Description: Load Calibration for Starrett Force and Material Testing Systems with Lx Software

Recommended Equipment:

Calibration standard; deadweights or load cell/readout, digital thermometer and humidity indicator

Personnel: Individuals who have received authorized training by The L.S. Starrett Company on this Work Instruction are certified to perform this Work Instruction.

Figure 1: An example of a hanging deadweight kit

Procedure:

1.0 Starrett Material Test System "Warm-up".

System should warm-up for at least 15 MINUTES before carrying out your calibration.

1.1 Connect the Starrett load cell to be calibrated to the Starrett Material Test Frame.

1.2 Place the Starrett load cell in a horizontal position on top of the test frame's crosshead to compensate for zero offset.

DO NOT INSTALL LOADCELL TO THE CROSSHEAD.

1.3 Turn Material Test Frame to ON using the power On/Off switch located on the test frame's back panel.

1.4 Set the Material Test frame's jog switch speed to **SLOW POSITION**.

1.5.1 On tablet devices using Starrett L2/S2 software, select the arrow icons displayed on the tablet. Select until the arrows are shown with a thick line denoting SLOW SPEED mode.

1.5.2 On all-in-one personal computer devices using Starrett L2Plus or L3 software, select the speed indicator icon in the upper tool bar until the pointer displays pointing to the left indicating SLOW SPEED mode.

Procedure:

2.0 Lx System Settings Adjustments

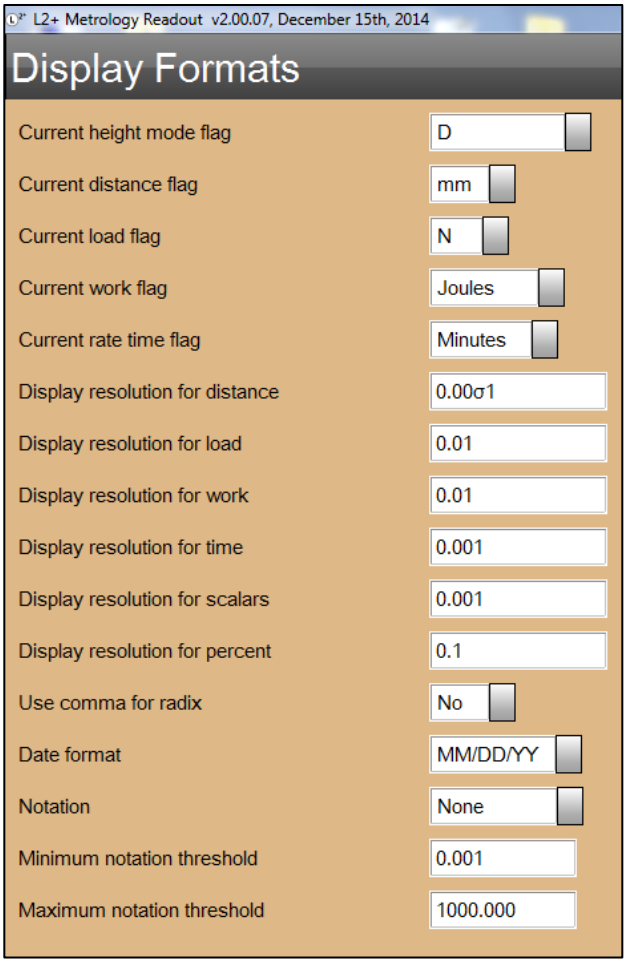
2.1 Select the Lx icon to display the Main Settings dialog.

2.2 Select the SETTINGS icon.

2.3 Select the DISPLAY FORMATS target to launch the Display Formats settings options.

2.4 Verify and change if necessary your Display Formats Setting.
Display Format settings should be:
- Current inch/mm flag = mm
- Current load flag = N

Select DONE on your Lx software. This will take you to the main Settings view again.

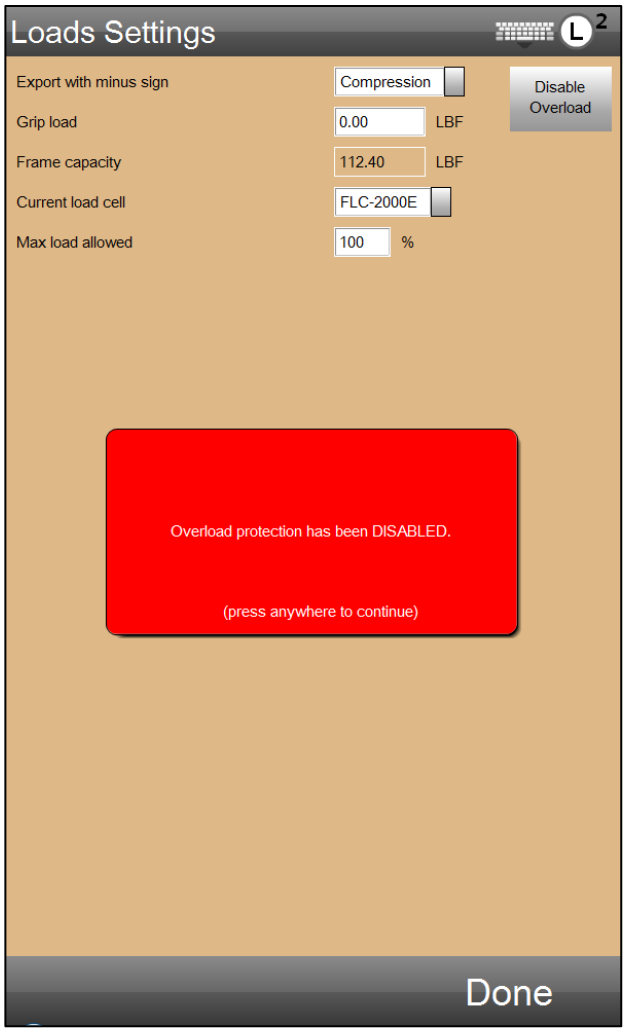


2.5 Select the LOADS target to launch the Load settings options.

2.6 Select the DISABLE OVERLOADS target.

IMPORTANT

Disabling Overloads removes all inherent protection on your Starrett Lx System. The Starrett load cell and the Starrett frame are no longer protected from damage due to overloading. **USE EXTREME CAUTION WHEN POSITIONING THE CROSSHEAD AND WHEN APPLYING A LOAD TO YOUR LOAD STRING.**



2.7 A dialog box will display asking you to "Enter overload password:"

2.8 Enter the Starrett password that permits you to Disable Overloads. This password was supplied to all authorized Starrett Service personal that are certified to perform Load Calibrations per this Work Instruction.

NOTE

If you do not know the Starrett password, contact Starrett Technical Support.

IMPORTANT

You should not continue with the calibration if you have not Disabled Overloads.

2.9 After you enter the Starrett Password, a message will display on the Lx System: "Overload protection has been DISABLED."

2.10 Select DONE. This will return you to the main Settings view.

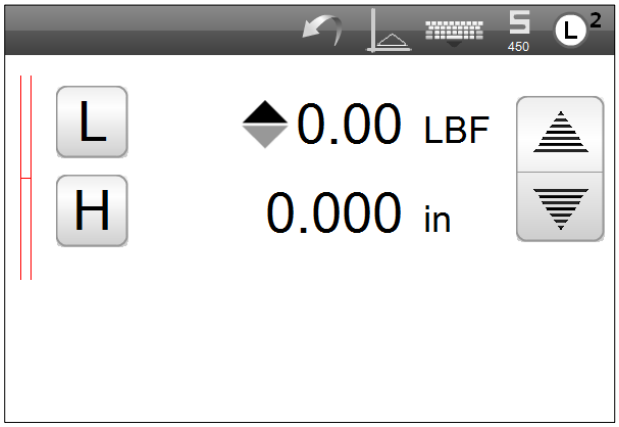


Figure 2: Note load status indicator changes to red when Disable Overload is enabled

Procedure:

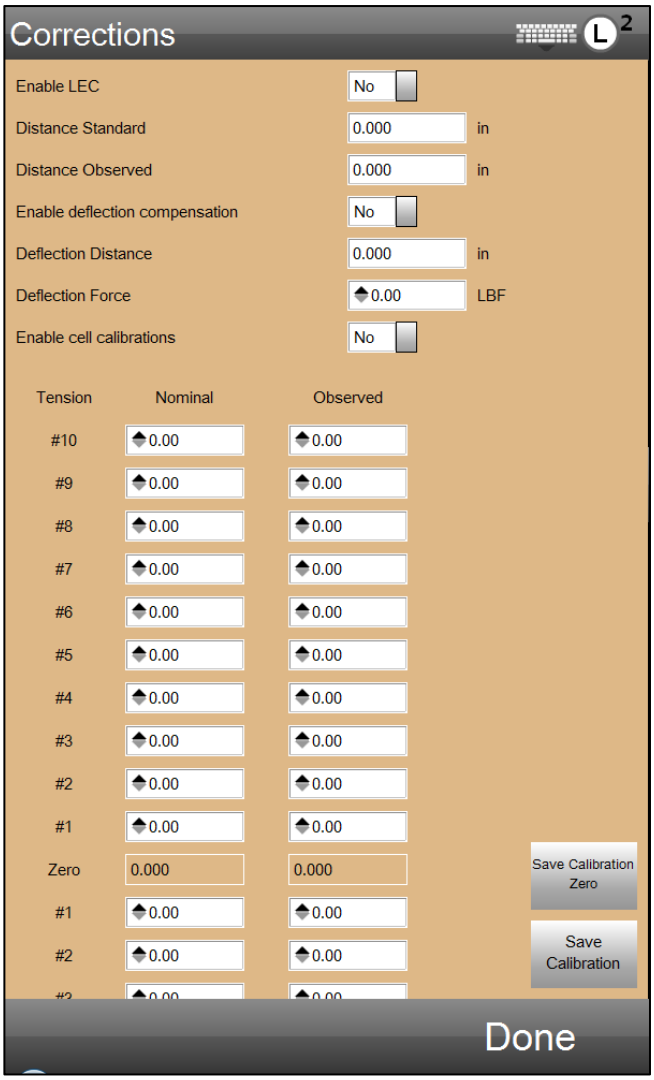
3.0 Corrections Settings Adjustments

Verify your LOADCELL CORRECTIONS settings by selecting the CORRECTIONS target on the main Settings view.

3.1 Go to the Lx LOADCELL CORRECTIONS setting.
- Select the Lx icon on the Home view.
- Select the Settings icon.
- Select the CORRECTIONS setting.

3.2 Verify the Corrections currently set for your Lx System. They will read as follows:
- Enable LEC = No
- Distance Nominal = 0.00mm (Note: this may have a value if corrections were made at the last calibration).
- Distance Observed = 0.00mm (Note: this may have a value if corrections were made at the last calibration).
- Enable deflection compensation = No (Note: if this is enabled “YES”, change to “NO”.
- Deflection Distance = 0.00mm (Note: change to 0.00mm if a value is present)
- Deflection Force = 0.0N (Note: change to).0N if a value is present)
- Enable cell calibrations = No

Select DONE



3.3 Zero the LOAD on the Starrett load cell by selecting the L target on the user interface, e.g. tablet or AIO computer.

3.4 Return to the Corrections Screen and Press SAVE CALIBRATION ZERO

Select DONE

Procedure:

4.0 Measure Calibration Points - TENSION

4.1 Mount the Starrett load cell to the cross head and thread in the hanging weight hook

4.2 Zero the Lx software by pressing L on the DRO

4.3.1 For Deadweights hang the weights to apply load to the load cell

4.3.2 When using another load cell to perform the calibration, slowly apply load using the jog switch to move the desired test points.

NOTE

Lx systems have 10 calibration points for both the tensile direction and compression direction. So there are a total of 20 possible points, plus Zero for a standard force measurement calibration. Not all need to be used, start with Point 1 and leave higher number blank if less than 10 points are taken.

Procedure:

5.0 Measure Calibration Points – COMPRESSION

5.1 For hanging weights mount the Starrett load cell upside down on the top of the crosshead. Use a fixture to transfer the load around the crosshead like shown below.

5.2 Zero the Lx software by pressing L on the DRO

5.3.1 For Deadweights hang the weights to apply load to the load cell

5.3.2 When using another load cell to perform the calibration, the load cell remains mounted below the crosshead. Slowly apply load using the jog switch to move the desired test points.

Procedure:

6.0 Enter Calibration Nominal and Observed values into the Lx System's CORRECTIONS setting for the Starrett load cell that was calibrated.

Percent Error greater than 10% could be a result of an improper calibration or a damaged load cell which may not be possible to calibrate. A well preforming load cell should be less than 1%.

6.1 Go to the Lx System's CORRECTIONS setting.

6.2 Enter the NOMINAL values at each calibration point for Tension and Compression.

IMPORTANT

The Nominal values are the values recorded and taken from the measurement standard.

6.3 Enter the OBSERVED values at each calibration point for Tension and Compression.

IMPORTANT

The Observed values are the values recorded and taken from the Lx System.

6.4 Select the SAVE CALIBRATION button.

6.5 Change the "Enable cell calibrations" option to YES.
- Select DONE.
- Select DONE.

6.6 Power cycle your Lx System as follows:
- Log out of your Lx software.
- Turn power OFF on your Lx test frame.
- Wait 10 seconds before power-up.
- Power-up your Lx test frame.
- Launch you Lx software.

6.7 Verify that the Field Calibration Date displayed when selecting the load cell icon on your Lx System is displaying the calibration date that the Starrett load cell was just calibrated on.

6.8 Verify that no zero offset is present on the calibrated Starrett load cell. The bar graph should not display green at either the tensile or compressive directions with no load applied. A very slight green line indication is acceptable; however, a larger green bar indicates a zero offset problem which may mean:
- the load cell must be re-calibrated
- the load cell is physically damaged and must be replaced if another calibration does not remove the indication
-Greater than 10% of the bar could indicate either an improper calibration or a permanently damaged load cell

Procedure:

7.0 Starrett recommends take a final set of As Left readings to validate the calibration results.