

Instruction Manual

Valid as of: 01.11.2018 • Please keep the manual for future reference!



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1 Warranty and liability

In principle, the supply of the device is subject to our “General Conditions of Sale and Delivery.” These have been provided to the operating company on conclusion of the contract, at the latest.

Warranty:

- SCHMIDT tension meters are warranted for 12 months.
- Parts subject to wear, electronic components and measuring springs are not covered by the warranty. No warranty or liability will be accepted for bodily injury or property damage resulting from one or several of the following causes:
 - Misuse or abuse of the device.
 - Improper mounting, commissioning, operation and maintenance of the device (e.g. verification interval).
 - Operation of the device if any safeguards are defective or if any safety and protection precautions are not properly installed or not operative.
 - Failure to comply with the notices in the instruction manual regarding transport, storage, mounting, commissioning, operation, maintenance and setup of the device.
 - Any unauthorized structural alteration of the device.
 - Insufficient inspection of device components that are subject to wear.
 - Opening the device or improper repair work.
 - Disasters caused by the effects of foreign objects or by force majeure.

1.1 Notices within the instruction manual

The fundamental prerequisite for the safe handling of this device and its troublefree operation is the knowledge of the basic safety notices and safety instructions.

This instruction manual contains the most important notices for the safe operation of the device.

This instruction manual, in particular the safety notices, must be observed by any person who works with the device. In addition, the local valid rules and regulations for the prevention of accidents must be complied with.

The representations within the instruction manual are not true to scale.

The dimensions given are not binding.

General indications of direction, such as FRONT, REAR, RIGHT, LEFT apply when viewing the front of the device.

1.2 Responsibilities of the operating company

In compliance with the EC Directive 89/655/EEC, the operating company agrees to only permit persons to work with the device who:

- are familiar with the basic regulations on industrial safety and accident prevention and who have been trained in handling the device.
- have read and understood the chapter on safety and the warning notices in these instruction manual and have confirmed this with their signatures.
- are examined regularly on their safe and conscientious working method.

1.3 Responsibilities of the personnel

All persons who work with the device agree to perform the following duties before starting work:

- to observe the basic regulations on industrial safety and accident prevention.
- to read the chapter on safety and the warning notices in these instruction manual and to confirm with their signatures that they have understood them.

1.4 Informal safety measures

The instruction manual must always be kept on hand where the device is operated. Apart from the instruction manual, the generally and locally valid regulations on accident prevention and environmental protection must be provided and complied with.

1.5 Training of the personnel

Only trained and instructed personnel is permitted to work with the device. The responsibilities of the personnel must be clearly defined for mounting, commissioning, operation, setup, maintenance, and repair. Trainees may only work with the device under the supervision of experienced personnel.

1.6 Intended use

The device is intended exclusively to be used as a tension meter. Any other use or any use exceeding this intention will be regarded as misuse. Under no circumstances shall Hans Schmidt & Co GmbH be held liable for damage resulting from misuse.

The intended use also includes:

- Complying with all notices included in the instruction manual and observing all inspection and maintenance works.

1.7 Dangers in handling the device

The device was designed according to the state of the art and the approved safety standards. Nevertheless, its use may cause serious or fatal injury to the user or third persons, and/or an impairment of the device or of other material assets.

The device may only be applied:

- For its intended use in a faultless condition with regard to the safety requirements.
- Malfunctions that could impair safety must be remedied immediately.
- Personal protective equipment must be used according to the EC Directive 89/686/EEC.



The device must not be operated in potential explosive areas and must not come into contact with aggressive substances.

1.8 Copyright

The copyright on these instruction manual remains with the company Hans Schmidt & Co GmbH.

These instruction manual is intended for the operating company and its personnel only. They contain instructions and notices that may only be reproduced on the prior written permission of

Hans Schmidt & Co GmbH

and under indication of the complete reference data.

Violations will be prosecuted.

1.9 Declaration of conformity, RoHs II and WEEE registration

In compliance with the EU Directives 2014/30/EU and 2011/65/EU



Hans Schmidt & Co GmbH is registered in compliance with the German Electrical and Electronic Equipment Act (ElektroG) under WEEE Reg. No. DE 48092317.

2 Available models

2.1 General Information

1 These instruction manual refer to the DTX model of the DT series; they are also applicable to the following models: DTXB, DTXE, DTXF und DTXL.

The individual models of the DT series are also available with the following modifications (customized versions):

- Special tension ranges
- Customized measuring head width for applications with limited access space
- Customized distance between the two outside guide rollers to minimize deflection of fragile material

2.1.1 Available DTX models

| Model | Tension Ranges cN | *Measuring Head Width mm | **SCHMIDT Calibration Material 1 (PA = Polyamide Monofilament) | SCHMIDT Calibration Material 2 (soft-annealed Copper Wire) | Material Thickness Compensator Included |
|------------|-------------------|--------------------------|--|--|---|
| DTX-200 | 1 - 200.0 | 66 | 0.12 mm Ø | 0.10 mm Ø | |
| DTX-500 | 1 - 500.0 | 66 | 0.12 + 0.20 mm Ø | 0.16 + 0.25 mm Ø | yes |
| DTX-1000 | 10 - 1000 | 66 | 0.20 + 0.40 mm Ø | 0.25 + 0.40 mm Ø | yes |
| DTX-2000 | 20 - 2000 | 66 | 0.40 + 0.70 mm Ø | 0.40 + 0.60 mm Ø | yes |
| DTX-2500 | 25 - 2500 | 116 | 0.40 + 0.70 mm Ø | 0.40 + 0.60 mm Ø | yes |
| DTX-4000 | 40 - 4000 | 66 | 0.50 + 0.80 mm Ø | 0.50 + 0.80 mm Ø | yes |
| DTX-5000 | 50 - 5000 | 116 | 0.60 + 1.20 mm Ø | 0.60 + 1.00 mm Ø | yes |
| DTX-10K | 0.1 - 10.00 daN | 116 | 0.80 + 1.40 mm Ø | 0.80 + 1.20 mm Ø | yes |
| DTX-20K | 0.2 - 20.00 daN | 166 | 1.20 + 1.80 mm Ø | steel rope: 1.5 mm Ø steel rope: 2.0 mm Ø | yes |
| DTX-30K | 0.3 - 30.00 daN | 216 | 1.40 + 2.00 mm Ø | steel rope: 1.5 mm Ø steel rope: 2.5 mm Ø | yes |
| DTX-50K | 0.5 - 50.00 daN | 216 | steel rope 1.5 mm Ø (7 x 7 x 0.15) | steel rope 2.0 mm Ø (7 x 7 x 0.30) | |
| DTX-60K-V1 | 0.6 - 60.00 daN | 280 | steel rope 2.0 mm Ø (7 x 7 x 0.30) | steel rope 2.5 mm Ø (7 x 7 x 0.40) | |

International unit of tensile force: 1 cN = 1.02 g = 0.01 N, 1 daN = 1.02 kg = 10.0 N

* Depending on model, either width of filament guide or outer distance between outside guide rollers.

** Suitable for 95 % of all applications. If the material to be measured differs significant from the SCHMIDT calibration material in diameter, rigidity, shape, etc., we recommend calibration using customer supplied material. Instruments with calibration on customer sample are not adjusted and calibrated on material 1 and 2.

2.1.1 Available DTX models

| Model | Tension Range cN | Textile Industry Applications | Wire Industry Applications (Copper Wire) |
|------------|---------------------|----------------------------------|--|
| DTX-200 | 1 - 200.0 | max. 200 tex | max. 0.15 mm Ø |
| DTX-500 | 1 - 500.0 | max. 500 tex | 0.05 - 0.25 mm Ø |
| DTX-1000 | 10 - 1000 | max. 1000 tex | 0.10 - 0.40 mm Ø |
| DTX-2000 | 20 - 2000 | max. 2000 tex | 0.30 - 0.60 mm Ø |
| DTX-2500 | 25 - 2500 | max. 2500 tex | 0.30 - 0.70 mm Ø |
| DTX-4000 | 40 - 4000 | max. 4000 tex | 0.35 - 0.90 mm Ø |
| DTX-5000 | 50 - 5000 | max. 5000 tex | 0.40 - 1.00 mm Ø |
| DTX-10K | 0.1 - 10.00 daN | max. 10000 tex | 0.70 - 1.40 mm Ø |
| DTX-20K | 0.2 - 20.00 daN | max. 20000 tex | 1.00 - 2.00 mm Ø |
| DTX-30K | 0.3 - 30.00 daN | max. 30000 tex | 1.20 - 2.50 mm Ø |
| DTX-50K | 0.5 - 50.00 daN | max. 50000 tex | 1.40 - 3.00 mm Ø |
| DTX-60K-V1 | 0.6 - 60.00 daN | max. 60000 tex | 1.80 - 3.50 mm Ø |



DTX guide rollers:

| V-grooved | Line Speed max. m/min | Roller Material |
|---|--------------------------|--|
| Standard | 2000 | Hard-coated aluminium |
| Code K | 3500 | Hard-coated aluminium |
| Code H | 5000 | Plasma-coated aluminium |
| Code T | 1000 | Plastic (POM) black |
| Code T | 4000 | Plastic (PVC) red only for DTXF |
| Code W | 1000 | Nickel-plated steel |
| Code ST | 1000 | Hardened steel |
| Code B | 1000 | Tempered steel for measuring tire cord |
| Code CE2 | 1000 | ceramic-coated aluminium |
| Asymmetrical groove Code ASY | 1000 | Hard-coated aluminium (not for DTX-200) |
| Code ASYB | 1000 | Tempered steel for measuring tire cord (not for DTX-200) |
| Code V1 | 1000 | Hard-coated aluminium (only for DTX-60K-V1) |
| U-grooved Code U | 2000 | Hard-coated aluminium (not for DTX-200) |

2.1.2 Available DTXL models

| Model | Tension Ranges cN | *Measuring Head Width mm | **SCHMIDT Calibration |
|-------------|-------------------|--------------------------|--|
| DTXL-2500 | 150 - 2500 | 185 | With convenient material for each roller design or customer supplied samples |
| DTXL-5000 | 250 - 5000 | 185 | |
| DTXL-10K | 1 - 10.00 daN | 235 | |
| DTXL-20K | 2 - 20.00 daN | 235 | |
| DTXL-50K-R4 | 5 - 50.00 daN | 226 | With convenient or customer supplied material |
| DTXL-50K-R5 | 5 - 50.00 daN | 226 | |
| DTXL-60K-R4 | 6 - 60.00 daN | 276 | |
| DTXL-60K-R5 | 6 - 60.00 daN | 276 | |



* Outer distance between outside guide rollers.

** The model DTXL do not include a material thickness compensator and is calibrated only on one material

DTXL guide rollers:

| V-Groove | Line Speed max. m/min | Roller Material |
|-----------------------------------|-----------------------|---|
| Standard | 4000 | Stainless steel 1.4125 (Ø max. 4 mm) |
| U-Groove Code R1 | 4000 | Hard chrome-plated steel (radius 5) |
| Code R4 | 1000 | Hardened steel (Ø 8 - 11 mm) only DTXL-50K-R4 and DTXL-60K-R4 |
| Code R5 | 1000 | Hardened steel (Ø 12 - 15 mm) only DTXL-50K-R5 and DTXL-60K-R5 |
| flat Code B6 | 2000 | Hardened steel, width 6 mm |
| Code B10 | 2000 | Hardened steel, width 10 mm |

2.1.3 Available DTXF models

| Model | Tension Ranges cN | *Measuring Head Width mm | **SCHMIDT Calibration |
|-----------|-------------------|--------------------------|-----------------------|
| DTXF-200 | 1 - 200.0 | 140 | 0.12 mm Ø |
| DTXF-500 | 1 - 500.0 | 140 | 0.20 mm Ø |
| DTXF-1000 | 10 - 1000 | 140 | 0.30 mm Ø |
| DTXF-2000 | 20 - 2000 | 140 | 0.50 mm Ø |



* Outer distance between outside guide rollers.

** Suitable for 95 % of applications. PA = Polyamide Monofilament
The model DTXF do not include a material thickness compensator and is calibrated only on one material

DTXF guide rollers:

| V-Groove | Line Speed max. m/min | Roller Material |
|-----------------|-----------------------|-----------------------|
| Standard | 4000 | Hard-coated aluminium |
| Code T | 4000 | Plastic (PVC red) |

2.1.4 Available DTXE models

| Model | Tension Ranges cN | *Measuring Head Width mm | **SCHMIDT Calibration |
|-----------|-------------------|--------------------------|-----------------------|
| DTXE-200 | 1 - 200 | 36 | 0.12 mm Ø |
| DTXE-500 | 1 - 500 | 36 | 0.20 mm Ø |
| DTXE-1000 | 10 - 1000 | 36 | 0.30 mm Ø |
| DTXE-2000 | 20 - 2000 | 36 | 0.50 mm Ø |



* Width of bracket assembly.

** Suitable for 95 % of applications. PA = Polyamide Monofilament
The model DTXE do not include a material thickness compensator and is calibrated only on one material

DTXE guide rollers:

| V-Groove | Line Speed max. m/min | Roller Material |
|-----------------|-----------------------|-----------------------|
| Standard | 900 | Hard-coated aluminium |
| Code K | 2000 | Hard-coated aluminium |

2.1.5 Available DTXB models

| Model | Tension Ranges cN | *Measuring Head Width mm | Roller Widths mm |
|-----------|-------------------|--------------------------|----------------------|
| DTXB-500 | 5 - 500 | 55 | 7, 10, 15, 20 |
| DTXB-1000 | 50 - 1000 | 55 | 7, 10, 15, 20, 30,41 |
| DTXB-2000 | 100 - 2000 | 55 | 7, 10, 15, 20, 30,41 |
| DTXB-2500 | 150 - 2500 | 117 | 7, 10, 15, 20, 30,41 |
| DTXB-4000 | 200 - 4000 | 55 | 7, 10, 15, 20, 30,41 |
| DTXB-5000 | 250 - 5000 | 117 | 7, 10, 15, 20, 30,41 |
| DTXB-10K | 0.5 - 10 daN | 117 | 7, 10, 15, 20, 30 |
| DTXB-20K | 1 - 20 daN | 167 | 7, 10, 15, 20, 30 |
| DTXB-30K | 1.5 - 30 daN | 217 | 7, 10, 15 |
| DTXB-50K | 2.5 - 50 daN | 217 | 7, 10 |



* Outer distance between outside guide rollers.

SCHMIDT calibration - according to measuring range and roller width - with a textile ribbon or thin tape.

The model DTXB do not include a material thickness compensator and is calibrated only on one material

DTXB guide rollers:

| V-Groove | Line Speed [m/min ... max.] | Roller Material |
|-----------------|-----------------------------|-----------------------|
| Standard | 1000 | Hard-coated aluminium |

2.2 Specifications

| | |
|-------------------------------------|--|
| Calibration: | According SCHMIDT factory procedure |
| Accuracy: | For PA from 5 % up to 100 % full scale: ± 0.5 % full scale ± 1 digit remaining tension range and other calibration materials: ± 3 % full scale ± 1 digit |
| Accuracy DTXL: | From 5 % up to 100 % full scale: ± 0.5 % full scale ± 1 digit remaining tension range, device with tension range 50 daN and 60 daN and customer supplied material: ± 5 % full scale ± 1 digit |
| Memory for material curves | DTX: 2 factory adjustments and 9 for customized calibrations DTXB, DTXL, DTXF, DTXE: 1 factory adjustment and 10 for customized calibrations |
| Measuring units: | Force: cN, daN, g, kg, N, lb and Thickness: mm, inch |
| Overrange: | Approx. 10 % full scale, full scale, without accuracy guarantee |
| Overload protection: | 100 % full scale |
| Measuring principle: | Strain gauge bridge |
| Measuring roller deflection: | Max. 0.2 mm |
| Signal processing: | digital |
| Measuring frequency: | Max. 1 kHz (1000 measurements/sec), internal 8 kHz |
| Display: | Graphic LCD display with 3 different displays: numeric, numeric with bargraph, X-Y-diagramm (time-tension) |
| Display update time: | 2/sec (Display update) |
| Memory: | Min, Max, Peak, Avg and Last. 60.000 values at 255 measuring periods |
| Memory modes: | 5 Memory modes with statistical evaluation |
| Damping: | Adjustable electronic damping (averaging) |
| Cal. Adjustment: | ± 10 steps in 1 % increments |
| Thickness compensation: | Max. 2.5 mm (not available for all models) |
| Output signal: | USB |
| Auto power off: | Approx. 3 minutes of non-use |
| Signal processing: | 16 bit A/D |
| Temperature coefficient: | Gain: less than ± 0.01 % full scale/ $^{\circ}$ C at 25 $^{\circ}$ C Zero point: better than ± 0.03 % full scale/ $^{\circ}$ C at 25 $^{\circ}$ C |
| Temperature range: | 10 - 45 $^{\circ}$ C |
| Air humidity: | 85 % RH, max. |
| Power supply: | LiPo Accumulator (approx. 40 h continuous use, charging time approx. 3 1/2 h), USB AC adapter 100 - 240 V AC, adapters (EU/USA/UK/AUS-NZ) |
| Housing material: | Die-cast aluminium |
| Housing dimensions: | 265 x 78.5 x 46 mm (L x W x H) |
| Weight net (gross): | Up to DTX-50K approx. 875 g (1550 g) DTX-60K-V1 approx. 1040 g (2700 g) |

2.3 Connecting the tension meter



The requirements of the CE specification are only complied with if the tension meter is equipped and operated with equipment supplied by Hans Schmidt & Co GmbH. Certification to the CE specification does not extend to, and shall be invalid for any other combination. For damage resulting thereby we assume no liability.

2.4 Delivery includes

- Tension meter with accumulator
- USB AC adapter with 4 adapters (EU/US/UK/AUS-NZ)
- USB cable
- Software »Tension Inspect 3« for PC Windows 7 or higher
- Certificate of Compliance with the order 2.1 under EN 10204
- Instruction manual
- Carrying case

2.5 Unpacking

Unpack the tension meter and inspect it for any shipping damage. Notices of defect must be announced immediately, in writing, at the latest within 7 days on receipt of the goods.

3 Operations

3.1 Notes before starting measurement



Have you read and understood the instruction manual, in particular chapter 1 “Warranty and liability” ?

You are not permitted to operate the tension meter before doing so.

Before working with the instrument you must put on your personal protective clothing, if necessary. For example, eye protectors, gloves, etc.

To avoid damage do not move the center roller by hand.

Tensions that exceed the tension range of the instrument by more than 100 % may cause permanent damage to the measuring spring and must be avoided under any circumstances.



The ID plate with the CE mark and the serial number as well as the calibration label (optional) are provided on the backside of the instrument, the SCHMIDT quality seal is provided on the surface.

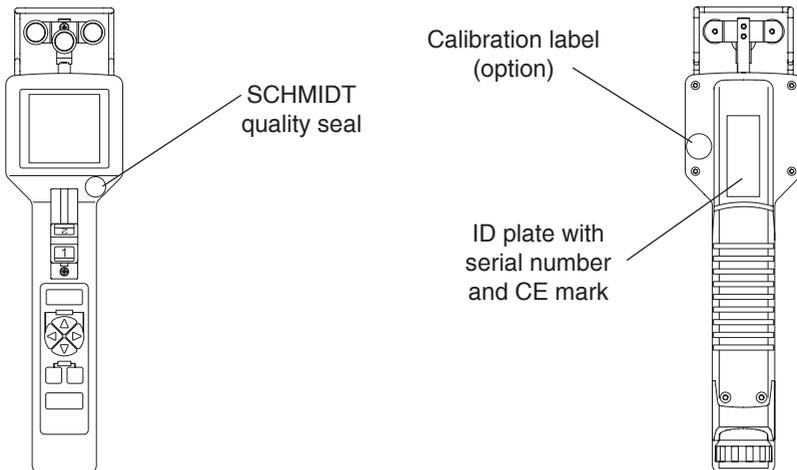


fig. 3.1

3.1.1 Stationary mounting of the unit (optional)

(Code MH - with distance bolts)

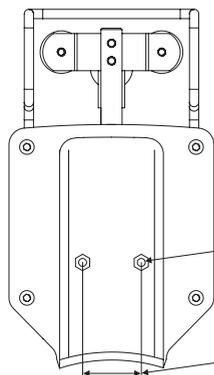


fig. 3.1.1

Distance bolts length 10 mm

Thread size M5

Thread depth max. 5 mm

Hole distance 23 mm

Optionally, the tension meter can be delivered with distance bolts for stationary use. The dimensions are given in fig. 3.1.1. The distance bolts can be removed.



Only factory-made threaded holes for the distance bolts are permissible (otherwise, we cannot accept any warranty).

3.1.2 Wi-Fi communication (optional)

(Code WL - with Wi-Fi antenna)

Tension meters equipped with the Wi-Fi feature can transmit measured values to a PC via Wi-Fi.

Requirements:

- The Wi-Fi feature must have been enabled in the Wi-Fi Setup.

Manual connection to a network

- Select „Wi-Fi Setup/Settings“ and enter the name of the network (SSID) and the password (PW).

Automatic connection to a network

- Select Scan Network in the menu „Wi-Fi Setup/Settings“.
All available networks will be displayed.
- Select the desired network and confirm the network name (SSID) by pressing .
- Enter the password required for this network and confirm with .

1 • The name (SSID) of the currently selected network is displayed under „Wi-Fi Setup/Settings“.

If you do not need the Wi-Fi feature you can remove the antenna.

3.1.2 Wi-Fi communication (optional) (cont.)

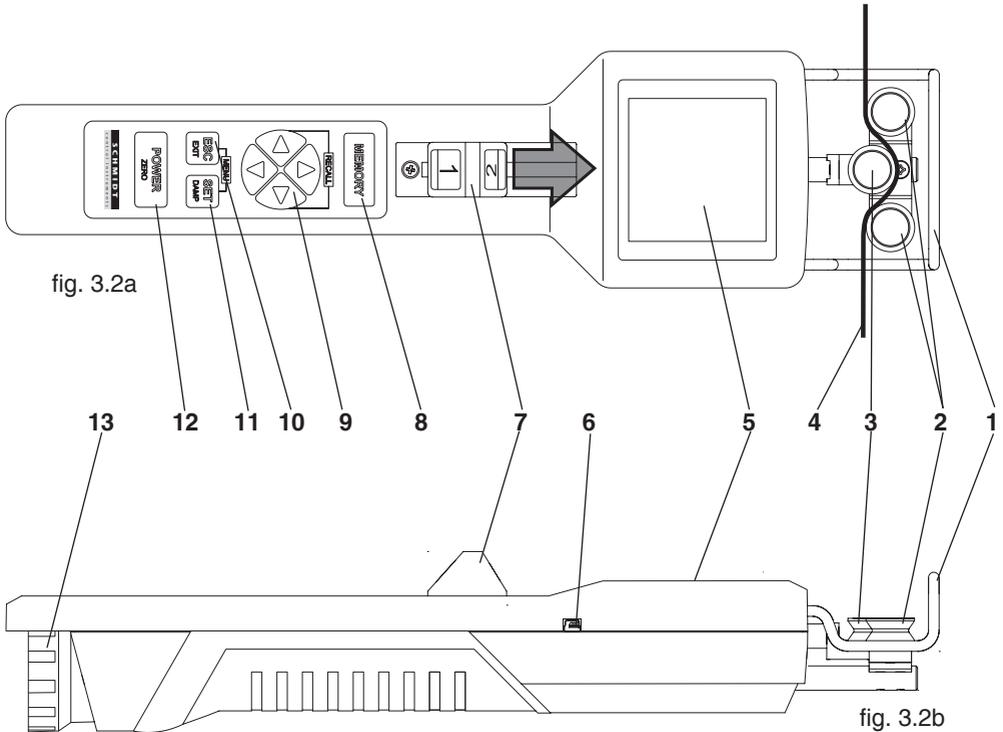


This device complies with part 15 of the FCC rules.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

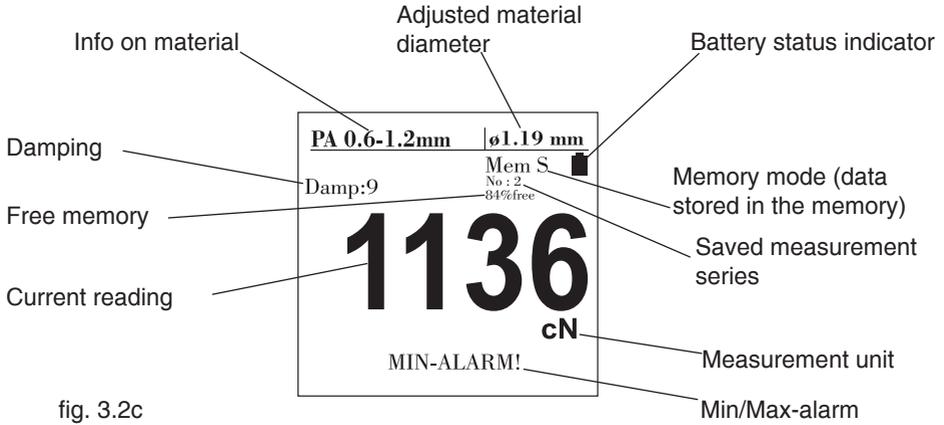
3.2 Operating and display elements



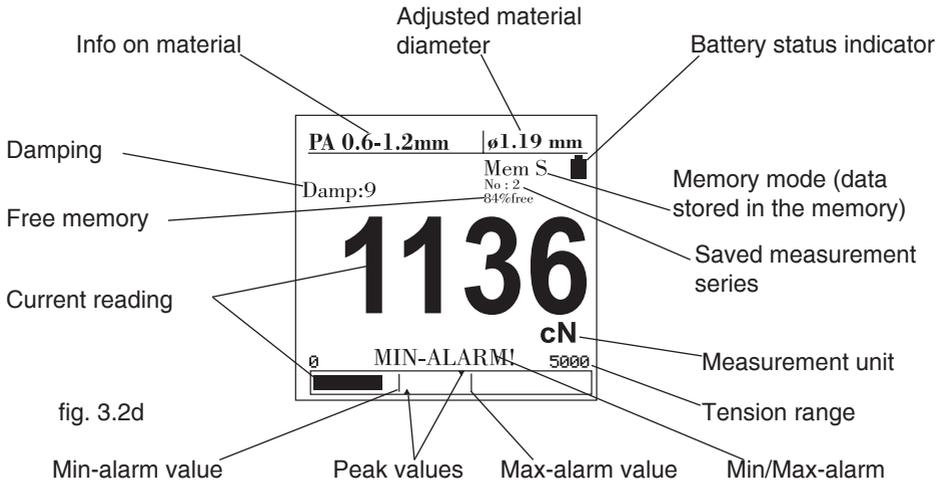
- | | | | |
|---|-------------------------------|----|---|
| 1 | Filament guide | 8 | „MEMORY“ key |
| 2 | Guide rollers | 9 | Arrow key |
| 3 | Measuring roller | 10 | „ESC/EXIT“ key |
| 4 | Material to be measured | 11 | „SET/DAMP“ key |
| 5 | Display | 12 | „POWER/ZERO“ key |
| 6 | USB interface/power connector | 13 | Adjustment wheel for material thickness compensator (subject to model or measuring range - otherwise a cover cap is provided) |
| 7 | Thumbpiece | | |

3.2 Operating and display elements

Numeric display

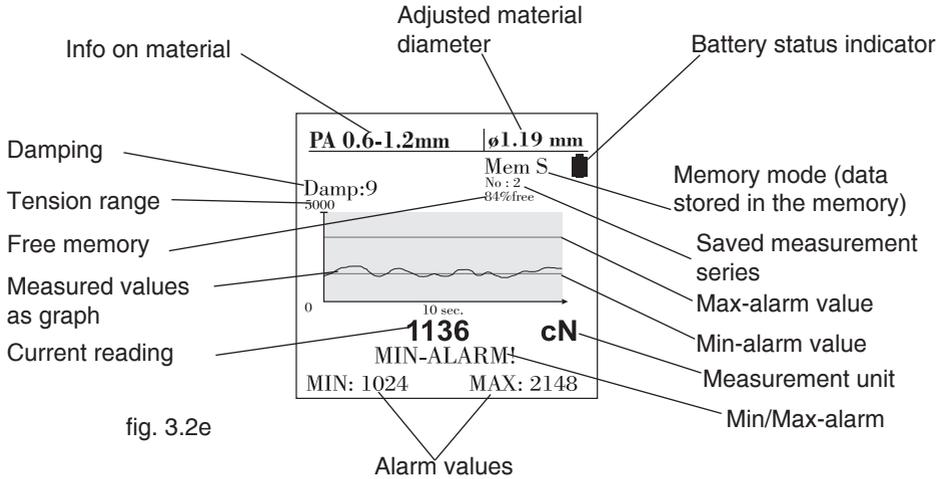


Display with bargraph



3.2 Operating and display elements

Graphic display



- i** The Y-axis can be scaled with the ▲ and ▼ buttons.
3 Scalings: total measuring range, set limits range plus approx. 1/3 of Max-alarm value and minus approx. 1/3 of Min-alarm value, if limit values are entered and the damping is not activated.
With the ◀ or ▶ button the X-axis can be scaled. The setting range is 0.5 to 60 sec.
The scaling can also be changed during the measurement, whereby values already displayed are deleted when the X-axis is changed.

3.3 Setup

The tension meter is delivered with a built-in rechargeable LiPo battery, which has been charged at the factory. The tension meter can only be switched on if the battery is still working, i.e. if the battery has enough charge. If the instrument does not power up or if the battery level indicator shows only one bar  after power-up (chapter 3.3.2), the battery needs to be recharged.



To ensure maximum battery life, avoid discharging it completely or charging it frequently for short periods. The battery should not be stored for a extended period of time when empty. After a maximum storage period of one year, the battery has to be recharged.

3.3.1 Charging the battery



The battery can only be charged at a temperature between +5 °C and +45 °C. Before you connect the AC adapter, verify that the supply voltage is correct (100 V - 240 V).

Hans Schmidt & Co. GmbH provides no warranty or liability for any damage resulting from the use of AC adapters from other manufacturers.

To charge the battery, remove the rubber stopper from the USB interface. Then connect the cable of the AC adapter to the USB output.

The battery can also be charged by connecting the USB cable to a PC.

When the battery is fully charged, the battery level indicator will show 5 bars .

The charging time is approx. 3 ½ hours (using the AC adapter).



Battery overcharging is not possible

3.3.2 Switching the tension meter on

Press and hold the  button (for approx. 1 sec.) until the display shows the measuring range, the software and hardware versions, e.g. E 1.0, and then “0”.

During startup, the tension meter performs an automatic zero adjustment. If the tension meter does not display zero, perform a manual zero adjustment procedure (chapter 3.5.2).

Holding the  button makes the display freeze so that you can read the measuring range and the software and hardware versions.



While switch-on the tension meter, make sure not to move it. Otherwise, the automatic zero adjustment will be faulty.

3.3.3 Switching the tension meter off

Automatic switch-off (if enabled):

- After an idle period of 3 minutes, the tension meter switches off.

Manual switch-off:

- Press and hold the  button for 5 seconds.

3.4 Tension meter settings

Thumbpiece positions

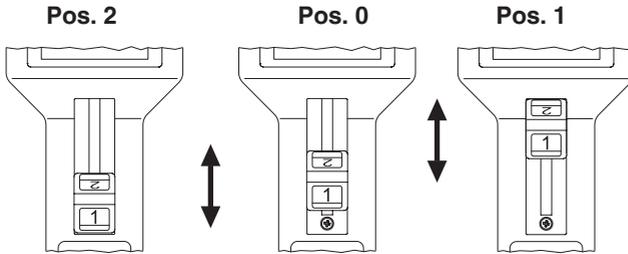


fig. 3.4

2 = Measurement position

0 = Adjustment position

1 = Threading position (guide rollers in their forward position)



Menu settings can be changed with the thumbpiece in Pos. 0 (Adjustment position). To perform measurements the thumbpiece must be in the measurement position 2.

Tension meter settings

- Press the **ESC**/**EXIT** and **SET**/**DAMP** buttons simultaneously to access the main menu.
- The **▲** and **▼** buttons can be used to select the various menu items of the main menu, the submenus and the settings menus.
- Press the **▶** button to open the selected menu; by pressing the **◀** or **ESC**/**EXIT** button you can close the menu without saving changes.
- In menus with multi-digit fields (e.g. date) use the **◀** and **▶** buttons to move forward and backward between digits.
- Press the **SET**/**DAMP** button to save the settings and exit the settings menu or press the **ESC**/**EXIT** button to exit the current menu without saving.
- To exit the main menu press the **ESC**/**EXIT** button.

3.4 Tension meter settings

| Main Menu | Submenu | Settings Menu | Description |
|-----------------------|-----------------|---|--|
| Material | [1] to [11] | | Chapter 3.4.1 Material-Set-up |
| Cal. Adjustment | — | [- 10 %] - [+ 10 %] | Chapter 3.5.6 |
| Display (chapter 3.2) | — | [numeric] [Bargraph] [Graphic] | <ul style="list-style-type: none"> Measured value displayed as number and alarm monitoring Measured value displayed as number, bar graph trend display and alarm monitoring Measured value displayed as graphical trend, measured value/limit values as numbers |
| Alarms | — | [ON] , [OFF] | <p>Activate/deactivate the alarm for all calibrations.</p> <p>The alarm of a material characteristic is only active if the [Alarm] menu item in Material Setup is activated as well.</p> |
| Peak Display | | [ON], [OFF] | Activate/deactivate the peak values in the bar graph display. |
| Settings | Tension Unit | [cN] , [N], [lb], [g], [kg] | Set the measurement unit. The available units may vary depending on the measuring range of the device. |
| | Diameter Unit | [mm] , [inch] | To select between mm and inch. |
| | Contrast | [0] - [10] | To adjust the contrast |
| | Backlight | [ON], [OFF], [AUTO] | Switch the display light on or off. With the AUTO setting, the light switches on and off automatically depending on the ambient light. |
| | Brightness | [1], [2] , [3] | Set the display brightness. |
| | Screen Rotation | [0°], [90°], [180°]; [270°], [AUTO] | To set the display orientation to be fixed or to automatically adapt to the current orientation of the device. |
| | Auto Power Off | [ON] , [OFF] | Toggle the „Auto Power off“ function on and off. |
| | Language | [EN] , [DE] | Select between the english and german user language. |
| | Date/Time | [Time], [Date], [Timeformat] | Set the time, date, and date/time format. |
| | Password | [0000] - [9999] | Chapter 3.4.2 |
| | Factory reset | | Reset to the factory settings. |
| | Wi-Fi Setup | | Chapter 3.1.2 |
| Memory Settings | Memory Mode | [S] , [C], [F], [H], [D] | Chapter 3.7 |

Factory settings are illustrated bold

3.4.1 Material menu

In the material menu you can make the settings for the selected material characteristics and perform the calibration. To perform the calibration, the weights for the selected calibration points must be available.

| Material Setup | Submenu | Settings Menu | Description |
|---|-------------|---|--|
| No. of the characteristic material curve 1 - 11 | — | [character], [numbers], [special character] | to enter a name for the selected material characteristic. The name can also been adjusted by using the provided software |
| Damping | — | [1] - [9]; [5] | Chapter 3.5.4 |
| Alarms | — | [ON] , [OFF] | To activate or deactivate the alarm function for the material characteristic. |
| High limit | — | [0000] - [9999] | If the set limit value is exceeded, the display reads Max-alarm. |
| Low limit | — | [0000] - [9999] | If the value falls below the set limit value, the display reads Max-alarm. |
| Calibration (chapter 3.6.1) | Start | | To perform a calibration, follow the instructions shown on the display. |
| | Cal. Points | between [10 %] and [100 %] of the tension range | Set three calibration points for which a calibration should be performed. |
| | Weights | [cN/daN] [g/kg] | Set the unit of the calibration weights used. |

Factory settings are illustrated bold

3.4.2 Password

By setting a password, you can block the access to some menu parts for unauthorized users:

0000 All menus are accessible.

0001 - 0999 The Material, Cal. Adjustment, Settings, and Memory Settings menus are locked

1000-9999 The entire menu is locked.



To apply a changed password, exit the main menu.

Entering 0000 as the password disables the password feature.

If you forgot the password, please contact Hans Schmidt & Co GmbH to request the master password. As an alternative, you can perform a factory reset. Please note, that in this case, you will lose any customer-defined calibrations.

3.4.3 Factory reset

A factory reset resets the tension meter to its original manufacturer settings. This procedure will delete all settings, including any customer-defined material characteristics (calibrations); the factory calibration, however, will be kept.



Customer calibrations will be deleted.

3.5 Operation procedure

Requirements:

- Switch the tension meter on (chapter 3.3)
- Define the required tension meter settings (chapter 3.4)
- Select the desired material characteristic (chapter 3.4.1)
- Set the material thickness compensator (chapter 3.5.1), if equipped
- Bring the tension meter into the desired measuring position and carry out a zero adjustment as described in chapter 3.5.2, if required.

3.5.1 Material thickness compensator

(only for devices with thumbwheel)

The 3-roller-system for tension measurement relies on the displacement of the middle roller (measuring roller) to give an indication of the line tension. As the material thickness changes, there will be a change in the tension reading, even when the line tension has not changed. To compensate for this effect, high-range instruments are usually equipped, as necessary, with a material thickness compensator, which automatically shifts the outer rollers. To adapt the tension meter to the diameter of the material to be measured, push the thumbpiece into the adjustment position "0" (chapter 3.5.3) and pull the thumbwheel of the material thickness compensator backward to the adjustment position (fig. 3.5.1). Turn it clockwise or anti-clockwise until the desired diameter, such as $\varnothing 0.26 \text{ mm}$, appears in the upper right part of the display. Then push the thumbwheel of the material thickness compensator back to the measurement position (fig. 3.5.1). If you set a diameter that has not been calibrated for the selected material characteristic, the set diameter is displayed with a black background color, e.g. $\varnothing 0.26 \text{ mm}$.

The tension meter can be used anyhow, but please note, that depending on the material

to be measured, slight deviations in the measured values might occur.

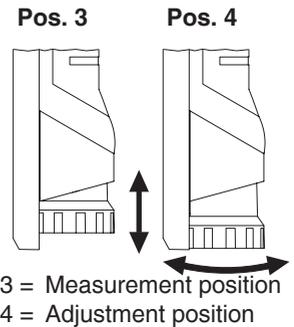


fig. 3.5.1



If you rotate the thumbwheel while the thumbpiece is in position 2 (measuring position fig 3.4), the reading on the display will be updated, but the value will not be used by the instrument to determine the tension – false measurement!

The maximum material thickness you can set is 2.50 mm. Setting a higher diameter can damage the tension meter.

3.5.2 Zero adjustment of the measurement position

Each time the measurement position is changed, the tension meter will automatically perform a zero adjustment.



If the tension meter does not display zero in its measuring position, perform a manual zero adjustment procedure.

For this purpose, no material to be measured must have been inserted yet!

Requirements:

- The tension meter has been switched on as described in chapter 3.3.2.

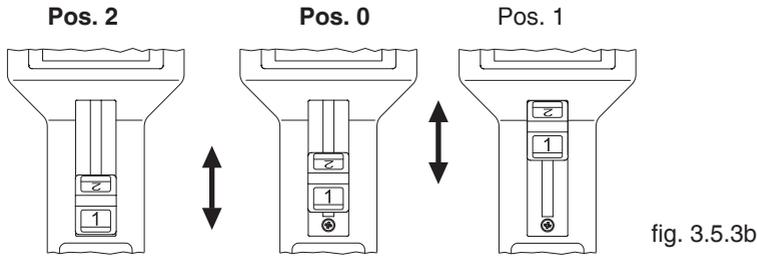
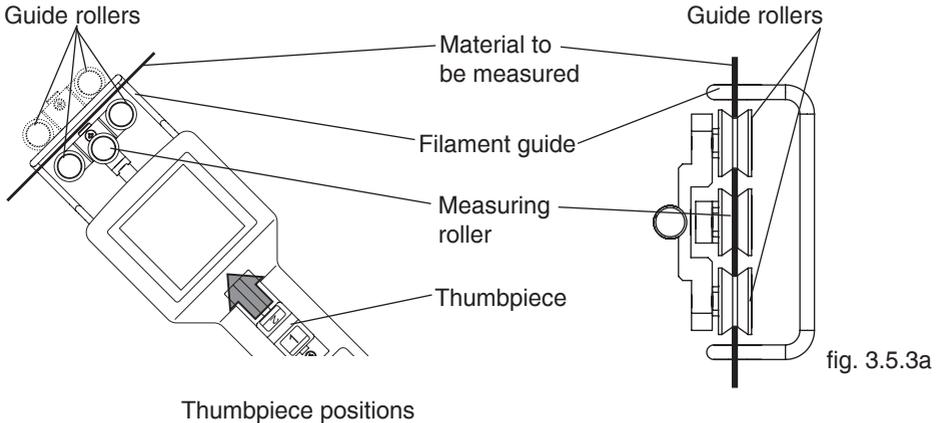
To carry out zero adjustment:

- Bring the tension meter into the desired measuring position and make sure not to move it.
- Press the  button.

The display momentarily shows  and then switches to .

The tension meter is now adjusted to its new measuring position and ready to take measurements.

3.5.3 Inserting and removing material to be measured



- 2 = Measurement position
- 0 = Adjustment position
- 1 = Thread in position (the guide rollers extend forward)

Inserting the material to be measured:

- Push the thumbpiece in the direction of the arrow into its threading position 1 (fig. 3.5.3a) until the outer guide rollers extend beyond the filament guide.
- Position the material to be measured into the tension meter in such a way that it contacts the Filament guide and passes between the outer rollers and the middle measuring roller (fig. 3.5.3a).
- **Slowly** move the thumbpiece back into the adjustment position (fig. 3.5.3b). It is important to ensure that the material to be measured runs smoothly between the measuring roller and the guide rollers.
- Push the thumbpiece into the measuring position 2 (fig. 3.5.3b).
- The display shows the measured tension value.



If the thumbpiece is not in position 2, a corresponding message is issued on the display. If the thumbpiece is not locked, faulty measurements might result.



fig. 3.5.3c

3.5.3 Inserting and removing material to be measured (cont.)

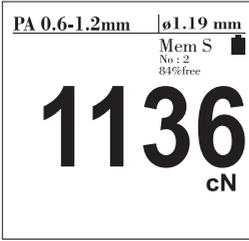


fig. 3.5.3d
Numerical Display



fig. 3.5.3e
Display with bargraph

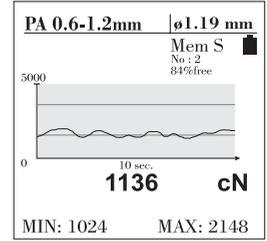


fig. 3.5.3f
Graphical Display



Press the ▲ and ▼ button simultaneously to change the different display modes during the working mode.



Do not let the thumbpiece snap back as this could affect the calibration and damage the instrument.

While measuring the thumbwheel of the material thickness compensator must be set to the measurement position, so that the material diameter is not altered inadvertently.

If you rotate the thumbwheel while the thumbpiece is in position 2 (measuring position), the reading on the display will be updated, but the value will not be used by the instrument to determine the tension – false measurement!

To remove the material to be measured:

- Push the thumbpiece in the direction of the arrow into its threading position 1 (fig 3.5.3b).
- Remove the material to be measured.
- **Slowly** set back the thumbpiece into the adjustment position 0 (fig. 3.5.3b).

3.5.4 Damping

Feature to be used for tensions that vary strongly

In the Damping menu (chapter 3.4.1), you can specify separate damping factors for each material characteristic. Back in the display mode, press the  button to activate or deactivate the damping function. This is recommended if the displayed values vary strongly. Press the  button to increase the damping value or the  button to decrease it.

i Changes made to the damping factor using the arrow keys are not saved permanently in the material characteristic. If you disable the damping feature or select a different material characteristic, the damping factor will be reset to the value originally saved for the material characteristic.

The factory setting for the damping factor is 5. The average shown on the display is calculated as follows:

$$\frac{5 \text{ old measured values} + 4 \text{ new measured values}}{9}$$

Damping can be changed in 9 steps from 01 = low damping:

$$\frac{1 \text{ old measured value} + 8 \text{ new measured values}}{9}$$

to 9 = high damping:

$$\frac{8 \text{ old measured values} + 1 \text{ new measured value}}{9}$$

3.5.5 Using the alarm function

Requirements:

In the Material Setup menu, make sure that the Min and Max limit values have been set for each material characteristic.

The limit value alarm can be enabled in the main menu.

3.5.6 Calibration adjustment

By performing a calibration adjustment, you can adjust a material characteristic calibrated for a particular material to a different material or diameter without creating a new material characteristic.

Requirements:

- Prepare the measuring setup as shown in fig. 3.5.6a.
- Make sure that the thumbpiece is in the adjustment position (chapter 3.5.3).
- Set the material thickness as described in chapter 3.5.1.
- Select the desired material (chapter 3.4.1).
- Move the tension meter into the desired measuring position and carry out a zero adjustment, if required.

Adjusting:

- Select the „Cal. Adjustment“ menu item from the main menu (fig. 3.5.6b)
- Insert the material to be measured (chapter 3.5.3) and push the thumbpiece into the measuring position.
- Press the ▲ or ▼ key to perform the calibration adjustment until the value on the display corresponds to the weight suspended to the material.
The adjustment can be performed in 1 % steps within the range from +10 % to -10 %.
- Press the  button to save the determined value.

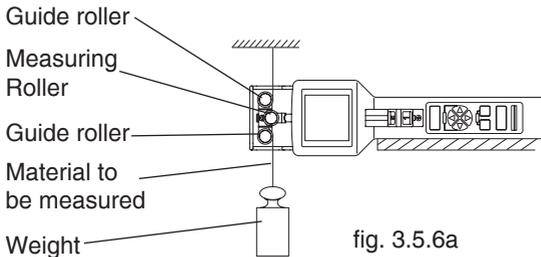


fig. 3.5.6a

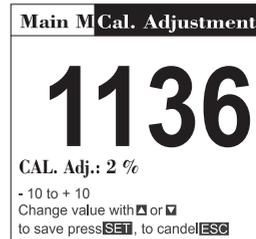


fig. 3.5.6b



Please note that this is a general value. So determine it separately for each material characteristic and note it down for later reference. It is not possible to save it per material characteristic.

To disable calibration adjustment, reset the value to 0 % in the „Cal. Adjustment“ menu.

3.5.7 Peak value

During a measurement cycle, the tension meter automatically calculates the Peak Minimum and Peak Maximum values. If these values should not be displayed in the bar graph or in the statistics, disable their display in the main menu. Regardless, the Peak values will be used and shown always in the software »Tension Inspect 3«.

3.6 Creating a material characteristic

The tension meter has been calibrated on material 1 and material 2 according our SCHMIDT procedure for a vertical material path and cannot be deleted or overwritten. The the materials and diameters are given in chapter 2. Factory calibrations using customer supplied materials follow the same procedure. In this case, however, the calibration on Schmidt material 1 and 2 is omitted

1 • The material characteristics 1 and 2 have been preset in the factory and cannot be overwritten. For these material characteristics, you can only change the damping factor, the alarm function setting, and the limit values.

3.6.1 Calibration procedure

Calibrations of the tension meter are performed according to the SCHMIDT factory procedure using weights that correspond to 10 %, 50 %, and 90 % of the measuring range. In 95 % of all industrial applications, the SCHMIDT calibration has been proven to provide the best results. In particular, it is suitable for comparative purposes. If the material to be measured differs significantly from the SCHMIDT calibration material in material type, diameter, rigidity, shape, etc., we recommend to perform a calibration using customer-supplied material. In addition to the two factory-preset materials, you can save up to 9 additional materials.

1 • The material thickness unit used for the calibration is the same as currently selected in the „Settings menu“. It is not possible to overwrite the factory calibrations.

Calibration Units and Calibration Points

- You can select Newton or Kilogram as the unit of the calibration weights.
- For the calibration of the tension meter, three calibration weights are used. For example, if you select 10 %, 40 %, 70 % for the calibration, the weights must correspond to 10 %, 40 %, and 70 % of the measuring range. In this example, you need the following weights for the DTX-1000:
Calibration in Newton: 100 cN, 400 cN, and 700 cN
Calibration in Kilogram: 100 g, 400 g, and 700 g

1 • The measured values are displayed in the unit set in the „Settings“ menu, independent from the unit that was used to calibrate the material characteristic. So that they are available when you verify the calibration later or repeat the calibration after a factory reset.

e. g.

| Material to be measured | Unit | Calibration points | Ø 1 | Ø 2 |
|-------------------------|------|--------------------|--------|--------|
| Steel wire | cN | 10 %, 30 %, 50 % | 0.4 mm | 0.6 mm |

3.6.1 Calibration procedure (cont.)

Requirements:

- The thumbpiece must be in the adjustment position (fig. 3.5.3b).
- The material thickness compensator (if existing) must be set to the adjustment position (chapter 3.5.1)
- The unit for the material thickness must have been set (chapter 3.4)

To perform the calibration procedure

- Select a new material or edit an existing one (by re-entering the values) from the „material“ menu.
- Enter a designation (you can use the software supplied with the tension meter alternatively).

Vertical calibration (standard for SCHMIDT calibrations)

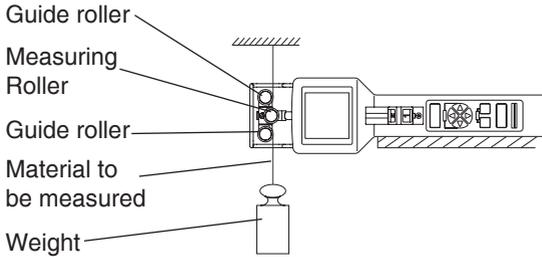


fig. 3.6.1

i While performing the calibration, the tension meter must be fixed in such a way that the material to be measured runs smoothly between the guide rollers and the measuring roller.

i The display gives detailed information on the calibration.

In the „Material“ menu, select Calibration.



Step 1:

Set the calibration points and weights, e.g. in Newton using the calibration points 10 %, 50 %, and 90 % of full scale

Start: Select the Start menu item.

Alternative calibration points: 10 %, 40 %, 70 % 10 %, 30 %, 60 %
10 %, 30 %, 50 % 10 %, 20 %, 40 %
10 %, 40 %, 90 % 10 %, 60 %, 90 %
10 %, 60 %, 100 %

We recommend to use the 10 %, 50 %, 90 % setting for an initial calibration. If the measured values are not accurate enough when you check the calibration, repeat the calibration using other calibration points.

We recommend that you align the middle of the tension range to be measured with the middle calibration point.

3.6.1 Calibration procedure (cont.)

| Mai | Mat | Mat | Calibration |
|--|-----|-----|-------------|
| Diameter 1 | | | |
| 0.66 mm | | | |
| Adjust diameter to material thickness to save press ESC , to return ESC | | | |

Step 2:

Set the diameter

This step is only required for tension meters with a material thickness compensator

| Mai | Mat | Mat | Calibration |
|--|-----|-----|-------------|
| Zeropoint | | | |
| 4472 | | | |
| Place instrument to cal. pos., wait for stable readings to save press ESC , to return ESC | | | |

Step 3:

Perform a zero adjustment with the tension meter in its measuring position

| Mai | Mat | Mat | Calibration |
|---|-----|-----|-------------|
| Point 1: 10% Diameter 1 Weight: 100 cN 4665 | | | |
| Insert sample, hang weight 1 wait for stable readings to save press ESC , to return ESC | | | |

Step 4:

Calibrate calibration point 1

Insert material to be measured

| Mai | Mat | Mat | Calibration |
|--|-----|-----|-------------|
| Point 2: 40% Diameter 1 Weight: 400 cN 4783 | | | |
| hang weight 2 wait for stable readings to save press ESC , to return ESC | | | |

Step 5:

Calibrate calibration point 2

| Mai | Mat | Mat | Calibration |
|--|-----|-----|-------------|
| Point 3: 70% Diameter 1 Weight: 700 cN 5012 | | | |
| hang weight 3 wait for stable readings to save press ESC , to return ESC | | | |

Step 6:

Calibrate calibration point 3

| Mai | Mat | Mat | Calibration |
|--|-----|-----|-------------|
| ESC to save and exit SET to continue with second diameter | | | |

Step 7:

Exit the calibration process or calibrate a second diameter. In this case, continue with step 2.

1 By calibrating a second diameter, you can define a material thickness range to be used for the material, e.g. 0.1 - 0.3 mm. Therefore the tension meter can be used for a diameter range instead of a specific diameter only



Once you have completed the calibration, make sure to verify it as described in chapter 3.6.2. In case of a large deviation, repeat the calibration or select different calibration points.

3.6.2 Verifying the calibration

When verifying the calibration, make sure to select the same material, calibration position and calibration points as used for creating the associated material characteristic. Otherwise, the precision of the measurements will not be sufficient.

The tension meter has been calibrated on material 1 and material 2 according our SCHMIDT procedure for a vertical material path and cannot be deleted or overwritten. The diameters and materials are given in chapter 2. Calibrations of the tension meter are performed according to the SCHMIDT factory procedure using weights that correspond to 10 %, 50 % and 90 % of the measuring range.

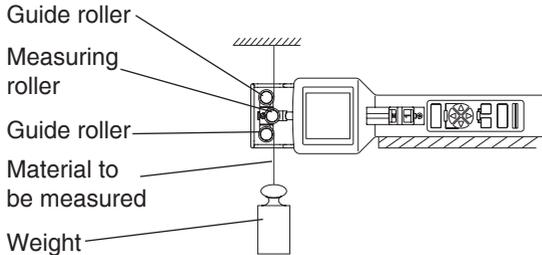


fig. 3.6.2

- Attach a weight vertically to the material to be measured that corresponds to the tension to be measured (make sure to select the correct unit). The weight must hang freely. (Always use a fresh portion of the material to be measured.)
- Insert the material as described in chapter 3.5.3.



Do not let the thumbpiece snap back as this could affect the calibration and damage the instrument.

- Before verifying the calibration, move the instrument slowly up and down to compensate for any mechanical friction losses and thus ensure repeatability of the measurements.
- The tension value shown on the display should be equal to the mass of the suspended weight.

If the verification of the calibration shows a deviation beyond the allowable tolerance so that reliable operation is no longer possible, the instrument needs to be re-calibrated or returned to the factory for repair.

3.7 Memory functions

The tension meter is delivered with 4 different memory modes. You can store up to 255 measurement series at one or more machine positions. The tension meter can store up to 60000 measured values.

All saved measured values and statistic datas can be transferred to a PC (for further processing, e.g. in Excel). For this purpose, use the software supplied with the tension meter.

Recall of memory: The display only shows the last measured value, the average, the minimum and maximum measured values, the peaks, the standard deviation and the number of measured values per measurement series.

By pressing the  button you can transfer all data from the selected measurement series to a PC.

You can select the desired memory programs from the main menu.

Memory mode “S” – standard

Data is recorded during a user-defined period.

The system will only determine and save statistical values.

Memory mode “H” – hold, freeze display

The last max. 128 values are saved. In graphical mode, you can freeze the display and thus view the course of the tension values after completion of the measurement. The system will determine statistical values and save them together with the measured values. Peak values are not determined.

Memory mode “C” – continuous

Data is recorded during a user-defined period (min. 10 sec, max. 8 h 20 min). The system will acquire 2 measured values/sec, determine statistical values, and save them for each measurement series together with the measured values.

Memory mode “F” - fast

Data is recorded during a user-defined period (min. 1 sec, max. 60 sec). The system will acquire 1000 measured values/sec, determine statistical values, and save them for each measurement series together with the measured values.

Memory mode „D“ - on demand

Recording single readings by the operator instigation.

Statistical values and readings will be saved for only one measurement series.

1 Changing to another memory mode will delete any saved data. When you select the memory mode, a corresponding message is displayed. The selected memory mode and the saved data will be kept even after switching off the tension meter.

3.7.1 Selecting the memory mode

Requirements:

- The tension meter has been switched on as described in chapter 3.3.2.
- Open the menu by pressing the **ESC** **EXIT** and **SET** **DAMP** buttons simultaneously and select Memory Settings.
- Select the desired memory mode in the user navigation.



If the memory already contains data, a message will inform you that the data will be deleted.

3.7.2 Memory mode “S” – standard

3.7.2.1 Saving data

Requirements:

- In the main menu, select „Memory Settings“ and then memory mode “S”.

To save the first measurement series:

- Press the **MEMORY** button to start recording the measured values.
- While recording is in process, “Rec S” flashes on the display.
- Press the **MEMORY** button again to stop recording.

The data is saved automatically (the display shows “Mem S”, the memory position and the free memory space).



fig. 3.7.2.1



To abort data recording, press the **ESC **EXIT** button. This stops the procedure. No data will be saved.**

To save more measurement series:

- Press the **MEMORY** button to start recording the measured values.
- While recording is in process, “Rec S” flashes on the display.
- Press the **MEMORY** button again to stop recording.

The data is saved automatically (the display shows “Mem S”, the memory position, and the free memory space)

3.7.2.2 Displaying the saved measured values

- Press the ◀ and ▶ buttons simultaneously to display the saved data.
- The ▼ and ▲ buttons allow you to switch between the various measurement series.

The display will only show statistical values:

- Number of batch (file)
- Name of the material to be measured
- Date and time of the measurement series
- Last reading
- Average
- Max
- Min
- Peak Max
- Peak Min
- Standard deviation (Std dev)
- Number of measured values (records)

By pressing the  button, you can send the statistical data from the selected measurement series to a PC. For this purpose, a suitable communication program, such as Terminal, must be installed on the PC (chapter 4.3).

3.7.2.3 Displaying the saved measured values on a PC

The SCHMIDT software »Tension Inspect 3« is supplied with the tension meter. It allows you to easily and accurately analyze the saved measured values and export them to an Excel table.

Sample memory printout

| | | |
|--------------------------|--------------------|-----------|
| 17.10.2016 11:37 | DTX-Series 1000 cN | Unit : cN |
| Material: CU 0.25-0.4mm | | |
| Start: 11:32:30 17.10.16 | | |
| Stop: 11:32:38 17.10.16 | | |
| Last: 233 | | |
| Avg: 236 | | |
| Max: 244 | | |
| Min: 219 | | |
| Std dev: 6 | | |
| Peak Max: 535 | | |
| Peak Min: 45 | | |
| Hi-Alarm: 850 | | |
| Lo-Alarm: 150 | | |
| Records: 16 | | |

3.7.2.4 Deleting the saved measured values

If data is saved in the tension meter, the display shows “Mem” and indicates the free memory space.

3.7.2.4 Deleting the saved measured values (cont.)

Deleting data:

- Press the ◀ and ▶ buttons
- Then press the  button and confirm with the  button.
This clears the memory.

3.7.3 Memory mode “H”

The last max. 128 values are saved. In graphical mode, the display freezes so that you can view it after completion of the measurement. In numerical mode, the last measured value is displayed.



This memory mode does not record Peak values.

3.7.3.1 Saving data

Requirements:

- In the main menu, select „Memory Settings“ and then memory mode H.
- Set the X-axis as described in chapter 3.2

To save the first measurement series:

- Press the  button to freeze the recording of the measured values.

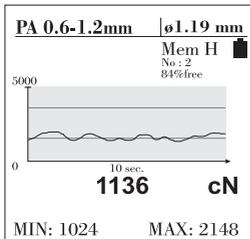


fig. 3.7.3.1

If you recorded less than 128 measured values, you can continue recording by pressing the  button. If the graphics window is full, its contents will be shifted to the left and you can only freeze the last 128 measured values.

- To save the graphics and measured values for later evaluation, press the  button.
This returns the tension meter to measuring mode.
- If you press the  or  button, no data will be saved and the tension meter returns to measuring mode.

3.7.3.2 Displaying the saved measured values

- Press the ◀ and ▶ buttons simultaneously to display the saved data.
- The ▼ and ▲ buttons allow you to switch between the various measurement series.

The display will only show statistical values:

- Number of batch (file)
- Name of the material to be measured
- Date and time of the measurement series
- Last reading
- Average
- Max.
- Min.
- Standard deviation (Std dev)
- Number of measured values (records)

The measuring values can be shown as a graph by pressing ▶

By pressing the  button, you can send all data from the selected measurement series to a PC. For this purpose, a suitable communication program, such as Terminal, must be installed on the PC (chapter 4.3).

3.7.3.3 Displaying the saved measured values on a PC

The SCHMIDT Software »Tension Inspect 3« is supplied with the tension meter. It allows you to easily and accurately analyze the saved measured values and export them to an Excel table.

Sample memory printout

| 17.10.2016 12:22 | DTX-Series 1000 cN | Unit cN |
|--------------------------|--------------------------|--------------------------|
| Material: CU 0.25-0.4mm | Material: CU 0.25-0.4mm | Material: CU 0.25-0.4mm |
| Start: 12:15:44 17.10.16 | Start: 12:16:21 17.10.16 | Start: 12:17:20 17.10.16 |
| Stop: 25 sec | Stop: 25 sec | Stop: 25 sec |
| Last: 207 | Last: 246 | Last: 272 |
| Avg: 231 | Avg: 235 | Avg: 234 |
| Max: 321 | Max: 313 | Max: 333 |
| Min: 134 | Min: 140 | Min: 137 |
| Std dev: 34 | Std dev: 31 | Std dev: 39 |
| Peak Max: 0* | Peak Max: 0 | Peak Max: 0 |
| Peak Min: 0* | Peak Min: 0 | Peak Min: 0 |
| Hi-Alarm: 850 | Hi-Alarm: 850 | Hi-Alarm: 850 |
| Lo-Alarm: 150 | Lo-Alarm: 150 | Lo-Alarm: 150 |
| Records: 128 | Records: 128 | Records: 128 |
| 211 | 195 | 184 |
| 246 | 278 | 285 |
| 231 | 186 | 200 |
| 219 | 279 | 284 |
| 266 | 223 | 202 |
| 186 | 260 | 285 |
| 293 | 223 | 201 |
| 182 | 278 | 307 |
| 208 | 189 | 178 |

*Peak are not recorded; therefore 0 in the printout

3.7.3.4 Deleting the saved measured values

If data is saved in the tension meter, the display shows "Mem" and indicates the free memory space.

Deleting data:

- Press the ◀ and ▶ buttons
- Then press the  button and confirm with the  button.
This clears the memory.

3.7.4 Memory mode “C”

Data is recorded during a user-defined period. The tension meter records 2 measured values/sec.

3.7.4.1 Saving data

Requirements:

- In the main menu, select „Memory Settings“ and then memory mode C.

To save the first measurement series:

- Press the **MEMORY** button to start recording the measured values.
- While recording is in process, “Rec C” flashes in the display.
- Once the set time has elapsed, no more data will be saved (the display shows “Mem C”, the memory position and the free memory space).
- If you press the **MEMORY** button before the set time has elapsed, no more data will be saved. The data is saved automatically (the display shows “Mem C”, the memory position and the free memory space)



fig. 3.7.4.1



To abort data recording, press the **ESC EXIT** button.
This deletes the procedure. No data will be saved.

To save more measurement series:

- Press the **MEMORY** button to start recording the measured values.
- While recording is in process, “Rec C” flashes in the display.

3.7.4.2 Displaying the saved measured values

- Press the ◀ and ▶ buttons simultaneously to display the saved data.
- The ▼ and ▲ buttons allow you to switch between the various measurement series.

3.7.4.2 Displaying the saved measured values (cont.)

The display will only show statistical values:

- Number of batch (file)
- Name of the material to be measured
- Date and time of the measurement series
- Last reading
- Average
- Max.
- Min.
- Peak Max.
- Peak Min.
- Standard deviation (Std dev)
- Number of measured values (records)

The measuring values can be shown as graph by pressing ►

By pressing the  button, you can send all data from the selected measurement series to a PC. For this purpose, a suitable communication program, such as Terminal, must be installed on the PC (chapter 4.3).

3.7.4.3 Displaying the saved measured values on a PC

The SCHMIDT software »Tension Inspect 3« is supplied with the tension meter. It allows you to easily and accurately analyze the saved measured values and export them to an Excel table.

Sample memory printout

| 17.10.2016 12:29 | DTX-Series 1000 cN | Unit cN |
|--------------------------|--------------------------|---------|
| Material: CU 0.25-0.4mm | Material: CU 0.25-0.4mm | |
| Start: 12:22:19 17.10.16 | Start: 12:24:05 17.10.16 | |
| Stop: 12:22:24 17.10.16 | Stop: 12:24:10 17.10.16 | |
| Last: 236 | Last: 238 | |
| Avg: 233 | Avg: 234 | |
| Max: 241 | Max: 243 | |
| Min: 221 | Min: 218 | |
| Std dev: 6 | Std dev: 8 | |
| Peak Max: 534 | Peak Max: 577 | |
| Peak Min: 42 | Peak Min: 36 | |
| Hi-Alarm: 850 | Hi-Alarm: 850 | |
| Lo-Alarm: 150 | Lo-Alarm: 150 | |
| Records: 10 | Records: 10 | |
| | 235 | 240 |
| | 237 | 243 |
| | 241 | 241 |
| | 237 | 241 |
| | 233 | 239 |
| | 225 | 232 |
| | 221 | 222 |
| | 230 | 218 |
| | 208 | 189 |

3.7.4.4 Deleting the saved measured values

If data is saved in the tension meter, the display shows “Mem” and indicates the free memory space.

Deleting data:

- Press the ◀ and ▶ buttons
- Then press the  button and confirm with the  button.
This clears the memory.

3.7.5 Memory mode “F”

Data is recorded during a user-defined period. The tension meter records 1000 measured values/sec

3.7.5.1 Saving data

Prerequisites:

- In the main menu, select „Memory Settings“ and then memory mode F.

To save the first measurement series:

- Press the  button to start recording the measured values.
- While recording is in process, “Rec F” flashes in the display.
- Once the set time has elapsed, no more data will be saved (the display shows “Mem F”, the memory position, and the free memory space).
- If you press the  button before the set time has elapsed, no more data will be saved. The data is saved automatically (the display shows “Mem F”, the memory position and the free memory space)



To abort data recording, press the  button.
This deletes the procedure. No data will be saved.

To save more measurement series:

- Press the  button to start recording the measured values.
- While recording is in process, “Rec F” flashes in the display.

3.7.5.2 Displaying the saved measured values

- Press the ◀ and ▶ buttons simultaneously to display the saved data.
- The ▼ and ▲ buttons allow you to switch between the various measurement series.

The display will only show statistical values:

- Number of batch (file)
- Name of the material to be measured
- Date and time of the measurement series
- Last reading
- Average
- Max
- Min
- Peak Max.
- Peak Min.
- Standard deviation (Std dev)
- Number of measured values (records)

The measuring values can be shown as graph by pressing ▶

By pressing the  button, you can send all data from the selected measurement series to a PC. For this purpose, a suitable communication program, such as Terminal, must be installed on the PC (chapter 4.3).

3.7.5.3 Displaying the saved measured values on a PC

The SCHMIDT software »Tension Inspect 3« is supplied with the tension meter. It allows you to easily and accurately analyze the saved measured values and export them to an Excel table.

Sample memory printout

| 17.10.2016 12:29 | DTX-Series 1000 cN | Unit cN |
|--------------------------|--------------------------|--------------------------|
| Material: CU 0.25-0.4mm | Material: CU 0.25-0.4mm | Material: CU 0.25-0.4mm |
| Start: 11:38:09 17.10.16 | Start: 11:39:10 17.10.16 | Start: 11:40:12 17.10.16 |
| Stop: 11:38:17 17.10.16 | Stop: 11:39:18 17.10.16 | Stop: 11:40:20 17.10.16 |
| Last: 237 | Last: 221 | Last: 239 |
| Avg: 236 | Avg: 234 | Avg: 235 |
| Max: 246 | Max: 243 | Max: 245 |
| Min: 216 | Min: 217 | Min: 214 |
| Std dev: 125 | Std dev: 115 | Std dev: 120 |
| Peak Max: 570 | Peak Max: 544 | Peak Max: 564 |
| Peak Min: 40 | Peak Min: 44 | Peak Min: 40 |
| Hi-Alarm: 850 | Hi-Alarm: 850 | Hi-Alarm: 850 |
| Lo-Alarm: 150 | Lo-Alarm: 150 | Lo-Alarm: 150 |
| Records: 8000 | Records: 8000 | Records: 8000 |
| | 374 | 229 |
| | 410 | 206 |
| | 438 | 190 |
| | 461 | 189 |
| | 478 | 215 |
| | 489 | 278 |
| | 497 | 355 |
| | 498 | 415 |
| | 492 | 441 |
| | | 385 |
| | | 382 |
| | | 399 |
| | | 410 |
| | | 430 |
| | | 454 |
| | | 466 |
| | | 466 |
| | | 467 |

3.7.5.4 Deleting the saved measured values

If data is saved in the tension meter, the display shows “Mem” and indicates the free memory space.

Deleting data:

- Press the ◀ and ▶ buttons
- Then press the  button and confirm with the  button.
This clears the memory.

3.7.6 Memory mode “D”

Recording single readings by the operator instigation.

3.7.6.1 Saving data

Requirements:

- In the main menu, select „Memory Settings“ and then memory mode D.

Saving:

- By pressing the  button the current reading will be saved.



fig. 3.7.6.1

3.7.6.2 Displaying the saved measured values

- Press the ◀ and ▶ buttons simultaneously to display the saved data.

The display will only show statistical values:

- Number of batch (file)
- Name of the material to be measured
- Date and time of the measurement series
- Last reading
- Average
- Max.
- Min.
- Standard deviation (Std dev)
- Number of measured values (records)

3.7.6.3 Displaying the saved measured values on a PC

The SCHMIDT software »Tension Inspect 3« is supplied with the tension meter. It allows you to easily and accurately analyze the saved measured values and export them to an Excel table.

Sample memory printout

| | | |
|--------------------------|--------------------|-----------|
| 17.10.2018 11:37 | DTX-Series 1000 cN | Unit : cN |
| Material: PA 0.2 mm | | |
| Start: 11:32:30 17.10.18 | | |
| Stop: 11:32:38 17.10.18 | | |
| Last: 233 | | |
| Avg: 230 | | |
| Max: 244 | | |
| Min: 219 | | |
| Std dev: 6 | | |
| Hi-Alarm: 850 | | |
| Lo-Alarm: 150 | | |
| Records: 6 | | |
| | | 219 |
| | | 222 |
| | | 244 |
| | | 234 |
| | | 228 |
| | | 233 |

3.7.6.4 Deleting the saved measured values

If data is saved in the tension meter, the display shows “Mem” and indicates the free memory space.

Deleting data:

- Press the ◀ and ▶ buttons
- Then press the  button and confirm with the  button.
This clears the memory.

4 PC Communication (USB Interface)

 The requirements of the CE specification are only complied with if the tension meter is equipped and operated with connecting cables supplied by Hans Schmidt & Co GmbH. Certification to the CE specification does not extend to, and shall be invalid for any other combination. Under no circumstances shall Hans Schmidt & Co GmbH be held liable for any damage resulting from the use of non-SCHMIDT sensors or cables.

4.1 Installing the USB driver

For data transfer to the PC, you will need a USB driver. If no matching driver is installed on your PC, the Windows Found New Hardware Wizard appears when you connect the unit to the computer for the first time. Follow the wizard steps. Specify the location of the driver on the supplied CD-ROM. You will find the driver in the “Driver” folder.

4.2 The »Tension Inspect 3« program

The »Tension Inspect 3« software from SCHMIDT is described in a separate user manual.

4.3 Terminal program

The contents of the memory can be transferred to a PC using the USB interface of the tension meter.

Connect the DTX to the computer using the USB cable type EK0662 which is supplied with the tension meter.

Prerequisites:

A communication program, such as Terminal, must be installed and configured on the computer.

PC communication commands (polling)

Requesting data:

(data is requested by PC polling)

- The ASCII character "r" is used to transfer the contents of the memory to the PC.

5 Service and maintenance

The tension meter is easy to maintain.

Depending on operating time and load, the instrument should be checked according to the locally valid regulations and conditions (as described in chapter 3.6.2). The use of other test methods than the procedure described in chapter 3.6.2 may cause deviating measuring results.

5.1 Rollers

You should regularly inspect the rollers to assure that they are running easily and smoothly. You can replace the rollers yourself, as necessary. Please indicate the tension meter model and the serial number (given on the rear side of the tension meter) in your spare-parts order.

For example:

To order spare rollers:

Model: DTX-1000 (given on rear side of tension meter)

Serial number: 921 - 888888 (given on rear side of tension meter)

Standard rollers: Model number R592104

Delivery: 1 set (3 pcs.) of spare rollers 2000 m/min, incl. mounting tool
or

Model: DTX-1000-K (given on rear side of tension meter)

Serial number: 921 - 888888 (given on rear side of tension meter)

Code **K** rollers: Model number R592103

Delivery: 1 set (3 pcs.) of spare rollers 3500 m/min, incl. mounting tool

6 Cleaning

For cleaning the unit do not use any



AGGRESSIVE SOLVENTS

such as trichloroethylene or similar chemicals.



NO WARRANTY OR LIABILITY

shall be accepted for damage resulting from improper cleaning.

7 Verification interval

The question of finding the right frequency of calibration accuracy verification depends on several different factors:

- ➔ Operating time and load of the SCHMIDT tension meter
- ➔ Tolerance band defined by the customer
- ➔ Changes to the tolerance band compared to previous calibrations

Therefore, the interval between verifications of calibration must be determined by the user's Quality Assurance Department, based on the user's experience.

Assuming normal operating time and load as well as careful handling of the tension meter, we recommend a verification interval of one year.

8 Correspondence

If you have any questions regarding the instrument or instruction manual or their use, please indicate all the following details which are given on the ID plate:

- 1) Model
- 2) Serial number

9 Repairs

Shipping instructions:

We kindly ask for return free of charge for us, if possible by airmail parcel. All occurring charges, if any (such as freight, customs clearance, duty etc.), will be billed to customer.

For return from foreign countries, we ask you to include a proforma invoice with a low value for customs clearance only, e.g. 50 Euro, each and to advise the shipment in advance by fax or eMail.

1 To avoid unnecessary follow-up questions, and the resulting loss of time or possible misunderstandings, please return the instrument with a detailed fault description to our service department. Please indicate in your order whether you require an Inspection Certificate 3.1 according to DIN EN 10204.

Service address:

**Hans Schmidt & Co GmbH
Schichtstr. 16
D-84478 Waldkraiburg
Germany**

Subject to change without notice!

More than 75 years - Worldwide -

Hans Schmidt & Co GmbH

Mailing address:

P. O. B. 1154
84464 Waldkraiburg Germany

Shipping address:

Schichtstr. 16
84478 Waldkraiburg Germany

Phone:

int. + 49 / (0)8638 / 9410-0

Fax:

int. + 49 / (0)8638 / 4825

int. + 49 / (0)8638 / 67898

e-mail:

info@hans-schmidt.com

Internet:

<http://www.hans-schmidt.com>