



ENVIRONMENTAL
EQUIPMENT, INC.

ARCH

ARCHWEIGH 2000 BELT SCALE WITH TOUCH PANEL DISPLAY

INSTALLATION / WIRING / OPERATION

11/2019



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1. Recommended Tools for Installation

Standard Phillips Screw Driver

Regular Pliers / Needle Nose Pliers

Nylon String

Wire Strippers or Utility Knife

3/8" or 1/2" Socket Set

3/16" T-Handle Allen Wrench

1/4" T-Handle Allen Wrench

Small 1/8" Straight Tip Screw Driver

1/2" Corded or Cordless Drill

Cord Grips or Liquid Tight for Scale and Integrator Wiring

2. Integrator Mounting

The integrator enclosure is a NEMA 4 type. It can be mounted in any location that meets NEMA 4 specifications, however it is recommended that the display be protected from direct sunlight. While direct sunlight will not permanently damage the display, it may cause viewing to be limited until it is shaded and allowed to cool.

3. Mechanical Installation:

Definitions: (See Figure 1)

Load Area: Any area covered by skirt board material.

Scale Area: Area from the minus three approach idler to the plus three retreat idler.

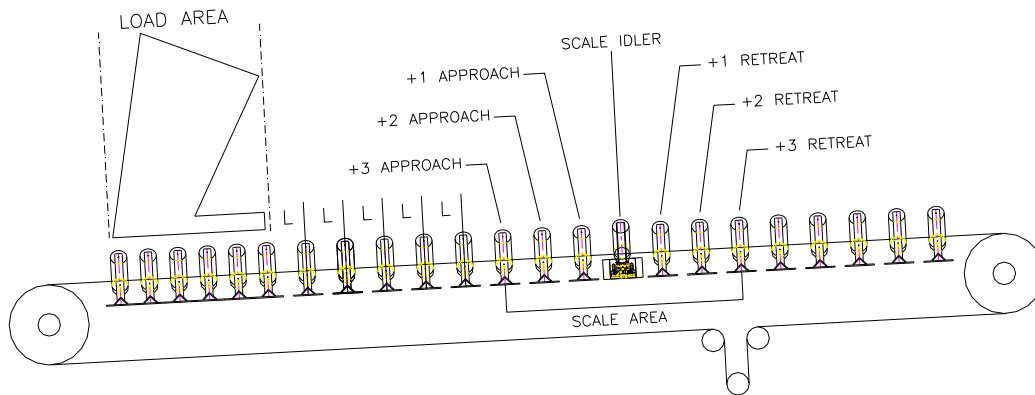


Figure 1

Location:

- The weigh idler should be installed at a point where material speed and belt speed match; generally within 50 feet of the load point, but no closer than 5 idlers of the load area.
- If the scale assembly is to be mounted on a conveyor containing a curve, the weigh idler should not be installed within 40 feet of the curve.
- The conveyor should be rigid, or bracing must be added to strengthen the framework.
- Scale assemblies should be located in areas with minimum vibration.
- Training idlers should not be located within 60 feet of the scale area.
- All idlers within the scale area must be in good condition and of the same make and model. In addition, T.I.R. must not exceed +/- 0.015 inch.
- The entire scale area should be protected from the elements as much as possible.
- Idler spacing within the scale area should conform to CEMA standards based on material conveyed, speed, etc.

Installation: (See Figure 2)

Scale Assembly:

- 1) If necessary, strengthen the conveyor framework.
- 2) Any separations (expansion joints) of the conveyor stringers near the scale must be rigidly welded together.
- 3) Insure that the conveyor is level from the minus 3 approach idler to the plus 3 retreat idler.
- 4) Raise or remove the belt over the entire scale area (from minus 3 approach to plus 3 retreat).
- 5) Remove the idler located in the scale position and replace with the ArchWeigh scale assembly.

WARNING: Remove the shipping pins after the scale is bolted in place. (The idler will drop approximately 1/8 to 1/4 inch when the shipping pins are removed. It will be impossible to correctly shim the idler until the shipping pins are removed.)

- 6) Locate and mark the mid point of the wing rolls of each idler assembly located in the scale area.
- 7) Square the minus two approach and the plus two retreat idlers with the conveyor structure.
- 8) Raise the minus three approach and the plus three retreat idlers 1/4 inch Above the belt line.
- 9) Evenly space all idlers (including scale assembly) located between the minus three approach and the plus three retreat idlers.
- 10) Tie four lines (a piano wire or equivalent) to the base of the minus three approach idler; one line running across the center marks of each wing roll and two lines evenly spaced and running across the center roll. Each line should then be tied tightly to the base of the plus three retreat idler.

Note: On scale systems over 54 inches, an additional string line should be placed on each wing roll for a total of 6 lines. Refer to figure 2.

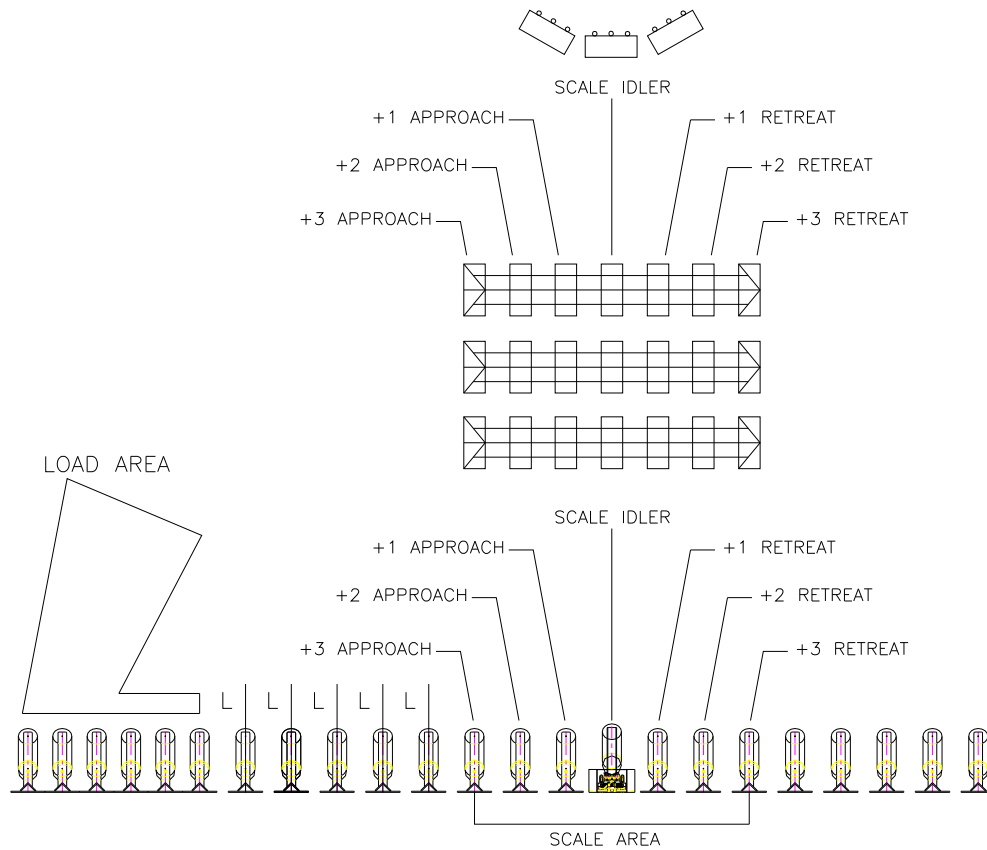


Figure 2

- ❑ **11)** At this point in the setup process the lines should only touch the plus three and minus three idlers. The other idlers should be below the lines. If the line touches any roll located in the scale area, additional 1/16 inch shims should be evenly added to the minus three and plus three idlers until a clearance exists.
- ❑ **12)** Shim all idlers between the plus three and minus three idler including the scale idler to within 1/32 inch of the lines but not touching the lines.
- ❑ **13)** Insure that all idlers are squared, leveled, and bolted tightly in place.
- ❑ **14)** See *Figure 3* - Loosen the Pivot Pin one (1) turn, loosen the Positioning Bolts two (2) turns. Tighten the Positioning Bolts and then tighten the Pivot Bolt. This procedure removes any torsion strain placed on the assembly during installation.
- ❑ **15)** See *Figure 3* - Tighten the load cells to the weight transfer bars and the mounting plate. There are 4 bolts per loadcell that has to be tightened.
- ❑ **16)** Remove all alignment strings.

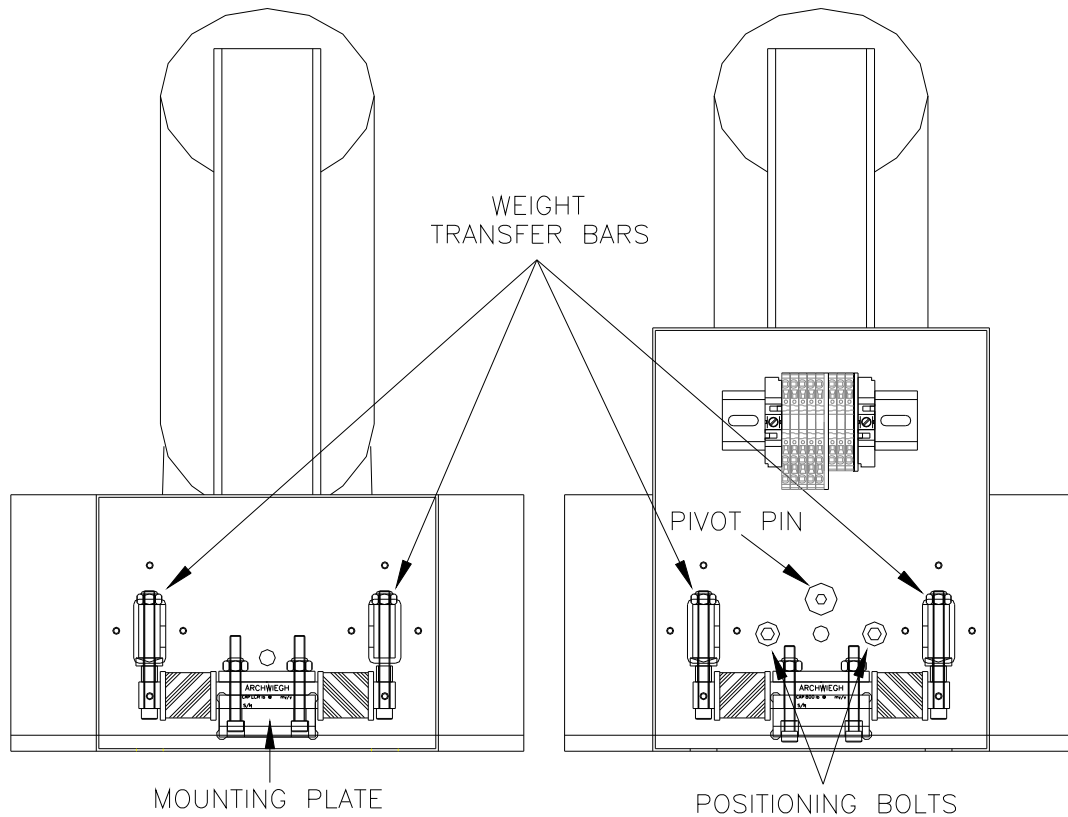


Figure 3

When tightening the loadcells in the junction boxes, make sure that all (4) bolts are tightened. There are (2) bolts through the mounting plate and (1) bolt in each transfer bar.

4. Electrical Connections

Once the Scale has been installed and the integrator mounted in its desired location, the electrical connections can be made. All ArchWeigh Scales are shipped with 25 feet of loadcell cable (Belden Cable P/N 8723, 22 AWG with 2 individually Shielded Pairs).

The load cells use four conductors and a shield, while the Speed Sensor uses 3 conductors. This will allow you to mount the Integrator 10–12 feet from the Scale. If you require the Integrator to be located farther from the scale ARCH can provide you extra cable, at an additional cost, or you may wish to use the above part number to buy it locally in your area.

Starting at the Scale

You will find the two loadcell wires and one speed sensor wire connected to the bottom of the terminal blocks in the junction box. See Figure 4 and 5.

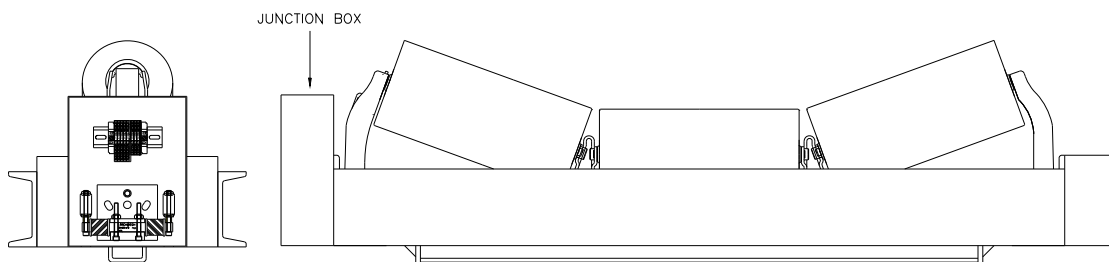


Figure 4

- ❑ 1) Remove the load cell enclosure cover from the junction box.
- ❑ 2) Place two small cord grips in the desired location of the junction box For the load cell and speed cables.

WARNING: *Do not cut the loadcell wires, they have been manufactured to compensate for temperature variances.*

- ❑ 3) Cut the supplied Belden Cable in half and insert one end of each cable through the side of the junction box enclosure.
- ❑ 4) Remove approximately (2) inches of the cable jacket from both ends of each cable that you inserted into the junction box enclosure.
- ❑ 5) Strip ¼" of insulation off all the colored conductors.

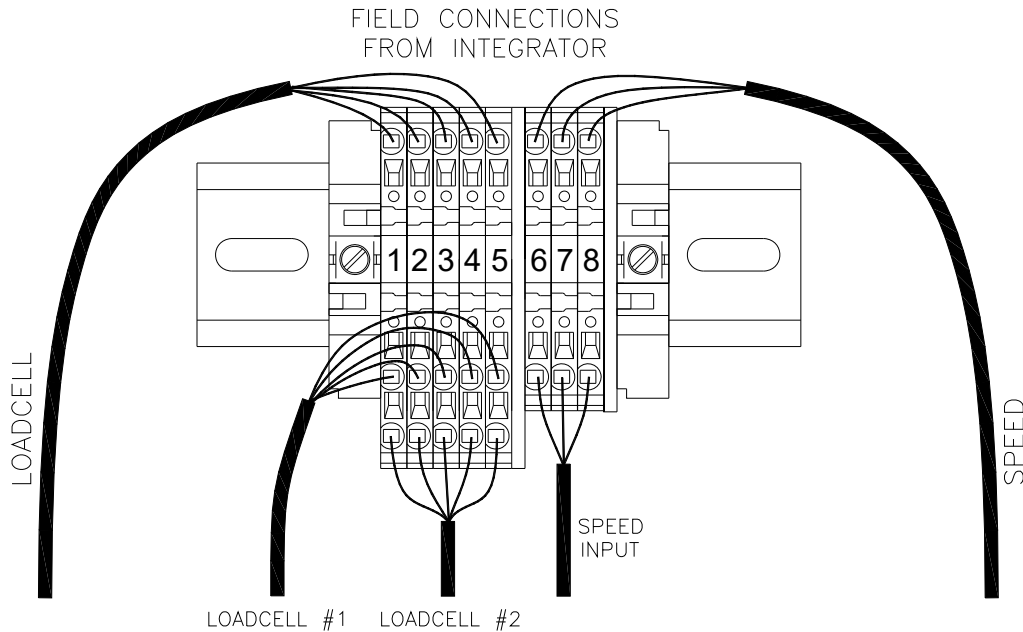


Figure 5

Terminal Strip in Scale Idler Junction Box

- ❑ 5) Place a small straight tipped screwdriver in the square hole just below the hole that you wish to terminate the conductor in. Pull the screwdriver down carefully to move the spring clamp so the wire can be inserted. After inserting the wire pull the screwdriver out. Pull on the wire to ensure that it will not come out of the terminal block.
- ❑ 6) Route other ends of the two cables to the Control Integrator and insert them into the box through cord grips placed at your description.

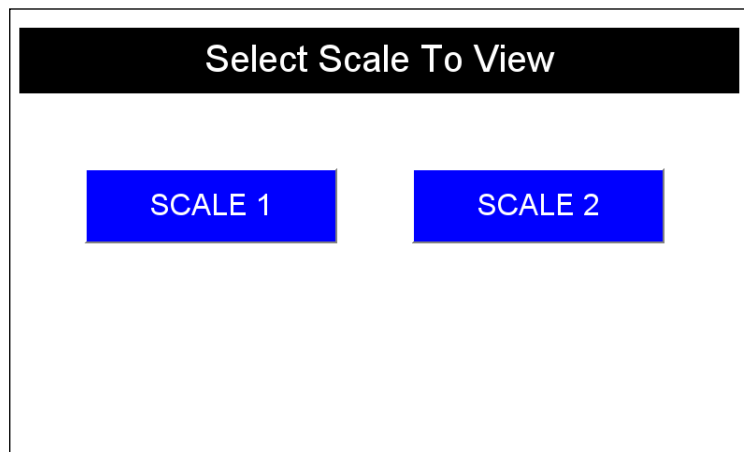
- ❑ **7)** Remove approximately (2) inches of the cable jacket from both ends of each cable that you inserted into the Control Integrator enclosure.
- ❑ **8)** Strip ¼" of insulation off all the colored conductors.
- ❑ **9)** Place a small straight tipped screwdriver in the square hole just above the hole that you wish to terminate the conductor in. Push the screwdriver up carefully to move the spring clamp so the wire can be inserted. After inserting the wire pull the screwdriver out. Pull on the wire to ensure that it will not come out of the terminal block.
- ❑ **10)** Reinstall the Junction Box Cover.

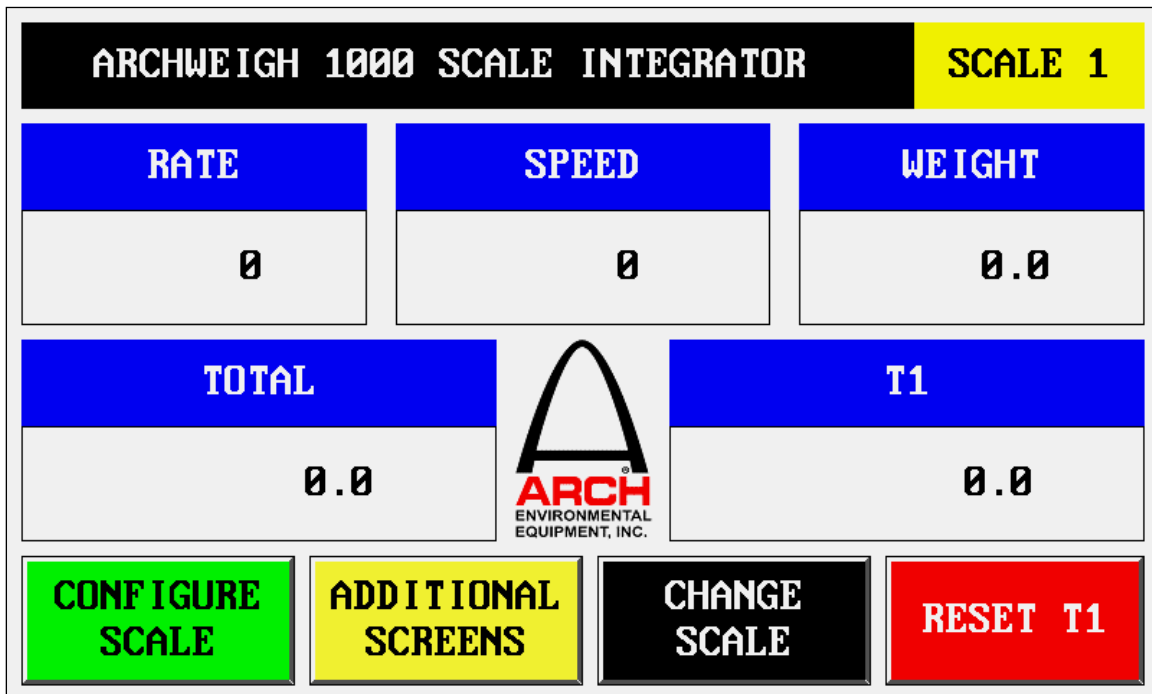
5. INITIAL SETUP / CONFIGURATION

Below is the initial screen upon power up. If this is the first power up there won't be any scale enabled to view. Press the blinking 'CONTINUE' button.



Press the desired scale to view and go to the main screen of that scale.





MAIN SCREEN SCALE 1

Function Buttons

Configure Scale	Starts the scale calibration procedures.
Additional Screens	More screens with various information.
Reset T1	Reset T1 Totalizer.
Change Scale	View other connected scales.

NOTE: The upper right had corner of the main screen indicates which scale is currently being viewed.

There are (3) steps to configuring ArchWeigh 2000 Scale Bases.

1. Scale Setup – Scale parameters for scale location
2. Scale Calibration – Perform dead weight and test weight procedures.
3. Belt Tare – Remove belt weight from scale.

The '**CHANGE SCALE**' button will go to a screen that will allow the user to select one of the installed scales to view.

6 INDIVIDUAL SCALE CALIBRATION

To configure a belt scale, press **Configure Scale button** at the bottom left of Main screen.

6.1 SCALE SETUP

CONFIGURE BELT SCALE SCALE 1

STEP 1 - GENERAL SETUP

STEP 2 - CALIBRATE

STEP 3 - BELT TARE

Return To Main Screen

To perform Setup, press the 'GENERAL SETUP' button.

GENERAL SETUP PAGE 1 OF 4 SCALE 1

PRESS CURRENT VALUE TO CHANGE

ROLL DIAMETER (INCHES): 5

PULSES PER REVOLUTION: 2

WEIGH SPAN AREA (INCHES): 48

< Back Next >

Roll Diameter – Diameter of the weigh idler rolls.

Pulses Per Revolution – Number of magnetic targets in the wing roll on the weigh idler junction box side of the scale.

Weigh Area Span – Measure from the scale to each of the idlers on each side of the scale. Add those two numbers and divide by 2.

Enter the Roll Diameter in inches, Pulses Per Revolution, and Weigh Area Span. Press 'NEXT >' to Continue or '< BACK' to go back one step.

General Setup page 2 of 4 SCALE 1

PRESS BUTTON TO CHANGE MEASUREMENT

0 - LBS	2 - LONG TONS
1 - TONS	3 - METRIC TONS

CURRENT SELECTION -> 0

< Back	Next >
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Select the desired unit of measurement.

Units: Pounds, Tons, Long Tons, and Metric Tons.

Press 'NEXT >' to Continue or '< BACK' to go back one step.

GENERAL SETUP PAGE 3 OF 4 SCALE 1

PRESS CURRENT VALUE TO CHANGE

4-20mA MAX OUTPUT RATE: 250

AUTO TARE (LBS):: 0

< Back	Next >
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4-20 Max Output Rate – Enter the maximum tons per hour the conveyor will operate at. This is used to scale the 4-20 mA rate output.

Auto Tare (LBS) – During initial setup this value will be set to 0. After initial setup, set auto tare to a value in pounds that is greater than the minor weight variations on the scale and less than the lightest weight of continuous flow on the belt. If weight remains below the Auto Tare value for three revolutions a new tare value is established.

Press 'NEXT >' to Continue or '< BACK' to go back one step.

GENERAL SETUP PAGE 4 OF 4 SCALE 1

SYSTEM CALIBRATION CONSTANT

PRESS CURRENT VALUE TO CHANGE

CURRENTLY

CALIBRATION CONSTANT - 1.0000

< Back	Next >
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Calibration Constant – Compensation factor for adjusting totalizer accumulation.

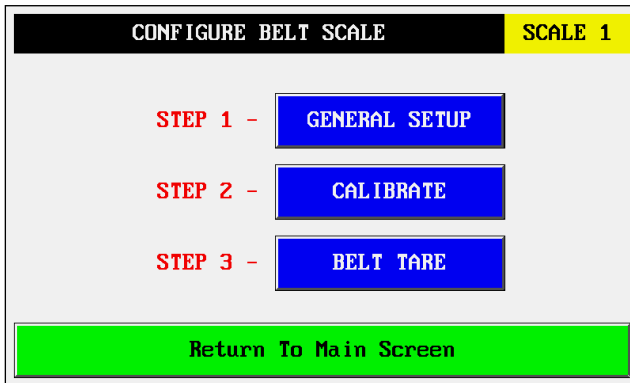
NOTE: This value should be 1.0000 for a newly installed scale system.

Press 'NEXT >' to Continue or '< BACK' to go back one step.



Press 'EXIT GENERAL SETUP' to return to Configure Scale Screen.

6.2 SCALE CALIBRATION



To perform Calibrate, press the 'CALIBRATE' button.



It is very important to empty the conveyor and stop the conveyor at this point.

NOTE: It is no longer necessary to lift the belt off the scale to perform a dead weight and test weight.

Press 'NEXT >' to Continue or 'ABORT' to cancel calibration.



Set Dead Weight- This will store the digitized analog value that represents the amount of weight the scale sees with no product on the belt.

NOTE: Wait for a few seconds for the ADC value to stabilize before pressing the Set Dead Weight button.

Press 'SET DEAD WEIGHT' to Continue or 'ABORT' to cancel calibration.

CALIBRATE PAGE 3 OF 6 SCALE 1

STEP 3 - HANG TEST WEIGHT(S)

SUSPEND TEST WEIGHTS THAT ARE 10% TO 50% OF THE LOADCELL RATED CAPACITY

PRESS NEXT WHEN THE WEIGHT(S) ARE IN PLACE.

Abort **Next >**

Suspend test weights – Ensure that the test weights are only in contact with the weigh idler bridge of the belt scale.

If the weights are in contact with any other parts of the scale the calibration will be off thus affecting the accuracy of the scale.

Press 'NEXT >' to Continue or 'ABORT' to cancel calibration.

CALIBRATE PAGE 4 OF 6 SCALE 1

STEP 4 - TEST WEIGHT(S) LBS

PRESS VALUE TO CHANGE

TEST WEIGHT (LBS) 25

Abort **Next >**

Enter the amount of weight that has been hung from the scale. The value must be rounded to the nearest pound.

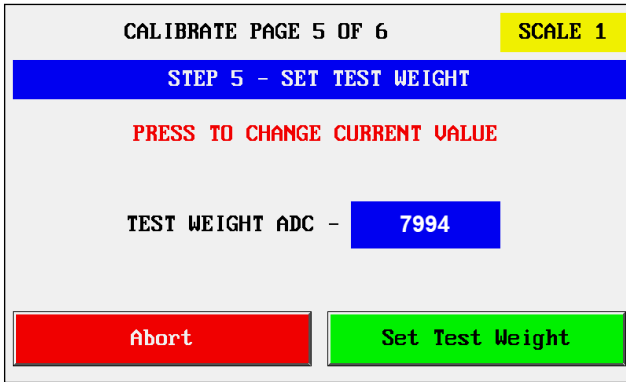
NOTE: The weight must be between 10% and 50% of the loadcells rated value.

Look inside one end of the scale carriages enclosures to find the loadcell value printed on the loadcell.

Enter the amount of test weight being used.

It is best if equal amounts of weight are suspended from each side of the weigh idler bridge.

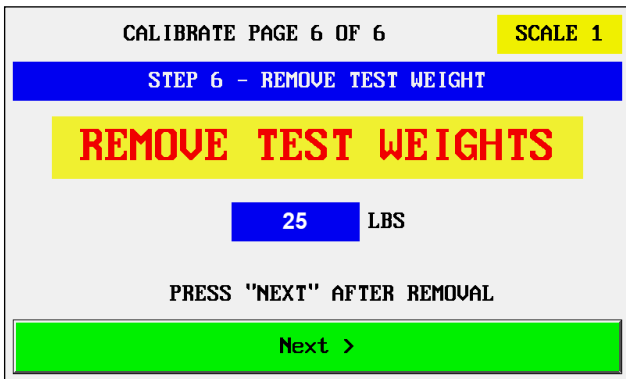
Press 'NEXT >' to Continue or 'ABORT' to cancel calibration.



Test Weight ADC - This will store the digitized analog value that represents the amount of test weight the scale sees.

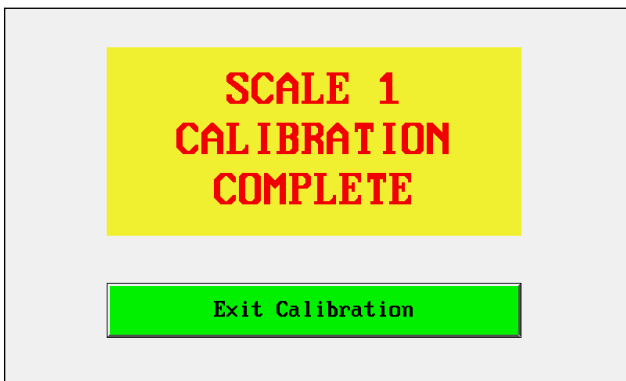
NOTE: Wait for a few seconds for the ADC value to stabilize before pressing the Set Test Weight button.

Press 'SET TEST WEIGHT >' to Continue or 'ABORT' to cancel calibration.



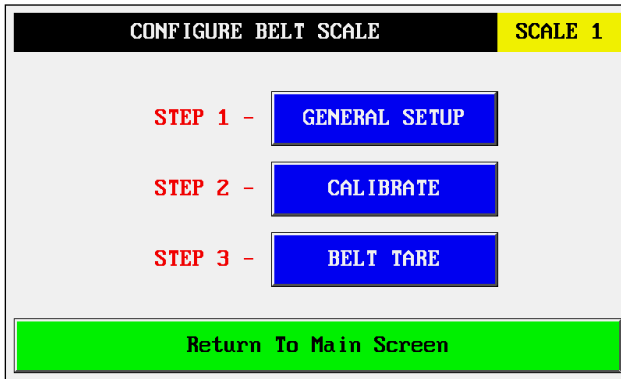
Remove test weights and ensure that every has been picked up and that the belt is clear to be started.

Press 'NEXT >' to Continue after test weights have been removed.

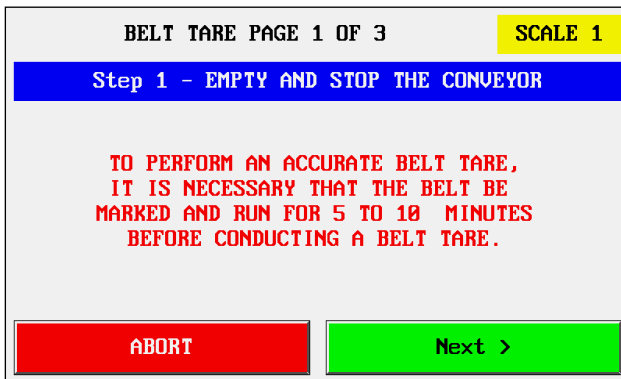


Press 'EXIT CALIBRATION' to return to Configure Scale Screen

6.3 BELT TARE



To perform a Belt Tare, press the 'BELT TARE' button.



MARK THE BELT

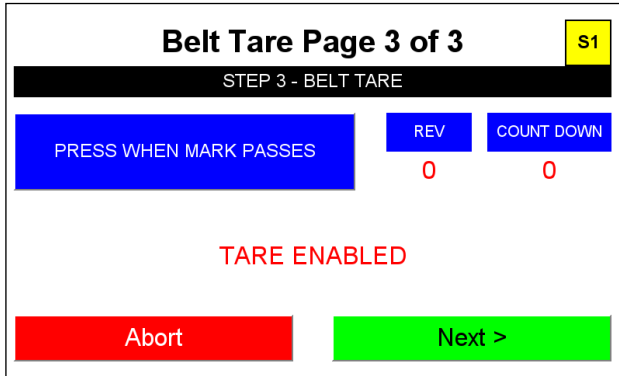
Paint a mark on the belt so it can be easily seen. If the belt has one mechanical splice, use it as a reference.

Start Conveyor – Insure that the conveyor is up to its normal operating speed before continuing with the belt tare.

Press 'NEXT >' to Continue or 'ABORT' to cancel Belt Tare.



Press 'START BELT TARE' to Continue or 'ABORT' to cancel Belt Tare.



Press the 'Press When Mark Passes' button when the mark passes the Belt Scale.

NOTE: The test will require (5) revolutions of the belt.

The Count Down counter will help you know when the mark is coming after the 2nd. and 3rd Revolutions of the belt.

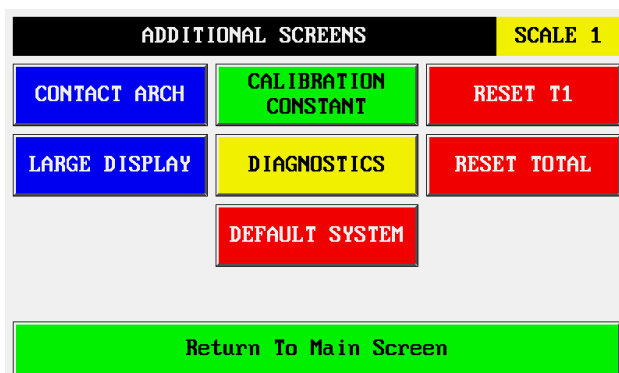
When Tare is completed after the 5th revolution press 'NEXT >'.

Press 'NEXT >' to Continue or 'ABORT' to cancel Belt Tare.



Press 'EXIT BELT TARE' to return to Configure Scale Screen

7. ADDITIONAL SCREENS



Press desired button to see additional information on the belt scale.

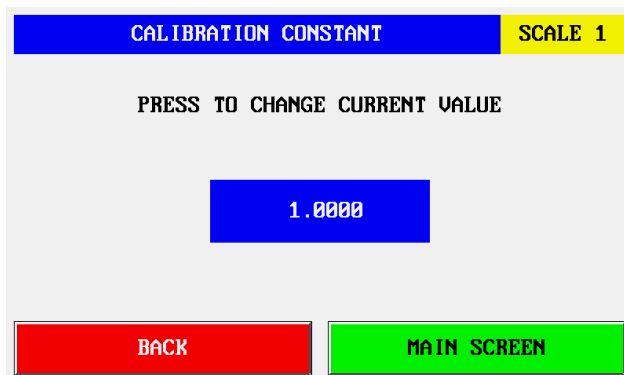
Press 'RETURN TO MAIN SCREEN' to go back.

7.1 CONTACT ARCH



Do not hesitate to call Arch if you have any questions, concerns, or Problems with your ArchWeigh 1000 Belt Scale System.

7.2 CALIBRATION CONSTANT



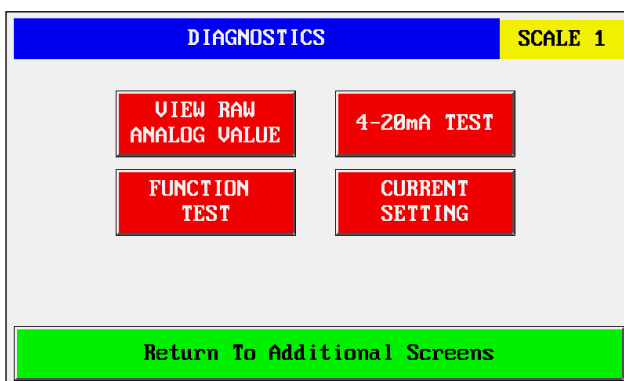
This is a compensation factor for adjusting totalizer accumulation.

This value should be 1.000 for a newly installed scale system.

Valid Ranges: 0.001 to 2.000

Press 'MAIN SCREEN' to go to main screen or '< BACK' to go back one step.

7.3 DIAGNOSTICS



Allows factory or designated plant person to perform tests on the scale system to locate possible problems with the scale system.

7.3.1 RAW ANALOG VALUE

RAW ANALOG	SCALE 1
8739	
THE ABOVE NUMBER REPRESENTS A mV ANALOG SIGNAL FROM THE LOADCELLS THAT HAS BEEN DIGITIZED	
RETURN TO DIAGNOSTICS	

7.3.2 FUNCTION TEST

FUNCTION TEST PAGE 1 OF 4	SCALE 1
A FUNCTION TEST CHECKS THE SCALES ACCURACY IN THE EVENT THAT A MATERIAL TEST CAN NOT BE PERFORMED.	
IT WILL CALCULATE A CALIBRATION CONSTANT THAT CAN BE USED TO GET THE SCALE AS ACCURATE AS POSSIBLE	
< Back	Next >

Press 'NEXT >' to Continue or '< BACK' to go back one screen.

FUNCTION TEST PAGE 2 OF 4	SCALE 1
1. RUN THE CONVEYOR BELT EMPTY. 2. SHUT DOWN CONVEYOR BELT. 3. ATTACH WEIGHT TO SCALE IDLERS.	
WEIGHT SHOULD BE BETWEEN 10% AND 50% OF THE LOADCELL RATED CAPACITY.	
< Back	Next >

Press 'NEXT >' to Continue or '< BACK' to go back one screen.

FUNCTION TEST PAGE 3 OF 4		SCALE 1
<p>ENTER THE AMOUNT OF WEIGHT BEING USED FOR THE FUNCTION TEST BELOW</p> <p>PRESS VALUE TO CHANGE</p>		
<div style="border: 1px solid black; background-color: blue; color: white; width: 100px; height: 30px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">40</div>		
<div style="background-color: red; color: white; padding: 5px; width: 100%; text-align: center;">< Back</div>	<div style="background-color: green; color: white; padding: 5px; width: 100%; text-align: center;">Next ></div>	

Press 'NEXT >' to Continue or '< BACK' to go back one screen.

FUNCTION TEST PAGE 4 OF 4		SCALE 1
<p>START BELT AND PRESS 'START TEST' WHEN CONVEYOR COMES UP TO SPEED.</p>		
T1 -		0.0
CALCULATED TOTAL -		0.0
CAL CONSTANT -		0.0000
<p>THE LONGER THE BELT IS RUN FOR THIS TEST. THE MORE ACCURATE THE RESULTS WILL BE</p>		
<div style="background-color: green; color: white; padding: 5px; width: 100%; text-align: center;">START TEST</div>		<div style="background-color: green; color: white; padding: 5px; width: 100%; text-align: center;">EXIT</div>

Press 'START TEST' to begin test.
Press 'EXIT' to go back.

FUNCTION TEST COMPLETE		SCALE 1
<p>THE SYSTEM HAS CALCULATED A NEW CALIBRATION CONSTANT OF:</p>		
<div style="border: 1px solid black; background-color: blue; color: white; width: 150px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center; font-size: 24px;">0.9957</div>		
<div style="background-color: green; color: white; padding: 5px; width: 100%; text-align: center;">ACCEPT</div>	<div style="background-color: yellow; color: black; padding: 5px; width: 100%; text-align: center;">NEW TEST</div>	<div style="background-color: green; color: white; padding: 5px; width: 100%; text-align: center;">EXIT</div>

Press 'EXIT' to not use the newly calculated calibration constant.
Press 'ACCEPT' to enter the new calibration constant.
Press 'NEW TEST' to start a new test.

7.3.3 4-20mA TEST

4-20 mA TROUBLE SHOOTING SCALE 1

SELECT mA OUTPUT FOR TESTING

4 mA 8 mA 12 mA

16 mA 20 mA

Return to Diagnostics

Tests the scales 4-20mA output.

Each button will send its corresponding output.

Outputs: 4, 8, 12, 16, and 20.

7.3.4 CURRENT SETTINGS

CURRENT SETTINGS SCALE 1

ROLL DIAMETER - 5

PULSES PER REVOLUTIONS - 2

SPAN BETWEEN IDLERS - 48

CURRENT MESUREMENT - 0

MAX OUTPUT RATE - 250

CALIBRATION CONSTANT - 1.0000

RETURN TO DIAGNOSTICS

Quick reference of what settings have been entered.

7.4 LARGE DISPLAY

LARGE DISPLAY SCALE 1

TOTAL - 0.0

T1 - 0.0

RATE - 0

RETURN RESET T1

7.5 DEFAULT SYSTEM

System information for the selected scale will be reset to:

Roll Diameter:	5
Pulses Per Revolution:	2
Weigh Area Span:	48
4-2- Max Output:	250
Auto Tare (LBS):	0
Calibration Constant:	1.0000

7.6 RESET MAIN TOTAL



RESET MAIN TOTALIZER SCALE 1

MAIN TOTALIZER IS CURRENTLY

1329.5

ARE YOU SURE YOU WISH TO RESET
THE MAIN TOTALIZER?
THIS CAN NOT BE UNDONE!

NO, DO NOT RESET YES, RESET

**IF YOU HAVE ANY QUESTIONS CONCERNING THE
INSTALLATION OR OPERATION OF THE ARCHWEIGH
SCALE SYSTEM PLEASE CALL: (800) 553-4567**