FRONT FORK SCALE INSTALLATION & SERVICE MANUAL

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1.0 INTRODUCTION

The Vulcan Front Fork Weighing System consists of two weight measuring forks, two mounting kits welded to the cross tube, V600 electronics package and associated accessories for protecting the system. It is designed to measure individual commercial collection weights and can monitor net or gross weight by summing the pickup weights.

Commercial pickup weights can be measured each time or by using an audit approach. This allows operators to optimize pricing of commercial accounts and improve their competitive position. The Front Fork Scale also allow operations to eliminate overweight fines, minimize legal liabilities, and reduce maintenance expenses by assuring the vehicles are not overloaded.

The V600 Fork Scale User Manual details how to operate the system. This small bound manual comes packaged with the V600 meter and should be included with every installed system.

There are three types of electronic kits that can be used with the fork scale. From the most basic push button auditing system to a complete Weigh-In-Motion system.

The three electronic systems are:

P/N	Description
A01:	A simple Manual push button - primarily used for specific customer auditing.
A04:	Static weighing method - driver pauses the fork motion, then the weight is taken automatically.
A02:	Full Weigh-In-Motion with lift control method - no pausing the forks motion, weight is taken automatically.

Vulcan recommends that a scale ready cross tube be used for installation. It simplifies the installation process, saves 8-10 hours of installation time and better assures a properly aligned system. Scale ready cross tubes are available from Vulcan for Heil and McNeilus refuse bodies. They can also be purchased from the OEM. Other OEM's may also have scale ready cross tubes available.

This installation manual details mounting a fork system with both a scale ready cross tube, and mounting a fork system on an existing cross tube assembly.

A CD is included with this manual. It contains a PDF version of this manual. There is also a second CD which contains the V600 Fork Scale User Manual and A video of How to Download Data from the V600 meter.

This Installation Manual is available from the Vulcan website at www.vulcanscales.com.

1.1 SYSTEM SPECIFICATIONS

- SYSTEM CAPACITY: 10,000 lb

- FORK SCALE:
  - Material: ASTM A514, heat treated high strength alloy steel
  - Finish: Plated for corrosion resistance
  - Operating Temperature: -40 to +140° F
  - Mounting Fasteners: Grade 8 hex cap screws

- FORK MOUNTING CLAMPS:
  - Through Hole Design, Material: ASTM A36, mild steel
  - Threaded Hole Design, Material: ASTM A514, heat treated high strength alloy steel

  All mounting blocks are painted with a weld through primer.

- VULCODER:
  - Operating Temperature: -40 to +180° F
  - Environment: Sealed for environmental protection

- METER:
  - Operating Temperature: -40 to +180° F
  - Input Voltage Requirement: 10.5 to 29 Vdc

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2.0 SYSTEM LAYOUT, PARTS, ACCESSORIES AND TOOLS

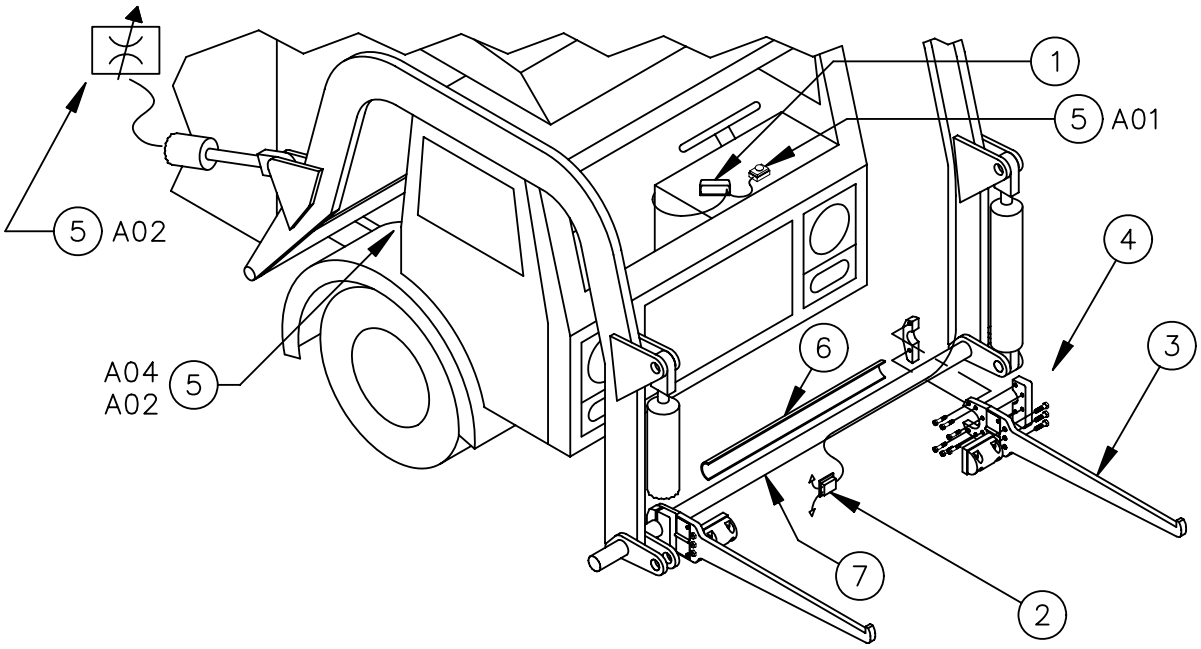


Figure 2-A

2.1 SYSTEM COMPONENTS

Item	Quantity	stock #	Description
1	1	M60	V600 meter
2	1	V33	VSL Vulcoder (1) VSL Vulcoder (1) Vulcoder guard
3	2	L38	Fork scale (1) Fork scale (1) Bumper plate (3) 7/8"-14 hex cap screws (1) Rubber bumper and mounting fasteners (1) Connector guard and fasteners

Item	Quantity	stock #	Description
Mounting Kit Options: (One set of either through hole or threaded kit is required)			
Threaded Mounting Clamp:			
4	2	H41R/L	3-1/2" Round mounting kit, right and left
		H42R/L	4" Round mounting kit, right and left
		H44R/L	4-1/2" Round mounting kit, right and left
			All mounting kits include: (2) Cross tube mounting clamps (6) 1"-14 Grade 8, hex cap screws (1) Hardened steel washer plate (1) Connector guard and fasteners
Through Hole Mounting Clamp:			
4	2	H31	3-1/2" Round mounting kit
		H36	4" Square mounting kit
		H53	5" Square mounting kit
		H35	Universal mounting kit
			All mounting kits include: (2) Cross tube mounting clamps (6) 1"-14 Grade 8, hex cap screws (6) 1"-14 Grade C hex nuts (1) Hardened steel washer plate (2) Connector guard and fasteners
Electronic Kit Options: (One required)			
5	1	A01	Manual button weigh method
		A04	Static / Weigh-In-Motion weigh method
		A02	Weigh-In-Motion with lift control weigh method

2.2 ACCESSORIES

Item	Quantity	Stock # or P/N	Description
6	1	H55	Cross tube cable guard (required by Vulcan Scales)
7	1	H56	Heil, scale ready cross tube 4.5" ∅
7	1	H57	McNeilus, scale ready cross tube 3.5" ∅, Atlantic body style
	1	59-30030-001	Printer, with signal and power cable
	1	59-30029-002	Printer mounting bracket

2.3 REPLACEMENT PARTS

Stock # or P/N	Description
H55	Cross tube cable guard
59-30042-001	Connector guard
59-30042-002	Vulcoder guard
59-30045-001	Proximity switch
A04R	Static, proximity switch upgrade kit
A02R	W.I.M. proximity switch upgrade kit
21-10003-001	Relay for proximity switch, static and W.I.M.

2.4 SERVICE REPAIR PARTS

Stock # or P/N	Description
59-30050-001	Fork connector replacement kit
59-20223-001	Fork connector O-ring replacement kit (7 O-rings)
53-20130-001	Vulcoder connector replacement pigtail kit
59-20370-001	Black Vulcoder cable splice kit
27-10086-001	Orange VSL cable displacement connector

2.5 INSTALLATION TOOLS

Stock # or P/N	Description
47-10192-001	3/4" Drive torque wrench
47-10105-001	Torque multiplier
30-90024-001	Threaded insert
47-10211-001	Threaded insertion tool
47-10217-001	Threaded insert tap drill
S21	Threaded insert replacement kit (6 threaded inserts, insertion tool, thread tap drill)

2.5.1 SHOP TOOLS REQUIRED FOR MOUNTING A FORK SYSTEM WITH A SCALE READY CROSS TUBE:

1000 ft-lb torquing capabilities.
A typical well stocked shop, no special shop equipment required.

2.5.2 SHOP TOOLS REQUIRED FOR MOUNTING A FORK SYSTEM ON AN EXISTING CROSS TUBE ASSEMBLY:

1000 ft-lb torquing capabilities.
Structural steel welding and cutting capabilities and a typical well stocked shop.

2.6 TROUBLESHOOTING EQUIPMENT

Stock # or P/N	Description
S20	Multi-meter
S22	Check-Out Box
56-30066-001	VSL Zero Offset Plug

2.7 VULCAN FORK SCALE DIMENSIONS WHEN MOUNTED TO DIFFERENT CROSS TUBES

The Vulcan Front Fork Scale is designed to mount directly to a front loader cross tube.

The Front Fork Mounting Kit is used in conjunction with the Front Fork Scale, replacing the original manufacturer's front fork. There are currently mounting kits for five different standard cross tube dimensions. Three mounting kits were designed for round cross tubes, 3-1/2", 4", and 4-1/2". Mounting kits were also designed for a 4" and 5" square cross tube. The kits have either a bolt/nut, through hole fastening configuration or a bolt/threaded insert fastening configuration.

In addition, a universal mounting kit is designed for through hole mounting only. The installer can configure this kit as required to meet the geometry needs of special installations.

All forks are 1-1/2" thick and the height tapers from 5-1/2" at the bumper to 2-1/2" towards the tip. The height at the end of the tip is 4".

Cross tube mounting clamps are shown in the following pictures with dashed lines.

For 10 yard bins and other very large containers, make sure the fork scale configuration will allow the bin contents to be dumped into the hopper without overshooting or undershooting. Configuration adjustments may have to be made to correct any problems that may develop from dumping such large containers. Spacers can be added to the fork scale bumper blocks as required.

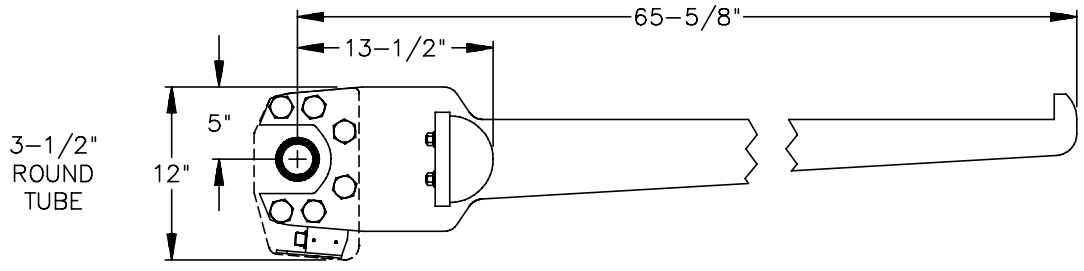


Figure 2-B:
3-1/2" Round Tube Mounting Kit
Through Hole Mounting Kit: H31
Tapped Hole Mounting Kit: H41 Right / Left

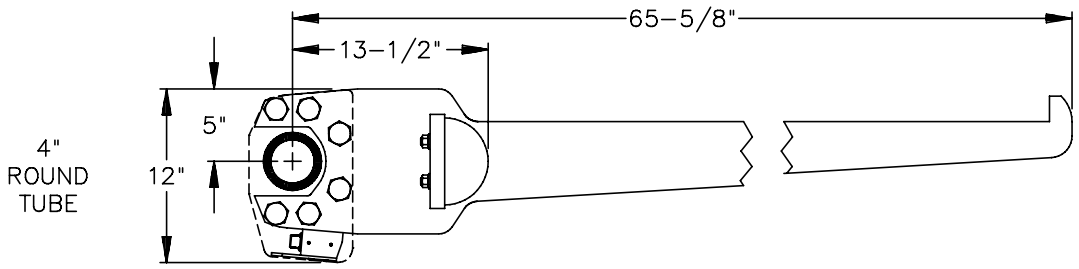


Figure 2-C:
4" Round Tube Mounting Kit
Tapped Hole Mounting Kit: H42 Right / Left

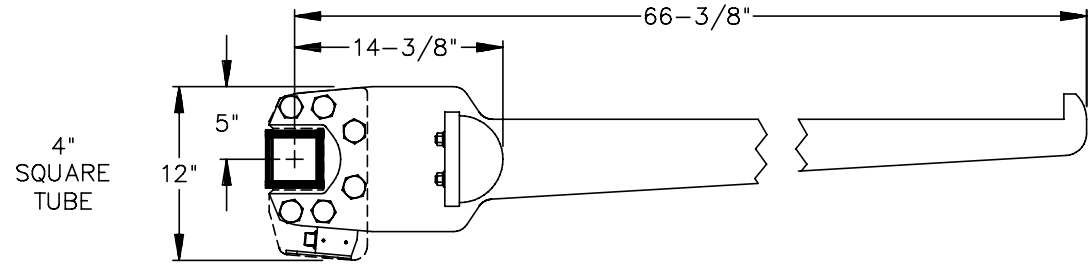


Figure 2-D:
4" Square Tube Mounting Kit
Through Hole Mounting Kit: H36

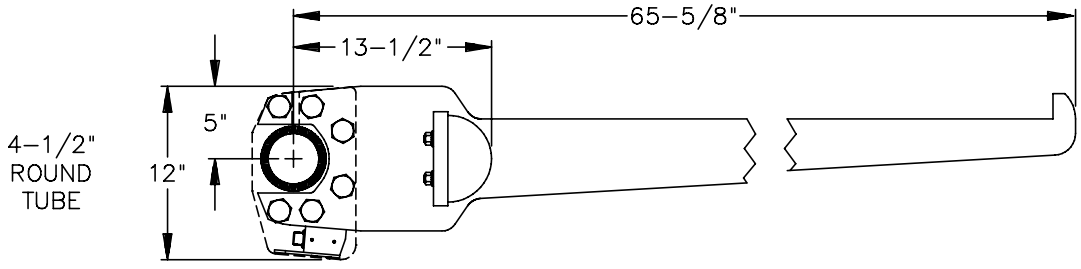


Figure 2-E:
4-1/2" Round Tube Mounting Kit
Tapped Hole Mounting Kit: H44 Right / Left

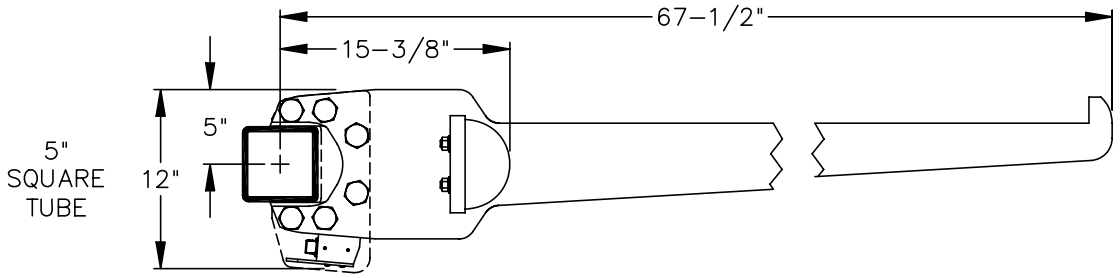


Figure 2-F:
5" Square Tube Mounting Kit
Through Hole Mounting Kit: H53

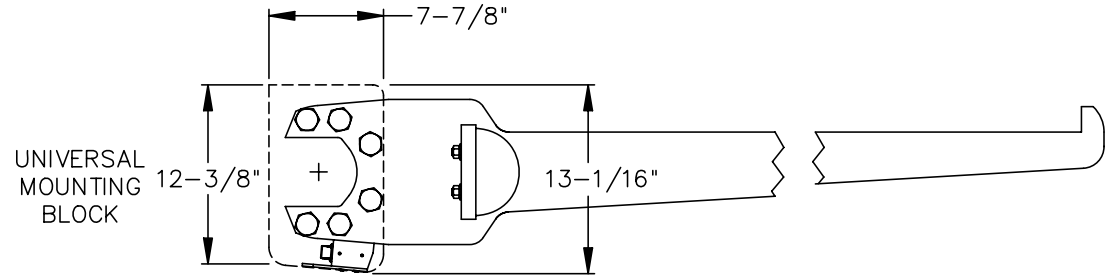


Figure 2-G:
Universal Mounting Kit
Through Hole Mounting Kit (Only): H35

3.0 UNPACKING FORKS

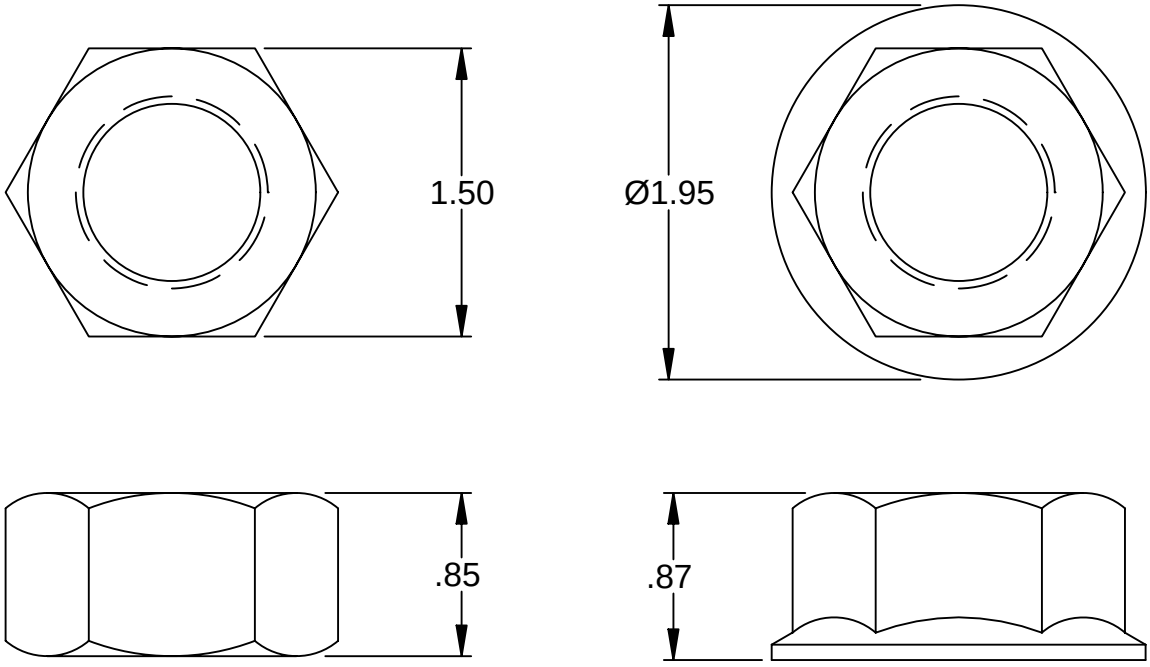
3.1 UNPACKING NOTES

When unpacking the Front Fork Scales from the shipping pallet, take special note for the following parts:

3.1.1 **Save the two 7/8"-14 bolts that hold the Front Fork Scale to the pallet.** These will be used later to mount the bumper plate to the Front Fork Scale. One more 7/8”-14 bolt is packaged with the other fasteners.

3.1.2 The 7/8"-14 nuts from this packaging assembly are not used and are to be discarded.

3.2 HOW TO IDENTIFY AND USE THE TWO TYPES OF 1"-14 NUTS SUPPLIED



GRADE 2
PLAIN NUT
NO FINISH (GREY COLOR)
MAXIMUM TORQUE: 250 lb-ft

Used only for initial assembly
of forks and mounting clamps
for alignment and welding

GRADE G (SAE GRADE 8)
LOCKING FLANGE NUT
ZINC PLATED (SILVER COLOR)
SPECIFIED TORQUE: 1000 lb-ft

Used only for final assembly
of forks after mounting clamps
are completely welded

USE OF TORQUE MULTIPLIER
IS REQUIRED

4.0 INSTALL SCALE READY CROSS TUBE (RECOMMENDED BY VULCAN)

Scale ready cross tubes can be purchased from Stress-Tek, Inc. for both McNeilus and Heil front loader vehicles. The scale ready cross tube for McNeilus is for the Atlantic Coast truck model. The Pacific Coast truck model is designed for the California market specifically and has a 9000 lb capacity fork vs. a 10,000 lb capacity fork used on the Atlantic model.

Other OEM's may sell a scale ready cross tube as well.

4.1 WHAT IS A SCALE READY CROSS TUBE?

A Scale ready cross tube includes:

- Complete cross tube sub assembly with the fork mounting clamps welded to the cross tube for the Heil and McNeilus front loaders.
- Strengthening coupler tube, welded between the fork mounting clamp and bell crank.
- A cross tube cable protector for running cable between the fork scales.
- Complete assembly is painted with an industrial primer finish.
- Assembly is a direct bolt in replacement, all the major welding and alignment is done for you by Vulcan Scales.
- Once this assembly is installed, the fork scales are simply bolted to it.
- The scale ready cross tube simplifies the installation and saves 8-10 hours by eliminating fabrication and welding steps. It also assures the scale system is properly aligned.

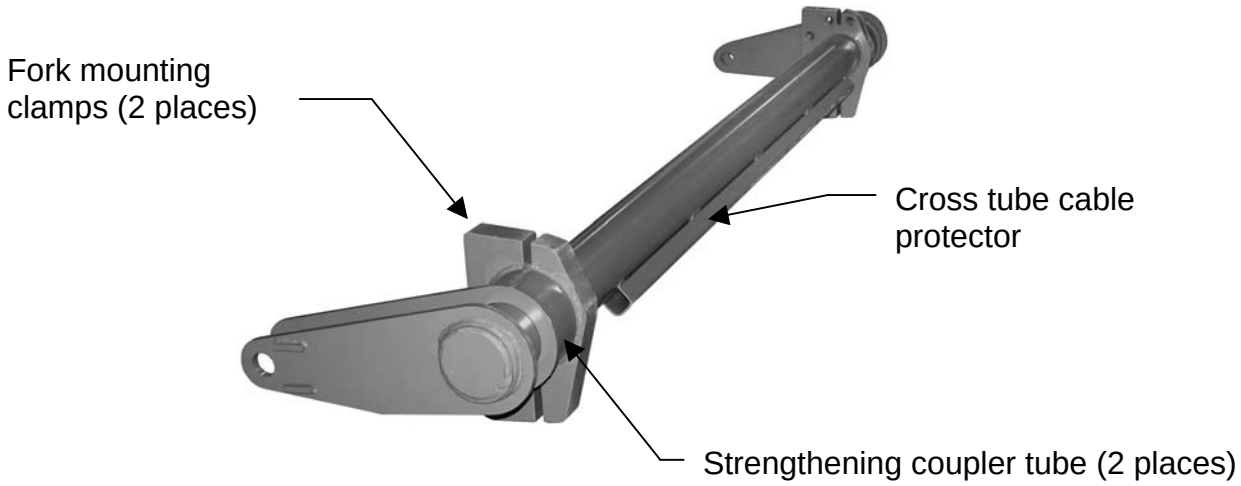


Figure 4-A:
Scale Ready Cross Tube

4.2 INSTALLING THE SCALE READY CROSS TUBE

Unbolt and drop out the existing fork cross tube. Keep the cap plates matched to the sides where they came from. They are a matched pair and may not be interchangeable.

Inspect bushings for excessive wear. Replace as required. Grease bushings before installing scale ready cross tube.

Bolt in the scale ready cross tube. Align and torque all bolts to secure new cross tube.

After bolting on the cross tube assembly, go to section 6.0 “Install Fork Assembly on Cross Tube” and complete the fork installation.

5.0 INSTALL FORK MOUNTING CLAMPS ON EXISTING CROSS TUBE

5.1 PREINSTALLATION MEASUREMENTS

5.1.1 Measure the existing cross tube cross-section to ensure the proper fork mounting kit was ordered. If the tube is round, measure the diameter. If the tube is square, measure one side (refer to Figure 5-A).

5.1.2 Verify the new fork assembly when installed, still dumps the bin contents without overshooting (refer back to Figures 2-B through 2-F). This is especially important if lifting 10 yard containers. Although all trucks do not have the same size forks, the Vulcan Front Fork is designed to be similar to the typical OEM fork dimensions.

5.1.3 If the installation of the Front Fork System is on a new truck without factory forks installed, consult body manufacturer for the fork hydraulic extension dimension that is ideal for their truck (refer forward to Figure 5-B).

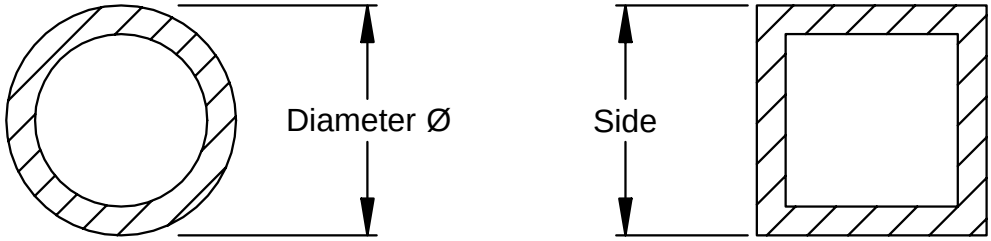


Figure 5-A:
Cross Tube measurement

5.2 MEASURE EXISTING CONFIGURATION

5.2.1 Lower arms so the cross tube is waist level. Use a level to position the fork on a horizontal plane. Measure how far the fork hydraulic cylinder is extended (refer to Figure 5-B). Record this dimension, (A). This dimension will be used in aligning the fork scale.

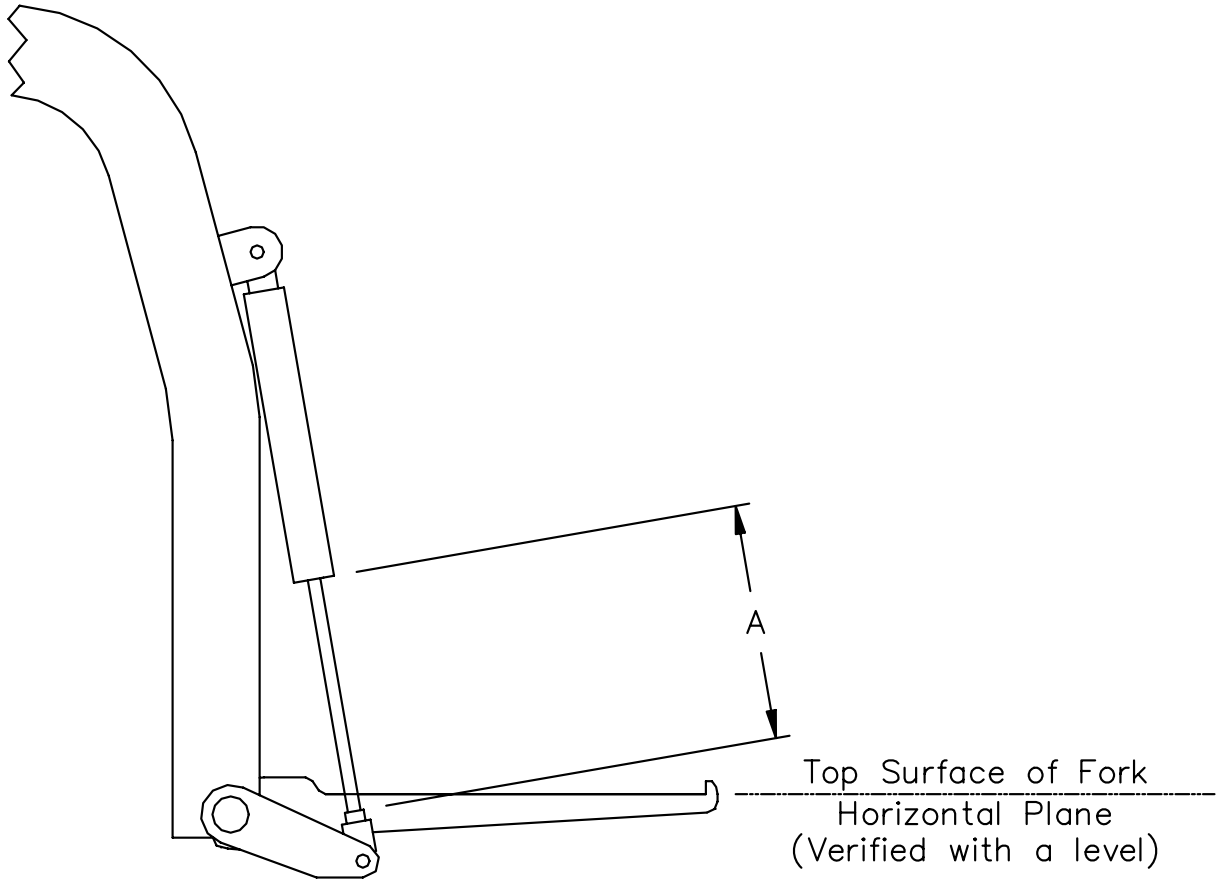


Figure 5-B:
Measuring Fork Cylinder Extension, (A)

5.2.2 Measure the internal dimensions between the two existing forks as shown in Figure 5-C. Record each dimension, B, C, D, E. **Note:** Front fork thickness dimensions vary from manufacturer to manufacturer. The Vulcan Front Fork Scale is 1-1/2" thick. Be sure to measure the inside dimension of the forks to ensure the forks will fit in all of the container lifting sleeves.

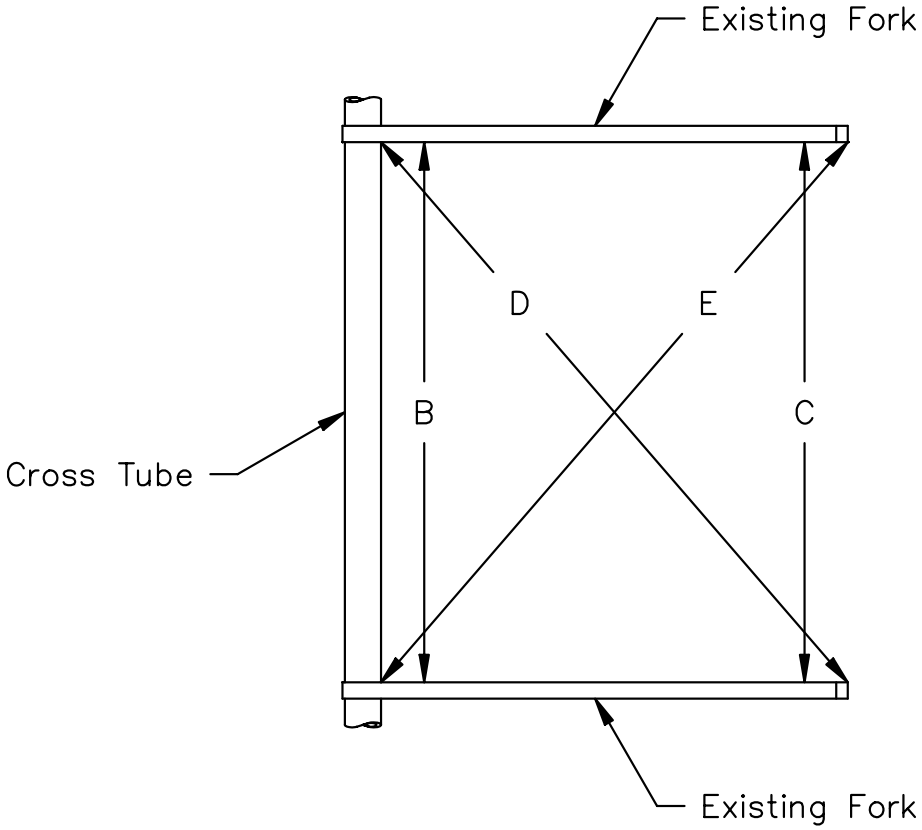


Figure 5-C:
Measuring Internal Fork Dimensions, (B, C, D, E)

5.3 REMOVE EXISTING FORKS AND RELATED HARDWARE

Note: Instead of removing the existing fork, some operations remove the existing cross tube and fork assembly to use as a spare. This is replaced with just the OEM cross tube, which these mounting clamps are then welded to.

5.3.1 It is recommended to remove the existing factory mounted fork assemblies from the cross tube by using an air arc (carbon arc). **Note:** Removing the cross tube and fork assembly from the truck before starting the work is recommended. This allows the fork mounting clamps to be welded in a flat position creating a better weld. This also protects the truck from cutting and welding splatter and other damage.

5.3.2 Prepare the cross tube for installing the Front Fork Mounting Kit by grinding smooth any excess welds, slag, or burrs. If the cross tube's structural integrity is diminished due to gouging or other actions during the removal of fork components, the cross tube must be replaced.

5.3.3 Most truck body manufacturers use a reinforcement coupler support between the fork and coupler plate. There are various types of coupler supports being installed by OEM's. The two most common types are illustrated below (refer to Figure 5-D). This coupler support will need to be removed to allow welding access when installing the fork mounting clamp on the cross tube. This coupler support must be reinstalled on the fork scales so the final fork assembly is equivalent in strength to the original OEM design.

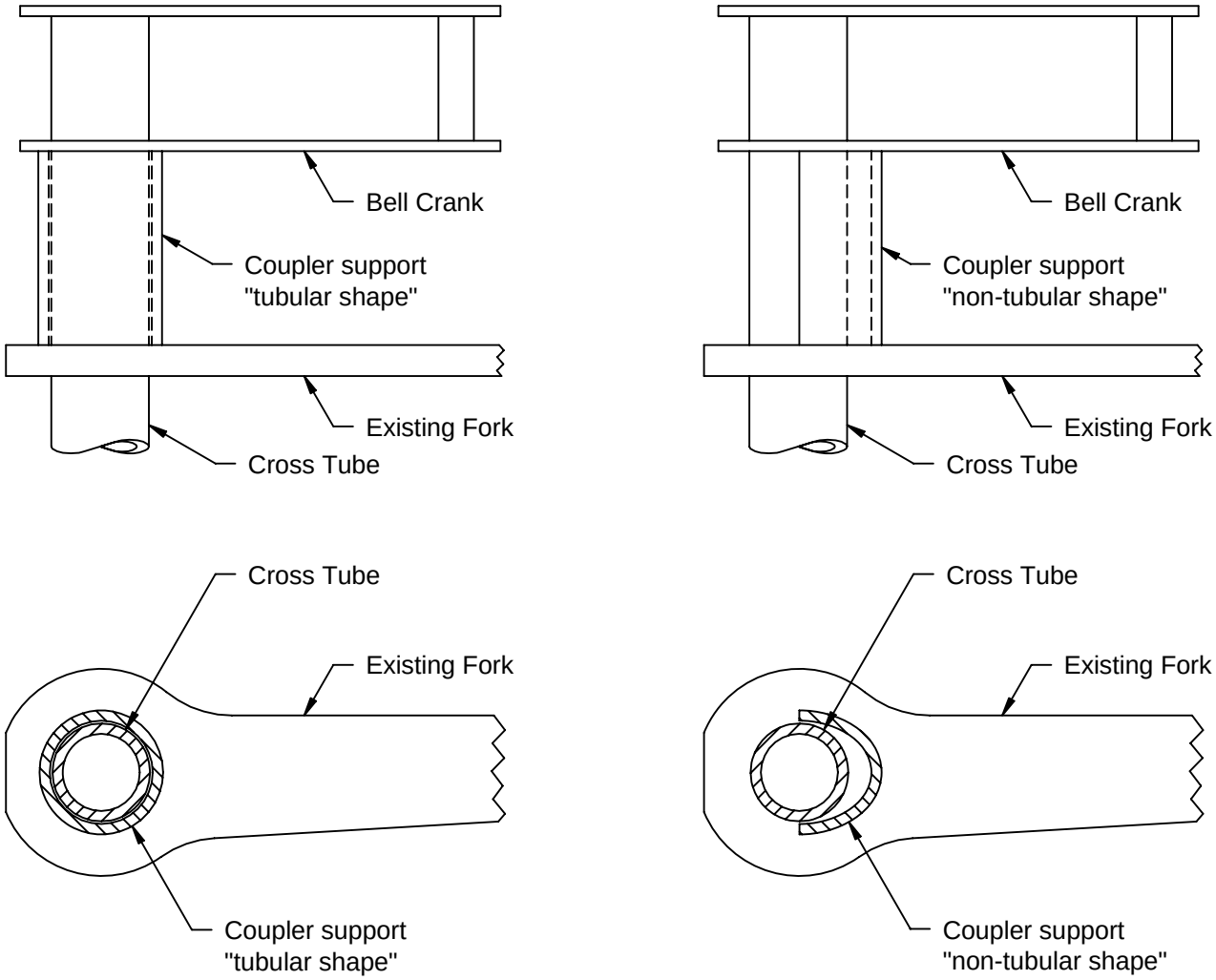


Figure 5-D

5.4 RECOMMENDED PROCEDURE FOR WELDING FORK MOUNTING CLAMPS

There are two types of fork mounting brackets:

Threaded insert design, made from ASTM A514 (T-1) steel.
Through bolt design, made from ASTM A36 steel.

Below are general welding recommendations for all welding processes and specific welding recommendations for welding on the ASTM A514 (T-1) steel parts.

5.4.1 General Recommendations:

1. Recommended weld process: Flux core arc welding (FCAW-G).
2. Recommend weld wire: UltraCore™ 712C, .045" minimum diameter, (larger diameter desirable) mfg: Lincoln Arc Welding. This wire requires using 100% CO_2 gas.
3. Recommend a weld machine with a 450A minimum capacity.
4. Use a 3 stringer minimum weld pass configuration. No weave pattern allowed.
5. All welds shall be free of cracks, overlaps, and unacceptable profiles shown in Figure 5.4 in AWS D1.1 2006. Acceptable weld profiles are shown in this figure. Full weld penetration required.
6. Preheat weld area to 250° F to remove all moisture from weld area.
7. Parts must be free of moisture, organic compounds, oils, rust and other welding contaminates prior to welding.
8. Grind off mill scale on mounting clamps in the weld area.
9. Welding shall not be done when the immediate environment temperature is below 32° F.
10. It is recommended to remove the cross tube for welding fork mounting clamps and stand on end to create a flat welding condition.

5.4.2 Additional specific recommendations for low hydrogen welding on ASTM A514 (T-1) steel. This is for mounting clamps with threaded inserts.

1. Follow AWS D1.1 2006 for procedures, workmanship, technique, inspection, and contractor obligations for low hydrogen welding on ASTM A514 (T-1) steel.
2. The weld wire is usable for only 7 days after sealed package is opened. Once removed from original package, wire shall be protected and stored in a moisture free environment so the welded metal properties are not negatively affected.
3. Minimum preheat temperature for ASTM A514 steel is 250° F. Maximum interpass temperature is 450° F.
4. Subsequent weld inspection for cracking to be performed a minimum of 48 hours after weld completion.
5. No thermal stress relieving permitted.

5.5 WELDING MOUNTING CLAMPS TO CROSS TUBE

Bolt the Front Fork Scales to the mounting clamps and the cross tube using the 1"-14 X 3" Grade 8 cap screws and the hardened steel washer plate. The cap screws do not have to be tightened to their specified torque, 400-500 ft-lb is sufficient to create enough clamping force between the mounting clamps and the fork. **Note:** This is the alignment stage of the assembly. The bolts will be torqued to specification during final assembly. Use the dimensions B, C, D, and E taken from the factory fork assembly (refer to Figure 5-C) to position the Front Fork Scales in the same location and check for squareness. Make sure both forks are level. The mounting clamps should fit snug around the cross tube when bolted in place. Shimming should not be required. **Note:** Do not shim between Mounting Clamps and Front Fork Scales (refer to Figure 5-E).

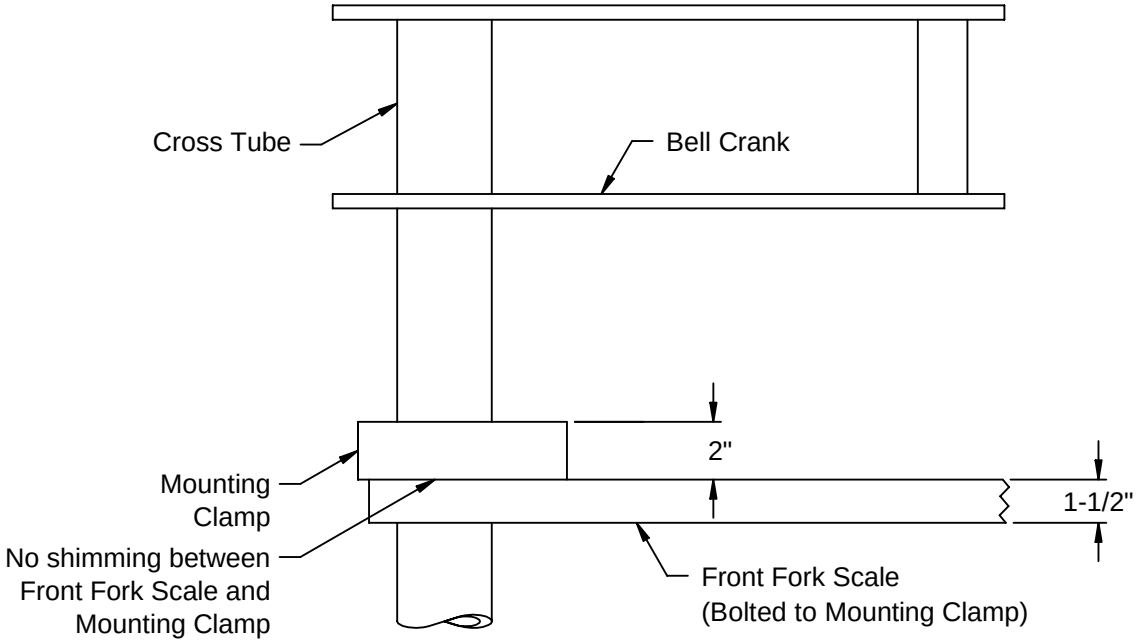


Figure 5-E

5.5.2 It is recommended to build a weld jig for holding the forks together and creating good alignment between the forks and the cross tube. An optional method of fork alignment is to tack weld an appropriate length (refer to Figure 5-C) of bar stock steel to the Front Fork Scale tips to eliminate any possible movement during bracket tack welding (refer to Figure 5-F).

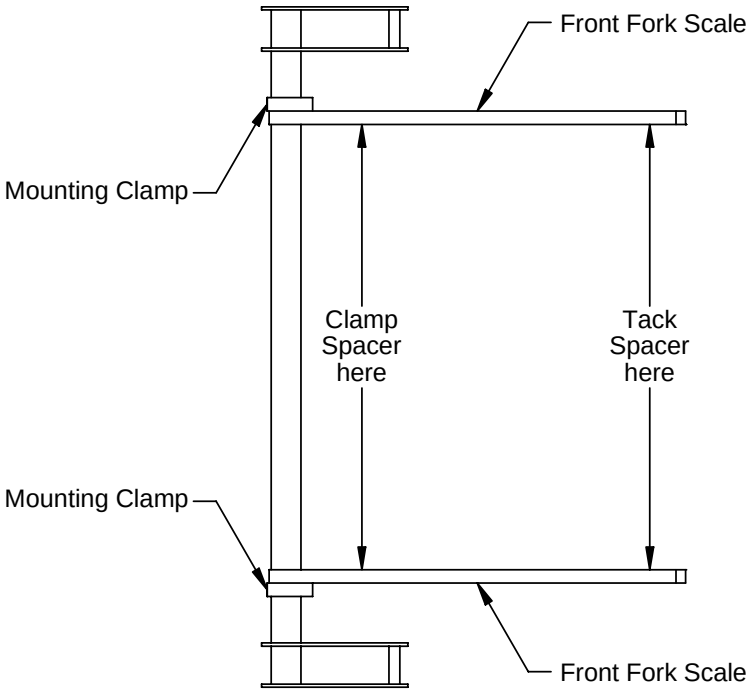


Figure 5-F

5.5.3 Tack weld the Mounting Clamps to the cross tube (refer to Figure 5-G). **Note: DO NOT** tack the Front Fork Scale to the mounting clamp.

Note: The tack welds must be sufficient so the Mounting Clamps do not pull out of position during the final welding stage. If the Mounting Clamps do not remain square, the forks will not mount correctly. It is recommended to use a weld jig.

Caution! Arcing on the body of the Front Fork Scale may seriously damage its structural integrity and must NOT be installed if this occurs. This also voids manufacturer's warranty. It is OK to tack weld installation jigs to the fork tip.

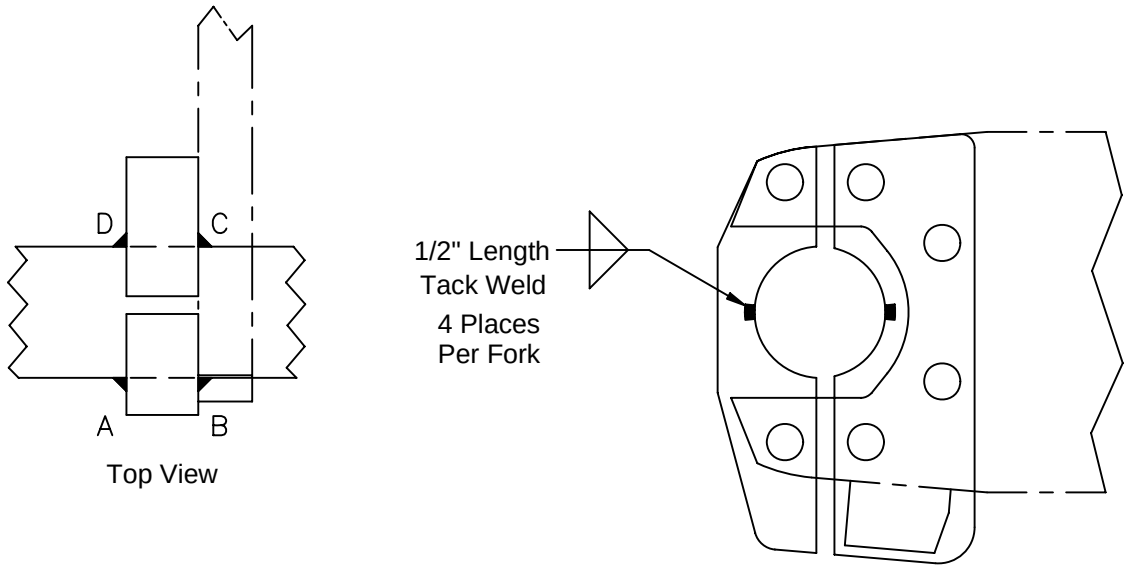


Figure 5-G

5.5.4 **Remove** the Front Fork Scales from the mounting clamps and completely weld the Mounting Clamps to the cross tube using a minimum three pass, 3/8" fillet weld (refer to Figures 5-H and 5-I).

Note: Tape up fastener holes in the mounting clamps to prevent weld spatter from entering the fastener holes.

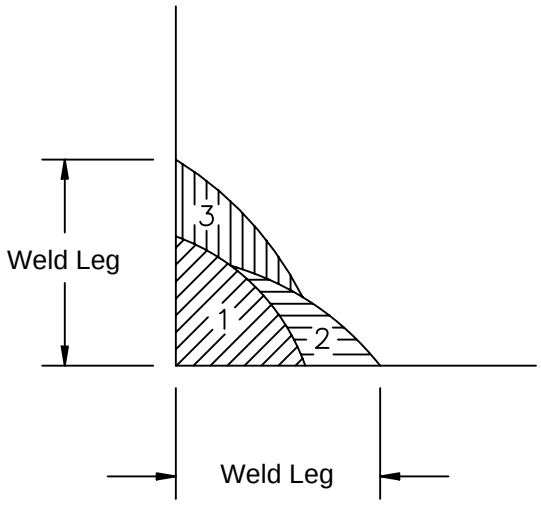


Figure 5-H

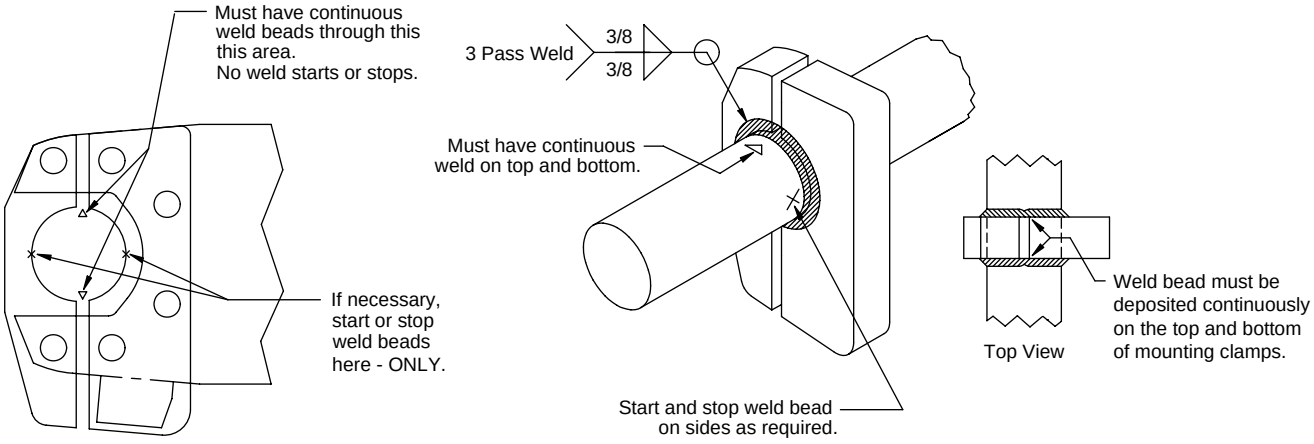


Figure 5-I

5.5.5 Trim the original coupler support length to fit between the mounting clamp and coupler plate or make a new coupler support. Weld coupler supports in place (refer to Figure 5-J).

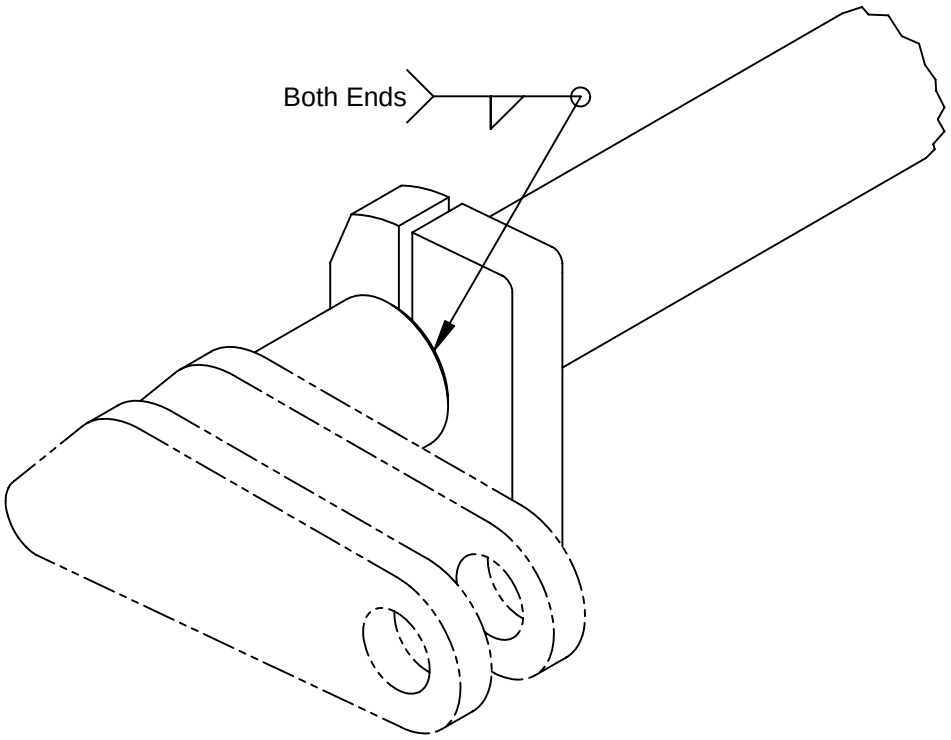


Figure 5-J

6.0 INSTALL FORK ASSEMBLY ON CROSS TUBE

6.1 INSTALL FORKS TO MOUNTING CLAMPS WITH WASHER PLATE

Re-attach the Front Fork Scales to the mounting clamps using the supplied 1"-14 hex cap screws and hardened steel washer plate. Torque the 1"-14 hex cap screws to 1000 ft-lb. **Note:** Ensure that the Mounting Clamp surfaces are clean and smooth before fastening the fork to it. Use “Never Seize” or equivalent thread lubricant when installing all mounting cap screws (refer to Figure 6-A). **DO NOT use the “Never Seize” or any other grease on the load cell connectors**. **Note:** If bolts are not torqued to proper value, scale inaccuracies may result. Torque stripes are recommended.

6.2 ASSEMBLE BUMPER PLATE AND BUMPER

6.2.1 Assemble the bumper plate with the 7/8"-14 hex cap screws provided. Remember that two of these cap screws were used to package the fork scale to the shipping pallet. Use “Never Seize” or equivalent thread lubricant when installing all mounting fasteners. Torque the bumper plate hex cap screws to 700 ft-lb (refer to Figure 6-A).

Install the rubber bumpers using the four, ½" bolts, washers and locking flange nuts.

Check all fork scale mounting fastener torque values after the first week of operation and periodically, using a normal maintenance schedule.

After torquing the 1" cap screws, weld each of the hardened steel washer plates to the cross tube using a 3/16" fillet weld.

When installing the Vulcoder in section 7.4.2, one of these bumpers must be removed to install a Vulcoder guard.

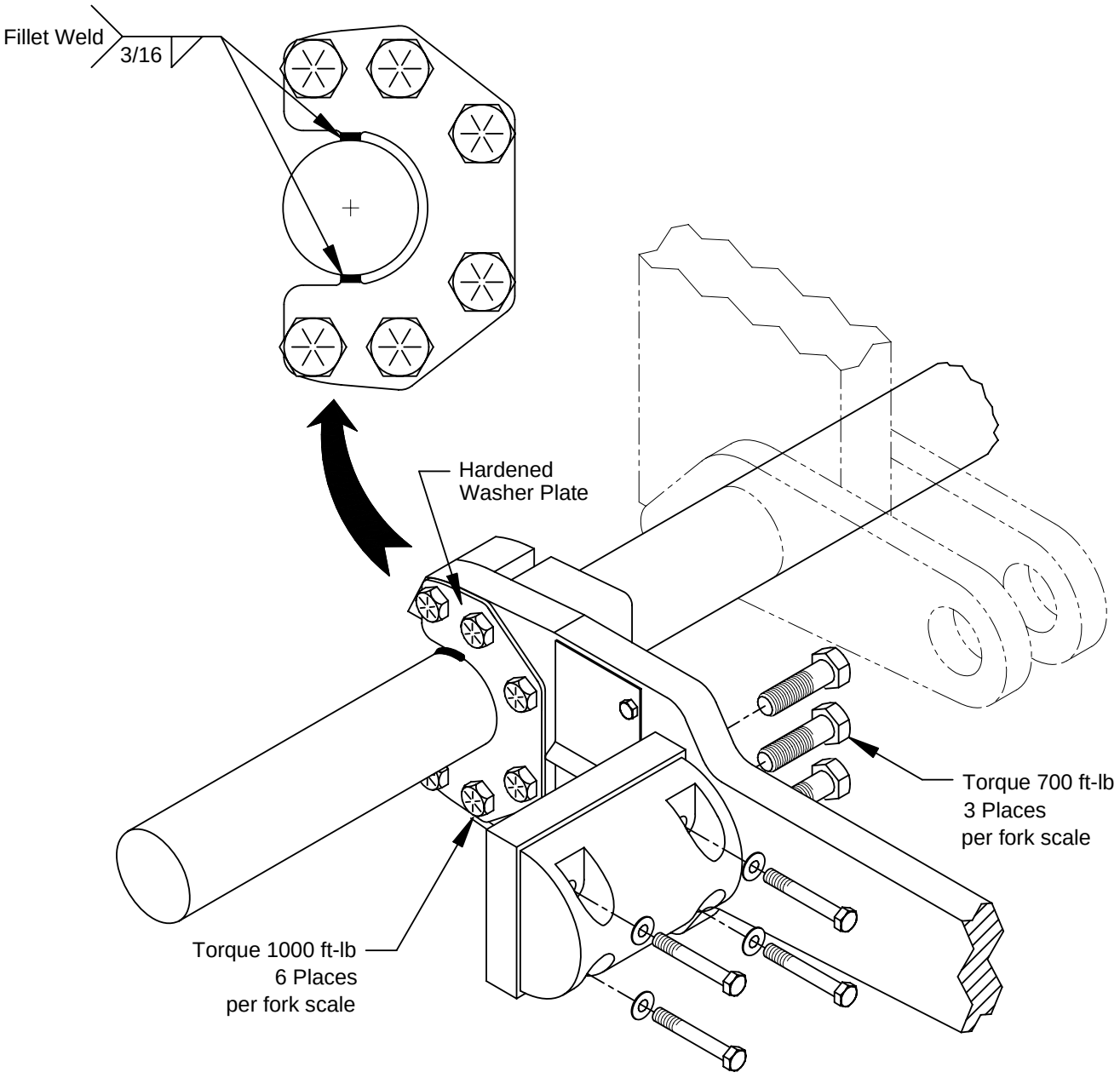


Figure 6-A

Note: If bolts are not torqued to proper value, or thread lubricant is not used, scale inaccuracies will result. If you cannot obtain a torque multiplier, contact Vulcan Customer Service at 800-237-0022.

Do not add any support bracing from the backside of the bumper plate to the Cross Tube (refer to Figure 6-B). This will cause scale inaccuracies.

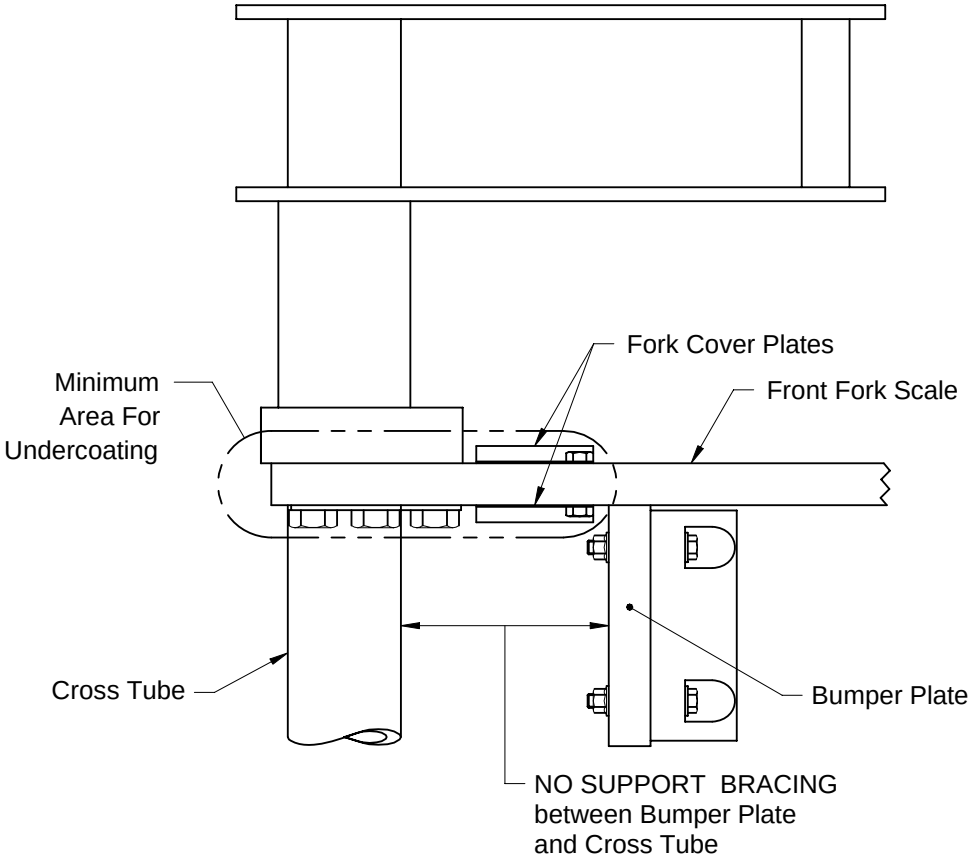


Figure 6-B

6.3 MINIMUM MAINTENANCE REQUIREMENT

Certain minimum maintenance will be necessary to claim warranty of Front Fork Scales. Apply high quality paint to the Front Fork Scales and Mounting Clamps. For environments where high concentrations of salts are used on road surfaces, undercoating is recommended (3M, Universal Rubberized Undercoating, 3M P/N: 8883). Areas between the bumper plate and cross tube are most critical and should be well coated. This specifically includes the connector area, fork cover plate areas and mounting clamp contact areas. **Note:** Spray undercoating only when Front Fork Scales are fully assembled to the Mounting Clamps and are connected to the electronics.

6.4 CHECK CAB GUARD CLEARANCE

With the fork scales completely assembled on the cross tube, lift the cross tube/fork scale assembly and check the clearance between the cab guard and the fork scales (refer to Figure 6-C). There can be no interference here. The cab guard must be modified, as required, to allow clearance.

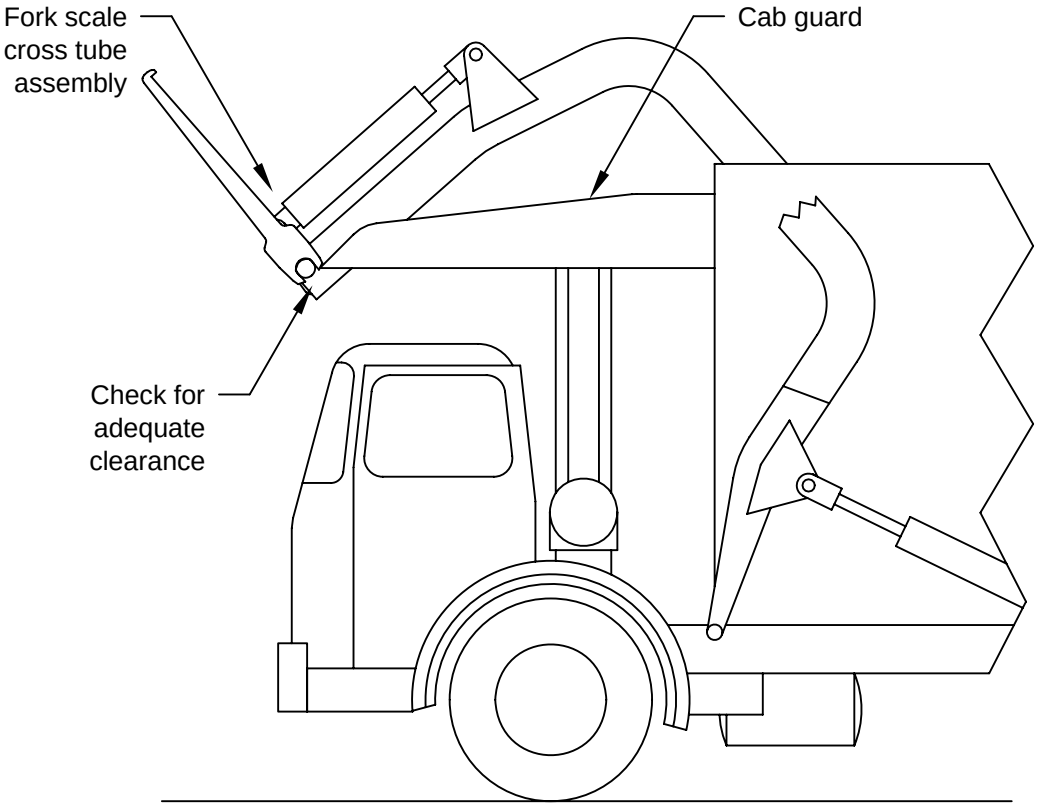


Figure 6-C

6.5 CHECK EXHAUST PORT CLEARANCE

Check to verify the exhaust is not blowing on the forks where they attach to the cross tube. Some trucks have exhaust exit ports on top of the cab guard that blow onto one of the forks when it is in the up position while the truck is being driven. Prolonged exposure to hot exhaust gases will damage the fork scale.

Below, figures 6-D through 6-G illustrate one possible modification to redirect the exhaust to avoid exposure to hot exhaust.

Figure 6-D:
Existing condition of exhaust gases blowing back directly on the fork.

Figure 6-E:
View under the cab guard showing the rerouted exhaust pipe to the center of cab guard.

Figure 6-F:
View under the cab guard showing the rerouted exhaust pipe.

Figure 6-G:
Cab guard modification so the exhaust gases are exiting in the center of the cab guard, between the forks. In this example, a welding torch was used to create a perforated exhaust exit in the cab guard.

The existing exhaust pipe is cut below the cab guard. Another section of exhaust pipe is welded to the remaining exhaust system such that the exhaust exits through the cab guard toward the center of the truck, between the two forks. A new hole is cut in the cab guard to allow the exhaust to exit. This new hole must have a screen or use perforated steel to prevent debris from going into it. The new exhaust port must be sufficiently large so no backpressure is created on the exhaust system.

Modifications are only required to those trucks that have exhaust blowing directly in the path of the fork motion.

7.0 FORK SCALE ELECTRONICS INSTALLATION

7.1 ELECTRONICS SYSTEM OVERVIEW

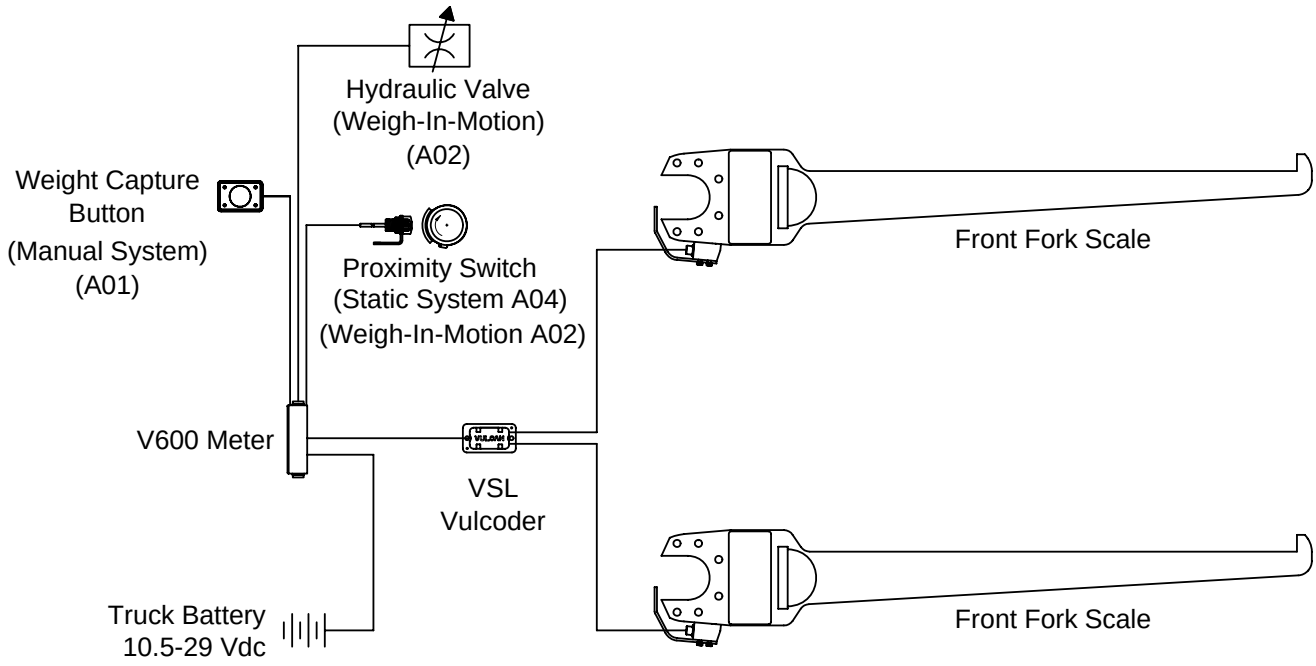


Figure 7-A

7.2 DESCRIPTIONS OF THE THREE ELECTRONICS OPTIONS FOR THE FORK SCALE

All Vulcan Front Fork Scales include a V600 Meter, VSL Vulcoder and offer three control options for the scale system.

7.2.1 THE MANUAL METHOD (P/N: A01)

The Manual Method requires the installation of a "Weight Capture" button. The driver lifts and levels a full bin, then presses the Weight Capture button to tell the meter to take a weight reading. Similarly, on lowering the bin, before placing it on the ground, the driver levels the empty bin and once again presses the Weight Capture button. Both the up and down weights are captured and the net weight is calculated and displayed. This allows the driver to take weights on all customers or complete audits on specific customers. This system is recommended for auditing routes where not every customer is weighed.

The A01 kit comes with the Weight Capture button and all required parts.

7.2.2 THE STATIC METHOD (P/N: A04)

The Static Method requires the installation of a proximity switch to tell the meter when a bin is lifted. The driver controls the fork speed to allow a weight to be taken. There is no button to push to record weights. Instead, when the driver lifts and levels a full bin, the meter detects when the weight is stable, takes a reading and produces an audible signal letting the driver know a stable weight has been captured and to continue the lift. When returning the empty bin, the driver levels the bin before placing it on the ground. The meter will once again signal that a stable empty weight has been captured, and the driver can set the bin on the ground. Both the up and down weights are automatically captured and the net weight is calculated and displayed.

If the motion of the bin while lifting in the weigh zone is too rough, uncontrolled or generally not smooth enough, the meter will not capture a weight and will display an “error” code. This condition is acknowledged by multiple audible beeps from the meter when the bin exits the weigh zone.

This same bin can be re-entered into the weigh zone to get a successful weight capture.
If the bin does not re-enter the weigh zone, no weight will be recorded for that customer and an error message will be stored in meter memory for that customer.

The “static” system will not capture a weight value for a customer if the lift conditions are not steady in the weigh zone.

The A04 kit comes with the proximity switch and all required parts.

7.2.3 THE WEIGH-IN-MOTION WITH LIFT CONTROL METHOD (P/N: A02)

The Weigh-In-Motion with Lift Control Method requires the installation of a proximity switch to tell the meter that a bin has been lifted. A hydraulic valve is installed in the lift arms hydraulic line which “softens” the movement of the arms. There is no need for the driver to do anything other than a normal lift. The V600 Meter will capture the up and down weights automatically while the bin is in motion. Both the up and down weights are captured and the net weight is calculated and displayed. This is a completely automated system.

When a successful up or down weight capture is made, it is acknowledged by two audible beeps or a single beep from the meter.

If the motion of the bin while lifting in the weigh zone is too rough, uncontrolled or generally not smooth enough, the meter will acknowledge this condition by multiple audible beeps when the bin exits the weigh zone. In this case, the meter will still capture a weight, but the weight captured may not be as accurate as it could be if lifted smoothly.
This same bin can be re-entered into the weigh zone to get a potentially more accurate weight reading.

The Weigh-In-Motion with Lift Control “motion” system will always capture a weight value for every customer no matter what the lifting conditions are in the weigh zone.

The A02 kit comes with the proximity switch, hydraulic valve and all required parts.

7.3 MOUNT METER IN CAB

7.3.1 Find a suitable location to mount the meter in the cab that is visible and accessible to the driver and does not block any mirrors or controls. Secure the meter mounting bracket in place and fasten meter to it.

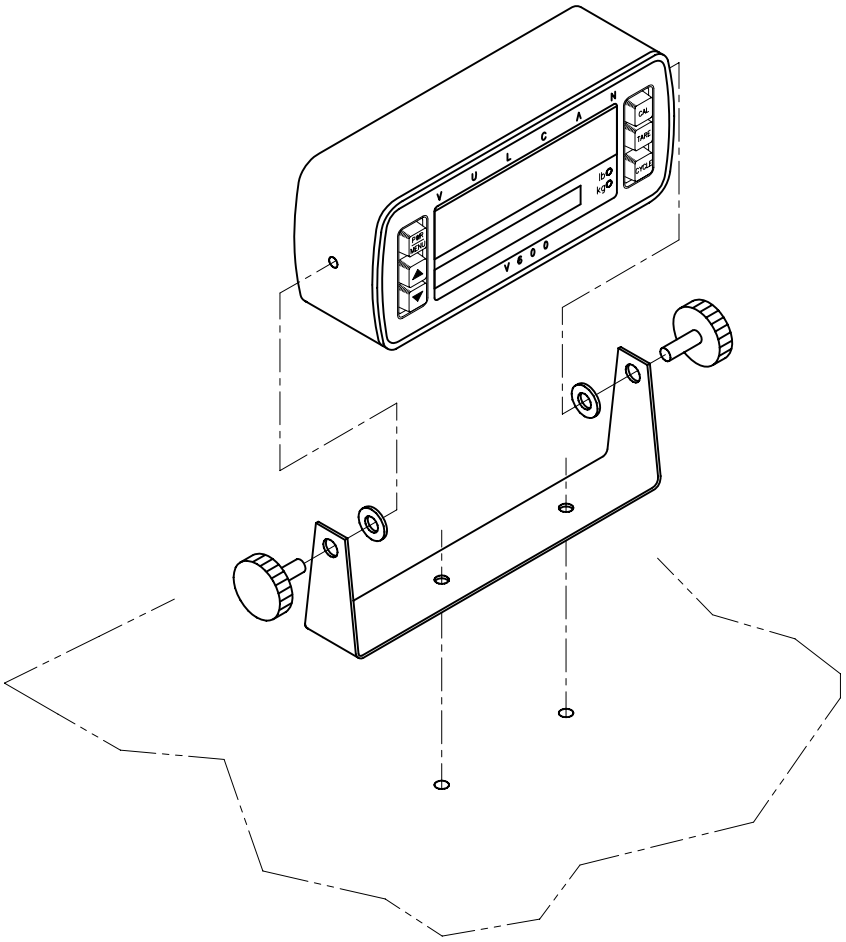


Figure 7-B

7.4 MOUNT VULCODER AND VULCODER GUARD

7.4.1 Tape the exposed ends of the Vulcoder connector sockets prior to routing the cables to avoid contamination. Mount Vulcoder on the back side of the bumper plate using the two, ¼"-20 tapped holes provided (refer to Figure 7-C).

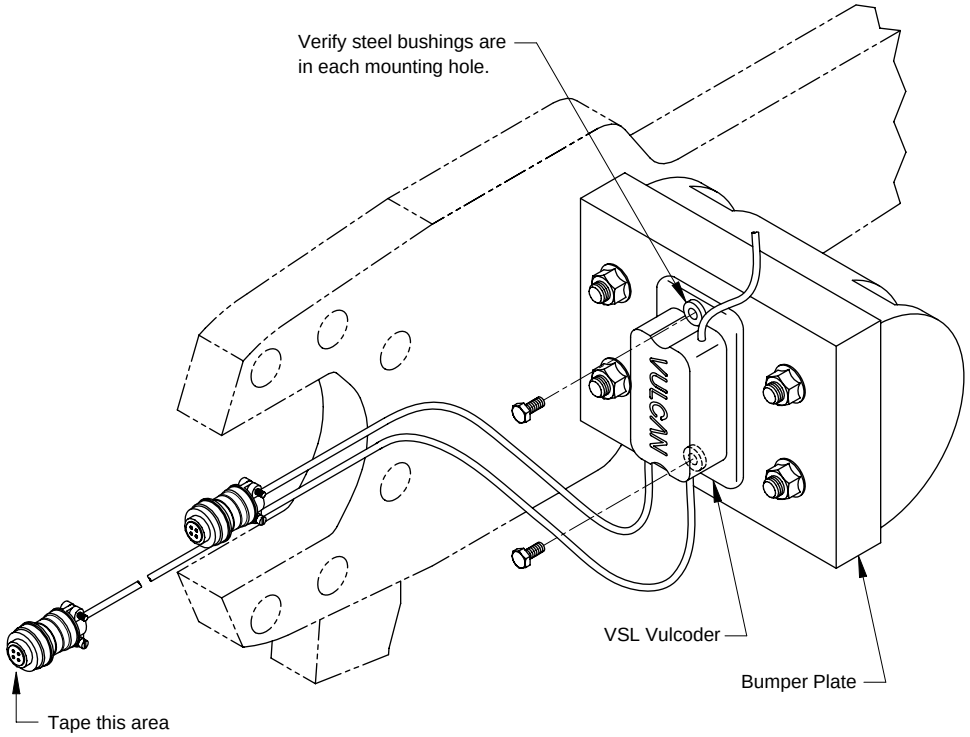


Figure 7-C

7.4.2 Add protective Vulcoder guard to the bumper plate where Vulcoder is mounted. The Vulcoder guard is packaged with the Vulcoder. The bumper must be removed to install the Vulcoder guard.

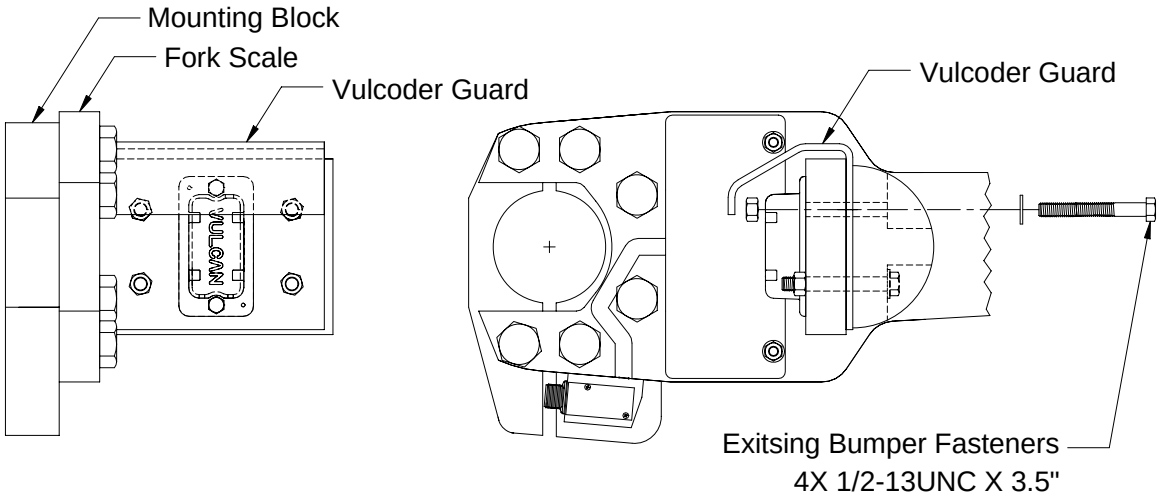


Figure 7-D

7.5 ROUTE VULCODER BLACK AND ORANGE CABLES

7.5.1 There are two black cable lengths, a short one and a longer one. The shorter length cable is to be connected to the Front Fork Scale where the VSL Vulcoder is mounted. The longer black cable is routed along the backside of the cross tube to the fork opposite of the VSL Vulcoder. This cable has an added jacket for protection. **Do not** trim, nick, or cut the black cables to length.

7.5.2 A mechanical cable guard must be installed to protect the black cable as it runs across the cross tube. A cable guard can be made by the installer or purchased from Vulcan Scales, (P/N: H55). Figure 7-E illustrates the cable guard that can be purchased from Vulcan Scales.

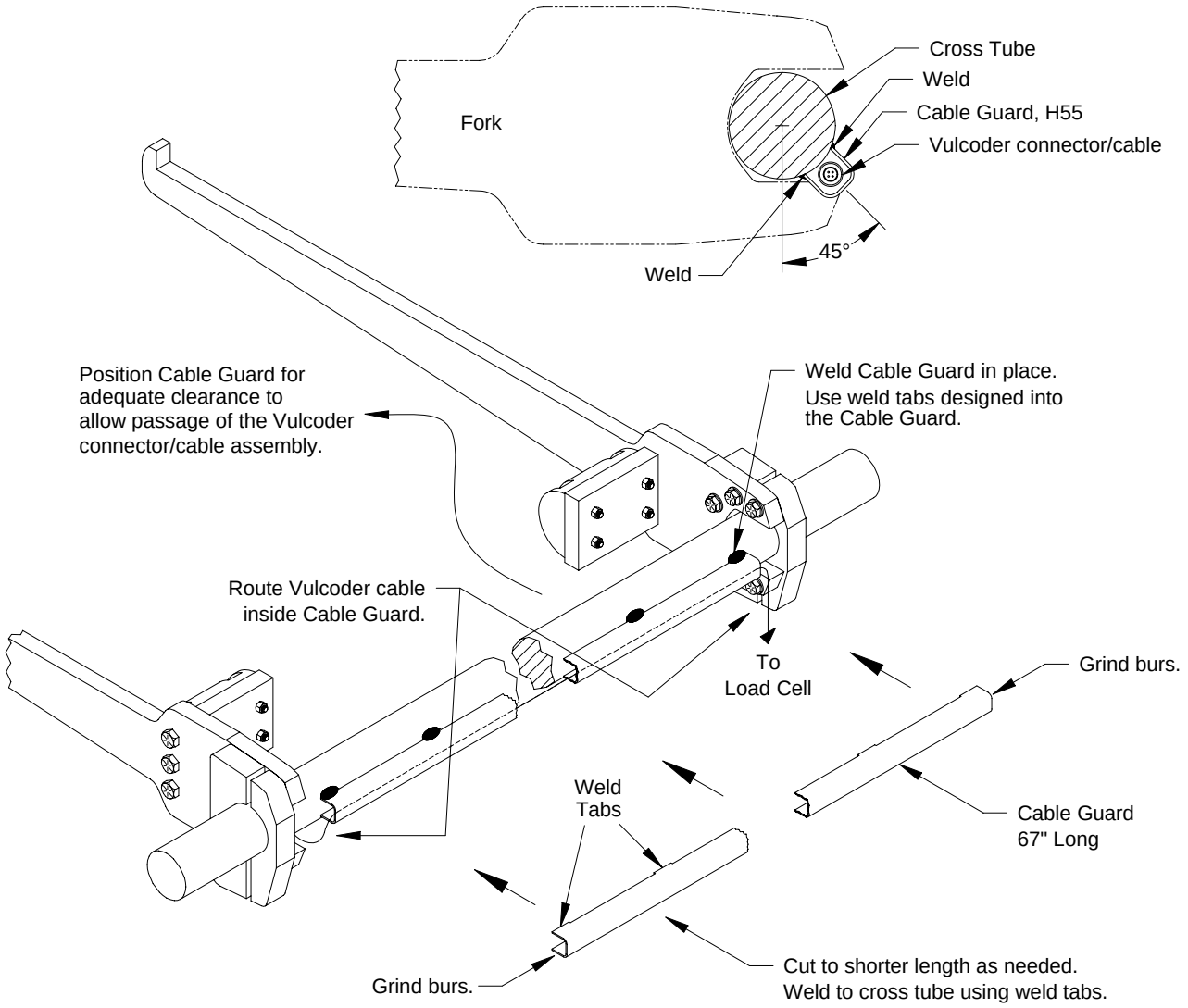


Figure 7-E

7.5.3 Inspect the connectors on the VSL Vulcoder black cables by doing the following; verify the connector has an O-ring, check the connectors on the Front Fork Scale and VSL Vulcoders to make sure they are clean and dry. **Important: Do not** get moisture, contact cleaner or any other substance inside the connectors. **Do not** grease or lubricate inside the Front Fork Scale connector or VSL Vulcoder connector. These components are highly sensitive to foreign substances and inaccurate readings will occur if these components are contaminated. **Your manufacturer's warranty does not cover the failure of VULCAN components due to contamination (use of grease or other conductive substance) in either of these component connectors.**

7.5.4 Attach the black VSL Vulcoder cable connectors to the bulkhead connectors on the Front Fork Scales. Make sure they are finger tight plus an additional 1/8 turn with channel lock pliers. The additional tightening is necessary to correctly compress the O-ring. This prevents scale errors, which can occur from moisture entering through the connector. **Caution:** Do not over tighten the connectors as this can damage them. Slide the heavy protective jacket up against the connector so the black cable has maximum protection. Tape in place.

7.5.5 Route the 2-wire orange VSL Vulcoder cable from the Front Fork Scale to the arm, allowing enough slack for cross tube rotation (refer to Figure 7-F). Route orange cable by following the arm hydraulic lines to the arm pivot point. For extra protection, we recommend welding a steel tube to the lift arm and routing the orange cable through it. A tube 5/8" ∅ with a 1/16" wall is adequate size. The orange cable can be pulled through using weld wire. A wire pulling lubricant can also be used to make it easier to pull the cable through. Small clamps can be welded to the arm to hold the steel tube in place.

The orange cable can also be routed inside the tube arm for protection. Protect the cable inside an air line or hydraulic line when running inside the arm.

Route the orange cable to the inside of the arm when meeting the cross tube. The cable is more vulnerable to damage if routed on the outside of the arm. For bodies that tip for service, the orange cable must be routed from the arm pivot point through the rear hinge pin and to the cab. Follow existing wire harness where possible. If the cab is a front tilt model, route the cables through the hinge point to enter the cab, preferably through a grommet.

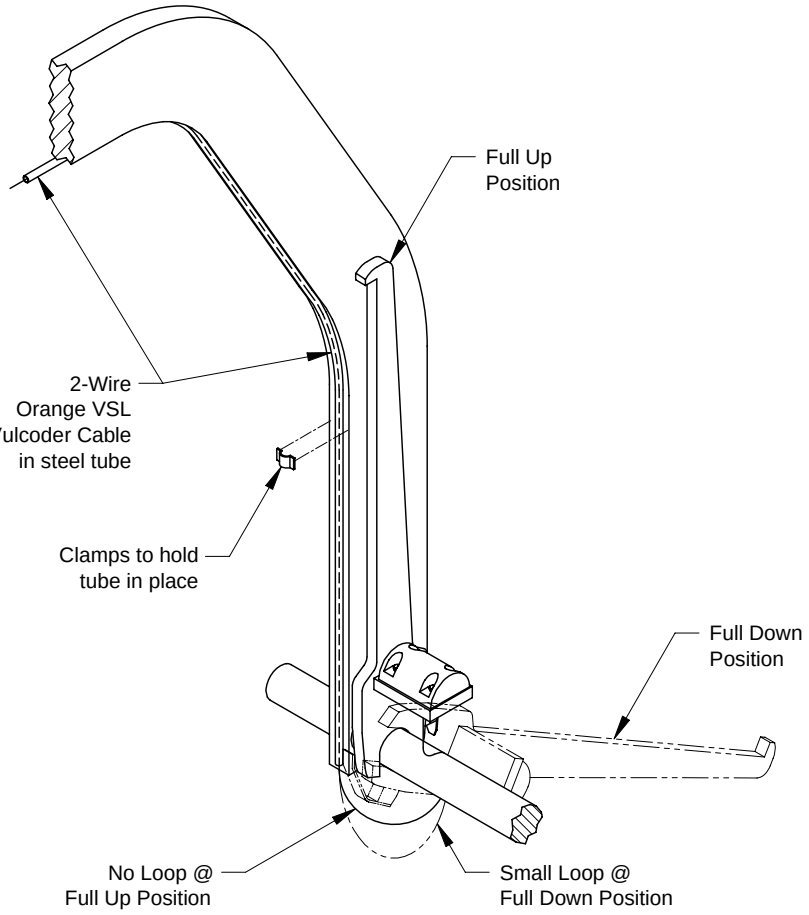


Figure 7-F

7.6 INSTALL CONNECTOR GUARDS

7.6.1 Install connector guards on each of the two forks as shown in Figure 7-G.

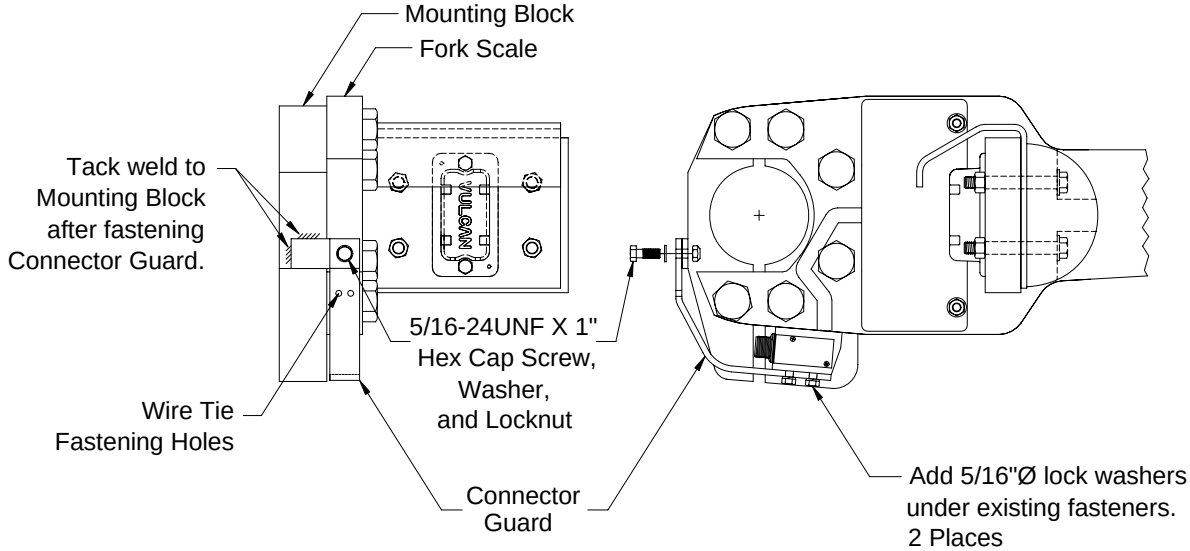


Figure 7-G

8.0 MANUAL CONTROL KIT (A01) INSTALLATION

8.1. ELECTRICAL DIAGRAMS

8.1.1 METER WIRE CONNECTION DIAGRAM

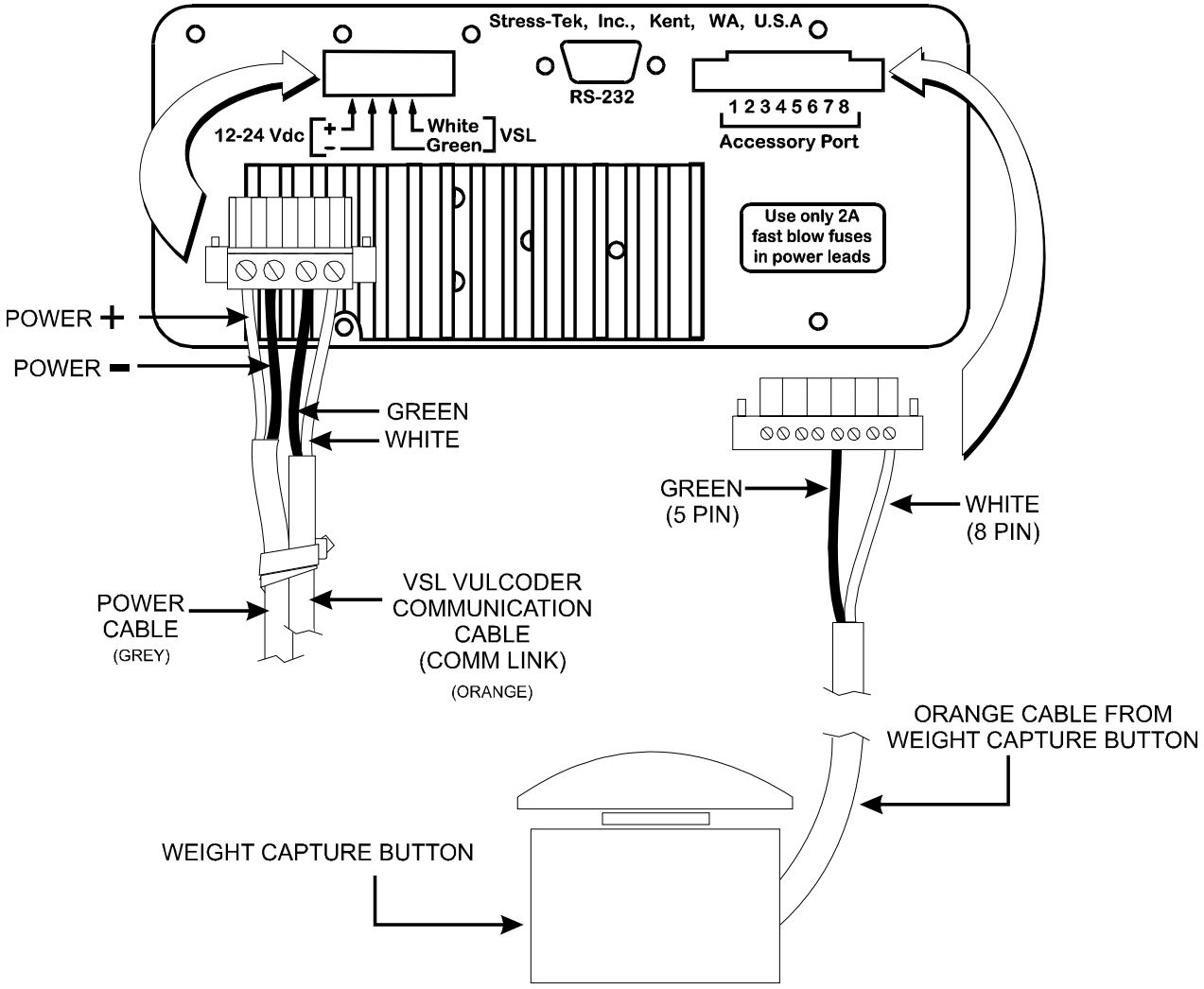


Figure 8-A

Route the grey power cable from the truck battery to the meter in the cab. Route through the cab hinge point. The fuses must be at the battery end of the cable.

In the truck cab, strain relief and cut the VSL Vulcoder cable, meter power cable and Weight Capture button cable to ideal lengths. Unplug the terminal blocks from the back of the meter, strip the wires, and connect to the terminal blocks (refer to Figure 8-A). Be careful that stray wires ***DO NOT*** contact adjacent terminals. Twist conductor strands together (refer to Figure 8-B). **Do not** plug the terminal block into the meter at this time.

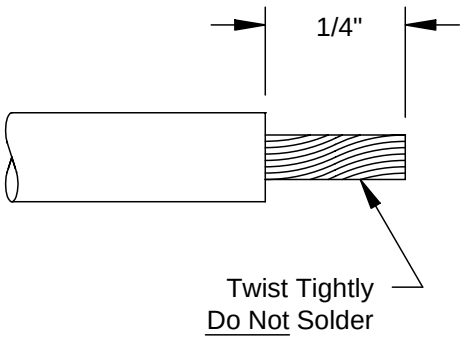


Figure 8-B

8.1.2 CONNECTION TO TRUCK BATTERY

Disassemble the positive fuse holder, (red wire). Apply grease to the positive connector at the battery post to inhibit corrosion. Crimp ringed terminals to the power leads. Connect fused power leads directly to battery posts for best operation. Power must be connected directly to battery. Maximum power is 29 Vdc. **Note:** The Vulcan V600 meter is configured to be used in a **12 Vdc** system using **2 amp** fast blow fuses in both power leads. **Do not** connect the power cable to a power source activated by the key switch.

Remember: Turn meter off while making any wire connections.

WARNING: If installing the meter in a vehicle with a **positive ground** electrical system, the meter chassis, mounting bracket, and mounting fasteners **MUST** be electrically isolated from the vehicle chassis.

8.2 METER SETUP AND SYSTEM TEST

8.2.1 START UP DISPLAY METER

Note: If there are any problems with the following quick system tests, contact Vulcan Customer Service.

1. Start the truck.

Bring the arms down and put the forks in a level position.

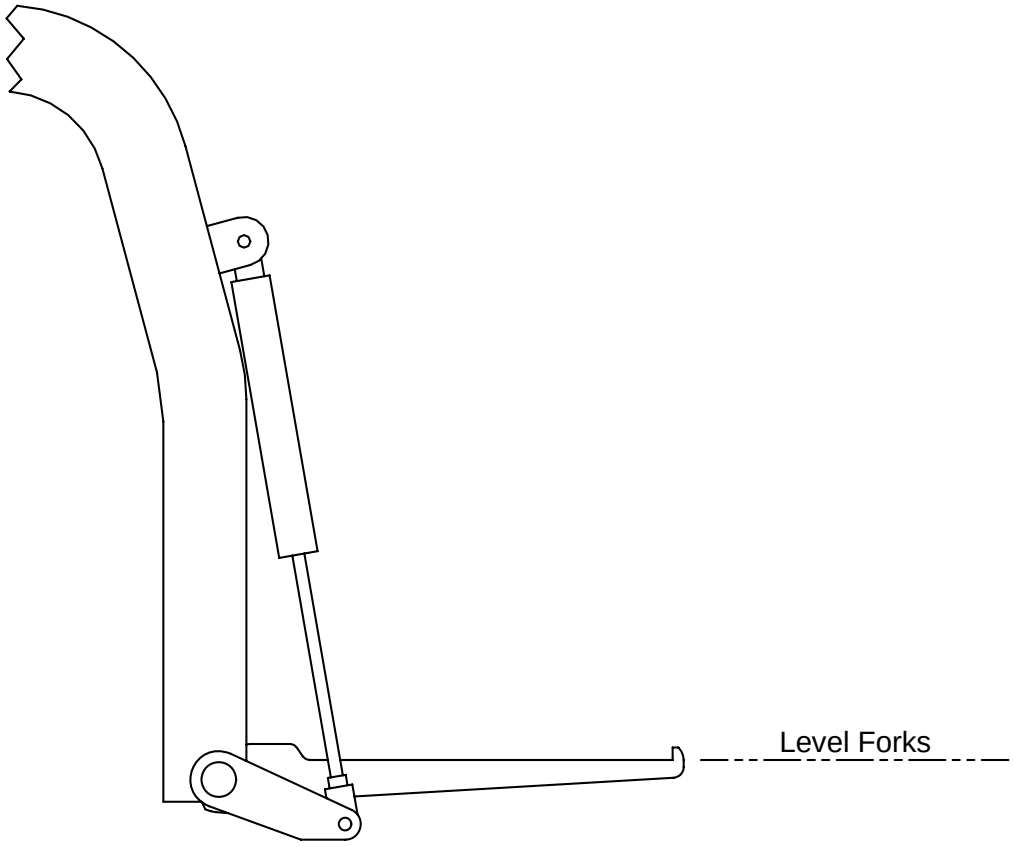
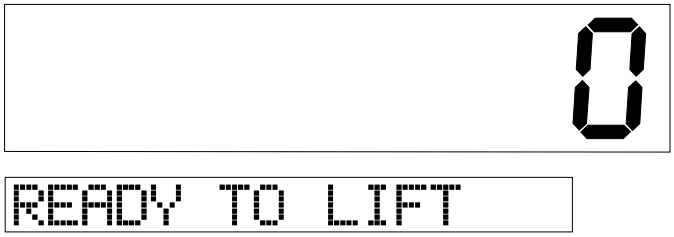


Figure 8-C

2. Turn the meter on and let it complete its startup routine.

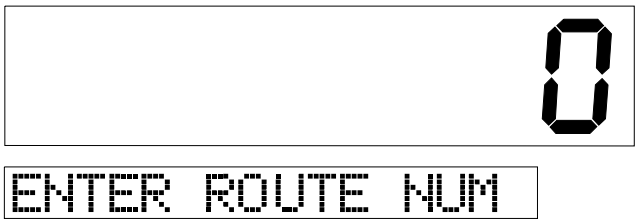
Press the **PWR / MENU** button for less than 2 seconds.

After the meter has completed its startup routine, the meter will display **READY TO LIFT**.



If the meter does not have the display shown above, but instead has the display shown below, the meter is not in BASIC mode, it is in CUSTOMER mode. See section 13.2 for instructions on how to put the meter back into BASIC mode before continuing. See the Vulcan V600 Fork Scale User Manual for a description of customer mode.

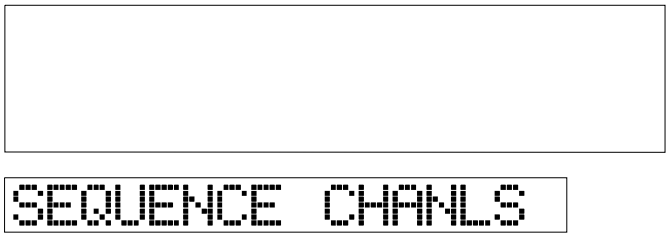
Below is the display shown when the meter is in CUSTOMER mode.



8.2.2 ERASING THE METER AND VULCODER

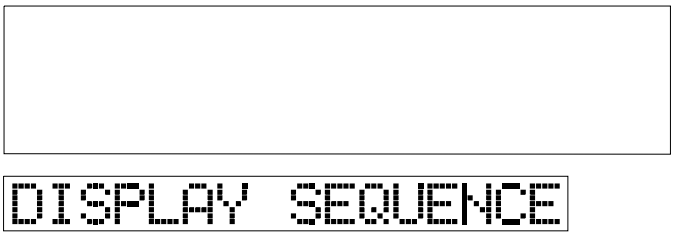
Press the **PWR / MENU** button to enter the Program menu.

Press the **CYCLE** button until **SEQUENCE CHANLS** is displayed.



Note: When trying to "SEQUENCE CHANLS", if the lower display shows "Password?" with the cursor blinking, the Driver Lock Password feature is activated and the Configure System, Setup/Calibrate, Sequence Channels, and System Test menus are not accessible. Refer to section 13.1 to unlock the system.

Press the **ENTER** button to select the **SEQUENCE CHANLS** menu option.



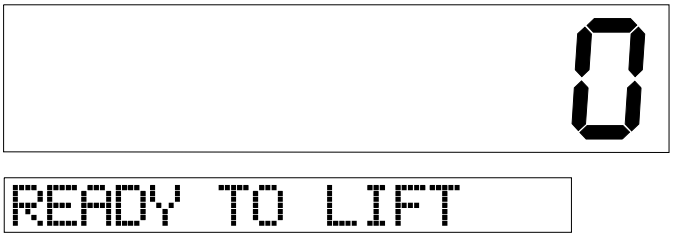
Press the **ENTER** button to enter the **DISPLAY SEQUENCE** menu option. The meter will display the truck Vulcoder as a rear **<R>** designator.

Press and hold the **ENTER** button for two seconds to erase the Vulcoder. The meter will display **<->**. This shows that the Vulcoder has been erased.

Press and hold the **ENTER** button again to erase the meter. The meter will display all dashes on the upper display and **---Wait---** on the lower display.

Press and hold the **PWR / MENU** button until the meter powers off. Once the power is off, press the **PWR / MENU** button again to power the meter back up.

After the meter has completed its startup routine, the meter will display **READY TO LIFT**.



The meter is now set up in the BASIC mode, using the manual method of weighing.

8.2.3 VERIFY FORK OPERATION

Verify the forks are working by either sitting or standing on each fork. The scales should read the amount of weight on each fork.

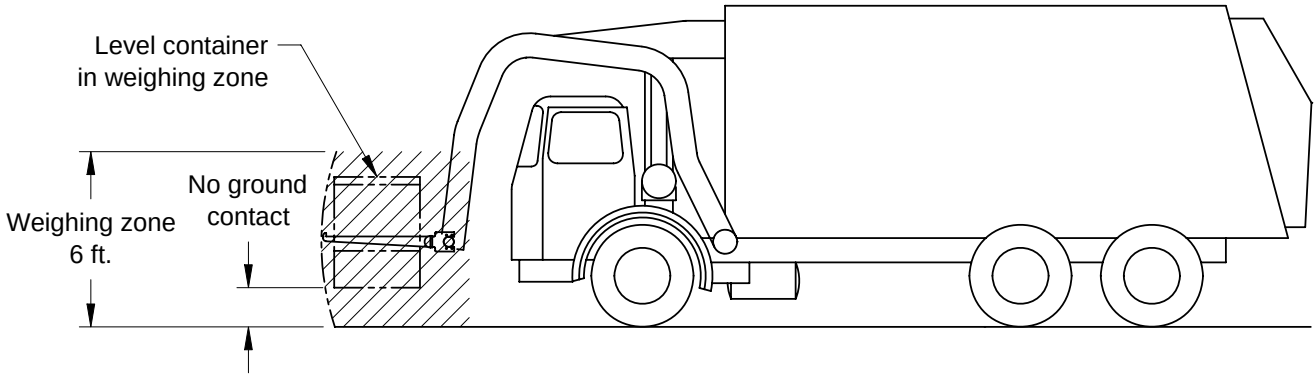


Figure 8-D

1. Lift a bin off the ground within the weigh zone, keeping the forks level. It is best if the bin has weight but it's not required. Press the "Weight Capture" button. Wait for the "two beep" audible signal from the meter to verify weight capture. The bin weight will be displayed.

2. With the bin in the same position, again hit the "Weight Capture" button. Wait for the "two beep" audible signal from the meter to verify weight capture. A net weight of about zero should be displayed by the meter. If there are no beeps, recheck electrical connections per section 8.1 and/or call Vulcan Scales.

3. Set the bin down and disengage the forks from the bin so there is no contact. The meter display should return to zero, within 50 lb.

4. Repeat the first 3 steps 2 times to verify the full weights displayed and zero net weights displayed are repeated within 50 lb.

5. All the up weight readings should be close to the same weight (within 50 lb) and all the net weights should be close to zero (within 50 lb), although they may not be equal to the exact pound or kilogram. If not, retorque fork mounting bolts per section 12.1 and/or call Vulcan Scales.

6. Activate the Driver Lockout Password feature. Vulcan Scales recommends the activation of this password feature to prohibit the driver from changing the scale system setup parameters. See section 13.1 to activate this feature.

8.3 CALIBRATION

The Front Fork Scale comes calibrated from the factory. There is no need for further calibration by the installer. Once the system is working in the field, fine tuning the calibration may be desired to obtain a higher accuracy. This can only be done after the system is working in the field.

The V600 Fork Scale User Manual (P/N: 44-10115-001) has complete details on the calibration methods.

8.4 MANUAL CONTROL KIT DRIVER CARD

The following page has a copy of the driver card used for the Manual Control Kit. This driver card also comes packaged with the Manual Control Kit, (P/N: A01). If driver card cannot be found, copy this page, fold in half and laminate. Put this card in the truck for the driver to reference as needed. This driver card is also available from the Vulcan website at www.vulcanscales.com.

DAILY DRIVER OPERATING GUIDE: FRONT FORK, MANUAL

GUIDELINES TO MAXIMIZE PICKUP WEIGHT ACCURACY

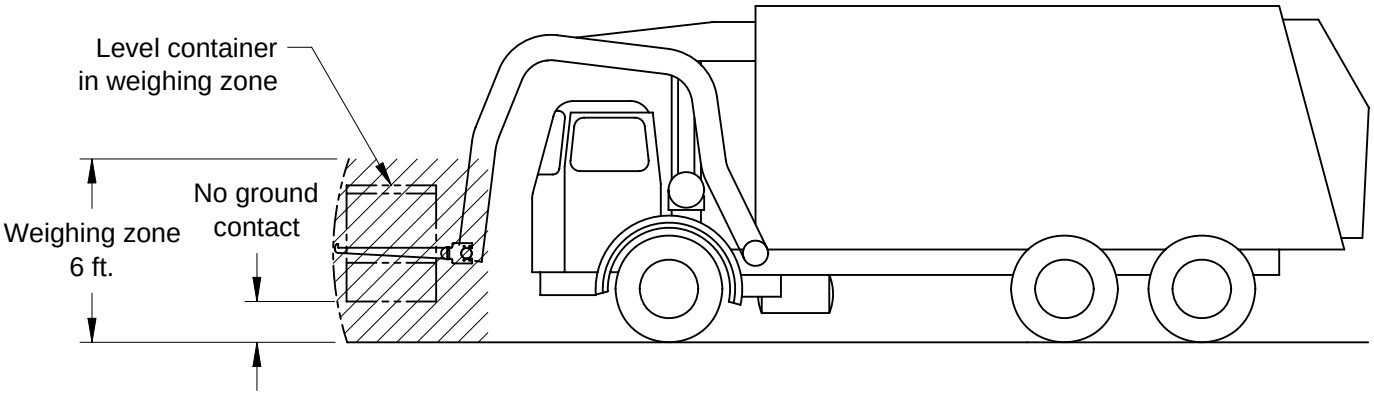
- Just before bin engagement with forks in level position, if the meter reads more than 50 lb, press the **TARE / ZERO** button to rezero.
- Lift the full bin completely off of the ground smoothly, stop the forks in a level position within the 6' weigh zone. Press the “weight capture” button, wait for a “two beep” audible signal from the meter, then dump the full bin.
- Lower the empty bin and stop within the 6' weigh zone with level forks, press the “weight capture” button, wait for a “two beep” audible signal from the meter, then gently return empty bin to the ground.
- When the meter emits “two beeps”, the weight has been captured.
- If picking a bin from a dock, bring it down within the 6' weigh zone before pressing the “weight capture” button.

VULCAN CUSTOMER SERVICE

1-800-237-0022

HOURS:
7:30 a.m. - 5:00 p.m.
PACIFIC TIME

UP AND DOWN LIFT CYCLE



INSTALLATION NOTE:

Please wire tie this driver card to the Vulcan V600 Meter bracket.

DRIVER NOTE:

Please place this driver card on visor or clipboard to use as a quick reference guide.

9.0 STATIC / WEIGH-IN-MOTION CONTROL KIT (A04) INSTALLATION

9.1 PROXIMITY SWITCH INSTALLATION

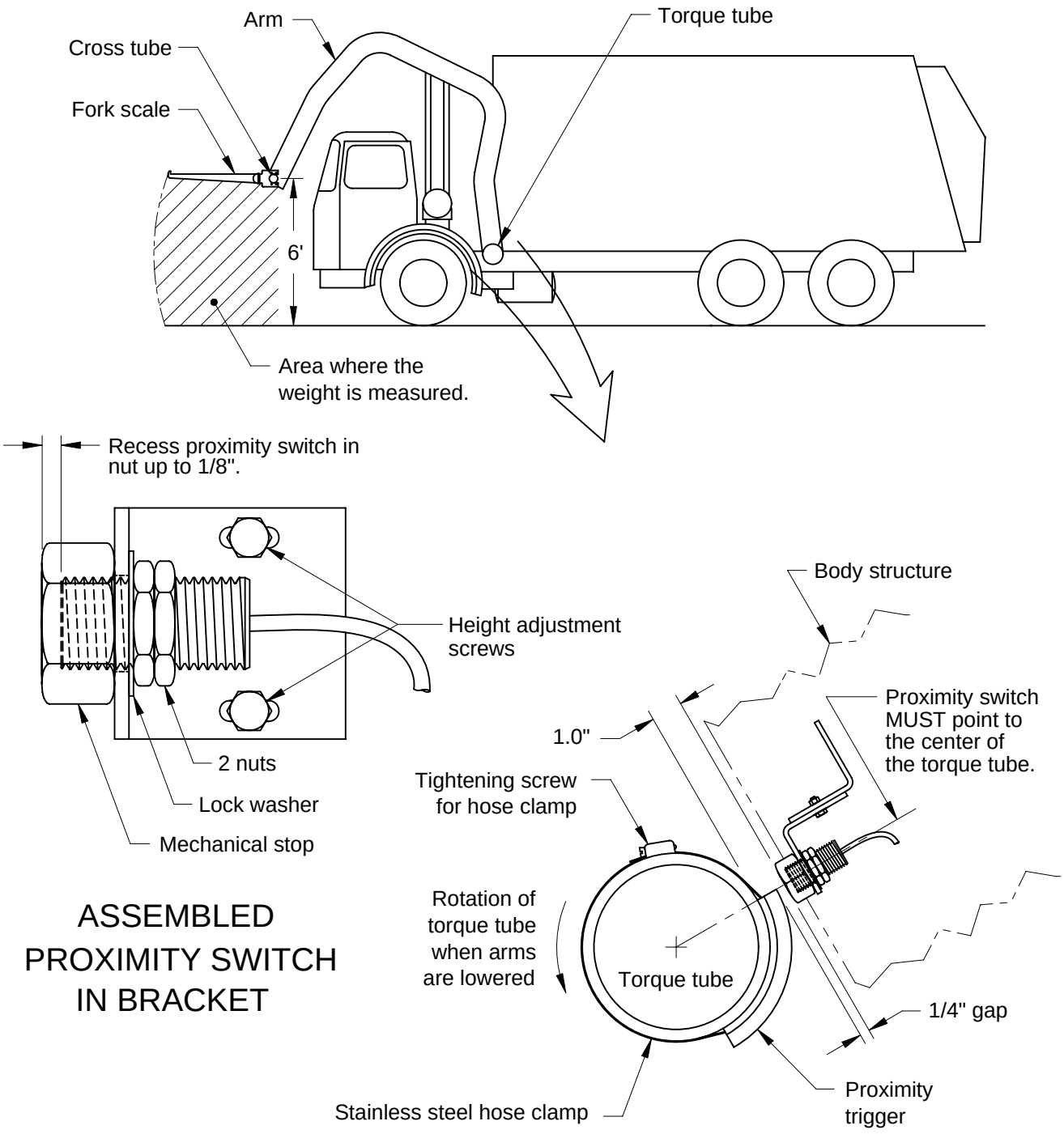


Figure 9-A

1. Raise the cross tube until it is six feet above the ground. Locate a position on the truck body structure, near the torque tube, where the supplied bracket can be installed. Proximity switch must be installed on truck body, not on truck chassis. The base of the nut must be 1" from the surface of the torque tube.

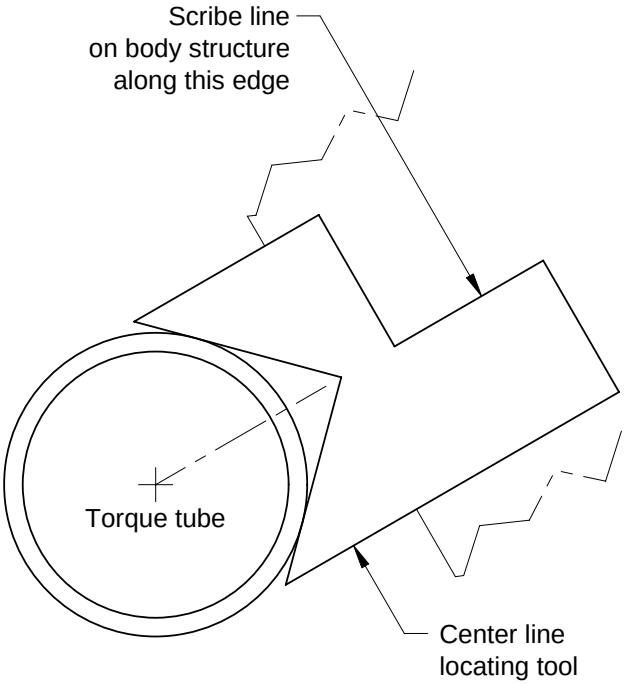


Figure 9-B

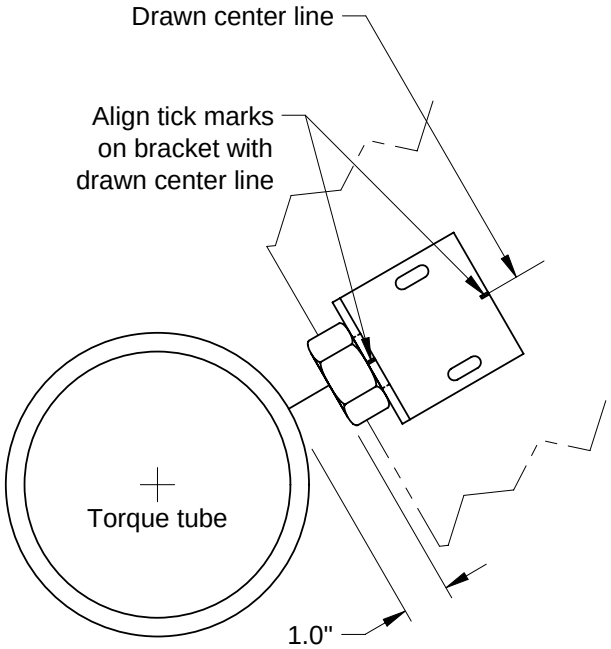


Figure 9-C

2. Remove the “Center Line Locating Tool” pattern from section 9.6. Place the “Center Line Locating Tool” on the torque tube and mark a line on the body structure where the bracket will be installed, see Figure 9-B.

3. Use the tick marks on the angle bracket to align it with the line drawn on the truck structure. This aligns the center of the bracket with the center of the torque tube. The base of the nut must be 1" from the surface of the torque tube. The bracket can be cut down or additional bracketry can be welded to it so it fits properly in the desired area, see figure 9-C.

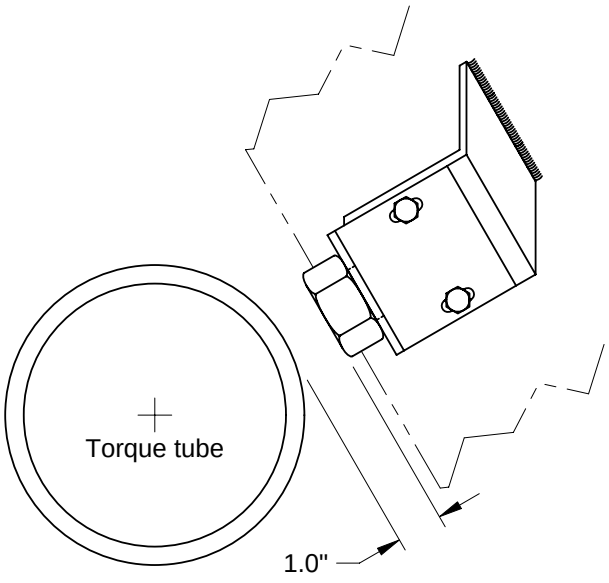


Figure 9-D

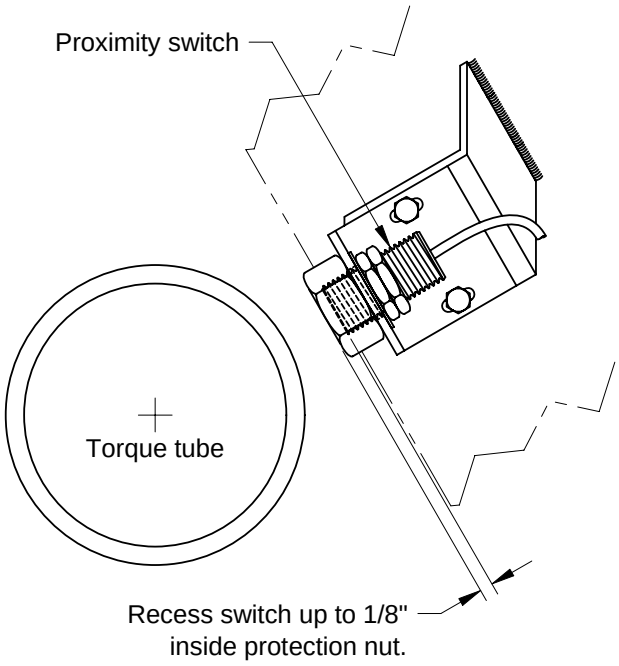


Figure 9-E

4. Weld bracket to the truck structure and set a 1" gap between the nut and torque tube, see Figure 9-D.

5. Install the proximity switch in the bracket nut. Tighten in place so the sensor is recessed in the nut up to 1/8" maximum, see Figure 9-E.

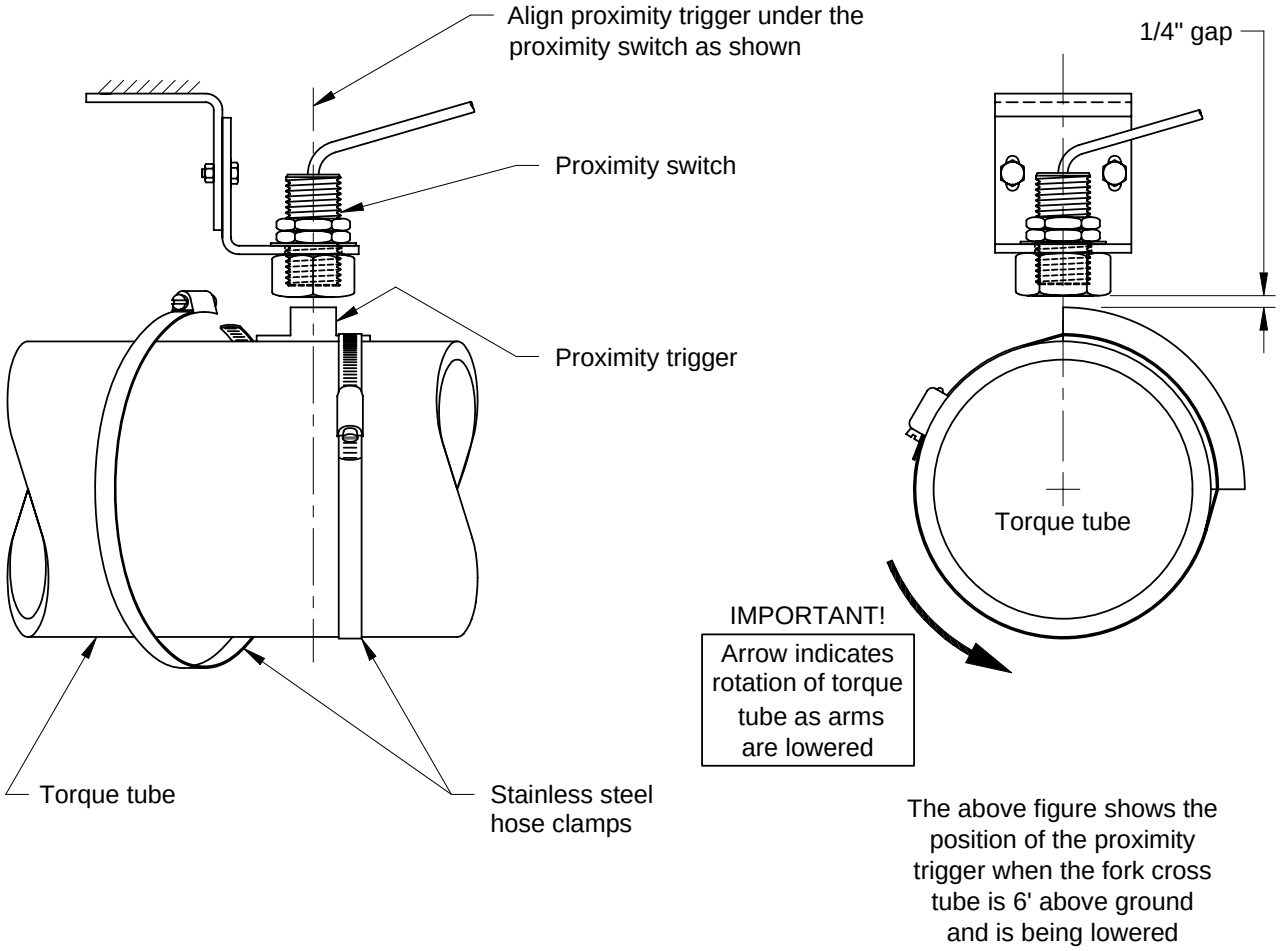


Figure 9-F

6. The proximity trigger will be mounted directly below the proximity switch on the torque tube. Clean off grease and debris from the torque tube in this area. Use the hose clamps to fasten the proximity trigger to the torque tube. Verify the cross tube is six feet off the ground before final alignment. Align the trigger with the proximity switch and set up the final installed distances as shown in Figure 9-F.

7. As the arms are raised and lowered, the gap between the proximity sensor and the proximity trigger must remain 1/4". If the gap is greater than 1/4", the sensor may not trigger properly.

8. When the position is finalized, tighten the two, ¼-20 fasteners and tack weld the two mounting plates together so they will not slip.

9.2 ELECTRICAL SCHEMATICS / DIAGRAMS

9.2.1 STATIC / WEIGH-IN-MOTION SYSTEM ELECTRICAL SCHEMATIC

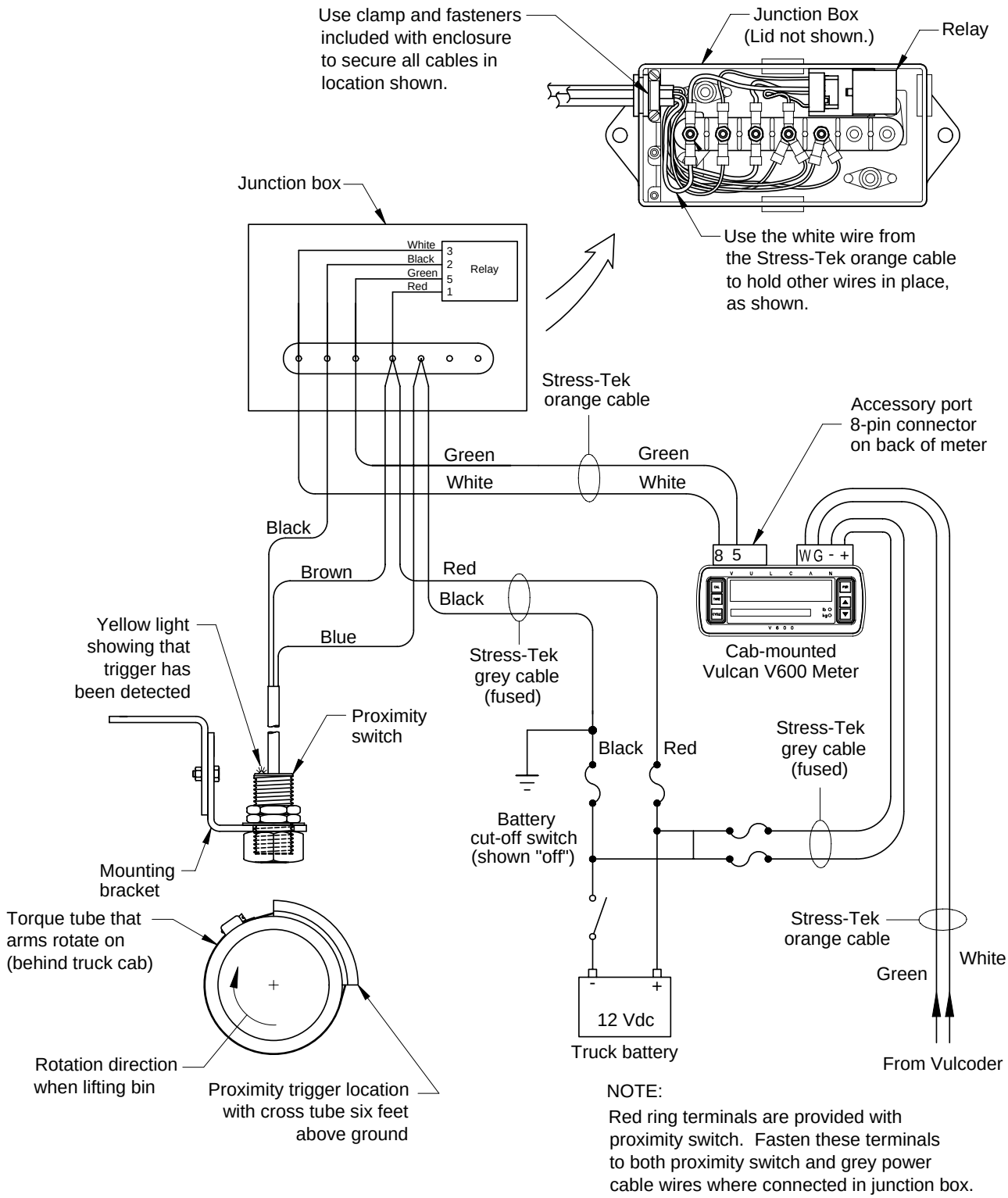


Figure 9-G

1. Mount the junction box in a protected location on the truck body structure.

2. Route and secure the proximity switch wires to the junction box. For trucks that tip to eject and tip for service, route and secure the orange and grey cables through the body rear hinge point to the junction box.

3. The junction box comes with the relay already wired to the proper terminals. Wire the orange and grey cables to the junction box as shown in Figure 9-G.

9.2.2 METER WIRE CONNECTION DIAGRAM

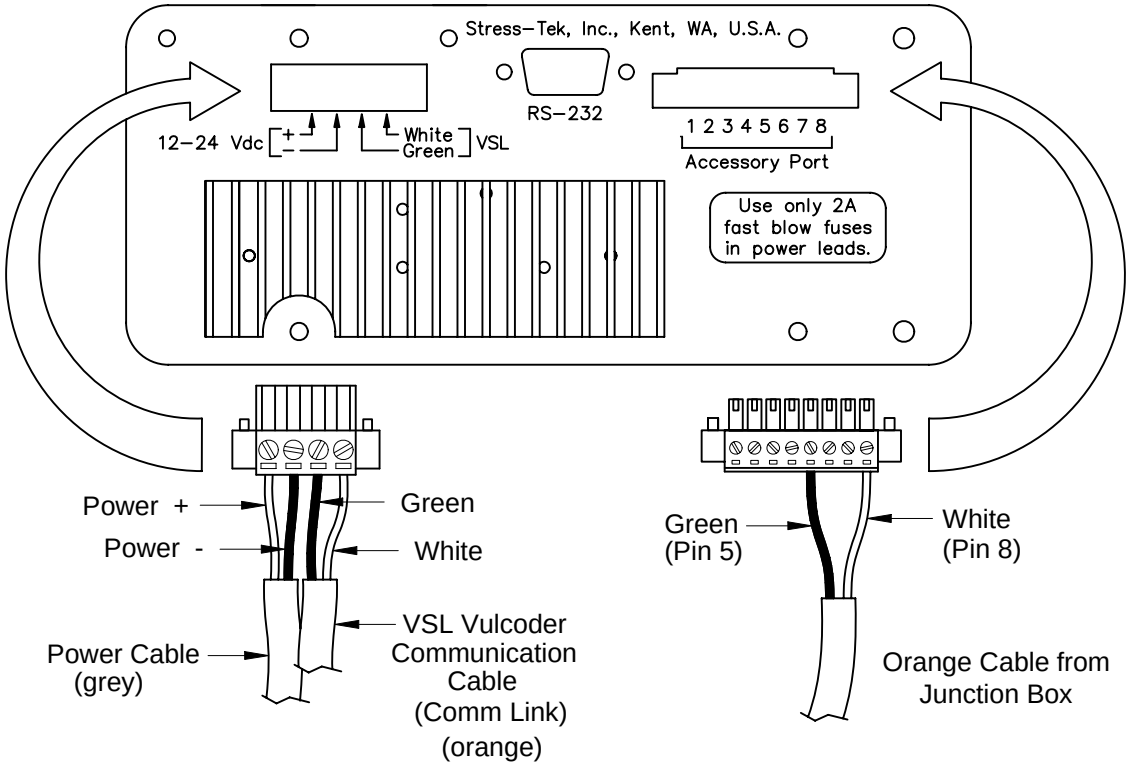


Figure 9-H

Route the grey power cable from the truck battery to the meter in the cab. Route through the cab hinge point. The fuses must be at the battery end of the cable.

In the truck cab, strain relief and cut the VSL Vulcoder cable, meter power cable and junction box cables to ideal lengths. Unplug the terminal blocks from the back of the meter, strip the wires, and connect to the terminal blocks (refer to Figure 9-H). Be careful that stray wires ***DO NOT*** contact adjacent terminals. Twist conductor strands together (refer to Figure 9-I). **Do not** plug the terminal block into the meter at this time.

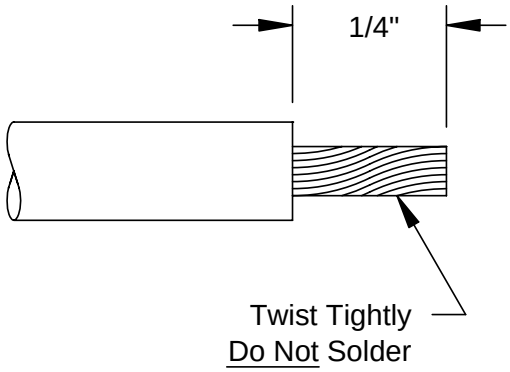


Figure 9-I

9.2.3 CONNECTION TO TRUCK BATTERY

Disassemble the positive fuse holder, (red wire). Apply grease to the positive connector at the battery post to inhibit corrosion. Crimp ringed terminals to the power leads. Connect fused power leads directly to battery posts for best operation. Power must be connected directly to battery. Maximum power is 29 Vdc. **Note:** The Vulcan V600 meter is configured to be used in a **12 Vdc** system using **2 amp** fast blow fuses in both leads. **Do not** connect the power cable to a power source activated by the key switch.

Remember: Turn meter off while making any wire connections.

WARNING: If installing the meter in a vehicle with a **positive ground** electrical system, the meter chassis, mounting bracket, and mounting fasteners **MUST** be electrically isolated from the vehicle chassis.

9.3 METER SETUP AND SYSTEM TEST

9.3.1 OPERATIONAL CHECK OF PROXIMITY SWITCH

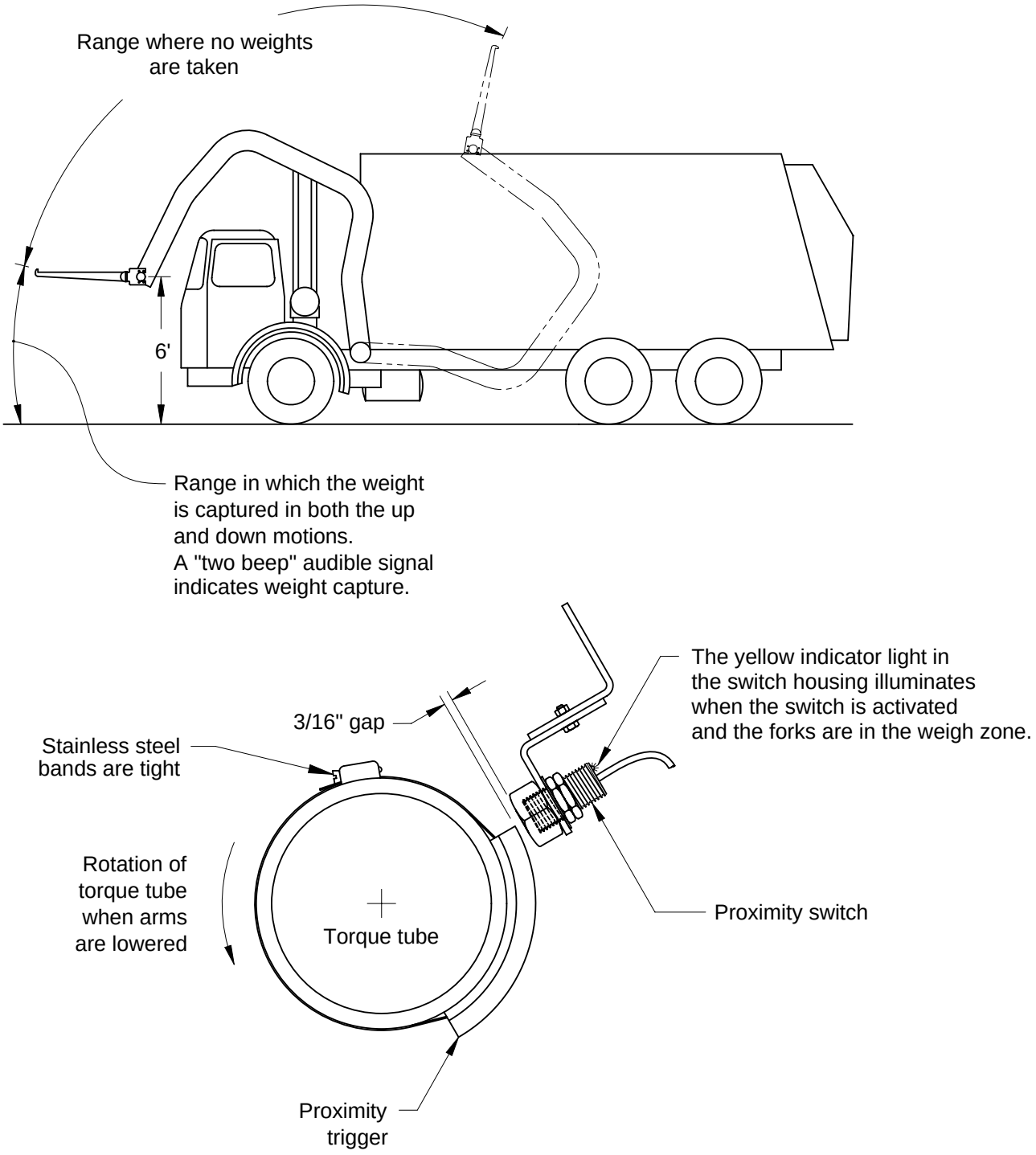


Figure 9-J

9.3.2 START UP DISPLAY METER

Note: If there are any problems with the following quick system tests contact Vulcan Customer Service.

1. Start the truck.

Bring the arms down and put the forks in a level position.

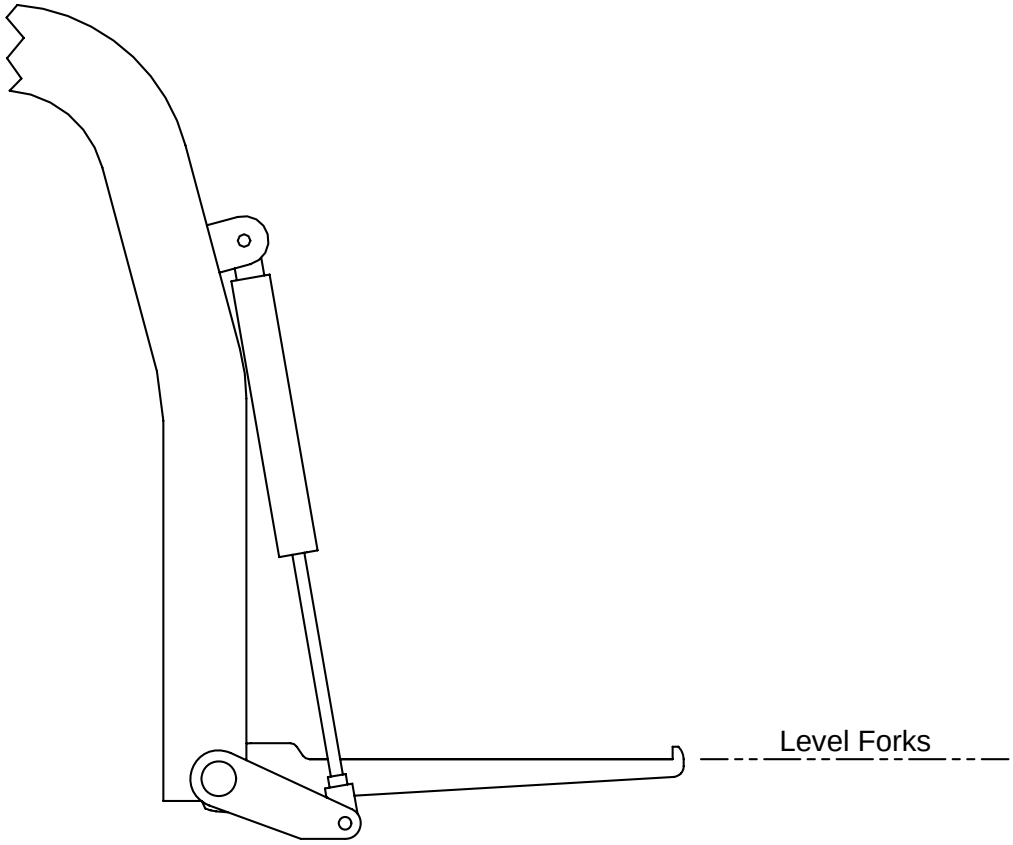
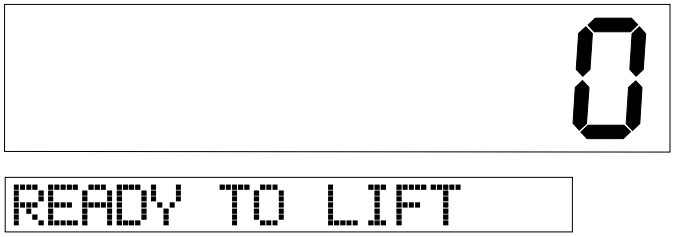


Figure 9-K

2. Turn the meter on and let it complete its startup routine.

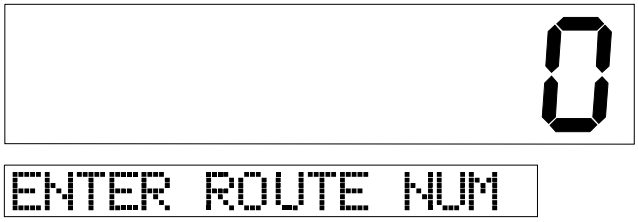
Press the **PWR / MENU** button for less than 2 seconds.

After the meter has completed its startup routine, the meter will display **READY TO LIFT**.



If the meter does not have the display shown above, but instead has the display shown below, the meter is not in BASIC mode, it is in CUSTOMER mode. See section 13.2 for instructions on how to put the meter back into BASIC mode before continuing. See the Vulcan V600 Fork Scale User Manual for a description of customer mode.

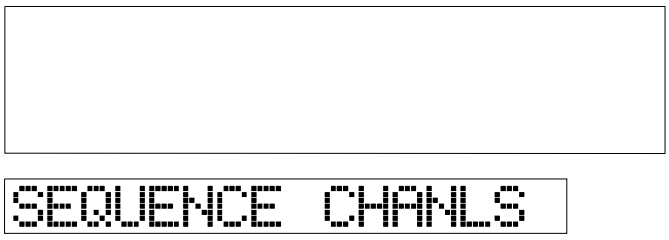
Below is the display shown when the meter is in CUSTOMER mode.



9.3.3 ERASING THE METER AND VULCODER

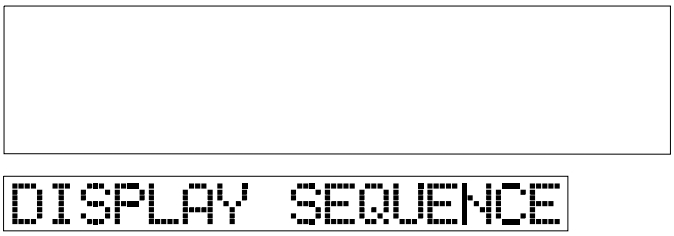
Press the **PWR / MENU** button to enter the Program menu.

Press the **CYCLE** button until **SEQUENCE CHANLS** is displayed.



Note: When trying to "SEQUENCE CHANLS", if the lower display shows "Password?" with the cursor blinking, the Driver Lock Password feature is activated and the Configure System, Setup/Calibrate, Sequence Channels, and System Test menus are not accessible. Refer to section 13.1 to unlock the system.

Press the **ENTER** button to select the **SEQUENCE CHANLS** menu option.



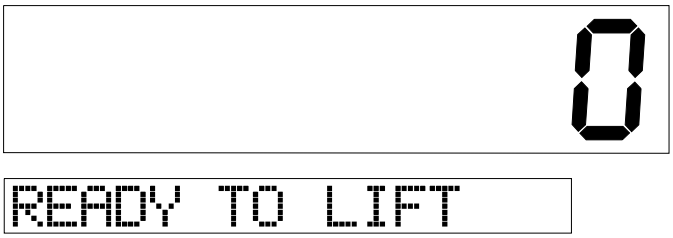
Press the **ENTER** button to enter the **DISPLAY SEQUENCE** menu option. The meter will display the truck Vulcoder as a rear **<R>** designator.

Press and hold the **ENTER** button for two seconds to erase the Vulcoder. The meter will display **<->**. This shows that the Vulcoder has been erased.

Press and hold the **ENTER** button again to erase the meter. The meter will display all dashes on the upper display and **---Wait---** on the lower display.

Press and hold the **PWR / MENU** button until the meter powers off. Once the power is off, press the **PWR / MENU** button again to power the meter back up.

After the meter has completed its startup routine, the meter will display **READY TO LIFT**.



9.3.4 Using the Static System as Weigh-In–Motion

The Static System (A04) can be used with the Static meter software or the Weigh-In-Motion software. The user can select either software method. If the static scale system is used with the Weigh-In-Motion software, the driver must be careful to make a smooth lift in the weigh zone. There is no hydraulic valve to automatically smooth out the arm motion in the weigh zone. The hydraulic valve only comes with the Weigh-In-Motion kit, (A02).

How the “Static” software system works:

The driver controls the fork speed to allow a weight to be taken. If a successful up or down weight capture is made, it is acknowledged by two audible beeps from the meter.

If the motion of the bin while lifting in the weigh zone is too rough, uncontrolled or generally not smooth enough, the meter will not capture a weight and will display an “error” code. This condition is acknowledged by multiple audible beeps from the meter when the bin exits the weigh zone.
This same bin can be re-entered into the weigh zone to get a successful weight capture.
If the bin does not re-enter the weigh zone, no weight will be recorded for that customer and an error message will be stored in meter memory for that customer.

The “Static” system will not capture a weight value for a customer if the lift conditions are to uncontrolled in the weigh zone.

How the “Weigh-In-Motion” software system works:

There is no need for the driver to do anything other than a normal lift. The V600 Meter will capture the up and down weights automatically while the bin is in motion. If a successful up or down weight capture is made, it is acknowledged by two audible beeps or a single beep from the meter.

If the motion of the bin while lifting in the weigh zone is too rough, uncontrolled or generally not smooth enough, the meter will acknowledge this condition by multiple audible beeps when the bin exits the weigh zone. In this case, the meter will still capture a weight, but the weight captured may not be as accurate as it could be if lifted smoothly.
This same bin can be re-entered into the weigh zone to get a potentially more accurate weight capture.

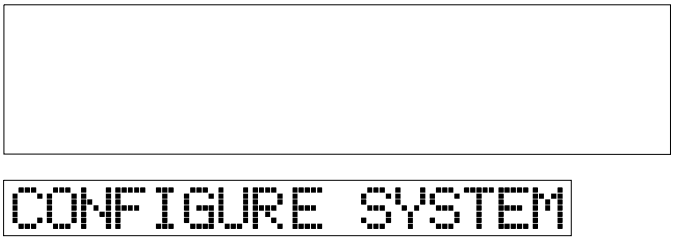
The “Motion” system will always capture a weight value for every customer no matter what the lifting conditions are in the weigh zone.

9.3.5 METER SETUP FOR STATIC OR WEIGH-IN-MOTION

With the meter already on and displaying “Ready to lift”.

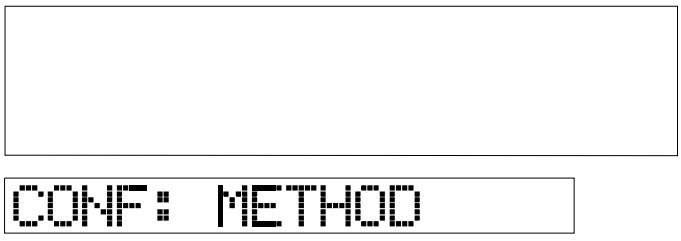
Press the **PWR / MENU** button to enter the Program menu.

Press the **CYCLE** button until **CONFIGURE SYSTEM** is displayed.



Press the **ENTER** button to select the **CONFIGURE SYSTEM** menu option.

Press the **CYCLE** button until **CONF: METHOD** is displayed.



Press the **ENTER** button to select the **CONF: METHOD** menu option.

Press either the **UP** or **DOWN ARROW** buttons until **METHOD: [STATIC]** or **[MOTION]** is displayed. You can choose either method, see section 9.3.4.

Press the **ENTER** button to store the method.

9.3.6 VERIFY FORK OPERATION

Verify the forks are working by either sitting or standing on the each fork. The scales should read the amount of weight on each fork.

1. With a bin on the forks (empty or full), run the lift arms up and down and verify the meter gives the “two beep” signal for weight capture for both up and down directions.

   If not:
   - Verify the proximity switch illuminates its yellow light indicating the detection of the weigh zone.
   - Verify the weigh position of the proximity switch is triggered up to 6' off the ground.

2. Lift a bin (with weight is preferred, but empty is OK) through the up and down cycle 5 times without dumping and check the repeatability of the meter’s computed readings. Note each up and down reading the meter computes. All up readings should be close to the same weight (within 50 lb) and all down readings should be close to the same weight (within 50 lb), although they may not be equal to the exact pound or kilogram.

3. Activate the Driver Lockout Password feature. Vulcan Scales recommends the activation of this password feature to prohibit the driver from changing the scale system set up parameters. See section 13.1 to activate this feature.

9.4 CALIBRATION

The Front Fork Scale comes calibrated from the factory. There is no need for further calibration by the installer. Once the system is working in the field, fine tuning the calibration may be desired to obtain a higher accuracy. This can only be done after the system is working in the field.

The V600 Fork Scale User Manual has complete details on the calibration methods.

9.5 STATIC / WEIGH-IN-MOTION CONTROL KIT DRIVER CARD

The following page has a copy of the driver card used for the Static / Weigh-In-Motion Control Kit. This driver card also comes packaged with the Static / Weigh-In-Motion control kit (P/N: A04). If driver card cannot be found, copy this page, fold in half and laminate. Put this card in the truck for the driver to reference as needed. This driver card is also available on the Vulcan website at www.vulcanscales.com.

DAILY DRIVER OPERATING GUIDE: FRONT FORK, STATIC / WEIGH-IN-MOTION SYSTEM

GUIDELINES TO MAXIMIZE PICKUP WEIGHT ACCURACY

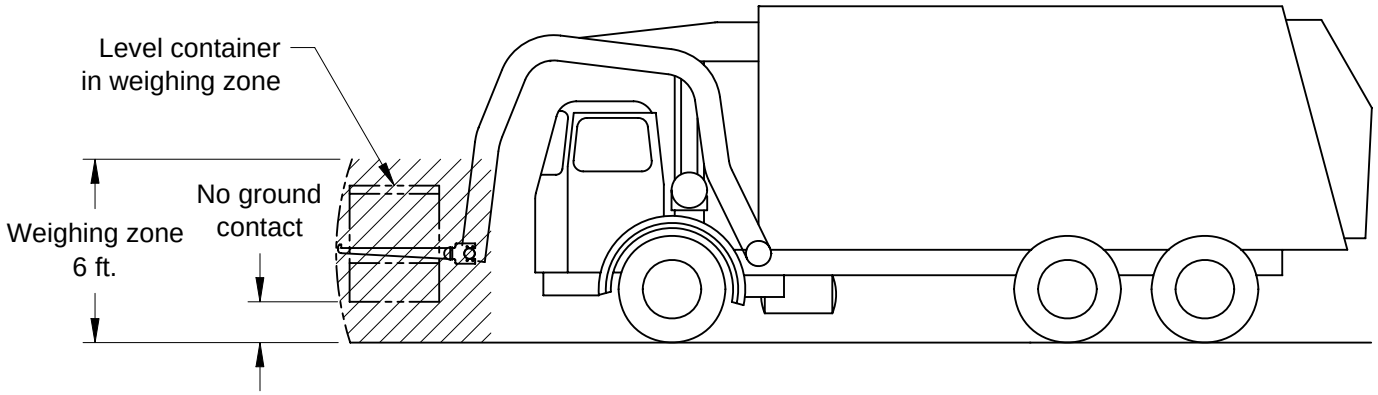
- Just before bin engagement with forks in level position, if the meter reads more than 50 lb, press the **TARE / ZERO** button to rezero.
- Lift the full bin completely off of the ground smoothly, stop the forks in a level position within the 6' weigh zone. Wait for a “two beep” audible signal from the meter indicating weight capture, then dump the full bin.
- Lower the empty bin and stop within the 6' weigh zone with level forks, wait for a “two beep” audible signal indicating weight capture, and return empty bin to the ground.
- If continuous beeping occurs while lifting the bin to dump or setting it on the ground, bring the bin back into the weighing zone and wait for the “two beep” signal.
- If maneuvering a bin to get in the lifting position, momentarily set the bin back on the ground before weighing. This will reset the weighing cycle.
- If picking a bin from a dock, bring it down within the 6' weigh zone and wait for the “two beep” audible signal before dumping.

VULCAN CUSTOMER SERVICE

1-800-237-0022

HOURS:
7:30 a.m. - 5:00 p.m.
PACIFIC TIME

UP AND DOWN LIFT CYCLE



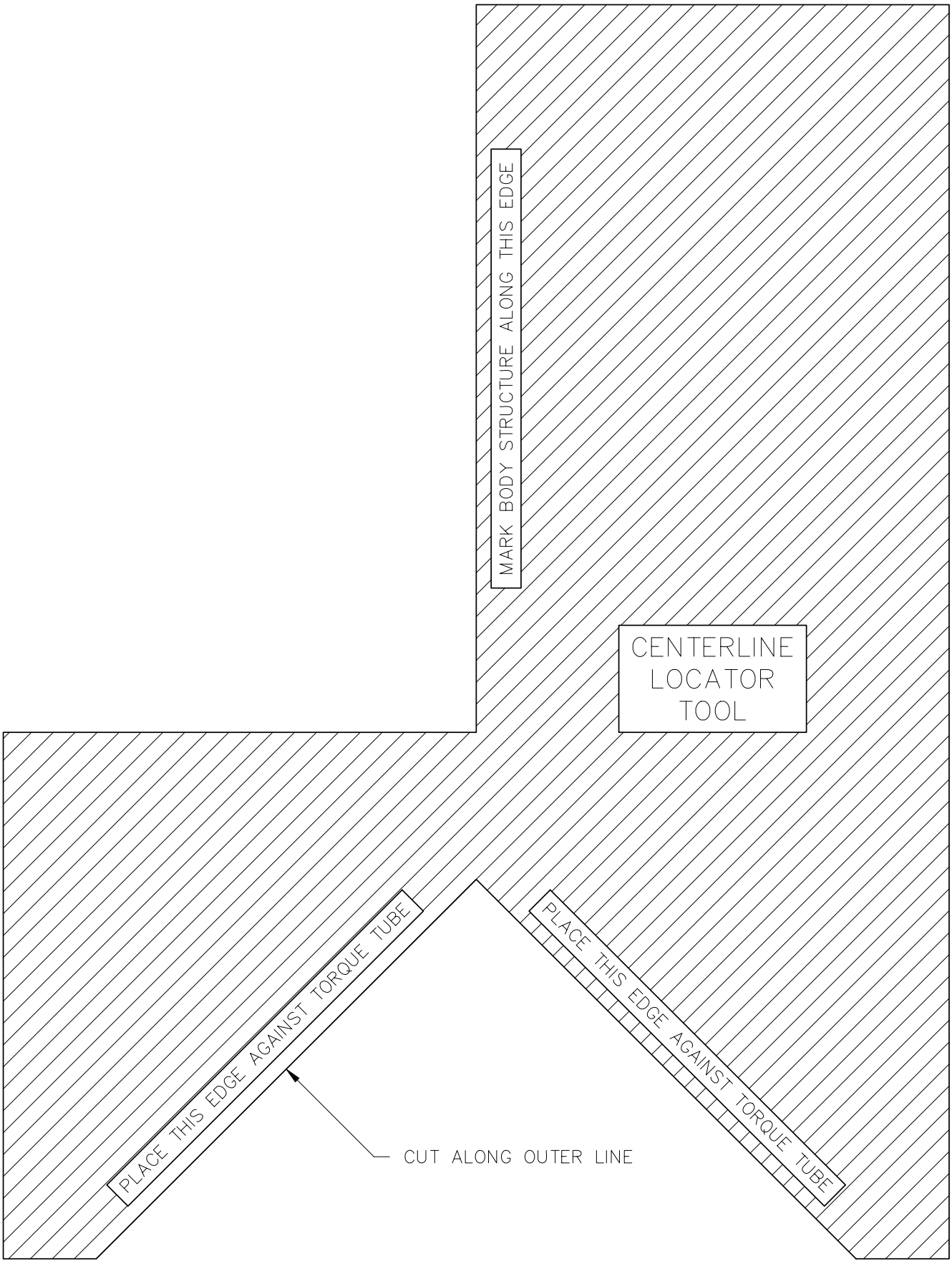
INSTALLATION NOTE:

Please wire tie this driver card to the Vulcan V600 Meter bracket.

DRIVER NOTE:

Please place this driver card on visor or clipboard to use as a quick reference guide.

9.6 CENTERLINE LOCATING TOOL



10.0 WEIGH-IN-MOTION WITH LIFT CONTROL KIT (A02) INSTALLATION

10.1 PROXIMITY SWITCH INSTALLATION

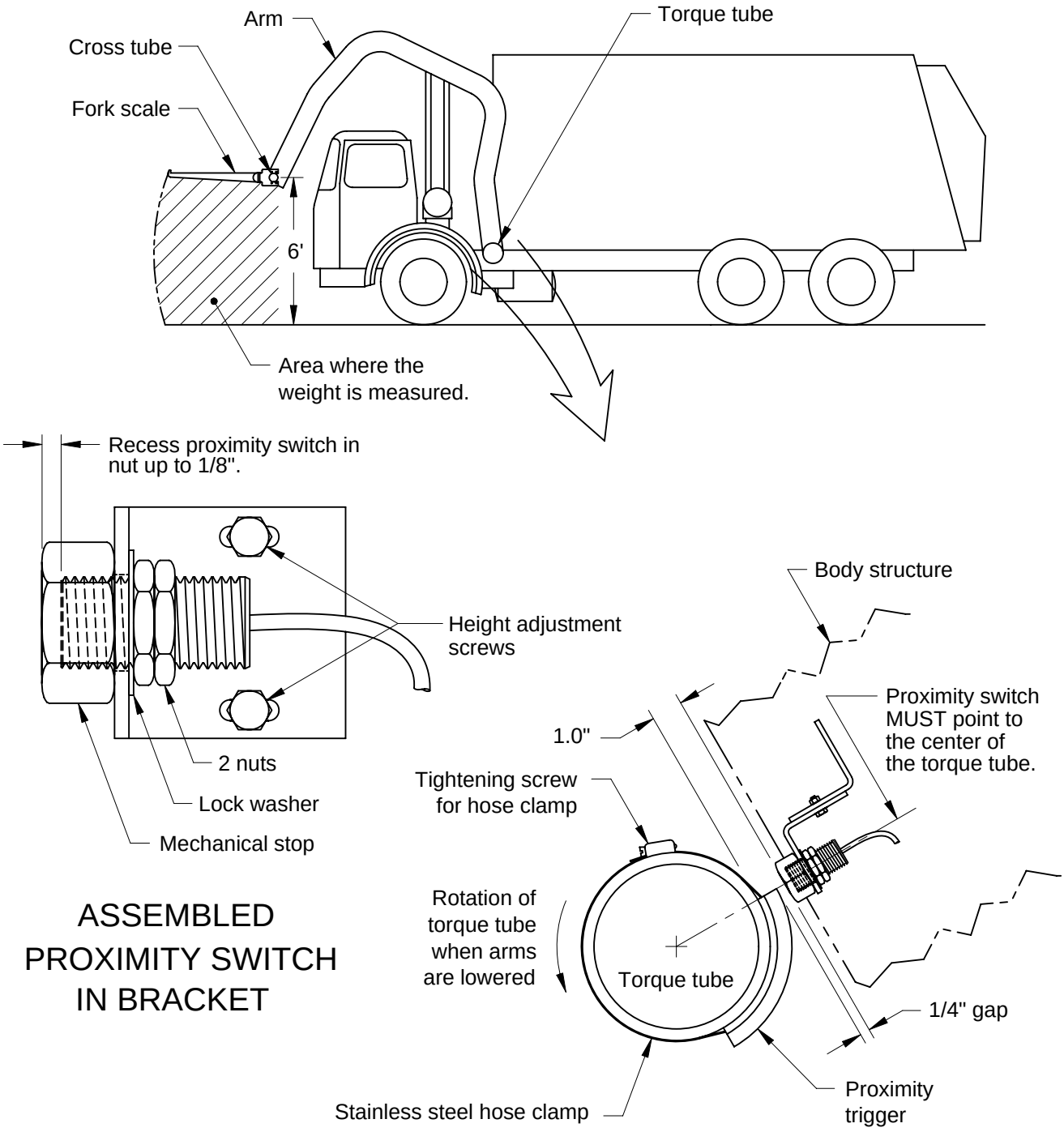


Figure 10-A

1. Raise the cross tube until it is six feet above the ground. Locate a position on the truck body structure, near the torque tube, where the supplied bracket can be installed. Proximity switch must be installed on truck body, not on truck chassis. The base of the nut must be 1" from the surface of the torque tube.

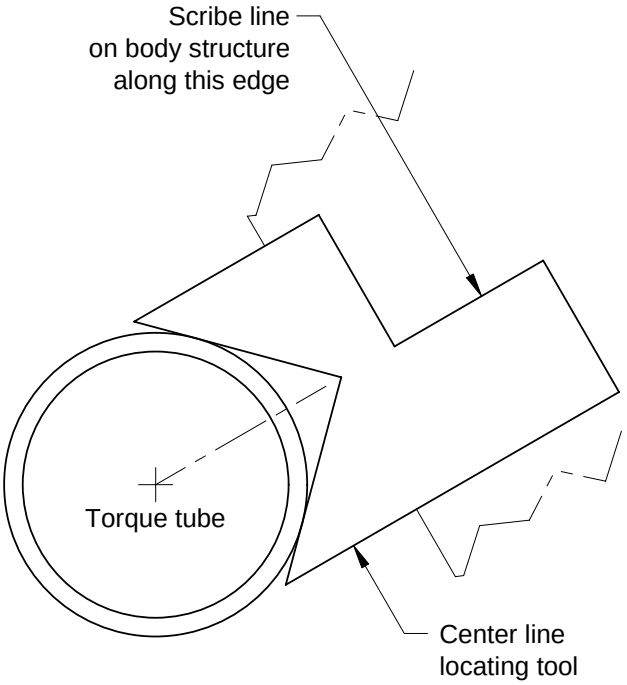


Figure 10-B

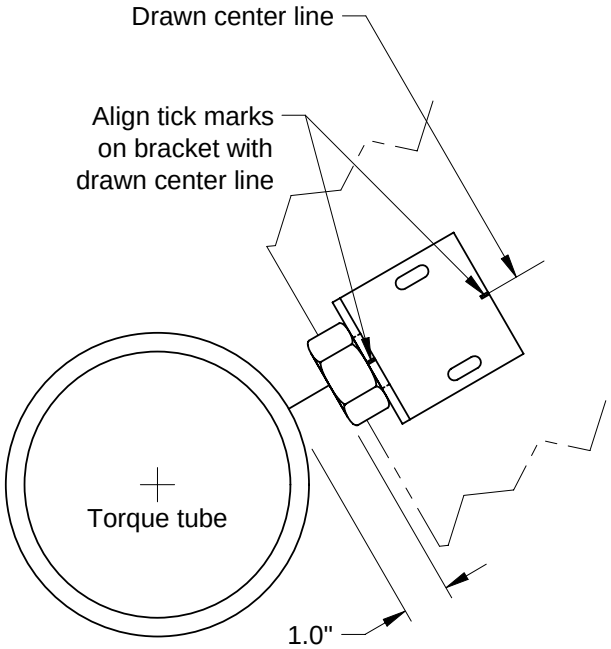


Figure 10-C

2. Remove the “Center Line Locating Tool” pattern from the section 10.7. Place the “Center Line Locating Tool” on the torque tube and mark a line on the body structure where the bracket will be installed, see Figure 10-B.

3. Use the tick marks on the angle bracket to align it with the line drawn on the truck structure. This aligns the center of the bracket with the center of the torque tube. The base of the nut must be 1" from the surface of the torque tube. The bracket can be cut down or additional bracketry can be welded to it so it fits properly in the desired area, see Figure 10-C.

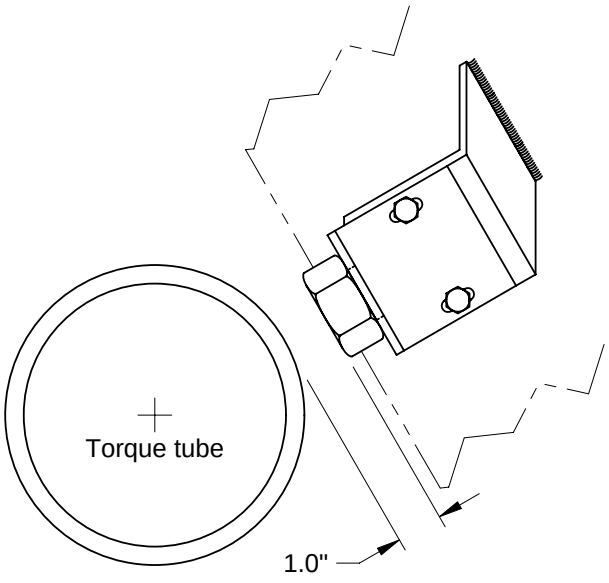


Figure 10-D

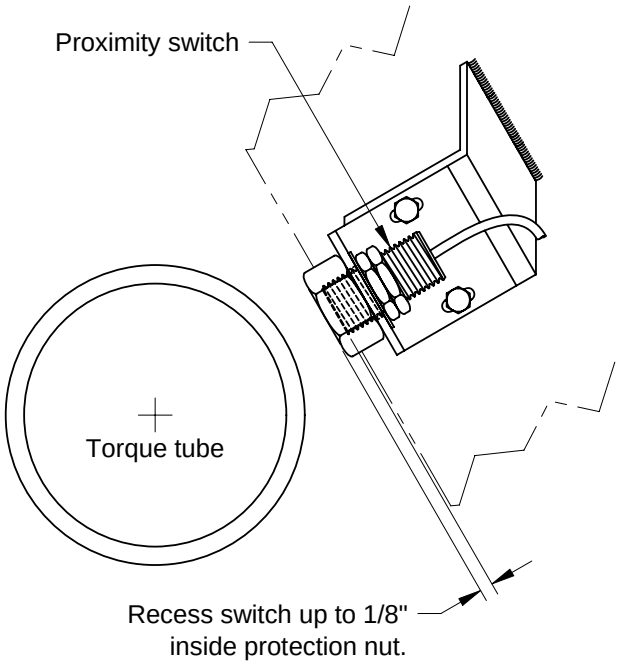


Figure 10-E

4. Weld bracket to the truck structure and set a 1" gap between the nut and torque tube, see Figure 10-D.

5. Install the proximity switch in the bracket nut. Tighten in place so the sensor is recessed in the nut up to 1/8" maximum, see Figure 10-E.

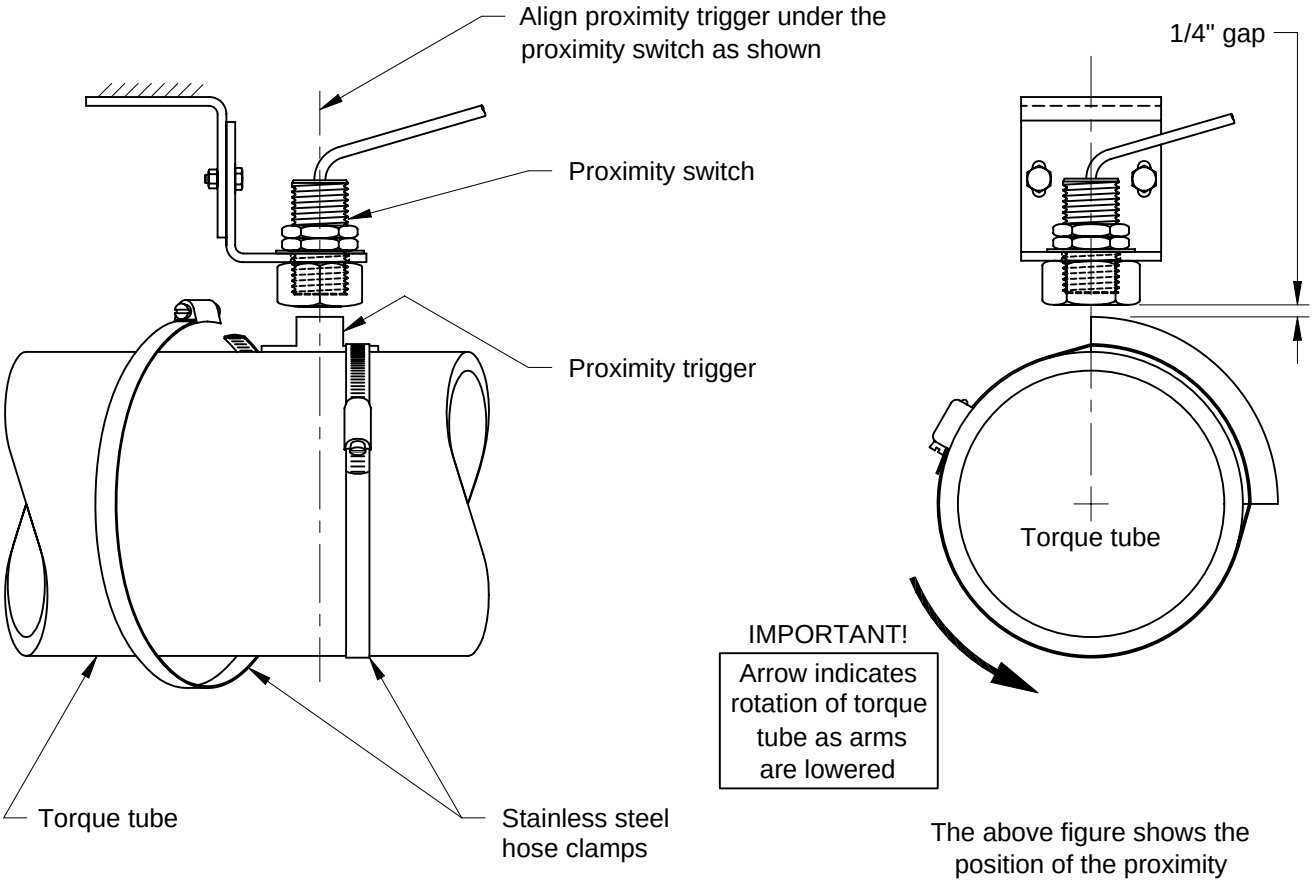


Figure 10-F

7. The proximity trigger will be mounted directly below the proximity switch on the torque tube. Clean off grease and debris from the torque tube in this area. Use the hose clamps to fasten the proximity trigger to the torque tube. Verify the cross tube is six feet off the ground before final alignment. Align the trigger with the proximity switch and set up the final installed distances as shown in Figure 10-F.

8. As the arms are raised and lowered, the gap between the proximity sensor and the proximity trigger must remain 1/4". If the gap is greater than 1/4", the sensor may not trigger properly.

9. When the position is finalized, tighten the 2, ¼-20 fasteners and tack weld the 2 mounting plates together so they will not slip.

10.2 HYDRAULIC FLOW CONTROL VALVE INSTALLATION AND CONFIGURATION

Install the Vulcan hydraulic control valve between the main valve manifold and the “T” connection, as shown in Figure 10-G. The valve must be installed where it can affect both arm hydraulic cylinders.

It does not matter whether the arm cylinders are single acting or double acting. The valve will work for both types. On double acting cylinders, the valve must be installed in the return line when the cylinder is extending.

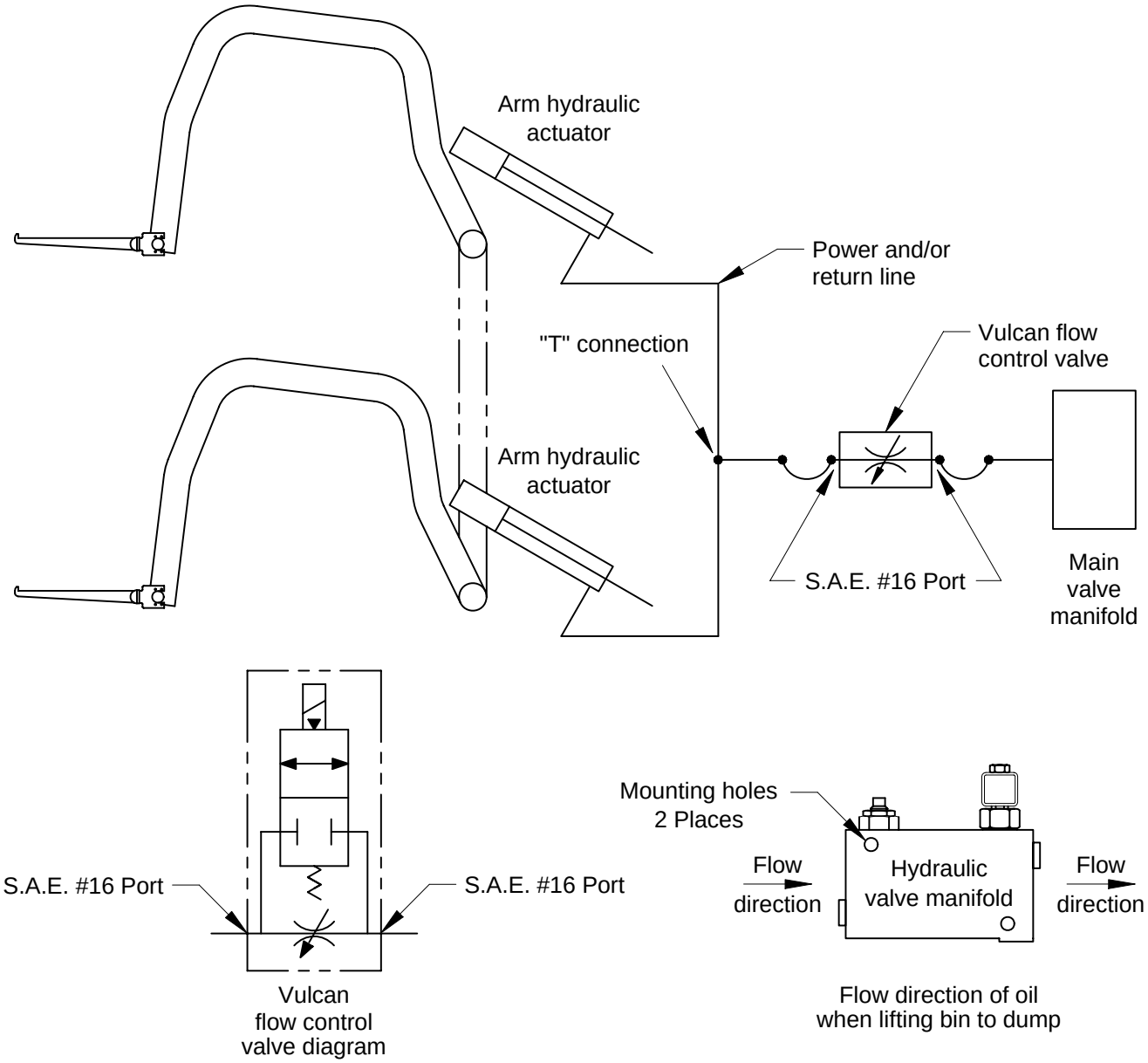


Figure 10-G

Use the two holes in the valve manifold to mount the unit to the truck body structure. It may be helpful to bolt the valve to a larger piece of steel angle or tube, then bolt or weld the angle or tube to the truck body structure.

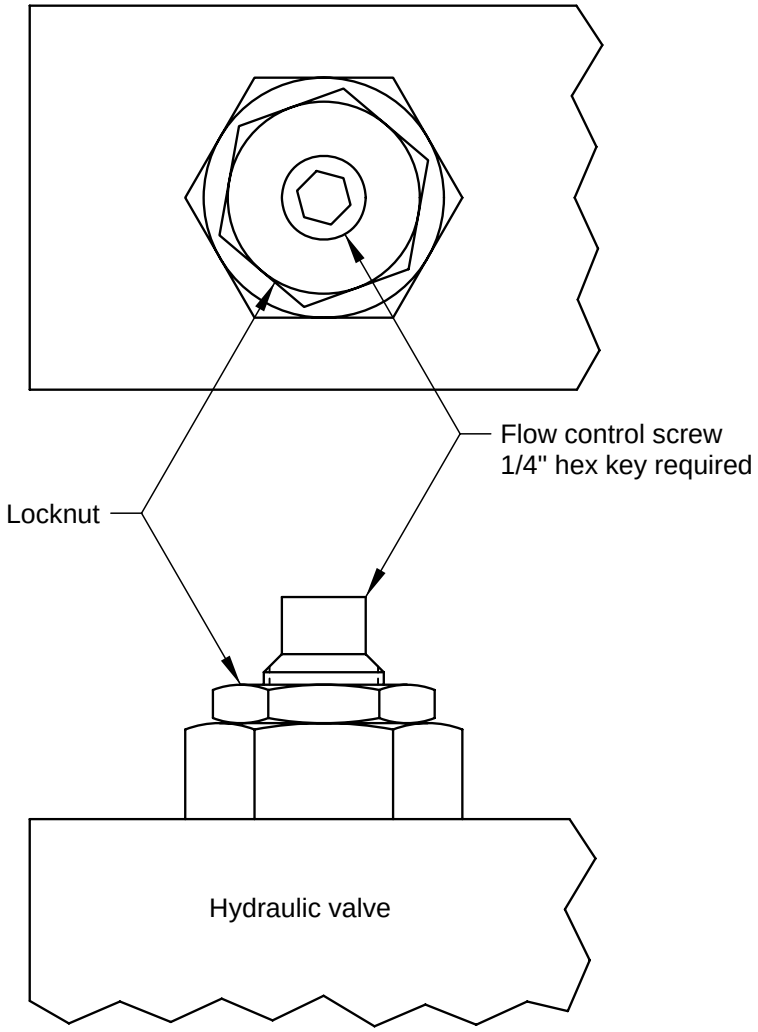


Figure 10-H

Factory recommended setting for Weigh-In-Motion: Flow control screw open 1-3/4 turns counterclockwise.

Procedure for adjusting flow control screw to factory recommended setting:

Step 1: Loosen the flow control screw locknut.

Step 2: Turn the flow control screw clockwise until tight. This fully closes the valve.

Step 3: Turn the flow control screw counterclockwise 1-3/4 turns and tighten the locknut. The flow control valve is now at the recommended setting of open 1-3/4 turns.

10.3 ELECTRICAL SCHEMATICS / DIAGRAMS

10.3.1 WEIGH-IN-MOTION WITH LIFT CONTROL SYSTEM ELECTRICAL SCHEMATIC

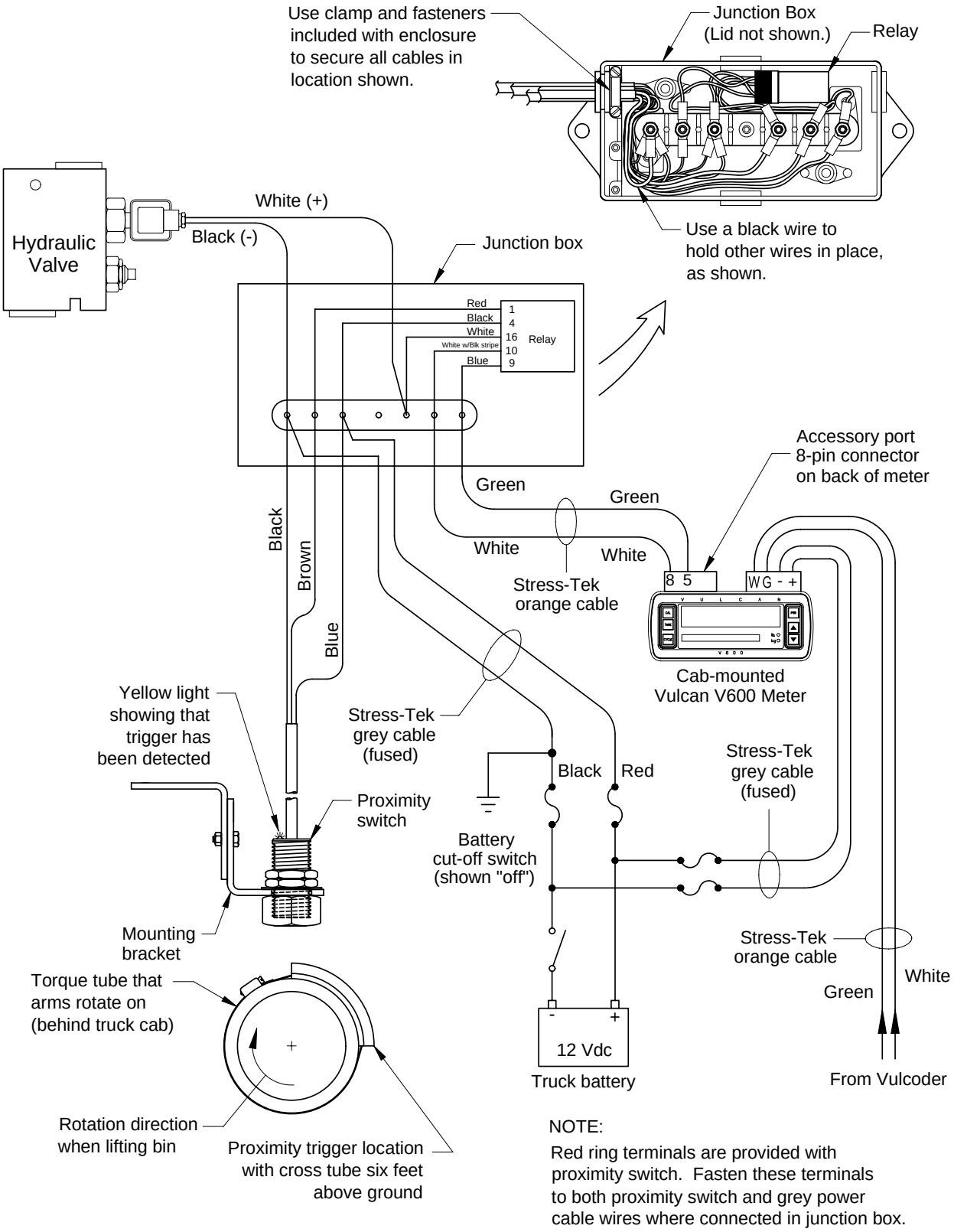


Figure 10-I

1. Mount the junction box in a protected location on the truck body structure.

2. Route and secure the proximity switch cables to the junction box. For trucks that tip to eject, and tip for service, route and secure the orange and grey cables through the body rear hinge point to the junction box.

3. The junction box comes with the relay already wired to the proper terminals. Wire the orange and grey cables to the junction box as shown in Figure 10-I.

10.3.2 METER WIRE CONNECTION DIAGRAM

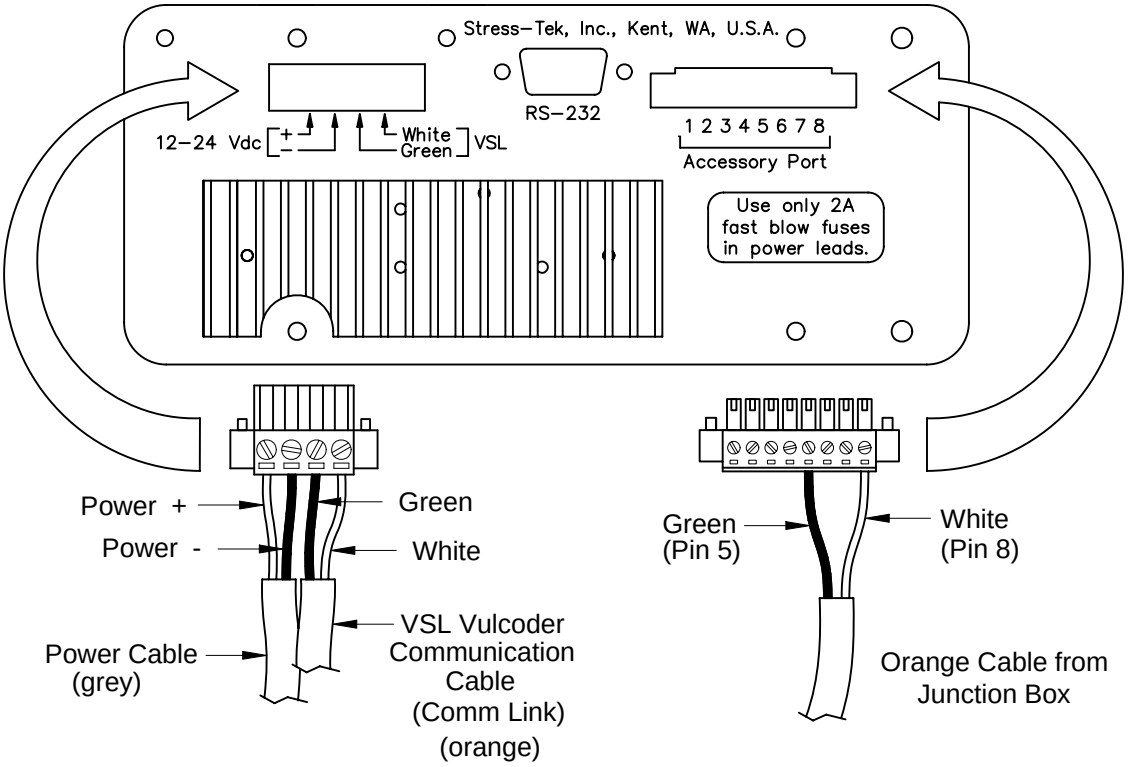


Figure 10-J

Route the grey power cable from the truck battery to the meter in the cab. Route through the cab hinge point. The fuses must be at the battery end of the cable.

In the truck cab, strain relief and cut the VSL Vulcoder cable, meter power cable, and junction box cables to ideal lengths. Unplug the terminal blocks from the back of the meter, strip the wires, and connect to the terminal block (refer to Figure 10-J). Be careful that stray wires ***DO NOT*** contact adjacent terminals. Twist conductor strands together (refer to Figure 10-K). **Do not** plug the terminal block into the meter at this time.

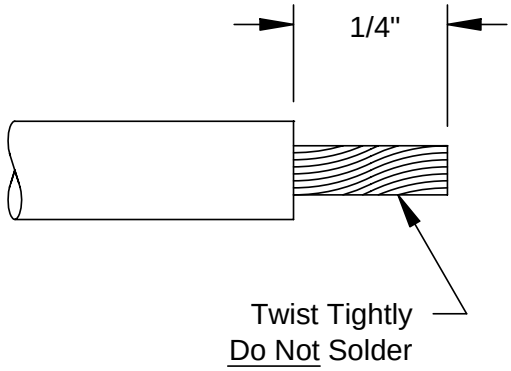


Figure 10-K

10.3.3 HYDRAULIC VALVE WIRE CONNECTION DIAGRAM

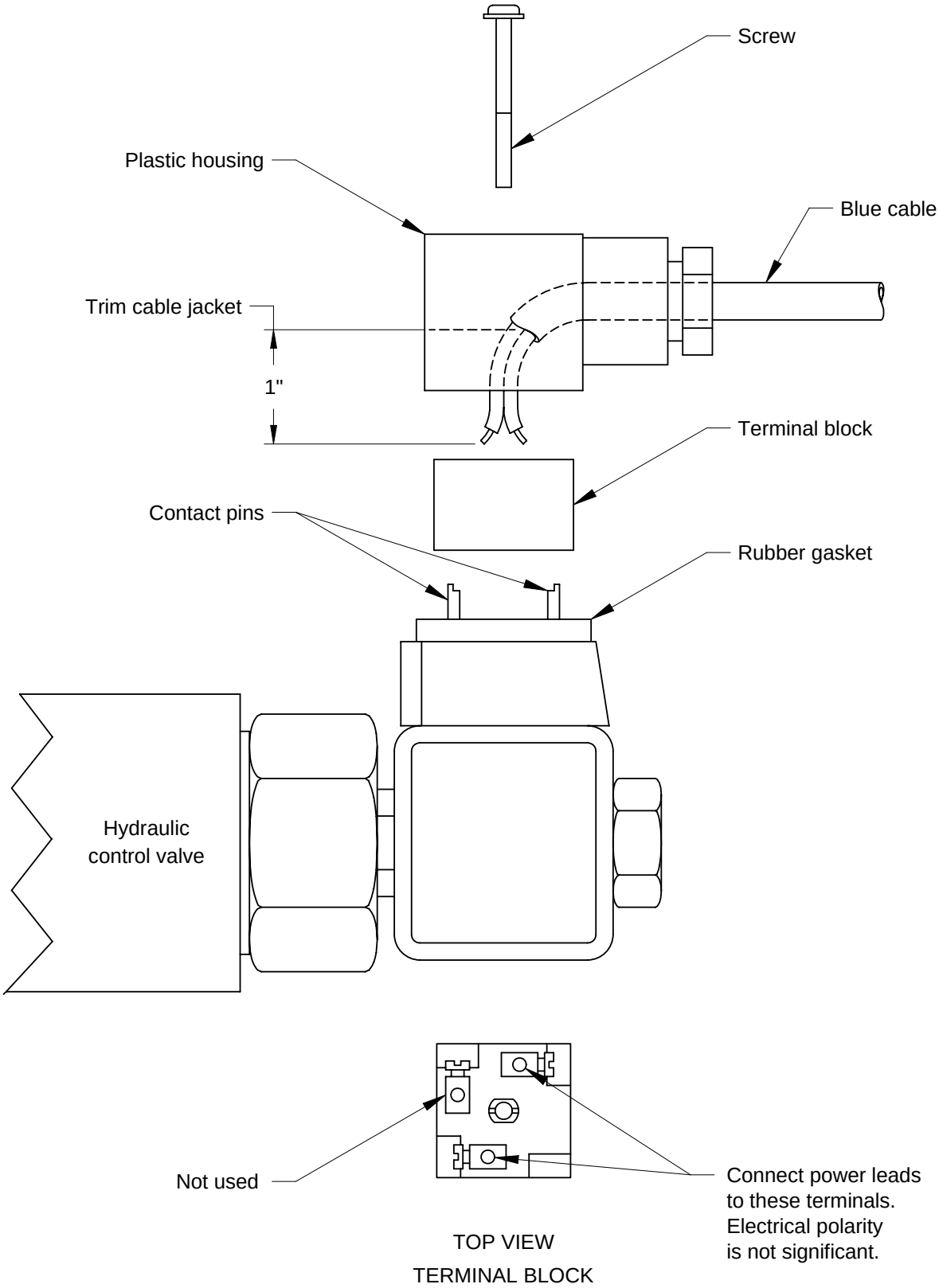


Figure 10-L

Connect the cable from the junction box to the hydraulic control valve terminal block (refer to Figure 10-L). Electrical polarity is not significant on the hydraulic terminal block.

10.3.4 CONNECTION TO TRUCK BATTERY

Disassemble the positive fuse holder, (red wire). Apply grease to the positive connector at the battery post to inhibit corrosion. Crimp ringed terminals to the power leads. Connect fused power leads directly to battery posts for best operation. Power must be connected directly to battery. Maximum power is 29 Vdc. **Note:** The Vulcan V600 meter is configured to be used in a **12 Vdc** system using **2 amp** fast blow fuses in both leads. **Do not** connect the power cable to a power source activated by the key switch.

Remember: Turn meter off while making any wire connections.

WARNING: If installing the meter in a vehicle with a **positive ground** electrical system, the meter chassis, mounting bracket, and mounting fasteners **MUST** be electrically isolated from the vehicle chassis.

10.4 METER SETUP AND SYSTEM TEST

10.4.1 OPERATIONAL CHECK OF PROXIMITY SWITCH AND HYDRAULIC VALVE

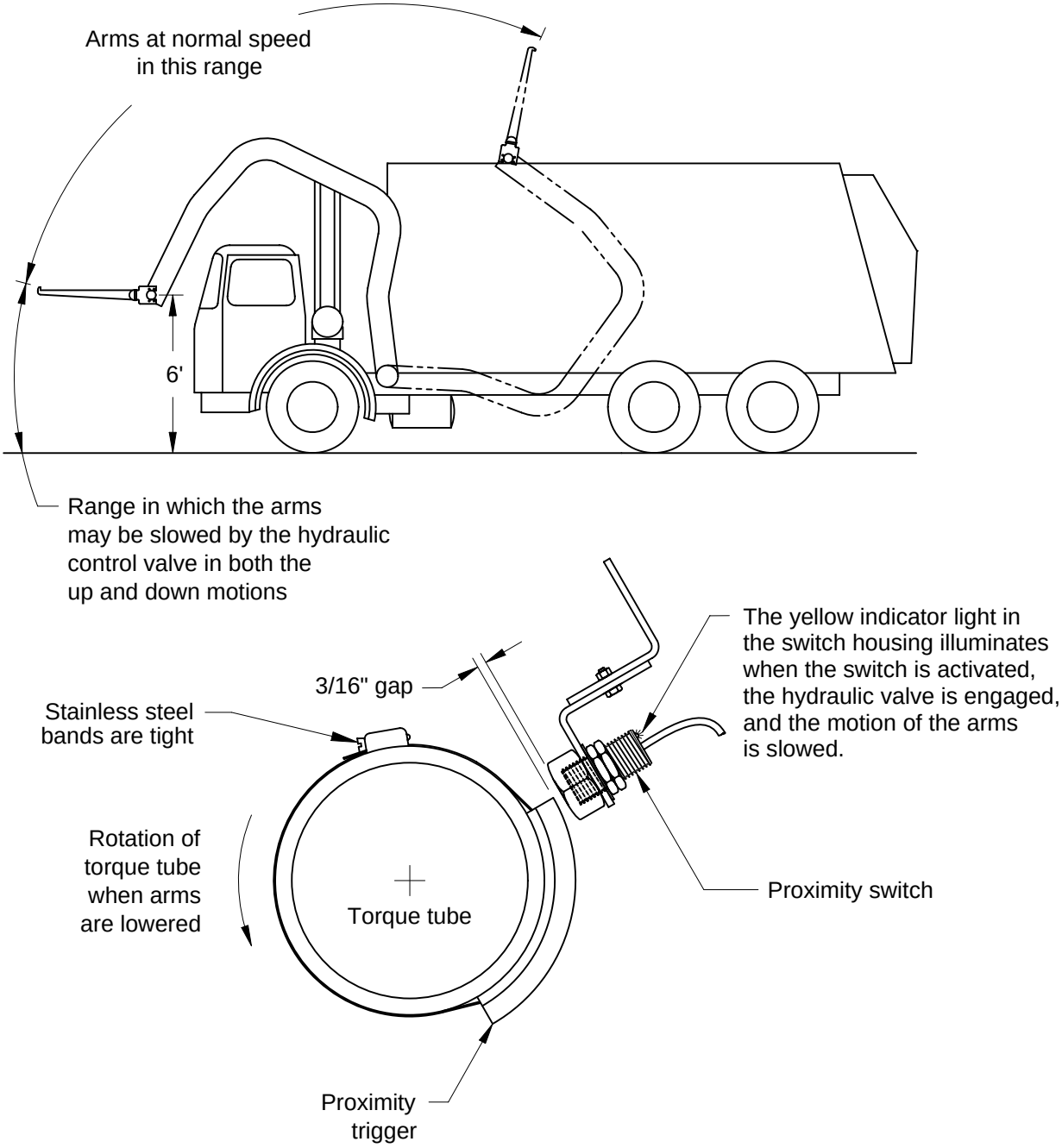


Figure 10-M

10.4.2 START UP DISPLAY METER

Note: If there are any problems with the following quick system tests contact Vulcan Customer Service.

1. Start the truck.

Bring the arms down and put the forks in a level position.

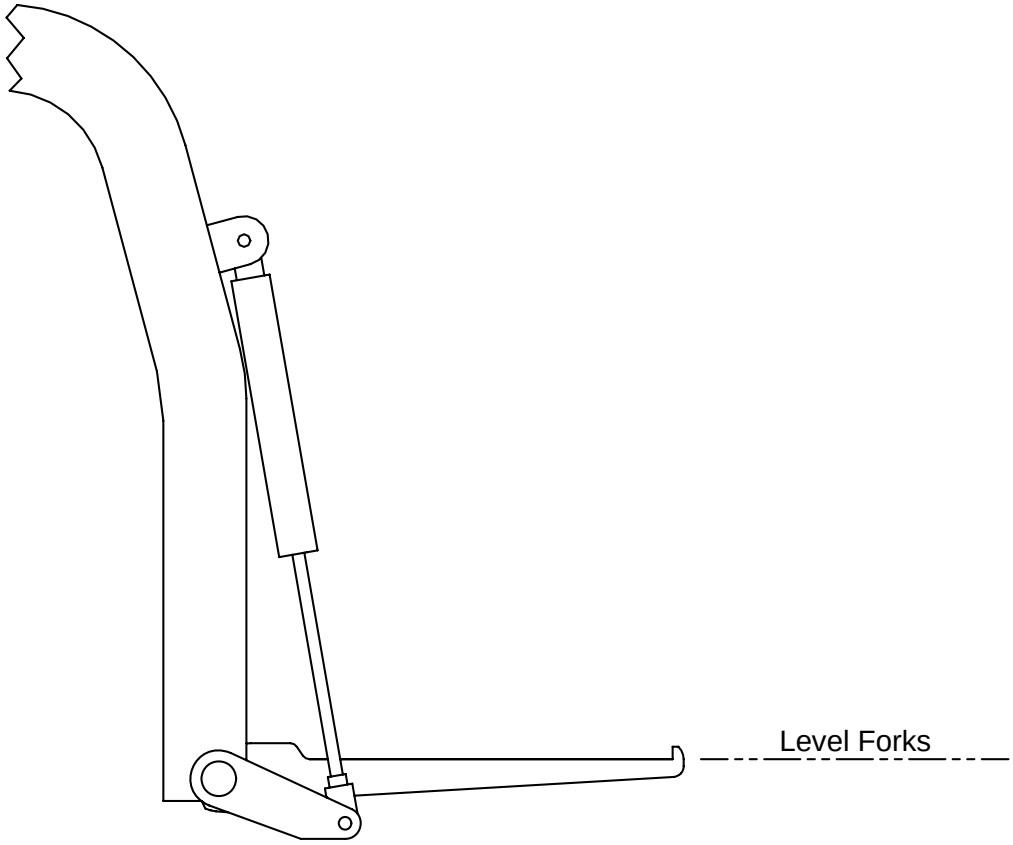
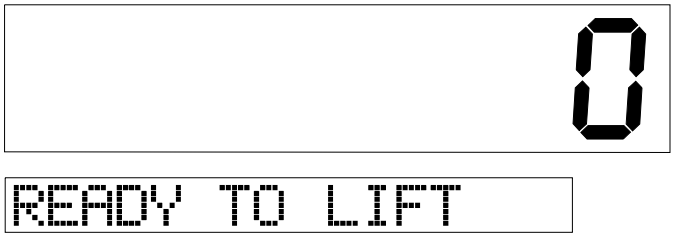


Figure 10-N

2. Turn the meter on and let it go through its startup routine.

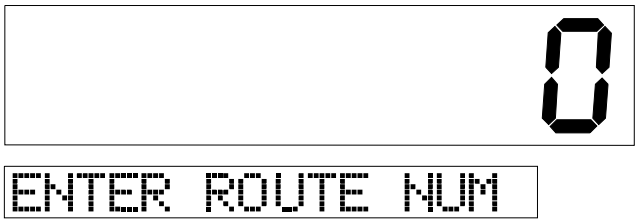
Press the **PWR / MENU** button for less than 2 seconds.

After the meter has completed its startup routine, the meter will display **READY TO LIFT**.



If the meter does not have the display shown above, but instead has the display shown below, the meter is not in BASIC mode, it is in CUSTOMER mode. See section 13.2 for instructions on how to put the meter back into BASIC mode before continuing. See the Vulcan V600 Fork Scale User Manual for a description of customer mode.

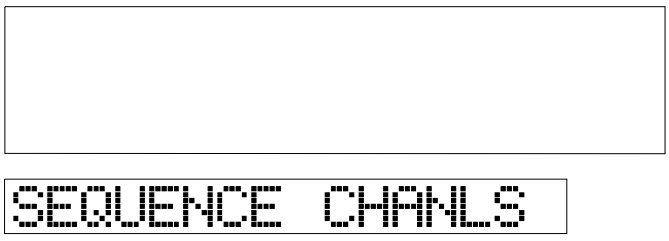
Below is the display shown when the meter is in CUSTOMER mode.



10.4.3 ERASING THE METER AND VULCODER

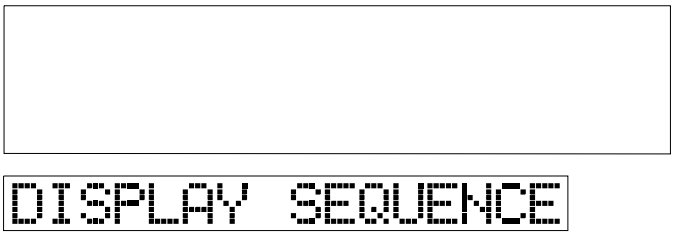
Press the **PWR / MENU** button to enter the Program menu.

Press the **CYCLE** button until **SEQUENCE CHANLS** is displayed.



Note: When trying to "SEQUENCE CHANLS", if the lower display shows "Password?" with the cursor blinking, the Driver Lock Password feature is activated and the Configure System, Setup/Calibrate, Sequence Channels, and System Test menus are not accessible. Refer to section 13.1 to unlock the system.

Press the **ENTER** button to select the **SEQUENCE CHANLS** menu option.



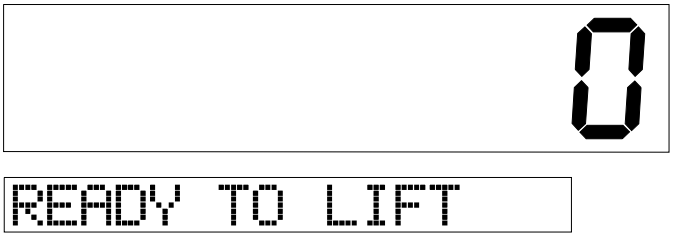
Press the **ENTER** button to enter the **DISPLAY SEQUENCE** menu option. The meter will display the truck Vulcoder as a rear **<R>** designator.

Press and hold the **ENTER** button for two seconds to erase the Vulcoder. The meter will display **<->**. This shows that the Vulcoder has been erased.

Press and hold the **ENTER** button again to erase the meter. The meter will display all dashes on the upper display and **---Wait---** on the lower display.

Press and hold the **PWR / MENU** button until the meter powers off. Once the power is off, press the **PWR / MENU** button again to power the meter back up.

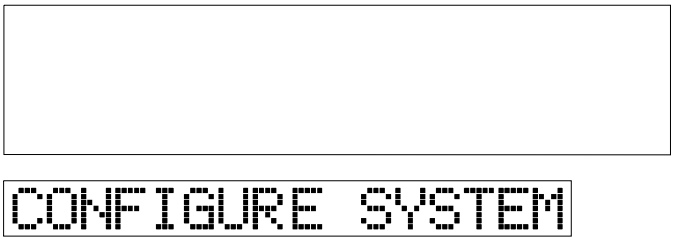
After the meter has completed its start up routine, the meter will display **READY TO LIFT**.



10.4.4 METER SETUP FOR WEIGH-IN-MOTION

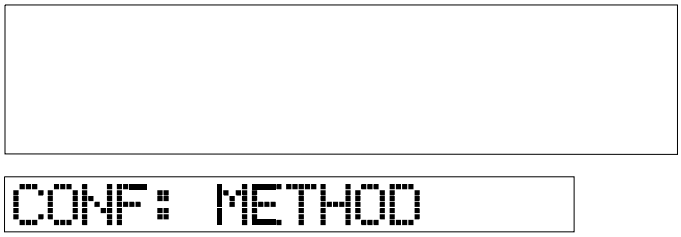
Press the **PWR / MENU** button to enter the Program menu.

Press the **CYCLE** button until **CONFIGURE SYSTEM** is displayed.

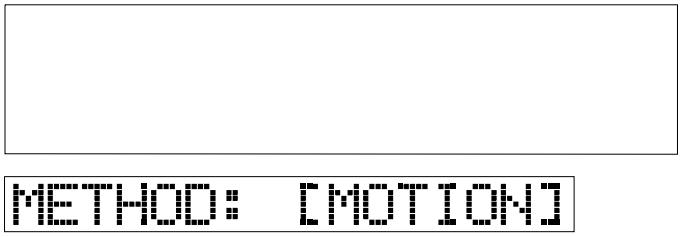


Press the **ENTER** button to select the **CONFIGURE SYSTEM** menu option.

Press the **CYCLE** button until **CONF: METHOD** is displayed.



Press the **ENTER** button to select the **CONF: METHOD** menu option.



Press either the **UP** or **DOWN ARROW** buttons until **METHOD: [MOTION]** is displayed.

Press the **ENTER** button to store the method and return to the **CONF: METHOD** menu option.

Press the **PWR / MENU** button twice to exit and the meter will return to its operating mode. The scale system is now ready to weigh.

10.4.5 VERIFY FORK OPERATION

Verify the forks are working by either sitting or standing on the each fork. The scales should read the amount of weight on each fork.

1. Run the lift arms up and down and make sure they are slow and smooth in the weighing range.

   If not:
   - Check the hydraulic valve setting. It should be 1-3/4 turns open, see section 10.2.
   - Hydraulic trip point should be about 6 feet off the ground and should be the same spot going up and down.
   - Check to see where the hydraulics engages on the up cycle.
   - If arms are moving too fast, turn hydraulic valve setting ¼ turn clockwise (cw) and retest.

2. Lift a bin (with weight is preferred, but empty is OK) through the up and down cycle 5 times without dumping and check the repeatability of the meter's computed readings. Note each up and down reading the meter computes. All up readings should be close to the same (within 50 lb) and all down readings should be close to the same (within 50 lb), although they may not be equal to the exact pound or kilogram.

3. Activate the Driver Lockout Password feature. Vulcan Scales recommends the activation of this password feature to prohibit the driver from changing the scale system set up parameters. See section 13.1 to activate this feature.

10.5 CALIBRATION

The Front Fork Scale comes calibrated from the factory. There is no need for further calibration by the installer. Once the system is working in the field, fine tuning the calibration may be desired to obtain a higher accuracy. This can only be done after the system is working in the field.

The V600 Fork Scale User Manual has complete details on the calibration methods.

10.6 WEIGH-IN-MOTION WITH LIFT CONTROL KIT DRIVER CARD

The following page has a copy of the driver card used for the Weigh-In-Motion with Lift Control Kit. This driver card also comes packaged with the Weigh-In-Motion with Lift Control Kit (P/N: A02). If driver card cannot be found, copy this page, fold in half and laminate. Put this card in the truck for the driver to reference as needed. This driver card is also available from the Vulcan website at www.vulcanscales.com.

DAILY DRIVER OPERATING GUIDE: FRONT FORK, WEIGH-IN-MOTION WITH LIFT CONTROL

GUIDELINES TO MAXIMIZE PICKUP WEIGHT ACCURACY

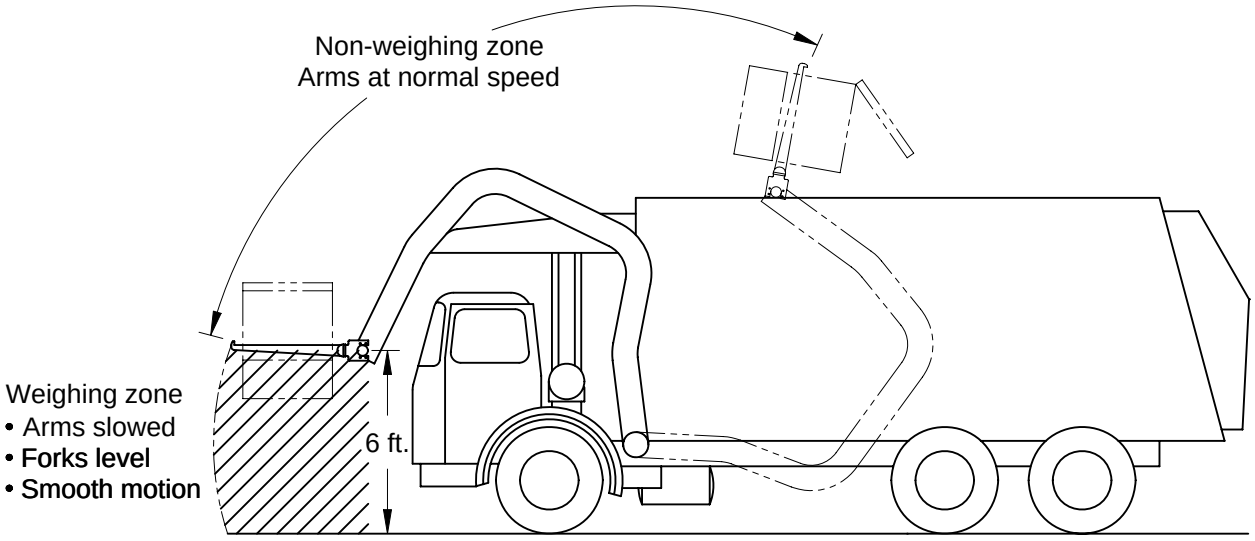
- Just before bin engagement with forks in level position, if the meter reads more than 50 lb, press the **TARE / ZERO** button to rezero.
- Lift the full bin off of the ground smoothly and maintain a smooth motion through the 6' weigh zone. Lower the empty bin smoothly through the 6' weigh zone.
- While lifting the bin, keep the forks level in the weigh zone until a single or double beep is emitted by the meter.
- Set the bin down gently on the ground.
- If maneuvering a bin into the lifting position, momentarily set the bin back on the ground before lifting to dump. This will reset the weigh cycle.
- If picking a bin from a dock, bring it down to a few feet off the ground, this will reset the weighing cycle.
- If continuous beeping occurs while lifting the bin to dump, bring the bin back into the weigh zone until the meter emits a single or double beep.

VULCAN CUSTOMER SERVICE

1-800-237-0022

HOURS:
7:30 a.m. - 5:00 p.m.
PACIFIC TIME

UP AND DOWN LIFT CYCLE



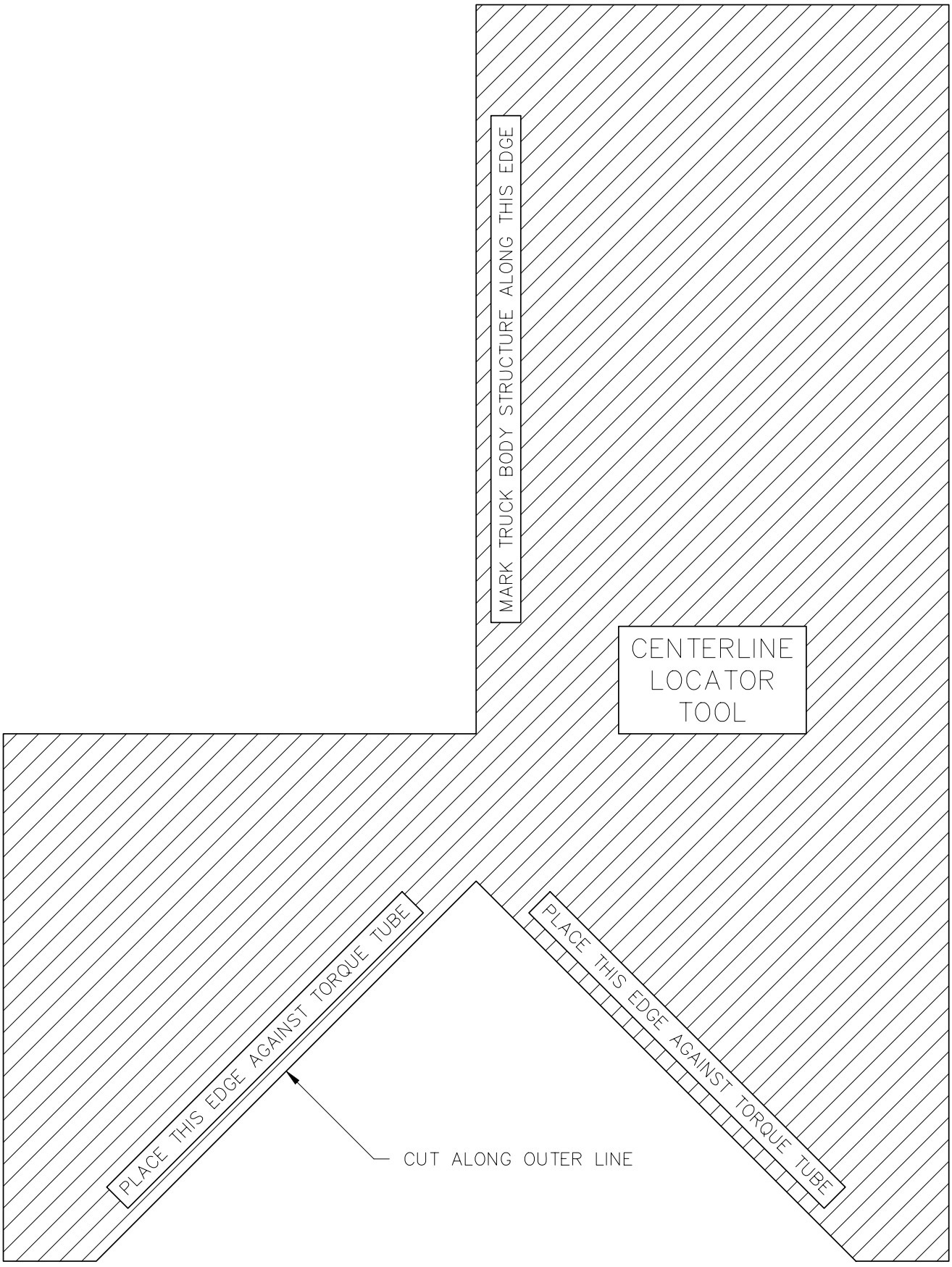
INSTALLATION NOTE:

Please wire tie this driver card to the Vulcan V600 Meter bracket.

DRIVER NOTE:

Please place this driver card on visor or clipboard to use as a quick reference guide.

10.7 CENTERLINE LOCATING TOOL



11.0 FORK SCALE FINAL INSPECTION CHECKLIST

This section can be photocopied and used repeatedly as a checklist for inspecting installations.

11.1 FRONT FORK SCALE ASSEMBLY

- ☐ The Front Fork Scales are mounted parallel and square to the cross tube with correct spacing between them, section 5.2.2
- ☐ The cross tubes structural integrity has not been diminished during the removal of fork components, section 5.3.2.
- ☐ Coupler support is installed to meet strength requirements of OEM design, section 5.3.3.
- ☐ There is a complete 3-pass weld wrapped around the Mounting Clamps, section 5.5.4.
- ☐ All mounting cap screws are torqued to specification, section 6.1, and 6.2.1.
- ☐ Rubber bumpers are installed, section 6.2.
- ☐ The Front Fork Scale and Mounting Clamp assembly is painted with a high quality paint, section 6.3.
- ☐ There is adequate clearance between cross tube, cab guard and fork scale during lift cycle, section 6.4.
- ☐ System dumps bin in the hopper without overshooting or undershooting, especially important for 10 yard bins, section 2.7.
- ☐ Connector guard, Vulcoder guard, and cross tube cable guards are installed, section 7.6, 7.4.2, 7.5.2.
- ☐ Fork does not pass through truck exhaust when passing above the cab, section 6.5.

11.2 ELECTRONICS ASSEMBLY

- ☐ The V600 Meter in the cab does not block mirrors or other in-cab equipment. Wires have adequate strain relief, section 7.3.
- ☐ There is adequate strain relief for the VSL Vulcoder orange cable between the cross tube and arm when the Front Fork Scale is rotated in the full up and full down position, section 7.5.5, Figure 7-F.

- ☐ Cable from Vulcoder running up the arm is completely protected in steel conduit, section 7.5.5, Figure 7-F.
- ☐ Meter is powered from the battery, Manual System - section 8.1.2, Static System - 9.2.3, Weigh-In-Motion System - section 10.3.4.
- ☐ Orange VSL Vulcoder cable is routed through the rear hinge point of body and through hinge point of front tilt cab, use a grommet to protect cable from abrasion, section 7.5.5.
- ☐ Black cable routed from the VSL Vulcoder to the Front Fork Scale on the opposite side of the truck is protected, section 7.5, Figure 7-E.
- ☐ If the vehicle has a positive ground electrical system, the meter chassis mounting bracket and mounting fasteners must be electrically isolated from the vehicle chassis, Manual System - section 8.1.2, Static System - 9.2.3, Weigh-In-Motion System - section 10.3.4.
- ☐ Power cable has the fused ends near the battery, not by the meter in the cab, Manual System - section 8.1.2, Static System - 9.2.3, Weigh-In-Motion System - section 10.3.4.
- ☐ Meter mounting screws are secure and rear meter connections are in place.
- ☐ V600 meter terminal connections are protected from clipboard use and other in cab equipment.
- ☐ V600 Meter is set in BASIC mode, section 13.2.
- ☐ Driver Lockout Password feature is activated. This prevents the driver from modifying the scale systems setup parameters, section 13.1.

11.2.1 MANUAL METHOD WEIGH SYSTEMS

- ☐ Accessory port is wired correctly for the Weight Capture button, section 8.1.1.
- ☐ Weight Capture button is in a desirable location and is strain relieved.

11.2.2 STATIC / WEIGH-IN-MOTION METHOD WEIGH SYSTEMS

- ☐ Accessory port is wired correctly, section 9.2.2. and Figure 9-G.
- ☐ Proximity switch triggers in the proper location, section 9.1.
- ☐ Junction box wires are routed through the body’s tipping hinge point, section 9.2.1.

☐ Proximity switch is mechanically protected inside the protective mounting bracket nut, section 9.1. and Figure 9-E.

11.2.3 WEIGH-IN-MOTION WITH LIFT CONTROL METHOD WEIGH SYSTEMS

☐ Accessory port is wired correctly, section 10.3.2. and Figure 10-J.

☐ Proximity switch triggers in the proper location, section 10.1. and Figure 10-F.

☐ Junction box wires are routed through the body's tipping hinge point, section 10.3.1. and Figure 10-E.

☐ Proximity switch is mechanically protected inside the protective mounting bracket nut, section 10.1.

☐ Hydraulic valve engages and disengages only in the proximity trigger area determined by the proximity switch and the arms move smoothly through this area, section 10.4.1.

☐ Hydraulic valve flow control screw is set correctly, section 10.2., Figure 10-H.

11.3 DOCUMENTATION

☐ Appropriate driver card (Manual, Static / Weigh-In-Motion, or Weigh-In-Motion with lift control) is sent with the truck.

☐ V600 Fork Scale User Manual (P/N: 44-10115-001) is sent with truck.

☐ Warranty cards are sent with the truck (if not filled out by dealer).

12.0 FORK SCALE MAINTENANCE

This section can be photocopied and used repeatedly as a checklist for maintenance inspections.

Preventative Maintenance

In order to keep any system functioning properly, it is important that the system be properly maintained. This includes daily vehicle inspection and preventative maintenance during regular scheduled maintenance periods.

Certain minimum maintenance will be necessary to claim warranty of fork scales and other scale components.

12.1 FRONT FORK SCALE ASSEMBLY

- ☐ Check all Front Fork Scale fastener torques after the first week of operation and then periodically and whenever the truck is being serviced.
- ☐ Torque fork mounting bolts:
  1”-14 Grade 8, hex cap screws and Grade G, locking flange nuts 1000 ft-lb
- ☐ Torque bumper block mounting bolts:
  7/8”-14 Grade 8, hex cap screws 700 ft-lb
- ☐ Inspect rubber bumpers for excessive wear.
- ☐ Verify the connector guard, Vulcoder guard and cross tube cable guards are intact and undamaged.
- ☐ Check for signs of overloading in the cross tube bell crank area.
- ☐ Check and repaint or undercoat areas that show excessive corrosion and rust.
- ☐ Verify there is adequate clearance between the cross tube/fork scale assembly and cab guard during a lift cycle.
- ☐ Torque striping bolts:
  It is recommended to apply torque stripes to bolt heads to make sure they remain properly torqued. To apply a torque stripe: Use a durable, brightly colored paint. Paint a stripe crossing the head of the fastener, continuing down the fastened structure, as shown in Figure 12-A.

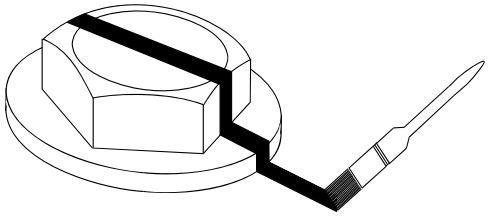


Figure 12-A: Painting a Torque Stripe

☐ Verify the Driver Lockout Password feature is activated to prevent the driver from modifying scale system setup parameters.

12.2 ELECTRONICS ASSEMBLY

☐ Check the orange cable strain relief loop at the cross tube/arm junction to make sure it's not getting damaged.

☐ Verify V600 Meter in cab cable routing is strain relieved and secure.

☐ Verify cable running up the arm is undamaged and protected in conduit and the conduit is securely in place.

☐ Verify orange cable to the meter is routed through the front hinge point of the cab, through a grommet and is not damaged.

12.3 MANUAL WEIGH SYSTEM

☐ Verify Weight Capture button is in a desirable location and is strain relieved.

☐ Verify Weight Capture button functions properly and a weight is obtained when used.

12.4 STATIC / WEIGH-IN-MOTION SYSTEM

☐ Verify proximity switch triggers in the proper location.

☐ Verify junction box wires are routed through the body's tipping hinge point and are undamaged.

☐ Verify proximity switch is mechanically protected inside the protective mounting bracket nut.

☐ Verify system measures a weight when a bin is dumped.

12.5 WEIGH IN MOTION WITH LIFT CONTROL SYSTEM

☐ Verify proximity switch triggers in the proper location.

☐ Verify junction box wires are routed through the body's tipping hinge point.

☐ Verify proximity switch is mechanically protected inside the protective mounting bracket nut.

☐ Verify hydraulic valve engages and disengages only in the trigger area determined by the proximity switch and the arms move smoothly through this area.

☐ Verify system measures a weight when a bin is dumped.

If you need additional assistance, parts, or service, give us a call at:

VULCAN CUSTOMER SERVICE

1-800-237-0022

HOURS:
7:30 a.m. - 5:00 p.m.
PACIFIC TIME

13.0 FORK SCALE TROUBLESHOOTING AND REPAIR

FORK SCALE TROUBLESHOOTING

In general, troubleshooting is a systematic process of testing and eliminating potential problem sources until the one that is causing the problem is found. The problem can then be fixed by repairing or replacing the faulty part.

With a little knowledge and by following a step by step procedure, most of the problems that you may encounter will be easy to diagnose and solve. In this section, you will find guidelines on how to troubleshoot the system, some characteristics of a properly functioning system, and where to look when certain problems occur.

Occasionally, someone has a problem that is not described here. By approaching the problem systematically, you will be able to eliminate potential sources of trouble until you find the one that is causing the problem.

The following section covers an explanation of V600 Test Procedures, Fork Scale Evaluation Test Procedures and Vulcan Error Codes.

Recommended equipment for complete system troubleshooting:

Stock # or P/N	Description
S20	Multi-Meter
S22*	Check-Out Box
56-30066-001*	VSL Zero Offset Plug
	Isopropyl Alcohol
	Cotton Swabs
	Hair Dryer

* Indicates part is available only from Vulcan On-Board Scales.

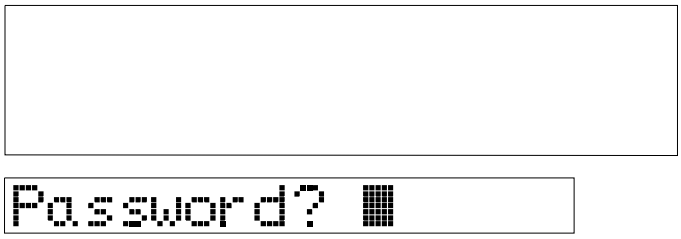
13.1 DRIVER LOCKOUT PASSWORD FEATURE

This feature “locks” the meter and allows drivers to access the “Driver Entries” menu only. It prohibits modification of any of the Configure System, Setup/Calibrate, Sequence Channels, or the System Test menus without entering the proper password. All meters have the same password. The meter comes from the factory with the password lock inactive. Vulcan Scales recommends the activation of this password feature after the installation and setup process is complete.

How the Password works in BASIC mode (if not in BASIC mode refer to section 13.2)

Press the **PWR / MENU** button to turn on the meter.

After the meter has completed its startup routine and is running, press the **PWR / MENU** button to enter the program menu.



If the password feature is active, the display now shows “Password?” with the cursor blinking. Without entering the correct password there is no access to other menu options.

To return to the normal operating mode if password is not known

Press the **ENTER** button.

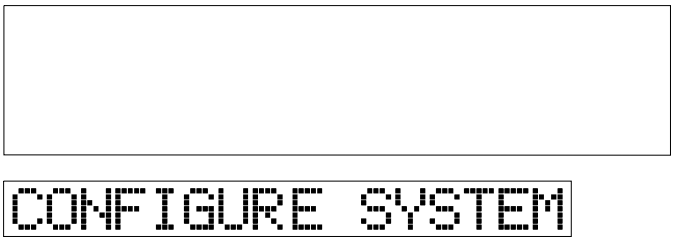
Press the **PWR / MENU** button to return to the normal operating mode. The scale system is now ready to weigh.

To Activate or Deactivate the Driver Lockout Password Feature

Press the **PWR / MENU** button to turn on the meter.

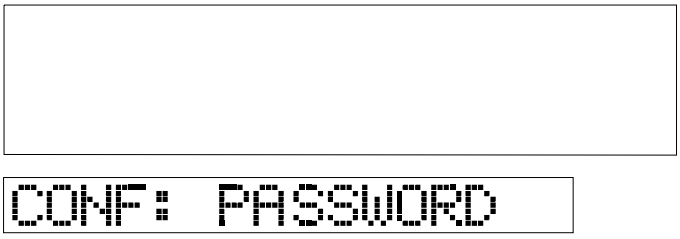
After the meter has completed its startup routine and is running, press the **PWR / MENU** button to enter the program menu.

Press the **CYCLE** button until **CONFIGURE SYSTEM** is displayed.

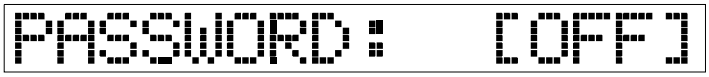


Press the **ENTER** button to select the **CONFIGURE SYSTEM** menu.

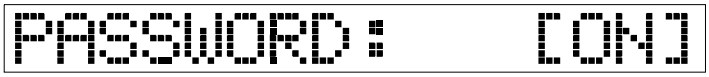
Press the **CYCLE** button until **CONF: PASSWORD** is displayed.



Press the **ENTER** button to select the **CONF: PASSWORD** option.



Or



With the cycle button depressed, press the **UP ARROW** button to switch between the two options.

Press the **ENTER** button to save the selection.

Press the **PWR / MENU** button twice to exit and the meter will return to its operating mode. The scale system is now ready to weigh.

Definition of the Password

The password is a series of button presses. Press these buttons: **TARE/ZERO**, **CYCLE**, ▲, ▼, **ENTER** – in that order. Any other sequence of button presses will leave the meter "locked." Enter this sequence of button presses when prompted by the meter to obtain full access to all the meter's menus. If a mistake is made when entering the password code, press the **ENTER** button and restart entering the password code.

13.2 SWITCH THE METER BETWEEN BASIC AND CUSTOMER MODE

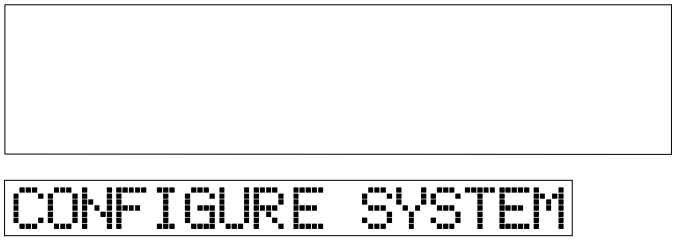
Vulcan Scales recommends the meter be set in BASIC mode. The meter factory default setting is BASIC mode, but this should be verified.

Press the **PWR / MENU** button to turn on the meter.

After the meter has completed its startup routine and is running, press the **PWR / MENU** button to enter the program menu.

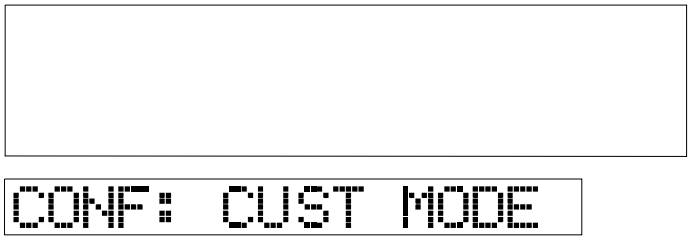
If the meter display shows "Ready To Lift", the meter is in BASIC mode.

Press the **CYCLE** button until **CONFIGURE SYSTEM** is displayed.



Press the **ENTER** button to select the **CONFIGURE SYSTEM** menu.

Press the **CYCLE** button until **CONF: CUST MODE** is displayed.



Press the **ENTER** button to select the **CONF: CUST MODE** option.

Press either the **UP** or **DOWN ARROW** buttons to turn the CUSTOMER mode to **[OFF]** or **[ON]**.

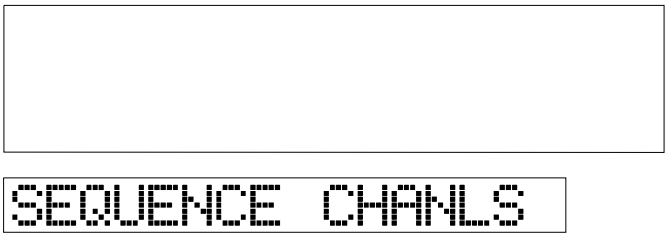
Press the **PWR / MENU** button twice to exit and the meter will return to normal operation in BASIC mode, and it is now ready to weigh. See the Vulcan V600 Fork Scale User Manual for a description of customer mode.

13.3 RE-SEQUENCE THE VULCODER

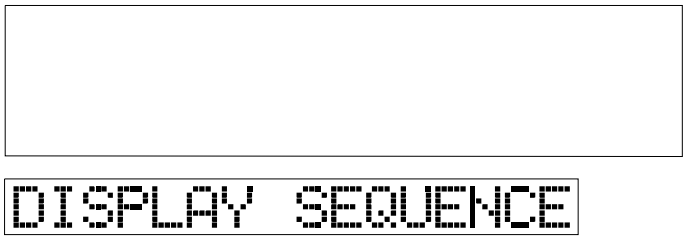
Press the **PWR / MENU** button to turn on the meter.

After the meter has completed its start up routine and is running, press the **PWR / MENU** button to enter the program menu.

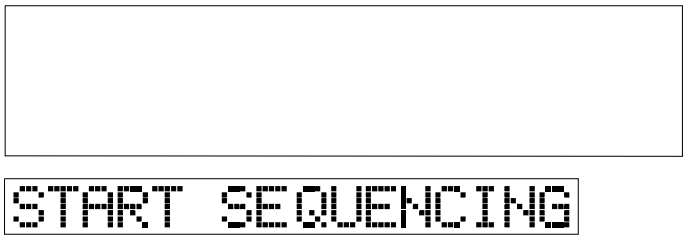
Press the **CYCLE** button until **SEQUENCE CHANLS** is displayed.



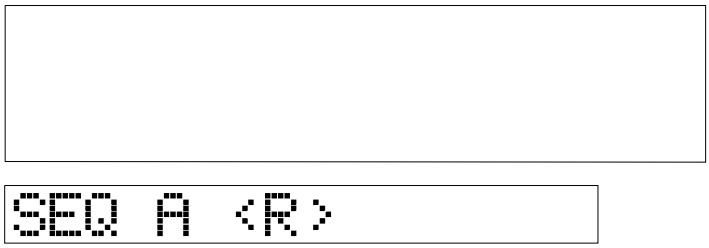
Press the **ENTER** button to select the **SEQUENCE CHANLS** option.



Press the **CYCLE** button to start the channel sequence process.



Press the **ENTER** button.



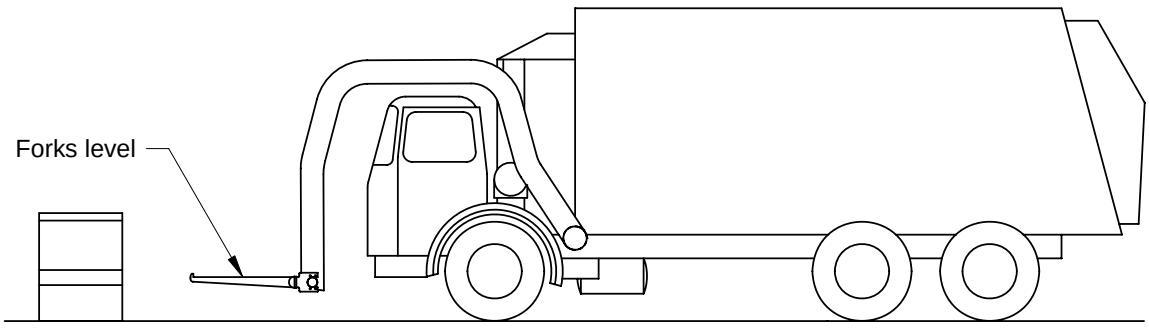
The channel in now re-sequenced.

Press the **PWR / MENU** button twice to return to the normal operation mode. The scale system is now ready to weigh.

13.4 LOOSE BOLT TEST

Loose bolt test

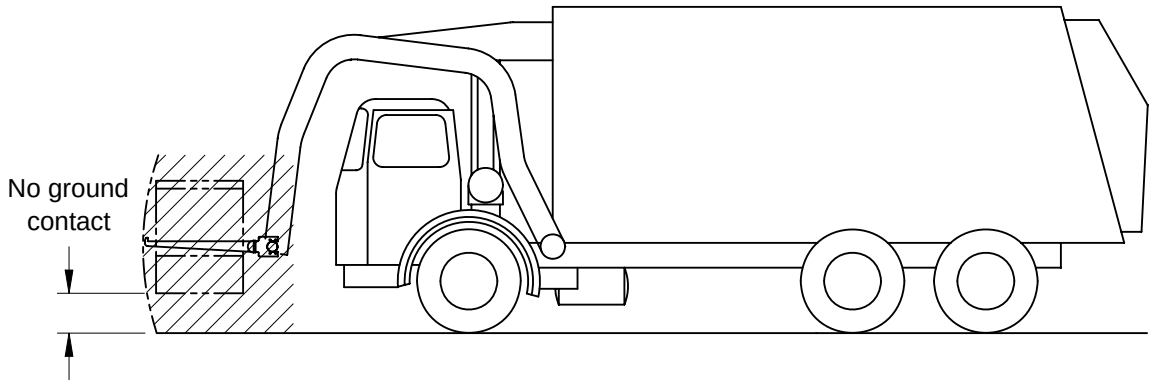
To see if the fork mounting bolts are loose, a loaded bin (2000 lb or more) is lifted up and down several times. The meter should return to zero within 50 lb. If not, the fork mounting bolts need to be torqued to 1000 ft-lb.



Obtain a bin that weighs at least 2000 lb.

Press the **PWR / MENU** button to turn on the meter.

- Forks must be down, level, and ready to stab a bin. Be sure the meter reads zero with no load on the forks. If the meter does not read zero, then press the **TARE/ZERO** button.



- Pick up the bin so that the bin is off of the ground completely. Do not dump bin. Return bin to the ground. Lift the bin 2 more times.
- Return the bin to the ground and completely disengage the forks, keeping the forks level.
- The meter display should read zero, within 50 lb
- If not, torque the bolts to 1000 ft-lb and re-test.
- Call Vulcan Scales if problem continues.

13.5 VULCAN CHECK-OUT BOX

The Vulcan Check-Out Box can be used to check the fork scales and electronics. It works as an extension to bring fork scale connector pins to the side of truck where readings can be conveniently made. It can also simulate an applied load to the VSL Vulcoder. The Check-Out Box is an optional equipment item for the Leakage and Resistance Tests. Vulcan Scales recommends every installer and troubleshooter has one.

Before using the Check-Out Box, make sure the meter fuses are good. Use a multi-meter to ensure there is a minimum of 10.4 Vdc from the input power connections at the back of the meter when the system is running. (Make sure the green plug is plugged in and the meter is turned on.) If there are any error messages displayed, refer to section 13.7 "V600 Meter Error Codes".

To order a Check-Out Box (P/N: S22), contact your Vulcan dealer.

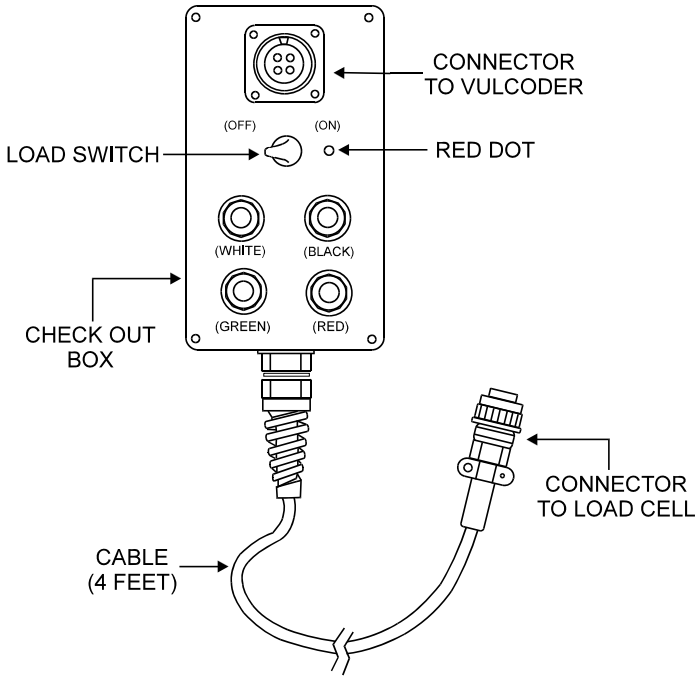


Figure 13-A: Vulcan Check-Out Box

13.6 FORK SCALE EVALUATION TESTS

The tests listed below will help identify and locate any problem you may encounter with your Vulcan fork scales.

Leakage Test
Tare Test
Resistance Test

13.6.1 LEAKAGE TEST PROCEDURE

Required Equipment: **Digital Multi-Meter With Conductivity Scale**
Isopropyl Alcohol
Cotton Swabs
Hair Dryer

Optional Equipment: Vulcan Check-Out Box

The Leakage Test detects the presence of moisture that could cause erratic meter readings. The way to measure leakage is to use a digital multi-meter that has a conductivity scale. Electrical isolation is measured between any pin and an unpainted clean surface on the fork scale or the connector body. Electrical isolation must not exceed 2.0 nS (nano-siemens) or be less than 500 Meg Ohms. Nano-siemens and Meg Ohms are two different units of measure for evaluating electrical leakage.

Refer to Figure 13-B for the Leakage Test equipment setup.

For proper operation, the power and signal leads from the fork scale must have a very high resistance to the fork scale body. An electrical path between the wires and the body would indicate moisture in the fork or shorting to the body. This would result in erratic, fluctuating, or even out of range weight displays.

If the fork scale fails (electrical isolation is greater than 2.0 nS or is less that 500 Meg Ohms), check the inside of the fork scale connector with a dry cotton swab to make sure it is clean and dry. If not, clean with isopropyl alcohol, dry with a hair dryer, and check the electrical isolation again.

If the fork scale cannot be brought to Vulcan specifications, contact Vulcan customer service or your Vulcan dealer.

Caution: Do not touch the multi-meter probes with your hands when making measurements. This could cause an error in the meter reading. A person's body can have 10 times the allowable conductivity of a fork scale.

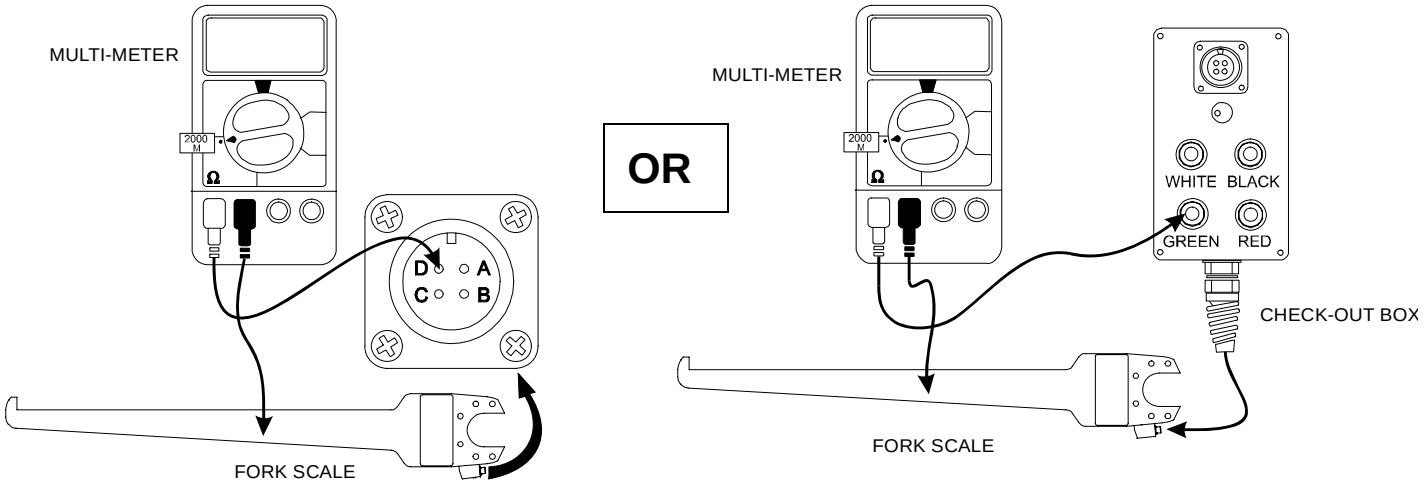


Figure 13-B: Leakage Test

Leakage Test Specifications:

Measure between any pin and an unpainted clean surface of the fork scale or connector body. Electrical Isolation must not be greater than 2.0 nS or less than 500 Meg Ohms.

13.6.2 TARE TEST PROCEDURE

This test checks each fork scale for a high preload number caused by mechanical damage or moisture. Both forks must be connected to the Vulcoder.

With the truck empty and no bin on the forks, lower the arms and extend forks to a level position.

Press the **PWR / MENU** button to turn on the meter and let it complete it's startup routine.

Record the current truck Tare weight. The Tare weight is the weight displayed when the vehicle is empty and there is no bin on the forks. For trucks that use 0 for a Tare weight, this step can be omitted.

Current Tare Weight: _____

Press the **PWR / MENU** button to enter the program menu.

Note: If the **PWR / MENU** button is held too long, the meter display will display all 8's and the meter will turn off.

Press the **CYCLE** button until **SETUP/CALIBRATE** is displayed.

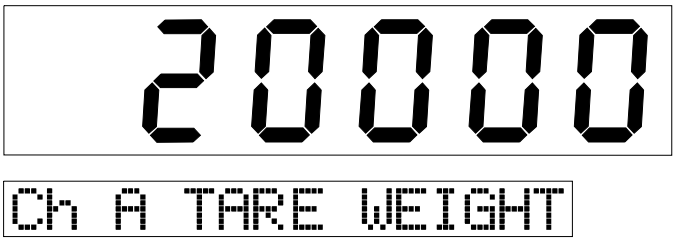
Note: When trying to enter the SETUP/CALIBRATE menu, if the lower display shows "Password?" with the cursor blinking, the Driver Lock Password feature is activated and the Configure System, Setup/Calibrate, Sequence Channels, and System Test menus are not accessible. Refer to section 13.1 to unlock the system.

Press the **ENTER** button to select the **SETUP / CALIBRATE** menu option.

Press the **CYCLE** button until **SET: TARE WEIGHT** is displayed.

Press the **ENTER** button to select the **SET: TARE WEIGHT** option.

Example: 20,000 lb Tare weight is shown.



Press either the **UP** or **DOWN ARROW** buttons to adjust the number to "**0**".

Press the **ENTER** button to save the new Tare weight and return to the **SET: TARE WEIGHT** menu option.

Press the **PWR / MENU** button twice to go directly to the normal operating mode.

Note: Pressing the **PWR / MENU** button before pressing the **ENTER** button will cancel that configuration change.

Disconnect one fork scale from the VSL Vulcoder of the channel to be tested.

The meter will display the “still connected” fork scale preload number. The preload number should not exceed +2,000 lb to -2,000 lb.

If the preload number is between +2,000 lb to -2,000 lb, the fork scale is within specification. Test the other fork scale using the same method. If the preload number is within specification for both fork scales, reconnect and secure all fork scale leads. Reset the Tare weight if required. **Note:** If the preload number is out of specification, clean the fork scale connector and cable connector with cotton swabs and isopropyl alcohol and dry thoroughly with a hair dryer. **DO NOT OVERHEAT** the connector. This procedure will remove any moisture that may have been causing the problem.

Check the electrical isolation of the fork scale by performing the Leakage Test, (section 13.6.1).

Check the preload number again to see if it is within the +2,000 lb to -2,000 lb range. If the fork scale is still out of range, it may be faulty. Perform the Resistance Test, (section 13.6.3).

If the fork scale cannot be brought to Vulcan specifications, contact Vulcan customer service your Vulcan dealer.

13.6.3 RESISTANCE TEST PROCEDURE

Required Equipment: Digital Multi-Meter With Conductivity Scale
Optional Equipment: Vulcan Check-Out Box

Please refer to drawing below in setting up the Resistance Test. The resistance in the pins should correspond to the Vulcan specifications listed below. Refer to acceptable resistance ranges as shown below.

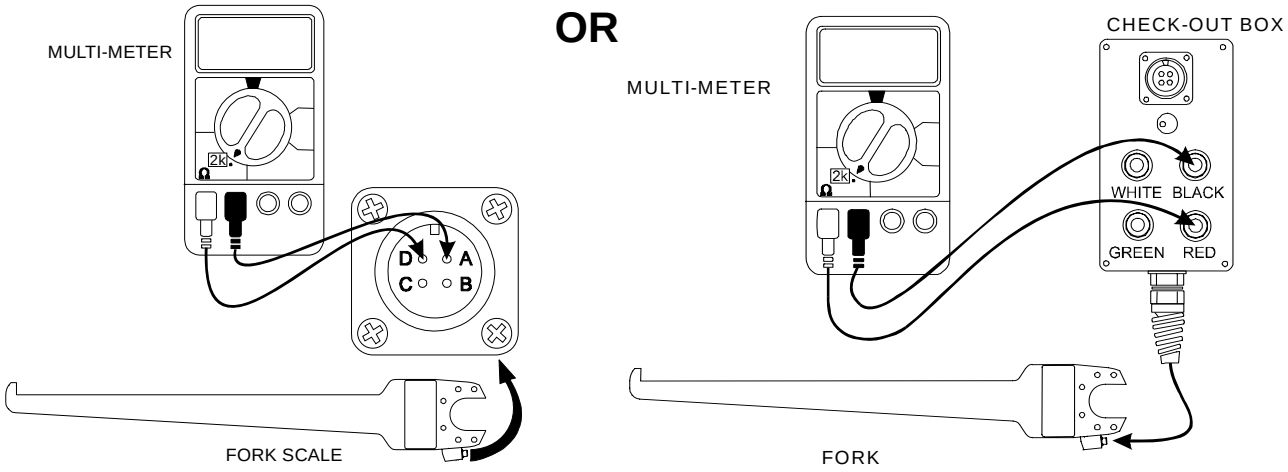


Figure 13-C: Resistance Test

Pins	Terminal Color Code	Acceptable Resistance Range
A to D	Red to Black	349 to 450 Ohms
B to C	Green to White	349 to 352 Ohms

Pin B (Green) to Pin A (Red) should be the same number as Pin B (Green) to Pin D (Black) within 1 Ohm.

Pin C (White) to Pin A (Red) should be the same number as Pin C (White) to Pin D (Black) within 1 Ohm.

If the fork scale is not within Vulcan specifications, contact Vulcan customer service or your Vulcan dealer.

13.7 V600 METER ERROR CODES

13.7.1 Err 01

Indicates that the VSL Vulcoder is processing an over-ranged signal. An over-ranged signal means the fork scale output is greater than the maximum the VSL Vulcoder will accept.

Possible Causes:

1. The fork scales are being overloaded.
2. There is moisture in a fork scale connector.
3. One of the black VSL Vulcoder to fork scale cables has been damaged.
4. A fork scale has a large preload number.
5. A fork scale is faulty.

What to Do:

1. Inspect Vulcoder cables.

2. Clean connectors with isopropyl alcohol and dry with a hair dryer.

3. Perform the Tare Test, (section 13.6.2).

4. Perform the Leakage Test, (section 13.6.1).

5. Check the fork scales. Check by disconnecting one fork scale at a time. When the faulty fork scale has been disconnected, the meter will read a number instead of the error code.

13.7.2 Err 02

Indicates the reading to be displayed is beyond the limitations of the meter's display.

Possible Causes:

1. Calibration number set too high.
2. Tare weight set too high.

What to Do:

1. Check and reset the Calibration number and Tare weight.

13.7.3 Err 03

Indicates that the meter is not receiving a weight from the VSL Vulcoder.

Possible Causes:

1. Break in the orange cable.
2. Green and white leads reversed on VSL Vulcoder line where connected to the meter.
3. Vulcoder is not sequenced.
4. Faulty VSL Vulcoder.
5. Faulty meter.

What to Do:

1. Reconnect any cables that have become disconnected.

2. Re-sequence Vulcoder, (section 13.3).

3. Inspect VSL Vulcoder communication line for cut or broken wires. Inspect the pivot point on the fork cross tube area.

4. Inspect and clean meter connectors.

5. VSL Vulcoder is damaged. Replace VSL Vulcoder.

6. Meter is damaged. Replace meter.

13.7.4 Err 04

Indicates the VSL Vulcoder is not calibrated.

Possible Causes:

1. Calibration or Tare number is not entered.

What to Do:

1. Check and reset the Calibration number and Tare weight.

13.7.5 Err 05

Indicates the VSL Vulcoder has a hardware problem.

Possible Causes:

1. VSL Vulcoder hardware component is damaged.

What to do:

1. Press and hold the **PWR / MENU** button to turn the meter off and then press **PWR / MENU** again to turn it on. This may reset the meter and eliminate the error.

2. Inspect VSL Vulcoder communication line for cut or broken wires.

3. VSL Vulcoder is damaged. Replace VSL Vulcoder.

13.7.6 Err 06

Indicates the VSL Vulcoder is processing an under-ranged signal. An under-ranged signal means the fork scale output is less than the minimum the VSL Vulcoder will accept.

Possible Causes:

1. There is moisture in a fork scale connector.
2. One of the black VSL Vulcoder to fork scale cables has been damaged.
3. No fork scales are connected to the VSL Vulcoder.
4. A fork scale is faulty.

What to Do:

1. Check to see that the fork scales are properly connected to the VSL Vulcoder.

2. Clean fork scale connectors with isopropyl alcohol and dry with a hair dryer.

3. Perform the Tare Test, (section 13.6.2).

4. Perform the Leakage Test, (section 13.6.1).

5. Check the fork scales. Check by disconnecting one fork scale at a time. When the faulty fork scale has been disconnected, the meter will read a number instead of the error code.

13.7.7 Err 07

Indicates a new VSL Vulcoder has been detected.

Possible Causes:

1. Line noise.
2. Faulty Vulcoder.

What to Do:

1. Vulcoder needs to be manually re-sequenced, (section 13.3).
2. Turn the meter off and then back on to cycle power in the system.
3. VSL Vulcoder is damaged. Replace VSL Vulcoder.

13.7.8 Err 08 / Err 09

Indicates there is electrical noise in the system.

Possible Causes:

1. Radio frequency interference from other equipment or faulty electrical connections.

What to Do:

1. Re-sequence the VSL Vulcoder, (section 13.3).
2. See electronics installation section for proper installation procedure, Manual system - section 8.0, Static system - section 9.0, Weigh-In-Motion system – section 10.0. Check integrity of electrical connections.

13.7.9 Err 10

Communication error between the meter and the VSL Vulcoder. The VSL Vulcoder is in a “locked” state.

Possible Causes:

1. Faulty VSL Vulcoder.

What to Do:

1. VSL Comm test from the V600 Meter Test Menu, (section 13.10.4).
2. Replace VSL Vulcoder.

13.7.10 Err 11

The meter “watchdog” circuit system is not running.

Possible Causes:

1. New or recently repaired meter.

What to Do:

1. Turn the meter off and then back on to cycle power in system.

3. If Err 11 is still displayed, replace meter.

13.8 SYSTEM MALFUNCTIONS

13.8.1 CONDITION: Meter displays ERR 3

Indicates the meter is not receiving a weight from the VSL Vulcoder.

Possible Causes:

1. Break in the orange cable.
2. Green and white leads reversed on VSL Vulcoder line where connected to the meter.
3. Vulcoder is not sequenced.
4. Faulty VSL Vulcoder.
5. Faulty meter.

What to Do:

1. Reconnect any cables that have become disconnected.

2. Re-sequence the Vulcoder, (section 13.3).

3. Inspect VSL Vulcoder communication line for cut or broken wires. Inspect the pivot point on the fork cross tube area.

4. Inspect and clean meter connectors.

5. VSL Vulcoder is damaged. Replace VSL Vulcoder.

6. Meter is damaged. Replace meter.

13.8.2. CONDITION: Sum of the pickup weights don’t match the landfill

Possible Causes:

1. Fork mounting bolts are loose.
2. Further calibration is required.
3. Not following the lift procedure.
4. Pickups not being recorded.

What to Do:

1. Retorque fork mounting bolts to 1000 ft-lb.

2. Verify fork operation, Manual System – section 8.2.3, Static System – section 9.3.6, Weigh-In-Motion System – section 10.4.5.

3. For a single trip to the landfill, every lift must be recorded before comparing to the landfill weight.

4. Fine tune the calibration, see V600 Fork Scale User Manual.

13.8.3 CONDITION: Weight not returning to zero after lifting a bin

Possible Causes:

1. Fork mounting bolts are loose.
2. Not zeroing the scale properly.
3. Not following the lift procedure.

What to Do:

1. Retorque fork mounting bolts to 1000 ft-lb.

2. Review the operational procedure in the V600 Fork Scale User manual or the driver card for correct lift procedure and how to zero the display properly.

13.8.4 CONDITION: Meter displays ERR 6 or ERR 1

Indicates the VSL Vulcoder is processing an out of range signal. This means the fork scale output is beyond the limits the VSL Vulcoder will accept.

Possible Causes:

1. There is moisture in a fork scale connector.
2. One of the black VSL Vulcoder to fork scale cables has been damaged.
3. No fork scales are connected to the VSL Vulcoder.
4. A fork scale has a large preload number.
5. A fork scale is faulty.

What to Do:

1. Check to see the fork scales are properly connected to the VSL Vulcoder.

2. Clean connectors with isopropyl alcohol and dry with a hair dryer.

3. Perform the Tare Test, (section 13.6.2).

4. Perform the Leakage Test, (section 13.6.1).

5. Check the fork scales. Check by disconnecting one fork scale at a time. When the faulty fork scale has been disconnected, the meter will read a number instead of the error code.

13.8.5 CONDITION: Not advancing to next customer or not computing net weight

Possible Causes:

1. Proximity switch sensor needs adjustment.
2. Proximity switch sensor has failed.
3. Holding the manual Weight Capture button down too long.

What to Do:

1. Check the correct trip location for the proximity sensor.

2. Failed proximity sensor. Replace the proximity sensor.

3. Review the operational procedure or the driver card for correct lift procedure, Manual System – section 8.4, Static System – section 9.5, Weigh-In-Motion System – section 10.6.

13.8.6 CONDITION: Meter displays LO-LO

If the meter encounters a low voltage situation, either on the power input lead or the VSL line, the meter will display **"LO-LO"** and then switch to **"1 90"**, “1” indicates the input power is low and the “90” being the amount of voltage (9.0 Vdc) being read by the meter. If the meter displays **"LO-LO"** and then switches to **"2 0"**, “2” indicates the VSL line is low and the other number being the amount of voltage read by the meter.

Possible Causes For "LO-LO" and "1 XX":

1. Corroded fuses or corroded/bad meter cable connections to the battery.
2. Battery is low (under 10.5 Volts).
3. Damaged power or ground cable.
4. Faulty Meter.

What to Do:

1. Using a multi-meter, check the power at the back of the meter. When the meter is turned on and off, the power should not change more than 1/2 Volt. Turn off the meter either by the key or truck battery switch for a few seconds and then turn on again. If the meter still does not work, proceed to step 2.

2. Check the fuses for both negative and positive leads. Use 2 amp fast blow fuses for 12 Vdc applications and 1 amp fast blow fuses for 24 Vdc applications.

3. Check the power supply wires are attached correctly at the 12 or 24 Volt power source and to the green connector at the back of the meter. Check the battery connections for corrosion.

4. If a spare meter is available, the quickest and easiest next step is to exchange the meter. If the new meter works, try the old meter again. If the old meter now works, the problem was likely the meter's internal circuit breaker. If both the old meter and the new meter do not work, the problem is most likely in the power source (battery, meter power cable, or fuses). If the new meter works, but the old one doesn't, the old meter is faulty.

   If you do not have a spare meter, disconnect then reconnect the green power plug on the back of the meter. If the meter doesn't work, then check the power source (battery, meter power cable, or fuses). If the power source checks out OK, then the meter is faulty.

Possible Causes For "LO-LO" and "2 X":

1. VSL line (orange cable) is pinched or shorted.
2. VSL line incorrectly wired.
3. Damaged VSL plug or receptacle.

What to Do:

1. Using a multi-meter, check the voltage at the back of the meter when the meter is turned on and off. The power should not change more than 1/2 Volt. Turn off the meter either by the key or truck battery switch for a few seconds and then turn on again. If the meter still shows the error, proceed to step 2.

2. Check the fuses for both negative and positive leads. Use 2 amp fast blow fuses for 12 Vdc applications and 1 amp fast blow fuses for 24 Vdc applications. Blown fuses could indicate a shorted VSL line. Check for a shorted line by disconnecting the green and white wire from the back of the meter. Measure the resistance between the green and white wire. It should be greater than 1000 Ohms.

3. Faulty meter. Replace meter.

13.8.7 CONDITION: Unable To Enter Tare Or Calibration Numbers

Possible Causes:

1. Meter may be in the Driver Lockout Password mode, which does not allow the Tare weight, Cal number, or Cal weight to be changed.
2. Faulty Meter.

What to Do:

1. See section 13.1 for setting the Driver Lockout Password feature, or call Vulcan Scales at 1-800-237-0022. It is required to be unlocked to change the Cal and Tare numbers.

2. Make sure the Vulcoder is connected to both fork scales.

3. Unplug the green connector at the back of the meter for a few seconds, re-plug it in and try to enter the Tare or Cal numbers again.

4. Possible faulty meter buttons. Run the meter keypad test, section 13.10.1.

5. Faulty meter. Replace meter.

13.8.8 CONDITION: No indicator display or function lights

Possible Causes:

1. Power switch turned off.
2. Power to the meter has been disconnected.
3. Bad meter cable connections to the battery.
4. Battery is low (under 10.5 Volts).
5. A fuse is blown in the power or ground cable.
6. Faulty power switch.
7. Faulty meter.
8. Reversed polarity.

What to Do:

1. Check the power to the meter. When the meter is turned on and off, the power should not change more than 1/2 Volt. Turn off the meter either by the key or truck battery switch for a few seconds and then turn on again. If the meter still does not work, proceed to step 2.

2. Check the fuses for both negative and positive leads. Use 2 amp fast blow fuses for 12 Vdc applications and 1 amp fast blow fuses for 24 Vdc applications.

3. Check the power supply wires are attached correctly at the 12 Volt power source and to the green connector at the back of the meter. Check the battery connections for corrosion.

4. If a spare meter is available, the quickest and easiest next step is to exchange the meter. If the new meter works, try the old meter again. If the old meter now works, the problem was likely the meter's internal circuit breaker. If both the old meter and the new meter do not work, the problem is most likely in the power source (battery, meter power cable, or fuses). If the new meter works, but the old one doesn't, the old meter is faulty.

   If you do not have a spare meter, disconnect then reconnect the green power plug on the back of the meter. If the meter doesn't work, then check the power source (battery, meter power cable, or fuses). If the power source checks out OK, then the meter is faulty.

13.8.9 IDLE – Next Cust # n

IDLE- Next Cust # n is not an error condition. It indicates the system is ready to download data.

To download data from the V600 Meter, the forks must be out of the weigh zone and have less than 200 lb on the display. Data cannot be downloaded without these conditions being met. When these conditions are met, the meter will display "IDLE – Next Cust # n" indicating data can be downloaded. The word "IDLE" will be flashing.

Refer to the V600 Fork Scale User Manual for details on how to download data from the V600 Meter.

13.8.10 PASSWORD?

"Password?" showing on the lower display is not an error condition. It indicates the Driver Password Lockout feature is activated. It prohibits modification of any of the Configure System, Setup/Calibrate, Sequence Channels, or the System Test menus without entering the proper password. The meter comes from the factory with the password lock inactive.

To return to the normal operating mode if password is not known

Press the **ENTER** button.

Press the **PWR / MENU** button to return to the normal operating mode. The scale system is now ready to weigh.

For activating and deactivating the Driver Lockout Password feature, see section 13.1.

13.9 REPAIR TECHNIQUES

13.9.1 HOW TO REPAIR THE BLACK VULCODER CABLE

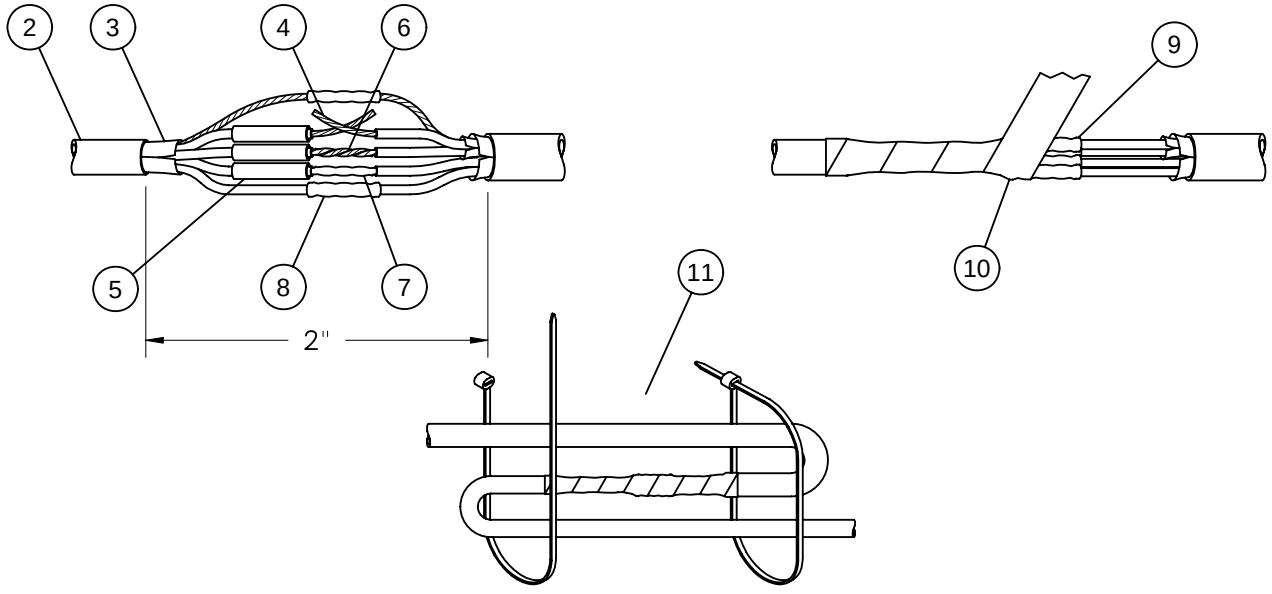
How To Repair The Black Vulcoder Cable

This black cable runs between the Vulcoder and the fork scales.

Vulcan has a splice kit available with all the parts required.
4-wire splice kit, p/n: 59-20370-001.

Caution: Make certain power to the system is turned off before beginning splice procedure.

1. Cut cable to remove damaged section.
2. Remove approx. 2" of outer jacket, being careful not to cut individual wire insulation.
3. Pull back shield(s) from splice area.
4. Strip insulation back 1/2" from each wire and gently twist each exposed wire end.
5. Slip heat shrink tubing on each wire.
6. Twist wire leads together, color to color.
7. Solder individual twisted wire.
8. Slide shrink tubing over soldered area and apply heat.
9. Apply butyl-rubber moisture barrier over each wire, insulating the wires from each other.
10. Wrap completed splice with electrical tape.
11. Fold cable as shown to create strain relief and secure with tie-wraps.



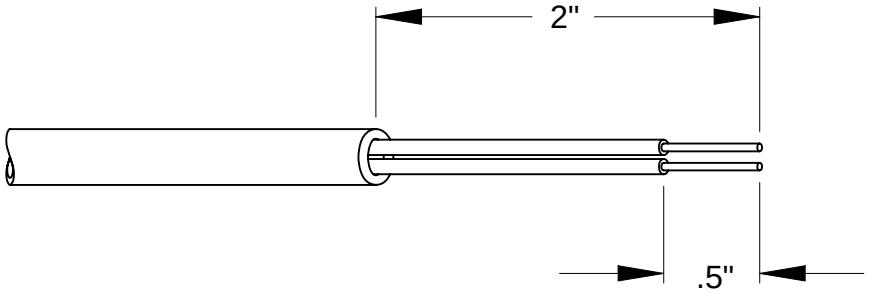
13.9.2 HOW TO REPAIR THE ORANGE VSL CABLE

How To Repair The Orange VSL Cable

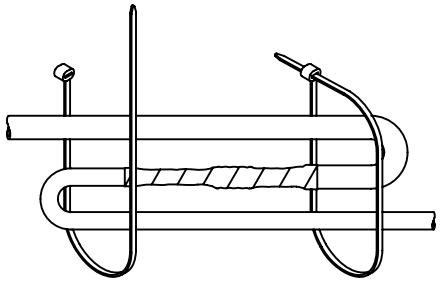
The orange VSL cable can be easily repaired with common wire repair tools and methods. Crimp connecting and soldering are both acceptable processes.

Caution: Make sure power to the system is turned off before beginning splicing procedure.

- Cut the orange cable at least 2” away form each side of the damaged section. If cable is too short due to extensive damage, common extension cord wire can be used to replace a section.

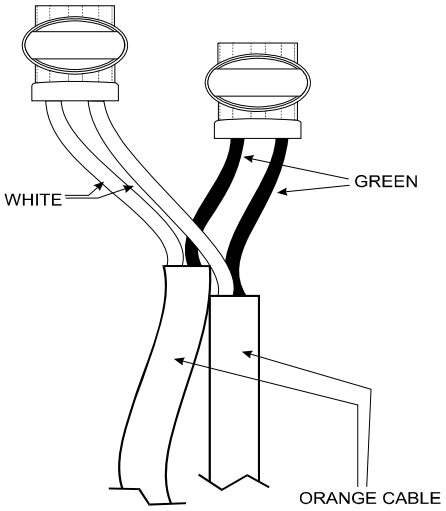


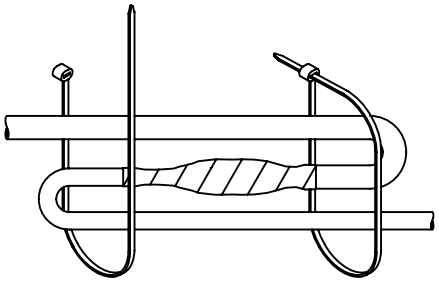
- Remove 2” of the outer jacket, being careful not to cut individual wire insulation.
- Strip insulation back ½” from each wire.
- If soldering, put heat shrink over the wires.
- Solder or crimp splice the like color wires together.
- If heat shrink was used, slide over soldered area and apply heat to shrink.
- Wrap completed splice with electrical tape. Tape the connection and all the wires with the orange insulation stripped off to help seal and prevent wires from chaffing which can cause a wire to short.
- Fold cable as shown to create strain relief and secure with wire ties.



You can also use the Vulcan VSL 3M connectors for making the cable splice. These connectors are available from Vulcan Scales, p/n: 27-10086-001.

- 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 so the connection is strain relieved.



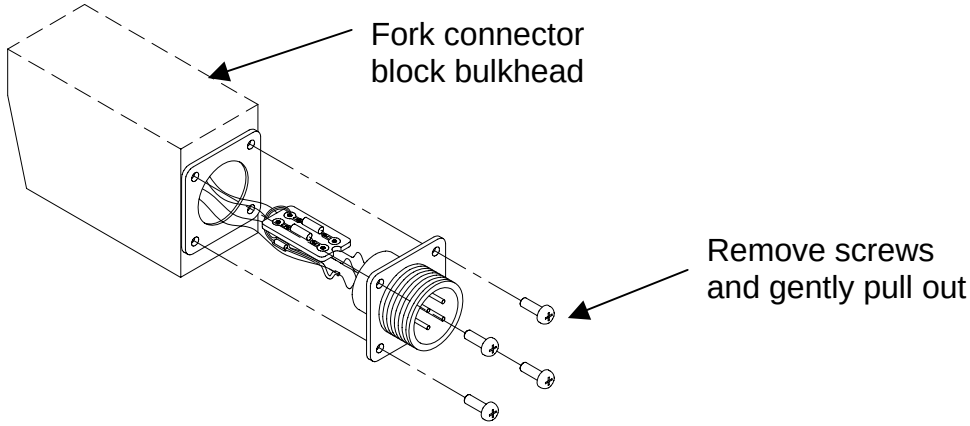


13.9.3 FORK SCALE CONNECTOR REPLACEMENT

Fork Scale Connector Replacement

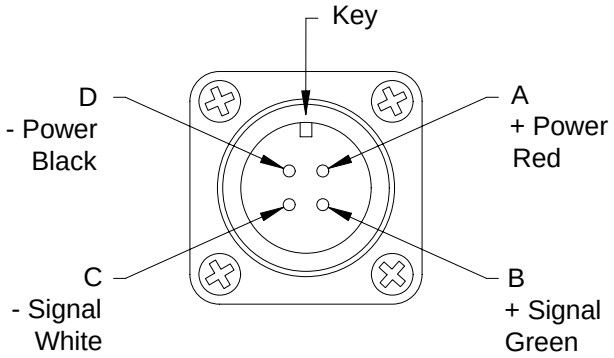
Kit p/n: 59-30050-001

- Remove the four 4-40 screws that hold the connector in place.
- Gently pull the connector away from the housing. There is 2-3 inches of extra wire inside to allow for connector removal.

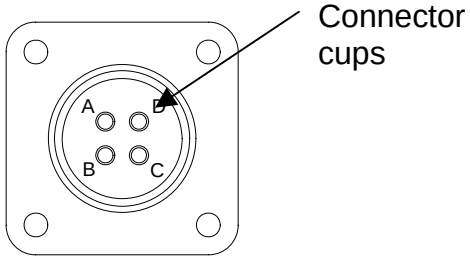


- Trim away the sealant from the 4 pins that are soldered into the connector. Use tweezers as required. Keep the small circuit board and any resistors intact as they are.

- Once cleaned, use a solder gun to remove the pins from the connector cups. Keep track of what pin came from what cup. The cups are identified as A, B, C, D.



Connector Front



Connector Back

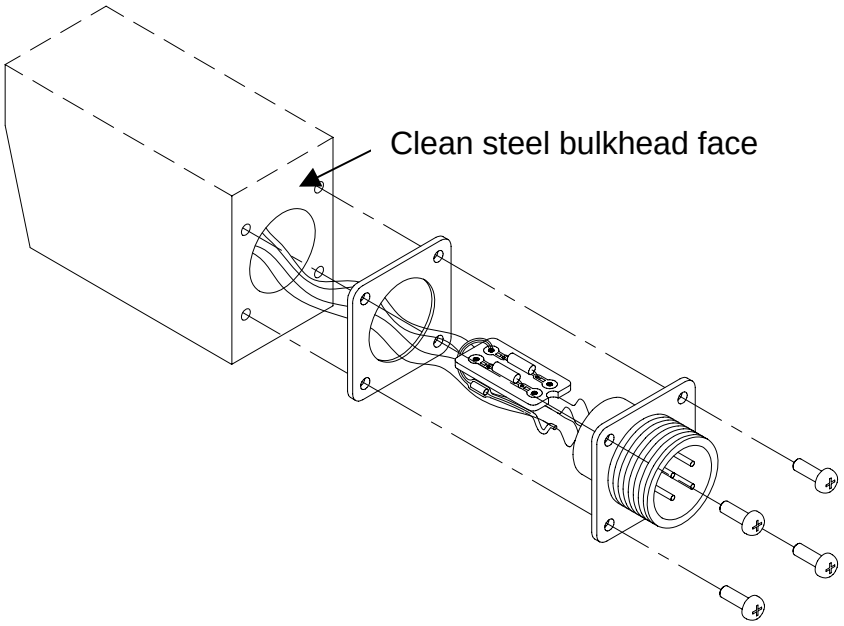
- Clean all four pins. Apply new heat shrink if the existing heat shrink was damaged. Cut heat shrink to size as required. Fill each of the connector solder cups with solder. Solder each connection wire into the correct cup in the new connector.

- Coat all the new solder joints, connector cups and connector back area with silicone sealant.

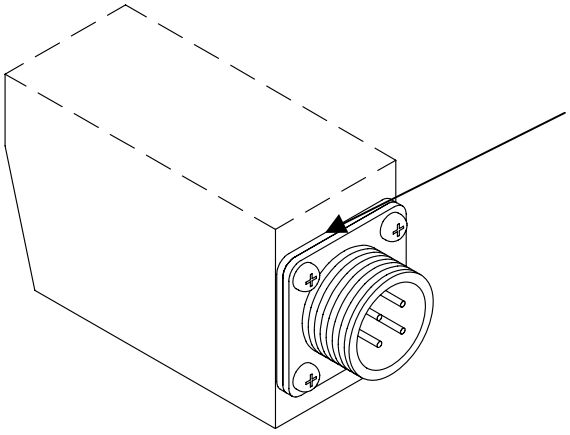
- Clean steel bulkhead face where connector gasket will seat.

- Remove enough sealant from inside the bulkhead housing so the assembly fits back in easily. Too much insertion force will bend the pins.

- Apply a new gasket by stretching over assembly. Push the connector back in the housing and secure in place with four mounting screws.



- Apply a silicone bead to the perimeter of the new connector. Let dry completely.



- When completely dry, put red cap over the connector to protect threads and spray with a rubberized undercoating (3M, Universal Rubberized Undercoating, 3M p/n: 8883).

13.9.4 FORK SCALE O-RING REPLACEMENT

Fork Scale O-ring Replacement

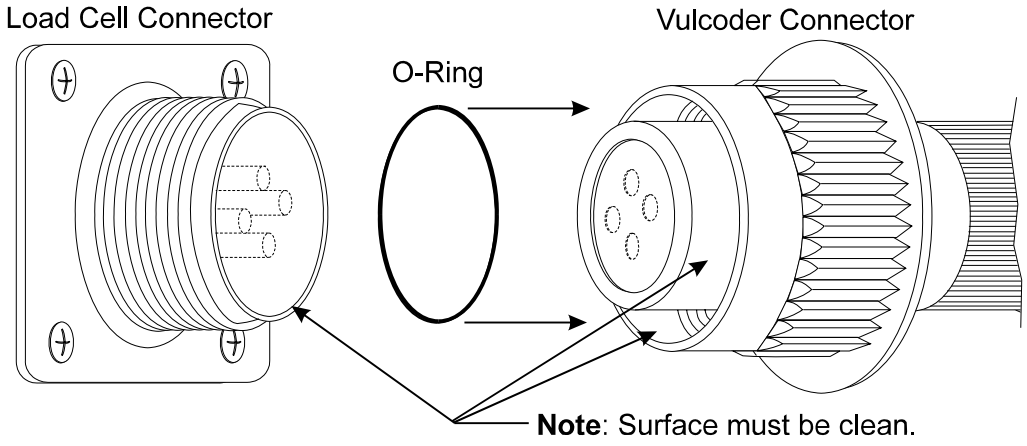
O-ring kit p/n: 59-20223-001

The O-ring is designed to keep the connectors free of moisture. O-rings shall be replaced anytime the connector is removed for servicing or troubleshooting.

O-RING INSTALLATION ON FORK SCALE CONNECTORS

Make sure the old O-ring is removed completely. Clean both connector ends as required. Use cotton swabs and isopropyl alcohol. Be sure to dry thoroughly with a hair dryer. **DO NOT OVERHEAT.**
Slip one O-ring over Vulcoder connector barrel (see figure below) and push down 1/4" to 1/2". O-ring will seat itself when connector parts are mated.

Note: There are two types of O-rings used, a flat ring style and a standard O-ring. Never use more than one O-ring at a time in any connector no matter which type is used.



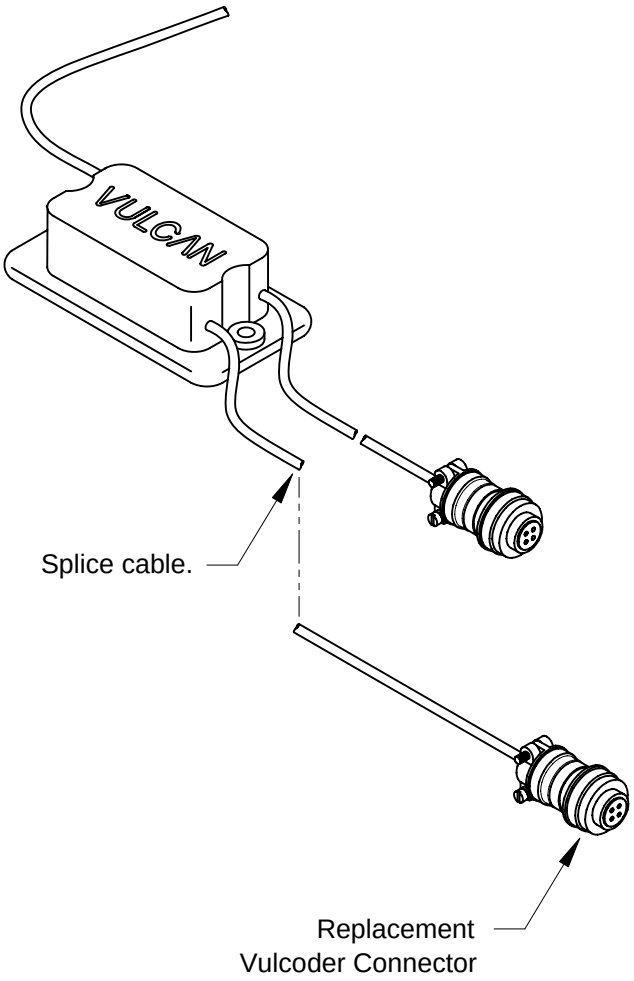
For assembly of connectors, make sure they are finger tight plus an additional 1/8 of a turn more with channel lock pliers.

13.9.5 HOW TO REPAIR A VULCODER CONNECTOR

How to Repair a Vulcoder Connector

If a Vulcoder connector is damaged, it can be replaced without replacing the entire Vulcoder.

Purchase a “Vulcoder Connector Pigtail Replacement Kit” form Vulcan Scales, p/n: 53-20130-001. This kit includes a Vulcoder connector completely sealed with the black signal cable. A Vulcoder black cable splice kit (P/N: 59-20370-001) is also included as an item in this kit.



This new connector assembly is then spliced onto the existing Vulcoder’s black cable by following the “How to Repair the Black Vulcoder Cable” section 13.9.1. A bulletin also comes with the cable replacement kit detailing how to properly make the splice.

If you need additional assistance, parts, or service, give us a call at:

VULCAN CUSTOMER SERVICE

1-800-237-0022

HOURS:
7:30 a.m. - 5:00 p.m.
PACIFIC TIME

13.10 SYSTEM TEST MENU

Note: When trying to enter the SYSTEM TEST menu, if the lower display shows "Password?" with the cursor blinking, the Driver Lockout Password feature is activated and the Configure System, Setup/Calibrate, Sequence Channels, and System Test menus are not accessible. Refer to section 13.1 to unlock the system.

Five diagnostic tests are available with the Vulcan V600 Meter. The tests are called **Test: Keypad**, which performs the keypad test, **Test: Leds**, which performs the LED display test, **Test: Memory**, which performs a test on the storage memory inside the meter, **Test: VSL Comm**, which performs the VSL communications test.

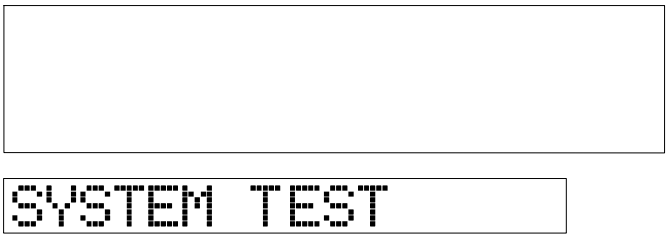
To Enter the Meter Program Menu:

Press the **PWR / MENU** button to turn on the meter. Let it complete its startup routine.

Note: If the **PWR / MENU** button is held too long, the meter will display all 8's and the meter will turn off.

Press the **PWR / MENU** button to enter the program menu.

Press the **CYCLE** button until **SYSTEM/TEST** is displayed.



Press the **ENTER** button to select the **SYSTEM TEST** menu.

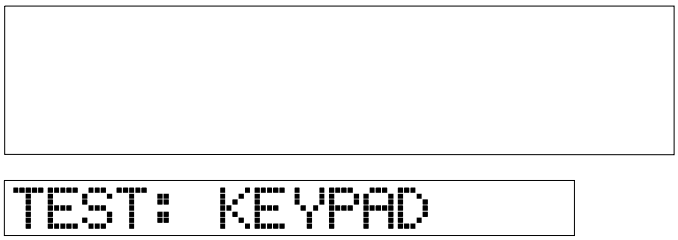
13.10.1 TEST KEYPAD

TEST: KEYPAD, the keypad test, can be used to determine whether all of the keys on the keypad are operating properly.

Procedure to Test the Keypad:

Enter the **SYSTEM TEST** menu, (section 13.10).

Press the **CYCLE** button until **TEST: KEYPAD** is displayed.



Press the **ENTER** button to begin the selected **TEST: KEYPAD** test. A “0” will be displayed, indicating that no buttons are being pushed.

The buttons (keys) are labeled “1” through “6” with “1” being the **PWR / MENU** button and “6” being the **CYCLE** button. Press each button, one at a time, the corresponding number should be displayed indicating the button (key) is functioning. The small alpha-numeric display will also indicate which button is being pressed.

Press the **UP** and **DOWN ARROW** buttons at the same time to exit and return to the **TEST: KEYPAD** menu option.

Press the **CYCLE** button to advance to the next **SYSTEM TEST** menu option.

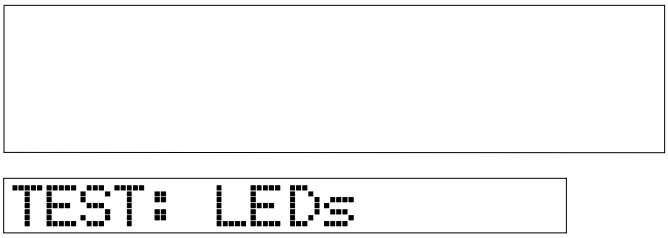
13.10.2 TEST LEDs

TEST: LEDs can be used to determine if the LEDs are operating properly.

Procedure To Test The LEDs:

Enter the **SYSTEM TEST** menu, (section 13.10).

Press the **CYCLE** button until **TEST: LEDs** is displayed.



Press the **ENTER** button to begin the selected **TEST: LEDs** test.

This tests all the combinations of segment on/off conditions, which might produce an error in the display. There are several patterns, which are run. If seeing any deviation from this pattern, contact your Vulcan dealer.

Press the **TARE / ZERO** button to exit and return to the **TEST: LEDs** menu option.

Press the **CYCLE** button to advance to the next **SYSTEM TEST** menu item.

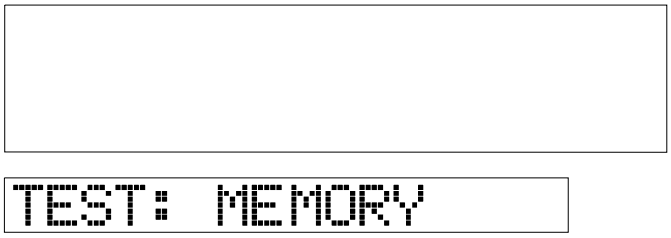
13.10.3 TEST MEMORY

TEST: MEMORY, performs a test on the internal memory storage on the V600 Meter. When the test is finished, the meter will display **MEMORY TEST OK!,** if each memory location passes the test, otherwise an **ERROR** will be displayed.

Procedure To Test The Memory:

Enter the **SYSTEM TEST** menu, (section 13.10).

Press the **CYCLE** button until **TEST: MEMORY** is displayed.



Press the **ENTER** button to begin the selected **TEST: MEMORY** test.

Press the **TARE / ZERO** button to exit and return to the **TEST: MEMORY** menu option.

Press the **CYCLE** button to advance to the next **SYSTEM TEST** menu item.

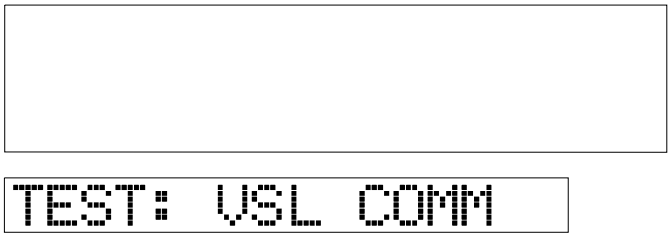
13.10.4 TEST VSL COMM

TEST: VSL COMM, the communications test, can be used to determine if the electronics are communicating properly.

Procedure To Test The VSL COMM:

Enter the **SYSTEM TEST** menu, (section 13.10).

Press the **CYCLE** button until **TEST: VSL COMM** is displayed.



Press the **ENTER** button to begin the selected **TEST: VSL COMM** communications test. The smaller alpha-numeric display will indicate which channel is currently monitored.

Press the **CYCLE** button to advance to a different channel.

The display will show “n” in the left most position and you should see a number on the right hand side, which will be counting up. As you press the **UP** or **DOWN** arrow keys, you will cycle through the various readings listed below:

n	Number of transmission attempts
o	Number of buffer overruns detected
F	Number of framing errors detected
t	Number of timeouts detected
C	Number of checksum errors detected

Note: Intermittent communications such as a bad cable connection while running the truck, will show up by the number of timeouts detected, for example "t 6".

Some errors are inherent in any communication system. The VSL system is designed to recover from most error conditions. If the error rate becomes excessive (greater than 1% of the total transmissions), contact your Vulcan dealer.

Press the **TARE / ZERO** button to exit and return to the **TEST: VSL COMM** menu option.

Press the **CYCLE** button to advance to the next **SYSTEM TEST** menu item.

13.10.5 EXITING THE PROGRAM MENU

To Exit the Meter Program Menu:

Press the **PWR / MENU** button once to exit from the main program menu at any time to return to the normal operating mode.

Note: If the **PWR / MENU** button is held too long the meter will display all 8’s and the meter will turn off.