



PENN-TECH
INTERNATIONAL

TENSION METER USER MANUAL

TM-700, TM-800, TM-1000



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CAUTION: Only have your Penn-Tech Tension Meter calibrated at Penn-Tech International, Inc., or a Penn-Tech Certified Calibration Center.

Any unauthorized repairs or maintenance may void your warranty. If you have questions about maintenance or calibration, please contact us.

1.0 INTRODUCTION

Congratulations, you are using the most accurate, easy to use, and versatile shunt type Tension Meter on the market today. No need for batteries or data input, just choose the correct saddle and handle position for the diameter and strand construction you are measuring and you're ready to go.

This manual covers the operation and care of Penn-Tech's various Tension Meters.

Penn-Tech Tension Meters are designed for installation, inspection and maintenance of all types of cable-load applications.

The Tension Meter uses cable deflection averaging. Readings can be taken directly from loaded cables without disturbing termination points. Measurements are reliable and the work is done quickly and safely.

Combining a Penn-Tech Tension Meter with Twist Plumb and Tension (TPT) software by GTS creates an awesome dynamic field tool no tower tech should be without, proven to increase efficiency and cut inspection time in the field.

2.0 IMPORTANT INSTRUCTIONS

- 2.1** Before using the Tension Meter, to ensure safe and efficient use, read and understand the information and instructions presented in this manual. Watch the helpful training video, available on the Penn-Tech website. A copy of this manual should be made available to every operator. Extra copies available upon request.
- 2.2** Be sure all personnel operating the Tension Meter knows how to use it safely.
- 2.3** This manual must be made available to all users.
- 2.4** Before using the Tension Meter, inspect the unit as well as the accessories for any visible damage. Never use a Tension Meter that is not in good condition.
- 2.5** Protect your Tension Meter from any form of impact, especially the dial indicator.
- 2.6** Do not use the Tension Meter for loads that exceed the maximum for that Tension Meter model.
- 2.7** The use of your Tension Meter must be in full compliance with all OSHA safety and health regulations.
- 2.8** The calibration charts that are provided with the unit are plotted specifically for use with that unit.
- 2.9** Always keep the calibration charts in the case with the appropriate Tension Meter.
- 2.10** At the time of purchase or recalibration a PDF copy of the calibration charts will be sent to you via email. It is suggested that you save them to your computers.
- 2.11** Only use the Tension Meter for the correct construction, breaking strength and size of cable/wire that the Tension Meter is calibrated for.
- 2.12** Verify the cable/wire size before using the Tension Meter with your PTI cable gauge.
- 2.13** Be certain to use the correct handle position and/or accessory saddle when taking measurements. These are shown on the charts for the given cable/wire.
- 2.14** Incorrect handle position and accessory saddle use will result in false readings and possible damage to the Tension Meter.
- 2.15** Calibration of the Tension Meter must be performed by Penn-Tech. Improper calibration will result in false readings.

2.16 Penn-Tech is not responsible/liable if any damage or defect results from (1) misuse, abuse, neglect, or improper installation; (2) disasters such as fire, flood, lightning or improper electric current; (3) service or alteration by anyone other than a Penn-Tech Technician; (4) damages incurred through irresponsible use, or other non-recommended practices.

2.17 Penn-Tech is not responsible for the maintenance or calibration of the Tension Meter beyond the date of shipment. Annual maintenance, calibration, and adjustments are the responsibility of the purchaser/owner.

3.0 UNPACKING

3.1 Inspect your Penn-Tech Tension Meter upon arrival. Damage or missing items must be reported immediately to Penn-Tech within 24 hours of arrival.

Contact Penn-Tech for shipper's tracking number to report damage that occurred during shipping. Carefully check the contents to ensure that all accessories and charts are accounted for. Each unit is photographed just before shipping and is available if needed for claims.

3.1.1 New Tension Meter comes complete with carry case, saddle block(s), field calibration verification tool, cable gauge, calibration charts and calibration certificate.

- TM-700 includes (1) #12 saddle block.
- TM-800 includes (1) #58 saddle block.
- TM-1000 includes (4) saddle blocks: S, M, L, XL.



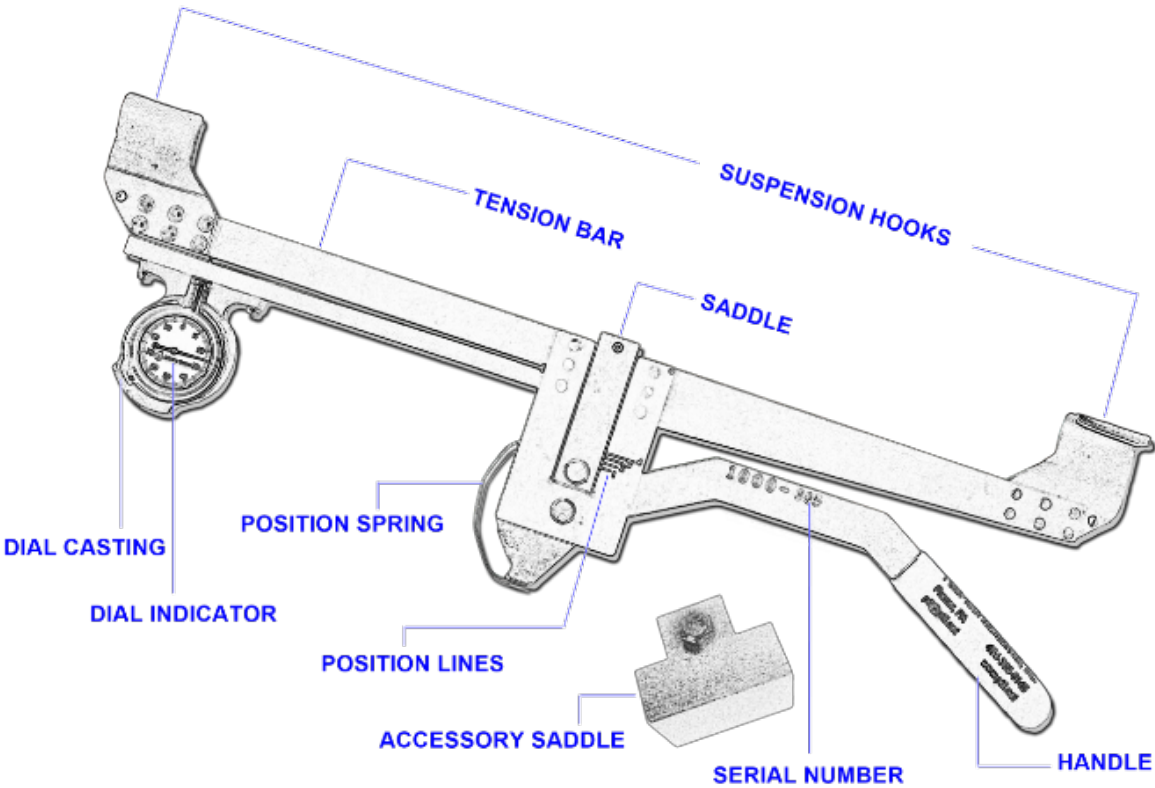
Models TM-700, TM-800



Model TM-1000

Accessories shown in the case may not be included and only show that the case accommodates extra accessories.

4.0 DESCRIPTION



Tension Meter Parts Diagram

5.0 SPECIFICATIONS

Display

Mechanical Dial, NO batteries required.

Capacity

TM-700	100 to 7,000 pounds
TM-800	100 to 12,000 pounds
TM-1000	100 to 35,000 pounds

Wire Types

High strength (HS), extra high strength (EHS), bridge strand (BS), Alumoweld and more.

Number of Wires

Unlimited (within diameter range of model).

Wire Diameter

TM-700	3/16" – 5/8"
TM-800	3/16" – 3/4"
TM-1000	3/16" -1-1/8"

Accuracy

+/- 1%

Environmental Temperature

Indoors or Outdoors, 0°F to 150°F

Weight

TM-700:	7.5 pounds with #12 accessory saddle
TM-800:	8.5 pounds with #58 accessory saddle
TM-1000:	14.5 pounds with accessory saddles

Dimension of Models

TM-700:	18"x6-1/2"x1-2/8" approx.
TM-800:	19"x6-7/8"x1-7/8" approx.
TM-1000:	26"x8-1/4"x1-5/8" approx.

6.0 FIELD CALIBRATION VERIFICATION

6.1 The field calibration verification tool was designed to test your Penn-Tech Tension Meter prior to use in the field and any time the meter has been dropped or impacted in any way.

The tool is used to verify that your dial is properly functioning and readings are accurate compared to the calibrated readings recorded during the last manufacturer calibration.

Caution: Use of this tool shall be performed as instructed in this manual to ensure proper readings are achieved.

The verification tool is tested in the calibration lab and readings are recorded on your calibration certificate. When testing in the field you should have measurements within $\pm 2\%$ of the manufacturer's recorded readings.

If this is not achieved the Tension Meter may have to be sent to the manufacturer and repaired or re-calibrated. Before deciding to send in the unit the user should inspect for loose hardware, dirt, mud or any object lodged in the movable parts of the handle and dial areas.

6.2 The verification tool is simple to use. The tool has two positions for test readings labeled 1 and 2 on each end.

Each of the two ends will provide a dial reading that is to be compared to the calibration readings recorded on the calibration certificate provided with your Tension Meter charts.

6.2.1 If you are using TPT software, the set-up tab has an area to input your verification readings. After you click the field calibration tab you will have a certificate displaying test 1 and test 2 readings.

The certificate will indicate if the test passed or failed compared to the manufacturer's recorded readings that are programmed into your software program during calibration.



6.2.2 The new field calibration verification tool is machined from 305 stainless steel. Each end has a specific width and is labeled as 1 and 2.

The verification readings are determined by inserting each end of the tool between the cut in the Tension Meter body at the dial location end.

Caution: Each end is pointed and can cause injury if used or stored incorrectly.

6.2.3 Lay the Tension Meter on a flat surface as shown in the next set of images. The dial indicator will not be pointing at zero when in this position. It will be similar to the dial in the next image.

We suggest using your Tension Meter case as this is what we use in the calibration lab for the calibrated readings provided with your Tension Meter. If an uneven surface is used the readings may not be accurate.

6.2.4 Insert position 1 while the Tension Meter is laying on a flat surface and record the dial reading. After recording the reading turn the tool 180 degrees and insert position 2. Record the dial reading.

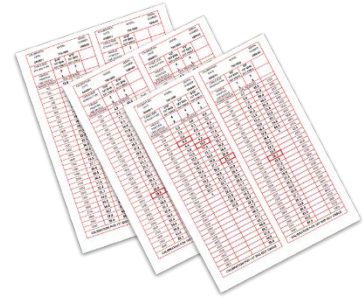


6.2.5 You will find the field Calibration verification tool readings recorded by the Penn-Tech calibration lab on your calibration certificate provided with your Tension Meter.

7.0 OPERATION

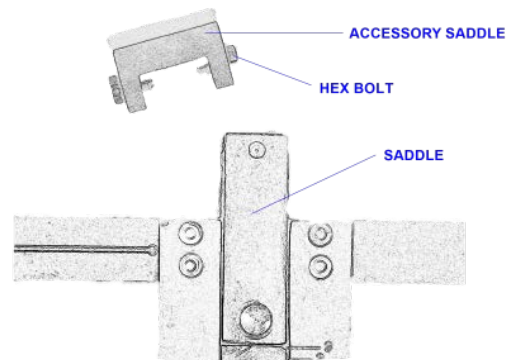
7.1 Calibration Charts

Each Tension Meter comes with calibration charts plotted specifically for use with that unit. The serial number on each chart is the serial number of the unit for which it was calibrated. A PDF copy of the charts is emailed to you and should be saved to your computer.



7.2 Accessory Saddle(s)

The TMB accessory saddle/block is used to measure small cable diameters. It is secured to the built-in saddle with two hex bolts. The accessory saddle must be removed to test larger cable. Always check the calibration chart to determine accessory saddle requirements.



7.3 Dial Indicator

For accurate readings, the dial indicator should point to zero when the Tension Meter is suspended from the cable. To check the dial indicator, hold the Tension Meter by the hooks and tilt it to a 45-degree angle with the dial at the low end. If the dial pin does not “zero out” adjust the dial face by loosening the slotted screw that is recessed in the dial casing.

Turn the dial face until the needle is pointing at “0” and tighten the screw. The dial indicator reads from 0 to 100, most measurements will be within this range and are recorded as the number the needle indicates. On high load measurements the dial needle may pass zero, in this case the measurement is recorded as 100 plus the number indicated by the dial needle.



8.0 BEFORE MEASURING

Test the Tension Meter with the field calibration verification tool as instructed in section 6. Verify the diameter of the cable/wire you will be testing. Consult the calibration charts for the cable/wire diameter you will be testing to get the following information.

8.1 Handle Position

8.1.1 Models TM-700 and TM-800: the chart will indicate the correct handle position 1, 2, or 3 to be used for the given size cable/wire.

8.1.2 Model TM-1000: the chart will indicate the correct handle position 1, 2, 3, or 4 to be used for the given size cable/wire.

8.2 Accessory Saddle

8.2.1 Models TM-700 and TM-800: a YES beside the handle position number indicates that an accessory saddle must be used.

8.2.2 Model TM-1000: An X, L, M, or S beside the handle position number indicates what size accessory saddle must be used. Verify that the dial indicator is “zeroed out” (see section 7.3).

9.0 TAKING MEASUREMENTS

Once the above items have been verified you are ready to begin taking measurements.

9.1 Readings should be taken at least 12 inches above anchorage hardware (preforms, wire clips, etc.).

9.2 The cable test area must be free from damage caused by cable grips, clamps or severe corrosion.

9.3 If the chart indicates to use an accessory saddle place the appropriate accessory saddle on the Tension Meter using the two hex bolts and make sure the bolts are snug (see section 7.2).

9.4 Place the Tension Meter on the cable/wire by the hooks with the dial indicator facing the user.

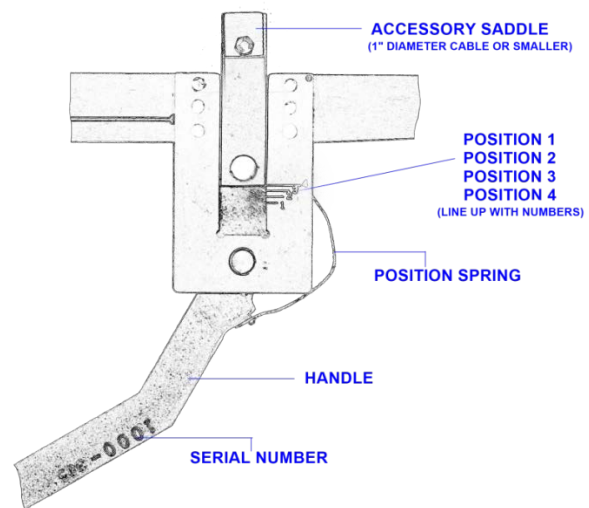
9.5 The dial is best placed at the user's eye level so that the dial can be viewed straight on.

9.6 The dial indicator and handle should be at the low end of the cable/wire.

9.7 Set the handle to the appropriate position.

9.8 The dial will register a reading. Record the dial reading and repeat this process at least three times, moving the Tension Meter along the cable/wire approximately six inches or so for each reading. Record the temperature of the cable/wire.

9.9 You are looking for three consistent numbers. Average the readings and consult the charts to convert the reading to pounds.



10.0 MAINTENANCE & TIPS

10.1 Annual maintenance and recalibration is recommended to protect your unit from natural wear and tear. This will keep your Penn-Tech Cable Tension Meter performing at its best.

10.1.1 Keep your Tension Meter dry and clean. If you encounter a sudden rain or snow shower, wipe the unit dry before storing.

10.1.2 If moisture/condensation is found in dial do not remove dial from Tension Meter. Allow unit to air dry in a warm environment.

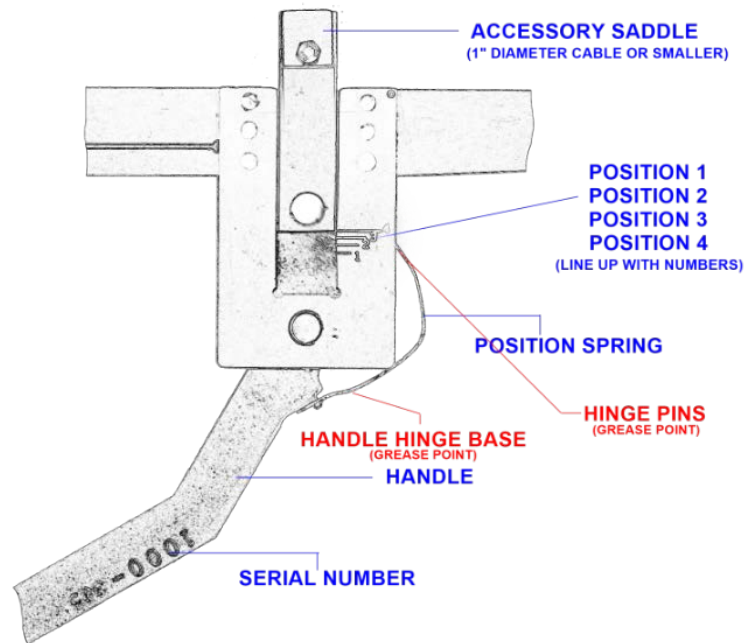
10.1.3 If the foam inside your case gets wet, remove it from the hard case and air dry before returning it to the case.

10.1.4 When traveling always take unit inside and store in dry warm place when not in use. This also eliminates the possibility of equipment being stolen from work vehicles.

10.1.5 Do not use penetrating oils to grease your unit; these oils remove grease and jeopardize the unit's integrity. Use lithium grease on the areas specified on the next diagram.

10.1.6 Keeping your unit clean and dry to ensure your tool is in top working condition. Be sure to remove any dirt or sand that may get into your carry case.

10.1.7 If your dial is not operating properly DO NOT try to fix it. Send it in and our Tech will address the problem. Do not use penetrating oils or grease on the dial. This will cause internal gear damage and the dial will have to be replaced. Tampering with the dial or dial casing will void any warranty that might be in effect.



11.0 SPARE PARTS & ACCESSORIES

The following parts and accessories are all available from Penn-Tech International, Inc. Please contact us or head to our website to place your order.

11.1 Spare Parts

- Tension Meter Spring
- Saddle Blocks

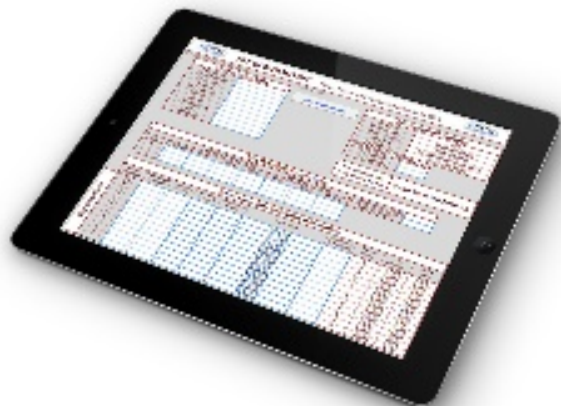
11.2 Accessories

- Calibration Verification Tool
- PTI Cable Gauge
- Tension Meter Carrying Case

Take the calculations out of tension and alignment work.

Visit our website for more information about our TPT Contractor software:

www.ptii.net/TPT-Contractor



12.0 LIMITED WARRANTY

12.1 Definitions.

For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or internet/email order (or, if different, on Seller's quotation, order acknowledgement or confirmation), (ii) "Seller" shall mean the entity identified on Seller's quotation, order acknowledgement, confirmation or internet/email order and (iii) "Equipment" shall mean a product manufactured by Seller pursuant to the applicable purchase order or internet/email order, quotation, order acknowledgement or confirmation.

12.2 Limited Warranty.

Seller warrants for a period of one (1) year from the date of original shipment from Seller's facility, that the equipment will be free from defects in materials or workmanship arising under proper and normal use. This warranty shall apply only to the Tension Meter and shall not apply to any other goods, parts or components.

12.3 Inspection.

If Buyer claims that the equipment is defective in materials or workmanship, Seller shall have the right to examine the equipment and issue shipping instructions for return of the equipment. Buyer shall prepay all transportation charges for such return.

12.4 Remedies.

Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective equipment or a credit for the purchase price of the defective equipment. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective equipment, the replaced or repaired equipment will be warranted for the remainder of the warranty term applicable to the originally shipped equipment, but the warranty shall not be extended beyond its original term.

12.5 Notice and Waiver.

If Buyer discovers any defect in materials or workmanship in the Product, Buyer must notify Seller of the claimed defect on or before the fifth (5th) day after the date on which Buyer discovers the claimed defect. FAILURE TO GIVE TIMELY NOTICE OF A CLAIM UNDER THIS WARRANTY SHALL RESULT IN BUYER'S WAIVER OF SUCH CLAIM.

12.6 Transfer of Ownership.

This warranty is not transferable.

12.7 Exclusions from Warranty.

This warranty shall be subject to normal wear and tear of the equipment and shall not apply to any defects attributable to: (a) improper installation; (b) misapplication of parts; (c) lack of proper inspection or maintenance; (d) ordinary wear and tear; (e) severe weather conditions or acts of nature, including but not limited to lightning or floods; (f) usage or operation not in accordance with published ratings, specifications or instructions, (g) any adjustment, modification, alteration or repair not expressly authorized by Seller; (h) misuse, abuse or neglect of the equipment; (i) any type of aesthetic changes due to oxidation or corrosion occurring on steel parts; or (j) accidental damage.

12.8 Limitations on Liability.

THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE EQUIPMENT WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED THE PURCHASE PRICE OF SUCH EQUIPMENT. IN NO EVENT WILL SELLER BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED REVENUES OR PROFITS. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

12.9 Choice of Law.

The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania, U.S.A.