# WP25 SCALE PROCESSOR MANUAL

Tecnetics Industries, Inc.

Weight Processor Model: WP25 Firmware Version: 1.4.XX PCB Model: MP600-01-XX
Compatible with all load cell scales including WY, HY and CY series belt scale, and WF series belt feeders.

**Compatible with LVDT scales via LVDT signal card or LVDT interface board)*



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# CHAPTER 1 - SAFETY

This symbol is to alert the user to of important operating and maintenance (servicing) instructions.

This symbol is to alert the user of uninsulated dangerous voltage within the processor enclosure. The voltage may be of sufficient magnitude to constitute a risk of electrical shock.

## 1.01 The Manual

This entire manual should be read thoroughly to gain the proper knowledge of how the system works and how to operate it safely. Also be sure to read the safety instructions and warnings. Failure to heed these safety instructions and warnings could result in serious personal injury or death.

## 1.02 Lifting of Equipment

The HY15 scale's components are light enough for a person to lift by themselves, but the conveyor idlers should not be lifted manually. If scale idlers must be handled manually a minimum of two people should work together.

Fully welded WY10/20 & WY15/25/45 scales include a minimum of four mounting holes located in the four corners of the scale's main carriage. It is recommended that these holes be used when lifting the equipment. The use of a crane or forklift with a spreader bar is recommended. Use caution at all times when rigging, or hoisting scale carriages. Mishandling can cause damage and/or injury to personnel.

It is not recommended that the equipment be manually lifted, but if the equipment must be lifted manually a minimum of two people should lift the equipment. At no time should manual lifting or installation be attempted on conveyor scales designed for 48" or wider belts.

Weigh belt feeder should be lifted with a crane using the rigging holes in the feeder's legs. Spreader bars should always be used. Care in rigging so the uneven load of a weigh belt feeder is balanced when lifting. NEVER stand under any equipment when it is being lifted.

## 1.03 Transporting Equipment

Portable conveyor belts are a common location for scale installations. Use caution at all times when transporting, rigging, or hoisting scale carriages. Mishandling can cause damage and/or injury to personnel. Remove the calibration weights during transport to prevent damage to the scale and also to prevent the weights from falling.

## 1.04 Electrical Codes

**WARNING! – DANGER!** Follow all local electrical and safety codes as well as the National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA) and the Mining Safety and Health Act (MSHA) where applicable. Improper wiring or improper grounding could cause serious personal injury or death. Disconnect and lock out all power from the scale before servicing. Only authorized service technicians should have access to the inside of the electrical enclosures. Even with the equipment's power disconnected, live voltage can be present inside the WP25's enclosure.

## 1.05 Hazardous Environments

**WARNING!** The standard scale is not "explosion-proof". The standard scale must not be operated in an environment where conditions exist that could cause an explosion of dust or gas. Specially built explosion proof scales, signal conditioner enclosures, and speed sensors are available from **Tecnetics** for hazardous environments.

## 1.06 Scale Over-Loading

**WARNING!** Excessive loading on the scale could result in damage to the scale, conveyor, or cause injury to personnel. Information that applies to your specific application is available in Section 11 of this manual. An increase in maximum rate and/or a reduction of belt speed could result in overloading the scale. Additionally, increasing the idler center-to-center distance (refer to Section 7.02.5), which increases the loading on the weigh idler, can also result in overloading the scale. Load cell over-load stop kits are available for field retro-fit on WY15/25/45 scales, if severe overloading happens often.

Do not stand on the belt scale or on the belt above the scale.

## 1.07 Environment

The equipment is designed to be operated in wet or dry environments, within a temperature range of +32° to +104° Fahrenheit (0° to +40° Celsius), and a relative humidity less than 80%. Although the WP25 will operate outside this temperature range, the accuracy of the equipment might be affected by higher / lower temperatures inside the enclosure. A heater option is available for lower temperatures. Protect from direct sunlight to avoid higher temperatures.

If the equipment is to be stored for an extended period of time, keep it in a cool dry area. Do not expose the shipping crate or pallet to the weather unless care is taken to protect it from rain and snow.

## 1.08 Printed Circuit Board (PCB) Precautions

Disconnect and lock out all power to the scale before servicing. When handling PCBs, always use a commercially available grounding wrist strap to prevent electrostatic discharge, which can destroy electronic components. Store unused PCBs in electrostatic protection bags made for that purpose.

## 1.09 Welding Precautions

**Do not** do electrical welding on or near the scale carriage, electrical enclosures, load cells, or signal wiring. Electrical current passing through the PCBs will destroy them, as can induced electromagnetic radiation. If welding near the scale is absolutely necessary, place the ground clamp as close to the welding area as possible and in the opposite direction of the load cells. Disconnect all connector plugs in the scale card to minimize destructive inductive current paths. Cover any wires and connector plugs to prevent damage from weld splatter.

# CHAPTER 2 - INTRODUCTION

## 2.01 Tecnetics Industries, Inc. and Tecweigh.

Tecnetics Industries, Inc., is the legal name for Tecnetics. Tecweigh is the product brand name. They are frequently used interchangeably in this manual and within the company.

## 2.02 Contacting Tecnetics Industries, Inc. (Tecweigh)

**When contacting Tecweigh service about a WP25, or signal conditioner (SC), please have the serial number and model number available. Their location and how they are identified is as follows:**

Inside the enclosure on the printed circuit board (PCB) there are two hand printed numbers, a serial number and model number. The serial number identifies both who owns the unit and the year and month it was shipped. The model number indicates the design revision of the processor's components. Be sure to disconnect and lock out all power before opening any enclosure.

Examples of model numbers:

**MP600-00-00**

A 600 series MP (Main Processor) on its initial hardware version (-00) and firmware version (1.4).

**SC500-XX-XX**

A 500 series SC (Signal Conditioner) its hardware version (-01) and firmware version (2.0.3).

### Tecnetics (Tecweigh) Service Department contact information:

Phone: 651-777-4780 (General number).
651-233-1946 (Service Department)
651-233-1976 (Parts)
800-536-4880 (Toll Free)
FAX: 651-777-5582
Emails: ContactUs@tecweigh.com (Sales Department)
Service@tecweigh.com (Service Department)
Shipping@tecweigh.com (Shipping Department)

**Tecweigh** web site: www.tecweigh.com

## 2.03 Wording Conventions in this Manual

This manual uses two specific wording conventions to help identify the two most important components of the processor; the Parameter table and the faceplate KEYS.

| | |
|---|---|
| First letter **C**apitalized | In this manual, a Parameter will always appear with its first letter **C**apitalized and will also be spelled as it appears in the processor's Parameter table. That is, if a Parameter is truncated in a processor display, it will also be truncated in the manual. |
| ALL CAPITALIZED | When referring to the pushbutton KEYS and other features on the face of the processor, all the letters are CAPATIALIZED. Examples: AUTO ZERO, AUTO SPAN, or MODE window. |

## 2.04 Basic Operation

A conveyor scale's primary function is to continuously measure the material weight on the belt at any particular instant in time and then display the material flow RATE and TOTAL weight. The WP25 has the ability to operate in two basic configurations to accomplish this. (1) called DIRECT mode where the speed and load signals are taken into the WP25 directly, and (2) SCALE CARD mode (SCM) where a signal condition card is mounted near the scale carriage and the information from the speed and load sensors is relayed to the WP25 via a data link. The main components of the scale system are the scale carriage, the WP25 Weight Processor, speed sensor, signal conditioner (if used), load sensors (load cells or LVDT sensors), calibration weights with lifter arms, and weigh idler(s).

The scale carriage mounts on the conveyor stringers and uses one or two of the conveyor's existing idlers depending on which **Tecweigh** scale model was purchased. Models WY10, WY15 and HY15 replaces one idler while the WY20, WY25 and HY25 replace two idlers. The speed sensor indicates the speed that the belt is moving. Load cells or LVDT sensors on the scale carriage, measure the weight of material on the belt. These signals can be wired to terminals inside the WP25 enclosure, or to terminals in the junction box, or to terminals on the Signal Conditioning board – (with Scale Card Mode enabled).

With the load cells wired directly into the WP25, the WP25 will have to be mounted relatively close to the scale. The load cells come with 10 feet of cable. Signal Conditioning Card and Junction Box enclosures, along with additional cables to extend the wiring, are available.

The recommended maximum cable length from a load cell summing Junction Box to the WP25 (special applications only) when only analog signals are employed is 300 ft (91.4 M).

The maximum cable length from Signal Conditioner Card to the WP25 is 4000 ft (1220 M) (with Scale Card Mode enabled).

## 2.05 Conveyor Scales (WY10 / WY20 / WY15 / WY25)

A Tecweigh conveyor scale typically consists of a carriage, load cells, or LVDTs, for sensing weight, a speed sensor, a junction box or signal conditioner enclosure, and a Weight Processor. These models are equipped with self-storing calibration weight(s) and a mechanism for easy manipulation. Additional scale information is provided in chapter 3.

## 2.06 Modular Conveyor Scales (HY15 & HY25)

A Tecweigh modular conveyor scale typically consists of a left and right module including load cell, a speed sensor, a junction box or signal conditioner enclosure, and a Weight Processor. Additional scale information is provided in chapter 3.

## 2.07 Weigh Belt Feeders (WF10/WF14/WF16/WF18

A **Tecweigh** weigh belt feeder (WBF) is a complete weighing and conveying mechanism that consists of the head and tail pulleys, a drive motor, a belt tensioner, a belt speed sensor, the belt, one or more weighing idlers, and the material weight sensing load cells. A **Tecweigh** WBF is also normally equipped with a self-storing calibration weight(s) and a mechanism for easy operation.

## 2.08 Signal Conditioner

When employed, material weight and belt speed signals are sent to the signal conditioner (SC) which is mounted on or near the scale carriage or weigh modules. The signal conditioner has two functions: first it collects and electronically conditions the material weight and belt speed signals; and, secondly, it detects problems at the scale such as faulty weight or speed sensor. The weight, speed, and scale status information is continuously sent to the Weight Processor via RS485 serial communication protocol.

## 2.09 WP25 Scale Processor

The WP25 is the microprocessor of the scale system. All settings are stored in the WP25 such as belt length, calibration weight, and desired I/O options. At the very basic level, it receives belt speed pulses signal, and material load from the load cells or (Signal Card – with Scale Card Mode enabled), and displays the corresponding average material RATE on the WP25's display. The WP25 accumulates a TOTAL of material weight that passes over the scale. While displaying the RATE and TOTAL, the WP25 also interprets status information and displays status messages when appropriate.

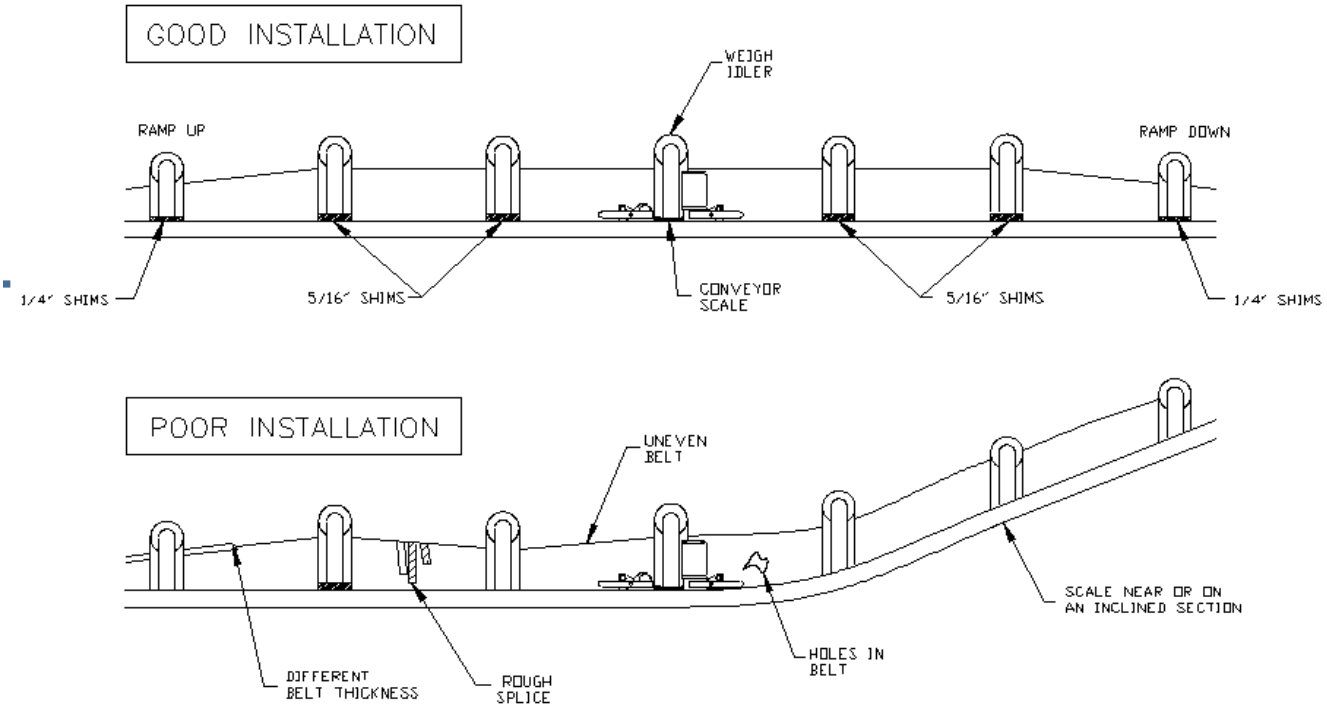
However, the WP25 can do much more than just display RATE, belt SPEED, TOTAL, and scale status. Various analog, relay, and serial inputs and outputs, allows control of the WP25's primary functions remotely using a PLC or other plant controller. The WP25 also has onboard data logging capabilities for recording rate and totals along with tracking routine calibration results.

Optional field bus communication cards are available for the WP25 processor. They are add on plug-in interface devices, that allows the user to remotely initiate actions (like AUTO ZERO) and retrieve data (like RATE and TOTAL) using either Ethernet or Modbus. The field bus also allows multiple WP25s to be integrated into a site automation system.

# CHAPTER 3 – SCALE INSTALLATION

## 3.01 Proper Installation, WY & HY Belt Scale Models

Proper scale installation is critical for high accuracy and repeatability. A properly mounted scale should be located on a rigid, horizontal conveyor. If the conveyor is at an incline, assure it is not so steep that material rolls back on itself causing it to be weighed twice. The belt and idlers should move smoothly and the scale should be mounted in an area free of extreme temperature, wind and vibration. The shimming and aligning of the idlers surrounding the scale is extremely critical, because the weigh area must be slightly raised above the other idlers as indicated below.




**Avoid the following:**

- Badly worn belts and splices
- Joined belts with different thickness
- Poor belt training or alignment
- Wind, temperature, or vibration extremes
- Material build-up on belt, idlers or calibration weights
- Loosely mounted unstable conveyor
- High belt tension near the head pulley
- Steep conveyors allowing material to roll back
- Locating the scale within 20 FT of belt skirting or end of the inlet
- Locating the scale within 40 FT of a belt training / steering idler
- Locating the scale within 40 Ft of the tangent points in a concave curved conveyor
- Conveyors with idlers mounted inset between the conveyor stringers, this requires unique scale design(s) that are non-stock

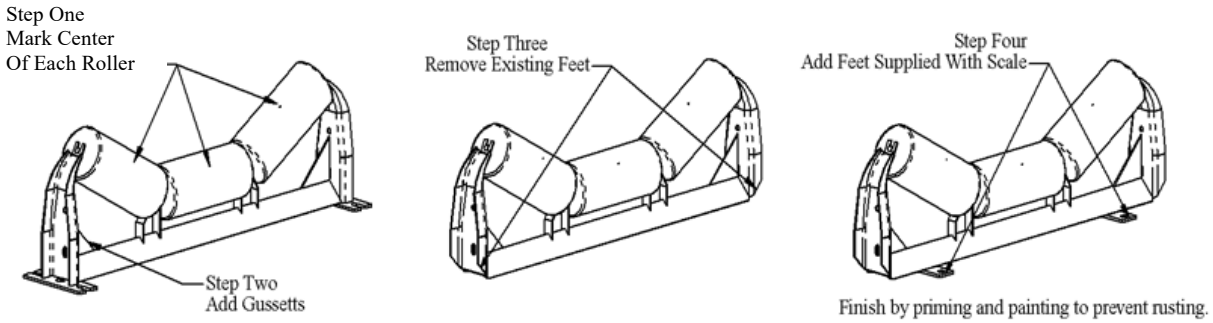
## 3.02 Idler Preparation, WY Models

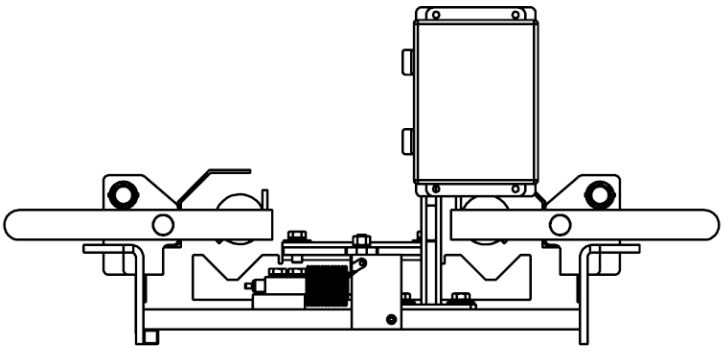
After finding a suitable location for the scale, reduce the conveyor belt tension. Raise the belt so it is supported at least one foot above the idler where the scale will be located and also one foot above the three idlers before and after the scale. Note, if you are installing a dual-idler scale (model WY25), follow the same instructions as for the single-idler scale (model WY15) and just repeat the instructions for both idlers. Short conveyors might only have two idlers on one or both sides of the scale, but this is not recommended because accuracy might suffer. If this should occur, consult the Tecweigh service department for advice (Section 2.01).

***DO NOT WELD ON OR NEAR THE SCALE!!!***

1) Mark the center of each roller on the scale idler, three idlers before the scale, and three after (see below).
2) Remove the idler where the scale will be located--this will be used as the weigh idler.
3) Weld a reinforcement gusset in each corner of the weigh idler.
4) Remove the weigh idler's factory mounting pads.
5) Center the weigh idler on the unpainted scale mounting pads and mark the location on idler.
6) Remove the idler and the unpainted mounting pads from scale.
7) Weld the unpainted mounting pads to the idler at the previously marked locations.
8) Paint the weigh idler for corrosion prevention.

With the weigh idler modification complete, mount the idler on the scale using the four ½" bolts provided. Center the idler on the scale as indicated below.



WY15 Scale Carriage

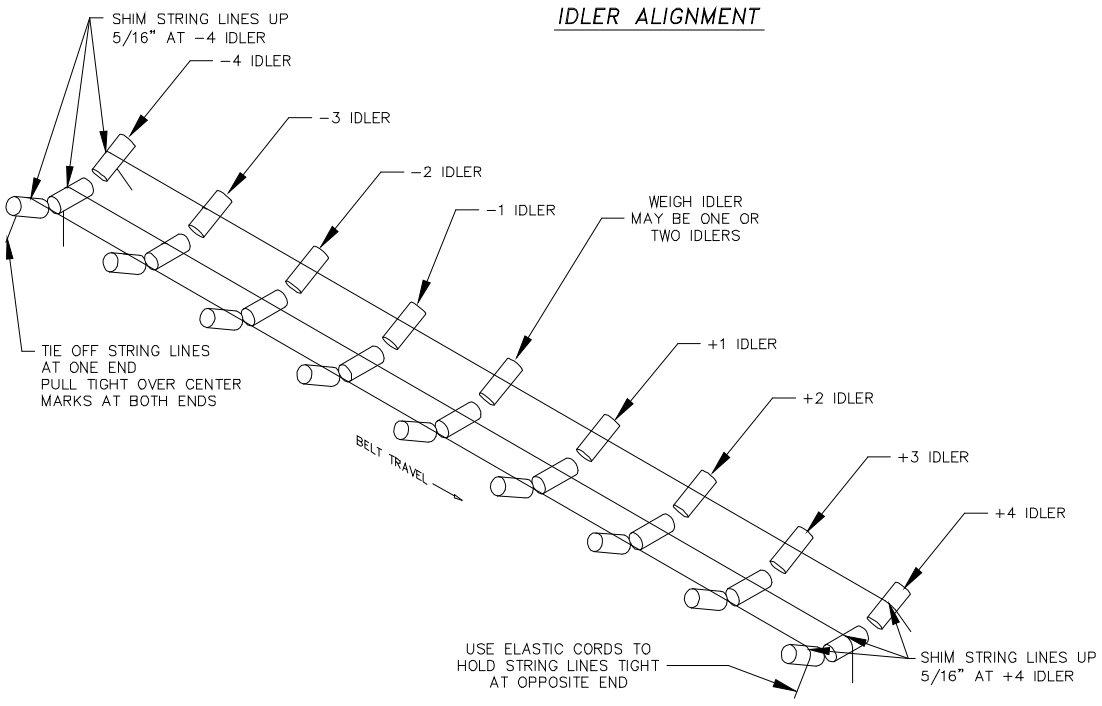
## 3.03 Scale Mounting, WY Models

Locate the scale carriage on the conveyor stringers. Center and align the scale between the stringers and mark the location of the mounting holes. Alternatively, you can use the dimension drawings in Chapter 10 for marking hole locations, but using the scale as a template is preferred. Slide the scale out of the way and drill the four mounting holes. Place the scale over the holes, but do not tighten the bolts yet. Locate the modified idler.

***IMPORTANT!!!*** On the **WYX5** scale models, remove the two shipping plates on both ends of the idler mounting bar. These plates prevent overloading of the load cells during shipment. When using a portable conveyor, use the shipping plates during transportation to avoid load cell damage. Refer to the diagram in section 9.05.

Now align the weigh idler with the three idlers on either side of the scale using the fish line and shims provided. Perform the instructions following and refer to the diagram below.

1) Stretch three string lines across the -4 to +4 idlers, aligned with center marks on the rollers
2) Use elastic cords to hold the string lines in place at each end
3) Shim the string lines up 5/16" up at the -4 and +4 idlers
4) Loosen the three idlers before and after the scale.
5) Shim and tighten the +/-1 thru +/- 3 idlers with a 1/16" gap between the string lines and the rollers. <u>All idlers from -3 to +3 are to be equally spaced within 1/32".</u>
6) Shim the scale leaving a 1/16" gap between the weigh idler and string line.
7) <u>Use shims under the scale, if necessary, so it does not rock or pivot while on the conveyor stringers.</u>
8) Tighten the scale carriage bolts, verify the 1/16" gap. <u>Do not twist or rack the scale carriage when tightening.</u>



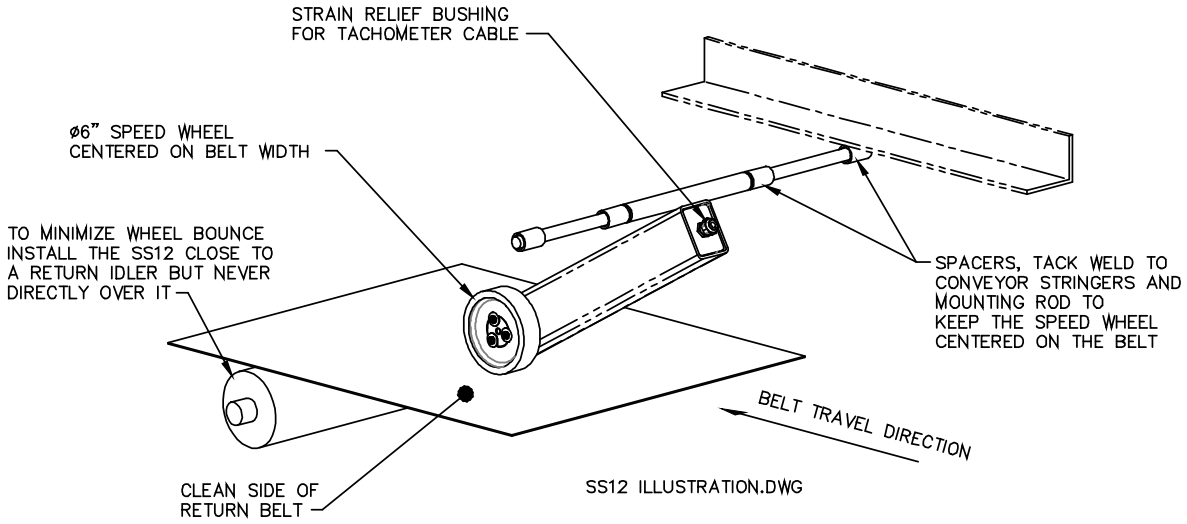
**The idler alignment is very important!** Before proceeding, verify that the string line is exactly over the center marks on the rollers and there is exactly a 1/16 inch gap between all the rollers and string line. Also verify that the idlers are exactly square with the stringers.

Remove string lines & shims at the +/- 4 idlers. Re-tension and align the belt so that it tracks in the center of the idlers. Make sure all of the rollers are turning freely and are securely bolted down.

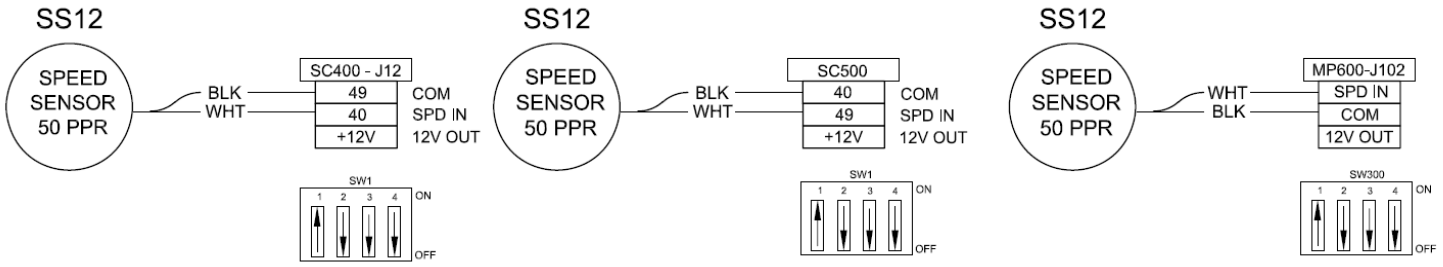
## 3.04 Speed Sensor Installation

**The SS12 speed sensor (obsolete):**
Mount the speed sensor assembly so that it is aligned with the belt. If it is not straight, it might bounce and wear down the wheel or belt prematurely. To minimize motion from the belt, position the wheel so that it is close to but not directly on top of a return idler.

1) Weld two of the supplied pieces of pipe spacers to the conveyor stringers.
2) Slide the remaining two pipe spacers and speed sensor assembly onto the rod. Install the assembly into the spacers on the stringers.
3) Tack weld all four spacers to the rod so the speed sensor is loosely constrained, but can still swing freely.

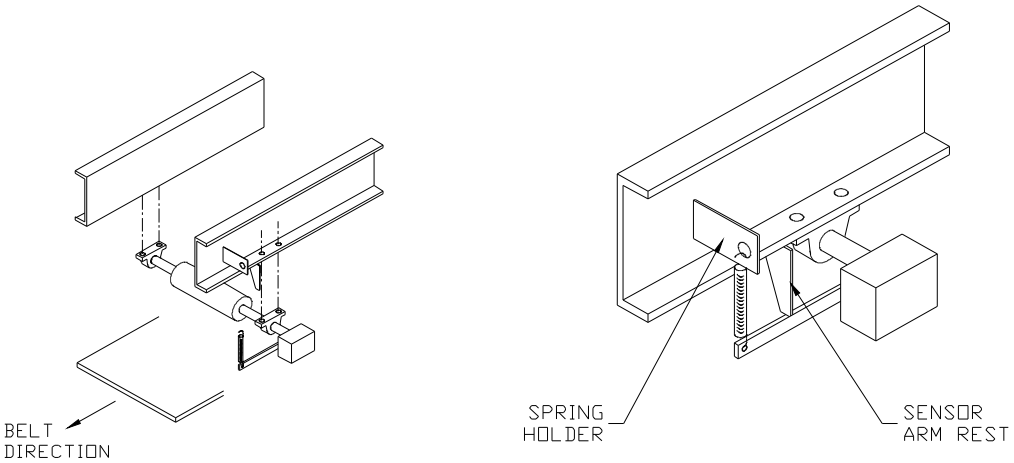


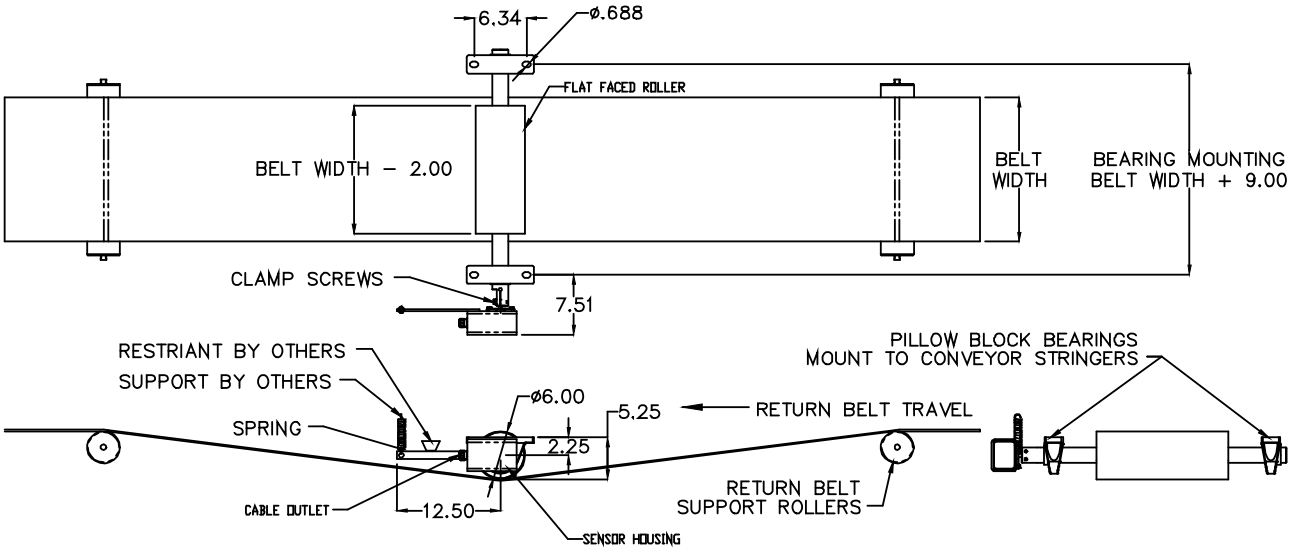

**WP25**
**MP600 BOARD**



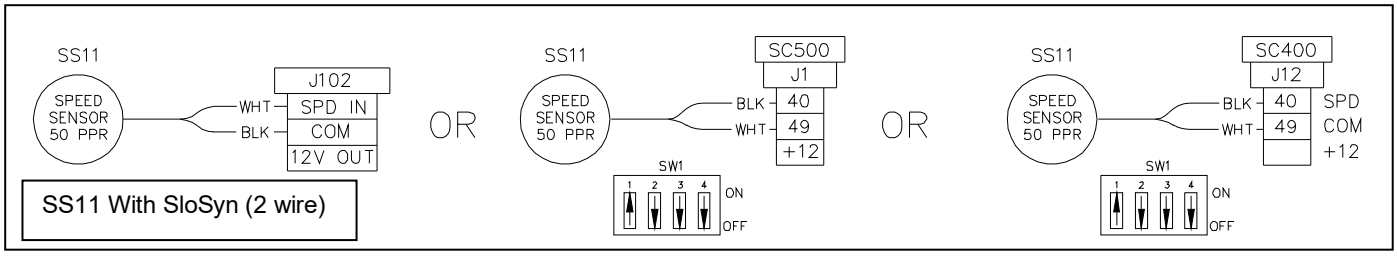
**The heavy duty SS11 speed sensor:**

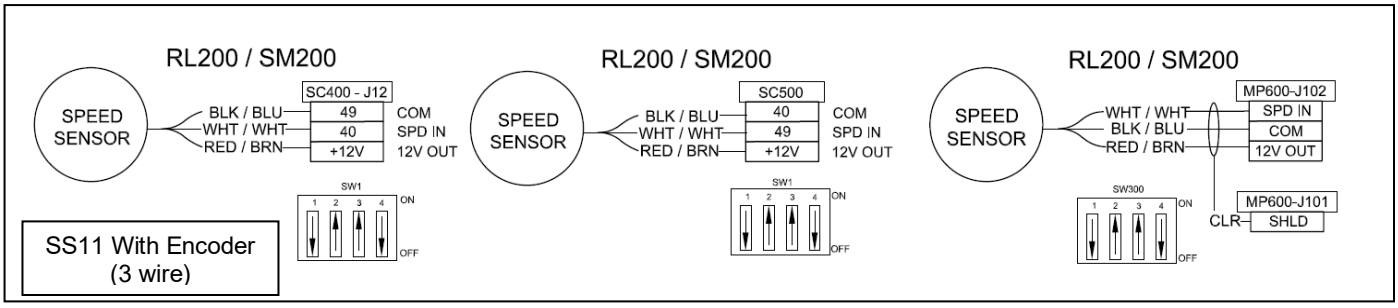
Since most brands and styles of conveyors are constructed differently, it's not possible to give specific installation instructions for the SS11 heavy duty speed sensor. However, four holes will need to be drilled for the bearing bolt holes. Also, one bracket will need to be formed and welded, on which to clip the spring, and a second bracket to hold the speed sensor arm horizontal.




NOTE:
MOUNTING HARDWARE FOR BEARINGS, RESTRAINT,
AND SPRING SUPPORT SUPPLIED BY CUSTOMER.

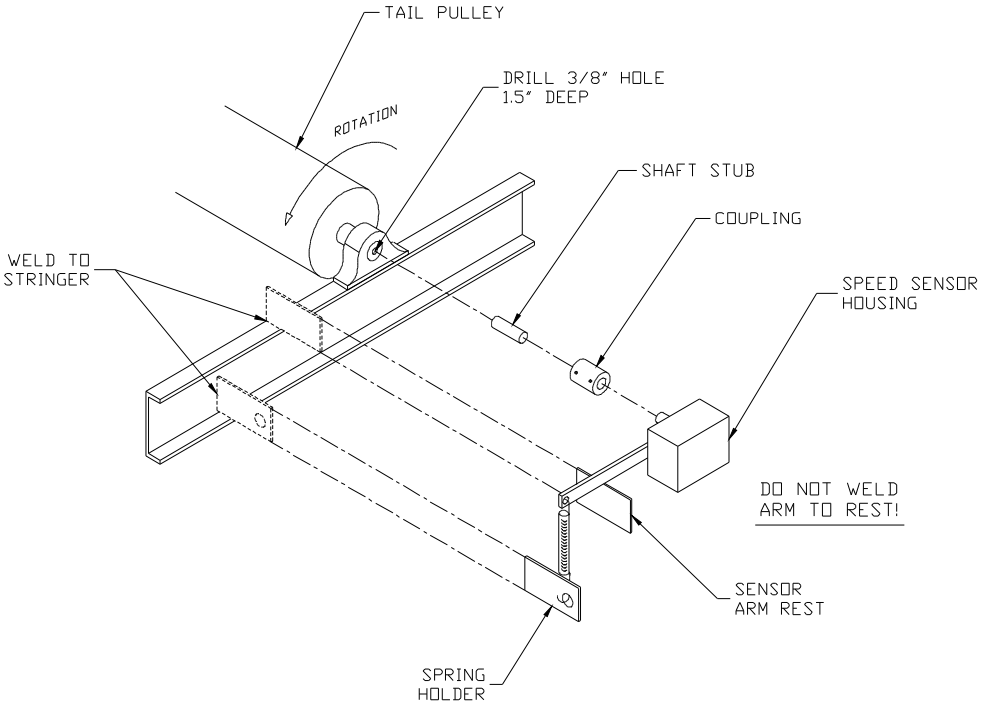


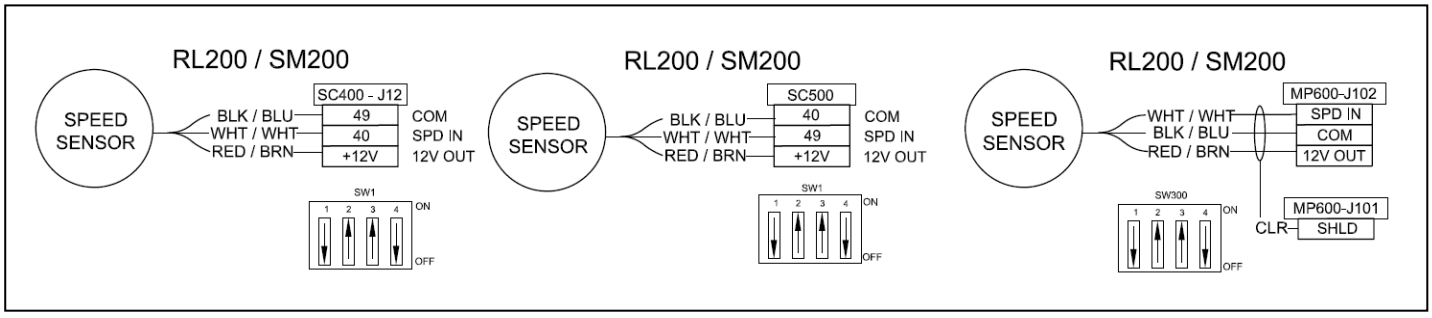



### The RL200 / SM200 speed sensor:

As indicated diagram below, a hole is needed in the tail / bend pulley shaft, and a smaller stub shaft is needed for the speed sensor coupling. Also two formed brackets are needed to hold the speed sensor in place. The rotation of the tail pulley is critical for correct orientation of the speed sensor. The speed sensor should rotate in a way that it pushes against the sensor arm rest NOT pull on the spring.

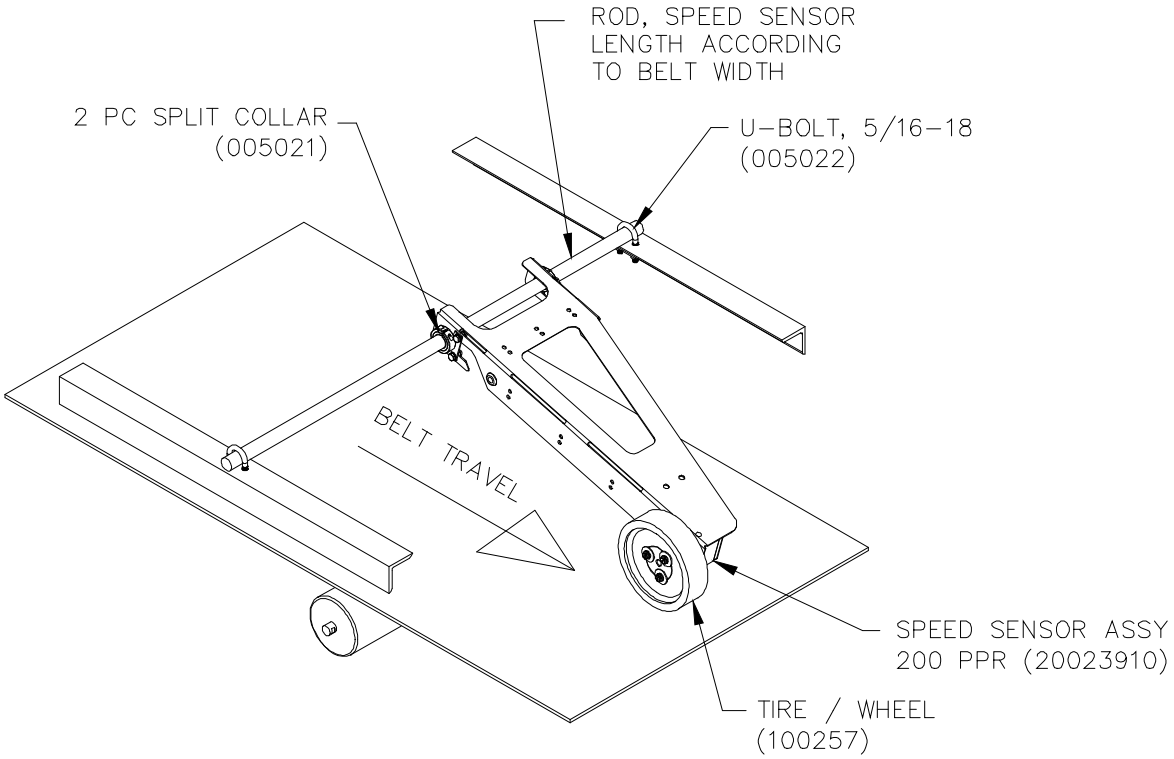
1) Drill a 3/8" diameter hole exactly in the center of the tail pulley or any live shaft 1/2" deep.
2) Insert shaft stub and weld in place. Stub should protrude about 1" from the shaft face.
3) Hold the speed sensor up to the shaft to form an arm rest and spring holder.
4) Place the arm rest and spring holder in a suitable location and weld to the stringer.
5) Tighten the coupling onto the shaft stub.
6) Slide speed sensor shaft into the coupling and tighten.
7) Attach spring to speed sensor arm and spring holder.
8) Run the conveyor. Speed sensor should have minimal amount of wobble.
9) Run required length of electrical cable to the processor.

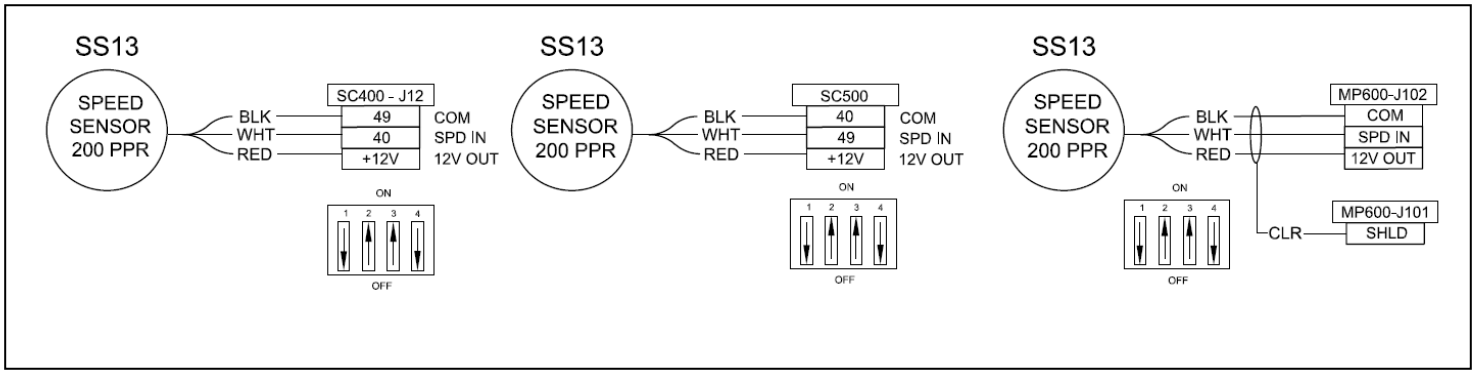


**The SS13 speed sensor:**
Mount the speed sensor assembly so that it is aligned exactly with the belt. If it is not straight, it will bounce and wear down the wheel or belt prematurely. Position the wheel so that it is at least 6 to 8 inches from a return idler.

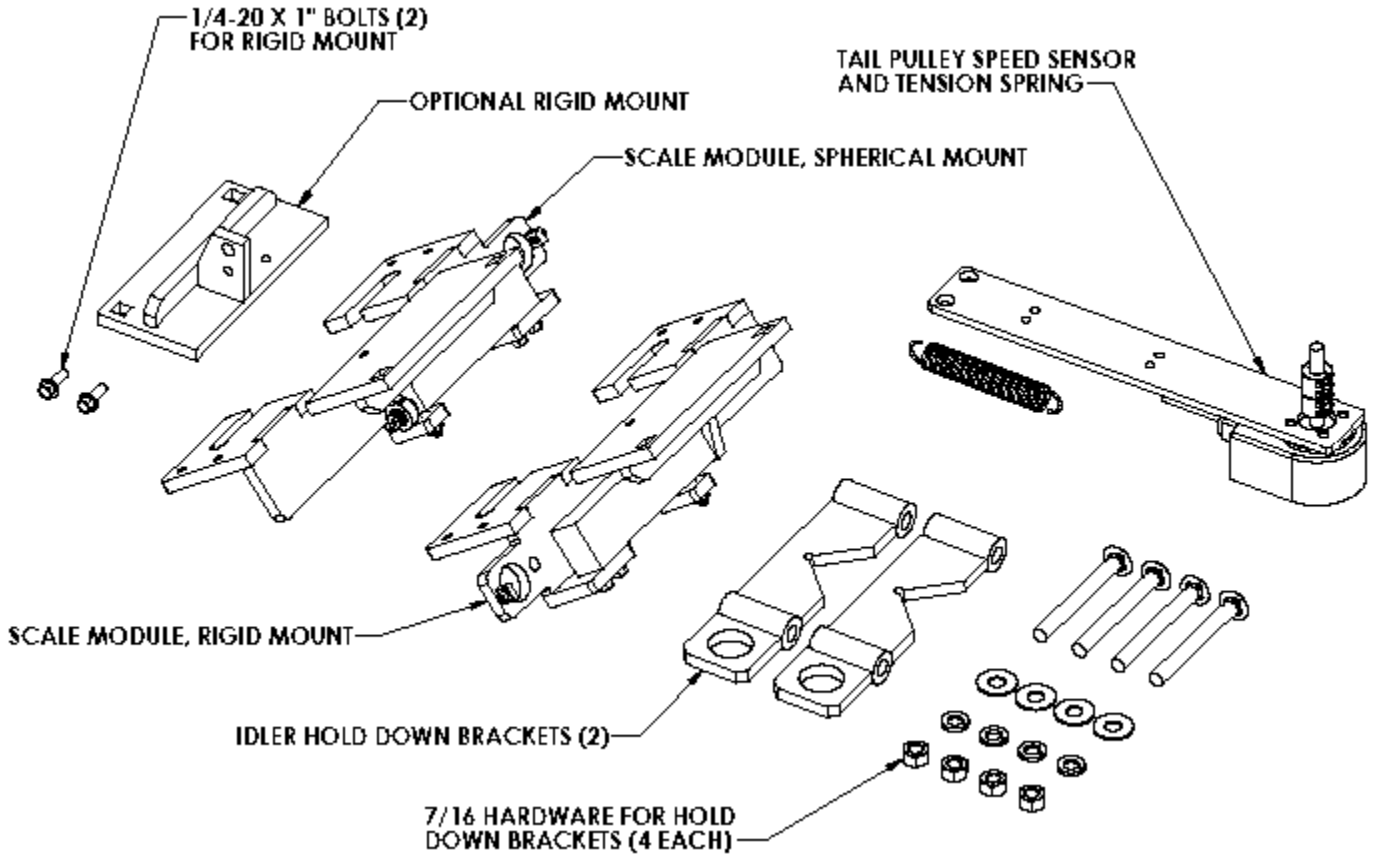
1) Drill Ø3/8" holes in conveyor members for the U-bolts.
2) Mount speed sensor rod and fasten to conveyor with the U-bolts.
3) Position the formed arm, on the rod, and install the retainers.
4) Install the split collars to position the wheel in the center of the belt.
5) Run required length of electrical cable to the speed sensor input connector.



## 3.05 Modular Scale Description, HY Models

The HY15 is different from our other scales in that it a modular design. It does not have a single rigid frame that an idler can be mounted on before scale installation. Instead it is a left and right hand module that needs to be mounted on the conveyor structure and then the idler is mounted between the modules. An HY15 is usually supplied with the components shown below.




An HY15 scale can be mounted in series creating a dual idler scale, an HY25. An HY25 would include a second scale that would be identical to the first. See Section 10.03 for mechanical drawings of the HY15 and HY25.

## 3.06 Idler Preparation, HY Models

After finding a suitable location for the scale, reduce the conveyor belt tension. Raise the belt so it is supported at least one foot above the idler where the scale will be located and also one foot above the two idlers before and after the scale. Note, if you are installing a dual-idler scale (model HY25), follow the same instructions as for the single-idler scale (model HY15) and just repeat the instructions for both idlers.

***DO NOT WELD ON OR NEAR THE SCALE!!!***

1) Mark the center of each roller on the scale idler, two idlers before the scale, and two after - see IDLER ALIGNMENT – page 11.
2) Remove the idler where the scale will be located--this will be used as the weigh idler.
3) Weld a reinforcement gusset in each corner of the weigh idler.
4) Remove the weigh idler's factory mounting pads.
5) Paint the weigh idler for corrosion prevention.

## 3.07 Scale Mounting, HY Models

The HY design utilizes an asymmetric design in that the left and right mounts are slightly different. One side incorporates a rigid mount that bolts directly to the load cell. The other side uses a spherical rod end bearing to allow some flex in the mounting structure while minimizing drift and inaccuracies associated weak or flexing structures.

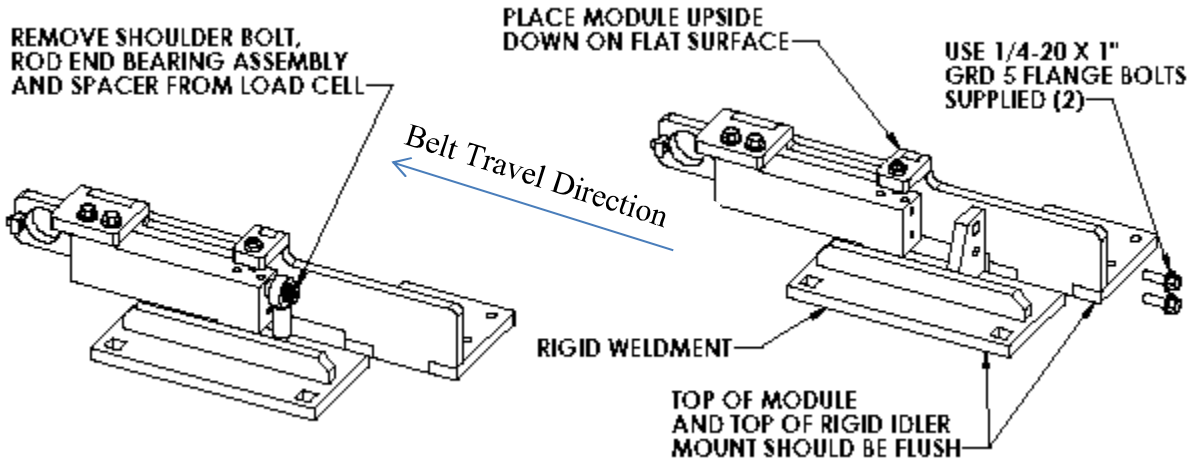
Although this benefit can be great in many applications it is not always the appropriate mount to be used. The following list highlights applications that won't benefit from the spherical bearing mount, and the symmetrical rigid mount that is also supplied should be used.

**The spherical bearing mount may be detrimental in these applications:**

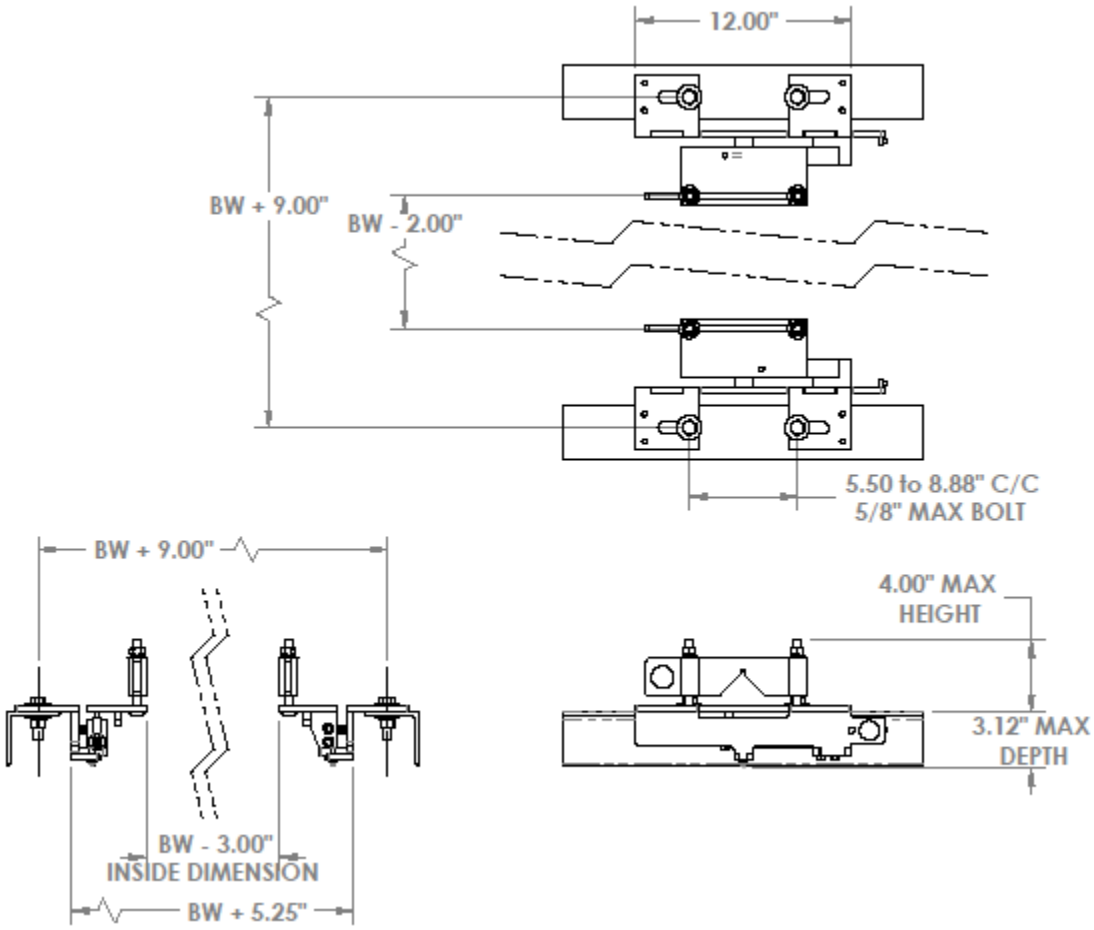
- Applications with over 150lbs per foot of belt load. (500Kg per meter)
- Non-top mounted CEMA idlers.
- Flat carrier idlers or rollers.
- Belt speeds over 500 FPM.
- Belt widths over 48" (1200mm).

Consult our factory for unique applications. The HY15 modular scale is very adaptable.

If the application requires a symmetrical rigid mount simply remove the shoulder bolt from the rod end bearing to disassemble. Then use the two bolts supplied with the rigid mount to attach it to the end of the load cell. See below.




Because the HY modular scale is in two separate assemblies they need to be mounted parallel and square with each other. On a standard top mounted CEMA idler conveyor the left and right modules should bolt directly into the same mounting holes of the weighing idler.




Mount the modules directly across from each other using a square or common reference point. The mounts should also be centered between the closest idlers on either side of the weighing idler(s). Once centered and squared tighten down the mounting bolts for the left and right modules.

You can now place the modified idler on top of the mounting pads. Make sure the belt direction of the idler is correct. Assemble the idler hold down clamps with the carriage bolts and hardware supplied. Only finger tighten at this point. Loosen the mounting bolts on the end of the load cells with the rigid mount on them. Just enough to allow the mounting pad to settle and come into full contact with the inverted angle of the CEMA idler.

For HY25 dual idler installations repeat this process for the second idler.

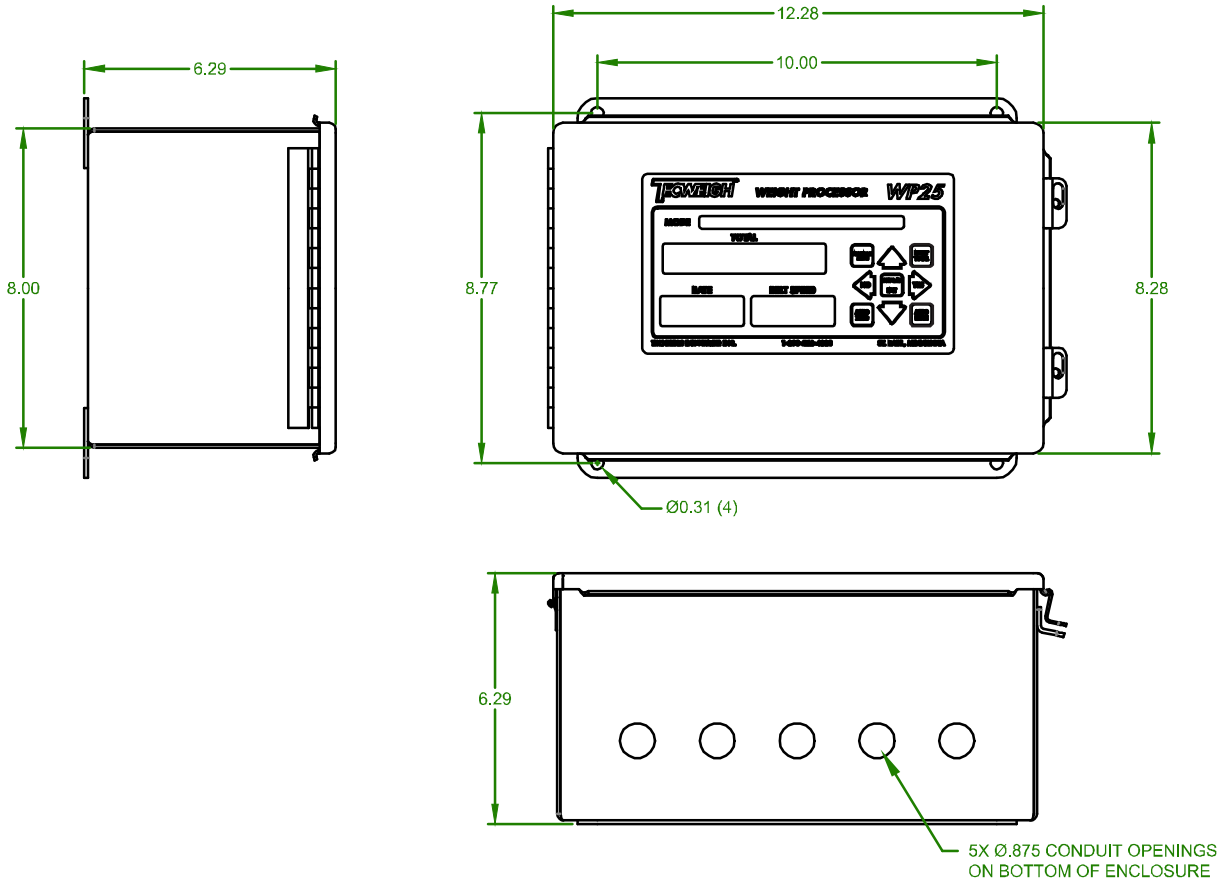
> *Note that if the structure is truly flat and square the idler(s) that have now been mounted on the modular scale assemblies is approximately 1/8" higher than the adjacent idlers. This is not always the case but the following instructions are based on this assumption. Adjustments and shim size references may need to be different in your specific application.*

Now align the weigh idler with the three idlers on either side of the scale using the string line and shims provided. See IDLER ALIGNMENT - page 11 for the procedure.

**The idler alignment is very important!** Before proceeding, verify that the string line is exactly over the center marks on the rollers and there is exactly a 1/16 inch gap between the string line and the weighing idler(s) and adjacent idlers. Also verify that the idlers are exactly square with the stringers. Make sure all of the rollers are turning freely and are securely bolted down.

## 3.08 WP25 Installation

Mount the WP25 in a reasonably clean area away from severe heat and isolated from vibration. Avoid areas of bright sunlight since the lighted displays may become difficult to read. Where outdoor installation is necessary, the WP25 should be mounted under a “roof”, “dog house” or “visor” to provide rain and snow protection as well as shade. Be sure to allow room for the enclosure door to swing out. Any unused enclosure holes must be plugged with the appropriately rate hole plug for the environment. The WP25 can be remotely located with up to 4,000 feet of proper grade wire cable from the scale, when using a wired cable to the signal conditioner card. Refer to the mounting dimensions in the figure below. Refer to Section 4 for WP25 wiring diagrams and information.



# CHAPTER 4 – SYSTEM WIRING

## 4.01 Wiring Precautions

The following is a list of important precautions that should be observed during field wiring.

- Wiring should be compliant with all applicable electrical codes.
- Input power can be 120 – 240 VAC, 47-63 HZ, 50 watts, or 9-36 VDC, 30 watts.
- Only apply input power after assuring all wiring is correct.
- The electrical power source must be of utility quality and specification.
- Never splice wires. Replace short wires with one continuous length.
- **Always** run power wiring and signal wiring in **separate** conduits.
- Ground shield wires at only one location, usually the WP25.
- To prevent possible shorts, tape all shielded wire ends and keep the wiring neat.
- Use properly sized water tight compression fittings on cables entering the enclosure.
- **Do not** connect any wires to terminals designated as unused.
- Pay particular attention to proper grounding as depicted in the wiring diagrams.

## 4.02 WP25 Wiring

There are two common ways the WP25 is configured with conveyor belt scales. These are known as DIRECT MODE and SCALE CARD MODE.

DIRECT mode (see 4.06 for wiring diagram) is where the speed sensor and load cells are wired directly into the WP25/MP600 enclosure. The enclosure contains terminal block for the speed sensor and a small summing block for the load cell wires.

SCALE CARD MODE (SCM) (see 4.07 for wiring diagram) utilizes the WP25 serial port to communicate with a scale signal condition card. In this configuration the SPEED and LOAD information is transmitted digitally from the SC500 scale card to the WP25.

If the equipment application has been custom built by **Tecweigh,** you will find an "as built" wiring diagram supplied in addition to this manual. Chapter 6 in this manual defines the Parameter settings required to enable the features of the outputs used.

The pluggable green connectors on the MP600 WP25 PCB have a conductor range of 28 to 14 AWG (.14-1.5 $mm^2$) and a screw toque requirement of 35 oz-in (.25 Nm) max torque.

**Relay Outputs**

Two configurable relays provide dry contact outputs for a remote totalizer, high/low RATE alarm, high/low speed alarm, set point deviation alarms (feed control only) or a calibration weight lifter interlock and more are on terminal strip J104. The relay contacts are SPST and should not be used to control more than 250 VA. When a relay is used as a totalizing pulse relay, limit the frequency of operation to 5 pulses per second for reliable operation. Note that even though the relays are rated for up to 250 VA, it is highly recommended that electrical noise emitted from the relays be minimized to assure problem free operation of the processor. When possible, it is recommended that 24 VDC (3 amps max.) be used to drive external loads. When higher voltage loads need to be driven, it is recommended that an interposing relay is installed between the WP25 output relay and the load. When

an AC load is being pulsed by the relay, it **may be necessary** to remove the RC snubber jumper (JP800 or JP801) for proper operation.

Refer to sections 6.04.20 to 6.04.37 for relay configuration options.

**4-20 ma current loop output**

The WP25 provides two 4-20 ma (or 0-20 ma) current loop outputs that are programmable for RATE, SPEED, LOAD, WEIGHT or CONTROL. The RATE current loop outputs can be used for driving chart recorders, displays, data loggers, and similar client provided devices and may be spanned independently from each other. Use a single shielded twisted pair cable for the current loop wiring, Belden #8760 or its equivalent is recommended (wire can be obtained through **Tecweigh**).

**WARNING: THE CURRENT LOOP OUTPUT IS ACTIVE! THAT MEANS A DC VOLTAGE IS PRESENT AT THE TERMINALS. ENSURE THAT THE LOOP IS CONNECTED TO A PASSIVE LOAD (resistive only) OR DAMAGE WILL RESULT!**

In most systems applications, **current loop isolation is essential** to eliminate induced noise interference, and also to eliminate ground loops. The current loop outputs at the PCB are **non-isolated.** Consequently, the WP25 requires current loop (signal) isolators for loop isolation (these can be purchased through Tecnetics). Note that if more than one load is driven by a loop, for proper loop operation, all loads in the loop must be isolated. Proper shield grounding is also essential. The maximum load resistance that can be driven by any single current loop output is 350 ohms, (load and isolator) with a maximum voltage of 13.5 Vdc.

**Serial port**

RS-485 is available on terminal strip J103. It is capable of sending data in a “broadcast” mode and responding to received commands in a “query” mode. In Scale Card Mode (SCM) the serial port is dedicated to communication with the scale card and not available as an auxiliary port. (Refer to Chapter 8).

**Digital Inputs**

There are two programmable digital inputs on terminal strip J104. Tying DIG IN 1 or DIG IN 2 through a dry contact to DIG COM will activate the function of the corresponding input. (Refer to section 6.04.38 – 39).

**Analog Input**

There is one analog input on terminal strip J101. This analog input, when configured is dedicated to a remote setpoint for the feed control loop when enabled.

**Other Option**

For installations with optional printer, wireless communication to scale card, large scoreboard for rate or total, contact Tecweigh for job specific prints.

## 4.03 Load Cell Wiring (WY15 & WY25)

The load cell wire color code for wiring strain gauge load cells must always be verified as there is no industry standard color code. The color code is either printed on the load cell, on the load cell wire cable or on a sheet of paper in the load cell box. The following is a reference for the most commonly used load cells and their color codes. Take special care on the **CB6** to note the **model** (T or TP) as the color codes are **NOT** the same for both!

| Load Cell Model | CI-LC22 | SB1 or LC | CB6-XX-T | CB6-XX-TP |
|---|---|---|---|---|
| Signal - | red | white | white | white |
| Signal + | white | green | green | red |
| Excitation - | black | black | black | black |
| Excitation + | green | red | red | green |

The SB1 and CB6 models are used on standard wiring diagrams in the manual.

When installed, be certain the arrow on the load cell(s) is pointing down.

## 4.04 Load Cell Wiring (HY15 & HY25)

| Load Cell Model | SP4 | C1-40 |
|---|---|---|
| Signal - | red | red |
| Signal + | white | white |
| Excitation - | black | black |
| Excitation + | green | green |
| Vref (sense) - | blue | brown |
| Vref (sense) + | org | blue |
| Shield | yellow | yellow |

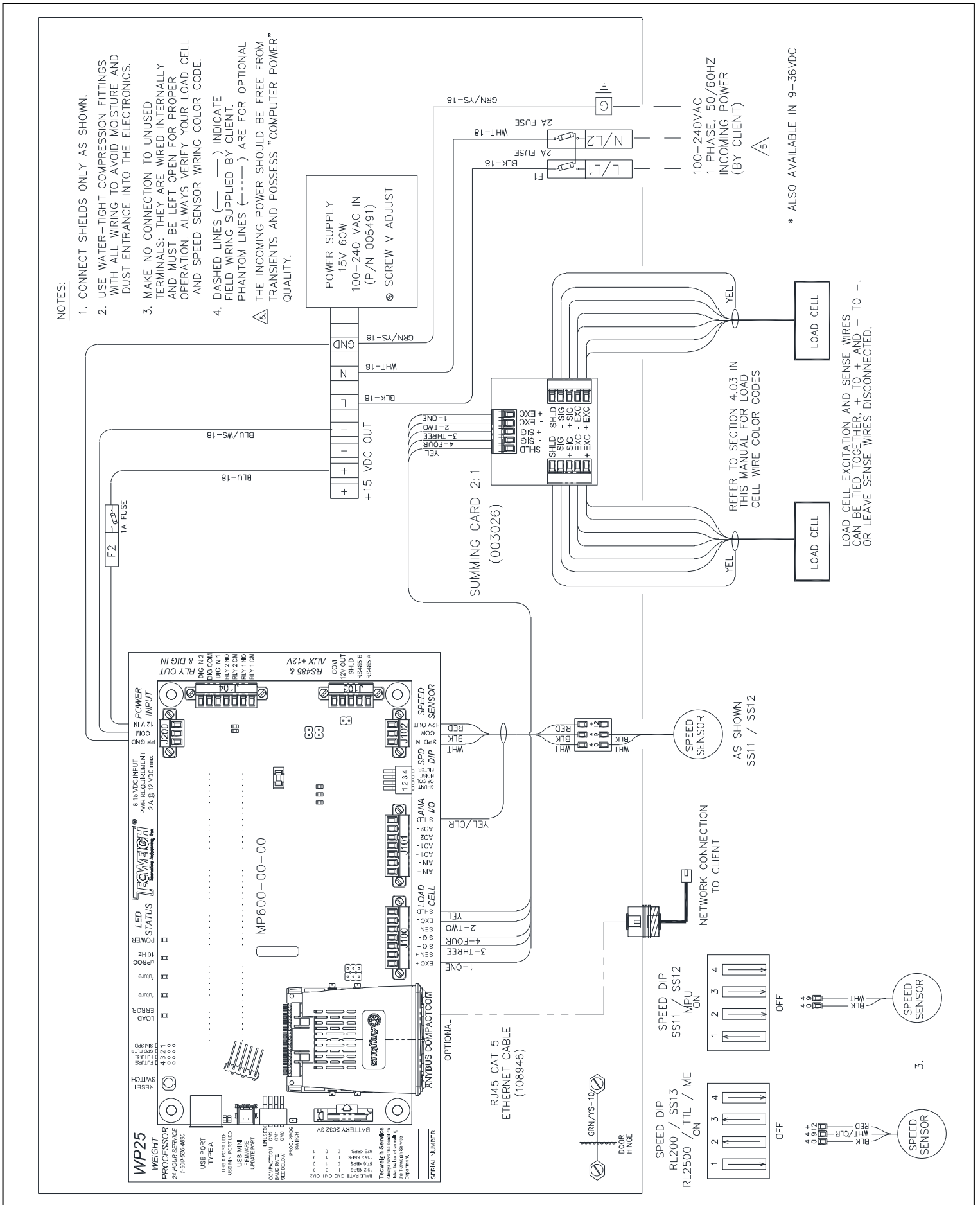
*NOTE 1: In DIRECT mode JP1300 and SP1301 jumpers are for selecting 4 or 6 wire load cells. For 6 wire load cells the jumpers would be on the lower two pins, while 4 wire load cells require the jumpers be on the upper two pins of each header. Note that if a 6-wire load cell ties the Excitation and Sense wires together at a summing card, and then 4 wires are run to the WP25 PCB the jumpers should be set for a 4 wire connection. The jumper settings are based on the wires that are landed at the PCB. In SCM the jumpers are JP3 & JP3 and are located on the SC500 scale card.*

*NOTE 2: All load cell cables have a shield that needs to be connected to a protective earth ground terminal. This terminal could be on the WP25 PCB itself, a summing card terminal, or a Din rail mounted shield clip for braided shields in the WP25 enclosure.*

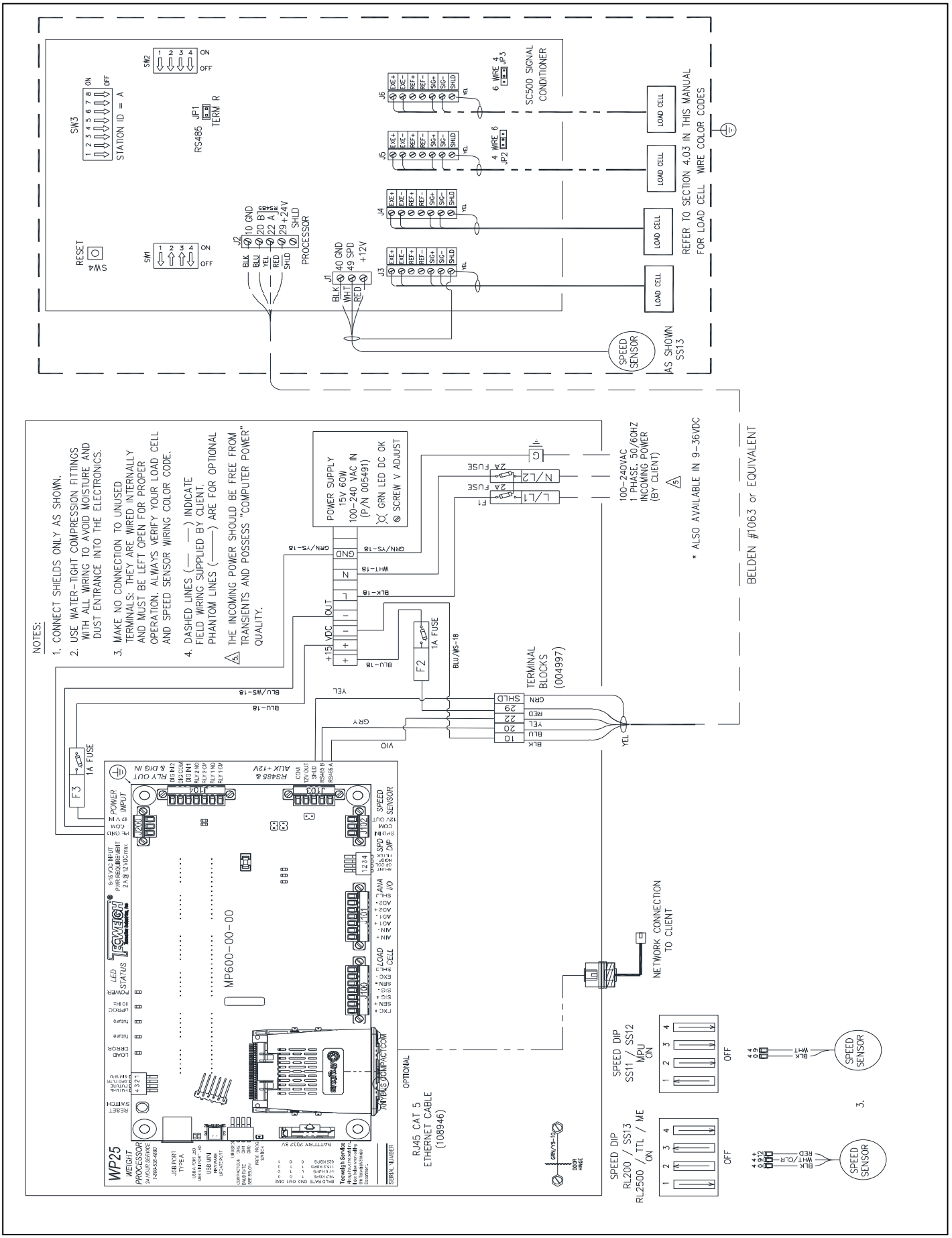
## 4.05 Speed sensor Wiring

Due to no industry wide color code and the many color schemes in use, it is necessary to verify the color code/wire function on speed sensors when wiring or replacing them. The most common speed sensors and the wire codes are shown in paragraph 3.04 pages 12 – 15) and the following prints (4.06 and 4.07). It's not feasible to list them all here. The specific color code can be found on the device label, printed on box it came in or on a datasheet inside the box it came in. This is particularly important when replacing a part with a new compatible part from a different manufacture. For example, one speed encoder manufacture may use the RED wire for the encoder power. Another manufacturer uses the RED wire for the common. Although the Tecweigh scale card is compatible with both, not following the manufactures color code and replacement of wire color by color and not by function, could damage the device!

# 4.06 WP25 / Internal Summing (DIRECT Mode)



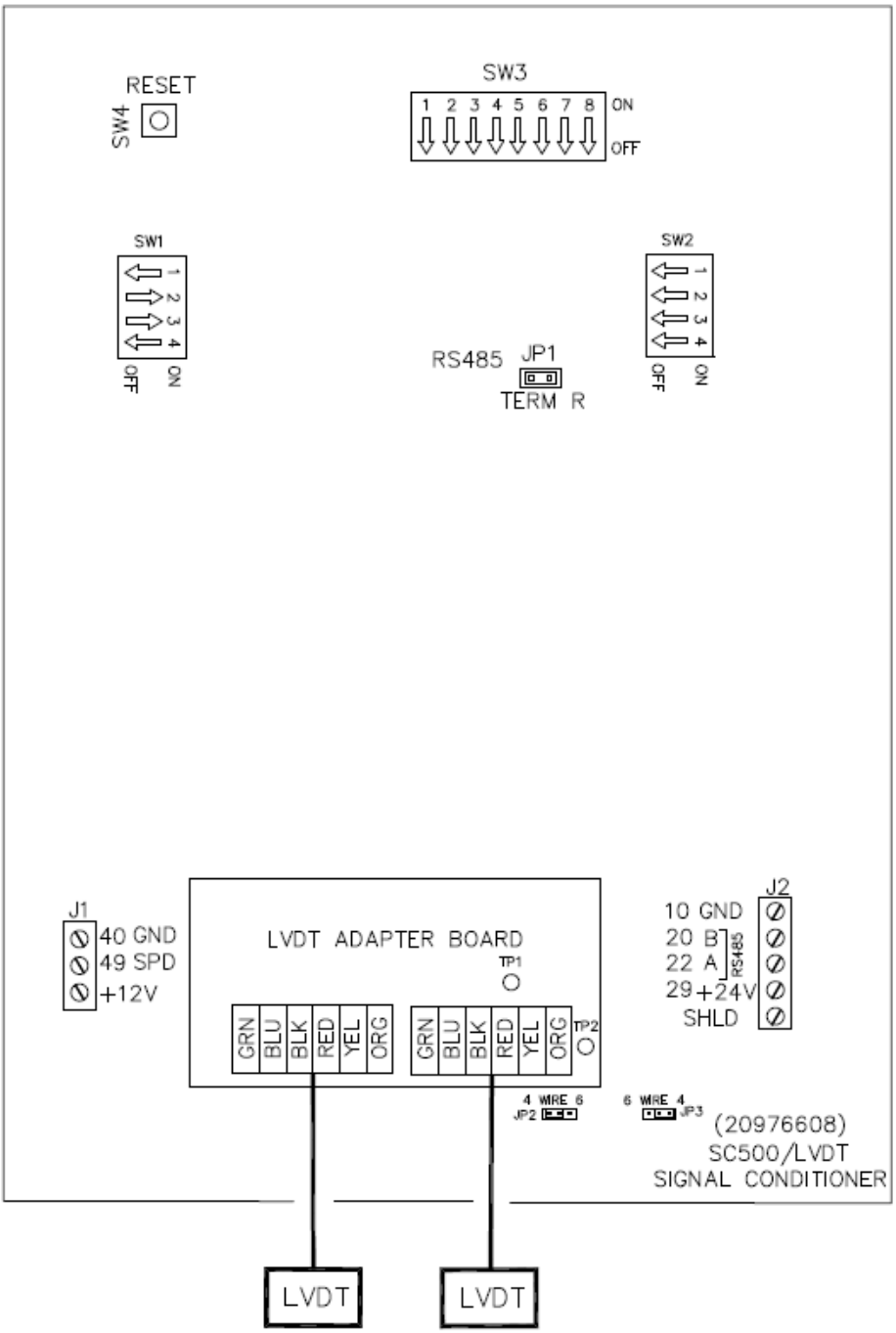
# 4.07 WP25 / Scale Card Mode (SCM)



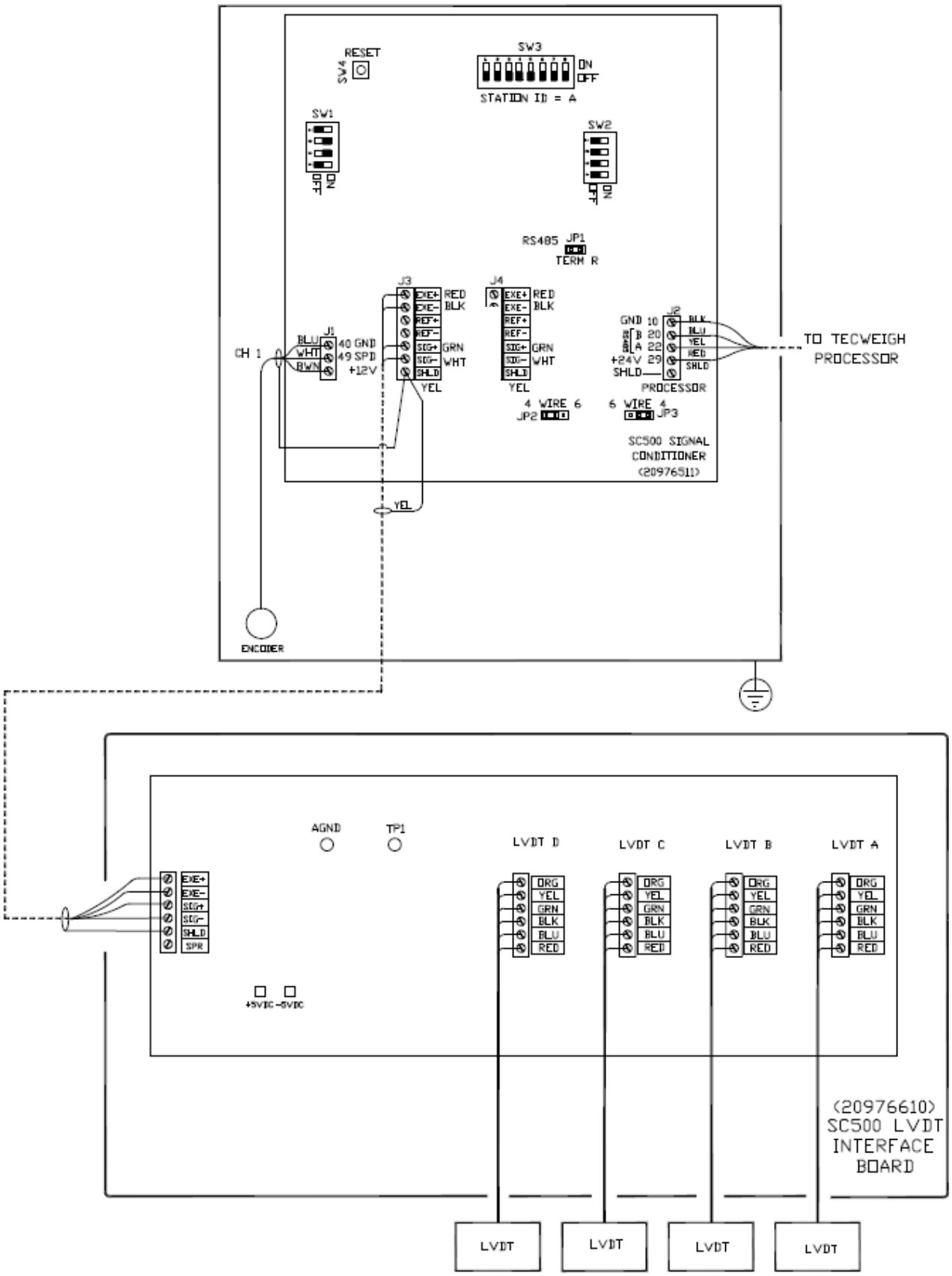
## 4.08 SC500 Use on WY10 Scale Carriage

The WY10 scale carriage is able interface to the SC500 scale card with either an adapter card installed on the SC500 or a LVDT interface board inside the scale carriage. This allows replacement of the obsolete SC400 signal conditioning board with the more modern SC500 signal conditioning board. A retrofit kit is available from Tecweigh to adapt the WY10 to the SC500 scale board.

LVDT Adapter board Mounted on SC500



SC500 LVDT Interface Board (PN20976610)



The following steps need to be completed when replacing a SC400 scale card and retrofitting a LVDT interface board (20976610) into a WY series scale to allow the use of the standard SC500 (20976511) signal conditioner scale card:

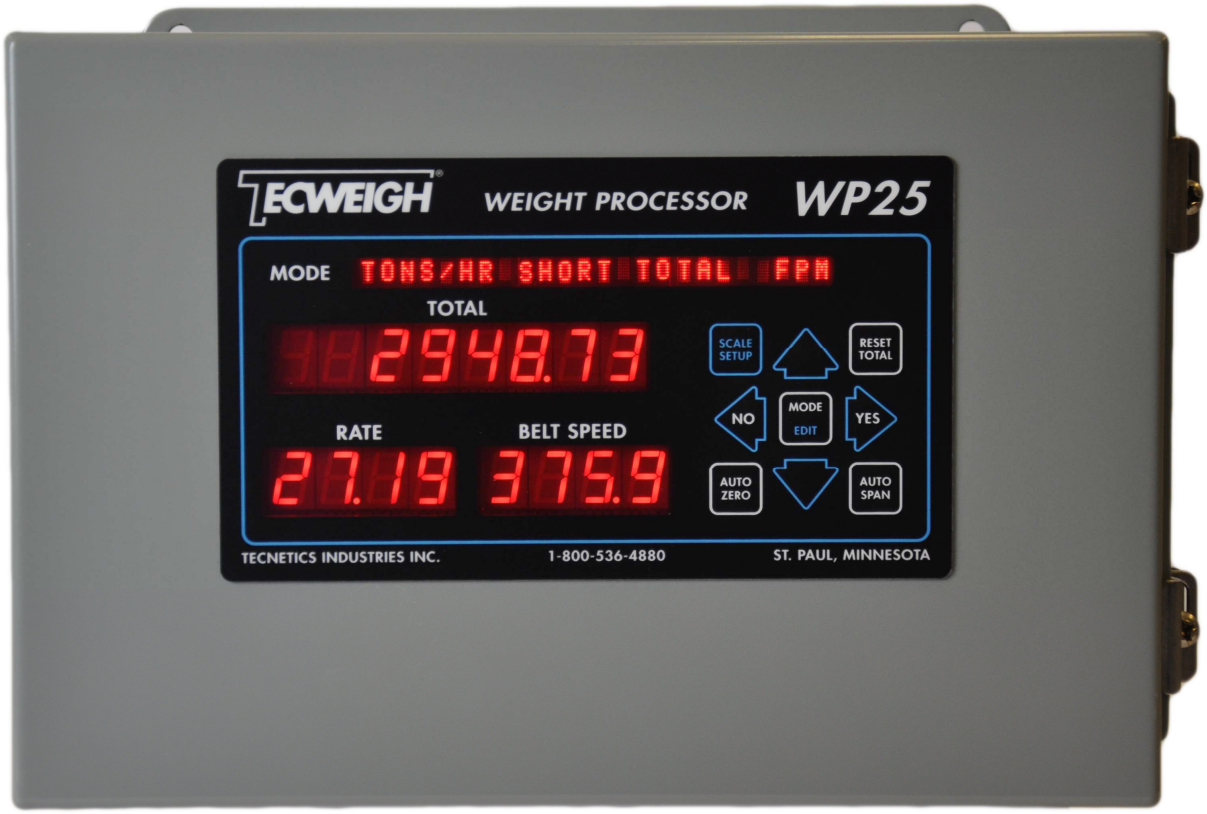
- The speed sensor and data cable from the weigh processor are removed from the SC400 and placed on the same numbered terminals on the SC500.
- The SC400 board is replaced by the LVDT Interface board.
- The no longer used speed sensor cord grip on the WY10 carriage is replaced with a metal pipe plug to maintain weather integrity.
- The LVDT interface board is wired to a SC500 board load cell connector as shown. A replacement cord grip for the WY10 scale carriage is provided for the new cable if needed. 10 feet of the red cable that connected the SC500 interface board in the WY10 carriage to the SC500 in the junction box are supplied to allow the SC500 junction box enclosure to be mounted in a convenient location near the scale carriage.
- The LVDTs are transferred from the SC400 to the new interface board observing the color code shown on the LVDT Interface board.
- The SC500 does not work in the negative direction as the SC400 does, so the LVDTs alignment must be checked to insure a slight positive bias. To align an LVDT, unplug all the LVDT blue connectors except the one for the LVDT to be aligned. Carefully adjust the LVDT in its clamp until between TP1 and AGND you have 1 mvDC (1 millivolt DC) ±.1 mvDC; and retighten the clamp. The meter must be polarity correct (TP1) positive, (AGND) negative. Repeat this process for all LVDTs with only the LVDT to be checked/aligned plugged in. When all LVDTs have been checked, plug them all back into the interface board.
- Recalibrate the scale in the normal sequence of belt speed verification, AUTO ZERO, AUTO SPAN and if available material test validation.

# CHAPTER 5 – USER INTERFACE

## 5.01 Display

At this point, the scale should be installed and the WP25 Weight Processor mounted and wired. Power up the unit. The display windows should light up with information. Since the unit has not been set up yet, disregard any error messages or incorrect values on the display.

The image below shows the WP25 user interface front panel. There are four windows that display information along with several buttons. The next section of the manual goes through setup in detail. For now, feel free to press the buttons and familiarize yourself with the interface.




LED Display Windows

The WP25 has four display windows: three are 7-segment digit displays and one 24 character 5x7 dot matrix alpha numeric display.

The following defines the various displays in the windows shown in the previous figure:

RATE - Displays the RATE at which material is passing over the scale.

TOTAL - Displays the TOTAL weight of material that has passed over the focus scale since the last time the TOTAL was reset to zero. Both Short and Long Totals are visible.

BELT SPEED - Displays the BELT SPEED of the conveyor belt.

MODE - There are three different run/setup configurations the mode window utilizes. In each configuration the mode field only certain functions are available and only certain information is displayed as described below.

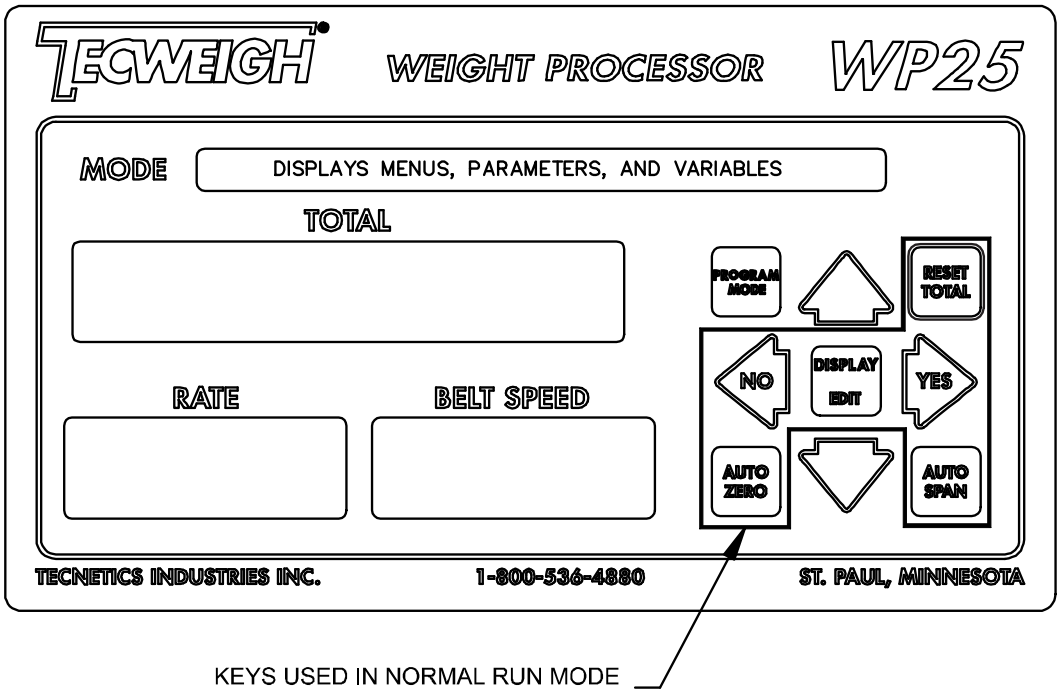
1) Normal Run – Mode field displays the Date/Time, Units of measure, Short Total (ST), Long Total (LT), Scale Weight, Scale Loading, and Scale error/status messages. Pushing the Mode/Edit (center button), when in normal Run configuration will sequential scroll through these Mode Window displays. When FEED CONTROL is enabled, Set point, Control Output (CO) and Feed Control Mode are also available on the sequential scroll.

2) Parameter Edit – once the parameter has been selected, followed by the EDIT key, the parameter setting or value can be edited with the arrows. Depress EDIT a second time to accept the change and go back to the parameter.

3) Simulation – when simulation is set to ON (Input/Output parameter 6.04.01) a user determined RATE (6.04.02) and SPEED (6.04.03) are displayed which can be used to simulate normal operation. These values can be edited to calibrate the outputs to peripheral devices. Simulation is automatically disabled when the parameter setup is exited.

## 5.02 Button Definitions

Displays Interface, Normal Run Mode



## *Normal Run*

After initial power up, the WP25 will display a Self Test Passed message in the mode window for a short time. After this the information displayed in the mode window can be sequentially displayed by pressing and releasing the center DISPLAY button.

In run configuration, the WHITE key labels are used to change the display, calibrate the scale, reset totals, etc.

**DISPLAY key**

Each time the DISPLAY key is depressed, the mode display will scroll through the basic operating displays of: Short TOTAL, Long TOTAL, belt Loading, Scale Weight, Date/Time and Feed Control operational info. Using the example above the screens would advance every time the DISPLAY key is depressed and then cycle back to the first.

- TONS/HR SHORT TOTAL
- TONS/HR LONG TOTAL
- Loading lbs/ft ##.##
- Scale Weight Lbs ##.##
- Year/Month/Date/Time (in format selected)
- Setpoint/Control Output/PID mode (if feed control is enabled)
- Error messages, if any present.

**YES and NO keys**

The YES and NO keys are to respond to prompts in the MODE window. See RESET TOTAL, AUTO ZERO and AUTO SPAN. If there is no prompt for a YES or NO answer in the MODE window they are functional. Pressing the YES and NO keys simultaneously will display the version of firmware installed in the processor.

**RESET TOTAL key**

To reset the TOTAL, long or short, this key is depressed momentarily, a message will display in the MODE window asking for confirmation YES or NO. When the YES key is depressed the total will be reset.

If the MODE window shows that the SHORT TOTAL is being displayed in the TOTAL window the message will say:

“RESET SHORT TOTAL? YES/NO”

If the YES key is depressed only the Short TOTAL is reset to zero and the Long TOTAL does not change. If the NO key is depressed the MODE window goes back to the message it was displaying when the RESET TOTAL key was depressed.

If the MODE window shows that the Long TOTAL is being displayed in the TOTAL window the message will say:

“RESET LONG TOTAL? YES/NO”

If the YES key is depressed both the Long and the Short TOTAL are reset to zero, and the Long TOTAL is added to the odometer value. If the NO key is depressed the MODE window goes back to the message it was displaying when the RESET TOTAL key was depressed.

**AUTO ZERO key**

To calibrate the ZERO or "tare" the scale, this key is depressed momentarily, a message will display in the MODE window asking for confirmation YES or NO.

"AUTO ZERO SCALE? YES/NO"

If the YES key is depressed the AUTO ZERO routine starts. If the NO key is depressed the MODE window will go back to the message it was displaying when the AUTO ZERO key was depressed.

After zero calibration is complete, a message will display showing the percent of calibration change from the previous calibration as well as prompting the user to accept the new value by selecting YES or NO.

**AUTO SPAN key**

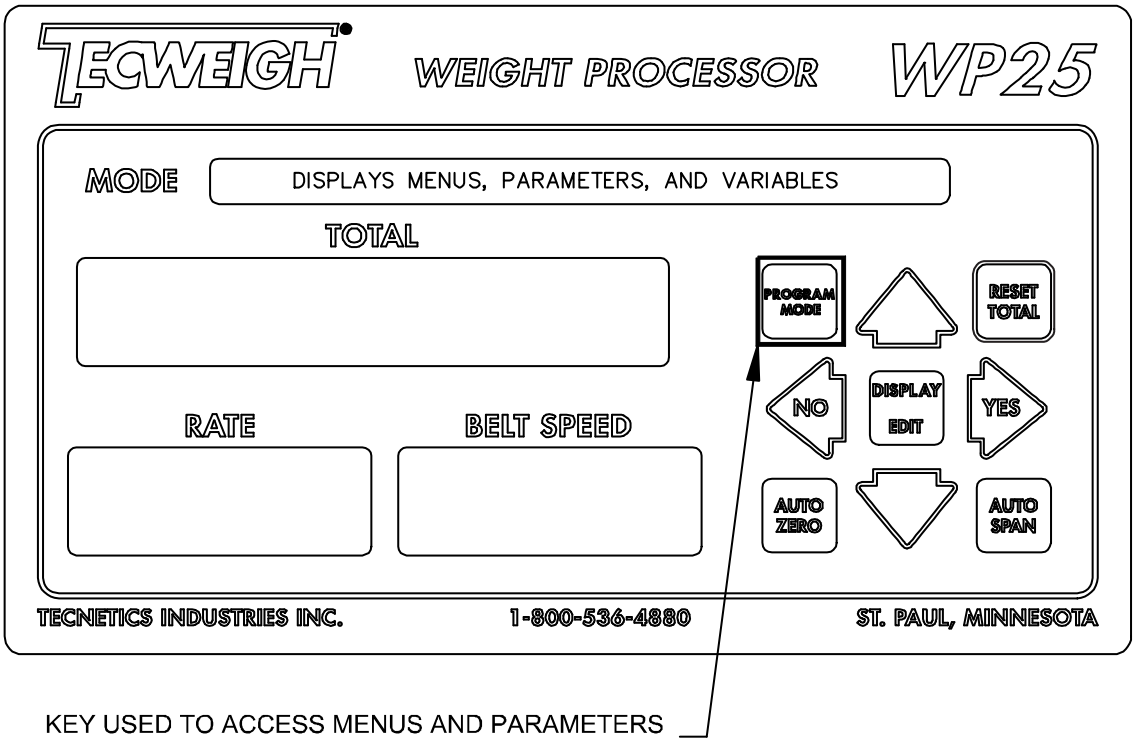
To calibrate the SPAN of the scale, this key is depressed momentarily, a message will display in the MODE window asking for confirmation YES or NO.

"AUTO SPAN SCALE? YES/NO"

If the YES key is depressed the AUTO SPAN routine will start. If the NO key is depressed the MODE window will go back to the message it was displaying when the AUTO SPAN key was depressed.

After span calibration is complete, a message will display showing the percent of calibration change from the previous calibration as well as prompting the user to accept the new value by selecting YES or NO.

Display Interface, Scale Setup / Parameter Entry




## Parameter Edit Mode

The Program Mode key enters and exits the Parameter Edit Mode. This mode includes menu navigation, parameter navigation, and parameter editing. While in Normal Run Mode the PROGRAM MODE key can be depressed to access Menus and Parameters. Once in the Parameter Edit Mode, whether navigating through parameters or in the middle of editing a parameter, if the PROGRAM MODE key is depressed again the WP25 goes back into Normal Run Mode, saving whatever changes were made to the parameters. The PROGRAM MODE key is not functional when there is a prompt in the mode window to respond with a YES or NO key press.

**Navigating Menus and Parameters**

The parameter table in the WP25 is two tiered. When PROGRAM MODE is depressed you have entered a top level of descriptive menus. Each menu has its own parameters. As shown in the MODE window the Menus are:

Main Menu ⬍⟹

Calibration Menu ⬍⟹

Display Setup Menu ⬍⟹

Input/Output Menu ⬍⟹

Feed Control Menu ⬍⟹

RS485 Serial Menu ⬍⟹

Security Menu ⬍⟹

Clock/Printer Menu ⬍⟹

USB/Logging Menu ⬍⟹

Maintenance Menu ⬍⟹

The Up and Down arrows and Right arrow indicate the keys available for navigation.

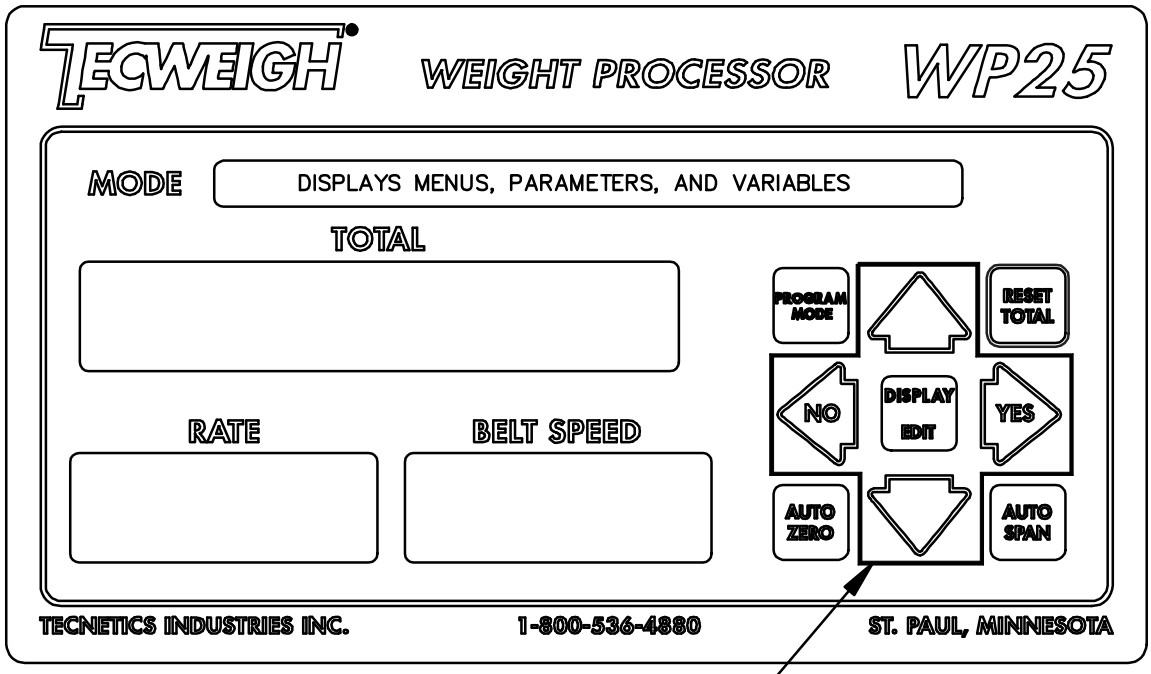
**Navigating - Up and Down Arrow keys**

Using the Up and Down arrows navigates through the list of Menus or Parameters.

**Navigating - Left and Right Arrow keys**

Using the Left and Right arrows jumps from Menus to Parameters. The Right arrow key enters that Menu's list of Parameters. The Left arrow key brings you from a Parameter back to the Menu list.

Display Interface, Parameter Navigating and Editing




When the Right arrow key is depressed, that Menu's parameters are shown in the MODE window and may look like this:

If you were on this Menu "Main Menu⇕⟹" and depressed the Right arrow key you would enter the first parameter…

Units: ⟸⇕ TONS/HR

At this point you are still navigating, so the indicator arrows show that you can depress the Left arrow key and go back to the Main Menu, or you can use the Up and Down arrow keys to scroll through the parameters within the Main Menu.

**Editing Parameters**

Once the parameter has been selected, followed by the EDIT key, the parameter setting or value can be edited with the arrows. The EDIT key is used to both start and finish editing. When on this Parameter "Units:⟸⇕ TONS/HR" and you press the EDIT key, only the UP and DOWN arrows are displayed. The Parameter will start blinking, indicating it is ready to be edited. It would look like this "Units: ⇕ TONS/HR" with TONS/HR blinking. Now the UP and DOWN arrows are used to scroll through the different "Units" that are available.

When desired "Units" have been selected, press the EDIT key again to accept the change and go back to the parameter.

To edit a numerical Parameter, or a descriptive Parameter, for instance the calibration weight, each character or digit will blink and the UP and DOWN arrows will change the selection. To move from one digit to the next, the RIGHT and LEFT arrows are used.

"Cal Wt: 0120.00"

When you have made the necessary changes, press the EDIT key again to accept the change and go back to the parameter.

# CHAPTER 6 – PARAMETERS

See Parameter Edit Mode in Section 5.02, Button Definitions, for instruction on navigating the parameters.

This section describes of all the available Parameters referred to in this manual.

If this manual was used for check out of Tecweigh supplied equipment, the Parameter Table in Section 11.02 also contains a record of all the Parameter values that were entered at the factory for this particular application. However, the factory values should not be relied on entirely. All specific Parameter values that are determined on site and used in the application should be written down in the Parameter Table for future reference.

It is highly recommended that the scale be properly calibrated before enabling the optional outputs.

## 6.01 Main Menu

***6.01.01) Units (TONS/HR)*** Selects the desired units of measure for the RATE display. The TOTAL display will use the weight portion of the RATE units selected [pounds (KG) or tons (tonnes)]. If Imperial units are selected, all setup must be done using Imperial units, similarly for metric units. Once set up, however, the RATE units can be changed at any time and the Cal Wt (or Cal Chain), Weigh Span, and Belt Length, units will be converted automatically. It is not recommended this be done frequently, however, because the rounding error will increase every time a conversion is calculated.

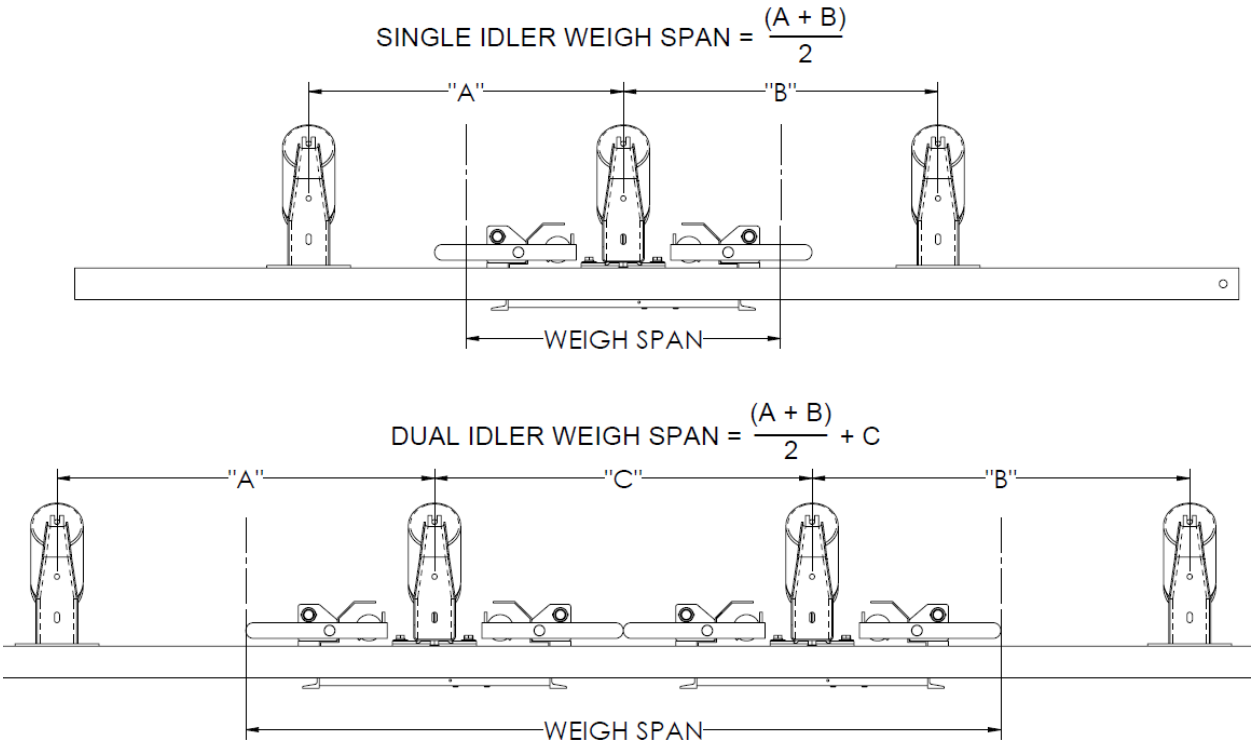
| Imperial Units | | Metric Units | |
|---|---|---|---|
| TONS/HR | tons per hour | TONNES/HR | tonnes per hour |
| TONS/MIN | tons per minute | TONNES/MIN | tonnes per minute |
| PPH x 1000 | pounds per hour x 1000 | KG/HR | kilograms per hour |
| LBS/HR | pounds per hour | KG/MIN | kilograms per minute |
| LBS/MIN | pounds per minute | | |

***6.01.02)*** ***Cal Factor*** The Calibration Factor varies with the physical differences between scale types, use static calibration weights or calibration chain; and accounts for the physical difference in the location of the actual material sensed weigh, to the static sensed calibration weight(s). Select the appropriate value for the scale model and calibration method.

| Scale Model | Imperial Cal Factor | Metric Cal Factor |
|---|---|---|
| Cal Chain – All Models | .03 | .06 |
| WF10 – *SW* | .27 | .045 |
| WF18 – *SW* | .36 | .06 |
| WY10 STD – *SW* | .27 | .045 |
| WY15, HY15, WY25, HY25 – *SW* | .36 | .06 |
| WY20, WY10HD - *SW* | .54 | .09 |
| WY10SHD - *SW* | .70 | .1166 |

*SW* = Static Weight(s)

***6.01.03)*** ***Wgh Span*** The Weigh Span is the length of the belt sensed by the scale. The weigh span equals the distance from the idler before the scale to the idler after divided by two. The units are in inches if using English or in meters if using metric.




***6.01.04)*** ***Belt Len*** Enter the exact length of the **conveyor belt** in feet if using English or in meters if using metric. Important, do not enter the **conveyor length**! Enter the entire belt length as if it was cut and stretched out flat on a surface.

***6.01.05) Dead Band (0.0)*** This parameter is a dead band greater than zero running rate where the rate will be ignored and no increase will be added to the totalizers. It is used to ignore changes in an empty belt weight (Commonly due to imperfections, repairs, splices or damage to the belt), or small trickles of material that do not want to be added to the total.

***6.01.06) Odometer (000000000)*** This non-editable, unit-less, parameter is an indicator of the life of the equipment on which it is installed. Every time the Long Total is reset, that amount is added to the Odometer value. This is intended for use where the unit of measure is not expected to change and the user would like to reference the tons, pounds or kilograms of service the equipment has delivered for maintenance purposes.

## 6.02 Calibration Menu

***6.02.01) P/P WP Tot ("short total")*** The pre/post weight will be used for a material test calibration. This parameter will be the current short total as the parameter table is entered. This total will be compared to the next parameter's value, P/P Actual to calculate the adjustment required. The P/P WP Tot can be over written manually if the short total continued to increment or was reset after a material test was loaded but before the actual weight could be entered. The WP25 TOTAL (this parameter's value) and the stationary scale weight total (the next parameter's value) will be compared and a tuning adjustment made. This test is discussed more in Chapter 7, Calibration.

***6.02.02) P/P Actual (0.0)*** The pre/post weight is used for a material test. Let it remain equal to zero if this is a first time setup. Material is loaded into a truck, and then weighed on a stationary reference scale. The reference scale weight will then be entered in the P/P Actual parameter. The WP25 TOTAL and the reference scale total will be compared and a tuning adjustment made. This test is discussed more in Chapter 7, Calibration.

***6.02.03) Method (Cal Weight)*** The options for calibration method are Cal Weight, Cal Chain and Electronic.

| | |
|---|---|
| Cal Weight | This method takes into account the Cal Factor and Cal Wt parameters and a spanning process that requires calibration weights. |
| Cal Chain | This method takes into account a Cal Factor of .03 (.06 if metric UofM) and Cal Chn parameters and a spanning process that requires a calibration chain be loaded on top of the belt through the entire weighing area of the scale. This is considered the most accurate method of initial calibration. |
| Electronic | This method only applies to load cell scales that have a .36 (.06 if metric UofM) Cal Factor. It will also apply LC Cap, LC Mv/v and Angle parameters to mathematically calculate a span value without the need of calibration weights. |

***6.02.04) Cal Wt (150.0)*** Enter the exact value of the calibration weight. This value is stamped on the end of the calibration weight (in pounds) if you are using one from the factory. Enter the value in pounds when using English units or kilograms when using metric (KG = 0.453 X LBS).

***6.02.05) Cal Chn (0.0)*** Enter the weight per length of the calibration chain if one is being used in place of a calibration weight. To determine this value, weigh the chain (in pounds or kilograms) and measure its length (in feet or meters). Be sure to use only English or Metric units. Then divide the weight by the length (weight/length) and enter the resultant value. If English, the value is in Lbs/Ft, if Metric it is Kg/M.

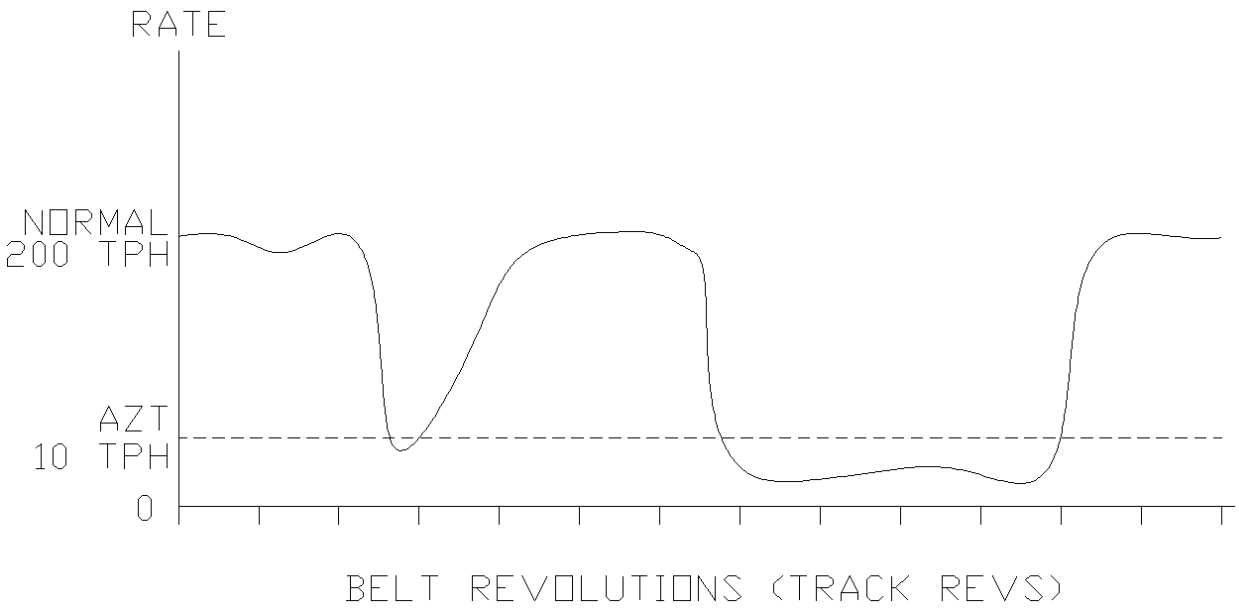
***6.02.06) LC Cap (330.0)*** Used for electronic calibration, enter the accumulated rated total capacity of all load cells connected to the WP25. Enter in Lbs for English or Kg for Metric.

***6.02.07) LC Mv/v (2.0)*** Required for electronic calibration. Enter the sensitivity of the load cells. If more than one load cell is connected, enter the average of all calibrated sensitivity ratings. Units are in mv/V of excitation voltage.

***6.02.08) Angle (0.0)*** Used during electronic calibration. Knowing the incline or decline angle will apply a correction factor when electronic calibration is done, resulting in a more accurate initial weighment.

***6.02.09) AZT +/- (0.0)*** Auto Zero Tracking or AZT compensates for material build-up or other conditions that cause the RATE to diverge from zero even when the belt is empty. The AZT value is a RATE. When the actual RATE falls below the AZT RATE, the WP25 performs an Auto Zero calibration when the RATE falls below the AZT RATE. Set AZT to zero to disable it, or set AZT to about 5% of the normal running RATE to enable the feature. If the running RATE is typically low, it is recommended that the AZT be left disabled (=0). **To avoid complications, leave AZT set to zero when first setting up the system. If using AZT, both AZT and Trck Revs must be greater than zero.**

***6.02.10) Trck Revs (0.0)*** Track revs is directly related to AZT. If Track Revs = 0, and AZT is enabled, the displayed RATE will be forced to zero when the actual RATE falls below AZT (option one). If Track Revs is not zero, the WP25 will show a RATE of zero <u>and</u> do an Auto Zero calibration if the RATE falls below AZT for longer than the number of belt revolutions in Track Revs (option two). Refer to the following graph. Assume the normal running rate is 200 tons per hour, AZT is set to 10 tons per hour, and Track Revs is set to two belt revolutions. When the RATE falls below AZT for less than two belt revolutions, as indicated by the first dip, the RATE display is forced to zero.




If the RATE falls below AZT for more than two belt revolutions, an Auto Zero is performed and what used to be about five tons per hour is now zero tons per hour. This can happen when material sticks to the belt, effectively making it heavier. To use this feature, enter a value for Track Revs that allows at least 5 minutes of tracking before the Auto Zero begins, to allow time for the conveyor belt to empty completely.

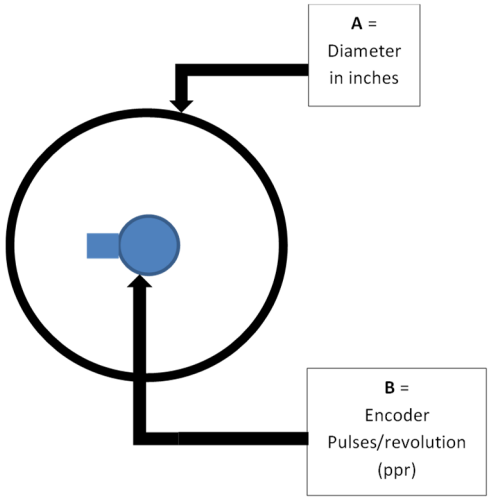
*Note, when AZT is enabled, each time the RATE falls below the AZT Rate, the "zero tracking" message appears in the MODE display as a notice only. Pressing any key will remove the message, or it will disappear automatically when the RATE again rises above the AZT value.*

***6.02.11) Zero Revs (2.0)*** When AUTO ZERO is pressed, the WP25 will zero the scale. For this Parameter enter the number of belt revolutions to be used for an Auto Zero cycle. In general, the more time (more belt revolutions) allowed for an Auto Zero cycle, the more accurate it will be. While the Auto Zero cycle is being performed, the WP25 spends time "learning" about the belt splices and other inconsistencies in the system. A zero-load test (AUTO ZERO) must be performed over a period of at least 3 minutes and with a whole number of complete belt revolutions. AUTO ZERO is discussed further in the Calibration Section 7.05.

***6.02.12) Span Revs (2.0)*** When AUTO SPAN is pressed, the WP25 will re-span the scale using the calibration weight(s) or a calibration chain. Enter the number of belt revolutions to be used for an Auto Span cycle. In general, the more time (more belt revolutions) allowed for an Auto Span cycle, the more accurate it will be. A simulated load test (AUTO SPAN) must be performed over a period of at least 3 minutes and with a whole number of complete belt revolutions. Auto Span is discussed further in section 7.06.

***6.02.13) Speed Spn (1.88 for SS12, 0.47 for SS13)*** Speed Spn is used to calibrate the belt SPEED if the WP25 displayed SPEED does not equal the actual belt SPEED. Increase Speed Spn to increase the SPEED value or decrease it to decrease the SPEED value.

Speed Span Calculation




SPEED SPAN PARAMETER can be computed by:

$$\frac{5 \times A \times \pi}{B} = \textbf{Speed Span}$$

A = The diameter of the speed wheel or pulley in inches. Note: if a pulley is used, the belt thickness must also be included in the diameter.

B = The pulses per revolution of the speed encoder or generator.

SPEED SPAN set to 1.000 will display the frequency in Hertz from the encoder.

***6.02.14) Speed Count (0)*** This display only, unit-less parameter shows the raw speed counts used in an integration cycle by the WP25. This is a good tool to evaluate the speed sensor input. Typically used by a technician.

***6.02.15) Rate K Fctr (1.0)*** *This parameter was previously called ASC in the Tecweigh 20 processor*. After the WP25 calculates the RATE, it multiplies that number by the Rate K factor before displaying it in the RATE window. In an ideal setup, the Rate K Fctr would remain 1.000 which means that no correction is being made to the RATE. However, every system requires some tuning. After calibrating the scale (discussed in Chapter 7) the value can be increased or decreased manually to fine tune the displayed RATE, or you can do a material test (Section 7.08) and the proper value will be computed automatically. For example, if the tested material weight ends up being 1.06 times the WP25 total, the value will be changed to 1.06 times the previous Rate K Fctr value. From that point on, the WP25 will calculate the RATE and then multiply it by the new value before displaying it.

***6.02.16) Span Detect (100000)*** During an AUTO SPAN, the processor waits for a change in the load cell signal before initiating the procedure. This Parameter represents that change in load cell signal that is a requirement to start the Auto Span procedure. The factory setting should be adequate unless a calibration weight change is made in the field. As a reference, this Parameter entry should be approximately 75% of the total change in Load Counts between the calibration weights being up and down for a 2 cal weight scale and 90% of the change for a 4 cal weight scale, to ensure all cal weights are lowered before starting to span.

***6.02.17) Load Count ("Actual Counts")*** For technical trouble shooting purposes, the WP25 can display raw counts from the load cells. The counts with the calibration weight up should be low, and the counts with the calibration weight down should be high. The raw counts with the calibration weight lifted, compared to the Zero Counts, indicates if the scale is functional. The low/high range varies from system to system, but it should be consistent from day to day for the same system. This value is mainly used when consulting with the **Tecweigh** Service Department (Section 2.01).

***6.02.18) Zero Count (500000)*** This Parameter is only editable when **?Maintenance** is enabled (**See 6.10**). For technical trouble shooting purposes, this Parameter displays the Load Counts that the processor is using as a zero reference. This viewable Parameter is calculated during the Auto Zero procedure. It is mainly used when consulting with the **Tecweigh** Service Department (Section 2.01).

***6.02.19) Span Count (1500000)*** This Parameter is only editable when **?Maintenance** is enabled (**See 6.10**). For technical trouble shooting purposes, this Parameter displays the Load Counts that the processor is using as a span reference. This viewable Parameter is calculated during the Auto Span procedure. This value is mainly used when consulting with the **Tecweigh** Service Department (Section 2.01).

***6.02.20) Offset Count 1000000)*** This Parameter is not editable. This Parameter displays the difference in counts from Zero Counts to Span Counts. This viewable Parameter is calculated during the Auto Span procedure. This value is mainly used when consulting with the **Tecweigh** Service Department (Section 2.01), for monitoring calibration stability over time.

***6.02.21) Down Count (NO)*** Selecting YES for this parameter will change the total accumulation to allow negative running rates to decrement from the total. In rare cases with very long belts, and belts with greatly varying empty loading that would require a large dead band, turning this option on can result in a better zero and total over time.

## 6.03 Display Setup Menu

***NOTE*****:** *All DP (decimal point) settings greater that "0" will automatically change as a value becomes larger than what can be displayed to the left of the decimal point. For instance, if you normally run under 100 TPH and Rate DP is set to 2 your total might read 85.24. But if the rate should go over 99.99 the decimal point will shift to the right so a rate of 120.5 will be displayed. The decimal point will continue to move to the right until the display show whole numbers before It will show the 9--- as an overrun of the display's capabilities.*

***6.03.01) Rate DP (0)*** Enter the desired decimal point position for the RATE window. Set to Ones when the maximum RATE will be greater than 100, set to Tens when the maximum RATE will be less than 100, and set to Hunds when the maximum operating RATE will be less than 10. The decimal point positioning for various positions will appear as:

| | |
|---|---|
| 0 | 0000 |
| 1 | 000.0 |
| 2 | 00.00 |

If the RATE exceeds what will fit in the display, a series of dashes will appear in the RATE window and looks like 9--- .

***6.03.02) Rate Damp (15)*** Enter the damping factor for the RATE display. Damping makes the RATE display more stable so the numbers do not change faster than they can be read. The higher the Damping Factor the more stable the reading. RATE damping does not affect the TOTAL or the accuracy of the system. Note that the higher the damping, the slower the RATE display will update after changes occur in the actual RATE. A typical value for Rate Damp is 30. Set to zero to turn off damping.

***6.03.03) Speed DP (0)*** Enter the decimal point position for the belt SPEED display. Set to Ones when the maximum belt SPEED will be greater than 100, set to Tens when the maximum belt SPEED will be less than 100, and set to Hunds when the maximum belt SPEED will be less than 10. The decimal point positioning for various positions will appear as:

| | |
|---|---|
| 0 | 0000 |
| 1 | 00.0 |
| 2 | 0.00 |

If the SPEED exceeds what fits in the display, a series of dashes will appear in the SPEED window and looks like 9---.

***6.03.04) Speed Damp (15)*** Enter the Damping Factor for the belt SPEED display. Damping makes the SPEED display more stable so the numbers do not change faster than they can be read. The higher the Damping Factor the more stable the reading. SPEED damping does not affect the RATE, TOTAL, or the accuracy of the system. Note that the higher the damping, the slower the SPEED display will update after changes occur in the actual SPEED. A typical value for Rate Damp is 30. Set to zero to turn off damping.

***6.03.05) Total DP (0)*** Enter the desired decimal point position for the TOTAL window. Higher RATES make decimal positioning unnecessary, because the TOTAL will increment at one or more units at a time. The decimal point positioning for various positions will appear as:

| | |
|---|---|
| 0 | 00000000 |
| 1 | 000000.0 |
| 2 | 00000.00 |
| 3 | 0000.000 |

If the TOTAL exceeds the display size, a series of dashes will appear in the TOTAL window and will look like 9------- .

## 6.04 Input Output Menu

***6.04.01) Simulation (OFF)*** When in Simulation mode, the WP25 produces an artificial RATE, SPEED, and TOTAL. These values can be very useful when calibrating auxiliary equipment such as a chart recorder or a remote display. Note that the scale does **not** need to be connected for the Simulation to work. The selections are Simulation OFF or ON.

When ON, the Simulated values are:

RATE = the value entered in the Sim Rate Parameter
SPEED = the value entered in the Sim Speed Parameter

When Simulation is set to ON, the pre-existing TOTAL value (display) is stored in memory and recalled and re-displayed when Simulation is set to Off.

***6.04.02) Sim Rate (100.0)*** Sets the simulated RATE used when the Simulation Parameter is set to ON.

***6.04.03) Sim Speed (100.0)*** Sets the simulated BELT SPEED used when the Simulation Parameter is set to ON.

***6.04.04) A1 Function (UNUSED)*** Analog output 1 can perform five different functions. Select the function desired.

UNUSED – Analog output 1 is not active and ***6.04.5*** thru ***6.04.9*** are not visible
RATE - This analog output will be scaled to represent the Rate.
SPEED - This analog output will be scaled to represent the Belt Speed.
LOAD - This analog output will be scaled to represent the Belt Load.
WEIGHT - This analog output will be scaled to represent the total Load.
CONTROL - This analog output will be scaled to represent a Control Output (CO) for the feed control PID loop

***6.04.05) A1 Damp (15)*** Enter the damping factor for the current loop output if used. The damping factor smoothes the current signal. Like RATE and SPEED damping, current loop damping does not affect system accuracy.

***6.04.06) A1 Base mA (4.0)*** Enter the current loop output value desired when the value it represents equals zero. The default value is 4.0 mA.

***6.04.07) A1 Base Trim (1.0)*** This Parameter allows fine tuning of the Base mA output Parameter. A milliamp range ammeter will need to be connected to the output terminals for this adjustment. Increase the number to increase the current and decrease the number to decrease the current.

***6.04.08 A1 Peak Trim (1.0)*** This Parameter allows fine tuning of the Value @ 20mA Parameter. A milliamp range ammeter will need to be connected to the output terminals for this adjustment. Increase the number to increase the current and decrease the number to decrease the current.

***6.04.09) A1 Range (100.0)*** This Parameter sets the value that corresponds to a current output of 20 mA.

***6.04.10) A2 Function (UNUSED)*** Analog output 2 can perform five different functions. Select the function desired.

UNUSED – Analog output 2 is not active and 6.04.11 thru 6.04.15 are not visible
RATE - This analog output will be scaled to represent the Rate.
SPEED - This analog output will be scaled to represent the Belt Speed.
LOAD - This analog output will be scaled to represent the Belt Load.
WEIGHT - This analog output will be scaled to represent the total Load.
CONTROL - This analog output will be scaled to represent a Control Output (CO) for the feed control PID loop

***6.04.11) A2 mA Damp (15)*** Enter the damping factor for the current loop output if used. The damping factor smoothes the current signal. Like RATE and SPEED damping, current loop damping does not affect system accuracy.

***6.04.12) A2 Base mA (4.0)*** Enter the current loop output value desired when the value it represents equals zero. The default value is 4.0 mA.

***6.04.13) A2 Base Trim (1.0)*** This Parameter allows fine tuning of the Base mA output Parameter. A milliamp range ammeter will need to be connected to the output terminals for this adjustment. Increase the number to increase the current and decrease the number to decrease the current.

***6.04.14) A2 Peak Trim (1.0)*** This Parameter allows fine tuning of the Value @ 20mA Parameter. A milliamp range ammeter will need to be connected to the output terminals for this adjustment. Increase the number to increase the current and decrease the number to decrease the current.

***6.04.15) A2 Range (100.0)*** This Parameter sets the Rate value that corresponds to a current output of 20 mA.

*Note on **AIN** (analog input): The analog input function is reserved for use only as a remote set point input for the PID control loop in the Feed Control Feature. On Rev0 MP600 boards a small modification to the board is required for this feature to function, and when this modification is installed the board is designated a MP600FC with a part number30407603*

***6.04.16) AIN Base mA (4.0)*** Enter the current loop input value desired when the value it represents equals zero. The default value is 4.0 mA.

***6.04.17) AIN Base mA Trim (4.0)*** This Parameter allows fine tuning of the Base mA input Parameter. This can be adjusted so the setpoint sending zero value is equal to zero in the WP20 run screen setpoint value when using remote analog setpoint for the feed control loop.

***6.04.18) AIN Peak Trim (4.0)*** This Parameter allows fine tuning of the Range mA input Parameter. This can be adjusted so the setpoint sending maximum value is equal to the setpoint in the WP20 run screen setpoint value when using remote analog setpoint for the feed control loop.

***6.04.19) AIN Range (100.0)*** This Parameter sets the Rate setpoint value that corresponds to a current input of 20 mA.

***6.04.20) RLY 1 Func (Unused)*** Relay 1 can be configured for one of several different functions. Select the function desired.

UNUSED – This output is not active and no set up parameters for it are visible.

| | |
|---|---|
| TPRL | - Long Total Pulse Repeater, relay 1 is activated in increments of the LONG TOTAL. |
| TPRS | - Short Total Pulse Repeater, relay 1 is activated in increments of the SHORT TOTAL. |
| HLRA | - High/Low Rate Alarm, relay 1 is activated when the RATE is outside a specified range. |
| %HLRA | - %High/Low Rate Alarm, (feed control mode only) relay 1 is activated when the RATE is outside a specified range from the feed control set point. |
| HLSA | - High/Low Speed Alarm, relay 1 is activated when the SPEED is outside a specified range. |
| SPAN | - Auto Span output, relay 1 is activated during an Auto Span to lower or raise the calibration weight(s). |
| HSTA | - High Short Total Alarm, relay 1 is active when the short total exceeds this setting. |
| HLTA | - High Long Total Alarm, relay 1 is active when the short total exceeds this setting. |
| AZT | - Used to energize a relay if the AZT function exceeds the AZT Limit. |
| RUN ENABLE | - Run Enable output active when FEED CONTROL mode AUTO or OVERRIDE is selected. |

*Note: the following relay Parameters only appear when it's above associated relay function is selected.*

TPRL and TPRS use RLY 1 Pls and RLY 1 TS Parameters.

HLRA, %HLRA and HLSA use RLY 1 Low, High, and Delay Parameters.

SPAN does not use any other Parameters.

HSTA and HLTA use RLY 1 Total Parameter.

AZT uses RLY1 AZT %FS Parameter.

***6.04.21) RLY 1 Lgc (N.O.)*** The relay's "normal" state can either be de-energized (N.O.) or energized (N.C.) state.

N.O. – Normally open or de-energized state.

N.C. – Normally closed or energized state.

***6.04.22) RLY 1 Pls (1.0)*** When TPRS or TPRL is selected, enter the duration of the relay pulse, in seconds, that drives the remote totalizer. The relay must be closed for at least 0.10 seconds, but the option exists for keeping it closed longer, as long as that does not conflict with the following RLY 1 TS Parameter (the relay cannot be closed longer than the time between pulses, because that would be the equivalent of a continuous on). Start with 0.20 seconds and increase the value if the remote device does not respond to the shorter pulse.

***6.04.23) RLY 1 TS (0.0)*** When TPRS or TPRL is selected, enter the frequency of the relay pulse or the "total scaling". For example, set RLY 1 TS to 1.00 to close the relay every 1 ton. Set to .01 to close the relay every .01 tons. If RLY 1 TS is set too small and the RATE is too high, there will not be enough time to open and close the relay. It is best to set it so the relay closes once every few seconds.

***6.04.24) RLY 1 Low (10.0)*** When HLRA is selected, enter the lowest RATE allowed before the low RATE alarm relay is activated. When HLSA is selected, enter the lowest SPEED allowed before the low SPEED alarm relay is activated.

***6.04.25) RLY 1 High (1000.0)*** When HLRA is selected, enter the highest RATE allowed before the high RATE alarm relay is activated. When HLSA is selected, enter the highest SPEED allowed before the high SPEED alarm relay is activated.

***6.04.26) RLY 1 Delay (10)*** When HLRA or HLSA are selected, enter the time delay, in seconds, that a high or low RATE or SPEED alarm condition can exist before the alarm relay activates. For example, setting the delay to 10 seconds will allow the rate to fall below RLY 1 Low for 10 seconds before the alarm is activated. The delay eliminates false or nuisance alarms when the RATE or SPEED momentarily go outside the preset boundaries.

***6.04.27) RLY 1 Total (0.0)*** When HSTA or HLTA is selected, enter the TOTAL at which the relay is activated. Once the related total is reset and it drops below this value the relay will de-energize.

***6.04.28) RLY 1 AZT %FS (5.0)*** When AZT is selected, enter the % of full scale at which the relay is activated. This will occur when an AZT Auto Zero routine is initiated and the results shift the zero reference point greater than this value.

***6.04.29) RLY 2 Func (Unused)*** Relay 2 can be configured for one of several different functions. Select the function desired.

UNUSED – This output is not active and no set up parameters for it are visible.

| | |
|---|---|
| TPRL | - Long Total Pulse Repeater, relay 2 is activated in increments of the LONG TOTAL. |
| TPRS | - Short Total Pulse Repeater, relay 2 is activated in increments of the SHORT TOTAL. |
| HLRA | - High/Low Rate Alarm, relay 2 is activated when the RATE is outside a specified range. |
| %HLRA | - %High/Low Rate Alarm, (feed control mode only) relay 2 is activated when the RATE is outside a specified range from the feed control set point. |
| HLSA | - High/Low Speed Alarm, relay 2 is activated when the SPEED is outside a specified range. |
| SPAN | - Auto Span output, relay 2 is activated during an Auto Span to lower or raise the calibration weight(s). |
| HSTA | - High Short Total Alarm, relay 2 is active when the short total exceeds this setting. |
| HLTA | - High Long Total Alarm, relay 2 is active when the short total exceeds this setting. |
| AZT | - Used to energize a relay if the AZT function exceeds the AZT Limit. |
| RUN ENABLE | - Run Enable output active when FEED CONTROL mode AUTO or OVERRIDE is selected. |

*Note: the following six relay Parameters only appear when its above associated relay function is selected.*

TPRL and TPRS use RLY 2 Pls and RLY 2 TS Parameters.

HLRA, %HLRA and HLSA use RLY 2 Low, High, and Delay Parameters.

SPAN does not use any other Parameters.

HSTA and HLTA use RLY 2 Total Parameter.

AZT uses RLY 2 AZT %FS Parameter.

***6.04.30) RLY 2 Lgc (N.O.)*** The relay's "normal" state can either be de-energized (N.O.) or energized (N.C.) state.

N.O. – Normally open or de-energized state.

N.C. – Normally closed or energized state.

***6.04.31) RLY 2 Pls (1.0)*** When TPRS or TPRL is selected, enter the duration of the relay pulse, in seconds, that drives the remote totalizer. The relay must be closed for at least 0.10 seconds, but the option exists for keeping it closed longer, as long as that does not conflict with the following RLY 1 TS Parameter (the relay cannot be closed longer than the time between pulses, because that would be the equivalent of a continuous on). Start with 0.20 seconds and increase the value if the remote device does not respond to the shorter pulse.

***6.04.32) RLY 2 TS (0.0)*** When TPRS or TPRL is selected, enter the frequency of the relay pulse or the "total scaling". For example, set RLY 1 TS to 1.00 to close the relay every 1 ton. Set to .01 to close the relay every .01 tons. If RLY 1 TS is set too small and the RATE is too high, there will not be enough time to open and close the relay. It is best to set it so the relay closes once every few seconds.

***6.04.33) RLY 2 Low (10.0)*** When HLRA is selected, enter the lowest RATE allowed before the low RATE alarm relay is activated. When HLSA is selected, enter the lowest SPEED allowed before the low SPEED alarm relay is activated.

***6.04.34) RLY 2 High (1000.0)*** When HLRA is selected, enter the highest RATE allowed before the high RATE alarm relay is activated. When HLSA is selected, enter the highest SPEED allowed before the high SPEED alarm relay is activated.

***6.04.35) RLY 2 Delay (10)*** When HLRA or HLSA are selected, enter the time delay, in seconds, that a high or low RATE or SPEED alarm condition can exist before the alarm relay activates. For example, setting the delay to 10 seconds will allow the rate to fall below RLY 1 Low for 10 seconds before the alarm is activated. The delay eliminates false or nuisance alarms when the RATE or SPEED momentarily go outside the preset boundaries.

***6.04.36) RLY 2 Total (0.0)*** When HSTA or HLTA is selected, enter the TOTAL at which the relay is activated. Once the related total is reset and it drops below this value the relay will de-energize.

***6.04.37) RLY 2 AZT %FS (5.0)*** When AZT is selected, enter the % of full scale at which the relay is activated. This will occur when an AZT Auto Zero routine is initiated and the results shift the zero reference point greater than this value.

***6.04.38) DI 1 Func (Unused)*** Digital Input 1 can be configured for one of several different functions. Select the function desired.

Unused
STR - Reset the Short Total.
LTR - Reset the Long Total.
ZERO - Auto Zero the scale.
SPAN - Auto Span the scale.
INT - Interlock (when OPEN halts totalizer incrementation)
PRINT - Print enabled fields when optional printer installed

***6.04.39) DI 2 Func (Unused)*** Digital Input 1 can be configured for one of several different functions. Select the function desired.

Unused
STR - Reset the Short Total.
LTR - Reset the Long Total.
ZERO - Auto Zero the scale.
SPAN - Auto Span the scale.
INT - Interlock (when OPEN halts totalizer incrementation)
PRINT - Print enabled fields when optional printer installed

## 6.05 Feed Control Menu

***6.05.01) PID Set Srce (Keypad)*** Selects whether the keypad entered setpoint or the remote analog setpoint is used for the Feed control loop setpoint.

***6.05.02) PID Setpoint (0.0)*** Entered setpoint value used by the control loop when keyboard is selected as the setpoint source.

***6.05.03) Max CO (100.0%)*** Is the maximum CONTROL OUTPUT and can be used to limit the control loop maximum output, to limit the belt speed when the belt runs empty.

***6.05.04) PID Mode (Off)*** Selects the control loop operating mode of OFF, OVERRIDE or AUTO

- Off: the feed control loop is not active.
- OVERRIDE: The feed control loop is running at the percent of control output entered into the PID OVERRIDE parameter setting
- AUTO: The feed control loop is actively adjusting the control output to maintain the scale sensed feedrate at the setpoint entered feedrate.

***6.05.05) PID Override (0.0%)*** This is the percent of control output when override is selected as the PID operating mode. This can be useful during scale calibrations and volumetric testing of the feeder.

***6.05.06) PID Period (2)***This is the number of seconds in time averaged for the PID loop sample.

***6.05.07) PID MAX I (710.0)*** Control loop parameter for minimizing Integral windup. MAX I needs to be set high enough so the running Control Output (CO) can just reach 100% when the belt runs empty (under PID control) but not saturating significantly. If PID MAXI is set too high, the integral will wind up when the belt runs empty and the control loop will take longer time to respond when the material again flows on the belt. If MAXI is set to low, the control loop will not maintain the proper setpoint rate and the rate maintained will be at an offset lower than the setpoint. When changes are made to the control loop parameters, MAXI should be rechecked to make sure the value is not too high or too low. This can be checked by running the belt empty and observe the CO just reaches 100%.

***6.05.08) PID P (1.5)*** Control loop proportional parameter.

***6.05.09) PID I (0.12)*** Control loop integral parameter.

***6.05.10) PID D (0.0)*** Control loop derivative parameter.

## 6.06 RS485 Serial Menu

The RS485 Serial Port can be used to interface with any Tecweigh scale carriage signal conditioning card (with appropriate RANGE selection) or used with peripheral serial devices, but not both at the same time.

***6.06.01) Scale Card Md (DIS)*** If SCM is to be used, enable SCM by changing the DIS to EN. Then you will be prompted to accept (Y or N). Press Y to start the SCM, note that now the LOAD, SPEED and STATUS information the WP25 will use for computing RATE and TOTAL is coming from the scale signal conditioning card. Any inputs directly to the WP25 load cell connector and speed sensor connector will be ignored. After selecting yes (Y) you will see in the display Scale Card Md EN. Press the down arrow to enter the scale card A/D counts range. **For the SC400 and SC500 enter a range of 32767**. For older scale cards or SC500s with load cells other than approximately 2 mv/v, consult Tecnetics for the proper range selection. Once the Range is selected the WP25 may be calibrated and run as normal. Note depending on the selected Range, 1 or more of the right hand most LOAD COUNT digits, will be held to a constant zero to maintain threshold compatibility throughout the WP25 parameters.

***Note: 6.06.02 thru 6.06.10 are only active when Scale Card Mode is Disabled.***

***6.06.02) Station ID (A)*** When using the WP25's serial communication features with multiple scales, each scale must have a unique Station ID (or address). Station ID's are designated A through P. Select a different station ID from A to P for each scale.

***6.06.03) Parity (None)*** When using the WP25's serial communication features, select the same parity as the remotely connected communications device. The selections are: None, Odd, or Even.

***6.06.04) Baud Rate (9600)*** When using the WP25's serial communications features, select the same Baud Rate as the remotely connected communications device. The selections are: 9600, 19200, 38400, 57600, 115200, 230400.

***6.06.05) Command Menu (00)*** The WP25 can send data to a remote device via the serial port, either automatically (every $1/10^{th}$ second) or upon request (manually). If it's to be done automatically, the desired data must be pre-selected using the Command Menu listed in the Serial Port chapter. (Commands 01 through 26). There are also outputs that are driven by resetting the total, E1 and E2. If a remote device will request that data be sent, the Command Menu must be set to 00 (manual). Refer to the Serial Port chapter for details on how to remotely request data from the WP25.

***6.06.06 Protocol Menu (Tec Std)*** This parameter can be set to Tec Old for older communication commands for retrofitting old installations. Contact Tecweigh for further information.

***Note: 6.06.07 thru 6.06.10 are only active when Scale Card Mode is Disabled* and *USB/Logging is not used***

***6.06.07 Export Log (No)*** Change this parameter to Yes when you want to export the flash memory contents created by Command Menu E3 or E4 settings. To export the data log, change this parameter to Yes and exit the parameter table. Then force the processor to boot up by depressing the white reset button on the upper left corner of the MP600 PCB. The enclosure will need to be opened to access this button. The processor, before starting up and operating, will export the contents of the flash memory. Depending on the file size it may take several seconds to export.

***6.06.08 Erase Log (No)*** Change this parameter to Yes when you want to erase the flash memory contents created by Command Menu E3 or E4 settings. To erase of clear the data log, change this parameter to Yes and exit the parameter table. Then force the processor to boot up by depressing the white reset button on the upper left corner of the MP600 PCB. The enclosure will need to be opened to access this button. The processor, before starting up and operating, will erase the contents of the flash memory. Depending on the file size it may take several seconds to erase.

***6.06.09 Event Count (0)*** This parameter is not editable. Each time the total is reset, when using the Command Menu E3 and E4 data logging feature, this parameter will increment up one. This number could be seen as the number of trucks that have been loaded, if the short total is reset after each truck.

***6.06.10) Mem (0% Used 392K Free)*** This Parameter is not editable. It shows the use of the flash memory dedicated to data logging in two ways. Percent of full capacity and free memory space in Kbytes.

## 6.07 Security Menu

***6.07.01) Lock Match (0)*** If there is a Lock Code entered other than zero, then this parameter will have to entered and match the Lock Code before the parameters can be edited.

***6.07.02) Lock Code (0)*** Enter any number in this parameter to lock out editing of the Lock AZ/AS and Lock Resets parameters. Lock Match parameter has to be entered and match this parameter before editing can be done. This parameter is hidden until the correct Lock Code is entered.

***6.07.03) Lock AZ/AS (NONE)*** This parameter controls the locking out of the AUTO ZERO and AUTO SPAN buttons.

- NONE Calibration buttons operable.
- AZ ONLY AUTO ZERO button locked.
- AS ONLY AUTO SPAN button locked.
- AS & AZ Both AUTO ZERO and AUTO SPAN buttons locked.

***6.07.04) Lock Resets (NONE)*** This parameter controls the locking out of the SHORT TOTAL and LONG TOTAL reset buttons.

- NONE Reset total button operable.
- SHORT Resetting short total locked.
- LONG Resetting long total locked.
- LNG&SHRT Resetting both long and short totals locked.

***6.07.05) Param Ops (NO CHNG)*** This parameter allows you to save and recover the current parameter settings and default params to and from flash memory. SAVE will save the current parameter set to flash memory. RECALL will recover the last saved parameters. DEFAULTS will recover the default parameter table.

After RECALL or DEFAULTS is selected the MODE window will display PLEASE REBOOT. This can be done by either power cycling the WP25, or you can open the door of the enclosure and press the reset button that is in the upper left corner of the PCB when looking at the inside of the door.

## 6.08 Clock / Printer Menu

**Intro:** The WP25 has provisions for a real time clock (RTC) and for an optional printer that can print selectable data fields and has an editable header.

> *Note: For the printer feature, a small modification to the MP600 rev0 board is required and when this modification is made the board is designated a MP600P with PN 30407602*

***6.08.01) Real Time Clock (RTC)*** The RTC has the following user selectable formats:

- **12 hour** time - **Year, Month, Day** date
- **12 hour** time – **Month, Day, Year** date
- **24 hour** time – **Year, Month, Day** date
- **24 hour** time – **Month, Day, Year** date

The desired format is selected and date/time is edited in the same manner as all other parameters.

**Printer Option:** The optional printer is capable of printing a ticket on two inch wide thermal paper (Tecweigh PN 005219 or equivalent). The ticket can have up to five lines of text in the header with a maximum of 30 characters per line (actual number of characters printable per line depends on the cumulated characters widths). The data field has the options of printing any or all of the following process values: Date/Time, Short total, Long Total, Rate; and if desired there is an option to automatically reset the Short Total after printing.

***6.08.02) Date*** Printed in selected format.

***6.08.03) Time*** Printed in selected format.

***6.08.04) Printer Port Function (Print)*** printing

> *Note: Only one printer port function can be enabled at a time*

- **Print** – Allows the TTL port to function as a printer output.
- **Short TTL** - Allows the TTL port to broadcast short total (ST) updated 10 times a second for use in an external total display
- **Scoreboard** – Allows the TTL port to broadcast the last 1 minute sliding average rate, updating this rate every 5 seconds. This is useful in large scoreboard displays desiring to see an average rate and avoid digit flutter with rapid updates.

***6.08.05) Print Tck (OFF)***

- **OFF** (no printing)
- **ON W/RST** (Short total automatically reset after ticket printed)
- **ON NO RST** (Short total not reset after printing ticket)

***6.08.06) Min Rate (0.0)*** This is a Rate the system must be below to enable printing, for sites that want to minimize on the fly printing. Leave Min Rate at 0.0 (default) to disable Min Rate requirement.

**Print Header:** The print header consists of up to five lines: L1, L2, L3, L4 and L5. Each of these lines can be edited with the onboard editor containing the full ascii character set or imported from a text file contained on a USB. The lines then may be enabled or disable as desired.

When editing a print header line with the on board editor, the standard WP25 keyboard operations are employed. When selecting data from a USB, the USB drive must be installed and the processor rebooted to look for the USB drive. This allows using a text editor on a PC. The line information

contained on the USB must be text only and in five lines, maximum of 30 characters and each line corresponding to the same print header line.

***6.08.07) L1*** (Line one)

- Print Header Line 1
- No USB Option
- No UNDO Option

***6.08.08) Edl1*** (Edit Line one)

- Print Header Line – Example: 'Rocks For Sale, Inc.'

***6.08.09) L2*** (Line two)

- Print Header Line 2
- No USB Option
- No UNDO Option

***6.08.10) Edl2*** (Edit Line two)

- Print Header Line – Example: 'Phone 123-456-7890'

***6.08.11) L3*** (Line three)

- Print Header Line 3
- No USB Option
- No UNDO Option

***6.08.12) Edl3*** (Edit Line three)

- Print Header Line – Example: '123 Bed Rock Lane'

***6.08.13) L4*** (Line four)

- Print Header Line 4
- No USB Option
- No UNDO Option

***6.08.14) Edl4*** (Edit Line four)

- Print Header Line – Example: 'Slate Enterprises'

***6.07.15) L5*** (Line five)

- Print Header Line 5
- No USB Option
- No UNDO Option

***6.08.16) Edl5*** (Edit Line five)

- Print Header Line – Example: 'Dino Quarry Road 54321'

The example would look like this:

Rocks For Sale, Inc.
Phone 123-456-7890
123 Bed Rock Lane
Slate Enterprises
Dino Quarry Road 54321

Note pad is a good text editor, save the file to the USB drive as a text file named "WP25Hdr" If no USB drive was present on WP25 boot, the line editing routine will say "No USB Option". If the USB drive was recognized, the information for this line will be displayed and may be selected for the specific header line.

**Ticket configuration:** Each of the following items may be **ON** or **OFF**, if OFF the line or data field will not be included on the printed ticket.

***6.08.17)*** **Print Line1** (header)
***6.08.18)*** **Print Line2** (header)
***6.08.19)*** **Print Line3** (header)
***6.08.20)*** **Print Line4** (header)
***6.08.21)*** **Print Line5** (header)
***6.08.22)*** **Date/Time** (data field)
***6.08.23)*** **ST** (short total data field)
***6.08.24)*** **LT** (long total data field)
***6.08.25)*** **Rate** (1 minute average rate data field)
***6.08.26)*** **Print Spaces** (blank lines after selected information printed)

## 6.09 USB / Logging Menu

The WP25 has capabilities of logging certain calibration and operational data to on-board flash memory for later export via the USB or RS485 port, or both. The records are stored in comma delineated fields that allow easy importation into an excel sheet.

The two categories of logging are **CALIBRATION** and **DATA**.

In the **calibration logging**, all accepted calibrations are logged (AUTO ZERO, AUTO SPAN, P/P). A manually inserted RFK is not logged, however this is recorded in any future AUTO ZERO or AUTO SPAN calibration records. The calibration logging records consist of the following fields: Record ID, Date, Time, Units, Zero counts, Span Counts, Offset counts, Rate K factor, Speed span, Weigh span, Calibration factor, calibration method, Load cell mv/v, Calibration weight, Calibration chain and Conveyor angle.

Sample of calibration logging:

ID,Date,Time,Units,Zero_Cts,Span_Cts,Offset_Cts,RKF,Speed_Spn,Wgh_Span,Cal_Fctr,Cal_Method
,LC_mv/v,Cal_WtCal_Chn,Angle
1,2019/08/27,10:52:34,TONS/HR,202062,1500000,1297938,1.000,1.880,36.000,0.360,0,2.000,150.000,0.000,0.000
2.2019/08/27.10:53:03.TONS/HR.202062.584444.382382.1.000.1.880.36.000.0.360.0.2.000.150.000.0.000.0.000

In the **DATA logging** function, there are two ways the records are logged. One being **EVENT** logging and the other being **PERODIC** logging, or both. The data logging records consist of the following fields: Record ID, Date, Time, Operating Units, Short total, Long total, Belt speed, Last 1 minute of average rate and Status bit.

- Event logging when enabled records a data record on a reset event
- Periodic logging when enabled records a data record at a selected interval.

Sample of periodic logging:

ID,Date,Time,Units,S_Total,L_Total,Belt_Spd,Rate,Status
1,2019/08/27,10:40:02,TONS/HR,50616.106,50616.106,376,0564,P
2,2019/08/27,10:45:01,TONS/HR,50616.592,50616.592,376,0564,P
3,2019/08/27,10:50:03,TONS/HR,50617.078,50617.078,376,0564,P
4,2019/08/27,10:55:02,TONS/HR,50617.564,50617.564,376,0564,P

***Exporting stored Calibration and Data logging records:*** For simplicity, the USB operations are initiated only during a boot-up. Note that during the time while the stored data is being exported, the scale processor will not be totalizing. So exporting should be planned to be accomplished when the belt is running empty or stopped. Also note that if there are a large number of records to be exported and the export method is to be via the RS485 port, depending on the baud rate it could take several minutes to export all of the records. Exporting is accomplished with the selection of the Export Method described later in this chapter.

### *6.09.01) Mem*

This is a 'gas gauge' and displays the percentage of logging memory currently used. When the memory gets full, the oldest records are deleted to make way for the new records. If you are recording only the daily totals at midnight, there is more than 10 years of record space before the memory will be full. To maximize the flash memory life, the records are written sequentially in flash and are stored in blocks. When the memory gets full, the oldest block of data will be deleted to make room for the new records.

This menu allows the selection of **NO ACTION** or **ERASE**

- **NO ACTION** – Nothing is changed when this menu accessed
- **ERASE** – Allows the erasing of the flash stored calibration and data logging without export. To erase all records, select Erase, press mode/edit so Erase quits flashing and reboot.

### *6.09.02) Cal Event Ct XXX*

This is a read only numerical value of the number of calibration events currently stored in the Calibrations log.

### *6.09.03) Data Event Ct XXX*

This is a numerical value of the number of data logging events currently stored in the data logging log.

### *6.09.04) Log Select*

This determines whether Calibration and/or Data logging takes place. The selections are:

- **None** – No calibration, periodic or event logging takes place
- **Cal** – Only logging of accepted calibration results takes place
- **Data** – Only logging of the event and periodic data takes place
- **Both** – Both calibration logging data logging takes place

### *6.09.05) Log Events*

This determines what events, if any, are to be data logged. The selections are:

- **No Logging** – No event logging takes place
- **Log on STR** – Data logging recorded written for every STR (short total reset)
- **Log on LTR** - Data logging recorded written for every LTR (long total reset)
- **Log on Both** - Data logging recorded written for every STR and LTR

### *6.09.06) Log Interval*

This determines what periodic data logging, if any, takes place. The selections are:

- **None** – no periodic logging
- **24 Hour** – one record automatically recorded at midnight
- **1 Hour** – one record automatically recorded at the start of every hour
- **15 minute** - one recorded automatically recorded at the start of every hour and each cardinal hour point (00,15,30,45)
- **5 minute** - one record automatically recorded at the start of every hour and each five minute point (00,05,10,15,20 etc)

### *6.09.07) Export Method*

This parameter determines what media the stored records are exported from and also allows the option of automatically erasing all records after export. The selections for export method are:

- **None** – No export takes place
- **485** – Export takes place via the RS485 serial port
- **USB** – Export takes place via the USB
- **Both** – Export takes place over both the RS485 port and the USB

*Note: if RS485 is selected with a slower baud and there are considerable records stored, it could take a few minutes to export.*

### *6.09.08) Erase Method*

This parameter determines if the stored records are automatically erased after export. The selections are:

- **None** – Stored records are exported but not erased. Future records are added to the existing ones.
- **After Export** – Stored records are automatically erased after exported to USB and/or Serial port.

## Export Records procedure.

Due to the substantial variance in USB products and the limitations at many locations to automatically down load drivers, the USB is designed to work with generic USB flash drives. If desired Tecweigh has these available (Tecweigh PN: 005028) with a built in LED to observe data activity when being exported.

When ready to export stored records:

- Connect the RS485 and/or install a USB flash drive as appropriate for the export data method being employed.
- Press setup or program key to get to the main menu

- Arrow down to the USB/Logging menu
- Arrow right to enter USB/Logging parameter tree
- Arrow down to Export Method
- Press Display/Edit and using up/down arrows scroll to desired export method
- Press Display/Edit to stop the flashing of the desired method
- Press the Reset (Re-boot) button
- Observe data LED flashing on USB drive and/or RS485 interface if user devices so equipped.
- When export is complete, Self-Test passed will show in the display and the scale is back running. The USB drive and/or RS485 port may be removed. The USB and RS485 exported data may be read with any text reader like notepad and may be imported into excel.

## 6.10 Maintenance Menu

The WP25 has provisions in a maintenance menu for an artificial belt speed, for manually changing the ZERO COUNTS, SPAN COUNTS and ODOMETER parameter values; and a speed signal filter.

### *6.10.01) ? Speed 200*

The Speed 200 has the following user selectable settings for an artificial belt speed pulses:

- **DIS**
- **EN**

The default setting is DIS or Disabled. The artificial belt speed can be set to approximate actual belt speed if the belt speed sensor becomes disabled / inoperative. Multiply 200 times the Spd Spn to get the appropriate artificial belt speed. The Spd Spn is entered thru the CALIBRATION MENU.

### *6.10.02) ? Speed Filt*

The Speed Filter has the following user selectable settings:

- **DIS**
- **EN**

The default setting is DIS or Disabled. The speed filter selection averages 3 successive speed samples together for the speed processing. This can help stabilize the speed signal in situation where the speed sensor is subject to vibrations.

### *6.10.03 ? Maintenance*

The Maintenance has the following user selectable settings:

- **DIS**
- **EN**

The default setting is DIS or Disabled. The maintenance selection allows the editing of the ZERO COUNTS, SPAN COUNTS and Odometer parameters. This allows the manual transfer of a scale calibration from a failed board into a replacement board where it is not easy to complete a recalibration by Auto Zero and Auto Span. The parameter will be automatically set back to DIS once the program setup tree has been exited (back to normal run mode).

## 6.11 Fieldbus Data

*Note: For detailed WP25 fieldbus instruction reference Tecweigh WP25 EIP MBTPC manual part number 30199802*

***6.11.01)*** ***IP Address*** Only used with CompactComm daughter board, IP address entered into CompactComm directly.

***6.11.02)*** ***Sub Mask*** Only used with CompactComm daughter board, Sub Mask entered into CompactComm directly.

***6.11.03)*** ***Gateway Address*** Only used with CompactComm daughter board, Gateway address entered into CompactComm directly.

***6.11.04)*** ***DNS1*** Only used with CompactComm daughter board, DNS1 entered into CompactComm directly.

***6.11.05)*** ***DNS2*** Only used with CompactComm daughter board, DNS2 entered into CompactComm directly.

# CHAPTER 7 – CALIBRATION

## 7.01 Calibration Intro

Calibrating the scale system consists of determining the method of calibration to be used, entering necessary parameters and following a specific sequence for the calibration method to be employed.

Parameters necessary before scale calibration can begin are:

- Weigh Span
- Calibration weight (*used for static weight calibration span calibration*)
- Cal chain lbs/kilos per foot/meter (*calibration chain span calibration*)
- Load cell mv/V average (*electronic span calibration*)
- Cal factor

Other important parameters to be entered/verified

- Belt length
- Zero revolutions
- Span revolutions

The sequence of scale calibration takes place in the following order:

- Wiring verified correct and system powered up
- Parameters verified/entered
- LVDT Alignment/verification (*LVDT load sensor scale only – WY10, WY20*)
- Belt speed calibration/verification
- Zero calibration
- Span calibration
- Material Test Calibration

## 7.02 Apply Power to the System

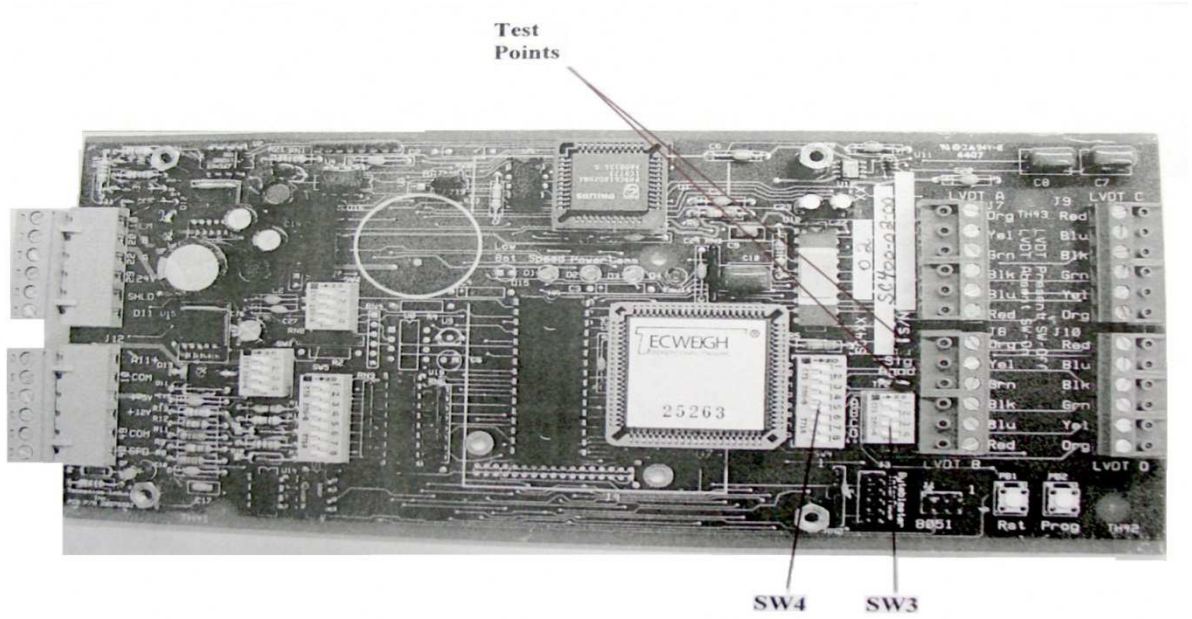
Assuming that all the entered Parameters are correct, and all the equipment is installed properly, the scale must now be calibrated. Without calibration, the scale will only approximate the RATE. Turn on the conveyor, power up the WP25, make sure the belt is clean. Let the conveyor run empty for at least half an hour, (longer in colder environments) so the belt attains temperature stability, before doing any calibrations.

## 7.03 LVDT Alignment

### 7.03.01 LVDT Alignment - Scales with SC400 Scale Card

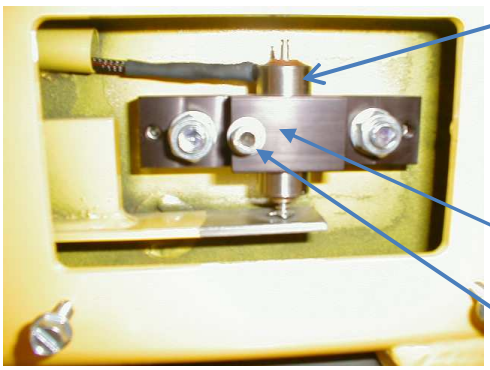
Omit this step for the strain gauge load cell scales (*WY15/25, HY15/25*).
The WY10 and WY10HD have two LVDTs, while the WY20 have four LVDTs. Alignment of the LVDTs is important for scale accuracy. The LVDTs were aligned at the factory, but it must be verified that they are still in alignment after shipping and installation. Turn the belt off, leave the WP25 on and remove both side covers from the scale. On the SC400 PCB, DIP switches SW3 and SW4 are used in the alignment procedure (see the figure below). First verify that SW3 and SW4 are set to the positions

shown on the first or second lines in the following chart depending on the particular scale at hand. Next, to verify proper alignment, connect a DC voltmeter across the test points (again see the figure). If the voltage is 2.50 +/- 0.10 VDC, the LVDTs are sufficiently aligned and move on to the next section, however, if the voltage is outside the stated range, continue as follows.




The LVDTs are aligned one at a time. The goal is to attain 2.50 +/- 0.05 VDC across the test points for each LVDT. First, set SW3 and SW4 to the positions shown in the chart at line three, “Aligning LVDT “A” Only”. Next, loosen the clamp screw slightly (see the following figure) to loosen the LVDT and slide the LVDT up or down until the voltmeter reading is 2.50 +/- 0.05 VDC. DO NOT POUND ON THE LVDT! Now do the same procedure for LVDT B (and then C and D for a WY20 scale). After the alignment is complete, the switches should be reset back to line one or two in the chart depending on the scale at hand.

| SW3 and SW4, LVDT Selection and Alignment Switches | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SW3 | | | | SW4 | | | | | | | |
| | Pos 1 | Pos 2 | Pos 3 | Pos 4 | Pos 1 | Pos 2 | Pos 3 | Pos 4 | Pos 5 | Pos 6 | Pos 7 | Pos 8 |
| LVDT "A" and "B", WY10, WY10HD | OFF | OFF | ON | ON | OFF | OFF | ON | ON | OFF | OFF | ON | ON |
| LVDT "A" "B" "C" and "D", WY20 | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| Aligning LVDT "A" Only | OFF | ON | ON | ON | OFF | ON | ON | ON | OFF | ON | ON | ON |
| Aligning LVDT "B" Only | ON | OFF | ON | ON | ON | OFF | ON | ON | ON | OFF | ON | ON |
| Aligning LVDT "C" Only | ON | ON | OFF | ON | ON | ON | OFF | ON | ON | ON | OFF | ON |
| Aligning LVDT "D" Only | ON | ON | ON | OFF | ON | ON | ON | OFF | ON | ON | ON | OFF |



### 7.03.01 LVDT Alignment - Scales with SC500 Scale Card

For LVDT scales (WY10, WY20) using the SC500 scale card via a LVDT interface board 20976610:

*Note: The SC500 is not designed to work in the negative direction as the SC400, so the LVDTs alignment is accomplished with a slight positive bias to allow emulation of a SGLC.*

- To align an LVDT, unplug all the LVDT connector plugs except the one for the LVDT to be aligned.
- Carefully adjust the LVDT in its clamp until between TP1 and AGND there is 1.0 mvDC (1 millivolt DC) ±0.1 mvDC; and retighten the clamp. The meter must be polarity correct (TP1) positive, (AGND) negative.
- Repeat this process for all LVDTs with only the LVDT to be checked/aligned plugged in.
- When all LVDTs have been checked, plug them all back into the interface board.

## 7.04 Scale Calibration

Verify all the following entered Parameters are correct, and the scale is installed properly. Without calibration, the scale will only approximate the RATE. Critical parameters for proper calibration involve verifying proper entry for:

- Cal Factor – ***6.01.02***
- Weigh Span – ***6.01.03***
- Belt Length – ***6.01.04***
- Calibration method – ***6.02.03*** (*Cal weight, Cal chain, Electronic*)
- Total of all Calibration weight(s) – (*If using Cal weight method*) – ***6.02.04***
- Calibration Chain – (*If using Cal chain method*) – ***6.02.05***
- Load cell capacity – ***6.02.06***
- Rated Load Cell Output mv / V – ***6.02.07***
- Tracking Revolutions of belt – ***6.02.10***
- Zero Revolutions of belt – ***6.02.11***
- Span Revolutions of belt – ***6.02.12***
- Speed span (belt speed) – ***6.02.13***

***Note: an AUTO ZERO must always be done before an AUTO SPAN.***

## 7.05 Belt Speed

Belt speed must be indicating correctly before calibration is started. There are many different speed sensors and the scaling must be correct for a proper scale calibration. This is accomplished by observing the Belt speed on the WP25 display; and the SPEED SPAN parameter is adjusted up or down as needed to make the WP25 indicated belt speed match the actual belt speed. The actual belt speed is obtained by the use of a tachometer or by a timed measurement of a known amount of belt length.

## 7.06 Auto Zero

Once belt speed is calibrated/verified correct, AUTO ZERO is the next calibration step to perform. This is defined as the WP25 displaying zero RATE when the belt is empty. With the conveyor belt limbered up and running empty, press the AUTO ZERO followed by the YES button. The message "AUTO ZERO WAIT" appears and the WP25 will now do an AUTO ZERO for as many belt revolutions as are specified in the Zero Revs Parameter (Section ***6.02.11***). A zero-load test (AUTO ZERO) must be performed over a period of at least 3 minutes and with a whole number of complete belt revolutions. The WP25 must "learn" what an empty belt and zero-RATE "feels like". After zero calibration is complete, a message will display showing the percent of calibration change from the previous calibration as well as prompting the user to accept the new value by selecting YES or NO.

An AUTO ZERO can be cancelled at any time by pressing NO to cancel. If the message "AUTO ZERO ERROR" appears during an AUTO ZERO, refer to Section 9 for troubleshooting tips. Note that the RATE might wander above and below zero to some extent depending upon the condition of the conveyor belt. After scale calibration is complete; (*both AUTO ZERO and AUTO SPAN*), refer to Section ***6.01.05*** for DEADBAND settings to eliminate this "zero fluctuation".

## 7.07 Auto Span

AUTO SPAN is the next calibration step to perform. This procedure calibrates the scale using a known weight, (calibration weight); a known loading (calibration chain) or known load cell response (electronic calibration); so the WP25 can determine the material weight sensed as it passes over the weigh idler. The type of calibration to be done must be entered into the CALIBRATION MENU METHOD parameter.

With the conveyor running empty, press the AUTO SPAN button followed by the YES button. For SPAN calibration with calibration weight(s) the message "LOWER CAL WEIGHT" appears. At this time lower the calibration weight(s). For SPAN calibration with a calibration chain the message "LOWER CAL WEIGHT" appears. At this time deploy out the calibration chain. For SPAN calibration with Electronic calibration the message "CALCULATING SPAN" appears. The AUTO SPAN procedure is then initiated by the WP25. *See Section* ***6.02.16*** *for information on the Span Detect Parameter.* The display in the MODE window should then change to "AUTO SPAN WAIT". A simulated load test (AUTO SPAN) with the calibration weight(s) or calibration chain, must be performed over a period of 3 minutes and with a whole number of belt revolutions. If, after lowering the cal weight(s), the "AUTO SPAN WAIT" message does not appear, press and release the AUTO SPAN button again. This action will manually initiate the start the AUTO SPAN.

When utilizing the cal weights(s) or cal chain, the AUTO SPAN is complete when the mode window message "RAISE CAL WEIGHT" is observed. **Before raising the cal weight(s) allow the RATE settle to a steady value.** When the cal weight(s) are then raised, the RATE display should return to ZERO and the calibration is complete. Totalizing will not resume until the calibration weight is raised or 1 minute elapses. An AUTO SPAN can be cancelled at any time by pressing NO.

After span calibration is complete, a message will display showing the percent of calibration change from the previous calibration as well as prompting the user to accept the new value by selecting YES or NO.

> **Note 1:** *An AUTO ZERO can be performed without doing another AUTO SPAN, so as to re-zero the belt due to zero drift. Zero drift can be caused by material build-up, variation of belt tension, or changes in the environment surrounding the scale.*

**Note 2***: If the AUTO SPAN had to be manually initiated, the Span Detect Parameter (Section **6.02.16**) needs to be adjusted so the next AUTO SPAN request proceeds to completion. Change this Parameter **after** the calibration has been completed. To determine the new Span Detect value for a single idler belt scale, subtract the Zero Count (Section **6.02.18**) from the Span Count (Section **6.02.19**), and calculate 75% (multiply by 0.75) of the difference and enter it as the new Span Detect value.*

Now that the initial scale calibration is complete, the scale needs to be checked for accuracy. The following calculated **value** (or very close to it) is what you should see in the RATE window:

$$\left[\frac{(CF \times BS \times CW)}{WS}\right] \text{ X Rate K Fctr = CAL RATE}$$

Where:

CF = Cal Factor (parameter value)
BS = Belt Spd (actual in FPM)
CW = Calibration Weight (actual total in LBS)
WS = Weigh Span (parameter value)
Rate K Fctr = Auto Span Correction Factor (parameter value)

To verify the scale's repeatability, lower the calibration weight(s) to see if the scale returns to the RATE that was displayed after performing the AUTO SPAN. Repeating this procedure several times will assure that the scale is performing properly.

## 7.08 Material (Pre/Post) Test

To attain a the most precise scale measurement, a material (or pre/post) test is performed as follows:

Make sure the calibration weight is raised. While in Normal Run Mode, if operations permit, RESET the SHORT TOTAL. If this is not possible, the value can be entered later in the PRE/POST process. Weigh and record an empty truck or container on a certified reference scale, and then run a load of material into it. Run the material at the normal running RATE. Do not perform this test in the rain as the water weight will add to the totalized load. The loading duration should be the same as ***Zero Revs*** and ***Span Revs***.

Now weigh the full truck or container and subtract the empty container weight leaving only the net material weight. In Parameter Edit Mode go to the P/P Actual Parameter (Section ***6.02.02***) and enter the material test load (and edit the scale weight if a previous total reset was not possible). When Program Mode is exited, the WP25 will automatically compare the material test total to the WP25 total (in the P/P menu) and modify the Rate K Fctr Parameter (Section ***6.02.15***) accordingly. P/P Actual is automatically set to zero after the test is done.

The calculation is:

(Post) Actual Weight ÷ (Pre) WP25 Scale Weight x Rate K Fctr = New Rate K Fctr.

This calculation can also be done manually and the Rate K Fctr adjusted up or down as necessary to fine tune the scale. *This value was previously known as ASC in Tecweigh Wp20 processors.*

## 7.09 Running the System

Now the system is ready to run. With the calibration weight(s) up, the RATE should be zero. Reset the TOTAL display by pressing RESET followed by YES. Begin running material on the belt. The RATE should increase and the TOTAL should begin to increment. Press the DISPLAY EDIT key momentarily to toggle between the SHORT TOTAL, LONG TOTAL, BELT LOADING, net WEIGHT on the weigh idler, and DATE / TIME. Turn the belt off and the message ZERO BELT SPEED should be displayed. Resume running material and the ZERO BELT SPEED message should disappear and the RATE units or SPEED display should reappear.

Refer to Section 9.01 for the definitions of any messages that appear in the MODE window. If the system is determined to be running properly, auxiliary equipment such as a recorder can now be added. Consult Chapter 4 for wiring information. Refer to section ***6.04 Input Output Menu*** for configuration information to enable the WP25 to interface with auxiliary equipment. Consult Chapter 8 for complete instructions on using the Serial Communication features.

## 7.10 PID Control Opertions

The WP25 contains a basic PID control loop capability for use in simple applications where the processing power of a PLC is not required. The PID controller has 3 basic modes: OFF, OVERRIDE and AUTO where in OFF there is no PID control output, OVERRIDE the control output is manually set and AUTO the control output is controlled by the PID loop. The SETPOINT source for the control loop to maintain can either be entered from the WP25 keypad or through a remote analog input 4/20 ma signal; and the CONTROL OUTPUT (CO) is a 4/20 ma analog output signal.

### FEED CONTROL parameters

SETPOINT SOURCE is configured with parameter ***6.05.01*** and selects whether the keypad entered setpoint or the remote analog setpoint is used.

Setpoint is the value used by the control loop when keyboard is selected as the setpoint source ***6.05.02***

MAX CO is the maximum CONTROL OUTPUT and can be used to limit the control loop maximum output. ***6.05.03***

PID Mode selects the control loop operating mode of OFF, OVERRIDE or AUTO ***6.05.04***

PID Override is the percent of control output when override is selected as the operating mode. ***6.05.05***

PID Period is the seconds of time averaged for the PID loop sample. ***6.05.06***

PID MAXI is used to limit integral windup. This needs to be set high enough so the running Control Output (CO) can just reach 100% when the belt runs empty (under PID control) but not saturating significantly. If PID MAXI is set too high, the integral will wind up when the belt runs empty and the control loop will take longer time to respond when the material again flows on the belt. If MAXI is set to low, the control loop will not maintain the proper setpoint rate and the rate maintained will be at an offset lower than the setpoint. When changes are made to the control loop parameters, MAXI should be rechecked to make sure the value is not too high or too low. This can be checked by running the belt empty and observe the CO just reaches 100***%.*** ***6.05.07***

PID P allows adjustment of the control loop proportional term***.*** ***6.05.08***

PID I allows adjustment of the control loop integral term ***6.05.09***

PID D allows adjustment of the control loop derivative term. ***6.05.10***

## Input / Output Parameters

CONTROL: When Analog In (AIN) is used for the remote setpoint, the following parameters are used to configure AIN:

- BASE: The remote setpoint zero reference, usually set to 4, for 4 ma to equate to a remote setpoint of zero. ***6.04.16***
- TRIM: Used to fine tune the BASE if needed ***6.04.17***
- PEAK: Used to fine tune the RANGE if needed ***6.04.18***
- RANGE: The remote setpoint maximum reference rate for 20 ma to be equal to. ***6.04.19***

RELAY: Option to set a relay as a RUN ENABLE so when PID is in the OFF setting, there is no run enable being sent. When PID is in either the OVERRIDE or AUTO the relay dry contact can be used to send a RUN ENABLE.

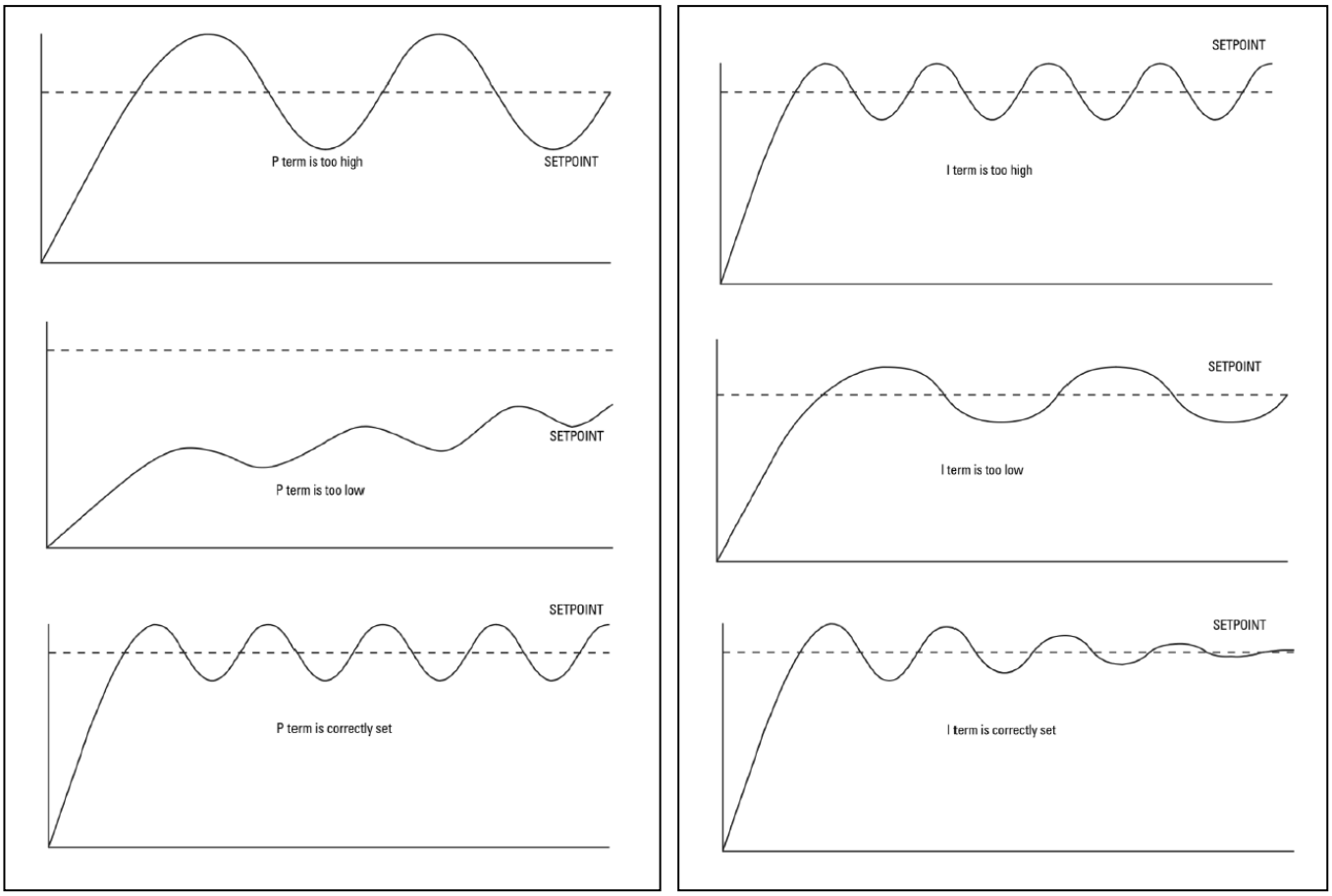
## Main Run Screen

When out of the setup menu tree, the run screen cycles through the sequence of SHORT TOTAL, LONG TOTAL, LOAD, WEIGHT, DATE/TIME and error/status messages with each pressing of the Display/Edit button. When the Feed control is enabled an addition mode window showing the Setpoint (SP), Control Output (CO) and Mode is added to the main screen views.

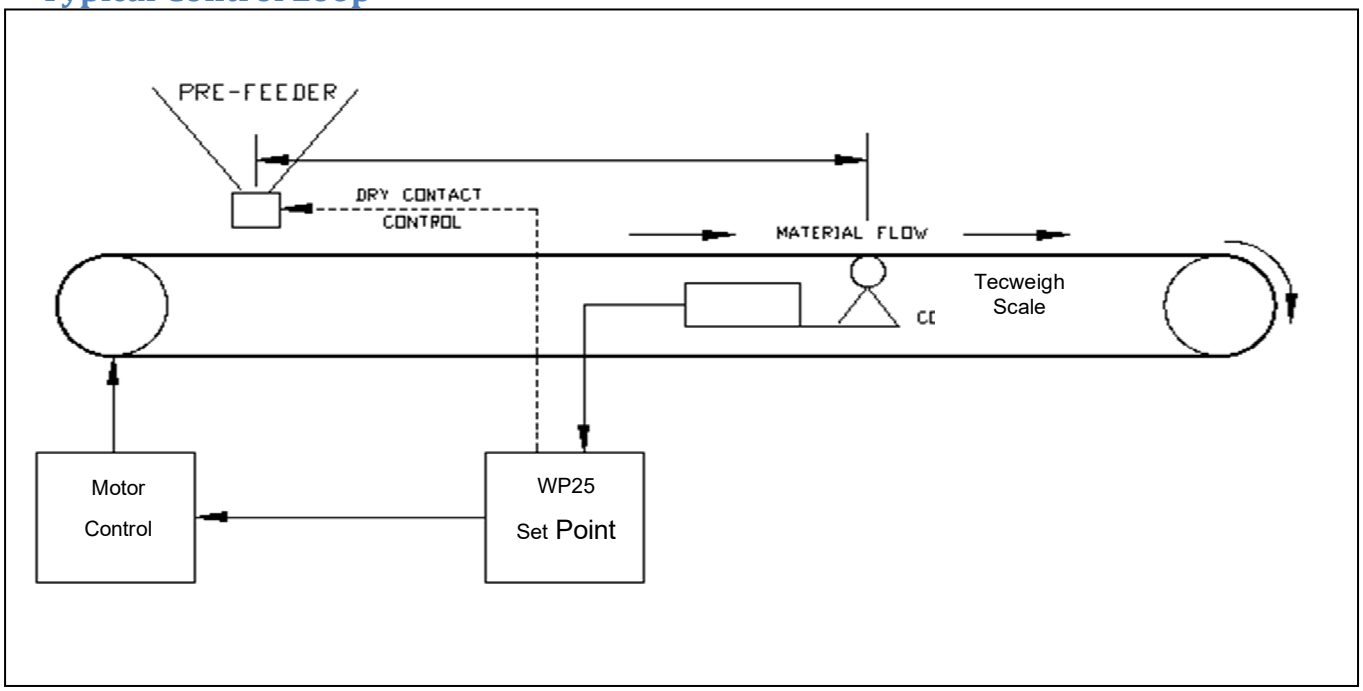

## PID RUNNING

When the control loop is running in AUTO (PID Control), with the main run screen showing the setpoint, control output and mode in AUTO, the control output should increase or decrease as needed for the running RATE to be maintained at the Setpoint RATE. Adjustments to the P, I, D and MAXI along with MAX CO and sample time can be made to optimize the control loop response to the application.

## Control Loop Optimization




## Typical Control Loop



# CHAPTER 8 – SERIAL COMMUNICATION

## 8.01 Overview

The WP25's RS485 serial port works in two basic modes. The first mode allows the RS485 Serial port, on a properly outfitted controller, to interface with an existing scale carriage signal conditioning circuit board to receive belt load and speed information from the scale card. This is known as Scale Card Mode (SCM). The second mode is the more conventional mode that allows the WP25 to interface serially with a PC or PLC. The WP25 RS485 serial port is limited to only doing one of these functions at a time and when the SCM is selected all of the conventional serial port menus are no longer displayed.

In the conventional mode where the WP25's RS485 serial communications is interfaced to a remote computers or PLC, there is access to RATE, TOTAL, SPEED, and Status data, in addition to requesting basic calibration functions. The WP25 can be configured to send data either automatically (every 1/10 second fixed) or upon request (manually). If sending data automatically, only one unit can be used per serial link. The automatic mode is commonly used for sending Rate and/or Total to display devices. When requesting data via query (manually), up to16 units can be multi-dropped on one RS485 serial link and each unit is identified using capital letter (A to P) as a station identifier. It is important in the conventional serial communications mode to insure all serial parameters are set correctly for the system to operate properly.

## 8.02 Automatic Transmission

When a Command Menu Parameter (selected from the following table) other than 00 is entered into the WP25, it will send the selected data automatically every 1/10 second. For example, if the Command Menu is set to 04, the WP25 will transmit the RATE and SHORT TOTAL every 1/10 second.

| Command Menu | Data Transmitted |
|---|---|
| 00 | (*Used for data query transmission only, see section 8.03*) |
| 01 | RATE |
| 02 | SHORT TOTAL |
| 03 | SPEED |
| 04 | RATE, SHORT TOTAL |
| 05 | RATE, SPEED |
| 06 | Average RATE |
| 07 | Average SPEED |
| 08 | Average RATE, SHORT TOTAL |
| 09 | Average RATE, Average SPEED |
| 10 | Status |
| 11 | RATE, Status |
| 12 | SHORT TOTAL, Status |
| 13 | SPEED, Status |

| | |
|---|---|
| 14 | RATE, Status, SHORT TOTAL |
| 15 | RATE, Status, SPEED |
| 16 | Average RATE, Status |
| 17 | Average SPEED, Status |
| 18 | Average RATE, Status, SHORT TOTAL |
| 19 | Average RATE, Status, Average SPEED |
| 20 | Send Average RATE in FC20 set point mode. See FC20 manual. |
| 21 | LONG TOTAL |
| 22 | RATE, LONG TOTAL |
| 23 | Average RATE, LONG TOTAL |
| 24 | LONG TOTAL, Status |
| 25 | RATE, Status, LONG TOTAL |
| 26 | Average RATE, Status, LONG TOTAL |
| 27 | Average Rate Score Board Format |
| E1 | Record ID, Date, Time, SHORT TOTAL |
| E2 | Record ID, Date, Time, SHORT TOTAL, LONG TOTAL |
| E3 | Record ID, Date, Time, SHORT TOTAL |
| E4 | Record ID, Date, Time, SHORT TOTAL, LONG TOTAL |
| SB | Last 1 minute average rate updated every 5 seconds, for serial score board displays(Broadcast only, use 27 for SB query) |

E1 through E4 are unique event driven outputs. The event that triggers the output is resetting any total. When the totals are reset these E1-E4 outputs record the total values before the output. E1 and E2 will send the string out the RS485 port at the time of reset. E3 and E4 will send the string to the flash memory in the processor for exporting at a later date. See the RS485 parameters for more information on exporting and clearing the flash memory.

Data sent from the WP25 in automatic (or manual) modes will be in the following format:

[Station ID] [Data Value(s)] [Carriage Return]

The station ID is a single ASCII character from A to P specifying the unit address.

When status is sent, it is a single ASCII character defined as follows:

| | |
|---|---|
| P | Positive RATE (normal operation, positive rate) |
| N | Negative RATE |
| Z | AUTO ZERO in progress |
| T | Auto Tracking in progress |
| S | AUTO SPAN in progress |
| A | Alarm condition |
| L | Load Error |

Example 1: Station K has a RATE of 450 and the Command Menu parameter is 01 (RATE):

| [ Station ID ] | [ RATE ] | [ Carriage Return ] |
|---|---|---|
| K (one character) | 0450 (four characters) | ^M (one character) |

Example 2: Station C has a SPEED of 375 and the Command Menu parameter is 03 (SPEED):

[ Station ID ] [ SPEED ] [ Carriage Return ]

C (one character) 0375(four characters) ^M (one character)

Example 3: Station A has a RATE of 103.8, the TOTAL is 399.75, and the Command Menu parameter is 14 (RATE, Status, TOTAL):

[ Station ID ] [ RATE Status TOTAL ]

A (one character) 1038 (four characters) P (one character) 00039975 (eight characters)

[ Carriage Return ]

^M (one character)

## 8.03 Manual Transmission (Query Data)

If the Command Menu Parameter is set to 00 in the WP25, it will only send data after a request is made. The same data is available and is returned in the same format using ASCII characters as outlined in the above section for Automatic Transmission. The data request is sent in the format ([Station ID] [Command parameter] [Carriage Return]) and as defined below:

[Station ID] A to P (one character)

[Command parameter] (from the list in sec. 8.02, (01 to SB) (two characters)

[Carriage Return] ^M (one character)

Example: A request for RATE and TOTAL is sent to Station A:

[ Station ID ] [ command parameter ] [ Carriage Return ]

A (one character) 04 (two characters) ^M (one character)

*Note that the WP25 has a 16 command input buffer.*

## 8.04 Remote Calibration

*Note: The COMMAND MENU* (section 8.02) *must be in the QUERY mode (set to 00) to use remote calibration*

There are five commands that can be sent to the WP25 for Remote Calibration.

*Note: No data is returned after calibration commands are sent; however monitoring of the STATUS BIT will show the on-going evolution status*

The characters are ASCII. Use the following format to send the WP25 Remote Calibration commands:

[Station ID] [Command] [Carriage Return].

TEC STD

| Command | Action |
|---|---|
| =R | Resets the SHORT TOTAL display |
| =L | Resets the LONG (and SHORT) TOTAL display |

| | |
|---|---|
| =Z | Starts an AUTO ZERO Cycle |
| =S | Starts an AUTO SPAN Cycle |
| =C | Cancels an AUTO ZERO or AUTO SPAN Cycle |

Example: To start an AUTO SPAN cycle at Station G, send the following command:

| [ Station ID ] | [ Command ] | [ Carriage Return ] |
|---|---|---|
| G (one character) | =S (two characters) | ^M (one character) |

Be careful not to send serial commands when there is someone working at that station. Serial communications should only be done after the station is completely set up, calibrated, and in Run Mode. Sending commands while in Program Mode could cause conflicts and corrupt data. The WP25 ignores commands that it does not recognize and only detects and acknowledges a framing error.

## 8.05 Event Driven Outputs and Internal Logging

The WP25 has a feature that allows the operator to capture the total resets in an output via the RS485 port. Command Menu options E1 through E4 are outputs and internal logging options for capturing these resets. E1 and E2 send the total information with a time and date stamp out the serial port at the time of the event: total reset. E3 and E4 send this information to internal flash memory and the down loading and erasing of this memory is done by changing parameter values and resetting (booting up) the processor.

See the parameter table chapter (Section 6.05) for more detailed explanation of the parameters involved in this feature.

**Internal Storage and Exporting of Load Data Trail**

**E3 and E4 Command Menu options operate as follows:**

Both of these options save load out information in the microprocessor's internal flash memory. The format is CSV featuring the following fields. E3 does not save the long total, only the short total. E4 saves everything shown below.

Field 1 – unique load ID that starts at "1" after each Long Total reset.

Field 2 – Date

Field 3 – Time

Field 4 – Short Total

Field 5 – Long Total (only on E4)

Field 6 – Unit of Measure

Carriage return

Line feed

*Note: For more detailed event logging, or event logging when SCM is enabled, see **6.09***

An example of the out saved to a .txt file, renamed to a .csv file and opened with a spreadsheet software is shown below.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | ID | DATE | TIME | SHORT_TOT | LONG_TOT | UNITS |
| 2 | 1 | 1/3/2017 | 2:59:55 | 2.185 | 2.185 | TON |
| 3 | 2 | 1/3/2017 | 3:00:44 | 1.542 | 3.727 | TON |
| 4 | 3 | 1/3/2017 | 3:01:28 | 3.227 | 6.954 | TON |
| 5 | 4 | 1/3/2017 | 3:02:25 | 2.339 | 9.293 | TON |
| 6 | 5 | 1/3/2017 | 3:03:28 | 5.796 | 15.089 | TON |
| 7 | 6 | 1/3/2017 | 3:04:09 | 2.465 | 17.555 | TON |
| 8 | ID | DATE | TIME | SHORT_TOT | LONG_TOT | UNITS |
| 9 | 1 | 1/3/2017 | 3:05:07 | 2.45 | 2.45 | TON |
| 10 | 2 | 1/3/2017 | 3:06:07 | 6.567 | 9.016 | TON |
| 11 | | | | | | |

When the Long Total is reset the output string repeats the header row. Every short and long total value is to 3 place decimal accuracy. The date and time are from the internal clock in the microprocessor so make sure they are set correctly.

# CHAPTER 9 – TROUBLESHOOTING

## 9.01 Status Messages

Every time the WP25 is powered up it immediately performs two functions.

***"SELF TEST – PASS"*** The memory is OK. No changes have occurred.

Other messages

***"AUTO ZERO ERROR" or "AUTO SPAN ERROR"***

The AUTO ZERO and AUTO SPAN error messages indicate an abnormal condition during calibration. Press the RESET button to clear the message and perform another AUTO ZERO. After a successful AUTO ZERO has been done, do another AUTO SPAN.

Possible causes of the message:

- Rocks (or material) were jammed under the weigh idler.
- The cal weight was lowered for an AUTO ZERO, when it should have been raised.
- The cal weight was raised for an AUTO SPAN, when it should have been lowered.
- The conveyor had material running on it during calibration.
- The load cell(s) are damaged.
- The belt skirting was touching the weigh idler or the belt near the scale.
- The Parameters for Weigh Span, Cal Weight, etc. are incorrect.
- The Load Count Parameter does not increase when the calibration weight is lowered.

Additional explanations:

**An AUTO ZERO must be done before an AUTO SPAN!** If the Load Count Parameter (Section 6.02.17) does not meet the criteria given, then the load cell(s) might be damaged. See Section 9.05 for load cell testing and replacement. Note: if an AUTO ZERO or AUTO SPAN is started and then the belt is stopped, it will never complete the number of belt revolutions required. Press RESET and start over if the belt has been stopped.

***"AUTO ZERO (WAIT)" or "AUTO SPAN (WAIT)"***

These messages indicate that an AUTO ZERO or AUTO SPAN calibration is in progress. An AUTO ZERO or AUTO SPAN can be initiated manually, remotely through the serial port, or automatically by the AZT Parameter (Section 6.02.10). It will perform according to the Zero Revs Parameter (Section 6.02.11) and Span Revs Parameter (Section 6.02.12). The respective message will remain viewable until the corresponding cycle is completed or until the RESET button is pressed.

***"FRAMING ERROR"***

This message indicates a serial communications Parameter setting is incorrect when using the serial communications function. Assure that all serial communications related Parameters are correct for the system -- Station ID, Parity, Baud Rate, Command Menu, and Protocol (Sections 6.06.02-06). **Important: The plant remote equipment must also be operating with the exact same serial communications settings (mutually compatible) for the system to operate properly**.

***"INTERLOCK OPEN"***

Terminals on J104-5 (DI1) or J104-7 (DI2) and J104-6 (COM) are programmed as an interlock, and that must be electrically connected (closed) for normal WP25 operation. If an interlock is programmed and the interlock is not closed, the RATE, TOTAL, and all outputs are disabled. Verify the external interlock wiring to insure remote equipment is controlling the interlock circuit.

***"LOAD ERROR"***

On WYx5 and HYx5 scales, this message indicates either a faulty load cell signal, or the weight on the load cell(s) exceeds their capacity. Check the Load Count Parameter (Section 6.02.17) and make sure the load counts increase when the calibration weight is lowered.

Other possible causes of the message are:

- The load cell(s) are installed with the arrow pointing up rather than down.
- A load cell is incorrectly wired to the terminals. Refer to the load cell wire color code.
- A load cell wire(s) is damaged or broken.
- A loose terminal strip(s) or terminal screw(s).
- Load cell fuse blown (not valid for SCM)
- A load cell is physically damaged.
- A load cell has been overstressed and permanently damaged.
- Material is jammed near the load cell.
- Attached devices, such as a chart recorder, are drawing more than 1 amp total.

Refer to Section 9.05 for load cell testing and replacement if required. Refer to Chapter 4 for System Wiring.

On WY10 and WY20 scales, this message indicates a faulty LVDT signal. Check the Load Count Parameter (Section 6.02.17) and make sure the load counts increase when the calibration weights(s) is lowered.

Other possible causes of the message are:

- A LVDT is incorrectly wired to the terminals. Refer to the LVDT wire color code.
- A LVDT wire(s) is damaged or broken.
- A loose terminal strip(s) or terminal screw(s).
- A LVDT(s) is not properly aligned (Section 7.03)
- A LVDT spring(s) is broken or off center
- A LVDT(s) center plunger is stuck
- A LVDT(s) has a pit in the surface of the deflection arm.

Refer to Section 9.06 for LVDT testing and replacement if required. Refer to Chapter 4 for System Wiring.

***"LOW POWER" – SCM Mode Only***

This message indicates insufficient power to the signal conditioner. Possible causes of this message are:

- **AC** power to the WP25 is less than 100 VAC on the **AC** power version.
- **DC** power to the WP25 is less than 12 VDC on the **DC** power version.
- The WP25 (**AC** power version) is not producing +14.5 VDC across terminals 10 and 29.*****
- The WP25 (**DC** power version) is not producing +14.5 VDC across terminals 10 and 29.*****

- The cable between the WP25 and the signal conditioner is longer than 4000 feet.
- Attached devices, such as a chart recorder, are drawing more than 1 amp total.
- There is a break or short in the cable between the WP25 and the signal conditioner.

* For older ET20-XX scale cards, consult factory for required SCM voltages

Refer to Sections 9.02 and 9.03 for more comprehensive troubleshooting.

***"SCALE DATA ERROR" – SCM Mode Only***

This message indicates a communications problem between the WP25 and the scale (signal conditioner (SC500).

Possible causes of the message are:

- Terminals 20 and 22 are wired backwards (reverse wired).
- The WP25 (**AC** power version) is not producing +24 VDC across terminals 10 and 29.
- The WP25 (**DC** power version) is not producing +14 VDC across terminals 10 and 29.
- The cable distance between the WP25 and the SC is longer than 4000 feet.
- Incorrect termination resistor jumper placement
- There is a break or short in the cable between the WP25 and the SC
- Either the processor or SC or both have been damaged by a power surge or lightening.

Refer to Sections 9.02 or 9.03 for more comprehensive troubleshooting.

***"SELF TEST"***

This message always appears when power is first applied to the WP25. The WP25 performs a quick self-diagnostic routine and then the message disappears. This message might also appear if terminals are shorted or if there is excessive power use by attached auxiliary equipment. It also could appear if the WP25 power or communications wiring is too close to other devices or wiring (high voltage power wiring, high voltage motor wiring, 120 vac, etc.).

***"9----" or "----0"***

This message indicates that the RATE, BELT SPEED or TOTAL values are too large to fit the display, or the TOTAL is a negative number. Move the decimal position to the right using the Rate DP Parameter (Section 6.03.01) or the Total DP Parameter (Section 6.03.05). Also note that the TOTAL will need to be RESET when it reaches the upper limit. "9---" indicates the number has over run the display, "---0".

***"ZERO BELT SPEED"***

This message indicates that, 1) the belt is simply not moving, 2) the belt is moving, but a speed signal is not being generated, or, 3) the signal conditioner is defective. If the belt is moving, make sure the green LED labeled "speed" on the SC is blinking. Note that it might appear to be solid on if it is blinking rapidly. If it is not blinking, possible causes are a defective speed sensor or circuit, the signal conditioner has failed, or there is no DC power. If the message appears even when the belt is moving, check for the following adverse conditions:

- The speed sensor wheel is not turning freely, replace it if that condition exists. A broken or shorted cable from the speed sensor to the signal conditioner.
- Loose terminal connections.

- Incorrect speed sensor DIP switch setting.
- No +24 VDC power (+14 VDC on DC models) across terminals 29 (DC) and 10 (CM) on the signal conditioner.
- If in SCM the DC power is correct, the speed signal is present, and the message persists, replace the signal conditioner

.

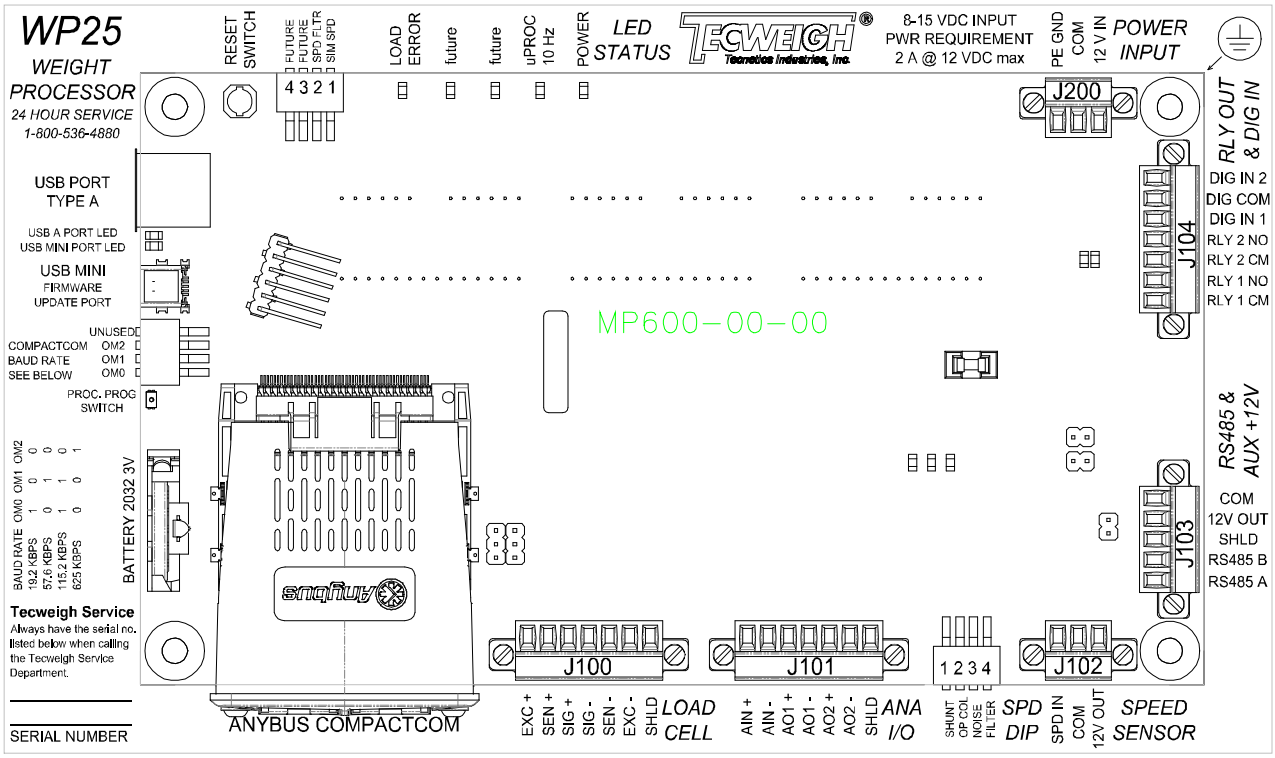
***"-----"***

This message indicates that the RATE or TOTAL values are too large to fit the display, or the TOTAL is a negative number. Move the decimal position to the right using the Rate DP Parameter (Section 6.03.01) or the Total DP Parameter (Section 6.03.05). Also note that the TOTAL will need to be RESET when it reaches the upper limit.

## 9.02 Electrical troubleshooting

This section provides methods of diagnosing lower level electrical problems. If this is a first time installation, verify that it is correctly wired and that all wires are secure in their terminals. For reference for the following paragraphs, the following three figures show the layout of the MP600 PCB and the SC500 and SC400 signal conditioner PCBs.

MP600 Main Processor PCB



***SPD DIP – SW300 (not used in SCM)***

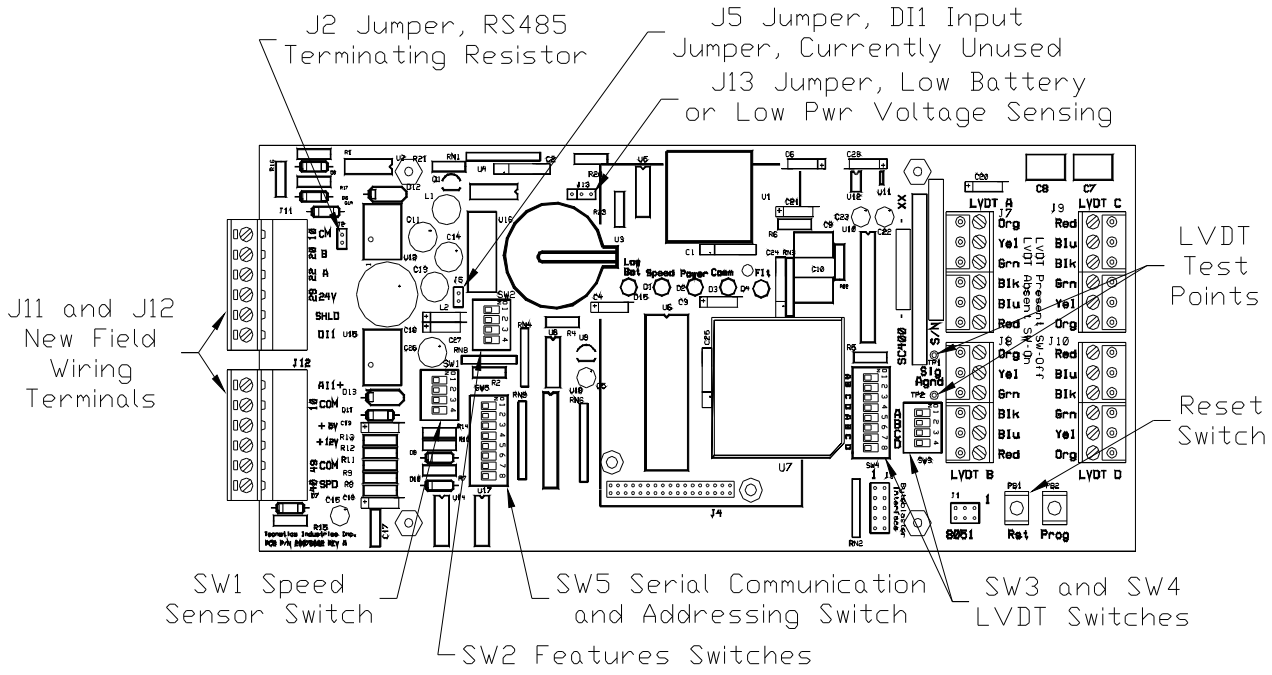
Pos1--ShuntR-- when ON, the voltage produced by SS12 and SS11 heavy duty speed sensors is loaded down, which prevents damage caused by high speed belts and minimizes electrical noise contamination. This switch must be ON unless a magnetic pickup, open collector, or TTL type speed sensor is used.

Pos2--O.C.--turn ON to add a pull-up resistor when using an open collector type speed sensor.

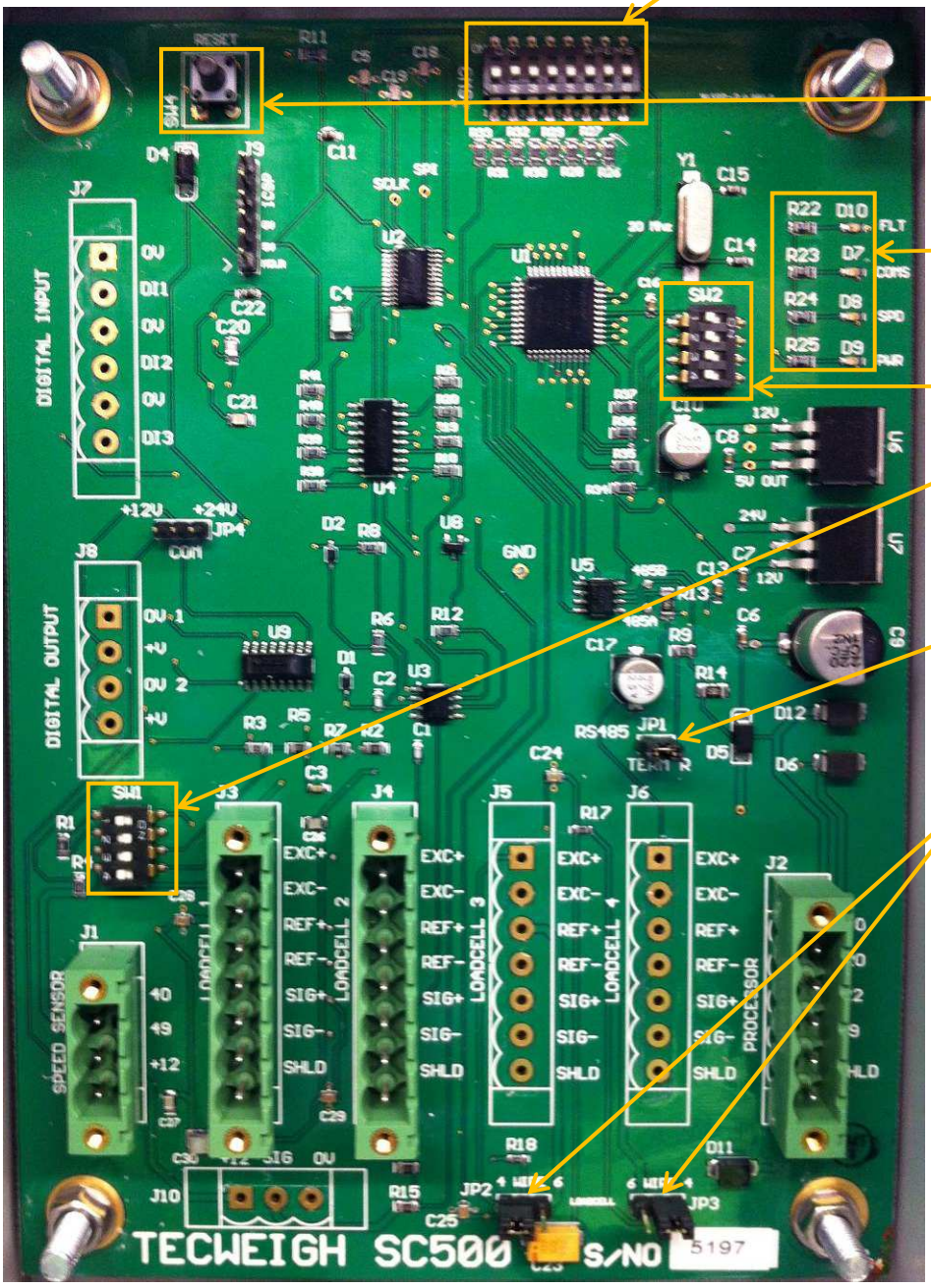
Pos3--Bias--when ON, lower level electrical “noise” is suppressed by raising the noise floor; however an increased amplitude speed sensor signal is required.

Pos4--Filter--When ON, attempts are made to smooth the speed signal and ignore electrical “noise”.

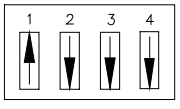
SC400 PCB
(WY10 and WY20)



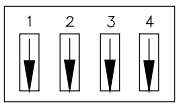
**SC500 Signal Conditioner PCB**



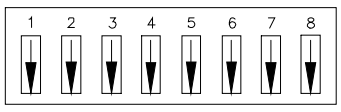

SW1




SW2




SW3




Default DIP switch settings

***Speed sensor options…***

Low belt speed or high electrical "noise" environments might require using some of the speed sensor options as defined below. Experiment with them one at a time to determine which combination results in the smoothest belt speed reading. Contact the **Tecweigh** Service Department (Section 2.01) for assistance if needed.

**SW1**

Pos1--ShuntR-- when ON, the voltage produced by SS12 and SS11 heavy duty speed sensors is loaded down, which prevents damage caused by high speed belts and minimizes electrical noise contamination. This switch must be ON unless a magnetic pickup, open collector, or TTL type speed sensor is used.

Pos2--O.C.--turn ON to add a pull-up resistor when using an open collector type speed sensor.

Pos3--Bias--when ON, lower level electrical "noise" is suppressed by raising the noise floor; however an increased amplitude speed sensor signal is required.

Pos4--Filter--When ON, attempts are made to smooth the speed signal and ignore electrical "noise".

**SW2**

Pos1--when ON, the measured speed is multiplied times 2. Try using this option if the belt speed is less than 15 feet per minute. The scale must be recalibrated per section 7.03.

Pos2--when ON, a fixed simulated SPEED for trouble shooting is produced. The SPEED value displayed on the WP25 will equal 200 times the Speed Span Parameter (Section 6.02.13). Use this option to remove the speed sensor as a potential problem when troubleshooting.

Pos3--when ON, the resistance to false belt speeds due to vibration is increased. However, lower belt speeds (less than 20 feet per minute with the standard speed sensor) might not be detected.

Pos4--when ON, decreases the resolution of the load cell signal for backwards compatibility to WP20's with the WP20-02B main processor board. Contact the Tecweigh Service Department (Section 2.02) for further details when using this option.

***Display failure…***

There are two display failure scenarios: it does not light up at all, or it does light up but is acting abnormally.

If it does not light up at all, first observe the green and red **L**ight **E**mitting **D**iodes (LED)s on the WP25 printed circuit board (PCB). The green LED indicates sufficient power to the PCB and the red LED indicates PCB failure. If the green LED is off or the red LED is on, verify that the DC power supply is working properly as follows: Verify incoming 12VDC on J200. Verify fuses on the WP25 enclosure and on the MP600 board.

If the display lights up but portions of it appear vacant or flash uncontrollably, it is likely that the display has been damaged or is being corrupted by electoral noise/interference.

If any of these conditions are found to exist, or the problem cannot be pinpointed, contact the Tecweigh Service Department (Section 2.01) for assistance.

***Other electrical problems…***

- Electrical "noise" from external electrical equipment such as variable frequency drives (VFD)s and/or large motors can interfere with WP25 and signal conditioner (SC) operation. The following are things that can be done to help prevent this problem:
- Assure that the WP25 is on its own electrical circuit and verify that terminal G is **earth grounded**.
- Do not mount the scale or the WP25 near equipment that is a source of electrical "noise", or remove the "noise" source as much as is practical. This includes, but is not limited to, motors, VFDs, SCRs, and high voltage power electrical cabling.
- Do not run power or communication wires to peripheral devices near equipment that is a source of electrical "noise". This includes not only 240/480 VAC motor wires, but also 120 VAC wires.
- **Always** take static precautions when handling PCB's (grounded wrist straps, static bags, etc.)(See Section 1.08).
- Never electrically weld near or on the scale or WP25, this can destroy the PCB's, load cells, (See Section 1.09).
- Lightning storms can destroy PCBs and/or load cells. This can either be caused by electromagnetic radiation or voltage spikes generated in the power conductors. If after a lightning storm the WP25 fails to work, you might need to replace the WP25 and/or load cells. Contact the Tecweigh Service or Parts Departments (Section 2.02) to determine replacement part requirements. Note that lightning strike damage is not covered under the warranty.

## 9.03 Operation Troubleshooting

If the system is electrically functional, but it does not seem to be calculating the correct RATE or TOTAL, first verify that all the Parameters are correct. Leaving Weigh Spn = 0 or Belt Len = 0 (Section 6.01.02 & 03), for example, will cause an erroneous calibration and the displayed RATE will be incorrect. The following are some other problems that might exist and possible solutions:

***RATE is unsteady…***

If there are large swings in the RATE during relatively constant material flow, several causes are possible. First, check the belt SPEED and make sure that it is constant, or at least does not deviate by more than about 1%. If the belt SPEED is not constant, consult Section 9.02 for speed sensor options. Second, turn off the belt and look at the Load Count Parameter (Section 6.02.17). Assure that the load counts are higher with the calibration weight down than with the cal weight up. Additionally, the load counts should not be negative and should remain relatively steady with the belt not running and no vibration. Replace the load cell(s) (Section 9.05) if the load counts are inconsistent. If the SPEED and load counts are steady, the RATE should also be steady unless the AUTO ZERO and AUTO SPAN procedures were not successful. Try doing an AUTO ZERO and AUTO SPAN again and be sure to do the AUTO ZERO first (Section 7.06). Other things to consider are the AZT setting and RATE damping. First try disabling the AZT function (Section 6.02.09), and then try increasing the Rate Damp Parameter (Section 6.03.02).

Ultimately the WP25 should calculate the Rate as follows:

Rate (STPH) = (Cal Factor) x (Scale Load (lbs)) x (Belt Speed (fpm)) ÷ (Weigh Span (in)) x RKF

Since the Cal Factor and Weigh Span do not change, the only possible problems with RATE will originate from the scale LOAD and belt SPEED. By using the calibration weight to load the scale and by simulating the belt speed, the RATE should be steady. If the rate is still unsteady, it is most likely caused by vibration or excessive electrical "noise" (See Section 9.03, paragraph "other electrical problems"). Consult the Tecweigh Service Department (Section 2.02) if problems persist.

***Scale is inaccurate…***

It is important to understand that no conveyor scale is 100% accurate. Every detail from installation through calibration contributes to overall accuracy. A very good installation on a new conveyor in a noise and vibration free environment can attain an accuracy of +/- 0.5%. A poor installation on an older and much used portable conveyor might only attain +/- 3% accuracy. Based on that range of accuracy, estimate a realistic potential accuracy for the weighing system and then proceed with searching for sources of error. Try to eliminate as many undesirable conditions as possible. If it can be verified that the RATE is consistently high or low, for finer tuning adjust the RKF Parameter (Section 6.02.15) up or down accordingly.

The following are a number of potential problems that can contribute to scale inaccuracy:

- The scale and weigh idler(s) are not aligned properly (Chapter 3).
- The weigh idler rollers do not spin freely.
- The speed sensor does not spin freely.
- The scale is subject to high vibration near a crusher or screen.
- The scale is incline mounted causing material to roll back and be weighed twice.
- The load cell(s) are damaged (Section 9.05-06).
- The conveyor belt has many splices, repairs and irregularities.
- High temperature fluctuations are causing scale, conveyor, and belt deformation.
- High winds are causing fluctuations in weighing.
- Rain water increases the weight after the scale weighs it and before the truck is weighed.
- There are incorrect or invalid Parameter settings (Chapter 6).
- There was material on the belt during calibration.
- The belt speed was not calibrated properly (Section 7.05).
- A material test was not performed (Section 7.08).
- Electrical interference is causing a false speed or load signal.

***The Parameter values cannot be edited…***

After a power line voltage spike or a lightning strike nearby, the Parameter values can get scrambled/corrupted. An indication of this happening is when one of the digits of a Parameter cannot be changed. Remove the WP25 power, remove the WP25 RAM battery and leave off for a few minutes. Reinstall the battery and reapply power. If this does resolve the issue replace the WP25 circuit board. This kind of damage is not field repairable. Contact the Tecweigh Service Department (Section 2.02) for assistance.

***Resetting the PCB…***

If after trying other troubleshooting techniques, the equipment still does not perform up to expectations, press the reset button **on the WP25 PCB**. The reset button is a small white button on the back at the upper left corner of the PCB. Also refer to Section 9.02 for a picture of its location. This will check for corrupt data and also recover Parameters from memory if necessary. If this has no effect, try disconnecting the power completely and after a short time delay reconnecting it.

## 9.04 Auxiliary Outputs Troubleshooting

***Relay failure…***

For each relay on the WP25 printed circuit board (PCB), a green LED also exists. When a relay is energized, its LED will illuminate, and should illuminate whether a load is connected to the relay or not. The relays will also make a clicking sound as they are energized and de-energized. If a relay is found to be non-functional per the above, replace the PCB. The relays are not field replaceable. Contact the Tecweigh Service or Parts Department (Section 2.02) for assistance.

If the relays seem to work properly in Simulation mode, but do not work during normal operation, consider how realistic the relay Parameters settings are. Common errors are described as follows:

The most common error made when setting up the Total Pulse Repeater (TPRS for short total, TPRL for long total) function (Sections 6.04.23,32) is to request that the relay open and close too frequently (Sections 6.04.22, 31). This can cause it to remain always open or always closed.

The most common error made when setting up the relays for High/Low RATE or High/Low SPEED Alarms (Section 6.04.24-26, 33-35) is that the selected limits are not realistic. This causes the alarm condition to never exist or to exist constantly. Also check the time delay before energization (Sections 6.04.26,35) and for form (N.O. or N.C.6.04.21,30) to insure it is compatible with the application. The alarm condition must exist for at least the length of the delay time before the relay will be energized.

***Current loop outputs are non-functional…***

The WP25 has two 4 (or 0) to 20 milli-amp outputs that act in unison and that are programmable for various functions. Ensure the parameters settings and trim parameters are correct and verify operation (or non-operation with a functional milliamp meter

Verify that the remote devices in the current loop are “passive”, that is, they do not provide power to the loop. Remove or replace any that are found to be non-passive. If the output works properly with just the milli-ammeter connected, but fails with a passive load(s) connected, the load is probably too large. The maximum load permissible is approximately 350 ohms total.

Another possible problem that could arise is that the current output is functional, but one or more loads are not functional in a multi-load loop. This problem is usually caused by the loads not being isolated. Every load in the current loop needs to be isolated (See Section 4.02). Also refer to Section 4.02, “4-20 ma RATE current loop output”.

If all of the above fails to rectify the problem, the PCB is faulty. It is not field repairable. Contact the Tecweigh Service or Parts Department (Section 2.02) for assistance.

***Other problems…***

The outputs could become disabled or not operate as expected, 1) if an interlock is programmed and open (Section 4.01, "Remote Interlock), 2) during an Auto Zero or Auto Span, or, 3) while the unit is in Program Mode. If everything is correct and the system is operating normally, but a remote device is not, consult the supplier of that device, otherwise, contact the Tecweigh Service Department (Section 2.01) for assistance.

## 9.05 Load Cell Testing / Replacement

The following explains how to test a load cell(s). The resistance checks can find a gross load cell issue and the voltage checks can find much more subtle problems.

### Resistance Checks:

First stop the conveyor and disconnect power from the WP25. Then unplug the green connector from the WP25 internal summing board (Direct mode) or SC500 signal conditioner (Scale card mode) that the load cell wires are connected to. If more than one load cell is connected to the green connector, to get at accurate reading, the wires of the load cell to be tested will have to be removed from the connector. Next, using an ohmmeter, verify the following resistance values. If even one resistance value varies by more than +/- 10%, replace the load cell.

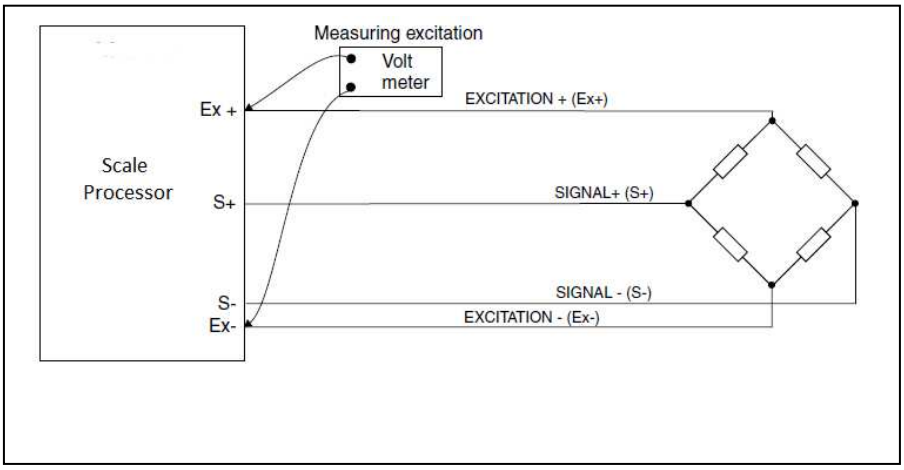
| Model | CI-LC22 | SB1 or LC | CB6-XX-T | CB6-XX-TP | SP4M |
|---|---|---|---|---|---|
| Red-Black | 310 Ω | 350 Ω | 400 Ω | 280 Ω * | 290 Ω |
| Red-Green | 290 Ω | 280 Ω | 290 Ω | 300 Ω * | 290 Ω |
| Red-White | 360 Ω | 280 Ω | 290 Ω | 350 Ω | 388 Ω |
| Black-White | 290 Ω | 280 Ω | 290 Ω | 280 Ω * | 290 Ω |
| Black-Green | 390 Ω | 280 Ω | 290 Ω | 400 Ω | 388 Ω |
| Green-White | 290 Ω | 350 Ω | 350 Ω | 300 Ω * | 290 Ω |

** NOTE: Changes in the temperature compensate engineering result in the + legs resistance being different from the – legs.*

## Voltmeter Checks:

Load cell functionality can be checked on the conveyor scale with a voltmeter. The following illustration shows how to measure the excitation voltage. Both the WP25 in direct mode and the SC500 in SCM use 5 volts DC excitation.

*Note with 5 volts of excitation and a load cell has a 2 millivolts per volt (mv/v) rating, the maximum load cell signal during normal operations will be .01 volts (10 mv)*




### Load Cell Dynamic Test

1. Using a volt meter measure the excitation voltage (EXC+ to EXC -) and record.
2. From the load cell label verify the mv/v rating (most Tecweigh scales use 2 mv/v load cells)
3. Using a millivolt meter record the signal voltage (SIG+ to SIG-) with the belt empty. Polarity is important. The belt does not need to be running.
4. Lower the calibration weight(s) and using a millivolt meter measure and record the signal voltage (SIG+ to SIG-). Polarity is important. The belt does not need to be running.
5. The millivolt (mv) signal should increase with the calibration weights lowered. With a 2 mv/v load cell the millivolt signal should be less than 10 mv. If greater than 10 mv or if the signal voltage is negative at any time, the load cell should be replaced.

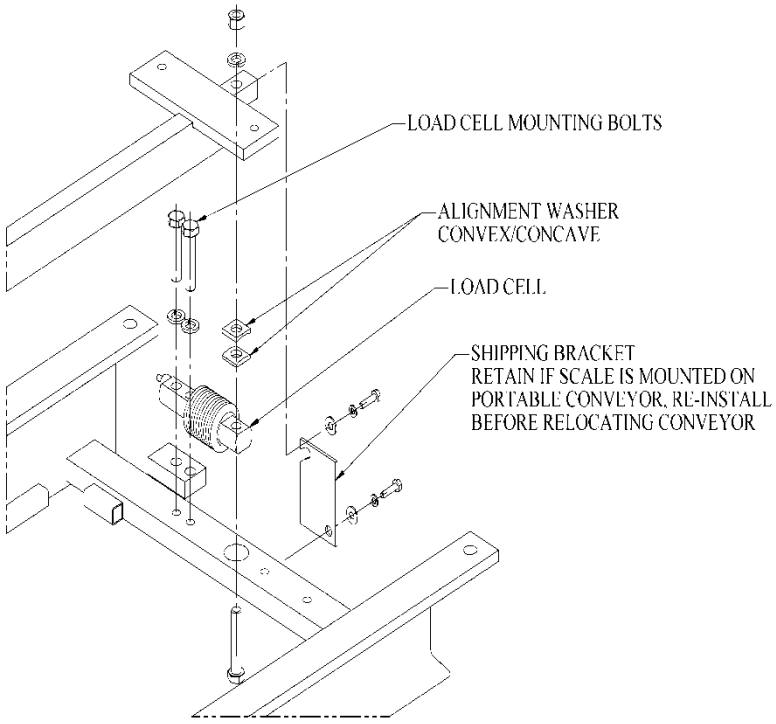
| | |
|---|---|
| Excitation voltage | |
| Signal mv no cal weight | |
| Signal mv with cal weight | |

### Single Load Cell Test

The same dynamic test may be performed on a single load cell by unplugging the remaining load cells and making the same observations with each load cell plugged in one at a time.

## Load Cell Replacement

If it is necessary to replace a load cell, be sure to re-assemble the new load cell exactly the same way it was disassembled. It is best to remove the weigh idler and spreader bar from the scale to prevent twisting and damaging the other load cell from moving the spreader bar up or down. Take special note of the hemispherical swivel washers. The contoured faces of these washers fit together and the flat faces are on top and bottom. The orientation is important to remove any mechanical stress from the spreader bar bolted between the load cells that support the weigh idler. The shipping brackets are only used during transportation and installation. It they should be removed during normal operations.



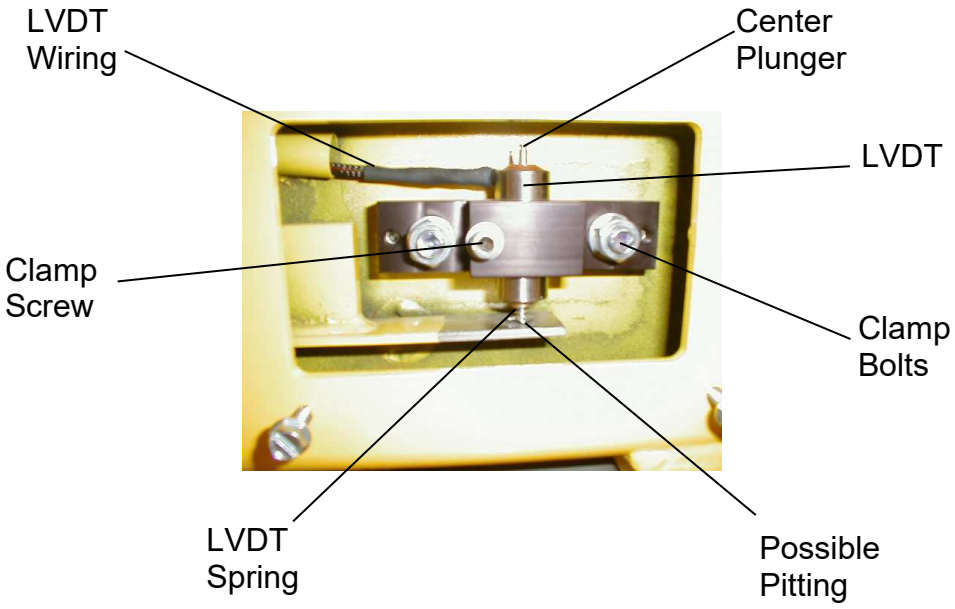

# 9.06 LVDT Testing and Replacement

The following explains how to test and replace a LVDT(s). First stop the conveyor and disconnect power from the WP25. Then remove the side cover on the scale carriage to allow access to the SC400 signal conditioner (SC) or LVDT to SC500 converter board junction box. Next, unplug the connector from the SC400 or LVDT converter board that the LVDT wires are connected to. Then, using an ohmmeter, verify the following resistance values off the removed blue connector on the appropriate colored wires. The screws holding the wires into the blue connector make a convenient place to measure the resistance. If any resistance value varies by more than +/- 20 %, replace that LVDT.

ORG - YEL = 70 Ω
GRN - BLK = 100 Ω
BLU - RED = 100 Ω

If replacement of a defective LVDT is necessary, use the following instructions. Refer to the following figure. First remove the LVDT wiring from the connector. Then remove the two bolts from the LVDT clamp. Next, remove the LVDT assembly from the carriage. Now loosen the clamp screw and slide the LVDT out of the clamp. Verify no pit or divot is worn into the arm when the LVDT plunger makes

contact with the arm. Install the new LVDT in approximately the same position, and assemble in reverse order. Re-wire it to the green connector, being careful to keep the wiring away from the deflection arm. The new LVDT(s) must be aligned (Section 7.03, or for the converter board the instruction supplied with it) and the scale re-calibrated (Section 7.04) after a LVDT has been replaced.




## 9.07 Defaulting Parameters

(Setting all Parameters to their default values)

If the WP25 does not respond properly to any commands and the firmware appears to be "scrambled" or corrupt, re-setting the Parameter Table to its last saved set or to default values can be tried.

> *IMPORTANT NOTE: Before you default the processor, make sure that all current user determined Parameters (recorded in the Parameter Table, Section 11.02) are available, so they can be replaced in the WP25 processor after defaulting.*

### Recovering last saved parameter set

- Access security menu
- Scroll to **Param Ops**
- Change **No Change** to **Recall**
- Reboot when prompted

### Restoring DEFAULT parameter set

- Access security menu
- Scroll to **Param Ops**
- Change **No Change** to **Default**
- Reboot when prompted

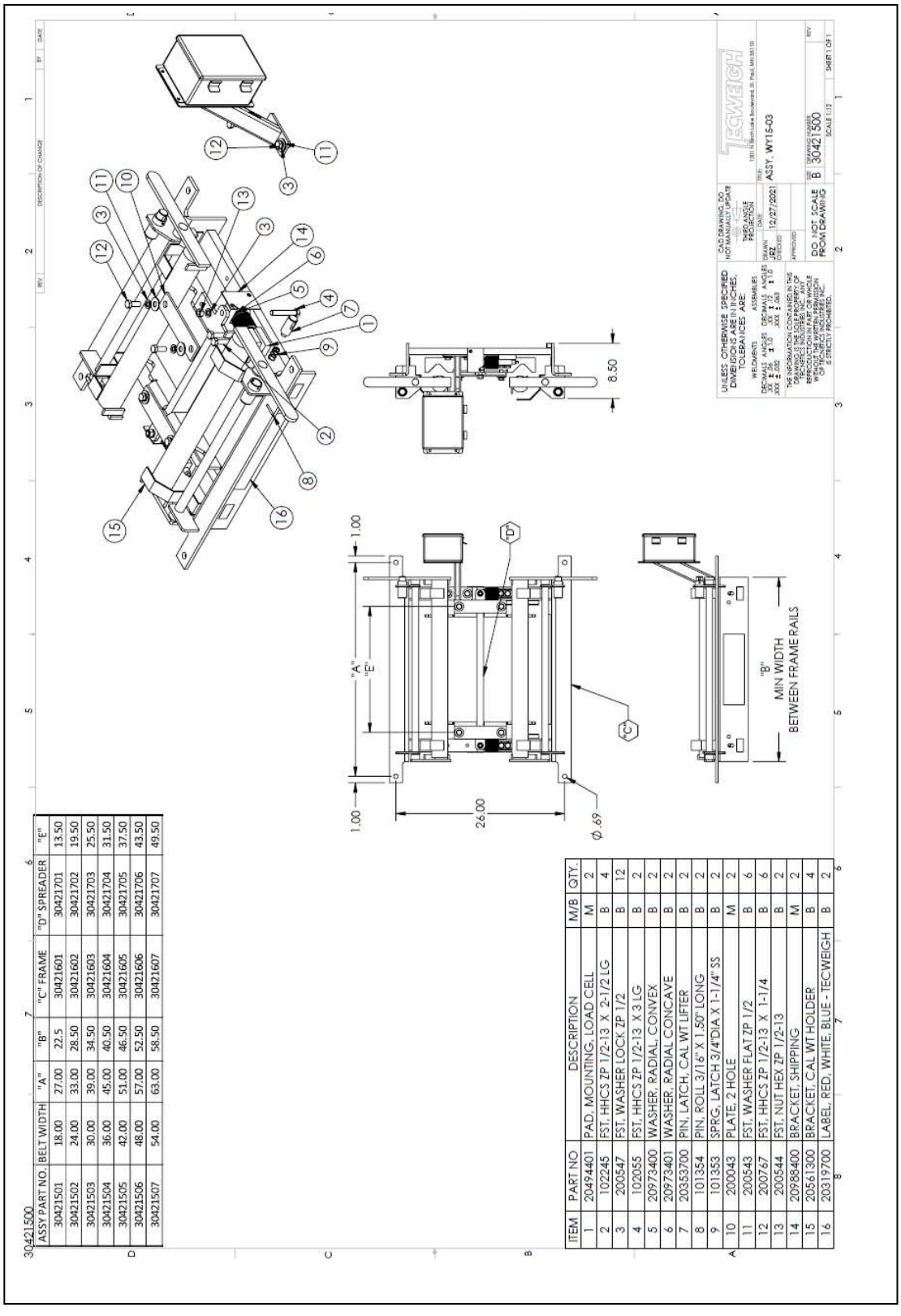
If **neither** of the above procedures worked, another Default procedure can be tried by placing a piece of paper between the battery and the clip holding the battery in and shutting off the power for 2 minutes. This will force a complete RAM reload. If this does not work, most likely the processor is defective and needs to be returned for servicing. Contact the Tecweigh Service or Parts Department (Section 2.02) for assistance.

## 9.08 WP25 Support Items:

- 30407600 Standard MP600 circuit board
- 30407602 MP600 circuit board for TTL printer
- 30407603 MP600 circuit board for remote analog setpoint
- 10983413 MP600 Fuse Kit
- 106497 Scale Card Cable
- 002028 USB extension cable
- 005028 USB Flash drive
- 108575 WP25 switch membrane
- 106004 Ribbon cable 90° adapter
- 005218 WP25 TTL Printer
- 005219 WP25 Printer Paper Roll
- 30201711 WP25 TTL to RS485 Adapter
- 005135 RS485 to USB adapter for Aux Serial Port
- 20976610 SC500 LVDT Interface Card
- 30420443 WY10 SC500 LVDT Interface Retrofit Kit
  *(Items to replace obsolete SC400 card with a SC500 card)*

# CHAPTER 10 – DIMENSIONS

## 10.01 WY15 Dimensions



# 10.02 HW15 (Modular Scale)

**MODEL HY15**
SINGLE IDLER MODULAR CONVEYOR BELT SCALE

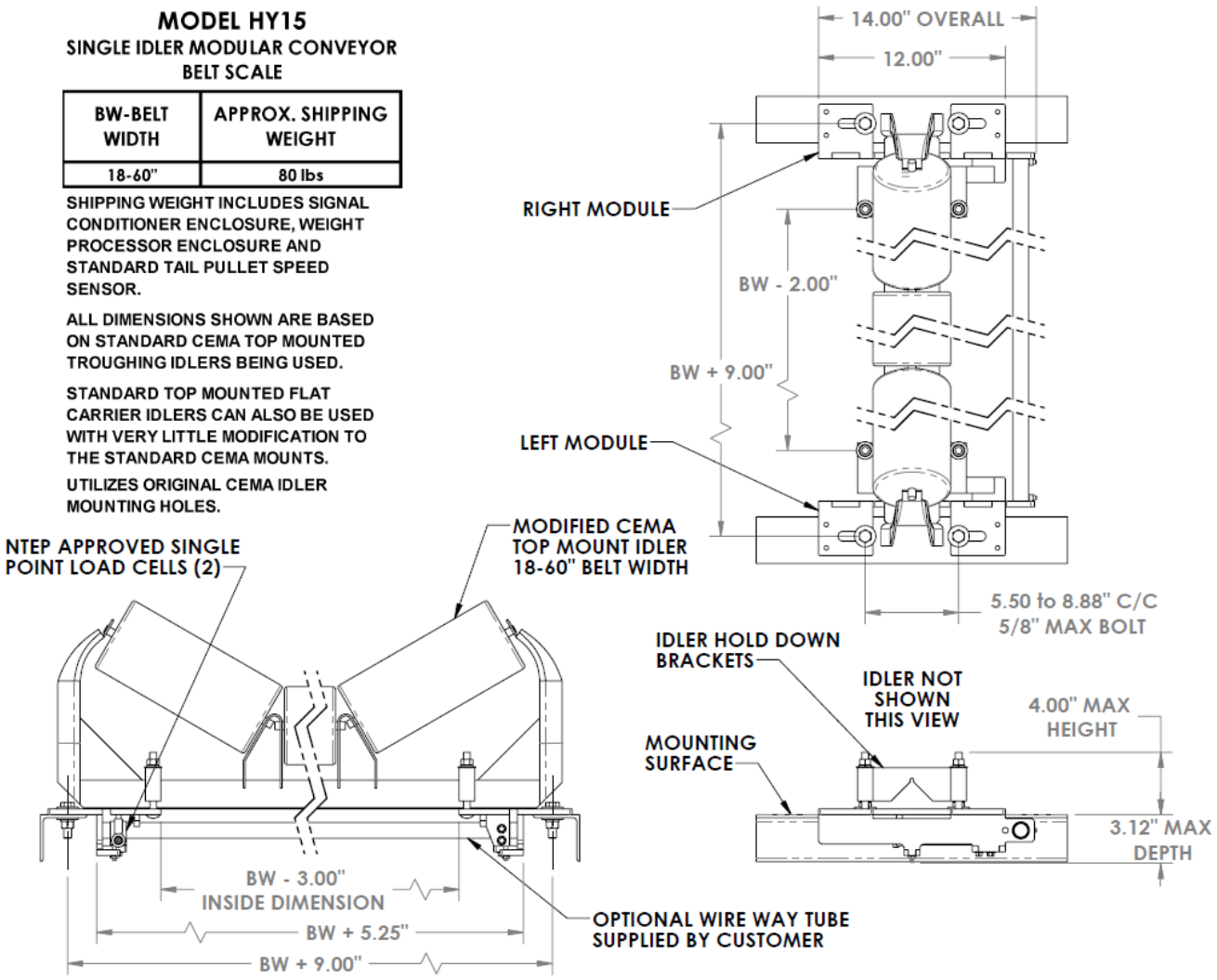
| BW-BELT WIDTH | APPROX. SHIPPING WEIGHT |
|---|---|
| 18-60" | 80 lbs |

SHIPPING WEIGHT INCLUDES SIGNAL CONDITIONER ENCLOSURE, WEIGHT PROCESSOR ENCLOSURE AND STANDARD TAIL PULLET SPEED SENSOR.

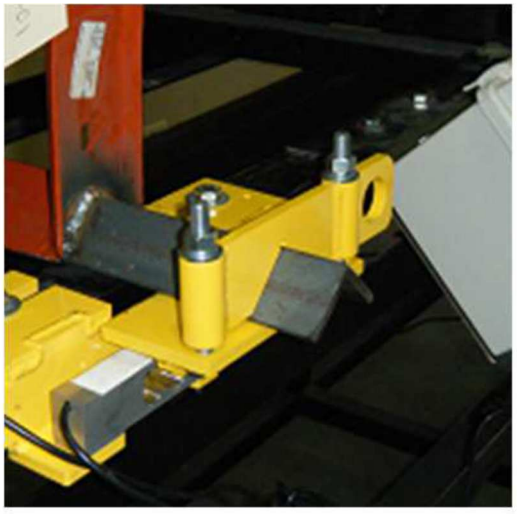
ALL DIMENSIONS SHOWN ARE BASED ON STANDARD CEMA TOP MOUNTED TROUGHING IDLERS BEING USED.

STANDARD TOP MOUNTED FLAT CARRIER IDLERS CAN ALSO BE USED WITH VERY LITTLE MODIFICATION TO THE STANDARD CEMA MOUNTS.

UTILIZES ORIGINAL CEMA IDLER MOUNTING HOLES.




The HW15 modular scale is also available in an external configuration that is useful for installation on stacking conveyors where there is not sufficient space between the top of the lower channel and the top of the return side of the belt for a standard scale carriage to be installed without being hit by the return side of the belt. Contact Tecweigh for further information on the HY15 external configuration.



HY15 External Configuration

## 10.03 WY15HD, WY25, WY25HD and WY45 Dimensions

Most WY15 Heavy Duty, WY25(dual idler), WY25HD and WY45 (Quad Idler) scales are built to order and have a unique print supplied specific to each job. Contact Tecweigh for a job specific print for dimensions of these scales.

# CHAPTER 11 –FACTORY SETUP SHEET AND PARAMETER TABLE

## 11.01 Factory Setup Sheet

Job Number: _____Serial Number _____

Customer Name: _____

WP25: Model: WP25 - _____ - _____ - _____ - _____ - _____

WP25 firmware version: _____

WP25 hardware version: _____

Scale Carriage: Model: _____

Date Shipped _____ / ____ / 20 _____Set-up by: _____

PRELIMINARY DATA: (order information)

Unit of measurement: _____

Feed Rate: _____min, _____avg, _____ max.

Belt Speed: _____ min, _____avg, _____ max.

Belt Width:_____ Belt Length:_____

Scale Carriage: Size:_____ Style_____

Factory Idler Mod: _____ Offset Idler:_____

Speed Sensor: Model:_____Style: _____

WP25 supply voltage: _____

WP25 milliamp output set at : _____

SPECIAL

_____

_____

_____

_____

# 11.02 PARAMETER TABLE

| | Parameter | Description | Parameter Settings | | |
|---|---|---|---|---|---|
| **Main Menu 6.01** | | | **Default** | **Factory** | **Field** |
| 1 ) | Units | Calibration method selected (weight,chain,elecronic) | Tons/Hr | | |
| 2 ) | Cal Factor | Calibration factor for a given scale model (see appendix) | 0.36 | | |
| 3 ) | Wgh Span | Weigh span length (inches, meters) | 36.0 | | |
| 4 ) | Belt Len | Belt length (feet, meters) | 150.0 | | |
| 5 ) | Dead Band | Threshold below which no totalizing accumulates | 0.0 | | |
| 6 ) | Odometer | Lifetime total number of units accumulated | live | | |
| 7 ) | Scale Name | CompactComm parameter only (or Customer designation) | | | |
| 8 ) | Belt speed | Observation from main display | live | | |
| 9 ) | Software Ver | Observation from main display ( ← → same time) | live | | |
| **Calibration Menu 6.02** | | | | | |
| 1 ) | P/P WP Tot | Processor material test PRE weight (short total) | live | | |
| 2 ) | P/P Actual | Actual material test POST weight (user entered) | 0.0 | | |
| 3 ) | Method | Calibration method selected (weight,chain,elecronic) | CAL WEIGHT | | |
| 4 ) | Cal Wt | Calibration weight value (lbs,Kg) | 150.0 | | |
| 5 ) | Cal Chn | Calibration chain (lbs/ft, kg/m) | 0.0 | | |
| 6 ) | LC Cap | Total capacity of all load cells (lbs,kg) | 330.0 | | |
| 7 ) | LC mv/v | Load cell output sensitivity millivolts/volt | 2.0 | | |
| 8 ) | Angle | Conveyor angle of incline or decline from horizontal (deg) | 0.0 | | |
| 9 ) | AZT | Auto Zero Tracking rate | 0.0 | | |
| 10 ) | Trck Revs | Number of belt revolutions used by AZT | 0.0 | | |
| 11 ) | Zero Revs | Number of belt revolutions used by Auto Zero | 2.0 | | |
| 12 ) | Span Revs | Number of belt revolutions used by Auto Span | 2.0 | | |
| 13 ) | Speed Spn | Speed calibration factor (unity=sensor HZ) | 0.47 | | |
| 14 ) | Speed Counts | Raw speed counts per integration cycle | live | | |
| 15 ) | Rate K Fctr | Rate Correction factor | 1.0 | | |
| 16 ) | Span Detect | Change in load counts required to initiate Auto Span | 100000 | | |
| 17 ) | Load Count | Live load counts from load sensor A/D | live | | |
| 18 ) | Zero Count | Load counts averaged during Auto Zero Calibration | 500000 | | |
| 19 ) | Span Count | Load counts averaged during Auto Span Calibration | 1500000 | | |
| 20 ) | Offset Count | Difference of Span and Zero counts | 1000000 | | |
| 21 ) | Down Count | Allow negative rate to decrement total | No | | |
| **Display Setup Menu 6.03** | | | | | |
| 1 ) | Rate DP | Rate display decimal point setting | 0 | | |
| 2 ) | Rate Damp | Rate display damping factor | 15.0 | | |
| 3 ) | Speed DP | Speed display decimal point setting | 0 | | |
| 4 ) | Speed Damp | Speed display damping factor | 15.0 | | |
| 5 ) | Total DP | Total display decimal point setting | 0 | | |
| **Input Output Menu 6.04** | | | | | |
| 1 ) | Simulation | Artificial rate and speed for calibrating peripheral devices | OFF | | |
| 2 ) | Sim Rate | Artificial rate used when Simulation enabled | 100.0 | | |
| 3 ) | Sim Speed | Artificial speed used when Simulation enabled | 100.0 | | |
| 4 ) | A1 Function | Selects the function for analog output #1 | UNUSED | | |
| 5 ) | A1 mA Damp | Analog #1 output damping factor | 15.0 | | |
| 6 ) | A1 Base mA | Analog #1 output at zero | 4.0 | | |
| 7 ) | A1 Base Trim | Analog #1 trim for the zero mA output | 1.0 | | |
| 8 ) | A1 Peak Trim | Analog #1 trims for the range mA output | 1.0 | | |
| 9 ) | A1 Range | Analog #1 output at 20 mA output current | 100.0 | | |

**Input Output Menu 6.04 cont**

| | | | | | |
|---|---|---|---|---|---|
| 10 ) | A2 Function | Selects the function for analog output #2 | UNUSED | | |
| 11 ) | A2 mA Damp | Analog #2 output damping factor | 15.0 | | |
| 12 ) | A2 Base mA | Analog #2 output at zero | 4.0 | | |
| 13 ) | A2 Base Trim | Analog #2 trim for the zero mA output | 1.0 | | |
| 14 ) | A2 Peak Trim | Analog #2 trims for the range mA output | 1.0 | | |
| 15 ) | A2 Range | Analog #2 output at 20 mA output current | 100.0 | | |
| 16 ) | AIN Base mA | Analog Input at zero | 4.0 | | |
| 17 ) | AIN Base Trim | Analog Input trim for the zero mA input | 1.0 | | |
| 18 ) | AIN Peak Trim | Analog Input trim for the range mA input | 1.0 | | |
| 19 ) | AIN Range | Analog Input at 20 mA input current | 100.0 | | |
| 20 ) | RLY 1 Func | Relay 1 output function | UNUSED | | |
| 21 ) | RLY 1 Lgc | Relay 1 logic (N.O. or N.C.) | N.O. | | |
| 22 ) | RLY 1 Pls | Relay 1 pulse duration (seconds) | 1.0 | | |
| 23 ) | RLY 1 TS | Relay 1 totalizer scale | 0.0 | | |
| 24 ) | RLY 1 Low | Relay 1 low alarm setpoint | 10.0 | | |
| 25 ) | RLY 1 High | Relay 1 high setpoint | 100.0 | | |
| 26 ) | RLY 1 Delay | Relay 1 delay before alarm (seconds) | 10.0 | | |
| 27 ) | RLY 1 Total | Relay 1 high total alarm setpoint | 0.0 | | |
| 28 ) | RLY 1 AZT%FS | Relay 1 AZT % of full scale | 5.0 | | |
| 29 ) | RLY 2 Func | Relay 2 output function | UNUSED | | |
| 30 ) | RLY 2 Lgc | Relay 2 logic (N.O. or N.C.) | N.O. | | |
| 31 ) | RLY 2 Pls | Relay 2 pulse duration (seconds) | 1.0 | | |
| 32 ) | RLY 2 TS | Relay 2 totalizer scale | 0.0 | | |
| 33 ) | RLY 2 Low | Relay 2 low alarm setpoint | 10.0 | | |
| 34 ) | RLY 2 High | Relay 2 high setpoint | 100.0 | | |
| 35 ) | RLY 2 Delay | Relay 2 delay before alarm (seconds) | 10.0 | | |
| 36 ) | RLY 2 Total | Relay 2 high total alarm setpoint | 0.0 | | |
| 37 ) | RLY 2 AZT%FS | Relay 2 AZT % of full scale | 5.0 | | |
| 38 ) | DI 1 Func | Digital input 1 function | UNUSED | | |
| 39 ) | DI 2 Func | Digital input 2 function | UNUSED | | |

**Feed Control Menu 6.05**

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | PID Set Srce | Setpoint source for PID control loop | Keypad | | |
| 2 ) | PID Setpoint | Keypad entered setpoint | 0.0 | | |
| 3 ) | Max CO | Maximum control output (%) | 100.0 | | |
| 4 ) | PID Mode | Selects PID control loop operating mode | OFF | | |
| 5 ) | PID Override | Selects CO % when override enabled | 0.0 | | |
| 6 ) | PID Period | Selects averaging for PID loop (seconds) | 2 | | |
| 7 ) | PID Max I | Value for minimizing integral windup | 710.0 | | |
| 8 ) | PID P | PID Proportional term | 1.5 | | |
| 9 ) | PID I | PID Integral term | 0.12 | | |
| 10 ) | PID D | PID Derivative term | 0.0 | | |

RS485 Serial Menu 6.06

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | Scale Card Md | Enable or disable Scale Card Mode (SCM) | DIS | | |
| 1a) | Range | (*SCM only*) A/D resolution of scale card | 32767 | | |
| 2 ) | Station ID | WP25 serial interface station ID letter | A | | |
| 3 ) | Parity | Serial port parity type | None | | |
| 4 ) | Baud rate | Serial port baud rate | 9600 | | |
| 5 ) | Command menu | Serial port broadcast mode menu selection | 00 | | |
| 6 ) | Protocol menu | Selects the desired Tecweigh protocol | TEC STD | | |
| 7 ) | Export Log | Determines RS485 logging action at next boot up | NO | | |
| 8 ) | Erase Log | Determines RS485 logging action at next boot up | NO | | |
| 9 ) | Event Count | Number of events in the RS485 log | live | | |
| 10 ) | Mem | Flash memory in % full used by data logging | live | | |

Security Menu 6.07

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | Lock Match | User entered code to access setup if lock code > 0 entered | 0 | | |
| 2 ) | Lock Code | Lock code required to be matched (if non zero) | 0 | | |
| 3 ) | Lock AZ/AS | Lock for Zero and SPAN calibrations from keypad | None | | |
| 4 ) | Lock Resets | Lock reset of total from keypad | None | | |
| 5 ) | Param Ops | Allows saving, storing or defaulting of parameters | NO CHNG | | |

Clock/Printer Menu 6.08

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | RTC Config | Real Time Clock format | 12H-YMD | | |
| 2 ) | Date | WP25 date in format selected by RTC Config | 2017/01/01 | | |
| 3 ) | Time | WP25 time in format selected by RTC Config | 00:00:00 | | |
| 4 ) | P-Port Fcn | Printer port function | Print | | |
| 5 ) | Print Tck | Enables ticket printing (when DI set to print and activated) | No | | |
| 6 ) | Min Rate | Value rate must be lower than to allow printing (0=disabled) | 0.0 | | |
| 7 ) | L1 | Text of print header line 1 | Print Header Line 1 | | |
| 8 ) | EdL1 | Edit text of print header line 1 | Print Header Line 1 | | |
| 9 ) | L2 | Text of print header line 2 | Print Header Line 2 | | |
| 10 ) | EdL2 | Edit text of print header line 2 | Print Header Line 2 | | |
| 11 ) | L3 | Text of print header line 3 | Print Header Line 3 | | |
| 12 ) | EdL3 | Edit text of print header line 3 | Print Header Line 3 | | |
| 13 ) | L4 | Text of print header line 4 | Print Header Line 4 | | |
| 14 ) | EdL4 | Edit text of print header line 4 | Print Header Line 4 | | |
| 15 ) | L5 | Text of print header line 1 | Print Header Line 5 | | |
| 16 ) | EdL5 | Edit text of print header line 5 | Print Header Line 5 | | |
| 17 ) | ? Print Line 1 | Include print header line 1 when printing | OFF | | |
| 18 ) | ? Print Line 2 | Include print header line 2 when printing | OFF | | |
| 19 ) | ? Print Line 3 | Include print header line 3 when printing | OFF | | |
| 20 ) | ? Print Line 4 | Include print header line 4 when printing | OFF | | |
| 21 ) | ? Print Line 5 | Include print header line 5 when printing | OFF | | |
| 22 ) | ? Date/Time | Include date and time in print header when printing | OFF | | |
| 23 ) | ? ST | Include short total in print header when printing | OFF | | |
| 24 ) | ? LT | Include long total in print header when printing | OFF | | |
| 25 ) | ? Rate | Include 1 min ave rate in print header when printing | OFF | | |
| 26 ) | Print Spaces | Number of blank linefeeds after ticket printed | 3 | | |

**USB/Logging Menu 6.09**

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | Mem | Percent of data logging memory used | NO ACTION | | |
| 2 ) | Cal Event Ct | Number of calibration events logged | Live | | |
| 3 ) | Data Event Ct | Number of data logging events logged | Live | | |
| 4 ) | Log Select | Select type(s) of data to be logged | None | | |
| 5 ) | Log Events | Selects the events to have data logged on | No logging | | |
| 6 ) | Log Interval | Selects the frequency of periodic data logging | None | | |
| 7 ) | Export Method | Selects where the saved records are sent to on export | None | | |
| 8 ) | Erase Method | Enables erasing logged data after export | None | | |

**Maintenance Menu 6.10**

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | ? Speed 200 | Enables an artificial belt speed of 200 pulses per int cycle | DIS | | |
| 2 ) | ? Speed Filt | Enables average of 3 speed int cycles | DIS | | |
| **3 )** | ? Maintenance | Enables editing some parameters | DIS | | |

**FieldBus Data 6.11**

| | | | | | |
|---|---|---|---|---|---|
| 1 ) | IP Address | | 0.0.0.0 | | |
| 2 ) | Sub Mask | | 0.0.0.0 | | |
| 3 ) | Gateway | | 0.0.0.0 | | |
| 4 ) | DNS1 | | | | |
| 5 ) | DNS2 | | | | |

# CHAPTER 12 - WARRANTY AND SERVICE POLICIES

WARRANTY & SERVICE POLICY

CONVEYOR SCALES &

WEIGH BELT FEEDERS

Statement of Limited Warranty – Tecnetics Industries, Inc.

**Tecnetics Industries, Inc.,** Warrants this equipment against faulty components or factory defects, for a period of five (5) years beginning on the date of shipment/invoice. (Speed sensors and load cells) shall have a warranty of one (1) year. During the warranty period, any defect will be repaired or replaced without charge, providing that the equipment is returned, pre-paid and undamaged to **TECNETICS'** factory. When on site repair or replacement is required, a **Tecnetics** authorized distributor or technician can be hired to diagnose and make necessary repairs. **The Warranty will cover affected parts, but excludes travel and labor expenses.**

Terms and Conditions of Limited Warranty

Accuracy of the device may be limited by poor installation, faulty or improper conveyor equipment on which the scale is to be placed, or improper calibration methods. Warranty is therefore limited to those installations having the approval of **TECNETICS** or an authorized **TECNETICS REPRESENTATIVE**. This exclusive warranty is limited to the original user, and no other express or implied warranties shall apply. Excluded from the warranty are normal wear and tear, removal or installation of warranty parts, freight, physical abuse, or buyer caused damage including, but not limited to, such things as overloading of the system, change in belt speed, or damage resulting from over-voltage, lightning, or water entry.

WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

**Tecnetics Industries, Inc.,** shall not be liable for damage to equipment, property or person due to improper installation or through attempts to utilize the goods under conditions that exceed the designated capabilities. It is the user's responsibility to determine the suitability of the equipment to his needs. Various State and Local agencies may require certain certification procedures relative to the use of this equipment. **Tecnetics** makes no assurance that this device fulfills those criteria beyond this warranty based on data sheets received from the buyer. **Tecnetics** Industries, Inc. specifically disclaims any consequential liability arising from the use of this product; maximum liability is limited to the original purchase price.