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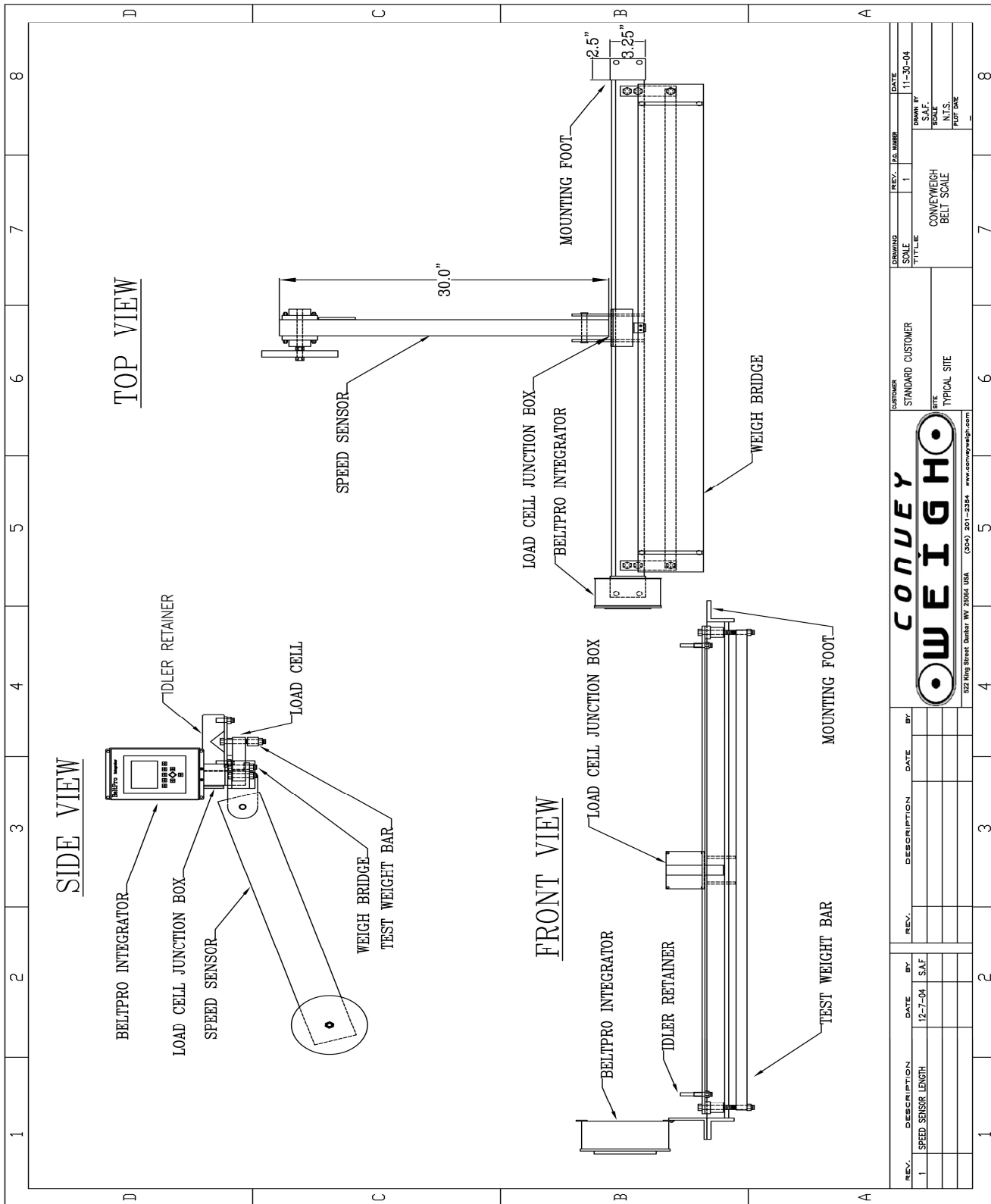
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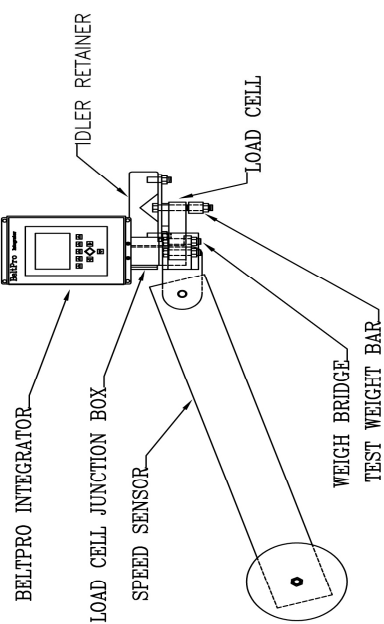
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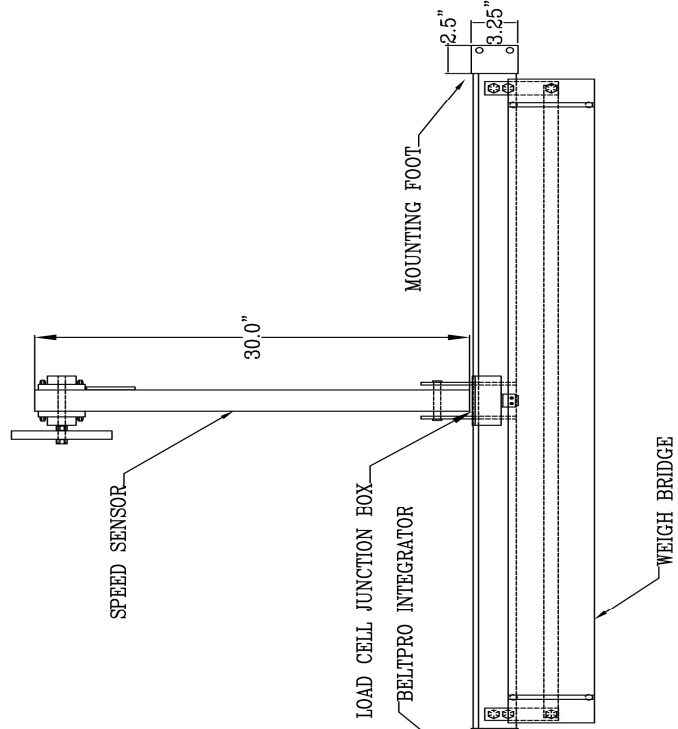
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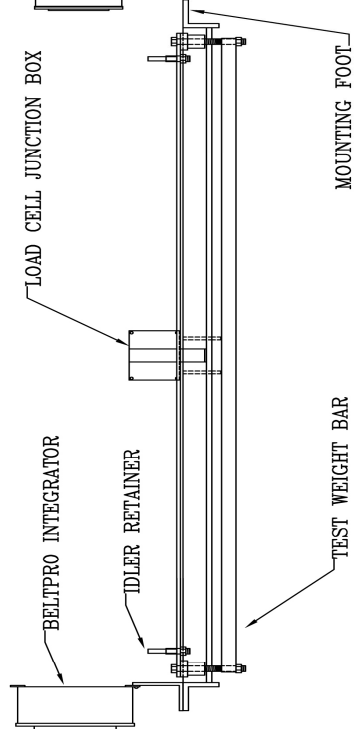
SIDE VIEW



TOP VIEW



FRONT VIEW



REV.	DESCRIPTION	DATE	BY	REV.	DESCRIPTION	DATE	BY
1	SPEED SENSOR LENGTH	12-7-04	SAF	1	SOLE	11-30-04	SAF

FORMING	REV.	DATE
SOLE	1	11-30-04

CUSTOMER	STANDARD CUSTOMER
TITLE	CONVEYWEIGH BELT SCALE
DATE	11-30-04
BY	SAF
CHECKED	SAF
APPROVED	N.T.S.
PART NAME	

CONVEY
WEIGH

522 King Street, Dunbar, WV 26046, USA (304) 261-2254 www.conveyweigh.com

1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8

D C B A

D C B A

NOTE: IF HARDWARE IS LOCATED IN A HAZARDOUS LOCATION IT IS THE CUSTOMERS RESPONSIBILITY TO INSTALL AND MAKE ANY SPECIAL CONSIDERATIONS THAT MAY APPLY.

- 1) THE FOLLOWING ARE THE GUIDELINES IN DETERMINING THE PROPER LOCATION OF A BELT SCALE IN A CONVEYOR SYSTEM.
 - A) LOCATE IN AN AREA WHERE BELT TENSIONS (AND TENSION VARIATIONS) ARE MINIMAL.
 - B) IF LOCATED NEAR TAIL PULLEY, MOVE SYSTEM FORWARD ENOUGH SO THAT THE BELT SPACING AT THE TAIL PULLEY SUPPLIES DO NOT INFLUENCE WEIGHING (20 FT. BEYOND SKIRTS/BOARDS).
 - C) IF LOCATION IS NEAR CONVEX CURVE AREA, LOCATE SCALE 20 FT. (OR 5 IDLER SPACINGS) FROM TANGENT POINT OF THE RADIUS.
 - D) IF LOCATION IS NEAR CONCAVE CURVE AREA, LOCATE SCALE 40 TO 80 FT. FROM TANGENT POINT OF THE RADIUS.
 - E) LOCATION OF SCALE INCLUDING BELT TRIPPER: LOCATE SCALE 40 TO 80 FT. BACK FROM MINIMAL MOVEMENT POINT OF TRIPPER.
 - F) LOCATE WHERE ERRORS DUE TO THE ENVIRONMENT CAN BE CONTROLLED.
 - G) LOCATE AWAY FROM ANY MECHANICAL EQUIPMENT ON THE CONVEYOR SYSTEM.
 - H) LOCATE WHERE BELT STRAINER SUPPORT IS ADEQUATELY PROVIDED (MAX DEFLECTION .01" PER FT. OF IDLER SPACING).
- 2) USE CONVEYOR IDLERS WITH THE BEST ALIGNMENT CHARACTERISTICS.
- 3) IDLER SPACING NOT TO EXCEED 4'-6".
- 4) BELT TRAINING IDLERS TO BE LOCATED A MINIMUM OF 80 FT. ON EITHER SIDE OF SCALE.

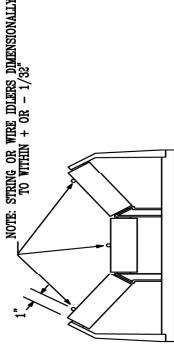
NOTE: THE CONDUIT RUNS AND INTEGRATOR LOCATION ON THIS DRAWING REPRESENT A TYPICAL INSTALLATION AND CAN BE ALTERED TO MEET THE CUSTOMERS NEEDS.

IT IS THE CUSTOMERS RESPONSIBILITY TO MEET ANY APPLICABLE CODES THAT MAY APPLY TO THE INSTALLATION OF THIS SYSTEM.

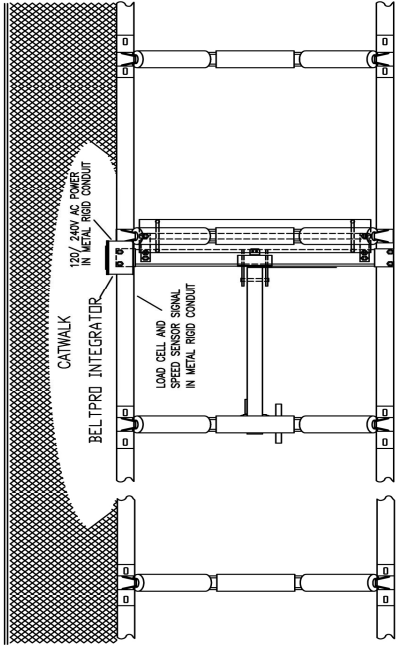
NOTE: THE SPEED SENSOR IS WIRED DIRECT THROUGH THE JUNCTION BOX.
 THE COLOR CODE IS:
 BROWN +12
 BLUE COMMON
 BLACK -SIGNAL

BELT SCALE ALIGNMENT

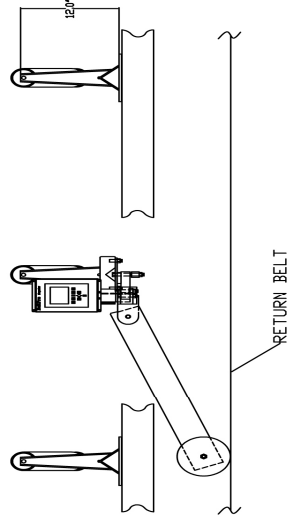
THE WEIGH PLATFORM, IDLER AND 3 ENTRY AND EXIT IDLERS MUST BE ALIGNED THROUGHOUT THE ENTIRE CONVEYOR SYSTEM. IT IS IMPORTANT FOR GOOD BELT TRACKING (TRAINING) UNDER ALL LOAD CONDITIONS.



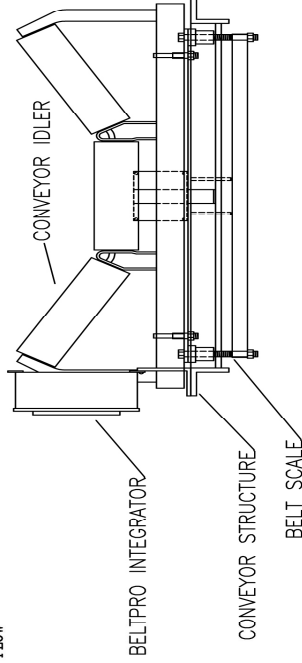
TOP VIEW



SIDE VIEW



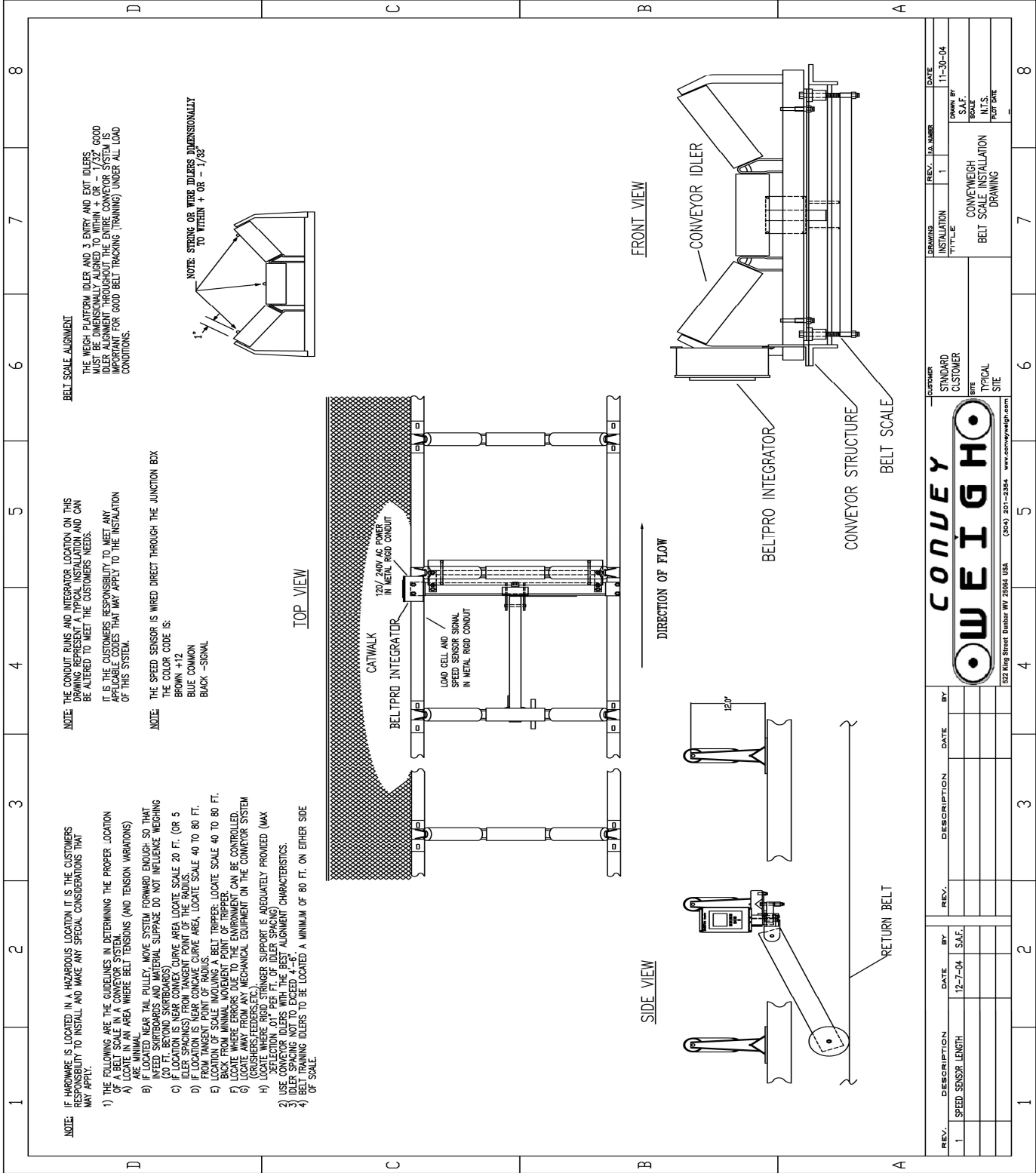
FRONT VIEW



REV.	DESCRIPTION	DATE	BY	REV.	DESCRIPTION	DATE	BY
1	SPEED SENSOR LENGTH	12-7-04	S.A.F.				

DRAWING TITLE		REV. NO.	DATE
CONVEYOR BELT SCALE INSTALLATION		1	11-30-04
CUSTOMER		DRAWN BY	SCALE
STANDARD CUSTOMER			N.T.S.
SITE		DATE	
TYPICAL SITE			

		522 King Street Dunbar WV 26044 USA (304) 261-2354 www.conveyweigh.com	
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BELT SCALE SYSTEM INSTALLATION GUIDE

1.0 Introduction

A conveyor belt scale is a device which measures the rate at which material travels on a conveyor belt. It can also determine the total mass of material which has traveled over the belt during a given period of time. The scale does this by sensing the static weight on the scale idler and integrating this weight with the speed at which the conveyor belt is traveling. Therefore, a rate of mass per time is produced (unit of mass/unit of time).

ConveyWeigh produces conveyor belt scale systems. This manual outlines the installation and maintenance of the full line of ConveyWeigh equipment. The term "single idler" means that the scale utilizes one conveyor idler to weigh the material traveling on the belt. Naturally, the more idlers a scale uses for the weighing, the greater the total weigh area of the scale. Therefore, a four idler scale system will achieve a greater accuracy level than a scale system with only one idler. ConveyWeigh achieves this higher level of accuracy by placing multiple single idler scale systems in line on the conveyor.

The ConveyWeigh 1i single idler scale system is not intended to be a high accuracy scale. It is designed to provide the user with an economical method of weighing moving material when it is not feasible or possible to install a higher accuracy scale. Under most conditions, the ConveyWeigh single idler scale will perform within the range of plus or minus one to two percent of a known test standard. In some cases the accuracy level can be increased. This is usually dependent on the installation and maintenance of the scale.

The ConveyWeigh 2i dual idler scale system offers accuracy of plus or minus one half to one percent of a known test standard

The ConveyWeigh 3i three idler scale system offer accuracy of plus or minus one quarter to one half percent of a known test standard

The ConveyWeigh 4i four idler scale system offer accuracy of plus or minus one quarter percent of a known test standard

2.0 Scale Components

2.1 Weigh Bridge

The weigh bridge is the steel structure which supports the load cells and the scale idler. It is the part of the scale which actually connects to the conveyor structure. It is extremely important that the weigh bridge is constructed so that it is as rigid as possible. The only force which should be detected by the scale is the vertical force of the material on the conveyor belt.

2.2 Weigh Idler

This is the actual idler which is mounted on the scale. A high quality idler which is of the same specifications of the conveyor idlers should be used to maximize the performance of the scale. The weigh idler transfers the weight of the material to the load cells.

2.3 Load Cells

The load cells are the devices which receive the force transferred by the weigh idler. The force is then converted to an electrical signal that can be received by the integrator.

2.4 Speed Sensor

The measurement of the speed of the conveyor belt is critical to the accuracy of the scale. The speed sensor provides a constant measurement of the rate (unit of length/unit of time) of the conveyor. Any error in speed is directly related to the percent error of the scale. The speed signal is also transmitted to the integrator.

2.5 Integrator

Signals from the load cells and the speed sensor are transmitted to the integrator. The integrator receives these signals and mathematically converts them to the rate. It also provides the total mass of the material which has passed over the scale for a certain period of time.

2.6 Conveyor Belt System

The conveyor belt system itself is a component of the scale. The performance of the conveyor can greatly affect the accuracy of the scale. If the speed of the belt or the loading of the belt varies greatly, the scale will not provide the maximum accuracy possible. The load cells and the calibration of the scale are specifically referenced to the normal capacity and speed of the conveyor belt.

3.0 Selecting an Installation Site

Many factors should be considered when selecting a location to install the scale. The following briefly describes certain locations which are not the most suitable for proper scale performance. Naturally, it is not possible to achieve all of the outlined criteria for every belt scale installation. However, each should be observed if it is feasible.

The scale should be installed in an area where the belt tension is constant. The tension of the belt is force acting on the scale and therefore is factored out during calibration. If the tension dramatically changes very often, then it is no longer a constant of the calibration. It is preferred that the conveyor system have some type of take-up device. A gravity take-up is best.

When possible, the scale should not be installed near the loading point of the conveyor. The loading of the belt usually varies in this location. This is also true near the head pulley or tail pulley of the conveyor. The scale should be installed at least five conveyor idlers from any of these locations.

A conveyor belt that has an extreme angle of incline is not a suitable location for the scale. In these cases the material slides back down the conveyor thus causing the material to be weighed multiple times. Extreme inclines also increase angular forces on the scale. Conveyors with adjustable angles of incline are not proper locations for a scale.

Locations where the conveyor forms a concave or convex curve should be avoided. The scale should be located at least twenty feet (approx. six meters) from the apex of the curve.

Other factors such as weather, vibration, or deflection of the conveyor can sometimes affect the scale. Many times these factors are unable to be controlled, but they should be avoided when possible.

4.0 Installation of the Scale

The ConveyWeigh single idler scale is designed for easy installation. Once a proper location is found, there are three steps to the installation of the scale.

First, the scale must be fitted with an idler of similar specifications as the conveyor idlers. In many cases, the actual conveyor idler that must be removed for the scale installation can be used for the scale idler. The idler is then connected to the scale using the mounting brackets that are supplied with the scale.

The scale can now be placed on the conveyor structure where the idler was previously located. The scale must be installed with the load cells pointing in the same direction as the belt travels. At this point the scale can be bolted to the structure.

The single idler is equipped with an integrated tail-drag type speed sensor. When the scale is installed, the speed sensor wheel should make solid contact with the top of the return belt. The speed wheel should never make contact with any portion of the conveyor structure and it should not be located directly over a return idler.

Install the integrator close to the scale when possible. It is not suggested to exceed one hundred feet (approx. thirty meters) from the scale.

The final step is the alignment of the scale with the entrance and exit idlers. The scale should be mounted the same distance from the next idler on either side of it. This distance will be the normal distance between the existing conveyor idlers. Two idlers on each side of the scale should be aligned such that the belt is absolutely level across the entire area. This will ensure that the tension of the belt is equal throughout the weigh area.

5.0 Scale Setup

There is a specific list of instructions for the setup of the scale found on pages 5.1 - XXX of this manual. Please refer to this page for the proper setup of the scale.

6.0 Continuing Maintenance

Once the scale is properly installed and calibrated the maintenance of the scale must be considered. Since the scale will be located in a rather hostile environment, it will require periodic checks and services.

The scale should be kept clean of debris or spilled material. Heavy buildup of material will register as weight on the scale. This will produce a high error over a long period of time. The scale idler and speed sensor should be kept properly lubricated.

The scale should be calibrated periodically. Once per month is recommended. The calibration can drift slightly due to wear on the scale, changing conditions of the belt, or deviation of the operation of the conveyor. Monthly calibration of the scale will keep these changing factors in check with the scale. Please refer to the Calibration Manual for the proper calibration procedures.

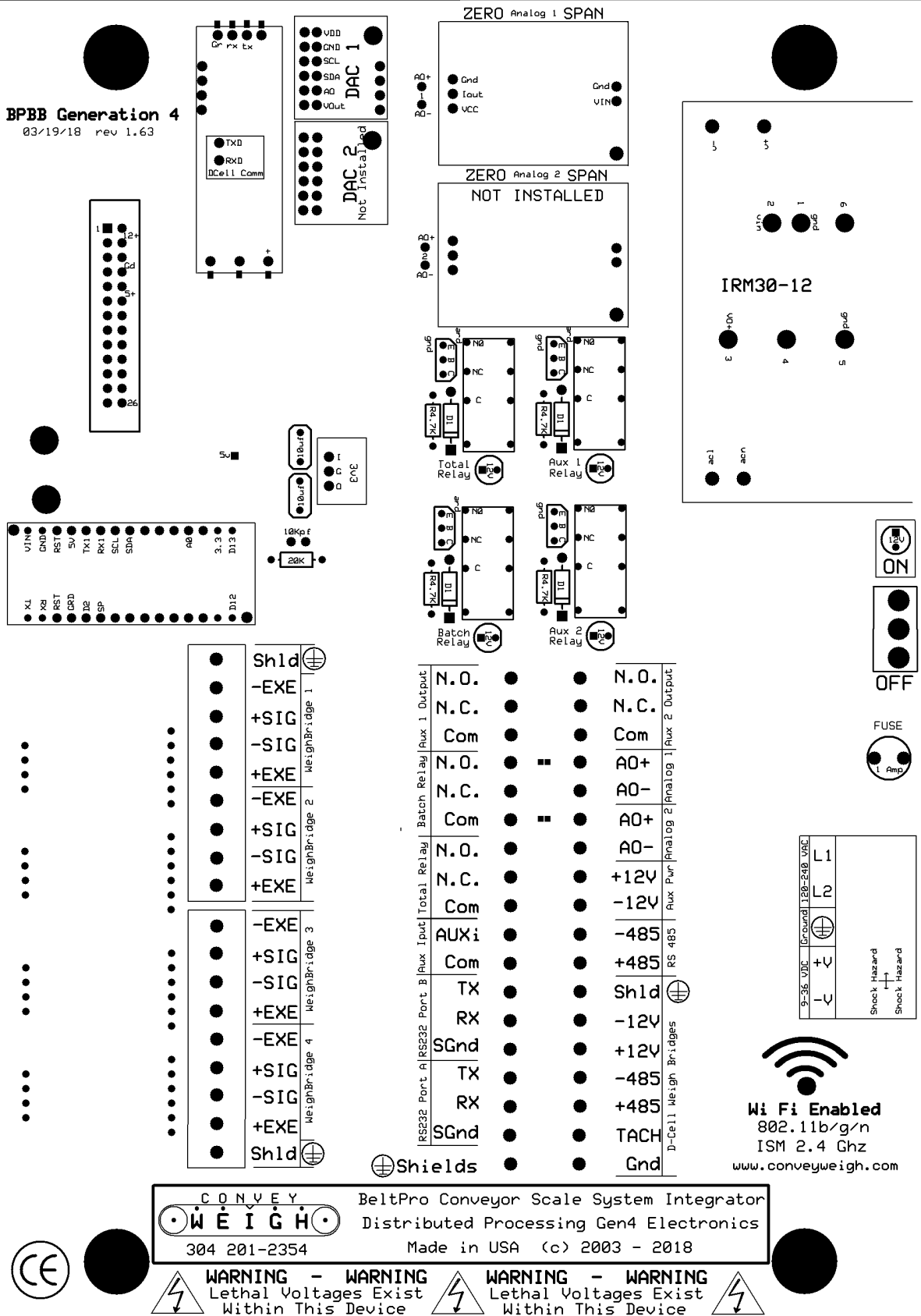
BeltPro Integrator Electrical Connections Guide

Section 1 WIRING

The ConveyWeigh BeltPro Integrator contains an Integrator Interface Board (Part Number XXXX) that allows for easy termination of all field wiring. Each Device will be addressed separately in the upcoming sections. During the production of your ConveyWeigh Scale, our technicians connected the load cell and speed sensor wiring to the Integrator.

Figure 1.1 BeltPro Integrator Interface Board

BPBB Generation 4
03/19/18 rev 1.63



CONVEY BeltPro Conveyor Scale System Integrator
WEIGH Distributed Processing Gen4 Electronics
 304 201-2354 Made in USA (c) 2003 - 2018

WARNING - WARNING
 Lethal Voltages Exist Within This Device

WARNING - WARNING
 Lethal Voltages Exist Within This Device

1.1 LOAD CELL WIRING

Most ConveyWeigh scales use a load cell summation board for the pressure signal (Figure 1.2). All load cells are individually terminated at the weigh bridge junction box (Figure 1.3). The weigh bridge is designed to use 4-wire (non-remote sensing) load cells. The junction box will be connected to a BeltPro Integrator. The BeltPro Integrator has the capability to utilize 1 to 4 weigh bridge inputs. Each BeltPro Integrator will be assembled to meet the exact weigh bridge requirements of the order.

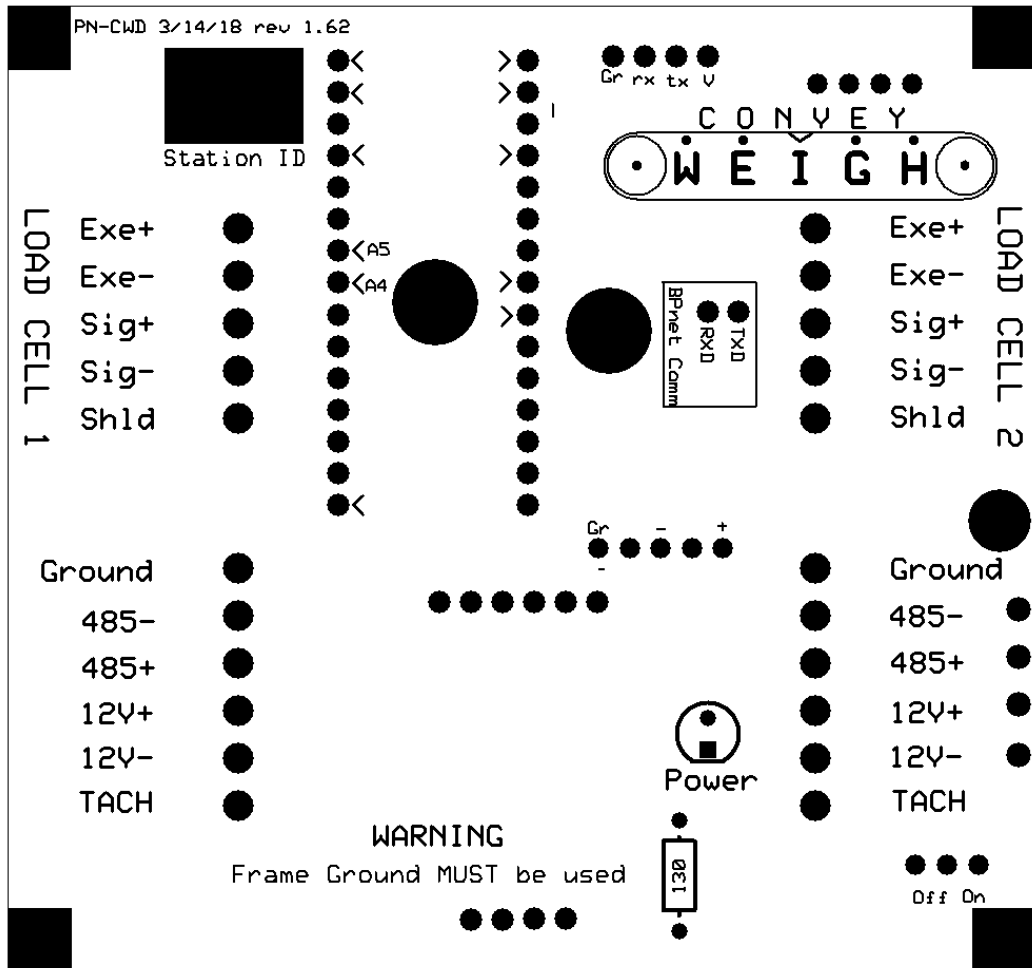


Figure 1.2 Load Cell Junction Board to Integrator Wiring Diagram

1.3 ANALOG OUTPUT (Optional)

The ConveyWeigh BeltPro Integrator has the option for a 4 to 20ma analog output signal representative of the instantaneous tons per hour rate. The signal is self-powered and **does not** require the use of an external power supply to power the loop. This signal can be connected to a remote signaling device such as a rate meter or chart recorder, or even interfaced to PLC based control system (Figure 1.6).

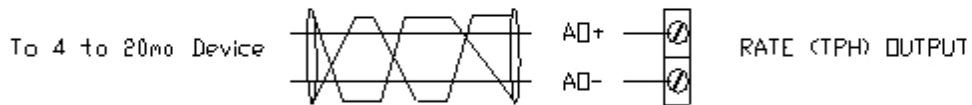


Figure 1.6 Rate (TPH) Analog Output (4 to 20ma)

1.4 COMMUNICATIONS WIRING

The ConveyWeigh BeltPro Integrator has the capability of RS-232 Full Duplex, and RS 485 Half Duplex Communication. The connection diagram for both signals is shown in Figure 1.7.

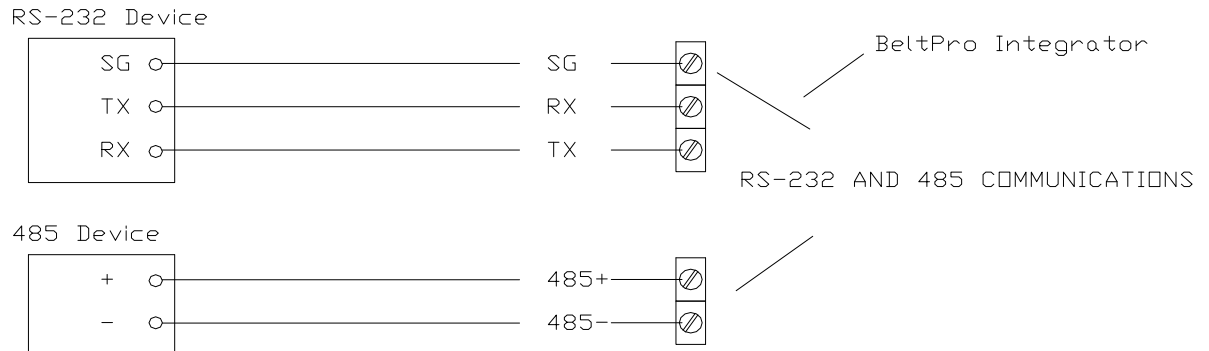


Figure 1.7 RS-232 and 485 Communications

1.4 REMOTE TOTALIZER WIRING

The ConveyWeigh BeltPro Integrator comes equipped with a Normally Open Dry Contact output for a Remote Tons Counter. The Contact is rated at .6A 125VAC/110VDC. The connection diagram for the tons counter output is shown in Figure 1.8

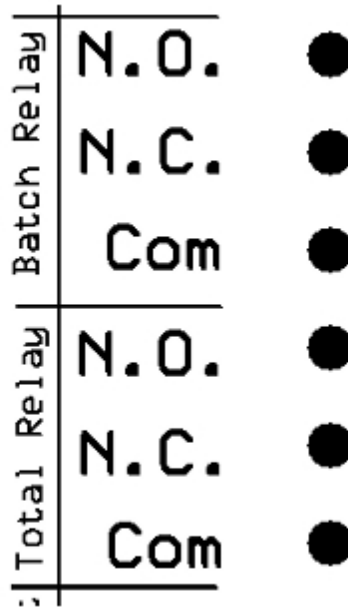


Figure 1.8 Remote Tons Counter Wiring

1.5 INCOMING POWER

The ConveyWeigh BeltPro Integrator is designed to operate on 120/ 240AC Single Phase Power, and is protected by a 1A, TR5 Fuse. An extra L1 Terminal is provided for auxiliary power. 14AWG wire is recommended for power connections.

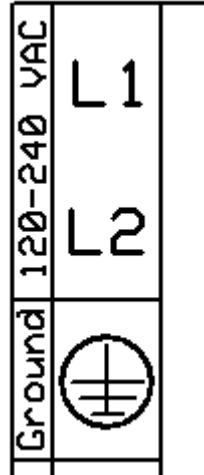


Figure 1.9 Incoming Power Connections (Standard 120/ 240 AC Power)

At the Customer's request the ConveyWeigh BeltPro Integrator can be modified to operate on 12 or 24VDC Power (Note: ***not*** 12 to 24VDC) An extra +12VDC terminal is provided for auxiliary power. These units do not contain the square block shaped AC/DC power supply that is used on the standard integrator. 14AWG wire is recommended for power connections.

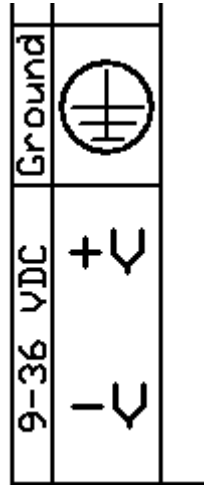


Figure 1.9A Incoming Power Connection on modified 12 or 24VDC units

2.1 ANALOG RATE OUTPUT POTENTIOMETERS

An available option of the ConveyWeigh BeltPro Integrator is a 4 to 20ma output signal that is representative of the instantaneous tons per hour reading. For the utmost accuracy for the remote indication device this signal has the ability to be adjusted via two potentiometers on the Integrator Interface board. The integrators are shipped with the 4 to 20ma signal factor calibrated, but in case it needs to be field adjusted, the procedure is as follows:

Zero Adjustment ó Using the keypad on the front of the indicator, under the **Main Menu\ Utility**, go to **Analog Out Cal.** Under this menu press the left up arrow key for **Zero**. Next, place a milliamp meter across the + and ó A.O. terminals. Adjust the **Zero potentiometer** until the milliamp meter reads 4ma.

***** You must power the Integrator Off and then back ON before proceeding to the Span Adjustment.**

Span Adjustment ó Using the keypad on the front of the indicator, under the **Main Menu\ Utility**, go to **Analog Out Cal.** Under this menu press the center up arrow key for **Full Scale**. Then place a milliamp meter across the + and ó A.O. terminals. **Adjust the Span** potentiometer until the milliamp meter reads 20ma.

***** You must power the Integrator Off and then back ON after completing the Span Adjustment.**

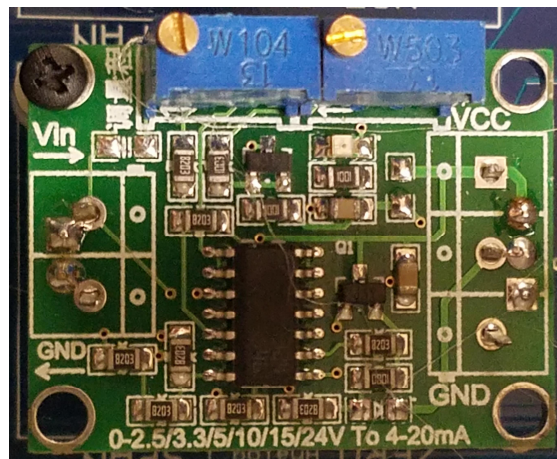
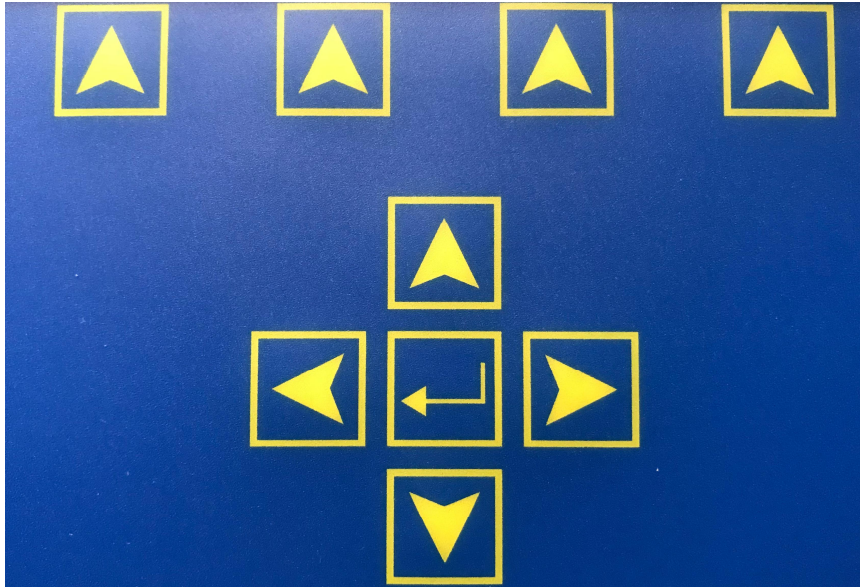


Figure 1.11 Analog Rate Output Adjustment Potentiometers

BeltPro Integrator Users Guide

1. Keypad



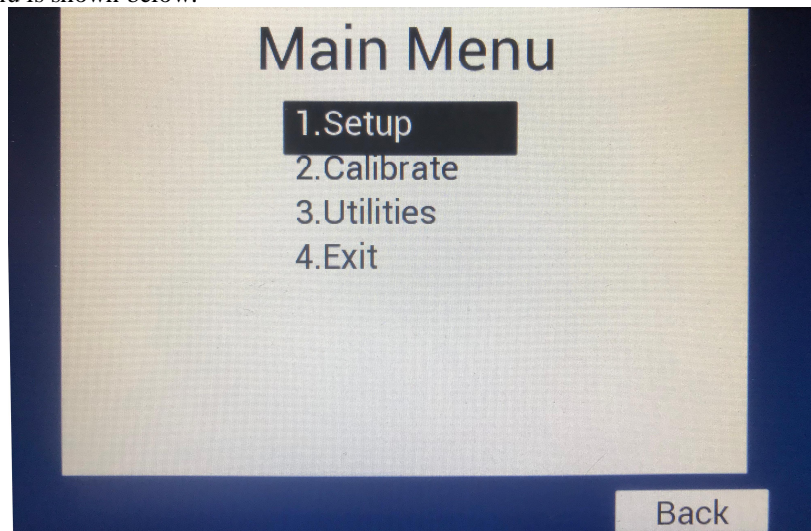
Pictured above is the keypad for the integrator unit.

The top row of keys is referred to as **soft keys**, the arrow keys in the grey area are referred to as the **up/down/left/right arrow** keys. The large button in the middle is referred to as the **enter** key.

Operator interaction screens fall into essentially three categories:

- 1) Menus
- 2) Virtual Key Pad Data Entry
- 3) Soft Key Driven Procedures.

A typical menu is shown below:

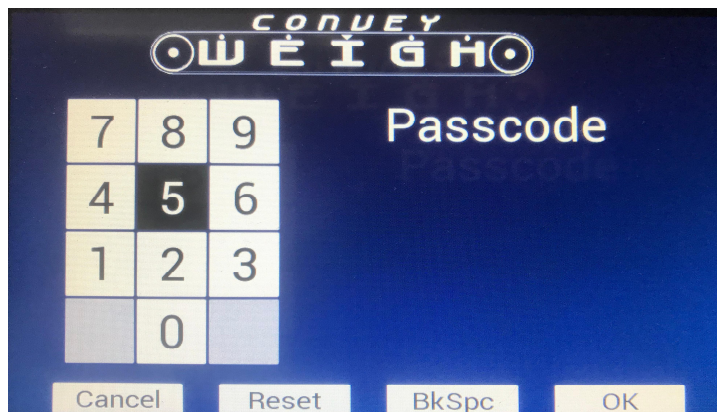


In this example the Setup option is highlighted

- To move the highlight bar use the **up** and **down arrow** keys.
- To select a menu option , highlight it and press the **enter** key.
- To exit from a menu, move to the Exit option and press **enter** or use the **right arrow** key.
- The **soft keys** to the left and right of the **up arrow** key will page up and page down on a long menu.

1.2 Virtual Keypad Navigation

A typical virtual keypad is shown below:



Use the **up/down/left/right** keys to highlight a key on the virtual key pad. Press the **enter** key to select highlighted digit or option. Highlight RET and press enter to accept the value in the data window.

1.3 Soft key driven routines

The calibration routines discussed later are examples of soft key driven routines, text labels for actions that can be performed by the operator are displayed above the soft keys. To select the action, press the **soft key(s)** under the text label.

2. Operating modes

The BeltPro integrator has two operating modes, run mode and setup/ calibrate mode.

2.1 Run Mode

Run mode is the default power on mode, the integrator calculates rate and total by sampling the load cell signal and determining the belt travel. Four process variables are tracked during run mode: Total, rate, load and belt speed. The integrator display shows the currently selected process variable in large font, as well as the current rate in a smaller font. If auto zero tracking is enabled and the instrument is running an auto zero test, then the text "AZT" will be displayed on the integrator screen. To change the primary run mode display to another of the four process variables, press and release either the left or right arrow key on the keypad. In addition to the four process variables, a fifth screen is available in run mode that allows the viewing of resettable batch totalizer. Use the left and right arrows to switch between screens during run mode. In the batch total screen press the soft key under "Reset" to reset the batch total. Press the soft key under "Print", if available, to send the batch total, time and date out the serial port to an attached printer.

3. Menus

3.1 Main Menu

The main menu has four options:

- 1.Setup ó Access the Setup Menu to enter various parameters.
- 2.Calibrate ó Access the Calibrate Menu to run calibration procedures or view/change calibration data.
- 3.Utility ó Access the Utility Menu to perform various utility functions.
- 4.Exit ó Exit the menu and return to run mode.

3.2 Setup Menu

The setup menu has various options that pertain to the operation of the integrator. These are explained below.

Max Rate: This parameter is the maximum rate at which the scale is anticipated to operate.

Belt Speed: This parameter is the maximum speed value the belt is anticipated to run. This value is also used as the belt speed, when the integrator is running in constant speed mode.

Belt Length: This parameter represents the belt length in the currently selected length units (feet or meters).

Test Revs: This parameter represents the number of revolutions the calibration tests will run.

Zero Dropout: This parameter represents the value as a percentage of design rate below which the integrator will not totalize.

of Bridges: This parameter represents the number of weigh bridges attached to the instrument, Single Idler = One, Dual Idler = Two, Three Idler = Three, Four Idler = Four.

Local Count By: This parameter controls the increment that the displayed totalizer counts by. Options are: .001,.01,.1,1,10,100,1000.

Remote Count By: This parameter controls what a pulse of the remote counter relay represents. Options are .001,.01,.1,1,10,100,1000. If .1 is selected then the relay will pulse once for every tenth of a totalization unit of material that crosses the scale.

Remote on Time: This parameter represents the number of milliseconds the remote counter output will remain on for each pulse.

Rate Units: This parameter represents the rate units the integrator will use. Options are: Metric Tons per Hour (MTPH), Kilograms per Hour (KG/H), Long Tons per Hour (LTPH), Short Tons per Hour (STPH) and Pounds per Hour (LB/H). Selection of the rate units controls the units for total, speed, length and load.

Selection	Total Units	Speed Units	Length Units	Load Units
MTPH	Metric Tons	Meters/Min	Meters	kg/m
KG/H	Kilograms	Meters/Min	Meters	kg/m
LTPH	Long Tons	Feet/min	Feet	lb/ft
STPH	Short Tons	Feet/min	Feet	lb/ft
LB/H	Pounds	Feet/min	Feet	lb/ft

Auto Zero: This parameter controls whether the instrument will initiate a zero calibration automatically under certain conditions. If it is turned on then if the belt runs at under two percent of the design capacity for one revolution then a zero test will commence. If at the end of the test, the cumulative deviation from the last operator initiated zero test is two percent or less, the zero value will be adjusted. When the auto zero test is running, the display will blink "AZT" in red. If during the test, the rate increases above the start test criteria, the test will be aborted with no loss of totalization.

Unit Address: Enter a byte value to identify the scale. Valid entries range from 1 to 254.

Pass code: Enter a value other than zero in this field will cause setup and calibration options to become password protected. This is a field that can be up to 5 digits and can range from 1 to 32000. A value of zero will disable this feature.

Angle Sensor: Enables/Disables the angle compensation feature.

Analog Out #1: Enables/Disables the analog output feature for port 1.

Analog Out #2: Enables/Disables the analog output feature for port 2.

Exit: Exit the Setup Menu.

3.3 Calibration Menu

See Belt Scale System Startup Guide or Calibration Guide for detailed calibration instructions.

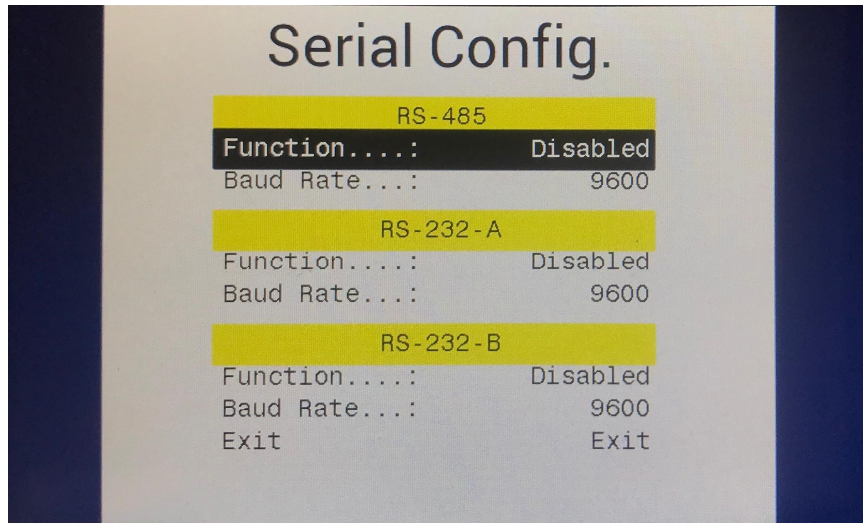
3.3 Utility Menu

Reset Totalizer: This item will reset both, Batch and Master Totals as well as the pulse queue for the remote totalizer relay.

View Load Cells: Displays a graphical representation of each weigh bridge along with raw signal data, current load and estimated mV output for each. Bridges shown in gray are excluded based on the value entered for # of Bridges in the Setup menu. Bridges shown in red are not communicating with the integrator.

Set Date and Time: Provides an interface to set the date and time (time should be entered in 24-hour format).

Serial Config:



For each Port the you may define the following:

Function:

- Disabled ó Disables the port
- Stream ó Streams integration data every 500 milliseconds. See BeltPro ASCII Format below.
- Poll ó Provides integration data upon request. See BeltPro Poll Request Format below.
- Print ó Sends Date, Time, Batch Total and Master Total to our printer (optional).
- Billboard-Rate ó Displays the rate on our billboard display (optional).
- Billboard-Batch ó Displays the rate on our billboard display (optional).
- Billboard-Total ó Displays the rate on our billboard display (optional).

Baud Rate: 9600, 14400, 19200, 28800, 38400, 57600 and 115200

Each setting requires 8 data bits, no parity and 1 stop bit

BeltPro ASCII Format:

```
<STX>YYYY|MM|DD|HH|MM|SS,<u>,ttttt.ttt,rrrr.rrr,sss,l111.l11,pppppp.pp  
p,bbbbbb.bbb<EOT><CR><LF>
```

where:

<STX> is a single byte, ASCII value 2, start of text
Y|M|D|H|S is a string that contains the date delimited by `|`
<u> is a single byte, possible ASCII values, 49,50,51,52,53,
represents the rate units currently selected:

- 49=Metric Tons per Hour
- 50=Kilograms per Hour.
- 51=Long Tons per Hour.
- 52=Short Tons per Hour.
- 53=Pounds per Hour.

t,r,s,l,p,b total, rate, speed, load, batch preset, batch total
variable bytes each, explicit decimal point, precision
based on local count by settings.

<CR> one byte, ASCII 13, carriage return
<LF> one byte, ASCII 10, line feed
<EOT> one byte, ASCII 3, end of text.

BeltPro Poll Request Format:

<STX>P<ua><ETX>

where

<STX> one byte, ASCII value 2
P one byte, ASCII value 80
<ua> one byte, ASCII value 0 thru 255
<ETX> one byte, ASCII value 3

BeltPro Poll Response Format:

**<STX>YYYY|MM|DD|HH|MM|SS,<u>,ttttt.ttt,rrrr.rrr,sss,1111.111,pppppp.pp
p,bbbbbb.bbb<EOT><CR><LF>**

where:

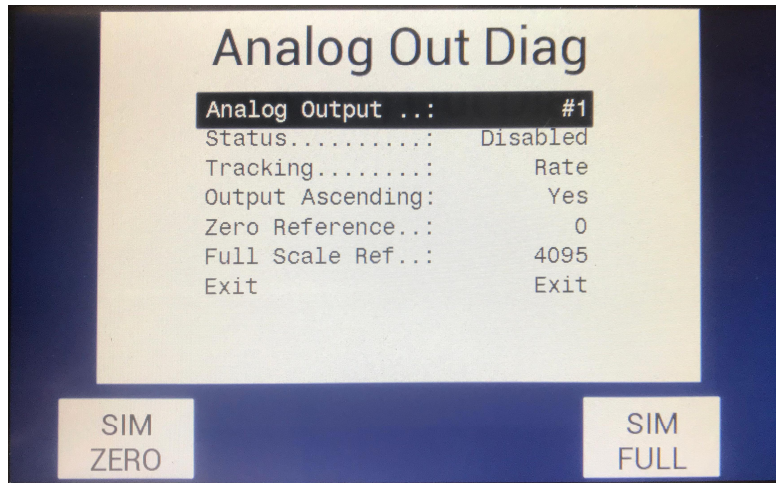
<STX> is a single byte, ASCII value 2, start of text
Y|M|D|H|S is a string that contains the date delimited by `|`
<u> is a single byte, possible ASCII values, 49,50,51,52,53,
represents the rate units currently selected:

- 49=Metric Tons per Hour
- 50=Kilograms per Hour.
- 51=Long Tons per Hour.
- 52=Short Tons per Hour.
- 53=Pounds per Hour.

t,r,s,l,p,b total, rate, speed, load, batch preset, batch total
variable bytes each, explicit decimal point, precision
based on local count by settings.

<CR> one byte, ASCII 13, carriage return
<LF> one byte, ASCII 10, line feed
<EOT> one byte, ASCII 3, end of text.

Analog Out Diag:



The BeltPro integrator is equipped with an industrial analog 4-20 milliamp output which is proportional to the value of the item being tracked. This signal is standard 2 wire 4-20 mA and is a current source type output. These outputs are commonly used with PLC inputs, rate meter displays, chart recorders, etc.

When the scale is at zero rate, the Beltpro outputs 4mA. When the scale is operating at the Max Rate under settings, the Beltpro outputs 20mA.

From zero rate to the maximum rate, the analog 4-20 Milliamp is linear.

Analog Output: Select between analog output #1 and #2 (optional)

Status: Select Disabled and Enabled for the selected Analog Output

Tracking: Select what data element the 4-20 signal is based on (Rate, Load and Speed).

Output Ascending: Determines whether the 4-20 signal value tracks with the value of the selected data element selected or in contrast.

Zero Reference: 12-bit value (0 to 4095) used to tune the bottom value of the 4-20 signal.

Full Reference: 12-bit value (0 to 4095) used to tune the top value of the 4-20 signal.

Sim Zero: Forces the selected analog channel to output the value in Zero Reference for tuning/diagnostics.

Sim Full: Forces the selected analog channel to output the value in Full Reference for tuning/diagnostics.

Example:

The scale maximum rate is setup to be 500 tons per hour.

At zero tons per hour rate, the analog signal is 4 milliamps

At 500 tons per hour rate, the analog signal is 20 milliamps

At 250 tons per hour rate (half), the analog signal is 12 milliamps.

BELT SCALE SYSTEM STARTUP GUIDE

1.0 Introduction

This guide outlines the startup for the ConveyWeigh Belt Scale System.

2.0 Scale Installation

Pages 2.1 ó 2.3 cover the Installation of the Scale.

Refer to these pages and complete the proper installation of the scale.

3.0 Electrical Connections to BeltPro Integrator

Pages 3.1 ó 3.9 cover the available Electrical Connections.

Refer to these pages and complete the required electrical connections to the scale for your application.

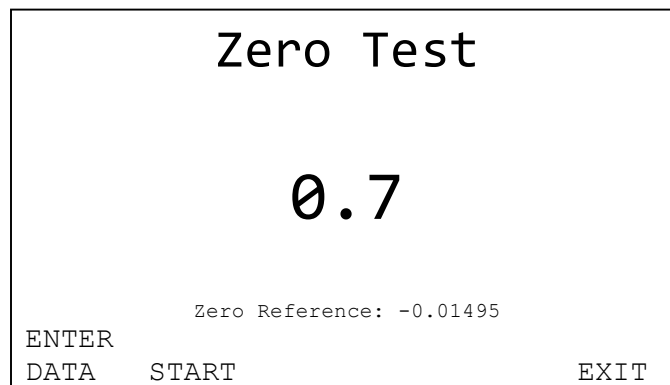
4.0 Speed Check

1. Power up the BeltPro Integrator
2. Start the conveyor belt.
3. **Run the conveyor empty – no material.**
4. Use the Right Arrow Key on the Keypad until the Speed Screen is displayed.
Refer to page 4.1 for Keypad Operation.
5. Confirm that the Belt Speed displayed matches the Belt Speed design rate.
Option A ó If the Belt Speed is displayed correctly proceed to the next step below (5.0 Zero Setup)
Option B ó If the Belt Speed is not displayed correctly refer to page 6.5 for the Speed Test procedure.
ó After the Belt Speed is displayed correctly proceed to the next step below (5.0 Zero Setup)

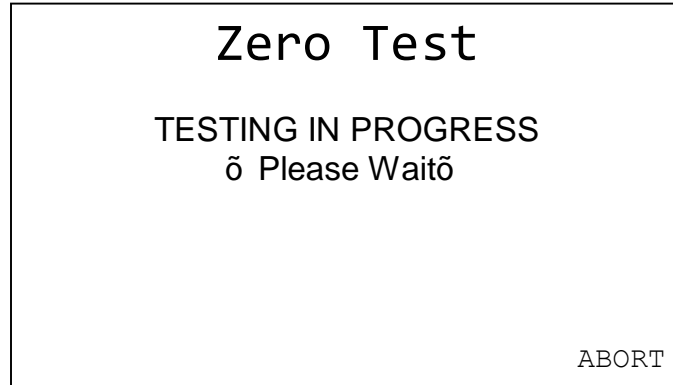
5.0 Zero Calibration

This process will complete the initial calibration of the Zero Test. The steps are as follows:

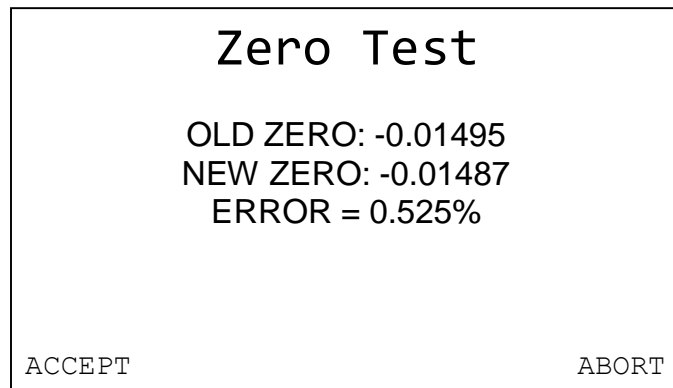
1. **Run the conveyor empty – no material.**
2. Go to the Calibration Menu.
3. Select the Zero Test.
4. Upon selecting the Zero Test option from the Calibrate Menu you will see a screen similar to the following:



5. To begin the Zero Test press the key under the START label.
6. You will see a screen similar to below with a progress bar to indicate the amount of time left for test to run:



7. Once the test has completed, the screen will appear similar to below:

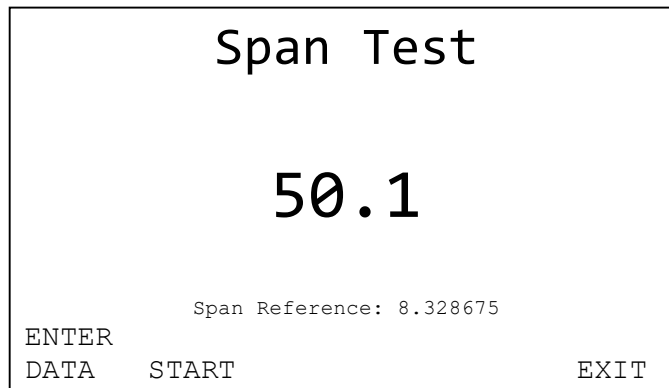


8. Press a key under the ACCEPT label to accept the results.
Proceed to the next step below (Span Test).

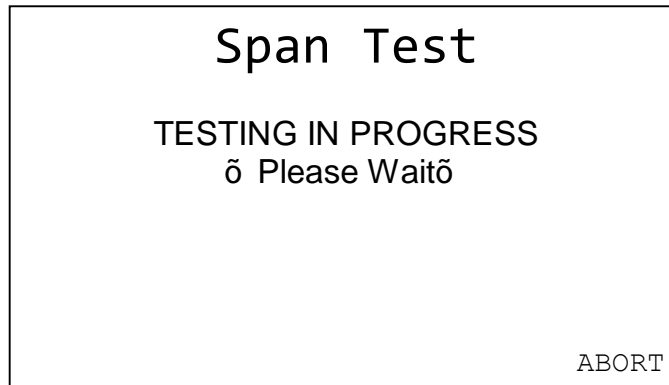
8.0 Span Test Routine

This process will complete the initial calibration of the Span Test. The steps are as follows:

1. **Stop the conveyor belt to ensure your personal safety.**
 2. Attached the required calibration test weights to the weigh bridge(s).
 3. **Run the conveyor empty – no material.**
 4. Return to the Calibration Menu.
 5. Select the Span Test.
6. Upon selecting the Span Test option from the Calibrate Menu you will see a screen similar to the following:



7. To begin the Span Test press the key under the START label.
8. You will see a screen similar to below with a progress bar to indicate the amount of time left for test to run:



9. Once the test has completed, the screen will appear similar to below:

<h2>Span Test</h2>	
OLD SPAN: 8.328675	
NEW SPAN: 8.300380	
ERROR = -0.33%	
ACCEPT	ABORT

10. Press a key under the ACCEPT label to accept the results.
11. **REMOVE THE CALIBRATION TEST WEIGHTS from the SCALE and STORE for FUTURE USE**
12. The initial scale calibration is now complete and the scale is ready for normal operation

BELT SCALE SYSTEM CALIBRATION GUIDE

1.0 Introduction

This guide outlines the calibration procedures for the ConveyWeigh Belt Scale System.

2.0 Scale Startup Guide

Option A ó Scale Startup Guide has been completed
ó Proceed to the next step below (3.0 Setup / Calibrate Mode)

Option B ó Scale Startup Guide **HAS NOT** been completed
ó Please refer to the Scale Startup Guide found on page 5.1

3.0 Setup/Calibrate Mode

To enter the Setup/Calibration Mode on the BeltPro Integrator, press and release the **enter** key on the keypad. When in this mode, integration stops.

3.1 Main Menu Selection

Select **Option 2 “Calibrate”** from the main menu. This will allow access to the calibration menu to run calibration procedures or view/change calibration data.

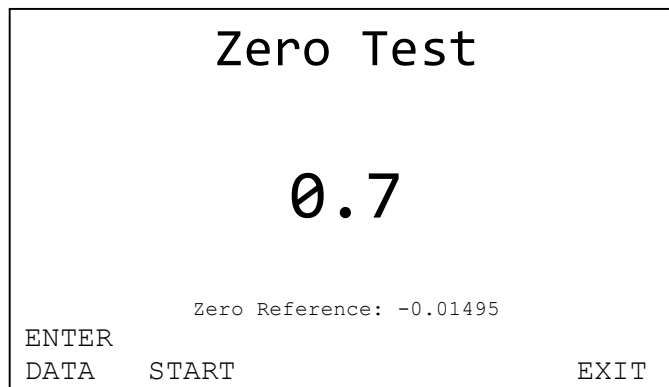
3.2 Calibrate Menu

The calibrate menu is where you select which calibration routines you would like to perform. The options are as follows:

- 1.Zero Test
- 2.Span Test
- 3.Speed Test
- 4.Exit

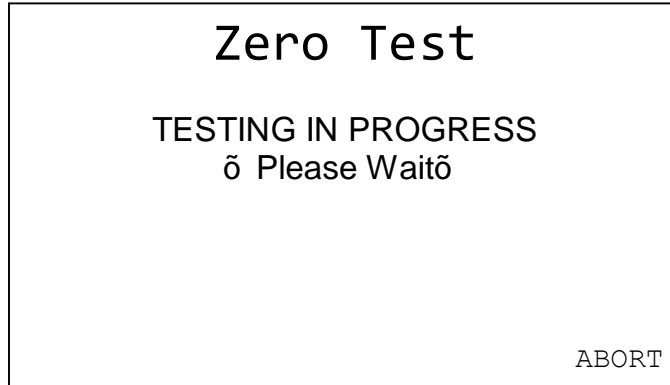
4.0 Zero Test Routine

Upon selecting the Zero Test option from the Calibrate Menu you will see a screen similar to the following:

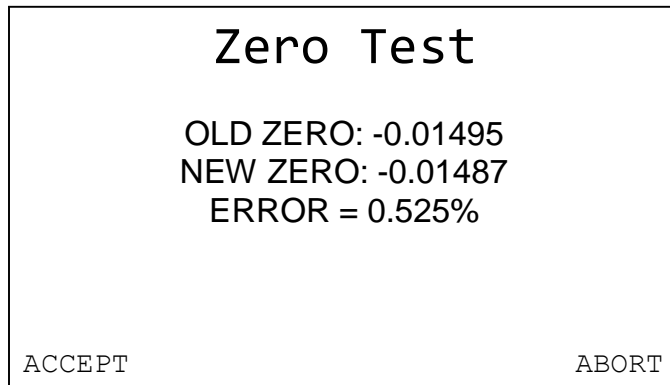


The large number in the middle of the display is the current load on the belt in load units.

To begin the Zero Calibration test, insure the belt is running and empty, press the key under the START label. You will see a screen similar to below with a progress bar to indicate the amount of time left for test to run. Press the ABORT key to stop the test.



Once the test has completed, the screen will appear similar to below:

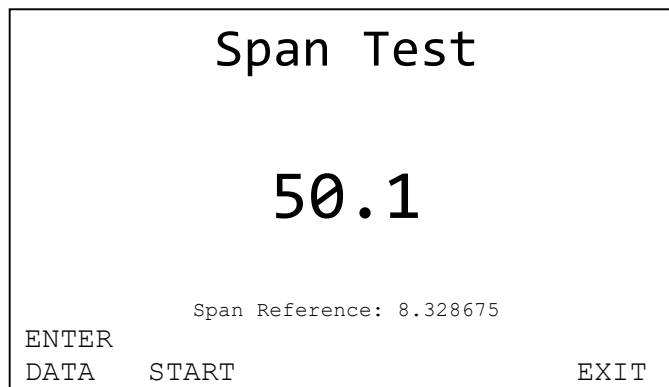


Record these values in the Calibration Test Record starting on page 7.1 . Press a key under the ACCEPT label to accept the results, or press a key under the ABORT label to discard the results.

5.0 Span Test Data

1. **Stop the conveyor belt to ensure your personal safety.**
2. Attached the required calibration test weights to the weigh bridge(s).
3. **Run the conveyor empty – no material.**
4. Return to the Calibration Menu.
5. Select the Span Test.

Upon selecting the Span Test option from the Calibrate Menu you will see a screen similar to the following:



The Span Test Data was entered at the ConveyWeigh factory for your application prior to the shipment of the scale. The following items are for your reference only in the event that your application changes in the future.

If there are no changes required in your scale setting proceed to the next step (6.0 Running A Span Calibration Test).

Below the load display is a line of span calibration information. In this example, CHAIN is the current calibration method selected, lb/ft are the load units in effect (from rate unit selection in setup menu), and 1200 is the current value of the span reference number.

To change span calibration settings and data press one of the keys under the ENTER DATA label.

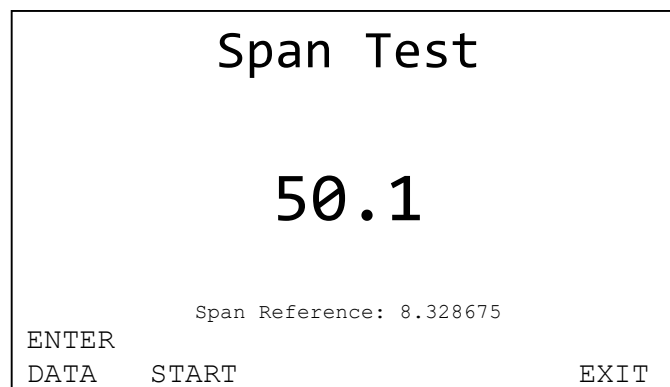
The following data items can be entered in the span ENTER DATA menu:

1. Calibration Mode: This is the weight reference type you are using to calibrate, select either CHAIN for a test chain, or WEIGHTS for static hanging weights.
2. Test Load: This is the value in load units that your test reference represents, test chains typically have this value stamped on them, for static weights, enter the total weight of the weights being used. Each calibration method has its own test load value that it stores.
3. Span Reference: Once a span test has been performed, this value represents the digital signal the integrator sees with the test load applied. Each calibration method has its own value.
4. Span Adjustment: You can key in an error in this parameter and the integrator will adjust the span reference number by this error. This adjustment is done immediately upon entry of the error.
5. Weigh Area: This option is only available when the WEIGHTS calibration mode is selected, upon entry of a value here, the integrator will divide the total of the weights entered in the test load parameter, by this value, placing the results in the test load parameter.

6.0 Running a Span Calibration Test:

Once the appropriate parameters have been setup as per the above discussion and with the belt running and the test load applied you are ready to run the Span Calibration Test.

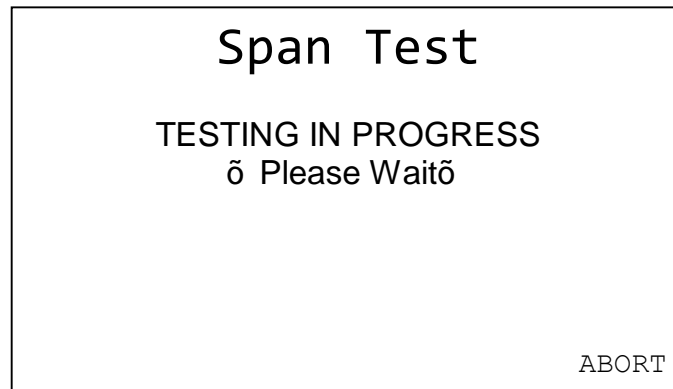
Upon selecting the Span Test option from the Calibrate Menu you will see a screen similar to the following:



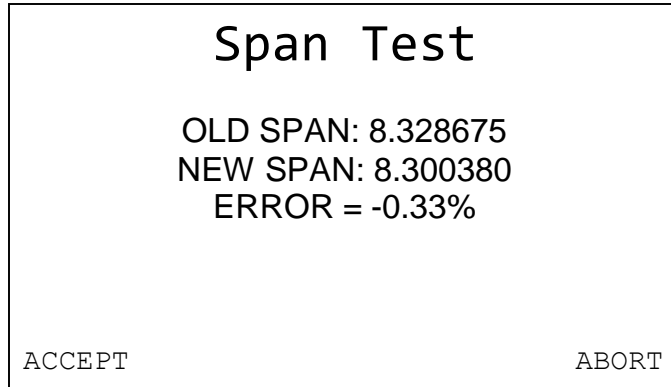
Press the key below the START label to begin the test.

You will see a screen similar to below with a progress bar to indicate the amount of time left for test to run.

Press the ABORT key to stop the test.



Once the test has completed, the screen will appear similar to below:



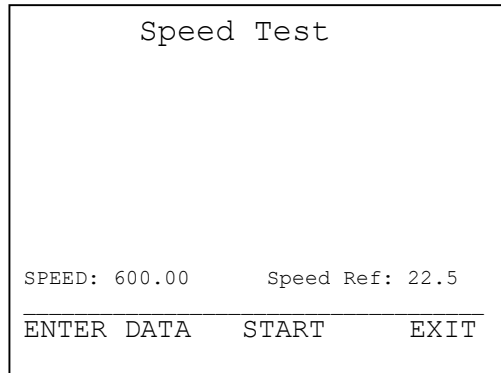
Press a key under the ACCEPT label to accept the results, or press a key under the ABORT label to discard the results.

REMOVE THE CALIBRATION TEST WEIGHTS and STORE THEM ELSEWHERE.
The scale calibration is now complete and ready for normal use.

7.0 Speed Test Routine

A Speed Test was performed at the ConveyWeigh factory for your application prior to the shipment of the scale. The following items are for your reference only in the event that your application changes in the future.

Upon selecting the Speed Test option from the Calibrate Menu you will see a screen similar to the following:



The line of information above the ENTER DATA line contains two values, the design belt speed from the Setup Menu and the speed reference number.

To enter speed specific data press a key below the ENTER DATA label.

The following data items are available in the speed ENTER DATA menu.

1.Speed Mode: Select from CONSTANT or ACTUAL, if CONSTANT is selected then the design belt speed is used to determine belt travel during integration, otherwise the integrator counts speed pulses from the speed sensor.

2.Belt Speed: Design belt speed, same parameter as in Setup Menu. This is the value the speed will be calibrated to when running a Speed Test.

If you don't know the speed and don't have an instrument to measure the speed you can follow these steps.

1. Use white chalk to draw a line on the belt.
2. Measure out 100 feet and draw a second line.
3. Run the belt at operating speed while empty.
4. Using a stopwatch, start the time when the first white line passes, and stop when the second line passes. Repeat a few times and average out.
5. Use this formula: $(D / T) * 60 = \text{Feet per Minute}$

D = distance T = Elapsed test time

Example: $(100\text{feet} / 12 \text{ seconds}) * 60 = 500 \text{ FPM}$

Note If your scale is set up to display Metric Tons per Hour or Kilograms per Hour then your test distance will have to be in Meters with the goal of finding Meters per Minute. Rate Units can be changed in the setup screen.

3.Run Input: Input for sensing belt running status, for constant speed operation. This is an optional item.

4.Speed Input: Input number for speed sensor.

5.Speed Span: Speed reference number.

Material Test Adjustment

On the main run screen, press the button to the left of the big button and find the "Batch Total" screen. Press the "reset" button to drop the total back to zero. Run a normal amount of product across the scale. Have the material weighed either before or after it travels across the belt scale. When you are done you will have a Known Weight total and a Belt Scale total.

Use the following formula to determine the % of difference:

Known Weight Total (minus) Belt Scale Total (equals) X

X (divided by) Belt Scale Total (equals) Y

Y (times) 100 (equals) Span Adjustment Percentage

*Note: Using this formula will result in either a positive or negative number. Be sure to enter a negative symbol if needed.

Go to >Menu

>Calibration

>Span Test

>Data

>Span Adjustment

Enter the calculated value and press "RET" to accept the change.

Trouble Shooting Guide

Problem	Solution
Integrator asks for a password, and I don't know what it is.	Enter 7494 on the Keypad.
With no weight on the scale, the View Load Cells menu option shows a load cell at full range. (10VDC)	+Signal or -Signal wire going to load cell is broken or disconnected. Find wire and reconnect.
Integrator will not come on.	<p>Check Device Power.</p> <p>Check fuse, if bad replace.</p> <p>Make sure On/ Off switch is in the On (Up) Position.</p>
Belt Speed not working.	<p>Ensure that proximity switch is properly adjusted. Open access cover on speed switch. and turn the speed sensor wheel. The light on the proximity switch should flash on and off. If not readjust sprocket and or Proximity switch.</p> <p>Continued....</p> <p>Open the integrator, and ensure that 12VDC is present on the +S.S and -S.S terminals going out to the speed sensor.</p> <p>Ensure continuity on the wires from the speed sensor to the integrator. If disconnected or broken, repair and replace.</p>
Scale not weighing properly.	Scale out of calibration, recalibrate scale.

	<p>Scale is not shimmed properly. Re-shim belt scale making sure weigh is evenly distributed on the weigh bridge.</p> <p>Checking load cell signal voltage shows a voltage level above 36 mvdc. Remove all weight from cells. With a ohmmeter, check resistance between +Signal and -Signal, and between +Excitation and -Excitation. Resistance value should be a nominal 350 ohms. If far greater, load cell is damaged. Replace load cell.</p>
<p>My integrator has the 4-20ma option, but when I go into the Analog Calibration utility, it tells me "Option Not Installed"</p>	<p>Check to make sure the Cat - 5 cable is plugged securely into the CPU board, and the Analog option board.</p> <p>Using a voltmeter, make sure 15-24 VDC is present between DCIN and GND, and 5 VDC is present between +5 and GND on the analog option board.</p> <p>Continued... If the option board is properly installed, the led on the option board will flash when the integrator is first turned on, and will continuously flash while the integrator is in "Run Mode"</p>
<p>My integrator has the Analog output option, but I really need 0-10VDC instead of 4-20ma.</p>	<p>The signal from the Aout00 and GND to the R.I.+ and R.I.- on the integrator interface board is a 0-10VDC signal.</p>
<p>When turning the BeltPro</p>	<p>Defective Unit, consult</p>

Integrator On, the power supply light just flashes and will not come on steady.	factory.
When turning the BeltPro on, the screen just flashes a black line across it.	Defective Unit, consult factory.
Belt Speed Shows ****	Enter Factory Speed Span Value of 24.00 in the Data Section of the Speed Test.

