Operating Instructions
STX Series
Digital Strap Tension Meter
Custom Calibrations for the STX-Series of Digital Tension Meters

The Calibration feature is password protected. In order to perform a Custom Calibration a series of key inputs are required. Warning: This procedure will erase previous calibration data. Only a qualified testing laboratory with traceable weights and standards should perform a calibration.

(If you only need to verify that the calibration you've selected is accurate, go to the "How To Check Accuracy" section on the preceding page.)

PERFORMING A 5-POINT LINEARIZATION CALIBRATION

Step 1: From the Main Display press ↑ or ↓ arrows until you reach Setup. Press ENTER. Press the ↓ arrow button until you reach Cal Tension. Press ENTER. The screen will display: Setup, Calibrate Tension, Enter Password. Contact Tensitron at service@tensitron.com for the password. Now the screen will display Setup, Calibrate Tension and you will be able to scroll down the list to select the description that you want to use for the new calibration. When this new description is highlighted, press ENTER.

Step 2: Next you will be prompted ENTER WEIGHT 1. Using the ↑ and ↓ arrows select a minimum tension value (do not use zero). Press ENTER. Select increasing weight values for WEIGHT 2 THRU 4 (No. 4 being the maximum weight value). At each weight number select your weight value using the ↑ and ↓ arrows. ENTER each selection. Next you will calibrate the instrument to the weight values you just selected. (To simulate tension loads for calibration, take a sample length of your material and suspend it from above. Next hang weights from your material in the weight values you previously selected in "enter weights 1 through 4").

Your instrument will now prompt you PLACE WEIGHT 0. With zero tension applied to the instrument press ENTER. Next you will be prompted PLACE WEIGHT 1. Suspend the exact weight value from your material that you previously selected. Engage instrument to the tensioned material and then press ENTER. Next suspend weight value 2 from your material, engage the instrument to your tensioned material and press ENTER. Repeat procedure for steps 3 and 4. Once you have entered the value for WEIGHT 4 you have finished the calibration and will be returned to the Main Display. Your main display will now indicate the description of the calibration you've just entered. This indicates you have now selected the calibration you just performed. To change calibration use the ↑ or ↓ arrows until you reach SELECT MATERIAL. Follow procedures outlined in Section 3.5. To change the description or name of your new calibration, see Section 4, No. 8.
HOW TO CHECK ACCURACY:
To verify the accuracy of your instrument, simulate a tension load on your strapping by suspending known weights to a sample length of the material. Then verify these values with the instrument, e.g.: if a 100 lbs weight is freely suspended from a single length of strapping, the strap is now tensioned to 100 lbs, and your instrument should indicate 100 lbs on the display when properly engaged to the material. To correctly obtain readings, first zero your instrument in the attitude it will be used for testing, without a load, then engage the instrument to the tensioned strapping and note the reading. When performing this test make certain your strapping thickness is dimensionally within tolerance (+/- .003” of size), and not out of tolerance.

KEEP IT SIMPLE. Only simulate tensions using free-hanging weights on correctly-sized strapping material. Never use any device that attempts to convert rotational torque values into tension loads, as these types of systems are highly inaccurate.

When calibrating instruments use lb weights values only. (For optimum accuracy use weights traceable to National Standards.) Note: If your standards are in kg, convert their values into lb. (1 kg = 2.2046 lb)

Custom Calibrations for the STX-Series of Digital Tension Meters
The Calibration feature is password protected. In order to perform a Custom Calibration a series of key inputs are required. Warning: This procedure will erase previous calibration data. Only a qualified testing laboratory with traceable weights and standards should perform a calibration.

Figure 1, Simulating Strap Tension

Sec 1. SAFETY AND MAINTENANCE.
WARNING: When using cordless, electronic instruments, always follow basic safety precautions to reduce the risk of fire, electric shock and personal injury.

READ AND SAVE ALL INSTRUCTIONS FOR FUTURE USE. Before use, ensure all users read and understand this manual, as well as any labels packaged with or attached to the instrument.

1. KNOW YOUR INSTRUMENT. Read this manual carefully to learn your tension meter’s applications and limitations, as well as the potential hazards associated with this type of instrument.
2. AVOID DANGEROUS ENVIRONMENTS. Do not use your instrument in explosive atmospheres (gaseous fumes, dust or flammable materials). Do not submerge your instrument in liquids. Guard against electric shock when connecting power supply to voltage source.
3. USE THE RIGHT TOOL OR INSTRUMENT. Do not use this instrument to do a job for which it is not recommended.
4. CHECK FOR DAMAGED PARTS. Inspect instrument before use. Check for any binding of moving parts, improper mountings, broken parts and any other condition that may affect operation. Do not use a damaged instrument. Tag damaged instrument “DO NOT USE” until repaired. For repair, send instruments directly to Tensitron.
5. MAINTAIN INSTRUMENT CAREFULLY. Keep handles dry, clean and free from oil and grease. Do not lubricate. All roller bearings are sealed.
6. DO NOT USE INSTRUMENT IF it has received a sharp blow, been dropped or damaged in any way. Do not disassemble. Incorrect reassembly may result in the risk of electric shock, fire or exposure to battery fluids. If instrument is damaged return it to Tensitron for repair.
7. STANDARD POWER SUPPLY IS RATED FOR 100-240 VAC and includes several “blades” allowing use with European, US, Australian and other plug configurations.
8. DO NOT USE INSTRUMENT WHEN TEMPERATURE is below 35°F or above 115°F. Charging in direct sunlight or near a heat source will not produce a full charge and may permanently damage battery pack.
9. STORE INSTRUMENT AND CHARGER in a cool, dry place. Do not store where temperatures may exceed 120°F or fall below 35°F for storage times less than one month. Never let LCD display or battery pack assembly freeze.
10. WARNING: Only use battery pack assemblies provided by Tensitron with your meter. Other types of batteries may leak or explode, causing personal or property damage if charged in this device.

Sec. 2. CHARGING INSTRUMENT BATTERIES.
1. Use only a Tensitron power supply to avoid damage to instrument. Connect power supply cable to instrument. Plug the power supply into a 100 – 240 VAC outlet.
2. Fully charge battery prior to first use (approximately eight hours).
3. Battery pack assembly cannot be overcharged, however instrument will remain on while plugged into power supply.
4. Fully charged battery assemblies will operate approximately six hours +/- 20% depending upon usage and backlighting intensity.
5. Battery charge level is indicated in the upper, right-hand corner of display.

Sec. 3. OPERATION: QUICK START.

1. TURN UNIT ON by pressing ON button. Display shows:
   Tension (Lbs, Newtons, or Kilograms), Cable size selected and battery charge level.
2. MEMORY FUNCTION. Depress the MEMORY button to store and display up to five separate tension readings, plus the average (AVG) of these stored values.
3. MOVE BETWEEN SCREENS by pressing either the ↑ or ↓ arrows. To make or enter a selection, depress the ENTER key. To exit a setting, depress the ESCAPE key.
4. ZERO THE INSTRUMENT before taking readings by holding the instrument in the attitude in which it will be used, and with no load applied press the button marked ZERO.
5. READING OF TENSION. Variations in materials and sizes affect tension readings. It is essential to select the correct material and size from the calibration menu before use, or values may be incorrect.
6. SELECT MATERIAL. From the Main Display (first screen seen when unit is turned on) use the ↑ or ↓ keys until SELECT MATERIAL is displayed. Press ENTER. Next toggle through the various selections using the ↑ or ↓ arrows until correct strap size is highlighted, and press ENTER to make your selection. If your specific material is not listed, follow the calibration instructions included at the end of these instructions, or send a sample and the instrument to Tensitron for a custom calibration.
7. SELECTING TENSION UNITS IN LBS, KG or daN. Press the ↑ or ↓ keys until TENSION UNITS is displayed. Press ENTER. Next, select: Lbs, Kilograms or Decanewtons and ENTER selection.
8. ENGAGE INSTRUMENT TO TENSIONED MATERIAL. For best accuracy hold the instrument in the attitude the measurement will be taken in and press ZERO. Then engage the tensioned material by slipping or guiding the instrument’s three contact elements onto the strap. Proper routing of the strapping material is: under the two, outside guide pins, and over the center contact element.

Sec. 4. ADDITIONAL TECHNICAL INFORMATION.

1. SPEEDING UP OR SLOWING DOWN DISPLAY LCD REFRESH RATES - DAMPENING ADJUSTMENT. To either speed up or slow down the rate at which tension values refresh on the display. Use the ↑ or ↓ keys, select SETUP, and press ENTER. Next select DAMPENING and after entering this selection, choose the refresh rate from: 1Hz, 2Hz or 5Hz. When new rate is highlighted, press ENTER.
2. AUDIO. Turn on or off audio beep (with key inputs) by selecting: SETUP, then select AUDIO, and finally either select ON or OFF.
3. BACKLIGHTING INTENSITY. Increase or decrease backlighting intensity by selecting: SETUP, then BACKLIGHT, and finally intensity level.
4. DATA LOGGING. (Optional feature). From the Main display use the UP or DOWN keys until

INSTRUMENTS:

Note: Add option designator to the end of the part number. (For example, a Model STX-250-E denotes a standard, STX-250 with the optional RS-232, serial output function installed).  
- A Analog Output option. 0-5 VDC or 4-20 mA with Software-definable ending sequences. Provided with 10’ cable. Data outputted at 40 Hz.
- E RS-233 Serial Output option. Provided with 10’ cable to Interface with your receiving device. Select data sampling rate from 1, 2 or 5 Hz.
- D Data Logging Option. Capture and play back data within a user-defined time window. Input Real-Time Serial Data into any Windows® application using any number of software wedge programs, such as WinWedge Pro® for Windows, or configure your Windows® operating system to capture the data via Hyper Terminal®. Instruments can be configured with any or all of these options.

SPECIFICATIONS:

- Approximate weight is 2.3 lbs (Weight varies depending upon instrument configuration).
- Re-chargeable NiMH battery with power supply provided. Approximately 6 hours of operation per battery charge depending upon backlighting intensity.
- Power Supply operates with input voltages from 100 – 240V and includes several, interchangeable “blades” allowing use with European, US, Australian, and other plug configurations.
- Automatic shutoff after 10 minutes of non-use.
- Instruments may be operated continuously while connected to power supply.
- Durable, lightweight carrying case with protective foam inserts.
- CE Certification complying with heavy industrial immunity standards.

STX Instruments - calibrated specifically to your strapping type(s) and size(s) to ensure greatest accuracy.

<table>
<thead>
<tr>
<th>Model</th>
<th>Resolution:</th>
<th>Range:</th>
<th>Accuracy*</th>
</tr>
</thead>
<tbody>
<tr>
<td>STX-250</td>
<td>0.5 LBS</td>
<td>5 – 250 LBS</td>
<td>1%</td>
</tr>
<tr>
<td>STX-500</td>
<td>1 LBS</td>
<td>25 – 500 LBS</td>
<td>1%</td>
</tr>
<tr>
<td>STX-1000</td>
<td>5 LBS</td>
<td>50 – 1000 LBS</td>
<td>1%</td>
</tr>
<tr>
<td>STX-2000</td>
<td>10 LBS</td>
<td>100 – 2000 LBS</td>
<td>2%</td>
</tr>
</tbody>
</table>

STXM Instruments - multiple calibrations for different Poly and PET strap sizes.

<table>
<thead>
<tr>
<th>Model</th>
<th>Resolution:</th>
<th>Range:</th>
<th>Accuracy*</th>
</tr>
</thead>
<tbody>
<tr>
<td>STXM-250</td>
<td>0.5 LBS</td>
<td>5 – 250 LBS</td>
<td>3%</td>
</tr>
<tr>
<td>STXM-500</td>
<td>1 LBS</td>
<td>25 – 500 LBS</td>
<td>3-1/2%</td>
</tr>
<tr>
<td>STXM-1000</td>
<td>5 LBS</td>
<td>50 – 1000 LBS</td>
<td>4%</td>
</tr>
<tr>
<td>STXM-2000</td>
<td>10 LBS</td>
<td>100 – 2000 LBS</td>
<td>4%</td>
</tr>
</tbody>
</table>

*Full-scale accuracy for all menu-selectable calibrations. Accuracy for custom calibrations is material specific.
second, respectively. The dampening rate can be set by going to the SETUP menu, selecting DAMPING, adjusting the value of the dampening rate with the \( \uparrow \) and \( \downarrow \) keys and then pressing the ENTER button.

D. The units output serially will be the same units that are selected in the “Tension Units” menu. The currently selected tension units (such as Lbs, Kilograms or Newtons) are also displayed on the main tension screen.

E. Perform the following steps in order to log serial data from the instrument using Hyper Terminal on a PC and put it into a Microsoft Excel spreadsheet:

1. Ensure that the dampening rate is set to “1 Hz + Serial”, “2 Hz + Serial” or “5 Hz + Serial”.
2. Connect the serial cable from the instrument to a serial port on your PC.
3. Go to the Windows® Start Menu and choose Programs->Accessories->Communications->Hyper Terminal®.
4. In the Connection Description dialog box that pops up, type in a name for the new connection (you can use any name you wish to describe this file) and press the OK button.
5. In the Connect To dialog box that pops up next, go to the drop down menu labeled “Serial Port” and select the serial port you connected the cable to in step 2. It is most likely that you are connected to COM1.
6. In the COMX Properties dialog box that pops up next, set the “Bits per second:” to 9600, the “Data bits:” to 8, the “Parity:” to None, the “Stop bits:” to 1 and the “Flow Control:” to None.
7. Click the Apply button and then click the OK button.
8. You should now see tension values appearing in the Hyper Terminal window.
9. If you are connecting to COM1 you saved the data log in and save it as an Excel® file.

10. To retrieve, or upload logged data from the instrument, depress the ESC (escape) key. Collected data will remain in memory, regardless if instrument is turned off, and will only be overwritten once new data is collected. To view collected data select View Data Log and press ENTER. Logged Data can also be uploaded to your computer via the RS-232, serial port.

11. Refer to Sec 4.12, Uploading logged data, for specific instructions.

12. UPLOADING LOGGED DATA (Optional Feature) via RS-232, SERIAL COMMUNICATIONS.

a. Refer to the previous section, Sec. 3.11, Serial Data Collection (RS-232 option) and configure communication protocols as outlined. Note: Step c has no effect on transferring stored data and can be adjusted to any setting.

b. To retrieve, or upload logged data from the instrument, send a lower case ‘d’.

c. Collected data will remain in memory, regardless if instrument is turned off, until overwritten with new data.

**AVAILABLE OPTIONS FOR ALL**

**Data Logging** is displayed. Press ENTER. Next, select **Logging Rate** and select Hz rate which your data will be collected in (choices are from 1Hz to 100Hz). Next select **Duration** and select the time period the data will be collected over by using the UP or DOWN keys. Finally select **Begin Logging** when you are ready to collect your data. Note: You can stop collecting data at any time by simply depressing ESC (escape). Collected data will remain in memory, regardless if instrument is turned off, and will only be overwritten once new data is collected. To view collected data select View Data Log and press ENTER. Logged Data can also be uploaded to your computer via the RS-232, serial port.
FLOW CHART
Model: STX-SERIES DIGITAL TENSION METER

Select Material

3/8"x.020" Poly
1/2"x .020" Poly
5/8"x.035" Poly
5/8"x.040" Poly
1/2"x.019" Steel
3/4"x.025" Steel
1.25"x.031" Steel
Custom 9

Tension Units

Kilograms
Decanewtons
LBS

Data Logging
(Optional)

Logging Rate
Duration
Begin Logging
View Data

Setup

Dampening

Select:
1 Hz
2 Hz
5 Hz

Custom Names

Select:
Custom 1..9

Resolution

Re-Calibrate
Tension

Audio

Backlight

Contrast
Settings

Version

Contrast

Select:
Beep On
Beep Off

Model:

Use ↑ and ↓ keys to navigate main screens
Use ENTER to reach subscreens and ↑ and ↓ keys to make selections.