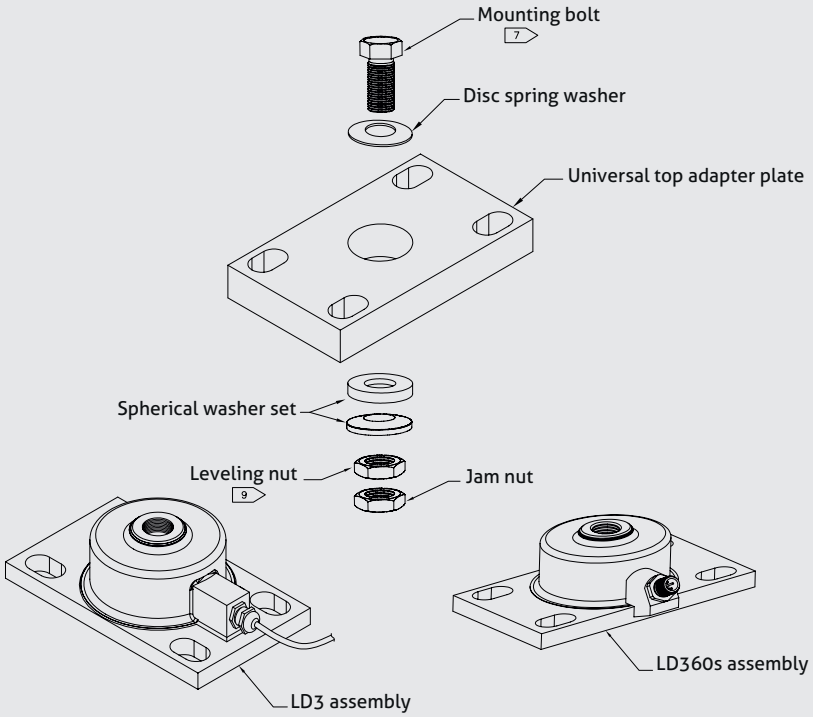
The additional leveling function allows vertical height adjustment, which is secured by a locking-jam nut.

Note

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

360° movement of the top plate.

Height adjustment from 104 to 107.2 mm.



Anyadapter Top Adapter Plate (Optional on request, nominal load 450 - 3,400 kg)

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

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

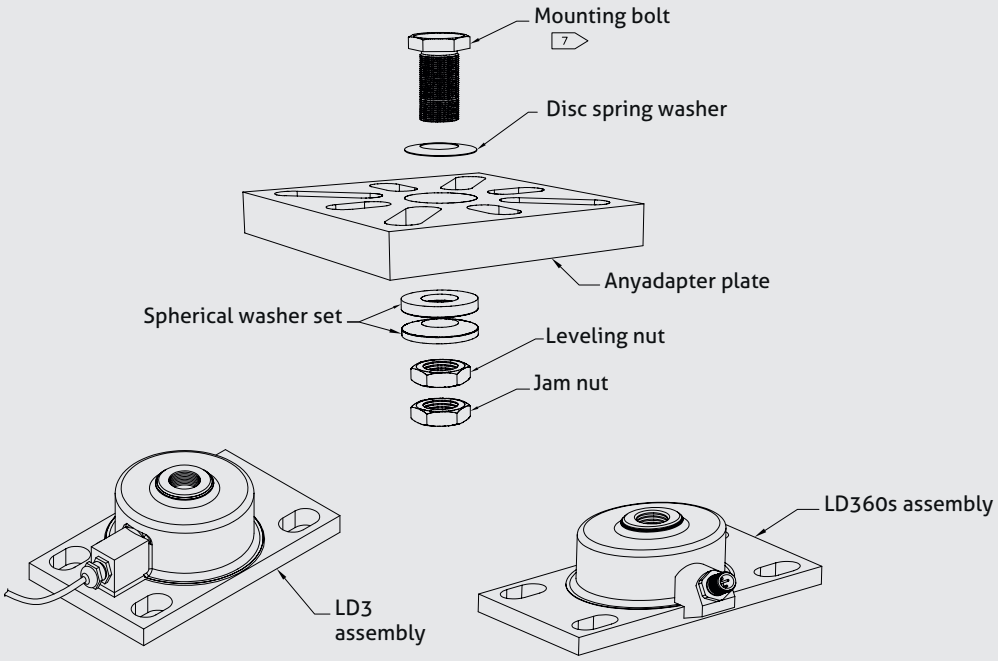
The additional leveling function allows vertical height adjustment, which is secured by a locking-jam nut.

Note

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

360° movement of the top plate.

Height adjustment from 104 to 107.2 mm.



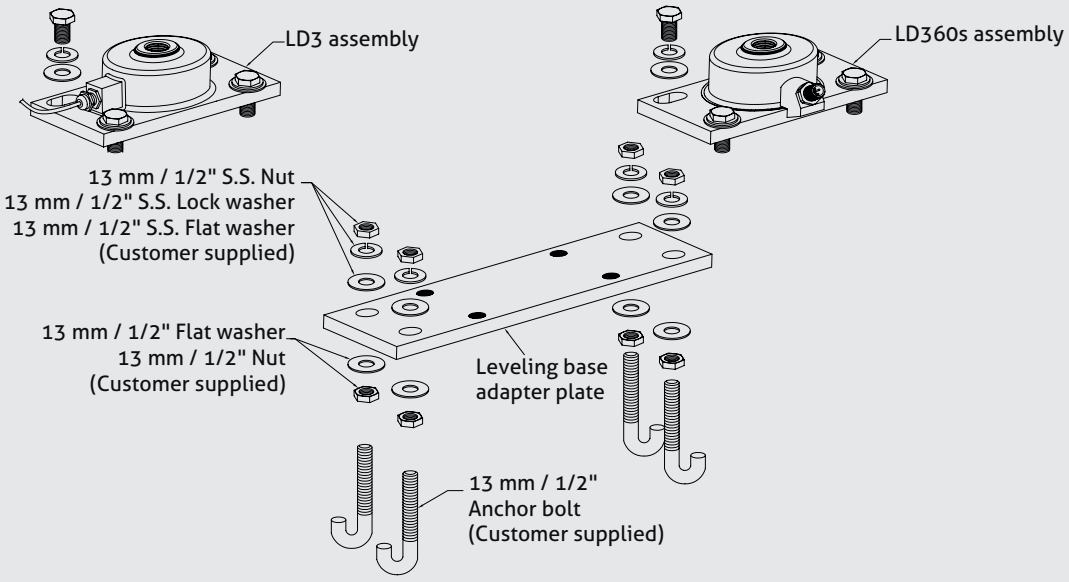
Leveling Base Plate

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

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

Note

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



Preparing for the Load Disc installation

Check shipment

Check Load Disc order items

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

· Load Disc Load Cell

· Junction box

· Top or bottom mounting hardware.

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

Visual inspection

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

Note

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

Equipment (customer side)

The following equipment is needed to install Load Discs:

· Lifting equipment

· Tape measure

· Level

· Pry bar

· Marking pen

· Wrenches

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

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

· Anderson-Negele test gauge or signal processor

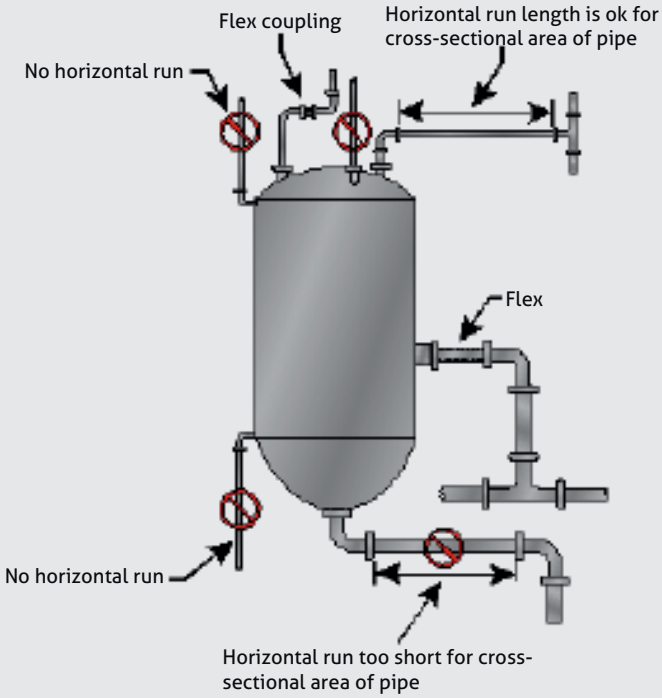
· Shims (if applicable)*

· Grout (if applicable)*

· Digital Multimeter (DMM), optional

* See Technical Drawings in Appendix for appropriate bolt size.

Figure 2-1:
Examples of typical causes of error



Vessel preparation

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

- An inadequate vessel foundation may allow excessive movement. Ensure the foundation is concrete or steel.
- Hidden load-bearing structures, such as discharge chutes or plumbing supported by the floor, can reduce loads on the vessel supports. Install flexible couplings to minimise this problem.
- Cross-connecting structures can transfer loads from adjacent vessels. Install slip joint or flexible couplings to minimise this problem.
- Shock loads can damage the Load Disc. Install protective barriers or stops to prevent vehicles from hitting the vessel supports.

Factors influencing performance

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

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

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

Mounting the Load Disc

General information

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

Hardware and bolts

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

Load Disc General installation

Installation with:

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

1. Before installing the Load Discs, make sure that they have the correct capacity for your application (this is engraved on the Load Disc base plates).
2. Connect the Load Disc cable to the test meter. Measure the Load Disc voltage output. With no-load, the preliminary measurement should be between +5mV and -5mV. (This measurement range is only used to verify the condition of the Load Disc). If the reading is significantly outside this range, contact Anderson-Negele before proceeding with the installation.
3. Raise the vessel.
4. Remove the cable from the test meter to the Load Disc.
5. Insert the bolt through the centre hole of the adapter plate and install the hardware for your application (see Appendix: TI Drawings).
   a) For Universal Top Adapter Plate: Attach the screw and plate to the Load Disc and tighten the screw to 7-14 Nm.
   b) For Leveling Top Adapter Plate and Any-Adapter Top Plate: Loosely attach washers and nuts to the Load Disc, then tighten the screw to 7-14 Nm.
6. For Leveling and Anyadapter applications, adjust the plate to the lowest position by lowering and tightening the jam nut onto the Load Disc. Then lower the leveling nut onto the jam nut.

Caution

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

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

Securing the Load Disc after leveling/shimming

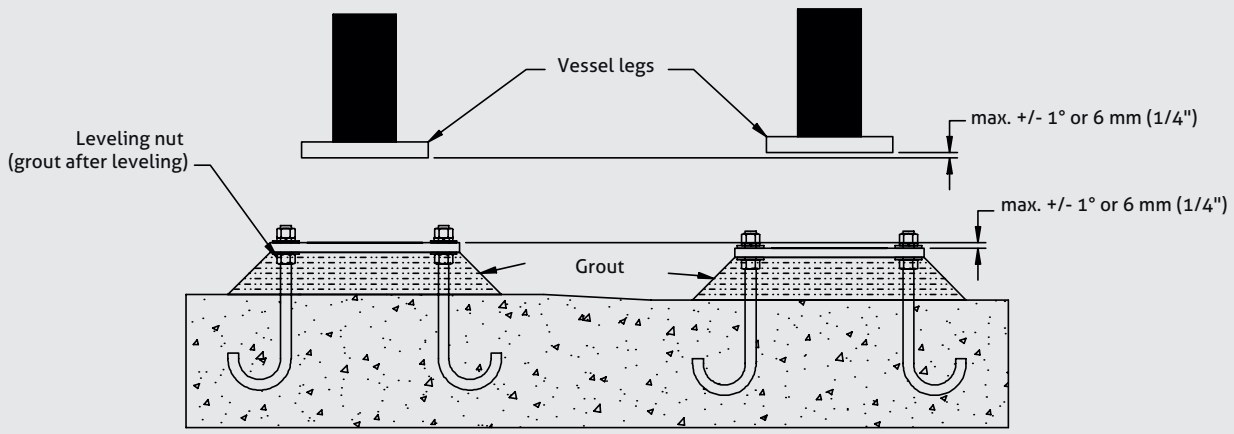
When the criteria for weight distribution through leveling and/or shimming have been met, complete the installation by tightening the screws.

Note

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

7. Inspect the foundation and vessel mounting surfaces at the location of the Load Disc plates.
   a) Check the position and size of the mounting holes on the foundation base and the base plate of the vessel. (Refer to the TI drawings, Appendix).
   b) Check the surfaces for flatness and angular misalignment. A base plate with leveling nuts is recommended. (See figure 3-1 below)

Figure 3-1
Uneven surfaces



8. Mount the Load Disc assembly on the foundation. (See TI drawings, Appendix)
   a) Carefully lower the Load Disc onto the foundation. Make sure to align the mounting holes with the foundation mounting holes/bolts.
   b) Install the bolts and nuts as required. DO NOT fully tighten the bolts at this time. Leave a gap of 5-6 mm (1/4") 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.
9. Reinstall the Load Disc cable and record the output voltage at „no load" condition now that it is in position.
   a) Connect the Load Disc cable to the test meter as shown in Figure C-1 Troubleshooting.
   b) Turn on the 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 as in Figure 3-5.
   d) Assign a number to the Load Disc (1, 2, 3, etc.) and note it
   e) Repeat steps c and d for all Load Discs.

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

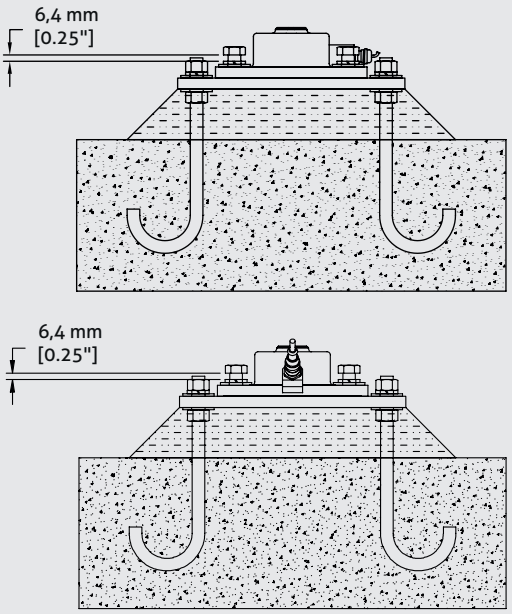


Figure 3-3
Weight Distribution Chart: Record YOUR system's Load Outputs

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

10. Mount the vessel on the Load Disc.
    a) Carefully lower the vessel onto the Load Discs. (Alignment pins can be used to guide and position the vessel) (See Figure 3-4).
    b) Center the top mounting holes of the Load Discs with the mounting holes of the vessel by fine alignment.

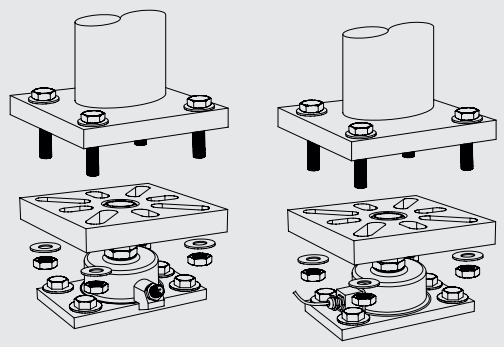
Note

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

    c) Place the four top bolts (customer supplied) through the vessel and the Load Disc mounting holes. The bolts must be able to pass freely through the holes without interference.
    d) Tighten the bolts, leaving a 5-6 mm gap for positioning. (See Figure 3-2)
11. Check dead weight output.
    a) Connect the Load Disc cable to the test meter.
    b) Record the dead weight values on your weight distribution chart started on page 13.

       See the example below in Figure 3-5.
    c) Calculate the output change. (The change should be positive).
    d) The output increase from no load to dead weight should be within ten percent of the AVERAGE of all measurements. In the following example, the average output change for Load Discs No. 1, No. 2, and No. 4 meets this condition, while that of Load Disc No. 3 is too low, indicating that it carries less weight.
    e) Load Disc No. 3 requires a shimming and/or leveling procedure that distributes the weight more evenly among all supports. (See page 15, Leveling/ Compensation).

Figure 3-4
Lower vessel onto top plate.



Note

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

Note

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

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

Calculation example

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

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

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

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

Leveling and Shimming

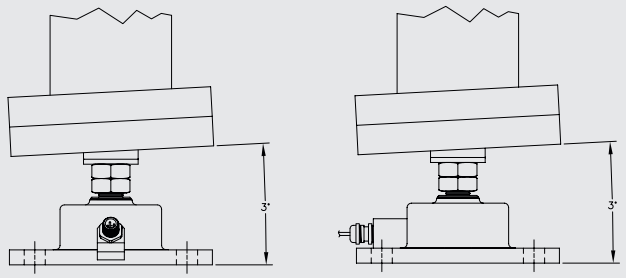
The main objective of vessel leveling/shimming is to distribute the weight evenly across all Load Discs. Uneven weight distribution will reduce the accuracy of the entire weight measurement system and, in extreme cases, may damage the Load Discs.

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

Universal Top Adapter Plate UA

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

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



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

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

Note

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

Note

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

Note

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

Note

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

Caution

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

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.

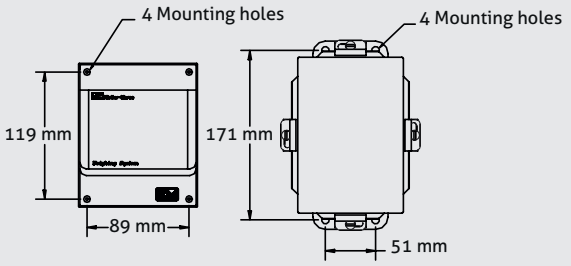
Mounting and wiring of the Stainless Steel Junction Box

Mounting junction box

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

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

Figure 3-7
Plastic and Stainless Steel Junction Box Mounting



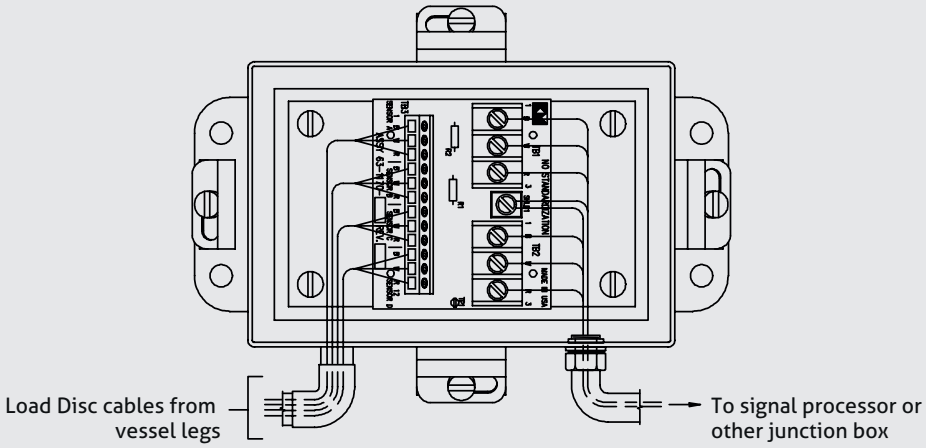
Wiring the Load Disc to the Junction Box

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

Proceed as follows:

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

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



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

Note

Earth the cable shielding only at the signal processor.

6. Follow steps 2 to 5 for each load disc you wire to this junction box. Up to two Load Disc can be wired to each terminal.
7. Replace the junction box cover if not ready to begin wiring the junction boxes together.

Wiring Stainless Steel Junction Boxes Together and to Signal Processor

1. Remove the junction box cover.
2. Based on Figure 3-9, route the 3-wire cable through the fitting into the junction box farthest from the signal processor. Connect the wires of the cable to terminal TB1/TB2 in the junction box: the black wire to B, the white wire to W, and the brown or red wire to R.
3. Route the cable through a conduit to the nearest junction box. Estimate the required cable length to the terminal block, leaving a little extra for strain relief. Cut off the excess cable. Connect the wires of the cable to terminals TB1/TB2 in the junction box: black wire to B, white wire to W, and brown or red wire to R.
4. Route another 3-wire cable through the fitting into this junction box and connect the wires to the TB1 TB2 terminal: the 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. For information on wiring the junction box to the signal processor, refer to the signal processor manual. One vessel occupies one channel in the Signal Processor - the channel shows the average value of all Load Discs under the vessel.

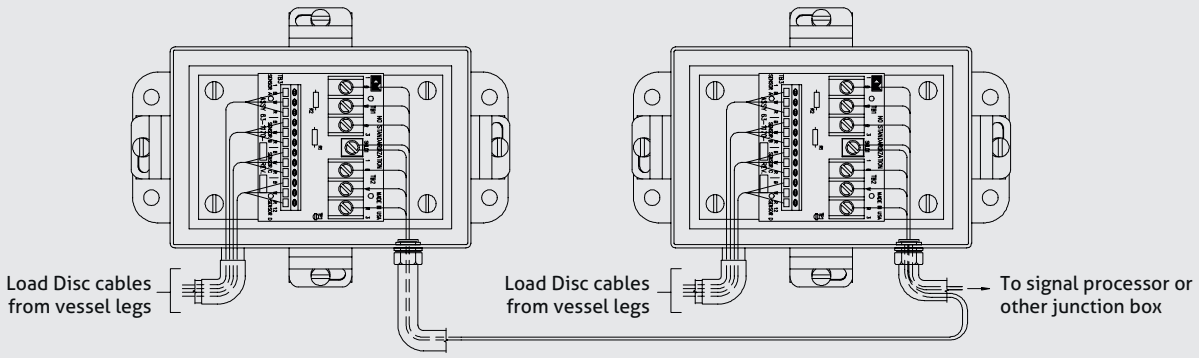
Note

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

Caution

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

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



System Calibration for the Load Disc

Calibration methods

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

There are two calibration methods:

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

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

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

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

Refer to the indicator manuals for detailed calibration instructions.

Troubleshooting the Load Disc System

Function Test: Measurement Output

1. Connect the brown or red, white and black wires of the Load Disc to the corresponding terminals of the test meter as shown in Figure C-1. Place the Load Disc on a stable surface.
2. Turn on the test meter and set the Simulate/Test switch to the Test position.
3. Make sure that the no-load output is between +5 mV and -5 mV. (This preliminary measurement specification simply determines the state of the Load Disc. If the output reading is outside of +/-5 mV, contact Anderson-Negele.)
4. Repeat steps 2 and 3 for each load disc.

Functional Test: Measuring Resistance

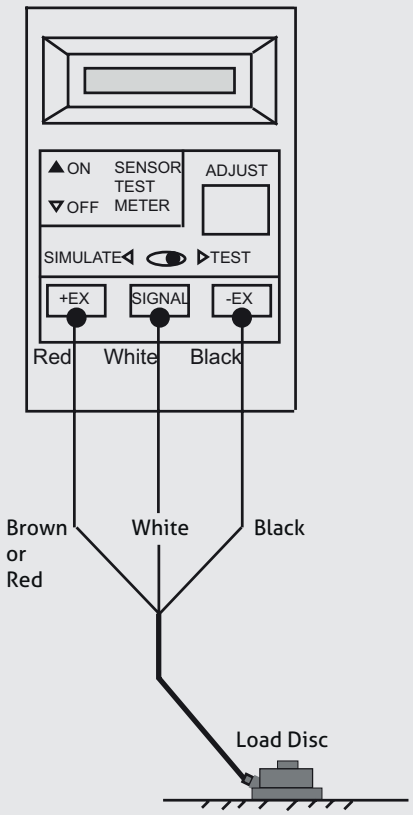
Follow this procedure to test the Load Disc if you do not have an Anderson-Negele test meter or if the no-load output with the test meter is out of range for a Load Disc.

1. Set the resistance scale of the ohmmeter to the range up to 20K ohms.
2. Connect one DMM (digital multimeter) lead to the black wire of the Load Disc and the other lead to the brown wire. Check that the resistance from brown to black is between 4.0 K ohms and 6.0 K ohms.
3. Place the load disc on a stable surface. Connect one DMM lead to the white wire on the Load Disc and the other lead to the brown wire. Make sure that the brown to white resistance is between 8.5 K ohms and 9.0K ohms.
4. Place one DMM lead on the white wire of the load disc and the other lead on the black wire. Verify that the black to white resistance is between 8.5 K ohms and 9.0 K ohms and is within 40 ohms of the brown to white value from step 3.
5. Repeat steps 2 through 4 for each load disc. If a reading is outside the above ranges, contact Anderson-Negele before proceeding with the installation.

Note

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

Figure C-1
Load Disc connection to the Anderson-Negele test meter



Problem	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in the display	Fluctuations can be caused by moisture in cable conduit, junction boxes, or PCBs.	Check conduit, junction boxes, and PCBs for water contamination. Find water entry source and correct problem. Dry with a hair drier. Remove/replace corroded parts and materials. **Caution** If using sealant to eliminate water entry, use Sikaflex ™ 1A polyurethane sealant or Dow Corning™ RTV 739 or RTV 738. Other sealants may contain acetic acid, which is harmful to electronics.
	Fluctuations can be caused by damaged Load Disc.	Using Digital Multimeter (DMM), check resistance of the individual Load Discs: 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	Description	Solution
Small Amplitude Changes or Erratic Fluctuations in display readings	Fluctuations can be caused by problems with signal processor.	Check signal processor excitation voltage and incoming AC voltage for accuracy and stability (refer to signal processor manual).
Sudden Change in Weight Reading or System Requires Frequent Recalibration	One broken Load Disc can cause indicated weight to shift up or down by large amount, up to 100% of full-scale live load.	Using Digital Multimeter (DMM), check resistance of the individual Load Discs as described above under step 1 to 6.
	Check signal processor excitation voltage and incoming AC voltage for accuracy and stability (refer to signal processor manual).	Sudden change in weight reading can be caused by problems with signal processor.

Appendix. Technical Drawings (TI)

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

REVISIONS					
LTR	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 (omnislide) Revised Note 6 to remove omnislide	ECN 06-072	SE 2-14-06	JD	2-14-06

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 descibed:

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's, 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. For 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 loacations and size on both the foundation base and the vessel foot pad.
   b. Also check the surfaces for flatness and angular misalignment. A baseplate with leveling nuts is recommended. (See Figure 1: Angular Misalignment).
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 a and b for remaing 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 c 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.

   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 ± 10% =
81.8mV ± (.1 x 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
150 VENTURE BLVD.
SPARTANBURG, SC 29306

TITLE: INSTALLATION ARRANGEMENTS 1K-25K, LOAD DISC 360s

SCALE: NONE

SIZE: B

FILE: TI-LC.LD360s-01

REF: KM

UNSPECIFIED TOLERENCES
DECIMALS .XX ±=.01
.XXX ±=.005
ANGLES: ±=1/2°
DEBURR & BREAK EDGES .005
Ⓓ = CRITICAL DIM. OR NOTE

MATERIAL: Noted

FINISH: _____

PART: TI-LC.LD360s-01

SHEET: 1 of 14

Leveling and Shimming:

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

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

Leveling for the Universal Top Adapter Plate

1. Based on the Weight Distribution Chart (Figure 3) and visual inspection, cut/place shims as required to adjust adjust the distribution of weight on the Load Discs. Begin with the "smallest change" disc first.
2. Measure the dead weight output and the output change change of all of the Load Discs to see how they are affected. Record again into the Weight Distribution Chart (Figure 3).
3. Repeat Steps 1 and 2 until you have achieved the desired output change of all of the Load Discs.
4. Securing 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 1and 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.

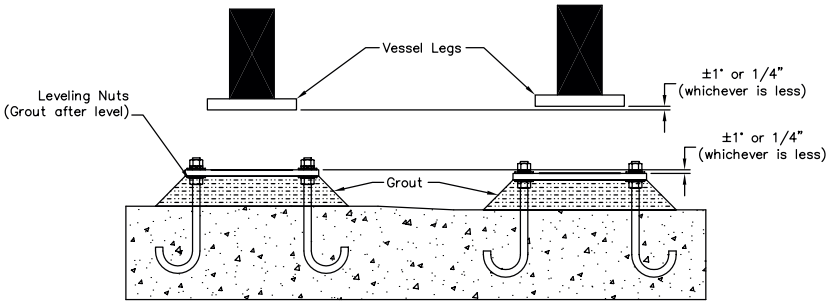


FIGURE 1: ANGULAR MISALIGNMENT

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

Anchor bolts supplied by customer.

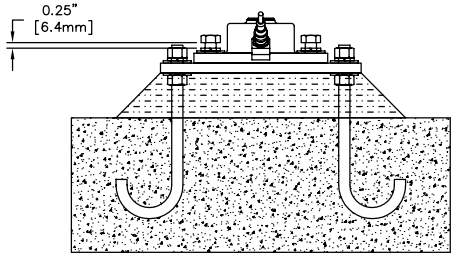


FIGURE 2: LEAVE 1/4" GAP FOR POSITIONING

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 wher 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 [13mm] Anchor Bolts and Nuts (ASTM–325, or equivalent SAE grade 8 or stronger).

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

5. Deleted

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

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

8. When using leveling nuts, after leveling and load balancing of Load Discs is completed and Load Discs are secured in place, pack grout or cement in place. When grouting underneath the steel plate, do not grout past the bottom edges of the steel plate to facilitate removal of the Load Disc 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 tess can also be used. Check J–Box first to insure adequate space is available before punching conduit holes and mounting J–Box.

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

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

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

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

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

FIGURE 4: EXAMPLE OF DEAD WEIGHT OUTPUT AND OUTPUT CHANGE

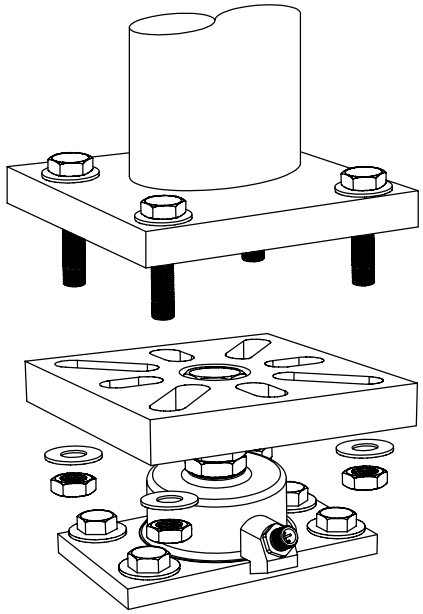


FIGURE 5: LOWER VESSEL
ONTO TOP PLATE
1Klb-7.5Klb SYSTEMS ONLY

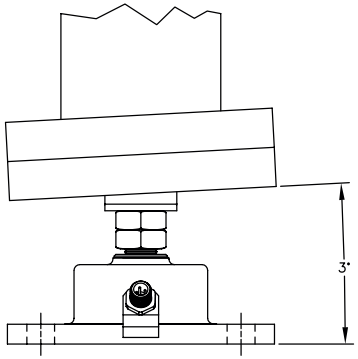


FIGURE 6: ANGULAR MISALIGNMENT
UP TO 3 DEGREES
1Klb-7.5Klb SYSTEMS ONLY

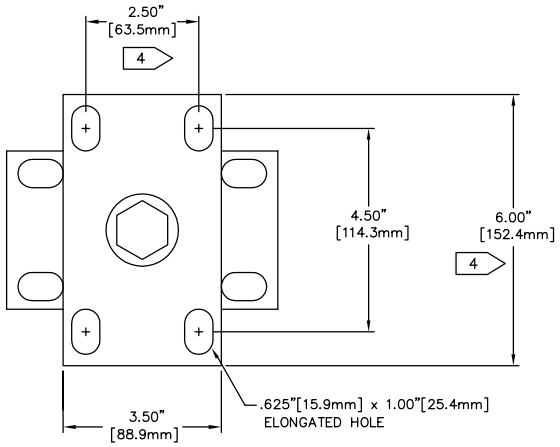
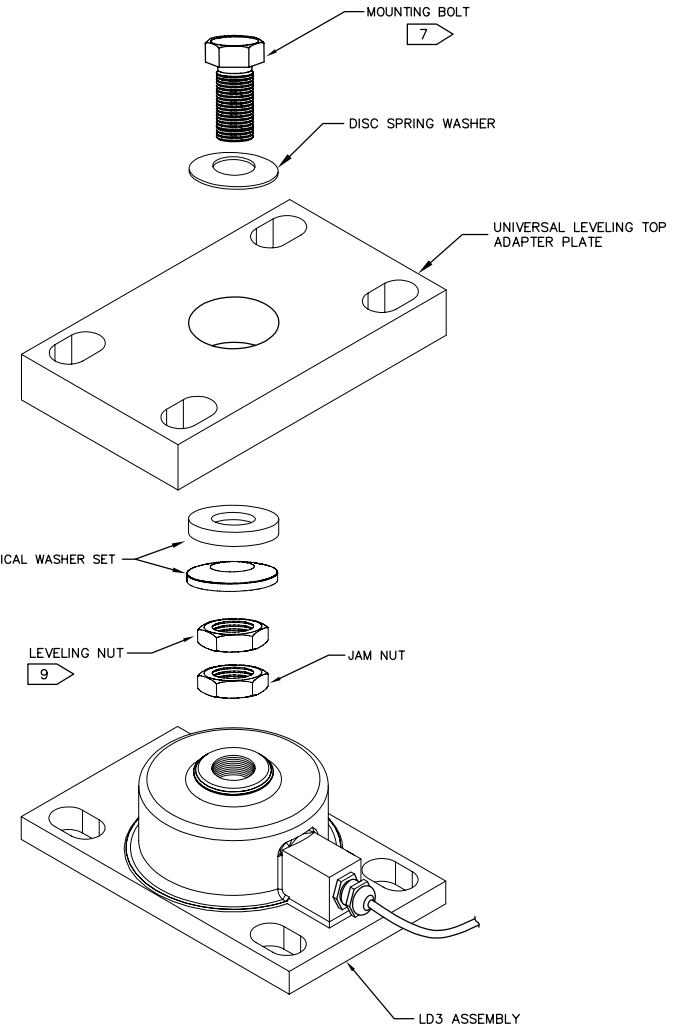
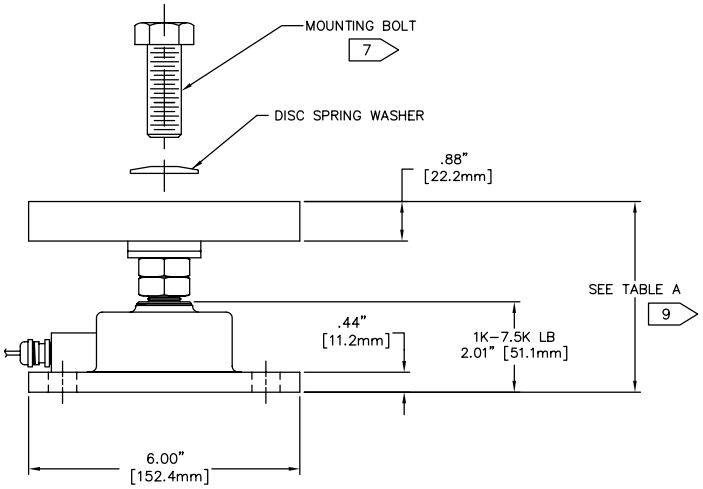
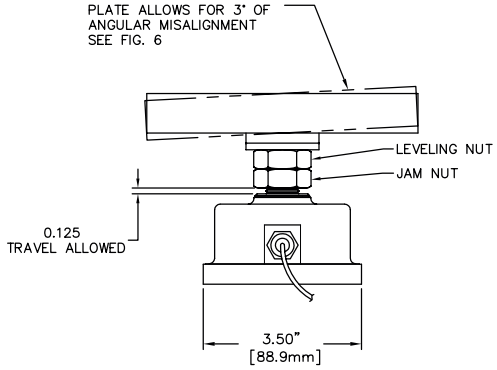


TABLE A

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

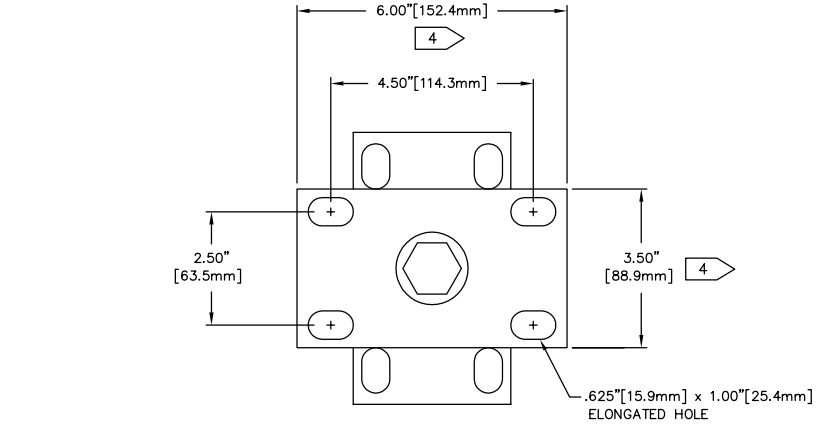


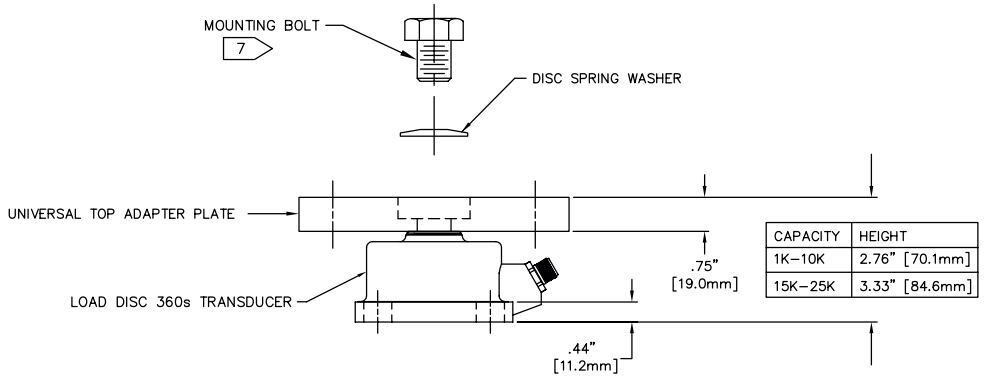




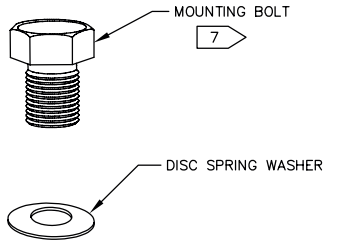
1Klb-7.5Klb LOAD DISC LD3 TRANSDUCER
WITH LEVELING TOP UNIVERSAL ADAPTER PLATE
MOUNTING DIMENSIONS

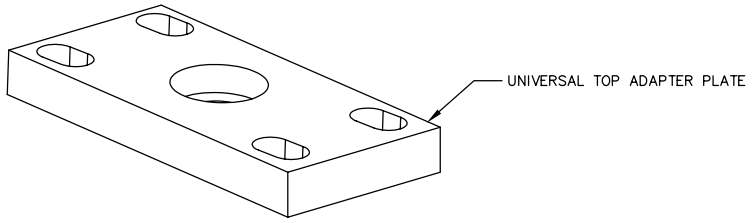
PART	SHEET
TI–LC.LD3–01	5of14 RevA

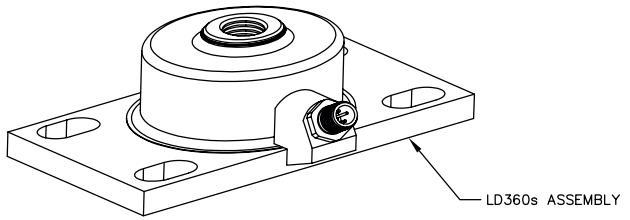




CAPACITY	HEIGHT
1K–10K	2.76" [70.1mm]
15K–25K	3.33" [84.6mm]





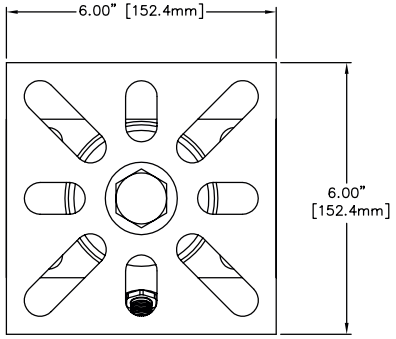


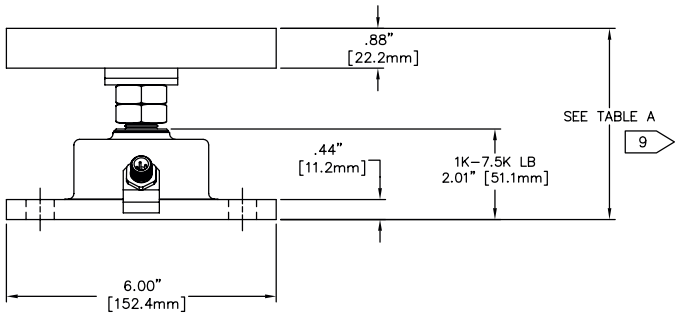
1Klb-25Klb LOAD DISC 360s TRANSDUCER
WITH UNIVERSAL TOP ADAPTER PLATE (UA360)
MOUNTING DIMENSIONS

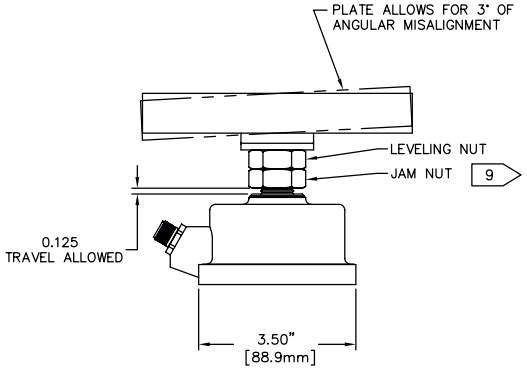
PART	SHEET
TI–LC.LD360s–01	6of14 RevD

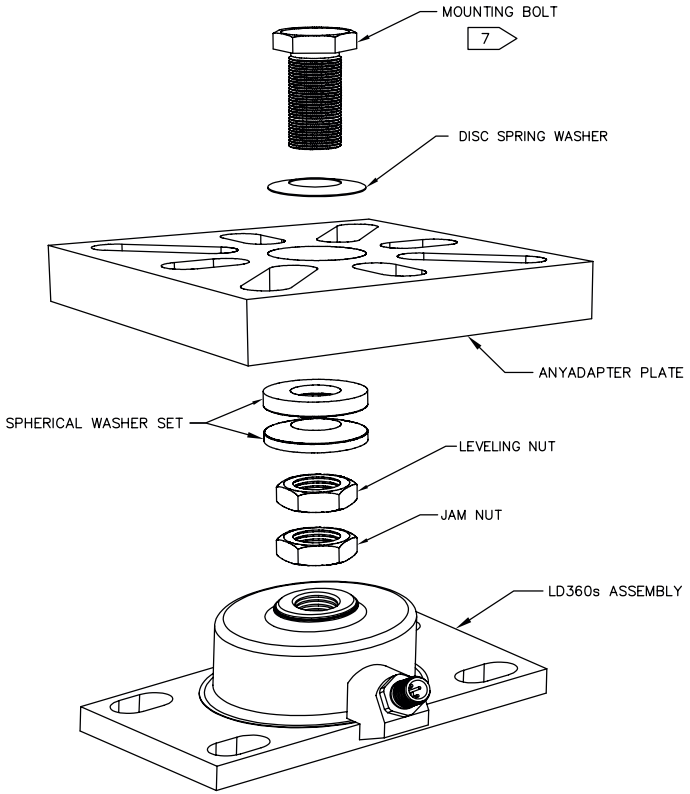
TABLE A

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



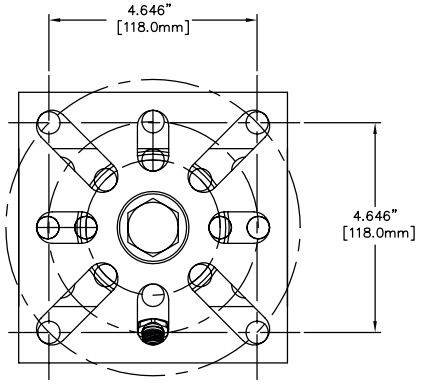


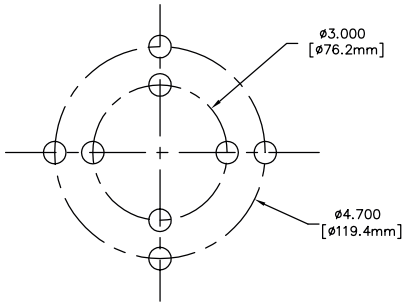




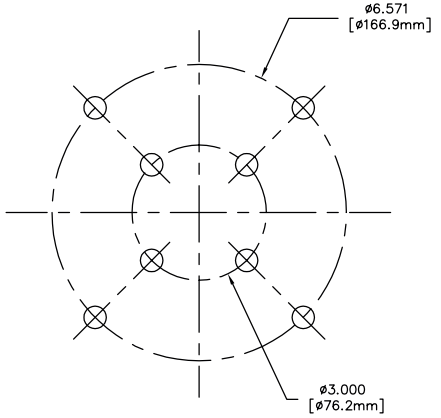
1Klb-7.5Klb LOAD DISC 360s TRANSDUCER
WITH ANYADAPTER TOP ADAPTER PLATE (AD360)
MOUNTING DIMENSIONS

PART	SHEET
TI–LC.LD360s–01	7of14 RevD





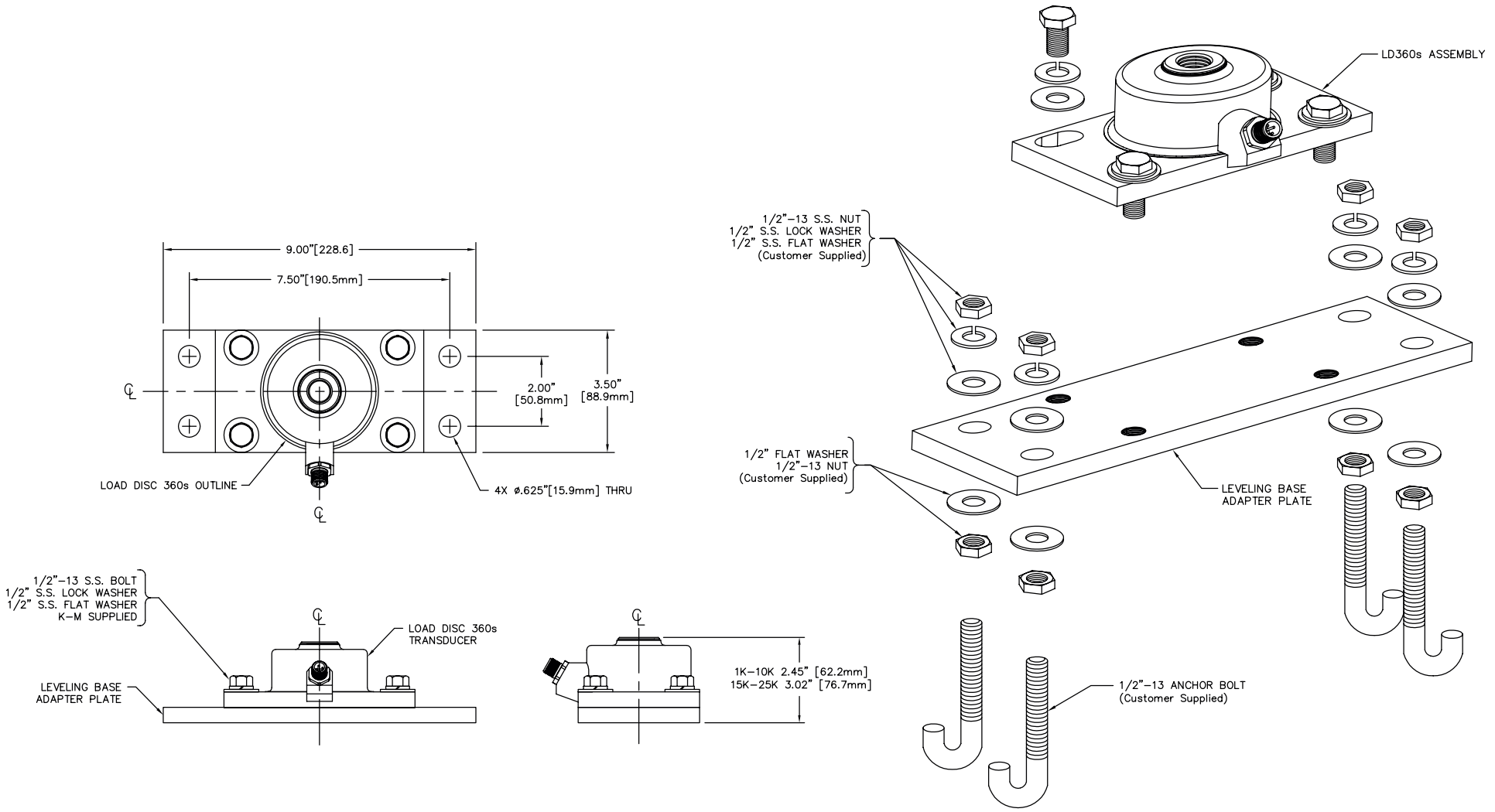
MINIMUM/MAXIMUM BOLT PATTERN
FOR HORIZONTAL/VERTICAL SLOTS



MINIMUM/MAXIMUM BOLT PATTERN
FOR ANGLED SLOTS

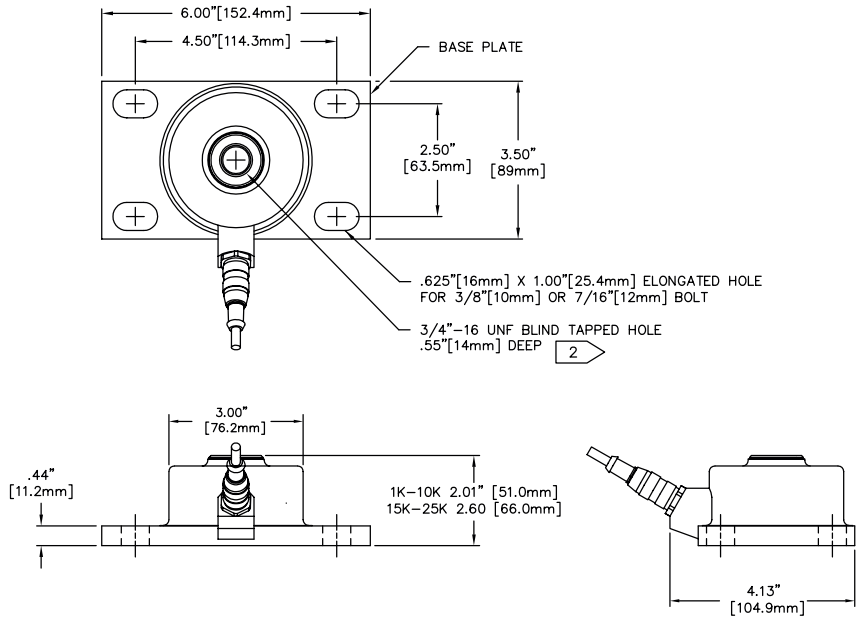
VESSEL MOUNTING HOLE PATTERNS
FOR ANYADAPTER TOP ADAPTER PLATE (AD360)
(MINIMUM (4) 1/2" HEX HEAD BOLTS REQUIRED)

PART	SHEET
TI-LC.LD360s-01	8of14 RevD

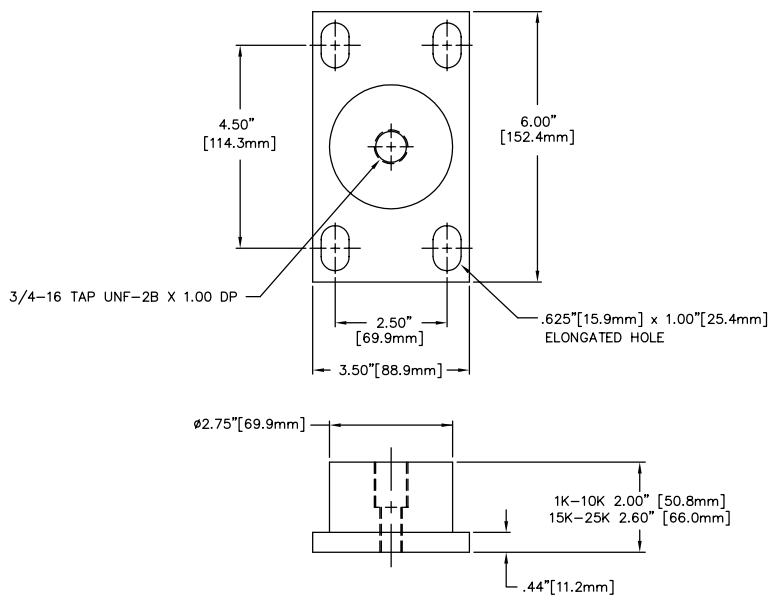


1Klb-25Klb LOAD DISC 360s TRANSDUCER
WITH LEVELING BASE ADAPTER PLATE (LB360)
MOUNTING DIMENSIONS

PART	SHEET
TI–LC.LD360s–01	9of14 RevD

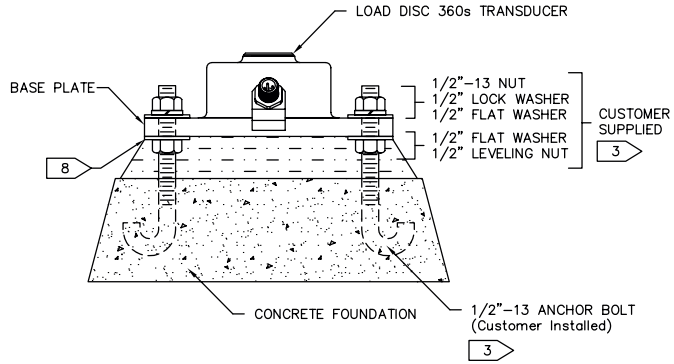


1Klb-25Klb LOAD DISC 360s TRANSDUCER
MOUNTING DIMENSIONS

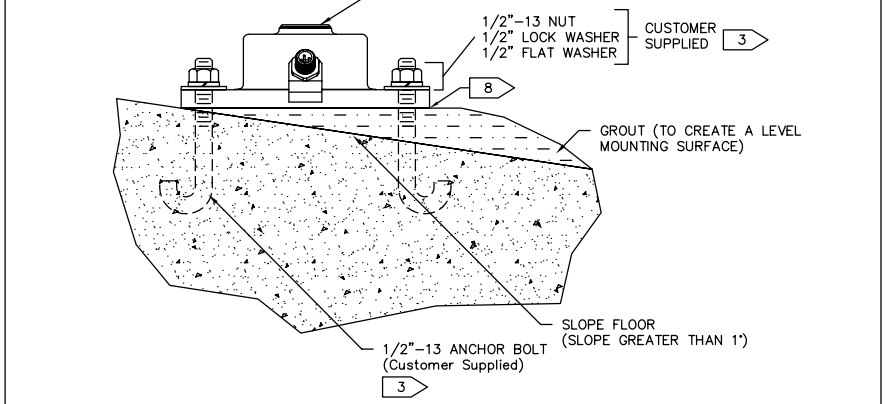


1Klb-25Klb LOAD DISC 360s TRANSDUCER DUMMY
MOUNTING DIMENSIONS

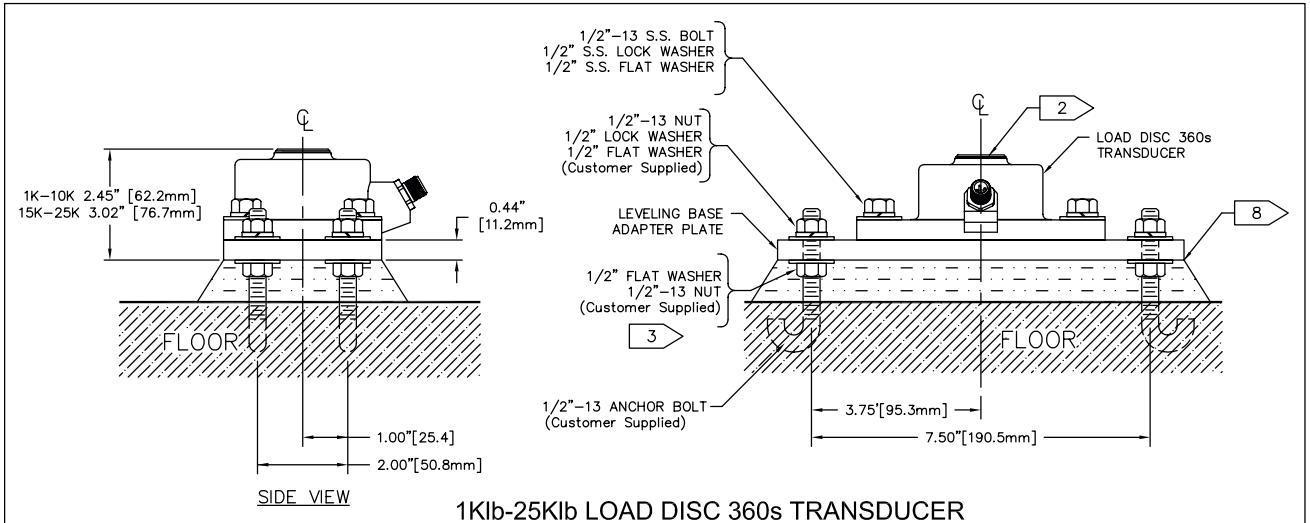
PART	SHEET
TI-LC.LD360s-01	10 of 14 RevD



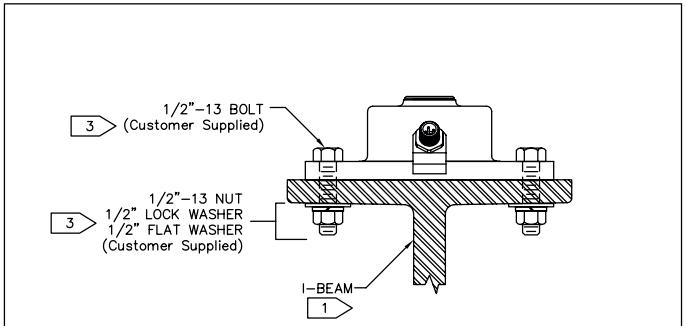
1Klb-25Klb LOAD DISC 360s TRANSDUCER ON
CONCRETE FOUNDATION WITH ANCHOR BOLTS



1Klb-25Klb LOAD DISC 360s TRANSDUCER
MOUNTED ON SLOPE FLOOR

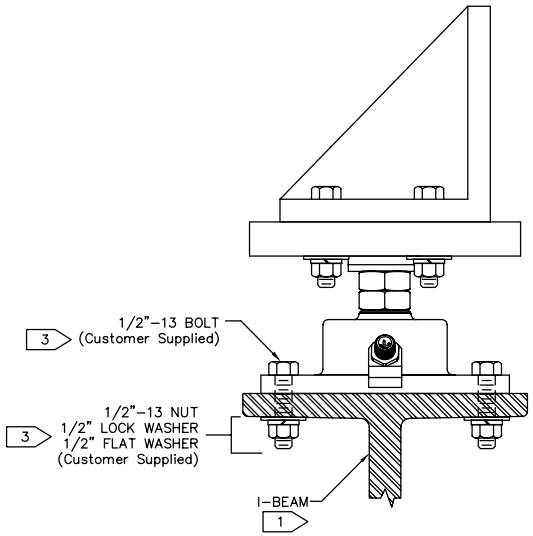


1Klb-25Klb LOAD DISC 360s TRANSDUCER
WITH LEVELING BASE ADAPTER PLATE (LB360)

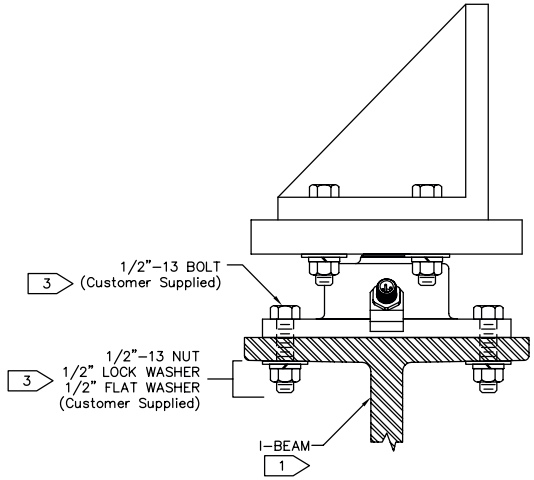


1Klb-25Klb LOAD DISC 360s TRANSDUCER
MOUNTED ON I-BEAM

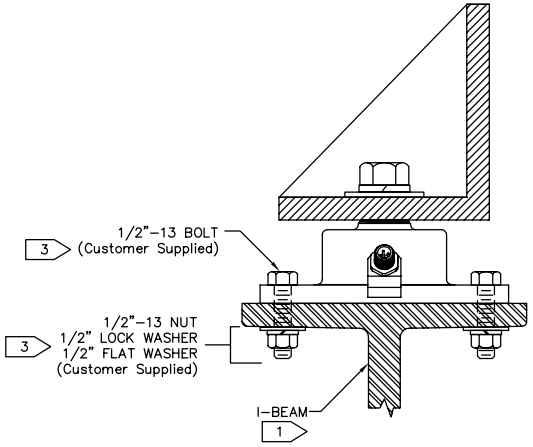
PART	SHEET
TI–LC.LD360s–01	11 of 14 RevD



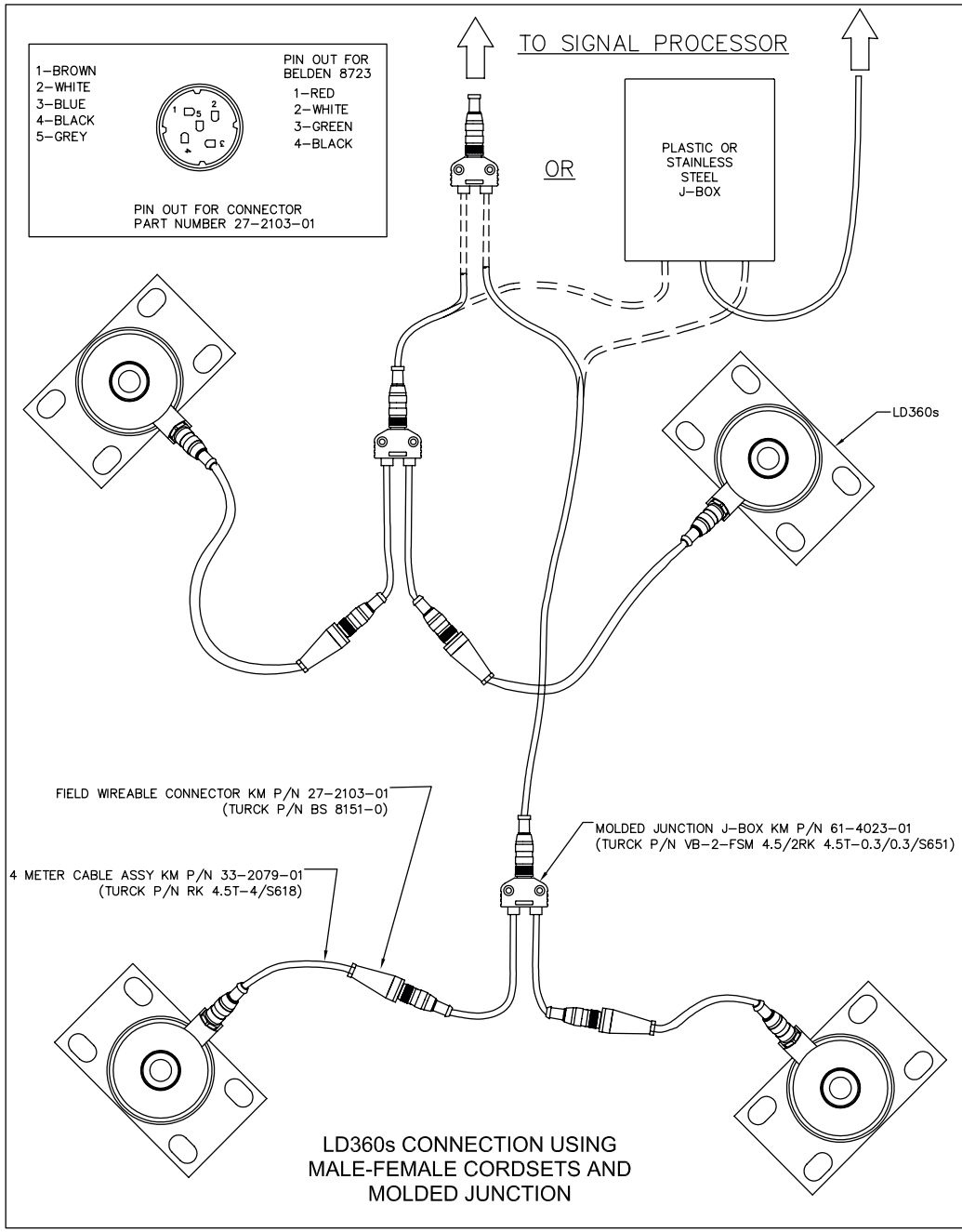
1Klb-7.5Klb LOAD DISC 360s TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.
LT360



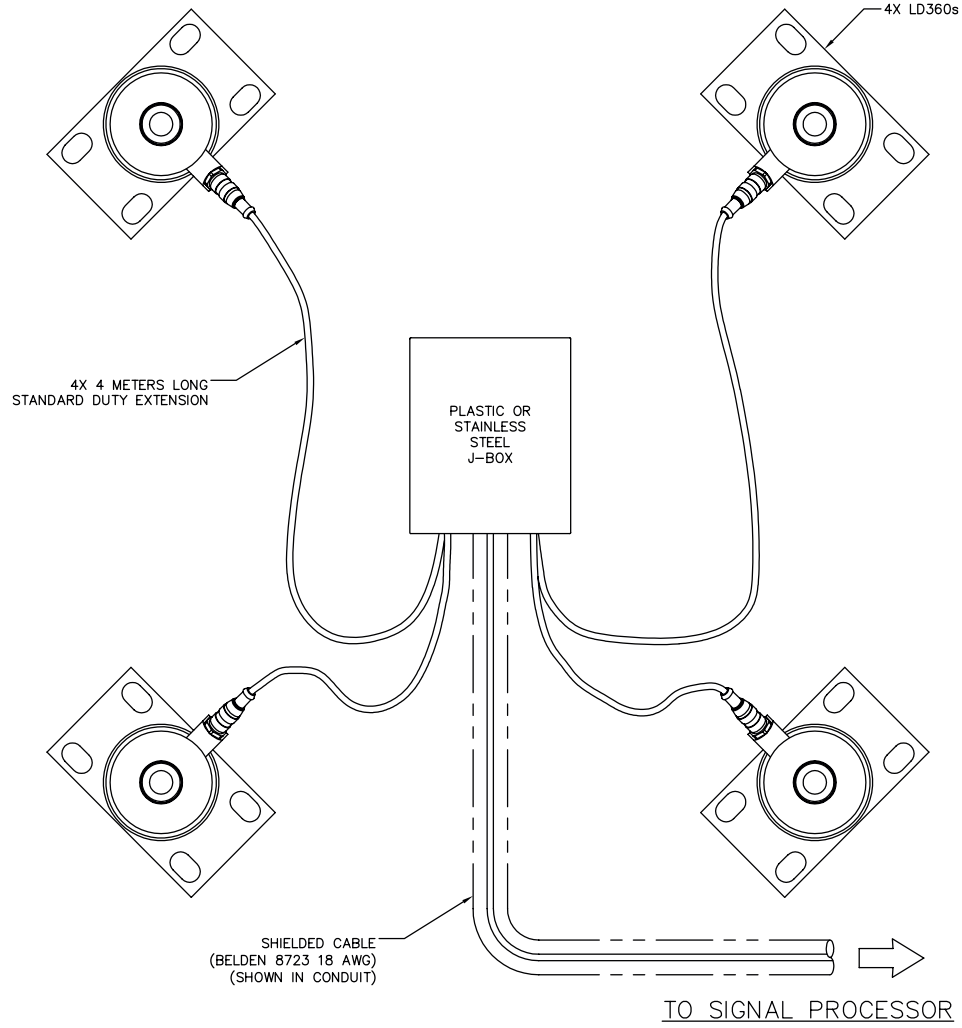
1Klb-25Klb LOAD DISC 360s TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.



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

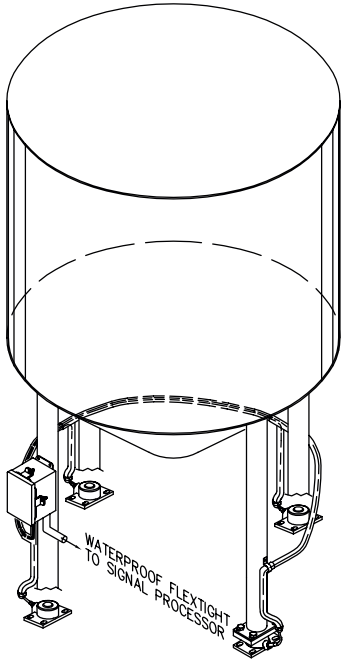


LD360s CONNECTION USING
MALE-FEMALE CORDSETS AND
MOLDED JUNCTION



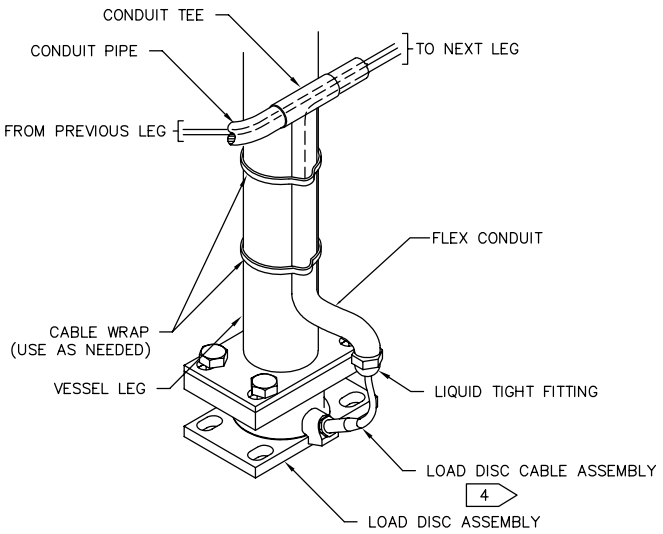
LD360s CONNECTION USING
STAINLESS STEEL J-BOX

PART	SHEET
TI–LC.LD360s–01	13 of 14 RevD



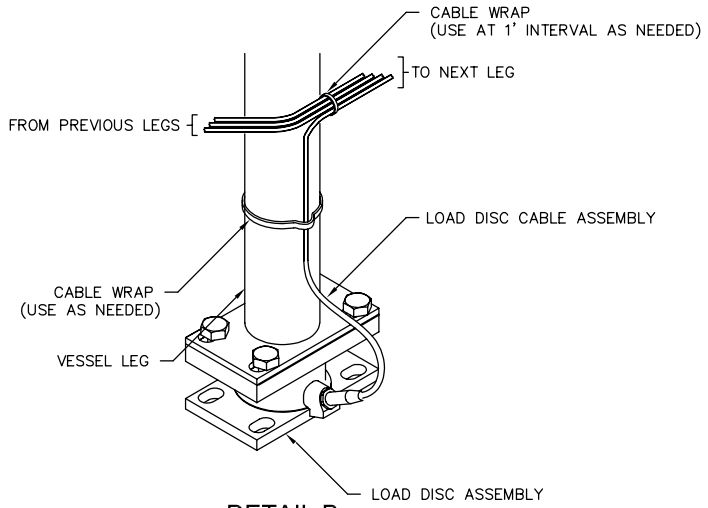
TYPICAL LOAD DISCS CABLE ROUTING ON VESSEL LEGS

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



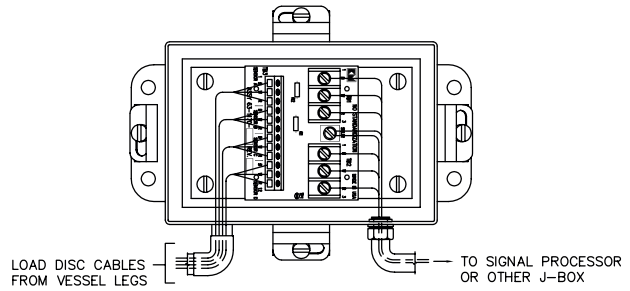
DETAIL A

CONDUITED LOAD DISC CABLE LAYOUT (PREFERRED)



DETAIL B

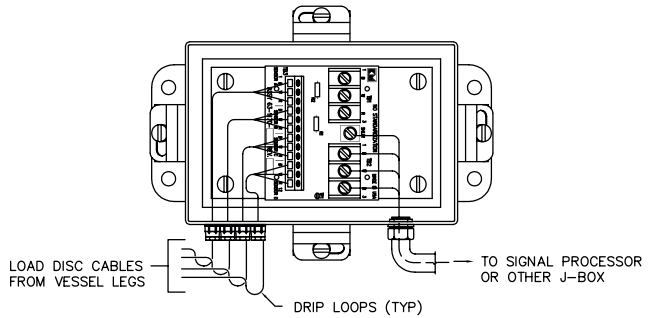
NON-CONDUITED LOAD DISC CABLE LAYOUT (NOT RECOMMENDED)



DETAIL C

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

12



DETAIL D

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

12

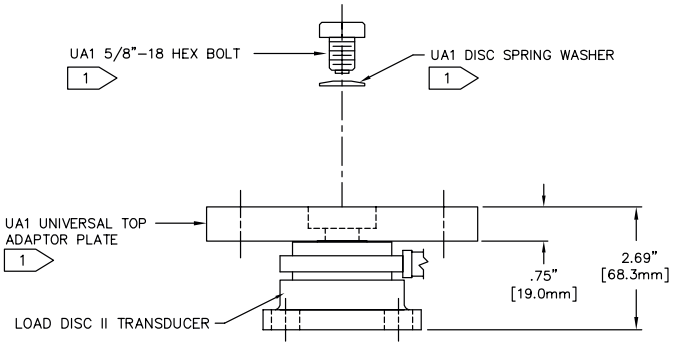
PART	SHEET
TI-LC.LD360s-01	14 of 14 RevD

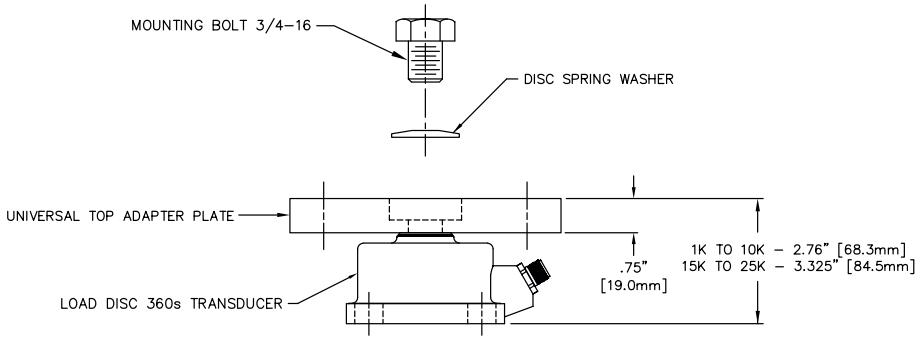
REVISIONS					
LTR	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE
A	PRODUCTION RELEASE	BWC	JT	TS	3/22/02
B	Deleted page 2 (omnislide)	ECN 06-072	SE 2-14-06	JD	2-14-06

NOTES:

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

LD360s/UA360 RETROFIT
FROM LD-II/UA1





UNCONTROLLED COPY

venture MEASUREMENT
150 VENTURE BLVD.
SPARTANBURG, SC 29306

TITLE: RETRO-FIT TI-DWG
1K-25K, LOAD DISC 360s

SCALE: NONE

SIZE: B

FILE: RF-LC.LD360s-01

REF: KM

UNSPECIFIED TOLERENCES
DECIMALS: XX ±=.01
XXX ±=.005
ANGLES: ±=1/2°
DEBURR & BREAK EDGES .005
(P) = CRITICAL DIM. OR NOTE

MATERIAL: Noted

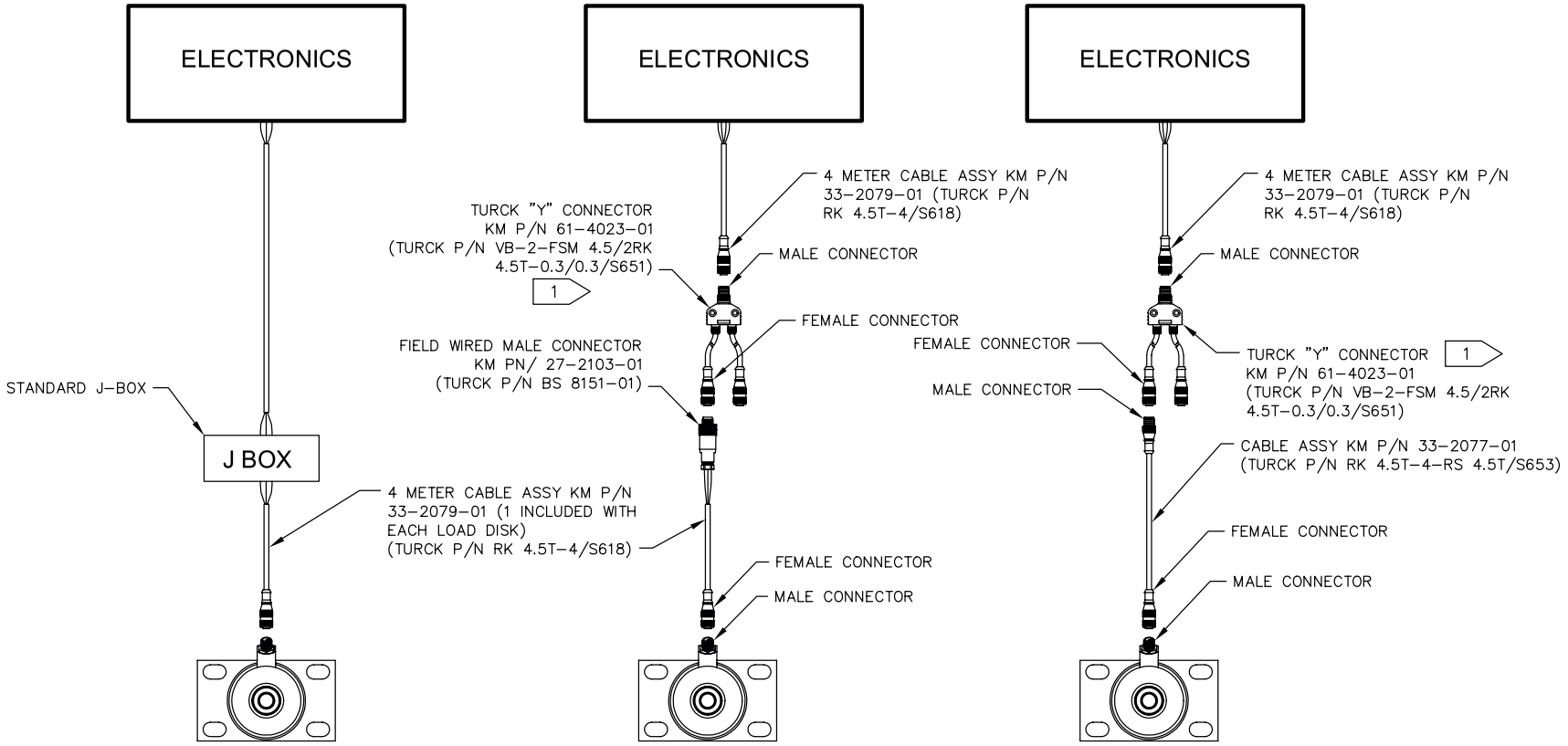
FINISH: _____

PART: RF-LC.LD360s-01

SHEET: 1 of 1

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

LD360s TYPICAL CABLING DIAGRAM



NOTES:

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

ECO ACCUMULATION:	APPROVALS	DATE
ECO 1:	DRAWN: BW Cooper	3/22/02
ECO 2:	CHECKED: J Thornton	3/22/02
ECO 3:	PROJ. ENGR: T Szymanski	3/22/02
ECO 4:	PRODUCTION:	
ECO 5: INCORPORATE ABOVE ECO'S	PURCHASING	

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

Kistler-Morse Bothell, WA

TITLE: LD360s TYPICAL CABLING DIAGRAM

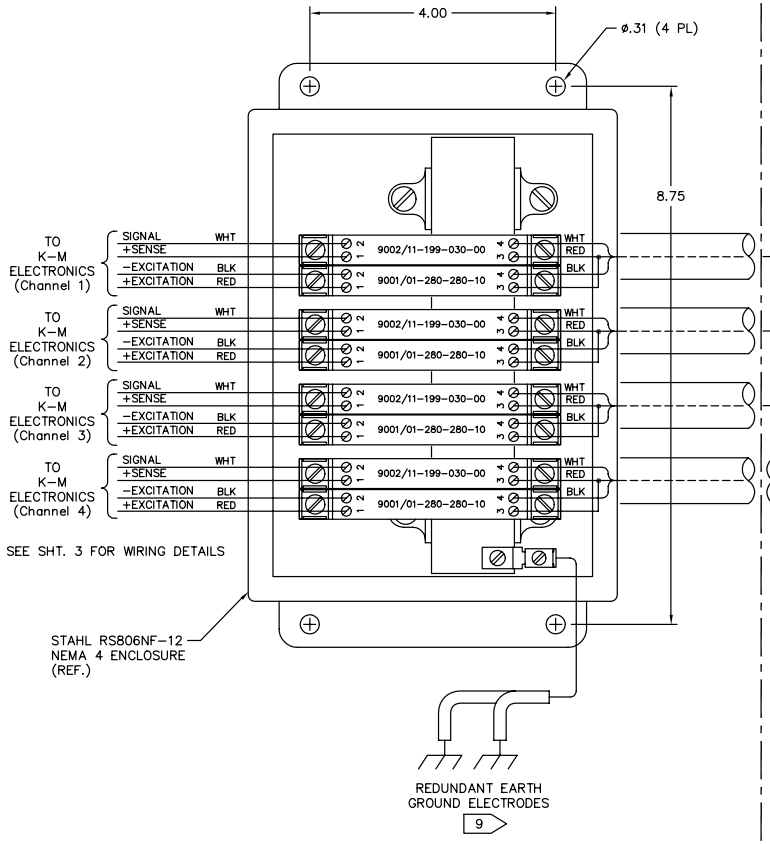
SIZE B | DWG. No. TI-LD360s-01 | REV. B

ACAD# TI-LD360s-01B | SHT 1 OF 1

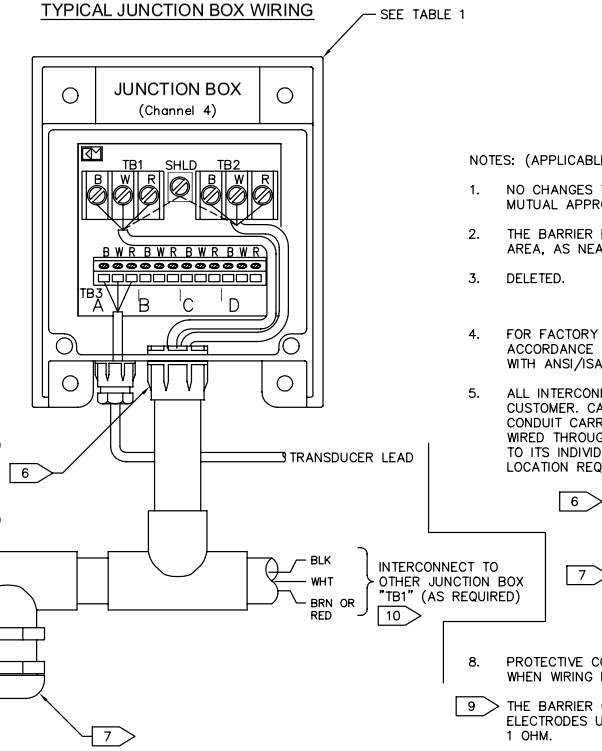
REVISIONS					
LTR	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE
A	PRODUCTION RELEASE	BWC	TS	TS	7/8/02
B	PER ECO 4915	DPS	TS	TS	9/03/02
C	PER ECO 4928	BWC	TS	TS	9/26/02

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

(TYPICAL INTERCONNECT DIAGRAM)



TYPICAL JUNCTION BOX WIRING



NOTES: (APPLICABLE TO SHEETS 1, AND 2)

1. NO CHANGES TO THIS DOCUMENT ALLOWED WITHOUT PRIOR FACTORY MUTUAL APPROVAL.
2. THE BARRIER ENCLOSURE MUST BE LOCATED OUTSIDE THE HAZARDOUS AREA, AS NEAR ITS BOUNDARY AS POSSIBLE.
3. DELETED.
4. FOR FACTORY MUTUAL APPROVAL, INSTALLATION MUST BE IN ACCORDANCE WITH THIS TECHNICAL ILLUSTRATION DRAWING AND WITH ANSI/ISA RP12.06.01 AND NEC ANSI/NFPA 70.
5. 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.

6 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.

7 TO PREVENT MOISTURE ACCUMULATION IN JUNCTION BOX, INSTALL A DRAIN IN LOWER PORTION OF CONDUIT. USE CROUSE–HINDS #ECD17 DRAIN OR EQUIVALENT.

8. PROTECTIVE COVER MUST BE REPLACED ON THE BARRIER ENCLOSURE WHEN WIRING IS COMPLETED.

9 THE BARRIER GROUND BUS MUST BE CONNECTED TO EARTH GROUND ELECTRODES USING REDUNDANT WIRES. RESISTANCE NOT TO EXCEED 1 OHM.

10 TERMINATE WIRES SO THAT BLACK CONNECTS TO B, WHITE CONNECTS TO W, AND BROWN OR RED CONNECTS TO R.

11. CAUTION: DO NOT APPLY IN EXCESS OF 8 LB–IN. OF TORQUE TO JUNCTION BOX COVER SCREWS.

(NOTES CONTINUED ON SHEET 2)

NON-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
HAZARDOUS LOCATION

FM CONTROLLED DOCUMENT NO CHANGES TO DRAWING WITHOUT PRIOR FM APPROVAL

TYPICAL FOUR CHANNEL INSTALLATION

ECO ACCUMULATION:	APPROVALS	DATE
ECO 1:	DRAWN: BW Cooper	4/11/02
ECO 2:	CHECKED: R Barnett	7/3/02
ECO 3:	PROJ. ENGR: T Szymanski	7/8/02
ECO 4:	PRODUCTION:	
ECO 5: INCORPORATE ABOVE ECO'S	PURCHASING	

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

Kistler-Morse Bothell, WA

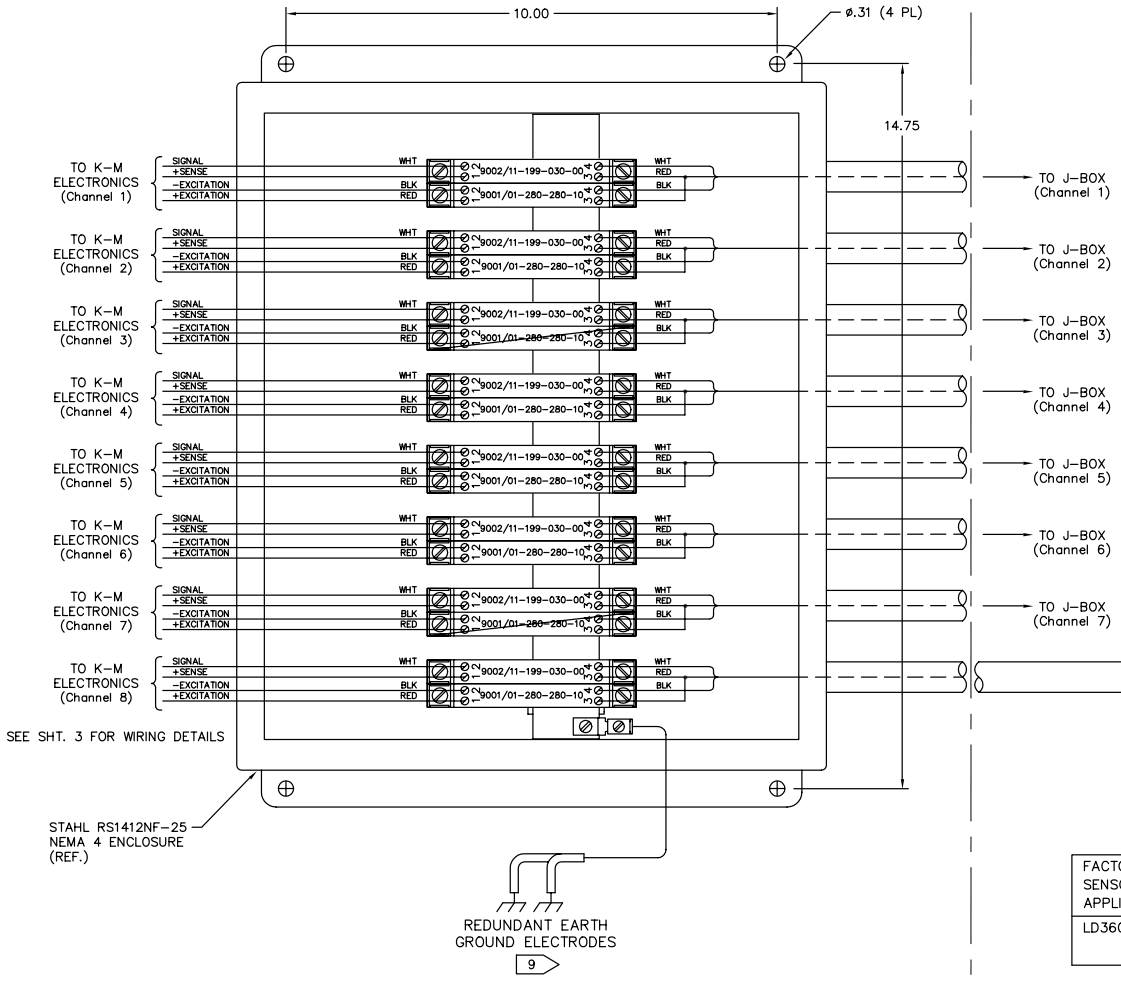
TITLE: INSTALLATION, STAHL SAFETY BARRIER (FM APPROVED)

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

ACAD# TI–LD360s.FM–01C | SHT 1 OF 3

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:

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

TYPICAL JUNCTION BOX WIRING

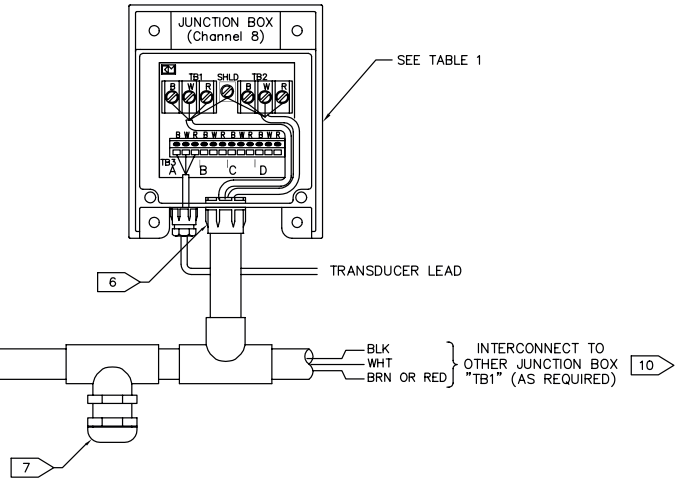


TABLE 1

FACTORY MUTUAL APPROVED SENSOR TO WHICH THIS DRAWING 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

FM CONTROLLED DOCUMENT NO CHANGES TO DRAWING WITHOUT PRIOR FM APPROVAL

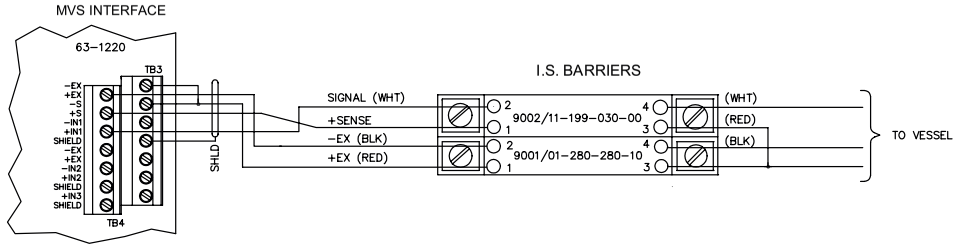
TYPICAL MULTI CHANNEL INSTALLATION

Kistler-Morse Bothell, WA

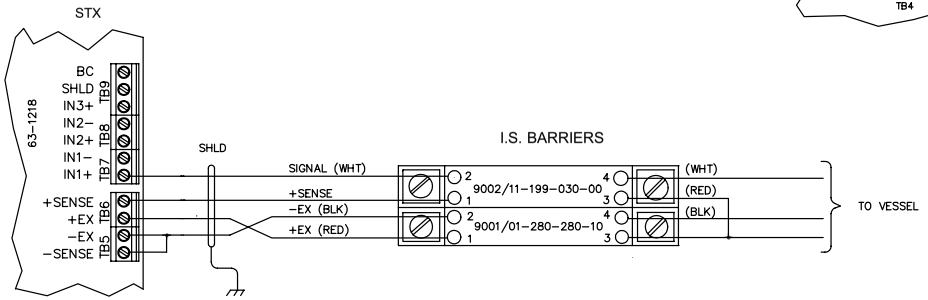
SIZE	DWG. No.	REV.
B	TI-LD360s.FM-01	C

ACAD# TI–LD360s.FM–01C | SHT 2 OF 3

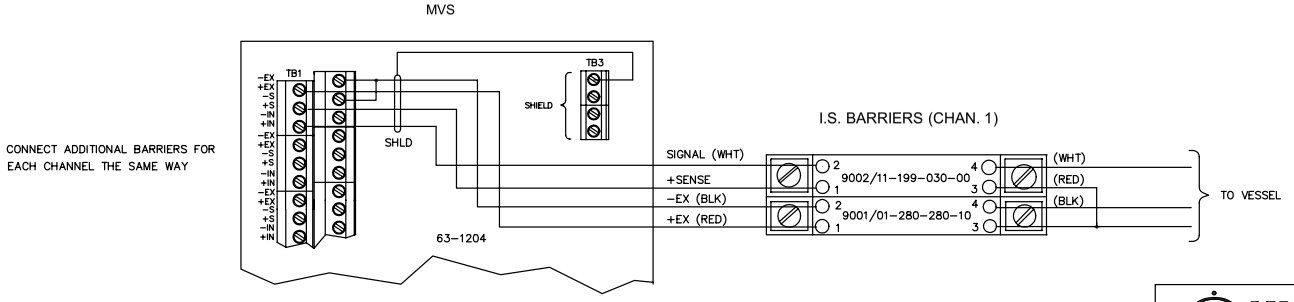
TYPICAL CONNECTION
FOR STX SYSTEMS, MVS RESIDENT.



TYPICAL CONNECTION
FOR STAND-ALONE STX SYSTEMS.



TYPICAL CONNECTION
FOR TRANSDUCERS (SENSORS)



TYPICAL STAHL BARRIER CONNECTIONS TO MVS FOR DIFFERENT APPLICATIONS

FM CONTROLLED DOCUMENT
NO CHANGES TO DRAWING
WITHOUT PRIOR FM APPROVAL

Kistler-Morse
Bothell, WA

SIZE	DWG. No.	REV.
B	TI-LD360s.FM-01	C
ACAD# TI-LD360s.FM-01C		SHT 3 OF 3

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

INSTALLATION INSTRUCTIONS FOR THE LD3

Hardware Options

The following hardware options and their installation will be descibed:

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/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 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 loacations and size on both the foundation base and the vessel foot pad.
   b. Also check the surfaces for flatness and angular misalignment. A baseplate with leveling nuts is recommended. (See Figure 1: Angular Misalignment).
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).
   c. Repeat steps a and b for remaining Load Discs.
9. Re–install the LD3 cable and record the voltage output of the LD3 at "no–load" condition now that it is in position.
   a. 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 c 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.
    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: 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.

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 ± 10% =
81.8mV ± (.1 x 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
150 VENTURE BLVD.
SPARTANBURG, SC 29306

TITLE: INSTALLATION ARRANGEMENTS 1K–25K, LOAD DISC LD3

SCALE: NONE

SIZE: B

FILE: TI–LC.LD3–01

REF: KM

UNSPECIFIED TOLERENCES
DECIMALS: XX ±=.01
XXX ±=.005
ANGLES: ±=1/2°
DEBURR & BREAK EDGES .005
Ⓕ = CRITICAL DIM. OR NOTE

MATERIAL: Noted

FINISH: _____

PART: TI–LC.LD3–01

SHEET: 1 of 14

Leveling and Shimming:

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

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

Leveling for the Universal Top Adapter Plate

1. Based on the Weight Distribution Chart (Figure 3) and visual inspection, cut/place shims as required to adjust adjust the distribution of weight on the Load Discs. Begin with the "smallest change" disc first.
2. Measure the dead weight output and the output change change of all of the Load Discs to see how they are affected. Record again into the Weight Distribution Chart (Figure 3).
3. Repeat Steps 1 and 2 until you have achieved the desired output change of all of the Load Discs.
4. Securing 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 1and 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.

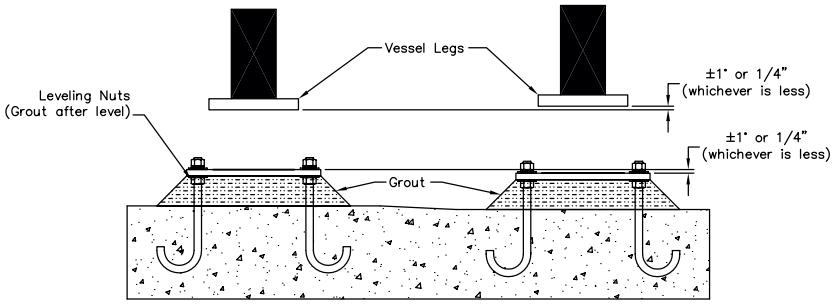


FIGURE 1: ANGULAR MISALIGNMENT

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

Anchor bolts supplied by customer.

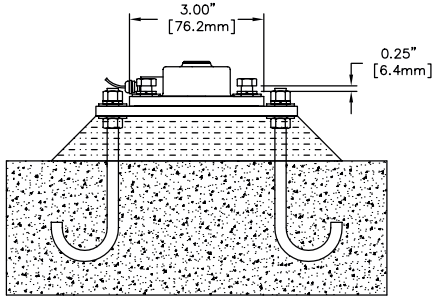


FIGURE 2: LEAVE 1/4" GAP FOR POSITIONING

INSTALLATION OPTION FLAGNOTES:

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

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

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

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

5. Deleted

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

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

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

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

10. Tighten then back off 1/8 turn.

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

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

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

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

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

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

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

FIGURE 4: EXAMPLE OF DEAD WEIGHT OUTPUT AND OUTPUT CHANGE

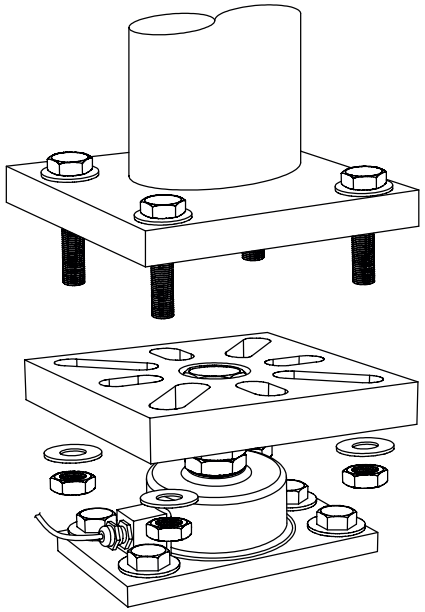


FIGURE 5: LOWER VESSEL
ONTO TOP PLATE
1Klb-7.5Klb SYSTEMS ONLY

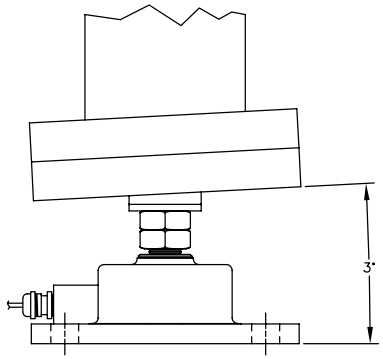


FIGURE 6: ANGULAR MISALIGNMENT
UP TO 3 DEGREES
1Klb-7.5Klb SYSTEMS ONLY

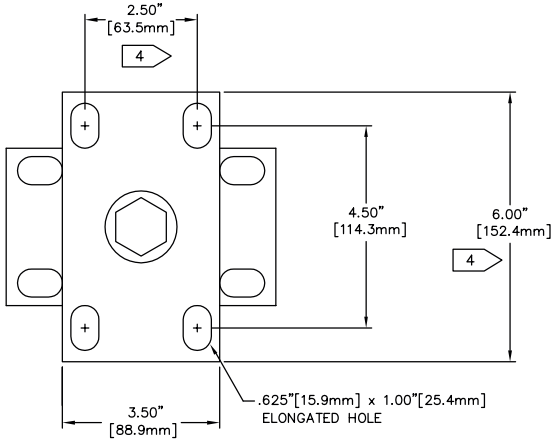
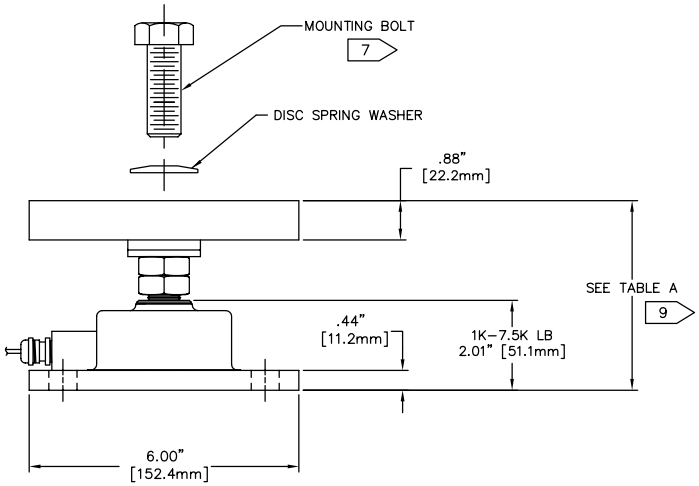
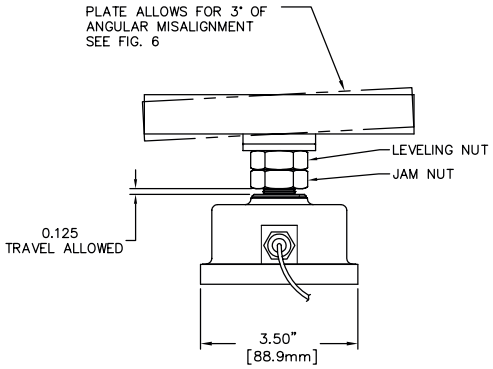
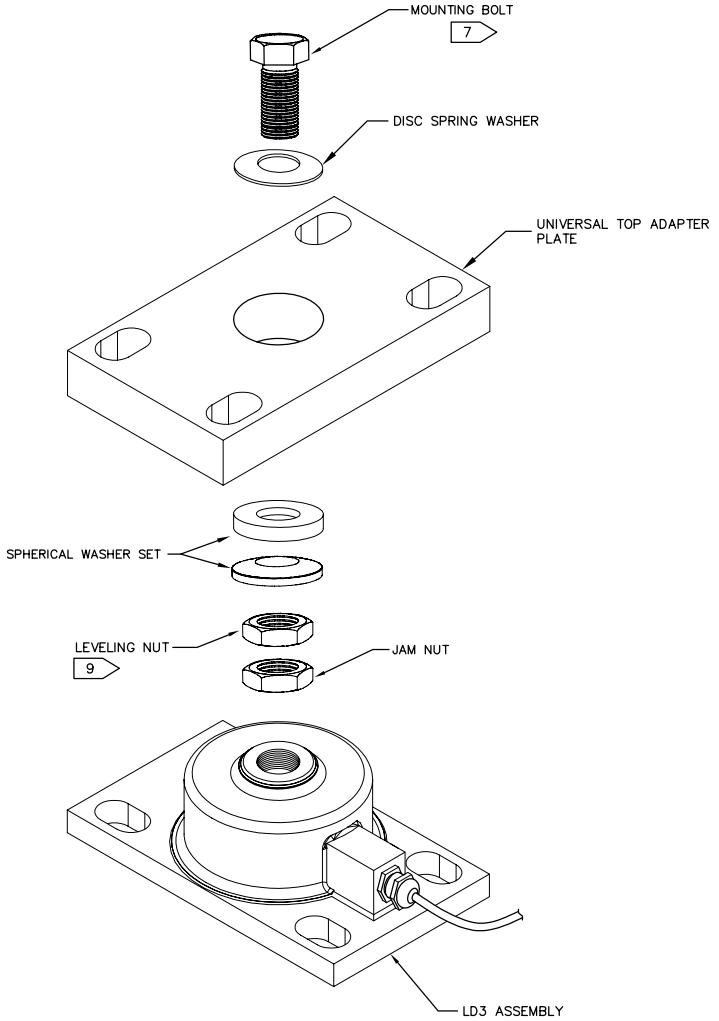


TABLE A

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

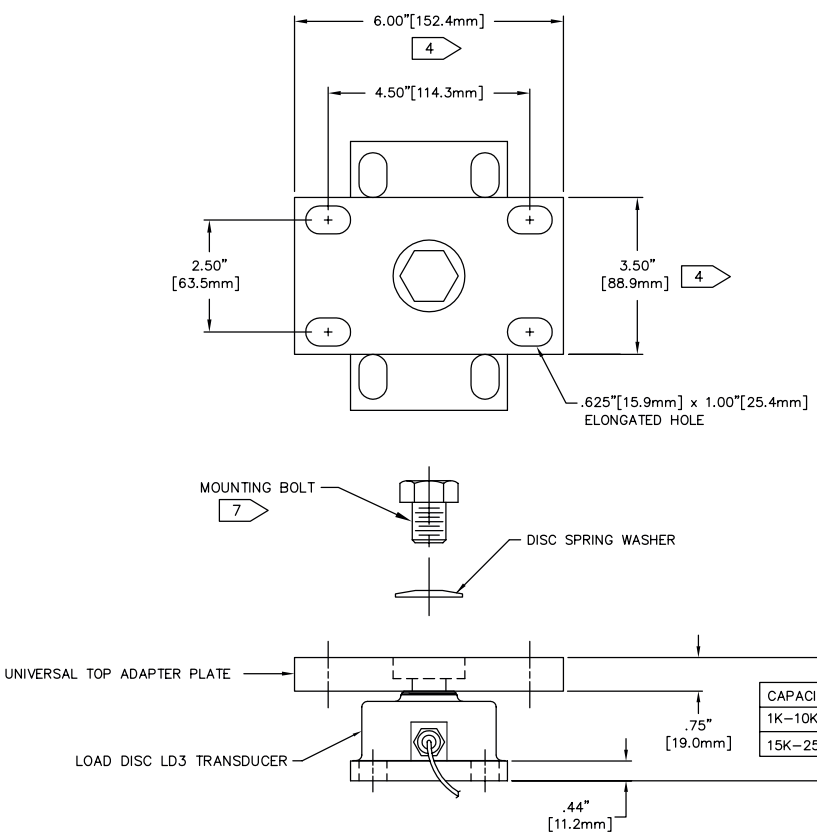


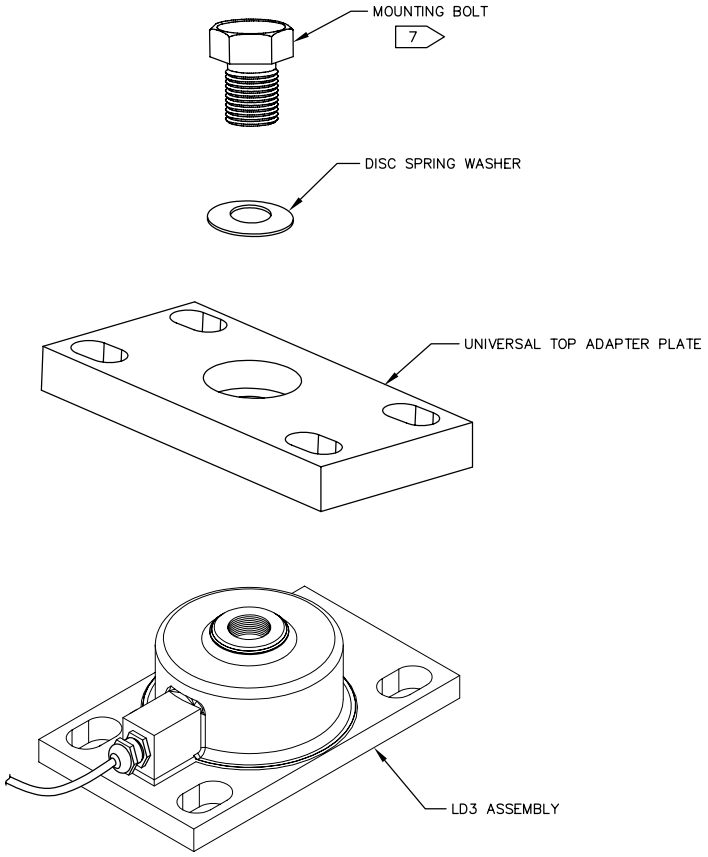




1Klb-7.5Klb LOAD DISC LD3 TRANSDUCER
WITH LEVELING TOP UNIVERSAL ADAPTER PLATE
MOUNTING DIMENSIONS

PART	SHEET
TI–LC.LD3–01	5of14 RevA



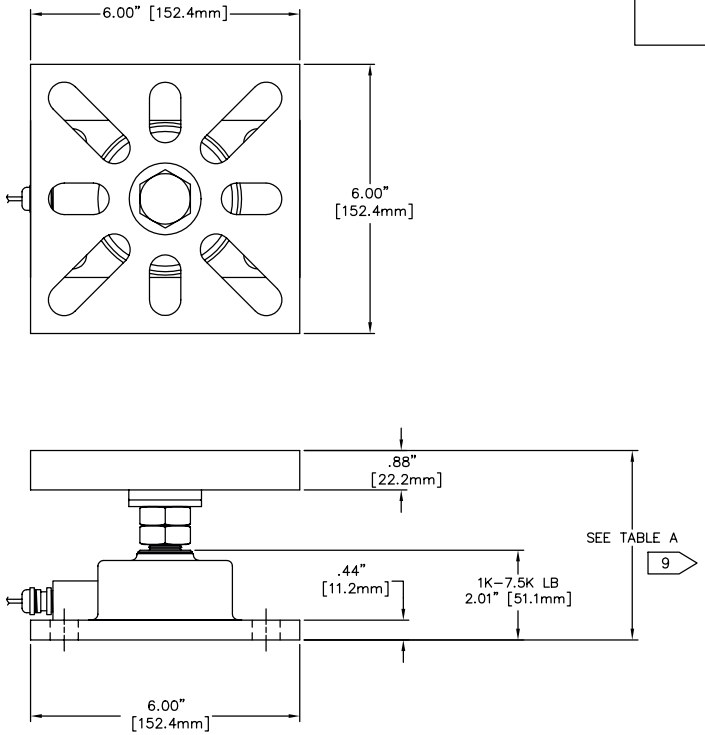


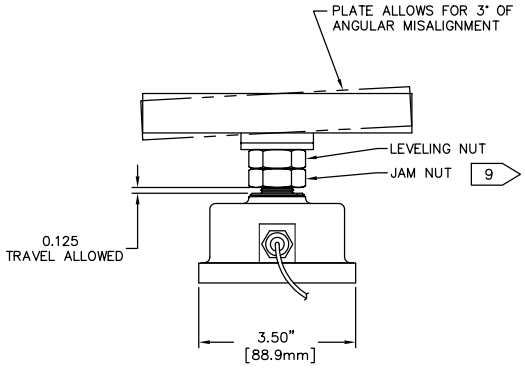
1Klb-25Klb LOAD DISC LD3 TRANSDUCER WITH UNIVERSAL ADAPTER PLATE MOUNTING DIMENSIONS

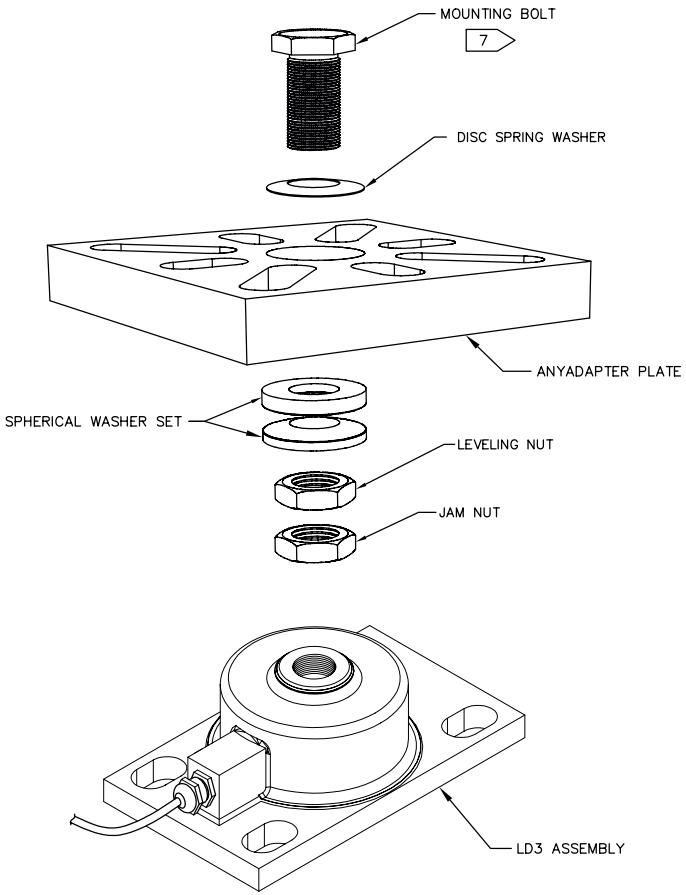
PART	SHEET
TI–LC.LD3–01	6 of 14 RevA

TABLE A

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

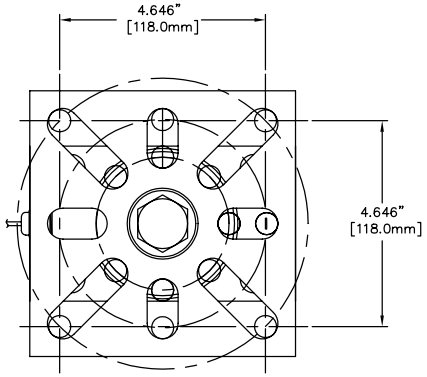


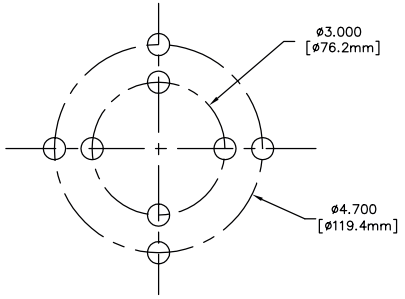




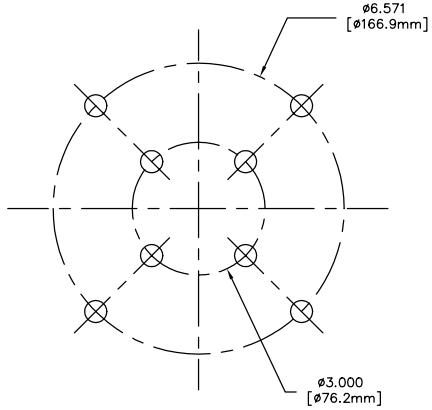
1Klb-7.5Klb LOAD DISC LD3 TRANSDUCER WITH ANYADAPTER TOP ADAPTER PLATE MOUNTING DIMENSIONS

PART	SHEET
TI–LC.LD3–01	7of14 RevA





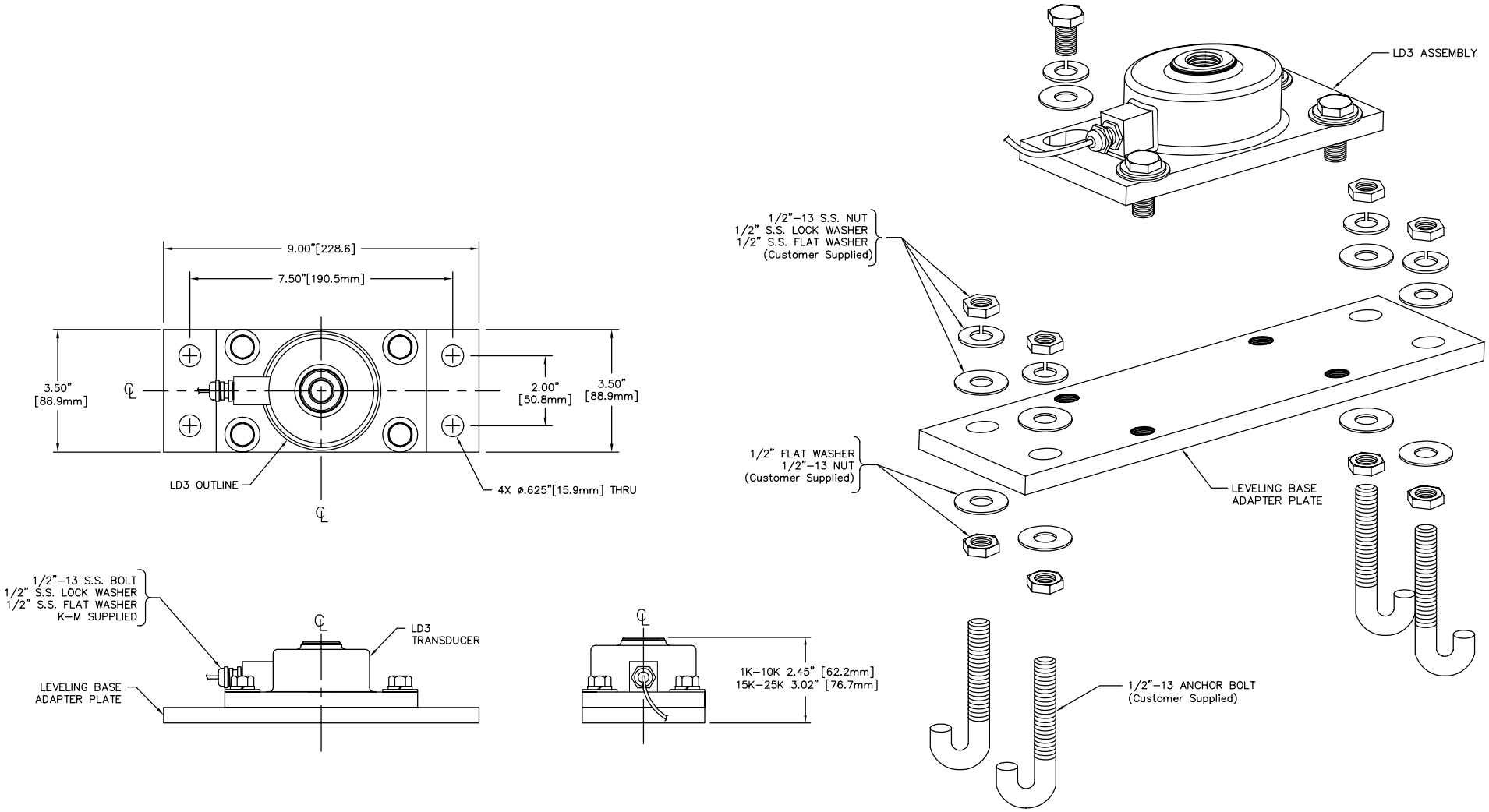
MINIMUM/MAXIMUM BOLT PATTERN
FOR HORIZONTAL/VERTICAL SLOTS



MINIMUM/MAXIMUM BOLT PATTERN
FOR ANGLED SLOTS

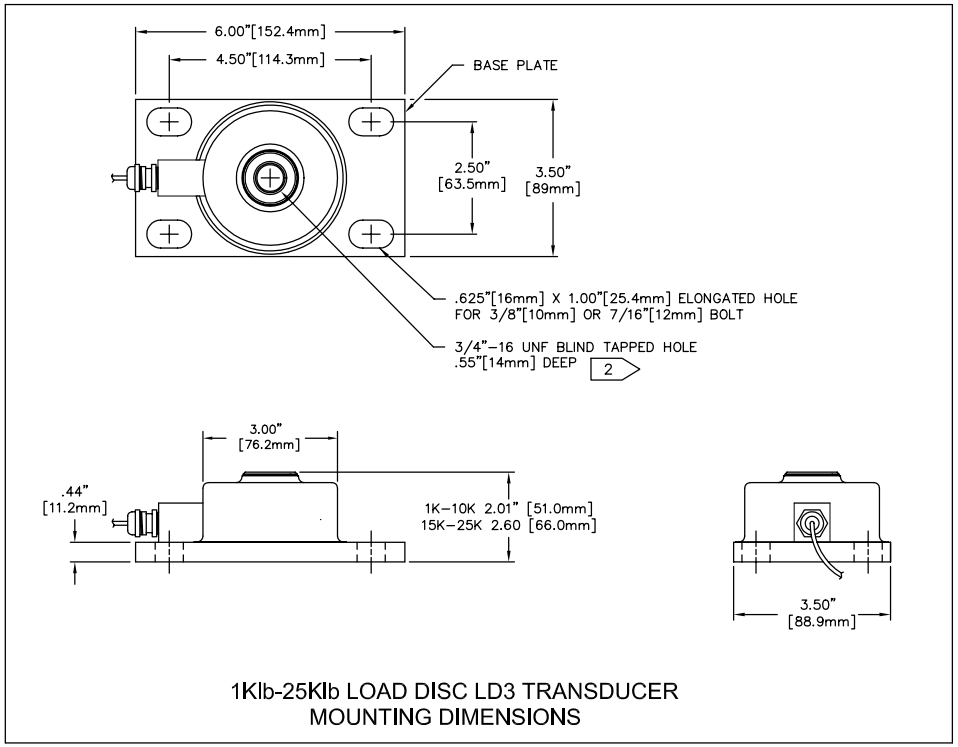
vESSEL MOUNTING HOLE PATTERNS
FOR ANYADAPTER TOP ADAPTER PLATE
(MINIMUM (4) 1/2" HEX HEAD BLOTS REQUIRED)

PART	SHEET
TI-LC.LD3-01	8of14 RevA

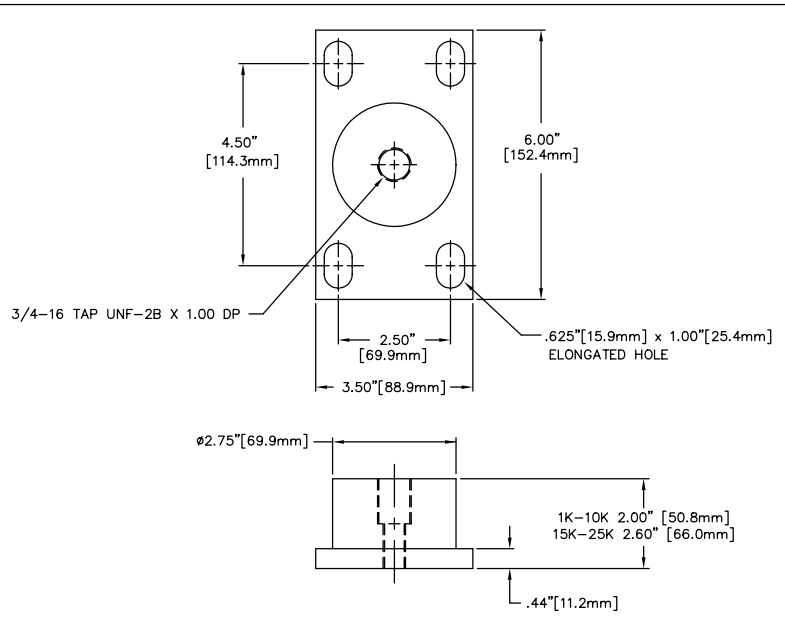


1Klb-25Klb LOAD DISC LD3 TRANSDUCER
WITH LEVELING BASE ADAPTER PLATE
MOUNTING DIMENSIONS

PART	SHEET
TI–LC.LD3–01	9 of 14 RevA

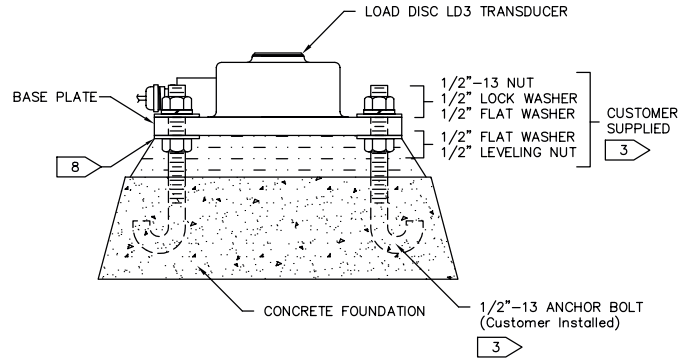


1Klb-25Klb LOAD DISC LD3 TRANSDUCER
MOUNTING DIMENSIONS

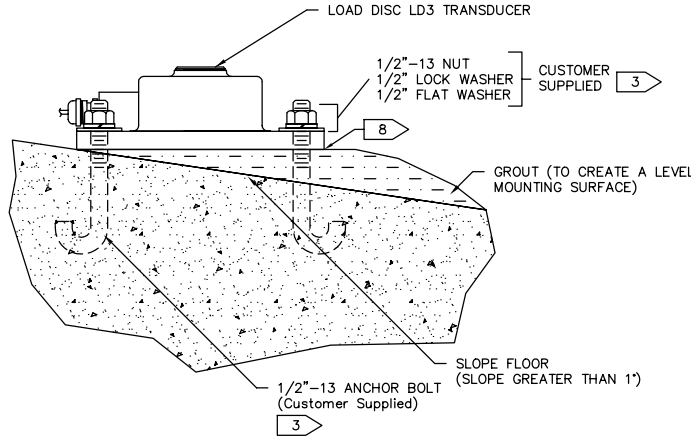


1Klb-25Klb LOAD DISC LD3 TRANSDUCER DUMMY
MOUNTING DIMENSIONS

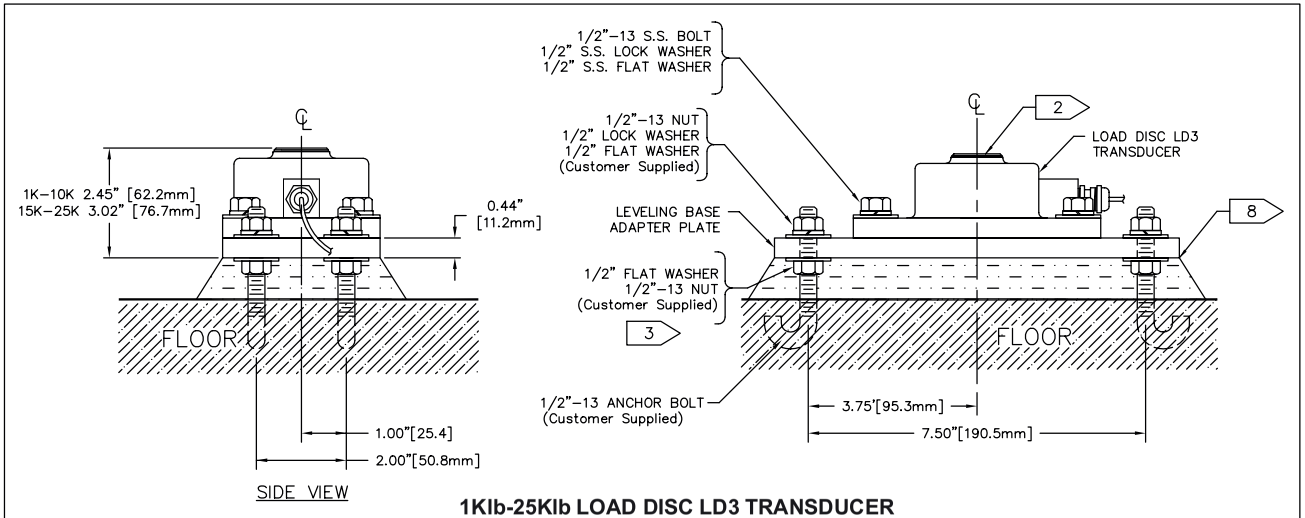
PART	SHEET
TI–LC.LD3–01	10 of 14 RevA



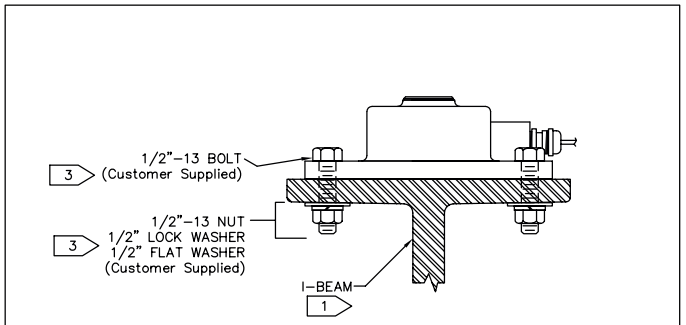
1Klb-25Klb LOAD DISC LD3 TRANSDUCER ON CONCRETE FOUNDATION WITH ANCHOR BOLTS



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

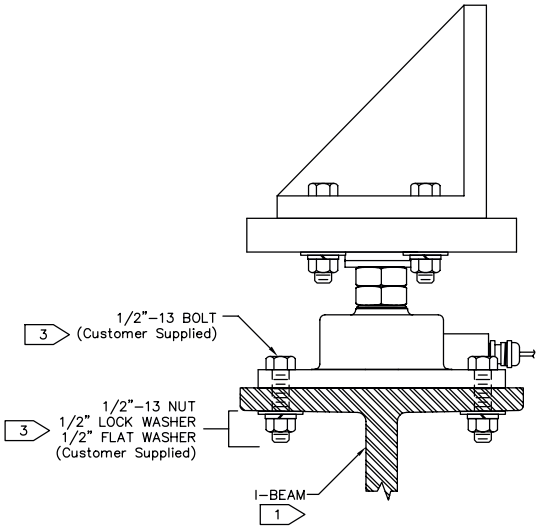


1Klb-25Klb LOAD DISC LD3 TRANSDUCER WITH LEVELING BASE ADAPTER PLATE

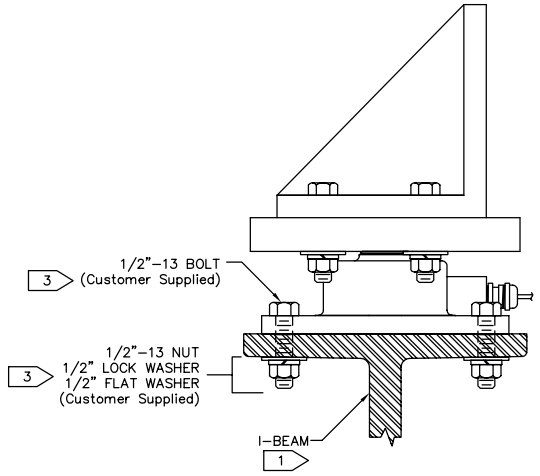


1Klb-25Klb LOAD DISC LD3 TRANSDUCER MOUNTED ON I-BEAM

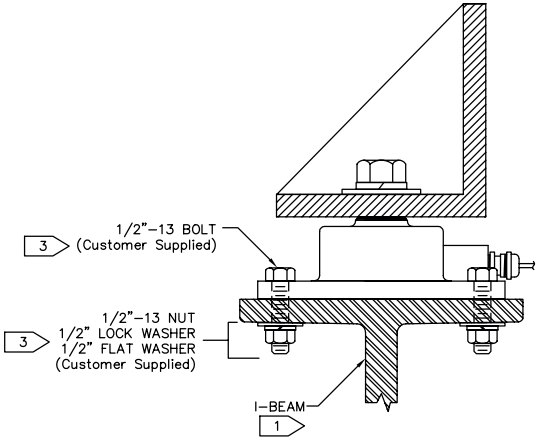
PART	SHEET
TI–LC.LD3–01	11 of 14 RevA



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

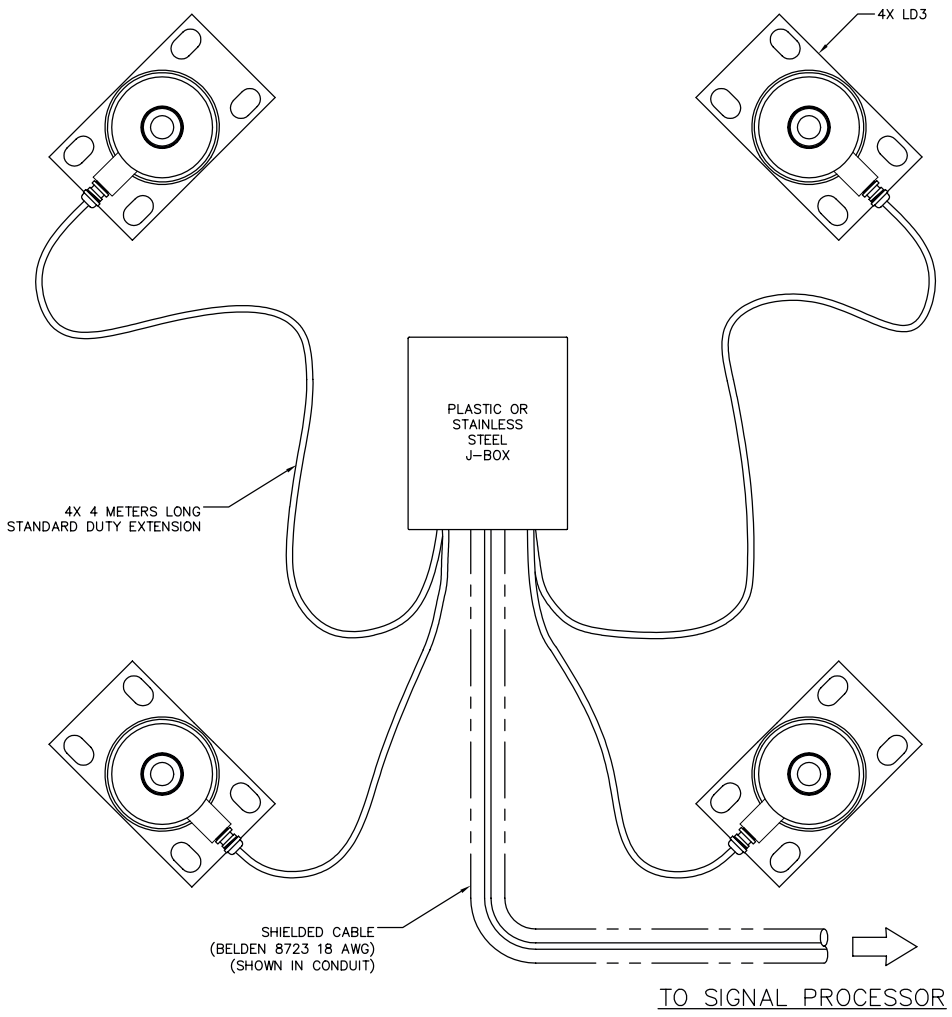


1Klb-25Klb LOAD DISC LD3 TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.



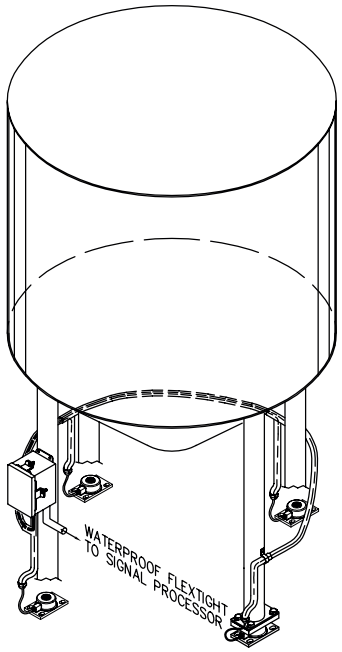
1Klb-25Klb LOAD DISC LD3 TRANSDUCER
GUSSET LEG ATTACHMENT ON I-BEAM.

PART	SHEET
TI-LC.LD3-01	12of14 RevA



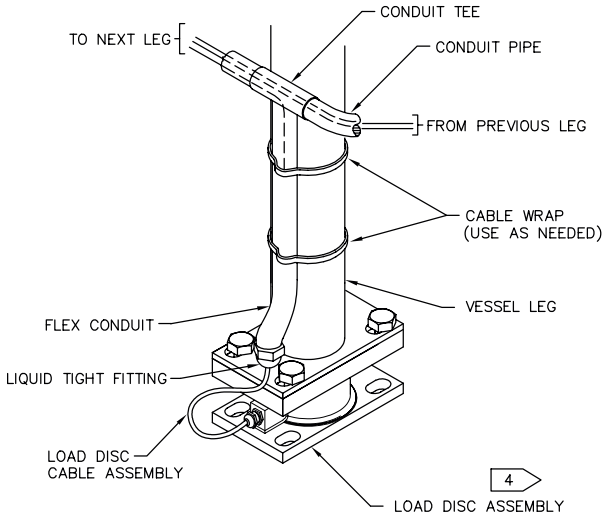
TYPICAL A LEG LD3 CONNECTION USING
STAINLESS STEEL J-BOX

PART	SHEET
TI-LC.LD3-01	13of14 RevA



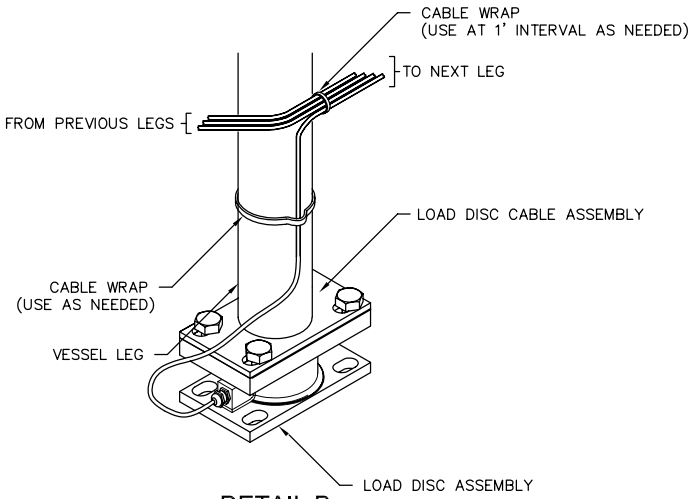
TYPICAL LOAD DISCS CABLE ROUTING ON VESSEL LEGS

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



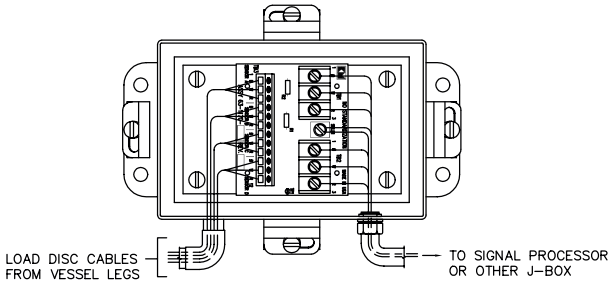
DETAIL A

CONDUITED LOAD DISC CABLE LAYOUT (PREFERRED)



DETAIL B

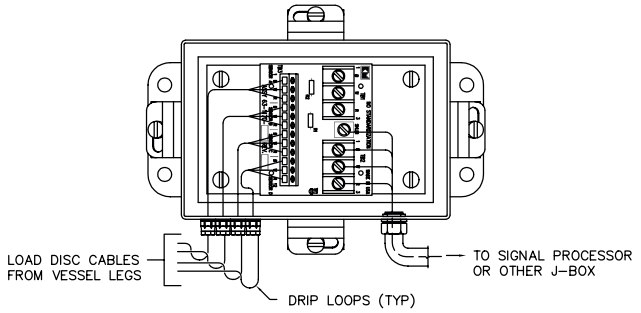
NON-CONDUITED LOAD DISC CABLE LAYOUT (NOT RECOMMENDED)



DETAIL C

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

12



DETAIL D

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

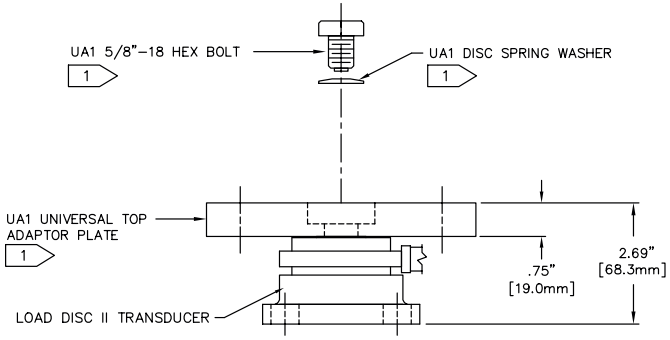
12

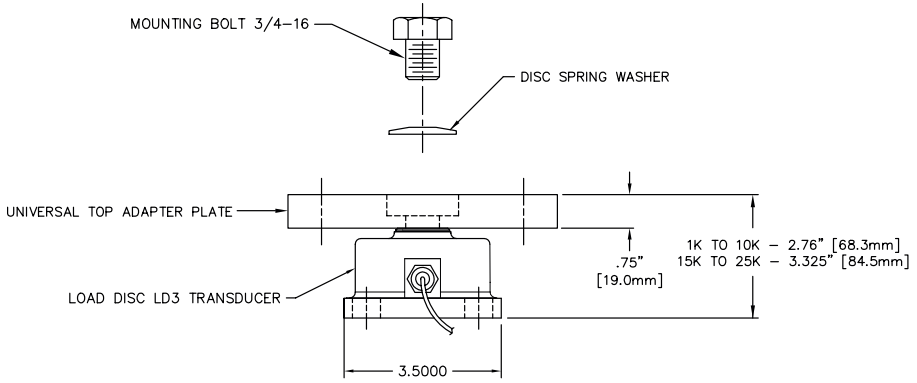
PART	SHEET
TI-LC.LD3-01	14of14 RevA

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

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

LD3/UA360 RETROFIT FROM LD-II/UA1



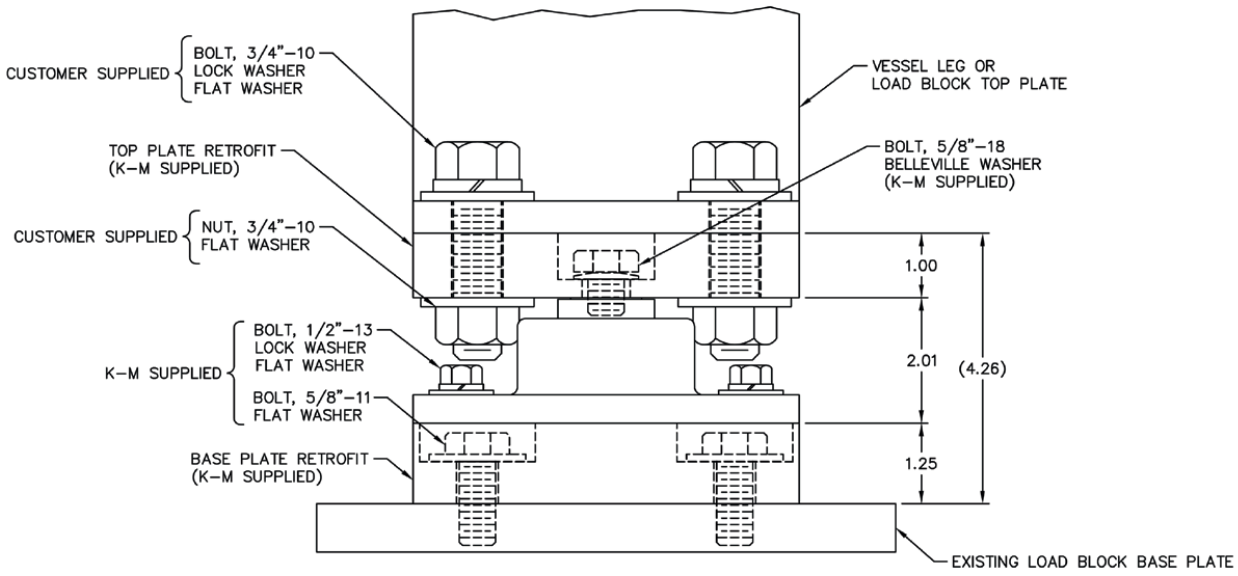


venture MEASUREMENT
150 VENTURE BLVD.
SPARTANBURG, SC 29306

TITLE	RETRO-FIT TI-DWG 1K-25K, LOAD DISC LD3
SCALE	NONE
SIZE	B
FILE	RF-LC.LD3-01
REF	KM
MATERIAL	Noted
FINISH	_____
PART	RF-LC.LD3-01
SHEET	1 of 1

UNSPECIFIED TOLERENCES
DECIMALS: XX ±=.01
XXX ±=.005
ANGLES: ±=1/2°
DEBURR & BREAK EDGES .005
Ⓒ = CRITICAL DIM. OR NOTE

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



venture MEASUREMENT
150 VENTURE BLVD.
SPARTANBURG, SC 29306

TITLE: RETROFIT KIT, LOAD BLOCK to LD3 & LD360s 1K-10K

SCALE: NONE

SIZE: B

FILE: TI-LC.LD3&360-01

REF: KM

UNSPECIFIED TOLERENCES
DECIMALS: XX ±=.01
XXX ±=.005
ANGLES: ±=1/2°
DEBURR & BREAK EDGES .005
(F) = CRITICAL DIM. OR NOTE

MATERIAL: _____

FINISH: _____

PART: TI-LC.LD3&360-01

SHEET: 1 of 1