Troubleshooting

Tuffer™ Weigh-in-Motion Loader Scales

P/N: 85-00920-01L

NOTE: *The Tuffer WM Loader Scale System has been designed for simple operation and maintenance. Although problems do occur, most can be easily corrected. The causes and solutions below are listed in order of probability. Therefore, it is recommended that the solutions be investigated and tried in the order listed. If the scale system does not operate properly after these solutions have been tried, please contact Technical Support at* **(800) 638-5111 626-363-7541**

5920 South 194th Street | Kent, WA 98032 | USA
USA -Sales Support: 800-638-5111 | Technical Support: 626-202-5047
Canada – Sales and Technical Support: 800-989-1499
E-mail: sionboard@vpgsensors.com

www.sionboard.com

The display does not light up when the POWER button is pressed:

1) *The power has not been connected or the power cable has been damaged:* Check the power cable from the vehicle's battery to the Tuffer. Use a volt meter to check for proper voltage level.

2) *The circuit breaker has been tripped:* Reset the circuit breaker by pressing the button under the rubber dome on the back of the Tuffer.

The display is not visible or is very dim.

1) *The viewing angle is not correct:* At certain viewing angles, the display will not be visible. Rotate the Tuffer so that the display is visible.

2) *Display has been dimmed:* Brighten the display.

The Tuffer does not display a weight reading when the boom is lifted.

1) *The **proximity switches** are not connected to the Tuffer:* Check the connection from the **proximity switch harness** to the back of the Tuffer.

2) *The **proximity switch** spacing is incorrect:* Check the distance between the **proximity switches** and the **target plate**. It should be about 1/4". See "Installing the Proximity Switches" on page 20. ①

3) *The **proximity** switch or the **proximity switch harness** has been damaged:* Place a small piece of metal (the blade of a screwdriver for example) in front of the **proximity switch**. The yellow light on the back of the switch will light up. If not, the switch or cable may need to be replaced. ①

The Tuffer does not respond when the remote switch is pressed

1) *The **remote switch** is not connected to the Tuffer or the cable has been damaged:* Check the connection from the **remote switch** to the Tuffer. Check the cable for damage. ②

2) *The scale is not in MANUAL ADD MODE:* Turn on MANUAL ADD MODE.

The weight readings are erratic

1) *The hydraulic hose may be connected to the wrong hydraulic line:* Make sure that the hose is connected to the LIFTING line. See “Tapping Into the Hydraulic System” on page 6. ③

2) *The hydraulic hose may be clogged:* Loosen the hydraulic connection on the back of the Tuffer. Lift the boom slightly. If oil does not flow out, the line may be clogged. Disconnect and clean out the line. ③

3) *Air is trapped inside the hydraulic line:* Loosen the hydraulic hose connection on the back of the Tuffer. Lift the boom slightly until oil flows out. Tighten the hose connection.

4) *Not enough time during the weighing range:* At fast engine RPM, the weighing range should be about 2 seconds long. Use LIFT PRESSURE MODE to check the weighing time. ⑤

5) *The loader was not warmed up before calibrating:* Thoroughly warm up the loader and then calibrate the scale. See “Beginning the Calibration” on page 21.

6) *Improper weighing procedure:* Make sure to pull the lift lever all the way back during weighing, and start each lift with the **target plate** well below the lower **proximity switch**. Lift the boom several times in LIFT PRESSURE MODE. Watch how the pressure changes when the lift lever is not pulled back all the way. ⑤

Weight readings are very low (at or near zero)

1) *The scale has not been calibrated properly:* Calibrate the scale again. Be sure to use a full bucket during full bucket calibration. See “Beginning the Calibration” on page 21.

2) *The hydraulic hose may be completely clogged:* Loosen the hydraulic connection on the back of the Tuffer. Lift the boom slightly. If oil does not flow out, the line may be clogged. Disconnect and clean out the line. ③

Weight readings are consistently too high or consistently too low

1) *The scale has not been zeroed recently:* Zero the scale.

2) *The scale has not been calibrated properly:* Calibrate the scale again. Be sure to use a full bucket during full bucket calibration. See “Beginning the Calibration” on page 21.

3) *The calibration may need to be adjusted.*

4) *The wrong calibration is being used:* Check the calibration number.

①, ②, ③, ④, and ⑤: See “Troubleshooting Using Lift Pressure Mode” on page 4 for additional details.

Troubleshooting Using LIFT PRESSURE MODE

The Tuffer WM Loader Scale System is equipped with a special diagnostic mode that can be used during the troubleshooting process. To enter LIFT PRESSURE MODE, press the MODE button. Press the soft key labeled "CAL OPTIONS". Next, press the soft key labeled, “DISPLAY LIFTING PSI”. "LIFT PRESSURE MODE" will be displayed in the upper left hand corner of the display, and the Tuffer will display the current hydraulic lift pressure, and the conditions of both proximity switches and the remote switch. Refer to Figure 13.

NOTE: *The information displayed in LIFT PRESSURE MODE can be used to verify certain conditions during troubleshooting. Each of these conditions are labeled in the Troubleshooting section on the previous pages*

① Raise the boom. When the **target plate** passes in front of the **lower proximity switch**, the Tuffer will display, “THE LOWER SWITCH HAS BEEN ACTIVATED” on the bottom line of the display. When the **target plate** passes in front of the **upper proximity switch**, the Tuffer will display, “THE UPPER SWITCH HAS BEEN ACTIVATED”. If not, the **proximity switches** may not connected to the Tuffer or have been installed incorrectly.

② Press the **remote switch**. When the switch is depressed, the Tuffer will display, “THE REMOTE SWITCH IS PRESSED” on the third line of the display. If not, the **remote switch** may not be connected, or the **remote switch** CABLE may be damaged.

③ Raise the boom. If the pressure reading displayed on the first line of the display does not increase, the hydraulic connection may have been made to the wrong pressure line, or the hydraulic line may be clogged.

④ Raise the boom. If the pressure reading stays near zero, the hydraulic line may not be connected, or the line may be completely clogged.

⑤ Lower the boom until it is just above ground level. Raise the boom until the **target plate** is above the **upper proximity switch**. The second line of the display will show the time it took for the target plate to pass between the **proximity switches**, the average pressure in psi, and the **load weight** in the bucket. Refer to Figure 23.

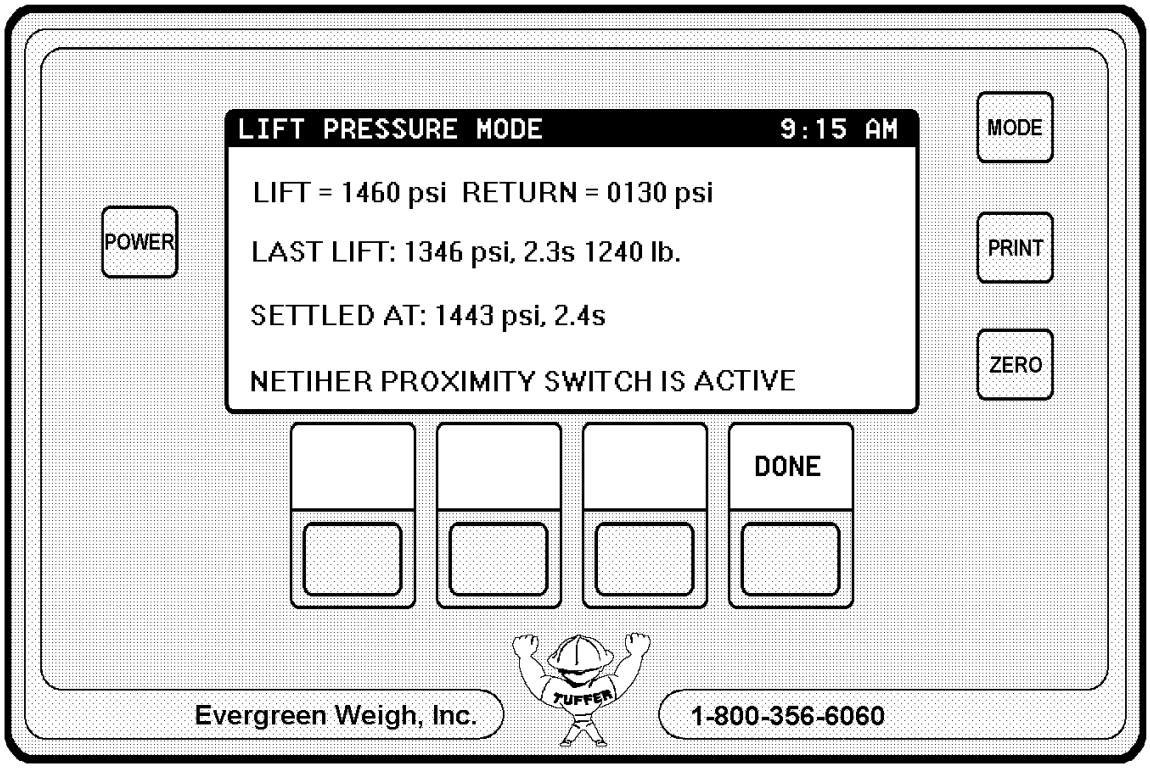


Figure 23, Lift Time in LIFT PRESSURE MODE

Making Adjustments to the Calibration

If the weight displayed is *consistently* high or *consistently* low, and there are **no** other problems with the scale system, the calibration can be adjusted so that the correct weight is displayed. Be sure that the weight is **consistently** incorrect. The error should be approximately the same amount at all engine speeds.

NOTE: *If the displayed weight is sometimes high and sometimes low, or if the problem is intermittent, the calibration should* ***not*** *be adjusted. Instead, follow the Troubleshooting section on page 33.*

Step 1

Determine the amount of error

Weigh a load of known weight several times to determine the amount of error. Use as full a load as possible, and take the average of several weight readings.

The readings from several truck loads can be used as well. After loading a truck, weigh the truck on a platform scale to determine the weight of material. Write down the **truck total** displayed on the Tuffer. Total up several truck loads for best results.

Step 2

Determine the original calibration weight.
Press the MODE button. Next, press the soft key labeled “CAL OPTIONS”. Press the soft key labeled “MODIFY THE CAL”. Then, press the soft key labeled “ADJUST THE CAL”. The Tuffer will display this warning:

Press the soft key labeled “PROCEED”. The Tuffer will display:

ADJUST THE CALIBRATION WEIGHT SHOWN BELOW. PRESS “DONE” WHEN FINISHED.

The original **calibration weight** will be shown below this message.

Step 3

Calculate the adjusted calibration weight.
Use this formula to calculate the adjusted calibration weight:

Actual load weight ÷ Tuffer reading x calibration weight = Adjusted calibration weight

EXAMPLE: The Tuffer was calibrated with 11,500 lb.
The actual weight of the load is 9,600 lb., but the Tuffer reads 9,400 lb.

The adjusted calibration weight would be:
9,600 LB ÷ 9,400 LB x 11,500 LB = 11,740 LB

Step 4

Enter the adjusted calibration weight.
Use the soft keys labeled "UP" and "DOWN" to adjust the original calibration weight displayed on the Tuffer either up or down. When the weight displayed is equal to the adjusted calibration weight calculated in step 3, press the soft key labeled "DONE".

Step 5

Zero the scale system.
Raise an empty bucket. If the **load weight** does not read zero or near zero then press the ZERO button.

Step 6

Check the calibration.
Weigh a full load to verify that the adjustment has been made.

Warnings and Error Messages

The WM Tuffer displays warnings and error messages to remind the operator of certain conditions and to help the operator diagnose problems. Each of the error messages and warnings are listed below, and if necessary, any steps that are needed to correct the error or condition.

Warning: Must Calibrate and Zero!

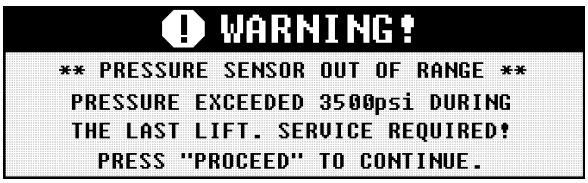
Before you can weigh, the Tuffer must be calibrated and zeroed. See “Calibration” on page 21. If you have already calibrated the scale, make sure that you are using the correct calibration position.

Load Weight out of Range

The Tuffer can display **load weights** up to a maximum of 65,000 lb. If the **load weight** exceeds 65,000 lb., this error message will be displayed. If the scale was not properly calibrated, this message may also be displayed.

Truck Total out of Range

The Tuffer can keep track of truck weights up to 1,000,000 lb. When the **truck total** exceeds 1,000,000 lb., “TRUCK TOTAL OUT OF RANGE” will be displayed. Press the soft key labeled, “TOTALS”. Then, press the soft key labeled, “STORE” to add the **truck total** to the **long total**, or press the soft key labeled, “CLEAR TRUCK TOTAL” to zero the **truck total**.

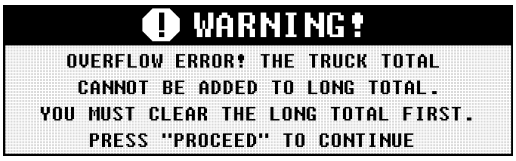


Although the pressure sensor has a burst pressure of 25,000 psi, the Tuffer is equipped to read lift pressures up to only 3,500 psi. If the Tuffer senses a pressure greater than 3,500 psi during weighing, this warning will be displayed.

Sometimes the high hydraulic pressures encountered during digging may trigger this message. Make sure that the lower proximity switch is not triggered during digging. If the problem persists, contact Evergreen Weigh’s service department for additional instructions.

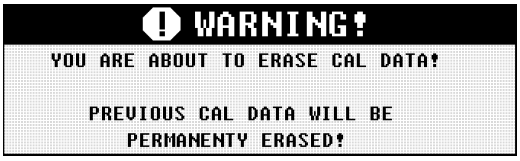
During calibration and zeroing, it is recommended that three lifts be done at each speed to maintain a high level of accuracy. If desired, one or two lifts can be done to reduce the time it takes to calibrate and zero the scale.

The accuracy of the scale system may be affected, however. Evergreen Weigh strongly recommends that all three lifts be done at each speed.



The **long total** has a limit of 99,000,000 pounds, 49,500,000 Kg. The Tuffer will not add the **truck total** to the **long total** if this limit would be exceeded. Clear out the **long total** before storing the **truck total**.

The calibration has been protected, and the password you entered is not correct. Enter in the correct password, or call Evergreen Weigh for assistance if you cannot remember your password.



In cal utilities mode, calibrations can be erased. If you are calibrating the scale and would like to erase the old calibration data, press “PROCEED”. Otherwise, press “CANCEL” to save your calibration data.

ROD and BORE Listing

BRAND	MODEL	ROD	BORE
Bell	L1760B	2.76	4.92
Case	621	2.99	5.00
Clark	75B	2.24	5.00
	125B	2.70	5.98
	175C	2.69	5.98
Caterpillar	IT12 I & F	2.20	3.50
	IT 24	2.50	4.75
	IT 28	2.50	4.75
	910E	2.25	4.00
	910F	2.25	4.00
	918F	2.25	4.00
	924F	2.50	4.25
	926 & E	2.50	4.50
	928F	2.50	4.50
	936 E & F	2.50	5.50
	938F		
	950 B,E, & F		6.00
	966 A& B	2.50	6.50
	966 D,E. & F		7.00
	970F	3.54	7.09
	980C	3.50	7.50
	980F	4.33	8.66
	988 B & F	4.02	8.50
Caterpillar	R1500	3.25	7.76
Elphinstone	R1700	4.00	8.50
	R2800	4.00	8.50
John Deere	244E	1.77	3.15
	310	1.77	3.11
	344E	2.36	4.33
	344G	2.17	3.94
	444E	2.36	4.33
	444G	2.36	4.33
	544 E & G	2.48	4.92

BRAND	MODEL	ROD	BORE
	624 E & G	2.48	5.51
	644 E & G	3.15	6.30
	744E	3.94	6.69
	744H	3.74	7.09
	844	3.50	7.00
Dresser	510B	2.01	4.02
	515B	2.76	4.50
	520	2.68	4.88
	520C	2.76	4.50
	530	3.03	5.50
	558	5.00	8.00
Fiat Allis	FR10	2.20	4.33
	FR12	2.76	5.51
	645		6.00
Furakawa	FL230	2.76	5.51
Hyundai	HL17	2.76	8.27
	HL25	2.95	5.51
	HL35	3.54	6.30
	HL750	2.95	5.51
	770	3.54	6.30
Hitachi	LX70	2.36	4.33
	LX80	2.36	4.33
	LXI00	3.15	6.30
	150	3.15	6.30
	LX200	3.74	6.69
Kawasaki	70ZIII	2.95	5.51
	80ZII	3.15	6.30
	80ZIII	2.95	5.91
	88ZII	3.74	6.69
	95Z	3.94	7.48
	KSSI00	4.41	8.66
	110Z	4.72	8.82

BRAND	MODEL	ROD	BORE
Komatsu	WA120	2.76	4.33
	WA180	2.76	4.72
	WA320	3.03	5.51
	WA380	3.35	5.91
	WA420	3.54	7.48
	WA450	3.70	7.40
	WA470	7.09	0.00
	WA500	7.87	0.00
	WA600	8.86	0.00
Michigan	L120	2.01	4.02
	L150	4.00	6.75
	275C		
Volvo	L50	1.97	3.54
	L50C	2.76	3.94
	L70	2.36	3.94
	L70 B & C	2.76	3.94
	L90	2.36	4.72
	L90C	2.76	5.12
	L120	2.76	5.91
	L120C	3.15	6.30
	L150	3.15	6.69
	L160	3.15	6.30
	L180C	3.54	7.48
	L330C	3.54	8.66