WEIGH-TRONIX

Conveyor Scale Installation Manual

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Description

The Weigh-Tronix conveyor scale is a freestanding, self-contained and self-powered, flat-belt weighing system that can be incorporated into new or existing production facilities. The scale operates while the conveyor is in motion and is intended for the weighing of individual boxes, cartons, cans or unpackaged products such as large cuts of meat. It is ideally suited to checkweighing, straight weighing and weight accumulation operations.

This manual covers the installation and setup of the conveyor. Specific information on the operation of Weigh-Tronix indicators with the conveyor scale can be found in the appendices of this manual.

Options

Weight Indicator
The conveyor scale comes equipped with either the WI-127 or WI-130 indicator. Both of these come in a NEMA-IV stainless steel housing for washdown environments.

Weight Capacity
Capacities of 100 lbs and 200 lbs are available.

Belt Size
Belt lengths of 36", 48", and 60" are available. Widths of 12" to 36", in 6" increments, are available.

Height Adjustment
Three height range options are available: 18" to 28", 27" to 37", and 36" to 46". You can raise or lower the unit in 1/32" inch graduations.

Construction Materials
The conveyor scale is available as either a stainless steel model for sanitary washdown environments or as a carbon steel model for general industrial applications.

The conveyor scale uses a USDA approved acetal polymer, flush grid belt. The belt material is very durable and has excellent wear and friction characteristics. The grid pattern results in a 31% open area which facilitates cleaning procedures. Since the belt is made of individual strips, damaged portions of the belt can be replaced quite easily. This eliminates the need to replace an entire belt if only a small area is damaged.

Motor Size
The conveyor belt is driven by a 1/3 horsepower electric motor. The standard motor uses a 230/460VAC, 60Hz, three phase power supply. An optional 115VAC, 60Hz, single phase motor is available. A motor starter is not included in the price of the scale.

Belt Speed
The standard conveyor scale will work at only one pre-selected belt speed. The standard speed is 60 feet per minute (fpm). Alternate speeds are available in 5 fpm increments from 30 fpm to 120 fpm.

A variable speed option is available. The speed control unit provided with this option requires a 115VAC, 60Hz, single phase power supply. It rectifies the current from AC to DC to drive a DC motor. The control unit is equipped with a rheostat that allows the belt speed to be regulated between 0 fpm and 120 fpm. A nonstandard speed range must be stipulated when an order is placed.

Features

The scale component of the conveyor scale is suspended by means of chains from four Weigh Bars. The Weigh Bar outputs feed into a junction box which in turn transmits weight data to the scale indicator by a 25 foot interface cable. The chain link suspension of the belt assembly allows some movement, thus helping to absorb the adverse effects of knocks and jolts. The scale also has four overload stops that help prevent damage to the Weigh Bars.

Because of the relatively high speed at which products travel across this scale, you should interface the unit with a printer or computer in order to collect data. Because of this, serial RS-232 output is required. Also, the motion detection capability should be disabled to ensure proper data transmission and printing.

The conveyor scale has two NEMA 4 photo electric eyes, one at each end of the scale. When the product to be weighed enters the scale, it breaks the beam of the first photocell which is then reconnected after the product passes by. From this time on, the indicator records a weight many times per second until the product breaks the beam of the second photo cell. Once the second beam is broken, the indicator averages the recorded weights and transmits this average to a printer or computer. This weight averaging technique results in much more accurate weighments. Weigh-Tronix conveyor scales are accurate to within ±.1% of scale capacity provided the entire item being weighed remains on the scale for at least one second.

Installation

Remove the side panel covering the Photocell Junction Box. Connect the photocell junction box to the indicator according to the drawings in the appropriate appendix for your indicator.

Connect the indicator to the Weigh Bar junction box according to the information in the appropriate appendix for your indicator.

Lift each corner of the belt assembly and remove the shipping material under each overload stop. Replace the side panel after connections are made.

Installation Recommendations

These recommendations will prevent problems which can affect weighing performance. They are not intended to replace or suggest that local or national electrical codes be ignored or deviated from.

Orientation

The conveyor belt must travel in the right direction for the conveyor scale to function properly. **Be sure the belt moves towards the end where the electric motor is located.** If not, the belt will be pushed rather than pulled which causes the belt to run less smoothly, noisier, and will reduce the weighing accuracy achievable by the conveyor scale system.

Height

The height of the conveyor should be adjusted such that the conveyor height is the same as the entrance conveyor and the exit conveyor. This should be done as accurately as possible to insure as smooth a transition as possible.

Motor Connections

The motor is part of the “live” part of the scale so the electrical connection to the motor can have a significant impact on the weighing performance. Avoid very short or very rigid connections.

A relatively long, horizontal run from the motor to the mechanical connection off of the live portion of the conveyor is recommended (such as from the motor to the side or end of the conveyor furthest from the motor connection.) If conduit is required it should be flexible or liquid tight flexible. Rigid conduit must not be used.

Photocell Programming

The photocells used on the conveyor scale have programming modules in them and the entrance photocell is programmed differently than the exit photocell. The entrance photocell is programmed to trigger only after the back edge of the item clears the entrance photocell. The exit photocell is programmed to trigger as soon as the front edge blocks it. See the section *Photocell Connections* for proper programming information. Typically, if they are not programmed properly the system will weigh properly when tested statically, but the weights will be light when weighing in motion. Photocell operation can be tested by blocking the entrance photocell and then clearing the photocell path. The indicator should not begin averaging (WI-127 will go to dashes) until after the photocell is cleared. The exit photocell should cause the indicator to display the averaged weight as soon as it is blocked.

Photocell synchronization

Whenever the indicator is first powered up or the entrance photocell has been triggered without the exit photocell being triggered, the system needs to be synchronized. This is done by momentarily blocking the exit photocell. If you don’t do this, the first item through will resynchronize the indicator, but that weight will not be averaged or transmitted.

Checking Scale Function

The conveyor scale should be checked for weighing accuracy after it is installed. Follow these procedures to check the weighing accuracy. **DO NOT RUN THIS TEST WITH THE BELT RUNNING.**

1. Power up the indicator and press **ZERO**. . . — ***0***s displayed on indicator.
2. Place a test weight not greater than 25% of scale capacity on a corner of the conveyor belt. . . — Weight is displayed on the indicator. Check this for accuracy.
3. Repeat step two for all four corners. . . — There are three possibilities:
   - **A.** The four weight readings are identical and correct.
   - **B**. The four weight readings are identical and incorrect.
   - **C**. The four weight readings do not agree.

If **A** occurs, the scale is ready for use.

If **B** occurs, recalibrate the indicator following the instructions in the indicator service manual.

If **C** occurs, proceed to step 5 under *Balancing Weigh Bars Routed Through A Junction Box,* then repeat this test.

Operating the Conveyor Scale

1. Power up the conveyor scale. . . — make sure all portions of the system are working properly, especially the two sensors.
2. Power up the indicator and press **ZERO.** . . — ***0***s displayed on indicator.
3. Start the conveyors leading to and from the scale. . . — Material should move toward the scale.
4. Material passes entry photocell. . . — Dashes are displayed while weighing is in process.
5. Material breaks beam of exit photocell. . . — Weight is displayed and transmitted to a peripheral device.

Balancing Weigh Bars Routed Through a Junction Box

This scale uses a junction box (J-box) where the outputs of multiple Weigh Bars of matching capacities are added together. The J-box then sends a single capacity signal to the indicator. These multiple signals must be balanced for the scale to function properly. This is done at the factory, but these instructions are provided in case you ever need them.

Figure 1 illustrates the type of J-box in the conveyor scale. Each potentiometer affects one weight sensor. Balance the weight sensors by adjusting potentiometers in the J-Box, as follows:

1. Remove J-Box cover to access potentiometers.
2. Use R1 to set the zero value required by the indicator.
3. Use a test weight that does not exceed the capacity of one weight sensor, usually 1/4 scale capacity, and obtain a displayed weight value for the test weight applied to each weight sensor in the scale system, like this:
   - 3a. Place certified test weight directly above first weight sensor
   - 3b. Record displayed weight value.
   - 3c. Completely remove test weight and verify the display returns to zero before reloading above another weight sensor.
   - 3d. Repeat Steps 3a through 3c for each weight sensor in scale system.
4. If displayed weight value for any weight sensor varies from the others by less than ±1 division, proceed now to appropriate manual with the calibration instructions for the indicator being used.
5. If displayed weight value for any weight sensor varies from the others by more than ±1 division, adjust J-Box potentiometers by turning them the number of 360° turns indicated by this formula:

$$\frac{\textbf{Certified Test Weight Value - Displayed Weight Value}}{\textbf{Certified Test Weight Value x 0.0028}} = \textbf{Number of Turns}$$

If **Number of Turns** is positive value, turn potentiometers clockwise. If **Number of Turns** is a negative value, turn potentiometers counterclockwise.

6. Repeat Steps 3a through 3c, checking all weight sensors with test weights, to make sure you have properly adjusted J-Box potentiometers.

   If displayed weight values for all weight sensors are equal, within ±1 scale division, proceed to appropriate manual with the calibration instructions for the indicator being used.

   If displayed weight value for any weight sensor varies from the others by more than ±1 scale division, then repeat Steps 3 through 5 until you achieve equal readings.

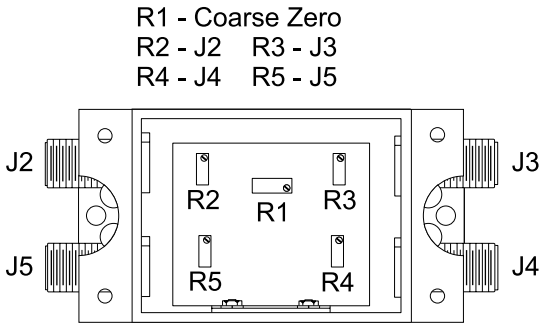


Figure 1
Weigh Bar J-Box

Photocells and Connections

Table 1 shows the connections in the photocell junction box.

J-Box Terminal #	Wire Color	Description
2	White	Set
3	Red	+15
4	Black	Com
5	Green	Reset

Table 1
Connections in the Photocell Junction Box

The photocells are connected to the terminals in the Photocell Junction Box at the factory. If you need to replace a photocell, Table 2 gives the connections for the entrance and exit photocells. Also see Figure 2.

	Photocell J-Box Terminal #	Wire Color	Description
Entrance Photocell	5 4 3	Green Black Red	Reset Common +15
Exit Photocell	4 3 2	Black Red Green	Common +15 Set

Table 2
Photocell Connections To J-Box

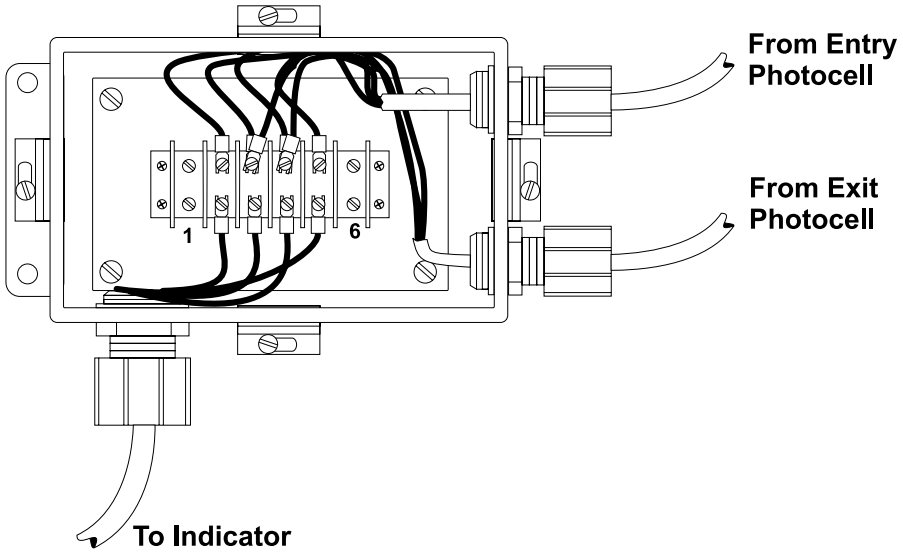


Figure 2
Photocell junction box with the cover removed

Photocell Programmable Modules

The photocells contain programmable modules. Remove the back cover of the photocell case. The programming switches on the modules need to be positioned correctly for the photocells to function properly. See Figure 2 for programming switch positions. R1 and R2, as seen in Figure 2, are one-turn potentiometers. Turn them as labeled for proper function. (CCW means fully counterclockwise and 50% means turned halfway between the fully CCW and fully CW positions, etc.)

Use the first set of illustrations in Figure 3 if you have the original (non-B2 series) photocell. Use the second set of illustrations if yours photocells are the Series B2 type. Note that the only difference between the two types is the position of switches 7 and 8. Switches 1-6 remain the same.

IMPORTANT: If you have a photocell with a Series B2 designation on the cover label, be sure to use the appropriate illustration of your module.

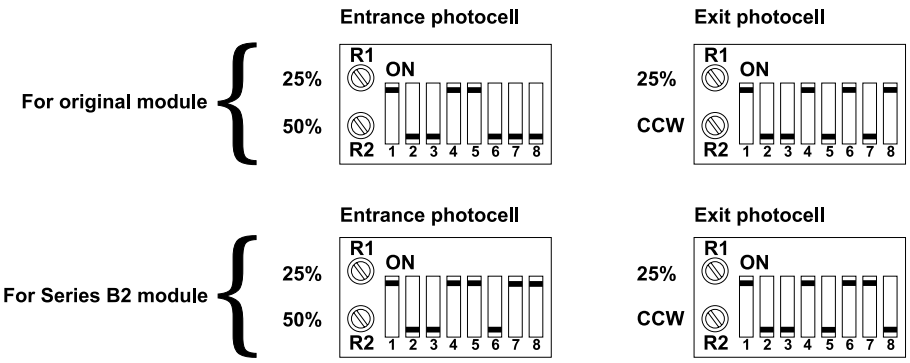
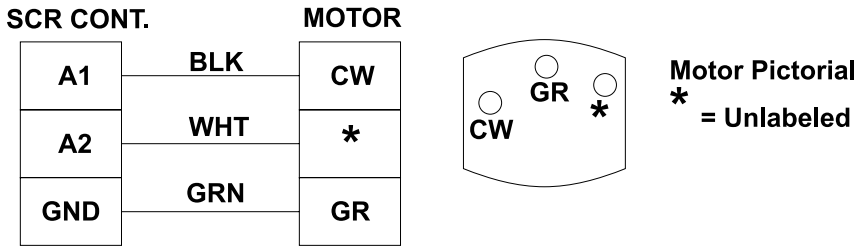


Figure 3
Photocell Module Programming

Optional DC Motor Speed Control Wiring

Below are diagrams for wiring the optional speed controller to the DC motor.



Appendix A: WI-110/WI-120 Information

This appendix gives specific information about connecting the conveyor scale to the WI-110 / WI-120 indicators.

Serial ASCII Output

Only one serial ASCII output, the A port, can be used on the WI-110. To ensure that only displayed weights are printed, the serial card is permanently programmed to send either gross or net weight, whichever is being displayed.

Wiring

Remove the cover from the photocell junction box. Insert the **spade lug** ends of cable number 26909-0015 through the bottom strain relief plug (See Figure 4) of the photocell junction box. Connect the spade lugs to the bottom row of terminal screws as shown in Figure 2 and Table 1. Replace the cover of the photocell junction box after the connections are made.

Connect the **wire** ends of cable number 26909-0015 to the terminals of TB201 of the A-15 Serial Adapter Card on the back of the WI-110 as shown in Figure 5 and described in Table 3. On the NEMA 4 version the stainless steel enclosure has a back plate that must be removed to gain access to the adapter card on the rear of the chassis. On the NEMA 4 version, the cable end must be passed through the strain relief plug assembly (See Figure 4) in the bottom of the housing before attachment to the adapter card.

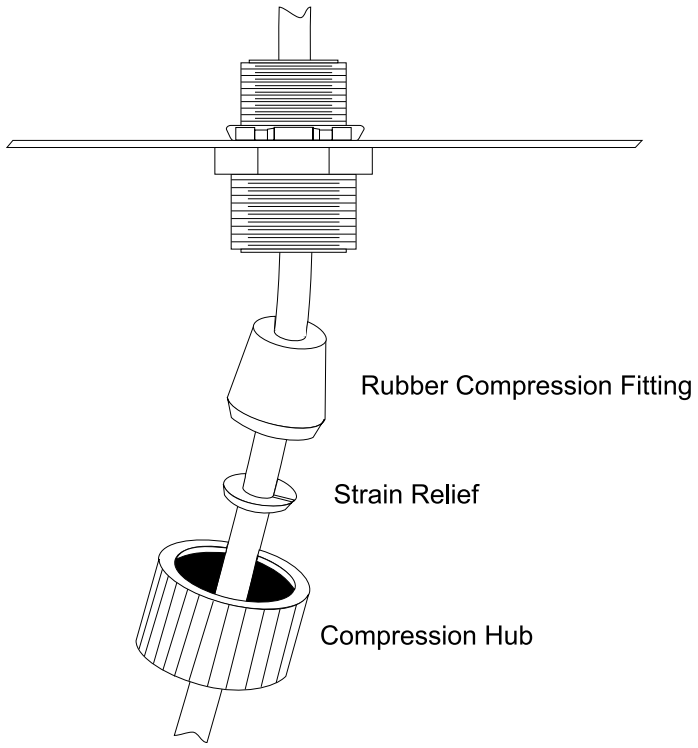


Figure 4
Strain relief plug assembly

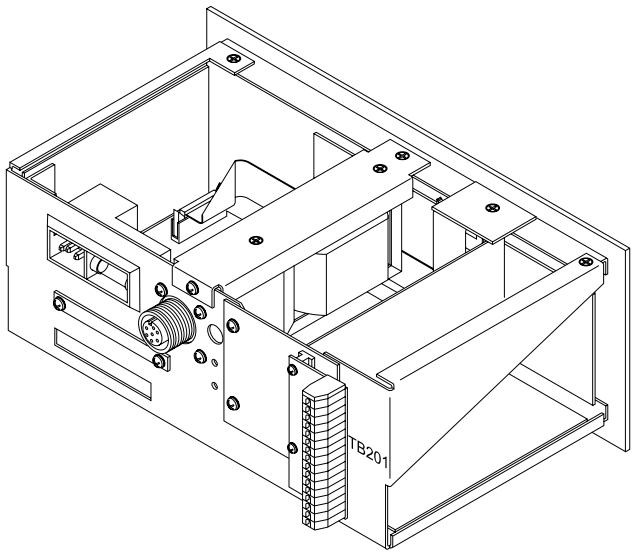


Figure 5
Cable attachment to the A-15 serial adapter card (TB201)

Terminal (TB201)	Wire Color	Description
1	White/Orange	Shield
5	Green	Reset
7	Black	Com
8	Red	+15
9	White	Set

Table 3
WI-110 terminal connections from photocell junction box

The type of connection made to the WI-110 indicator from the scale junction box depends on the style of your indicator enclosure. If your WI-110 comes in a standard housing, the connection is made with a screw-in 7-pin connector. Plug the connector end of the cable into the receptacle on the back of the indicator and tighten the collar. If you have the NEMA 4 stainless steel housing, this connection is made at the factory. The wire color chart and terminal connections are listed in Table 4 for reference.

TB101 Terminal (NEMA 4)	Wire Color	Description
1	Green	+Excitation
2	Yellow	+Sense
3	White	+Output
4	White/Orange	Shield
5	Red	-Output
6	Blue	-Sense
7	Black	-Excitation

Table 4
Scale to Indicator Connections

A printer or computer may be attached to the A-15 Serial Adapter Card. Table 5 shows the wiring for serial output connections.

A-15 TB201 Terminal	Wire Color	Signal Description
1	Shield	Protective Ground
2	Red	XMT Data
7	Black	Signal Ground
12	White	Ready / Busy

Table 5
Serial Output Connections

Appendix B: WI-130 Information

Setpoints

Setpoint #1 is the start averaging input

Setpoint #2 is the stop averaging input

Setpoint #3 is the accept output

Setpoint #4 is the reject output

8587A Photocell I/0 Installation Configuration

Showvar displays the weight to the screen.

WT is the variable that the average weight is stored in and used for display and accept/reject purposes.

Setpoint 1 is the minimum acceptable value.

Setpoint 2 is the maximum acceptable value.

The F1 key is used to set the min and max values.

Operation

When setpoint #1 (ie. entrance photocell) is triggered by the trailing edge of the container, the WI-130 begins averaging and turns off both accept and reject outputs.

When the leading edge of the container triggers setpoint #2 (ie. exit photo-cell) the WI-130 stops averaging, displays the average weight on the scale, and at that time the accept and reject output are turned on or off according to the values entered using the F1 key.

WI-130 Main Board I/O Configuration

Install input OPTO 22 modules in J22, J23 on WI-130 main board.

SSCU-8 Remote Expanded I/O Configuration

Set SW1 1,2,& 3 to ON position.

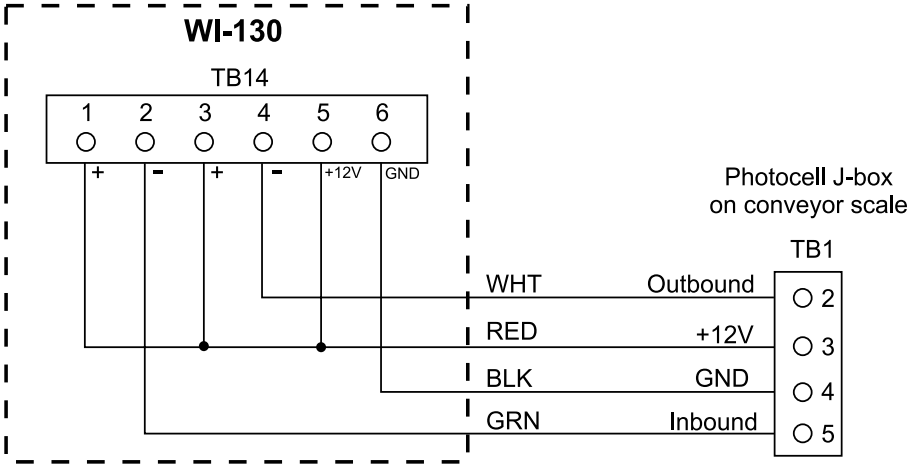
Install output OPTO 22 modules in J40, J41 on I/O expansion board.

WI-130 To I/O Expansion Board Cable Connections

SIGNAL	I/O BRD	WI-130 MAIN BRD
SCL	TB35-1	TB5-1
SDA	TB35-2	TB5-2
IICINT	TB35-3	TB5-3
GND	TB35-4	TB5-4
+5V	TB35-5	TB5-5
RESET	TB35-6	TB5-6
SHIELD	TB35-7	TB5-7

Photocell Connections

SIGNAL	MAIN BOARD	PHOTOCELLS/ WI-130 MAIN BOARD
Entrance cell "+" (RED) (NOTE: Tie S1+ to +12V supply (TB14-5 on rev. D main board)	TB14-1	Entrance cell "+" TO S1+
Entrance cell "SINK" (GRN)	TB14-2	Entrance cell "SINK" to S1-
Entrance cell "-" (BLK)		BLK "-" TO GND (TB14-6 on rev. D)
Exit cell "+" (RED) (NOTE: Tie S2+ to +12V supply (TB14-5 on rev. D main board)	TB14-3	Exit cell "+" to S2+
Exit cell "SINK" (GRN)	TB14-4	Exit Cell "SINK" to S2-
Exit cell "-" (BLK)		(BLK "-" to GND (TB14-6 on rev. D)

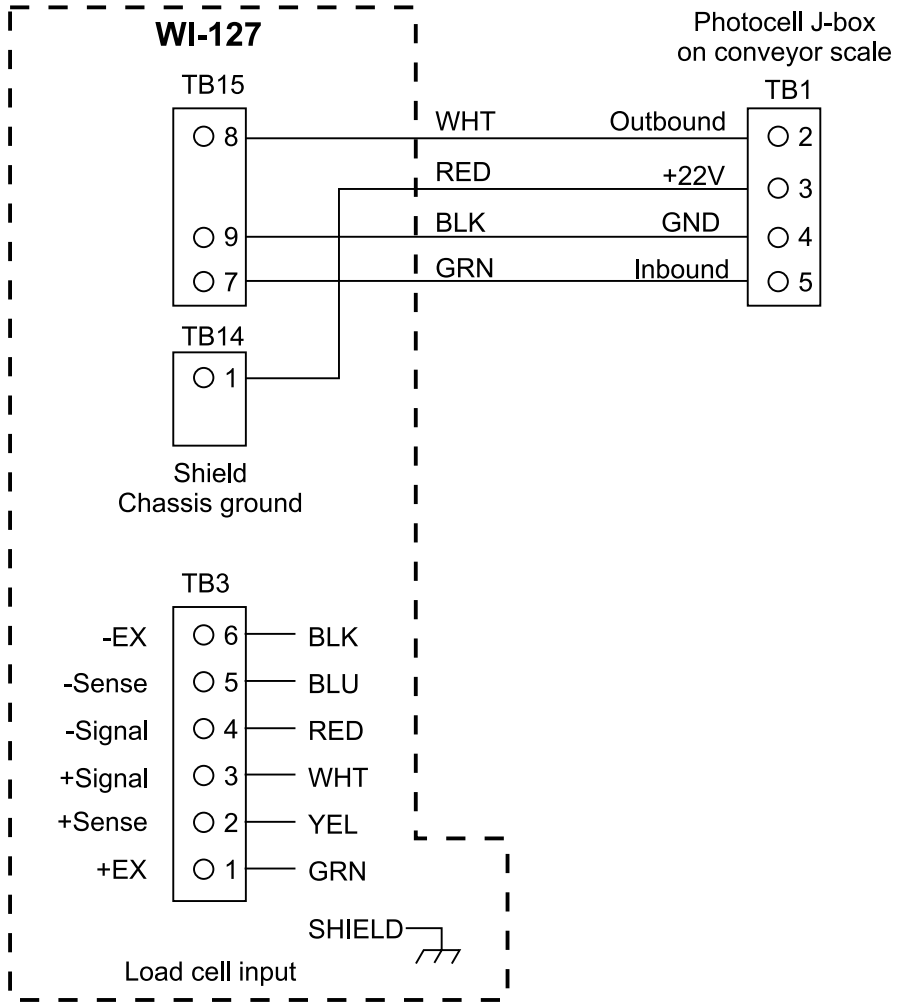


Appendix C: WI-127 Information

WI-127 In-Motion wiring

The wiring information to connect a WI-127 indicator to a conveyor scale is shown below as is a sketch of the connection.

Photocell J-box	Wire Color	WI-127	Function
TB1-2	White	TB15-8	Set input (exit trigger)
TB1-3	Red	TB14-1	+22 VDC Power
TB1-4	Black	TB15-9	Logic Gnd
TB1-5	Green	TB15-7	Reset input (entrance trigger)
	Shield		Chassis Shield



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