Toledo Integrated Systems

ZT-SLIM Tonnage Kit

Allen Bradley PLC/PanelView

Signature Tonnage Analysis Software

Technical Manual – Version 1.1

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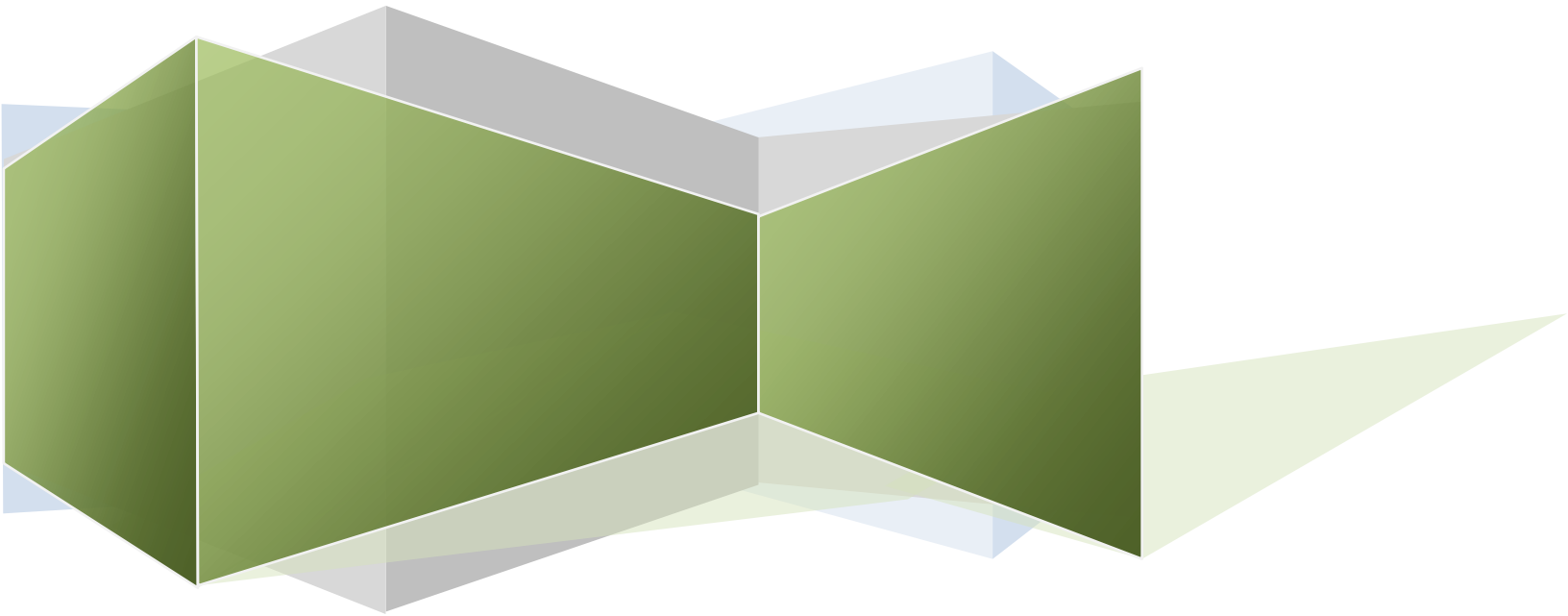

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Article I. Limited Warranty

The software is warranted by the manufacturer, Toledo Integrated Systems, to be free from defects in workmanship for one year from the date of manufacturer's shipment. This warranty is limited to the functions of SlimWare as stated in this manual. If modifications are made to the software, Toledo Integrated Systems will not be responsible for SlimWare.

All products subject to this warranty must be returned for examination, repair or replacement to:

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Maumee, OH 43537

The express warranty set forth herein is in lieu of all other warranties, expressed or implied, including without limitation any warranties of merchant-ability or fitness for particular purpose. All such warranties are hereby disclaimed and excluded by the manufacturer.

Repair or replacement of defective products as provided above is the sole and exclusive remedy provided there under. The manufacturer shall not be liable for any further loss, damages, or expenses, including incidental or consequential damages, directly or indirectly arising from the sale or use of this product.

Any unauthorized changes to the program will void this warranty.

There are no warranties that extend beyond those expressly set forth herein.

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1. Overview

SlimWare is the user interface for our ZT-SLIM tonnage module. SlimWare can provide and monitor all information stored in the ZT-SLIM including tonnage, setpoints, alarm history and signatures (tonnage curves).

The ZT-SLIM is a powerful tonnage monitor that does more than protect your press and die's from hard-hits. The ZT-SLIM allows for 5 levels of alarms (Capacity, CCM, High & Low Setpoint, High & Low Envelope and Reverse Setpoint). Each alarm type can be enabled/bypassed and configured for top or immediate stop.

Another feature of the ZT-SLIM is to provide users with signature based tonnage analysis. These signatures are extremely helpful in determining problems in the forming process. Problems can include excessive tonnage through the stroke, loose tie-rods, low nitrogen cylinders or reverse (strike-through) tonnage. SlimWare is able to monitor and control all features included with the ZT-SLIM unit.

2. Main Window

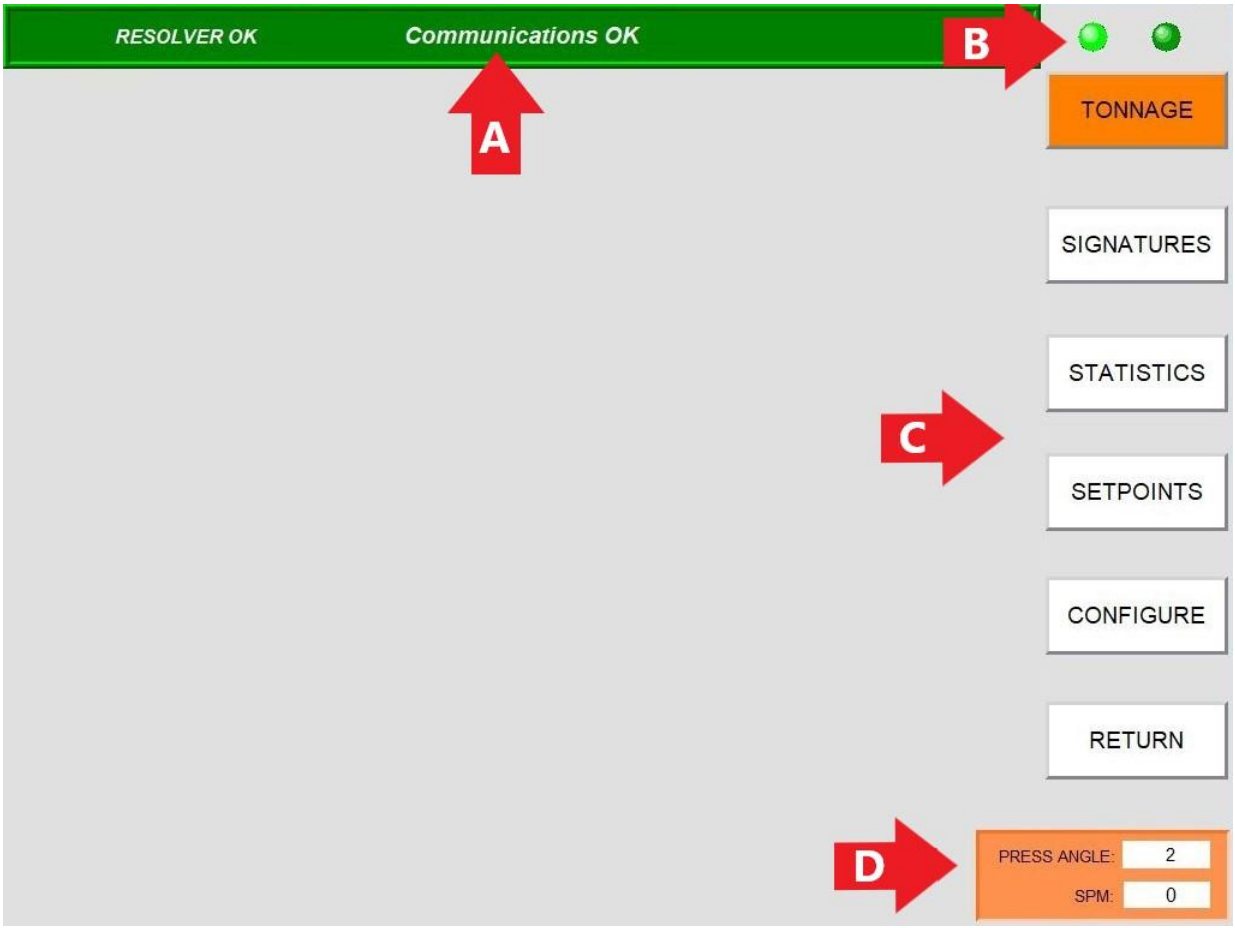


Figure 2-1 – SlimWare Main Window

The main window is always displayed regardless of what page a user is on. The main window includes the status bar, indicator lights, navigation buttons, resolver angle, and strokes per minute.

- **Status Bar (A)** – Displays the current status of the ZT-SLIM unit. If an alarm is detected, the status bar will flash red and white and display the highest level alarm. To reset an alarm, a user can simply touch on this bar while alarmed.
- **Indicator Lights (B)** – In the top right hand of the SlimWare windows are two (2) yellow LED's. These LED's mirror the transmit and receive LED's status located on the ZT-SLIM unit. If these LED's are idle, this is due to a communication error.
- **Navigation (C)** – These buttons allow the user to navigate to the various pages throughout SlimWare.
    - **Tonnage** – Touching this button will load the tonnage page. From the tonnage page, the current peak or reverse tonnage can be viewed easily. Setup or learn modes can be enabled from this page.

    - **Signatures** – Touching this button will load the signature page. From the signature page, users can recall current signatures from an online ZT-SLIM monitor or recall previously saved signatures.
    - **Statistics** – Touching this button will load the statistics page. This page displays information such as the highest load, number of high alarms, and last alarm. The alarm history can also be cleared from this page.
    - **Setpoints** – Touching the setpoints button will load the setpoints page. Setpoints such as high alarms, low alarms, and reverse tonnage setpoints can be modified from this page.
    - **Configure** – Touching this button will load the configure page. Hardware settings can be modified, alarms can be disabled, and a tonnage calibration can be performed from this page.
    - **Return** – Touching this button will dismiss the application.
- **Resolver Angle (D)** – Displays the current angle of the press if a resolver is used.
- **SPM – Strokes Per Minute (D)** – Displays the speed at which the press is running.

3. Tonnage

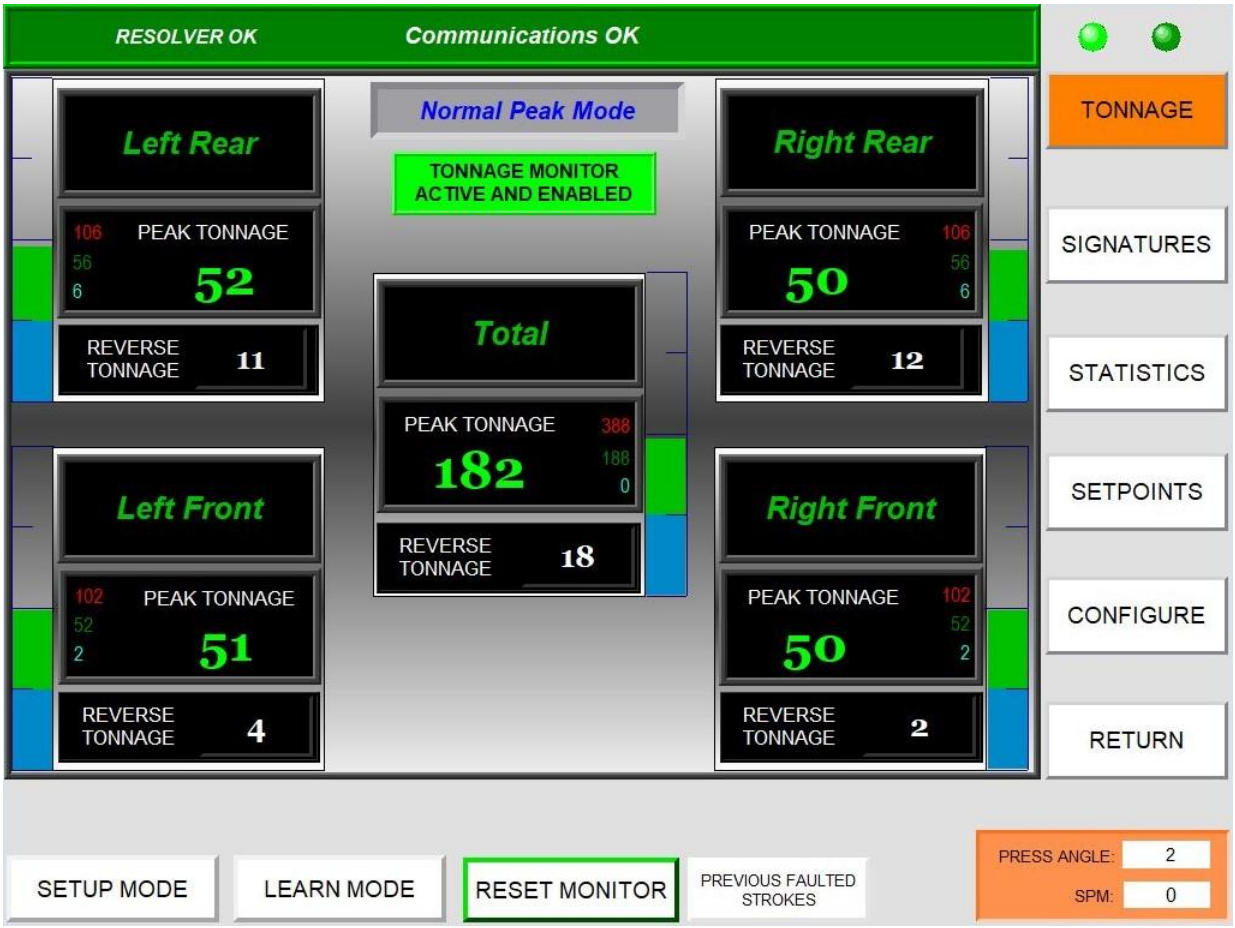


Figure 3-1 – Tonnage Screen (4 Channel)

The tonnage page displays all relevant tonnage information. This information includes current peak tonnage, reverse tonnage, alarm status of each channel, the monitor mode (setup, learn or normal) and a graphical representation of each corners high/low setpoint windows with regards to current tonnage. To navigate to the tonnage page, simply press the "Tonnage" button on the right side of the main screen.

Figure 3-1 shows a typical four (4) channel ZT-SLIM monitor. Each corner displays the current tonnage and will turn red if an alarm is flagged for that channel.

I. Setup Mode

- Touch the "Setup Mode" button in the bottom left hand corner to place the ZT-SLIM unit into setup mode. While in setup mode, the press will be able to run and the following alarms will be bypassed
    - High and Low Envelope Alarms

- High and Low Setpoint Alarms
- Reverse Alarms

The monitor should only be placed in setup for the beginning or end of runs. Setup mode is not recommended for normal production use, as several alarm modes are bypassed.

II. Learn Mode

- Touch the "Learn Mode" button in the bottom left hand corner to place the ZT-SLIM unit into learn mode. Learn mode will run for eight (8) strokes. During these eight strokes, the ZT-SLIM unit will calculate new high and low setpoints, as well as a new benchmark for each channel.
- When the learn mode button is touched, a dialogue box will appear prompting the user to confirm that learn mode is desired. This is to prevent users from accidently entering learn mode and learning new benchmarks.
- This ZT-SLIM unit will come out of learn mode automatically after eight (8) strokes.

III. Reset Monitor

- Touch the "Reset Monitor" button to reset any alarms.
- Alarms can also be reset by pressing the channel which is alarmed or pressing the flashing status bar at the top of the screen.

IV. Previous Faulted Strokes

- Touch the "Previous Faulted Strokes" button to view information on the last 50 faulted strokes. Figure 3-2 will appear.

Figure 3-2 – Previous Faulted Strokes

- Touch the "-" button and "+" button to navigate the previous faulted strokes. Touch the "Select" button to select the previous faulted stroke or the "Cancel" button to close Figure 3-2.

- Once a previous faulted stroke is selected, the tonnage page and signature page will display the information surrounding this previous faulted stroke.

V. Bar Graphs

- The bar graphs next to each channel display the relationship between the current tonnage and the high and low setpoint window.
- This graph can be changed to display either the current tonnage with regards to the high and low setpoint window, or the benchmark with regards to the percentage variation of each hit. The display is determined by which autoset mode (Capacity or Benchmark) is selected in the configuration page.

VI. Mode Display

- Above the total tonnage is the mode display box. This displays what type of mode the monitor is in. These modes can be any of the following:
    - Normal Peak Mode (Shown in figure 3-1)
    - First Level Mode
    - Second Level Mode
    - Point In Time Mode
    - Pendulum Mode
- The tonnage modes can only be changed from the configuration page. (To learn more about each type of mode, refer to the configuration section.)

VII. Alarms

- If the ZT-SLIM unit detects an alarm, the status bar will begin flashing red and white and the alarmed channel will turn red. To reset any of these alarms, first find the cause for the alarm. Once the cause has been corrected, press either the alarmed corner, the status box or the “reset monitor” pushbutton in the bottom right hand corner of the tonnage page.

4. Signatures

Figure 4-1 – Signature Screen (1 Channel)

Figure 4-2 – Signature Screen (4 Channel)

The signature page is used to display historical or live signatures from the ZT-SLIM monitor. To navigate to the signature page, simply press the "Signatures" button on the right side of the main screen.

Depending on what is selected in the config names page, either Figure 4-1 or Figure 4-2 will appear. Figure 4-1 will appear if the x1 view is selected and Figure 4-2 will appear if the x4 view is selected.

Figure 4-2 shows a typical four (4) channel signature with enveloping. Operators can analyze the signatures from each stroke and determine if there are problems such as excessive tonnage early or late in the stroke.

I. Channels

- To view the signature of a single channel, touch the desired channel under the graph(s) or the x1 view button (only available if x4 view is selected in configuration).
- To return to a four channel view, touch the x4 view button (only available if x4 view is selected in configuration).
- The Total view shows the total for the selected slide(s).

II. All Channels

- This view will overlay all four corners into one window. This is best used to view differences between channels. The high and low envelope signal details are hidden when this button is touched. The “All Channels” button, “CCM” button, “Envelope” button, and “Overlay” button are all changed to “On” buttons. To hide or display a channel, touch the corresponding “On” button. To return to a normal viewing position, touch any channel.

III. CCM

- Touch the “CCM” button to either hide or display the CMM signatures.

IV. Envelope

- Touch the “Envelope” button to either hide or display high envelope and low envelope signatures.
- This option is only available if enveloping is enabled.

V. Overlay

- Touch the “Overlay” button to either hide or display the master signature.

VI. Pause and View Details

- While viewing live signatures the signature will continually update. To examine a signature more closely touch the “Pause” button to stop the screen from updating. SlimWare will continue to update all critical data in the background.
- To view the details of the captured signal, high envelope signature, and low envelope signature, use the four (4) buttons in the bottom left hand corner of the signature window. A red line will appear through the signature viewing area. To change the degree, use the four (4) navigation buttons mentioned above.

VII. Update Master Signature

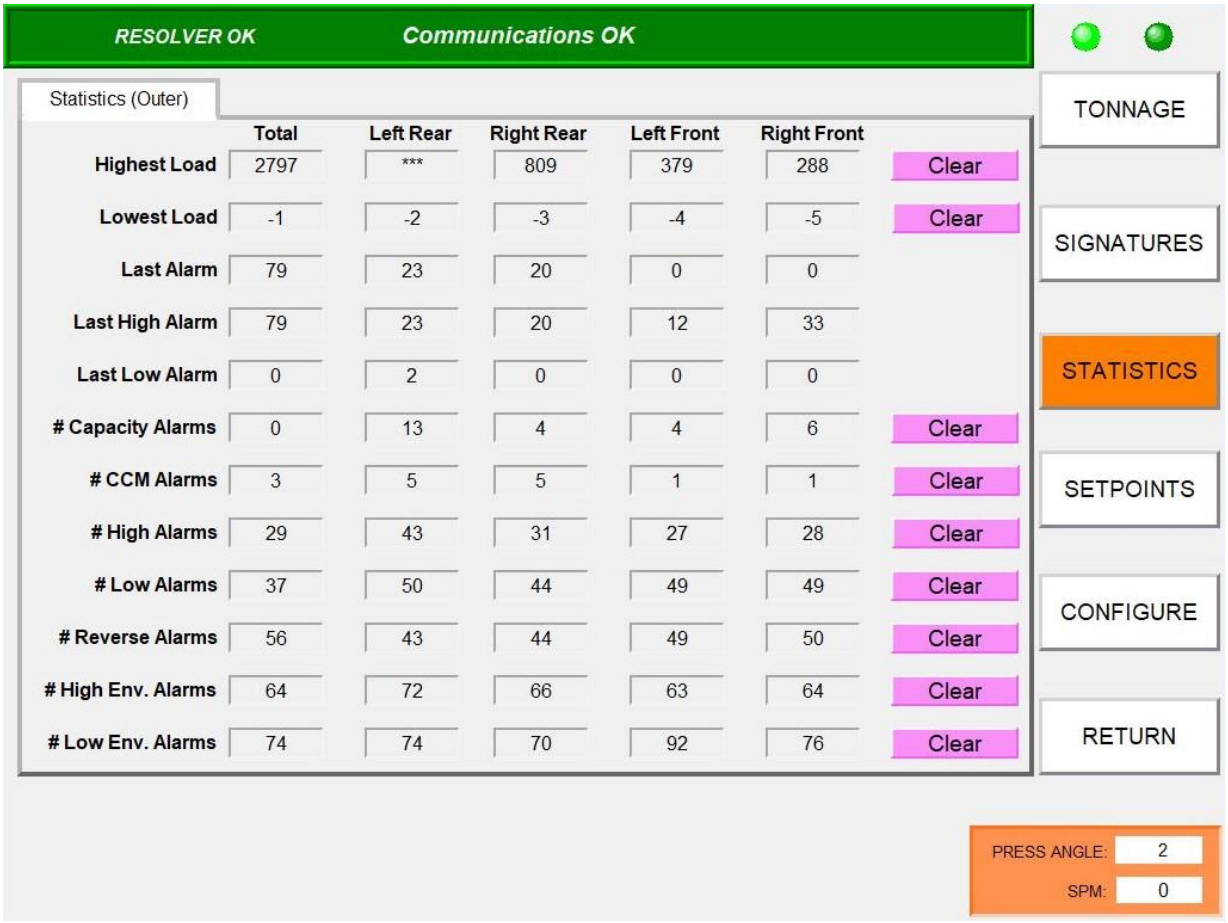
- Update Master Signature works identical to learn mode except only one (1) stroke is used. When the “Update Master Signature” button is pressed, the press will stroke once (1). During this stroke, the ZT-SLIM unit will calculate new high and low setpoints, as well as a new benchmark for each channel.

VIII. Zoom

- Touch the “Zoom” button for a closer look at a graph. The zoom feature will zoom in the amount represented in the “Zoom 10 degree Window” button, “Zoom 20 degree Window” button, and “Zoom 40 degree Window” button. Touch the “Zoom” button again to exit zooming.

5. Statistics

The statistics page is used to detail the number and types of alarms that have been recorded by the ZT-SLIM unit. From this page, any user can view the various alarms for each channel. To navigate to the statistics page, simply press the "Statistics" button on the right side of the main screen.



	Total	Left Rear	Right Rear	Left Front	Right Front	
Highest Load	2797	***	809	379	288	Clear
Lowest Load	-1	-2	-3	-4	-5	Clear
Last Alarm	79	23	20	0	0	
Last High Alarm	79	23	20	12	33	
Last Low Alarm	0	2	0	0	0	
# Capacity Alarms	0	13	4	4	6	Clear
# CCM Alarms	3	5	5	1	1	Clear
# High Alarms	29	43	31	27	28	Clear
# Low Alarms	37	50	44	49	49	Clear
# Reverse Alarms	56	43	44	49	50	Clear
# High Env. Alarms	64	72	66	63	64	Clear
# Low Env. Alarms	74	74	70	92	76	Clear

Figure 5-1 – Statistics Screen (4 Channel)

Figure 5-1 shows a typical four (4) channel ZT-SLIM unit's historical statistics. These values can be cleared by pressing the "Clear" button for the corresponding alarm row. The different types of alarm are listed below.

- **Highest Load** – Displays the highest recorded tonnage per channel
- **Lowest Load** – Displays the lowest recorded tonnage per channel
- **Last Alarm** – The last recorded alarm (any type) per channel
- **Last High Alarm** – The last recorded high alarm per channel
- **Last Low Alarm** – the last recorded low alarm per channel
- **# Capacity Alarms** – The number of capacity alarms recorded per channel

- **# CCM Alarms** – The number of CCM alarms recorded per channel
- **# High Alarms** – The number of high alarms recorded per channel
- **# Low Alarms** – The number of low alarms recorded per channel
- **# Reverse Alarms** – The number of reverse alarms recorded per channel
- **# High Envelope Alarms** – The number of high envelope alarms recorded per channel
- **# Low Envelope Alarms** – The number of low envelope alarms recorded per channel

6. Setpoints

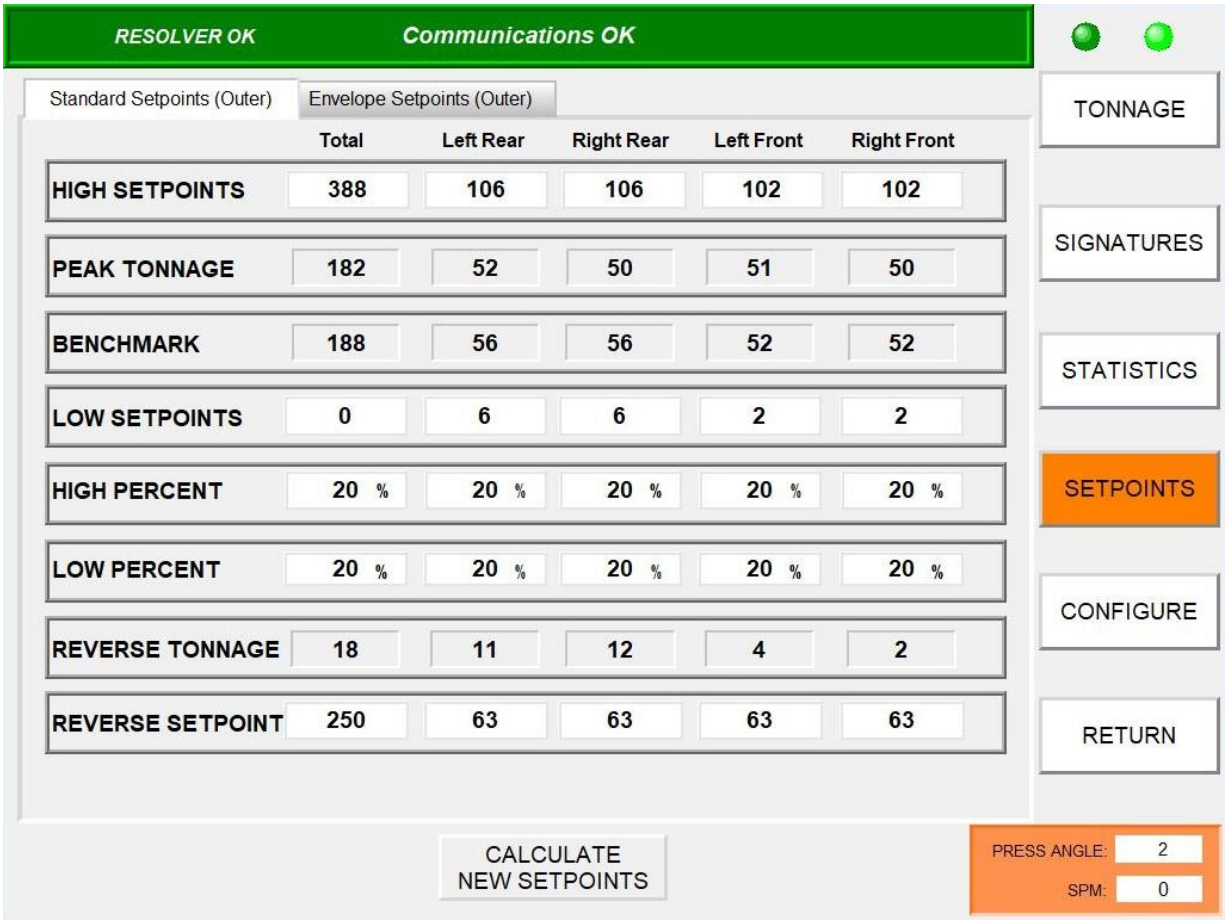


Figure 6-1 – Setpoints Screen (4 Channel)

The setpoints page displays and configures the ZT-SLIM unit's alarm setpoint values. From this page, setpoints such as high and low setpoints, high and low benchmark percentages and reverse setpoints can be altered. Capacity settings are "read only" on this page and can only be changed from the configure screen. To navigate to the setpoints page, simply press the "Setpoints" button on the right side of the main screen.

Figure 6-1 shows a typical four (4) channel ZT-SLIM unit setpoint screen.

I. Standard Setpoints

A. High Setpoint

- The high setpoint value will stop the press when peak tonnage is above this value.

- The high setpoint value is stored with each job, so each job can have a different high setpoint value.
- A high setpoint alarm can be configured for an immediate stop or top stop (See section 7).

B. Peak Tonnage

- Peak tonnage is current tonnage that the ZT-SLIM has recorded. This value is specific to the monitor mode (Standard, First Level, Etc…).
- Peak tonnage is read only and cannot be changed.

C. Benchmark

- The benchmark value is desired peak tonnage per corner. The benchmark value is created by putting the monitor into learn mode.
- The benchmark tonnage is read only and can only be changed by putting the ZT-SLIM into learn mode.
- The benchmark tonnage is stored with each job, so each job can have a different benchmark tonnage.

D. Low Setpoint

- The low setpoint value will stop the press when peak tonnage is below this value.
- The low setpoint value is stored with each job, so each job can have a different low setpoint value.
- A low setpoint alarm is always top stop.

E. High Percentage

- The high percentage value is used in conjunction with learn mode. This value is used to determine the new high setpoint value.
- While in learn mode, the ZT-SLIM unit will multiply either the capacity or new benchmark value (configurable) by the high percentage value. The difference is then added to the benchmark value and the high setpoint value is established.
- The high percentage value is stored with each job, so each job can have a different high percentage value.

F. Low Percentage

- The low percentage value is used in conjunction with learn mode. This value is used to determine the new low setpoint value.
- While in learn mode, the ZT-SLIM unit will multiply either the capacity or new benchmark value (configurable) by the low percentage value. The difference is then deducted from the benchmark value and low setpoint value is established.
- The low percentage value is stored with each job, so each job can have a different low percentage value.

G. Reverse Tonnage

- Reverse tonnage is current reverse tonnage that the ZT-SLIM has recorded.
- Also called “Snap Thru” tonnage, this is tonnage that is applied to the press once the punch stamps through the part.
- Reverse tonnage is read only and cannot be changed.

H. Reverse Setpoint

- The reverse setpoint value will stop the press when reverse tonnage is beyond this value.
- The reverse setpoint value is stored with each job, so each job can have a different reverse setpoint value.
- A reverse setpoint alarm can be configured for an immediate or top-stop. (This setting is available from the configure screen.)

II. Calculate New Standard Setpoints

- The high setpoints, low setpoints, high percent, low percent, and reverse setpoints can all be adjusted from this page. After any change is made, touch the “Calculate New Setpoints” button.
- If the user adjusts a high setpoints and touches the “Calculate New Setpoints” button, the high percent will automatically adjust to reflect the new high setpoints. If the user adjusts a high percent and touches the “Calculate New Setpoints”, then the high setpoint will automatically adjust to reflect the new high percent. The low setpoints and low percent work identical.

III. Envelope Setpoints

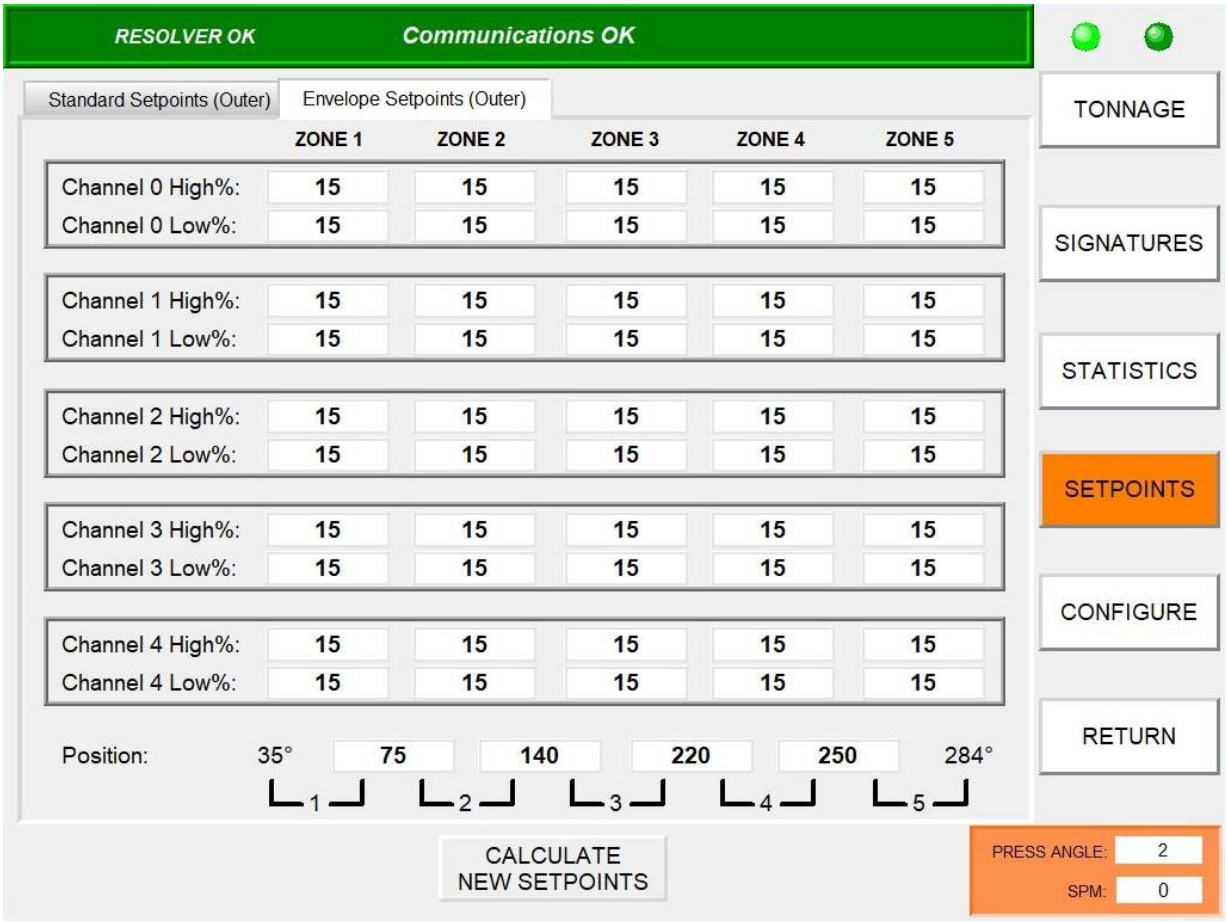


Figure 6-2 – Envelope Setpoints (4 Channel)

Enveloping allows for a form-fitting curve through the entire press stroke. Enveloping goes above and beyond a simple high and low setpoint by calculating different high and low limits throughout each degree of the press stroke.

With the ZT-SLIM unit, five (5) envelope zones can be calculated allowing for different high and low tolerances throughout certain windows. As seen in figure 6-2, the enveloping setpoints for each zone are set by a degree based value. Each window can be configured by entering the desired degrees. To bypass a zone, simply enter the same value as the previous zone.

A. Channel High and Low %

- These are the percentage values above and below the benchmark used to calculate the high and low enveloping limits in each specified zone. These values are used during learn mode.

B. Position

- The ZT-SLIM allow for up to five (5) zones to be calculated throughout the press stroke. Enter the desired windows in these textboxes.

IV. Calculate New Envelope Setpoints

- The high percentages and low percentages of all channels can all be adjusted from this page. The position of the zones can also be adjusted from this page. After any change is made, touch the “Calculate New Setpoints” button.

7. Configure

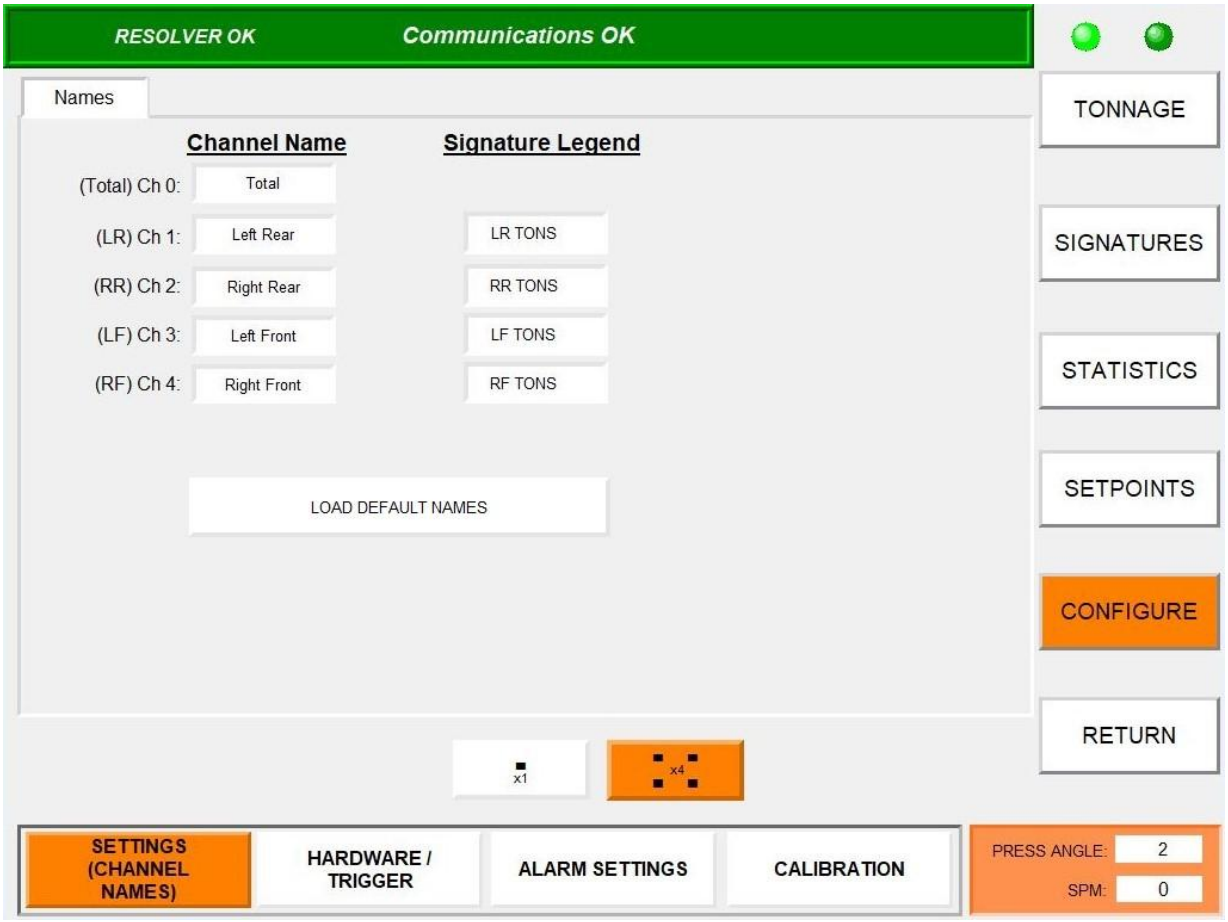


Figure 7-1 – Configuration Settings Screen

I. Settings (Channel Names)

There are 4 total configuration pages. From these pages, a user can access such features as tonnage calibration, channel names, capacity values and alarm bypass settings. The configure page has its own navigation buttons along the bottom of the screen. These buttons allow the user to navigate to the various configure pages throughout SlimWare.

Figure 7-1 shows the initial configure page (settings). This page allows the user to change the channel names, signature legend names, and signature screen view.

- **Names**
  - **Channel Names** – Each channel can be configured for a specific name. Type in the desired name and press "Enter" to save the name to the desired corner.
  - **Signature Legend** – Each channel (besides the total) can be given a signature legend name. This affects how the name appears in the legend of a signature.

- **Load Default Names** – The default names are shown in figure 7-1. Touching this button will automatically enter these names.

- **Default Signature Screen View**
  - **x1 View –** The default view of the Signature Screen can be set to view 1 channel at a time. This is the fastest viewing mode.
  - **x4 View –** The default view of the Signature Screen can be set to view 4 channels at the same time. This viewing mode takes longer than the x1 viewing mode, however it displays more information at once. The user can freely switch between x1 and x4 from the Signatures Screen when this option is selected.

II. Hardware / Trigger

The hardware/trigger page contains the basic tonnage monitor features such as the monitor type, number of channels, corner capacity, type of position instrument, decimal place precision and enveloping mode.

A. Hardware Configuration

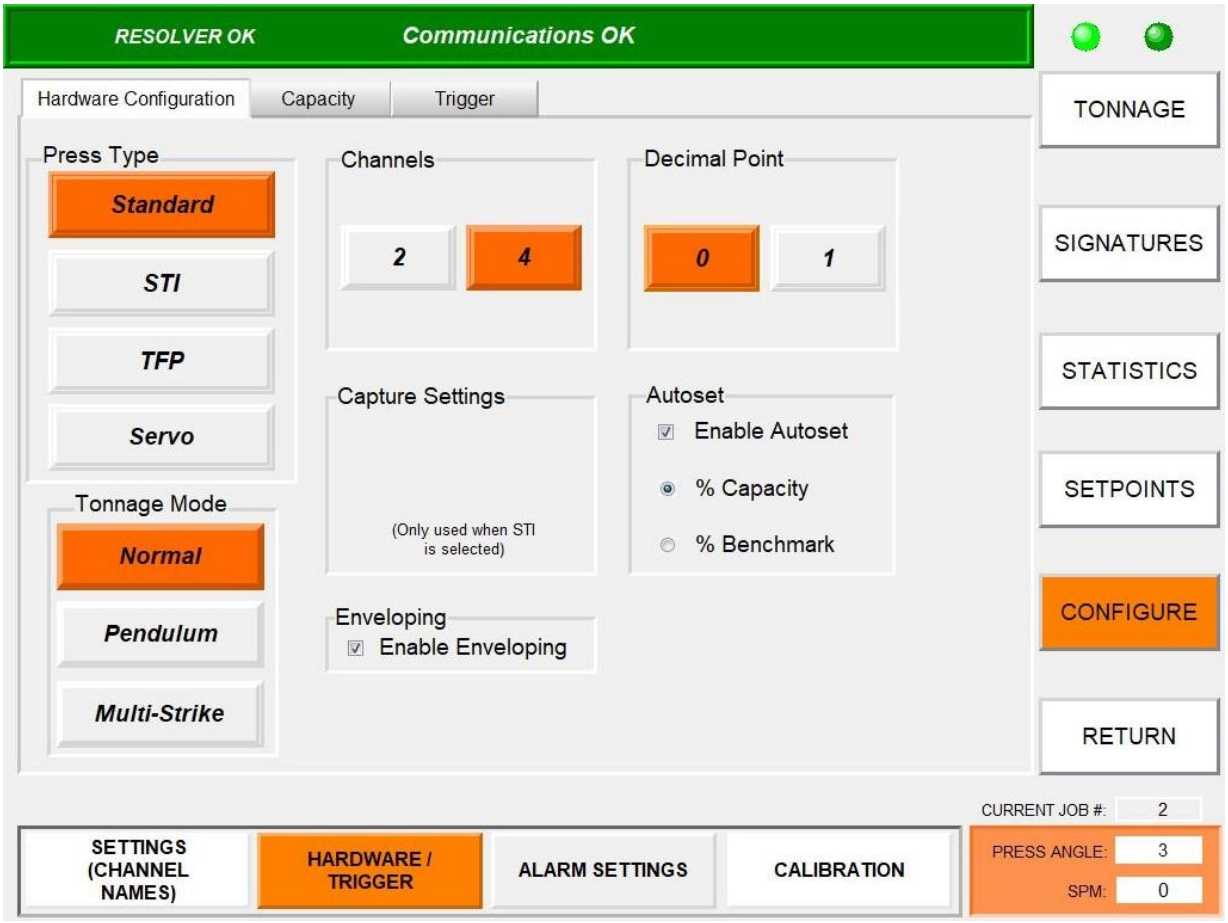


Figure 7-2 – Configuration Hardware/Trigger Screen

- **Press Type**
    - **Standard** – The normal mode of operation. For most applications, this is the desired mode. Unless otherwise noted, use this tonnage mode.
    - **STI** – Designed for double-action stamping presses. This mode allows for the inner and outer slide tonnage to be monitored with only mounting four (4) sensors.
    - **TFP** – Designed for a specific type of transfer press system with six (6) columns, where center columns are shared by the two slides.
    - **Servo**
- **Tonnage Mode (only with Servo Press Type)**
    - **Normal**
    - **Pendulum**
    - **Multi-Strike**
- **Channels** – The number of channels the ZT-SLIM unit is to monitor, normally four (4) channels.
- **Decimal Point** – Sets the digits to the right of the decimal point to be displayed.
- **Capture Settings**
    - **Position** – Used with first level and STI tonnage modes, this is the position (resolver based) that the load will be captured.
    - **Time** – Used with first level and STI tonnage modes, this is the amount of time the peak hold circuit is monitored once the threshold tonnage has been crossed (threshold triggering) or the probe input signal is read (probe triggering).
- **Autoset**
    - **Enable Autoset (Capacity)** – When enabled, the monitor will calculate all percentages based on press capacity. (The percentages can be configured from the setpoints page).
    - **Enable Autoset (Benchmark)** – When enabled, the monitor will calculate all percentages based on the obtained benchmark value calculated during learn mode. (The percentages can be configured from the setpoints page).
- **Enveloping**
    - **Enable Enveloping** – Check this to enable enveloping mode. Enveloping provides a window throughout the press stroke that monitors tonnage from 35 to 284 degrees. Applies to resolver triggering only.

B. Capacity

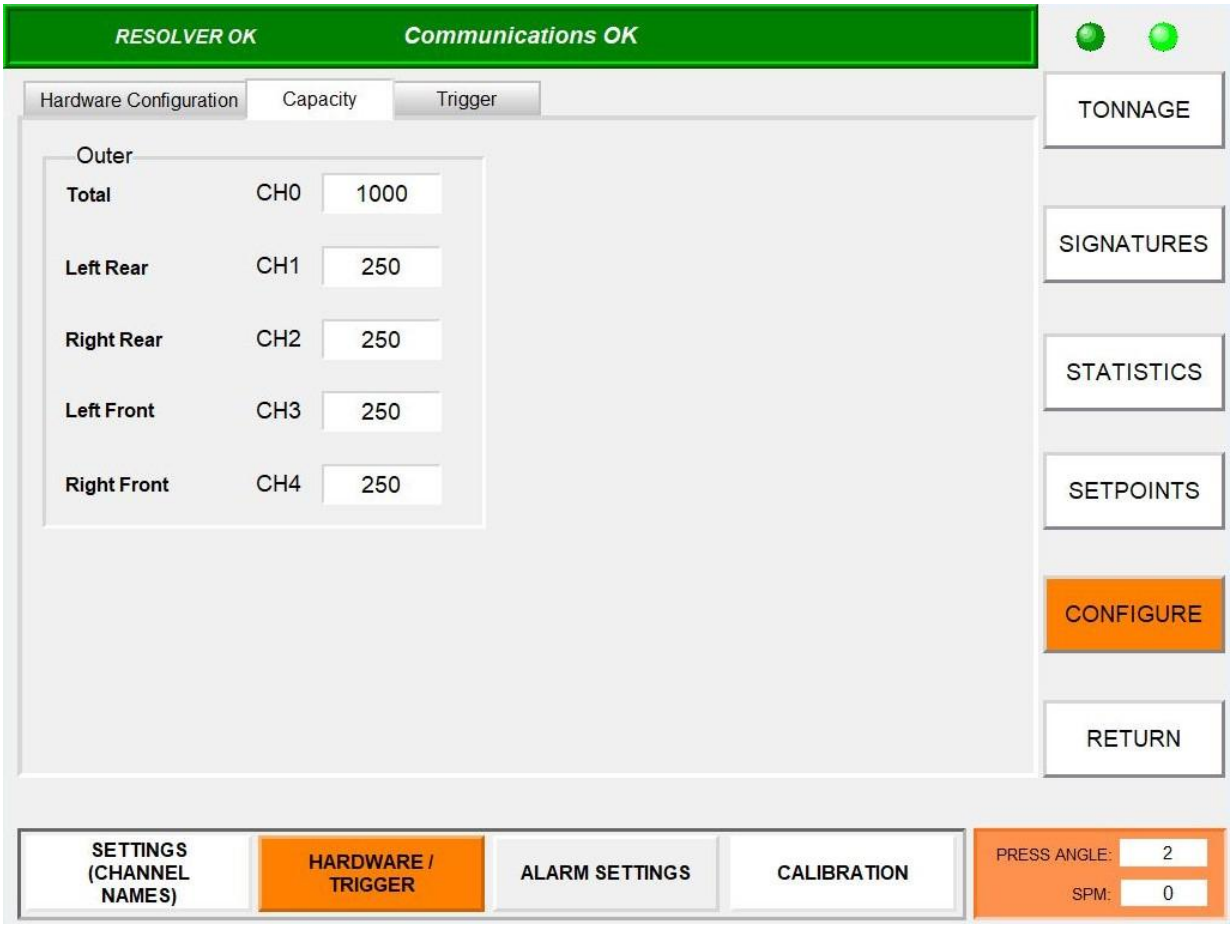


Figure 7-3 **–** Capacity Screen (4 Channel)

- **Capacity** – The capacity settings for the unit should be set during initial startup and should not be changed thereafter. Changing the capacity will affect all other setpoints. Touch the corresponding channel capacity to adjust it.

C. Trigger

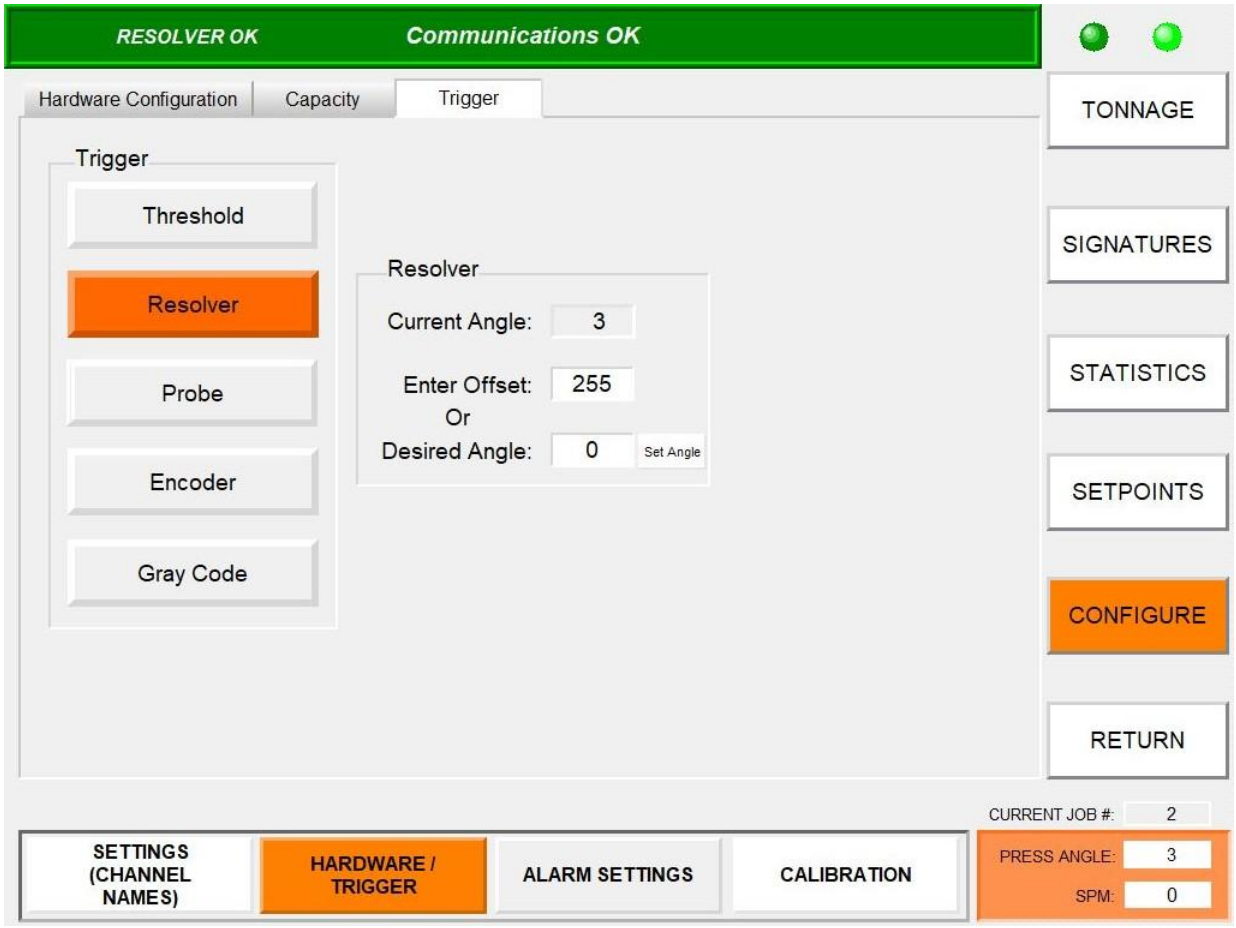


Figure 7-4 – Trigger Screen

- **Trigger**
  - **Threshold** – Setting the trigger to threshold will allow a user to enter a desired tonnage value at which the monitor should start monitoring. For example, if 100 tons is entered, the monitor will not begin its peak hold circuit until 100 tons has been obtained.
    - The maximum press speed is 400 spm with a threshold trigger.
    - Signatures are not available when using a threshold trigger.
    - The threshold textbox is the total tonnage value (CH0) at which the ZT-SLIM unit will start to monitor. If the threshold method is not selected, this textbox is not editable.
  - **Resolver** – The standard method. Use this method when a resolver is wired into the position input on the ZT-SLIM unit.
    - The resolver position textbox is read only and displays the current resolver angle.

        - The maximum press speed with a resolver trigger is 1200 spm.
        - The resolver offset textbox allows users to enter the desired offset angle to obtain the correct resolver angle. Valid offset angles range from 0-359.
        - Alternatively, the user can enter the desired angle and the offset will automatically be calculated.
    - **Probe** – The probe method can be wired so that an input signal can trigger the monitor to start and stop monitoring.
        - The maximum press speed with a probe trigger is 2000 spm.
        - Signatures are not available when using a probe trigger.
    - **Encoder** – Use this method when an encoder is wired into the position input on the ZT-SLIM.
    - **Greycode** – Use this method when the Greycode is supplied by the Servo manufacturer.

III. Alarm Settings

Alarm settings can be configured from the alarm setup page. Below is a sample screen of the alarm settings page. Each type of alarm can be configured for a specific type of stop including top or immediate stop. Alarms can also be bypassed on a channel by channel basis.

Figure 7-5 – Configuration Bypass Screen (4 Channel)

For example, in the above screen shot, the high setpoint and reverse alarms are bypassed, while capacity, CCM, low setpoint, high envelope, and low enveloping alarms are active for the Right Front. Immediate stops are declared for CCM alarms, high setpoint alarms, and high envelope alarms, and low envelope alarms, while top stops are declared for the remaining alarms.

To bypass and/or change the alarm type, click on the corresponding button to scroll through the available options. All changes are saved automatically.

For an eight (8) channel unit, toggle between the slides by using the two tabs near the top of the screen. As with the four (4) channel unit, each slide and channel number can be configured independently.

IV. Calibration

This details the tonnage calibration for the ZT-SLIM unit. This should only be done by a trained Toledo Integrated Systems technician or someone else with tonnage monitor calibration knowledge.

Refer to the Initial Setup of this manual for further details.

**Warning: Improper calibration of the ZT-SLIM unit can result in physical damage to the press. Please contact Toledo Integrated Systems if you have any questions about the tonnage calibration procedure.

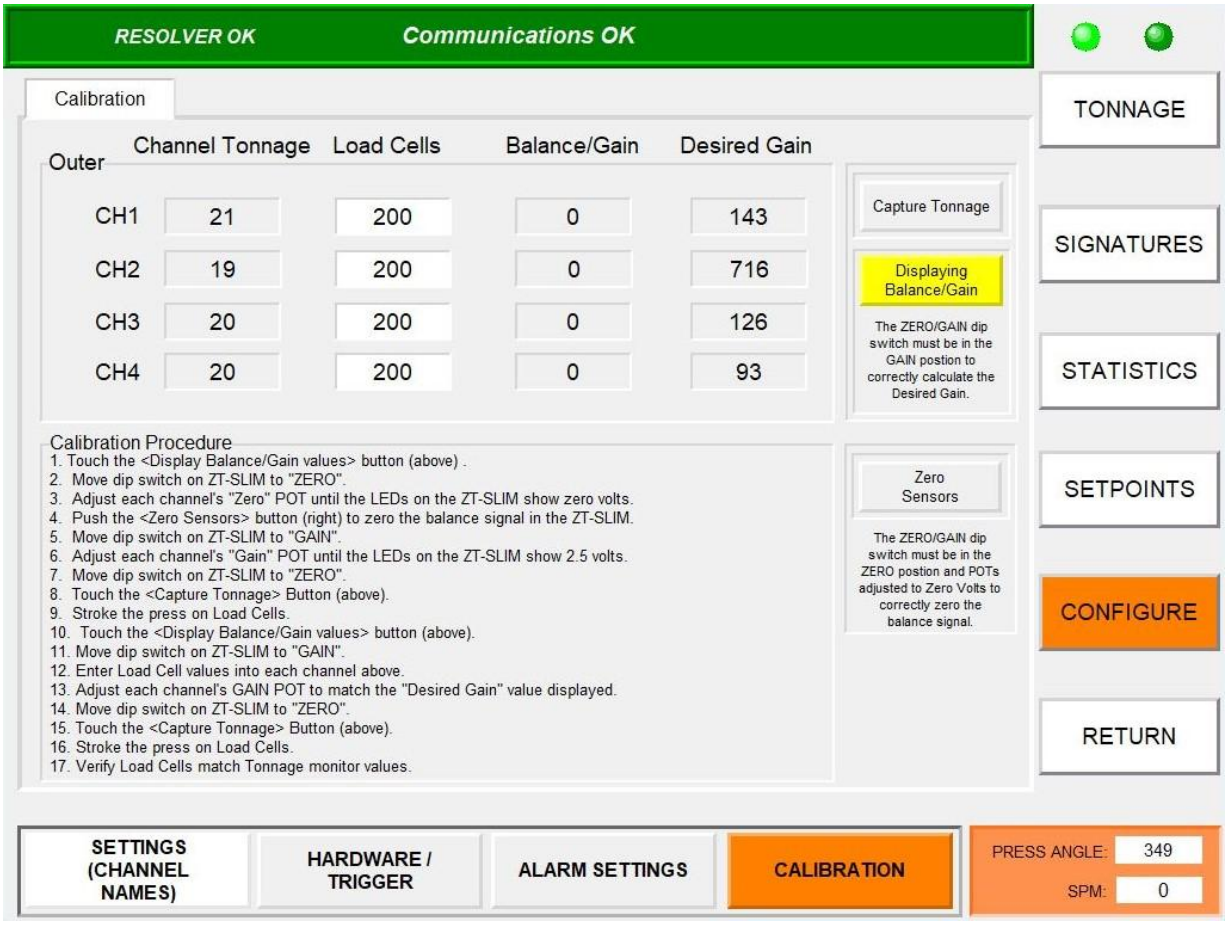


Figure 7-6 – Configuration Tonnage Calibration Screen (4 Channel)

- **Channel Tonnage** – Displays the current peak tonnage from the ZT-SLIM unit
- **Load Cells** – User input of the displayed tonnage from the calibration load cells (AutoCells). Available when displaying Gain values. Entering a Load Cell value will cause SlimWare to calculate a new Desired Gain value based on the current channel tonnage. Note that the desired gain values are not saved to the ZT-SLIM unit until the "Apply Desired Gain" button, described below, is pressed.
- **Balance/Gain** – Depending on the mode and stage of calibration, the monitor's balance (zero) or gain (shunt).

- **Desired Gain** – User input of the new desired gain values. Available when displaying Gain values. These can be manually entered (for example, if re-entering previous calibration data) or they can be automatically calculated by entering load cell values.
- **Capture/Capturing Tonnage** – When the ZT-SLIM is ready to capture peak load tonnage values, this button will turn yellow and display the "Capturing Tonnage" message. When the balance or gain values are being displayed, pressing this button will exit calibration mode and the ZT-SLIM will be ready to capture peak load tonnage again.
- **Zero/Zeroing Sensors** – When displaying the balance, this button zeroes the balance of the ZT-SLIM monitor's channels. The balance should only be zeroed when the press is in the top position without any load on the sensors.
- **Display/Displaying Balance/Gain** – Press this button to display the current gain values stored in the monitor and sensor balance for each channel. These values will be displayed in the "Balance/Gain" textboxes. For greater accuracy, pressing this button will automatically cause the ZT-SLIM to zero the balance prior to displaying the Balance/Gain. Because of this, only press the "Display Balance/Gain" button when the press is in the top position without any load on the sensors. The monitor will not update its peak tonnage while it is displaying the Balance/Gain.

8. SlimWare Initial Ethernet to PLC Setup

Setting Up Initial Ethernet Communications in SlimWare 7

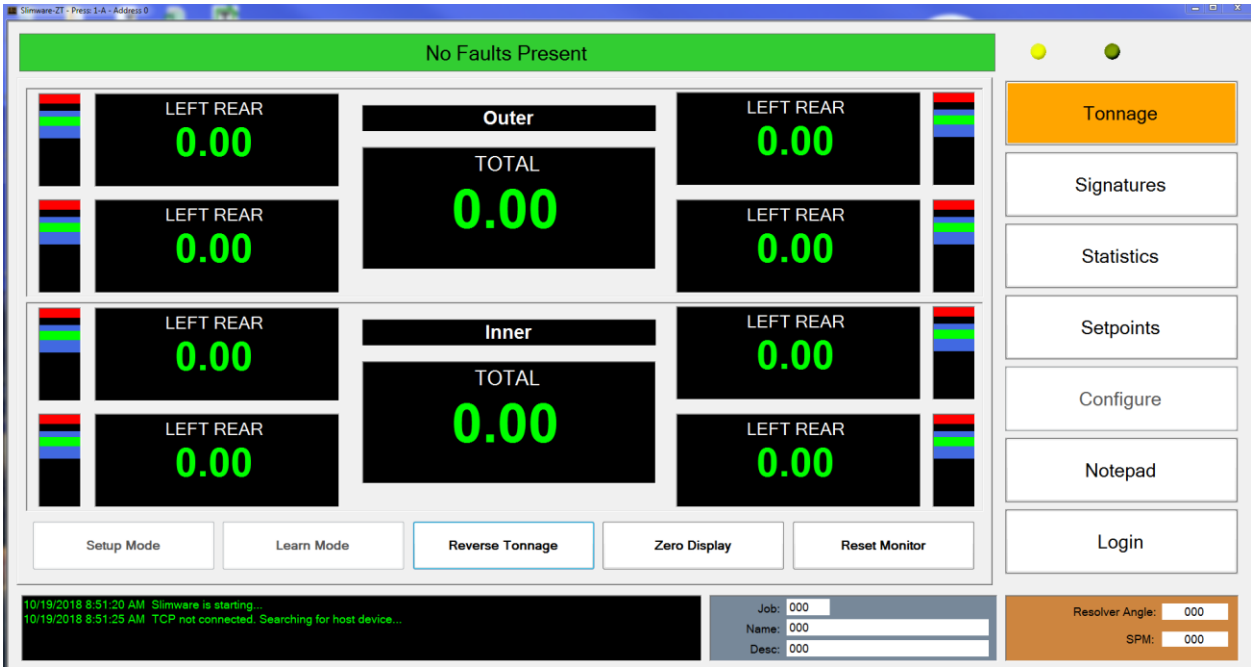
This guide explains how to establish and configure an Ethernet connection between the SlimWare HMI software and ZT-SLIM tonnage monitor. This guide assumes that:

a) SlimWare 7 has already been installed on the HMI PC.
b) The HMI PC and the ZT-SLIM are both connected to the same Ethernet network.

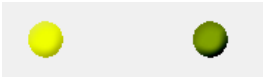
By default, the ZT-SLIM ships with an IP address of 192.168.16.180 with a subnet mask of 255.255.255.0 and a TCP Port of 31000.

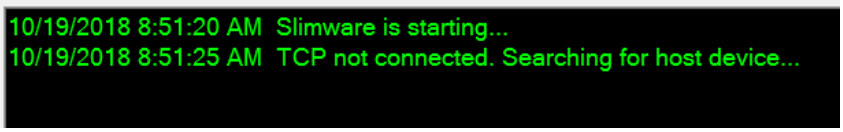
Preferred method:
To establish initial communications, you may choose to install SlimWare on a laptop and configure the laptop's network interface to a compatible IP address. Then use an Ethernet cable to connect directly to the ZT-SLIM.

1) Start SlimWare.



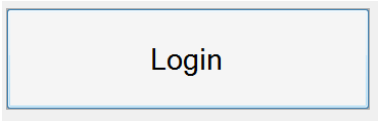
When you first start SlimWare, you will notice that the communication lights in the top right corner are not flashing and you get the following message in the status window at the bottom.





This indicates that communication is not yet established.

2) Login.

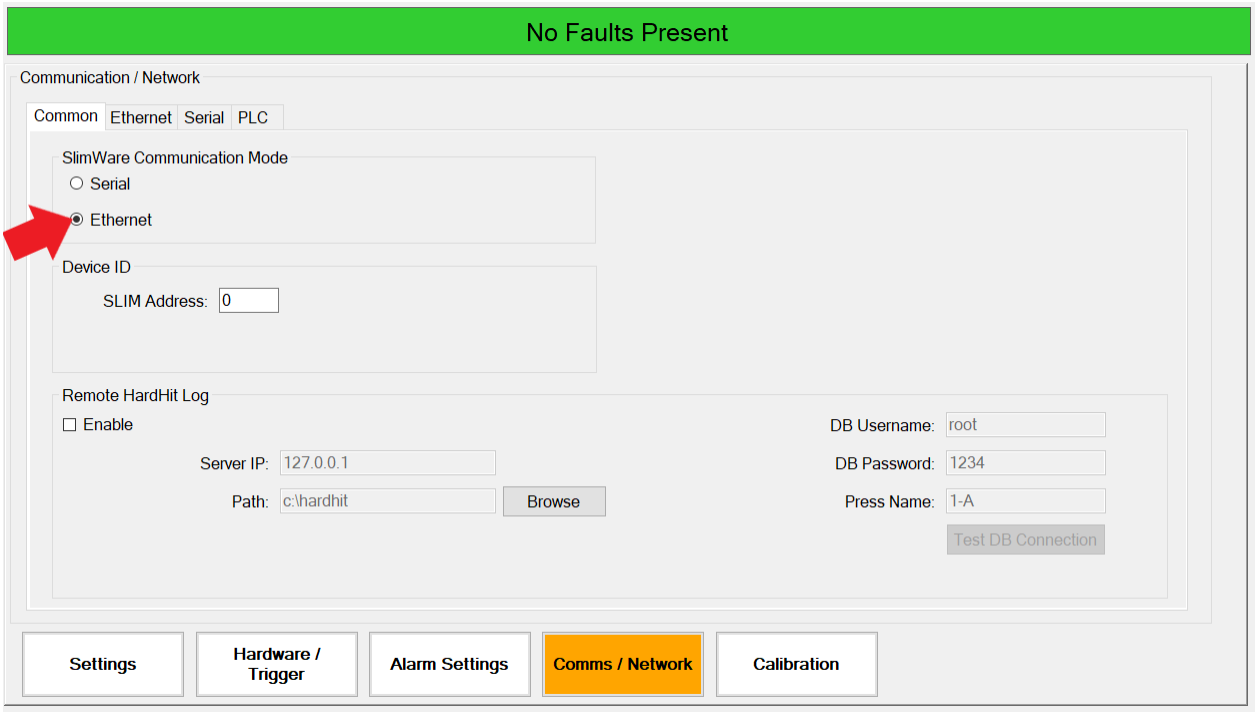


Click the **Login** button on the right and enter the master password (default is “m”).

3) Go to the Comms / Network configuration page.

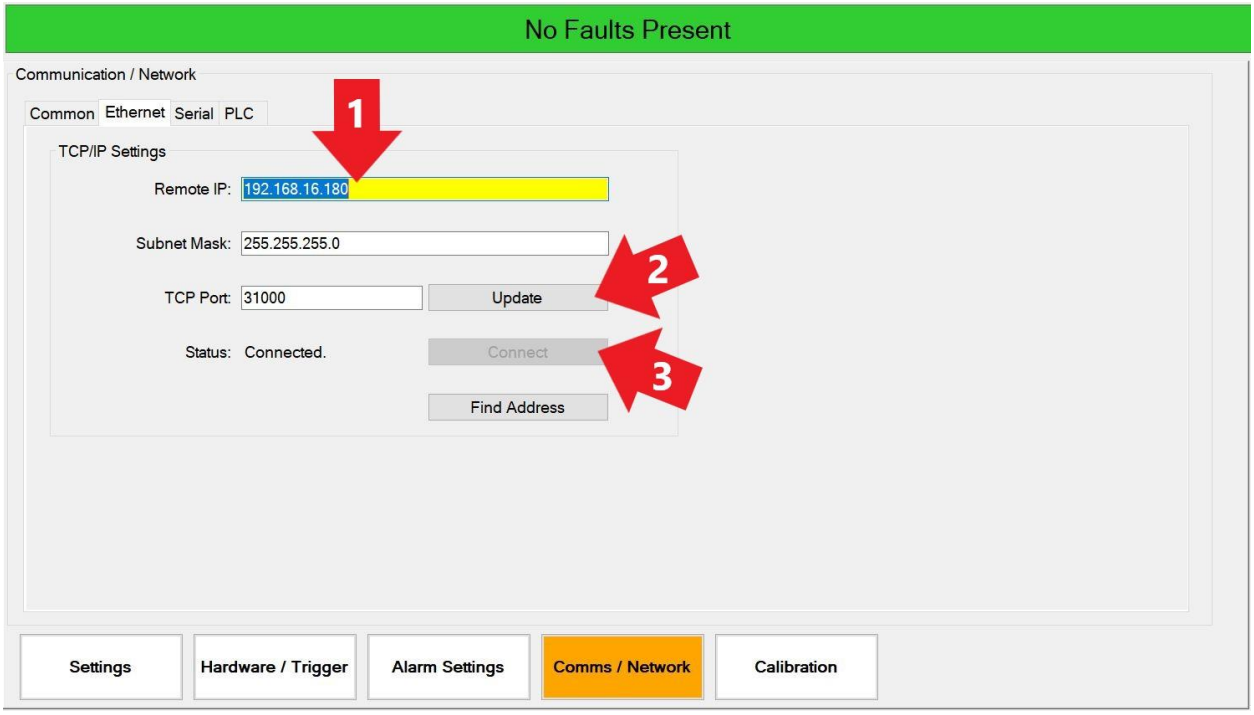
Click the **Configure** button on the right, then click the **Comms / Network** button at the bottom.

4) Set the Communication Mode to Ethernet.



On the Common tab, verify that the communication mode is set to Ethernet. If not, select it.

5) Go to the Ethernet tab.



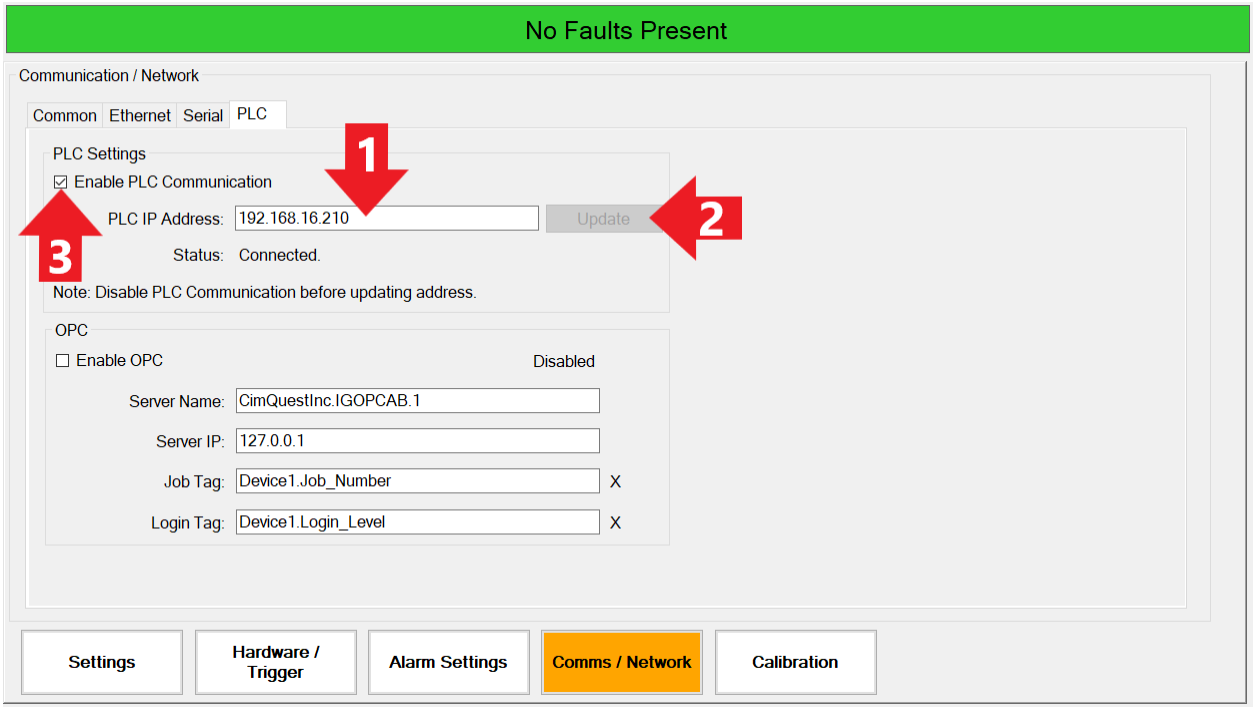
While still on the Comms / Network page, click the Ethernet tab to display its settings.

Click anywhere in the **Remote IP** field to bring up the entry keypad. Enter the default IP address "192.168.16.180" and click **Enter**. Keep all other settings the same and click the **Update** button and then the **Connect** button.

6) Confirm connection.

After a brief pause, you should notice that the communication lights on the top right corner will begin flashing and the status window at the bottom will verify that the TCP connection is established.

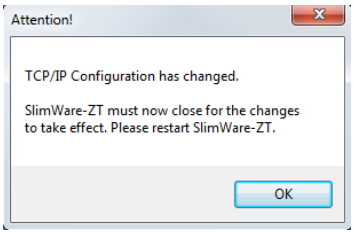
7) Go to the PLC tab



While still on the Comms / Network page, click the PLC tab to display its settings.

Click anywhere in the **PLC IP Address** field to bring up the entry keypad. Enter the PLC IP address and click on the **Update** button. Then, click the Enable PLC Communication checkbox.

8) Save SlimWare settings and shut down.



Click the **Update** button one more time. SlimWare will confirm that the configuration has changed. Click OK to save the settings and close SlimWare.

9) Restart SlimWare.

Open SlimWare from the desktop shortcut or start menu. Communications should start normally.

10) Configure the ZT-SLIM for the press network.

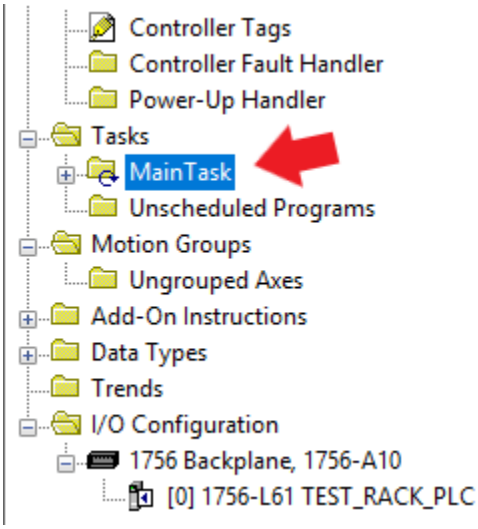
Repeat steps 2-7, except this time enter the desired IP address, subnet mask, and TCP port for the press network. Once you click **Update**, the ZT-SLIM will apply the new settings and reboot. If you chose to use a laptop and direct Ethernet connection to establish communications (the preferred method) continue with step 12 below.

11) **Connect the ZT-SLIM to the press Ethernet network. Reboot the ZT-SLIM.**
12) **Connect the HMI PC to the press Ethernet network.**
13) **Start SlimWare on the HMI PC.**
14) **Repeat steps 2-9, using the IP address, subnet mask, and TCP port that were configured in step 10.**

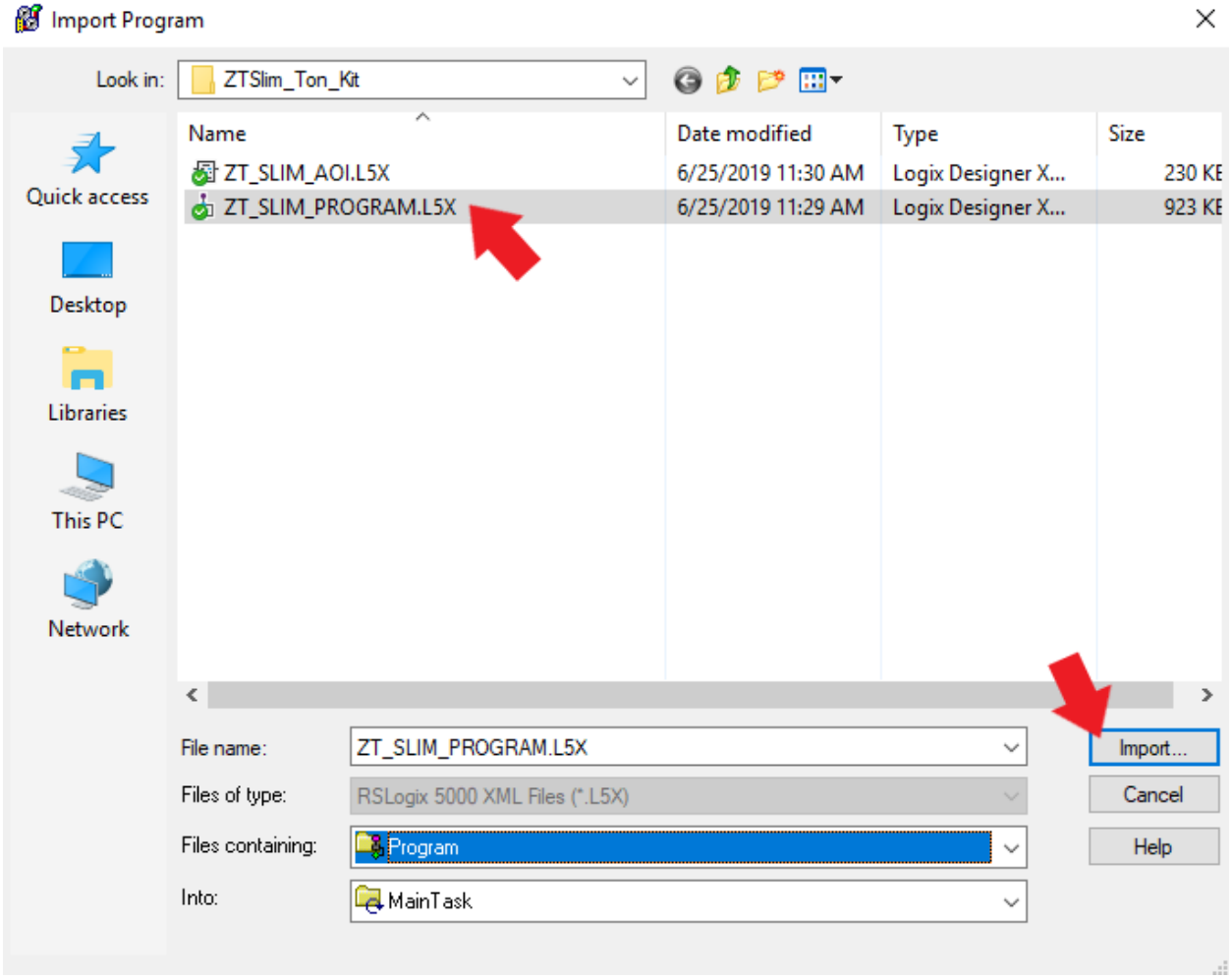
9. Program Import

To import a program, complete the following steps.

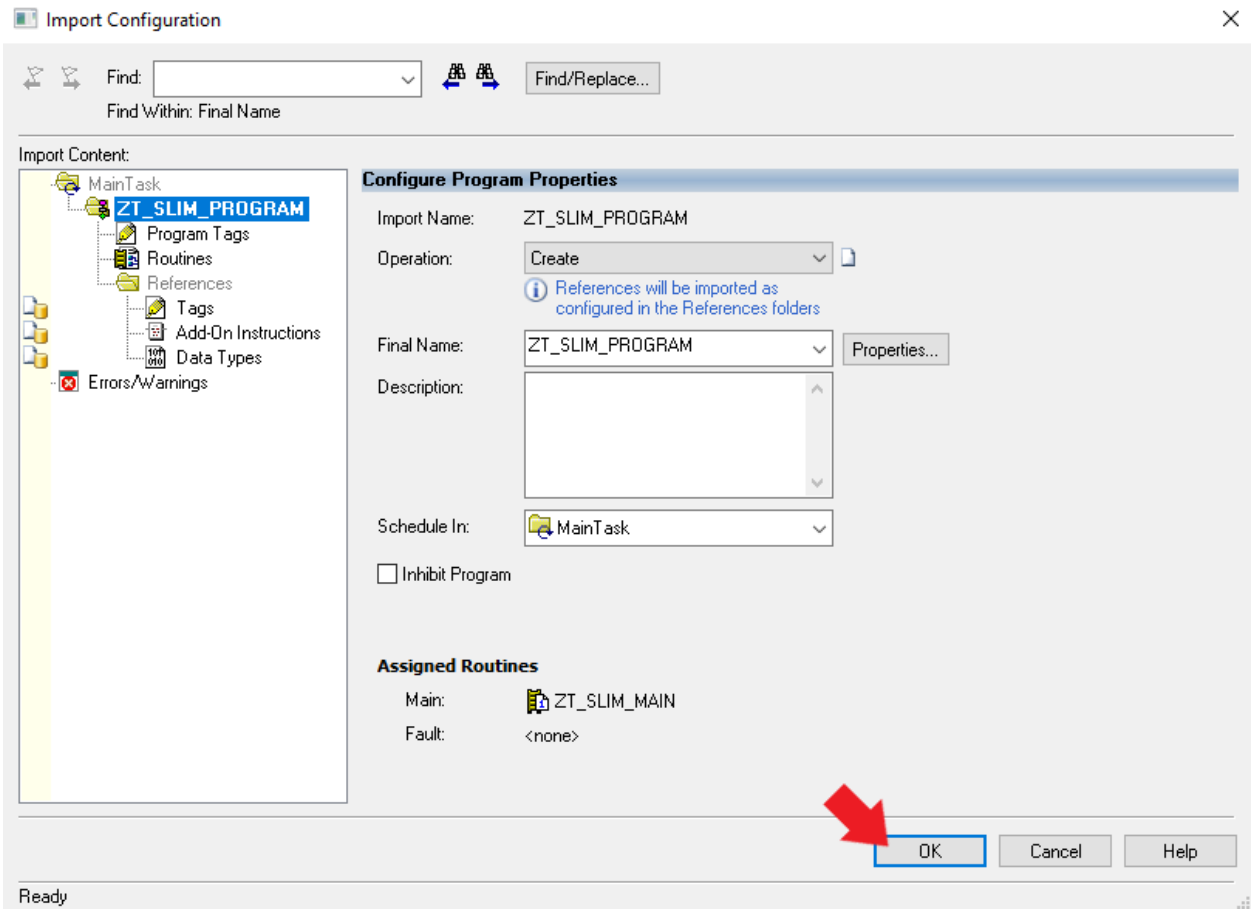
1) Right click on “MainTask” and then click the “Import Program” option.



2) Find and click “ZT_SLIM_PROGRAM.L5X” file. Then, click the “Import” button.



3) Click the “OK” button.



4) The program is successfully imported.

10. Initial Setup

In order for the ZT-SLIM to display accurate tonnage information, the unit must be properly calibrated.

1) **Open the Slimware application.**

2) **Go to the Configure → Hardware/Trigger page.**

a) Select the desired Press Type, Tonnage Mode, Channel number, and Decimal Point.
b) Select in Enable Enveloping.
c) Select Enable Autoset and % Capacity.

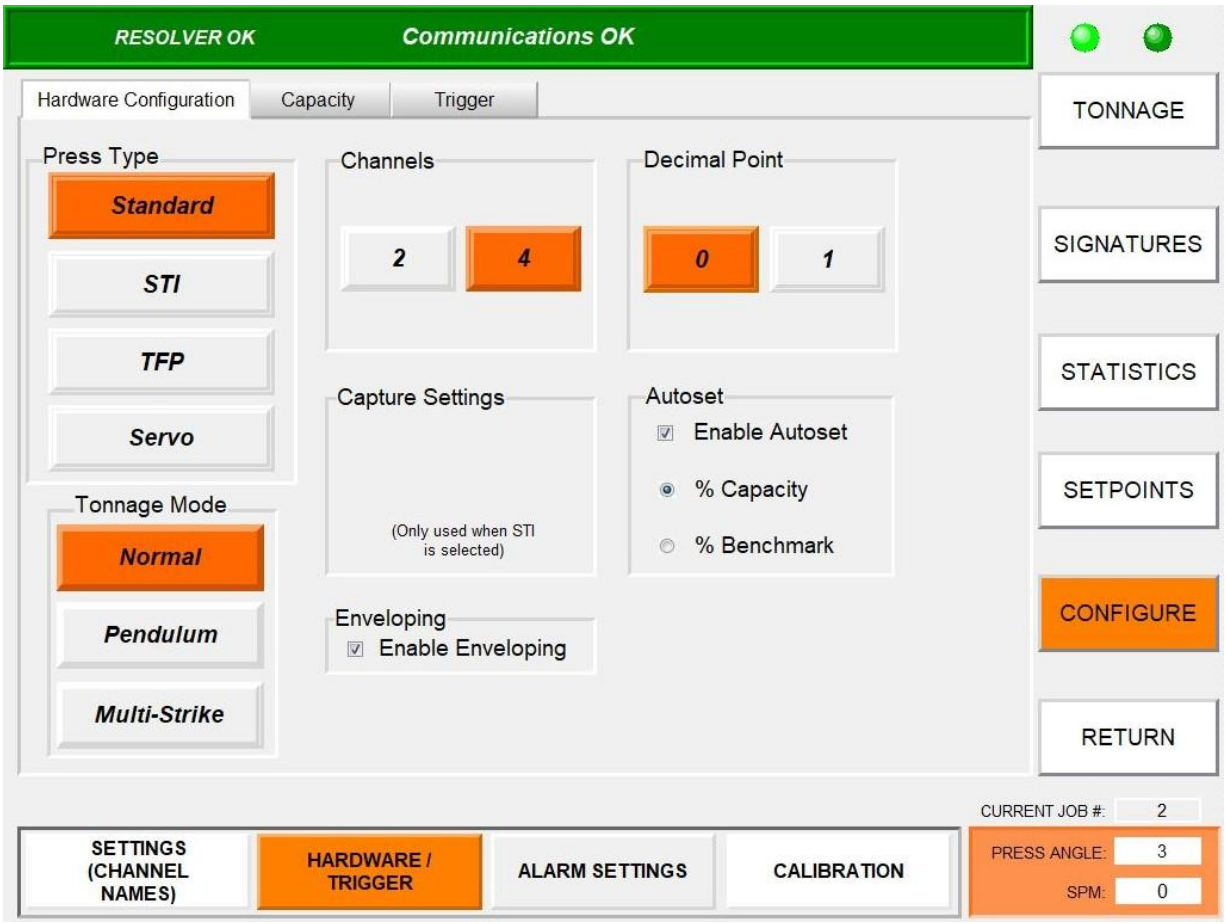


Figure 10-1 – Hardware Configuration Screen

d) Touch the Capacity tab.

e) Enter the press capacity.

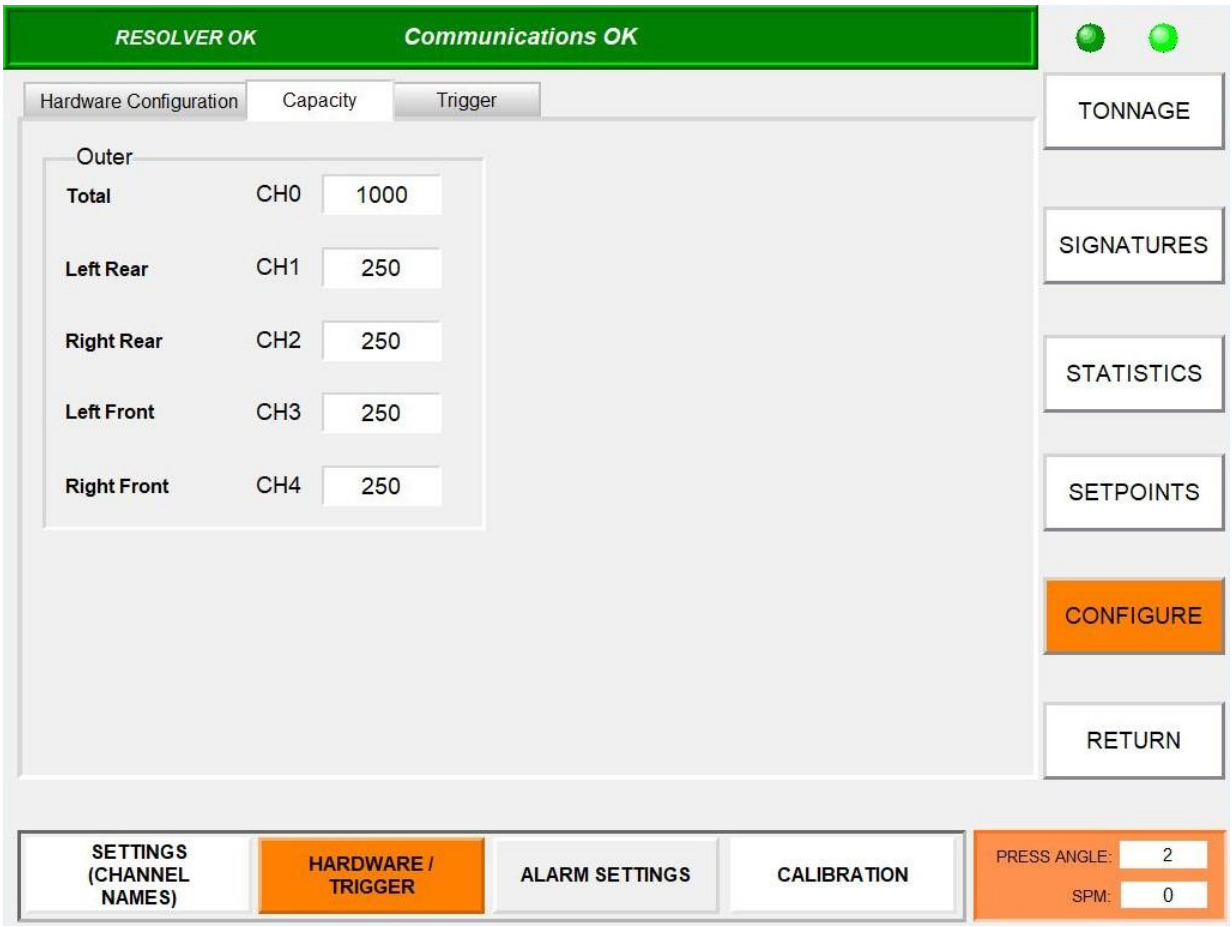


Figure 10-2 – Capacity Screen

f) Touch the Trigger tab.

g) Set the resolver offset so that the resolver angle matches the press angle.

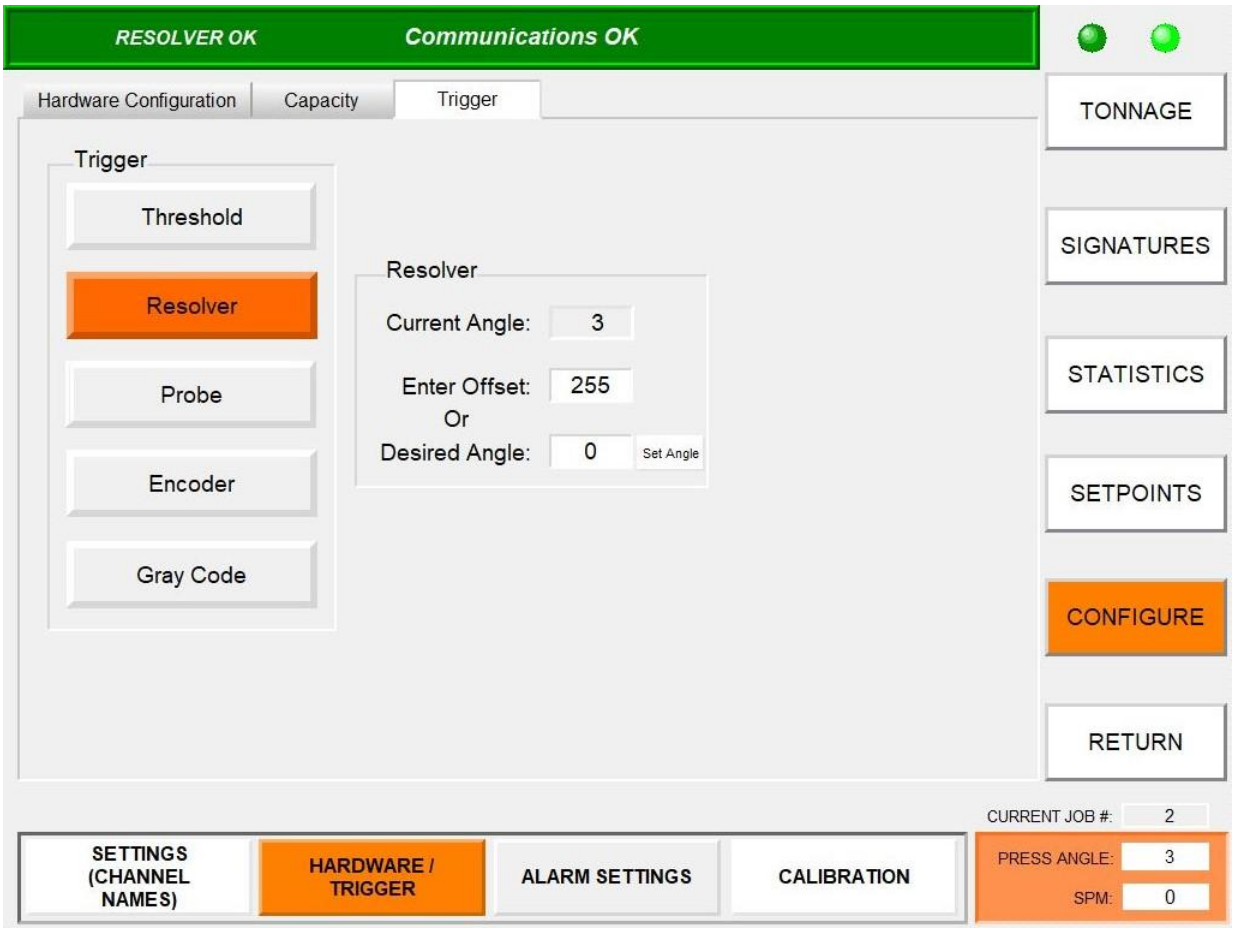


Figure 10-3 – Trigger Screen

3) Enable “Setup Mode” to bypass the high and low limits.

Figure 10-4 – Tonnage Setup Mode (4 Channel)

4) Find the shut height of the press.

a) Jog the press until the ram is at bottom dead center (BDC) or 180° without any load cells or die in the press.

b) Determine the amount of spacers needed with your load cells. Cycle the press without load cells to insure correct height.

5) Place the load cells in the correct position in the press.

a) All load cells should be equal distance from the sides and front and rear. For example, 12” from the sides, 10” from the front and rear. Load cells are typically placed at each corner of the press’s bed.

b) Cycle the press without hitting the load cells first.

c) Place cardboard on the top and bottom of the load cells.

d) Further adjust the shut height so that the press impacts the load cells and generates a load at 100% of press capacity. See the following warning.

WARNING:

Depending on the press capacity and the size of the load cells being used, loading the press at capacity with load cells could indent the ram or bolster. To prevent this situation from happening, do one of the following:

- Calibrate the press only up to 80% of capacity, or
- Use larger load cells to increase the loading surface. For instance, to calibrate a 400 Ton press at capacity, use (4) 250 Ton load cells instead of (4) 100 Ton load cells.

6) Balance the tonnage sensors.

a) Make sure the press is under no load.

b) Go to the Configure → Calibration page (see figure below).

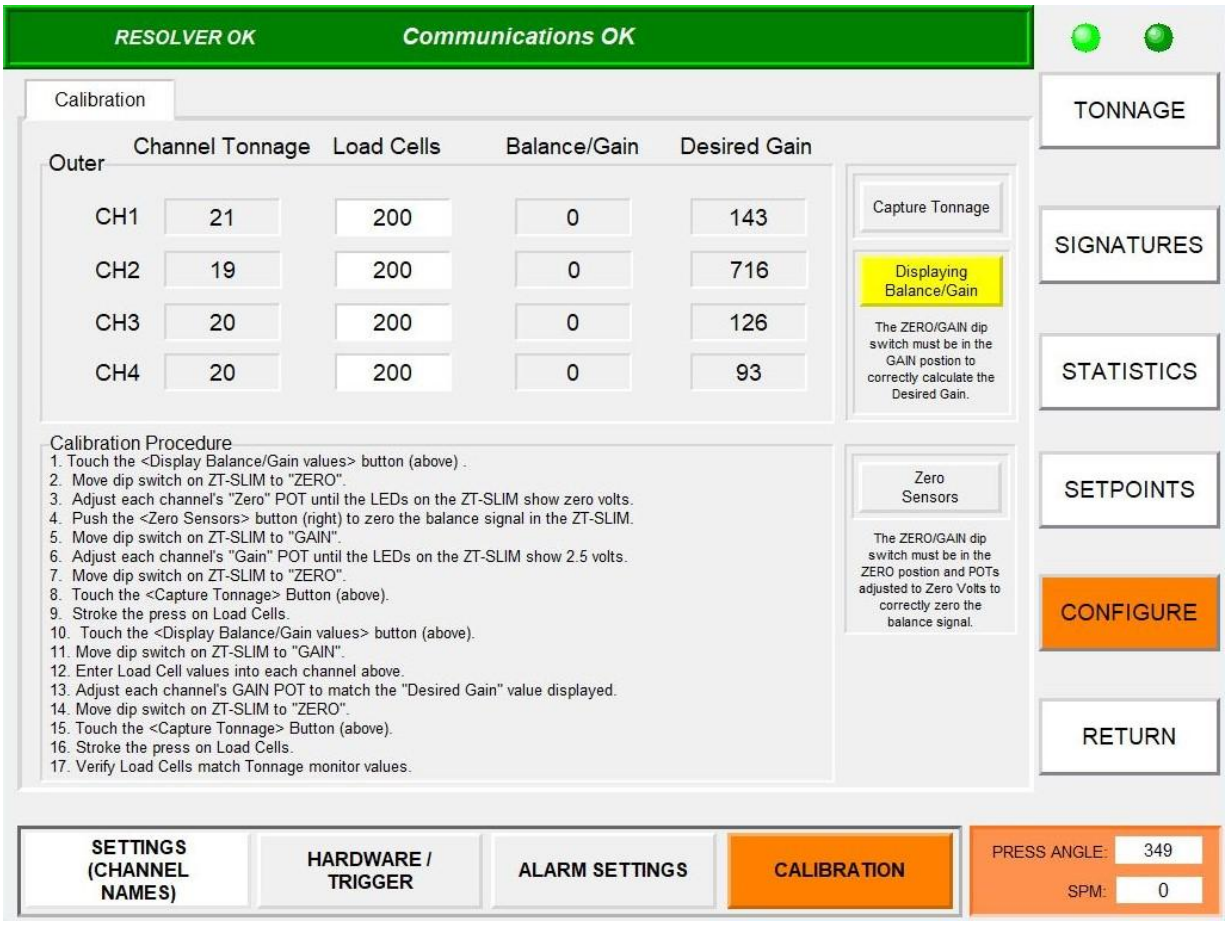


Figure 10-5 – Configuration Tonnage Calibration Screen (4 Channel)

c) Perform the following procedure.

1) Touch the “Display Balance/Gain” button. It will change to “Displaying Balance/Gain”.

2) Move the dip switch on the ZT-4 to “Zero”.

3) Adjust each channel’s “Zero” POT until the LED on the ZT-4 shows zero volts.

4) Touch the “Zero Sensors” button to zero the balance in the ZT-4.

5) Move the dip switch on the ZT-4 to “Gain”.

6) Adjust each channel’s “Gain” POT until the LED on the ZT-4 shows 2.5 Volts.

7) Move the dip switch on the ZT-4 back to “Zero”.

8) Touch the “Capture Tonnage” button.

9) Stroke the press onto the Load Cells.

10) Touch the “Display Balance/Gain” button again.

11) Move the dip switch on the ZT-4 back to “Gain”.

12) Enter the Load Cell values onto the corresponding channels.

13) Adjust each channel’s GAIN POT to match the Desired Gain value displayed.

14) Move the dip switch on the ZT-4 back to “Zero”.

15) Touch the “Capture Tonnage” button again.

16) Stroke the press onto the Load Cells again.

17) Verify that the values on the Load Cells match that of the Tonnage monitor values.

7) Record Gain Numbers.

a) The values in the “Desired Gain” column are the Gain Numbers. Record these numbers on the calibration card located on the side of the ZT-SLIM. Refer to Figure 10-4.

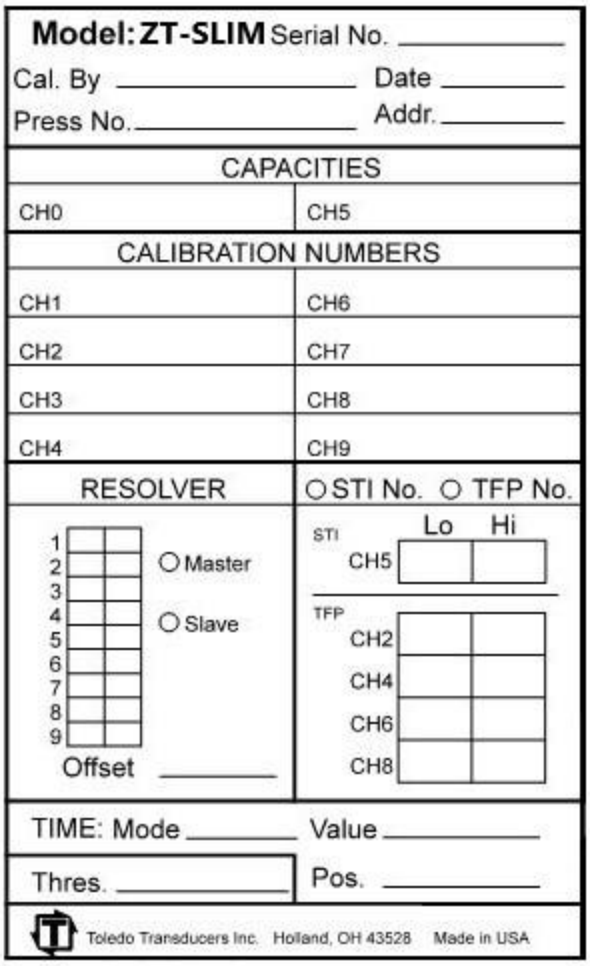


Figure 10-6 – Calibration Card

8) Make linearity check.

a) Go to the Tonnage page (see figure below).
b) Raise the shut height in .020 to .030 inch increments to decrease tonnage.
c) Cycle the press and impact the load cells.
d) Compare the tonnage applied to the load cells to the tonnage displayed on the ZT-SLIM. Record these data on the Calibration Sheet (Form #1224) provided at the end of this procedure.

9) Calibration complete.

The calibration procedure is now complete. Contact Toledo Integrated Systems' Service Department for assistance if needed. Our Service Department can be reached at 419-867-4170, Monday through Friday, 8:00AM to 5:00PM.