Cardinal®

Cardinal Scale Manufacturing Co.

ARMOR® TRUCK SCALES

SMARTCELL® DIGITAL LOAD CELLS

Digital Truck Scale Troubleshooting Guide

COPYRIGHT

DISCLAIMER

While every precaution has been taken in the preparation of this manual, the Seller assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from use of the information contained herein. All instructions and diagrams have been checked for accuracy and ease of application; however, success and safety in working with tools depend largely upon the individual accuracy, skill and caution. For this reason, the Seller is not able to guarantee the result of any procedure contained herein. Nor can they assume responsibility for any damage to property or injury to persons occasioned from the procedures. Persons engaging the procedures do so entirely at their own risk.

TABLE OF CONTENTS

INTRODUCTION

It can happen sometimes; the truck scale installation has been completed, but the system just doesn't work or it has been running smoothly and then a problem occurs. Before calling Cardinal Scale for assistance, there are a few things to check first that can be done to get the system back up and running. Remember, that there is a logical explanation for all problems and for troubleshooting to be successful, it must be approached in a logical and rational manner.

The 225D and 825D indicators used on the ARMOR Digital Truck scales are equipped with software that indicates when an error in the operation takes place. Should a problem be detected, an error message will be displayed alerting the operator to that condition. The following is a list of some of the top system problems and recommended solutions to those problems.

DISPLAYED ERROR MESSAGES

REPLACE LOAD CELL X

SOLUTION:

A. Using a NEST, test the load cell.

B. If the load cell fails the test on the NEST, replace the indicated load cell.

C. Verify calibration on the scale.

LOW VOLTAGE DETECTED CELL X

SOLUTION:

A. Using a NEST, test the load cell.

B. If the load cell fails the test on the NEST, replace the indicated load cell.

C. If the load cell passes the test on the NEST, proceed with the following:

D. Cut the end off of an extra load cell cable and strip back the wires to make a test cable.

E. Ensure the scale is powered up.

F. Remove the End Node (terminator) from the last load cell in the loop, and connect the test cable to the port on the load cell where the End Node (terminator) was.

G. Use a DVM to measure the DC voltage between the White wire (V+ Bus) and Blue wire (V- Bus). The voltage should be a minimum of 9 VDC. *Note that the voltage depends on the number of load cells in loop.*

H. If the system voltage is above 9 VDC, replace all the load cells indicated in the LOW VOLTAGE error message displayed.

LOW VOLTAGE DETECTED CELL X, Cont.

SOLUTION:

I. If the system voltage is below 9 VDC, proceed as follows:

J. First remove the White (V+ Bus) and Blue (V- Bus) wires from the Homerun cable on the DLC Card, and using a DVM, read the voltage on the connector. This should be *minimum* of 14 VDC on the 225DLC (11.5 VDC on the 825-DLC). If the voltage is low, replace the DLC card. If it is minimum of 14 VDC on the 225DLC (or 11.5 VDC on the 825-DLC) proceed as follows:

K. Measure the current draw on the system. Remove the White (V+ Bus) wire from the DLC card. Put one lead of a DVM in the (V+ Bus) terminal on DLC card. Attach the other lead of your DVM to the White (V+ Bus) wire going to the scale. Place your DVM in the Milliamps range. Note that on some DVM's, you may have to move the lead position from the normal position to the 0-400 milliamps range.

L. On the 225D, you should read approximately 200 milliamps of current through an 8-load cell system (each load cell will pull approximately 25 milliamps). A 10-load cell system would read approximately 250 milliamps. Tolerance is +/- 15 milliamps.
On the 825D, you should read approximately 250 milliamps of current through an 8-load cell system (each load cell will pull approximately 30 milliamps). A 10-load cell system would read approximately 300 milliamps. Tolerance is +/- 15 milliamps.

M. If the value is out of range, disconnect all load cell cables and read the current draw with no cells connected. Now, connect the cables to the load cells one at a time, and make sure that the current draw increases each time a load cell is connected.

- On the 225D, current draw should increase approximately 25 milliamps with each load cell connected.
- On the 825D, current draw should increase approximately 30 milliamps with each load cell connected.

If you find that connecting a load cell gives you a suspect reading, try it with a different cable. If the reading is still bad, replace the load cell.

N. Proceed through testing the current draw on all cables and load cells, then retest the system voltage at the last load cell (End Node) in the loop. If the reading is still below 9 VDC replace the DLC card and check the voltage again.

O. For a large number of cells and/or a long Homerun cable, an external 24 VDC power supply may be required. Consult the factory for recommendations.

CURRENT DRAW MORE THAN 150% OF CAPACITY

SOLUTION:

A. Cut the end off of an extra load cell cable and strip back the wires to make a test cable.

B. Ensure the scale is powered up.

C. Remove the End Node (terminator) from the last load cell in the loop, and connect the test cable to the port on the load cell where the End Node (terminator) was.

D. Use a DVM to measure the DC voltage between the White wire (V+ Bus) and Blue wire (V- Bus). The voltage should be a minimum of 9 VDC. *Note that the voltage depends on the number of load cells in loop.*

E. If the system voltage is below 9 VDC, proceed as follows:

E. Measure the current draw on the system. Remove the White (V+ Bus) wire from the DLC card. Put one lead of a DVM in the (V+ Bus) terminal on DLC card. Attach the other lead of your DVM to the White (V+ Bus) wire going to the scale. Place your DVM in the Milliamps range. Note that on some DVM's, you may have to move lead position from the normal position to the 0-400 milliamps range.

F. On the 225D, you should read approximately 200 milliamps of current through an 8-load cell system (each load cell will pull approximately 25 milliamps). A 10-load cell system would read approximately 250 milliamps. Tolerance is +/- 15 milliamps.
On the 825D, you should read approximately 250 milliamps of current through an 8-load cell system (each load cell will pull approximately 30 milliamps). A 10-load cell system would read approximately 300 milliamps. Tolerance is +/- 15 milliamps.

G. If the value is out of range, disconnect all load cell cables and read the current draw with no cells connected. Now, connect the cables to the load cells one at a time, and make sure that the current draw increases each time a load cell is connected.

- On the 225D, current draw should increase approximately 25 milliamps with each load cell connected.
- On the 825D, current draw should increase approximately 30 milliamps with each load cell connected.

If you find that connecting a load cell gives you a suspect reading, try it with a different cable. If the reading is still bad, replace the load cell.

H. Proceed through testing the current draw on all cables and load cells, then retest the system voltage at the last cell (End Node) in the loop. If the reading is still below 9 VDC replace the DLC card and check the voltage again.

LOAD CELL X NOT RESPONDING

SOLUTION:

A. Jack up the weighbridge at load cell location to remove the deadload from the load cell.

B. Using a NEST, run the automated load cell test.

C. If the load cell fails the NEST test, replace the load cell.

D. If the load cell passes the NEST test, proceed to the error message,

COMMUNICATIONS ERROR BETWEEN INDICATOR AND SCALE

E. If multiple load cells are not responding, confirm that the Start Node and End Node load cells in the loop match the settings in the indicator.

COMMUNICATIONS ERROR BETWEEN INDICATOR AND SCALE

SOLUTION:

A. Remove power to the indicator, and leave it off for a few minutes. Apply power to the indicator. If the indicator displays weight, proceed with normal operations. Otherwise, follow the next steps to determine the problem.

NOTE: If the indicator works for a few minutes, then the error message appears again, install a ground wire between the 225D (825D) and the scale ground rod.

B. Go to the Load Cell Assignment screen on the indicator and write down all of the load cell IDs and their corresponding scale locations (NOT the location in the data loop).

C. If a Cardinal Digital Load Cell Simulator is available, remove the Homerun cable from the first load cell in the loop and attach it to the simulator.

D. Go to the Scale Setup screen and change the number of load cells to “1” and assign the simulator ID to that load cell position. The 225D (825D) should display CELL RESPONDED. If NO CELL RESPONSE is displayed, return to the Calibration screen, and perform a **ZERO CAL**. Return to the Weight screen, and cycle power (turn off, then back on) to save the settings. The 225D (825D) should display weight when the slide on the simulator is moved.

E. If the scale will not function with the simulator, go to the Calibration screen, select SmartCal, and attempt to calibrate the scale.

F. If the scale will not calibrate with the simulator, using a short test cable, connect the simulator directly to the 225DLC (825-DLC) card, bypassing the Homerun cable. If the 225D (825D) will not recognize and communicate with the simulator, the 225DLC (825-DLC) card is bad and will need to be replaced.

G. If the scale will calibrate with the simulator connected directly to the 225DLC (825-DLC) card, use a NEST and perform the cable test on the Homerun cable.

COMMUNICATIONS ERROR BETWEEN INDICATOR AND SCALE, Cont.

SOLUTION:

H. If a NEST is not available, proceed with the following instructions to check the Homerun cable for shorts:

1. Disconnect the Homerun cable from the load cell (Start Node).
2. Starting with one wire, check the resistance between it and each of the other wires one at a time. With a DVM this should always read “OL” to indicate there is no current flow between that pair of wires.
3. After checking the first wire take the next wire and check it for shorts to the remaining three wires.
4. Continue this procedure until all wires are tested for shorts to all other wires.

I. If the Homerun cable, 225DLC (825-DLC) and 225D (825D) check good with the simulator, we need to test each load cell in the loop by starting with the first load cell.

Go to the Scale Setup screen, and enter “1 Loadcell” to select that cell, assign it to scale one, and enter the ID for the load cell you are connected to. Press ENTER. The 225D (825D) should display CELL RESPONDED, indicating that the load cell is communicating and good. If NO CELL RESPONSE is displayed, return to the Calibration screen, and perform a **ZERO CAL**. Return to the Weight screen, and cycle power (turn off, then back on) to save the settings. If the 225D (825D) displays weight, zero the indicator, then stand on the deck over the load cell to confirm operation. If the load cell fails to respond, replace the load cell.

J. Next, connect the next load cell in the loop. Go to the Scale Setup screen, and enter “Number of Cells 2”. Enter the ID for the second load cell. Press ENTER. The 225D (825D) should display CELL RESPONDED, indicating that the second load cell is communicating and good. If NO CELL RESPONSE is displayed, return to the Calibration screen, and perform a **ZERO CAL**. Return to the Weight screen, and cycle power (turn off, then back on) to save the settings. If the 225D (825D) displays weight, zero the indicator, then stand on the deck over the second load cell to confirm operation. If the load cell fails to respond, replace the load cell.

K. Continue adding load cells one at a time until you have a load cell that will not communicate. When that occurs, first replace the cable connecting the last good load cell to the load cell you are testing, to see if a different cable resolves the failure. If it does, proceed to the next load cell to test. If a different cable does not correct the failure, place a new load cell in the current position and input that load cell ID, and see if it responds. If the new load cell does not respond, place the new load cell in the previous position to see if it will communicate through it.

L. Continue this process until all load cells are working and making weight. After all load cells are communicating and making weight, go back into the Load Cell Setup and enter the load cell IDs in their correct scale position. Cycle power (turn off, then back on) to save the settings, perform a **ZERO CAL**, and then verify calibration.

LOAD CELL X HAS NO ADDRESS

SOLUTION:

A. Go to the Scale Setup screen and enter the load cell ID in the correct scale location.

COMMUNICATION ERROR BETWEEN LOADCELLS X AND Y

SOLUTION:

A. Use the NEST to test the suspect load cell cable for defects.

B. If the load cell cable tests good, use the NEST to test the two connecting load cells.

C. If a NEST is not available, replace the suspect load cell cable with a new load cell cable and confirm operation.

D. If after replacing the load cell cable, the error still exists, replace the two connecting load cells (one at a time) to confirm operation.

SCALE WILL NOT RETURN TO ZERO

SOLUTION:

A. After ensuring the scale deck is clear of any buildup or debris, enter DIAGNOSTICS.

B. The first screen displays the actual deadload that is on each load cell. If these values look correct, push the ZERO key to get a zero reading for each load cell.

C. Make multiple passes with a loaded truck and observe which (if any) load cells do not return to zero. Small errors are normal as the deck may not return to exactly its previous position.

D. If a load cell is not returning to zero, jack up the bridge at that load cell location and check for broken pivot plates, balls or the hardened cup.

E. Check for clearance from the corner stand to the main beam flanges. If a stand is not centered, and rubbing the bridge, it will cause zero errors.

SCALE IS UNSTABLE

SOLUTION:

A. Go to the second diagnostics screen MINIMUN/MAXIMUM WEIGHTS and press ZERO.

B. Observe the change in output of the load cells for 10-15 minutes to identify a drifting load cell.

LOAD CELL OR SCALE COMMUNICATIONS PROBLEMS

SOLUTION:

A. Go to the Diagnostics screen LOAD CELL COMMUNICATIONS ERRORS and observe the historical error counters for each load cell.

B. Record these numbers.

C. Press EXIT(?) to zero the counters on the 225D.

   For the 825D, press C)lear to zero the counters.

   NOTE: Some number of the communications errors are normal, however they should all be approximately the same.

Cardinal Scale Mfg. Co.
203 E. Daugherty, Webb City, MO 64870 USA
Ph: 417-673-4631 or 1-800-641-2008
Fax: 417-673-2153
www.cardinalscale.com

Technical Support: 1-866-254-8261
E-mail: tech@cardet.com

Printed in USA

0330-1302-0M Rev A 03/19