

PW-LS RV2 STI Supplemental Manual

Revision: A

Table of Contents

1: STI DESCRIPTION	3
2: STI OPERATION	4
Enabling STI tonnage mode	4
Setting the capture position	5
3: STI SENSOR INSTALLATION	6
4: CALIBRATION	7

Table of Figures

Figure 1.1: Typical Composite Load Signature	3
Figure 2.1: Enabling STI Tonnage Mode	4
Figure 2.2: Adjusting the Capture Position.....	5
Figure 3.1: Sensor Wiring for STI Installation	6



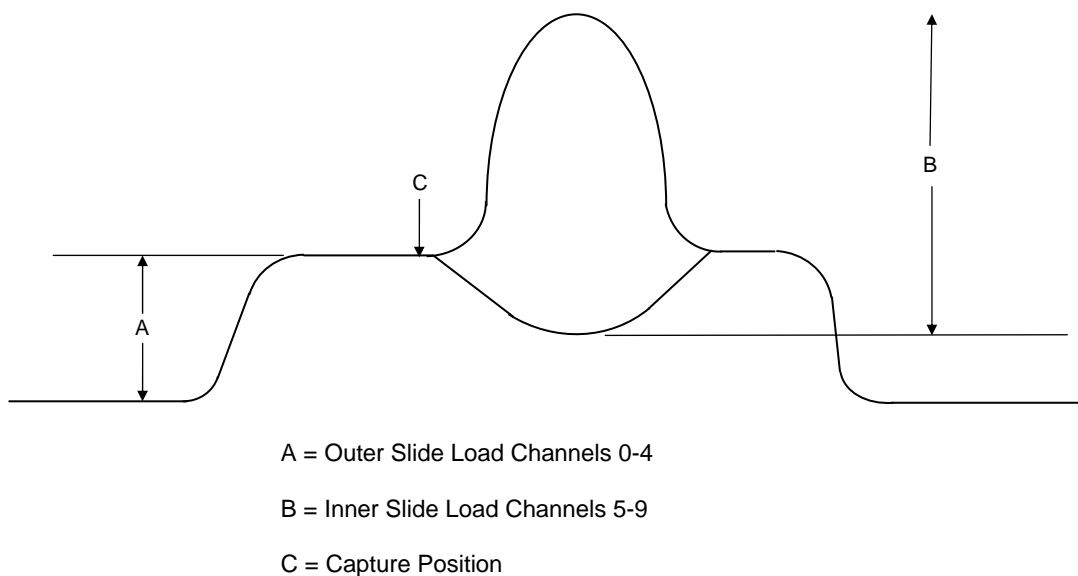
1: STI DESCRIPTION

Getting usable punch load information from a top-drive double action press has always been difficult. Because of the way these presses are designed, the outer slide load drops off as the punch does its work. This is a problem for standard load monitors because they cannot show this outer slide drop off and thus the true inner punch load. The PW-LS RV2's STI tonnage mode solves this problem by displaying the actual inner slide load and the actual outer slide load.

The STI tonnage mode is specially designed for top-drive double action stamping presses. Most tonnage monitors are used on underdrive presses. On these presses the only place to get usable signals is with sensors on the pull rods. With top-drive double action presses it is often impossible to find space on a moving member where the sensors can be mounted. The STI tonnage mode overcomes this problem by providing useful load information with just four frame-mounted sensors.

STI stands for Slide Tonnage Isolation. The signal on the frame of a top-drive double action press contains load information from both the outer slide (blankholder) and the inner slide (punch). This composite signal is separated electronically to faithfully isolate the inner slide signal from the outer slide signal. When STI mode is enabled, SlimWare displays the load distribution and total of the outer slide (channels 0-4), and the load distribution and total of the inner slide (channels 5-9). This allows you to see the actual inner punch load.

Figure 1.1: Typical Composite Load Signature



2: STI OPERATION

Most of the tonnage-related features of the PW-LS RV2 such as job storage, benchmark and setpoint learning, and alarms, may still be used while operating in STI tonnage mode.

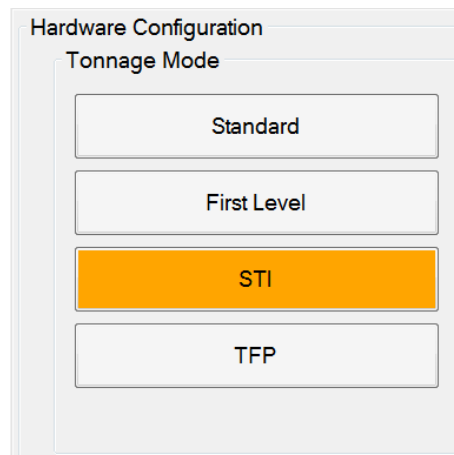
However, you should note the following exception:

- STI tonnage mode works best on presses with a maximum speed of 45 strokes per minute.
- Currently, only resolver-based triggering supports the STI tonnage mode.
- The enveloping feature is not compatible with the STI tonnage mode.

Enabling STI tonnage mode:

STI tonnage mode is selected on the *Configure* → *Hardware/Trigger* screen.

Figure 2.1: Enabling STI Tonnage Mode



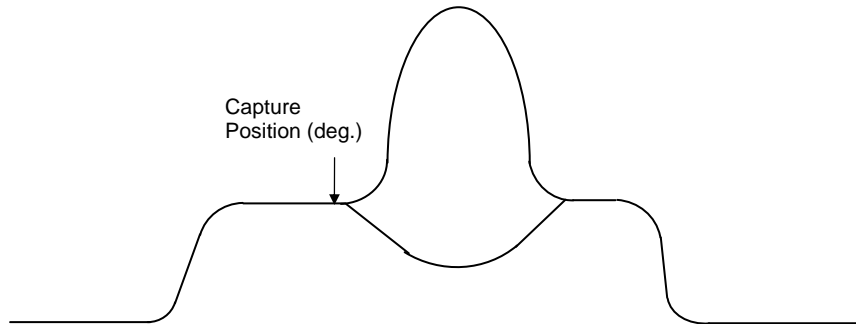
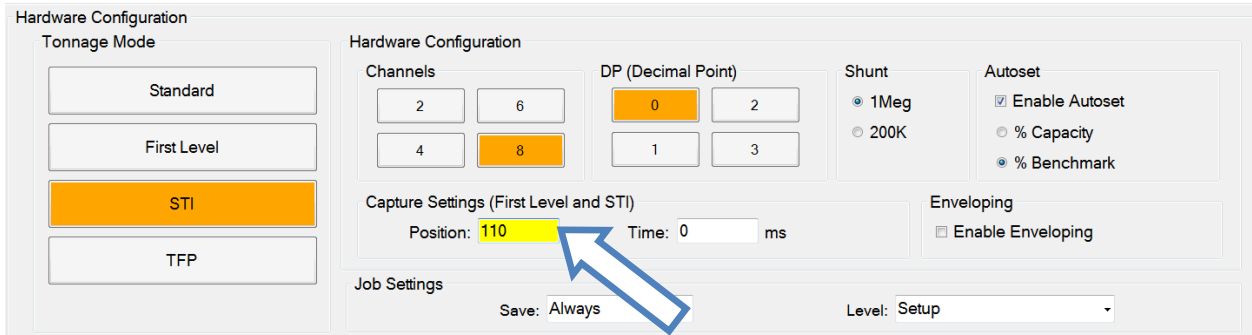
The following notes apply when the PW-LS RV2 is set to STI Mode:

- STI Mode requires 4 sensors wired to 8 sensor inputs to work properly. Therefore, while the mode is set to STI, you must set the number of channels to 8.
- Because STI Mode separates the load signal into an outer slide portion and an inner slide portion, the PW-LS RV2 operates in an 8-channel configuration. As a general rule, data for the outer slide (blankholder) is shown on CH0-4 and data for the inner slide (punch) is shown on CH5-9.
- Due to the nature of STI Mode, the reverse tonnage for the inner slide will always be zero. Reverse tonnage is still available for the outer slide.

Setting the capture position:

The capture position is the press position where the blankholder is clamping, before the punch comes in (see item **C** in **Figure 1.1**). To set the capture position, navigate to the **Configure** → **Hardware/Trigger** screen and adjust the capture position, as shown below. 110° to 140° are typical capture position angles.

Figure 2.2: Adjusting the Capture Position

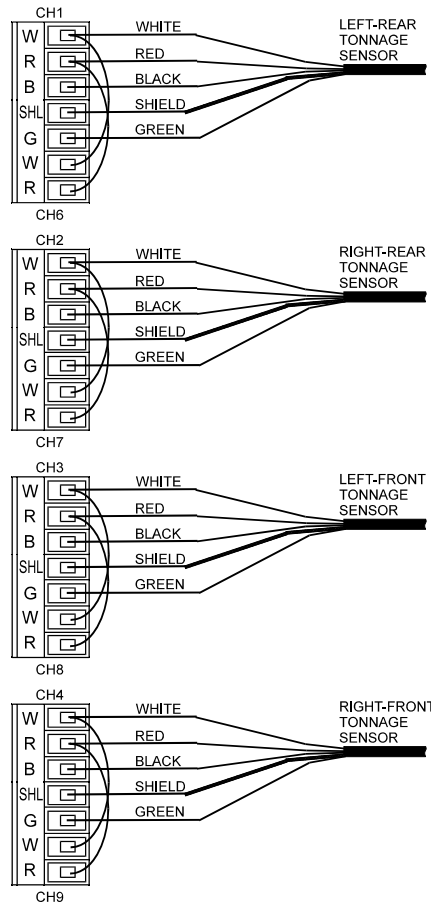


3: STI SENSOR INSTALLATION

Follow the installation instructions in the PW-LS RV2 Installation Manual to install the tonnage sensors. Then follow the steps below:

- 1) Wire the (4) sensors to the outer slide channels (CH1-4) according to the Installation Manual. The left-rear sensor should go to CH1, the right-rear sensor should go to CH2, the left-front sensor should go to CH3, and the right-front sensor should go to CH4.
- 2) Wire the CH1 red and white signal wires in parallel to the CH6 red and white terminals on the same plug. Follow the diagram below.
- 3) Repeat step #2 for each of the remaining channels.
- 4) The unit can now be calibrated.

Figure 3.1: Sensor Wiring for STI Installation



4: CALIBRATION

In order to calibrate the PW-LS RV2 you will need stands, spacers, shims, and eight load cells in order to load both the inner and outer slides at the same time. Use the following steps for proper tonnage calibration:

1) Place the PW-LS RV2 in Setup Mode

- A. On the Tonnage screen, place the unit in Setup mode. This will eliminate the possibility of nuisance alarms during the calibration procedure.

2) Set Number of Channels and Press Capacity

- A. Navigate to the *Configure* → *Hardware/Trigger* screen.
- B. Set the number of channels to 8. Restart SlimWare, when recommended.

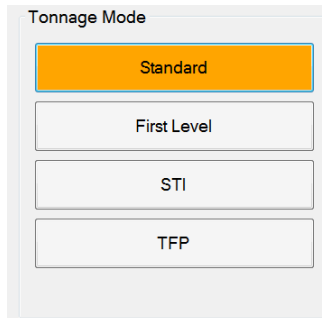


- C. Determine the capacities for the outer slide and the inner slide, as specified by the press manufacturer. Enter the outer slide capacity in CH0 and the inner slide capacity in CH5.

Capacity	
CH0	600
CH1	150
CH2	150
CH3	150
CH4	150
CH5	1000
CH6	250
CH7	250
CH8	250
CH9	250

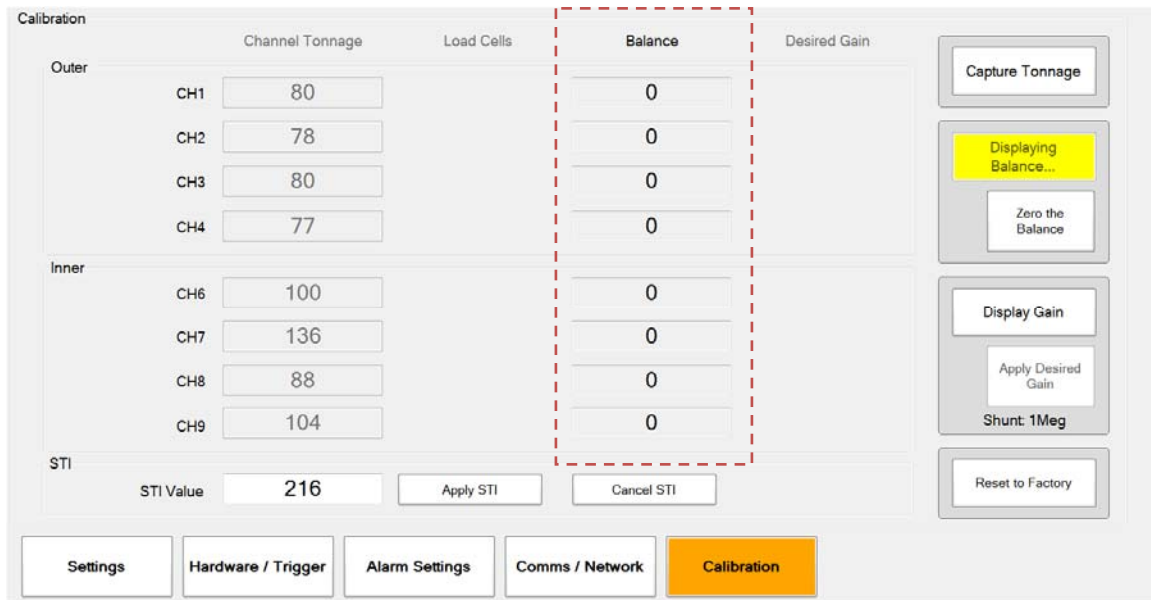
3) Set the Tonnage Mode to Standard

- A. While on the *Configure* → *Hardware/Trigger* screen, sett the mode to **Standard**.
Do not turn on STI mode at this time.



4) Balance the Tonnage Sensors

- A. Make sure the press is under no load.
- B. Navigate to the *Configure* → *Calibration* screen.
- C. Click the **Display Balance** button to view the sensor balance.
- D. Click the **Zero the Balance** button. All channels should balance to zero. If not, press the **Zero the Balance** button again.



5) Calibrate the Outer Slide (Channels 1-4)

A. Find the Shut Height of the Press

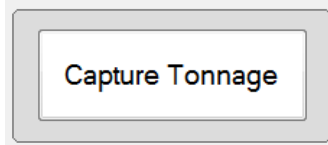
- i. Jog the press until the ram is at bottom dead center (BDC) or 180° without any load cells or the die in the press.
- ii. Determine the amount of spacers needed with your load cells. Cycle the press without load cells to insure correct height.

B. Place the Load Cells in the Correct Position in the Press

- i. Place a load cell under each corner of the **outer slide only**.
- ii. All load cells should be equal distance from the sides and front and rear. For example, 12” from side, 10” from front and rear. Load cells are typically placed at each corner of the press’s bed.
- iii. Cycle the press without hitting the load cells first.
- iv. Place cardboard on the top and bottom of the load cells.

C. Cycle the Press

- i. While still on the *Calibration* screen, click the **Capture Tonnage** button to display the Peak load.



- ii. Cycle the press once. Make sure the ram impacts the load cells. Add the four load cell values to determine the total load on the press.
- iii. Adjust the shut height and cycle the press until the press impacts the load cells (total load) at 100% of the outer slide press capacity. See warning below.

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 from happening, consider one of the following:

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

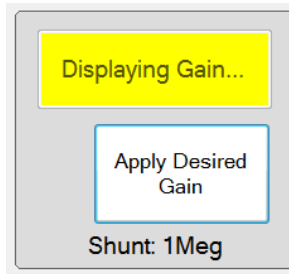
- iv. Check the four load cells. Ideally, their load should match. If not, use shims on the load cells as needed until you get an evenly distributed load.

D. Gather, Record, and Enter Data

- i. Click the **Display Gain** button.
- ii. 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.



- iii. Record the outer slide peak tonnage values (CH1-4).
- iv. Click the **Apply Desired Gain** button. The correct Calibration Numbers will automatically be calculated and loaded into the tonnage monitor.



E. Verify Results and Repeat

- i. While still on the *Calibration* screen, click the **Capture Tonnage** button to display the Peak load.
- ii. Cycle the press and verify that the load cell values and the peak tonnage values from the Channel Tonnage fields are the same. If not, repeat step **D** until the values are the same.
- iii. This completes the outer slide calibration.

F. Document CAL#s

- i. On the *Calibration* screen, press the **Display Gain** button to view the values in the Desired Gain fields. These are the Calibration Numbers.
- ii. Record the Calibration Numbers on the Calibration Label located on the door inside the unit.

6) Calibrate the Inner Slide (Channels 6-9)

A. Find the Shut Height of the Press

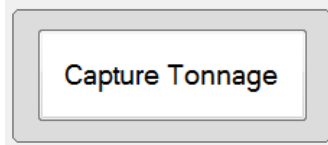
- i. Jog the press until the ram is at bottom dead center (BDC) or 180° without any load cells or the die in the press.
- ii. Determine the amount of spacers needed with your load cells. Cycle the press without load cells to insure correct height.

B. Place the Load Cells in the Correct Position in the Press

- i. Place a load cell under each corner of the **inner slide only**.
- ii. All load cells should be equal distance from the sides and front and rear. For example, 12” from side, 10” from front and rear. Load cells are typically placed at each corner of the press’s bed.
- iii. Cycle the press without hitting the load cells first.
- iv. Place cardboard on the top and bottom of the load cells.

C. Cycle the Press

- i. While still on the *Calibration* screen, click the **Capture Tonnage** button to display the Peak load.



- ii. Cycle the press once. Make sure the ram impacts the load cells. Add the four load cell values to determine the total load on the press.
- iii. Adjust the shut height and cycle the press until the press impacts the load cells (total load) at 100% of the outer slide press capacity. See warning below.

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 from happening, consider one of the following:

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

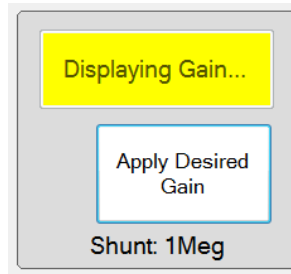
- iv. Check the four load cells. Ideally, their load should match. If not, use shims on the load cells as needed until you get an evenly distributed load.

D. Gather, Record, and Enter Data

- i. Click the **Display Gain** button.
- ii. 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.



- iii. Record the inner slide peak tonnage values (CH6-9).
- iv. Click the **Apply Desired Gain** button. The correct Calibration Numbers will automatically be calculated and loaded into the tonnage monitor.



E. Verify Results and Repeat

- i. While still on the *Calibration* screen, click the **Capture Tonnage** button to display the Peak load.
- ii. Cycle the press and verify that the load cell values and the peak tonnage values from the Channel Tonnage fields are the same. If not, repeat step **D** until the values are the same.
- iii. This completes the outer slide calibration.

F. Document CAL#s

- i. On the *Calibration* screen, press the **Display Gain** button to view the values in the Desired Gain fields. These are the Calibration Numbers.
- ii. Record the Calibration Numbers on the Calibration Label located on the door inside the unit.

7) Calibrate Both Slides Simultaneously

- A. Navigate to the *Configure* → *Hardware/Trigger* screen and change the Tonnage Mode to **STI**.
- B. Enter a value for the capture position. Refer to the **Setting the capture position** section earlier in this manual.
- C. Place all 8 load cells on the bolster. Four under the outer slide and four under the inner slide.
- D. Cycle the press once. Make sure the ram impacts all eight load cells. Because the outer gives or dips during impact the inner tonnage may no longer be accurate. Next, you will set the STI reference number to compensate for this inaccuracy.

About the STI Reference Number: The STI reference number is an adjustment number ranging from 0 to 255, with 0 being no adjustment and 255 being the maximum adjustment. It provides a correction factor to compensate for the outer slide dip.

E. Navigate to the *Configure* → *Calibration* screen.

F. Start by setting the **STI Value** to 20. Click **Apply**.



The screenshot shows a software interface for STI calibration. At the top left, the text "STI" is displayed. Below it, there is a label "STI Value" followed by a yellow input field containing the number "20". To the right of the input field are two buttons: "Apply STI" and "Cancel STI".

G. Cycle the press and observe the peak tonnage. At first, the total inner slide tonnage should be greater than the total load on the inner load cells.

H. Increase the **STI Value**, cycle the press, and observe the total inner slide tonnage. Repeat this step until the total inner slide tonnage is equal to the inner load cell total.

I. This completes the calibration of both slides.

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 peak tonnage displayed on the PW-LS RV2. These values should be documented.

9) Document calibration details on the Calibration Sheet (Form #1224) provided with the User's Manual and file it for future reference. Include the STI reference number.

10) Record STI reference numbers on the calibration label located on the door inside the unit.

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.

