

**Installation, Setup and Calibration  
of Vulcan Deflection Sensors on  
Hendrickson 462/463 and Haulmaxx Equalizing  
Suspension Beams**

**(Includes Models HN 402, HN 462, HN FR, RT 463,  
RTE 463, HMX and HMX 400.)**



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## 1.0 INTRODUCTION

1. Sensor installation must be done with an empty truck.
2. The J brackets are designed to be welded to the suspension beam using circular welds in the two large holes in the brackets. **Do not weld anywhere else on the beam.**
3. For the best scale system accuracy, one sensor should be mounted on the **forward** arm of one suspension beam. The other sensor should be mounted on the **rear** arm on the opposite beam, as shown in Figure 1.

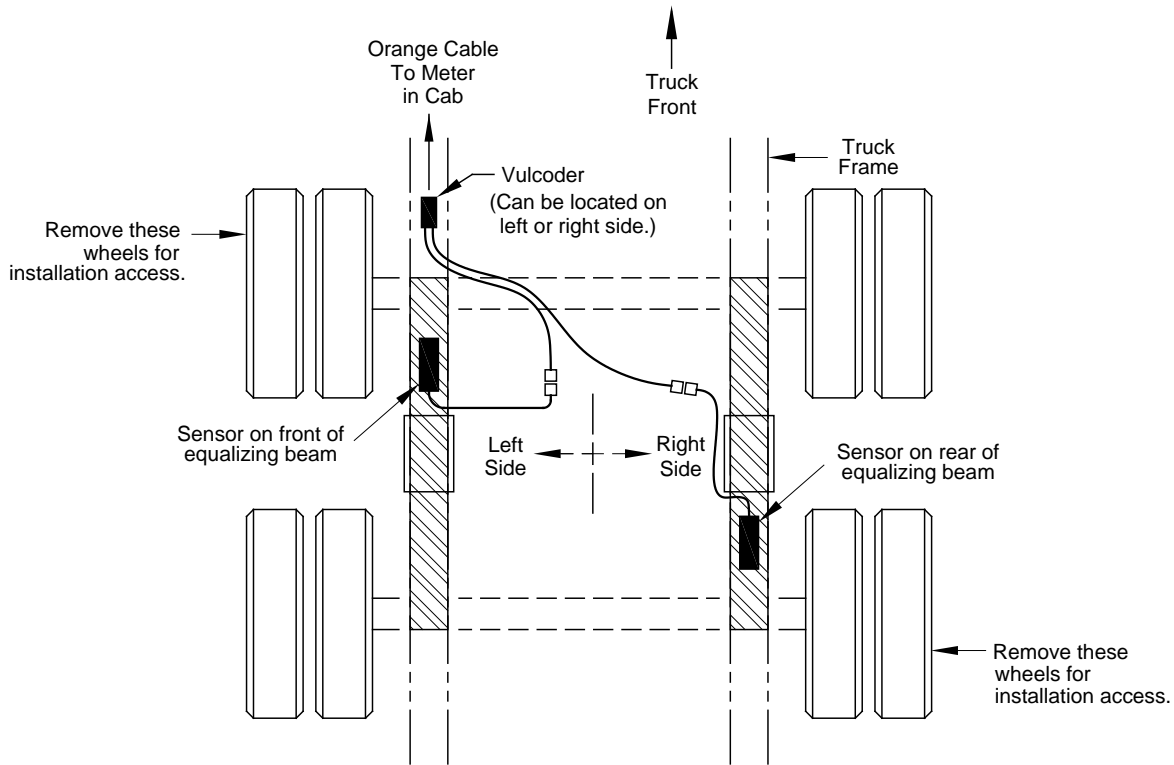


Figure 1

4. **Do not** paint brackets prior to installation.
5. After circular welding the J brackets to the suspension beam:
  - a. Allow the brackets to air cool naturally before removing clamps.
  - b. Do not move the truck until the brackets have cooled
6. The electronics must be installed before mounting the sensors to the J brackets.

## 2.0 J BRACKET INSTALLATION

1. Mount the J brackets (one with the hole, one with the slot) to the installation tool as shown in Figures 2 – 5. The slot in the angle fixture must align with the hole in the J bracket. The circular weld holes must be towards each other, see Figure 2. Make sure the brackets are touching both set screws and that the edges are parallel. When properly positioned, tighten the assembly to hold the two brackets in alignment.

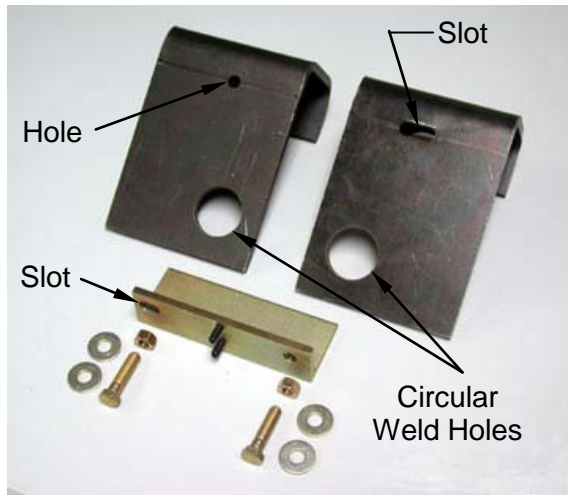


Figure 2

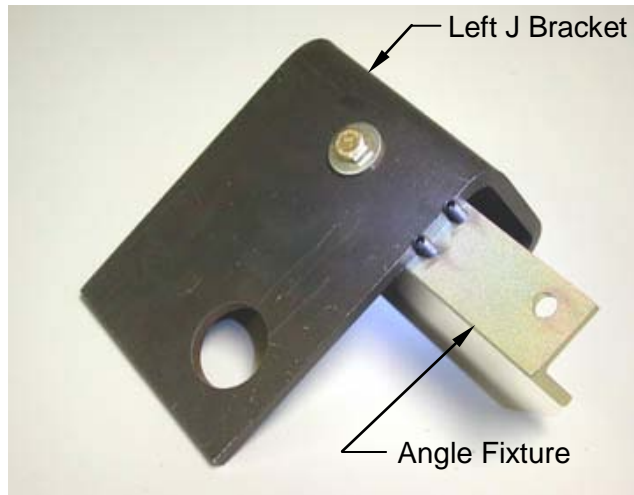


Figure 3

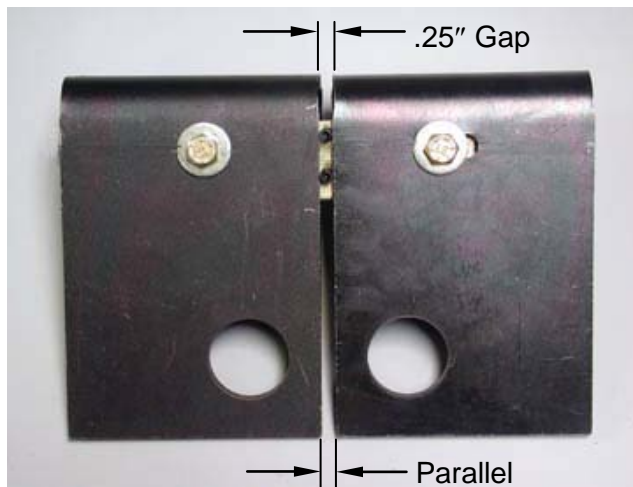


Figure 4

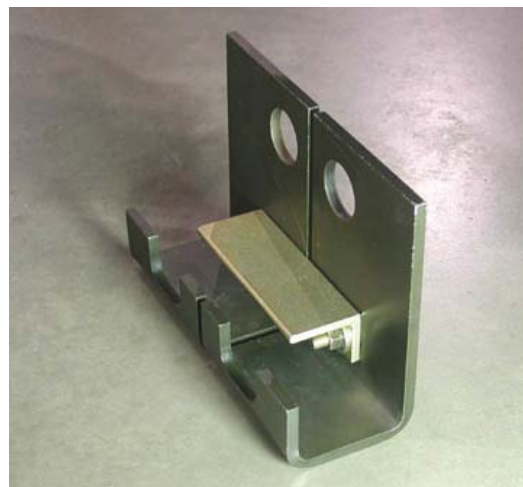


Figure 5

2. Remove the appropriate wheels on the truck to provide working access to the equalizing beam. Position the J brackets on top of the suspension beam, as shown in Figure 6 and 7. The circular weld holes go on the outboard side of the beam.

Two templates are included in the installation kit. The template is used to set the proper spacing of the J Bracket assembly from the end of the beam. Equalizing beams of the Haulmaxx design require the use of the shorter HMX template.

Using the appropriate template, slide the J Bracket assembly into position as shown. Mark the location of the two circular weld holes on the suspension beam and remove the bracket assembly.

**Template**

Hendrickson 462/463

Hendrickson HMX

**Use On Hendrickson Models**

HN 402, HN 462, HN FR, RT 463 and RTE 463

HMX and HMX 400

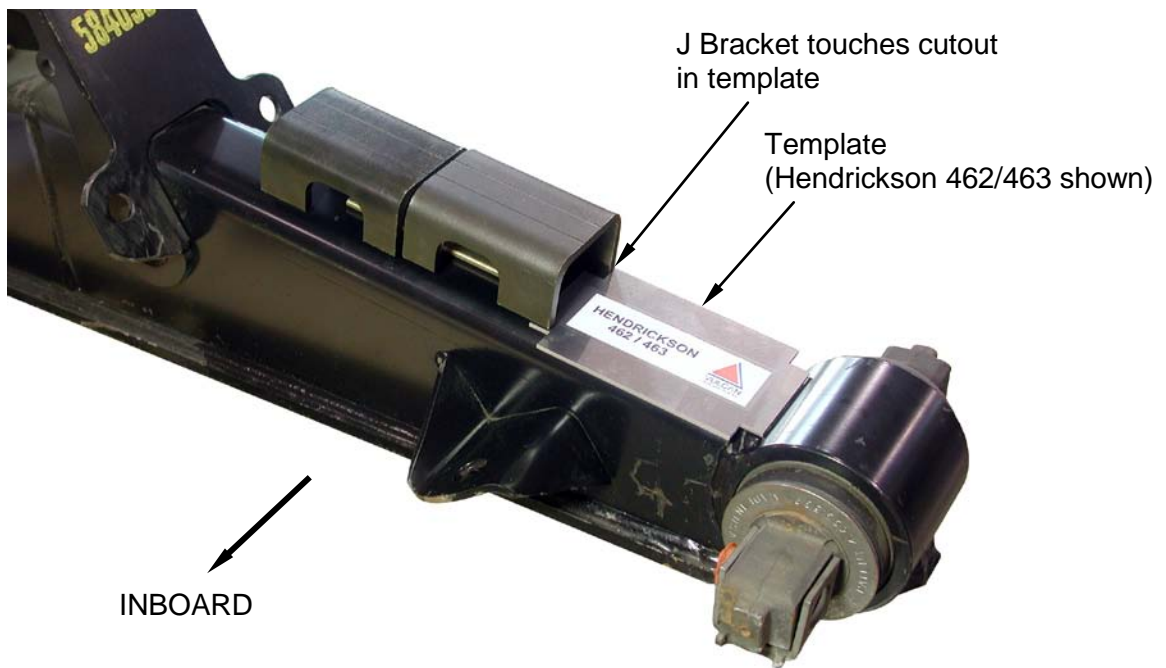


Figure 6

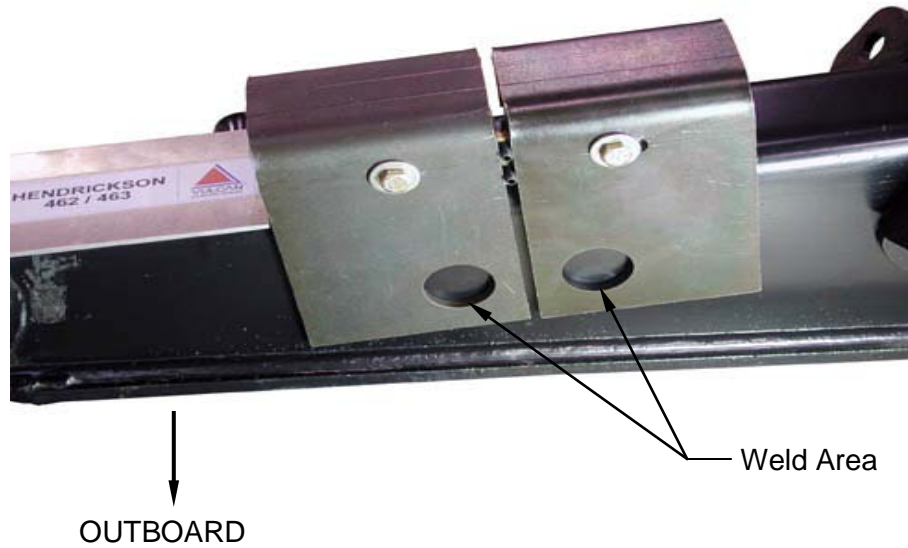


Figure 7

3. Prep weld area by cleaning and sanding to bare metal using a 40 to 80 grit flap wheel or sanding pad.



Figure 8

4. Reposition bracket assembly on beam using the Hendrickson 462/463 template. Clamp in place, see Figure 9. Make sure the angle fixture is sitting flush on the equalizing beam.

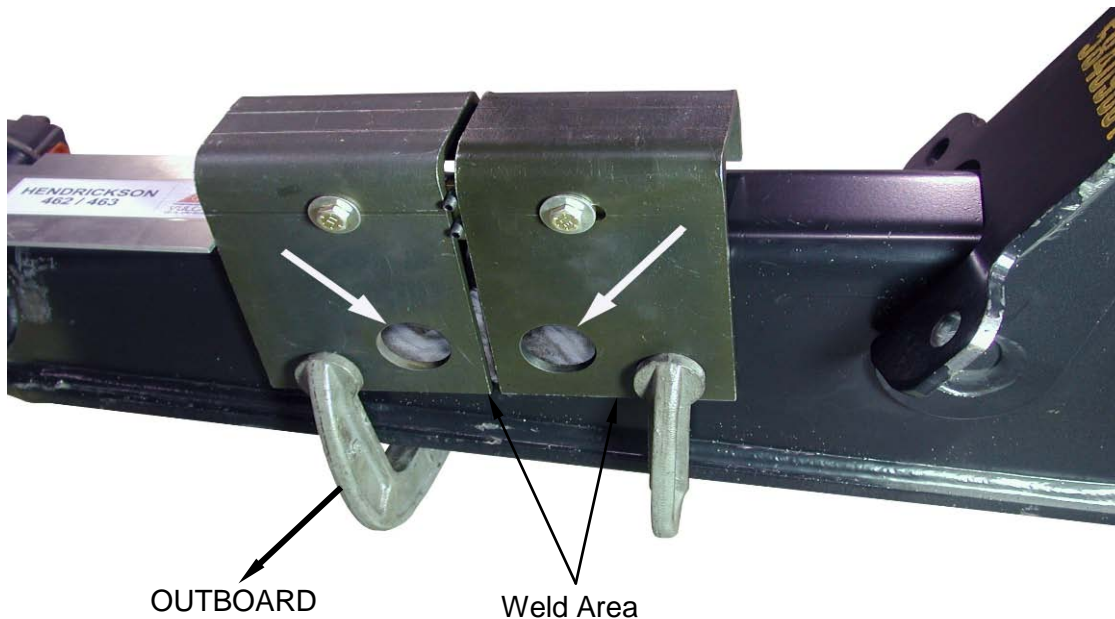


Figure 9

## 5. Welding

- a. Use AWS 60 or 70 series welding rod or wire.
- b. Parts must be free of moisture, organic compounds, oils, rust and other welding contaminants prior to welding. Follow AWS D1.1 2006 for procedures, workmanship, technique, inspection and contractor obligations for mild steel welding.
- c. Attach the brackets to the beam by first tack welding each hole at two locations (12 o'clock and 6 o'clock positions). Weld the circumference of the two large holes using a 5/16 fillet weld. **Do not weld anywhere else on the beam.** Allow to air cool naturally before removing clamps and angle fixture.

When the brackets have cooled, remove the clamps and angle fixture. The equalizing beam is now ready for installation of the deflection sensor.

## 3.0 V320 ELECTRONICS INSTALLATION

### 3.1 Install Vulcoder and Route Black Cable

- Tape the VSL Vulcoder connector ends prior to routing the black cabling to avoid contamination.
- Mount the VSL Vulcoder near the sensors on the inside of the truck frame rail or next to a structural member. The VSL Vulcoder mounting surface must be in an area protected from road and hauling debris.
- Route the Vulcoder black cables to the location of where the sensor cable connectors will be. (**Do not** trim the black cable to length). Route cables to include proper strain relief to prevent damage from suspension travel.

### 3.2 Vulcoder Black Wire Loop

- The VSL Vulcoder has a black loop that must remain uncut. The meter uses the uncut loop for channel assignment. This system will have a single channel assigned, channel A.

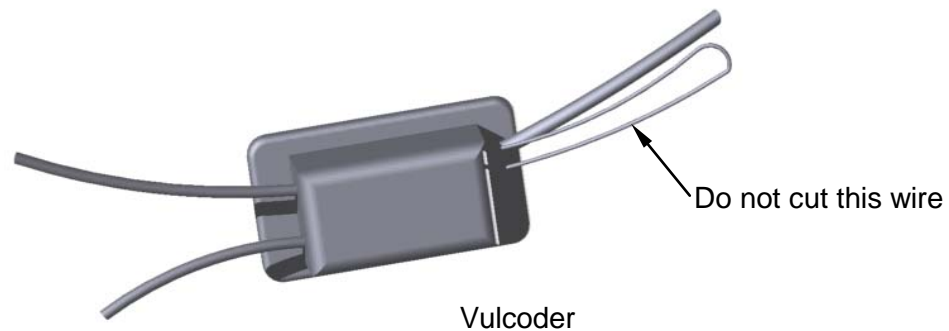


Figure 10



### 3.3 Mount Meter in Cab and Route Cable

- Find a suitable location for the meter in the cab and install the mounting bracket.
- Route the 2-wire orange VSL Vulcoder cable from the meter location in the cab to the VSL Vulcoder near the rear suspension. If the cab is a front tilt model, route the orange cable through the hinge point.
- Route the cable to the meter but **do not** trim any excess orange cable off at the meter at this time.
- Where the orange cable meets the VSL Vulcoder, trim off the excess cable leaving approximately 1' – 2' of extra orange cable to allow for splicing these cables together.



Figure 11

### 3.4 Splice Orange Vulcoder Cables Together

- Splice the orange cables together from the meter and Vulcoder. Use the 3M displacement connectors supplied. See Figures 12 – 15.
- When using the Vulcan supplied 3M connector, **do not** strip the insulation from each wire.
- Be sure to insert wires **completely** into the connector and check their position by looking through the translucent connector body.
- Crimp the connector cap down flush with the top edge of the connector body, ensuring a good connection.
- Tape the connection and all of the wires with the orange insulation stripped off to help seal and prevent wire chaffing that can cause a wire to short.
- Wire tie the splice as shown below for strain relief.

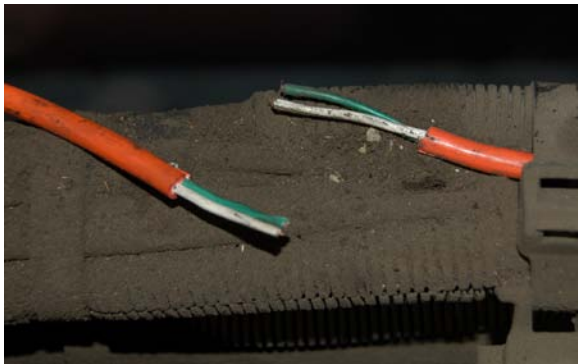


Figure 12



Figure 13

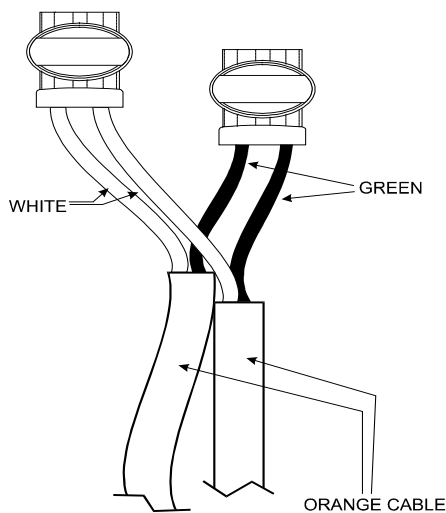


Figure 14

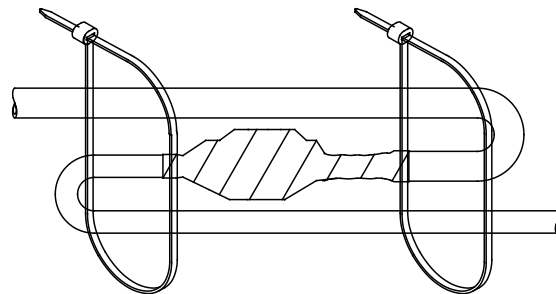
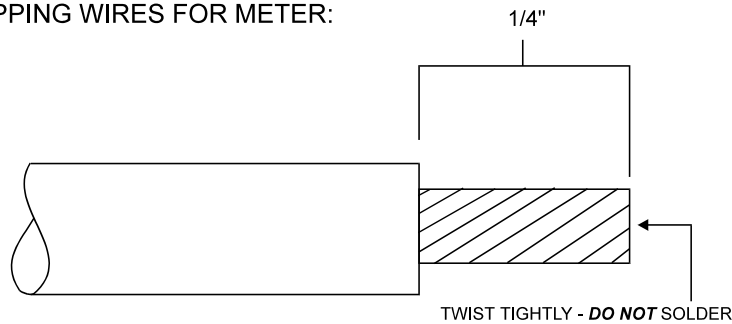


Figure 15

### 3.5 Secure Cab Wires and Connect Meter Terminal Block

- In the truck cab, secure the orange cable so it does not obstruct other in cab equipment and allow for strain relief.
- Unplug the terminal block from the back of the meter, strip the wires, and connect the VSL Vulcoder wires to the terminal block (refer to Figures 16 and 17).
- Secure the power cable so it does not obstruct other in cab equipment. Strain relieve the power cable and **cut** to length.
- Strip the wires and make all wire connections to the terminal block as shown on the back of the meter. **Do not** plug the terminal block into the meter at this time.

STRIPPING WIRES FOR METER:



Be careful that stray wires **DO NOT** contact adjacent terminals

Figure 16: Stripping Wires for the Meter

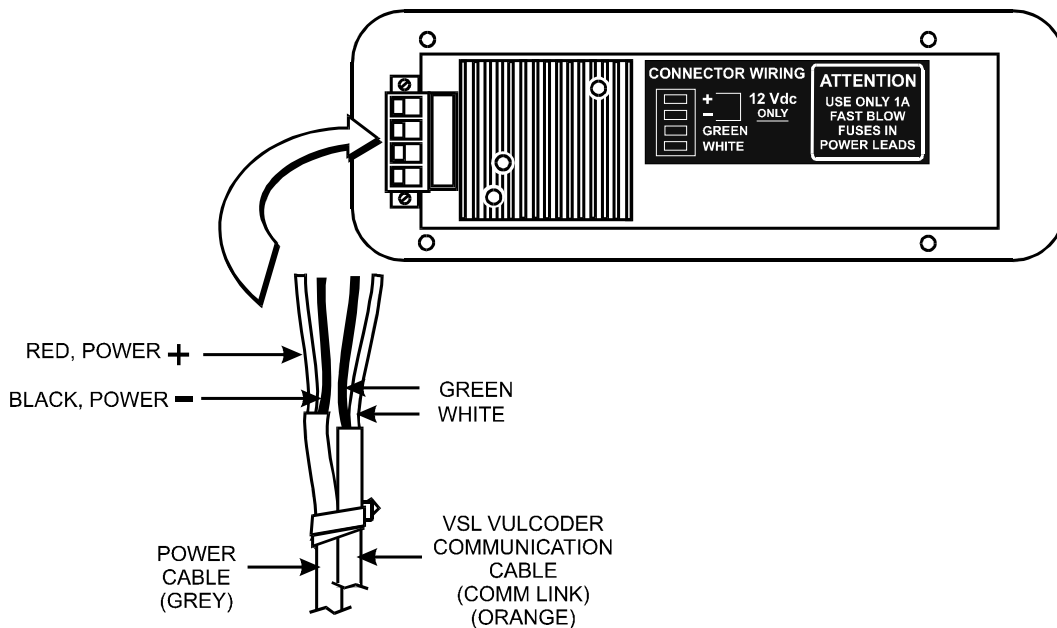


Figure 17: V300 Series Wire Connections to the Meter

### 3.6 Connect Meter to Battery Power

- Disassemble the positive fuse holder, (red wire)
- Apply grease to the positive connector at the battery post to inhibit corrosion.
- Connect fused power leads directly to battery posts **12 Vdc only**. **Do not** connect the power cable to a power source activated by the key switch; power **must** be supplied at all times.

3.7 Review sections 3.5 and 3.6 before connecting the terminal block to the back of the meter. Connect terminal block to the back of the meter.

## 4.0 CONNECTING THE DEFLECTION SENSORS

- a. Make sure the mounting surfaces on the sensor and brackets are clean and free from lubricants. Make sure there is no paint on the mounting surfaces. It is important to have clean, metal to metal, contact.

**Important:** Check the sensor pigtail connectors to make sure they are clean and dry. **Do not** allow moisture, contact cleaner, grease or any other substance inside of connectors.

- b. Set both sensors on the equalizing beams (one on each side of the truck) under the J brackets with the **serial number facing up** and the **cable exiting towards the center of the beam**, as shown in Figure 18. Do not insert the fasteners at this time.
- c. Verify the sensor connector coming from the VSL Vulcoder has an O-ring inside the connector shell. There are two types of O-rings, a flat style and a standard round style. Either type is OK, never use more than one.
- d. Attach the black cable connectors to the pigtail connectors coming from the sensors. Make sure they are finger tight plus an additional 1/8 of a turn more, use channel lock pliers. The additional tightening is necessary to compress the O-ring. This prevents scale errors, which can occur from moisture entering into the sensor's connector. **Caution:** Do not over tighten the connectors as this can damage them.

## 5.0 V320 ELECTRONICS SETUP

### Set the “Tare” weight to zero



Press the **PWR / MENU** button to turn on the meter. After start up, the meter will display a weight number.



Press and release the **TARE** button. The **TARE** and **LOCK** LED's are illuminated.

Press the ▲ and ▼ buttons together to zero the meter.



Press and release the **TARE** button to return to normal operating mode.

### Enter the starting “Calibration” number



Press and release the **CAL** button. The **LOCK** and **CAL** LED 's are illuminated. The flashing LED below the channel designation indicates which channel(s) is selected.



Use the ▲ or ▼ buttons to make the starting calibration number read 3200.



Press the **CAL** button until the **CAL** LED is no longer illuminated. (The **CAL** button may need to be pressed once or twice for this to occur).

Bolting the sensors to the J brackets will cause preloads in the sensors. This will cause the display to show non-zero weight values.

Too high of a preload can over range the electronics during normal operation. Section 6.0 will explain how to avoid excessive preloading.

## 6.0 MOUNTING THE DEFLECTION SENSORS

- a. **Make sure the serial number is facing up** and attach **one** sensor to the brackets using the 2 ¼" long Grade 8 screws. The screws must be clean and dry – **Do Not lubricate**. Use a heavy washer, P/N: 30-70015-003, (supplied in the J bracket kit) under the screw head and under the hi-nut. Screws should be inserted from the inboard side with the hi-nuts on the outboard side, see Figure 18. **Do not** install a washer between the J bracket and sensor. Hand-tighten the mounting fasteners.

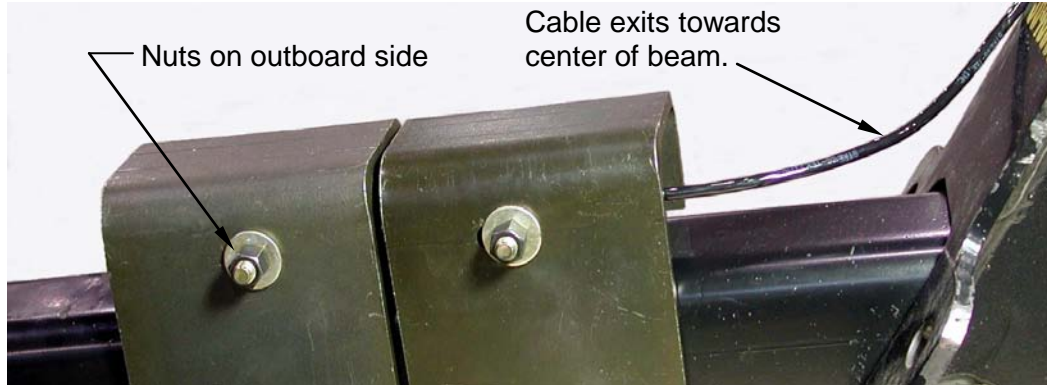


Figure 18

- b. When torquing the nuts, if the reading changes by more than  $\pm 20,000$  lb, **stop** and go to step e.
- c. Pre-torque both nuts to 15 ft-lb. Torque the nut at the cable end of the sensor first. When tightening, hold the screw head and turn only the hi-nut.
- d. Torque the hi-nuts to 45 to 50 ft-lb. Torque the nut at the cable end first. Hold the screw head and only turn the nut. Check the reading. After both fasteners have been fully torqued the output (preload) must be within  $\pm 10,000$  lb of zero. If not, loosen completely the fasteners and go to step e. Once the output is within range, **record this reading** in the table in section 8.0. Go to step f.
- e. If the output is too high, increase the pre-torque on the fastener at the cable end. Tighten this fastener to 25 ft-lb then pre-torque the opposite fastener to 15 ft-lb. Torque the fastener at the cable end to 45-50 ft-lb, then do the same for the other fastener. If the output is too low (large negative weight), repeat step c except pre-torque the fastener opposite the cable end first. After both fasteners are pre-torqued, apply final torque (45-50 ft-lb) to both fasteners starting with the fastener opposite the cable end.

### Note

Whichever fastener is pre-torqued first will determine the direction of the preload. If the fastener at the cable end is done first, the output (preload) will tend to go negative. If the fastener at the opposite end is done first, the output (preload) will tend to go positive.

Once the output (preload) is within range ( $\pm 10,000$  lb) with both nuts torqued to 45-50 ft-lb, record this reading in the table in Section 8.0.

- f. Repeat the process, steps a through e, for the other sensor. After torquing the hi-nuts, the system output should be within  $\pm 10,000$  lb of the installed reading from the first sensor. This guarantees that both sensors do not have an excessive preload. Record the final offset readings in the table in section 8.0.
- g. Installation of the sensors is now complete and the circular welded area and brackets can be painted to protect against corrosion. Overspray will not hurt the sensor.

## 7.0 ELECTRONICS INSTALLATION CHECKLIST

1. Make sure electrical connectors are tight.
2. Provide proper slack in load cell sensor pigtail cables and Vulcoder wires to prevent cable damage from suspension travel.
3. Verify Vulcoder is secure and clear of potential damage from road debris.
4. Paint transducer weld area and mounting surfaces with a high quality rust preventative paint.
5. Make sure meter power is hot at all times when truck's battery switch is on.
6. Verify there is adequate strain relief for the cables in the truck cab.
7. Verify meter placement is in clear view for the driver but not obstructing his vision.
8. Mount the wheels and set the empty truck on level ground.
9. Set the truck's axle group Tare weight in the meter.



Press and release the **TARE** button. The **TARE** and **LOCK** LED's are illuminated.



Use the ▲ or ▼ buttons to increase or decrease the displayed Tare weight to match the actual truck's empty weight. Starting tare weight is in pounds.



Press and release the **TARE** button to return to normal operating mode.

10. Verify the starting Calibration number is still set to 3200. See Section 5.0.

### 11. Assigning Other Meter Setup Functions



Press the **PWR/MENU** button once to turn the meter on. (The meter will go through its startup routine and then into normal weighing mode.)



Press the **PWR/MENU** button to enter program menu (The meter will display... "PSr" for program sequence.)



Press the **CYCLE** button until program units ("PU") is displayed. Use the ▲ or ▼ buttons to select unit of measure (lb, kg).





Press the **CYCLE** button until program grad (“**PG**”) is displayed. Use the ▲ or ▼ buttons to select 100.



Press the **CYCLE** button until program lock (“**PL**”) is displayed. Use the ▲ or ▼ buttons to activate the Driver Lock feature. Set the driver lock to “on”.

“PL OFF”= deactivated “PL ON”= activated



Press the **PWR/MENU** button to exit program menu and return to normal weighing mode.



Press and hold **PWR/MENU** button to turn meter off.

**Congratulations!** You have completed the installation and meter setup.

**Note:** After the truck has been working in the field for one week, the scale system will settle in. After this period, resetting the Tare weight and fine tuning the Calibration number should be done. This is covered in the Vulcan V320 Owner’s Manual.



## 9.0 FOR FINE TUNING CALIBRATION OF VULCAN SCALE SYSTEM

### DATA COLLECTION SHEET

Truck # \_\_\_\_\_

Make copies of this sheet for repeated use as needed.

1. Record all weight readings with truck stopped on the platform scale.
2. When the sheet is complete, contact Fleet Services so that they can determine new CAL numbers and enter them into the meter.

**Note:** Do not use a pre-recorded empty (Tare) weight. For best scale accuracy, empty weights must be measured each time leaving the transfer station.

		Truck Fully Loaded		Truck Empty	
No.	Date	Meter Display	Platform	Meter Display	Platform
1					
2					
3					
4					
5					
SUM COLUMNS HERE →		BOX 1	BOX 2	BOX 3	BOX 4

## FINE TUNING CALIBRATION

Calibration consists of setting the appropriate Tare weight and Calibration number.

If additional assistance is needed to fine tune your scale system, contact Stress-Tek's Customer Service at 1-800-237-0022, Ext. 2.

### Calibration Procedure:

The tare weight is set to the trucks actual tare weight.

Numbers from the Data Collection Sheet must be used for fine tuning a specific trucks calibration settings.

There must be the same number of readings for each of the 4 columns in the Data Collection Sheet.

Negative numbers in the columns are treated as negatives, so they subtract from totals.

On the Data Collection Sheet for the specific truck number, add the four columns of numbers separately and write the values in the boxes provided on the last horizontal line noted "SUM COLUMNS".

Subtract box 4 from box 2 to get the platform scale net weight (Total 1).

$$\boxed{\text{Box 2}} - \boxed{\text{Box 4}} = \boxed{\text{Total 1}}$$

Subtract box 3 from box 1 to get the display meter net weight (Total 2).

$$\boxed{\text{Box 1}} - \boxed{\text{Box 3}} = \boxed{\text{Total 2}}$$

**To find new calibration number** (trucks current Cal number is required).

Divide Total 1 by Total 2 and multiply by the trucks current Cal number.

$$\boxed{\text{Total 1}} \div \boxed{\text{Total 2}} \times \underline{\text{current Cal \#}} = \underline{\text{new Cal \#}}$$

Enter new Cal number into meter and change tare number if required.  
(See Vulcan Meter Setup sheet for instructions on changing these numbers.)

Record new Cal numbers along with truck # for future reference on the Vulcan Scale Calibration Log sheet.



## 11.0 DAILY DRIVER OPERATING GUIDE

This quick reference card is to be used by the driver as a reminder of how to operated the weigh system once a driver is familiar with it.

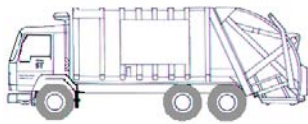
What to do:

1. Copy this page.
2. Cut the copied page on the dashed line.
3. Laminate the half page.
4. Put in the truck cab for easy driver reference.

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### DAILY DRIVER OPERATING GUIDE: OVERWEIGHT SYSTEM

#### GUIDELINES TO MAXIMIZE WEIGHT ACCURACY



To turn meter on, press the Power/Menu button. (The meter will complete its startup routine then display the truck's weight.)

To obtain the most accurate weight readings the following criteria must be met.

1. Come to a slow easy stop on a level surface.
2. For side loaders, stow the grabber arm.
3. Move the packing blade into the transport mode.

The numbers on the display may bounce for a moment until the truck and payload has completely stopped moving.

Once the numbers become stable, the number displayed will represent the trucks net weight.