

Owner's Manual Addendum

Displaying Axle Weights

Vulcan V320/V340 Meter - Software Version C-40

Version C-40 is a special software edition of the Vulcan V320 and V340 meters. It has been created for use with roll-off and dump trucks to provide individual axle weights. This system is designed to work with load cells or shear pins in the rear of the truck and either load cells, shear pins, or a hydraulic pressure sensor in the front. In addition, the V340 meter allows you to monitor weight on up to two “pup” channels, although axle weights are only displayed for the truck channels.

Axle weights are determined using the Center of Gravity (CG) principle. Two distances must be measured and entered into the V320 or V340 meter, along with starting calibration numbers. Additional programming/menu items have been provided to allow the user to enter these values.

The standard features of the V320/V340 meters are detailed in the V300 Series Owner's Manual. This addendum outlines changes to that document.

Note: To get an accurate weight from the scales, the payload box must be lifted and held steady off the frame rails in the same location every weighment. This “weigh point” should be marked on the truck structure so the driver can easily lift the box to the same location for every weighment. See Figure 2 below for recommended weigh heights.

STARTING CALIBRATION NUMBERS

Before calibrating, both Channel A (front) and Channel B (rear) need to have starting calibration numbers entered. The starting calibration number depends on the number and type of weight sensors being used.

For channels using shear pins or load cells, use the following table to determine starting cal numbers:

LOAD CELL		VULCODER	
TYPE	STOCK NO.	V26 1 LEAD	V23, V27 2 LEAD
15" SUPER-BEAM	L01, L02	2050	2050
26" SUPER-BEAM	L08, L09, L18, L19	2050	2050
26" HEAVY DUTY SUPER-BEAM	L11	3075	3075
2" SHEAR PIN	L25, L26	1895	1895
2 1/2" SHEAR PIN	L43	N/A	3785
3" SHEAR PIN 58-10608-005		N/A	3618
3" SHEAR PIN	L53	N/A	7042
28" SHEAR BEAM, EXTRA HD	L27	3660	3660

Table 1. Starting Calibration Numbers

Example: A dump truck with a single vertical lift cylinder is using a 2" shear pin in the front and two 2 ½" shear pins in the rear, a V26 Vulcoder in the front and a V23 Vulcoder in the rear.

Ch A = 1895

Ch B = 3785

If Channel A uses a hydraulic sensor, its calibration number is determined using the following formulas.

Dump Trucks (with vertical lift cylinder):

Starting Channel A Cal # = 126.7 x (D x D)

Where D = Hydraulic cylinder bore diameter in inches

Starting Channel B Cal # = see Table 1 above

Example: A dump truck has a single vertical lift cylinder with a bore diameter of 6" and two 2" shear pins with a V23 Vulcoder in the rear.

Starting Channel A Cal # = 126.7 x (6 x 6) = 4562

Starting Channel B Cal # = 1895

Roll-offs (with two lift cylinders – forward or rear-facing):

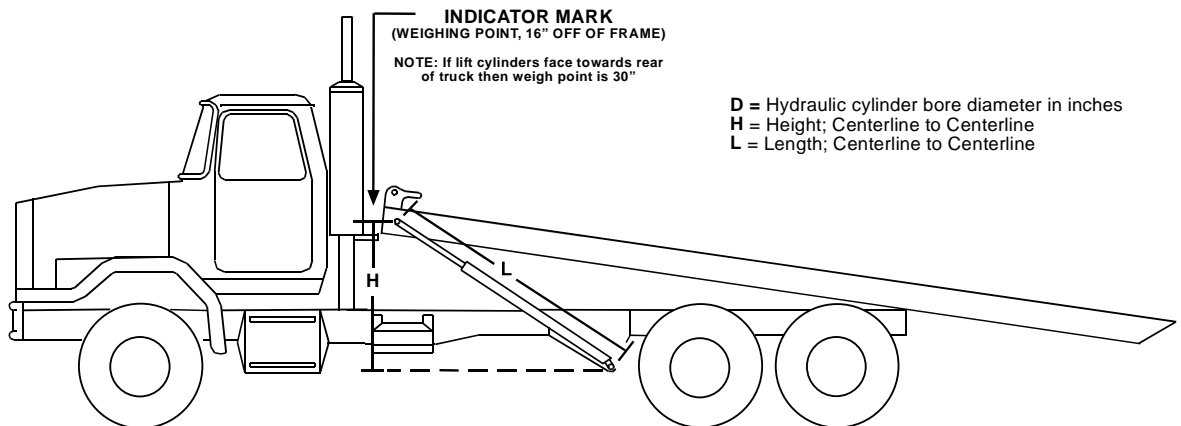


Figure 1.

Starting Channel A Cal # = 253.5 x (D x D) x (H ÷ L)

Where D = Hydraulic cylinder bore diameter in inches.

L = Length of lift cylinder while in weighing position.

H = Vertical height difference between upper pin and lower pin in weighing position.

Starting Channel B Cal # = see Table 1 above

Example: Find the starting Cal Numbers for a roll-off having two lift cylinders, each with a bore diameter of 5", with H = 28" and L = 56", and 2 ½" shear pins in the rear.

Starting Channel A Cal # = 253.5 x (5 x 5) x (28 ÷ 56) = 3168

Starting Channel B Cal # = 3785

Enter Starting Cal Numbers

1. Make sure Driver Lock is Off. To turn Driver Lock off:
 - a. Press the **PWR/MENU** button to show “PSFr”, “PSFrr-” or “PSFrFr” on the display.
 - b. Press the **CYCLE** button until the display shows “PL Off” or “PL On”. This is the “Program Lock” option. If necessary, use the ▲ or ▼ button to change the display to read “PL Off”.
 - c. Press PWR/MENU to return to weight display.
2. Be sure Axle Weight mode is turned off:
 - a. Press the **PWR/MENU** button to show “PSFr”, “PSFrr-” or “PSFrFr” on the display.
 - b. Press the **CYCLE** button to advance the display to “PA Off” or “PA On”. This is the “Program Axle” option. If necessary, use the ▲ or ▼ button to change the display to read “PA Off”.
 - c. Press the **PWR/MENU** button to enter the normal operating mode for viewing axle weights.
3. Press and *release* the **CAL** button. The **LOCK** and **CAL LED**'s are illuminated. The flashing LED below the channel designation indicates which channel(s) is selected.
4. Press the **CYCLE** button to select a channel or to advance to the next desired channel A, B, C, or D to enter calibration numbers.
5. Use the ▲ or ▼ buttons to increase or decrease the Cal Number to match the Starting Cal Number for each channel, as determined above.

If the Cal Number is flashing:

The Lock option is activated. The ▲ and ▼ buttons will have no effect. Refer to Step 1 to deactivate the Lock feature.

6. When all channels have the correct starting calibration numbers, press the **CAL** button. The meter will return to normal weight display.

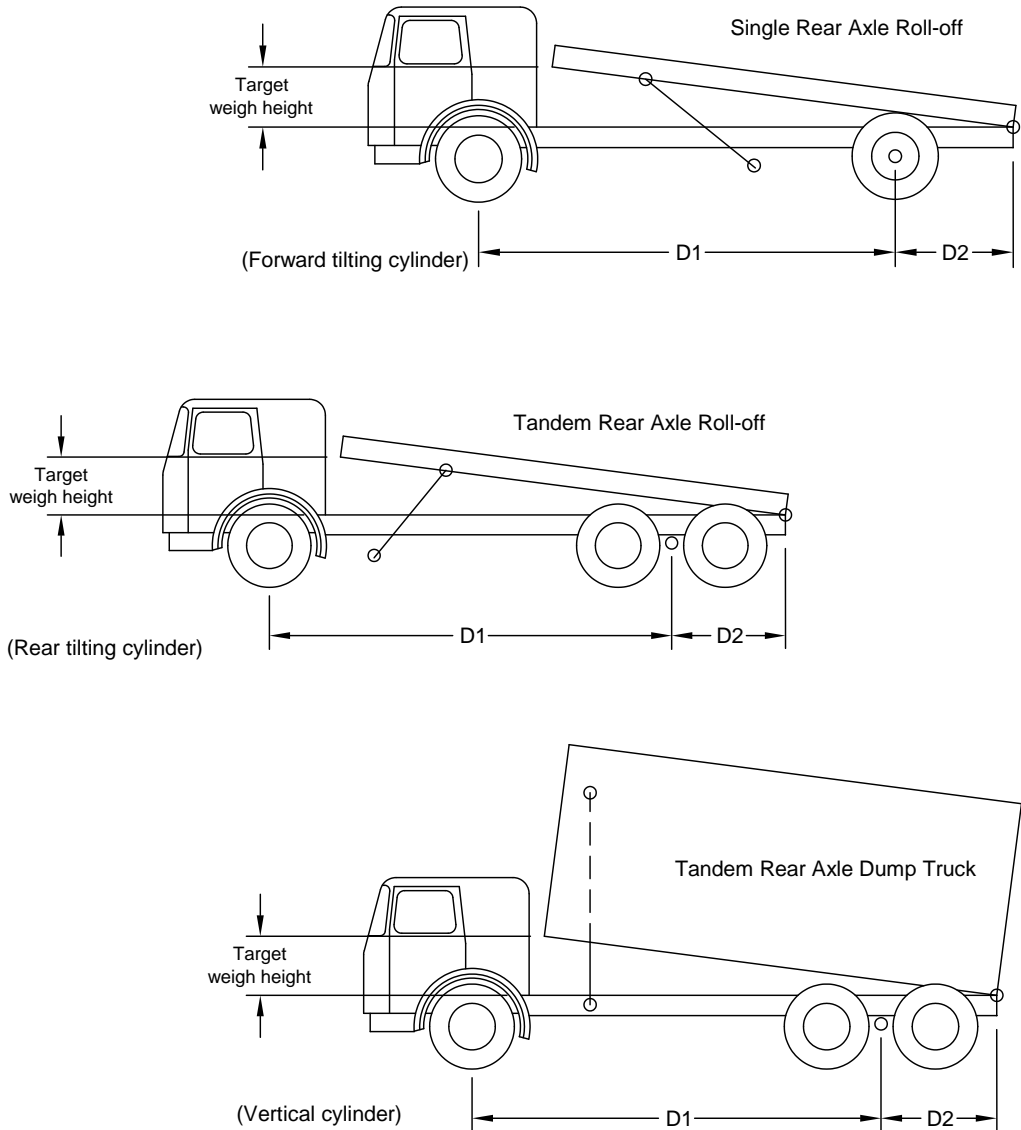
To Set Up Truck for Axle Weight Mode

1. Activate the Axle Weight mode:
 - a. Press the **PWR/MENU** button to show “PSFr”, “PSFrr-” or “PSFrFr” on the display.
 - b. Press the **CYCLE** button to advance the display to “PA Off”. This is the “Program Axle” option. Use the ▲ or ▼ button to change the display to read “PA On”.
 - c. Now, either:
 - i. Press the **PWR/MENU** button to enter the normal operating mode for viewing axle weights.

OR

 - ii. If setting up the Axle Weight mode **for the first time**:
 - a) Press the **CYCLE** button to enter “D” values for your truck. (Correct “D” values must be entered for accurate axle weights to be displayed).
 - b) Pressing the **CYCLE** button prompts the meter to ask you for two dimensions D1 and D2. You must make these measurements and input them into the meter using the following two steps: (it is a good idea to write these three dimensions down and keep them with your calibration information – space is provided at the end of this document to record these settings)
 - i) “**D1 nnn**”. This is “Distance 1” (D1). *It corresponds to the wheelbase of the vehicle – refer to Figure 2 below.* Measure the distance between the front and rear axles. If the rears are a tandem axle, measure to the midpoint between them. Press either the ▲ or ▼ button to change the “300” inch default to the D1 value you measured. Press the **CYCLE** button to move to the next D parameter.
 - ii) “**D2 nn**”. This is “Distance 2” (D2). *It corresponds to the distance between the rear hinge and the rear axle – refer to Figure 2 below.* If the rears are a tandem axle, measure from the hinge to the midpoint between axles (the same measurement point should be used for both D1 and D2). Press either the ▲ or ▼ button to change the “48” inch default to the D2 value you measured. Press the **PWR/MENU** button to return to weight display mode.
- Note:** The previous two menu options will NOT appear unless the V320/V340 meter has been placed in Axle Weight mode.
2. When you are in Axle Weight mode, the decimal points on the display will “blink” every few seconds to let you know you are viewing Axle Weights.

Note: Lift cylinders can tilt forward, to the rear, or be vertical



Target Weigh Height For Roll-offs	
Forward Tilting Cylinder	16"
Rear Tilting Cylinder	30"
Target Weigh Height For Dump Trucks	
Vertical Cylinder	10" to 12"

Figure 2: Axle Weight mode dimensions and weigh heights for roll-offs and dump trucks. All dimensions are in inches.

Calibrating the System in Axle Weight Mode

Use a platform scale (preferably a certified scale) for calibration. **Note:** If you have a V340 meter, calibration of Channels C and D must be done as specified in the V300 Series Owner's Manual. The following steps are for Channels A and B only.

Calibration consists of two major parts. You must first set the empty weight of your truck, then the full weight. Pay particular attention to the required hoist position for each calibration step.

1. Verify the Driver Lock is Off.
2. Verify the meter is in Axle Weight mode and that the correct starting calibration numbers and "D" values have been entered for the truck.
3. Verify truck is empty.
4. Pull only the steering axle onto a platform scale **with the hoist still down**. Record the weight from the platform scale here. _____
5. **Lift hoist to the weigh point**. Refer to Figure 2 for the recommend weigh height. Some applications may have a body up light set for the weigh point.
6. Press the **TARE** button. The Tare and Lock LED's will light and the Channel A and "lb" LED's will blink. The display will show the current axle Tare weight for the indicated channel (the display will show 0 the first time you calibrate the scale). **Note:** The decimal points in the display will "blink" every 2 seconds to remind you that you are in "Axle Mode".
7. Press either the ▲ or ▼ button to adjust the display to show the Tare weight that you recorded above. Press the **CYCLE** button to advance to the rear axle or rear axle group.
8. The Channel A LED will turn off and the Channel B LED will start "blinking".
9. Pull forward until only the rear axle (or axle group) is on the platform scale. Be sure the front axle is completely off the platform scale. **Lower the hoist**. Record the platform scale weight here.

10. **Raise the hoist** to the recommended weigh height. Press either the ▲ or ▼ button to adjust the display to show the weight that you recorded above.
11. Press the **TARE** button to return to Axle Weight mode. The Lock LED should turn off and the display will cycle between the front axle (Channel A LED lit), the rear axle (Channel B LED lit), and total Gross Vehicle Weight (GVW – Channel A and Channel B LED's lit). **Note:** The decimal points will "blink" with the channel changes indicating you are reading axle weights.
12. Lower the hoist and get a load.
13. Load the truck close to its legal limit and return to the platform scale **with the hoist down**. Pull the steering axle onto the platform scale. Record the weight from the platform scale here.

14. **Lift hoist to the weigh point**.

15. Press the **CAL** button. **Note:** If you have not placed a heavy load on your truck when you push the **CAL** button, “Err 15” will be displayed on the meter.
16. The display will show the current weight on the front axle. The Cal and Lock LED’s will be lit. The Channel A LED and “lb” LED will blink.
17. Use either the ▲ or ▼ button to change the number in the display so that it matches the weight you recorded above.
18. Press the **CYCLE** button. The Channel A LED will turn off and the Channel B LED will start “blinking”.
19. **Lower the hoist** and pull the rear axles (or axle group) onto the platform scale, making sure the front axle is completely off. Record the weight from the platform scale here. _____
20. **Raise the hoist** to the recommended weigh height. Use either the ▲ or ▼ button to change the number in the display so that it matches the weight you recorded above.
21. Press the **CYCLE** button to view the new Cal number for Channel A. Pressing the **CYCLE** button again will show the new Cal number for Channel B. For your records, write down the new Cal numbers for Channel A and Channel B. There is a space below to record your settings.
22. Press the **CAL** button to return to Axle Weight mode for viewing axle weights.
23. Press **PWR/MENU**. The Program Sequence menu will appear.
24. Press the **CYCLE** button repeatedly until you see “CG nnn”. This is the CG Factor. Write this value in the appropriate space below. **Note:** The CG factor should be blinking to indicate that it CANNOT be modified.
25. Turn on the meter Driver Lock (“PL On”) to avoid accidentally changing the calibration. (see step 1 in *Enter Starting Cal Numbers* to access the driver lock feature)

Set Up and Calibration Notes for Truck _____

D1 = _____	D2 = _____	CG Factor = _____
Tare A = _____	Starting Cal# A = _____	New Cal# A = _____
Tare B = _____	Starting Cal# B = _____	New Cal# B = _____

Date: _____

Recalibration

In the event your system needs to be recalibrated, use the following procedure if you have previously recorded your calibration factors and you are empty:

1. Erase the V320 Meter and Vulcoders.

- a. Power the V320/V340 on by pressing the **PWR/MENU** button.
- b. When the V320/V340 completes its power-up tests, it will be in Weight Display mode.
- c. Press the **PWR/MENU** button. The Program Sequence menu will appear. The display might look something like this: “PSFr”.
- d. Press and hold the **TARE** button until the lower display changes to “PS--” (V320) or “PS----” (V340), then release.
- e. Press and hold the **ENTER** button again until the display “blinks” and the display returns to “PS--” or “PS----”.
- f. Power the meter off by pressing and holding the **PWR/MENU** button.
- g. Disconnect any pup/trailer Vulcoders. Turn on the meter by pressing the **PWR/MENU** button.
- h. If you have a pup or trailer, turn the meter off and connect the pup/trailer Vulcoder(s). Then turn the meter back on.
- i. The V320/V340 meter and all Vulcoders will now be set to their factory default settings.

2. Restore the “New Cal Numbers”.

- a. Press the **CAL** button. The Cal, Lock and Channel A LED’s will be lit. The upper display should contain “2050”.
- b. Use the ▲ and ▼ buttons to change the Cal Number for Channel A to the “New Cal # A” you entered on the previous page.
- c. Press the **CYCLE** button. The Channel A LED will go out and the Channel B LED will be lit. The upper display will show “2050”.
- d. Use the ▲ and ▼ buttons to change the Cal Number for Channel B to the “New Cal # B” you entered on the previous page.
- e. Press the **CAL** button.

3. Place the Meter in Axle Weight mode.

- a. Press the **PWR/MENU** button. The Program Sequence menu will be displayed.
- b. Press the **CYCLE** button. The display will show “PA OFF”
- c. Use the ▲ or ▼ button to change the display to read “PA On”.

4. Modify the Distance settings.

- a. Press the **CYCLE** button. The display should show “D1 300”
- b. Use the ▲ and ▼ buttons to change the value in the display to match the D1 entry.
- c. Press the **CYCLE** button. The display should show “D2 48”
- d. Use the ▲ and ▼ buttons to change the value in the upper display to match the D2 value.

5. Enter the CG Factor.

- a. Press the **CYCLE** button again. The display should show “CG 0”.
- b. Use the ▲ and ▼ buttons to enter the CG Factor you wrote down in the Calibration Notes table.
- c. Press the **PWR/MENU** button to return to weight display.

6. Enter Tare weights.

Note: The truck MUST be EMPTY to perform this step.

- a. **Lift hoist to the weigh point.** Refer to Figure 2 for the recommend weigh height.
- b. Press the **TARE** button. The Lock, Tare, and Channel A LED’s should be lit.
- c. Use the ▲ and ▼ buttons until the upper display shows the same Tare weight you recorded in the Calibration Notes table above for Channel A.
- d. Press the **CYCLE** button. The Channel A LED will go out and the Channel B LED will be lit.
- e. **With the hoist still at the recommended weigh height,** use the ▲ and ▼ buttons to adjust the display to show the Tare weight that you recorded above for Channel B.
- f. Press the **TARE** button.

Weights shown on the meter will now be axle weights, as indicated by the “blinking” decimal points. Channel A LED will light when the FRONT axle weight is being displayed and the Channel B LED when the REAR axle weight is being displayed. Total weight is shown when both A & B lights are lit.

Viewing Net Payload Weight

A feature has been added to the C-40 version of the Vulcan V320 and V340 Meters. It is the ability to view Net Payload Weight from Axle Weight mode. To do this, simply press and hold the **CYCLE** button. After 2 seconds, all of the LED’s (LOCK, TARE, CAL and all Channels) will be lit, while the upper display will show the net payload on the vehicle. This includes any pup/trailer weight (on a V340).

The Net Payload Weight will be displayed as long as the **CYCLE** button is held down. When it is released, the meter will return to normal weight display mode.