Weigh Shark
Conveyor Belt Scales

Installation & Calibration Manual HD SCALE

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Made in the USA
Dec. 12, 2019

Thank you for your purchase. Your *Weigh Shark*® Belt Scale has been carefully designed to provide you with years of operation and accuracy. We have designed features to allow simple installation, calibration and operation of your scale. Our standard features should provide you with the tools to monitor and record your important production data.

The software was designed and written with you in mind. Operation is simple with the use of minimal buttons. No formulas must be calculated and no switches must be set for operation. Everything needed to calibrate your scale is accomplished via our software and high speed processor. You simply enter your calibration data, perform a couple simple steps and your scale is calibrated.

Sincerely,

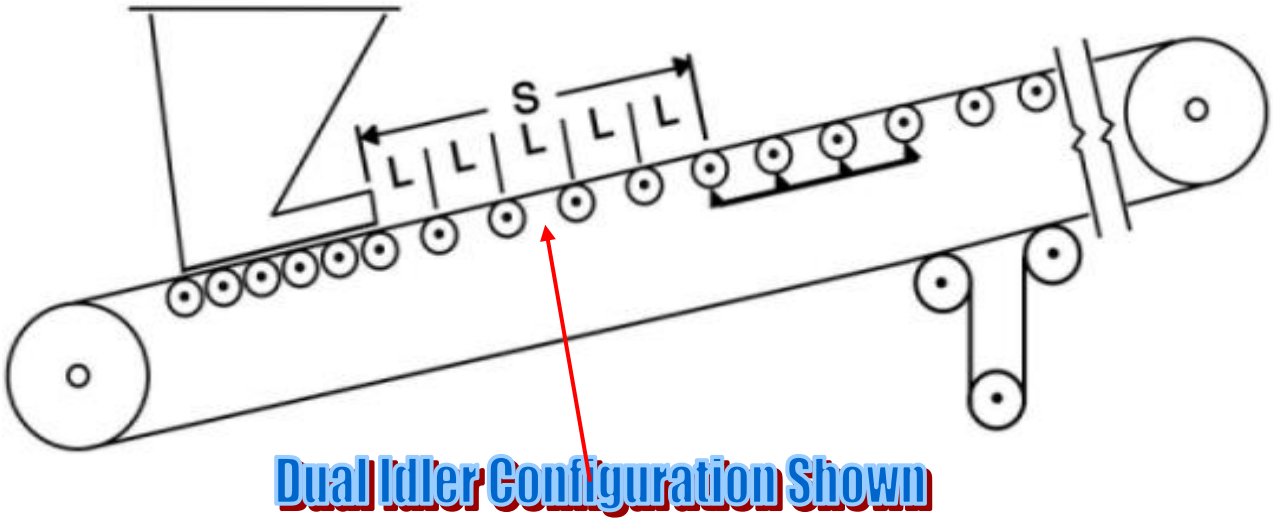
Mark Humphreys
President

This is not a Legal for Trade Scale.

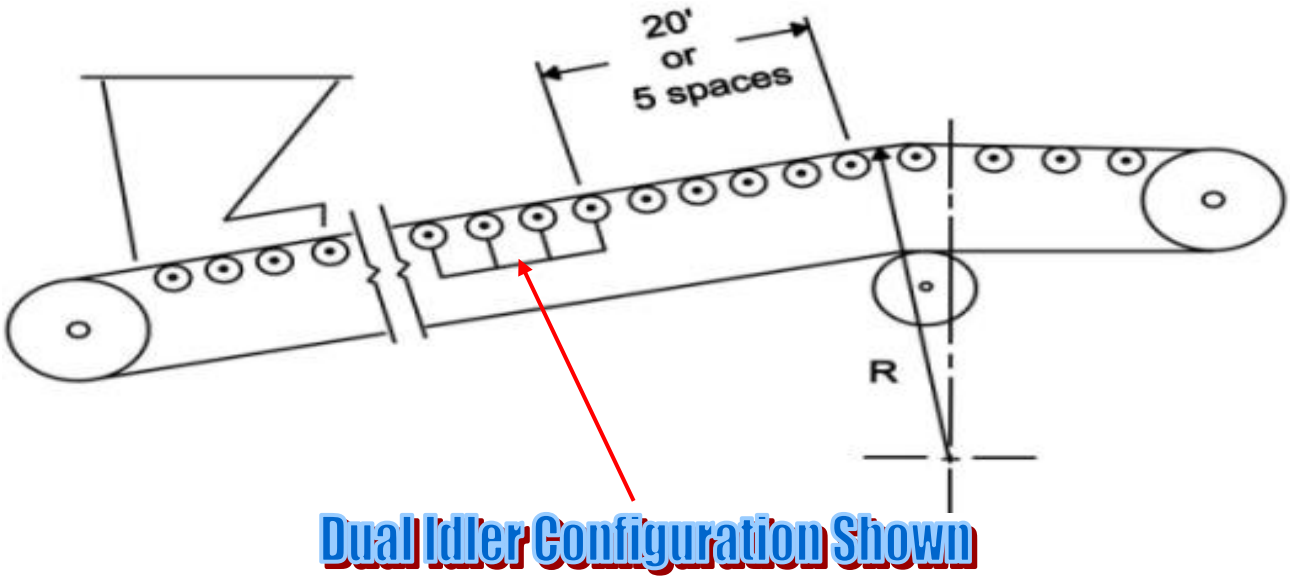
Index

Mechanical Installation

1. Select an Idler at least 5 idlers up from drop zone and 5 idlers back from Head Pulley.*(See Illustration Below)* Idler should be in good operational order, mechanically sound with rollers that are turning with minimum effort.
2. **A *Minimum* of 5 idlers; same make, model, can size and degree of angle is required**. *(or recommendations on Next Page)* The selection of good idlers is CRITICAL in the accuracy that your scale will be able to obtain.
3. The scale should be installed within 50 feet of the loading point but not closer than 6m (20 ft.) or 5 idler spaces to the end of the skirt board.



- ***Straight conveyors are preferable to curved conveyors. Convex (shown) or Concave curves are permissible at a distance of 20 feet or 5 idler spaces beyond the scale.***



1.

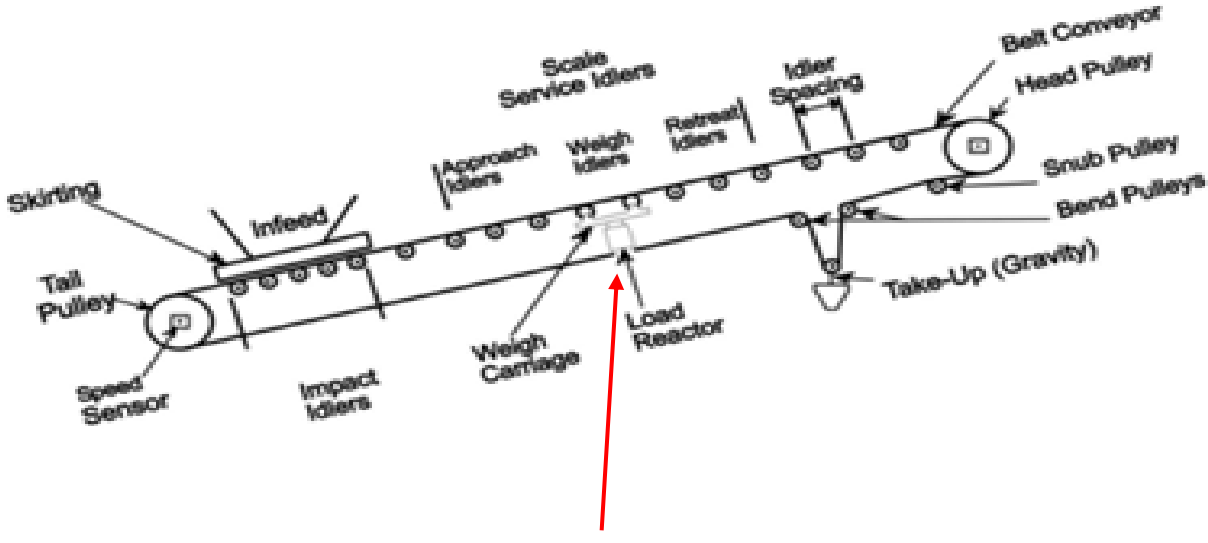
Weigh (Scale) Duty Idlers

(RECOMMENDED)

Idler misalignment amplifies the effect of belt tension and is the major contributor of errors on Electro-Mechanical (E/M) belt weighing systems. Idlers alignment can only be as good as the idler sets to be aligned. Standard idlers vary from unit to unit in; troughing angle, T.I.R., idler deflection etc.

This makes accurate alignment almost impossible. Poor roller balance can also affect the scale performance.

To achieve the highest possible accuracy and most reliable operation one should use Weigh (Scale) class idlers on: The *Approach* (before the weigh bridge) The *Retreat* (after the weigh bridge) & The *Weigh Bridge*



Dual Idler Configuration Shown

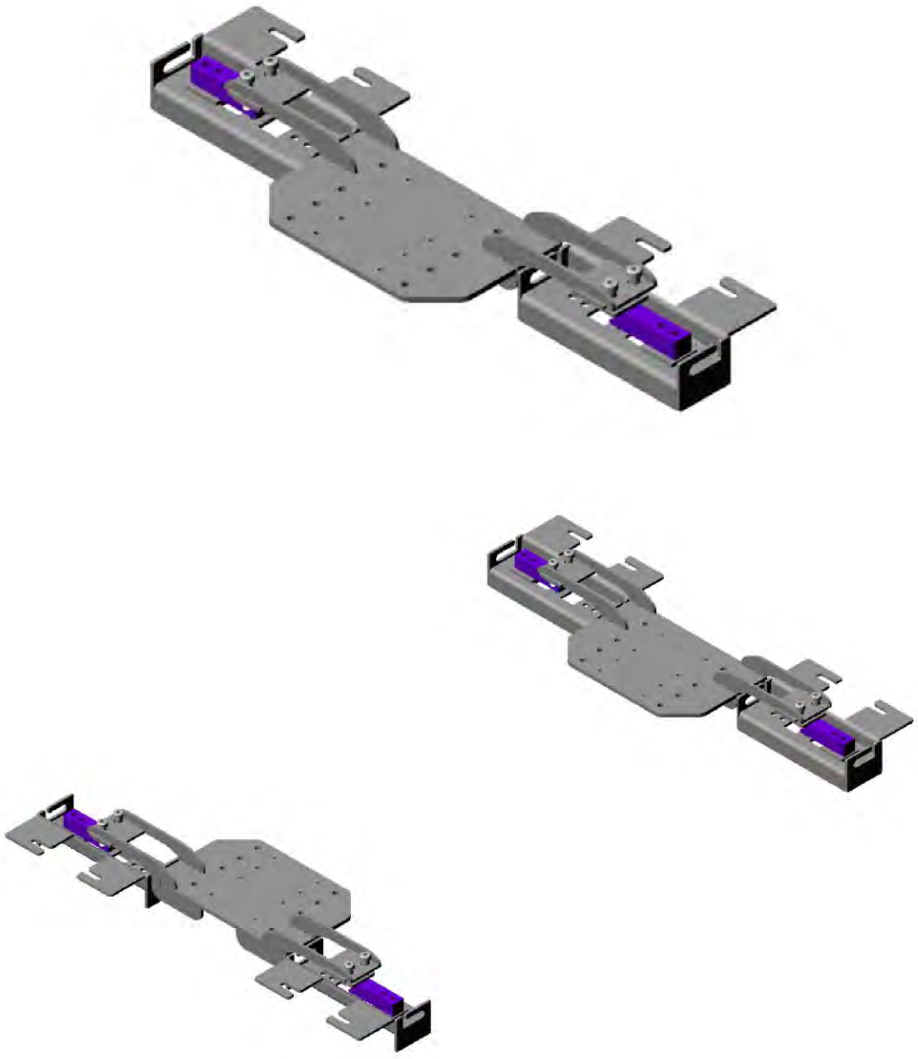
Weigh (Scale) class idlers are designed to match the application and scale model.

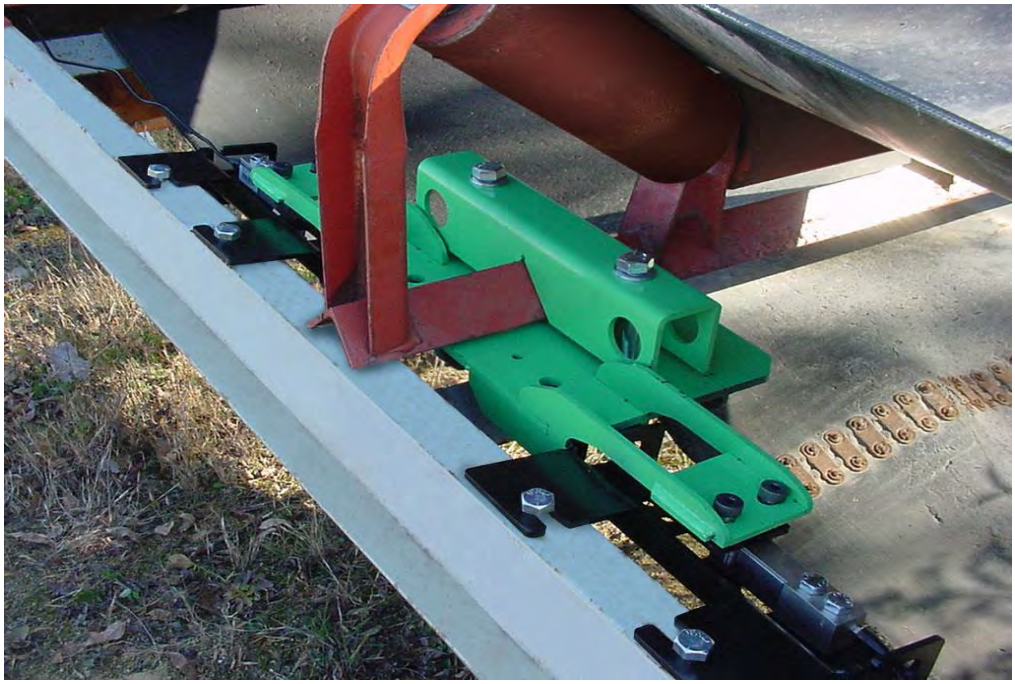
Each application is computer analyzed to optimize: Idler roll diameter, Roll shaft diameter, Roll TIR, Roller dynamic balance, Idler base section, Deflections that can be accommodated and Stiffness for very high speed applications.

These idler **bases** are manufactured to the stringent troughing angle tolerances required for high precision weighing duty.

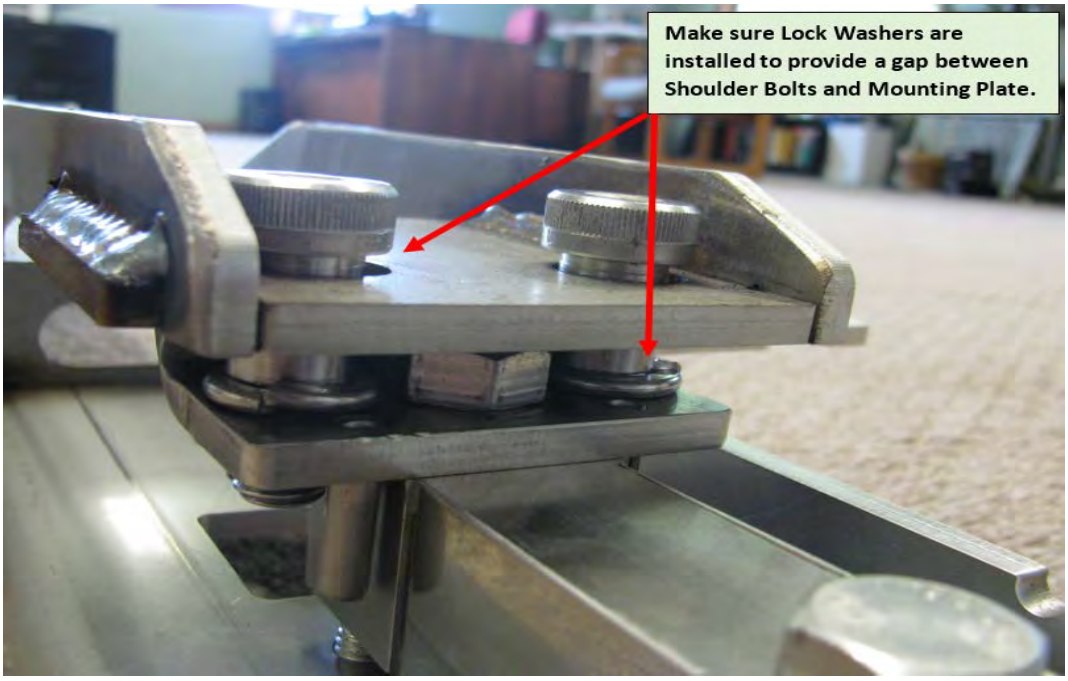
- On application with higher belt speeds (in excess of approx. 150m/min)
- The idler **rolls** are dynamically balanced
- Additionally (steel rollers only)
- The idler **rolls** are selected to meet the low break-away torque required for weighing duty.

1-A

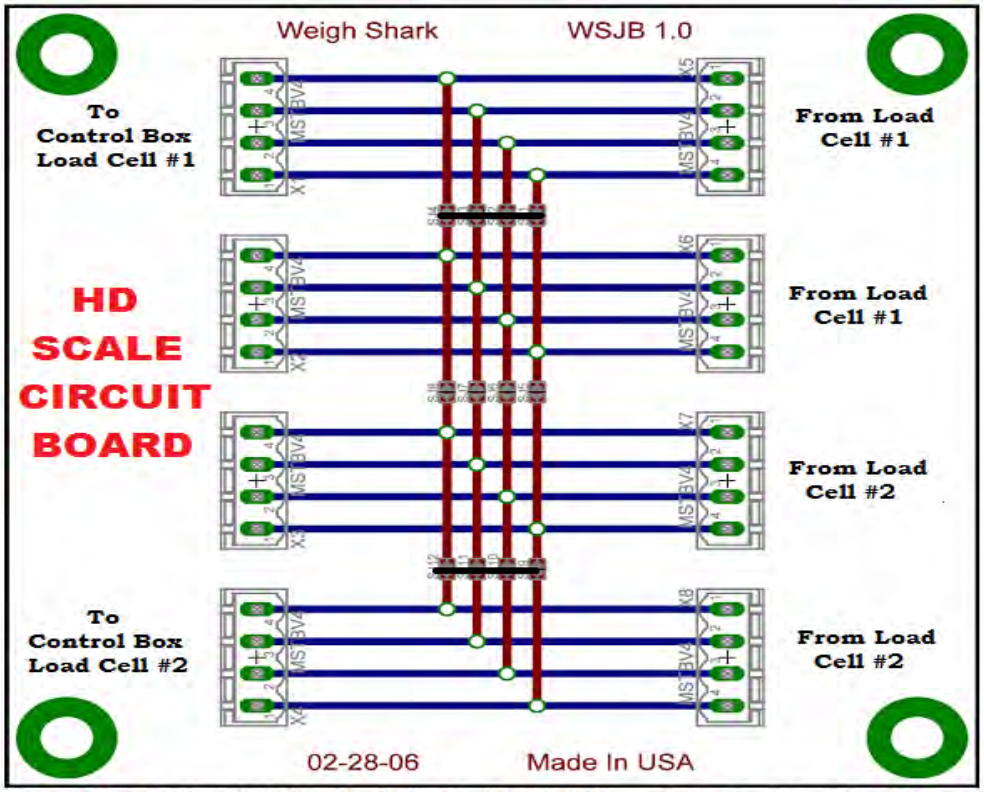




1-B



Must Label 1 Side of Load Cell Cables from assemblies as #1
Mark Other Side of Load Cell Cables from assemblies as #2



1-C

4. Sample Installation

DIRECTION OF TRAVEL

5..Remove bolts that Secure Idler to Conveyor.

6. Cut the mounting feet off the idler **as shown in picture above.**

7. Slide the load cell assembly under your idler and position it to line up the holes on your conveyor that previously secured the idler.

8. Bolt the assembly to your conveyor.

9. Install and secure the idler to the load cell assembly via the V blocks and bolts provided.

*** Do Not Over tighten Bolts as this may cause strain on load cells!!**
*** DO NOT WALK ON BELT or risk damaging Load cells!!**

10. Go to the other side of the conveyor and repeat this process.

11. Your idler should now be supported by the load cell assemblies and should not be making contact with the conveyor frame.

12. Route your load cell cables to the side of the conveyor that you will be installing the control box. ***DO NOT ROUTE NEAR HIGH VOLTAGE!!***

2.

13. Run a string along the edge of 2 idlers preceding and 2 idlers following your idler to establish that all 5 idlers are level. ***Adjust any idlers that are not in alignment using the shims provided***. This step is important to maintain constant belt pressure on the scale when the belt is empty since during the calibration process we establish the weight of the empty belt for tare.

SEE NEXT PAGE!!

14. Select a different idler to install your speed sensor assembly. It can be any other idler. We suggest you select the next idler in the direction of where you will install the control box. Minimum Belt Speed recommended is 40 FPM.

DIRECTION OF TRAVEL

15. Using the special Tri-Fold bolt provided, secure the speed sensor assembly to your idler.

16. Route the speed sensor cable and secure it to the idler with cable ties.
17. Run all three cables to the location where your control box is installed
    A. DO NOT ROUTE ALONG HIGH VOLTAGE POWER or near a VFD!
    B. Do Not Cut Cables Unless Absolutely Necessary.
    c. Use Belden 8723 or equivalent twisted shielded pair cable to extend cables,
    D. Weigh Shark Junction Box or Soldering of Cable with Heat Shrink must be performed when extending cables.
18. **Install your Integrator (Control box)**
    a. Mount Integrator away from vibration to avoid damage to circuit board **Mounting near vibration will void warranty.**
    b. ***Do Not Mount near a Variable Frequency Drive (VFD)!!***
    c. **Mount out of direct sunlight to avoid damage to Liquid Crystal Display.**

* IMPORTANT *

The Idler mounted on the scale assembly MUST be removed before *Overland Transport* to avoid damage to load cells.

Idler Alignment

(String Lining)

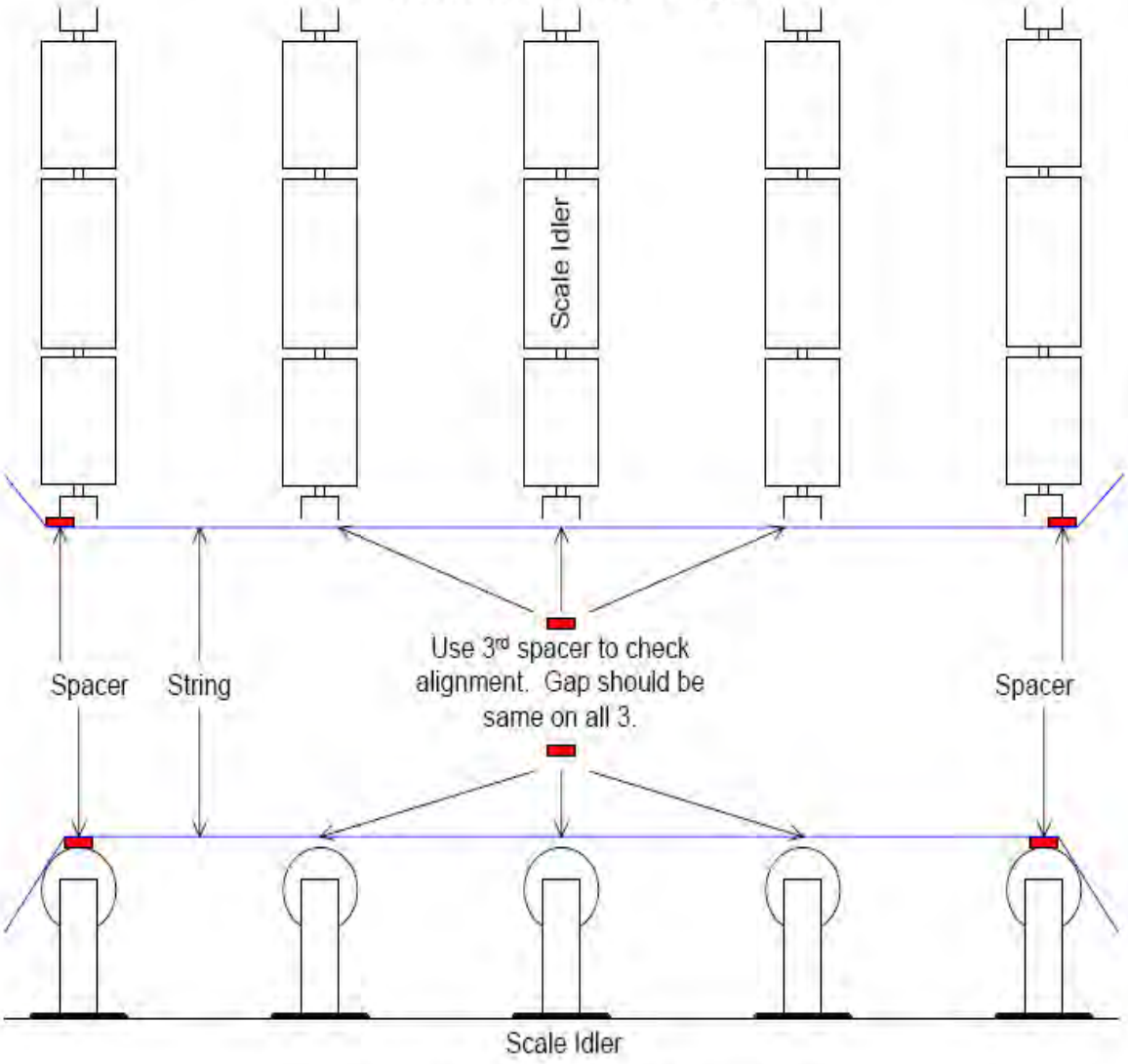
DO NOT SKIP THIS STEP!

The alignment of the the idlers directly affects the accuracy of the scale

Tips:

- Use all the same brand and model idlers.
- ½" Bolts can be used as spacers.

Check Idlers Side-to-Side Alignment



Check Idlers Vertical Alignment

(Check BOTH sides of conveyor!)

Shim idlers accordingly to be within 1/8"

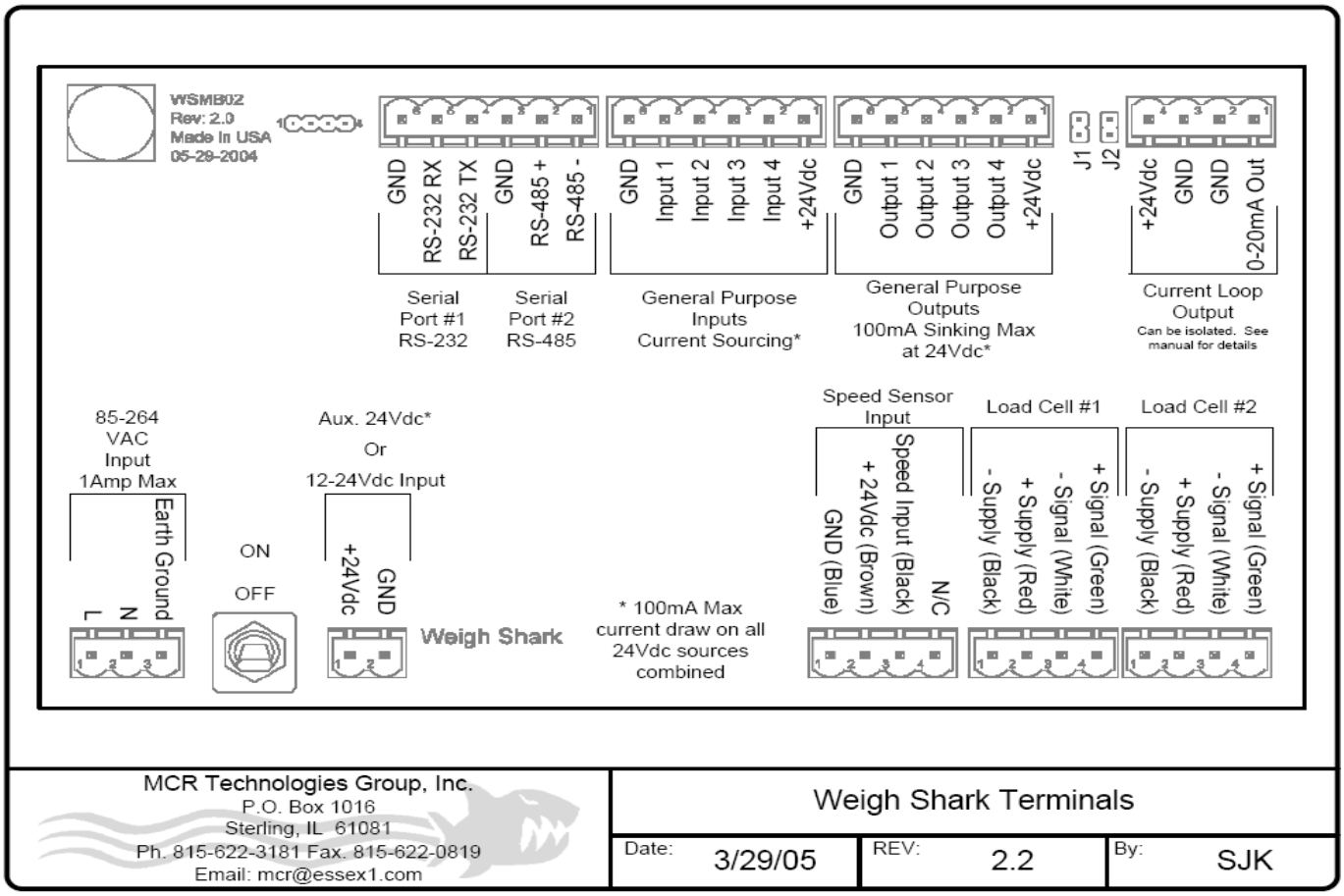
Shims are Included and MUST be used to Raise 2 sets of Idlers directly Before & After the Scale Idler

ELECTRICAL WIRING

1. Route your load cell and speed sensor cables through the special 4 hole cable grip. Locate the load cell terminals and connect. Wire the speed sensor cable to the indicated terminal also on the circuit board.
2. Route your power cable to the control box and run the cable though the 1 hole cord grip.
3. Wire either 110 VAC or 220 VAC single phase or 12-24 VDC to the terminals indicated on the board using 14 gauge wire. (Diagram below.)

When extending Speed Sensor or Load Cell Cables it is highly Recommended to use a Junction Box or Soldeing of Wires with Heat Shrink Wrap. Wire Nuts or Butt Connectors are NEVER to be used.

CIRCUIT BOARD DIAGRAM



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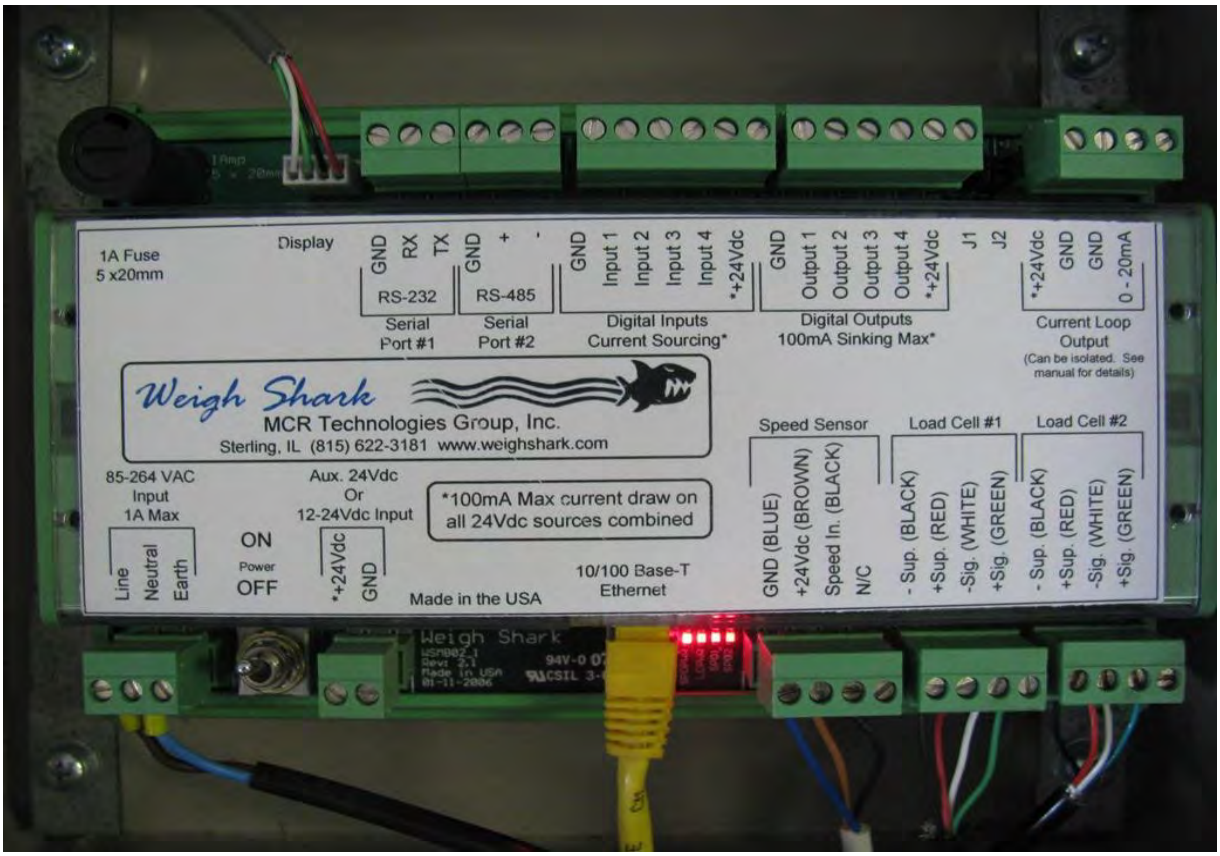
Weigh Shark Terminals

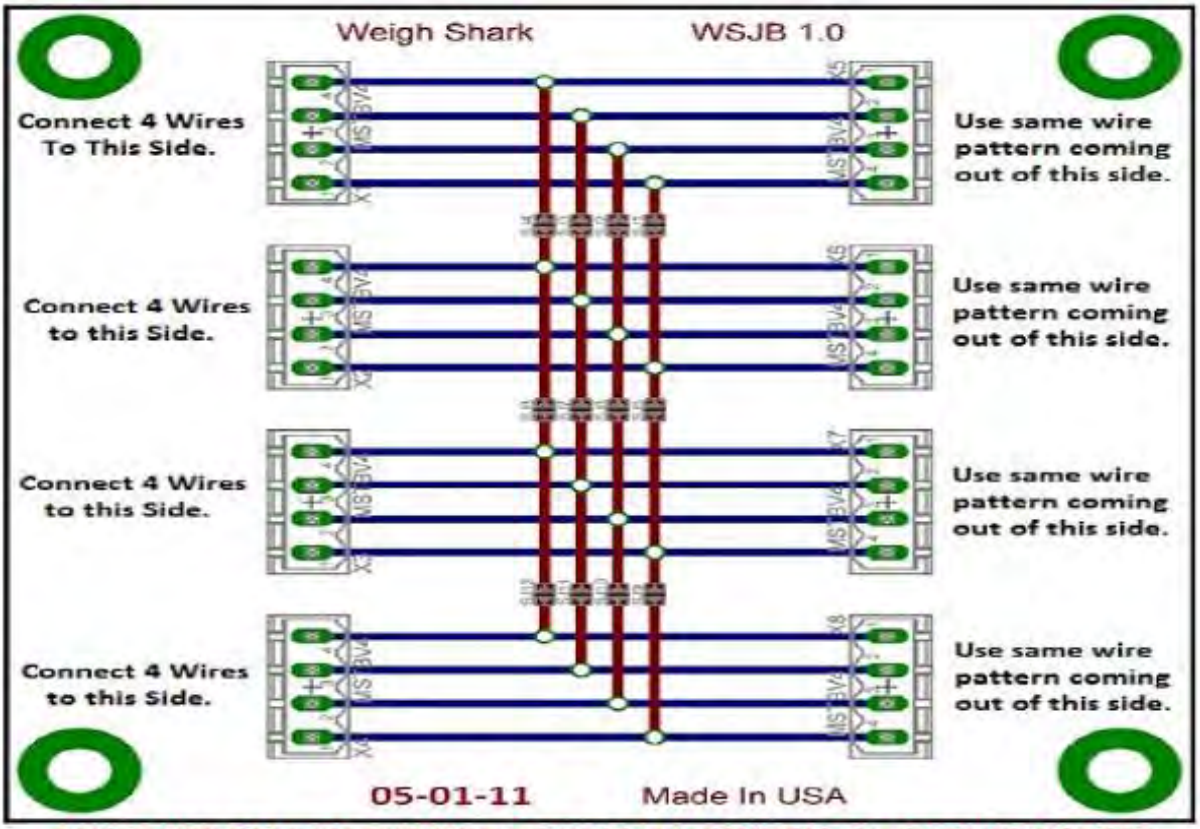
Date:	REV:	By:
3/29/05	2.2	SJK

4. When all electrical connections are properly made, turn **ON** the unit at the Power Switch on the board.

CORRECT CIRCUIT BOARD WIRING.



* Junction Box Wiring Instructions *



MUST USE BELDEN 8723 OR EQUIVALENT WHEN EXTENDING CABLES

Single or Dual Idler Scales

Our WEIGH SHARK integrator will support up to 8 Load Cells (4-pairs)

Our Standard Weigh Shark Scale is a single idler scale. It can be converted to a Multi Idler Scale by the addition of pairs of load cell assemblies on adjacent idlers. Multi idler scales increase accuracy by weighing more material for a longer period of time.

Bolt additional pairs of load cell assemblies to the adjacent idler using procedure shown on page 1.

STRING LINING: -Very Important- All idlers including a minimum of one idler before and after idler scale are mounted on.

Recommended String lining 2 Idlers Before & After Scale Idler!

When calibrating your scale you will be asked to enter Idler Span Distance during the Span Test.

Let's say your idlers are on 4 foot centers:

Single Idler Scale Span = 8 feet.
Dual Idler Scale Span = 16 feet.
Triple Idler Scale Span = 24 feet.
Quad Idler Scale Span = 32 feet.

*** See Following Page! ***

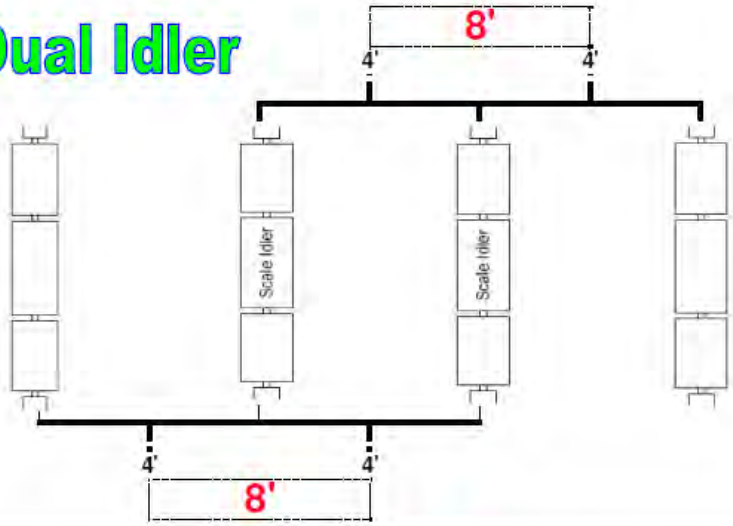
During the Next Step of the SPAN TEST you are instructed to enter the TOTAL value of test weights including the bar you will be using.

You must put weight on every scale idler using these guidelines

TEST WEIGHT VALUE RECOMMENDATIONS-

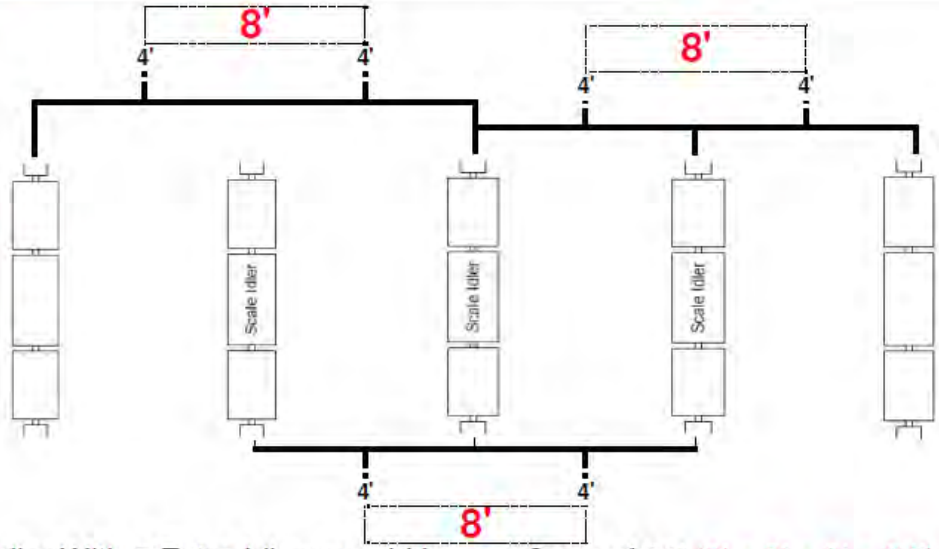
HD 250 = 500 lbs. HD 500 = 1000 lbs HD 1000 = 1,500.00 lbs.

Dual Idler



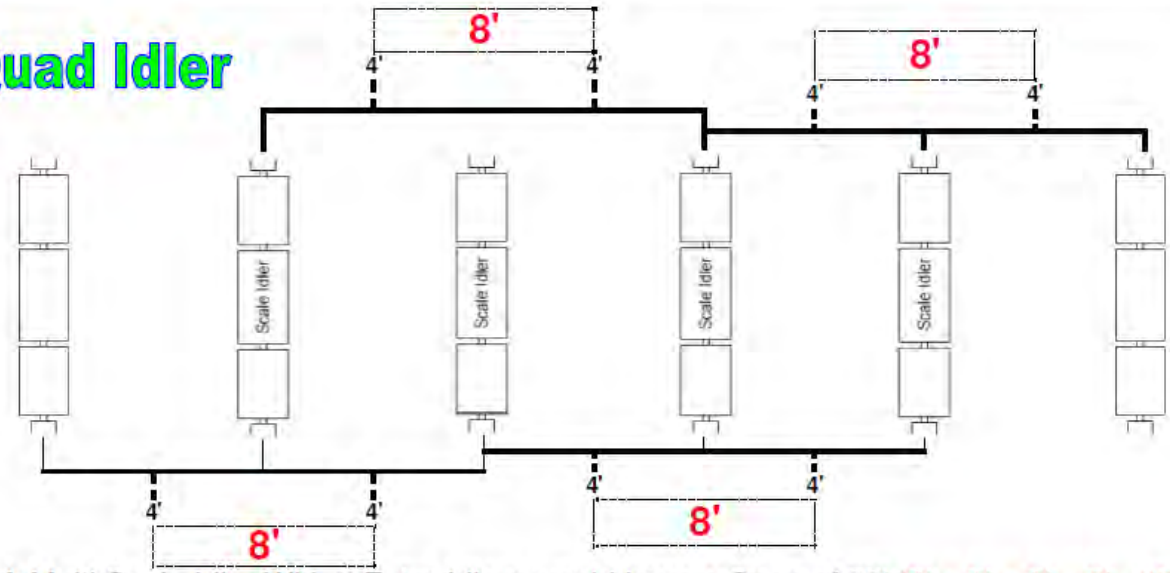
A Multi Scale Idler With 1 Extra Idlers would have a Span of 16' (8' + 8' = 16')

Triple Idler



A Multi Scale Idler With 2 Extra Idlers would have a Span of 24' (8' + 8' + 8' = 24')

Quad Idler



A Multi Scale Idler With 3 Extra Idlers would have a Span of 32' (8' + 8' + 8' + 8'= 32')

-Continue with Calibration Process-

CALIBRATION

The calibration is divided into two categories.
A) Zero Test
B) Span Calibration

The display will take you step by step through both processes and instruct you on what is taking place during the process and what to do next.

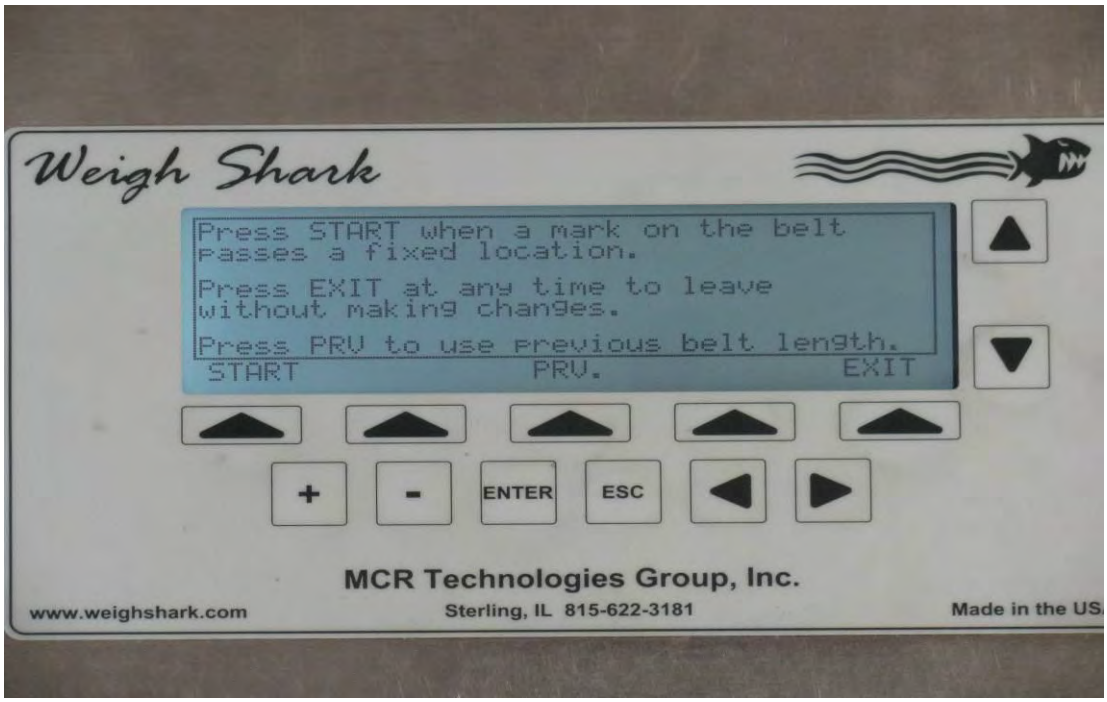
Zero Test

1. The first step of calibration is to weigh your **Empty Belt and Idler** and tare off the weight of the belt and the idler so the scale only weighs material on the belt.

2. Push the arrow key located under "Calib." to select this calibration process.

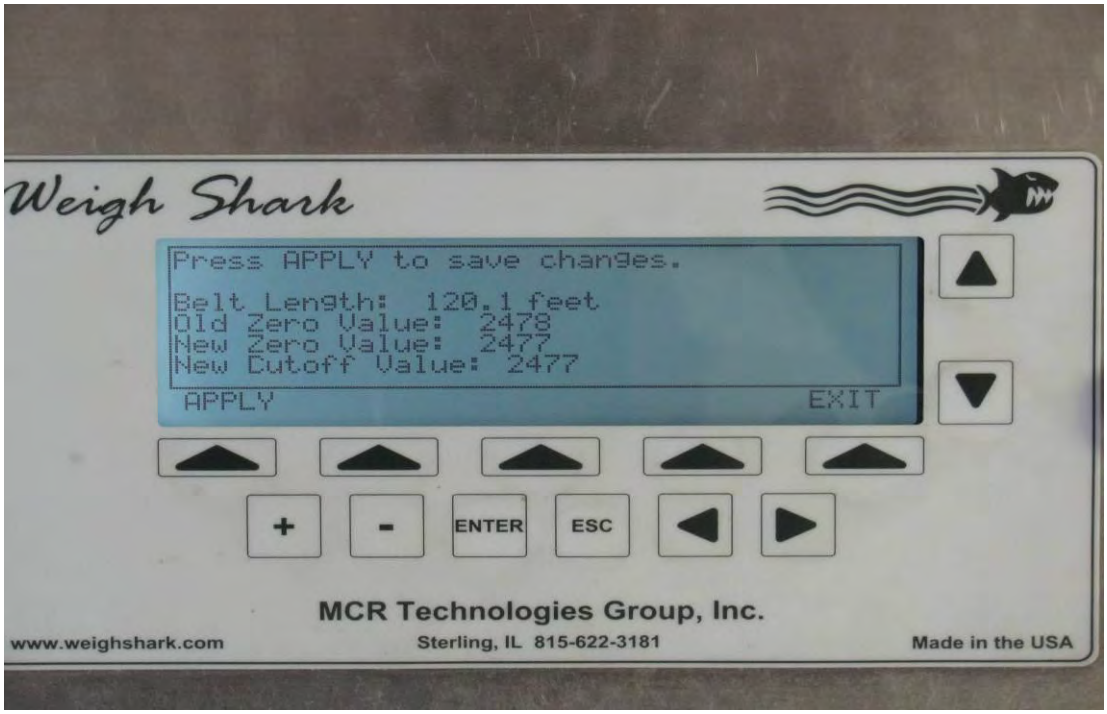
3. The main calibration screen will appear. An arrow will point to "Zero Test – Press Enter"

4. Mark the belt or use the belt splice as your reference. Follow the instructions on the display.

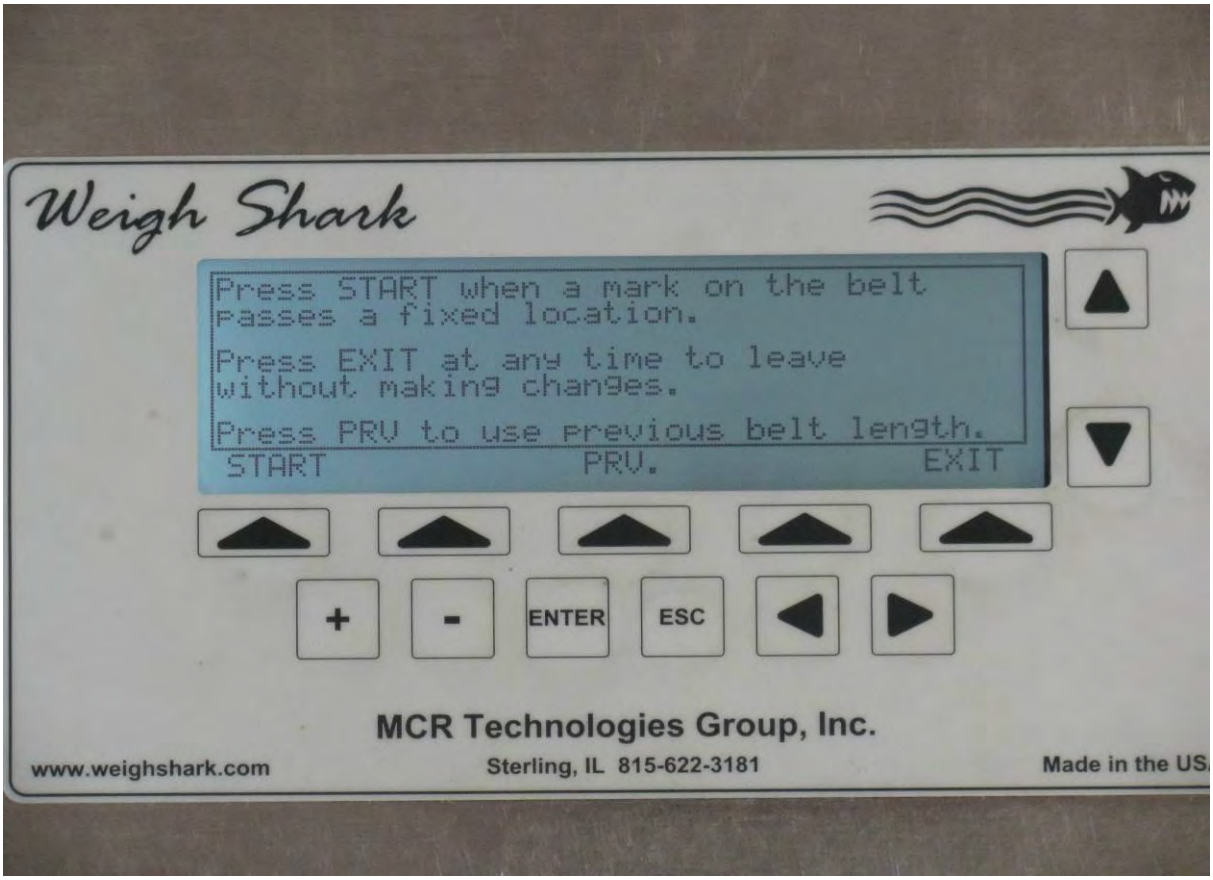


5. Press the Arrow under **START** when your **Empty Belt** passes a reference point start to measure and weigh your belt. The display will show you information during this step. Watch your belt make one (1) revolution and press the arrow under **END** after completion of this one revolution.

6. The screen will automatically change. It will show Belt Length (feet), Old Zero Value and New Zero Value. It will instruct you to press the arrow under **APPLY**. This will establish your Auto Zero value. The screen automatically goes back to the main calibration screen.



PREVIOUS FEATURE



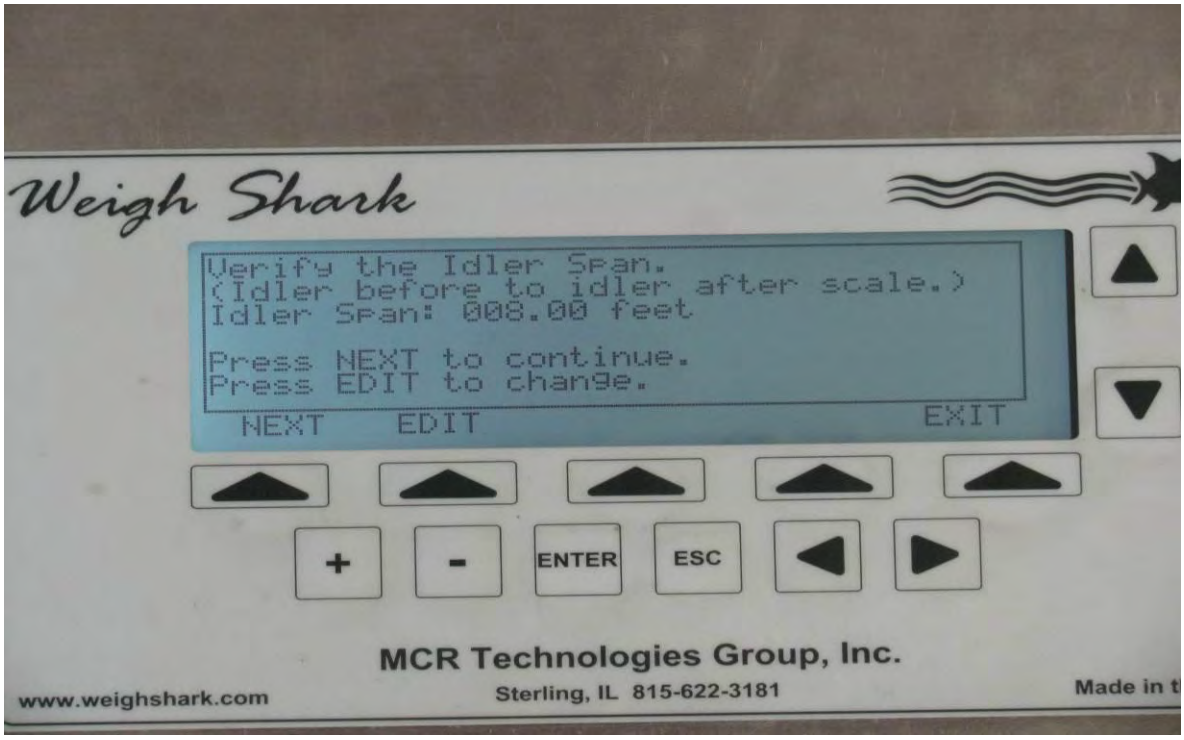
Once you have established a Zero Number you have also established a belt length for your conveyor. By using the PRV (previous) feature on the screen, it will allow you to start a zero test without having to wait for your splice or mark on the belt. Keep in mind that the belt MUST be empty and no calibration weights or bar applied.

This feature is only used for recalibrating your zero number with your existing belt length.

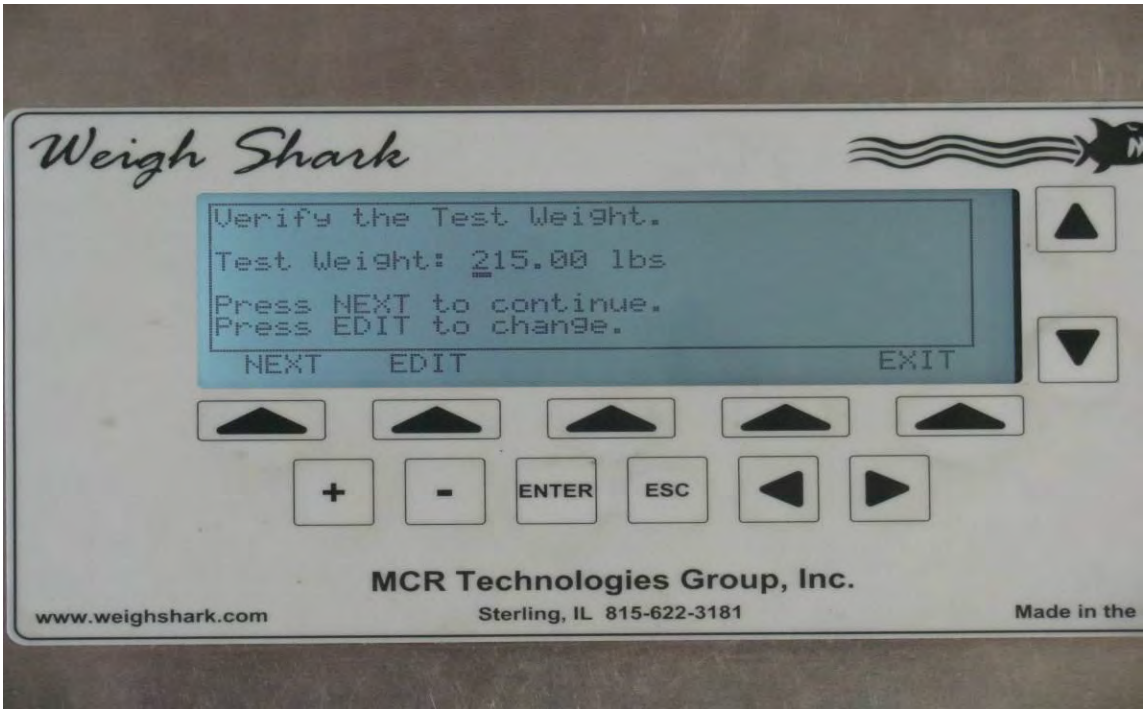
If you lose your settings for any reason, you will need to run a New Zero Test following the instructions beginning on page 9.

Span Calibration

1. Use the ▼ arrow key located to the right of the display to move the cursor arrow (>) down to the next line. “Span Test – Press Enter”.
2. Press ENTER
3. The screen will automatically change and instruct you to “Press START to perform a Span Calibration.
4. Press the arrow under START to start your process.
5. The screen will change and ask you to “Verify the Idler Span”. (If your idlers are on 4 foot centers….. you have a “Span” of 8 feet)!



6. The screen will instruct you to Press NEXT to continue or Press EDIT to Change. The Idler Span value defaults to 8.00 feet. If you need to change this value, press the arrow under EDIT.
7. To EDIT, press the ◄ or ► Arrow keys to move the cursor to activate the cell you wish to change.
8. Use the + and - keys to change the value up or down.
9. Press the arrow under NEXT to continue.



10. The screen will change and ask you to “Verify the Test Weight” value. Again you can accept the default value (100 lbs) NEXT or select EDIT and change the value. Enter the total weight of your test bar and weights.
    - *If you are going to run a material test to calibrate your scale….*
    - *You can skip these steps……*
    - *Press EXIT….Catch material and follow the instructions on :* ***PAGE 16…”Material Test”***

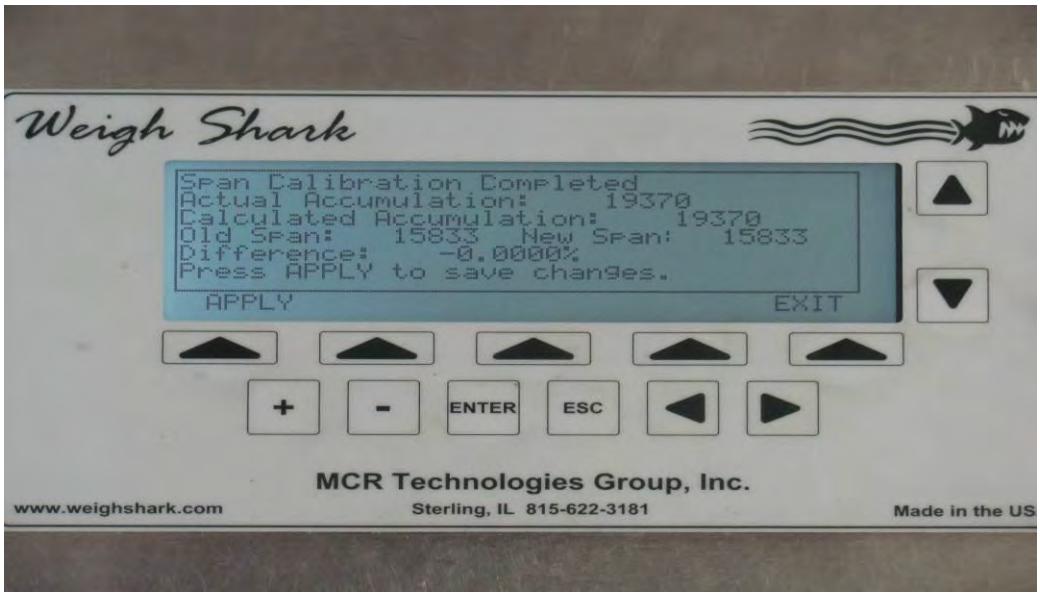
11. When you press NEXT the screen changes and reads: “Install Test Weights on the scale". When safe, run the belt empty.” **INSTALL YOUR TEST BAR AND WEIGHTS** though the holes in the “V” Blocks

12. Start up your conveyor with the belt running empty. Press the arrow under **NEXT** to start. Since we previously measured your belt, you can start this process at any time and do not have to wait for your reference mark or splice.

13. The screen will again automatically change to show you that the Span Calibration process is taking place. It will show you how many revolutions and feet remain during the test. Since you measured the belt length during the Auto Zero calibration process we know your belt length and count down feet during this step.

14. When the Span Calibration process is complete the display will show you “Actual Accumulation” - “Calculated Accumulation” - "Old Span" & "New Span" and "Difference.

15. Press the arrow under EXIT. The last calibration screen appears. It informs you “Span Calibration is Complete”. It provides “Actual Accumulation”, “Calculated Accumulation”, “Old Span”, “New Span” and “Difference”. (% Error) You want to correct the error by pressing APPLY.



16. Run **Span Calibration** process ***2-3 times*** with test weights applied and starting @ Step 1 on page 12. Each time you will see the difference in the Old & New Span Decreasing.

Calibration is Complete

"MATERIAL TEST"

- We also suggest if possible that you verify the accuracy vs. a legal for trade truck scale. Catch material and write down the Belt Scale total and the Truck Scale total….then

a) Press ▲ under "Calib."

b) Use ▼at right of display to bring the cursor down to the line SPAN.

c) Press ENTER

d) You will want to Increase the SPAN if the scale was light and Decrease the SPAN if the scale was heavy.

(Known Weight) Divided By (Weight On Screen)

New SPAN = (Truck Scale Wt. / Belt Scale Wt.) X Old SPAN

(Multiplier you use to calculate your new SPAN number)

IE: If you wish to make the SPAN larger by 12% …. You take your existing SPAN number x 1.12….. If you wish to make your SPAN smaller by 12%, you take your SPAN number x .88.

e) Press ▲under EDIT. A line will appear under the last number in the New Span: line.

f) Use the + or – buttons to change the number. Use the ◄ to move to the next number to the left and again use the + or – button to change that number. Continue until you have entered in the complete number.

g) Press ▲under APPLY to accept your changes.

h) Press VIEW a couple times to go back to the default screen.

Load %

The default screen (View) shows your Load %. It is important that you have a reasonable load on the Weigh Shark scale to ensure the best opportunity for accuracy. Ideally we would like to see about 75% Load when you are running your normal rate. This will provide a good load cell signal and allow for additional rate. If you find you are running under 50%, we recommend you increase your ADC Gain. This will increase the amplification of the load cell signal to give us more load cell signal to represent weight.

(Your ADC GAIN is set at the factory to 10).

Steps to Change ADC GAIN:

1) Go to SETUP
2) Arrow down to CALIBRATION SETUP
3) Press ENTER
4) Arrow up to ADC GAIN
5) Press ENTER
6) Press EDIT
7) Use the + button to increase your number to 15 or 20
   Please Contact us to discuss your application.
8) Press APPLY
9) COMPLETED.

You will need to Re-Calibrate your scale.
You must do both the ZERO Test and the SPAN Test.

Real Time Performance (RT Prfm%)

Real Time Performance % is also shown on the default (View) screen. This shows you your performance RATE you are running based on the Standard Rate (your goal). The factory default setting is 350 TPH. You can change your Standard Rate to allow you to see what you are doing in relationship to your goal. This will give you instant information to allow you to understand your production.

Steps to change your Standard Rate:

1) Go to SETUP
2) Arrow down to CALIBRATION SETUP
3) Press ENTER
4) Arrow down to STANDARD RATE
5) Press ENTER
6) Press EDIT
7) Use the + or – buttons to raise or lower the number.
8) Press APPLY
9) COMPLETED

You Do Not have to Recalibrate your Scale.

TOTALS

There are four (4) independent totals with their own Production screen. They can be viewed, cleared and * printed separately. *(With optional ticket printer)***

Daily Total: This total is displayed on the default screen. It shows your accumulating total.

*If you wish to clear off this total, press **ENTER** key while the cursor is pointing to the "**Daily Total**". This will access your Production Screen.*

Press Arrow Button below CLEAR to clear off this total.

Press ESCAPE button or EXIT to go back to Default Screen

Scroll Down (using arrows on right of faceplate) 4 times to "Weekly Total".

Weekly Total: **This is also an accumulating total for you to use. You can view the weekly production screen by pressing ENTER.**

Monthly Total: **This accumulating total is listed next and can be cleared by pressing ENTER to go to its production screen.**

Yearly Total: **Located is located on the next screen, just press the down arrow key to move cursor to this line and Press ENTER.**

Any of your totals can be printed while viewing the production screen.
You can customize your ticket. (See Ticket Printer Pg. 28)

CHANGING FROM ENGLISH TONS TO METRIC TONS

1. Press **Setup**
2. Scroll to **Units**
3. Press **Enter**
4. Press **Edit**
5. Press +/- to change Units
6. Press **Apply**

Analog Outputs *(Option)*

You may use the standard analog output (4-20 mA) for monitoring your production to a chart recorder, PLC or any device that accepts 4-20 mA.

Press arrow located under I/O to access these setup screens.

Press ENTER while the cursor (>) is next to Analog Output to go to the setup screen.

Press the arrow under EDIT. The cursor (>) moves next to "Rate". This cell is active and you can select your function. Press the + or – keys to view your options.

The Current Loop configuration screen displays all the settings that pertain to the current loop.

Setting	Description
Function	Function of the output (i.e. Rate, Belt Speed, Load%, etc.)
Direction	Direction of the output (Forward or Reverse).
Minimum	Minimum value for the output
Maximum	Maximum value for the output
Averaging	The number of samples to average (1 to 65000)
Range	4-20mA or 0-20mA output

To make changes press the EDIT button. Use the ▲ and ▼ keys to move the cursor through the settings. To edit the number values use the ◄ and ► keys to move through the individual digits of the number. Use the + and – keys to change the values.

Press the ▼ arrow key to move your cursor to "Forward". Use the + key to select Forward or Reverse.

Press the ▼ arrow key again to move your cursor next to *"Minimum"* Press the ► arrow key to move your cell line over to the location where you want to enter your TPH. The cell is active at the location of the short line. Use the + key to enter in the value for this cell.

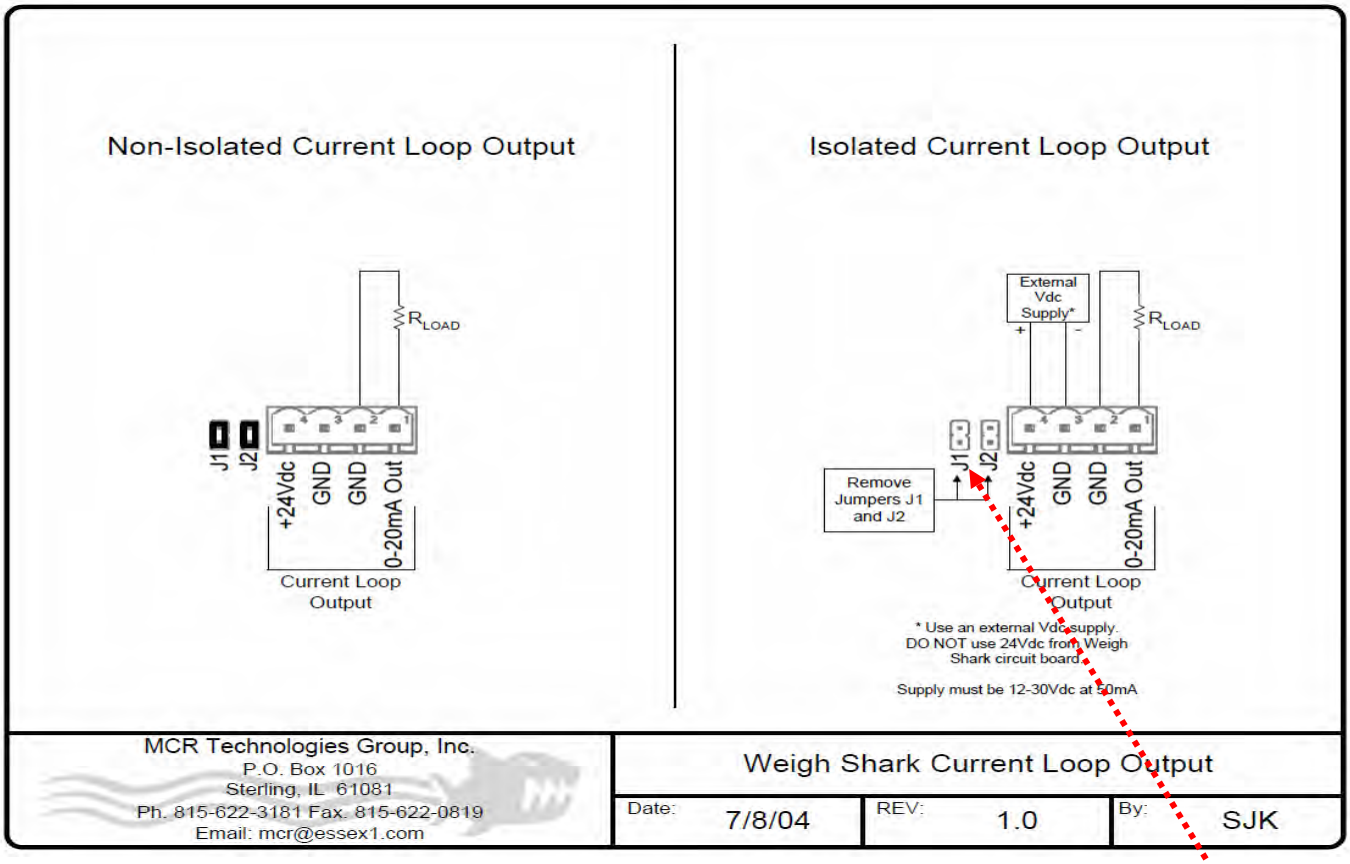
(Example) If you wish to have your Minimum Rate (at 4 mA) be 100 TPH. Press the ► arrow key until the short line is directly left of the 0. Press the + key to select 0. Press the ◄ arrow key 1 time to move the short line to the left. Press the + key to place a 1 in that cell. You should now see 100 TPH.

Press the ▼ arrow key to move the cursor (>) next to *"Maximum"* Follow the same procedure to enter your desired Rate at 20 mA.

Current Loop Tips:

- Increasing the Averaging value slows the response time of the output. For blending or control applications the number should be lowered to increase the response time.
- When connecting to a PLC or Data Acquisition device, it might be helpful to output a Total; this would allow the calculation of the Rate and Total.
- The 0-20mA and 4-20mA settings both have the same output resolution (16bit).

When you have selected your desired functions; press the arrow under APPLY or EXIT to leave without saving the changes.



To Isolate Current Loop Output Remove Jumpers J1 & J2

Current Loop Examples

Output current Rate (TPH)

Desired output: 500tph = 20mA 10tph = 4mA

Set the following:

Function: **Rate**

Direction: **Forward**

Minimum: **10 TPH** **Maximum:** **500 TPH**

Range: **4 to 20mA**

Output current Belt Speed (fpm)

Desired output: 250fpm = 0mA 0fpm = 20mA

Set the following:

Function: **Belt Speed**

Direction: **Reverse**

Minimum: **0 fpm** **Maximum:** **250 fpm**

Range: **0 to 20mA**

Output current Total 4

Desired output: 10,000tons = 20mA 0tph = 0mA

Set the following:

Function: **Total 4**

Direction: **Forward**

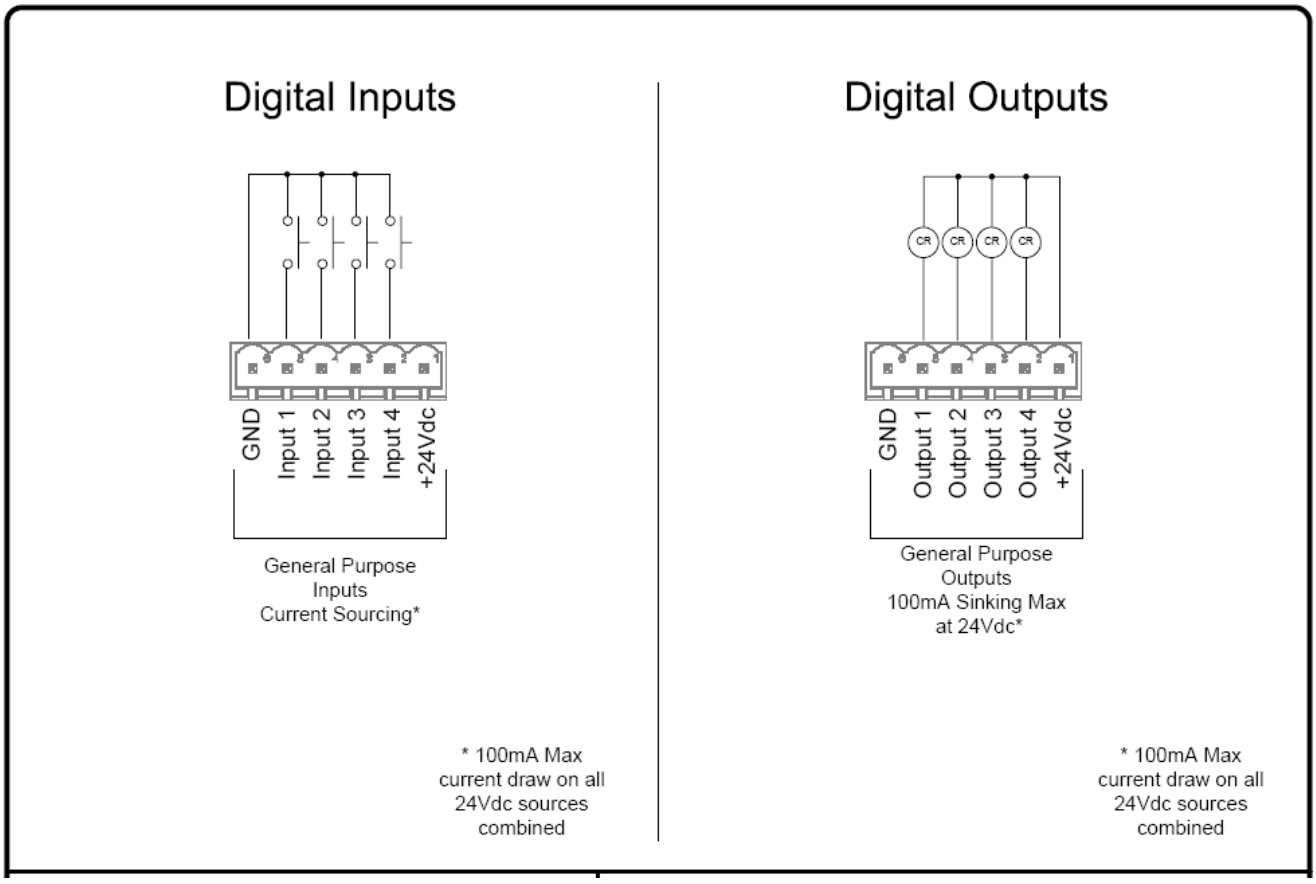
Minimum: **0 tons** **Maximum:** **10000 tons**

Range: **0 to 20mA**

Digital Inputs

Press ENTER under I/O to access the Digital Inputs screen. You have 4 Inputs labeled Input 1, Input 2, Input 3 and Input 4.

1. Press the ▼ to place the cursor (>) next to Input 1.
2. Press ENTER to open the screen for entering your information.
3. Press EDIT to make your entries. You will see the > next to the word Function: This cell is active.
4. Use your + or – keys to scroll your options.
5. Press the ▼ to select if you want your Input to be ON or OFF
6. When you have selected your Function, press APPLY
7. Press EXIT to go back to your I/O screen.
8. If you wish to use more than 1 Input, you will use the ▼to move the cursor down to the next line (Input 2). Repeat the above procedure etc.



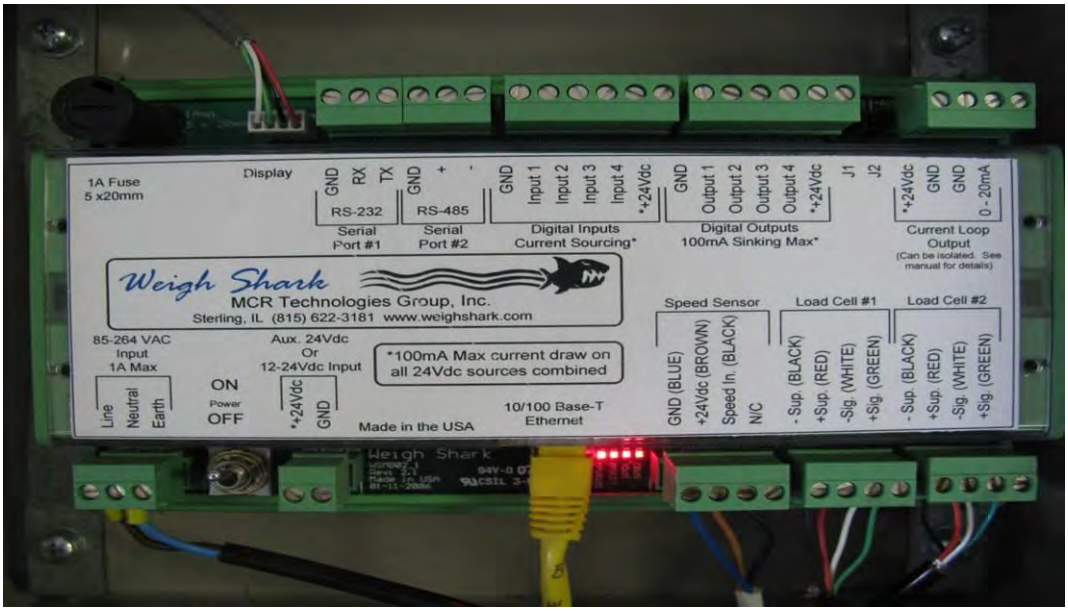
Digital Outputs

You have 4 Digital Outputs labeled Output 1 through Output 4. They are located on the same screen as the Inputs. You will use the ▼to move your cursor to the Output you wish.

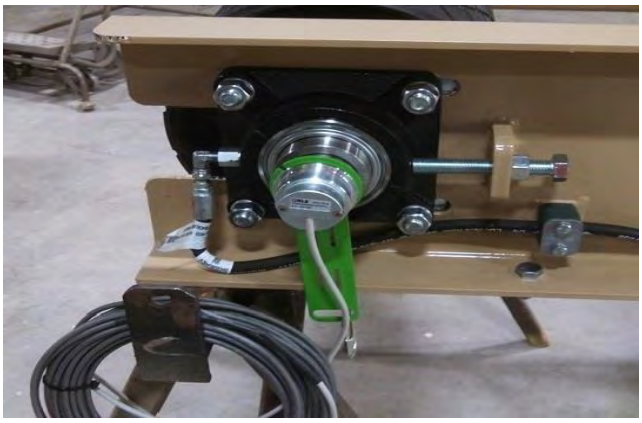
1. Press ENTER to go to the setup screen.
2. Press the arrow under EDIT to make your entries. The cursor (>) will appear next to "Function:"
3. Use the + or – keys to scroll your options. (1 Ton Pulse, .1 Ton Pulse…..)
4. Press the ▼to move the cursor down one line to "Set point:" This cell is active and this value may be changed. Press the + or – keys to change the value.
5. Press the ▼to move the cursor to the line "Action": You can select ON or OFF.
6. Press the arrow under APPLY to set your changes.

Let's say you want the scale to stop your conveyor when a certain weight is reached. You would select "Daily Total", and enter you set point (15 tons). You would go to the normal screen. While the cursor (>) is pointing to "Daily Total" you would press ENTER to go to the screen to clear off this total and set it back to 0.

Press CLEAR to clear off your "Daily Total", when you start running material the accumulation will show your production. When you reach your set point of 15 tons, Output 1 would turn ON to stop your conveyor. You can wire up a "remote clear" button to Input 1. Each time you would press your button your "Daily Total" would clear to 0.



Changing from Belt Driven to Magnetic Encoder 80 Pulse



Wiring Specifications for Extended Cable

ENCODER	EXTENDED CABLES	CONTROL BOX
Blue Wire	White/Green	GND(**Blue**)
Red Wire	**Red**	+24 vdc(**Brown**)
Gray Wire	**Black**	Speed In (**Black**)

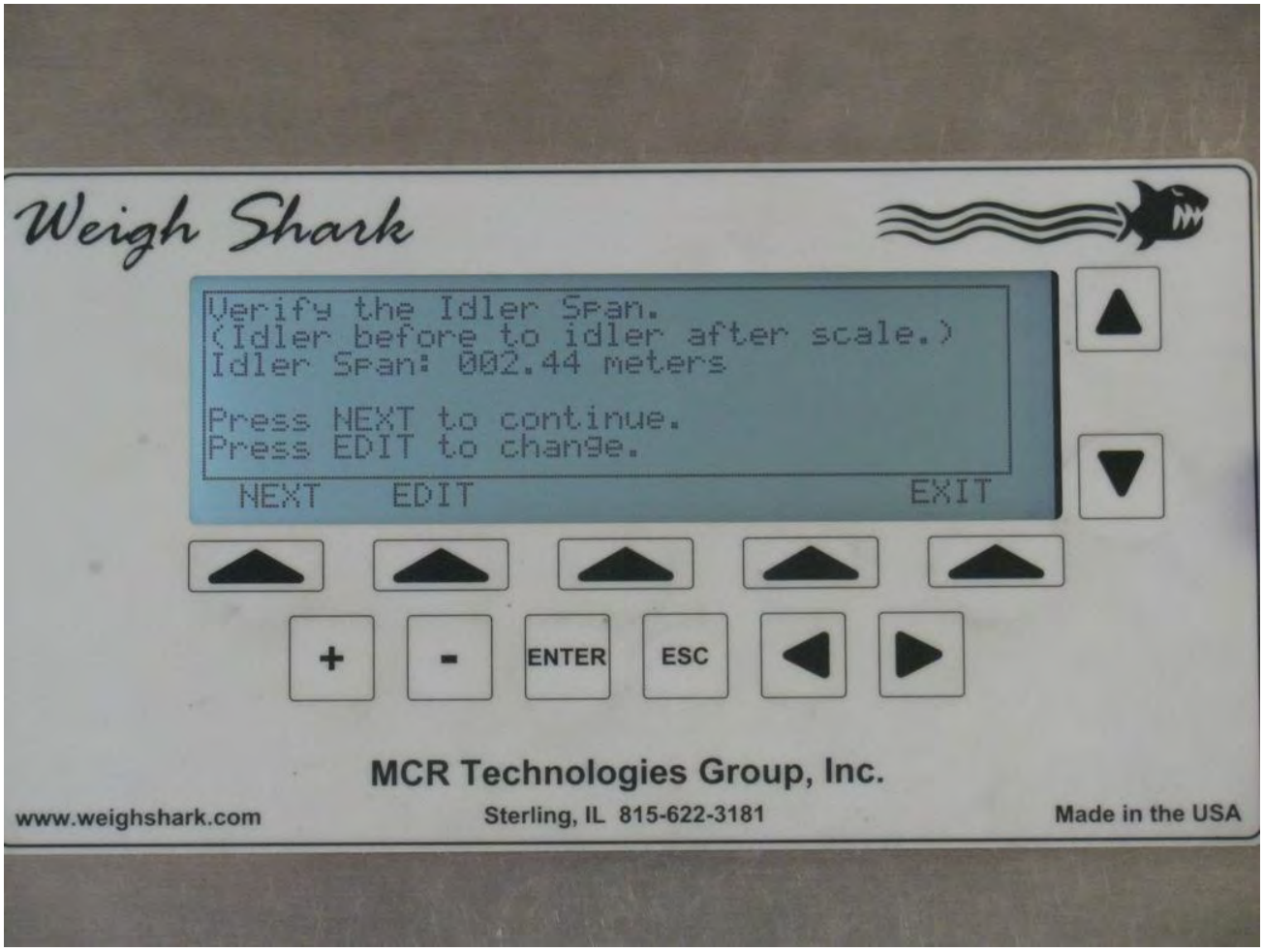
NOTE: Do NOT use Pink, Green, Yellow, White or Brown wires directly from Encoder.

After Installing Encoder you will need to go to **Control Box**:

Press SETUP button
Press down arrow key to Calibration Setup
Press ENTER
Press down arrow to Wheel Dia.
Press ENTER
Press EDIT

Use left arrow key to move the cursor to change to your pulley diameter (inches)

Use the + or - buttons to set the pulses per revolution to 80
Press APPLY



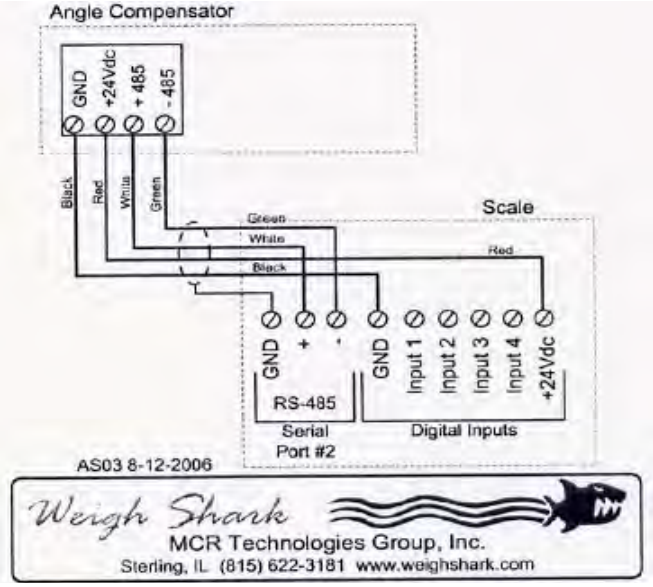
Arrow down one line to Pulses per Revolution
Verify you have 80 pulses
If not Press ENTER and EDIT to change this number.
Press APPLY

Changes are complete… Press EXIT to go to default screen.

Automatic Angle Compensator

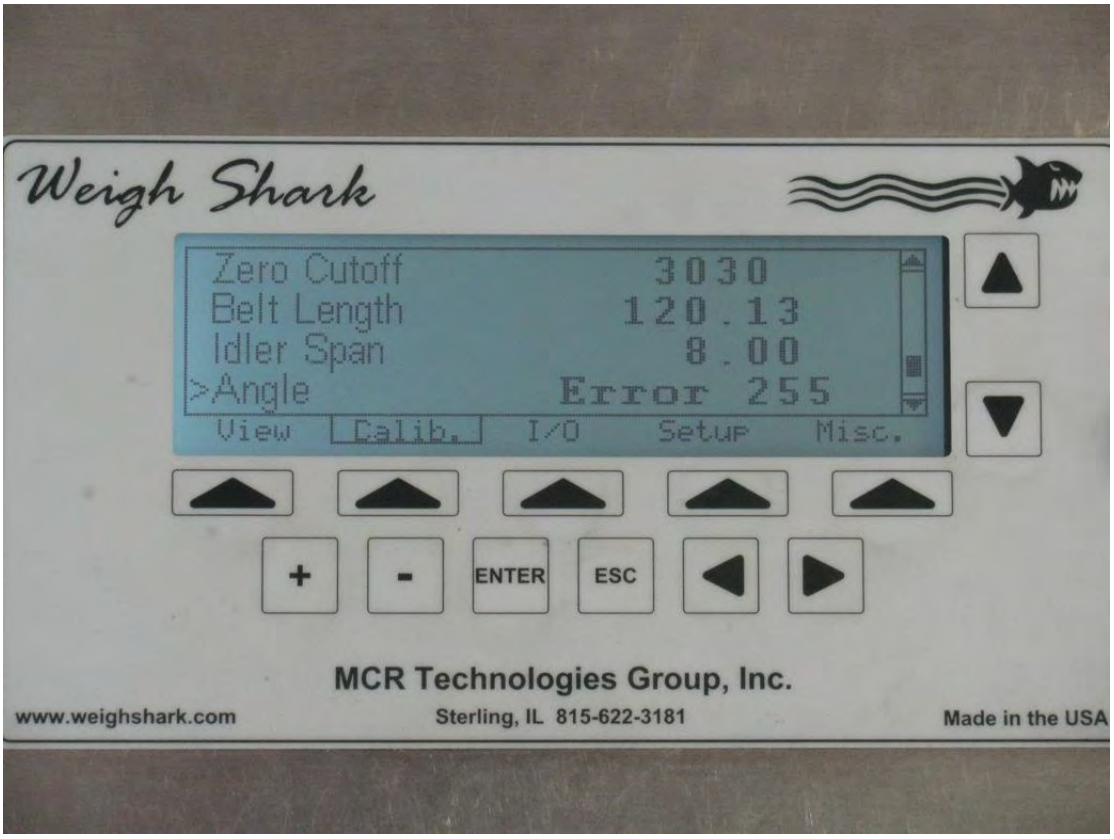
An Automatic Angle Compensator option is used if you have a stacker conveyor that elevation changes or moves side to side. The Automatic Angle Compensator is bolted to your conveyor frame. It measures the angle incline changes. The scale automatically adjusts for the angle change and the scale remains in calibration.

1. Mount your Automatic Angle Compensator to the conveyor frame.
2. Wire Automatic Angle Compensator to control box according to wiring diagram.



3. Power ON the control box.
4. Select I/O menu.
5. Scroll down to SERIAL PORTS.
6. Press ENTER.
7. Select SERIAL PORT 2 (RS 485)
8. Press ENTER.
9. Press EDIT and use + - key to change FUNCTION to ANGLE SENSOR.
10. Press APPLY.
11. Turn OFF the belt scale and turn it back ON.
12. Calibrate the belt scale (Both ZERO and SPAN) as normal.
13. Angle Compensator information can be viewed under the CALIB. Menu by using the ▲ or ▼ buttons on the right side of screen. Display will provide angle degree or error if there is a problem.

Angle Information Displayed when Properly Set Up

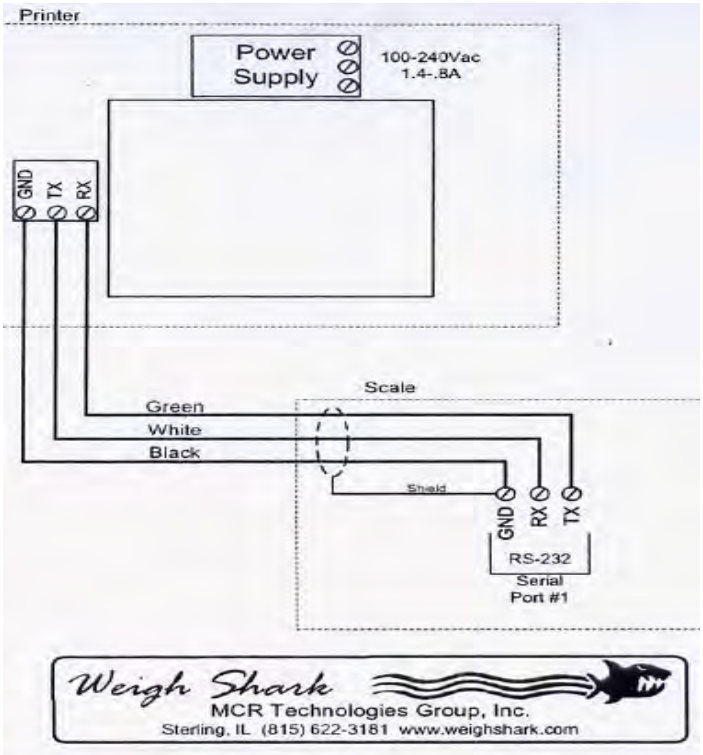


ERROR Message Showing NOT properly set up.

TICKET PRINTER

A Ticket Printer may be purchased and used to record Production Data. The ticket printer comes mounted inside a NEMA 4x fiberglass enclosure with clear window and lockable latch. The ticket printer can be used to print Production Data for any of the four (4) independent totalizers of the scale.

1. Wire Ticket Printer according to diagram located in the back of the printer enclosure **(RS 232)**
2. Connect printer to 110 VAC power.
3. Select I/O menu.
4. Scroll down to line stating: SERIAL PORTS
5. Press ENTER.
6. Select Port 1 **(RS 232)**
7. Press ENTER than Press EDIT
8. Use + and _- to select Function: TICKET PRINTER
9. Press APPLY
10. Turn scale control box OFF and ON to cycle power.



MUST CHANGE TIME

1. *Go to Setup Screen – Scroll to Time Setup – PRESS ENTER*
2. *Use +/- Button to set time to **00:00 GMT time***
3. *Exit Screen.*
4. *Got to Miscellaneous Screen – PRESS ENTER – PRESS EDIT*
5. *Enter In the Current Correct time at your location using the +/- buttons*
6. *Press Apply to Recycle Power*

PRINTING TICKET

1. Select the TOTAL to be printed. Use ▲or ▲ keys to move the cursor to the TOTAL you wish to view and print.
2. Press ENTER (Here you will see Production Data information for your current TOTAL and the previous TOTAL).
3. Press PRINT to print ticket.

CUSTOMIZE TICKET

1. To add/edit the Scale Name and User Fields…….
2. Select SETUP Menu.
3. Press ▲ or ▼ keys to select Scale Name or Use Fields.
4. Press ENTER to edit. Press EDIT to display the cursor.
5. Use + - keys to change the character in the active field.
6. Use the ◄ or ► keys to move the cursor to the next field to make it active. (Note: Scale Name and User Field 1 print at the top of the ticket. And User Field 2 and 2 print at the bottom of the ticket).
7. Press: APPLY after you have entered in the information you wish printed.

You can turn ON or OFF information (CURRENT or PREVIOUS) that you wish printed.

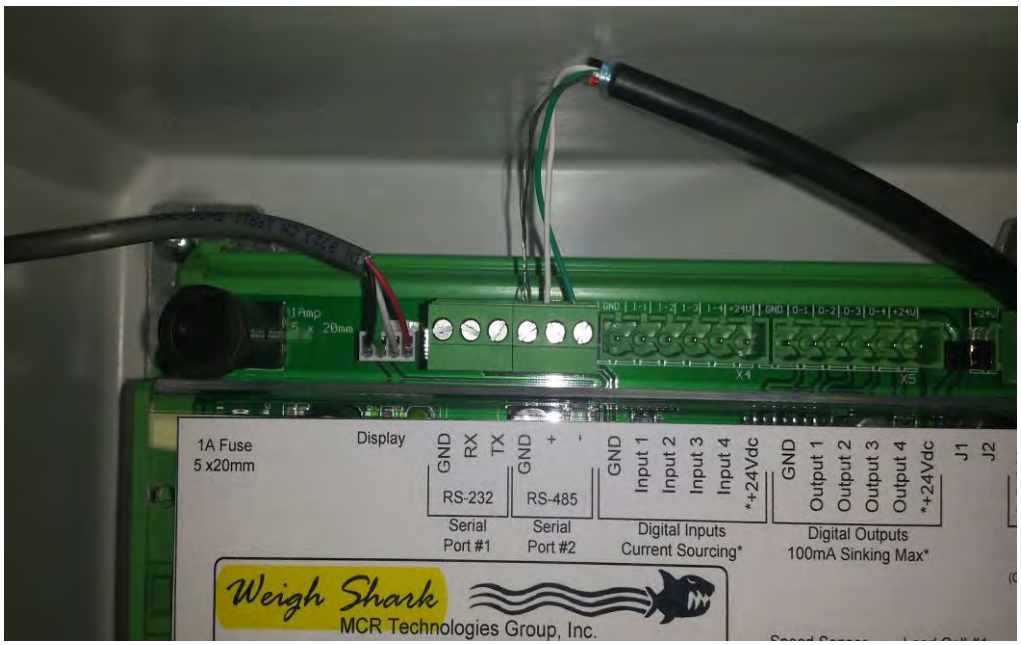
1. Select TOTAL you wish to edit.
2. Press ENTER
3. Press SETUP
4. Press EDIT
5. Use any arrow keys to select item…. Then + or – to turn this item ON or OFF.
6. Press: APPLY.

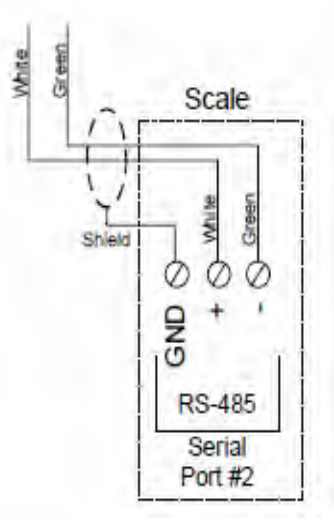
WEIGH SHARK MARQUEE SIGN SETUP

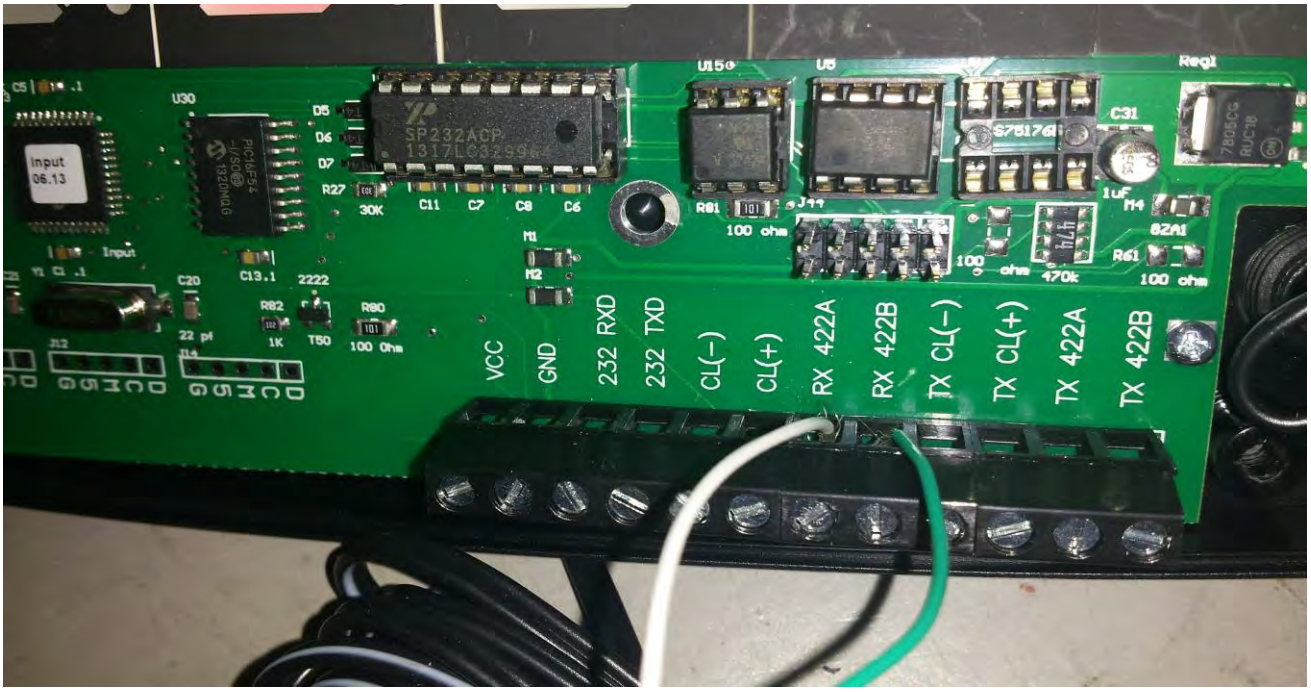
Applies to belt scale software version 3.1.8 or greater.
The Marquee will display either 1 or 2 lies of selectable information from the belt scale. The Marquee is powered by 110/220 VAC, 12 VDC or 24VDC and communicates with the scale via RS 485. The RS 485 can be up to 1,000ft from the scale.

Setup:

- Connect 110/220 VAC, 12 VDC or 24 VDC to the sign. When marquee is powered up it should display its default message.
- Connect sign to RS 485 serial plug in Weigh Shark scale. Refer to Wiring Diagram included.
    - Go to **I/O** > **Serial Ports** (Press Enter) > **RS 485** (Press ENTER)
    - Press **EDIT**. Use the **+ / - keys** to select sign Matko SBL
    - Press-**APPLY**. Belt scale will automatically reset.
    - After the scale resets, go to I/O > **Marquee Setup** (Press Enter).
    - Use **+ / - keys** to select # of lines (1 line displayed or 2 lines displayed).
    - Arrow down and use + / - key to select what you want displayed:







Wiring Configuration

Connect the Scale indicator using the appropriate diagram.

	Indicator	Pin	Display
Indicators with Active 20 mA Output	+20mA	6	CL (+)
	–20mA	5	CL (–)
Indicators with Passive 20 mA Output	+20mA	1	VCC
		2	GND ┐ JUMP
		5	CL(–) ┘
	–20mA	6	CL(+)
Indicators with RS232 Output	TXD	3	232 RXD
	GND	2	GND
Indicators with RS422 Output	TX 422A (+)	7	RX 422A
	TX 422B (–)	8	RX 422B

Connector Pin Out

1	VCC
2	GND
3	232 RXD
4	232 TXD
5	CL(-)
6	CL(+)
7	RX 422A
8	RX 422B
9	TX CL(-)
10	TX CL(+)
11	TX 422A
12	TX 422B
13	13 GREEN
14	14 RED

#7 = White Wire

8 = Green Wire

The corresponding green LED will blink when the following three requirements are satisfied.

1. The display is powered on.
2. The indicator's port is enabled to transmit continuously.
3. The wires are connected to the terminal block as previously described.

The display will learn "automatically configure" to the transmitting device when the **LEARN** button is pressed at the end of startup. It will display the BAUD rate and then display the weight. Pressing LEFT or RIGHT will move the displayed stream accordingly until the desired data can be seen on the display.

Weigh Shark®

Modbus Serial and Ethernet Interface

Version 1.3.0
May 21, 2019
by Steven Keller

1.0 Table of Contents

2.0 Technical Description

The Weigh Shark Modbus Slave interface allows a PLC, Operator Interface, PC or other Modbus Master device to access scale data over a RS-485 or Ethernet network.

The Weigh Shark scale provides the Modbus Slave interface thru the RS-485 port (Port 2) or the 10/100 Base-T Ethernet network.

Both the serial port and Ethernet port interfaces use the same data tables and can operate at the same time.

The following operations can be performed using the Modbus interface:

- Totals can be read and cleared. Current totals, run times and average rates as well as previous total information can be read.
- Current Rate and Belt Speed.
- Calibration Data can be read but NOT written. However a Zero Test can be performed thru the interface.
- Digital and Analog Inputs can be read and Outputs can be read and written.
- Data registers for the Truck load out systems can read and written.
- Scale name can be read and written. Total names can be read.

3.0 Port Setup

This section covers the basic steps of the Modbus Slave port Configuration. Configuration should be performed by qualified personal.

3.1 RS-485 Setup.

3.1.1 Software Configuration

The RS-485 port is capable running the MODBUS RTU protocol at 9600baud, 8 bit, no parity, and 1 stop bit.

To setup the RS-485 port for Modbus:

- Press the key under **I/O.**
- Use the ▼ key to move the cursor to **Serial Ports**.
- Press **Enter**.
- Use the ▼ key to move the cursor to **Port 2 (RS-485).**
- Press **Enter**.
- Press the key under **Edit**. A cursor should display after the word **Function**.
- Use the + key to change the function to **MODBUS RTU**.
- Press the key under **Apply**.
- The screen will change back to the previous screen. Line 3 shows **Modbus/RTU ID.**
- To change the **Modbus/RTU ID** use the ▼ key to move the cursor to line 3. Use the +/- key to change the value.
- **Cycle the power on the scale for the serial port changes to take affect.**

3.1.2 Hardware Configuration

3.1.2.1 RS-485 Port

The RS-485 hardware port is a 3 pin terminal located at the top left side of the main circuit board. If the network cable is going to be run long distances it is recommended that it be isolated; contact factory for more details.

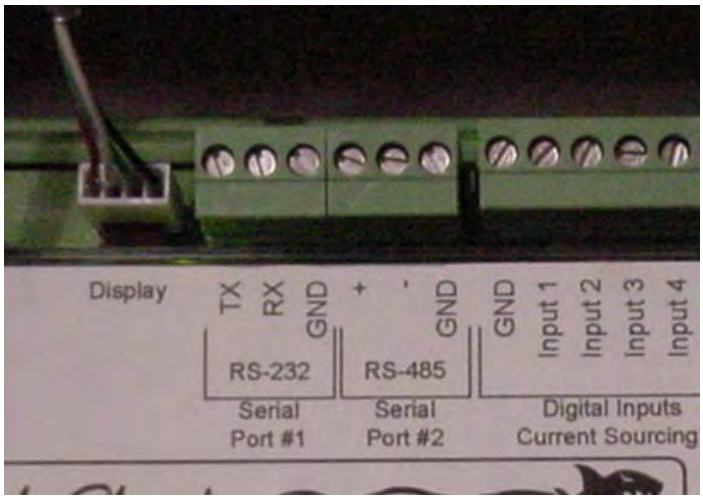


Figure 1

3.1.2.2 RS-485 Port Termination Resistor

The RS-485 port comes standard with a 220Ω termination resistor installed. To change this 2 jumpers must be removed.

- Remove circuit board cover by removing the 4 screws (2 on each side of the cover).
- Locate the two jumpers (JP1) below and to the right of the 3 pin RS-485 terminal.

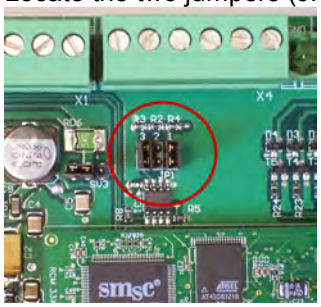


Figure 2 - RS-485 Termination Jumpers ON

- Remove the 2 jumpers and place them on only 1 pin each for storage.

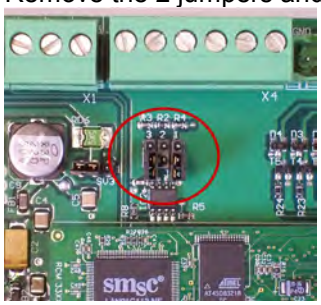


Figure 3 - RS-485 Termination Jumpers OFF

3.2 Ethernet Configuration

3.2.1 Software Configuration

3.2.1.1 Enable Modbus/IP

To enable Modbus on the Ethernet port Modbus/IP must be turned ON.

- Press the key under **I/O.**
- Use the ▲ key to move the cursor up. This will move to the last item in the I/O menu which is **Network**.
- Press **ENTER** when the cursor is by **Network**.
- The Network menu should display.
- Use the ▲ key to move the cursor up; this will switch to the last screen of the network settings.
- Continue pressing the ▲until the cursor is pointing to **Modbus/IP (+/-).**
- Use the +/- keys to change the value to **ON**.
- Press **<<Back** key to return to previous screen.

3.2.1.2 Set IP Address

An IP address consists of 4 groups of numbers; each group can be a value between 0 and 254. An example of an IP address is: 192.168.000.001. In most simple networks the first 3 groups of numbers stay the same between all the scales and PLC's; only the last group of numbers changes from scale to scale. For example if there were 5 scales on the network the numbering could be as follows:

Scale 1	192.168.000.001
Scale 2	192.168.000.002
Scale 3	192.168.000.003
Scale 4	192.168.000.004
Scale 5	192.168.000.005

The default IP address for all scales is 192.168.000.100. This should be changed on ALL the scales to a unique value.

To change the IP Address of a scale:

- Press the key under **I/O.**
- Use the ▲ key to move the cursor up. This will move to the last item in the I/O menu which is **Network**.
- Press **ENTER** when the cursor is by **Network**.
- The Network menu should display.
- The cursor should now be pointing to **IP Address.**
- Press **ENTER** to open the edit screen for the IP Address.
- Press the arrow key under **EDIT**. This will display the cursor under the last group of numbers.
- Use the ◄► keys to move the cursor left or right.
- Use the +/- keys to increase or decrease the number under the cursor.
- When the correct IP Address is set, press the arrow key under **Apply**. The will save the value and return back to the Network menu.
- If an error is made during the edit process press **Default** to return the IP address back to the factory default of 192.168.000.100.
- Pressing **EXIT** during the edit process will exit the screen without making changes.

Repeat the process for setting the network mask, gateway and name server.

3.2.2 Ethernet Hardware

The Weigh Shark Remote Display accepts standard RJ-12 10/100 Base-T Ethernet connection. The network port is located to the right of the 24Vdc power terminals. Figure 5 shows the empty port and the port with a network cable plugged in.

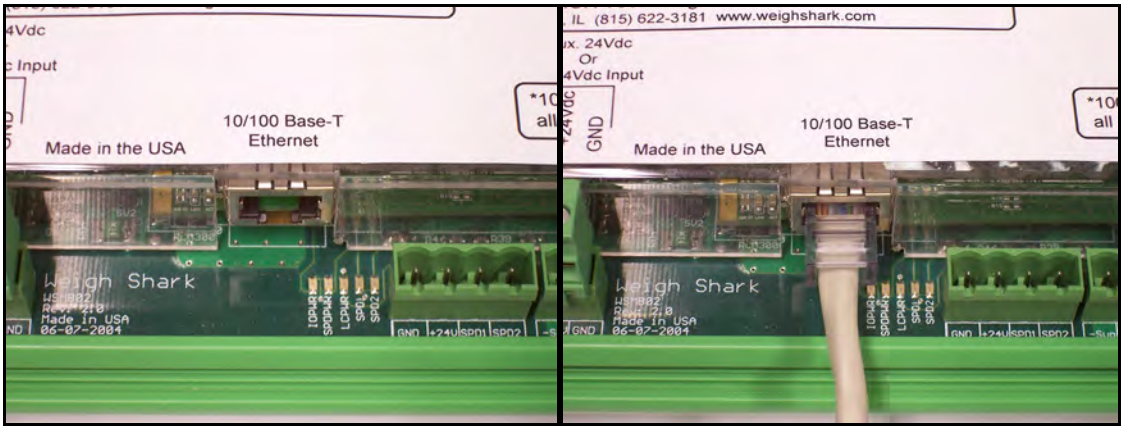


Figure 4

4.0 Modbus Registers

The Modbus registers are the same regardless of the port (RS-485 or Ethernet) used to access them. All register addresses are listed as decimal numbers and are Base 1; registers are numbered starting at 1.

4.1 Input Registers

Command: 0x02 Read Discrete Inputs

Inputs can be read as individual bits or as a single 16bit register.

Address	Function	Holding Register
1	Digital Input 1	92:0
2	Digital Input 2	92:1
3	Digital Input 3	92:2
4	Digital Input 4	92:3
5	Current Loop status (1 = Loop closed; 0 = Loop Open)	92:4
6	Truck Output	92:5
7	Truck Input	92:6
8	Truck Ready	92:7
9	Truck Done	92:8
10	Truck at Cutoff	92:9
11	Ticket Printing Enabled	92:10

4.2 Output Registers

Command: 0x01 Read Coils
0x05 Write Single Coil

Output values are Read/Write. For Digital outputs to be under Modbus control their function must be set to MODBUS. Outputs can be read/written as individual bits or in one of 2 16bit registers.

Address	Function	Holding Register
1	Digital Output 1	93:0
2	Digital Output 2	93:1
3	Digital Output 3	93:2
4	Digital Output 4	93:3
5	Clear Total 1	93:4
6	Clear Total 2	93:5
7	Clear Total 3	93:6
8	Clear Total 4	93:7
9	Clear All Totals	93:8
10	Print Total 1 Ticket	93:9
11	Print Total 2 Ticket	93:10
12	Print Total 3 Ticket	93:11
13	Print Total 4 Ticket	93:12
14	Truck Load Out Clear	93:13
15	Truck Load Out Start	93:14
16	Truck Load Out Stop	93:15
17	Clear Truck Total	94:0
18	Print Truck Ticket	94:1

4.3 Input and Holding Registers

Command: 0x04 – Read Input Register
0x03 – Read Holding Register
0x06 – Write Single Register
0x16 – Write Multiple Registers

Data Types:
Int – 16bit Word
Long – 32bit Signed (stored in 2 Registers)
Unsigned Long – 32 bit unsigned (stored in 2 Registers)
Float – 32bit floating point (stored in 2 Registers)

Multi-byte values that are stored in 2 registers are stored as follows:
123456789 = 0x075BCD15 hex

Register 0 = CD15
Register 1 = 075B

Address	Date Type	Read/Write	Description
1	float	r/w	Conveyor Angle (Angle Sensor must be installed)
2			
3	float	r/w	Cosine of Conveyor Angle
4			
5	float	r/w	Multiplier for Load Cell AD
6			
7	int	r/w	Angle Sensor Update
8	int	r/w	Angle Sensor Status
9	int	r/w	Angle Sensor Calibration
10	int	r/w	Used to perform Zero Calibration. See section 5.1
11	int	r/w	Clear Totals. See section 5.3
12	int	r/w	Clear Total 1. (Setting to 1 will clear Daily Total)
13	int	r/w	Spare4;
14	int	r/w	Spare5;
15	int	r/w	Spare6;
16	unsigned int	r/w	Down Counts
17	unsigned int	r/w	Previous Down Counts
18	long	r	Total 1 Accumulator in Lbs or Kg
19		r	
20	long	r	Total 1 Accumulator in Hundredth of Tons
21		r	
22	long	r	Total 2 Accumulator in Tenth of Tons
23		r	
24	long	r	Total 3 Accumulator in Tenth of Tons
25		r	
26	long	r	Total 4 Accumulator in whole Tons
27		r	
28	long	r	Run Time 1 in Seconds
29		r	
30	long	r	Run Time 2 in Seconds

31		r	
32	long	r	Run Time 3 in Seconds
33		r	
34	long	r	Run Time 4 in Seconds
35		r	
36	long	r	Previous Total 1 in lbs
37		r	
38	long	r	Previous Total 2 in Tenth of Tons
39		r	
40	long	r	Previous Total 3 in Tenth of Tons
41		r	
42	long	r	Previous Total 4 in Whole Tons
43		r	
44	unsigned long	r	Total 1 Last Clear in Seconds since January 1, 1980.
45		r	
46	unsigned long	r	Total 2 Last Clear in Seconds since January 1, 1980.
47		r	
48	unsigned long	r	Total 3 Last Clear in Seconds since January 1, 1980.
49		r	
50	unsigned long	r	Total 4 Last Clear in Seconds since January 1, 1980.
51		r	
52	long	r	Previous Run Time 1 in Seconds
53		r	
54	long	r	Previous Run Time 2 in Seconds
55		r	
56	long	r	Previous Run Time 3 in Seconds
57		r	
58	long	r	Previous Run Time 4 in Seconds
59		r	
60	long	r	Unused
61		r	
62	long	r	Average Rate in Hundredth of TPH
63		r	
64	long	r	Unfiltered Belt speed in hundredth of FPM
65		r	
66	long	r	Average Belt Speed in Hundredth of FPM
67		r	
68	long	r	Percent Load in Hundredth of %
69		r	
70	long	r	Unfiltered Load Cell AD value
71		r	
72	long	r	Filtered Load Cell AD Value
73		r	
74	long	r	Unused
75		r	
76	long	r	Scale weight in Hundredth of Lbs.
77		r	
78	long	r/w	Set point Value for Input 1
79		r/w	
80	long	r/w	Set point Value for Input 2

81		r/w	
82	long	r/w	Set point Value for Input 3
83		r/w	
84	long	r/w	Set point Value for Input 4
85		r/w	
86	unsigned long	r	Zero Calibration Value
87		r	
88	long	r	Span Calibration Value
89		r	
90	float	r	Belt Length in Feet
91		r	
92	int	r	Inputs (See Section 4.1)
93	int	r/w	Outputs (See Section 4.2)
94	int	r/w	Outputs (See Section 4.2)
95	int	r/w	Current Loop Output (See section 5.2)
96	int	r	Load Cell ADC Gain
97	int	r	Day
98	int	r	Month
99	int	r	Year
100	int	r	hour
101	int	r	min
102	int	r	sec
103	int	r	units (0 = English; 1 = Metric)
104	unsigned long	r	Total Trucks Loaded
105		r	
106	unsigned long	r	Total Tons loaded in Hundredth of tons
107		r	
108	unsigned long	r	Total Fill Time in Seconds
109		r	
110	float	r	Average Truck Weight
111		r	
112	float	r	Average Truck Fill Time
113		r	
114	float	r	Average Truck Fill Tons Per Hour
115		r	
116	float	r	Average Difference between Truck Loads
117		r	
118	float	r	Current Truck Percent Full
119		r	
120	float	r	Current Truck Estimate seconds until full
121		r	
122	float	r	Average Trucks per Hour
123		r	
124	unsigned long	r/w	Truck Cutoff Weight in Hundredth of Tons
125		r/w	
126	unsigned long	r/w	Truck Minimum Load in Hundredth of Tons
127		r/w	
128	unsigned long	r/w	Truck Maximum Load in Hundredth of Tons
129		r/w	
130	unsigned long	r	Current Truck Fill Time

131		r	
132	unsigned long	r/w	Current Truck Target Weight in Hundredth of Tons
133		r/w	
134	long	r	Current Truck Accumulator
135		r	
136	long	r	Current Truck Difference of Actual from Target weight
137		r	
138	int	r	Truck State
139	int	r	Truck Status
140	float	r	Idler Span in feet
141		r	
142	unsigned long	r	Time and Date of Last Zero. (Seconds since January 1, 1980.)
143		r	
144	unsigned long	r	Time and Date of Last Span. (Seconds since January 1, 1980.)
145		r	
146	float	r	Zero Test Belt Length
147		r	
148	unsigned long	r	New Zero Value
149		r	
150	long	r	Run Time 1 in thousandths of hours
151		r	
152	long	r	Average Rate in hundredth of tons based on Run Time 1.
153		r	
154	unsigned int	r	Cutoff Value
155	unsigned Int	r	Standard Rate in tph
156	char	r	Total 1 Name (16 characters)
157		r	
158		r	
159		r	
160		r	
161		r	
162		r	
163		r	
164	char	r	Total 2 Name (16 characters)
165		r	
166		r	
167		r	
168		r	
169		r	
170		r	
171		r	
172	char	r	Total 3 Name (16 characters)
173		r	
174		r	
175		r	
176		r	
177		r	
178		r	

179		r	
180	char	r	Total 4 Name (16 characters)
181		r	
182		r	
183		r	
184		r	
185		r	
186		r	
187		r	
188	char	r/w	Scale Name (26 Characters)
189		r/w	
190		r/w	
191		r/w	
192		r/w	
193		r/w	
194		r/w	
195		r/w	
196		r/w	
197		r/w	
198		r/w	
199		r/w	
200		r/w	
201	char	r/w	Truck ID (20 characters)
202		r/w	
203		r/w	
204		r/w	
205		r/w	
206		r/w	
207		r/w	
208		r/w	
209		r/w	
210		r/w	
211	char	r	Software Version (20 characters)
212		r	
213		r	
214		r	
215		r	
216		r	
217		r	
218		r	
219		r	
220		r	
221	char	r	Hardware Version (20 characters)
222		r	
223		r	
224		r	
225		r	
226		r	
227		r	

228		r	
229		r	
230		r	
Daily Total			
231	long	r	1 - Accumulator in Lbs or Kg
232		r	
233	long	r	1 - Previous Accumulator in Lbs or Kg
234		r	
235	long	r	1 - Run Time in Seconds
236		r	
237	long	r	1 - Previous Run Time in Seconds
238		r	
239	unsigned int	r	1 - Down Counts
240	unsigned int	r	1 - Previous Down Counts
241	unsigned long	r	1 - Previous Clear
242		r	
243	long	r	1 - DO NOT USE - Factory use only
244		r	
245	unsinged long	r	1- Production Time in Seconds
246		r	
247	unsinged int	r	1 - Production Down Counts
248	unsigned long	r	1 - Last Production Time
249		r	
250	unsigned int	r	1 - Last Production Down Counts
251	unsigned int	r	1 - Auxiliary Counter
252	unsigned long	r	1 - Auxiliary Timer in Seconds
253		r	
254	unsigned int	r	1 - Last Auxiliary Counter
255	unsinged long	r	1 - Last Auxilary Timer in Seconds
256		r	
Weekly Total			
257	long	r	2 - Accumulator in tenth of tons
258		r	
259	long	r	2 - Previous Accumulator in tenth of tons
260		r	
261	long	r	2 - Run Time in Seconds
262		r	
263	long	r	2 - Previous Run Time in Seconds
264		r	
265	unsigned int	r	2 - Down Counts
266	unsigned int	r	2 - Previous Down Counts
267	unsigned long	r	2 - Previous Clear
268		r	
269	long	r	2 - DO NOT USE - Factory use only
270		r	
271	unsinged long	r	2- Production Time in Seconds
272		r	

273	unsinged int	r	2 - Production Down Counts
274	unsigned long	r	2 - Last Production Time
275		r	
276	unsigned int	r	2 - Last Production Down Counts
277	unsigned int	r	2 - Auxiliary Counter
278	unsigned long	r	2 - Auxiliary Timer in Seconds
279		r	
280	unsigned int	r	2 - Last Auxiliary Counter
281	unsigned int	r	2 - Last Auxiliary Timer in Seconds
282		r	
Monthly Total			
283	long	r	3 - Accumulator in tenth of tons
284		r	
285	long	r	3 - Previous Accumulator in tenth of tons
286		r	
287	long	r	3 - Run Time in Seconds
288		r	
289	long	r	3 - Previous Run Time in Seconds
290		r	
291	unsigned int	r	3 - Down Counts
292	unsigned int	r	3 - Previous Down Counts
293	unsigned long	r	3 - Previous Clear
294		r	
295	long	r	3 - DO NOT USE - Factory use only
296		r	
297	unsinged long	r	3- Production Time in Seconds
298		r	
299	unsinged int	r	3 - Production Down Counts
300	unsigned long	r	3 - Last Production Time
301		r	
302	unsigned int	r	3 - Last Production Down Counts
303	unsigned int	r	3 - Auxiliary Counter
304	unsigned long	r	3 - Auxiliary Timer in Seconds
305		r	
306	unsigned int	r	3 - Last Auxiliary Counter
307	unsinged int	r	3 - Last Auxiliary Timer in Seconds
308		r	
Yearly Total			
309	long	r	4 - Accumulator in tons
310		r	
311	long	r	4 - Previous Accumulator in tons
312		r	
313	long	r	4 - Run Time in Seconds
314		r	
315	long	r	4 - Previous Run Time in Seconds
316		r	
317	unsigned int	r	4 - Down Counts

318	unsigned int	r	4 - Previous Down Counts
319	unsigned long	r	4 - Previous Clear
320		r	
321	long	r	4 - DO NOT USE - Factory use only
322		r	
323	unsinged long	r	4- Production Time in Seconds
324		r	
325	unsinged int	r	4 - Production Down Counts
326	unsigned long	r	4 - Last Production Time
327		r	
328	unsigned int	r	4 - Last Production Down Counts
329	unsigned int	r	4 - Auxiliary Counter
330	unsigned long	r	4 - Auxiliary Timer in Seconds
331		r	
332	unsigned int	r	4 - Last Auxiliary Counter
333	unsinged int	r	4 - Last Auxiliary Timer in Seconds
334		r	
Weight Logging Total – used for Weight Logging			
335	long	r	5 - Accumulator in Lbs or Kg
336		r	
337	long	r	5 - Previous Accumulator in Lbs or Kg
338		r	
339	long	r	5 - Run Time in Seconds
340		r	
341	long	r	5 - Previous Run Time in Seconds
342		r	
343	unsigned int	r	5 - Down Counts
344	unsigned int	r	5 - Previous Down Counts
345	unsigned long	r	5 - Previous Clear
346		r	
347	long	r	5 - DO NOT USE - Factory use only
348		r	
349	unsinged long	r	5- Production Time in Seconds
350		r	
351	unsinged int	r	5 - Production Down Counts
352	unsigned long	r	5 - Last Production Time
353		r	
354	unsigned int	r	5 - Last Production Down Counts
355	unsigned int	r	5 - Auxiliary Counter
356	unsigned long	r	5 - Auxiliary Timer in Seconds
357		r	
358	unsigned int	r	5 - Last Auxiliary Counter
359	unsinged int	r	5 - Last auxiliary Timer in Seconds
360		r	
Day Accumulator – Resets when new day starts			
361	long	r	6 - Accumulator in Lbs or Kg
362		r	

363	long	r	6 - Previous Accumulator in Lbs or Kg
364		r	
365	long	r	6 - Run Time in Seconds
366		r	
367	long	r	6 - Previous Run Time in Seconds
368		r	
369	unsigned int	r	6 - Down Counts
370	unsigned int	r	6 - Previous Down Counts
371	unsigned long	r	6 - Previous Clear
372		r	
373	long	r	6 - DO NOT USE - Factory use only
374		r	
375	unsinged long	r	6- Production Time in Seconds
376		r	
377	unsinged int	r	6 - Production Down Counts
378	unsigned long	r	6 - Last Production Time
379		r	
380	unsigned int	r	6 - Last Production Down Counts
381	unsigned int	r	6 - auxiliary Counter
382	unsigned long	r	6 - auxiliary Timer in Seconds
383		r	
384	unsigned int	r	6 - Last Auxiliary Counter
385	unsinged int	r	6 - Last auxiliary Timer in Seconds
386		r	
387			
388			
389			
390			
391			
392			
393			
394			
395			
396			
397			
398			
399			
400			
401			
402			
403			
404			
405			
406			
407			
408			
409			

410			
411			
412	unsigned long	r	ip address
413		r	
414	unsigned long	r	mask
415		r	
416	unsigned long	r	name server
417		r	
418	unsigned long	r	dns
419		r	
420	unsigned int	r	mac address
421	unsigned int	r	"
422	unsigned int	r	"
423	unsigned int	r	"
424	unsigned int	r/w	Password for Calibration Changes 44810

5.0 Special Functions

5.1 Performing a Zero Calibration

Holding Registers Used: 10 – Read/Write Zero Calibration status
146 – Current Belt Length
148 – New Zero Value

A Zero Calibration can be performed at any time. However it is up to the user to be sure that the belt is empty during the test. There is nothing in the scale that will prevent a user from doing a Zero Calibration with a fully loaded belt.

The Zero Calibration is done using the stored belt length so it is not necessary to watch the belt for 1 complete revolution.

Values are Read and Written to Holding Register 10. The user will write values to the register and the scale will update the register with the current status of the Zero Test.

To start Zero Calibration:

- Write 1 to holding register 10. The Zero Calibration will start.
- Read register 10. During the Zero Calibration it will read 2.
- While test is running register 146 will show how far the belt has traveled.
- When test is done register 10 will read 3 and register 148 will contain the new Zero Value.
- Write 4 to register 10 to accept new Zero Value.
- Writing any other value to register 10 will cancel the test with no changes made to the calibration.

Register 10		
0	r	Zero Calibration not running
1	w	Start Zero Calibration
2	r	Zero Calibration Running
3	r	Zero Calibration Complete
4	w	Apply new Zero value
99	r/w	Cancel Zero Calibration

5.2 Current Loop Output

Holding Registers Used: 95 – Current Loop

Setting the Analog output function to Modbus will allow the current loop to be controlled directly by the Modbus master.

The current loop is a 16bit DAC. The value written to register 95 will directly output to the DAC.

The Analog Output settings, Action, Averaging and Range will still affect the output.

5.3 Clearing Totals

There are 2 ways to clear scale totals.

1. Use Digital outputs addresses 5 – 9. (Or write to their corresponding Holding Registers)
2. Write to Holding Register 11.
   a. Normally Register 11 is read as -1.
   b. Writing the following values will clear the corresponding total.

0	Clear All Totals
1	Clear Total 1
2	Clear Total 2
3	Clear Total 3
4	Clear Total 4
5	Clear Truck Totals

   c. After total is clear Register will read -1.

Totals can be cleared at any time.

The default IP address for all scales is 192.168.000.100. This should be changed to a unique value.

If this will be on an existing network then refer to the network administrator for the proper ID address for this scale.

To change the IP address of a scale:

- Press the key under I/O
- Use the ▲ key to move the cursor up. This will move to the last item in the I/O menu which is network.
- Press **Enter** when the cursor is by **Network.**
- The Network should display.
- Press cursor should now be pointing at **IP Address.**
- Press **Enter** to open the edit screen for the IP Address
- Press the arrow key under Edit. This will display the cursor under the last group of Numbers.
- Use the ◄ o ► keys to move the cursor Right or Left.
- Use the + or – key to increase or decrease the number under the cursor.
- When the correct I/P address is set ores the Arrow Key under apply. This will save the value and return back to the Network Menu.
- If an error is made during the edit process press default to return the IP addresses back to default.
- Pressing **Exit** during the edit process will exit the screen with no changes applied.

Set Subnet Mask, Gateway and Name Server in the Same Manner, (If you are not sure which numbers to use refer to you Network Administrator.

1. **Web Server**

The built in Web Server must also be enabled.

- Under the Network Scroll menu scroll down to Web Server (+/-)
- Press + to change from Off to On.

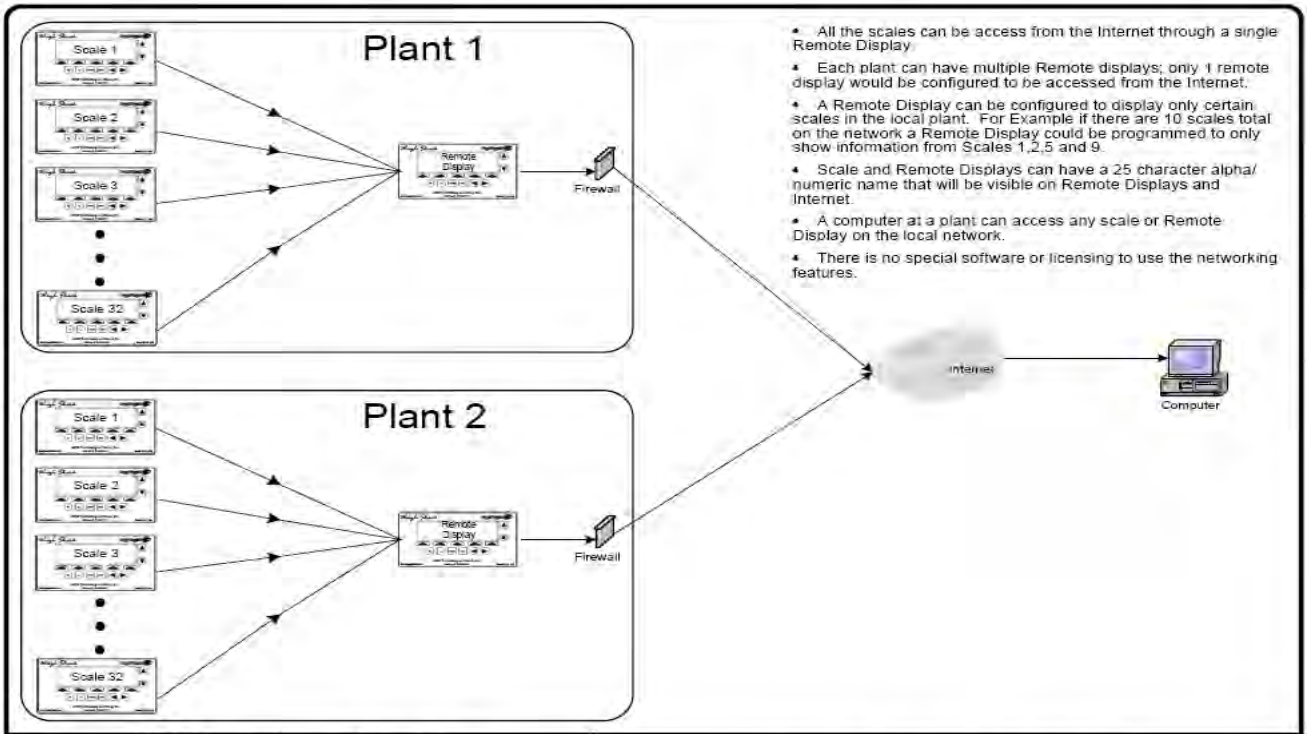
2. **Scale Name**

Each scale should have a name that describes the scale. This will allow the scale to be easily identified on the Remote Display-2. If no scale name is given the RD-2 will show the scales IP address when viewing that scales information. The Scale Name can be up to 24 characters long with numbers letters and punctuation

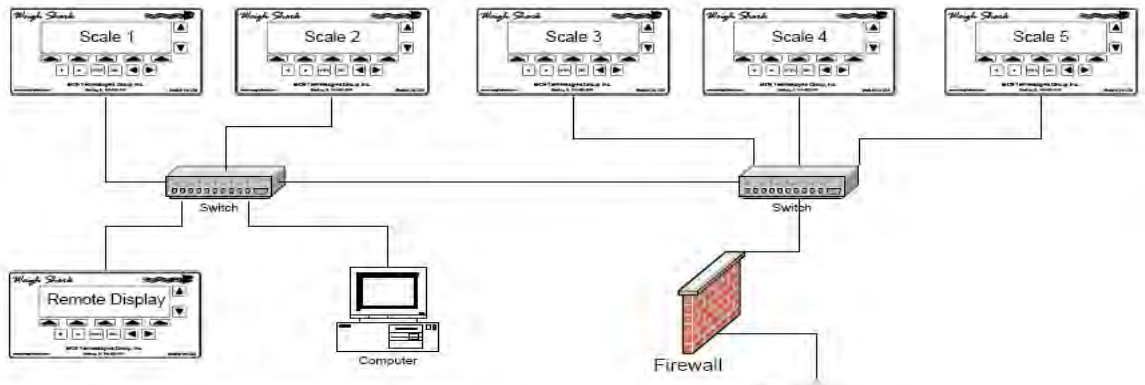
To Change the scale name:

- Press the key under Setup
- The cursor should be on the first line pointing to Scale Name. If not use the ▼ ▲ keys to move the cursor to Scale Name.
- Press **Enter** when the cursor is next to Scale Name.
- The Scale Name screen should now be displayed.
- Press the key under **Edit.** This will display the cursor on the far right ofn New Name Line.
- Use the ◄ o ► keys to move the Cursor Left and Right.
- Use the +/- keys to change each character.
- When the value correct name is set, press the Key under Apply. The will save the value and return back to the setup menu.
- Pressing Exit during the edit process will exit serene with no changes applied.

* Internet Access to Scales & Ethernet Example*



MCR Technologies Group, Inc. P.O. Box 1016 Sterling, IL 61081 Ph. 815-622-3181 Fax. 815-622-0819 Email: mcr@essex1.com	Internet Access to Scales		
	Date: 1/4/07	REV: 1.0	By: SJK



MCR Technologies Group, Inc. P.O. Box 1016 Sterling, IL 61081 Ph. 815-622-3181 Fax. 815-622-0819 Email: mcr@essex1.com	Ethernet wiring example		
	Date: 7/18/05	REV: 1.0	By: SJK

Weigh Shark Mechanical Data

Performance	
Accuracy	0.5 to 1% over 3 to 1 range (depends on application)
Repeatability	0.02% of rated output
Non-Linearity	0.03% of rated output
Capacity	>6000 tph at 4' idler spacing and max belt speed
Speed Sensor	
Wheel Diameter	Stainless Steel 4.511
Pulses/Rev	32
Input	10 – 30 Vdc
Output	3-wire, NPN
Load Cell (2 per Idler)	
Construction	Single Ended Shear Beam
Material	Steel or Aluminum (Stainless Optional)
Non-Linearity	0.03% Rated Output
Hysteresis	0.02% Rated Output
Repeatability	0.02% Rated Output
Standard Capacities	100, 250, 500 lbs
Overload	1.5x rated capacity
Operational Temperature Range	-40°F to +176 F
Temperature Compensation	-10°C to +50°C 15°F to +122°F
Rated Excitation	10Vdc (20Vdc Max)
Output	3mV/V
Idler	
Profile	Flat to 35° Up to 45° with reduced accuracy
Diameter	2 to 7"
Spacing	2 to 5 feet
Conveyor	
Belt Speed	up to 1000fpm (with standard speed sensor)
Max Belt Width	> 48"
Incline	20° from horizontal up to 30° with less accuracy Angle Compensator available for variable incline applications.

Manufactured by:
MCR Technologies Group, Inc.
P.O. Box 1016
Sterling, IL. 61081
Phone: 815-622-3181
Fax: 815-622-0819
www.weighshark.com

Weigh Shark Integrator Technical Data

Display	
Type	Graphical Dot Matrix Wide Temperature LCD
Size	240 x 64 pixels 5.0" wide x 1.34" high visible
Memory	
Program Memory	non-volatile FLASH memory
Calibration Memory	battery backed RAM replaceable lithium coin cell 10 year retention (Temperature dependant)
Totalizers (4)	
Total 1	1, 073,742 tons max
Total 2 and 3	214,748,365 tons max
Total 4	2,147,483,647 tons max Totalizers accumulate and clear independent of each other.
Power Supply	
Voltage	85-264 VAC
Frequency	47-63 Hz
Power	10 Watt
Isolation	4200Vac Input-Output
DC Input	9-30 VDC 10Watts
Load Cell Input	
Excitation	5Vdc 8 Load Cells max
Input	0 – 30mV
Resolution	16 bit (24bit internal)
Speed Sensor Input	
Supply	24 VDC, 100mA max 5 VDC, 100mA max
Input	1 - 1200Hz NPN switch or dry contact

Digital Inputs (4)	
Supply	24Vdc, 100mA max
Input	NPN switch or dry contact
Programmable functions (17)	Clear Total 1,2,3,4 or All, Print Total 1,2,3,4 or all ticket, Print Calibration Summary, Truck Load out Clear, Stop, Start, Enable Print Truck Totals or Ticket
Digital Outputs (4)	
Supply	24Vdc, 100mA max
Output	30Vdc, 100mA Sinking max
Programmable functions (16)	Rate set point, Speed set point, Total 1,2,3,4 set point, 1, 0.1, 0.01, 0.005 ton pulse Accumulation Direction, Truck Load out Ready, Done, Feeder cutoff, Running MODBUS

Weigh Shark

Manufactured by:
MCR Technologies Group, Inc.
P.O. Box 1016, Sterling, IL. 61081
Phone: 815-622-3181
Fax: 815-622-0819
www.weighshark.com

Analog Output (1)	
Current	0/4-20mA
Resolution	16bit(0-20mA or 4-20mA)
Load	1k Ω max
Isolation	2500 V rms (External 24Vdc supply required)
Programmable functions (13)	Rate, Belt Speed, Load % Totals 1,2,3,4 Run Time 1,2,3,4 Truck Fill % Modbus
Communications	
Ethernet	10/100Base-T HTTP, Modbus/IP
RS-232 (1)	Ticket Printer, Angle Sensor, Modbus RTU
RS-485 (1)	Ticket Printer, Angle Sensor, Touch screen, Modbus RTU
Enclosure	
Material	fiberglass reinforced polyester Clear Lexan window
Dimensions	11.3" W x 9.31" H x 5.43" D
Protection	NEMA 3, 3R, 4, 4X, 12 & 13
Accessories	
Angle Compensator	for conveyors with changing angle.
Truck Load out touch screen	touch screen for truck and rail car loading. (6, 8, 10, or 15" screen size available)
Ticket Printer	for printing Truck, Totalizer or Calibration tickets
Remote Display	View multiple scales on 1 display, scales connected via Ethernet.
Industrial Network interfaces	Contact factory for availability.

Truck Load Out (TLO)

The TLO software can be configured to work with the scale keypad, external touch screen, external push buttons or a combination of the above. The TLO uses its own accumulator so there is no conflict with any of the 4 main totalizers.

Programming

Settings for the TLO system can be found at Setup>Truck Load Out Setup menu.

SETUP>Truck Load Out Setup Menu

Setting	Description
Truck Load Out	On/Off – Enables the Truck Load Out system.
Require Truck ID	On/Off – Requires a Truck ID to be entered before the load can begin.
Clear ID on Complete	On/Off – Clears Truck ID at completion of load.
Require Input	On/Off – Requires a digital input to be activated before the load can begin. The input and configured in the I/O menu.
Auto Print Ticket	On/Off – Automatically print a truck ticket on completion of load. Requires optional ticket printer.
Auto Clear Target	On/Off – Clear Target weight at completion of load.
Stop Timer On	Controls Truck fill timer.
	Output: Truck fill timer is stopped when the Truck Output turns off.
	Clear: Truck fill timer is stopped when the load is complete and the operator Clears the weight.
	Min. Rate: Truck fill timer accumulates time only when the Rate is above the Minimum Rate setting found in the SETUP>Calibration Setup menu.
Cutoff	The amount to subtract from the Target weight to turn off the Cutoff output.
Min. Target	Minimum allowable Target weight
Max. Target	Maximum allowable Target weight

TLO Inputs

Any of the 4 digital Inputs can be configured for the following functions. Inputs can be configured under I/O>Inputs menu.

I/O>Inputs

Function	Description
Truck Load Out Clear	Clears Truck accumulator when the load is complete.
Truck Load Out Stop	Stops the truck load out process and turn off outputs. (This should NOT be used as an E-Stop.)
Truck Load Out Start	Starts the Truck load out process
Truck Load Out Enable	If setting Require Input = ON then this input needs to be ON for truck load out to start.

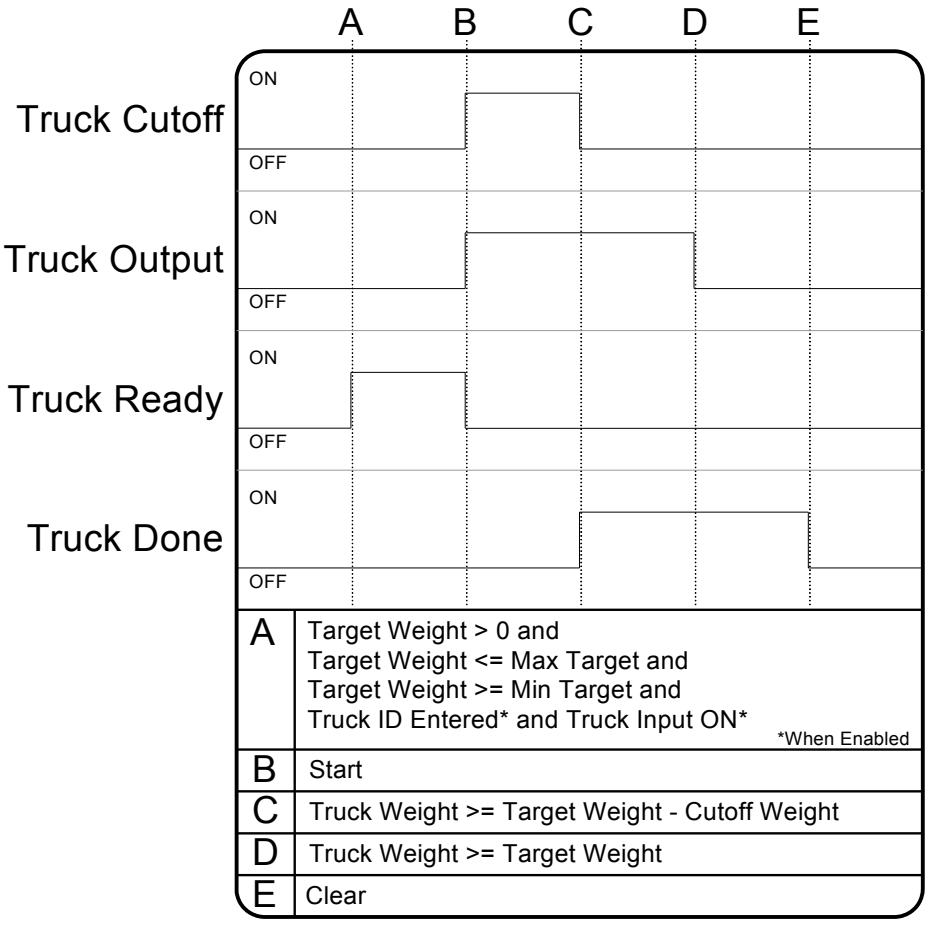
TLO Outputs

Any of the 4 digital Outputs can be configured for the following function. Outputs can be configured under I/O>Outputs menu.

I/O>Outputs

Function	Description
Truck Output	On when loading starts, off when Target weigh is reached.
Truck Ready	All the requirements are met for the loading to start.
Truck Done	On when accumulator reaches Target Weight – Truck Cutoff weight.
Truck Cutoff	On when loading starts, off when Target Weight – Truck Cutoff Weight is reached.

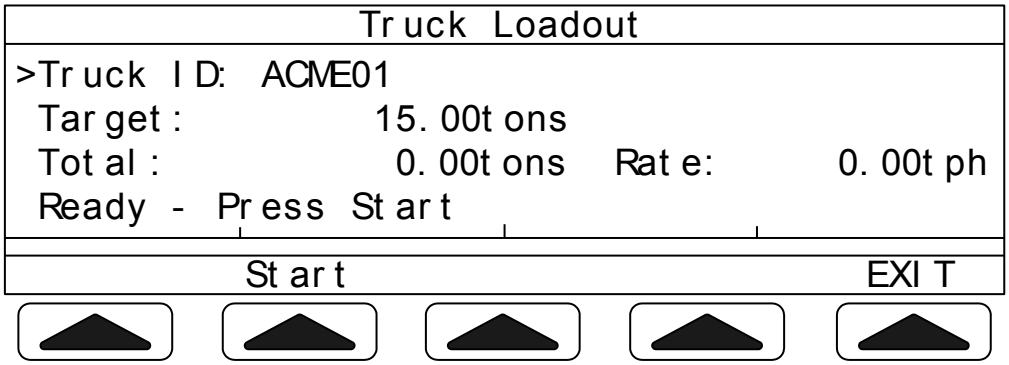
TLO output function table.



A	Target Weight > 0 and Target Weight <= Max Target and Target Weight >= Min Target and Truck ID Entered* and Truck Input ON* *When Enabled
B	Start
C	Truck Weight >= Target Weight - Cutoff Weight
D	Truck Weight >= Target Weight
E	Clear

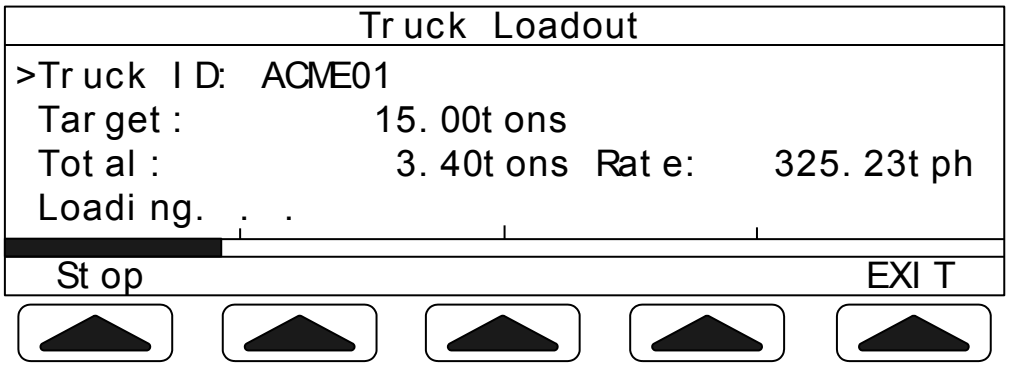
TLO Operation with Scale Screen

When the TLO system is Enabled there are 2 extra options under the VIEW menu, Truck Total and Trucks. Use the ▲ and ▼ keys to move the cursor to the Truck Total option and press ENTER. This will open the Truck Load out screen.

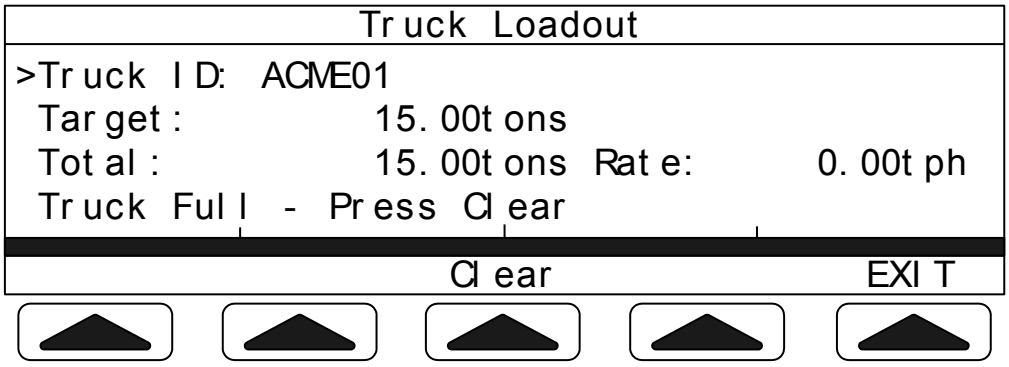


1. Enter Truck ID. Use the ▲ and ▼ keys to move the cursor to Truck ID. Press ENTER to open the Truck ID edit screen. Press button under EDIT to begin editing the Truck ID. Use the + and – keys to change the value. Use the ◄ and ► keys to move between each column. Press APPLY to apply settings and exit.
2. Enter Target weight. Use the ▲ and ▼ keys to move the cursor to Target. Press ENTER to open the Target edit screen. Press button under EDIT to begin editing the Target weight. Use the + and – keys to change the value. Use the ◄ and ► keys to move between each column. Press APPLY to apply settings and exit.

   If Target weight is between the Maximum and Minimum settings then the screen will display "Ready – Press Start". If setting, Require Truck ID, is set to ON then a Truck ID will be required before load can begin. If setting, Require Input, is set to ON then the input configure as Truck Load Out Enabled must be ON before the load can begin.
3. Press button under Start to clear the accumulator and begin loading truck. Press Stop at anytime to stop the loading process.



4. When Loading is completed press **Clear** to complete load. If setting, Clear Truck ID, is set to ON the Truck ID will be cleared. If setting, Auto Clear Target, is set to ON then the Target weight will also be cleared.

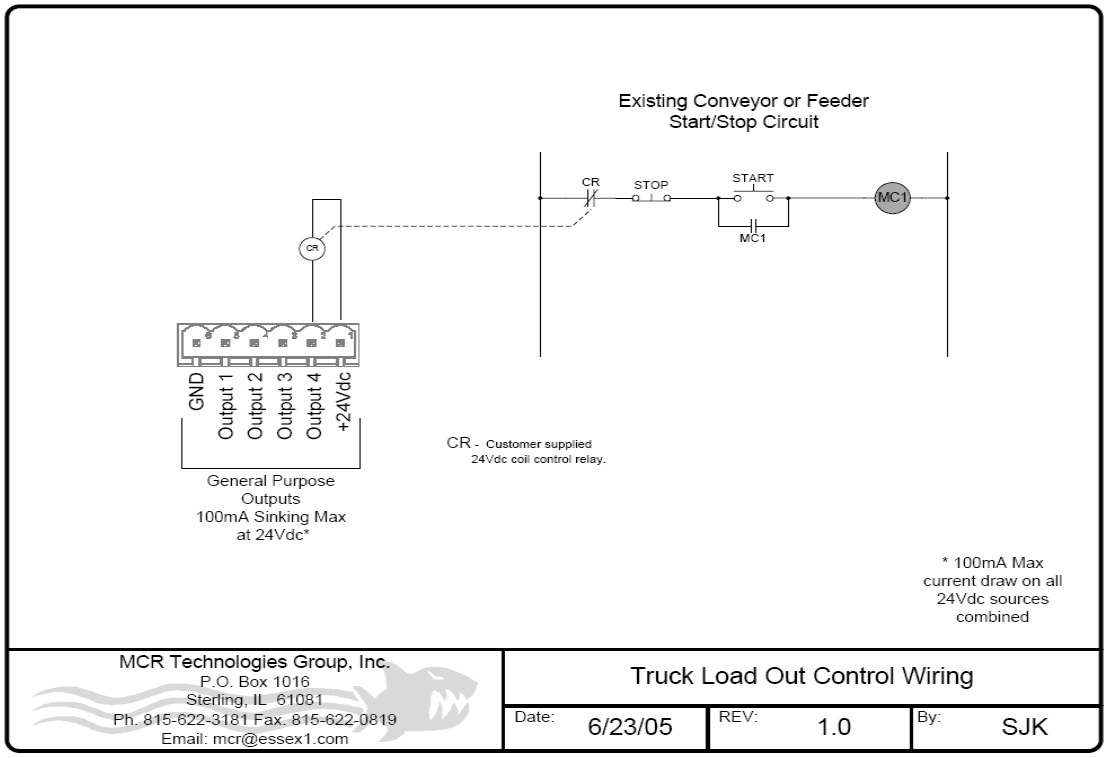


5. Truck Load out is complete; the system is ready for the next truck.

TLO with Touch Screen

1. Enter Truck ID. Press the Truck ID Button on touch screen to edit the Truck ID. Press ENT in the top left corner of the screen to accept changes.
2. Enter Target Weight. Press the Target Weight button to edit the Target Weight. Press Enter to accept changes.

   If Target weight is between the Maximum and Minimum settings then the screen will display “Ready – Press Start to continue”. If setting, Require Truck ID, is set to ON then a Truck ID will be required before load can begin. If setting, Require Input, is set to ON then the input configure as Truck Load Out Enabled must be ON before the load can begin.
3. Press Start button to clear accumulator and begin loading truck. Press Stop at anytime to stop the loading process.
4. When Loading is completed press **Clear** to complete load. If setting, Clear Truck ID, is set to ON the Truck ID will be cleared. If setting, Auto Clear Target, is set to ON then the Target weight will also be cleared.
5. Truck Load out is complete; the system is ready for the next truck.



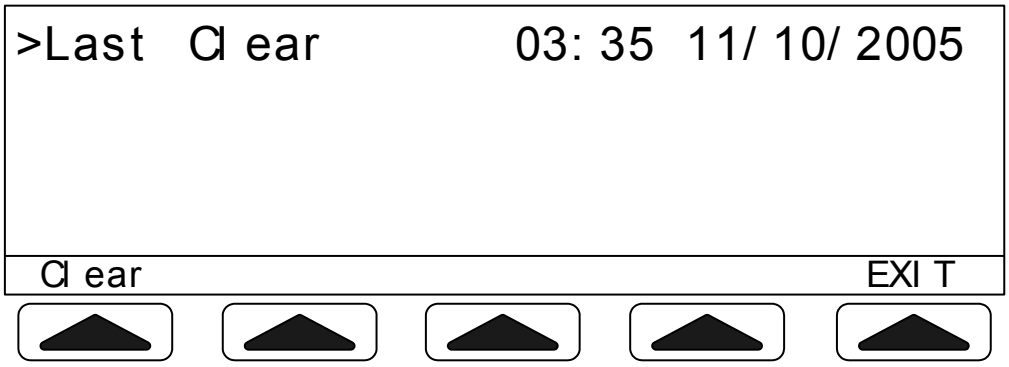
TLO Truck Summary Screen

Under the VIEW menu use the ▲ and ▼ keys to move the cursor to the Trucks option and press ENTER. This will open the Trucks Summary screen.

Page 1

Page 2

Page 3



Pressing Clear will clear the Truck summary and change the Last Clear value to the current time and date. The information will update at the completion of every truck load.

TLO Example

The following is an example Truck Load out set up. The system will do the following:

- Target Weight must be between 5 and 25 tons.
- A new Target Weight must be entered after every truck.
- The feeder will be shut off .25 tons before the Target Weight is reached.
- The Truck Fill Timer will accumulate until the loading is complete and the weight is cleared.
- Use an external push button, wired to Input 4, to Start the loading.
- Wire the feeder to Output 1.
- Touch screen will be used to control truck load out.

Software settings:

- Setup>Truck Load Out Setup menu
  - Truck Load Out = ON.
  - Require Truck ID = NO
  - Clear ID on Complete = NO
  - Require Input = NO
  - Auto Print Ticket = NO
  - Auto Clear Target = YES
  - Stop Time On = Clear
  - Cutoff = .25
  - Min. Target = 5
  - Max. Target = 25
- I/O>Inputs>Input 4
  - Function = Truck Load Out Start
  - When Input is: = ON
  - Filter Preset = 50ms
- I/O>Outputs>Output 1
  - Function = Truck Cutoff
  - Action = ON

Hardware Settings:

- Wire push button to Input 4
- Wire feeder relay to Output 1

Operation

1. Enter Target Weight.
2. Press Start push button or Start on touch screen. Truck accumulator will clear to 0.00 and Output 1 will turn ON.
3. When the Truck accumulator is .25tons from Target Weight Output 1 will turn Off.
4. Press Clear to complete load. This will also clear the Target weight to 0.00.

Weigh Shark Warranty

MCR TECHNOLOGIES GROUP, INC. manufactures the Weigh Shark Conveyor belt Scale and the Weigh Shark SI Dry Solids Impact Flow Meter.

MCR TECHNOLOGIES GROUP, INC. offers a 2 Year Limited Warranty on parts against defective workmanship and failure. MCR TECHNOLOGIES GROUP, INC. will replace any defective part within the 2 Years of Purchase Date by either sending the replacement part to the customer or sending a complete assembly to be exchanged with the defective assembly. The Warranty does not cover Any Labor. MCR will pay Ground Freight expenses to the customer. It will be the responsibility of the customer to return their part to MCR TECHNOLOGIES GROUP, INC for testing.

If MCR TECHNOLOGIES GROUP, INC. determines that the returned part or assembly is not covered under the warranty due to neglect, abuse or misapplication, the customer will be charged to repair or replace the damaged part or assembly. If the customer fails to return their part or assembly, MCR TECHNOLOGIES GROUP, INC. may charge the customer.

Weigh Shark

Conveyor Belt Scales

This is not a Legal for Trade Scale.

BELT CONVEYOR SCALE MAINTENANCE CHECK LIST

ITEM	VERIFICATION INTERVALS					NOTES
	DAILY	WEEKLY	MONTHLY	QUARTERLY	ANNUALLY	
Scale Area - Debris	X X X					Keep area around scale & Speed Sensor Free of Debris
Load Percentage		XXX				Should be at or around 75% if below 50% increase ADC gain by a factor of 5.
Idler Roller Condition		XXX				Inspect & repair / replace as needed
Material Test			XXX			Perform material test as refrenced on "Material Test" page in manual
Auto Zero			XXX			Perform Auto Zero test according to manual.
Span Calculation			XXX			Run Span Calibration at this time or whenever any mechanical change has taken place
Belt Scraper			XXX			Check operation, adjust or replace worn blades
Belt Condition			XXX			Visually inspect for cuts tears or undue wear
Belt Take Up			XXX			Inspect bearings-sheaves etc… for free travel
Speed Pulley			XXX			Inspect for wear, material build up, belt wrap. Check Bearings
Load Cell Offset				XXX		Load Output percentage should not exceed 90%
Load Cell Balance				XXX		Multiple load cells must be balanced to within 1 mV
Revolution Time				XXX		Verify time for 1 belt rev @ maximum speed
Alignment					XXX	Complete per instruction manual
Belt Length					XXX	Measure & Verify. Perform test outlined in manual.
I/O integrity					XXX	Check & Verify performance of all I/O being used.
Wire Terminations					XXX	Inspect for corrosion and tightness
Cable Integrity					XXX	Check for corrosion, moisture,deterioraton and perform ohm test.

* After performing ANY tests or maintenance ALWAYS run a Zero and SPAN test! *

** Please contact technical support at 815-622-3181 ext 12 with any questions or needed assistance**

MCR Technologies Group, Inc.
PO Box 1016 Sterling, IL 61081
815.622.3181 fax 815.622.0819
www.weighshark.com sales@weighshark.com

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www.weighshark.com sales@weighshark.com

Customer Name		Date	
Company Name		Phone	
Address		Fax	
State & Zip		e-mail	
Nature of Call			

Control Box Serial Number:	Display Number

1	Scale designation:	Conveyor		Product:		Other:
2	Scale Model #:			*(IE Model 100-250 or 500)*		
3	Does this scale have an Angle Compensator		Yes		No	
4	What is your RATE reading?	EMPTY Belt LOADED Belt				View Screen Line 2
5	What is the belt speed?		FPM			View Screen Line 3
6	Is the belt speed reasonable?		Yes		No	
7	If not, what would be reasonable?		FPM			
8	What is your ADC GAIN setting?					Setup - Calibration Setup - Line 11
9	What is your ZERO reading					Calib. Screen Line 3
10	What is your SPAN reading?					Calib. Screen Line 4
11	What is your ZERO Cutoff #					Calib. Screen Line 5
12	Belt Length stored in integrator					Calib. Screen Line 6
13	Idler Span stored in integrator					Calib. Screen Line 7
14	Angle number shown (if applicable)					Calib. Screen Line 8

Belt Scale Trouble Shooting Guide.

15 What is the LOAD % under EMPTY LOAD? _____ View Screen Line 4

16 What is the LOAD % under 'NORMAL' LOAD? _____ View Screen Line 4

17 What is your LOAD CELL AD reading? (With Both Load Cells Plugged In)
EMPTY BELT _____ Misc. Screen Line 4
LOADED BELT _____

18 Load Cell AD: Reading Load Cell #1 Only Empty Belt _____ "Un-Plug Load Cell #2"

19 Load Cell AD: Reading Load Cell #2 Only Empty Belt _____ "Un-Plug Load Cell #1"

20 What are the belt dimensions? Length _____ Feet Width _____ Inches

21 What is your idler center distance? *(idler to next idler)* _____

22 Were the idlers string lined during installation? Yes _____ No _____

23 Was scale calibrated using Weights & Bar? Yes _____ No _____
Total of weights & bar? _____

24 Did you feel comfortable performing the ZERO & SPAN tests? Yes _____ No _____
If no, what difficulties did you have? _____

25 Did you perform the ZERO & SPAN test with the belt running empty? Yes _____ No _____

26 Have you extended the cable length? Yes _____ No _____
If yes, how did you do this? _____

NOTE: Make sure that the Scale Weight (Misc Screen Line 3) matches up with your test bar and weights with the conveyor EMPTY and STOPPED.

27 Additional Information and Notes:

28 Problem resolution and recommendations:

SYMPTOM:	CHECK	ACTION
No Belt Speed	1a. Check connection to control Box to	1a. Correctly wire Proximity Switch according to manual.
	1b. Check for loose wire to control Box or loose connection	1b. Tighten wire or connector if loose connection found.
	1c. Slowly turn speed sensor wheel And observe the LED on the The proximity switch to ensure an Even pace.	1c. If LED lights on an irregular basis, check to make sure it prox switch Is lined up with gear tooth. Also check the gear itself to Ensure that it is aligned close to the switch, so that every Tooth is picked up and it is not rubbing into the switch
	1d. Perform pervious test, but check LED on circuit board labeled SPD1.	1d. If the LED is lighting at at irregular intervals, check for loose connection on either cable end, loose wire or cable damage. If a loose connection or wire correct the problem. If cable is damaged, repair or replace.
Low Belt Speed	2a. Check speed sensor according to 1c and 1d	2a. Perform the specified action as described in 1c and 1d.
		2b. Confirm the accurate Speed with a hand held tachometer or time the belt to calculate belt speed.

Note: If you have an erratic belt speed, this is typically caused by interference due to VFD's or motors. We suggest you ground the electronics to the conveyor frame. Take a wire from the GND terminal at the 12-24 VDC (2 pin) terminal located to the im

No Accumulation Of Weight or Rate	3a. Check belt speed	3a. If there is no belt speed or if belt speed seems too fast or slow, check speed sensor according to 1. & 2.
	3b. Check ZERO and SPAN Number. Both are found on the CALIB. Screen.	3b. If either number is 0, first check load cell wiring to ensure it is correct. If wired incorrectly…. Correct. If either number is 0, you will need to go to the CALIB. Select ZERO or SPAN and Press ENTER. You must M
	3c. Check load cell cables for damage.	3c. Repair or replace damage.

NOTE: If you have extended your cables, it is imparitive you use a junction box. A splice area is a prime location of problems.

3d. Check LOAD CELL AD Located on the MISC.	3d. First unplug one load cell and observe number. You should never see a 0 or 65,535. Check the other load cell. If One load cell is bent, or damaged by lightning, etc. It must be Replaced

Note: Load cell tests, Zero Tests and Span Tests must be Performed with the belt running EMPTY.

Note: A load cell provides a positive mV signal to our processor. We convert this signal to a number. This number is found as LOAD CELL AD on our MISC. screen. If the load cell is bent UP we will show a 0 since we cannot show a negative number.

	CHECK	ACTION
Scale is reading Light.	4a. Check belt speed.	4a. If belt speed seems wrong check according to 1c and 1d.
	4b. Check rate with belt running empty.	4b. If rate is fluctuating near 0, this is perfectly normal this occurs because the scale is seeing the lighter and heavier portions of the belt.
		If the rate is a steady negative number, then check load cell According to 3d
		If they check out OK, then go to the Calibration Screen and Run both the ZERO test and SPAN test.
	Are idlers in alignment ?	Perform a string test as is described in the manual.

Note: To verify that the calibration was performed correctly, do the following. When the ZERO test and SPAN test are complete, leave the test weights on the empty belt and go to the MISC. screen. The SCALE WEIGHT value should match the total amount of

Note: Scale accuracy should be confirmed vs. a legal for trade truck scale.

Scale is reading Heavy.	5a. Check Load Cell AD Numbers according to 3d.	5a. Perform required action in 3d.
	5b. Check rate with belt Running empty.	5b. If rate is significantly sbove 0 then perform both ZERO and SPAN tests.

Note: if rate fluctuates slightly above and below 0 this is perfectly normal, Provided there is no accumulation of weight

	5c. Check idlers for Alignment	5c. Perform string test as Explained in the manual To ensure proper idler Alignment

Note: To verify the calibration was performed correctly, do the following. When the ZERO and SPAN test are completed, leave the test weights and bar on the scale and leave the test weights on the empty belt. Go to the MISC. screen and look at your SCAL

Note: Scale accuracy should be confirmed vs. a legal for trade truck scale.

Scale does not turn ON:	6a. Check to ensure that Proper power is being Supplied to the correct location on the board.	6a. Scale will operate on 110 or 220 VAC or 12-24 VDC. Verify power is wired correctly.
	6b. Check to make sure Scale is turned on.	6b. Flip switch in control box to turn on scale
	6c. Check fuse located in upper left corner of Board.	6c. If blown… replace.
	6d. Check to make sure display is properly connected to circuit board.	6d. Inspect connection and condition of cable between circuit board and display.
Nothing happens When a keypad Button is pressed.	7a. Check to ensure control box is turned on.	7a. Perform checks in Section 6
	7b. Check to ensure that keybap is plugged in.	7b. Look behind door of control panel to ensure that display is connected to the keypad.
	7c. Is display readable ?	7c. If display has readable info. Replace keypad. If display has nonsense, replace display.

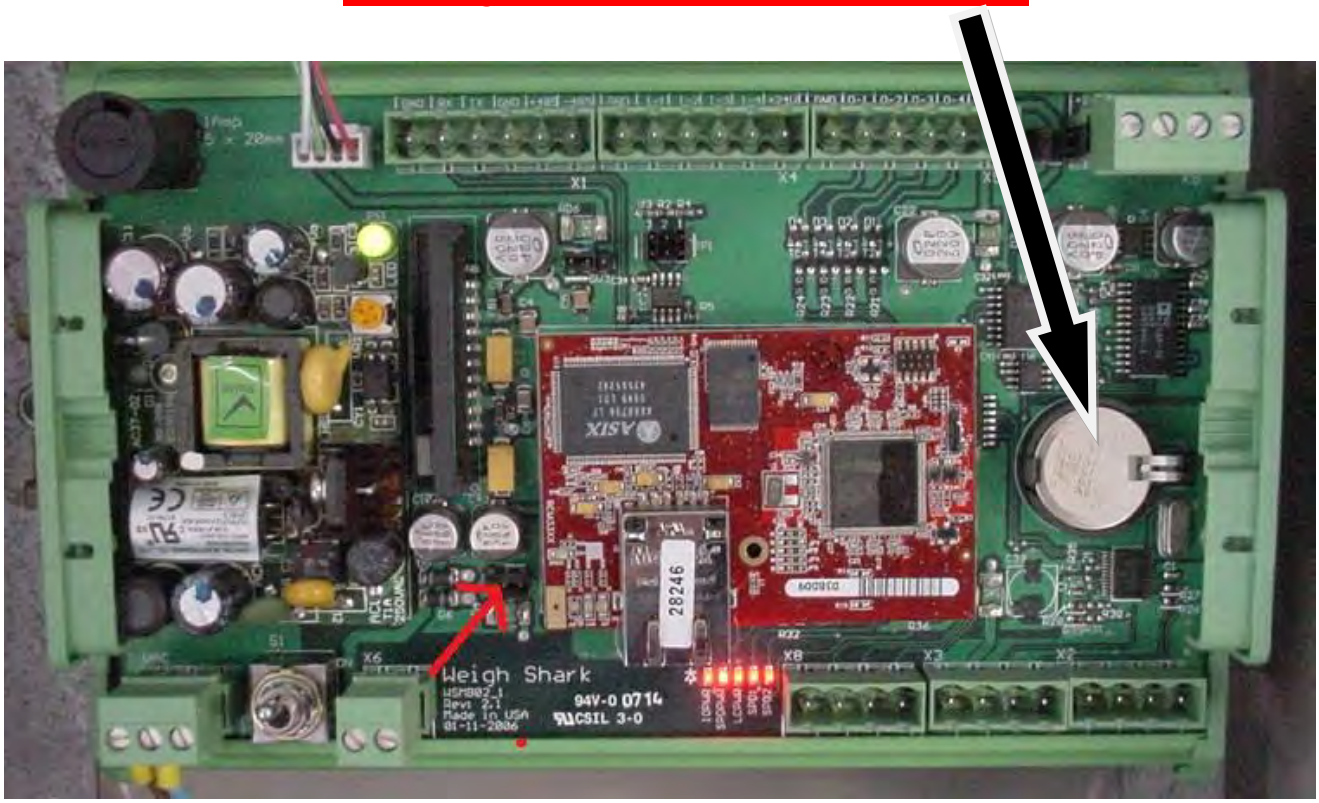
Troubleshooting Tips if Scale is resetting to default values when powered on & off

It may be as simple as changing the battery as shown below.

If not please try the following steps:

1. **Check Battery Cell Holder to see if it is larger than the battery, this may cause the battery to be loose and causing the default values to appear.**
2. **If loose remove battery from holder, raise the spring steel normally used for negative contact. This should result in better battery contact.**
3. **If still having issues place a small coin (penny or dime) in between contact for ground & the battery. It should reset 1 time after this is done.**
4. **If this does not work replace battery**
5. **If problem persists contact *Weigh Shark* Technical Support**
    - **815-622-3181 ext. 3**

Battery Part Number: CR 2032



NOTES

Scale Model: _____

Control Box #:_____

Installation Date: _____

Scale Designation: **Conveyor Name: _____**

Product: _____

Initial Settings: ***(after calibration is complete)***

Belt Speed_____ **ADC Gain:_____**

Zero Reading_____ **Span Reading_____**

Other Notes:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

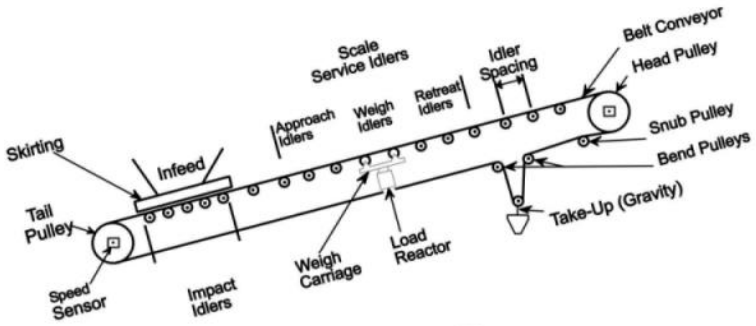
N.I.S.A. - BELT SCALES OVERVIEW

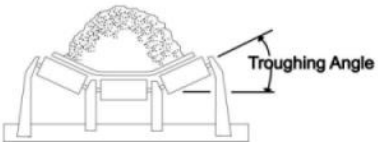
Overview of Conveyor Belt Scales

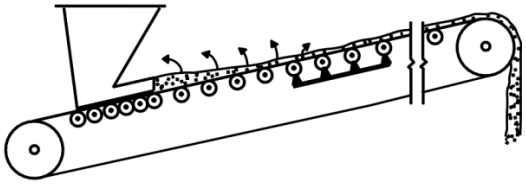
The following illustrations, text and photos are samples of the Technical Papers presented at the NISA Spring and Fall Technical Seminars. (2/8/98)

The Conveyor

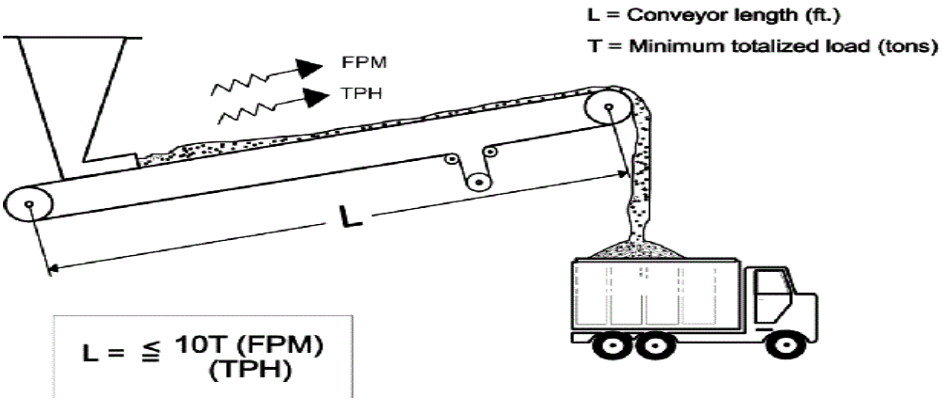
Components of the conveyor, belt scale and weigh bridge assembly.





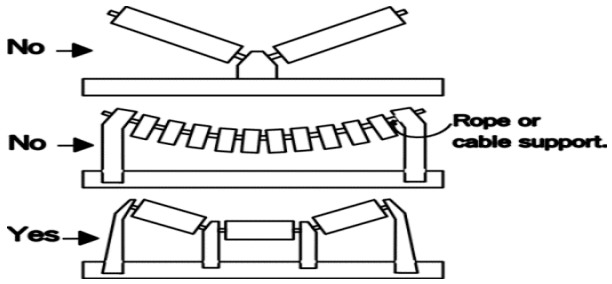


The conveyor speed and slope should not exceed that at which material slippage occurs. Accurate weight totalization requires that material velocity matches belt velocity. This may require that the scale be located a considerable distance from the loading point on a steeply inclined, high velocity systems handling certain materials.

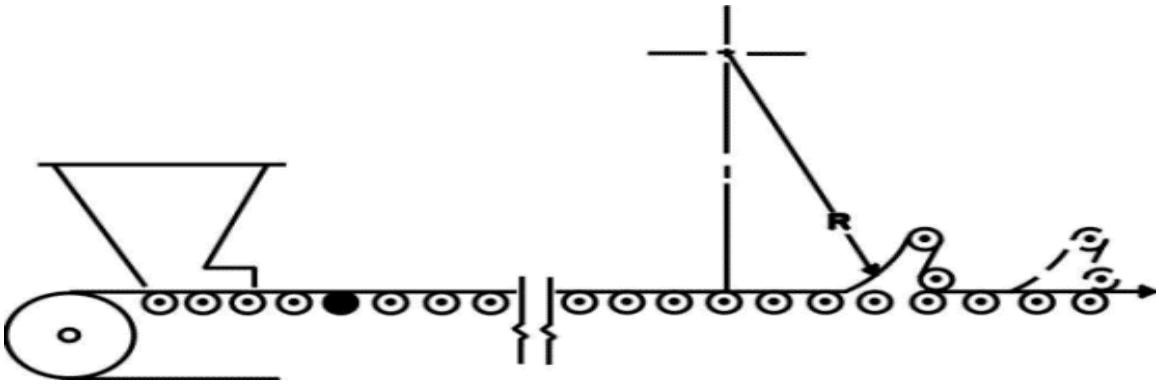


Conveyor length should not exceed that which assures that the belt will travel at least 3 circuits while delivering the minimum totalized load for which accurate weight information is required.

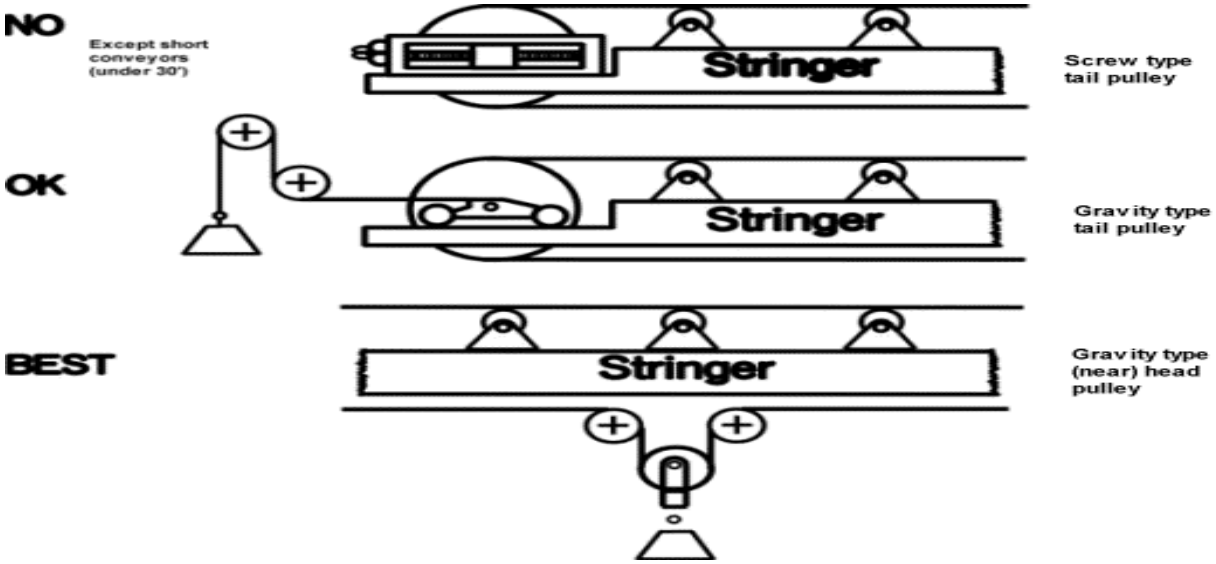
All idlers should be of rigid frame construction with a horizontal roller section. So called "V" rolls and "limber" rolls are not advisable.



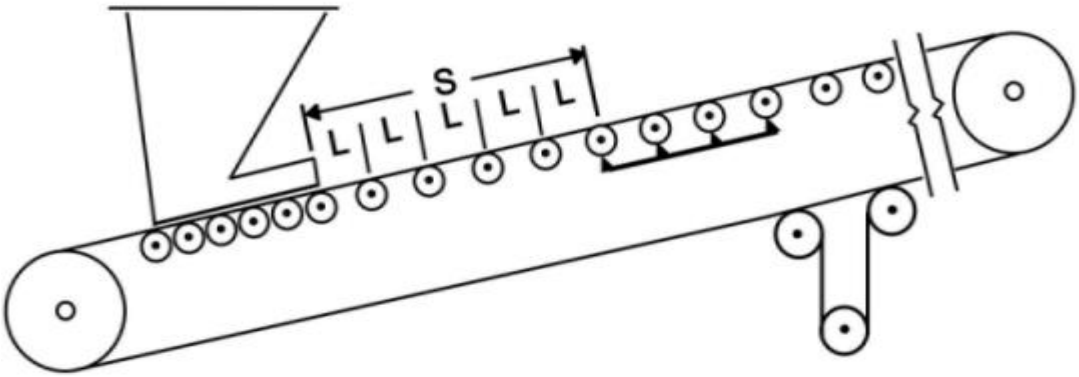
There shall be no tripper or moveable head pulleys in the conveyor.



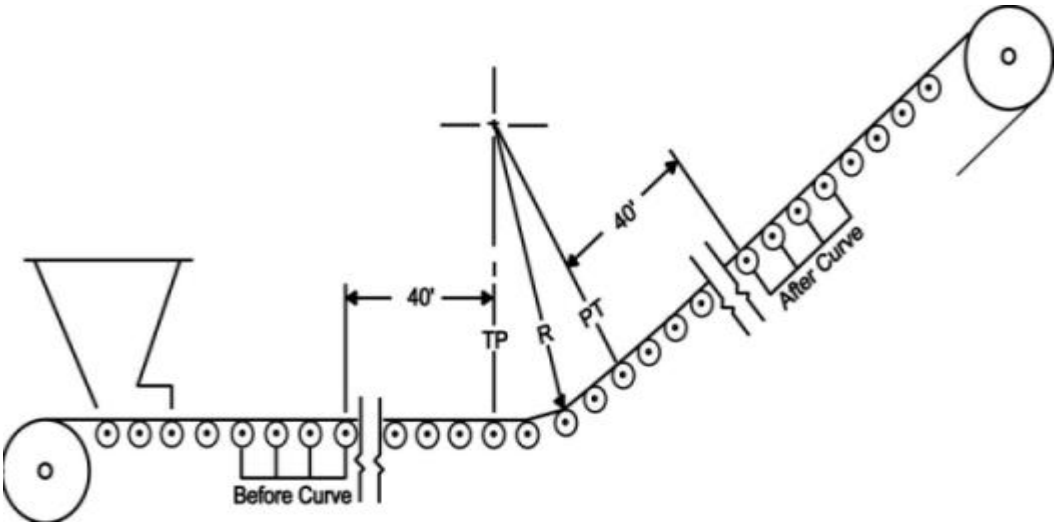
The conveyor should be equipped with a constant-tension or gravity-type take-up



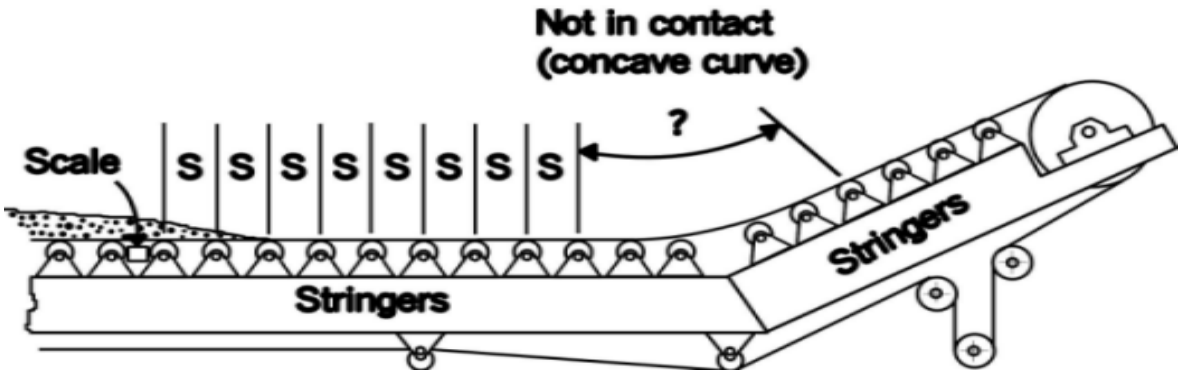
BELT SCALE LOCATION



The scale should be installed within 50 feet of the loading point but not closer than 6m (20 ft) or 5 idler spaces to the end of the skirt board.



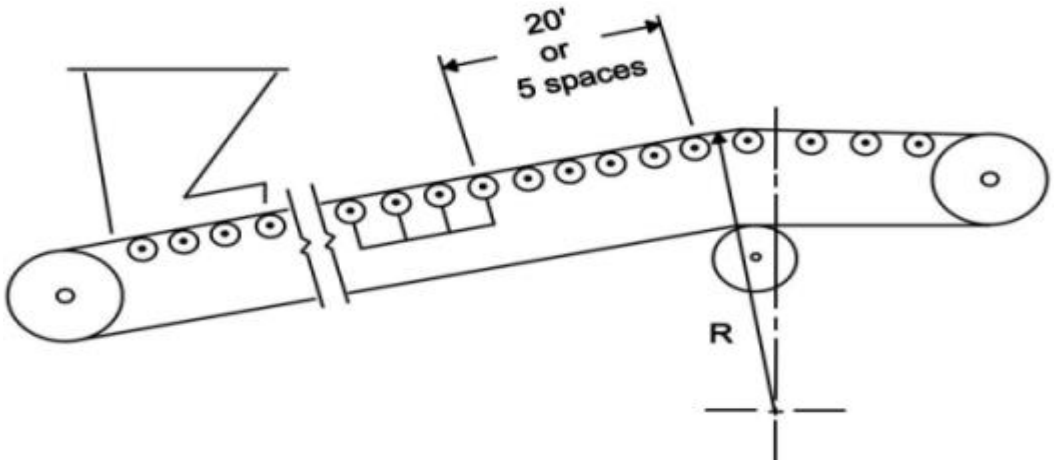
If there is a concave curve in the conveyor between the scale and the loading point, the scale shall be installed so that the belt is in contact with the idlers at all times for at least 6m (20 ft) or 5 idler spaces, whichever is greater, before and after the scale. A concave curve beyond the scale shall start no closer than 12m (40 ft) from the scale.



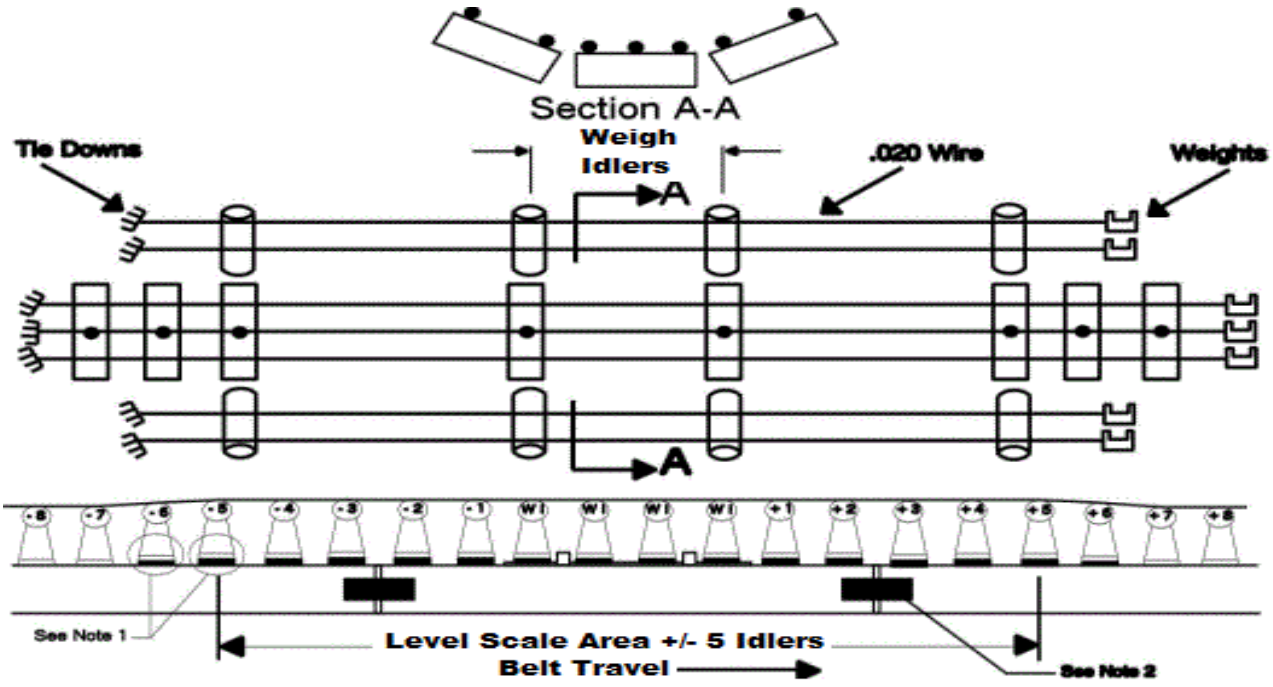
If installed on a conveyor with a concave curve, the scale must be installed in a section of the conveyor where the belt is straight (not necessarily horizontal) and in contact with at least 8 idlers to either side of the scale throughout the entire loading range (empty to full load)

Straight conveyors are preferable to curved conveyors. Convex curves are permissible at a distance of 20 feet or 5 idler spaces beyond the scale.

The scale should be installed within 50 feet of the loading point but not closer than 6m (20 ft) or 5 idler spaces to the end of the skirt board.



BELT SCALE ALIGNMENT



The 2 Idlers before & after the scale should be Shimmed within 1/32"

RECOMMENDED PRACTICES FOR CALIBRATING, TESTING, AND OPERATING BELT SCALES

Calibration and simulated load test methods

1. Calibration

a. Weighed Load Test

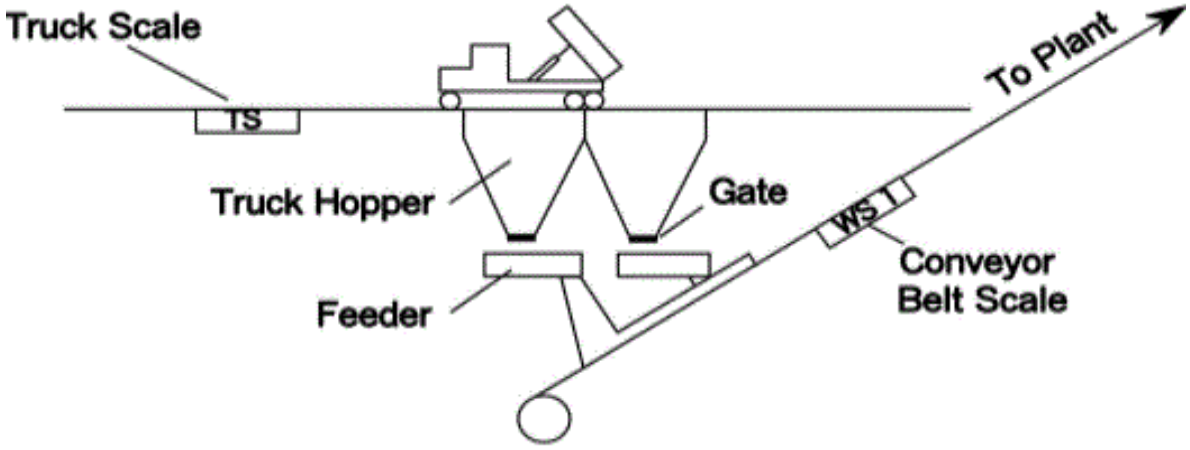
2. Simulated Load Testing

a. Roller Test Chain

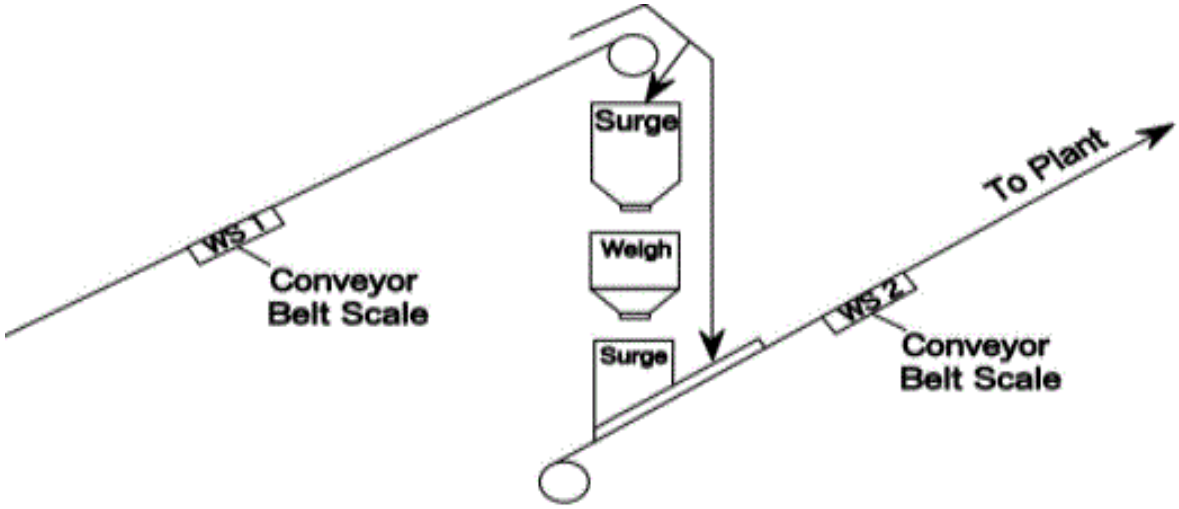
b. Static Test Weights

c. Electronic Calibration

Material Test Using a Truck Scale as the Reference Scale



Material Test Using Static Hopper Scale



Weighed Load Test

Advantages

1. Only method which can establish traceable conveyor scale accuracy.

2. Readily permits testing at several feed rates to test linearity.

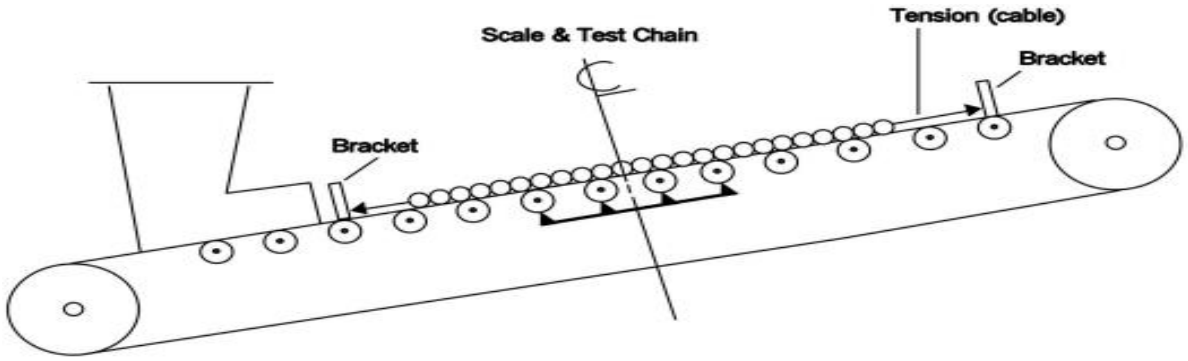
3. Test entire system, electronics, scale carriage, and conveyor effects.

Disadvantages

1. Requires availability of accurate static scale.

2. Requires accumulation, transportation to static scales, and static weighing of the test load material.

Chain Test



Roller Test Chains

Advantages

1. Simulates some conveyor belt effects.

2. Acceptable simulated test.

Disadvantages

1. Chains do not provide a traceable conveyor scale calibration standard.

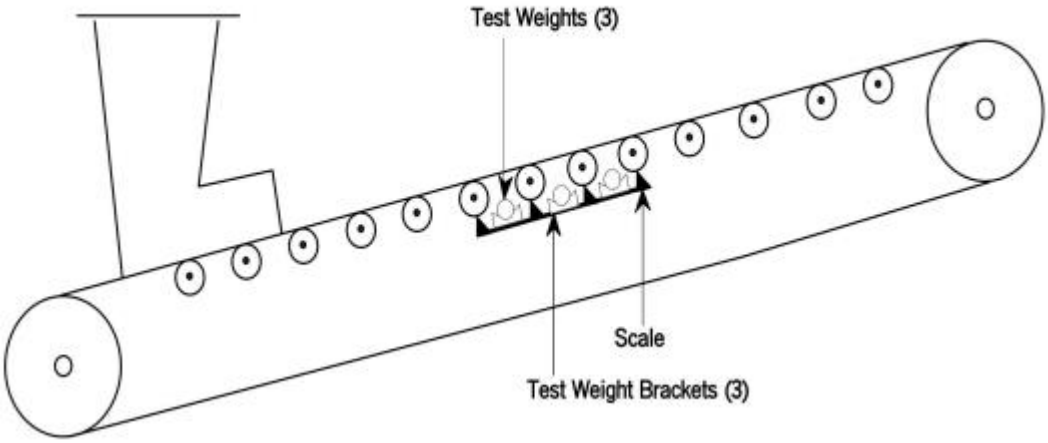
2. Heavy chains are difficult to handle.

3. Conveyor belt must be stopped to apply and remove test chains.

4. Linearity test requires several chains.

5. Chains are costly.

Test Weights



Static Test Weights

Advantages

1. Simulates some conveyor belt effects.

2. Easy to apply.

3. Conveyor belt does not have to be stopped to apply weights.

4. Linearity test easy to perform.

5. Detects load cell failures, and applies force to the load cell.

6. Acceptable simulated test.

Disadvantages

1. Weights do not provide a traceable conveyor scale calibration standard.

2. Does not simulate conveyor belt effects.

MAJOR FACTORS AFFECTING FREQUENCY OF RE-ZEROING

1. Stability of the scale and associated integrating equipment to environmental changes and time.

2. The rate at which material collects on "weighed parts."

3. Uncontrollable conveyor parameters.

4. Conveyor maintenance.

5. Required accuracy.

MAJOR FACTORS AFFECTING FREQUENCY OF SPAN ADJUSTMENT

1. Stability of the scale and associated integrating equipment to environmental changes and time.

2. Mechanical wear.

a.. Leverage ratios.

b. Belt contact roll.

3. Material collected on speed sensor roll.

4. Uncontrollable conveyor parameters.

5. Conveyor maintenance.

6. Required accuracy.

7. Shifts in conveyor structure.

MATERIAL TESTING OF BELT SCALES FOR CERTIFICATION (NIST Handbook 44)

UR User Requirements

U.R.2.3 - Material Test - A belt conveyor scale shall be installed so that a material test can be conveniently conducted (non-retroactive as of January 1, 1981). Added 1980.

UR 3. - Use Requirements

U.R.3.1- Loading - The feed of material to the scale shall be controlled to assure that, during normal operation, the material flow is in accordance with manufacturer's recommendation for rated capacity.

NOTES

N.1.1- Official Test - An official test of a belt-conveyor scale shall be a materials test.

N.1.2. - Simulated Test - Simulated loading conditions as recommended by the manufacturer and approved by the official with statutory authority may be used to properly monitor the system

operational performance between official test, but shall not be used for official certification (Amended 1991).

N.2 - A belt-conveyor scale shall be tested after it is installed on the conveyor system with which it is to be used and under such environmental conditions as may normally be expected. It shall be tested at normal use capacity and may be tested at any other rate of flow that may be used at the installation.

Each test shall be conducted for:

(a) Not less than 1000 scale divisions,

(b) At least three revolutions of the belt, and

(c) At least 10 minutes of operations, or for a normal weighment. (Amended 1986)

N.3 Test Procedures

N.3.1 Zero Load Tests - The variation between the beginning and ending indication of the master weight totalizer shall not be more than plus or minus 1 scale division when the instrument is operated at no load for a period of time equivalent to that required to deliver the minimum totalized load of 1000 scale divisions.

The zero-load test shall be conducted over a whole number of belt revolutions, but not less than three revolutions or 10 minutes of operations, whichever is greater.

During any portion of the zero-load test, the totalizer shall not change more than three scale divisions from its initial indication. (Amended 1989)

N.3.3. Material Tests - On initial verification, at least three individual tests shall be conducted. On subsequent verifications, at least two individual tests shall be conducted. The performance of the equipment is not to be determined by averaging the results of the individual tests. The results of all of these tests shall be within the tolerance limits. (Amended 1986, 1989)

N.3.2.1. Accuracy of Material - The quantity of material comprising the material test shall be weighed statically to an accuracy of at least 0.1 percent.

N.3.3. Simulated Load Test - As required by the Official with Statutory authority, simulated load tests as recommended by the manufacturer are to be conducted between material tests to monitor the system's operational performance, but shall not be used for official certification. (Amended 1991)

A simulated load test consisting of at least three consecutive test runs shall be conducted as soon as possible, but not more than 12 hours after the completion of the material test, to establish the factor to relate the results of the simulated load tests to the results of the material tests. (Added 1990)

The results of the simulated load test shall repeat within 0.1 percent. (Added 1990) (Amended 1989 and 1990)

T.1 Tolerances Values - Maintenance and acceptance tolerance on material tests, relative to the weight of the material, shall be plus or minus 0.25 percent of the test load. (Amended 1993)

T.2 Tolerance Values, Repeatability Tests - The variation in the values obtained during the conduct of materials tests shall not be greater than 0.25 percent (1/400) Added 1993)