



**VULCAN DEFLECTION TRANSDUCER  
INSTALLATION INSTRUCTIONS**



# DEFLECTION TRANSDUCER INSTALLATION MANUAL

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# VULCAN

## TRANSDUCER INSTALLATION

### 1.0 INTRODUCTION:

Vulcan On-Board Scales is a leading supplier of on-board electronic weighing systems. We provide a variety of application specific solutions including a side-mounted, deflection transducer. The deflection transducer provides dependable service if it is properly installed in appropriate locations. The installation is relatively simple, but all instructions must be followed to insure both system accuracy and life of the system components.

The basic component is the load sensor, or deflection transducer, which is bolted to mounting brackets that are welded on the truck suspension. As load is added or removed, the truck suspension deflects a slight amount. The deflection transducer also deflects slightly and it sends an electrical signal to the Vulcoder providing information to a meter in the cab. The strength of the electrical signal is determined by the amount the transducer deflects.

Because the transducers are mounted to the side of the two "L" shaped mounting brackets, they are referred to as side mounted. This term does not refer to the mounting position of the brackets themselves. These mounting brackets can be installed on top of the walking beams, front axles, thru-trunnions, some trailer axles and some rear end housings. The locations of the mounting bracket / transducer combination are very important. Adequate clearance above the transducer installation is also crucial. Detailed instructions about location are provided in these installation instructions.

## 2.0 TYPES OF INSTALLATIONS:

The side mount transducer can be installed on several types of truck and trailer suspension parts:

- Steel Walking Beams (with “I” beam cross section)
- Front Axles
- Thru-trunnions (including Mack Camel Backs)
- Some Rear End Housings
- Some Trailer Straight Axles

Installation is similar for each type, but variations among them require specific instructions.

## 2.1 STEEL WALKING BEAM INSTALLATION:

1. Make sure vehicle is on flat and level ground before beginning installation.

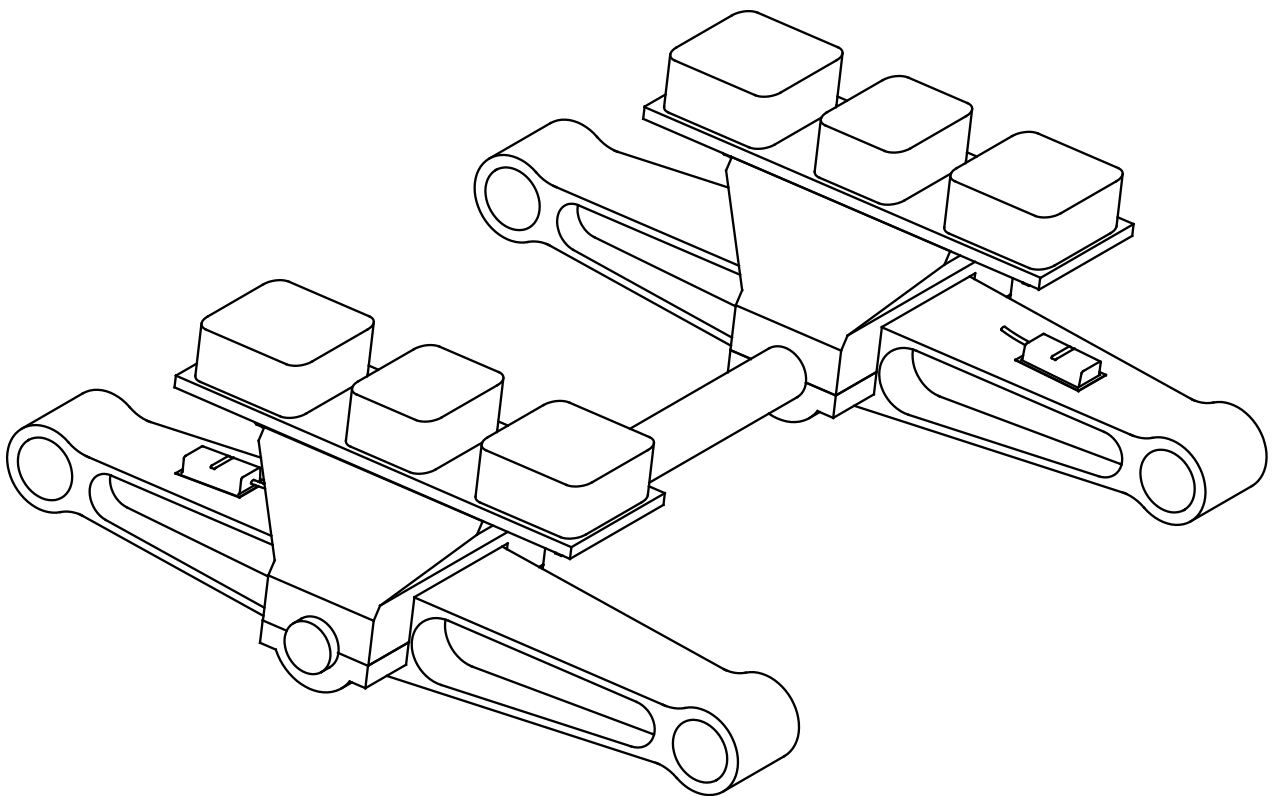


Figure 2.1-A – Walking Beam Assembly

2. Thoroughly clean a 12" space all across the top of each beam where the mounting brackets / deflection transducers will be located. (One on the front side of the walking beam and the other on the opposite rear side). For walking beams with rubber cushions, the transducer location will be between 10" and 22" from the beam's centerline. For walking beams without rubber cushions, the space should be between 6" and 18" from the center of the walking beam. Remove all paint, dirt and grease, exposing bare metal. Use solvent and a wire brush as necessary.
3. Determine the load limit of the walking beam. This will establish the spacing distance between the mounting brackets as shown in the following tables:

LOAD LIMIT	SPACE BETWEEN MOUNTING BRACKETS
38,000 lbs. (forged) .....	2-1/2"
44,000 lbs. (forged) .....	3"
38-44,000 lbs. (cast).....	3-1/2"

5. Using the two 2-1/4" long cap screws from the installation kit, bolt the installation spacer bar to a pair of mounting brackets. **Note:** The mounting bracket holes are elongated allowing adjustment of the space between the inside edges of the mounting brackets from 2-1/2" to 3-1/2". Select the proper spacing from the above table.

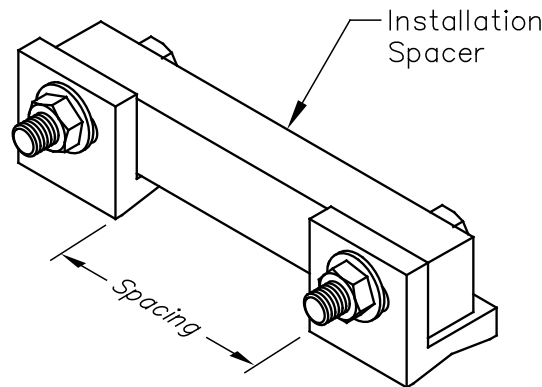


Figure 2.1-B – Transducer Assembly

6. Measure and mark for deflection transducer location. From the centerline of the walking beam, measure out onto the cleaned area. The mark will be used to position the inside bolt connecting the mounting bracket and the installation spacer bar. The distance from the centerline to the inside (closest to the centerline) bolt depends on the type of beam. Measurements are as follows:

Steel Beam.....	10-3/4"
Steel Beam with rubber biscuits .....	14-3/4"

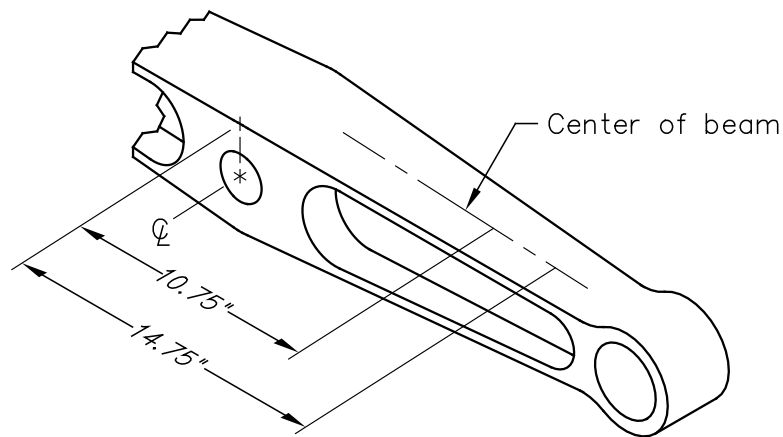


Figure 2.1-C – Walking Beam location

7. Before welding the mounting brackets to the beams, make sure the beams are the proper temperature. Steel beams should be at least 65° F.
8. Position the mounting brackets / installation spacer bar on the beam and clamp in place. The brackets should sit flat without rocking or without gaps under them. Light grinding may be required. In addition to positioning the inside (closest to the centerline) bolt as described in step #5, center the mounting bracket from side to side. The V-groove in the bottom of each bracket should be directly over the web of the beam. In addition, the installation spacer bar should be facing toward the **outside** of the truck.
9. Weld the mounting bracket / installation spacer bar unit to the beams along the inside and outside edge of each mounting bracket, (refer to Figure 2.1-D). **Do not weld all around the mounting bracket and do not weld on the sides with the “V” groove, (see Figure 2.1-D). Note:** Use a low hydrogen rod such as AWS E 7016.

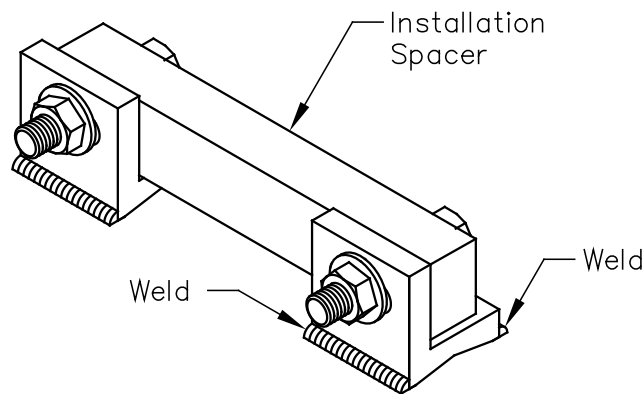


Figure 2.1-D – Welding Transducer Mounting Bracket / Installation Spacer

9. After weld has cooled, unbolt and remove installation spacer bar.
10. Clean brackets and transducer mounting surfaces with alcohol or solvent. Make sure there is no weld splatter on mounting surfaces for the transducer.

11. Bolt the transducer to the mounting brackets with pigtail facing the center of the beam using the two, 3/8" - 24 x 2-1/4" cap screws and four washers. Place the bolt heads and washers on the transducer side and the nuts and washers on the mounting bracket side and **hand tighten only**. Be sure that the top of the transducer is up so that you can read the serial number. The pigtail should be exiting below the centerline of the transducer, (see Figure 2.1-E).

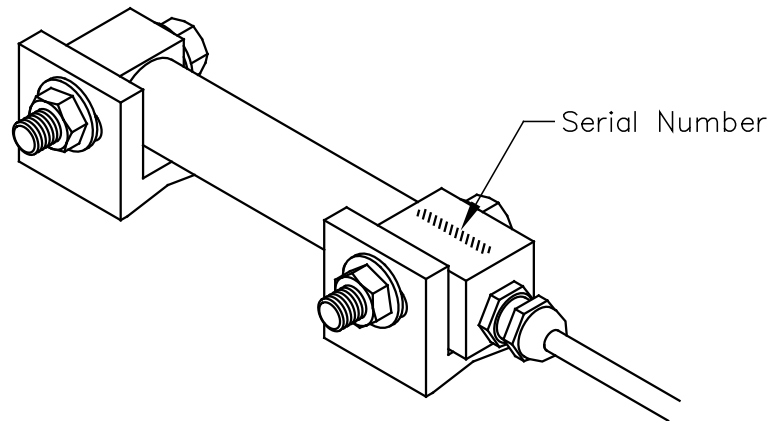


Figure 2.1-E – Transducer Assembly

12. Tighten transducer cap screws, see section 3.0.
13. Install transducer cover, see section 4.0.



## 2.2 FRONT AXLE INSTALLATION – Weld-On Mounting:

1. Measure and mark the center of the axle, both side-to-side and front to back, (see Figure 2.2-A).

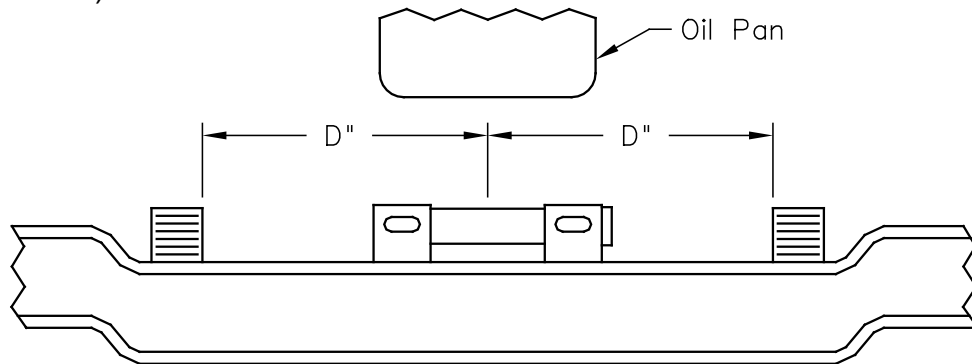


Figure 2.2-A: Front Axle Location

2. Check for adequate clearance between transducer assembly and oil pan. To do so, measure the suspension travel distance between top of spring and axle stop. Since the transducer assembly, including cover, requires 3", the measurement from the oil pan to the axle must be at least the distance of suspension travel plus 3".
3. Clean a 12" space in the center of the axle. Remove all paint, dirt and grease, exposing bare metal. Use solvent and a wire brush as necessary.
4. Using two, 2-1/4" long cap screws from the installation kit, bolt the installation spacer bar to a pair of mounting brackets. **Note:** The mounting bracket holes are elongated allowing adjustment of the space between the inside edges of the mounting brackets from 2-1/2" to 3-1/2". The load rating of the axle determines the spacing of the brackets.

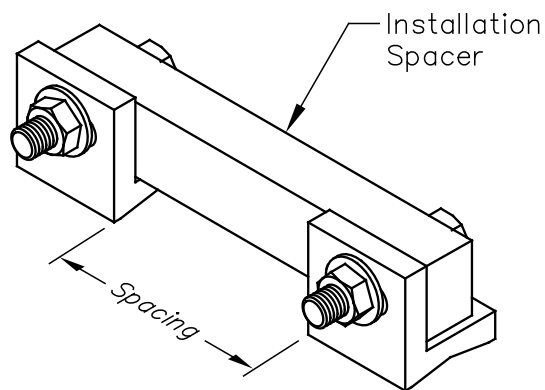


Figure 2.2-B – Installation Spacer Assembly

LOAD LIMIT	SPACE BETWEEN MOUNTING BRACKETS
12,000 lbs.....	2 1/2"
14,000 lbs.....	2 1/2"
18,000 lbs.....	2 1/2"
20,000 lbs.....	3"

- Position the mounting brackets / installation spacer bar on the axle and clamp in place. The brackets should sit flat without rocking or without gaps under them. Light grinding may be required. The groove in the bottom of each bracket should be directly over the web of the axle.
- Weld the mounting bracket / installation spacer bar unit to the axle along the two edges of each mounting bracket, (see Figure 2.2-C). **Do not weld all around the mounting bracket and do not weld on the sides with the “V” groove, (see Figure 2.2-C).**  
**Note:** Use a low hydrogen rod such as AWS E 7016.

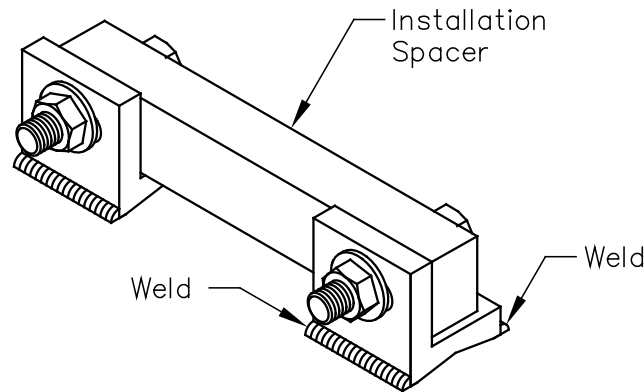


Figure 2.2-C – Welding Transducer Mounting Bracket / Installation Spacer

- After weld has cooled, unbolt and remove installation spacer bar.
- Clean brackets and transducer mounting surfaces with alcohol or solvent. Make sure there is no weld splatter on mounting surfaces for the transducer.

9. Position the transducer so that the pigtail can be connected to the cable coming from the meter in the cab. This is usually the driver's side. Bolt the transducer to the mounting brackets using the two, 3/8" - 24 x 2-1/4" cap screws and four washers. Place the bolt heads and washers on the transducer side and the nuts and washers on the mounting bracket side and **hand tighten only**. Be sure that the top of the transducer is up so that you can read the serial number. The pigtail should be exiting below the centerline of the transducer, (see Figure 2.2-D).

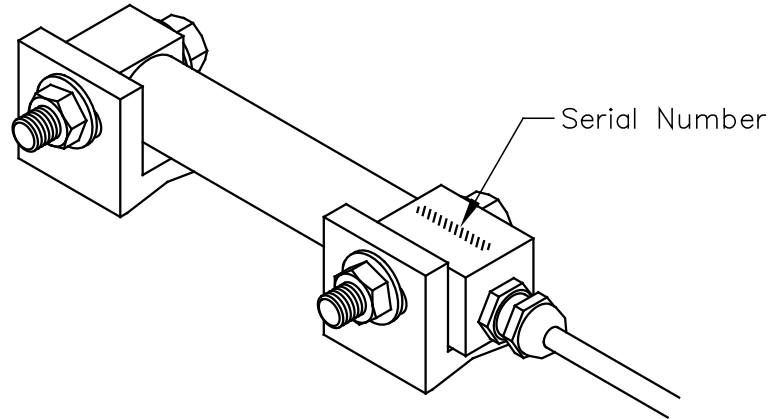


Figure 2.2-D – Transducer Assembly

10. Tighten transducer cap screws, see section 3.0.
11. Install transducer cover, see section 4.0.

## 2.3 FRONT AXLE INSTALLATION – Bonded Mounting:

1. Measure and mark the center of the axle, both side-to-side and front to back, (see Figure 2.3-A).

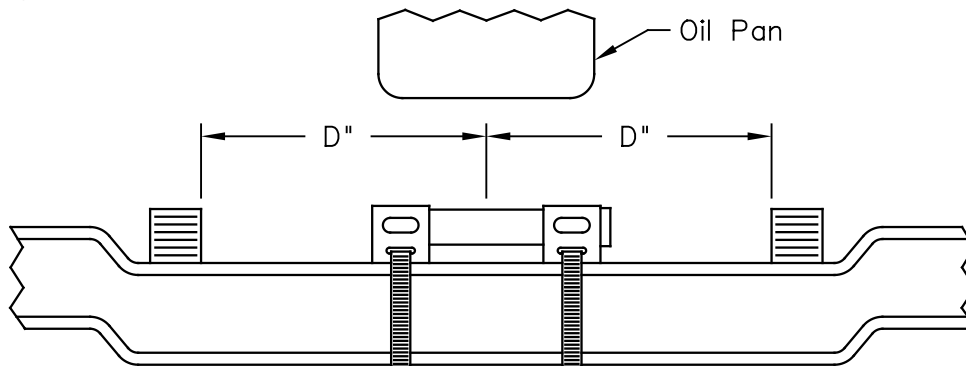


Figure 2.3-A: Front Axle Location

2. Check for adequate clearance between transducer assembly and oil pan. To do so, measure the suspension travel distance between top of spring and axle stop. Since the transducer assembly, including cover, requires 3", the measurement from the oil pan to the axle must be at least the distance of suspension travel plus 3".
3. Clean a 12" space in the center of the axle. Remove all paint, dirt and grease, exposing bare metal. Use solvent and a wire brush as necessary.
4. Using two, 2-1/4" long cap screws from the installation kit, bolt the installation spacer bar to a pair of mounting brackets. **Note:** The mounting bracket holes are elongated allowing adjustment of the space between the inside edges of the mounting brackets from 2-1/2" to 3-1/2". The load rating of the axle determines the spacing of the brackets.

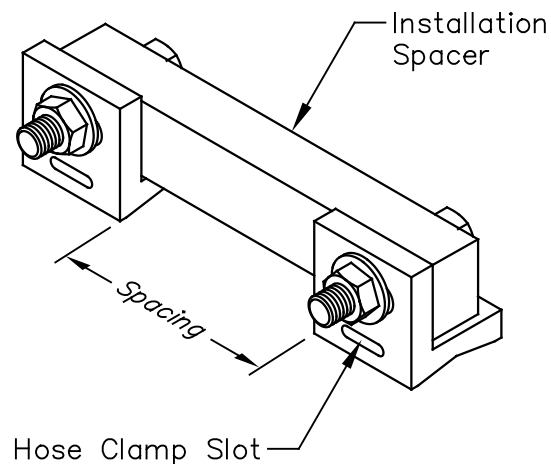


Figure 2.3-B – Installation Spacer Assembly

<b>LOAD LIMIT</b>	<b>SPACE BETWEEN MOUNTING BRACKETS</b>
12,000 lbs. ....	2 1/2"
14,000 lbs. ....	2 1/2"
18,000 lbs. ....	2 1/2"
20,000 lbs. ....	3"

5. Position the mounting brackets / installation spacer bar on the axle and clamp in place. The brackets should sit flat without rocking or without gaps under them. Light grinding may be required. The groove in the bottom of each bracket should be directly over the web of the axle.
6. Remove the transducer mounts and do a final cleaning of the bonding surfaces with the provided alcohol prep pads.
7. For the adhesive to properly cure, the axle temperature must be 70° F (21° C) at a minimum. Curing time is reduced at higher temperatures.

<b>Cure Temperature</b>	<b>Cure Time</b>
70° F (21° C)	24 Hours
90° F (32° C)	6 Hours
105° F (41° C)	3 Hours
120° F (49° C)	1 Hour

If needed, heat the front axle to the desired curing temperature using one or two magnetic oil pan heaters clamped to the axle.

8. Thoroughly mix the adhesive compounds and apply enough adhesive to cover both mating surfaces. Set the transducer mounting brackets and installation spacer in the marked location and clamp in place using a “C” clamp and tighten. Install the two supplied hose clamps and tighten firmly, (see Figure 2.3-C).

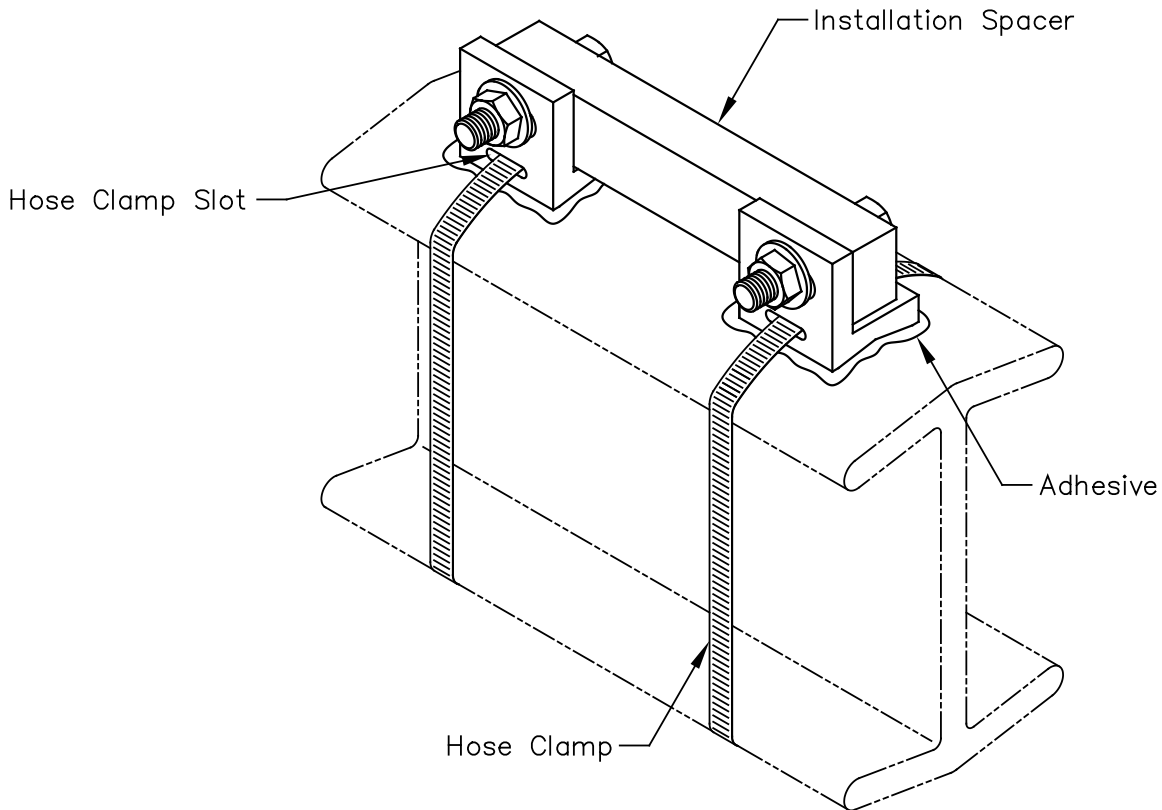


Figure 2.3-C – Bonded Transducer Mounting Bracket / Installation Spacer

10. After adhesive has cured, unbolt and remove installation spacer bar.
11. Clean brackets and transducer mounting surfaces with alcohol or solvent. Make sure there is no adhesive on mounting surfaces for the transducer.
12. Position the transducer so that the pigtail can be connected to the cable coming from the meter in the cab. This is usually the driver's side. Bolt the transducer to the mounting brackets using the two, 3/8" - 24 x 2-1/4" cap screws and four washers. Place the bolt heads and washers on the transducer side and the nuts and washers on the mounting bracket side and **hand tighten only**. Be sure that the top of the transducer is up so that you can read the serial number. The pigtail should be exiting below the centerline of the transducer, (see Figure 2.3-D).

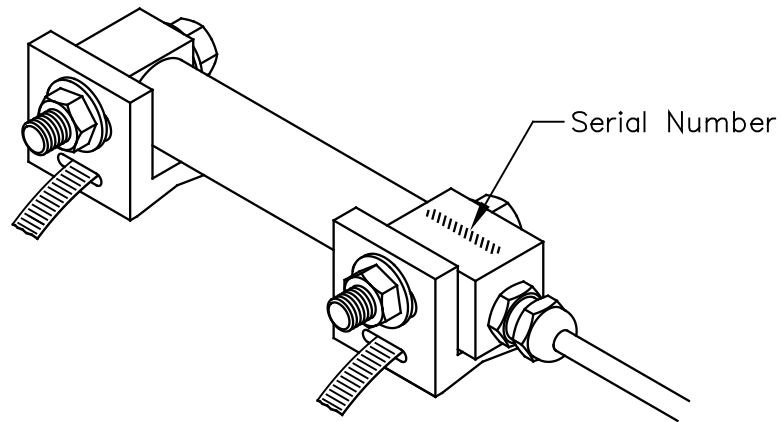


Figure 2.3-D – Transducer Assembly

12. Tighten transducer cap screws, see section 3.0.

13. Install transducer cover, see section 4.0.

## 2.4 THRU-TRUNNION INSTALLATION (MACK CAMELBACK):

1. Measure and mark the center of the trunnion tube side to side, (see Figure 2.4-A).

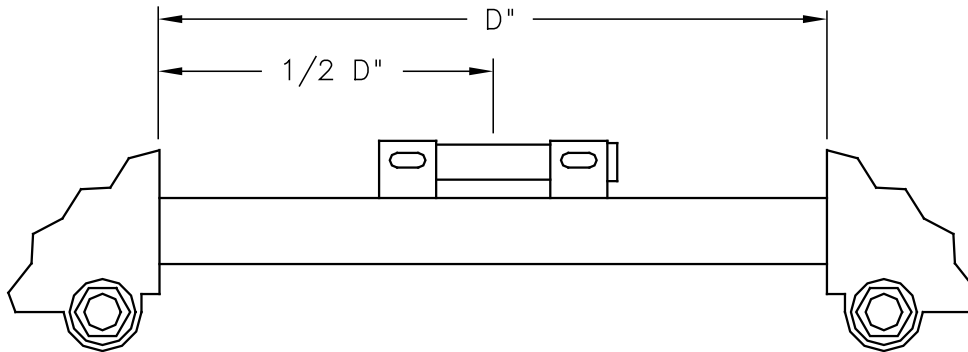


Figure 2.4 –A: Trunnion Mounting Location

2. Check for adequate clearance between transducer assembly and the drive shaft.
3. Clean a 12" space in the center of the axle. Remove all paint, dirt and grease, exposing bare metal. Use solvent and a wire brush as necessary.
4. Using the two, 2-1/4" long cap screws from the installation kit, bolt the installation spacer bar to a pair of mounting brackets. **Note:** The mounting bracket holes are elongated allowing adjustment of the space between the inside edges of the mounting brackets from 2-1/2" to 3-1/2". Set the cap screws so the space between the inside edges of the bracket is 3-1/2".

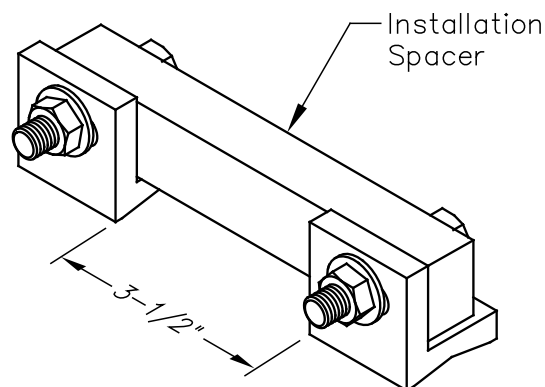


Figure 2.4-B – Installation Spacer Assembly

5. Position the mounting brackets / installation spacer bar on top of the trunnion and clamp in place. The assembly should be right in the middle, side-to-side and front to back. The brackets should sit flat without rocking or without gaps under them.
6. Weld the mounting bracket / installation spacer bar unit to the trunnion along the two edges of each mounting bracket, (see Figure 2.4-C). **Do not weld all around the mounting bracket and do not weld on the sides with the "V" groove, (see Figure 2.4-C).** **Note:** Use a low hydrogen rod such as AWS E 7016.



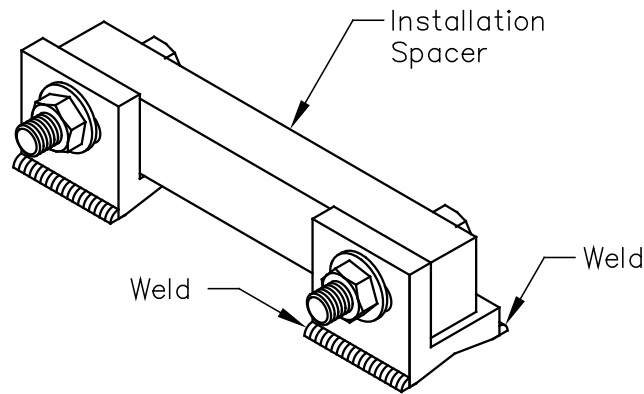


Figure 2.4-C – Welding Transducer Mounting Bracket / Installation Spacer

7. After weld has cooled, unbolt and remove installation spacer bar.
8. Clean brackets and transducer mounting surfaces with alcohol or solvent. Make sure there is no weld splatter on mounting surfaces for the transducer.
9. Position the transducer so that the pigtail can be connected to the cable coming from the meter in the cab. This is usually the driver's side. Bolt the transducer to the mounting brackets using the two, 3/8" - 24 x 2-1/4" cap screws and four washers. Place the bolt heads and washers on the transducer side and the nuts and washers on the mounting bracket side and **hand tighten only**. Be sure that the top of the transducer is up so that you can read the serial number. The pigtail should be exiting below the centerline of the transducer, (see Figure 2.4-D).

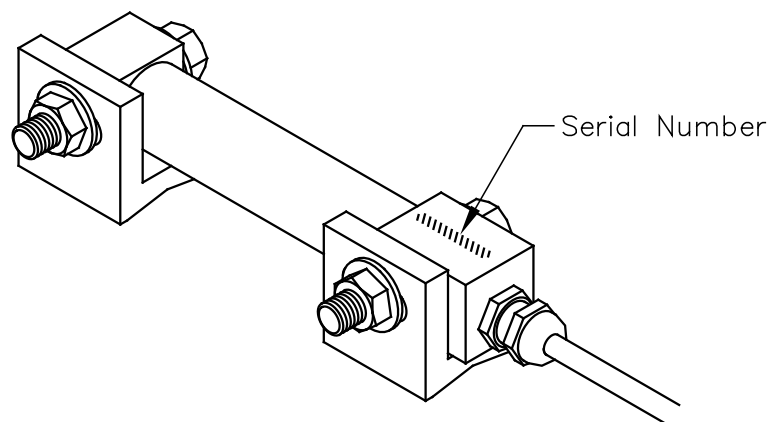


Figure 2.4-D – Transducer Assembly

10. Tighten transducer cap screws, see section 3.0.
11. Install transducer cover, see section 4.0.

## 2.5 FABRICATED STEEL WALKING BEAM INSTALLATION – Wide Mount:

1. Make sure vehicle is on flat and level ground before beginning installation.

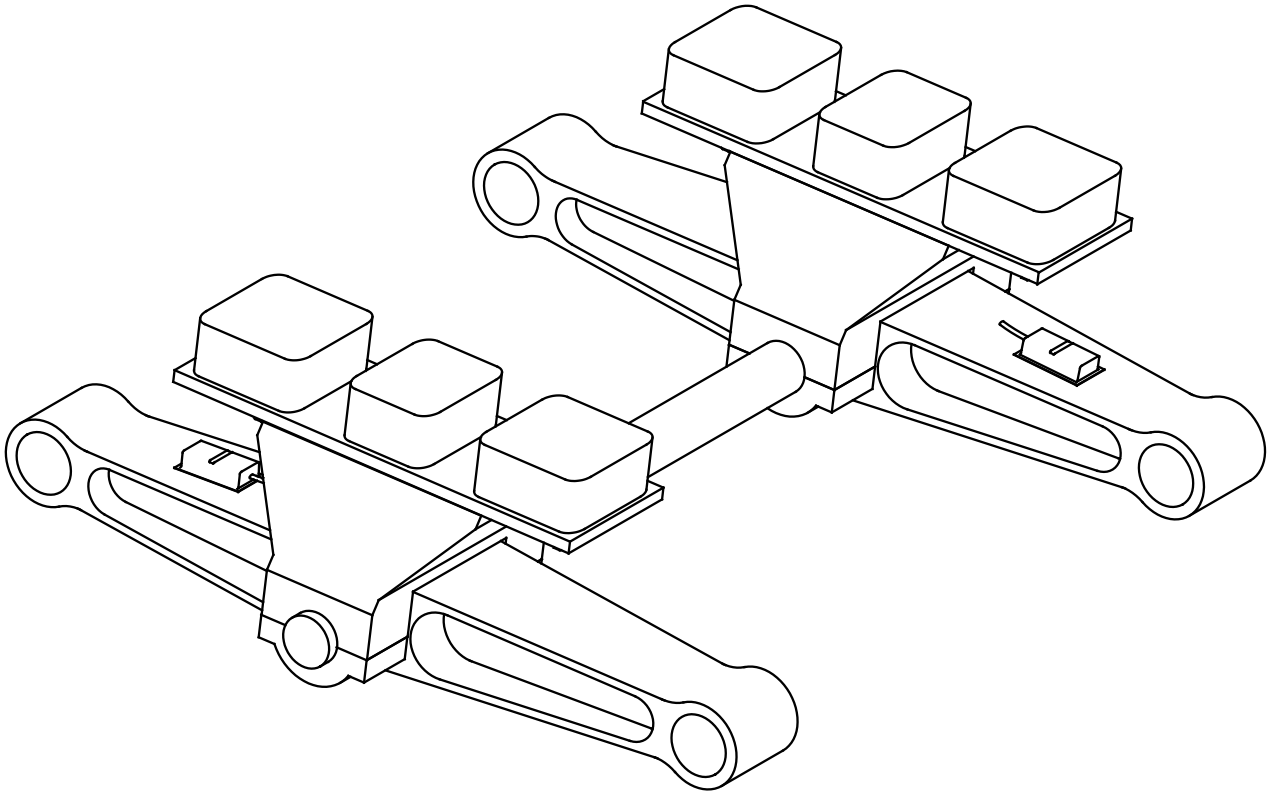


Figure 2.5-A – Walking Beam Assembly

2. Thoroughly clean a 12" space all across the top of each beam where the mounting brackets / deflection transducers will be located. (One on the front side of the walking beam and the other on the opposite rear side). For walking beams with rubber cushions, the transducer location will be between 10" and 22" from the beam's centerline. For walking beams without rubber cushions, the space should be between 6" and 18" from the center of the walking beam. Remove all paint, dirt and grease, exposing bare metal. Use solvent and a wire brush as necessary.
3. Using the two 2-1/4" long cap screws from the installation kit, bolt the installation spacer bar to a pair of mounting brackets.

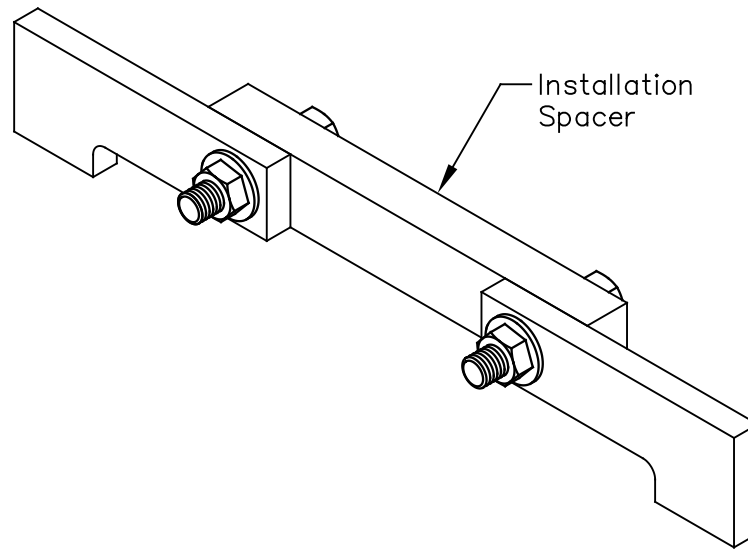


Figure 2.5-B – Transducer Assembly

4. Measure and mark for deflection transducer location. From the centerline of the walking beam, measure out onto the cleaned area. The mark will be used to position the inside bolt connecting the mounting bracket and the installation spacer bar. The distance from the centerline to the inside (closest to the centerline) bolt depends on the type of beam.

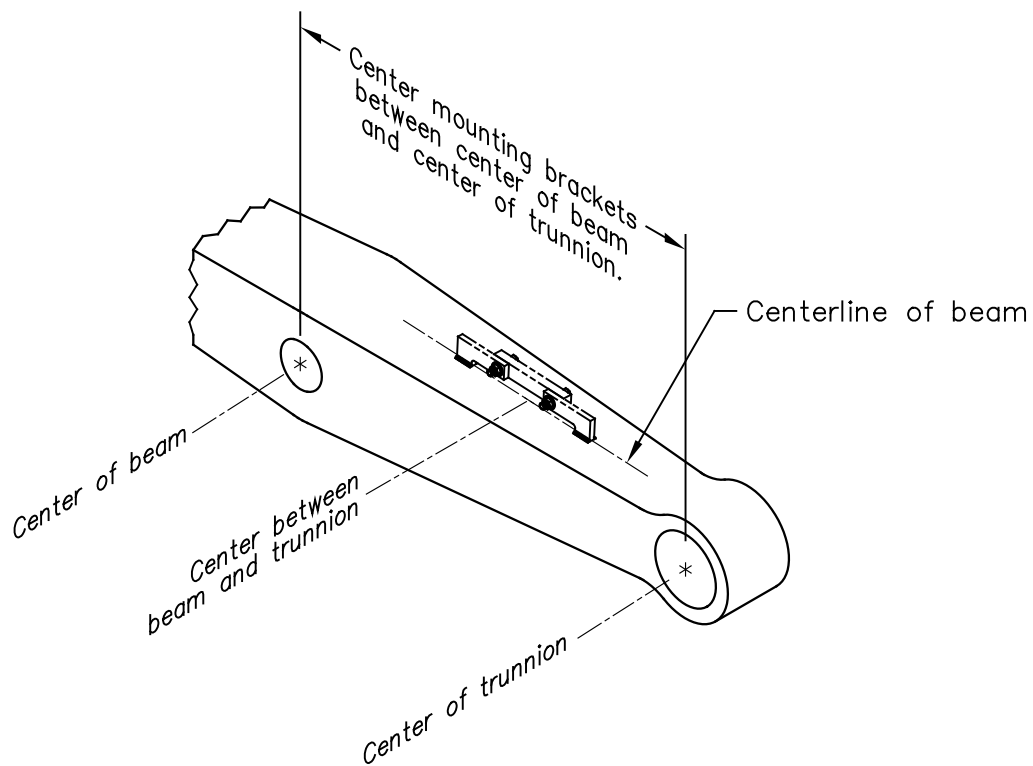


Figure 2.5-C – Walking Beam location

5. Before welding the mounting brackets to the beams, make sure the beams are the proper temperature. Steel beams should be at least 65° F.
6. Position the mounting brackets / installation spacer bar on the beam and clamp in place as described in step #4. The brackets should sit flat without rocking or without gaps under them. **Note:** The installation spacer bar should be facing toward the **outside** of the truck.
7. Weld the mounting bracket / installation spacer bar unit to the beams along the inside and outside edge of each mounting bracket, (refer to Figure 2.5-D). **Do not weld all around the mounting bracket and do not weld on the end, (see Figure 2.5-D).** **Note:** Use a low hydrogen rod such as AWS E 7016.

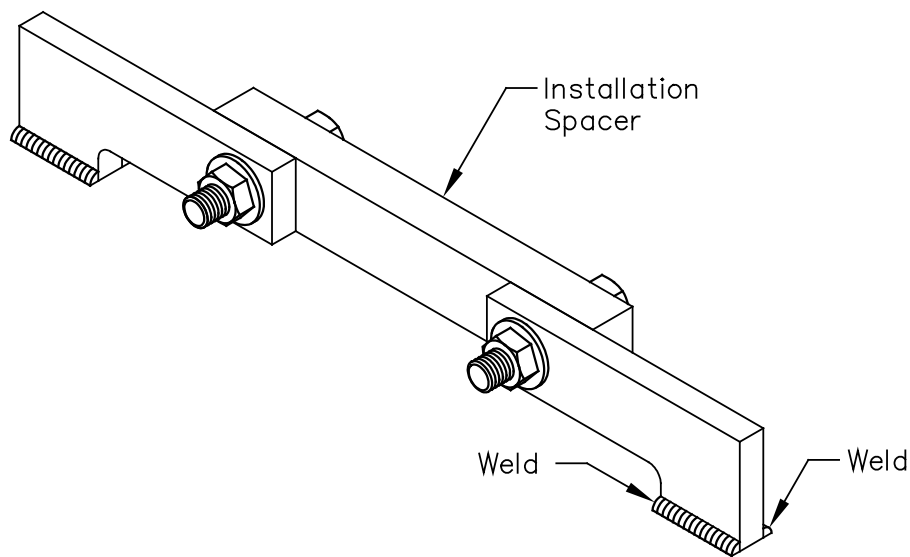


Figure 2.5-D – Welding Transducer Mounting Bracket / Installation Spacer

8. After weld has cooled, unbolt and remove installation spacer bar.
9. Clean brackets and transducer mounting surfaces with alcohol or solvent. Make sure there is no weld splatter on mounting surfaces for the transducer.
10. Bolt the transducer to the mounting brackets with pigtail facing the center of the beam using the two, 3/8" - 24 x 2-1/4" cap screws and four washers. Place the bolt heads and washers on the transducer side and the nuts and washers on the mounting bracket side and **hand tighten only**. Be sure that the top of the transducer is up so that you can read the serial number. The pigtail should be exiting below the centerline of the transducer, (see Figure 2.5-E).

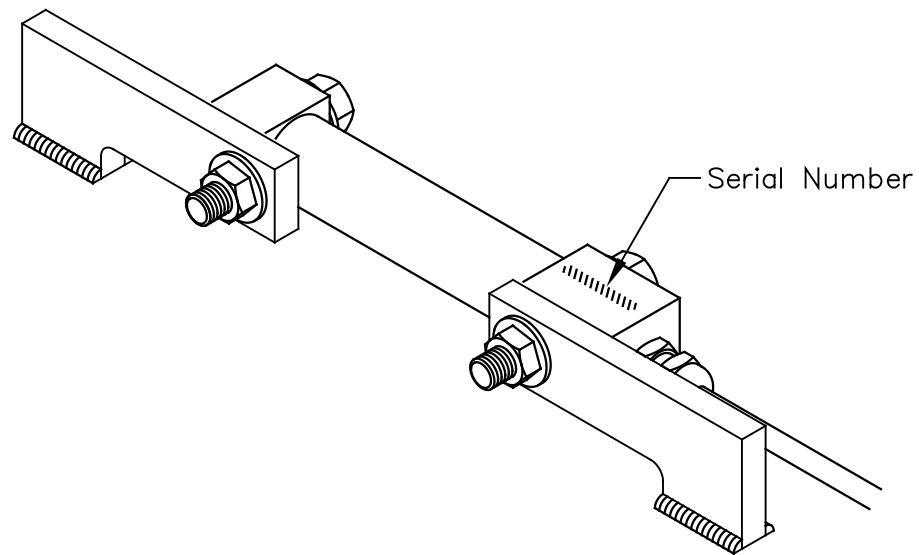


Figure 2.5-E – Transducer Assembly

11. Tighten transducer cap screws, see section 3.0.
12. Install transducer cover, see section 4.0.

### 3.0 TIGHTENING TRANSDUCER CAP SCREWS:

1. Make sure the transducer mounting cap screws are *hand tightened only*.

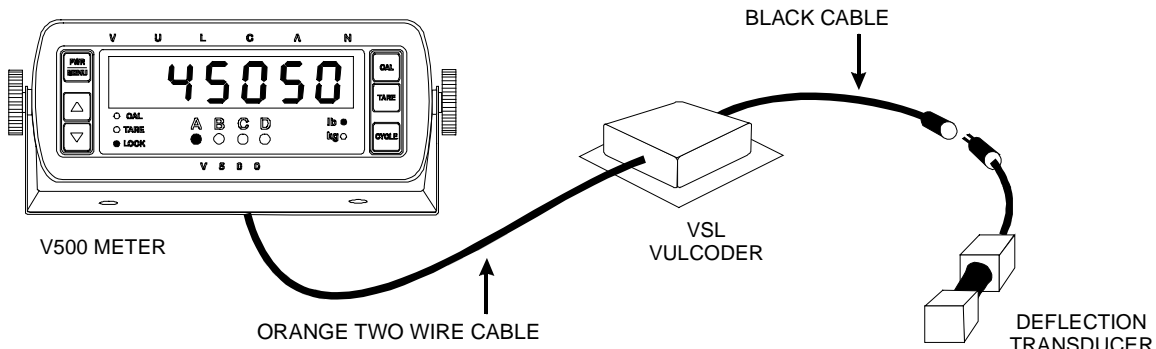


Figure 3.0-A

2. To adjust the installation offset, temporarily locate the meter so it is visible while cap screw torque on the transducer is adjusted. Make all electrical connections between the meter and Vulcoder.
  - a. Connect the white and green wires from the Vulcoder to the back of the V500 Meter.
  - b. Temporarily connect 12 Vdc power to the V500 Meter.
  - c. Connect the black cable from the Vulcoder to the black cable coming from the deflection transducer.
3. Lock the meter on the channel you are using, adjust the calibration number to 3200 on the meter. Push the **Tare** button and adjust the meter to read "0" using the **Up** or **Down** arrow buttons. Torque the cap screws connecting the transducer to the transducer mounting bracket to **50 ft-lb by tightening the nut side and holding the cap screw head stationary**. Take care that the reading on the meter does not change by more than 500 lb (either up or down). If this does change by more than that limit, loosen the cap screw and retighten them. Try to get as close to zero as possible. If installing two transducers on the same 2-lead Vulcoder, unplug the first transducer and follow the above procedure for the second transducer. For best performance, get both transducers as close to zero as possible.

Installation offset can be adjusted by slightly turning the cap screw head while tightening the nut.

**Note:** If acceptable offset cannot be obtained, unbolt and re-install the transducer.

#### 4.0 INSTALLING PLASTIC TRANSDUCER COVER:

1. Clean welding residue with a clean wire brush.
2. Mask off the area around the transducer installation.
3. Paint the transducer, mounting brackets, and the area under the transducer. Use a high quality rust preventative paint such as Rustoleum or Tremclad. Let paint dry before proceeding with steps 5,6,7, and 8.
4. If the transducers are being installed on Hendrickson Walking Beams, attach the warning label supplied. The label should be attached in the web of the walking beam directly below the transducer installation, (see Figure 4.0-C).
5. If the transducers are being mounted on a fabricated walking beam, it is necessary to notch the cover in order to fit over the wide mount brackets, (see Figure 4.0-C).
6. Clean the bottom flange of the cover.
7. Apply a bead of silicon sealant to the bottom of the flange, (see Figure 4.0-A, C).
8. Install the cover over the transducer using wire zip ties, (see Figure 4.0-B, D).
9. Seal the holes at the end of the cover and around the cable from the transducer using silicone sealant.

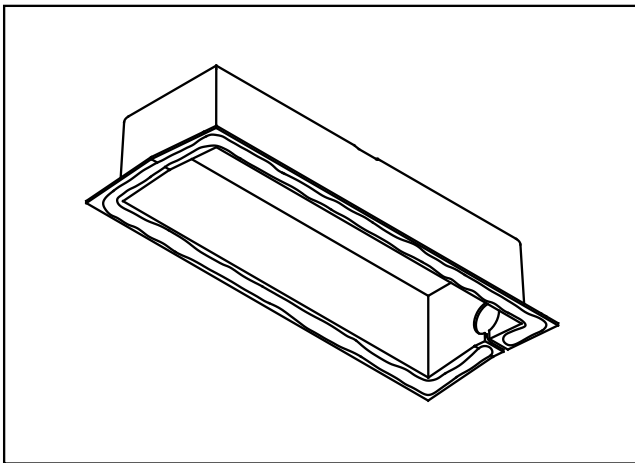


Figure 4.0-A

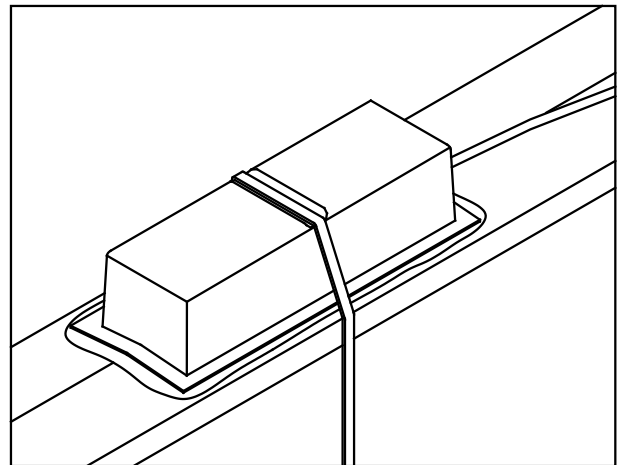


Figure 4.0-B

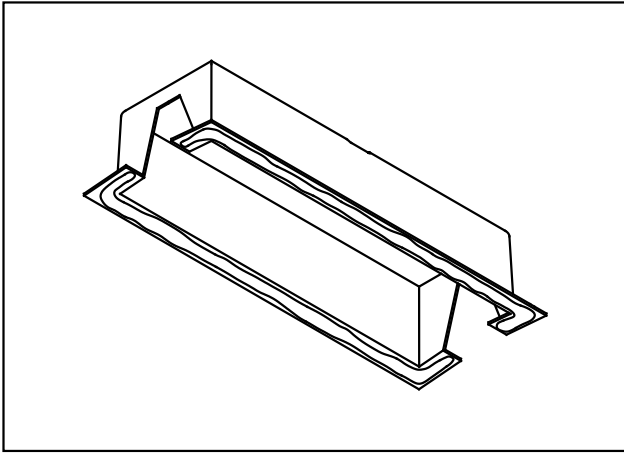


Figure 4.0-C – Wide Mount

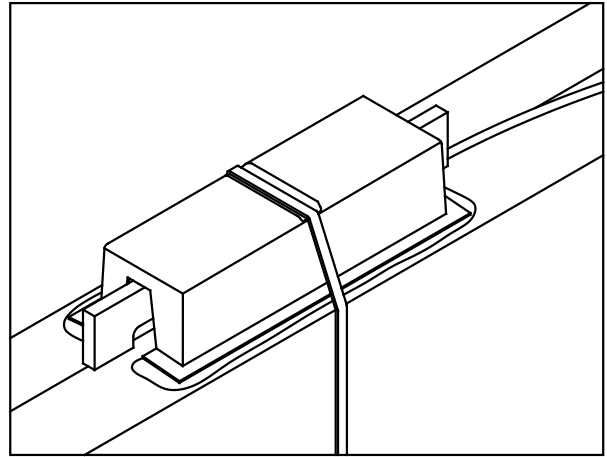


Figure 4.0-D – Wide Mount



# WARNING

This transducer is accompanied by a warning label for walking beam installations. The label must be attached to the web of the walking beam when the transducer is installed, with the red arrows pointing up toward the transducer mounting area. The reason for the warning label is that the walking beams are occasionally removed from the vehicle to replace the bushing. If the walking beam is accidentally replaced upside down, the scale will not work properly and the fatigue life of the walking beam may be shortened.

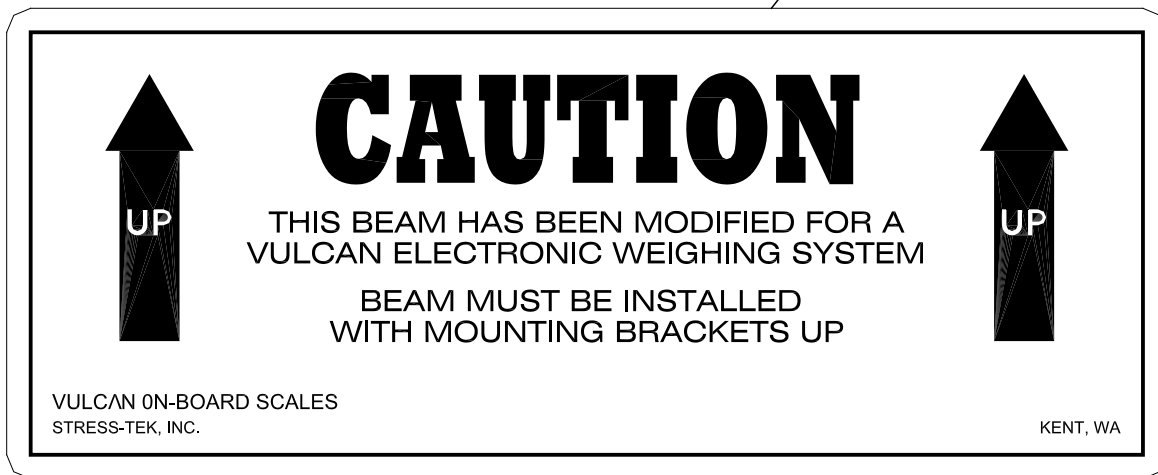
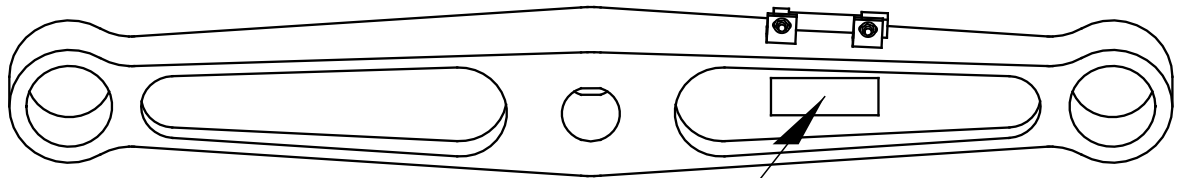


Figure 4.0-C: Warning Label Installation Location

## 5.0 INSTALLATION CHECKLIST:

1. Make sure that adequate clearance is available above all transducers **before** installation.
2. Make sure that all electrical connectors are tight.
3. Provide proper slack in pigtails or cables. This will prevent cable damage from suspension travel.
4. Use care when tightening cap screws. Watch that the meter does not exceed +/- 500 lbs. Improper tightening of the cap screws preloads the transducer and shortens its life.
5. Keep everything clean, both before and after transducer installation.
6. Paint transducer, mounting brackets and surrounding area with high quality rust preventative paint.
7. Attach warning label to walking beam installations.
8. Note that the transducer **must** be removed from the front axle when the axle is straightened or aligned.
9. Completely seal the transducer cover around the bottom flange and holes in the ends.