Table 1: Revision history

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Initial release. Formerly 244390.</td>
<td>051201</td>
</tr>
<tr>
<td>1.1</td>
<td>Electronics revision</td>
<td>090306</td>
</tr>
<tr>
<td>1.2</td>
<td>Added certification information and IECex label</td>
<td>090820</td>
</tr>
<tr>
<td>1.3</td>
<td>Changed company name, logo, and website</td>
<td>110301</td>
</tr>
</tbody>
</table>

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VEGA Americas, Inc.
4170 Rosslyn Drive
Cincinnati, Ohio 45209-1599 USA
Voice: (513) 272-0131
FAX: (513) 272-0133
Web site www.vega-americas.com

WARNING

Use this equipment only in the manner that this manual describes. If you do not use the equipment per VEGA specifications, the unit is not CE compliant, and may be damaged or cause personal injury.
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Explanation of symbols
Table 2 lists the symbols that the manual and instrument use.

| Radiation notice | In the manual, information concerning radioactive materials or radiation safety information is found in the accompanying text. |
| Caution          | In the manual, warnings concerning potential damage to the equipment or bodily harm are found in the accompanying text. |
| AC current or voltage | On the instrument, a terminal to which or from which an alternating (sine wave) current or voltage may be applied or supplied. |
| DC current or voltage | On the instrument, a terminal to which or from which a direct current voltage may be applied or supplied. |
| Potentially hazardous voltages | On the instrument, a terminal on which potentially hazardous voltage exists. |
Your comments
VEGA values your opinion! Please fill out this page so that we can continually improve our technical documentation.


Date: ______________
Customer Order Number: ___________________

How we can contact you (optional if you prefer to remain anonymous):

Name: ____________________________
Title: ____________________________
Company: __________________________
Address: __________________________

Did you find errors in this manual? If so, specify the error and page number.

Did you find this manual understandable, usable, and well organized? Please make suggestions for improvement.

Was information you needed or would find helpful not in this manual? Please specify.

Please send this page to:

VEGA Americas, Inc.
Director of Engineering
4241 Allendorf Drive
Cincinnati, OH 45209-1599
Preface

Notes
Chapter 1: Introduction

This equipment contains radioactive source material that emits gamma radiation. Gamma radiation is a form of high-energy electromagnetic radiation. The W-4800 comes with a low activity source holder (SHGL). This source holder can be distributed to a general or specific licensee. A general licensee may perform the following:

- Initially mount
- Install
- Perform wipe tests

The general licensee may also relocate the device following the manufacturer’s instructions if the manufacturer or another specific licensee has evaluated the new location to ensure that all general license criteria are met.

This source holder does not have a shutter so there is not a requirement for a shutter test.

Storage

Whenever the device is removed from its mounted position, the shield on the back of the device must be mounted to shield the front beam port using the captivated bolts in the shield.

Transfer and disposal

The transfer of this device from one general licensee to another must be performed in accordance with the specific countries regulatory statutes. All recipients of device transfers or disposal must be specific licensees.

Leak tests

Devices containing 3.7 MBq (100 uCi) or less of CO-60 or CS-137 need not be leak tested. Devices containing more than 3.7 MBq (100 uCi) must be leak tested at least once every 36 months.

VEGA Field Service engineers have the specific license to install and commission nuclear gauges, and can instruct you in the safe operation of your weigh scale. To contact VEGA Field Service, call 513-272-0131. Users outside the U.S. and Canada may contact their local representative for parts and service.
Introduction

Note: Special instructions concerning your source holder are found in the envelope that was shipped with the source holder and the “Radiation Safety for U.S. General and Specific Licensees, Canadian and International Users” and the “Radiation Safety Manual Reference Addendum” CD. Please refer to this document for radiation safety information.

CAUTION!

Make sure that you are familiar with radiation safety practices in accordance with your U.S. Agreement State, U.S. NRC, or your country’s applicable regulations before unpacking the equipment.

- Unpack the unit in a clean, dry area
- Inspect the shipment for completeness by checking against the packing slip
- Inspect the shipment for damage during shipment or storage
- If the detector is included as a separate package in the shipment, inspect the assembly for damage that may have occurred during shipment or storage
- If there was damage to the unit during shipment, file a claim against the carrier and report the damage in detail. Any claim on the VEGA Americas, Inc. for shortages, errors in shipment, etc., must be made within 30 days of receipt of the shipment
- If you need to return the equipment, see the section “Returning equipment for repair to VEGA” in the “Diagnostics and Repair” chapter

Note: Call VEGA Field Service (513-272-0131) immediately for further instructions if on arrival the source holder is not attached to the source holder mounting plate.

Storing the source holder

If you must store the source holder, adhere to the following guidelines:

- Store in a clean, dry area
- Verify that the source holder is attached to the shipping cover so that it covers the radiation beam port
- Check the current local regulations (U.S. NRC, Agreement State, or other) to determine if this area must have any restrictions.
Storing the detector
If you must store the detector, adhere to the following guidelines:

- Avoid storage at temperatures below freezing.
- Store the detector indoors in an area that has temperature-control between +50 °F and +95 °F (+10 °C and +35 °C) and less than 50% relative humidity.
- Store equipment in dry conditions until installation.

Certifications
This gauge is designed for certification compliance from the following agencies:

- ATEX Standard
- CCOE (India)
- CEPEL/INMETRO (Brazil)
- CSA
- FM Standard
- GOST-B Standard
- GOST-R Standard
- IECex
- JIS (Japan)
- KTL (Korea)
- NEPSI (China)

Safety Information for EX Areas
Please note the EX-specific safety information for installation and operation in EX areas.

Figure 1: IECex Label
## Specifications

*Table 3: Specifications list (please check the specification list)*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Accuracy</strong></td>
<td>2% of span typical Accuracy depends on specific application parameters</td>
</tr>
<tr>
<td><strong>Typical Sources</strong></td>
<td>Cesium-137 0.667 MeV gamma radiation emitter, 30.2 year half life</td>
</tr>
<tr>
<td><strong>Conveyor Width</strong></td>
<td>305mm to 2438mm (12” to 60”)</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Belt or drag chain</td>
</tr>
<tr>
<td><strong>Source Holder Type</strong></td>
<td>Multiple point source</td>
</tr>
<tr>
<td><strong>Models</strong></td>
<td>SHGL or SHLD</td>
</tr>
<tr>
<td><strong>License</strong></td>
<td>General License (U.S.A. only)</td>
</tr>
<tr>
<td><strong>Shutter Type</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Power Requirements</strong></td>
<td>AC 115 VAC at 50/60 Hz, at 450 VA maximum power consumption (50 VA under normal operating conditions)</td>
</tr>
<tr>
<td><strong>Measurement Zero Standardization</strong></td>
<td>Empty conveyor</td>
</tr>
<tr>
<td><strong>Calibration Check</strong></td>
<td>Empty conveyor with absorber plate</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±1.0% or better of full scale, dependent upon application</td>
</tr>
<tr>
<td><strong>Loading Range</strong></td>
<td>14.5 to 278 kg/sq meter (3 to 57 lbs/sq ft)</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>4-wire hookup with DC 1.02–0.643mm (#18–20AWG ) four conductor shielded</td>
</tr>
<tr>
<td><strong>Certification to CSA and UL standards</strong></td>
<td>Designed to meet National Electric Code (U.S. &amp; Canada)</td>
</tr>
<tr>
<td><strong>CENELEC certification</strong></td>
<td>EEExd IIIC T5 (pending)</td>
</tr>
<tr>
<td><strong>Enclosure rating</strong></td>
<td>NEMA 4X IP-66</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>–20 °C … 60 °C (–4 °F … 140 °F) option for lower temperatures available</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>0-95%, non-condensing</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>Tested to IEC 68-2-6, IEC 68-2-27, and IEC 68-2-36</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Cast aluminum ASTM A 357</td>
</tr>
<tr>
<td><strong>Weight Housing</strong></td>
<td>5.44 kg (12lb)</td>
</tr>
<tr>
<td><strong>Diagnostics</strong></td>
<td>LED indication +6V, Memory Corruption, CPU Active, High Voltage</td>
</tr>
<tr>
<td><strong>Power Requirements</strong></td>
<td>AC 100–230VAC ±10% (90–250VAC) at 50/60 Hz, at 15VA maximum power consumption (25VA max with heater) CE compliance requires 100–230VAC ±10%</td>
</tr>
<tr>
<td></td>
<td>DC 20–60VDC (less than 100mV, 1/1,000 Hz ripple) at 15VA. CE compliance requires 24VDC±10%</td>
</tr>
<tr>
<td></td>
<td>Wiring 1.63–0.643mm (#14–#22AWG)</td>
</tr>
</tbody>
</table>
Where to find help
If you need help finding information, check the Index and Table of Contents within this manual. Also, refer to the Smart Pro Reference manual for information on calibration and operation with the Smart Pro.

Customer Service
VEGA has Field Service Engineers or Radiation Safety Officers available for onsite service, emergency services, or equipment start up.

Table 4: Contact information

<table>
<thead>
<tr>
<th>Contact Information</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday through Friday 8:00 A.M. - 5:00 P.M. EST (Eastern Standard Time)</td>
<td>1-513-272-0131</td>
</tr>
<tr>
<td>Emergencies: Follow the voice mail instructions</td>
<td>1-513-272-0131</td>
</tr>
<tr>
<td>Fax</td>
<td>1-513-272-0133</td>
</tr>
</tbody>
</table>

In addition, VEGA provides field service for customers outside the U.S. and Canada. Customers outside the U.S. and Canada can contact their local VEGA representative for parts and service.

When calling with a question, if possible, please have the following information ready:

☑️ VEGA Customer Order (C.O.) Number—Locate on the engraved label on the source holder

☑️ Sensor serial number—Locate on the sensor housing inside the external housing
System overview

The W-4800 Weigh Scale detector uses VEGA’s GEN2000 electronics. The W-4800 Weigh Scale system consists of three main components:

- Low activity source holder
- W-4800 Weigh Scale detector assembly
- Electronics console (Smart Pro or Smart Pro Pac electronics)

![System overview diagram](image-url)

Figure 2: System overview
The following statements describe the source holder:

- A welded steel enclosure that houses a radiation-emitting source capsule
- Directs the radiation in a narrow collimated beam through the process material
- Shields the radiation elsewhere
- Has an auxiliary shipping cap

Figure 3: Low activity source holder
The following statements describe the functions of the W-4800 Weigh Scale detector assembly:

- The gauge mounts opposite the source holder
- Self-contained calibration absorber for performing a two-point calibration on an empty belt
- Inside the LSG housing is a scintillation material
- The scintillation material produces light in proportion to the intensity of its exposure to radiation
- A photomultiplier tube detects the scintillator’s light and converts it into voltage pulses
- The microprocessor receives these voltage pulses after amplification and conditioning by the photomultiplier tube
- The microprocessor and associated electronics convert the pulses into a calibratable output to the Smart Pro electronics
- The Smart Pro electronics receives and reads the input and converts it into process units
- Several outputs are available on the Smart Pro, including a 4 mA … 20mA output of the process variable. Refer to the Smart Pro Reference manual for more information.
Principles of operation

VEGA’s W-4800 Weigh Scale is a nuclear gauge that mounts outside the conveyor footprint. The detector receives a narrow beam of radiation, through the process material, from the source holder.

The amount of radiation that the detector senses is in proportion to the amount of the material’s mass. Since the radiation source and the detector are always the same distance apart, the only possible change in signal is an inverse measure of the belt loading. A belt with a light load allows more radiation to pass through to the detector. A belt with a heavier load allows less radiation to pass through to the detector.

The Smart Pro calibrates the W-4800 Weigh Scale output and associates the digitized detector readings, known as counts (the detector frequency output), with the loading of the belt, in engineering units. The output range of the Smart Pro with the W-4800 Weigh Scale are two 4 mA … 20mA current loop signals, in proportion either the loading (pounds per linear foot), or weight transfer rate (pounds per minute), or the density (pounds per square foot). In addition to the analog outputs, there are up to four process relays available to convey totalization or other configurable alarm conditions.
Communicating with the gauge

Use either a Smart Pro or Smart Pro Pac to enable the following:

- Initial setup
- Calibration
- Operation

**W-4800 software**

The W-4800 software is accessible through the Smart Pro wall mount or Pro Pac rack mount units. You can use step-by-step method of screen selection for pre-programmed routines or direct access to screens.

**Step-by-step method**

The step-by-step method takes you from the Main menus to the sub-menus by moving the cursor to your choice and pressing SELECT and ENTER. You can press the NEXT SCREEN and PREVIOUS SCREEN to take you back and forth between menus.

**Direct access method**

Use direct access to bypass the step-by-step progression of screens and go directly to your chosen screen. You enter the screen number in the number field in the left hand corner and press ENTER. For more information concerning function and data entry keys, refer to pages 23 and 24.

**Smart listing**

The Smart Listing is a table of RAM addresses that lists the data that is stored at each address.

This listing contains the software settings that configure each system for individual and unique applications. You do not normally need this list, since all necessary information for normal operation is accessible through user-friendly screens.

The top line of the listing’s label is **Filename**. It displays the following information:

- Shop order name
- Shop order number
- Date of printout
- Time of printout

The first column down the left side is the base number. The base number represents the address. The first row across the top is the displacement from the base (incremental value). Each address location is itemized by adding the displacement to the base.
Address location = base + displacement

For example, find 40 going down the first column and follow it across to the 12 located in the top row. This represents address location 52 (40+12) and contains data 17196.

The LOW process value used to calibrate the gauge at the factory is at address location 153 (140+13). In this sample, that data value is 8427.

Sample Smart Listing

<table>
<thead>
<tr>
<th>ADDR</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13...</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8191</td>
<td>16668</td>
<td>.</td>
<td>10</td>
<td>11</td>
<td>.</td>
<td>1668</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>65153</td>
</tr>
<tr>
<td>20</td>
<td>534</td>
<td>37121</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>5500</td>
<td>1644</td>
<td>110</td>
<td>1991</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>21760</td>
</tr>
<tr>
<td>40</td>
<td>16896</td>
<td>.</td>
<td>16946</td>
<td>.</td>
<td>16996</td>
<td>.</td>
<td>17046</td>
<td>.</td>
<td>17096</td>
<td>.</td>
<td>17146</td>
<td>.</td>
<td>17196</td>
<td>.</td>
</tr>
<tr>
<td>60</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
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<td>100</td>
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<td>120</td>
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<tr>
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<td>1807</td>
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<tr>
<td>160</td>
<td>.</td>
<td>6500</td>
<td>7657</td>
<td>7410</td>
<td>1</td>
<td>60</td>
<td>110</td>
<td>8427</td>
<td>5920</td>
<td>.</td>
<td>.</td>
<td>109</td>
<td>9000</td>
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<td>...</td>
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</tbody>
</table>

Note: This example shows only a partial listing. The actual listing has 20 displacement fields. In addition, a dot (.) represents the zeros (0) in this example, to enhance readability.
Chapter 2: Installation

Location considerations

When you ordered the W-4800 Weigh Scale, the number of sources and their location were determined for optimal performance. Notify VEGA prior to installation of the gauge if the location of the gauge is different from the original order location. Proper location of the weigh scale can sometimes mean the difference between satisfactory and unsatisfactory operation.

Note: Try to locate the source holder in such a place that process material will not coat it. Refer to the “Radiation Safety for U.S. General and Specific Licensees, Canadian and International Users” and the “Radiation Safety Manual Reference Addendum” CD that came with the source holder and the appropriate current regulations for details.

Avoid source cross-talk

When multiple adjacent conveyors have nuclear gauges, you must consider the orientation of the source beams so that each detector senses radiation only from its appropriate source. The best orientation, in this case, is for the source holders to be on the inside with radiation beams pointing away from each other.

Applications

Place the scale on a flat or trough conveyor. The scale can also accommodate any conveyor inclination angle. However, you must determine the exact location of the scale when ordering the scale and adhere to the original location as ordered. A changing profile causes unwanted measurement error. Some rotary feed systems tend to cause loading variations with time.

Prevent process accumulation

Prevent process material or dirt from accumulating between the source and the detector. Such accumulation can cause the gauge to indicate a higher weight than actual.
Re-cal considerations
The W-4800 Weigh Scale requires periodic recalibration. Ensure that you have adequate room for access to the source housing during the calibration procedures. You must actuate the self-contained absorbers.

Restrict air gap access
Restrict access to the area between the source holder and the side of the conveyor belt. Cover this area to prevent personnel from placing themselves and foreign material in the gap. VEGA personnel can recommend the appropriate restrictions at the commission of your system.

Standardization considerations
The W-4800 requires periodic standardization with an empty belt or with absorber plates on an empty belt.
Weigh scale assembly

The weigh scale can be disassembled and inserted into the line.

![Diagram of W-4800 assembly]

Figure 5: W-4800 assembly

Contact VEGA for the best/safest mounting arrangement.
Procedure to install the low level source holder

Procedure 1: Install the SHGL source holder on the weigh scale

1. Remove the source holder mounting plate assembly from the shipping container
2. Position the source holder and source holder mounting plate in alignment with the mounting plate on the gauge frame
3. Position the source holder so that the radiation port aims away from you body
4. Remove the auxiliary shipping cover and attach the source holder assembly to the plate on the gauge frame
5. Attach the auxiliary shipping cover to the rear/top of the source holder for storage

Caution

If you are removing the source holder from the W-4800 for any reason, reattach the shipping cover to the source holder. It must cover the radiation beam port.
Mounting the electronics console

Smart Pro mounting

Figure 6 illustrates a typical Smart Pro mounting diagram.

![Diagram of Smart Pro mounting](image)

*Figure 6: Typical Smart Pro dimensions*
Pro Pac mounting

**Notes:**
- Humidity: 0 to 95% noncondensing.
- Ambient temperature range: 0 degC (32 degF) to 50 degC (122 degF).
- Vibration free mounting required.
- Cabinet is designed as DIN-3U and must be mounted in an ordinary (non-hazardous) location.
- Weight with electronics is approximately 9kg (20lbs).
- Power requirements: (specify at order) 115VAC or 230VAC +/- 10%, 50 or 60 Hz, single phase 60W, maximum.

**Figure 7: Typical Pro Pac dimensions**
Rack mount computerized electronics
Figure 8 illustrates the rack mount display/interface.

The rack mount display/interface includes the following components:

- On/Off switch with circuit breaker and pilot light
- CPU board
- I/O termination board
- Case
- Power supply board
- Hinged front panel
- Processor select circuit board
- Key pad assembly
- LCD display interface circuit board
- Operator display/interface
- Display window
- Data entry keys
- Function keys
- Access keys and indicators
On/Off switch with circuit breaker and pilot light

A/C power enters the power supply board, from the back panel I/O board, after passing through On/Off switch. There are two types of switches to use, depending on the power source. They are:

- 110V AC
- 220V AC

CPU board

The CPU board enables communication to and from the field equipment. The CPU board is the main controller of the Smart Pro or Pro Pac and should be jumpered in the isolated configuration (refer to page 43 for details on read/write protect on JP-17). This provides isolation at the wall or rack mount display/interface side for analog output #1 (density) and from analog output #2 (position). Figure 9 illustrates the CPU board.

The software PROMS contain the program for operating the Smart Pro or Pro Pac. Install them at locations U24 and U25 on the CPU board. Optional EEPROM chips install into location U26.

The battery-backed RAM chip installs at location U27. This is a non-volatile memory when the battery is functioning. The estimated battery life is 10 years.
I/O termination board
The I/O termination board provides AC power termination along the interconnecting termination points for the field unit. Its location is at the back of the case. Analog outputs and the optional DCS interface box terminate on this board.

Case
The case is the enclosure for the wall or rack mount display/interface.

Power supply
The power supply converts incoming A/C power into ±15VDC and +5VDC. The wall or rack mount display/interface uses these three DC voltages. VEGA hardwires the power supply board to accept either 110VAC or 220VAC.

Hinged front panel
The hinged front panel provides access to the inside of the wall or rack mount display/interface.

Processor select circuit board
On the rack mount unit only, the processor select circuit board controls the select keys (A-B-C-D) that correspond to the possible four field units. The operator presses a select key to access one of the four field systems.

Key pad assembly
The keypad assembly contains both the basic keypad (data and function keys) and the processor select keys. It connects to the processor select circuit board.

LCD display interface circuit board
The LCD display interface circuit board receives information from the processor select circuit board and converts it into a format that the LCD display uses for viewing.

Operator display/interface
The front of the rack mount display/interface has four main areas. These areas are:

- Liquid crystal display (LCD) window that can be multiple windows if there is more than one field unit
- Data entry keys
- Special function keys
- Access keys and indicators
Display window

The display window presents screens of information to the operator. Each screen of information displays on the LCD that is back-lit and consists of four rows, each row being 20 characters long.

Each area of information on the screen is a field. Some fields are for display only and are not changeable. However, fields that display a blinking cursor are data fields that the operator can change to a new value.

The upper left-hand corner of each screen displays the current screen number that can range from 000 to 999. Not all possible screen numbers are valid. If you enter an invalid screen number, a “MENU DOES NOT EXIST” message displays.

The upper right-hand corner displays the Alarm signal. This displays as an “A”. This field displays on every screen except password.

The cursor underlines its current location.

Each screen has display fields and sometimes data fields. The display fields are not selectable or adjustable. Data fields enable the operator to enter data. Use SELECT to move to the beginning of a data field.

Security access level can effect whether you can enter data into a specific data field. For example, alarms can be set at the supervisor security level but not at the operator security level. If you attempt to enter an item that requires a higher security level, the “ACCESS DENIED” message displays or the screen remains blank.
Data entry keys

Data entry keys are numbers 0–9, the hyphen, and the decimal point. Use these keys to enter numeric data.

The labels on the 10 numeric keys represent the most frequently used operations.

**Note**

INTERVALS (key 2) is not available.

The tasks for the remaining labels are accessible with the correct security access level by pressing the number key and ENTER. For example, to select the calibration screen press the number eight key and ENTER. The calibration screen displays.

Figure 10 illustrates the data entry/function keys.

![Figure 10: Data entry/function keys](image)
Function keys
The eight function keys enable the operator to perform the following:

- Move through screens
- Enter and change values easily
- Toggle between various modes of operation

Many of these keys perform different functions depending on the mode that is active at the time. Table 6 lists the functions for each function key.

Table 6: Function key descriptions

<table>
<thead>
<tr>
<th>Function Key</th>
<th>Function</th>
</tr>
</thead>
</table>
| Next Screen  | • Selects the next screen in a functional sequence  
                 • Selects the next character in an alphabetical sequence |
| Previous Screen | • Selects the previous screen in a functional sequence  
                      • Selects the previous character in an alphabetical sequence |
| Auto Manual  | • Selects automatic mode  
                 • Selects manual mode |
| Yes No        | • Selects Yes to complete an operation  
                 • Selects No to cancel or abort an operation |
| Enter         | Final entry of entire screen of information |
| Delete        | Deletes character left of the cursor |
| Select        | Selects a field on the display by moving the cursor to that location |
| Help          | Goes to an on-line help screen, if one exists, for that field. Press once to get into HELP, press again to exit HELP and return to the original screen |

Note: In Screens 525, HELP advances the Parameter # “n”.  
Screen 527, HELP advances the PR code “n”.  
Screen 528, HELP advances the Curve # “n”.
Access keys and indicators

The Pro Pac can communicate with up to four field units. Each display window represents a different field unit with labels A, B, C, and D. If one or more field units connect to a rack mount unit, select the desired field unit by pressing the key with the corresponding letter. A red indicator lights up for the active display window.
Wiring the equipment

VEGA provides detailed Interconnect drawings for the W-4800 Weigh Scale.

**Note:** If the instructions on the drawing differ from the instructions in this manual, use the drawing. It may contain special instructions specific to your order.

Use the drawing notes and the steps that follow to make the input and output connections. Make the connections at the removable terminal strips mounted on the CPU board. Access the CPU board by removing the explosion-proof housing cap.

**Note:** Not all connections are required for operation. See page 28 for terminal names and positions.

![Figure 12: Typical interconnect diagram for W-4800](image)
Wiring the equipment

VEGA provides detailed Interconnect drawings for the LSGF.

**Note:** If the instructions on the drawing differ from the instructions in this manual, use the drawing. It may contain special instructions specific to your order.

Use the drawing notes and the steps that follow to make the input and output connections. Make the connections at the removable terminal strips mounted on the CPU board. Access the CPU board by removing the explosion-proof housing cap.

**Note:** Not all connections are required for operation. See page 28 for terminal names and positions.

VEGA provides an internal and external ground screw for connection of the power Earth ground wire. After removing the top cover, the location of the internal ground screw is at the front of the housing. The location of the external ground screw is next to the conduit entry.
## Table 7: Terminal names and descriptions

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>Power In</td>
</tr>
<tr>
<td>2</td>
<td>N</td>
<td>Power In</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Freq+</td>
<td>Measurement signal</td>
</tr>
<tr>
<td>7</td>
<td>Freq-</td>
<td>Measurement signal</td>
</tr>
<tr>
<td>8</td>
<td>+6V</td>
<td>Tachometer signal</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
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<td>12</td>
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<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Power

CAUTION!
DO NOT APPLY POWER until a thorough check of all the wiring is complete!

The AC power source voltage input is 90 to 250V AC at 50/60 Hz, at 15 watts (without heater) or 25 watts (with optional heater) maximum power consumption. AC power can share with transient producing loads. Use an individual AC lighting circuit. Supply a separate earth ground.

DC power is polarity independent. The DC power source voltage input is 20–60VDC (24VDC±10% for CE compliance) (less than 100mV, 1/1,000 Hz ripple) at 15VA maximum power consumption. DC power cable can be part of a single cable 4-wire hookup, or can be separate from output signal cable. (See "Output current loop" section) Power is not to be shared with transient producing loads.

Use wire between #18–#20AWG for power wiring.

Switch for CE compliance
For CE compliance, install a power line switch no more than one meter from the operator control station.

Conduit
Conduit runs must be continuous and you must provide protection to prevent conduit moisture condensation from dripping into any of the housings or junction boxes. Use sealant in the conduit, or arrange the runs so that they are below the entries to the housings and use weep holes where permitted.

You must use a conduit seal-off in the proximity of the housing when the location is in a hazardous area. Requirements for the actual distance must be in accordance with local code.

If you use only one conduit hub, plug the other conduit hub to prevent the entry of dirt and moisture.
Smart Pro and Pro Pac connections
The measurement signal from pins 6 and 7 go to an VEGA Smart Pro or Pro Pac. The measurement signal is 0/100 kHz, maximum, true digital, and satisfies RS-422 and RS-423.

See the table below for interconnect information.

<table>
<thead>
<tr>
<th>From W-4800 Weigh Scale</th>
<th>To Smart Pro</th>
<th>To Smart Pro Pac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 6</td>
<td>TB 4-1</td>
<td>TB 1-4</td>
</tr>
<tr>
<td>Pin 7</td>
<td>TB 4-2</td>
<td>TB 1-5</td>
</tr>
<tr>
<td>Shield wire</td>
<td>TB 4-3</td>
<td>TB 1-12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From W-4800 Weigh Scale</th>
<th>To Smart Pro</th>
<th>To Pro Pac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 9</td>
<td>TB 4-5</td>
<td>TB 1-7</td>
</tr>
<tr>
<td>Pin 8</td>
<td>TB 4-6</td>
<td>TB 1-8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From W-4800 Tachometer</th>
<th>To Smart Pro</th>
<th>To Pro Pac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact D</td>
<td>TB 4-8</td>
<td>TB 2-4</td>
</tr>
<tr>
<td>Contact E</td>
<td>TB 4-9</td>
<td>TB 2-5</td>
</tr>
</tbody>
</table>
Figure 14: Typical interconnect diagram for Smart Pro
Figure 15: Typical interconnect diagram for Pro Pac
Power

Detector

Use the certified interconnect drawings for power requirements.

CAUTION!

DO NOT APPLY POWER until a thorough check of all the wiring is complete!

Connect the sensor part of the W-4800 to a voltage supply that is not at risk for inadvertent turn off. The power supply should be clean and transient-free. For example, a good power supply is a lighting panel. Apply power to the measuring assembly and console continuously. This keeps the equipment warm and dry. Warm-up time from a cold start can take up to 24 hours.

Switch for CE compliance

For CE compliance, install a power line switch no more than one meter from the operator control station.

Conduit

Conduit runs must be continuous and you must provide protection to prevent conduit moisture condensation from dripping into any of the housings or junction boxes. Use sealant in the conduit, or arrange the runs so that they are below the entries to the housings and use weep holes where permitted.

You must use a conduit seal-off in the proximity of the housing when the location is in a hazardous area. Requirements for the actual distance must be in accordance with local code.

If you use only one conduit hub, plug the other conduit hub to prevent the entry of dirt and moisture.
Auxiliary and optional equipment

Tachometer
The tachometer monitors the conveyor belt or screw speed. Use the tachometer when the belt or screw speed variation exceeds ±1%. Mount the tachometer correctly to maintain the proper speed. The digital tachometer provides 1,200 pulses per revolution. The shaft revolutions per minute (RPM) must be between 5 and 1,000 when line speed is at its maximum. Use a step-up or step-down arrangement if the shaft RPM is not within this range.

The drive shaft (or idler roller) must have positive contact with the conveyor to ensure accurate correlation of the speed. For accurate operation, select one of the following four locations on the conveyor for driving the tachometer:

1. The tail pulley
2. The idler take-up roller where the conveyor has adequate tension and wrap-around to prevent slippage
3. The idler roller where there is adequate contact with the conveyor, even when the conveyor is lightly loaded
4. The pulley in contact with the underside of the conveyor. Only use this location if the first three locations are inconvenient or impossible.

VEGA does not recommend the following locations for the positioning of the tachometer:

- Idler or pulley that is in contact with the side of the conveyor handling material. Material build-up on the idler can cause a decrease in speed. This decrease in speed introduces an error into the system.
- Head pulley when there is a possibility of slippage. This slippage is prevalent on conveyors that are too long, inclined, or heavily loaded.

Be careful when you make the mechanical connections from the idler to the tachometer. Correct mechanical connections prevent any eccentricity of the gears or couplings causing output signal variations. VEGA provides a coupling adapter for each tachometer flexible coupling. The three holes that you use for mounting the adapter are intentionally oversized to permit necessary adjustments for centering on the shaft.

The installation drawings illustrate the dimensions of the tachometer and several methods of coupling it to the conveyor.

Refer to the interconnect drawing on page 26 for general wiring information. Refer to the certified drawings that VEGA supplies for specific wiring details.
Line down contacts

Use line down contact when the belt speed is constant and does not vary and no digital tachometer is supplied. Contact must be isolated (dry) and have a burden of 15VDC at 10mA. Close the contacts when the line is not running.

Note: This standard factory setting can be changed.
Commissioning the gauge

The process of commissioning the gauge includes the following:

• Checking the pre-programmed setup parameters
• Calibrating on process
• Verifying the working of the gauge

VEGA Field Service Engineers can commission the gauge.

Note: Users outside the U.S. must comply with the appropriate nuclear regulatory body regulations in matters pertaining to licensing and handling the equipment.

The license sets limits on what the user can do with the gauge. Licenses fall into two categories:

1. General
2. Specific

It is up to the user to review the license to determine if they have the appropriate permission to perform any of the following tasks to the source holder:

• Disassemble
• Install
• Relocate
• Repair
• Test
Field service commissioning cal checklist

In many U.S. installations, an VEGA Field Service Engineer commissions the gauge. To reduce service time and costs, use this checklist to ensure the gauge is ready for commission before the Field Service Engineer arrives:

- Mount the source holder and detector per the VEGA certified drawings.
- Allow access for future maintenance.
- Make all wiring connections per the certified drawings and the “Wiring the Equipment” section in this manual. Tie in the wiring from the Smart Pro analog output to the DCS/PLC/chart recorder.
- Ensure that the AC power to the W-4800 Weigh Scale is a regulated transient-free power source. UPS type power is the best.
- If using DC power, verify that the ripple is less than 100mV.

Note
The equipment warranty is void if there is damage to the W-4800 Weigh Scale due to incorrect wiring not checked by the VEGA Field Service Engineer.

- Have process ready for calibration.
- When possible, it is best to have process available near both the low and high end of the measurement span. A weight change of at least 70% is a common requirement.
- When possible, have the material that you use for periodic recalibration of the gauge available.
- If you cannot meet any of these process conditions, you can still calibrate the gauge; however, it is not as accurate.
Installation

Notes
Chapter 3: Setup menus

All of the setup options for the W-4800 are available through one of four setup menus. The setup screens number from 14–17. You can access the screens directly by entering the screen number or from the main menu.

Note: Initial setup values are programmed at VEGA’s factory based on information received during the order process.
In most cases, these values will not have to be adjusted at the installation.

Detailed screen description

Setup menus

<table>
<thead>
<tr>
<th>014 SETUP 1 OF 4</th>
<th>015 SETUP 2 OF 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET TIME OR DATE</td>
<td>SET/CAL ANALOG OUTPUTS</td>
</tr>
<tr>
<td>UP/DOWN LOAD MEMORY</td>
<td>SET GAGE MEAS SPAN</td>
</tr>
<tr>
<td>CHANGE PASSWORD</td>
<td>SET MEASURE UNITS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>016 SETUP 3 OF 4</th>
<th>017 SETUP 4 OF 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM PORT SETUP</td>
<td>INPUT CHAN#1</td>
</tr>
<tr>
<td>TEMP COMP SETUP</td>
<td>INPUT CHAN#2</td>
</tr>
<tr>
<td>SET OPERATOR SCREEN</td>
<td>OUTPUT CHANNEL</td>
</tr>
</tbody>
</table>

Figure 16: Setup screens 1–4
Setup menus

Time and Date

Current time in HH:MM:SS that is set in the real time clock. The time is always in the 24-hour military format.

Current date in MM/DD/YY (month, day, year) format. The date reverts to 00/00/00 on failure.

Procedure 2: Change time and date

1. From 007 TIME/DATE screen, select CHANGE TIME and press ENTER
2. From 025 SET TIME screen, enter the new time in military time format (e.g., 13:01:01) and press ENTER
3. Press PREVIOUS SCREEN to return to 007 TIME/DATE screen
4. From 007 TIME/DATE screen, press SELECT to choose CHANGE DATE
5. From 026 SET DATE screen, enter new date in month, day, year format (e.g., 03/10/01) and press ENTER
6. Go to screen 310 MEMORY BACKUP
7. From 310 MEMORY BACKUP screen, select UPPER RAM TRANSFERS and press ENTER
8. From 314 UPPER RAM XFERS screen, select RAM TO UPPER RAM and press ENTER
9. In 316 RAM TO UPPER RAM screen, press 1 and press ENTER to activate the transfer.
Memory Functions

W-4800 configurations save in three different memory areas. These areas are:

1. Lower RAM (active)
2. Upper Ram (with battery-backup)
3. EEPROM (non-volatile)

Lower RAM is the memory that the gauge uses during operation. If you make changes to the gauge configuration or calibration that you want to save, then you must save these changes to the EEPROM. If you do not save to the Upper RAM and EEPROM, the new information is not available after powering off. When you save to the EEPROM you save the configuration and calibration changes that you want to keep and this information loads down to the Upper RAM and Lower (active) RAM at power up.

![Figure 18: Memory areas EEPROM vs. RAM](image)

![Figure 19: Memory backup screen](image)
Upper RAM transfers

The upper RAM can hold a copy of the active gauge configuration. This is useful when making a copy of the non-volatile EEPROM. Use this screen to make transfers to and from upper RAM. Enter a one to initiate the transfer. The transfer completes almost instantaneously.

Procedure 3: Transfer to upper RAM

1. From **310 MEMORY BACKUP** screen, select **UPPER RAM TRANSFERS** and press ENTER
2. From **314 UPPER RAM Xfers** screen, select **RAM TO UPPER RAM** and press ENTER
3. In **316 RAM TO UPPER RAM TRANSFER** screen, press 1 and press ENTER to activate the transfer

Procedure 4: Transfer to RAM

1. From **310 MEMORY BACKUP** screen, select **UPPER RAM TRANSFERS** and press ENTER
2. From **314 UPPER RAM Xfers** screen, press SELECT to choose **UPPER RAM TO RAM** and press ENTER
3. In **318 UPPER RAM TO RAM TRANSFER** screen, press 1 and press ENTER to activate the transfer
EEPROM Transfers

The EEPROM holds a non-volatile copy of the complete gauge configuration. The configuration loads from the EEPROM when you turn on the gauge. Use the EEPROM transfer screen to make transfers to and from the EEPROM.

Procedure 5: Upload to EEPROM

1. Connect the write protect jumper JP17

2. From the 310 MEMORY BACKUP screen, press SELECT to choose EEPROM TRANSFERS

3. Screen 311 displays with the message, “CAUTION, PRESS HELP KEY FOR EEPROM MESSAGE” If you press HELP, the following message displays

   “770 MAKE SURE THERE IS AN EEPROM IN U26 BEFORE USING THIS FEATURE. PRESS HELP.”

   Press HELP to return to screen 311 and press ENTER to continue

4. From 100 EEPROM SERVICE screen, select one of the following options:

   • SELECT COPY RAM TO EEPROM
   • COPY EEPROM TO RAM
   • GET EEPROM CHKSUM

5. If you choose SELECT COPY RAM TO EEPROM, screen 102 RAM TO EEPROM screen displays. Enter 1 and press ENTER to initiate the transfer. If a zero displays, the transfer was successful. If a one displays, the transfer was unsuccessful

   If the transfer was unsuccessful, verify that the jumper on JP17 is in place. It is necessary to place the jumper on JP17 to enable any uploading to the EEPROM

6. If you choose COPY EEPROM TO RAM, screen 104 EEPROM TO RAM screen displays. Enter 1 and press ENTER to initiate the transfer

7. If you choose GET EEPROM CHKSUM, screen 106 EEPROM CHECKSUM screen displays. Enter 1 and press ENTER to generate a new checksum

8. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Upload and download configuration program

Use the SmartPro Upload/Download to download Smart Pro configurations for storage as a computer file. In addition, you can use this program to upload an existing file to Smart Pro to restore a saved configuration.

![SmartPro Upload/Download Application](image)

Figure 20: Smart Pro upload and download application

The communication cable connects to the circuit board mounted on the Smart Pro housing.

![Communication cable](image)

Figure 21: Communication cable

**Note:**
1. Use heat shrink on ends as required.
2. Length is determined by C.O.
Password functions

052 ENTER PASSWORD
XXXX
ACCESS LEVEL = X
LEVEL OF ACCESS

053 CHANGE PASSWORD
LEVEL 1 PASSWORD
LEVEL 2 PASSWORD
LEVEL 3 PASSWORD

The default passwords are:

Table 11: Access levels and passwords

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Password</th>
<th>Access and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0—Operator Access</td>
<td>No password</td>
<td>No editing and limits the access to most of the gauges screens</td>
</tr>
<tr>
<td>1—Supervisor Access</td>
<td>0011</td>
<td>Access to most of the gauge screens (i.e., setup &amp; calibration) but no direct editing of parameters in any of the functional blocks (e.g., FreqIn Block at address 520)</td>
</tr>
<tr>
<td>2—Installation Access</td>
<td>0022</td>
<td>Complete access to all gauge parameters and functions</td>
</tr>
</tbody>
</table>

Procedure 6: Input password

1. From the 092 screen, type screen number 052 and press ENTER
2. On the 052 screen, type the password to the access level you need
3. Press ENTER

Procedure 7: Change password

1. From the 092 screen, type screen number 053 and press ENTER
2. From 053 CHANGE PASSWORD screen, press SELECT to choose the access level for the password you want to change and press ENTER
3. From 054 LEVEL 1 PASSWORD, enter new 4-digit password and press ENTER
4. From 055 LEVEL 2 PASSWORD, enter new 4-digit password and press ENTER
5. Connect the write protect jumper JP17
6. Save to EEPROM
7. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Setup menus

Analog output setup

There are two analog output channels. You must span and calibrate the channels before they can transmit a meaningful signal. The analog output span can be set independent from the measurement span of this gauge. Setting the span is simply a matter of defining what process values that correspond to the 4 mA and 20 mA or 0 mA and 20mA levels.

The Smart Pro or Pro PAC CPU board mounts on the door of the Smart Pro. The jumpers are clearly labeled. See Figure 24 for details on jumper and test points.

Figure 23: Analog output setup screens
Setup menus

Input: Channel # 1—Always frequency

Input Channel # 2—Notes 1 & 2

<table>
<thead>
<tr>
<th>From Digital Tach, or 2nd Sensor</th>
<th>From Ohmart Temp. Comp.</th>
<th>Frequency Analog Outputs:</th>
<th>Power Selection: (Notes 2 &amp; 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Digital Tach, or 2nd Sensor</td>
<td>From Ohmart Temp. Comp.</td>
<td>Current Analog Outputs:</td>
<td>Power Selection: (Notes 2 &amp; 3)</td>
</tr>
<tr>
<td>From Digital Tach, or 2nd Sensor</td>
<td>From Ohmart Temp. Comp.</td>
<td>Analog Outputs:</td>
<td>Power Selection: (Notes 2 &amp; 3)</td>
</tr>
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<td>From Ohmart Temp. Comp.</td>
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</tr>
<tr>
<td>From Digital Tach, or 2nd Sensor</td>
<td>From Ohmart Temp. Comp.</td>
<td>Analog Outputs:</td>
<td>Power Selection: (Notes 2 &amp;3)</td>
</tr>
</tbody>
</table>

Notes:
1. Input # 1 for frequency input only
2. N/ A—Not applicable
3. NR—Not required

Figure 24: Smart Pro/Pro Pac CPU board jumper and test information
Setup menus

**Figure 25: Simplified Smart Pro circuit board**

**Table 12: Smart Pro CPU board jumper information**

<table>
<thead>
<tr>
<th>JPR#</th>
<th>Process Section</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP1</td>
<td>Analog Output 1</td>
<td>mV select</td>
</tr>
<tr>
<td>JP2</td>
<td>Analog Output 2</td>
<td>mV select</td>
</tr>
<tr>
<td>JP3</td>
<td>Analog Output 1 &amp; 2</td>
<td>–15VDC select</td>
</tr>
<tr>
<td>JP4</td>
<td>Analog Output 1 &amp; 2</td>
<td>15VDC common select</td>
</tr>
<tr>
<td>JP5</td>
<td>Analog Output 1 &amp; 2</td>
<td>+15VDC select</td>
</tr>
<tr>
<td>JP6</td>
<td>Analog Input 2</td>
<td>Shunt select</td>
</tr>
<tr>
<td>JP7</td>
<td>Analog Input 2</td>
<td>Analog/Frequency select</td>
</tr>
<tr>
<td>JP8</td>
<td>Analog Input 2</td>
<td>Gain select</td>
</tr>
<tr>
<td>JP9</td>
<td>Analog Input 2</td>
<td>Analog/Frequency select</td>
</tr>
<tr>
<td>JP10</td>
<td>Communications</td>
<td>RS232/RS422 select</td>
</tr>
<tr>
<td>JP11</td>
<td>Communications</td>
<td>RS323/RS422 select</td>
</tr>
<tr>
<td>JP12</td>
<td>TTL Output 1</td>
<td>Isolated/Non-isolated select</td>
</tr>
<tr>
<td>JP13</td>
<td>Memory U24</td>
<td>+VCC Pin 28/32 select</td>
</tr>
<tr>
<td>JP14</td>
<td>Memory U25</td>
<td>+VCC Pin 28/32 select</td>
</tr>
<tr>
<td>JP15</td>
<td>Memory U24</td>
<td>EPROM configuration</td>
</tr>
<tr>
<td>JP16</td>
<td>Memory U25</td>
<td>EPROM configuration</td>
</tr>
<tr>
<td>JP17</td>
<td>Memory U26</td>
<td>E2PROM configuration</td>
</tr>
<tr>
<td>JP18</td>
<td>Memory U27</td>
<td>RAM configuration</td>
</tr>
<tr>
<td>JP19</td>
<td>Processor</td>
<td>Test</td>
</tr>
<tr>
<td>JP20</td>
<td>Reset U35</td>
<td>5VDC monitor &amp; reset signal generator</td>
</tr>
<tr>
<td>JP21</td>
<td>CPU Section</td>
<td>CPU reset</td>
</tr>
</tbody>
</table>
### Table 13: Smart Pro CPU board test point information

<table>
<thead>
<tr>
<th>TP#</th>
<th>Section</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP1</td>
<td>Analog output#1</td>
<td>Voltage signal</td>
</tr>
<tr>
<td>TP2</td>
<td>AC/DC power</td>
<td>+5VDC</td>
</tr>
<tr>
<td>TP3</td>
<td>AC/DC power</td>
<td>+5VDC common</td>
</tr>
<tr>
<td>TP4</td>
<td>AC/DC power</td>
<td>–15VDC</td>
</tr>
<tr>
<td>TP5</td>
<td>AC/DC power</td>
<td>+15VDC</td>
</tr>
<tr>
<td>TP6</td>
<td>AC/DC power</td>
<td>15VDC common</td>
</tr>
<tr>
<td>TP7</td>
<td>Analog output #2</td>
<td>Voltage signal</td>
</tr>
<tr>
<td>TP8</td>
<td>Analog output #2</td>
<td>Voltage signal</td>
</tr>
</tbody>
</table>

### Procedure 8: Select output type

1. From the **063 SELECT OUTPUT TYPE**, select either of the following options:
   - **4–20 or 0–20 Channel #1**
   - **4–20 or 0–20 Channel #2**

   Press ENTER

   Note: If you require a voltage output, choose 0–20 on screen 63 and connect a jumper for Channel #1 to JP1 and Channel #2 to JP2

2. Connect the write protect jumper JP17

3. Save to EEPROM

4. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.

Calibrate the analog output by setting the mid-point (12mA) to a reference meter or DCS/PLC reading. This reconciles any small voltage differences between this gauge and the primary measurement control system.
Procedure 9: Setup analog output Channel #1

1. From 065 ANALOG OUTPUTS screen, select SET ANALOG OUTPUT SPAN and press ENTER
2. From 060 ANALOG OUTPUT SPAN screen, select SET OUT CHAN#1 SPAN and press ENTER
3. From 078 TYPE OF ANALOG OUTPUT UNITS TO USE screen, select either
   - USE STANDARD UNITS
   - USE RATE UNITS
   Press ENTER
4. If you select USE STANDARD UNITS perform the following steps:
   - From 240 SET ANALOG OUTPUT SPAN screen, select SET LOW LIMIT and press ENTER
   - From 242 SET LOW LIMIT screen, enter the new setting and press ENTER
   - Return to screen 240 by pressing PREVIOUS SCREEN
   - From 240 screen, press SELECT to choose SET HIGH LIMIT and press ENTER
   - From 244 SET HIGH LIMIT screen, enter the new setting and press ENTER
5. If you select USE RATE UNITS perform the following steps:
   - From 240 SET ANALOG OUTPUT SPAN screen, select SET LOW LIMIT and press ENTER
   - From 243 SET LOW LIMIT screen, enter the new setting and press ENTER
   - Return to screen 240 by pressing PREVIOUS SCREEN
   - From 240 screen, press SELECT to choose SET HIGH LIMIT and press ENTER
   - From 245 SET HIGH LIMIT screen, enter the new setting and press ENTER
6. Connect the write protect jumper JP17
7. Save to EEPROM
8. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Procedure 10: Setup analog output Channel #2

1. From 065 ANALOG OUTPUTS screen, select SET ANALOG OUTPUT SPAN and press ENTER

2. From 060 ANALOG OUTPUT SPAN screen, select SET OUT CHAN#2 SPAN and press ENTER

3. From 062 TYPE OF ANALOG OUTPUT UNITS TO USE screen, select either
   • USE STANDARD UNITS
   • USE RATE UNITS
   Press ENTER

4. If you select USE STANDARD UNITS perform the following steps:
   • From 064 SET ANALOG OUTPUT #2 SPAN, select SET LOW LIMIT press ENTER
   • From 066 SET LOW LIMIT screen, enter the new setting and press ENTER
   • Return to screen 064 by pressing PREVIOUS SCREEN
   • From screen 064, press SELECT to choose SET HIGH LIMIT AND press ENTER
   • From 068 SET HIGH LIMIT, enter the new setting and press ENTER

5. If you select USE RATE UNITS perform the following steps:
   • From 064 SET ANALOG OUTPUT #2 SPAN screen, select SET LOW LIMIT and press ENTER
   • From 067 SET LOW LIMIT screen, enter the new setting and press ENTER
   • Return to screen 064 by pressing PREVIOUS SCREEN
   • From 064 screen, press SELECT to choose SET HIGH LIMIT and press ENTER
   • From 069 SET HIGH LIMIT screen, enter the new setting and press ENTER

6. Connect the write protect jumper JP17

7. Save to EEPROM

8. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Measurement span setup

The Process span is the anticipated lowest and highest weight (Min and Max Weight) for the gauge to measure. Calibrate the W-4800 within these settings. These define the endpoints for the calibration and the linearizer curve. This does not define the span for the output current loop (see current loop span, page 107).

VEGA enters these parameters at the factory based on information received at the time of the order. If the values are correct, no change is necessary.

Note: The Min and Max weight values for the process span are essential to proper calibration of the system. You must enter the Min and Max density values before you can perform an initial calibration. If you change the values for the process span Min or Max densities, you must perform a new initial calibration procedure.

You must modify the span setting if you move the W-4800 from its intended location or are measuring on a different span. In any case, it is a good practice to verify that the setting is correct before performing an initial calibration.
Procedure 11: Setup gauge span—Channel #1

1. From 098 SET GAGE SPAN screen, select SET MINIMUM READING and press ENTER

2. From 096 MIN SPAN SETTING screen press HELP

   Screen 799 displays “CHANGING SPAN LIMITS REQUIRES GAGE RECALIBRATION. PRESS HELP.” Press HELP to return to screen 096 and press ENTER

3. From 096 MIN SPAN SETTING screen, press select and type in the new minimum span setting and press ENTER

4. Press PREVIOUS SCREEN to return to screen 098

5. From 098 SET GAGE SPAN screen, select SET MAXIMUM READING and press ENTER

6. From 097 MAX SPAN SETTING screen, press select to get to the NEW SETTING area and type in the new max span setting and press ENTER

7. Connect the write protect jumper JP17

8. Save to EEPROM

9. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
### Setup menus

**Procedure 12: Setup gauge span—Channel #2**

1. From the **MAIN MENU 1 OF 2** screen, press SELECT to choose **CALIBRATE SYSTEM** and press ENTER.

2. From **018 CAL MENU 1 OF 2** screen, select **SET PRODUCT CODE** and press ENTER.

3. From **003 PRODUCT CODE SELECTION SCREEN**, type 9 and press ENTER.

4. Return to the **MAIN MENU 2 OF 2** by pressing PREVIOUS SCREEN and NEXT SCREEN.

5. From **MAIN MENU 2 OF 2**, select **SETUP GAGE** and press ENTER.

6. Screen **014 SETUP 1 OF 4** displays, press NEXT SCREEN.

7. From **014 SETUP 2 OF 4** screen, press SELECT to choose **SET GAGE MEAS SPAN** and press ENTER.

8. From **098 SET GAGE SPAN** screen, select **SET MINIMUM READING** and press ENTER.

9. From **096 MIN SPAN SETTING** screen press HELP.
   
   Screen **799** displays “CHANGING SPAN LIMITS REQUIRES GAGE RECALIBRATION. PRESS HELP.” Press HELP to return to screen **096** and press ENTER.

10. From **096 MIN SPAN SETTING** screen, press select and type in the new minimum span setting.

    Press ENTER.

11. Press **PREVIOUS SCREEN** to return to screen 098.

12. From **098 SET GAGE SPAN** screen, select **SET MAXIMUM READING** and press ENTER.

13. From **097 MAXSPAN SETTING** screen, press select to get to the **NEW SETTING** area and type in the new max span setting.

    Press ENTER.


15. Save to EEPROM.

*Continued on next page*
Procedure 12: Setup gauge span—Channel #2 (continued)

16. Press PREVIOUS SCREEN to return to the MAIN MENU

17. On the Main Menu screen, press select to position the cursor in the top left corner and type 316 and press ENTER

18. From 316 RAM TO UPPER RAM TRANSFER screen, press 1 to activate the transfer

19. Screen 316 displays, type 003 in the menu number area and press ENTER

20. From 003 PRODUCT CODE SELECTION SCREEN, type 0 and press ENTER to return to product code 0

21. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Measurement units setup

The measurement units for both the channels are set at screen 009. Under screen 9, the weight and rate units list separately for Channel #1. The units for the second channel are limited to speed and custom.

Custom units

If the engineering units required are not in the standard list, you can program a custom unit. Please contact VEGA for your specific needs.
Procedure 13: Setup units of measurement for Channel #1 and #2

1. From 009 SELECT UNITS screen, choose SELECT CHAN#1 UNITS and press ENTER

2. From 085 CHANGE UNITS screen, select one of the following units of measure:
   - DENSITY
   - LENGTH
   - WEIGHT
   - MOISTURE
   - RATE
   - CUSTOM

3. For example, if you choose LENGTH, on screen 041 you can choose from the following measurements:
   - Inches
   - CMS
   - %Full
   - Feet
   - Meters
   - Custom

   If you choose RATE, on screen 044 you can choose from the following measurements:
   - TON/HR
   - LBS/HR
   - LBS/MIN
   - GAL/MIN
   - LTR/MIN
   - Custom

4. Press SELECT to scroll through to the correct unit measurement and press ENTER to select

Continued on next page
**Procedure 13: Setup units of measurement for Channel #1 and #2 (continued)**

5. From **009 SELECT UNITS** screen, choose **SELECT CHAN#2 UNITS** and press ENTER

6. From **087 CHANGE UNITS** screen, select one of the following units of measure:
   - SPEED
   - TEMPERATURE
   - CUSTOM

7. For example, if you choose **SPEED**, on screen **088** you can choose from the following measurements:
   - FT/MIN
   - MTR/MIN
   - RPM
   - Custom

   If you choose **TEMPERATURE**, on screen **089** you can choose from the following measurements:
   - DEG C
   - DEG F
   - Custom

   IF you choose **CUSTOM**, from **220 SETUP CUSTOM**, you can select any of the following functions:
   - **CHANGE UNITS TEXT**, in screen **221 NEW UNITS**, type in new units and select **YES** and press ENTER to save data
   - **CHANGE CONV. FACTOR**, in screen **222 NEW FACTOR**, type in new factor and select **YES** and press ENTER to save data
   - **CHANGE CONV. EXPNT**, in screen **223 CONV. EXPONENT**, type in new exponent and select **YES** and press ENTER to save data

8. Connect the write protect jumper JP17

9. Save to EEPROM

10. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Communication port setup

| 230 COMM PORT SETUP |
| SELECT BAUDRATE      |
| 9600  4800  2400     |
| 1200  300  19200     |

*Figure 28: Comm port setup screen*

The communications port on this instrument is configurable for either RS232 or RS485.

*Note: The W-4800 application does not generally use the serial communicator.*
**Procedure 14: Setup communication port**

1. From **230 COMM PORT SETUP** screen, press SELECT to move to one of the following baud rates:
   - **9600** (default)
   - **1200**
   - **4800**
   - **300**
   - **2400**
   - **19200**
   Press ENTER to select

2. Screen **231 COMM PORT SETUP** displays the prompt, “HOW MANY DATA BITS?” Select either of the following:
   - **8-bits** (default)
   - **7-bits**
   Press ENTER

3. Screen **232 COMM PORT SETUP** displays the prompt, “SELECT PARITY.” Select one of the following:
   - **NONE** (default)
   - **ODD**
   - **EVEN**
   Press ENTER

4. Screen **233 COMM PORT SETUP** displays, “HOW MANY STOP BITS?” Select from either of the following:
   - **2-BITS**
   - **1-BIT** (default)
   Press ENTER

5. Connect the write protect jumper JP17

6. Screen **234 COMM PORT SETUP** displays, “SAVE IN EEPROM?” Select **YES** or **NO** and press ENTER

7. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Temperature compensation setup

024 AUX INPUT SETUP
SET TEMP COEF.
SET REF TEMP

Figure 29: Temperature compensation setup screen

Note: Scale applications do not use this screen. It is present here for completeness and clarification purposes only.
Operator

The operator screen is by definition screen 000. This screen normally appears on the display. The information that displays on this screen is configurable to read different parameters. The default screen setting is for screen 0 to point to screen 092 and display the Rate, Weight, and Total.

<table>
<thead>
<tr>
<th>090 SELECT OP SCR</th>
<th>092 VEGA WeighART</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELECT SCREEN 91..95</td>
<td>RATE = 00000 LBS/MIN</td>
</tr>
<tr>
<td>OLD NEW</td>
<td>WT. = 00000 LBS</td>
</tr>
<tr>
<td>000000 000000</td>
<td>TOT = 000000 TONS</td>
</tr>
</tbody>
</table>

![Figure 30: Operator setup screens](image)

**Procedure 15: Setup operator screen**

1. From **016 SETUP 3 of 4** screen, press SELECT to choose **SET OPERATOR SCREEN** and press enter

2. In **090 SELECT OP SCR** screen, type in new default screen number and press **ENTER**

3. Connect the write protect jumper JP17

4. Save to EEPROM

5. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Input channel setup

The screens at 520 and 521 give direct access to the parameters controlling the two input channels. There is no need to access these screens for basic gauge operation. The calibration functions automatically update these values as necessary.

Note: Personnel that are unfamiliar with the system should not access these screens. Changing values at these address locations can adversely effect the operation of the gauge.

Each of the screens (520 and 521) hold 50 items numbered 0 to 49. Please refer to the tables in Appendix I, page 139 for a complete listing of each item. Refer to Figure 24 for jumper configurations for the frequency input Channel #1.

```
<table>
<thead>
<tr>
<th>520 FREQIN CHAN#1</th>
<th>521 FREQIN CHAN#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM 000</td>
<td>ITEM 000</td>
</tr>
<tr>
<td>NEXT 000</td>
<td>NEXT 000</td>
</tr>
<tr>
<td>CURRENT VAL 00000</td>
<td>CURRENT VAL 00000</td>
</tr>
<tr>
<td>NEW VAL 00000</td>
<td>NEW VAL 00000</td>
</tr>
</tbody>
</table>
```

Figure 31: Input channel setup screens

520 Frequency input channel #1, primary sensor signal (frequency only)

This memory block processes frequency input parameters such as:

- Signal type (direct/inverse)
- Source decay counts
- Raw, filtered, normalized, and calibrated counts
- Gain factors
521 Frequency input channel #2, tachometer/speed input

This memory block processes frequency input signals from Channel #2 similar to Channel #1. Channel #2 input is limited to optional equipment, such as, the tachometer.

It is possible, in limited application needing two sensors, for the raw count signal at Channel #2 to come from a secondary sensor. The counts add to those coming into Channel #1 from the primary sensor to obtain a total raw count, before signal processing. You cannot use this feature to process two separate measurements. Refer to Figure 24 for jumper configurations for the frequency input Channel #2.

| Tachometer    | jumper configuration for frequency |
| Speed input   | jumper configuration for 0–10V or 4 … 20 mA input |
Output channel setup

<table>
<thead>
<tr>
<th>522 FREQOT CHANNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM 000</td>
</tr>
<tr>
<td>NEXT 000</td>
</tr>
<tr>
<td>CURRENT VAL 000000</td>
</tr>
<tr>
<td>NEW VAL 000000</td>
</tr>
</tbody>
</table>

Figure 32: Output channel setup screen

The screen at 522 gives direct access to the parameters controlling the two output channels. There is no need to access this screen for basic gauge operation. The calibration functions automatically update the values as required.

Note: Personnel that are unfamiliar with the system should not access these screens. Changing values at these address locations can adversely affect the operation of the gauge.

Screen 522 holds 16 items numbered 0 to 7 (for Channel #1) and 8 to 15 (for Channel #2). Please refer to the tables in Appendix I, page 139 for a complete listing of each item.
Product codes

Product codes are a convenient method of grouping variables that are associated to a unique product. Channels #1 and #2 use unique product codes. You can store the set of parameters listed in the table in Appendix I into each Product Code Table.

Channel#1 product codes

Channel #1 handles the process sensor input and uses product codes 0–8. Use access level 0 to display the product code tables and level 1 to setup or change values in the table.

Channel #2 product code

Channel #2 handles optional sensor input (e.g., tachometer) and uses product code 9. Use access level 0 to display the product code table and level 1 to setup or change values to the table.

Directly select the product code from screen 3 or through the calibration loop on screen 18. Use screen 527 to setup the product code by performing the following procedure.

Note: The W-4800 does not generally use more than one product code.

Procedure 16: Setup product code

1. From screen **052 ENTER PASSWORD**, enter the correct password for access level 1 and press ENTER
2. Go to screen **527 PR CODE**
   
   Note: Screen 527 is the most important part of the computer memory. Be very careful when entering information at this level
3. Press HELP to go to the desired product code number
4. Enter the new value for each item number. Use the AUTO/MAN to scroll forward one at a time through the item numbers. Use the YES/NO to scroll backward
   
   Warning: Do not scroll backwards past zero (0)
5. Connect the write protect jumper JP17 and upload to EEPROM
6. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Get linearizer data points

The linearizer curve corrects for the inherent non-linear response of a nuclear gauge. The value that you enter in the linearizer curve automatically compensates for the non-linear response and then provides an accurate measurement. Since the linearizer curve stores as one of the many parameters in the product code, it automatically applies to the calibration and measurement process through the re-cal of each product code.

Before starting this procedure:

☑ Have the process full to maximum

☑ Prepare to write the datapoints on the Linearizer curve chart on page 69.

☑ Prepare to take process off the conveyor in increments of 10%
**Procedure 17: Take datapoints for linearizer curve**

1. Gain access to security level 1 by entering the correct password on screen 52.
2. Be certain the correct product code has been selected.
3. Go directly to screen 168 START COLLECT and press ENTER to begin the data collect.
4. At the end of the time period, take a reading of Avg. Counts. Turn to the chart on the following page, and enter that reading across from Full (100%).
5. Empty approximately 10% of the process go to screen 168 START COLLECT again and press ENTER. Get a reading of Avg. Counts. Enter this number on the chart across from 90%. Enter the exact percent of the process in the Actual column if it differs from 90%.
6. Continue until the chart is AVG COUNT section of the chart is complete.
   
   Note: Obtain optimal results by using 11 readings (100%, nine intermediate values, and 0%). If 11 readings are not possible to obtain, the minimal number of readings necessary is five (100%, three intermediate values, and 0%). In either case, the exact number of the intermediate values must be known.
7. Call VEGA Field Service (513) 272-0131 with the chart entry points. They can calculate the 41 data points for you. Prepare to write down these points in the third column of the chart.
8. If Password has expired, regain entry to level 1.
9. Go to screen 528 CURVE #. This is located in the core of the computer memory. Take great care when working with information at this level.
10. Press HELP to secure the linearizer curve number of interest.
11. Enter the **NEW VALUES** (from VEGA) for each **ITEM NO**.
   - Use AUTO/MAN key to scroll forward one at a time through datapoints 0–40.
   - Use the YES/NO key to scroll backward one at a time through the ITEM NO.s. Do not go back past 0.
12. Continue past Item 40 (entry value=10000) to Item 41. Enter a 1 to indicate in software that a linearizer curve is needed for this application.
13. Connect the write protect jumper JP17 and save results to the EEPROM.
14. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
<table>
<thead>
<tr>
<th>Actual Process Condition</th>
<th>Screen #168 Reading in AVG COUNT</th>
<th>Data Points (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full (100%)</td>
<td></td>
<td>0=00000</td>
</tr>
<tr>
<td>90%</td>
<td></td>
<td>1=</td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td>2=</td>
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<tr>
<td>70%</td>
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<td>3=</td>
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<tr>
<td>60%</td>
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<td>4=</td>
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<tr>
<td>50%</td>
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<td>5=</td>
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<tr>
<td>40%</td>
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<td>6=</td>
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<tr>
<td>30%</td>
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<td>7=</td>
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<td>20%</td>
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<td>8=</td>
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<tr>
<td>10%</td>
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<td>9=</td>
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<tr>
<td>Empty (0%)</td>
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<td>11=</td>
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<td>38=</td>
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<tr>
<td></td>
<td></td>
<td>39=</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40=10,000</td>
</tr>
</tbody>
</table>

(*) Break points of curve - no decimals used
Data Collect Setup

![Figure 33: Data collect setup screens](image)

Data collection interval

The Data coll interval function is the time in seconds that the system takes to collect a process sample measurement. The gauge uses this interval time to collect data for the following functions:

- Initial calibration
- Linearizer curve
- Standardization
Measurement cutoff

Some belt scale applications have the belt scale running empty for prolonged periods. If there is a buildup of product sticking to the belt, the gauge measures and totalizes this product when not actually receiving the product. The measurement cutoff feature turns the measurement off in the frequency input block when the measurement drops below a setpoint. The Measurement Cutoff Setpoint is entered in Standardize Compensated Counts.

**Note**

The setpoint is entered as counts above the zero point. The gauge keeps track of the zero point and you enter the counts. For example, if the cutoff should trigger at 20 counts above the cutoff, enter 20 in the setpoint location.

Some applications have a large noise factor or very light loading. This makes it hard to distinguish between an empty belt and a low product. The Cutoff Time Constant feature provides for those cases requiring filtering of the raw counts used to trigger the cutoff function. This filtering is independent of the measurement process and does not affect the measurement in any way. As the Cutoff Time Constant is raised, the noise factor is reduced and the cutoff response time is increased. A Cutoff Time Constant entry is required if using the Measurement Cutoff feature. An entry of 1 gives the fastest response just as in the normal measurement time constant entry. The Measurement Cutoff function will not operate with an entry of zero for the Cutoff Time Constant.

**Note:** The cutoff time constant should be set as low as possible while still getting reliable cutoff indications.

When the measurement is actually cut off, there are two indications of the condition. The measurement processing in the frequency Input block will be zeroed from the normalized count location on and the Cutoff Flag will contain a one. The Cutoff Flag will be zero with the channel is in normal operation. You can use the Cutoff Flag to set an alarm, indicate an “end of batch”, and so forth.

Refer to page 140 for the Frequency Input Block locations.
Filtering

This feature enables change to the response time of the system by increasing or decreasing the averaging time that the gauge uses to filter the noise in the signal. An increased time for averaging enables the accumulation of a greater number of readings and therefore produces a greater statistical accuracy. However, this is at the expense of response time to changes in the process.

Type (RC exponential or rectangular window)

The W-4800 offers a choice of signal filters such as

- Linear
- RC exponential
- Rectangular window

The W-4800 transmitter has a sample rate of about one sample/second, but process variables generally change measurably on the order of minutes. Electrical and source noise occur on the order of seconds, so they can be filtered out with a low pass filter, leaving only the change in the process variable in the signal.

RC exponential

RC exponential filtering simulates the traditional Resistance/Capacitance filtering. It provides an infinite impulse, in which all of the previous samples contribute less and less to the average, but all contribute somewhat. The most recent samples are weighted most heavily in computing the average. Compared to rectangular window filtering, RC exponential filtering provides a quicker response to step changes in the process but has a larger noise band.

Rectangular window filtering

Rectangular window filtering computes an average based only on a specified (finite) number of samples. All samples are weighted equally in the average. Although it provides a slower step response (since the most recent measurements are weighted the same as those further back in time), it produces a less noisy signal. Generally, rectangular window linear averaging by itself produces results similar to combining RC exponential filtering with the fast cutoff feature.

Diagnostic RC filter

The measurement channel has either a rectangular or diagnostic RC filter. When you point this filter to a specific address, it will display the filtered counts. For example, you can point to address 2814 (raw counts) and 2810 (seconds). Screen 2812 then displays the filter count number.
Damping

The type of filter you choose determines the damping function.

With the RC exponential method, the damping entry is equivalent to a time constant; that is, the amount of time (in seconds) that it takes for the gauge reading to achieve 63.2% of a step change in process. A range of integer values from 1–600 seconds is possible for this time constant entry.

With the rectangular window filtering, the damping entry determines how many samples to use when calculating the average, responding to 100% of a process step change. The maximum damping entry is 100 with this type of filtering.

Fast response cutoff

Fast response cutoff temporarily bypasses the RC or digital filtering when the change in process exceeds this value (in engineering units) between successive samples. This enables the W-4800 to respond immediately to large step changes while filtering the smaller variations in the signal caused by noise and normal process variations. To turn off the fast cutoff filter, set the value to zero.
Selecting the filter type

Select the filter type at Item No. 18 in the Product Code Table on screen 527 (see the table in Appendix I, page 140).

Note
Rectangular window is the default filtering type.

Selecting a filter type, damping, and fast cutoff

Procedure 18: Selecting a filter type, damping, and fast cutoff

1. From **527 PR CODE** screen, enter one of the following for a filter type (item 18):
   - 0 for RC exponential
   - 1 for rectangular window
   Press ENTER

2. From **018 CAL MENU 1 OF 2**, press SELECT to choose **SET TIME CONSTANT** and press ENTER

3. From **035 TIME CONSTANT** screen, enter the new value for the time constant and press ENTER

4. From **035 TIME CONSTANT** screen, select **ENTER FAST CUTOFF VALUE** and press ENTER

5. From **049 ENTER DIGITAL FILTER CUTOFF VALUE** screen, select **CHANNEL #1 FILTER** and press ENTER

6. From **050 ENTER CHANNEL#1 FILTER CUTOFF VALUE**, enter the new value and press ENTER

7. Press PREVIOUS SCREEN to return to screen **049**

8. From **049 ENTER DIGITAL FILTER CUTOFF VALUE** screen, select **CHANNEL #2 FILTER** and press ENTER

9. From **051 ENTER CHANNEL#2 FILTER CUTOFF VALUE** screen, enter the new value and press ENTER

10. **Note**: To turn off Fast cutoff, enter 0 as the value.

17. Connect write protect jumper, JP17 and save to EEPROM

18. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Adaptive filter

After the measurement channel comes out of the cutoff condition, the output of the measurement filter is set to the first reading seen. Because of the normal fluctuations from measurement noise and the nature of radioactive decay, this first reading may not be precisely representative of the process conditions. To minimize this effect, you can activate an adaptive filter that improves the performance of the gauge. This adaptive filter is set up in screen 529, addresses 90 through 96.

Procedure 19: Setting up an adaptive filter

1. From 529 APP CODE ACCESS screen, address 90, type 1 and press ENTER to enable the adaptive filter.

2. From 529 APP CODE ACCESS screen, address 91, type the minimum value to set the time constant when coming of fast cutoff (default minimum value is set to a value of one) and press ENTER.

3. From 529 APP CODE ACCESS screen, address 92, type the maximum value to increment the time constant (set same as normal time constant up to a value of 100 seconds, the default value is set to 30 seconds) and press ENTER.

4. From 529 APP CODE ACCESS screen, address 93, type how many seconds to maintain each time constant before bumping to the new value (default value is set to 10 seconds) and press ENTER.

5. From 529 APP CODE ACCESS screen, address 94, Enter how much to step up the time constant (default value is five seconds) and press ENTER.

6. To view the current time constant value of the adaptive filter, go to 529 APP CODE ACCESS screen, address 95.

7. Connect write protect jumper, JP17 and save to EEPROM.

8. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.

529 APP CODE ACCESS screen, address 95 and 96 are diagnostic locations. Address 95 is the current time constant with the adaptive filter. Address 96 is the maximum time constant minus the current time constant. When this number gets to zero, the adaptive filtering is complete until the detection of the next cutoff condition.
Totalizer menu

The totalizer features are:

- Consists of two up-counters that are associated with a particular measurement. The totalizer can indicate tons, pounds, kilograms, or other units where summing is necessary.
- Takes lbs/ft from Channel #1 and multiplies that number by the belt speed from Channel #2. It then calculates the mass rate. The totalizer gives a pulse output for each predetermined weight interval (i.e., 1 pulse per 100 pounds). Contact VEGA Field Service to help configure this feature.
- Begins on the CAL menu 2 of 2. Direct access is on screen 4 where two separate totalizers are available.
- Can be PRESET or RESET
  - Presetting involves setting in a count that produces an indication or closes a contact when it reaches that count
  - Resetting the totalizer returns the upper counter to zero.
- HOLD and RESET/HOLD are available options. NORMAL is necessary to revoke the HOLD and begin count again.
Procedure 20: Setup totalizer #1

1. From **004 TOTALIZER MENU**, select **TOTALIZER #1**

2. From **030 TOTALIZER #1** screen, select one of the following:
   - **RESET**
   - **PRESET**
   - **HOLD**
   - **REST/HOLD**
   
   And press ENTER

3. If you chose **PRESET**,

   From the **115 TOTALIZER #1 ENTER PRESET VALUE** screen, enter the new value of totalizer #1 and press ENTER

4. Connect the write protect jumper JP17

5. Save to EEPROM

6. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Procedure 21: Setup totalizer #2

1. From 004 TOTALIZER MENU screen, select TOTALIZER #2

2. From 031 TOTALIZER #2 screen, select one of the following:
   - RESET
   - PRESET
   - HOLD
   - REST/HOLD
   And press ENTER

3. If you chose PRESET,
   From the 116 TOTALIZER #2 ENTER PRESET VALUE screen, enter the new value of totalizer #2 and press ENTER

4. Connect the write protect jumper JP17

5. Save to EEPROM

6. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Procedure 22: Setup totalizer #1 & 2 total units

1. From 004 TOTALIZER MENU screen, press select to choose SELECT TOTAL UNITS.

2. From 117 SELECT TOTAL UNITS FOR TOTALIZER screen, select TOTALIZER #1 UNITS.

3. From 118 TOTALS #1 UNITS, select one of the following units of measurement:
   - LBS
   - TON
   - KGMS
   And press ENTER.

4. From 117 SELECT TOTAL UNITS FOR TOTALIZER screen, select TOTALIZER #2 UNITS.

5. From 119 TOTALS #2 UNITS, select one of the following units of measurement:
   - LBS
   - TON
   - KGMS
   And press ENTER.


7. Save to EEPROM.

8. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Setup menus

Minus sign configuration

Figure 36: Screen 092 main screen display

This feature enables the Smart Pro or Pro Pac to display negative numbers on screen 092.

The base address for the minus sign feature is 529, item 2815.

Table 15: Screen 092 minus sign configuration

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
</table>
| 2815  | Sign Config    | 1=Do not show minus sign on screen 92  
|       |                | 0=Show minus sign on screen 92 if sensor counts are greater than the empty belt counts |
Chapter 4: Calibration

Use the Smart Pro or Smart Pro Pac (the software in both operates identically) to calibrate the W-4800 Weigh Scale. Refer to the Smart Pro Electronics Reference Manual for instructions to use the Smart Pro software. To perform the calibration, you must be familiar with the Smart Pro topics:

- Navigating through the Smart Pro screens
- Security access level
- Product Code
- Saving to Upper RAM

This section provides a summary of the calibration procedure for a standard density. Refer to the Smart Pro Electronics Reference and the Smart Pro Mini Guide to Fast Startups for more details.

Smart Pro Note: The instructions in this manual are compatible with Smart Pro firmware 4500.08 or later.
Process calibration

Calibration establishes reference points that relate the detector output to actual (or known) values of the process. When you first receive the scale there is no calibration and the sensor does not read the weight.

There are three different types of calibrations:

1. Channel #1 Initial Cal—Perform an initial calibration with a static load to get a close calibration (this is not an easily reproducible calibration)
2. Channel #1 Periodic Cal—This is a quick and reproducible calibration. It always end with the same calibration, without moving the product around
3. Channel #2 Cal.

Calibration main menus

All of the calibration functions for the gauge are available under the Cal Menu.

```
018 CAL MENU 1 OF 2
  SET PRODUCT CODE
  CALIBRATE GAGE
  SET TIME CONSTANT

018 CAL MENU 2 OF 2
  TOTALIZER MENU
```

Figure 37: Cal menu screens

Product code screen

```
003 PRODUCT CODE
  SELECTION SCREEN
  OLD=0.0  NEW=0.0
  EXAMINE P.C. TABLE

527 PR CODE 0
  ITEM 000  NEXT=0.00
  CURRENT VAL  NEW VAL
  000000  0000
```

Figure 38: Product code screens

The product code groups together a set of parameters that are associated to a unique product. There are nine Product codes available for use.

Product codes 0 through 8 are available for Channel #1 that handles the process sensor input, and product code 9 is for Channel #2 that is for optional sensor input.

You can view Product Code Tables from access level 0, however, access level 1 enables you to setup or change values in the table. The table in Appendix 1 lists the set of 25 parameters. Procedures for changing the product code screen are available on page 66 of this manual.
Initial calibration overview

Before you can use the gauge, a relationship between the detector signal and the actual process values must be determined. The initial calibration determines this relationship by collecting data and measuring the actual process value. The initial calibration of the gauge includes following steps.

1. Verifying the correct measurement units
2. Verifying the proper measurement span entries
3. Determining the linearization
4. Collecting data for the zero and span
5. Calculating the calibration
6. Resetting the absorber value
7. Saving the calibration information to EEPROM

Figure 39: Graphical representation of the calibration curve

Counts

Cal_lo

Cal_hi

Weight_lo

Weight_hi

Weight

Figure 39: Graphical representation of the calibration curve
Step 1: Verifying the proper measurement units
You can configure the W-4800 weigh scale to measure different variables. With proper installation, it can measure the following:

- Weight/Length
- Weight/Area
- Weight/Volume
- Weight/Time

Procedure 23: Verify units of measurement

1. From the Main screen 092, verify that the units of measurement are correct.
2. If the units are incorrect, use the procedure on page 57 to correct the settings of the units of measurement.
Step 2: Verifying the proper measurement span entries

From Setup Menu 2 of 4 use the SELECT and ENTER keys to progress through these functions.

Procedure 24: Verify proper measurement span entries

1. From the 015 SETUP MENU 2 of 4 screen, select SET GAGE MEAS SPAN
2. From the 098 SET GAGE SPAN menu, select SET MINIMUM READING
3. In the 096 MIN SPAN SETTING screen, verify the Low Span setting is correct and then Press PREVIOUS SCREEN to return to 098 screen
   Note: If the Low span setting is incorrect, go to the procedure on page 54 to correct the span setting
4. From the 098 SET GAGE SPAN menu, select SET MAXIMUM READING
5. In the 097 SET MAX SPAN SETTING screen, verify the high process value (the value that corresponds to the maximum process loading condition) in process units
6. Note: If the Low span setting is incorrect, go to the procedure on page 54 to correct the span setting.
Step 3: Determine the linearization

Nuclear Measurements are inherently non-linear. The heavier the loading, the more the measurement becomes non-linear. Since the gauge calibrates near the ends of the measurement span, the gauge reads correctly there. However, you must load the correct linearization curve into the Smart Pro before the gauge reads the correct weight in the middle of the span. This curve depends on the following components:

- Measurement span
- Geometry of the source and detector

Procedure 25: Verify the curve is loaded into Smart Pro

1. From the 052 ENTER PASSWORD screen, enter the password for the appropriate access level
2. Go to screen 528 CURVE #, to view the current values from 1-40
3. Enter the item number and press ENTER to view the specific data point.
4. Check items 0 to 40. If the data is between 0 and 10,000 (0–100%) in increments of 250, then Linearization is not present
5. Several loadings between 0–100% must be run on the belt or simulated in a static condition to derive data for this curve. Upon completing the data collection, provide VEGA with the collected data points. VEGA calculates the curve and supplies 41 linearization points.
Step 4: Collecting data for the zero and span

This step sets the upper and lower detector signal limits that are associated with the endpoints of the calibration. These endpoints display graphically as Cal_lo and Cal_hi. You do not have to collect data at the endpoints of the calibration, but in general the closer to the ends the better.

Perform this procedure one time only for the initial calibration. Calibrations that follow the initial cal use the self-contained absorber.

**Calibrate zero—low on process Channel #1**

![210 CALIBRATE LOW ON PROCESS YES NO (ABORT)](Figure 40: Cal Lo on process screen)

Before starting this procedure:

- Have the process at zero
- Have the actual process value for the empty belt
Procedure 26: Collect data for zero Channel #1—low on process

1. For the zero, run an empty belt
2. From the MAIN MENU 1 OF 2 screen, press SELECT to choose CALIBRATE SYSTEM and press ENTER
3. From 018 CAL MENU 1 OF 2 screen, press SELECT to choose CALIBRATE GAGE and press ENTER
4. From 008 CALIBRATE GAGE screen, press ENTER at SELECT CHANNEL
   Note: Verify that you are using the correct product code (0-8 for Channel #1 or 9 for Channel #2)
5. From 146 CAL CHANNES screen, select CAL CHANNEL #1 and press ENTER
6. From 149 CAL CHANNEL #1 screen, press SELECT to choose MORE CAL FUNCTIONS and press ENTER
7. From 150 CAL CHANNEL #1 screen, press SELECT to choose MORE CAL FUNCTIONS and press ENTER
8. From 151 CAL CHANNEL #1 screen, press SELECT to choose MORE CAL FUNCTIONS and press ENTER
9. From 152 CAL CHANNEL #1 screen, press SELECT to choose CAL LO ON PROCESS and press ENTER
10. From 210 CALIBRATE LOW ON PROCESS screen, press SELECT to choose either YES or NO (ABORT)
11. From 211 CAL TIME LEFT, press ENTER when the countdown reaches 0
12. From 212 ENTER PROD VAL screen, enter the actual value of the process and press ENTER. Screen 212 displays again with the cursor on the YES line. Press ENTER to continue
13. On the 157 SAVE CALIBRATE RESULT IN UPPER RAM? screen, press ENTER on the YES line to save to upper ram or NO to abort the save
14. If you choose to save the results, the AVG. COUNT stores in memory for later use. Do this only when you are sure the results are correct and you are ready to continue
15. Press SELECT to choose the YES and press ENTER to continue
16. Connect the write protect jumper JP17 and save to EERPOM
17. Disconnect the write protect jumper, JP17.

Calibrate high on process—Channel #1
Before starting this procedure:

☑ Have enough process available to statically load a 6ft length of belt to maximum loading
Procedure 27: Collect data for span Channel #1—high process

1. From the **MAIN MENU 1 OF 2** screen, press SELECT to choose **CALIBRATE SYSTEM** and press ENTER

2. From **018 CAL MENU 1 OF 2** screen, press SELECT to choose **CALIBRATE GAGE** and press ENTER

3. From **008 CALIBRATE GAGE** screen, press ENTER at **SELECT CHANNEL**
   Note: Verify that you are using the correct product code (0-8 for Channel #1 or 9 for Channel #2)

4. From **146 CAL CHANNELS** screen, select **CAL CHANNEL #1** and press ENTER

5. From **149 CAL CHANNEL #1** screen, press SELECT to choose **MORE CAL FUNCTIONS** and press ENTER

6. From **150 CAL CHANNEL #1** screen, press SELECT to choose **CAL HI ON PROCESS** and press ENTER

7. From **047 CALIBRATE HI ON PROCESS** screen, press SELECT to choose either **YES** or **NO**

8. From **027 CAL TIME LEFT AFTER TIMEOUT**, press ENTER when the countdown reaches 0 seconds left
   Note: Stop the conveyor at this point and collect a known length of the material.
   Weigh the material and determine the lbs/ft

9. From **156 ENTER PROD VAL** screen, enter the actual value of the process and press ENTER. Screen 156 displays again with the cursor on the **YES** line. Press ENTER to continue

10. On the **157 SAVE CALIBRATE RESULT IN UPPER RAM?** Screen, press ENTER on the **YES** line to save to Upper Ram or **NO** to abort the save

11. If you choose to save the results, the AVG. COUNT stores in memory for later use.

12. Press SELECT to choose the **YES** and press ENTER to continue

13. Connect the write protect jumper JP17

14. Save to EEPROM

15. Disconnect the write protect jumper, JP17.
Step 5: Calculating the calibration

The data collected in the previous section does not immediately impact the calibration parameters the gauge is using. Once you finish collecting the data for both ends of the calibration, calculate the new calibration parameters by using the “Two Point Cal” function from the calibration menu.

Note: It is important to have the proper Linearization curve loaded into the gauge before executing the Two Point Cal function. The gauge may have to extrapolate the endpoints and must have the curve in place to do this.

```
Two point calibration
155 TWO POINT CAL
HAVE YOU DONE A CAL LO AND CAL HI FIRST?
   YES    NO
```

*Figure 42: Two point calibration screen*
Procedure 28: Calculate calibration—Channel #1

1. From 146 CAL CHANNELS screen, select CAL CHANNEL #1 and press ENTER
2. From 149 CAL CHANNEL #1 screen, press SELECT to choose MORE CAL FUNCTIONS and press ENTER
3. From 150 CAL CHANNEL #1 screen, press SELECT to choose MORE CAL FUNCTIONS and press ENTER
4. From 151 CAL CHANNEL #1 screen, press SELECT to choose MORE CAL FUNCTIONS and press ENTER
5. From 152 CAL CHANNEL #1 screen, press SELECT to choose TWO POINT CALIBRATE and press ENTER
6. From 155 TWO POINT CAL HAVE YOU DONE A CAL LO AND CAL HI FIRST? screen, select YES and press ENTER
7. From 157 SAVE CALIBRATE RESULT IN UPPER RAM? screen, select YES and press ENTER
8. Press PREVIOUS SCREEN until you return to MAIN MENU
9. Connect the write protect jumper JP17
10. Save to EEPROM
11. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM
Step 6: Setting the absorber value

Procedure 29: Set absorber value

1. With a moving empty belt, pull out the absorber and perform a simple data collect to determine the value
   Make a note of the absorber reading and counts

2. From 159 ENTER ABSORBER VALUES screen, select HIGH ABSORBER VALUE and press ENTER

3. From 148 HIGH ABSORBER screen, enter the new value and press ENTER

4. Screen 148 displays, press ENTER on the YES line to save to Upper RAM

5. Connect the write protect jumper JP17

6. Save to EEPROM

7. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Step 7: Saving the calibration information to EEPROM

After completion of step 6, all of the calibration information is in the RAM memory of the Smart Pro. You must copy this data to the non-volatile EEPROM for long-term storage. On all system re-boots, the EEPROM data copies into the RAM memory and becomes the current configuration. Refer to page 44 for information concerning the upload and download configuration program.

Procedure 30: Save calibration information to EEPROM

1. Connect the write protect jumper JP17
2. From the 310 MEMORY BACKUP screen, press SELECT to choose EEPROM TRANSFERS
3. Screen 311 displays with the message, “CAUTION, PRESS HELP KEY FOR EEPROM MESSAGE” If you press HELP, the following message displays:

   “770 MAKE SURE THERE IS AN EEPROM IN U26 BEFORE USING THIS FEATURE. PRESS HELP.”

   Press HELP to return to screen 311 and press ENTER to continue
4. From 100 EEPROM SERVICE screen, choose SELECT COPY RAM TO EEPROM
5. Screen 102 RAM TO EEPROM screen displays. Enter 1 and press ENTER to initiate the transfer. If a zero displays, the transfer was successful. If a one displays, the transfer was unsuccessful

   If the transfer was unsuccessful, verify that the jumper on JP17 is in place. It is necessary to place the jumper on JP17 to enable any uploading to the EEPROM
6. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Periodic calibration—Channel #1 functions

Periodic calibration overview

Periodic calibration adjusts the system by resetting one point of the calibration curve to an independently measured or known sample.

The frequency of periodic calibration depends on several factors, including desired accuracy of the reading.

Periodic calibration consists of five steps:

1. Adjustment of zero reading by using the Simple Re-Cal function
2. Checking the absorber value by performing a simple data collect. Cal Hi on absorber if absorber value reads off by an unacceptable amount
3. Empty the belt and perform a simple data collect if the gauge is still not reading the product correctly
4. Empty the belt and reset the absorber value
5. Save re-cal to EEPROM.

Smart Pro Note: Refer to the “Smart Pro Reference Chapter 3, section Re-Cal / Channel #1 (Category II Functions)” for more information about choosing a method and performing the periodic re-cal.

If the calibration is not accurate after performing a zero and recalibration on absorber, then perform a Cal Hi to verify that the gauge is reading correctly. After the gauge is reading correctly, have the gauge detect an empty belt condition with the absorber in place, for the correct high value for the absorber. The new value should be re-entered at screen 159.
Step 1: Simple cal on low

1. From screen 149 **CAL CHANNEL #1**, select **SIMPLE RE-CAL LOW** and press ENTER

2. From screen 141 **START SIMPLE CAL ON EMPTY**, select **YES** and press ENTER to confirm

3. On screen 173 **CAL TIME LEFT**, press ENTER when the counter reaches 0

4. From screen 174 **EVAL DATA COLLECT**, verify that the absorber and process value are correct. If not correct, press SELECT for **NO** to adjust the CAL or **YES** to continue. Press ENTER

   If you chose YES, screen 175 displays

5. Connect the write protect jumper, JP17 and save to EEPROM

6. On 175 **SAVE CALIBRATE RESULT IN EEPROM** screen, press SELECT to choose **YES** or **NO** and press ENTER

7. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Step 2: Cal Hi on absorber

| 181 CAL HI, ABSORBER |
| CONFIRM |
| YES | NO (ABORT) |

*Figure 44: Cal on absorber screen*

1. From screen **181 CAL Hi** screen, select **YES** and press ENTER to confirm
2. From screen **170 CAL TIME LEFT** screen, press ENTER after timeout
3. On screen **171 EVAL DATA COLL.**, view the absorber value and measured value. Press ENTER on the YES field to adjust the cal or press SELECT and press ENTER to choose NO
4. Connect the write protect jumper JP17
5. On **172 SAVE CALIBRATE RESULT IN EEPROM** screen, press SELECT to choose **YES** or **NO** and press ENTER
6. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Step 3: Simple data collect

This function allows the collection of a timed average of the Channel #1 sensor signal. It takes no control action, but enables the user to see the average sensor signal, as it would collect if you perform a calibration step.

**Procedure 33: Simple data collect—Channel #1**

1. From screen **149 CAL CHANNEL #1**, select **MORE CAL FUNCTIONS** and press **ENTER**

2. From screen **150 CAL CHANNEL #1**, select **MORE CAL FUNCTIONS** and press **ENTER**

3. From screen **151 CAL CHANNEL #1**, press **SELECT** to choose **SIMPLE DATA COLLECT** and press **ENTER**

4. On screen **168 START COLLECT**, press **ENTER** when the counter reaches 0. Write the average counts on the screen.
Step 4: Absorber value setup

159 ENTER ABSORBER VALUES.
LOW ABSORBER VALUE
HI ABSORBER VALUE

Figure 46: Absorber value setup screen

Procedure 34: Absorber value setup—Channel #1

1. From screen **159 ENTER ABSORBER VALUES**, select **HI ABSORBER VALUE** and press ENTER

2. From screen **148 HIGH ABSORBER screen**, enter the new value of the absorber on high and press ENTER and then press ENTER again to confirm

3. Connect the write protect jumper JP17 and save to EEPROM

4. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Step 5: Saving the calibration information to EEPROM

After completion of step 4, all of the calibration information is in the RAM memory of the Smart Pro. You must copy this data to the non-volatile EEPROM for long-term storage. On all system re-boots, the EEPROM data copies into the RAM memory and becomes the current configuration. Refer to page 44 for information concerning the upload and download configuration program. Follow the procedure on page 94 to save the calibration information to the EEPROM.
Calibration—Channel #2 functions

Step 1: Collecting data for the zero and span
This step sets the upper and lower detector signal limits that are associated with the endpoints of the calibration. These endpoints display graphically as Cal_lo and Cal_hi. You do not have to collect data at the endpoints of the calibration, but in general the closer to the ends the better.

Perform this procedure one time only for the initial calibration. Calibrations that follow the initial cal use the self-contained absorber.

![Cal Channel #2 function screen](image)

Figure 47: Cal Channel #2 function screen

**Cal Lo on process**

![Cal Lo on process screen](image)

Figure 48: Cal Lo on process screen
Calibration

Calibrate zero—low on process Channel #2

Before starting this procedure:

☑ Have the process at zero
☑ Have the actual process value for the empty belt

Procedure 35: Collect data for zero Channel#2—low on process

1. For the zero, stop the belt.
2. From the MAIN MENU 1 OF 2 screen, press SELECT to choose CALIBRATE SYSTEM and press ENTER
3. From 018 CAL MENU 1 OF 2 screen, press SELECT to choose CALIBRATE GAGE and press ENTER
4. From 008 CALIBRATE GAGE screen, press ENTER at SELECT CHANNEL
   Note: Verify that you are using the correct product code (0-8 for Channel #1 or 9 for Channel #2)
5. From 146 CAL CHANNELS screen, select CAL CHANNEL #2 and press ENTER
6. From 185 CAL CHANNEL #2 screen, select CAL LOW ON PROCESS and press ENTER
7. From 187 CALIBRATE LOW ON PROCESS screen, press SELECT to choose either YES or NO (ABORT)
8. From 188 CAL TIME LEFT, press ENTER when the countdown reaches 0
9. From 191 ENTER PROD VAL screen, enter the actual value of the process and press ENTER. Screen 191 displays again with the cursor on the YES line. Press ENTER to continue
10. On the 157 SAVE CALIBRATE RESULT IN UPPER RAM? screen, press ENTER on the YES line to save to Upper Ram or NO to abort the save
11. If you choose to save the results, the AVG. COUNT stores in memory for later use. Do this only when you are sure the results are correct and you are ready to continue
12. Press SELECT to choose the YES and press ENTER to continue
13. Connect the write protect jumper JP17 and save to EEPROM
Calibrate high on process—Channel #2

200  CALIBRATE HI
     ON PROCESS.

YES    NO

Figure 49: Cal Hi on process screen

Before starting this procedure:

☑️ Have enough process available to statically load a 6ft length of belt to maximum loading
Calibration

Procedure 36: Collect data for span Channel#2—high process

1. From the **MAIN MENU 1 OF 2** screen, press SELECT to choose **CALIBRATE SYSTEM** and press ENTER

2. From **018 CAL MENU 1 OF 2** screen, press SELECT to choose **CALIBRATE GAGE** and press ENTER

3. From **008 CALIBRATE GAGE** screen, press ENTER at **SELECT CHANNEL**
   Note: Verify that you are using the correct product code (0-8 for Channel #1 or 9 for Channel #2)

4. From **146 CAL CHANNELS** screen, select **CAL CHANNEL #2** and press ENTER

5A. From **185 CAL CHANNEL #2** screen, press SELECT to choose **CAL HI ON PROCESS** and press ENTER

5B. Turn off the source, load belt statically, and turn on source. Try to replicate the loading profile.

6. From **200 CALIBRATE HI ON PROCESS** screen, press SELECT to choose either **YES** or **NO**

7. From **201 CAL TIME LEFT AFTER TIMEOUT**, press ENTER when the countdown reaches 0 seconds left
   Note: Stop the conveyor at this point and collect a known length of the material. Weigh the material and determine the lbs/ft

8. From **202 ENTER PROD VAL** screen, enter the actual value of the process and press ENTER. Screen **156** displays again with the cursor on the **YES** line. Press ENTER to continue

9. On the **157 SAVE CALIBRATE RESULT IN UPPER RAM?** screen, press ENTER on the **YES** line to save to Upper Ram or **NO** to abort the save

10. If you choose to save the results, the AVG. COUNT stores in memory for later use.

11. Press SELECT to choose the **YES** and press ENTER to continue

12. Connect the write protect jumper JP17 and save to EEPROM

Step 2: Calculating the calibration

The data collected in the previous section does not immediately impact the calibration parameters the gauge is using. Once you finish collecting the data for both ends of the calibration, calculate the new calibration parameters by using the “Two Point Cal” function from the calibration menu.

Note: It is important to have the proper Linearization curve loaded into the gauge before executing the Two Point Cal function. The gauge may have to extrapolate the endpoints and needs the curve in place to do this.

Procedure 37: Calculate calibration—Channel #2

1. From 146 CAL CHANNELS screen, select CAL CHANNEL #2 and press ENTER
2. From 149 CAL CHANNEL #1 screen, press SELECT to choose CAL CHANNEL #2 and press ENTER
3. From 185 CAL CHANNEL #2 screen, press SELECT to choose TWO POINT CALIBRATE and press ENTER
4. From 192 TWO POINT CAL HAVE YOU DONE A CAL LO AND CAL HI FIRST? screen, select YES and press ENTER
5. From 157 SAVE CALIBRATE RESULT IN UPPER RAM? screen, select YES and press ENTER
6. Press PREVIOUS SCREEN until you return to MAIN MENU
7. Connect the write protect jumper JP17 and save to EEPROM
8. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM
Step 3: Saving the calibration information to EEPROM

After completion of step 2, all of the calibration information is in the RAM memory of the Smart Pro. You must copy this data to the non-volatile EEPROM for long-term storage. On all system re-boots, the EEPROM data copies into the RAM memory and becomes the current configuration. Refer to page 44 for information concerning the upload and download configuration program. Follow the procedure on page 94 to save the calibration information to the EEPROM.
Current loop (analog output) calibration

Calibrating the current loop adjusts the 4 ... 20 mA output to a reference—either the PLC/DCS or a certified ammeter. It forces the 4 and 20 mA outputs to the external reference. The current loop is pre-adjusted at the VEGA factory with a certified ammeter, so it is usually very close to the outputs required.

Analog output

Output signals are available through two channels. The two channels can control the output that goes to the devices that use the analog output. Some of these devices are:

- Controller
- Indicator
- Chart recorder

Each channel can be set up and calibrated to accommodate one of the following:

- 4 ... 20 mA
- 0 ... 20 mA
- 0 ... 100 mV

Analog output #1 ties to the product code at Item No. 10 and 11 of the Product Code Table. The second analog output is not product dependent.

Select the output range for each channel from screen 63. If voltage is desired, the choice of 0–20 is made on screen 63 and requires hardware jumpering.

The objective of calibrating the analog output is to set the low signal (4 mA, 0 mA, or 0 mV) equal to the actual low process value (or lowest value of interest), and to equate the high signal (20 mA or 100 mV) to the high process value (or highest value of interest.) Refer to Figure 24 for jumper information.
Calibration of the analog output signal

Calibrate the analog output signal by monitoring the current with a DC milliammeter.
Procedure 38: Calibrate the analog output signal—Channel#1

1. Attach the DC milliammeter to terminal block TB4 at pin locations 11 and 12 for analog output #1
2. Attach the DC milliammeter to terminal block TB3 at pins 3 and 4 for analog output #2
3. From the 052 PASSWORD screen, type in the password for Level 1
4. From the 015 SETUP 2 of 4 screen, select SET/CAL ANALOG OUTS and press ENTER
5. From the 065 ANALOG OUTPUTS screen, press SELECT to choose the CAL ANALOG OUTPUTS and press ENTER
6. From the 061 CAL OUTPUT CHANNEL screen, select CAL OUTPUT CHAN #1 and press ENTER
7. From screen 070 CAL ANALOG OUTS press ENTER to select OUTPUT ##% OF RANGE
8. From screen 077 SEL ADJUST RATE, press SELECT to choose either of the following options:
   • COARSE ADJUSTMENT
   • FINE ADJUSTMENT
   and press ENTER to continue
9. From 071 ADJUST OUT screen, select either of the following options:
   • INCREASE OUTPUT
   • DECREASE OUTPUT
   and press ENTER
10. Depending on the step 6 selection either screen 073 or 074 displays.
    • From 073 CAL ANALOG OUT screen, press ENTER to stop increasing output
    • From 074 CAL ANALOG OUT screen, press ENTER to stop decreasing output
11. From 075 CAL ANALOG OUT screen, press ENTER on YES to exit setup mode
12. Connect the write protect jumper JP17
13. From 076 SAVE CALIBRATE RESULT IN EEPROM screen, press ENTER on YES line to save to the EEPROM
14. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.

Procedure 39: Calibrate the analog output signal—Channel#2

1. Attach the DC milliammeter to terminal block TB4 at pin locations 11 & 12 for analog output #1
2. Attach the DC milliammeter to terminal block TB3 at pins 3 & 4 for analog output #2

3. From the 052 PASSWORD screen, type in the password for Level 1

4. From the 015 SETUP 2 of 4 screen, select SET/CAL ANALOG OUTS and press ENTER

5. From the 065 ANALOG OUTPUTS screen, press SELECT to choose the CAL ANALOG OUTPUTS and press ENTER

6. From the 061 CAL OUTPUT CHANNEL screen, select CAL OUTPUT CHAN #2 and press ENTER

7. From screen 070 CAL ANALOG OUTS press ENTER to select OUTPUT ##% OF RANGE

8. From screen 077 SEL ADJUST RATE, press SELECT to choose either of the following options:
   - COARSE ADJUSTMENT
   - FINE ADJUSTMENT
   and press ENTER to continue

9. From 071 ADJUST OUT screen, select either of the following options:
   - INCREASE OUTPUT
   - DECREASE OUTPUT
   and press ENTER

10. Depending on the step 6 selection either screen 073 or 074 displays.
    - From 073 CAL ANALOG OUT screen, press ENTER to stop increasing output
    - From 074 CAL ANALOG OUT screen, press ENTER to stop decreasing output

11. From 075 CAL ANALOG OUT screen, press ENTER on YES to exit setup mode

12. Connect the write protect jumper JP17

13. From 076 SAVE CALIBRATE RESULT IN EEPROM screen, press ENTER on YES line to Save to the EEPROM and disconnect the write protect jumper, JP17.
<table>
<thead>
<tr>
<th>Screen, item</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>520,25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527,0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527,1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520,23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527,18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>529,110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>529,111</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Calibration

Notes
Chapter 5: Diagnostics and repair

Communication diagnostics

Bi-level input

The following table lists the bi-level inputs, terminals, and addresses. It also lists the LED differences between the newer revision D boards and their older counterparts. All addresses are reached through screen 529.

**Note:** The Pro Pac information is for each of the four sets of terminals.

<table>
<thead>
<tr>
<th>Input #</th>
<th>Smart Pro Terminal</th>
<th>Smart Pro Active, Ground</th>
<th>Pro Pac Terminal</th>
<th>Pro Pac Active, Ground</th>
<th>Address from Screen 529</th>
<th>Older board (Revision C or older)</th>
<th>New board (Revision D or newer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TB4</td>
<td>8, 9</td>
<td>TB2</td>
<td>4, 5</td>
<td>1102</td>
<td>LED 37</td>
<td>LED 30</td>
</tr>
<tr>
<td>2</td>
<td>TB5</td>
<td>1, 2</td>
<td>TB2</td>
<td>6, 5</td>
<td>1101</td>
<td>LED 36</td>
<td>LED 29</td>
</tr>
<tr>
<td>3</td>
<td>TB5</td>
<td>3, 4</td>
<td>TB2</td>
<td>7, 8</td>
<td>1100</td>
<td>LED 35</td>
<td>LED 28</td>
</tr>
<tr>
<td>4</td>
<td>TB5</td>
<td>5, 6</td>
<td>TB2</td>
<td>9, 8</td>
<td>1099</td>
<td>LED 34</td>
<td>LED 27</td>
</tr>
<tr>
<td>5</td>
<td>TB5</td>
<td>7, 9</td>
<td>TB2</td>
<td>10, 11</td>
<td>1098</td>
<td>LED 33</td>
<td>LED 26</td>
</tr>
<tr>
<td>6</td>
<td>TB5</td>
<td>8, 9</td>
<td>TB2</td>
<td>12, 11</td>
<td>1097</td>
<td>LED 32</td>
<td>LED 25</td>
</tr>
</tbody>
</table>

An open circuit has a no light and the address equals zero. A closed circuit has a light and an address of one. Figure 50 is an example of a bi-level input with an open circuit.

*Figure 50: Example of a bi-level input open circuit*
The following Smart Pro and Pro Pac troubleshooting flow charts may be useful in diagnosing many communication problems.

![Power supply flow chart](image)

Figure 51: Smart Pro—power supply flow chart – part 1

Notes for power supply flow chart:
1. Other +5V possibilities:
   a. Communication ports I/O J4 & J5. Isolate any connections
   b. Field connection at TB3 & 6. Isolate
   c. SPDT relays. Replace I/O board
   d. Fiber optic receivers (if used). Replace I/O board
   e. DC/DC converter. CPU U4 (if used). Replace CPU board

2. Other +5V, +15V possibilities:
   a. I/O power cable at I/O J2. Replace cable
   b. Power harness. I/O J1 to I/O J2. Replace harness

3. DC/DC converter
   a. Measure + or -15V at CPU board:
      RS to U1-4 = +15V
      U1-11 to U1-4 = -15V
Figure 52: Smart Pro—power supply flow chart – part 2
Figure 53: Smart Pro—TTL/Relay flow chart
Frequency Input

Start

Is correct signal present at TB4-1 for input 1 and/or TB4-5 for input 2?

Yes

Is same signal present at U5-3 for input 1 and/or U7-3 for input 2?

Yes

Does +5VDC measure across (8-5) at U5 for Input 1 and/or U7 for input 2?

Yes

Replace CPU board

No

Problem with sensor or external wiring

Check jumpers and I/O signal cable

Refer to power supply flow chart

End

Figure 54: Smart Pro—frequency input
Diagnostics and repair

Figure 55: Smart Pro—analog output (mA/mV) flow chart

Start

1. Does U2 side of R5 measure +15VDC to U2-8?
   - Yes
   - No

   Refer to power supply flow chart

2. Does U2 (8-4) measure -15VDC?
   - Yes
   - No

   Refer to power supply flow chart

3. If mA selected, JP1 not installed
   - mA
   - mV

   Set output equal to 50%

4. Does TB4(11-12) measure 12mA or 50mV?
   - Yes
   - No

   Check I/O signal cable or replace CPU

5. Does U15 side of R32 measure +15VDC to U15-8?
   - Yes
   - No

   Refer to power supply flow chart

6. If mA selected, JP2 not installed
   - mA
   - mV

   Set output equal to 50%

7. Does TB3(6-7) measure 12mA or 50mV?
   - Yes
   - No

   Check I/O signal cable or replace CPU

8. Does U15 (8-4) measure -15VDC?
   - Yes
   - No

   External wiring or controller problem
Figure 56: Smart Pro—analog input-2 flow chart
Is correct signal present at TB1-4 for input and/or TB1-7 for input 2?

Check CPU jumpers and I/O signal cable, Ok?

Have power supply levels been checked?

Replace CPU

Figure 57: PRO PAC—Frequency input
Figure 58: Pro Pac—Analog Input-2

Analog Input-2

Start

Is signal present at Input 2 TB1 (7-8)?

Yes

Check jumpers, I/O signal cable OK?

Yes

Have power supply levels been checked?

Yes

Replace CPU

End

No

Problem with external wiring or transmitter

No

Correct

Yes

Refer to power supply flow chart
Diagnostics and repair

TTL/Relay Flow Chart

Start

Have power supply levels been checked?

Refer to power supply flow chart

Are signals at I/O TB numbers (see Table #1) correct?

Check I/O signal cable and CPU

Replace I/O board

External wiring or field device problem

End

Table #1 – I/O Board

<table>
<thead>
<tr>
<th>Relays</th>
<th>COM</th>
<th>N.C.</th>
<th>N.O.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TTL (O.C.)</th>
<th>Non-isolated</th>
<th>Isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4-11</td>
<td>4-5</td>
</tr>
<tr>
<td>3</td>
<td>4-6</td>
<td>N/A</td>
</tr>
<tr>
<td>4</td>
<td>5-6</td>
<td>N/A</td>
</tr>
<tr>
<td>5</td>
<td>7-9</td>
<td>N/A</td>
</tr>
<tr>
<td>6</td>
<td>8-9</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Figure 59: PRO PAC—TTL/Relay flow chart
### Analog Output (mA/mV)

**Figure 60: PRO PAC—analog output (mA/mV) flow chart**
Figure 61: PRO PAC — AC voltage and power supply flow chart

- **Power switch to ON**
- **User AC at I/O TB5**
- **Correct AC**
- **Check Power switch I/O J1 & harness**
- **Remove power supply +5V wires, +5V?**
- **Replace power supply**
- **Isolate +5V usage and correct**
- **Isolate bad CPU**
- **End**
- **Yes**
- **No**

**Power supply terminals**
- TB1-1 AC/L1
- TB1-2 AC/N
- TB1-4 AC GND
- TB2-1 -15V
- TB2-2 15V COMM
- TB2-3 +15V
- TB2-5V COM
- TB2-6 +5V

*W-4800 Weigh Scale Technical Reference Manual*
Maintenance and repair

Periodic maintenance schedule

The W-4800 Weigh Scale requires very little maintenance because it contains no moving parts. We suggest the following schedule to prevent problems and to comply with radiation regulations:

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-cal</td>
<td>As required by process conditions, usually at least once a month</td>
<td>Smart Pro Calibration chapter</td>
</tr>
<tr>
<td>Source wipe/Leak test</td>
<td>Every three years unless otherwise required by applicable nuclear regulatory agency</td>
<td>Radiation safety instructions shipped separately with source holder and following instructions</td>
</tr>
</tbody>
</table>

Spare parts

Contact VEGA Field Service at +1 513-272-0131 for parts, service, and repairs.

Outside the U.S., contact your local VEGA representative for parts, service, and repairs.
Hardware diagnostics for GEN2000 electronics

Two circuit boards in the LSGF are replaceable. Figure 62 identifies the two boards.

![Diagram of circuit board identification](image)

*Figure 62: Circuit board identification*

The following figure may be helpful in finding test points, fuses, jumpers, and connectors on the CPU circuit board.

Access the test points on the CPU board by pulling the sensor assembly slightly out of the housing.
Figure 63: Test points and jumpers
Test points

Test points are located on the Power Supply and CPU board.

*Table 19: Power supply board test points and labels*

<table>
<thead>
<tr>
<th>Power Supply Test point label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Not used</td>
</tr>
<tr>
<td>H2</td>
<td>Not used</td>
</tr>
<tr>
<td>TP1</td>
<td>Isolated ground</td>
</tr>
<tr>
<td>TP2</td>
<td>Loop current test point 200mV/mA loop current. Referenced to isolated ground.</td>
</tr>
</tbody>
</table>

*Table 20: CPU board test points and labels*

<table>
<thead>
<tr>
<th>CPU Test point label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>Raw input signal coming from preamp.</td>
</tr>
<tr>
<td>GND</td>
<td>Logic ground</td>
</tr>
<tr>
<td>U5 pin8</td>
<td>+5V power supply test points referenced to Logic ground.</td>
</tr>
</tbody>
</table>

Jumpers

The LSGF uses jumpers J1–J4 on the CPU board as division values for the output frequency to the SmartPro.

**Note:** Do not change the jumper from the current setting without consulting VEGA Field Service

*Table 21: Jumper division values*

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>Divide by 20</td>
</tr>
<tr>
<td>J2</td>
<td>Divide by 10</td>
</tr>
<tr>
<td>J3</td>
<td>Divide by 5</td>
</tr>
<tr>
<td>J4</td>
<td>Divide by 2</td>
</tr>
<tr>
<td>None</td>
<td>Divide by 1</td>
</tr>
</tbody>
</table>

If the LSGF does not have a jumper, the division value is one.
LED indicators

Check the basic functioning of the VEGA electronics at the instrument with LED indicators on the CPU board. They are visible when you remove the explosion proof housing cap.

See the tables on pages 132 and 133 for a summary of the LED indications.

![LED indicators diagram]

Figure 64: LED indicators

Power Supply Board LED summary table

Table 22: Power Supply Board LED summary table

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
<th>Normal condition</th>
<th>Error condition</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| +6V | +6V DC voltage level to electronics | ON               | OFF  
Electronics are not receiving +6V DC voltage required for functioning                                                                      | Verify +6V on test points.  
Check fuse on Power Supply board.  
Check power input terminals 1, 2.                                               |
| +24V | Not used                        |                  |                                                                                                                                                |                                                     |
| Relay | Not used                       |                  |                                                                                                                                                |                                                     |
**Table 23: CPU Board LED summary table**

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
<th>Normal condition</th>
<th>Error condition</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mem</td>
<td>Not used</td>
<td>ON</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>HART</td>
<td>Not used</td>
<td>ON</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>Central processing unit on CPU board</td>
<td>Blinks at rate of 1 time per second</td>
<td>LED doesn't blink. CPU not functioning.</td>
<td>Check power input. Replace CPU board.</td>
</tr>
<tr>
<td></td>
<td>“heartbeat”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aux</td>
<td>Auxiliary input frequency signal</td>
<td>Blinks if auxiliary input present.</td>
<td>None</td>
<td>Check auxiliary input wiring terminals 11 and 12 with a meter for frequency signal. Check auxiliary input equipment.</td>
</tr>
<tr>
<td></td>
<td>indicator</td>
<td>OFF if no auxiliary input present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV</td>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td>Radiation field detector</td>
<td>Cycles in proportion to radiation field intensity at detector. ON for 10 seconds for each mR/hr, then off for 2 seconds. (Can use LED 5 that blinks 1 time/sec to time LED 9 for field indicator.)</td>
<td>None</td>
<td>A 1mR/hr (2580nC/kg/hr) field is usually required for a measurement. Check for closed source shutter, buildup, and insulation.</td>
</tr>
</tbody>
</table>
Maintenance and repair

Periodic maintenance schedule
Since the VEGA LSGF contains no moving parts, very little periodic maintenance is required. We suggest the following schedule to prevent problems and to comply with radiation regulations:

Table 24: Maintenance schedule

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-cal</td>
<td>As required by process conditions, usually at least once a month</td>
<td>Calibration chapter</td>
</tr>
<tr>
<td>Source wipe</td>
<td>Every three years unless otherwise required by applicable nuclear regulatory agency</td>
<td>Radiation safety instructions (shipped separately with source holder and in the folder of this manual)</td>
</tr>
</tbody>
</table>

Spare parts
Spare parts are available directly from VEGA Parts and Repairs Department for U.S. and Canada installations. Installations in other countries can purchase spare parts through their local VEGA representative.

Table 25: Spare part numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>VEGA part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply board</td>
<td>241519</td>
</tr>
<tr>
<td>CPU board</td>
<td>242281</td>
</tr>
<tr>
<td>125mA fuse on power supply</td>
<td>238661</td>
</tr>
<tr>
<td>2A fuse on power supply</td>
<td>240539</td>
</tr>
</tbody>
</table>

Field repair procedures
Very few parts are field repairable, but you can replace entire assemblies or boards. The following parts are replaceable:

- CPU circuit board
- Power supply circuit board

Use great care to prevent damage to the electrical components of the gauge. VEGA recommends appropriate electrostatic discharge procedures.

CAUTION!

NEVER remove the two screws holding down the sensor electronics. This contains the photomultiplier tube assembly. This component is easily damaged. Removing the sensor and then re-installing it can cause sensor problems.

NEVER remove the bottom cover. This protects the coupling joint of the detector. There are no serviceable parts under the bottom cover.
Procedure 40: To replace the CPU or power supply board

1. Turn off power to the gauge
2. Remove the housing cover
3. Remove the plastic electronics cover
4. Remove the terminal wiring connector
5. Remove the three (3) screws holding the electronics package in place
6. Carefully pull the electronics package out of the housing.
7. Remove the appropriate board from the clamshell assembly by removing the three (3) mounting nuts.
   
   **Note:** If you are changing the CPU board, you must move the old firmware chip to the new board if the new board firmware is different.

8. Carefully reconnect any ribbon cables.
9. Install the electronics package in the housing.
10. Replace the three (3) mounting nuts.
11. Reconnect the terminal wiring connector.
12. Install the plastic electronics cover.
13. Install the housing cover.
14. Turn on the power to the unit.

**Note:** If you change the CPU board, a **New Hardware Found** error message normally appears when you connect with the HART communicator. In Ohmview2000, click **Diagnostics, New hardware, New CPU**, and click **OK** for a new backup of EEPROMS.
Requesting field service

To request field service within the U.S. and Canada; call 513-272-0131 from 8:00 A.M. to 5:00 P.M. Monday through Friday. For emergency service after hours, call 513-272-0131 and follow the voice mail instructions.

Returning equipment for repair to VEGA

When calling VEGA to arrange repair service, be ready with the following information:

- Product model that is being returned for repair
- Description of the problem
- VEGA Customer Order (C.O.) Number
- Purchase order number for the repair service
- Shipping address
- Billing address
- Date needed
- Method of shipment
- Tax information
Returning equipment for repair

Procedure 41: Returning equipment for repair

1. Call VEGA Nuclear Products Repair at 513-272-0131 between Monday and Friday, 8:00 A.M. to 5:00 P.M. United States Eastern Standard Time

2. VEGA assigns the job a material return authorization (MRA) number

   Please note: VEGA reserves the right to refuse any shipment that does not have a MRA number assignment.

3. Indicate the MRA on the repair service purchase order

4. Clearly mark the shipping package with the MRA number

5. Send the confirming purchase order and the equipment to:
   VEGA Americas, Inc.
   Attention: Repair Department
   4170 Rosslyn Drive
   Cincinnati, OH 45209-1599 USA

   Note: You must first contact VEGA and receive a material return authorization number (MRA) before returning any equipment to VEGA. VEGA reserves the right to refuse any shipment not marked with the MRA number.
Appendix I: Parameter blocks

Screen 520 FREQUENCY INPUT BLOCK

```
520 FREQIN CHAN#1
ITEM 000 NEXT=000
CURRENT VAL NEW VAL
000000 000000
```

Figure 65: Frequency input Channel #1 screen

```
521 FREQIN CHAN#2
ITEM 000 NEXT=000
CURRENT VAL NEW VAL
000000 000000
```

Figure 66: Frequency input Channel #2 screen

The base address for screen 520 FREQIN CHAN#1 is 529, item 128.
The base address for screen 521 FREQIN CHAN #2 is 529, item 178.
### Table 26: Screen 520 OR 521 Frequency input block

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter Description</th>
</tr>
</thead>
</table>
| 0     | SIGNAL TYPE                                         | 0=off, 1=type 1 input, 2=type 2 input, 3=type 1 test mode, 4=type 2 test mode  
Type 1, counts are inversely proportional to process variable  
Type 2, counts directly proportional to process variable |
| 1     | Status Location                                     | Shows countdown for timed calibrations                                                                                                               |
| 2     | SPARE LOCATION                                      |                                                                                                                                                    |
| 3     | SPARE LOCATION                                      |                                                                                                                                                    |
| 4     | TEMPERATURE COMPENSATION CHANNEL POINTER            | Base address of temp. comp. channel block                                                                                                          |
| 5     | TACH/FLOWMETER CHANNEL POINTER                     | Base address of tach or flow channel block                                                                                                        |
| 6     | RAW COUNTS                                          | Counts per second from counter                                                                                                                     |
| 7     | AMPLIFIED RAW COUNTS                                | Location 6 multiplied by location 29                                                                                                              |
| 8     | DECAY COMPENSATED COUNTS                            | Source decay comp. using decay factor at location 27                                                                                              |
| 9     | STANDARDIZE COMPENSATED COUNTS                      | Compensation per current standardize counts at location 25                                                                                       |
| 10    | NORMALIZED COUNTS                                   | Counts input converted to 0–10,000 count range                                                                                                    |
| 11    | PRODUCT                                             | Linearized and converted to process units, e.g., SGU, lbs/ft, etc                                                                                  |
| 12    | FILTERED PRODUCT                                    | Filtered per time constant in product code table                                                                                                  |
| 13    | TEMPERATURE COMPENSATED PRODUCT                     | Compensated to reference temperature using process temperature and temperature coefficients                                                      |
| 14    | FINAL PRODUCT                                       | Final customer process units for display                                                                                                           |
| 15    | DRY SOLIDS                                          | For slurries only, 0 for all others                                                                                                               |
| 16    | RATE                                                | Weight per unit time when tach/flow channel enabled                                                                                               |
| 17    | PRODUCT MULTIPLIER                                  |                                                                                                                                                    |
| 18    | PRODUCT DIVIDER                                     | (Product Multiplier/Divider)—On slurries (type 2 density measurements) used as a scale factor for DRY SOLIDS. Used as scale factor to get FINAL PRODUCT on all other applications |
| 19    | RATE MULTIPLIER                                     | Scaling for rate customer units                                                                                                                   |
| 20    | RATE DIVIDER                                        | Scaling for rate customer units                                                                                                                   |
| 21    | REFERENCE TEMPERATURE X                             | For temperature compensation                                                                                                                     |
| 22    | MEASUREMENT CUTOFF SETPOINT                         | Standardize compensated counts where measurement cuts off                                                                                         |
| 23    | CUTOFF TIME CONSTANT                                | XXXXX seconds for cutoff filtering                                                                                                                |
| 24    | CUTOFF FLAG                                         | 1 if measurement is cut off, 0 if not                                                                                                              |
| 25    | STANDARDIZE AVERAGE COUNTS                          | From last standardize—standardize gain=location 26/location 25                                                                                   |
| 26    | CAL. LOW AVG. COUNTS                                | Starting counts from original calibration                                                                                                         |
| 27    | DECAY FACTOR                                        | Decay gain=65536/65536—decay factor                                                                                                               |
| 28    | DECAY REFERENCE                                     | Source type code for decay rate                                                                                                                   |
| 29    | RAW GAIN                                            | Entry=gain factor for location 7                                                                                                                   |
| 30    | FUNCTION CODE                                       | Enter 0 to 9 for selected function code                                                                                                           |
| 31    | START/[STOP]                                        | Enter 1 to Start a selected function. Enter second 1 to Stop function in Start/Stop mode. Location zeroes automatically |
### Table 26: Screen 520 OR 521 Frequency input block (continued)

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>LOW SAMPLE INPUT</td>
<td>Enter actual value of Low Process sample collected for Standardize and Calibrate Low procedures</td>
</tr>
<tr>
<td>33</td>
<td>HIGH SAMPLE INPUT</td>
<td>Enter actual value of High Process sample collected for Calibrate High procedure</td>
</tr>
<tr>
<td>34</td>
<td>LOW OUTPUT</td>
<td>Indicates time remaining during Low data collection and shows Cal. Check value when data collection complete</td>
</tr>
<tr>
<td>35</td>
<td>HIGH OUTPUT</td>
<td>Indicates time remaining during High data collection and shows Cal. Check value when data collection complete</td>
</tr>
<tr>
<td>36</td>
<td>DURATION TYPE</td>
<td>Enter 1=timed, 2=Start/Stop, 3=tach pulses, 4=tach/10, and 5=tach/100</td>
</tr>
<tr>
<td>37</td>
<td>DURATION</td>
<td>Enter 1 to 65535 seconds, tach pulses, tach pulses/10, or tach pulses/100. No entry needed for STDZ</td>
</tr>
<tr>
<td>38</td>
<td>CALIBRATE LOW DATE</td>
<td>Date that current standardize or calibrate low was performed</td>
</tr>
<tr>
<td>39</td>
<td>STDZ/CAL. LOW AVERAGE COUNTS</td>
<td>Raw count average from data collection during most recent Standardize or Cal. Low procedure</td>
</tr>
<tr>
<td>40</td>
<td>CAL. HIGH AVERAGE COUNTS</td>
<td>Raw count average from data collection during most recent Calibrate High procedure</td>
</tr>
<tr>
<td>41</td>
<td>ALARM LIMIT</td>
<td>Enter 0 to 65535% of change from last standardize that should cause an alarm. Enter 0 to turn off alarm function</td>
</tr>
<tr>
<td>42</td>
<td>TOTALIZER</td>
<td>Accumulated total weight over the duration of the most recent Cal. High data collection. Use for Cal High on bulk total</td>
</tr>
<tr>
<td>43</td>
<td>TOTALIZER SCALING</td>
<td>Converts Rate data to a total. Rate divides by this factor before adding into total</td>
</tr>
<tr>
<td>44</td>
<td>STDZ HISTORY #1 DATE</td>
<td>Date of Stdz. or Cal Low before current</td>
</tr>
<tr>
<td>45</td>
<td>STDZ HISTORY #1 COUNTS</td>
<td>Standardize counts for that date</td>
</tr>
<tr>
<td>46</td>
<td>STDZ HISTORY #2 DATE</td>
<td>Date of Stdz. or Cal Low before History 1</td>
</tr>
<tr>
<td>47</td>
<td>STDZ HISTORY #2 COUNTS</td>
<td>Standardize counts for that date</td>
</tr>
<tr>
<td>48</td>
<td>STDZ HISTORY #3 DATE</td>
<td>Date of Stdz. or Cal Low before History 2</td>
</tr>
<tr>
<td>49</td>
<td>STDZ HISTORY #3 COUNTS</td>
<td>Standardize counts for that date</td>
</tr>
</tbody>
</table>
Appendix I: Parameter blocks

Screen 522 FREQUENCY OUTPUT BLOCK

![Figure 67: Frequency output channel screen](image)

The base address for screen 522 FREQOT CHANNEL is 529, item 1024.

**Table 27: Screen 522 Frequency Output block Channel #1**

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>STATUS</td>
<td>Enter an even number to turn on block. Enter an odd number to turn off block. Enter 10 to force block to use internal limits rather than Product Code table limits</td>
</tr>
<tr>
<td>1</td>
<td>COUNTER INITIALIZE</td>
<td>Equals 1 if counter that connects to this block was previously initialized. Power loss may require re-initialization of counters. Enter 0 to re-initialize and the computer changes to 1</td>
</tr>
<tr>
<td>2</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>DATA POINTER</td>
<td>Pointer to address of output data location</td>
</tr>
<tr>
<td>4</td>
<td>LOW LIMIT</td>
<td>Value of data from the data pointer that gives minimum analog output—4 mA or 0 V</td>
</tr>
<tr>
<td>5</td>
<td>HIGH LIMIT</td>
<td>Value of data from data pointer that gives maximum analog output—20 mA or 10 V</td>
</tr>
<tr>
<td>6</td>
<td>OUTPUT COUNTS</td>
<td>Count value actually sent to counter. See description below</td>
</tr>
<tr>
<td>7</td>
<td>RANGE SELECT</td>
<td>Enter 0 to select 4 … 20 mA range. Enter 1 to select 0 … 20 mA range. Use screen #63 to setup</td>
</tr>
</tbody>
</table>

**Table 28: Screen 522 Frequency Output block Channel #2**

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>STATUS</td>
<td>Enter an even number to turn on block. Enter an odd number to turn off block. Enter 10 to force block to use internal limits rather than Product Code table limits</td>
</tr>
<tr>
<td>9</td>
<td>COUNTER INITIALIZE</td>
<td>Equals 1 if counter that connects to this block was previously initialized. Power loss may require re-initialization of counters. Enter 0 to re-initialize and the computer changes to 1</td>
</tr>
<tr>
<td>10</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>DATA POINTER</td>
<td>Pointer to address of output data location</td>
</tr>
<tr>
<td>12</td>
<td>LOW LIMIT</td>
<td>Value of data from the data pointer that gives minimum analog output—4 mA or 0 V</td>
</tr>
<tr>
<td>13</td>
<td>HIGH LIMIT</td>
<td>Value of data from data pointer that gives maximum analog output—20 mA or 10 V</td>
</tr>
<tr>
<td>14</td>
<td>OUTPUT COUNTS</td>
<td>Count value actually sent to counter. See description below</td>
</tr>
<tr>
<td>15</td>
<td>RANGE SELECT</td>
<td>Enter 0 to select 4 … 20 mA range. Enter 1 to select 0 … 20 mA range. Use screen #63 to setup</td>
</tr>
</tbody>
</table>
Screen 524 Auto Zero Log

The data from the last group of auto zeros log here. Each data item logs and stores in a 20 element array. The history index is used by the firmware to know where to place the next set of data in the array. Screen 524 displays the contents of the data arrays.

Only the counts and the date and time of the last complete data collect logs.

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2729</td>
<td>History Index</td>
<td>Index that places data into the arrays</td>
</tr>
<tr>
<td>2730-</td>
<td>Cycles Count</td>
<td>How many auto zeros occurred during the last auto zero period</td>
</tr>
<tr>
<td>2749</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2750-</td>
<td>Counts Avg</td>
<td>The sensor counts recorded during the last data collect of the last auto zero period</td>
</tr>
<tr>
<td>2769</td>
<td>Month Day</td>
<td>The month and day of the last auto zero period in a MMDD format</td>
</tr>
<tr>
<td>2770-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2789</td>
<td>Hours Minutes</td>
<td>The hours and minutes of the last auto zero period in HHMM format</td>
</tr>
<tr>
<td>2809</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix I: Parameter blocks

Screen 525 TOTALIZER BLOCK

The base address for screen 525 TOTALS CHAN #1 is 529, item 1072.

Table 30: Screen 525 Totalizer block #1

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>STATUS</td>
<td>0=normal counting, 1=Reset, 2=Hold, 3=Reset/Hold</td>
</tr>
<tr>
<td>1</td>
<td>DATA POINTER</td>
<td>Location of Rate data to totalize</td>
</tr>
<tr>
<td>2</td>
<td>REFERENCE</td>
<td>Time and weight conversion from Rate to Total</td>
</tr>
<tr>
<td>3</td>
<td>PRESET LOW ENTRY</td>
<td>Low 4-digits of 8-digit Preset entry</td>
</tr>
<tr>
<td>4</td>
<td>PRESET HIGH ENTRY</td>
<td>High 4-digits of 8-digit Preset entry</td>
</tr>
<tr>
<td>5</td>
<td>REMOTE TOTALIZER DRIVE</td>
<td>Changes to 1 for each count added into Total. Changes back to 0 in 50 milliseconds. 10 counts per second maximum</td>
</tr>
<tr>
<td>6</td>
<td>PRESET ALARM</td>
<td>Equals 1 when 8-digit Total exceeds 8-digit Preset Entry. Raise Preset or Reset Total to clear alarm</td>
</tr>
<tr>
<td>7</td>
<td>LOW TOTAL</td>
<td>Lower 4-digits of 8-digit totalizer</td>
</tr>
<tr>
<td>8</td>
<td>HIGH TOTAL</td>
<td>Upper 4-digits of 8-digit totalizer</td>
</tr>
</tbody>
</table>

Table 31: Screen 525 Totalizer block #2

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>STATUS</td>
<td>0=normal counting, 1=Reset, 2=Hold, 3=Reset/Hold</td>
</tr>
<tr>
<td>9</td>
<td>DATA POINTER</td>
<td>Location of Rate data to totalize</td>
</tr>
<tr>
<td>10</td>
<td>REFERENCE</td>
<td>Time and weight conversion from Rate to Total</td>
</tr>
<tr>
<td>11</td>
<td>PRESET LOW ENTRY</td>
<td>Low 4-digits of 8-digit Preset entry</td>
</tr>
<tr>
<td>12</td>
<td>PRESET HIGH ENTRY</td>
<td>High 4-digits of 8-digit Preset entry</td>
</tr>
<tr>
<td>13</td>
<td>REMOTE TOTALIZER DRIVE</td>
<td>Changes to 1 for each count added into Total. Changes back to 0 in 50 milliseconds. 10 counts per second maximum</td>
</tr>
<tr>
<td>14</td>
<td>PRESET ALARM</td>
<td>Equals 1 when 8-digit Total exceeds 8-digit Preset Entry. Raise Preset or Reset Total to clear alarm</td>
</tr>
<tr>
<td>15</td>
<td>LOW TOTAL</td>
<td>Lower 4-digits of 8-digit totalizer</td>
</tr>
<tr>
<td>16</td>
<td>HIGH TOTAL</td>
<td>Upper 4-digits of 8-digit totalizer</td>
</tr>
</tbody>
</table>
Screen 527 PRODUCT CODE BLOCK

![Screen 527 PRODUCT CODE BLOCK](image)

The base address for screen 527 PROD CODE TABLE is 529, item 256.

The \( n \) on the top line is a number from 0 to 9. This number is the current Product Code table that you are accessing. The value of \( n \) can be incremented by pressing the HELP key. Note that changing the value of \( n \) does not change the Product Code table selected on Screen #3.
### Appendix I: Parameter blocks

#### Table 32: Screen 527 Product code block

<table>
<thead>
<tr>
<th>Item #</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>TIME CONSTANT</td>
<td>When the product code table entry #18 is set to zero, time constant is the time (in XXXXX seconds) that 63% of a step change applied at the input of the digital filter will appear out the output of the filter. When the product code table entry #18 is set to one, time constant defines the number of readings to use to generate a measurement average. (100 readings max)</td>
</tr>
<tr>
<td>1</td>
<td>FAST RESPONSE FILTER ENTRY (Chrontrol)</td>
<td>When the difference between the current gage reading and the previous gage reading exceeds the value of this entry, temporarily bypasses the filter</td>
</tr>
<tr>
<td>2</td>
<td>SPAN</td>
<td>Application of gain to get normalized counts after subtraction of cal low reference. Gain=entry/1000</td>
</tr>
<tr>
<td>3</td>
<td>LINEARIZER NUMBER</td>
<td>Which linearizer curve to use (0–9). Normally, the curve number is the same as the product code number. For example, Product Code #0 usually uses Curve #0, Product Code #1 uses Curve #1, etc.</td>
</tr>
<tr>
<td>4</td>
<td>TEMPERATURE COEFFICIENT</td>
<td>When temperature compensation enables. Entry=0.0XXXXXSGU per degrees C or F.</td>
</tr>
<tr>
<td>5</td>
<td>DENSITY TYPE</td>
<td>Enter 0=channel is not density or is straight density in SGU units. Enter 1=channel is a slurry gage and converts to %Solids and Dry Solids. Enter 2=solutions and gives %Solids conversion.</td>
</tr>
<tr>
<td>6</td>
<td>SOLIDS DENSITY</td>
<td>For density types 1 and 2 only.</td>
</tr>
<tr>
<td>7</td>
<td>LIQUID DENSITY</td>
<td>For density types 1 and 2 only.</td>
</tr>
<tr>
<td>8</td>
<td>STANDARDIZE ABSORBER VALUE</td>
<td>In units of product, frequency input block location 12.</td>
</tr>
<tr>
<td>9</td>
<td>CALIBRATE HIGH ABSORBER VALUE</td>
<td>In units of product, frequency input block location 12.</td>
</tr>
<tr>
<td>10</td>
<td>FREQUENCY OUTPUT LOW LIMIT</td>
<td>Value of data from the data pointer that gives min. analog output.</td>
</tr>
<tr>
<td>11</td>
<td>FREQUENCY OUTPUT HIGH LIMIT</td>
<td>Value of data from the data pointer that gives max. analog output.</td>
</tr>
<tr>
<td>12</td>
<td>LOW ALARM LIMIT</td>
<td>Setpoint for triggering a low alert.</td>
</tr>
<tr>
<td>13</td>
<td>HIGH ALARM LIMIT</td>
<td>Setpoint for triggering a high alert.</td>
</tr>
<tr>
<td>14</td>
<td>LOW-LOW ALARM LIMIT</td>
<td>Setpoint for triggering a low alarm.</td>
</tr>
<tr>
<td>15</td>
<td>HIGH-HIGH ALARM LIMIT</td>
<td>Setpoint for triggering a high alarm.</td>
</tr>
<tr>
<td>16</td>
<td>NUMBER OF TABLES</td>
<td>Not currently used.</td>
</tr>
<tr>
<td>17</td>
<td>COEFFICIENT TYPE</td>
<td>0=Normal (Negative) Temp Coef, 1=Positive Temp Coef.</td>
</tr>
<tr>
<td>18</td>
<td>FILTER TYPE</td>
<td>0=RC Simulation Filter, 1=Averaging Filter.</td>
</tr>
<tr>
<td>19</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>SPARE</td>
<td></td>
</tr>
</tbody>
</table>
Appendix I: Parameter blocks

Screen 528 LINEARIZER BLOCK

```
528 LINEAR CURVES \nITEM  000  NEXT=000
CURRENT VAL  NEW VAL
00000  00000
```

*Figure 70: Linearizer curve screen*

The base address for screen 528 LINEAR CURVES is 529, item 512.

The $n$ on the top line is a number from 0 to 9. This number is the current linearizer curve that you are accessing. The value of $n$ can be incremented by pressing the HELP key.

**Table 33: Screen 528 Linearizer block**

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CURVE</td>
<td>Start of 40-slope linearizer curve. Uses 41 locations. Curve in normalized units, usually 0 to 10,000. (i.e., 0–100%)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>The percent of process span that corresponds to 2.5% of the count range</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>The percent of process span that corresponds to 5.0% of the count range</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>HIGH END POINT OF CURVE</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>CURVE STATUS</td>
<td>0=no curve data entered, 1=40 point curve entered- 41 locations</td>
</tr>
<tr>
<td>42</td>
<td>LOW PRODUCT VALUE</td>
<td>Value of low end of curve in product units. These are VEGA product units for calibration</td>
</tr>
<tr>
<td>43</td>
<td>HIGH PRODUCT VALUE</td>
<td>Value of high end of curve in product units for calibration purposes</td>
</tr>
<tr>
<td>44</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>SPARE</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>SPARE</td>
<td></td>
</tr>
</tbody>
</table>
Appendix II: Auto Zero feature

The Auto Zero feature enables the scale to reset at zero automatically.

Two conditions have to happen for an auto zero to occur.

1. Nothing is on the belt but the belt is moving
2. Feed drops off but the line keeps running

Note: Talk to VEGA Field Service before you configure the Auto Zero feature.

The base address for the Auto Zero feature is 529, items 2700 to 2711.
Appendix II: Auto zero feature

529 APP CODE ACCESS
ADR 2700 _
CURRENT VAL NEW VAL
0 _

Figure 71: Auto Zero screen

Table 34: Screen 529 Auto Zero feature

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700</td>
<td>AZ ENABLE</td>
<td>0=AZ Disabled, 1=AZ Enabled</td>
</tr>
<tr>
<td>2701</td>
<td>AZ STATUS</td>
<td>0=AZ not currently running, 1=AZ sample interval active</td>
</tr>
<tr>
<td>2702</td>
<td>AZ CYCLES</td>
<td>If AZ is active, how many AZs done so far</td>
</tr>
<tr>
<td>2703</td>
<td>AZC 1 VECTOR</td>
<td>Address of blending line belt LDC (0=running, 1=not running)</td>
</tr>
<tr>
<td>2704</td>
<td>AZC 2 VECTOR</td>
<td>Address of dry bin belt LDC (0=running, 1=not running)</td>
</tr>
<tr>
<td>2705</td>
<td>AZC 3 VECTOR</td>
<td>Address of undefined LDC (not used)</td>
</tr>
<tr>
<td>2706</td>
<td>AZ PAUSE TIME</td>
<td>Amount of time (in quarter seconds) to wait after dry bin LDC trips before starting AZ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>counter used to determine when the pause time has elapsed</td>
</tr>
<tr>
<td>2707</td>
<td>AZ TIMER</td>
<td>Time has elapsed</td>
</tr>
<tr>
<td>2708</td>
<td>AZ STATE</td>
<td>Used internally to synchronize AZ function</td>
</tr>
<tr>
<td>2709</td>
<td>AZ SAMPLING</td>
<td>1=wait over, 2=still waiting</td>
</tr>
<tr>
<td>2710</td>
<td>AZ CUTOFF ENABLE</td>
<td>0=Disable, 1=Enable</td>
</tr>
<tr>
<td>2711</td>
<td>AZ CUT OFF VECTOR</td>
<td>2709 for AZ-time out</td>
</tr>
</tbody>
</table>
Procedure 42: Auto Zero feature

1. Connect the write protect jumper JP17

2. From the 529 APP ACCESS CODE screen, press SELECT to enter item 2700 and press ENTER

3. Press SELECT to move to enter new value 1 to enable or 0 to disable and press ENTER to continue

4. From the 529 APP ACCESS CODE screen, press SELECT to enter item 2701 and press ENTER

5. Press SELECT to move to enter new value 1 to activate sample interval or 0 to deactivate sample interval and press ENTER to continue

6. From the 529 APP ACCESS CODE screen, press SELECT to enter item 2702 and press ENTER

   The number of AZs completed so far displays if the AZ is active

7. From the 529 APP ACCESS CODE screen, press SELECT to enter item 2702 and press ENTER

   The address of blending line belt LDC (0=running, 1=not running)

8. Connect Jumper JP 17

9. From 100 EEPROM SERVICE screen, choose SELECT COPY RAM TO EEPROM

10. Screen 102 RAM TO EEPROM screen displays. Enter 1 and press ENTER to initiate the transfer. If a zero displays, the transfer was successful. If a one displays, the transfer was unsuccessful

   If the transfer was unsuccessful, verify that the jumper on JP17 is in place. It is necessary to place the jumper on JP17 to enable any uploading to the EEPROM

11. Disconnect the write protect jumper, JP17. This protects the information in the EEPROM.
Auto zero log

This feature logs the last data from the Auto Zero feature.

Each logged data item stores in a 20-element array. The firmware uses the history index to identify the placement of the next set of data in the array. Use screen 524 to view the contents of the data arrays.

Note: Only the counts and the date and time of the last completed data collect are logged.

The base address for the Auto Zero feature is 529, items 2729 to 2809.

![Figure 72: History index screen](image)

Table 35: Screen 529 Auto zero feature

<table>
<thead>
<tr>
<th>Item#</th>
<th>Parameter Name</th>
<th>Parameter description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2729</td>
<td>History Index</td>
<td>Index used to place data into the arrays</td>
</tr>
<tr>
<td>2730-2749</td>
<td>Cycles Count</td>
<td>How many AZs done during the last AZ period</td>
</tr>
<tr>
<td>2750-2769</td>
<td>Counts Avg</td>
<td>The sensor counts recorded during the last data collect of the last AZ period</td>
</tr>
<tr>
<td>2770-2789</td>
<td>Month Day</td>
<td>The month and day of the last AZ period in MMDD format</td>
</tr>
<tr>
<td>2790-2809</td>
<td>Hours Minutes</td>
<td>The hours and minutes of the last AZ period in an HHMM format</td>
</tr>
</tbody>
</table>
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