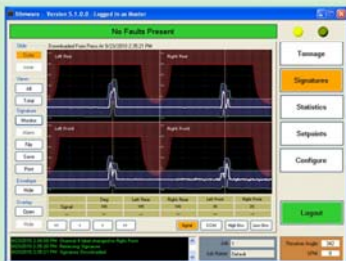


PRESSWATCH

Load Signature Series



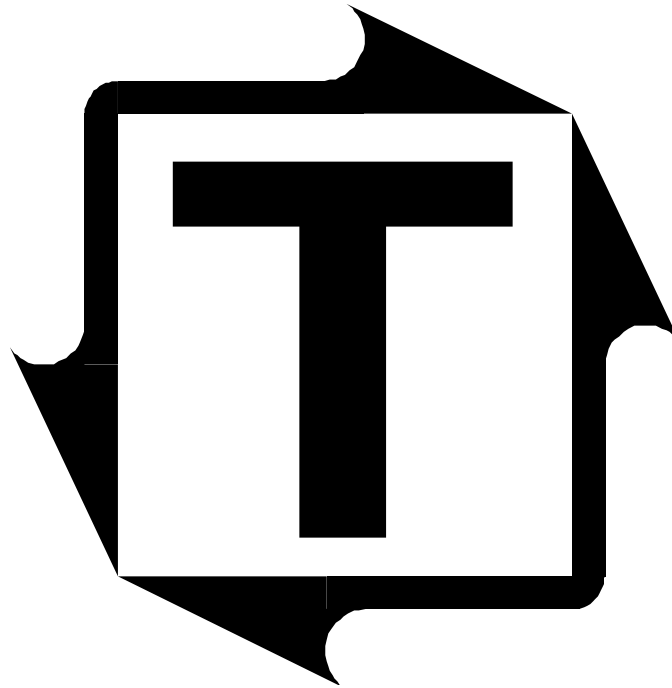
Signature	Total	Left Rear	Right Rear	Left Front	Right Front	Time Taken
Character	Green	Green	Green	Green	Green	Red
CLM	Green	Green	Green	Green	Green	Green
High Torque	Green	Green	Green	Green	Green	Yellow
Low Torque	Green	Green	Green	Green	Green	Yellow
Reverse	Red	Red	Red	Red	Red	Yellow
High Acceleration	Green	Green	Green	Green	Green	Yellow
Low Acceleration	Green	Green	Green	Green	Green	Yellow



Production Monitor

By Toledo Integrated Systems

User's Manual



PressWatch Load Signature Series RV2 Load Monitor User's Manual

Revision: A



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Limited Warranty

This unit is warranted by the manufacturer, Toledo Transducers, Inc., to be free of defects in workmanship and materials for one year from date of manufacturer's shipment. This warranty is limited to repairing or replacing products which manufacturer's investigation shows were defective at the time of shipment by the manufacturer.

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

F.O.B. to: Toledo Transducers, Inc.
6834 Spring Valley Drive
Holland, Ohio 43528

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 a 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 thereunder. 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.

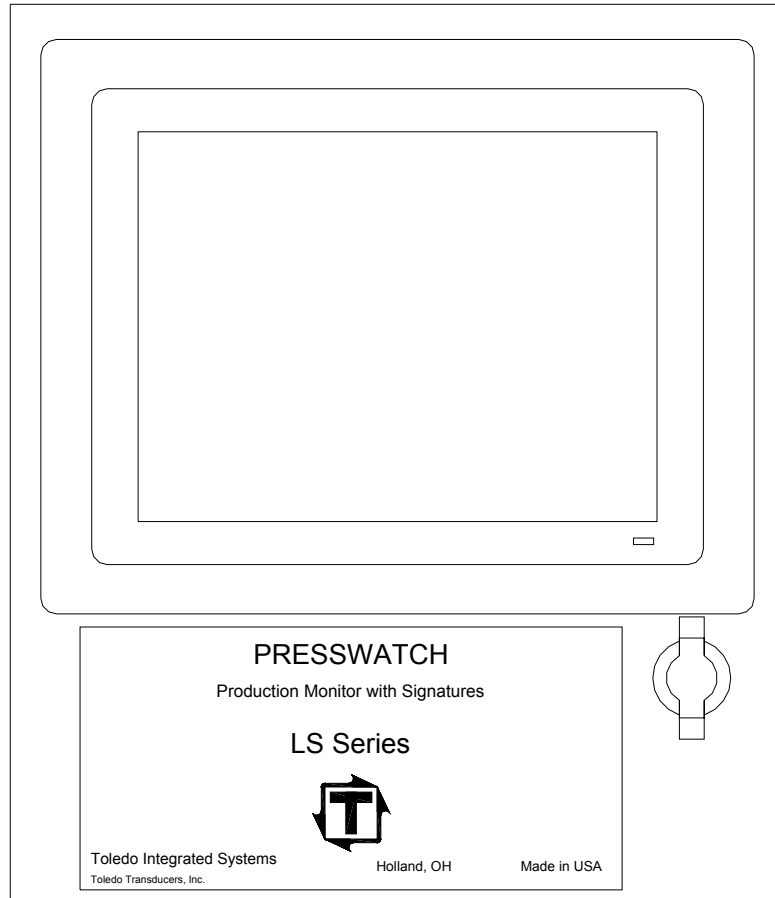
Any unauthorized repair voids this warranty.

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



Features Overview

The PressWatch LS Series is a press tonnage monitor with signatures. It integrates tonnage monitoring and signatures with enveloping into ONE system. It features a large 10.4" touch screen interface, making the tonnage and signatures easy to read and access.



FEATURES

- 2 or 4 channel tonnage monitoring
- Reverse tonnage
- Signatures - each press corner and total
- 5 signature zones for enveloping
- Critical Curve Monitoring - CCM
- Hard Hit signature storage
- Job storage
- 3 password levels
- PressNet 5 compatibility

OPTIONS

- Additional 2 or 4 channels for tonnage monitoring or analog input
- TR-1 Resolver

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Specifications

Tonnage	No. of Channels	Two or Four (Six or Eight optional)
	Sensor Inputs	Full bridge strain gage sensors 120 to 1,000 ohms Up to (8) 350 ohm sensors
	Sensor Excitation	Built-in 10VDC @ 500mA max (Short circuit protected)
	Sensor Input Connections	7-pin .2" pitch Phoenix connector
	Automatic Zero Balance	Yes
	Balance Range	+/- 1mV/V of offset (digitally controlled)
	Gain Range	100 to 11,000x (digitally controlled)
	Analog Output	1.25VDC @ Press Capacity
	Analog Output Connection	.15" pitch Phoenix connector
	Inaccuracy	+/- 1% of full scale max
	Non-linearity	+/- .1% of full scale max
	Frequency Response	Flat DC to 6 KHz
	Resolution	Each channel provides a 4-digit load value in 1024 count resolution
	Calibration Shunts	Calculation based on 1 Meg Ohm shunt resistor
Counters	Stroke counter	9-digit, for Press Preventive Maintenance
	Part counter	8-digit, 1 to 255 parts/stroke (programmable)
	Good part counter	8-digit
	(2) Batch counters	8-digit, Top stop
Job Storage	Yes	Limited only by available PC storage capacity
Password	Master level	For supervisor
	Setup level	For die setter
	Operator level	For general operation
Speed Limit	Up to 1200 SPM	
Human Machine Interface (HMI) Unit	Display	10.4" diagonal TFT LCD display
		Full color SVGA graphics
	Input	Touch screen standard USB ports available for keyboard and/or mouse
	Operating System	Windows XP Embedded
	Flash Disk	4GB Compact Flash for operating system and data storage
	Network	Integrated Ethernet NIC



Shutdown Relay		Mechanical relay with N.O. contacts (N.C. optional) 8 AMP @ 250VAC 8 AMP @ 30VDC
General	Resolver	Built-in excitation supports standard 5000Hz rotor excited positional resolver
	Computer Interface	10/100/1000 Mbps Ethernet
	Power requirements	95 Watts max. 85-132VAC @ 50-60Hz or 170-264VAC @ 50-60Hz
	Operating temperature	0-50 degrees Celsius
	Dimensions	12.5" W x 14.5" H x 7.53" D, or 318mm W x 368mm H x 191mm D



➤ Installation

Mounting the PW-LS

The PW-LS is an electronic instrument and must therefore be protected from physical stresses such as shock and vibration. Shock mounts are provided with every PW-LS for this purpose. Failure to use these shock mounts may result in premature failure of the instrument and possibly void your warranty.

The PW-LS may be mounted directly to the press or to an adjacent structure. It should be positioned so that the display is easily read and the instrument is readily accessible. Figure 1-1 below provides the mounting dimensions and demonstrates the proper attachment of the provided shock mounts. A ground wire is also provided for proper instrument grounding and should be installed across one of the shock mounts.

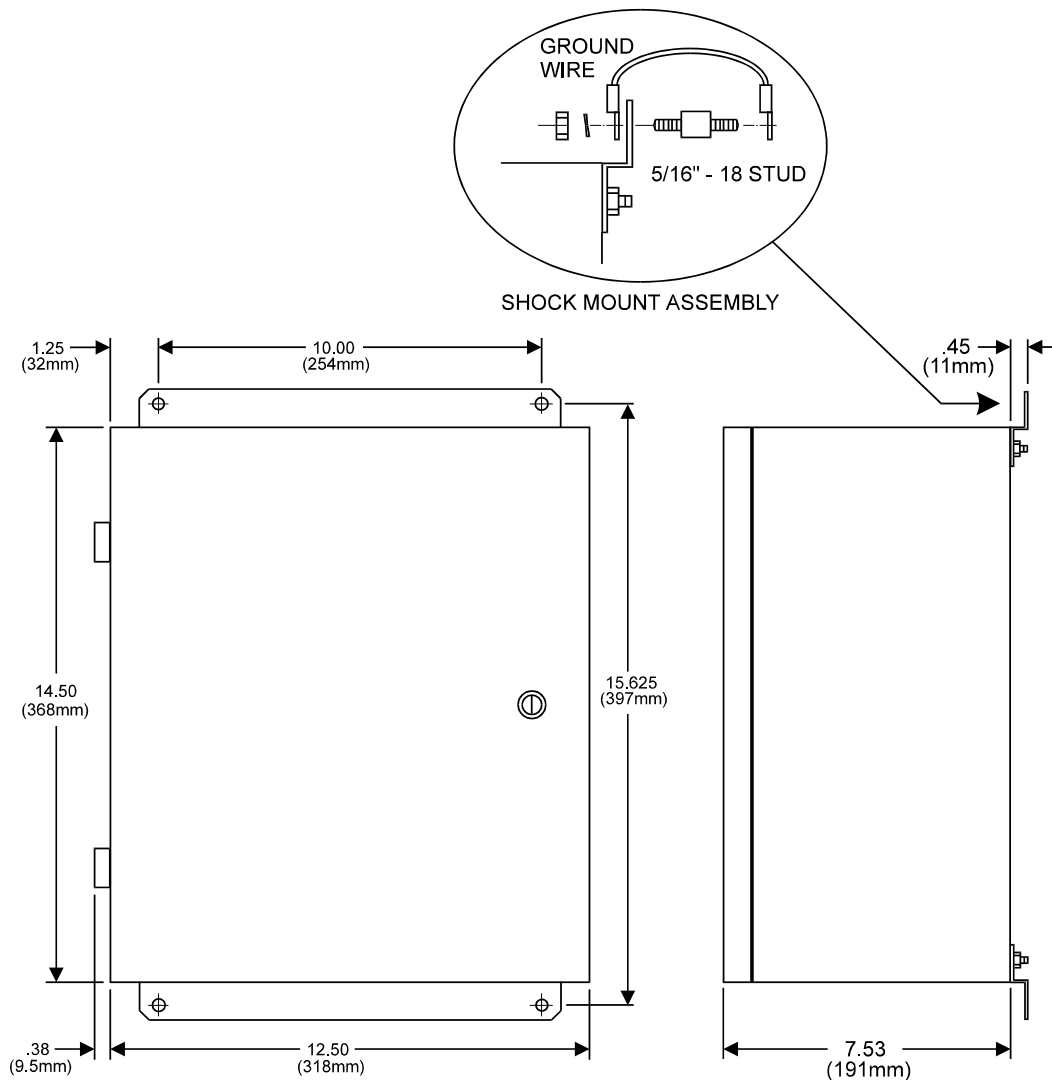


Figure 1-1: Mounting Dimensions

PW-LS Components

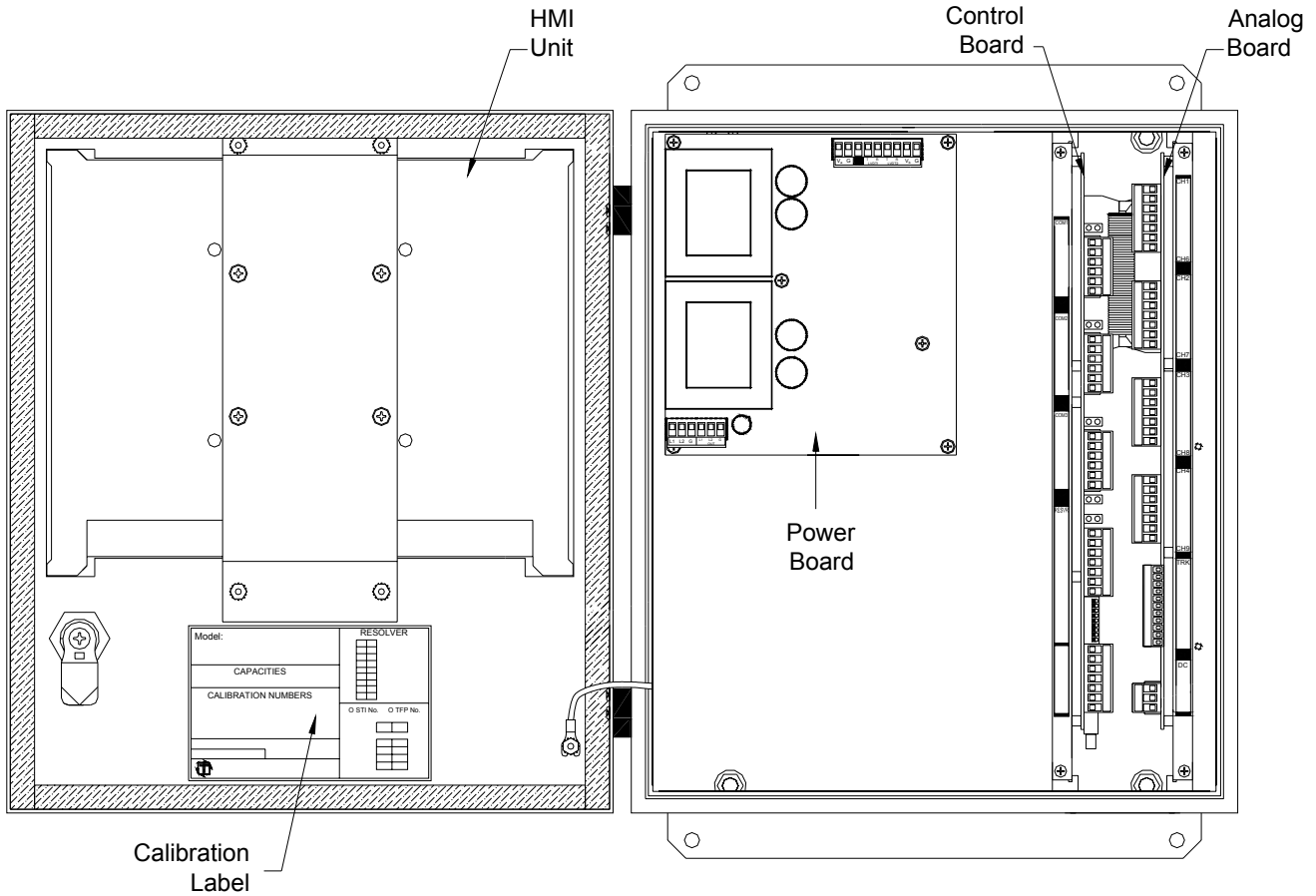


Figure 1-2: PW-LS Components

Conduit Hole Selection

Follow Figure 1-3 to select the proper conduit hole for cabling. The holes are for 3/4" conduit, but they can be enlarged in the field if a larger fitting is required.

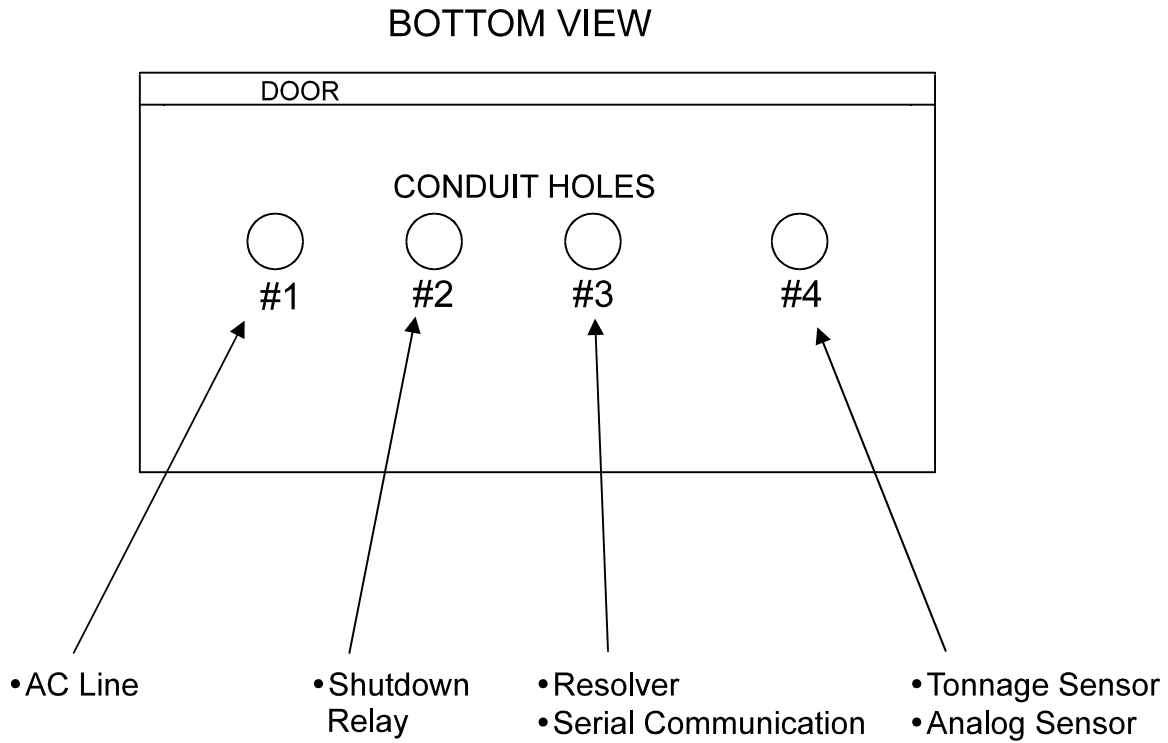


Figure 1-3: Conduit Hole Selection

AC Power Requirement

With the proper jumper settings, the PW-LS can be powered by either 115 VAC or 230 VAC (Factory set at 115 VAC.) The jumpers are located on the Power Board as shown in Figure 1-4

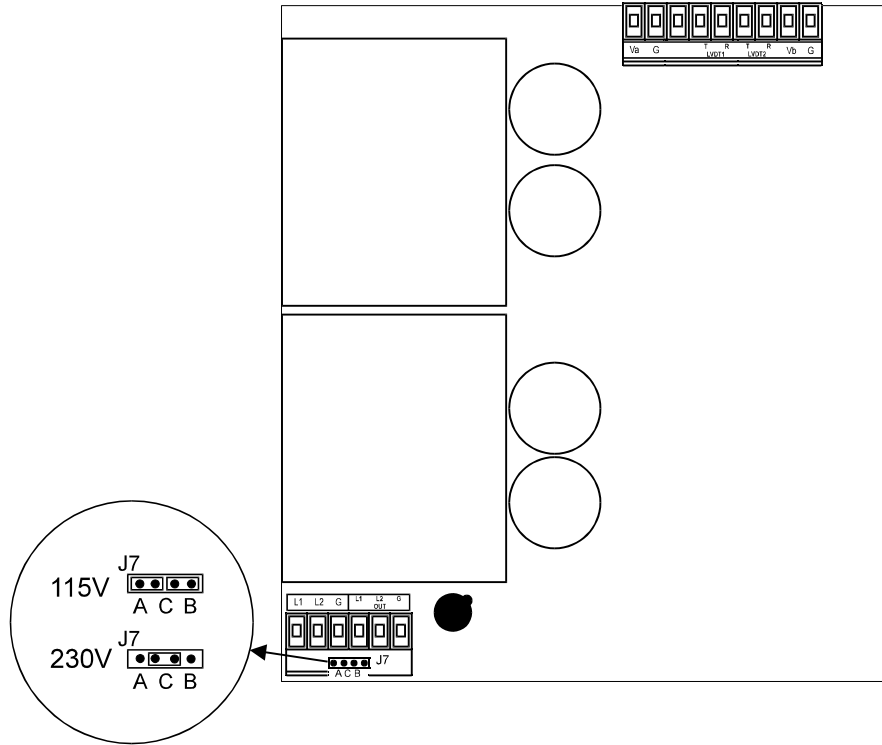


Figure 1-4: Power Board AC Power Jumper Settings

115 VAC = Jumpers A & B
230 VAC= Jumper C Only

AC Power Connection

AC power is connected to the PW-LS as shown in Figure 1-5. Use Conduit Hole #1 (see Figure 1-3) for the AC Power Wiring. Use the proper fuse as indicated.

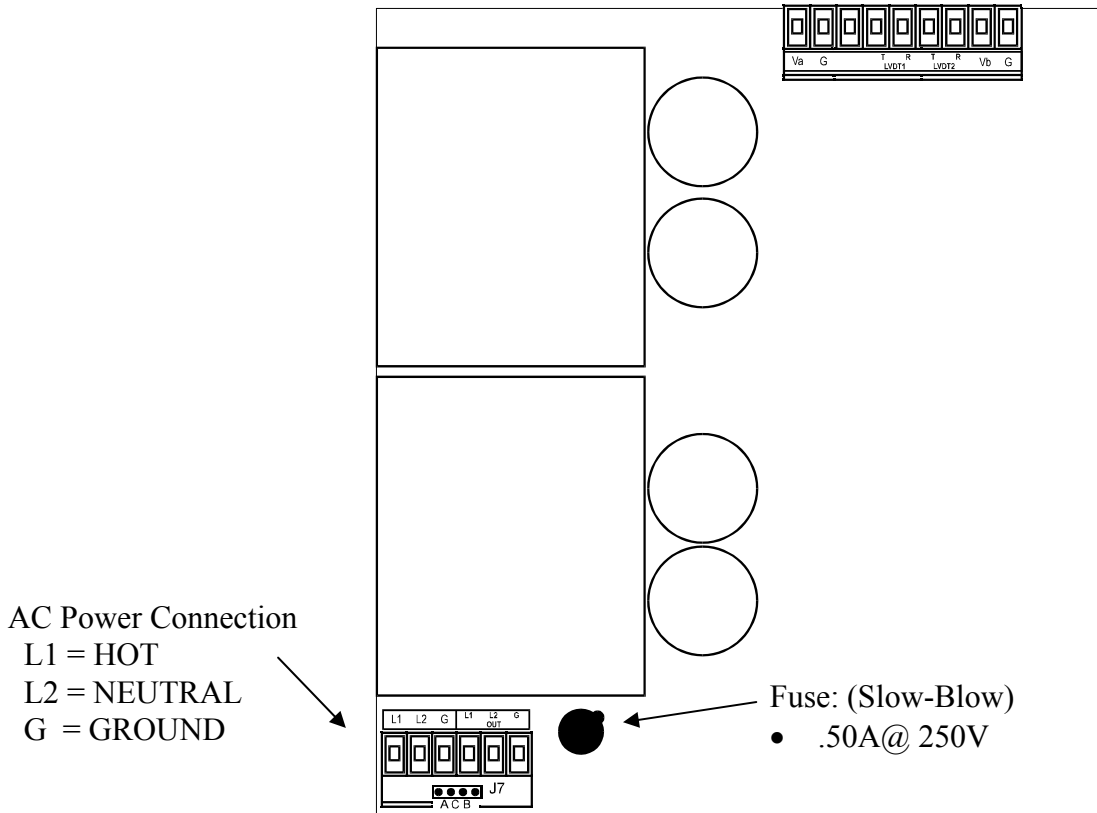


Figure 1-5: AC Power Wiring

Tonnage Sensor Connection

Refer to Figure 1-6 for the procedures below to connect tonnage sensors properly:

- 1) Power down the unit. Open the door of the PW-LS enclosure.
- 2) Run Tonnage Sensor Cables through the Conduit Hole #4 (see Figure 1-3), and route cables upward to the right of the Analog Board.
- 3) Prepare the sensor cable for termination as described in Illustration A on page 16.
- 4) Remove the four 7-pin Phoenix plugs from the Analog Board and wire each sensor cable as described in Illustration B on page 17.
- 5) The 7-pin phoenix plugs can then be inserted into the corresponding sockets. The tonnage sensor cable connections are now complete.



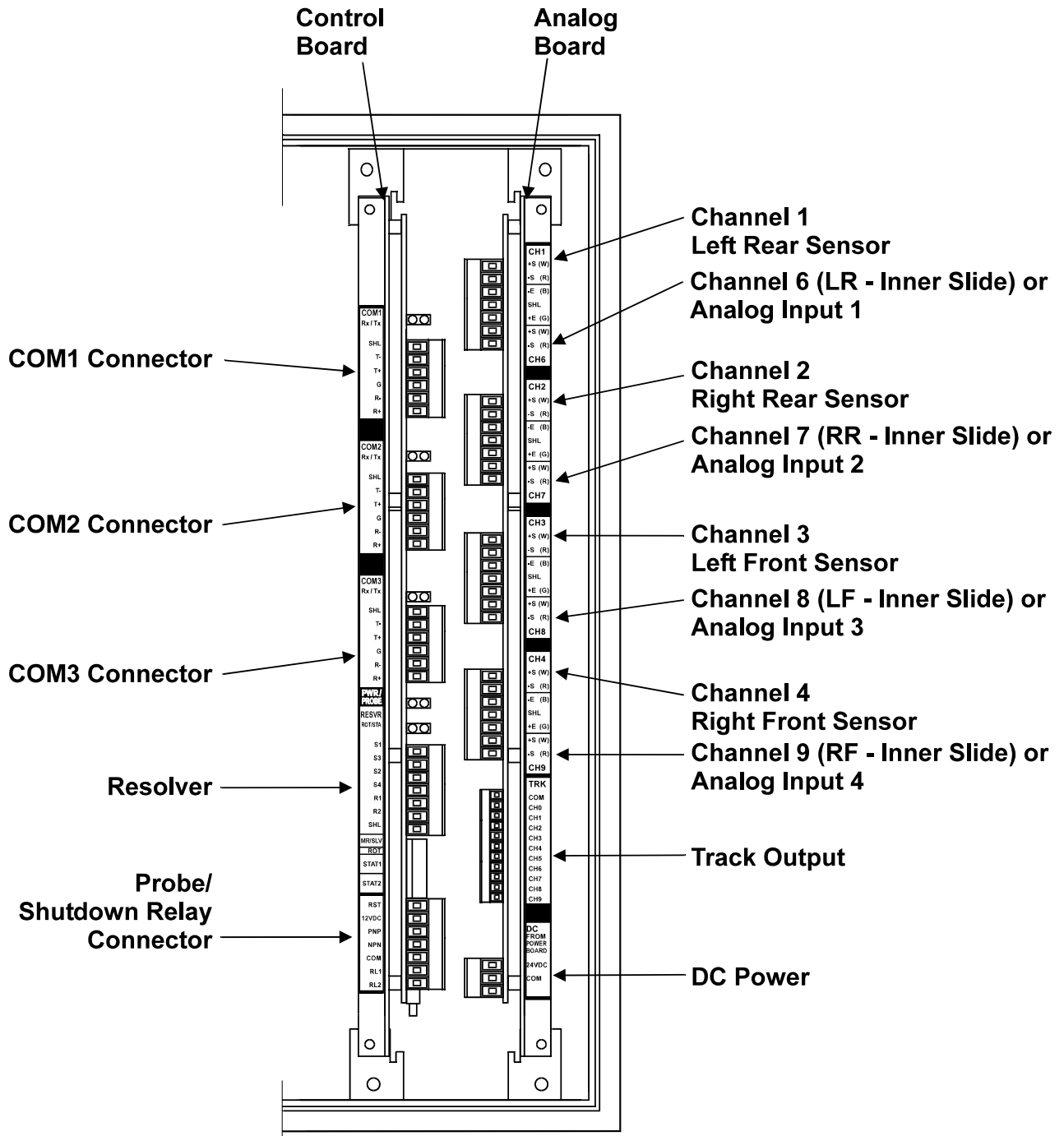


Figure 1-6: Tonnage Sensor Input

Illustration A - Sensor Cable Termination

- 1) Strip the sensor cable as shown in Figure 1-7 below. Be sure not to nick any of the signal conductors or cut the braid shield.

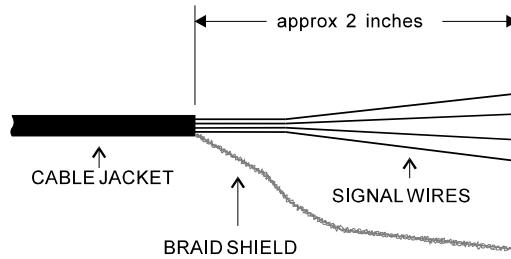


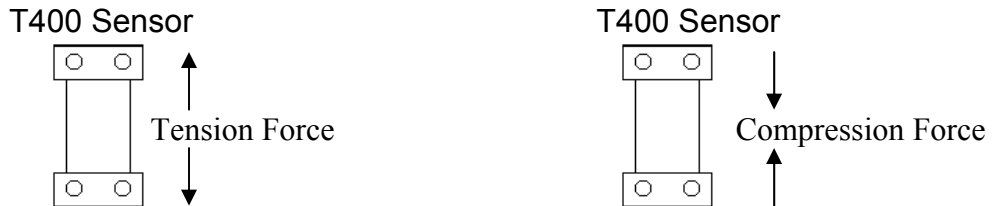
Figure 1-7: Tonnage Sensor Cable Stripping

- 2) Strip approximately $\frac{1}{4}$ " of insulation from each of the four signal conductors.

Note: If your sensor cable is not double shielded with both foil and a braid, electrical noise may affect your output readings.

Illustration B - Sensors Connection

The PW-LS accepts the signals from Toledo Transducers T-400 sensors as well as other strain gage sensors. Figure 1-8 illustrates the sensor connections.



Tension connection shown. For compression connections, switch the red and white wires

CONNECTION FOR 2- OR 4-CHANNEL UNITS

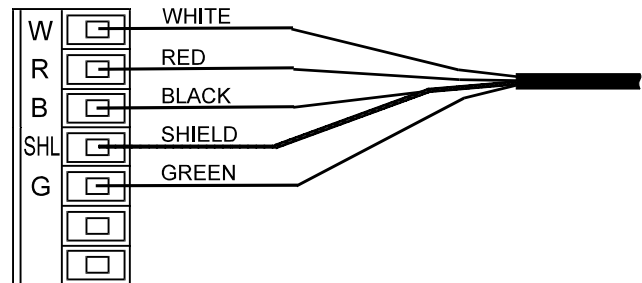
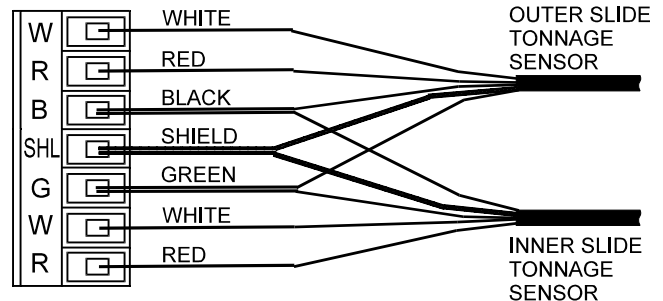


Figure 1-8: Tonnage Sensor Wiring

CONNECTION FOR 6- OR 8-CHANNEL UNITS



If two sensors share the same connector, the black wires from both sensors are wired to the black terminal. Wire the shield and green wires from both sensors in a similar

Resolver Connection

The PW-LS resolver input has a built-in excitation which supports standard 5,000 Hz rotor-excited positional resolvers. The input can be configured in Master Mode or Slave Mode. In Master Mode, the PW-LS supplies excitation voltage to the resolver and is wired directly to the resolver. In Slave Mode, the PW-LS does not supply excitation voltage to the resolver and is wired to the resolver input terminal of a Master device, where the resolver signal is shared.

Use Conduit Hole #3 (see Figure 1-3) for the Resolver Cable. The resolver input consists of the following components:

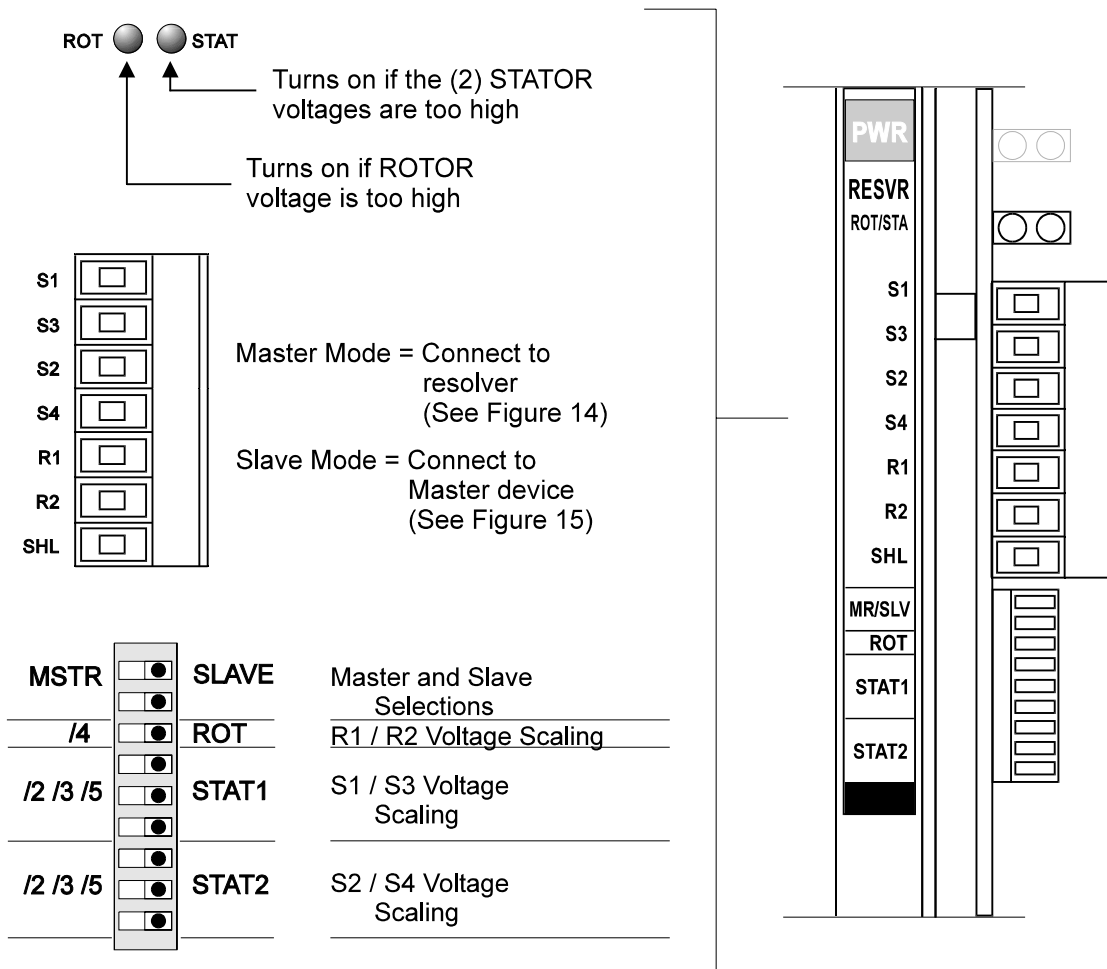
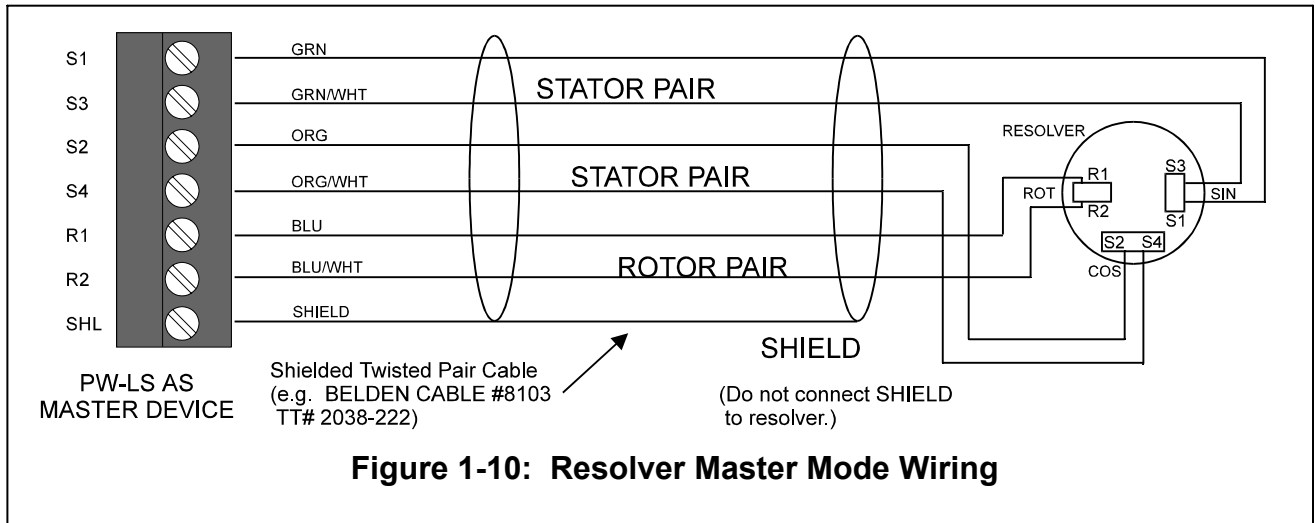
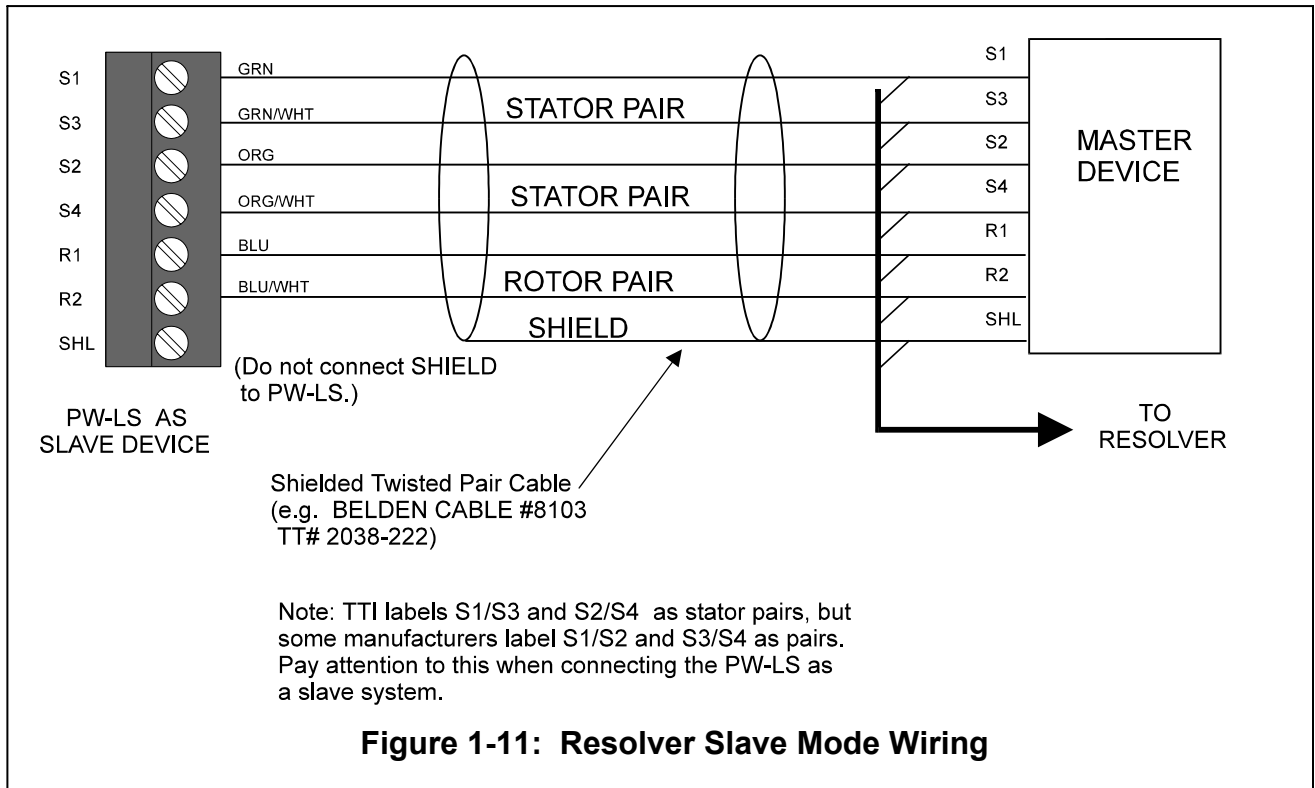


Figure 1-9: Resolver Input Descriptions

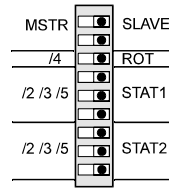
Master Mode Wiring:



Slave Mode Wiring:

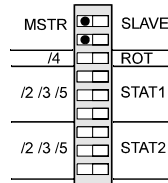


Resolver Input Setup

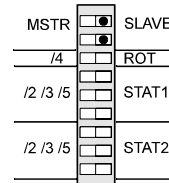


- 1) Set all DIP switches to the OFF (right) position.
- 2) Determine whether the resolver input should be in MASTER mode or SLAVE mode and make the proper setting.

Master Mode

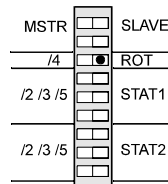


Slave Mode

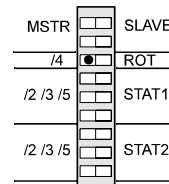


- 3) Make resolver connection.
- 4) With the system on (press can be either running or not running), check to see if the "ROT" LED turns on. Scale down the rotor input voltage by 4X if the "ROT" LED does turn on.

No Scale



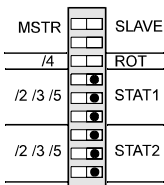
Scale Down 4X



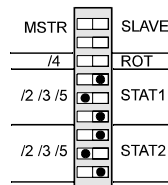
- 5) With the press running, check to see if the "STAT" LED turns on. If it turns on, scale down both stator input voltages first by 2X. If it still turns on, scale it down further by 3X and then by 5X until the "STAT" LED is not turned on. Perform the test in this order to give our unit the highest workable voltage and therefore more accurate results.

NOTE: Two stator inputs must have the same scale down factor. Therefore, the setting of STAT1 must be the same as STAT2.

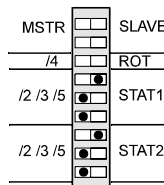
No Scale



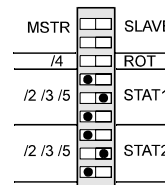
Scale Down 2X



Scale Down 3X



Scale Down 5X



- 6) Record all DIP switch settings on the calibration label.
- 7) Setup is basically completed. Refer to the Operation section of this manual for resolver offset adjustment.



Analog Output

The analog outputs are provided on an 11-pin connector for easy access and for interfacing with other peripherals. Use Conduit Hole #4 (see Figure 1-3) for the Analog Output wiring.

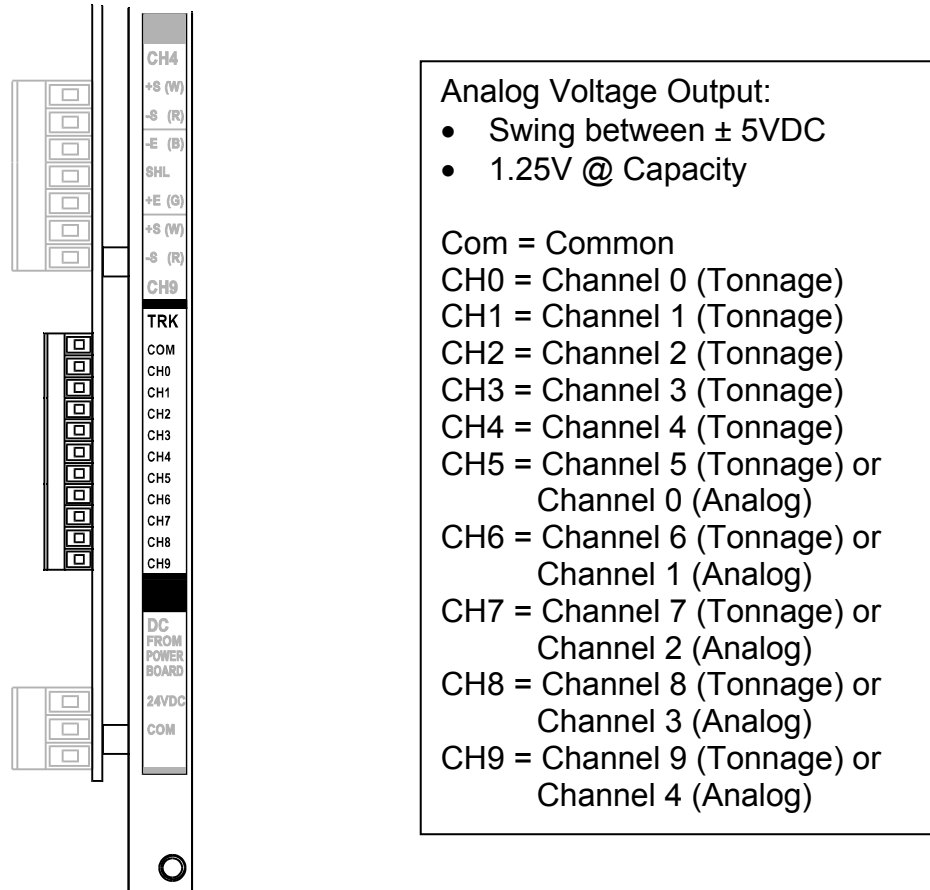


Figure 1-12: Analog Output Wiring

Shutdown Relay

An internal relay is provided for press shutdown. The relay terminals are located on the Control Board, as shown below. Relay rating is 8 Amps, 250VAC or 30VDC. Relay contact provides standard Normally – Open operation. Normally – Closed operation is also available as an option.

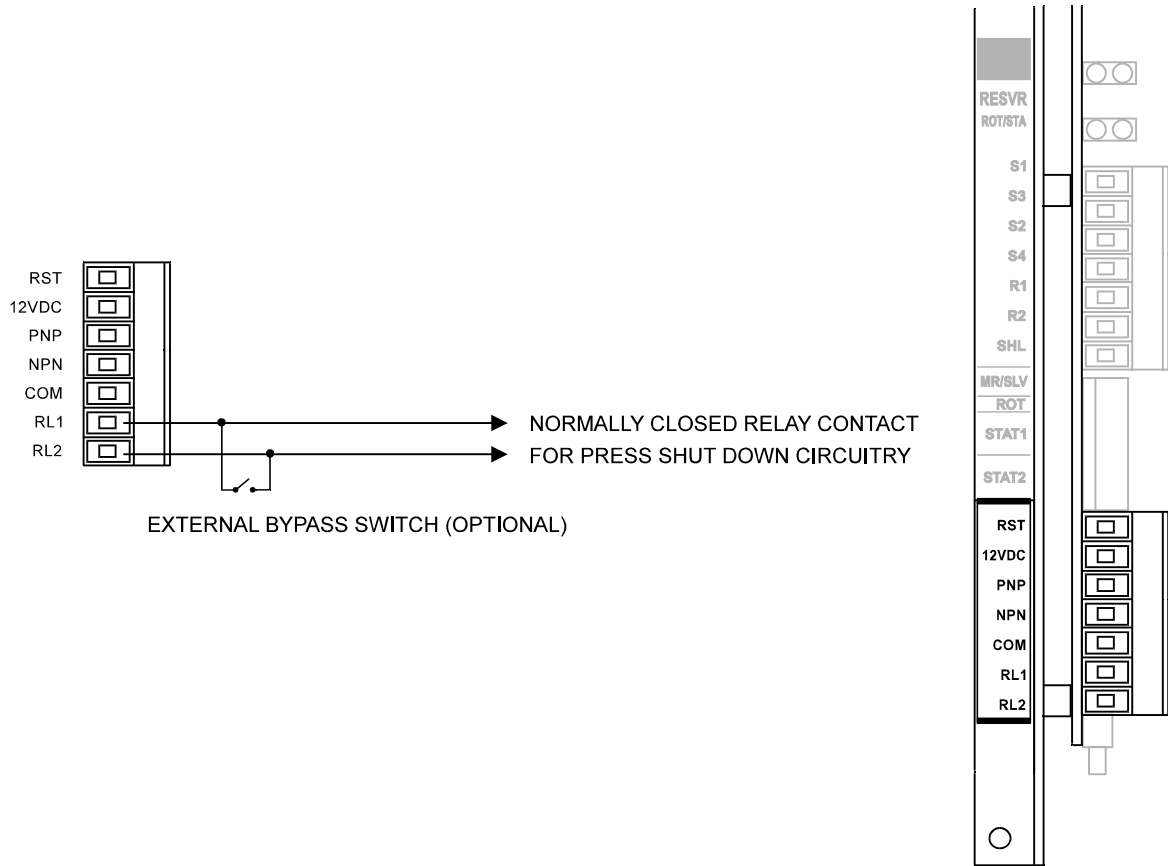


Figure 1-13: Shutdown Relay Wiring

Reset Switch

Two terminals are provided for connecting an external reset switch (optional). The reset terminals are located on the Control Board, as shown below. The rating of the switch and wiring can be minimal since it only interfaces with a small signal, similar to a TTL signal.

Note: In order to reduce noise that may trigger false reset:

- Use twisted pair wires for the connection.
- Do not run this pair of wires along with any high voltage or high current cables.
- Keep the wiring no longer than 12 feet.

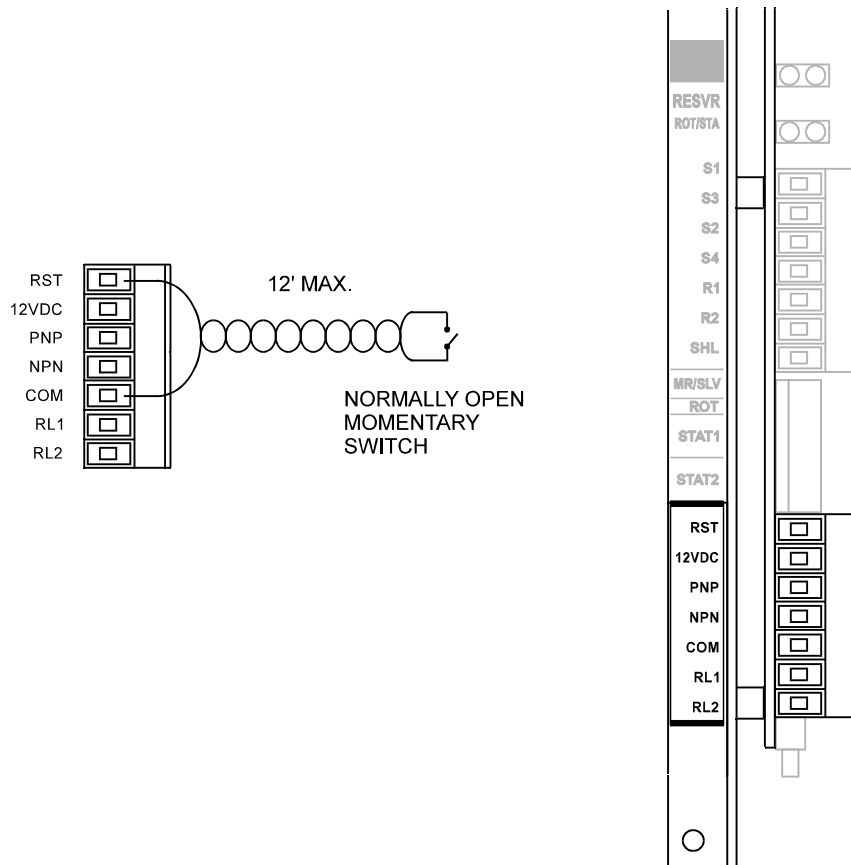


Figure 1-14: Reset Switch Wiring

Probe Input

The PW-LS can be triggered by an external probe signal. The probe supply voltage (+12VDC) is provided by the PW-LS. The figure below illustrates the wiring for a variety of sensing devices.

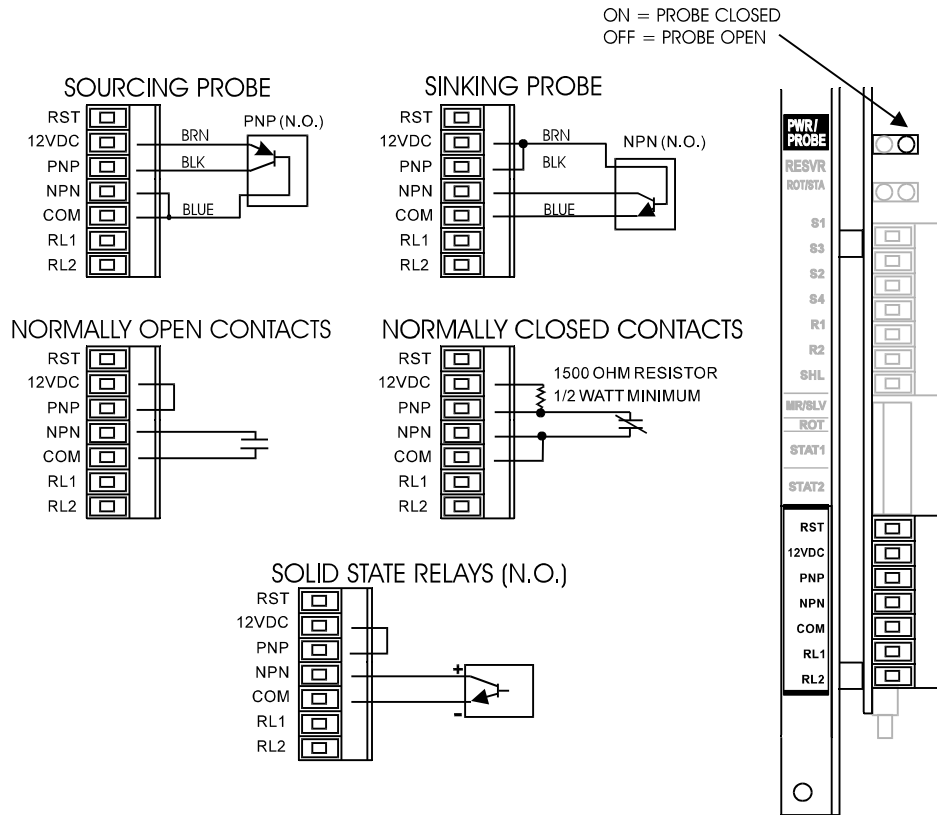


Figure 1-15: Probe Input Wiring

The timing of the probe should be such that it turns on just before the machine begins generating a load, typically at (140°) and remains on until the load is removed, typically at (240°).

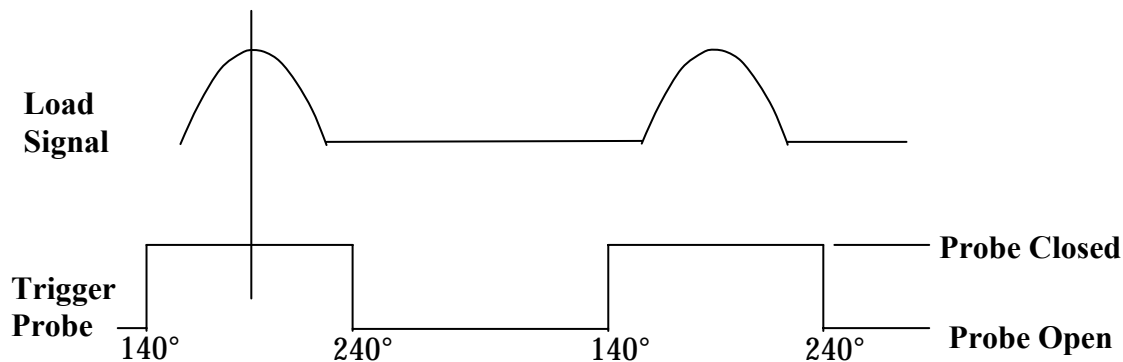


Figure 1-16: Probe Timing Diagram

➤ Operation

Overview

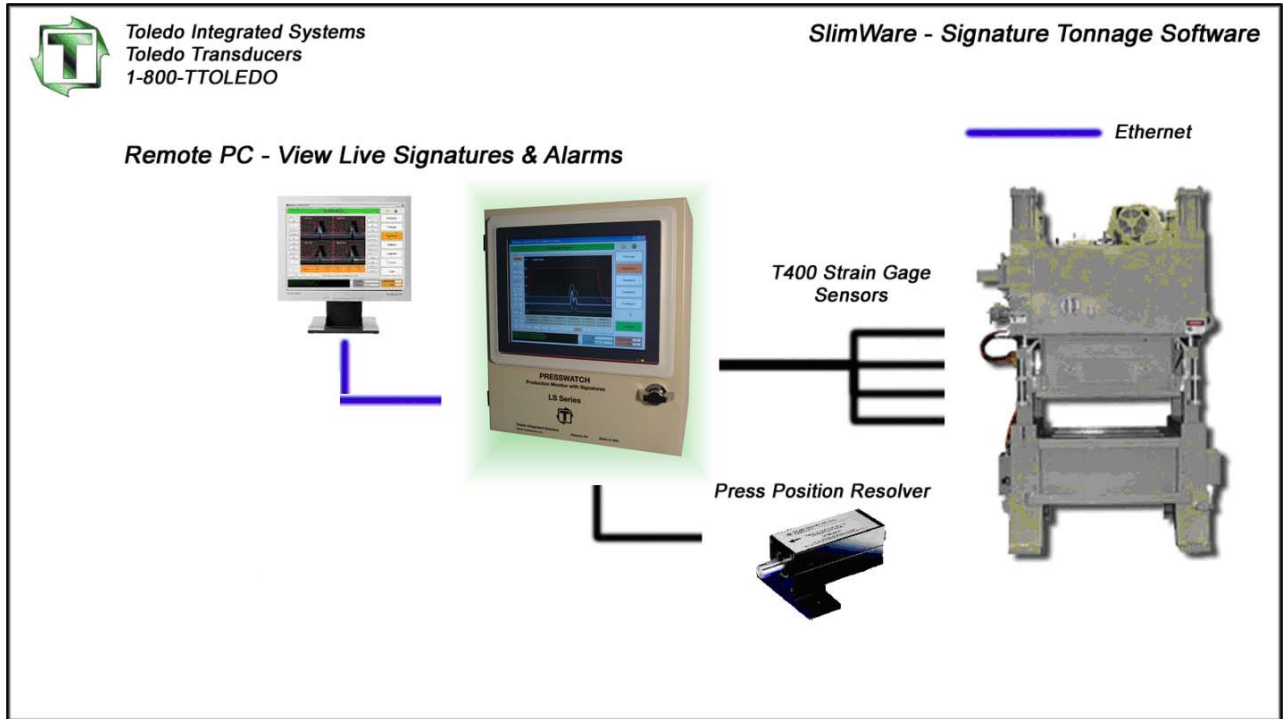


Figure 2-1: System Overview

The PW-LS uses our exclusive SlimWare HMI (Human-Machine Interface) software. SlimWare can provide and monitor all information stored in the PW-LS including tonnage, setpoints, alarm history and signatures (tonnage curves).

The PW-LS is a powerful tonnage monitor that does more than protect your press and dies from hard-hits. The PW-LS 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 PW-LS 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 PW-LS unit.

Initial Startup

The initial communications settings are as follows:

- Baud Rate: 460800
- Serial Port: Com5
- Address: 0

If the Panel PC/PW-LS is set for different communication settings, the settings must be manually configured from the Configure-Comms/Network screen (see page 48).

SlimWare will start automatically upon boot-up. It can also be manually started by either double-clicking the shortcut on the desktop or by the following:

Start >> All Programs >> Toledo Integrated Systems >> SlimWare >> SlimWare

To determine if communications have been established between SlimWare and the monitor, start SlimWare. If there is no communications, the yellow LED's in the upper right hand corner of the SlimWare window will not be flashing and a communications error will appear near the top of the screen as well as in the historical data box. See Figure 2-2 and Figure 2-3 for examples of a communications error.



Figure 2-2: Communication Error Alert

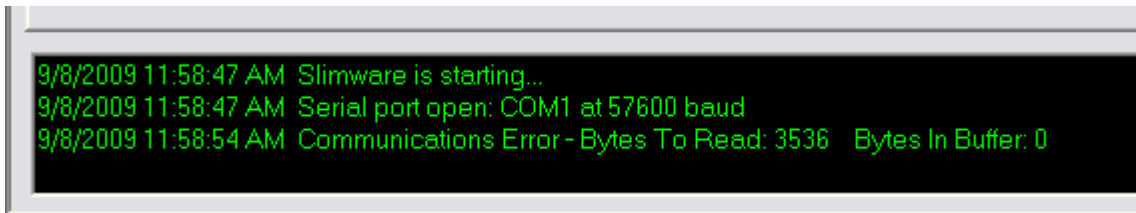


Figure 2-3: Communication Error (Historical Data Box)

See Comms/Network Configuration on page 48 for a more detailed explanation of establishing communications between SlimWare and the PW-LS monitor.

Main Window

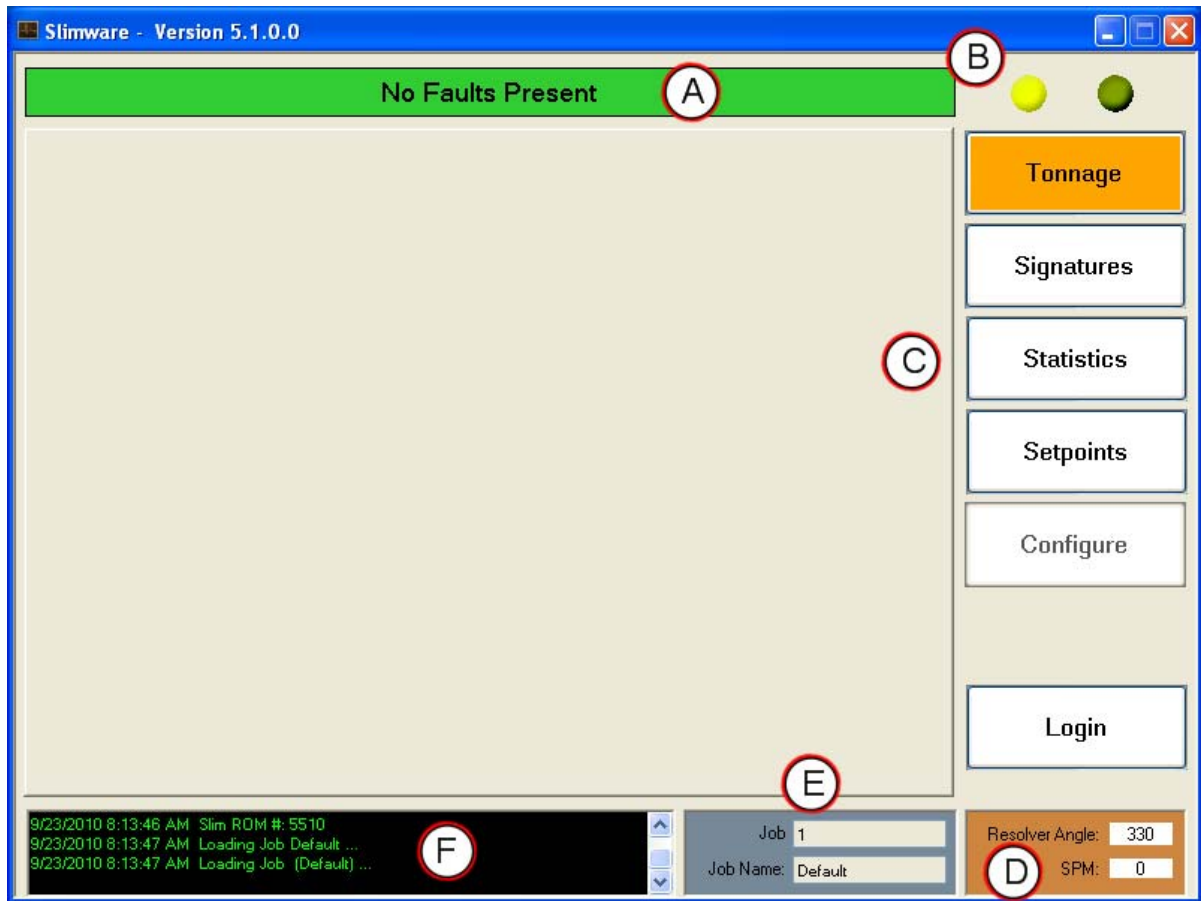


Figure 2-4: SlimWare Main Window

The main window is always displayed regardless of what page a user is on. The main window includes all of the navigation buttons, resolver angle, strokes per minute, job number and name, status bar and the historical data log. Also displayed in the top left hand corner of the main window is the SlimWare version number and username if logged in.

- **Status Bar (A)** – Displays the current status of the PW-LS 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 click 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 PW-LS 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** – Pressing this button will load the tonnage page. From the tonnage page, the current peak or reverse tonnage can be viewed easily. Personnel with a setup or master password can also enable setup or learn modes from this page.
 - **Signatures** – This button will load the signature page. From the signature page, users can recall current signatures from the PW-LS monitor or recall previously saved signatures.
 - **Statistics** – Pressing this button will load the statistics page. This page displays information such as the highest load, number of high alarms and last alarm. Personnel logged in with a setup or master password can clear the alarm history from this page.
 - **Setpoints** – Clicking the setpoints button will load the setpoints page. If the user is not logged in with a setup or master password, this page is read only and no setpoints can be changed. If a user is logged in with a setup or master password, setpoints such as high and low alarms and reverse tonnage setpoints can be modified.
 - **Configure** – Only a master password can access the configure page. From this configure page, all personnel and hardware settings can be modified, alarms can be disabled and a tonnage calibration can be performed.
 - **External Application (shown only when enabled)** – This button will call an external program, which is declared on the configuration page. This will be hidden if the External Application feature is disabled on the configure page.
 - **Login/Logout** – Pressing this button will load the login keypad if no user is currently logged in. Enter the correct password and the button will change to a green background indicating that a user is logged in. While logged in, if the user selects this button again, the current user will be logged out. The Login/Logout pushbutton will be hidden if SlimWare is configured to use external data management.

The PW-LS comes shipped with the default passwords set to:

Master	= "m"
Setup	= "s"
Operator	= "o"

The passwords can be changed from the Configure → Hardware/Trigger screen.

- **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.
- **Job Number (E)** – Displays the current job number loaded. If enabled, a user can click on the job number box and load or create a new job.
- **Job Name (E)** – Displays the current job name loaded. If enabled, a user can click on the job name box and load or create a new job.
- **Historical Data Log (F)** – This displays all pertinent information regarding the PW-LS unit and any changes or alarms that occur. This log can be saved to a log file located in the installation folder if "Data and Alarm Logging" is enabled from the configure page.



Tonnage

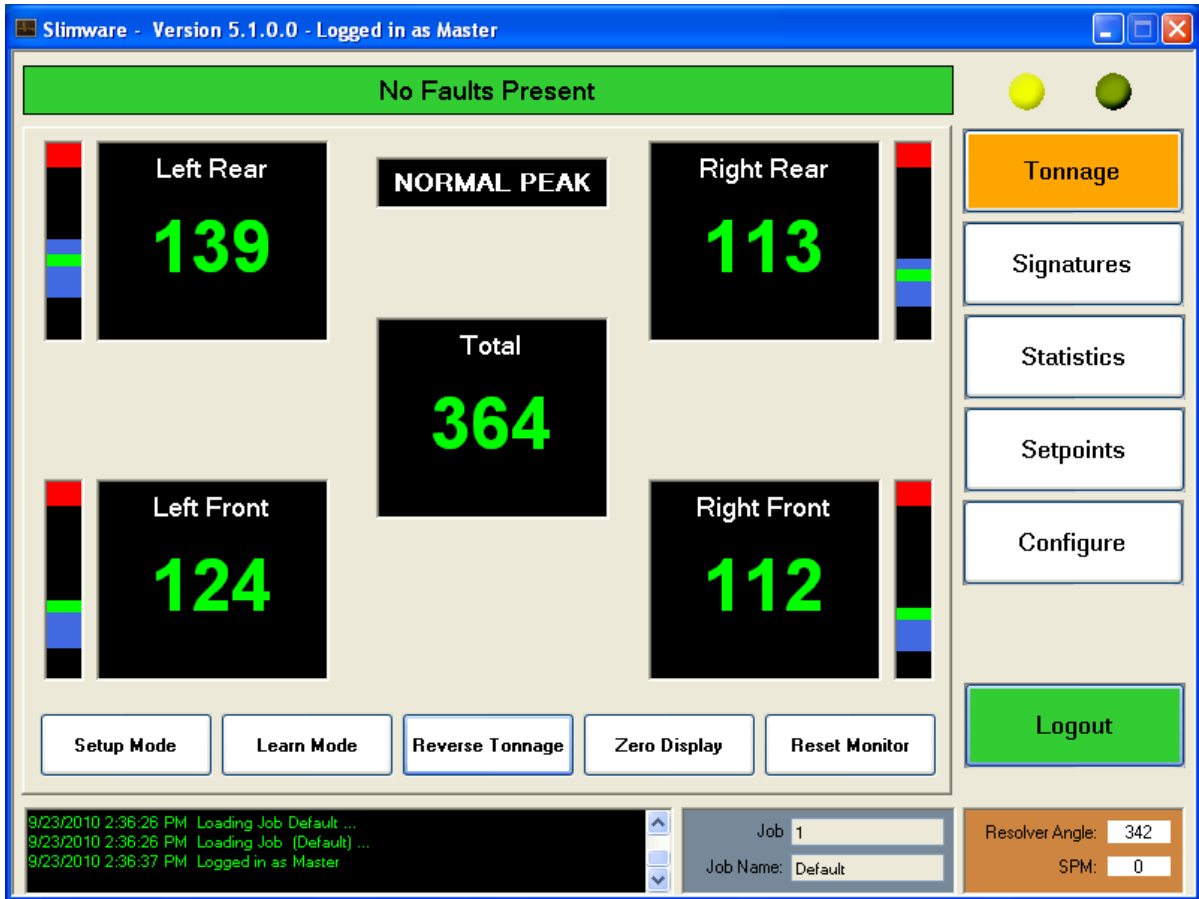


Figure 2-5: Tonnage Screen

The tonnage page displays all relevant tonnage information. This information includes current 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.

Figure 2-5 shows a typical four (4) channel PW-LS monitor. Each corner displays the current tonnage and will turn red if an alarm is flagged for that channel.

Setup Mode

- *[Requires Setup or Master password]*
- Press the “Setup Mode” button in the bottom left hand corner to place the PW-LS 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 setup mode button is only available for users with a setup level password or higher. 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.

Learn Mode

- *[Requires Setup or Master password]*
- Press the “Learn Mode” button in the bottom left hand corner to place the PW-LS unit into learn mode. Learn mode will run for seven (8) strokes. During these eight strokes, the PW-LS unit will calculate new high, low and reverse setpoints, as well as a new benchmark for each channel.
- When the learn mode button is pressed, a dialogue box will appear prompting the user to confirm that learn mode is desired. This is to prevent users from accidentally entering learn mode and learning new benchmarks.
- The PW-LS unit will come out of learn mode automatically after eight (8) strokes.
- The learn mode button is only available for users with a setup level password or higher.

Reverse Tonnage

- Press the “Reverse Tonnage” button to display the reverse tonnage for each channel.
- Even with reverse tonnage displayed, the monitor will function as in normal mode; all alarms will be monitored. This button is available for all users.
- To return to normal mode, simply press the “Reverse Tonnage” button and the normal tonnage will be displayed.

Zero Display

- Press the “Zero Display” button to clear the displayed tonnage.
- This is mostly used in the initial setup of the PW-LS to make sure communications are correct and the tonnage values are updating properly.



Reset Monitor

- *[Requires Setup or Master password, Operator option available]*
- Press the “Reset Monitor” to reset any alarms.
- The “Reset Monitor” button by default is only available to setup or higher level passwords, however it can be enabled for Operators if “Operator Personnel Reset Alarms” is enabled on the configure page (See page 41).
- Alarms can also be reset by pressing the channel which is alarmed or pressing the flashing status bar at the top of the screen (subject to password authorization).

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 autosest mode (Capacity or Benchmark) is selected in the configuration page.

Mode Display

- Just 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 (Shown in Figure 2-5)
 - B4
 - First Level
 - Second Level
 - Point In Time
- The tonnage modes can only be changed from the configuration page. To learn more about each type of mode, refer to the configuration section on page 44.

Alarms

- If the PW-LS 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 (subject to password authorization).



Signatures

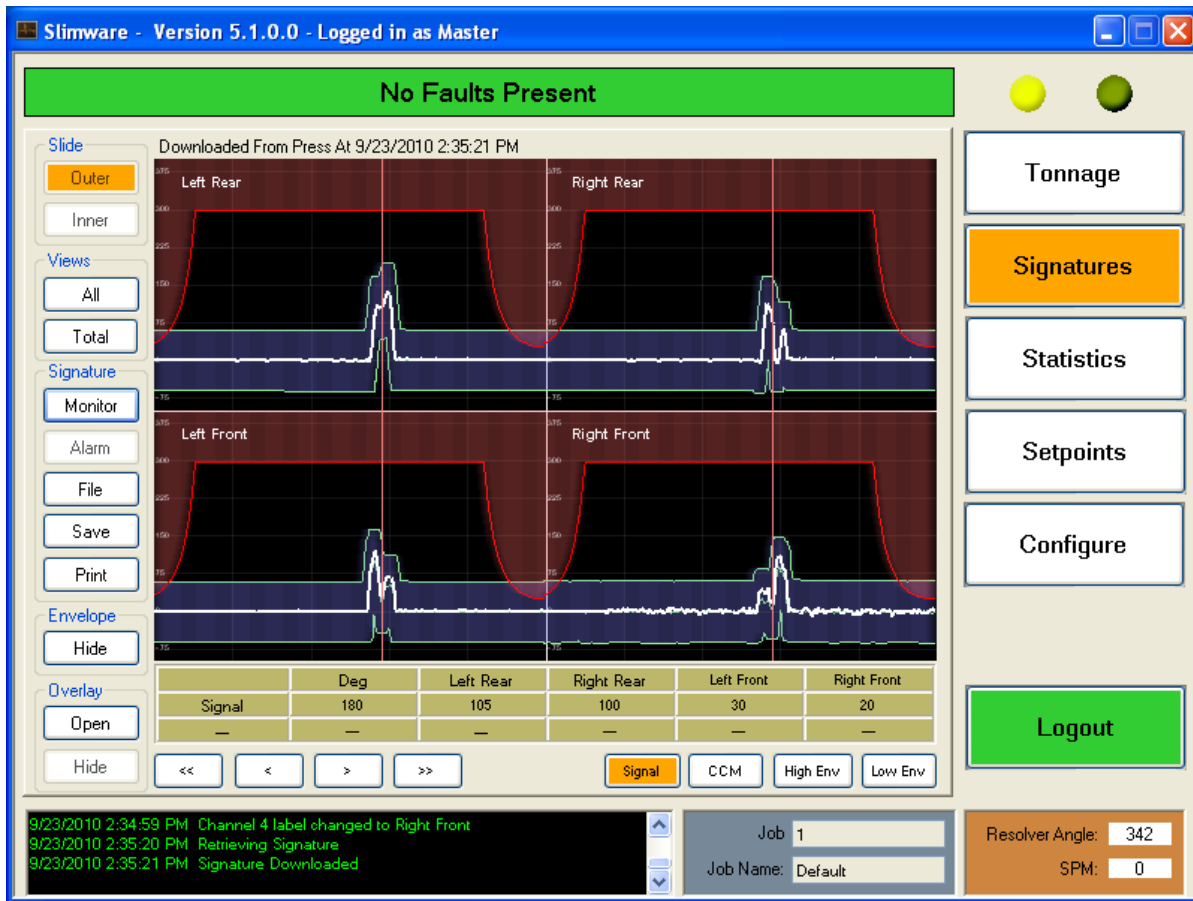


Figure 2-6: Signature Screen

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

Figure 2-6 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.

Slide

- The slide is to determine whether to poll the PW-LS unit for the inner or outside slide. If the number of channels is set to 2 or 4, the inner slide option is disabled.
 - Outer – Polls the PW-LS for the outer slide signature (Channels 0-4)
 - Inner – Polls the PW-LS for the inner slide signature (Channels 5-9)

Signature

- The signature group box contains the controls for polling, retrieving from file or saving to file, a signature.
 - Monitor – Select this button to poll the PW-LS for the most up-to-date signature. If the SLIM unit is alarmed, use this control to poll the alarmed signature.
 - File – Selecting this button will load a file dialogue box. From here, select either a .SIG or .SWS file to open and view in the signature viewing window. When a signature is loaded, the file path will be shown below the viewing window.
 - Save – Select this control to save the loaded signature to a file.
 - Print - Use the print function to print out any signatures or overlays shown in the viewing window. The default print setting is landscape mode. When printing a signature, the current signature view will be printed.
- Note:** Before you can print, one of the following must be true:
- The PW-LS Panel PC must be connected to and configured for the network and a network printer must be properly setup.
 - The PW-LS Panel PC must be connected to a local USB printer and the printer's drivers must be properly installed.

Envelope

- This option enables an operator to hide or display envelope and benchmark signatures. This option is only available if enveloping is enabled.

Overlay

- Once a signature is loaded, the overlay controls will become enabled. Use overlays to compared previous “good” signatures to current signatures.
 - Open – Selecting this control will load a file dialogue box. From here, select either a .SIG or .SWS file to load as an overlay. The overlay will be a light gray color in each channel.
 - Hide – Once an overlay is loaded, select the “Hide” control to hide the overlay.

View

- The default view of the signatures page is all 4 corners shown in normal viewing mode. Use the various buttons on the right hand side of the signature screen to enlarge one specific corner or view all corners laid on top of each other.
 - Corners – This is the default viewing window. This view displays all four channels.



- All – This view will overlay all four corners into one window. This is best used to view differences between channels.
- The remaining five (5) buttons are used to display channel(s) 0 to 4. The name used for each button is the user assigned corner name (see the Configure-Settings section on page 41).

Detail and Scan

- To view the details of each signature (peak, CCM, envelope and capacity at each degree), click anywhere in the signature window or 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, touch the signature viewing window or use the four (4) navigation buttons mentioned above.
- The details display is updated if the view or angle is changed. When all four corners are displayed, the details include:
 - Degree
 - Channel 1 Signal Value
 - Channel 2 Signal Value
 - Channel 3 Signal Value
 - Channel 4 Signal Value

If the total or any corner is displayed, the values include:

- Degree
- Load Value
- CCM Value
- High Envelope Value
- Low Envelope Value
- To remove the red line (detail scan), click the “Clear Detail Scan” button located in the bottom left hand corner of the signature window.
- The current loaded signature filename or timestamp is shown in the bottom right hand corner of the signature window. If the signature has been downloaded from the press, this path will include the timestamp and press name from which the signature was downloaded. If the signature has been recalled from a file, the file path will be shown.
- All signatures and overlays are saved as .SWSX files.



Statistics

The statistics page is used to detail the number and types of alarms that have been recorded by the PW-LS unit. From this page, any user can view the various alarms for each channel.



Figure 2-7: Statistics Screen

Figure 2-7 shows a typical four (4) channel PW-LS unit's historical statistics. If the user is not logged in with a setup or master password, these statistics are "read only". If logged in with a setup or master password, these values can be cleared by pressing the "C" button for the corresponding alarm row. For an eight (8) channel unit, toggle between the slides by using the tabs near the top of the screen.

- **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

Setpoints

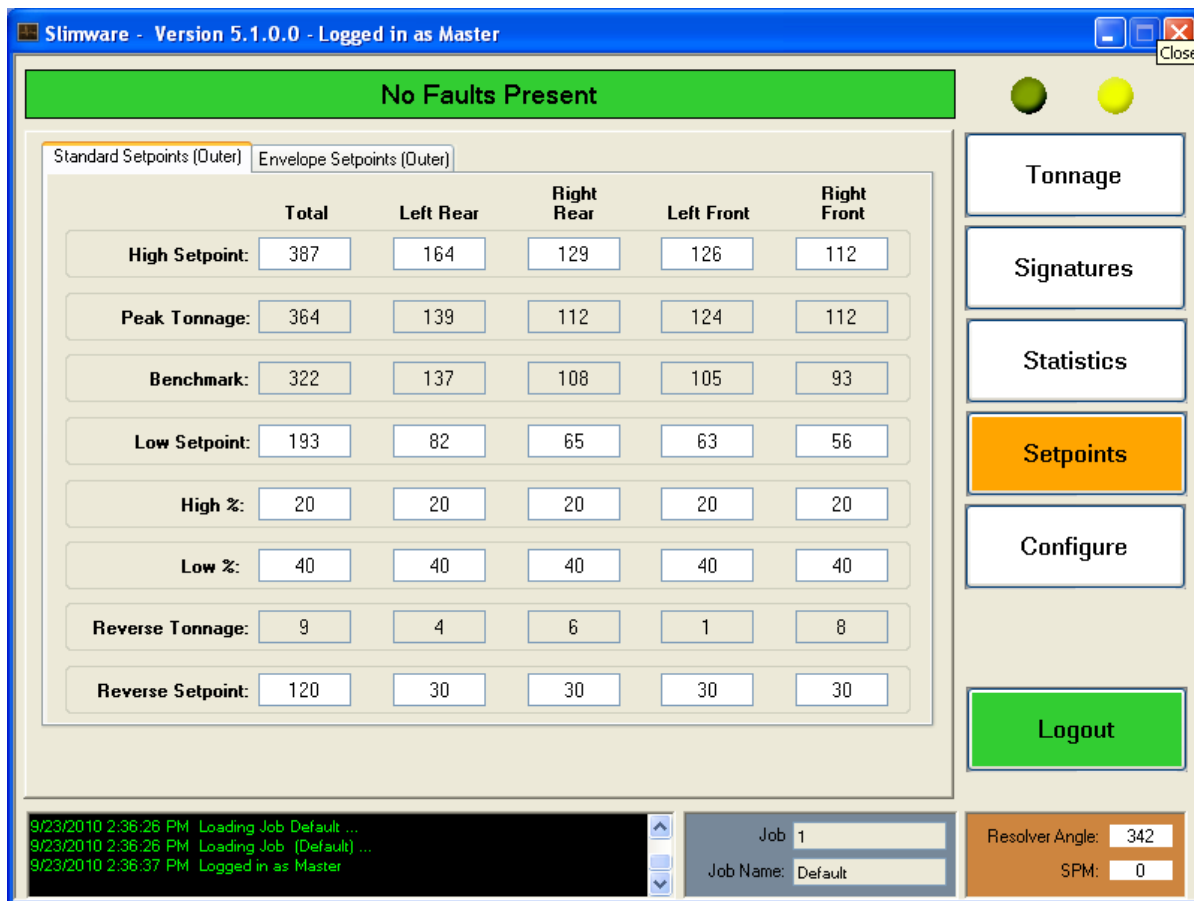


Figure 2-8: Setpoints-Standard Screen

The setpoints page displays and configures the PW-LS 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.

Figure 8-1 shows a typical four (4) channel PW-LS unit setpoint screen. If the user is not logged in with a setup or master level password, these setpoints are "read only". If a user is logged in with a setup or master password, these values can be changed.

For an eight (8) channel unit, toggle between the slides by using the tabs near the top of the screen.

Standard Setpoints

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 Configure-Alarm Settings section on page 47).

Peak Tonnage

- Peak tonnage is the current tonnage that the PW-LS has recorded. This value is specific to the monitor mode (Normal Peak, B4, First Level, Etc...).
- Peak tonnage is read only and cannot be changed.

Benchmark

- The benchmark value is the 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 PW-LS into learn mode.
- The benchmark tonnage is stored with each job, so each job can have a different benchmark tonnage.

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 can only be configured for top stop (See Configure-Alarm Settings section on page 47).

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 PW-LS 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.

Low Percent

- 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 PW-LS 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 the low setpoint value is established.
- The low percentage value is stored with each job, so each job can have a different low percentage value.

Reverse Tonnage

- Reverse tonnage is current reverse tonnage that the 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.

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 (See Configure-Alarm Settings section on page 47).





Figure 2-9: Setpoints-Envelope Screen

Envelope Setpoints

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 PW-LS unit, five (5) envelope zones can be calculated allowing for different high and low tolerances throughout certain windows. As seen in Figure 2-9, 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. For an eight (8) channel unit, toggle between the slides by using the tabs near the top of the screen.

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.

Position

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

Configure

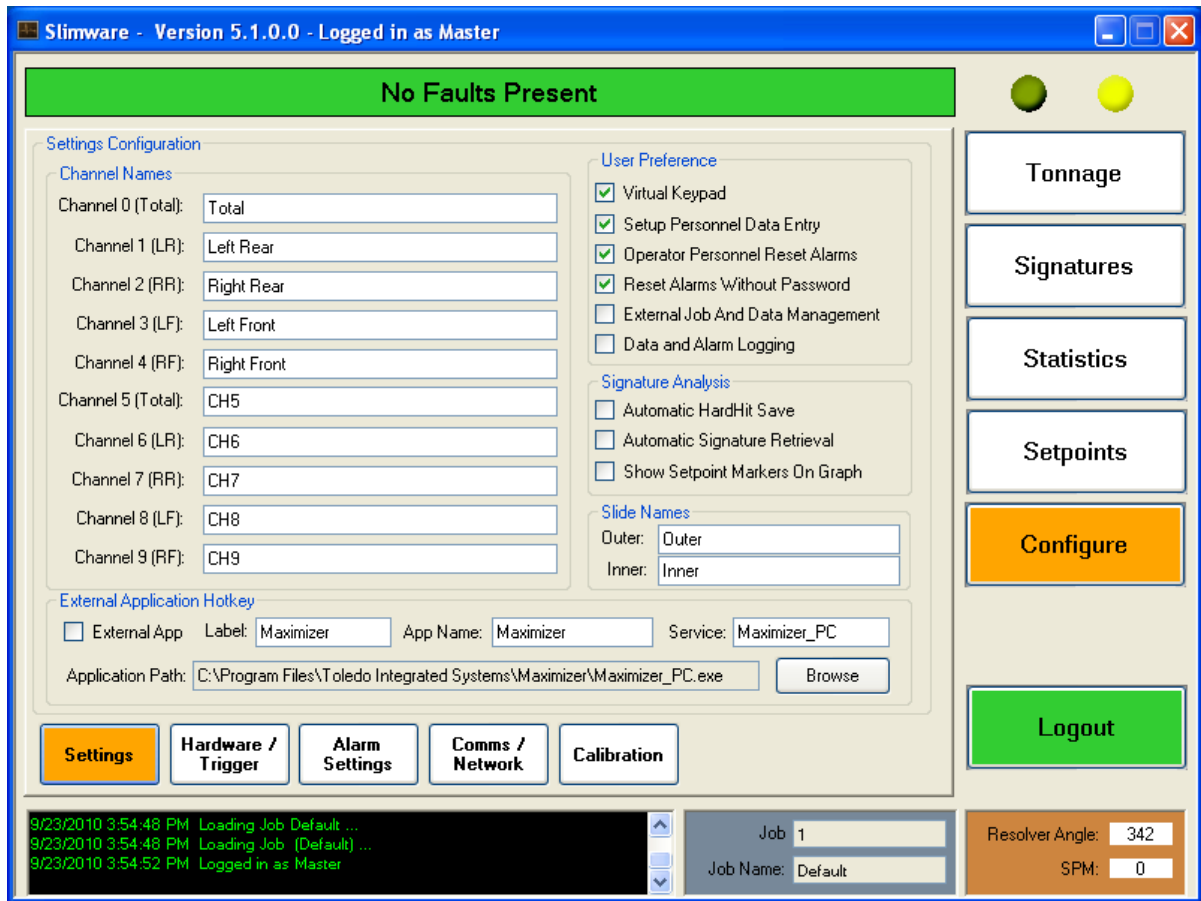


Figure 2-10: Configure-Settings Screen

Settings

There are 5 total configuration pages. From these pages, a user logged in with a master password can access such features as tonnage calibration, user settings, communication settings, capacity values and alarm bypass settings.

Figure 2-10 shows the initial configure page (settings). Use the buttons near the bottom of the configuration window to navigate to the different configuration menus.

- **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.

- **User Preferences**
 - **Virtual Keypad** – Enabled by default, this calls a keypad to the foreground when an alpha or numeric entry is required. This is to be used when an external keyboard is not available (touch-screen applications). If a keypad is not desired, uncheck this option.
 - **Setup Personnel Data Entry** – By checking this, setup personnel are allowed to enter data including:
 - High Setpoints
 - Low Setpoints
 - Benchmark Percentage Setpoints
 - Enveloping Setpoints
 - Reverse Setpoints
 - **Operator Personnel Reset Alarms** – This option allows users logged in as an operator to reset alarms. If operators should not be allowed to reset alarms, uncheck this option.
 - **Reset Alarms Without Password** – Checking this option will allow alarms to be reset regardless of the level of user logged in or when no one is logged in. Setting this option will override the operator personnel reset alarm option.
 - **External Job Data and Management** – This allows for a third party program to be used with SlimWare. For example, if using a SCADA program, this option would be checked. By checking this option, the Login/Logout button becomes invisible and the external application button becomes visible. Users must now login/logout with INI files (see the External Configuration Files section on page 56 for INI descriptions and instructions).
 - **Data Alarm And Logging** – Checking this option will log all events from the event viewer window to a text file. This file is stored in the program installation folder (default location: *C:\Program Files\Toledo Integrated Systems\SlimWare*). If this log file becomes larger than 2GB, the oldest record will be deleted and the most current records will be added.
- **Signature Analysis**
 - **Automatic Hard Hit Save** – This option allows for SlimWare to automatically save the current alarm signature to a file every time a hard hit occurs. The file is stored in the *C:\Program Files\Toledo Integrated Systems\SlimWare\HardHit* directory.
 - **Automatic Signature Retrieval** – This option allows for SlimWare to automatically request a signature every 60 strokes if the signature page is loaded.
 - **Show Setpoint Markers On Graph** – Checking this option will display the high and low setpoint markers on the signature(s). These markers are designated by yellow lines on the graph.
- **Slide Names** – Each slide can be configured for a specific name. Type in the desired name and press “Enter” to save the name to the desired corner.



- **External Application Hotkey**
 - **External App** – Checking this option will enable the external application button near the top right of the screen. This button is used to call a third party program to the front.
 - **Label** – input the name to be shown on the external application button.
 - **App Name** – The name of the external application. This name can be seen in the taskbar when the program is running.
 - **Service** – This is the external applications service name. The service name can be seen by right clicking on the taskbar and selecting “Task Manager”. On the services tab of the task manager, find the external applications service name.
 - **Application Path** – This is the path to the .exe of the external application. Use the browse button to open a dialogue box to browse to the external program executable.



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.

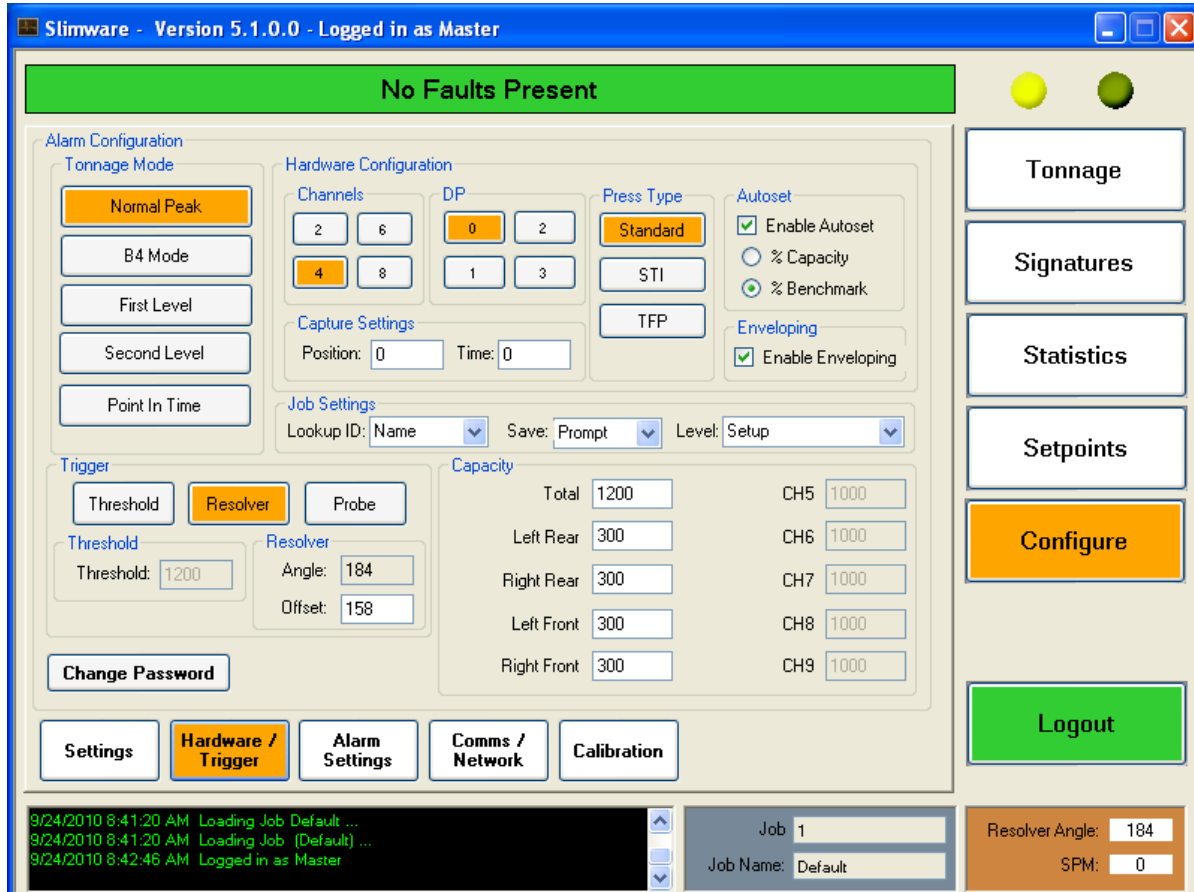


Figure 2-11: Configure-Hardware/Trigger Screen

- **Tonnage Mode**
 - **Normal Peak** – The normal mode of operation. For most applications, this is the desired mode. Unless otherwise noted, use this tonnage mode.
 - **B4 Mode** - This mode is a combination of the normal peak mode and first level mode. When selected, B4 mode displays the distribution forces at the first level time in channels 1 thru 4. Then when the punch finishes the stroke, the total load is displayed in channel 0.

- **First Level** - In first level mode, the load is the peak loading which occurs during the portion of the stroke from the initial threshold crossing until the time point is reached.
- **Second Level** - The second level loading is the peak load, which occurs in each channel between the time point and the end of the stroke.
- **Point-In-Time** – With this mode enabled, every stroke of the press will display the loading at the desired point-in-time value.
- **Hardware Configuration**
 - **Channels** – The number of channels the PW-LS unit is to monitor, normally four (4) channels.
 - **Decimal Place** – Sets the digits to the right of the decimal point to be displayed.
 - **Capture Settings**
 - **Position** – Used with modes other than normal peak, this is the position (resolver based) that the load will be captured.
 - **Time** – Used with modes other than normal peak, this is the amount of time the peak hold circuit is monitored once the position has been crossed.
- **Job Settings**
 - Due to the fact that jobs can be stored under job numbers or job names, SlimWare allows for users to select which method of storage is to be used. To change any of the job settings listed below, click on the drop down box and select the desired method. The changes are automatically saved.
 - **Job Lookup ID** – If jobs are normally called by numbers, select “Number” from the drop down box. If job names are used, select “Name”.
 - **Save** – When changing setpoints (standard or enveloping) to a loaded job, the changes can be:
 - Always saved
 - Prompted before saving
 - Never saved (dismissed)
 - **Level** – As an extra level of security, a login level can be required to perform job changes. Select the lowest level of user desired for job changes from this list. All levels above the selected level will also be allowed to perform job changes.
- **Press Type**
 - **Standard** – The factory default and most common setting, this is the normal mode of operation for a standard press.
 - **STI** – Designed for double action stamping presses. This type 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 two slides.



- **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.
- **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 tonnage value at which the PW-LS 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 PW-LS 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.
 - **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.
- **Change Password** – Press the button to change the passwords for master, setup or operator users. Select the desired type of user from the top radio buttons and select “Enter” once a new password has been entered.
- **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.



Alarm Settings

Alarm settings can be configured from the alarm settings 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.

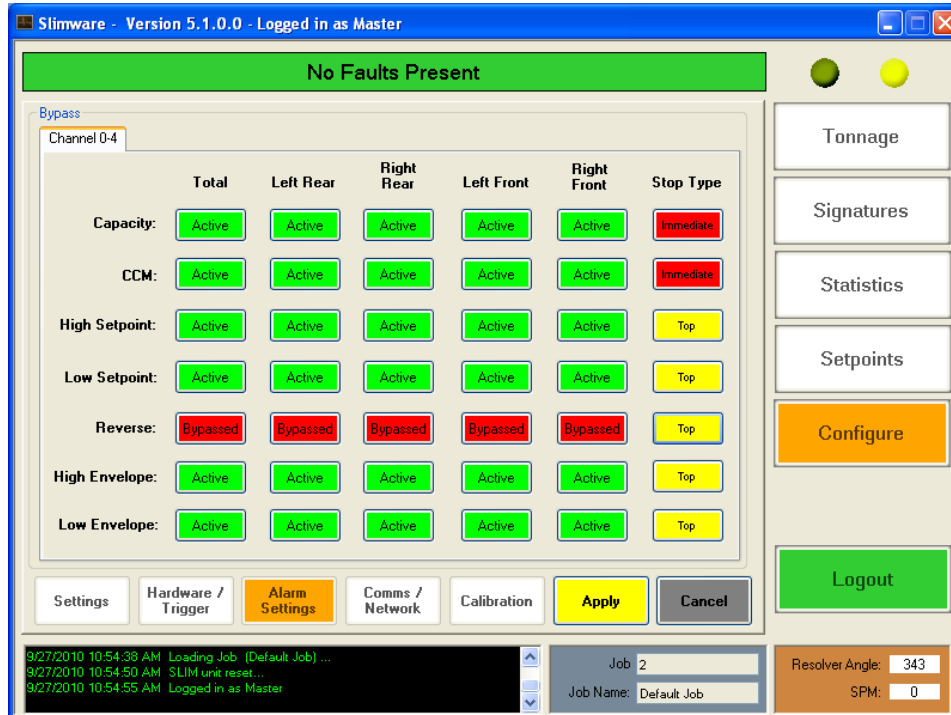


Figure 2-12: Configure-Alarm Settings Screen

For example, in the above screen shot, the reverse alarms are bypassed, while capacity, CCM, High and Low setpoint, and High and Low enveloping alarms are active. Immediate stops are declared for Capacity and CCM alarms, while top stops are declared for the remaining alarms.

To bypass and/or change the alarm type, click on the button to scroll through the available options. When any type of alarm or stop is changed, an “Apply” and “Cancel” button will appear in the bottom right hand corner of the configuration screen. To save the alarm setting changes, press the “Apply” button.

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.

Comms/Network

The comms (communications) / network page contains all of the settings pertaining to the communication between SlimWare and the PW-LS unit, hard-hit software connections and OPC server and client tag definitions. Once configured during setup, the communication and network settings should not be adjusted unless communications have been terminated.



Figure 2-13: Configure-Comms/Network Screen

- **Comport Settings**
 - This group-box displays the available comports and whether communications are established and running.
 - **Available Com Ports** – Lists the available com ports on the PC.
 - **Communication Running / Idle** – Indicates whether communications have been established and whether communications are running. If the COM port is open, this button will be green. If no COM port is open, this button is yellow.
 - **Find SLIM** – Select this button if the com port, baud rate or address have been changed. See more about this in the initial communication setup later in this section.

- **Baud Settings**

- The PW-LS unit comes standard with three (3) communication ports. Each port can be configured for a different baud rate.
- **Baud Rate Port #1 (and Panel PC)** – This is the main communication port between the Panel PC (SlimWare) and the PW-LS unit. Select the correct baud rate and enter the address (factory default is 0) of the PW-LS unit.
- **Baud Rate Port #2** – This is used for configuring the baud rate for PW-LS port #2. This port is used for servicing the PW-LS.
- **Baud Rate Port #3** – This is used for configuring the baud rate for PW-LS port #3. This port is used as a possible second connection to the PW-LS unit.

If communications has been lost or SlimWare is being installed on a new PC, follow these steps to establish communication with the PW-LS unit.

- **Communication Setup**

- If communications are currently running, press the green “Communications Running” button. The button should turn yellow and the text will change to “Communication Not Running”.
- From the available comport list box, select the desired comport. SlimWare will automatically try to connect to the desired comport.
- If needed, change the baud rate and address for port #1 to the desired values.

- **OPC**

- This group box contains the OPC server address and OPC client tag names used for job changes, bolster ID, etc.
- Enable OPC – If checked, SlimWare will attempt to read the OPC tags defined from the tag names and server address.
- Server Name – This is the OPC server name. By default, this is *CimQuestInc.IGOPCAB.1*
- Server IP – The IP address of the PC where the OPC server is located.
- Job Tag – The OPC client tag name. This value is defined by the job name/number tag in the PLC.



- **Network**

- This group box contains the network settings for using the optional PressNet and Hard-Hit Report software.
- Enable Network – If checked, SlimWare will attempt to write any alarm values to the remote database and save hard-hit signatures (alarms) to the remote PC. If the remote PC is unavailable, SlimWare will attempt to store the alarm information in a local database. Once the remote PC becomes available, the alarm data stored in the local PC will be transferred to the remote PC database.
- Server Name – The name of the remote PC (ex. "John_Smith").
- Server IP – The IP address of the remote PC.
- DB Username – The MySQL database username (Default: "root").
- DB Password – The MySQL database password (Default: "1234").
- Press Name – The name of the press. This is stored in the remote database and used for reporting purposes.
- Test DB Connection – This button can be used to verify the connection between SlimWare and the remote database. By clicking this button, SlimWare will attempt to connect to the remote database. A message box will appear indicating the connection status.



Calibration

This section details the features of the tonnage Calibration screen. The steps for calibrating the PW-LS can be found in the **Calibration Procedure** section, which can be found later in this manual. Calibration should only be done by a trained Toledo Integrated Systems technician or someone else with tonnage monitor calibration knowledge.

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

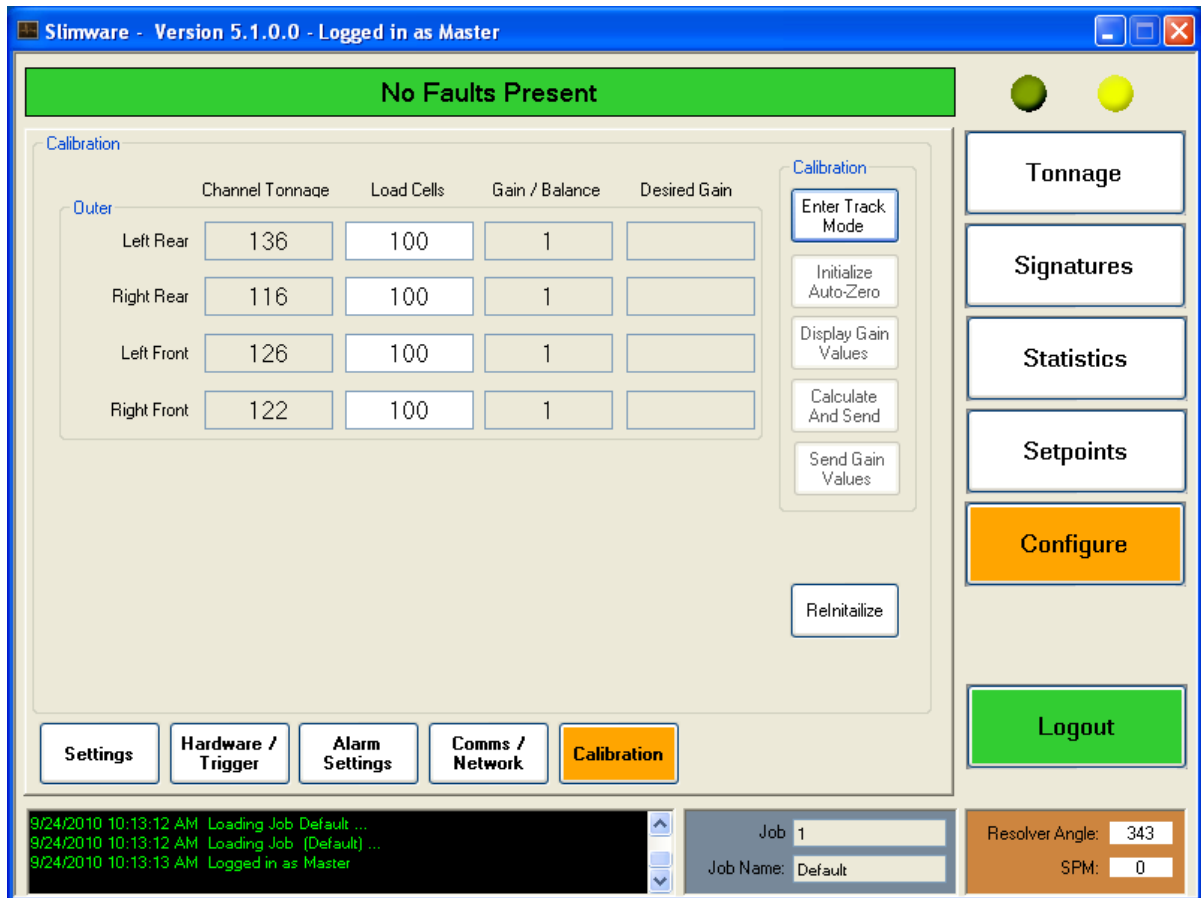


Figure 2-14: Configure-Calibration Screen

- **Current Tonnage** – Displays the current tonnage from the PW-LS unit
- **Load Cells** – User input of the displayed tonnage from the calibration load cells (AutoCells)
- **Current 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.

- **Enter Track Mode** – Puts the PW-LS monitor in Track mode. This mode is used for calibration purposes. The monitor will not update its peak tonnage while in track mode. To exit track mode, simply press this button again.
- **Initialize Auto-Zero** – This zero's the balance of the PW-LS monitor. Track mode must be enabled to auto-zero the unit.
- **Display Gain Values** – Once the monitor is in track mode, press this button to display the current gain values stored in the monitor. These values will be displayed in the "Current Balance/Gain Values" textboxes.
- **Calculate** – Used during the calibration process, pressing this button will automatically calculate the desired gain values based on the current tonnage and load cell values. **Once calculated, the values are automatically sent to the PW-LS monitor.**
- **Send Gain Values** – This button will send the desired gain values to the PW-LS unit.
- **Reinitialize** – Pressing this button will reinitialize the calibration data in the PW-LS unit. This is used if the PW-LS balance and/or gain becomes unresponsive (i.e. the Auto-Zero fails to balance one or more channels, or sending the Gain Values fails).



Job Settings

The job settings can be controlled through SlimWare itself or externally through INI configuration files (see page 56). From SlimWare, users can add, edit or delete job setpoints. To access the job settings page, click anywhere in the job group box near the bottom of the screen (see Figure 2-4, point E). If the password is at or above the required level to access the job settings page, the screen in Figure 2-15 will load.

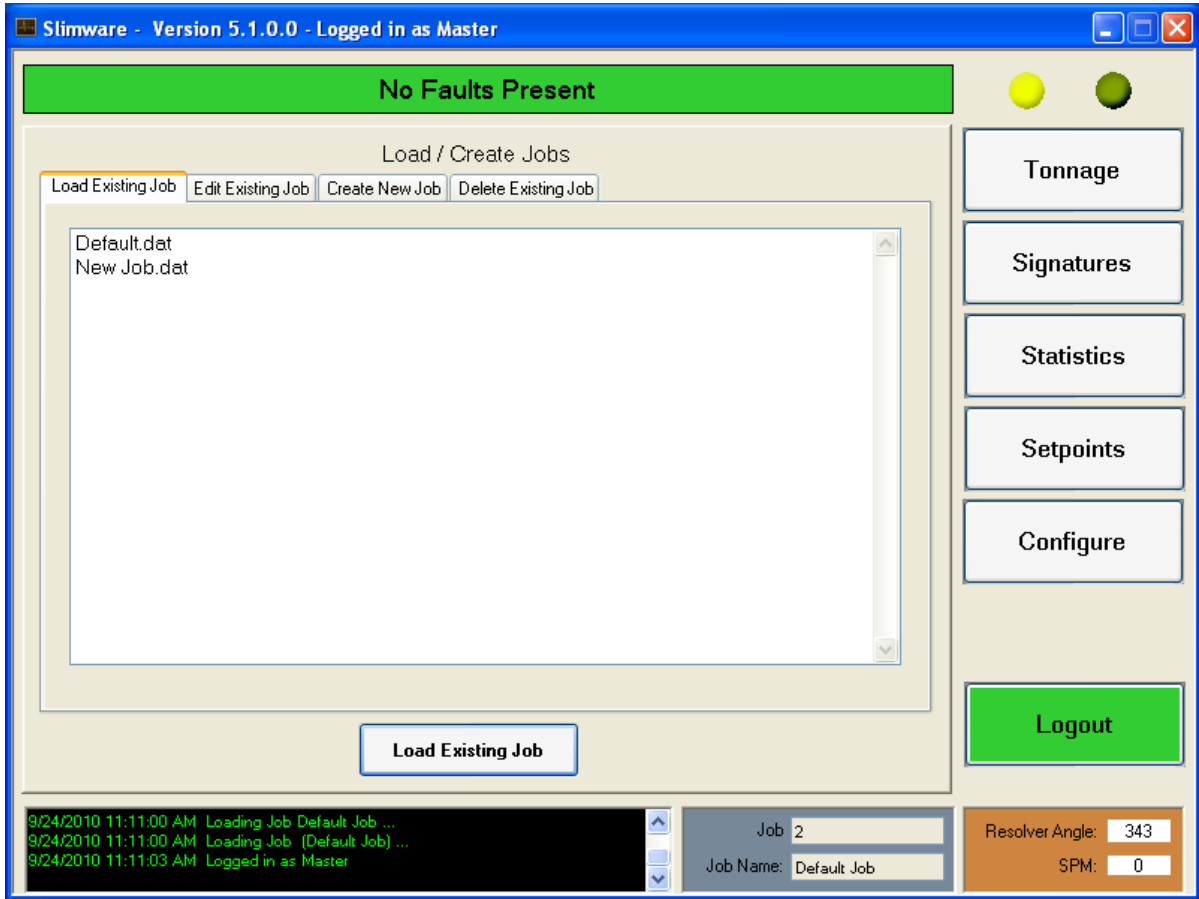


Figure 2-15: Load Existing Job

Load Existing Job

As mentioned above, SlimWare is able to manually or externally load a new job. If “External Job Data and Management” is checked on the configuration page, third party programs need to create an INI file in SlimWare’s external file directory and a new job will load.

- To load a new job manually, click on the desired job (the new job will become highlighted in the list), and select “Load Existing Job”. Notice the job number and name will update along with the historical text box.
- If the loaded job is new or has not yet been “learned”, a message will appear notifying the user that no available signature is available. Once the job has been successfully “learned”, a saved signature and folder will be created for the job. (To learn a job, simply select “Learn” from the tonnage page once the new job is loaded. This will automatically calculate setpoints based on 8 strokes.)
- The external job folder is located in the SlimWare installation directory. Normally, this path is: *C:\Program Files\Toledo Integrated Systems\SlimWare\ExtData*. If the installation path is changed during installation, the above path should be modified to show that change.
- To view the INI file structure type, view the External Configuration Files section on page 56 for all external file type structures.

Edit Existing Job

- SlimWare allows for users to edit job parameters while the job is not loaded. By selected the “Edit Existing Job” tab, a list of all previously saved jobs (excluding the currently loaded job) will appear. Click on the desired job and the setpoints (standard and enveloping) will load.
- Edit any of the job parameters and select “Save Job Settings”. This will save the setpoints to the desired job. The changes will be reflected next time the job loads.

Create New Job

- To create a new job, select the “Create New Job” tab. The window below will load.

Figure 2-16: Create New Job

- Enter the desired job number, job name and description for the new job and select “Create New Job”.
- The newly created job is not loaded, just created. It is created with the current setpoints that are stored in the PW-LS unit (the current job loaded). To load the new job, select the “Load Existing Job” tab. The recently created job will be listed. Click on the new job and select “Load Existing Job”. The new job will be loaded.
- If the setpoints of the currently loaded job are not suitable, once created, follow the steps above for editing an existing job.

Delete Existing Job

- To remove an existing job, select the “Delete Existing Job” tab and highlight the job that is to be removed. Once highlighted, select “Delete Job”. A message box will appear asking for confirmation; select “Yes” to permanently remove the job from SlimWare.



External Configuration Files

There are two (2) configuration files that control job, login and setpoint features. These two configuration files are named Ext_Job.ini and Slimware_Stat.ini. These files are to be written to the following location:

C:\Program Files\Toledo Integrated Systems\SlimWare\ExtData

The above path reflects the default installation path. If this path was changed during SlimWare installation, the path will reflect these changes.

Ext_Job.ini

- Ext_Job.ini controls all features related to job changes. A sample Ext_Job.ini is shown below in Figure 2-17.

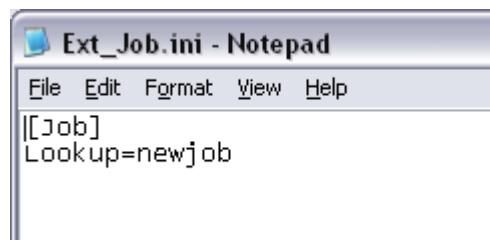
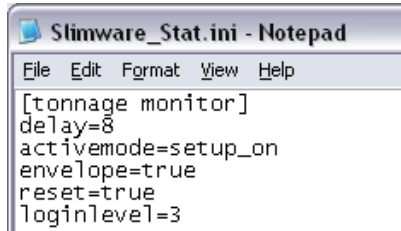


Figure 2-17: Ext_Job.ini File

- **[Job]** – This is a static value and cannot be changed. When writing the Ext_Job.ini, this value must be included.
- **Lookup** Depending on the type of lookup value defined under the “Job Settings” tab, this is the value that SlimWare will use to lookup or create the job.
- In Figure 2-17, SlimWare is searching for the job labeled “newjob”. According to this lookup, SlimWare will be searching by the job name, not job number. If this job can be found, the job and corresponding setpoints will be loaded. If “newjob” is not found, the job will be created with the current setpoints and the user will be alerted that the job could not be found (in the historical data window).

Slimware_Stat.ini

- Slimware_Stat.ini controls all features related to setpoints, login and other functions with the PW-LS unit.



```

[tonnage monitor]
delay=8
activemode=setup_on
envelope=true
reset=true
loginlevel=3

```

Figure 2-18: Slimware_Stat.ini File

For all items defined below, only one variable is required when writing the Slimware_Stat.ini. For example, to reset the monitor, only the reset command needs to be sent. The delay, activemode, envelope and loginlevel are not required to be written along with the reset command.

- **[tonnage monitor]** - This is a static value and cannot be changed. When writing the Slimware_Stat.ini, this value must be included.
- **Delay** – This value is used in conjunction with the activemode feature (described below). When the delay value is set, the monitor will remain in setup mode for the declared amount of cycles before switching to learn mode. In Figure 2-18, the monitor will remain in setup mode of eight (8) cycles before automatically moving to learn mode.
- **Activemode** – There are four possible declarations for this variable:
 - setup_on: This will place the monitor in setup mode.
 - setup_off: This will take the monitor out of the setup mode.
 - learn_on: This will place the monitor into learn mode.
 - learn_off: This will take the monitor out of the learn mode.
 Activemode is optional and is only required when the delay value is declared.
- **Envelope** – By setting this value to “true”, the monitor will enable enveloping mode. Enveloping is disabled by writing a “false” to this variable.
- **Reset** – The only value that can be written to this variable is “true”. By writing “true”, the monitor will issue the reset command to reset any alarms.
- **Loginlevel** – By writing a “3”, “2”, “1” or “0”, users can be logged in or out. Below are the login levels and equivalent values:
 - Master: “3”
 - Setup: “2”
 - Operator: “1”
 - Log Out: “0”

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➤ Calibration Procedure

In order for the PW-LS to accurately report the correct tonnage and protect the press, the unit must first be calibrated. The following section explains the procedure for performing a new calibration.

1) Set Press Capacity and Place Monitor in Setup Mode

- A) If not already logged in, press the **Login** button and enter the master password.
- B) Navigate to the Configure-Hardware/Trigger screen.
- C) Enter the press capacity for the total and each corner. Refer to the Configure-Hardware/Trigger section on page 44 for more detail.
- D) Navigate to the Tonnage screen and press the **Setup Mode** button. Setup mode will eliminate nuisance alarms during the calibration procedure while still providing over-capacity protection.

2) Balance the Tonnage Sensors

- A) Make sure the press is under no load.
- B) Navigate to the Configure-Calibration screen.
- C) Press the **Enter Track Mode** button to display the balance for the tonnage sensors.
- D) Press the **Initialize Auto-Zero** button. The Gain/Balance fields for each corner should read close to zero. If not, press the **Initialize Auto-Zero** button once more. If the corners still will not zero, press the **Reinitialize** button to reset the internal Analog-to-Digital circuits, then try the **Initialize Auto-Zero** button again. If one or more corners still will not zero, check the sensor wiring (page 14) and the mounting on the press (see Appendix A for sensor installation instructions).

3) 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.

4) 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 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.



5) Cycle the Press

- A) From the Calibration screen, turn off Track Mode if it is on.
- B) Further adjust the shut height so that the press impacts the load cells and generates a load at 100% of press capacity. See warning below.
- C) If an alarm is generated on the tonnage monitor, press the flashing banner at the top of the screen to reset it.

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:

- a) Calibrate the press only up to 80% of capacity, or
- b) 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) Gather, Record, and Enter Data

Automatic Method:

- A) Record the load cell readings for each of the corners on the calibration sheet. These are the load values of the press corners. Also enter these values in the corresponding **Load Cell** fields on the Calibration screen.
- B) Record the peak tonnage values from the Channel Tonnage fields for each of the corners.
- C) Press the **Enter Track Mode** button to turn on Track Mode.
- D) Press the **Display Gain Values** button to view the current gain.
- E) Press the **Calculate and Send** button. The correct Calibration Numbers will automatically be calculated and loaded into the tonnage monitor.
- F) Press the **Gain Values Displayed** button to turn off the gain and view the sensor balance. Use the **Initialize Auto-Zero** button to zero the corners again, if needed.
- G) Press the **Display Gain Values** button to view the gain numbers again. The values in the **Gain/Balance** fields should closely match the values in the **Desired Gain** fields.
- H) Repeat steps E-G until the actual gain numbers match the desired gain values. In most cases, the process will not need to be repeated.

Manual Method:

- A) Record the load cell readings for each of the corners on the calibration sheet. These are the load values of the press corners.
- B) Record the peak tonnage values from the Channel Tonnage fields for each of the corners.
- C) Press the **Enter Track Mode** button to turn on Track Mode.
- D) Press the **Display Gain Values** button to view the current gain.
- E) Use the following formula to determine the new gain number:

$\text{New Gain Number} = (\text{Load Cell reading} \div \text{Peak Tonnage reading}) \times \text{Current Gain Number}$
--

- F) Repeat the calculation for each corner.



- G) Enter the new calculated gain number for each corner into their corresponding **Desired Gain** fields.
- H) Press the **Send Gain Values** button to load the new gain numbers into the tonnage monitor.
- I) Press the **Gain Values Displayed** button to turn off the gain and view the sensor balance. Use the **Initialize Auto-Zero** button to zero the corners again, if needed.
- J) Press the **Display Gain Values** button to view the gain numbers again. The values in the **Gain/Balance** fields should closely match the values in the **Desired Gain** fields.
- K) Repeat steps H-J until the actual gain numbers match the desired gain values. In most cases, the process will not need to be repeated.

7) Verify Results and Repeat

- A) From the Calibration screen, turn off Track Mode if it is on.
- B) Cycle the press.
- C) Verify that the load cell values and the peak tonnage values from the Channel Tonnage fields are the same. If not, repeat step 6 until the values are the same.

8) Make Linearity Check

- A) Raise the shut-height in .020 to .030 inch increments to decrease tonnage.
- B) Cycle the press and impact the load cells.
- C) Compare the tonnage applied to the load cells to the tonnage displayed on the monitor. These values should be documented.

9) Document calibration details on the Calibration Sheet (Form #1224) provided and file it for future reference.

10) Record Gain Numbers

- A) On the Calibration screen, turn on Track Mode then press the **Display Gain Values** button to view the values in the **Desired Gain** fields. These are the Calibration Numbers.
- B) Record these values on the calibration label located on the door inside of the unit. See the **Calibration Information Label** section on page 63 for details on the calibration label.

11) 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, 8:00 AM to 5:00 PM.



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➤ Calibration Information Label

The Calibration Information Label is provided to document the Calibration Numbers, press capacity, and other important configuration data. This label is located inside of the tonnage monitor on the door. Below is an example of the information that should be documented.

Model: PW-LS		RESOLVER									
Cal. By JOHN DOE	Date 9-28-10	1 <input checked="" type="checkbox"/>	<input checked="" type="radio"/> Master <input type="radio"/> Slave Offset 158								
Press No. 116	Addr. 0	2 <input checked="" type="checkbox"/>									
CAPACITIES		3 <input checked="" type="checkbox"/>									
CH0 2000	CH5	4 <input checked="" type="checkbox"/>									
CALIBRATION NUMBERS		5 <input checked="" type="checkbox"/>									
CH1 1015	CH6	6 <input checked="" type="checkbox"/>									
CH2 1019	CH7	7 <input checked="" type="checkbox"/>									
CH3 994	CH8	8 <input checked="" type="checkbox"/>									
CH4 1006	CH9	9 <input checked="" type="checkbox"/>									
TIME: Mode NORMAL	Value _____	<input type="radio"/> STI No. <input type="radio"/> TFP No.									
Thres. N/A	Pos. _____	STI CH5 <table border="1"><tr><td>Lo</td><td>Hi</td></tr><tr><td></td><td></td></tr></table>		Lo	Hi						
Lo	Hi										
Toledo Integrated Systems Toledo Transducers Inc., Holland, OH 43528 Made in USA		TFP <table border="1"><tr><td>CH2</td><td></td></tr><tr><td>CH4</td><td></td></tr><tr><td>CH6</td><td></td></tr><tr><td>CH8</td><td></td></tr></table>		CH2		CH4		CH6		CH8	
CH2											
CH4											
CH6											
CH8											

Figure 4-1: Calibration Information Label

- 1) **Cal By**
The name of the person that performed the calibration procedure.
- 2) **Date**
The date that the calibration was completed.
- 3) **Press No.**
The press on which the monitor is installed.
- 4) **Address**
The network/communication address for the monitor.
- 5) **Capacity (CH0)**
The total capacity of the press. For a double-action press, this is the total capacity of the outer slide.
- 6) **Capacity (CH5)**
The total capacity associated with load sensors 6-9. For example, in the case of a double-action press where sensors 6-9 are used to measure the load for the inner slide, the CH5 capacity is the total capacity for the inner slide. For a single-action press, this will be blank.
- 7) **Calibration Numbers**
Record each channel's Calibration Number from step 10 of the Calibration Procedure here.

8) Time Mode

If the monitor is configured to use one of the time modes (B4 Mode, First Level, Second Level, or Point-in-Time) write the mode here. If the standard setting of Normal Peak is used, write "Normal" or simply leave this blank.

A) Value

If the monitor is configured to use one of the time modes (B4 Mode, First Level, Second Level, or Point-in-Time) and is triggered by threshold or probe, write the capture time value in milliseconds here.

B) Position

If the monitor is configured to use one of the time modes (B4 Mode, First Level, Second Level, or Point-in-Time) and is triggered by resolver, write the capture position in degrees here.

9) Thres. Value

If the trigger method is set to **Threshold**, record the Threshold value here. If the trigger method is set to probe or resolver, the threshold value is not applicable.

10) Resolver

If the trigger method is set to **Resolver**, fill out the following information:

A) Resolver Configuration

Record the resolver dip switch settings from the Resolver Board here.

B) Offset Value

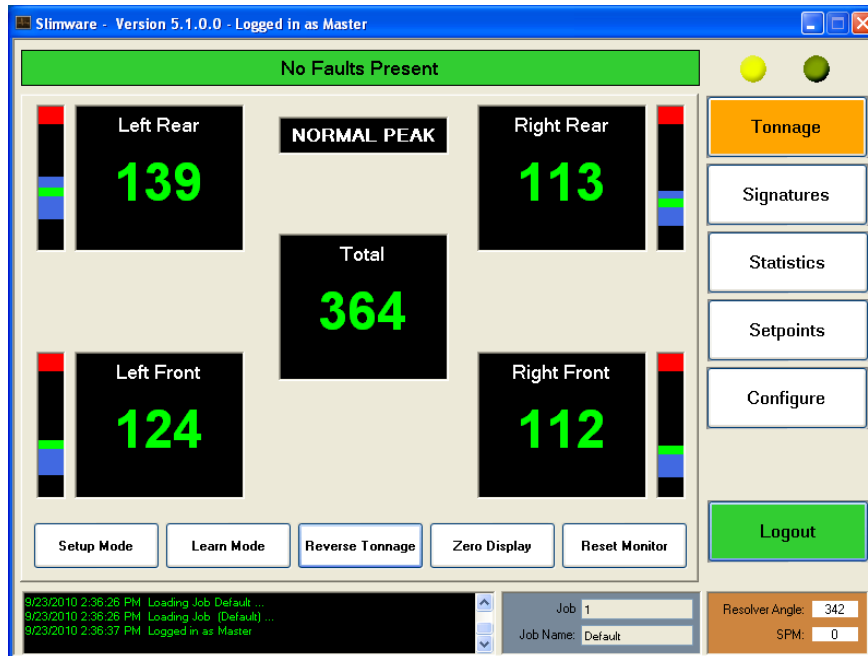
Enter the offset value that is required to zero the press angle.

11) STI/TFP

If the monitor is configured for the special STI or TFP modes, mark the appropriate mode and enter the STI or TFP calibration numbers in this section.



➤ Operator's Guide



- The PW-LS tonnage monitor reads the force generated as a stamping press produces parts. By comparing this force to a known, good benchmark tonnage, the PW-LS can generate high and low limits (setpoints) and check the force from each stroke to ensure that it falls within this acceptable range. The PW-LS can generate alarms and stop the press when the tonnage gets too high or too low, which protects the quality of the parts produced, as well as protecting the press and die from dangerous over-capacity tonnage.
- When setting a new die in the press, place the PW-LS into Setup Mode by pressing the **Setup Mode** button on the Tonnage screen. Run material through the press until a good part is formed, then place the PW-LS into Learn Mode by pressing the **Learn Mode** button. After 8 strokes, the PW-LS establishes a new benchmark and calculates new high and low setpoints based on the percentage settings from the Setpoints screen.
- If the PW-LS is not configured to automatically generate high and low setpoints, the setpoints can be manually entered on the Setpoints screen.
- Once a benchmark and setpoints have been established for a particular die, all settings can be saved in a job file by pressing the grey Job box at the bottom of the screen. Select the **Create New Job** tab, enter a unique job number, name, and description and press the **Create New Job** button to save.
- To load a job file for an previously run die, simply press the grey Job box at the bottom of the screen, select the job file that you want to load, and press the **Load Existing Job** button. All stored setpoints will be sent to the PW-LS.
- When an alarm occurs, the shutdown relay opens to stop the press and the status bar at the top of the screen will flash red and display a message to indicate the type of alarm. In the case of tonnage alarms, the faulted channel(s) on the Tonnage screen will also flash red to indicate the location of the problem. To reset the alarm, first correct the situation that caused the alarm, then press the red flashing status bar, the faulted corner, or the **Reset Monitor** button to clear the alarm and close the shutdown relay.
- To avoid nuisance alarms and shutdowns while adjusting the press, put the PW-LS in Setup Mode. The press will still be protected from an over-capacity hit, but high and low setpoint violations will be ignored.



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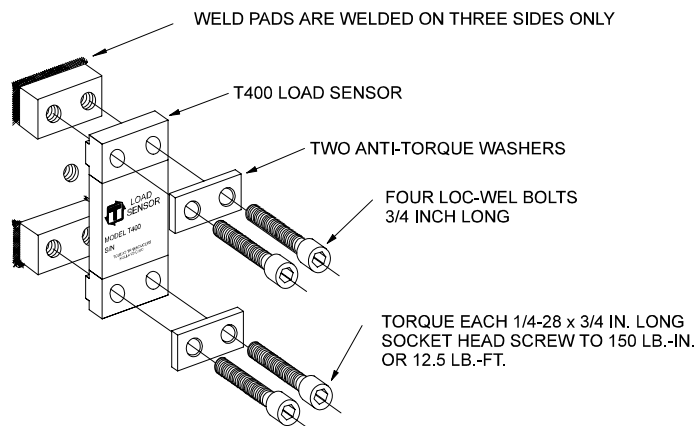
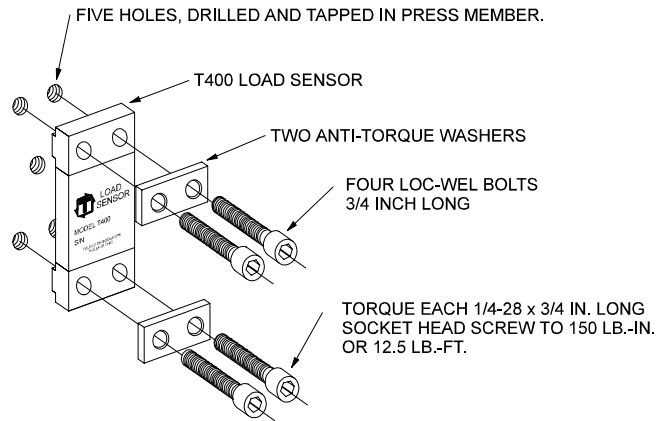
Appendix

- A) **Sensor Installation (Doc# 11080)**
- B) **Calibration Sheets (2) (Form# 1224)**

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INSTALLING T400 LOAD SENSORS



The above illustrations represent the proper arrangement of Model T400 Load Sensor kit parts using either the Drill and Tap method or the Weld method.

A proper installation is necessary to produce good results.

Before installing the sensors, please read the appropriate instructions listed below.

Sensor Placement	Page 2
Press Frame	Page 3
Pitman Mount	Page 4
Drill and Tap Method of Installing Sensors	Page 5
Weld Method of Installing Sensors	Page 6
T400 Enclosure Mounting Details	Page 7

NOTES:

- 1) (2) SENSORS REQUIRED
- 2) (2) SENSOR ENCLOSURES ARE INCLUDED. THESE HELP PROTECT THE T400 SENSOR GAUGES. THESE ENCLOSURES INCLUDE 1/2" KNOCK-OUT HOLES. IF CONDUIT IS USED, WE SUGGEST USING 1/2" STRAIN RELIEFS IN THE KNOCK-OUT HOLES.

SENSOR PLACEMENT

Sensor location must be determined. You have two locations. The front or the rear of the press. (Shown in the shaded area.)

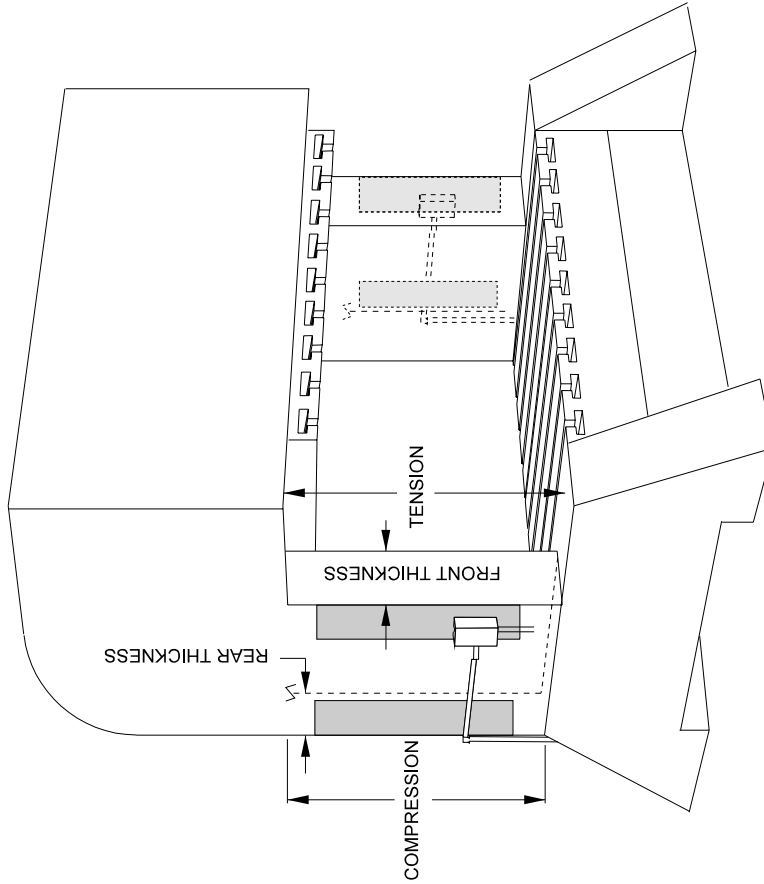
HOW TO DETERMINE THE BEST LOCATION

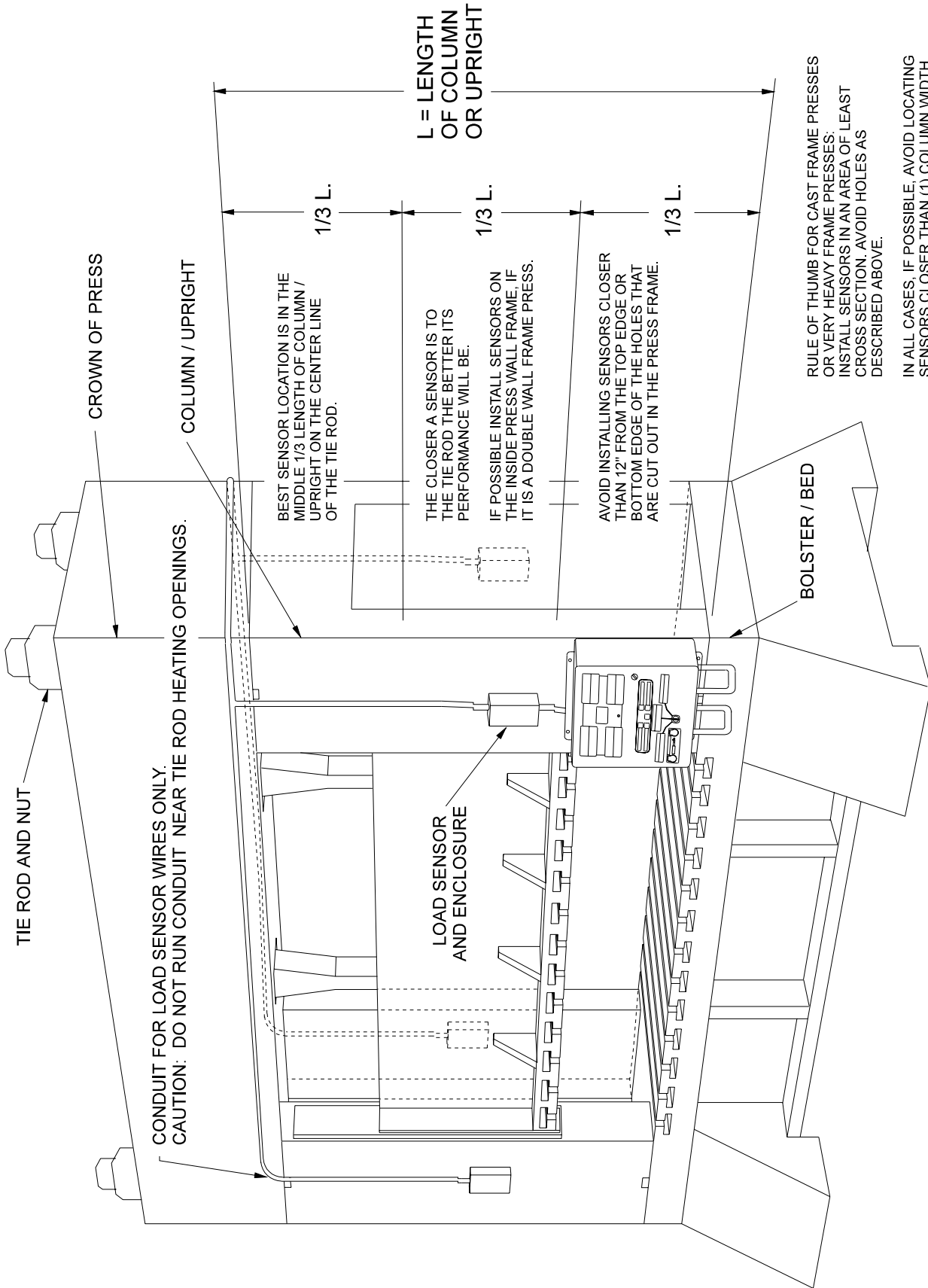
* MEASURE THE REAR THICKNESS _____ REAR

* MULTIPLY BY THREE X 3 =

* MEASURE THE FRONT THICKNESS _____ FRONT

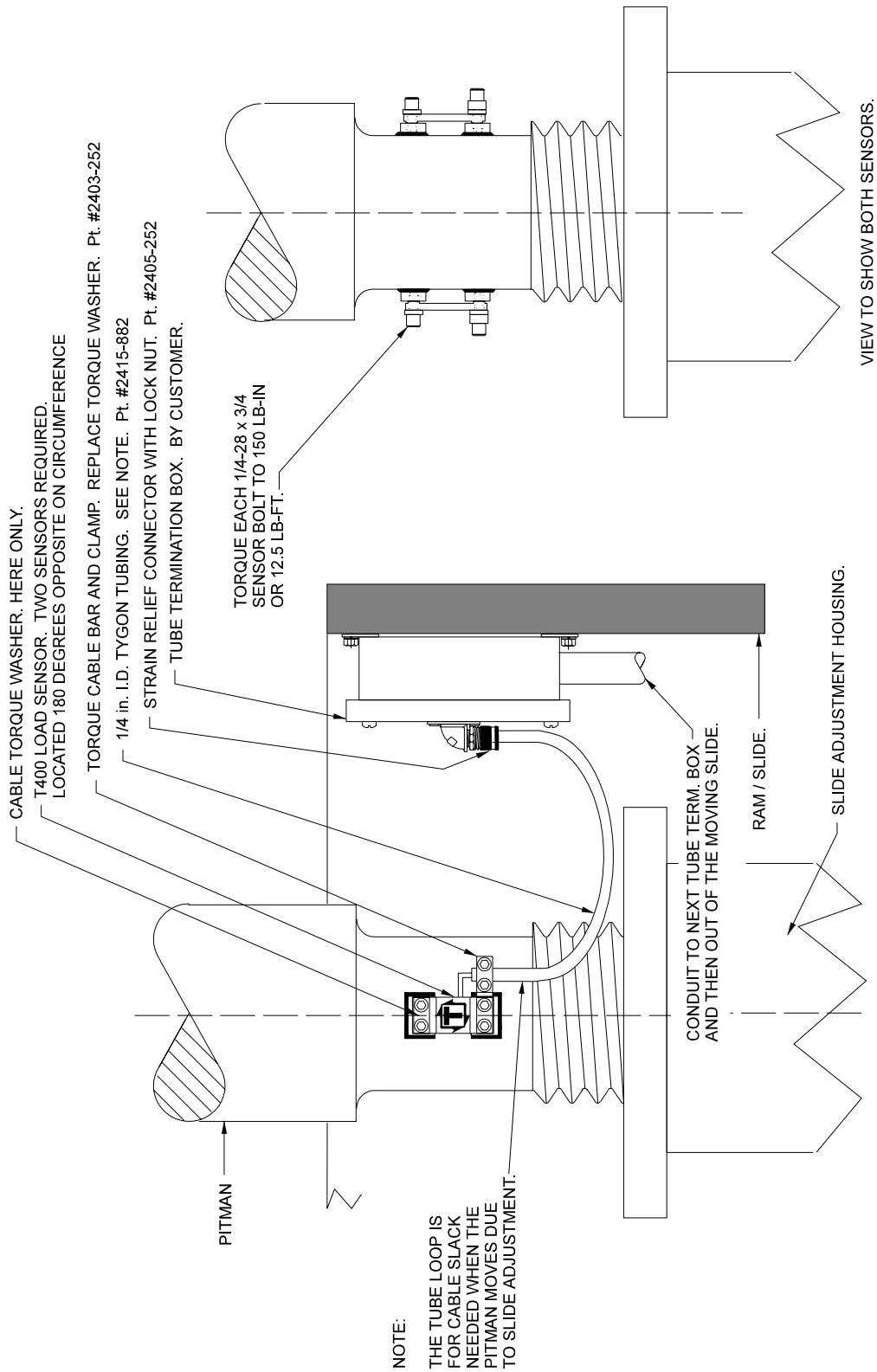
If the front thickness is smaller than value in , then mount sensors in the front. (This is the most common.)
If the front thickness is larger, then place the sensor in the rear. Adjust the input connection for compression readings instead of tension.





RULE OF THUMB FOR CAST FRAME PRESSES OR VERY HEAVY FRAME PRESSES:
INSTALL SENSORS IN AN AREA OF LEAST CROSS SECTION. AVOID HOLES AS DESCRIBED ABOVE.

IN ALL CASES, IF POSSIBLE, AVOID LOCATING SENSORS CLOSER THAN (1) COLUMN WIDTH FROM THE CROWN OR BOLSTER.

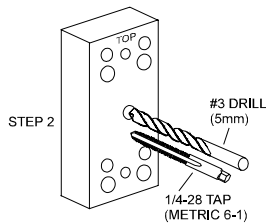


USING THE T400 SENSOR INSTALLATION FIXTURE KIT No. 1977-749

(METRIC INSTALLATION FIXTURE KIT No. 1974-749)

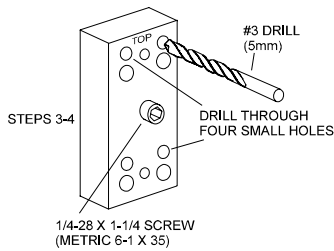
DRILL AND TAP METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE BEST LOCATION DESCRIBED ON THE PREVIOUS PAGES.



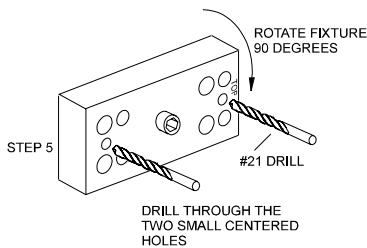
STEP 1 Remove all paint and grease from sensor mount area. If the machine surface is flat (total indicated reading of .002”) and smooth (125 μ in.) the load sensor can be bolted directly to the surface.

STEP 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be ½ inch (13mm) deep.

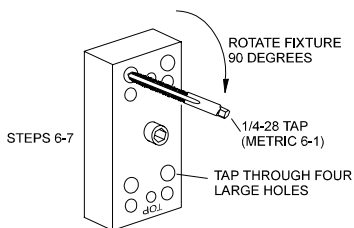


STEP 3 Bolt the fixture to the press member using the ¼-28 by 1-¼ inch (M6-1 x 35) long socket head cap screw in the center of the fixture.

STEP 4 Insert the number 3 drill (5mm) into the smaller corner hole and drill out all four holes to a depth of ¾ of an inch (19mm.)



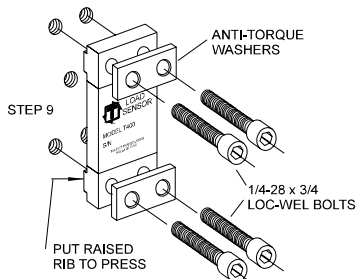
STEP 5 Loosen the fixture. Rotate the fixture 90 degrees clockwise. Tighten the center screw of the fixture. Insert the number 21 drill into the small centered hole and drill out both holes to a depth of 3/8 of an inch. These holes are for mounting the sensor enclosure. The fixture does not allow for tapping these holes. They are tapped without the fixture. Enclosure mounting is not done in metric.



STEP 6 Loosen the fixture. Rotate the fixture another 90 degrees clockwise such that the larger corner holes line up with the holes drilled in Step 4. Insert a tap to be sure the holes line up. Lock the fixture in place by tightening the center screw.

STEP 7 Insert the tap into the larger tap guide holes and tap each hole.

BE SURE TO USE PLENTY OF TAPPING FLUID.



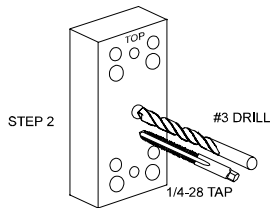
STEP 8 Remove the fixture and repeat Steps 1-7 for each additional sensor mounting position.

STEP 9 Mount the sensor with the raised rib to the press. The anti-torque washers should go between the screw and the sensor body. Torque each ¼-28 x ¾ in. long socket head cap screw to 150 LB.-IN or 12.5 LB.-FT.

USING THE T400 SENSOR INSTALLATION FIXTURE KIT No. 1977-749

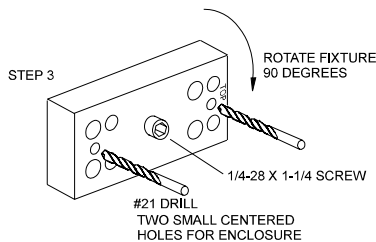
WELD PAD METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE BEST LOCATION DESCRIBED ON THE PREVIOUS PAGES.

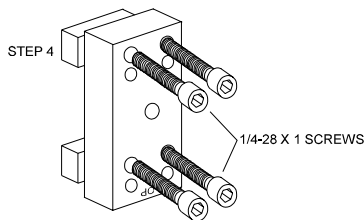


STEP 1 Remove all paint, grease, and or rust from surface to be welded. (Surface should be flat T.I.R. 1/32 of an inch.)

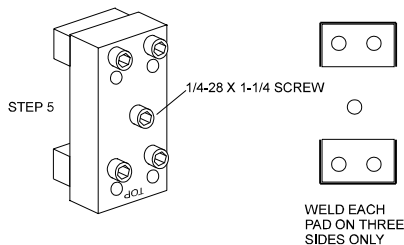
STEP 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be 1/2 inch deep. (Optional)



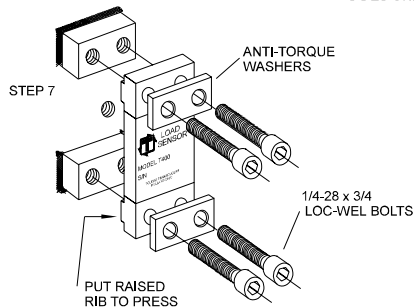
STEP 3 Bolt the fixture to the press member using the 1/4-28 by 1-1/4 inch long socket head cap screw in the center of the fixture. Orient the fixture as shown and drill out the #21 holes to a depth of 3/8 of an inch for the enclosure mounting. The fixture is not used for tapping these holes. (Optional)



STEP 4 Remove the fixture from the press member. Bolt the weld pads to the fixture with 1/4-28 by 1 inch long socket head cap screws provided. Reattach the fixture with the weld pads bolted on using the center hole as in Step 3. Orient the fixture as shown.



STEP 5 Weld the weld pads to the press member. (BE SURE TO ONLY WELD THE WELD PADS ON THREE SIDES AS SHOWN.) A single pass is sufficient. Do not remove the fixture until slag is removed and or assembly has cooled. When welding cast iron, use a dry nickel rod such as: Lincoln Electric "Soft Weld", Hobart "NI Cast 99", or MB Weld Prod. "MG 210. Strike arc on steel then puddle into the cast iron.



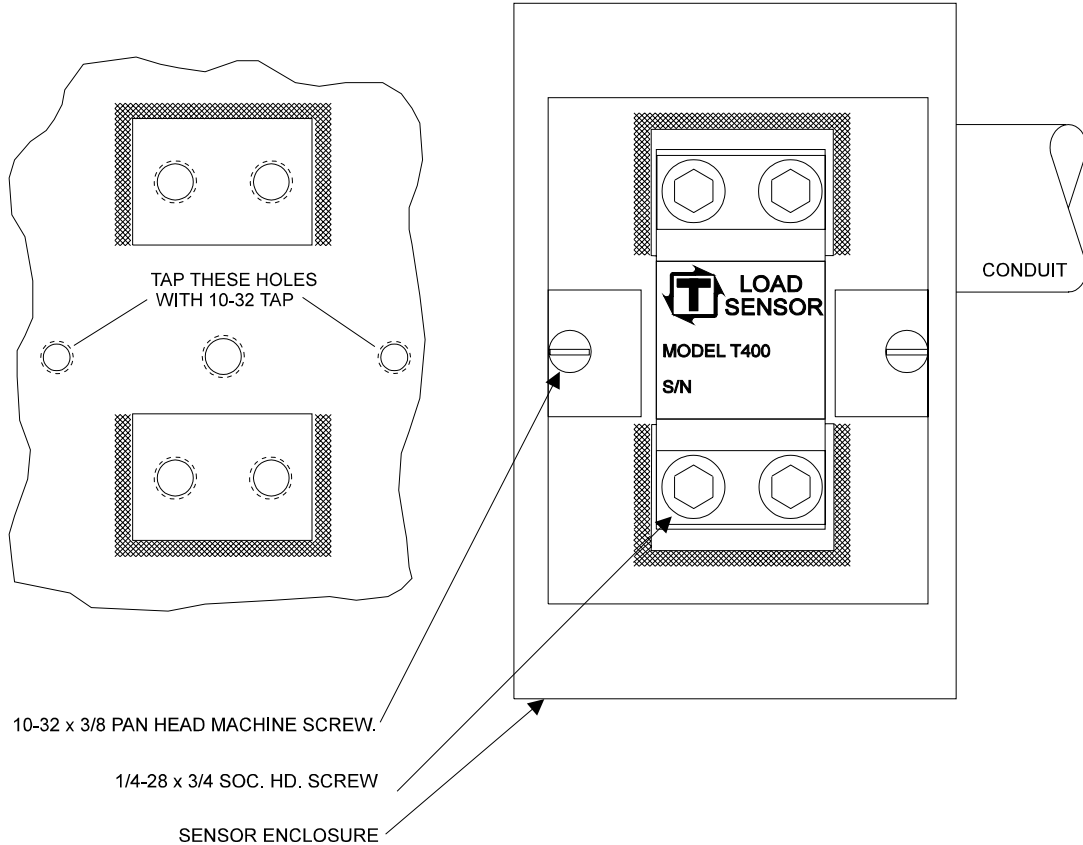
STEP 6 Remove the weld fixture. DO NOT WELD AFTER FIXTURE IS REMOVED. The 4 screws holding the pads to the fixture and the 1 center screw may be discarded. DO NOT USE THE FOUR 1 INCH LONG SCREWS TO ASSEMBLE SENSOR. The sensor kit contains four 3/4 inch long screws for assembling the sensor to the press member. Weld pad surface must be clean – no weld bumps, scratches, etc. Be sure the weld pad tapped holes are clean and bottom of holes are free of weld flash.

STEP 7 Mount the sensor with the raised rib to the press. The anti-torque washers should go between the screw and the sensor body. Torque each 1/4-28 x 3/4 in. long socket head screw to 150 LB.-IN or 12.5 LB.-FT.

SENSOR ENCLOSURE MOUNTING

USE 10-32 TAP IN THE TWO 3/8" DEEP HOLES THAT WERE DRILLED WITH THE FIXTURE IN THE PREVIOUS INSTRUCTIONS. MOUNT THE ENCLOSURE TO THE PRESS MEMBER AND RUN 1/2 INCH CONDUIT TO THE LOAD MONITOR ENCLOSURE.

RUN SENSOR CABLE THROUGH CONDUIT. PLACE SENSOR ON MOUNTING HOLES. PLACE ANTI-TORQUE WASHERS OVER SENSOR HOLES. SCREW IN SENSORS BOLTS, (4) EACH, FINGER TIGHT. USE ONLY THE 1/4-28 x 3/4" "LOC-WEL" BOLTS THAT ARE IN THE SENSOR PACKAGE. TORQUE EACH 1/4-28 x 3/4" SCREW TO 150 LB.-IN. OR 12.5LB.-FT. ASSEMBLE BOX COVER.



COMPANY: _____

DATE: _____

PRESS SERIAL No: _____

PRESS (Type and & No.): _____

CONTACT: _____

PRESS CAPACITY: _____

PHONE: (____) _____

LOAD MONITOR MODEL: _____

SERVICE ORDER #: _____

MONITOR SERIAL No. _____

SLIDE-ADJUST INDICATOR

TONNAGE APPLIED TO **LOAD CELLS** ON PRESS

TONNAGE DISPLAYED ON **LOAD MONITOR**

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

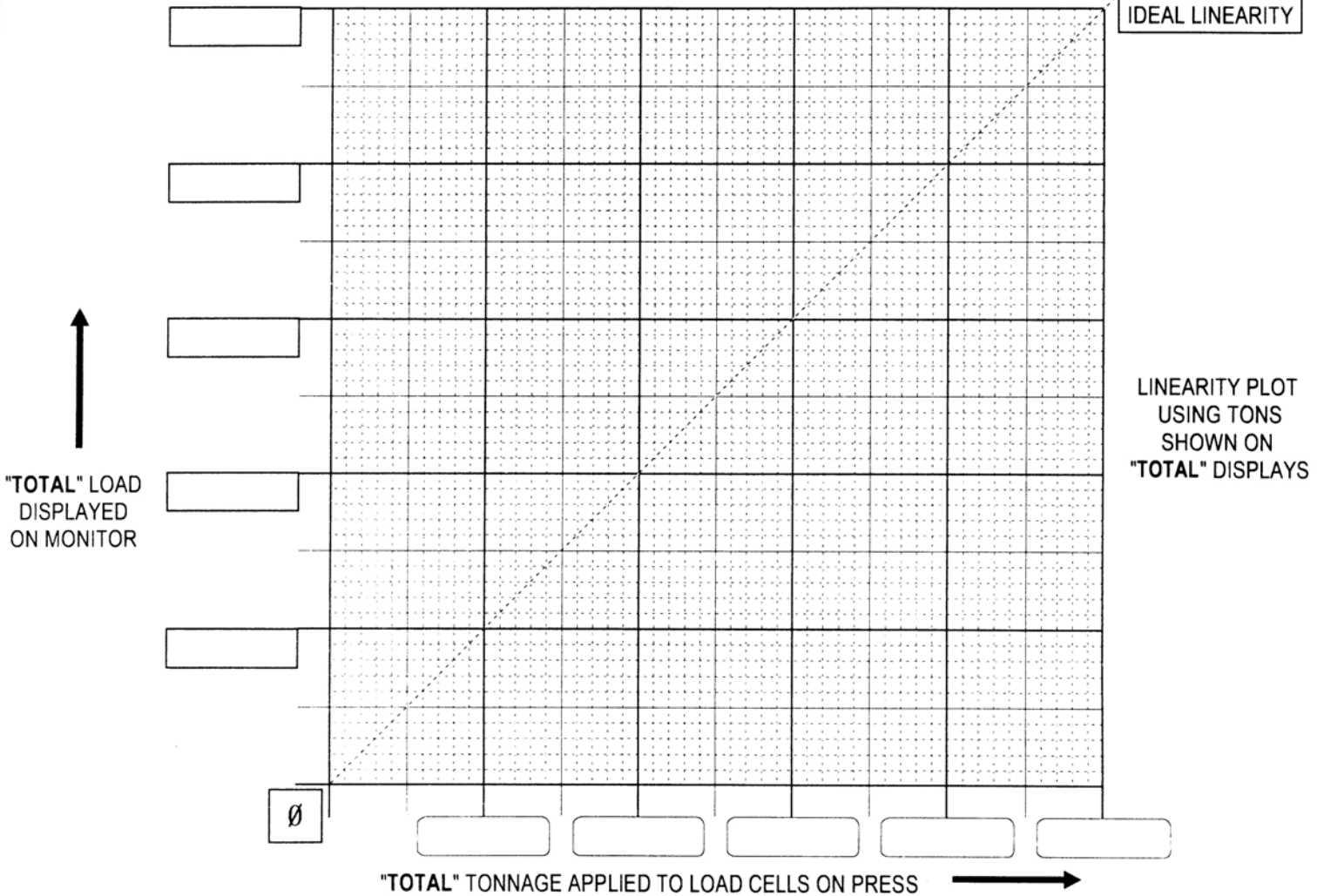
LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF



DRAW IN : _____

- CHANNEL NUMBER
- SENSOR LOCATION
- MONITOR LOCATION
- LOAD CELL LOCATION
- DIRECTION OF MATL. FLOW

SHUNT RESISTORS:
 ONE MEG ? YES ___ NO ___

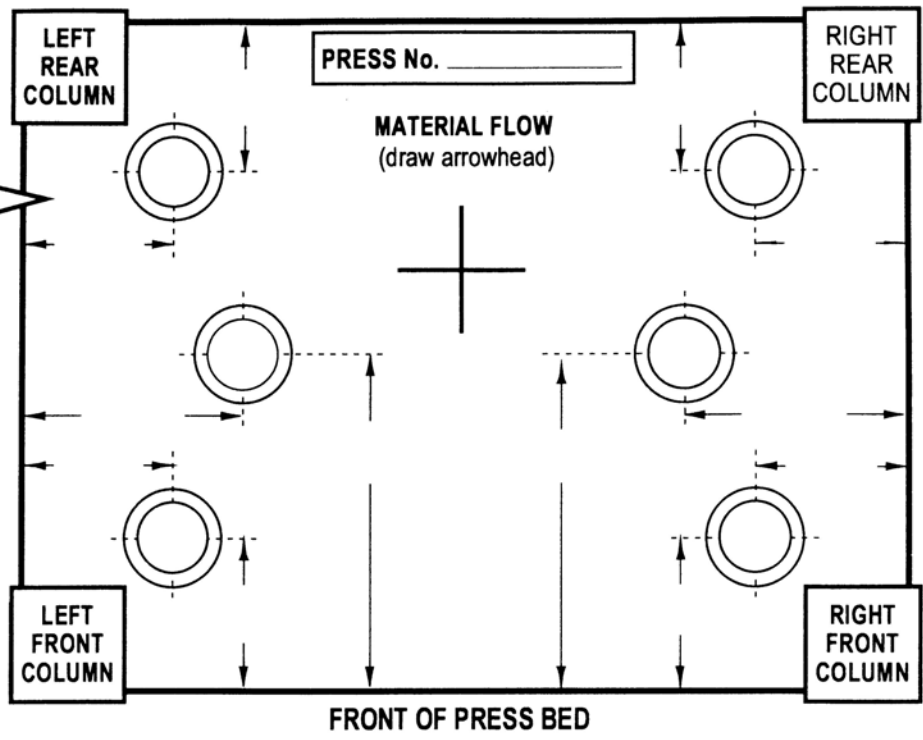
OTHER RESISTORS:

CHAN. 1 _____

CHAN. 2 _____

CHAN. 3 _____

CHAN. 4 _____



TYPE OF LOAD CELLS: _____ TYPE OF LOAD CELL READOUT: _____

TONNAGE SENSORS

CALIBRATION LOAD CELLS

SENSOR NUMBER	SERIAL NO.	CAL. NO.	X 10	LOCATION (LF, RF, LR, RR)
1				
2				
3				
4				

CELL NUMBER	CAPACITY TONS	SERIAL NO.	CAL. NO.
①			
②			
③			
④			

CCM TYPE: _____ CCM OFFSET: _____ STI REFERENCE NUMBER: LOW: _____ HIGH: _____

STI DEGREES IN CHANNEL No. 1: _____

TRIGGERED FROM PROBE ? YES ___ NO ___ (Show threshold value if not triggered from probe): _____

TRIPPED ALARM RELAY STOPS PRESS ? YES ___ NO ___ EXPLAIN: _____

ALL STICKERS AND DOCUMENTS FILLED OUT ? YES ___ NO ___ IF NOT, EXPLAIN WHY: _____

TFP No.: HIGH 2 _____ LOW 2 _____ HIGH 4 _____ LOW 4 _____ HIGH 6 _____ LOW 6 _____ HIGH 8 _____ LOW 8 _____

COMMENTS: _____

TESTS MADE BY: _____ TESTS ACCEPTED BY: _____ DATE: _____

MAIL ADDRESS:
 TOLEDO TRANSDUCERS, INC.
 P.O. BOX 10
 HOLLAND, OHIO 43528

SHIPPING ADDRESS:
 TOLEDO TRANSDUCERS, INC.
 6834 SPRING VALLEY DR.
 HOLLAND, OHIO 43528

PHONE: 1 (419) 867-4170
FAX: 1 (419) 867-4180

COMPANY: _____

DATE: _____

PRESS SERIAL No: _____

PRESS (Type and & No.): _____

CONTACT: _____

PRESS CAPACITY: _____

PHONE: (____) _____

LOAD MONITOR MODEL: _____

SERVICE ORDER #: _____

MONITOR SERIAL No. _____

SLIDE-ADJUST INDICATOR

TONNAGE APPLIED TO **LOAD CELLS** ON PRESS

TONNAGE DISPLAYED ON **LOAD MONITOR**

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

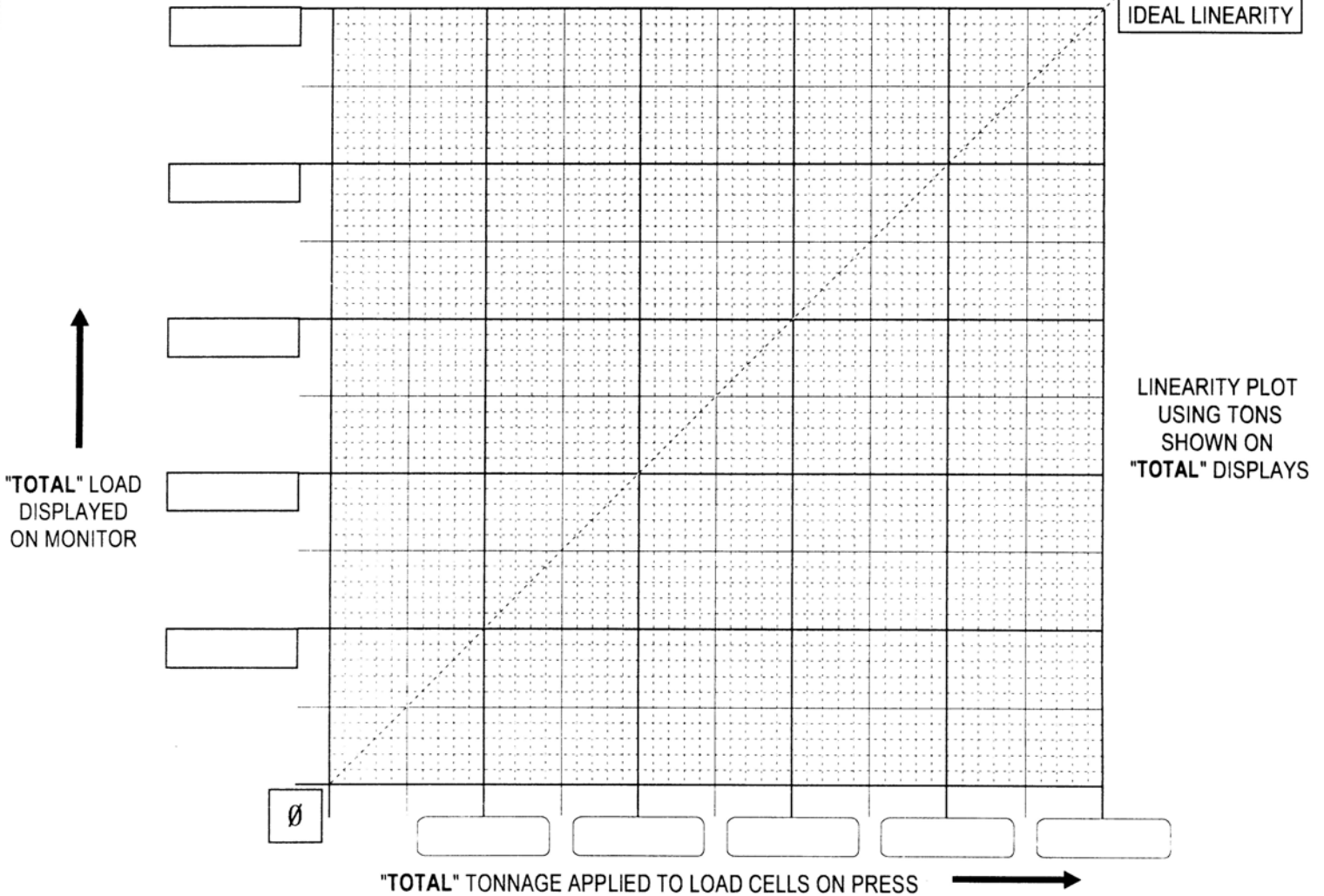
LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF

LR	<input type="text"/>	TOTAL	<input type="text"/>	RR
LF	<input type="text"/>	<input type="text"/>	<input type="text"/>	RF



IDEAL LINEARITY

LINEARITY PLOT USING TONS SHOWN ON "TOTAL" DISPLAYS

- DRAW IN :** _____
- CHANNEL NUMBER
 - SENSOR LOCATION
 - MONITOR LOCATION
 - LOAD CELL LOCATION
 - DIRECTION OF MATL. FLOW

SHUNT RESISTORS:
ONE MEG ? YES ___ NO ___

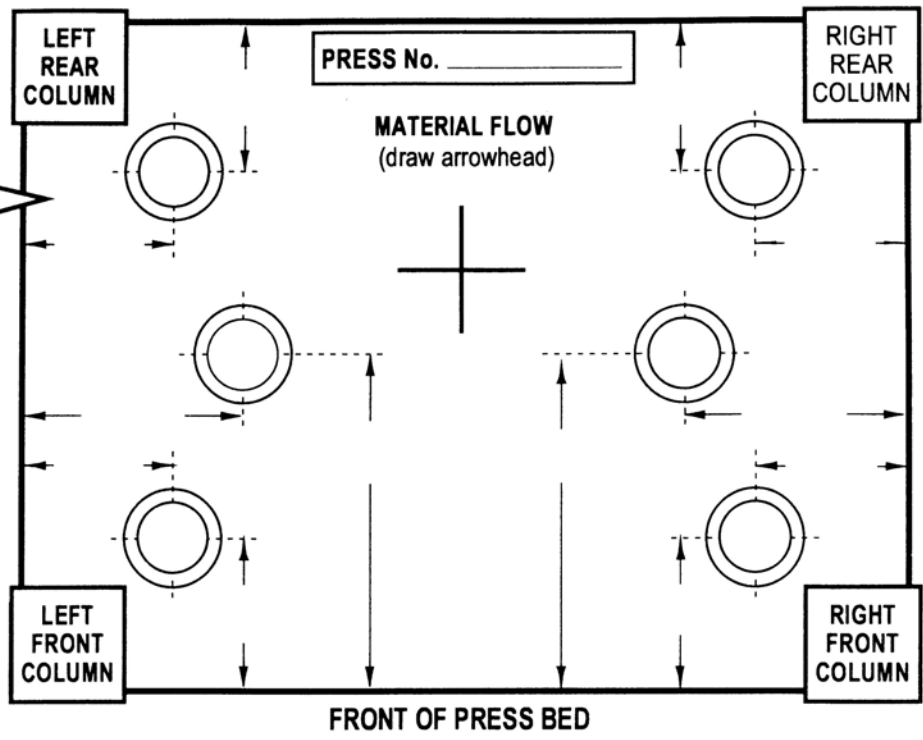
OTHER RESISTORS:

CHAN. 1 _____

CHAN. 2 _____

CHAN. 3 _____

CHAN. 4 _____



TYPE OF LOAD CELLS: _____ TYPE OF LOAD CELL READOUT: _____

TONNAGE SENSORS

CALIBRATION LOAD CELLS

SENSOR NUMBER	SERIAL NO.	CAL. NO.	X 10	LOCATION (LF, RF, LR, RR)
1				
2				
3				
4				

CELL NUMBER	CAPACITY TONS	SERIAL NO.	CAL. NO.
1			
2			
3			
4			

CCM TYPE: _____ CCM OFFSET: _____ STI REFERENCE NUMBER: LOW: _____ HIGH: _____

STI DEGREES IN CHANNEL No. 1: _____

TRIGGERED FROM PROBE ? YES ___ NO ___ (Show threshold value if not triggered from probe): _____

TRIPPED ALARM RELAY STOPS PRESS ? YES ___ NO ___ EXPLAIN: _____

ALL STICKERS AND DOCUMENTS FILLED OUT ? YES ___ NO ___ IF NOT, EXPLAIN WHY: _____

TFP No.: HIGH 2 _____ LOW 2 _____ HIGH 4 _____ LOW 4 _____ HIGH 6 _____ LOW 6 _____ HIGH 8 _____ LOW 8 _____

COMMENTS: _____

TESTS MADE BY: _____ TESTS ACCEPTED BY: _____ DATE: _____

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